Synchronization Technical Interface Specification

Meter Data Management and Repository

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Related Documents

The following documents are related to the MDM/R Synchronization Interface.

Document Title	Document ID
MDM/R Synchronization Updates Report Technical Specification (IR06)	SME-SPEC-81
MDM/R Synchronization Exception Report Technical Specification (IR07)	SME-SPEC-82
MDM/R Incomplete Synchronization File Set Report Technical Specification (IR10)	SME-SPEC-84
MDM/R Synchronization Staging Table Loader Exception Report Technical Specification (IR14)	SME-SPEC-85
MDM/R VEE Standard for the Ontario Smart Metering System	IESO_STD_0078
MDM/R TOU Schedule and Calendar Manual	SME_MAN_0005
MDM/R File Transfer Services and Web Services Configuration Workbook	SME_MAN_9001
MDM/R Service and Performance Levels	SME_SPEC_0005
Ontario Regulation: Functional Specifications for an Advanced Metering Infrastructure, Version 2	440/07
Ontario Regulation: Designation of Smart Metering Entity	233/08
Ontario Energy Board Order EB-2015-0297 Smart Metering Entity	EB-2015-0297

Table of Changes

The following is a summary of changes to this document from version 1.10 dated July 25, 2024

Reference (Section)	Former Section	Description of Change
		Table, figure and example numbers updated throughout document where needed.
2.2.6.4		Format ”105” removed from Commodity Rate class row in Table 2.2.6.4-1

1. Introduction

Special Note: This document is part of a series of documents that compile the MDM/R Technical Interface Specifications. These documents are included in the series that is available in the MDM/R Service Desk Knowledge Base at https://mdmrsupport.service-now.com/:

- MDM/R Universal SDP ID Assignment Technical Interface Specification
- MDM/R Billing Service Standard Technical Interface Specification
- MDM/R Web Services Retrieval Technical Interface Specification
- MDM/R Meter Read Technical Interface Specification – Sensus
- MDM/R Meter Read Technical Interface Specification – AMRDef
- MDM/R Meter Read Technical Interface Specification – Trilliant
- MDM/R Meter Read Technical Interface Specification – Itron
- MDM/R Meter Data Removal Request / Response Technical Interface Specification

1.1 Purpose

This document defines the technical interface specification for the Synchronization Interface for the Meter Data Management and Repository (MDM/R). The specification in this document provides the detailed format of the Synchronization file set associated with the integration of the MDM/R with various external systems of the Local Distribution Companies (LDCs), and/or their authorized agents.

1.2 Document Scope

The scope of this document is limited to the integration specification between the MDM/R and various external data systems, including the specific file formats of the Synchronization process.

This document does not define the overall design and the internal behaviour of the MDM/R itself or the technical design and configuration of the File Transfer Services (FTS) described in the MDM/R File Transfer Services and Web Services Configuration Workbook.

1.3 Definition of Terms

Terms used within this document have been defined in the table below.

Table 1.3| Definitions

Term	Description
AMCC	AMCC means the Advanced Metering Control Computer that is used to retrieve or receive and temporarily store Meter Reads before or as they are being transmitted to the MDM/R. The information stored in the AMCC is available to log maintenance and transmission faults and issue reports on the overall health of the AMI to the LDC.

Term	Description
AMCD	AMDC means the Advanced Metering Communication Device within a Smart meter that measures the amount of electrical energy consumed by a residence, business, or an electrically-powered device and transmits that data to an AMCC.
AMI	AMI means the Advanced Metering Infrastructure, it includes the meter, Advanced Metering Communication Device (AMCD), Local Area Network (LAN), Advanced Metering Regional Collector (AMRC), Advanced Metering Control Computer (AMCC), Wide Area Network (WAN), and related hardware, software, and connectivity required for a fully functioning data collection system. An AMI does not include the MDM/R.
AMRC	AMRC means the Advanced Metering Regional Collector, which is the part of the AMI that collects meter read data from Smart Meters and transmits that data to the AMCC.
AS2	AS2 means Applicability Statement 2 and is a specification of the Electronic Data Interchange over the Internet (EDIINT) working group of the Internet Engineering Task Force (IETF).
Authorized Agent	An organization that will send and receive files and reports in addition to or on behalf of the LDC. Examples of Authorized Agents are AMI Operators and Billing Agents.
Billing Quantity	Refers to consumption data that has been through VEE and Framing and is ready for use in billing.
Block Demand	Calculated kVA and/or kW demand based on a time period with fixed boundaries, such as one hour (e.g. 16:00 to 17:00).
CIS	The Customer Information System, in which Customer account information is held.
Crush	The submission of an End Date/Time for an element that is equal to the current Start Date/Time, in effect cancelling the element.
CST	Central Standard Time
Consumer or Customer	Refers to residential or small general service consumers where the metering of demand is not required.
CPP	Refers to specific rate structures called Critical Peak Pricing. Under these structures, the price of electricity is variable. Such an occurrence will typically occur when wholesale prices for electricity are very high due to constrained supply. CPP is currently not used in the MDM/R.
Currently in Effect	Specific to Synchronization, currently in effect refers to an element that is active or the record has a start date and no end date associated with it.
Delivered Energy	This term is used for energy delivered from the electrical grid (the distributor's energy system) to the premise.
Delivered SDP	The Service Delivery Point dedicated to processing Delivered Energy.
EST	In this document the term "EST" means Eastern Standard Time.

Term	Description
Extracted Date Time	The Extracted Date Time is the date and time the data in the synchronization file set was extracted from the source systems. This may be coincident with the time that the creation of the synchronization file set was started.
File Transfer Service or FTS	The service which manages the transfer of files between the MDM/R and LDCs and/or the LDC's authorized agents.
Firmographic /Demographic	Basic profiling information about business organizations and individuals, respectively. Firmographic data is more relevant for business-to-business transactions involving automated electronic data exchange between businesses or trading partners; they do not typically involve Customers.
Framing	Framing is the process by which interval data is assembled into Billing Quantities.
Framing Structure	Framing Structure means a parameter that denotes the method by which Meter Reads are assembled into Billing Quantities by the MDM/R. This is displayed in the MDM/R GUI as the Energy Purchase Service.
GKWH	This term is used in the channel names for the Received Energy, to distinguish from channels for Delivered Energy, which would use KWH in the channel names.
Global or Globally	Global refers to configuration settings that are set at the same value for all LDCs.
GUI	Graphical User Interface is the most commonly used type of computer interface, exemplified by Microsoft Windows and MacOS. Typical elements of a GUI are a mouse interface and a system of visual directories that look like file folders.
In Effect	Specific to Synchronization, 'in effect' refers to an effective-dated element that is active between the Start Date/Time and the End Date/Time (effective period) of the element.
Interested Party	An entity that is authorized to access specific data from the MDM/R, e.g. an Interested Party may be a Billing Agent or an AMI Operator.
Hourly Framing	For SDPs with an Hourly Framing Structure the Framing process is not used. On building a Billing Service Standard Reply, the MDM/R retrieves the relevant interval consumption data from the Meter Data Database and provides hourly data no matter the interval length of the Meter Read data that was submitted.
Incremental Synchronization (I-sync)	The synchronization process by which MDM/R Service Recipients transmit the elements, or changing elements, to the MDM/R to support their business processes.
kVAh	Kilovolt-ampere hour
kVARh	Kilovolt-ampere-reactive hour
kWh	Kilowatt hour
kW77 Peak Demand	Calculated kVA and/or kW demand in the period between 7:00 a.m. & 7:00 p.m. prevailing time on weekdays that are not statutory holidays within a billing period.

Term	Description
LDC	Means a Local Distribution Company, which is an LDC, as defined in the Ontario Energy Board Act, 1998.
Meter Read	Is a number generated by a meter that reflects cumulative electricity consumption at a specific point in time. (The Meter Read and related data will be reported to the MDM/R at a specific Service Delivery Point.)
Meter Transfer Block	Meter Transfer Block is a set of data transferred from an AMCC (or other system) to the MDM/R relating to Meter Reads for a specific Universal SDP ID. A Meter Transfer Block is a set of interval consumption data with a register reading at the end of the set of interval data, or a set of interval register reads for a number of contiguous intervals.
MDM/R	Means the meter data management and meter data repository functions within which Meter Reads are processed to produce Billing Quantity data and the storage of data for future use.
MDM/R Administrator	An administrator of the MDM/R system. This may be a person from the Operational Service Provider (OSP) or the Smart Metering Entity (SME) depending on the task involved.
MMD	Means the MDM/R Master Directory, which is a portion of the MDM/R that contains the data relationship among the Meter Read data received from the AMCC and the Service Delivery Point.
Net Metering	The Net Metering program is established by the Ministry of Energy and is governed by the Regulation O. Reg. 541/05: NET METERING. This regulation sets the rules for eligibility, technical requirements, financial calculations, and other administrative procedures for net metering. In the MDM/R, Net Metering is supported through specific configuration to enable the processing of both Delivered Energy (KWH data) and Received Energy (GKWH data) sourced from a single bi-directional meter. This is the SME's preferred Net Metering solution that has been available in the MDM/R since May 1, 2023.
Net Metering 2 SDP	Under the same regulation, O. Reg. 541/05: NET METERING, an accommodation is being made for LDCs who have implemented single bi-directional meters that are represented by two (2) distinct Service Delivery Points. One SDP is dedicated to processing KWH data (Delivered Energy), while the other SDP is dedicated to processing GKWH data (Received Energy). Relevant Master Data (where applicable) needs to be aligned between the Delivered SDP and Received SDP.
Organization ID or ORG ID	A unique Identifier for an organization that is assigned within the MDM/R during the registration process. Examples of organizations include LDC, billing agents, AMI operators and Retailers.
OSP	Operational Service Provider.

Term	Description
Participant	Participant refers to an organization that is configured as an AS2 client and registered with the MDM/R to exchange files using File Transfer Service.
Periodic Framing	During Periodic framing the Framing process computes and records a single value that represents the total kWh usage for each day.
Received Energy	This term is used for the electricity conveyed into the distributor's electricity system by the generator, e.g. a solar panel installation generates a number of kWh, the premise uses some of the energy, the excess is transmitted back to the electrical grid.
Received SDP	The Service Delivery Point dedicated to processing Received Energy.
SDP	Service Delivery Point means the point at which delivery is metered or calculated. The SDP is the point at which billing occurs based on input from one or more smart meters.
SDP ID	Service Delivery Point Identifier is the LDC supplied and controlled identifier that relates to the SDP. It must be unique within the LDC's systems and must not change. It relates to the SDP within the MDM/R.
SME	SME, and any subsidiary, means the IESO acting as the Smart Metering Entity designated under the Electricity Act, 1998 (Ontario).
Staging Table Loader (STL)	The STL processes synchronization files, loads the staging tables and generates the Synchronization Staging Table Loader Exception Report (IR14).
TOU	Time of Use – The sale of electricity based on rates established for certain times of day, days of week, and/or season of year. For billing purposes, Interval data is grouped into a number of rating periods, in accordance with the rate structure determined by the Ontario Energy Board, to enable the recording of consumption at certain times of the day, week, or year.
ULO	Ultra-low overnight time-of-use rate plan with a rate structure determined by the Ontario Energy Board. This is an optional rate structure that LDC customers can select to opt-in and consists of four price periods: an ultra-low overnight price period that applies from 11:00 PM–7:00 AM on weekdays, weekends, and holidays throughout the year, on-peak price period, mid-peak price period and off-peak price period.
Universal SDP ID	Universal Service Delivery Point Identifier is the MDM/R unique identifier by which authorized Parties interact with the Service Delivery Point. This identifier will be provided to the LDC in the "Universal SDP ID Assignment Response" file. The Universal SDP ID is unique within the MDM/R.
VEE	VEE means Validation, Estimating and Editing of Meter Reads to identify and account for missed and inaccurate Meter Reads to derive billing data. The algorithm to complete VEE identifies gaps in Meter Reads and rebuilds consumption based on the estimation method stipulated by the VEE Service synchronized with the SDP.

1.4 Interface Descriptions

Each technical interface specification description has a common layout, as follows:

- Description
- Integration
- Business Rules
- Pre-conditions
- Post-conditions
- Assumptions and Limitations
- Frequency and Timing
- Interface Samples
- File Formats

1.5 Document Relationships

The following documents are related to the Synchronization Interface:

1. MDM/R File Transfer Services and Web Services Configuration Workbook: This document is an aide to assist Organizations with their AS2 configurations for file transfers to and from the MDM/R.
2. MDM/R Synchronization Updates Report Technical Specification (IR06): This document describes the format and content of the Synchronization Updates Report that reports on updates made to the MDM/R MMD in a specific synchronization submission.
3. MDM/R Synchronization Exception Report Technical Specification (IR07): This document describes the format and content of the Synchronization Exception Report and reports on the updates that could not be made to the MMD in a specific synchronization submission.
4. MDM/R Incomplete Synchronization File Set Report Technical Specification (IR10): This report describes exceptions that occur in the order and completeness of the Synchronization file set.
5. MDM/R Synchronization Staging Table Loader Exception Report Technical Specification (IR14): This report provides the status and possible exceptions encountered during the Staging Table Loader process.
6. MDM/R Service and Performance Levels: This document sets out the volumetric projections, and corresponding expectations for service and performance for the MDM/R.

The documents in this library are available from the MDM/R Service Desk Knowledge Base (https://mdmrsupport.service-now.com).

1.6 Conventions for Data Field Formats

The conventions used for the data fields in the files contained within this document are as follows.

Table 1.6| Data Field Formats

Data Type	Char(X)	Varchar(X)	Fixed Number (X)	Number (X) or Number (X,Y)	Date/Time	Time Interval
Description	A fixed length alphanumeric field with a defined length of "X"	A variable length alphanumeric field with a maximum length of "X"	A fixed length numeric field with a defined length of "X"	A floating numeric field with a maximum of "X" digits to the left of the decimal and a maximum of "Y" digits to the right of the decimal (if existing)	A Date/Time or Date field	A length of time as indicated in months, days, hours and minutes
Format	AAAAA	AAAAA	NNNNN	NNNNN.NN	yyyyMMddHHmmss or yyyyMMdd	MMDDhhmm
Special Instructions	Includes the full ASCII character set, with the exception of the Pipe (|) character Character count must always be the defined length. Padding is not acceptable or required.	Includes the full ASCII character set, with the exception of the Pipe (|) character	Fields of this type must be padded to the left with zeros.		Date/Time fields must always be expressed in Eastern Standard Time (EST). yyyy – Year MM – Month dd – Day HH – Hour, in 24 hour format mm – Minutes ss – Seconds	MM – Month DD – Day hh – Hour, in 24 hour format mm – Minutes
Format example	Char(6) AB123C	Varchar(10) AB123C ABC123DEFG	Fixed Number (3) 123 045	Number (5,2) 123 12345.67	Date/Time 20130220 130703 Date 20130220	Time Interval 00000100 indicating 1 hour intervals

1.7 MDM/R FTS Use of File Names

The MDM/R FTS refers to each registered organization as a Participant. The value assigned to the Participant is used in two places.

- The first is in the configuration of the Participant AS2 client. The AS2 client will add the AS2 ID to the AS2 protocol headers attached to each file that it sends to the MDM/R.
- The second is in the list of Participants and their associated Organization IDs. This list is part of the MDM/R FTS configuration files and is maintained by the MDM/R Administrator.

Each file that is sent by a Participant to the MDM/R or by the MDM/R to a Participant has a file name that meets the specifications in this section.

MDM/R FTS depends on the file name specification to direct incoming files into the appropriate directory for processing by the target application without looking into the content of the file. Likewise, the Participant is able to rely on the names of files received from the MDM/R.

1.7.1 Structure of MDM/R File Names

The file names used by MDM/R are structured into two groups of elements.

The first group of elements is common to all file names and each element must always be present and in the order in which they are specified in the next section.

The second group of elements is dependent upon the file type being named. If an element is specified for a file type then it must be present and it must be in the order in which it is specified.

File name elements are separated by a period (.).

File name elements may contain letters (A-Z, a-z) and numbers (0-9). Other than letters, numbers and the separator character, no other characters (e.g. / \ : * ? " | < > and all others) are permitted in the file name elements.

The file name ends with the extension .DAT.

The file name specification does not speak to the manner in which data in the file is organized. Files containing delimited data and files containing XML encoded data will both have a .DAT extension.

The general syntax for the file name is:

<ORG_ID_1>.<ORG_ID_2>.<FILE_ID>.<FILE_VER>.<DATE_TIME>{.request specific element n}.DAT

The specific elements of the file name are described in the following sections.

1.7.2 File Name Elements Common to All Files

The first five elements described below are common to all file names.

Element 1: ORG_ID_1 (Organization ID)

This mandatory element is the eight-character Organization ID, beginning with ORG, that identifies the Participant on whose behalf the file has been submitted or received.

The Organization ID must be a valid Organization ID that is already known to the MDM/R FTS.

Element 2: ORG_ID_2 (Agent Organization ID)

This mandatory element is the eight-character Organization ID, beginning with "ORG", that identifies the authorized Agent that is acting on behalf of the Participant to submit and receive files.

The Agent Organization ID must be a valid Organization ID that is already known to the MDM/R FTS.

Relationship between Element 1 and Element 2

In the situation where a Participant is submitting its own files the Organization ID and the Agent Organization ID will be identical.

The relationship of Organization ID to Agent Organization ID must be known to the MDM/R FTS at the time the relationship is asserted through an incoming file name. This information is captured when the relationship is established. It is maintained by the MDM/R Administrator in MDM/R FTS configuration files.

Agent Organization ID is used in situations where one organization is acting on behalf of another organization. An example of such a relationship is a third party authorized agent submitting a Synchronization file set on behalf of the LDC with which it has a contract.

Element 3: FILE_ID (FILE ID)

This mandatory element is a four-digit value that identifies the type of file.

FILE_ID comes from the list of valid files that can be sent to the MDM/R. This list is maintained by the MDM/R Administrator and is part of the MDM/R FTS configuration files. This list only changes when a new type of file is introduced or retired.

This document contains the list of valid files and the specification of each.

Table 1.7.2 | Valid Synchronization File Type

FILE ID	Version	File Type	Comments
4000	00	Incremental Synchronization	Update the MDM/R Master Directory as SDP element changes are supplied by the LDC to the MDM/R, based on changes in LDC Data Source(s).

Element 4: FILE_VER (File Version)

This mandatory element is a fixed two-digit value that identifies the format version of the file.

The file format version starts at 00 and increases as new versions of each file format are introduced.

File format version is provided to allow multiple format versions of the same file type to co-exist. This is of use in situations where the MDM/R is migrating to a new format version of a file but must maintain the previous version long enough for each Participant to migrate to the new format.

The current version is listed in the Valid Synchronization File Types table above.

Element 5: DATE_TIME (Date and Time)

This mandatory element is a 14-digit value that identifies the date and time of the file.

The format of the field is yyyyMMddHHmmss where yyyy is the year, MM is the month, dd is the day, HH is the hour in 24 hour clock format, mm is the minutes and ss is the seconds. All positions must be numeric and meet the standard validity tests of date and time.

The value in this field is set by the sender. The value in this field should not be assumed to be the file creation date and time. The business meaning of this field is further defined in the specification of the individual interface.

Where a file submission is made up of multiple files each file in the set must have the same value for DATE_TIME.

1.7.3 File Name Elements Specific to Synchronization Files

File ID 4000 – Incremental Synchronization – Version 00

Version 00 of the Incremental Synchronization is conceptually a single file but it is made up of a set of seven (7) related files.

Element 6 – TX_ID (Transaction Identifier)

This mandatory element is a fixed six-character value that relates all seven files in this file type. The same value must be present in this element position for each file that makes up the synchronization file set.

The value that is placed in this element is defined by the sender. The value is used to group a given file set together and as a reference for the sender.

NOTE: Characters used in this file name element are limited to the alpha (upper and lower case letters) and number characters (integers 0 through 9) of the ASCII character set. Special characters must not be used (e.g. / \ : * ? " | < > and all others).

Element 7 – FILE_NO (File Number)

This mandatory element is a two-digit value that identifies which of the seven files that make up an Incremental Synchronization file set. The file numbers are:

00. Manifest File
01. Asset Data File
02. Premise Data File
03. Service Agreement Data File
04. Parameter Data File
05. Relationship Data File
07. Component SDP Channel to Channel & Channel to Formula Data File

NOTE: Characters used in this file name element are limited to the number characters (integers 0 through 9) of the ASCII character set. Special characters must not be used (e.g. / \ : * ? " | < > and all others).

Element 8 – SEGMENT_NO (Segment Number)

This mandatory element is a fixed two-digit value that represents the file segment number. The purpose of this is to allow an LDC to break up a large synchronization file into smaller synchronization files.

For example, if you are submitting three Asset files, the segment numbers will be 01, 02, and 03.

If a file is sent as a single segment the value for the Segment Number element must be 01.

NOTE: Characters used in this file name element are limited to the number characters (integers 0 through 9) of the ASCII character set. Special characters must not be used (e.g. / \ : * ? " | < > and all others).

1.7.4 File Name Record

Different AS2 clients have different ways of treating filenames. While some will retain the original file name when transferring the file from one AS2 system to another, others will change the name. To ensure that the file names are retained regardless of the AS2 client an Organization chooses to install, the file name is the first record of every inbound file from an Organization to the MDM/R and every outbound file from the MDM/R to an Organization.

1.7.5 MDM/R File Name Examples

The following examples illustrate the naming of files exchanged with the MDM/R.

Assume that the following organizations or Participants have been enrolled with the MDM/R and assigned Organization IDs (ORG_ID):

- ORG11111 is Acme Hydro (a fictitious utility)
- ORG22222 is Best Billing (a fictitious billing agent)

Further assume that Acme Hydro has outsourced its billing operations to Best Billing. This business relationship has been registered with the MDM/R and the MDM/R Operator has updated the necessary configuration files.

The general syntax from the sections above is:
<ORG_ID_1>.<ORG_ID_2>.<FILE_ID>.<REQ_VER>.<DATE_TIME>{.request specific element n}.DAT

Table 1.7.5 | Examples of File Names

Transaction description	File Name
Acme Hydro sends a version 00 Incremental Synchronization file set to the MDM/R. In this example, the unique identifier assigned by Acme Hydro to this specific request is 'J39x82'.	ORG11111.ORG11111.4000.00.20130214221345.J39x82.00.01.DAT ORG11111.ORG11111.4000.00.20130214221345.J39x82.01.01.DAT ORG11111.ORG11111.4000.00.20130214221345.J39x82.02.01.DAT ORG11111.ORG11111.4000.00.20130214221345.J39x82.03.01.DAT ORG11111.ORG11111.4000.00.20130214221345.J39x82.04.01.DAT ORG11111.ORG11111.4000.00.20130214221345.J39x82.05.01.DAT
Acme Hydro sends a version 00 Incremental Synchronization file set to the MDM/R. Acme Hydro chooses to split their Asset file into 3 separate files. In this example, the unique identifier assigned by Acme Hydro to this specific request is 'efefef'.	ORG11111.ORG11111.4000.00.20130214221345.efefef.00.01.DAT ORG11111.ORG11111.4000.00.20130214221345.efefef.01.01.DAT ORG11111.ORG11111.4000.00.20130214221345.efefef.01.02.DAT ORG11111.ORG11111.4000.00.20130214221345.efefef.01.03.DAT ORG11111.ORG11111.4000.00.20130214221345.efefef.02.01.DAT ORG11111.ORG11111.4000.00.20130214221345.efefef.03.01.DAT ORG11111.ORG11111.4000.00.20130214221345.efefef.04.01.DAT ORG11111.ORG11111.4000.00.20130214221345.efefef.05.01.DAT

– End of Section –

2. Synchronization Technical Interface Specification

2.1 Synchronization File Set and Content

This section provides a listing of elements that are submitted in each Synchronization file and those elements that are derived when the MDM/R successfully applies those elements to the MMD. The table below explains each column included in the chart.

Bolded elements in the Synchronization File Set and Content table indicate the element as it is viewed in the MDM/R GUI.

2.1.1 Incremental Synchronization File Set and Content Description

The following table describes the elements shown in the Synchronization File Set and Content table and provides links to the locations of the file descriptions within this document.

Table 2.1.1| Incremental Synchronization File Set and Content Description

Column Name	Description
Synchronization File Set and Content	
Sync File Number	The number of the file within the file set is described in the Characteristics section
Sync File	The name of the synchronization file as outlined in each sub-section of the File Format – Incremental Synchronization Version 00 section.
Element	This is the name of the element contained in the file as described in each file.
Main MDM/R Processes using this Data	This column lists the processes that require input from the data synchronized for the specific element.
Required for MDM/R Processing	All of those elements indicated by "Y" are mandatory elements for MDM/R processing from Meter Read data processing to the delivery of billing quantities.
MDM/R – Results of Sync Files on Master Data	
SDP Assets	The SDP asset is submitted in the Asset Data file. The location elements are submitted in the Premise Data file. Date-effective relationships between the SDP and other elements are submitted in the Service Agreement Data file, the Parameter Data file and the Relationship Data file.

Column Name	Description
Meter Assets	The Meter Asset is submitted in the Asset Data file along with the elements that describe the meter, e.g. interval length, Channel Configuration Set and scaling constant. The date-effective relationship of the Meter to an SDP is submitted in the Relationship Data file.
Communication Module Assets	The Communication Module (AMCD ID) is submitted in the Asset Data file. The date-effective Meter to Communication Module relationship is submitted in the Relationship Data file.
Channel Assets	The Channel Assets are created from Meter elements: Interval Length and Channel Configuration Set.
Account	The SDP to Account Relationship is submitted in the Relationship Data file and is a date-effective element.
CT/PT Multiplier Asset	The date-effective CT/PT Multiplier element is submitted in the Parameter Data file and provides the SDP to CT/PT Relationship.
Service Group	The date-effective Service Group element is submitted in the Parameter Data file and provides the SDP to Service Group Relationship.
Element Effective Date / Times	This column indicates the elements that are started by submitting a Start Date/Time and may be ended by submitting the Start Date/Time and End Date/Time. Date-effective elements are submitted in the Service Agreement Data file (framing structure), Parameter Data file and the Relationship Data file.
Service Type Records	The records that relate to the services provided by the MDM/R for each SDP are indicated for the related elements. These are derived using the elements indicated for each Service Type Record.
Asset Relationships	This column indicates the relationships that are formed from the submission of the Parameter Data file and the Relationship Data file.
SDP Parameters	This column indicates the SDP parameters that are submitted in the Parameter Data file.
Meter Parameters	This column indicates the Meter parameters that are submitted in the Asset, Parameter and Relationship Data files. These elements are used to process Meter Read data submitted to the MDM/R.
Service Parameters	Related to Service Type Records, these derived elements, e.g. Data Delivery Service, are used by the MDM/R to determine the profile of billing quantities that are returned in a Billing Service Standard Reply.

2.1.2 Synchronization File Set and Content Table

Table 2.1.2 | Incremental Synchronization File Set and Content V00

Incremental Synchronization File Set V00				**Results of Synchronization Files on MDM/R Master Data** Visible in the MDM/R GUI indicated by **Bold** typeface												
Sync File Number	**Sync File**	**Element**	**Main MDM/R Processes using this data**	**Required for MDM/R Processing**	**SDP Assets**	**Meter Assets**	**Communication Module Assets**	**Channel Assets**	**Account**	**CT/PT Multiplier Asset**	**Route-Asset Service Group**	**Element Effective Date/Times (Start and End)**	**Service Type Records** (related to SDP)	**Asset Relationships**	**SDP Parameters**	**Meter Parameters**	**Service Parameters**
1	Asset	**SDP**	All	Y	**SDP**							n/a					
	Asset	**Meter** (with related Interval Length, Channel Configuration Set and Scaling Constant)	VEE, Billing	Y		**Meter**		**Channels** (created using Interval Length and Channel Configuration Set)				n/a				**Scaling Constant** (value from Meter asset sync record)	
	Asset	**Communication Module**	VEE	Y			**Communication Module**					n/a	Contributes to: Service (using AMCC Type)				
2	Premise	Premise Address, City, Province, Postal Code, Time Zone	Defaults to X	Y (Defaults to X for privacy protection reasons)	SDP Premise							n/a					
3	Service Agreement	**Framing Structure**	Framing, Billing	Y								Start & End	Primary: **Energy Purchase Service** Derives: **1. Framing Service 2. Data Delivery Service** (derived from Energy Purchase Service and VEE Service SDP Parameter)				Derives: **Data Delivery Service – Measurement Profile**

Incremental Synchronization File Set					Results of Synchronization Files on MDM/R Master Data												
Sync File Number	**Sync File**	**Element**	**Main MDM/R Processes using this data**	**Required for MDM/R Processing**	**SDP Assets**	**Meter Assets**	**Communication Module Assets**	**Channel Assets**	**Account**	**CT/PT Multiplier Asset**	**Route Asset**	**Element Effective Date/Times (Start and End)**	**Service Type Records** (related to SDP)	**Asset Relationships**	**SDP Parameters**	**Meter Parameters**	**Service Parameters**
4	Parameter	SDP Parameter (**Billing Cycle ID**)		N							**Route**	Start & End		**SDP to Service Group/Route ****			
	Parameter	SDP Parameter (**CT/PT Multiplier**)	VEE, Billing	N						**CT-PT**		Start & End		**SDP to CT-PT ****			
	Parameter	SDP Parameter (**VEE Service**)	VEE, Billing	Y								Start & End	Derives: 1. **VEE Service** 2. **Data Delivery Service** (derived from Energy Purchase Service and VEE Service SDP Parameter)		Primary: **VEE Code**		
	Parameter	SDP Parameter (**Distributor Rate Class**)		N								Start & End			**Distributor Rate Class**		
	Parameter	SDP Parameter (**Commodity Rate Class**)		N								Start & End			**Commodity Rate Class**		
	Parameter	SDP Parameter (**Occupant Change**)		N								Start & End			**Occupant Change**		
	Parameter	SDP Parameter (**Generation Type**)		N								Start & End			**Generation Type**		
	Parameter	SDP Parameter (**Maximum Generation Capacity**)		N								Start & End			**Maximum Generation Capacity**		
	Parameter	SDP Parameter (**Electric Vehicle**)		N								Start & End			**Electric Vehicle**		
	Parameter	SDP Parameter (**Delivered USDP**)		N								Start & End			**Delivered USDP**		
	Parameter	Meter Parameter (**Dials**)	VEE, Billing	Y								Start & End				**Dials**	
	Parameter	Meter Parameter (**Meter Volts**)		N								Start & End				**Volts**	
	Parameter	Meter Parameter (**Meter Amps**)		N								Start & End				**Amps**	
	Parameter	Meter Parameter (**Meter Phases**)		N								Start & End				**Phases**	
	Parameter	Meter Parameter (**Meter Form**)		N								Start & End				**Form**	

**** Future Dated Asset Relationships are not allowed**

Incremental Synchronization File Set V00					Results of Synchronization Files on MDM/R Master Data Visible in the MDM/R GUI indicated by **Bold** typeface												
Spec File Number	**Spec File**	**Element**		**Main MDM/R Processes using this data**	**Required for MDM/R Processing**	**SDP Assets**	**Meter Assets**	**Communication Module Assets**	**Channel Assets**	**Account**	**CT/PT Multiplier Asset**	**Route Asset**	**Element Effective Date/Times (Start and End)**	**Service Type Records** (related to SDP)	**Asset Relationships**	**SDP Parameters**	**Meter Parameters**	**Service Parameters**
5	Relationship	**SDP to Meter**		VEE, Framing, Billing	Y								Start & End		Primary: **SDP to Meter **** & **Meter to Channel ****			
	Relationship	**Meter to Communication Module**			Y								Start & End		Primary: **Meter to Communication Module ****		**Scaling Constant** (start and end dates from Meter asset using Meter to CommMod dates)	
	Relationship	**SDP to Account**		VEE, Billing	N					**Account**			Start & End		**SDP to Account**			
	Relationship	**SDP to Billing Agent**		Billing, Meter Read Data Retrieval Web Services	Y								Start & End	**Billing Service *** (with Service Provider ID)				
	Relationship	**SDP to AMI Operator**		Meter Read Data Retrieval Web Services	Y								Start & End	**AMI Operator Service *** (with Service Provider ID)				
	Relationship	**SDP to Energy Service Provider**		Meter Read Data Retrieval Web Services	N								Start & End	**Energy Supplier Service *** (with Service Provider ID)				
	Relationship	**SDP to CCA Service Provider**		Meter Read Data Retrieval Web Services	N								Start & End	**Energy Services Agent Service *** (with Service Provider ID)				
7	Component SDP	**Channel to Channel**			N	Records are not validated or loaded												
	Component SDP	**Channel to Formula**			N													

*** Future Dated Agent Relationships are not allowed**	**** Future Dated Asset Relationships are not allowed**

The relationship between two Assets (SDP, Meter, Channel, Communication Module, Service Group,CT/PT Multiplier) CANNOT be specificed with a Future Dated End Date or Start Date.

This table is available in a printable version on the MDM/R Service Desk Knowledge Base.

2.2 File Format –Incremental Synchronization Version 00

2.2.1 Manifest File

The Manifest File lists the File Name for each file that is included in the specific synchronization data set submission.

2.2.1.1 File Name Record for the Manifest File

The first record in this interface file is used to store the name of the file as specified in the MDM/R FTS Use of File Names section of this document. This record is used in the event that the original file name is modified during the transfer between the MDM/R and an Organization.

The first record of the interface file contains the following three elements:

Table 2.2.1.1 | File Name Record for the Manifest File

Field Name	Data Type/Length	Format	Required	Description
Prefix	Char (7)	Specific Usage: <FTSFN>	Y	This field always contains the record type "<FTSFN>".
File Name	Varchar (250)	Refer to MDM/R FTS Use of File Names.	Y	This field contains the name of the file on the originating system.
Suffix	Char (8)	Specific Usage: </FTSFN>	Y	This field always contains the record type "</FTSFN>".

An example of this record for a Version 00 Incremental Synchronization file is:

<FTSFN>ORG11111.ORG22222.4000.00.20150214221345.abcdef.00.01.DAT</FTSFN>

2.2.1.2 Manifest File Header Record

The second record will be a header record as described in the following table:

Table 2.2.1.2 | Manifest File Header Record

Field	Data Type/ Length	Format	Required	Description
Record Type	Char (1)	General: A Specific: H	Y	This field indicates that this record is a header record. It must be 'H'.
LDC ORG_ID	Char (8)	General: AAAAAAAA Example: 'ORG25153'	Y	The unique Organization identifier assigned to the LDC during the registration/enrolment process.
Process Mode	Varchar (20)	General: AAAAAAAAAAAAA	Y	Populated with "IncrementalSync".

Field	Data Type/ Length	Format	Required	Description
		Specific Usage: 'IncrementalSync'		
Process Object	Char (20)	General: AAAAAAAAAAAAAAA Specific Usage: 'Manifest'	Y	Always populated with "Manifest".
Extracted Date Time	Date/Time	yyyyMMddHHmmss	Y	The date and time the data in this synchronization file set was extracted from the source systems. This may be coincident with the time that the creation of this synchronization file set was started.
Sequence Number	Number (6)	General: AAAAAA Examples: 000001 007353 999999	Y	This mandatory element is a fixed 6 digit value that defines a sequence for the Incremental synchronization file sets. If an LDC submits a sequence number that is not the next sequential number, the file set will not be processed. The value that is placed in this element will begin with 000001 and increment by 1 with every new Synchronization file set. In the event that the maximum value is reached (999999) then the number will reset to 000001. Please reference Synchronization File Set Sequencing in this document

2.2.1.3 Manifest File Detail Record

The Manifest File Detail Record provides a complete list of all of the files that are part of a single synchronization file set. At a minimum, this file must contain one of each mandatory file (including the manifest file itself), as defined in the File Name Elements Specific to Synchronization Files section of this document. If multiple files of the same type are submitted, then all of those file names must be provided in the manifest file with a properly configured segment number.

Table 2.2.1.3 | Manifest File Detail Record

Field	Data Type/ Length	Format	Required	Description
Filename	Varchar (250)		Y	This is the full file name of each synchronization file being submitted as part of the synchronization file set, as described in the MDM/R FTS Use of File Names section in this document.

2.2.2 Asset Data File

The Asset Data file describes the primary elements associated with an SDP, a Meter, and a Communication Module.

2.2.2.1 File Name Record for the Asset Data File

The first record in this interface file is used to store the name of the file as specified in the MDM/R FTS Use of File Names section of this document. This record is used in the event that the original file name is modified during the transfer between the MDM/R and an Organization.

The first record of the interface file contains the following three elements:

Table 2.2.2.1 | File Name Record for the Asset Data File

Field Name	Data Type/ Length	Format	Required	Description
Prefix	Char (7)	Specific Usage: <FTSFN>	Y	This field always contains the record type "<FTSFN>".
File Name	Varchar (250)	Refer to MDM/R FTS Use of File Names.	Y	This field contains the name of the file on the originating system.
Suffix	Char (8)	Specific Usage: </FTSFN>	Y	This field always contains the record type "</FTSFN>".

An example of this record for a Version 00 Incremental Synchronization file is:

<FTSFN>ORG11111.ORG22222.4000.00.20150214221345.abcdef.01.02.DAT</FTSFN>

2.2.2.2 Asset Data File Header Record

The second record will be a header record as described in the following table:

Table 2.2.2.2 | Asset Data File Header Record

Field	Data Type/ Length	Format	Required	Description
Record Type	Char (1)	General; A Specific: H	File Name Record and Header Record are required whether or not Detail Record data are required. Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common Business Scenarios.	This field indicates that this record is a header record. It must be 'H'.
LDC ORG_ID	Char (8)	General: AAAAAAAA Example: 'ORG25153'		The unique Organization identifier assigned to the LDC during the registration/enrollment process.
Process Mode	Varchar (20)	General: AAAAAAAAAAAAA Specific Usage: 'IncrementalSync'		Populated with "IncrementalSync".
Process Object	Char (20)	General: AAAAAAAAAAAAAAAA Specific Usage: 'Asset'		Always populated with "Asset".
Extracted Date Time	Date/Time	yyyyMMddHHmmss		The date and time the data in this synchronization file set was extracted from the source systems. This may be coincident with the time that the creation of this synchronization file set was started.

2.2.2.3 Asset Data File Detail Record

The Asset Data File allows the LDC (or its designated agent) to create various assets within the MDM/R. The following are the different types of assets that are available within the MDM/R:

- SDP
- Meter
- Communication module

Table 2.2.2.3 | Asset Data File Detail Record

Field	Data Type/ Length	Format	Required	Description
Record Indicator	Varchar (50)	General: AAAAAAAA Specific Usage: One of the following 'SDP' 'Meter' 'Communication Module'	Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common business scenarios.	This field indicates the type of record being submitted. Acceptable values are: • SDP • Meter • Communication Module
Universal SDP ID	Fixed Number (8)	General: NNNNNNNN Example: '00037482'		The Ontario-wide unique identifier assigned by the Universal SDP ID Assignment Request/Response integration. This field will only be populated if the Record Indicator field is populated with "SDP".
SDP ID	Varchar (50)	No format prescribed		This identifier is maintained in the LDC systems and uniquely identifies the SDP. This field will only be populated if the Record Indicator field is populated with "SDP".
Type	Varchar (50)	General: A Specific Usage: 'P'		For SDPs, this indicates this is a physical service delivery point. 'P' is for physical. For Meters, this indicates this is a physical Meter. 'P' is for physical. This field will only be populated if the Record Indicator field is populated with "SDP" or "Meter". If a value of V is provided it will default to P (physical).
Service Status	Varchar (50)	General: A Specific Usage: ONE of the following characters, 'Y' or 'N'.		Flag indicates whether electric service is connected to the Service Delivery Point (i.e. wires leading to the meter have been disconnected). This field will only be populated if the Record Indicator field is populated with "SDP".
Load Status	Varchar (50)	General: A Specific Usage: ONE of the following characters, 'Y' or 'N'		Flag indicates whether electric service is available to the Customer (e.g. whether the meter is booted/sleeved or not). This field will only be populated if the Record Indicator field is populated with "SDP".
Meter ID	Varchar (50)	No format prescribed		This is an identifier of the installed meter and must be unique within an LDC.

Field	Data Type/ Length	Format	Required	Description
			Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common business scenarios.	This field will only be populated if the Record Indicator field is populated with "Meter". The Meter, along with the Interval Length and the Channel Configuration Set will be used in the creation of the Interval and Register Read Channels.
AMCD ID	Varchar (50)	No format prescribed		This is the LDC's unique identifier for the AMCD. This is the ID that is used as a key for the integration between the MDM/R and AMCC. Depending on the AMI technology this may be, for example, the Meter ID above, the Meter's Serial Number or the ID of the smart meter's communication module. See the Meter Read Integrations section per AMCC vendor for information of what to populate in this field. This field will only be populated if the Record Indicator field is populated with "Communication Module".
AMCC Type	Varchar (50)	General: AA Specific Usage: ONE of the following: '01' '02' '03' '04' '05' '06'		This is the type of AMI technology utilized for this meter. Acceptable values are: '01' - Elster '02' - Sensus '03' - Trilliant '04' – Tantalus (Tantalus has been retired since September 26, 2019.) '05' – SmartSynch (The 7400 (SmartSynch) adapter has been retired since January 30, 2024.) '06' - Itron This field will only be populated if the Record Indicator field is populated with "Communication Module".
Interval Length	Number (3)	General: NNN Example: '60'		This field is populated with the length of the interval in minutes that will be delivered from the meter that is related to the SDP. Acceptable values are 5, 10, 15, 30 and 60. The Interval Length, along with the Meter ID and the Channel Configuration Set will be used in the creation of the Interval and Register Read Channels.
Channel Configuration Set	Number (2)	General: NN Specific Usage: ONE of the following '01' '02' '03'		This is the set identifier that will be used to control the creation of information channels into which Meter Read Data and related derived data will be stored. The Channel Configuration Set, along with the Interval Length and the Meter ID will be used in the creation of the Interval, Register Read and Usage Channels. NOTE: The synchronization process will use valid values provided in the Asset Data file. If a value is not provided, then a default value of '01' will be created. Please refer to the Channel Configuration Sets section of this document.
Scaling Constant	Number (20,10)	General: NNNNN.NN		This is the factor that will be used to multiply the Register Readings received as part of the Meter Transfer Block.

Field	Data Type/ Length	Format	Required	Description
		Examples: '1' '100' '130.33' '99999.99'		The "Meter to Comm Module Relationship" Start Date/Time and End Date/Time will be used for this Meter Parameter. NOTE: The synchronization process will use valid values provided in the Asset Data File. If a value is not provided then a default value of '1.00' will be created for this Meter parameter.
Asset Extra 1	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.
Asset Extra 2	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.
Asset Extra 3	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.
Asset Extra 4	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.
Asset Extra 5	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.

2.2.3 Channel Configuration Sets

The following table identifies all of the Channel Configuration Sets that are used to define which channels by Unit of Measurement and Type are required for a given meter.

Table 2.2.3| Channel Configuration Sets

Number	Classification	Type	Interval Data	Usage	Register Data	Derived Data	Notes
01	Default Configuration	Physical Meter Physical Channels (kWh only)	Physical Channel kWh	Physical Channel kWh	Physical Channel kWh		
02	Physical Net Metering Configuration	Physical Meter Physical Channels kWh, GKWH	Physical Channels kWh, GKWH	Physical Channel kWh, GKWH	Physical Channels kWh, GKWH		Bi-directional meters will have separate physical channels for the Delivered Energy and Received Energy. They can be distinguished in the GUI by the channel name. The physical channels for Delivered Energy will utilize KWH, while physical channels for Received Energy will utilize GKWH. This is the recommended configuration for Net Metering installations.

Number	Classification	Type	Interval Data	Usage	Register Data	Derived Data	Notes
03	Physical Received Energy Configuration	Physical Meter Physical Channels (GKWH only)	Physical Channel GKWH	Physical Channel GKWH	Physical Channel GKWH		A meter associated to an SDP that will only have physical channels for processing Received Energy. <u>For the Net Metering 2 SDP solution:</u> A single bi-directional meter is represented by a Delivered SDP and a Received SDP in the MDM/R. The Delivered SDP is dedicated to processing Delivered Energy which is set up with a meter in the MDM/R using Channel Configuration Set '01'. The Received SDP is dedicated to processing Received Energy which is set up with a meter in the MDM/R using Channel Configuration Set '03'. Note: The Received SDP should have the 'Delivered USDP' SDP Parameter in order to associate it to the related Delivered SDP.

2.2.4 Premise Data File

The Premise Data file describes the premise related elements associated with an SDP

2.2.4.1 File Name Record for the Premise Data File

The first record in this interface file is used to store the name of the file as specified in the MDM/R FTS Use of File Names section of this document. This record is used in the event that the original file name is modified during the transfer between the MDM/R and an Organization.

The first record of the interface file contains the following three elements:

Table 2.2.4.1 | File Name Record for the Premise Data File

Field Name	Data Type/ Length	Format	Required	Description
Prefix	Char (7)	Specific Usage: <FTSFN>	Y	This field always contains the record type "<FTSFN>".

Field Name	Data Type/ Length	Format	Required	Description
File Name	Varchar (250)	Refer to MDM/R_FTS Use of File Names.	Y	This field contains the name of the file on the originating system.
Suffix	Char (8)	Specific Usage: </FTSFN>	Y	This field always contains the record type "</FTSFN>".

An example of this record for a Version 00 Incremental Synchronization file is:

<FTSFN>ORG11111.ORG22222.4000.00.20150214221345.abcdef.02.01.DAT</FTSFN>

2.2.4.2 Premise Data File Header Record

Table 2.2.4.2 | Premise Data File Header Record

The second record will be a header record as described in the following table:

Field	Data Type/ Length	Format	I Sync V00 Required	Description
Record Type	Char (1)	General; A Specific: H	File Name Record and Header Record are required whether or not Detail Record data are required. Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common Business Scenarios.	This field indicates that this record is a header record. It must be 'H'.
LDC ORG_ID	Char (8)	General: AAAAAAAA Example: 'ORG25153'		The unique Organization identifier assigned to the LDC during the registration/enrolment process.
Process Mode	Varchar (20)	General: AAAAAAAAAAAAA Specific Usage: "IncrementalSync"		Populated with "IncrementalSync".
Process Object	Char (20)	General: AAAAAAAAAAAAAAA Specific Usage: 'Premise'		Always populated with "Premise".
Extracted Date Time	Date/Time	yyyyMMddHHmmss		The date and time the data in this synchronization file set was extracted from the source systems. This may be coincident with the time that the creation of this synchronization file set was started.

2.2.4.3 Premise Data File Detail Record

The Premise Data File Detail Record allows the LDC to provide premise related data to the MDM/R.

Table 2.2.4.3 | Premise Data File Detail Record

Field	Data Type/ Length	Format	Required	Description
Record Indicator	Varchar (50)	General: AAAAAAAAAA Specific Usage: "Premise"	Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common Business Scenarios.	This field indicates the type of record being submitted. For this file the record indicator will always be "Premise".
Universal SDP ID	Fixed Number (8)	General: NNNNNNNN Example: '00037482'		This identifier is maintained in the LDC systems and uniquely identifies the SDP.
Premise Address	Varchar (100)	No format prescribed		The physical street address of the SDP. The MDM/R defaults any value submitted to 'X"
City	Varchar (20)	No format prescribed		This is the city in which the SDP exists. The MDM/R defaults any value submitted to 'X"
Province	Varchar (20)	No format prescribed		This is the province in which the SDP exists. The MDM/R defaults any value submitted to "ON"
Postal Code	Fixed Length (X)	General: ANANAN		This is the postal code associated with the SDP i.e. Service Location, where the meter is installed. This field must be 6 characters in length. No blank spaces allowed Alpha characters must be upper cased. First character must correspond to a valid Postal Code Region in Ontario: K,L,M,N,P A default value of "W8W8W8" can be used temporarily where the postal code is not available (e.g. new developments) A default value of "W8W8W8" should be used for instances of single residential premise in a six character postal code for as long as the condition exists. A valid Postal Code is required by Ontario Energy Board Order EB-2015-0297
Time Zone	Char(3)	General: AAA Specific Usage: 'EST'		This is the time zone associated with Meter Read data as stored and presented in the MDM/R. Since all Meter Read data transmitted to the MDM/R must be in Eastern Standard Time (EST) for all premise locations, this value must always be 'EST'. Meter Read data is stored with the 'Local Read Time' = 'EST' and presented in the MDM/R GUI as Time = 'EST'.
Premise Extra 1	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.
Premise Extra 2	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.

Field	Data Type/ Length	Format	Required	Description
Premise Extra 3	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.

2.2.5 Service Agreement Data File

The Service Agreement Data file describes the Framing Structure and Commodity Type associated with an SDP.

2.2.5.1 File Name Record for the Service Agreement Data File

The first record in this interface file is used to store the name of the file as specified in the MDM/R FTS Use of File Names section of this document. This record is used in the event that the original file name is modified during the transfer between the MDM/R and an Organization.

The first record of the interface file contains the following three elements:

Table 2.2.5.1 | File Name Record for the Service Agreement Data File

Field Name	Data Type/ Length	Format	Required	Description
Prefix	Char (7)	Specific Usage: <FTSFN>	Y	This field always contains the record type "<FTSFN>".
File Name	Varchar (250)	Refer to MDM/R FTS Use of File Names.	Y	This field contains the name of the file on the originating system.
Suffix	Char (8)	Specific Usage: </FTSFN>	Y	This field always contains the record type "</FTSFN>".

An example of this record for a Version 00 Incremental Synchronization file is:

<FTSFN>ORG11111.ORG22222.4000.00.20150214221345.abcdef.03.01.DAT</FTSFN>

2.2.5.2 Service Agreement File Header Record

The second record will be a header record as described in the following table.

Table 2.2.5.2 | Header Record for the Service Agreement Data File

Field	Data Type/ Length	Format	Required	Description
Record Type	Char (1)	General: A Specific: H	File Name Record and Header Record are required whether or not Detail Record data are required.	This field indicates that this record is a header record. It must be 'H'.
LDC ORG_ ID	Char (8)	General: AAAAAAAA Example: 'ORG83458'		The unique Organization identifier assigned to the LDC during the registration/ enrollment process.

Field	Data Type/ Length	Format	Required	Description
Process Mode	Varchar (20)	General: AAAAAAAAAAAAA Specific Usage: "IncrementalSync"	Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common Business Scenarios.	Populated with "IncrementalSync".
Process Object	Varchar (20)	General: AAAAAAAAAAA Specific Usage: 'Service Agreement'		Always populated with "Service Agreement".
Extracted Date Time	Date/Time	yyyyMMddHHmmss		The date and time the data in this synchronization file set was extracted from the source systems. This may be coincident with the time that the creation of this synchronization file set was started.

2.2.5.3 Service Agreement Data File Detail Record

The Service Agreement Data File allows LDCs to associate Framing Structures to a particular SDP.

The data records start after the header and will contain one line for each Service Agreement associated with each Universal SDP ID as defined in the following table.

Table 2.2.5.3 | Detail Record for the Service Agreement Data File

Field	Data Type/ Length	Format	Required	Description
Record Indicator	Varchar (50)	General: AAAAAAAAAA Specific Usage: 'Service Agreement'	Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common Business Scenarios.	This field indicates the type of record being submitted. For this file the record indicator will always be "Service Agreement".
Commodity	Char(1)	General: A Specific Usage: 'E'		Always "E" for electricity.
Framing Structure ID	Char (2)	General: AA Specific Usage: For energy one of '01', '02', '03', '04', '05', '06', '11', '12','14', '15', '16', '21', '22', '24', '25', '26'		From this framing structure ID element, the MDM/R determines the billing quantities that are to be delivered for the related Universal SDP ID. See the Cross Reference Framing Structure ID; Framing Structure; Energy Purchase Service and Measurement Profile Values table in this document for Framing Structure ID code values and associated Framing Structures.
Universal SDP ID	Fixed Number (8)	General: NNNNNNNN Example: '00037482'		This identifier is maintained in the LDC systems and uniquely identifies the SDP.
Universal SDP ID to Framing	Date/Time	yyyyMMddHHmmss		This is the Date/Time when the Framing Structure and Universal SDP ID relationship starts. This Date/Time is

Field	Data Type/ Length	Format	Required	Description
Structure Relationship Start Date			Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common Business Scenarios.	inclusive and considered to be midnight at the start of the day. This time must be reported in EST. Please refer to the Business Rules Affecting Framing Structure Changes in the Incremental Synchronization Business Rules section of this document.
Universal SDP ID to Framing Structure Relationship End Date	Date/Time	yyyyMMddHHmmss		This is the Date/Time when the Framing Structure and Universal SDP ID relationship ends. This date/time is exclusive and considered to be the first moment that the relationship is not in effect. This time must be reported in EST. Please refer to the Business Rules Affecting Current, Future and Retroactive Dating and Rules Affecting Framing Structure Changes in the Incremental Synchronization Business Rules section of this document.
Service Agreement Extra 1	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.
Service Agreement Extra 2	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.
Service Agreement Extra 3	Varchar (50)	No format prescribed	This field must be empty	Reserved for future use.

2.2.5.4 Cross Reference Framing Structure ID; Framing Structure; Energy Purchase Service and Measurement Profile Values

The following table provides a cross reference of the Framing Structure ID codes to associated Framing Structures together with a brief description of the resulting billing quantity data components and associated time reference for each billing quantity data component. This table also provides the resulting Energy Purchase Service type names viewable in the MDM/R GUI and reported in the Synchronization Updates Report (IR06) for each Framing Structure, together with the Measurement Profile element values as viewable in the MDM/R GUI within the Data Delivery Service and used by the MDM/R to determine the type of billing quantities provided in the Billing Service Standard Reply.

Table 2.2.5.4 | Cross Reference Framing Structure ID; Framing Structure; Energy Purchase Service and Measurement Profile Values

Framing Structure ID	Framing Structure Billing Quantity Data Components and Time Basis	Energy Purchase Service – Service Type Name	Data Delivery Service – Measurement Profile Element Values	Notes
"01"	"TOU/CPP (EST)" TOU/CPP kWh (EST)	"Energy Purchase Service, TOU/CPP (EST)"	"MP TOU Billing Quantities RRCR"	
"02"	"TOU/CPP (CST)" TOU/CPP kWh (CST)	"Energy Purchase Service, TOU/CPP (CST)"	"MP TOU Billing Quantities RRCR"	
"03"	"Hourly" Hourly kWh (EST)	"Energy Purchase Service, Hourly"	"MP Hourly Billing Quantities RRCR"	
"04"	"Periodic" Periodic kWh (EST)	"Energy Purchase Service, Periodic"	"MP Periodic Billing Quantities RRCR"	
"05"	"ULO (EST)" Ultra-Low Overnight kWh (EST)	"Energy Purchase Service, ULO (EST)"	"MP ULO Billing Quantities RRCR"	
"06"	"ULO (CST)" Ultra-Low Overnight kWh (CST)	"Energy Purchase Service, ULO (CST)"	"MP ULO Billing Quantities RRCR"	
"11"	"NM TOU (EST)" Net Metered TOU (EST)	"Energy Purchase Service, NM TOU (EST)"	"MP NM TOU Billing Quantities RRCR"	Only used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '02'.
"12"	"NM TOU (CST)" Net Metered TOU (CST)	"Energy Purchase Service, NM TOU (CST)"	"MP NM TOU Billing Quantities RRCR"	Only used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '02'.
"14"	"NM Periodic" Net Metered Periodic kWh (EST)	"Energy Purchase Service, NM Periodic"	"MP NM Periodic Billing Quantities RRCR"	Only used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '02'.
"15"	"NM ULO (EST)" Net Metered Ultra-Low Overnight kWh (EST)	"Energy Purchase Service, NM ULO (EST)"	"MP NM ULO Billing Quantities RRCR"	Only used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '02'.

Framing Structure ID	Framing Structure Billing Quantity Data Components and Time Basis	Energy Purchase Service – Service Type Name	Data Delivery Service – Measurement Profile Element Values	Notes
"16"	"NM ULO (CST)" Net Metered Ultra-Low Overnight kWh (CST)	"Energy Purchase Service, NM ULO (CST)"	"MP NM ULO Billing Quantities RRCR"	Only used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '02'.
"21"	"NM TOU (EST)" Net Metered TOU (EST)	"Energy Purchase Service NM 2 SDP TOU (EST)"	"MP NM 2 SDP TOU Billing Quantities RRCR"	Only be used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '03'.
"22"	"NM TOU (CST)" Net Metered TOU (CST)	"Energy Purchase Service NM 2 SDP TOU (CST)"	"MP NM 2 SDP TOU Billing Quantities RRCR"	Only be used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '03'.
"24"	"NM TOU Periodic" Net Metered Periodic"	"Energy Purchase Service NM 2 SDP Periodic"	"MP NM 2 SDP Periodic Billing Quantities RRCR"	Only be used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '03'.
"25"	"NM ULO (EST)" Net Metered ULO (EST)	"Energy Purchase Service NM 2 SDP ULO (EST)"	"MP NM 2 SDP ULO Billing Quantities RRCR"	Only be used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '03'.
"26"	"NM ULO (CST)" Net Metered ULO (CST)	"Energy Purchase Service NM 2 SDP ULO (CST)"	"MP NM 2 SDP ULO Billing Quantities RRCR"	Only be used for SDPs where the meter has been set up in the MDM/R using Channel Configuration Set '03'.

2.2.6 Parameter Data File

The Parameter Data file describes additional elements of an SDP or a Meter, for example the VEE Service assigned to an SDP is submitted in the Parameter Data file.

2.2.6.1 File Name Record for the Parameter Data File

The first record in this interface file is used to store the name of the file as specified in the MDM/R FTS Use of File Names section of this document. This record is used in the event that the original file name is modified during the transfer between the MDM/R and an Organization.

The first record of the interface file contains the following three elements:

Table 2.2.6.1| File Name Record for the Parameter Data File

Field Name	Data Type/ Length	Format	Required	Description
Prefix	Char (7)	Specific Usage: <FTSFN>	Y	This field always contains the record type "<FTSFN>".
File Name	Varchar (250)	Refer to MDM/R_FTS Use of File Names.	Y	This field contains the name of the file on the originating system.
Suffix	Char (8)	Specific Usage: </FTSFN>	Y	This field always contains the record type "</FTSFN>".

An example of this record for a Version 00 Incremental Synchronization file is:

<FTSFN>ORG11111.ORG22222.4000.00.20150214221345.abcdef.04.01.DAT</FTSFN>

2.2.6.2 Parameter Data File Header Record

The second record of the file will be a header record as described in the following table.

Table 2.2.6.2| Header Record for the Parameter Data File

Field	Data Type/ Length	Format	Required	Description
Record Type	Char (1)	General; A Specific: H	File Name Record and Header Record are required whether or not Detail Record data are required. Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common Business Scenarios.	This field indicates that this record is a header record. It must be 'H'.
LDC ORG_ID	Char (8)	General: AAAAAAAA Example: 'ORG47153'		The unique Organization identifier assigned to the LDC during the registration/enrollment process.
Process Mode	Varchar (20)	General: AAAAAAAAAAAA Specific Usage: "IncrementalSync"		Populated with "IncrementalSync".
Process Object	Varchar (20)	General: AAAAAAAAAAAA Specific Usage: 'Parameter'		Always populated with "Parameter".
Extracted Date Time	Date/Time	yyyyMMddHHmmss		The date and time the data in this synchronization file set was extracted from the source systems. This maybe coincident with the time that the

Field	Data Type/ Length	Format	Required	Description
				creation of this synchronization file set was started.

2.2.6.3 Parameter Data File Detail Record

The Parameter Data File Detail Record allows the LDC to associate different parameters with an SDP or Meter. These parameters are outlined in the Parameter Data File Detail Record and the Field Format for Parameter Values by Parameter Name tables. The table below lists each SDP and Meter Parameter and indicates if future dating is allowed.

Table 2.2.6.3-1| Future Dating Parameters

UDC ID	Parameter Name	Future Dating
Universal SDP ID	Loss Factor Classification	Allowed
Universal SDP ID	Service Volts	Allowed
Universal SDP ID	Service Amps	Allowed
Universal SDP ID	Service Phases	Allowed
Universal SDP ID	Service Form	Allowed
Universal SDP ID	Dem-firm #1	Allowed
Universal SDP ID	Dem-firm #2	Allowed
Universal SDP ID	Dem-firm #3	Allowed
Universal SDP ID	Dem-firm #4	Allowed
Universal SDP ID	Billing Cycle ID	Not Allowed
Universal SDP ID	CT/PT Multiplier	Not Allowed
Universal SDP ID	VEE Service	Allowed
Universal SDP ID	Distributor Rate Class	Allowed
Universal SDP ID	Commodity Rate Class	Allowed
Universal SDP ID	Occupant Change	Allowed
Universal SDP ID	Generation Type	Allowed
Universal SDP ID	Maximum Generation Capacity	Allowed
Universal SDP ID	Electric Vehicle	Allowed
Universal SDP ID	Delivered USDP	Allowed
Meter ID	Dials	Allowed
Meter ID	Meter Volts	Allowed
Meter ID	Meter Amps	Allowed
Meter ID	Meter Phases	Allowed
Meter ID	Meter Form	Allowed

Table 2.2.6.3-2| Parameter Data File Detail Record

Field	Data Type/ Length	Format	Required	Description
Record Indicator	Varchar (50)	General: AAAAAAAAAA Specific Usage: 'Parameter'	Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common business scenarios.	This field indicates the type of record being submitted. For this file the record indicator will always be "Parameter".
UDC ID	Varchar(50)	General: AAAAAAAAAA Example; 984233		Depending on what kind of parameter is being submitted, this value will be either the Universal SDP ID or the Meter ID that will be associated with the parameter.
Param Name	Varchar(50)	General: AAAAAAAAA		This defines the type of parameter that is being submitted. Please refer to the Field Format for Parameter Values by Parameter Name below for a detailed description of each parameter.
Param Value	Refer to the table below.	Refer to the table below.		This is the value that is associated with the parameter being submitted. Refer to the table for Field Format for Parameter Values by Parameter Name below for descriptions of these data elements.
Start Date Time	Date/Time	yyyyMMddHHmmss		This is the Start Date/Time associated with the parameter. This Date/Time is inclusive and is considered the first moment that the parameter is active. This time must be reported in EST.
End Date Time	Date/Time	yyyyMMddHHmmss		This is the End Date/Time associated with the parameter. This Date/Time is exclusive and considered to be the first moment that the parameter is not in effect. This time must be reported in EST. Please refer to the Business Rules Affecting Current, Future and Retroactive Dating in the Synchronization Business Rules section of this document.

2.2.6.4 Field Format for Parameter Values

The following table defines the field format for each Parameter Value by Parameter Name. Please refer to the Future Dating Parameters table to determine which parameters may be future dated.

Table 2.2.6.4-1| Field Format for Parameter Values

Param Name	Data Type/ Length	Format	Required	Description
Loss Factor Classification	Number (2)	General: NN Valid Values: '01' through '12'	N	This parameter can be used for reporting out of the DataMart, LDCs can submit a data request through the service desk. It is not currently used to drive aggregation in the MDM/R. NOTE: This SDP Parameter will be displayed in the MDM/R GUI with an Element Name of "Loss Factor".
Service Volts	Varchar (20)	No format prescribed	N	Volts of the service to the SDP. Supplied to the MDM/R for informational purposes only.

Param Name	Data Type/ Length	Format	Required	Description
Service Amps	Varchar (20)	No format prescribed	N	Amps of the service to the SDP. Supplied to the MDM/R for informational purposes only.
Service Phases	Varchar (20)	No formatprescribed	N	Phase of the service to the SDP. Supplied to the MDM/R for informational purposes only.
Service Form	Varchar (20)	No formatprescribed	N	Service wires, i.e. 3 phase 4 wire, 3 phase 3 wire. Supplied to the MDM/R for informational purposes only.
Dem-firm #1	Varchar (50)	No format prescribed	N	Placeholder for future demographic data.
Dem-firm #2	Varchar (50)	No format prescribed	N	Placeholder for future demographic data.
Dem-firm #3	Varchar (50)	No format prescribed	N	Placeholder for future demographic data.
Dem-firm #4	Varchar (50)	No format prescribed	N	Placeholder for future demographic data.
Billing Cycle ID	Varchar (3)	General: AAA Examples: '1' 'C45'	N	This record is validated but not loaded in the MDM/R This record if submitted will be validated and errors reported in the IR14 report, however when records passes validation it is not loaded in the MDM/R.
CT/PT Multiplier	Number (20,10)	General: NNNNN.NN Examples: '1', '100' '130.33'. and '99999.99'	N	The multiplier that should be applied to the metering data received from the AMCC. This SDP Parameter is stored/displayed in the MDM/R GUI in the SDP CT-PT View tab as CT-PT Multiplier with the value displayed if a non-unity value has been applied. Please refer to the Synchronization Business Rules section of this document for Business Rules Affecting CT/PT Multipliers.
VEE Service	Char (2)	General : AA Example : '02'	Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common Business Scenarios.	This defines the VEE rule set that applies to the Universal SDP ID defined below. Allowable values: 01, 02, 03, 04 … Valid values will only include established VEE services.
Distributor Rate Class	Number (3)	General: NNN Specific Usage: One of the following: '201','202','203', '301' '999'	N	This defines the market segment to which the customer, associated to the Service Delivery Point (SDP), belongs. For informational purposes only. Required by Ontario Energy Board Order EB-2015-0297 Refer to Table Distributor Rate Class Codes for allowable values.
Commodity Rate Class	Number (3)	General: NNN	N	This defines the price plan for the customer associated to the Service Delivery Point (SDP).

Param Name	Data Type/ Length	Format	Required	Description
		Specific Usage: One of the following: '101','102' '103','104' '106', '999'		For informational purposes only. Required by Ontario Energy Board Order EB-2015-0297 Refer to Commodity Rate Class Codes for allowable values.
Occupant Change	Varchar (1)	General: 'A' Specific Usage: 'X'	N	The dates associated with this parameter define only the year of the premise's occupant change. Element must always have StartDateTime and EndDateTime populated. StartDateTime: yyyy0101000000 EndDateTime: yyyy1231000000 or End Date Time: yyyy 0101000000 (to crush the record for correction purposes) For this field the value is always an upper case 'X'. For informational purposes only. Required by Ontario Energy Board Order EB-2015-0297
Generation Type	Char (3)	General: 'AAA' Example: '101'	N	This defines the generation type for the bi-directional meter that is associated to the Service Delivery Point (SDP). Refer to Generation Type Codes for allowable values.
Maximum Generation Capacity	Number (15,6)	General: NNNNN.NN Examples: '1', '100' '130.33' and '99999.99'	N	This is the maximum capacity in kW to insert energy back into the electrical grid considering all energy sources (Solar, Wind, etc.). It is provided by the LDC for the SDP. This value will be used in reports for intervals that exceed it.
Electric Vehicle	Char (1)	General: 'A' Specific Usage: 'Y'	N	There are one or more electric vehicles in the premise. For this field value will always be an upper case 'Y'. For informational purposes only.
Delivered USDP	Fixed Number (8)	General: NNNNNNNN Example: '00037482'	N	This provides the link between the Received SDP and the Delivered SDP for the Net Metering 2 SDP solution. This parameter should only exist on the Received SDP. It indicates the Universal SDP ID of the associated Delivered SDP. Refer to the Business Rules for additional criteria specific to the Delivered USDP Parameter.
Dials	Number (2)	General: NN Examples include: '6'	Please refer to Business Scenarios for Synchronization for files and detail data fields required for common Business Scenarios.	This is the number of dials or in the case of solid state meters, the number of digits reported by the AMCC for this meter. Please refer to Business Rules Affecting Meter Asset Relationship and Parameters in the

Param Name	Data Type/ Length	Format	Required	Description
				Synchronization Business Rules section of this document.
Meter Volts	Varchar (20)	No format prescribed	N	Volts of the Meter. Supplied to the MDM/R for informational purposes only.
Meter Amps	Varchar (20)	No format prescribed	N	Amps of the Meter. Supplied to the MDM/R for informational purposes only.
Meter Phases	Varchar (20)	No format prescribed	N	Phase of the Meter. Supplied to the MDM/R for informational purposes only.
Meter Form	Varchar (20)	No format prescribed	N	This is the meter form factor for the SDP as defined by the ANSI C12.10 standard (i.e. 2S, 16S, etc.). Supplied to the MDM/R for informational purposes only.

Table 2.2.6.4-2| Distributor Rate Class Codes

Parameter Value	Distributor Rate Class	Notes
201	Residential - Regular	Applies to a consumer account taking electricity at 750 volts or less where the electricity is used exclusively in a separate metered living accommodation (for domestic household and personal residency use).
202	Residential - Condo	Applies to a consumer account with a distributor, if the account relates to: - A property as defined in the Condominium Act, 1998 - A residential complex as defined in the Residential Tenancies Act, 2006, or - A property that includes one or more dwellings and that is owned or leased by a cooperative as defined in the Co-operative Corporations Act.
203	Residential- Seasonal	Applies to a consumer account with a distributor, if the account relates to: a residential dwelling that is not a year-round residence as defined by the LDC, and cannot be classified in the residential categories described above or as small general service less than 50 kW, e.g. cottages, chalets and camps.
301	Small General Service (<less than 50kW)	Applies to a non-residential account taking electricity at 750 volts or less whose average monthly maximum demand is less than, or is forecast to be less than 50 kW.
999	Other	Applies to consumers that are not included within the current SME mandate (i.e. that are not Residential or General Service <50kW) hence cannot be classified within the parameter values described above, but the Universal SDPs have been synchronized with the MDM/R e.g. General Service > 50kW < 5000kW, Large User > 5000kW and Sub Transmission.

Table 2.2.6.4-3| Commodity Rate Class Codes

Parameter Value	Commodity Rate Class	Notes
101	Time-of-Use (TOU)	Price option with three time-of-use price periods: off-peak, mid-peak, and on-peak; developed as part of the Regulated Price Plan (RPP) for those with smart meters
102	Tiered	Price option in which consumers can use a certain amount of electricity each month at a lower price; when they pass that level, the rate goes up for all additional electricity.

103	Retailer	Applicable to consumers who have signed a contract with a licensed active energy retailer and pay a fixed rate that replaces the time-of-use and tiered pricing RPP options. These consumers have chosen to no longer be under the Regulated Price Plan (RPP).
104	Spot Market Pricing	Price option in which consumers pay, for a given hour, the Hourly Ontario Energy Price established by the IESO for that hour. These consumers are not considered under the Regulated Price Plan (RPP).
106	Ultra-Low Overnight Time-of-Use (ULO)	Price option with four price periods: an ultra-low overnight price period that applies from 11:00 PM–7:00 AM on weekdays, weekends, and holidays throughout the year, on-peak price period, mid-peak price period and off- peak price period.
999	Other	Price options that do not fall within the parameter values described above but the Universal SDPs are synchronized with the MDM/R e.g. microFIT, FIT.

Table 2.2.6.4-4| Generation Type Codes

Parameter Value	Generation Type
101	Solar
102	Wind
103	Hydro
104	Biomass
105	Battery Storage
106	Electric Vehicle to Grid (V2G)

2.2.7 Relationship Data File

The Relationship Data file describes the relationship between two assets or an asset and an organization.

2.2.7.1 File Name Record for the Relationship Data File

The first record in this interface file is used to store the name of the file as specified in the MDM/R FTS Use of File Names section of this document. This record is used in the event that the original file name is modified during the transfer between the MDM/R and an Organization.

The first record of the interface file contains the following three elements:

Table 2.2.7.1| File Name Record for the Relationship Data File

Field Name	Data Type/ Length	Format	Required	Description
Prefix	Char (7)	Specific Usage: <FTSFN>	Y	This field always contains the record type "<FTSFN>".
File Name	Varchar (250)	Refer to MDM/R FTS Use of File Names.	Y	This field contains the name of the file on the originating system.
Suffix	Char (8)	Specific Usage: </FTSFN>	Y	This field always contains the record type "</FTSFN>".

An example of this record for a Version 00 Incremental Synchronization file is:

<FTSFN>ORG11111.ORG22222.4000.00.20150214221345.abcdef.05.01.DAT</FTSFN>

2.2.7.2 Relationship Data File Header Record

The second record of the file will be a header record as described in the following table.

Table 2.2.7.2| Header Record for the Relationship Data File

Field	Data Type/ Length	Format	Required	Description
Record Type	Char (1)	General; A Specific: H	File Name Record and Header Record are required whether or not Detail Record data are required. Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common business scenarios.	This field indicates that this record is a header record. It must be 'H'.
LDC ORG_ID	Char (8)	General: AAAAAAAA Example: 'ORG84153'		The unique Organization identifier assigned to the LDC during the registration/enrollment process.
Process Mode	Varchar (20)	General: AAAAAAAAAAAA Specific Usage: "IncrementalSync"		Populated with "IncrementalSync".
Process Object	Varchar (20)	General: AAAAAAAAAAAAAAAA Specific Usage: 'Relationship"		Always populated with "Relationship".
Extracted Date Time	Date/Time	yyyyMMddHHmmss		The date and time in EST that the data in this synchronization file set was extracted from the source systems. This maybe coincident with the time that the creation of this synchronization file set was started.

2.2.7.3 Relationship Data File Detail Record

The Relationship Data File Detail Record allows the LDC to define the relationship between assets and/or accounts in the MDM/R. The LDC or its designated agent must submit the relationships as defined in the Defined Relationships and Future Dating table below, based on the Business Scenarios for Incremental Synchronization. The following table describes each relationship, indicates if it is a required relationship and if submitting future-dates is allowed.

Table 2.2.7.3-1| Relationship Data File Detail Record

Field	Data Type/ Length	Format	Required	Description
Record Indicator	Varchar (50)	General: AAAAAAAAAA Specific Usage: "Relationship"	Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for	This field indicates the type of record being submitted. For this file the record indicator will always be "Relationship".
Object 1	If Relationship Identifier 1 is:			Based on what is submitted in the "Object 1" field, this value could be: • The Universal SDP ID

Field	Data Type/ Length	Format	Required	Description
	"SDP" - Fixed Number (8) "METER" - Varchar (50)		common business scenarios.	• The Meter ID
Relationship Identifier 1	Varchar (50)	General: AAAAAAAAAA Specific Usage "SDP" or "METER"		This is the type of asset being submitted in the "Relationship Identifier 1" field. Acceptable values are defined in the Defined Relationships and Future Dating table in this document.
Object 2	If 'Relationship Identifier 2' is: "METER" - Varchar (50) "ACCOUNT' – Varchar(50) "COMMUNICATION MODULE" – Varchar(50) "BILLING AGENT", "AMI OPERATOR", "ENERGY SERVICE PROVIDER", or "CCA SERVICE PROVIDER" – Char(8)		Please refer to Business Scenarios for Incremental Synchronization for files and detail data fields required for common business scenarios.	Based on what is submitted in the "Object 2" field, this value could be: • The Meter ID • The Account ID • The AMCD ID • The Billing Agent Organization ID • The AMI Operator Organization ID • The Energy Service Provider Organization ID • The CCA Organization ID Please refer to the Synchronization Business Rules section of this document.
Relationship Identifier 2	Varchar (50)	General: AAAAAAAAAA Specific Usage One of: 'METER' 'ACCOUNT' 'COMMUNICATION MODULE' 'BILLING AGENT' 'AMI OPERATOR' 'ENERGY SERVICE PROVIDER' 'CCA SERVICE PROVIDER'		This is the type of asset being submitted in the "Object 2" field. Acceptable values are defined in the Defined Relationships and Future Dating table in this document.
Start Date Time	Date/Time	yyyyMMddHHmmss		This is the Start Date/Time of the relationship. This Date/Time is inclusive and is considered the first moment that the relationship is active. This time must be reported in EST. Please refer to the Synchronization Business Rules section of this document for details regarding the use of Start Date/Time for each element.
End Date Time	Date/Time	yyyyMMddHHmmss	N	This is the End Date/Time of the relationship. This Date/Time is

Field	Data Type/ Length	Format	Required	Description
				exclusive and considered to be the first moment that the relationship is not in effect. This time must be reported in EST. Please refer to the Synchronization Business Rules section of this document. Please refer to the Defined Relationships and Future Dating table in this document for relationships that can use future dates.

Table 2.2.7.3-2| Defined Relationships and Future Dating

Values – Relationship Identifier 1	Values – Relationship Identifier 2	Required Relationship	Future Dates	Description
SDP	METER	Required	Not Allowed	The SDP to METER relationship is used to track meter installation and removal actions.
SDP	ACCOUNT	Optional	Allowed	The SDP to ACCOUNT relationship is used to track Customer move in/ move out actions.
METER	COMMUNICATION MODULE	Required	Not Allowed	The METER to COMMUNICATION MODULE relationship is used to relate the AMCC ID to the Meter ID.
SDP	BILLING AGENT	Required	Not Allowed	The SDP to BILLING AGENT relationship determines the organization that may submit Billing Service Standard Interface Request files and to which billing quantity values are provided in each Billing Service Standard Interface Reply for each SDP to which the Billing Agent has been related.
SDP	AMI OPERATOR	Required	Not Allowed	The SDP to AMI OPERATOR relationship determines the agent organization that may submit Meter Read data. Both an agent organization designated in this relationship and the LDC may submit Meter Read data for the same SDP.
SDP	ENERGY SERVICE PROVIDER	Optional	Not Allowed	The SDP to ENERGY SERVICE PROVIDER relationship determines the organization to which read-only web services access is granted for each SDP. LDCs may use this relationship to provide data access to an organization registered within the MDM/R for which a customer contract relationship exists.
SDP	CCA SERVICE PROVIDER	Optional	Not Allowed	The SDP to CCA SERVICE PROVIDER relationship determines the organization to which read-only web services access is granted for each SDP. LDCs may use this relationship to provide data access to another organization registered with the MDM/R for which a customer contract relationship exists.

2.2.8 Component SDP Channel to Channel & Channel to Formula Data File

The Component SDP Channel to Channel & Channel to Formula Data file is not loaded in the MDM/R, however when submitted the header record must follow the specifications described below. Records within the file are not validated. File Name Record for the Component SDP Channel to Channel & Channel to Formula Data File

The first record in this interface file is used to store the name of the file as specified in the MDM/R FTS Use of File Names section of this document. This record is used in the event that the original file name is modified during the transfer between the MDM/R and an Organization.

The first record of the interface file contains the following three elements:

Table 2.2.8| File Name Record for the Component SDP CHANNEL to CHANNEL & CHANNEL to FORMULA Data File

Field Name	Data Type/ Length	Format	Required	Description
Prefix	Char (7)	Specific Usage: <FTSFN>	Y	This field always contains the record type "<FTSFN>".
File Name	Varchar (250)	Refer to MDM/R FTS Use of File Names.	Y	This field contains the name of the file on the originating system.
Suffix	Char (8)	Specific Usage: </FTSFN>	Y	This field always contains the record type "</FTSFN>".

An example of this record for a Version 00 Incremental Synchronization file is:
<FTSFN>ORG11111.ORG22222.4000.00.20150214221345.abcdef.07. 02.DAT</FTSFN>

2.2.8.1 Component SDP Channel to Channel & Channel to Formula Data File Header Record

The second record of the file will be a header record as described in the following table.

Table 2.2.8.1| Header Record for the Component SDP CHANNEL to CHANNEL & CHANNEL to FORMULA Data File

Field	Data Type/ Length	Format	Required	Description
Record Type	Char (1)	General; A Specific: H	File Name Record and Header Record are required whether or not Detail Record data are required. Please refer to Business Scenarios for Incremental	This field indicates that this record is a header record. It must be 'H'.
LDC ORG_ID	Char (8)	General: AAAAAAAA Example: 'ORG88153'		The unique Organization identifier assigned to the LDC during the registration/enrollment process.
Process Mode	Varchar (20)	General: AAAAAAAAAA Specific Usage: "IncrementalSync"		Populated with "IncrementalSync".

Field	Data Type/ Length	Format	Required	Description
Process Object	Char (20)	General: AAAAAAAAAAAA Specific Usage: 'ComponentSDP'	Synchronization for files and detail data fields required for common business scenarios.	Always populated with "ComponentSDP".
Extracted Date Time	Date/Time	yyyyMMddHHmmss		The date and time the data in this synchronization file set was extracted from the source systems. This may be coincident with the time that the creation of this synchronization file set was started.

2.3 Synchronization Interface (File Type 4000) – Version 00

2.3.1 Description – Version 00

The purpose of the Incremental Synchronization interface is to update the MDM/R Master Directory (MMD) as SDP-related element changes are supplied by the LDC to the MDM/R, based on changes in LDC data source(s).

The data contained in the Incremental Synchronization file set represents the condition of the master data that has changed in LDC's source system(s) at a point in time relative to the previous Synchronization. This point in time is identified in the header records of the synchronization file set as the Extracted Date Time. This is the date and time that the data in the synchronization file set was extracted from the source system(s). This time will likely be coincident with the time that the synchronization file set was created.

The synchronization file set's Extracted Date Time provides the point in time against which all transactions contained in the synchronization file set are evaluated to determine if such transactions are intended to make changes in the past or in the future.

This interface is used to:

- "Create" Service Delivery Point (SDP) objects in the MMD. This is a one-time activity completed for every new Universal SDP ID that has already been "assigned" by the Universal SDP ID Assignment Request/Response Interface. The SDP object is "created" in the MMD along with the elements sent through the Synchronization interface by the LDC. Elements required to allow and support SDP-related processing are described in detail in the in the Synchronization File Set and Content section in this document and indicated as "Y" in the 'Required for MDM/R Processing' column.
- Update elements for Service Delivery Points that already exist in the MDM/R Master Directory.

Synchronization allows the LDC to update either or both of the following:

- Only the SDPs that are new,
- Only those elements for each SDP that have changed. Please see Business Scenarios for Incremental Synchronization – Version 00.

2.3.2 Integration – Version 00

2.3.2.1 Direction

LDC to the MDM/R

2.3.2.2 Characteristics

This is a batch process involving the transfer and processing of pipe (|) delimited text files.

An Incremental Synchronization file may contain information related to only those assets whose elements have changed since the last Incremental file set.

Version 00 of the Incremental Synchronization consists of seven files, as follows:

- File No. 00 – A Manifest File, listing each file that is included in the specific Incremental Synchronization data set submission
- File No. 01 – One or more Asset Data Files that describes the primary elements associated with an SDP, a Meter, and a Communication Module
- File No. 02 – One or more Premise Data Files that describes the premise related elements associated with an SDP
- File No. 03 – One or more Service Agreement Data Files that describe the Framing Structure and Commodity Type associated with an SDP
- File No. 04 – One or more Parameter Data Files that describes additional elements of an SDP or a Meter
- File No. 05 – One or more Relationship Data Files that describes the relationship between two assets or an asset and an organization
- File No. 07 – One or more Component SDP Data Files, this file is not loaded in the MDM/R.

For Incremental Synchronization Version 00, File Numbers 00, 01, 02, 03, 04 and 05 are mandatory and must be submitted as part of the Incremental Synchronization file set. File Numbers 01, 02, 03, 04 and 05 must contain a consistent data set for the updates being submitted, which for some updates may result in an empty file. Thus, not only can a file consisting of only a File Name Record and a File Header Record be submitted without any Detail Records, such a file for any one or more of the mandatory files must be submitted.

Segmentation

In order to allow for the efficient transmission of Synchronization data file sets, synchronization data files can be split or segmented into multiple smaller files. All records in a segmented file must be complete. File segmentation can only be between complete records. Partial records will result in exceptions. For example, an LDC submitting 1000 records for an Asset Data File could submit a single file with 1000 records, or 10 files with 100 records each. These file segments must be appropriately named (as described in the File Name Elements Specific to Synchronization Files section of this document) and the name of each file submitted in the Detail record of the single Manifest File for the synchronization submission.

Synchronization will process each segmented file as submitted in the Manifest File for Incremental Synchronization Version 00. The segment numbers of any one file of the file set may have gaps and do not need to be sequential. The MDM/R does load the data for each of the mandatory files of the sync file set (i.e. files 01, 02, 03, 04 and 05) in a particular order but does not consider order when loading the data from any one segmented file.

Reports Generated during the Loading of a Synchronization File Set

The Incomplete Synchronization File Set Report (IR10) informs the LDC that their synchronization file set was not accepted by the MDM/R. Please refer to the MDM/R Incomplete Synchronization File Set Report Technical Specification (IR10).

The Synchronization Staging Table Loader Exception Report (IR14) provides exceptions for problems encountered during the synchronization preparation process which precedes the synchronization process. Please refer to the MDM/R Synchronization Staging Table Loader Exceptions Report Technical Specification (IR14).

2.3.2.3 Synchronization File Set Sequencing

The "Sequence Number" provided as a mandatory element in the Manifest File Header Record defines the processing sequence for Version 00 Incremental Synchronization file sets. Thus the "Sequence Number" must be incremented by the LDC for any Incremental file set transmission in the sequence that the LDC intends to be processed.

Synchronization file sets will be processed in numeric sequence. In the event that an LDC requires a synchronization file set to be processed out of sequence (that is, process a synchronization file set that is not the next file set in sequence), the LDC must communicate to the MDM/R Operator via the MDM/R Service Desk the Sequence Number (i.e. the value of the "Sequence Number" field in the Manifest File Header Record) of that synchronization file set. The MDM/R Operator will manually set the transaction identifier in the MDM/R. Once this is completed, the LDC can submit the synchronization file set.

NOTE: Once the MDM/R operator manually sets the new transaction identifier, the LDC cannot submit synchronization file sets with a sequence number less than the new transaction identifier. If the LDC requires a synchronization file set to be processed with a transaction identifier less than the new transaction identifier, the LDC must follow the same process described above. For example, if the most recent transaction Identifier is 003726 and the LDC requires that the next synchronization file set to be processed is 003744, the LDC must provide this transaction identifier to the MDM/R Operator. The MDM/R Operator will change the last transaction identifier provided to the MDM/R from 003726 to 003743. When this is done, the LDC would be able to submit synchronization file set transaction identifier 003744. However, the LDC would not be able to submit synchronization file sets with transaction identifier 003727 through 003743 unless they follow the same process to reset the sequence number.

The synchronization file set transaction identifier will be updated by the MDM/R upon successful completion of the synchronization process. In the event that the synchronization process is reported

as not successfully loaded (e.g. file set reported on the Incomplete Synchronization File Set Report (IR10), file set reported on the Synchronization Staging Table Loader Exception Report (IR14), or threshold checks are exceeded) does not complete successfully the synchronization file set sequence number will not be updated by the MDM/R.

2.3.3 Business Rules – Version 00

General Business Rules:

1. The File Name Record, File Header Record and File Detail Records must be included for each of the synchronization files whether details are provided or not. All mandatory files as described in the Characteristics section of this document will be listed in the Manifest File Detail Record. For each change, the affected detail records will be transmitted per the Business Scenarios for Incremental Synchronization – Version 00 in this document. If there is no change, no detail records will be transmitted.
2. The Extracted Date Time must not be more than 14 days prior to the current MDM/R system Date/Time (EST) when the file set is submitted.
3. The Extracted Date Time must be the same in each file of the same synchronization file set.
4. For SDPs and Meters that exist in the MDM/R Master Directory and in the Incremental Synchronization file set, the MDM/R updates the SDP and Meter elements in the MDM/R with the elements for the SDP and Meter in the Incremental Synchronization file set according to these business rules.
5. For SDPs and Meters that do not exist in the MDM/R Master Directory but are in the Incremental Synchronization file set, the MDM/R "creates" the SDP and Meter and associates any parameters, service agreements, and relationships that are provided in the Incremental Synchronization file set.
6. Date-effective elements cannot have effective start or end Date/Times prior to December 31st, 1899 or post January 1st,2100.

Business Rules for Exceptions:

7. The following are examples of exception cases:
    a. The MDM/R detects an exception when the Extracted Date Time of the Synchronization file set is more than 14 days prior to the current system date when the file set is submitted.
    b. The MDM/R Synchronization Adapter detects exceptions in regards to invalid pipe (|) delimited file formats and data type errors.
    c. The MDM/R detects exceptions when the LDC Identifier or Universal SDP ID values are not known by the system.
    d. The MDM/R detects exceptions when, in the file, the Universal SDP ID is associated with an LDC Identifier and SDP ID for which that Universal SDP ID was not originally assigned.
    e. The MDM/R detects exceptions when a synchronization file does not contain data in a field that is required.
    f. The MDM/R detects exceptions when an asset (SDP ID, Meter ID, or AMCD ID) is provided in the Relationship Data file that does not exist in the MDM/R or the submitted synchronization file set.

g. The MDM/R detects exceptions when there are overlapping in-effect periods for date effective elements:

Business Rule for Report Output:

8. The reports described below are created for each Incremental Synchronization file set:
    a. The Synchronization Staging Table Loader Exception Report (IR14) provides a status of the Synchronization file set after staging the file set for synchronization. (Reference MDM/R Synchronization Staging Table Loader Exception Report Technical Specification (IR14).)
    b. The Synchronization Updates Report (IR06) provides a complete listing of the records, that were updated via the Incremental Synchronization process (Refer to the MDM/R Synchronization Updates Report Technical Specification (IR06).)
    c. The Synchronization Exception Report (IR07) provides a complete listing of the records that were not updated via the Incremental Synchronization process because an error occurred (Refer to the MDM/R Synchronization Exception Report Technical Specification (IR07).)

Rules Affecting Current, Future and Retroactive Dating:

9. Date effective changes are generally state changes related to three specific periods of time, namely future state, current state, and prior state. Three types of value and/or date related changes/corrections can be accomplished using the Incremental Synchronization process. These are:
    a. Future State Changes
    b. Current State Changes
    c. Prior State Value and/or Date Corrections

Future State Element Change Business Rules

A future state changes is where a new element is being supplied with a Start Date/Time that is after the Extracted Date Time.

10. Future-dated element changes can be submitted using Incremental Synchronization for those Parameters and Relationships where it is allowed.
11. The following Synchronization elements CANNOT be future dated. (Please refer to the Defined Relationships and Future Dating and the Future Dating Parameters tables.) Attempting to future date any of these elements will result in the Synchronization file set being rejected on the Synchronization Staging Table Loader Exception Report (IR14):
    a. In the SDP Parameter file:
        i. CT/PT Multiplier
        ii. Billing Cycle ID
    b. In the Relationship file:
        i. SDP to Meter
        ii. Meter to Communication Module

i. SDP to Energy Service Provider

ii. SDP to CCA Service Provider

iii. SDP to AMI Operator

iv. SDP to Billing Agent

12. The future-dated element changes must provide the current state element that is currently in effect as well as the element that will start at a future Date/Time.

    a. The current state element Start Date/Time must be earlier than the Extracted Date Time.

    b. The current state element End Date/Time must be later than the Extracted Date Time, and

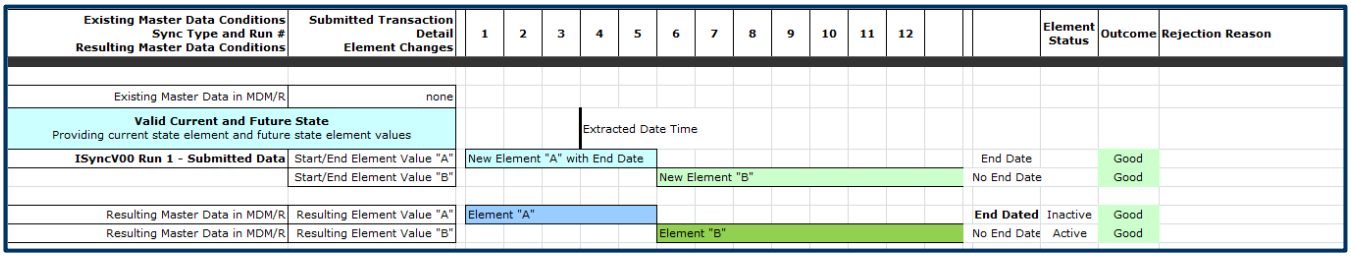
    c. The current state element End Date/Time must be earlier or equal to the Start Date/Time of the future-dated element.

    d. The End Date/Time of the future-dated element must not be provided.

    e. If there is not a currently in-effect element the future-dated element may be provided on its own with a future Start Date/Time.

    (Diagram on next page)

Figure 2.3.3-1| Valid Future-Dated Element Change



(A full sized version of synchronization diagrams can be found in the Examples section of this document.)

13. For subsequent synchronizations of future-dated elements until they become current:

    a. If the current state element is being provided for that SDP in subsequent Incremental Synchronization file set submissions, then the future-dated element change must be included until it becomes the current state for that element.

    b. Subsequent synchronization submissions only need to provide the pair of future-dated element change records if there is a need to change the contents or effective dates of the future-dated element.

Current State Element Change Business Rules

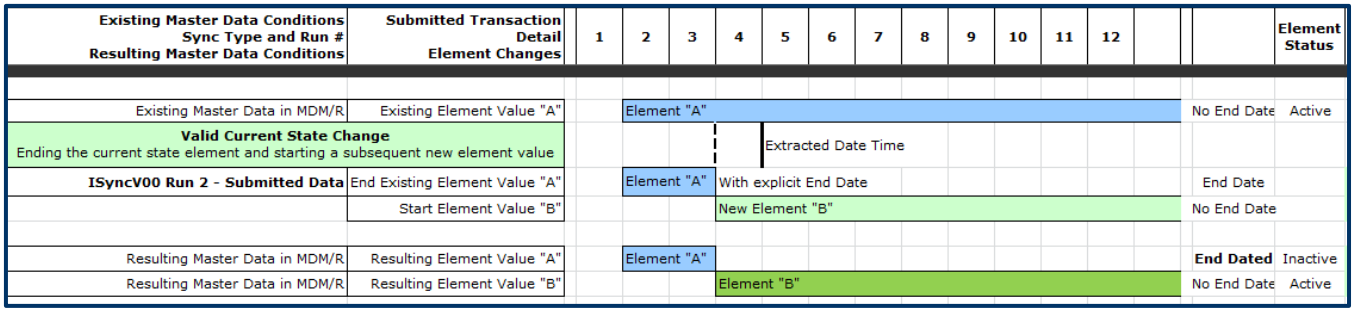
A current state change is where Start Date/Time of the new element value is equal to or after the Start Date/Time of the existing element value.

14. Current state element changes can be submitted using Incremental Synchronization.

15. To end the current state element (i.e. the element currently in effect) and start a new element (to become the in-effect element):

If the new element Start Date/Time is greater than the Start Date/Time of the currently in-effect element, then the existing element must be provided with its current Start Date/Time and its new End Date/Time that is equal to or less than the Start Date/Time of the new element

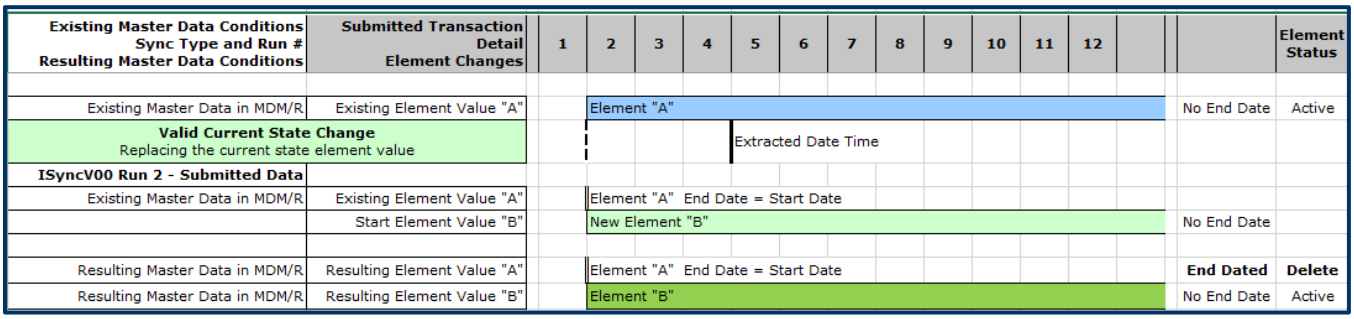
Figure 2.3.3-2| Valid Current State Change



(A full sized version of synchronization diagrams can be found in the Examples section of this document.)

a. If the Start Date/Time of a provided element is equal to the Start Date/Time of the currently in-effect element but the new element value is different, the synchronization must include the existing element with its End Date/Time equal to the Start Date/Time.

Figure 2.3.3-3| Valid Current State Change (Crush)

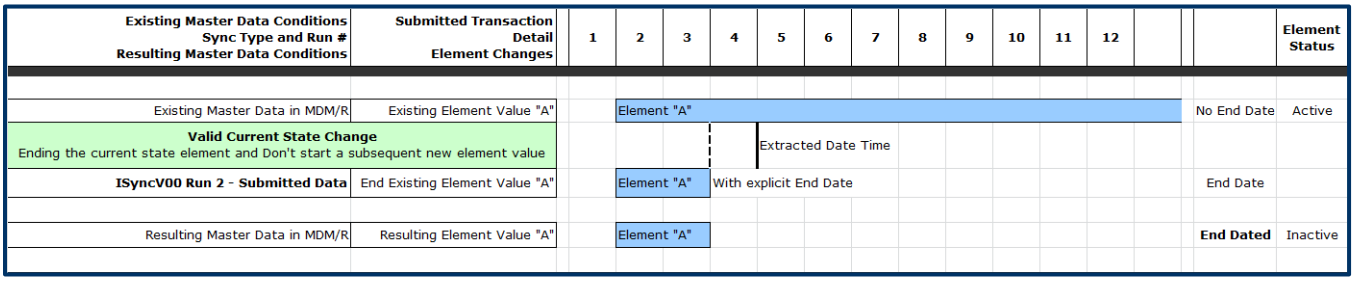


(A full sized version of synchronization diagrams can be found in the Examples section of this document.)

b. If the new element Start Date/Time is earlier than the Start Date/Time of the existing element, it is treated as a retroactive transaction. Please see the Prior State Value and/or Date Corrections Business Rules below.

16. To end the current state element (i.e. the element currently in effect) and NOT start a new element, the Incremental Synchronization records must provide the element that is currently in effect in the MMD, providing the same Start Date/Time as that existing element value stored in the MMD and its new End Date/Time.

Figure 2.3.3-4| Valid Current State Change – Element Ended



(A full sized version of synchronization diagrams can be found in the Examples section of this document.)

Prior State Value and/or Date Corrections Business Rules

A prior state change is where a series of elements are being supplied with Start Date/Times that are before the current state element (i.e. the element currently in effect) already in the MMD and start before the Extracted Date Time provided in the synchronization file set. The processing of the new element is intended to:

- **Correct Prior State Values** where previously submitted element values are being corrected but the dates over which these values were effective is remaining unchanged, or
- **Correct Prior State Dates** where previously submitted element values and order over time are remaining unchanged but the dates over which they were effective is being corrected, or
- **Correct Prior State Values and Dates** where both the previously submitted element values and their effective dates are being corrected.

17. To correct an element or elements in the past, the series of submitted prior state element records must provide a complete replacement set of element records with each element value and their applicable Start Date/Times and End Date/Times. For example, if the Start Date/Time from an element record from five years ago is to change, the complete set of element records from that corrected date to the current date must be provided.

    Existing element records that are being replaced by the prior state element records should be provided. Any existing element record that is no longer required once the prior state element value records are applied must have the End Date/Time set equal to the Start Date/Time by the synchronization process.

Figure 2.3.3-5| Valid Prior State Change – New Element Pre-dates Existing Elements

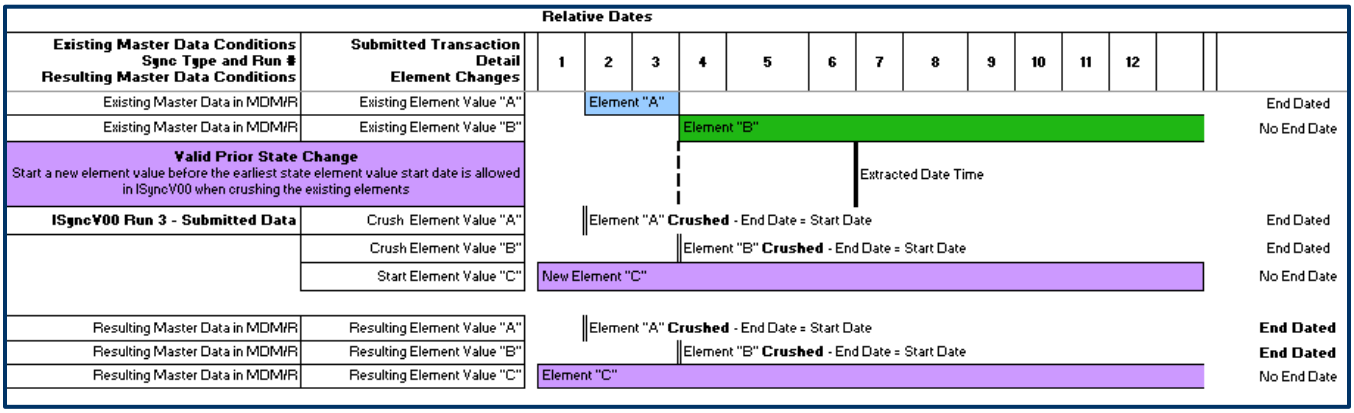
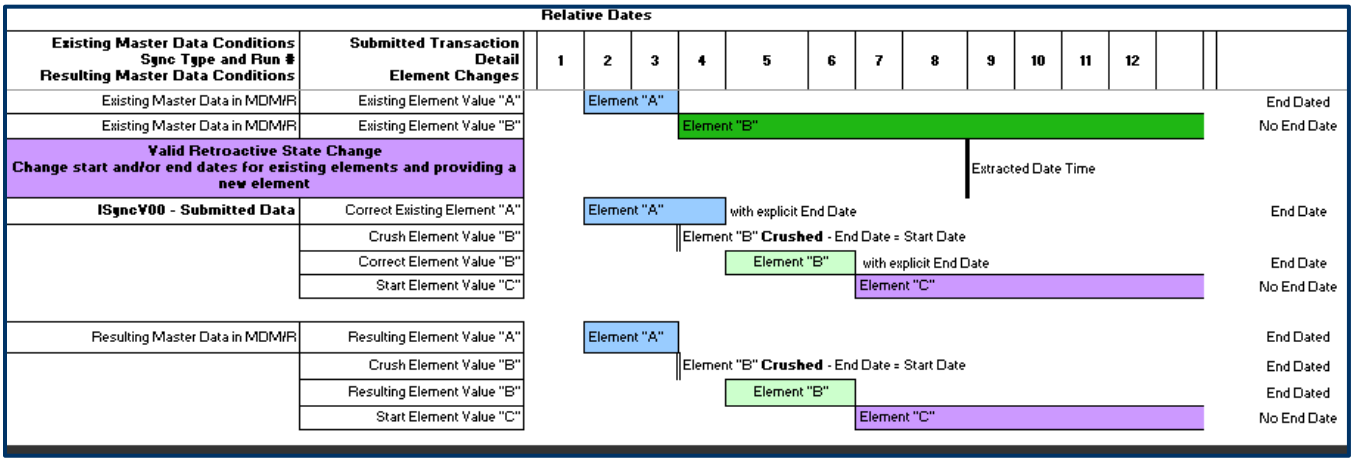


Figure 2.3.3-6| Valid Prior State Change – New Element Starts Later than Existing Element



(A full sized version of synchronization diagrams can be found in the Examples section of this document.)

NOTE: For scenarios not described above please contact the Smart Metering Entity using the MDM/R Service Desk tool at https://mdmrsupport.service-now.com.

Business Rules Affecting Meter Asset Relationships and Parameters:

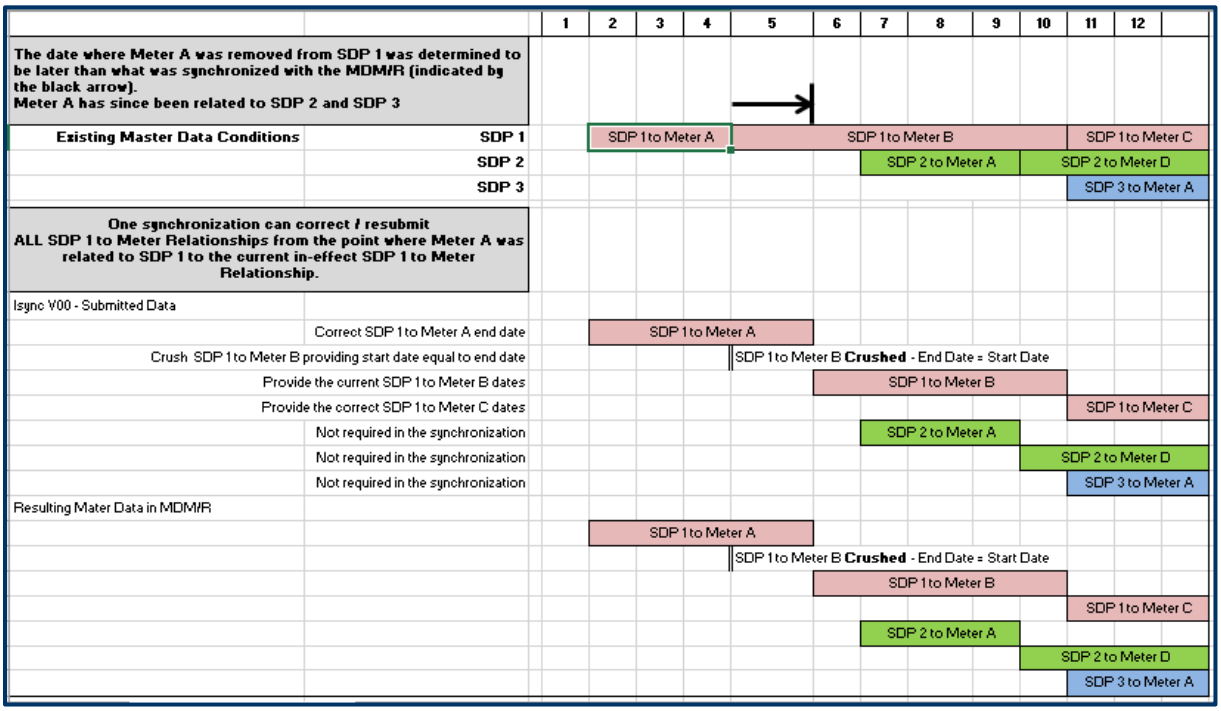
18. A Meter can be installed at multiple SDPs over time so long as there are no overlaps in effective dates. This means that the SDP to Meter Relationships for a given Meter cannot be in effect at more than one SDP at a time. When resolving a crossed meter scenario (i.e. two or more meter(s) was(were) erroneously synchronized to a given SDP(s)) it is recommended to end the SDP to Meter Relationship in one synchronization, and activate the new relationship in a subsequent synchronization. Attempting to end and start the same meter(s) between different SDPs in the same synchronization file set may result in exceptions (IR07 report) due to processing timings.
19. The SDP to Meter Relationship is separate from the Meter to Communication Module Relationship and must be managed independently. The SDP to Meter Relationship can change over time; however, in general terms, the Meter's relationship to its Communication Module is established when the Meter is built and remains until the Meter is decommissioned.
20. When effective dating Meter-related elements, Meter to Communication Module Relationship and Parameters should not be ended.
    a. The first time that the Meter is installed at an SDP, start the SDP to Meter Relationship, and start the required Meter to Communication Module Relationship and the Meter parameter for Dials (and any non-required parameters) with the same effective Start Date/Time.
        i. When the Meter is removed from the SDP only the SDP to Meter Relationship is ended. The Meter to Communication Module Relationship and Meter parameter for Dials (and any non-required parameters) remain in effect.

ii. When the Meter is installed at a new SDP, the SDP to Meter Relationship will be started with the new effective Start Date/Time, but the effective Start Date/Time for the Meter to Communication Module Relationship and Meter parameter for Dials (and any non-required parameters) will be the Date/Time at which the Meter was installed for the first time.

21. When providing the retroactive history of an SDP to Meter Relationship for a given SDP, the current and prior Meters related to that SDP from the earliest effective dates must be provided in the Synchronization file set along with each Meter's related history of relationship from the point in time that each Meter was related to the SDP through to each Meter's current state of its elements, no matter the SDP to which each Meter is currently related.
22. The history of Meter-related elements represents the changes to those elements related to the Meter no matter the SDP to which the Meter has been related.

When an SDP to Meter Relationship in the past needs correcting and the Meter has been related to other SDPs from the time requiring correction: each SDP to Meter Relationship must be submitted for synchronization starting with the oldest SDP to Meter Relationship that requires correction until the currently in-effect SDP to Meter Relationship. In the example below the Meter has been installed at two other SDPs since an incorrect date exists The correction can be accomplished in one synchronization as shown:

Figure 2.3.3-7| Provide SDP to Meter History to Correct Past Dates



Note: Meter Read data will need to be resubmitted to align with the changes made.

23. The End Date/Time of the SDP to Meter Relationship for a removed meter should reflect the actual time of the meter removal to allow processing by the MDM/R of any final transmission of interval data or register read data.
24. The Start Date/Time of the SDP to Meter Relationship for a newly installed meter should reflect the actual time of the meter installation to allow processing by the MDM/R of any first transmission of interval data or register read data.
25. Each Meter asset requires a Meter to Communication Module Relationship and Dials parameter. Non-required Meter asset parameters are Meter Volts, Meter Amps, Meter Phases and Meter Form. The submission of the history of these Meter asset elements must follow the rules relating to Future State, Current State and Prior State transaction submission.
    a. The Meter Dials parameter is required in order to perform certain Validation, Estimation and Billing functionality, for example the number of Dials is used by the Dial Rollover Algorithm for Message Sum Check, the Billing Validation Sum Check, Register Read Scaling and the Register Read Calculator. Please refer to the VEE Standard for the Ontario Smart Metering System for details.
    b. Not synchronizing the Meter Dials parameter, or submitting a number of dials that is not equal to the number of digits to the left of the decimal point received from the Meter can cause exceptions in the above processes.

Business Rules Affecting CT/PT Multipliers

26. The MDM/R is designed to only apply non-unity CT/PT Multipliers to received interval data. Only non-unity CT/PT Multipliers are processed by synchronization and stored within the MDM/R and thus only non-unity CT/PT Multipliers are visible within the MDM/R GUI.
    a. MDM/R synchronization will not process a unity CT/PT Multiplier (CT/PT = 1).
    b. Non-unity CT/PT Multipliers must be explicitly ended through the submission of the non-unity CT/PT Multiplier transaction in the SDP Parameter file with its original Start Date/Time and the applicable End Date/Time.

Note: The non-unity CT/PT Multiplier is applied to interval data and the resulting interval values are stored. If a change is made to a CT/PT Multiplier for a period where Meter Read data has already been submitted, that Meter Read data must be resubmitted to apply the new CT/PT Multiplier value.

27. The Start Date/Time or End Date/Time for this SDP parameter must NOT be later than the Extracted Date Time for the synchronization file set, i.e. no future-dated changes can be made to a CT/PT Multiplier.
28. A change to the CT/PT Multiplier must be accompanied by a corresponding actual or logical change to the SDP to Meter Relationship. A logical change to an SDP to Meter Relationship is defined as ending and starting the SDP to Meter Relationship for the same meter.

Business Rules Affecting Meter Interval Length and Meter Channel Configuration Set Changes

29. The MDM/R uses the Meter Interval Length for validating Meter Read data submissions and in the Register Read Calculator process. The Meter Asset Interval Length parameter synchronized with the MDM/R must match the interval length received from the Meter. The Meter, along with the Interval Length and the Channel Configuration Set are used in the creation of the Interval, Register Read and Usage Channels.

30. If a Meter interval length and/or the channel configuration set need to be corrected it must be completed in two synchronizations:

    a. Submit one synchronization to submit the Start Date/Time and End Date/Time (equal to the Start Date/Time) of the current SDP to Meter Relationship. The Meter Asset must be provided with the current incorrect interval length and/or channel configuration set NOT the new corrected value. This will ensure that the relationships associated with the incorrect values are all crushed correctly.
    b. When the above synchronization is processed, submit another synchronization to Restart the SDP to Meter Relationship to start on or before the Start Date/Time of the original SDP to Meter relationship. Ensure the interval length and/or the channel configuration set of the Meter Asset is the corrected value

Business Rules Affecting Account Changes

31. An SDP to Account Relationship Start Date/Time and End Date/Time must be at midnight EST using Incremental Synchronization to support the LDC's Move In/Move Out process.

32. Account changes, if provided, are considered in the estimation and billing processes. Please refer to the VEE Standard for the Ontario Smart Metering System and the MDM/R Billing Service Standard Technical Interface Specification.

    a. Estimation and billing considerations are not applied if an account is not provided.
    b. The MDM/R will consider the following account changes.
        i. An SDP to Account Relationship change where the Account ID changes.
        ii. An SDP to Account Relationship change where the Account ID does not change.
        iii. An SDP to Account Relationship when none previously existed.
        iv. An SDP to Account Relationship is ended and no new SDP to Account Relationship is provided

Business Rules Affecting Framing Structure Changes

33. An SDP to Framing Structure Relationship Start Date/Time and End Date/Time must be specified at midnight EST using Incremental Synchronization to support the framing process.

34. The MDM/R performs a daily framing process that uses the Framing Structure that is in effect for each SDP at the start of each day. The Start Date/Time should be submitted as the inclusive start of day (N) at time HHmmss = 000000 and the End Date/Time should be submitted as the exclusive end of day (N + n) at time HHmmss = 000000 (where $n \geq 0$ whole days) to assure that each entire day is processed using the same Framing Structure.

Business Rules Affecting Authorized Agents

35. Only the organization with the Organization ID synchronized in the currently in-effect SDP to Billing Agent Relationship may submit Billing Requests on behalf of the LDC.
36. The organization with the Organization ID synchronized in the currently in-effect SDP to AMI Operator Relationship may submit Meter Read data on behalf of the LDC. If it is an authorized agent, the LDC may also submit Meter Read data.

Business Rules Affecting Distributor Rate Class and Commodity Rate Class

37. When providing the Distributor Rate Class and Commodity Rate Class the Start Date/Time and End Date/Time for these parameters must be specified at midnight EST.
38. The Distributor Rate Class and the Commodity Rate Class are informational fields required by OEB Order and Decision EB-2015-0297, these fields are used by the OEB and other organizations for data analytic purposes. Congruency is expected, but not enforced by the MDM/R, between the Distributor Rate Class and the VEE Service, and between the Commodity Rate Class and the Framing Structure.

Business Rules Affecting Occupant Changes

39. When providing the Occupant Change, the Start Date/Time must be specified as January 1st at midnight EST and End Date/Time for the parameter must be specified as December 31st at midnight EST. The StartDate/Time and EndDate/Time must be for the same year.
40. All Occupant Changes must have the Start Date/Time and End Date/Time populated.
41. An Occupant Change can be crushed by providing an End Date/Time that matches exactly the Start Date/Time. The parameter End Date/Time must then be specified with the year of the Start Date/Time on January 1st at midnight EST.

Business Rules Affecting Delivered USDP

42. For the Net Metering 2 SDP solution, the Delivered USDP parameter should be provided for the Received SDP only. This will link the Received SDP to the Delivered SDP as part of the Net Metering 2 SDP solution where single bi-directional meters will utilize two distinct SDPs: a Delivered SDP dedicated to processing Delivered Energy, and a Received SDP dedicated to processing Received Energy.
43. The Start Date/Time and End Date/Time of the Delivered USDP parameter should reflect the period in which the Service Delivery Point is effective for processing Received Energy.
44. When providing the Delivered USDP parameter, the Param Value must be a valid Universal SDP ID assigned to the LDC Organization ID.
45. When providing the Delivered USDP parameter, the Param Value which should be a Universal SDP ID cannot be the same as the UDC ID value for the parameter record. In other words, this parameter record cannot reference itself as being the Delivered USDP.

Business Rules Affecting Postal Codes

46. When a single residential premise exists in a six-digit postal code, LDCs should synchronize the default postal code W8W8W8.

2.3.4 Pre-conditions – Version 00

The following must exist for the input file to be processed through the interface:

- The LDC is enrolled and has an LDC ORG_ID assigned.
- The LDC has requested and has been assigned a Universal SDP ID for each SDP in the Incremental Synchronization file set.

2.3.5 Post-conditions– Version 00

The following outcomes result from the file set being processed through the interface:

- Should the transmission of the synchronization file set be incomplete for more than the allowed length of time the LDC has received the Incomplete Synchronization File Set Report (IR10) via FTS.
- The LDC has received the Synchronization Staging Table Loader Exception Report (IR14) via FTS.
- SDPs and element changes identified in the Incremental Synchronization file set are updated in the MDM/R Master Directory.
- The LDC has received the Synchronization Updates Report (IR06) and the Synchronization Exceptions Report (IR07) outlined in the Incremental Synchronization Business Rules – Version 00 section of this document via File Transfer Services or via the MDM/R GUI.

2.3.6 Assumptions and Limitations – Version 00

1. Information in the Incremental Synchronization File will only be for SDPs that are or will be associated with Smart Meters.
2. With the synchronization file set above, it may be defined that multiple Interested Parties roles can be associated to a given SDP, multiple SDPs can be related to a single account.
3. SDPs framed as Hourly by any LDC for the purpose of spot pricing are expected to be a small percentage of the total SDPs. Billing quantity data will be delivered as Hourly consumption data for each day.

2.3.7 Frequency and Timing – Version 00

- **Frequency**: The Incremental Synchronization file set may be sent as often as needed by the LDC.
- **Timing**: Incremental Synchronization file sets received by 16:00 EST will be processed by midnight EST.

2.3.8 Sample of the Incremental Synchronization File Set – Version 00

A sample of the Incremental Synchronization file set is available from the MDM/R Service Desk Knowledgebase: Sample Reports and Files section.

2.3.9 Data Mapping and File Format – Version 00

The data mapping definitions and the file format layout are described in the File Format – Incremental Synchronization Version 00 section of this document for the Incremental Synchronization.

For Incremental Synchronization, the "Process Mode" field in each Synchronization File Header Record will contain "IncrementalSync".

2.3.10 Business Scenarios for Incremental Synchronization – Version 00

Incremental Synchronization can be used to create SDPs or update existing SDPs in the MDM/R. When updating SDPs only the modified and expressly related information for an SDP definition should be provided in an Incremental Synchronization file set. This results in all required end date-related elements being provided and only the elements that describe the new elements of the SDP being provided.

The tables in this section list business scenarios that can be required during the course of regular business for an LDC, and the files that must be submitted as part of an Incremental Synchronization file set for updates using the Incremental Synchronization process.

The detail data Fields, Data Type/Length, Format, and Description for the Files and Elements listed in the tables below can be found in in the Incremental Synchronization Version 00 section of this document.

Table 2.3.10-1| Valid Prior State Change – Business Scenario 1 – Create a New SDP with the all of the Mandatory Elements Required to Produce Billing Quantities

File	Element	Notes
Asset	SDP	
Asset	Meter	
Asset	Communication Module	
Premise	Premise	
Service Agreement	Service Agreement (Framing Structure)	The inclusive Start Date/Time of the Framing Structure must be Midnight EST at the beginning of the first day (the first moment the framing structure IS active).
Parameter	SDP Parameter (VEE Service)	
Parameter	Meter Parameter (Dials)	
Relationship	SDP to Meter	The inclusive Start Date/Time should be the actual time of installation. If the Meter was previously installed at a different SDP, that SDP to Meter Relationship must have been ended in a prior Synchronization file set submission.
Relationship	Meter to Communication Module	The Start Date/Time should be when the Meter was first installed at any SDP. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document.
Relationship	SDP to Billing Agent	
Relationship	SDP to AMI Operator	

Table 2.3.10-2| Business Scenario 2 – Create Optional Elements of an SDP

File	Element	Notes
Parameter	SDP Parameter (Loss Factor Classification)	

File	Element	Notes
Parameter	SDP Parameter (Service Volts)	
Parameter	SDP Parameter (Service Amps)	
Parameter	SDP Parameter (Service Phases)	
Parameter	SDP Parameter (Service Form)	
Parameter	SDP Parameter (Dem-firm #1)	Placeholder for future demographic data.
Parameter	SDP Parameter (Dem-firm #1)	Placeholder for future demographic data.
Parameter	SDP Parameter (Dem-firm #1)	Placeholder for future demographic data.
Parameter	SDP Parameter (Dem-firm #1)	Placeholder for future demographic data.
Parameter	SDP Parameter (Distributor Rate Class)	Required to be populated in the MDM/R to comply with Ontario Energy Board Order EB-2015-0297
Parameter	SDP Parameter (Commodity Rate Class)	Required to be populated in the MDM/R to comply with Ontario Energy Board Order EB-2015-0297
Parameter	SDP Parameter (Occupant Change)	Required to be populated in the MDM/R to comply with Ontario Energy Board Order EB-2015-0297
Parameter	SDP Parameter (Generation Type)	
Parameter	SDP Parameter (Maximum Generation Capacity)	
Parameter	Electric Vehicle	
Parameter	SDP Parameter (Billing Cycle ID)	
Parameter	SDP Parameter (CT/PT Multiplier)	Non-unity only. This value should not be zero (0) or one (1). Please see the Rules Affecting CT/PT Multipliers in the Business Rules section of this document.
Parameter	Meter Parameter (Meter Volts)	
Parameter	Meter Parameter (Meter Amps)	
Parameter	Meter Parameter (Meter Phases)	
Parameter	Meter Parameter (Meter Form)	
Relationship	SDP to Account	The inclusive Start Date/Time of the SDP to Account Relationship must be Midnight EST at the beginning of the first day (the first moment the SDP to Account Relationship IS active).
Relationship	SDP to Energy Service Provider	
Relationship	SDP to CCA Service Provider	

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

Table 2.3.10-3| Business Scenario 3 – Physical Meter Change where the Interval Length and Channel Configuration Set of the old and new meter are the same

File	Element	Notes
Remove the Old Meter from SDP		
Asset	Meter	The meter asset being ended/removed from the SDP must be provided so that the related Meter to Channel relationships and Scaling Constant can also be ended.
Asset	Communication Module	
Relationship	SDP to Meter	The current inclusive Start Date/Time and the exclusive actual End Date/Time must be submitted.
Relationship	Meter to Communication Module	Required to correctly end the related Data Collection Service. The current inclusive Start Date/Time must be provided. The exclusive End Date/Time can be left null if the Meter to Communication Module Relationship is being left in-effect. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document.
Provide the New Meter and all other Mandatory elements of the existing SDP		
Asset	SDP	
Asset	Meter	
Asset	Communication Module	
Parameter	Meter Parameter (Dials)	
Relationship	Meter to Communication Module	Include the inclusive Start Date/Time of the Meter to Communication Module Relationship. The End Date/Time is left null. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document.
Relationship	SDP to Meter	Include the actual Start Date/Time of the SDP to Meter Relationship. The End Date/Time isleft null. If this meter has been installed at another SDP, that SDP to Meter Relationship must have been ended in a previous synchronization file set submission.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

If the Interval Length and/or the Channel Configuration Set of the old meter and the new meter differ, refer to Business Scenario 19.

Table 2.3.10-4| Business Scenario 4 – Logical Meter Change

File	Element	Notes
Providing both parts in one sync:		
Part 1: End the Meter at the SDP		
Asset	Meter	The meter asset being ended/removed from the SDP must be provided so that the related Meter to Channel relationships and Scaling Constant can also be ended.
Relationship	SDP to Meter	The current inclusive Start Date/Time and the exclusive End Date/Time must be submitted. For a logical meter change this End Date/Time should be on an interval boundary and may be equal to the Start Date/Time for the installed meter.
Asset	Communication Module	This is the AMCD ID for the Communication Module.
Relationship	Meter to Communication Module	The current inclusive Start Date/Time must be provided. The exclusive End Date/Time should be left null to leave the Meter to Communication Module Relationship in-effect. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document.
Part 2: Start the same Meter at the same SDP		
Relationship	SDP to Meter	For a logical meter change the Start Date/Time must be on an interval boundary and equal to the End Date/Time for the ended SDP to Meter Relationship.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

Table 2.3.10-5| Business Scenario 5 – Ending a Physical Meter

File	Element	Notes
Asset	Meter	The meter asset being ended / removed from the SDP must be provided so that the related Meter to Channel relationships and Scaling Constant can also be ended.
Relationship	SDP to Meter	The current Start Date/Time and the End Date/Time must be submitted. This Start Date/Time should not be on an interval boundary and should be later than the Date/Time of the last register reading for the Meter.
Asset	Communication Module	This is the AMCD ID for the Communication Module.
Relationship	Meter to Communication Module	Include the Start Date/Time of the Meter to Communication Module Relationship. The End Date/Time will be left null. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document for the use of Start and End Date/Times.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

Table 2.3.10-6| Business Scenario 6 – Start Physical Meter

File	Element	Notes
Where there is either no meter or the previous Meter has been ended		
Asset	SDP	
Asset	Meter	If this meter has been installed at another SDP, that SDP to Meter Relationship must have been ended in a previous synchronization file set submission.
Asset	Communication Module	
Parameter	Meter Parameter (Dials)	This is the number of dials (digits left of the decimal point) reported on the Meter. This MUST match the register reading data sent by the Meter.
Relationship	Meter to Communication Module	Include the Start Date/Time of the Meter to Communication Module Relationship. The End Date/Time is left null. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document.
Relationship	SDP to Meter	Include the actual Start Date/Time of the SDP to Meter Relationship – the time the Meter was installed. The End Date/Time is left null.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

Table 2.3.10-7| Business Scenario 7 – Service Cut at Pole

File	Element	Notes
Asset	SDP	Service Status = 'N' Load Status = either "Y" or "N", which ever status is currently true for the SDP.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

Table 2.3.10-8| Business Scenario 8 – Booting a Meter

File	Element	Notes
Asset	SDP	Service Status = either "Y" or "N", which ever status is currently true for the SDP. Load Status = 'N'

NOTE: In Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

Table 2.3.10-9| Business Scenario 9 – Framing Structure Change

File	Element	Notes
Providing both parts in one sync:		
Part 1: End the existing Service Agreement		
Service Agreement	Service Agreement (Framing Structure)	The Start Date/Time and the End Date/Time of the existing Framing Structure must be Midnight EST. The End Date/Time must be midnight at the beginning of the day following the framing structure change (the first moment the framing structure is NOT active).
Part 2: Start the new Service Agreement		
Service Agreement	Service Agreement (Framing Structure)	The Start Date/Time of the new Framing Structure should be equal to the End Date/Time of the existing Framing Structure, and must be Midnight EST at the beginning of the first day (the first moment the framing structure IS active). The End Date/Time is left null.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

Table 2.3.10-10| Business Scenario 10 – VEE Service Change

File	Element	Notes
This scenario assumes the SDP Parameter (VEE Service) is in effect for a space of time before changing the value, i.e. The Start Date/Time for the currently in-effect value is prior to the End Date/Time.		
Providing both parts in one sync:		
Part 1: End the old VEE Service		
Parameter	SDP Parameter (VEE Service)	Include the Start Date/Time and the End Date/Time of the existing VEE Service.
Part 2: Start the new VEE Service		
Parameter	SDP Parameter (VEE Service)	Include the Start Date/Time of the new VEE Service. The End Date/Time is left null.
NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.		

Table 2.3.10-11| Business Scenario 11 – CT/PT Multiplier Change

File	Element	Notes
This scenario assumes the SDP Parameter (CT/PT Multiplier) is in effect for a space of time before changing the value, i.e. The Start Date/Time for the currently in-effect value is prior to the End Date/Time. NOTE: A CT/PT Multiplier change must be accompanied by a Physical Meter Change or a Logical Meter Change, both described earlier in this section.		
Providing both parts in one sync:		
Part 1: End the old CT/PT Multiplier		
Parameter	SDP Parameter (CT/PT Multiplier)	Include the Start Date/Time and the End Date/Time of the existing CT/PT Multiplier.

File	Element	Notes
Part 2: Start the new CT/PT Multiplier		
Parameter	SDP Parameter (CT/PT Multiplier)	Include the Start Date/Time of the new CT/PT Multiplier. The End Date/Time is left null. The MDM/R only processes non-unity CT/PT Multipliers. CT/PT Multipliers equal to one (1) or zero (0) will not be processed. Please see the Rules Affecting CT/PT Multipliers in the Business Rules section of this document.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

Table 2.3.10-12| Business Scenario 12 – Account Change

File	Element	Notes
This scenario assumes the SDP to Account Relationship is in effect for a space of time before changing the value, i.e. The Start Date/Time for the currently in-effect value is prior to the End Date/Time.		
Providing both parts in one sync:		
Part 1: End the old SDP to Account Relationship		
Relationship	SDP to Account	The inclusive Start Date/Time and the exclusive End Date/Time of the existing SDP to Account Relationship must be Midnight EST. The End Date/Time must be midnight at the beginning of the day following the SDP to Account Relationship change (the first moment the SDP to Account Relationship is NOT active).
Part 2: Start the new SDP to Account Relationship		
Relationship	SDP to Account	The inclusive Start Date/Time of the new SDP to Account Relationship should be equal to the End Date/Time of the existing SDP to Account Relationship, and must be Midnight EST at the beginning of the first day (the first moment the SDP to Account Relationship IS active). The End Date/Time is left null.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

As part of an LDC process an Account Change might trigger an Occupant Change described in Scenario 17.

Table 2.3.10-13| Business Scenario 13 – Billing Agent Change

File	Element	Notes
This scenario assumes the SDP to Billing Agent Relationship is in effect for a space of time before changing the value, i.e. The Start Date/Time for the currently in-effect value is prior to the End Date/Time.		
Providing both parts in one sync:		

File	Element	Notes
Part 1: End the old SDP to Billing Agent Relationship		
Asset	SDP	
Relationship	SDP to Billing Agent	Include the Start Date/Time and the End Date/Time of the existing SDP to Billing Agent Relationship.
Part 2: Start the new SDP to Billing Agent Relationship		
Relationship	SDP to Billing Agent	Include the Start Date/Time of the new SDP to Billing Agent Relationship. The End Date/Time is left null.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document.

Table 2.3.10-14| Business Scenario 14 – AMI Operator Change

File	Element	Notes
This scenario assumes the SDP to AMI Operator Relationship is in effect for a space of time before changing the value, i.e. The Start Date/Time for the currently in-effect value is prior to the End Date/Time.		
Providing both parts in one sync:		
Part 1: End the old SDP to AMI Operator Relationship		
Asset	SDP	
Relationship	SDP to AMI Operator	Include the Start Date/Time and the End Date/Time of the existing SDP to AMI Operator Relationship. NOTE: Either the LDC ORG ID or its AMI Operator ORG ID must be in-effect.
Part 2: Start the new SDP to AMI Operator Relationship		
Relationship	SDP to AMI Operator	Include the Start Date/Time of the new SDP to AMI Operator Relationship. The End Date/Time is left null. NOTE: Either the LDC ORG ID or its AMI Operator ORG ID must be in-effect.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document

Table 2.3.10-15| Business Scenario 15 – Energy Service Provider (Retailer) Change

File	Element	Notes
This scenario assumes the SDP to Energy Service Provider is in effect for a space of time before changing the value, i.e. The Start Date/Time for the currently in-effect value is prior to the End Date/Time.		
Providing both parts in one sync:		
Part 1: End the old SDP to Energy Service Provider Relationship		
Relationship	SDP to Energy Service Provider	Include the Start Date/Time and the End Date/Time of the existing SDP to Energy Service Provider Relationship.

File	Element	Notes
		NOTE: If the framing structure will change at the same time as the Energy Service Provider. End the Service Agreement as described in Business Scenario 9.
Part 2: Start the new SDP to Energy Service Provider Relationship		
Relationship	SDP to Energy Service Provider	Include the Start Date/Time of the new SDP to Energy Service Provider Relationship. The End Date/Time is left null. NOTE: If the framing structure will change at the same time as the Energy Service Provider, start the Service Agreement as described in Business Scenario 9.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document

Table 2.3.10-16| Business Scenario 16 – Occupant Change

File	Element	Notes
All occupant changes must be specified with a StartDateTime and EndDateTime. In this scenario an occupant change occurs on Dec 28, 2013.		
Parameter	SDP Parameter (Occupant Change)	Include the Start Date/Time and the End Date/Time of the existing SDP Parameter(Occupant Change) with value of 'X' StartDate/Time: 20130101000000 EndDate/Time: 20131231000000
At a later date, it is confirmed that the occupant change actually took place in 2014.		
Parameter	SDP Parameter (Occupant Change)	Include the Start Date/Time and the End Date/Time of the existing SDP Parameter(Occupant Change) with value of 'X' StartDate/Time: 20130101000000 EndDate/Time: 20130101000000 Include the StartDate/Time and the EndDate/Time of the new SDP Parameter(Occupant Change) with value of 'X' StartDate/Time: 20140101000000 EndDate/Time: 20141231000000

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document

Table 2.3.10-17| Business Scenario 17 – Correcting the Interval Length and/or Channel Configuration Set for an existing meter.

File	Element	Notes
This scenario assumes that the attributes associated with a Meter installed at an SDP have been identified as incorrect prior to the submission of meter read data or, as a result of data collection exceptions reported in the DC07/DC17 report. This scenario must be completed in two synchronization sets. The first set ends the **existing** meter at the SDP and provides the **existing** meter interval length and **existing** meter channel configuration set. One or both of these current meter attributes may be incorrect.		

File	Element	Notes
The second synchronization starts the same meter at the SDP and provides the **correct** meter interval length and **correct** meter channel configuration set. For both synchronizations it is important to provide the two elements even if only one of them is incorrect.		
Part 1: Crush the Meter at the SDP providing the existing meter interval length and existing channel configuration set		
Asset	Meter	The existing meter asset with its existing meter attributes (interval length and channel configuration set) must be provided so that the related Meter to Channel relationships can also be ended.
Asset	Communication Module	
Relationship	SDP to Meter	The current Start Date/Time and the End Date/Time must be submitted. The Start Date/Time and the End Date/Time should be equal, which creates a "crush".
Relationship	Meter to Communication Module	Required whenever the SDP to Meter Relationship is provided in a synchronization set and required to correctly end the related Data Collection Service. The current inclusive Start Date/Time must be provided. The exclusive End Date/Time can be left null if the Meter to Communication Module Relationship is being left in-effect. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document.
Part 2: Start the Meter at the SDP using the correct meter interval length and correct channel configuration set		
Asset	Meter	The meter asset with its correct interval length and channel configuraiton set attributes must be provided so that the related Channels and Meter to Channel relationships can also be created/started.
Asset	Communication Module	
Relationship	SDP to Meter	Include the Start Date/Time of the SDP to Meter Relationship – the time the Meter was installed. The End Date/Time is left null.
Relationship	Meter to Communication Module	Required whenever the SDP to Meter Relationship is provided in a synchronization set and required to correctly start the related Data Collection Service. The current inclusive Start Date/Time must be provided. The exclusive End Date/Time can be left null if the Meter to Communication Module Relationship is being left in-effect. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document

When the configuration channel set is not provided, the default value of "01" is applied.

Table 2.3.10-18| Business Scenario 18 – Physical Meter Change with an Interval Length and/or the Channel Configuration Set Change

File	Element	Notes
When the installation of a new meter at an SDP requires a change to the meter attributes for interval length and/or channel configuration set, then the removal of the existing meter must be performed via synchronization before the new meter can be installed at the SDP via a second synchronization. This scenario must be completed in two synchronization sets. The first synchronization set ends the relationship of the existing meter to the SDP (with its existing attributes: interval length and channel configuraiton set). The second synchronization set starts the new meter at the SDP with its interval length and its meter channel configuration set.		
Part 1: Remove the Old Meter from SDP		
Asset	Meter	The meter asset being ended/removed from the SDP must be provided so that the related Meter to Channel relationships and Scaling Constant can also be ended. Provide the existing/current meter interval length and channel configuration set for the meter to be removed.
Asset	Communication Module	
Parameter	Meter Parameter (Dials)	End the Meter parameter (Dials) as required within your business processes for Meter Removal.
Relationship	SDP to Meter	The current inclusive Start Date/Time and the exclusive actual End Date/Time must be submitted.
Relationship	Meter to Communication Module	Required whenever the SDP to Meter Relationship is provided in a synchronization set and required to correctly end the related Data Collection Service. The current inclusive Start Date/Time must be provided. The exclusive End Date/Time can be left null if the Meter to Communication Module Relationship is being left in-effect. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document.
Part 2: Provide the New Meter and all other Mandatory elements of the existing SDP		
Asset	SDP	
Asset	Meter	Provide the meter interval length and/or channel configuration set for the new meter. If the channel configuration set is the same of the old meter but different from "01" always provide it, or the default configuration channel set "01" is applied.
Asset	Communication Module	
Parameter	Meter Parameter (Dials)	Start the Meter parameter (Dials) as required within yur business processes for Meter Installation.
Relationship	SDP to Meter	Include the actual Start Date/Time of the SDP to Meter Relationship. The End Date/Time is left null. If this meter has been installed at another SDP, that SDP to Meter Relationship must have been ended in a previous synchronization file set submission.
Relationship	Meter to Communication Module	Required whenever the SDP to Meter Relationship is provided in a synchronization set and include the inclusive Start Date/Time of the Meter to Communication Module Relationship. The End Date/Time is left null. Please reference the Rules Affecting Meter Asset Relationships and Parameters in the Business Rules section of this document.

NOTE: An Incremental Synchronization file set must include all six mandatory files: Manifest file, Asset file, Premise file, Service Agreement file, Parameter file and Relationship file. Please refer to the Characteristics section of this document

2.3.11 Incremental Synchronization Examples

The following are Incremental Synchronization examples for creating, changing and correcting element values, for example, SDP Parameter (Service Volts or Loss Factor Classification or Meter Amps) or Service Agreement (Framing Structure), SDP to Account Relationships, SDP to Meter Relationships, Meter to Communication Module Relationships or SDP to CT/PT Multiplier Relationships.

Each example provides:

- The current MMD in the MDM/R
- The Extracted Date Time
- The description of the synchronization scenario
- The Synchronization run indicated by the lettered arrows
- The resulting MMD in the MDM/R

NOTE: Not all synchronization scenarios are provided as examples. The examples below are intended to provide a basis for the understanding of synchronization processing.

2.3.11.1 Examples for Element Creation

The following scenarios depict the logic required to successfully create new master data elements in the MDM/R. These examples apply to all sync elements unless otherwise specified at the top of each example.

Example 1| Valid Current State Start: Submission of a new element

Example 1. Valid Current State Start: Submission of a new element																
Description: Currently, the element does not exist in the MMD. New Element value "A" is submitted with its Start Date/Time of midnight on day 2, prior to the Extracted Date Time. Element "A" is created in the MDM/R with the submitted Start Date/Time with no end date.																
Existing Master Data Conditions **Sync Submitted Data** **Resulting Master Data Conditions**	**Submitted Transaction Detail Element Changes**		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**		**Outcome**	**Rejection Reason**
Existing Master Data in MDM/R	none																
Valid Current State Start						Extracted Date Time											
Synchronization - Submitted Data	Start Element Value "A"			New Element "A"											No End Date	Good	
																	N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"			Element "A"											**No End Date**	Good	

Example 2| Valid Prior and Current State: Submission of a new element with its history

Example 2. Valid Prior and Current State: Submission of a new element with its history

Description: Currently, the element does not exist in the MMD. Prior to the Extracted Date Time the element has had three values. The synchronization includes the Start and End Date/Times of the Element values represented by "A" and "B" and the Start Date/Time for the Element value "C". The resulting values in the MMD show Element values "A" and "B" end dated with no overlapping date and value "C" as the current in effect value with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	none															
Valid Prior & Current State Providing initial history and current state element values				Extracted Date Time												
Synchronization - Submitted Data	Start/End Element Value "A"	"A"												End Date	Good	
	Start/End Element Value "B"		"B"											End Date	Good	
	Start Element Value "C"			New Element "C"										No End Date	Good	
																N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"	"A"												**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"		"B"											**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"			Element "C"										**No End Date**	Good	

Example 3| Valid Current and Future State: Submission of a new element that will undergo a future change

Example 3. Valid Current and Future State: Submission of a new element that will undergo a future change.

Description: Currently, the element does not exist in the MMD. The element started at midnight on day 1, prior to the Extracted Date Time. A future-dated change exists for day 6 at midnight. The synchronization includes the current Start Date/Time and future End Date/Time of Element value "A" along with the future Start Date/Time of Element value "B". The resulting MMD has Element value "A" end dated in the future and Element value "B" with a future start date and no end date.
Future State changes are not allowed for elements indicated on the Synchronization File Set and Content table and listed in Business Rules.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	none															
Valid Current and Future State Providing current state element and future state element values					Extracted Date Time											
Synchronization - Submitted Data	Start/End Element Value "A"	New Element "A" with End Date												End Date	Good	
	Start Element Value "B"						New Element "B"							No End Date	Good	
																N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A"												**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"						Element "B"							**No End Date**	Good	

2.3.11.2 Examples for Changes to Current State Elements

The following figures depict valid and invalid scenarios when making changes to current elements in the MDM/R, i.e. elements that are currently in effect and the LDC needs to change the value and/or the dates associated to the element(s).

Example 4| Valid Current State Change: Replacing current element value with new element for the same Start Date/Time

Example 4. Valid Current State Change: Replacing current element value with new element for the same Start Date/Time.

Description: The MMD has a current Element value "A" started at midnight day 2, but should have been value "B" starting at midnight on day 2. Crushed Element value "A" (End Date/Time equal to Start Date/Time) is submitted with or prior to Element value "B" with the same Start Date/Time and no end date. The resulting MMD shows Element value "A" is crushed and Element value "B" with the submitted Start Date/Time with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"											No End Date		
Valid Current State Change Replacing the current state element value when the existing element value is crushed				Extracted Date Time												
Synchronization - Submitted Data	Crush Existing Element Value "A"		Element "A" Crushed - End Date = Start Date											End Date = Start Date	Good	
	Start Element Value "B"		New Element "B"											No End Date	Good	
																N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A" Crushed - End Date = Start Date											**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"		Element "B"											**No End Date**	Good	

Example 5a| Invalid Current State Change: Replacing current element value with new element for the same Start Date/Time

Example 5a. Invalid Current State Change: Replacing current element value with new element for the same Start Date/Time.
Note: this example only applies to SDP-CT/PT Parameter, SDP-Account, SDP-Meter and Meter-Communication Module Relationships.

Description: The MMD has a current Element value "A" started at midnight day 2, but should have been value "B" starting at midnight on day 2. Only a record for Element value "B" with midnight day 2 Start Date/Time with no end date is submitted. This transaction was rejected because the crush of Element "A" was not submitted (End Date/Time equal to Start Date/Time) with or prior to the submission of new Element value "B" with the same Start Date/Time. The correct submission is depicted in Example 4.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"											No End Date		
Invalid Current State Change **Replacing the existing current state element with a new value** is **NOT** allowed if the existing current state element value is not crushed				Extracted Date Time												**Current State Change without crushing the existing current state element value is not allowed**
Synchronization - Submitted Data	Start Element Value "B"		New Element "B"											No End Date	**Rejected**	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A"											**No End Date**	Good	

Example 5b| Valid Current State Change: Replacing current element value with new element for the same Start Date/Time

Example 5b. Valid Current State Change: Replacing current element value with new element for the same Start Date/Time.
Note: this example only applies to SDP Parameters (except CT/PT), Meter Parameters, Energy Purchase Service, and Agent Services (AMI Operator, Billing, Energy Supplier and Energy Services Agent).

Description: The MMD has a current Element value "A" started at midnight day 2, but should have been value "B" starting at midnight on day 2. Only a record for Element value "B" with midnight day 2 Start Date/Time with no end date is submitted. The resulting MMD shows Element value "A" is crushed and Element value "B" with the submitted Start Date/Time with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"												No End Date		
Valid Current State Change Replacing the existing current state element with a new value without explicitly crushing the existing current state element is allowed ONLY for SDP Parameters, Meter Parameters, Energy Purchase Service and Agent Services			Extracted Date Time													
Synchronization - Submitted Data	Start Element Value "B"		New Element "B"											No End Date	Good	
																N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A" Crushed - End Date = Start Date												**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"	Element "B"												**No End Date**	Good	

Example 6| Valid Current State Change: End of current element and start of new element

Example 6. Valid Current State Change: End of current element and start of new element.

Description: Currently, Element value "A" exists in the MMD. The value of the element changed at midnight day 4. Element value "A" is submitted with its Start and End Date/Times and Element value "B" is submitted with the new Start Date/Time and no End Date/Time. The resulting MMD shows Element value "A" end dated and Element value "B" with the submitted Start Date/Time with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"												No End Date		
Valid Current State Change Ending the current state element and starting a subsequent new element value			Extracted Date Time													
Synchronization - Submitted Data	End Existing Element Value "A"	Element "A"												End Date	Good	
	Start Element Value "B"				New Element "B"									No End Date	Good	
																N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A"												**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"				Element "B"									**No End Date**	Good	

Example 7| Valid Current State Change: Current element is ended by the submission of an End Date/Time

Example 7. Valid Current State Change: Current element is ended by the submission of an End Date/Time.

Description: Currently, Element value "A" exists in the MMD. Element value "A" is no longer required and will be ended at midnight on day 4. The Synchronization includes the Start Date/Time and End Date/time of Element value "A". The resulting MMD shows Element value "A" end dated at the specified time.

Existing Master Data Conditions **Sync Submitted Data** **Resulting Master Data Conditions**	**Submitted Transaction Detail Element Changes**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**		**Outcome**	**Rejection Reason**
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"											No End Date		
Valid Current State Change Ending the current state element and don't start a subsequent new element value				Extracted Date Time												
Synchronization - Submitted Data	End Existing Element Value "A"		Element "A"											End Date	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A"											**End Dated**	Good	

Example 8| Valid Current/Future State Change: Starting a new element with a future Start Date/Time

Example 8. Valid Current/Future State Change: Starting a new element with a future Start Date/Time.

Description: Element value "A" is an existing value prior to the Extracted Date Time. A future-dated change is required to start day 7 at midnight. Existing Element vlaue "A" with a future End Date/Time is submitted with or prior to the submission of the future Start Date/Time of Element value "B". The resulting MMD has Element value "A" as the currently in effect value that is end dated in the future, and Element value "B" with a future start date and no end date.
Future State changes are not allowed for elements indicated on the Synchronization File Set and Content table. Please refer to the Future State Change Business Rules.

Existing Master Data Conditions **Sync Submitted Data** **Resulting Master Data Conditions**	**Submitted Transaction Detail Element Changes**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**		**Outcome**	**Rejection Reason**
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"											No End Date		
Valid Current/Future State Change Ending the current state element and starting a subsequent new element value in the future				Extracted Date Time												
Synchronization - Submitted Data	End Existing Element Value "A"		Existing Element "A" with End Date											End Date	Good	
	Start Element Value "B"							New Element "B"						No End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A"											**End Dated**	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"							Element "B"						**No End Date**	Good	

Example 9| Invalid Current/Future State Change: Starting a new element with a future Start Date/Time

Example 9. Invalid Current/Future State Change: Starting a new element with a future Start Date/Time.

Description: Element value "A" is an existing value prior to the Extracted Date Time. A future-dated change is required to start day 7 at midnight. The synchronization includes the future Start Date/Time of Element value "B" only. This transaction will be rejected because the existing current state element value was not end-dated. The correct submission is depicted in Example 8.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"												No End Date		
Invalid Current/Future State Change Starting a future new element value when the existing element has not been ended is **NOT** allowed						Extracted Date Time										**Current/Future State Change when the existing element has not been ended is not allowed**
Synchronization - Submitted Data	Start Element Value "B"							New Element "B"						No End Date	**Rejected**	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A"												No End Date	Good	

Example 10| Valid Current State Change: Current state element should have started at a later Start Date/Time and with a different value

Example 10. Valid Current State Change: Current state element should have started at a later Start Date/Time and with a different value.

Description: Element value "A" started at midnight day 2 exists in the MMD, but should have been value "B" starting at midnight on day 3. Crushed Element value "A" (End Date/Time equal to Start Date/Time) is submitted with or prior to the submission of Element value "B" with the later Start Date/Time and no end date. The resulting MMD shows Element value "A" is crushed and Element value "B" with the submitted Start Date/Time with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"												No End Date		
Valid Current State Change Replacing the existing current state element with a new value and later start date when the existing current state element value is crushed.						Extracted Date Time										
Synchronization - Submitted Data	Crush Existing Element "A"	Element "A" **Crushed** - End Date = Start Date												End Date = Start Date	Good	
	Start Element Value "B"			New Element "B"										No End Date	Good	
																N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A" **Crushed** - End Date = Start Date												**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"			Element "B"										**No End Date**	Good	

Example 11a| Invalid Current State Change: Current state element should have started at a later Start Date/Time and with a different value

Example 11a. Invalid Current State Change: Current state element should have started at a later Start Date/Time and with a different value.
Note: this example only applies to SDP Parameters, Meter Parameters, Energy Purchase Service, SDP-Account, SDP-Meter and Meter-Communication Module Relationships.

Description: Element value "A" started at midnight day 2 exists in the MMD, but should have been value "B" starting at midnight on day 3. The synchronization submission includes Element value "B" with the correct Start Date/Time only. This transaction was rejected because existing Element "A" was not crushed (End Date/Time equal to the Start Date/Time) with or prior to the submission of Element value "B" with a later Start date/time. The correct submission is depicted in Example 10.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	**Submitted Transaction Detail Element Changes**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**			**Outcome**	**Rejection Reason**
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"												No End Date		
Invalid Current State Change Replacing the existing current state element with a new value and later start date is **NOT** allowed if the existing current state element value is not crushed				Extracted Date Time													**Current State Change without ending/crushing the existing element value is not allowed**
Synchronization - Submitted Data	Start Element Value "B"			New Element "B"											No End Date	**Rejected**	

Example 11b| Valid Current State Change: Current state element should have started at a later Start Date/Time and with a different value

Example 11b. Valid Current State Change: Current state element should have started at a later Start Date/Time and with a different value.
Note: this example only applies the the Agent Services (AMI Operator, Billing, Energy Supplier, Energy Services Agent).

Description: Element value "A" started at midnight day 2 exists in the MMD, but should have been value "B" starting at midnight on day 3. The synchronization submission includes Element value "B" with the correct Start Date/Time only. The resulting MMD shows Element value "A" is end-dated with the submitted Start Date/Time from Element value "B" and Element value "B" with the submitted Start Date/Time with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	**Submitted Transaction Detail Element Changes**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**			**Outcome**	**Rejection Reason**
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"												No End Date		
Valid Current State Change Starting a new value and later start date without explicitly end-dating or crushing the existing current state element is allowed for ONLY the Agent Services				Extracted Date Time													
Synchronization - Submitted Data	Start Element Value "B"			New Element "B"											No End Date	Good	
																	N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"			Element "A"											**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"			Element "B"											**No End Date**	Good	

Example 12| Valid Current State / Date Change: Current state element should have started at an earlier Start Date/Time and with a different value

Example 12. Valid Current State / Date Change: Current state element should have started at an earlier Start Date/Time and with a different value.

Description: Element value "A" started at midnight day 2 exists in the MMD, but should have been value "B" starting at midnight on day 1. Crushed Element value "A" (End Date/Time equal to Start Date/Time) is submitted with or prior to the submission of Element value "B" with an earlier Start Date/Time and no end date. The resulting MMD shows Element value "A" is crushed and Element value "B" with the submitted Start Date/Time with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"											No End Date		
Valid Current State Change Replacing the current state element with a new value and earlier start date when the existing current state element is crushed				Extracted Date Time												
Synchronization - Submitted Data	Crush Existing Element Value "A"		Element "A" Crushed - End Date = Start Date											End Date	Good	
	Start Element Value "B"	New Element "B"												No End Date	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A" Crushed - End Date = Start Date											**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"	Element "B"												**No End Date**	Good	

Example 13a| Invalid Current State / Date Change: Current state element should have started at an earlier Start Date/Time and with a different value

Example 13a. Invalid Current State / Date Change: Current state element should have started at an earlier Start Date/Time and with a different value.
Note: this example only applies to SDP-CT/PT Parameter, SDP-Account, SDP-Meter and Meter-Communication Module Relationships.

Description: Element value "A" started at midnight day 2 exists in the MMD, but should have been value "B" starting at midnight on day 1. The synchronization submission includes Element value "B" with the correct Start Date/Time only. This transaction was rejected because the crush of Element "A" (End Date/Time equal to the Start Date/Time) was not submitted with or prior to submitting Element value "B" with an earlier Start date/time. The correct submission is depicted in Example 12.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"											No End Date		
Invalid Current State Change Replacing the current state element with a new value and earlier start date without crushing the existing current state element is **NOT** allowed				Extracted Date Time												**Current State Change without crushing the existing element value is not allowed**
Synchronization - Submitted Data	Start Element Value "B"	New Element "B"												No End Date	**Rejected**	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A"											No End Date	Good	

Example 13b | Valid Current State / Date Change: Current state element should have started at an earlier Start Date/Time and with a different value

Example 13b. Valid Current State / Date Change: Current state element should have started at an earlier Start Date/Time and with a different value.
Note: this example only applies to SDP Parameters (except CT/PT), Meter Parameters, Energy Purchase Service and Agent Services (AMI Operator, Billing, Energy Supplier, Energy Services Agent).

Description: Element value "A" started at midnight day 2 exists in the MMD, but should have been value "B" starting at midnight on day 1. The synchronization submission includes Element value "B" with the correct Start Date/Time only. The resulting MMD shows Element value "A" is crushed and Element value "B" with the submitted Start Date/Time with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	**Submitted Transaction Detail Element Changes**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**			**Outcome**	**Rejection Reason**
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"												No End Date		
Valid Current State Change Replacing the current state element with a new value and earlier start date without explicitly crushing the existing current state element is allowed ONLY for SDP Parameters, Meter Parameters, Energy Purchase Service and Agent Services				Extracted Date Time													
Synchronization - Submitted Data	Start Element Value "B"	New Element "B"													No End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A" Crushed - End Date = Start Date												**End Date = Start Date**	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"	Element "B"													**No End Date**	Good	

2.3.11.3 Examples for Changes to Prior State Elements

The following figures depict valid and invalid scenarios when corrections to elements that are not the currently in-effect element(s) i.e. elements that are part of the history stored in the MDM/R.

Example 14| Valid Prior State / Date Change: Correcting multiple historical records for an element by providing the changes from the earliest anchoring Start Date/Time requiring correction

Example 14. Valid Prior State / Date Change: Correcting multiple historical records for an element by providing the changes from the earliest anchoring Start Date/Time requiring correction.

Description: Element value "A" , "Element B and "Element value "C" exist in the MMD. Element value "B" ended at midnight day 5, while Element value "C" started at midnight day 5 with no end date. Element value "B" should have ended later at midnight day 6, Element value "C" should have started later at midnight day 6 and ended at midnight day 8, and new Element value "D" started at midnight day 8 with no end date. Element value "B" is submitted with the correct End Date/Time; Element value "C" is submitted with an End Date/Time equal to the existing Start Date/Time; Element value "C" is submitted with the new Start and End Date/Times; new Element value "D" is submitted with a Start Date/Time and no end date. The resulting MMD shows Element value "A" with original start and end dates, Element value "B" with the submitted End Date/Time, existing Element value "C" is crushed, Element value "C" with the submitted Start and End Date/Times, and new Element value "D" with the submitted Start Date/Time with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element"A"															
Existing Master Data in MDM/R	Existing Element Value "B"			Element "B"											End Dated		
Existing Master Data in MDM/R	Existing Element Value "C"					Element "C"									No End Date		
Valid Prior State Change **Starting a prior state element by ending or crushing an existing prior state element in the MMD so that there will be no overlapping of the effective periods**										Extracted Date Time							
Synchronization - Submitted Data	End Existing Element Value "B"			Element "B"											End Date	Good	
	Crush Existing Element Value "C"					Element "C" **Crushed** - End Date = Start Date									End Date = Start Date	Good	
	End Element Value "C"						Element "C"								End Date	Good	
	Start Element Value "D"								Element "D"						No End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element"A"													End Dated	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"			Element "B"											**End Dated**	Good	**N/A**
Resulting Master Data in MDM/R	Resulting Element Value "C"					Element "C" **Crushed** - End Date = Start Date									**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"						Element "C"								**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "D"								Element "D"						**No End Date**	Good	

Example 15a | Invalid Prior State / Date Change: Correcting multiple historical records for an element by providing the changes from the earliest anchoring Start Date/Time requiring correction

Example 15a. Invalid Prior State / Date Change: Correcting multiple historical records for an element by providing the changes from the earliest anchoring Start Date/Time requiring correction.
Note: this example only applies to SDP-CT/PT Parameter, SDP-Account, SDP-Meter and Meter-Communication Module Relationships.

Description: Element value "A", Element value "B" and Element value "C" exist in the MMD. Element value "B" ended at midnight day 5, while Element value "C" started at midnight day 5 with no end date. Element value "B" should have ended later at midnight day 6, Element value "C" should have started later at midnight day 6 and ended at midnight day 8, and new Element value "D" started at midnight day 8 with no end date. The transaction was rejected because the crush of the existing Element value "C" with an earlier Start/Date was not submitted which would cause an overlap with the submitted data. The correct submission is depicted in Example 14.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"													End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"			Element "B"											End Dated		
Existing Master Data in MDM/R	Existing Element Value "C"					Element C									No End Date		
Invalid Prior State Change **Starting a prior state element without ending or crushing existing prior state elements in the MMD is NOT allowed if the effective periods will overlap**										Extracted Date Time							
Synchronization - Submitted Data	End Existing Element Value "B"			Element "B"											End Date	**Rejected**	**Prior State Change when the effective period of submitted data overlaps with existing elements in the MMD is not allowed**
	End Existing Element Value "C"						Element "C"								End Date	**Rejected**	
	Start Element Value "D"								Element D						No End Date	**Rejected**	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A"													End Dated	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"			Element "B"											End Dated	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"					Element C									No End Date	Good	

Example 15b| Valid Prior State / Date Change: Correcting multiple historical records for an element by providing the changes from the earliest anchoring Start Date/Time requiring correction

Example 15b. Valid Prior State / Date Change: Correcting multiple historical records for an element by providing the changes from the earliest anchoring Start Date/Time requiring correction.
Note: this example only applies to SDP Parameters (except CT/PT), Meter Parameters, Energy Purchase Service and Agent Services (AMI Operator, Billing, Energy Supplier, Energy Services Agent).

Description: Element value "A", Element value "B" and Element value "C" exist in the MMD. Element value "B" ended at midnight day 5, while Element value "C" started at midnight day 5 with no end date. Element value "B" should have ended later at midnight day 6, Element value "C" should have started later at midnight day 6 and ended at midnight day 8, and new Element value "D" started at midnight day 8 with no end date. The resulting MMD shows Element value "A" with original start and end dates, Element value "B" with the submitted End Date/Time, existing Element value "C" is crushed, Element value "C" with the submitted Start and End Date/Times, and new Element value "D" with the submitted Start Date/Time with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	**Submitted Transaction Detail Element Changes**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**			**Outcome**	**Rejection Reason**
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"													End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"			Element "B"											End Dated		
Existing Master Data in MDM/R	Existing Element Value "C"					Element C									No End Date		
Valid Prior State Change Starting a prior state element without explicitly end-dating or crushing existing prior state elements in the MMD is allowed if the earliest provided Start Date/Time is the same as an existing one in the MMD ONLY for SDP Parameters, Meter Parameters, Energy Purchase Service and Agent Services										Extracted Date Time							
Synchronization - Submitted Data	End Existing Element Value "B"			Element "B"											End Date	Good	
	End Existing Element Value "C"						Element "C"								End Date	Good	
	Start Element Value "D"								Element D						No End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element"A"													End Dated	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"			Element "B"											**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"					Element "C" **Crushed** - End Date = Start Date									**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"						Element "C"								**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "D"								Element "D"						**No End Date**	Good	

Example 16| Valid Prior State / Date Change: Provide the prior state Element Value where the End Date/Time is to be corrected

Example 16. Valid Prior State / Date Change: Provide the prior state Element Value where the End Date/Time is to be corrected.

Description: Element value "A" , Element value "B" and Element value "C" exist in the MMD. Element value "A" ended at midnight day 4, while Element value "B" started at midnight day 4 and ended at midnight day 7, and Element value "C" started at midnight day 7 with no end date. Element value "B" should have ended at midnight day 6 (no changes required for Element value "A" and Element value "C"). Only Element value "B" is submitted with the correct earlier End Date/Time. The resulting MMD shows no change to end-dated Element value "A", Element value "B" with the submitted End Date/Time, and no change to Element value "C".

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"											End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"				Element "B"									End Dated		
Existing Master Data in MDM/R	Existing Element Value "C"							Element "C"						No End Date		
Valid Prior State Change Change end dates for existing elements with no overlapping of the effective periods										Extracted Date Time						
Synchronization - Submitted Data	End Existing Element Value "B"				Element "B"									End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A"											End Dated	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"				Element "B"									**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"							Element "C"						No End Date	Good	

Example 17| Valid Prior State / Date Change: Provide the crushed existing prior state Element along with the prior state Element with the correct Start Date/Time

Example 17. Valid Prior State / Date Change: Provide the crushed existing prior state Element along with the prior state Element with the correct Start Date/Time.

Description: Element value "A" , Element value "B" and Element value "C" exist in the MMD. Element value "A" ended at midnight day 4, while Element value "B" started at midnight day 4 and ended at midnight day 7, and Element value "C" started at midnight day 7 with no end date. Element value "B" should started at midnight day 5 (no changes required for Element value "A" and Element value "C"). Only the existing Element value "B" with Start and End Date/Time of midnight day 4 along with the end-dated Element value "B" with the correct Start Date/Time is submitted. The resulting MMD shows no change to end-dated Element value "A", Element value "B" with the submitted Start and End Date/Time, and no change to Element value "C".

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"											End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"				Element "B"									End Dated		
Existing Master Data in MDM/R	Existing Element Value "C"							Element "C"						No End Date		
Valid Prior State Change Changing a prior state element by crushing the existing element and starting the prior state element at the correct Start Date/Time with no overlapping of the effective periods										Extracted Date Time						
Synchronization - Submitted Data	Crush Existing Element Value "B"				Element "B" **Crushed** - End Date = Start Date									End Date = Start Date	Good	
	End Element Value "B"					Element "B"								End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A"											End Dated	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"				Element "B" **Crushed** - End Date = Start Date									**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"					Element "B"								**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"							Element "C"						No End Date	Good	

Example 18| Valid Prior State / Date Change: Provide a new prior state element where the effective period is within a gap in existing history in the MMD

Example 18. Valid Prior State / Date Change: Provide a new prior state element where the effective period is within a gap in existing history in the MMD.

Description: Element value "A" and Element value "C" exist in the MMD. Element value "A" ended at midnight day 4, and Element value "C" started at midnight day 7 with no end date. Element value "B" should started at midnight day 5 and ended at midnight day 7 within a gap in the history (no changes required for Element value "A" and Element value "C"). Only the new end-dated Element value "B" is submitted. The resulting MMD shows no change to end-dated Element value "A", Element value "B" with the submitted Start and End Date/Time, and no change to Element value "C".

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"												End Dated		
Existing Master Data in MDM/R	Existing Element Value "C"							Element "C"							No End Date		
Valid Prior State Change **Starting new end-dated prior state elements within a gap in history with no overlapping of the effective periods**										Extracted Date Time							
Synchronization - Submitted Data	End Element Value "B"					Element "B"									End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A"												End Dated	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"					Element "B"									**End Dated**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"							Element "C"							No End Date	Good	

Example 19| Valid Prior State / Date Change: Reactivating the earliest element

Example 19. Valid Prior State / Date Change: Reactivating the earliest element.

Description: Element value "A", Element value "B" and Element value "C" exist in the MMD. Element value "A" started at midnight day 2 and ended at midnight day 4, while Element value "B" started at midnight day 4 and ended at midnight day 7, and Element value "C" started midnight day 7 with no end date. Element value "A" should have never ended (so Element value "B" and Element value "C" should not have existed). The crush (End Date/Time same as Start Date/Time) of existing Element value "B" and existing Element value "C" is submitted with or prior to the submission of the existing Element value "A" with no end date. The resulting MMD shows Element value "A" with no end date, Element value "B" crushed and Element value "C" crushed.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"												End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"			Element "B"											No End Date		
								Element "C"									
Valid Prior State Change Reactivate the earliest element when the existing elements with later Start Dates are crushed										Extracted Date Time							
Synchronization - Submitted Data	Start Existing Element Value "A"		New Element "A"												No End Date	Good	
	Crush Existing Element Value "B"			Element "B" **Crushed** - End Date = Start Date											End Date = Start Date	Good	
	Crush Existing Element Value "C"							Element "C" **Crushed** - End Date = Start Date							End Date = Start Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A"												**No End Date**	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"			Element "B" **Crushed** - End Date = Start Date											**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"							Element "C" **Crushed** - End Date = Start Date							**End Date = Start Date**	Good	

Example 20a| Invalid Prior State / Date Change: Reactivating the earliest element

Example 20a. Invalid Prior State / Date Change: Reactivating the earliest element.
Note: this example only applies to SDP-CT/PT Parameter, SDP-Account, SDP-Meter and Meter-Communication Module Relationships.

Description: Element value "A", Element value "B" and Element value "C" exist in the MMD. Element value "A" started at midnight day 2 and ended at midnight day 4, while Element value "B" started at midnight day 4 and ended at midnight day 7, and Element value "C" started midnight day 7 with no end date. Element value "A" should have never ended (so Element value "B" and Element value "C" should not have existed). The transaction was rejected because the crush of the existing Element value "B" and crush of the existing Element value "C" were not submitted which would cause an overlap with the submitted data. The correct submission is depicted in Example 19.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"													End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"				Element "B"										End Dated		
Existing Master Data in MDM/R	Existing Element Value "C"							Element "C"							No End Date		
Invalid Prior State Change Reactivate the earliest element without crushing existing elements with later Start Date/Times is NOT allowed										Extracted Date Time							**Prior State Change where effective period of submitted data overlaps with existing elements in the MMD**
Synchronization - Submitted Data	Start Existing Element Value "A"	New Element "A"													No End Date	**Rejected**	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A"													End Dated	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"				Element "B"										End Dated	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"							Element "C"							No End Date	Good	

Example 20b| Valid Prior State / Date Change: Reactivating the earliest element

Example 20b. Valid Prior State / Date Change: Reactivating the earliest element.
Note: this example only applies to SDP Parameters (except CT/PT), Meter Parameters, Energy Purchase Service and Agent Services (AMI Operator, Billing, Energy Supplier, Energy Services Agent).

Description: Element value "A", Element value "B" and Element value "C" exist in the MMD. Element value "A" started at midnight day 2 and ended at midnight day 4, while Element value "B" started at midnight day 4 and ended at midnight day 7, and Element value "C" started midnight day 7 with no end date. Element value "A" should have never ended (so Element value "B" and Element value "C" should not have existed). The resulting MMD shows Element value "A" with no end date, Element value "B" crushed and Element value "C" crushed.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"													End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"				Element "B"										End Dated		
Existing Master Data in MDM/R	Existing Element Value "C"							Element "C"							No End Date		
Valid Prior State Change Reactivate the earliest element with later Start Date/Times without explicitly crushing existing elements in the MMD is allowed ONLY for SDP Parameters, Meter Parameters, Energy Purchase Service and Agent Services										Extracted Date Time							
Synchronization - Submitted Data	Start Existing Element Value "A"	New Element "A"													No End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A"													**No End Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"				Element "B" **Crushed** - End Date = Start Date										**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"							Element "C" **Crushed** - End Date = Start Date							**End Date = Start Date**	Good	

Example 21| Valid Prior State / Date Change: Starting new current state element that starts within the effective period of existing history in the MMD

Example 21. Valid Prior State / Date Change: Starting new current state element that starts within the effective period of existing history in the MMD.

Description: Element value "A" and Element value "B" exist in the MMD. Element value "A" started at midnight day 2 and ended at midnight day 4, while Element value "B" started at midnight day 4 with no end date. Element value "C" should have started at midnight day 3 with no end date (so Element value "A" and Element value "B" should not have existed). The crush (End Date/Time same as Start Date/Time) of existing Element value "A" and existing Element value "B" is submitted with or prior to the submission of the new Element value "C" with no end date. The resulting MMD shows Element value "A" crushed, Element value "B" crushed and Element value "C" with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"												End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"		Element "B"											No End Date		
Valid Prior State Change **Attemting to start an element value before the current state element value without aligning the start date is NOT allowed in Synchronization**				Extracted Date Time												
Synchronization - Submitted Data	Crush Existing Element Value "A"	Element "A" **Crushed** - End Date = Start Date												End Date = Start Date	Good	
	Crush Existing Element Value "B"		Element "B" **Crushed** - End Date = Start Date											End Date = Start Date	Good	
	Start Element Value "C"			New Element "C"										No End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A" **Crushed** - End Date = Start Date												**End Date = Start Date**	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"		Element "B" **Crushed** - End Date = Start Date											**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"			New Element "C"										**No End Date**	Good	

Example 22a| Invalid Prior State / Date Change: Starting new current state element that starts within the effective period of existing history in the MMD

Example 22a. Invalid Prior State / Date Change: Starting new current state element that starts within the effective period of existing history in the MMD.
Note: this example only applies to SDP Parameters, Meter Parameters, Energy Purchase Service, SDP-Account, SDP-Meter and Meter-Communication Module Relationships.

Description: Element value "A" and Element value "B" exist in the MMD. Element value "A" started at midnight day 2 and ended at midnight day 4, while Element value "B" started at midnight day 4 with no end date. Element value "C" should have started at midnight day 3 with no end date (so Element value "A" and Element value "B" should not have existed). The transaction was rejected because the crush of the existing Element value "A" and crush of the existing Element value "B" were not submitted which would cause an overlap with the submitted data. The correct submission is depicted in Example 21.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12		Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"												End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"		Element "B"											No End Date		
Invalid Prior State Change **Attempting to start a new current state element value without ending or crushing existing data in the MMD that would result in overlapping of the effective periods is NOT allowed**				Extracted Date Time												**Prior State Change where effective period of submitted data overlaps with existing elements in the MMD**
Synchronization - Submitted Data	Start Element Value "C"			New Element "C"										No End Date	**Rejected**	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A"												End Dated	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"		Element "B"											No End Date	Good	

Example 22b| Valid Prior State / Date Change: Starting new current state element that starts within the effective period of existing history in the MMD

Example 22b. Valid Prior State / Date Change: Starting new current state element that starts within the effective period of existing history in the MMD.
Note: this scenario only applies the the Agent Services (AMI Operator, Billing, Energy Supplier, Energy Services Agent).

Description: Element value "A" and Element value "B" exist in the MMD. Element value "A" started at midnight day 2 and ended at midnight day 4, while Element value "B" started at midnight day 4 with no end date. Element value "C" should have started at midnight day 3 with no end date (so Element value "A" and Element value "B" should not have existed). The resulting MMD shows Element value "A" end-dated with the submitted Start Date/Time from Element value "C", Element value "B" crushed and Element value "C" with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"													End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"		Element "B"												No End Date		
Valid Prior State Change Attempting to start a new current state element value within the effective period of existing data in the MMD without explicitly end-dating or crushing existing data in the MMD is allowed for ONLY Agent Services				Extracted Date Time													
Synchronization - Submitted Data	Start Element Value "C"			New Element "C"											No End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A"													**End Dated**	Good	N'A
Resulting Master Data in MDM/R	Resulting Element Value "B"		Element "B" **Crushed** - End Date = Start Date												**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"			New Element "C"											**No End Date**	Good	

Example 23| Valid Prior State / Date Change: Starting a new current state element that starts earlier than existing history in the MMD

Example 23. Valid Prior State / Date Change: Starting a new current state element that starts earlier than existing history in the MMD.

Description: Element value "A" and Element value "B" exist in the MMD. Element value "A" started at midnight day 2 and ended at midnight day 4, while Element value "B" started at midnight day 4 with no end date. Element value "C" should have started at midnight day 1 with no end date (so Element value "A" and Element value "B" should not have existed). The crush (End Date/Time same as Start Date/Time) of existing Element value "A" and existing Element value "B" is submitted with new Element value "C" with no end date. The resulting MMD shows Element value "A" crushed, Element value "B" crushed and Element value "C" with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"	Element "A"													End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"		Element "B"												No End Date		
Valid Prior State Change **Attemting to start an element value before the current state element value without aligning the start date is NOT allowed in Synchronization**				Extracted Date Time													
Synchronization - Submitted Data	Crush Existing Element Value "A"	Element "A" **Crushed** - End Date = Start Date													End Date = Start Date	Good	
	Crush Existing Element Value "B"		Element "B" **Crushed** - End Date = Start Date												End Date = Start Date	Good	
	Start Element Value "C"	New Element "C"													No End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"	Element "A" **Crushed** - End Date = Start Date													**End Date = Start Date**	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"		Element "B" **Crushed** - End Date = Start Date												**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"	Element "C"													**No End Date**	Good	

Example 24a| Invalid Prior State / Date Change: Starting a new current state element that starts earlier than existing history in the MMD

Example 24a. Invalid Prior State / Date Change: Starting a new current state element that starts earlier than existing history in the MMD.
Note: this example only applies to SDP-CT/PT Parameter, SDP-Account, SDP-Meter and Meter-Communication Module Relationships.

Description: Element value "A" and Element value "B" exist in the MMD. Element value "A" started at midnight day 2 and ended at midnight day 4, while Element value "B" started at midnight day 4 with no end date. Element value "C" should have started at midnight day 1 with no end date (so Element value "A" and Element value "B" should not have existed). The transaction was rejected because the crush of the existing Element value "A" and crush of the existing Element value "B" were not submitted which would cause an overlap with the submitted data. The correct submission is depicted in Example 23.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"												End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"				Element "B"										No End Date		
Invalid Prior State Change Attempting to start a new current state element value earlier Start Date without crushing existing data in the MMD that would result in overlapping of the effective periods is NOT allowed								Extracted Date Time									**Prior State Change where effective period of submitted data overlaps with existing elements in the MMD**
Synchronization - Submitted Data	Start Element Value "C"	New Element "C"													No End Date	**Rejected**	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A"												End Dated	Good	
Resulting Master Data in MDM/R	Resulting Element Value "B"				Element "B"										No End Date	Good	

Example 24b| Valid Prior State / Date Change: Starting a new current state element that starts earlier than existing history in the MMD

Example 24b. Valid Prior State / Date Change: Starting a new current state element that starts earlier than existing history in the MMD.
Note: this example only applies to SDP Parameters (except CT/PT), Meter Parameters, Energy Purchase Service and Agent Services (AMI Operator, Billing, Energy Supplier, Energy Services Agent).

Description: Element value "A" and Element value "B" exist in the MMD. Element value "A" started at midnight day 2 and ended at midnight day 4, while Element value "B" started at midnight day 4 with no end date. Element value "C" should have started at midnight day 1 with no end date (so Element value "A" and Element value "B" should not have existed). The resulting MMD shows Element value "A" crushed, Element value "B" crushed and Element value "C" with no end date.

Existing Master Data Conditions Sync Submitted Data Resulting Master Data Conditions	Submitted Transaction Detail Element Changes	1	2	3	4	5	6	7	8	9	10	11	12			Outcome	Rejection Reason
Existing Master Data in MDM/R	Existing Element Value "A"		Element "A"												End Dated		
Existing Master Data in MDM/R	Existing Element Value "B"				Element "B"										No End Date		
Valid Prior State Change Attempting to start a new current state element value earlier Start Date without explicitly crushing existing data in the MMD is allowed ONLY for SDP Parameters, Meter Parameters, Energy Purchase Service and Agent Services							Extracted Date Time										
Synchronization - Submitted Data	Start Element Value "C"	New Element "C"													No End Date	Good	
Resulting Master Data in MDM/R	Resulting Element Value "A"		Element "A" **Crushed** - End Date = Start Date												**End Date = Start Date**	Good	N/A
Resulting Master Data in MDM/R	Resulting Element Value "B"				Element "B" **Crushed** - End Date = Start Date										**End Date = Start Date**	Good	
Resulting Master Data in MDM/R	Resulting Element Value "C"	Element "C"													**No End Date**	Good	

3. Retired Interface Reference

The Periodic Audit Synchronization has been retired with the upgrade to eIP8.6

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