



C2M v2.9

4.2.2.1 Calculate Usage

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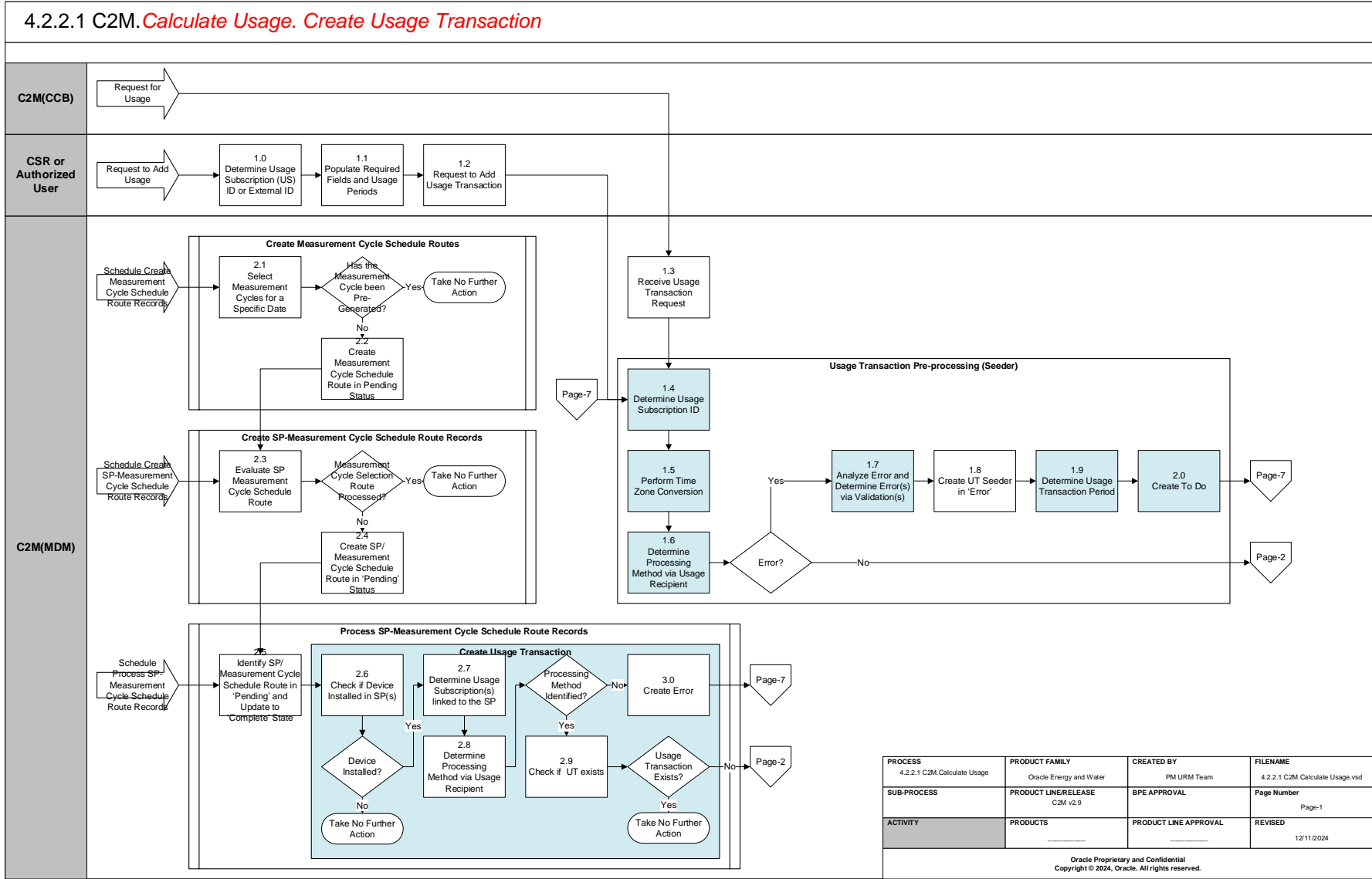
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Brief Description

Business Process: 4.2.2.1 C2M.Calculate Usage
Process Type: Sub-Process
Parent Process: 4.2.2 C2M.Manage Bill
Sibling Processes: N/A

This process is initiated when a Usage Transaction is created either manually by the user, automatically based on a measurement cycle, or ad hoc by a request from an external application. C2M(MDM) calculates usage for Usage Subscribers based on [Usage rules](#) defined in Usage Group(s) that are 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.

Business Process Model Page 1



Note:
1. All the Usage Rules are applicable only when they meet eligibility criteria, else the respective rule is skipped.

CSR or Authorized User

C2M(CCB)

C2M(MDM)

```

graph TD
    Start([Start]) --> P1[Page-1]
    P1 --> 3.1[3.1 Create UT in Pending Status]
    3.1 --> D1{Defer Calculation for Batch Processing?}
    D1 -- Yes --> 3.3[3.3 Update UT to Calculation Deferred Status]
    D1 -- No --> 3.2[3.2 Update UT to Calculate Status]
    3.3 --> 3.4[3.4 Evaluate UT in Calculation Deferred and Update to Calculate Status]
    3.4 --> 3.5[3.5 Determine UT Start and End Date/Time(s)]
    3.5 --> 3.6[3.6 Determine Effective Usage Group(s)]
    3.6 --> D2{Usage Group Exists?}
    D2 -- No --> 4.0[4.0 Update UT to Issue Detected Status]
    D2 -- Yes --> D3{Multiple Usage Groups Exist?}
    D3 -- No --> 4.0
    D3 -- Yes --> 3.8[3.8 Create Sub UTs and Update Current UT to Calculation in Progress Status]
    3.8 --> P3[Page-3]
    P3 --> 3.9[3.9 Initiate Usage Processor]
    3.9 --> D4{Calculation Error?}
    D4 -- Yes --> 4.0
    D4 -- No --> D5{Approval Required?}
    D5 -- Yes --> 4.2[4.2 Create Approval To Do]
    D5 -- No --> 4.6[4.6 Update UT to Sent Status]
    4.2 --> P7[Page-7]
    P7 --> 4.3[4.3 Analyze To Do and Evaluate Usage]
    4.3 --> D6{Approve Usage?}
    D6 -- No --> P7_10.5((P7, 10.5))
    P7_10.5 --> Discard[Discard Usage]
    D6 -- Yes --> 4.4[4.4 Request to Approve Usage]
    4.4 --> 4.5[4.5 Update UT to Approved Status]
    4.5 --> 4.6
    4.6 --> SendUsage[Send Usage]
    subgraph SendUsage [Send Usage]
        4.7[4.7 Determine Usage Recipient] --> 4.8[4.8 Determine Processing Method for UT Notification]
        4.8 --> D7{Receive UT via Batch?}
        D7 -- No --> 4.9[4.9 Create an Outbound Message to Send Usage]
        D7 -- Yes --> 5.0[5.0 Update Usage Transaction with Batch Code and Batch Run Number]
        4.9 --> 5.1[5.1 Process and Send Usage Transaction]
        5.0 --> 5.1
    end
    5.1 --> 5.2[5.2 Send Flat File]
    5.2 --> 5.3[5.3 Receive Usage]
    5.3 --> End([End])
  
```

PROCESS
4.2.2.1 C2M.Calculate Usage

PRODUCT FAMILY
Oracle Energy and Water

CREATED BY
PM URM Team

FILENAME
4.2.2.1 C2M.Calculate Usage.vsd

SUB-PROCESS

PRODUCT LINE/RELEASE
C2M v2.9

BPE APPROVAL

Page Number
Page-2

ACTIVITY

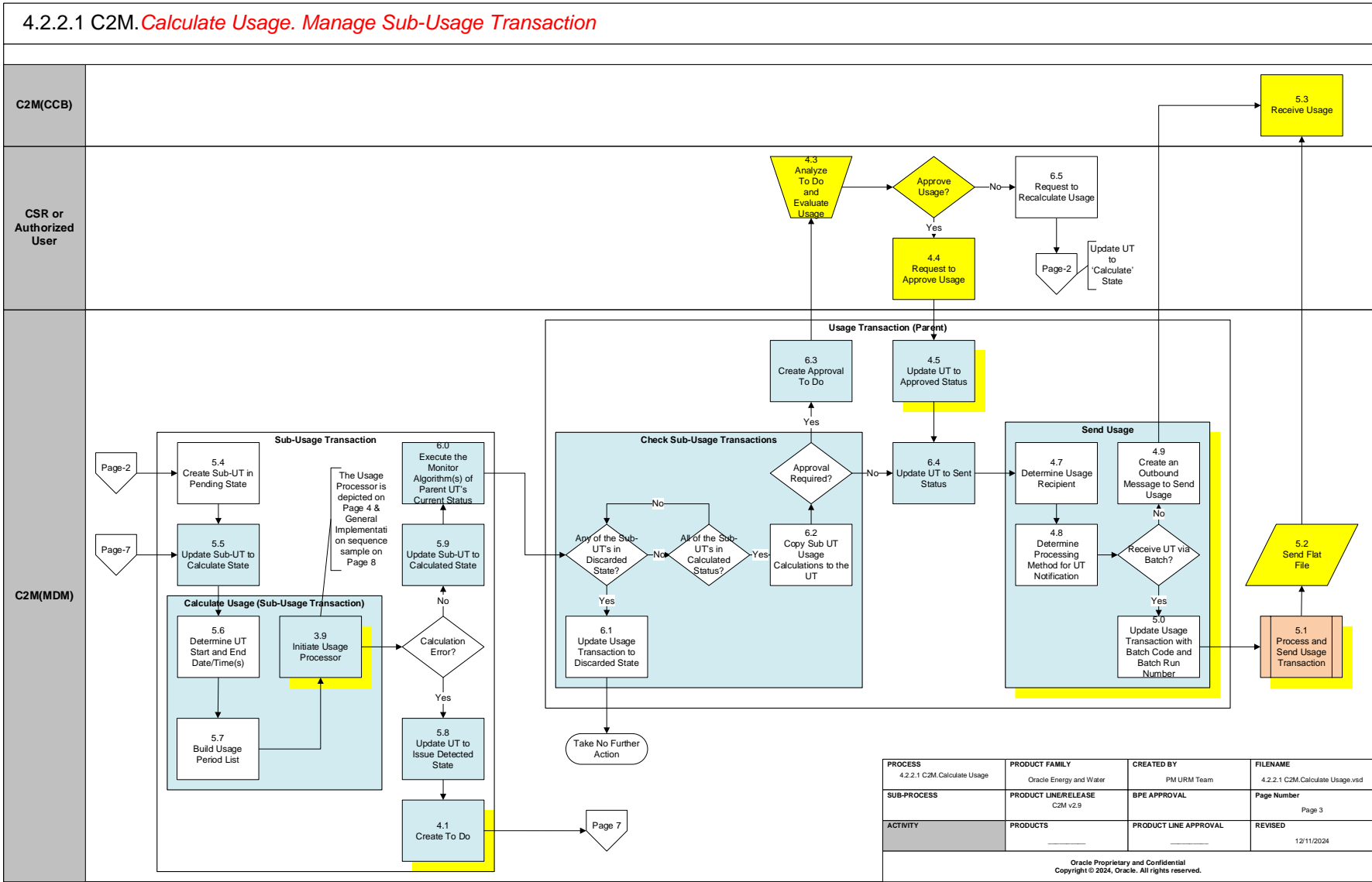
PRODUCTS

PRODUCT LINE APPROVAL

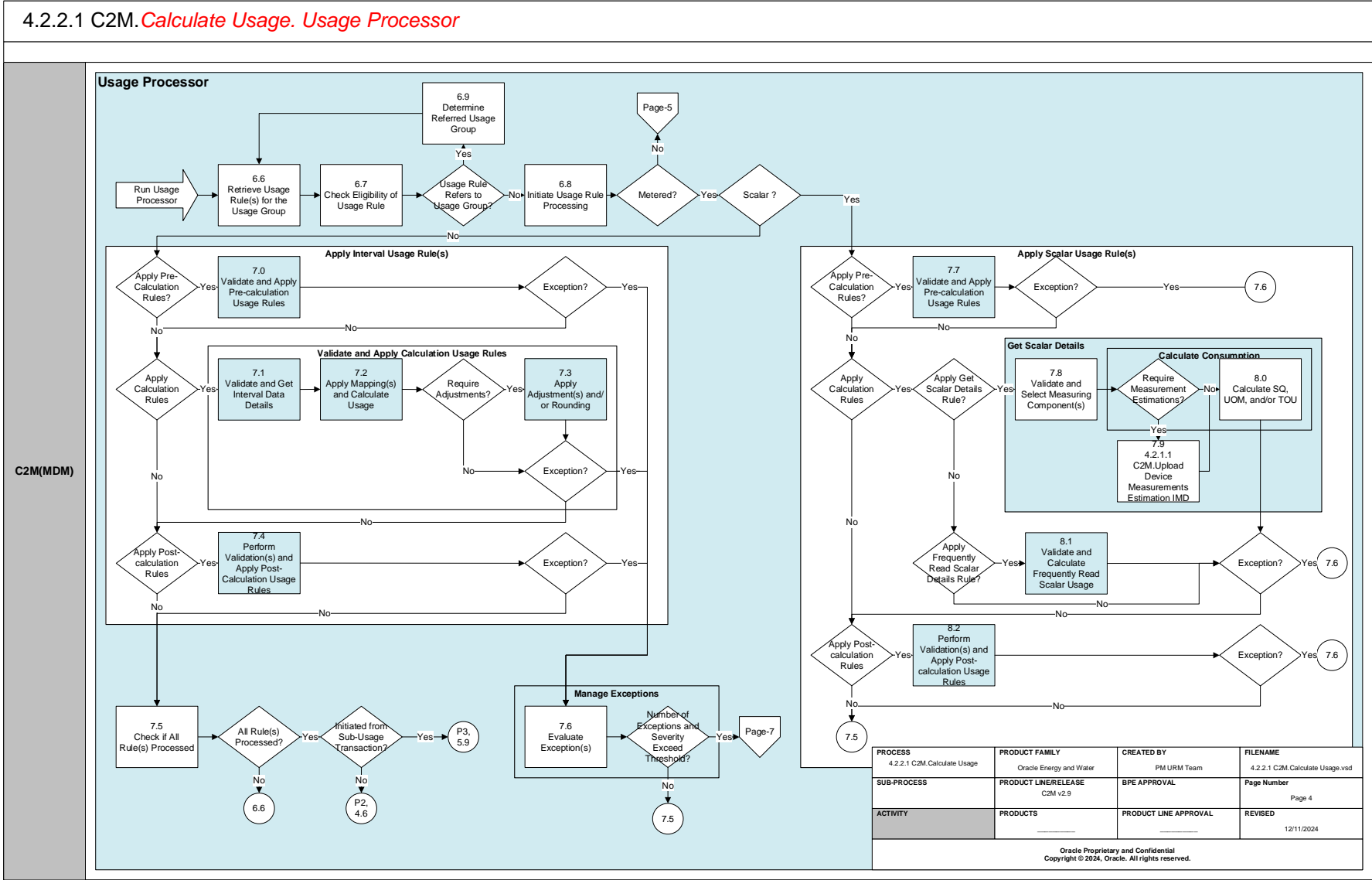
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12/11/2024

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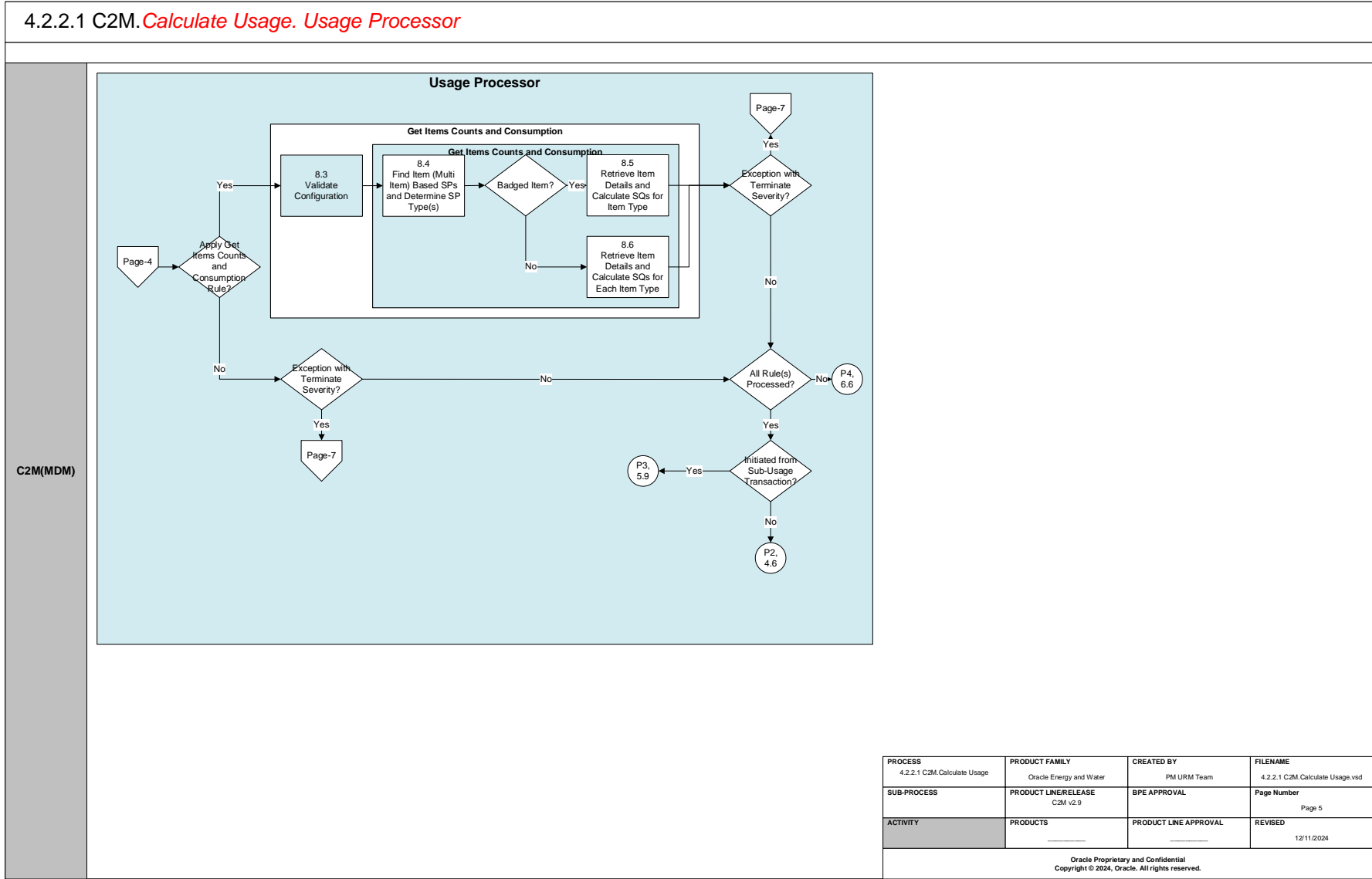
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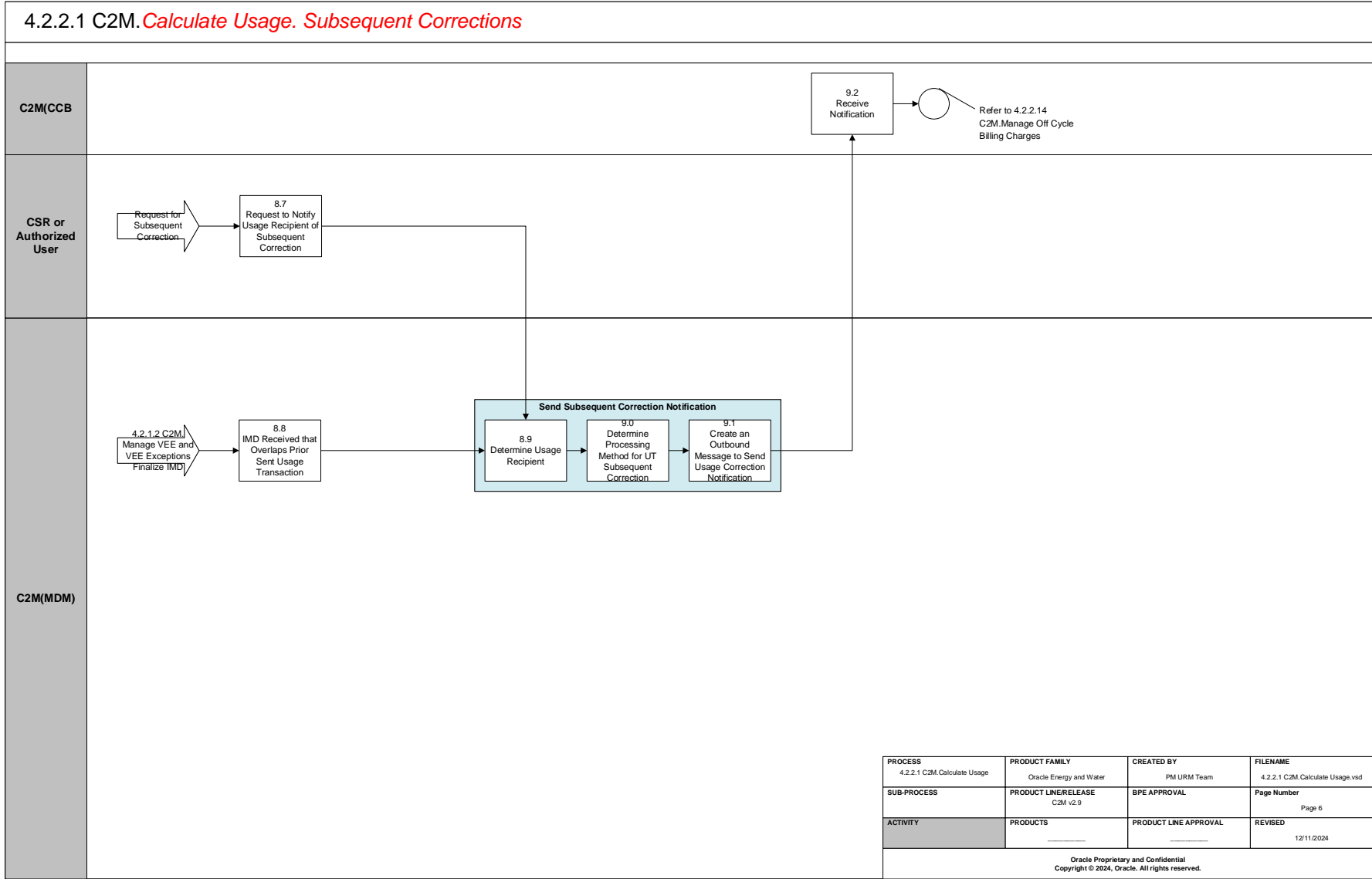
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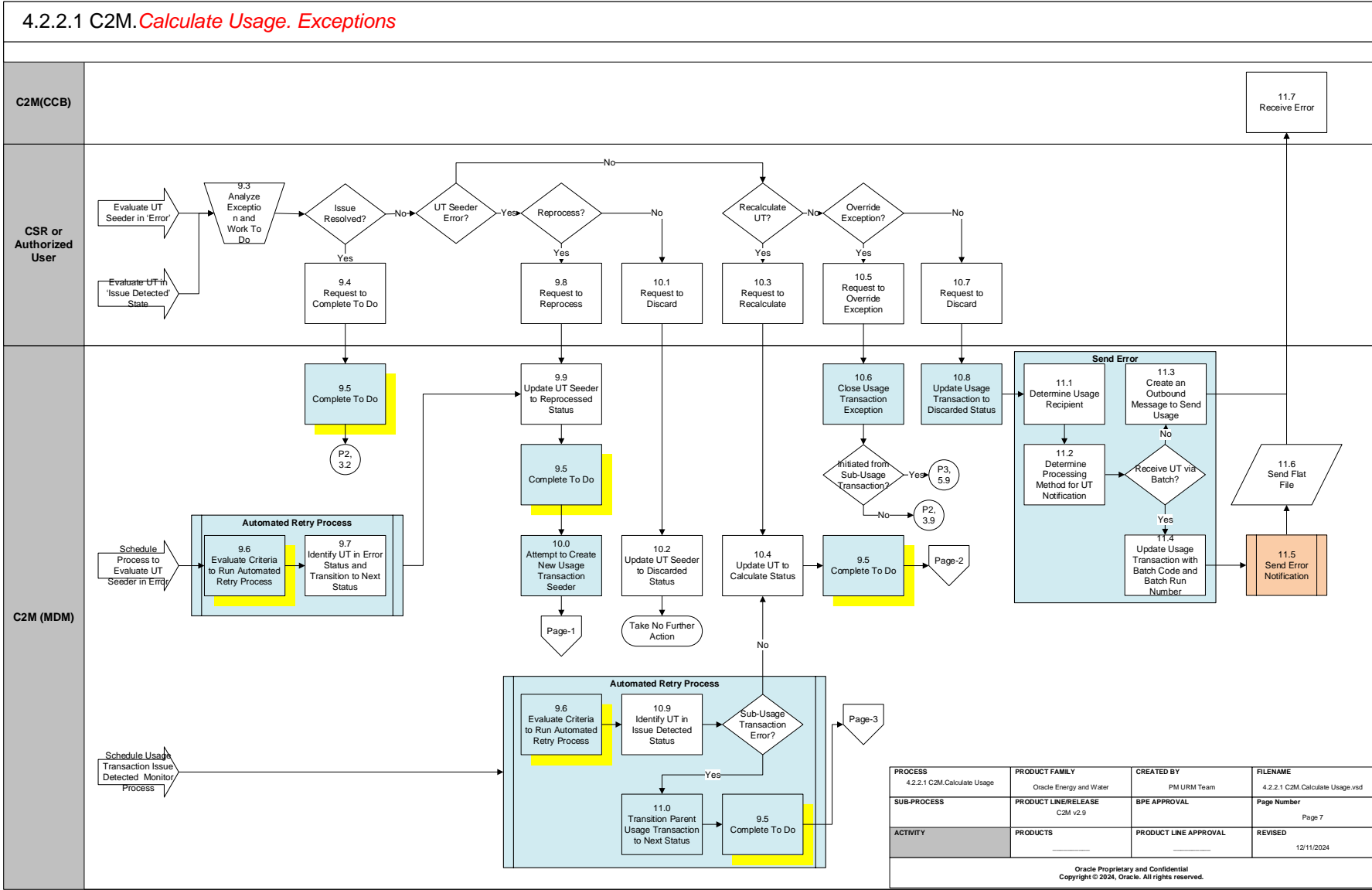
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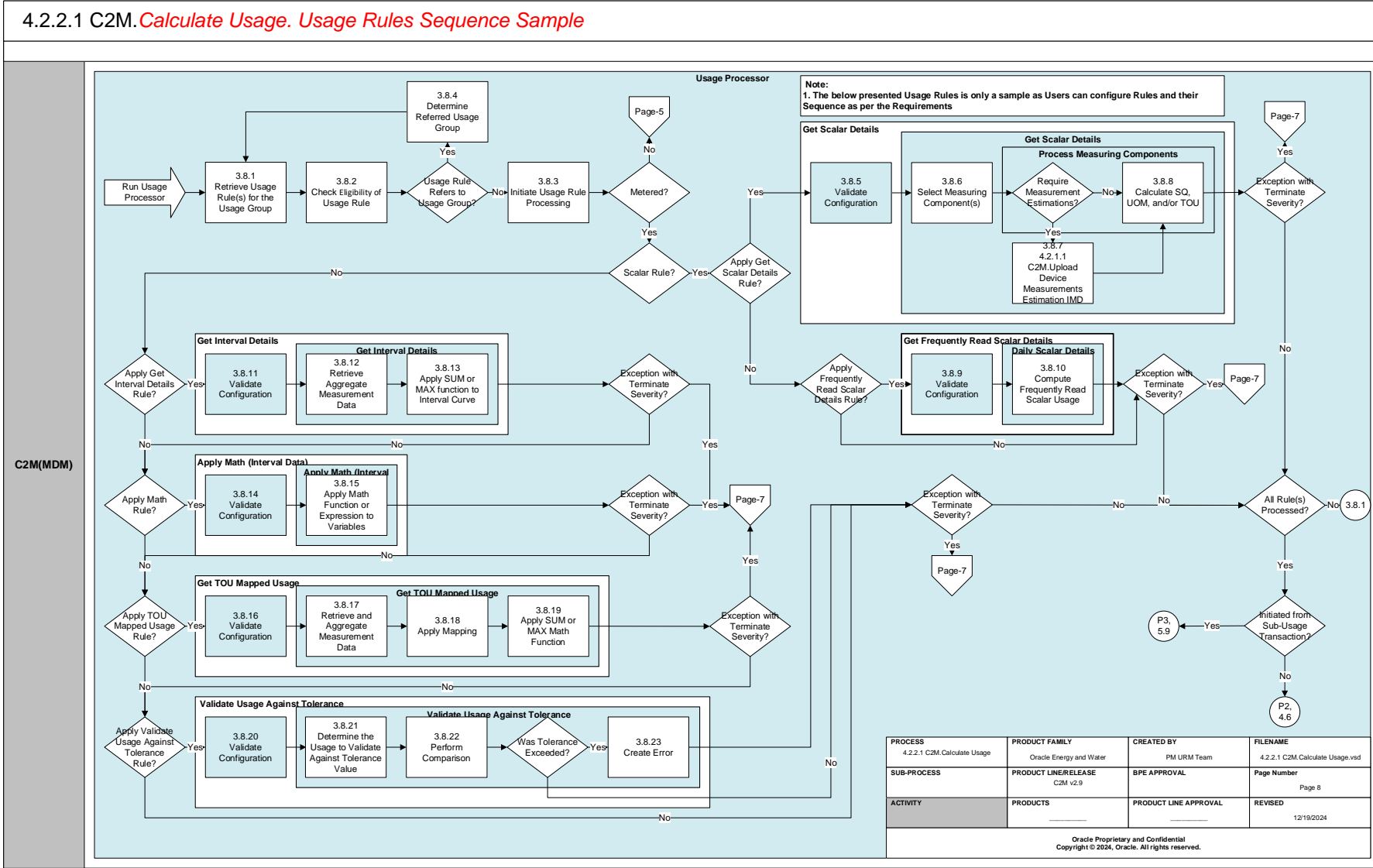
Business Process Model Page 6



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Business Process Model Page 8



Detail Business Process Model Description

1.0 Determine Usage Subscription (US) ID or External ID

Actor/Role: MDM Authorized User

Description:

User selects a Usage Subscription for which to create a Usage Transaction

Configuration required (Y/N) **Entities to Configure:**

Usage Subscription

1.1 Populate Required Fields and Usage Periods

Actor/Role: MDM Authorized User

Description:

User [populates details](#) about usage calculation period for interval and/or scalar reading, and options about how the Usage Transaction should be processed including “Defer Calculation” and “Automatic Retry”.

1.2 Request to Add Usage Transaction

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

Actor/Role: C2M(MDM)

Description:

The C2M(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 the C2M(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 Group: Usage Transaction Pre-processing (Seeder) Group: Usage Transaction Pre-processing (Seeder)

Actor/Role: C2M(MDM)

Description:

Once a Usage Transaction request is received either from an External system or directly entered by the User, the C2M(MDM) application first determines Usage Subscription ID based on provided External Usage Subscription ID.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-DETUSID

Business Object (Y/N) **Business Object**

D2-UsgTranSeeder

1.5 Perform Time Zone Conversion Group: Usage Transaction Pre-processing (Seeder) Group: Usage Transaction Pre-processing (Seeder)**Actor/Role:** C2M(MDM)**Description:**

If the implementation supports multiple time zones, C2M(MDM) will perform time zone conversion by identifying the source time zone of the seeder information and converting the date/times to the target time zone of the usage transaction.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-PERUTTZCV

Business Object (Y/N) **Business Object**[D2-UsgTranSeeder](#)**1.6 Determine Processing Method via Usage Recipient Group: Usage Transaction Pre-processing (Seeder)****Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-DETUTBO

Business Object (Y/N) **Business Object**[D2-UsgTranSeeder](#)**Configuration required (Y/N)** **Entities to Configure:**

Usage Subscription

Usage Subscription Type

Service Provider

Processing Method

1.7 Analyze Error and Determine Error(s) via Validation(s) Group: Usage Transaction Pre-processing (Seeder)**Actor/Role:** C2M(MDM)**Description:**

If 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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-UTSEEDVAL

D2-INSCP-VAL

Business Object (Y/N) **Business Object**

D2-UsgTranSeeder

1.8 Create UT Seeder in 'Error' Group: Usage Transaction Pre-processing (Seeder)

Actor/Role: C2M(MDM)

Description:

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

Business Object (Y/N) **Business Object**

D2-UsgTranSeeder

1.9 Determine Usage Transaction Period Group: Usage Transaction Pre-processing (Seeder)

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-DET-UTDT

Business Object (Y/N) **Business Object**

D2-UsgTranSeeder

2.0 Create To Do Group: Usage Transaction Pre-processing (Seeder)

Actor/Role: C2M(MDM)

Description:

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

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-CHKSUBUT
D2-UTSE-TODO

Business Object (Y/N) **Business Object**

D2-UsgTranSeeder

Configuration required (Y/N) **Entities to Configure:**

To Do Type
To Do Role

2.1 Select Measurement Cycles for a Specific Date Group: Create Measurement Cycle Schedule Routes

Actor/Role: C2M(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 been generated and have a scheduled selection date on or before the business date are selected.

Business Object (Y/N)	Business Object	D1-MeasurementCycleSchedule
Customizable process (Y/N)	Process Name:	D1-CMCS
Configuration required (Y/N)	Entities to Configure:	Measurement Cycle Route
		Measurement Cycle Schedule

2.2 Create Measurement Cycle Schedule Route in Pending Status Group: Create Measurement Cycle Schedule Routes

Actor/Role: C2M(MDM)

Description:

For the Measurement Cycle Route(s) that are ready for processing, a Measurement Cycle Schedule Route entry is created in status of Pending.

Business Object (Y/N)	Business Object	D1-SPMsrmtCycScheduleRoute
		D1-MeasurementCycleSchedule
Customizable process (Y/N)	Process Name:	D1-CMCS

2.3 Evaluate SP Measurement Cycle Schedule Route Group: Create SP-Measurement Cycle Schedule Route Records

Actor/Role: C2M(MDM)

Description:

The process selects Measurement Cycle Schedule Route(s) are on or before the specified business date and are in a Pending status.

Business Object (Y/N)	Business Object	D1-SPMsrmtCycScheduleRoute
Customizable process (Y/N)	Process Name:	D1-PSPSR

2.4 Create SP/Measurement Cycle Schedule Route in 'Pending' Status Group: Create SP-Measurement Cycle Schedule Route Records

Actor/Role: C2M(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.

Business Object (Y/N)	Business Object
-----------------------	-----------------

Customizable process (Y/N)	Process Name:	<div>D1-SPMsrmtCycScheduleRoute</div>
		<div>D1-CSPSR</div>

2.5 Identify SP/Masurement Cycle Schedule Route in ‘Pending’ and Update to ‘Complete’ State Group: Process SP-Measurement Cycle Schedule Route Records

Actor/Role: C2M(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.

Business Object (Y/N)	Business Object	<div>D1-SPMsrmtCycScheduleRoute</div>
Customizable process (Y/N)	Process Name:	<div>D1-PSPSR</div>

2.6 Check if Device Installed in SP(s) Group: Process SP-Measurement Cycle Schedule Route Records

Actor/Role: C2M(MDM)

Description:

Verify that a device is currently installed at the Service Point.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	<div>D2-CRUSGTRN</div>				
Business Object (Y/N)	Business Object	<div>D1-SPMsrmtCycScheduleRoute</div>				
Configuration required (Y/N)	Entities to Configure:	<table><tr><td>Service Point</td></tr><tr><td>Device</td></tr><tr><td>Device Configuration</td></tr><tr><td>Install Event</td></tr></table>	Service Point	Device	Device Configuration	Install Event
Service Point						
Device						
Device Configuration						
Install Event						

2.7 Determine Usage Subscription(s) linked to the SP Group: Process SP-Measurement Cycle Schedule Route Records

Actor/Role: C2M(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

Process Plug-in enabled (Y/N)	Available Algorithm(s):
-------------------------------	-------------------------

Business Object (Y/N)	Business Object	D2-CRUSGTRN
Configuration required (Y/N)	Entities to Configure:	D1-SPMsrmtCycScheduleRoute
		Service Point
		Usage Subscription

2.8 Determine Processing Method via Usage Recipient Group: Process SP-Measurement Cycle Schedule Route Records

Actor/Role: C2M(MDM)

Description:

Find the Usage Recipient (i.e. Service Provider) associated with the Usage Subscription and then determine Processing Method BO associated with the "Usage Transaction Creation" Processing Role.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-CRUSGTRN
Business Object (Y/N)	Business Object	D1-SPMsrmtCycScheduleRoute
Configuration required (Y/N)	Entities to Configure:	Service Point
		Usage Subscription
		Service Provider

2.9 Check if UT exists Group: Process SP-Measurement Cycle Schedule Route Records

Actor/Role: C2M(MDM)

Description:

If a Usage Transaction for the same Usage Subscription, Start Date/Time, and End Date/Time already exists then do not create.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-CRUSGTRN
Business Object (Y/N)	Business Object	D1-SPMsrmtCycScheduleRoute

3.0 Create Error Group: Process SP-Measurement Cycle Schedule Route Records

Actor/Role: C2M(MDM)

Description:

If a Processing Method BO cannot be determined then an error will be generated.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-CRUSGTRN
--------------------------------------	--------------------------------	-------------

Business Object (Y/N)	Business Object
	D1-SPMsrmtCycScheduleRoute

3.1 Create UT in Pending Status

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):
	D2-TNORBATCH
Business Object (Y/N)	Business Object
	D2-UsageTransaction

3.2 Update UT to Calculate Status

Actor/Role: C2M(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, first 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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):
	D2-CALCUSG
	D2-TR-AF-CAL
	F1-AT-RQJ
Business Object (Y/N)	Business Object
	D2-UsageTransaction
	D2-UsgTranProUsgSub
	D2-UsageSubscriptionParentLITE

3.3 Update UT to Calculation Deferred Status

Actor/Role: C2M(MDM)

Description:

If the Usage Transaction is flagged as Defer Calculation, then the status will be transitioned to the Calculation Deferred. The start and end date/time will be determined.

Process Plug-in enabled (Y/N)	Available Algorithm(s):
	D2-DET-UTDT
	F1-AT-RQJ

Business Object (Y/N)**Business Object**[D2-UsageTransaction](#)**3.4 Evaluate UT in Calculation Deferred and Update to Calculate Status****Actor/Role:** C2M(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.

Business Object (Y/N)**Business Object**[D2-UsageTransaction](#)**Customizable process (Y/N)****Process Name**

D2- UTCD

3.5 Determine UT Start and End Date/Time(s) Group: Calculate Usage**Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N)**Available Algorithm(s):**

D2-CALCUSG

Business Object (Y/N)**Business Object**[D2-UsageTransaction](#)**3.6 Determine Effective Usage Group(s) Group: Calculate Usage****Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N)**Available Algorithm(s):**

D2-CALCUSG

Business Object (Y/N)**Business Object**[D2-UsageTransaction](#)**3.7 Build Usage Period List via Date Breaks Group: Calculate Usage****Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-CALCUSG

Business Object (Y/N) **Business Object**

D2-UsageTransaction

3.8 Create Sub UTs and Update Current UT to Calculation in Progress Status Group: Calculate Usage

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-CALCUSG

D2-DRVUSGGRP - Derive Usage Group Based On Rate and Installed Device
--

Business Object (Y/N) **Business Object**

D2-UsageTransaction

D2-SubUsageTransaction
--

Configuration required (Y/N) **Entities to Configure:**

Extendable Lookup (D2-CCBRateScheduleLookup)
--

3.9 Initiate Usage Processor Group: Calculate Usage

Actor/Role: C2M(MDM)

Description:

The Rules of 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 executes the rules of a Usage Group that belong to a specified Usage Rule Category (optional). If no Usage Rule Category is specified then all the rules of 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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-CALCUSG

Business Object (Y/N) **Business Object**

D2-UsageTransaction

Configuration required (Y/N) **Entities to Configure:**

D1-UsageProcessor

4.0 Update UT to Issue Detected Status**Actor/Role:** C2M(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 Issue or Terminate. If such an exception occurs, then the Usage Transaction transitions into an Issue Detected status.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-CK-UG-APR

Business Object (Y/N) **Business Object**[D2-UsageTransaction](#)**4.1 Create To Do****Actor/Role:** C2M(MDM)**Description:**

When the Usage Transaction enters the “Issue Detected” status a To Do will be opened.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-UTIS-TODO

Business Object (Y/N) **Business Object**[D2-UsageTransaction](#)

D2-SubUsageTransaction

Configuration required (Y/N) **Entities to Configure:**

To Do Type

To Do Role

4.2 Create Approval To Do**Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-CK-UG-APR

D2-UTAP-TODO

Business Object (Y/N) **Business Object**[D2-UsageTransaction](#)

D2-UsgTranProUsgSub

Configuration required (Y/N) Entities to Configure:

D2-UsageSubscriptionParentLITE
To Do Type
To Do Role

4.3 Analyze To Do and Evaluate Usage

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 Object (Y/N) Business Object

D2-UsageTransaction

4.4 Request to Approve Usage

Actor/Role: MDM Authorized User

Description:

An Authorized User can request that the Usage Transaction is approved so that downstream processing can continue.

Business Object (Y/N) Business Object

D2-UsageTransaction

4.5 Update UT to Approved Status

Actor/Role: C2M(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”.

Process Plug-in enabled (Y/N) Available Algorithm(s):

D2-SEND-USG

Business Object (Y/N) Business Object

D2-UsageTransaction

4.6 Update UT to Sent Status

Actor/Role: C2M(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 make subsequent corrections.

Process Plug-in enabled (Y/N) Available Algorithm(s):

D2-SEND-USG

Business Object (Y/N)**Business Object**[D2-UsageTransaction](#)**4.7 Determine Usage Recipient Group: Send Usage****Actor/Role:** C2M(MDM)**Description:**

The Service Provider (i.e. Usage Recipient) is determined from the Usage Subscription or Usage Subscription Type

Process Plug-in enabled (Y/N)**Available Algorithm(s):**

D2-SEND-USG

Business Object (Y/N)**Business Object**[D2-UsageTransaction](#)

D2-UsgTranProUsgSub

D2-UsgTranProSubTyp

Configuration required (Y/N) Entities to Configure:

Usage Subscription

Usage Subscription Type

Service Provider

4.8 Determine Processing Method for UT Notification Group: Send Usage**Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N)**Available Algorithm(s):**

D2-SEND-USG

Business Object (Y/N)**Business Object**[D2-UsageTransaction](#)**Business Object (Y/N)****Business Service**

D1-DetermineServiceProviders

4.9 Create an Outbound Message to Send Usage Group: Send Usage**Actor/Role:** C2M(MDM)**Description:**

Outbound Message is created and immediately sent to Usage Recipient.

Process Plug-in enabled (Y/N)**Available Algorithm(s):**

D2-SEND-USG

Business Object (Y/N)

Business Object

D2-UsageTransaction
D2-UsageTranOutboundMesg

5.0 Update Usage Transaction with Batch Code and Batch Run Number Group: Send Usage

Actor/Role: C2M(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 been sent.

Process Plug-in enabled (Y/N)

Available Algorithm(s):

D2-SEND-USG

Business Object (Y/N)

Business Object

D2-UsageTransaction
D2-UsageTranOutboundMesg

5.1 Process and Send Usage Transaction

Actor/Role: C2M(MDM)

Description:

Batch Control facilitates completing the Usage Transaction by sending the information to the Service Provider.

5.2 Send Flat File

Actor/Role: C2M(MDM)

Description:

C2M(MDM) sends a flat file.

5.3 Receive Usage

Actor/Role: C2M(CCB)

Description:

A file containing the requested data is received.

5.4 Create Sub-UT in Pending State Group: Sub-Usage Transaction

Actor/Role: C2M(MDM)

Description:

The Sub Usage Transaction created in a status of Pending.

Business Object (Y/N)

Business Object

D2-SubUsageTransaction

5.5 Update Sub-UT to Calculate State Group: Sub-Usage Transaction

Actor/Role: C2M(MDM)**Description:**

The application monitors for Sub Usage Transactions with the Pending status, and promotes them to the Calculate status.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

F1-AT-RQJ

Business Object (Y/N)**Business Object**

D2-SubUsageTransaction

5.6 Determine UT Start and End Date/Time(s) Group: Sub-Usage Transaction**Actor/Role:** C2M(MDM)**Description:**

From the Scalar and Interval start and stop date and time specified in the Sub Usage Transaction, the earliest start time and latest stop time is determined.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-CALUSGSUB

Business Object (Y/N)**Business Object**

D2-SubUsageTransaction

5.7 Build Usage Period List Group: Sub-Usage Transaction**Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-CALUSGSUB

Business Object (Y/N)**Business Object**

D2-SubUsageTransaction

5.8 Update UT to Issue Detected State Group: Sub-Usage Transaction**Actor/Role:** C2M(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 with severity Issue or Terminate. If such an exception occurs, then the Sub Usage Transaction transitions to an Issue Detected status.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-TNAFCALCH

Business Object (Y/N)**Business Object**

D2-SubUsageTransaction

5.9 Update Sub-UT to Calculated State Group: Sub-Usage Transaction**Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-TNAFCALCH

Business Object (Y/N) **Business Object**

D2-SubUsageTransaction

6.0 Execute the Monitor Algorithm(s) of Parent UT's Current Status Group: Sub-Usage Transaction**Actor/Role:** C2M(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 algorithms of the parent Usage Transaction, in the Calculation in Progress status, are executed.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-TRNUSGPNT

Business Object (Y/N) **Business Object**

D2-SubUsageTransaction

6.1 Update Usage Transaction to Discarded State Group: Usage Transaction (Parent)**Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-CHKSUBUT

Business Object (Y/N) **Business Object**[D2-UsageTransaction](#)**6.2 Copy Sub UT Usage Calculations to the UT Group: Usage Transaction (Parent)****Actor/Role:** C2M(MDM)**Description:**

While in the Calculation in Progress status, 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 done for each Sub Usage Transaction will be copied to the parent Usage Transaction.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-CHKSUBUT
Business Object (Y/N)	Business Object	D2-UsageTransaction

6.3 Create Approval To Do Group: Usage Transaction (Parent)

Actor/Role: C2M(MDM)

Description:

While in the Calculation in Progress status, 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 status. When the Usage Subscription specifies that approval is required, the Usage Transaction will move to the “Approval in Progress”. 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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-CHKSUBUT D2-UTAP-TODO
Business Object (Y/N)	Business Object	D2-UsageTransaction D2-UsgTranProUsgSub D2-UsageSubscriptionParentLITE
Configuration required (Y/N)	Entities to Configure:	To Do Type To Do Role

6.4 Update UT to Sent Status Group: Usage Transaction (Parent)

Actor/Role: C2M(MDM)

Description:

The Usage Transaction can achieve the Sent status in two ways. First while in the Calculation in Progress status, 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 status. When the Usage Subscription specifies that approval is not required, the Usage Transaction will move to the Sent. 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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-CHKSUBUT
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Business Object (Y/N)**Business Object**[D2-UsageTransaction](#)**6.5 Request to Recalculate Usage****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 Object (Y/N)**Business Object**[D2-UsageTransaction](#)**6.6 Retrieve Usage Rule(s) for the Usage Group****Actor/Role:** C2M(MDM)**Description:**

Retrieve the Usage Rules associated with the Usage Group.

Business Object (Y/N)**Business Object**

D1-GenericUsageRule

D1-UsageGroup

Business Object (Y/N)**Business Service**

D1-UsageProcessor

6.7 Check Eligibility of Usage Rule**Actor/Role:** C2M(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 Object (Y/N)**Business Object**

D1-GenericUsageRule

Business Object (Y/N)**Business Service**

D1-UsageProcessor

6.8 Initiate Usage Rule Processing**Actor/Role:** C2M(MDM)**Description:**

A Usage Rule can either be stand alone or refer to another Usage Group. Initiate Usage Rule processing.

Business Object (Y/N)**Business Object**

Business Object (Y/N)	Business Service	D1-GenericUsageRule
		D1-UsageProcessor

6.9 Determine Referred Usage Group

Actor/Role: C2M(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 Object (Y/N)	Business Object	D1-UsageGroup
Business Object (Y/N)	Business Service	D1-UsageProcessor

7.0 Validate and Apply Pre-calculation Usage Rules Group: Apply Interval Usage Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) validates the availability of configuration data and applies pre-calculation usage rules.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	Alignment and Delay - Validation (D2-VALALGDEL)
		Alignment and Delay Usage Rule (D2-ALGNDELAY)
Business Object (Y/N)	Business Object	Check Existence of Installed Device (D2-CHKEXTDVC)
		D2-AlignmentandDelay
Configuration required (Y/N)	Entities to Configure:	D2-ChkExistenceofInstalledDvc
		EXL-ALINDLY
		EXL-CHKINSTL

7.1 Validate and Get Interval Data Details Group: Apply Interval Usage Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) validates the availability of configuration data and gets interval data.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	Get Interval Data - Validation (D2-VALINTDAT)
		Get Interval Data (D2-GETINTDAT)

Business Object (Y/N)**Business Object**

D2-GetIntervalData

Configuration required (Y/N) Entities to Configure:

EXTRACT KVARH

EXTRACT KWH

GET-KVARH

7.2 Apply Mapping(s) and Calculate Usage Group: Apply Interval Usage Rule(s)**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) validates the availability of configuration data, applies TOU and other required mapping. Further it proceeds forward to calculate the Usage based on mathematical and other calculations.

Process Plug-in enabled (Y/N)**Available Algorithm(s):**

Get TOU Mapped Usage - Validation (D2-VALTOUUSG)

Get Time Of Use Mapped Usage (D2-GETTOUUSG)

Validate Math (D2-VALMATH)

Vector and Service Quantity Math (D2-MATH)

Apply Math on Interval Data - Validation (D2-VALAPPMTH)

Apply Math (Interval Data) (D2-APPMATHIN)

Xcel Energy - Residential Peak Time Rebate Calculation (DM_RPTR)

Business Object (Y/N)**Business Object**

D2-GetTOUUsage

D2-Math

D2-ApplyMathInt

DM_PeakTimeRebate

Configuration required (Y/N) Entities to Configure:

COINCIDENTPEAK

DERIVEKW

DERIVEKWH

DM-USG-RULE-MATH

ENG-INTERVALIZE

EX-SUMCHECK

GET-KWH-CONS

GETKWHCURVE
GETTOTALKWH
GRAND TOTAL
KWHCONSFLOWADJ
KWHCONSUMP
NEW-CALCULATE-NET-CONSUMPTION3
POWER FACTOR CALCULATION
POWERFACTOR
PTR-QTY-CALC
TOTALIZATION FOR 43046772 CHAN
TOTALIZATION FOR 55059504 CHAN
TOTALIZATION FOR 61291603 CHAN
TOU MAP YEAR ROUND
TOU-MAP KWH
TOUMAPKWH
TOU-MAP-KWH-ANT

7.3 Apply Adjustment(s) and/or Rounding Group: Apply Interval Usage Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) applies adjustments and performs any rounding requirements.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

Round And Adjust Usage - Validation(D2-RNADUSVAL)
Round And Adjust Usage (D2-RNDADJUSG)

Business Object (Y/N) **Business Object**

D2-RoundAndAdjustUsage

Configuration required (Y/N) **Entities to Configure:**

ROUND AND ADJUST USAGE

7.4 Perform Validation(s) and Apply Post-calculation Usage Rules Group: Apply Interval Usage Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) performs validations and applies post-calculation usage rules. Some of the rules include business flag hold, validation against tolerances, and validating against high low limits.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

Business Object (Y/N)

Business Object

Configuration required (Y/N) Entities to Configure:

Validate Business Flag Hold (D2-VALBFH)
Identify Business Flag Holds (D2-AUR-IBFH)
Validate Usage Against Tolerance - Validation (D2-VALTOL)
Validate Usage Against Tolerance (D2-VALUSGTOL)
Usage High/Low - Validation (D2-VALUGHILO)
Usage High/Low Rule (D2-USGHIGLOW)

D2-BusinessFlagHold
D2-ValAgainstTol
D2-UsageHighLowRule

BUS_FLG_HOLD
EXL-SUMCHK2
RES-KWH-HILO20-BOTH

7.5 Check if All Rule(s) Processed

Actor/Role: C2M(MDM)

Description:

C2M(MDM) checks if all the usage rules are processed.

7.6 Evaluate Exception(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) evaluates exceptions raised during the execution of usage rules.

Process Plug-in enabled (Y/N)

Available Algorithm(s):

Usage Rule Exception Handler (D2-UREXPCHAN)

Business Object (Y/N)

Business Object

D2-UsageRuleExceptionHandler

Configuration required (Y/N) Entities to Configure:

USAGE RULE EXCP HANDLER

7.7 Validate and Apply Pre-calculation Usage Rules Group: Apply Scalar Usage Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) validates the availability of configuration data and applies pre-calculation usage rules.

Process Plug-in enabled (Y/N)

Available Algorithm(s):

Business Object (Y/N)

Business Object

Alignment and Delay - Validation (D2-VALALGDEL)
Alignment and Delay Usage Rule (D2-ALGNDELAY)
Check Existence of Installed Device (D2-CHKEXTDVC)

Configuration required (Y/N) Entities to Configure:

D2-AlignmentandDelay
D2-ChkExistenceofInstalledDvc

EXL-ALINDLY
EXL-CHKINSTL

7.8 Validate and Select Measuring Component(s) Group: Apply Scalar Usage Rule(s)

Actor/Role: C2M(MDM)

Description:

Validate that each of the scalar details to be calculated specifies either a [UOM, TOU, or SQI](#). Further, the Usage Rule definition can specify a listing of measuring components to calculate, if nothing is specified in the Usage Rule then all the measuring components defined in the Measuring Component Type will be calculated

Process Plug-in enabled (Y/N)

Available Algorithm(s):

D2-GETSCALAR
D2-ValScalar

Business Object (Y/N)

Business Object

D2-GetScalar
D1-GenericUsageRule

Configuration required (Y/N) Entities to Configure:

Measuring Component Type
DM-USG-RULE-KWH
ENG-GET-SCAL
GETALLSCALAR
SCALARCONS
SUM-SCALAR-TOU-DEMAND-VALUES

7.9 4.2.1.1 C2M.Upload Device Measurements Estimation IMD Group: Apply Scalar Usage Rule(s)

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETSCALAR
Business Object (Y/N)	Business Object	D2-GetScalar
		D1-GenericUsageRule
		D1-GenericAdderIMD

8.0 Calculate SQ, UOM, and/or TOU Group: Apply Scalar Usage Rule(s)

Actor/Role: C2M(MDM)

Description:

Calculate each measuring component and save results as a Usage Scalar Detail record.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETSCALAR
Business Object (Y/N)	Business Object	D2-GetScalar
		D1-GenericUsageRule
		D2-UsageTransaction

8.1 Validate and Calculate Frequently Read Scalar Usage Group: Apply Scalar Usage Rule(s)

Actor/Role: C2M(MDM)

Description:

Validate that at least one of the UOM, TOU, or SQI is populated. Further, C2M(MDM) computes daily scalar usage values for measuring components installed at service points associated with usage subscription.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-VALFRESCR
		D2-GETFRESCR
Business Object (Y/N)	Business Object	D2-CalFrequentlyReadScalar
		D1-GenericUsageRule

8.2 Perform Validation(s) and Apply Post-calculation Usage Rules Group: Apply Scalar Usage Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) performs validations and applies post-calculation usage rules. Some of the rules include business flag hold, validation against tolerances, and validating against high low limits.

Process Plug-in enabled (Y/N)	Available Algorithm(s):
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Business Object (Y/N)	Business Object	Validate Business Flag Hold (D2-VALBFH)
		Identify Business Flag Holds (D2-AUR-IBFH)
		Validate Usage Against Tolerance - Validation (D2-VALTOL)
		Validate Usage Against Tolerance (D2-VALUSGTOL)
		Usage High/Low - Validation (D2-VALUGHILO)
		Usage High/Low Rule (D2-USGHIGLOW)
Configuration required (Y/N)	Entities to Configure:	D2-BusinessFlagHold
		D2-ValAgainstTol
		D2-UsageHighLowRule
		BUS_FLG_HOLD
		EXL-SUMCHK2
		RES-KWH-HILO20-BOTH

8.3 Validate Configuration Group: Get Items Counts and Consumption

Actor/Role: C2M(MDM)
Description:
C2M(MDM) performs required validations to process usage rule Get Items Counts and Consumption

Process Plug-in enabled (Y/N)	Available Algorithm(s):	Get Item Counts and Consumption (D2-GETITEMCC)
Business Object (Y/N)	Business Object	
		D2-GetItemCountsConsumption
		D1-GenericUsageRule

8.4 Find Item (Multi Item) Based SPs and Determine SP Type(s) Group: Get Items Counts and Consumption

Actor/Role: C2M(MDM)
Description:
C2M(MDM) find Item based service points and determines service point types.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	Get Item Counts and Consumption (D2-GETITEMCC)
Business Object (Y/N)	Business Object	
		D2-GetItemCountsConsumption
		D1-GenericUsageRule

8.5 Retrieve Item Details and Calculate SQs for Item Type Group: Get Items Counts and Consumption**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) retrieves Item details and calculates Service Quantity for Item type.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

Get Item Counts and Consumption (D2-GETITEMCC)

Business Object (Y/N) **Business Object**

D2-GetItemCountsConsumption

D1-GenericUsageRule

Configuration required (Y/N) **Entities to Configure:**

BUS_FLG_HOLD

EXL-SUMCHK2

RES-KWH-HILO20-BOTH

E-ITEMS

ELECTRIC - BADGED ITEM

8.6 Retrieve Item Details and Calculate SQs for Each Item Type Group: Get Items Counts and Consumption**Actor/Role:** C2M(MDM)**Description:** C2M(MDM) Retrieve Item Details and Calculate SQs for Each Item Type**Process Plug-in enabled (Y/N)** **Available Algorithm(s):**

Get Item Counts and Consumption (D2-GETITEMCC)

Business Object (Y/N) **Business Object**

D2-GetItemCountsConsumption

D1-GenericUsageRule

Configuration required (Y/N) **Entities to Configure:**

E-ITEMS

ELECTRIC MULTI-ITEM

8.7 Request to Notify Usage Recipient Of Subsequent Correction**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

8.8 IMD Received that Overlaps Prior Sent Usage Transaction**Actor/Role:** C2M(MDM)**Description:**

When an IMD is received that overlaps a Usage Transaction that is in Sent status, the status is transitioned to a Subsequent Correction status.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D1-TRAN-UT (Transition Usage Transaction(s))
Business Object (Y/N)	Business Object	D1-InitialLoadIMDInterval
		D1-InitialLoadIMDScalar
		D1-ManualIMDInterval
		D1-ManualIMDScalar
		D1-EstimationIMDInterval
		D1-EstimationIMDScalar

8.9 Determine Usage Recipient

Actor/Role: C2M(MDM)

Description:

The Service Provider (i.e. Usage Recipient) is determined from the Usage Subscription or Usage Subscription Type

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-SEND-USG
Business Object (Y/N)	Business Object	D2-UsageTransaction
		D2-UsgTranProUsgSub
		D2-UsgTranProSubTyp
Configuration required (Y/N)	Entities to Configure:	Usage Subscription
		Usage Subscription Type
		Service Provider

9.0 Determine Processing Method for UT Subsequent Correction

Actor/Role: C2M(MDM)

Description:

The Service Providers “Processing Methods” describes how the notification of subsequent usage corrections is sent.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-SEND-SUBC
Business Object (Y/N)	Business Object	D2-UsageTransaction
Business Object (Y/N)	Business Service	D1-DetermineServiceProviders

9.1 Create an Outbound Message to Send Usage Correction Notification

Actor/Role: C2M(MDM)

Description:

Outbound Message is created and immediately sent to Usage Recipient.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-SEND-USG
Business Object (Y/N)	Business Object	D2-UsageTranOutboundMesg
		D2-UsageTransaction

9.2 Receive Notification

Actor/Role: C2M(CCB)

Description:

The Usage Recipient receives a notification of subsequent correction.

9.3 Analyze Exception and Work To Do

Actor/Role: MDM Authorized User

Description:

The Authorized User will review the issue and determine the next step

9.4 Request to Complete To Do

Actor/Role: MDM Authorized User

Description:

The Authorized User will request that the To Do be completed.

9.5 Complete To Do

Actor/Role: C2M(MDM)

Description:

The To Do is closed.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D1-GTDCBO
Business Object (Y/N)	Business Object	D2-UsgTranSeeder
		D2-UsageTransaction

9.6 Evaluate Criteria to Run Automated Retry Process

Actor/Role: C2M(MDM)

Description:

Select the UT Seeders in the Error status that meet BO, Status Code, and Batch Code restrictions.

Business Object (Y/N)	Business Object	D2-UsgTranSeeder
Customizable process (N)	Process Name	D2-UTSED

9.7 Identify UT in Error Status and Transition to Next Status

Actor/Role: C2M(MDM)

Description:

Transition UT Seeder in the Error status to the next status.

Business Object (Y/N)	Business Object	D2-UsgTranSeeder
Customizable process (N)	Process Name	D2-UTSED

9.8 Request to Reprocess

Actor/Role: MDM Authorized User

Description:

The Authorized User determines that the UT Seeder should be Reprocessed.

9.9 Update UT Seeder to Reprocessed Status

Actor/Role: C2M(MDM)

Description:

The UT Seeder is transitioned to the Reprocess status.

Business Object (Y/N)	Business Object	D2-UsgTranSeeder
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10.0 Attempt to Create New Usage Transaction Seeder

Actor/Role: C2M(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)

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-CRE-UTSD
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Business Object (Y/N)**Business Object**[D2-UsgTranSeeder](#)**10.1 Request to Discard****Actor/Role:** MDM Authorized User**Description:**

The Authorized User determines the UT Seeder should be discarded.

10.2 Update UT Seeder to Discarded Status**Actor/Role:** C2M(MDM)**Description:**

The UT Seeder is transitioned to a Discarded status

Business Object (Y/N)**Business Object**[D2-UsgTranSeeder](#)**10.3 Request to Recalculate****Actor/Role:** MDM Authorized User**Description:**

The Authorized User determines the UT should be recalculated.

10.4 Update UT in Issue Detected Status to Calculate Status**Actor/Role:** C2M(MDM)**Description:**

The UT is transitioned from the Issue Detected status to the Calculated status

Business Object (Y/N)**Business Object**[D2-UsageTransaction](#)**10.5 Request to Override Exception****Actor/Role:** MDM Authorized User**Description:**

Some validation calculation rules support manual user override of the exception. The Authorized User makes a request to Override Exception for the UT.

Note: The 'Override Exception' button is enabled on the usage transaction display only if override exception is allowed for all open exceptions and if exception severity for all open exceptions is 'Issues'.**10.6 Close Usage Transaction Exception****Actor/Role:** C2M(MDM)**Description:**

The UT is transitioned from Issue Detected to Override Exception status. When a Usage Transaction enters this status all the open exceptions linked to the usage transaction are closed.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-SEND-EROR
Business Object (Y/N)	Business Object	D2-UsageTransaction

10.7 Request to Discard

Actor/Role: MDM Authorized User

Description:

The Authorized User makes a request to Discard the UT.

10.8 Update Usage Transaction to Discarded Status

Actor/Role: C2M(MDM)

Description:

The UT is transitioned from Issue Detected to Discarded status. When a Usage Transaction enters this status the Send Error algorithm will be triggered to notify the Usage Recipient.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-SEND-EROR
Business Object (Y/N)	Business Object	D2-UsageTransaction

10.9 Identify UT in Issue Detected Status

Actor/Role: C2M(MDM)

Description:

C2M(MDM) identifies Usage Transactions in Issue Detected State.

Business Object (Y/N)	Business Object	D2-UsageTransaction
Customizable process (N)	Process Name	D2-UTID

11.0 Transition Parent Usage Transaction to Next Status

Actor/Role: C2M(MDM)

Description:

The Parent Usage Transaction is transition to the next available status.

Business Object (Y/N)	Business Object
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D2-UsageTransaction

11.1 Determine Usage Recipient Group: Send Error

Actor/Role: C2M(MDM)

Description:

The Service Provider (i.e. Usage Recipient) is determined from the Usage Subscription or Usage Subscription Type

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-SEND-EROR

Business Object (Y/N) **Business Object**

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

Configuration required (Y/N) **Entities to Configure:**

Usage Subscription
Usage Subscription Type
Service Provider

11.2 Determine Processing Method for UT Notification Group: Send Error

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-SEND-EROR

Business Object (Y/N) **Business Object**

D2-UsageTransaction

Business Object (Y/N) **Business Object**

D1-DetermineServiceProviders

11.3 Create an Outbound Message to Send Usage Group: Send Error

Actor/Role: C2M(MDM)

Description:

Outbound Message is created and immediately sent to Usage Recipient.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D2-SEND-EROR

Business Object (Y/N)**Business Object**

D2-UsageTransaction
D2-UsageTranOutboundMesg

11.4 Update Usage Transaction with Batch Code and Batch Run Number Group: Send Error**Actor/Role:** C2M(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.

Process Plug-in enabled (Y/N)**Available Algorithm(s):**

D2-SEND-EROR

Business Object (Y/N)**Business Object**

D2-UsageTransaction
D2-UsageTranOutboundMesg

11.5 Send Error Notification**Actor/Role:** C2M(MDM)**Description:**

Batch Control facilitates completing the Usage Transaction by sending the error to the Service Provider.

11.6 Send Flat File**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) sends flat file.

11.7 Receive Error**Actor/Role:** C2M(CCB)**Description:**

The Service Provider receives the error file.

Sample - Usage Processor Calculate Usage

3.8.1 Retrieve Usage Rule(s) for the Usage Group

Actor/Role: C2M(MDM)

Description:

Retrieve the Usage Rules associated with the Usage Group.

Business Object (Y/N)	Business Object	D1-GenericUsageRule
		D1-UsageGroup
Business Object (Y/N)	Business Service	D1-UsageProcessor

3.8.2 Check Eligibility of Usage Rule

Actor/Role: C2M(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 Object (Y/N)	Business Object	D1-GenericUsageRule
		D1-UsageProcessor

3.8.3 Initiate Usage Rule Processing

Actor/Role: C2M(MDM)

Description:

A Usage Rule can either be stand alone or refer to another Usage Group. Initiate Usage Rule processing.

Business Object (Y/N)	Business Object	D1-GenericUsageRule
		D1-UsageProcessor

3.8.4 Determine Referred Usage Group

Actor/Role: C2M(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 Object (Y/N)	Business Object	D1-UsageGroup
Business Object (Y/N)	Business Service	D1-UsageProcessor

3.8.5 Validate Configuration Group: Get Scalar Details

Actor/Role: C2M(MDM)

Description:

Validate that each of the scalar details to be calculated specifies either a [UOM, TOU, or SQL](#).

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-ValScalar
Business Object (Y/N)	Business Object	D2-GetScalar
		D1-GenericUsageRule

3.8.6 Select Measuring Component(s) Group: Get Scalar Details

Actor/Role: C2M(MDM)

Description:

The Usage Rule definition can specify a listing of measuring components to calculate, if nothing is specified in the Usage Rule then all the measuring components defined in the Measuring Component Type will be calculated.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETSCALAR
Business Object (Y/N)	Business Object	D2-GetScalar
		D1-GenericUsageRule
Configuration required (Y/N)	Entities to Configure:	Measuring Component Type

3.8.7 4.2.1.1 C2M.Upload Device Measurements Estimation IMD Group: Get Scalar Details

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETSCALAR
-------------------------------	-------------------------	--------------

Business Object (Y/N)

Business Object

D2-GetScalar
D1-GenericUsageRule
D2-UsageTransaction

3.8.8 Calculate SQ, UOM, and/or TOU Group: Get Scalar Details

Actor/Role: C2M(MDM)

Description:

Calculate each measuring component, and save results as a Usage Scalar Detail record.

Process Plug-in enabled (Y/N)

Available Algorithm(s):

D2-GETSCALAR

Business Object (Y/N)

Business Object

D2-GetScalar
D1-GenericUsageRule
D2-UsageTransaction

3.8.9 Validate Configuration Group: Get Frequently Read Scalar Details

Actor/Role: C2M(MDM)

Description:

Validate that at least one of the UOM, TOU, or SQI is populated.

Process Plug-in enabled (Y/N)

Available Algorithm(s):

D2-VALFRESCR

Business Object (Y/N)

Business Object

D2-CalFrequentlyReadScalar
D1-GenericUsageRule

3.8.10 Compute Frequently Read Scalar Usage Group: Get Frequently Read Scalar Details

Actor/Role: C2M(MDM)

Description:

C2M(MDM) computes daily scalar usage values for measuring components installed at service points associated with usage subscription.

Process Plug-in enabled (Y/N)

Available Algorithm(s):

D2-GETFRESCR

Business Object (Y/N)

Business Object

D2-CalFrequentlyReadScalar
D1-GenericUsageRule

3.8.11 Validate Configuration Group: Get Interval Details

Actor/Role: C2M(MDM)

Description:

Validate that at least one of UOM, TOU, or SQI is specified in the Usage Rule

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-VALINTDAT
Business Object (Y/N)	Business Object	D2-GetIntervalData
		D1-GenericUsageRule

3.8.12 Retrieve Aggregate Measurement Data Group: Get Interval Details

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETINTDAT
Business Object (Y/N)	Business Object	D2-GetIntervalData
		D1-GenericUsageRule

3.8.13 Apply SUM or MAX function to Interval Curve Group: Get Interval Details

Actor/Role: C2M(MDM)

Description:

Apply SUM or MAX function to Interval Curve and save results to the Usage Period Service Quantities (SQ).

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETINTDAT
Business Object (Y/N)	Business Object	D2-GetIntervalData
		D2-UsageTransaction
		D1-GenericUsageRule

3.8.14 Validate Configuration Group: Apply Math (Interval Data)

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-VALAPPMTH
Business Object (Y/N)	Business Object	D2-ApplyMathInt
		D1-GenericUsageRule

3.8.15 Apply Math Function or Expression to Variables Group: Apply Math (Interval Data)

Actor/Role: C2M(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).

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-APPMATHIN
Business Object (Y/N)	Business Object	D2-ApplyMathInt
		D2-UsageTransaction
		D1-GenericUsageRule

3.8.16 Validate Configuration Group: Get TOU Mapped Usage

Actor/Role: C2M(MDM)

Description:

Validate that either UOM or SQI is populated in the Usage Rule.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETTOUUSG
Business Object (Y/N)	Business Object	D2-GetTOUUsage
		D1-GenericUsageRule

3.8.17 Retrieve and Aggregate Measurement Data Group: Get TOU Mapped Usage

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETTOUSG
Business Object (Y/N)	Business Object	D2-GetTOUUsage
		D1-GenericUsageRule

3.8.18 Apply Mapping Group: Get TOU Mapped Usage

Actor/Role: C2M(MDM)

Description:

Apply the TOU mapping to the interval curve.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETTOUSG
Business Object (Y/N)	Business Object	D2-GetTOUUsage
		D1-GenericUsageRule

3.8.19 Apply SUM or MAX Math Function Group: Get TOU Mapped Usage

Actor/Role: C2M(MDM)

Description:

Apply either the SUM or MAX to values within a TOU period. Results are saved to the Usage Period Service Quantities (SQ).

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-GETTOUSG
Business Object (Y/N)	Business Object	D2-GetTOUUsage
		D2-UsageTransaction
		D1-GenericUsageRule

3.8.20 Validate Configuration Group: Validate Usage Against Tolerance

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-VALTOL
Business Object (Y/N)	Business Object	D2-ValAgainstTol

D1-GenericUsageRule

3.8.21 Determine the Usage to Validate Against Tolerance Value Group: Validate Usage Against Tolerance

Actor/Role: C2M(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.

Process Plug-in enabled (Y/N)	Available Algorithm(s):		
	<table border="1"><tr><td>D2-VALUSGTOL</td></tr></table>	D2-VALUSGTOL	
D2-VALUSGTOL			
Business Object (Y/N)	Business Object		
	<table border="1"><tr><td>D2-ValAgainstTol</td></tr><tr><td>D1-GenericUsageRule</td></tr></table>	D2-ValAgainstTol	D1-GenericUsageRule
D2-ValAgainstTol			
D1-GenericUsageRule			

3.8.22 Perform Comparison Group: Validate Usage Against Tolerance

Actor/Role: C2M(MDM)

Description:

Compare the Tolerance value to the Usage value.

Process Plug-in enabled (Y/N)	Available Algorithm(s):		
	<table border="1"><tr><td>D2-VALUSGTOL</td></tr></table>	D2-VALUSGTOL	
D2-VALUSGTOL			
Business Object (Y/N)	Business Object		
	<table border="1"><tr><td>D2-ValAgainstTol</td></tr><tr><td>D1-GenericUsageRule</td></tr></table>	D2-ValAgainstTol	D1-GenericUsageRule
D2-ValAgainstTol			
D1-GenericUsageRule			

3.8.23 Create Error Group: Validate Usage Against Tolerance

Actor/Role: C2M(MDM)

Description:

An exception is issued with a specified severity level.

Process Plug-in enabled (Y/N)	Available Algorithm(s):		
	<table border="1"><tr><td>D2-VALUSGTOL</td></tr></table>	D2-VALUSGTOL	
D2-VALUSGTOL			
Business Object (Y/N)	Business Object		
	<table border="1"><tr><td>D2-ValAgainstTol</td></tr><tr><td>D1-GenericUsageRule</td></tr></table>	D2-ValAgainstTol	D1-GenericUsageRule
D2-ValAgainstTol			
D1-GenericUsageRule			

Test Assets related to the Current Process

Testing Asset Sr.No	Testing Asset-Flows	No Of Data sets
1	URM-C2M-4221-001-Manually-Create-Usage-Transaction	2
2	URM-C2M-4221-002-Create-Usage-Transaction-Via-Batch-Process	2

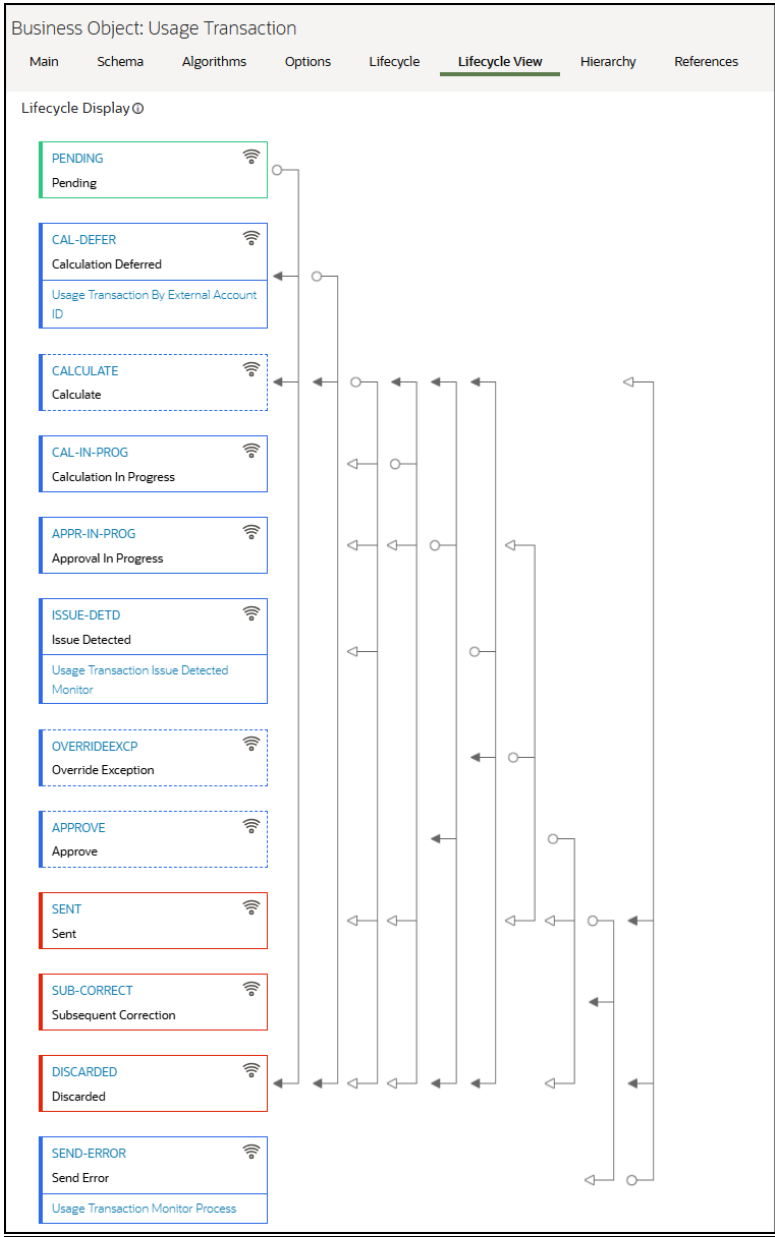
Document Control

Change Record

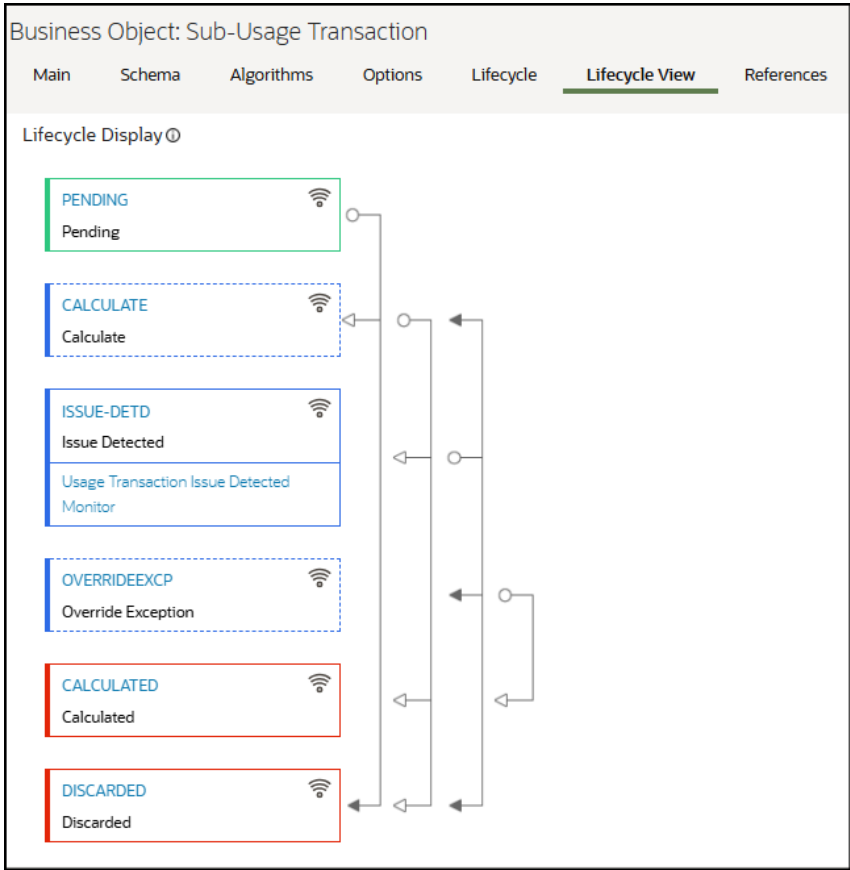
Date	Author	Version	Change Reference
06/13/2011	Mark Barnhart	1	Initial Version
09/10/2011	Galina Polonsky	1	Reviewed
10/21/2012	Layne Nelson	1	Reviewed
09/10/2015	Srinivas Kanteti	2	Update for V2.1
11/20/2015	Walter Wolanski		Reviewed
11/20/2015	Galina Polonsky	2.1	Minor updates, Reviewed
11/20/2015	Galina Polonsky		Approved
6/7/2019	Satya Kalavala		Updated format for v2.7
1/30/2020	Antonio Napoli		Changed Filename, Process name as per URM formatting in this document and Visio
10/23/2024	Kunal Nerkar		Updated document and Visio for C2M v2.9
11/15/2024	Ashish Shukla		Reviewed
12/18/2024	Galina Polonsky		Reviewed, Approved

Attachments

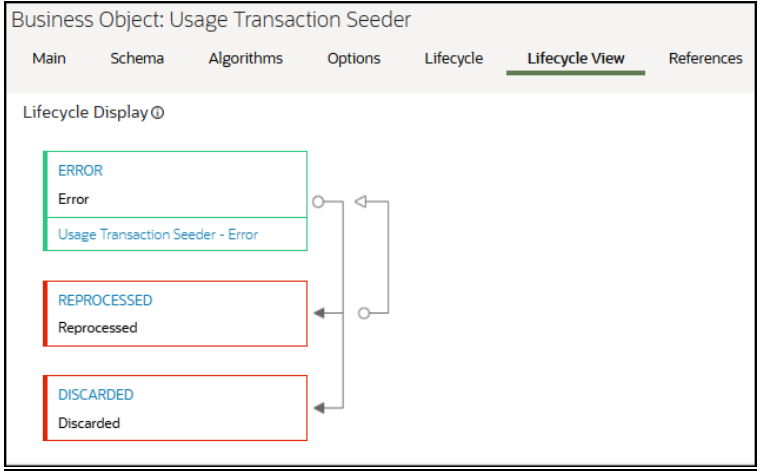
Usage Transaction Lifecycle



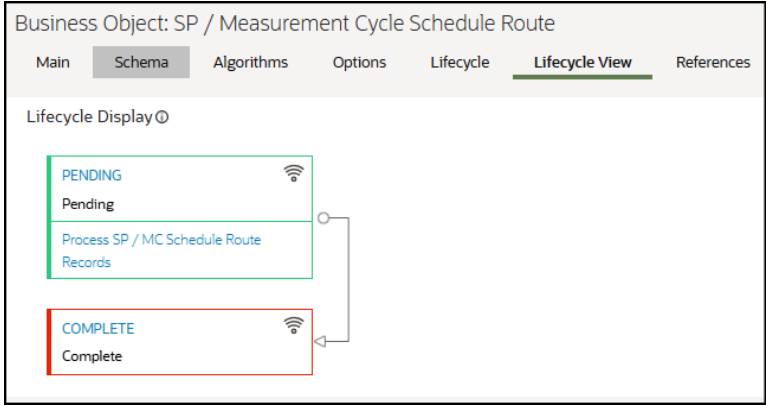
Sub Usage Transaction Lifecycle



Usage Transaction Seeder Lifecycle



SP / Measurement Cycle Schedule Route Lifecycle



Usage Transaction Seeder

Usage Transaction Seeder

Main

Usage Subscription

Q

Usage Subscription External ID

External System

Q

Usage External ID

Previous Usage Transaction

Q

Previous Usage External ID

Estimate Through Date

Bill Condition

Automated Retry

No

Retry Until Date/Time

Defer Calculation

No

Trace

Off

Calculation Mode

Service Provider

Service Provider External ID

Time Zone

External Time Zone

Usage Adjustment Profile Factors

Profile Factor

Characteristic Value

Interval Measuring Component

Start Date/Time

End Date/Time - From

End Date/Time - To

Date Break

Scalar Measuring Component

Start Date/Time

End Range Option

Specified

End Date/Time - From

End Date/Time - To

Allow Estimate

Allow Estimates

Estimate Time

Estimate Date

Save

Cancel

Get Scalar Details

Usage Calculation Rule

Add

Search

Bookmark

Refresh

Main

Usage Calculation Rule

Show All Rules

Main

Calculation GroupUSGGRP_GETSCALAR

Calculation RuleGET_SCALAR_RULE

Sequence1

DescriptionGET_SCALAR_RULE

Detailed Description

Calculation RuleUsage Calculation

Category

Scalar Details

Perform Measurement

Quality Assessment

End Read Option

Exclude Offset Days For

Initial Bill

Start/End Read

Required

Yes

Create Usage Period for

Zero SQ

No

Build Scalar Details

Yes

SP Device Filter

Meter Exchange Read

Unit of Measure	Time of Use	Service Quantity Identifier	Build Service Quantity
GD_KWH			<input checked="" type="checkbox"/>

SQ Rounding Details

Rounding Method

Decimal Positions

Extract To Measurement Data Snapshot

Measurement Data

Snapshot Type

Usage Transaction ID To

Use

Extract To Different

Usage Subscription

Irregular Data Mapping

Measurement Condition From

Measurement Condition To

Irregular Data

Eligibility Criteria List

Add

Record Actions

Edit

Duplicate

Delete

Record Information

Business ObjectGet Scalar Details

Usage Transaction Exceptions

Usage Calculation Exception

Exception Type

Exception Severity

Measurement Retrieval Exception

Exception Type

Exception Severity

Configuration Exception

Exception Type

Exception Severity

Invalid Data Exception

Exception Type

Exception Severity

4.2.2.1 C2M.Calculate Usage

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Usage Rules

Task Box	Level-1	Level-2	Scalar/Interval/Common	Usage Group
7.4	Post-Calculation		Common	Electric - Residential Interval TOU - (on/off/sh) with Business Flag Hold
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Commercial - Coincident Demand
7.8	Usage Calculation	Perform Calculation	Common	Gas - Residential - Simple (total TH)
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Commercial - Demand
7.2	Usage Calculation	Perform Mapping & Calculation	Interval	Electric - Commercial - Demand
7.8	Usage Calculation	Get Data	Scalar	Usage Group - CMA Demo
7.2	Usage Calculation	Perform Calculation	Interval	Usage Group - CMA Demo
8.3	Usage Calculation	Perform Calculation	Common	Electric - Lamp
8.3	Usage Calculation	Perform Calculation	Common	Electric - Badged Item
8.3	Usage Calculation	Perform Calculation	Common	Electric - Multi-Item
7.8	Usage Calculation	Get Data	Scalar	Electric - Residential
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Residential
7.0	Pre-Calculation		Common	Common Usage Group
7.0	Pre-Calculation		Common	Common Usage Group
7.4	Post-Calculation		Common	Common Usage Group
7.2	Usage Calculation	Perform Calculation	Interval	Exelon Usage Group
7.1	Usage Calculation	Get Data	Interval	Electric - Commercial - Extract Interval Curves
7.1	Usage Calculation	Get Data	Interval	Electric - Commercial - Extract Interval Curves
7.8	Usage Calculation	Get Data	Scalar	Retrieve All Scalar Values
7.1	Usage Calculation	Get Data	Interval	Electric - Residential Interval TOU - 3 (on/off/sh & total)
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Residential Peak-Time Rebate

7.2	Usage Calculation	Perform Calculation	Interval	Electric - Residential Interval TOU - 3 (on/off/sh & total)
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Commercial - General (on/off/sh & kW)
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Complex Billing - Customer-Specific
	Usage Calculation	Aggregation	Common	Electric - Historic Consumption
7.2	Usage Calculation	Perform Calculation	Interval	Electric - KWH Consumption With Flow Adjusted
7.2	Usage Calculation	Perform Calculation	Interval	Electric - KWH Consumption With Flow Adjusted
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Residential Solar (Net consumption)
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Commercial Interval TOU (seasonal & PF)
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Commercial - Large (PF)
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Residential Peak-Time Rebate
7.4	Post-Calculation		Scalar	Electric - Residential - Simple (Scalar)
7.8	Usage Calculation	Get Data	Scalar	Gas - Residential - Simple (total TH)
7.8	Usage Calculation	Get Data	Scalar	Electric - Residential - Simple (Scalar)
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Residential Interval TOU - 4 (seasonal & total)
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Residential Interval TOU - 3 (on/off/sh & total)
	Usage Calculation	Perform Calculation	Interval	Water - Sum HCF Intervals
7.8	Usage Calculation	Get Data	Scalar	Electric - Commercial Scalar TOU
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Complex Billing - Customer-Specific
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Complex Billing - Customer-Specific
7.2	Usage Calculation	Perform Calculation	Interval	Electric - Complex Billing - Customer-Specific
	Usage Calculation	Perform Calculation	Interval	Gas - Interval TOU on/off/sh & total Therms
	Usage Calculation	Perform Mapping	Interval	Gas - Interval TOU on/off/sh
7.2	Usage Calculation	Perform Mapping	Interval	Electric - Industrial TOU (on/off/sh)

7.2	Usage Calculation	Perform Mapping	Interval	Electric - Residential TOU (Electric Vehicle)
7.2	Usage Calculation	Perform Mapping	Interval	Electric - Commercial - Large (PF)
7.2	Usage Calculation	Perform Mapping	Interval	Electric - Residential Interval TOU - ANT
7.8	Usage Calculation	Get Data	Scalar	Water - Sum Scalar HCF