

Proposal to introduce a DTS flows for Inventory processing

1. Introduction

1.1. Purpose

This document seeks to explain the approach and use of the proposed two data flows and their associated data items.

The following is provided to explain the logic of the design. Part of this text will need to be included in the DTC or BSC documents to ensure correct interoperation.

Version updated 27th Nov 2020 following discussion with stakeholders, two UMSUG workshops and MRA in respect of data flow design.

2. Data items

2.1. Charge Code

1. Charge Code is a Domain "Code" defined in MDD to ensure it is always CHAR(13).
2. This data item requires inclusion of any leading zeros so that all entries are 13 characters long. It also future proofs the design if there is a future desire to use characters.
3. The valid set in the data item refers to 'as defined in Market Domain Data' although this is taken to include any Charge Codes which the UMSO may define locally within the constraints of the OID.

2.2. CMS Indicator

1. Boolean indicator to distinguish between a CMS & Non-CMS Sub-Meter.

2.3. CMS Unit Reference

1. CMS Unit Reference is a Domain "Code" defined to ensure it is always CHAR(12).
2. When defined as a code the field must always be populated with 12 characters whether they be spaces or zeros. The values will be provided by the customer in the detailed inventory and must align exactly with the values provided to the MA in the CMS Event Log.
3. BSCP520 currently restricts the use of H & T as initial characters on the CMS Unit Reference. The DTC file structure does not use H & T to identify Header & Trailer rows, however the BSCP520 definitions of the Event Log file continues to use the H & T logic. Therefore, the constraint on using H & T as the first character of CMS Unit References is retained. UMSOs should already be validating and rejecting CMS Unit References commencing with H or T, this would continue to be a requirement.
4. The CMS Unit Reference can only contain characters allowed in the definition of the Data Transfer User File Design Specification which includes all the numbers and letters, but also includes some special characters (excluding the | which is the DTS delimiter character).
5. Each CMS Unit Reference must be unique.
6. For CMS Controls the CMS Unit Reference is currently defined in the BSCP as "Control < padded with spaces to make a total of 12 characters >". The MRA have advised against the use of spaces in a variable wide format so it is proposed to use the concatenated words Controller01, Controller02, etc. This will allow up to 99 entries of controllers which is more than sufficient. It allows the CMS Unit Reference to be unique. It requires a rule in the BSCP that genuine CMS Unit References should not commence with "Controller".

2.4. Effective from Date {UMS}

1. The Effective from Date{UMS} should be within the valid range, such as not older than [13] months from today, and not more than [30] calendar days in the future. [13] months is proposed to allow for processing and allowing for data to be processed by HHDC & HHDA in the current settlement timeframe. The future constraint of [30] calendar days is to limit how far in the future the MA receives information which may be changed before it becomes of value to the MA. The current 14 month settlement window is proposed to shorten to [4] months under the proposed changed for Market Wide HH Settlement.
2. The Effective from Date {UMS} is the date that all, or some, the inventories within the MPAN are effective. This is a change from the current practice of each sub-meter having an effective from date. (*subject to decision in section 3*)
3. On change of MA, or on Registration start date of a newly created MPAN, the UMSO should send an Inventory flow with an Effective from Date {UMS} set to be the start date of the appointment. The flow should be sent prior to the commencement date, but no more than [30] days prior to the commencement date. The MA can validate (accept or reject) the UMS Inventory on its receipt, ideally resolving any problems prior to their appointment actually commencing.
4. There is an issue about BST/GMT effective from dates and the interaction with the appointment dates. For example, if the Inventory EFD is 1st June, and the MA appointment is EFD 1st June. The DC needs data for the last two time periods of the previous day, so this means the last two time periods of 31st May need calculation. This is something the MA will need to resolve within their own Equivalent Meter. This will simplify under the proposed changed for Market Wide HH Settlement.

2.5. Inventory Sequence Number

1. Inventory Sequence Number uniquely identifies the set of data being sent. If a set of data is sent with Inventory Sequence Number = 3, which may be accepted or rejected, then the next set of data sent should be Inventory Sequence Number = 4.
2. In the event the MA is de-appointed for a year, then re-appointed, then in a year's time the Inventory Sequence Number may have increased to 15. So, the UMSO is incrementing the Inventory Sequence Number for that MPAN, but the receiving MA will not necessarily receive a contiguous number, just a higher number than the previous value they hold.
3. In the event that one or more versions are rejected, then to avoid any ambiguity, once the errors are corrected, the resent file will have an incremented in number. For example, if Inventory Sequence Number 7 is rejected due to an invalid Charge Code, then the subsequent corrected version, would be Inventory Sequence Number 8.
4. The definition is an INT(4) so monthly updates will reach a value of 9999 after 833 years of monthly submissions, which should be sufficient.

2.6. Number of Items

1. It is not expected that a value of zero would be included in the inventory file. The feedback from UMSOs indicates they reject or exclude zero entries. However, if the MA receives a zero entry they should process as normal.

2.7. Response Reason Code

1. Described further in section 0

2.8. UMS Error code

1. A code to identify the different errors within the inventory

Values are:

- A Invalid Switch Regime
- B Invalid Charge Code
- C Invalid CC/SR combination
- D Invalid CMS Unit Reference

2.9. UMS Sub-Meter

1. Current requirement in the BSCP is to allocate upper case to non-CMS and lower case to CMS. There is no requirement to continue this convention as the CMS Indicator will differentiate between the different types of Sub-Meter. However, the feedback in the UMSUG workshop is to retain this convention.
2. The Sub-Meter used for CMS must equal the Sub-Meter used by the CMS provider, including upper/lower case as appropriate.
3. The Sub-Meter must be unique within an MPAN.

2.10. Switch Regime

1. Switch Regime is a "Code" defined in MDD to ensure it is always CHAR(3).
2. This requires inclusion of any leading zeros so that all entries are 3 characters long.
3. The valid set in the data item refers to 'as defined in Market Domain Data' although this is taken to include any Switch Regimes which the UMSO may define locally within the constraints of the OID.

3. UMS Inventory Data Flow

1. The UMS Inventory flow design combines the existing BSCP520 summary and control file into one new DTC flow.
2. Information for multiple MPANs can be included in a single file.
3. The entry for an MPAN is associated with a different effective from date.
4. Each submission for an MPAN has an incrementing Inventory Sequence Number
5. The submission of MPAN data must include either Option 1 or Option 2.
 - a. **Option 1**, information for *all* the active Sub-Meters for that MPAN, even where some of the inventory data for a Sub-Meter has not changed since a previous submission. This is to avoid any ambiguity and ensure a full set of inventory data for each Sub-Meter is provided each time. Typical example is where the customer updates the inventory for the lighting equipment monthly, but the traffic signals may be updated annually. In this event the effective date for all the Sub-Meters will reflect the date on which they were last all updated. For the purpose of UMSOs managing the age of inventory submissions they will need to retain the age of which part of the inventory was updated at what time. The design approach is that the submission will include information for every Sub-Meter which removes any ambiguity for the MA by ensuring a complete record for the MPAN each time.
 - b. **Option 2**, information for one or more Sub-Meters for that MPAN, which have changed since a previous submission. This is consistent with the current approach of only sending inventories which have changed. Typical example is where the customer updates the inventory for the lighting equipment monthly, but the traffic signals may be updated annually. In this event the effective date for each Sub-Meter will reflect the date on which they were each last updated. For the purpose of

UMSOs managing the age of inventory submissions the age of each Sub-Meter could be different depending on which part of the inventory was updated at what time. The design approach could lead to ambiguity of the most recent information for each Sub-Meter.

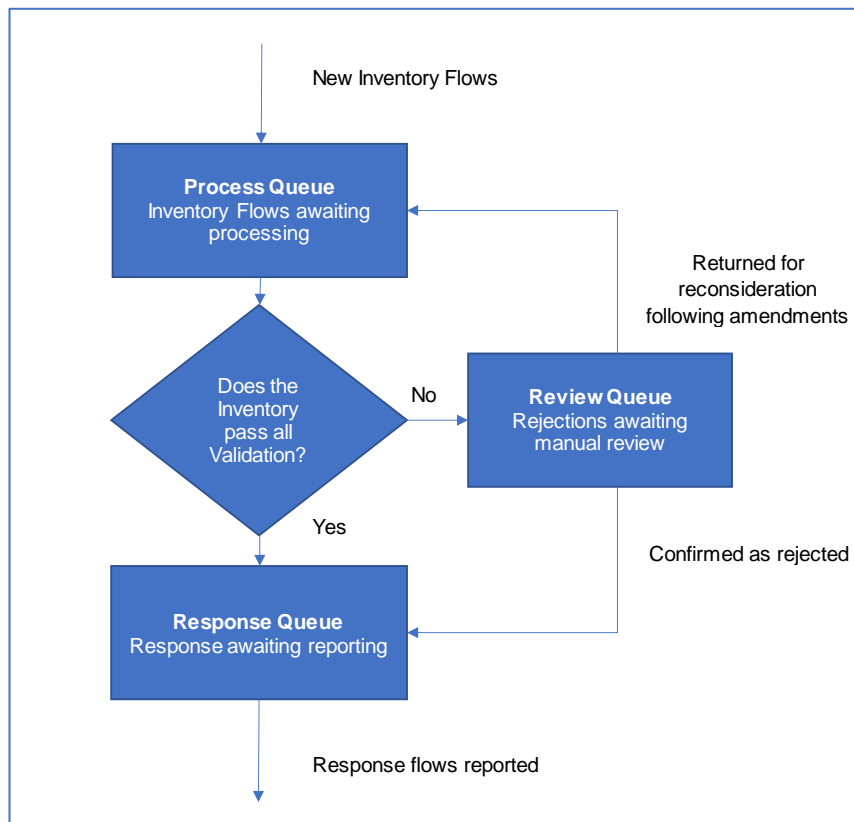
- c. **Comments**, Option 1 was questioned in the Oct workshop, both options were discussed in the Nov workshop but not concluded. The following points should be considered in judging the options:
- i. In both Options, the change of MA who will require details for all sub-meters prior to their commencement;
 - ii. Option 1 makes it explicit to the MA the information to use reducing risk of error;
 - iii. Option 1 reduces the risk of 'old' incorrect data remaining with MA;
 - iv. Option 1 reduces the opportunity for manual error by the UMSO to all changed sub-meters;
 - v. The future MHHS approach will virtually all be single sub-meter to a single MPAN with no multiple sub-meters;
 - vi. A resend of the same sub-meter data as previously submitted should not reveal any new validation failures by the MA;
 - vii. The UMSO IT system would be configured to ensure all the submeter data is resent (or not depending on chosen option), either option should not require any different user input;
 - viii. Whichever option is selected, then the data flow design does not need to change, just the business rule of sub-meter population. So, if there is a desire to change the business rule subsequently the dataflow should not need to be changed.
6. When an MPAN/Sub-Meter receives historic updates, then the entry should include the earliest EFD{UMS} entry plus entries for all the subsequent effective from dates (via multiple GP1 groups). For example, a retrospective update with EFD{UMS} of 1st Dec 2019, would also include, say, update effective from 1st Jan 2019, 1st Feb 2019, etc. to one that covered today
7. On change of Supplier or change of HHDC, with no change of MA, the UMSO does not need to resend any information to the MA.
8. If the UMSO receives a statement from the customer or determines the inventory has not changed there is no need, but it does not prevent the UMSO sending an update (even the same inventory details) to the MA.
9. It is assumed that managing this flow successfully on a large scale will rely on an IT system, use of spreadsheet processing will become impractical except for UMSOs with a very small portfolio.

4. Comments on UMS Response Data Flow

1. The UMS Response flow design combines a report of successfully processed data and rejected data. It was suggested defining two DTC data flows, one for acceptance, another for rejection, but this is not considered optimum in the DTC design.
2. To make the UMS Response a sensible file size and to not repeat all the data that it was sent as the DTN is considered a reliable communication mechanism. The rejected data items are only identified once in the response flow.
3. As an MA we anticipate a business process that has several queues. The Process Queue would be added to by all newly arriving Inventory data flows and would include all the inventories awaiting re-processing. The Review Queue would be added to where the

process (described below) identifies a validation failure. Some validation failures would not require manual review others would be set for manual review. Where an Inventory fail validation for the lowest Inventory Sequence Number, we anticipate 'pending' any subsequent Inventories until the earliest one is resolved.

4. The manual review of the Review Queue entries would either result in the confirmation of the rejection, or changes of information, which result in the MPAN/Inventory Sequence Number being returned to the Process Queue for repeated processing.
5. Any inventory that runs through the validation process successfully would be added a Response Queue so that it can be reported back to the relevant UMSO. Similarly, any manually reviewed validation failures which are manually confirmed as rejections will be added to a Response Queue prior to being reported back to the UMSO.
6. The UMS Response flow will not necessarily contain all of the MPANs in a recently submitted UMS Inventory, some MPANs may be responded to immediately, others may be held in the Review Queue and processed subsequently. For example, a longer response may be where the validity of an MA appointment is being confirmed prior to processing or rejection. In all cases a response should be submitted within 5 WDs as currently defined in the BSCP.
7. The UMS Response flow would be sent by the MA to the respective UMSO several times each day and may contain entries for multiple MPANs.
8. It is assumed that managing this flow successfully on a large scale will rely on an IT system, use of spreadsheet processing will become impractical.



4.1. MA validation rules for the UMS Inventory

The following sequence is envisaged for the MA to validate and create the UMS Response:

From the Process Queue, select an MPAN and the record with the lowest Inventory Sequence Number for that MPAN. Process in the following order:

1. There are some fundamental checks which negate any further validation, once failure of the check is reached, then the set of data for that MPAN and that Inventory Sequence Number is rejected. So, in order they are:
 - a. File received from incorrect UMSO or invalid MPAN
 If received from an incorrect UMSO, identified from MPAN initial two digits and UMSO MPID. Also, if the MPAN core is simply invalid (MPAN wrong length or check digit does not validate) then the Inventory is rejected.
 If it fails these tests then it is rejected with **Response Reason Code = B**
 - b. Inventory Sequence Number error
 If the Inventory Sequence Number is equal to, or lower, than the Inventory Sequence Number currently recorded as processed (accepted or rejected) within the MA Equivalent Meter then the Inventory is rejected. The latest Inventory Sequence Number (of the rejected data) processed should be incremented.
 If there are two identical sequence numbers for a MPAN in the Process Queue, we do not know which set of data is the correct one, so both will be rejected.
 If it fails these tests then it is rejected with **Response Reason Code = C**
 - c. Invalid EFD{UMS}
 If the dates are outside the valid range – see comment above in 2.4 about the valid range of dates.
 If it fails these tests then it is rejected with **Response Reason Code = D**
 - d. No appointment
 If the MA is not appointed to the MPAN, then it is rejected. Need to take account of Inventories having Effective from Dates {UMS} which are in advance of the actual appointment commencement date.
 If it fails this test then it is rejected with **Response Reason Code = E**
 - e. Invalid Sub-Meter
 If the Sub-Meter is not valid for the MPAN or data for a Sub-Meter is missing (*subject to decision in section 3*), then it is rejected.
 If it fails these tests then it is rejected with **Response Reason Code = F**
2. If all the above checks are passed then validation of the inventory content should commence. When validating the content all the following checks should be performed for all of the inventory data provided. This will ensure that if there is a problem identified than a complete list of rejections can be passed back to the UMSO. This should minimise repeated attempts to correct an inventory. The following highlight a hierarchy of checking and reporting:
 - a. UMS Error Code = A, Invalid Switch Regime
 A single entry of any invalid Switch Regime identified in any of the Sub-Meters.
 If it fails this test then a list of each failure is reported once in **Group RP2**
 The Group RP2 would include the erroneous Switch Regime, such as: RP2|A|ABC|||

b. **UMS Error Code = B, Invalid Charge Code**

A single entry of any invalid Charge Code identified in any of the Sub-Meters.

If it fails this test then a list of each failure is reported once in **Group RP2**

The Group RP2 would include the erroneous Charge Code, such as:

RP2|B||1234567890123||

c. **UMS Error Code = C, Invalid combination of a valid Charge Code with a valid Switch Regime**

Where the combination of a valid Charge Code or a valid Switch Regime are deemed to be an invalid combination as per the published OID/MDD, then an entry of the CC/SR combination is included once in the UMS Response file. Invalid Switch Regime and Invalid Charge Codes will have been reported against Error Code A & B respectively and will not be reported again in this group.

This will include the validation in the context of the combination. For example, a SR=100 with any Charge Code in a CMS Sub-Meter is deemed to be an invalid combination. Similarly, a Switch Regime=999 with any Charge Code in the non-CMS Sub-Meter is deemed to be an invalid combination.

This will include invalid *Controller* Charge Codes and Switch Regime combinations.

If it fails this test then a list of each failure is reported once in **Group RP2**

The Group RP2 would include the erroneous combination of Switch Regime and Charge Code, such as: RP2|C|031|0300500000100||

d. **UMS Error Code = D, Invalid CMS Unit Reference**

CMS Unit Reference which are duplicated or incorrect number of characters is deemed to be invalid.

If it fails this test then a list of each failure is reported once in **Group RP2**

The Group RP2 would include the erroneous CMS Unit Reference such as:

RP2|A|||Test node|

If it fails these tests then it is rejected with **Response Reason Code = G**, with information included in group RP2 with the respective invalid data.

3. If all the above checks are passed, then the response reason code in **Group RP1** for the MPAN & Inventory Version Sequence will be **Response Reason Code = A** for accepted and will be added to the Response Queue.
4. If one of the above checks fail, then if the MPAN & Inventory Sequence Number will either:
 - a. be added directly to the Response Queue with the appropriate Response Reason Code and associated information, or
 - b. be added to the Review Queue. If there are any subsequent Inventory Sequence Numbers for the same MPAN, these will set to pending until the lowest sequence number is resolved (accepted or rejected), when they are then reconsidered by the Process Queue
5. The processing will then proceed to the next set of data in Process Queue , returning to step 1, until all entries in the Process Queue have been considered.