

Oracle Utilities
Meter Data Management

User's Guide

Release 2.1.0 Service Pack 3

E41625-03

May 2015

Oracle Utilities Meter Data Management User's Guide

Release 2.1.0 Service Pack 3

E41625-03

May 2015

Documentation build: 5.1.2015 12:48:49 [D2_1430509729000]

Copyright © 2010, 2015, Oracle and/or its affiliates. All rights reserved.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners. Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

Contents

Overview	6
What's New	7
Getting Started	10
About Oracle Utilities Meter Data Management.....	10
Starting the Application.....	11
Understanding the User Interface.....	11
Menus and Navigation.....	11
Oracle Utilities Meter Data Management Menu Options.....	12
360 Degree Search	15
About the 360 Degree Search.....	15
Searching Data Using the 360 Degree Search.....	15
360 Degree View	17
About the 360 Degree View.....	17
Viewing Measuring Component Data Using the 360 Degree View.....	17
Using the Interval-Initial Measurement Overlay Zone.....	19
Using the Final Values Overlay Zone.....	20
Using the Interval - Audit View Zone.....	21
Using the Time Of Use By Day Zone.....	22
Using the Time of Use Overlay Zone.....	23
Using the Time of Use Over Time Zone.....	23
Using the Scalar-Initial Measurement Overlay Zone.....	24
Using the Scalar-Audit View Zone.....	25
Applying Functions.....	26
Viewing Initial Measurement Data for a Measuring Component.....	27
Using the Interval Initial Measurement Lens Zone.....	29
Using the Scalar Initial Measurement Zone.....	30
Viewing Final Measurements for a Measuring Component.....	31
Viewing Device Data Using the 360 Degree View.....	32
Viewing Service Point Data Using the 360 Degree View.....	33
Using the Service Point Consumption History Zone.....	34
Viewing Usage Subscription Data Using the 360 Degree View.....	35
Viewing Contact Data Using the 360 Degree View.....	35
Aggregations	37
About Aggregations.....	37
Base Package Aggregators.....	38
Working with Aggregations.....	38
Creating Aggregations.....	38
Aggregation Search.....	39
Maintaining Aggregations.....	39
Device Management	41
Understanding Devices and Measuring Components.....	41
About Devices.....	41
About Device Configurations.....	42
About Measuring Components.....	42
About Scratchpad Measuring Components.....	43
Working with Scratchpad Measuring Components.....	44
Creating Scratchpad Measuring Components.....	44
Scratchpad Measuring Component Search.....	44
Maintaining Scratchpad Measuring Components.....	45
Manually Adding Register Readings for Scalar Measuring Components.....	45
Usage Management	47
Understanding Usage Management.....	47
About Dynamic Options.....	47
About Dynamic Option Types.....	48
About Dynamic Option Events.....	48
About TOU Maps.....	48
About TOU Groups.....	48

About TOU Map Templates.....	48
About TOU Map Types.....	49
About Usage Subscriptions.....	49
About Usage Subscription Types.....	50
About Usage Transactions.....	51
Working with Dynamic Options.....	53
Creating Dynamic Options.....	53
Dynamic Option Search.....	53
Maintaining Dynamic Options.....	53
Working with Dynamic Option Events.....	54
Creating Dynamic Option Events.....	54
Dynamic Option Event Search.....	54
Maintaining Dynamic Option Events.....	54
Working with TOU Maps.....	55
Creating TOU Maps.....	55
TOU Map Search.....	55
Maintaining TOU Maps.....	55
Working with Usage Subscriptions.....	56
Creating Usage Subscriptions.....	56
Usage Subscription Search.....	57
Maintaining Usage Subscriptions.....	57
Working with Usage Transactions.....	58
Creating Usage Transactions.....	58
Usage Transaction Search.....	58
Maintaining Usage Transactions.....	58
Usage Rule Administration.....	59
Defining Dynamic Option Types.....	59
Defining TOU Groups.....	60
Defining TOU Map Templates.....	60
Defining TOU Map Types.....	61
Defining Usage Subscription Types.....	62
Reports.....	63
About Reports.....	63
About the Device VEE Exceptions Report.....	63
About the Device Events Report.....	64
Working with Reports.....	65
Running Reports.....	65
VEE Rule Administration.....	66
Understanding VEE Rule Setup and Administration.....	66
About VEE Groups.....	66
About VEE Rules.....	66
About VEE Rule Eligibility Criteria.....	68
Base Package VEE Groups and “Utility” Rules.....	68
Base Package VEE Validation Rules.....	72
Duplicate IMD Check.....	73
Final Measurement Validation.....	74
Ensure IMD Exists for Sibling MCs.....	75
High/Low Check.....	76
Interval Replacement Rule.....	80
Interval Size Validation.....	81
Interval Spike Check.....	82
Multiplier Check.....	84
Negative Consumption Check.....	85
Raise Missing Quantity Exception.....	86
Scalar Replacement Rule.....	88
Sum Check.....	89
Unit of Measure Check.....	91
Zero Consumption Check.....	92
Base Package VEE Estimation Rules.....	94
Interval Adjustment from Scalar.....	95
Interval Averaging Estimation.....	98
Interval Interpolation Estimation.....	101
Interval Profile Estimation.....	103
Scalar Calculation from Interval.....	105

Scalar Estimation.....	106
Scalar Profile Estimation.....	109
Scalar Proration.....	111
Working with VEE Groups.....	113
Creating VEE Groups.....	113
VEE Group Search.....	114
Maintaining VEE Groups.....	114
Working with VEE Rules.....	115
Creating VEE Rules.....	115
VEE Rule Search.....	115
Maintaining VEE Rules.....	115
Defining Eligibility Criteria for a VEE Rule.....	116
Usage Rule Administration.....	117
Understanding Usage Groups and Rules.....	117
About Usage Groups.....	117
About Usage Rules.....	117
About Usage Rule Eligibility Criteria.....	118
Base Package Usage Rules.....	119
Apply Math (Interval Data).....	119
Check Existence of Installed Device.....	123
Daily Scalar Usage Rule.....	124
Get Interval Data.....	126
Get Item Counts and Consumption.....	128
Get Scalar Details.....	129
Get TOU Mapped Usage.....	131
Interval Tier Calculation.....	132
Profile Accumulation.....	138
Vector and Service Quantity Math.....	140
Validate Against Tolerance.....	146
Working with Usage Groups.....	148
Creating Usage Groups.....	148
Usage Group Search.....	148
Maintaining Usage Groups.....	149
Working with Usage Rules.....	149
Creating Usage Rules.....	149
Usage Rule Search.....	150
Maintaining Usage Rules.....	150
Defining Eligibility Criteria for a Usage Rule.....	150
Integrations.....	152
Creating Data Extracts using Oracle Utilities DataConnect.....	152
Understanding Oracle Utilities DataConnect Data Extracts.....	152
About Consumption Extract Requests.....	152
About Consumption Extract Request Types.....	153
About Consumption Extract Types.....	153
Working with Consumption Extract Requests.....	155
Searching and Viewing Consumption Extract Requests.....	155
Creating Consumption Extract Requests.....	156
Consumption Extract Administration.....	156
Defining Consumption Extract Request Types.....	156
Defining Consumption Extract Types.....	157
Reference Topics.....	158
Glossary.....	158
Standard Actions for Admin-Level Data Maintenance.....	163
Standard Actions for Data Maintenance.....	164
Viewing and Adding Log Entries.....	165
FAQs.....	166
How Do I...?.....	166
What's the Difference Between ...?.....	167
Can I ...?.....	169

Chapter 1

Overview

This User Guide describes how to work with Oracle Utilities Meter Data Management. This includes:

[Getting Started](#)

[User Documentation](#)

[System Administration](#)

[Reference Topics](#)

[FAQs](#)

This guide contains the same content as the Oracle Utilities Meter Data Management section of the online help.

Chapter 2

What's New

This section outlines the new features in Oracle Utilities Meter Data Management that are documented in this guide.

New Features in Version 2.1.0.3

Feature	For More Information
New usage rules: Interval Tier Calculation: calculates the difference between a source and reference vector, and then breaks that difference into one or more positive or negative tiers Daily Scalar Usage Rule: calculates usage for daily scalar measuring components. Check Existence of Installed Device: checks for the existence of a device installed on the usage subscription's service point for the usage period.	Interval Tier Calculation Daily Scalar Usage Rule Check Existence of Installed Device
Oracle Utilities DataConnect Functionality that supports extract of consumption and master data for used with external applications.	Creating Data Extracts using Oracle Utilities DataConnect
Support for Measuring Components on Usage Subscriptions Added information about defining specific measuring components directly on usage subscriptions. Added reference to usage subscription measuring components to Vector and Service Quantity Math usage rule.	About Usage Subscriptions Vector and Service Quantity Math
Item-based Aggregation Aggregation can now be performed on consumption for items.	About Aggregations Base Package Aggregators

New Features in Version 2.1.0.2

Feature	For More Information
<p>Support for items and item-based usage calculations</p> <p>Added new "Get Item Counts and Consumption" usage rule to support usage calculations for items.</p> <p>Usage Transactions now include additional information related to usage calculations for items</p>	<p>Get Item Counts and Consumption</p>
<p>Support for Rate Comparisons via Oracle Utilities Customer Self Service</p> <p>Added new "Profile Accumulation" usage rule to support rate comparison usage calculations initiated from Oracle Utilities Customer Self Service.</p> <p>Usage Transactions now include additional information related to rate comparison calculations, including "Calculation Mode" field and Usage Adjustment Profile Factors" section.</p>	<p>Profile Accumulation</p>
<p>Dependent Measuring Component Consumption Synchronization</p> <p>The Sum Check, Interval Adjustment from Scalar, and Scalar Calculation from Interval VEE rules have been enhanced to support consumption synchronization calculations for related measuring components.</p> <p>Added new "Final Validation" VEE rule to compare incoming initial measurements against existing final measurements to determine which if any, are of a lesser quality (a lower condition code) and if final measurements should be created for them.</p> <p>Added new "Scalar Proration" VEE rule to prorate existing estimated scalar measurements.</p>	<p>Sum Check</p> <p>Interval Adjustment from Scalar</p> <p>Scalar Calculation from Interval</p> <p>Final Measurement Validation</p> <p>Scalar Proration</p>

New Features in Version 2.1.0.1

Feature	For More Information
<p>Support for Meter Exchange</p> <p>Usage Subscription Types now include a "Meter Exchange Option" that specifies whether to consider new device configurations that became effective during the usage transactions cutoff period (the time period between the End Date/Time From and End Date/Time To values) when calculating usage transactions.</p>	<p>About Usage Subscription Types</p> <p>Base Package Usage Management Administration Objects</p>
<p>Coincident Peak Calculation via Vector and Service Quantity Math Usage Rule</p> <p>The Vector & Service Quantity Math usage rule has been enhanced to provide new functions to determine the coincident maximum or minimum value of one interval vector relative to a second reference vector.</p>	<p>Vector and Service Quantity Math</p>
<p>Usage Rules Enhancements to Store Service Quantity Highlights</p> <p>Several usage rules have been enhanced to store service quantity highlight date/times (such as maximum quantity date/times) and source measurement conditions in a new list introduced to the Usage Transaction.</p>	<p>Get Interval Data</p> <p>Get Scalar Details</p> <p>Get TOU Mapped Usage</p>

Feature	For More Information
<p>Usage Rules Enhancements to Perform Measurement Quality Assessment</p> <p>Several usage rules have been enhanced to examine the quality of the source measurement data and store this information in a new list added to the Usage Transaction, and to populate a new flag within the Usage Transaction to indicate whether the quantity is based on data that is not the highest quality.</p>	<p>Get Interval Data</p> <p>Get Scalar Details</p> <p>Get TOU Mapped Usage</p>
<p>Axis Conversion Capabilities in "Get Interval Data" Usage Rule</p> <p>The Get Interval Data usage rule in Oracle Utilities Meter Data Management has been enhanced to enable axis conversion, permitting interval data snapshots to be stored on the usage transaction in an interval size and/or unit of measure that differs from the source of the data.</p>	<p>Get Interval Data</p>
<p>Bill Print Enhancements</p> <p>Usage Transactions now include additional information that can be passed to bill print systems to capture measurement quality (condition) and date/time values for peak usage.</p>	<p>About Usage Transactions</p> <p>Additional information about configuring usage rules to provide these details can be found in the Oracle Utilities Meter Data Management Configuration Guide.</p>
<p>Support for Re-Sending Usage Transactions</p> <p>Usage transactions that encounter an error when being sent to subscribing external systems can be resent.</p>	<p>About Usage Transactions</p>

New Features in Version 2.1.0.0

Feature	For More Information
<p>Support for manually entering scalar readings via Device Configuration 360 Degree View zone or Scalar Measurements device configuration portal zone.</p>	<p>Manually Adding Register Readings for Scalar Measuring Components</p>
<p>Support for "master" and "sub" usage subscriptions.</p> <p>"Master" and "sub" usage subscriptions allow for hierarchical relationships between usage subscriptions to represent situations where a subscription is a subordinate to another usage subscription (such as when a utility is issuing a bill for a third-party service).</p>	<p>About Usage Subscriptions</p>
<p>New Override Start and End Date/Time fields for usage subscription service points.</p>	<p>About Usage Subscriptions</p>

Chapter 3

Getting Started

This section provides an overview of Oracle Utilities Meter Data Management.

About Oracle Utilities Meter Data Management

Oracle Utilities Meter Data Management provides functionality for handling large volumes of meter data to enable increased accuracy, flexibility, and scalability.

Oracle Utilities Meter Data Management supports the following business process:

- Defining meters, meter configurations, service points, and meter installations
- Loading of meter readings from a head-end system or other source
- Automatic validation, editing, and estimation of measurement data
- Calculation and publishing of bill determinants and other data from measurement data for use in external down-stream systems such as billing, pricing, etc.

Oracle Utilities Meter Data Management includes the following functional areas (including functionality provided by Oracle Utilities Service and Measurement Data Foundation):

- **360 Degree Search and View:** Used by analysts and administrators to search and view data for devices, measuring components, service points, usage subscriptions, and contacts.
- **Aggregations:** Used by analysts and administrators to search, view and maintain aggregated measurements that represent a summarization of other measurements from a set of devices and/or measuring components.
- **Device Management:** Used by analysts and administrators in managing and defining the devices used to record and capture meter data. Device management functionality is provided by both Oracle Utilities Meter Data Management and the Oracle Utilities Service and Measurement Data Foundation.
- **Device Installation:** Used by analysts and administrators in managing the installation of devices, including defining markets and service providers, service points and contacts, and installation events. Device installation also includes communication between devices, as well as defining the schedules for manual meter reading. Device installation functionality is provided through Oracle Utilities Service and Measurement Data Foundation.

- **Usage Management** : Used by analysts and administrators to manage the calculation of usage data and to provide the results of those calculations (commonly referred to as bill determinants) to external systems and parties.
- **Validation, Editing, and Estimation (VEE)**: Used by analysts and administrators to define validation, editing, and estimation (VEE) rules to be applied to measurement data. See [Understanding VEE Rule Setup and Administration](#) for more information.
- **Usage Groups and Rule** : Used by analysts and administrators to define calculation rules to be applied to measurement data. See [Understanding Usage Groups and Rules](#) for more information.

Starting the Application

Use this procedure to start Oracle Utilities Meter Data Management.

1. Click the desktop icon or program menu option to start the Oracle Utilities Meter Data Management server application.
2. Log in using your user ID and password.
3. If prompted, select a language.
4. Use the toolbar or menu bar (on the left edge of the screen) to select the function you want to perform.

Understanding the User Interface

For information about the application's main toolbar, menu system, user setup and security, and user interface standards, see the System Wide Standards topic in the Framework Business Processes online help.

Menus and Navigation

This topic describes the Oracle Utilities Meter Data Management menus and general rules for navigating the system.

Main Menu and Admin Menu

The Oracle Utilities Meter Data Management menu displays on the left side of the application screen. The menu is configurable, so the options that appear may vary based on your user profile and your system's configuration.

By default, the system provides two menus: the Main menu and the Admin menu.

The Main Menu is displayed by default. Click the Menu icon in the main toolbar to display a list of available menus, then select the menu you want to use. The selected menu appears on the left-hand side of the screen.

The Admin menu provides access to functions used for setup and administration. Only users who have administrative privileges will be able to see this menu. The main menu provides access to all other functions. The options displayed on each menu are based on the settings defined in your user profile. Your user profile also controls your access to different portals and dashboard zones.

Functional and Alphabetical Menus

The system supports two different menu styles: alphabetical and functional.

The functional menu groups menu options by the function, such as Device, Device Installation, and Usage Rules. Thus, to add a new Usage Rule, you would first click the Usage submenu, and then select the Usage Rule option.

Functional menu groups (including menu options from Oracle Utilities Service and Measurement Data Foundation) include the following:

- Common (Admin Menu)
- Communication (Admin and Main Menus)
- Customer Information (Admin and Main Menu)
- Device (Admin and Main Menus)
- Device Installation (Admin and Main Menus)
- Usage (Main and Admin Menus)
- Usage Rules (Admin Menu)
- VEE Rules (Admin Menu)
- Data Synchronization (Main Menu)
- Total and Trends (Main Menu)

The alphabetical menu groups menu options by the first letter of the option name. Thus, to add a new Usage Rule, you would first click the U submenu, and then select the Usage Rule option.

The procedures outlined in this documentation assume that you are using the functional menus. If you are using alphabetical menus instead, simply replace the functional submenu with the alphabetical submenu. For example, if the procedure instructs you to select:

Main Menu > Usage > Usage Rule

then you would instead select:

Main Menu > U > Usage Rule

The menu system provides access to Oracle Utilities Application Framework functions, Oracle Utilities Service and Measurement Data Foundation, and Oracle Utilities Meter Data Management functions. If you have additional Oracle Utilities applications installed, the menu system will provide access to functions for that application as well. Framework functions are described in the Framework online help; Framework help topics are listed under the appropriate Framework heading in the help contents panel. Likewise, Oracle Utilities Service and Measurement Data Foundation topics are listed in the help contents panel under the appropriate Oracle Utilities Service and Measurement Data Foundation heading.

Navigating to Portals in Add or Edit Mode

Most menu options display a + sign next to the option name. If you click the plus sign, rather than the option name, you will go directly to a screen that lets you add a new record. For example, if you click the plus sign next to the **Usage Rule** option, the system navigates to the Usage Rule add/edit screen so you can begin creating a new Usage Rule. This is referred to as 'navigating to the Usage Rule portal in add mode.' In this online help, using this option will be notated as **Usage Rule+**.

If you click the option name, rather than the + sign, the system navigates to a search portal, where you can select the entity you want to view or edit. (For admin-level data maintenance, the system navigates to a screen that lists the entities and lets you select one from the list.) This is referred to as 'navigating to the Usage Rule portal in edit mode.' Once you have found the entity you want to work with, the system displays a maintenance portal listing all the actions you can perform on that entity. The valid options will vary depending on the entity, your user privileges, and your system's configuration. Standard actions typically include Edit, Duplicate, and Delete, but other actions may be available depending on the configuration of the entity. Valid actions also typically include changes to the entity's status.

Oracle Utilities Meter Data Management Menu Options

This topic describes the Oracle Utilities Meter Data Management menu options.

The following tables list the base menu functions for the Oracle Utilities Service and Measurement Data Foundation and the Oracle Utilities Meter Data Management application. Online documentation for all functions listed below is provided under the Oracle Utilities Service and Measurement Data Foundation and Oracle Utilities Meter Data Management options on the online help contents panel.

NOTE: Note that an implementation can add or remove any of these functions from the menu system, change the menu option name or the submenus under which they appear, or restrict access to the options for some or all users.

Oracle Utilities Service and Measurement Data Foundation Menu Options

Menu (Admin or Main)	Functional Menu	Menu Option
Admin	BI Configuration	BI Configuration
Admin	Common	Factor
Admin	Common	Service Quantity Identifier
Admin	Common	Service Type
Admin	Common	Time of Use
Admin	Common	Unit of Measure
Admin	Communications	Activity Type
Admin	Communications	Communication Type
Admin	Communications	Device Event Type
Admin	Communications	Market
Admin	Communications	Service Provider
Admin	Communications	Service Task Type
Admin	Consumption Extract Type	Consumption Extract Type
Admin	Customer Information	Contact Type
Admin	Device	Device Configuration Type
Admin	Device	Device Type
Admin	Device	Manufacturer
Admin	Device	Measuring Component Type
Admin	Device Installation	Service Point Type
Admin	Device Installation	Measurement Cycle
Admin	Device Installation	Measurement Cycle Schedule
Admin	VEE Rules	VEE Group
Admin	VEE Rules	VEE Rule
Admin	VEE Rules	Exception Type
Main	Customer Information	Contact
Main	Device Installation	Install Event
Main	Device Installation	Service Point
Main	Device Installation	Route Management
Main	Device Installation	Facility
Main	Device Installation	Network Location
Main	Device	Device
Main	Device	Device Configuration
Main	Device	Measuring Component
Main	Communication	Activity

Menu (Admin or Main)	Functional Menu	Menu Option
Main	Communication	Completion Event
Main	Communication	Communication
Main	Communication	Appointment
Main	Communication	Device Event
Main	Communication	Notification Suppression
Main	Communication	Load IMDs / Events (XML)
Main	Initial Measurement Data	
Main	Data Synchronization	Sync Request Inbound
Main	Data Synchronization	Sync Request Inbound Exceptions
Main	Data Synchronization	Sync Request Outbound
Main	Service Task	
Main	Totals and Trends	Processing Statistics
Main	Totals and Trends	Service Order Trends Dashboard
Main	Service Order Operational Dashboard	

Oracle Utilities Meter Data Management Menu Options

Menu (Admin or Main)	Functional Menu	Menu Option
Admin	Usage	Dynamic Option Type
Admin	Usage	TOU Group
Admin	Usage	TOU Map Template
Admin	Usage	TOU Map Type
Admin	Usage	Usage Subscription Type
Admin	Usage Rules	Usage Group
Admin	Usage Rules	Usage Rule
Main	Device	Scratchpad Measuring Component
Main	Usage	Dynamic Option
Main	Usage	Dynamic Option Event
Main	Usage	TOU Map
Main	Usage	Usage Subscription
Main	Usage	Usage Transaction
Main	Usage	Consumption Extract Request
Main	Total and Trends	Consumption Statistics
Main	360 Degree Search	Search by Name
Main	360 Degree Search	Search by Address
Main	360 Degree Search	Search by Device

Chapter 4

360 Degree Search

This section describes use of the 360 Degree Search feature.

About the 360 Degree Search

The 360 Degree Search feature allows users to search for devices, measuring components, service points, and/or usage subscriptions using a variety of search criteria.

From the search results list, you can navigate to the 360 Degree View portal to view data on one of the following tabs:

- Measuring Component
- Device
- Service point
- Usage Subscription
- Contact

When accessed, the 360 Degree View opens on the tab corresponding to the type of object (device, measuring component, etc.) you select. For example, if you click the Measuring Component description, the Measuring Component tab opens.

Searching Data Using the 360 Degree Search

Use this procedure to search for data using the 360 Degree Search portal.

1. Select **Main Menu > 360 Search > [Option]**.

You can search by Name, Address, or Device.

2. Enter your search criteria.

Base package query options include the following:

- **Search by Name:** Allows search by name/address OR contact identifier OR usage subscription identifier. To search by address, click **Go To Search by Address**. To search by device, click **Device**.
 - **Search by Address:** Allows search by address/name OR service point identifier. To search by name, click **Go To Search by Name**. To search by device, click **Device**.
-

NOTE: “Search by Address” search results contain service points with one or more active usage subscriptions only.

- **Search by Device:** Allows search by device identifier OR measuring component identifier. To search by name, click **Go To Search by Name**. To search by address, click **Address**.

3. Click **Refresh**.

4. In the search results list, click the link for the object you want to view.

The 360 Degree View opens on the tab corresponding to the type of object (device, measuring component, etc.) you selected. For example, if you click the Measuring Component description, the Measuring Component tab opens.

Chapter 5

360 Degree View

This section describes use of the 360 Degree View feature.

About the 360 Degree View

The 360 Degree View feature allows users to view data for devices, measuring components, service points, usage subscriptions, and contacts from a single set of portals.

The 360 Degree View has a separate portal for each type of object:

- Measuring Component
- Device
- Service point
- Usage Subscription
- Contact

Viewing Measuring Component Data Using the 360 Degree View

Use this procedure to view measuring component-related data on the 360 Degree View.

The Measuring Component tab contains the following zones:

- **Measuring Component Overview:** Displays the service point, device, device configuration, install event, and usage subscription for the selected device.
- **Device Configuration Overview:** Displays an overview of the measuring component's parent device's configurations over time, including the measuring components associated with each configuration, and service points (along with the relevant install events) at which the device's configurations have been installed over time, if any exist.

To create a new reading for a scalar measuring component associated to a device configuration, click the **New Reading** link in the zone title bar.

- **Interval - Initial Measurement Overlay:** Overlays initial interval measurements (either pre-VEE or post-VEE) against the final measurements for a given period in graphic and tabular formats.
- **Final Values Overlay:** Graphs final measurements for a measuring component, and provides the ability to overlay the graphed data with final measurements from other measuring components. The zone also permits overlaying data from the same measuring component for different time periods, as well as data from measuring components that measuring different quantities, such as temperature.
- **Interval - Audit View:** Allows users to view an interval measurement curve for a given period overlaid with the count of audit records for each individual measurement. It also allows users to magnify a portion of the curve and see how the measurements looked at different points in time.
- **Time of Use By Day:** Displays daily TOU-mapped usage data for an interval measuring component based on a user-defined time period and TOU map.
- **Time of Use Overlay:** Displays an overlay of the TOU periods on a final interval measurement along with totalized TOU consumption based on a user-defined time period and TOU map.
- **Time of Use Over Time:** Displays usage for each TOU period based on a user-defined time period and TOU map.

NOTE: The Time of Use Over Time zone is included with demonstration data ONLY, and may not be available in your implementation.

- **Scalar - Initial Measurement Overlay:** Overlays initial scalar measurements (either pre-VEE or post-VEE) against the final measurements for a given period in graphic and tabular formats.
- **Scalar - Audit View:** Allows users to view a scalar measurement for a given period overlaid with the count of audit records for each individual measurement. It also allows users to magnify a portion of the measurement and see how the measurements looked at different points in time.
- **Measurements:** Displays measurement details for the current measuring component, including the following for each measurement displayed:
 - Date/Time
 - Primary Value Identifier (UOM, TOU, or SQI)
 - Measured Values (Value 1, Value 2, Value 3, etc.)
 - Additional Details (start reading, stop reading, condition codes, etc.)
- **Usage Subscriptions Directly Linked to MC:** Displays usage subscriptions that are directly linked to current measuring component.

You can access the Measuring Component tab by clicking the Measuring Component tab from any other tab on the 360 Degree View, or you can search for a specific measuring component. To search for a measuring component:


1. Select Main Menu > 360 Search > [Option].

You can search by Name, Address, or Device.

2. Enter your search criteria.

Base package query options include the following:

- **Search by Name:** Allows search by name/address OR contact identifier OR usage subscription identifier. To search by address, click **Go To Search by Address**. To search by device, click **Device**.
- **Search by Address:** Allows search by address/name OR service point identifier. To search by name, click **Go To Search by Name**. To search by device, click **Device**.
- **Search by Device:** Allows search by device identifier OR measuring component identifier. To search by name, click **Go To Search by Name**. To search by address, click **Address**.

3. Click **Refresh**.
4. In the search results list, click the **Measuring Component** link for the measuring component you want to view.
The 360 Degree View opens on the Measuring Component tab.
5. To navigate to a related measuring component or service point in the 360 Degree View, click the  button on the Device Configuration Overview zone.

Using the Interval-Initial Measurement Overlay Zone

Use this procedure to view interval measurement data using the Interval-Initial Measurement Overlay zone.

You access the Interval-Initial Measurement Overlay zone from the Measuring Component tab of the 360 Degree View.

The Interval-Initial Measurement Overlay zone overlays initial interval measurements (either pre-VEE or post-VEE) against the final measurements for a given period in graphic and tabular formats. This zone displays the following:

- **Measuring Component:** The measuring component from which the measurement data comes.
- **Start Date/Time:** The start date and time of the measurement data displayed in the zone. The default start date/time is X amount of time prior to the End Date/Time where X is the **Hours of Data to Display** on the measuring component type.
- **End Date/Time:** The end date and time of the measurement data displayed in the zone. The default is the most recent end date of the measuring component's initial measurements.
- **Event Bar Profile:** The event bar profile displayed in the zone. This specifies how events are depicted on the graph. Available event bar profiles are defined for the measuring component type.
- **Interval Data:** Details derived from the interval measurement displayed, including average, minimum, and maximum values. This section also provides a list of available functions for the measuring component.
- **Initial Measurement Data Graph:** A graphical display of the initial measurement data for the measuring component. The upper portion of the graph displays interval values as a line graph, with Complete, Finalized, VEE Ready, etc. quantities indicated as color-shaded areas below the line graph. The lower portion displays events (based on the selected Event Bar Profile) as a bar graph.
- **Initial Measurement Data Table:** A table that lists the initial measurement data available for graphing. This table displays a description, measurement count, and Pre-VEE and Post-VEE values for measurement count, average value, minimum value, and maximum value for each initial measurement data in the table.

To use the Interval-Initial Measurement Overlay zone:

1. Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.
2. To change the dates or times for the display, adjust the dates and times as appropriate, and click **Load**.
3. To change the event bar profile for the display, select the profile from the drop-down list, and click **Load**.
4. To use a function, select the function from the **Select Function** drop-down list. See [Applying Functions](#) for more information.
5. To change the Pre-VEE measurements included in the display, select or deselect the initial measurement data as appropriate, and click **Reload Initial Measurements Using Pre-VEE**.
6. To change the Post-VEE measurements included in the display (if available), select or deselect the initial measurement data as appropriate, and click **Reload Initial Measurements Using Post-VEE**.
7. To view an individual initial measurement data in more detail, click the description link for the data you wish to view.
The initial measurement data is displayed in the Initial Measurement zone. See [Viewing Initial Measurement Data for a Measuring Component](#) for more information.

Using the Final Values Overlay Zone

Use this procedure to view measurement data using the Final Values Overlay zone.

You access the Final Values Overlay zone from the Measuring Component tab of the 360 Degree View.

The Final Values Overlay zone graphs final measurements for a measuring component, and provides the ability to overlay the graphed data with final measurements from other measuring components. The zone also permits overlaying data from the same measuring component for different time periods, as well as data from measuring components that measuring different quantities, such as temperature. This zone displays the following:

- **Measuring Component:** The measuring component from which the measurement data comes.
- **Value Identifier Type:** The value identifier of the measurement data displayed in the zone. Value identifiers are used to provide short descriptions for the various types of values measured by the measuring component (KWH, KW, etc.).
- **Start Date/Time:** The start date and time of the measurement data displayed in the zone. The default start date/time is X amount of time prior to the End Date/Time where X is the **Hours of Data to Display** on the measuring component type.
- **End Date/Time:** The end date and time of the measurement data displayed in the zone. The default is the most recent end date of the measuring component's final measurements.
- **Final Values Overlay Profile:** The final values overlay profile displayed in the zone. This specifies which types of final values are available for the graph. Available final values overlay profiles are defined for the measuring component type.
- **Event Bar Profile:** The event bar profile displayed in the zone. This specifies how events are depicted on the graph. Available event bar profiles are defined for the measuring component type.
- **Values to Graph:** A table that lists additional measurement data to be included in the graph.
- **Interval Data:** Details derived from the interval measurement displayed, including average, minimum, and maximum values. This section also provides a list of available functions for the measuring component.
- **Measurement Data Graph:** A graphical display of the measurement data for the measuring component and other data (from the Values to Graph section). The upper portion of the graph displays interval values as a series of line graphs. The lower portion displays events (based on the selected Event Bar Profile) as a bar graph. The Y-axis on the graph are based on the UOMs for the selected measurement data. The graph can display up to two unique UOMs.
- **Measuring Component Data Table:** A table that lists the measuring components whose data is displayed on the graph. This table displays a description, offset days, value identifier type, total, average value, minimum value, and maximum value for each measuring component in the table (if available).

To use the Final Values Overlay zone:

1. Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.
2. To change the value identifier type, select the type from the drop-down list, and click **Load**.
3. To change the dates or times for the display, adjust the dates and times as appropriate, and click **Load**.
4. To change the final values overlay profile, select the profile from the drop-down list, and click **Load**.
5. To change the event bar profile for the display, select the profile from the drop-down list, and click **Load**.
6. To add measuring components to the graph, add them to the Values to Graph table, as follows:
 - a) Check the **Show on Graph** checkbox to include the new measuring component on the graph.
 - b) Click the **Search for Data** icon to search for the measuring component.
 - c) Select the **Value Identifier Type** from the drop-down list.

- d) To overlay the new measuring component for a different time-period, enter the time-period's **Offset Day**. For example, to display the same date range from the previous year, enter -365; to display the date range for the previous month, enter -30 (or-31).
 - e) Click **Load** to reload the graph with the new measuring component.
7. To use a function, select the function from the **Select Function** drop-down list. See [Applying Functions](#) for more information.

Using the Interval - Audit View Zone

Use this procedure to view interval measurement data using the Interval - Audit View zone.

You access the Interval-Audit View zone from the Measuring Component tab of the 360 Degree View.

The Interval - Audit View zone allows users to view an interval measurement curve for a given period overlaid with the count of audit records for each individual measurement. It also allows users to magnify a portion of the curve and see how the measurements looked at different points in time. This zone displays the following:

- **Measuring Component:** The measuring component from which the measurement data comes.
- **Start Date/Time:** The start date and time of the measurement data displayed in the zone. The default start date/time is X amount of time prior to the End Date/Time where X is the **Hours of Data to Display** on the measuring component type.
- **End Date/Time:** The end date and time of the measurement data displayed in the zone. The default is the most recent end date of the measuring component's final measurements.
- **Event Bar Profile:** The event bar profile displayed in the zone. This specifies how events are depicted on the graph. Available event bar profiles are defined for the measuring component type.
- **Interval Data:** Details derived from the interval measurement displayed, including average, minimum, and maximum values. This section also provides a list of available functions for the measuring component.
- **Interval Data Graph:** A graphical display of the measurement data for the measuring component. The upper portion of the graph displays interval values as a line graph. The lower portion displays events (based on the selected Event Bar Profile) as a bar graph. The Y-axis on the left side of the graph displays the UOM of the measurement data. The y-axis on the right side of the graph displays the count of the number of measurement logs for each interval (Log Count).
- **Lens Graph:** A graph displaying a selected portion of the interval data graph (highlighted in red in the interval data graph above).
- **Lens Values Table:** A table displaying individual interval values for the data displayed in the lens graph, including date/time, number of changes, current quantity, previous quantity, current condition code, and previous condition code for each interval value.

To use the Interval-Audit View zone:

1. Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.
2. To change the dates or times for the display, adjust the dates and times as appropriate, and click **Load**.
3. To change the event bar profile for the display, select the profile from the drop-down list, and click **Load**.
4. To use a function, select the function from the **Select Function** drop-down list. See [Applying Functions](#) for more information.
5. To move the start of the Lens Graph to a specific interval, enter the interval number in the **Lens Start Index** field and click the **Enter** key. You can also use the mouse to change the start of the Lens Graph, or click the left and right arrows on either side of the **Lens Start Index** field.
6. To change the size (in number of intervals) for the Lens Graph, enter the appropriate number of intervals in the **Lens Size** field, and click the **Enter** key.

7. To view values in the Lens Values Table for an interval on the Lens Graph, click the interval.
The selected interval will be highlighted in the Lens Values Table.
8. To locate an interval on the Lens Graph based on data in the Lens Values Table, click the Current Quantity in the Lens Values Table.
The selected interval will be indicated on the Lens Graph.
9. To view quantities and conditions for a different point in history, select the time range on the **Snapshot as of** drop-down list.

Using the Time Of Use By Day Zone

Use this procedure to view interval measurement data using the Time of Use By Day zone.

You access the Time of Use By Day zone from the Measuring Component tab of the 360 Degree View.

The Time of Use By Day zone displays daily TOU-mapped usage data for an interval measuring component based on a user-defined time period and TOU map. This zone displays the following:

- **Measuring Component:** The measuring component from which the measurement data comes.
- **Value Identifier Type:** The value identifier of the measurement data displayed in the zone. Value identifiers are used to provide short descriptions for the various types of values measured by the measuring component (KWH, KW, etc.).
- **Start Date:** The start date of the measurement data displayed in the zone. The default start date is 30 days prior to the end date.
- **End Date:** The end date of the measurement data displayed in the zone. The default is the most recent end date of the measuring component's final measurements.
- **TOU Map:** The TOU map being applied to the measurement data displayed in the zone. .
- **Event Bar Profile:** The event bar profile displayed in the zone. This specifies how events are depicted on the graph. Available event bar profiles are defined for the measuring component type.
- **Interval Data:** Details derived from the interval measurement displayed, including average, minimum, and maximum values. This section also provides a list of available functions for the measuring component.
- **TOU Usage Graph:** A graphical display of TOU usage data for the measuring component. The upper portion of the graph displays TOU periods for each day as a series of color-coded vertical bars (weather data is displayed as a line graph). The lower portion displays events (based on the selected Event Bar Profile) as a horizontal bar graph. The Y-axis on the left side of the graph displays the UOM of the measurement data. The y-axis on the right side of the graph displays UOM for the temperature data displayed.
- **Time Of Use Table:** A table that lists the TOU periods displayed in the graph, including a color code and quantity for each. Up to four TOUs can be selected at one time. If there are more than 5 TOUs in the table, remaining TOUs will be grouped together using a single color.

To use the Time of Use By Day zone:

1. Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.
2. To change the value identifier type, select the type from the drop-down list, and click **Load**.
3. To change the dates for the display, adjust the dates as appropriate, and click **Load**.
4. To change the TOU Map for the display, search for and select the appropriate TOU map, and click **Load**.
5. To change the event bar profile for the display, select the profile from the drop-down list, and click **Load**.
6. To use a function, select the function from the **Select Function** drop-down list. See [Applying Functions](#) for more information.

7. To change the TOU periods displayed on the graph, select or deselect the TOU periods in the Time of Use Table as appropriate and click **Reload**.

Using the Time of Use Overlay Zone

Use this procedure to view interval measurement data using the Time of Use Overlay zone.

You access the Time of Use Overlay zone from the Measuring Component tab of the 360 Degree View.

The Time of Use Overlay zone displays an overlay of the TOU periods on a final interval measurement along with totalized TOU consumption based on a user-defined time period and TOU map. This zone displays the following:

- **Measuring Component:** The measuring component from which the measurement data comes.
- **Value Identifier Type:** The value identifier of the measurement data displayed in the zone. Value identifiers are used to provide short descriptions for the various types of values measured by the measuring component (KWH, KW, etc.).
- **Start Date/Time:** The start date and time of the measurement data displayed in the zone. The default start date/time is X amount of time prior to the End Date/Time where X is the **Hours of Data to Display** on the measuring component type.
- **End Date/Time:** The end date and time of the measurement data displayed in the zone. The default is the most recent end date of the measuring component's final measurements.
- **TOU Map:** The TOU map being applied to the measurement data displayed in the zone. .
- **Event Bar Profile:** The event bar profile displayed in the zone. This specifies how events are depicted on the graph. Available event bar profiles are defined for the measuring component type.
- **Interval Data:** Details derived from the interval measurement displayed, including average, minimum, and maximum values. This section also provides a list of available functions for the measuring component.
- **Measurement Data Graph:** A graphical display of the measurement data for the measuring component. The upper portion of the graph displays the measurement data as a line graph with TOU periods indicated as color-shaded areas below the line graph. The lower portion displays events (based on the selected Event Bar Profile) as a horizontal bar graph.
- **Time Of Use Table:** A table that lists the TOU periods displayed in the graph, including a color code and quantity for each. Up to four TOUs can be selected at one time. If there are more than 5 TOUs in the table, remaining TOUs will be grouped together using a single color.

To use the Time of Use Overlay zone:

1. Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.
2. To change the value identifier type, select the type from the drop-down list, and click **Load**.
3. To change the dates and times for the display, adjust the dates and times as appropriate, and click **Load**.
4. To change the TOU Map for the display, search for and select the appropriate TOU map, and click **Load**.
5. To change the event bar profile for the display, select the profile from the drop-down list, and click **Load**.
6. To use a function, select the function from the **Select Function** drop-down list. See [Applying Functions](#) for more information.
7. To change the TOU periods displayed on the graph, select or deselect the TOU periods in the Time of Use Table as appropriate and click **Reload**.

Using the Time of Use Over Time Zone

Use this procedure to view TOU data using the Time of Use Over Time zone.

You access the Time of Use Over Time zone from the Measuring Component tab of the 360 Degree View.

NOTE: The Time of Use Over Time zone is included with demonstration data ONLY, and may not be available in your implementation.

The Time of Use Over Time zone displays usage for each TOU period within a user-defined time period for a user-specified TOU map. This zone displays the following:

- **Measuring Component:** The measuring component from which the measurement data comes.
- **Value Identifier Type:** The value identifier of the measurement data displayed in the zone. Value identifiers are used to provide short descriptions for the various types of values measured by the measuring component (KWH, KW, etc.).
- **From Year:** The start year of the measurement data displayed in the zone.
- **To Year:** The end year of the measurement data displayed in the zone.
- **TOU Map:** The TOU map being applied to the measurement data displayed in the zone. .
- **Group By:** The manner in which the data is grouped (typically by month or year).
- **TOU Quantities Table:** A table that lists a series of time periods (based on the Group By setting), and quantities for each TOU with the period.

To use the Time of Use Over Time zone:

1. Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.
2. To change the value identifier type, select the type from the drop-down list, and click **Load**.
3. To change the years for the display, adjust the years as appropriate, and click **Load**.
4. To change the TOU Map for the display, search for and select the appropriate TOU map, and click **Load**.
5. To change the manner in which the data is grouped, select the appropriate setting from the drop-down list, and click **Load**.

Using the Scalar-Initial Measurement Overlay Zone

Use this procedure to view scalar measurement data using the Scalar-Initial Measurement Overlay zone.

You access the Scalar-Initial Measurement Overlay zone from the Measuring Component tab of the 360 Degree View.

The Scalar-Initial Measurement Overlay zone overlays initial scalar measurements (either pre-VEE or post-VEE) against the final measurements for a given period in graphic and tabular formats. This zone displays the following:

- **Measuring Component:** The measuring component from which the measurement data comes.
- **Start Date/Time:** The start date and time of the measurement data displayed in the zone. The default start date/time is X amount of time prior to the End Date/Time where X is the **Hours of Data to Display** on the measuring component type.
- **End Date/Time:** The end date and time of the measurement data displayed in the zone. The default is the most recent end date of the measuring component's initial measurements.
- **Event Bar Profile:** The event bar profile displayed in the zone. This specifies how events are depicted on the graph. Available event bar profiles are defined for the measuring component type.
- **Scalar Data:** Details derived from the scalar measurement displayed, including total, minimum, and maximum values. This section also provides a list of available functions for the measuring component.
- **Initial Measurement Data Graph:** A graphical display of the measurement data for the measuring component. The upper portion of the graph displays scalar values as a line graph, with Complete, Finalized, VEE Ready, etc. quantities indicated as color-coded bars below the line graph. The lower portion displays events (based on the selected Event Bar Profile) as a bar graph.

- **Initial Measurement Data Table:** A table that lists the initial measurement data available for graphing. This table displays a description, measurement count, Pre-VEE and Post-VEE quantities, final quantities and condition codes, and start/end readings for each initial measurement data in the table.

To use the Scalar-Initial Measurement Overlay zone:

1. Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.
2. To change the dates or times for the display, adjust the dates and times as appropriate, and click **Load**.
3. To change the event bar profile for the display, select the profile from the drop-down list, and click **Load**.
4. To use a function, select the function from the **Select Function** drop-down list. See [Applying Functions](#) for more information.
5. To change the Pre-VEE measurements included in the display, select or deselect the initial measurement data as appropriate, and click **Reload Initial Measurements Using Pre-VEE**.
6. To change the Post-VEE measurements included in the display (if available), select or deselect the initial measurement data as appropriate, and click **Reload Initial Measurements Using Post-VEE**.
7. To view an individual initial measurement data in more detail, click the description link for the data you wish to view.
The initial measurement data is displayed in the Initial Measurement zone. See [Viewing Initial Measurement Data for a Measuring Component](#) for more information.

Using the Scalar-Audit View Zone

Use this procedure to view scalar measurement data using the Scalar-Audit View zone.

You access the Scalar-Audit View zone from the Measuring Component tab of the 360 Degree View.

The Scalar - Audit View zone allows users to view a scalar measurement for a given period overlaid with the count of audit records for each individual measurement. It also allows users to magnify a portion of the measurement and see how the measurements looked at different points in time This zone displays the following:

- **Measuring Component:** The measuring component from which the measurement data comes.
- **Start Date/Time:** The start date and time of the measurement data displayed in the zone. The default start date/time is X amount of time prior to the End Date/Time where X is the **Hours of Data to Display** on the measuring component type.
- **End Date/Time:** The end date and time of the measurement data displayed in the zone. The default is the most recent end date of the measuring component's final measurements.
- **Event Bar Profile:** The event bar profile displayed in the zone. This specifies how events are depicted on the graph. Available event bar profiles are defined for the measuring component type.
- **Scalar Data:** Details derived from the scalar measurement displayed, including total, minimum, and maximum values. This section also provides a list of available functions for the measuring component.
- **Scalar Data Graph:** A graphical display of the measurement data for the measuring component. The upper portion of the graph displays scalar values as a line graph. The lower portion displays events (based on the selected Event Bar Profile) as a bar graph.
- **Lens Graph:** A graph displaying a selected portion of the scalar data graph (highlighted in red in the interval data graph).
- **Lens Values Table:** A table displaying individual scalar values for the data displayed in the lens graph, including start date/time, end date/time, number of changes, current quantity, current condition code, and an indication if the measurement has been edited by a user.

To use the Scalar-Audit View zone:

1. Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.

2. To change the dates or times for the display, adjust the dates and times as appropriate, and click **Load**.
3. To change the event bar profile for the display, select the profile from the drop-down list, and click **Load**.
4. To use a function, select the function from the **Select Function** drop-down list. See [Applying Functions](#) for more information.
5. To move the start of the Lens Graph to a specific measurement, enter the measurement number in the **Lens Start Index** field and click the **Enter** key. You can also use the mouse to change the start of the Lens Graph, or click the left and right arrows on either side of the **Lens Start Index** field.
6. To change the size (in number of measurement) for the Lens Graph, enter the appropriate number of measurement in the **Lens Size** field, and click the **Enter** key.
7. To view quantities and conditions for a different point in history, select the time range on the **Snapshot as of** drop-down list.

Applying Functions

Use this procedure to apply and perform functions when using the 360 Degree View and the Interval-Initial Measurement Lens zone.

You must be viewing measurement data for a measuring component on the 360 Degree View or Interval-Initial Measurement Lens zone before you can apply or perform a function.

The functions available are based on the zone you are working in. When working in the 360 Degree View zones, functions allow users to create new measurement data, export data to a file, or save existing data to a new measuring component. When working in the Interval-Initial Measurement Lens zone, functions allow users to edit and manipulate the interval data.

- Interval measurement zones on the Measuring Component tab of the 360 Degree View (Interval-Initial Measurement Overlay, Final Values (interval), Interval-Audit View, Time of Use By Day, and Time of Use Overlay) provide access to the following base package functions:
 - **Create Scratchpad:** Creates a scratchpad measuring component along with new initial measurement data by copying all or some of the final measurements from the measuring component displayed in the zone.
 - **Create / Override:** Creates new initial measurement data for a selected measuring component for all or part of a selected time period. This function can either copy existing final measurements or create new measurement data for the initial measurement it creates.
 - **Export to Excel:** Exports measurement data to a comma-separated values spreadsheet.
 - **New Reading:** Creates a new interval initial measurement reading for the measuring component.
 - **Rederive Values:** Rederives the measurement's values displayed in the zone.
 - **Save As:** Creates new initial measurement data for a measuring component other than that being displayed by copying all or some of the final measurements shown in the zone.
- Scalar measurement zones on the Measuring Component tab of the 360 Degree View (Scalar-Initial Measurement Overlay, Final Values (scalar), and Scalar-Audit View) provide access to the following base package functions:
 - **Convert to Interval:** Converts scalar consumption into interval consumption. The converted consumption is held in a new scratchpad measuring component.
 - **Create / Override:** Creates new initial measurement data for a selected measuring component for all or part of a selected time period. This function can either copy existing final measurements or create new measurement data into the initial measurement it creates.
 - **Export to Excel:** Exports measurement data to a comma-separated values spreadsheet.
 - **New Reading:** Creates a new scalar initial measurement reading for the measuring component.
 - **Rederive Scalar Values:** Rederives the measurement's values displayed in the zone.

- The Interval-Initial Measurement Lens zone on the Initial Measurement portal provides access to the following base package functions:
 - **Adjust Intervals to Scalar Quantity:** Adjusts all interval values within a user-defined time period in an interval measurement such that the total of all interval values equals a user-defined scalar quantity.
 - **Adjust Intervals Using Math:** Adjusts all interval values within a user-defined time period using math operations (add, subtract, multiply, or divide).
 - **Insert Intervals:** Inserts intervals into initial measurement data.
 - **Remove Intervals:** Removes intervals from initial measurement data
 - **Set Conditions:** Sets condition codes within initial measurement data. Condition codes indicate the circumstances (estimated, missing, etc.) of individual measurements. Condition codes are assigned to both scalar and interval measurement data both for initial measurement data and final measurements.
 - **Shift Intervals:** Shifts intervals of initial measurement data to a new start date and time.
 - **Smooth Spikes:** Reduces "spike" intervals (intervals with values that are more than a user-defined percentage higher than other intervals within the initial measurement data).

To perform a function:

1. Navigate to one of the 360 Degree Measuring Component zones or the Interval-Initial Measurement Lens zone (as appropriate).
2. Select the function you wish to perform from the **Select Function** drop-down list.
The function screen for the selected function opens.
3. Enter the parameters for the function.
Click ⓘ to display descriptions of the function, and the fields and parameters used by the function.
4. Click **OK**.

Viewing Initial Measurement Data for a Measuring Component

Use this procedure to view initial measurement data for a measuring component.

Prerequisite: You must be viewing a measuring component in the Measuring Component portal or 360 Degree View into order to view initial measurement data for that measuring component.

You use the Initial Measurement portal to view initial measurement data. This portal includes the following zones:

- **Open Exception Summary:** Displays a list of open exceptions for the initial measurement. This zone appears only if open exceptions exist for the initial measurement
- **Interval Initial Measurement Lens:** Displays a graphical view of the measurement data and allows manual editing of interval measurements. This zone allows users to magnify a portion of the measurement data for editing. This zone appears only when viewing initial measurement data for an interval measuring component.
- **Scalar Initial Measurement:** Displays basic information for the scalar measurement data, including start and end quantities, and allows users to edit the quantity and final condition of the measurement. This zone appears only when viewing initial measurement data for a scalar measuring component.
- **Initial Measurement:** Defines the basic attributes, pre-VEE data, and post-VEE data for the initial measurement.
- **Measurements of Initial Measurement:** Lists final measurements based on the initial measurement.
- **Initial Measurement Exception Detail:** Displays details of a broadcast exception listed in the Open Exception Summary zone.

To view initial measurement data:

1. From the Measuring Component portal:
 - a) Navigate to the Measuring Component portal in edit mode.
 - b) Click the initial measurement in the Initial Measurement Data History zone.
The initial measurement opens in the Initial Measurement portal.
2. From the 360 Degree View:
 - a) Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.
 - b) Click the initial measurement you wish to view in the Interval (or Scalar) Initial Measurement Overlay zone.
The initial measurement opens in the Initial Measurement portal.
3. To view details of an exception, click the **Broadcast** icon in the Open Exception Summary zone. The broadcast exception opens in the Initial Measurement Exception Detail zone.
4. To view and edit interval initial measurement data using the Interval-Initial Measurement Lens zone, see [Using the Interval Initial Measurement Lens Zone](#).
5. To view and edit scalar initial measurement data using the Scalar-Initial Measurement Lens zone, see [Using the Scalar Initial Measurement Zone](#).
6. To perform an action on the Initial Measurement zone, click the appropriate button.

The specific actions available for a measurement are based on the current status of the measurement, and the measurement business object. The statuses in which each action are allowed are listed in parentheses. Action options include the following:

Trace	Turns Trace On or Off (Allowed Status: All)
Edit	Allows user to edit the initial measurement. (Allowed Status: Pending, Error)
Delete	Deletes the initial measurement. (Allowed Status: Pending, Error)
Prepare for VEE	Prepares the initial measurement for VEE processing, and changes the status to VEE Ready, and then to either Error or VEE Complete. (Allowed Status: Pending, Error)
Remove from Processing	Removes the initial measurement from further processing (Allowed Status: Pending, Error)
Perform VEE	Performs VEE processing on the initial measurement, based on the VEE groups defined for the measuring component. This changes the status of initial measurements to VEE Complete and then either Exception (if the measurement falls one or more validations) or Complete (if the measurement passes all validations) (Allowed Status: Exception)
Force Complete	Changes the state of the initial measurement to Force Complete, regardless of whether or not the measurement passes VEE processing, (Allowed Status: Exception)
Re-Process	(Allowed Status: Error)
Discard	Discards the initial measurement. (Allowed Status: Error, Exception)

7. To view the pre-VEE data, click the expand icon in the Pre-VEE Initial Measurement Data section.
This section displays the attributes of initial measurement data prior to VEE processing. For interval measurements, this includes a list of interval data values.
8. To view the post-VEE data, click the expand icon in the Post-VEE Initial Measurement Data section.
This section displays the attributes of initial measurement data after VEE processing. For interval measurements, this includes a list of interval data values.
9. To view an individual final measurement based on the initial measurement, click the measurement in the Measurements of Initial Measurement zone. The selected measurement opens in the Measurement zone. See [Viewing Final Measurements for a Measuring Component](#) for more information about viewing final measurements.

Using the Interval Initial Measurement Lens Zone

Use this procedure to view and edit interval initial measurement data using the Interval Initial Measurement zone.

You access the Interval Initial Measurement zone from the Initial Measurement portal.

The Interval Initial Measurement zone displays a graphical view of the measurement data and allows manual editing of interval measurements. This zone allows users to magnify a portion of the measurement data for editing. This zone displays the following:

- **Initial Measurement Data:** The start and end date and time for the initial measurement.
- **Measuring Component:** The measuring component from which the initial measurement data comes.
- **Area Content:** The type of values (Pre-VEE or Final) displayed as shaded areas below the line graph. The default setting is none.
- **Interval Data:** Details derived from the interval measurement, including total, minimum, and maximum values. This section also provides a list of available functions for the measuring component.
- **Interval Data Graph:** A graphical display of the initial measurement data. The upper portion of the graph displays Post-VEE interval values as a line graph, with Pre-VEE or Final values depicted as color-shaded areas below the line graph (based on the current Area Content setting).
- **Lens Graph:** A graph displaying a selected portion of the interval data graph (highlighted in red in the interval data graph above).
- **Lens Values Table:** A table displaying individual interval values for the data displayed in the lens graph, including the following for each:
 - Date Time, current quantity, previous quantity, current condition code, and previous condition code for each interval value.
 - Post VEE Quantity and Condition (editable)
 - User Edited Flag (indicates if the interval value has been manually edited by a user)
 - Pre-VEE Quantity and Condition (view only)
 - Final Quantity and Condition

To use the Interval Initial Measurement zone:

1. From the Measuring Component portal:
 - a) Navigate to the Measuring Component portal in edit mode.
 - b) Click the initial measurement in the Initial Measurement Data History zone.
The initial measurement opens in the Initial Measurement portal.
2. From the 360 Degree View:
 - a) Navigate to the Measuring Component tab in the 360 Degree View for the measuring component you wish to view.
 - b) Click the initial measurement you wish to view in the Interval (or Scalar) Initial Measurement Overlay zone.
The initial measurement opens in the Initial Measurement portal.
3. To change the types of values (Pre-VEE or Final) displayed as shaded areas below the line graph, select the setting from the **Area Content** drop-down list, and click **Load**.
4. To apply a function to the measurement, select the function from the **Select Function** drop-down list. See [Applying Functions](#) for more information.

5. To move the start of the Lens Graph to a specific interval, enter the interval number in the **Lens Start Index** field and click the **Enter** key. You can also use the mouse to change the start of the Lens Graph, or click the left and right arrows on either side of the **Lens Start Index** field.
6. To change the size (in number of intervals) for the Lens Graph, enter the appropriate number of intervals in the **Lens Size** field, and click the **Enter** key.
7. To view values in the Lens Values Table for an interval on the Lens Graph, click the interval.
The selected interval will be highlighted in the Lens Values Table.
8. To locate an interval on the Lens Graph based on data in the Lens Values Table, click the Post-VEE Quantity in the Lens Values Table.
The selected interval will be indicated on the Lens Graph.
9. To highlight all Pre-VEE or Post-VEE interval values of a certain condition code in the Lens Graph, select the condition code in the **Highlight Pre-VEE Condition** or **Highlight Post-VEE Condition** drop-down lists (respectively).
Note: You can highlight either Pre-VEE or Post-VEE interval values at one time.
10. To edit a value in the Lens Graph, select the interval in the graph and adjust the interval value up or down as appropriate.
The corresponding value in the Lens Values Table will change accordingly, and the condition will change to the default condition (if defined).
11. To edit a value on the Lens Value Table, select the interval to change in the table and enter the appropriate Quantity in the Post-VEE column.
The corresponding value in the Lens Graph will change accordingly.
12. To edit a condition on the Lens Value Table, select the appropriate Condition in the Post-VEE column.
13. To set a default condition code for user-edited values, select the condition the **Default Condition** drop-down list.
14. To apply changes to interval values and condition codes, click **Apply Changes**.
15. To undo the last set of changes (since the last time you clicked **Apply Changes**), click **Undo Changes**.

Using the Scalar Initial Measurement Zone

Use this procedure to view and edit scalar initial measurement data using the Scalar Initial Measurement zone.

You access the Scalar Initial Measurement zone from the Initial Measurement portal.

The Scalar Initial Measurement zone displays basic information for the scalar measurement data, including start and end quantities, and allows users to edit the quantity and final condition of the measurement. This zone displays the following:

- **Initial Measurement Data:** The start and end date and time for the initial measurement.
- **Measuring Component:** The measuring component from which the initial measurement data comes.
- **Start Quantity:** The start quantity for the scalar measurement.
- **End Quantity:** The end quantity for the scalar measurement.
- **Quantity:** The total quantity for the measurement (taking into account factors such as register multipliers, installation constants, etc.)
- **Final Condition:** The condition code for the scalar measurement.

To use the Scalar-Initial Measurement zone:

1. From the Measuring Component portal:
 - a) Navigate to the Measuring Component portal in edit mode.

- b) Click the initial measurement you wish to view in the Interval (or Scalar) Initial Measurement Overlay zone.
The initial measurement opens in the Initial Measurement portal.
- c) Click the final measurement you wish to view in the Measurements of Initial Measurement zone.
The selected measurement opens in the Measurement portal.

Viewing Device Data Using the 360 Degree View

Use this procedure to view device-related data on the 360 Degree View.

The Device tab contains the following zones:

- **Device Overview:** Displays the device, service point, install event, and usage subscription for the selected device.
- **Device Configuration Overview:** Displays an overview of the device's configurations over time, including the measuring components associated with each configuration, and service points (along with the relevant install events) at which the device's configurations have been installed.
- **Scalar Readings:** Displays a list of scalar readings for scalar measuring components associated with the current device and device configuration.
 - To create a new reading for scalar measuring components associated with the device configuration, click **New Reading**.
 - To edit an existing reading, click the edit icon for the reading you wish to edit. Editing a reading creates new initial measurements that are validated. If these edits do not pass validations, including VEE rules, the changes are not saved.

You can access the Device tab by clicking the Device tab from any other tab on the **360 Degree View**, or you can search for a specific device. To search for a device:

1. Select **Main Menu > 360 Search > [Option]**.

You can search by Name, Address, or Device.

2. Enter your search criteria.


Base package query options include the following:

- **Search by Name:** Allows search by name/address OR contact identifier OR usage subscription identifier. To search by address, click **Go To Search by Address**. To search by device, click **Device**.
- **Search by Address:** Allows search by address/name OR service point identifier. To search by name, click **Go To Search by Name**. To search by device, click **Device**.
- **Search by Device:** Allows search by device identifier OR measuring component identifier. To search by name, click **Go To Search by Name**. To search by address, click **Address**.

3. Click **Refresh**.

4. In the search results list, click the **Device** link for the device you want to view.

The 360 Degree View opens on the Device tab.

5. To navigate to a related measuring component or service point in the 360 Degree View, click the  button on the Device Configuration Overview zone.

Viewing Service Point Data Using the 360 Degree View

Use this procedure to view service point-related data on the 360 Degree View.

The Service Point tab contains the following zones:

- **Service Point Overview:** Displays the service point, device, device configuration, install event, and usage subscription for the selected service point.
- **Measuring Component Types:** Lists the measuring component types configured for the service point.
- **Interval Consumption History:** Displays a graph of interval consumption for a broadcast interval measuring component type.
- **Scalar Consumption History:** Displays a graph of scalar consumption for a broadcast scalar measuring component type.
- **Timeline:** Displays a timeline of events for the service point, including usage transactions, activities, and VEE exceptions. Each event is depicted as a button containing the date on which the event occurred.
- **Service Issue Monitors Related to SP:** displays a list of service issue monitors and related service investigative orders related to the current service point, in reverse chronological order.

You can access the Service Point tab by clicking the Service Point tab from any other tab on the 360 Degree View, or you can search for a specific service point. To search for a service point:

1. Select **Main Menu > 360 Search > [Option]**.

You can search by Name, Address, or Device.

2. Enter your search criteria.

Base package query options include the following:

- **Search by Name:** Allows search by name/address OR contact identifier OR usage subscription identifier. To search by address, click **Go To Search by Address**. To search by device, click **Device**.
- **Search by Address:** Allows search by address/name OR service point identifier. To search by name, click **Go To Search by Name**. To search by device, click **Device**.
- **Search by Device:** Allows search by device identifier OR measuring component identifier. To search by name, click **Go To Search by Name**. To search by address, click **Address**.

3. Click **Refresh**.

4. In the search results list, click the **Service Point** link for the service point you want to view.

The 360 Degree View opens on the Service Point tab.

5. To display consumption history for a measuring component, click the **Broadcast** icon in the Measuring Component Types zone.

The Interval or Scalar Consumption History zone opens for the selected measuring component. See [Using the Consumption History Zones](#) for more information about using these zones.

6. To search for a specific month and year in the Timeline zone, select the month and year from the drop-down lists and click the **Search** icon. To navigate forward and back along the timeline, use the left and right arrows.
7. To view an event displayed in the Timeline zone, click the event button. A description of the event displayed below the timeline. Click the description to navigate to view more details for the event.

Using the Service Point Consumption History Zone

Use this procedure when using the Service Point Consumption History zones.

You access the Service Point Consumption History zones from the Service Point tab of the 360 Degree View.

The Service History Consumption History zone graphs consumption for a broadcast measuring component type. This zone displays the following:

- **Service Point:** The service point from which the consumption data comes.
- **Measuring Component Type:** The measuring component type from which the measurement data comes.
- **Value Identifier Type:** The value identifier of the measurement data displayed in the zone. Value identifiers are used to provide short descriptions for the various types of values measured by the measuring component (KWH, KW, etc.).

NOTE: This option is disabled if the display period straddles a meter exchange in which the measuring components are of different measuring component types.

- **Start Date/Time:** The start date and time of the measurement data displayed in the zone. The default start date/time is X amount of time prior to the End Date/Time where X is the **Hours of Data to Display** on the measuring component type.
- **End Date/Time:** The end date and time of the measurement data displayed in the zone. The default is the most recent end date of the measuring component's final measurements.
- **Event Bar Profile:** The event bar profile displayed in the zone. This specifies how events are depicted on the graph. Available event bar profiles are defined for the measuring component type.
- **Interval Data:** Details derived from the interval measurement displayed, including total, minimum, and maximum values. This section appears only if the broadcast measuring component type is an interval measuring component type.
- **Scalar Data:** Details derived from the scalar measurement displayed, including total, minimum, and maximum values. This section appears only if the broadcast measuring component type is a scalar measuring component type.
- **Consumption Data Graph:** A graphical display of the consumption data for the service point. The upper portion of the graph displays consumption values as a line graph. The lower portion displays events (based on the selected Event Bar Profile) as a bar graph.

NOTE: In the case of a meter exchange where a scalar meter is replaced by an interval meter, if the scalar meter references a measuring component type defined as a "Consumption Compatible Scalar MC Type" on the interval channel measuring component, the display will include consumption from both measuring components. If the scalar meter is not of a "compatible" measuring component type, consumption will only be displayed for the interval channel measuring component.

When displaying consumption from more than one measuring component, the shaded area will display a different color for each different device type installed at the service point during the display period.

- **Service Point Data Table:** A table that displays the install event, measuring component, and total, average value, minimum value, and maximum values for the consumption data displayed.

To use the Service Consumption History zones:

1. Navigate to the Service Point tab in the 360 Degree View for the service point you wish to view.
2. Click the broadcast icon for the measuring component type applicable to the consumption history you wish to view.
3. To change the value identifier type, select the type from the drop-down list, and click **Load**.
4. To change the dates or times for the display, adjust the dates and times as appropriate, and click **Load**.

5. To change the event bar profile for the display, select the profile from the drop-down list, and click **Load**.

Viewing Usage Subscription Data Using the 360 Degree View

Use this procedure to view usage subscription-related data on the 360 Degree View.

The Usage Subscription tab contains the following zones:

- **Usage Subscription Overview:** Displays the usage subscription, main customer, service point, and direct channels for the selected usage subscription.
- **Usage Transaction History:** Lists usage transaction records for the usage subscription, including the start date/time, end date/time, description, and duration (in days) for each.
- **Timeline:** Displays a timeline of events for the usage subscription, including usage transactions, activities, and VEE exceptions. Each event is depicted as a button containing the date on which the event occurred.

You can access the Usage Subscription tab by clicking the Usage Subscription tab from any other tab on the 360 Degree View, or you can search for a specific usage subscription. To search for a usage subscription:

1. Select **Main Menu > 360 Search > [Option]**.

You can search by Name, Address, or Device.

2. Enter your search criteria.

Base package query options include the following:

- **Search by Name:** Allows search by name/address OR contact identifier OR usage subscription identifier. To search by address, click **Go To Search by Address**. To search by device, click **Device**.
- **Search by Address:** Allows search by address/name OR service point identifier. To search by name, click **Go To Search by Name**. To search by device, click **Device**.
- **Search by Device:** Allows search by device identifier OR measuring component identifier. To search by name, click **Go To Search by Name**. To search by address, click **Address**.

3. Click **Refresh**.

4. In the search results list, click the **Usage Subscription** link for the service point you want to view.

The 360 Degree View opens on the Usage Subscription tab.

5. To search for a specific month and year in the Timeline zone, select the month and year from the drop-down lists and click the **Search** icon. To navigate forward and back along the timeline, use the left and right arrows.
6. To view an event displayed in the Timeline zone, click the event button. A description of the event displayed below the timeline. Click the description to navigate to view more details for the event.

Viewing Contact Data Using the 360 Degree View

Use this procedure to view contact-related data on the 360 Degree View.

The Contact tab contains the following zones:

- **Contact Overview:** Displays contact information (name, phone number, email address, etc.) for the selected contact.
- **Contact's Service Points:** Lists the service points related to the contact, including the relationship type (main contact, main customer, etc.) for each.

- **Contact's Usage Subscriptions:** Lists the usage subscriptions related to the contact, including the relationship type (main contact, main customer, etc.) for each.

You can access the Contact tab by clicking the Contact tab from any other tab on the 360 Degree View, or you can search for a specific contact. To search for a contact:

1. Select **Main Menu > 360 Search > [Option]**.

You can search by Name, Address, or Device.

2. Enter your search criteria.

Base package query options include the following:

- **Search by Name:** Allows search by name/address OR contact identifier OR usage subscription identifier. To search by address, click **Go To Search by Address**. To search by device, click **Device**.
- **Search by Address:** Allows search by address/name OR service point identifier. To search by name, click **Go To Search by Name**. To search by device, click **Device**.
- **Search by Device:** Allows search by device identifier OR measuring component identifier. To search by name, click **Go To Search by Name**. To search by address, click **Address**.

3. Click **Refresh**.

4. In the search results list, click the **Contact** link for the contact you want to view.

The 360 Degree View opens on the Contact tab.

Chapter 6

Aggregations

This section describes concepts and procedures related to managing aggregations.

About Aggregations

Aggregations are measurements that represent a summarization of other measurements from a set of devices, items, and/or measuring components.

For example, an aggregation may be based on the sum of the electric consumption of all residential customers in a particular postal code within the utility's service territory.

The group of related measuring components for which measurements are summarized are referred to as constituent measuring components.

Every type of aggregation has one or more dimensions. For example, a transformer aggregation might be defined with three dimensions as follows:

- Substation
- Feeder
- Transformer

Aggregations are defined by aggregator measuring components. A separate aggregator measuring component should be defined for every distinct combination of dimensions for a given type of aggregation. For example, the transformer aggregation described above would require an aggregator measuring component for every distinct combination of substation / feeder / transformer found among the electric service points.

Aggregations can also be aggregated. For example, the aggregator measuring components for each substation / feeder / transformer combination can in turn be used to aggregate consumption at each substation / feeder combination. In this case, a distinct aggregator measuring component would be defined for each unique substation / feeder combination. Likewise, the aggregator measuring components for each substation / feeder combination could be used to aggregate consumption at each substation, in which case, distinct aggregator measuring components would be defined for every unique substation. Finally, the aggregator measuring components for each substation can be used to aggregate total consumption for all substations, with an aggregator measuring component defined to represent the entire service area.

Base Package Aggregators

This topic describes the base package aggregators delivered with Oracle Utilities Meter Data Management.

Base package aggregators are delivered as aggregator measuring component business objects and measuring component types.

The base package contains the following aggregators:

- **Aggregator — Postal and Service Type:** Aggregates measurement quantities for constituent measuring components based on postal code and service type dimensions.
- **Item Aggregator — Postal and Service Type:** Aggregates measurement quantities for constituent items based on postal code and service type dimensions.
- **Business Intelligence Aggregators:** The following aggregators are used by the Oracle Utilities Meter Data Management Extractors and Schemas, and aggregate measurement data (including quantities and counts) for constituent measuring components based on the following dimensions: Postal, City, Head-End, Device Type, Usage Calculation Group, Market and Service Provider, and Service Type.
 - **Measurement Measured Quantity Aggregator:** Aggregates measurement quantities and distributes the constituents' measurements across Value Identifiers based on condition codes.
 - **Measurement Quality Count Aggregator:** Aggregates measurement counts and distributes the constituents' counts across Value Identifiers based on condition codes.
 - **Measurement Timeliness Count Aggregator:** Aggregates measurement counts that arrived on time or are late.
 - **Measurement Timeliness Quantity Aggregator:** Aggregates measurement quantities that arrived on time or are late.

Working with Aggregations

This section describes common tasks related to working with aggregations.

Creating Aggregations

Use this procedure to manually create a new aggregator measuring component.

Aggregator measuring components are automatically created when new "dimensional values" are detected. For example, if a new substation is added to the system a new aggregator measuring component will be created for the substation. However, users can also create aggregator measuring components using the following procedure.

1. **Main Menu > Total and Trends > Consumption Statistics.**
2. Click the **Add** link in the **Aggregator Search** zone title bar.
3. Select the measuring component type for the new aggregator.

The list of available measuring component types is filtered by Measuring Component Category to display only Aggregator measuring component types.

4. Click **OK**.
5. If the aggregator is to aggregate data for a one time event, check the **One Time Aggregation** checkbox. If aggregation for the aggregator measuring component are to be performed indefinitely, leave this unchecked.
6. Complete any remaining fields and sections.

NOTE: Remaining fields and sections are based on the aggregator measuring component type you selected.

7. Enter the start and end date and time for the aggregation period in the **Next Aggregation Horizon** section.
8. Click **Save**.

Once the aggregator has been created, aggregated measurements can be calculated manually, or via batch process.

Aggregation Search

Use this procedure to search for aggregations using the **Consumption Statistics** portal.

1. Select **Main Menu > Total and Trends > Consumption Statistics**.
2. Enter your search criteria.
Base package search options include service type and postal code.
3. Click **Refresh**.
4. In the search results list, click the link for the aggregation you want to view.
The selected aggregation is displayed in the **Total and Trends View** portal.

Maintaining Aggregations

Use this procedure to maintain an existing aggregation.

You use the **Total and Trends View** portal to maintain aggregations. This portal includes the following zones:

- **Measuring Component:** defines the basic attributes of the aggregator measuring component.
- **Measurements:** displays aggregated measurement data for the selected aggregator measuring component.
- **Interval - Audit View:** allows users to view an interval measurement curve for a given period overlaid with the count of audit records for each individual measurement.
- **Final Values Overlay:** displays final measurements for a measuring component, and provides the ability to overlay the graphed data with final measurements from other measuring components.
- **Time of Use Overlay:** displays an overlay of the TOU periods on a final interval measurement along with totalized TOU consumption based on a user-defined time period and TOU map

To maintain an aggregation:

1. Select **Main Menu > Total and Trends > Consumption Statistics** to navigate to the **Consumption Statistics** portal.
2. Search for and select the appropriate aggregation.
3. Click the **Edit** or **Delete** button as appropriate.

NOTE: Other actions available for the aggregations are based on the business object used to define the aggregation, and the current status of the aggregation.

4. To activate an inactive aggregation, click the **Activate** button.
5. To deactivate an active aggregation, click the **Deactivate** button.

6. To aggregate measurements for the aggregator measuring component, click the **Aggregate** button.

Chapter 7

Device Management

This section describes concepts and procedures related to managing meter-related objects such as meters, registers, and channels. This includes managing devices, device configurations, and measuring components.

Understanding Devices and Measuring Components

This section describes concepts related to device management.

About Devices

Devices are physical or virtual objects that can produce data to be handled by the system.

Examples of devices include meters, substations, transformers, demand response devices, weather stations, etc.

Attributes used to define devices include the following:

- The device type of the device
- One or more device identifiers such as serial number, badge number, meter number, etc.
- Manufacturer and model
- The status of the device (active, inactive, retired, etc.)

A device can have one or more device configurations over time. A device's measuring components (if applicable) are associated with the device via device configurations.

You use the Device portal to maintain devices. This portal includes the following zones:

- **Device:** defines the basic attributes of the device
- **Device Configuration Overview:** lists the device configurations for the device
- **Device Activities:** lists activities related to the device in date descending order

- **Device Exceptions:** lists the first 50 VEE exceptions for all measuring components for the device, sorted by the exception creation date in descending order

Refer to the Oracle Utilities Service and Measurement Data Foundation online help for more information about working with devices.

About Items

While the most common type of devices are meters, there are many other devices that can be involved with a customer's service. These other devices are referred to simply as "items", and are used for many different devices including lamps, poles, current transformers, backflow devices, pulse initiators, etc.

Items can be either "badged" or "unbadged". "Badged" items are those that have unique identifiers, and are represented by device records. Device records are not created for "unbadged" items. "Badged" items are installed at service points in much the same way as meters are installed (though they use an item-specific install event). For "unbadged" items, "multi-item" service points are used to define the number of each TYPE of item that is installed at the service point.

About Device Configurations

Device configurations represent specific configurations of a device as of a certain time.

Over time, a device can have many configurations. Device configurations are effective-dated, allowing a device to retain its identifiers (such as serial number, badge number, etc.) even while the quantities it measures change over time.

Attributes used to define device configurations include the following:

- The device configuration type
- The parent device
- The effective date and time of the device configuration
- The time zone in which the device operates
- The status of the device configuration (active, inactive, etc.)

Each device configuration can have one or more measuring components associated with it.

You use the Device Configuration portal to maintain device configurations. This portal includes the following zones:

- **Device Configuration:** Defines the basic attributes of the device configuration
- **Measuring Components:** Lists the measuring components for the device configuration
- **Scalar Readings:** Displays a list of scalar readings for scalar measuring components associated with the current device configuration. To create a new reading for scalar measuring components associated with the device configuration, click **New Reading**. To edit an existing reading, click the edit icon for the reading you wish to edit.

NOTE: The **Scalar Readings** zone is available only with Oracle Utilities Meter Data Management.

Refer to the Oracle Utilities Service and Measurement Data Foundation online help for more information about working with device configurations.

About Measuring Components

Measuring components are single points for which data will be received and stored in the system.

A measuring component can be associated to a device, which can have one or more measuring components, or it can be "virtual" or "stand-alone," meaning that it is not associated to a device. Examples of stand-alone measuring components include:

- **Aggregator:** A class of measuring component that stores measurements that represent a summarization of other measurements from a potentially diverse set of devices. For example, an aggregator may derive the sum of the natural gas consumption of all residential customers in a particular postal code within the utility's service territory.
- **Interval Scratchpad:** A class of measuring component that provides users with a means to manipulate "scratchpad" measurement data without affecting existing "live" measurement data.

Attributes used to define measuring components can include the following:

- The measuring component type
- The device configuration to which the measuring component is associated
- Details concerning how the measuring component is read, such as the number of digits, the type of read out (dials or digital), the meter multiplier, etc.
- The VEE groups used for validation and estimation of measurement data. The base package supports the following type of VEE groups:
 - **VEE Group for Initial Load:** the VEE group used for validation upon initial load of the measurement data
 - **VEE Group for Estimation:** the VEE group used for estimation of missing data for the measuring component
 - **VEE Group for Manual Override:** the VEE group used for when the measurement data is in the Manual Override state (this state allows users to edit data prior to VEE processing)

You use the Measuring Component portal to maintain measuring components. This portal includes the following zones:

- **Measuring Component:** defines the basic attributes of the measuring component
- **Initial Measurement Data History:** lists the last 50 initial measurements for the measuring component, in date-descending order.
- **Measuring Component Profile Use:** lists all profile factors on which the measuring component is referenced as a factor value.
- **Measurements:** lists final measurements for the measuring component, including any derived values for each measurement.
- **Device Configuration Overview:** Displays an overview of the measuring component's parent device's configurations over time, including the measuring components associated with each configuration, and service points (along with the relevant install events) at which the device's configurations have been installed over time, if any exist.

Refer to the Oracle Utilities Service and Measurement Data Foundation online help for more information about working with measuring components.

About Scratchpad Measuring Components

Scratchpad measuring components are stand-alone measuring components that provides users with a means to manipulate "scratchpad" measurement data without affecting existing "live" measurement data.

Scratchpad measuring components are defined by the same attributes as "regular" measuring components, with the following additional attributes:

- **User:** The name of the user who created the scratchpad. All scratchpad measuring components "belong" to a user.
- **Source Measuring Component:** The measuring component upon which the scratchpad is based.

Like "regular" measuring components, scratchpad measuring components can be related to a device through a device configuration, but scratchpad measuring components are not considered "active" for purposes of install events, and are not used in usage calculations for usage subscriptions.

Like "regular" measuring components, scratchpad measuring components are viewed and maintained using the Measuring Component portal, and measurement data for scratchpad measuring components can be viewed using the Initial Measurement portal or the 360 Degree View.

Working with Scratchpad Measuring Components

This section describes common tasks related to working with scratchpad measuring components.

Creating Scratchpad Measuring Components

Use this procedure to create a new scratchpad measuring component.

Prerequisites: You must define at least one scratchpad measuring component type before you can create scratchpad measuring components.

You create scratchpad measuring components based on a specific measuring component, via the Create Scratchpad function on the Select Function drop-down list on zones on the Measuring Component tab in the 360 Degree View.

1. Navigate to the Measuring Component tab of the 360 Degree View for the measuring component upon which you wish to base your new scratchpad measuring component.
2. Select **Create Scratchpad** from the **Select Function** drop-down list in the Interval Data section of one of the following zones:
 - Interval - Initial Measurement Overlay
 - Final Values Overlay
 - Interval - Audit View
 - Time of Use By Day
 - Time of Use Overlay
3. Enter the Start and End dates and times for the new scratchpad measuring component. These define the time range for the measurement data for the scratchpad measuring component.

The start and end dates and times default to the dates on the zone from which you selected the function, but can be adjusted.
4. To shift the start time of the measurement data (and the interval measurements it contains), check the Shift Intervals checkbox, and enter a **New Start Date/Time**.
5. Select the scratchpad measuring component type for the new scratchpad measuring component.
6. Enter a description for the new scratchpad measuring component.
7. Click **OK**.

You can now view and edit the measurement data for this scratchpad measuring component as you might for any other measuring component.

Scratchpad Measuring Component Search

Use this procedure to search for a scratchpad measuring component on the Scratchpad Measuring Component portal.

1. Select **Main Menu > Device > Scratchpad Measuring Component**.

The Scratchpad Measuring Component portal contains the following zones:

- **My Scratchpad Measuring Components:** Lists all the scratchpad measuring components for the current user.
- **Scratchpad Measuring Component Search:** Allows the user to search for scratchpad measuring components.

2. To view one of your scratchpad measuring components in the 360 Degree View, click the **Go To 360 Degree View** icon for the scratchpad measuring component you wish to view.
3. To search for a scratchpad measuring component, enter your search criteria in the Scratchpad Measuring Component Search zone.
You can search by source measuring component, or user.
4. Click **Refresh**.
5. In the search results list, click the link for the scratchpad measuring component you want to view or edit.

Maintaining Scratchpad Measuring Components

Use this procedure to maintain an existing scratchpad measuring component.

You use the Measuring Component portal to maintain scratchpad measuring components. This portal includes the following zones:

- **Measuring Component:** Defines the basic attributes of the scratchpad measuring component
- **Initial Measurement Data History:** Lists the last 50 initial measurements for the scratchpad measuring component, in date-descending order.
- **Measuring Component Profile Use:** Lists all profile factors on which the scratchpad measuring component is referenced as a factor value.
- **Device Configuration Overview:** Lists device configuration information for the source measuring component, including the measuring components associated with each configuration. This zone also lists service points (along with the relevant install events) at which the device's configurations have been installed over time.

To maintain a scratchpad measuring component:

1. Select **Main Menu > Device > Scratchpad Measuring Component** to navigate to the Measuring Component portal.
2. Search for and select the appropriate scratchpad measuring component.
3. Click the **Edit** or **Delete** button as appropriate.
4. To deactivate the scratchpad measuring component, click the **Deactivate** button.
5. To view initial measurement data for the measuring component, click the initial measurement in the Initial Measurement Data History zone. The selected measurement opens in the Initial Measurement portal. See [Viewing Initial Measurement Data for a Measuring Component](#) for more information.

Manually Adding Register Readings for Scalar Measuring Components

Use this procedure to manually add or modify scalar readings for register measuring components.

Scalar reads can only be entered manually for manually-read scalar “Register” measuring components. This feature can not be used with “Register — Auto Read” measuring components.

You can add register readings from either the **Device Configuration Overview** zone on the **360 Degree View** portal, or the **Scalar Readings** zone on the **Device Configuration** portal. To add or modify scalar readings:

1. Click the **New Reading** link.
The **Meter Read** page opens.

The **Main** section defines the device configuration and date and time for scalar readings. When creating new readings or editing existing readings, the date/time fields can be edited as needed to reflect the date and time of the reading(s).

The **Registers** section defines details of the scalar readings for the scalar register measuring components on the device configuration, including:

- **Sequence:** The sequence for the reading (display-only).
- **Measuring Component:** The measuring component for the reading.
- **Reading:** The dial reading for the register. When creating/editing readings, enter the appropriate value in this field.
- **Measurement Condition:** The condition code the reading. When creating/editing readings, select the appropriate condition code for the reading from the drop-down list.
- **Reading Information:** Details concerning the reading (updated when reading is saved).
- **Previous Reading Information:** Details about the read that precedes this read (updated when reading is saved).

NOTE: Any errors with existing readings will be indicated when this page opens. Also, if you enter invalid data (based on the configuration of the measuring component), an error will be returned when you attempt to save the readings.

2. Enter the **Read Date/Time** for the reading(s).
3. Enter the **Reading** value. This is typically the dial reading as of the date/time.
4. Select the condition code for the reading from the **Measurement Condition** drop-down list.
5. Click **Save**.

The **Reading Information** and **Previous Reading Information** fields are populated when the reading is saved.

Chapter 8

Usage Management

This section describes concepts and procedures related to managing usage subscriptions, usage transactions, and related data.

Understanding Usage Management

This section describes concepts related to usage management.

About Dynamic Options

Dynamic Options specify terms that override how usage is normally calculated, such as a critical peak period that affects the TOU mapping of interval consumption.

There are circumstances and conditions during which the rules for creating TOU map data might need to be calculated differently than according to the utility's standard rules. Examples of this might include critical peak periods, curtailment requests or other demand response events. During these types of events, the TOU rules defined for a TOU map may be overridden. This is done through the use of dynamic options and dynamic option events.

Dynamic options allow flexibility for ad-hoc and special events that might impact how usage calculations are performed. For example, if a utility requests that its customers curtail their usage for a specific time period, a dynamic option and corresponding dynamic option event could be used to represent the curtailment request. During the time period of the curtailment request, usage might be calculated differently (with a different set of TOU periods, for example), which in turn might impact how the customer's bill is calculated.

Attributes used to define dynamic options include the following:

- Dynamic Option Type
- Status

About Dynamic Option Types

Dynamic option types store information common to dynamic options of a specific type.

About Dynamic Option Events

Dynamic Option Events are specific periods of time during which a dynamic option is applicable.

There are circumstances and conditions during which the rules for creating TOU map data might need to be calculated differently than according to the utility's standard rules. Examples of this might include critical peak periods, curtailment requests or other demand response events. During these types of events, the TOU rules defined for a TOU map may be overridden. This is done through the use of dynamic options and dynamic option events.

A dynamic option may have many dynamic option events over time.

Attributes used to define dynamic option events include the following:

- **Status:** The status of the event
- **Start Date/Time:** The start time for the period during which the dynamic option is in effect
- **Stop Date/Time:** The stop time for the period during which the dynamic option is in effect

About TOU Maps

TOU Maps are collections of TOU map data derived via a given TOU map template at a specific interval size and TOU.

A TOU map is typically specified when configuring a usage calculation rule for TOU mapping. This TOU map's data will then be used when summarizing the interval data for each TOU period.

TOU Map Data are interval date/times and associated TOU periods as defined by a TOU map template. For example, if the schedule defined for a TOU map template specifies that the period on weekdays from 9 AM to 5 PM falls into On-Peak, and the data is hourly, TOU map data for that template would include records with the date/time 5/3/2010 at 10 AM, 5/3/2010 at 11 AM, 5/3/2010 at 12 PM, etc., each with a value of On-Peak.

TOU maps can also have dynamic options defined for them, which are used to override normal TOU map data creation for specific date ranges (defined as dynamic option events). Each dynamic option defined for a TOU map has a related alternative TOU map used to create TOU map data during the period of the dynamic option event. For example, assume a schedule defined for a TOU map template specifies that the period on weekdays from 9 AM to 5 PM falls into On-Peak (same as above). You could define a dynamic option that overrides this for a certain period of time (specified in a dynamic option event) during which the period on weekdays from 9 AM to 5 PM falls into Off-Peak (or some other TOU).

About TOU Groups

TOU Groups are groups of TOUs used to limit the set of TOUs usable in a TOU schedule.

TOU groups are used when defining a TOU schedule via a TOU map template.

About TOU Map Templates

TOU Map Templates are the schedules used for TOU map data generation.

Attributes used to define TOU map templates include the following:

- **TOU Group:** the TOU group used by the map template
- **Default TOU:** the default TOU for the map template (from the TOU Group). This is the TOU used when creating TOU map data for dates not accounted for in the TOU Schedules section.
- **Work Calendar:** the work calendar associated with the map template. Work calendars define the days of the week on which work is performed, and specify holidays.
- **Holiday TOU:** the TOU used for holidays (from the TOU Group)
- **Holiday Template:** the TOU map template used for holidays (if applicable)
- **Interval Size:** the size of the intervals for TOU map data created from the map template, represented as hours:minutes:seconds (HH:MI:SS).
- **TOU Schedules:** date ranges (including month, day, and time ranges) and which TOUs should be used during each.

About TOU Map Types

TOU Map Types define important properties of TOU maps of the type, including the interval size and the valid TOU map templates.

Attributes used to define TOU map types include the following:

- **Time Zone:** the time zone in which TOU maps of this type are applicable
- **Interval Size:** the size of the intervals for TOU map data created from maps of this type, represented as hours:minutes:seconds (HH:MI:SS).
- **Default TOU Map Template:** the default TOU map template used by maps of this type
- **Override TOU Map Templates:** one or more TOU map templates that can be used as an override on TOU maps of this type.

About Usage Subscriptions

Usage Subscriptions are ongoing requests to send one or more service points' usage to one or more external systems (such as a billing application).

Attributes used to define usage subscriptions include the following:

- **Master Usage Subscription:** The "master" usage subscription for this "sub" usage subscription (if applicable). "Master" and "sub" usage subscriptions allow for hierarchical relationships between usage subscriptions to represent situations where a subscription is a subordinate to another usage subscription (such as when a utility is issuing a bill for a third-party service).
- **Start and End Date and Times:** The start and end times that define the time period during which the usage subscription is active.
- **Usage Recipient:** The recipient of bill determinants and usage calculated for the usage subscription, based on Valid Service Providers defined by the usage subscription's type.
- **Usage Approved:** A flag that indicates if usage must be approved before being sent to the recipient.
- **Main Contact:** The main contact for the usage subscription.
- **Time Zone:** The time zone in which the usage subscription is active.
- **Factor Overrides:** One or more factors used as override values when calculating bill determinants or usage.
- **Usage Groups:** The usage groups used to calculate bill determinants or usage. Usage groups are effective-dated and can have an expiration date and time. If all usage groups for the usage subscription have expired or none are in effect when calculations are performed, calculations are performed using the Fallback Usage Group defined for the usage subscription's type.

Note: If the **Usage Group Determination Override Algorithm** field on the usage subscription type is populated, the specified algorithm is used to determine the usage groups to use, and the usage groups defined in this section are ignored.

- **Fallback Usage Groups:** Defines effective dated fallback usage groups for the current usage subscription type (used in event that no valid usage groups are defined for the usage subscription).
Note: If the **Usage Group Determination Override Algorithm** field on the usage subscription type is populated, the specified algorithm is used to determine the usage groups to use, and the usage groups defined in this section are ignored.
- **Rate History:** One or more effective-dated Oracle Utilities Customer Care and Billing rates for the usage subscription. These are used when integrating Oracle Utilities Meter Data Management with Oracle Utilities Customer Care and Billing to support dynamic determination of the usage groups to use when calculating usage for the usage subscription.
- **Measuring Components:** One or more measuring components directly related to the usage subscription. Measuring components of this type are most often aggregator measuring components, but can also include profile measuring components.
 - **Relationship Type:** The type of relationship between the usage subscription and the measuring component. Relationship types are defined in the Usage Subscription Measuring Component Relationship Type lookup (US_MC_REL_TYPE_FLG). Base package relationship types include “Consumption Aggregator.”
 - **Measuring Component:** The measuring component ID for the related measuring component.
- **Service Points:** The service points whose measurements are used to calculate usage for the usage subscription.
 - **Start Date/Time:** The start date and time of the relationship between the usage subscription and the service point. All measurements used calculate usage for the usage subscription should have a start date/time later than this date and time.
 - **Override Start Date/Time:** An override date and time used to specify the start date and time when identifying measurements used to calculate usage for the usage subscription. If not specified, the **Start Date/Time** is used
 - **Stop Date/Time:** The stop date and time of the relationship between the usage subscription and the service point. All measurements used calculate usage for the usage subscription should have a stop date/time before than this date and time.
 - **Override Stop Date/Time:** An override date and time used to specify the stop date time when identifying measurements used to calculate usage for the usage subscription. If not specified, the **Stop Date/Time** is used.
 - **Usage:** A flag that indicates how the consumption from this service point is used when calculating usage for the usage subscription. Valid values include:
 - **Add:** The service point's consumption should be added to the consumption of other service points when calculating usage for the usage subscription.
 - **Exclude:** The service point's consumption should be excluded when calculating usage for the usage subscription.
 - **Subtract:** The service point's consumption should be subtracted from the consumption of other service points when calculating usage for the usage subscription.
 - **Use Percent:** The percentage of consumption from this service point that should be used when calculating usage for the usage subscription.

About Usage Subscription Types

Usage Subscription Types define a collection of properties defining a class of usage subscriptions.

Usage subscription types also control valid values for various attributes of usage subscriptions.

Usage subscription types are defined by the following:

- **Usage Recipient :** The service provider for usage subscriptions of this type
- **Usage Group Determination Override Algorithm:** An override algorithm used to determine the usage calculation group to use when creating usage transactions for usage subscriptions of this type. If an algorithm is specified, its logic

overrides the existing method of determining the usage group. If no algorithm is specified, the default method of using the usage group specified on the usage subscription is used.

- **Meter Exchange Option:** A flag that specifies whether to consider new device configurations that became effective during the usage transactions cutoff period (the time period between the **End Date/Time From** and **End Date/Time To** values). If the flag is set to 'Defer Calculation', new device configurations are excluded in the current usage transaction. If the flag is blank or set to 'Calculate Usage', new device configurations are included in the current usage transaction.
- **Valid Service Point Types:** One or more service point types considered valid for usage subscriptions of this type
- **Valid Usage Recipients:** One or more service providers considered valid recipients for usage transactions created from usage subscriptions of this type
- **Valid Usage Groups:** One or more usage groups considered valid for usage subscriptions of this type
- **Fallback Usage Groups:** One or more fallback usage groups for usage subscriptions of this type. Fallback usage groups are used in the event that a usage group defined for a usage subscription is not in effect at the time usage is to be calculated.

About Usage Transactions

Usage transactions are records of bill determinant calculations for a usage subscription.

Attributes used to define usage transactions include the following:

- **Parent Usage Transaction:** The "parent" usage transaction for this "sub" usage transaction (if applicable). "Master" and "sub" usage transaction allow for hierarchical relationships between usage transactions. Applicable only to "sub" usage transactions.
- **Usage Subscription:** The usage subscription for which the usage transaction was created.
- **Previous Usage Transaction:** The information string for the previous usage transaction for the same usage subscription.
- **Usage External ID:** An ID used by external systems used to identify the usage transaction. When Oracle Utilities Meter Data Management is integrated with Oracle Utilities Customer Care and Billing, Oracle Utilities Customer Care and Billing can send this to help identify the previous usage transaction.
- **Status:** the current state of the usage transaction
- **Start and End Date and Times:** The start and end times that define the time period for the usage transaction.
- **Usage Group:** The usage group (or groups) used to calculate usage for the usage transaction.
- **Bill Condition:** The status of the bill associated with the usage transaction (if applicable), used for informational purposes only. Valid values include "Initial", "Interim", and "Closing"
- **Automated Retry:** A flag that indicates if system should automatically retry to perform calculations in the event that an issue is detected.
- **Next Retry Date/Time:** The date and time for the next time at which the system will retry to perform calculations following the detection of an issue. Applicable only if the **Automated Retry** drop-down list is set to "Yes".
- **Retry Until Date/Time:** The last date and time until which the system will retry to perform calculations following the detection of an issue. Applicable only if the **Automated Retry** drop-down list is set to "Yes".
- **Sub Usage Transactions Exist:** A flag that indicates if sub-usage transactions exist for the usage transaction.
- **Defer Calculation:** A flag that indicates if calculations for the usage transaction should be deferred.
- **Trace:** Indicates if tracing is on for the usage transaction.
- **Skip:** A flag that indicates if the usage transaction should be skipped.
- **Skip Reason:** A reason for skipping the usage transaction.
- **Next Scheduled Read Date:** The next scheduled read date for the service point associated with the usage transaction.

- **Calculation Mode:** A flag that indicates the mode in which the usage transaction calculations are/were performed. Valid values include:
 - **Hypothetical Calculation:** Indicates that the calculations are performed for purposes of comparing an existing rate against an alternative rate. This field can be referenced by usage rule eligibility criteria to determine if/when a usage rule should be processed when performing a rate comparison.
- **Usage Adjustment Profile Factors:** Defines one or more profile factors and applicable characteristic values used to adjust usage values when performing a rate comparison. Usage adjustment profile factors are defined for specific rates in the **Rate Comparison Configuration** section of the "Self-Service Master Configuration". When a configured rate is used in usage transaction calculations, the profile factors defined for that rate are retrieved by "Profile Accumulation" usage rules.
- **Interval Measuring Component:** Start and End dates and times for the interval measuring component that created the measurements used in calculating usage for the usage transaction (if applicable).
- **Scalar Measuring Component:** Start and End dates and times (and other details) for the scalar measuring component that created the measurements used in calculating usage for the usage transaction (if applicable).
- **Date Break:** One or more date breaks for the usage transaction. Date breaks are used to break up a usage period into sub-periods based on the dates on which rate changes took place for the service point (and its related account).
- **Issues:** A list of issues or exceptions related to the usage transaction
- **Scalar Detail:** Details of scalar measurements used in calculating for the usage transaction
- **Usage Period:** A list of the usage quantities calculated for the usage transaction, including the following:
 - **UOM, TOU, SQI** (as applicable): The unit of measure/time of use period/service quantity identifier for the service quantity
 - **Quantity:** The total quantity for the service quantity
 - **Data Quality Assessment:** A flag that indicates the quality of the service quantity. Can be one of the following:
 - **No Assessment Done:** Indicates that quality assessment was not performed for the service quantity
 - **Quantity Based on Regular Data Only:** Indicates that the service quantity contains only data with a condition that falls in the "regular" condition range
 - **Quantity Based on Some Non-Regular Data:** Indicates that the service quantity contains some data with a "non-regular" condition code (i.e. data that falls outside the "regular" condition range)
 - **SQ (Service Quantity) Type:** The type of service quantity (Factor, Measuring Component, Item, Other)
 - **Service Point:** The service point associated with the service quantity
 - **Measuring Component:** The measuring component associated with the measurements used to calculate the service quantity
 - **TOU Map** (if applicable): The time of use map used to calculate the service quantity
 - **Usage Group:** The usage group that contains the usage rule used to calculate the service quantity
 - **Usage Rule:** The usage rule used to calculate the service quantity
 - **Source Measurement Quality List:** XML that contains a list of measurements aggregated by condition/quality.
 - **SQ Highlight Date/Time List:** XML that contains a list of maximum/minimum date/times, based on condition/quality
- **Item Detail:** A list of one or more items for which usage was calculated for the usage transaction. This section displays details for each service quantity calculated for each item, including item type, item count, total quantity, daily service quantity, start and end times, UOM, service point, override quantity (if applicable) and the usage group/rule used to calculate the usage.

Working with Dynamic Options

This section describes common tasks related to working with dynamic options.

Creating Dynamic Options

Use this procedure to create a new dynamic option.

Prerequisites: You must define at least one dynamic option type before you can create dynamic options.

1. Select **Main Menu > Usage > Dynamic Option+**.
2. Select the dynamic option type that will define the dynamic option.
3. Enter a description for the dynamic option.
4. Complete any remaining fields (if applicable).
5. Click **Save**.

Dynamic Option Search

Use this procedure to search for a dynamic option on the Dynamic Option Query portal.

1. Select **Main Menu > Usage > Dynamic Option**.
2. Enter your search criteria.
You can search by Dynamic Option ID or Description, or Dynamic Option Type or Description.
3. Click **Refresh**.
4. In the search results list, click the link for the dynamic option you want to view or edit.

Maintaining Dynamic Options

Use this procedure to maintain an existing dynamic option.

You use the Dynamic Option portal to maintain dynamic options. This portal includes the following zones:

- **Dynamic Option:** Defines basic information about the dynamic option
- **Dynamic Option Event List:** Lists dynamic option events based on the dynamic option

To maintain a dynamic option:

1. Select **Main Menu > Usage > Dynamic Option** to navigate to the Dynamic Option portal.
2. Search for and select the appropriate dynamic option.
3. Click the **Edit** or **Delete** button as appropriate.
4. To view a dynamic option event, click the event in the **Dynamic Option Event List** zone. See [Maintaining Dynamic Option Events](#) for more information.

Working with Dynamic Option Events

This section describes common tasks related to working with dynamic option events.

Creating Dynamic Option Events

Use this procedure to create a new dynamic option event.

Prerequisites: You must define at least one dynamic option before you can create dynamic option events.

1. Select **Main Menu > Usage > Dynamic Option Event+**.
2. Search for and select the dynamic option on which the new dynamic option event will be based.
3. Click **OK**.
4. Enter a start and end date and time for the dynamic option event.
5. Complete any remaining fields (if applicable).
6. Click **Save**.

Dynamic Option Event Search

Use this procedure to search for a dynamic option event on the Dynamic Option Event Query portal.

1. Select **Main Menu > Usage > Dynamic Option Event**.
2. Enter your search criteria.
You can search by Dynamic Option Event ID or or Dynamic Option ID and Start and End dates and times.
3. Click **Refresh**.
4. In the search results list, click the link for the dynamic option event you want to view or edit.

Maintaining Dynamic Option Events

Use this procedure to maintain an existing dynamic option event.

You use the Dynamic Option Event portal to maintain dynamic option events. This portal includes the following zones:

- **Dynamic Option Event:** Defines basic information about the dynamic option

To maintain a dynamic option event:

1. Select **Main Menu > Usage > Dynamic Option Event** to navigate to the Dynamic Option Event portal.
2. Search for and select the appropriate dynamic option event.
3. Click the **Edit** or **Delete** button as appropriate.

Working with TOU Maps

This section describes common tasks related to working with TOU maps.

Creating TOU Maps

Use this procedure to create a new TOU map.

Prerequisites: You must define at least one TOU map type before you can create TOU maps.

1. Select **Main Menu > Usage > TOU Map+**.
2. Select the TOU map type that will define the TOU map.
3. Click **OK**.
4. Enter a description for the TOU map.
5. Select the TOU map template for the TOU map
6. Complete any remaining fields (if applicable).
7. To add dynamic options to the TOU map, click the + or – sign in the **Dynamic Option/Dynamic TOU Map** section and do the following each:
 - Enter a sequence number for the dynamic option
 - Search for and select the dynamic option
 - Search for and select the TOU to use with the dynamic option
8. Click **Save**.

TOU Map Search

Use this procedure to search for a TOU map on the TOU Map Query portal.

1. Select **Main Menu > Usage > TOU Map**.
2. Enter your search criteria.
You can search by Description, TOU Map Type, or creation date.
3. Click **Refresh**.
4. In the search results list, click the link for the TOU map you want to view or edit.

Maintaining TOU Maps

Use this procedure to maintain an existing TOU map.

You use the TOU Map portal to maintain TOU maps. This portal includes the following zones:

- **TOU Map:** Defines basic information about the TOU map, including dynamic options
- **TOU Map Data List:** Lists TOU map data created from the TOU map

To maintain a TOU map:

1. Select **Main Menu > Usage > TOU Map** to navigate to the TOU Map portal.
2. Search for and select the appropriate TOU map.
3. Click the **Edit** or **Delete** button as appropriate.
4. To deactivate the TOU map, click the **Deactivate** button.
5. To generate TOU map data for the TOU map, click the **Generate TOU Map Data** button, enter the Start and End date and time, and click **Generate**.

The TOU Map Data List zone will refresh displayed the generated TOU map data.

6. To edit TOU map data, click the **Edit** icon for the record you wish to change.

Working with Usage Subscriptions

This section describes common tasks related to working with usage subscriptions.

Creating Usage Subscriptions

Use this procedure to create a new usage subscription.

Prerequisites: You must define at least one usage subscription type before you can create usage subscriptions.

1. Select **Main Menu > Usage > Usage Subscription+**.
2. Select the usage subscription type that will define the usage subscription. This specifies the business object that defines the usage subscription.
3. Click **OK**.
4. Select the “master” usage subscription for the current usage subscription (if applicable).
5. Enter the Start and End date and time for the usage subscription.
6. Select the usage recipient for the usage subscription. Usage recipients are defined as service providers.
7. Enter an external ID for the usage subscription.
8. Search for and select a main contact for the usage subscription.
9. Select the time zone applicable for the usage subscription.
10. Complete any remaining fields (if applicable).
11. To add or remove service points for the usage subscription, click the + or – sign in the Service Points section and do the following for each:
 - Search for and select the service point.
 - Enter the override start and end dates for the service point.
 - Enter the start and end dates for the service point.
 - Select the manner in which usage is calculated for the service point.
 - Specify the percentage of usage allocated to the service point.
12. To add or remove factor overrides for the usage subscription, click the + or – sign in the Factor Overrides section and do the following for each:
 - Select the factor

- Enter the start and end dates for the factor override
 - Enter the value for the factor override
- 13.** To add or remove usage groups for the usage subscription, click the + or – sign in the Usage Groups or Fallback Usage Groups sections and do the following for each:
- Enter the effective date and time for the usage group.
 - Enter the expiration date and time for the usage group. (does not apply to Fallback Usage Groups)
 - Select the usage group.
- 14.** To add or remove an associated rate for the usage subscription, click the + or – sign in the Rate History section and do the following for each:
- Enter the rate. This should match the rate code of a rate defined in the CCB Rate Schedule Extendable Lookup.
 - Enter the effective date and time for the rate.
- 15.** To add or remove a related measuring component to the usage subscription, click the + or – sign in the Measuring Components section and do the following for each:
- Select the Relationship Type.
 - Search for and select the measuring component.
- 16.** Click **Save**.

You can now use this usage subscription to create usage transactions.

Usage Subscription Search

Use this procedure to search for a usage subscription on the Usage Subscription Query portal.

- 1.** Select **Main Menu > Usage > Usage Subscription**.
- 2.** Enter your search criteria.
Base package query options include name/address, usage subscription identifier, and contact identifier.
- 3.** Click **Refresh**.
- 4.** In the search results list, click the link for the usage subscription you want to view or edit.

Maintaining Usage Subscriptions

Use this procedure to maintain an existing usage subscription.

You use the Usage Subscription portal to maintain usage subscriptions. This portal includes the following zones:

- **Usage Subscription:** Defines basic information about the usage subscription, including factor overrides, usage groups, and service points.
- **Sub Usage Subscriptions:** Lists the first fifty “sub” usage subscriptions for the master usage subscription displayed in the **Usage Subscription** zone. This zone is only displayed for “master” usage subscriptions.

To maintain a usage subscription:

- 1.** Select **Main Menu > Usage > Usage Subscription** to navigate to the Usage Subscription portal.
- 2.** Search for and select the appropriate usage subscription.
- 3.** Click the **Edit** or **Delete** button as appropriate.
- 4.** To deactivate the usage subscription, click the **Deactivate** button.

Working with Usage Transactions

This section describes common tasks related to working with usage transactions.

Creating Usage Transactions

Use this procedure to create a new usage transaction.

Prerequisites: You must define at least one usage subscription before you can create usage transactions.

Usage transactions are most often created by batch processing or requests from external systems, but can be created manually as well.

1. Select **Main Menu > Usage > Usage Transaction+**.
2. Search for and select the usage subscription for the usage transaction.
3. Select the Bill Condition for the usage transaction.
4. Select whether or not tracing for the usage transaction is on or off. Tracing allows users to view a trace zone that lists the steps performed during usage calculations.
5. If the usage transaction will calculate usage from interval measuring components, enter the Start and End dates and times for the usage period in the Interval Measuring Component section. Note that a usage transaction can calculate usage from both interval and scalar measuring components.
6. If the usage transaction will calculate usage from scalar measuring components, enter the Start and End dates and times for the usage period in the Scalar Measuring Component section. Note that a usage transaction can calculate usage from both interval and scalar measuring components.
7. Complete any remaining fields (if applicable).
8. Click **Save**.

Usage Transaction Search

Use this procedure to search for a usage transaction on the Usage Transaction Query portal.

1. Select **Main Menu > Usage > Usage Transaction**.
2. Enter your search criteria.
Base package query options include name/address, usage subscription ID, and usage transaction ID.
3. Click **Refresh**.
4. In the search results list, click the link for the usage transaction you want to view or edit.

Maintaining Usage Transactions

Use this procedure to maintain an existing usage transaction.

You use the Usage Transaction portal to maintain usage transactions. This portal includes the following zones:

- **Usage Transaction:** Defines basic information about the usage transaction, including usage period date ranges, date breaks within the usage period, scalar usage details, and usage quantity details.
- **Service Quantity Overlay:** Displays interval data for each service quantity for the usage transaction's usage period
- **Time of Use By Day:** Displays TOU-mapped interval data by day for the usage transaction's usage period

To maintain a usage transaction:

1. elect **Main Menu > Usage > Usage Transaction** to navigate to the Usage Transaction portal.
2. Search for and select the appropriate usage transaction.
3. To perform an action, click the appropriate button.

The specific actions available for a usage transaction are based on the current status of the usage transaction. The statuses in which each action are allowed are listed in parentheses. Action options include the following:

Edit	Allows user to edit the usage transaction. (Allowed Status: Any)
Delete	Deletes the usage transaction. (Allowed Status: Any)
Approve	Approves the usage transaction, and sets the status of the usage transaction to Sent (Allowed Status: Approval In Progress, Issue Detected)
Re-Calculate	Re-calculates usage for the usage transaction. (Allowed Status: Approval In Progress, Issue Detected)
Subsequent Correction	Allows a user to indicate that the usage transaction was corrected after being sent. Sets the status of the usage transaction to Subsequent Correction. (Allowed Status: Sent)
Resend	Allows a user to re-send a usage transaction (via its related outbound message) to an external system. Used when an error occurs when sending usage transactions. (Allowed Status: Send Error)
Discard	Discards the usage transaction. (Allowed Status: Issue Detected)

Usage Rule Administration

This section describes common tasks related to usage rule administration.

Defining Dynamic Option Types

Use this procedure to define dynamic option types.

Prerequisites: You must define time zones before you can create dynamic option types. Refer to the Oracle Utilities Application Framework online help for more information about creating time zones.

To maintain existing dynamic option types, select **Admin Menu > Usage > Dynamic Option Type**, then use [standard actions](#) to edit, duplicate, or delete a dynamic option type.

To define a new dynamic option type, follow these steps:

1. Select **Admin Menu > Usage > Dynamic Option Type+**.

NOTE: If your system supports more than one dynamic option type business object, you will be prompted to select a business object for this dynamic option type.

2. Enter a name and a meaningful description for the dynamic option type.

3. Select the business object to use when creating dynamic options of this type.
4. Select the time zone for dynamic options of this type.
5. Complete any remaining fields (if applicable).
6. Click **Save**.

Now you can use the dynamic option type when creating dynamic options.

Defining TOU Groups

Use this procedure to define TOU groups.

Prerequisites: You must define TOU periods (TOUs) before you can create TOU groups. Refer to the Oracle Utilities Service and Measurement Data Foundation online help for more information about creating TOU periods.

To maintain existing TOU groups, select **Admin Menu > Usage > TOU Group**, then use *standard actions* to edit, duplicate, or delete a TOU group.

To define a new TOU group, follow these steps:

1. Select **Admin Menu > Usage > TOU Group+**.

NOTE: If your system supports more than one TOU group business object, you will be prompted to select a business object for this TOU group.

2. Enter a name and a meaningful description for the TOU group.
3. To add or remove TOU periods for this TOU group, click the + or – sign in the TOU Section, enter a priority, and select the TOU.
4. Complete any remaining fields (if applicable).
5. Click **Save**.

Now you can use the TOU group when creating TOU map templates.

Defining TOU Map Templates

Use this procedure to define TOU map templates.

Prerequisites: You must define TOU groups and work calendars before you can create TOU map templates. Refer to the Oracle Utilities Application Framework online help for more information about creating work calendars.

To maintain existing TOU map templates, select **Admin Menu > Usage > TOU Map Template**, then use *standard actions* to edit, duplicate, or delete a TOU map template.

To define a new TOU map template, follow these steps:

1. Select **Admin Menu > Usage > TOU Map Template+**.

NOTE: If your system supports more than one TOU map template business object, you will be prompted to select a business object for this TOU map template.

2. Enter a name and a meaningful description for the TOU map template.
3. Select the TOU group for the TOU map template.

4. Select the default TOU for the TOU map template.
5. Select the work calendar for the TOU map template.
6. Select the holiday TOU for the TOU map template.
7. Select the TOU map template used for holidays (if applicable).
8. Specify the interval size for TOU map data created from the map template. Interval size is designated as hours:minutes:seconds (HH:MM:SS)
9. To specify TOU schedules for this TOU map template, click the + or – sign in the TOU Schedule Section and enter or select the following:
 - **Start and Stop Dates**
 - **Start and Stop Weekdays:** To add or remove Start and Stop Weekday pairs with the Start and Stop Dates, click the + or – sign and select the appropriate weekdays
 - **Start and Stop Times:** To add or remove Start and Stop Times within a Start and Stop Weekday pair, click the + or – sign and enter the appropriate times
 - **TOU**
10. Complete any remaining fields (if applicable).
11. Click **Save**.

Now you can use the TOU map template when creating TOU types.

Defining TOU Map Types

Use this procedure to define TOU map types.

Prerequisites: You must define TOU map templates and time zones before you can create TOU map types. Refer to the Oracle Utilities Application Framework online help for more information about creating time zones.

To maintain existing TOU map types, select **Admin Menu > Usage > TOU Map Type**, then use *standard actions* to edit, duplicate, or delete a TOU map type.

To define a new TOU map type, follow these steps:

1. Select **Admin Menu > Usage > TOU Map Type+**.

NOTE: If your system supports more than one TOU map type business object, you will be prompted to select a business object for this TOU map type.

2. Enter a name and a meaningful description for the TOU map type.
3. Select the time zone for the TOU map type.
4. Specify the interval size for TOU map data created from the map type. Interval size is designated as hours:minutes:seconds (HH:MM:SS)
5. Select the default TOU map template for the TOU map type.
6. Select the business object to use when creating TOU maps of this type
7. To add or remove override TOU map templates for this TOU type, click the + or – sign in the Override TOU Map Templates section and select the TOU map template.
8. Complete any remaining fields (if applicable).
9. Click **Save**.

Now you can use the TOU map type when creating TOU maps.

Defining Usage Subscription Types

Use this procedure to define usage subscription types.

Prerequisites: You must define service providers before you can create usage subscriptions types. Refer to the Oracle Utilities Service and Measurement Data Foundation online help for more information about creating service providers.

To maintain existing usage subscription types, select **Admin Menu > Usage > Usage Subscription**, then use *standard actions* to edit, duplicate, or delete a usage subscription type.

To define a new usage subscription type, follow these steps:

1. Select **Admin Menu > Usage > Usage Subscription+**.

NOTE: If your system supports more than one usage subscription type business object, you will be prompted to select a business object for this usage subscription type.

2. Enter a name and a meaningful description for the usage subscription type.
3. Select the service provider for the usage subscription type. This will be used as the Recipient for usage subscriptions based on this type.
4. Select the business object to use when creating usage subscriptions of this type
5. Complete any remaining fields (if applicable).
6. To add or remove valid service point types for this usage subscription type, click the + or – sign in the Valid Service Point Types section and select the service point type.
7. To add or remove valid service providers for this usage subscription type, click the + or – sign in the Valid Service Providers section and select the service provider.
8. To add or remove valid usage groups for this usage subscription type, click the + or – sign in the Valid Usage Groups section and select the usage group.
9. To add or remove fallback usage groups for this usage subscription type, click the + or – sign in the Fallback Usage Groups section and select the usage group.
10. Click **Save**.

Now you can use the usage subscription type when creating usage subscriptions.

Chapter 9

Reports

This section describes concepts and procedures related to reports.

About Reports

Reports include operational reports related to device events, validation exceptions, and other operational data. Reports can also be based on devices, measuring components, service points, service providers, and other data.

Oracle Utilities Meter Data Management reports are implemented using Oracle Business Intelligence Publisher (BI Publisher), and are administered via Oracle Business Intelligence Publisher and the Report functionality of the Oracle Utilities Application Framework.

Refer to the Oracle Business Intelligence Publisher documentation for more information about installing Oracle Business Intelligence Publisher and creating and defining reports.

Refer to the Oracle Utilities Application Framework for more information about how reports are defined and administered.

About the Device VEE Exceptions Report

The Device VEE Exceptions report displays VEE exceptions based on user-specified parameters.

Reported Data

The report displays the following:

- **Exceptions By Type:** a pie graph depicting the percentage of each type of exception reported.
- For each exception listed in the report:
 - Device Type
 - Device ID
 - Serial Number

- Status
- Date
- Exception ID
- Service Point ID
- Service Point Information
- Exceptions are grouped by Market, and then by Exception Type within each market.

Report Parameters

The Device VEE Exceptions report uses the following parameters:

- **From Date:** the start date for the report (required).
- **To Date:** the end date for the report (required).
- **Market:** the market in which the exceptions and/or events occurred (used to restrict the report output by market).
- **Exception Type:** the exception type (used to restrict the report output by exception type).
- **Device Type:** the device type for the report (used to restrict the report output by device type).
- **Device ID:** the device ID for the report (used to restrict the report output based on a specific device)

About the Device Events Report

The Device Events Report displays device events based on user-specified parameters.

Reported Data

The report displays the following:

- **Events By Type:** a pie graph depicting the percentage of each type of event reported.
- For each event listed in the report:
 - Device Event ID (Dvc Evt ID)
 - Business Object
 - Service Provider
 - Status
 - Event Date/Time
 - Device ID
 - Device Information
- Device Events are grouped by Device Event Type.

Report Parameters

The Device VEE Exceptions report uses the following parameters:

- **From Date:** the start date for the report (required).
- **To Date:** the end date for the report (required).
- **Device Event Type:** the device event type (used to restrict the report output by device event type).
- **Service Provider:** the service provider (used to restrict the report output by service provider).

Working with Reports

This section describes common tasks related to working with reports.

Running Reports

Use this procedure to run a report.

A report must have previously been defined in Oracle Business Intelligence Publisher and in the Report Definition portal of the Oracle Utilities Application Framework before it can be run.

1. **Main Menu > Batch > Report Submission.**
2. Search for and select the report you wish to run. You can search by the **Report Code** or **Description**.
3. Enter parameter values for the report as appropriate.
4. Click **Submit**.

The Oracle BI Publisher window opens. Enter a user ID and password to access the Oracle BI Publisher server.

5. Use the Oracle BI Publisher viewer to view the report.
 - a) The default output format for reports is Adobe Acrobat (PDF). To change the output format, select the desired format from the drop-down list and click **View**.
 - b) To export the report, click **Export** and specify a directory and file name for the report.
 - c) Refer to the Oracle BI Publisher documentation for more information about using the Oracle BI Publisher viewer.

Chapter 10

VEE Rule Administration

This section describes concepts and common tasks related to Validation , Editing, and Estimation (VEE) rule administration.

Understanding VEE Rule Setup and Administration

This section describes entities used to support the management of VEE rules.

About VEE Groups

VEE groups are collections of VEE rules that are applied to initial measurement data.

VEE groups can be associated to a specific measuring component, or to a measuring component type (or both). VEE groups associated with a measuring component type are applied to all measuring components of that type, while those associated to a specific measuring component are applied only to that measuring component.

VEE groups can also be referenced by individual Execute VEE Group VEE rules. See [About VEE Rules](#) for more information.

About VEE Rules

VEE rules are standard and custom Validation, Estimation and Editing (VEE) rules that perform checking and/or manipulation of initial measurement data.

VEE rules are created for a specific VEE group. For example, if you were configuring two VEE groups and both included a specific VEE rule, you would need to create two instances of the VEE rule, one for each group.

Attributes used to define VEE rules typically include the following:

- **Basic Information:** Basic information about the VEE rule, including its name and description, the VEE group to which the rule belongs, the sequence of the rule within the group, the category, and start and end dates. This information is standard for most VEE rules.
- **Parameters:** The parameters used by the rule. Parameters are specific to each rule.
- **Exception Types and Severity:** Details about how to handle exceptions, including the Exception Type and Exception Severity for exceptions created by the rule. There are three levels of Exception Severity:
 - **Information:** Used to highlight minor issues, but not sufficient to cause the initial measurement data to be put into the exception state. Exceptions of this category can be used to report on the frequency of interesting, but not fatal issues
 - **Issues:** Used to report a problem that will prevent the initial measurement data from being finalized. Multiple "issue exceptions" can be created during VEE processing. If at least one issue exists after all rules have been applied, the initial measurement data is transitioned to the exception state
 - **Terminate:** Used to report a severe issue that will cause the VEE process to stop and the initial measurement data to be transitioned immediately to the exception state. Only one terminate exception can be issued (as the first one causes VEE processing to stop on an initial measurement data).

The Oracle Utilities Service and Measurement Data Foundation includes the following "generic utility" base package VEE rule types that can be used when configuring VEE groups and rules with Oracle Utilities Meter Data Management:

- **Exception Handler:** used to define options and logic to terminate the VEE process when a set of user configured criteria are met. VEE rules of this type can be included in a group to specify how exceptions are handled for that group, and allow for creation of a single "parent" exception for the group. Exception Handler rules use the following options:
 - **Exception Handler:** defines the exception type for "parent" exceptions created when one or more VEE rules within the VEE group fail, along with the To Do Type and To Do Role for To Do entries for this exception.
 - **Comparison Results:** defines the conditions under which the "parent" exception is generated. A "parent" exception is created when a user-specified combination of exceptions (of user-specified quantities and exception types) are generated by the rules within the VEE group. For example, a "parent" exception might be generated when 3 exceptions of one type **and** 2 exceptions of another type are triggered, or if 2 exceptions of one type **or** 2 exceptions of a different type are triggered.
- **Execute VEE Group:** used to define business logic to allow reference to a VEE group. This allows rules that are used frequently to be bunched under a single VEE group, which can be referenced/called by other rules as needed. For example, if a set of standard rules should be applied to all initial measurement data for a certain type of measuring component, this set of rules can be configured as part of a VEE group, which is referenced by a single VEE rule of this type. Execute VEE Group rules use the following options:
 - **Referred VEE Group:** defines the VEE Group referenced by the rule.
 - **Insufficient Input Data Exception:** defines the Exception Type and Exception Severity for exceptions created when there is insufficient data to execute the VEE rule.
- **Successful Termination:** used to define options and logic to successfully terminate VEE processing for any initial measurement that passes a pre-defined set of validations before accumulating a pre-defined number of exceptions. For example, a set of validation rules can be executed early in the overall sequence of rules that proves that the data is good enough to use, such that no further rules need to be executed. Successful Termination rules use the following options:
 - **Comparison Results:** defines the conditions under which processing is successfully terminated. Processing is terminated if fewer than a user-specified combination of exceptions (of user-specified quantities and exception types) are generated by the rules within the VEE group. For example, processing might terminate when less than 3 exceptions of one type **AND** less than 2 exceptions of another type have been issued, or if less than 2 exceptions of one type **OR** less than 2 exceptions of a different type have been issued.
- **VEE Rule Group Matrix (Factor):** used to define business logic to allow reference to a factor (of type VEE group) where the values of the factor are a list of VEE groups. This allows creating a VEE rule that can select from a list of VEE groups (referred to as a matrix) whose rules to execute next. One example of this might be to call geographically-specific

VEE groups from within a larger-purpose group. A residential VEE group might contain a rule that will pick the VEE group to execute based on service point location, where the matrix specifies:

Service Point Location	VEE Group to Execute
Service Point in the North	VEE Group N
Service Point in the East	VEE Group E
Service Point in the South	VEE Group S

Group Matrix (Factor) rules use the following options:

- **VEE Group Matrix (Factor):** defines the VEE Group factor referenced by the rule, and what to do if the group cannot be found.
- **Insufficient Input Data Exception:** defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.

Other Oracle Utilities products, such as Oracle Utilities Meter Data Management, provide standard "out-of-the-box" VEE rule types that can be used when creating VEE rules.

About VEE Rule Eligibility Criteria

VEE rule eligibility criteria are user-definable conditions that could cause a given VEE rule to be applied or skipped. This can involve the evaluation of some attribute of the device or measuring component, or something else entirely.

A VEE rule can have multiple eligibility criteria for determining if the rule should be applied or skipped, based on a user-defined sequence. Each eligibility criteria uses the following settings:

- **Criteria Comparison:** defines the specific comparison for the criteria, based on the following:
 - **Criteria Field:** the algorithm used to retrieve the value of the criteria field
 - **Comparison Operator:** the operator used in the comparison
 - **Value:** a user-specified value to which the retrieved value is compared (using the comparison operator)
- **Comparison Results:** defines how the rule should behave, based on the results of the comparison defined under Criteria Comparison:
 - **If True:** the action to take if the comparison is true
 - **If False:** the action to take if the comparison is false
 - **If Insufficient Data:** the action to take if there is insufficient data to perform the comparison

Base Package VEE Groups and “Utility” Rules

This section provides descriptions of the attributes used to define the validation, editing, and estimation (VEE) groups and “utility” rules provided with the base package.

VEE Group

VEE groups are collections of VEE rules that are applied to initial measurement data.

Field	Description
VEE Group	The code/name of the VEE group.
Description	A description of the VEE group. This is used in information strings when referencing the VEE group.
Detailed Description	A detailed description of the VEE group. This can be used to provide additional details about the content and intended uses of the VEE group.

Business Object: D1-VEEGroup

Exception Handler

Exception Handler rules are used to define options and logic to terminate the VEE process when a set of user configured criteria are met. VEE rules of this type can be included in a group to specify how exceptions are handled for that group, and allow for creation of a single "parent" exception for the group.

Field	Description
VEE Group	The VEE group to which the rule belongs. All VEE rules belong to a group.
VEE Rule	The code/name for the VEE rule.
Sequence	The sequence in which the rule appears in its VEE group. The sequence determines the order in which rules are processed within a group.
Description	A description of the VEE rule. This is used in information strings when referencing the VEE rule.
Detailed Description	A detailed description of the rule. This can be used to provide additional details about the rule.
Category	The category of rule for the VEE rule. Options include "Automatic Correction of Invalid Data", "Estimation Rules", and "Validation Rules".
Start Date	The date on which the VEE rule is considered in effect.
End Date	The date after the VEE rule is considered no longer in effect.
Comparison Results	Defines the criteria that will cause VEE processing to immediately terminate. This criteria can simply reference the Number of Exceptions of a given Exception Type . Alternatively, if the criteria involves multiple exception types the Exception Criteria Relationship can be used to define and/or criteria that must be satisfied before the VEE processing is terminated. For example, processing might terminate when 3 exceptions of one type and 2 exceptions of another type have been issued, or if 2 exceptions of one type or 2 exceptions of a different type have been issued. Note, the Number of Exceptions is the minimum number that must exist for VEE processing to terminate.
Exception Handler	Defines the type of VEE exception that is generated when the exception criteria defined in the Comparison Results section are met. In addition, when VEE processing is terminated, a To Do entry is created. If you wish this To Do entry to have a different To Do Type or Role than the default, specify override values as appropriate.

Business Object: D1-VEERuleExceptionHandler

VEE Group Matrix (Factor)

VEE Group Matrix (Factor) rules are used to define a reference to a factor (of type VEE Group) where the values of the factor are a list of VEE groups. This allows creating a VEE rule that can select from a list of VEE groups (referred to as a matrix) whose rules to execute next. One example of this might be to call geographically-specific VEE groups from within a larger-purpose group.

Field	Description
VEE Group	The VEE group to which the rule belongs. All VEE rules belong to a group.
VEE Rule	The code/name for the VEE rule.
Sequence	The sequence in which the rule appears in its VEE group. The sequence determines the order in which rules are processed within a group.
Description	A description of the VEE rule. This is used in information strings when referencing the VEE rule.
Detailed Description	A detailed description of the rule. This can be used to provide additional details about the rule.
Category	The category of rule for the VEE rule. Options include "Automatic Correction of Invalid Data", "Estimation Rules", and "Validation Rules".
Start Date	The date on which the VEE rule is considered in effect.

Field	Description
End Date	The date after the VEE rule is considered no longer in effect.
VEE Group Matrix (Factor)	Defines the factor referenced by this rule, and what to do if the VEE group referenced by the factor or the factor's characteristic value can not be found (Error or Skip).
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.

Business Object: D1-VEERuleGroupFactor

Execute VEE Group

Execute VEE Group rules are used to execute a specified VEE group. This allows rules that are used frequently to be bunched under a single VEE group, which can be referenced/called by other rules as needed. For example, if a set of standard rules should be applied to all initial measurement data for a certain type of measuring component, this set of rules can be configured as part of a VEE group, which is referenced by a single VEE rule of this type.

Field	Description
VEE Group	The VEE group to which the rule belongs. All VEE rules belong to a group.
VEE Rule	The code/name for the VEE rule.
Sequence	The sequence in which the rule appears in its VEE group. The sequence determines the order in which rules are processed within a group.
Description	A description of the VEE rule. This is used in information strings when referencing the VEE rule.
Detailed Description	A detailed description of the rule. This can be used to provide additional details about the rule.
Category	The category of rule for the VEE rule. Options include "Automatic Correction of Invalid Data", "Estimation Rules", and "Validation Rules".
Start Date	The date on which the VEE rule is considered in effect.
End Date	The date after the VEE rule is considered no longer in effect.
Referenced VEE Group	Defines the VEE group executed by the rule.
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.

Business Object: D1-VEERuleReferredVEEGroup

Successful Termination

Successful Termination rules are used to define options and logic to successfully terminate VEE processing for any initial measurement that passes a pre-defined set of validations before accumulating a pre-defined number of exceptions. For example, a set of validation rules can be executed early in the overall sequence of rules that proves that the data is good enough to use, such that no further rules need to be executed.

Field	Description
VEE Group	The VEE group to which the rule belongs. All VEE rules belong to a group.
VEE Rule	The code/name for the VEE rule.
Sequence	The sequence in which the rule appears in its VEE group. The sequence determines the order in which rules are processed within a group.
Description	A description of the VEE rule. This is used in information strings when referencing the VEE rule.
Detailed Description	A detailed description of the rule. This can be used to provide additional details about the rule.

Field	Description
Category	The category of rule for the VEE rule. Options include "Automatic Correction of Invalid Data", "Estimation Rules", and "Validation Rules".
Start Date	The date on which the VEE rule is considered in effect.
End Date	The date after the VEE rule is considered no longer in effect.
Comparison Results	Defines the conditions under which processing is successfully terminated. Processing is terminated if fewer than a user-specified combination of exceptions (of user-specified quantities and exception types) are generated by the rules within the VEE group. For example, processing might terminate when less than 3 exceptions of one type AND less than 2 exceptions of another type have been issued, or if less than 2 exceptions of one type OR less than 2 exceptions of a different type have been issued. •

Business Object: D1-VEERuleSuccessTermination

VEE Eligibility Criteria

VEE eligibility criteria are user-definable conditions that could cause a given VEE rule to be applied or skipped. This can involve the evaluation of some attribute of the device or measuring component, or something else entirely.

Field	Description
VEE Group	The VEE group to which the rule associated with the eligibility criteria belongs.
VEE Rule	The code/name for the VEE rule to which the eligibility criteria is applied.
Sequence	The sequence in which the eligibility criteria is evaluated for the rule. The sequence determines the order in which criteria are processed for the rule.
Description	A description of the eligibility criteria . This is used in information strings when referencing the eligibility criteria .
Detailed Description	A detailed description of the eligibility criteria . This can be used to provide additional details about the eligibility criteria .
Criteria Comparison	Defines how eligibility criteria are compared and evaluated for the VEE rule, including the criteria field, comparison operator, and value used in the comparison.
Comparison Results	Defines how the VEE rule should behave, based on the results of the comparison defined in the Criteria Comparison section. <ul style="list-style-type: none"> • If True: The action to perform if the criteria comparison is true. • If False: The action to perform if the criteria comparison is false. • If Insufficient Data: The action to perform if there is insufficient data to perform the criteria comparison . <p>Actions include:</p> <ul style="list-style-type: none"> • Apply Rule: Apply the VEE rule associated with the eligibility criteria. • Check Next Condition: Check the next eligibility criteria defined for the rule (if applicable) • Skip Rule: Skip the VEE rule associated with the eligibility criteria. • Error: Create an exception using the Exception Type and Severity defined for the Insufficient Input Data Exception for the VEE rule associated with the eligibility criteria. Applicable only for the If Insufficient Data drop-down list.

Business Object: D1-VEEEligibilityCriteria

Base Package VEE Validation Rules

This section provides descriptions for the base package VEE rules used in validation of initial measurement data. Validation rules are used to validate that an initial measurement is within expected tolerances, and is correct. Some validation rules can also perform edits to the initial measurement.

VEE Rule Descriptions

This section provides detailed descriptions of each of the base package VEE rules provided with Oracle Utilities Meter Data Management. The descriptions of the VEE rules below contain the following information:

- **Rule Name:** The name of the rule
- **Base Package VEE Rule Business Object:** The base package business object used by the rule
- **Apply VEE Rule Algorithm Type / Algorithm:** The base package algorithm type and algorithm specified in the “Apply VEE Rule” system event for the rule
- **Apply VEE Rule Algorithm Parameters:** The “soft” parameters (if any) used by the algorithm used by the rule. Most parameters used by “Apply VEE Rule” algorithms are used to define ranges of measurement conditions used in validation processing (measurement conditions are assigned a numerical value as well as a description). The algorithm parameters used by these validations specify the top and bottom measurement conditions in a particular measurement condition range. For example, some validations must taken into account whether or not a measurement value was estimated. Estimated measurements are designated through a set of base package measurement conditions including “System Estimate”, “External Estimate, and “Office Estimate” that span a numeric range from 201000 through 402000. Specifying a “top range value” of 201000, and a “bottom range value” of 402000, means that any measurement whose measurement condition falls within that range is considered to be estimated.
- **Validation Algorithm Type / Algorithm:** The base package algorithm type and algorithm specified in the “Validation” system event for the rule, if applicable. If specified, a brief description of the algorithm is also provided. Validation algorithms used by VEE rules do not use “soft” parameters.
- **Rule Parameters:** Parameters used to define the rule (if applicable). Does not include common parameters used by all rules (see below)
- **Processing Logic:** A description of the processing performed by the rule. Processing logic is performed by the “Apply VEE Rule” algorithm specified on the VEE rule business object.
- **Example:** An example configuration of the rule. Note that all examples use default values for all “Apply VEE Rule Algorithm Parameters”.

Common Parameters

All VEE rules use the following common parameters:

- **VEE Group:** The VEE group to which the rule belongs
- **VEE Rule:** The user-defined name given to the VEE rule
- **Sequence:** The sequence within its VEE group that the rule will be executed
- **Description:** A short description of the rule. This is used as the Information String for the rule in the user interface.
- **Detailed Description:** A detailed description of the rule
- **Category:** The rule’s category. Base package options include “Automatic Correction of Invalid Data,” “Estimation Rules,” and “Validation Rules.”
- **Start Date:** The date on which the rule is considered in effect. VEE rules are not applied to initial measurements whose start dates are earlier than this date.

- **End Date:** The date after which the rule is considered no longer in effect. VEE rules are not applied to initial measurements whose stop dates are later than this date.

Duplicate IMD Check

Duplicate IMD Check rules check to determine whether the current initial measurement is a duplicate of one already received for the same measuring component.

If the initial measurement is determined to be a duplicate, the rule produces a VEE exception of the type and severity defined on the rule when it is configured.

- **Rule Name:** Duplicate IMD Check
- **Base Package VEE Rule Business Object:** D1-DuplicateIMDCheck
- **Apply VEE Rule Algorithm Type / Algorithm:** D1-DUPIMDCHK
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Duplicate IMD Exception Configuration	Defines the Exception Type and Severity for exceptions created when a duplicate IMD is detected. In addition, an Override To Do Type and Override To Do Role can also be defined.

Processing Logic

Duplicate IMD Check rules check for duplicate initial measurements by looking for:

- Initial measurements associated to the same measuring component as the current initial measurement
- Initial measurements that utilize the same business object as the current initial measurement (for example, Initial Load Scalar)
- Initial measurements that reference the same To Date/Time (ends on the same date) as the current initial measurement
- Initial measurements that exist in a "Finalized" state
- Initial measurements that with pre-VEE contents identical to the pre-VEE contents of the current initial measurement

If any existing initial measurements are found that meet all of the above criteria, the current initial measurement is deemed to be a duplicate, and an exception is created using the Exception Type and Severity defined for the “Duplicate IMD Exception Configuration” parameters. This exception will have a Message Category of 11802 and a Message Number of 10021.

Example

The following VEE rule creates an exception if the current initial measurement is determined to be a duplicate of an existing “Final” initial measurement for the same measuring component.

VEE Group: Initial Load Validations

VEE Rule: DUPLICATE_CHECK

Sequence: 10

Description: Duplicate IMD Check

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Duplicate IMD Exception Configuration:

- **Exception Type:** Duplicate IMD Detected
 - **Exception Severity:** Terminate
 - **Override To Do Type:** N/A
 - **Override To Do Role:** N/A
-

Final Measurement Validation

Final Measurement Validation rules compare incoming initial measurement values with existing final measurement values for the same date/time range to determine which if any, are of a lesser quality (a lower condition code) and if final measurements should be created for them.

- **Rule Name:** Final Measurement Validation
- **Base Package VEE Rule Business Object:** D2-FinalMeasurementValidation
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-VLMSRCOND
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Measurement Replacement Validation	<p>Defines the replacement condition code for measurements whose condition is less than the condition of existing final measurements</p> <p>Replacement Condition Code: When a measurement in the initial measurement is found to have a condition code that is of lesser quality than the existing measurement, it will be updated with the condition code specified here.</p> <p>NOTE: In order to ensure that final measurements are not overwritten by initial measurements with lesser condition codes than those of existing final measurements, this value should be set to the Condition Code for the 'System – No Read' parameter for the "normalize" Enter algorithm (based on the D1-NORM-IMD algorithm type) on the Finalized status of the initial measurement business object. The base package condition code of this type is "No Read - System (100000)."</p>
Measurement Replacement Exception	<p>Defines the Exception Type and Severity for exceptions when an initial measurement's condition code is of lesser quality than the existing final measurement.</p>

Processing Logic

This rule retrieves existing measurements for the initial measurement's measuring components during the period of the incoming initial measurement. It then cross references the measurement condition of the existing measurements against the measurements in the initial measurement. If the initial measurement's measurements have a condition code that is of lesser quality than existing measurements, it will set the measurement from the initial measurement to the condition value specified for the **Replacement Condition Code** parameter (if specified), and generate an exception based on the **Measurement Replacement Exception** parameters.

Note that processing does not stop once a conflict has been detected (even if the rule is configured to "terminate") but rather will identify all measurements in the initial measurement in conflict and update their condition to the **Replacement Condition Code** for System No Read.

This rule is used when validating measurements for both interval and scalar measuring components.

Example

The following VEE rule creates an exception if an initial measurement has lower quality condition codes than existing final measurements for the same time period as the initial measurement.

VEE Group: Initial Load Validations

VEE Rule: FINAL_MEASUREMENT_VALIDATION

Sequence: 10

Description: Final Measurement Validation

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Measurement Replacement Validation:

- **Replacement Condition Code:** No Read — System

Measurement Replacement Exception:

- **Exception Type:** Measurement Replacement Exception
 - **Exception Severity:** Issues
-

Ensure IMD Exists for Sibling MCs

Ensure IMD Exists for Sibling MCs rules check to ensure that all sibling measuring components of the current initial measurement's measuring component each have initial measurements associated to them for the same period as the current initial measurement.

If one or more of sibling measuring components does not have an initial measurement for the same period as the current initial measurement, the rule creates an exception. Sibling measuring components are those associated to the same device configuration as the current initial measurement's measuring component.

- **Rule Name:** Ensure IMD Exists for Sibling MCs
- **Base Package VEE Rule Business Object:** D2-EnsureIMDExistsForSibling
- **Apply VEE Rule Algorithm Type / Algorithm:**D2-ENSIMDMC
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
IMD Not Found Exception	Defines the Exception Type and Severity for exceptions created when no initial measurement data can be found for the sibling measuring component.

Processing Logic

Ensure IMD Exists for Sibling MCs rules validate that initial measurements exist for all of the other measuring components associated to the same device configuration as the current measuring component, for the same period of time as the initial

measurement being validated. These rules also check that all of the initial measurements have the same External Source ID (indicating that they all came from the same usage file).

If either of these validations fails, an exception is created using the Exception Type and Severity defined for the “IMD Not Found Exception” parameter. This exception will have a Message Category of 11802 and a Message Number of 10021.

If the measuring component is not supplied in the initial measurement, an exception is created using the Exception Type and Severity defined for the “Insufficient Input Data Exception” parameter. This exception will have a Message Category of 11802 and a Message Number of 10115.

If an external source id is not supplied in the initial measurement, an exception is created using the Exception Type and Severity defined for the “Insufficient Input Data Exception” parameter. This exception will have a Message Category of 11802 and a Message Number of 10020.

Example

The following VEE rule creates an exception if initial measurements are not found for all sibling measuring components of the current initial measurement's measuring component.

VEE Group: Initial Load Validations

VEE Rule: CHECK_SIBLING_MC_IMD

Sequence: 10

Description: Check IMDs for Sibling MCs

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

IMD Not Found Exception:

- **Exception Type:** No Data Found
 - **Exception Severity:** Issues
-

High/Low Check

High/Low Check rules compare consumption of an incoming initial measurement against historical data as a means of assuring reasonable data. High/Low Check rules can be used with both scalar and interval initial measurements.

- **Rule Name:** High/Low Check
- **Base Package VEE Rule Business Object:** D2-VEERuleHighLowCheck
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-HILO-CHK
- **Apply VEE Rule Algorithm Parameters:**
 - Condition - bottom range value representing Non-Normal measurements
 - Condition - top range value representing Non-Normal measurements
 - Condition - bottom range value for System-Estimated measurements
 - Condition - top range value for System-Estimated measurements
 - Condition - bottom range value for measurements during an Outage
 - Condition - top range value for measurements during an Outage

- **Validation Algorithm Type / Algorithm:** D2-HILO-VAL

NOTE: This algorithm ensures that if the rule is configured to perform a high check or a low check (or both) that the corresponding tolerance is supplied. For each option, this validation ensures that either a tolerance percentage or a tolerance factor is configured, but not both.

Rule Parameters

Field	Description
High/Low Check	Indicates if the rule should check for high usage, low usage, or both when comparing the initial measurement to historical data.
High/Low Limits from master config	Indicates if the rule should use high/low limits defined in the "MDM Master Configuration" instead of the limits defined on the rule. This is typically used when integrating Oracle Utilities Meter Data Management with Oracle Utilities Customer Care and Billing.
High Tolerance (%)	The percentage tolerance by which the measurement data can exceed historical data before failing the validation.
High Tolerance Factor	A factor containing the tolerance by which the measurement data can exceed historical data before failing the validation.
Low Tolerance (%)	The percentage tolerance by which the measurement data can be below historical data before failing the validation.
Low Tolerance Factor	A factor containing the tolerance by which the measurement data can be below historical data before failing the validation.
Required Historical Data (%) Basis	<p>Defines how to calculate Historical Percentage. If not specified the "IMD Start/End" option will be used as the calculation method.</p> <ul style="list-style-type: none"> • IMD Start/End: calculation will be based on (historical data and initial measurement time span). Historical % is calculated as follows: (Total Number of ON Days for which Historical data found within derived Start and End Date time) / (IMDs End Date Time - IMDs Start Date Time) • Historical Window Start/End: calculation will be based on (historical data/historical window time span). Historical % is calculated as follows: (Total Number of ON Days for which Historical data found within derived Start and End Date time)/(derived End Date Time - derived Start Date Time)
Required Historical Data (%)	The percentage amount of historical data required for the validation to be executed, relative to the duration of the initial measurement being validated. For example, if the duration of the initial measurement is 1 day and this parameter is set to 50%, the system must find at least ½ day of historical data in order for the rule to execute. Note that this field can be set to values higher than 100%.
Historical Pre-Window	The number of days prior to the start date to find historical data.
Historical Post-Window	The number of days after the stop date to find historical data.
Allowed Historical User Edited Data(%)	The percentage amount of historical data allowed if some of the data has been user edited.
Allowed Historical System Estimated Data(%)	The percentage amount of historical data allowed if some of the data has been system estimated.
Allowed Historical Non Normal Data(%)	The percentage amount of historical data allowed if some of the data is "non-normal". This parameter is only used for interval measuring component types.
Historical Look First	Specifies the first point in time to find historical data. If consumption can't be found in the specified Historical First Look period, the other period is used. Options include "Last Reading" and "Last Year."
Comparison Method	The method by which historical data and the measurement data are compared (Average or Maximum).
Perform Outage Check	Specifies the rule should check for an outage for the device that supplied the measurement.

Field	Description
Outage Activity Type	Specifies an activity type that designates an outage for the device that supplied the measurement.
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
No Historical Data Found Exception	Defines the Exception Type and Severity for exceptions created when there is no historical data found.
High Check Exception	Defines the Exception Type and Severity for exceptions created when the measurement fails a high check
Low Check Exception	Defines the Exception Type and Severity for exceptions created when the measurement fails a low check.
Low Check Outage Exception	Defines the Exception Type and Severity for exceptions created when the rule detects an outage for the device that supplied the measurement.

Processing Logic

High/Low Check rules compare either the Average Daily Usage (ADU) or the maximum value of the initial measurement being validated with the ADU / max for historical measurements. Historical measurements can be based on measurements from either one year ago or from the most recent reading for the initial measurement's measuring component. If insufficient usable data is found using the first historical option, measurement data for the second historical option is evaluated. These rules can be configured to specify whether to check measurements from one year ago or the most recent reading first. It can also specify whether to perform both High and Low checking, or only one or the other.

When looking for data from the last reading, the system retrieves all measurements for the period from (IMD Start Date - Historical Pre-Window) through (IMD start date)

When looking for data from last year, the system retries all measurements from (IMD end date minus 1 year - Historical Pre-Window) through (IMD end date minus 1 year + Historical Post-Window).

When performing a High check, the rule checks to determine if the ADU/Maximum of the initial measurement is greater than (within a tolerance defined by the "High Tolerance (%)" and "High Tolerance Factor" parameters) of the historical data. When performing a Low check, the rule checks to determine if the ADU/Maximum of the initial measurement is less than (within a tolerance defined by the "Low Tolerance (%)" and "Low Tolerance Factor" parameters) of the historical data.

The "Required Historical Data" parameter defines the percentage of historical data required for the rule to execute. This percentage is relative to the duration of the initial measurement being validated. If the specified amount of historical data is not found, the rule does not execute.

The Rule can be configured to reject historical data based on the condition codes of the data. These options can be used to find measurement data that is likely to produce a reasonable ADU/Maximum for comparison to the current data.

Non-Normal Data

The "Allowed Historical Non Normal Data(%)" parameter specifies the maximum percentage amount of historical data allowed if some of the data is "non-normal". For interval data, the percentage calculation is calculated based on the number of measurements compared to the total number of measurements in the period. For scalar data, the time span of the measurement relative to the length of the historical period is used to determine the percentage

The "Condition - bottom range value representing Non-Normal measurements" and "Condition - top range value representing Non-Normal measurements" parameters are used to define the range of condition values for measurements that should be categorized as Non-Normal. For example, Non-Normal data might be any measurement whose condition code is between Missing (201000) and Office Estimate (402000). Depending upon how condition codes are configured, the bottom range condition parameter might be set as 200000, and the top range condition parameter as 402999. If custom conditions have been added in the Office Estimate category, such as 402500 (corresponding to "Office Estimate to Correct Spike", for example) measurements referencing those custom conditions will also be treated as "Non-Normal".

System Estimated Data

The "Allowed Historical System Estimated Data(%)" parameter specifies the maximum percentage amount of historical data allowed if some of the data has been system estimated.

The “Condition - bottom range value representing System-Estimated measurements” and “Condition - top range value representing System-Estimated measurements” parameters are used to define the range of condition values for measurements that should be categorized as System-Estimated. For example, System-Estimated data might be any measurement whose condition code is between 300000 (below the System-Estimated value of 301000) and 399999 (just below Office Estimate). To evaluate Office Estimates along with System Estimates, the top range can be extended to include Office Estimate condition values.

If the ADU/Maximum for the current initial measurement is higher or lower than the historical ADU/Maximum, taking into account the tolerances configured on the rule, an exception is logged using the Exception Type and Severity defined for the “High Check Exception” or “Low Check Exception” parameters (respectively).

The rule can also check for outages for the initial measurements’ device between the measurement’s start and end time. Outages can be determined by either the presence of an outage activity for the measurement’s device, or if the measurement contains condition codes that fall within the range of “outage” conditions defined on the algorithm. The “Outage Activity Type” parameter specifies the Activity Type used to designate an outage for the measurement’s device. The “Condition - bottom range value for measurements during an Outage” and “Condition - top range value for measurements during an Outage” algorithm parameters define the range of outage conditions for the rule. Outage checks are performed when the initial measurement’s ADU/Maximum is lower than the historical ADU/Maximum tolerance. If an outage is detected, an exception is created using the Exception Type and Severity defined for the “Low Check Outage Exception” parameter.

This rule will include data from previously installed devices in the computation of the historical ADU/max if the following conditions are met:

- The previously installed measuring component has a different measuring component type but shares the same Unit of Measure and SQI as the measuring component being processed.
- The previously installed measuring component is scalar and its measuring component type is listed on the measuring component type of the measuring component being processed as a **Consumption Compatible Scalar MC Type**.

Example

The following VEE rule performs both a High check and Low check against historical data. When gathering historical data for comparison, the rule will use up to 5% user-edited data, up to 20% system estimated data, and up to 10% non-normal data. In addition, if consumption for the current initial measurement is deemed to be “low”, the rule will also check for outages.

VEE Group: Initial Load Validations

VEE Rule: HIGH-LOW-CHECK

Sequence: 10

Description: High/Low Check

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

High Low Check:

- **High Low Check:** Both
- **High/Low Limits from master config:** No
- **High Tolerance (%):** 200
- **Low Tolerance (%):** 49
- **Required Historical Data (%):** 20
- **Historical Pre-Window:** 10
- **Historical Post-Window:** 0
- **Allowed Historical User Edited Data (%):** 5

- **Allowed Historical System Estimated Data (%)**: 20
- **Allowed Historical Non Normal Data (%)**: 10
- **Historical First Look**: Last Reading
- **Comparison Method**: Average
- **Perform Outage Check**: Perform If Low Consumption
- **Outage Activity Type**: Outage Activity

Insufficient Input Data Exception:

- **Exception Type**: Insufficient Input Data
- **Exception Severity**: Issues

No Historical Data Found Exception:

- **Exception Type**: No Data Found
- **Exception Severity**: Issues

High Check Exception:

- **Exception Type**: Consumption Exceeds Threshold
- **Exception Severity**: Issues

Low Check Exception:

- **Exception Type**: Consumption Less Than Threshold
- **Exception Severity**: Issues

Low Check Outage Exception:

- **Exception Type**: Consumption Less Than Threshold due to Outage
- **Exception Severity**: Issues

Interval Replacement Rule

Interval Replacement rules determine whether or not an interval reading will replace any existing measurements and specify whether or not to allow this to happen.

- **Rule Name**: Interval Replacement Rule
- **Base Package VEE Rule Business Object**: D2-IntervalReplacementRule
- **Apply VEE Rule Algorithm Type / Algorithm**: D2-INTREPRL
- **Apply VEE Rule Algorithm Parameters**: N/A
- **Validation Algorithm Type / Algorithm**: N/A

Rule Parameters

Field	Description
Replacement Handling Method	Indicates if the rule should reject all replacement readings (Reject All), or reject only those replacement readings that would replace a reading that has been manually edited (Reject If Existing Data Is Manually Edited)
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.

Field	Description
Interval Replacement Exception	Defines the Exception Type and Severity for exceptions created when this rule replaces an existing reading.

Processing Logic

Interval Replacement rules check if the intervals in an interval initial measurement will replace existing final measurements.

If the “Replacement Handling Method” parameters is set to "Reject All", the rule creates an exception and exits from processing if the incoming measurement would replace existing final measurements using the Exception Type and Severity defined for the “Interval Replacement Exception” parameter. This exception will have a Message Category of 11802 and a Message Number of 10007.

If the “Replacement Handling Method” parameters is set to "Reject If Existing Data Is Manually Edited", the rule creates logs an exception and exits from processing if the incoming measurement would replace existing final measurements that had been user (manually) edited. The exception is created using the Exception Type and Severity defined for the “Interval Replacement Exception” parameter. This exception will have a Message Category of 11802 and a Message Number of 10022.

Example

The following VEE rule determines whether or not an interval reading would replace any existing measurements and if so, will reject the incoming measurements.

VEE Group: Initial Load Validations

VEE Rule: INTERVAL_REPLACEMENT

Sequence: 10

Description: Interval Replacement Rule

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Replacement Handling Method: Reject All

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Interval Replacement Exception:

- **Exception Type:** Interval Data Replacement
- **Exception Severity:** Issues

Interval Size Validation

Interval Size Validation rules check to ensure that the interval size of the incoming initial measurement data matches the value defined in the measuring component type.

- **Rule Name:** Interval Size Validation
- **Base Package VEE Rule Business Object:** D2-IntervalSizeValidation
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-INTSIZVAL
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule. Interval Size Validation rules require the interval size (Seconds-Per-Interval or SPI) be supplied in the initial measurement.
Invalid Interval Size Exception	Defines the Exception Type and Severity for exceptions created if the measurement fails this validation.

Processing Logic

Interval Size Validation rules validate that the seconds per interval (SPI) supplied with the initial measurement being validated is equal to the interval size defined on measurement's measuring component type. If these are not equal, the rule creates an exception using the Exception Type and Severity defined for the "Invalid Interval Size Exception" parameter. This exception will have a Message Category of 11802 and a Message Number of 10009.

If the interval size is not supplied in the initial measurement, an exception is created using the Exception Type and Severity defined for the "Insufficient Input Data Exception" parameter. This exception will have a Message Category of 11802 and a Message Number of 10018.

Example

Example: The following VEE rule issues an exception if the interval size of the incoming initial measurement does not match the value defined for its measuring component type.

VEE Group: Interval Validations

VEE Rule: SPI_CHECK

Sequence: 10

Description: SPI Check

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Invalid Interval Size Exception:

- **Exception Type:** Interval Size Discrepancy
 - **Exception Severity:** Issues
-

Interval Spike Check

Interval Spike Check rules examine interval data to identify intervals with conspicuously high usage relative to surrounding intervals.

Interval Spike Check rules identify spikes by subtracting the third-highest peak from the highest peak minus, and dividing the result by the third-highest peak. If the percent result is larger than the tolerance configured on the rule, the rule creates an exception.

- **Rule Name:** Interval Spike Check
- **Base Package VEE Rule Business Object:** D2-IntervalSpikeCheck
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-INTSPKCHK
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** D2-INTSPKVLD

NOTE: This algorithm ensures that the "minimum number of intervals" parameter on the Interval Spike Check VEE rule has a value greater than or equal to 3. (The rule requires the first- and third-highest intervals, and so by definition requires 3 intervals.)

Rule Parameters

Field	Description
Minimum Number of Intervals	The minimum number of interval data values required in the measurement for the rule to be executed.
Spike Check Method	Specifies whether to check for spikes for the entire interval cut (Entire Interval Cut), or for each 24 hour period within the cut (Repeat for Each 24 Hour Period).
Spike Tolerance (%)	Percentage value used to determine if an interval data value is considered a spike. This value is compared against a value equal to the highest peak minus the third-highest peak, divided by the third-highest peak. If this value is greater than the specified tolerance, the measurement fails this validation, and an exception is generated.
Condition Flag Value to identify spike(s)	The condition value assigned to interval data values that are adjusted as a result of being identified as a spike.
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Interval Spike Detected	Defines the Exception Type and Severity for exceptions created when a spike is identified within the measurement.

Processing Logic

Interval Spike Check rules identify spikes by subtracting the third-highest peak from the highest peak, and dividing the result by the third-highest peak. If the percent result is larger than the “Spike Tolerance (%)” parameter, the rule creates an exception using the Exception Type and Severity defined for the “Interval Spike Detected” parameter.

These rules can be executed in one of two modes, based on the “Spike Check Method” parameter:

- Repeat for Each 24 Hour Period: The spike check is performed for every 24-hour portion of data in the initial measurement.
- Entire Interval Cut: The spike check is performed for the entire initial measurement

Note that this rule uses a measurement service to identify spikes. To access this logic outside of the context of this rule, please refer to the D1-IdentifySpikes business service along with its underlying service.

Example

Example: The following VEE rule checks the entire measurement for interval spikes, and flags those interval values identified as spikes, based on a spike tolerance of 70%.

VEE Group: Interval Validations

VEE Rule: SPIKE_CHECK

Sequence: 10

Description: Interval Spike Check

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Minimum Number of Intervals: 8

Spike Check Method: Entire Cut

Spike Tolerance (%): 70

Condition Flag Value to Interval Spike(s): Spike - Treat As Missing

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Interval Spike Check Exception:

- **Exception Type:** Interval Spike Detected
 - **Exception Severity:** Issues
-

Multiplier Check

Multiplier Check rules check to ensure that the device multiplier value of the incoming initial measurement data matches the multiplier value stored on the measuring component.

- **Rule Name:** Multiplier Check
- **Base Package VEE Rule Business Object:** D2-RegisterMultiplierCheck
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-REGMULCHK
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule. Multiplier Check rules require the register multiplier be supplied in the initial measurement.
Multiplier Exception	Defines the Exception Type and Severity for exceptions created if the measurement fails this validation

Processing Logic

Multiplier Check rules validate that the register multiplier supplied with the initial measurement is equal to the multiplier stored on the measuring component. If these are not equal, the rule creates an exception using the Exception Type and Severity defined for the “Multiplier Exception” parameter. This exception will have a Message Category of 11802 and a Message Number of 10010

If the register multiplier is not supplied in the initial measurement, the rule creates an exception using the Exception Type and Severity defined for the “Insufficient Input Data Exception” parameter. This exception will have a Message Category of 11802 and a Message Number of 10015.

Example

The following VEE rule checks if the meter multiplier supplied in the initial measurement differs from the meter multiplier defined for the measuring component.

VEE Group: Initial Load Validations

VEE Rule: MULTIPLIER_CHECK

Sequence: 10

Description: Multiplier Check

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Multiplier Exception:

- **Exception Type:** Device Multiplier Discrepancy
 - **Exception Severity:** Issues
-

Negative Consumption Check

Negative Consumption Check rules check for negative consumption.

Negative consumption occurs if the total consumption for the initial measurement (calculated by summing all measurements from the initial measurement) is less than zero. Note that Negative Consumption Check rules should not be applied to measurements received from devices that can have negative readings.

- **Rule Name:** Negative Consumption Check
- **Base Package VEE Rule Business Object:** D2-NegativeConsumptionCheck
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-NCON-CHK
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Negative Consumption	Defines the Exception Type and Severity for exceptions created when negative consumption is detected.

Processing Logic

Negative Consumption Check rules create an exception if the total consumption, calculated by summing all measurements from the initial measurement, is less than zero. The exception is created using the Exception Type and Severity defined for the “Negative Consumption” parameters. Note if the rule encounters negative consumption, an exception will be created only if the measuring component type is **not** configured to "Allow Negative Consumption".

Example

The following VEE rule checks for negative consumption and creates an exception if negative consumption is detected.

VEE Group: Initial Load Validations

VEE Rule: NEGATIVE_CONSUMPTION_CHECK

Sequence: 10

Description: Negative Consumption Check

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Negative Consumption Exception:

- **Exception Type:** Unexpected Negative Consumption
 - **Exception Severity:** Issues
-

Raise Missing Quantity Exception

Raise Missing Quantity Exception rules create an exception if a specified percentage of measurements within the initial measurement are missing, excluding intervals associated with an Outage event.

- **Rule Name:** Raise Missing Quantity Exception
- **Base Package VEE Rule Business Object:** D2-RaiseMissingQuantityExcp
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-RAIMISQTY
- **Apply VEE Rule Algorithm Parameters:**
 - Condition - bottom range value to include
 - Condition - top range value to include
 - Condition - bottom range value to exclude
 - Condition - top range value to exclude
 - Threshold Percentage XPath
 - Exception Type XPath
 - Exception Severity XPath
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Percentage Threshold of Missing Intervals	Defines the percentage of missing intervals that must fall within the "missing" range before an exception will be created. The "missing" range is defined on the algorithm used by this rule. Note that this parameter is not required when validation usage for scalar measuring components.
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Missing Quantity Exception	Defines the Exception Type and Severity for exceptions created when the percentage of "missing" interval measurements exceeds the Percentage Threshold of Missing Intervals.

Processing Logic

Raise Missing Quantity Exception rules create an exception if the percentage of measurements within an interval initial measurement (defined by the "Percentage Threshold of Missing Intervals" parameter) is considered "missing." The exception is created using the Exception Type and Severity defined for the "Missing Quantity Exception" parameter.

Missing intervals are those marked with a condition code that falls between the condition range defined by the "Condition - bottom range value to include" and the "Condition - top range value to include" algorithm parameters. The "Condition - bottom range value to exclude" and the "Condition - top range value to exclude" algorithm parameters can be used to define a range of conditions for intervals to be excluded by the rule. The condition ranges can overlap (the range for "missing" might contain a superset of conditions that includes those for "outage" or some other condition). For example, assume the condition range for "missing" spans entirely the condition range for "outage". This rule could be configured to raise an exception for any interval that has a value in the range of "missing" conditions, but at the same time exclude intervals marked with "outage" conditions from triggering the exception creation.

The "Threshold Percentage XPath", "Exception Type XPath" and "Exception Severity XPath" algorithm parameters identify the XPath location within the VEE rule BO schema for the corresponding elements. These parameters should only be changed if a custom version of this rule is created, and the XPath location for these elements in the VEE rule BO schema is changed from the BO schema provided with the base package.

Example

The following VEE rule creates an exception if more than 10 percent of the interval values within an initial measurement are missing.

VEE Group: Interval Validations

VEE Rule: MISSING_EXCEPTION

Sequence: 10

Description: Excessive Gaps

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Missing Quantity Data:

- **Percentage Threshold of Missing Intervals:** 10

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Missing Quantity Exception:

- **Exception Type:** Gaps Detected in Data
- **Exception Severity:** Issues

Scalar Replacement Rule

Scalar Replacement rules identify whether or not a scalar reading will completely replace an existing measurement and specify whether or not to allow this to happen.

- **Rule Name:** Scalar Replacement Rule
- **Base Package VEE Rule Business Object:** D2-ScalarReplacementRule
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-SCAREPRL
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Replacement Handling Method	Indicates if the rule should reject all replacement readings (Reject All), or reject only those replacement readings that would replace a reading that has been manually edited (Reject If Existing Data Is Manually Edited)
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Scalar Replacement Exception	Defines the Exception Type and Severity for exceptions created when this rule replaces an existing reading.

Processing Logic

Scalar Replacement rules check if a scalar initial measurement will replace an existing final measurement.

If the “Replacement Handling Method” parameters is set to "Reject All", the rule creates an exception and exits from processing if the incoming measurement would replace an existing final measurement using the Exception Type and Severity defined for the “Scalar Replacement Exception” parameter. This exception will have a Message Category of 11802 and a Message Number of 10008.

If the “Replacement Handling Method” parameters is set to "Reject If Existing Data Is Manually Edited", the rule creates logs an exception and exits from processing if the incoming measurement would replace an existing final measurement that had been user (manually) edited. The exception is created using the Exception Type and Severity defined for the “Scalar Replacement Exception” parameter. This exception will have a Message Category of 11802 and a Message Number of 10023.

Example

Example: The following VEE rule determines whether or not a scalar reading will replace existing measurements and if so, whether it will reject the incoming measurements if the existing measurements were manually edited.

VEE Group: Scalar Validations

VEE Rule: SCALAR_REPLACEMENT

Sequence: 10

Description: Scalar Replacement

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Replacement Handling Method: Reject If Existing Data Is Manually Edited

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Scalar Replacement Exception:

- **Exception Type:** Scalar Data Replacement
 - **Exception Severity:** Issues
-

Sum Check

Sum Check rules compare the difference between the total consumption of an incoming initial measurement against the total consumption (based on final measurements) for a related measuring component on the same device over time.

If the difference exceeds a specified tolerance, the rule creates an exception. Related measuring components are those defined as “Consumption Reference Measuring Components” for the initial measurement’s measuring component.

- **Rule Name:** Sum Check
- **Base Package VEE Rule Business Object:** D2-SumCheck
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-SUM-CHK
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** D2-SUMCHKVAL

NOTE: This algorithm ensures that for the Sum Check VEE rule, only one sum check tolerance type is supplied (either percentage, hard value, or meter multiplier-based), and that its value is not negative.

Rule Parameters

Field	Description
Sum Check	<p>Defines the different types of tolerance that can be used by this rule, including:</p> <ul style="list-style-type: none">• Percentage Tolerance (%): The percentage difference between the consumption of the two measuring components. If the percentage difference is higher than this tolerance, the measurement fails the validation.• Tolerance: The difference between the consumption of the two measuring components. If the difference is higher than this tolerance, the measurement fails the validation.• Meter Multiplier Tolerance (%): The tolerance based on the multiples of the meter multiplier. For example, if this tolerance is set to "2", for a measuring component that measures KWH with a multiplier 3.5, an exception is created if the difference between the consumption and the total related consumption exceeds 7% (3.5*2). If the percentage difference is higher than this tolerance, the measurement fails the validation.• Required Related MC Measurements (%): The percentage of time that must be covered by the measurement data of the related measuring component as compared to the time covered by the initial measurement that is being processed that must be present for a related measuring component in order for the rule to execute. If a related measuring component does not have at least this amount of measurement data, the rule generates an exception based on the Insufficient Related MC Measurements Exception parameters. If there are more than one related measuring components, each of the related measuring components must each have this minimum amount of measurement data. For example, if this parameter is set to 75% and the initial measurement being

Field	Description
	<p>processed covers a period of 24 hours and the related measuring component's measurements cover only 12 of those hours, the system raise an exception (the related measuring component coverage is only 50%).</p> <p>Note: Only one tolerance can be defined for this rule.</p>
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Sum Check	Defines the Exception Type and Severity for exceptions created when consumption does not match between the initial measurement data and measurement data for the related measuring component.
Insufficient Related MC Measurements Exception	Defines the Exception Type and Severity for exceptions created when a related measuring component does not have enough measurement data to meet the value defined for the Required MC Measurement (%) parameter.
No Data Found	Defines the Exception Type and Severity for exceptions created when there is no data found for related measuring components.

Processing Logic

Sum Check rules evaluate whether consumption for the current initial measurement is within a specified tolerance of the sum of the consumption during the same time period for any measuring components related to the current initial measurement's measuring component. If the values are not within the defined tolerance of each other, an exception is created using the Exception Type and Severity defined for the "Sum Check Exception" parameter. If no measurement data can be found for the related measuring component for the same time period, an exception is created using the Exception Type and Severity defined for the "No Data Found Exception" parameter.

The rule can be used to evaluate consumption totals for an interval measuring component that has a related scalar measuring component with the same UOM, to ensure that the total consumption of the interval measuring component is within a tolerance of that of the scalar value. It can also be used to evaluate consumption totals for scalar TOU meters that have a "check" register (for example, three registers that measure ON-PEAK, OFF-PEAK, and SHOULDER, with a fourth check register that measures the total consumption).

Example

The following VEE rule creates an exception if the percentage difference between the consumption of the incoming initial measurement and consumption for its related measuring components is more than 95%.

VEE Group: Interval Validations

VEE Rule: SUM_CHECK

Sequence: 10

Description: SumCheck

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Sum Check:

- **Percentage Tolerance (%):** 95
- **Tolerance:** N/A
- **Meter Multiplier Tolerance:** N/A
- **Required Related MC Measurements (%):**

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Sum Check Exception:

- **Exception Type:** Consumption Differs from Reference Amount
- **Exception Severity:** Issues

Insufficient Related MC Measurements Exception:

- **Exception Type:**
- **Exception Severity:**

No Data Found Exception:

- **Exception Type:** No Data Found
 - **Exception Severity:** Issues
-

Unit of Measure Check

Unit Of Measure Check rules check that the Unit of Measure (UOM) of the incoming initial measurement data matches the UOM specified on the measuring component's type.

- **Rule Name:** Unit of Measure Check
- **Base Package VEE Rule Business Object:** D2-UOMCheck
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-UOMCHK
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule. Unit of Measure Check rules require that the unit of measure be supplied in the initial measurement.
UOM Check	Defines the Exception Type and Severity for exceptions created if the measurement fails this validation.

Processing Logic

Unit Of Measure Check rules check the unit of measure passed in with the initial measurement against the primary unit of measure configured on the initial measurement's measuring component type. If the two are not equal, the rule creates an exception using the Exception Type and Severity defined for the "Unit Of Measure Exception" parameter. This exception will have a Message Category of 11802 and a Message Number of 10011.

If the UOM is not supplied on the initial measurement, the rule creates an exception using the Exception Type and Severity defined for the "Insufficient Input Data Exception" parameter. This exception will have a Message Category of 11802 and a Message Number of 10016.

Example

The following VEE rule creates an exception if the unit of measure specified in the initial measurement does not match the unit of measure defined for its measuring components' type.

VEE Group: Initial Load Validations

VEE Rule: UOM_CHECK

Sequence: 10

Description: Unit of Measure Check

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Unit of Measure Exception:

- **Exception Type:** Unit of Measure Discrepancy
 - **Exception Severity:** Issues
-

Zero Consumption Check

Zero Consumption Check rules check for zero consumption for an incoming initial measurement, and can also optionally check for an outage (of a specified Outage Activity Type) for the usage period if zero consumption is detected.

- **Rule Name:** Zero Consumption Check
- **Base Package VEE Rule Business Object:** D2-ZeroConsumptionCheck
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-ZEROCNCHK
- **Apply VEE Rule Algorithm Parameters:**
 - Outage Bottom Range Condition
 - Outage Top Range Condition
- **Validation Algorithm Type / Algorithm:** D2-OACHKVAL

NOTE: This algorithm validates to ensure that Outage Activity Type is populated if "Perform Outage Check if Zero Consumption" flag is set to "Yes".

Rule Parameters

Field	Description
Perform Outage Check If Zero Consumption	Specifies whether or not the rule should check for an outage.
Outage Activity Type	Specifies the activity type that represents an outage (used if Perform Outage Check If Zero Consumption is set to "Yes.")
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Zero Consumption	Defines the Exception Type and Severity for exceptions created when the rule detects zero consumption for the current initial measurement.
Zero Consumption Outage	Defines the Exception Type and Severity for exceptions created when an outage of the specified Outage Activity Type is detected during the initial measurement's period. Applicable only if Perform Outage Check If Zero Consumption is set to "Yes."

Processing Logic

Zero Consumption Check rules detect if the total consumption for the current initial measurement is zero. For interval measurements, the rule sums all the Post-VEE measurement quantities to obtain the total consumption for the interval measurement. For scalar measurements, the rule retrieves the Post-VEE measurement quantity to obtain the total consumption. Note: if the current scalar initial measurement is the first measurement for the measuring component (measurement quantity is zero and start date time is not populated), the rule exits.

If the consumption for the initial measurement is zero and the "Perform Outage Check if Zero Consumption" parameter is set to "Yes", the rule also checks for outages for the initial measurements' device between the measurement's start and end time. Outages can be determined by either the presence of an outage activity for the measurement's device, or if the measurement contains condition codes that fall within the range of "outage" conditions defined on the algorithm. The "Outage Activity Type" parameter specifies the Activity Type used to designate an outage for the measurement's device. The "Outage Bottom Range Condition" and "Outage Top Range Condition" algorithm parameters define the range of outage conditions for the rule. If an outage is detected, an exception is created using the Exception Type and Severity defined for the "Zero Consumption Outage" parameter. This exception will have a Message Category of 11802 and a Message Number of 10110.

If the consumption for the initial measurement is zero and an outage is not detected, or if the "Perform Outage Check if Zero Consumption" parameter is set to "No", the rule creates an exception using the Exception Type and Severity defined for the "Zero Consumption" parameter. This exception will have a Message Category of 11802 and a Message Number of 10025.

Example

The following VEE rule creates an exception if the total consumption for the incoming initial measurement is zero. If the consumption is zero, this rule will also check for outage activities.

VEE Group: Initial Load Validations

VEE Rule: ZERO_CONSUMPTION_CHECK

Sequence: 10

Description: Zero Consumption Check

Category: Validation Rules.

Start Date: 05-01-2010

End Date: N/A

Perform Outage Check If Zero Consumption: Yes

Outage Activity Type: Outage Activity

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Issues

Zero Consumption:

- **Exception Type:** Zero Consumption
- **Exception Severity:** Issues

Zero Consumption Outage:

- **Exception Type:** Zero Consumption Due to Outage
 - **Exception Severity:** Issues
-

Base Package VEE Estimation Rules

This section provides descriptions for the base package VEE rules used in estimation of initial measurement data. Estimation rules are used to estimate initial measurement data based on existing data. Estimation calculations can be based on averaging of historical data, profile application, or adjusting and calculating values based on related measurement data.

VEE Rule Descriptions

This section provides detailed descriptions of each of the base package VEE rules provided with Oracle Utilities Meter Data Management. The descriptions of the VEE rules below contain the following information:

- **Rule Name:** The name of the rule
- **Base Package VEE Rule Business Object:** The base package business object used by the rule
- **Apply VEE Rule Algorithm Type / Algorithm:** The base package algorithm type and algorithm specified in the “Apply VEE Rule” system event for the rule
- **Apply VEE Rule Algorithm Parameters:** The “soft” parameters (if any) used by the algorithm used by the rule. Most parameters used by “Apply VEE Rule” algorithms are used to define ranges of measurement conditions used in validation processing (measurement conditions are assigned a numerical value as well as a description). The algorithm parameters used by these validations specify the top and bottom measurement conditions in a particular measurement condition range. For example, some validations must taken into account whether or not a measurement value was estimated. Estimated measurements are designated through a set of base package measurement conditions including “System Estimate”, “External Estimate, and “Office Estimate” that span a numeric range from 201000 through 402000. Specifying a “top range value” of 201000, and a “bottom range value” of 402000, means that any measurement whose measurement condition falls within that range is considered to be estimated.
- **Validation Algorithm Type / Algorithm:** The base package algorithm type and algorithm specified in the “Validation” system event for the rule, if applicable. If specified, a brief description of the algorithm is also provided. Validation algorithms used by VEE rules do not use “soft” parameters.
- **Rule Parameters:** Parameters used to define the rule (if applicable). Does not include common parameters used by all rules (see below)
- **Processing Logic:** A description of the processing performed by the rule. Processing logic is performed by the “Apply VEE Rule” algorithm specified on the VEE rule business object.
- **Example:** An example configuration of the rule. Note that all examples use default values for all “Apply VEE Rule Algorithm Parameters”.

Common Parameters

All VEE rules use the following common parameters:

- **VEE Group:** The VEE group to which the rule belongs
- **VEE Rule:** The user-defined name given to the VEE rule
- **Sequence:** The sequence within its VEE group that the rule will be executed
- **Description:** A short description of the rule. This is used as the Information String for the rule in the user interface.
- **Detailed Description:** A detailed description of the rule
- **Category:** The rule’s category. Base package options include “Automatic Correction of Invalid Data,” “Estimation Rules,” and “Validation Rules.”
- **Start Date:** The date on which the rule is considered in effect. VEE rules are not applied to initial measurements whose start dates are earlier than this date.

- **End Date:** The date after which the rule is considered no longer in effect. VEE rules are not applied to initial measurements whose stop dates are later than this date.

Interval Adjustment from Scalar

Interval Adjustment From Scalar rules adjust interval measurements based on existing scalar measurements such that the total of the intervals equals the scalar measurement value for the same time period.

This adjustment can be performed on either all intervals in the interval measurement, or only on those intervals that fall within a specified condition range. Both options require that a scalar measuring component be related to the current interval measuring component as a “Consumption Reference Measuring Component”, and that one or more final measurements be present for the related measuring component between the start and end date/times of the current initial measurement.

- **Rule Name:** Interval Adjustment From Scalar
- **Base Package VEE Rule Business Object:** D2-IntervalAdjustmentFrmScalar
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-INTADJSCA
- **Apply VEE Rule Algorithm Parameters:**
 - Intervalize Partial Scalar Measurements
 - Condition — bottom range value for Interpolation
 - Condition — top range value for Interpolation
 - Condition — bottom range value for Missing
 - Condition — top range value for Missing
 - Condition — bottom range value for Outage
 - Condition — top range value for Outage
 - Condition — bottom range value for Exclusion
 - Condition — top range value for Exclusion
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Interval Adjustment From Scalar	<p>Defines the parameters used by the VEE rule, including:</p> <ul style="list-style-type: none"> • Intervals to Adjust: Specifies which interval data values should be subject to adjustment. Can be either the entire range of interval data values (All), or only those interval data values that have a condition within a defined range (Restrict by Condition). • Bottom Range Condition Value: Specifies the bottom of the range of condition values for intervals that will be subject to adjustment. • Top Range Condition Value: Specifies the top of the range of condition values for intervals that will be subject to adjustment. • Interpolate Zero Quantity Intervals: A flag that indicates if any zero quantity intervals within the condition range should be estimated using linear interpolation prior to the application of the adjustment factor. Note: the set of intervals that will be interpolated is controlled by the parameters for the D2-INTADJSCA - 'Interval Adjustment Based on Related Scalar Measurement' algorithm. • Maximum Consecutive Hours to Interpolate: The maximum number of consecutive hours to be interpolated. If there are more hours to interpolate than the value of this parameter, an exception is generated based on the Interval Adjustment Exception parameter. Applicable only when Interpolate Zero Quantity Intervals is Yes.

Field	Description
	<ul style="list-style-type: none"> • Condition Value for Adjusted Intervals: The condition value assigned to intervals adjusted by this rule. • Adjust All Intervals for Empty IMD: A flag that indicates (yes or no) if the Intervals to Adjust parameter should be set to "All" when processing an initial measurement that contains all zero interval values with the conditions that fall into the condition range to adjust and the Intervals to Adjust parameter is set to "Restrict by Condition". This ensures that all zero intervals will be adjusted by this rule. • Required Related MC Measurements (%): The percentage of time that must be covered by the measurement data of the related measuring component as compared to the time covered by the initial measurement that is being processed that must be present in order for the rule to execute. If a related measuring component does not have at least this amount of measurement data, the rule generates an exception based on the Insufficient Related MC Measurements Exception parameters. If there are more than one related measuring components, each of the related measuring components must have this minimum amount of measurement data. For example, if this parameter is set to 75% and the initial measurement being processed covers a period of 24 hours and the related measuring component's measurements only cover 12 of those hours, the system raises an exception (the related measuring component coverage is only 50%).
Override Condition for High Quality Source Measurements	<p>This is an optional set of parameters used to override condition codes for interval estimated measurements that are based on measurements from a related measuring component which are deemed to be of "high quality."</p> <p>Minimum Condition Quality to Override: Specifies the minimum condition quality value for the related scalar measuring component's measurements. Measurements will be considered "high quality" if all applicable measurement conditions are equal to or greater than this value.</p> <p>Override Condition value: If all of the related scalar measurements are of "high quality" (based on the Minimum Condition Quality to Override parameter), this condition value will be used for the estimated measurement.</p>
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Interval Adjustment Exception	Defines the Exception Type and Severity for exceptions created to indicate that the measurement has been adjusted.
Insufficient Related MC Measurements Exception	Defines the Exception Type and Severity for exceptions created when a related measuring component does not have enough measurement data to meet the value defined for the Required MC Measurement (%) parameter.
Interpolation Failure Exception	Defines the Exception Type and Severity for exceptions created when interpolation fails because the maximum number of hours to interpolate has been exceeded.

Processing Logic

Interval Adjustment From Scalar rules adjust an interval initial measurement such that the total of the interval values in the measurement equal a scalar value. This rule can adjust either all the interval in the measurement or a subset of intervals, based on condition.

When the "Intervals to Adjust" parameter is set to "All", the scalar consumption provides a value that is then used to proportionally adjust all of the intervals in the measurement. The formula used to calculate the value of each interval is:

$$(\text{Scalar Consumption} / \text{Total Initial Measurement Consumption}) * \text{Interval Amount}$$

If the total of all of the intervals is equal to zero, the rule adjusts all of the intervals to the same value.

When the "Intervals to Adjust" parameter is set to "Restrict by Condition", the rule only adjusts those intervals with a condition code that falls within the range of conditions defined by the "Bottom Range Condition Value" and the "Top Range Condition Value" parameters. In this case, the formula used to calculate the value of each interval is:

$$(\text{Scalar Consumption} / \text{Conditional Initial Measurement Consumption}) * \text{Interval Amount}$$

If the total of the intervals that match the specified condition is equal to zero, the rule adjusts all of the intervals to the same value.

Any adjusted intervals are assigned a condition based on the “Condition Value for Adjusted Intervals” parameter.

Example

The following VEE rule adjusts all interval values in an interval measurement based on final measurements for a related scalar measuring component, and flags all adjusted intervals as “system estimate”.

VEE Group: Interval Estimations

VEE Rule: INTERVAL_ADJUST

Sequence: 10

Description: Interval Adjustment From Scalar

Category: Estimation Rules.

Start Date: 05-01-2010

End Date: N/A

Interval Adjustment From Scalar:

- **Interval to Adjust:** All
- **Bottom Range Condition Value:**
- **Top Range Condition Value:**
- **Interpolate Zero Quantity Intervals:**
- **Maximum Consecutive Hours to Interpolate:**
- **Condition Value for Adjusted Intervals:** System Estimate
- **Adjust All Intervals for Empty IMD:**
- **Required Scalar MC Measurement (%)**

Override Condition for High Quality Source Measurements:

- **Minimum Condition Quality to Override:**
- **Override Condition Value:**

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Information

Interval Adjustment Exception:

- **Exception Type:** Interval Measurement Adjusted Per Scalar Value
- **Exception Severity:** Information

Insufficient Related MC Measurements Exception:

- **Exception Type:**
- **Exception Severity:**

Interpolation Failure Exception:

- **Exception Type:**
 - **Exception Severity:**
-

Interval Averaging Estimation

Interval Averaging Estimation rules estimate missing interval values based on averaging of historical data for the same device and measuring component.

Rules of this type can be configured to specify a maximum allowed percentage of missing interval values, whether or not to include user-edited measurements when averaging historical data, and other parameters related to selecting historical measurements for averaging.

- **Rule Name:** Interval AveragingEstimation
- **Base Package VEE Rule Business Object:** D2-IntervalAveragingEstimation
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-INTAVGEST
- **Apply VEE Rule Algorithm Parameters:**
 - Missing Bottom Range Condition
 - Missing Top Range Condition
 - Outage Bottom Range Condition
 - Outage Top Range Condition
 - Regular Bottom Range Condition
 - Regular Top Range Condition
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Interval Averaging Estimation	<p>Defines the parameters used when estimating missing interval data values using averaging, including:</p> <ul style="list-style-type: none">• Work Calendar: The work calendar used to define which days are work days, weekends, and holidays.• Maximum Percentage Missing Intervals: The maximum percentage of missing values allowable in the initial measurement being estimated.• Estimate if Not Attached to SP: Specifies whether or not to estimate missing values if the measurement is not attached to a service point.• Include User Edited Intervals: Indicates that user edited intervals are included when summing the interval consumption amounts to average.• Include Intervalized Scalar Data: Indicates whether or not intervalized scalar data should be used when accumulating the total average. This is used when a service point has changed from a scalar meter to an interval meter and scalar historical usage.• Holiday Scan Range: This identifies how many weeks the application will scan when looking for previous/next holidays to use in collecting consumption amounts used for interval estimation.• Sunday Scan Range: This identifies how many previous/next Sundays to use in collecting consumption amounts used for interval estimation.• Same Day of Week Scan Range: The number of weeks to check back/forward for intervals on the same day of the week. After this number of weeks has been reached, the rule will switch to looking at ""Like Days"", which scans back/forward on days immediately next to the interval date.• Neighboring Day Scan Range: The number of days to check back/forward immediately next to the interval date.

Field	Description
	<ul style="list-style-type: none"> • Intervals to Average: The number of days to average when using averages to estimate missing data. • Condition Value for Estimates Created: The condition value assigned to estimated interval data values created by this rule.
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Max Percentage Missing Intervals Exception	Defines the Exception Type and Severity for exceptions created if the measurement has more missing interval data values that specified in the Maximum Percentage Missing Intervals parameter.

Processing Logic

Interval Averaging Estimation rules estimate missing consumption by aggregating consumption history for a measuring component and using the average consumption as the estimated amount. The selection of historical data is based on the type of day being estimated. For example, if the missing interval values fall on a holiday, only historical data from holidays and Sundays are used. Likewise, if missing interval is a non-holiday weekend day, historical data from weekend days is used.

The number of days to scan, the specific calendar to use, and the number of historical days of data to average are defined as rule parameters.

The rule calculates the percentage of missing intervals by totaling the number of intervals whose condition codes indicate they are either missing or occurred during an outage. Missing intervals are those marked with a condition code that falls between the condition range defined by the “Missing Bottom Range Condition” and the “Missing Top Range Condition” algorithm parameters. Intervals considered to be missing due to an outage are those marked with a condition code that falls between the condition range defined by the “Outage Bottom Range Condition” and the “Outage Top Range Condition” algorithm parameters.

The rule calculates average interval values based on “regular” intervals values from historical data. “Regular” intervals are those marked with a condition code that falls between the condition range defined by the “Regular Bottom Range Condition” and the “Regular Top Range Condition” algorithm parameters.

The algorithm performs estimation as follows:

First, the rule determines if the measurement is eligible for estimation. Estimation is performed only if the following conditions are true.

- The measuring component is interval.
- The measuring component is linked to a service point, or the “Estimate If Not Attached to SP” parameter is set to “Estimate”.
- The percentage of missing intervals is less than the value set for the “Maximum Percentage Missing Intervals” parameter. If the percentage of missing interval is greater than this parameter, the rule creates an exception using the Exception Type and Severity defined for the “Max Percentage Missing Intervals Exception” parameter.

If the measurement is eligible for estimation, each missing interval is estimated using averaging as follows:

- For Holiday Estimation:
Sum all of the measuring component’s consumption alternating between previous and next holiday dates, whichever holiday date is nearer to the date/time of the interval to be estimated. This is repeated until either the number of weeks specified in the “Holiday Scan Range” parameter is reached or until a number of intervals equal to the “Number of Intervals to Average” parameter have been found.

If the number of weeks specified in the “Holiday Scan Range” parameter is reached but the number of intervals equal to the “Number of Intervals to Average” parameter is not met, sum all of the measuring component’s consumption alternating between previous and next Sundays. This is repeated until either the number of days specified in the “Sunday Scan Range” parameter is reached or until a number of intervals equal to the “Number of Intervals to Average” parameter have been found.

- For Non-Holiday Estimation:

Sum all of the measuring component's consumption alternating between previous and next same days of the week, excluding holidays. This is repeated until either the number of days specified in the "Same Day Scan Range" parameter is reached or until a number of intervals equal to the "Number of Intervals to Average" parameter have been found.

If the number of days specified in the "Same Day Scan Range" parameter is reached but the number of intervals equal to the "Number of Intervals to Average" parameter is not met, sum all of the measuring component's consumption alternating between previous and next neighboring days excluding holidays until either the number of days specified in the "Neighboring Scan Range" parameter is reached or until a number of intervals equal to the "Number of Intervals to Average" parameter have been found.

- Once a number of "regular" intervals equal to the "Number of Intervals to Average" parameter have been found, estimated consumption is calculated as follows:
Total Accumulated Consumption / Total Number of Intervals.

This rule will include data from previously installed devices in the historical consumption if the following conditions are met:

- The previously installed measuring component has a different measuring component type but shares the same Unit of Measure and SQI as the measuring component being processed.
- The previously installed measuring component is scalar and its measuring component type is listed on the measuring component type of the measuring component being processed as a **Consumption Compatible Scalar MC Type**.

Example

The following VEE rule estimates interval values in an initial measurement based on averaging of three historical interval values providing that no more than 10% of the interval values in the measurement are missing.

VEE Group: Interval Estimations

VEE Rule: INTERVAL_AVERAGING_ESTIMATION

Sequence: 10

Description: Interval Averaging Estimation

Category: Estimation Rules.

Start Date: 05-01-2010

End Date: N/A

Interval Averaging Estimation:

- **Work Calendar:** US Work Calendar 1
- **Maximum Percentage Missing Intervals:** 10
- **Estimate if Not Attached to SP:** Estimate
- **Include User Edited Intervals:** Include
- **Include Intervalized Scalar Data:** No
- **Same Day of Week Scan Range:** 3
- **Neighboring Day Scan Range:** 3
- **Sunday Scan Range:** 3
- **Holiday Scan Range:** 2
- **Intervals to Average:** 3
- **Condition Value Estimates Created:** System Estimate

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Information

Max Percentage Missing Intervals Exception:

- **Exception Type:** Maximum Percentage of Missing Data Exceeded
 - **Exception Severity:** Information
-

Interval Interpolation Estimation

Interval Interpolation Estimation rules estimate gaps of missing interval values based on linear interpolation.

When performing interpolation, interval values to either side of the missing intervals are used as the basis for interpolation. An "estimation adder" value equal to (preceding value - subsequent value)/(number of intervals in gap + 1) is added to the interval preceding the first missing interval to calculate the value of the first interval. The estimation adder is then added to the first missing interval's interpolated value to derive the second missing interval value, and process is repeated for each subsequent missing interval.

If missing intervals lie at the beginning or end of the initial measurement, the rule uses final measurements immediately before or after the measurement (respectively) in an attempt to find two reference measurement values for interpolation. If a valid measurement can be found for only one side of a gap, the rule assigns each interval in the gap the value of the available measurement. This is referred to as applying a "flat load".

Interval Interpolation Estimation rules can be configured to specify a maximum duration allowed for interpolation, and a maximum allowed percentage of missing interval values.

- **Rule Name:** Interval Interpolation Estimation
- **Base Package VEE Rule Business Object:** D2-IntervalInterpolationEst
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-INTINTEST
- **Apply VEE Rule Algorithm Parameters:**
 - Condition - bottom range value for Missing
 - Condition - top range value for Missing
 - Condition - bottom range value for Outage
 - Condition - top range value for Outage
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Interval Interpolation Estimation	Defines the parameters used when estimating missing interval data values using interpolation, including: <ul style="list-style-type: none">• Maximum Percentage Missing Intervals: The maximum percentage of missing values allowable for estimations.• Estimate if Not Attached to SP: Specifies whether or not to estimate missing values if the measurement is not attached to a service point.• Maximum Hours to Interpolate: The maximum number of hours to be interpolated• Condition Value for Estimates Created: The condition value assigned to estimated interval data values created by this rule.
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Maximum Hours Exceeded Exception	Defines the Exception Type and Severity for exceptions created if the measurement has more missing hours of data than the Maximum Hours to Interpolate parameter.

Field	Description
Max Percentage Missing Intervals Exception	Defines the Exception Type and Severity for exceptions created if the measurement has more missing interval data values than specified in the Maximum Percentage Missing Intervals parameter.

Processing Logic

Interval Interpolation Estimation rules estimate gaps in interval initial measurements using prior and subsequent intervals as starting points for linear interpolation. The rule estimates intervals that are designated as “missing” based on condition codes, but not those designated as having occurred during an outage.

Two pairs of algorithm parameters are used to define the range of condition values that correspond to "missing" and "outage" intervals. The “Condition - bottom range value for Missing” and the “Condition - top range value for Missing” parameters define the condition range for “missing” intervals, while the “Condition - bottom range value for Outage” and the “Condition - top range value for Outage” parameters define the condition range for “outage” intervals. The condition ranges can overlap (the range for “missing” might contain a superset of conditions that includes those for “outage” or some other condition). For example, assume the condition range for "missing" spans entirely the condition range for "outage". This rule could be configured to perform estimation for any interval that has a value in the range of "missing" conditions, but at the same time exclude intervals marked with "outage" conditions from estimation calculation.

The “Maximum Hours to Interpolate” parameter specifies the maximum number of consecutive intervals within a gap before that gap can no longer be interpolated.

When estimating values for intervals in the middle of the initial measurement, interval values to either side of the missing intervals are used as the basis for interpolation. An "estimation adder" value equal to (preceding value - subsequent value)/ (number of intervals in gap + 1) is added to the interval preceding the first missing interval to calculate the value of the first interval. The estimation adder is then added to the first missing interval's interpolated value to derive the second missing interval value, and process is repeated for each subsequent missing interval.

If missing intervals lie at the beginning or end of the initial measurement, the rule uses final measurements immediately before or after the measurement (respectively) in an attempt to find two reference measurement values for interpolation. If a valid measurement can be found for only one side of a gap, the rule assigns each interval in the gap the value of the available measurement. This is referred to as applying a "flat load". Note that final measurements used for interpolation at the beginning or end of an initial measurement must not be either “missing” or “outage” intervals, based on the algorithm parameters described above. In the event that the gap to be estimated is the entire length of the initial measurement (and the rule is configured such that this is not too large of a gap), the rule attempts to find final measurements as described above.

Estimated intervals are assigned a condition value as defined for the “Condition Value for Estimates Created” parameter.

Example

The following VEE rule estimates up to three hours of missing interval values using linear interpolation providing that no more than 20% of the interval values in the measurement are missing.

VEE Group: Interval Estimations

VEE Rule: INTERPOLATE_GAPS

Sequence: 10

Description: Interpolate Gaps

Category: Estimation Rules.

Start Date: 05-01-2010

End Date: N/A

Interval Interpolation Estimation:

- **Maximum Percentage Missing Intervals:** 20
- **Estimate if Not Attached to SP:** Estimate
- **Maximum Hours to Interpolate:** 3

- **Condition Value for Estimates Created:** System Estimate

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Information

Maximum Hours Exceeded Exception:

- **Exception Type:** Maximum Gaps Size for Estimation Exceeded
- **Exception Severity:** Information

Max Percentage Missing Intervals Exception:

- **Exception Type:** Maximum Percentage of Missing Data Exceeded
 - **Exception Severity:** Information
-

Interval Profile Estimation

Interval Profile Estimation rules estimate missing interval values based on an associated profile measuring component.

Rules of this type can be configured to specify a maximum allowed percentage of missing interval values.

Note that the profile measuring component must contain measurement data for the same time period as the initial measurement to be estimated.

- **Rule Name:** Interval Profile Estimation
- **Base Package VEE Rule Business Object:** D2-IntervalProfileEstimation
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-INTPROEST
- **Apply VEE Rule Algorithm Parameters:**
 - Condition - bottom range value for Missing
 - Condition - top range value for Missing
 - Condition - bottom range value for Outage
 - Condition - top range value for Outage
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Interval Profile Estimation	Defines the parameters used when estimating missing interval data values from a profile, including: <ul style="list-style-type: none"> • Maximum Percentage Missing Intervals: The maximum percentage of missing values allowable for estimations. • Estimate if Not Attached to SP: Specifies whether or not to estimate missing values if the measurement is not attached to a service point. • Profile Factor: The profile factor to be used when estimating interval data values. • Condition Value for Estimates Created: The condition value assigned to estimated interval data values created by this rule.
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.

Field	Description
Max Percentage Missing Intervals Exception	Defines the Exception Type and Severity for exceptions created if the measurement has more missing interval data values than specified in the Maximum Percentage Missing Intervals parameter.

Processing Logic

Interval Profile Estimation rules use a profile measuring component's interval consumption as a source of values to assign to intervals in the current initial measurement that are designated "missing" (based on the interval's condition). The rule does not estimate intervals designated as an "outage".

Two pairs of algorithm parameters are used to define the range of condition values that correspond to "missing" and "outage" intervals. The "Condition - bottom range value for Missing" and the "Condition - top range value for Missing" parameters define the condition range for "missing" intervals, while the "Condition - bottom range value for Outage" and the "Condition - top range value for Outage" parameters define the condition range for "outage" intervals.

For each interval in the current initial measurement that falls into the category of "missing" and does not fall into the category of "outage", the measurement value for the same date and time from the profile measuring component (defined by the "Profile Factor" parameter) is used as the estimated value. The condition of the estimated interval is then updated to a new condition defined by the "Condition Value for Estimates Created" parameter.

If a measurement is not available for the profile measuring component on the date and time of an interval, the interval is left unchanged.

This rule will only estimate a specified percentage of missing intervals. This percentage is defined by the "Maximum Percentage Missing Intervals". If the initial measurement has more missing intervals than this percentage, the rule creates an exception using the Exception Type and Severity defined for the "Max Percentage Missing Exception" parameter. If consumption data for the profile measuring component cannot be found for the date and time of an interval to be estimated, the rule creates an exception using the Exception Type and Severity defined for the "Insufficient Input Data Exception" parameter.

If the interval size on the interval measuring component differs from the profile interval size, the rule will attempt to convert the profile's interval size to match that of the interval measuring component before performing estimation calculations.

Example

The following VEE rule estimates interval measurements based on the "kWh - Profile:" profile measuring component (defined as a factor) provided that no more than 20% of the interval values in the measurement are missing.

VEE Group: Interval Estimation

VEE Rule: INTERVAL_PROFILE_EST

Sequence: 10

Description: Interval Profile Estimation

Category: Estimation Rules.

Start Date: 05-01-2010

End Date: N/A

Interval Profile Estimation:

- **Maximum Percentage Missing Intervals:** 20
- **Estimate if Not Attached to SP:** Estimate
- **Factor:** kWh - Profile
- **Condition Value for Estimates Created:** System Estimate

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data

- **Exception Severity:** Information

Max Percentage Missing Intervals Exception:

- **Exception Type:** Maximum Percentage of Missing Data Exceeded
- **Exception Severity:** Information

Scalar Calculation from Interval

Scalar Calculation From Interval rules calculate a scalar reading and consumption value from measurements for a related interval measuring component for the same time period as the initial measurement being estimated.

- **Rule Name:** Scalar Calculation From Interval
- **Base Package VEE Rule Business Object:** D2-ScalarCalcFromInterval
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-SCACALINT
- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Scalar Calculation from Interval	<p>Defines the parameters used when calculating scalar values from interval data values, including:</p> <ul style="list-style-type: none"> • Minimum Condition to Preserve Measurement: If the initial measurement already has a measurement value and the condition for the measurement value is greater than or equal to the condition specified then the rule will exit and not perform scalar estimation calculations. If left blank the existing measurement value in the initial measurement may be overridden with the estimated value from the measuring component. This is to preserve estimations that may have been generated by other rules. • IMD Created Condition Value: The condition value assigned to estimated scalar data created by this rule. • Required Interval MC Measurement (%): The percentage of time that must be covered by the measurement data of the related measuring component as compared to the time covered by the initial measurement that is being processed that must present in order for the rule to execute. If a related interval measuring component does not have at least this amount of measurement data, the rule generates an exception based on the Insufficient Related MC Measurements Exception parameters. If there are more than one related measuring components, each of the related measuring components must have this minimum amount of measurement data. For example, if this parameter is set to 75% and the initial measurement being processed covers a period of 24 hours and the related measuring component's measurements only cover 12 of those hours, the system raises an exception (the related measuring component coverage is only 50%).
Override Condition for High Quality Source Measurements	<p>This is an optional set of parameters used to override condition codes for scalar scalar measurements that are based on measurements which are deemed to be of "high quality."</p> <p>Minimum Condition Quality to Override: Specifies the minimum condition quality value for the related interval measuring component's measurements. Measurements will be considered "high quality" if all applicable measurement conditions are equal to or greater than this value.</p> <p>Override Condition Value: If all scalar measurements are of "high quality" (based on the Minimum Condition Quality to Override parameter), this condition value will be used for the estimated measurement.</p>
Insufficient Input Data Exception	<p>Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.</p>
Insufficient Related MC Measurements Exception	<p>Defines the Exception Type and Severity for exceptions created when a related measuring component does not have enough measurement data to meet the value defined for the Required MC Measurement (%) parameter.</p>

Processing Logic

Scalar Calculation From Interval rules calculate a single consumption amount for a scalar initial measurement using the total consumption for the same date/time range for a related interval measuring component.

The scalar value replaces any existing value within the initial measurement (in the post-VEE list) and updates the condition to the value configured on the VEE rule. This VEE rule updates the condition to the **Override Condition Value** when the measurement condition value for all underlying interval data is greater than or equal to **Minimum Condition Quality to Override** (if defined) otherwise it updates the condition of the initial measurement to the **IMD Created Condition Value**.

If this rule is executed for an interval measuring component, the rule does not produce an error, and does not attempt to perform any processing.

Example

The following VEE rule calculates a scalar measurement value based on the total consumption for the same date/time range for a related interval measuring component.

VEE Group: Scalar Estimations

VEE Rule: SCALAR_CALC_FROM_INTERVAL

Sequence: 10

Description: Scalar Calculation From Interval

Category: Estimation Rules.

Start Date: 05-01-2010

End Date: N/A

Scalar Calculation From Interval:

- **IMD Created Condition Value:** System Estimate
- **Required Scalar MC Measurement (%)**

Override Condition for High Quality Source Measurements:

- **Minimum Condition Quality to Override:**
- **Override Condition Value:**

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Information

Insufficient Related MC Measurements Exception:

- **Exception Type:**
 - **Exception Severity:**
-

Scalar Estimation

Scalar Estimation rules estimate scalar usage based on Average Daily Use (ADU) for the same measuring component from one year-ago or from its most recent measurements.

This VEE rule uses historical data for the same measuring component to derive an estimated value for a scalar Initial Measurement. Depending upon the configuration, the routine will evaluate historical data from a month ago and then data from a year ago, or vice-versa. If the data for the first historical period turns out to be usable, the second historical period will not be evaluated.

Rules of this type can be configured to specify a required percentage of historical data for estimation, the maximum percentage of user-edited or system estimated historical allowed in estimation calculations, and high and low tolerances for estimated values relative to earlier measurements for the same measuring component.

- **Rule Name:** Scalar Estimation
- **Base Package VEE Rule Business Object:** D2-ScalarEstimation
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-SCALAREST
- **Apply VEE Rule Algorithm Parameters:**
 - Condition - bottom range value for System-Estimated
 - Condition - top range value for System-Estimated
 - Condition - bottom range value for Regular
 - Condition - top range value for Regular
 - Condition - bottom range value for No Read
 - Condition - top range value for No Read
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Scalar Estimation	<p>Defines the parameters used by this rule, including:</p> <ul style="list-style-type: none"> • Historical Percentage Required: The percentage amount of history required for the validation to be executed. • Historical Look First: Specifies the first point in time to find historical data (Last Reading, or Last Year). If consumption cannot be found using the Historical First Look period, the other period is used. • Historical Pre-Window: The number of days prior to the start date to find historical data. • Historical Post-Window: The number of days after the stop date to find historical data. • Allowed Historical System Estimated Data (%): The percentage of system estimated historical data allowed in the estimation calculation. • Allowed Historical User Edited Data (%): The percentage of user edited historical data allowed in the estimation calculation. • Interim Reading High Threshold Percentage: When estimating consumption for a date/time after which there are existing measurements, this field defines the percentage by which an estimated consumption value can be greater than the consumption derived from an interpolated reading for that date/time. This value can be greater than 100%. • Interim Reading Low Threshold Percentage: When estimating consumption for a date/time after which there are existing measurements, this field defines the percentage by which an estimated consumption value can be less than the consumption derived from an interpolated reading for that date/time. • Condition Value for Estimates Created: The condition value assigned to estimated interval data values created by this rule.
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Estimated Value Exceed Limit Exception	Defines the Exception Type and Severity for exceptions created when the estimated value exceeds the limits based on existing reading.

Processing Logic

Scalar Estimation rules use historical data for the same measuring component to derive an estimated value for a scalar initial measurement. The rule can use historical data from either the previous year or the previous reading, based on the “Historical Look First” parameter.

When looking for data from the last reading, the system retrieves all measurements for the period from (IMD Start Date - Historical Pre-Window) through (IMD start date)

When looking for data from last year, the system retrieves all measurements from (IMD end date minus 1 year - Historical Pre-Window) through (IMD end date minus 1 year + Historical Post-Window).

If the data for the selected historical period (Last Reading or Last Year) turns out to be unusable, the second historical period is evaluated. Whether historical data qualifies for use in estimation is determined through a combination of rule parameters and a set of algorithm parameters.

The “Condition - bottom range value for System Estimated” and the “Condition - top range value for System Estimated” parameters define the condition range for system estimated intervals, while the “Condition - bottom range value for Regular” and the “Condition - top range value for Regular” parameters define the condition range for regular intervals. The rule does not attempt to estimate if there is already a value present in the initial measurement that has a condition that falls within the ranges defined as either "system-estimated" or "regular" based on the algorithm parameters.

Estimated values are calculated based on whether or not the measuring component measures a “peak quantity” (such as demand measured by kilowatts).

- If the measuring component references a unit of measure that does not "measure peak quantity", the rule calculates an estimated value by finding an "average daily usage" for the historical period, and applying that value to the length of the current period of the initial measurement. For example, if the initial measurement is 30 days, and the calculated average daily usage is 50, the initial measurement would be equal to 1500 (30 days X 50 per day).
- If the measuring component references a unit of measure that "measures peak quantity", the routine uses the maximum returned from the historical period as the estimated value.

In both cases, the rule calls a common routine to arrive at the estimated value that is also used by the High/Low Check.

The rule rejects consumption from a historical period as unusable for estimation if too great a portion of the period is covered by final measurements that are not high-quality. The “Allowed Historical System Estimated Data (%)” and “Allowed Historical User Edited Data (%)” parameters define the maximum percentage of system estimated or user edited historical data (respectively) that is allowed to be used in estimation calculations.

Once an estimated value is calculated, the routine backs into a reading, which involves backing out multipliers and, if the measuring component is subtractive, adding the result to the prior reading. The Calculate Scalar Consumption (DI-SC-CNSUMP) algorithm does this in a special "Back Into Reading" mode.

Assuming the measuring component does not "measure peak quantity" (in other words, assuming it measures consumption), and that it does not allow negative consumption, the rule then validates that the current estimate is in line with any subsequent measurement (if one exists), and compares it to a “reasonable” value, as follows:

- If the estimate is greater than the consumption represented by the subsequent measurement, an exception is created and the estimated value is not used. To find the consumption represented by the subsequent measurement, the rule calls the Calculate Scalar Consumption algorithm using the start reading of the current initial measurement and end reading of the subsequent measurement.
- If the estimate does not exceed the consumption represented by the subsequent measurement, the rule evaluates whether the estimate exceeds a "reasonable" value by some percentage. The "reasonable" value is found by calculating an average daily usage for the consumption represented by the subsequent measurement, and multiplying this average by the number of days of the current initial measurement. The percentage difference is found by taking the difference between the "reasonable" value and the estimate, and dividing by the reasonable value. If the resulting percentage exceeds the value specified for the “Interim High Reading Threshold” parameter, the estimate is rejected and an exception is logged.

If the estimate passes these checks, the Initial Measurement is updated with its value, and the condition is updated with the new condition specified by the “Condition Value for Estimates Created” parameter.

Example

The following VEE rule estimates scalar usage based on measurements from one year-ago, providing that no more than 20% of the historical data was either user-edited to estimated.

VEE Group: Scalar Estimations

VEE Rule: SCALAR_ESTIMATION

Sequence: 10

Description: Scalar Estimation

Category: Estimation Rules

Start Date: 05-01-2010

End Date: N/A

Scalar Estimation:

- **Historical Percentage Required:** 50
- **Historical First Look:** Last Year
- **Historical Pre-Window:** 10
- **Historical Post-Window:** 5
- **Allowed Historical System Estimated Data (%):** 20
- **Allowed Historical User Edited Data (%):** 20
- **Interim Reading High Threshold Percentage:** 50
- **Interim Reading Low Threshold Percentage:** 50
- **Condition Value Estimates Created:** System Estimate

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Information

Estimated Value Exceeds Limit Exception:

- **Exception Type:** Consumption Differs from Reference Amount
 - **Exception Severity:** Information
-

Scalar Profile Estimation

Scalar Profile Estimation rules estimate missing scalar readings based on an associated profile measuring component.

Rules of this type calculate a scalar estimate by looking at final measurements for a profile measuring component covering the same date range as the current Initial Measurement. The profile measuring component to be used as a source of measurement data is defined via a profile factor on the rule.

- **Rule Name:** Scalar Profile Estimation
- **Base Package VEE Rule Business Object:** D2-ScalarProfileEstimation
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-SCAPROEST
- **Apply VEE Rule Algorithm Parameters:**

- Condition - bottom range value for System-Estimated
- Condition - top range value for System-Estimated
- Condition - bottom range value for Regular
- Condition - top range value for Regular
- Condition - bottom range value for No Read
- Condition - top range value for No Read
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Scalar Profile Estimation	<p>Defines the parameters used when estimating missing scalar data from a profile, including:</p> <ul style="list-style-type: none"> • Historical Percentage Required: The percentage amount of history required for the validation to be executed. • Allowed Historical System Estimated Data (%): The percentage of system estimated historical data allowed in the estimation calculation. • Estimation Profile Factor: Defines the profile factor referencing the measuring component to use for generating estimates if no historical data for the same measuring component can be found. If it's not populated, profile-based estimation will not be performed when no historical data is found to be usable from the current measuring component. • Interim Reading High Threshold Percentage: When estimating consumption for a date/time after which there are existing measurements, this element defines the percentage by which an estimated consumption value can be greater than the consumption derived from an interpolated reading for that date/time. This value can be greater than 100%. • Interim Reading Low Threshold Percentage: When estimating consumption for a date/time after which there are existing measurements, this element defines the percentage by which an estimated consumption value can be less than the consumption derived from an interpolated reading for that date/time. • Condition Value for Estimates Created: The condition value assigned to estimated interval data values created by this rule.
Insufficient Input Data Exception	Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.
Estimated Value Exceed Limit Exception	Defines the Exception Type and Severity for exceptions created when the estimated value exceeds the limits based on existing reading.

Processing Logic

Scalar Profile Estimation rules calculate a scalar estimate by looking at final measurements for a profile measuring component covering the same date range as the current initial measurement. The profile measuring component to be used as a source of measurement data is defined in the “Estimation Profile Factor” parameter. This rule is meant primarily for a configuration in which the profile measuring components are interval, although the profile could be scalar as well.

The “Condition bottom range value for System Estimated” and the “Condition top range value for System Estimated” algorithm parameters define the condition range for system estimated intervals, while the “Condition code bottom range value for Regular” and the “Condition code top range value for Regular” algorithm parameters define the condition range for regular intervals. The rule does not attempt to estimate if there is already a value present in the initial measurement that has a condition that falls within the ranges defined as either "system-estimated" or "regular" based on the algorithm parameters.

These algorithm parameters are also used in the evaluation of the quality of the profile measuring component's data. The "system estimated" condition range algorithm parameter values are used in conjunction with the "Allowed Historical System Estimated Data (%)" parameter to reject the profile data if too high a percentage of the data has a condition inside the "system estimated" range.

If the measuring component references a unit of measure that "measures peak quantity", the maximum value returned from the profile data is used as the estimated value. Otherwise, an "average daily usage" value is calculated using the profile data, and that value is applied to the length of the current period of the initial measurement. For example, if the initial measurement is 30 days, and the calculated average daily usage is 50, the initial measurement would be equal to 1500 (30 days X 50 per day).

Note that the logic in this algorithm calls the same common routine used in the High/Low Check and rules.

Example

The following VEE rule estimates scalar measurement values based on a specified profile measuring component, providing that no more than 20% of the historical data was estimated.

VEE Group: Scalar Estimations

VEE Rule: SCALAR_PROFILE_EST

Sequence: 10

Description: Scalar Profile Estimation

Category: Estimation Rules.

Start Date: 05-01-2010

End Date: N/A

Scalar Estimation:

- **Historical Percentage Required:** 50
- **Allowed Historical System Estimated Data (%):** 20
- **Estimation Profile Factor:** kWh - Profile
- **Interim Reading High Threshold Percentage:** 50
- **Interim Reading Low Threshold Percentage:** 50
- **Condition Value Estimates Created:** System Estimate

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Information

Estimated Value Exceeds Limit Exception:

- **Exception Type:** Consumption Differs from Reference Amount
- **Exception Severity:** Information

Scalar Proration

Scalar Proration rules estimate a scalar value by prorating the quantity of the measurement immediately following the initial measurement's "To Date/Time" (the subsequent measurement).

- **Rule Name:** Scalar Proration
- **Base Package VEE Rule Business Object:** D2-ScalarProration
- **Apply VEE Rule Algorithm Type / Algorithm:** D2-SCLRPRORT

- **Apply VEE Rule Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Scalar Proration	<p>Defines the parameters used when prorating a scalar value using this rule, including:</p> <ul style="list-style-type: none"> • Minimum Condition to Preserve Measurement: If the initial measurement already has a measurement value and the condition for the measurement value is greater than or equal to this condition, the rule will exit and not perform proration calculations. If left blank, the rule will prorate existing measurements regardless of their condition code. This is to preserve estimations that may have been generated by other rules. • Minimum Related Measurement Condition: If there is a related interval measuring component and it has measurements for the time period covered by subsequent reading, the measurement must be at least this condition or greater to impact the proration. • IMD Created Condition Value: The condition value assigned to initial measurement data created by this rule. • Minimum Preceding Read Condition Quality: If specified, the prior reading must have a condition code greater than or equal to the specified condition code in order for the rule to execute. This is an optional parameter. • Minimum Subsequent Read Condition Quality: If specified, the subsequent reading must have a condition greater than or equal to the specified condition code in order for the rule to execute. This is an optional parameter.
Override Condition for High Quality Source Measurements	<p>This is an optional set of parameters used to override condition codes for scalar estimated measurements that are based on measurements which are deemed to be of "high quality."</p> <p>Minimum Condition Quality to Override: Specifies the minimum condition quality value for the preceding and subsequent scalar measurements. Measurements will be considered "high quality" if both measurement conditions are equal to or greater than this value.</p> <p>Override Condition value: If both the preceding and subsequent measurements are of "high quality" (based on the Minimum Condition Quality to Override parameter), this condition value will be used for the estimated measurement.</p>
Insufficient Input Data Exception	<p>Defines the Exception Type and Severity for exceptions created when there is insufficient data to execute the VEE rule.</p>
Reading Quality Exception	<p>Defines the Exception Type and Severity for exceptions created if either the preceding or subsequent measurement does not meet the respective quality threshold specified in the Scalar Proration section.</p>

Processing Logic

The scalar quantity calculation is performed using the following equation:

Estimated Scalar Quantity = (Initial Measurement Duration / Subsequent Measurement Duration) * Subsequent Measurement Quantity

The estimation's measurement condition will be determined based upon the quality of the preceding and subsequent measurements. If measurement conditions of both measurements are equal to or greater than the rule's **Minimum Condition Quality to Override** (if specified) then the **Override Condition Value** will be used. Otherwise the condition code specified for the **IMD Creation Condition Value** parameter will be used.

If the **Minimum Preceding Reading Condition Quality** and the **Minimum Subsequent Reading Condition Quality** have been defined for the rule, the rule will only execute if both measurements have a condition that is greater than or equal to the condition code quality defined in the respective parameters.

If the initial measurement's measurement list has an existing quantity and that quantity has a condition code that is greater than or equal to the **Minimum Condition to Preserve IMD Quantity** the rule will exit.

This rule does not work for interval measuring components or for scalar measuring components whose primary measurement measures peak.

Example

The following VEE rule prorates a scalar measurement value based on the preceding and subsequent measurements.

VEE Group: Scalar Estimations

VEE Rule: SCALAR_PRORATION

Sequence: 10

Description: Scalar Proration

Category: Estimation Rules.

Start Date: 05-01-2010

End Date: N/A

Scalar Proration:

- **Minimum Condition to Preserve Measurement:**
- **IMD Created Condition Value:** External Estimate
- **Minimum Preceding Read Condition Quality:** Regular
- **Minimum Subsequent Read Condition Quality:** Regular

Override Condition for High Quality Source Measurements:

- **Minimum Condition Quality to Override:** Regular
- **Override Condition Value:** System Estimate

Insufficient Input Data Exception:

- **Exception Type:** Insufficient Input Data
- **Exception Severity:** Information

Reading Quality Exception:

- **Exception Type:** Reading Quality Exception
 - **Exception Severity:** Issues
-

Working with VEE Groups

This section describes common tasks related to working with VEE groups.

Creating VEE Groups

Use this procedure to create a new VEE group.

1. Select **Admin Menu > VEE Rules > VEE Group+**.

NOTE: If your system supports more than one VEE group business object, you will be prompted to select a business object for the VEE group.

2. Enter the name, description, and detailed description for the VEE group.
3. Complete any remaining fields (if applicable).
4. Click **Save**.
5. To add a VEE rule to the VEE group, click the **Add Rule** link in the VEE Rules List zone title bar. See [Creating VEE Rules](#) for more information about creating VEE rules.

Now you can create VEE rules for this group.

VEE Group Search

Use this procedure to search for a VEE Group on the VEE Group Query portal.

1. Select **Admin Menu > VEE Rules > VEE Group**.
2. Enter your search criteria.
You can search by VEE Group or description, or VEE Group Factor.
3. Click **Refresh**.
4. In the search results list, click the link for the VEE group you want to view or edit.

Maintaining VEE Groups

Use this procedure to maintain an existing VEE group.

You use the VEE Group portal to maintain VEE groups. This portal includes the following zones:

- **VEE Group:** Defines basic information about VEE group
- **VEE Rules List:** lists the VEE rules belonging to the group
- **Referencing VEE Rules List:** lists the VEE rules that reference the group
- **Referencing VEE Group Factors List:** lists the VEE group factors that reference the group
- **Referencing Measuring Component Type List:** lists the measuring component types that reference the group
- **Referencing Measuring Component List:** lists the measuring components that reference the group

To maintain a VEE group:

1. Select **Admin Menu > VEE Rules > VEE Group** to navigate to the VEE Group portal.
2. Search for and select the appropriate VEE group.
3. Click the **Edit**, **Duplicate**, or **Delete** button as appropriate.
4. To add a VEE rule to the VEE group, click the **Add Rule** link in the VEE Rules List zone title bar. See [Creating VEE Rules](#) for more information about creating VEE rules.
5. To change the sequence of VEE rules for the group, click the **Resequence Rules** link in the VEE Rules List zone title bar, edit the Execution Sequence in the Resequence Rules dialog, and click **Save**.

Working with VEE Rules

This section describes common tasks related to working with VEE rules.

Creating VEE Rules

Use this procedure to create a new VEE rule.

Prerequisites: You must define at least one VEE group before you can create VEE rules.

1. Select **Admin Menu > VEE Rules > VEE Rule+**.
2. Search for and select the VEE group to which the new VEE rule will belong.
3. Select the business object that will define the VEE rule.
4. Click **OK**.
5. Enter a name, sequence number, description, and detailed description for the rule.
6. Select the category for the rule.
7. Enter the Start Date and (optional) Stop Date for the rule.
8. Complete the remaining fields and sections.

NOTE: The remaining fields and sections are based on the VEE rule business object you selected.

9. Click **Save**.
10. To define eligibility criteria for the rule, click the **Add** link in the Eligibility Criteria List zone title bar. See [Defining Eligibility Criteria for a VEE Rule](#) for more information.

VEE Rule Search

Use this procedure to search for a VEE Rule on the VEE Rule Query portal.

1. Select **Admin Menu > VEE Rules > VEE Rule**.
2. Enter your search criteria.
You can search by VEE Rule or description.
3. Click **Refresh**.
4. In the search results list, click the link for the VEE rule you want to view or edit.

Maintaining VEE Rules

Use this procedure to maintain an existing VEE rule.

You use the VEE Rule portal to maintain VEE rules. This portal includes the following zones:

- **VEE Rule:** Defines the VEE rule, including parameters used when executing the rule

- **Eligibility Criteria List:** lists the eligibility criteria defined for the rule

To maintain a VEE rule:

1. Select **Admin Menu** > **VEE Rules** > **VEE Rule** to navigate to the VEE Rule portal.
2. Search for and select the appropriate VEE rule.
3. Click the **Edit**, **Duplicate**, or **Delete** button as appropriate.
4. To define eligibility criteria for the rule, click the **Add** link in the Eligibility Criteria List zone title bar. See [Defining Eligibility Criteria for a VEE Rule](#) for more information.

Defining Eligibility Criteria for a VEE Rule

Use this procedure to define eligibility criteria for a VEE rule.

Prerequisites: You must create a VEE rule before you can define eligibility criteria.

1. Click the **Add** link in the Eligibility Criteria List zone title bar.

NOTE: If your system supports more than one eligibility criteria business object, you will be prompted to select a business object for the eligibility criteria.

2. Enter a sequence number, description, and detailed description for the criteria.
3. Complete the Criteria Comparison section as follows:
 - **Criteria Field:** the algorithm used to retrieve the value of the criteria field
 - **Comparison Operator:** the operator used in the comparison
 - **Value:** a user-specified value to which the retrieved value is compared (using the comparison operator)
4. Complete the Comparison Results section as follows:
 - **If True:** the action to take if the comparison is true
 - **If False:** the action to take if the comparison is false
 - **If Insufficient Data:** the action to take if there is insufficient data to perform the comparison
5. Complete any remaining fields (if applicable).
6. Click **Save**.

Chapter 11

Usage Rule Administration

This section describes common tasks related to usage rule administration.

Understanding Usage Groups and Rules

This section describes entities used to support the management of usage groups and rules.

About Usage Groups

Usage groups are collections of usage rules that are applied to measurement data to calculate bill determinants for usage subscriptions.

Usage groups are associated with specific usage subscriptions and usage subscription types (or both). When assigned to usage subscriptions, usage groups contain the usage rules to be used to calculate usage and bill determinants. Usage groups associated with usage subscription types are those groups considered valid for usage subscriptions of that type.

Usage groups can also specify a list of device configuration types that are considered valid. Usage groups should only be associated with usage subscriptions for service points related to device configurations of a valid device configuration type.

Usage groups can also be referenced by individual Execute Usage Group usage rules. See [About Usage Rules](#) for more information.

About Usage Rules

Usage rules are standard and custom rules that perform calculations on measurement data to generate bill determinants and other values used by external systems, such as billing systems, customer information systems, etc.

Usage rules are created for a specific usage group. For example, if you were configuring two usage groups and both included a specific usage rule, you would need to create two instances of the usage rule, one for each group.

Attributes used to define usage rules typically include the following:

- **Basic Information:** Basic information about the usage rule, including its name and description, the usage group to which the rule belongs, the sequence of the rule within the group, and the usage rule category. This information is standard for most usage rules.
- **Parameters:** The parameters used by the rule. Parameters are specific to each rule.

Oracle Utilities Meter Data Management includes the following "generic utility" base package usage rule type that can be used when configuring usage rules:

- **Execute Usage Group** : used to define business logic to allow reference to a usage group. This allows rules that are used frequently to be bunched under a single usage group, which can be referenced/called by other rules as needed. For example, if a set of standard rules should be applied to all usage subscriptions, this set of rules can be configured as part of a usage group, which is referenced by a single usage rule of this type. Referred Usage Group rules use the following options:
 - **Referred Usage Group:** defines the usage group referenced by the rule.

Oracle Utilities Meter Data Management includes the following base package usage rule types that can be used when creating usage rules:

- **Apply Math to Interval Data:** summarizes interval measurements and applies a mathematical formula against the results to derive a usage quantity.
- **Get Interval Data:** retrieves interval data for a measuring component and date range.
- **Get Scalar Details:** assembles scalar readings and measurements (consumption).
- **Get TOU Mapped Usage:** summarizes interval measurements into TOU buckets based on a TOU map (where the TOU map is created based on the schedule defined within a TOU map template).
- **Math:** derives a set of interval measurements based on a formula. This rule can also apply TOU mapping to the derived values, and perform mathematical operations on Usage Transaction Service Quantity entries.
- **Validate Usage Against Tolerance:** validates calculated usage against a specified tolerance.

About Usage Rule Eligibility Criteria

Usage rule eligibility criteria are user-definable conditions that could cause a given usage rule to be applied or skipped. This can involve the evaluation of some attribute of the usage subscription or service point, or something else entirely.

A usage rule can have multiple eligibility criteria for determining if the rule should be applied or skipped, based on a user-defined sequence. Each eligibility criteria uses the following settings:

- **Criteria Comparison:** defines the specific comparison for the criteria, based on the following:
 - **Criteria Field:** the algorithm used to retrieve the value of the criteria field
 - **Comparison Operator:** the operator used in the comparison
 - **Value:** a user-specified value to which the retrieved value is compared (using the comparison operator)
- **Comparison Results:** defines how the rule should behave, based on the results of the comparison defined under Criteria Comparison:
 - **If True:** the action to take if the comparison is true
 - **If False:** the action to take if the comparison is false
 - **If Insufficient Data:** the action to take if there is insufficient data to perform the comparison

Base Package Usage Rules

Oracle Utilities Meter Data Management includes a number of base package usage rules that can be configured to calculate usage from measurements. This section provides descriptions for the base package usage rules used when calculating usage for usage subscriptions. Usage rules are standard and custom rules that perform calculation on measurement data to generate bill determinants and other values used by external systems, such as billing systems, customer information systems, etc. The results of usage rule calculations are stored in usage transactions as Service Quantities.

Usage Rule Descriptions

This section provides detailed descriptions of each of the base package VEE rules provided with Oracle Utilities Meter Data Management. The descriptions of the VEE rules below contain the following information:

- **Rule Name:** The name of the rule
- **Base Package Usage Rule Business Object:** The base package business object used by the rule
- **Apply Usage Rule Algorithm Type / Algorithm:** The base package algorithm type and algorithm specified in the “Apply Usage Rule” system event for the rule
- **Apply Usage Rule Algorithm Parameters:** The “soft” parameters (if any) used by the “Apply Usage Rule” algorithm used by the rule
- **Validation Algorithm Type / Algorithm:** The base package algorithm type and algorithm specified in the “Validation” system event for the rule, if applicable. If specified, a brief description of the algorithm is also provided. Validation algorithms used by VEE rules do not use “soft” parameters.
- **Rule Parameters:** Parameters used to define the rule (if applicable). Does not include common parameters used by all rules (see below)
- **Processing Logic:** A description of the processing performed by the rule. Processing logic is performed by the “Apply VEE Rule” algorithm specified on the usage rule business object.
- **Example:** An example configuration of the rule. Note that all examples use default values for all “Apply Usage Rule Algorithm Parameters”.

Common Parameters

All usage rules use the following common parameters:

- **Usage Group:** The usage group to which the rule belongs
- **Usage Rule:** The user-defined name given to the usage rule
- **Sequence:** The sequence within its usage group that the rule will be executed
- **Description:** A short description of the rule. This is used as the Information String for the rule in the user interface.
- **Detailed Description:** A detailed description of the rule
- **Category:** The rule’s category. Base package options include “Usage Calculation” and “Validation”.

Apply Math (Interval Data)

Apply Math (Interval Data) rules summarize interval measurements and apply a mathematical formula against the results to calculate usage quantities.

- **Rule Name:** Apply Math (Interval Data)
- **Base Package Usage Rule Business Object:** D2-ApplyMathInt

- **Apply Usage Rule Algorithm Type / Algorithm:** D2-APPMATHIN
- **Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** D2-VALAPPMTH
This algorithm performs the following validations:
 - A UOM and/or TOU and/or SQI must be supplied in the “Result” section.
 - If the Calculation Type is “Single Value”, a Single Value Variable must be supplied.
 - If the Calculation Type is “Math Function”, a Math Function and one or more Member Variables must be supplied.
 - If the Calculation Type is “Mathematical Expression”, a Mathematical Expression must be supplied.
 - For each entry in the Variables list
 - If the Variable Type is “Channel Accumulation”, a UOM and/or TOU and/or SQI and a Set Function must be supplied.
 - If the Variable Type is “Factor”, a Factor must be supplied

Rule Parameters

Field	Description
Result	<p>Specifies the resulting entries the rule will insert into the usage transaction service quantity list. Options include:</p> <p>UOM: the Unit of Measure to be used when inserting service quantity entries</p> <p>TOU: the Time of Use to be used when inserting service quantity entries</p> <p>SQI: the Service Quantity Identifier to be used when inserting service quantity entries</p>
Calculation Details	<p>This section defines details related to the type of calculation performed, including arguments and expressions used in calculations.</p> <p>Calculation Type: Defines the type of operation to perform using variables defined in the Variables section. Options include:</p> <ul style="list-style-type: none"> • Single Value: The rule returns the value of a single variable defined in the Single Value Variable field. • Math Function: The rule returns the Sum, Maximum, or Minimum value based on variables defined in the Member Variables field. • Mathematical Expression: The rule returns the result of a mathematical expression defined in the Mathematical Expression field. <p>Single Value Variable: The Variable Name of the variable used by Single Value calculations. Example: V1</p> <p>Member Variables: The Variable Names, separated by a space, of the variables used by Math Function calculations. Example: V1 V2 V3</p> <p>Mathematical Expression: The mathematical expression used by Mathematical Expression calculations.</p> <ul style="list-style-type: none"> • Example 1: $(V1 + V2) / V3$ • Example 2: $SQRT(V1^2 + V2^2)$
Variables	<p>This section defines the variables used in calculations defined in the Calculation Details section.</p> <p>Variable Name: The name of the variable.</p> <p>Variable Type: The type of variable. Options include:</p> <ul style="list-style-type: none"> • Channel Accumulation: Used to reference one or more interval measuring components (linked to the subscription's service points) that share common traits (for example, all measuring components with a given UOM). The UOM and/or TOU and/or SQI and a Set Function are required for this type of variable. • Factor: Used when a factor is used in the calculation. • Usage Period Hours: Used when total number of hours in the usage period is used in the calculation.

Field	Description
	UOM: Specifies the UOM of the measurement data when the Variable Type is Channel Accumulation.
	TOU: Specifies the TOU of the measurement data when the Variable Type is Channel Accumulation.
	SQI: Specifies the SQI of the measurement data when the Variable Type is Channel Accumulation.
	Set Function: The function to apply to the measurement data when the Variable Type is Channel Accumulation. Options include:
	<ul style="list-style-type: none"> • Sum: Returns the sum of the UOM/TOU/SQI specified. This is used when calculating the total usage for an interval measurement. • Max: Returns of the interval maximum value for the UOM specified. • Min: Returns the minimum interval value for the UOM specified.
	Target Unit of Measure: The target UOM of the calculation when the Variable Type is Channel Accumulation.
	Factor: The factor to retrieve when the Variable Type is Factor.

Processing Logic

Apply Math (Interval Data) rules perform calculations on interval data and store the results in the usage transaction's service quantities. Calculations are based on calculation type and variables defined in the rule.

Calculation Types can be one of the following:

- **Single Value:** For Single Value calculations, the Single Variable Name is required, which identifies the variable to process.
- **Math Function:** For Math Function calculations, a Math Function is required and one or more Member Variables are required. These define the function to apply to the Member Variables specified.
- **Mathematical Expression:** For Mathematical Expression calculations, the Mathematical Expression is required, which identifies the mathematical expression and variables to use.

Variables can be one of the following types:

- **Channel Accumulation:** For Channel Accumulation variables, a UOM/TOU/SQI is required, which is used to identify the measuring components (linked to the usage subscription's service points) to process. A Target Unit Of Measure is optional, and is used UOM conversions, such as converting KWH to KW.
- **Factor:** For Factor variables, a Factor is required that identifies the factor to use when retrieving the variable value.
- **Usage Period Hours:** Usage Period Hours variables are used when the number of hours in the usage period is a variable to be used in the calculation.

The rule applies the calculation type to the specified variables to calculate usage quantities.

Example

The following usage rule calculates usage based on an interval measurement by calculating the total of the interval values for measuring components that measure KWH.

Usage Group: Interval Usage

Usage Rule: TOTAL_KWH

Sequence: 10

Description: Total KWH

Category: Usage Calculation

Result:

- **UOM:** Kilowatt-Hours
- **TOU:**

- **SQI:**

Calculation Details:

- **Calculation Type:** Single Value
- **Single Value Variable:** V1

Variables:

- **V1:**
 - **Variable Type:** Channel Accumulation
 - **UOM:** Kilowatt-Hours
 - **Set Function:** Sum
-

Example

The following usage rule calculates usage based on the higher value between measuring components that measure KWH and KVARH.

Usage Group: Interval Usage

Usage Rule: CALC_MAX

Sequence: 10

Description: Calculate Maximum Value for KWH or KVARH

Category: Usage Calculation

Result:

- **UOM:** Kilowatt-Hours
- **TOU:**
- **SQI:**

Calculation Details:

- **Calculation Type:** Math Function
- **Math Function:** Max
- **Member Variables:** V1 V2

Variables:

- **V1:**
 - **Variable Type:** Channel Accumulation
 - **UOM:** Kilowatt-Hours
 - **Set Function:** Sum
 - **V2:**
 - **Variable Type:** Channel Accumulation
 - **UOM:** Kilovolt-Ampere Reactive Hours
 - **Set Function:** Sum
-

Example

The following usage rule calculates usage based on an interval measurement by multiplying the total of the interval values in the measurement by a “power factor” stored as a factor.

Usage Group: Interval Usage

Usage Rule: POWER_FACTOR

Sequence: 10

Description: Apply Power Factor to Interval Data Total

Category: Usage Calculation

Result:

- **UOM:** Kilowatt-Hours
- **TOU:**
- **SQI:** Power Factor Applied

Calculation Details:

- **Calculation Type:** Mathematical Expression
- **Mathematical Expression:** V1*V2

Variables:

- **V1:**
 - **Variable Type:** Channel Accumulation
 - **UOM:** Kilowatt-Hours
 - **Set Function:** Sum
 - **V2:**
 - **Variable Type:** Factor
 - **Factor:** Power Factors
-

Check Existence of Installed Device

Check Existence of Installed Device rules check for the existence of a device installed on the usage subscription's service point for the usage period.

This rule also checks if multi-items, that are effective during the usage period, exist for the usage period.

This rule should be configured in usage groups before other usage rules that calculate usage for the service point to ensure that usage calculations are only performed if a device is currently installed.

- **Rule Name:** Check Existence of Installed Device
- **Base Package Usage Rule Business Object:** D2-ChkExistenceofInstalledDvc
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-CHKEXTDVC

Rule Parameters

Field	Description
Validation Details	<p>This section defines attributes used to determine how to proceed if an installed device is not detected at the service point.</p> <p>Exception Severity: Defines the severity of exceptions when an installed device is not found:</p> <ul style="list-style-type: none">• Information: Highlights something worth noting but does not cause the usage transaction to be put into the Exception state.

Field	Description
	<ul style="list-style-type: none"> • Issues: Used to report a problem that will prevent the usage transaction from being finalized but does not stop processing. If an issue exists after all rules have been applied, the usage transaction is transitioned to the Exception state. • Terminate: Reports a severe issue that will cause the process to stop and the usage transaction to be transitioned immediately to the Exception state. <p>Exception Requires Approval: Indicates (Yes or No) if usage transactions which generate an exception should be set to the "Approval in Progress" state. If set to "No" usage transactions are set to the "Issue Detected" state. Applicable only if the Exception Severity drop-down list is set to "Information" or "Issues."</p>

Processing Logic

Check Existence of Installed Device rules check for an installed device (including items) for the period covered by the usage period. The rule retrieves the service points (including child service points if applicable) associated with the usage subscription, and then checks the installation history of each service point against the usage period.

Example

The following usage rule checks for the existence of an installed device at the service point, and if an installed device is not found, it sets the usage transaction to the "Approval in Progress" state.

Usage Group: Interval Usage

Usage Rule: CHECK_INSTALLED_DEVICE

Sequence: 10

Description: Check for Installed Device

Category: Validation

Validation Details:

- **Exception Severity:** Issues
- **Exception Requires Approval:** Yes

Daily Scalar Usage Rule

Daily Scalar Usage Rule rules calculate usage for daily scalar measuring components.

- **Rule Name:** Daily Scalar Usage Rule
- **Base Package Usage Rule Business Object:** D2-CalFrequentlyReadScalar
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-GETFRESCR
- **Algorithm Parameters:**
 - Regular Bottom Range Condition
 - Regular Top Range Condition
 - Estimate Bottom Range Condition
 - Estimate Top Range Condition
- **Validation Algorithm Type / Algorithm:** D2-VALFRESCR
This algorithm performs the following validations:
 - A UOM and/or TOU and/or SQI must be supplied.

Rule Parameters

Field	Description
Daily Scalar Usage Details	<p>This section defines attributes used to calculate daily scalar usage.</p> <p>UOM/TOU/SQI: Defines specific UOMs, TOUs, or SQIs to be retrieved by the usage rule. If not specified, the rule processes all scalar measuring components for the usage transaction's service point.</p> <p>Perform Measurement Quality Assessment: A flag that indicates (yes or no) if the measurement conditions of the measurements used when calculating usage should be evaluated and included in the resulting usage transaction and outbound message.</p> <p>Offset Hours: A duration (indicated as hours:minutes:seconds) added and subtracted to the reference date (either a date time break or start/end date time) to build a search window for finding measurements. Applicable only when calculating non-peak usage.</p>

Processing Logic

Daily Scalar Usage Rule rules calculate usage for daily scalar measuring components installed at the service points associated with a usage subscription for a specified usage period.

This rule processes only automatically read scalar measuring components with value identifier that matches usage rule's UOM/TOU/SQI.

This rule supports date break processing. The algorithm attempts to find measurements for a search period derived by adding and subtracting the rule's offset hours parameters to the date break date time. The rule will return an error if measurements are not found for the date break.

Non-peak usage (such as kilowatt hours) is calculated by taking the difference between the start and end readings for the usage period. Peak usage (such as kilowatts) is derived as the maximum consumption for the usage period. The rule will return an error if measurements used to calculate usage are not found.

The measurement details are stored in the usage transaction's scalar details. A single scalar detail entry is created for each service point and measuring component for the usage period. Usage is also stored in the usage transaction's service quantities.

The rule can be configured to perform measurement quality assessments, which result in the population of a measurement quality list with the quantities and corresponding conditions of those measurements (regular, estimated, etc.). The Regular Condition Top and Bottom Range algorithm parameters are used to flag service quantities appropriately (regular or non-regular).

If configuring this rule with interval and scalar usage rules within a usage group, this rule should be executed after any interval usage rules and before scalar usage rules.

Example

The following usage rule retrieves kilowatt hours from daily scalar measurements and adds the results to the service quantity list in the usage transaction.

Usage Group: Scalar Usage

Usage Rule: GET_DAILY_SCALAR_KWH

Sequence: 10

Description: Get Daily Scalar KWH

Category: Usage Calculation

Scalar Details:

- **UOM:** Kilowatt-Hours
- **TOU:**

- **SQI:**
 - **Offset Hours:** 12:00:00
-

Get Interval Data

Get Interval Data rules calculate interval data quantities from interval measurements for a specified UOM, TOU, or SQI.

- **Rule Name:** Get Interval Data
- **Base Package Usage Rule Business Object:** D2-GetIntervalData
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-GETINTDAT
- **Algorithm Parameters:**
 - Interval Data Snapshot Format
 - Axis Conversion Excess Handling
 - Regular Bottom Range Condition
 - Regular Top Range Condition
- **Validation Algorithm Type / Algorithm:** D2-VALINTDAT
This algorithm performs the following validations:
 - A UOM and/or TOU and/or SQI must be supplied.

Rule Parameters

Field	Description
Interval Data Details	<p>Specifies the resulting interval data entries the rule will insert into the usage transaction service quantity list.</p> <p>Options include:</p> <p>UOM: The unit of measure to be retrieved from the interval measurement. Should be used only with measuring components that measure one or more UOMs.</p> <p>TOU: The time of use to be retrieved from the interval measurement. Should be used only with measuring components that measure one or more TOUs.</p> <p>SQI: The service quantity identifier to be retrieved from the interval measurement. Should be used only with measuring components that measure one or more SQIs.</p> <p>Calculation Function: Defines how the selected intervals will be aggregated, the aggregated value will be used as the Service Quantity. Note if "Max" is selected as the function, the date/time of the maximum/minimum will be included in the resulting usage transaction and outbound message.</p> <ul style="list-style-type: none"> • Sum: The total consumption from all selected intervals. • Max: The highest consumption from all intervals selected. <p>Extract Interval Data: A flag that indicates ("Yes" or "No") if a "snapshot" of the interval data resulting from this usage rule should be sent to external systems when usage from the usage transaction is sent to external systems. This used when sending usage to a billing system that performs interval-based pricing calculations.</p> <p>Perform Axis Conversion: A flag that indicates ("Yes" or "No") if the intervals being selected should be converted to a new UOM and interval size.</p> <p>Target UOM: The target UOM for converting values when Perform Axis Conversion is "Yes". In order to perform UOM conversion, the UOM and Target UOM must have the same Base UOM. For example, KWH and MWH. Required when Perform Axis Conversion is "Yes".</p>

Field	Description
	<p>Target Interval Size: The target interval size (designated as hours:minutes:seconds) to which the selected interval values should be scaled when Perform Axis Conversion is "Yes". Required when Perform Axis Conversion is Yes.</p> <p>Measurement Condition Processing: Specifies how measurement condition will be selected when converting intervals from a smaller interval size (e.g. 00:15:00) to a larger interval size (e.g. 01:00:00). Options include:</p> <ul style="list-style-type: none"> • Highest Quality: Of the smaller intervals that are being combined to produce the larger interval, the interval whose measurement condition is the highest quality will be selected. For example, if one interval was Regular (501000) and the rest were System Estimate (301000) the Regular condition would be selected. • Lowest Quality: Of the smaller intervals that are being combined to produce the larger interval, the interval whose measurement condition is the lowest quality will be selected. For example, if one interval was System Estimate (301000) and the rest were Regular (501000) the System Estimate condition would be selected. • None: Only if all of the smaller intervals that are being combined to create the larger interval have the same measurement condition will the measurement condition be applied to the new larger interval. If just one of the measurement conditions differs the new larger interval will have no measurement condition. <p>Perform Measurement Quality Assessment: A flag that indicates (yes or no) if the measurement conditions of the measurements used when calculating usage should be evaluated and included in the resulting usage transaction and outbound message.</p>
Result	<p>This usage rule inserts or updates a service quantity with its computed service quantity. When performing axis conversion (Perform Axis Conversion = "Yes") this section is required. When not performing axis conversion this section is optional, when left blank the UOM/TOU/SQI combination from the Interval Data Details section will be used.</p> <p>UOM: The UOM to be used when maintaining the service quantity.</p> <p>TOU: The TOU to be used when maintaining the service quantity.</p> <p>SQI: The SQI to be used when maintaining the service quantity.</p>

Processing Logic

Get Interval Data rules get interval quantities from interval measuring components installed in the service points linked to the usage subscription for the specified 'interval' usage period. Only measuring components that match the UOM/TOU/SQI defined in the usage rule are processed.

Measurements within the period are stored in the usage transaction's service quantities' interval data list. The service quantity entry's quantity is calculated based on the Calculate Function (Max or Sum) defined in the usage rule. This is done for every entry in the usage period list.

Example

The following usage rule calculates the sum of the interval values in interval measurements that record kilowatt hours, and extracts a snapshot of the resulting interval data.

Usage Group: Interval Usage

Usage Rule: GET_INTERVAL_KWH DATA

Sequence: 10

Description: Get Interval Data - KWH

Category: Usage Calculation

Interval Data Details:

- **UOM:** Kilowatt-Hours
- **TOU:**
- **SQI:**

- **Calculation Function:** Sum
 - **Extract Interval Data:** Yes
-

Get Item Counts and Consumption

Get Item Counts and Consumption rules calculate usage for items installed at the service points associated with a usage subscription.

Usage is calculated based on the number of items installed and the average daily service quantity defined for each item's type.

- **Rule Name:** Get Item Counts and Consumption
- **Base Package Usage Rule Business Object:** D2-GetItemCountsConsumption
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-GETITEMCC
- **Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** N/A

Rule Parameters

Field	Description
Item Processing	Defines the types of items processed by the rule.
Configuration	Restrict to Items of This Type: Indicates that the rule should only calculate usage for items of the specified type. Item Types: A list of one or more item types and corresponding SQLs to be processed by the rule.

Processing Logic

This usage rule finds item-based and multi-item-based service points linked to the usage subscription for the current usage transaction, summarizes the item counts by item type and service point, and calculates item-based consumption.

- Item counts by item type / service point are stored as usage period item details entries.
- Item-based consumption amounts are stored as usage period service quantities, using a Usage Service Quantity Type of "item", kept separate per service point.

Note that all logic described below can be restricted to a particular item type when the usage rule is configured.

Badged Items

Badged items are combined into a single count (a single usage period item detail entry) if the item type has been configured to "Summarize Badged Items for Usage Export", assuming that the installation periods for each badged item are identical (for example, if all of the badged items were installed for the entire length of the usage period).

If the consumption source defined for badged item types is Device Type Service Quantity, the rule will execute the Calculate Device Type SQ algorithm defined on the Device Type Service Quantity business object. The Calculate Device Type SQ algorithm returns the quantity for a single device, and the rule then determines the quantity based on the item count. The quantity is recorded in the usage period item detail entry. If the item type does not have a consumption source defined, the rule counts the item but does not attempt to calculate consumption for it.

Multi-Items

If a service point linked to the usage subscription has one or more multi-item list entries in effect at any time within the usage period, the rule creates a Usage Period Item Detail Entry for each item type within the multi-item entry, keeping the multi-item dates separate by service point. When more than one multi-item installation is in effect during the usage period, usage period item detail entries are created corresponding to each item type within each multi-item.

Note that when calculating the quantity consumed for a multi-item service point, an Installation Override Quantity may be defined for the multi-item. If so, this quantity overrides any consumption derivable via device type service quantities. When the item detail record is created, the override quantity flag is set to true if an Installation Override Quantity is present, and the quantity is not calculated.

If there is no Installation Override Quantity defined for the multi-item, the quantity is calculated for any item type that is configured with a consumption source - as described above for badged items - and is recorded in the item detail entry.

Service Quantities

Once the item detail entries are created, the rule processes goes through them to create usage period service quantities.

If item detail entries indicate that an Installation Override Quantity exists for the multi-item, the quantity is retrieved from the multi-item entry on the service point. It is a daily quantity, so the rule multiplies it by the number of days in the usage period, and creates a service quantity of type "item" using the result, specifying the service point. The UOM is taken from the Installation Override Quantity.

If the item detail entry is not governed by an override quantity, the entry is evaluated to check whether the rule has been configured to produce a different SQI for this item type. The service quantity is then recorded (using a service quantity type of "item") if one does not already exist for the service point and its UOM/SQI combination. If one does exist for the UOM/SQI, and the UOM does not measure peak, the quantity for the item detail entry is added to the existing quantity.

Example

The following usage rule calculates consumption for service points where street lights are installed.

Usage Group: Street Light Consumption

Usage Rule: GET_STREET_LIGHT_COUNT AND CONSUMPTION

Sequence: 10

Description: Get Street Light Count and Consumption

Category: Usage Calculation

Item Processing Configuration:

- **Restrict to Items of This Type:**
 - **Item Types:**
 - **Item Type:** Street Light — 10 KWH
 - **SQI:**
-

Get Scalar Details

Get Scalar Details rules assemble scalar readings and measurements.

- **Rule Name:** Get Scalar Details
- **Base Package Usage Rule Business Object:** D2-GetScalar
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-GETSCALAR
- **Algorithm Parameters:**
 - Estimate Bottom Range Condition
 - Estimate Top Range Condition
 - Measurement Cycle Schedule Thru Date Option (1 - Usage Period End Date, 2 - Retry Until Date)
 - Characteristic Type To Identify "Summary Account" Usage Subscriptions
 - Characteristic Value To Identify "Summary Account" Usage Subscriptions

- Find Measurements Within US Start/Stop Day (true/false)
- Start Measurement Search Option
- Stop Measurement Search Option
- Regular Bottom Range Condition
- Regular Top Range Condition
- **Validation Algorithm Type / Algorithm: D2-VALSCALAR**
This algorithm performs the following validations:
 - A UOM and/or TOU and/or SQI must be supplied.

Rule Parameters

Field	Description
Scalar Details	<p>Defines specific UOMs, TOUs, or SQIs to be retrieved by the usage rule, and if the results should be added to the service quantity (SQ) list for the usage period. If not specified, the rule processes all scalar measuring components for the usage transaction's service point.</p> <p>Perform Measurement Quality Assessment: A flag that indicates (yes or no) if the measurement conditions of the measurements used when calculating usage should be evaluated and included in the resulting usage transaction and outbound message.</p>

Processing Logic

Get Scalar Details rules get usage from scalar measuring components installed in the service points linked to the usage subscription for the specified 'scalar' usage period.

By default all scalar measuring components are processed, but if specific UOMs/TOUs/SQIs are defined in the usage rule, then only applicable measuring components are processed. Measurements within the usage period are retrieved. The usage transaction request may indicate whether or not 'Estimate' measurements are allowed. The "Estimate Bottom Range Condition" and "Estimate Top Range Condition" algorithm parameters are used to define the range of measurement condition values that correspond to 'Estimate' measurements.

Please note, this rule combines all individual scalar measurements for the bill (usage transaction) period unless the measurement condition is marked as "Do Not Use."

The measurement details are stored in the usage transaction's scalar details. The usage is also stored in the usage transaction's service quantities unless otherwise specified in the usage rule (using Build Service Quantity indicator).

The "Measurement Cycle Schedule Thru Date Option (1 - Usage Period End Date, 2 - Retry Until Date)", "Characteristic Type To Identify "Summary Account" Usage Subscriptions", and "Characteristic Value To Identify "Summary Account" Usage Subscriptions" parameters are used when integrating Oracle Utilities Meter Data Management to Oracle Utilities Customer Care and Billing. The "Measurement Cycle Schedule Thru Date Option (1 - Usage Period End Date, 2 - Retry Until Date)" parameter is used to define the thru date for measurement cycles. Available values are:

1. Usage Period End Date
2. Retry Until Date (the bill cycle window end date)

The "Characteristic Type To Identify "Summary Account" Usage Subscriptions", and "Characteristic Value To Identify "Summary Account" Usage Subscriptions" parameters are used to define the characteristic type and value (respectively) used as indicators in custom algorithms used to trigger estimation prior to the bill cycle window end date.

Example

The following usage rule retrieves kilowatt hours from scalar measurements and adds the results to the service quantity list in the usage transaction.

Usage Group: Scalar Usage

Usage Rule: GET_SCALAR_KWH

Sequence: 10

Description: Get Scalar KWH

Category: Usage Calculation

Scalar Details:

- **UOM:** Kilowatt-Hours
 - **TOU:**
 - **SQI:**
 - **Build Service Quantity:** True (checked)
-

Get TOU Mapped Usage

Get TOU Mapped Usage rules calculate usage from interval measurements based on a TOU map.

Service quantities are created for each TOU period defined for the TOU map used by the rule. For example, usage calculated from a TOU map with "On-Peak" and "Off-Peak" TOU periods would result in both "On-Peak" and "Off-Peak" service quantities.

- **Rule Name:** Get TOU Mapped Usage
- **Base Package Usage Rule Business Object:** D2-GetTOUUsage
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-GETTOUUSG
- **Algorithm Parameters:**
 - RegularBottom Range Condition
 - RegularTop Range Condition
- **Validation Algorithm Type / Algorithm:** D2-VALTOUUSG
This algorithm performs the following validations:
 - UOM and/or SQI must be supplied

Rule Parameters

Field	Description
TOU Mapping Details	<p>Specifies details of how interval measurements are mapped into TOU quantities, including:</p> <p>Result SQI: The resulting SQI for entries inserted into the service quantities list by the rule</p> <p>Unit of Measure: The UOM used to filter the measuring components from which interval measurements are used by the rule.</p> <p>Service Quantity Identifier: The SQI used to filter the measuring components from which interval measurements are used by the rule.</p> <p>Time of Use Calculate Function: The function used to calculate TOU data. The calculated value will be used as the Service Quantity. Note if "Max" is selected as the function, the date/time of the maximum value will be included in the resulting usage transaction and outbound message.</p> <ul style="list-style-type: none">• Sum: The total consumption for each TOU period, based on the specified TOU map.• Max: The highest consumption for each TOU period, based on the specified TOU map. <p>TOU Map: The ID of the TOU map used.</p>

Field	Description
	Perform Measurement Quality Assessment: A flag that indicates (yes or no) if the measurement conditions of the measurements used when calculating usage should be evaluated and included in the resulting usage transaction and outbound message.

Processing Logic

Get TOU Mapped Usage rules get time of use quantities from interval measuring components installed in the service points linked to the usage subscription for the specified 'interval' usage period. Only measuring components that match the UOM/SQL defined in the usage rule instance are processed.

Measurements within the period are mapped to time of use quantities based on the TOU map defined in the “TOU Map” parameter. If dynamic options are specified in the referenced TOU map and if there are dynamic option events in effect within the usage period, the TOU map associated with the dynamic option is used for the entire dynamic option event period. This is done for every usage period requested.

The calculated time of use quantities are stored in the usage transaction's service quantities.

Example

The following usage rule calculates TOU values from interval measurements that record kilowatt hours based on a specified TOU map.

Usage Group: Interval Usage

Usage Rule: GET_TOU_MAPPED_KWH

Sequence: 10

Description: Get TOU Mapped KWH Usage

Category: Usage Calculation

TOU Mapping Details:

- **Result SQL:**
- **Unit of Measure:** Kilowatt-Hours
- **Service Quantity Identifier:**
- **Time of Use Calculate Function:** Sum
- **TOU Map:** Summer / Winter, 15 minute interval

Interval Tier Calculation

Interval Tier Calculation rules calculate the difference between a source and reference vector, and then breaks that difference into one or more positive or negative tiers.

Positive and negative tiers are defined as percentage ranges of the reference vector.

For each tier calculated the rule creates a service quantity with the optional ability to create additional service quantities for the total of all positive tiers and the total of all negative tiers.

- **Rule Name:** Interval Tier Calculation
- **Base Package Usage Rule Business Object:** D2-IntervalTierCalculation
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-GETINTIER
- **Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** D2-TIERIMVAL

This algorithm validates the configuration of the vectors, tiers, and totals configuration for the interval tier calculation usage rule.

For the vector configuration it validates that the source and reference vector have compatible UOMs (if applicable). For the positive and negative tiers the following validations are performed:

- There must be at least one tier defined (either positive or negative)
- Positive tiers must be greater than or equal to zero
- Negative tiers must be less than or equal to zero
- Tiers cannot overlap
- Only one positive and one negative tier can be unbounded (i.e. has no end range)
- Start range values must be less than the end range values
- Start range is required for all tiers

For the total configuration, if the rule is configured to calculate totals, the UOM for the positive tier total and negative tier total is required.

Rule Parameters

Field	Description
Source Vector	<p>Defines the measuring component to be used as the source vector in the interval tier calculation. The tiers will be assigned by finding the difference between the Source and Reference Vectors (i.e. Source Vector - Reference Vector).</p> <p>Vector Type: the source of values for this vector:</p> <ul style="list-style-type: none"> • Direct Channel on Usage Subscription: the measuring component will be selected from one of the channels specified directly on the usage subscription using the supplied Direct Channel Relationship Type <p>Direct Channel Relationship Type: identifies the relationship type to be used when retrieving the measuring component for the source vector from the Usage Subscription.</p> <p>Use Primary Measurement: indicates that the primary measurement values measured by the referenced measuring component are to be used in calculations.</p> <p>Unit of Measure: the UOM of the values to be retrieved. This is only applicable if Use Primary Measurement is set to No.</p> <p>Time of Use: the TOU of the values to be retrieved. This is only applicable if Use Primary Measurement is set to No.</p> <p>Service Quantity Identifier: the SQI for the values to be retrieved. This is only applicable if Use Primary Measurement is set to No.</p>
Reference Vector	<p>Defines the measuring component to be used as the reference vector in the interval tier calculation. The tiers will be assigned by subtracting the reference vector from the source vector (i.e. source Vector - reference vector).</p> <p>Vector Type: the source of values for this vector:</p> <ul style="list-style-type: none"> • Direct Channel on Usage Subscription: the measuring component will be selected from one of the channels specified directly on the usage subscription using the supplied Direct Channel Relationship Type <p>Direct Channel Relationship Type: identifies the relationship type to be used when retrieving the measuring component for the source vector from the Usage Subscription.</p> <p>Use Primary Measurement: indicates that the primary measurement values measured by the referenced measuring component are to be used in calculations.</p> <p>Unit of Measure: the UOM of the values to be retrieved. This is only applicable if Use Primary Measurement is set to No.</p>

Field	Description
	<p>Time of Use: the TOU of the values to be retrieved. This is only applicable if Use Primary Measurement is set to No.</p> <p>Service Quantity Identifier: the SQI for the values to be retrieved. This is only applicable if Use Primary Measurement is set to No.</p>
Vector Processing	<p>Defines how to calculate the interval values for the curve/vector to be derived. In situations where the source and reference vectors differ in either interval size or UOM this configuration will be used to align them.</p> <p>Common Interval Size: the common interval size (designated as hours:minutes:seconds) to which interval measurement values (from defined vectors) should be scaled before performing calculations. This is required if multiple vectors are defined.</p> <p>Target Unit of Measure: if specified, the retrieved values are further converted. In order to perform UOM conversion, the UOM and Target UOM must have the same Base UOM. For example, KWH and MWH.</p>
Interval Tiers — Positive Tiers	<p>The positive tiers will categorize the difference between the source and reference vectors when the reference vector is less than the source vector.</p> <p>Sequence: uniquely identifies a tier as well as defines the display order of the tiers.</p> <p>Start Range and End Range: The start and end ranges define how each tier will be calculated. The calculation is done by taking the difference between the source and reference vector and comparing it to the start and end ranges. The amount assigned to each tier will either be (1) The difference between the source and reference vector less the start range. This is when the difference between source and reference is less than the end range. (2) The end range less the start range. This is when the difference between source and reference is greater than or equal to the end range. Percentage values for the start and end ranges are expressed in whole numbers (i.e. 10% would be 10 not .10).</p> <ul style="list-style-type: none"> • Start Range: defines the starting percentage (of the reference vector) for the tier. This field is required and must be less than the End Range (if applicable). • End Range: defines the ending percentage (of the reference vector) for the tier. When a start range is provided and no end range is provided it is considered to be an unbounded tier (i.e. if the start range is 30 and there is no end range the tier is considered to be "30 and above"). Only one tier can be defined without an end range. <p>Unit of Measure: the UOM used for service quantities derived from this tier.</p> <p>Time of Use: the TOU used for service quantities derived from this tier.</p> <p>Service Quantity Identifier: the SQI used for service quantities derived from this tier.</p> <p>Exclude From Total: when set to "Yes" it will exclude this tier from total positive tiers calculation (if applicable).</p>
Interval Tiers — Negative Tiers	<p>The negative tiers will categorize the difference between the source and reference vectors when the reference vector is more than the source vector.</p> <p>Sequence: uniquely identifies a tier as well as defines the display order of the tiers.</p> <p>Start Range and End Range: The start and end ranges define how each tier will be calculated. The calculation is done by taking the difference between the source and reference vector and comparing it to the start and end ranges. The amount assigned to each tier will either be (1) The difference between the source and reference vector less the start range. This is when the difference between source and reference is less than the end range. (2) The end range less the start range. This is when the difference between source and reference is greater than or equal to the end range. Percentage values for the start and end ranges are expressed in whole numbers (i.e. 10% would be 10 not .10).</p> <ul style="list-style-type: none"> • Start Range: defines the starting percentage (of the reference vector) for the tier. This field is required and must be less than the End Range (if applicable). • End Range: defines the ending percentage (of the reference vector) for the tier. When a start range is provided and no end range is provided it is considered to be an unbounded tier (i.e. if the start range is 30 and there is no end range the tier is considered to be "30 and above"). Only one tier can be defined without an end range. <p>Unit of Measure: the UOM used for service quantities derived from this tier.</p>

Field	Description
	<p>Time of Use: the TOU used for service quantities derived from this tier.</p> <p>Service Quantity Identifier: the SQI used for service quantities derived from this tier.</p> <p>Exclude From Total: when set to "Yes" it will exclude this tier from total positive tiers calculation (if applicable).</p>
Result Processing	<p>Defines details for how results are calculated for this rule.</p> <p>Use Absolute Value For SQ: When set to "Yes" the service quantities for the negative tiers will use the absolute value of the difference between the source and reference vectors.</p> <p>Extract Interval Data: A flag that indicates ("Yes" or "No") if a "snapshot" of the interval data resulting from this usage rule should be sent to external systems when usage from this usage transaction is sent to external systems. This used when sending usage to a billing system that performs interval-based pricing calculations.</p> <p>Calculate Total Vectors: When set to "Yes" a service quantity for the total positive tiers and total negative tiers will be created. If set to "Yes" then the Total Positive Tier and Total Negative Tier sections must be defined.</p> <p>Total Positive Tiers: specifies details for how service quantities for total positive tiers are calculated, including:</p> <ul style="list-style-type: none"> • Unit of Measure: the UOM used for total positive tier service quantities • Time of Use: the TOU used for total positive tier service quantities • Service Quantity Identifier: the SQI used total positive tier service quantities <p>Total Negative Tiers: specifies details for how service quantities for total negative tiers are calculated, including:</p> <ul style="list-style-type: none"> • Unit of Measure: the UOM used for total negative tier service quantities • Time of Use: the TOU used for total negative tier service quantities • Service Quantity Identifier: the SQI used total negative tier service quantities

Processing Logic

This rule loops through each tier configured and calculates the imbalance amount associated to each tier level.

Positive and negative tiers are defined as percentage ranges of the reference vector. For example, if an interval value for the reference vector is 50,000, and the Start Range and End Range for a "Normal" tier are 0% and 10%, any calculated quantity between 0 and 5,000 (10% of 50,000) would fall into the "Normal" tier. If a "High" tier has a Start Range and End Range of 10% and 20%, and the difference was 7,500, 5,000 would fall into the "Normal" tier, and 2,500 would fall into the "High" tier. If a "Low" tier has a Start Range and End Range of -10% and -20%, and the difference was -5,500, the entire quantity would fall into the "Low" tier.

The tables below provide an example of how tiers quantities are calculated by this rule.

Table 1: Vectors

Date	Source Vector (Usage)	Reference Vector (Profile)	Quantity
1/1/2015	5,300	5,000	300
1/2/2015	5,100	5,500	-400
1/3/2015	6,400	5,500	900
1/4/2015	7,500	6,000	1,500

Table 2: Positive Tiers

Tier	Start Range	End Range
Normal	0	10
High	10	20

Table 3: Negative Tiers

Tier	Start Range	End Range
Very Low	-20	
Low	-10	-20
Normal	-10	0

Table 4: Positive Tier Quantities

Date	Normal (0 to 10%)	High (10% to 20%)	Very High (20% +)
1/1/2015	300	0	0
1/2/2015	0	0	0
1/3/2015	550	350	0
1/4/2015	600	600	150

Table 5: Negative Tiers Quantities

Date	Normal (0 to -10%)	Low (-10% to -20%)	Very Low (-20% +)
1/1/2015	0	0	0
1/2/2015	-400	0	0
1/3/2015	0	0	0
1/4/2015	0	0	0

Example

The following usage rule calculates interval tiers for “Average”, “Above Average”, and “Excess of Average” ranges of kilowatt hours based on the difference between an average usage profile and aggregated consumption for a usage subscription (profile — aggregated consumption). This rule also calculates a total for both positive and negative tiers.

Usage Group: Interval Usage

Usage Rule: INT_TIER_CALC_KWH

Sequence: 10

Description: Interval Tier Calculation — KWH

Category: Usage Calculation

Source Vector :

- **Vector Type:** Direct Channel on Usage Subscription
- **Direct Channel Relationship Type:** Average Usage Profile
- **Use Primary Measurement:** Yes

Reference Vector :

- **Vector Type:** Direct Channel on Usage Subscription
- **Direct Channel Relationship Type:** Consumption Aggregator
- **Use Primary Measurement:** Yes

Scalar Variables: N/A

Vector Processing:

- **Common Interval Size:** 01:00:00
- **Target Unit of Measure:** Kilowatt Hours

Interval Tiers — Positive Tiers:

- **Tier 1:**
 - **Sequence:** 1
 - **Start Range:** 0
 - **End Range:** 10
 - **Unit of Measure:** Kilowatt Hours
 - **Service Quantity Identifier:** Average
- **Tier 2:**
 - **Sequence:** 2
 - **Start Range:** 10
 - **End Range:** 20
 - **Unit of Measure:** Kilowatt Hours
 - **Service Quantity Identifier:** Above Average
- **Tier 3:**
 - **Sequence:** 3
 - **Start Range:** 20
 - **End Range:**
 - **Unit of Measure:** Kilowatt Hours
 - **Service Quantity Identifier:** Excess of Average

Result Processing:

- **Use Absolute Value for SQ:** Yes
 - **Extract Interval Data:** Yes
 - **Calculate Total Tiers:** Yes
 - **Total Positive Tiers:**
 - **Unit of Measure:** Kilowatt Hours
 - **Service Quantity Identifier:** Total — Positive Tiers
 - **Total Negative Tiers:**
 - **Unit of Measure:** Kilowatt Hours
 - **Service Quantity Identifier:** Total — Negative Tiers
-

Profile Accumulation

Profile Accumulation rules calculate usage by accumulating historical usage with profile data.

This usage rule is used to manipulate a customer's interval data by adding other vectors to it. Those other vectors are derived from a list of profile factors and corresponding characteristic values stored in a list on the usage transaction. The typical application of this rule is for customer self-service rate comparison, in which a self-service user has selected a set of usage adjustments to apply to his/her historical consumption to assess the effect on the amount consumed.

Rules of this type are most often configured with eligibility criteria to determine if/when a usage rule should be processed when performing a rate comparison. Eligibility criteria for this rule can be based on the usage transaction's **Calculation Mode**.

- **Rule Name:** Profile Accumulation
- **Base Package Usage Rule Business Object:** D2-ProfileAccumulation
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-DYNPRFLAC
- **Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** D2-VALPRFLAC
This algorithm performs the following validations:
 - If **Apply TOU Map To Derived Vector** is set to Yes, the TOU Map must be supplied

Rule Parameters

Field	Description
Vector Source Configuration	Defines the usage measurements to be used in the calculation. <ul style="list-style-type: none">• Vector Type: The source of usage values for the rule. Valid options include:<ul style="list-style-type: none">• Channels Linked To Usage Subscription: Retrieves values from channels linked to the usage subscription (via its related service point, and their related devices and measuring components), based on specified UOM, TOU, and SQI• Usage Transaction Service Quantity: Retrieves values from the usage transaction service quantity entries, identified by the UOM, TOU, and SQI.• Unit of Measure: The UOM of the values to be retrieved.• Time of Use: The TOU of the values to be retrieved.• Service Quantity Identifier: The SQI for the values to be retrieved.• Target Interval Size : The target interval size (designated as hours:minutes:seconds) to which interval measurement values should be scaled before performing calculations.
Result Processing Configuration	Defines how values are processed by the rule. <p>Apply TOU Map To Derived Vector: Indicates if a TOU map should be applied to the derived measurement values. If TOU periods and values are returned as a result, then service quantity entries are inserted regardless on how Insert Primary SQ Entry is set.</p> <p>TOU Map: The TOU Map to apply to the derived measurement values (applicable if Apply TOU Map To Derived Vector is set to "Yes").</p>
Result Storage Configuration	Defines if and how result of the rule's calculation are stored and saved. <p>Insert Primary SQ Entry: Indicates whether to insert the results of the rule into the usage transaction service quantity list. If set as Yes an SQ entry would be inserted.</p>

Field	Description
	<p>Save Derived Vector: Indicates whether or not to store the derived measurement values in the usage transaction service quantity entry to be inserted (if Insert Primary SQ Entry is set to Yes).</p> <p>Service Quantity Identifier: The SQI used for service quantities inserted into the usage transaction service quantity list.</p> <p>Extract Interval Data: A flag that indicates if a "snapshot" of the interval data resulting from this usage rule should be sent to external systems when usage from this usage transaction is sent to external systems.</p>

Processing Logic

Profile Accumulation rules retrieve a customer's usage (the source UOM) for a usage period using one of two options:

- A channel linked to a usage subscription
- A usage transaction service quantity

The rule then takes each entry in the usage transaction's profile factor list, finds the profile measuring component for each, retrieves the measurement data for the profile, applies axis conversion to align it to the source UOM and target interval size, and adds it to the source vector. Each profile's data is added progressively to arrive at a final vector.

TOU mapping can be applied to the final vector, and the vector itself may be preserved or discarded.

Example

The following usage rule accumulates KWH profile factors and the customer's KWH usage, and derives TOU values from the result based on a specified TOU map.

Usage Group: Rate Comparison

Usage Rule: KWH_PROFILE_ACCUMULATION

Sequence: 10

Description: KWH Profile Accumulation

Category: Usage Calculation

Vector Source Configuration:

- **Vector Type:** Channels Linked to Usage Subscription
- **Unit of Measure:** Kilowatt-Hours
- **Time of Use:**
- **Service Quantity Identifier:**
- **Target Interval Size:** 01:00:00

Result Processing Configuration:

- **Apply TOU Map to Derived Vector:** Yes
- **TOU Map:** Summer / Winter, 15 minute interval

Result Storage Configuration:

- **Insert Primary SQ Entry:** Yes
 - **Save Derived Vector:** Yes
 - **Service Quantity Identifier:**
 - **Extract Interval Data:** Yes
-

Vector and Service Quantity Math

Vector and Service Quantity Math rules derive interval data measurements based on a formula, and apply TOU mappings and/or other operations to the derived data to calculate usage quantities.

Rules of this type can also perform operations on existing Usage Transaction Service Quantity entries.

- **Rule Name:** Vector and Service Quantity Math
- **Base Package Usage Rule Business Object:** D2-Math
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-MATH
- **Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** D2-VALMATH

This algorithm validates the configuration of the Vector and Service Quantity Math usage rule.

It ensures that only variables referencing a set function of Coincident Min or Coincident Max specify a Reference Interval Set. Along the same lines, if a variable references a set function of Coincident Min or Coincident Max, a Reference Interval Set must be specified.

Rule Parameters

Field	Description
Vector 1 (Vector 2, Vector 3, ... Vector 5)	<p>Defines the vectors to be used in the calculation. When used in formulas, interval values for this vector are designated as IV1, IV2, IV3, IV4, or IV5.</p> <p>Type: the source of values for this vector:</p> <ul style="list-style-type: none">• Direct Channels on Usage Subscription: retrieves values from measuring components directly linked to the usage subscription.• Physical Channels Linked To Usage Subscription: retrieves values from physical channels linked to the usage subscription (via its related service point, and their related devices and measuring components), based on specified UOM, TOU, and SQL• Profile Factor: retrieves values from the profile measuring component defined on the profile factor• Specific Measuring Component: retrieves values from a specified measuring component• Usage Transaction Service Quantity: retrieves values from the usage transaction service quantity entries, identified by UOM, TOU, and SQL. <p>Unit of Measure: the UOM of the values to be retrieved. This is applicable if type is Physical Channels Linked to Usage Subscription or Usage Transaction Service Quantity. If type is either Profile Factor or Specific Measuring Component, this is only applicable if Use Primary Measurement is set to No.</p> <p>Time of Use: the TOU of the values to be retrieved. This is applicable if type is Physical Channels Linked to Usage Subscription or Usage Transaction Service Quantity. If type is either Profile Factor or Specific Measuring Component, this is only applicable if Use Primary Measurement is set to No.</p> <p>Service Quantity Identifier: the SQL for the values to be retrieved. This is applicable if type is Physical Channels Linked to Usage Subscription or Usage Transaction Service Quantity. If type is either Profile Factor or Specific Measuring Component, this is only applicable if Use Primary Measurement is set to No.</p> <p>Target Unit of Measure: if specified, the retrieved values are further converted. In order to perform UOM conversion, the UOM and Target UOM must have the same Base UOM. For example, KWH and MWH. This is applicable only if type is Physical Channels Linked To Usage Subscription.</p>

Field	Description
	<p>Check Missing Intervals: indicates if the rule should check for missing interval values during the usage period for any of the measuring components providing input to the vector. This is applicable only if type is Physical Channels Linked To Usage Subscription.</p> <p>Profile Factor: the profile factor used to retrieve the profile measuring component from which the values are retrieved. This is applicable only if type is Profile Factor.</p> <p>Profile: if specified, this is the profile (based on the profile factor above) used to retrieve the profile measuring component. This is applicable only if type is Profile Factor.</p> <p>Direct Channel Relationship Type: The type of relationship between the usage subscription and a directly linked measuring component. Relationship types are defined in the Usage Subscription Measuring Component Relationship Type lookup (US_MC_REL_TYPE_FLG). Base package relationship types include "Consumption Aggregator." This is applicable only if type is Direct Channel on Usage Subscription.</p> <p>Use Primary Measurement: indicates that the primary measurement values measured by the referenced measuring component are to be used in calculations. This is applicable only if type is Direct Channel on Usage Subscription, Profile Factor or Specific Measuring Component.</p> <p>Measuring Component ID: the measuring component from which the values are retrieved. This is applicable only if type is either Profile Factor or Specific Measuring Component.</p>
Scalar Variables	<p>Defines scalar variables to be used in the calculation. When used in formulas, scalar variables are designated as V_n, where n is the number of the variable (based on the sequence in which they are defined in the list).</p> <p>Type: the type of variable. Can be one of the following:</p> <ul style="list-style-type: none"> • Factor: the value for a specified factor that is in effect for the usage period. • Set Function: the result of applying a function to a set of interval measurement values (defined as a vector). • Usage Transaction Service Quantity: service quantities from the current usage transaction, based on a specified UOM, TOU, or SQL. This type of variable allows this rule to make use of values calculated by other rules. <p>Set Function: the function used to calculate a scalar value from a set of interval measurement values (defined as a vector). This is applicable only if Type is Set Function). Can be one of the following:</p> <ul style="list-style-type: none"> • Average: calculates the average of the vector's interval measurement values. • Comax: returns the coincident maximum value from the vector's interval measurement values and the interval measurement values from the specified Reference Interval Set. • Comin: returns the coincident minimum value from the vector's interval measurement values and the interval measurement values from the specified Reference Interval Set. • Count: returns the number of interval measurements. • Max: returns the maximum value from the vector's interval measurement values. • Min: returns the minimum value from the vector's interval measurement values. • Total: calculates the total of the vector's interval measurement values. <p>Interval Set: the vector to be used for this variable (applicable only if Type is Set Function). Can be one of the following:</p> <ul style="list-style-type: none"> • FV (Final Vector Interval Value): the vector containing the results of the formula defined in the Vector Processing section. • IV1 (Vector 1 Interval Value): the vector defined as Vector 1. • IV2 (Vector 2 Interval Value): the vector defined as Vector 2. • IV3 (Vector 3 Interval Value): the vector defined as Vector 3. • IV4 (Vector 4 Interval Value): the vector defined as Vector 4.

Field	Description
	<ul style="list-style-type: none"> • IV5 (Vector 5 Interval Value): the vector defined as Vector 5. <p>Reference Interval Set: a reference vector to be used for this variable (applicable only if Type is Set Function and the selected function is either Comax or Comin). Can be one of the following:</p> <ul style="list-style-type: none"> • FV (Final Vector Interval Value): the vector containing the results of the formula defined in the Vector Processing section. • IV1 (Vector 1 Interval Value): the vector defined as Vector 1. • IV2 (Vector 2 Interval Value): the vector defined as Vector 2. • IV3 (Vector 3 Interval Value): the vector defined as Vector 3. • IV4 (Vector 4 Interval Value): the vector defined as Vector 4. • IV5 (Vector 5 Interval Value): the vector defined as Vector 5. <p>Factor: the factor used to retrieve the variable value (applicable only if Type is Factor).</p> <p>Unit of Measure: the UOM for service quantities to retrieve from the usage transaction's service quantity list (applicable only if Type is Usage Transaction Service Quantity).</p> <p>Time of Use: the TOU for service quantities to retrieve from the usage transaction's service quantity list (applicable only if Type is Usage Transaction Service Quantity).</p> <p>Service Quantity Identifier: the SQI for service quantities to retrieve from the usage transaction's service quantity list (applicable only if Type is Usage Transaction Service Quantity).</p>
Vector Processing	<p>Defines how to calculate the interval values for the curve/vector to be derived. This is not applicable when performing purely scalar calculations.</p> <p>Common Interval Size: the common interval size (designated as hours:minutes:seconds) to which interval measurement values (from defined vectors) should be scaled before performing calculations. This is required if multiple vectors are defined.</p> <p>Vector Formula Source: the type of formula to be used to derive the interval values. Can be one of the following:</p> <ul style="list-style-type: none"> • Simple Vector Formula: indicates that a simple formula will be used. • Conditional Vector Formula: indicates that a conditional formula will be used. This allows comparison between one or more pairs of operands to determine the specific formula to execute. <p>Simple Vector Formula: the simple formula used to derive the interval values. Can reference a vector (designated as IVn, where n is the number of the vector) or an expression referencing one or more vectors or a scalar variable (designated as Vn).</p> <p>Conditional Vector Formula: the conditional formula used to derive the interval measurement values. A conditional formula can utilize one or more conditions. Each condition comprises the following:</p> <ul style="list-style-type: none"> • Operand 1: the first operand in the condition. Can reference a vector (designated as IVn, where n is the number of the vector) or an expression referencing one or more vectors or a scalar variable (designated as Vn). • Criteria Operator: the operator used to compare Operand 1 with Operand 2. • Operand 2: the second operand in the condition. Can reference a vector (designated as IVn, where n is the number of the vector) or an expression referencing one or more vectors or a scalar variable (designated as Vn). • True Action: indicates how to proceed if the comparison between the operands is true. Can be one of the following: <ul style="list-style-type: none"> • Apply True Formula: indicates that the True Formula be executed. • Check Next Condition: indicates that the next condition should be checked. • True Formula: the formula to apply if True Action is set to Apply True Formula. Can reference a vector (designated as IVn, where n is the number of the vector) or an expression referencing one or more vectors or a scalar variable (designated as Vn).

Field	Description
Result	<ul style="list-style-type: none"> • False Action: indicates how to proceed if the comparison between the operands is false. Can be one of the following: <ul style="list-style-type: none"> • Apply False Formula: indicates that the False Formula be executed. • Check Next Condition: indicates that the next condition should be checked. • False Formula: the formula to apply if the False Action is set to Apply False Formula. Can reference a vector (designated as IVn, where n is the number of the vector) or an expression referencing one or more vectors or a scalar variable (designated as Vn). <p>This usage rule can insert one or more entries into the usage transaction service quantity list.</p> <p>Unit of Measure: the UOM to be used when inserting service quantity entries</p> <p>Service Quantity Identifier: the SQI to be used when inserting service quantity entries</p> <p>Insert SQ Entry: indicates whether or not to insert an entry into the usage transaction service quantity list. This should always be set to Yes if Apply TOU Map To Derived Vector is set to No.</p> <p>SQ Entry Quantity Source: indicates the method to use to calculate for the service quantity (applicable only if Insert SQ Entry is Yes). Can be one of the following:</p> <ul style="list-style-type: none"> • Set Function Against Derived Vector: applies a function to the derived interval measurement values. The function to be applied is specified in the Set Function Against Derived Vector field. • Scalar Formula Result: applies a user-defined formula. The formula is specified in the Scalar Formula field. <p>Set Function Against Derived Vector: the function to apply to the derived interval measurement values (applicable only if SQ Entry Quantity Source is set to Set Function Against Derived Vector). Note if "Max", "Min", "Comax", or "Comin" is selected as the function, the date/time of the maximum/minimum value will be included in the resulting usage transaction and outbound message. Can be one of the following:</p> <ul style="list-style-type: none"> • Average: calculates the average of the derived interval measurement values. • Comax: returns the coincident maximum value from the vector's interval measurement values and the interval measurement values from the specified Reference Interval Set. • Comin: returns the coincident minimum value from the vector's interval measurement values and the interval measurement values from the specified Reference Interval Set. • Count: returns the number of derived interval measurements. • Max: returns the maximum value from the derived interval measurement values. • Min: returns the minimum value from the derived interval measurement values. • Total: calculates the total of the derived interval measurement values. <p>Reference Interval Set: a reference vector to be used for this variable (applicable only if Type is Set Function and the selected function is either Comax or Comin). Can be one of the following:</p> <ul style="list-style-type: none"> • FV (Final Vector Interval Value): the vector containing the results of the formula defined in the Vector Processing section. • IV1 (Vector 1 Interval Value): the vector defined as Vector 1. • IV2 (Vector 2 Interval Value): the vector defined as Vector 2. • IV3 (Vector 3 Interval Value): the vector defined as Vector 3. • IV4 (Vector 4 Interval Value): the vector defined as Vector 4. • IV5 (Vector 5 Interval Value): the vector defined as Vector 5. <p>Scalar Formula: the formula to apply (applicable only if SQ Entry Quantity Source is set to Scalar Formula). Variables used in this formula must be defined in the Scalar Variables section. When referenced in formulas, scalar variables are designated as Vn (where n is the number of the variable).</p>

Field	Description
	<p>Save Derived Vector: indicates whether or not to store the derived interval measurement values in the usage transaction service quantity entry to be inserted (applicable only if Insert SQ Entry is set to Yes).</p> <p>Extract Interval Data: A flag that indicates ("Yes" or "No") if a "snapshot" of the interval data resulting from this usage rule should be sent to external systems when usage from the usage transaction is sent to external systems. This used when sending usage to a billing system that performs interval-based pricing calculations.</p> <p>Apply TOU Map To Derived Vector: indicates if a TOU map should be applied to the derived interval measurement values. If TOU periods and values are returned as a result of TOU mapping, then service quantity entries are inserted regardless on how Insert SQ Entry is set.</p> <p>TOU Map: the TOU Map to apply to the derived interval measurement values (applicable only if Apply TOU Map To Derived Vector is set to Yes).</p> <p>Time of Use Calculate Function: the function to apply to the derived interval measurement values when calculating for the time of use values (applicable only of Apply TOU Map To Derived Vector is set to Yes). Can be one of the following:</p> <ul style="list-style-type: none"> • Max: returns the maximum value from the derived interval measurement values for each TOU period. • Sum: returns the sum of the derived interval measurement values for each TOU period.

Processing Logic

Vector and Service Quantity Math rules derive interval data measurements based on a formula, and apply TOU mappings and/or other operations to the derived data to calculate usage quantities. Examples include the following:

- Derive an interval data curve (vector) given a formula. For example, derive a power factor curve given a formula using kWh and kvarh curves.
- Apply TOU mapping to a derived interval data curve. For example, after deriving the power factor curve, perform TOU mapping on the result.
- Perform mathematical operations on Usage Transaction Service Quantity entries. For example, get total kWh consumption by adding “kWh On Peak”, “kWh Off Peak”, and “kWh Shoulder Peak” where “kWh On Peak”, “kWh Off Peak”, and “kWh Shoulder Peak” were calculated by a previous usage rule.

Each interval data curve is defined as a vector parameter (the rule can define up to 5 vectors). Mathematical operations defined by the “Vector Processing” parameters can be performed between vectors (e.g. IV1 * IV2) and between vectors and scalar variables (e.g. IV1 * V1). When performing mathematical operations on more than one vector, the “Common Interval Size” parameter specifies the interval size that each vector is to be scaled to prior to calculations. For example, in the above example (IV1 * IV2), if vector IV1 contains 15 minute intervals, and vector IV2 contains 1 hour intervals, the 15 minute vector is scaled to 1 hour intervals prior to multiplying the two vectors. The values used for service quantities are derived from the resulting derived vector.

The rule uses the earliest date/time through which data exists for all measuring components contributing to each vector and use only data through that date/time. For example, a vector based on data from two measuring components (one that has data through June 15, and another with data through June 20) would calculate the vector with an end date of June 15 (the earliest date for which there is data for both measuring components). If there is not enough data to satisfy the usage period, the rule will produce an error. If multiple vectors are provided to the rule and each has a different length (and all of them satisfy the usage period), the length of "Vector 1" takes precedence.

Example

The following usage rule calculates KVA (kilovolt amperes) from KW (kilowatts) and KVAR (kilovolt amperes reactive).

Usage Group: Interval Usage

Usage Rule: CALC_KVA

Sequence: 10

Description: Calculate KVA from KW and KVAR

Category: Usage Calculation

Vector 1: (IV1)

- **Type:** Physical Channels Linked To Usage Subscription
- **Unit of Measure:** Kilowatts
- **Time of Use:**
- **Service Quantity Identifier:**
- **Target Unit of Measure:** Kilowatts

Vector 2: (IV2)

- **Type:** Physical Channels Linked To Usage Subscription
- **Unit of Measure:** Kilovolt-Amperes Reactive
- **Time of Use:**
- **Service Quantity Identifier:**
- **Target Unit of Measure:** Kilovolt-Amperes Reactive

Scalar Variables: N/A

Vector Processing:

- **Common Interval Size:** 01:00:00
- **Vector Formula Source:** Simple Vector Formula
- **Simple Vector Formula:** (IV1*IV2)

Result:

- **Unit of Measure:** Kilovolt-Amperes
- **Service Quantity Identifier:**
- **Insert SQ Entry:** Yes
- **SQ Entry Quantity Source:** Set Function Against Derived Vector
- **Set Function Against Derived Vector:** Max
- **Save Derived Vector:** Yes
- **Extract Interval Data:** No
- **Apply TOU Map to Derived Vector:** No

Example

The following usage rule calculates net usage for customers with solar panels by subtracting generated usage from consumed usage, and multiplying the resulting interval values by a "power factor" stored as a factor. This rule also extracts a snapshot of the interval data resulting from the rule.

Usage Group: Interval Usage

Usage Rule: CALC_NET_USAGE_PF

Sequence: 10

Description: Calculate Net Usage with Power Factor Applied

Category: Usage Calculation

Vector 1: (IV1)

- **Type:** Physical Channels Linked To Usage Subscription

- **Unit of Measure:** Kilowatt-Hours
- **Time of Use:**
- **Service Quantity Identifier:** Consumed
- **Target Unit of Measure:** Kilowatt-Hours

Vector 2: (IV2)

- **Type:** Physical Channels Linked To Usage Subscription
- **Unit of Measure:** Kilowatt-Hours
- **Time of Use:**
- **Service Quantity Identifier:** Generated
- **Target Unit of Measure:** Kilowatt-Hours

Scalar Variables:

- **V1:**
 - **Sequence:** 1
 - **Factor:** Power Factors

Vector Processing:

- **Common Interval Size:** 01:00:00
- **Vector Formula Source:** Simple Vector Formula
- **Simple Vector Formula:** (IV1-IV2)*V1

Result:

- **Unit of Measure:** Kilowatt-Hours
- **Service Quantity Identifier:** Net Consumption
- **Insert SQ Entry:** Yes
- **SQ Entry Quantity Source:** Set Function Against Derived Vector
- **Set Function Against Derived Vector:** Total
- **Save Derived Vector:** Yes
- **Extract Interval Data:** Yes
- **Apply TOU Map to Derived Vector:** Yes
- **TOU Map:** Year round schedule, 15 minute interval
- **Time of Use Calculate Function:** Sum

Validate Against Tolerance

Validate Against Tolerance rules validate calculated usage service quantities against a specified tolerance.

These rules are typically used later in the usage calculation process to validate results of previously executed usage rules. For example, after calculating kilowatt hour usage for a particular service point, a rule of this type could be used to validate that the calculated usage does not exceed a certain threshold.

- **Rule Name:** Validate Against Tolerance
- **Base Package Usage Rule Business Object:** D2-ValAgainstTol
- **Apply Usage Rule Algorithm Type / Algorithm:** D2-VALUSGTOL

- **Algorithm Parameters:** N/A
- **Validation Algorithm Type / Algorithm:** D2-VALTOL
This algorithm performs the following validations:
 - A UOM and/or TOU and/or SQI must be supplied.
 - Either a Tolerance Value or Tolerance Factor must be supplied.

Rule Parameters

Field	Description
Validation Details	<p>Defines details of how the usage is validated, including:</p> <p>UOM: The UOM whose quantity is validated by the rule.</p> <p>TOU: The TOU whose quantity is validated by the rule.</p> <p>SQI: The SQI whose quantity is validated by the rule.</p> <p>Set Function: The function (Sum, Max, or Min) used to calculate the usage value to be validated.</p> <p>Tolerance Value: A user-defined value that serves as the tolerance value in the validation.</p> <p>Tolerance Factor: The factor used to define the tolerance value in the validation.</p> <p>Comparison Operator: The mathematical operator used to compare the usage value to the tolerance value.</p> <p>Exception Severity: The severity of exceptions triggered if the usage value fails the validation.</p>

Processing Logic

Validate Against Tolerance rules validate the calculated usage against a tolerance value. When configuring the usage group, this usage rule must be placed after all the usage calculation usage rules.

This rule aggregates all usage transaction service quantities that match the UOM/TOU/SQI defined in the usage rule. Depending on the function defined in the “Set Function” parameter, the aggregated value can either be the highest quantity, the lowest quantity or the sum of all quantities.

The tolerance value may either come from the value specified in the “Tolerance Value” parameter or a factor value for the factor defined in the “Tolerance Factor” parameter.

The “Comparison Operator” parameter determines how the two values (the aggregated value and the tolerance) are compared. If comparison results to True, an entry is inserted into the Exceptions List, based in the “Exception Severity” parameter.

Example

The following usage rule validates that the sum of calculated usage values for kilowatt hours is less than or equal to a specified tolerance (1000 KWH).

Usage Group: Interval Usage

Usage Rule: VALIDATE_AGAINST_TOLERANCE

Sequence: 10

Description: Validate Against Tolerance

Category: Validation

Validation Details:

- **UOM:** Kilowatt-Hours
- **TOU:**
- **SQI:**

- **Set Function:** Sum
 - **Tolerance Value:** 1000
 - **Comparison Operator:** <=
 - **Exception Severity:** Information
-

Working with Usage Groups

This section describes common tasks related to working with usage groups.

Creating Usage Groups

Use this procedure to create a new usage group.

1. Select **Admin Menu > Usage Rules > Usage Group+**.

NOTE: If your system supports more than one usage group business object, you will be prompted to select a business object for the usage group.

2. Enter the name, description, and detailed description for the usage group.
3. To add device configuration types to the usage group, click the + or – sign in the Device Configuration Types section and select the device configuration type.
4. Complete any remaining fields (if applicable).
See *Base Package Usage Groups and “Utility” Rules* for detailed descriptions of the fields used to define usage groups.
5. Click **Save**.
6. To add a usage rule to the usage group, click the **Add Rule** link in the Usage Rules List zone title bar. See *Creating Usage Rules* for more information about creating usage rules.

Now you can create usage rules for this group.

Usage Group Search

Use this procedure to search for a usage group on the Usage Group Query portal.

1. Select **Admin Menu > Usage Rules > Usage Group**.
2. Enter your search criteria.
You can search by Usage Group or Description.
3. Click **Refresh**.
4. In the search results list, click the link for the usage group you want to view or edit.

Maintaining Usage Groups

Use this procedure to maintain an existing usage group.

You use the Usage Group portal to maintain usage groups. This portal includes the following zones:

- **Usage Group:** Defines basic information about usage group
- **Usage Rules List:** lists the usage rules belonging to the group
- **Referencing Usage Rules List:** lists the usage rules that reference the group
- **Referencing Usage Subscription Type List:** lists the usage subscription types that reference the group
- **Referencing Usage Subscriptions List:** lists the usage subscriptions that reference the group

To maintain a usage group:

1. Select **Admin Menu > Usage Rules > Usage Group** to navigate to the Usage Group portal.
2. Search for and select the appropriate usage group.
3. Click the **Edit, Duplicate, or Delete** button as appropriate.
See [Base Package Usage Groups and “Utility” Rules](#) for detailed descriptions of the fields used to define usage groups.
4. To add a Usage rule to the Usage group, click the **Add Rule** link in the Usage Rules List zone title bar. See [Creating Usage Rules](#) for more information about creating Usage rules.
5. To change the sequence of usage rules for the group, click the **Resequence Rules** link in the Usage Rules List zone title bar, edit the Execution Sequence in the Resequence Rules dialog, and click **Save**.

Working with Usage Rules

This section describes common tasks related to working with usage rules.

Creating Usage Rules

Use this procedure to create a new usage rule.

Prerequisites: You must define at least one usage group before you can create usage rules.

1. Select **Admin Menu > Usage Rules > Usage Rule+**.
2. Search for and select the usage group to which the new usage rule will belong.
3. Select the business object that will define the usage rule.
4. Click **OK**.
5. Enter a name, sequence number, description, and detailed description for the rule.
6. Select the category for the rule.
7. Complete the remaining fields and sections.

NOTE: The remaining fields and sections are based on the usage rule business object you selected.

See [Base Package Usage Rule Objects](#) for detailed descriptions of the fields used to define usage rules.

8. Click **Save**.
9. To define eligibility criteria for the rule, click the **Add** link in the Eligibility Criteria List zone title bar. See [Defining Eligibility Criteria for a Usage Rule](#) for more information.

Usage Rule Search

Use this procedure to search for a usage Rule on the Usage Rule Query portal.

1. Select **Admin Menu > Usage Rules > Usage Rule**.
2. Enter your search criteria.
You can search by Usage Rule or Description.
3. Click **Refresh**.
4. In the search results list, click the link for the usage rule you want to view or edit.

Maintaining Usage Rules

Use this procedure to maintain an existing usage rule.

You use the Usage Rule portal to maintain usage rules. This portal includes the following zones:

- **Usage Rule:** Defines the usage rule, including parameters used when executing the rule
- **Eligibility Criteria List:** Lists the eligibility criteria defined for the rule

To maintain a usage rule:

1. Select **Admin Menu > Usage Rules > Usage Rule** to navigate to the Usage Rule portal.
2. Search for and select the appropriate usage rule.
3. Click the **Edit**, **Duplicate**, or **Delete** button as appropriate.
See [Base Package Usage Rule Objects](#) for detailed descriptions of the fields used to define usage rules.
4. To define eligibility criteria for the rule, click the **Add** link in the Eligibility Criteria List zone title bar. See [Defining Eligibility Criteria for a Usage Rule](#) for more information.

Defining Eligibility Criteria for a Usage Rule

Use this procedure to define eligibility criteria for a usage rule.

Prerequisites: You must create a usage rule before you can define eligibility criteria.

1. Click the **Add** link in the Eligibility Criteria List zone title bar.

NOTE: If your system supports more than one eligibility criteria business object, you will be prompted to select a business object for the eligibility criteria.

2. Enter a sequence number, description, and detailed description for the criteria.
3. Complete the Criteria Comparison section as follows;
 - **Criteria Field:** the algorithm used to retrieve the value of the criteria field
 - **Comparison Operator:** the operator used in the comparison

- Value: a user-specified value to which the retrieved value is compared (using the comparison operator)
4. Complete the Comparison Results section as follows:
 - If True: the action to take if the comparison is true
 - If False: the action to take if the comparison is false
 - If Insufficient Data: the action to take if there is insufficient data to perform the comparison
 5. Complete any remaining fields (if applicable).

See *Base Package Usage Groups and “Utility” Rules* for detailed descriptions of the fields used to define usage rule eligibility criteria.
 6. Click **Save**.

Chapter 12

Integrations

This section describes concepts and procedures related to integrating Oracle Utilities Meter Data Management to other systems.

Creating Data Extracts using Oracle Utilities DataConnect

This section describes concepts and procedures related to using Oracle Utilities DataConnect to extract data from Oracle Utilities Meter Data Management for use in external systems such as analytics applications or energy management systems.

Understanding Oracle Utilities DataConnect Data Extracts

This section describes concepts related using Oracle Utilities DataConnect to create extracts for use with external applications.

About Consumption Extract Requests

Consumption extract requests are requests to extract consumption for one or more service points.

Consumption extract requests are defined by the following:

- **Request Type:** The request type for the request.
- **Status:** The current status of the request. Statuses include Pending, Submit Job, Wait for Run to Finish, Error, Complete, and Discarded.
- **Consumption Extract Type:** The consumption extract type for the request. Consumption extract types define the specific parameters for the extract request (see below).
- **Start Date/Time:** The start date and time for the extract request.
- **End Date/Time:** The end date and time for the extract request.

- **Last Submitted Batch Job ID:** The batch job ID for the last batch submitted for the request.

The specific parameters used by consumption extract requests are defined by its Consumption Extract Type, which include the target unit of measure, target interval size, request type, frequency, criteria for locating measurements to extract, and the algorithms and batch controls used in processing the extract request. See [About Consumption Extract Types](#) for more information.

Consumption extract requests are most often created via a batch process, but users can also create them manually if needed.

About Consumption Extract Request Types

Consumption extract request types define informational details about specific types of consumption extract requests.

Consumption extract request types are defined by the following:

- **Request Type:** A code/name that designates the request type.
- **Description:** A short description for the request type, used in information strings for requests of this type.
- **Status:** The current status of the request type. Request types can be either Active or Inactive.
- **Detailed Description:** A description for the request type. This field can be used to include specific information about the request type.

About Consumption Extract Types

Consumption extract types define the specific parameters used when processing a consumption extract request.

Consumption extract types are defined by the following:

- **Consumption Extract Type:** A code/name that designates the extract type.
- **Description:** A short description for the extract type, used in information strings for requests of this type.
- **Status:** The current status of the extract type. Request types can be either Active or Inactive.
- **Extraction Through Date/Time:** The date and time through which extract requests for this extract type have been processed.
- **Extraction Cutoff Time:** The time at which extract requests of this extract type are cutoff.
- **Extraction Parameters:** Parameters used in extraction processing, including:
 - **Target UOM:** The unit of measure for the extracted consumption. If consumption is extracted from measuring components that record measurements with different UOMs, the extracted consumption is converted into this UOM. Note: in this case the measuring components must record related UOMs.
 - **Target Seconds Per Interval:** The interval size (indicated as hours:minutes:seconds) for the extracted consumption. If consumption is extracted from measuring components that record measurements with different interval sizes, the extracted consumption is converted into this interval size. This field is not used by TOU extract types.
 - **TOU Map:** An optional TOU map for the extracted consumption. Consumption is created for each TOU period defined for the specified TOU map. If this field is populated, a **TOU Map Template** should NOT be selected. This field is only used by TOU extract types.
 - **TOU Map Template:** An optional TOU map template for the extracted consumption. Consumption is created for each TOU period defined for the specified TOU map template. If this field is populated, a **TOU Map** should NOT be selected. This field is only used by TOU extract types.
 - **Subscription Type:** The type of subscription for which extracts of this type are processed.
 - **Request Type:** The request type associated with the extraction type.

- **Frequency:** The frequency at which extract requests of this extract type are processed. Frequency options include Adhoc and Automated Daily.
- **Find Measurement Criteria:** Parameters used when identifying and gathering measurement data for the extraction, including:
 - **Consumption Retrieval Method:** A flag that specifies the method used for retrieving consumption. Base package options include:
 - **Combine MCs:** Indicates that the consumption extract should combine measurements from multiple measuring components. If this option is selected, the **Multiple Condition Resolution Mode** drop-down list specifies how conflicts of measurement conditions are resolved.
 - **Prioritize MC:** Indicates that the consumption extract should use measurements based on prioritized measuring components (based on the **Priority** assigned to the measuring component's service point type in the **Service Point Types** section).
 - **Return Individualized MCs:** Indicates that the consumption extract should include data for each individual measuring component identified during the extraction process.
 - **Multiple Condition Resolution Mode:** A flag that specifies how to resolve situations that arise when measurements with multiple and different condition codes are retrieved. This flag is only applicable if the "Combine MCs" option is selected in the **Consumption Retrieval Method** drop-down list. Base package options include:
 - **Assign Default:** Use the condition specified in the **Default Measurement Condition** drop-down list.
 - **Leave Blank:** Leave the condition blank.
 - **Maximum:** Use the "maximum" condition code (the condition code with the highest numerical value).
 - **Minimum:** Use the "minimum" condition code (the condition code with the lowest numerical value).
 - **Default Measurement Condition:** A flag that specifies a default measurement condition code to be used when measurements with multiple and different condition codes are retrieved. This flag is only applicable if the "Assign Default" option is selected in the **Multiple Condition Resolution Mode** drop-down list.
- **Algorithms:** Defines the algorithms used in extraction processing.
 - **Interval Data Extract By Period:** The algorithm used when extracting consumption based on a specified date range. This algorithm is used with most regular extraction processing.
 - **Historical Correction Extract Algorithm:** The algorithm used when extracting consumption for historical correction purposes.
- **Batch Control:** Defines the batch controls used for extraction processing.
 - **Initial Load/Ongoing Batch Control:** The batch control used when extracting consumption for initial load of data and ongoing extraction processing.
 - **Historical Correction Batch Control:** The batch control used when extracting consumption for historical correction purposes.
- **Service Point Types:** Defines one or more service point types for which consumption is extracted for extracts of this type. Valid service point types are defined by the following:
 - **Sequence:** The sequence in which the extraction process searches for suitable measuring components from which to extract consumption.
 - **Service Point Type:** The service point type for which consumption will be extracted.
 - **UOM/TOU/SQI:** The unit of measure, time of use, and/or service quantity identifier used when extracting consumption.
 - **How To Use:** Indicates how consumption for service points of this type is used (additive, subtractive, peak, or check) when extracting consumption. Options include:

- **Additive** Indicates that the service point type's consumption should be added to other service point type's consumption (with the same UOM and TOU value).
- **Subtractive**: Indicates that the service point type's consumption should be subtracted from other service point type's consumption (with the same UOM and TOU value).
- **Peak**: Indicates that this service point type's consumption should be compared against other service point type's consumption (with the same UOM and TOU value) and that the higher consumption value should be used.
- **Check**: Indicates that the consumption associated with this service point type should be ignored.
- **Priority**: The priority assigned to consumption for this service point type. This is used if the "Prioritize MCs" option is selected in the **Consumption Retrieval Method** drop-down list.

Working with Consumption Extract Requests

This section describes common tasks related to working with consumption extract requests used with Oracle Utilities DataConnect.

Searching and Viewing Consumption Extract Requests

Use this procedure to search for, view, and maintain consumption extract requests.

Users work with the **Consumption Extract Request Query** portal and the **Request Search** zone to search for consumption extract requests. Users work with the **Consumption Extract Request** portal and the **Request** zone to view and maintain consumption extract requests.

1. Select **Main Menu > Usage > Consumption Extract Request**.

The **Consumption Extract Request Query** portal opens.

2. Select a request type for the search from the **Request Type** drop-down list.
3. To restrict your search based on the user ID of the user who created the request, enter a user ID in the **User** field.
4. To search for all requests for the selected request type, select "Yes" in the **Show All Requests** drop-down list.

If the **Show All Requests** drop-down list is not set to "Yes," the search returns only requests in their initial state. In most cases, this is "Pending."

5. Click **Refresh**.

The **Request Search** zone displays a list of consumption extraction requests matching the search criteria

6. Click the **Request** link for the request you wish to view.

The select request opens in the **Consumption Extract Request** portal.

- The **Request** zone displays the selected request.
- The **Request Log** zone displays an activity log for the selected request.

7. To edit the request, click **Edit**, make any appropriate or required changes, and click **Save**.
8. To discard the request, click **Discard**.
9. To resubmit a request currently in the "Error" state, click **Submit Job**.

Creating Consumption Extract Requests

Use this procedure to manually create a consumption extract request.

Prerequisite: You must create at least one consumption extract request type before you can create a consumption extract.

Consumption extract requests are most often created via a batch process, but can be created manually if needed.

1. Select **Main Menu > Usage > Consumption Extract Request+**.
2. Select the type of request to create from the **Request Type** drop-down list and click **OK**.
3. Select the extract type for the request from the **Consumption Extract Type** drop-down list.
4. Enter the start and end times for the request in the **Start Date/Time** and **End Date/Time** fields.
5. Click **Save**.

The new request is displayed in the **Consumption Extract Request** portal. The **Request** zone displays details for the request. The **Request Log** zone displays a list of activity for the request. Newly created requests are in the “Pending” state until submitted for processing via batch process.

6. To edit the request, click **Edit**, make any appropriate or necessary changes, and click **Save**.
7. To discard the request, click **Discard**.

Consumption Extract Administration

This section describes concepts and common tasks related to consumption extract administration.

Defining Consumption Extract Request Types

Use this procedure to define and maintain consumption extract request types.

Users work with the **Request Type** portal and **Request Type** zone when defining and maintaining consumption extract request types.

1. Select **Admin > R > Request Type+**, or click **Add** in the **Request Type List** zone title bar.
2. Select the appropriate business object for the request type from the **Request Type Business Object** drop-down list.
3. Click **OK**.
4. Enter a code for the request type in the **Request Type** field.
5. Enter a description and optional detailed description for the request type in the **Description** and **Detailed Description** fields.
6. Click **Save**.

The new request type opens in the **Request Type** portal.

- The **Request Type List** zone displays a list of all request types defined in the system. To display a different request type, click the **Broadcast** link for the appropriate request type.
 - The **Request Type** portal displays the request type.
 - The **Request Type Log** zone displays an activity log for the request type.
7. To edit the request type, click **Edit**, make any appropriate or required changes, and click **Save**.
 8. To delete the request type, click **Delete**.

9. To duplicate the request type, click **Duplicate**.
10. To deactivate the request type, click **Deactivate**.

Now you can use the request type when creating consumption extract types and consumption extract requests.

Defining Consumption Extract Types

Prerequisites: You must define consumption extract request types before you can create consumption extract type.

See [About Consumption Extract Types](#) for descriptions of the fields referenced below.

1. Select **Admin > C > Consumption Extract Type+** or click **Save** in the **Consumption Extract Type List** zone title bar.
2. Select the appropriate business object for the extract type from the **Consumption Extract Type Business Object** drop-down list.
3. Click **OK**.
4. Enter a code for the extract type in the **Consumption Extract Type** field.
5. Enter a description for the extract type in the **Description** field.
6. Specify a cutoff time for extractions of this type in the **Extract Cutoff Time** field.
7. Define the parameters used for extracting consumption for requests of this type in the **Extraction Parameters** section.
8. Define the criteria used for locating measurements for requests of this type in the **Find Measurement Criteria** section.
9. Specify the algorithms to use for extraction processing in the **Algorithms** section.
10. Specify the batch controls to use for extraction processing in the **Batch Control** section.
11. Specify one or more service point types for requests of this type in the **Service Point Types** section.
12. Click **Save**.

The new consumption extract type opens in the **Consumption Extract Type** portal.

- The **Consumption Extract Type List** zone displays a list of all consumption extract types defined in the system. To display a different consumption extract type, click the **Broadcast** link for the appropriate extract type.
- The **Consumption Extract Type** portal displays the consumption extract type.

13. To edit the consumption extract type, click **Edit**, make any appropriate or required changes, and click **Save**.
14. To delete the consumption extract type, click **Delete**.
15. To duplicate the consumption extract type, click **Duplicate**.

Now you can use the consumption extract type when creating consumption extract requests.

Chapter 13

Reference Topics

This section provides reference information to support tasks.

Glossary

This glossary provides definitions of commonly used terms.

[A-C](#) [D-G](#) [H-K](#) [L-O](#) [P-R](#) [S-U](#) [V-Z](#)

360 Degree View - Final Values Overlay

A zone that graphs final measurements for a measuring component, and provides the ability to overlay the graphed data with final measurements from other measuring components. The zone also permits overlaying data from the same measuring component for different time periods, as well as data from measuring components measuring different quantities, such as temperature.

360 Degree View - Audit View

A zone that allows users to view an interval measurement curve for a given period overlaid with the count of audit records for each individual measurement. It also allows users to magnify a portion of the curve and see how the measurements looked at different points in time.

360 Degree View - Time of Use by Day

A zone that displays daily TOU-mapped usage data for a measuring component based on a user-defined time period and TOU Map.

360 Degree View - Time of Use Overlay

A zone that displays an overlay of the TOU periods on a final measurement along with totalized TOU consumption based on a user-defined time period and TOU map.

360 Degree View - Timeline Zone

A zone that displays a timeline of activities and other events for a given service point, device, etc.

Adjust Intervals To Scalar Quantity

An initial measurement data function used to adjust all interval values within a user-defined time period in an interval measurement such that the total of all interval values equals a user-defined scalar quantity.

Adjust Intervals Using Math	This function results in a measurement that retains the shape of the original measurement, but has been scaled up or down.
Bill Determinants	An initial measurement data function used to adjust all interval values within a user-defined time period using math operations (add, subtract, multiply, or divide).
Consumption	Measurement data summarized for use by a billing application. Bill determinants can take the form of TOU-mapped interval consumption, scalar consumption, scalar readings, and/or interval consumption obtained via measurements. A common variety of bill determinant is TOU-mapped interval consumption, which reduces a full month's worth of interval data into several buckets of consumption based on time of use.
Convert Scalar to Interval Consumption	A measurement by a given device of the amount of energy, water, gas, etc. consumed over a given time period. Synonymous with the term "measurement".
Create/Override	A measuring component consumption function used to convert scalar consumption into interval consumption. The converted consumption is held in a new scratchpad measuring component. The "shape" of the new interval measurement can be based on either a profile or can have a flat distribution.
Create Scratchpad Interval Consumption	A measuring component consumption function used to create new initial measurement data for a selected measuring component for all or part of a selected time period. This function can either copy existing final measurements (for example, from a profile) or create new measurement data for the IMD it creates.
Dynamic Option	A measuring component consumption function used save all or some of the final measurements shown in the zone as a new initial measurement for a scratchpad measuring component.
Dynamic Option Event	Used to specify terms that override how usage is normally calculated - such as a critical peak period that affects the TOU mapping of interval consumption.
Dynamic Option Type	The period of time during which a dynamic option is applicable. A dynamic option may have many events over time.
Factor	Used to define information common to dynamic options of a specific type.
Function	A centrally stored set of values for use in validation rules, bill determinants calculations, and other processes. A factor can have different values depending upon some definable attribute of a system object, such as customer size associated with a service point. The values are effective-dated so that changes over time are retained. Examples of factors can include minimum/maximum thresholds, loss factors, etc. Classes of factors are defined that can have numeric values (as in the above examples), or values pointing to profile measuring components or VEE groups.
Function	An online-initiated action applied to measurement data, comprising one or more measurement services.

Initial Measurement Data Function (IMDF)	An online means of manipulating initial measurement data. IMD Functions typically move intervals (shift, insert, remove, etc.) or manipulate their values or conditions.
Insert Intervals	An initial measurement data function used to insert intervals into initial measurement data. Intervals can be inserted at either the beginning or end of the measurement. The end date/time of the measurement is shifted to account for the inserted intervals.
Interval Data Snapshot	A copy of the interval data associated with a usage transaction that can be sent to external systems for using in billing calculations (such as real-time pricing). Snapshots are included in outbound messages sent to external systems.
Interval Size	The "size" of an interval, representing the length of time between intervals. Interval size is typically measured in seconds-per-interval (SPI).
Measuring Component Consumption Function (MCCF)	An online means of initiating the process of adding or editing measurements. Measuring Component Consumption Functions typically create new initial measurements based on a copy of existing final measurements.
New Scalar Reading	A measuring component consumption function used to create new initial measurement data containing a reading (rather than consumption) for the scalar measuring component displayed in the zone for a user-defined time period. NOTE: A reading refers to the measurements as read from the meter, while consumption refers to the total consumption, accounting for meter multiplier and/or offset.
Oracle Utilities Meter Data Management	Oracle Utilities application that provides functionality for handling large volumes of meter data to enable increased accuracy, flexibility, and scalability.
Profiling of Scalar Data	The process of applying an interval consumption "shape" to a scalar measurement, using an existing interval measuring component. The individual interval values are adjusted such that when totaled, they equal the value of the scalar measurement.
Remove Intervals	An initial measurement data function used to remove intervals from initial measurement data. Intervals can be removed from either the beginning or end of the measurement. The end date/time of the measurement is shifted to account for the new number of intervals in the measurement.
Save As Interval Consumption	A measuring component consumption function used save all or some of the final measurements shown in the zone as a new initial measurement for a different (new or existing) measuring component.
Self-Service Meter Read	Meter reads created by end-users via the Oracle Utilities Self-Service application.
Service Point	A location at which a company supplies service. Used to store information describing the type of service and how it is measured.
Set Condition Codes	An initial measurement data function used to set condition codes within initial measurement data. Condition codes indicate the circumstances

	(estimated, missing, etc.) of individual measurements. Condition codes are assigned to both scalar and interval measurement data both for initial measurement data and final measurements.
Shift Intervals	An initial measurement data function used to shift intervals of initial measurement data forward or backward time. The end result is a measurement with a different start or end time.
Smooth Spikes	<p>An initial measurement data function used to reduce "spike" intervals (intervals with values that are more than a user-defined percentage higher than other intervals within the initial measurement data). The function smoothes spikes using linear interpolation as follows:</p> <ul style="list-style-type: none"> • Get the value of the interval immediately preceding the spike (the "Left Value"). • Get the value of the interval immediately after the spike (the "Right Value"). • Subtract the Left Value from the Right Value, divide result by two. The result is called the Estimation Adder • Add the Estimation Adder to the interval immediately before the spike.
Sub Usage Subscription	A "child" usage subscription that is subordinate to another usage subscription (such as when a utility is issuing a bill for a third party service).
Usage	A generic term for the amount of energy, water, gas, etc. consumed at one or more service points, sometimes representing quantities that have been adjusted from the original calculated consumption.
Usage Calculation Group	A set of sequenced usage rules used to calculate usage for a usage subscription.
Usage Rule	Business rules / logic used to calculate usage (bill determinants), such as a TOU-mapped consumption calculation. Each rule is a modular unit that can be grouped together and sequenced within a calculation group.
Usage Rule - Apply Math (Interval Data)	A usage rule used to summarize interval measurements and apply a mathematical formula against the results to derive a usage quantity.
Usage Rule - Get Interval Data	A usage rule used to get interval data for a measuring component and date range.
Usage Rule - Get Scalar Details	A usage rule used to assemble scalar readings and measurements (consumption).
Usage Rule - Get TOU Mapped Usage	A usage rule used to summarize interval measurements into TOU buckets based on a TOU map (where the TOU map is created based on the schedule defined within a TOU map template).
Usage Rule - Validate Usage Against Tolerance	A usage rule used to validate calculated usage against a specified tolerance.
Usage Rule Eligibility Criteria	Configured criteria used to determine whether to execute a specific usage rule when calculating usage.
Usage Subscription Type	A collection of properties defining a class of usage subscriptions. The usage subscription type also controls valid values for various attributes of usage subscriptions.
Usage Subscription	A record of an ongoing request to send one or more service points' usage to one or more external systems (such as a billing application).

Usage Transaction	A record of bill determinant calculations for a usage subscription.
Usage Transaction Correction Processor	An activity used to update usage transactions if needed when updated initial measurements are received that might impact the usage transaction(s).
Validation, Estimation, and Editing (VEE)	The process by which initial measurement data is validated, estimated (if necessary) and edited (if necessary) based on a set of user-defined rules.
VEE Eligibility Criteria	User-definable conditions that could cause a given VEE rule to be applied or skipped. This could involve the evaluation of some attribute of the device or measuring component, or something else entirely.
VEE Exception	An exception generated during Validation, Estimation and Editing (VEE) processing of initial measurement data. Exceptions are assigned a severity that is used in determining whether or not the initial measurement data should be transitioned into an exception state.
VEE Group	A collection of VEE Rules.
VEE Group Matrix (Factor)	A VEE rule within a VEE group can be configured to pick from a list of VEE groups (referred to as a matrix) whose rules to execute next. This list of VEE groups is configured as the values of a factor. One example of its use could be to call geographically-specific VEE groups from within a larger-purpose group. A residential VEE group might contain a rule that will pick the VEE group to execute based on service point location, where the VEE Group Matrix specifies: SP in the North - VEE Group N SP in the East - VEE Group E SP in the South - VEE Group S
VEE Group Matrix (Factor) Referencing Group	A zone that displays a list of VEE group matrices (factors) that reference the VEE group being viewed in the VEE group portal.
VEE Rule	Standard and custom Validation, Estimation and Editing (VEE) Rules that perform checking and/or manipulation of initial measurement data.
VEE Rule - Duplicate IMD Check	VEE Rule that checks to determine whether the current initial measurement is a duplicate of one already received for the same measuring component.
VEE Rule - Ensure IMD Exists for Sibling MCs	VEE Rule that checks to ensure that initial measurement data exists for siblings measuring components.
VEE Rule - High/Low Check	VEE Rule that compares consumption of incoming initial measurement data against historical data as a means of assuring the reasonableness of the data.
VEE Rule - Interval Adjustment from Scalar	VEE Rule that adjust an interval initial measurement based on values from a related scalar initial measurement.
VEE Rule - Interval Averaging Estimation	VEE Rule that estimates interval initial measurement data based on averaging historical values for the same measuring component.
VEE Rule - Interval Interpolation Estimation	VEE Rule that estimates interval initial measurement data based on linear interpolation.
VEE Rule - Interval Profile Estimation	VEE Rule that estimates interval initial measurement data based on profile initial measurement data.
VEE Rule - Interval Replacement Rule	VEE Rule that determines whether or not an incoming initial measurement will replace any existing measurements and if so, whether or not to allow this to happen.

VEE Rule - Interval Size Validation	VEE Rule that checks to ensure that the interval size of the incoming initial measurement data matches the value defined in the measuring component type.
VEE Rule - Interval Spike Check	VEE Rule that examines incoming initial measurement data to identify intervals with conspicuously high usage relative to surrounding intervals.
VEE Rule - Multiplier Check	VEE Rule that checks to ensure that the device multiplier value of the incoming initial measurement data matches the multiplier value stored on the measuring component.
VEE Rule - Negative Consumption Check	VEE Rule that checks for negative consumption.
VEE Rule - Raise Missing Quantity Exception	VEE Rule that checks for missing measurement quantities in interval initial measurements.
VEE Rule - Scalar Calculation from Interval	VEE Rule that calculates a scalar initial measurement based on values from a related interval initial measurement.
VEE Rule - Scalar Estimation	VEE Rule that estimates scalar initial measurement data based on historical initial measurement data for the same measuring component.
VEE Rule - Scalar Profile Estimation	VEE Rule that estimates scalar initial measurement data based on profile initial measurement data.
VEE Rule - Scalar Replacement Rule	VEE Rule that identifies whether or not a scalar reading will completely replace an existing measurement and if so, whether or not to allow this to happen.
VEE Rule - Scalar Replacement Rule	VEE Rule that determines whether or not an incoming scalar measurement will replace any existing measurements and if so, whether or not to allow this to happen.
VEE Rule - Sum Check	VEE Rule that checks the difference between the total consumption of incoming initial measurement data against the total consumption (based on final measurements) for one or more related measuring components on the same device over the same time period.
VEE Rule - Unit Of Measure Check	VEE Rule that checks to ensure that the Unit of Measure (UOM) of the incoming initial measurement data matches the UOM specified on the measuring component's type.
VEE Rule - Zero Consumption Check	VEE Rule that checks for zero consumption.
VEE Rules Referencing Group	A zone that displays a list of VEE rules that reference the VEE group being viewed in the VEE group portal.

Standard Actions for Admin-Level Data Maintenance

A standard set of maintenance portals are used to define objects that are maintained from the Admin menu. These portals use a common interface and support a set of standard actions for creating and maintaining objects.

The following quick reference table provides the basic steps for performing any of the standard actions.


Action	Steps
Add	Click the Add link in the list or search zone title bar. Provide all necessary information and click Save .
Edit	Select the object you want to edit from the list zone, then click the Edit icon. Enter your changes and click Save .


Action	Steps
Delete	Select the object you want to delete from the list zone, then click the Delete icon. Confirm the deletion.
Duplicate	Select the object you want to duplicate from the list zone, then click the Duplicate icon. Key fields will be cleared in the new record. Complete all required fields and click Save .
Broadcast	Select the object you want to broadcast from the list zone, then click the Broadcast icon. The details and available actions for the selected object are displayed in the appropriate zones.
Activate or Deactivate	Select the object you want to activate or deactivate from the list zone, then click Activate or Deactivate as appropriate. NOTE: These actions only apply to objects that support an Active and Inactive status, such as activity types. When such an object is deactivated, no new objects of this type can be created.
Sort	Click a column header in the list zone to resort by the values in that column. Click again to reverse the order (from ascending to descending or descending to ascending).
Filter	If a list zone supports filtering, a Filter icon is displayed in the list zone title bar (on the far right). Click the Filter icon, then select the field by which you want to filter and click Refresh .
View or add log entries	Click the Log tab to view log entries. To add an entry, click the Add link in the list zone title bar and provide the requested information.

Standard Actions for Data Maintenance

This topic provides the basic steps for performing standard actions on data maintained from the Main Menu.

NOTE: The system displays buttons for all valid actions, based on the object's current status, your user privileges, and your system's configuration. The following table provide instructions for performing all standard actions.

Action	Steps
Edit	From the Main Menu: <ol style="list-style-type: none"> 1. Select the option for the object you want to maintain. A query portal is displayed. 2. Enter search criteria to locate the object. The maintenance portal is displayed. 3. Click the Edit button in the Record Actions section. 4. Enter your changes. Click  to display field descriptions. 5. Click Save.
Delete	From the Main Menu: <ol style="list-style-type: none"> 1. Select the option for the object you want to delete. A query portal is displayed. 2. Enter search criteria to locate the object. The maintenance portal is displayed. 3. Click the Delete button in the Record Actions section. A confirmation dialog opens asking you to confirm the deletion of the record. Click OK to delete the object.
Duplicate	From the Main Menu:

Action	Steps
View or add log entries	<ol style="list-style-type: none"> 1. Select the option for the object you want to duplicate. A query portal is displayed. 2. Enter search criteria to locate the object. The maintenance portal is displayed. 3. Click the Duplicate button in the Record Actions section. A new record is created and the Add/Edit screen is displayed. Key fields will be cleared in the new record. 4. Complete all required fields. Click  to display field descriptions. 5. Click Save. <hr/> <p>From the Main Menu:</p> <ol style="list-style-type: none"> 1. Select the option for the object you want to manage log entries for. A query portal is displayed. 2. Enter search criteria to locate the object. The maintenance portal is displayed. 3. Click the Log tab. 4. To add a log entry, click the Add link in the Log zone title bar. 5. Type the log detail and click Save.

Viewing and Adding Log Entries

Use the Log tab to view or add log entries for the current object.

The log displays a list of user and system actions associated with an object, such as when it was created, last updated, or transitioned to different status. For each log entry, the system displays the date and time the action occurred, the user/system that initiated the action, the type of action, and related object, if any.

To create a new log entry, click the **Add Log Entry** link in the zone title, then enter log entry details and click **Save**. Your user ID is saved with the log entry.

Chapter 14

FAQs

This section provides answers to commonly asked questions.

How Do I...?

This topic answers questions about how to perform day-to-day functions.

Q. How do I configure Usage rules that are only applied under certain circumstances?

A. You can define eligibility criteria for usage rules that specify that the rule should only be executed when specific circumstances apply.

How do I override how TOU map data is created for special events?

A. Do the following:

1. Create a TOU group, TOU map template, TOU map type, and TOU map that define how TOU map data are to be created during the override period.
2. Create a dynamic option for the override.
3. Create a dynamic option event that represents the override period.
4. Associate the dynamic option and override TOU map with the TOU map you use under normal circumstances. When you generate TOU map data for the override period, the TOU map data creation process will use the override TOU map during the period defined in the dynamic option event.

Q. How do I re-use VEE rules? Can you provide an example of configuring VEE groups and rules that illustrates how groups and rules can be re-used?

A. The following is a simple example that shows how this might be done. Assume that you need to apply the following VEE rules:

- Three VEE rules to be applied to all measuring components (designated as A1, A2, and A3)
- Three VEE rules to be applied to interval measuring components only (designated as I1, I2, and I3)
- Two VEE rules to be applied to scalar measuring components only (designated as S1 and S2)

One approach would be as follows:

1. Create a VEE group for each set of VEE rules, named as follows:
 - ALL_RULES
 - INTERVAL_RULES
 - SCALAR_RULES
2. Create the VEE rules to be applied to all measuring components (A1, A2, and A3) in the ALL_RULES group.
3. Create the VEE rules to be applied to interval measuring components (I1, I2, and I3) in the INTERVAL_RULES group.
4. Create the VEE rules to be applied to scalar measuring components (S1 and S2) in the SCALAR_RULES group.
5. Create a Execute VEE Group VEE rule for each of the three groups as follows:
 - ALL_GRP (references the ALL_RULES group)
 - INTERVAL_GRP (references the INTERVAL_RULES group)
 - SCALAR_GRP (references the SCALAR_RULES group)
6. Create a VEE group to be used with interval measuring components called INTERVAL_MCS that contains the following rules:
 - ALL_GRP
 - INTERVAL_GRP
7. Create a VEE group to be used with scalar measuring components called SCALAR_MCS that contains the following rules:
 - ALL_GRP
 - SCALAR_GRP

Q. How do I configure VEE rules that are only applied under certain circumstances?

A. You can define eligibility criteria for VEE rules that specify that the rule should only be executed when specific circumstances apply.

Q. How do I apply a set of VEE rules to a group of measuring components?

A. You can define VEE groups for a measuring component type, in which case, all measuring components of that type will use the VEE groups defined for the measuring component type.

What's the Difference Between ...?

This topic describes the difference between terms and concepts that are closely related.

Q. What's the difference between Oracle Utilities Service and Measurement Data Foundation and Oracle Utilities Meter Data Management?

A. **Oracle Utilities Service and Measurement Data Foundation** provides shared functionality, including device management, device installation management, and Validation, Editing, and Estimation used by Oracle Utilities Meter Data Management, Oracle Utilities Smart Grid Gateway, and other Oracle Utilities products.

Oracle Utilities Meter Data Management is an application based on Oracle Utilities Service and Measurement Data Foundation that provides additional device management, device installation management, and VEE functionality, in addition to usage management and analytic tools.

Q. What's the difference between a measuring component and a scratchpad measuring component?

A. A **measuring component** is a single point for which data will be received and stored in the system.

A scratchpad measuring component is a measuring component that provides users with a means to manipulate "scratchpad" (or non-production) measurement data without affecting existing measurements.

Q. What's the difference between a TOU Map Template and a TOU Map Type?

A. A **TOU Map Template** is the schedule used for TOU map data generation, for example defining year, month, and day ranges and which TOUs should be used during each.

A **TOU Map Type** defines certain important properties of TOU maps of the type, including the interval size, and the valid TOU map templates.

Q. What's the difference between a TOU Map and TOU Map Data?

A. A **TOU Map** is a collection of TOU map data derived via a given TOU map template at a specific interval size and TOU. A TOU map is typically specified when configuring a usage calculation rule for TOU mapping. This TOU map's data will then be used when summarizing the interval data for each TOU period.

TOU Map Data are interval date/times and their associated TOU as defined by a TOU map template. For example, if the schedule defined for a TOU map template specifies that the period on weekdays from 9 AM to 5 PM falls into On-Peak, and the data is hourly, rows would be stored in the TOU map data table with the date/time 5/3/2010 at 10 AM, 5/3/2010 at 11 AM, 5/3/2010 at 12 PM, etc., each with a value of On-Peak.

Q. What's the difference between a Usage rule and a Usage group?

A. A **Usage rule** is a standard or custom rule that calculates bill determinants from measurement data.

A **Usage group** is a collection of Usage rules.

Q. What's the difference between a VEE rule and a usage rule?

A. A **VEE rule** is a standard or custom Validation, Estimation and Editing (VEE) rules that performs checking and/or manipulation of initial measurement data.

A **Usage rule** is a standard or custom rule that calculates bill determinants (or other Usage Transactions) from measurement data.

Q. What's the difference between a Usage Subscription and a Usage Transaction?

A. A **Usage Subscription** is a record of an ongoing request to send one or more service points' usage to one or more external systems (such as a billing application).

A **Usage Transaction** is a record of bill determinant calculations for a usage subscription.

Q. What's the difference between a VEE rule and a VEE group?

A. A **VEE rule** is a standard or custom Validation, Estimation and Editing (VEE) rules that performs checking and/or manipulation of initial measurement data.

A **VEE group** is a collection of VEE rules .

Q. What's the difference between a VEE Group Factor VEE rule and a Execute VEE Group VEE rule?

A. A **VEE Group Factor VEE rule** is a VEE rule used to define business logic to allow reference to a factor (of type VEE group) where the values of the factor are a list of VEE groups. This allows creating a VEE rule that can select from a list of VEE groups (referred to as a matrix) whose rules to execute next.

An **Execute VEE Group VEE rule** is a VEE rule used to define business logic to allow reference to a VEE group. This allows rules that are used frequently to be bunched under a single VEE group, which can be referenced/called by other rules as needed. For example, if a set of standard rules should be applied to all initial measurement data for a certain type of measuring component, this set of rules can be configured as part of a VEE group, which is referenced by a single VEE rule of this type.

Can I ...?

This topic answers questions about whether certain actions or configurations are permitted.

Q. Can I configure usage rules that are only applied under certain circumstances?

A. Yes. By defining eligibility criteria for Usage rules, you can define the circumstances under which the rules are applied or skipped.

Q. Can I create usage groups that can be reused by more than one usage subscription?

A. Yes. You can create an Execute Usage Group rule that reference a usage group. When this rule is executed, the rules within the referred usage group are executed.

Q. Can I override how TOU map data is created for special events?

A. Yes. By defining dynamic options, dynamic option events, and TOU maps for the override period, and associating the dynamic option and override TOU map to your TOU map.

Q. Can I apply a set of VEE rules to a group of measuring components?

A. Yes. If the group of measuring components are all based on the same measuring component type, you can create a VEE group that contains the set of VEE rules you wish to apply, and assign the group to the measuring component type.

Q. Can I configure VEE rules that are only applied under certain circumstances?

A. Yes. By defining eligibility criteria for VEE rules, you can define the circumstances under which the rules are applied or skipped.

Q. Can I configure VEE rules so that different sets of rules are executed based on a specific property of a device or measuring component?

A. Yes. You can create a VEE Group Factor rule that references a factor whose values are a list of VEE groups. This rule can select from the list of VEE groups (referred to as a matrix) whose rules to execute next.

Q. Can I create VEE groups that can be reused by more than one measuring component or measuring component type?

A. Yes. You can create an Execute VEE Group rule that reference a VEE group. When this rule is executed, the rules within the referred VEE group are executed.