

**Oracle Utilities Meter Data Management  
Release 2.0.1**

Utility Reference Model

4.2.2.1 MDM Calculate Usage

January 2014

Oracle Utilities Meter Data Management Utility Reference Model 4.2.2.1 Release 2.0.1

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# Chapter 1

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## Overview

This chapter provides a brief description of the MDM Calculate Usage business process and associated process diagrams. This includes:

- **Brief Description**
  - **Actors/Roles**

---

## Brief Description

**Business Process:** 4.2.2.1 MDM Calculate Usage

**Process Type:** Process

**Parent Process:** 4.2.1 MDM. Manage Bill

**Sibling Processes:**

This process is initiated when a usage transaction is created either manually, automatically based on a measurement cycle, or ad hoc by a request from an external application. MDM calculates usage for usage subscribers based on rules defined in usage group(s) that is active during the required usage period. If more than one usage group is active during the period then a sub usage transaction will be created for each of the active periods. Once the calculations for the usage transaction have been successfully completed then the results are sent to the usage recipient either online or by a scheduled batch process.

## Actors/Roles

The MDM Calculate Usage business process involves the following actors and roles.

- **MDM Authorized User:** An authorized user of the Meter Data Management application
- **MDM Application:** The Meter Data Management system

# Chapter 2

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## Detailed Business Process Model Description

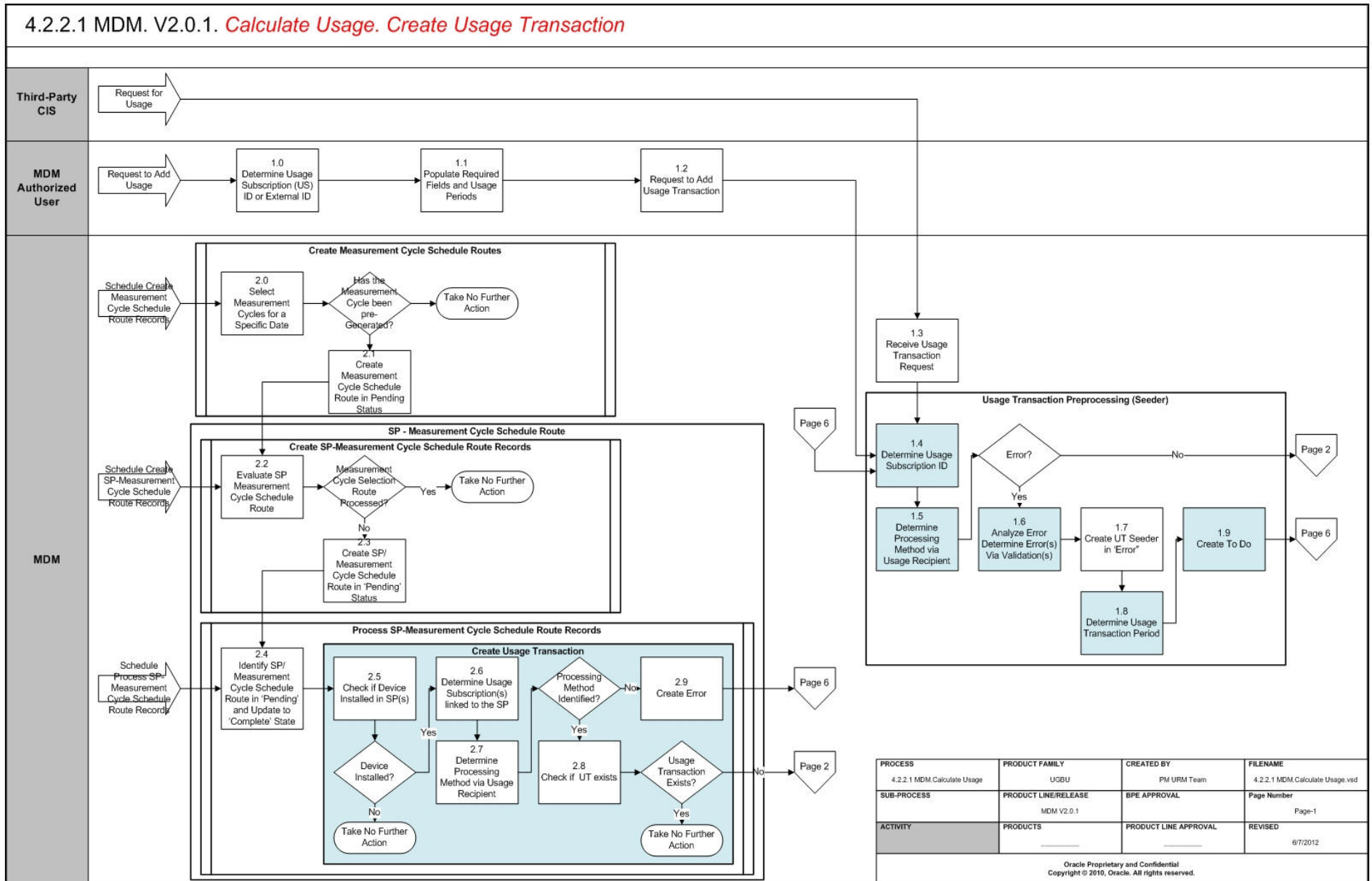
This chapter provides a detailed description of the MDM Calculate Usage business process. This includes:

- **Business Process Diagrams**
  - MDM Calculate Usage Page 1
  - MDM Calculate Usage Page 2
  - MDM Calculate Usage Page 3
  - MDM Calculate Usage Page 4
  - MDM Calculate Usage Page 5
  - MDM Calculate Usage Page 6
- MDM Calculate Usage Description
- **Business Objects Lifecycle**
  - D2-UsgTranSeeder
  - D1-SPMSrmtCycScheduleRoute
  - D2-UsageTransaction
  - D2-SubUsageTransaction
- **Related Training**



# Business Process Diagrams

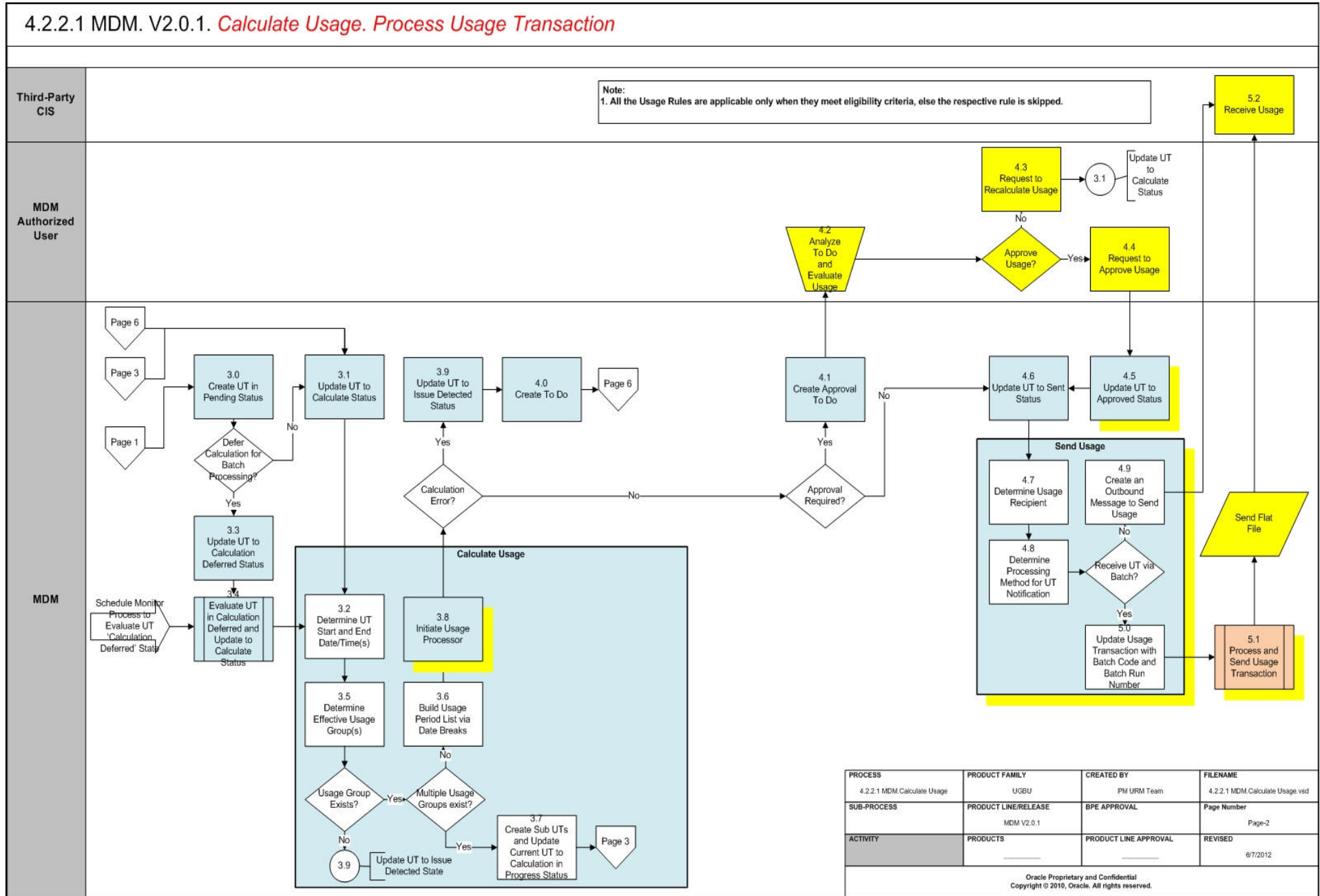
## MDM Calculate Usage Page 1



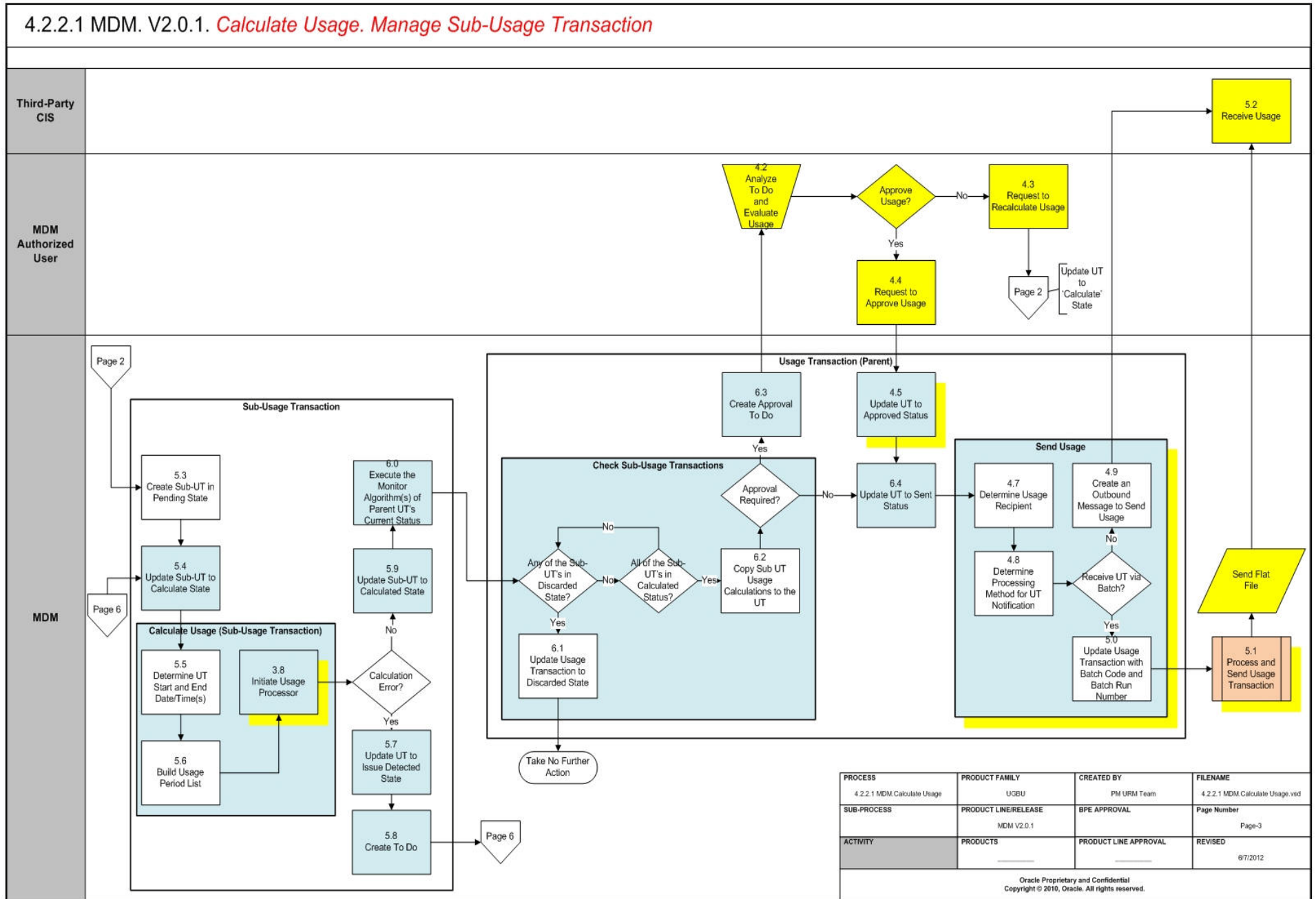
| PROCESS                     | PRODUCT FAMILY       | CREATED BY            | FILENAME                        |
|-----------------------------|----------------------|-----------------------|---------------------------------|
| 4.2.2.1 MDM.Calculate Usage | UGBU                 | PM URM Team           | 4.2.2.1 MDM.Calculate Usage.vsd |
| SUB-PROCESS                 | PRODUCT LINE/RELEASE | BPE APPROVAL          | Page Number                     |
|                             | MDM V2.0.1           |                       | Page-1                          |
| ACTIVITY                    | PRODUCTS             | PRODUCT LINE APPROVAL | REVISED                         |
|                             |                      |                       | 6/7/2012                        |

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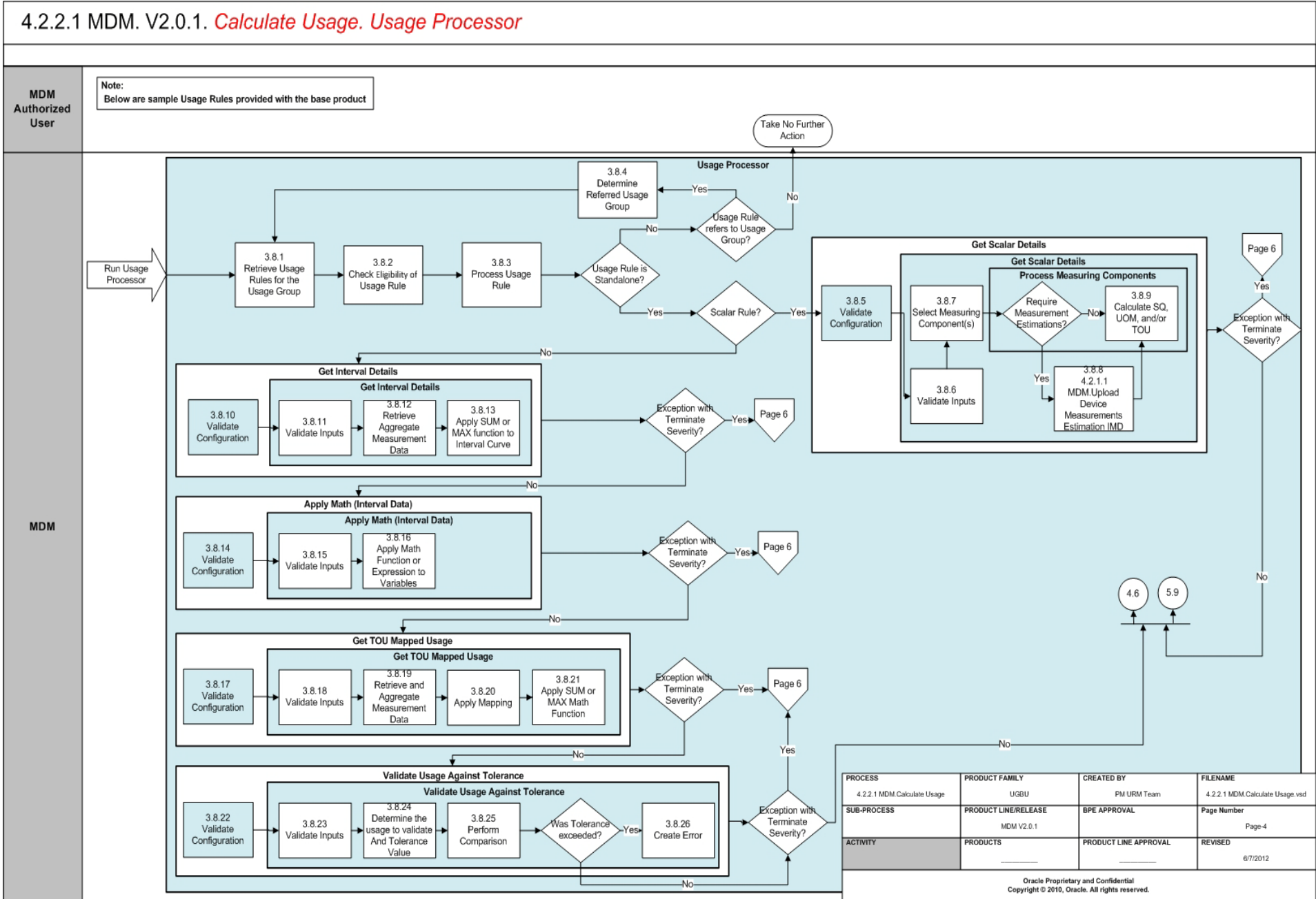
# MDM Calculate Usage Page 2



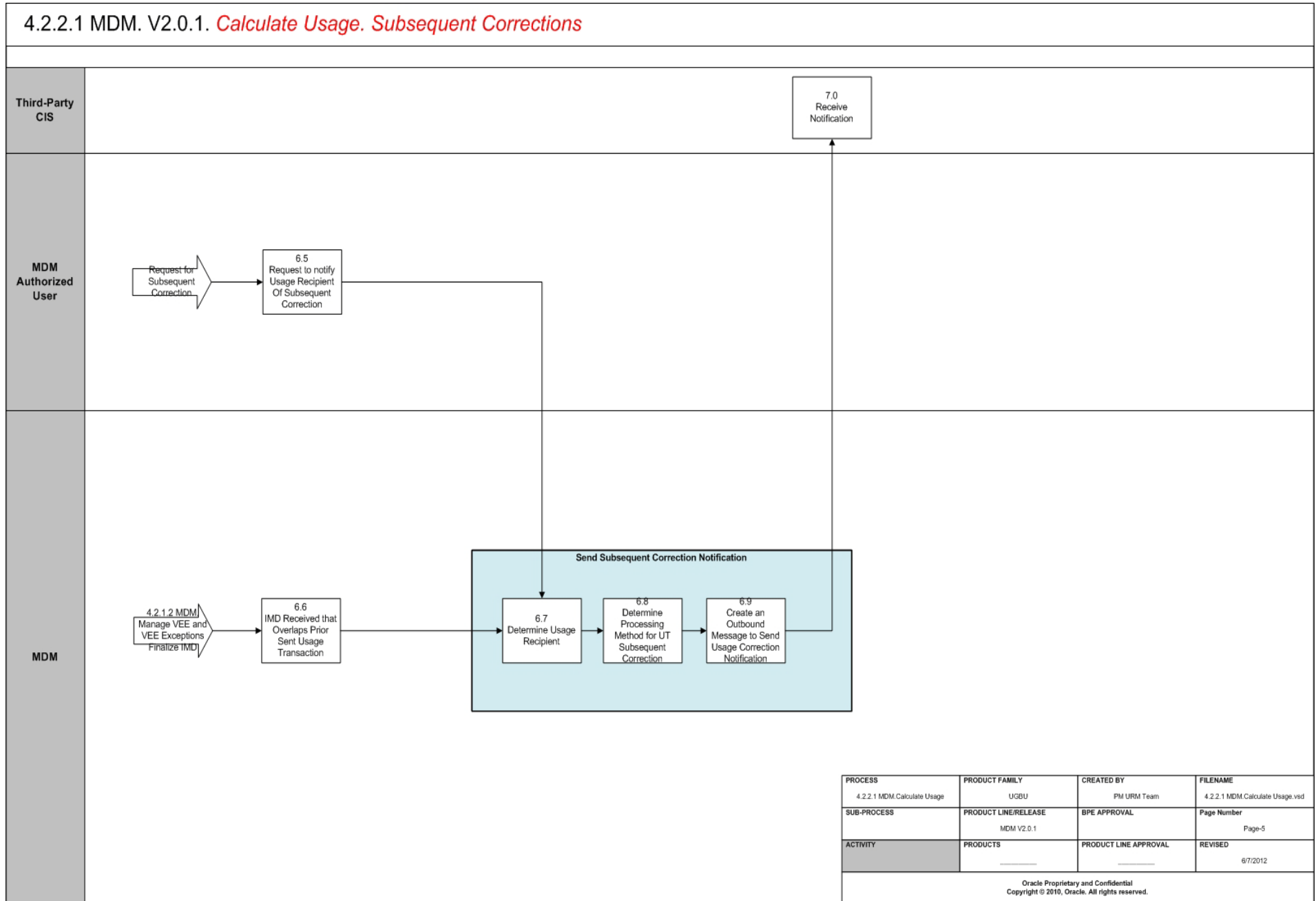
# MDM Calculate Usage Page 3



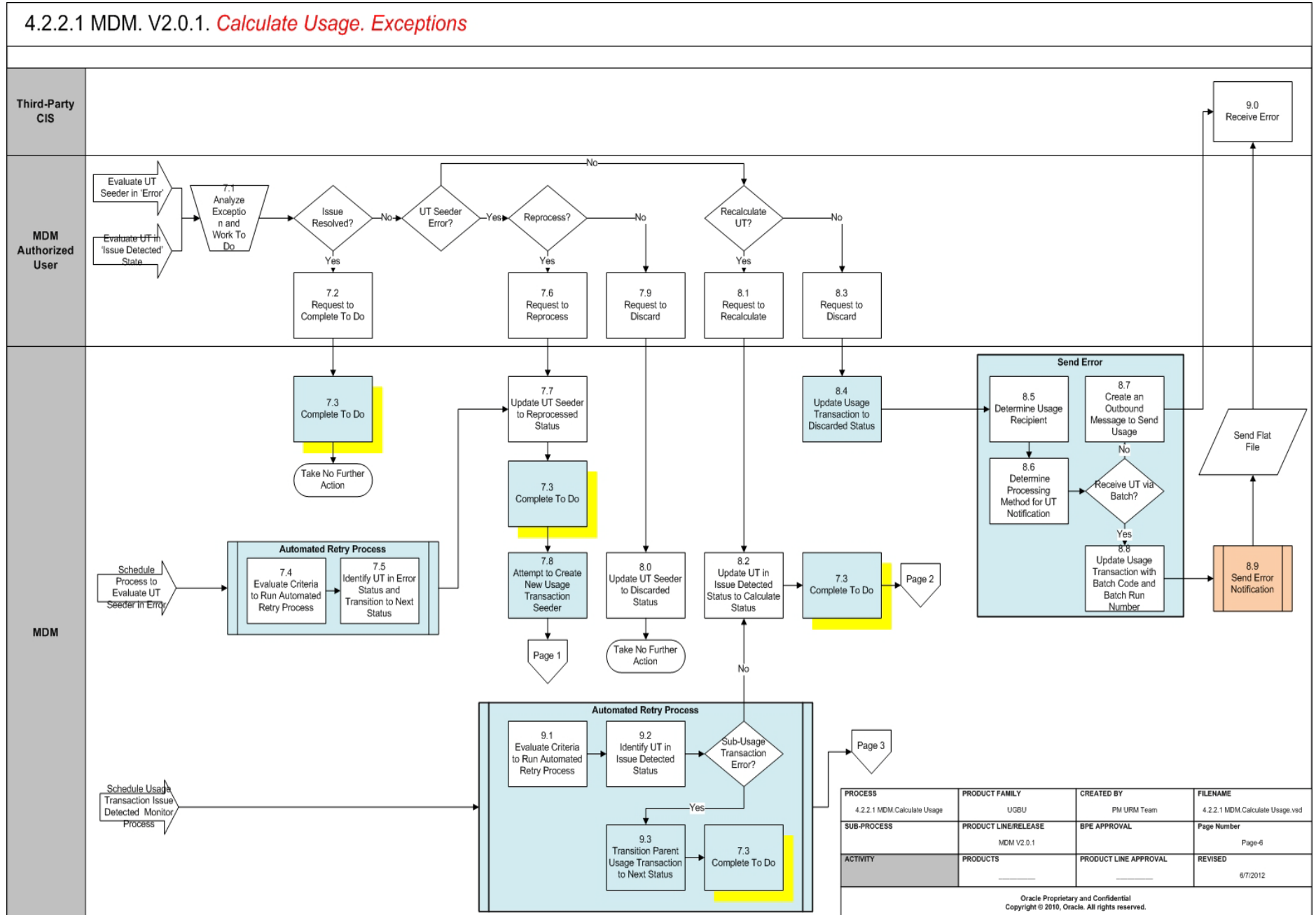
# MDM Calculate Usage Page 4



# MDM Calculate Usage Page 5



MDM Calculate Usage Page 6



## MDM Calculate Usage Description

This section includes detailed descriptions of the steps involved in the MDM Calculate Usage business process, including:

- 1.0 Determine Usage Subscription (US) ID or External ID
- 1.1 Populate Required Fields and Usage Periods
- 1.2 Request to Add Usage Transaction
- 1.3 Receive Usage Transaction Request
- 1.4 Determine Usage Subscription ID
- 1.5 Determine Processing Method via Usage Recipient
- 1.6 Analyze Error Determine Error(s) Via Validation(s)
- 1.7 Create UT Seeder in "Error"
- 1.8 Determine Usage Transaction Period
- 1.9 Create To Do
- 2.0 Select Measurement Cycles for a Specific Date
- 2.1 Create Measurement Cycle Schedule Route in 'Pending' Status
- 2.2 Evaluate SP Measurement Cycle Schedule Route
- 2.3 Create SP/Measurement Cycle Schedule Route in Pending Status
- 2.4 Identify SP/Measurement Cycle Schedule Route in Pending and Update to Complete state
- 2.5 Check if Device installed in SP(s)
- 2.6 Determine Usage Subscription(s) linked to the SP
- 2.7 Determine Processing Method via Usage Recipient
- 2.8 Check if UT exists
- 2.9 Create Error
- 3.0 Create UT in "Pending" State
- 3.1 Update UT to 'Calculate' State
- 3.2 Determine UT Start and End Date/Time(s)
- 3.3 Update UT to Calculation Deferred State
- 3.4 Evaluate UT in "Calculation Deferred" and Update to "Calculation" State
- 3.5 Determine the Effective Usage Group(s)
- 3.6 Build Usage Period List via Date Breaks
- 3.7 Create Sub UTs and Update Current UT to 'Calculation in Progress' State
- 3.8 Initiate Usage Processor
  - 3.8.1 Retrieve Usage Rules for the Usage Group
  - 3.8.2 Check Eligibility of Usage Rule
  - 3.8.3 Process Usage Rule
  - 3.8.4 Determine Referred Usage Group
  - 3.8.5 Validate Configuration
  - 3.8.6 Validate Inputs

- 3.8.7 Select Measuring Component(s)
- 3.8.8 4.2.1.1 MDM.Upload Device Measurements Estimation IMD
- 3.8.9 Calculate SQ, UOM, and/or TOU
- 3.8.10 Validate Configuration
- 3.8.11 Validate Inputs
- 3.8.12 Retrieve Aggregate Measurement Data
- 3.8.13 Apply SUM or MAX function to Interval Curve
- 3.8.14 Validate Configuration
- 3.8.15 Validate Inputs
- 3.8.16 Apply Math Function or Expression to Variables
- 3.8.17 Validate Configuration
- 3.8.18 Validate Inputs
- 3.8.19 Retrieve and Aggregate Measurement Data
- 3.8.20 Apply Mapping
- 3.8.21 Apply SUM or MAX Math Function
- 3.8.22 Validate Configuration
- 3.8.23 Validate Inputs
- 3.8.24 Determine the usage to validate and Tolerance Value
- 3.8.25 Perform Comparison
- 3.8.26 Create Error
- 3.9 Update UT to "Issue Detected" State
- 4.0 Create To Do
- 4.1 Create Approval To Do
- 4.2 Analyze To Do and Evaluate Usage
- 4.3 Request to Recalculate Usage
- 4.4 Request to Approve Usage
- 4.5 Update UT to "Approved" state
- 4.6 Update UT to "Sent" Status
- 4.7 Determine Usage Recipient
- 4.8 Determine Processing Method for UT Notification
- 4.9 Create an Outbound Message to Send Usage
- 5.0 Update Usage Transaction with Batch Code and Batch Run Number
- 5.1 Process and Send Usage Transaction
- 5.2 Receive Usage
- 5.3 Create Sub-UT in Pending State
- 5.4 Update Sub-UT to Calculate State
- 5.5 Determine UT Start and End Date/Time(s)
- 5.6 Build Usage Period List



- 5.7 Update UT to Issue Detected State
- 5.8 Create To Do
- 5.9 Update Sub-UT to Calculated State
- 6.0 Execute the Monitor Algorithm(s) of Parent UT's Current Status
- 6.1 Update Usage Transaction to Discarded State
- 6.2 Copy Sub UT Usage Calculations to the UT
- 6.3 Create Approval To Do
- 6.4 Update UT to Sent Status
- 6.5 Request to notify Usage Recipient Of Subsequent Correction
- 6.6 IMD Received that Overlaps Prior Sent Usage Transaction
- 6.7 Determine Usage Recipient
- 6.8 Determine Processing Method for UT Subsequent Correction
- 6.9 Create an Outbound Message to Send Usage Correction Notification
- 7.0 Receive Notification
- 7.1 Analyze Exception and Work To Do
- 7.2 Request to Complete To Do
- 7.3 Complete To Do
- 7.4 Evaluate Criteria to Run Automated Retry Process
- 7.5 Identify UT in Error Status and Transition to Next Status
- 7.6 Request to Reprocess
- 7.7 Update UT Seeder to Reprocessed Status
- 7.8 Attempt to Create New Usage Transaction Seeder
- 7.9 Request to Discard
- 8.0 Update UT Seeder to Discarded Status
- 8.1 Request to Recalculate
- 8.2 Update UT in Issue Detected Status to Calculate Status
- 8.3 Request to Discard
- 8.4 Update Usage Transaction to Discarded Status
- 8.5 Determine Usage Recipient
- 8.6 Determine Processing Method for UT Notification
- 8.7 Create an Outbound Message to Send Usage
- 8.8 Update Usage Transaction with Batch Code and Batch Run Number
- 8.9 Send Error Notification
- 9.0 Receive Error
- 9.1 Evaluate Criteria to Run Automated Retry Process
- 9.2 Identify UT in Issue Detected Status
- 9.3 Transition Parent Usage Transaction to Next Status

## 1.0 Determine Usage Subscription (US) ID or External ID

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** To create a usage transaction, the user selects a usage subscription.

---

### Entities to Configure

---

Usage Subscription

---

## 1.1 Populate Required Fields and Usage Periods

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** The user populates details about the usage calculation period for interval and/or scalar readings, and options on how the usage transaction should be processed including "Defer Calculation" and "Automatic Retry".

## 1.2 Request to Add Usage Transaction

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** Once the user has input all required parameters it is possible to add the usage transaction request.

## 1.3 Receive Usage Transaction Request

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The MDM application is often integrated with Third-Party systems that will make ad-hoc usage transaction requests for a specific usage periods. An XAI inbound interface is provided to receive and start the processing of these requests (D2-UsageTransactionRequestInbound). The request should include either the MDM Usage Subscription ID or the Third-Party External Usage Subscription ID, as well as the dates of the period for which the usage transaction should be calculated.

## 1.4 Determine Usage Subscription ID

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** Usage Transaction Preprocessing (Seeder)

**Actor/Role:** MDM

**Description:** Once a usage transaction request is received either from an external system or directly entered by the user, the MDM application determines the Usage Subscription ID based on provided External Usage Subscription ID.

| Business Objects | Available Algorithms |
|------------------|----------------------|
| D2-UsgTranSeeder | D2-DETUSID           |

## 1.5 Determine Processing Method via Usage Recipient

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** Usage Transaction Preprocessing (Seeder)

**Actor/Role:** MDM

**Description:** Once the Usage Subscription ID is known, the usage recipient (i.e., service provider) is either determined directly from the usage subscription or the usage subscription type by the Determine Usage Transactions BO. The usage recipient specifies the various processing methods that define the interactions with the usage recipient. The specific processing method of interest here is the "Usage Transaction Creation" processing role, which identifies the business object to be used to create the usage transaction.

| Entities to Configure   |  |
|-------------------------|--|
| Usage Subscription      |  |
| Usage Subscription Type |  |
| Service Provider        |  |
| Processing Method       |  |

| Business Objects | Available Algorithms |
|------------------|----------------------|
| D2-UsgTranSeeder | D2-DETUTBO           |

## 1.6 Analyze Error Determine Error(s) Via Validation(s)

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** Usage Transaction Preprocessing (Seeder)

**Actor/Role:** MDM

**Description:** If the process method to create usage transaction cannot be determined, then validation algorithms are used to determine the error(s). The validation checks usage subscription and dates provided for the interval and scalar periods are valid.

| Business Objects | Available Algorithms         |
|------------------|------------------------------|
| D2-UsgTranSeeder | D2-UTSEEDVAL<br>D2-INSCP-VAL |

## 1.7 Create UT Seeder in "Error"

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** Usage Transaction Preprocessing (Seeder)

**Actor/Role:** MDM

**Description:** The Usage Transaction Seeder creates a record in an error state.

---

### Business Objects

---

D2-UsgTranSeeder

---

## 1.8 Determine Usage Transaction Period

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** Usage Transaction Preprocessing (Seeder)

**Actor/Role:** MDM

**Description:** When entering the Error status, the start and end dates/times of the Usage Transaction request are determined by using the earliest start date and the latest stop date.

---

### Business Objects

---

D2-UsgTranSeeder

---



---

### Available Algorithms

---

D2-DET-UTDT

---

## 1.9 Create To Do

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** Usage Transaction Preprocessing (Seeder)

**Actor/Role:** MDM

**Description:** When entering the Error status, a To Do is created to inform the user of detected errors.

---

### Entities to Configure

---

To Do Type

To Do Role

---



---

### Business Objects

---

D2-UsgTranSeeder

---



---

### Available Algorithms

---

D2-UTSE-TODO

---

## 2.0 Select Measurement Cycles for a Specific Date

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The Create Measurement Cycle Schedule Route background process kicks off activities that automatically create usage transactions that pushes data to usage recipients on a schedule. Measurement cycle route(s) not previously generated and have a scheduled selection date on or before the business date are selected.

---

### Customizable process

---

D1-CMCS

---



---

### Entities to Configure

---

Measurement Cycle Route

Measurement Cycle Schedule

---



---

### Business Objects

---

D1-MeasurementCycleSchedule

---

## 2.1 Create Measurement Cycle Schedule Route in 'Pending' Status

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** For the measurement cycle route(s) that are ready for processing, a measurement cycle schedule route entry is created in a status of pending.

---

### Customizable process

---

D1-CMCS

---



---

### Business Objects

---

D1-MeasurementCycleSchedule

D1-SPMrmtCycScheduleRoute

---

## 2.2 Evaluate SP Measurement Cycle Schedule Route

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** SP - Measurement Cycle Schedule Route

**Actor/Role:** MDM

**Description:** The process selects measurement cycle schedule route(s) are on or before the specified business date and are in a pending status.

---

**Customizable process**

D1-CSPSR

---



---

**Business Objects**

D1-SPMrmtCycScheduleRoute

---

## 2.3 Create SP/Measurement Cycle Schedule Route in Pending Status

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** SP - Measurement Cycle Schedule Route

**Actor/Role:** MDM

**Description:** All service points that are associated with a measurement cycle and measuring cycle route where a measurement cycle schedule route record exists that is ready for processing will have a service point measurement cycle schedule route record created in a pending status.

---

**Customizable process**

D1-CSPSR

---



---

**Business Objects**

D1-SPMrmtCycScheduleRoute

---

## 2.4 Identify SP/Measurement Cycle Schedule Route in Pending and Update to Complete state

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** SP - Measurement Cycle Schedule Route

**Actor/Role:** MDM

**Description:** A batch process transitions the SP / Measurement Cycle Schedule Route BO from "Pending" to "Complete" status. NOTE: The application provides the "Create Usage Transaction" algorithm to create the usage transaction which would be plugged into entry of the "Complete" status, however the application is not delivered with this algorithm plugged-in.

---

**Customizable process**


---

D1-PSPSR

---

**Business Objects**


---

D1-SPMsrmtCycScheduleRoute

## 2.5 Check if Device installed in SP(s)

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** SP - Measurement Cycle Schedule Route

**Actor/Role:** MDM

**Description:** Verify that a device is currently installed at the service point.

---

**Entities to Configure**


---

Service Point

Device

Device Configuration

Install Event

---

**Business Objects**


---

D1-SPMsrmtCycScheduleRoute

---

**Available Algorithms**


---

D2-CRUSGTRN

## 2.6 Determine Usage Subscription(s) linked to the SP

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** SP - Measurement Cycle Schedule Route

**Actor/Role:** MDM

**Description:** Retrieve the usage subscription that is linked to the service point with a device installed. The usage subscription's start date must be on or before the scheduled work date of the input measurement cycle schedule.

---

**Entities to Configure**


---

Service Point

Usage Subscription

| Business Objects          | Available Algorithms |
|---------------------------|----------------------|
| D1-SPMrmtCycScheduleRoute | D2-CRUSGTRN          |

## 2.7 Determine Processing Method via Usage Recipient

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** SP - Measurement Cycle Schedule Route

**Actor/Role:** MDM

**Description:** Find the usage recipient (i.e., service provider) associated with the usage subscription and then determine the Processing Method BO associated with the "Usage Transaction Creation" processing role.

| Entities to Configure |
|-----------------------|
| Service Point         |
| Usage Subscription    |
| Service Provider      |

| Business Objects          | Available Algorithms |
|---------------------------|----------------------|
| D1-SPMrmtCycScheduleRoute | D2-CRUSGTRN          |

## 2.8 Check if UT exists

See **MDM Calculate Usage Page 1** on page 2-2 for the business process diagram associated with this activity.

**Group:** SP - Measurement Cycle Schedule Route

**Actor/Role:** MDM

**Description:** If a usage transaction for the same usage subscription, Start Date/Time, and End Date/Time already exists then do not create a new record.

| Business Objects          | Available Algorithms |
|---------------------------|----------------------|
| D1-SPMrmtCycScheduleRoute | D2-CRUSGTRN          |

## 2.9 Create Error

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Group:** SP - Measurement Cycle Schedule Route

**Actor/Role:** MDM



**Description:** If a processing method BO cannot be determined then an error will be generated.

| Business Objects           | Available Algorithms |
|----------------------------|----------------------|
| D1-SPMsrmtCycScheduleRoute | D2-CRUSGTRN          |

### 3.0 Create UT in “Pending” State

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** A usage transaction is created in status of pending. The application monitors for Usage transactions with the pending status, and depending on the defer calculation flag determines whether to proceed directly to the calculation or to defer the calculation to a scheduled background processes.

| Business Objects           | Available Algorithms |
|----------------------------|----------------------|
| D1-SPMsrmtCycScheduleRoute | D2-TNORBATCH         |

### 3.1 Update UT to 'Calculate' State

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** If the usage transaction is not flagged as "Defer Calculation", then the status will be immediately transitioned to the "Calculate" status. Upon entering this status, the Calculate Usage algorithm will proceed with performing the necessary calculations. Upon completion of the calculations, a check will be made to look for exceptions with severity of "issue" or "terminate", and if found stop processing. Otherwise, the usage subscription will be check to find if an approval is required. The usage transaction will then be transitioned to the next status.

| Business Objects               | Available Algorithms |
|--------------------------------|----------------------|
| D2-UsageTransaction            | D2-CALCUSG           |
| D2-UsqTranProUsqSub            | D2-TR-AF-CAL         |
| D2-UsageSubscriptionParentLITE | F1-AT-RQJ            |

### 3.2 Determine UT Start and End Date/Time(s)

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The usage transactions start and end Date/Time(s) are calculated from the earliest scalar or interval start and the latest scalar or interval end date/time.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-CALCUSG           |

### 3.3 Update UT to Calculation Deferred State

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** If the usage transaction is flagged as defer calculation, then the status will be transitioned to "Calculation Deferred." The start and end date/time will be determined.

| Business Objects    | Available Algorithms     |
|---------------------|--------------------------|
| D2-UsageTransaction | D2-DET-UTDT<br>F1-AT-RQJ |

### 3.4 Evaluate UT in "Calculation Deferred" and Update to "Calculation" State

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The "Usage Transaction Calculate Defer Monitor" background batch process will run at scheduled intervals and transitions the usage transaction state to "Calculate" to continue processing.

| Customizable process |
|----------------------|
| D2-UTCD              |

| Business Objects    |
|---------------------|
| D2-UsageTransaction |

### 3.5 Determine the Effective Usage Group(s)

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The Usage Group in effect at the start of the usage period is determined by first checking the usage subscription. If an effective usage group is not found, then the usage subscription type is checked. If no effective user group is identified, then the usage transaction will be set to an "Issue Detected" state and a "To Do" is created. Additionally, it is possible to have multiple usage groups in effect during a usage period. In the situation where the prorate flag is set to "yes" and there is two separate usage groups that apply to different portions of the usage period, then a sub-usage transactions will need to be created for each usage group.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-CALCUSG           |

### 3.6 Build Usage Period List via Date Breaks

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The usage transaction specifies a start and stop date for which usage should be calculated. However, date breaks can also be used to subdivide the usage transaction period into smaller periods.

**Note:** This is important when a rate change occurs during a billing cycle.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-CALCUSG           |

### 3.7 Create Sub UTs and Update Current UT to 'Calculation in Progress' State

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** When multiple usage groups are in effect during the usage transaction calculation period, a sub usage transaction will be created for each usage group. The status of the "parent" usage transaction will be transitioned to "Calculation in Progress" status.

| Business Objects                              | Available Algorithms |
|---|----------------------|
| D2-UsageTransaction<br>D2-SubUsageTransaction | D2-CALCUSG           |

### 3.8 Initiate Usage Processor

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The usage rules for a usage group will be applied separately to each usage period. To calculate the usage rules for a usage period, the application calls the Apply Usage Rules (D2-GetUsgGrp) which invokes the Usage Processor (D1-UsageProcessor) business service. The Usage Processor then determines the rules that belong to a specified usage rule category (optional). If no usage rule category is specified, then all the rules for the usage group are considered for execution. The rules executed can also be limited by assigning eligibility criteria to conditionally apply the rule, which provides flexibility in accommodating nonstandard business rules.

---

**Business Services**


---

D1-UsageProcessor

---

**Business Objects**


---

D2-UsageTransaction

---

**Available Algorithms**


---

D2-CALCUSG

### 3.8.1 Retrieve Usage Rules for the Usage Group

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** Retrieve the usage rules associated with the usage group.

---

**Business Services**


---

D1-UsageProcessor

---

**Business Objects**


---

D1-UsageGroup

D1-GenericUsageRule

### 3.8.2 Check Eligibility of Usage Rule

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** Optionally, a usage rule may be assigned eligibility criteria that controls the rule's application. This enables a single usage group to be flexible in accommodating nonstandard business rules by conditionally applying each usage rules. For example, special business rules could apply to premises with solar panels. If a rule is determined to be ineligibility, processing will move on the next rule.

---

**Business Services**


---

D1-UsageProcessor

---

**Business Objects**


---

D1-GenericUsageRule

### 3.8.3 Process Usage Rule

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** A usage rule can either be stand alone or refer to another usage group.

---

#### Business Services

---

D1-UsageProcessor

---



---

#### Business Objects

---

D1-GenericUsageRule

---

### 3.8.4 Determine Referred Usage Group

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** When a usage rule refers to another usage group, the rules within the new group will need to be retrieved and checked for eligibility.

---

#### Business Services

---

D1-UsageProcessor

---



---

#### Business Objects

---

D1-UsageGroup

---

### 3.8.5 Validate Configuration

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get Scalar Details

**Actor/Role:** MDM

**Description:** Validate that each of the scalar details to be calculated specifies either a UOM, TOU, or SQL.

---

#### Business Objects

---

D2-GetScalar  
D1-GenericUsageRule

---



---

#### Available Algorithms

---

D2-ValScalar

---

### 3.8.6 Validate Inputs

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get Scalar Details

**Actor/Role:** MDM

**Description:** Validate that the scalar measuring component Start Time/Date and Stop Time/Date are populated and that the Stop is greater than or equal to the Start. Additionally the estimation range dates are validated.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-GetScalar        | D2-GETSCALAR         |
| D1-GenericUsageRule |                      |

### 3.8.7 Select Measuring Component(s)

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get Scalar Details

**Actor/Role:** MDM

**Description:** The Usage rule definition can specify a listing of measuring components to calculate usage; if nothing is specified in the usage rule then all the measuring components defined in the measuring component type will be calculated.

| Entities to Configure    |
|--------------------------|
| Measuring Component Type |

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-GetScalar        | D2-GETSCALAR         |
| D1-GenericUsageRule |                      |

### 3.8.8 4.2.1.1 MDM.Upload Device Measurements Estimation IMD

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get Scalar Details

**Actor/Role:** MDM

**Description:** If estimation is allowed and the current date is on or after the specified date at which estimations should occur, then an initial measurement will be created.

| Business Objects  | Available Algorithms |
|---|----------------------|
| D2-GetScalar<br>D1-GenericUsageRule<br>D1-GenericAdderIMD | D2-GETSCALAR         |

### 3.8.9 Calculate SQ, UOM, and/or TOU

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get Scalar Details

**Group:** Process Measuring Components

**Actor/Role:** MDM

**Description:** Calculate each measuring component, and save results as a usage scalar detail record.

| Business Objects  | Available Algorithms |
|---|----------------------|
| D2-GetScalar<br>D1-GenericUsageRule<br><b>D2-UsageTransaction</b> | D2-GETSCALAR         |

### 3.8.10 Validate Configuration

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get Interval Details

**Actor/Role:** MDM

**Description:** Validate that at least one of UOM, TOU, or SQI is specified in the usage rule.

| Business Objects                          | Available Algorithms |
|---|----------------------|
| D2-GetIntervalData<br>D1-GenericUsageRule | D2-VALINTDAT         |

### 3.8.11 Validate Inputs

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get Interval Details

**Actor/Role:** MDM

**Description:** MDM validates input data (e.g. Start Date/Time and End Date/Time).

| Business Objects                          | Available Algorithms |
|---|----------------------|
| D2-GetIntervalData<br>D1-GenericUsageRule | D2-GETINTDAT         |

### 3.8.12 Retrieve Aggregate Measurement Data

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get Interval Details

**Actor/Role:** MDM

**Description:** Find all the service points for the given usage subscription with active device configuration at any time within the usage period. Retrieve the device configuration's measuring components and check if they are applicable for the calculation specified by the usage rule. Aggregate usage from all Service Points.

| Business Objects                          | Available Algorithms |
|---|----------------------|
| D2-GetIntervalData<br>D1-GenericUsageRule | D2-GETINTDAT         |

### 3.8.13 Apply SUM or MAX function to Interval Curve

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get Interval Details

**Actor/Role:** MDM

**Description:** Apply SUM or MAX function to the interval curves and save the results to the usage period service quantities (SQ).

| Business Objects  | Available Algorithms |
|---|----------------------|
| D2-GetIntervalData<br>D1-GenericUsageRule<br><b>D2-UsageTransaction</b> | D2-GETINTDAT         |

### 3.8.14 Validate Configuration

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Apply Math (Interval Data)

**Actor/Role:** MDM

**Description:** Validate that at least one UOM, TOU, or SQI result is populated in the usage rule. Additionally, the configuration of the calculation is validated based on calculation type.



| Business Objects                       | Available Algorithms |
|--|----------------------|
| D2-ApplyMathInt<br>D1-GenericUsageRule | D2-VALAPPMTH         |

### 3.8.15 Validate Inputs

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Apply Math (Interval Data)

**Actor/Role:** MDM

**Description:** MDM validates input data (e.g. Start Date/Time and End Date/Time).

| Business Objects                       | Available Algorithms |
|--|----------------------|
| D2-ApplyMathInt<br>D1-GenericUsageRule | D2-APPMATHIN         |

### 3.8.16 Apply Math Function or Expression to Variables

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Apply Math (Interval Data)

**Actor/Role:** MDM

**Description:** The necessary variables are computed, and then either the math function or the mathematical expression is applied in order to determine the final value. Results are saved to the usage period service quantities (SQ).

| Business Objects   | Available Algorithms |
|--|----------------------|
| D2-ApplyMathInt<br><b>D2-UsageTransaction</b><br>D1-GenericUsageRule | D2-APPMATHIN         |

### 3.8.17 Validate Configuration

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get TOU Mapped Usage

**Actor/Role:** MDM

**Description:** Validate that either UOM or SQI is populated in the usage rule.

| Business Objects                      | Available Algorithms |
|---------------------------------------|----------------------|
| D2-GetTOUUsage<br>D1-GenericUsageRule | D2-VALTOUUSG         |

### 3.8.18 Validate Inputs

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get TOU Mapped Usage

**Actor/Role:** MDM

**Description:** MDM validates input data (e.g. Start Date/Time and End Date/Time).

| Business Objects                      | Available Algorithms |
|---------------------------------------|----------------------|
| D2-GetTOUUsage<br>D1-GenericUsageRule | D2-GETTOUUSG         |

### 3.8.19 Retrieve and Aggregate Measurement Data

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get TOU Mapped Usage

**Actor/Role:** MDM

**Description:** Find all the service points for the given usage subscription with active device configuration at any time within the usage period. Retrieve the Device configuration's measuring components and check if they are applicable for the calculation specified by the usage rule. Aggregate usage from all service points.

| Business Objects                      | Available Algorithms |
|---------------------------------------|----------------------|
| D2-GetTOUUsage<br>D1-GenericUsageRule | D2-GETTOUUSG         |

### 3.8.20 Apply Mapping

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get TOU Mapped Usage

**Actor/Role:** MDM

**Description:** Apply the TOU mapping to the interval curve.

| Business Objects                      | Available Algorithms |
|---------------------------------------|----------------------|
| D2-GetTOUUsage<br>D1-GenericUsageRule | D2-GETTOUUSG         |

### 3.8.21 Apply SUM or MAX Math Function

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Get TOU Mapped Usage

**Actor/Role:** MDM

**Description:** Apply either the SUM or MAX to values within a TOU period. Results are saved to the usage period service quantities (SQ).

| Business Objects  | Available Algorithms |
|---|----------------------|
| D2-GetTOUUsage<br><b>D2-UsageTransaction</b><br>D1-GenericUsageRule | D2-GETTOUUSG         |

### 3.8.22 Validate Configuration

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Validate Usage Against Tolerance

**Actor/Role:** MDM

**Description:** Validate that the usage rule specifies at least one valid UOM, TOU, or SQI. Also, either the tolerance value or factor must be populated.

| Business Objects                        | Available Algorithms |
|---|----------------------|
| D2-ValAgainstTol<br>D1-GenericUsageRule | D2-VALTOL            |

### 3.8.23 Validate Inputs

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Validate Usage Against Tolerance

**Actor/Role:** MDM

**Description:** Validate that the usage transaction period end date is greater than or equal to the start date.

| Business Objects                        | Available Algorithms |
|---|----------------------|
| D2-ValAgainstTol<br>D1-GenericUsageRule | D2-VALUSGTOL         |

### 3.8.24 Determine the usage to validate and Tolerance Value

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Validate Usage Against Tolerance

**Actor/Role:** MDM

**Description:** For each service quantity calculated for the usage transaction period, apply the validation set function to find either the SUM, MAX, or MIN of the service quantities. The tolerance value can either be a specific value or defined via a Factor.

| Business Objects                        | Available Algorithms |
|---|----------------------|
| D2-ValAgainstTol<br>D1-GenericUsageRule | D2-VALUSGTOL         |

### 3.8.25 Perform Comparison

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Validate Usage Against Tolerance

**Actor/Role:** MDM

**Description:** Compare the tolerance value to the usage value.

| Business Objects                        | Available Algorithms |
|---|----------------------|
| D2-ValAgainstTol<br>D1-GenericUsageRule | D2-VALUSGTOL         |

### 3.8.26 Create Error

See **MDM Calculate Usage Page 4** on page 2-5 for the business process diagram associated with this activity.

**Group:** Validate Usage Against Tolerance

**Actor/Role:** MDM

**Description:** An exception is issued with a specified severity level.

| Business Objects                        | Available Algorithms |
|---|----------------------|
| D2-ValAgainstTol<br>D1-GenericUsageRule | D2-VALUSGTOL         |

### 3.9 Update UT to "Issue Detected" State

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** While the Usage Transaction is in a calculate status, during the execution of a usage rules, the Transition After Calculation algorithm monitors for exceptions with severity of "Issue" or "Terminate." If such an exception occurs, then the usage transaction transitions to the "Issue Detected" status.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-CK-UG-APR         |

### 4.0 Create To Do

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** When the usage transaction enters the "Issue Detected" status a To Do will be opened.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-UTIS-TODO         |

### 4.1 Create Approval To Do

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** After successful completion of the usage rule calculations, the "Transition After Calculation" algorithm will update the status to "Approval in Progress" if the usage subscription indicates that approval is required. Upon entering the "Approval in Progress" status, the application will open a To Do with the "Usage Transaction Requiring Approval" description. The Usage Transaction will then wait for the users review.

---

**Entities to Configure**


---

To Do Type

To Do Role

---

**Business Objects**


---

**D2-UsageTransaction**

D2-UsgTranProUsgSub

D2-UsageSubscriptionParentLITE

---

**Available Algorithms**


---

D2-CK-UG-APR

D2-UTAP-TODO

## 4.2 Analyze To Do and Evaluate Usage

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** The authorized user will review the calculated values and determine whether to provide approval or to recalculate the result.

---

**Business Objects**


---

D2-UsageTransaction

## 4.3 Request to Recalculate Usage

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** An authorized user may wish to recalculate the usage transaction if new data has been received or if edits were made to the existing data. By selecting recalculate, the usage transaction will go back to the "Calculate" status.

---

**Business Objects**


---

D2-UsageTransaction

## 4.4 Request to Approve Usage

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** An authorized user can request that the usage transaction is approved so that downstream processing can continue.

| Business Objects    |
|---------------------|
| D2-UsageTransaction |

## 4.5 Update UT to "Approved" state

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** Once an authorized user has provided approval, the status of the usage transaction will be updated to "Approve." The application will monitor for Usage Transactions in the "Approve" status and automatically transition them to the next status of "Sent."

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | F1-AT-RQ             |

## 4.6 Update UT to "Sent" Status

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** The final status in the normal lifecycle is "Sent." When a usage transaction enters this status the Send Usage algorithm will be triggered to send the results to the usage recipient. While in this status, the user has the ability to change the status to "Subsequent Correction".

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-SEND-USG          |

## 4.7 Determine Usage Recipient

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** The service provider (i.e., usage recipient) is determined from the usage subscription or usage subscription type.

---

**Entities to Configure**


---

Usage Subscription  
Usage Subscription Type  
Service Provider

---



---

**Business Objects**
**Available Algorithms**


---

**D2-UsageTransaction**  
D2-UsgTranProUsgSub  
D2-UsgTranProSubTyp

---

D2-SEND-USG

## 4.8 Determine Processing Method for UT Notification

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** The service providers "Processing Methods" can include both a "batch" and "online" notification methods. The method used is set by the "Request Mode" parameter of the usage transaction schema.

---

**Business Objects**
**Available Algorithms**


---

**D2-UsageTransaction**

---

D2-SEND-USG

---

**Business Services**


---

D1-DetermineServiceProviders

---

## 4.9 Create an Outbound Message to Send Usage

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** An outbound Message is created and immediately sent to the usage recipient.

---

**Business Objects**
**Available Algorithms**


---

**D2-UsageTransaction**  
D2-UsageTranOutboundMesg

---

D2-SEND-USG



## 5.0 Update Usage Transaction with Batch Code and Batch Run Number

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** If the processing method is "batch, then the usage transaction will be updated with the batch code and run number. This data is returned from the Determine Service Providers Business Service which is called by the "Send Usage" algorithm. This will enable users to determine if the usage transaction has actually been sent.

| Business Objects                                | Available Algorithms |
|---|----------------------|
| D2-UsageTransaction<br>D2-UsageTranOutboundMesg | D2-SEND-USG          |

## 5.1 Process and Send Usage Transaction

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** MDM completes the usage transaction by sending the information to the service provider.

## 5.2 Receive Usage

See **MDM Calculate Usage Page 2** on page 2-3 for the business process diagram associated with this activity.

**Actor/Role:** Third-Party CIS

**Description:** A file containing the requested data is received.

## 5.3 Create Sub-UT in Pending State

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Sub-Usage Transaction

**Actor/Role:** MDM

**Description:** The sub usage transaction created in a status of "Pending".

| Business Objects       |
|------------------------|
| D2-SubUsageTransaction |

## 5.4 Update Sub-UT to Calculate State

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Sub-Usage Transaction

**Actor/Role:** MDM

**Description:** The application monitors for sub usage transactions with the "Pending" status, and promotes them to the "Calculate" status.

| Business Objects       | Available Algorithms |
|------------------------|----------------------|
| D2-SubUsageTransaction | F1-AT-RQJ            |

## 5.5 Determine UT Start and End Date/Time(s)

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Sub-Usage Transaction

**Group:** Calculate Usage (Sub-Usage Transaction)

**Actor/Role:** MDM

**Description:** From the scalar and interval start and stop date/time specified in the sub usage transaction, the earliest start time and latest stop time is determined.s.

| Business Objects       | Available Algorithms |
|------------------------|----------------------|
| D2-SubUsageTransaction | D2-CALUSGSUB         |

## 5.6 Build Usage Period List

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Sub-Usage Transaction

**Group:** Calculate Usage (Sub-Usage Transaction)

**Actor/Role:** MDM

**Description:** If date brakes are not populated then use the sub usage transaction start and stop date/times as the period. Otherwise, use the date brakes to split the sub usage transaction period into multiple calculation periods.

| Business Objects       | Available Algorithms |
|------------------------|----------------------|
| D2-SubUsageTransaction | D2-CALUSGSUB         |

## 5.7 Update UT to Issue Detected State

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Sub-Usage Transaction

**Actor/Role:** MDM

**Description:** The Transition After Calculation (Sub Usage Transaction) algorithm monitors for exceptions with severity issue or terminate. If such an exception occurs, then the sub usage transaction transitions to an issue detected status.

| Business Objects       | Available Algorithms |
|------------------------|----------------------|
| D2-SubUsageTransaction | D2-TNAFCALCH         |

## 5.8 Create To Do

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Sub-Usage Transaction

**Actor/Role:** MDM

**Description:** When the usage transaction enters the issue detected status, a To Do will be opened.

| Entities to Configure |
|-----------------------|
| To Do Type            |
| To Do Role            |

| Business Objects       | Available Algorithms |
|------------------------|----------------------|
| D2-SubUsageTransaction | D2-UTIS-TODO         |

## 5.9 Update Sub-UT to Calculated State

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Sub-Usage Transaction

**Actor/Role:** MDM

**Description:** While the Sub Usage Transaction is in a "Calculate" status, performing Usage Rules execution, the Transition After Calculation (Sub Usage Transaction) algorithm monitors for exceptions. If no exception occurs, then the Sub Usage Transaction transitions to a "Calculated" status.

| Business Objects       | Available Algorithms |
|------------------------|----------------------|
| D2-SubUsageTransaction | D2-TNAFCALCH         |

## 6.0 Execute the Monitor Algorithm(s) of Parent UT's Current Status

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Sub-Usage Transaction

**Actor/Role:** MDM

**Description:** When the sub usage transaction enters the "Calculated" status, the Try to Transition Parent Usage Transaction algorithm executes which requests that the monitor algorithm of the parent usage transaction, in the "Calculation in Progress" state, are executed.

| Business Objects       | Available Algorithms |
|------------------------|----------------------|
| D2-SubUsageTransaction | D2-TRNUSGPNT         |

## 6.1 Update Usage Transaction to Discarded State

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** While in the "Calculation in Progress" status, the usage transaction monitors the status of its sub usage transactions. If any of the sub usage transactions have a "Discarded" status, then the parent usage transaction will be automatically transitioned to the "Discarded" status.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-CHKSUBUT          |

## 6.2 Copy Sub UT Usage Calculations to the UT

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** While in the "Calculation in Progress" state, the usage transaction monitors the status of its sub usage transactions. If all of the sub usage transactions have a "Calculated" status, then the usage calculations for each sub usage transaction will be copied to the parent usage transaction.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-CHKSUBUT          |

## 6.3 Create Approval To Do

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** While in the "Calculation in Progress" state, the usage transaction monitors the status of its sub usage transactions. If all of the sub usage transactions have a "Calculated" status,

then the parent usage transaction is ready to transition to the next state. When the usage subscription specifies that approval is required, the usage transaction will move to the "Approval in Progress" state. Upon entering the "Approval in Progress" status, the application will open a To Do with the "Usage Transaction Requiring Approval" description. The usage transaction will then wait for the users review..

---

#### Entities to Configure

---

To Do Type

To Do Role

---

| Business Objects               | Available Algorithms |
|--------------------------------|----------------------|
| <b>D2-UsageTransaction</b>     | D2-CHKSUBUT          |
| D2-UsgTranProUsgSub            | D2-UTAP-TODO         |
| D2-UsageSubscriptionParentLITE |                      |

## 6.4 Update UT to Sent Status

See **MDM Calculate Usage Page 3** on page 2-4 for the business process diagram associated with this activity.

**Group:** Usage Transaction (Parent)

**Actor/Role:** MDM

**Description:** The usage transaction can achieve the "Sent" status in two ways. First, while in the "Calculation in Progress" state, the Usage transaction monitors the status of its sub usage transactions. If all of the sub usage transactions have a "Calculated" status, then the parent usage transaction is ready to transition to the next state. When the usage subscription specifies that approval is not required, the usage transaction will move to the "Sent" state. The second way that a Usage Transaction can achieve the "Sent" status is after the approval of the usage transaction is provided. When a usage transaction enters this status, the Send Usage algorithm will be triggered to send the results to the usage recipient.

| Business Objects           | Available Algorithms |
|----------------------------|----------------------|
| <b>D2-UsageTransaction</b> | D2-CHKSUBUT          |

## 6.5 Request to notify Usage Recipient Of Subsequent Correction

See **MDM Calculate Usage Page 5** on page 2-6 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** When the usage transaction is in send status, an authorized user has the option to send a notification of subsequent correction.

## 6.6 IMD Received that Overlaps Prior Sent Usage Transaction

See **MDM Calculate Usage Page 5** on page 2-6 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** When a IMD is received that overlaps a usage transaction that is in a "Sent" state, the status is transitioned to a "Subsequent Correction" status.

| Business Objects          | Available Algorithms                         |
|---------------------------|--|
| D1-InitialLoadIMDInterval | D1-TRAN-UT (Transition Usage Transaction(s)) |
| D1-InitialLoadIMDScalar   |  |
| D1-ManualIMDInterval      |  |
| D1-ManualIMDScalar        |  |
| D1-EstimationIMDInterval  |  |
| D1-EstimationIMDScalar    |  |

## 6.7 Determine Usage Recipient

See **MDM Calculate Usage Page 5** on page 2-6 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The Service Provider (i.e. Usage Recipient) is determined from the usage subscription or usage subscription type.

| Entities to Configure   |
|-------------------------|
| Usage Subscription      |
| Usage Subscription Type |
| Service Provider        |

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-SEND-SUBC         |
| D2-UsgTranProUsgSub |                      |
| D2-UsgTranProSubTyp |                      |

## 6.8 Determine Processing Method for UT Subsequent Correction

See **MDM Calculate Usage Page 5** on page 2-6 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The Service Providers "Processing Methods" describes how the notification of a subsequent usage correction is sent.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-SEND-USG          |

---

**Business Services**


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D1-DetermineServiceProviders

---

## 6.9 Create an Outbound Message to Send Usage Correction Notification

See **MDM Calculate Usage Page 5** on page 2-6 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** An outbound message is created and immediately sent to usage recipient.

---

**Business Objects**


---



---

**Available Algorithms**


---

**D2-UsageTransaction**

D2-SEND-USG

D2-UsageTranOutboundMesg

---

## 7.0 Receive Notification

See **MDM Calculate Usage Page 5** on page 2-6 for the business process diagram associated with this activity.

**Actor/Role:** Third-Party CIS

**Description:** The Usage Recipient receives a notification of subsequent correction.

## 7.1 Analyze Exception and Work To Do

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** The authorized user will review the issue and determine the next step

## 7.2 Request to Complete To Do

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** The authorized user will request that the To Do be completed.

## 7.3 Complete To Do

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The To Do is closed.

| Business Objects                        | Available Algorithms |
|---|----------------------|
| D2-UsageTransaction<br>D2-UsgTranSeeder | D1-GTDCBO            |

## 7.4 Evaluate Criteria to Run Automated Retry Process

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** Select the UT seeders in the error status that meet BO, status code, and batch code restrictions.

| Business Objects |
|------------------|
| D2-UsgTranSeeder |

| Customizable process |
|----------------------|
| D2-UTSED             |

## 7.5 Identify UT in Error Status and Transition to Next Status

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** Transition UT Seeder in the "Error" status to the next status.

| Business Objects |
|------------------|
| D2-UsgTranSeeder |

| Customizable process |
|----------------------|
| D2-UTSED             |

## 7.6 Request to Reprocess

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** The Authorized User determines that the UT Seeder should be Reprocessed and initiates re-processing using Usage Transaction page.



## 7.7 Update UT Seeder to Reprocessed Status

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The UT Seeder is transitioned to the "Reprocess" state.

---

### Business Objects

---

D2-UsgTranSeeder

---

## 7.8 Attempt to Create New Usage Transaction Seeder

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The Attempt to Reprocess Usage Transaction Seeder algorithm finds the "BO Instance" of the past seeder attempt, which will be the BO of the UT Seeder if a BO Processing Method could not be found. The UT Seeder then invokes a new Add UT, based on the original inputs. If the "BO Instance" of the next attempt is also the UT Seeder (i.e. still could not find a BO Processing Method), then an error will be thrown and BO of the next attempt will be rolled back and the BO of the first attempt will be transitioned back to the Error status (i.e. this is not shown in the lifecycle).

---

### Business Objects

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D2-UsgTranSeeder

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---

### Available Algorithms

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D2-CRE-UTSD

---

## 7.9 Request to Discard

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** The Authorized User requests to discard the UT Seeder.

## 8.0 Update UT Seeder to Discarded Status

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The UT Seeder is transitioned to a "Discarded" state.

---

### Business Objects

---

D2-UsgTranSeeder

---

## 8.1 Request to Recalculate

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** The Authorized User requests to recalculate the UT.

## 8.2 Update UT in Issue Detected Status to Calculate Status

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The UT is transitioned from the "Issue Detected" status to the "Calculated" state.

| Business Objects    |
|---------------------|
| D2-UsageTransaction |

## 8.3 Request to Discard

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM Authorized User

**Description:** The Authorized User determines the UT should be recalculated.

## 8.4 Update Usage Transaction to Discarded Status

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The UT is transitioned from "Issue Detected" to "Discarded" state. When a usage transaction enters this status the Send Error algorithm will be triggered to notify the usage recipient.

| Business Objects    | Available Algorithms |
|---------------------|----------------------|
| D2-UsageTransaction | D2-SEND-EROR         |

## 8.5 Determine Usage Recipient

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The Service Provider (i.e. Usage Recipient) is determined from the usage subscription or usage subscription type.

---

**Entities to Configure**


---

Usage Subscription  
Usage Subscription Type  
Service Provider

---



---

**Business Objects**


---

**Available Algorithms**

**D2-UsageTransaction**  
D2-UsageTransactionExceptions  
D2-UsgTranProUsgSub  
D2-UsgTranProSubTyp

---

D2-SEND-EROR

## 8.6 Determine Processing Method for UT Notification

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The service providers processing methods can include both a "batch" and "online" notification methods. The method used is set by the "Request Mode" parameter of the usage transaction schema.

---

**Business Service**


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D1-DetermineServiceProviders

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---

**Business Objects**


---

**Available Algorithms**

**D2-UsageTransaction**

---

D2-SEND-EROR

## 8.7 Create an Outbound Message to Send Usage

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** Outbound Message is created and immediately sent to a usage recipient.

---

**Business Objects**


---

**Available Algorithms**

**D2-UsageTransaction**  
D2-UsageTranOutboundMesg

---

D2-SEND-EROR

## 8.8 Update Usage Transaction with Batch Code and Batch Run Number

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** If the processing method is "batch" then the usage transaction will be updated with the batch code and run number returned from the Determine Service Providers business service which is called by the "Send Usage" algorithm. This will enable users to determine if the usage transaction has actually been sent.

| Business Objects                                | Available Algorithms |
|---|----------------------|
| D2-UsageTransaction<br>D2-UsageTranOutboundMesg | D2-SEND-EROR         |

## 8.9 Send Error Notification

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** MDM sends the error to the service provider.

## 9.0 Receive Error

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** Third-Party CIS

**Description:** The Service Provider receives the error file.

## 9.1 Evaluate Criteria to Run Automated Retry Process

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** Select the usage transactions in the issue detected status that meet bo, status code, and batch code restrictions.

### Customizable process

D2-UTID

### Business Objects

D2-UsageTransaction

---

## 9.2 Identify UT in Issue Detected Status

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** Transition the usage transaction in the issue detected status to the next status.

---

**Customizable process**

---

D2-UTID

---

---

**Business Objects**

---

D2-UsageTransaction

---

## 9.3 Transition Parent Usage Transaction to Next Status

See **MDM Calculate Usage Page 6** on page 2-7 for the business process diagram associated with this activity.

**Actor/Role:** MDM

**Description:** The parent usage transaction is transition to the next available status.

---

**Business Objects**

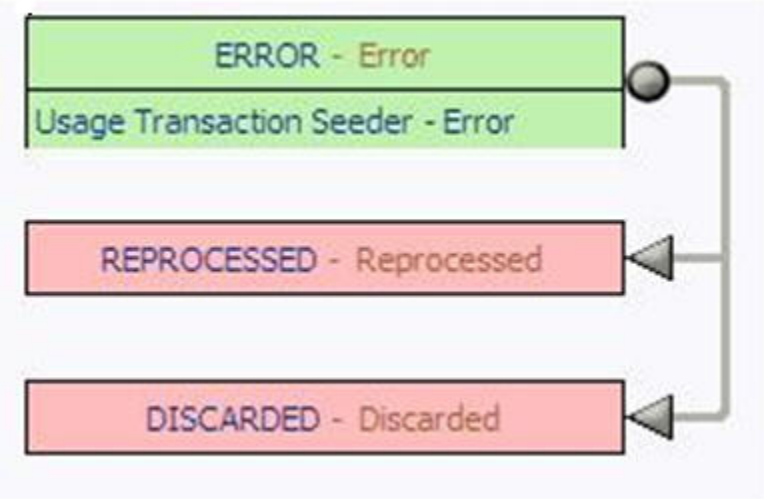
---

D2-UsageTransaction

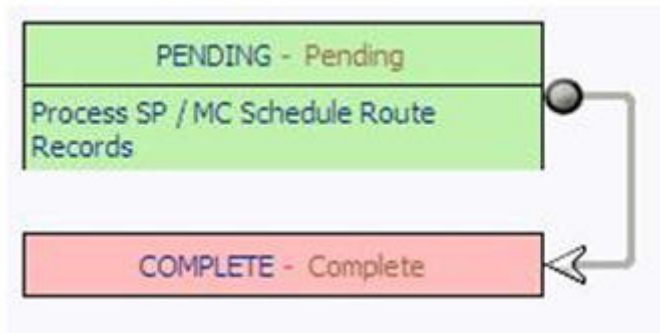
---

# Business Objects Lifecycle

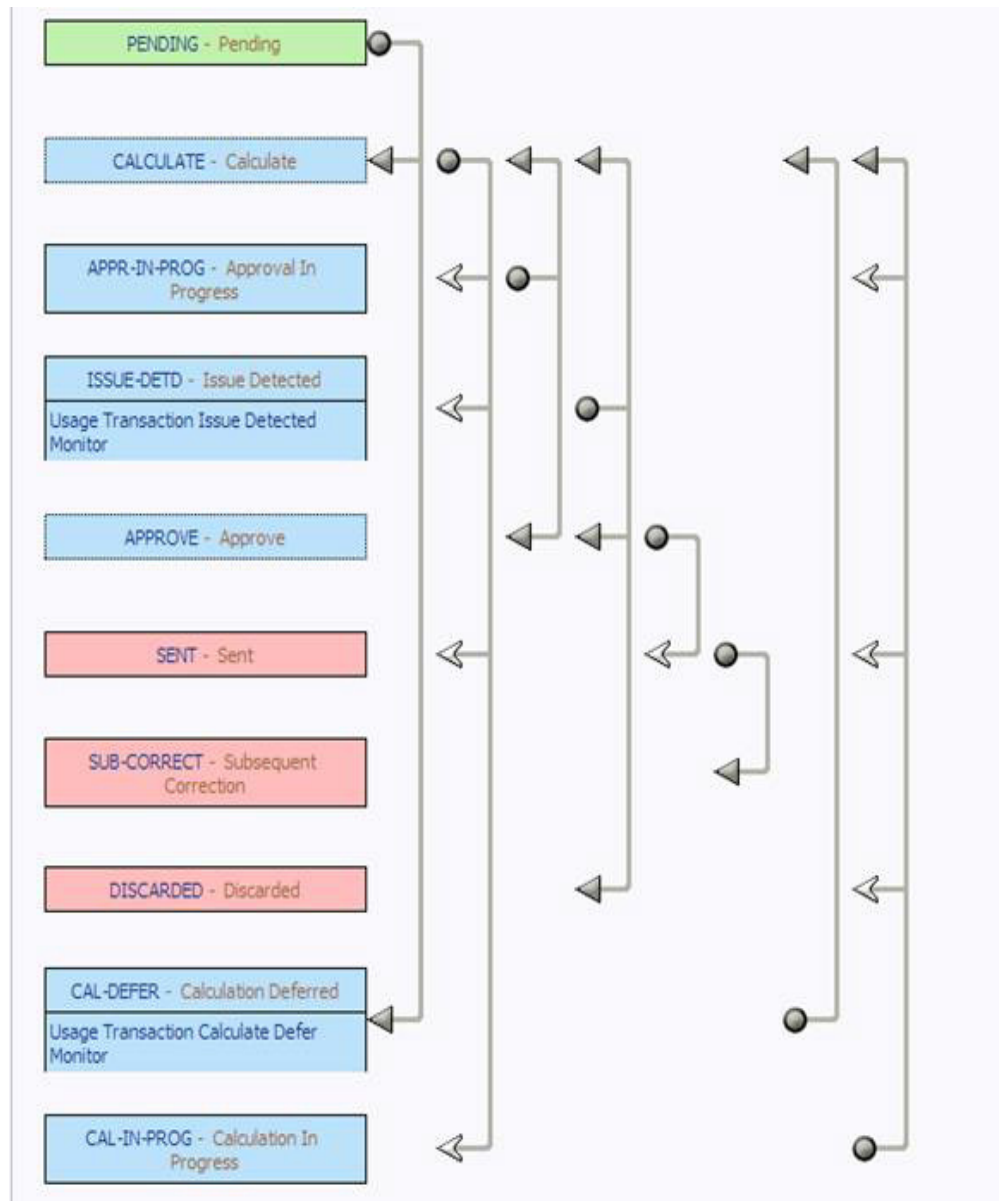
## D2-UsgTranSeeder



## D1-SPMrmtCycScheduleRoute

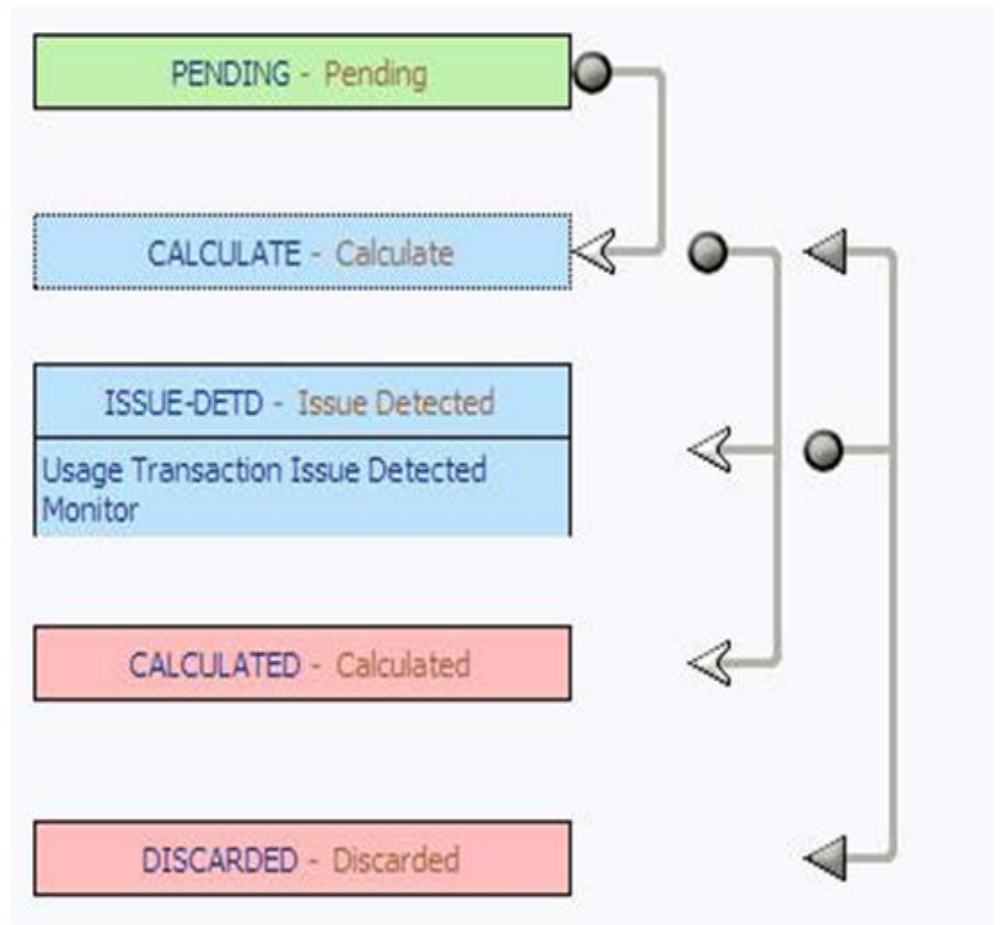


## D2-UsageTransaction





## D2-SubUsageTransaction



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## Related Training

The following User Productivity Kit (UPK) modules provide training related to this business process:

- Oracle Utilities UPK for Meter Data Management Administrative Setup
- Oracle Utilities UPK for Meter Data Management User Tasks
- Oracle Utilities UPK for Meter Data Management VEE and Usage Rules
- Oracle Utilities UPK for Meter Data Management Working with Measurement Data