

Specification



Meter Data Management & Repository (MDM/R) Service and Performance Levels

Issue 2.0

This document provides a specification of the expected service levels for the Meter Data Management & Repository.

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Related Documents

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| Ontario Regulation 425/06 | <i>Functional Specification for an Advanced Metering Infrastructure</i> | July 14, 2006 |
| IESO_SPEC_0241 | <i>Meter Data Management and Repository System (MDM/R) - Functional Specification</i> | Issue 1.1 |
| IESO_SPEC_0240 | <i>Meter Data Management and Repository System (MDM/R) – Business Process Description Levels</i> | Issue 1.1 |
| IESO_ARCH_0008 | <i>Meter Data Management and Repository System (MDM/R) – Logical Application and Data Architecture (LADA)</i> | Issue 1.0 |

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| Reference (Section and Paragraph) | Description of Change |
|--|---|
| Figure 3-1 | Replaced figure to correct typographical error in the group heading, “ <i>VEE Process – Exception Reporting</i> ” |
| Figure 3-2 | Replaced figure to correct the end time for the, “ <i>Aggregation of Billing Quantities</i> ” group. End time should read, “Day N+2, 21:00 EST” |
| Section 3.3.2 | Added bullet to describe “ <i>VEE Process – Exception Reporting</i> ” in order to be consistent with <i>figure 3-1</i> . |
| Section 3.3.3 - 1 st bullet (“Editing”) | Corrected typographical error: end time should occur on Day N+2, not , “Day N-2”. |
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| | |

1. Introduction

The Independent Electricity System Operator (IESO) Smart Metering System Implementation Program (SMSIP) team and the selected vendors supporting the IESO in the delivery and operation of the Meter Data Management & Repository (MDM/R) system solution require a common understanding of the scope and definitions of the systems required to support the Smart Metering System.

1.1 Purpose

This Service and Performance Level document outlines minimum performance standards, service levels and volumetric thresholds for major transaction types that must be met in the provision of the MDM/R system.

1.2 Scope

While the scope of this document is limited to performance standards, service levels and volumetric thresholds for the MDM/R system, various references are made to upstream systems that provided data to the MDM/R. The quality of those systems (for which, certain assumptions have been made) has a direct impact on various aspects of the MDM/R system performance itself. These assumptions are further outlined in the section entitled “Volumetric Assumptions.”

From the perspective of the *MDM/R Logical Applications and Data Architecture (LADA)*, this document encompasses performance standards, service levels and volumetric thresholds for the MDM/R Operational Solution Space (SS-1). In terms of business processes outlined in the *MDM/R Business Process Description*, this document imparts service levels on the various MDM/R applications and databases that support the 42 MDM/R Major Process Areas outlined in that document.

1.3 Who Should Use This Document

This document has been prepared for use by the members of the IESO SMSIP Team and the vendors pre-qualified for the design, delivery, and integrated operation of MDM/R Solution Space as part of the Ontario Smart Metering System.

1.4 Assumptions and Limitations

Specific volumetric assumptions about the future operation of the MDM/R have been made. Please see the section entitled, “Performance” for further details.

1.5 Standard Conventions

The standard conventions followed for this document are as follows:

- Italics are used to highlight publications, titles of procedures, letters and forms

1.6 Roles and Responsibilities

This document does not impart any specific roles or responsibilities. This document is intended to provide the design basis for development of the systems solutions and documentation associated with the MDM/R system implementation and development of associated interfaces.

1.7 How This Document Is Organized

This document is organized as follows:

Section 2 – Service Description: This section is a cross-reference to the other documents that form the description of the services whose service levels are discussed in this document.

Section 3 – Performance: This section includes Volumetric Assumptions and Projections for those MDM/R applications that are involved in processing significant transaction volumes.

Section 4 – Availability: This section outlines various aspects of availability requirements for the MDM/R applications.

Section 5 – Service Levels: This section describes service and support levels for each Technical Interface described in the *MDM/R Business Process Description* document.

– End of Section –

2. Service Description

The Meter Data Management/Repository is intended to meet the functional requirements set out in the in *the MDM/R Functional Specification*,. The business processes that support those functional requirements are further detailed in the *MDM/R Business Process Description* document.

Within the *MDM/R Business Process Description* document, each business process was cross-referenced with the supporting applications in the *MDM/R Logical Applications and Data Architecture (LADA)* document.

In this document, volumetric projections, and availability will be discussed in the context of the applications cross-referenced to the business processes while service levels will be discussed in the context of the business processes themselves.

– End of Section –

3. Performance

3.1 Volumetric Assumptions

This section outlines the various volumetric assumptions that underpin the processing requirements for the MDM/R.

Volumetric assumptions are presented in terms of the following categories:

- Customer Base
- Entities
- Interval Size
- Time-of-use Rate structures (RPP)
- Failure and Exception Rates

For each category, assumptions are illustrated in terms of a “high,” “medium,” and “low” scenario for the years 2007 and 2010. For the sake of prudence and the purposes of formulating projections from these assumptions, the intention is to use the “high” scenario for service level planning purposes.

3.1.1 Volumetric Assumptions - Customer Base

The growth of the MDM/R customer base through to the year 2010 is based upon the government of Ontario’s over-arching objective “... to install a smart electricity meter in 800,000 homes and small businesses by 2007 and throughout Ontario by 2010”¹.

Within the table, below it is anticipated that the growth of Points of Delivery (POD’s) served by the MDM/R will be in two prominent sub-categories as follows:

- 1) POD’s for residential or small general service consumers where metering of demand is not required, and

¹ Source: Ontario Ministry of Energy website.

- 2) POD’s for larger commercial and industrial customers where both demand and energy readings may be recorded and processed by the MDMR.

The volumetric assumptions concerning these POD’s are outlined in table 3-1.

Table 3-1 – Assumption: Points of Delivery (POD)

| | 2007 | | | 2010 | | |
|---|-----------|---------|---------|-----------|-----------|-----------|
| | High | Medium | Low | High | Medium | Low |
| Number of Points of Delivery - electric residential customers with no demand | 1,000,000 | 800,000 | 300,000 | 5,200,000 | 4,500,000 | 4,000,000 |
| Number of Points of Delivery - commercial/industrial customers with demand and 15-minute interval meters - electric | 0 | 0 | 0 | 500,000 | 500,000 | 500,000 |

Over the lifecycle of a Point of Delivery, it is anticipated that Local Distribution Companies (LDC’s) will need to update POD records in the MDM/R Master Directory (MMD) for a variety of different reasons. These reasons break down into 3 main categories as follows:

- 1) Basic Maintenance transactions involving changes to a POD attribute (e.g. meter identifier, type of meter, AMI system, etc.);
- 2) User access transactions that identify which customers and/or authorized interested parties may be able to access various data sets associated with a POD (e.g. meter reads, derived quantities, etc.). Typically these transactions are triggered by move in/move out transactions and the estimates in this area are based on rates observed in an LDC with an exceptionally high turnover rate. This was chosen in order to ground these assumptions with a high-volume bias.
- 3) User access transactions that identify which authorized interested parties may retrieve meter data and billing quantities for a particular POD on behalf of a customer. Typically these types of transactions are triggered by a customer switching between retailers or between a retailer and an LDC.

The assumptions behind these three types of POD transactions are disclosed in tables 3-2, 3-3 and 3-4 respectively.

Table 3-2 – POD Maintenance Transactions

| | 2007 | | | 2010 | | |
|--|-------------|--------|------|-------------|--------|------|
| | High | Medium | Low | High | Medium | Low |
| Rate: PoD maintenace transaction: EXCLUDING customer/retailer/LDC switching/enrolment EXCLUDING demographics INCLUDING changes between active and inactive status- electric | 0.6% | 0.6% | 0.6% | 0.6% | 0.6% | 0.6% |

Table 3-3 – User access transactions (other than customer switching between LDC’s and retailers)

| | 2007 | | | 2010 | | |
|--|-------------|---------|--------|-------------|-----------|-----------|
| | High | Medium | Low | High | Medium | Low |
| Customer/Retailer/LDC enrolment requests/year - electric | 324,135 | 259,308 | 97,241 | 1,685,502 | 1,458,608 | 1,296,540 |

Table 3-4 – User access transactions involving customer switching between LDC’s and retailers

| | 2007 | | | 2010 | | |
|--|-------------|---------|--------|-------------|-----------|-----------|
| | High | Medium | Low | High | Medium | Low |
| Number of Point of Delivery data access changes/YEAR including move in/move out) (used 25% turnover rate PER YEAR) | 250,000 | 200,000 | 75,000 | 1,300,000 | 1,125,000 | 1,000,000 |

3.1.2 Volumetric Assumptions - Entities

It is anticipated that the first tier of smart meter installations will largely take place within the service territories of the largest LDC’s in Ontario – although it is important to note that there will be exceptions to this general rule and the ultimate goals of this program will involve installations in virtually every LDC in the province.

At present, there are 93 LDC’s in Ontario, with the 7 largest exceeding 125,000 customers (the largest estimated to exceed 1.1 million customers). For the purposes of planning volumetric, it is assumed that the overall number of LDC’s will not diminish between now and 2010 – in order to err on the side of planning for supporting at least this number of distribution entities.

The licensing of new retailers is more difficult to predict – particularly given the fluid nature of retail activity observed in Ontario since market opening in 2002. Of the approximately 25 retailers officially licensed by the Ontario Energy Board, the level of activity and customer accounts between these organizations has varied widely. For volumetric planning purposes however, we shall assume an active compliment of at least 25 retailers over the next four years.

Table 3-5 – Assumptions about Entities

| | 2007 | | | 2010 | | |
|---------------------------------------|-------------|---------------|------------|-------------|---------------|------------|
| | High | Medium | Low | High | Medium | Low |
| No. of LDC's with > 125,000 customers | 7 | 7 | 7 | 7 | 7 | 7 |
| No. of LDC's with < 125,000 customers | 86 | 86 | 86 | 86 | 86 | 86 |
| No. of Retailers | 25 | 25 | 25 | 25 | 25 | 25 |

3.1.3 Volumetric Assumptions – Interval Size

As outlined in the *MDM/R Functional Specification*, it is assumed that for most residential and general service consumers, energy consumption will be measured on an hour basis.

As data from larger commercial/industrial customers is integrated in to the MDM/R over time, it is anticipated that these customers will be metered on a 15-minute basis as is commonly found amount this customer base today. The number of data channels provided by these meters can vary widely. For planning purposes however, it is assumed that 3 channels (kWh, kVA, kvar) are the most prominent for this segment of the customer base.

Table 3-6 – Assumptions about Intervals Per Day by Meter Type

| | 2007 | | | 2010 | | |
|--|------|--------|-----|------|--------|-----|
| | High | Medium | Low | High | Medium | Low |
| No. of intervals per day - electric - small consumers without demand meters | 24 | 24 | 24 | 24 | 24 | 24 |
| | High | Medium | Low | High | Medium | Low |
| Number of Intervals/day - commercial/industrial customers with 15-minute interval meters sending at least 3 data channels - electric | 96 | 96 | 96 | 96 | 96 | 96 |

3.1.4 Volumetric Assumptions – Time-of-use Rate structures

The structure of the time of use rates employed by the MDM/R has a significant effect on data processing volumes. The number of Time-of-Use (TOU) and Critical Peak Pricing (CPP) assembly transactions may be varied at the discretion of the Ontario Energy Board (OEB). In addition, the number of CPP events that may be triggered in a given year may also be varied.

For the purposes of projecting the impact of time-of-use rate structures, the following definitions have been employed:

| | |
|--------------------------|--|
| Meter Read | A number generated by a meter that reflects cumulative electricity consumption at a specific point in time (i.e. 24 meter reads per day for residential hourly interval smart meter or 96 meter reads per day for a larger commercial customer x 3 channels) |
| TOU Assembly Transaction | A transaction to assemble 1 or more VEE-processed meter reads into a single TOU rate bucket for one customer |
| CPP Assembly Transaction | A transaction to assemble 1 or more VEE-processed meter reads into a single CPP rate bucket for one customer |

The assumptions about the number of time periods (rate buckets) per day employed for TOU rates is outlined in table 3-7, as are the number of anticipated CPP events per year.

Table 3-7 – Assumptions about Rate Structures

| | 2007 | | | 2010 | | |
|----------------------------------|-------------|--------|-----|-------------|--------|-----|
| | High | Medium | Low | High | Medium | Low |
| No. of TOU Rate buckets - Summer | 7 | 5 | 3 | 7 | 5 | 3 |
| No. of TOU Rate buckets - Winter | 7 | 5 | 3 | 7 | 5 | 3 |
| No. of CPP events per year | 30 | 15 | 5 | 30 | 15 | 5 |

3.1.5 Volumetric Assumptions – Failure and Exception Rates

Certain assumptions must be made about the quality of incoming *meter reads* arriving at the MDM/R interface and the Advanced Metering Infrastructure (AMI) communications channels that carry them. Both of these factors are beyond the control of the MDM/R operator but nonetheless, must be factored into performance levels as they significantly affect performance volumes – particularly in the areas of manual importation of meter reads, and the Validation, Estimating and Editing Process. Table 3-8 sets out the assumptions regarding rates of failure (expressed as a percentage of incoming meter reads – discussed later under “Volumetric Projections”) for the AMI system, VEE exceptions and dispute-related adjustments to meter data. In all cases, the percentages chosen are biased in favour of prudently planning for larger processing volumes.

Table 3-8 – Assumptions about Error and Exception Rates

| | 2007 | | | 2010 | | |
|--|-------------|---------------|------------|-------------|---------------|------------|
| | High | Medium | Low | High | Medium | Low |
| Percentage - AMI readings requiring manual import - electric | 10% | 5% | 5% | 10% | 5% | 5% |
| | High | Medium | Low | High | Medium | Low |
| Percentage - VEE Process Exceptions (Validation, Estimation and Editing stages) - electric | 2.5% | 2.0% | 1.5% | 2.5% | 2.0% | 1.5% |
| | High | Medium | Low | High | Medium | Low |
| Percentage - VEE exceptions requiring manual edit - electric | 2.5% | 2.0% | 1.5% | 2.5% | 2.0% | 1.5% |
| | High | Medium | Low | High | Medium | Low |
| Percentage of monthly bills resulting in a dispute-related adjustment - electric | 3.5% | 2.0% | 2.0% | 3.5% | 2.0% | 2.0% |

3.2 Volumetric Projections

3.2.1 Overview to Volumetric Projections

This section briefly provides an overview to the format of MDM/R Volumetric projections and lists those MDM/R applications where such projections are relevant.

3.2.1.1 Format:

Based upon the volumetric assumptions presented in section 3.1 this section now sets out the projections for volumes anticipated for each of the relevant applications outlined in the LADA. For each projection, the data is presented in the following format:

- Projections for the years 2007 and 2010 are given.
- Depending on the application, the time resolution of the projection is on a DAILY or YEARLY basis. Where the time resolution is DAILY, it may be assumed to be an average of all of the days of the year. This document makes no assumptions about intra-year growth rates (for example, the rate at which Points of Delivery are added to the system over the course of the year). Where the time resolution is YEARLY, it may be assumed to be a cumulative projection for the entire calendar year.
- Like the assumptions, projections are broken down into “high,” “medium,” and “low” scenario for each of the years 2007 and 2010.
- Units of measurement are dependent on each application area and are disclosed in the table in section 3.2.1.2

For the purposed of this document, only the volumetric projections in the “high” column are relevant, as they form the minimum performance requirement for the application in question.

3.2.1.2 MDM/R Applications where a projection is given:

Table 3-9 outlines those MDM/R applications noted in the LADA document for which volumetric projections are relevant and given.

Table 3-9 – Listing of MDM/R Applications

| Application (see also, LADA diagram) | Volumetric Projection Given? | Unit of Measurement for projection. |
|---|--|--|
| A100 - Meter Data Receiver | Yes | Meter Reads per day |
| A101 - Meter Data Edit Interface | Yes | Meter Reads per day |
| A102 – Validation, Estimation and Editing (VEE) | Yes | Meter Reads per day |
| A103 – MDM/R Master Directory Interface (MMD Interface) | Yes | Transactions per year |
| A104 – MDM/R Data Aggregation | Yes | TOU Assembly transactions per day CPP Assembly transactions per day |
| A105 – MDM/R Operator Interface | No Performance of application is subject to other service levels. | N/A |
| A106 – MDM/R Billing Data Interface | Yes | Billing quantities per day |
| A107 – MDM/R Ad Hoc Data Reporting Interface | Yes | Customer presentment requests per day |
| A108 – MDM/R Public Reporting Interface | No Performance of application is subject to other service levels. | N/A |
| A109 - Initial Meter Data Population | No Performance of application is subject to other service levels. | N/A |
| A110 - Initial MDM/R Master Directory Population | No Performance of application is subject to other service levels. | N/A |
| A111 – MDM/R Administrative Services | No Performance of application is subject to other service levels. | N/A |

3.2.2 Projections – Application A100 – Meter Data Receiver

For a description of this application, please refer to the LADA document. For a description of the various business processes that make use of this application, please refer to the *MDM/R Business Process Description* Document.

Table 3-10 – Projection for application A-100 – Meter Data Receiver

| | 2007 | | | 2010 | | |
|---|-------------------|-------------------|------------------|--------------------|--------------------|--------------------|
| | High | Medium | Low | High | Medium | Low |
| No. of meter reads/day-electric | 24,000,000 | 19,200,000 | 7,200,000 | 268,800,000 | 252,000,000 | 240,000,000 |
| No. of repeat reads/day-electric | 2,400,000 | 960,000 | 360,000 | 26,880,000 | 12,600,000 | 12,000,000 |
| A100 Transaction METER READ Total per day - electric | 26,400,000 | 20,160,000 | 7,560,000 | 295,680,000 | 264,600,000 | 252,000,000 |

The daily projections for application A100 includes normally scheduled meter reads from all active POD’s and any associated re-reads including those that are manually re-injected into an AMI system for re-transmission to the MDM/R. By 2010, the presence of 15-minute interval metered commercial customers with 3-channel meters (see also “Volumetric Assumptions) will greatly augment the number of anticipated daily meter reads.

3.2.3 Projections – Application A101 – Meter Data Edit Interface

For a description of this application, please refer to the LADA document. For a description of the various business processes that make use of this application, please refer to the *MDM/R Business Process Description* Document.

Table 3-11 – Projection for application A-101 – Meter Data Edit Interface

| | 2007 | | | 2010 | | |
|--|------------------|----------------|----------------|-------------------|-------------------|-------------------|
| | High | Medium | Low | High | Medium | Low |
| No. of manually imported METER READS - day arising from AMI errors - electric | 2,400,000 | 960,000 | 360,000 | 26,880,000 | 12,600,000 | 12,000,000 |
| No. of manually imported METER READS per day arising from VEE exceptions - electric (meter reads times VEE exception rate times % of VEE exceptions needing manual intervention) | 16,500 | 8,064 | 1,701 | 184,800 | 105,840 | 56,700 |
| No. of manually imported METER READS per day arising from Customer disputes - electric | 42,000 | 19,200 | 7,200 | 470,400 | 252,000 | 240,000 |
| A101 Transaction METER READ Total per day - electric | 2,458,500 | 987,264 | 368,901 | 27,535,200 | 12,957,840 | 12,296,700 |

These daily projections for the Meter Data Edit Interface are based upon assumptions about the number of active POD’s, VEE exception rates and AMI error rates disclosed previously in the section, “Volumetric Assumptions.” These projections include meter reads that may be manually imported through various channels OTHER THAN re-injection into the AMI system (see projections for application A100 which includes these).

3.2.4 Projections – Application A102 – Validation, Estimation and Editing (VEE)

For a description of this application, please refer to the LADA document. For a description of the various business processes that make use of this application, please refer to the *MDM/R Business Process Description* Document.

Table 3-12 – Projection for application A-102 – Validating, Estimation and Editing (VEE)

| | 2007 | | | 2010 | | |
|--|-------------------|-------------------|------------------|--------------------|--------------------|--------------------|
| | High | Medium | Low | High | Medium | Low |
| No. of METER READ Validations per day (including. Manual imports) - electric | 26,400,000 | 20,160,000 | 7,560,000 | 295,680,000 | 264,600,000 | 252,000,000 |
| No. of METER READ Estimations per day (including. Manual imports) - electric | 660,000 | 403,200 | 113,400 | 7,392,000 | 5,292,000 | 3,780,000 |
| No. of Automatic, rule-based METER READ edits per day - electric | 660,000 | 403,200 | 113,400 | 7,392,000 | 5,292,000 | 3,780,000 |
| Validation based error messages per day - electric | 660,000 | 403,200 | 113,400 | 7,392,000 | 5,292,000 | 3,780,000 |
| Automatic VEE edit advisory messages per day - electric | 660,000 | 403,200 | 113,400 | 7,392,000 | 5,292,000 | 3,780,000 |
| A102 Transaction Total per day - electric | 29,040,000 | 21,772,800 | 8,013,600 | 325,248,000 | 285,768,000 | 267,120,000 |

These daily projections for the VEE application are based upon assumptions about the number of active POD’s, and VEE exception rates disclosed previously in the section, “Volumetric Assumptions.”

3.2.5 Projections – A103 – MDM/R Master Directory Interface

For a description of this application, please refer to the LADA document. For a description of the various business processes that make use of this application, please refer to the *MDM/R Business Process Description* Document.

Table 3-13 – Projection for application A-103 – MDM/R Master Directory Interface

| | | | | | | |
|--|----------------|----------------|----------------|------------------|------------------|------------------|
| No. of POD Creation transactions PER YEAR - electric | 14,000 | 11,200 | 4,200 | 72,800 | 63,000 | 56,000 |
| No. of POD Maintenance transactions PER YEAR - electric | 6,000 | 4,800 | 1,800 | 31,200 | 27,000 | 24,000 |
| MMD changes PER YEAR due to customer access privileges arising from switching and enrolment requests - electric | 324,135 | 259,308 | 97,241 | 1,685,502 | 1,458,608 | 1,296,540 |
| MMD changes PER YEAR due to customer access privileges arising move in/move outs and customer account changes - electric | 250,000 | 200,000 | 75,000 | 1,300,000 | 1,125,000 | 1,000,000 |
| A103 Transaction Total PER YEAR - electric | 344,135 | 275,308 | 103,241 | 1,789,502 | 1,548,608 | 1,376,540 |

The YEARLY projections for the MMD application are based upon assumptions about the number of active POD’s, customer switching transactions, move-in/move-out transactions and POD maintenance rates disclosed previously in the section, “Volumetric Assumptions.” In addition, an Ontario population growth rate of 1.4% per year is assumed.

Please note that the line item entitled, “No. of POD Creation transactions PER YEAR – electric” does NOT include the initial set up of existing Points of Delivery which will be part of the initial data migration to the MDM/R as smart meters are activated at a POD location for the first time.

3.2.6 Projections – A104 – MDM/R Data Aggregation

For a description of this application, please refer to the LADA document. For a description of the various business processes that make use of this application, please refer to the *MDM/R Business Process Description* Document

Table 3-14 – Projection for application A-104 – MDM/R Data Aggregation

| | 2007 | | | 2010 | | |
|---|------------------|------------------|------------------|--------------------|-------------------|-------------------|
| | High | Medium | Low | High | Medium | Low |
| No. of TOU Assembly transactions per day - electric | 8,604,750 | 4,488,000 | 1,005,075 | 96,373,200 | 58,905,000 | 33,502,500 |
| PEAK no. of CPP Assembly transactions per day - electric | 1,229,250 | 897,600 | 335,025 | 13,767,600 | 11,781,000 | 11,167,500 |
| AVERAGE No. of CPP Assembly transactions per day - electric | 101,034 | 36,888 | 4,589 | 1,131,584 | 484,151 | 152,979 |
| A104 Transaction Total per day - electric | 9,834,000 | 5,385,600 | 1,340,100 | 110,140,800 | 70,686,000 | 44,670,000 |

These daily projections for TOU assembly transactions and CPP assembly transactions are based upon assumptions about the number of active POD's, rate structures and number of CPP events/year disclosed previously in the section, "Volumetric Assumptions."

3.2.7 Projections – A106 – MDM/R Billing Data Interface

For a description of this application, please refer to the LADA document. For a description of the various business processes that make use of this application, please refer to the *MDM/R Business Process Description* Document

Table 3-15 – Projection for application A-106 – MDM/R Billing Data Interface

| | 2007 | | | 2010 | | |
|---|-------------------|-------------------|------------------|--------------------|--------------------|-------------------|
| | High | Medium | Low | High | Medium | Low |
| A106 Transaction Billing Quantity Total per day - electric | 19,668,000 | 10,771,200 | 2,680,200 | 220,281,600 | 141,372,000 | 89,340,000 |

Projections for the MDM/R Billing Data Interface are based upon the assumption that all billing quantities created by application A104 will immediately be transmitted to LDC's and/or interested parties immediately following this. For the sake of prudence, these projections are assumed that all billing quantities will need to be sent to the LDC owning the point of deliver and at least one other authorized, interested party.

3.2.8 Projections – A107 – MDM/R Ad Hoc Data Reporting Interface

For a description of this application, please refer to the LADA document. For a description of the various business processes that make use of this application, please refer to the *MDM/R Business Process Description* Document

Table 3-16 – Projection for application A-107 – MDM/R Ad Hoc Data Reporting Interface

| | 2007 | | | 2010 | | |
|---|----------------|----------------|---------------|------------------|----------------|----------------|
| | High | Medium | Low | High | Medium | Low |
| No. of customer presentment requests PER DAY - electric | 200,000 | 160,000 | 60,000 | 1,040,000 | 900,000 | 800,000 |
| A107 Transaction Total per day - electric | 200,000 | 160,000 | 60,000 | 1,040,000 | 900,000 | 800,000 |

It should be noted that only CUSTOMER data presentment requests are shown in the projection for application A107. However, application A107 will also support ad hoc requests from LDC’s and authorized interested parties.

3.3 Processing Timelines

3.3.1 Timelines Examined in This Section

In this section, we shall look at performance in terms of key timelines for the MDM/R. For the purposes of this analysis we shall look at processing timelines with respect to the major process areas outlined in *MDM/R Business Process Description* in terms of:

- **Automatic Meter Read Processing Timeline** – which follows the path of the majority of the Meter Reads from their collection at the MDM/R interface to their initial availability as preliminary Meter Read data.
- **Automatic Billing Quantity Processing Timeline** – which follows the path of meter reads that are automatically processed by the MDM/R for dissemination as Billing Quantity data.

3.3.2 Automatic Meter Read Processing Timeline

The path of a Meter Read that is automatically provided from the AMI system to the MDM/R may be traced through the *MDM/R Business Process Description*. In general terms, however, processing along this path can be broken down into the following grouping of major processes:

- **Configuration:** Ensuring that the MMD is updated with the latest configurations for all Meter Reads following this automatic pass. Assuming no manual intervention override is required during the Daily Read Period (“day N”). The *MDM/R Functional Specification* implies that this process be complete by the beginning of the Daily Read Period.
- **AMI Inputs into the MDM/R:** the process of receiving Meter Reads during day N and Meter Reads in files/batches over the course of the Daily Read Period and into the first five hours of the following day (day N+1);
- **Pre-VEE processes:** the process of screening, preparing and storing meter reads prior to the Validation Estimation and Editing (VEE) process itself;
- **Feedback for AMI Inputs into the MDM/R:** These processes provide feedback to the AMI operator and/or LDC over the course of the daily read period and into the first five hours of the following day (day N+1);
- **VEE Process – Validation and Estimation:** – which may begin on Meter Reads that have completed the Pre-VEE process, providing automatic validation, estimating, and reporting of exceptions by 07:00 on day N+1;

- **VEE Process – Exception Reporting:** – which is active throughout the VEE Validation and Estimation process to provide feedback to the LDC’s and authorized parties; and,
- **Preliminary Meter Read Data:** the process of making Meter Read data, for which the VEE process may not have been completed, available to LDCs, Billing Agents, Authorized Interested Parties, and Customers by 08:00 on day N+1 via the MDM/R Ad Hoc Data Reporting Interface.

When one considers each of these major grouping of business processes in the context of the Data Transfer Timeline depicted in the *MDM/R Functional Specification*, it is possible to extend those processes into day N that may be performed concurrently as Meter Reads arrive at the MDM/R over the course of the Daily Read Period. This in turn yields a maximum processing timeline for a meter reading following the Automatic Meter Read Processing Timeline. This timeline, including the concurrency of various major process groupings is depicted in figure 3-1 and table 3-17.

While the time for competing most value added processes (i.e. other than Configuration) is fixed, the start time can vary over a range depending on the design of the MDM/R solution.

- The earliest start time for Automatic Meter Read Processing lies between 01:00 EST and 01:30 EST during the day ‘N’ Daily Read Period, at which point the first real-time Meter Reads (i.e. those Meter Reads that are not held in batches until the end of the daily read period) could begin arriving at the MDM/R. While the start of these processes is not quite “concurrent” for a single Meter Read this short period of time represents the theoretical frontier for their earliest possible start for most of the value added process that touch on a Meter Read within the MDM/R.
- The latest start time would be the one that guarantees completion by the fixed completion times, allowing for any contingency

3.3.3 Automatic Billing Quantity Processing Timeline

This timeline, including the concurrency of various major process groupings is depicted in figure 3-2 and table 3-18.

- **Editing:** – which may begin on Meter Reads for which validation and estimation exceptions have been identified and reported and should be complete by day N+2 at 15:00 EST; and,
- **Aggregation of Billing Quantities:** The processes involving the aggregation of Meter Reads into TOU and CPP Billing Quantity data to be complete by day N+2 at 21:00 EST; and,
- **Dissemination of Billing Quantity data and post-VEE Meter Data:** The processes which feedback Meter Reads and TOU and CPP Billing Quantities to LDC’s and Billing Agents to be completed by day N+2 at 21:00 EST.

Figure 3-1 – Automatic Meter Read Timeline

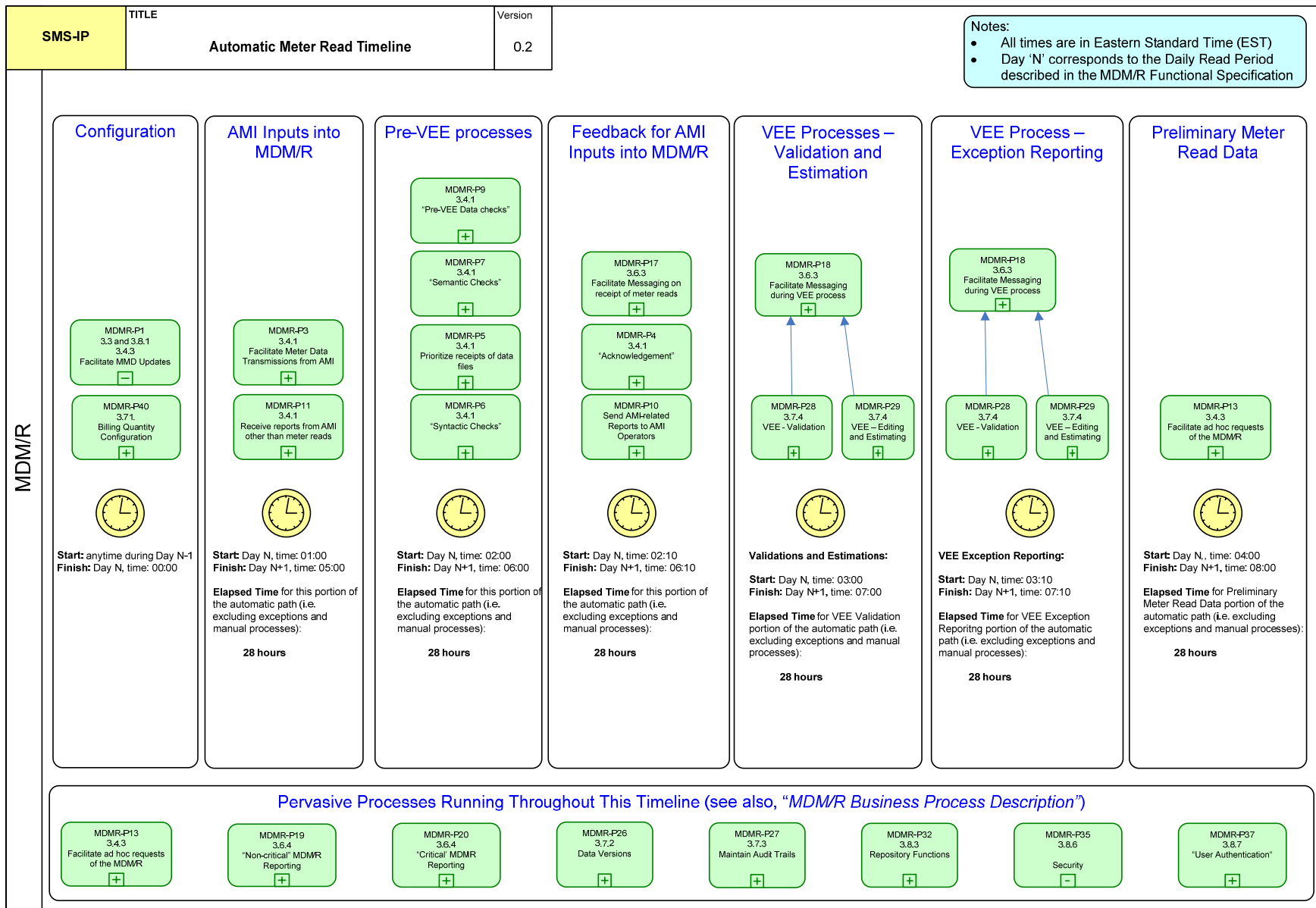


Figure 3-2 – Automatic Billing Quantity Timeline

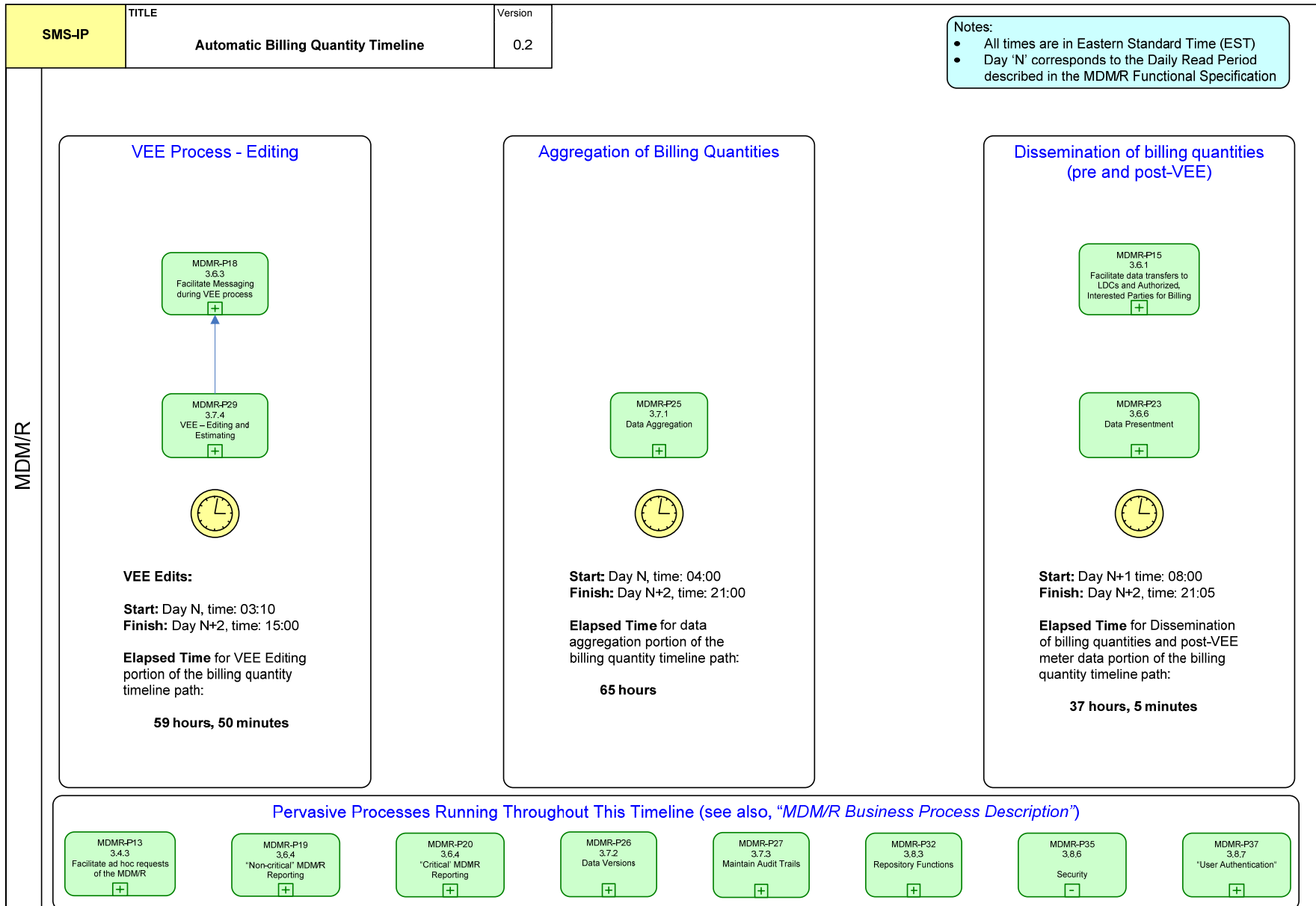


Table 3-17 - Automatic Meter Read Timeline

| Process Grouping (see figure 3-1) | Relevant Volumetric Projection(s) | Earliest Possible Action on a single Meter Read | End Time for meter reads from daily read period ending on day 'N' | Maximum elapsed time for all meter reads following the Automatic Meter Read Timeline |
|---|--|---|---|---|
| Configuration | Table 3-13, A-103 | n/a must be complete by beginning of day 'N' | Day 'N' – 00:00 EST | n/a |
| AMI Inputs into the MDM/R | Table 3-10, A-100 (no. of meter reads/day) | Day 'N' – 01:00 EST | Day 'N+1' – 05:00 EST | 28 hours |
| Pre-VEE processes | Table 3-10, A-100 (no. of meter reads/day) | Day 'N' – 02:00 EST | Day 'N+1' – 06:00 EST | 28 hours |
| Feedback for AMI Inputs into the MDM/R | Table 3-10, A-100 (no. of meter reads/day) | Day 'N' – 02:10 EST | Day 'N+1' – 06:10 EST | 28 hours |
| Validation and Estimating | Table 3-11, A-101 and Table 3-12, A-102 | Validation: Day 'N' – 03:00 EST Estimation: Day 'N' – 03:00 EST Exception Report: Day 'N' – 03:10 EST | Validation: Day 'N+1' – 07:00 EST Estimation: Day 'N+1' – 07:00 EST Exception Report: Day 'N+1' – 07:10 EST | Validation: 28 hours Estimation: 28 hours Exception Reporting: 28 hours |
| Preliminary Meter Read Data | | Day 'N' – 04:00 EST | Day 'N+1' – 08:00 EST | 28 hours |

Table 3-18 - Automatic Billing Quantity Timeline

| | | | | |
|--|---|--|--|---|
| Editing | Table 3-11, A-101 and Table 3-12, A-102 | Editing: Day 'N' – 03:10 EST | Editing: Day 'N+2' – 15:00 EST | Editing: 59 hours, 50 minutes |
| Aggregation of Billing Quantities | Table 3-14, A-104 | Day 'N' – 04:00 EST | Day 'N+2' – 21:00 EST | 65 hours |
| Dissemination of Billing Quantities (Pre- and post-VEE) | Table 3-15, A-106 | Day 'N+1' – 08:00 EST | Day 'N+2' – 21:05 EST | 37 hours, 5 minutes |

– End of Section –

4. Availability

4.1 Scope of this section

This section provides availability requirements for each of the applications outlined in the MDM/R Operational Solution Space – (SS-1) as described in the *MDM/R Logical Application and Data Architecture* regardless if a volumetric projection was provided in Section 3 of this document.

Over the course of this section, the availability of the components of the MDM/R Operational Solution Space shall be discussed in terms of:

- **Availability windows:** Outlines the required days and times each day that the application should be available. Availability windows are described in terms of a “Highest Availability Window” when peak transaction volumes are expected to occur and hours of the day outside of the “Highest Availability Window.” This section also describes when planned maintenance and housekeeping may occur.
- **Availability rates:** Outlines the required availability rates (as a percentage of user uptime during and outside of “Highest Availability Windows”) for each application.
- **Failover and restoration times:** the amount of time to failover production systems to back-up systems from the moment the disruptive, unplanned incident, and the disruptive time required to restore the production systems from the back-up systems.

The requirement for availability is defined for each logical application as described in the the *MDM/R Logical Application and Data Architecture* and should be interpreted as the combined effect of both the Availability Window described in Section 4.2 and the Availability Rate described in Section 4.3. Thus the overall availability for each logical application is defined separately for the times of the Highest Availability Window and the times Outside of the Highest Availability Window. These availability requirements are specified in terms of planned and unplanned service disruptions as defined fully at the start of Section 4.3

4.2 Availability Windows

The MDM/R has a number of critical applications that must be available every day of the year, and within each processing day be able to handle transaction-intensive processing on the scale outlined in section 2 of this document. These applications must support the 42 major process areas outlined in the *MDM/R Business Process Description* document as meter reads are read from the AMI and processed into billing quantities, while at the same time allowing LDC's to manage complex data arrangements through the MDM/R master directory. These challenges imply various peak processing times through the 24 hours of the day, depending on the application and the business process it is intended to support.

Along these lines, Table 4-1 outlines the required availability windows for each application in the MDM/R Operational Solution Space. For each application denoted in the LADA this table outlines the following information in each column:

- **Available Service Days:** Denotes the days of the year the application must be available. As the MDM/R is a continuous process involving the processing of meter reads every day, then the phrase “every day” shall mean every day of the calendar year. In cases where a *business day* is referred to, then it shall mean any day other than a Saturday, a Sunday or a holiday as defined in section 29 of the *Interpretation Act* (Ontario);
- **Available Service Hours – Highest Availability Window:** denotes the hours that comprise the Highest Availability Window for the application in question.
- **Available Service Hours – Outside of the Highest Availability Window:** denotes activities that may continue to take place outside of the Highest Availability Window.
- **Special Conditions:** A description of conditions that may affect the definition of the Highest Availability Window during irregular periods of time.
- **Housekeeping, planned maintenance:** notes any restrictions on when routine maintenance may be performed – particularly when it disrupts the application in question.

Table 4-1 - Availability Windows

| Application (see also, LADA diagram) | Available Service Days | Available Service Hours – Highest Availability Window | Available Service Hours outside of the Highest Availability Window | Special Conditions | Housekeeping, planned maintenance |
|---|------------------------|---|---|--|---|
| A100 - Meter Data Receiver | Every day | <ul style="list-style-type: none"> Highest availability window: Regular, time triggered gathering of meter reads from the AMI between 00:00 and 08:00 each day. | <ul style="list-style-type: none"> Re-reads may take place any time of the day. Manual imports of meter reads may take place any time of the day. | <ul style="list-style-type: none"> Time window for regular, time triggered gathering of meter reads from the AMI must be configurable. | <ul style="list-style-type: none"> Any maintenance that might disrupt this application must be scheduled outside of the highest availability window for regular, time triggered gathering of meter reads from the AMI and account for any movements of this time window under special conditions |
| A101 - Meter Data Edit Interface | Every day | <ul style="list-style-type: none"> Highest availability window: required from 06:00 to 20:00 each business day | <ul style="list-style-type: none"> Meter edits may take place outside of the Highest Availability Window | <ul style="list-style-type: none"> Highest availability window may move in conjunction to a change in the A100 or A102 highest availability windows | <ul style="list-style-type: none"> Any maintenance that might disrupt this application must be scheduled outside of Highest availability window |
| A102 – Validation, Estimation and Editing (VEE) | Every day | <ul style="list-style-type: none"> Highest availability window: required from 05:00 to 23:00 each day | <ul style="list-style-type: none"> VEE Process may continue outside of the Highest Availability Window | <ul style="list-style-type: none"> Highest availability window may move in conjunction to a change in the A100 highest availability window | <ul style="list-style-type: none"> Any maintenance that might disrupt this application must be scheduled outside of Highest availability window |
| A103 – MDM/R Master Directory Interface (MMD Interface) | Every day | <ul style="list-style-type: none"> Highest availability window: required from 00:00 to 20:00 each day | <ul style="list-style-type: none"> MMD updates may be submitted outside of the Highest Availability Window | | <ul style="list-style-type: none"> Any maintenance that might disrupt this application must be scheduled outside of Highest availability window |

| Application (see also, LADA diagram) | Available Service Days | Available Service Hours – Highest Availability Window | Available Service Hours outside of the Highest Availability Window | Special Conditions | Housekeeping, planned maintenance |
|--|------------------------|--|---|---|---|
| A104 – MDM/R Data Aggregation | Every day | <ul style="list-style-type: none"> • Highest availability window: required from 08:00 to 23:59 each day • | <ul style="list-style-type: none"> • MDM/R Data Aggregation may take place anytime outside of the highest availability window | <ul style="list-style-type: none"> • Highest availability window may move in conjunction to a change in the A100 highest availability window | <ul style="list-style-type: none"> • Any maintenance that might disrupt this application must be scheduled outside of Highest availability window |
| A105 – MDM/R Operator Interface | Every day | <ul style="list-style-type: none"> • Highest availability window: required from 00:00 to 20:00 each business day | <ul style="list-style-type: none"> • MDM/R Operator Interface must be functional 24 hours per day | <ul style="list-style-type: none"> • | <ul style="list-style-type: none"> • Any maintenance that might disrupt this application must be scheduled outside of Highest availability window. • Certain portions of this interface cannot be disrupted if the scheduled maintenance coincides with the Highest availability window of the application. |
| A106 – MDM/R Billing Data Interface | Every day | <ul style="list-style-type: none"> • Highest availability window: required from 15:00 to 23:59 each day • | <ul style="list-style-type: none"> • MDM/R Billing Data Interface must be available outside of the highest availability window | <ul style="list-style-type: none"> • | <ul style="list-style-type: none"> • Any maintenance that might disrupt this application must be scheduled outside of Highest availability window |
| A107 – MDM/R Ad Hoc Data Reporting Interface | Every day | <ul style="list-style-type: none"> • Highest availability window: required from 06:00 to 20:00 each business day | <ul style="list-style-type: none"> • Ad hoc Data Reporting may take place outside of the Highest availability window. | <ul style="list-style-type: none"> • | <ul style="list-style-type: none"> • Any maintenance that might disrupt this application must be scheduled outside of Highest availability window |
| A108 - MDMR Public Reporting Interface | Every day | <ul style="list-style-type: none"> • Highest availability window: required from 06:00 to 20:00 each business day | <ul style="list-style-type: none"> • Public reports may be presented outside of the Highest availability window. | <ul style="list-style-type: none"> • | <ul style="list-style-type: none"> • Any maintenance that might disrupt this application must be scheduled outside of Highest availability window |

| Application (see also, LADA diagram) | Available Service Days | Available Service Hours – Highest Availability Window | Available Service Hours outside of the Highest Availability Window | Special Conditions | Housekeeping, planned maintenance |
|--|------------------------|---|---|--|--|
| A109 - Initial Meter Data Population | Business Days | <ul style="list-style-type: none"> Highest availability window: n/a this application runs during specified upload times (TBD) | <ul style="list-style-type: none"> n/a | <ul style="list-style-type: none"> This application runs at irregular times as new LDC's are integrated into the MDM/R and runs on a schedule pre-determined between the LDC and the MDM/R operator | |
| A110 - Initial MDM/R Master Directory Population | Business Days | <ul style="list-style-type: none"> Highest availability window: n/a this application runs during specified upload times (TBD) | <ul style="list-style-type: none"> n/a | <ul style="list-style-type: none"> This application runs at irregular times as new LDC's are integrated into the MDM/R and runs on a schedule pre-determined between the LDC and the MDM/R operator | |
| A111 – MDM/R Administrative Services | Every day | <ul style="list-style-type: none"> Highest availability window: required from 06:00 to 20:00 each business day | <ul style="list-style-type: none"> MDM/R Administrative Services must be available outside of the Highest availability window. | <ul style="list-style-type: none"> | <ul style="list-style-type: none"> Any maintenance that might disrupt this application must be scheduled outside of Highest availability window |

4.3 Availability Rates

Given the Availability windows described in section 4.2, Table 4-3 defines the required availability rates for each logical application as described in the *MDM/R Logical Application and Data Architecture* both inside and outside the Highest Availability Window for both planned and unplanned service disruptions.

Table 4-2 provides to following information in each column:

- **Assumed amount of downtime per unplanned failure (hours):** Denotes the average length of time required to recovery availability of an application if it is disrupted by an unplanned failure. For critical applications this should correspond to failover time to a backup system. The times quoted include time to detect and diagnose the unplanned incident.
- **Assumed amount of downtime per planned event (hours):** Denotes the average length of time required to recovery availability of an application if it is disrupted by a planned maintenance event.
- **Maximum NUMBER of unplanned service failures/year to be tolerated during Highest Availability Window:** This column describes the maximum number of unplanned failures to the application in question that should take place within the Highest Availability window over the course of a calendar year.
- **Maximum NUMBER of unplanned service failures/year to be tolerated outside of Highest Availability Window:** This column describes the maximum number of unplanned failures to the application in question that should take place outside the Highest Availability window over the course of a calendar year.
- **Maximum NUMBER of planned service disruptions/year to be tolerated during Highest Availability Window:** This column describes the maximum number of planned events that disrupt the application in question that should take place within the Highest Availability window over the course of a calendar year.
- **Maximum NUMBER of planned service disruptions/year to be tolerated outside of Highest Availability Window:** This column describes the maximum number of planned events that disrupts the application in question that should take place outside of the Highest Availability window over the course of a calendar year.
- **Planned percentage availability during Highest Availability Window:** The percentage of hours the application should be available during the Highest Availability Window, accounting for both planned and unplanned outages.
- **Planned percentage availability outside of Highest Availability Window:** The percentage of hours the application should be available outside of the Highest Availability Window, accounting for both planned and unplanned outages.

Within the above descriptions a failure or disruption that DOES NOT prevent the overall completion of Automatic Meter Read Processing or Automatic Billing Quantity Processing within the timelines described in Section 3.3 will not be counted in determining actual availability.

Please note the following:

- Availability rates for A100 – Meter Data Receiver and A102 – Validation, Estimation and Editing are not exclusive since these logical applications must be available to support the key Automatic Meter Read Processing Timeline.
- Availability rates for A104 – MDM/R Data Aggregation and A106 – MDM/R Billing Data Interface are not exclusive since these logical applications must be available to support the key Automatic Billing Quantity Processing Timeline.

Table 4-2 - Availability Rates

| Application (see also, LADA diagram) | Assumed amount of downtime per unplanned failure (hours) | Assumed amount of downtime per planned event (hours) | Maximum NUMBER of unplanned service failures/year to be tolerated during Highest Availability Window | Maximum NUMBER of unplanned service failures/year to be tolerated outside of Highest Availability Window | Maximum NUMBER of planned service disruptions/year to be tolerated during Highest Availability Window | Maximum NUMBER of planned service disruptions/year to be tolerated outside of Highest Availability Window | Planned percentage availability during Highest Availability Window | Planned percentage availability outside of Highest Availability Window |
|---|--|--|--|--|---|---|--|--|
| A100 - Meter Data Receiver | 1 | 0.5 | 2 | 2 | 1 | 12 | 99.966% | 99.909% |
| A101 - Meter Data Edit Interface | 1 | 0.5 | 2 | 2 | 1 | 12 | 99.966% | 99.909% |
| A102 – Validation, Estimation and Editing (VEE) | 1 | 0.5 | 2 | 2 | 1 | 12 | 99.966% | 99.909% |
| A103 – MDM/R Master Directory Interface (MMD Interface) | 2 | 1 | 2 | 2 | 1 | 12 | 99.932% | 99.817% |
| A104 – MDM/R Data Aggregation | 2 | 1 | 2 | 2 | 1 | 12 | 99.932% | 99.817% |
| A105 – MDM/R Operator Interface | 1 | 0.5 | 2 | 2 | 1 | 12 | 99.966% | 99.909% |
| A106 – MDM/R Billing Data Interface | 2 | 1 | 2 | 2 | 1 | 12 | 99.932% | 99.817% |
| A107 – MDM/R Ad Hoc Data Reporting Interface | 2 | 1 | 2 | 2 | 1 | 12 | 99.932% | 99.817% |
| A108 – MDM/R Public Reporting Interface | 4 | 2 | 2 | 2 | 1 | 12 | 99.863% | 99.635% |
| A111 – MDM/R Administrative Services | 2 | 1 | 3 | 7 | 1 | 12 | 99.909% | 99.703% |

4.4 Failover and Restoration Times

Table 4-3 – Allowable Failover and Restoration Times

| Application (see also, LADA diagram) | Assumed amount of downtime per unplanned failover event (hours) | Maximum allowable disruption per restoration event during Maximum Availability window (hours) | Maximum allowable disruption per restoration event outside Maximum Availability window (hours) |
|---|---|---|--|
| A100 - Meter Data Receiver | 1 | 0 | 1 |
| A101 - Meter Data Edit Interface | 1 | 0 | 1 |
| A102 – Validation, Estimation and Editing (VEE) | 1 | 0 | 1 |
| A103 – MDM/R Master Directory Interface (MMD Interface) | 2 | 0 | 1 |
| A104 – MDM/R Data Aggregation | 2 | 0 | 1 |
| A105 – MDM/R Operator Interface | 1 | 0 | 1 |
| A106 – MDM/R Billing Data Interface | 2 | 0 | 1 |
| A107 – MDM/R Ad Hoc Data Reporting Interface | 2 | 0 | 1 |
| A108 – MDM/R Public Reporting Interface | 4 | 1 | 1 |
| A109 - Initial Meter Data Population | n/a | n/a | |
| A110 - Initial MDM/R Master Directory Population | n/a | n/a | |
| A111 – MDM/R Administrative Services | 2 | 1 | 1 |

– End of Section –

5. Service Levels

5.1 Service Levels – High Level Data Processing Timeline

This section establishes the high level data processing timeline and expected service levels for key events in the automatic processing of Meter Read data and the automatic production of Billing Quantity data. Please reference the *MDM/R Functional Specification*, Section 3.5 – Data Transfer Timeline, Exhibit 3-2: Timeline for Data Processing.

5.1.1 Automatic Meter Read Processing

All Meter Reads collected during the Daily Read Period (Day N) are to be transferred from the AMCC to the MDM/R no later than 5:00 a.m. local time following the Daily Read Period as provided under Ontario Regulation 425/06 *Functional Specification for an Advanced Metering Infrastructure* (reference section 2.6).

The MDM/R Meter Data Receiver (A100) as described in the *MDM/R Logical Application and Data Architecture* will provide data transfer mechanisms that will facilitate the completion of all Meter Read data transmissions from all AMCCs by 5:00 a.m. on Day N+1.

Syntactic, Semantic, and Pre-VEE Data Checks

Syntactic checks, semantic checks and pre-VEE data checks will be completed by 06:00 EST on Day N+1 for 100% of the Meter Reads sent by all AMCCs, and received and receipted by the MDM/R for each Daily Read Period.

- For Meter Reads received after 05:00 EST on Day N+1 these checks will be completed within one hour after such data is received.

All acknowledgement and error messaging will meet the service levels specified in Section 5.2 of this document.

Validation and Estimation

Validation, estimation, and identification of validation and estimating exceptions will be completed by 07:00 EST on Day N+1 for 100% of the Meter Reads sent by all AMCCs, and received and receipted by the MDM/R for each Daily Read Period.

- For Meter Reads received after 05:00 EST on Day N+1 these checks will be completed within one hour after such data is received.

All exception reporting will meet the service levels specified in Section 5.2 of this document.

Preliminary Meter Read Data

Preliminary Meter Read data (i.e. data for which the VEE process may not have been completed) will be available for LDCs, Billing Agents, Authorized Interested Parties and Customers by 08:00 EST on Day N+1 for 100% of the Meter Reads sent by all AMCCs, and received and receipted by the MDM/R for each Daily Read Period.

5.1.2 Automatic Billing Quantity Processing

As indicated in Exhibit 3-2 of the *MDM/R Functional Specification*, LDCs are to complete Meter Read edits by Day N+2. Edits received by 15:00 EST on Day N+2 will be included in the fully VEE'd data used to determine Billing Quantities.

Billing Quantity Data and Related Meter Reads

Billing Quantity data and related Meter Read data, for 100% of the PODs for which there is fully VEE'd Meter Data by 15:00 EST on Day N+2, will be available to LDCs and Billing Agents by 21:00 EST on Day N+2.

- For Meter Reads for which edits are received after 15:00 EST on Day N+2, Billing Quantities will be available within one hour after such data is received.

5.2 Service Levels by Technical Interface

This section enumerates the expected service levels for various Technical Interfaces of the MDM/R from a business process perspective. These Technical Interfaces have various sub-types that are identified in the *MDM/R Business Process Description* document. However, the service levels themselves are described in table 5-1

| COLUMN NAME | DESCRIPTION |
|---|---|
| Major Process Area Identifier | A unique identifier which allows the reader to follow linkages between major process areas depicted on the diagrams that follow. |
| Major Process Area | The name of the major process identified. |
| Technical Interface Flow Direction | <ul style="list-style-type: none"> • “INBOUND”: denotes a technical interface flow FROM an external entity TO the MDM/R • “OUTBOUND”: denotes a technical interface flow TO an external entity FROM the MDM/R |

| COLUMN NAME | DESCRIPTION |
|-------------------------------------|--|
| Technical Interface Item | Corresponds to a high-level information flow depicted on the corresponding BPMN diagram for the major process area in the <i>MDM/R Business Process Description Area</i> |
| Transaction Turnaround Times | Where applicable, the required turnaround times for the Technical Interface transaction is provided |
| Incident Management | This section outlines the require availability window for various sub-components of Incident Management Services including: <ul style="list-style-type: none"> • Incident control: including: detection, classification, initial support and recording • Resolution and recovery • Incident closure |
| Problem Management | This section outlines the require availability window for various sub-components of Problem Management Services including: <ul style="list-style-type: none"> • Problem control: identification, classification, initial support and recording • Development of problems into “Known Errors” with associated workarounds • Assistance in handling major incidents • Incident closure • Problem prevention, including: trend analysis, support actions and provision of information • Major problem reviews |

Table 5-1 – Service Levels by Technical Interface

| Major Process Area Identifier | Major Process Area | Technical Interface Flow Direction | Technical Interface Item (for sub-types – please see <i>MDM/R Business Process Description Document</i>) | Required Transaction Turnaround Times | Incident Management | Problem Management |
|-------------------------------|------------------------|------------------------------------|---|--|--|--|
| MDMR-P1 | Facilitate MMD Updates | INBOUND | MMD Updates | <ul style="list-style-type: none"> • All updates successfully applied to MMD and receipted to the LDC via MMD Change Confirmation within 1 hour | <ul style="list-style-type: none"> • Incident Control via service desk: 24hr/day • Initial Classification and support via service desk: 24hr/day • Investigation, diagnosis | Problem management services available during Highest Availability window for the underlying applications |
| | | OUTBOUND | Security Rejection | <ul style="list-style-type: none"> • Security Rejections provided to interfacing system within 10 seconds of request | | |

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|-------------------------------|--|------------------------------------|---|---|---|--|
| | | OUTBOUND | Authentication Rejection | <ul style="list-style-type: none"> Authentication Rejections provided to interfacing system within 10 seconds of request | and resolution/recover during Highest Availability Window | |
| | | OUTBOUND | MMD Change Confirmation | <ul style="list-style-type: none"> All updates successfully applied to MMD and received to the LDC via MMD Change Confirmation within 1 hour | | |
| MDMR-P2 | Adhere to Data Transfer Timeline | n/a | n/a | <ul style="list-style-type: none"> All MDM/R timelines observed with immediate escalation to incident management | <ul style="list-style-type: none"> ALL incident management services available via service desk: 24hr/day | n/a |
| MDMR-P3 | Facilitate Meter Data Transmissions from AMI | INBOUND | Meter Reads | <ul style="list-style-type: none"> All meter reads received and received via Acknowledgement of Meter Read within 10 minutes | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| | | OUTBOUND | Meter Read Receipt | <ul style="list-style-type: none"> within 10 minutes of receipt of meter read | | |
| | | INBOUND | AMI Meter Read Failure Report | <ul style="list-style-type: none"> received within 10 minutes of receipt of report | | |
| | | INBOUND | AMI Outage Report | | | |
| | | INBOUND | AMI Restoration Report | | | |
| | | OUTBOUND | Security Rejection | <ul style="list-style-type: none"> Security Rejections provided to interfacing system within 10 seconds of request | | |
| | | OUTBOUND | Authentication Rejection | <ul style="list-style-type: none"> Authentication Rejections provided to interfacing system within 10 seconds of request | | |
| | | OUTBOUND | Acknowledgement of Meter Read | <ul style="list-style-type: none"> within 10 minutes of receipt | | |
| | | OUTBOUND | Acknowledgement of Outage Report | | | |
| | | OUTBOUND | Acknowledgement of Restoration Report | | | |
| OUTBOUND | Acknowledgement of Meter Read Failure Report | | | | | |
| MDMR-P4 | “Acknowledgement” | OUTBOUND | Acknowledgement of Meter Read | <ul style="list-style-type: none"> within 10 minutes of receipt | ALL incident management services available via service desk: 24hr/day | Problem management services available during Highest Availability window for the underlying applications |
| | | OUTBOUND | Acknowledgement of Outage Report | | | |
| | | OUTBOUND | Acknowledgement of Restoration Report | | | |
| | | OUTBOUND | Acknowledgement of Meter Read Failure Report | | | |
| | | OUTBOUND | Acknowledgement of Unsuccessful Meter Read | | | |
| | | INBOUND | Acknowledgement of Receipt of Billing Quantities | n/a | | |

| Major Process Area Identifier | Major Process Area | Technical Interface Flow Direction | Technical Interface Item (for sub-types – please see <i>MDM/R Business Process Description Document</i>) | Required Transaction Turnaround Times | Incident Management | Problem Management |
|-------------------------------|---|------------------------------------|---|---|--|--|
| MDMR-P5 | Prioritize receipts of data files | n/a | n/a | <ul style="list-style-type: none"> Files prioritized into queues for downstream processes within 30 minutes of receipt | ALL incident management services available via service desk: 24hr/day | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P6 | “Syntactic Checks” | OUTBOUND | Syntactic Check Errors | <ul style="list-style-type: none"> Error messages sent out within 10 minutes of completion of this process | ALL incident management services available via service desk: 24hr/day | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P7 | “Semantic Checks” | OUTBOUND | Semantic Check Errors | <ul style="list-style-type: none"> Error messages sent out within 10 minutes of completion of this process | ALL incident management services available via service desk: 24hr/day | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P8 | “Manual Imports” | OUTBOUND | Security Rejection | <ul style="list-style-type: none"> Security Rejections provided to interfacing system within 10 seconds of request | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| | | OUTBOUND | Authentication Rejection | <ul style="list-style-type: none"> Authentication Rejections provided to interfacing system within 10 seconds of request | | |
| | | INBOUND | Manual Meter read file from AMI | <ul style="list-style-type: none"> All meter reads received and receipted via Manual Meter Read Receipt within 10 minutes | | |
| | | INBOUND | Manual Meter read file from User Interface | <ul style="list-style-type: none"> All meter reads received and receipted via Manual Meter Read Receipt within 10 minutes | | |
| | | OUTBOUND | Manual Meter Read Receipt | <ul style="list-style-type: none"> within 10 minutes of receipt | | |
| | | OUTBOUND | Acknowledgement of Manual Meter Read | <ul style="list-style-type: none"> within 10 minutes of receipt | | |
| MDMR-P9 | “Pre-VEE Data checks” | OUTBOUND | Pre-VEE Errors | <ul style="list-style-type: none"> Error messages sent out within 10 minutes of completion of this process | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P10 | Deliver AMI-related reports to the LDC's | OUTBOUND | AMI Related Reports | <ul style="list-style-type: none"> Reports sent out within 10 minutes of report | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P11 | Receive reports from the AMI - other than meter reads | INBOUND | AMI Meter Read Failure Report | <ul style="list-style-type: none"> received within 10 minutes of receipt of report disseminated to all applicable downstream processes within 30 minutes of receipt of report | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| | | INBOUND | AMI Outage Report | | | |
| | | INBOUND | AMI Restoration Report | | | |
| MDMR-P12 | NOT USED | n/a | n/a | n/a | n/a | n/a |
| MDMR-P13 | Facilitate ad hoc | INBOUND | Ad Hoc Requests | <ul style="list-style-type: none"> Ad Hoc Requests for available | <ul style="list-style-type: none"> Incident Control via | Problem management |

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|-------------------------------|---|------------------------------------|---|---|--|--|
| | requests to the MDM/R | OUTBOUND | Ad Hoc Reports | <ul style="list-style-type: none"> data and defined reports fulfilled within 2 minutes Ad Hoc Requests for available data and user-defined reports fulfilled within 20 minutes | <ul style="list-style-type: none"> service desk: 24hr/day Initial Classification and support via service desk: 24hr/day Investigation, diagnosis and resolution/recover during Highest Availability Window | services available during Highest Availability window for the underlying applications |
| | | OUTBOUND | Security Rejection | <ul style="list-style-type: none"> Security Rejections provided to interfacing system within 10 seconds of request | | |
| | | OUTBOUND | Authentication Rejection | <ul style="list-style-type: none"> Authentication Rejections provided to interfacing system within 10 seconds of request | | |
| | | OUTBOUND | Ad Hoc Report Errors | <ul style="list-style-type: none"> Within 2 minutes of detection | | |
| MDMR-P14 | NOT USED | n/a | n/a | n/a | n/a | n/a |
| MDMR-P15 | Facilitate Data Transfers to LDC's and Interested Parties for Billing | OUTBOUND | TOU Billing Quantities | <ul style="list-style-type: none"> Time triggered “push” must adhere to timelines configured in MDMR-P2 Event triggered “pull” transactions where data is available – within 5 minutes of request | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| | | OUTBOUND | CPP Billing Quantities | | | |
| | | OUTBOUND | Validated, Estimated and Edited Meter Reads | | | |
| | | INBOUND | Request for Billing Data | | | |
| MDMR-P16 | NOT USED | n/a | n/a | n/a | n/a | n/a |
| MDMR-P17 | Facilitate Messaging on receipt of meter reads | OUTBOUND | Error Messages Related to receipt of meter reads | <ul style="list-style-type: none"> Sent within 10 minutes of event detection by applicable MDM/R processes (see also, <i>MDM/R Business Process Description</i> for further details) | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P18 | Facilitate Messaging during VEE process | OUTBOUND | VEE Messages | <ul style="list-style-type: none"> Sent within 10 minutes of VEE event | ALL incident management services available via service desk: 24hr/day | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P19 | “Non-critical” MDM/R Reporting | n/a | n/a | n/a | <ul style="list-style-type: none"> Incident Control via service desk: 24hr/day Initial Classification and support via service desk: 24hr/day Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P20 | “Critical” MDM/R Reporting | n/a | n/a | n/a | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P21 | Facilitate MDM/R Operator Interfaces | n/a | n/a | n/a | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |

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|-------------------------------|--|------------------------------------|---|--|--|--|
| MDMR-P22 | Facilitate External User Interfaces | INBOUND | Ad hoc requests | <ul style="list-style-type: none"> Ad Hoc Requests for available data and defined reports fulfilled within 2 minutes Ad Hoc Requests for available data and user-defined reports fulfilled within 20 minutes | <ul style="list-style-type: none"> Incident Control via service desk: 24hr/day Initial Classification and support via service desk: 24hr/day Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| | | INBOUND | Incoming Files | <ul style="list-style-type: none"> Received within 1 minute | | |
| | | INBOUND | Requests to associate more than one POD with a user | <ul style="list-style-type: none"> Received within 1 minute | | |
| | | OUTBOUND | Ad hoc reports | <ul style="list-style-type: none"> Ad Hoc Requests for available data and defined reports fulfilled within 2 minutes Ad Hoc Requests for available data and user-defined reports fulfilled within 20 minutes | | |
| | | OUTBOUND | Messages and Confirmations | <ul style="list-style-type: none"> Within 2 minutes of event | | |
| | | OUTBOUND | Error Messages | <ul style="list-style-type: none"> Within 2 minutes of detection | | |
| | | OUTBOUND | Security and Authentication Messages | <ul style="list-style-type: none"> Security Rejections provided to interfacing system within 10 seconds of request Authentication Rejections provided to interfacing system within 10 seconds of request | | |
| | | OUTBOUND | TOU Billing Quantities | | | |
| | | OUTBOUND | CPP Billing Quantities | | | |
| | | OUTBOUND | Validated, Estimated and Edited Meter Reads | <ul style="list-style-type: none"> Event triggered “pull” transactions where data is available – within 5 minutes of request | | |
| MDMR-P23 | Data Presentment | INBOUND | Web based request from customer | <ul style="list-style-type: none"> Requests fulfilled within 10 seconds | <ul style="list-style-type: none"> Incident Control via service desk: 24hr/day Initial Classification and support via service desk: 24hr/day Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| | | INBOUND | IVR based request from customer | | | |
| | | OUTBOUND | Web based feedback | | | |
| | | OUTBOUND | IVR based feedback | <ul style="list-style-type: none"> Time triggered “push” must adhere to timelines configured in MDMR-P2 | | |
| | | OUTBOUND | Presentment data for third party website | | | |
| OUTBOUND | Presentment data for third party IVR | | | | | |
| MDMR-P24 | Facilitate future billing process option | n/a | n/a | n/a | n/a | n/a |

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|-------------------------------|---|------------------------------------|---|--|--|--|
| MDMR-P25 | Data aggregation | n/a | n/a | Time triggered Assembly transactions must adhere to timelines configured in MDMR-P2 and timelines required by MDMR-P15 | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P26 | “Data Versions” | n/a | n/a | n/a | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P27 | Maintain Audit Trails | n/a | n/a | n/a | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P28 | Facilitate VEE process - Validation | n/a | Routed to MDMR-P18 | <ul style="list-style-type: none"> Feedback to MDMR-P18 required within 10 minutes of VEE event | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P29 | Facilitate VEE process - Editing and Estimating | n/a | Routed to MDMR-P18 | <ul style="list-style-type: none"> Feedback to MDMR-P18 required within 10 minutes of VEE event | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P30 | “Manage Clock Changes” | n/a | n/a | n/a | <ul style="list-style-type: none"> Incident Control via service desk: 24hr/day Initial Classification and support via service desk: 24hr/day Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P31 | NOT USED | n/a | n/a | n/a | n/a | n/a |
| MDMR-P32 | Repository Functions | n/a | n/a | n/a | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P33 | “Data Archival and Restoration” | n/a | n/a | n/a | <ul style="list-style-type: none"> Incident Control via service desk: 24hr/day Initial Classification and support via service desk: 24hr/day Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |

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|-------------------------------|---|--|---|---|--|--|
| MDMR-P34 | “Historical Data” | n/a | n/a | n/a | <ul style="list-style-type: none"> Incident Control via service desk: business hours Initial Classification and support via service desk: 24hr/day Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P35 | Security | Indirect interface from other processes | n/a | Rejections received to user within 10 seconds | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P36 | Facilitate "Flexibility" in customer arrangements | n/a received from other business processes: MDMR-P21 MDMR-P22 MDMR-P41 | Requests to associate more than one POD with a user | <ul style="list-style-type: none"> Applied to MMD before midnight on the day in which revisions are received Received within 10 minutes | <ul style="list-style-type: none"> Incident Control via service desk: business hours Initial Classification and support via service desk: 24hr/day Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P37 | “User Authentication“ | Indirect interface from other processes | n/a | <ul style="list-style-type: none"> Rejections received to user within 10 seconds | ALL incident management services available via service desk: 24hr/day | ALL problem management services available via service desk: 24hr/day |
| MDMR-P38 | Facilitate processes to ensure reliability | n/a | n/a | <ul style="list-style-type: none"> n/a | <ul style="list-style-type: none"> Incident Control via service desk: business hours Initial Classification and support via service desk: 24hr/day Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P39 | Initial Data Migration | INBOUND | Data from LDC's | n/a – irregular batch processing | <ul style="list-style-type: none"> Incident Control via | Problem management |

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|-------------------------------|--|------------------------------------|---|---|--|--|
| | | INBOUND | Data from Retailers and other interested parties | schedule | service desk: business hours • Initial Classification and support via service desk: 24hr/day • Investigation, diagnosis and resolution/recover during Highest Availability Window | services available during Highest Availability window for the underlying applications |
| MDMR-P40 | Billing Quantity Configuration | INBOUND | RPP rates from Ontario Energy Board (OEB) | • n/a – irregular batch processing schedule | • Incident Control via service desk: business hours • Initial Classification and support via service desk: 24hr/day • Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P41 | Administer Entities that use the MDM/R | INBOUND | Revisions to registration info. | • Applied to MMD before midnight on the day in which revisions are received | • Incident Control via service desk: business hours • Initial Classification and support via service desk: 24hr/day • Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| MDMR-P42 | Administer MDM/R Service Charges | OUTBOUND | Service Charge Summary Report | • n/a | • Incident Control via service desk: business hours • Initial Classification and support via service desk: 24hr/day • Investigation, diagnosis and resolution/recover during Highest Availability Window | Problem management services available during Highest Availability window for the underlying applications |
| | | OUTBOUND | Service Charge Invoices | | | |

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