

BS EN 61968-9:2014



BSI Standards Publication

Application integration at electric utilities — System interfaces for distribution management

Part 9: Interfaces for meter reading and control

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National foreword

This British Standard is the UK implementation of EN 61968-9:2014. It is identical to IEC 61968-9:2013. It supersedes BS EN 61968-9:2009 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/57, Power systems management and associated information exchange.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Amendments/corrigenda issued since publication

Date	Text affected
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English version

**Application integration at electric utilities -
System interfaces for distribution management -
Part 9: Interfaces for meter reading and control
(IEC 61968-9:2013)**

Intégration d'applications pour les services
électriques -
Interfaces système pour la gestion de
distribution -
Partie 9: Interfaces pour le relevé et la
commande des compteurs
(CEI 61968-9:2013)

Integration von Anwendungen in Anlagen
der Elektrizitätsversorgung -
Systemschnittstellen für Netzführung -
Teil 9: Zählerfernauslesung und -
steuerung
(IEC 61968-9:2013)

This European Standard was approved by CENELEC on 2013-11-20. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 57/1377/FDIS, future edition 1 of IEC 61968-9, prepared by IEC/TC 57, "Power systems management and associated information exchange" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61968-9:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-10-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-11-20

This document supersedes EN 61968-9:2009.

EN 61968-9:2014 includes the following significant technical changes with respect to EN 61968-9:2009:

- a) changes to and addition of new profiles to support PAN and Usage Points;
- b) extensions to support PAN devices generically as EndDevices;
- c) extensions to the MeterReading model and profiles to support richer descriptions of metered quantities and to accommodate coincident readings;
- d) addition of CIM Name class and corresponding revisions to profiles to allow reference by name instead of by mRID. Where the document may identify the use of mRID values as references, Name.name values may be alternatively used. This is described in more detail in Annex G;
- e) reference of ReadingTypes, EndDeviceEventTypes and EndDeviceControlTypes using name references;
- f) definition of normative enumerations for ReadingTypes, EndDeviceEventTypes and EndDeviceControlTypes in annexes;
- g) various corrections to example sequence diagrams;
- h) Removal of MeterAssetReading profile, where functionality is supported using the MeterReading profile;
- i) MeterAsset class is now named Meter;
- j) MeterAssetConfig profile now named MeterConfig;
- k) EndDeviceAssets profile now named EndDeviceConfig;
- l) removal of EndDeviceFirmware profile, where functionality is supported using the EndDeviceConfig profile;
- m) use of new namespaces to reflect the new edition, where the namespaces is reflective of the year in which a profile is defined;
- n) adoption of UsagePoint as a replacement for and a generalization of

ServiceDeliveryPoint;

- o) SDPLocationConfig has been deprecated in favor of UsagePointLocationConfig;
- p) some profiles previously defined have been moved into the new subclause 5.10 which is focused on data linkages;
- q) elimination of the MeterSystemEvents profile, as it provided no functionality that could not be achieved with the EndDeviceEvents profile;
- r) there were several profiles originally defined in support of prepayment use cases that were identified to be more general in nature, and were consequentially moved to 5.10. Subclause 5.8 now consists of only those profiles that are specific to prepayment. In all cases there has been some refactoring of these profiles to reflect other necessary changes that have been described;
- s) supplierConfig has been renamed ServiceSupplierConfig;
- t) messages using the SUBSCRIBE verb have been removed as these are related to the underlying communication transport and do not reflect actual EN 61968 messages.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61968-9:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61970-552	NOTE	Harmonised as EN 61970-552 (not modified).
IEC 62056 (Series)	NOTE	Harmonised as EN 62056 (Series) (not modified).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-300	-	International Electrotechnical Vocabulary - Electrical and electronic measurements and measuring instruments - Part 311: General terms relating to measurements - Part 312: General terms relating to electrical measurements - Part 313: Types of electrical measuring instruments - Part 314: Specific terms according to the type of instrument	-	-
IEC 61968-1	-	Application integration at electric utilities - System interfaces for distribution management - Part 1: Interface architecture and general requirements	EN 61968-1	-
IEC/TS 61968-2	-	Application integration at electric utilities - System interfaces for distribution management - Part 2: Glossary	-	-
IEC 61968-11	-	Application integration at electric utilities - System interfaces for distribution management - Part 11: Common information model (CIM) extensions for distribution	EN 61968-11	-
IEC 61968-100	2013	Application integration at electric utilities - System interfaces for distribution management - Part 100: Implementation profiles	EN 61968-100	2013
IEC 61970-301	-	Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base	EN 61970-301	-
IEC/TR 62051-1 + corr. June	-	Electricity metering - Data exchange for meter reading, tariff and load control - Glossary of terms - Part 1: Terms related to data exchange with metering equipment using DLMS/COSEM	-	-
ISO 8601	2004	Data elements and interchange formats - Information interchange - Representation of dates and times	-	-

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INTRODUCTION

The purpose of this document is to define a standard for the integration of Metering Systems (MS), which would include traditional (one or two-way) Automated Meter Reading (AMR) Systems, with other systems and business functions within the scope of IEC 61968. The scope of this standard is the exchange of meter reading, transactions, event and control information between systems within the utility enterprise and between enterprises. The specific details of communication protocols those systems employ are outside the scope of this standard. Instead, this standard will recognize and model the general capabilities that can be potentially provided by advanced and/or legacy meter infrastructures, including two-way communication capabilities such as load control, dynamic pricing, outage detection, distributed energy resource (DER) control signals and on-request read. In this way, this standard will not be impacted by the specification, development and/or deployment of next generation meter infrastructures, either through the use of standards or proprietary means.

The IEC 61968 series of standards is intended to facilitate inter-application integration as opposed to intra-application integration. Intra-application integration is aimed at programs in the same application system, usually communicating with each other using middleware that is embedded in their underlying runtime environment, and tends to be optimised for close, real-time, synchronous connections and interactive request/reply or conversation communication models. IEC 61968, by contrast, is intended to support the inter-application integration of a utility enterprise that needs to connect disparate applications that are already built or new (legacy or purchased applications), each supported by dissimilar runtime environments. Therefore, these interface standards are relevant to loosely coupled applications with more heterogeneity in languages, operating systems, protocols and management tools. This series of standards is intended to support applications that need to exchange data every few seconds, minutes, or hours rather than waiting for a nightly batch run. This series of standards, which are intended to be implemented with middleware services that exchange messages among applications, will complement, not replace utility data warehouses, database gateways, and operational stores.

As used in IEC 61968, a Distribution Management System (DMS) consists of various distributed application components for the utility to manage electrical distribution networks. These capabilities include monitoring and control of equipment for power delivery, management processes to ensure system reliability, voltage management, demand-side management, outage management, work management, automated mapping and facilities management. Standard interfaces are defined for each class of applications identified in the Interface Reference Model (IRM), which is described in IEC 61968-1, *Interface architecture and general requirements*.

This part of IEC 61968 contains the clauses listed in Table 1 below.

Table 1 – Document overview for IEC 61968-9

Clause	Title	Purpose
1	Scope	The scope and purpose of the document are described.
2	Normative References	Documents that contain provisions which, through reference in this text, constitute provisions of this International Standard.
3	Terms, Definitions and Abbreviations	
4	Reference and Information Models	Description of general approach to metering system, reference model, use cases, interface reference model, meter reading and control functions and components, message type terms and static information model.
5	Meter Reading and Control Message Types	Message types related to the exchange of information for documents related to meter reading and control.
6	Document Conventions	
Annex A	Message Type Verbs	Description of the Verbs that are used for the message types
Annex B	CIM Extensions	CIM extensions to support the recommended message structure for meter reading and control
Annex C	Procedure for the generation of a ReadingTypeIcd	Technique for constructing, and offers recommended enumerations for the ReadingTypeIcd textual name and mRID.
Annex D	QualityCode enumerations	Technique for constructing, and offers recommended enumerations for reading quality codes
Annex E	EndDeviceEvent Code enumerations	Defines EndDevice alarm and event codes
Annex F	EndDeviceControl code enumerations	Defines EndDevice control codes.
Annex G	Maintaining Relationships Between Objects	Describes the use of the master resource identifier (mRID) and Names.
Annex H	XML Schemas for message payloads	To provide xsd information for use by developers to create IEC 61968-9 messages.
Annex I	Mappings	To provide mappings between IEC 61968-9 MeterReadings and other standards.
Annex J	Request Parameters	Describes the qualification of GET requests using Request parameters.
Annex K	Master Data Management Transaction Processing	Describes how complex Master data Management / Data Synchronization transactions are conveyed and the associated processing rules.
Annex L	Master Data Management Use Cases and Sample XML	Describes many of the common Master Data Management use cases and provides sample XML to illustrate intended usage of the various Master Data Management related profiles.

Future editions of IEC 61968-9 will strive to have changes be 'non-breaking', where the namespace of the previous version may be preserved, but the Revision attribute in the XSD is incremented.

APPLICATION INTEGRATION AT ELECTRIC UTILITIES – SYSTEM INTERFACES FOR DISTRIBUTION MANAGEMENT –

Part 9: Interfaces for meter reading and control

1 Scope

This part of IEC 61968 specifies the information content of a set of message types that can be used to support many of the business functions related to meter reading and control. Typical uses of the message types include meter reading, controls, events, customer data synchronization and customer switching. Although intended primarily for electrical distribution networks, IEC 61968-9 can be used for other metering applications, including non-electrical metered quantities necessary to support gas and water networks.

The purpose of this part of IEC 61968 is to define a standard for the integration of metering systems (MS), which includes traditional manual systems, and (one or two-way) automated meter reading (AMR) systems, and meter data management (MDM) systems with other enterprise systems and business functions within the scope of IEC 61968. The scope of this part of IEC 61968 is the exchange of information between metering systems, MDM systems and other systems within the utility enterprise. The specific details of communication protocols those systems employ are outside the scope of this International Standard. Instead, this International Standard will recognize and model the general capabilities that can be potentially provided by advanced and/or legacy meter infrastructures, including two-way communication capabilities such as load control, dynamic pricing, outage detection, distributed energy resource (DER) control signals and on-request read. In this way, this standard will not be impacted by the specification, development and/or deployment of next generation meter infrastructures either through the use of standards or proprietary means.

The diagram in Figure 1 describes the scope of this part of IEC 61968 from the perspective of direct and causal or indirect impacts of IEC 61968-9 messages. Where the focus of IEC 61968-9 is to define standard messages for the integration of enterprise applications, these messages may be directly or indirectly related to information flows within a broader scope. Examples would include messaging between head end systems and meters or PAN devices. The various components described later in this document will typically fall into either the category of a metering system (MS) head end, an MDM or other enterprise application (e.g. OMS, DRMS, CIS).

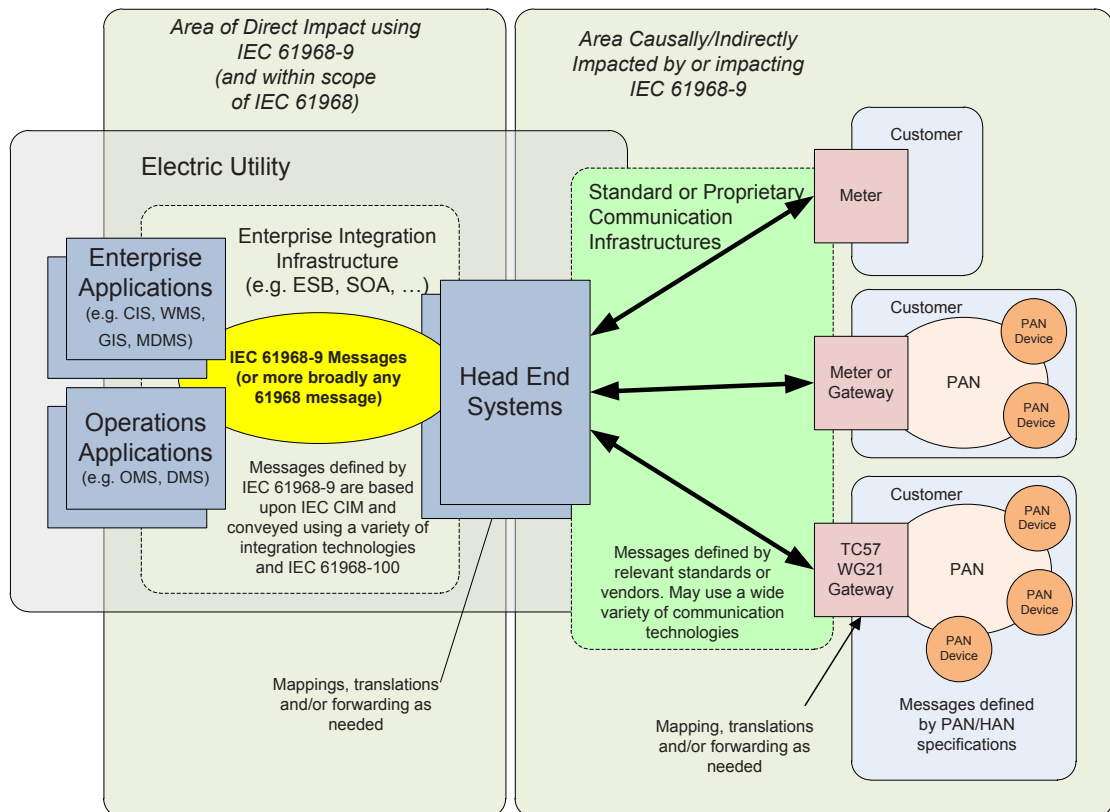


Figure 1 – IEC 61968-9 scope

The capabilities and information provided by a meter reading and meter data management systems are important for a variety of purposes, including (but not limited to) interval data, time-based demand data, time-based energy data (usage and production), outage management, service interruption, service restoration, quality of service monitoring, distribution network analysis, distribution planning, demand response, customer billing and work management. This standard also extends the CIM (Common Information Model) to support the exchange of meter data.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-300, *International Electrotechnical Vocabulary (IEV) – Electrical and electronic measurements and measuring instruments – Part 311: General terms relating to measurements – Part 312: General terms relating to electrical measurements – Part 313: Types of electrical measuring instruments – Part 314: Specific terms according to the type of instrument*

IEC 61968-1, *Application integration at electric utilities – System interfaces for distribution management – Part 1: Interface architecture and general recommendations*

IEC/TS 61968-2, *Application integration at electric utilities – System interfaces for distribution management – Part 2: Glossary*

IEC 61968-11, *Application integration at electric utilities – System interfaces for distribution management – Part 11: Common information model (CIM) extensions for distribution*

IEC 61968-100:2013, *Application integration at electric utilities – System interfaces for distribution management – Part 100: Implementation profiles*

IEC 61970-301, *Energy management system application program interface (EMS-API) – Part 301: Common information model (CIM) base*

IEC/TR 62051-1, *Electricity metering – Data exchange for meter reading, tariff and load control – Glossary of terms – Part 1: Terms related to data exchange with metering equipment using DLMS/COSEM*

ISO 8601:2004, *Data Elements and Interchange Formats – Information Interchange – Representation of Dates and Times*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this standard, the terms and definitions given in IEC 60050-300, IEC/TS 61968-2, IEC/TR 62051-1, IEC 62055-31 and the following terms apply.

NOTE Where there is a difference between the definitions in this standard and those contained in other referenced IEC standards, then those defined in IEC/TS 61968-2 shall take precedence over the others listed, and those defined in IEC 61968-9 shall take precedence over those defined in IEC/TS 61968-2.

3.1.1

customer program

classification scheme for the sale of energy to consumers according to a particular tariff

Note 1 to entry: The program may specify the purpose, conditions on the time of use, the service voltage(s), the volumes consumed, and/or other terms as a condition of the sale.

Note 2 to entry: Utilities may promote particular programs to their industrial, commercial, agricultural, and residential customers in an effort to encourage a particular behaviour, or to make them aware of their options.

3.1.2

demand response

set of processes and programs that are used to reduce consumption

Note 1 to entry: This may be done on an economic, mandatory or emergency basis.

3.1.3

end device

equipment located at the end of the communication system, usually on the customer premises

Note 1 to entry: An end device may perform functions such as metrology, connect/disconnect, load control, demand response, or other functions, and may have power relay and/or local communications capability. This is represented within the CIM using the EndDevice class. Meters and PAN devices are examples of end devices.

3.1.4

head end

component of a metering system that collects data from and issues controls to end devices

Note 1 to entry: A head end may also manage the communication system used to communicate with the end devices. From the perspective of enterprise integration, the head end acts as a proxy for end devices.

3.1.5

gateway

device that may be used to manage devices on a PAN and participate in internet-based interactions

Note 1 to entry: A gateway may apply a transformation from one protocol to another.

3.1.6

load control device

type of EndDevice which can receive signals causing it to shed load for the purposes of maintaining network reliability and/or commercial agreements

3.1.7

meter

type of end device which performs metrology and supports the tariffing of the distribution and/or transmission network

Note 1 to entry: This is represented using the CIM Meter class, which is a subclass of EndDevice.

Note 2 to entry: As an end device, a meter will typically, but not always, have a communication link with a head end system.

3.1.8

meter changeout

meter exchange

process of replacing an existing meter with a new meter

Note 1 to entry: The installer will customarily follow a work order which specifies a given location, and usually requires that he or she capture readings from the old and new meters, and record the time and day in which the work was performed.

3.1.9

meter data manager

system that manages meter data, and typically provides a variety of value added functionalities such as VEE

3.1.10

premise area network

fully inclusive of the scope of a home area network (HAN) as it also covers commercial premises

3.1.11

PAN device

type of end device that is located on a customer premise and communicates using a PAN

Note 1 to entry: A PAN device can typically accept controls and/or report events.

Note 2 to entry: PAN devices commonly use meters as communication gateways.

3.1.12

payment meter

electricity meter with additional functionalities that can be operated and controlled to allow the flow of energy according to agreed payment modes

Note 1 to entry: Typically this involves prepayment for electricity.

3.1.13

prepayment mode

payment mode in which automatic interruption occurs when available credit is exhausted

3.2 Abbreviations

AM	asset management
AMR	automated meter reading
AMI	advanced metering infrastructure
CIM	common information model
CIS	customer information system

COSEM	companion specification for energy metering
DLMS UA	device language message specification user association
DMS	distribution management system
DR	demand response
DRMS	demand response management system
HAN	home area network
IDR	interval data recorder
IEC	International Electrotechnical Commission
LC	load control
LDC	load control system
LMS	load management system
MAM	meter asset management
MDM	meter data management
MDM	master data management
MM	meter maintenance
MR	meter reading
MS	metering system
NO	network operations
OMS	outage management system
POS	point of sale
PAN	premise area network (includes scope of HAN)
RF	radio frequency
SM	smart meter
UML	unified modeling language
VEE	validating, editing, and estimating
WM	work management
XSD	XML schema

4 Reference and information models

4.1 General approach to metering systems

The spinning disk in an electromechanical meter generally serves as a pulse initiator to the meter recorder module. In a similar fashion, solid-state meters may also employ a metrology unit that generates pulses which represent a fraction of a kWh, and if more sophisticated, the solid-state meter may have a meter recorder which is able to accumulate many different kinds of information and store it for presentation to the meter communications module using a message and table-driven protocol such as ANSI C12.19 or IEC 62056.

The most common metered data element is kWh, but many electricity meters can also capture kW, kVAr, kVArh, and other similar billing quantities. Some meters can also capture pure engineering quantities such as voltage, current, power factor, etc.

Some AMR systems attempt to add value to meters by adding functionality that the meter may lack. For simple meters (e.g. energy only) it is common for an AMR meter module to add the capability to perform demand metering, Interval Data Recording (IDR), maintain an energisation count, or even provide estimates of certain engineering quantities such as voltage.

Commercial and Industrial meters often employ current transformers and voltage transformers to meter the actual service. Primary voltages and currents are scaled down using potential transformers (PTs) and current transformers (CTs) so that the meter does not have to be constructed to withstand the high voltages and currents actually delivered to the load. Secondary voltage or current values are those that are often measured directly by the meter. Secondary values are small percentage of the primary values that may actually delivered to or connected to the load. If secondary voltages and currents are measured by the meter, these can be converted back to primary values using the PT and CT ratios, which are just the ratio of primary to secondary values.

The metering system will convey meter data and other value-added data through the metering system network to the destination. Depending on the system, the journey may involve multiple steps through public or private networks, licensed or unlicensed RF spectrums, standardized or proprietary systems, in a one-way or two-way fashion.

Some general operations or services can be defined for a metering system. These general operations will translate to specific actions in the context of a given metering solution.

General operations can be scheduled or called on-demand. Each operation returns an answer with an optional status. A message encapsulates a general operation.

Readers of IEC 61968-9 interested in additional information may refer to other standards including IEC 62056, DLMS UA (Device Language Message Specification User Association) and the COSEM model: COmpanion Specification for Energy Metering.

4.2 Reference Model

4.2.1 General

The following diagrams serve as reference models and provide examples of the logical components and data flows related to this International Standard. Subclause 4.5.2 provides references to terms that are defined by the CIM.

The “meter” is a specialization of an “end device”. The end device may contain a metrology capability, it may contain a communications capability, it may be a load control unit, and it may contain a mixture of many different types of functionality. Figure 2 attempts to describe the concept of essentially a shopping-list of functionality which may be available in the (logical or physical) end device.

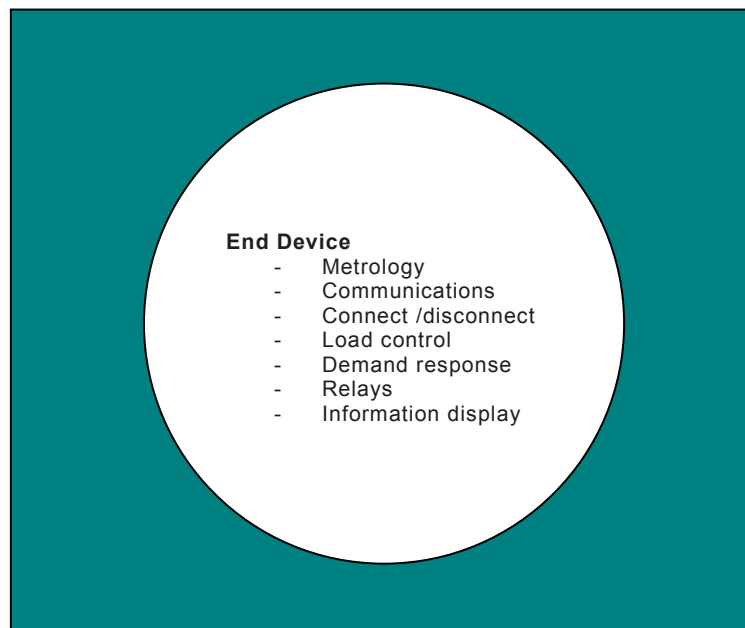


Figure 2 – Example of an end device with functions

The end device itself, while presenting a myriad of functionality, is not the subject of this standard. There are many interactions which ultimately affect the end device but occur as a result of a communication between systems at a much higher level in the control architecture. The interaction between systems is within the scope of this standard, and Figure 3 is an informative view of the systems involved and provides an overview to the stakeholder community.

From the perspective of this standard, an end device:

- has a unique identity (mRID and/or one or more instances of the Names class)
- is managed as a physical asset
- may issue events
- may receive control requests
- may collect and report measured values
- may participate in utility business processes

The following diagrams of Figures 3 and 4 describe the flows between the components in the reference model. Two diagrams are used in order to reduce the complexity that would be experienced by a single diagram. The numbers in brackets provide linkages to the flow definitions.

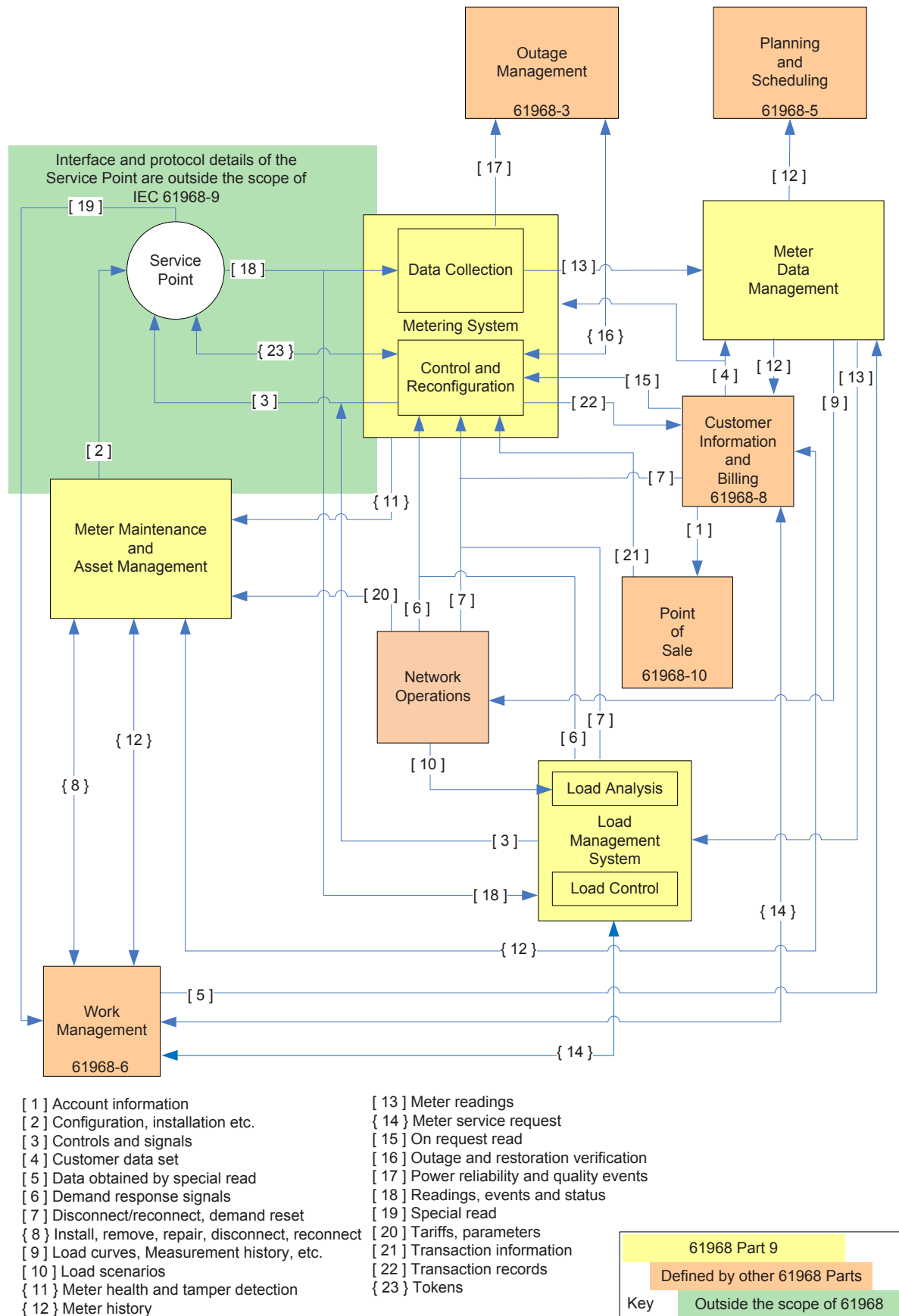


Figure 3 – IEC 61968-9 reference model

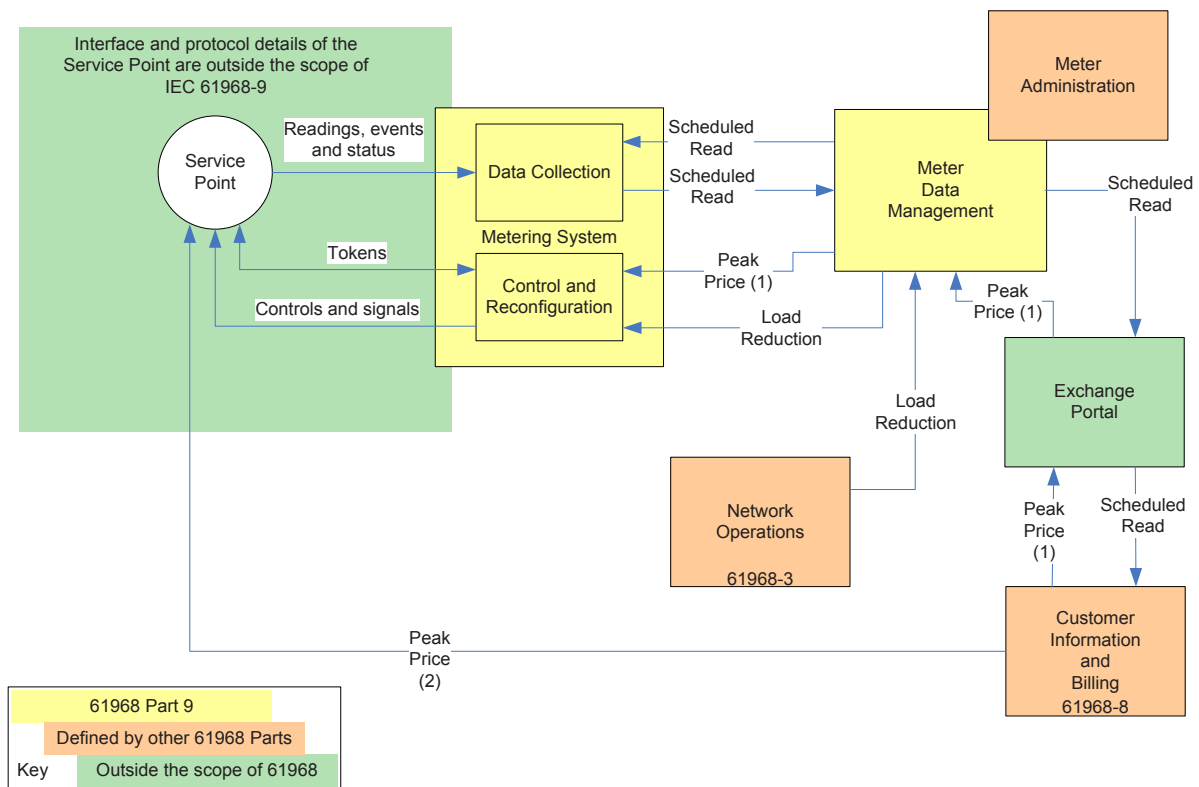


Figure 4 – IEC 61968-9 Reference model with customer information and billing system

The reference architecture reflects five main logical components (potentially realized as systems or subsystems) related to metering:

- metering system, potentially including data collection and control and reconfiguration functionality
- meter data management, which may include meter administration functions
- meter maintenance
- load management, potentially including load control and load analysis functionality
- meter asset management.

The metering system and meter maintenance system components may be bound to a specific meter and associated communication technology or they may support multiple meters (and more generically end devices) types and associated communication technology. The meter data management system component may support and consolidate meter data from more than one metering system. The metering system may also support consolidation of various measurement and data collection implementations, providing a consistent interface to the meter data management system component.

4.2.2 Metering system (MS) – Data collection

The tasks of the data collection sub-component within the metering system may include:

- readings and status collection. Readings and status may be obtained through either manual or automated means, on a scheduled or on-request basis
- transmission of meter readings and status to a meter data management system

- transmission of power reliability and quality event data to outage management, network operations, and capacity planning systems
- transmission of communication network health information to those responsible for maintaining the communications network.

It is important to note that metering systems are significantly diverse with respect to technologies used, protocols used, capabilities and frequency of data collection. The details of the internals of meters, communication transports and protocols are outside the scope of this international standard.

A handheld device used by a human meter reader could be regarded as a metering system. In a typical meter reading by human, a reader inputs meter data into a handheld device in a field. The handheld device is not connected to a communication network in a field. At the end of day work, the handheld device is connected to a communication network at reader's home (not in an office), and meter data is uploaded to a meter data management system. In this case, this communication network should be part of a metering system. Data collection is described in IEC 61968-1 as "MR-RMR."

4.2.3 Metering system (MS) – Control and reconfiguration

The tasks of the control and reconfiguration subcomponent within the metering system are:

- primary interface in executing meter control commands
- communicating payment system information
- act as a communication gateway for load control devices
- service connect / disconnect
- configuration of tariff units of measure and calendar
- configuration of power quality measurement
- configuration of meter event recording
- relay of load control signals
- configuration of meter identity and security credentials
- fraud detection.

This subcomponent is identified separately within the metering system in order to recognize the existence of metering systems that do not have the ability to send messages to meters. IEC 61968-1 describes this subcomponent as "MR-MOP-Meter Configuration." Metering systems with these capabilities are often referred to as "AMI".

4.2.4 Load control

The Metering System Infrastructure may often be used as a communication gateway to load control units. Load control units are end devices with load control (LC) capability. These are wired to control individual, target devices. End devices with LC functionality can take on different forms. Quite often a dedicated LC unit can be located at (or near) the device to be controlled. Another approach is to use meters that have relays which are configured to serve as LC devices. Still another approach is to interface with a customer energy management system (which would be another type of end device).

4.2.5 Load management system (LMS)

A load management system is used to manage and control load by the utility in order to promote system reliability. A load management system may perform load forecasting, contingency analysis, and other simulations prior to issuing a load control command.

4.2.6 Meter asset management (MAM) system

Utilities will employ some form of asset management software in an effort to maintain detailed records regarding their physical assets. Asset management is treated categorically in IEC 61968-4. However, metering has such special requirements that it is common for a utility to use specialized Meter Asset Management software. The software inventories the asset – providing a record of its physical attributes as well as its location. For sake of discussion, the IEC 61968-9 document will talk about a MAM system which is closely coupled to the MS and MDM, though some implementations will successfully generalize the asset management application sufficiently so that it can live within a more generic AM system.

4.2.7 Meter data management (MDM) system

From a historical perspective, it was common for a utility to have more than one automated meter reading system. Alternatively, a utility might outsource meter reading services to one or more third-party service providers who operate an AMR system and/or read the meters manually. The meter data management (MDM) system is used to provide a common repository, and point of management and access of meter data that is collected from disparate metering systems. In addition to data aggregation, quite often the MDM will also make an effort to scrutinize the data collected from the various metering systems, and provide a validating, editing, and estimating (VEE) capability. MDM systems will frequently also provide functionality involving issue, control, and tracking of EndDeviceControls and endDeviceEvents.

4.2.8 Customer information system (CIS)

A CIS will typically encompass functionality related to customer care and billing. This is a subject which is external to the IEC 61968-9 standard. The billing function is driven by readings, typically demand or time-of-use, obtained from the meter. The CIS is also often involved with processes related to billing inquires, meter disconnect and meter reconnect, rate program changes.

The CIS is frequently the “source of record” in utility enterprises for master data defining key entities such as meters, other end devices, usage points, service suppliers, customers, pricing structures, etc. and the relationships between these entities. See 5.10 and Annexes K and L for additional information related to master data management / data synchronization.

4.2.9 Outage management system (OMS)

An outage management system (OMS) is used by distribution operators to detect and track outages, and to assist in the process of verification and/or restoration of service. An OMS typically combines (or has ties to) functionality such as network operations fault management; operational planning and optimisation, network operation simulation; maintenance and construction; maintenance and inspection; and work scheduling and dispatching.

The metering system can be an important source of information for identifying the existence and extent of outages, and can be used to verify the restoration of outages. The MS might have the ability to publish outage and restoration data to the OMS as it finds it. This type of information typically joins customer call-ins in the OMS to allow it to better predict the location of the outage. However, due to the time-sensitive nature of outage detection, there is also the potential need for a request/reply interface with the MS, where the OMS can ask for specific equipment on the distribution network to be tested by the MS, and an energisation status returned for analysis. The request/reply interface can be used by the OMS to supply critical data needed to make an outage prediction, or by a dispatcher who would like to verify that power has been restored to all of the metered endpoints downstream of a particular switch prior to sending the lineman to the next location.

It is also relatively common for MDM systems to act as an intelligent agent in the brokering of outage related messages between Metering Systems and Outage Management Systems.

4.2.10 Network operations (NO)

Network Operations (IEC 61968-3) may occasionally need to issue load control and pricing signals to meters. This can be done for both economic and emergency reasons.

4.2.11 Meter maintenance (MM)

Meter Maintenance is responsible for functionality related to the configuration and installation of meters. This type of functionality generally falls under Meter Asset Management, or Asset Management in general. Performing meter maintenance may require exchanges with Work Management.

4.2.12 Planning

The planning function is described as operational planning and optimisation, network operation simulation.

4.2.13 Work management (WM)

A Work Management system is responsible for work that is performed by field resources. This subject is covered in maintenance and construction maintenance and inspection (IEC 61968-6).

With respect to metering, WM includes the installation, maintenance and replacement of meters. This may also involve the process of special reads.

4.2.14 Point of sale (POS)

A Point of Sale (POS) system is used for the management of payment meters, where a customer either purchases a token or makes a payment for service.

4.2.15 Meter

The meter records the data used for tariffing public networks, and data used for network balancing mechanisms. Meters are a subtype of EndDevice.

Readings captured by the metering system are collected by a system such as the MDM before being presented for billing purposes. Billing entities may correct the data, or, in some regions, the energy supplier may perform validating, editing, and estimating (VEE) according to rules established by the appropriate supervising regulatory agency. In any case, those corrections are made available to the user who requests them.

Where this international standard refers to a "Meter", it should be realized that a "Meter" is an end device that has metrology capability, it may or may not have communications capability, it may or may not have connect/disconnect capability, or a host of other capabilities. Given that a meter will have metrology capability, electricity meters will in all likelihood meter kWh, but possibly also demand, reactive energy and demand, time of use quantities, interval data, engineering quantities and more. In like manner, meters for other commodities such as gas and water may monitor analogous quantities.

4.2.16 Load control devices

Load control devices are used to control loads at a UsagePoint. The metering system may often have a communication network which can be used for transmitting load control signals (EndDeviceControls) in order to control the load presented by the EndDevice(s). Alternatively, the communication network could be used to communicate demand response (price) signals to devices in order to affect the load presented by the EndDevice(s). PAN devices can also provide load control functions.

4.2.17 PAN devices

PAN devices are used for a variety of purposes within a customer premise. The meter is often used as a gateway for communication between the head end system and the PAN device. PAN devices may react to control messages or generate EndDeviceEvents. Some PAN devices, such as in-home displays, may also present information to consumers. PAN devices may be configured to react to pricing or other demand response related signals that are issued as EndDeviceControls. PAN devices are modelled as EndDevices in the CIM.

4.2.18 Demand response management system (DRMS)

Demand Response Management Systems are used to manage registration in DR programs, send events to program participants and collect related performance information as needed for settlements.

4.3 Interface reference model

It is not the intention of this standard to define the applications and systems that vendors should produce. It is expected that a concrete (physical) application will provide the functionality of one or more abstract (logical) components as listed in this standard. These abstract components are grouped by the business functions of the Interface Reference Model.

In this standard, the term abstract component is used to refer to that portion of a software system that supports one or more of the interfaces defined in Parts 3 to 9. It does not necessarily mean that compliant software is delivered neither as separate modules nor as a single system.

IEC 61968-1 describes infrastructure services common to all abstract components while IEC 61968-3 to -9 define the details of the information exchanged for specific types of abstract component.

IEC 61968 defines that:

- a) An inter-application infrastructure is compliant if it supplies services defined in IEC 61968-1 to support at least two applications with interfaces compliant to sections of IEC 61968-3 to -9.
- b) An application interface is compliant if it supports the interface standards defined in IEC 61968-3 to -9 for the relevant abstract components defined in the Interface Reference Model.
- c) An application is only required to support interface standards of the applicable components listed under abstract components. An application is not required to support interfaces required by other abstract components of the same business sub-function or within the same business function. While this standard primarily defines information exchanged among components in different business functions, it will occasionally also define information exchanged among components within a single business function when a strong market need for this capability has been realised.

4.4 Meter reading and control functions and components

It should be noted that the message types defined in this "standard may be sent or received by any type of component within a distribution management system (DMS) system.

Table 2 shows these functions and typical abstract components that are expected to be producers of information for these message types. Typical consumers of the information include, but are not restricted to, the other components as listed in IEC 61968-1.

Table 2 – Business functions and abstract components

Business functions	Business sub-functions	Abstract components
Meter reading and control (MR)	Metering system (MS)	Data collection
		End point controls
		End point reconfiguration
		Disconnect/reconnect
		Demand reset
		On request read
		Point of sale
		Outage detection and restoration verification
		Power reliability and quality events
		Metering system events
	Meter maintenance and asset management	End point install, configure, remove, repair, disconnect, reconnect
		End point asset history
		End point reconfiguration
		Special read
		Meter service request
		Tariffs
	Meter data management (MDM)	Meter data repository
		Usage history
		Validation, estimation and editing
		Customer billing data
		End device controls and events
	Demand response (DR)	Real-time pricing
		Emergency reductions
		Economic reductions
		Program registration
	Load management (LM)	Load analysis
		Load control
		Demand response
		Performance measurements
Risk management		

4.5 Static information model

4.5.1 General

The information model relevant to meter reading and control consists of classes that provide a template for the attributes for each message.

The classes are defined in detail in IEC 61968-11, *Common Information Model (CIM) extensions for distribution* or in IEC 61970-301, *Energy management system application program interfaces – Common Information Model core*.

4.5.2 Classes for meter reading and control

Table 3 lists classes used within message types. Usually all the attributes of these classes are contained within a message type. The descriptions provided describe usage within this part.

Classes described as type "Asset" are defined in the 61968/Assets package of the CIM.

Classes described as type "Customer" are defined in the 61968/Customers package of the CIM.

Classes described as type "Metering" are defined in the 61968/Metering package of the CIM.

Classes described as type "PaymentMetering" are described in the 61968/PaymentMetering" package of the CIM.

Classes described as type "Profile" are contextual profiles defined for 61968-9 that describe message definitions defined using CIM objects.

Table 3 – Classes for meter reading and control

Class/Noun	Type	Description
AuxiliaryAccount	PaymentMetering	Variable and dynamic part of AuxiliaryAgreement, generally representing the current state of the account related to the outstanding balance defined in AuxiliaryAgreement.
AuxiliaryAgreement	PaymentMetering	An ad-hoc auxiliary account agreement associated with a customer agreement, not part of the customer's account, but typically subject to formal agreement between customer and supplier (utility). Typically this is used to collect revenue owing by the customer for other services or arrears accrued with the utility for other services. It is typically linked to a prepaid token purchase transaction, thus forcing the customer to make a payment towards settlement of the auxiliary account balance whenever he needs to purchase a prepaid token for electricity. The present status of AuxiliaryAgreement can be defined in the context of the utility's business rules, for example: enabled, disabled, pending, over recovered, under recovered, written off, etc.
AuxiliaryAgreementConfig	Profile	Message profile for AuxiliaryAgreements.
Card	PaymentMetering	Documentation of the tender when it is a type of card (credit, debit, etc).
Cashier	PaymentMetering	The operator of the point of sale for the duration of CashierShift. Cashier is under the exclusive management control of Vendor.
CashierShift	PaymentMetering	The operating shift for a cashier, during which he may transact against the CashierShift, subject to VendorShift being open.
Channel	Metering	A single path for the collection or reporting of register values over a period of time. For example, a register which measures forward energy can have two channels, one providing bulk quantity readings and the other providing interval readings of a fixed interval size.
Charge	PaymentMetering	A charge element associated with other entities such as tariff structures, auxiliary agreements or other charge elements. The total charge amount applicable to this instance of Charge is the sum of fixedPortion plus percentagePortion.
Cheque	PaymentMetering	The actual tender when it is a type of cheque. Cheque reference number (as printed on the cheque) is specified in 'name.'
ComFunction	Metering	Communication function of communication equipment or a device such as a meter.
ComModuleConfig	Profile	Profile for configuring communications modules.

Class/Noun	Type	Description
ConfigurationEvent	Metering	Used to report details on creation, change or deletion of an entity or its configuration.
ConsumptionTariffInterval	PaymentMetering	One of a sequence of intervals defined in terms of consumption quantity of a service such as electricity, water, gas, etc. It is typically used in association with TariffProfile to define the steps or blocks in a step tariff structure, where startValue simultaneously defines the entry value of this step and the closing value of the previous step. Where consumption is \geq startValue it falls within this interval and where consumption is $<$ startValue it falls within the previous interval.
Customer	Customers	Organisation receiving services from ServiceSupplier.
CustomerAccount	Customers	Assignment of a group of products and services purchased by the Customer through a CustomerAgreement, used as a mechanism for customer billing and payment. It contains common information from the various types of CustomerAgreements to create billings (invoices) for a Customer and receive payment.
CustomerAccountConfig	Profile	Message profile for CustomerAccounts.
CustomerAgreement	Customers	Agreement between the Customer and the ServiceSupplier to pay for service at a specific ServiceLocation. It records certain billing information about the type of service provided at the ServiceLocation and is used during charge creation to determine the type of service.
CustomerAgreementConfig	Profile	Message profile for CustomerAgreements.
CustomerMeterDataSet	Profile	The CustomerMeterDataSet includes one or more CustomerAccounts for one or more ServiceLocations for one or more UsagePoints. TheCustomerMeterDataSet may include one or more EndDeviceGroups.
DemandResponseProgram	Metering	Demand response program.
DeviceFunction	Metering	Function performed by a device such as a meter, communication equipment, controllers, etc.
EndDevice	Metering	The EndDevice is equipment that performs the role of an end device. It may contain functionality such as metrology, communications, load control, connect/disconnect, or other capabilities. It is known as "the meter", "a smart meter", an "advanced meter", "air conditioner", "refrigerator", "pool pump", etc. that a CommModule and/or Meter may monitor and/or control. The asset may be owned by a consumer, a service provider, utility or other party.
EndDeviceConfig	Profile	Message used to convey descriptions of one or more EndDevices.
EndDeviceControl	Metering	Used to issue commands to EndDevices such as meters. May be addressed by EndDevice or by EndDeviceGroup. EndDeviceControls may have control types and parameters.
EndDeviceControls	Profile	Message used to convey one or more EndDeviceControls
EndDeviceControlType	Metering	Defines types of EndDeviceControls
EndDeviceEvent	Metering	Used to report events detected by end devices such as meters. Each EndDeviceEvent has an event type and a timestamp.
EndDeviceEvents	Profile	Message used to convey one or more EndDeviceEvents.
EndDeviceEventType	Metering	Defines types of EndDeviceEvents
EndDeviceFirmware	Profile	Profile for EndDevice firmware configuration messages.
EndDeviceGroup	Metering	An EndDeviceGroup is used for grouping end devices for a variety of purposes including, but not limited to, load control and other types of demand response. An EndDeviceGroup may belong to another EndDeviceGroup, and an end device may belong to zero or more EndDeviceGroups. In some cases the group ID is maintained within the end device, but in other cases it can be managed by a metering system.
EndDeviceGroups	Profile	Use to convey changes in group membership
GetCustomerMeterDataSet	Profile	Profile for GET requests. See annex J.

Class/Noun	Type	Description
GetEndDeviceConfig	Profile	Profile for GET requests. See annex J.
GetMeterReadings	Profile	Profile for GET requests. See annex J.
GetMeterServiceRequests	Profile	Profile for GET requests. See annex J.
Get<ProfileName>	Profile	Each profile will have a corresponding ""Get" profile that is used to convey parameters on GET requests.
IntervalBlock	Metering	Time sequence of Readings of the same ReadingType. Contained IntervalReadings may need conversion through the application of an offset and a scalar defined in associated Pending.
IntervalReading	Metering	Data captured at regular intervals of time. Interval data could be captured as incremental data, absolute data, or relative data. The source for the data is usually a tariff quantity or an engineering quantity. Data is typically captured in time-tagged, uniform, fixed-length intervals of 5, 10, 15, 30, or 60 minutes. Note: Interval Data is sometimes also called "Interval Data Readings" (IDR).
MasterDataLinkageConfig	Profile	A message profile used to establish or modify relationships between objects.
MerchantAccount	PaymentMetering	The operating account controlled by MerchantAgreement, against which Vendor may vend tokens or receipt payments. Transactions via VendorShift debit the account and bank deposits via BankStatement credit the account.
MerchantAgreement	PaymentMetering	A formal controlling contractual agreement between Supplier and Merchant, in terms of which Merchant is authorised to vend tokens and receipt payments on behalf of Supplier. Merchant is accountable to Supplier for revenue collected at PointOfSale.
Meter	Metering	The Meter class is used to describe meters. A Meter is a type of EndDevice typically used to measure and potentially monitor a customer load. The EndDevice class definition should be used as the basis for Meter class.
MeterConfig	Profile	Message profile for Meter configuration messages.
MeterReading	Metering	A set of values obtained from the meter. Each MeterReading may have multiple ReadingTypes, and each ReadingType may contain multiple values.
MeterReadings	Profile	Profile for conveying MeterReadings.
MeterReadSchedule	Profile	A MeterReadSchedule message is used to schedule meter readings.
MeterServiceRequests	Profile	A meter service request is a type of work that can be used for a variety of meter service related activities. These activities would include meter installation, meter change out, customer disconnect/reconnect, , etc.
MeterServiceWork	Metering	Work involving meters.
ObjectNamesConfig	Profile	Used to add, change, or delete Names class identifiers of CIM objects.
Pending	Metering	When present, a scalar conversion that is associated with IntervalBlock and which needs to be applied to every contained IntervalReading value. This conversion results in a new associated ReadingType, reflecting the true dimensions of interval reading values after the conversion.
PointOfSale	PaymentMetering	Logical point where transactions take place with operational interaction between Cashier and the payment system; in certain cases PointOfSale interacts directly with the end customer, in which case Cashier might not be a real person: for example a self-service kiosk or over the internet.
PricingStructure	Customer	Grouping of pricing components and prices used in the creation of customer charges and the eligibility criteria under which these terms may be offered to a customer. The reasons for grouping include state, customer classification, site characteristics, classification (i.e. fee price structure, deposit price structure, electric service price structure, etc.) and accounting requirements.

Class/Noun	Type	Description
PricingStructureConfig	Profile	Profile for configuring pricing structures.
Reading	Metering	Specific value measured by a meter or other asset. Each Reading is associated with a specific ReadingType.
ReadingQuality	Metering	Quality of a specific reading value or interval reading value. Note that more than one Quality may be applicable to a given Reading. Typically not used unless problems or unusual conditions occur (i.e., quality for each Reading is assumed to be 'Good' unless stated otherwise in associated ReadingQuality).
ReadingQualityType	Metering	Defines types for qualities that can be associated with a reading value.
ReadingType	Metering	Type of data conveyed by a specific Reading.
Receipt	PaymentMetering	Record of total received payment from customer.
ReceiptRecord	Profile	Profile for receipt messages.
ReceiptSummary	PaymentMetering	Record of detail of receipts pertaining to one shift of operation (one record per 'tenderKind').
Register	Metering	Display for quantity that is metered on an end device such as a meter.
ServiceCategory	Customers	Category of service provided to the customer.
ServiceCategoryConfig	Profile	Profile for ServiceCategory configuration messages.
ServiceLocationConfig	Profile	Profile for ServiceLocation configuration messages.
ServiceSupplier	PaymentMetering	Organisation that provides services to Customers.
ServiceSupplierConfig	Profile	Profile for service supplier configuration messages.
Shift	PaymentMetering	Generally referring to a period of operation or work performed. Whether shift is open/closed can be derived from attributes 'activityInterval.start' and 'activityInterval.end'. The grand total for receipts (i.e., cumulative total of all actual received amounts during this shift; bankable + non-bankable; excludes rounding error totals) can be derived from Receipt attributes: =sum(Receipt.receiptAmount); includes bankable and non-bankable receipts.
SimpleEndDeviceFunction	Metering	Simple end device function distinguished by 'kind'; use this class for instances that cannot be represented by another end device function subtype.
Tariff	PaymentMetering	Document, approved by the responsible regulatory agency, listing the terms and conditions, including a schedule of prices, under which utility services will be provided. It has a unique number within the state or province. For Rate Schedules it is frequently allocated by the affiliated Public Utilities Commission.
Tender	PaymentMetering	Tender is what is "offered" by the customer towards making a payment and is often more than the required payment (hence the need for 'change'). The payment is thus that part of the Tender that goes towards settlement of a particular transaction. Tender is modelled as an aggregation of Cheque and Card. Both these tender types can exist in a single tender bid thus 'accountHolderName' shall exist separately in each of Cheque and Card as each could have a different account holder name.
TimeTariffInterval	PaymentMetering	One of a sequence of time intervals defined in terms of real time. It is typically used in association with TariffProfile to define the intervals in a time of use tariff structure, where startDateTime simultaneously determines the starting point of this interval and the ending point of the previous interval.
Transaction	PaymentMetering	The record of details of payment for service or token sale.
TransactionRecord	Profile	Profile for Transactions messages.
TransactionSummary	PaymentMetering	The record of detail of payment transactions pertaining to one shift of operation (one record per 'transactionKind').

Class/Noun	Type	Description
Transactor	PaymentMetering	The entity that ultimately executes the transaction and who is in control of the process; typically this is embodied in secure software running on a server that may employ secure hardware encryption devices for secure transaction processing.
UsagePointLocation	Metering	Location of an individual usage point. For residential or most businesses, it is typically the location of a meter on the customer's premises. For transmission, it is the point(s) of interconnection on the transmission provider's transmission system where capacity and/or energy transmitted by the transmission provider is made available to the receiving party. The point(s) of delivery is specified in the service agreement.
UsagePointLocationConfig	Profile	Message used to establish associations to UsagePointLocations.
UsagePoint	Metering	Logical point on a Distribution Network to which Meter Readings and/or End Device Events can be attributed. Used at the place where a physical or virtual meter may be located; however, it is not required that a Meter be present.
UsagePointConfig	Profile	Message used to establish associations to UsagePoints.
UsagePointGroup	Metering	Abstraction for management of group communications within a two-way AMR system or the data for a group of related usage points. Commands can be issued to all of the usage points that belong to a usage point group using a defined group address and the underlying AMR communication infrastructure.
UsagePointGroups	Profile	Message used to establish UsagePointGroups.
Vendor	PaymentMetering	The entity that owns PointOfSale and contracts with Cashier to receipt payments and vend tokens using the payment system. Vendor has a private contract with and is managed by Merchant who is a type of Organisation. Vendor is accountable to Merchant for revenue collected, who is in turn accountable to Supplier.
VendorShift	PaymentMetering	The operating shift for a vendor during which he may transact against the merchant's account. It aggregates transactions and receipts during the shift and periodically debits a merchant account. The totals in VendorShift should always = sum of totals aggregated in all cashier shifts that were open under the particular vendor shift.
NOTE The class definitions provided here are for convenience purposes only. The normative definitions are provided by the CIM.		

4.5.3 Classes related to meter reading and control

Table 4 lists those classes that are associated with meter reading and control classes but only the name of an instance is given within messages defined in this standard. The detailed attributes of these classes are used in message types defined in other parts of IEC 61968.

Table 4 – Classes related to meter reading and control

Related Class	Reference	Description
Organisation	Common	This class is used to identify companies or divisions within companies. Organisations might have roles as utilities, contractors, suppliers, manufacturers, etc.
PowerSystemResource	Core (IEC 61970-301)	An entity that describes the logical view of a component part of the utility business. PowerSystemResources are further classified as EquipmentContainers e.g. Substations, ConductingEquipment, ProtectionEquipment etc. Instances of type PowerSystemResource may be related to instances of type Asset.
PowerTransformer	Wires (IEC 61970-301)	An electrical device consisting of two or more coupled windings, with or without a magnetic core, for introducing mutual coupling between electric circuits. Transformers can be used to control voltage and phase shift (MW flow).

Related Class	Reference	Description
ServiceLocation	Customers	<p>A customer ServiceLocation has one or more UsagePoint(s). Meters are related to a UsagePoint. The location may be a point or a polygon depending on the specific circumstances</p> <p>For distribution, the ServiceLocation is typically the location of the utility customer's premise. Because a customer's premise may have one or more meters, the UsagePoint is used to define the actual conducting equipment that the EndDevice attaches to at the utility customer's ServiceLocation.</p> <p>For transmission, it is the point(s) of interconnection on the transmission provider's transmission system where capacity and/or energy transmitted by the transmission provider is made available to the receiving party.</p>
TransformerTank	Wires (IEC 61970-301)	A transformer winding.
<p>NOTE The class definitions provided here are for convenience purposes only. The normative definitions are provided by IEC 61968-11, which describes the distribution extensions to the IEC CIM.</p>		

5 Meter reading and control message types

5.1 General

The purpose of this Clause 5 is to describe the message types related to IEC 61968-9. It is important to note that some of these message types may also be used by other parts of IEC 61968. The general approach to the realization of message structures and XML schemas for IEC 61968 messages is described in IEC 61968-1 and IEC 61968-100.

Although they may be represented in sequence diagrams for context and completeness, this document does not describe message formats that are defined by other parts of IEC 61968. The message payload structures defined by this part of IEC 61968 are described in Clause 5.

The normative XML schemas for messages defined by this part are provided in Annex H, providing more detailed, annotated descriptions of the message structures. Annex I provides XML schemas that are currently informative. Message structures are diagrammed within Clause 5. The notation convention shows required elements with a solid outline, and optional elements with dashed outlines.

It is also important to note that the use cases and sequence diagrams provided in this standard are informative in nature, and are intended to provide examples of usage for the normative messages definitions. There is no intent by this standard to standardize specific business processes.

5.2 End device event messages

5.2.1 General

An event is a report of a change of state that may be of potential interest. End device event messages are designed as a means to convey changes in the state of an end device, either by the end device itself or by a proxy on behalf of an end device. End device events are viewed as a potential data stream which is not necessarily synchronized to the collection of meter reading for billing purposes. However, it may still be relevant to the billing process. A meter health alarm might be so severe that all readings from the meter have to be considered invalid. The data consumer (e.g. the MDM System) may receive the available relevant event data, and consider such during the validation, editing, and estimation process. It may also report event data to other enterprise systems and use the data to initiate actions such as creation of a MeterServiceRequest to repair or exchange a faulty meter.

5.2.2 Applications

5.2.2.1 General

This standard views “events” as being different than “statuses.” Most MR systems don't guarantee a timely delivery of an EndDeviceEvent. A “status” on the other hand is only useful if it is fresh. The status of an EndDevice is generally obtained using an “OnRequest” GetMeterReadings. The report of an EndDeviceEvent will eventually arrive to the utility back office and will be processed in turn. This implies that different applications will naturally fall into different types of message exchanges depending on both the underlying communication technology used by the MR system, as well as the need for having timely data. Some systems may have the ability to report an outage as an event. Other systems may treat it as a status. Most MR systems will report a change to meter health as an event, some may require it to be read as a status. Similarly most MR systems will report power quality as an event although some may treat it as a status.

5.2.2.2 Outage detection

When an outage is not due to a SCADA trip, electric utilities typically depend on the calls from the customers to identify the location of the fault. However, the use of a MS can provide another means to identify the location of trouble. It is often possible for a MS to determine that it has lost contact with a meter, in which case this can be reported as an EndDeviceEvent for potential use by an outage management system. It is important to note that loss of communications with a meter may not be sufficient to identify the existence of an outage, as it is common for some MS technologies to occasionally lose contact with meters for brief periods of time.

Some MS systems may be prone to false alarms as a result of the particular technology used to communicate with the meters. Many vendors are working to improve their technology and the accuracy of the data. The MDM, much like the role it sometimes plays in cleaning up metered data for billing applications, in many instances, can also play a role in cleaning up outage data supplied by the MS before it is relayed to the OMS. Such a decision, to route outage data through the MDM, depends on the capability of the MS to supply accurate data, the ability of the MDM to clean up data without introducing excessive delays, and the ability of the OMS to tolerate false alarms and delays. To support outage analysis and filtering of bad data, the MS may supply audit-trail data and quality of measurement data for the outage event, much like it supplies audit-trail data for billing reads. Figure 5 describes a deployment in which the MDM is employed to broker outage information.

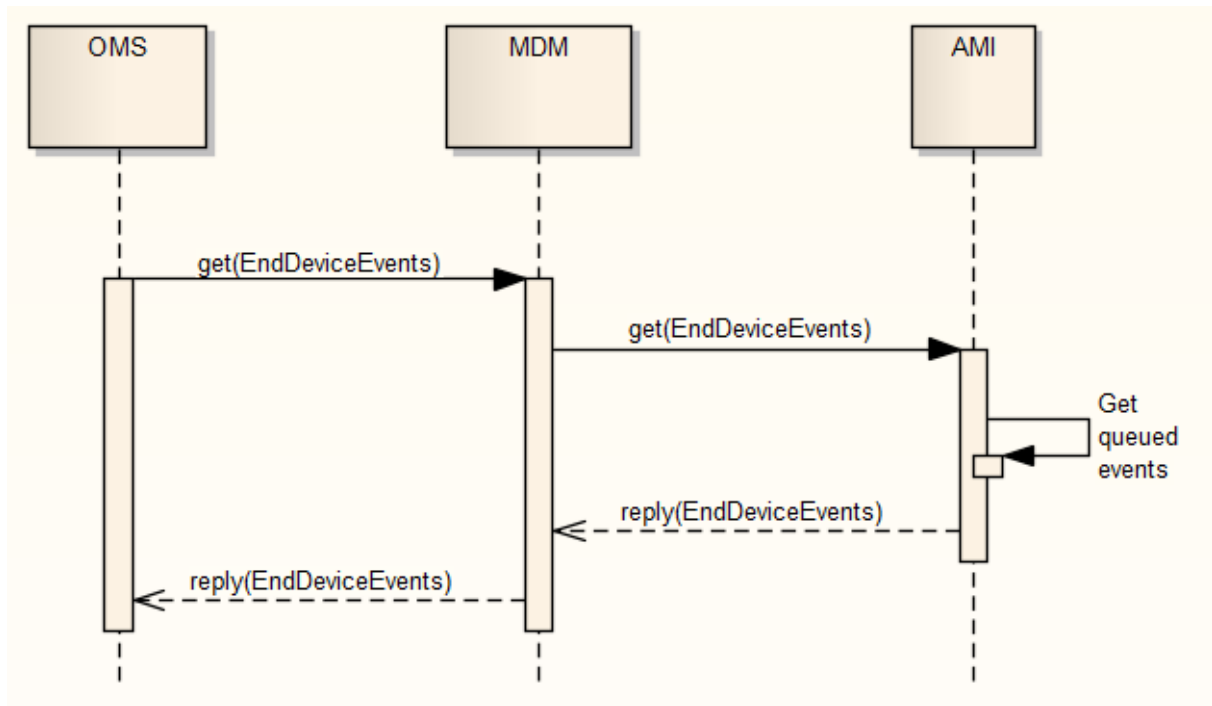


Figure 5 – Outage Detection, request/reply message exchange, example 1

Outage management systems analyze the circuit in terms of network topology. The `EndDeviceEventType` can indicate an event as detected by an end device for consideration in the analysis, as well as other information such as trouble tickets. Where an `EndDeviceEvent` can indicate a condition of interest that may in fact be an outage, an outage is usually the consequence of outage analysis within an OMS that will group potentially many events together within a single outage.

The use of an MDM to broker outage data is at the discretion of the utility. In some deployments, the outage detection request from the OMS may be issued directly to the MS as in the example of Figure 6.

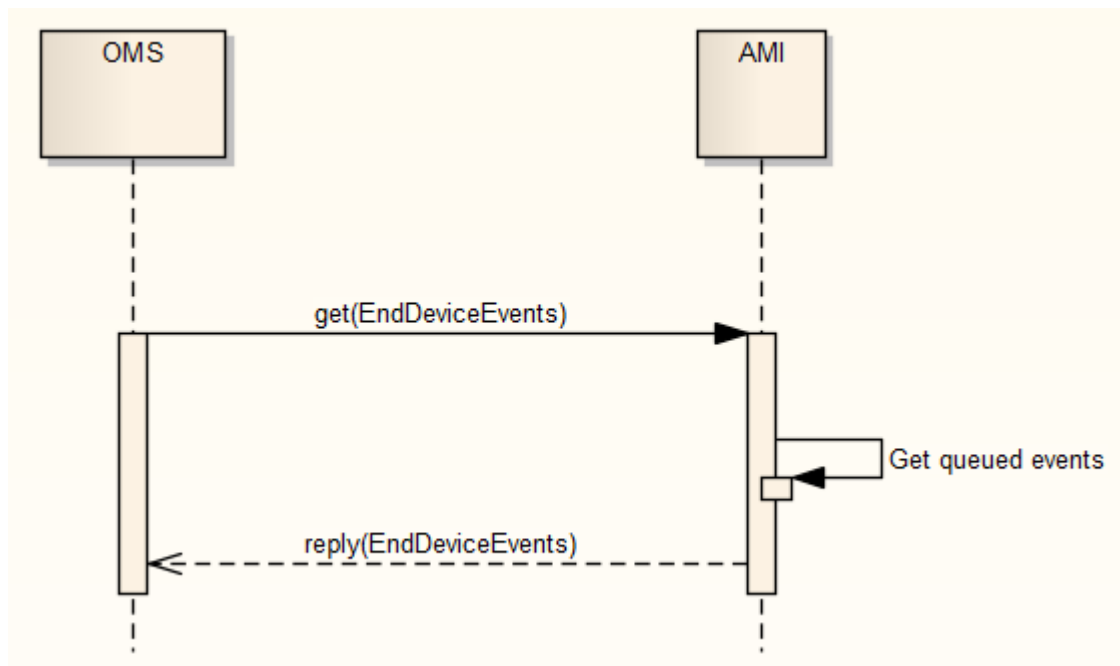


Figure 6 – Outage Detection, request / reply message exchange, Example 2

A reply (synchronous or asynchronous) from the MS will likely be in the form of zero or more EndDeviceEvents. The mRID or names structure will identify the end devices (e.g. meters) affected by the outage or restoration. Some data consumers that interact with the MS might only know how to deal with meter ID"s. Depending on the deployment, it may be required to limit the scope of exchanged mRID"s to that of meters ID"s using the Name class and not to that of power system resources in general. EndDeviceEvent.status can indicate "live" or "dead". Some metering systems may supplement the status information with collaborative evidence using the EndDeviceEventDetails class. EndDeviceEventType can be used to indicate that the status applies to a meter or power transformer. The reason for the event can be described (e.g. EndDeviceEvent.reason = "consecutiveFailCounter") and quantified (e.g. EndDeviceEvent.severity = "3").

While the request/reply exchange is useful whenever the OMS needs supplementary information, some MS are able to self-detect outages. A pub/sub exchange is ideal in these situations. Figure 7 shows such an exchange at a deployment where the MDM serves as an information broker. Figure 8 shows a deployment with information going directly from the MS to the OMS.

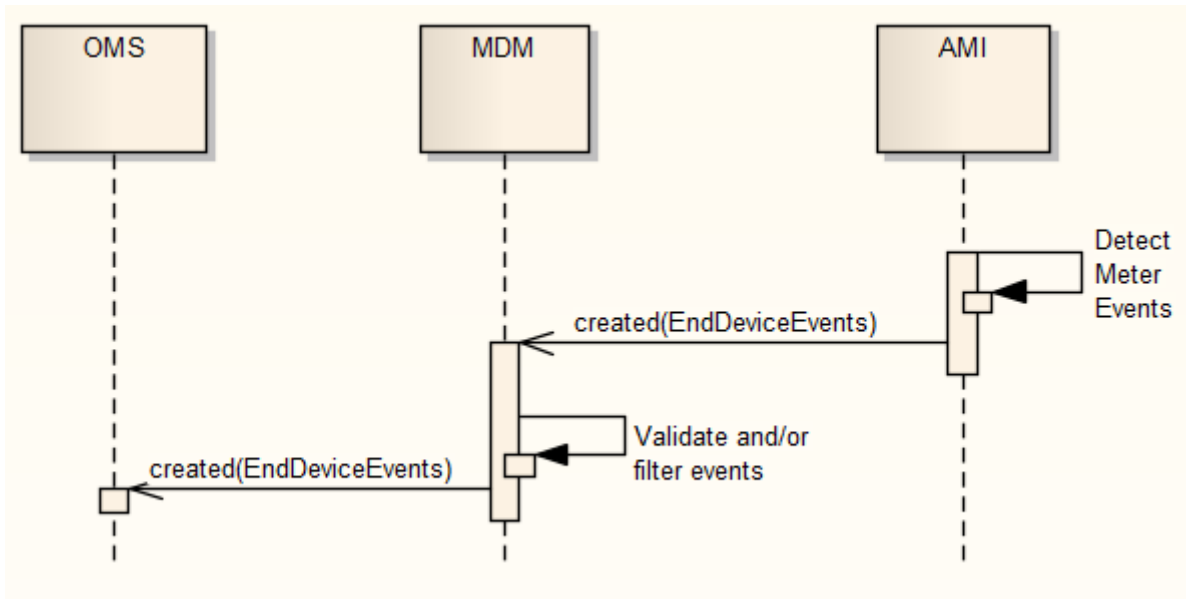


Figure 7 – Outage Detection, publish/subscribe exchange, Example 1

The following sequence diagram shows an example of event propagation without the use of an MDM.

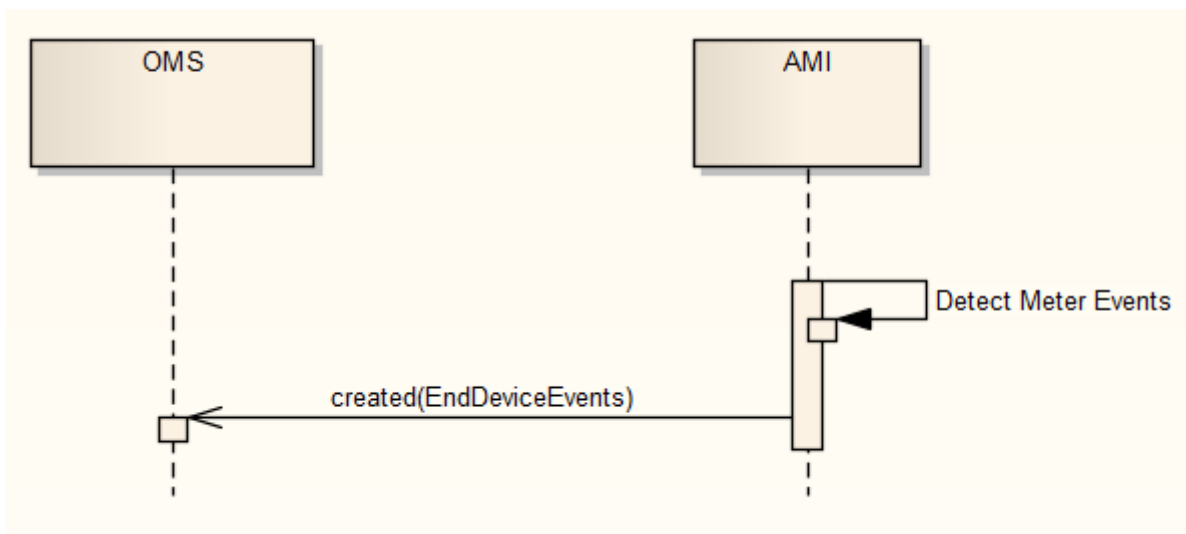


Figure 8 – Outage Detection, publish/subscribe exchange, Example 2

Some deployments may wish to limit the number of interfaces supported. The MeterReadings message structure also provides the means to convey EndDeviceEvents.

The preceding examples reflect the exchange of end device event messages to support outage management functions. As discussed previously, it is also frequently desirable to have an Outage Management System or MDM System make an on-demand read request to the Metering System to obtain the current energization status of a device. This is accomplished using a get(MeterReadings) exchange as described in 5.3. In such cases, the ReadingType (see Annex C) requested will indicate that it is the energization state that is being requested.

5.2.2.3 Meter Health Events

Some types of meters can sometimes generate meter health events, which can be used to identify issues with meter hardware, configuration or connection that should be resolved. The

alarms include such things as diagnostic alarms, tamper alarms, or other unusual conditions. The severity of the alarm might range from a simple notification to “fatal”. Often times, resolution of meter health events require a site visit, so typically they result in the creation of a MeterServiceRequest. Meter Health Events events are communicated using EndDeviceEvent messages.

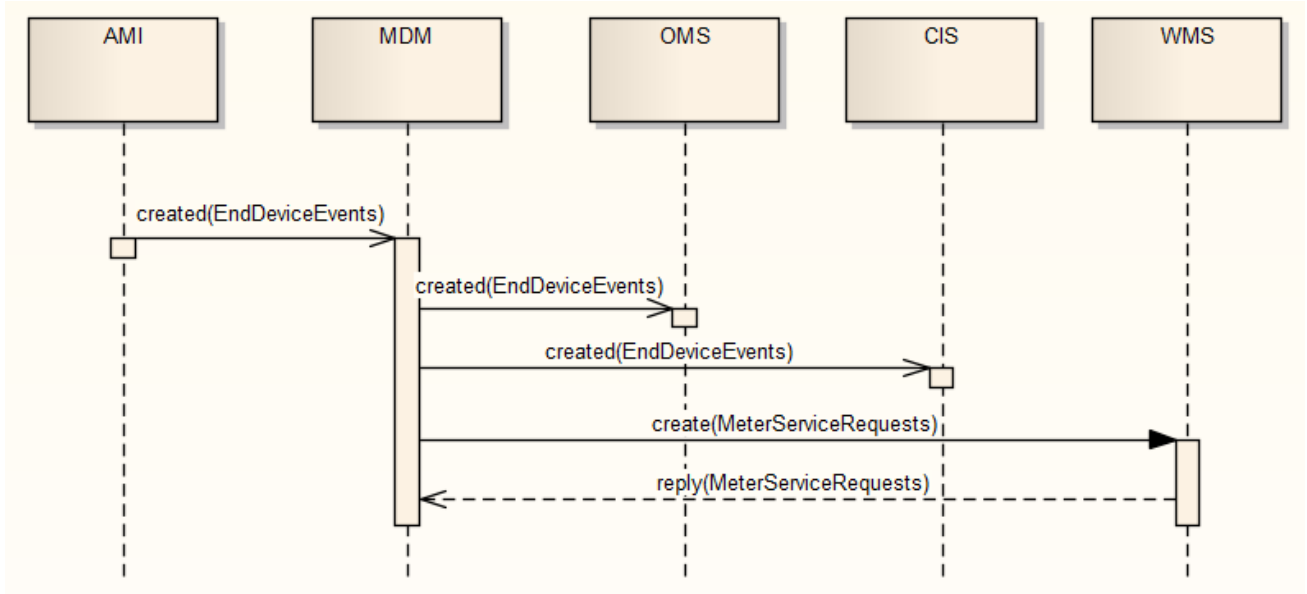


Figure 9 – Meter Health Event exchange, Example 1

In some deployments, the MDM will be present to broker meter health data for other stakeholders and potentially take action to initiate corrective actions as described in the scenario of Figure 9. Other installations however might not have an MDM or use it in this way. It is possible for the MS to publish data directly to the stakeholders that are equipped to receive it. Such an exchange is depicted in Figure 10.

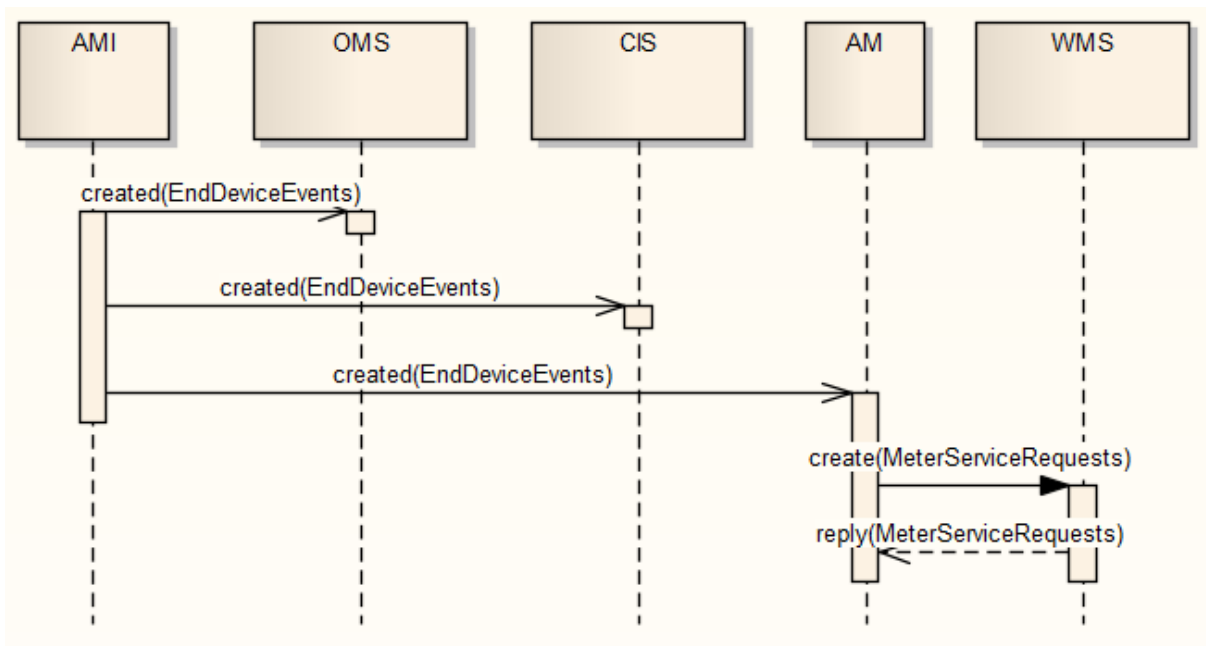


Figure 10 – Meter Health Event exchange, Example 2

5.2.2.4 Power Quality Event

Meters may collect information related to power quality, including but not limited to, momentary outage events, sustained outage events, low or high voltage events, and high distortion events. This information could be used for outage analysis, maintenance scheduling or capacity planning. Power quality events are a subtype of EndDeviceEvent.

Power quality events may be brokered (i.e. publications managed) by an MDM (as described in Figure 11), or sent directly to the various stakeholders (as described in Figure 12).

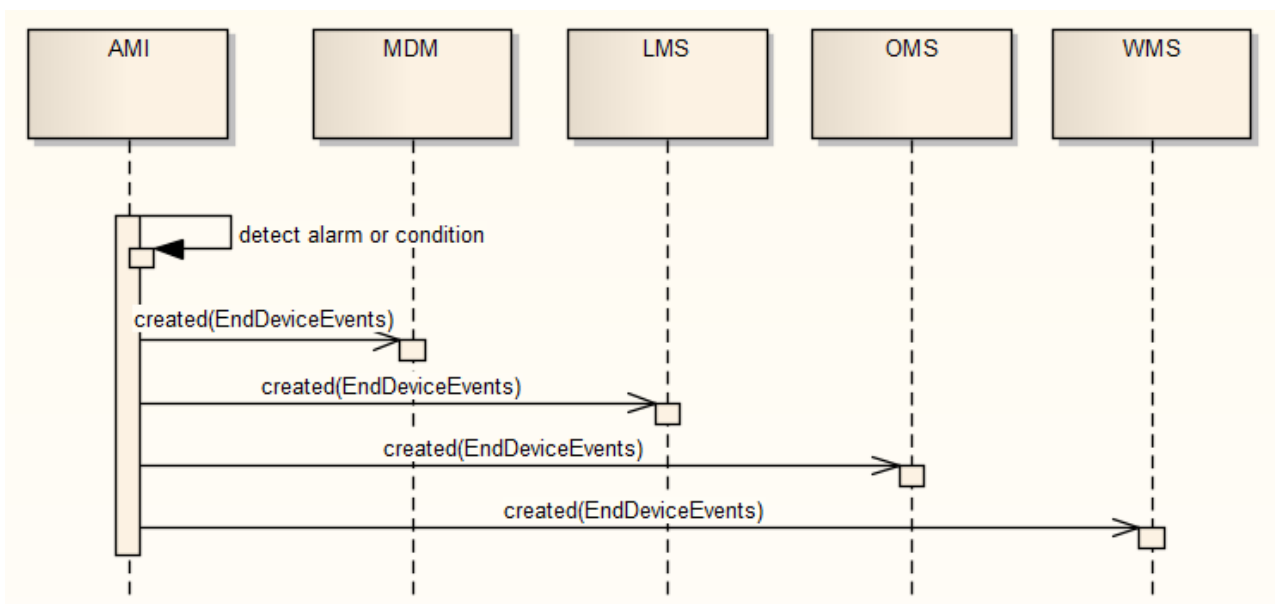


Figure 11 – Power quality event exchange, Example 1

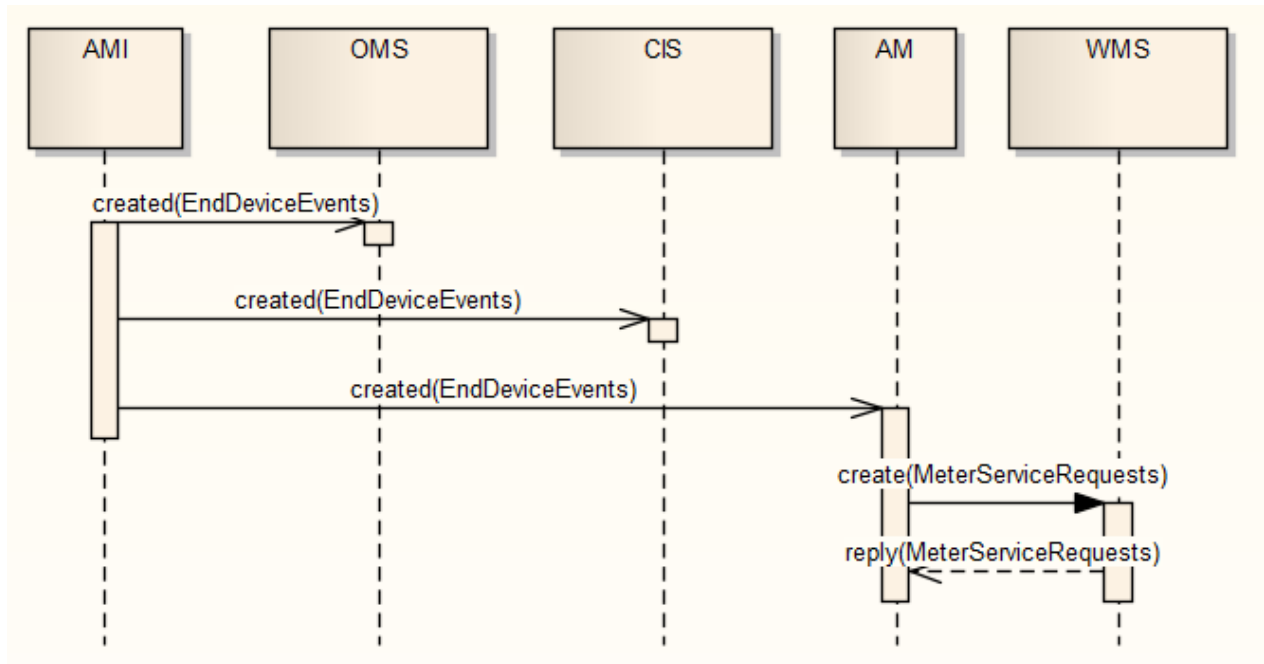


Figure 12 – Power quality event exchange, Example 2

5.2.3 Message format

Meter event messages are implemented using EndDeviceEvent structures in order to support a wider variety of event sources than just meters. The EndDeviceEvent.EndDeviceEventType (see Annex E) is a reference to an enumeration which indicates the type of event, such as outage detection, meter health, or power quality. The timestamp and mRID or a unique name of the end device are also required. The message format is described in Figure 13.

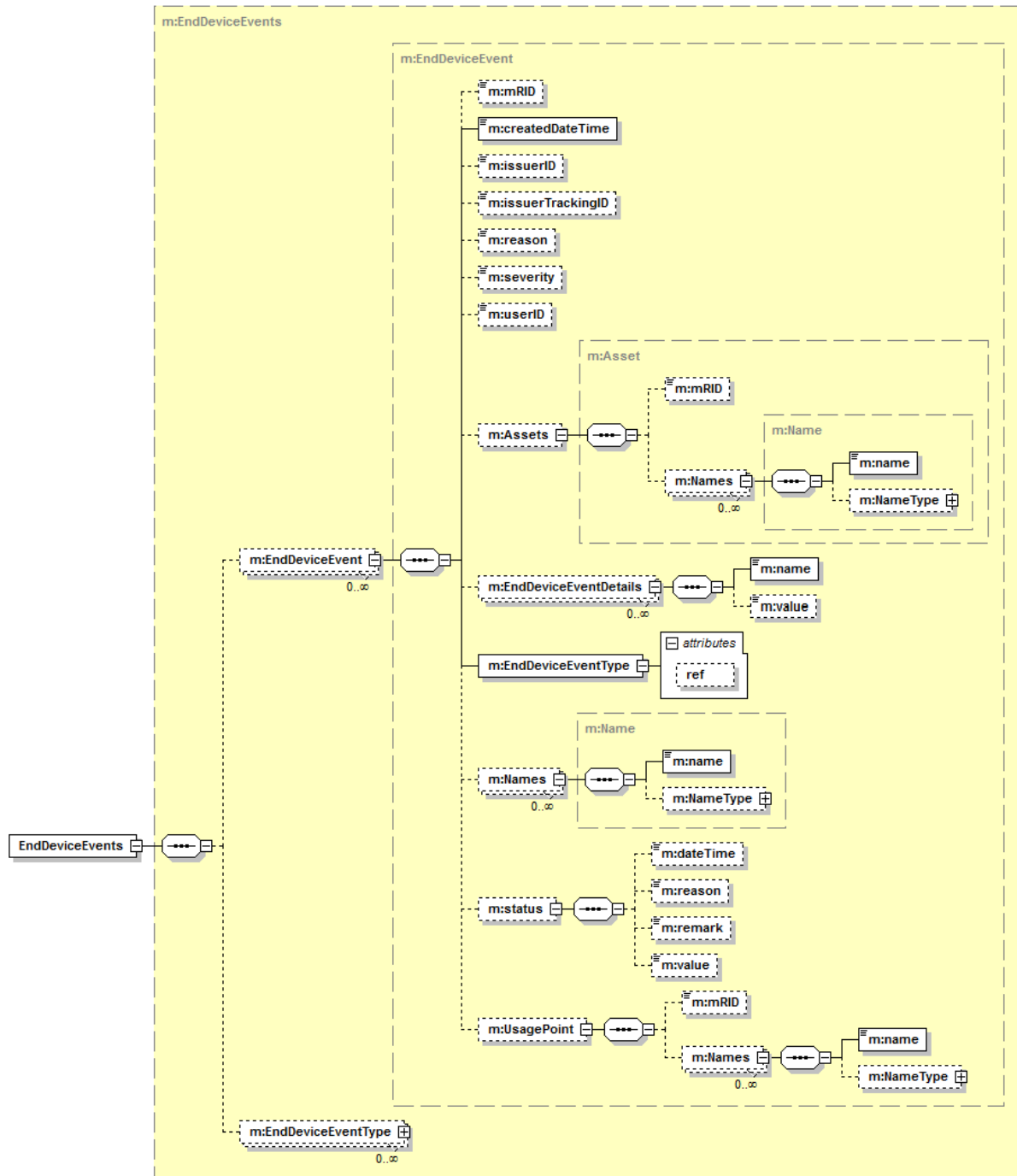


Figure 13 – End device event message format

As noted by Figure 13, only the timestamp and EndDeviceEventType elements are required, along with either an mRID or a unique name of the end device. The EndDeviceEventType element will allow different event types (e.g. meter health, outage detection, etc.) to be differentiated. Different event types would allow for an EndDeviceEvent message to convey events related (including but not limited) to:

- Sustained outage detection
- Momentary outage detection
- Low voltage threshold detection
- High voltage threshold detection

Distortion
Meter health
Tamper detection
Revenue event

The detailed XML schema is provided in Annex H. The following is an XML example for an EndDeviceEvent.

```
<?xml version="1.0" encoding="UTF-8"?> <end:EndDeviceEvents
xmlns:end="http://iec.ch/TC57/2011/EndDeviceEvents#"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <end:EndDeviceEvent>
    <end:createdDateTime>2011-11-10T21:54:53.404+01:00</end:createdDateTime>
    <end:issuerID>External System 1</end:issuerID>
    <end:issuerTrackingID>123</end:issuerTrackingID>
    <end:severity>5</end:severity>
    <end:Assets>
      <end:mRID>01f8b2e5-a677-4f2c-a6c0-1e79b409c55e</end:mRID>
      <end:Names>
        <end:name>Meter 123</end:name>
        <end:NameType>
          <end:name>Meter Name</end:name>
          <end:NameTypeAuthority>
            <end:name>Utility ABC</end:name>
          </end:NameTypeAuthority>
        </end:NameType>
      </end:Names>
    </end:Assets>
    <end:EndDeviceEventType ref="3.12.0.257"/>
  </end:EndDeviceEvent>
</end:EndDeviceEvents>
```

The EndDeviceEvent is logically generated by an EndDevice and/or a UsagePoint, either of which can be identified by mRID and/or Name. As in IEC 61968-9:2009, an EndDeviceEvent is associated with an Asset, where typically this will be an EndDevice.

5.3 Meter reading messages

5.3.1 General

Meter readings messages are designed to allow data collected by or calculated on behalf of a meter to be conveyed. This may include measured quantities, calculated quantities, state information or collected history. Whenever a “measurement” is required from an end device, a MeterReading exchange is quite likely the appropriate tool for the job. The end device may have metrology capability, and if so, is most likely called a “meter.” But there are other potential applications for MeterReading. If a data consumer wishes to measure the position of the switch on a connect/disconnect switch, this can be done as a MeterReading exchange. If a data consumer wishes to measure the “energisation” status of the end device, this can be done with a MeterReading exchange or alternatively, with an EndDeviceEvent exchange as described in 5.2.

5.3.2 Applications

5.3.2.1 Periodic meter reads

It is necessary to periodically gather meter readings from a MS for billing through the customer billing system. The request for meter reading should specify a meter or group of meters, a type of reading to collect, and a frequency and duration of interest. The scheduled frequency may consist of regular or irregular periods.

The MeterReadSchedule request may be initiated to the MS from any of the following:

- the CIS (in an effort to collect billing determinants);

- a planning and scheduling application (in an effort to acquire engineering data about the distribution network);
- an OMS (to establish a stream of status information);
- a meter data management system (in an effort to broker data for any or all of the above applications);
- the MS itself may also self-initiate a MeterReadSchedule.

An example for one such exchange (this one using an MDM) is shown in Figure 14.

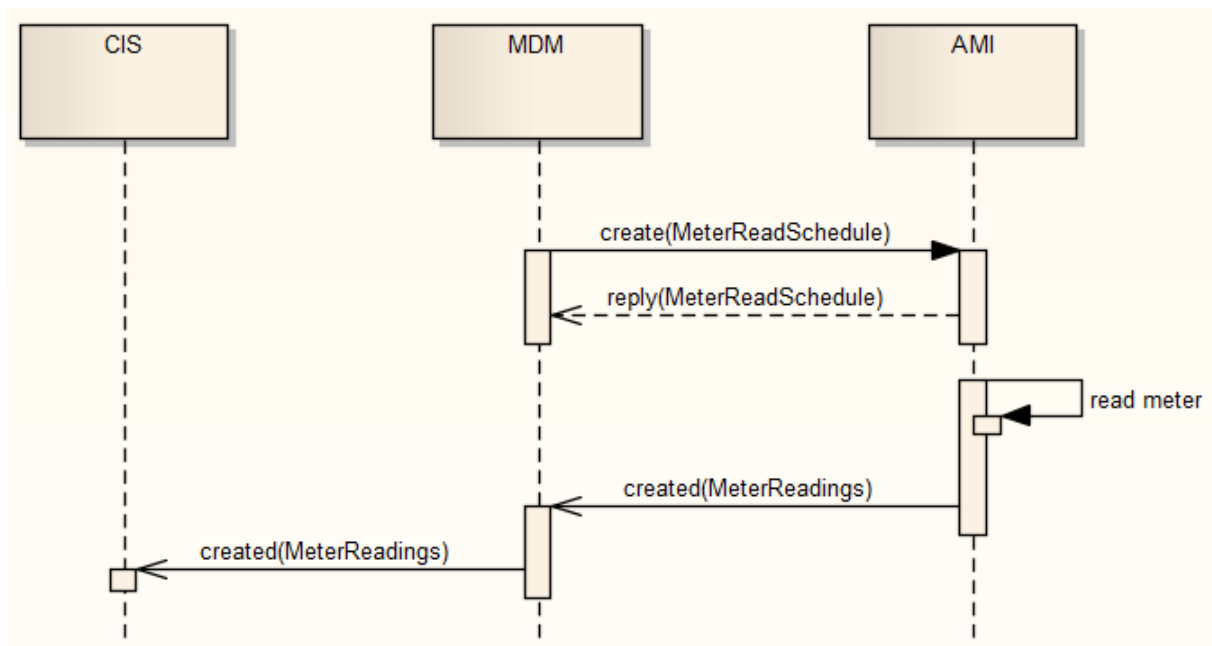


Figure 14 – Example use of meter read schedule to create subscription

Some metering systems may have the ability to decouple MeterReading collection from MeterReading reporting. For Metering Systems without this capability, readings may be reported immediately upon collection. In the MeterReadSchedule request, MeterReadings may be requested using a variety of parameters, including:

- Specific meter, using the EndDevice mRID or Names.name (see Annex G for discussion of the Names class)
- EndDeviceGroups, where a EndDeviceGroup identifies a group address used within the Metering System
- UsagePoint where a meter is located, using UsagePoint mRID or Names.name
- UsagePointGroups, where UsagePointGroup identifies a groupAddress used within the Metering System
- As specified using a TimeSchedule
- ReadingTypes can be specified to identify the desired reading types

5.3.2.2 Manual meter reading

Meter readings can be obtained manually by a meter reader. Data collected may be maintained by the meter data manager. Meters may collect a number of different measurement types. Some types of meters may measure more than one phase, or may collect values for non-electrical measurements, such as water or gas.

A meter reader may input data shown on the panel of meter into a handheld device, which could be regarded as a metering system. Data input may occur several hundred times per

day. A meter reader may present an account of the read to the customer. Note that this account is not an invoice. Billing would be generated normally by the CIS even in the manual reading case. Figure 15 shows such an exchange.

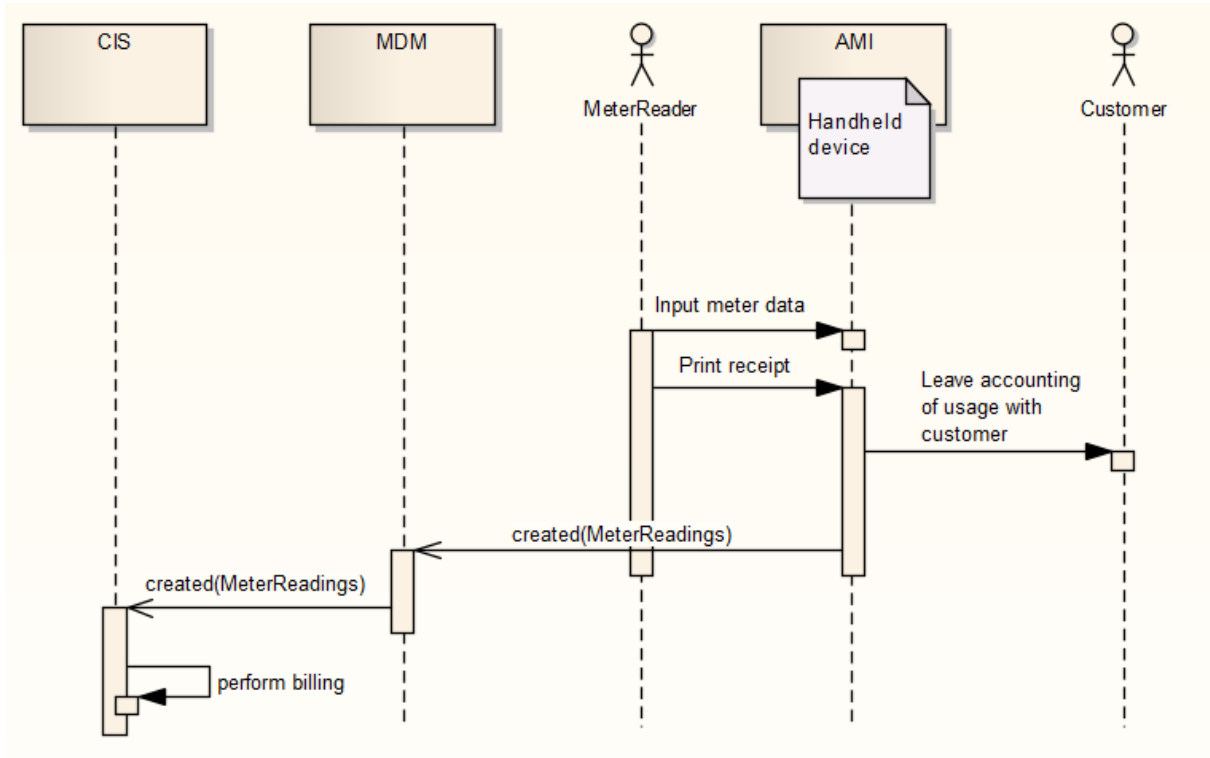


Figure 15 – Example manual meter reading exchange

At the end of the day of work, all data stored in the handheld device is sent to the MDM via a communication network. The MDM publishes a message to the CIS informing of the creation of MeterReading.

Schedules for walking a manual meter reading route are decided well in advance of performing the work.

5.3.2.3 On-Request meter read

Meter read requests are issued to a MS in order to obtain meter readings on a per request basis. The MS will send a request to the desired meters. These can be used for billing inquiries, outage extent verification, verification of restoration and other business purposes..

Many utilities have a policy of routing all revenue readings through the MDM so that all data will receive the same level of validation. However, not all MDM systems are able to offer validation services for outage data. For those that do, the utility shall weigh the value of MDM validation over the time delay it may introduce, as well as the ability of the particular OMS solution to reject incongruent data. For this reason, the example diagram shows revenue readings routed through the MDM, but outage data routed around it.

It is important to note that not all metering systems support ""on request" readings. For those that do, the implementation can also vary significantly.

On-request reads may be initiated to the MS from systems such as any of the following:

- The CIS (in an effort to collect billing determinants).

- A Planning and Scheduling application (in an effort to acquire engineering data about the distribution network).
- An OMS (in order to verify if a customer is affected by an outage or has been restored)
- A meter data management system (in an effort to broker data for any or all of the above applications).
- The MS itself may also directly initiate a meter read.

An example for one such exchange (this one using an MDM) is shown in Figure 16.

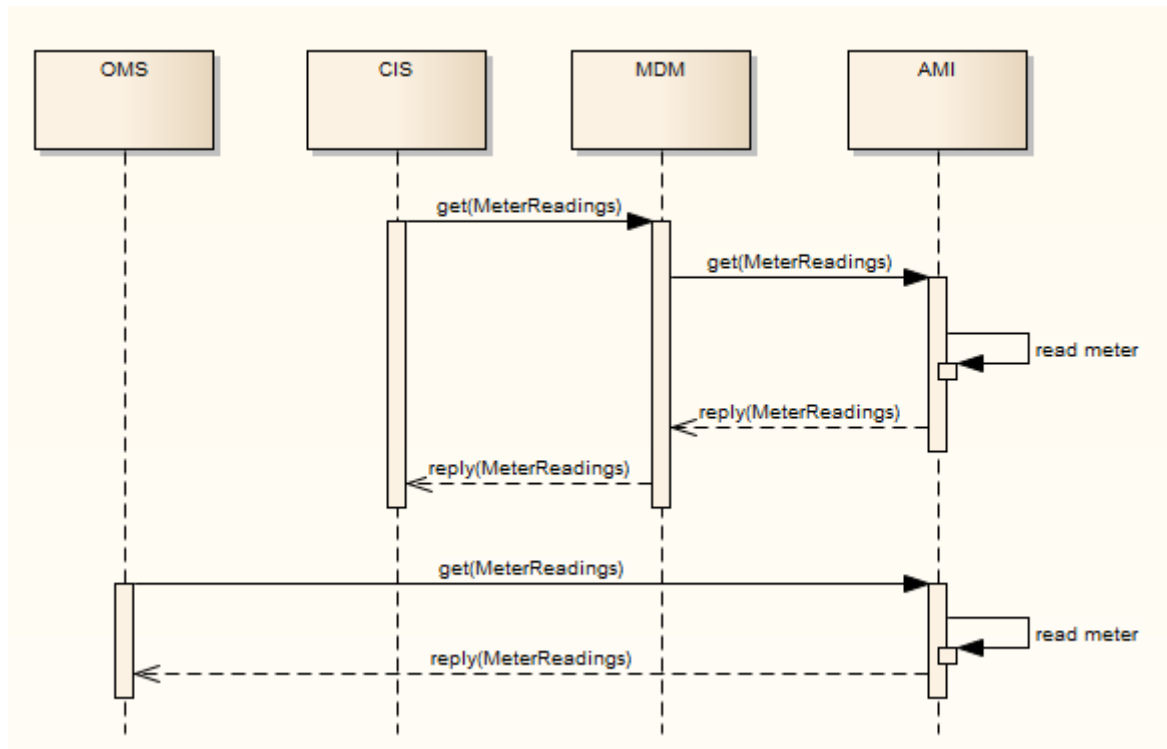


Figure 16 – Example On-Request meter read

5.3.2.4 Historical meter data access

A distribution network planner may use historical meter reading values as load information for capacity planning purposes. (See the request/reply example in Figure 17). This would permit usage to be aggregated to determine loads for a transformer or feeder.

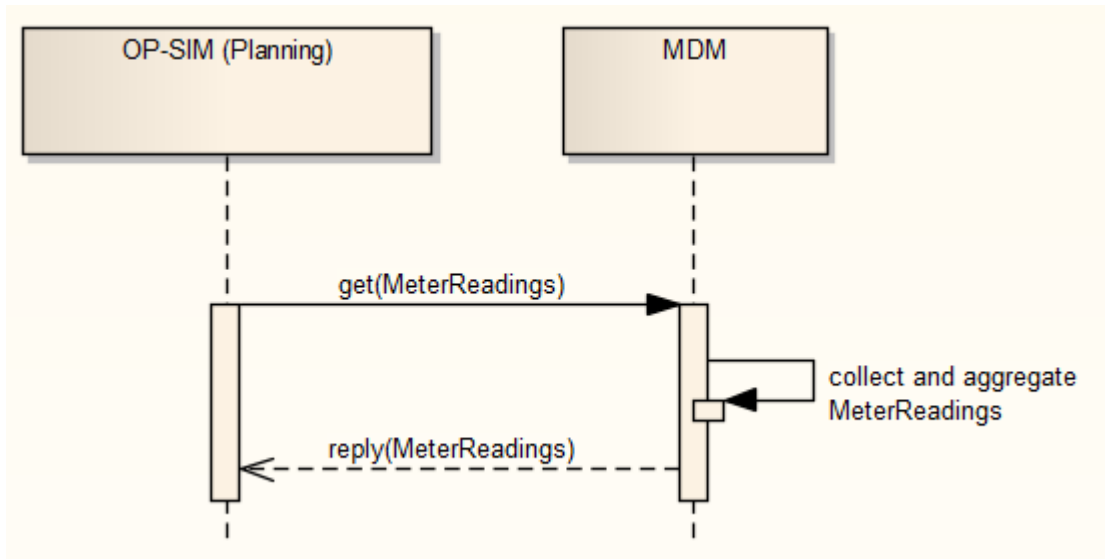


Figure 17 – Historical MeterData exchange

It is important to note the use of request parameters to qualify requests for meter data, filtering the results to obtain data for specific meters within specific timeframes.

5.3.2.5 Billing inquiry

A customer or an internal source may identify a customer billing issue. A meter read request in combination with historical meter reads may be used to resolve the billing issue. The top of Figure 18 shows an inquiry being satisfied by data which recently arrived, while later on in the day an inquiry is made which requires a fresh reading from the meter.

In some cases the desired data may be accessible from the MDM. In other cases, it may be necessary to issue a read request remotely through the MS, or manually through a meter service request.

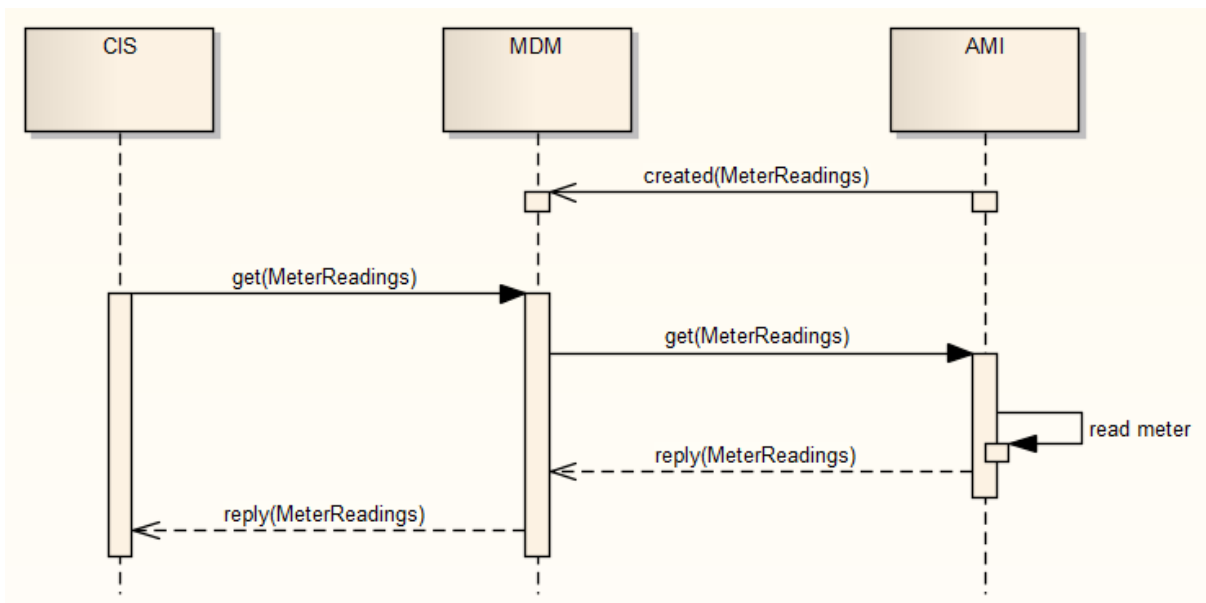


Figure 18 – Example billing inquiry message exchange

5.3.3 Message formats

The detailed XML schema for messages are described in Annex H. Figure 19 shows the message format used to present meter readings from one or more end devices.

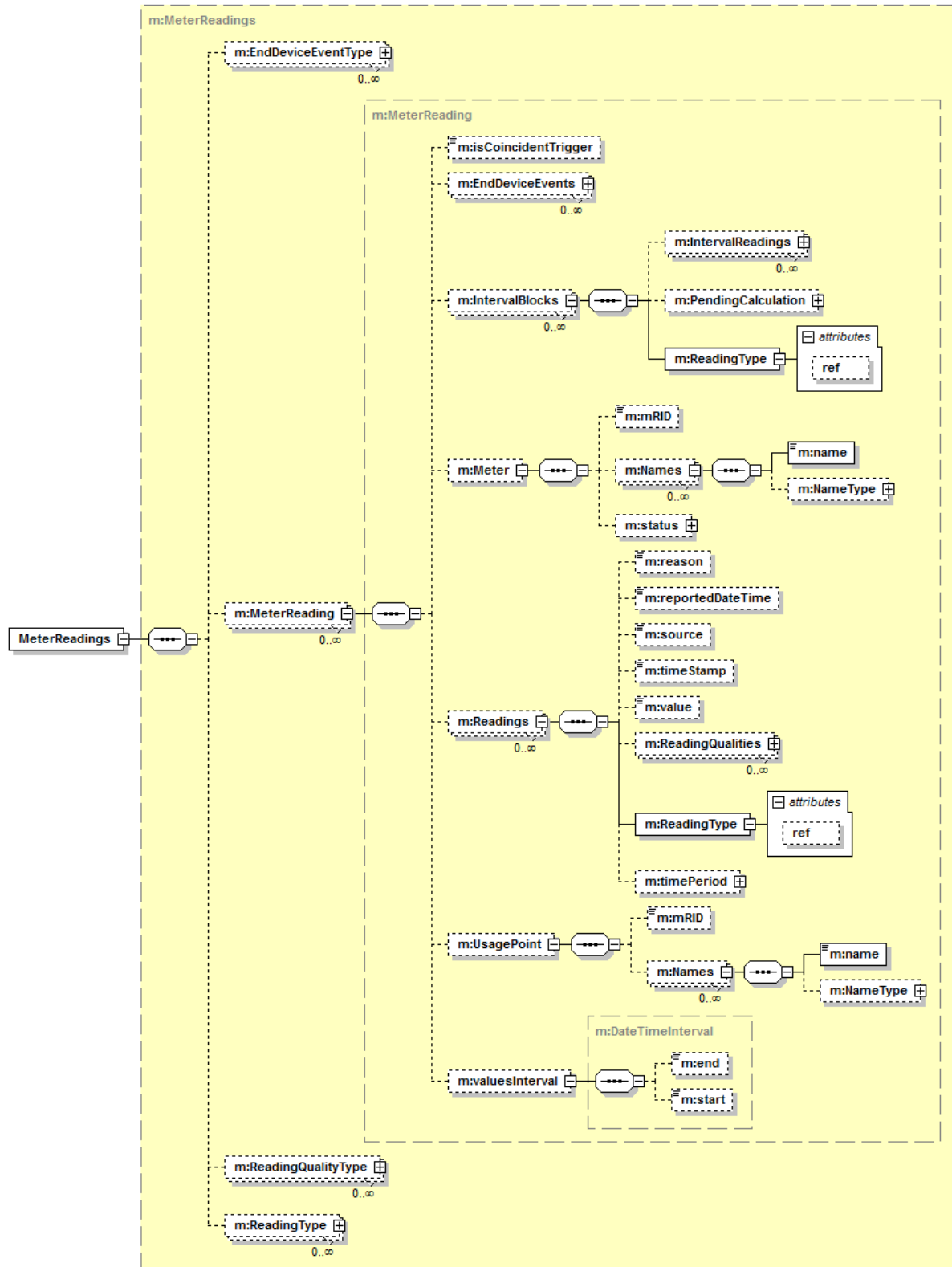


Figure 19 – Meter readings message format

The MeterReadings message structure allows for:

- readings from one or more meters
- reading values each have an associated reading type, timestamp and value
- many quality values can be associated with each reading value.
- readings can be supplied in the form of interval blocks, where readings of a common reading type are grouped together
- event histories can be returned with meter readings

Figure 20 shows the details of the structure used to convey Readings, where each Reading identifies a specific ReadingType (by reference), value and optional quality codes. The time Stamp is used to identify when the reading was captured. The timePeriod can be used to identify a specific time interval. The optional reportedDateTime can be used to identify when the reading was actually reported. The ReadingType is used to identify the meaning of the reading, data type of the value and the meaning of the different time values.

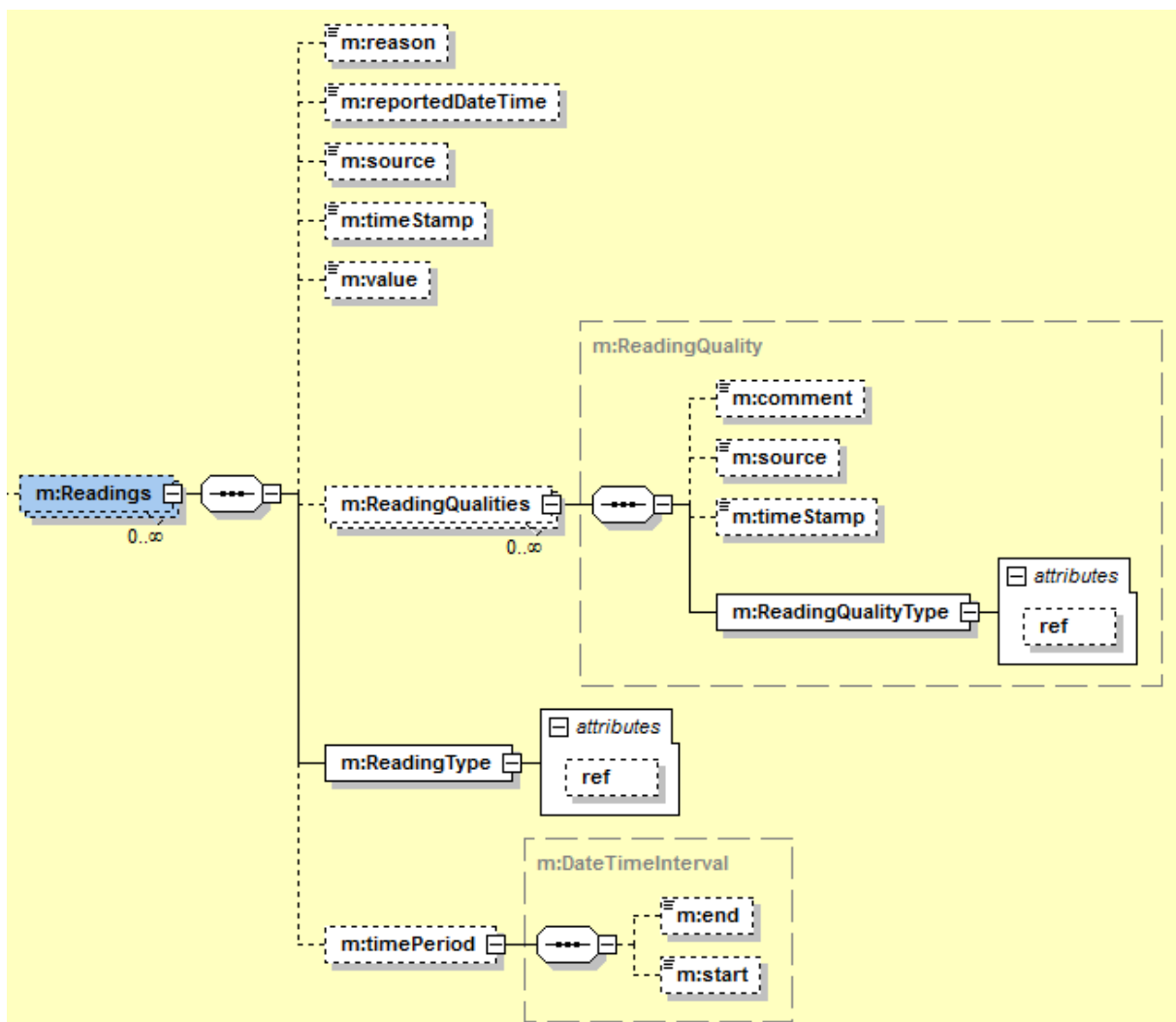


Figure 20 – Reading structure

Within a reading, the time Stamp and timePeriod attributes can be used to identify time-related aspects of the reading, with specific usage based upon reading type, where details are described in Annex C as needed. The following examples illustrate the general conventions for the use of time Stamp and timePeriod.

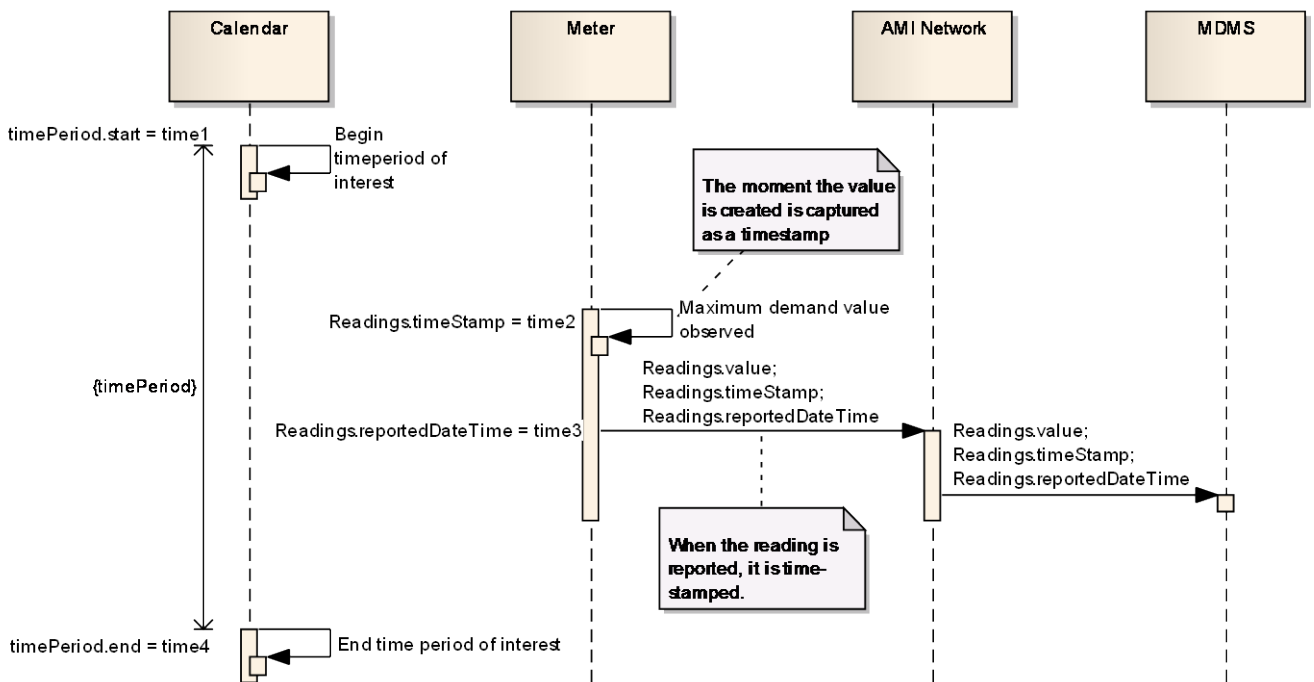


Figure 21 – Timestamps assigned between systems

Figure 21 shows the way that timestamps are assigned as values are created and passed between systems. From the perspective of the CIS and MDMS, there exists a “timePeriod” of interest for (perhaps) a billing period. A “get” request might specify this time range, and the AMI or MDMS would “reply” with readings that fall within this range. Important points in time regarding the generation and reporting of the value are also timestamped. All of these timestamps are found within the meterReadings schema. Another view of the same example (with real dates and times) is expressed below in Figure 22.

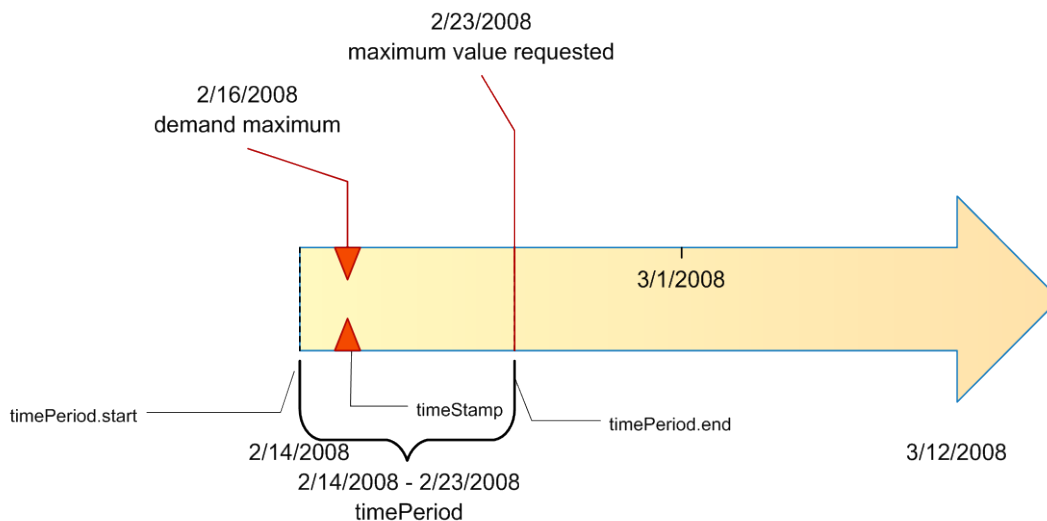


Figure 22 – Conventions for timeStamp and timePeriod

The IntervalBlock structure allows for a set of reading to be grouped by a common ReadingType and as a convenience for representation of a time series.

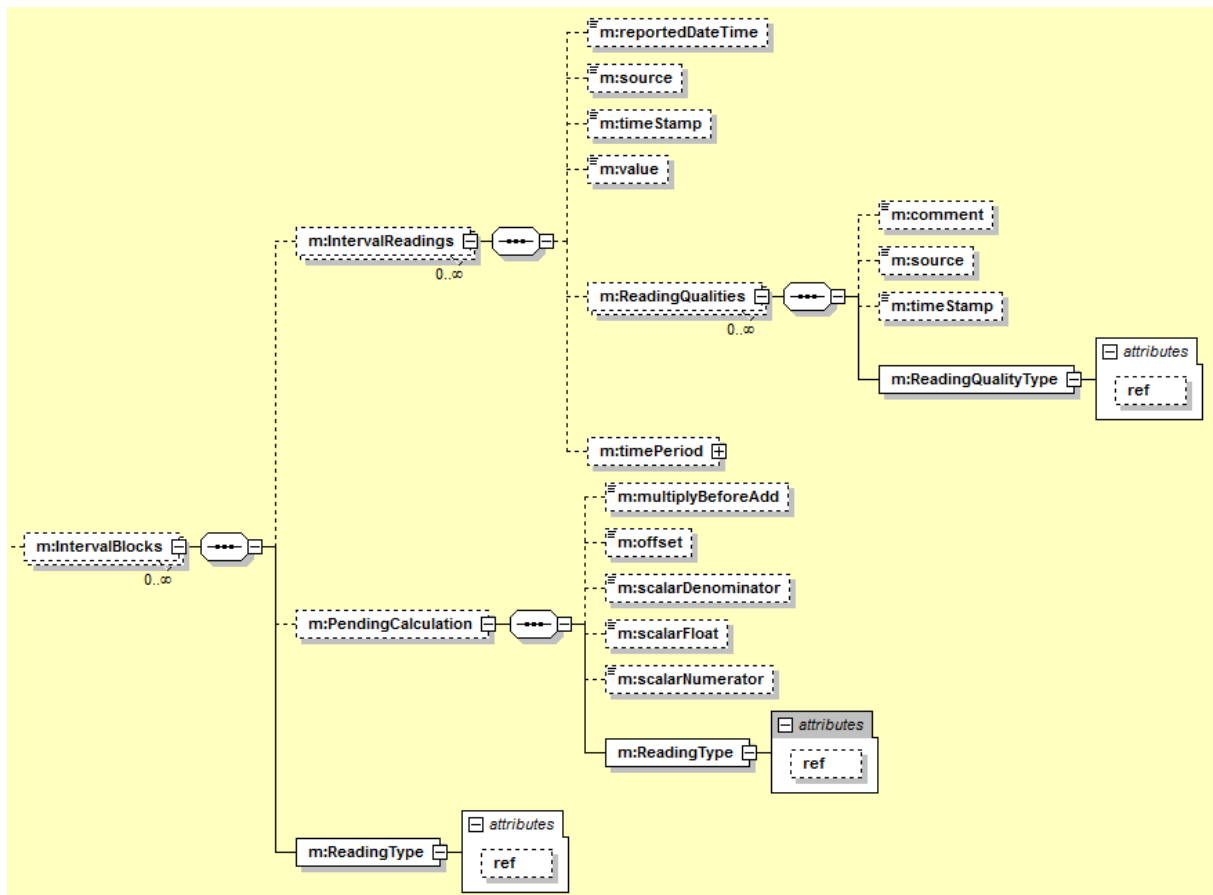


Figure 23 – IntervalBlock structure

The following diagram shows the convention for use of a timeStamp for interval data where an associated reading type identifies that the reading value is for a specified interval.

Different MR systems work in different ways, but for the purpose of the standard, timestamps denote the end of the interval. The implied generation process is described below in Figure 24.

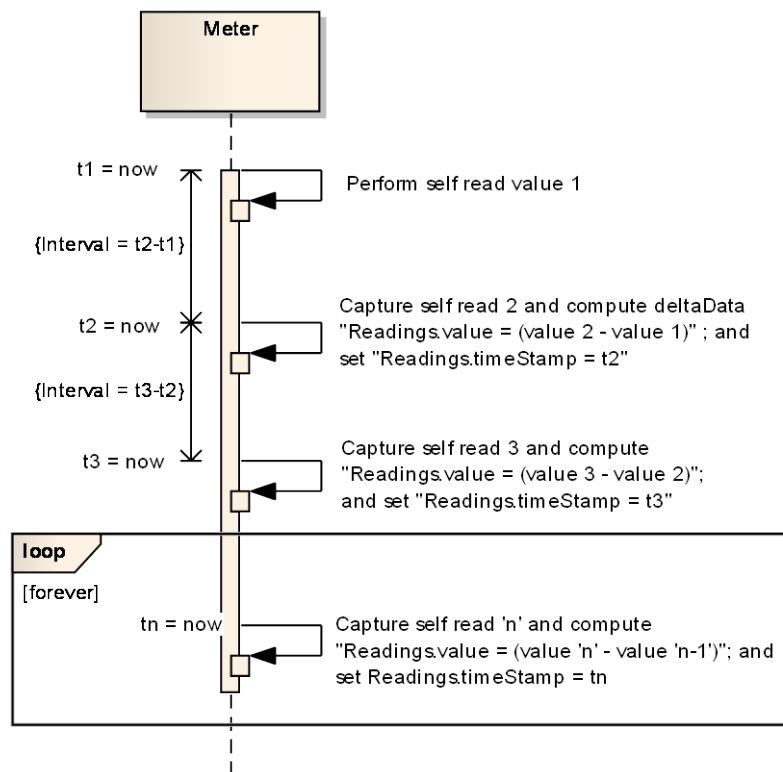


Figure 24 – Interval data timestamp generation

When a timestamp is used, it shall fall within a time range from 00:00:00 to 23:59:59 as depicted in Figure 25. A value of 23:59:59 plus 1 s places the time at midnight which is the start of the next day.

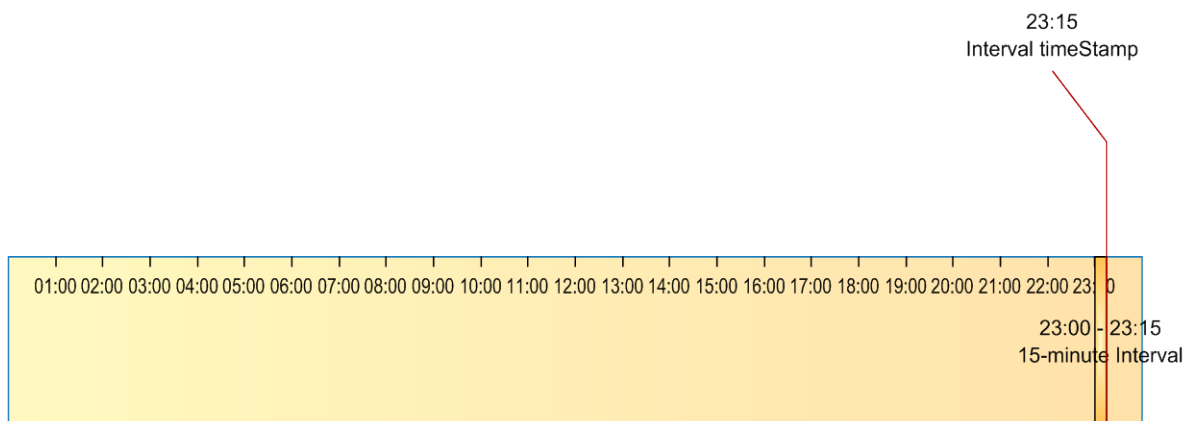


Figure 25 – Time interval conventions

Note that as defined by ISO 8601, the time 24:00 of the current day is the same as 00:00 for the next day. A day starts and ends at 00:00. It is important to note that interval data can be conveyed using IntervalBlocks with IntervalReadings or simply using Readings. IntervalBlocks shall be used in cases where the PendingCalculation elements are needed, otherwise they simply allow for a reduced XML footprint over Readings, which may be important in some situations.

Key to the reporting of a value from a meter is the reading type. The ReadingType class in the CIM is defined to allow capture of the following information as related to the description of a reading type, as is more thoroughly defined in Annex C.

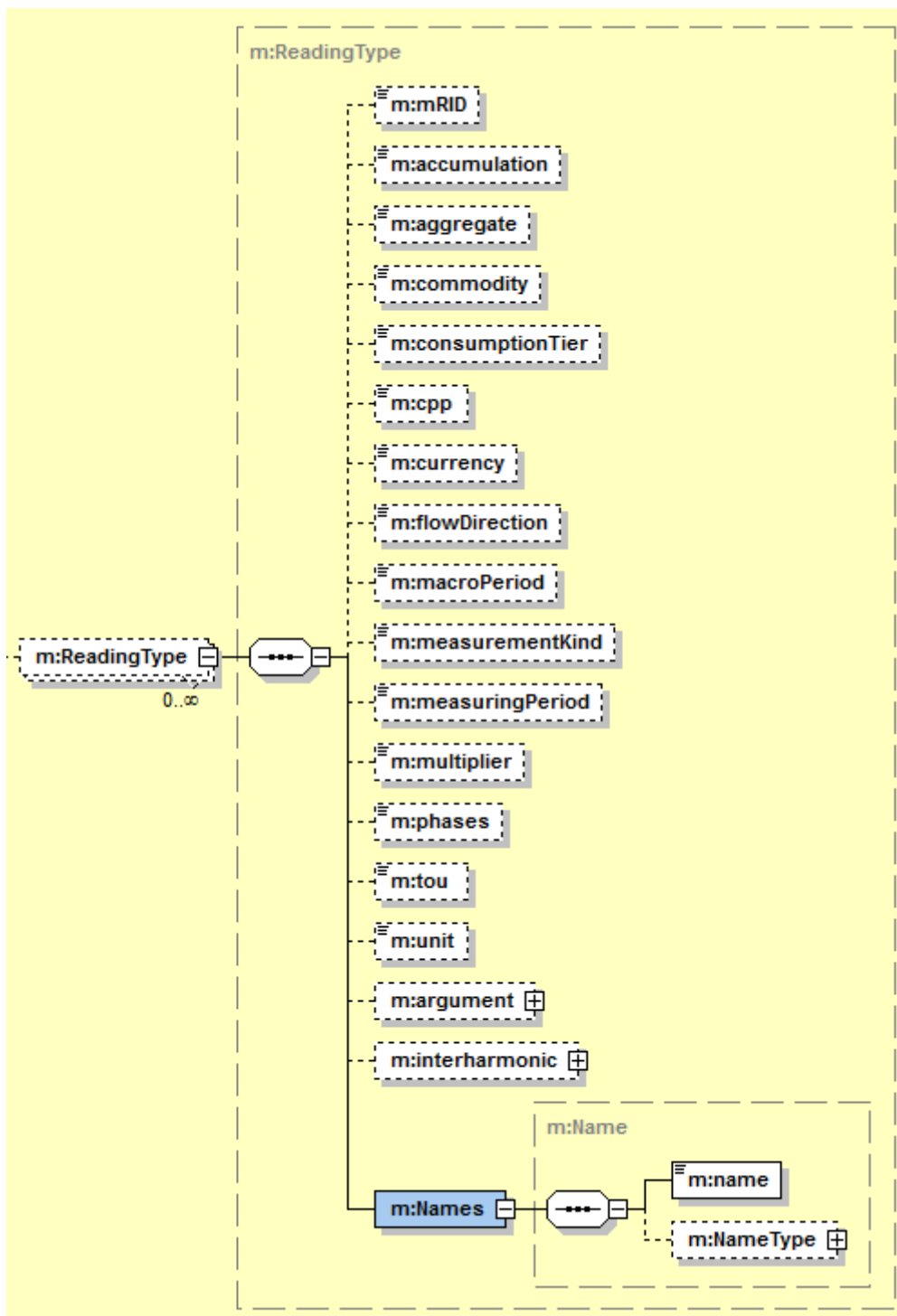


Figure 26 – ReadingType structure

While the ReadingType structure is present in the MeterReadings message, it should be expected that in normal practice it will not be populated, as it is anticipated that the consuming system will already be configured with the appropriate ReadingType definitions. The details of this and other classes specific to metering are described in the Metering package of the CIM. A more thorough discussion of reading types is provided in Annex C.

Readings are not limited to metering devices. Any EndDevice may potentially produce a measurement. In this edition of IEC 61968-9, the asset producing the reading shall be identified using the Meter class, even though the device may not be a meter. It is expected that all assets have a unique mRID or Names.name so that meters can be distinguished from remote connect/disconnect switches, and from other devices. It is expected that the future edition of IEC 61968-9 will provide a more explicit method of dealing with readings from devices other than Meters.

Interval data has unique timestamp requirements. The extended capabilities of ISO 8601 provide the means to specify both a formal interval length (as an ISO 8601 “period” of time), as well as a fixed reference point.

The following XML provides some XML example payloads of MeterReadings messages.

```
<?xml version="1.0" encoding="UTF-8"?>
<mr:MeterReadings xmlns:mr = "http://iec.ch/TC57/2011/MeterReadings#">
  <mr:MeterReading>
    <mr:Meter>
      <mr:Names>
        <mr:name>63.89.98.184</mr:name>
        <mr:NameType>
          <mr:description>This is an endpoint serial number</mr:description>
          <mr:name>EndpointID</mr:name>
          <mr:NameTypeAuthority>
            <mr:description>AssetManagementSystem</mr:description>
            <mr:name>com.company.assets</mr:name>
          </mr:NameTypeAuthority>
        </mr:NameType>
      </mr:Names>
    </mr:Meter>
    <mr:Readings>
      <mr:timeStamp>2011-12-05T17:21:40.628Z</mr:timeStamp>
      <mr:value>25.633</mr:value>
      <mr:ReadingType ref = "0.0.0.1.4.1.12.0.0.0.0.0.0.0.3.72.0"/>
    </mr:Readings>
    <mr:Readings>
      <mr:timeStamp>2011-12-05T17:21:40.628Z</mr:timeStamp>
      <mr:value>10.0</mr:value>
      <mr:ReadingType ref = "0.0.0.12.1.1.37.0.0.0.0.0.0.0.3.38.0"/>
    </mr:Readings>
  </mr:MeterReading>
</mr:MeterReadings>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<mr:MeterReadings xmlns:mr = "http://iec.ch/TC57/2011/MeterReadings#">
  <mr:MeterReading>
    <mr:Meter>
      <mr:Names>
        <mr:name>63.89.98.184</mr:name>
        <mr:NameType>
          <mr:description>This is an endpoint serial number</mr:description>
          <mr:name>EndpointID</mr:name>
          <mr:NameTypeAuthority>
            <mr:description>AssetManagementSystem</mr:description>
            <mr:name>com.company.assets</mr:name>
          </mr:NameTypeAuthority>
        </mr:NameType>
      </mr:Names>
    </mr:Meter>
    <mr:IntervalBlocks>
      <mr:IntervalReadings>
        <mr:reportedDateTime>2001-12-17T09:30:47Z</mr:reportedDateTime>
        <mr:timeStamp>2001-12-17T09:30:47Z</mr:timeStamp>
        <mr:value>25.44</mr:value>
        <mr:timePeriod>
          <mr:end>2001-12-17T09:30:47Z</mr:end>
          <mr:start>2001-12-17T09:30:47Z</mr:start>
        </mr:timePeriod>
      </mr:IntervalReadings>
      <mr:ReadingType ref = "0.0.2.4.1.1.12.0.0.0.0.0.0.0.3.72.0"/>
    </mr:IntervalBlocks>
```

```
<mr:Readings>
  <mr:timeStamp>2001-12-17T09:30:47Z</mr:timeStamp>
  <mr:value>10.0</mr:value>
  <mr:ReadingType ref = "0.0.0.12.1.1.37.0.0.0.0.0.0.0.0.0.3.38.0"/>
</mr:Readings>
</mr:MeterReading>
</mr:MeterReadings>
```

The concept of “coincident readings” deserves some attention. A coincident reading is a MeterReading that occurs at the same point in time as some other MeterReading or EndDeviceEvent.

Some meters have the ability to report a reading that was coincident with a certain other MeterReading or EndDeviceEvent (hereinafter referred to in IEC 61968-9 as the “trigger”). For example, it might record the “power factor coincident with the billing period maximum demand.

Additionally, some processes call for a coincident read to be reported. For example, when a meter is installed, it is common to capture an “initial reading.” Similarly, when a meter is disconnected, it is common practice to capture a “final read” coincident with the disconnection event.

Some systems may perform analysis of the data in storage to identify analytically derived coincident readings. For example:

- the voltage at UsagePoint A at the time of the peak daily demand on the distribution transformer (UsagePointB) that serves UsagePoint A. (UsagePoint “B” could be either a real or a virtual UsagePoint.)
- the 15-minute interval consumption at UsagePoint A at the time of the peak demand on a distribution network (UsagePoint C) on a hot, summer day
- a BulkQuantity kwh reading for a UsagePoint at the time of an EndDeviceEvent such as a meter disconnect.

The MeterReading class has an optional Boolean element called “isCoincidentTrigger.” The element doesn’t have to be used in a message, but if it is, there are rules for its interpretation. If any instance of a MeterReading message is marked with the isCoincidentTrigger Boolean set to “true”, then all other MeterReadings within the same MeterReadings message are considered to be coincident with the so marked MeterReading. Only one MeterReading element within a single MeterReadings message may have its isCoincidentTrigger Boolean set to “true”. If the isCoincidentTrigger Boolean is absent, it is defined to be “false”. It is recommended that the “trigger” MeterReading should have a timeStamp if this information is available.

The GetMeterReadings profile can be used to request MeterReadings that are coincident with a given MeterReading. This can be accomplished by including in the GetMeterReadings message a MeterReadings element in which the isCoincidentTrigger Boolean is set to “true” – in other words by specifying the “trigger” MeterReading in the GetMeterReadings filter criteria.

NOTE It is recognized that there may be small differences in time between a coincident trigger and the reading(s) that are coincident with the trigger. For example, a reading taken in conjunction with a meter disconnect can actually be taken several seconds after the operation of the disconnect switch. It is outside the scope of this Standard to define the window for readings to be considered coincident.

In the following example, a metering system identifies a power factor measurement that is coincident with the maximum demand for a given meter when the exact date and time of the maximum demand is not known:

```
<mr:MeterReadings
  xsi:schemaLocation = "http://iec.ch/TC57/2011/MeterReadings#MeterReadings.xsd"
  xmlns:mr = "http://iec.ch/TC57/2011/MeterReadings#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <mr:MeterReading>
    <mr:Meter>
      <mr:Names>
```



```

        <mr:name>Meter_XYZ</mr:name>
    </mr:Names>
</mr:Meter>
<mr:Readings>
    <mr:value>0.0914159</mr:value>
    <mr:ReadingType ref = "0.0.0.6.0.1.38.0.0.0.0.0.0.0.0.0.65.0"/>
    <!--indicating electricitySecondaryMetered powerFactor (cos?)-->
</mr:Readings>
</mr:MeterReading>
<mr:MeterReading>
    <mr:isCoincidentTrigger>true</mr:isCoincidentTrigger>
    <mr:Meter>
        <mr:Names>
            <mr:name>Meter_ABCx1</mr:name>
        </mr:Names>
    </mr:Meter>
    <mr:Readings>
        <mr:ReadingType ref = "8.8.0.6.1.1.8.0.0.0.0.0.0.0.0.3.38.0"/>
        <!--billingPeriod maximum indicating forward electricitySecondaryMetered demand (kW)-->
    </mr:Readings>
</mr:MeterReading>
</mr:MeterReadings>

```

In the next example, a metering system or MDMS identifies the final meter reading coincident with disconnection of service via RCD:

```

<mr:MeterReadings
  xsi:schemaLocation = "http://iec.ch/TC57/2011/MeterReadings#
    MeterReadings.xsd"
  xmlns:mr = "http://iec.ch/TC57/2011/MeterReadings#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <mr:MeterReading>
    <mr:isCoincidentTrigger>true</mr:isCoincidentTrigger>
    <mr:EndDeviceEvents>
      <mr:createdDateTime>2010-12-17T09:30:47Z</mr:createdDateTime>
      <mr:reason>moveOut</mr:reason>
      <mr:EndDeviceEventType ref = "3.31.0.68"/>
      <!--ElectricityMeter RCDSwitch Disconnected -->
    </mr:EndDeviceEvents>
    <mr:Meter>
      <mr:Names>
        <mr:name>Meter1</mr:name>
      </mr:Names>
    </mr:Meter>
  </mr:MeterReading>
  <mr:MeterReading>
    <mr:Meter>
      <mr:Names>
        <mr:name>Meter1</mr:name>
      </mr:Names>
    </mr:Meter>
    <mr:Readings>
      <mr:timeStamp>2010-12-17T09:30:49Z</mr:timeStamp>
      <mr:value>123456</mr:value>
      <mr:ReadingType ref = "0.0.0.1.4.1.12.0.0.0.0.0.0.0.0.3.72.0"/>
      <!--billingQuantity net electricitySecondaryMetered energy (kWh)-->
    </mr:Readings>
  </mr:MeterReading>
</mr:MeterReadings>

```

The next example demonstrates a request to get meter readings from a metering system or MDMS which are coincident with a disconnect that occurred within a specified time interval. The request is an open-ended invitation to send any type of MeterReading data which is coincident with an RCDSwitch disconnect for a given EndDevice (meter). The response to this request could very well be nothing more than the “final meter reading” example provided above. (If a more specific response was sought, it would be possible to filter for only the desired ReadingType(s) by populating the ReadingType element in the GetMeterReadings profile.)

```

<mr:GetMeterReadings
  xsi:schemaLocation="http://iec.ch/TC57/2011/GetMeterReadings#GetMeterReadings.xsd"

```

```

    xmlns:m="http://iec.ch/TC57/2011/GetMeterReadings#"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<mr:EndDevice>
  <mr:Names>
    <mr:name>Meter1</mr:name>
  </mr:Names>
</mr:EndDevice>
<mr:MeterReadings>
  <mr:isCoincidentTrigger>true</mr:isCoincidentTrigger>
  <mr:EndDeviceEvents>
    <mr:EndDeviceEventType>
      <mr:Names>
        <mr:name>3.31.0.68</mr:name>
        <!--ElectricityMeter RCDSwitch Disconnected -->
      </mr:Names>
    </mr:EndDeviceEventType>
  </mr:EndDeviceEvents>
</mr:MeterReadings>
<mr:TimeSchedule>
  <mr:scheduleInterval>
    <mr:end>2010-12-31T23:59:59Z</mr:end>
    <mr:start>2010-12-01T00:00:00Z</mr:start>
  </mr:scheduleInterval>
</mr:TimeSchedule>
</mr:GetMeterReadings>

```

NOTE When using timestamps as filters, note that the TimeSchedule.scheduleInterval elements are used to frame a request for data falling within a certain range. The MeterReadings response may populate the MeterReadings.MeterReading.valuesInterval elements to identify the range of dates offered in the response. The user will also find that interval data (which contains a time-ordered series of values) has no place in a discussion of coincident data. Only one interval may be coincident with a given event or another MeterReading. It therefore seems inappropriate to populate a series of MeterReading.IntervalBlocks.IntervalReadings elements. A single value may be presented as an interval, or the single interval value may be presented as a stand alone MeterReading.Readings instead.

The ability to schedule when meter readings are obtained is provided through the use of a MeterReadSchedule request. The following is the structure used for the payload of a MeterReadSchedule request message:

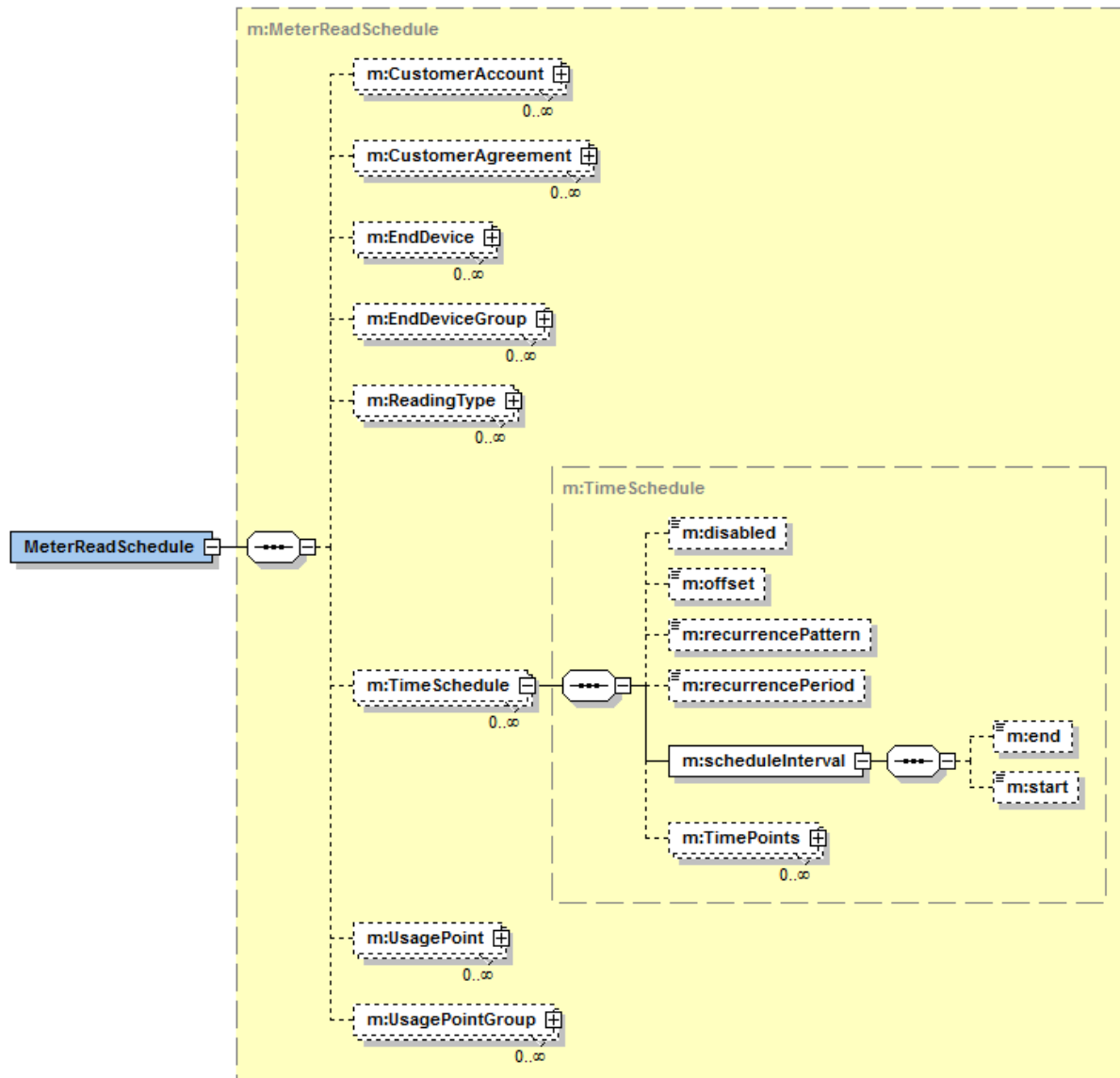


Figure 27 – Meter read schedule message format

Several elements in the TimeSchedule of the MeterReadSchedule are profile are unique to that profile and deserve special definition. These include:

disabled – True if this schedule is deactivated (disabled)

offset – The offset for the recurring (periodic) times in the TimeSchedule. Each point in the time series defined by scheduledInterval and either recurrencePeriod or recurrencePattern will be shifted by adding the offset value. The use of TimeSchedule.offset is not applicable when discrete TimePoints are specified in lieu of a recurrencePeriod or recurrencePattern.

recurrencePattern – Interval at which the scheduled action repeats, from the beginning of one action to the beginning of the next action (e.g., first Monday of every month, last day of the month, etc.). Used when the interval cannot be defined as a fixed number of seconds between points in time. The use of recurrencePattern is not applicable when recurrencePeriod is specified or when discrete TimePoints are specified in lieu of a recurrencePeriod or recurrencePattern.

recurrencePeriod – Duration between time points, from the beginning of one action to the beginning of the next action. Used when the interval can be defined as a fixed number of

seconds between points in time. The use of recurrencePeriod is not applicable when recurrencePattern is specified or when discrete TimePoints are specified in lieu of a recurrencePeriod or RecurrencePattern.

5.4 End device control messages

5.4.1 General

There are many types of end device control messages. These are used to send instructions to one or more end devices. EndDeviceControls may result in one or more consequential EndDeviceEvent message.

5.4.2 Applications

5.4.2.1 Load control

Load control (a.k.a. direct load control) requests can often be made to a MS for the purpose of load curtailment. This request would typically be initiated from network operations. Not all MS will have load control capabilities.

It should also be noted that this is different from a disconnect, where a disconnect results in the complete loss of power to a single customer.

A load control will typically result in the shedding of specifically configured loads (e.g. air conditioning, pumps, etc.)

The load control function executes load shed commands which are computed by load management software (contained in the network operations block). The load management software is used to compute an appropriate load-shed amount, and could potentially include many factors including the predicted duration of generation shortfalls, historical usage patterns, real-time usage data, and weather.

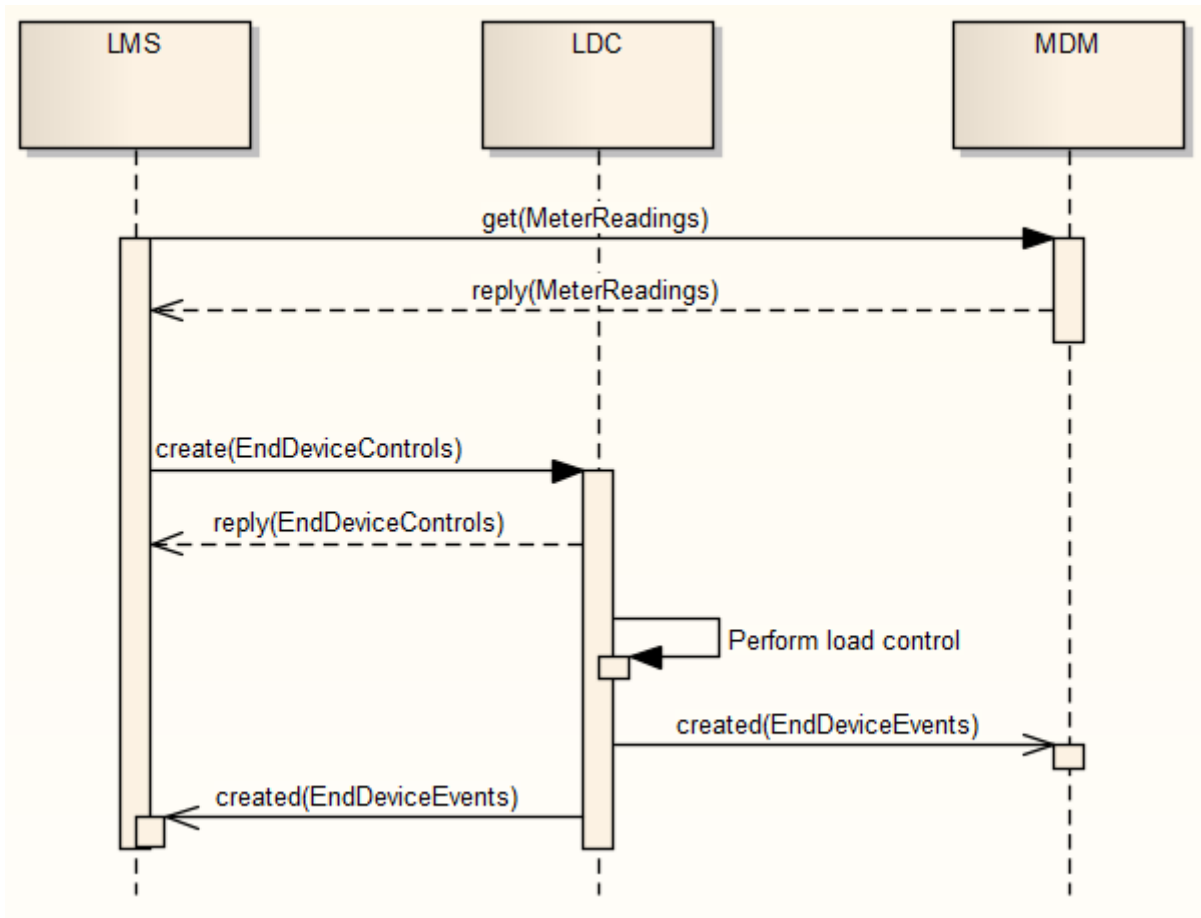


Figure 28 – Example load control message exchange

The example in Figure 28 shows how load history may be obtained from the MDM in the form of `MeterReadings` and used to perform load analysis. It also shows load control commands being issued by the LMS to the load control system. Deployments that don't support an MDM would interact directly with the MS instead.

Load control commands are implemented as a type of `EndDeviceControl`, where the command can be addressed by `EndDeviceGroup` (using a group address), by `EndDevice` (using `mRID`) or by `CustomerAgreement`.

Load control may also be implemented using PAN devices.

5.4.2.2 Load control device installation

The installation of load control units is usually more labour intensive than installing a meter, but the data exchange requirements are simpler. LC units are different from meters in the sense that they don't require periodic recalibration. Once an LC unit is installed it will probably remain in place for the life of the unit, even if the customer withdraws from the LC program, or if there is a change in tenancy.

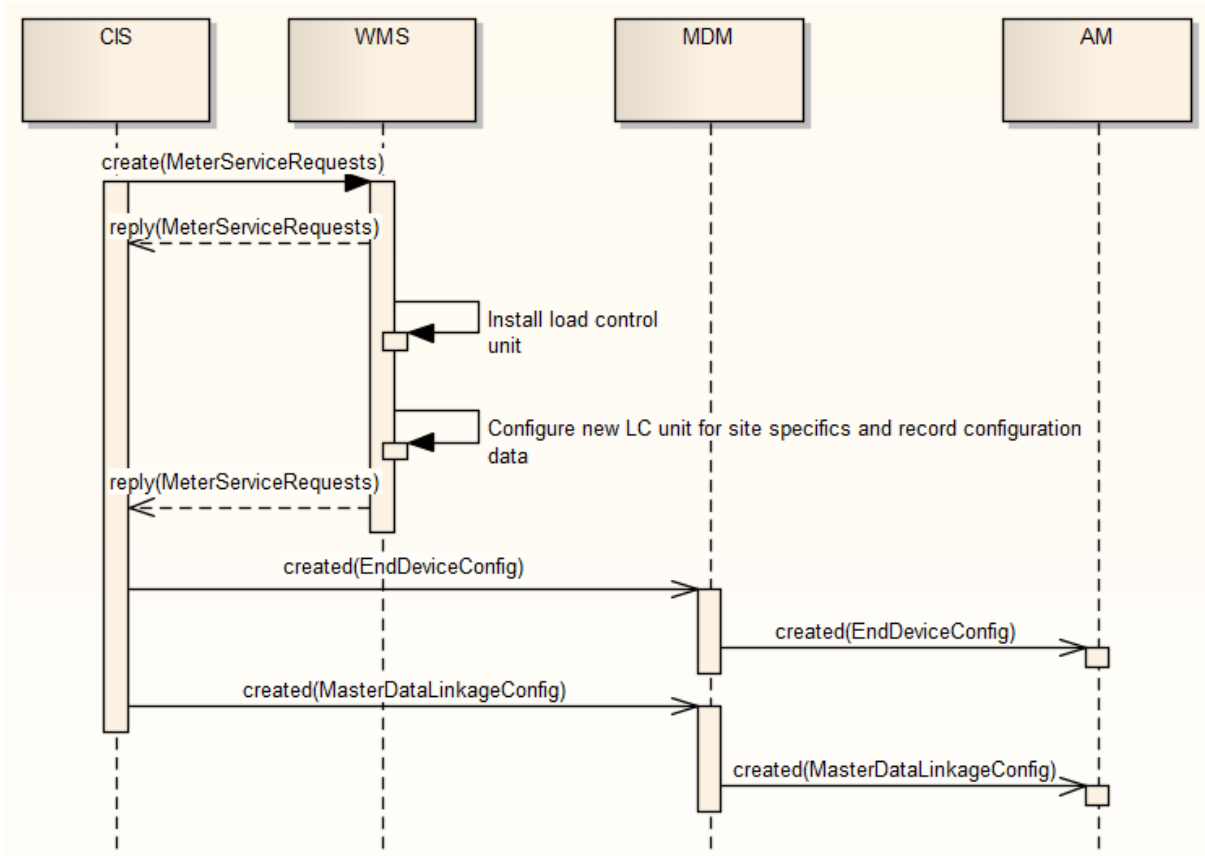


Figure 29 – Example message exchange for LC unit installation

Before travelling to the service location, the installer will know the customer account data, the type of load control unit to be installed, and the ratings of the device to be controlled. The installation data can confirm device ratings, and where appropriate, document the port number of the LC unit wired to the device. The results of the installation can be published to all of stakeholders as depicted in Figure 29.

5.4.2.3 Change of customer program

Particular metering solutions are usually chosen to fulfil specific metering needs as a result of customer program enrolment. In many cases, a flexible metering solution can provide coverage for a range of customer programs. When a customer transitions from enrolment in one program to another, it may simply require a change to the meter (or communication module) configuration. In extreme cases it may require a meter change out. In other cases, it may require no change at all. Changes to a configuration will need to be communicated amongst the stakeholders. An example exchange in which the deployment involves an MDM is described in Figure 30. Another example in which the deployment lacks an MDM is described in Figure 31.

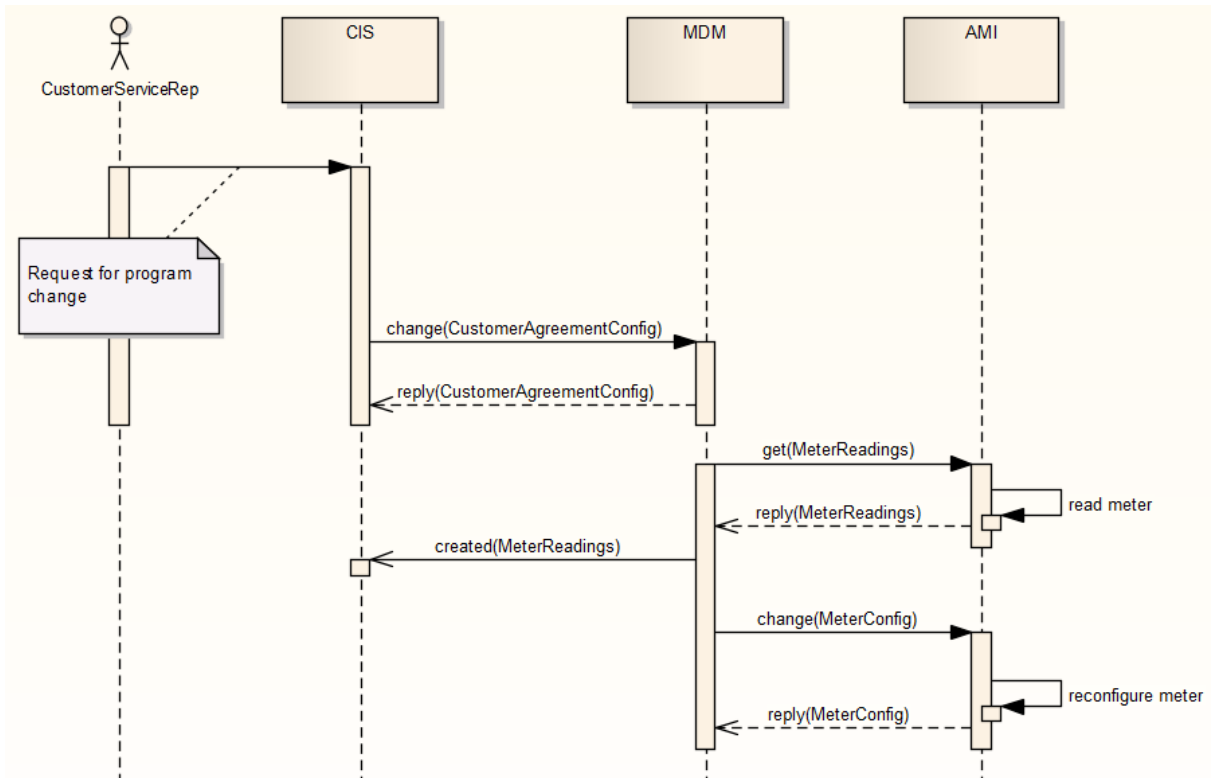


Figure 30 – Example message exchange for change of customer program

Changes to the meter configuration may be expressed as changes to the configuration of an EndDevice.

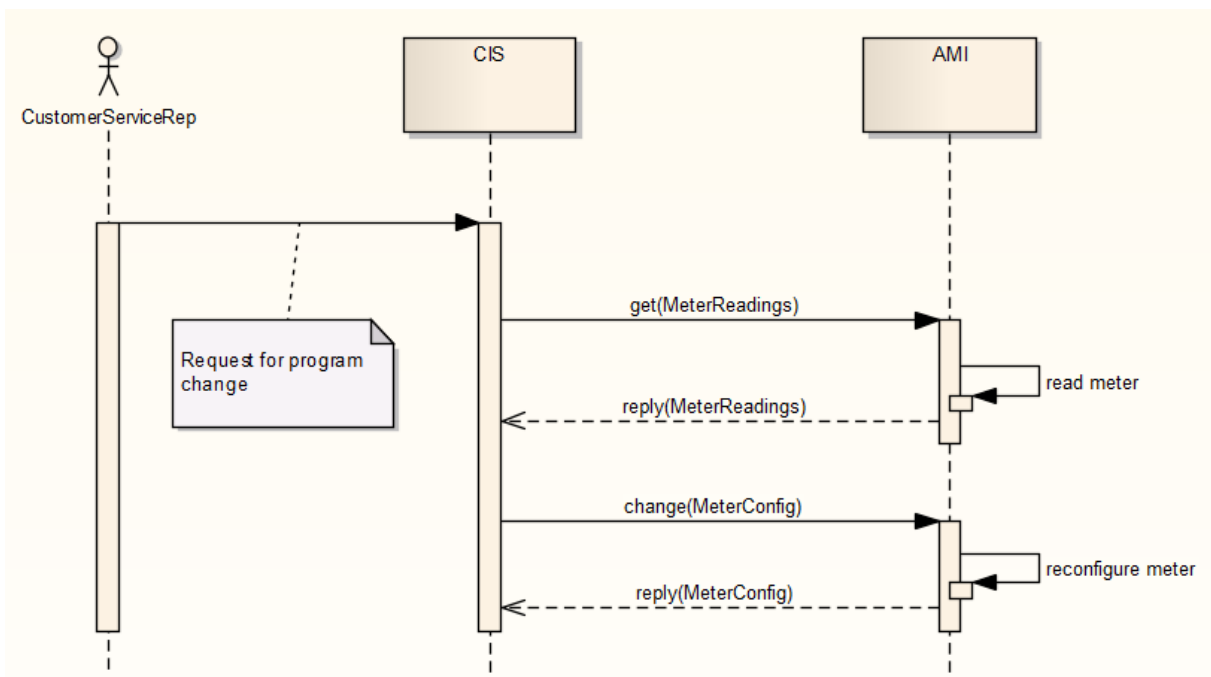


Figure 31 – Example message exchange for change of customer program w/o MDM

In other cases, a change to the customer program might not be accommodated with a meter reconfiguration. The program change may require a meter changeout (refer to 5.5 for more information on meter changeouts). Meter changeouts entail a different workflow than meter

reconfigurations. This will be reflected in the message exchange between systems. An example exchange is depicted in Figure 32.

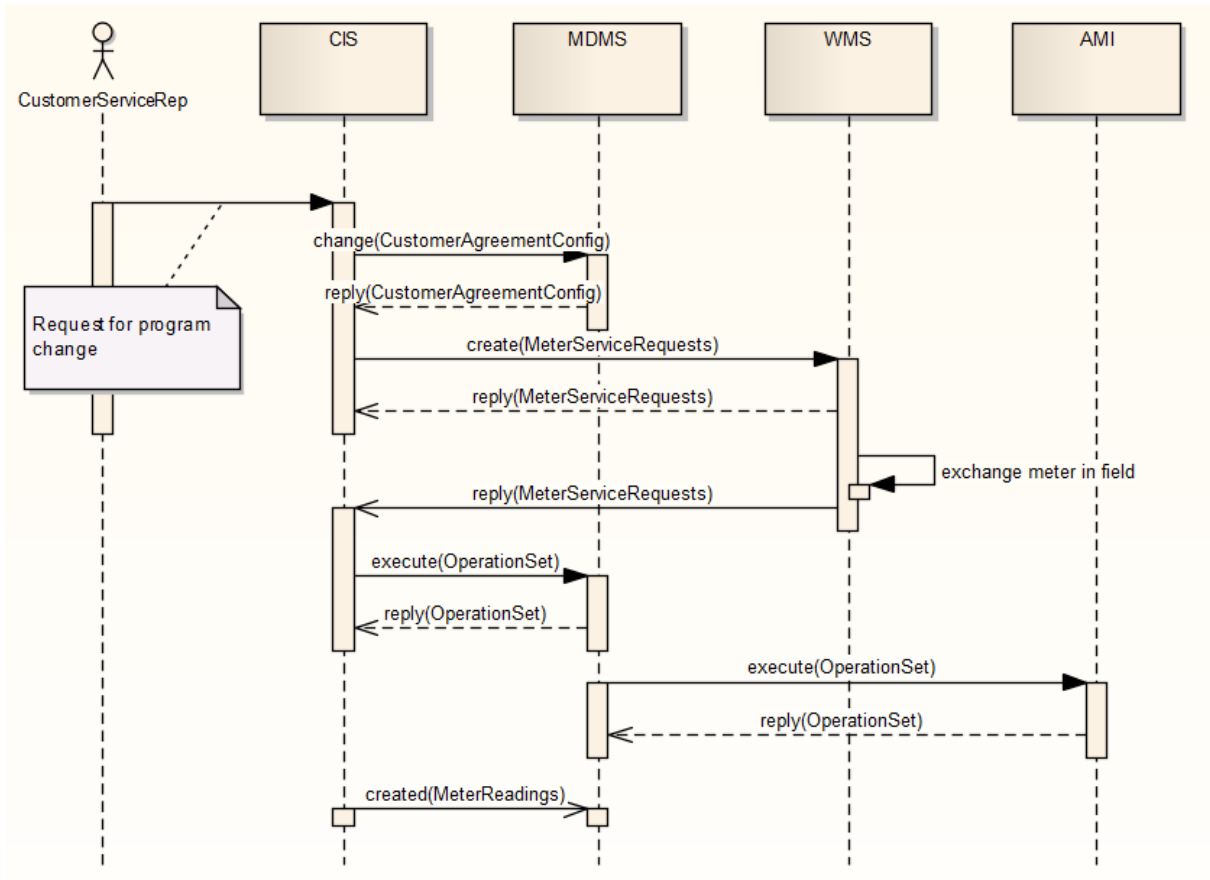


Figure 32 – Example for change of customer program with meter change out

See 5.6.2 on meter installation and removal for additional details on the MeterServiceRequest message.

5.4.2.4 Meter disconnect and reconnect

For a variety of reasons, such as non-payment, it may be necessary to disconnect or reconnect a customer. When disconnected, recorded usage should be zero and out of power complaints should be ignored. When it is not possible to perform a disconnect or reconnect remotely through an MS, a meter service request will typically be issued to perform the disconnect or reconnect manually. Example message exchanges for remote operation are depicted below in Figure 33 and Figure 34.

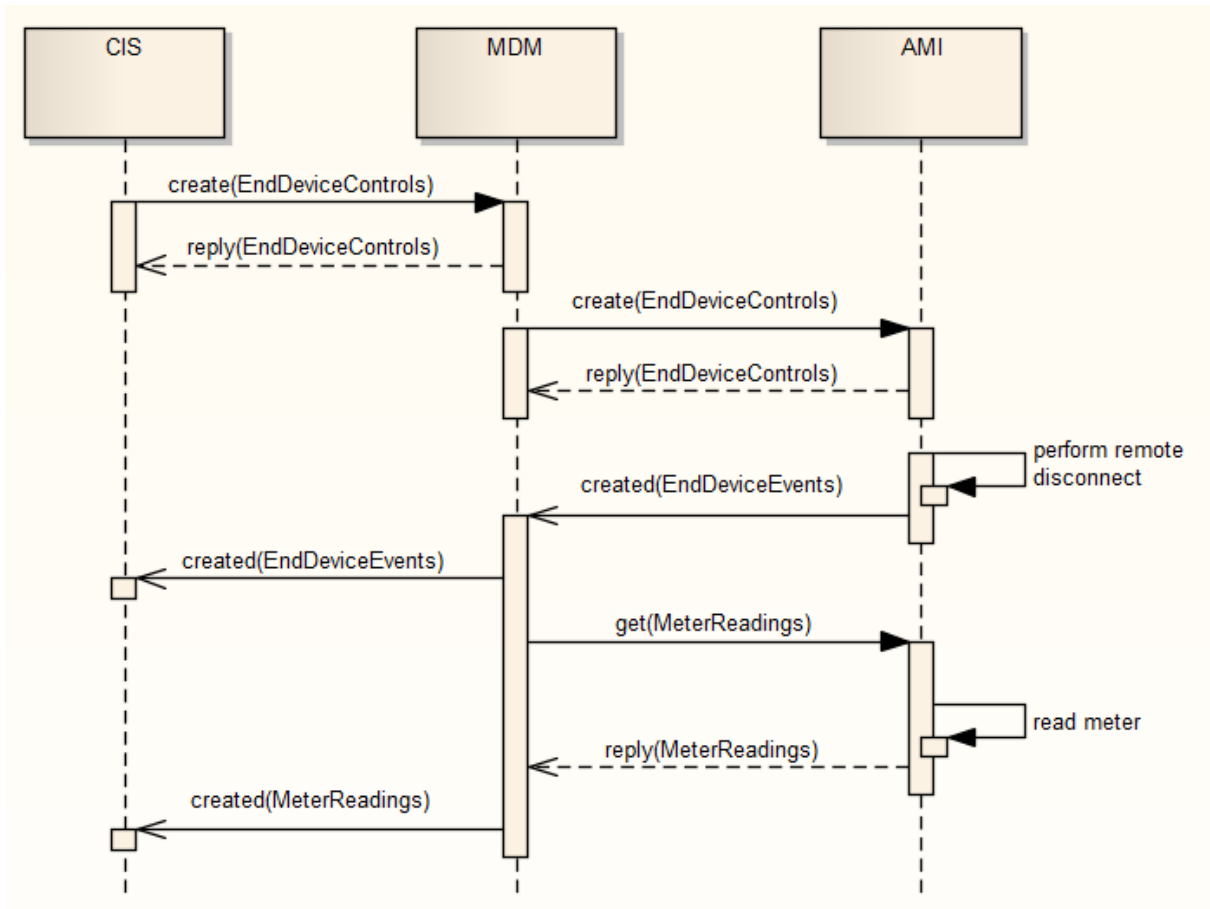


Figure 33 – Example message exchange for meter connect/disconnect

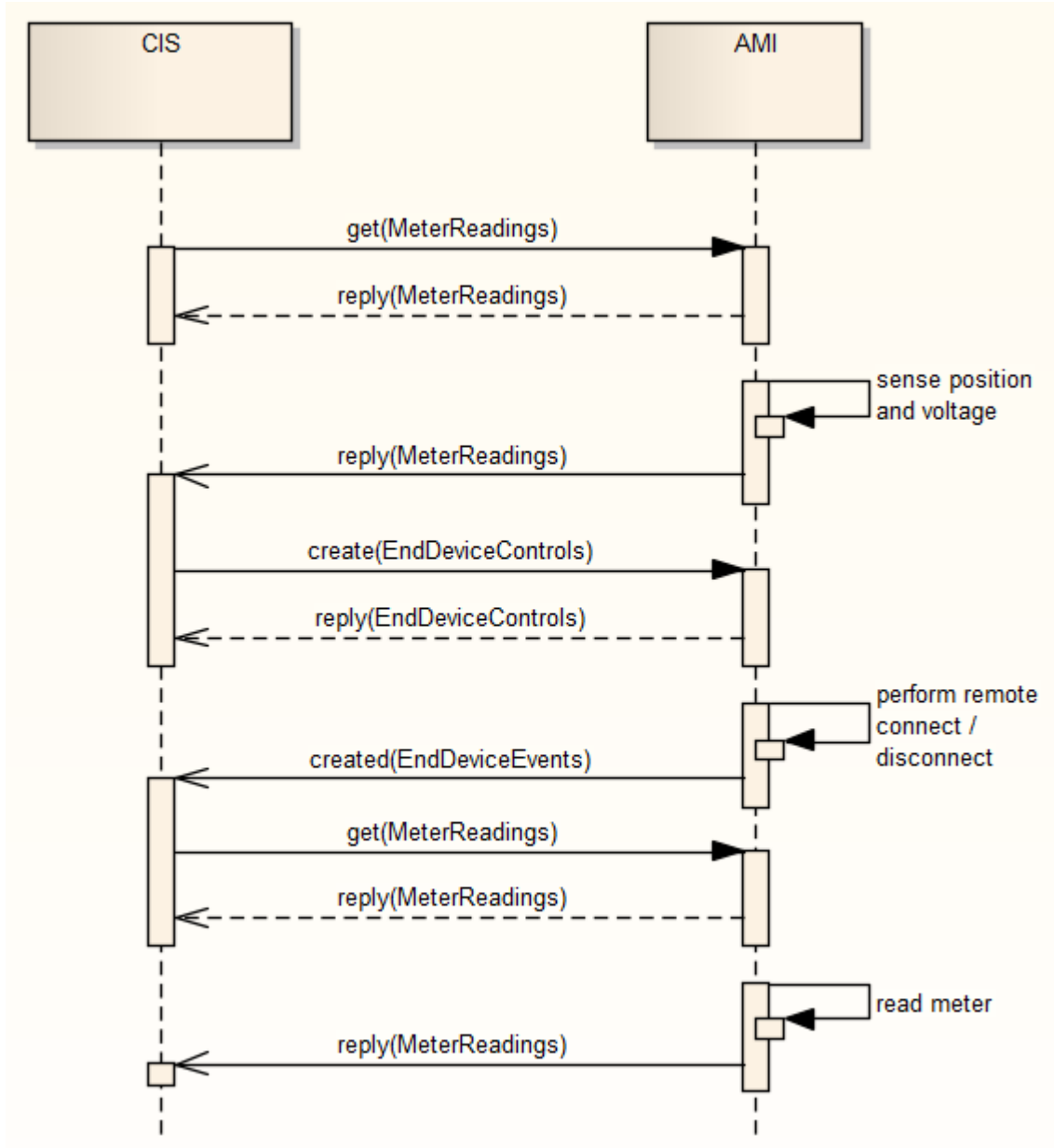


Figure 34 – Example of remote connect/disconnect directly between CIS and MS

5.4.2.5 Real-Time pricing

Real-time pricing signals and/or schedules can be sent to an end device via the MS. There are several ways this can be accomplished, such as:

- price signal issued in real-time identifying a price for a given time interval
- time of use (TOU) schedules published, which cause changes in the accumulation for each TOU Tier
- energy price schedules published in advance.

Often the EndDeviceGroup can be used to differentiate meters with different contracts or tariffs.

The example in Figure 35 shows a price signal being sent from network operations, to the MS. The MS then acts as a network service provider to communicate the price in real time to meters and other equipment.

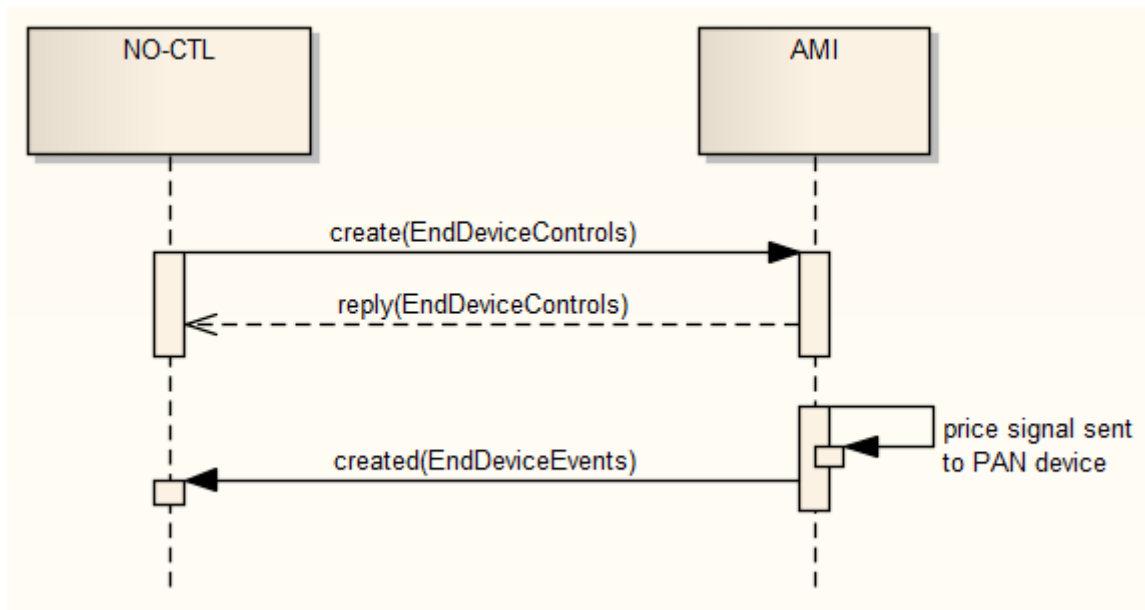


Figure 35 – Example message exchange for real-time price signal

Price signals are implemented as a subtype of EndDeviceControl, where the price is a message parameter.

5.4.3 Message format

5.4.3.1 General

Figure 36 describes the structure of an EndDeviceControls message. The XML schema for the EndDeviceControls message is defined in Annex H.

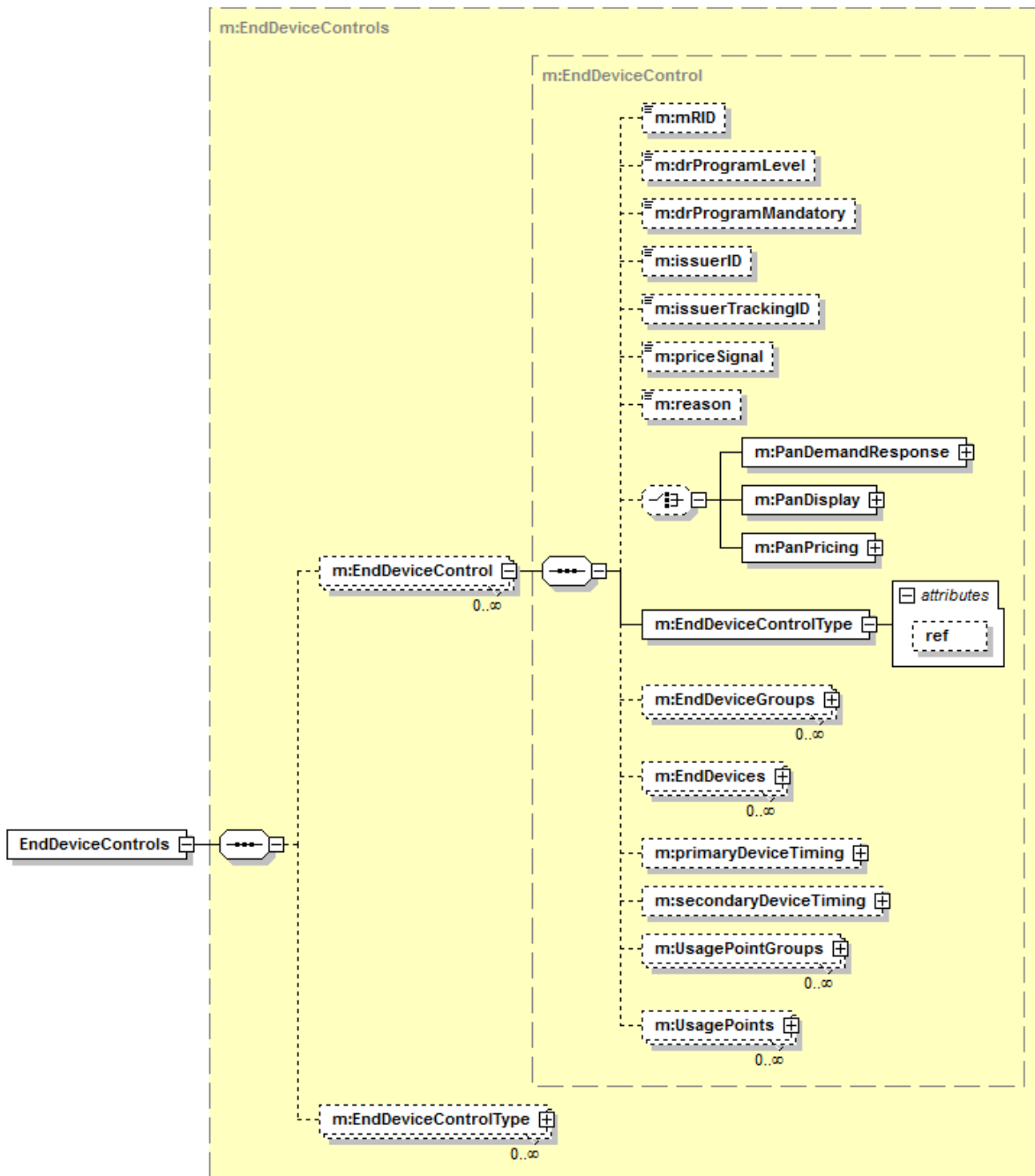


Figure 36 – End device controls message format

Within this message payload structure, specific meters may be addressed by EndDevice (e.g. meter) EndDeviceGroup, UsagePoint and/or UsagePointGroup. Aside from at least one address, the only required element is the EndDeviceControlType, which identifies the type of control to be performed. Examples of the different control types that could be used include, but are not limited to:

- load control signal
- price signal or schedule
- remote disconnect
- remote reconnect
- demand reset

- demand reduction signal
- sending a text message to a PAN device
- sending pricing signals to a PAN device
- sending load control / demand response events to a PAN device.

The following subclauses 5.4.3.2 to 5.4.3.5 are representative XML examples for EndDeviceControls.

5.4.3.2 Example of a demand reset payload

The following is an example for a demand reset. Note that in this example there are two devices being addressed, each of these is in its own EndDevices element. One of them is addressed by mRID and the other is addressed by Names.

```
<?xml version="1.0" encoding="UTF-8"?>
<m:EndDeviceControls
  xsi:schemaLocation = "http://iec.ch/TC57/2011/EndDeviceControls# EndDeviceControls.xsd"
  xmlns:m = "http://iec.ch/TC57/2011/EndDeviceControls#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <m:EndDeviceControl>
    <m:EndDeviceControlType ref = "3.8.0.214"/>
    <m:EndDevices>
      <m:mRID>3dc53ee5-777e-50b4-8699-a1c224f45f3d</m:mRID>
    </m:EndDevices>
    <m:EndDevices>
      <m:Names>
        <m:name>MeterABC</m:name>
        <m:NameType>
          <m:name>MeterID</m:name>
        </m:NameType>
      </m:Names>
    </m:EndDevices>
  </m:EndDeviceControl>
</m:EndDeviceControls>
```

5.4.3.3 Example of a meter disconnect by group

The following is an example of a meter disconnect by group.

```
<?xml version="1.0" encoding="UTF-8"?>
<m:EndDeviceControls
  xsi:schemaLocation = "http://iec.ch/TC57/2011/EndDeviceControls# EndDeviceControls.xsd"
  xmlns:m = "http://iec.ch/TC57/2011/EndDeviceControls#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <m:EndDeviceControl>
    <m:EndDeviceControlType ref = "3.31.0.23"/>
    <m:EndDeviceGroups>
      <m:mRID>3dc53ee5-777e-50b4-8699-a1c224f45f3d</m:mRID>
    </m:EndDeviceGroups>
  </m:EndDeviceControl>
</m:EndDeviceControls>
```

5.4.3.4 Example of a scheduled disconnect by group

The following is an example of a scheduled disconnect by group.

```
<?xml version="1.0" encoding="UTF-8"?>
<m:EndDeviceControls
  xsi:schemaLocation = "http://iec.ch/TC57/2011/EndDeviceControls# EndDeviceControls.xsd"
  xmlns:m = "http://iec.ch/TC57/2011/EndDeviceControls#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <m:EndDeviceControl>
    <m:EndDeviceControlType ref = "3.31.0.23"/>
    <m:EndDeviceGroups>
      <m:Names>
        <m:name>Disconnects in Region 123, May 2011</m:name>
      </m:Names>
    </m:EndDeviceGroups>
  </m:EndDeviceControl>
</m:EndDeviceControls>
```

```

        <m:NameType>
          <m:name>Regional Disconnect Group</m:name>
          <m:NameTypeAuthority>
            <m:name>Utility ABC</m:name>
          </m:NameTypeAuthority>
        </m:NameType>
      </m:Names>
    </m:EndDeviceGroups>
    <m:primaryDeviceTiming>
      <m:interval>
        <m:start>2001-12-17T09:30:47Z</m:start>
      </m:interval>
    </m:primaryDeviceTiming>
  </m:EndDeviceControl>
</m:EndDeviceControls>

```

5.4.3.5 Example of a meter connection by name

The following is an example of a meter connection, where the meter is specified by name.

```

<?xml version="1.0" encoding="UTF-8"?>
<!--Connect Meters by Meter Name-->
<m:EndDeviceControls
  xsi:schemaLocation = "http://iec.ch/TC57/2011/EndDeviceControls# EndDeviceControls.xsd"
  xmlns:obj = "http://iec.ch/TC57/2011/EndDeviceControls#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <m:EndDeviceControl>
    <m:mRID>76e7a0a3-3e33-4d21-b78f-b42227823ec7</m:mRID>
    <m:issuerID>External System 1</m:issuerID>
    <m:issuerTrackingID>123</m:issuerTrackingID>
    <m:EndDeviceControlType ref = "3.31.0.18"/>
    <m:EndDevices>
      <m:mRID>45e7a0a3-3e99-4d17-b43f-b67221212ec0</m:mRID>
      <m:Names>
        <m:name>Meter 123</m:name>
        <m:NameType>
          <m:name>Meter Name</m:name>
          <m:NameTypeAuthority>
            <m:name>Utility ABC</m:name>
          </m:NameTypeAuthority>
        </m:NameType>
      </m:Names>
    </m:EndDevices>
    <m:EndDevices>
      <m:mRID>09e7a0a3-3e50-4d10-b40f-b40980088ec3</m:mRID>
      <m:Names>
        <m:name>Meter 456</m:name>
        <m:NameType>
          <m:name>Meter Name</m:name>
          <m:NameTypeAuthority>
            <m:name>Utility ABC</m:name>
          </m:NameTypeAuthority>
        </m:NameType>
      </m:Names>
    </m:EndDevices>
    <m:primaryDeviceTiming>
      <m:interval>
        <m:start>2011-06-17T09:30:47.0Z</m:start>
      </m:interval>
    </m:primaryDeviceTiming>
  </m:EndDeviceControl>
</m:EndDeviceControls>

```

5.5 Meter service requests

5.5.1 General

Meter service requests are a subclass of Work, where an EndDevice is involved.

5.5.2 Applications

5.5.2.1 Meter installation and removal

It may be necessary to install, remove or configure meters as a consequence of the registration of a new customer, removal of a customer or the switch of a customer from one supplier to another. There may also be the need to change out a meter which involves the removal of the old meter, installation of the new meter and configuration of the new meter as needed by the metering system.

Prior to meter installation, subscriptions have been established between the MS and the MDM to receive updates to customer data (see 5.10 on master data management for more details). The workflow for a meter change out is shown in Figure 37. This encompasses both the meter installation and meter removal processes.

The OperationSet steps are included to synchronize the revised Master Data (the configuration data for the new and old meters and the association changes with the UsagePoint) with the MDM System and the Metering System. See 5.10 and Annexes K and L for additional information related to Master Data Management.

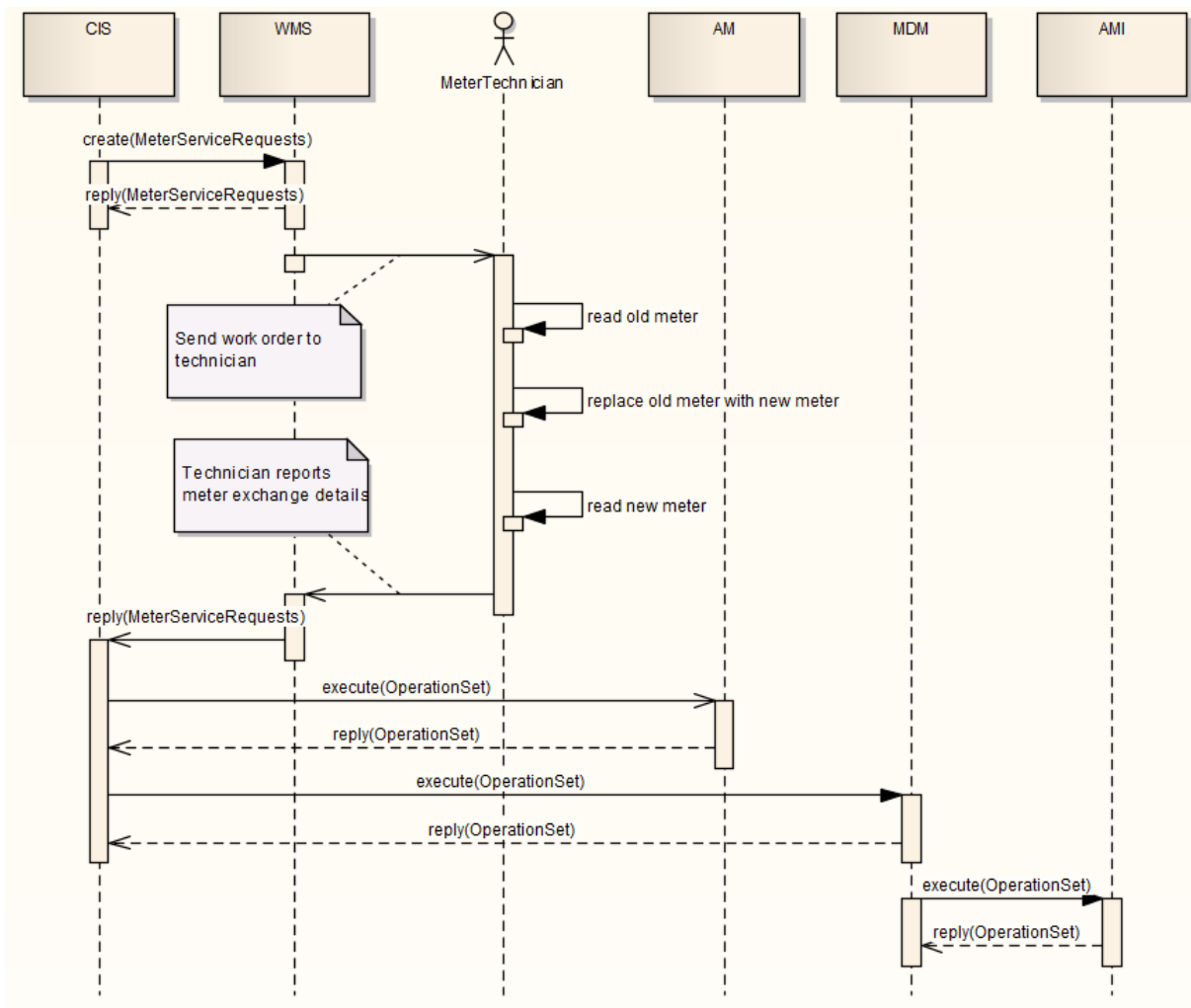


Figure 37 – Example meter installation and removal message exchange

The initial reading of the new meter and final reading of the old meter are of type MeterReading. MeterReading contains “UsagePoint” which is needed (in addition to ServiceLocation) to help identify the location of the new and old meters.

5.5.2.2 Meter replaced due to end device event

EndDeviceEvents (as described in 5.2) can cause an evaluation to occur which results in a request for a meter change out. Meter events may be published from the MS or MDM. Figure 38 describes an example exchange where the MDM has identified a problem, and brought it to the attention of the WMS which decides to change out the meter.

Once again, the OperationSet steps are included to synchronize the revised Master Data (the configuration data for the new and old meters and the association changes with the UsagePoint) with the MDM System and the Metering System. See 5.10 and Annexes K and L for additional information related to Master Data Management.

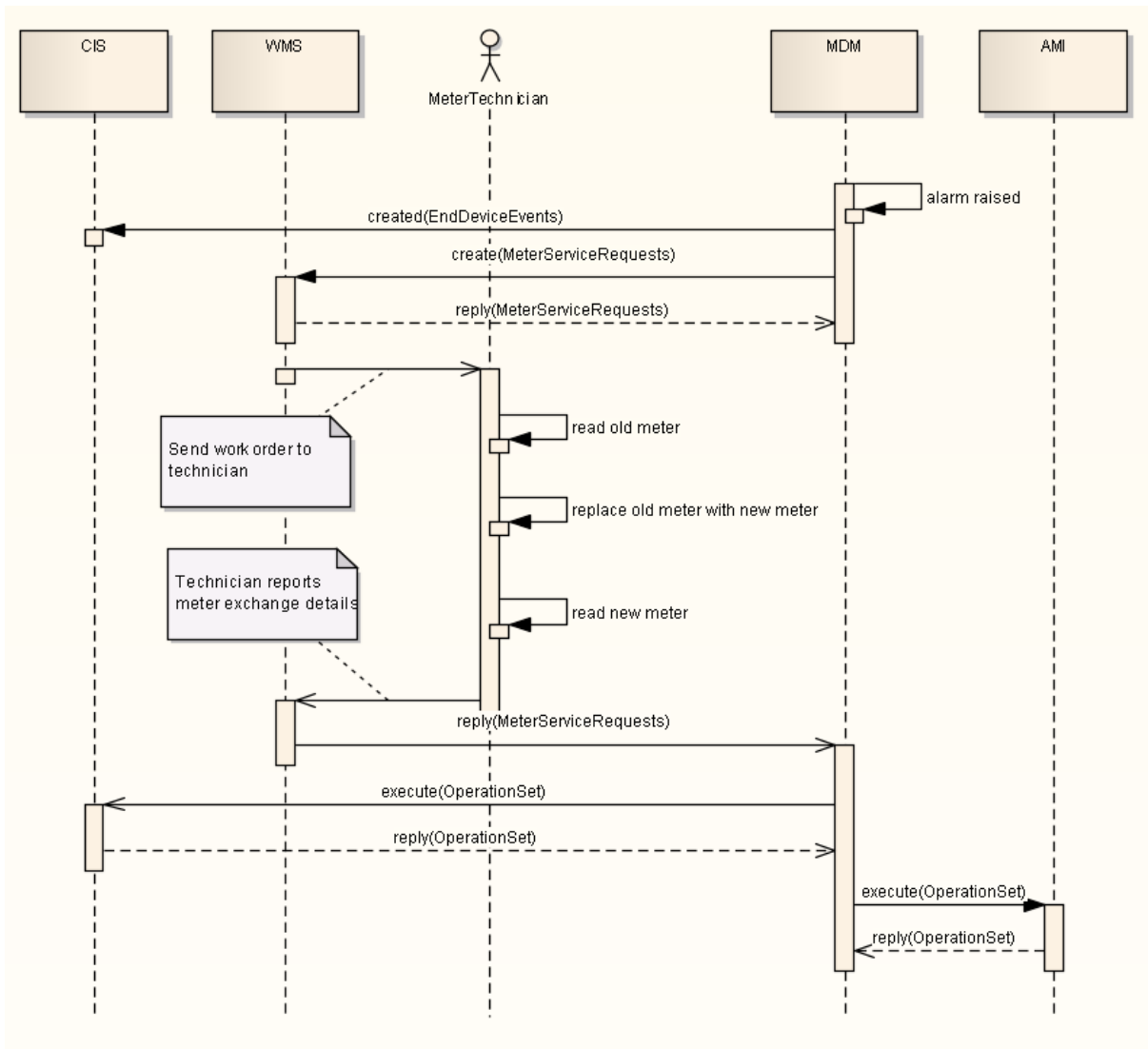


Figure 38 – Example end device event message exchange due to meter changeout

5.5.2.3 Meter changed-out due to CIS alarms or customer complaints

Data analysis by the CIS or customer billing complaints may cause the customer service department to request a site-visit to the customer location and possibly a meter change out. Figure 39 describes an example exchange where the CIS has identified a problem, and brought it to the attention of the WMS which decides to change out the meter.

Once again, the OperationSet steps are included to synchronize the revised Master Data (the configuration data for the new and old meters and the association changes with the

UsagePoint) with the MDM system and the metering system. See 5.10 and Annexes K and L for additional information related to master data management.

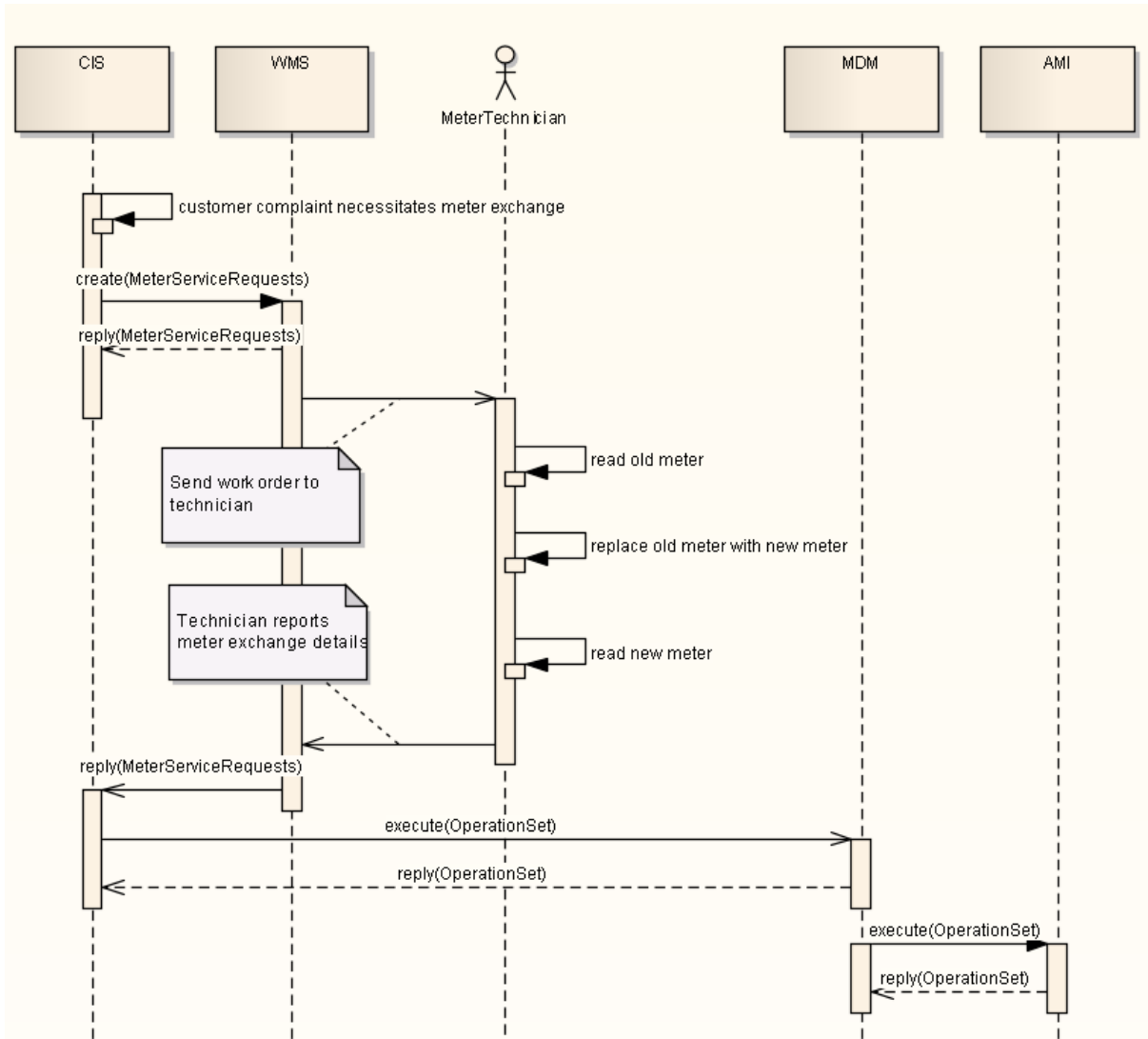


Figure 39 – Example message exchange due to CIS alarms

5.5.2.4 Meter changed-out for recalibration.

The WMS or other enterprise systems such as AM may track when meter recalibration is due, and change-out the meter. Some utilities may view the actual meter change out as a WMS issue as depicted in Figure 40, while others treat it as a MS issue.

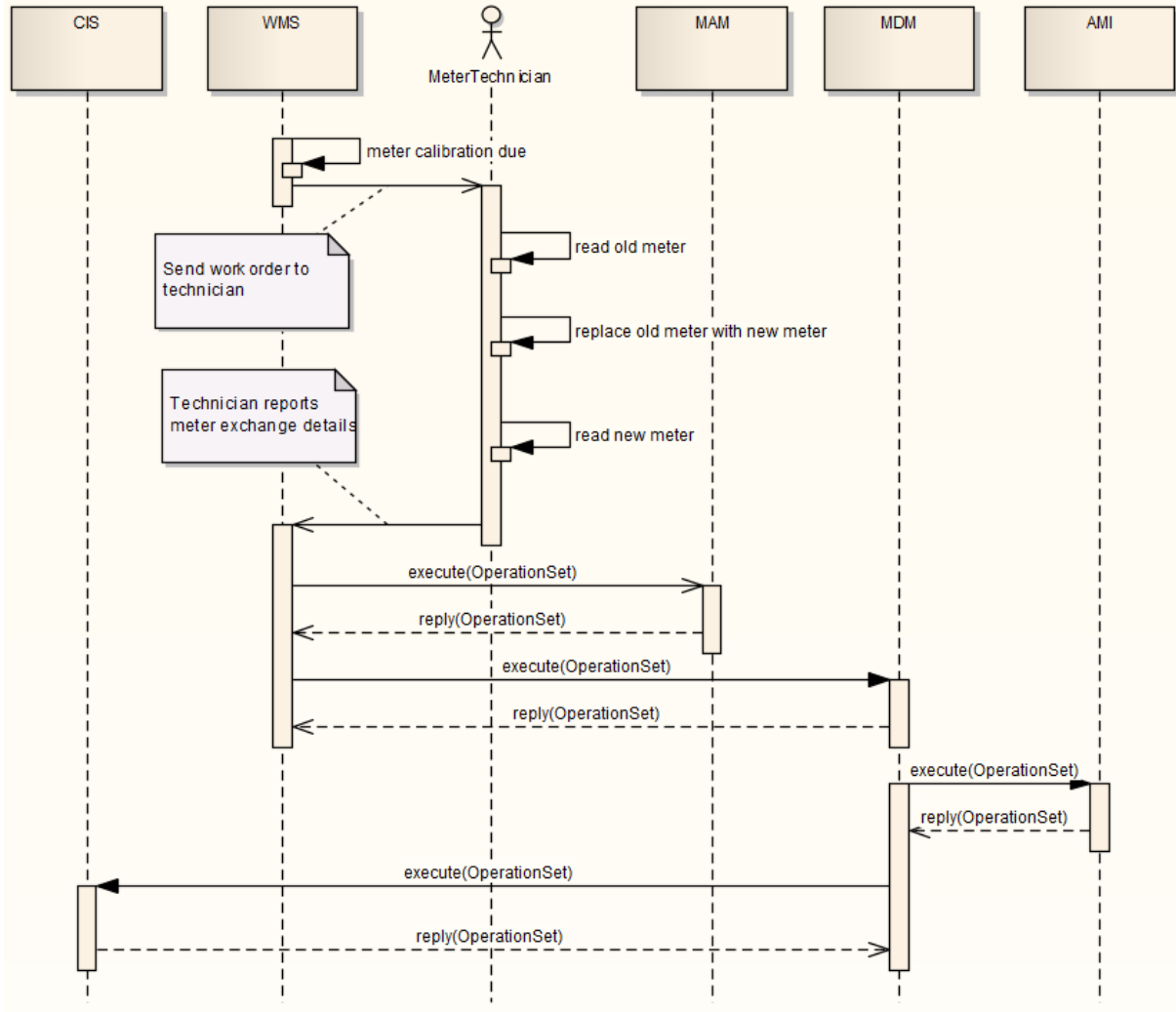


Figure 40 – Example message exchange when meter is changed out for recalibration

The OperationSet steps are included to synchronize the revised Master Data (the configuration data for the new and old meters and the association changes with the UsagePoint) with the MDM system and the metering system. See 5.10 and Annexes K and L for additional information related to MDM.

5.5.3 Message format

The message payload structure in Figure 41 describes MeterServiceRequests. It can be used for zero or more MeterServiceWork objects.

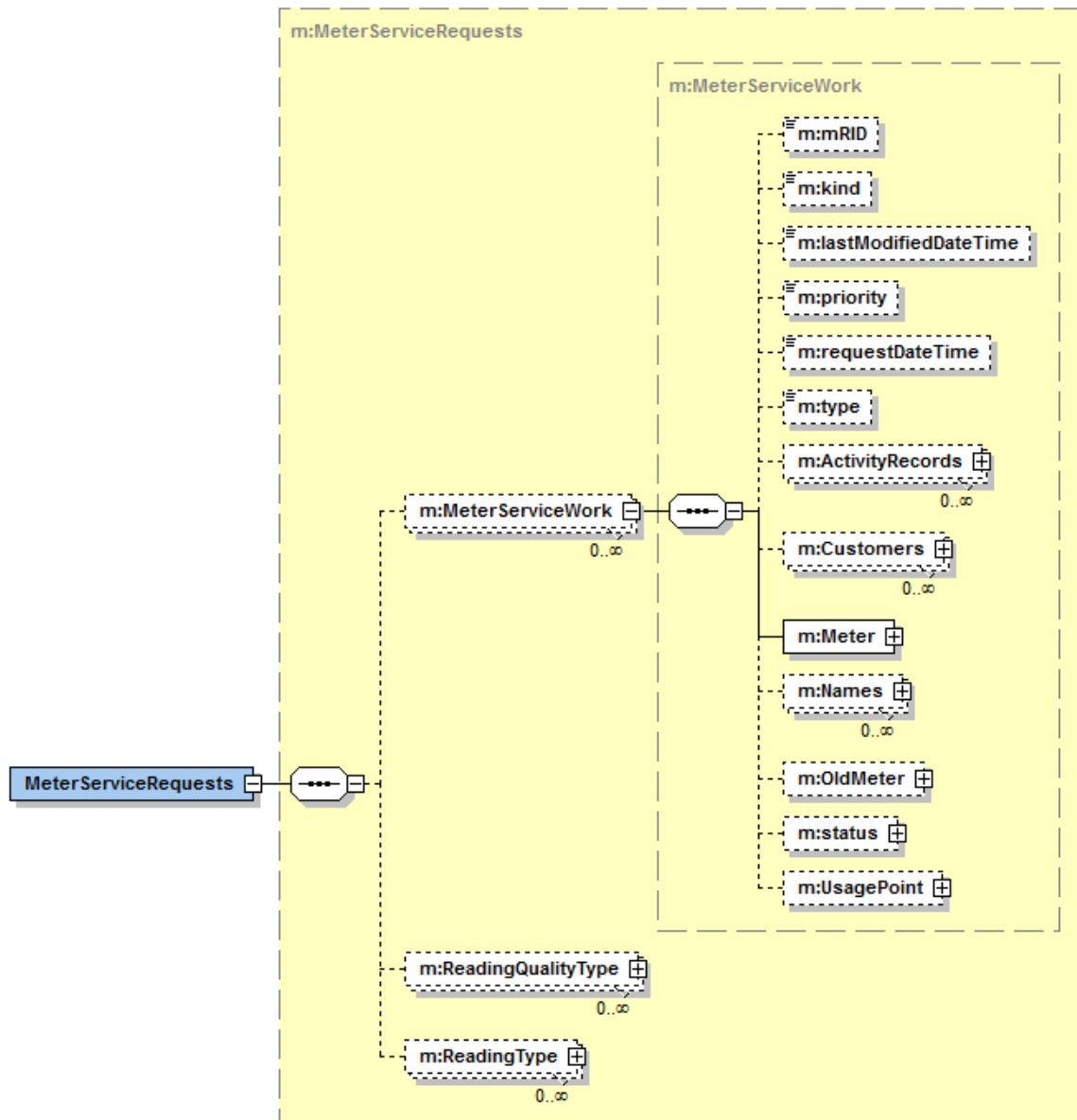


Figure 41 – Meter service requests message format

The message may include more than one MeterServiceWork item. Each item may refer to up to two meters to provide the means to replace a meter. Meter readings can be obtained as a part of the work. In the case of a meter replacement, readings for the old meter can be obtained as well as initial readings for the new meter. Location references can be supplied as a part of the customer data or for the meter asset, as appropriate for the work being done. The detailed, annotated XML schema is defined in Annex I.

5.6 Metering system events

5.6.1 General

There are different levels of need within the system for different kinds of messages.

The metering system (*per se*) may develop problems within its infrastructure which require a work order to fix. The data requirements for communicating this event are similar to the requirements of EndDeviceEvent as described in 5.2. With an EndDeviceEvent, a simple error code can be used to report a problem. This mechanism works when the recipient is able to look-up and interpret the meaning of the code. However, when a more detailed description of

the problem is required, a more elaborate schema shall be used. In some cases, the recipient is a human and requires a human-readable description of the problem, and the particular piece of equipment involved. When identifying the asset, it will probably be necessary to use vendor-specific terminology to describe the hardware.

5.6.2 Applications – Firmware upgrade

For an automated Metering System capable of two-way communication, it may be possible to upgrade the firmware of MS infrastructure in the field, or in some systems the communication assets in the end devices. Changes to the metering system that materially affect its operation shall be communicated to all of the relevant stakeholders. An example of such a publication using an EndDeviceConfig message is depicted in Figure 42.

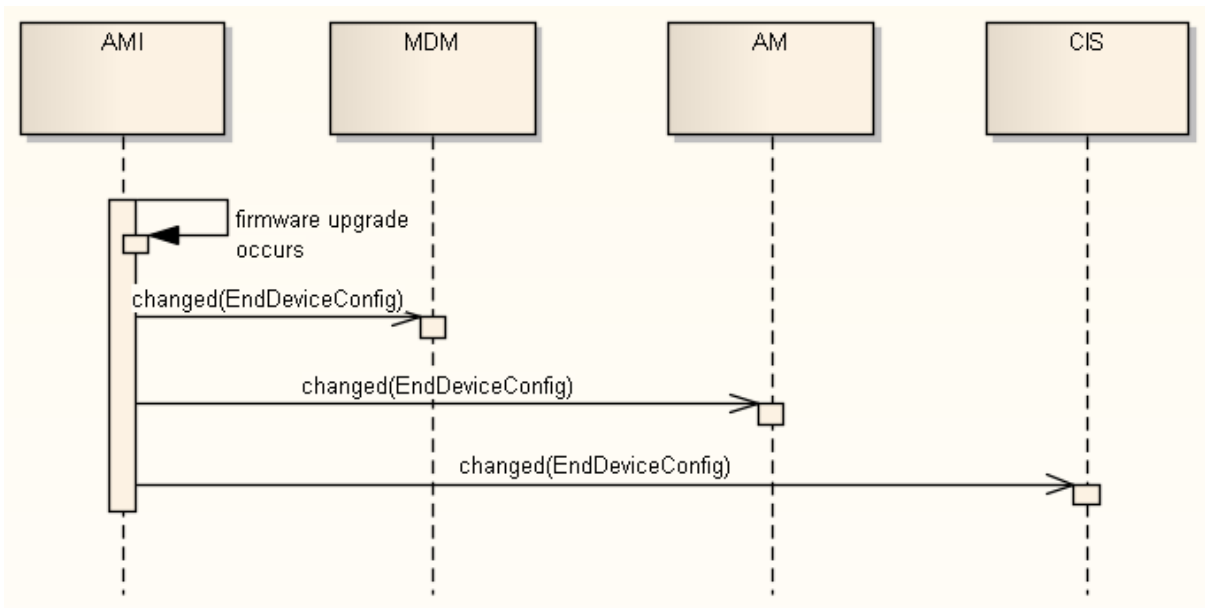


Figure 42 – Example firmware upgrade message exchange

The firmware upgrade may cause the EndDevice or CommEquipmentAsset to change in a number of ways, including device functional characteristics, firmware version and revision number, or configuration (expressed as a programId).

5.6.3 Message formats

Please refer to the EndDeviceConfig message format described in 5.10.3.

5.7 Customer switching

5.7.1 General

A customer in an open retail market can switch between energy suppliers. This may require reconfiguration and/or reinstallation of the meter. The reconfiguration or meter replacement may be a consequence of a customer changing energy programs at the time of the change of energy supplier. This process would likely involve an on request read as needed for final billing purposes. An example message exchange is provided below in Figure 43.

The OperationSet steps are included to synchronize the revised Master Data (the configuration data for the new and old retailers and the association changes with the Customer, CustomerAccount, and CustomerAgreement) with the MDM System and the Metering System. See 5.10 and Annexes K and L for additional information related to Master Data Management.

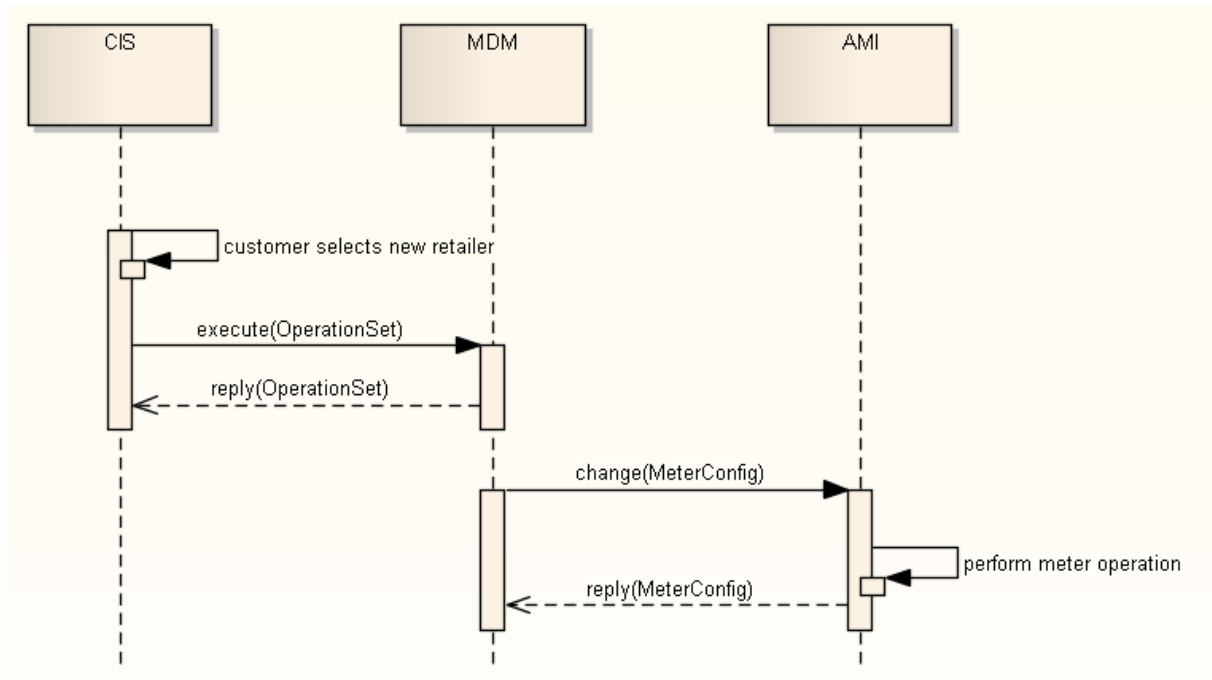


Figure 43 – Example customer switching message exchange

5.7.2 Message formats

The structure of a MeterServiceRequest was described by Figure 41. The structure of a MeterReading message was described by Figure 19.

5.8 Payment metering service messages

5.8.1 General

Payment metering services typically involve prepayment meters installed at customers' premises and token vending systems situated at convenient locations to serve the needs of customers. For the purpose of this standard, vending systems are regarded as being part of the metering system. Such vending systems typically require information about the meter, customer, service location, usage point, tariff, customer account, customer agreement and the supplier of the service that receives the revenue collected by the vending systems.

The information required by the vending systems usually originates in the CIS and billing system and is then transferred to the vending systems by means of the messages provided in 5.8.3.

Transaction and receipt information on the other hand originate in the vending systems when the customer makes a payment on an account or purchases a prepaid token at a point of sale. This information periodically needs to be transferred to the CIS and billing system for further processing, for which purpose the messages in 5.8.4 are provided.

In IEC 61968-9:2009, there were several profiles developed as a part of the efforts to support payment metering, where some of these were more general in nature. In this edition, those profiles are preserved in this subclause 5.8 where they are prefixed by "PrePay". It is hoped that these will be fully harmonized in future editions of IEC 61968-9.

5.8.2 Auxiliary agreements

Information about customer debt for collection may be configured into MS by means of AuxiliaryAgreementConfig message payload.

An example of a message exchange is given in Figure 44 and the message format is given in Figure 65.

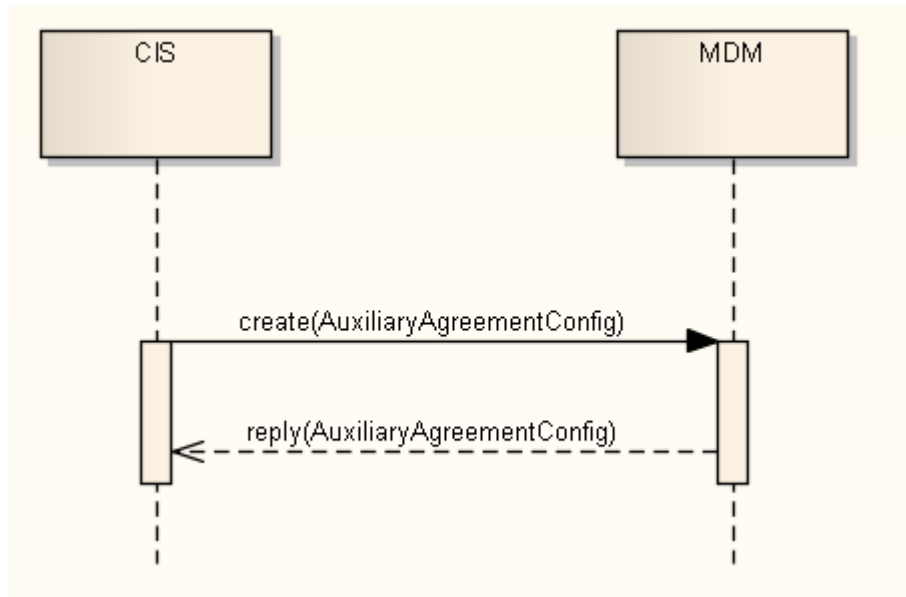


Figure 44 – Message exchange for transferring auxiliary agreement information

5.8.3 Applications

5.8.3.1 General

When a customer purchases a prepaid token at a point of sale or makes a payment on a billed account, financial information is originated in MS relating to this transaction. Typically this information is periodically transferred to the CIS and billing system for further processing.

The messages defined in 5.8.4 make provision for transferring this information to the CIS and billing system.

5.8.3.2 Receipts

When MS receives a payment, a receipt is generated and the relevant information about the payment is typically recorded as a receipt record. This information may be accessed by means of ReceiptRecord message payload.

In the case where a specified range (by date or mRID) of the message payload is to be specified in a particular contextual implementation, this may be realised by making use of the optional elements in the message header (see Figure B.2).

An example of a message exchange is given in Figure 45 and the message format given in Figure 48.

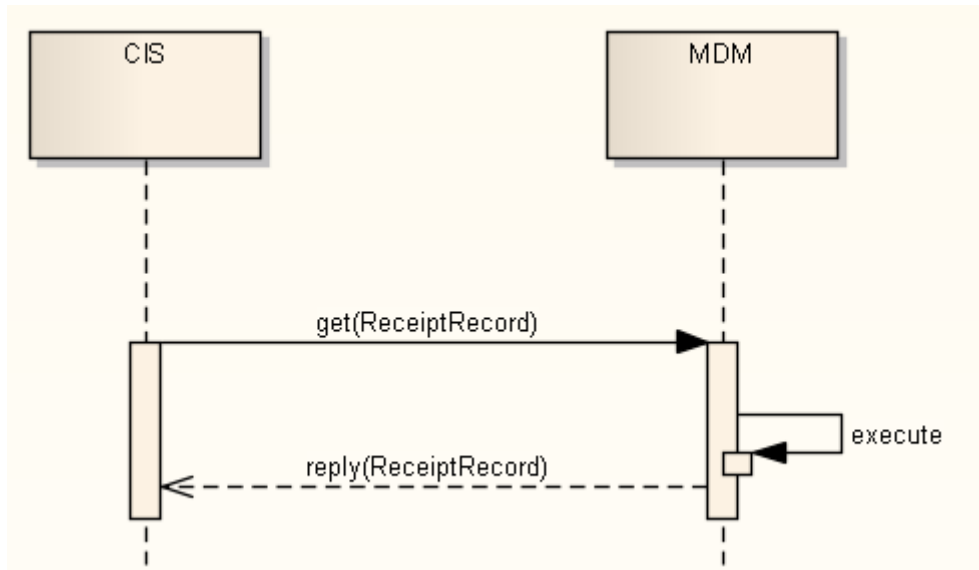


Figure 45 – Message exchange for transferring receipt information

5.8.3.3 Transactions

Information about the sale of a prepaid token or the receipt of an account payment is typically also recorded by MS in the form a financial transaction record, capturing the relevant details relating to the particular transaction. This information may be accessed by means of TransactionRecord message payload.

An example of a message exchange is given in Figure 46 and the message format is given in Figure 49.

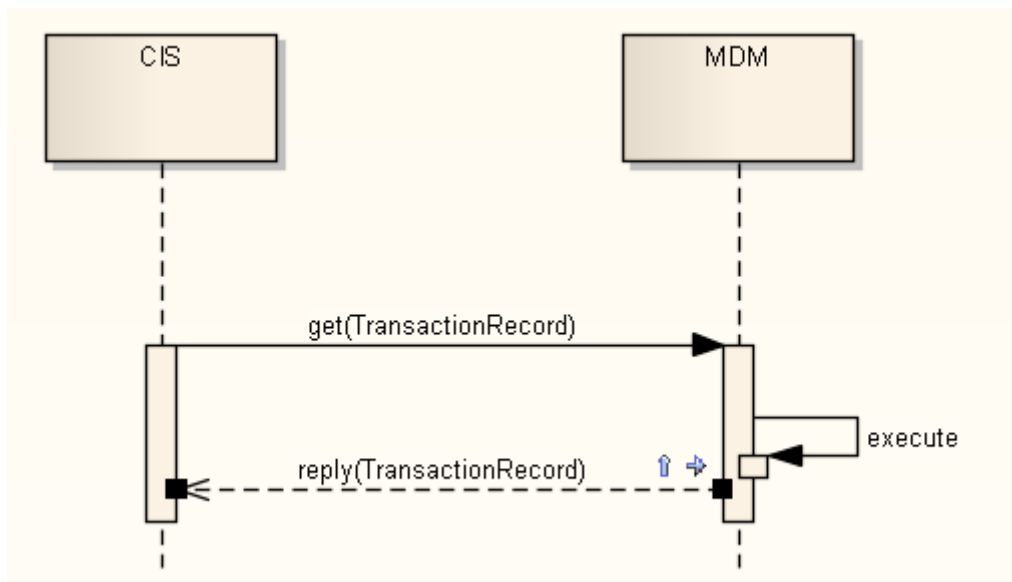


Figure 46 – Message exchange for transferring transaction information

5.8.4 Message formats

The diagram in Figure 47 describes the structure of message used to configure auxiliary agreements.

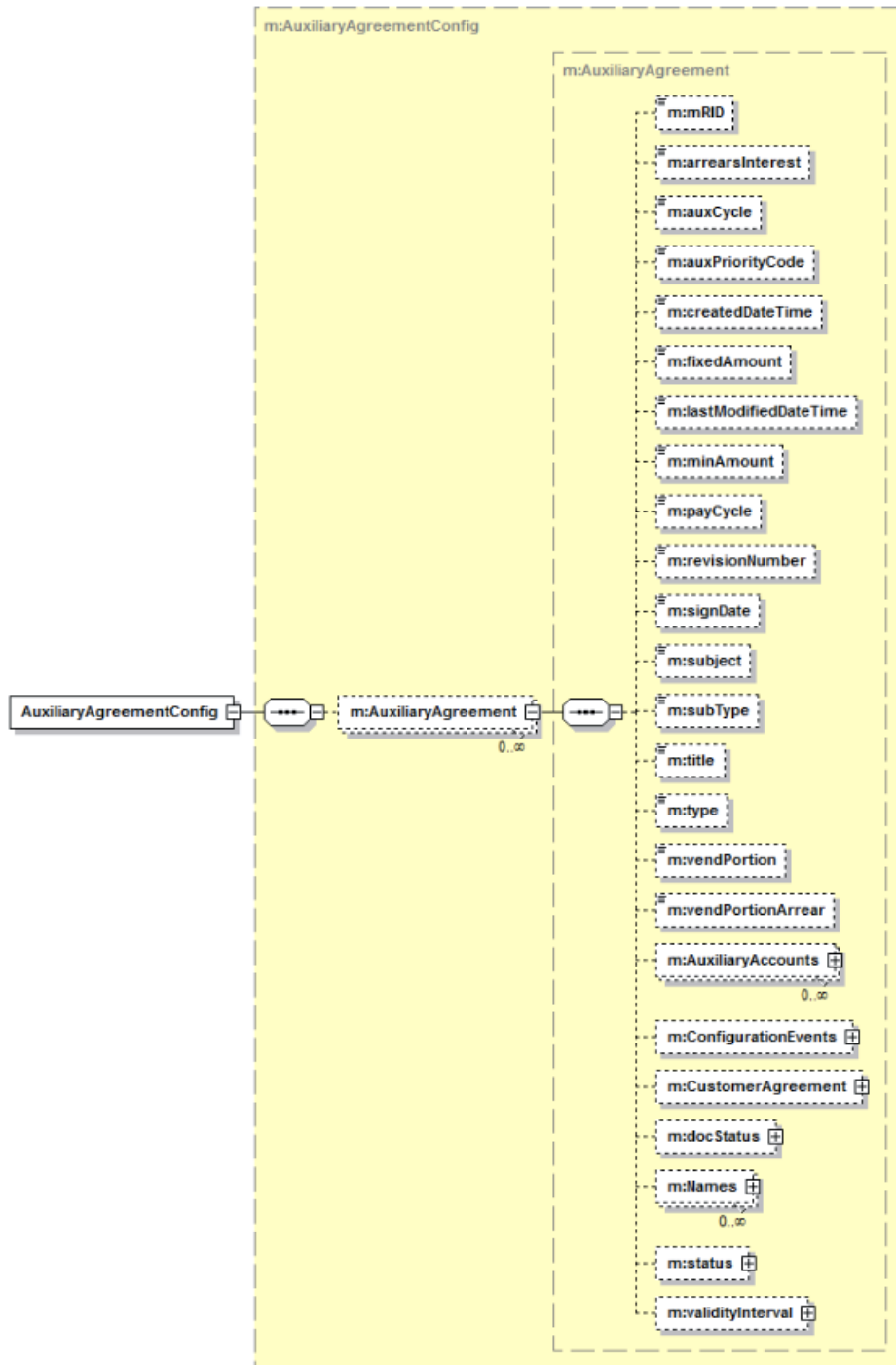


Figure 47 – Auxiliary agreement configuration message format

The message structure in Figure 48 is used to record receipts.

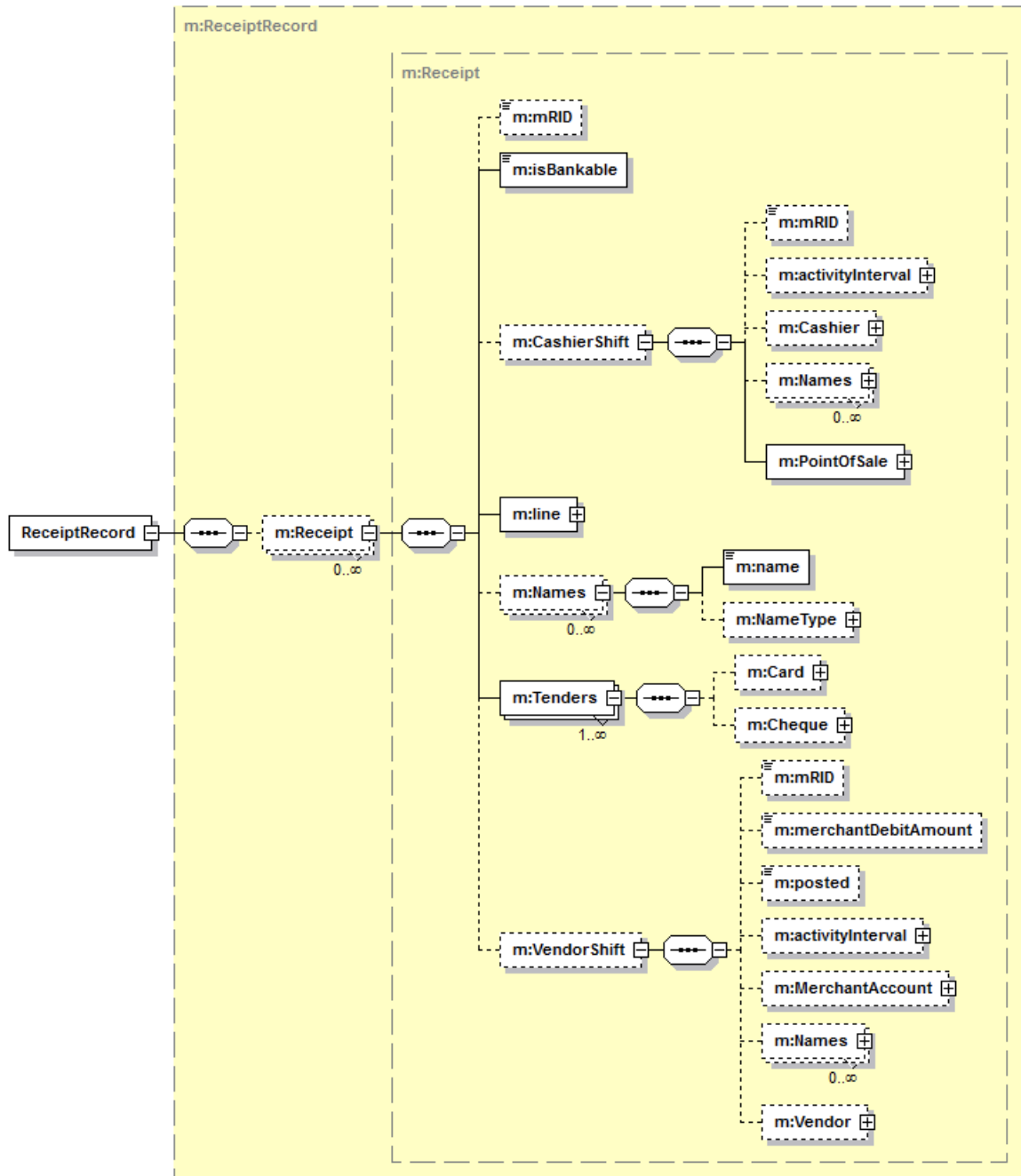


Figure 48 – ReceiptRecord message format

The message structure in Figure 49 is used to record transactions.

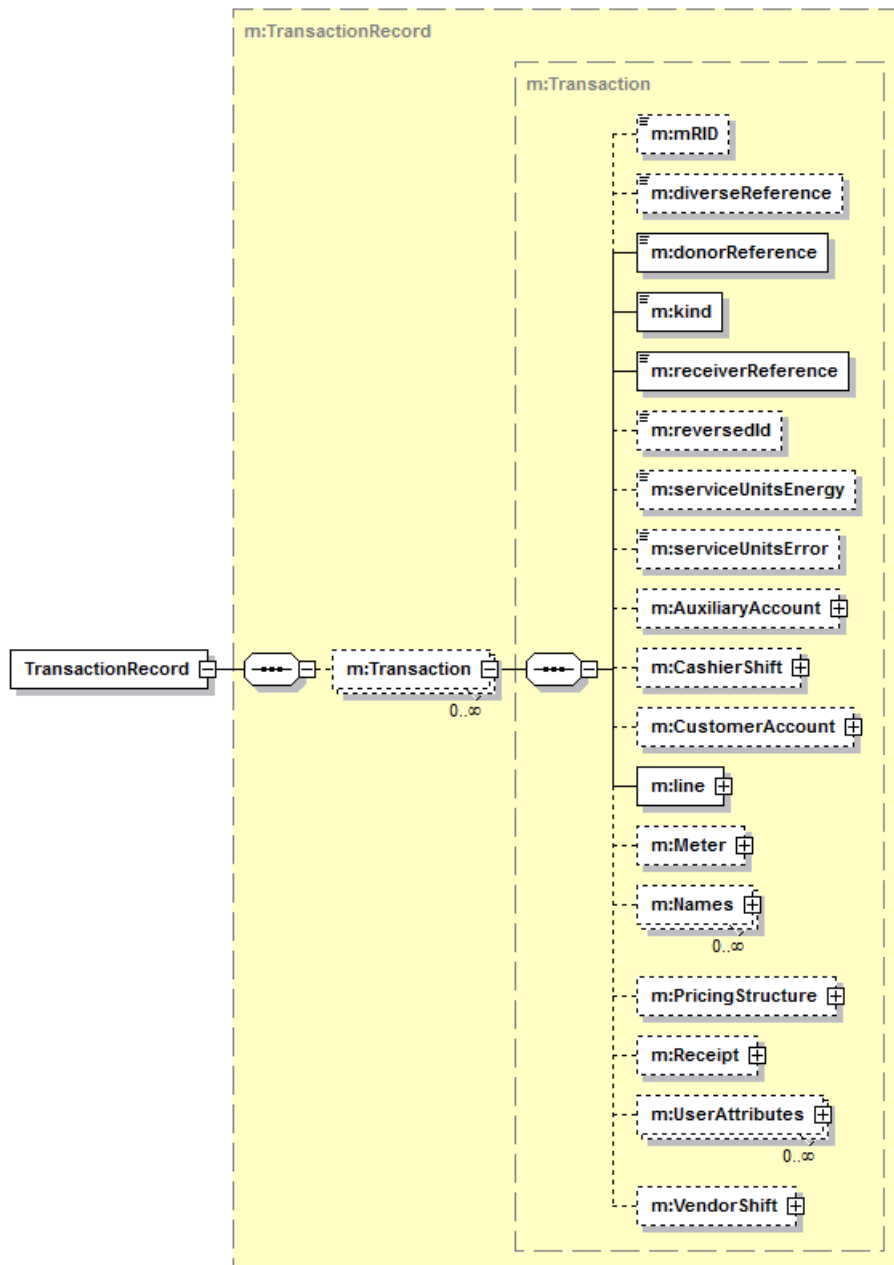


Figure 49 – TransactionRecord message format

5.9 Premise area networks

5.9.1 General

The metering system has been expanded to include devices that have been deployed within homes and businesses that are managed using the metering infrastructure. Within IEC 61968-9, these devices exist within a premise area network (PAN). This is inclusive of the commonly used term home area network (HAN). The PAN/HAN devices themselves are a special type of EndDevice.

Given the evolving nature of the underlying devices and communication protocols, IEC 61968-9 attempts to take a view that can be mapped as needed into a variety of device standards.

5.9.2 Applications

5.9.2.1 General

The applications for PAN devices primarily include dynamic pricing, demand response and providing information to customers. There are many types of PAN devices, including smart thermostats, in home displays, relays, etc.

5.9.2.2 PAN device pairing and unpairing

The pairing of a PAN device with a meter is required before the PAN device can be sent commands by the Metering System.

PAN device pairing (and un-pairing) is performed using an EndDeviceControls message as shown in the example of Figure 50. The following special conventions relative to the EndDeviceControl message apply to pairing a PAN device with a meter:

- The appropriate EndDeviceControlType code for pairing a PAN device should be selected from Annex F.
- Two (and only two) EndDevices are identified by mRid or the Names class – one is the meter and the other is the PAN device. The isPan Boolean will be set to true for the PAN device and the install code and electronicAddress.macAddress are also normally required.
- Successful or unsuccessful results for the pairing operation are reported using EndDeviceEvents messages, with the appropriate EndDeviceEventType enumerations found in Table E.24 of Annex E. It is possible for more than one EndDeviceEvent to be reported as a result of the EndDeviceControl.

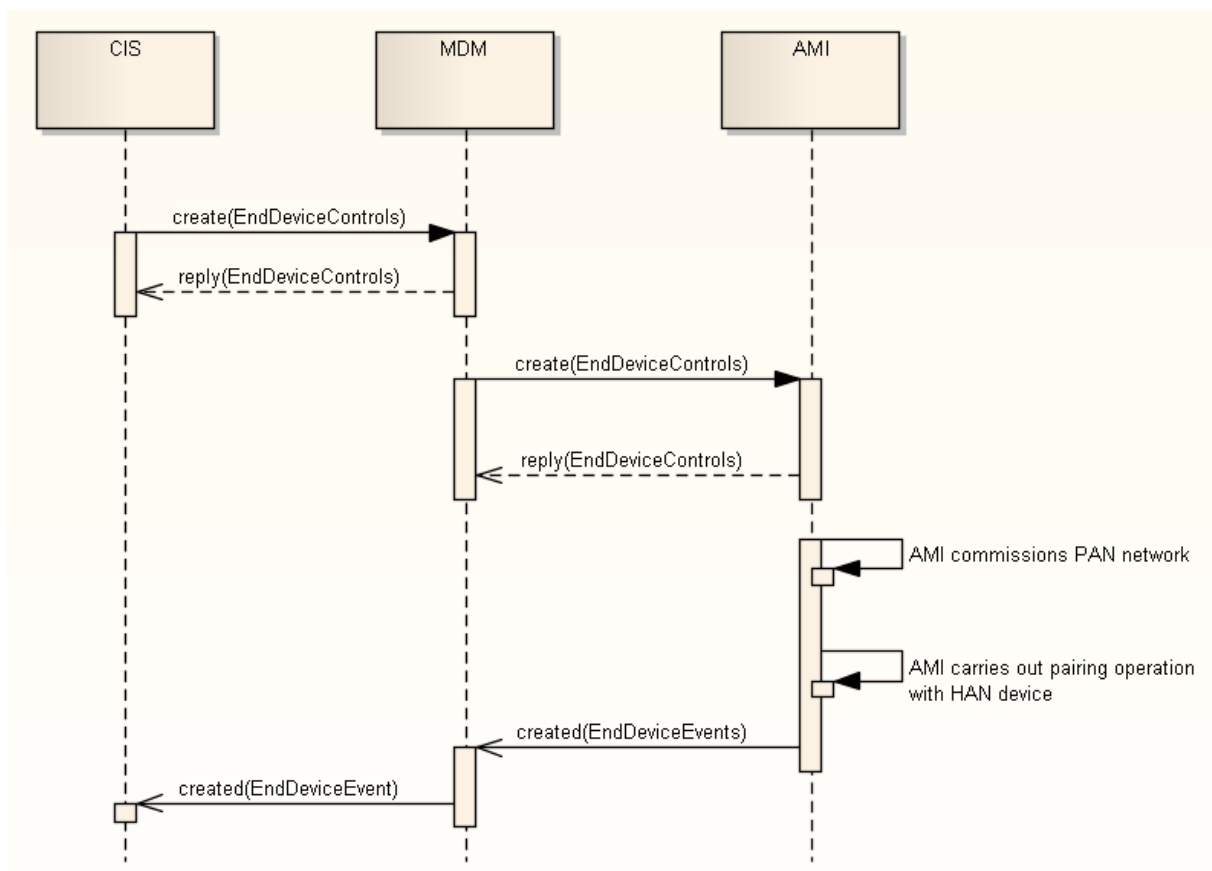


Figure 50 – Pairing of a PAN device

5.9.2.3 PAN Events

PAN device events are generated by a PAN device, where they are typically communicated through a meter or gateway to the metering system head end. The metering system head end will then publish the message to other enterprise applications that have subscribed. These events are conveyed using the EndDeviceEvents message. An example is shown in Figure 51.

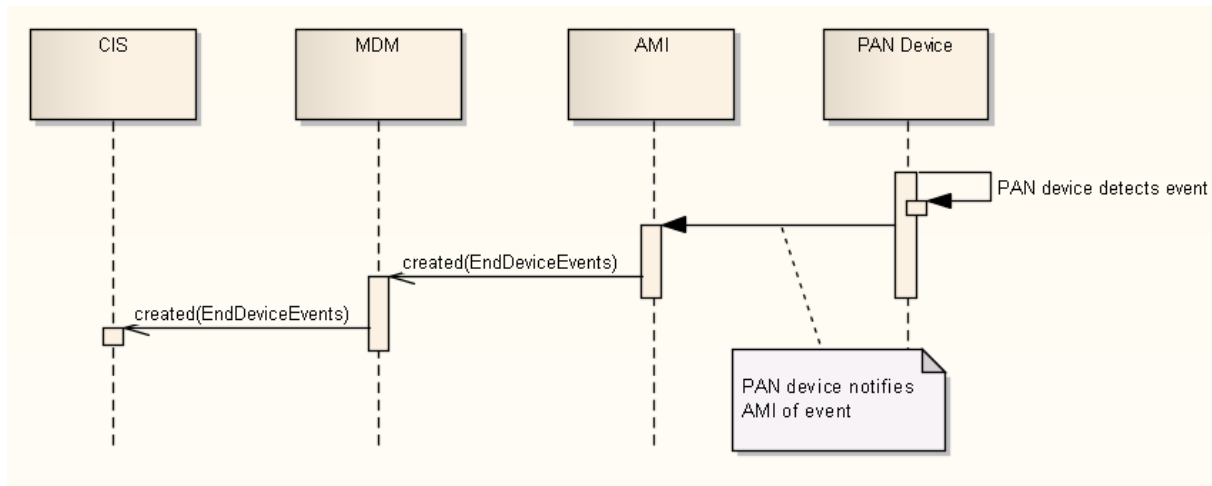


Figure 51 – PAN device events

5.9.2.4 PAN controls

Additional PAN device controls for purposes other than pairing may be initiated by an enterprise application such as a demand response management system to a metering system head end. These controls also use the EndDeviceControls message. Given that there are a variety of ways that the control can be addressed, there may be many target PAN devices. An example is shown in Figure 52.

EndDeviceControls messages intended for PAN devices will typically include one of the following special structures within the EndDeviceControl profile:

- PanDemandResponse
- PanDisplay
- PanPricing

The appropriate EndDeviceControlType and EndDeviceEventType enumerations for these functions can be found in Table E.24 and Table F.3.

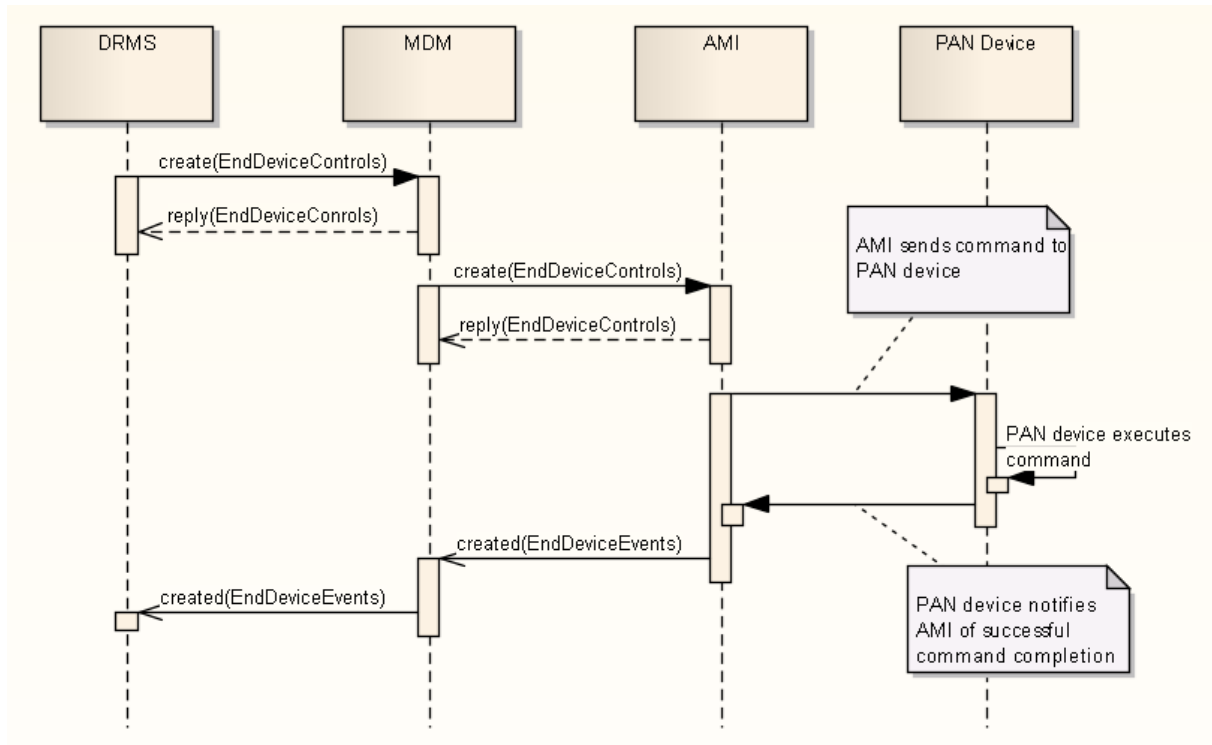


Figure 52 – PAN device controls

5.9.3 Message formats

There are no unique messages defined specifically for PAN devices. PAN devices are simply types of EndDevices.

5.10 Master data management messages

5.10.1 General

Enterprise systems exchanging messages in the Meter Reading and Control domain require a means of managing the non-transactional data that defines assets, other CIM objects and the relationships (or associations between them). Master Data Management (MDM) is the term used to describe the practice of creating, changing, and deleting these objects and relationships.

For IEC 61968-9 purposes, the CIM classes that fall within the scope of Master Data Management and the IEC 61968-9 profiles used to create/change/delete these objects (and their “configurations”) are included in Table 5:

Table 5 – IEC 61968-9 configuration profiles

CIM object	IEC 61968-9 profile
ComModule	ComModuleConfig
Customer	CustomerConfig
CustomerAccount	CustomerAccountConfig
CustomerAgreement	CustomerAgreementConfig
EndDevice	EndDeviceConfig
EndDeviceGroup	EndDeviceGroups
Meter	MeterConfig
PricingStructure	PricingStructureConfig
ServiceCategory	ServiceCategoryConfig
ServiceLocation	ServiceLocationConfig
ServiceSupplier	ServiceSupplierConfig
TransformerTank	^a
UsagePoint	UsagePointConfig
UsagePointGroup	UsagePointGroups
UsagePointLocation	UsagePointLocationConfig
^a For IEC 61968-9 purposes, the TransformerTank object has applicability to use cases involving Outage Management. The TransformerTank is technically outside the scope of IEC 61968-9, and there is no IEC 61968-9 profile for creation, modification or deletion of a TransformerTank. However, the TransformerTank can be referenced within the UsagePointConfig profile to identify the transformer that supplies power to the UsagePoint.	

ConfigurationEvents occur each time a create, change, or delete operation is performed using any of the “config” operations using the IEC 61968-9 profiles in Table 5 as well as any time that a MasterDataLinkageConfig transaction is executed to manage the relationships of MDM objects or an ObjectNamesConfig transaction is executed to add, delete, or change Names class identifiers for these objects.

The ConfigurationEvent class in the CIM is associated with each of the CIM classes in the first column of Table 5 and is incorporated into each of the IEC 61968-9 Profiles in column 2 of that table. It is also included in the MasterDataLinkageConfig and ObjectNamesConfig profiles. The function of the ConfigurationEvent class is to provide important business details about each “config” operation, including:

- the date and time at which the configuration or configuration change became effective or is to become effective,
- the entity performing the configuration operation, and
- free-form remarks providing additional business information related to the configuration event.

Refer to Annexes K and L for detailed descriptions of Master Data Management Use Cases and sample XML messages that clarify the intended use of the messages in this 5.10.

5.10.2 Applications

5.10.2.1 General

For the purposes of this standard, there are two methods used for managing the relationships between the CIM objects identified in 5.10.1. These are the MasterDataLinkage profile (described in 5.10.1) and, for a limited number of CIM objects, the relationships are explicitly

managed using profiles identified in 5.10.1. The following diagram identifies the object relationships that are critical to master data management within the scope of this standard and the specific method that is recommended to be used for managing each relationship.

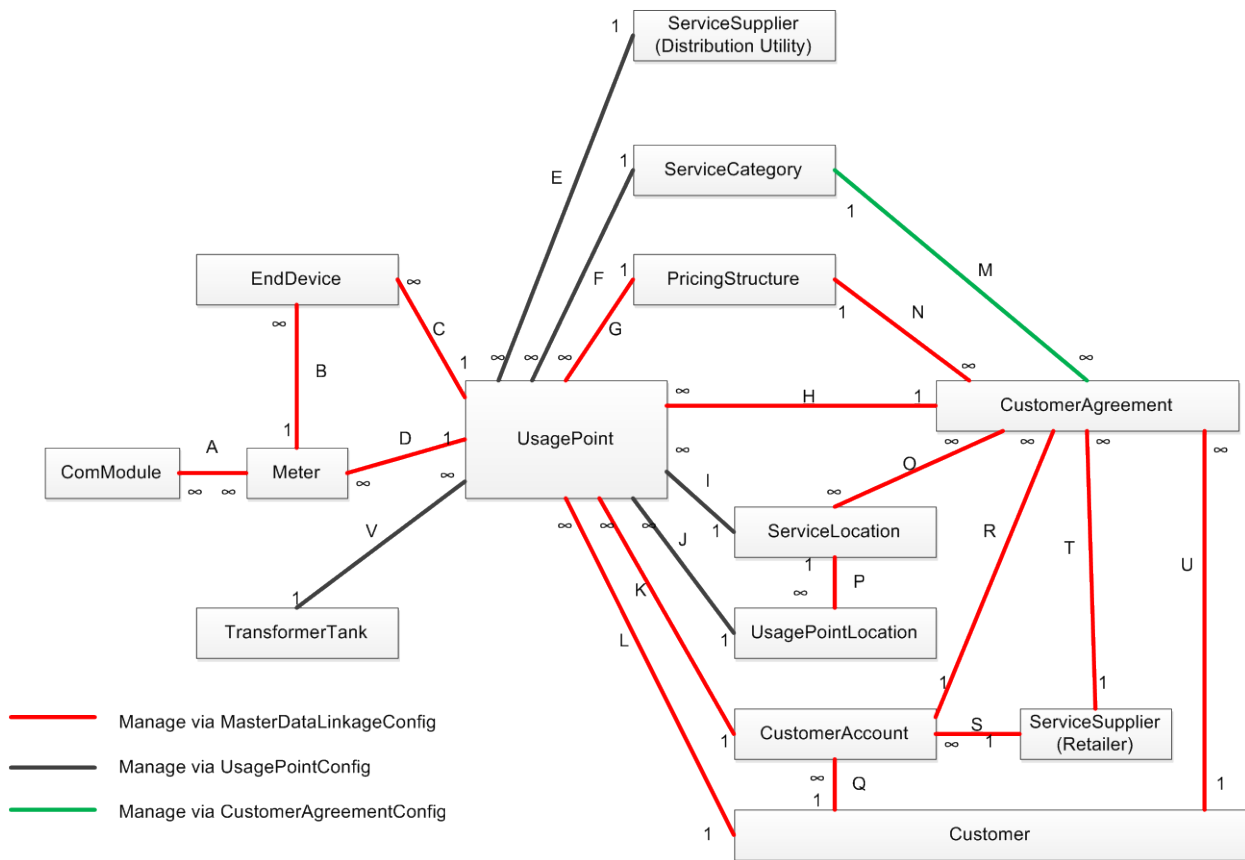


Figure 53 – Master data linkages

To fully comprehend Figure 53, it is necessary to understand that the IEC 61968-9 standard provides normative messages by which enterprise systems can exchange information; however there is no requirement that any given system implement an internal data model that is based upon or even consistent with the CIM. Accordingly, the above diagram presents the possibility of reflecting relationships in a variety of ways. For example, two systems may recognize the concepts of Customer, CustomerAccount and CustomerAgreement and choose to express the relationships between these entities and a UsagePoint by linking a Customer to a CustomerAccount (relationship Q), then linking the CustomerAccount to CustomerAgreement (relationship R) and finally linking the CustomerAgreement to the UsagePoint (relationship H). In this scenario, there may never be a need to utilize relationships K, L or U.

On the other hand, there may be two enterprise systems that do not materialize the concept of a CustomerAgreement in their internal data models. These systems may utilize messages that link a Customer to a CustomerAccount (relationship Q), and then link the CustomerAccount to the UsagePoint (relationship K). It is outside the scope of the IEC 61968-9 standard to be prescriptive on which of the relationships illustrated in Figure 53 are permissible or preferred. The MasterDataLinkageConfig profile may be used in a flexible manner to support the needs of any enterprise and its enterprise systems.

It is recommended that relationships E, F, I, J, M and V be managed by the “Config” profiles called out in the legend of the figure, rather than via the MasterDataLinkageConfig profile; however this is not a requirement and enterprises may choose to use the MasterDataLinkageConfig profile to manage these relationships as well. The reason for the

recommendation that these specific relationships be handled by the identified profiles rather than the MasterDataLinkageConfig is twofold:

- these specific relationships seldom change, and
- these specific relationships are viewed by almost all enterprise systems in a consistent way.

The converse is also true. Enterprises may choose to manage relationships depicted as red lines as if they were depicted by black lines provided that the relationship is supported by the CIM and is reflected in the appropriate IEC 61968-9 profile.

There is one additional IEC 61968-9 profile called the CustomerMeterDataSet. This profile is used only with a Header verb of get, and the resulting response provides a meter-centric detailed representation of all of the relationships in the above diagram.

Figure 53 is informative. Entities and relationships in Figure 53 may evolve over time as use of IEC 61968 IEC 61968-9 is extended to support new and revised business use cases.

5.10.2.2 Service Suppliers

Information about the supplier (retailer or utility for example) of the service may be configured into MS by means of SupplierConfig message payload.

An example of a message exchange is given in Figure 54 and the message format is given in 5.10.3.3.

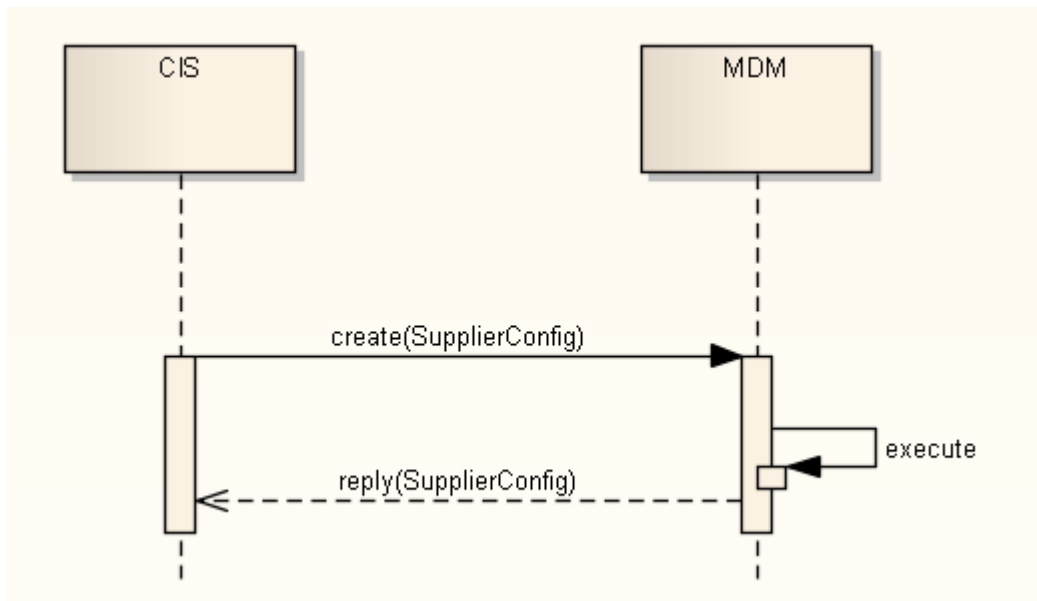


Figure 54 – Message exchange for transferring supplier information

5.10.2.3 Customers

Information about customers of the supplier of the service may be configured into MS by means of CustomerConfig message payload.

An example of a message exchange is given in Figure 55 and the message format is given in 5.10.3.4.

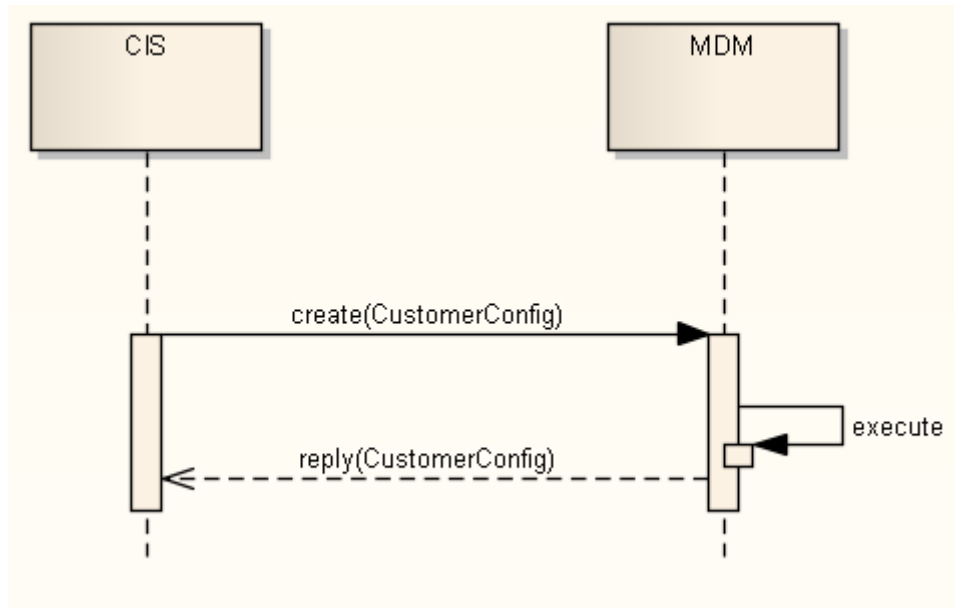


Figure 55 – Message exchange for transferring customer information

5.10.2.4 Customer agreements

Information about customer agreements may be configured into MS by means of CustomerAgreementConfig message payload.

An example of a message exchange is given in Figure 56 and the message format is given in 5.10.3.5.

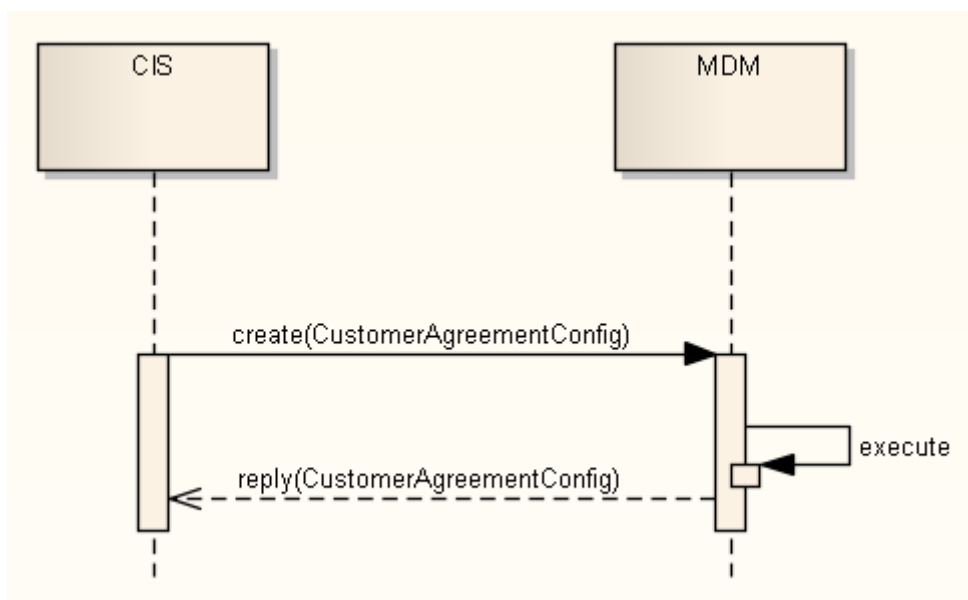


Figure 56 – Message exchange for transferring customer agreement information

5.10.2.5 Customer accounts

Information about customer accounts may be configured into MS by means of CustomerAccountConfig message payload.

An example of a message exchange is given in Figure 57 and the message format is given in 5.10.3.6.

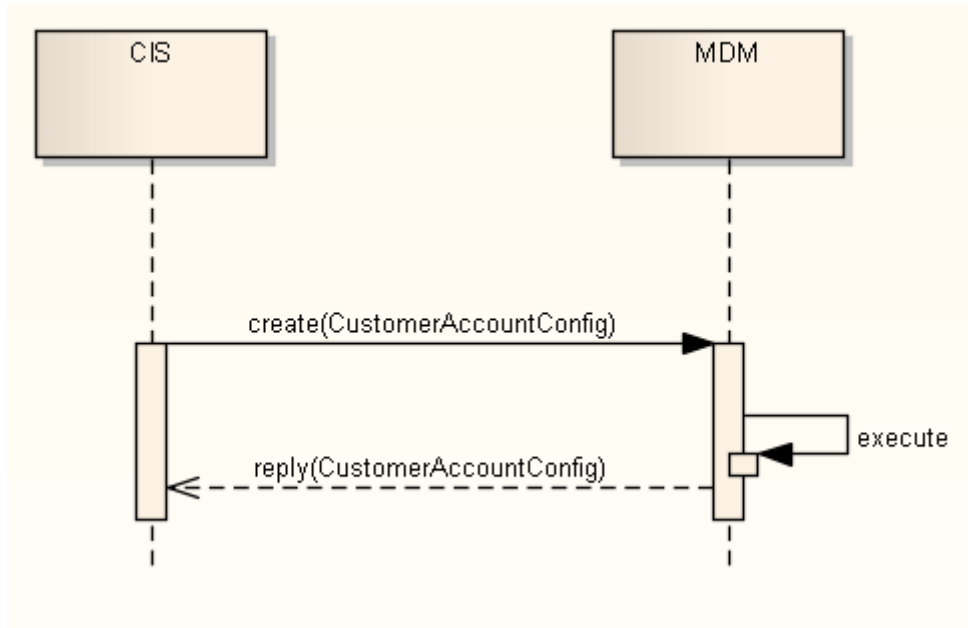


Figure 57 – Message exchange for transferring customer account information

5.10.2.6 Service categories

Information about the categories of service (electricity, water, gas for example) may be configured into MS by means of ServiceCategoryConfig message payload.

An example of a message exchange is given in Figure 58 and the message format is given in 5.10.3.7.

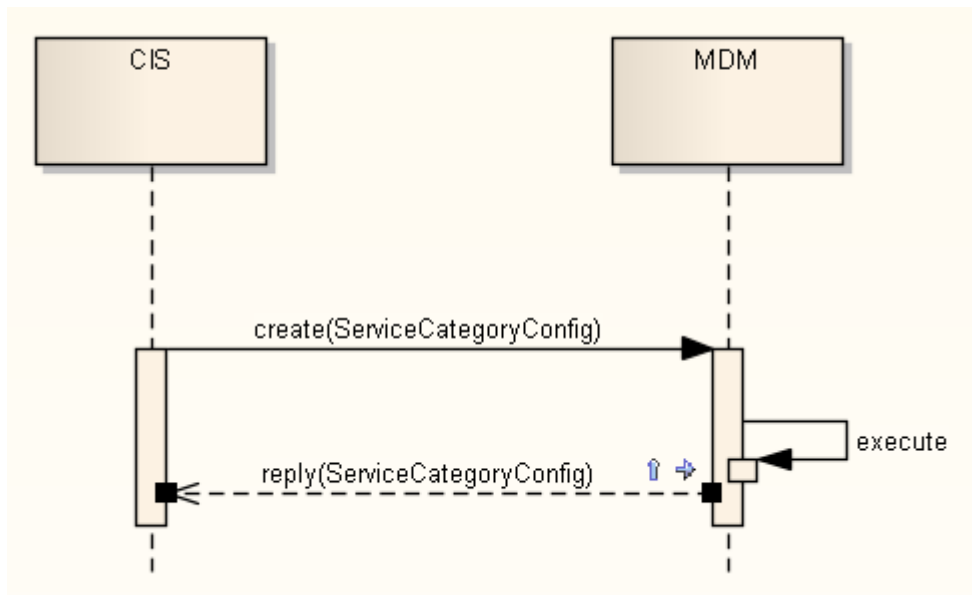


Figure 58 – Message exchange for transferring service category information

5.10.2.7 Usage points

Information about the usage points may be configured into MS by means of a UsagePointConfig message payload.

An example of a message exchange is given in Figure 59 and the message format is given in 5.10.3.8.

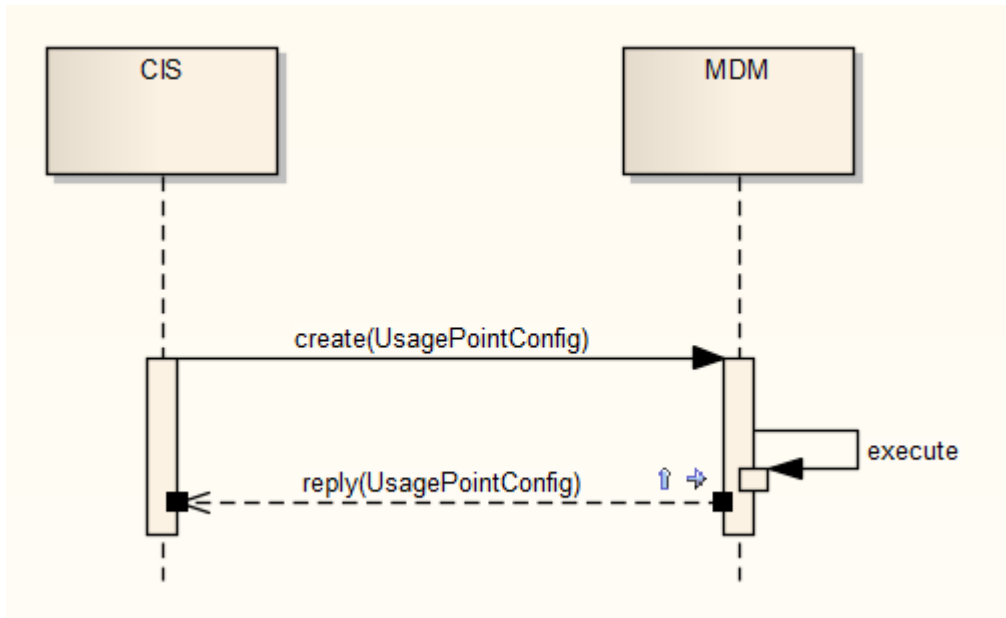


Figure 59 – Message exchange for transferring usage point information

5.10.2.8 Meters

Information about the meters in service may be configured into MS by means of MeterConfig message payload.

An example of a message exchange is given in Figure 60 and the message format is given in 5.10.3.11.

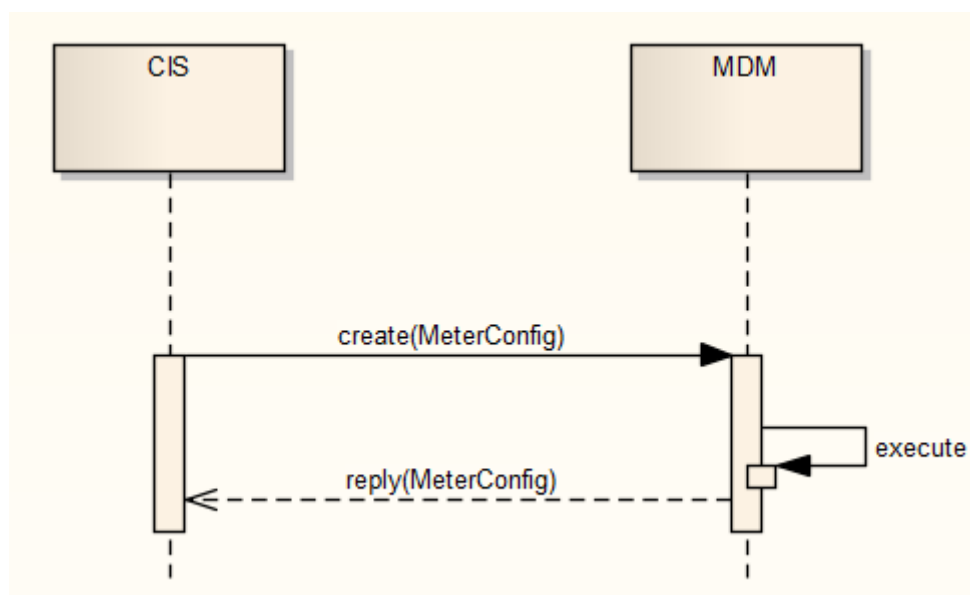


Figure 60 – Message exchange for transferring meter information

5.10.2.9 End devices

Information about end devices in service may be configured into MS by means of an EndDeviceConfig message payload.

An example of a message exchange is given in Figure 61 and the message format is given 5.10.3.10.

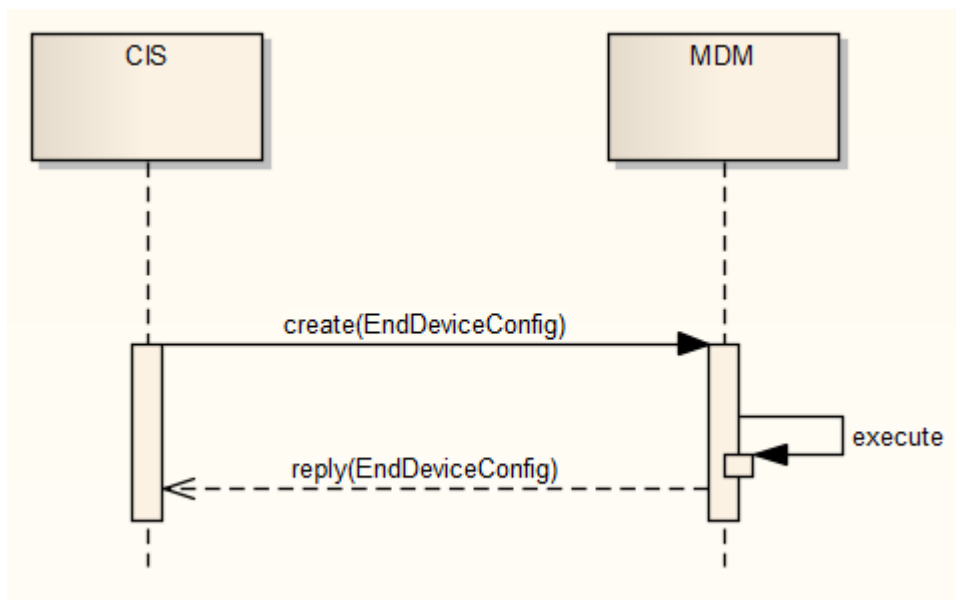


Figure 61 – Message exchange for transferring end device information

5.10.2.10 Service locations

Information about the service locations may be configured into MS by means of ServiceLocationConfig message payload.

An example of a message exchange is given in Figure 62 and the message format is given in 5.10.2.10.

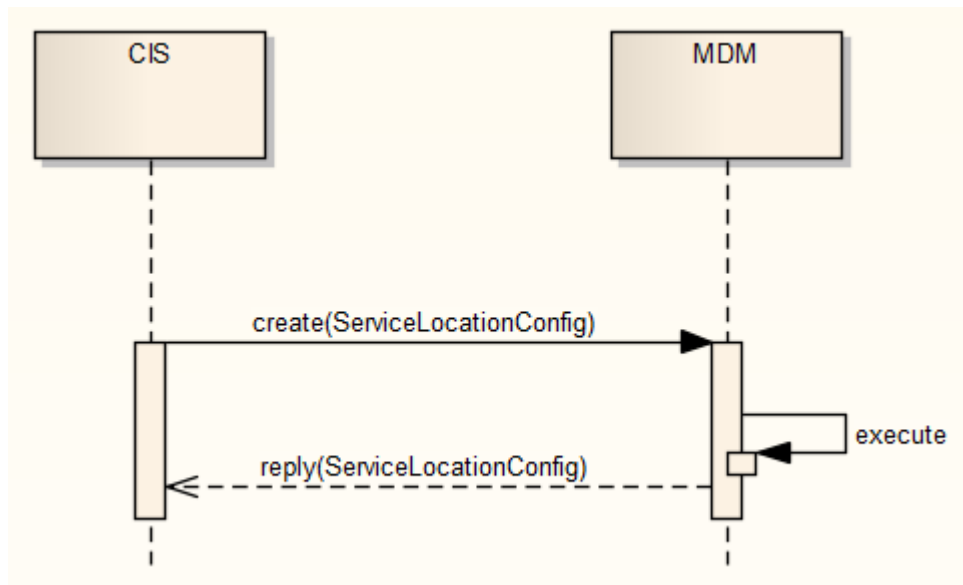


Figure 62 – Message exchange for transferring service location information

5.10.2.11 Pricing structure and tariffs

Information about pricing structures may be configured into MS by means of PricingStructureConfig message payload.

An example of a message exchange is given in Figure 63 and the message format is given in 5.10.3.14.

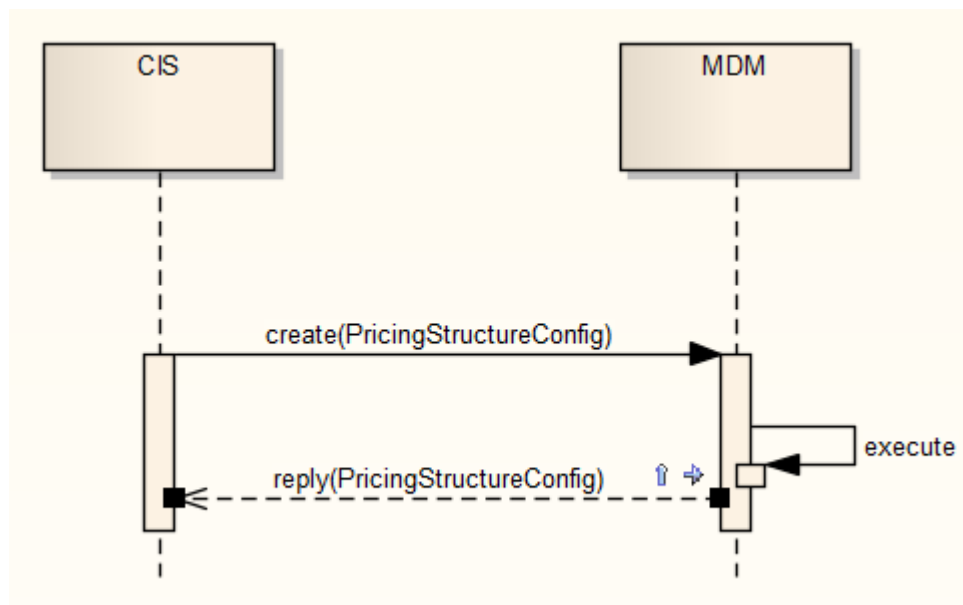


Figure 63 – Message exchange for transferring pricing structures

5.10.3 Message formats

5.10.3.1 General

This subclause 5.10.3 describes the message formats for the MasterDataLinkageConfig and other Master Data Management “config” messages. The detailed specification for each class

and attribute can be found in IEC 61968-11 and IEC 61970-301. The detailed, annotated XML schema is defined in Annex H.

5.10.3.2 MasterDataLinkageConfig

Figure 64 describes the top level structure of the Master Data Linkage Config message used to configure relationships between objects.

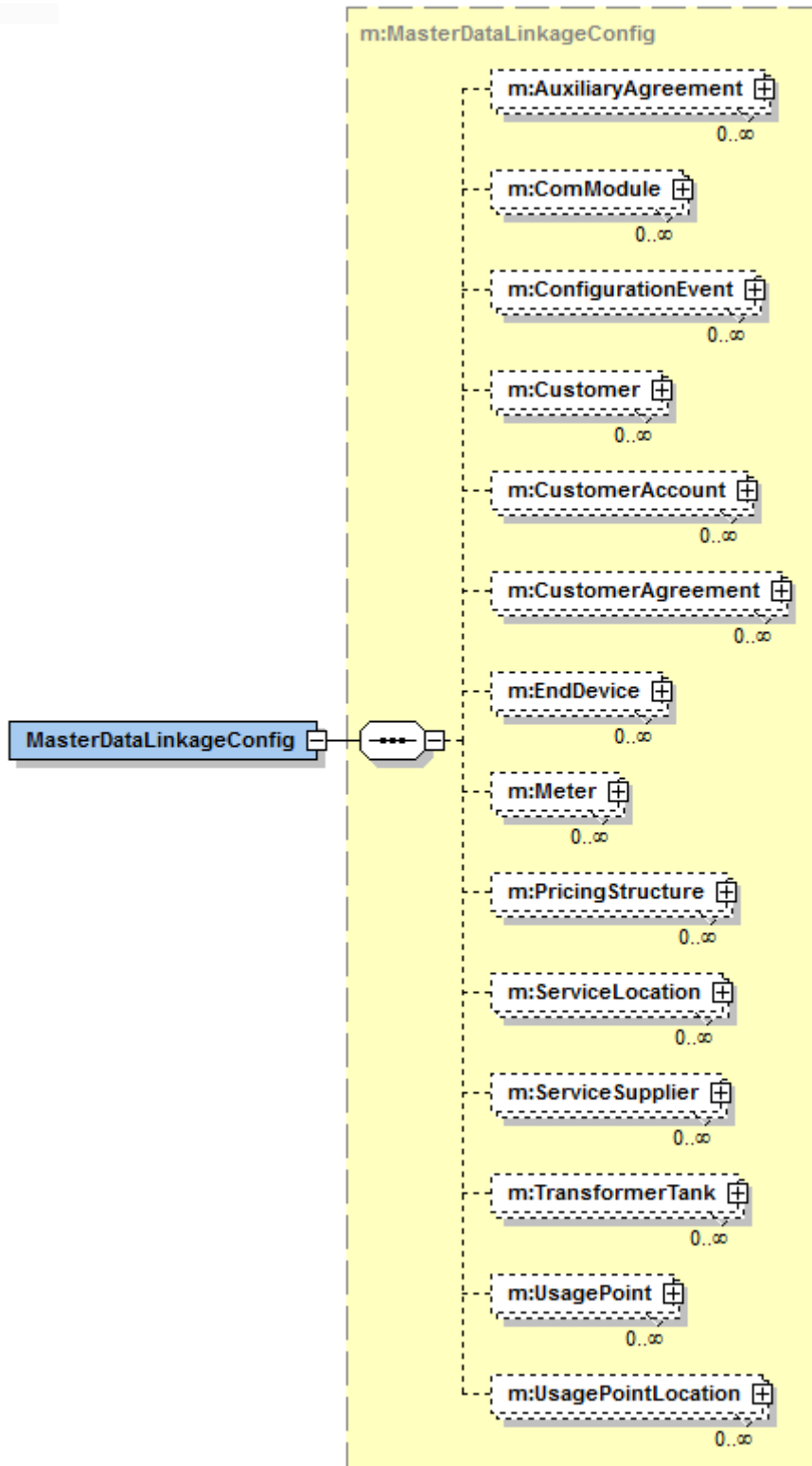


Figure 64 – MasterDataLinkageConfig message format

An example of MasterDataLinkageConfig is shown below. This message illustrates the “non-in-line” method of establishing an association between two CIM objects – in this case between the Meter and the UsagePoint are associated with each other using a MasterDataLinkageConfig command. This is the normative way to reflect the installation of a Meter at a UsagePoint.

```
<?xml version="1.0" encoding="UTF-8"?>
<m:MasterDataLinkageConfig
  xsi:schemaLocation = "http://iec.ch/TC57/2011/MasterDataLinkageConfig#
    MasterDataLinkageConfig.xsd"
  xmlns:m = "http://iec.ch/TC57/2011/MasterDataLinkageConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <m:ConfigurationEvent>
    <m:createdDateTime>2011-11-09T19:55:43.699Z</m:createdDateTime>
    <m:effectiveDateTime>2011-11-09T00:00:00.000Z</m:effectiveDateTime>
    <m:reason>MeterInstallation</m:reason>
  </m:ConfigurationEvent>
  <m:Meter>
    <m:Names>
      <m:name>1234LG</m:name>
    </m:Names>
  </m:Meter>
  <m:UsagePoint>
    <m:Names>
      <m:name>SDP1234E001001</m:name>
    </m:Names>
  </m:UsagePoint>
</m:MasterDataLinkageConfig>
```

5.10.3.3 SupplierConfig

The message structure in Figure 65 is used to configure service suppliers, replacing the SupplierConfig message defined in IEC 61968-9:2009.

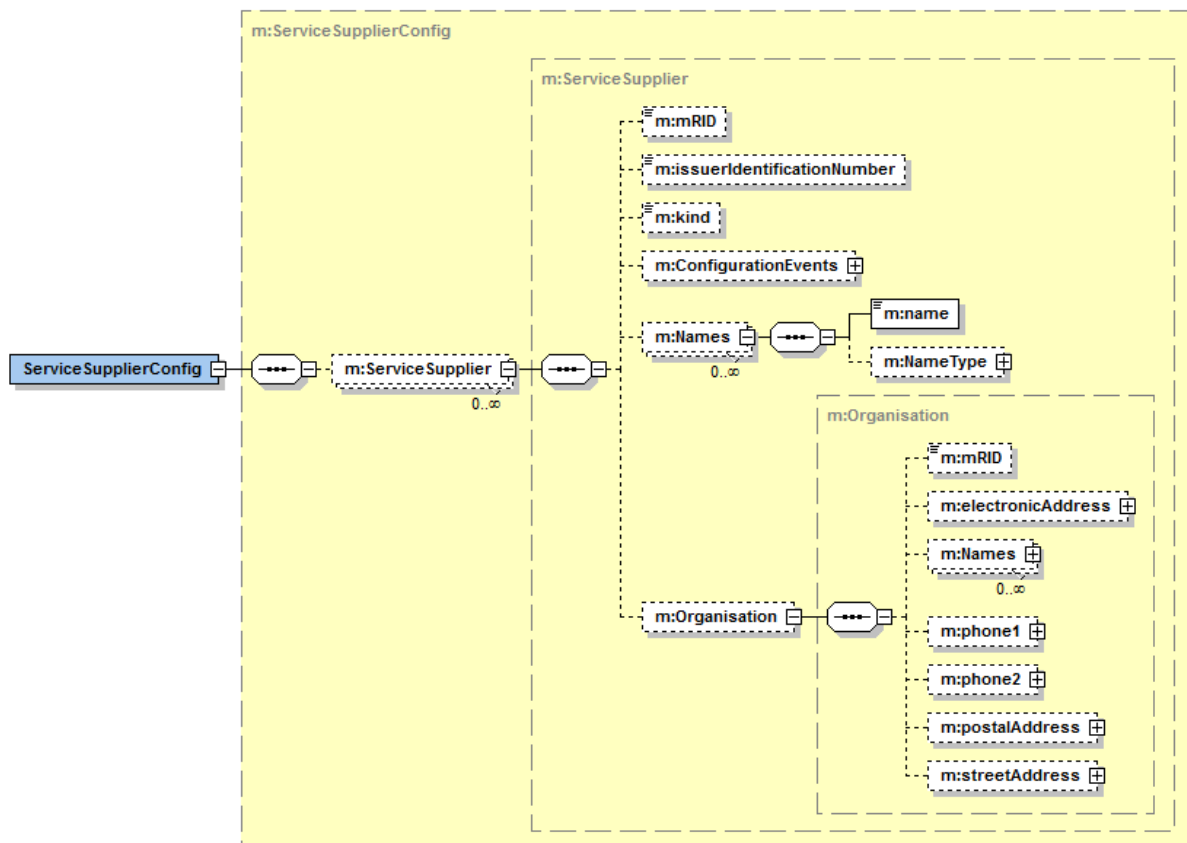


Figure 65 – Service supplier configuration message format

5.10.3.4 CustomerConfig

The message structure in Figure 66 is used to configure customers.

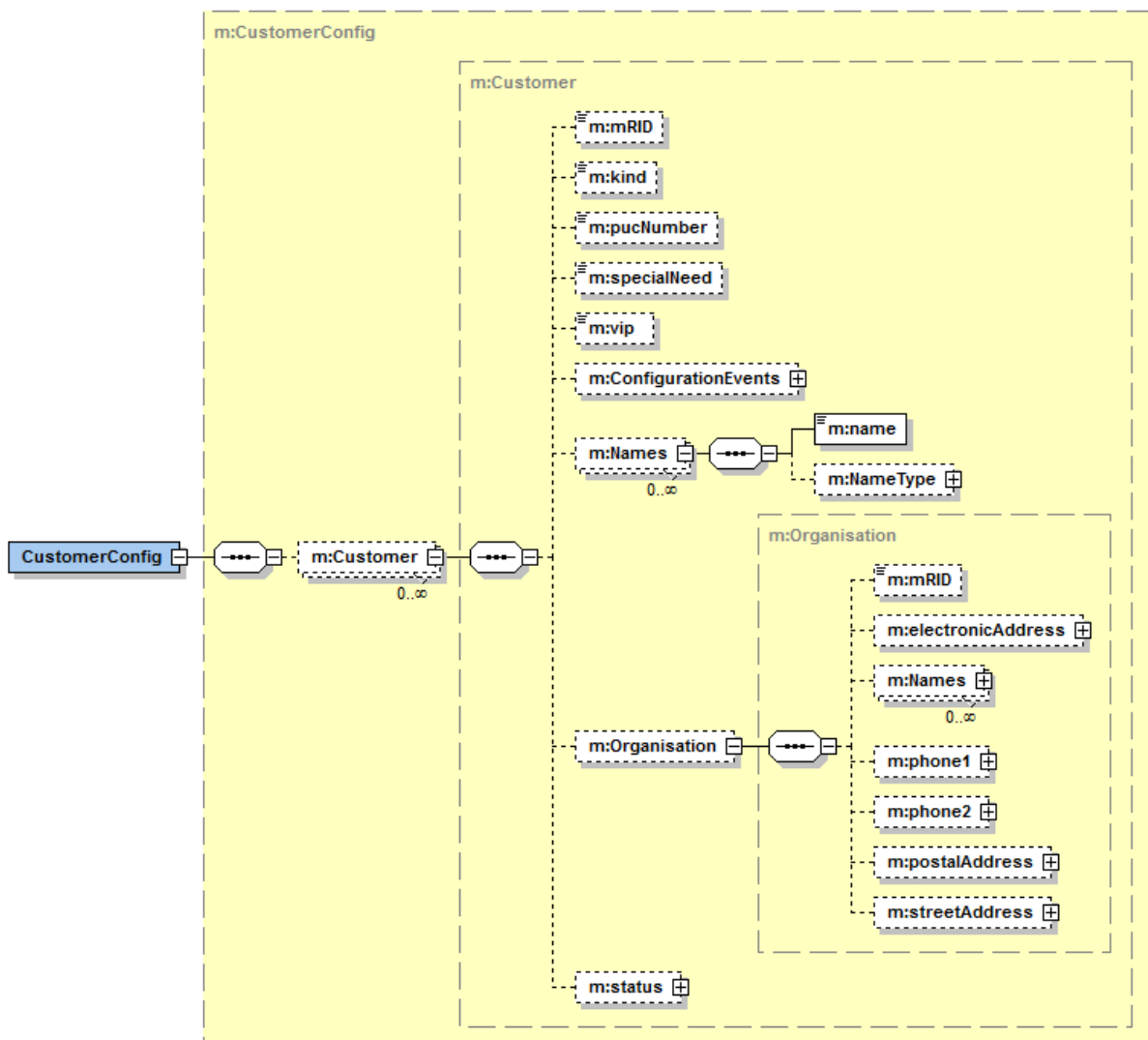


Figure 66 – Customer configuration message

5.10.3.5 CustomerAgreementConfig

The message structure in Figure 67 is used to configure customer agreements.

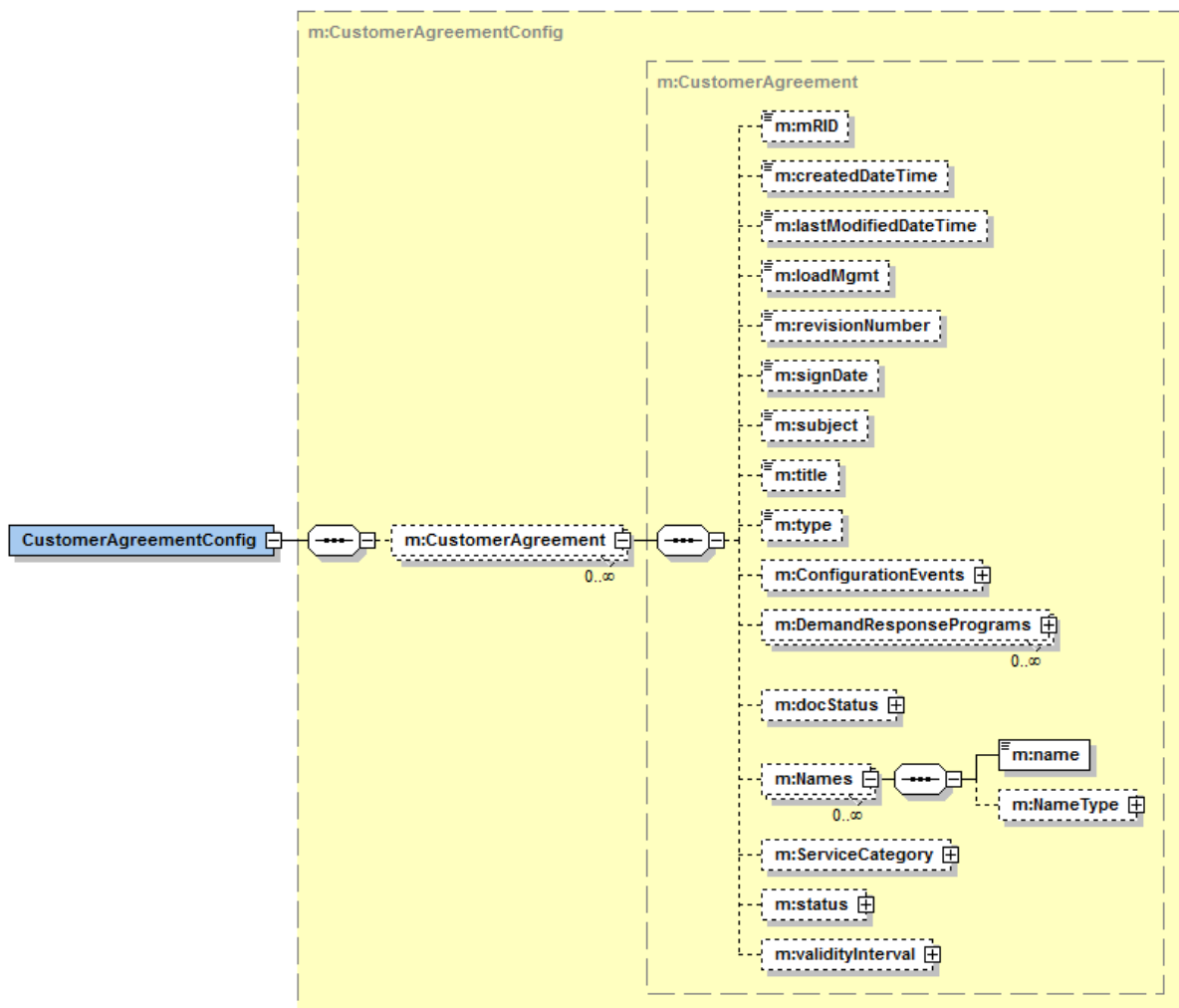


Figure 67 – Customer agreement configuration message

5.10.3.6 CustomerAccountConfig

The message structure in Figure 68 is used to configure customer accounts.

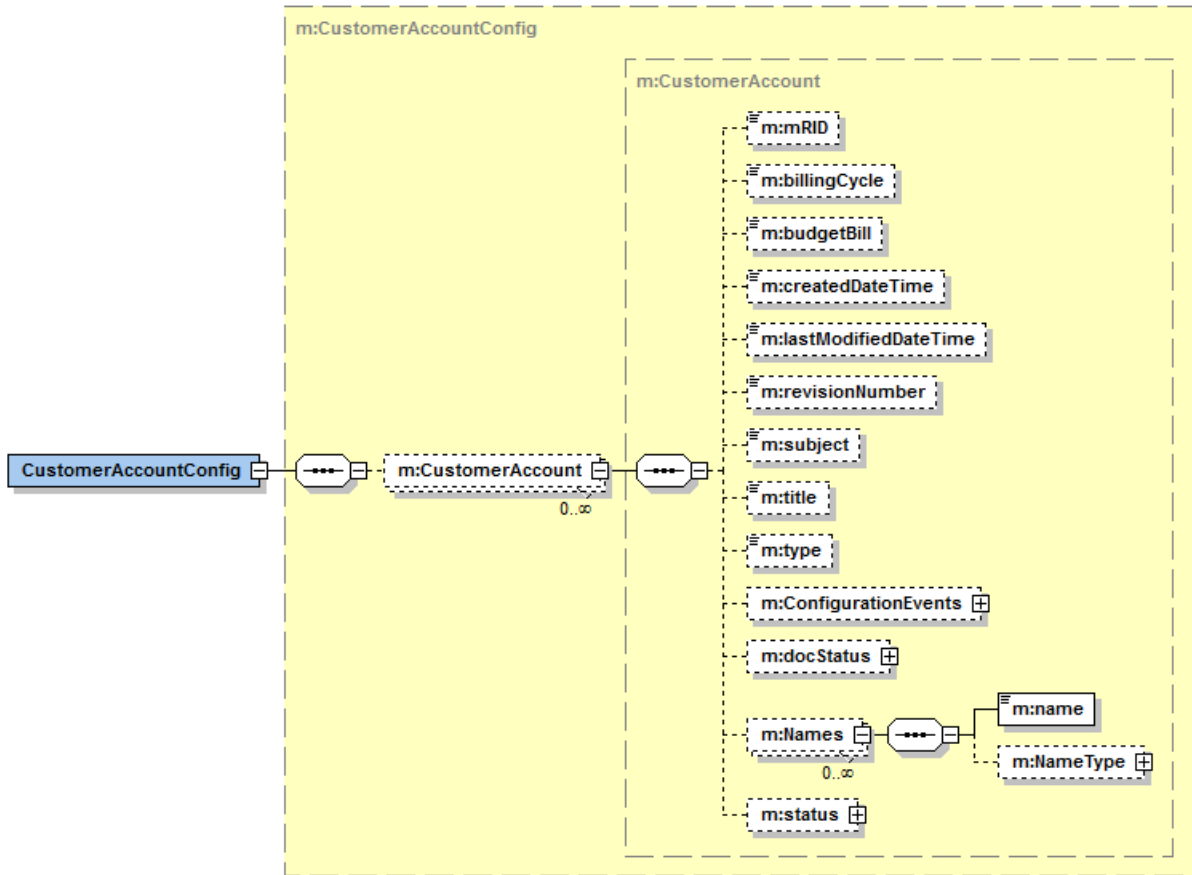


Figure 68 – Customer account configuration message

5.10.3.7 ServiceCategoryConfig

The message structure in Figure 69 is used to configure service categories.

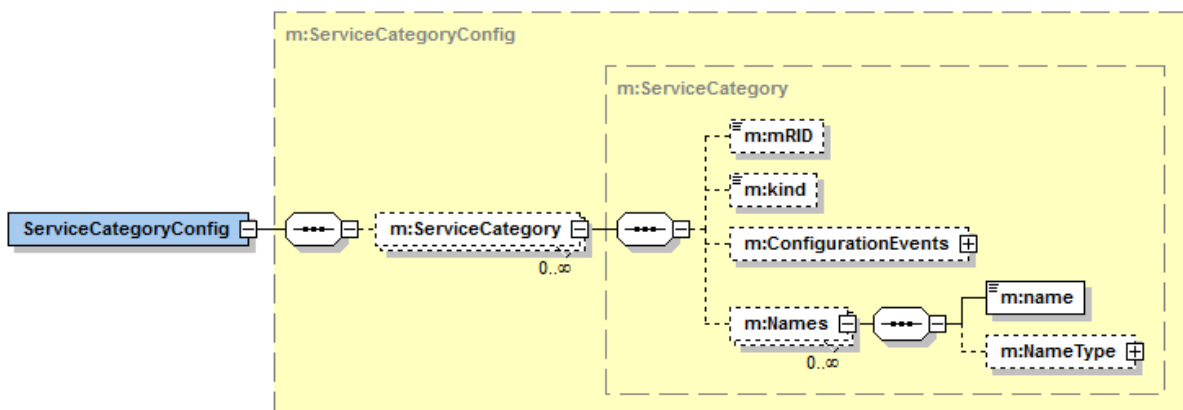


Figure 69 – ServiceCategoryConfig message format

5.10.3.8 UsagePointConfig

The message structure in Figure 70 is used to configure usage points. This replaces the service delivery points message defined in IEC 61968-9:2009.

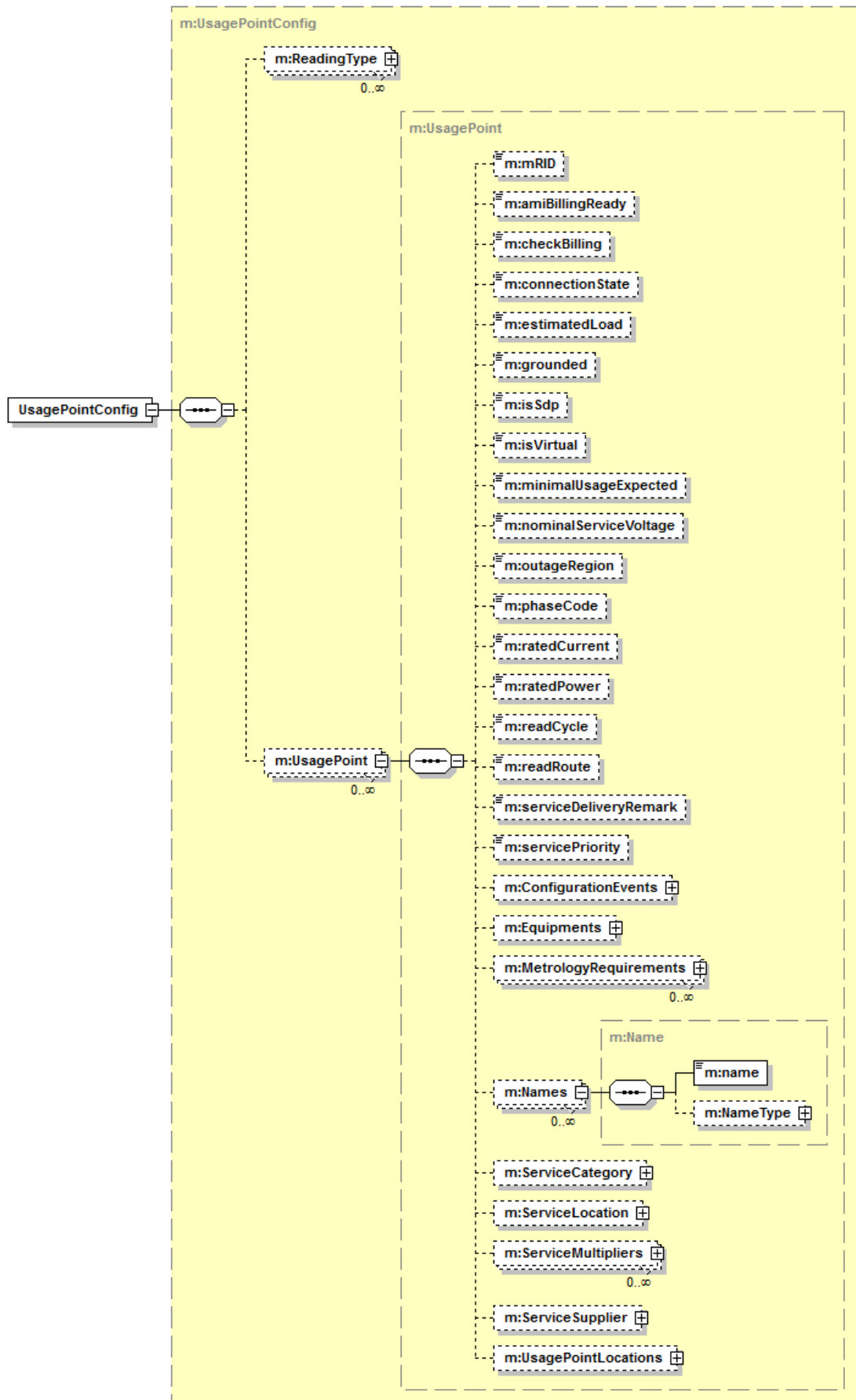


Figure 70 – UsagePointConfig message format

An example of UsagePointConfig payload is shown below.

```
<?xml version="1.0" encoding="UTF-8"?>
<m:UsagePointConfig xsi:schemaLocation="http://iec.ch/TC57/2011/UsagePointConfig#
UsagePointConfig.xsd" xmlns:m="http://iec.ch/TC57/2011/UsagePointConfig#"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <m:UsagePoint>
    <m:isSdp>true</m:isSdp>
    <m:ConfigurationEvents>
      <m:createdDateTime>2011-11-09T10:58:03.616Z</m:createdDateTime>
      <m:effectiveDateTime>2011-11-09T00:00:00.000Z</m:effectiveDateTime>
    </m:ConfigurationEvents>
    <m:Names>
      <m:name>SDP1234E001001</m:name>
      <m:NameType>
        <m:name>PrimaryName</m:name>
      </m:NameType>
    </m:Names>
    <m:UsagePointLocation>
      <m:Names>
        <m:name>LOC1234</m:name>
        <m:NameType>
          <m:name>PrimaryName</m:name>
        </m:NameType>
      </m:Names>
    </m:UsagePointLocation>
  </m:UsagePoint>
</m:UsagePointConfig>
```

5.10.3.9 UsagePointLocation

The diagram in Figure 71 describes the structure of the message used to define UsagePointLocations.

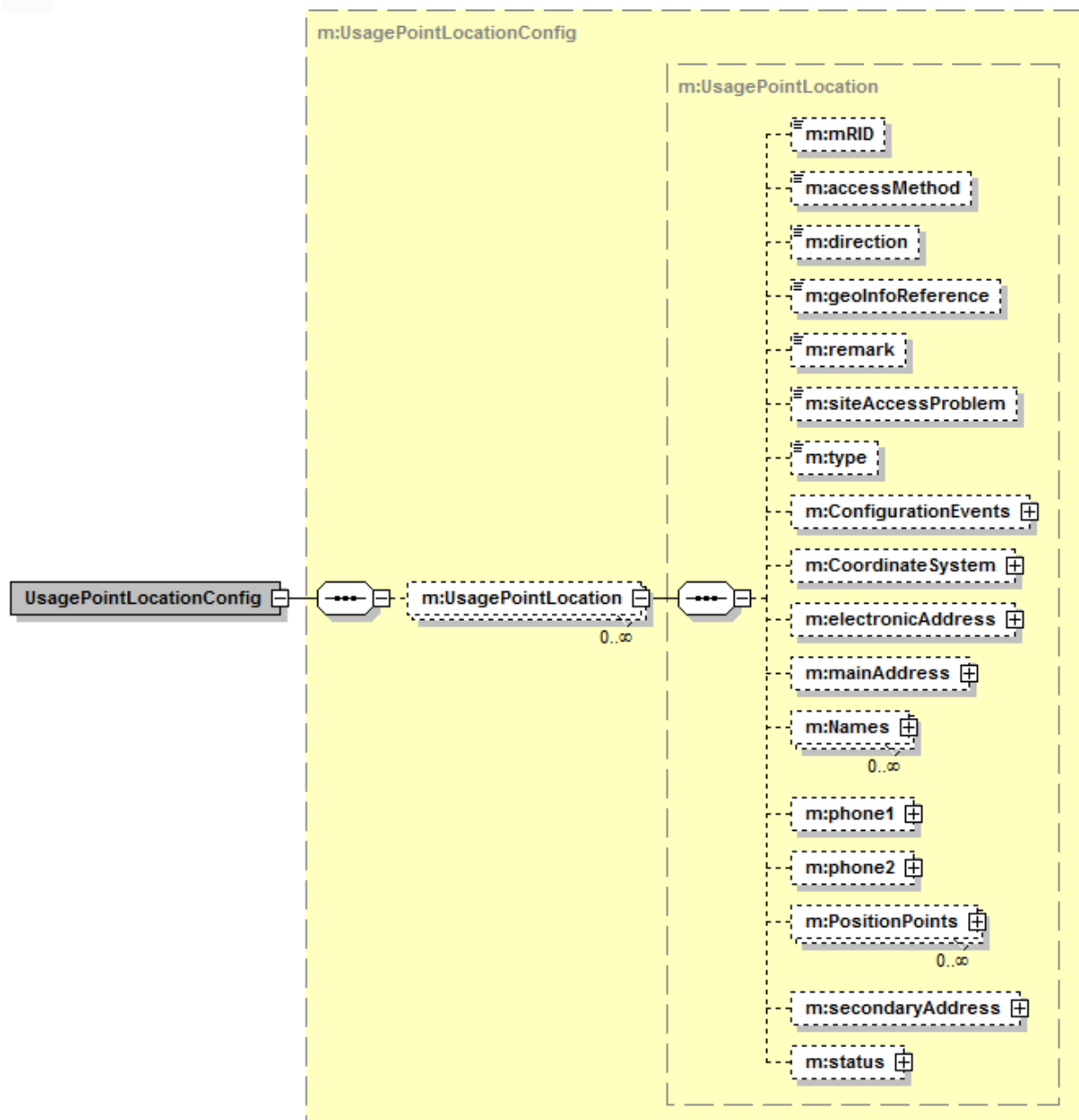


Figure 71 – UsagePointLocationConfig message format

An example payload of UsagePointLocationConfig is shown below.

```
<?xml version="1.0" encoding="UTF-8"?>
<m:UsagePointLocationConfig
  xsi:schemaLocation = "http://iec.ch/TC57/2011/UsagePointLocationConfig#
UsagePointLocationConfig.xsd"
  xmlns:m = "http://iec.ch/TC57/2011/UsagePointLocationConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <m:UsagePointLocation>
    <m:ConfigurationEvents>
      <m:createdDateTime>2011-11-09T10:57:02.583Z</m:createdDateTime>
      <m:effectiveDateTime>2011-11-09T00:00:00.000Z</m:effectiveDateTime>
    </m:ConfigurationEvents>
    <m:mainAddress>
      <m:streetDetail>
        <m:name>Main Street</m:name>
        <m:number>1234</m:number>
      </m:streetDetail>
      <m:townDetail>
        <m:country>US</m:country>
    </m:mainAddress>
  </m:UsagePointLocation>
</m:UsagePointLocationConfig>
```

```

    <m:name>Austin</m:name>
    <m:stateOrProvince>TX</m:stateOrProvince>
  </m:townDetail>
</m:mainAddress>
<m:Names>
  <m:name>LOC1234</m:name>
  <m:NameType>
    <m:name>PrimaryName</m:name>
  </m:NameType>
</m:Names>
</m:UsagePointLocation>
</m:UsagePointLocationConfig>

```

5.10.3.10 EndDeviceConfig

The diagram in Figure 72 describes the top level of the EndDeviceConfig message, which is used to provide for basic configuration of end devices.

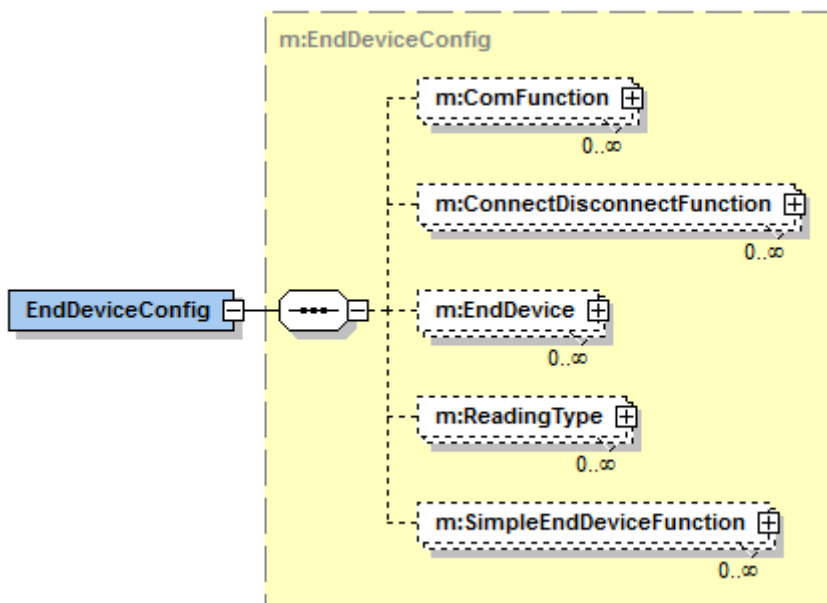


Figure 72 – End device config message format

5.10.3.11 MeterConfig

The message structure in Figure 73 is used to configure meters, where it is possible to supply information more specific to meters.

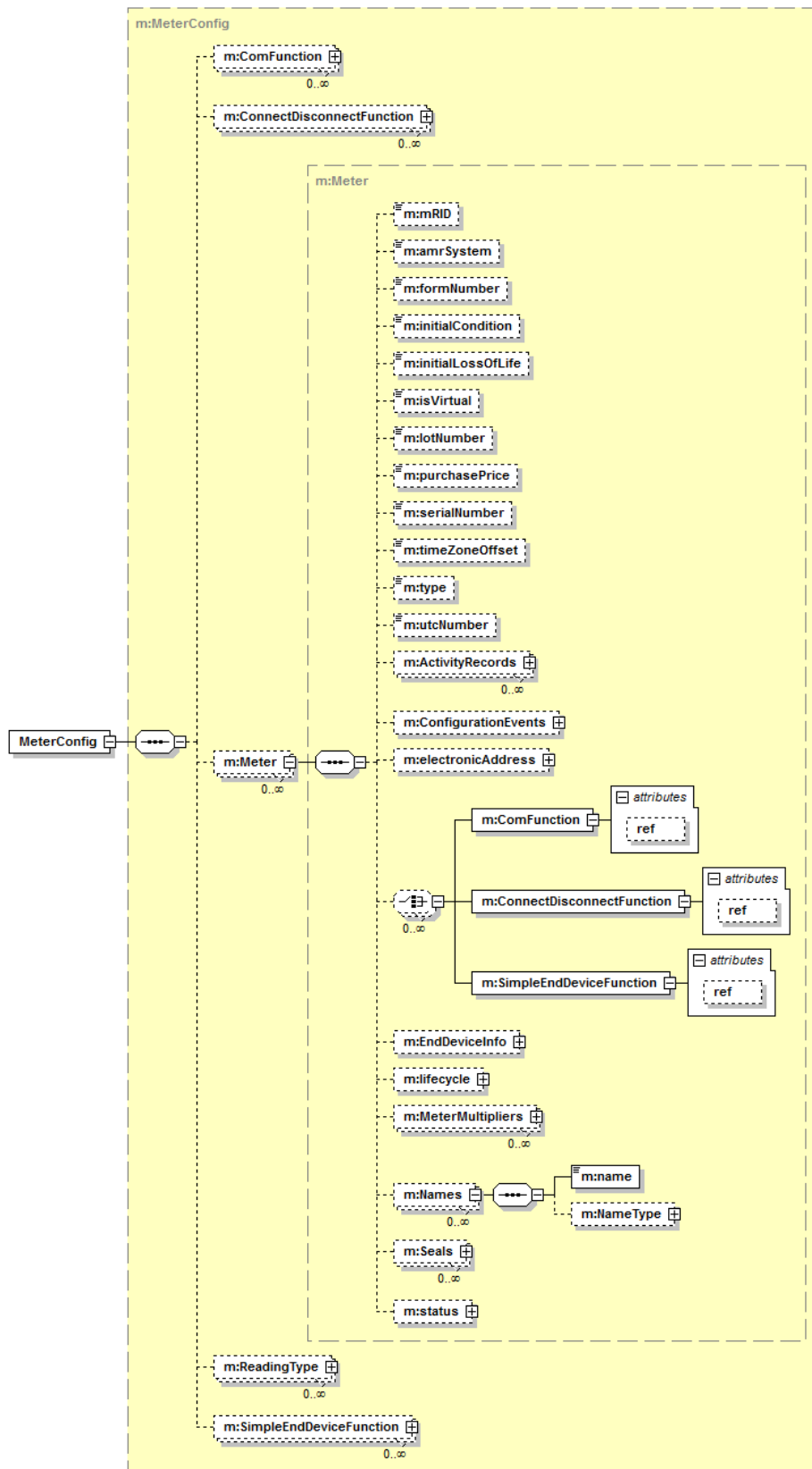


Figure 73 – Meter configuration message

An example of a MeterConfig payload is shown below.

```
<?xml version="1.0" encoding="UTF-8"?>
<m:MeterConfig
```

```

xsi:schemaLocation = "http://iec.ch/TC57/2011/MeterConfig# MeterConfig.xsd"
xmlns:m = "http://iec.ch/TC57/2011/MeterConfig#"
xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
<m:Meter>
  <m:amrSystem>CCTR</m:amrSystem>
  <m:serialNumber>82000001</m:serialNumber>
  <m:ConfigurationEvents>
    <m:createdDateTime>2011-11-09T13:55:02.776Z</m:createdDateTime>
    <m:effectiveDateTime>2011-11-09T00:00:00.000Z</m:effectiveDateTime>
    <m:reason>AssetCreation</m:reason>
  </m:ConfigurationEvents>
  <m:EndDeviceInfo>
    <m:AssetModel>
      <m:modelNumber>F60</m:modelNumber>
      <m:Manufacturer>
        <m:Names>
          <m:name>LG</m:name>
        </m:Names>
      </m:Manufacturer>
    </m:AssetModel>
  </m:EndDeviceInfo>
  <m:Names>
    <m:name>1234LG</m:name>
    <m:NameType>
      <m:name>PrimaryName</m:name>
    </m:NameType>
  </m:Names>
</m:Meter>
</m:MeterConfig>

```

5.10.3.12 ComModuleConfig

The diagram in Figure 74 provides the top level structure of the message used to configure communication modules.

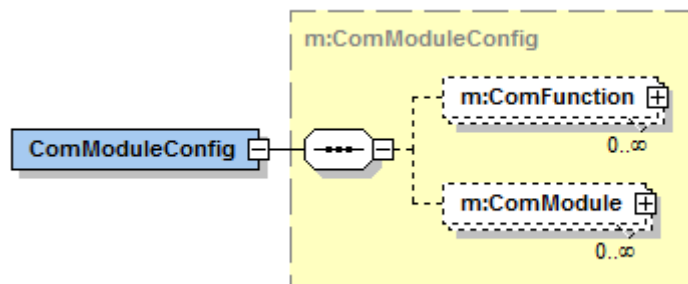


Figure 74 – ComModuleConfig message format

5.10.3.13 ServiceLocationConfig

The message structure in Figure 75 is used to configure service locations.

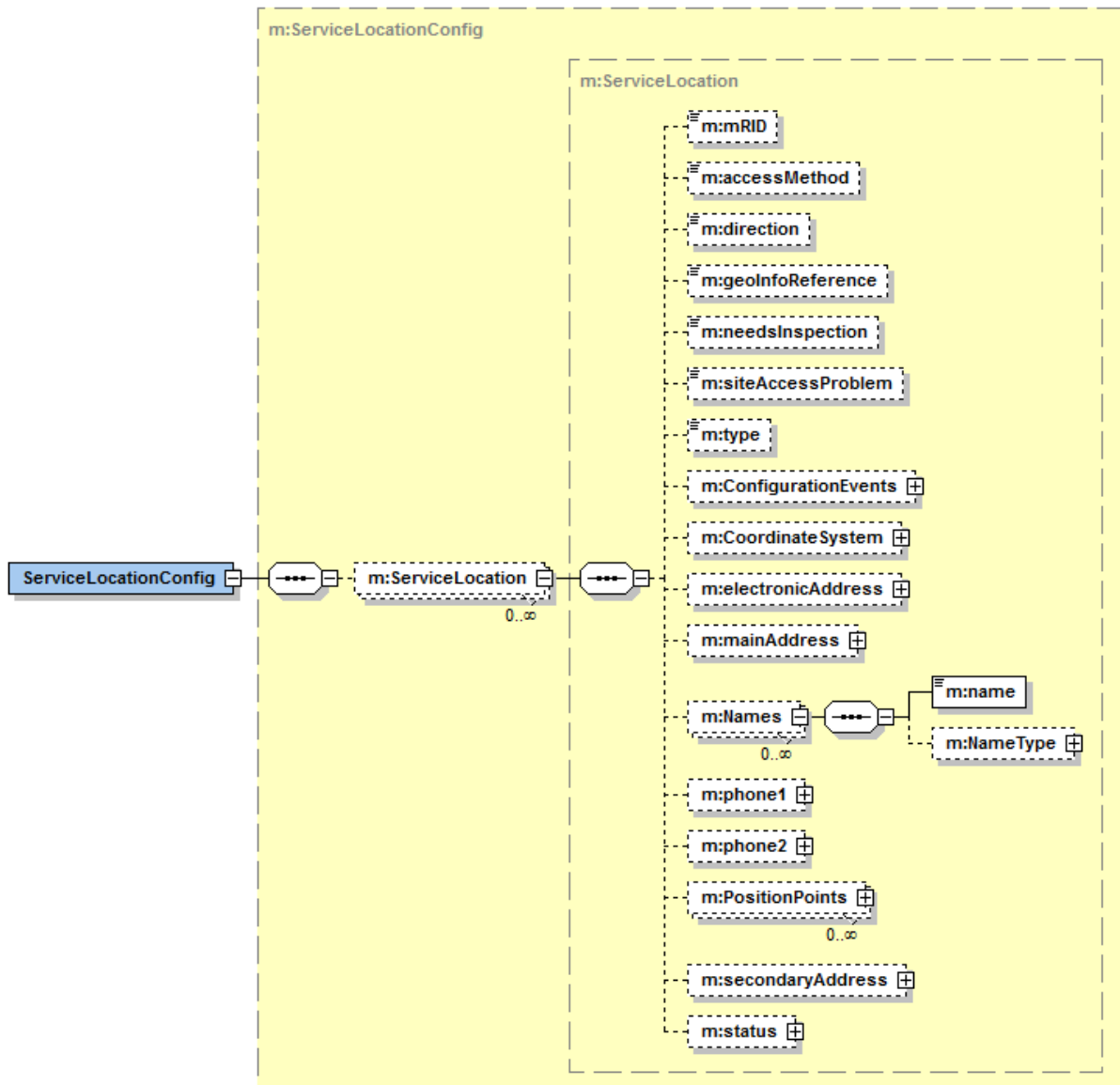


Figure 75 – ServiceLocationConfig message format

5.10.3.14 PricingStructureConfig

The message structure in Figure 76 is used to configure pricing structures.

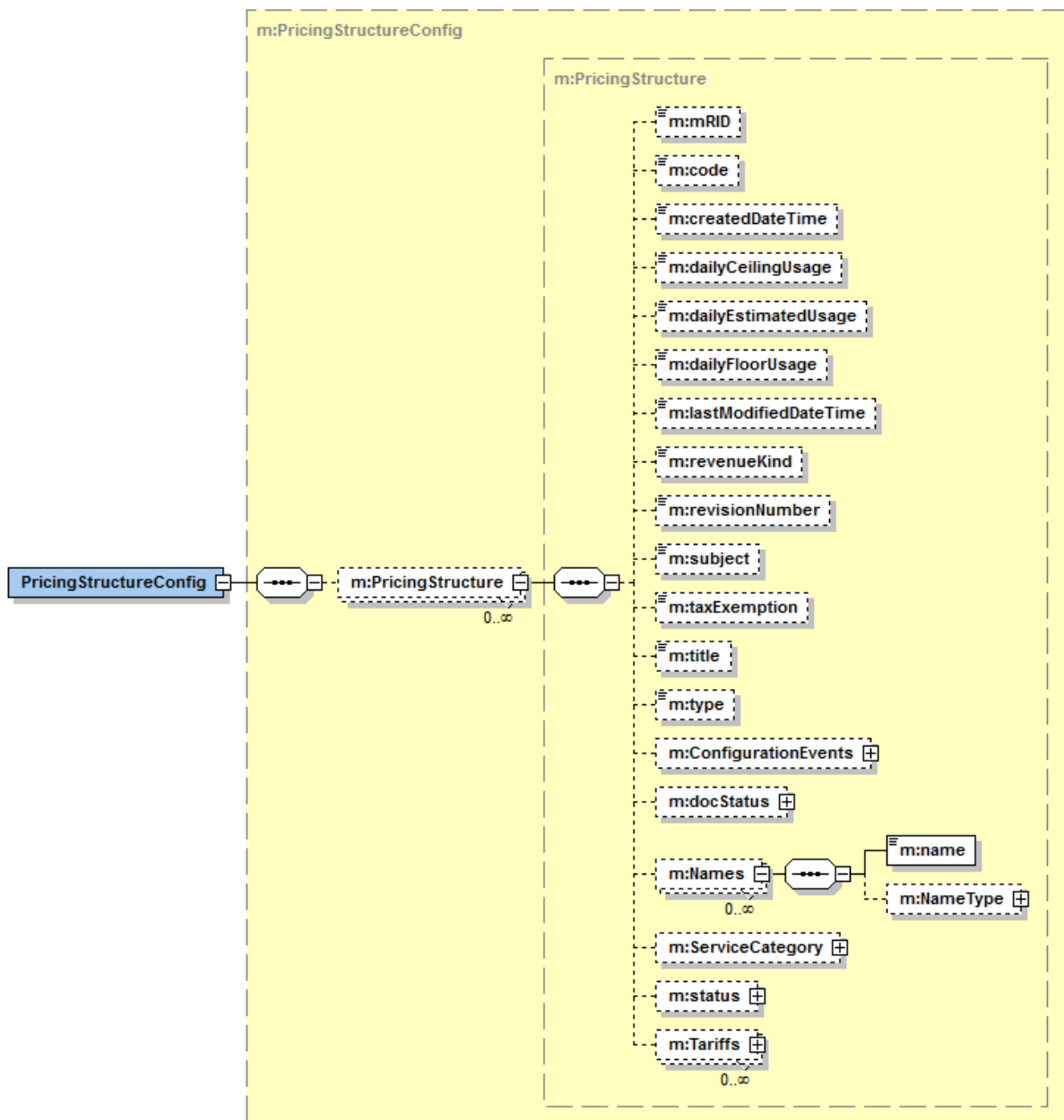


Figure 76 – PricingStructureConfig message format

6 Document conventions

6.1 UML diagrams

All UML-based sequence diagrams contained herein are to be considered as informative examples of how a message exchange could occur.

One of the strengths of the CIM is its flexibility. As technology advances, and new needs develop, new messages can be created. These new messages might involve additional systems (not pictured.) These new messages may leverage different options than the ones depicted in the example.

All UML-based communication diagrams and message flow diagrams contained herein are to be considered informative.

All UML-based class diagrams contained herein are to be considered informative. The reader is referred to IEC 61968-1 to locate the document that contains the normative definitions of the classes used in the CIM.

6.2 Message definitions

6.2.1 General

Message format diagrams contained in the body of this document are to be considered as either normative or informative, with the normative XML schemas being supplied in Annex H, and informative XML schemas being provided by Annex I.

Use cases and sequence diagrams presented in this document are for informative purposes only, and represent usage examples for the normative message definitions.

6.2.2 Mandatory vs. optional

The messages described within this standard were derived from use cases which satisfy an underlying business need for a specific information exchange. Each use case provides a given context for the use of the CIM. Message format diagrams describe the elements which are passed. The elements depicted in dashed-line boxes are to be considered optional in a given context. The elements depicted in solid boxes are to be considered mandatory in a given context. If a diagram should depict an entire class as mandatory or optional, the reader should interpret this to mean that the use of the class is either mandatory or optional, but not that every element within the class is now mandatory or optional. The reader shall refer to the normative definition of the class to determine this.

6.2.3 Verb tense

CIM verbs illustrated in some of the sequence diagrams within this standard are shown in UPPER CASE; however, the verbs in the headers of all IEC 61968-9 CIM messages are required to be in lower case.

6.3 Synchronous versus asynchronous messages

The use of asynchronous or synchronous messages in the sequence diagrams in this document is for illustrative purposes only and is not prescriptive.

6.4 Depiction of simple acknowledgment messages

In web services implementations, there is always a synchronous acknowledgment to request messages even if the overall exchange pattern is asynchronous. This synchronous acknowledgment is performed using a simple IEC 61968-9 response stereotype message having:

An IEC 61968-100 header

An IEC 61968-100 reply structure with:

Reply.Result = "OK"

Reply.Error.code = "0.3" (refer to Annex B)

When using JMS messaging, this simple acknowledgment is also included in the messaging pattern if the AckRequired Boolean is set to "true" in the 61968-100 Header of the request message. However; this simple acknowledgment is suppressed if the AckRequired Boolean is set to "false".

The depiction or lack of depiction of these simple acknowledgment messages in sequence diagrams within this document is intentionally inconsistent as the sequence diagrams are informative and no assumption is made as to whether JMS or web services are being used or whether the AckRequired Boolean is set to "true". Refer to IEC 61968-100 for further information on this subject.

Annex A (normative)

Description of message type verbs

Table A.1 is copied here from Annex B of IEC 61968-100:2013 for convenience purposes only.

Table A.1 – Commonly used verbs

Verbs	Meaning	Message structure
create	The "create" verb is used to publish a request to the master system to create a new object. The master system may in turn publish the new object as an event using the verb "created". The master system may also use the verb "reply" to respond to the "create" request, indicating whether the request has been processed successfully or not.	Request message will include HeaderType and Payload structures.
change	The "change" verb is used to publish a request to the master system to make a change to an object based on the information in the message. The master system may in turn publish the changed object as an event using the verb "changed" to notify that the object has been changed since last published. The master system may also use the verb "reply" to respond to the "change" request, indicating whether the request has been processed successfully or not.	Request message will include HeaderType, RequestType and optionally Payload structures. The requestType structure will potentially identify specific object IDs.
cancel	The "cancel" verb is used to publish a request to the master system to cancel the object, most commonly in the cases where the object represents a business document. The master system may in turn publish the cancelled message as an event using the verb "canceled" to notify that the document has been cancelled since last published. The master system may also use the verb "reply" to respond to the "cancel" request, indicating whether the request has been processed successfully or not. The "cancel" verb is used when the business content of the document is no longer valid due to error(s).	Request message will include HeaderType, RequestType and optionally Payload structures. The requestType structure will potentially identify specific object IDs.
close	The "close" verb is used to publish a request to the master system to close the object, most commonly in cases where the object represents a business document. The master system may in turn publish the closed message as an event using the verb "closed" to notify that the document has been closed since last published. The master system may also use the verb "reply" to respond to the "close" request, indicating whether the request has been processed successfully or not. The "close" verb is used when the business document reaches the end of its life cycle due to successful completion of a business process.	Request message will include HeaderType, RequestType and optionally Payload structures. The requestType structure will potentially identify specific object IDs.
delete	The "delete" verb is used to publish a request to the master system to delete one or more objects. The master system may in turn publish the closed message as an event using the verb "deleted" to notify that the object has been deleted since last published. The master system may also use the verb "reply" to respond to the "delete" request, indicating whether the request has been processed successfully or not. The "delete" verb is used when the business object should no longer be kept in the integrated systems either due to error(s) or due to archiving needs. However, the master system will most likely retain a historical record of the object after deletion.	Request message will include HeaderType, RequestType and optionally Payload structures. The requestType structure will potentially identify specific object IDs.
execute	This is used when the message is conveying a transaction that involves a variety of create, delete and/or change operations. See Annexes K and L.	See OperationSet in Message.xsd.

Verbs	Meaning	Message structure
get	The "get" verb is used to issue a query request to the master system to return a set of zero or more objects that meet a specified criteria. The master system may in turn return zero or more objects using the "reply" verb in a response message.	Request message will include HeaderType and RequestType structures. The requestType structure will potentially identify specific parameters to qualify the request, such as object IDs.
created	The "created" verb is used to publish an event that is a notification of the creation of an object as a result of either an external request or an internal action within the master system of that object. This message type is usually subscribed by interested systems and could be used for mass updates. There is no need to reply to this message type.	Event message will include HeaderType and Payload structures.
changed	The "changed" verb is used to publish an event that is a notification of the change of an object as a result of either an external request or an internal action within the master system of that object. This could be a generic change in the content of the object or a specific status change such as "approved", "issued" etc. This message type is usually subscribed by interested systems and could be used for mass updates. There is no need to reply to this message type.	Event message will include HeaderType and Payload structures.
closed	The "closed" verb is used to publish an event that is a notification of the normal closure of an object as a result of either an external request or an internal action within the master system of that object. This message type is usually subscribed by interested systems and could be used for mass updates. There is no need to reply to this message type.	Event message will include HeaderType and Payload structures.
canceled	The "canceled" verb is used to publish an event that is a notification of the cancellation of an object as a result of either an external request or an internal action within the master system of that object. This message type is usually subscribed by interested systems and could be used for mass updates. There is no need to reply to this message type.	Event message will include HeaderType and Payload structures.
deleted	The "deleted" verb is used to publish an event that is a notification of the deletion of an object as a result of either an external request or an internal action within the master system of that object. This message type is usually subscribed by interested systems and could be used for mass updates. There is no need to reply to this message type.	Event message will include HeaderType and Payload structures.
executed	This provides for an event that indicates the execution of a transaction.	See OperationSet in Message.xsd.
reply	There are two primary usages of the "reply" verb, but in both cases it is only used in response to request messages, whether the pattern used is synchronous or asynchronous. The first usage is to indicate the success, partial success or failure of a transactional request to the master system to create, change, delete, cancel, or close a document. The second usage is in response to a "get" request, where objects of interest may be returned in the response.	Used only for response messages. For responses to transactional requests, the message will contain HeaderType and ReplyType structures. For responses to get requests, the message will contain HeaderType, ReplyType and potentially Payload structures.
<p>NOTE 1 Verbs are listed in this standard for convenience purposes and also to reflect changes that may be reflected in future versions of IEC 61968-1.</p>		
<p>NOTE 2 Within this standard (e.g. on sequence diagrams), verbs are case insensitive. However, within the standard Message they shall be lower case. The verb SUBSCRIBE has been deprecated. Any usage of SUBSCRIBE is an indication that transport level (e.g. JMS) messages may be conveyed between parties, but these are not IEC 61968-9 messages.</p>		

Annex B (informative)

Reply error codes

B.1 Overview

The message structure to carry Reply.Error.Codes is defined in IEC 61968-1. Additional detail may be provided in supportive documents such as IEC 61968-100. Application specific codes are provided by individual parts. The application specific reply codes for IEC 61968-9 are defined here.

The normative reply codes are defined by IEC 61968-100.

B.2 Reply code categories

The ReplyCodes can be categorized into families as described in Table B.1:

Table B.1 – ReplyCode Categories

ReplyCode Category	Error	Normative Status
0	Error free	N
1	Bad or Missing element	N
2	Parameter invalid	N
3	Too many values	N
4	Request aborted	N
5	Application Error	N
6	Business rule violation	N
7	Security issue	N
N	Normative	
I	Informative	
D	Deprecated	

B.3 Code Construction

These categories can serve as the basis for a numbering scheme to form codes such as those described by the formula below.

ReplyCode ::= <ReplyCode Category> "." <ReplyCode Index>

B.4 Code Indexes

The indexes for each category are described in Tables B.2 through B.9 below.

Table B.2 – Error-free Enumerations

ReplyCode Category	ReplyCode Index	Error	Normative Status
0	0	Success / No errors	N
0	1	Partial result (additional results conveyed in separate messages)	N
0	2	Partial result (no further results to follow)	N
0	3	Simple acknowledgement	N

Table B.3 – Missing-element Enumerations

ReplyCode Category	ReplyCode Index	Error	Normative Status
1	1	Noun element(s) not found in message	N
1	2	Revision element not found in message	N
1	3	Verb element(s) not found in message	N
1	5	Mandatory Header elements missing	N
1	6	Mandatory Request elements missing	N
1	7	Mandatory Payload elements missing	N
1	8	Format of request does not validate against schema	N
1	9	Unsupported Revision in message Header	N

Table B.4 – Bad-value Enumerations

ReplyCode Category	ReplyCode Index	Error	Normative Status
2	1	Meter / RCD switch mismatch	N ^a
2	2	Invalid Feeder(s)	I
2	3	Feeder / Substation mismatch	I ^a
2	4	Invalid Meter(s)	N
2	5	Invalid Noun	N
2	6	Invalid ReadingType(s)	N
2	7	Invalid Substation(s)	I
2	8	Switch / Substation mismatch	I ^a
2	9	Invalid Verb	N
2	10	Unsupported Reading Type(s)	N
2	11	Payload mismatch	I
2	12	Invalid UsagePoint(s)	N
2	13	Meter / UsagePoint mismatch	N ^a
2	14	Invalid Source	N
2	15	Invalid Request ID(s)	N

ReplyCode Category	ReplyCode Index	Error	Normative Status
2	16	Invalid ServiceLocation(s)	N
2	17	Meter / ServiceLocation mismatch*	N
2	18	ComModule / Meter mismatch*	N ^a
2	19	Invalid CustomerAccount(s)	N
2	20	Invalid ServiceSupplier(s)	N
2	21	CustomerAccount / ServiceSupplier mismatch	N ^a
2	22	Invalid Customer(s)	N
2	23	Customer / CustomerAccount mismatch	N ^a
2	24	Invalid CustomerAgreement(s)	N
2	25	CustomerAccount / CustomerAgreement mismatch	N ^a
2	26	CustomerAgreement / UsagePoint mismatch	N ^a
2	27	CustomerAccount / UsagePoint mismatch	N ^a
2	28	ServiceSupplier / UsagePoint mismatch	N ^a
2	29	Object relationship mismatch	N
2	30	Invalid ComModule(s)	N
2	31	Invalid Service Category(ies)	N
2	32	Invalid UsagePointLocation(s)	N
2	33	Invalid PricingStructure(s)	N

^a Retained for backward compatibility. Intended for deprecation in the future edition of IEC 61968-9 and 2.29 will be used instead.

Table B.5 – Too-many-values enumerations

ReplyCode Category	ReplyCode Index	Error	Normative Status
3	1	Too many items in request	N
3	2	Too many pending requests	N
3	3	Too many ReadingTypes in request	I

Table B.6 – Request-timed-out enumerations

ReplyCode Category	ReplyCode Index	Error	Normative Status
4	1	Request timed out	N
4	2	Service not available	I
4	3	Local error in processing	I

Table B.7 – Application-error enumerations

ReplyCode Category	ReplyCode Index	Error	Normative Status
5	1	Unable to process the request - high system activity level	N
5	2	Unable to process request -transaction not attempted	N
5	3	Unable to process the request - transaction attempted and failed	N
5	4	Unable to process the request - multiple error types encountered	N
5	5	Some or all of the requested reading types are unavailable in MDMS	N
5	6	Some or all of the requested reading types are unavailable in AMI	N
5	7	Some or all of the requested data is unavailable	N
5	8	Unable to process the request – mandatory field(s) missing	N
5	9	Transaction aborted to maintain transactional integrity	N
5	10	Unable to process request – functionality not supported	N
5	11	Failure due to security	N

Table B.8 – Business-rule-violation enumerations

ReplyCode Category	ReplyCode Index	Error	Normative Status
6	1	Request canceled per business rule	N
6	2	Request placed on hold per business rule	N
6	3	Request released from business rule hold	N
6	4	Request rescheduled per business rule	N
6	5	Request canceled by user	N

Table B.9 – Security issue enumerations

ReplyCode Category	ReplyCode Index	Error	Normative Status
7	1	Temporary authentication failure	I
7	2	Authentication Required	I
7	3	Authentication mechanism insufficient	I
7	4	Authentication failure	I
7	5	Action not authorized for user	I
7	6	Authentication mechanism requires encryption	I
7	7	Policy violation	I

B.5 Reply.Error.code examples

Reply codes are constructed according to a formula that creates a dot notation which is expressed in the form a string. Example Reply.Error.codes are provided in Table B.10.

Table B.10 – Common enumerations

Reply Code	Description
0.0	Success / No errors
0.1	Partial result (additional results conveyed in separate messages)
0.2	Partial result (no further results to follow)
0.3	Simple acknowledgment
1.5	Mandatory Header elements missing
1.6	Mandatory Request elements missing
1.7	Mandatory Payload elements missing
1.8	Format of request does not validate against schema
1.9	Unsupported message revision in Header
2.4	Invalid Meter(s)
2.5	Invalid Noun
2.6	Invalid ReadingType(s)
2.9	Invalid Verb
2.10	Unsupported ReadingType(s)
2.12	Invalid UsagePoint(s)
2.13	Meter / UsagePoint mismatch
2.14	Invalid Source
2.15	Invalid Request ID(s)
2.16	Invalid ServiceLocation(s)
2.17	Meter / ServiceLocation mismatch*
2.18	ComModule / Meter mismatch*
2.19	Invalid CustomerAccount(s)
2.20	Invalid ServiceSupplier(s)
2.21	CustomerAccount / ServiceSupplier mismatch
2.22	Invalid Customer(s)
2.23	Customer / CustomerAccount mismatch
2.24	Invalid CustomerAgreement(s)
2.25	CustomerAccount / CustomerAgreement mismatch
2.26	CustomerAgreement / UsagePoint mismatch
2.27	CustomerAccount / UsagePoint mismatch
2.28	ServiceSupplier / UsagePoint mismatch
2.29	Object relationship mismatch
2.30	Invalid ComModule(s)
2.31	Invalid ServiceCategory(ies)
2.32	Invalid UsagePointLocation(s)
2.33	Invalid PricingStructure(s)
3.1	Too many items in request

Reply Code	Description
3.2	Too many pending requests
4.1	Request timed out
5.1	Unable to process the request - high system activity level
5.2	Unable to process request -transaction not attempted
5.3	Unable to process the request - transaction attempted and failed
5.4	Unable to process the request - multiple error types encountered
5.5	Some or all of the requested ReadingTypes are unavailable in MDMS
5.6	Some or all of the requested ReadingTypes are unavailable in AMI
5.7	Some or all of the requested data is unavailable
5.8	Unable to process the request – mandatory field(s) missing
5.9	Transaction aborted to maintain transactional integrity
6.1	Request canceled per business rule
6.2	Request placed on hold per business rule
6.3	Request released from business rule hold
6.4	Request rescheduled per business rule
6.5	Request canceled by user
7.1	Temporary authentication failure
7.2	Authentication required
7.3	Authentication mechanism insufficient
7.4	Authentication failure
7.5	Action not authorized for user
7.6	Authentication mechanism requires encryption
7.7	Policy violation

The standard message envelope also has a single Reply.Result value. This should be populated in the following manner:

"OK" if there are no errors and all results have been returned. There is no requirement that a Reply.Error record with code of "0.0" be present.

"PARTIAL" if only a partial set of results has been returned, with or without errors. A Reply.Error record with code of "0.1" may be present, as well as records that indicate errors.

"ERROR" if any Error records with a code other than "0.*" are returned, indicating actual errors.

This is represented by the following state transition diagram in Figure B.1.

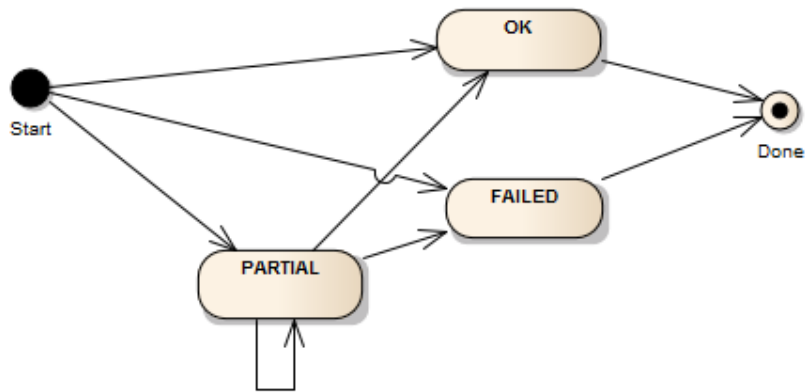


Figure B.1 – Reply Message States

Annex C (normative)

Procedure for the generation of a ReadingType name

C.1 General

The ReadingType enumeration is an important identifier in MeterReading messages. This standard specifies a profile which will be considered normative. IEC 61968-9 was developed with several design principles in mind:

The messages should be simple and general purposed.

A “Readings” message should be able to carry any type of value that might be in a meter, e.g. Power, Energy, Relay actuation counts, Status information, and Currency. The Readings.ReadingType should be able to describe whatever the Readings.value is.

It is easier for a data consumer to throw away information it has but does not need, than it is for it to recreate information it needs but does not have.

This third principle implies that data producers should be as explicit as possible when publishing data. The data therefore should be entirely self-describing so that other consumers who access the data (perhaps when it is residing in a data warehouse) can determine for themselves the suitability for use of the data. This will help avoid the need for the data consumer to attempt to reconstruct any implicit agreements which were in place at the time of publication.

It is understood that there will be occasions in which a data consumer (making a request for information) might not know all of the specific details regarding what is being asked. For example, a requestor may wish to obtain the “voltage” at a given location. It may not know if the service is single-phase or poly-phase. It should be able to make the request with the knowledge it has, and the data producer attempt to fulfil it and in the response supply additional detail as appropriate. This may result in the ReadingType(s) used in the response to differ slightly from the ReadingType used in the request.

C.2 Understanding the important attributes of a data element name

C.2.1 General

Data elements can be described in terms of 18 key attributes (several of which are compound attributes.) Every attribute has the feature that a value of zero (“0”) represents that it is not applicable to the description. The only exception to this rule is in the compound attributes. In this case dual zeros represent that the attribute is not applicable.

C.2.2 Attribute #1, macroPeriod

The macroPeriod describes an aspect of the data that reflects how it is viewed or captured over a long period of time. These are enumerated in Table C.1.

Table C.1 – Time-period of interest enumerations

Code	Enumeration	Comments	Normative Status
0	none	Not Applicable	N
8	billingPeriod	Captured during the billing period starting at midnight of the first day of the billing period (as defined by the billing cycle day). If during the current billing period, it specifies a period from the start of the current billing period until "now".	N
11	daily	Daily Period starting at midnight. If for the current day, this specifies the time from midnight to "now".	N
13	monthly	Monthly period starting at midnight on the first day of the month. If within the current month, this specifies the period from the start of the month until "now."	N
22	seasonal	A season of time spanning multiple months. E.g. "Summer," "Spring," "Fall," and "Winter" based cycle. If within the current season, it specifies the period from the start of the current season until "now."	N
24	weekly	Weekly period starting at midnight on the first day of the week and ending the instant before midnight the last day of the week. If within the current week, it specifies the period from the start of the week until "now."	N
32	specifiedPeriod	For the period defined by the start and end of the TimePeriod element in the message.	N

C.2.3 Attribute #2, aggregate

C.2.3.1 General

The way in which a reading is viewed in the aggregate (compared to others) serves as the second attribute. Possible enumerations include those described in Table C.2. This attribute may be used to define a mathematical operation carried out over the period of interest defined by attribute #1.

Table C.2 – Data qualifier enumerations

Code	Enumeration	Comments	Normative Status
0	none	Not Applicable	N
2	average		N
4	excess	The value represents an amount over which a threshold was exceeded.	I
5	highThreshold	The value represents a programmed threshold.	I
7	lowThreshold	The value represents a programmed threshold.	I
8	maximum	The highest value observed	N
9	minimum	The smallest value observed	N
11	nominal		I
12	normal		I
16	secondMaximum	The second highest value observed	N
17	secondMinimum	The second smallest value observed	N
23	thirdMaximum	The third highest value observed	N
24	fourthMaximum	The fourth highest value observed	N

Code	Enumeration	Comments	Normative Status
25	fifthMaximum	The fifth highest value observed	N
26	sum	The accumulated sum	N
27	high	Typically used to identify the high volume flow port of a compound water meter.	I
28	low	Typically used to identify the low volume flow port of a compound water meter.	I
N = Normative I = Informative D = Deprecated since last edition			

C.2.3.2 Changes with this edition

In IEC 61968-9:2009, it was suggested that “TestData” could be used as an enumeration to indicate that a value was not a real billing value. In this edition of IEC 61968-9, we encourage instead the use of ReadingQuality codes to identify test data. In a similar fashion, “missing” or “unstable” data should be identified by a suitable ReadingQuality code. Information on ReadingQuality codes may be found in Annex D.

In this edition of IEC 61968-9, attribute #2 is used strictly for range qualifiers. Terms such as “absolute” which may be used to qualify a pressure reading, or to qualify interval data are instead handled elsewhere. Separate units of measure have been created to differentiate gauge pressure from absolute pressure. Furthermore, the distinction between “absolute intervalData” and “incremental intervalData” is now handled by the message schema. Individual readings (of a “bulkQuantity” or “indicating” nature) are simply presented as readings with the “absolute” attribute being implied. “Incremental intervalData” is now described by the “DeltaData” term, and by presentation of the data in the “intervalReadings” portion of the message.

C.2.4 Attribute #3, measuringPeriod

C.2.4.1 General

The measuringPeriod supplies an “adjective” to describe aspects of a “time period” with regard to the measurement. This attribute describes a “time attribute” which is inherent or fundamental to the reading value. The attribute refers to the way the value was originally measured and not to the frequency at which it is reported or presented. For example, an hourly interval of consumption data would have “hourly” as an attribute. However in the case of an hourly sampled voltage value the meterReadings schema would carry the “hourly” interval size information. Enumerated values include the values described in Table C.3. When compared to attribute #1, the measuringPeriod is a small interval of time which is characteristic of the way the reading was captured, while the macroPeriod is a long interval of time related to the way in which the reading is reported. Either of these attributes are invoked only as needed to describe the data. Many dial readings need only the accompanying timestamp to be meaningful.

Table C.3 – measuringPeriod enumerations

Code	Enumeration	Comments	Normative Status
0	none	Not Applicable	N
1	tenMinute	10 min	N
2	fifteenMinute	15 min	N
3	oneMinute	1 min	N

Code	Enumeration	Comments	Normative Status
4	twentyfourHour	24 min	N
5	thirtyMinute	30 min	N
6	fiveMinute	5 min	N
7	sixtyMinute	60 min	N
10	twoMinute	2 min	N
14	threeMinute	3 min	N
15	present	Within the present period of time	I
16	previous	Shifted within the previous monthly cycle and data set	I
31	twentyMinute	20 min interval	N
50	fixedBlock60Min	60 min Fixed Block	N
51	fixedBlock30Min	30 min Fixed Block	N
52	fixedBlock20Min	20 min Fixed Block	N
53	fixedBlock15Min	15 min Fixed Block	N
54	fixedBlock10Min	10 min Fixed Block	N
55	fixedBlock5Min	5 min Fixed Block	N
56	fixedBlock1Min	1 min Fixed Block	N
57	rollingBlock60MinIntvl30MinSubIntvl	60 min Rolling Block with 30-minute sub-intervals	N
58	rollingBlock60MinIntvl20MinSubIntvl	60 min Rolling Block with 20-minute sub-intervals	N
59	rollingBlock60MinIntvl15MinSubIntvl	60 min Rolling Block with 15-minute sub-intervals	N
60	rollingBlock60MinIntvl12MinSubIntvl	60 min Rolling Block with 12-minute sub-intervals	N
61	rollingBlock60MinIntvl10MinSubIntvl	60 min Rolling Block with 10-minute sub-intervals	N
62	rollingBlock60MinIntvl6MinSubIntvl	60 min Rolling Block with 6-minute sub-intervals	N
63	rollingBlock60MinIntvl5MinSubIntvl	60 min Rolling Block with 5-minute sub-intervals	N
64	rollingBlock60MinIntvl4MinSubIntvl	60 min Rolling Block with 4-minute sub-intervals	N
65	rollingBlock30MinIntvl15MinSubIntvl	30 min Rolling Block with 15-minute sub-intervals	N
66	rollingBlock30MinIntvl10MinSubIntvl	30 min Rolling Block with 10-minute sub-intervals	N
67	rollingBlock30MinIntvl6MinSubIntvl	30 min Rolling Block with 6-minute sub-intervals	N
68	rollingBlock30MinIntvl5MinSubIntvl	30 min Rolling Block with 5-minute sub-intervals	N
69	rollingBlock30MinIntvl3MinSubIntvl	30 min Rolling Block with 3-minute sub-intervals	N
70	rollingBlock30MinIntvl2MinSubIntvl	30 min Rolling Block with 2-minute sub-intervals	N
71	rollingBlock15MinIntvl5MinSubIntvl	15 min Rolling Block with 5-minute sub-intervals	N
72	rollingBlock15MinIntvl3MinSubIntvl	15 min Rolling Block with 3-minute sub-intervals	N
73	rollingBlock15MinIntvl1MinSubIntvl	15 min Rolling Block with 1-minute sub-intervals	N

Code	Enumeration	Comments	Normative Status
74	rollingBlock10MinIntvl5MinSubIntvl	10 min Rolling Block with 5-minute sub-intervals	N
75	rollingBlock10MinIntvl2MinSubIntvl	10 min Rolling Block with 2-minute sub-intervals	N
76	rollingBlock10MinIntvl1MinSubIntvl	10 min Rolling Block with 1-minute sub-intervals	N
77	rollingBlock5MinIntvl1MinSubIntvl	5 min Rolling Block with 1-minute sub-intervals	N
78	twelveMinute	12 min	N
79	twoHour	2 h	N
80	fourHour	4 h	N
81	sixHour	6 h	N
82	twelveHour	12 h	N
83	threeHour	3 h	N
100	specifiedInterval	The interval length is described in attribute #10 in seconds. Attribute #11 should be "1" for whole seconds.	N
101	specifiedFixedBlock	The fixed block duration is described in attribute #10 in seconds. Attribute #11 should be "1" for whole seconds.	N
102	specifiedRollingBlock	The rolling block size is described by attribute #10 in seconds, and the sub-interval size by attribute #11 in seconds.	N
N = Normative I = Informative D = Deprecated since last edition			

It is common for meters to report demand in a form that is measured over the course of a portion of an hour. In Enterprise Applications however, it is commonly understood that demand (which has a unit of measure of "kW" or "kVAr") has been normalized to 1 h. The Metering System shall perform this transformation before publication and use by the other systems. The scalar used is chosen based on the block size (not any sub-interval size). These scalars are listed in Table C.4

Table C.4 – Demand normalization scalars

Demand block size	Normalization scalar
1 h	1
30 min	2
20 min	3
15 min	4
10 min	6
1 min	60

For example, before normalization, "15minuteFixedBlock" data might be said to have units of "kilo quarter-watt-hours" (kWh). After normalization, the unit of measure would become "kilo-watt-hours." Since "kilo quarter-watt-hours" is not a usable unit of measure, systems that find the need to communicate raw data in this form should use a unit of measure such as "count" and the PendingCalculation element to carry the scalar (or multiplier) needed and the resulting unit of measure when applied,

C.2.4.2 Common Usages (Informative)

Interval data is commonly found in 60 min, 30 min, and 15 min sizes. Larger sizes such as 24 h and smaller sizes down to 1 min are also possible but are less common. Users of the standard should leverage existing interval enumerations where they exist, but if the needed interval size does "not exist, a "specifiedInterval" may be used. This allows the enumeration itself to imbed the size of the interval in the enumeration. Similarly, uncommon fixed block and rolling block sizes may be specified.

IEC 61968-9:2009 offered the terms "Shifted," "Present," and "Previous" as adjectives that might be used to describe the state of the meter. While this works well for publishing data from a Metering System, it may be difficult to use between other enterprise applications. It seems that while "present" and "previous" are important attributes of the data while it is at the meter, the further one gets away from the meter, the less important these attributes become. With this edition of IEC 61968-9 we propose that the timespan over which the data is recorded be relied upon to determine if a value belongs to the "present" billing period or the "previous" billing period rather than the enumerations "present" or "previous." Furthermore, the rules used to compute demand are quite important. A single "Daily" demand is usually not adequate to compute a customer's bill. A complete collection of "Daily" demands or a single "Billing" demand are usually required. A distinction in the Daily/Billing/Seasonal observation period should be made in the ReadingType. In all cases, the timestamp associated with the maximum demand could be used to resolve which day, month, or season a "daily," "billing," or "seasonal" demand fell into.

In a utility where multiple techniques for capturing demand exist, it becomes important to communicate between systems the definition by which demand data is captured. Enumerations are provided in this edition which enable the data producer to be as specific as it knows how in describing the type of demand data being passed.

C.2.5 Attribute #4, accumulation

C.2.5.1 General

The "accumulation" attribute indicates how the value is represented to accumulate over time. Enumerated values include those described in Table C.5.

One benefit to explicitly declaring the accumulation behaviour as part of the readingType in an exchange between a MS and MDM is to help the MDM ensure that appropriate validation rules are applied to the data supplied by the MS.

Table C.5 – Accumulation behaviour enumerations

Code	Enumeration	Comments	Normative status
0	none	Not Applicable, or implied by the unit of measure.	N
1	bulkQuantity	<p>A value from a register which represents the bulk quantity of a commodity. This quantity is computed as the integral of the commodity usage rate. This value is typically used as the basis for the dial reading at the meter, and as a result, will roll over upon reaching a maximum dial value.</p> <p>NOTE 1 With the metering system, the roll-over behaviour typically implies a roll-under behavior so that the value presented is always a positive value (e.g. unsigned integer or positive decimal.) However, when communicating data between enterprise applications a negative value might occur in a case such as net metering.</p> <p>NOTE 2 A BulkQuantity refers primarily to the dial reading and not the consumption over a specific period of time.</p>	N
2	continuousCumulative	The sum of the previous billing period values and the present period value. Note: "ContinuousCumulative" is commonly used in conjunction with "demand." The "ContinuousCumulative Demand" would be the cumulative sum of the previous billing period maximum demand values (as occurring with each demand reset) summed with the present period maximum demand value (which has yet to be reset.)	N
3	cumulative	The sum of the previous billing period values. Note: "Cumulative" is commonly used in conjunction with "demand." Each demand reset causes the maximum demand value for the present billing period (since the last demand reset) to accumulate as an accumulative total of all maximum demands. So instead of "zeroing" the demand register, a demand reset has the affect of adding the present maximum demand to this accumulating total.	N
4	deltaData	<p>The difference between the value at the end of the prescribed interval and the beginning of the interval. This is used for incremental interval data.</p> <p>NOTE 3 One common application would be for load profile data, another use might be to report the number of events within an interval (such as the number of equipment energizations within the specified period of time.)</p>	N
6	indicating	As if a needle is swung out on the meter face to a value to indicate the current value. (Note: An "indicating" value is typically measured over hundreds of milliseconds or greater, or may imply a "pusher" mechanism to capture a value. Compare this to "instantaneous" which is measured over a shorter period of time.)	N
9	summation	<p>A form of accumulation which is selective with respect to time.</p> <p>NOTE 4 "Summation" could be considered a specialization of "Bulk Quantity" according to the rules of inheritance where "Summation" selectively accumulates pulses over a timing pattern, and "BulkQuantity" accumulates pulses all of the time.</p>	I
10	timeDelay	A form of computation which introduces a time delay characteristic to the data value	I

Code	Enumeration	Comments	Normative status
12	instantaneous	Typically measured over the fastest period of time allowed by the definition of the metric (usually milliseconds or tens of milliseconds.) (Note: “Instantaneous” was moved to attribute #4 in 61968-9Ed2 from attribute #1 in 61968-9:2009.)	N
13	latchingQuantity	<p>When this description is applied to a metered value, it implies that the value is a time-independent cumulative quantity much a BulkQuantity, except that it latches upon the maximum value upon reaching that value. Any additional accumulation (positive or negative) is discarded until a reset occurs.</p> <p>NOTE 5 A LatchingQuantity may also occur in the downward direction – upon reaching a minimum value. The terms “maximum” or “minimum” will usually be included as an attribute when this type of accumulation behaviour is present.</p> <p>When this description is applied to an encoded value (UOM= “Code”), it implies that the value has one or more bits which are latching. The condition that caused the bit to be set may have long since evaporated.</p> <p>In either case, the timestamp that accompanies the value may not coincide with the moment the value was initially set.</p> <p>In both cases a system will need to perform an operation to clear the latched value.</p>	N
14	boundedQuantity	A time-independent cumulative quantity much a BulkQuantity or a LatchingQuantity, except that the accumulation stops at the maximum or minimum values. When the maximum is reached, any additional positive accumulation is discarded, but negative accumulation may be accepted (thus lowering the counter.) Likewise, when the negative bound is reached, any additional negative accumulation is discarded, but positive accumulation is accepted (thus increasing the counter.)	N
<p>N = Normative</p> <p>I = Informative</p> <p>D = Deprecated since last edition</p>			

C.2.5.2 Types of IntervalReadings

In IEC 619689:2009, it was said IntervalReadings might be expressed in a number of styles qualified by attribute #2 (i.e. “Incremental,” “Relative,” or “Absolute”) and also described “RecordedData” and “DeltaData”.

In this edition of IEC 61968-9 we have made an effort to simplify the presentation of data. A sampled value which would have been called an “absolute interval” reading in IEC 61968-9:2009 may be presented without the word “absolute.” Indeed such readings may be published in the MeterReading.Readings portion of the message as ordinary readings rather than in the MeterReading.IntervalBlock.IntervalReadings portion of the message. The concept of “Relative IntervalData” is no longer found in the enumerations because the concept is supported in the message schema as a form of “pending” data scalars.

C.2.5.3 Common usages

The attributes described in Table C.5 are customarily used in particular ways to describe energy and demand values. These customs are described in Table C.6.

Table C.6 – Customary accumulation behaviour enumerations

Metrology data type	Common usages
Energy (Measured by simple counting and displayed to the user on the face of the meter.)	BulkQuantity
Demand (Ordinarily measured by integrating a power value over a specific period of time.)	Indicating, Cumulative, ContinuousCumulative
Power (Ordinarily measured in real time in solid-state meters.)	Instantaneous, TimeDelay
Time Of Use (TOU) Energy data (Measured by accumulating values in assorted registers depending on the time of day and day of the week.)	Summation
Time Of Use (TOU) Demand data (Derived by integrating energy values over a specified demand interval, with additional dependencies on the TOU calendar.)	Indicating, Cumulative, or ContinuousCumulative
Counters	BulkQuantity, LatchingQuantity

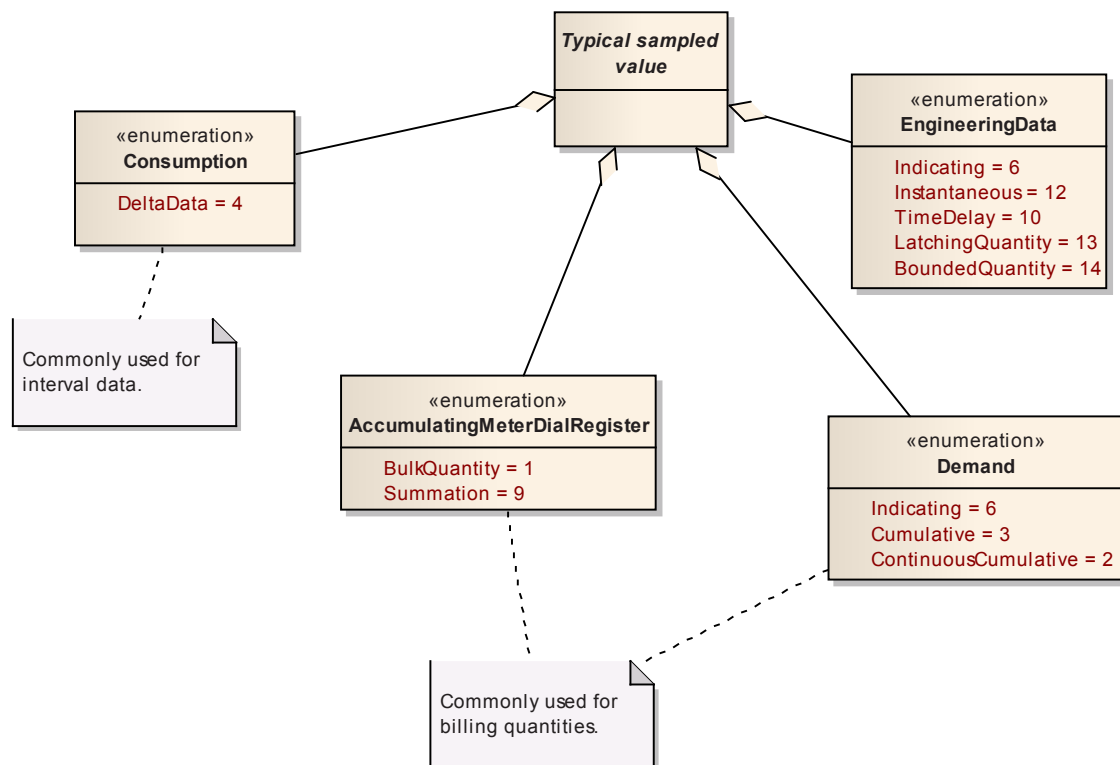


Figure C.1 – Typical enumerations for accumulation behaviourAttribute #5, flowDirection

C.2.6.1 General

Anything involving current might have a flow direction. Flow direction is very important, but when it is unknown, it should remain unspecified. Possible enumerations include those described in Table C.7.

The “flow direction” encompasses the electrical concept of four quadrant metering as well as the needs of various regional tariffs to describe how energy is billed.

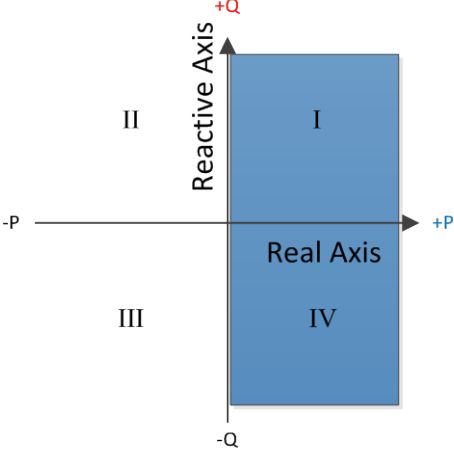
It should be recognized that different parts of the world operate according to different frames of reference for their tariff practices. Most regions define power delivery according to a

Producer's Reference Frame. Power is generated by the utility, flows through the utility grid, through the meter, and into the customer's wiring. The meter captures the energy sold to the customer. Some regions however take a customer-centric view. A Consumer Reference Frame says that power may be purchased by a consumer from the grid. Any forward flow through the meter registers the energy purchased by the consumer.

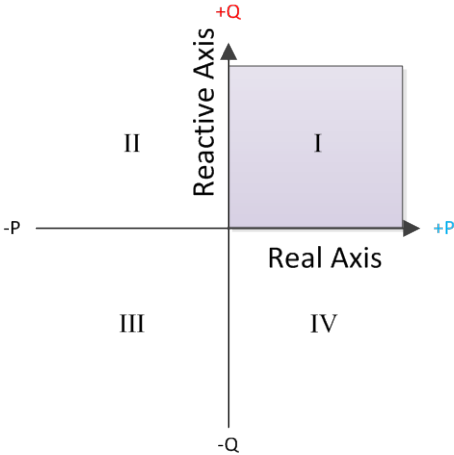
This standard attempts to circumnavigate the frame-of-reference issue by recognizing that these two views are equivalent. The energy bought is the energy sold. The "forward" flow from the meter's "source" side to the meter's "load" side (or equivalent terminology such as "V+" and a "V-") creates a measurement that can be used for either tariff definition. This standard will leverage the numeric code for a given semantic concept to be "normative," while the text used to name the concept is considered "informative."

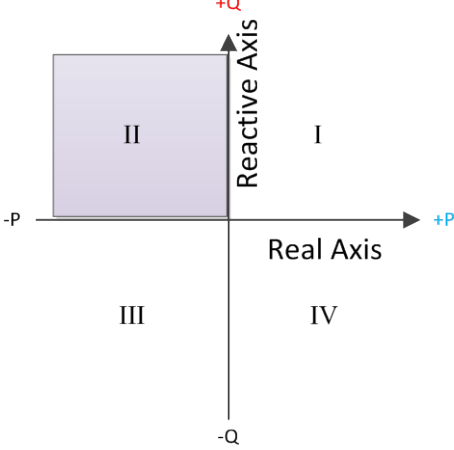
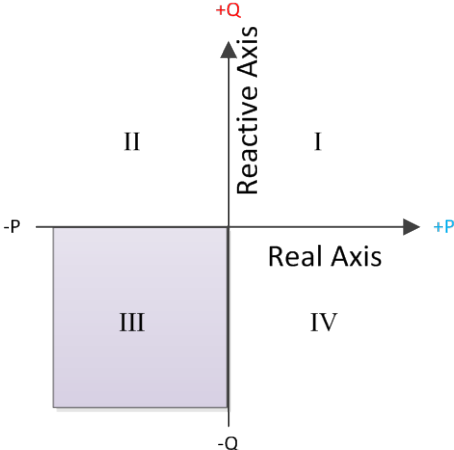
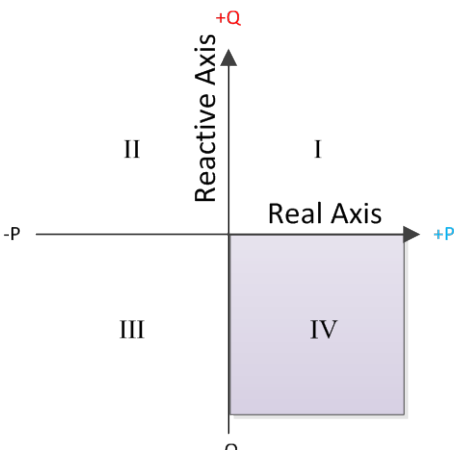
A second reason to keep the textual descriptions informative is due to the genuine language differences among the various participating countries in the IEC.

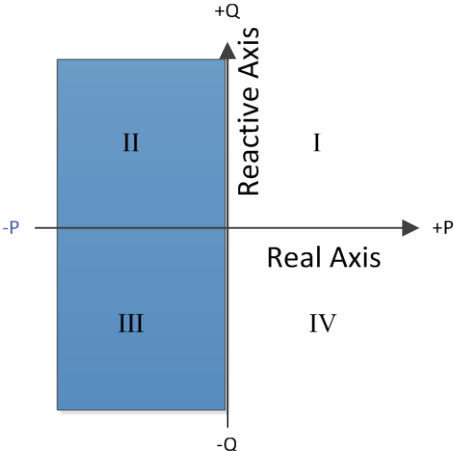
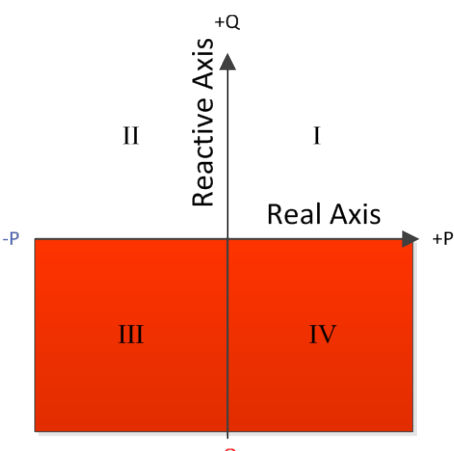
Table C.7 – Direction of flow enumeration

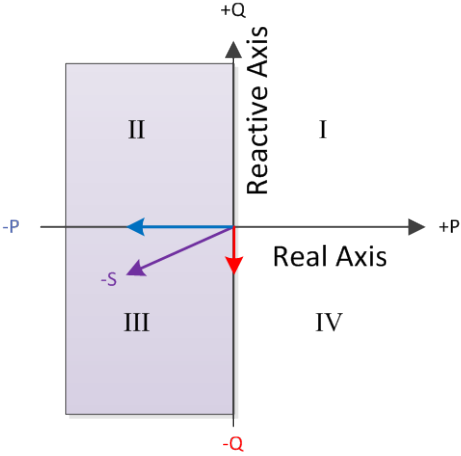
Code	Enumeration Name (informative)	Comments	Normative status of code
0	none	Not Applicable (N/A)	N
1	forward	<p>Also known as "Delivered," or "Imported" as defined in IEC/TS 61968-2.</p> <p>Forward Active Energy is a positive kWh value as one would naturally expect to find as energy is supplied by the utility and consumed at the service.</p> <p>Forward Active Energy is accumulated in a single phase service by observing the power flow (+P) in quadrants I and IV.</p>  <p>Forward Reactive Energy is a positive VARh value as one would naturally expect to find in the presence of inductive loading.</p> <p>Forward Reactive Energy is accumulated in a single phase service by observing the power flow (+Q) in quadrants I and II.</p>	N

Code	Enumeration Name (informative)	Comments	Normative status of code
		<div> </div> <p>Forward Apparent Energy is a positive VAh value much like Forward Active Energy. It is accumulated in a single phase service by observing the power flow ($S = P + jQ$) in quadrants I and IV.</p> <div> </div> <p>In polyphase metering, the forward energy register is incremented when the sum of the phase energies is greater than zero:</p> $\text{Energy}_A + \text{Energy}_B + \text{Energy}_C > 0$	
2	lagging	<p>Typically used to describe that a power factor is lagging the reference value (or to say that the current is lagging the voltage.)</p> <p>NOTE 1 When used to describe power factor, the term “Lagging” implies that the PF is negative. The term “lagging” in this case takes the place of the negative sign. If a signed PF value is to be passed by the data producer, then the direction of flow enumeration zero (none) should be used in order to avoid the possibility of creating an expression that employs a double negative. The data consumer should be able to tell from the sign of the data if the PF is leading or lagging. This</p>	N

Code	Enumeration Name (informative)	Comments	Normative status of code
		principle is analogous to the concept that "Reverse" energy is an implied negative value, and to publish a negative reverse value would be ambiguous. NOTE 2 Lagging power factors typically indicate inductive loading.	
3	leading	Typically used to describe that a power factor is leading the reference value (or to say that the current is leading the voltage.) NOTE 3 Leading power factors typically indicate capacitive loading.	N
4	net	Defined as Forward - Reverse , See IEC/TS 61968-2. NOTE 4 In some systems, the value passed as a "net" value could become negative. In other systems the value passed as a "net" value is always a positive number, and rolls-over and rolls-under as needed.	N
5	q1plusQ2	Reactive positive quadrants.	I
7	q1plusQ3	Quadrants 1 and 3	I
8	q1plusQ4	Quadrants 1 and 4 usually represent forward active energy	I
9	q1minusQ4	Q1 minus Q4	I
10	q2plusQ3	Quadrants 2 and 3 usually represent reverse active energy	I
11	q2plusQ4	Quadrants 2 and 4	I
12	q2minusQ3	Q2 minus Q3	I
13	q3plusQ4	Reactive negative quadrants.	I
14	q3minusQ2	Q3 minus Q2	I
15	quadrant1	Q1 only 	I

Code	Enumeration Name (informative)	Comments	Normative status of code
16	quadrant2	<p>Q2 only</p> 	I
17	quadrant3	<p>Q3 only</p> 	I
18	quadrant4	<p>Q4 only</p> 	I

Code	Enumeration Name (informative)	Comments	Normative status of code
19	reverse	<p>Reverse Active Energy is equivalent to "Received," or "Exported" as defined in IEC/TS 61968-2.</p> <p>Reverse Active Energy is a positive kWh value as one would expect to find when energy is produced and backed by the service onto the utility network.</p> <p>Reverse Active Energy is accumulated in a single phase service by observing the power flow (-P) in quadrants II and III.</p>  <p>Reverse Reactive Energy is a positive VARh value as one would expect to find in the presence of capacitive loading and a leading Power Factor.</p> <p>Reverse Reactive Energy is accumulated in a single phase service by observing the power flow (-Q) in quadrants III and IV.</p>  <p>Reverse Apparent Energy is a positive VAh value much as reverse active energy. It is accumulated in a single phase service by observing the power flow ($S = P + jQ$) in quadrants II and III.</p>	N

Code	Enumeration Name (informative)	Comments	Normative status of code
		 <p>In polyphase metering, the reverse energy register is incremented when the sum of the phase energies is less than zero:</p> $\text{Energy}_A + \text{Energy}_B + \text{Energy}_C < 0$ <p>NOTE 5 The value passed as a reverse value is always a positive value. It is understood by the label "reverse" that it represents negative flow.</p>	
20	total	<p> Forward + Reverse , See IEC/TS 61968-2.</p> <p>The sum of the commodity in all quadrants Q1+Q2+Q3+Q4.</p> <p>In polyphase metering, the total energy register is incremented when the absolute value of the sum of the phase energies is greater than zero:</p> $ \text{Energy}_A + \text{Energy}_B + \text{Energy}_C > 0$	N
21	totalByPhase	<p>In polyphase metering, the total by phase energy register is incremented when the sum of the absolute values of the phase energies is greater than zero:</p> $ \text{Energy}_A + \text{Energy}_B + \text{Energy}_C > 0$ <p>In single phase metering, the formulas for "Total" and "Total by phase" collapse to the same expression. For communication purposes however, the "Total" enumeration should be used with single phase meter data.</p>	N
<p>N = Normative</p> <p>I = Informative</p> <p>D = Deprecated since last edition</p>			

C.2.6.2 Common usages

The terminology used to specify the flow direction for reactive energy and reactive power is varies considerably by vendor. Table C.8 describes a number of equivalent flow directions by power (or energy) type, and recommends a preferred flow direction enumeration for communication.

Table C.8 – DirectionOfFlow enumeration equivalencies

Type of energy or power	Unit Of Measure	Equivalent flow directions commonly used in industry	Preferred flow direction for messaging
Active or Real	W or Wh	Forward, Delivered, Positive, Q1+Q4	Forward
		Reverse, Received, Negative, Q2+Q3	Reverse
		Net, Q1+Q4-(Q2+Q3)	Net
		Total, Q1+Q2+Q3+Q4	Total
Reactive	VAr or VArh	Forward, Delivered, Positive, Lagging, Q1+Q2	Forward
		Reverse, Received, Negative, Leading, Q3+Q4	Reverse
		Net, Q1+Q2-(Q3+Q4)	Net
		Total, Q1+Q2+Q3+Q4	Total
Apparent	VA or VAh	Forward, Delivered	Forward
		Reverse, Received	Reverse
		Net	Net
		Total	Total

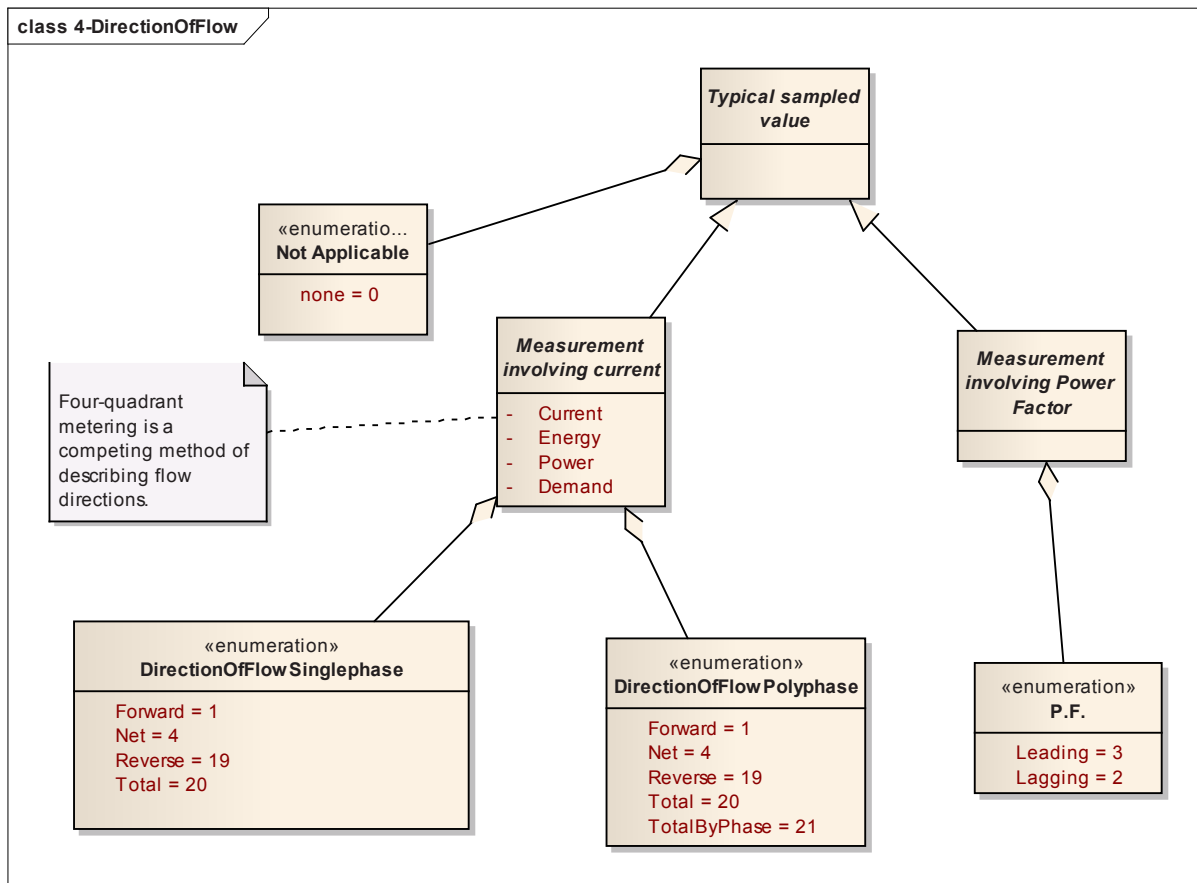


Figure C.2 – Typical enumerations for direction of flow

C.2.7 Attribute #6, commodity

In this standard, the commodity which is being measured has been isolated to become an attribute by itself. It is enumerated in Table C.9.

Table C.9 – Commodity

Code	Enumeration	Comments	Normative status
0	none	Not Applicable	N
1	electricity SecondaryMetered	All types of metered quantities. This type of reading comes from the meter and represents a “secondary” metered value.	N
2	electricity PrimaryMetered	It is possible for a meter to be outfitted with an external VT and/or CT. The meter might not be aware of these devices, and the display not compensate for their presence. Ultimately, when these scalars are applied, the value that represents the service value is called the “primary metered” value. The “index” in sub-category 3 mirrors those of sub-category 0.	N
3	communication	A measurement of the communication infrastructure itself.	N
4	air		N
5	insulativeGas	(SF ₆ is found separately below.)	N
6	insulativeOil		N
7	naturalGas		N
8	propane		N
9	potableWater	Drinkable water	N
10	steam	Water in steam form, usually used for heating.	N
11	wasteWater	(Sewerage)	N
12	heatingFluid	This fluid is likely in liquid form. It is not necessarily water or water based. The warm fluid returns cooler than when it was sent. The heat conveyed may be metered.	N
13	coolingFluid	The cool fluid returns warmer than when it was sent. The heat conveyed may be metered.	N
14	nonpotableWater	Reclaimed water – possibly used for irrigation but not sufficiently treated to be considered safe for drinking. Moisture in oil	N
15	nox	Nitrous Oxides, NO _x	N
16	so2	Sulfur Dioxide, SO ₂	N
17	ch4	Methane, CH ₄	N
18	co2	Carbon Dioxide, CO ₂	N
19	carbon	C	I
20	hch	Hexachlorocyclohexane, HCH	N
21	pfc	Perfluorocarbons, PFC	N
22	sf6	Sulfurhexafluoride, SF ₆	N
23	tvLicence	Television	N
24	internet	Internet service	N
25	refuse	Trash	N
26	h2	Hydrogen, H ₂	N
27	c2h2	Acetylene, C ₂ H ₂	N
28	c2h4	Ethylene, C ₂ H ₄	N
29	c2h6	Ethane, C ₂ H ₆	N
30	co	Carbon monoxide, CO	N
31	o2	Oxygen, O ₂	N

Code	Enumeration	Comments	Normative status
32	dissolvedCombustibleGas	Dissolved Combustible Gas (A combination of combustible gasses such as H ₂ , CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₆ , and/or CO in some mixture.)	N
33	co2e	Carbon Dioxide CO ₂ Equivalent	N
34	lead	Lead, Pb	N
35	mercury	Mercury, Hg	N
36	ozone	Ozone, O ₃	N
37	pm10	Particulate matter whose maximum size is 10 µm.	N
38	pm25	Particulate matter whose maximum size is 2,5 µm.	N
39	sox	Sulfur Oxides, SO _x	N
40	weather	Weather or meteorological conditions.	N
41	device	Condition of the meter or end device itself. For example, this enumeration might be used in combination with an enumeration for temperature to represent the internal temperature of a meter.	N
N = Normative I = Informative D = Deprecated since last edition			

C.2.8 Attribute #7, measurementKind

The “measurementKind” helps identify “what” is being measured. It further refines the commodity to provide a reading category. This attribute works in conjunction with the units attribute in creative ways to provide detail to the unit of measure. For example, “Energy” with a unit of measure of “kWh” indicates to the user that active energy is being measured, “Energy” with “kVAh” indicates apparent energy, and “Energy” with “kVArh” indicates reactive energy. “Power” can be combined in a similar way with various power units of measure. Distortion power (“DistortionVoltAmperes”) with “kVA” is different from “Power” with “kVA”. More information can be found by studying the examples at the end of this annex. Measurement kinds are enumerated in Table C.10.

Table C.10 – measurementKind Index

Code	Enumeration	Comments	Normative Status
0	none	Not Applicable	N
2	apparentPowerFactor		N
3	currency	funds	N
4	current		N
5	currentAngle		N
6	currentImbalance		N
7	date		N
8	demand		N
9	distance		N
10	distortionVoltAmperes		N
11	energization		N
12	energy		N

Code	Enumeration	Comments	Normative Status
13	energizationLoadSide		N
14	fan		N
15	frequency		N
16	Funds	Dup with "currency"	D
17	ieee1366ASAI		N
18	ieee1366ASIDI		N
19	ieee1366ASIFI		N
20	ieee1366CAIDI		N
21	ieee1366CAIFI		N
22	ieee1366CEMIn		N
23	ieee1366CEMSMIn		N
24	ieee1366CTAIDI		N
25	ieee1366MAIFI		N
26	ieee1366MAIFle		N
27	ieee1366SAIDI		N
28	ieee1366SAIFI		N
31	lineLosses		N
32	losses		N
33	negativeSequence		N
34	phasorPowerFactor		N
35	phasorReactivePower		N
36	positiveSequence		N
37	power		N
38	powerFactor		N
40	quantityPower		N
41	sag	or Voltage Dip	N
42	swell		N
43	switchPosition		N
44	tapPosition		I
45	tariffRate		N
46	temperature		N
47	totalHarmonicDistortion		N
48	transformerLosses		N
49	unipedeVoltageDip10to15		N
50	unipedeVoltageDip15to30		N
51	unipedeVoltageDip30to60		N
52	unipedeVoltageDip60to90		N
53	unipedeVoltageDip90to100		N
54	Voltage (rms)		N
55	voltageAngle		N
56	voltageExcursion		N
57	voltageImbalance		N

Code	Enumeration	Comments	Normative Status
58	volume	Clarified from IEC 61968-9:2009 to indicate fluid volume	N
59	zeroFlowDuration		N
60	zeroSequence		N
64	distortionPowerFactor		N
81	frequencyExcursion	Usually expressed as a "count"	N
90	applicationContext		I
91	apTitle		I
92	assetNumber		I
93	bandwidth		I
94	batteryVoltage		N
95	broadcastAddress		I
96	deviceAddressType1		I
97	deviceAddressType2		I
98	deviceAddressType3		I
99	deviceAddressType4		I
100	deviceClass		I
101	electronicSerialNumber		I
102	endDeviceID		I
103	groupAddressType1		I
104	groupAddressType2		I
105	groupAddressType3		I
106	groupAddressType4		I
107	ipAddress		I
108	macAddress		I
109	mfgAssignedConfigurationID		I
110	mfgAssignedPhysicalSerialNumber		I
111	mfgAssignedProductNumber		I
112	mfgAssignedUniqueCommunicationAddress		I
113	multiCastAddress		I
114	oneWayAddress		I
115	signalStrength		I
116	twoWayAddress		I
117	signaltoNoiseRatio	Moved here from Attribute #9 UOM	I
118	alarm		I
119	batteryCarryover		I
120	dataOverflowAlarm		I
121	demandLimit		N

Code	Enumeration	Comments	Normative Status
122	demandReset	Usually expressed as a count as part of a billing cycle	N
123	diagnostic		I
124	emergencyLimit		I
125	encoderTamper		I
126	ieee1366MomentaryInterruption		N
127	ieee1366MomentaryInterruptionEvent		N
128	ieee1366SustainedInterruption		N
129	interruptionBehaviour		I
130	inversionTamper		I
131	loadInterrupt		I
132	loadShed		I
133	maintenance		I
134	physicalTamper		I
135	powerLossTamper		I
136	powerOutage		I
137	powerQuality		I
138	powerRestoration		I
139	programmed		I
140	pushbutton		N
141	relayActivation		N
142	relayCycle	Usually expressed as a count	N
143	removalTamper		I
144	reprogrammingTamper		I
145	reverseRotationTamper		I
146	switchArmed		I
147	switchDisabled		I
148	tamper		I
149	watchdogTimeout		I
150	billLastPeriod	Customer's bill for the previous billing period Expressed as currency.	N
151	billToDate	Customer's bill, as known thus far within the present billing period. Expressed as currency.	N

Code	Enumeration	Comments	Normative Status
152	billCarryover	Customer's bill, part of a previous obligation carried over from a previous billing period. Expressed as currency.	N
153	connectionFee	Monthly fee for connection to commodity.	I
154	audibleVolume	Sound	I
155	volumetricFlow		I
156	relativeHumidity	Most common usage is in expressing weather or meteorological conditions	N
157	skyCover	Degree of sky cover. Used in expressing weather or meteorological conditions.	N
158	voltage	Unspecified	I
159	dcVoltage		I
160	acVoltagePeak	$V_p = \sqrt{2} \times V_{rms}$	I
161	acVoltagePeakToPeak	$V_{pp} = 2 \times V_p$	I
<p>N = Normative</p> <p>I = Informative</p> <p>D = Deprecated since last edition</p> <p>NOTE In this edition of IEC 61968-9 additional distinction has been made with respect to the voltage frame of reference. The original enumeration for "voltage" is now explicitly used to identify Volts_{RMS}. This is because the most common type of measurement passed between systems is a Volts_{RMS} value. However, it is not the only way to measure a voltage. New enumerations have been created to also identify Volts-peak, Volts-peak-to-peak, Volts DC, and unspecified voltage waveforms. A number of voltage measurements are defined in figure C.3. When combined with the accumulation attribute it is possible to show an "indicating Volts_{RMS}" which is measured over the course of many cycles, an "instantaneous Volts_{RMS}" which is measured over a single cycle, or an "instantaneous voltage" which is a single point sample on the waveform captured in an instant of time.</p>			

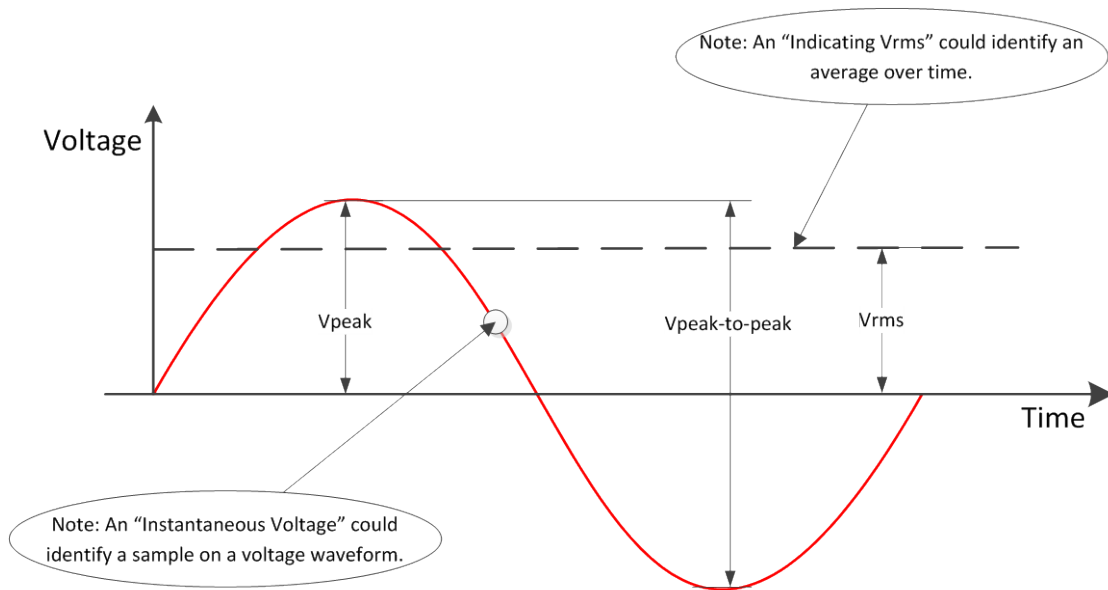


Figure C.3 – Voltage measurements

C.2.9 Attributes #8 interharmonicNumerator

See C.2.10.

C.2.10 Attribute #9 interharmonicDenominator

Interharmonics are represented as a rational number with a numerator and a denominator. Harmonics are represented using the same mechanism, and identified by having a denominator of "1."

This is represented formulaically as:

$$\text{Interharmonic} = \frac{\text{InterharmonicNumerator}}{\text{InterharmonicDenominator}}$$

and

$$\text{Harmonic} = \text{InterharmonicNumerator}$$

where the **InterharmonicDenominator** equals "1".

The harmonic or interharmonic enumeration is determined by a compound element:

<interharmonic> ::= <interharmonicNumerator> <interharmonicDenominator>

The normative interharmonic numerator and denominators are defined in Table C.11. Additional values may be freely created using this approach and would be considered "informative" rather than "normative" values.

Table C.11 – Harmonic and Interharmonic enumerations

Interharmonic Numerator	Interharmonic Denominator	Enumeration	Comments	Normative Status
0	0	none	Not Applicable	N
1	2	interharmonic1/2	Interharmonic of ½	N
1	1	fundamental	fundamental	N
2	1	harmonic2	second harmonic	N
3	1	harmonic3	third harmonic	N
4	1	harmonic4	fourth harmonic	N
5	1	harmonic5	fifth harmonic	N
6	1	harmonic6	sixth harmonic	N
7	1	harmonic7	seventh harmonic	N

N = Normative
I = Informative
D = Deprecated since last edition

C.2.11 Attributes #10 argumentNumerator

See C.2.12.

C.2.12 Attribute #11 argumentDenominator

The argument elements are used to introduce numbers into the unit of measure description where they are needed. The definition supports a rational number with a numerator and a denominator. Most arguments used in practice however will be integers. Integers will all have a “1” as their denominator.

$$\text{argument} = \frac{\text{numerator}}{\text{denominator}}$$

The argument enumeration is determined by a compound element:

<argument> ::= <numerator> <denominator>

The normative numerator and denominators are defined in Table C.12. Additional values may be freely created using this approach. For test purposes, values not shown in the table would be considered “informative” rather than “normative” values.

Table C.12 – Argument enumerations

Numerator	Denominator	Enumeration	Comments	Normative Status
0	0	none	Not Applicable	N
1	2	n½	One-half	I
0	1	n0	“Zero” (for systems that use zero based numbering schemes)	N
1	1	n1	“One,” where the measure needs an argument such as CEMI(n=1)	N
2	1	n2	“Two” where the measure needs an argument such as CEMI(n=2)	N

Numerator	Denominator	Enumeration	Comments	Normative Status
3	1	n3	"Three" where the measure needs an argument such as CEMI(n=3)	N
4	1	n4	"Four" where the measure needs an argument such as CEMI(n=4)	N
5	1	n5	"Five" where the measure needs an argument	N
6	1	n6	Six	N
7	1	n7	Seven	N
8	1	n8	Eight	N
9	1	n9	Nine	N
10	1	n10	Ten	N
15	1	n15	Fifteen	N
30	1	n30	Thirty	N
45	1	n45	Fourtyfive	N
60	1	n60	Sixty	N
120	1	n120	$2 \times 60 = 120$	N
155	1	n155	One hundred fifty five	N
240	1	n240	$4 \times 60 = 240$	N
305	1	n305	Three hundred and five.	N
360	1	n360	$6 \times 60 = 360$	N
480	1	n480	$8 \times 60 = 480$	N
720	1	n720	$12 \times 60 = 720$	N
720	60	n720/60	$12 \times 60/1 \times 60$	N
720	120	n720/120	$12 \times 60/2 \times 60$	N
720	180	n720/180	$12 \times 60/3 \times 60$	N
720	240	n720/240	$12 \times 60/4 \times 60$	N
720	360	n720/360	$12 \times 60/6 \times 60$	N
N = Normative				
I = Informative				
D = Deprecated since last edition				

C.2.13 Attribute #12, tou

The Time Of Use (TOU) element is used to describe any attribution of the value to a specific TOU bucket. The TOU enumerations are defined in Table C.13.

Table C.13 – Time Of Use Enumerations

Code	Enumeration	Comments	Normative Status
0	none	Not Applicable	N
1	touA	Usage in the first defined TOU bucket	N
2	touB	Usage in the second defined TOU bucket	N
3	touC	Usage in the third defined TOU bucket	N
4	touD	Usage in the fourth defined TOU bucket	N
5	touE	Usage in the fifth defined TOU bucket	N

Code	Enumeration	Comments	Normative Status
6	touF	Usage in the sixth defined TOU bucket	N
7	touG	Etc.	I
N = Normative I = Informative D = Deprecated since last edition			

C.2.14 Attribute #13, cpp

The Critical Peak Period (CPP) element is used to describe any attribution of the value to a specific CPP bucket. Even though CPP is usually considered a specialized form of TOU, it is separated from TOU enumerations to facilitate modelling. The CPP enumerations are defined in Table C.14.

Table C.14 – Critical Peak Period Enumerations

Code	Enumeration	Comments	Normative Status
0	none	Not Applicable	N
1	cppA	Consumption associated with critical peak period A	N
2	cppB	Consumption associated with critical peak period B	N
3	cppC	Consumption associated with critical peak period C	N
4	cppD	Consumption associated with critical peak period D	N
5	cppE	Consumption associated with critical peak period E	N
6	cppF	Consumption associated with critical peak period F	N
7	cppG	Etc.	I
N = Normative I = Informative D = Deprecated since last edition			

C.2.15 Attribute #14, consumptionTier

Consumption tier pricing refers to the method of billing in which a certain “block” of energy is purchased (or sold) at one price, after which the next block of energy is purchased at another price, and so on, all throughout a defined period. At the start of the defined period, consumption is initially zero, and any usage is measured against ConsumptionTier1. If this block of energy is consumed before the end of the period, energy consumption moves to be reconed against ConsumptionTier2. If this block of energy is consumed before the end of the period, energy consumption moves to ConsumptionTier3, and so on. At the end of the defined period the consumption accumulator is reset, and usage within ConsumptionTier1 restarts.

This is in contrast to the common “flat rate” for power, in which all purchases are at a given rate. When flat-rate pricing is used, a consumptionTier of “not applicable” should be specified.

Enumerations for Consumption Tiers are defined in Table C.15.

Table C.15 – Consumption Tier Enumerations

Code	Enumeration	Comments	Normative Status
0	none	Not applicable	N
1	consumptionTier1	Usage in the first defined consumption bucket	N
2	consumptionTier2	Usage in the second defined consumption bucket	N
3	consumptionTier3	Usage in the third defined consumption bucket	N
4	consumptionTier4	Usage in the fourth defined consumption bucket	N
5	consumptionTier5	Usage in the fifth defined consumption bucket	N
6	consumptionTier6	Usage in the sixth defined consumption bucket	N
7	consumptionTier7	Additional consumption tiers may be created as necessary.	I
N = Normative I = Informative D = Deprecated since last edition			

TOU or CPP pricing may be used in conjunction with consumption tier pricing. The examples provided in Table C.16 may be useful:

Table C.16 – Example Combinations of TOU and Consumption Tier Enumerations

Tou Code	Consumption Tier Code	Comments
1	0	TOU Period A with flat rate pricing
1	1	TOU Period A with Consumption Tier 1
1	2	TOU Period A with Consumption Tier 2
1	3	TOU Period A with Consumption Tier 3
2	1	TOU Period B with Consumption Tier 1
2	2	TOU Period B with Consumption Tier 2
2	3	TOU Period B with Consumption Tier 3
3	1	TOU Period C with Consumption Tier 1
3	2	TOU Period C with Consumption Tier 2
3	3	TOU Period C with Consumption Tier 3

Code	Enumeration	Position														Normative Status			
		Comments	Networked	14	13	12	11	10	S ₁	S ₂	A ₁	B ₁	C ₁	N ₁	A ₂		B ₂	C ₂	N ₂
225	phaseABCtoN	ABC to Neutral	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	N
256	s2	Phase S2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	N
257	s2N	Phase S2 to Neutral	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	N
512	s1	Phase S1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	N
513	s1N	Phase S1 to Neutral	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	N
768	s12	Phase S1 to S2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	N
769	s12N	Phase S1, S2 to Neutral	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	N
1248	threeWireWye	3W Wye	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	N
1249	fourWireWye	4W Wye	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	1	N
2272	threeWireDelta	3W Delta	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	N
2273	fourWireDelta	4W Delta	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	1	N
6369	fourWireHLDelta	4W High-leg Delta	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	1	N
10465	fourWireOpenDelta	4W Open Delta	0	1	0	1	0	0	0	1	1	1	0	0	0	0	0	1	N
17153	networked	Networked meter	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	N

NOTE 1 The code values were computed by:

$$\text{Code} = \text{Networked} \times 2^{14} + \text{Open} \times 2^{13} + \text{HighLeg} \times 2^{12} + \text{Delta} \times 2^{11} + \text{Wye} \times 2^{10} + S_1 \times 2^9 + S_2 \times 2^8 + A_1 \times 2^7 + B_1 \times 2^6 + C_1 \times 2^5 + N_1 \times 2^4 + A_2 \times 2^3 + B_2 \times 2^2 + C_2 \times 2^1 + N_2$$

NOTE 2 Directional vectors (such as V_{AB} vs. V_{BA}) are created in the phase code by invoking the involved phase (left to right in the matrix) in the order in which they are to be described in the enumeration (left to right as one reads).

When current is measured, it is often simple a single phase conductor indicated such as:

- A
- B
- C
- N

The Neutral-to-ground “phase” can be used to indicate current flowing from the neutral wire to ground. In this case select both N_1 and N_2 . When only neutral is selected choose N_1 . In all other cases when referencing neutral select N_2 . The main goal is readability. These rules should provide the necessary readability.

When voltage is measured, it may contain a simple description of the phase conductor, or if measured relative to something else, an indication of the measurement being “line-to-neutral” or “line-to-line” measured. Common voltage measurements include:

- A
- B
- C
- AN
- BN
- CN
- AB
- BC
- CA
- ABC

When phase angles are measured, it is usually relative to a fixed reference such as voltage phase A. The word “angle” has already been described in a previous field. This field may therefore contain an angle designation such as:

- $A_{\text{current}}^{\text{A volts}}$
- $B_{\text{current}}^{\text{A volts}}$
- $C_{\text{current}}^{\text{A volts}}$

Where the first phase listed is understood to describe the current or voltage phase being measured, and the second phase (the “A”) describes what it is being measured against (voltage phase A.) Since the fact that the measurement is an angle can be determined from the context (provided by the unit of

measure), and the point of reference is always the second phase, there is no need to provide additional indications within the phase lettering. This allows the same code (such as “Phase-CA”) to often be used as a line-to-line voltage descriptor, a voltage phase-angle descriptor, as well as a current phase-angle descriptor.

Residential or other two-phase secondary voltages may be identified as “S1” or “S2”. These labels may be used when the “ABC” names of the phase(s) that feed the service are unknown or unimportant.

The various polyphase network wirings may be identified as:

- Wye
- Delta
- High-leg delta
- Open delta
- Networked

The use of 3 wires or 4 wires may be determined by simply counting the number of phases (including neutral) involved in the service.

C.2.17 Attribute #16, multiplier

The ReadingType encoding offers a field to describe a power-of-ten multiplier against the data value. This is not quite the same as the customary SI-prefix, though in many cases it creates the same result. The user will have to decide what the appropriate displayable symbol is based on the dimensions of the unit of measure. The multiplier enumerations are described in Table C.18 for units of measure that have a single dimension (e.g. “V” not “V²”). The index value represents the power of ten.

Table C.18 – Power of ten enumerations

Code	Displayable symbol for single-dimensioned UOM	Comments	Normative status
-24	y	yocto = $\times 10^{-24}$	N
-21	z	zepto = $\times 10^{-21}$	N
-18	a	atto = $\times 10^{-18}$	N
-15	f	femto = $\times 10^{-15}$	N
-12	p	pico = $\times 10^{-12}$	N
-9	n	nano = $\times 10^{-9}$	N
-6	μ	micro = $\times 10^{-6}$	N
-3	m	milli= $\times 10^{-3}$	N
-2	c	centi = $\times 10^{-2}$	N
-1	d	deci = $\times 10^{-1}$	N
0		Not applicable or "x1"	N
1	da	deca = $\times 10^1$	N
2	h	hecto = $\times 10^2$	N
3	k	kilo = $\times 10^3$	N
6	M	Mega = $\times 10^6$	N
9	G	Giga = $\times 10^9$	N
12	T	Tera = $\times 10^{12}$	N
15	P	Peta = $\times 10^{15}$	N
18	E	Exa = $\times 10^{18}$	N
21	Z	Zetta = $\times 10^{21}$	N
24	Y	Yotta = $\times 10^{24}$	N
N = Normative I = Informative D = Deprecated since last edition			

It should be remembered that this power-of-ten multiplier does not work the same way as the SI prefix. The SI prefix is considered to be part of the unit of measure. A power-of-ten multiplier is not part of the unit of measure. When a SI-Prefix is used, it is understood that “10⁻³” is represented as “milli”, and a mm³ is the same as (mm)³ which is the same as (0,001 m)³ or 10⁻⁹ m³. This is not the same result as 0,001 \times m³ (which is what a power-of-ten multiplier yields.).

Rules for the use of SI prefixes may be found in IEC 60050-112:2010, 02-03.

When the unit of measure being described is a ratio which is rendered as a dimensionless quantity (such as a concentration), it is sometimes customary to display a symbol other than the standard metric prefix symbol. The modern convention however is to use the SI-prefix symbols in front of the dimensionless ratio being described. For example, a ppm concentration by volume (“ppmv”) should instead be described as “ $\mu\text{L/L}$ ”. A few historical dimensionless scalars are provided in Table C.19 for reference.

Table C.19 – Historical concentration multiplier enumerations

Code	Displayable Symbol	Comments	Normative Status
0	PU	per unit = $\times 1 = 10^0$	I
-2	%	percent = $\times 0,01 = \times 10^{-2}$	I
-3	‰	permille = $\times 0,001 = \times 10^{-3}$	I
-6	ppm	parts per million, $\times 0,000\ 001 = \times 10^{-6}$	I
-9	ppb	parts per billion, $\times 0,000\ 000\ 001 = \times 10^{-9}$	I
N = Normative I = Informative D = Deprecated since last edition			

C.2.18 Attribute #17, unit

In IEC 61968-9:2009, a "ppm" unit of measure was supported. In this edition this support was moved from the UOM attribute to the Power-of-ten multiplier attribute, and a number of "concentration" units of measure were introduced.

Tables C.20 through C.27 describe the unit of measure enumerations. They are organized by their relationships to the SI units of measure. SI-units are the preferred unit of measure, but as an international standard, it is understood that other units of measure shall also be supported in some regions.

In these tables, the "code" column is a unique value. The "normative status" indicates if the "code" is normative or informative. The "quantity" column indicates the category of measure. The "unit name" supplies the official name for the unit, and possibly comments regarding its use or relationship to other units. The "symbol" column indicates in most cases the official displayable symbol for the unit. Where there were cases for conflict because different measurement systems have been combined, preference is given to the SI unit of measure. (This happened in the case of rad (rd) and rod (rd).) The "enumeration" column creates a unique string which could be used by CIM modelers to capture a string value for the unit. The enumeration was created based on the following rules:

- A lower camel-case transformation of the symbol column is attempted. All spaces are removed from the symbol to create the enumeration.
- The symbol set is restricted to alpha-numeric characters.
- The symbols "-", "(", and ")" are removed.
- The symbol "/" is replaced by the string "Per".
- The symbol "°" is replaced by the string "Deg".
- Other special symbols such as "α", "μ", and "ħ" are replaced with alternative alpha text strings.
- Digits are not allowed as the first character in the enumeration.
- Text that is superscripted or subscripted is used as normal text in the enumeration (if conflicts are avoidable).
- If two different symbols would result in the same enumeration (due to capitalization rules) then one of them is changed (with preference being given to the base SI units). Exceptions were created for the symbols "A", "B", "G", "H", "ħ", "M", "m_e", "S", and "T".

Table C.20 – Base SI units of measure

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
2	Length	metre	m	m	N
3	Mass	gram	g	g	N
5	Current	ampere	A	a	N
6	Temperature	Kelvin	K	degK	I
7	Amount of substance	mole	mol	mol	I
8	Luminous intensity	candela	cd	cd	I
27	Time	second	s	s	N

N = Normative
I = Informative
D = Deprecated since last edition

NOTE The British spelling "metre" and American spelling "meter" are equivalent.

Table C.21 – Derived SI units of measure with special names

Code	Quantity	Unit name (and comments)	Displayable Symbol	Enumeration	Normative Status
10	Plane angle	Radian (m/m)	rad	rad	N
11	Solid angle	Steradian (m ² /m ²)	sr	sr	I
21	Absorbed dose	Gray (J/kg)	Gy	gy	I
22	Radioactivity	Becquerel (1/s)	Bq	bq	I
23	Temperature	degrees Celsius	°C	degC	N
24	Dose equivalent	Sievert (J/kg)	Sv	sv	I
25	Electric capacitance	Farad (C/V)	F	f	N
26	Electric charge	Coulomb (Amp second)	C	c	I

Code	Quantity	Unit name (and comments)	Displayable Symbol	Enumeration	Normative Status
28	Electric inductance	Henry (Wb/A)	H	h	N
29	Electric potential	Volt (W/A)	V	v	N
30	Electric resistance	Ohm (V/A)	Ω	ohm	N
31	Energy joule	(N·m = C·V = W·s)	J	j	N
32	Force newton	(kg m/s ²)	N	n	N
33	Frequency	Cycles per second or (1/s)	Hz	hz	N
34	Illuminance lux	(lm/m ²)	lx	lx	I
35	Luminous flux	lumen (cd sr)	lm	lm	I
36	Magnetic flux	Weber (V s)	Wb	wb	I
37	Magnetic flux density	Tesla (Wb/m ²)	T	t	I
38	Real power	Watt. By definition, one Watt equals oneJoule per second. Electrical power may have real and reactive components. The real portion of electrical power (I^2R) or $V\cos\theta$, is expressed in Watts. (See also apparent power and reactive power.)	W	w	N
39	Pressure	Pascal (N/m ²) Note: the absolute or relative measurement of pressure is implied with this entry. See below for more explicit forms.	Pa	pa	N
53	Electric Conductance	Siemens (A / V = 1 / Ω)	S	siemens	N
155	Pressure	Pascal, absolute pressure	PaA	paA	N
140	Pressure	Pascal, gauge pressure	PaG	paG	N
158	Catalytic activity	katal = mol / s	kat	kat	I

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I = Informative
D = Deprecated since last edition

NOTE The British spelling "litre" and American spelling "liter" are equivalent.

Table C.22 – Derived SI Units of Measure without Special Names

Code	Quantity	Unit name (and comments)	Displayable Symbol	Enumeration	Normative Status
4	Rotational speed	rotations per second NOTE Compare to cycles per second, Hz	rev/s	revPerS	I
41	Area	square metre	m ²	m2	N
42	Volume	cubic metre	m ³	m3	N
43	Velocity	metre per second (m/s)	m/s	mPerS	N
44	Acceleration	metre per second squared	m/s ²	mPerS2	I
45	Volumetric flow rate	cubic metres per second	m ³ /s	m3PerS	N
46	Fuel efficiency	metre / cubic metre	m/m ³	mPerM3	I
47	Moment of mass	kilogram metre (kg·m) (first moment of mass) NOTE 1 Users shall supply the "k" prefix to obtain "kg m".	g m	gM	I
48	Density	gram/cubic metre NOTE 2 Users shall supply the prefix multiplier "k" to form kg/m ³	g/m ³	gPerM3	I
49	Viscosity	metre squared / second	m ² /s	m2PerS	I
50	Thermal conductivity	Watt/metre Kelvin	W/(m K)	wPerMK	I
51	Heat capacity	Joule/Kelvin	J/K	jPerK	I
54	Angular velocity	radians per second	rad/s	radPerS	I
61	Apparent power	Volt Ampere (See also real power and reactive power.)	VA	vA	N
63	Reactive power	Volt Ampere reactive. The "reactive" or "imaginary" component of electrical power (VISinθ). (See also real power and apparent power). NOTE 3 Different meter designs use different methods to arrive at their results. Some meters may compute reactive power as an arithmetic value, while others compute the value vectorially. The data consumer should determine the method in use and the suitability of the measurement for the intended purpose.	VAr	vAr	N
66	Volt seconds	Volt seconds (Ws/A)	Vs	vS	N
67	Volts squared	Volt squared (W ² /A ²)	V ²	v2	N
68	Amp seconds	Amp seconds	As	aS	N
69	Amps squared	Amp squared	A ²	a2	N

Code	Quantity	Unit name (and comments)	Displayable Symbol	Enumeration	Normative Status
70	Amps squared time	square Amp second	A ² s	a2S	I
71	Apparent energy	Volt Ampere hours	VAh	vAH	N
72	Real energy	Watt hours	Wh	wH	N
73	Reactive energy	Volt Ampere reactive hours	VArh	vArH	N
74	Magnetic flux	Volt per Hertz	V/Hz	vPerHz	I
75	Rate of change of frequency	Hertz per second	Hz/s	hzPerS	I
78	Moment of mass	kg m ² (Second moment of mass, commonly called the moment of inertia) NOTE 4 Users shall supply the "k" prefix to obtain "kg m ² ".	gm ²	gm2	I
81	Ramp rate	Watt per second	W/s	wPerS	I
82	Volumetric flow rate	litre per second	L/s	lPerS	I
100	Quantity power	Q	Q	q	I
101	Quantity energy	Qh	Qh	qh	I
102	resistivity	Ohm metre, ρ (rho)	Ωm	ohmM	I
103	A/m	magnetic field strength, Ampere per metre	A/m	aPerM	I
104	volt-squared hour	Volt-squared-hours	V ² h	v2H	I
105	ampere-squared hour	Ampere-squared hour	A ² h	a2H	I
106	Ampere-hours	Ampere-hours	Ah	aH	I
107	Wh/m ³	energy per volume	Wh/m ³	wHPerM3	I
108	Timestamp	time and date per ISO 8601 format	timeStamp	timeStamp	N
115	Kh-Wh	active energy metering constant	Wh/rev	wHPerRev	N
116	Kh-VArh	reactive energy metering constant	VArh/rev	vArHPerRev	N
117	Kh-Vah	apparent energy metering constant	VAh/rev	vAHPerRev	N
125	Volumetric flow rate	cubic metre per hour	m ³ /h	m3PerH	N
126	Volumetric flow rate	compensated cubic metre per hour	m ³ _(compensated) /h	m3CompensatedPerH	N
127	Volumetric flow rate	uncompensated cubic metre per hour	m ³ _(uncompensated) /h	m3UncompensatedPerH	N
137	Volumetric flow rate	litre per hour	L/h	lPerH	N
139	Volumetric flow rate	litre (uncompensated) per hour	L _(uncompensated) /h	lUncompensatedPerH	N

Code	Quantity	Unit name (and comments)	Displayable Symbol	Enumeration	Normative Status
138	Volumetric flow rate	litre (compensated) per hour	$L_{(compensated)}/h$	lCompensatedPerH	N
161	Quantity power	Q measured at 45°	Q ₄₅	q45	I
162	Quantity power	Q measured at 60°	Q ₆₀	q60	I
163	Quantity energy	Qh measured at 45°	Q ₄₅ h	q45H	I
164	Quantity energy	Qh measured at 60°	Q ₆₀ h	q60H	I
165	Specific energy	Joule / kg	J/kg	jPerKg	I
166	Volume	cubic metre, with the value uncompensated for weather effects.	$m^3_{(uncompensated)}$	m3Uncompensated	N
167	Volume	cubic metre, with the value compensated for weather effects.	$m^3_{(compensated)}$	m3Compensated	N
173	Wavenumber	reciprocal metre, $\sigma, \tilde{\nu}$ (1/m)	M ⁻¹	m1	I
174	Specific volume	cubic metre per kilogram, ν	m ³ /kg	m3PerKg	I
175	Dynamic viscosity	Pascal second	Pa s	paS	I
176	Moment of force	Newton metre	N m	nM	I
177	Surface tension	Newton per metre	N/m	nPerM	I
178	Angular acceleration	radian per second squared	rad/s ²	radPerS2	I
179	Heat flux density, irradiance	Watt per square metre	W/m ²	wPerM2	I
180	Specific heat capacity, specific entropy	Joule per kilogram kelvin	J/(kg K)	jPerKgK	I
181	energy density	Joule per cubic metre	J/m ³	jPerM3	I
182	electric field strength	Volt per metre	V/m	vPerM	I
183	electric charge density	Coulomb per cubic metre	C/m ³	cPerM3	I
184	surface charge density	Coulomb per square metre	C/m ²	cPerM2	I
185	permittivity	Farad per metre	F/m	fPerM	I
186	permeability	Henry per metre	H/m	hPerM	I
187	molar energy	Joule per mole	J/mol	jPerMol	I
188	molar entropy, molar heat capacity	Joule per mole kelvin	J/(mol K)	jPerMolK	I

Code	Quantity	Unit name (and comments)	Displayable Symbol	Enumeration	Normative Status
189	exposure (x rays)	Coulomb per kilogram	C/kg	cPerKg	I
190	absorbed dose rate	Gray per second	Gy/s	gyPerS	I
191	radiant intensity	Watt per steradian	W/sr	wPerSr	I
192	radiance	Watt per square metre steradian	W/(m ² sr)	wPerM2Sr	I
193	catalytic activity concentration	katal per cubic metre	kat/m ³	katPerM3	I
280	Volt-hour	Volt hours	Vh	vH	N

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Table C.23 – Non-SI Units of Measure accepted for use with the International System of Units

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
159	Time	minute = 60 s	min	min	I
160	Time	hour = 60 min = 3 600 s	h	hr	I
195	Time	day = 24 h = 86 400 s	d	d	I
9	Plane angle	degree	°	deg	N
196	Plane angle	minute	"	angleMin	I
197	Plane angle	second	"	angleSec	I
198	Area	hectare	ha	ha	I
134	Volume	litre = dm ³ = m ³ /1 000	L	l	N
199	mass	"tonne" or "metric ton" (1 000 kg = 1 Mg)	t	tonne	I

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I = Informative
D = Deprecated since last edition

NOTE The British spelling "litre" and American spelling "liter" are equivalent.

Table C.24 – Dimensionless and Concentration Units of Measure

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
0	N/A	none (not applicable)		none	N
65	Power factor	dimensionless $\cos\theta = \frac{P}{ S }$ NOTE 1 This definition of power factor only holds for balanced systems. See the alternative definition under code 153. NOTE 2 Beware of differing sign conventions in use between the IEC and EEI. It is assumed that the data consumer understands the type of meter in use and the sign convention in use by the utility.	cos θ	cosTheta	N
79	Logarithmic ratio	Bel NOTE 3 Users shall combine this unit with the multiplier prefix "d" to form decibels (dB)	B	bel	I
109	State	status, where: "1" = "true", "live", "on", "high", "set"; "0" = "false", "dead", "off", "low", "cleared" NOTE 4 A Boolean value is preferred but other values may be supported	status	status	N
111	Amount of substance	Counter value	count	count	N
113	Logarithmic ratio of signal strength	Bel-mW, normalized to 1mW. Note: to form "dBm" combine "Bm" with multiplier "d".	Bm	bm	N
114	Application Value	Encoded value	code	code	N
118	EndDeviceEvent	Value to be interpreted as a EndDeviceEventCode	meCode	meCode	N
143	Concentration	The ratio of the volume of a solute divided by the volume of the solution. NOTE 5 Users may need use a prefix such a "μ" to express a quantity such as "μL/L"	L/L	lPerL	N
144	Concentration	The ratio of the mass of a solute divided by the mass of the solution. NOTE 6 Users may need use a prefix such a "μ" to express a quantity such as "μg/g"	g/g	gPerG	N
145	Concentration	The amount of substance concentration, (c), the amount of solvent in moles divided by the volume of solution in m ³ .	mol/m ³	molPerM3	I
146	Concentration	Molar fraction (X), the ratio of the molar amount of a solute divided by the molar amount of the solution.	mol/mol	molPerMol	I

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
147	Concentration	Molality, the amount of solute in moles and the amount of solvent in kilograms.	mol/kg	molPerKg	I
148	Length	Ratio of length	m/m	mPerM	I
149	Time	Ratio of time NOTE 7 Users may need to supply a prefix such as "μ" to show rates such as "μs/s"	s/s	sPerS	N
150	Frequency	Rate of frequency change NOTE 8 Users may need to supply a prefix such as "m" to show rates such as "mHz/Hz"	Hz/Hz	hzPerHz	N
151	Voltage	Ratio of voltages NOTE 9 Users may need to supply a prefix such as "m" to show rates such as "mV/V"	V/V	vPerV	N
152	Current	Ratio of Amperages NOTE 10 Users may need to supply a prefix such as "m" to show rates such as "mA/A"	A/A	aPerA	I
153	Power factor	PF, the ratio of the active power to the apparent power. NOTE 11 The sign convention used for power factor will differ between IEC meters and IEEE (ANSI) meters. It is assumed that the data consumers understand the type of meter being used and agree on the sign convention in use at any given utility.	W/WA	wPerVA	I
154	Amount of rotation	Revolutions	rev	rev	I
168	Signal Strength	Ratio of power NOTE 12 Users may need to supply a prefix such as "m" to show rates such as "mW/W"	W/W	wPerW	I
170	Refractive Index	n	n	refractiveIndexN	I
171	Relative Permeability	μ_r	μ_r	relativePermeabilityMur	I
172	Logarithmic ratio	Neper	Np	np	I
281	Humidity	Relative humidity expressed as the ratio of partial pressure of water vapor in the air-water mixture to the saturated vapor pressure of water at the prescribed temperature.	ϕ	relativeHumidity	N
282	Sky Cover	Ratio of covered sky to total sky.	skyCover	skyCover	N

N = Normative

I = Informative

D = Deprecated since last edition

Table C.25 – Non-SI units whose values in SI units shall be obtained experimentally

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
200	energy	electronvolt (1 eV = $1,602\ 176 \times 10^{-19}$ J)	eV	eV	I
201	mass	dalton (1 Da = $1,660\ 538 \times 10^{-27}$ kg)	Da	da	I
202	mass	unified atomic mass unit (1 u = 1 Da)	u	u	I
203	length	astronomical unit (1ua = $1,495\ 978 \times 10^{11}$ m)	ua	ua	I
204	speed	natural unit of speed (speed of light in a vacuum) = $299\ 792\ 458$ m/s	c_0	c0	I
205	action	natural unit of action (reduced planck constant) = $1,054\ 571 \times 10^{-34}$ J s	\hbar	nuh	I
206	mass	natural unit of mass (electron mass) = $9,109\ 382 \times 10^{-31}$ kg	m_e	nuMe	I
207	time	natural unit of time	$\hbar/(m_e c_0^2)$	nuHPerNuMeC02	I
208	charge	atomic units of charge (elementary charge) = $1,602\ 176 \times 10^{-19}$ C	e	auE	I
209	mass	atomic units of mass (electron mass) = $9,109\ 382 \times 10^{-31}$ kg	m_e	auMe	I
210	action	atomic unit of action (reduced planck constant) = $1,054\ 571 \times 10^{-34}$ J s	\hbar	auH	I
211	length	atomic unit of length, bohr (Bohr radius) = $0,529\ 177 \times 10^{-10}$ m	a_0	auA0	I
212	energy	atomic unit of energy, hartree = $4,359\ 744$	E_h	auEh	I

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
213	time	atomic unit of time	h/E _h	auHPerAuEh	I
N = Normative					
I = Informative					
D = Deprecated since last edition					

Table C.26 – Other Non-SI Units of Measure

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
76	Number of characters	characters	char	char	N
77	Data rate	characters per second	char/s	charPerSec	I
80	Monetary unit	Generic money NOTE Specific monetary units are identified the currency class	¤	money	I
119	Volume	cubic foot	ft ³	ft3	N
120	Volume	cubic foot compensated for weather	ft ³ (compensated)	ft3Compensated	N
121	Volume	cubic foot uncompensated for weather	ft ³ (uncompensated)	ft3Uncompensated	N
122	Volumetric flow rate	cubic foot per hour	ft ³ /h	ft3PerH	N
123	Volumetric flow rate	compensated cubic feet per hour	ft ³ (compensated)/h	ft3CompensatedPerH	N
124	Volumetric flow rate	uncompensated cubic feet per hour	ft ³ (uncompensated)/h	ft3UncompensatedPerH	N
128	Volume	US gallon (1 gal = 231 in ³ = 128 fl oz.)	US gal	uSGal	N
129	Volumetric flow rate	US gallon per hour	US gal/h	uSGalPerH	N
130	Volume	Imperial gallon	imp gal	impGal	N
131	Volumetric flow rate	Imperial gallon per hour	imp gal/h	impGalPerH	N
132	Energy	British Thermal Unit	BTU	btu	N
133	Power	BTU per hour	BTU/h	btuPerH	N
141	Pressure	Pound per square inch, absolute	psiA	psiA	I
142	Pressure	Pound per square inch, gauge	psiG	psiG	I
156	Volume	Litre, with the value uncompensated for weather effects	L _(uncompensated)	IUncompensated	N

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
157	Volume	Litre, with the value compensated for weather effects	L _(compensated)	ICompensated	N
169	Energy	Therm	therm	therm	N
214	Pressure	bar (1 bar = 100 kPa)	bar	bar	I
215	Pressure	millimeter of mercury (1 mmHg ≈ 133,3 Pa)	mmHg	mmHg	I
216	Length	ångström (1 Å = 10 ⁻¹⁰ m)	Å	angstrom	I
217	Length	nautical mile (1 M = 1852 m)	M	nmi	I
218	Area	barn (1 b = 100 fm ² = 10 ⁻²⁸ m ²)	b	barn	I
219	Speed	knot (1 kn = 1852/3600) m/s	kn	kn	I
220	Activity	curie (1 Ci = 3,7 × 10 ¹⁰ Bq)	Ci	ci	I
221	exposure	roentgen (1 R = 2,58 × 10 ⁻⁴ C/kg)	R	r	I
222	absorbed dose	rad (1 rd = 1 cGy)	rd	doseRad	I
223	dose equivalent	rem (1 rem = 10 ⁻² Sv)	rem	rem	I
224	length	inch	in	in	I
225	length	foot (1 ft = 12 in)	ft	ft	I
226	length	rod (1 rod = 16,5 ft)	rod	rod	I
227	length	furlong (1 fur = 660 ft)	fur	fur	I
228	length	mile (1 statute mile = 8 fur = 80 chains = 320 rods = 5280 feet)	mi	mi	I
229	area	square foot (1 ft ² = 144 in ²)	ft ²	ft2	I
230	area	square yard (1 yd ² = 9 ft ²)	yd ²	yd2	I
231	area	square rod (1 rod ² = 272,25 ft ²)	rod ²	rod2	I
232	area	acre (1 acre = 160 rd ² = 43 560 ft ²)	acre	acre	I
233	area	square mile (1 mi ² = 640 acres)	mi ²	mi2	I
234	area	section of land (1 mi ² = 1 section of land)	section of land	sectionOfLand	I
235	area	township (1 township = 6 miles square)	township	township	I
237	Volume	cubic yard (1 yd ³ = 27 ft ³)	yd ³	yd3	I
238	length	link (1 li = 0,66 ft)	li	li	I
239	length	chain (1 ch = 100 links = 4 rods = 66 ft)	ch	ch	I
240	Volume	US liquid pint (1 pt = 28,875 in ³ = 128 fl dr)	US liq pt	uSLiqPt	I

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
241	Volume	US liquid quart (1 qt = 2 pt)	US liq qt	uSLiqQt	I
242	Volume	Apothecaries fluid dram	fl dr ap	flDrAp	I
243	Volume	Apothecaries fluid ounce (1 fl oz ap = 8 fl dr ap)	fl oz ap	flOzAp	I
244	Volume	US dry pint (1 pt = 67,2 in ³)	US dry pt	usDryPt	I
245	Volume	US dry quart (1 qt = 2 pints)	US dry qt	usDryQt	I
246	Volume	US peck (1 pk = 8 qt)	US pk	usPk	I
247	Volume	US bushel (1 bu = 4 pk)	US bu	usBu	I
248	Mass	grain (1 grain = 1/7000 avdp lb) NOTE The "grain" is the same in the avoirdupois, troy, and apothecaries units of mass.	gr	gr	I
249	Mass	Avoirdupois dram (1 Avdp dr = 27-11/32 gr) NOTE The abbreviation "dr" may be used if there is no chance of confusing the avoirdupois dram with the troy or apothecaries dram.	avdp dr	avdpDr	I
250	Mass	Avoirdupois ounce (1 Avdp oz = 16 Avdp dr) NOTE The abbreviation "oz" may be used if there is no chance of confusing the avoirdupois ounce with the troy or apothecaries ounce.	avdp oz	avdpOz	I
251	Mass	Avoirdupois pound (1 lb = 16 oz) NOTE Although the term "pound" is commonly used in many countries simply as "pound (lb)", the historical term "avoirdupois" is added to provide context and distinguish it in this setting from the troy and apothecaries systems of measure which use the same names. The abbreviation "lb" may be used instead of "avdp lb" if no confusion is possible with the pound named in these other systems.	avdp lb	avdpLb	I
252	Mass	Avoirdupois hundredweight (1 cwt = 100 lbs)	short cwt	shortCwt	I
253	Mass	Avoirdupois ton (1 short ton = 2000 lbs)	short ton	shortTon	I
254	Mass	Avoirdupois gross or long hundredweight (1 long cwt = 112 lbs)	long cwt	longCwt	I
255	Mass	Avoirdupois gross or long ton (1 long ton = 20 long cwt)	long ton	longTon	I
256	Mass	Troy pennyweight (1 dwt = 24 grains)	dwt	dwt	I

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
257	Mass	Troy ounce (1 oz t = 20 dwt)	oz t	ozT	I
258	Mass	Troy pound (1 lb t = 12 oz t)	lb t	lbT	I
259	Mass	Apothecaries scruple (1 s ap = 20 grains)	s ap	sAp	I
260	Mass	Apothecaries dram (1 dr ap = 3 s ap)	dr ap	drAp	I
261	Mass	Apothecaries ounce (1 oz ap = 8 dr ap)	oz ap	ozAp	I
262	Mass	Apothecaries pound (1 lb ap = 12 oz ap)	lb ap	lbAp	I
263	Fuel economy	mile per imperial gallon	mpg (Imp)	mpgImp	I
264	Fuel economy	mile per US gallon	mpg (US)	mpgUS	I
265	Fuel economy	mile per US gallon equivalent	MPGe (US)	mPGeUS	I
266	Fuel economy	litre per 100 km	l/(100 km)	lPer100km	I
267	Fuel economy	kilowatt-hour per mile (Note: users shall supply the "k" prefix to create "kWh/mi")	Wh/mi	wHPerMi	I
268	Fuel economy	kilowatt-hour per 100 mile (Note: users shall supply the "k" prefix to create "kWh/(100 mi)")	Wh/(100 mi)	wHPer100Mi	I
279	Temperature	degrees Fahrenheit	°F	degF	I

N = Normative
I = Informative
D = Deprecated since last edition

Table C.27 – Non-SI Units Associated with the CGS and the CGS-Gaussian System of Units

Code	Quantity	Unit name (and comments)	Symbol	Enumeration	Normative Status
269	Energy	erg (1 erg = 10^{-7} J)	erg	erg	I
270	Force	dyne (1 dyn = 10^{-5} N)	dyn	dyn	I
271	Dynamic viscosity	poise (1 P = 0,1 Pa s)	P	p	I
272	Kinematic viscosity	stokes (1 St = 1 cm ² /s)	St	st	I
273	Luminance	stilb (1 sb = 10^4 cd/m ²)	sb	sb	I
274	Illuminance	phot (1 ph = 10^4 lx)	ph	ph	I
275	Acceleration	gal (1 Gal = 10^{-2} m s ⁻²) NOTE This "Gal" is an abbreviation for "Galileo" not "gallon"	Gal	gal	I
276	Magnetic flux	Maxwell (1 Mx = 10^{-8} Wb)	Mx	mx	I
277	Magnetic flux density	Gauss (1 G = 10^{-4} T)	G	gauss	I
278	Magnetic field	Oersted (1 Oe = $(10^3/4\pi)$ A/m)	Oe	oe	I

N = Normative
I = Informative
D = Deprecated since last edition

C.2.19 Attribute #18, currency

Currency codes are defined in ISO 4217. A handful of codes have been repeated in Table C.28 for reference. Additional currency codes may be drawn freely from ISO 4217.

Table C.28 – Currency units of measure (from ISO 4217)

Code	Displayable Symbol	Unit name	Normative Status
0		None	N
36	AUD	Australian Dollar	I
124	CAD	Canadian Dollar	I
156	CNY	Chinese Yuan Renminbi	I
208	DKK	Danish Crown	I
356	INR	India Rupee	I
392	JPY	Japanese Yen	I
578	NOK	Norwegian Crown	I
643	RUB	Russian Ruble	I
710	ZAR	South African Rand	I
752	SEK	Swedish Krona	I
756	CHF	Swiss Franc	I
826	GBP	British Pound	I
840	USD	US Dollar	I
978	EUR	Euro	I
N = Normative			
I = Informative			
D = Deprecated since last edition			

C.3 Using data element attributes to define the ReadingType name – Construction formula with example ReadingType codes

The “ReadingType” may be automatically generated by judiciously populating each of the attributes and presenting them in order side-by-side. It is recommended that attributes be as explicit as possible to identify a data element, but on the other hand, not become so explicit that it overspecifies the data element.

A ReadingType Name may be generated by presenting the numeric form of each attribute in side-by-side fashion separated by dots.

```
<ReadingType.Name.name> ::= <macroPeriod> “.” <aggregate> “.” <measuringPeriod> “.”
<accumulation> “.” <flowDirection> “.” <commodity> “.” <measurementKind> “.”
<interharmonicNumerator> “.” <interharmonicDenominator> “.” <argumentNumerator> “.”
<argumentDenominator> “.” <tou> “.” <cpp> “.” <consumptionTier> “.” <phases> “.”
<multiplier> “.” <unit> “.” <currency>
```

These fields can be converted to a regionalized pronounceable name by using the regional text form for each non-zero attribute, and presenting them in order, side-by-side, separated by spaces and other symbols as appropriate. For most applications, this usually provides more information than needs to be said (verbally) about the data. It is accepted practice in common speech to suppress descriptive adjectives which are mutually understood by the context of the

communication. Table C.29 provides examples of such conversions into English. One will note that in the EBNF formula below, that symbols such as "(", and ")" are introduced to improve readability. Spaces around the unit of measure are also omitted to improve readability.

```
<Name.description> ::= [<macroPeriod> " "] [<aggregate> " "] [<measuringPeriod> " "]  
[<accumulation> " "] [<flowDirection> " "] [<commodity> " "] [<measurementKind> " "]  
[<interharmonicNumerator> " "] [<interharmonicDenominator> " "] [<argumentNumerator> " "]  
[<argumentDenominator> " "] [<tou> " "] [<cpp> " "] [<consumptionTier> " "] [<phases> " "] "("  
[<multiplier>] [<unit>] [<currency>] ")"
```

While a good interface will eliminate ambiguity, and not publish “anonymous” data, a good interface will also not go to the other extreme and overspecify the data it publishes. The concept is similar to the practice of publishing an appropriate number of digits of resolution for a numerical value. One system may know (for example) the phase on which a voltage was measured and supply it as an attribute of the measurement. Another system might not know the phase with good authority and simply publish the voltage measured at a given meter. The ReadingTypeIDs used in a response may (therefore) differ slightly than the ReadingTypeIDs used in a request. The ReadingType codes used by a data publisher should be appropriate for the data supplied.

The examples listed below are by no means an exhaustive list of what can be constructed given the enumeration values listed above. After searching the examples (below), and searching the lists of enumerations (above), and a needed enumeration cannot be found, custom made enumerations may be made. Some of the fields (such a “numerator”) are naturally an integer field. If the needed enumeration is merely an integer, then the user should supply the integer required. However, if the field is a list-type enumeration, some care should be used. Rather than merely using the next available number on the list, custom user enumerations should be created numbered 9,000 or above.

Table C.29 – Reading Type Examples

Reading Type ID Code	Description	Normative Status
8.0.0.0.1.152.0.0.0.0.0.0.0.0.0.840	billingPeriod electricitySecondaryMetered billCarryover (USD)	N
8.0.0.0.1.150.0.0.0.0.0.0.0.0.0.840	billingPeriod electricitySecondaryMetered billLastPeriod (USD)	N
8.8.0.3.1.1.8.0.0.0.0.0.0.0.3.38.0	billingPeriod maximum cumulative forward electricitySecondaryMetered demand (kW)	N
8.8.53.6.1.1.8.0.0.0.0.0.0.0.3.38.0	billingPeriod maximum fixedBlock15Min indicating forward electricitySecondaryMetered demand (kW)	N
8.8.0.6.1.1.8.0.0.0.0.0.0.0.3.63.0	billingPeriod maximum indicating forward electricitySecondaryMetered demand (kVA _r)	N
8.8.0.6.1.1.8.0.0.0.0.0.0.0.3.38.0	billingPeriod maximum indicating forward electricitySecondaryMetered demand (kW)	N
8.8.0.6.1.1.8.0.0.0.0.1.0.0.0.3.38.0	billingPeriod maximum indicating forward electricitySecondaryMetered demand touA (kW)	N
8.8.0.6.1.1.8.0.0.0.0.2.0.0.0.3.38.0	billingPeriod maximum indicating forward electricitySecondaryMetered demand touB (kW)	N
8.8.0.6.1.1.8.0.0.0.0.3.0.0.0.3.38.0	billingPeriod maximum indicating forward electricitySecondaryMetered demand touC (kW)	N
8.8.0.6.1.1.8.0.0.0.0.4.0.0.0.3.38.0	billingPeriod maximum indicating forward electricitySecondaryMetered demand touD (kW)	N
8.8.0.6.19.1.8.0.0.0.0.0.0.0.0.3.38.0	billingPeriod maximum indicating reverse electricitySecondaryMetered demand (kW)	N
8.8.71.6.1.1.8.0.0.0.0.0.0.0.3.38.0	billingPeriod maximum rollingBlock15MinIntvl5MinSubIntvl indicating forward electricitySecondaryMetered demand (kW)	N
8.8.101.6.1.1.8.0.0.720.1.0.0.0.0.3.38.0	billingPeriod maximum specifiedFixedBlock indicating forward electricitySecondaryMetered demand n720 (kW)	N
8.8.102.6.1.1.8.0.0.720.240.0.0.0.3.38.0	billingPeriod maximum specifiedRollingBlock indicating forward electricitySecondaryMetered demand n720/240 (kW)	N
8.0.0.9.1.1.12.0.0.0.0.1.0.0.0.3.72.0	billingPeriod summation forward electricitySecondaryMetered energy touA (kWh)	N
8.0.0.9.1.1.12.0.0.0.0.2.0.0.0.3.72.0	billingPeriod summation forward electricitySecondaryMetered energy touB (kWh)	N
8.0.0.9.1.1.12.0.0.0.0.3.0.0.0.3.72.0	billingPeriod summation forward electricitySecondaryMetered energy touC (kWh)	N
0.0.0.1.0.1.122.0.0.0.0.0.0.0.0.111.0	bulkQuantity electricitySecondaryMetered demandReset (count)	N
0.0.0.1.0.1.11.0.0.0.0.0.0.0.0.111.0	bulkQuantity electricitySecondaryMetered energization (count)	N
0.0.0.1.0.1.131.0.0.0.0.0.0.0.0.111.0	bulkQuantity electricitySecondaryMetered loadInterrupt (count)	N
0.0.0.1.0.1.141.0.0.0.0.0.0.0.0.111.0	bulkQuantity electricitySecondaryMetered relayActivation (count)	N
0.0.0.1.0.1.142.0.0.0.0.0.0.0.0.111.0	bulkQuantity electricitySecondaryMetered relayCycle (count)	N
0.0.0.1.1.1.12.0.0.0.0.0.0.0.3.73.0	bulkQuantity forward electricitySecondaryMetered energy (kVA _r h)	N
0.0.0.1.1.1.12.0.0.0.0.0.0.0.3.72.0	bulkQuantity forward electricitySecondaryMetered energy (kWh)	N
0.0.0.1.1.7.58.0.0.0.0.0.0.0.2.120.0	bulkQuantity forward naturalGas volume (hft ³ (compensated))	N
0.0.0.1.1.7.58.0.0.0.0.0.0.0.2.121.0	bulkQuantity forward naturalGas volume (hft ³ (uncompensated))	N

ReadingType ID Code	Description	Normative Status
0.0.0.1.1.7.58.0.0.0.0.0.0.0.3.120.0	bulkQuantity forward naturalGas volume (kft ³ (compensated))	N
0.0.0.1.1.7.58.0.0.0.0.0.0.0.3.121.0	bulkQuantity forward naturalGas volume (kft ³ (uncompensated))	N
0.0.0.1.4.1.12.0.0.0.0.0.0.0.3.73.0	bulkQuantity net electricitySecondaryMetered energy (kVArh)	N
0.0.0.1.4.1.12.0.0.0.0.0.0.0.3.72.0	bulkQuantity net electricitySecondaryMetered energy (kWh)	N
0.0.0.1.19.1.12.0.0.0.0.0.0.0.3.73.0	bulkQuantity reverse electricitySecondaryMetered energy (kVArh)	N
0.0.0.1.19.1.12.0.0.0.0.0.0.0.3.72.0	bulkQuantity reverse electricitySecondaryMetered energy (kWh)	N
0.0.0.1.20.1.12.0.0.0.0.0.0.0.3.73.0	bulkQuantity total electricitySecondaryMetered energy (kVArh)	N
0.0.0.1.20.1.12.0.0.0.0.0.0.0.3.73.0	bulkQuantity total electricitySecondaryMetered energy (kVArh)	N
0.0.0.1.20.1.12.0.0.0.0.0.0.0.3.72.0	bulkQuantity total electricitySecondaryMetered energy (kWh)	N
0.0.0.0.0.3.97.0.0.0.1.0.0.0.0.0.114.0	communication deviceAddressType2 n0 (code)	N
0.0.0.0.0.3.123.0.0.0.0.0.0.0.0.114.0	communication diagnostic (code)	N
0.0.0.0.0.3.104.0.0.0.1.0.0.0.0.0.114.0	communication groupAddressType2 n0 (code)	N
0.0.0.0.0.3.133.0.0.0.0.0.0.0.0.114.0	communication maintenance (code)	N
0.0.0.0.0.3.114.0.0.0.1.0.0.0.0.0.114.0	communication oneWayAddress n0 (code)	N
0.0.0.0.0.3.114.0.0.0.1.1.0.0.0.0.0.114.0	communication oneWayAddress n1 (code)	N
11.0.0.1.4.1.12.0.0.0.0.0.0.0.3.72.0	daily bulkQuantity net electricitySecondaryMetered energy (kWh)	N
11.0.0.4.0.1.126.0.0.0.0.0.0.0.0.0.111.0	daily deltaData electricitySecondaryMetered ieese1366MomentaryInterruption (count)	N
11.0.0.4.0.1.127.0.0.0.0.0.0.0.0.0.111.0	daily deltaData electricitySecondaryMetered ieese1366MomentaryInterruptionEvent (count)	N
11.0.0.4.0.1.128.0.0.0.0.0.0.0.0.0.111.0	daily deltaData electricitySecondaryMetered ieese1366SustainedInterruption (count)	N
11.0.0.4.0.1.128.0.0.0.0.0.0.0.0.0.27.0	daily deltaData electricitySecondaryMetered ieese1366SustainedInterruption (s)	N
11.8.0.6.1.1.8.0.0.0.0.0.0.0.3.38.0	daily maximum indicating forward electricitySecondaryMetered demand (kW)	N
11.0.0.9.4.1.12.0.0.0.0.1.0.0.0.3.72.0	daily summation net electricitySecondaryMetered energy touA (kWh)	N
0.0.0.4.1.1.12.0.0.0.0.0.0.0.3.73.0	deltaData forward electricitySecondaryMetered energy (kVArh)	N
0.0.0.4.1.1.12.0.0.0.0.0.0.0.3.72.0	deltaData forward electricitySecondaryMetered energy (kWh)	N
0.0.0.4.1.12.0.0.0.0.0.0.0.3.73.0	deltaData net electricitySecondaryMetered energy (kVArh)	N
0.0.0.4.1.12.0.0.0.0.0.0.0.3.72.0	deltaData net electricitySecondaryMetered energy (kWh)	N
0.0.0.4.19.1.12.0.0.0.0.0.0.0.3.73.0	deltaData reverse electricitySecondaryMetered energy (kVArh)	N
0.0.0.4.19.1.12.0.0.0.0.0.0.0.3.72.0	deltaData reverse electricitySecondaryMetered energy (kWh)	N
0.0.0.4.20.1.12.0.0.0.0.0.0.0.3.73.0	deltaData total electricitySecondaryMetered energy (kVArh)	N

ReadingType ID Code	Description	Normative Status
0.0.0.4.20.1.12.0.0.0.0.0.0.0.3.72.0	deltaData total electricitySecondaryMetered energy (kWh)	N
0.0.0.0.0.1.5.0.0.0.0.0.0.0.0.111.0	electricitySecondaryMetered currentAngle (count)	N
0.0.0.0.0.1.6.0.0.0.0.0.0.0.0.111.0	electricitySecondaryMetered currentImbalance (count)	N
0.0.0.0.0.1.11.0.0.0.0.0.0.0.0.109.0	electricitySecondaryMetered energization (status)	N
0.0.0.0.0.1.13.0.0.0.0.0.0.0.0.109.0	electricitySecondaryMetered energizationLoadSide (status)	N
0.0.0.0.0.1.43.0.0.0.0.0.0.0.0.109.0	electricitySecondaryMetered switchPosition (status)	N
0.0.0.0.0.1.57.0.0.0.0.0.0.0.0.111.0	electricitySecondaryMetered voltageImbalance (count)	N
0.0.0.0.0.1.59.0.0.0.0.0.0.0.0.111.0	electricitySecondaryMetered zeroFlowDuration (count)	N
0.4.0.0.0.1.55.0.0.0.0.0.0.0.0.111.0	excess electricitySecondaryMetered voltageAngle (count)	N
0.0.2.4.1.1.12.0.0.0.0.0.0.0.0.3.72.0	fifteenMinute deltaData forward electricitySecondaryMetered energy (kWh)	N
0.0.0.6.0.1.4.0.0.0.0.0.0.0.0.0.5.0	indicating electricitySecondaryMetered current (A)	N
0.0.0.6.0.1.4.0.0.0.0.0.0.128.0.5.0	indicating electricitySecondaryMetered current phaseA (A)	N
0.0.0.6.0.1.4.0.0.0.0.0.0.64.0.5.0	indicating electricitySecondaryMetered current phaseB (A)	N
0.0.0.6.0.1.4.0.0.0.0.0.0.32.0.5.0	indicating electricitySecondaryMetered current phaseC (A)	N
0.0.0.6.0.1.5.0.0.0.0.0.0.136.0.9.0	indicating electricitySecondaryMetered currentAngle phaseAtoAv (deg)	N
0.0.0.6.0.1.5.0.0.0.0.0.0.72.0.9.0	indicating electricitySecondaryMetered currentAngle phaseBtoAv (deg)	N
0.0.0.6.0.1.5.0.0.0.0.0.0.40.0.9.0	indicating electricitySecondaryMetered currentAngle phaseCtoAv (deg)	N
0.0.0.6.0.1.15.0.0.0.0.0.0.0.0.33.0	indicating electricitySecondaryMetered frequency (Hz)	N
0.0.0.6.0.1.38.0.0.0.0.0.0.0.0.65.0	indicating electricitySecondaryMetered powerFactor (cosθ)	N
0.0.0.6.0.1.54.0.0.0.0.0.0.0.0.29.0	indicating electricitySecondaryMetered voltage (V)	N
0.0.0.6.0.1.54.0.0.0.0.0.0.128.0.29.0	indicating electricitySecondaryMetered voltage phaseA (V)	N
0.0.0.6.0.1.54.0.0.0.0.0.0.64.0.29.0	indicating electricitySecondaryMetered voltage phaseB (V)	N
0.0.0.6.0.1.54.0.0.0.0.0.0.32.0.29.0	indicating electricitySecondaryMetered voltage phaseC (V)	N
0.0.0.6.0.1.55.0.0.0.0.0.0.72.0.9.0	indicating electricitySecondaryMetered voltageAngle phaseBtoAv (deg)	N
0.0.0.6.0.1.55.0.0.0.0.0.0.40.0.9.0	indicating electricitySecondaryMetered voltageAngle phaseCtoAv (deg)	N
0.0.0.6.19.1.8.0.0.0.0.0.0.0.3.38.0	indicating reverse electricitySecondaryMetered demand (kW)	N
0.0.0.12.1.1.37.0.0.0.0.0.0.0.0.3.63.0	instantaneous forward electricitySecondaryMetered power (kVAr)	N
0.0.0.12.1.1.37.0.0.0.0.0.0.0.0.3.38.0	instantaneous forward electricitySecondaryMetered power (kW)	N
0.0.0.12.20.1.37.0.0.0.0.0.0.0.0.3.38.0	instantaneous total electricitySecondaryMetered power (kW)	N

ReadingType ID Code	Description	Normative Status
0.0.0.13.0.1.140.0.0.0.0.0.0.0.0.108.0	latchingQuantity electricitySecondaryMetered pushbutton (timeStamp)	N
0.8.0.6.1.1.8.0.0.0.0.0.0.0.0.3.38.0	maximum indicating forward electricitySecondaryMetered demand (kW)	N
0.9.0.6.0.1.38.0.0.0.0.0.0.0.0.65.0	minimum indicating electricitySecondaryMetered powerFactor (cosφ)	N
0.0.0.0.19.1.4.0.0.0.0.0.0.0.0.111.0	reverse electricitySecondaryMetered current (count)	N
22.0.0.1.1.12.0.0.0.0.0.0.0.0.3.73.0	seasonal bulkQuantity forward electricitySecondaryMetered energy (kVArh)	N
22.8.0.6.1.1.8.0.0.0.1.0.0.0.3.38.0	seasonal maximum indicating forward electricitySecondaryMetered demand touA (kW)	N
22.8.0.6.1.1.8.0.0.0.2.0.0.0.3.38.0	seasonal maximum indicating forward electricitySecondaryMetered demand touB (kW)	N
22.8.0.6.1.1.8.0.0.0.3.0.0.0.3.38.0	seasonal maximum indicating forward electricitySecondaryMetered demand touC (kW)	N
22.0.0.9.1.1.12.0.0.0.0.1.0.0.0.3.72.0	seasonal summation forward electricitySecondaryMetered energy touA (kWh)	N
22.0.0.9.1.1.12.0.0.0.0.2.0.0.0.3.72.0	seasonal summation forward electricitySecondaryMetered energy touB (kWh)	N
22.0.0.9.1.1.12.0.0.0.0.3.0.0.0.3.72.0	seasonal summation forward electricitySecondaryMetered energy touC (kWh)	N
0.0.7.4.1.1.12.0.0.0.0.0.0.0.0.3.73.0	sixtyMinute deltaData forward electricitySecondaryMetered energy (kVArh)	N
0.0.7.4.1.1.12.0.0.0.0.0.0.0.0.3.72.0	sixtyMinute deltaData forward electricitySecondaryMetered energy (kWh)	N
0.0.7.4.1.1.12.0.0.0.0.0.0.0.0.3.73.0	sixtyMinute deltaData net electricitySecondaryMetered energy (kVArh)	N
0.0.7.4.1.1.12.0.0.0.0.0.0.0.0.3.72.0	sixtyMinute deltaData net electricitySecondaryMetered energy (kWh)	N
0.0.7.4.19.1.12.0.0.0.0.0.0.0.0.3.73.0	sixtyMinute deltaData reverse electricitySecondaryMetered energy (kVArh)	N
0.0.7.4.19.1.12.0.0.0.0.0.0.0.0.3.72.0	sixtyMinute deltaData reverse electricitySecondaryMetered energy (kWh)	N
0.0.7.4.20.1.12.0.0.0.0.0.0.0.0.3.73.0	sixtyMinute deltaData total electricitySecondaryMetered energy (kVArh)	N
0.0.7.4.20.1.12.0.0.0.0.0.0.0.0.3.72.0	sixtyMinute deltaData total electricitySecondaryMetered energy (kWh)	N
0.0.100.4.1.1.12.0.0.30.1.0.0.0.0.3.72.0	specifiedInterval deltaData forward electricitySecondaryMetered energy n30 (kWh)	N
32.0.0.4.0.1.12.0.0.0.0.0.0.0.0.3.72.0	specifiedPeriod deltaData electricitySecondaryMetered energy (kWh)	N
32.0.0.0.0.1.151.0.0.0.0.0.0.0.0.0.840	specifiedPeriod electricitySecondaryMetered billToDate (USD)	N
0.0.0.9.20.1.12.0.0.0.0.1.0.0.0.3.72.0	summation total electricitySecondaryMetered energy touA (kWh)	N
0.0.0.9.20.1.12.0.0.0.0.2.0.0.0.3.72.0	summation total electricitySecondaryMetered energy touB (kWh)	N
0.0.0.9.20.1.12.0.0.0.0.3.0.0.0.3.72.0	summation total electricitySecondaryMetered energy touC (kWh)	N
0.0.0.9.20.1.12.0.0.0.0.4.0.0.0.3.72.0	summation total electricitySecondaryMetered energy touD (kWh)	N

N = Normative

I = Informative

D = Deprecated since last edition

Annex D (normative)

Quality code enumerations

D.1 General

Quality codes may be returned with a Reading.value to indicate that there is something remarkable about the data. This Annex D describes a North American profile of enumerations for quality codes to be used in this context.

The presence of a quality code is optional. A missing element implies that no assertion regarding the goodness of the data is being offered by the data producer. Some systems (such as a MS) may have a policy of "no news is good news" and only add quality codes when problems are found. This keeps the volume of data to a minimum. Other systems (such a MDM) will add value to the data by validating it. At this point quality codes may be added to the data to explicitly declare that the data is "valid" or has passed formal "validation" tests.

The quality code values defined by this Annex D are conveyed within a message using the ReadingQuality.quality element.

D.2 Identification of the system offering commentary on the data

Concievably, any piece of equipment which touches the data could introduce error, or offer remarks regarding the veracity of the data. For example, a meter might record interval data, and offer this data to the data collection system, but in doing so also indicate that something remarkable (such as a power outage or clock adjustment) occurred during some of the intervals. A meter data collection system might obtain readings from the field, but perform a sanity check on the values to find that some of them are unreasonable. A meter data management system, armed with a knowledge of the account history and usage patterns might scrutinize the data to find that certain values are suspect or possibly suggest that tampering may have occurred. All of these systems need an opportunity to comment on the data without (necessarily) changing it. When a system does change the data, this too can be noted in the quality codes.

D.3 Construction

The North American profile defines the ReadingQuality.quality code to be built from a three part field:

ReadingQuality.quality ::= <System Identifier> "." <Categorization> "." <Index>

This creates a name with 3 fields. The mappings to CIM ReadingQualityType are defined by IEC 61968-11 as follows:

System Identifier = ReadingQualityType.systemId

Categorization = ReadingQualityType.category

Index = ReadingQualityType.subCategory

D.4 Quality code system identifier

The first of the three fields provides an identification of the system which has declared the issue with the data. This is described in Table D.1. Other systems, outside of an IEC 61968-9 subsystem, may also identify problems with data.

Table D.1 – System identifier

System Identifier Code	Description	Normative Status
0	Not Applicable	N
1	End Device	N
2	Metering system (data collection) network	N
3	Meter Data Management System	N
4	Other system (not listed)	N
5	Externally specified (see accompany data)	I
I = Informative N = Normative D = Deprecated		

D.5 Quality code categorization

The second of the three fields in the quality code identifies a category for the issue. These are described individually in Table D.2.

Table D.2 – Example quality code categories

Category	Description	Comment	Normative Status
0	Valid	Data valid	N
1	Diagnostics related	The equipment producing or handling the data has identified a diagnostics related issue which may have some effect on this value.	N
2	Power quality related issues at the data collection point	The equipment producing the data has identified power quality related issues which may have some effect on the veracity of the data.	N
3	Tamper / Revenue Protection related	A system identifies that the data is questionable due to tamper or revenue-protection related reasons.	N
4	Data collection related	A significant event or condition has occurred (which is not tamper related, power quality related, or diagnostics related) which may effect the veracity of the data.	N
5	Failed reasonability testing	Data at first blush appears to be invalid.	N
6	Failed validation testing	Data fails one or more validation rules.	N
7	Edited	Replaced or approved by a human.	N
8	Estimated	Replaced by a machine computed value based on analysis of historical data using the same type of measurement.	N

Category	Description	Comment	Normative Status
9	Oscillatory	This category appears to be covered by other categories in this standard.	D
10	Questionable	The veracity of the data is suspect for a reason other than those described by categories 1 to 6.	N
11	Derived	Value has been calculated (using logic or mathematical operations) based upon one or more readings from the meter or device to which the value is attributed and/or readings from meter(s) or device(s) other than the meter or device to which the value is attributed.	N
12	Projected	Forecasted value.	N
I = Informative N = Normative D = Deprecated			

D.6 Quality code index

Each category provides the context with which to understand a particular index.

Table D.3 elaborates on the “category 0” defined in Table D.2.

Table D.3 – Validity related codes

Category	Index	Description	Definition	Normative Status
0	0	Data Valid	No data quality problems have been detected; however, the data has not been processed by a formal Validation, Editing, and Estimation (VEE) process.	N
0	1	Validated	Reading has successfully passed the validation portion of a formal Validation, Editing and Estimation (VEE) process and has not been subsequently edited or estimated.	N
I = Informative N = Normative D = Deprecated				

Table D.4 elaborates on the “category 1” defined in Table D.2..

Table D.4 – Diagnostics related codes

Category	Index	Description	Comments	Normative Status
1	0	DiagnosticsFlag	One or more diagnostics have been generated from the originating equipment.	N
1	1	BatteryLow		N
1	3	SensorFailure		N
1	4	WatchdogFlag	A timeout of the watchdog timer or another failure of the watchdog function has occurred in the originating equipment.	N
1	5	ParityError	A parity error has been generated from the originating equipment.	N
1	6	CRCErrror	A cyclic redundancy check error has been generated from the originating equipment.	N
1	7	RAMChecksumError	A checksum error has been detected in the random access memory of the equipment.	N
1	8	ROMChecksumError	A checksum error has been detected in the read only memory of the equipment.	N
1	9	ClockError	A failure or abnormality has been detected with the clock in the equipment.	N
<p>I = Informative N = Normative D = Deprecated</p> <p>NOTE Diagnostic related codes may produce corresponding EndDeviceEvents to be generated.</p>				

Table D.5 elaborates on the “category 2” defined in Table D.2.

Table D.5 – Power quality related codes

Category	Index	Description	Comments	Normative Status
2	0	PowerQualityFlag	Look for related MeterEvent(s)	N
2	1	ExcessiveOutageCount	Power outage threshold count exceeded	N
2	2	PqCounter	Power quality threshold count exceeded	N
2	3	ServiceDisconnectSwitching	Service Disconnect operation during data collection interval	N

Category	Index	Description	Comments	Normative Status
2	32	PowerFail	Power fail occurred during or at the start of this interval. ANSI C12.19. If power is out for the entire interval, the data value presented should be zero.	N
I = Informative N = Normative D = Deprecated				

Table D.6 elaborates on the “category 3” defined in Table D.2.

Table D.6 – Tamper / revenue protection related codes

Category	Index	Description	Comments	Normative Status
3	0	RevenueProtection	Generic	N
3	1	CoverOpened	The meter reports that a sealed cover has been opened.	N
3	2	LogicalDisconnect	Value originates from a meter which (in theory) should have no flow or very minimal flow.	N
3	3	RevenueProtectionSuspect		N
3	4	ReverseRotation	Reverse flow of the measured commodity has been detected. This may indicate tampering at sites which have not been identified as being capable of customer-side generation.	N
3	5	StaticDataFlag	The meter shows very little (if any) historical usage.	N
I = Informative N = Normative D = Deprecated				

Table D.7 elaborates on the “category 4” defined in Table D.2.

Table D.7 – Data collection related codes

Category	Index	Description	Comments	Normative Status
4	0	AlarmFlag	Generic alarm	N
4	1	OverflowConditionDetected	A numeric overflow condition for a reading value or pulse counter was detected.	N
4	2	PartialInterval	Partial (short) interval due to clock change, power outage, or some similar event.	N

Category	Index	Description	Comments	Normative Status
4	3	LongInterval	Long interval recorded due to a clock change or some similar event.	N
4	4	SkippedInterval	Skipped interval by the meter due to a clock change or similar event.	N
4	5	TestData	Data value was obtained while the equipment was in test mode.	N
4	6	ConfigurationChanged	A configuration change has occurred that may affect the reading value or its interpretation.	N
4	7	NotRecording	Load profile recording stopped	N
4	8	ResetOccurred	A reset has occurred that may affect the reading value or its interpretation.	N
4	9	ClockChanged	A change in the clock time has occurred.	N
4	10	LoadControlOccurred	Data value was obtained at a time when load control was in effect.	N
4	16	DstInEffect	Daylight saving time in effect during or at start of this interval	N
4	64	ClockSetForward	Clock set forward during or at the start of this interval. The interval may be short.	N
4	128	ClockSetBackward	Clock set backward during or at the start of this interval. The interval may be long.	N
4	129	FailedProbeAttempt	A failure occurred that prevented the reading from being obtained through a manual probe.	N
4	130	CustomerRead	The reading value was provided by a customer.	N
4	131	ManualRead	The reading value was obtained by a utility employee performing a manual read.	N
4	259	DstChangeOccurred	Data has been adversely affected by a change in Daylight Saving Time. Timestamps and/or data values may be incorrect. NOTE Compared to the ANSI C12.19 approach in which the DST flag is set for the entire Summer, this flag is only set for the affected data when the DST change occurs in the Spring and Fall.	N
<p>I = Informative N = Normative D = Deprecated</p>				

Table D.8 elaborates on the “category 5” defined in Table D.2.

Table D.8 – Failed reasonability testing related codes

Category	Index	Description	Comments	Normative Status
5	256	DataOutsideExpectedRange	Presented data was identified as "invalid" by the originating system.	N
5	257	ErrorCode	Data was identified as "invalid" by the originating system and replaced with a special coded value to indicate an error.	N
5	258	Suspect	Data should be scrutinized and considered suspect	N
5	259	KnownMissingRead	NOTE 1 The "value" element should be empty when the quality code indicates that it is (obviously) missing. NOTE 2 If a reason is known, this can be supplied in the MeterReadings.Reason element.	N
I = Informative N = Normative D = Deprecated				

Table D.9 elaborates on the "category 6" defined in Table D.2.

Table D.9 – Failed validation testing related codes

Category	Index	Enumeration	Comments	Normative Status
6	0	Failed validation – Generic	The reading failed one or more unspecified validation checks. This is a generic code that can be used if a more specific code is not available in this table.	N
6	1	Failed validation – ZeroUsageOn ActiveMeter	The reading failed validation due to zero usage on an active meter.	N
6	2	Failed validation – UsageOn InactiveMeter	The reading failed validation due to non-zero usage on an inactive meter.	N
6	3	Failed validation – UsageAbove Maximum	The reading failed validation because it represents usage greater than an allowed absolute maximum.	N
6	4	Failed validation – UsageBelow Minimum	The reading failed validation because it represents usage less than a required absolute minimum.	N
6	5	Failed validation – UsageAbove MaximumPct	The reading failed validation because it represents usage greater than an allowed maximum percentage.	N
6	6	Failed validation – UsageBelow MinimumPct	The reading failed validation because it represents usage less than a required minimum	N

Category	Index	Enumeration	Comments	Normative Status
			percentage.	
6	9	Failed Validation – TOU SumCheck Failure	The reading failed validation because the sum of interval values failed a comparison with the corresponding difference in register readings.	N
6	y	Failed Validation Rule Y	<p>The reading failed one or more defined validation checks.</p> <p>“y” is to be replaced by a positive integer indicating which validation rule was failed.</p> <p>It is recommended that values for y begin at 1001 to allow for the build-out over time of the list of normative enumerations in the IEC standard up to 1000.</p> <p>There is no limit to how large a number can be used for “y”; however; the parties exchanging this code shall have a common understanding of what each validation rule #y means.</p>	I
<p>I = Informative</p> <p>N = Normative</p> <p>D = Deprecated</p>				

Individual deployments will subscribe to particular sets of formal validation rules. While there is no one worldwide standard regarding validation rules, this standard provides a placeholder where the first rule for a given deployment can be defined as “rule #1,” the second rule “rule #2,” and so on as necessary until all of the rules are numbered. Each system then, operating at a given utility under a given set of rules, will all be subject to the same set of rules which have been formally listed and numbered.

Table D.10 describes the “category 7” defined in Table D.2.

Table D.10 – Edit related codes

Category	Index	Description	Comments	Normative Status
7	0	Manually Edited – Generic	The reading value was edited by a person using an unspecified manual estimation method. This is a generic code that can be used if a more specific code is not available in this table.	N
7	1	Manually Added	A reading value was added by a person.	N
7	3	Manually Rejected	A value was proposed by the system or failed some level of quality checking. The value was reviewed and rejected by a human user	N
7	Y	Manually Edited – Method Y	The reading value was edited by a person using a defined manual estimation method.	I

Category	Index	Description	Comments	Normative Status
			<p>“y” is to be replaced by a positive integer indicating which manual estimation method was used.</p> <p>It is recommended that values for y begin at 1001 to allow for the build-out over time of the list of normative enumerations in the IEC standard up to 1 000.</p> <p>There is no limit to how large a number can be used for “y”; however; the parties exchanging this code shall have a common understanding of what each manual editing method #y means.</p>	
<p>I = Informative</p> <p>N = Normative</p> <p>D = Deprecated</p>				

The concept of “edited” means that a human was involved in creating the value. It may be hand-keyed into the system. It may be suggested by the system using one of many approaches, but ultimately approved by a human. Values that are computer generated and never approved by a human belong to the “estimated” category. Values that are originally from a meter, identified as suspect, yet nonetheless accepted for use by a human fall into the “questionable” category.

Different systems may find different ways to assist the user in creating a new value. The numbering scheme allows the various ways to be listed and formally identified for a given deployment.

Table D.11 describes describes the “category 8” defined in Table D.2.

Table D.11 – Estimation related codes

Category	Index	Enumeration	Comments	Normative Status
8	0	Estimated – Generic	The reading value was machine-estimated by a computing algorithm using an unspecified estimation method. This is a generic code that can be used if a more specific code is not available in this table.	N
8	Y	Machine Estimated – Method Y	<p>The reading value was machine-estimated by a computing algorithm using a defined estimation method.</p> <p>“y” is to be replaced by a positive integer indicating which estimation method was used.</p> <p>It is recommended that values for y begin at 1001 to allow for the build-out over time of the list of normative</p>	I

Category	Index	Enumeration	Comments	Normative Status
			enumerations in the IEC standard up to 1000. There is no limit to how large a number can be used for “y”; however; the parties exchanging this code shall have a common understanding of what each estimation method #y means.	
I = Informative N = Normative D = Deprecated				

There are a number of ways in which estimates may be generated. For example, an estimate might be based on a combination of historical usage, trend analysis, and weather patterns. Another approach would be to create a value for one meter by leveraging a measurement of equivalent information from a different different meter. (For example there may be multiple feeder voltage measurement sources available. When the preferred source fails, a different source could be used with an equivalent outcome.) Some of the techniques used may be proprietary. Other estimation techniques may be a matter of public record and may be legally required by certain regulators in certain locations. The numbering scheme “approach #1,” “approach #2,” etc. provides a placeholder in which the approaches used may be formally listed at a given deployment and identified as a specific technique.

Table D.12 describes the “category 10” defined in Table D.2.

Table D.12 – Questionable related codes

Category	Index	Description	Comments	Normative Status
10	0	Indeterminate	Quality is unknown or cannot be determined. NOTE 1 This is similar to the case in which no quality codes are supplied at all, but in this case other codes may be present which cast doubt on the veracity of the data, or a situation may have arisen which prevents any kind of analysis from being performed on the data or the equipment which supplied the data. NOTE 2 When used in response to a request for Power (Energization) Status or Switch Position, an “Indeterminate” quality means that the energization state or switch position is unknown or cannot be determined. When used in response to a request for other reading types, “Indeterminate” means that the quality of the value supplied is explicitly unknown.	N
10	1	Manually accepted	Indicates that a value failed some level of quality checking, but the failure was overridden by a human user.	N
I = Informative				

Category	Index	Description	Comments	Normative Status
N = Normative				
D = Deprecated				

Table D.13 describes the “category 11” defined in Table D.2..

Table D.13 – Derived related codes

Category	Index	Enumeration	Comments	Normative Status
11	0	Derived - Deterministic	<p>“Derived” indicates that the value has been calculated (using logic or mathematical operations) based upon one or more readings from the meter or device to which the value is attributed and/or readings from meter(s) or device(s) other than the meter or device to which the value is attributed.</p> <p>“Deterministic” (as differentiated from “Inferred” – see next entry) is used when a significant degree of uncertainty in the resulting value does not exist.</p> <p>For example, a quality of “x.11.0” or “Derived - Deterministic” can be used when a value for a virtual meter is computed as the sum of the values from two or more other meters.</p>	N
11	1	Derived - Inferred	<p>“Derived” indicates that the value has been calculated (using logic or mathematical operations) based upon one or more readings from the meter or device to which the value is attributed and/or readings from meter(s) or device(s) other than the meter or device to which the value is attributed.</p> <p>“Inferred” (as differentiated from “Deterministic” – see previous entry) is used when a significant degree of uncertainty in the resulting value may exist.</p> <p>When used in response to Power (Energization) Status Checks, “x.11.1” or “Derived – Inferred” is synonymous with “Inferred”.</p> <p>For example, a UsagePoint may be determined to have a value of “De-energized” and a Reading Quality of “Derived-Inferred” if it is being inferred as de-energized because one or more other UsagePoints on the same distribution transformer are confirmed to be “De-Energized”. In this case, there is a more than a negligible probability that the</p>	N

Category	Index	Enumeration	Comments	Normative Status
			inference is incorrect.	
I = Informative N = Normative D = Deprecated				

Table D.14 describes the “category 12” defined in Table D.2.

Table D.14 – Projected related codes

Category	Index	Enumeration	Comments	Normative Status
12	0	Projected – Generic	The reading value was projected (forecast) by a computing algorithm using an unspecified projection (forecast) method. This is a generic code that can be used if a more specific code is not available in this table.	N
12	Y	Projected – Method Y	The reading value was projected (forecast) by a computing algorithm using a defined projection (forecast) method. “y” is to be replaced by a positive integer indicating which projection (forecast) method was used. It is recommended that values for y begin at 1001 to allow for the build-out over time of the list of normative enumerations in the IEC standard up to 1000. There is no limit to how large a number can be used for “y”; however; the parties exchanging this code shall have a common understanding of what each projection method #y means.	I
I = Informative N = Normative D = Deprecated				

Much like in the way “estimated” creates a computer generated value based on a historical view of the data for an event that has occurred in the past, “projected” creates a computer generated value which is forecast into the future. The numbering scheme “approach #1,” “approach #2,” etc. provides a placeholder in which the approaches used may be formally listed at a given deployment and identified as a specific technique.

D.7 Example quality codes

Some of the codes described in Table D.15 have been found to be in use in systems since the publication of IEC 61968-9:2009.

Table D.15 – Example Quality Codes

Quality Code	Origin (From Table D.1)		Category (From Table D.2)		Index (From Tables D.3 to D.15)		Normative Status
Not provided	Not provided		Not provided		AssumedValid	none	N
1.0.0	End Device	1	0	Validity	DataValid	0	N
1.1.4	End Device	1	1	Diag	WatchdogFlag	4	N
1.4.1	End Device	1	4	Data Collection	OverflowConditionDetected	1	N
1.4.16	End Device	1	4	Data Collection	DstInEffect	16	N
1.4.2	End Device	1	4	Data Collection	Partial (short) Interval	2	N
1.4.3	End Device	1	4	Data Collection	LongInterval	3	N
1.4.4	End Device	1	4	Data Collection	SkippedInterval	4	N
1.4.5	End Device	1	4	Data Collection	TestData	5	N
1.5.257	End Device	1	5	Reasonability	ErrorCode	257	N
2.0.0	Ms Network	2	0	Validity	DataValid	0	N
2.3.4	Ms Network	2	3	Tamper	ReverseRotation	4	N
2.3.5	Ms Network	2	3	Tamper	StaticDataFlag	5	N
2.4.259	Ms Network	2	4	Data Collection	DstChangeOccurred	259	N
2.5.256	Ms Network	2	5	Reasonability	DataOutsideExpectedRange	256	N
2.5.257	Ms Network	2	5	Reasonability	ErrorCode	257	N
3.0.0	MDM	3	0	Validity	DataValid	0	N
3.10.0	MDM	3	10	Questionable	Indeterminate	0	N
3.10.1	MDM	3	7	Edited	Manually accepted	1	N
3.11.0	MDM	3	11	Derived	Derived – generic	0	N
3.11.1	MDM	3	11	Derived	Derived – inferred	1	N
3.3.3	MDM	3	3	Tamper	RevenueProtectionSuspect	3	N
3.3.5	MDM	3	3	Tamper	StaticDataFlag	5	N
3.5.259	MDM	3	5	Reasonability	Known missing read	259	N
3.6.0	MDM	3	6	Validation	Failed validation – Generic	0	N
3.7.0	MDM	3	7	Edited	Manually edited – Generic	0	N
3.8.0	MDM	3	8	Estimated	Estimated – Generic	0	N

Annex E (normative)

EndDeviceEventType enumerations

E.1 General

Metering systems not only collect readings from meters, but also report events. This annex describes recommended codes to be used for properly identifying IEC 61968 events.

Codes for EndDeviceEventTypes are categorized in a manner that divides the enumerated code into 4 parts:

EndDeviceEventType:=	
<EndDeviceType>.<EndDeviceDomain>.<EndDeviceSubdomain>.<EndDeviceEventOrAction>	
where	
<EndDeviceType>	= a numeric value from the EndDeviceType enumeration (see EndDeviceType section)
<EndDeviceDomain>	= a numeric value from the EndDeviceDomain enumeration (see EndDeviceDomain section)
<EndDeviceSubdomain>	= a numeric value from the EndDeviceSubdomain enumeration (see EndDeviceSubdomain section)
<EndDeviceEventOrAction>	= a numeric value from the EndDeviceEventOrAction enumeration (see EndDeviceEventOrAction section)

E.2 Alarm conditions

E.2.1 General

While the EndDeviceEventType defines the event that has occurred, there is also a need to specify the severity of an event (Alarm, Advisory, Normal, etc.). These values should be set in the EndDeviceEvent.severity field. This allows each system implementing CIM events to classify the severity of its events specific to its intentions, rather than being forced to classify it according to something rigidly defined by IEC 61968-9.

E.2.2 Clearing alarm conditions and communicating state/condition changes

There are scenarios where the state change for a particular setting shall be communicated to an external system. In the small number of cases that we have uncovered, we have simply added a concise EndDeviceEventOrAction to describe it. The following events support this method of communication.

Event or Control Description	EndDeviceEvent Category (using enum mnemonics)
Diagnostic 8 Condition High Neutral Current Cleared	*.Power.NeutralCurrent.MaxLimitReachedCleared
Leading kvarh cleared Caution 040000 Leading kvarh Condition Cleared	*.Power.PowerFactor.OutofRangeCleared
High Distortion Cleared Diagnostic 5 High Distortion Cleared	*.Power.PowerQuality.HighDistortionCleared
Voltage Imbalance Cleared Diagnostic 2 Voltage Imbalance Cleared	*.Power.Voltage.ImbalanceCleared
Phase alert cleared, Condition Phase Angle Alert Cleared	*.Power.PhaseAngle.OutofRangeCleared
Cross phase cleared Diagnostic 1 Condition Polarity, Cross Phase, Rv Energy Flow	*.Power.Phase.CrossPhaseCleared

Event or Control Description	EndDeviceEvent Category (using enum mnemonics)
Cleared	
Inactive phase cleared Diagnostic 3 Inactive Phase Current Condition Cleared	*.Power.Phase.InactiveCleared
Voltage Swell Started (Phase A)	*.Power.PhaseAVoltage.SwellStarted
Voltage Swell Started (Phase B)	*.Power.PhaseBVoltage.SwellStarted
Voltage Swell Started (Phase C)	*.Power.PhaseCVoltage.SwellStarted
Voltage swell cleared Caution 004000 Demand Overload Condition Cleared	*.Power.Voltage.SwellStopped
Voltage Swell Stopped (Phase A); Diagnostic 7 Condition Over Voltage, Phase A Cleared	*.Power.PhaseAVoltage.SwellStopped
Voltage Swell Stopped (Phase B)	*.Power.PhaseBVoltage.SwellStopped
Voltage Swell Stopped (Phase C)	*.Power.PhaseCVoltage.SwellStopped
Voltage Sag Started (Phase A)	*.Power.PhaseAVoltage.SagStarted
Voltage Sag Started (Phase B)	*.Power.PhaseBVoltage.SagStarted
Voltage Sag Started (Phase C)	*.Power.PhaseCVoltage.SagStarted
Voltage sag cleared Caution 000400 Under Voltage Condition Cleared	*.Power.Voltage.SagStopped
Voltage Sag Stopped (Phase A);Diagnostic 6 Condition UnderVoltage, Phase A Cleared	*.Power.PhaseAVoltage.SagStopped
Voltage Sag Stopped (Phase B)	*.Power.PhaseBVoltage.SagStopped
Voltage Sag Stopped (Phase C)	*.Power.PhaseCVoltage.SagStopped

E.3 Event data

Certain events require or contain more details than just a description and a category. For example, specification of a particular channel number, alarm number, relay number, port number, formula number, version number, etc. These should be set on the EndDeviceEvent.EndDeviceEventDetails name/value pair element.

However, this construct should not be overused or misused. The intention for this construct is only to capture some ancilliary data related to the event. It should not be used in place of sending a full set of EndDeviceEvent information, for example (see Figure E.1).

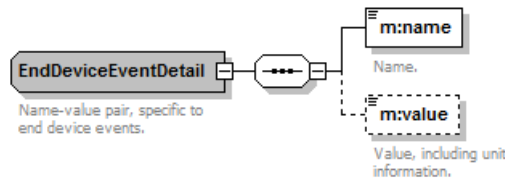


Figure E.1 – Event data

Some examples of its use:

A [PAN Pairing Completed] event may also provide the following data.

```
<m:EndDeviceEvent>
:
  <m:EndDeviceEventDetails>
    <m:name>InstallDate</m:dateTime>
    <m:value>2001-12-17</m:value>
  </m:EndDeviceEventDetails>
```

```

    <m:EndDeviceEventDetails>
      <m:name>ShortId</m:dateTime>
      <m:value>1002</m:value>
    </m:EndDeviceEventDetails>
  :
</m:EndDeviceEvent>

```

A [Firmware Downloaded] event may also provide the following data.

```

<m:EndDeviceEvent>
  :
  <m:EndDeviceEventDetails>
    <m:name>FirmwareVersion</m:dateTime>
    <m:value>1.2345</m:value>
  </m:EndDeviceEventDetails>
  :
</m:EndDeviceEvent>

```

A [Voltage Exception] event may also provide the following data.

```

<m:EndDeviceEvent>
  :
  <m:EndDeviceEventDetails>
    <m:name>VoltageThreshold</m:dateTime>
    <m:value>3</m:value>
  </m:EndDeviceEventDetails>
  :
</m:EndDeviceEvent>

```

E.4 The 4-Part ID: EndDeviceEventType

Clauses E.5 to E.8 describe each part of the EndDeviceEventType enumeration:

- <EndDeviceType>
- <EndDeviceDomain>
- <EndDeviceSubdomain>
- <EndDeviceEventOrAction>

E.5 EndDeviceType

At the highest level, it is helpful to identify the type of device from which the event was created. Each of these should represent a physical device, although a value of zero (0) can be used in special cases. EndDeviceType codes are enumerated and described in Table E.1.

Table E.1 – EndDeviceType codes

EndDeviceType Enumeration		
mnemonic	Value	Description
n/a	0	Not applicable. Use when a device type is not known.
Collector	10	A device that acts as a central point of communication between HES and devices located on premises.
ComDevice	26	A communication device
DAPDevice	1	A data aggregation point device
DERDevice	2	A demand response device
DSPDevice	6	A digital signal processing device
ElectricMeter	3	A device located on premises to measure electricity usage.
ElectricVehicle	58	(or Plug-in Electric Vehicle, PEV) a vehicle that can be plugged into the

EndDeviceType Enumeration		
mnemonic	Value	Description
		grid.
EnergyRouter	23	An energy router, analogous to the familiar data and communications router, automatically detects demand for power and delivers processed electricity in the required form (AC or DC) at the correct voltage and frequency on an electrical power system.
Feeder	13	Feeders carry three-phase power, and tend to follow the major streets near the substation.
GasMeter	4	A device located on premises to measure gas usage.
Gateway	5	A gateway device.
Generator	14	Typically a spinning electrical generator. Something has to spin the generator -- it might be a water wheel in a hydroelectric dam, a large diesel engine or a gas turbine.
InPremisesDisplay(IPD/IHD)	15	The In-Premises (In-Home) Display (IPD/IHD) allows utility customers to track their energy usage in chart or graph form based upon kWh used.
LoadControlDevice	16	A device used to implement “deferrable” services – commonly referred to as “off-peak”.
NetworkRouter	11	A router distributes Digital computer information that is contained within a data packet on a network.
PANDevice	12	A “premises area network” device that is not specifically described in further detail.
PANGateway	7	A PAN gateway connects an external communications network to energy management devices within the premises.
PANMeter	17	A “premises area network” device whose function is to measure (e.g. electricity usage).
PrepaymentTerminal	18	A device that enables the customer to make advance payment before energy can be used.
ProgCtlThermostat(PCT)	19	A thermostat device whose settings can be controlled via an API (ie. without human intervention).
RangeExtender	20	Wireless range-extenders or wireless repeaters can extend the range of an existing wireless network.
Regulator	21	A voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level.
Substation	22	An electrical substation is a subsidiary station of an electricity generation, transmission and distribution system where voltage is transformed from high to low or the reverse using transformers.
Transformer	8	A device that converts a generator's voltage (which is at the thousands of volts level) up to extremely high voltages for long-distance transmission on the transmission grid.
WasteWaterMeter	25	A device that measures waste water usage.
WaterMeter	24	A device that measures water usage.

E.6 EndDeviceDomain

After the type of device is known, the event should be classified by an EndDeviceDomain code. This code provides an indication as to the high-level nature of the event. Careful consideration shall be given to the EndDeviceDomain in which an event is classified. By properly classifying events by a small set of EndDeviceDomain codes, a system can more easily run reports based on the types of events that have occurred or been received. EndDeviceDomain codes are enumerated and described in Table E.2.

Table E.2 – EndDeviceDomain Codes

EndDeviceDomain Enumeration		
mnemonic	Value	Description
n/a	0	Not applicable. Use when a domain is not needed. This should rarely be used.
AssociatedDevice	39	A device (for example, a relay) that can be associated with an end device.
Battery	2	Any events or controls related to a device battery.
Billing	20	Events or controls related to cost of energy (Including Pricing, Tariff, TOU, etc.).
Cartridge	3	Events or controls related to cartridge fuses.
Clock	36	Events or controls related to a device internal clock.
Communication	1	Events or controls related to purely communication issues. Consider other domains before using this one.
Configuration	7	Events or controls related to device configuration.
Demand	8	Events or controls related to demand (ie. kW) and demand settings (as opposed to consumption (ie. kWh).
Firmware	11	Events or controls related to device firmware.
GasSupply	4	Events or controls related to the supply of natural gas or propane.
Installation	6	Events or controls related to device installation.
KYZPulseCounter	38	Pulse counting function inside a meter or other end device.
LoadControl	15	Events or controls related to the automatic restriction or control of a customer's energy consumption.
LoadProfile	16	Events or controls related to the energy consumption (ie. "load") over time on a device.
Logs	17	Events or controls related to device internal logs.
Memory	18	Events or controls related to device memory.
Metrology	21	Events or controls related to any type of measurement captured by a device.
MobileSecurity	14	Events or controls related to device security when the device is accessed via a mobile tool or device.
Modem	19	Events or controls related to a device's modem.
ModuleFirmware	9	Events or controls related to firmware on a module contained by a device.
Network	23	Events or controls generally related to a device's status on the network. Also used for general network events, such as commissioning of a PAN Area network.
Pairing	10	Events or controls related to linking devices together (e.g. PANDevice to Meter, ComDevice to Meter, etc.).
Power	26	Events or controls related to device energization status.
Pressure	29	Events or controls related to device pressure thresholds.
RCDSwitch	31	Events or controls related to device remote connect/disconnect activities.
Recorder	41	A device for encoding
Security	12	Events or controls related to device security (including SecurityKey, HMAC, Parity, Rotation, other TamperDetection, etc.).
Temperature	35	Events or controls related to device
VideoDisplay	13	Events or controls related to device CRT/display.
Volume	40	A quantity of 3-dimensional space enclosed by a boundary; the space occupied by a liquid or gas.
Watchdog	37	A hardware or software function triggered by a timer expiring.
WaterSupply	5	Events or controls related to the supply of water.

E.7 EndDeviceSubDomain

EndDeviceDomain can be subcategorized by EndDeviceSubdomain codes. EndDeviceSubdomain codes are enumerated and described in Table E.3.

Table E.3 – EndDeviceSubdomain codes

EndDeviceSubdomain enumeration		
mnemonic	Value	Description
n/a	0	Not applicable. Use when a subdomain is not needed. This should rarely be used
Access	1	Related to physical security (ie. Accessibility) or electronic permission to read/write digital media
Activation	283	Initiation of a function
AlarmTable	285	A table in a device for the tracking of alarms
ADConverter	142	Related to analog-to-digital conversion
AllEvents	148	Related to a set of events (typically used in a Load Control Cancel All Events scenario)
ApparentPower	290	The magnitude of the complex power measured in volt-amps
Allocation	2	Related to designation or allotment; Typically related to memory (RAM/ROM)
Association	74	Related to the linking/pairing of one device/object to another device/object
AUTDProcess	3	Related to Always Up To Date processes; watchdog or keep-alive processes
AutoRegistration	5	Related to automatic registration process
AutoTime	7	Related to automatic setting of time
BTU	13	Related to British Thermal Units
Buffer	14	Related to temporary data storage
Cable	15	Related to a physical cable
Calculation	16	Related to mathematical computation
Calibration	18	Related to a set of gradations that show positions or values
Certificate	21	Related to a document testifying to the truth of something; typically a security certificate
Charge	22	Related to electrical charge; Related to billing charge
Checksum	284	A fixed-size datum computed from an arbitrary block of digital data for the purpose of detecting accidental errors
Concentration	39	Related to the density or composition of something
Constants	23	Related to statically defined values
ControlPoint	26	Related to load control settings
Cover	29	Related to something that provides shelter; a covering
CRC	30	Related to cyclical redundancy check
Credit	8	Related to the right-hand side of an account; billing
Current	6	Related to electrical power measured in amperes
Data	31	Related to factual information
DataLog	33	Related to a record (ie. Log) of factual information
Date	34	Related to calendar time
Day	35	Related to the day portion of calendar time

EndDeviceSubdomain enumeration		
mnemonic	Value	Description
DaylightSavingsTime	56	Related to the practice of setting the clock forward one hour in the spring.
DayLimit	299	A limit established for a daily period
Decryption	36	Related to making encrypted data readable
Display	143	Related to a CRT, LED, or other form of video device
Door	128	Related to a moveable barrier used to cover an opening; as in a door to a meter or collector
EmergencySupplyCapacityLimit	138	Related to emergency supply capacity limits
Encoder	40	Related to the thing that converts information from one format to another
EncoderRegister	41	Related to the encoder register (ie. On a meter)
EPROM	42	Related to erasable programmable read-only memory
Event	43	Related to something that has happened; other, more specific subdomains should be used before using this one
EventLog	44	Related to a record (ie. Log) of event data
EWM	45	Related to an external wireless module
Feature	46	Related to a non-specific characteristic
FirmwareReset	47	Related to reverting of firmware to original state
Flow	48	Related to the movement of a substance (electricity, gas, water, etc.)
FPV	49	Related to a form of super-compressibility
Frames	50	Related to fixed-sized blocks; as in memory
Frequency	4	Related to the number of cycles per unit of time
GCAnalyzer	51	Related to gas chromatograph analyzer which is use to measure the component mixture of the natural gas delivers to a site
HeadEndSystem	52	Related to the metering/AMI system
HistoryLog	53	Related to a record (ie. Log) of historical data
HMAC	54	Related to hash-based message authentication code; a specific method for calculated a MAC
Holiday	97	Related to days set aside having special significance
Identity	10	Related to a unique identifier
Initialisation	298	Start-up function
Input	55	Related to data entered into the system
InstallDate	57	Related to the prepared for use date
IntelligentRegister	58	Related to a specific register on a device
Interval	59	Related to interval energy data; the time between to events
IO	60	Related to general input/output
IPAddress	127	Related to an IP Address (Internet Protocol Address)
LANAddress	61	Related to a unique identification of a device on a network of devices
LastRead	62	Related to the final reading from a meter
List	63	Related to an internal list [contained in memory or on firmware]
ListPointers	64	Related to a specific set of values kept by a meter
Login	65	Related to the process by which access is gained to a

EndDeviceSubdomain enumeration		
mnemonic	Value	Description
		device, computer, or system
LowSpeedBus	145	Related to a circuit that connects CPU with other devices; low-speed transmission
MagneticSwitch	66	Related to any type of magnetic switch
MaintMode	11	Related to a specific mode of operation into which a device can be set
Measurement	67	Relating to the magnitude of a quantity
MeasurementType	286	A code defining the kind of data under measurement
Mesh	68	Typically related to the type of meter network
MeterBus	147	Related to a circuit that connects a devices or module to a meter
MeteringMode	12	Related to a specific mode of operation into which a device can be set
Mobile	69	Related to devices that are not confined to one place
MOL%	70	Related to percentage of moles
NetworkId	71	Related to a unique identification of a device on a network of devices
NeutralCurrent	137	Related to the essential part of electroweak unification
NVRAM	72	Related to non-volatile random access memory
OptionBoard	146	Related to a type of module in a meter
Parameter	75	Related to a variable passed to a function
ParentDevice	76	Related to a device's owner
Parity	77	Typically related to an odd/even or on/off state; a symmetry property
Password	24	Related to a secret word used for authentication
Phase	25	Typically related to a means of distributing alternating current; When the specific phase is irrelevant, this should be used as the EndDeviceSubdomain
PhaseAngle	130	Related to the angular component of the polar coordinates
PhaseA	126	Related to the A phase of a multi-phase circuit
PhaseAApparentPower	291	The apparent power on phase A of a multi-phase circuit
PhaseACurrent	287	Related to the current of the first phase of 3-phase power
PhaseAReactivePower	295	The reactive power on phase A of a multi-phase circuit
PhaseAVoltage	131	Related to the voltage of the first phase of 3-phase power
PhaseAVoltagePotential	126	Related to the voltage potential of the first phase of 3-phase power
PhaseB	134	Related to the B phase of a multi-phase circuit
PhaseBApparentPower	292	The apparent power on phase B of a multi-phase circuit
PhaseBCurrent	288	Related to the current of the second phase of 3-phase power
PhaseBReactivePower	296	The reactive power on phase B of a multi-phase circuit
PhaseBVoltage	132	Related to the voltage of the second phase of 3-phase power
PhaseBVoltagePotential	134	Related to the voltage potential of the second phase of 3-phase power
PhaseC	135	Related to the C phase of a multi-phase circuit

EndDeviceSubdomain enumeration		
mnemonic	Value	Description
PhaseCAppearantPower	293	The apparent power on phase C of a multi-phase circuit
PhaseCCurrent	289	Related to the current of the third phase of 3-phase power
PhaseCReactivePower	297	The reactive power on phase C of a multi-phase circuit
PhaseCVoltage	133	Related to the voltage of the third phase of 3-phase power
PhaseCVoltagePotential	135	Related to the voltage potential of the third phase of 3-phase power
PhaseSequence	78	Related to the order of the phases in multi-phase power
PhaseVoltage	79	In single-phase or in situations where the specific phase is irrelevant, this is related to voltage across the phase
PowerFactor	27	Related to the ratio of the real power flowing to the load to the apparent power in the circuit
PowerQuality	28	Related to the set of limits of electrical properties that allows electrical systems to function in their intended manner without significant loss of performance
PowerQualityRecording	80	Related to the capture and storage of power quality data
PrepaymentCredit	81	Related to the right-hand side of an account; billing for prepayment accounts
Pricing	9	Related to billing
Processor	82	Related to a CPU, typically
Program	83	Related to a pre-defined set of instructions
Pulse	84	Related to a means by which energy is measured
Queue	197	Related to a relatively temporary storage area used to hold requests or tasks until they can be processed
Radio	136	Related to a physical device that processes radio signals
RAM	85	Related to random access memory
Rate	86	Related to the speed or velocity
ReadAccess	202	Related to the permission level one has; as in read, write, update
Readings	87	Related to the collection of consumption, diagnostic, and status data from a meter
ReactivePower	294	Power that does not perform work measured in VA reactive (VAr)
Recorder	300	A device for encoding
Recovery	88	Related to a process of restoring from a broken state
Register	89	Related to a placeholder for information
Registration	90	Related to a process by which a device is recognized or added
Relay	91	Related to an electrically operated switch
RemoteAccess	211	Related to physical security (ie. accessability) or electronic permission to read/write digital media from a mobile device or from a location other than where the object being accessed is
ROM	92	Related to read-only memory
Rotation	93	Related to the movement of an object in a circular motion
RTP	94	Related to real-time pricing
Schedule	95	Related to a timetable or plan of future events
Season	228	Related to the division of a year marked by changes in weather; typically winter, spring, summer, and fall

EndDeviceSubdomain enumeration		
mnemonic	Value	Description
SecondaryCredit	96	Related to a non-primary amount of credit
SecuredRegister	98	Related to a specific register on a device
SecuredTable	99	Related a table that requires authorization prior to access being granted
SecurityKey	32	Related to a piece of information that determines the functional output of a cryptographic cipher
SecurityKeyLength	119	Related to the length of a security key
SecurityKeyVersion	120	Related to the version of a security key
SelfRead	231	Related to a process where a device will read itself
SelfTest	100	Related to a process where a device will run an internal test on itself
Sensor	144	Related to a mechanical device that transmits a signal to a measuring device
Session	129	Related to a communication session, typically
SetPoint	101	Related to the threshold at which a feature is engaged; typically related to load control
SigmaticMessage	102	Related to sigmatic messages
Signature	103	Related to electronic security and signing of messages
SignatureLength	104	Related to the length of a security signature
SignatureTimestamp	105	Related to the timeframe within which a security signature is valid
SignatureUsage	106	Related to how a signature is being used
SpecificGravity	240	Related to the ratio of the density of a substance to the density of water
StandardTime	107	Related to the opposite of daylight savings time
StandbyMode	108	Related to a specific mode of operation into which a device can be set
Status	17	Related to the current state of something
Storage	109	Related to the medium on which information is kept; also related to the act of storing information
SupplyCapacityLimit	139	Related to supply capacity limits
Table	110	Relating to a structure containing rows and columns
Tariff	140	Billing term relating to cost or amount chaged
Test	111	Related to a classification that specifies non-production
TestMode	19	Related to a specific mode of operation into which a device can be set
TextMessage	112	Related to a message or set of characters that are sent to a device
Threshold	261	Related to a level or point at which something will happen
Tier	113	Related to a level
Time	114	Related to time of day, as in hours:minutes:seconds:milliseconds
Timeout	125	Related to a specific threshold specifying when to automatically return after having received no response
TimeReset	115	Related to the resetting of the time of day
TimeSync	116	Related to the process of adjusting the time of day value on a device to match that of a trusted source for time of day
TimeVariance	117	Related to the acceptable difference of a device time of

EndDeviceSubdomain enumeration		
mnemonic	Value	Description
		day as compared to a trusted source for time of day
TimeZone	118	Related to the time regions around the Earth defined by the lines of longitude
TOU	121	Related to time of use
Tranceiver	122	Related to a device that has both a transmitter and a receiver
Usage	123	Related to how something is used
Version	124	Related to a specific iteration or translation
Voltage	38	Related to the electrical force that would drive an electric current between two points
Window	73	Related to a period of time during which a device can be linked/paired with a meter or other device
WriteAccess	282	Related to the permission level one has; as in read, write, update

E.8 EndDeviceEventOrAction

The most specific part of the EndDeviceEventType is its EndDeviceEventOrAction value. This part of the EndDeviceEventType enumeration is generally in the form of a verb that gives action to the event that just occurred.

EndDeviceEventOrAction codes are enumerated and described in Table E.4.

Table E.4 – EndDeviceEventOrAction codes

EndDeviceEventOrAction enumeration		
mnemonic	Value	Description
n/a	0	Not applicable. Use when a EndDeviceEventOrAction is not needed. This should rarely be used.
Aborted	1	An event that occurs when some intervention causes the item (identified by the EndDeviceDomain/EndDeviceSubdomain) to stop.
Accessed	2	Typically a security event that occurs when physical access or access to data has been obtained (whether permitted or not).
Acknowledged	3	An event that indicates the receipt of the item (identified by the EndDeviceDomain/EndDeviceSubdomain).
Activated	4	An event that indicates that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) that was inactive is now active.
AlmostFull	283	An event to indicate that a resource is near capacity
ArmedForClosure	11	An event that indicates that an ArmForClosure command has been completed successfully.
ArmedForOpen	12	An event that indicates that an ArmForOpen command has been completed successfully.
ArmForClosure	5	A command to indicate a request to arm a switch for closure.
ArmForClosureFailed	226	An event that indicates that an ArmForClosure has failed.
ArmForOpen	6	A command to indicate a request to arm a switch for open.
ArmForOpenFailed	222	An event that indicates that an ArmFor Open has failed.
Attempted	7	An event that indicates that the item (identified by the EndDeviceDomain/EndDeviceSubdomain), based on the EndDeviceDomain and EndDeviceSubdomain combination, has been tried.

EndDeviceEventOrAction enumeration		
mnemonic	Value	Description
Calculated	21	An event that indicates that the item (identified by the EndDeviceDomain/EndDeviceSubdomain), based on the EndDeviceDomain and EndDeviceSubdomain combination, has been computed.
Cancel	8	A command to indicate a request to terminate a prior issued command.
CancelFailed	86	An event that indicates that a Cancel has failed.
Cancelled	10	An event that indicates that a prior issued command or set of commands was terminated successfully.
Change	13	A command to indicate a request to make modifications.
Changed	24	An event that indicates that a related Change request has completed successfully.
ChangedOut	284	An event to indicate that an asset has been replaced
ChangeOutRequired	27	A command to request that a device is replaced by a new device of the same kind.
ChangePending	14	An event that indicates that an update has not yet been performed.
Charged	15	An event that can indicate a billing-related state or in the form of being electrically charged.
Cleared	28	An event that indicates that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) on the device has been either resolved or emptied.
Close	299	A control command for the item described by EndDeviceDomain/EndDeviceSubdomain. NOTE This command might be used to close a pairing window. It should not be used to close a switch. The "Connect" command should be used instead.
Closed	16	An event that indicates the item (identified by the EndDeviceDomain/EndDeviceSubdomain) on the device that had been open is not open anymore.
ColdStarted	31	An event that indicates the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been started from a stopped state (as opposed to a WarmStart which implies that it was started from an already started state).
Confirmed	17	An event that indicates the receipt and agreement of the item (identified by the EndDeviceDomain/EndDeviceSubdomain).
Connect	18	A command to request that a device be put into service. NOTE This would effectively "close" an electrical switch or "open" a water valve.
Connected	42	An event to indicate that a device has been put into service.
ConnectFailed	67	An event that indicates a Connect request has failed.
Corrupted	43	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been altered from a correct state to an incorrect state.
CorruptionCleared	281	An event to indicate that a corruption condition has been cleared
Create	82	A command to request that something be created.
Created	83	An event that indicates that a Create request succeeded.
CreateFailed	297	An event that indicates that a Create request failed.
CrossPhaseCleared	70	An event that indicates that instability due to cross-phase modulation has been corrected.
CrossPhaseDetected	45	An event that indicates instability due to cross-phase modulation.
Deactivated	19	An event that indicates that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) on the device that had previously been in an active state is no longer active.

EndDeviceEventOrAction enumeration		
mnemonic	Value	Description
Decreased	57	An event that indicates that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has a lower value or magnitude.
Delayed	20	An event that indicates the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is slower than expected or will complete later than expected.
Disable	22	A command to request that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) be rendered incapable.
Disabled	66	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) was successfully rendered incapable.
DisableFailed	220	An event that indicates that a Disable request has failed.
Disallowed	161	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) was not allowed.
Disconnect	23	A command to request that a device be pulled from service; can also mean a request to sever connection to the item (identified by the EndDeviceDomain/EndDeviceSubdomain). NOTE This would effectively “open” an electrical switch or “close” a water valve.
Disconnected	68	An event to indicate that a device was successfully pulled from service; can also mean that connection to the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been severed or terminated.
DisconnectFailed	84	An event that indicates that a Disconnect request has failed.
Display	77	A command to request the display of something (as in a TextMessage).
Displayed	78	An event that indicates that a Display request completed successfully.
DisplayFailed	87	An event that indicates that a Display request failed.
Distorted	91	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been altered from its expected state.
Downloaded	25	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) transmitted from the network to the device.
Enable	26	A command to request that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) be rendered capable.
Enabled	76	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) was successfully rendered capable.
EnableFailed	221	An event that indicates that an Enable request failed.
Error	79	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) did not complete successfully.
ErrorCleared	279	An event to indicate that an error condition has been cleared
Established	29	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been recognized.
EventStarted	287	An event to indicate that an event (for example, demand response event) has begun
EventStopped	288	An event to indicate that an event (for example, demand response event) has halted
Exceeded	139	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has gone higher than its expected value.
Execute	30	A command to request that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) be performed.

EndDeviceEventOrAction enumeration		
mnemonic	Value	Description
Expired	64	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has come to an end, typically by date or time.
Failed	85	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has not succeeded.
Frozen	88	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is in a static state.
Full	32	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is at capacity.
HighDistortion	69	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has had an undesired change in the waveform of a signal.
HighDistortionCleared	71	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is back to normal after having been in a HighDistortion state.
ImbalanceCleared	75	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is back in balance after having been in an imbalanced state.
Imbalanced	98	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is not balanced.
Inactive	100	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is at a dormant state.
InactiveCleared	72	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is now in an active state after having been in a dormant state.
Increased	102	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has gotten larger.
Initialized	33	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been set to starting values.
InProgress	34	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is currently advancing toward a goal or an end.
Installed	105	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been prepared for use.
Invalid	35	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is in a faulty state.
LimitChanged	296	An event to indicate that the set point for a limit has been changed
LimitReached	286	An event to indicate that an upper or lower limit has been breached
Loaded	36	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is now engaged.
LossDetected	47	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has experienced a deprived condition. This is typically used in relation to power, voltage, or current.
MaxLimitChanged	295	An event to indicate that the set point for a maximum limit has been changed
MaxLimitCleared	293	An event to indicate that a previous MaxLimitReached event has been cleared
MaxLimitReached	93	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has reached a maximum acceptable value.
MaxLimitReachedCleared	73	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has returned to an acceptable state after having been as a MaxLimitReached state.
MinLimitChanged	294	An event to indicate that the set point for a minimum limit has been

EndDeviceEventOrAction enumeration		
mnemonic	Value	Description
		changed
MinLimitCleared	292	An event to indicate that a previous MinLimitReached event has been cleared
MinLimitReached	150	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has reached a minimum acceptable value.
Mismatched	159	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is not compatible with itself or something within its environment.
Missing	285	An event to indicate that an entity (for example, asset, measurement, etc.) is missing
Normal	37	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is in its typical state (or norm).
NotArmed	290	An event to indicate that a device is longer in an armed state
NotAuthorized	38	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been accessed without permission.
NotFound	160	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is lost or missing.
Open	298	A control command for the item described by EndDeviceDomain/EndDeviceSubdomain. NOTE This command might be used to open a pairing window. It should not be used to open a switch. The "Disconnect" command should be used instead.
Opened	39	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is accessible.
Opted-In	80	An event that indicates that a consumer has agreed to join a program.
Opted-Out	81	An event that indicates that a consumer does not want to join a program.
OutOfRange	40	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has gone outside of acceptable values.
OutOfRangeCleared	74	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has gone back to acceptable values.
Overflow	177	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has exceeded its size or volume.
Preempted	41	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) been replaced by another that has precedence over it.
Processed	44	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been successfully been put through the steps of a prescribed procedure.
Read	46	This can be an event (if treated as the past-tense of the verb, read) or a command (if treated as the verb, read).
Ready	48	An event that indicates that a ready condition has been reached on a device.
ReadyForActivation	280	An event to indicate that a device has been made ready
Re-established	49	An event that indicates that a condition, typically a connection, has achieved after having been lost.
Registered	50	An event that indicates that a device or condition of a device has been recorded.
Released	51	An event to indicate that the item (identified by the

EndDeviceEventOrAction enumeration		
mnemonic	Value	Description
		EndDeviceDomain/EndDeviceSubdomain) has been freed.
Removed	212	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been pulled out of service.
Replaced	52	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) replaced by a new item, usually as a consequence of being old or worn out.
Reprogrammed	213	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has had a change to its directions or program.
Reset	214	A command to request that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) should be set back to a zero-state or original-state.
ResetFailed	65	An event that indicates that a Reset request has failed.
ResetOccurred	215	An event that indicates that a Reset request has completed successfully.
Restarted	53	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has started again typically from an already started state.
Restored	216	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been put back to its prior state.
Reversed	219	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has changed to be the opposite of its normal state. This is typically used for rotation.
SagStarted	223	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has dipped or shrunk from its expected state.
SagStopped	224	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has stopped sagging. Typically used in conjunction with the SagStarted event.
Schedule	300	A control command to ask that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) will be set to execute at a future date.
Scheduled	225	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been set to execute at a future date.
ScheduleFailed	301	An event to indicate that the command to ask that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) to execute at a future date failed to schedule.
Sealed	227	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is in an airtight enclosure or cannot be accessed directly.
Start	54	A command to request that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) be triggered or begun.
Started	242	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has started.
StartFailed	217	An event that indicates that a Start request has failed.
Stop	55	A command to request that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) be shut down normally.
StopFailed	218	An event that indicates that a Stop request has failed.
Stopped	243	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has ceased. When this has resulted from a Stop command, it is assumed that things have stopped normally (ie. With no errors).
Substituted	56	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) replaced by an alternate

EndDeviceEventOrAction enumeration		
mnemonic	Value	Description
		item.
Succeeded	58	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) was accomplished.
SwellStarted	248	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has grown from its expected state.
SwellStopped	249	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has stopped swelling. Typically used in conjunction with the SwellStarted event.
SwitchPositionChanged	289	An event to indicate that a switch position has changed
TamperCleared	291	An event to indicate that a tamper alarm has been cleared
TamperDetected	257	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been secretly modified or altered. These events are typically associated with security or billing.
Terminate	302	A control command to request that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) end immediately and abruptly.
Terminated	59	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has ended abruptly.
TerminateFailed	303	An event to indicate that the attempt to terminate the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has failed.
Tilted	263	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been caused to lean, incline, slope, or slant.
Uninitialized	61	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has all its values in their starting state.
Unlocked	62	An event to indicate that the item's (identified by the EndDeviceDomain/EndDeviceSubdomain) lock, physical or software, is undone.
Unsealed	269	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is not sealed.
Unsecure	63	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is in an unprotected state.
Unstable	270	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) is in an irregular state.
Uploaded	60	An event to indicate that the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been transmitted from the device to the network.
WarmStarted	278	An event that indicates the item (identified by the EndDeviceDomain/EndDeviceSubdomain) has been started from an already started state (as opposed to a ColdStart which implies that it was started from a stopped state).
WriteFailed	282	An event to indicate that a write operation has failed

E.9 Normative EndDeviceEventTypes

EndDeviceType, EndDeviceDomain, EndDeviceSubdomain, and EndDeviceEventOrAction fields are combined and presented as a single string. The normative events are listed in the following Tables E.5 through E.31, grouped by EndDeviceDomain.

Table E.5 – Battery events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Battery low condition detected Module Low Battery Detected Low Battery Module Low Battery Detected	*.2.22.150	*	Battery	Charge	MinLimitReached
Battery OK Rf Battery OK	*.2.22.37	*	Battery	Charge	Normal
Battery failed	*.2.0.85	*	Battery	n/a	Failed
Battery installed	*.2.0.105	*	Battery	n/a	Installed
An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.					

Table E.6 – Billing events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Adjusted the remaining credit	*.20.8.24	*	Billing	Credit	Changed
Subtracted from remaining credit	*.20.8.57	*	Billing	Credit	Decreased
Added to remaining credit	*.20.8.102	*	Billing	Credit	Increased
Pre-payment emergency credit	*.20.81.102	*	Billing	PrepaymentCredit	Increased
Tariff program changed	*.20.83.24	*	Billing	Program	Changed
RTP activation	*.20.94.4	*	Billing	RTP	Activated
RTP deactivation	*.20.94.19	*	Billing	RTP	Deactivated
Special schedule activation	*.20.95.4	*	Billing	Schedule	Activated
Secondary emergency credit	*.20.96.102	*	Billing	SecondaryCredit	Increased
Daily tariff changed Week tariff changed Rate change	*.20.140.24	*	Billing	Tariff	Changed
Unscheduled billing reset Billing reset	*.20.140.214	*	Billing	Tariff	Reset
Tier changed	*.20.113.24	*	Billing	Tier	Changed
TOU start mismatch TOU mismatch TOU years mismatch	*.20.121.159	*	Billing	TOU	Mismatched
An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.					

Table E.7 – Cartridge events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Cartridge error	*.3.17.79	*	Cartridge	Status	Error
Cartridge frozen	*.3.17.88	*	Cartridge	Status	Frozen
Cartridge installed	*.3.17.105	*	Cartridge	Status	Installed
No cartridge inserted	*.3.17.160	*	Cartridge	Status	NotFound
Cartridge removed	*.3.17.212	*	Cartridge	Status	Removed
Cartridge changed Pushbutton cartridge changed Handheld terminal cartridge Cartridge change mode, unable to read	*.3.17.52	*	Cartridge	Status	Replaced

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.8 – Clock events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Auto time set performed	*.36.7.58	*	Clock	AutoTime	Succeeded
Date setting changed	*.36.34.24	*	Clock	Date	Changed
Invalid execution date and time Invalid complete date and time range	*.36.34.35	*	Clock	Date	Invalid
Day change error	*.36.35.79	*	Clock	Day	Error
Day of wrong length	*.36.35.35	*	Clock	Day	Invalid
DST change to new time	*.36.56.24	*	Clock	DaylightSavingsTime	Changed
Daylight savings or standard time variance error	*.36.56.40	*	Clock	DaylightSavingsTime	OutOfRange
DST change to previous time	*.36.56.214	*	Clock	DaylightSavingsTime	Reset
Change to Spring daylight savings time	*.36.56.242	*	Clock	DaylightSavingsTime	Started
Holiday changed Holidays changed	*.36.97.24	*	Clock	Holiday	Changed
Invalid installation date	*.36.57.35	*	Clock	InstallDate	Invalid
Temporary clock problem	*.36.0.79	*	Clock	n/a	Error
Clock malfunction E-clock failure	*.36.0.85	*	Clock	n/a	Failed
Season changed	*.36.228.24	*	Clock	Season	Changed
Change to Fall standard time	*.36.107.242	*	Clock	StandardTime	Started
Time setting changed to new time Working register time set to new time Time setting changed	*.36.114.24	*	Clock	Time	Changed

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
(old time) Time setting changed Collector Radio Set TimeKeeper Meter Time Adjustment					
Time change > 10 seconds	*.36.114.40	*	Clock	Time	OutofRange
Time setting reset to previous time Working register time set to previous time Time reset	*.36.114.214	*	Clock	Time	Reset
Unable to reset time	*.36.115.85	*	Clock	TimeReset	Failed
Time synchronization error	*.36.116.79	*	Clock	TimeSync	Error
Time sync failed: Meter I/O/clock failure(38)	*.36.116.85	*	Clock	TimeSync	Failed
Time synchronization of recorder	*.36.116.58	*	Clock	TimeSync	Succeeded
Time variance exceeded limits even after module tries to correct it Time variance exceeded limits without attempt to correct automatically	*.36.117.139	*	Clock	TimeVariance	Exceeded
Invalid time zone ID	*.36.118.35	*	Clock	TimeZone	Invalid
An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.					

Table E.9 – Communication events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Watch dog or keep-alive failure detected	*.1.3.85	*	Communication	AUTDProcess	Failed
Cut cable	*.1.15.85	*	Communication	Cable	Failed
Encoder register communication failure	*.1.41.85	*	Communication	EncoderRegister	Failed
RF HES Comm Established	*.1.52.29	*	Communication	HeadEndSystem	Established
Rf No HES Comm	*.1.52.85	*	Communication	HeadEndSystem	Failed
Intelligent register communication failure	*.1.58.85	*	Communication	IntelligentRegister	Failed
Communications between modules within a meter lost	*.1.60.85	*	Communication	IO	Failed
I/O board definition mismatch	*.1.60.159	*	Communication	IO	Mismatched
Rf No Mesh Comm	*.1.68.85	*	Communication	Mesh	Failed
Call-in failure Communications failure	*.1.0.85	*	Communication	n/a	Failed
Communications re-established	*.1.0.49	*	Communication	n/a	Re-established
Communication terminated normally	*.1.0.59	*	Communication	n/a	Terminated

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Queue alarm	*.1.197.85	*	Communication	Queue	Failed
Collector Communication Delay	*.1.17.20	*	Communication	Status	Delayed
Rf Transceiver Reset	*.1.122.214	*	Communication	Tranceiver	Reset

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.10 – Configuration events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Constants changed Primary constant changed Secondary constant changed Output constant changed	*.7.23.24	*	Configuration	Constants	Changed
Meter hard ID changed	*.7.10.24	*	Configuration	Identity	Changed
Invalid gateway ID Invalid Transformer ID	*.7.10.35	*	Configuration	Identity	Invalid
Missing node	*.7.10.160	*	Configuration	Identity	NotFound
Collector Radio Set IP List	*.7.127.24	*	Configuration	IPAddress	Changed
Maintenance mode Meter shop mode started	*.7.11.242	*	Configuration	MaintMode	Started
Meter shop mode stopped	*.7.11.243	*	Configuration	MaintMode	Stopped
Begin recording meter readings Begin idle mode	*.7.12.242	*	Configuration	MeteringMode	Started
Metering mode stopped	*.7.12.243	*	Configuration	MeteringMode	Stopped
Request customer configuration	*.7.0.13	*	Configuration	n/a	Change
Collector Radio Set Network Settings	*.7.0.24	*	Configuration	n/a	Changed
Configuration error detected	*.7.0.79	*	Configuration	n/a	Error
Configuration Initialized	*.7.0.33	*	Configuration	n/a	Initialized
Gateway reprogrammed	*.7.0.213	*	Configuration	n/a	Reprogrammed
Sum definition changed Sum type changed Meter counts synch Sum counts synch Output link changed Energy format changed Power format changed	*.7.75.24	*	Configuration	Parameter	Changed
Meter program change complete	*.7.83.24	*	Configuration	Program	Changed
Rate changed	*.7.86.24	*	Configuration	Rate	Changed
Setpoint exceeded, channel #	*.7.101.139	*	Configuration	SetPoint	Exceeded
Standby mode started	*.7.108.242	*	Configuration	StandbyMode	Started

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Storage medium changed	*.7.109.24	*	Configuration	Storage	Changed
Test button pushed	*.7.19.76	*	Configuration	TestMode	Enabled
Test mode started	*.7.19.242	*	Configuration	TestMode	Started
Test mode ended	*.7.19.243	*	Configuration	TestMode	Stopped
Invalid timeout date and time	*.7.125.35	*	Configuration	Timeout	Invalid

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.11 – Demand events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Unable to reset demand	*.8.0.65	*	Demand	n/a	ResetFailed
Demand reset detected	*.8.0.215	*	Demand	n/a	ResetOccurred
Demand definitions mismatch	*.8.0.159	*	Demand	n/a	Mismatched
Demand overload threshold	*.8.261.139	*	Demand	Threshold	Exceeded
Demand threshold caution	*.8.261.93	*	Demand	Threshold	MaxLimitReached

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.12 – Firmware events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
A/D converter error	*.11.142.79	*	Firmware	ADConverter	Error
Constants invalid	*.11.23.35	*	Firmware	Constants	Invalid
Unknown in analysis Diagnostic marker	*.11.31.79	*	Firmware	Data	Error
Unrecognized recorder event code Unintelligible message received	*.11.31.35	*	Firmware	Data	Invalid
Frozen error display	*.11.143.88	*	Firmware	Display	Frozen
Alarm acknowledged, alarm #	*.11.43.3	*	Firmware	Event	Acknowledged
Alarm activated, alarm # Area alarm	*.11.46.4	*	Firmware	Feature	Activated
Alarm disabled, alarm # Remote setup disabled Remote synch disabled	*.11.46.66	*	Firmware	Feature	Disabled
Alarm enabled, alarm # Remote setup enabled Remote synch enabled Alarm value set, alarm #	*.11.46.76	*	Firmware	Feature	Enabled
Delayed command failure	*.11.46.85	*	Firmware	Feature	Failed

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Illegal command	*.11.46.35	*	Firmware	Feature	Invalid
Unable to reset	*.11.47.85	*	Firmware	FirmwareReset	Failed
Internal device ID mismatch	*.11.10.159	*	Firmware	Identity	Mismatched
Unstable input, input #	*.11.55.270	*	Firmware	Input	Unstable
Read item list error	*.11.63.79	*	Firmware	List	Error
No protocol list, unable to find type No read items in list	*.11.63.160	*	Firmware	List	NotFound
Low speed bus error	*.11.145.79	*	Firmware	LowSpeedBus	Error
Meter bus alarm	*.11.147.79	*	Firmware	MeterBus	Error
Cold start	*.11.0.31	*	Firmware	n/a	ColdStarted
Firmware image corrupted	*.11.0.43	*	Firmware	n/a	Corrupted
Configuration lost	*.11.0.79	*	Firmware	n/a	Error
Collector Radio Load DCW	*.11.0.85	*	Firmware	n/a	Failed
Meter reprogram End device programmed Configuration written/changed Reprogrammed Meter reconfigured Device has been synchronized	*.11.0.213	*	Firmware	n/a	Reprogrammed
Last reset by watchdog Metering equipment reset	*.11.0.214	*	Firmware	n/a	Reset
Unscheduled restart	*.11.0.53	*	Firmware	n/a	Restarted
Meter not programmed	*.11.0.61	*	Firmware	n/a	Uninitialized
Warm start	*.11.0.278	*	Firmware	n/a	WarmStarted
Option board error	*.11.146.79	*	Firmware	OptionBoard	Error
Parameter error Configuration error	*.11.75.79	*	Firmware	Parameter	Error
Invalid re-programming data Invalid device type, e.g. not TOU	*.11.75.35	*	Firmware	Parameter	Invalid
Miscellaneous configuration mismatch	*.11.75.159	*	Firmware	Parameter	Mismatched
Alternate phone number used	*.11.75.56	*	Firmware	Parameter	Substituted
Register processor failed	*.11.82.85	*	Firmware	Processor	Failed
Illegal command processor state	*.11.82.35	*	Firmware	Processor	Invalid
Processor reset	*.11.82.214	*	Firmware	Processor	Reset
Un-programmed caution	*.11.83.79	*	Firmware	Program	Error
Program malfunction	*.11.83.85	*	Firmware	Program	Failed
Self-check error Diagnostic failure	*.11.100.79	*	Firmware	SelfTest	Error
Self test failure	*.11.100.85	*	Firmware	SelfTest	Failed
Sensor malfunction	*.11.144.85	*	Firmware	Sensor	Failed

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Alter option command executed	*.11.17.24	*	Firmware	Status	Changed
Firmware update pending	*.11.17.14	*	Firmware	Status	ChangePending
Firmware downloaded	*.11.17.25	*	Firmware	Status	Downloaded
Firmware download status Meter health checked	*.11.17.37	*	Firmware	Status	Normal
Firmware replaced Zigbee firmware change complete	*.11.17.52	*	Firmware	Status	Replaced
Device reset occurred	*.11.17.214	*	Firmware	Status	Reset
End of data event table reached	*.11.110.79	*	Firmware	Table	Error
Display table mismatch	*.11.110.159	*	Firmware	Table	Mismatched
Test call-in	*.11.111.58	*	Firmware	Test	Succeeded
Test mode display mismatch	*.11.19.159	*	Firmware	TestMode	Mismatched
Invalid down limit	*.11.261.35	*	Firmware	Threshold	Invalid
Calculation correction factor > max	*.11.261.40	*	Firmware	Threshold	OutofRange
Invalid meter software version	*.11.124.35	*	Firmware	Version	Invalid

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.13 – GasSupply events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Complete loss of gas supply	*.4.0.85	*	GasSupply	n/a	Failed
Gas supply restored	*.4.0.216	*	GasSupply	n/a	Restored

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.14 – Installation events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Auto registration status	*.6.5.34	*	Installation	AutoRegistration	InProgress
Auto registration confirmation	*.6.5.58	*	Installation	AutoRegistration	Succeeded
Meter change-out	*.6.0.27	*	Installation	n/a	ChangeOut

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.15 – LoadControl events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Control point changed by condition Control point changed by command Control point changed due to prepayment Control point changed by schedule	*.15.26.24	*	Loadcontrol	ControlPoint	Changed
Abort command executed	*.15.0.1	*	Loadcontrol	n/a	Aborted
Load Control User option	*.15.83.4	*	LoadControl	Program	Activated
Load control relay momentary closure, relay # Output control relay toggled, relay #	*.15.91.24	*	Loadcontrol	Relay	Changed
Switch schedule aborted	*.15.95.1	*	Loadcontrol	Schedule	Aborted
Schedule loaded	*.15.95.36	*	Loadcontrol	Schedule	Loaded
Load control restore	*.15.17.216	*	Loadcontrol	Status	Restored
Load control initiate Load control relay closed Load control relay permanent closure, relay # Load control pattern started	*.15.17.242	*	Loadcontrol	Status	Started
Load control relay opened Load control relay opened, relay #	*.15.17.243	*	Loadcontrol	Status	Stopped
An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.					

Table E.16 – LoadProfile events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
List Pointers reset	*.16.64.214	*	Loadprofile	ListPointers	Reset
Load survey readings failed	*.16.87.85	*	Loadprofile	Readings	Failed
Load profile data corrupt	*.16.109.43	*	Loadprofile	Storage	Corrupted
Load profile data area almost full	*.16.109.32	*	Loadprofile	Storage	Full
An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.					

Table E.17 – Logs events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Data log uploaded	*.17.33.60	*	Logs	DataLog	Transmitted
Event log last read entry updated	*.17.44.24	*	Logs	EventLog	Changed
Event log cleared	*.17.44.28	*	Logs	EventLog	Cleared
Event log error	*.17.44.79	*	Logs	EventLog	Error
Event log full	*.17.44.32	*	Logs	EventLog	Full
Event log uploaded Event call-in	*.17.44.60	*	Logs	EventLog	Transmitted
History log last read entry updated	*.17.53.24	*	Logs	HistoryLog	Changed
History log cleared	*.17.53.28	*	Logs	HistoryLog	Cleared

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.18 – Memory events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Memory allocation error	*.18.2.79	*	Memory	Allocation	Error
Buffer overflow/overrun error	*.18.14.177	*	Memory	Buffer	Overflow
EPROM read	*.18.42.2	*	Memory	EPROM	Accessed
EPROM written	*.18.42.24	*	Memory	EPROM	Changed
EPROM failure	*.18.42.85	*	Memory	EPROM	Failed
Framing error	*.18.50.79	*	Memory	Frames	Error
Interval overflow – pulses > 65,535	*.18.59.177	*	Memory	Interval	Overflow
Data corruption detection	*.18.0.43	*	Memory	n/a	Corrupted
Mass memory mismatch	*.18.0.159	*	Memory	n/a	Mismatched
NVRAM failure	*.18.72.85	*	Memory	NVRAM	Failed
Family definitions mismatch	*.18.75.159	*	Memory	Parameter	Mismatched
Redundant pulse monitoring error	*.18.84.79	*	Memory	Pulse	Error
RAM error	*.18.85.79	*	Memory	RAM	Error
RAM failure	*.18.85.85	*	Memory	RAM	Failed
RAM memory full	*.18.85.32	*	Memory	RAM	Full
Data recovery error	*.18.88.85	*	Memory	Recovery	Failed
ROM error	*.18.92.79	*	Memory	ROM	Error
ROM failure	*.18.92.85	*	Memory	ROM	Failed
Disk almost full	*.18.109.32	*	Memory	Storage	Full
Data table full	*.18.110.32	*	Memory	Table	Full
Table slot overflow	*.18.110.177	*	Memory	Table	Overflow

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.19 – Metrology events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
BTU alarm BTU out of range	*.21.13.40	*	Metrology	BTU	OutOfRange
Corrected volume calculation error	*.21.16.79	*	Metrology	Calculation	Error
Calibration change Calibration value set, #	*.21.18.24	*	Metrology	Calibration	Changed
Calibration over- deviation, #	*.21.18.40	*	Metrology	Calibration	OutOfRange
Calibration expired	*.21.18.64	*	Metrology	Calibration	Expired
Concentration alarm	*.21.39.40	*	Metrology	Concentration	OutOfRange
Event Log Cleared	*.21.44.28	*	Metrology	EventLog	Cleared
EWM potential failure	*.21.45.85	*	Metrology	EWM	Failed
FPV calculated unreasonably	*.21.49.40	*	Metrology	FPV	OutOfRange
GC analyzer failure	*.21.51.85	*	Metrology	GCAnalyzer	Failed
History Log Cleared	*.21.53.28	*	Metrology	HistoryLog	Cleared
Form C error, input #	*.21.55.79	*	Metrology	Input	Error
Invalid value, channel #	*.21.55.35	*	Metrology	Input	Invalid
Interval read succeeded	*.21.59.58	*	Metrology	Interval	Succeeded
Last read entry updated	*.21.62.24	*	Metrology	LastRead	Changed
Update list pointers	*.21.63.24	*	Metrology	List	Changed
List cleared	*.21.63.28	*	Metrology	List	Cleared
Reset list pointers	*.21.63.214	*	Metrology	List	Reset
Measurement error detected	*.21.67.79	*	Metrology	Measurement	Error
Measurement failed	*.21.67.85	*	Metrology	Measurement	Failed
Total MOL % out of range	*.21.70.40	*	Metrology	MOL%	OutOfRange
Measurement error detected	*.21.0.79	*	Metrology	n/a	Error
Meter return within limits, channel #	*.21.0.37	*	Metrology	n/a	Normal
Meter reprogrammed End Device Programmed	*.21.0.213	*	Metrology	n/a	Reprogrammed
Nonvolatile memory failure detected	*.21.72.85	*	Metrology	NVRAM	Failed
Turbine Pulse Error	*.21.84.79	*	Metrology	Pulse	Error
Pulse initiator	*.21.84.85	*	Metrology	Pulse	Failed
Pulse overflow, channel #	*.21.84.177	*	Metrology	Pulse	Overflow
Meter readings failed	*.21.87.85	*	Metrology	Readings	Failed
kWh received – alarm cleared	*.21.87.37	*	Metrology	Readings	Normal
Expected read missed	*.21.87.160	*	Metrology	Readings	NotFound
Scheduled call-in	*.21.87.225	*	Metrology	Readings	Scheduled
Register error	*.21.89.79	*	Metrology	Register	Error

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Previous kW > register capacity	*.21.89.139	*	Metrology	Register	Exceeded
Register full	*.21.89.32	*	Metrology	Register	Full
Register definitions mismatch	*.21.89.159	*	Metrology	Register	Mismatched
Register read succeeded	*.21.89.58	*	Metrology	Register	Succeeded
Self meter read	*.21.231.58	*	Metrology	SelfRead	Succeeded
Invalid sigmatic message	*.21.102.35	*	Metrology	SigmaticMessage	Invalid
Specific gravity alarm	*.21.240.40	*	Metrology	SpecificGravity	OutofRange
Self check error detected	*.21.17.79	*	Metrology	Status	Error
Pending table activation	*.21.110.4	*	Metrology	Table	Activated
Table written to	*.21.110.24	*	Metrology	Table	Changed
Pending table clear	*.21.110.28	*	Metrology	Table	Cleared
Meter over hi-hi threshold, channel # Meter over threshold, channel # Delta rate over threshold, channel #	*.21.261.139	*	Metrology	Threshold	Exceeded
Limit alarm reported	*.21.261.93	*	Metrology	Threshold	MaxLimitReached
Meter under threshold, channel # Meter over lo-lo threshold, channel # Low limit alarm	*.21.261.150	*	Metrology	Threshold	MinLimitReached
Meter over/under threshold	*.21.261.40	*	Metrology	Threshold	OutofRange
Gas day high limit exceeded	*.21.123.139	*	Metrology	Usage	Exceeded
An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.					

Table E.20 – MobileSecurity events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
MAT Token Random Data or Target LAN Error	*.14.31.79	*	MobileSecurity	Data	Error
MAT Token Invalid LAN Address Block	*.14.61.35	*	MobileSecurity	LANAddress	Invalid
MAT Token Invalid Network ID	*.14.71.35	*	MobileSecurity	NetworkId	Invalid
MAT Token Message Generation Error	*.14.32.79	*	MobileSecurity	SecurityKey	Error
MAT Token Expired MAT Token Expired, Keep Alive Timeout Exceeded	*.14.32.64	*	MobileSecurity	SecurityKey	Expired

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
MAT Token Invalid Options	*.14.32.35	*	MobileSecurity	SecurityKey	Invalid
MAT Token pre-empted	*.14.32.41	*	MobileSecurity	SecurityKey	Preempted
MAT Token Processed	*.14.32.44	*	MobileSecurity	SecurityKey	Processed
MAT Token released	*.14.32.51	*	MobileSecurity	SecurityKey	Released
MAT Token Invalid Length	*.14.119.35	*	MobileSecurity	SecurityKeyLength	Invalid
MAT Token Invalid Version	*.14.120.35	*	MobileSecurity	SecurityKeyVersion	Invalid
Prior session already established	*.14.129.161	*	MobileSecurity	Session	Disallowed

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.21 – Modem events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Power outage modem battery low	*.19.22.150	*	Modem	Charge	MinLimitReached
Modem failure detected	*.19.17.85	*	Modem	Status	Failed
Modem initialized	*.19.17.33	*	Modem	Status	Initialized
Modem change-out	*.19.17.105	*	Modem	Status	Installed
No modem	*.19.17.160	*	Modem	Status	NotFound

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.22 – ModuleFirmware events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Module firmware replaced	*.9.17.52	*	ModuleFirmware	Status	Replaced

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.23 – Network events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Network association failure	*.23.74.85	*	Network	Association	Failed
Collector First Connect	*.23.52.42	*	Network	HeadEndSystem	Connected
Parent device not enabled	*.23.76.66	*	Network	ParentDevice	Disabled
Radio faults	*.23.136.85	*	Network	Radio	Failed

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Collector Radio Registration Data	*.23.136.50	*	Network	Radio	Registered
Optional input closure, generator	*.23.17.42	*	Network	Status	Connected
Device not enabled Gateway not enabled	*.23.17.66	*	Network	Status	Disabled
Optional input opening, generator Device disconnected	*.23.17.68	*	Network	Status	Disconnected
DAP error DSP error	*.23.17.79	*	Network	Status	Error
Node failure Node link failure	*.23.17.85	*	Network	Status	Failed
Meter installed Gateway installed	*.23.17.105	*	Network	Status	Installed
End device sealed	*.23.17.227	*	Network	Status	Sealed
End device unsealed	*.23.17.269	*	Network	Status	Unsealed

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.24 – PAN / HAN events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
PAN pairing window closed	*.10.73.16	*	Pairing	Window	Closed
PAN pairing window opened (Ready To Pair)	*.10.73.39	*	Pairing	Window	Opened
PAN pairing succeeded	*.10.0.58	*	Pairing	n/a	Succeeded
PAN pairing failed	*.10.0.85	*	Pairing	n/a	Failed
PAN text message canceled	*.13.112.10	*	VideoDisplay	TextMessage	Canceled
PAN text message displayed	*.13.112.78	*	VideoDisplay	TextMessage	Displayed
PAN pricing succeeded	*.20.9.58	*	Billing	Pricing	Succeeded
PAN pricing failed	*.20.9.85	*	Billing	Pricing	Failed
PAN load control all events cancel failed	*.15.148.86	*	LoadControl	AllEvents	CancelFailed
PAN load control all events canceled	*.15.148.10	*	LoadControl	AllEvents	Canceled
PAN load control event cancel failed	*.15.43.86	*	LoadControl	Event	CancelFailed
PAN load control event canceled	*.15.43.10	*	LoadControl	Event	Canceled
PAN load control event scheduled	*.15.43.225	*	LoadControl	Event	Scheduled
PAN load control event opt-in	*.15.43.80	*	LoadControl	Event	Opt-In
PAN load control event opt-out	*.15.43.81	*	LoadControl	Event	Opt-Out

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
PAN device removed PAN load control device removed PAN gateway removed	*.0.0.212	*	n/a	n/a	Removed
PAN network enabled	*.23.0.76	*	Network	n/a	Enabled
PAN network disabled	*.23.0.66	*	Network	n/a	Disabled

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.25 – Power events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Low current limit exceeded	*.26.6.150	*	Power	Current	MinLimitReached
Line Frequency Unstable	*.26.4.270	*	Power	Frequency	Unstable
High neutral current	*.26.137.93	*	Power	NeutralCurrent	MaxLimitReached
High neutral current Cleared	*.26.137.y3	*	Power	NeutralCurrent	MaxLimitReachedCleared
Cross phase condition	*.26.25.45	*	Power	Phase	CrossPhaseDetected
Cross phase condition Cleared	*.26.25.70	*	Power	Phase	CrossPhaseCleared
Loss of phase, Phase drop out	*.26.25.85	*	Power	Phase	Failed
Inactive phase condition (voltage is present, current is not)	*.26.25.100	*	Power	Phase	Inactive
Inactive phase condition Cleared	*.26.25.72	*	Power	Phase	InactiveCleared
Phase alert cleared	*.26.25.37	*	Power	Phase	Normal
Phase threshold	*.26.25.40	*	Power	Phase	OutofRange
Phase restoration	*.26.25.216	*	Power	Phase	Restored
Phase angle limit above/below threshold	*.26.130.40	*	Power	PhaseAngle	OutofRange
Phase angle limit above/below threshold Cleared	*.26.130.74	*	Power	PhaseAngle	OutofRangeCleared

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Phase angle limit exceeded	*.26.130.139	*	Power	PhaseAngle	Exceeded
Voltage Sag Started (PhaseA)	*.26.131.223	*	Power	PhaseAVoltage	SagStarted
Voltage Sag Stopped (PhaseA)	*.26.131.224	*	Power	PhaseAVoltage	SagStopped
Voltage Swell Started (PhaseA)	*.26.131.248	*	Power	PhaseAVoltage	SwellStarted
Voltage Swell Stopped (PhaseA)	*.26.131.249	*	Power	PhaseAVoltage	SwellStopped
Phase A inactive	*.26.126.100	*	Power	PhaseA	Inactive
Voltage Sag Started (PhaseB)	*.26.132.223	*	Power	PhaseBVoltage	SagStarted
Voltage Sag Stopped (PhaseB)	*.26.132.224	*	Power	PhaseBVoltage	SagStopped
Voltage Swell Started (PhaseB)	*.26.132.248	*	Power	PhaseBVoltage	SwellStarted
Voltage Swell Stopped (PhaseB)	*.26.132.249	*	Power	PhaseBVoltage	SwellStopped
Phase B inactive	*.26.134.100	*	Power	PhaseB	Inactive
Voltage Sag Started (PhaseC)	*.26.133.223	*	Power	PhaseCVoltage	SagStarted
Voltage Sag Stopped (PhaseC)	*.26.133.224	*	Power	PhaseCVoltage	SagStopped
Voltage Swell Started (PhaseC)	*.26.133.248	*	Power	PhaseCVoltage	SwellStarted
Voltage Swell Stopped (PhaseC)	*.26.133.249	*	Power	PhaseCVoltage	SwellStopped
PhaseC inactive	*.26.135.100	*	Power	PhaseC	Inactive
Phase Sequence Error	*.26.78.79	*	Power	PhaseSequence	Error
Loss of voltage transducer on one phase Loss of voltage per phase	*.26.79.47	*	Power	PhaseVoltage	LossDetected
Power factor exceeded limits	*.26.27.139	*	Power	PowerFactor	Exceeded

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Leading kvarh cleared Leading kvarh Condition Cleared	*.26.27.24	*	Power	PowerFactor	OutofRangeCleared
Leading kvarh caution Leading kvarh Condition	*.26.27.40	*	Power	PowerFactor	OutofRange
High distortion detected	*.26.28.69	*	Power	PowerQuality	HighDistortion
High Distortion Cleared	*.26.28.71	*	Power	PowerQuality	HighDistortionCleared
Generic Power Quality Event	*.26.28.40	*	Power	PowerQuality	OutofRange
Recording disabled	*.26.80.66	*	Power	PowerQualityRecording	Disabled
Recording enabled	*.26.80.76	*	Power	PowerQualityRecording	Enabled
Verify Section Power Verify Meter Power Verify Feeder Power Verify Transformer Power	*.26.17.68	*	Power	Status	Disconnected
Rf Collector Power Outage Power outage Power out Undetected power outage Last gasp outage alarm Transformer Outage	*.26.0.85	*	Power	n/a	Failed
Loss of power or voltage on phase A	*.26.126.85	*	Power	PhaseA	Failed
Loss of power or voltage on phase B	*.26.134.85	*	Power	PhaseB	Failed
Loss of power or voltage on phase C	*.26.135.85	*	Power	PhaseC	Failed
Meter Restoration Power on / restored Transformer Restoration	*.26.0.216	*	Power	n/a	Restored
Restoration of power or voltage on phase A	*.26.126.216	*	Power	PhaseA	Restored

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Restoration of power or voltage on phase B	*.26.134.216	*	Power	PhaseB	Restored
Restoration of power or voltage on phase C	*.26.135.216	*	Power	PhaseC	Restored
Voltage exception	*.26.38.139	*	Power	Voltage	Exceeded
Voltage Imbalance Condition	*.26.38.98	*	Power	Voltage	Imbalanced
Voltage Imbalance Condition Cleared	*.26.38.75	*	Power	Voltage	ImbalanceCleared
Loss of voltage transducer VT Low loss potential detected	*.26.38.47	*	Power	Voltage	LossDetected
High Voltage	*.26.38.93	*	Power	Voltage	MaxLimitReached
Low voltage	*.26.38.150	*	Power	Voltage	MinLimitReached
Voltage Imbalance Cleared	*.26.38.37	*	Power	Voltage	Normal
Voltage swell cleared	*.26.38.37	*	Power	Voltage	Normal
Voltage sag	*.26.38.223	*	Power	Voltage	SagStarted
Voltage sag cleared	*.26.38.224	*	Power	Voltage	SagStopped
Voltage swell condition	*.26.38.248	*	Power	Voltage	SwellStarted
Voltage swell cleared	*.26.38.249	*	Power	Voltage	SwellStopped

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.26 – Pressure events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Sensed pressure equals P max	*.29.261.93	*	Pressure	Threshold	MaxLimitReached
Sensed pressure equals P min	*.29.261.150	*	Pressure	Threshold	MinLimitReached
Pressure is out of range	*.29.261.40	*	Pressure	Threshold	OutOfRange

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.27 – RCDSwitch events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Service turn-on Status input closure, # Meter connected Connect executed	*.31.0.42	*	RCDswitch	n/a	Connected
Connect failed	*.31.0.67	*	RCDSwitch	n/a	ConnectFailed
Service turn-off Status input opening, # Meter disconnected Breaker operation Disconnect executed	*.31.0.68	*	RCDswitch	n/a	Disconnected
Connect failed Disconnect failed	*.31.0.84	*	RCDswitch	n/a	DisconnectFailed

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.28 – Security events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Unauthorized access attempted	*.12.1.38	*	Security	Access	NotAuthorized
Unit accessed Unit accessed by reader Unit accessed by recorder	*.12.1.58	*	Security	Access	Succeeded
Certificate expiration alert Certificate expiration	*.12.21.64	*	Security	Certificate	Expired
Cover removal detected	*.12.29.212	*	Security	Cover	Removed
CRC error	*.12.30.79	*	Security	CRC	Error
Decryption Error Plain Text	*.12.31.63	*	Security	Data	Unsecure
Decryption Error General	*.12.36.79	*	Security	Decryption	Error
Decryption Failure	*.12.36.85	*	Security	Decryption	Failed
Collector Door Event	*.12.128.2	*	Security	Door	Accessed
Door closed	*.12.141.16	*	Security	Enclosure	Closed
Door opened	*.12.141.39	*	Security	Enclosure	Opened
Encoder tamper	*.12.40.257	*	Security	Encoder	TamperDetected
Crypto Init Failure	*.12.298.85	*	Security	Initialisation	Failed
Reverse flow detected	*.12.48.219	*	Security	Flow	Reversed
Decryption Error HMAC Failure	*.12.54.85	*	Security	HMAC	Failed
User login failure Gateway login failure	*.12.65.85	*	Security	Login	Failed
Magnetic switch alarm	*.12.66.257	*	Security	MagneticSwitch	TamperDetected

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Physical tamper Tamper indication Tamper attempt suspected	*.12.0.257	*	Security	n/a	TamperDetected
Tilt detected	*.12.0.263	*	Security	n/a	Tilted
Configuration Token Invalid Network ID	*.12.71.35	*	Security	NetworkId	Invalid
Parity error	*.12.77.79	*	Security	Parity	Error
Password changed	*.12.24.24	*	Security	Password	Changed
Invalid password	*.12.24.35	*	Security	Password	Invalid
Unit accessed remotely	*.12.211.58	*	Security	RemoteAccess	Succeeded
Inverted meter or reverse rotation detected Reverse Rotation detected	*.12.93.219	*	Security	Rotation	Reversed
Read secured register Read secured table	*.12.98.2	*	Security	SecuredRegister	Accessed
Local key disable	*.12.32.66	*	Security	SecurityKey	Disabled
Local key enable	*.12.32.76	*	Security	SecurityKey	Enabled
Configuration Token Message Generation Error	*.12.32.79	*	Security	SecurityKey	Error
Invalid security key	*.12.32.35	*	Security	SecurityKey	Invalid
Configuration Token Invalid Options	*.12.32.35	*	Security	SecurityKey	Invalid
Previous Key Used	*.12.32.41	*	Security	SecurityKey	Preempted
Configuration Token Processed	*.12.32.44	*	Security	SecurityKey	Processed
Local key unlock	*.12.32.62	*	Security	SecurityKey	Unlocked
Configuration Token Invalid Length	*.12.119.35	*	Security	SecurityKeyLength	Invalid
Configuration Token Invalid Version	*.12.120.35	*	Security	SecurityKeyVersion	Invalid
Signature General Error	*.12.103.79	*	Security	Signature	Error
Signature Algorithm Error Signature Verify Failure Signature Algorithm Error Signature Verify Failure Signature Algorithm Error Signature Verify Failure	*.12.103.85	*	Security	Signature	Failed

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Invalid Signature Key Specified Signature Verification Error Invalid Signature Key Specified Signature Verification Error Invalid Signature Key Specified Signature Verification Error	*.12.103.35	*	Security	Signature	Invalid
Signature Missing	*.12.103.160	*	Security	Signature	NotFound
Invalid Length	*.12.104.35	*	Security	SignatureLength	Invalid
Invalid Signature Timestamp	*.12.105.35	*	Security	SignatureTimestamp	Invalid
Signature Usage Error	*.12.106.79	*	Security	SignatureUsage	Error
End device accessed for write	*.12.282.58	*	Security	WriteAccess	Succeeded

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.29 – Temperature events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Temperature returns within range	*.35.0.37	*	Temperature	n/a	Normal
Temperature is out of range	*.35.0.40	*	Temperature	n/a	OutOfRange
Sensed temperature equals T max	*.35.261.93	*	Temperature	Threshold	MaxLimitReached
Sensed temperature equals T min	*.35.261.150	*	Temperature	Threshold	MinLimitReached

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.30 – VideoDisplay events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Display failure	*.13.17.85	*	VideoDisplay	Status	Failed

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table E.31 – WaterSupply events

Event or Control Description	EndDeviceEvent Type	EndDevice Type	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Complete loss of water supply	*.5.0.47	*	WaterSupply	n/a	Failed
Water supply restored	*.5.0.270	*	WaterSupply	n/a	Restored
An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.					

Annex F (normative)

EndDeviceControlType enumerations

F.1 General

Many metering systems have the capability to issue a command to equipment in the field that takes an action. The action might be to perform a demand-reset, open or close a switch, or a number of other activities. This Annex F describes example codes that may be used for such applications.

EndDeviceControlType enumerations are categorized in the same manner as the EndDeviceEventType enumerations described in Annex E. The code is divided into 4 parts:

EndDeviceControl.type:=
<EndDeviceType>.<EndDeviceDomain>.<EndDeviceSubdomain>.<EndDeviceEventOrAction>

where

<EndDeviceType>	a numeric value from the EndDeviceType enumeration (see EndDeviceType section in Annex E)
<EndDeviceDomain>	a numeric value from the EndDeviceDomain enumeration (see EndDeviceDomain section in Annex E)
<EndDeviceSubdomain>	a numeric value from the EndDeviceSubdomain enumeration (see EndDeviceSubdomain section in Annex E)
<EndDeviceEventOrAction>	a numeric value from the EndDeviceEventOrAction enumeration (see EndDeviceEventOrAction section in Annex E)

These control types are inclusive of the control types used for PAN device controls. Controls may cause an event to be generated by the end device, which would then be reported using a EndDeviceEvents message.

F.2 Normative EndDeviceControlType Enumerations

EndDeviceType, EndDeviceDomain, EndDeviceSubdomain, and EndDeviceEventOrAction fields are combined and presented as a single string. The normative events are listed in the following Tables F.1 through F.4, grouped by EndDeviceDomain.

Table F.1 – Demand Controls

Event or Control Description	EndDeviceControl Type	Expected Events	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Reset Demand	*.8.0.214	*.8.0.215 *.8.0.65	Demand	n/a	Reset

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table F.2 – LoadControl Controls

Event or Control Description	EndDeviceControl Type	Expected Events	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Load control initiate, port 0	*.15.0.54	*.15.17.242 *.15.17.217	LoadControl	n/a	Start
Load control stop/terminate, port 1	*.15.0.55	*.15.17.216 *.15.17.218	LoadControl	n/a	Stop

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table F.3 – PAN / HAN Controls

Event or Control Description	EndDeviceControl Type	Expected Events	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
PAN Pairing Window Open	*.10.73.298	*.10.73.39	Pairing	Window	Open
PAN Pairing Window Close	*.10.73.299	*.10.73.16	Pairing	Window	Close
PAN Text Message Display	*.13.112.77	*.13.112.78	VideoDisplay	TextMessage	Display
PAN Text Message Cancel	*.13.112.8	*.13.112.10	VideoDisplay	TextMessage	Cancel
PAN Price Signal Create	*.20.9.82	*.20.9.58	Billing	Pricing	Create
PAN Load Control All Event Cancel	*.15.148.8	*.15.148.10	LoadControl	AllEvents	Cancel
PAN Load Control Event Cancel	*.15.43.8	*.15.43.10	LoadControl	Event	Cancel
PAN Load Control Event Schedule	*.15.43.300	*.15.43.225	LoadControl	Event	Schedule
PAN Network Enable	*.23.0.26	*.23.0.76	Network	n/a	Enable
PAN Network Disable	*.23.0.22	*.23.0.66	Network	n/a	Disable

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Table F.4 – RCDSwitch Controls

Event or Control Description	EndDeviceControl Type	Expected Events	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Disable RCD Emergency Supply Capacity Limit	*.31.138.22	*.31.138.66 *.31.138.220	RCDSwitch	EmergencySupplyCapacityLimit	Disable
Enable RCD Emergency Supply Capacity Limit	*.31.138.26	*.31.138.76 *.31.138.221	RCDSwitch	EmergencySupplyCapacityLimit	Enable
Arm Remote Connect/Disconnect Switch for Closure	*.31.0.5	*.31.0.11 *.31.0.226	RCDSwitch	n/a	ArmForClosure
Arm Remote Connect/Disconnect Switch for Open	*.31.0.6	*.31.0.12 *.31.0.222	RCDSwitch	n/a	ArmForOpen
Close Remote Connect/Disconnect Switch	*.31.0.18	*.31.0.42 *.31.0.67	RCDSwitch	n/a	Connect

Event or Control Description	EndDeviceControl Type	Expected Events	EndDevice Domain	EndDevice SubDomain	EndDevice EventOrAction
Disable Demand Limiting formula #1 for RCD Switch Disable RCD Switch	*.31.0.22	*.31.0.66 *.31.0.220	RCDSwitch	n/a	Disable
Open Remote Connect/Disconnect Switch	*.31.0.23	*.31.0.68 *.31.0.84	RCDSwitch	n/a	Disconnect
Enable Demand Limiting formula #2 for RCD Switch Enable RCD Switch	*.31.0.26	*.31.0.76 *.31.0.221	RCDSwitch	n/a	Enable
Disable RCD Supply Capacity Limit	*.31.139.22	*.31.139.66 *.31.139.220	RCDSwitch	SupplyCapacityLimit	Disable
Enable RCD Supply Capacity Limit	*.31.139.26	*.31.139.76 *.31.139.221	RCDSwitch	SupplyCapacityLimit	Enable

An asterisk (*) denotes any of the EndDeviceType values. It is assumed that the value used in any production use of these events will be relevant to the device that is actually sending this event.

Annex G (normative)

Conventions for naming and identifying objects

G.1 General

This Annex G describes an example of the use of object identifiers as needed by IEC 61968 messages to maintain synchronization and correlation of information between systems.

G.2 Object identifiers

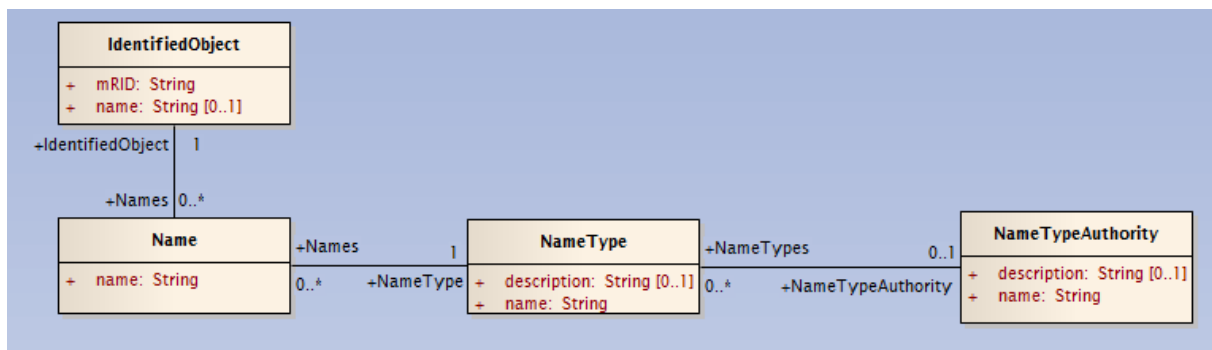


Figure G.1 – CIM naming

The CIM recognizes that an object can be known by many names. Objects should be given a “name” by the system of record by using one of the naming elements. Where the mRID value should be a globally unique identifier using a GUID, the name values are typically more human friendly and human useful. The uniqueness constraints may also be relaxed, as defined for rules by a given name type. Uniqueness rules may range from:

- globally unique
- globally unique within a name type and associated name type authority
- unique within a device (e.g. a meter)
- physical location (e.g. a substation)
- no uniqueness constraint.

In all cases, consuming applications need to be aware of uniqueness limitations for a given name type if any exist.

G.3 Object identifiers within messages

Figure G.1 shows the CIM models used for names. In Figure G.2, the model is seen from the perspective of an example XML structure that would be realized within a message profile.

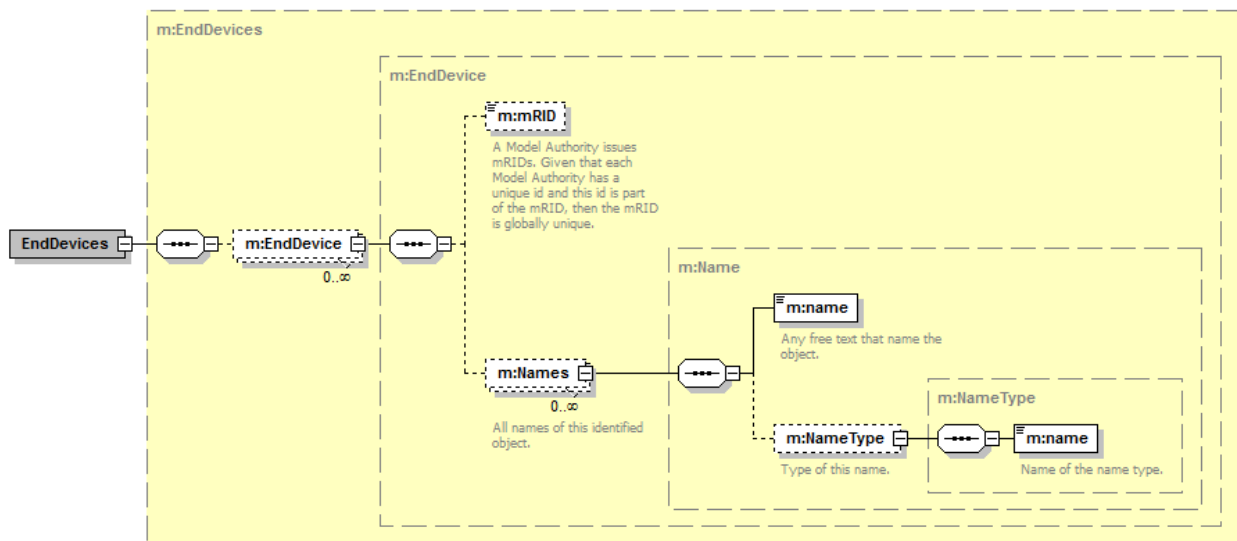


Figure G.2 – Example XML structure for names

Using the above example as a reference, there are a number of important rules that shall be followed:

An object may be identified using a globally unique mRID

An object may be identified using one or more Name.name values

Both mRID and Name.name values may be supplied

If more than one Name.name value is supplied, each Name should identify a corresponding NameType.name value

While the IdentifiedObject.name value is defined in the CIM, it is not used within IEC 61968-9 profiles in order to avoid ambiguities where a producer could choose to use IdentifiedObject.name, but a consumer could expect IdentifiedObject.Name.name. Therefore, from the perspective of IEC 61968-9 IdentifiedObject.name is deprecated.

Producers and consumers shall agree upon the use of mRID or Name.name values to be used for object correlation, where this can vary for a given implementation although the use of Name.name values is strongly recommended.

In the implementation cases where multiple consumers may exist, a producer may need to supply multiple Name.name values, each with a different NameType.name in order to support the specific needs of each consumer.

G.4 Object References within messages

Within message profiles, it is possible to refer to an object "by reference" as well as the common (nested) 'by value'. These references may be done using mRID or Name.name values. A common example of this for IEC 61968-9 can be seen for the reference of ReadingTypes (see Figure G.3).

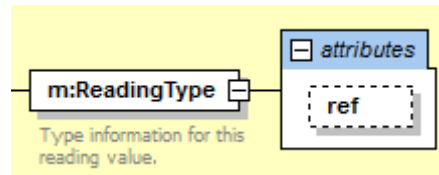


Figure G.3 – Use of names for references

Within an XML message the "ref" attribute would then identify a specific ReadingType using a Name.name value for the reading type. This scheme has many benefits, such as reducing the size of the XML message and allowing for aliasing of objects, where an object can be known by more than one name.

References are also used to identify specific types of EndDeviceControls or EndDeviceEvents, using references to an EndDeviceControlType or EndDeviceEventType as appropriate.

Annex H (normative)

XML schemas for message payloads

H.1 General

The purpose of this Annex H is to provide XML schemas for message payloads to augment the descriptions provided earlier in this document. These XML schemas were defined using profile definitions within CIMTool. These schemas may be extended as needed for specific implementation needs. This Annex H is supplemented by the informative XML schemas provided in Annex I.

H.2 CustomerAccountConfig

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#"
  xmlns:a="http://langdale.com.au/2005/Message#"
  xmlns:m="http://iec.ch/TC57/2011/CustomerAccountConfig#"
  xmlns:sawSDL="http://www.w3.org/ns/sawSDL" xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://iec.ch/TC57/2011/CustomerAccountConfig#" elementFormDefault="qualified"
  attributeFormDefault="unqualified">
  <xs:element name="CustomerAccountConfig" type="m:CustomerAccountConfig"/>
  <xs:complexType name="CustomerAccountConfig">
    <xs:sequence>
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ConfigurationEvent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
      <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
      <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
      <xs:element name="reason" type="xs:string" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
      <xs:element name="remark" type="xs:string" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
      <xs:element name="severity" type="xs:string" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="status" type="m:Status" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="billingCycle" type="xs:string" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount.billingCycle"/>
      <xs:element name="budgetBill" type="xs:string" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount.budgetBill"/>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
      <xs:element name="lastModifiedDate" type="xs:dateTime" minOccurs="0"
        sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDate"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

```
<xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
<xs:element name="subject" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
<xs:element name="title" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
<xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.ConfigurationEvents"/>
<xs:element name="docStatus" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>
```

H.3 CustomerAgreementConfig

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/CustomerAgreementConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/CustomerAgreementConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="CustomerAgreementConfig" type="m:CustomerAgreementConfig"/>
  <xs:complexType name="CustomerAgreementConfig">
```

```
<xs:sequence>
  <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ConfigurationEvent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConfigurationEvent">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
    <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
    <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
    <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerAccount">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
    <xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
    <xs:element name="loadMgmt" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement.loadMgmt"/>
    <xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
    <xs:element name="signDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Agreement.signDate"/>
    <xs:element name="subject" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
    <xs:element name="title" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
    <xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.ConfigurationEvents"/>
    <xs:element name="DemandResponsePrograms" type="m:DemandResponseProgram" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerAgreement.DemandResponsePrograms"/>
    <xs:element name="docStatus" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
```

```
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement.ServiceCategory"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
<xs:element name="validityInterval" type="m:DateTimeInterval" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Agreement.validityInterval"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="DateTimeInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval">
<xs:sequence>
<xs:element name="end" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
<xs:element name="start" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="DemandResponseProgram" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DemandResponseProgram">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
<xs:sequence>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
<xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
<xs:sequence>
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
<xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
<xs:sequence>
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceCategory" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceKind">
<xs:restriction base="xs:string">
<xs:enumeration value="electricity"/>
<xs:enumeration value="gas"/>
<xs:enumeration value="heat"/>
<xs:enumeration value="internet"/>
<xs:enumeration value="other"/>
<xs:enumeration value="rates"/>

```



```

        <xs:enumeration value="refuse"/>
        <xs:enumeration value="sewerage"/>
        <xs:enumeration value="time"/>
        <xs:enumeration value="tvLicence"/>
        <xs:enumeration value="water"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="Status" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status">
    <xs:sequence>
        <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
        <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
        <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
        <xs:element name="value" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

H.4 CustomerConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/CustomerConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/CustomerConfig#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
    <xs:element name="CustomerConfig" type="m:CustomerConfig"/>
    <xs:complexType name="CustomerConfig">
        <xs:sequence>
            <xs:element name="Customer" type="m:Customer" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ConfigurationEvent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
            <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
            <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
            <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
            <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
            <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
            <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
            <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
            <xs:element name="pucNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.pucNumber"/>
            <xs:element name="specialNeed" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.specialNeed"/>
            <xs:element name="vip" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.vip"/>
        </xs:sequence>
    </xs:complexType>

```

```
<xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#OrganisationRole.ConfigurationEvents"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="Organisation" type="m:Organisation" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#OrganisationRole.Organisation"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.status"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="commercialIndustrial"/>
    <xs:enumeration value="energyServiceScheduler"/>
    <xs:enumeration value="energyServiceSupplier"/>
    <xs:enumeration value="internalUse"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="pumpingLoad"/>
    <xs:enumeration value="residential"/>
    <xs:enumeration value="residentialAndCommercial"/>
    <xs:enumeration value="residentialAndStreetlight"/>
    <xs:enumeration value="residentialFarmService"/>
    <xs:enumeration value="residentialStreetlightOthers"/>
    <xs:enumeration value="windMachine"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ElectronicAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ElectronicAddress">
  <xs:sequence>
    <xs:element name="email1" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email1"/>
    <xs:element name="email2" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email2"/>
    <xs:element name="lan" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.lan"/>
    <xs:element name="mac" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.mac"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.password"/>
    <xs:element name="radio" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.radio"/>
    <xs:element name="userID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.userID"/>
    <xs:element name="web" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.web"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
```



```
<xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.type"/>
<xs:element name="withinTownLimits" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.withinTownLimits"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="TelephoneNumber" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber">
<xs:sequence>
<xs:element name="areaCode" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.areaCode"/>
<xs:element name="cityCode" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.cityCode"/>
<xs:element name="countryCode" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.countryCode"/>
<xs:element name="extension" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.extension"/>
<xs:element name="localNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.localNumber"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="TownDetail" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail">
<xs:sequence>
<xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.code"/>
<xs:element name="country" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.country"/>
<xs:element name="name" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.name"/>
<xs:element name="section" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.section"/>
<xs:element name="stateOrProvince" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.stateOrProvince"/>
</xs:sequence>
</xs:complexType>
</xs:schema>
```

H.5 EndDeviceConfig

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/EndDeviceConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/EndDeviceConfig#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
<xs:element name="EndDeviceConfig" type="m:EndDeviceConfig"/>
<xs:complexType name="EndDeviceConfig">
<xs:sequence>
<xs:element name="ComFunction" type="m:ComFunction" minOccurs="0" maxOccurs="unbounded"/>
<xs:element name="ConnectDisconnectFunction" type="m:ConnectDisconnectFunction" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="EndDevice" type="m:EndDevice" minOccurs="0" maxOccurs="unbounded"/>
<xs:element name="ReadingType" type="m:ReadingType" minOccurs="0" maxOccurs="unbounded"/>
<xs:element name="SimpleEndDeviceFunction" type="m:SimpleEndDeviceFunction" minOccurs="0"
maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ActivityRecord" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord">
<xs:sequence>
<xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
<xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
<xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
</xs:sequence>
</xs:complexType>
```

```
<xs:simpleType name="AssetModelUsageKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetModelUsageKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="customerSubstation"/>
    <xs:enumeration value="distributionOverhead"/>
    <xs:enumeration value="distributionUnderground"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="streetlight"/>
    <xs:enumeration value="substation"/>
    <xs:enumeration value="transmission"/>
    <xs:enumeration value="unknown"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="Channel" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Channel">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Channel.isVirtual"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="ReadingType" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Channel.ReadingType">
      <xs:complexType sawsdl:modelReference="">
        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ComDirectionKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComDirectionKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="biDirectional"/>
    <xs:enumeration value="fromDevice"/>
    <xs:enumeration value="toDevice"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ComFunction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrAddress" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.amrAddress"/>
    <xs:element name="amrRouter" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.amrRouter"/>
    <xs:element name="configID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.configID"/>
    <xs:element name="direction" type="m:ComDirectionKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.direction"/>
    <xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
    <xs:element name="firmwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.firmwareID"/>
    <xs:element name="hardwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.hardwareID"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
    <xs:element name="programID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.programID"/>
    <xs:element name="technology" type="m:ComTechnologyKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.technology"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ComTechnologyKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComTechnologyKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="cellular"/>
    <xs:enumeration value="ethernet"/>
    <xs:enumeration value="homePlug"/>
    <xs:enumeration value="pager"/>
    <xs:enumeration value="phone"/>
    <xs:enumeration value="plc"/>
  </xs:restriction>
</xs:simpleType>
```



```
<xs:enumeration value="rf"/>
<xs:enumeration value="rfMesh"/>
<xs:enumeration value="zigbee"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="ConfigurationEvent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
    <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
    <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
    <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ConnectDisconnectFunction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
    <xs:element name="eventCount" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.eventCount"/>
    <xs:element name="isConnected" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isConnected"/>
    <xs:element name="isDelayedDiscon" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isDelayedDiscon"/>
    <xs:element name="isLocalAutoDisconOp" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isLocalAutoDisconOp"/>
    <xs:element name="isLocalAutoReconOp" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isLocalAutoReconOp"/>
    <xs:element name="isRemoteAutoDisconOp" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isRemoteAutoDisconOp"/>
    <xs:element name="isRemoteAutoReconOp" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isRemoteAutoReconOp"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="rcdInfo" type="m:RemoteConnectDisconnectInfo" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.rcdInfo"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="CorporateStandardKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CorporateStandardKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="experimental"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="standard"/>
    <xs:enumeration value="underEvaluation"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval">
```

```
<xs:sequence>
  <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
  <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ElectronicAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ElectronicAddress">
  <xs:sequence>
    <xs:element name="email1" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email1"/>
    <xs:element name="email2" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email2"/>
    <xs:element name="lan" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.lan"/>
    <xs:element name="mac" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.mac"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.password"/>
    <xs:element name="radio" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.radio"/>
    <xs:element name="userID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.userID"/>
    <xs:element name="web" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.web"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDevice" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDevice">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrSystem" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.amrSystem"/>
    <xs:element name="initialCondition" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialCondition"/>
    <xs:element name="initialLossOfLife" type="m:PerCent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialLossOfLife"/>
    <xs:element name="installCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.installCode"/>
    <xs:element name="isPan" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.isPan"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.isVirtual"/>
    <xs:element name="lotNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lotNumber"/>
    <xs:element name="purchasePrice" type="m:Money" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.purchasePrice"/>
    <xs:element name="serialNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.serialNumber"/>
    <xs:element name="timeZoneOffset" type="m:Minutes" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.timeZoneOffset"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.type"/>
    <xs:element name="utcNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.utcNumber"/>
    <xs:element name="ActivityRecords" type="m:ActivityRecord" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.ActivityRecords"/>
    <xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.ConfigurationEvents"/>
    <xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.electronicAddress"/>
    <xs:choice minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.EndDeviceFunctions">
      <xs:element name="ComFunction" sawSDL:modelReference="">
        <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction">
          <xs:attribute name="ref" type="xs:string"/>
        </xs:complexType>
      </xs:element>
      <xs:element name="ConnectDisconnectFunction" sawSDL:modelReference="">
        <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConnectDisconnectFunction">
          <xs:attribute name="ref" type="xs:string"/>
        </xs:complexType>
      </xs:element>
    </xs:choice>
  </xs:sequence>
</xs:complexType>
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<xs:element name="SimpleEndDeviceFunction" sawsdl:modelReference="">
  <xs:complexType sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#SimpleEndDeviceFunction">
    <xs:attribute name="ref" type="xs:string"/>
  </xs:complexType>
</xs:element>
</xs:choice>
<xs:element name="EndDeviceInfo" type="m:EndDeviceInfo" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.EndDeviceInfo"/>
  <xs:element name="lifecycle" type="m:LifecycleDate" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lifecycle"/>
  <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  <xs:element name="Seals" type="m:Seal" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetContainer.Seals"/>
  <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.status"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceCapability" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability">
  <xs:sequence>
    <xs:element name="autonomousDst" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.autonomousDst"/>
    <xs:element name="communication" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.communication"/>
    <xs:element name="connectDisconnect" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.connectDisconnect"/>
    <xs:element name="demandResponse" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.demandResponse"/>
    <xs:element name="electricMetering" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.electricMetering"/>
    <xs:element name="gasMetering" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.gasMetering"/>
    <xs:element name="metrology" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.metrology"/>
    <xs:element name="onRequestRead" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.onRequestRead"/>
    <xs:element name="outageHistory" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.outageHistory"/>
    <xs:element name="pressureCompensation" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.pressureCompensation"/>
    <xs:element name="pricingInfo" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.pricingInfo"/>
    <xs:element name="pulseOutput" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.pulseOutput"/>
    <xs:element name="relaysProgramming" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.relaysProgramming"/>
    <xs:element name="reverseFlow" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.reverseFlow"/>
    <xs:element name="superCompressibilityCompensation" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.superCompressibilityCompensation"/>
    <xs:element name="temperatureCompensation" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.temperatureCompensation"/>
    <xs:element name="textMessage" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.textMessage"/>
    <xs:element name="waterMetering" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.waterMetering"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="EndDeviceFunctionKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceFunctionKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="autonomousDst"/>
    <xs:enumeration value="demandResponse"/>
    <xs:enumeration value="electricMetering"/>
    <xs:enumeration value="gasMetering"/>
    <xs:enumeration value="metrology"/>
    <xs:enumeration value="onRequestRead"/>
    <xs:enumeration value="outageHistory"/>
    <xs:enumeration value="relaysProgramming"/>
  </xs:restriction>
</xs:simpleType>
```



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<xs:enumeration value="reverseFlow"/>
<xs:enumeration value="waterMetering"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="EndDeviceInfo" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo">
  <xs:sequence>
    <xs:element name="isSolidState" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.isSolidState"/>
    <xs:element name="phaseCount" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.phaseCount"/>
    <xs:element name="ratedCurrent" type="m:CurrentFlow" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.ratedCurrent"/>
    <xs:element name="ratedVoltage" type="m:Voltage" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.ratedVoltage"/>
    <xs:element name="AssetModel" type="m:ProductAssetModel" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetInfo.AssetModel"/>
    <xs:element name="capability" type="m:EndDeviceCapability" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.capability"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="LifecycleDate" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate">
  <xs:sequence>
    <xs:element name="installationDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.installationDate"/>
    <xs:element name="manufacturedDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.manufacturedDate"/>
    <xs:element name="purchaseDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.purchaseDate"/>
    <xs:element name="receivedDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.receivedDate"/>
    <xs:element name="removalDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.removalDate"/>
    <xs:element name="retiredDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.retiredDate"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Manufacturer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Manufacturer">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
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<xs:complexType name="ProductAssetModel" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel">
  <xs:sequence>
    <xs:element name="corporateStandardKind" type="m:CorporateStandardKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.corporateStandardKind"/>
    <xs:element name="modelName" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.modelName"/>
    <xs:element name="modelVersion" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.modelVersion"/>
    <xs:element name="usageKind" type="m:AssetModelUsageKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.usageKind"/>
    <xs:element name="Manufacturer" type="m:Manufacturer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.Manufacturer"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="RationalNumber" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber">
  <xs:sequence>
    <xs:element name="denominator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.denominator"/>
    <xs:element name="numerator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.numerator"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ReadingInterharmonic" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic">
  <xs:sequence>
    <xs:element name="denominator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.denominator"/>
    <xs:element name="numerator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.numerator"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ReadingType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="accumulation" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.accumulation"/>
    <xs:element name="aggregate" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.aggregate"/>
    <xs:element name="commodity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.commodity"/>
    <xs:element name="consumptionTier" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.consumptionTier"/>
    <xs:element name="cpp" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.cpp"/>
    <xs:element name="currency" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.currency"/>
    <xs:element name="flowDirection" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.flowDirection"/>
    <xs:element name="macroPeriod" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.macroPeriod"/>
    <xs:element name="measurementKind" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measurementKind"/>
    <xs:element name="measuringPeriod" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measuringPeriod"/>
    <xs:element name="multiplier" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.multiplier"/>
    <xs:element name="phases" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.phases"/>
    <xs:element name="tou" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.tou"/>
    <xs:element name="unit" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.unit"/>
    <xs:element name="argument" type="m:RationalNumber" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.argument"/>
    <xs:element name="interharmonic" type="m:ReadingInterharmonic" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.interharmonic"/>
    <xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
```

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<xs:complexType name="Register" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.isVirtual"/>
    <xs:element name="leftDigitCount" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.leftDigitCount"/>
    <xs:element name="rightDigitCount" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.rightDigitCount"/>
    <xs:element name="touTierName" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.touTierName"/>
    <xs:element name="Channels" type="m:Channel" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.Channels"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="touTier" type="m:TimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.touTier"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="RemoteConnectDisconnectInfo"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo">
  <xs:sequence>
    <xs:element name="armedTimeout" type="m:Seconds" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.armedTimeout"/>
    <xs:element name="customerVoltageLimit" type="m:Voltage" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.customerVoltageLimit"/>
    <xs:element name="energyLimit" type="m:RealEnergy" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.energyLimit"/>
    <xs:element name="energyUsageStartDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.energyUsageStartDateTime"/>
    <xs:element name="energyUsageWarning" type="m:RealEnergy" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.energyUsageWarning"/>
    <xs:element name="isArmConnect" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.isArmConnect"/>
    <xs:element name="isArmDisconnect" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.isArmDisconnect"/>
    <xs:element name="isEnergyLimiting" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.isEnergyLimiting"/>
    <xs:element name="needsPowerLimitCheck" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.needsPowerLimitCheck"/>
    <xs:element name="needsVoltageLimitCheck" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.needsVoltageLimitCheck"/>
    <xs:element name="powerLimit" type="m:ActivePower" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.powerLimit"/>
    <xs:element name="usePushbutton" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.usePushbutton"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Seal" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal">
  <xs:sequence>
    <xs:element name="appliedDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.appliedDateTime"/>
    <xs:element name="condition" type="m:SealConditionKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.condition"/>
    <xs:element name="kind" type="m:SealKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.kind"/>
    <xs:element name="sealNumber" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.sealNumber"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="SealConditionKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SealConditionKind">
```

```
<xs:restriction base="xs:string">
  <xs:enumeration value="broken"/>
  <xs:enumeration value="locked"/>
  <xs:enumeration value="missing"/>
  <xs:enumeration value="open"/>
  <xs:enumeration value="other"/>
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="SealKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SealKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="lead"/>
    <xs:enumeration value="lock"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="steel"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="SimpleEndDeviceFunction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SimpleEndDeviceFunction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="configID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.configID"/>
    <xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
    <xs:element name="firmwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.firmwareID"/>
    <xs:element name="hardwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.hardwareID"/>
    <xs:element name="kind" type="m:EndDeviceFunctionKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SimpleEndDeviceFunction.kind"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
    <xs:element name="programID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.programID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="Registers" type="m:Register" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.Registers"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="TimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:time" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeInterval.end"/>
    <xs:element name="start" type="xs:time" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeInterval.start"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="RealEnergy" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RealEnergy">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="Voltage" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Voltage">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="CurrentFlow" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CurrentFlow">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
```

```

    <xs:simpleType name="ActivePower" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivePower">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="Minutes" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Minutes">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="Seconds" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seconds">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="PerCent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PerCent">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="Money" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Money">
      <xs:restriction base="xs:decimal"/>
    </xs:simpleType>
  </xs:schema>

```

H.6 EndDeviceControls

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/EndDeviceControls#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/EndDeviceControls#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="EndDeviceControls" type="m:EndDeviceControls"/>
  <xs:complexType name="EndDeviceControls">
    <xs:sequence>
      <xs:element name="EndDeviceControl" type="m:EndDeviceControl" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDeviceControlType" type="m:EndDeviceControlType"
minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ControlledAppliance" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ControlledAppliance">
    <xs:sequence>
      <xs:element name="isElectricVehicle" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ControlledAppliance.isElectricVehicle"/>
      <xs:element name="isExteriorLighting" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ControlledAppliance.isExteriorLighting"/>
      <xs:element name="isGenerationSystem" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ControlledAppliance.isGenerationSystem"/>
      <xs:element name="isHvacCompressorOrFurnace" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ControlledAppliance.isHvacCompressorOrFurnace"/>
      <xs:element name="isInteriorLighting" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ControlledAppliance.isInteriorLighting"/>
      <xs:element name="isIrrigationPump" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ControlledAppliance.isIrrigationPump"/>
      <xs:element name="isManagedCommercialIndustrialLoad" type="xs:boolean"
minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ControlledAppliance.isManagedCommercialIndustrialLoad"/>
      <xs:element name="isPoolPumpSpaJacuzzi" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ControlledAppliance.isPoolPumpSpaJacuzzi"/>
      <xs:element name="isSimpleMiscLoad" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ControlledAppliance.isSimpleMiscLoad"/>
      <xs:element name="isSmartAppliance" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ControlledAppliance.isSmartAppliance"/>
      <xs:element name="isStripAndBaseboardHeater" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ControlledAppliance.isStripAndBaseboardHeater"/>
      <xs:element name="isWaterHeater" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ControlledAppliance.isWaterHeater"/>
    </xs:sequence>
  </xs:complexType>

```



```
</xs:complexType>
<xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer">
  <xs:sequence/>
</xs:complexType>
<xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
    <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ElectronicAddress" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress">
  <xs:sequence>
    <xs:element name="email1" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email1"/>
    <xs:element name="email2" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email2"/>
    <xs:element name="lan" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.lan"/>
    <xs:element name="mac" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.mac"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.password"/>
    <xs:element name="radio" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.radio"/>
    <xs:element name="userID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.userID"/>
    <xs:element name="web" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.web"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDevice" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="installCode" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.installCode"/>
    <xs:element name="isPan" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.isPan"/>
    <xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.electronicAddress"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceAction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceAction">
  <xs:sequence>
    <xs:element name="command" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceAction.command"/>
    <xs:element name="duration" type="m:Minutes" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceAction.duration"/>
    <xs:element name="durationIndefinite" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceAction.durationIndefinite"/>
    <xs:element name="startDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceAction.startDateTime"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceControl" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="drProgramLevel" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.drProgramLevel"/>
    <xs:element name="drProgramMandatory" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.drProgramMandatory"/>
    <xs:element name="issuerID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.issuerID"/>
    <xs:element name="issuerTrackingID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.issuerTrackingID"/>
```

```
<xs:element name="priceSignal" type="m:FloatQuantity" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.priceSignal"/>
<xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.reason"/>
<xs:choice minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceControl.EndDeviceAction">
<xs:element name="PanDemandResponse" type="m:PanDemandResponse"
sawSDL:modelReference=""/>
<xs:element name="PanDisplay" type="m:PanDisplay"
sawSDL:modelReference=""/>
<xs:element name="PanPricing" type="m:PanPricing"
sawSDL:modelReference=""/>
</xs:choice>
<xs:element name="EndDeviceControlType"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.EndDeviceControlType">
<xs:complexType sawSDL:modelReference="">
<xs:attribute name="ref" type="xs:string"/>
</xs:complexType>
</xs:element>
<xs:element name="EndDeviceGroups" type="m:EndDeviceGroup" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceControl.EndDeviceGroups"/>
<xs:element name="EndDevices" type="m:EndDevice" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceControl.EndDevices"/>
<xs:element name="primaryDeviceTiming" type="m:EndDeviceTiming" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.primaryDeviceTiming"/>
<xs:element name="secondaryDeviceTiming" type="m:EndDeviceTiming" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceControl.secondaryDeviceTiming"/>
<xs:element name="UsagePointGroups" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceControl.UsagePointGroups"/>
<xs:element name="UsagePoints" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceControl.UsagePoints"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceControlType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceControlType">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="domain" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControlType.domain"/>
<xs:element name="eventOrAction" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControlType.eventOrAction"/>
<xs:element name="subDomain" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControlType.subDomain"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControlType.type"/>
<xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceGroup">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceInfo" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceInfo">
<xs:sequence/>
</xs:complexType>
<xs:complexType name="EndDeviceTiming" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceTiming">
<xs:sequence>
<xs:element name="duration" type="m:Minutes" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceTiming.duration"/>
<xs:element name="durationIndefinite" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceTiming.durationIndefinite"/>
```

```
        <xs:element name="randomisation" type="m:RandomisationKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceTiming.randomisation"/>
        <xs:element name="interval" type="m:DateTimeInterval" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceTiming.interval"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
    <xs:sequence>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
        <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="PanDemandResponse" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#PanDemandResponse">
    <xs:sequence>
        <xs:element name="avgLoadAdjustment" type="m:PerCent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.avgLoadAdjustment"/>
        <xs:element name="cancelControlMode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.cancelControlMode"/>
        <xs:element name="cancelDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.cancelDateTime"/>
        <xs:element name="cancelNow" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.cancelNow"/>
        <xs:element name="command" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceAction.command"/>
        <xs:element name="coolingOffset" type="m:Temperature" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.coolingOffset"/>
        <xs:element name="coolingSetpoint" type="m:Temperature" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.coolingSetpoint"/>
        <xs:element name="criticalityLevel" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.criticalityLevel"/>
        <xs:element name="duration" type="m:Minutes" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceAction.duration"/>
        <xs:element name="durationIndefinite" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceAction.durationIndefinite"/>
        <xs:element name="dutyCycle" type="m:PerCent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.dutyCycle"/>
        <xs:element name="enrollmentGroup" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.enrollmentGroup"/>
        <xs:element name="heatingOffset" type="m:Temperature" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.heatingOffset"/>
        <xs:element name="heatingSetpoint" type="m:Temperature" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.heatingSetpoint"/>
        <xs:element name="startDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceAction.startDateTime"/>
        <xs:element name="appliance" type="m:ControlledAppliance" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PanDemandResponse.appliance"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="PanDisplay" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PanDisplay">
    <xs:sequence>
```



```
        <xs:enumeration value="startAndEnd"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
      <xs:sequence/>
    </xs:complexType>
    <xs:simpleType name="TransmissionModeKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#TransmissionModeKind">
      <xs:restriction base="xs:string">
        <xs:enumeration value="anonymous"/>
        <xs:enumeration value="both"/>
        <xs:enumeration value="normal"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="Minutes" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Minutes">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="FloatQuantity" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#FloatQuantity">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="PerCent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PerCent">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="Money" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Money">
      <xs:restriction base="xs:decimal"/>
    </xs:simpleType>
    <xs:simpleType name="Temperature" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Temperature">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
  </xs:schema>
```

H.7 EndDeviceEvents

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/EndDeviceEvents#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/EndDeviceEvents#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="EndDeviceEvents" type="m:EndDeviceEvents"/>
  <xs:complexType name="EndDeviceEvents">
    <xs:sequence>
      <xs:element name="EndDeviceEvent" type="m:EndDeviceEvent" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="EndDeviceEventType" type="m:EndDeviceEventType" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Asset" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset">
```

```
<xs:sequence>
  <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
  <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEvent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceEvent">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
    <xs:element name="issuerID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.issuerID"/>
    <xs:element name="issuerTrackingID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.issuerTrackingID"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
    <xs:element name="severity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
    <xs:element name="userID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.userID"/>
    <xs:element name="Assets" type="m:Asset" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.Assets"/>
    <xs:element name="EndDeviceEventDetails" type="m:EndDeviceEventDetail" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceEvent.EndDeviceEventDetails"/>
    <xs:element name="EndDeviceEventType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceEvent.EndDeviceEventType">
      <xs:complexType sawSDL:modelReference="">
        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
    <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.UsagePoint"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEventDetail" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceEventDetail">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceEventDetail.name"/>
    <xs:element name="value" type="m:StringQuantity" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventDetail.value"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEventType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceEventType">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="domain" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventType.domain"/>
    <xs:element name="eventOrAction" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventType.eventOrAction"/>
    <xs:element name="subDomain" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventType.subDomain"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventType.type"/>
    <xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
</xs:sequence>
```

```

</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="StringQuantity" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#StringQuantity">
  <xs:restriction base="xs:string"/>
</xs:simpleType>
</xs:schema>

```

H.8 GetCustomerAccountConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetCustomerAccountConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetCustomerAccountConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="GetCustomerAccountConfig" type="m:GetCustomerAccountConfig"/>
  <xs:complexType name="GetCustomerAccountConfig">
    <xs:sequence>
      <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
    <xs:sequence>

```

```

        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="commercialIndustrial"/>
        <xs:enumeration value="energyServiceScheduler"/>
        <xs:enumeration value="energyServiceSupplier"/>
        <xs:enumeration value="internalUse"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="pumpingLoad"/>
        <xs:enumeration value="residential"/>
        <xs:enumeration value="residentialAndCommercial"/>
        <xs:enumeration value="residentialAndStreetlight"/>
        <xs:enumeration value="residentialFarmService"/>
        <xs:enumeration value="residentialStreetlightOthers"/>
        <xs:enumeration value="windMachine"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
    <xs:sequence>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
        <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceSupplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceSupplier">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="SupplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#SupplierKind">
```

```
<xs:restriction base="xs:string">
  <xs:enumeration value="other"/>
  <xs:enumeration value="retailer"/>
  <xs:enumeration value="utility"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>
```

H.9 GetCustomerAgreementConfig

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetCustomerAgreementConfig#"
xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetCustomerAgreementConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="GetCustomerAgreementConfig" type="m:GetCustomerAgreementConfig"/>
  <xs:complexType name="GetCustomerAgreementConfig">
    <xs:sequence>
      <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="PricingStructure" type="m:PricingStructure" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
```



```
</xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="commercialIndustrial"/>
    <xs:enumeration value="energyServiceScheduler"/>
    <xs:enumeration value="energyServiceSupplier"/>
    <xs:enumeration value="internalUse"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="pumpingLoad"/>
    <xs:enumeration value="residential"/>
    <xs:enumeration value="residentialAndCommercial"/>
    <xs:enumeration value="residentialAndStreetlight"/>
    <xs:enumeration value="residentialFarmService"/>
    <xs:enumeration value="residentialStreetlightOthers"/>
    <xs:enumeration value="windMachine"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PricingStructure" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.code"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceCategory" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="electricity"/>
    <xs:enumeration value="gas"/>
    <xs:enumeration value="heat"/>
  </xs:restriction>
</xs:simpleType>
```

```

        <xs:enumeration value="internet"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="rates"/>
        <xs:enumeration value="refuse"/>
        <xs:enumeration value="sewerage"/>
        <xs:enumeration value="time"/>
        <xs:enumeration value="tvLicence"/>
        <xs:enumeration value="water"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceSupplier" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceSupplier">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="SupplierKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#SupplierKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="other"/>
        <xs:enumeration value="retailer"/>
        <xs:enumeration value="utility"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

H.10 GetCustomerConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetCustomerConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetCustomerConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetCustomerConfig" type="m:GetCustomerConfig"/>
    <xs:complexType name="GetCustomerConfig">
        <xs:sequence>
            <xs:element name="Customer" type="m:Customer" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>

```



```
<xs:element name="kind" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind">
  <xs:simpleType sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerKind">
    <xs:restriction base="xs:string">
      <xs:enumeration value="commercialIndustrial"/>
      <xs:enumeration value="energyServiceScheduler"/>
      <xs:enumeration value="energyServiceSupplier"/>
      <xs:enumeration value="internalUse"/>
      <xs:enumeration value="other"/>
      <xs:enumeration value="pumpingLoad"/>
      <xs:enumeration value="residential"/>
      <xs:enumeration value="residentialAndCommercial"/>
      <xs:enumeration value="residentialAndStreetlight"/>
      <xs:enumeration value="residentialFarmService"/>
      <xs:enumeration value="residentialStreetlightOthers"/>
      <xs:enumeration value="windMachine"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
  <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
  <xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
      <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
      <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
      <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
      <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
      <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
```

```
</xs:sequence>  
</xs:complexType>  
</xs:schema>
```

H.11 GetEndDeviceConfig

```
<?xml version="1.0" encoding="UTF-8"?>  
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#" xmlns:m="http://iec.ch/TC57/2011/GetEndDeviceConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL" xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/GetEndDeviceConfig#" elementFormDefault="qualified" attributeFormDefault="unqualified">  
  <xs:element name="GetEndDeviceConfig" type="m:GetEndDeviceConfig"/>  
  <xs:complexType name="GetEndDeviceConfig">  
    <xs:sequence>  
      <xs:element name="Customer" type="m:Customer" minOccurs="0" maxOccurs="unbounded"/>  
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0" maxOccurs="unbounded"/>  
      <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0" maxOccurs="unbounded"/>  
      <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0" maxOccurs="unbounded"/>  
      <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0" maxOccurs="unbounded"/>  
      <xs:element name="Meter" type="m:Meter" minOccurs="0" maxOccurs="unbounded"/>  
      <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0" maxOccurs="unbounded"/>  
      <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0" maxOccurs="unbounded"/>  
      <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0" maxOccurs="unbounded"/>  
    </xs:sequence>  
  </xs:complexType>  
  <xs:complexType name="Customer" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer">  
    <xs:sequence>  
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>  
      <xs:element name="kind" type="m:CustomerKind" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>  
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>  
    </xs:sequence>  
  </xs:complexType>  
  <xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount">  
    <xs:sequence>  
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>  
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>  
    </xs:sequence>  
  </xs:complexType>  
  <xs:complexType name="CustomerAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement">  
    <xs:sequence>  
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>  
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>  
    </xs:sequence>  
  </xs:complexType>  
  <xs:simpleType name="CustomerKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerKind">  
    <xs:restriction base="xs:string">  
      <xs:enumeration value="commercialIndustrial"/>  
      <xs:enumeration value="energyServiceScheduler"/>  
      <xs:enumeration value="energyServiceSupplier"/>  
      <xs:enumeration value="internalUse"/>  
      <xs:enumeration value="other"/>  
      <xs:enumeration value="pumpingLoad"/>  
      <xs:enumeration value="residential"/>  
      <xs:enumeration value="residentialAndCommercial"/>  
    </xs:restriction>  
  </xs:simpleType>  
</xs:schema>
```

```
<xs:enumeration value="residentialAndStreetlight"/>
<xs:enumeration value="residentialFarmService"/>
<xs:enumeration value="residentialStreetlightOthers"/>
<xs:enumeration value="windMachine"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="EndDevice" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDevice">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrSystem" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.amrSystem"/>
    <xs:element name="isPan" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.isPan"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.type"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceGroup">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Meter">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrSystem" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.amrSystem"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
```

```

        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

H.12 GetEndDeviceControls

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetEndDeviceControls#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetEndDeviceControls#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetEndDeviceControls" type="m:GetEndDeviceControls"/>
    <xs:complexType name="GetEndDeviceControls">
        <xs:sequence>
            <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="EndDeviceControl" type="m:EndDeviceControl" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="EndDeviceControlType" type="m:EndDeviceControlType"
minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="Meter" type="m:Meter" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="TimeSchedule" type="m:TimeSchedule" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Customer" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>

```

```
<xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="commercialIndustrial"/>
    <xs:enumeration value="energyServiceScheduler"/>
    <xs:enumeration value="energyServiceSupplier"/>
    <xs:enumeration value="internalUse"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="pumpingLoad"/>
    <xs:enumeration value="residential"/>
    <xs:enumeration value="residentialAndCommercial"/>
    <xs:enumeration value="residentialAndStreetlight"/>
    <xs:enumeration value="residentialFarmService"/>
    <xs:enumeration value="residentialStreetlightOthers"/>
    <xs:enumeration value="windMachine"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DateTimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
    <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceControl" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceControl">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="issuerID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.issuerID"/>
    <xs:element name="issuerTrackingID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.issuerTrackingID"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceControl.reason"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceControlType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceControlType">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceGroup">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
```

```
</xs:complexType>
  <xs:complexType name="Meter" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Meter">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
    <xs:sequence>
      <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
      <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
      <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
      <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
      <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ServiceCategory" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceCategory">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="ServiceKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceKind">
    <xs:restriction base="xs:string">
      <xs:enumeration value="electricity"/>
      <xs:enumeration value="gas"/>
      <xs:enumeration value="heat"/>
      <xs:enumeration value="internet"/>
      <xs:enumeration value="other"/>
      <xs:enumeration value="rates"/>
      <xs:enumeration value="refuse"/>
      <xs:enumeration value="sewerage"/>
      <xs:enumeration value="time"/>
      <xs:enumeration value="tvLicence"/>
      <xs:enumeration value="water"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
```



```

    <xs:complexType name="TimeSchedule" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimeSchedule">
      <xs:sequence>
        <xs:element name="scheduleInterval" type="m:DateTimeInterval"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.scheduleInterval"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
  </xs:schema>

```

H.13 GetEndDeviceEvents

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetEndDeviceEvents#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetEndDeviceEvents#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="GetEndDeviceEvents" type="m:GetEndDeviceEvents"/>
  <xs:complexType name="GetEndDeviceEvents">
    <xs:sequence>
      <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDeviceEvent" type="m:EndDeviceEvent" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDeviceEventType" type="m:EndDeviceEventType" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="Meter" type="m:Meter" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="TimeSchedule" type="m:TimeSchedule" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>

```

```
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="commercialIndustrial"/>
    <xs:enumeration value="energyServiceScheduler"/>
    <xs:enumeration value="energyServiceSupplier"/>
    <xs:enumeration value="internalUse"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="pumpingLoad"/>
    <xs:enumeration value="residential"/>
    <xs:enumeration value="residentialAndCommercial"/>
    <xs:enumeration value="residentialAndStreetlight"/>
    <xs:enumeration value="residentialFarmService"/>
    <xs:enumeration value="residentialStreetlightOthers"/>
    <xs:enumeration value="windMachine"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DateTimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
    <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEvent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceEvent">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="issuerID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.issuerID"/>
    <xs:element name="issuerTrackingID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.issuerTrackingID"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
    <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEventType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceEventType">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceGroup">
  <xs:sequence>
```



```
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Meter">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
    <xs:sequence>
        <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
        <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
        <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
        <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceCategory" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceCategory">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="electricity"/>
        <xs:enumeration value="gas"/>
        <xs:enumeration value="heat"/>
        <xs:enumeration value="internet"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="rates"/>
        <xs:enumeration value="refuse"/>
        <xs:enumeration value="sewerage"/>
        <xs:enumeration value="time"/>
        <xs:enumeration value="tvLicence"/>
        <xs:enumeration value="water"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
```

```

        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="TimeSchedule" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimeSchedule">
    <xs:sequence>
        <xs:element name="scheduleInterval" type="m:DateTimeInterval"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.scheduleInterval"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

H.14 GetMeterConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetMeterConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/GetMeterConfig#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
    <xs:element name="GetMeterConfig" type="m:GetMeterConfig"/>
    <xs:complexType name="GetMeterConfig">
        <xs:sequence>
            <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="Meter" type="m:Meter" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Customer" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
        <xs:sequence>

```

```
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="commercialIndustrial"/>
        <xs:enumeration value="energyServiceScheduler"/>
        <xs:enumeration value="energyServiceSupplier"/>
        <xs:enumeration value="internalUse"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="pumpingLoad"/>
        <xs:enumeration value="residential"/>
        <xs:enumeration value="residentialAndCommercial"/>
        <xs:enumeration value="residentialAndStreetlight"/>
        <xs:enumeration value="residentialFarmService"/>
        <xs:enumeration value="residentialStreetlightOthers"/>
        <xs:enumeration value="windMachine"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="EndDeviceGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceGroup">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Meter">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="amrSystem" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.amrSystem"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
    <xs:sequence>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
        <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
    <xs:sequence>
```

```

        <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
        <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

H.15 GetMeterReadings

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetMeterReadings#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/GetMeterReadings#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
    <xs:element name="GetMeterReadings" type="m:GetMeterReadings"/>
    <xs:complexType name="GetMeterReadings">
        <xs:sequence>
            <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="MeterReadings" type="m:MeterReadings" minOccurs="0"/>
            <xs:element name="Reading" type="m:Reading" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="ReadingQuality" type="m:ReadingQuality" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="ReadingType" type="m:ReadingType" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="TimeSchedule" type="m:TimeSchedule" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="TransformerTank" type="m:TransformerTank" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CoincidentReading" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Reading">
        <xs:sequence>
            <xs:element name="reason" type="m:ReadingReasonKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Reading.reason"/>
            <xs:element name="source" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.source"/>
            <xs:element name="ReadingType" type="m:ReadingType"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Reading.ReadingType"/>
            <xs:element name="timePeriod" type="m:DateTimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.timePeriod"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#DateTimeInterval">

```

```
<xs:sequence>
  <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
  <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDevice" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDevice">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEvent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceEvent">
  <xs:sequence>
    <xs:element name="EndDeviceEventType" type="m:EndDeviceEventType"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.EndDeviceEventType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEventType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceEventType">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceGroup">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="MeterReadings" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#MeterReading">
  <xs:sequence>
    <xs:element name="isCoincidentTrigger" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.isCoincidentTrigger"/>
    <xs:element name="EndDeviceEvents" type="m:EndDeviceEvent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.EndDeviceEvents"/>
    <xs:element name="Meter" type="m:Meter" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.Meter"/>
    <xs:element name="Readings" type="m:CoincidentReading" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.Readings"/>
    <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.UsagePoint"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
```

```
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
<xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
<xs:sequence>
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Reading" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Reading">
<xs:sequence>
<xs:element name="reason" type="m:ReadingReasonKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Reading.reason"/>
<xs:element name="source" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.source"/>
<xs:element name="timePeriod" type="m:DateTimeInterval" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.timePeriod"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ReadingQuality" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingQuality">
<xs:sequence>
<xs:element name="ReadingQualityType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingQuality.ReadingQualityType">
<xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingQualityType">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="ReadingReasonKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingReasonKind">
<xs:restriction base="xs:string">
<xs:enumeration value="billing"/>
<xs:enumeration value="demandReset"/>
<xs:enumeration value="inquiry"/>
<xs:enumeration value="installation"/>
<xs:enumeration value="loadManagement"/>
<xs:enumeration value="loadResearch"/>
<xs:enumeration value="moveIn"/>
<xs:enumeration value="moveOut"/>
<xs:enumeration value="other"/>
<xs:enumeration value="removal"/>
<xs:enumeration value="serviceConnect"/>
<xs:enumeration value="serviceDisconnect"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="ReadingType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingType">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="TimeSchedule" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimeSchedule">
<xs:sequence>
<xs:element name="scheduleInterval" type="m:DateTimeInterval"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.scheduleInterval"/>
```



```

    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="TransformerTank" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TransformerTank">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointGroup">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>

```

H.16 GetServiceCategoryConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetServiceCategoryConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetServiceCategoryConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="GetServiceCategoryConfig" type="m:GetServiceCategoryConfig"/>
  <xs:complexType name="GetServiceCategoryConfig">
    <xs:sequence>
      <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
      <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
      <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
      <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
      <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>

```

```

        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceCategory" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceCategory">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="electricity"/>
        <xs:enumeration value="gas"/>
        <xs:enumeration value="heat"/>
        <xs:enumeration value="internet"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="rates"/>
        <xs:enumeration value="refuse"/>
        <xs:enumeration value="sewerage"/>
        <xs:enumeration value="time"/>
        <xs:enumeration value="tvLicence"/>
        <xs:enumeration value="water"/>
    </xs:restriction>
</xs:simpleType>
</xs:schema>

```

H.17 GetServiceLocationConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetServiceLocationConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetServiceLocationConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetServiceLocationConfig" type="m:GetServiceLocationConfig"/>
    <xs:complexType name="GetServiceLocationConfig">
        <xs:sequence>
            <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Customer" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
        <xs:sequence>

```



```

        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="commercialIndustrial"/>
        <xs:enumeration value="energyServiceScheduler"/>
        <xs:enumeration value="energyServiceSupplier"/>
        <xs:enumeration value="internalUse"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="pumpingLoad"/>
        <xs:enumeration value="residential"/>
        <xs:enumeration value="residentialAndCommercial"/>
        <xs:enumeration value="residentialAndStreetlight"/>
        <xs:enumeration value="residentialFarmService"/>
        <xs:enumeration value="residentialStreetlightOthers"/>
        <xs:enumeration value="windMachine"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
    <xs:sequence>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
        <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>

```

```

        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

H.18 GetServiceSupplierConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetServiceSupplierConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetServiceSupplierConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetServiceSupplierConfig" type="m:GetServiceSupplierConfig"/>
    <xs:complexType name="GetServiceSupplierConfig">
        <xs:sequence>
            <xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
        <xs:sequence>
            <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
            <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
        <xs:sequence>
            <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
            <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
            <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
        <xs:sequence>
            <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
            <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ServiceSupplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceSupplier">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="SupplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#SupplierKind">

```

```

        <xs:restriction base="xs:string">
            <xs:enumeration value="other"/>
            <xs:enumeration value="retailer"/>
            <xs:enumeration value="utility"/>
        </xs:restriction>
    </xs:simpleType>
</xs:schema>

```

H.19 GetUsagePointConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetUsagePointConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetUsagePointConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetUsagePointConfig" type="m:GetUsagePointConfig"/>
    <xs:complexType name="GetUsagePointConfig">
        <xs:sequence>
            <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="PricingStructure" type="m:PricingStructure" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="CustomerKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
        <xs:restriction base="xs:string">
            <xs:enumeration value="commercialIndustrial"/>

```

```
<xs:enumeration value="energyServiceScheduler"/>
<xs:enumeration value="energyServiceSupplier"/>
<xs:enumeration value="internalUse"/>
<xs:enumeration value="other"/>
<xs:enumeration value="pumpingLoad"/>
<xs:enumeration value="residential"/>
<xs:enumeration value="residentialAndCommercial"/>
<xs:enumeration value="residentialAndStreetlight"/>
<xs:enumeration value="residentialFarmService"/>
<xs:enumeration value="residentialStreetlightOthers"/>
<xs:enumeration value="windMachine"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PricingStructure" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#PricingStructure">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.code"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceCategory" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceCategory">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="electricity"/>
    <xs:enumeration value="gas"/>
    <xs:enumeration value="heat"/>
    <xs:enumeration value="internet"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="rates"/>
    <xs:enumeration value="refuse"/>
    <xs:enumeration value="sewerage"/>
    <xs:enumeration value="time"/>
  </xs:restriction>
</xs:simpleType>
```

```

        <xs:enumeration value="tvLicence"/>
        <xs:enumeration value="water"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceSupplier" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceSupplier">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="SupplierKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#SupplierKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="other"/>
        <xs:enumeration value="retailer"/>
        <xs:enumeration value="utility"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

H.20 GetUsagePointLocationConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetUsagePointLocationConfig#"
xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetUsagePointLocationConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetUsagePointLocationConfig" type="m:GetUsagePointLocationConfig"/>
    <xs:complexType name="GetUsagePointLocationConfig">
        <xs:sequence>
            <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
maxOccurs="unbounded"/>

```

```
<xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="commercialIndustrial"/>
    <xs:enumeration value="energyServiceScheduler"/>
    <xs:enumeration value="energyServiceSupplier"/>
    <xs:enumeration value="internalUse"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="pumpingLoad"/>
    <xs:enumeration value="residential"/>
    <xs:enumeration value="residentialAndCommercial"/>
    <xs:enumeration value="residentialAndStreetlight"/>
    <xs:enumeration value="residentialFarmService"/>
    <xs:enumeration value="residentialStreetlightOthers"/>
    <xs:enumeration value="windMachine"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
```



```
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceCategory" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceCategory">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="electricity"/>
    <xs:enumeration value="gas"/>
    <xs:enumeration value="heat"/>
    <xs:enumeration value="internet"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="rates"/>
    <xs:enumeration value="refuse"/>
    <xs:enumeration value="sewerage"/>
    <xs:enumeration value="time"/>
    <xs:enumeration value="tvLicence"/>
    <xs:enumeration value="water"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceSupplier" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceSupplier">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="SupplierKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#SupplierKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="other"/>
    <xs:enumeration value="retailer"/>
    <xs:enumeration value="utility"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
  <xs:sequence>
```

```

        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

H.21 MasterDataLinkageConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/MasterDataLinkageConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/MasterDataLinkageConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="MasterDataLinkageConfig" type="m:MasterDataLinkageConfig"/>
    <xs:complexType name="MasterDataLinkageConfig">
        <xs:sequence>
            <xs:element name="AuxiliaryAgreement" type="m:AuxiliaryAgreement" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="ComModule" type="m:ComModule" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="ConfigurationEvent" type="m:ConfigurationEvent" minOccurs="0"/>
            <xs:element name="Customer" type="m:Customer" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="Meter" type="m:Meter" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="PricingStructure" type="m:PricingStructure" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="TransformerTank" type="m:TransformerTank" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="UsagePointLocation" type="m:UsagePointLocation" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="AuxiliaryAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#AuxiliaryAgreement">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ComModule" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComModule">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ConfigurationEvent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConfigurationEvent">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
            <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
            <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
            <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>

```



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<xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
<xs:element name="severity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Customer" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDevice" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
<xs:sequence>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
<xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
<xs:sequence>
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
<xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
</xs:sequence>
</xs:complexType>
```

```
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PricingStructure" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceSupplier" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="TransformerTank" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TransformerTank">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointLocation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
```

```
</xs:schema>
```

H.22 MeterConfig

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/MeterConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/MeterConfig#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="MeterConfig" type="m:MeterConfig"/>
  <xs:complexType name="MeterConfig">
    <xs:sequence>
      <xs:element name="ComFunction" type="m:ComFunction" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ConnectDisconnectFunction" type="m:ConnectDisconnectFunction" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="Meter" type="m:Meter" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ReadingType" type="m:ReadingType" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="SimpleEndDeviceFunction" type="m:SimpleEndDeviceFunction" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ActivityRecord" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ActivityRecord">
    <xs:sequence>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
      <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
      <xs:element name="severity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
      <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="AssetModelUsageKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#AssetModelUsageKind">
    <xs:restriction base="xs:string">
      <xs:enumeration value="customerSubstation"/>
      <xs:enumeration value="distributionOverhead"/>
      <xs:enumeration value="distributionUnderground"/>
      <xs:enumeration value="other"/>
      <xs:enumeration value="streetlight"/>
      <xs:enumeration value="substation"/>
      <xs:enumeration value="transmission"/>
      <xs:enumeration value="unknown"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="Channel" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Channel">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Channel.isVirtual"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="ReadingType" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Channel.ReadingType">
        <xs:complexType sawSDL:modelReference="">
          <xs:attribute name="ref" type="xs:string"/>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="ComDirectionKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComDirectionKind">
    <xs:restriction base="xs:string">
      <xs:enumeration value="biDirectional"/>
      <xs:enumeration value="fromDevice"/>
      <xs:enumeration value="toDevice"/>
    </xs:restriction>
  </xs:simpleType>
```

```
<xs:complexType name="ComFunction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrAddress" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.amrAddress"/>
    <xs:element name="amrRouter" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.amrRouter"/>
    <xs:element name="configID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.configID"/>
    <xs:element name="direction" type="m:ComDirectionKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.direction"/>
    <xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
    <xs:element name="firmwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.firmwareID"/>
    <xs:element name="hardwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.hardwareID"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
    <xs:element name="programID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.programID"/>
    <xs:element name="technology" type="m:ComTechnologyKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.technology"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ComTechnologyKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComTechnologyKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="cellular"/>
    <xs:enumeration value="ethernet"/>
    <xs:enumeration value="homePlug"/>
    <xs:enumeration value="pager"/>
    <xs:enumeration value="phone"/>
    <xs:enumeration value="plc"/>
    <xs:enumeration value="rf"/>
    <xs:enumeration value="rfMesh"/>
    <xs:enumeration value="zigbee"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ConfigurationEvent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
    <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
    <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
    <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ConnectDisconnectFunction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
```

```
<xs:element name="eventCount" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.eventCount"/>
<xs:element name="isConnected" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isConnected"/>
<xs:element name="isDelayedDiscon" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isDelayedDiscon"/>
<xs:element name="isLocalAutoDisconOp" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isLocalAutoDisconOp"/>
<xs:element name="isLocalAutoReconOp" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isLocalAutoReconOp"/>
<xs:element name="isRemoteAutoDisconOp" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isRemoteAutoDisconOp"/>
<xs:element name="isRemoteAutoReconOp" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.isRemoteAutoReconOp"/>
<xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
<xs:element name="Names" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names">
  <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
      <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
      <xs:element name="NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType">
        <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
          <xs:sequence>
            <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
            <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
            <xs:element name="NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority">
              <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
                <xs:sequence>
                  <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
                  <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
                </xs:sequence>
              </xs:complexType>
            </xs:element>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="rcdInfo" type="m:RemoteConnectDisconnectInfo" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.rcdInfo"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="CorporateStandardKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CorporateStandardKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="experimental"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="standard"/>
    <xs:enumeration value="underEvaluation"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
    <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
  </xs:sequence>
```



```
</xs:complexType>
<xs:complexType name="ElectronicAddress" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress">
  <xs:sequence>
    <xs:element name="email1" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email1"/>
    <xs:element name="email2" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email2"/>
    <xs:element name="lan" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.lan"/>
    <xs:element name="mac" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.mac"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.password"/>
    <xs:element name="radio" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.radio"/>
    <xs:element name="userID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.userID"/>
    <xs:element name="web" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.web"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceCapability" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability">
  <xs:sequence>
    <xs:element name="autonomousDst" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.autonomousDst"/>
    <xs:element name="communication" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.communication"/>
    <xs:element name="connectDisconnect" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.connectDisconnect"/>
    <xs:element name="demandResponse" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.demandResponse"/>
    <xs:element name="electricMetering" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.electricMetering"/>
    <xs:element name="gasMetering" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.gasMetering"/>
    <xs:element name="metrology" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.metrology"/>
    <xs:element name="onRequestRead" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.onRequestRead"/>
    <xs:element name="outageHistory" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.outageHistory"/>
    <xs:element name="pressureCompensation" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.pressureCompensation"/>
    <xs:element name="pricingInfo" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.pricingInfo"/>
    <xs:element name="pulseOutput" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.pulseOutput"/>
    <xs:element name="relaysProgramming" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.relaysProgramming"/>
    <xs:element name="reverseFlow" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.reverseFlow"/>
    <xs:element name="superCompressibilityCompensation" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.superCompressibilityCompensation"/>
    <xs:element name="temperatureCompensation" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.temperatureCompensation"/>
    <xs:element name="textMessage" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.textMessage"/>
    <xs:element name="waterMetering" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.waterMetering"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="EndDeviceFunctionKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunctionKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="autonomousDst"/>
    <xs:enumeration value="demandResponse"/>
    <xs:enumeration value="electricMetering"/>
    <xs:enumeration value="gasMetering"/>
    <xs:enumeration value="metrology"/>
  </xs:restriction>
</xs:simpleType>

```



```
<xs:element name="ActivityRecords" type="m:ActivityRecord" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.ActivityRecords"/>
<xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.ConfigurationEvents"/>
<xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.electronicAddress"/>
<xs:choice minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.EndDeviceFunctions">
  <xs:element name="ComFunction" sawSDL:modelReference="">
    <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction">
      <xs:attribute name="ref" type="xs:string"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="ConnectDisconnectFunction" sawSDL:modelReference="">
    <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction">
      <xs:attribute name="ref" type="xs:string"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="SimpleEndDeviceFunction" sawSDL:modelReference="">
    <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SimpleEndDeviceFunction">
      <xs:attribute name="ref" type="xs:string"/>
    </xs:complexType>
  </xs:element>
</xs:choice>
<xs:element name="EndDeviceInfo" type="m:EndDeviceInfo" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.EndDeviceInfo"/>
<xs:element name="lifecycle" type="m:LifecycleDate" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lifecycle"/>
<xs:element name="MeterMultipliers" type="m:MeterMultiplier" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter.MeterMultipliers"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="Seals" type="m:Seal" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetContainer.Seals"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.status"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="MeterMultiplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplier">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:MeterMultiplierKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplier.kind"/>
    <xs:element name="value" type="xs:float" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplier.value"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="MeterMultiplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplierKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="ctRatio"/>
    <xs:enumeration value="kE"/>
    <xs:enumeration value="kH"/>
    <xs:enumeration value="kR"/>
    <xs:enumeration value="ptRatio"/>
    <xs:enumeration value="transformerRatio"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
```



```
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
<xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
<xs:sequence>
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ProductAssetModel" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ProductAssetModel">
<xs:sequence>
<xs:element name="corporateStandardKind" type="m:CorporateStandardKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ProductAssetModel.corporateStandardKind"/>
<xs:element name="modelName" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.modelName"/>
<xs:element name="modelVersion" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.modelVersion"/>
<xs:element name="usageKind" type="m:AssetModelUsageKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.usageKind"/>
<xs:element name="Manufacturer" type="m:Manufacturer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.Manufacturer"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="RationalNumber" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#RationalNumber">
<xs:sequence>
<xs:element name="denominator" type="xs:integer"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.denominator"/>
<xs:element name="numerator" type="xs:integer"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.numerator"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ReadingInterharmonic" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ReadingInterharmonic">
<xs:sequence>
<xs:element name="denominator" type="xs:integer"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.denominator"/>
<xs:element name="numerator" type="xs:integer"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.numerator"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ReadingType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingType">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="accumulation" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.accumulation"/>
<xs:element name="aggregate" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.aggregate"/>
<xs:element name="commodity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.commodity"/>
<xs:element name="consumptionTier" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.consumptionTier"/>
<xs:element name="cpp" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.cpp"/>
<xs:element name="currency" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.currency"/>
<xs:element name="flowDirection" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.flowDirection"/>
<xs:element name="macroPeriod" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.macroPeriod"/>
<xs:element name="measurementKind" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measurementKind"/>
<xs:element name="measuringPeriod" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measuringPeriod"/>
```

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<xs:element name="multiplier" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.multiplier"/>
<xs:element name="phases" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.phases"/>
<xs:element name="tou" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.tou"/>
<xs:element name="unit" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.unit"/>
<xs:element name="argument" type="m:RationalNumber" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.argument"/>
<xs:element name="interharmonic" type="m:ReadingInterharmonic" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.interharmonic"/>
<xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Register" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.isVirtual"/>
    <xs:element name="leftDigitCount" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.leftDigitCount"/>
    <xs:element name="rightDigitCount" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.rightDigitCount"/>
    <xs:element name="touTierName" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.touTierName"/>
    <xs:element name="Channels" type="m:Channel" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.Channels"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="touTier" type="m:TimeInterval" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.touTier"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="RemoteConnectDisconnectInfo"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo">
  <xs:sequence>
    <xs:element name="armedTimeout" type="m:Seconds" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.armedTimeout"/>
    <xs:element name="customerVoltageLimit" type="m:Voltage" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.customerVoltageLimit"/>
    <xs:element name="energyLimit" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.energyLimit"/>
    <xs:element name="energyUsageStartDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.energyUsageStartDateTime"/>
    <xs:element name="energyUsageWarning" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.energyUsageWarning"/>
    <xs:element name="isArmConnect" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.isArmConnect"/>
    <xs:element name="isArmDisconnect" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.isArmDisconnect"/>
    <xs:element name="isEnergyLimiting" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.isEnergyLimiting"/>
    <xs:element name="needsPowerLimitCheck" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.needsPowerLimitCheck"/>
    <xs:element name="needsVoltageLimitCheck" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.needsVoltageLimitCheck"/>
    <xs:element name="powerLimit" type="m:ActivePower" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.powerLimit"/>
    <xs:element name="usePushbutton" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.usePushbutton"/>
  </xs:sequence>
</xs:complexType>
```

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</xs:sequence>
</xs:complexType>
<xs:complexType name="Seal" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="appliedDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.appliedDateTime"/>
    <xs:element name="condition" type="m:SealConditionKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.condition"/>
    <xs:element name="kind" type="m:SealKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.kind"/>
    <xs:element name="sealNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.sealNumber"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="SealConditionKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SealConditionKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="broken"/>
    <xs:enumeration value="locked"/>
    <xs:enumeration value="missing"/>
    <xs:enumeration value="open"/>
    <xs:enumeration value="other"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="SealKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SealKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="lead"/>
    <xs:enumeration value="lock"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="steel"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="SimpleEndDeviceFunction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SimpleEndDeviceFunction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="configID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.configID"/>
    <xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
    <xs:element name="firmwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.firmwareID"/>
    <xs:element name="hardwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.hardwareID"/>
    <xs:element name="kind" type="m:EndDeviceFunctionKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SimpleEndDeviceFunction.kind"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
    <xs:element name="programID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.programID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="Registers" type="m:Register" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.Registers"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
```

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    <xs:complexType name="TimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeInterval">
      <xs:sequence>
        <xs:element name="end" type="xs:time" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeInterval.end"/>
        <xs:element name="start" type="xs:time" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeInterval.start"/>
      </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="RealEnergy" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RealEnergy">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="Voltage" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Voltage">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="CurrentFlow" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CurrentFlow">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="ActivePower" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivePower">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="Minutes" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Minutes">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="Seconds" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seconds">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="PerCent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PerCent">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
    <xs:simpleType name="Money" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Money">
      <xs:restriction base="xs:decimal"/>
    </xs:simpleType>
  </xs:schema>

```

H.23 MeterReadings

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/MeterReadings#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/MeterReadings#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="MeterReadings" type="m:MeterReadings"/>
  <xs:complexType name="MeterReadings">
    <xs:sequence>
      <xs:element name="EndDeviceEventType" type="m:EndDeviceEventType" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="MeterReading" type="m:MeterReading" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ReadingQualityType" type="m:ReadingQualityType" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="ReadingType" type="m:ReadingType" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Asset" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval">
    <xs:sequence>
      <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>

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<xs:element name="start" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEvent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="createdDateTime" type="xs:dateTime"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
<xs:element name="issuerID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.issuerID"/>
<xs:element name="issuerTrackingID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.issuerTrackingID"/>
<xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
<xs:element name="severity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
<xs:element name="userID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.userID"/>
<xs:element name="Assets" type="m:Asset" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.Assets"/>
<xs:element name="EndDeviceEventDetails" type="m:EndDeviceEventDetail" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.EndDeviceEventDetails"/>
<xs:element name="EndDeviceEventType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.EndDeviceEventType">
<xs:complexType sawSDL:modelReference="">
<xs:attribute name="ref" type="xs:string"/>
</xs:complexType>
</xs:element>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
<xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEvent.UsagePoint"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEventDetail" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventDetail">
<xs:sequence>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventDetail.name"/>
<xs:element name="value" type="m:StringQuantity" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventDetail.value"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceEventType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventType">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="domain" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventType.domain"/>
<xs:element name="eventOrAction" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventType.eventOrAction"/>
<xs:element name="subDomain" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventType.subDomain"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceEventType.type"/>
<xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="IntervalBlock" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IntervalBlock">
<xs:sequence>
<xs:element name="IntervalReadings" type="m:IntervalReading" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IntervalBlock.IntervalReadings"/>
<xs:element name="PendingCalculation" type="m:PendingCalculation" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IntervalBlock.PendingCalculation"/>
<xs:element name="ReadingType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IntervalBlock.ReadingType">
<xs:complexType sawSDL:modelReference="">
```



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        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="IntervalReading" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IntervalReading">
  <xs:sequence>
    <xs:element name="reportedDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.reportedDateTime"/>
    <xs:element name="source" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.source"/>
    <xs:element name="timeStamp" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeasurementValue.timeStamp"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.value"/>
    <xs:element name="ReadingQualities" type="m:ReadingQuality" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.ReadingQualities"/>
    <xs:element name="timePeriod" type="m:DateTimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.timePeriod"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.status"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="MeterReading" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading">
  <xs:sequence>
    <xs:element name="isCoincidentTrigger" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.isCoincidentTrigger"/>
    <xs:element name="EndDeviceEvents" type="m:EndDeviceEvent" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.EndDeviceEvents"/>
    <xs:element name="IntervalBlocks" type="m:IntervalBlock" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.IntervalBlocks"/>
    <xs:element name="Meter" type="m:Meter" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.Meter"/>
    <xs:element name="Readings" type="m:Reading" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.Readings"/>
    <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.UsagePoint"/>
    <xs:element name="valuesInterval" type="m:DateTimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading.valuesInterval"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
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<xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="PendingCalculation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PendingCalculation">
  <xs:sequence>
    <xs:element name="multiplyBeforeAdd" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PendingCalculation.multiplyBeforeAdd"/>
    <xs:element name="offset" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PendingCalculation.offset"/>
    <xs:element name="scalarDenominator" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PendingCalculation.scalarDenominator"/>
    <xs:element name="scalarFloat" type="xs:float" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PendingCalculation.scalarFloat"/>
    <xs:element name="scalarNumerator" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PendingCalculation.scalarNumerator"/>
    <xs:element name="ReadingType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PendingCalculation.ReadingType">
      <xs:complexType sawsdl:modelReference="">
        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="RationalNumber" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#RationalNumber">
  <xs:sequence>
    <xs:element name="denominator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.denominator"/>
    <xs:element name="numerator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.numerator"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Reading" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Reading">
  <xs:sequence>
    <xs:element name="reason" type="m:ReadingReasonKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Reading.reason"/>
    <xs:element name="reportedDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.reportedDateTime"/>
    <xs:element name="source" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.source"/>
    <xs:element name="timeStamp" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeasurementValue.timeStamp"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.value"/>
    <xs:element name="ReadingQualities" type="m:ReadingQuality" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.ReadingQualities"/>
    <xs:element name="ReadingType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Reading.ReadingType">
      <xs:complexType sawsdl:modelReference="">
        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="timePeriod" type="m:DateTimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.timePeriod"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ReadingInterharmonic" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ReadingInterharmonic">
  <xs:sequence>
    <xs:element name="denominator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.denominator"/>
    <xs:element name="numerator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.numerator"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ReadingQuality" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingQuality">
  <xs:sequence>
    <xs:element name="comment" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQuality.comment"/>
    <xs:element name="source" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQuality.source"/>
```

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<xs:element name="timeStamp" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQuality.timeStamp"/>
<xs:element name="ReadingQualityType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQuality.ReadingQualityType">
  <xs:complexType sawSDL:modelReference="">
    <xs:attribute name="ref" type="xs:string"/>
  </xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ReadingQualityType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQualityType">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="category" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQualityType.category"/>
    <xs:element name="subCategory" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQualityType.subCategory"/>
    <xs:element name="systemId" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQualityType.systemId"/>
    <xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ReadingReasonKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingReasonKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="billing"/>
    <xs:enumeration value="demandReset"/>
    <xs:enumeration value="inquiry"/>
    <xs:enumeration value="installation"/>
    <xs:enumeration value="loadManagement"/>
    <xs:enumeration value="loadResearch"/>
    <xs:enumeration value="moveIn"/>
    <xs:enumeration value="moveOut"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="removal"/>
    <xs:enumeration value="serviceConnect"/>
    <xs:enumeration value="serviceDisconnect"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ReadingType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="accumulation" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.accumulation"/>
    <xs:element name="aggregate" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.aggregate"/>
    <xs:element name="commodity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.commodity"/>
    <xs:element name="consumptionTier" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.consumptionTier"/>
    <xs:element name="cpp" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.cpp"/>
    <xs:element name="currency" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.currency"/>
    <xs:element name="flowDirection" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.flowDirection"/>
    <xs:element name="macroPeriod" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.macroPeriod"/>
    <xs:element name="measurementKind" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measurementKind"/>
    <xs:element name="measuringPeriod" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measuringPeriod"/>
    <xs:element name="multiplier" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.multiplier"/>
    <xs:element name="phases" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.phases"/>
    <xs:element name="tou" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.tou"/>
    <xs:element name="unit" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.unit"/>
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    <xs:element name="argument" type="m:RationalNumber" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.argument"/>
    <xs:element name="interharmonic" type="m:ReadingInterharmonic" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.interharmonic"/>
    <xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
  <xs:complexType name="Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status">
    <xs:sequence>
      <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
      <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
      <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
      <xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="UsagePoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="StringQuantity" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StringQuantity">
    <xs:restriction base="xs:string"/>
  </xs:simpleType>
</xs:schema>

```

H.24 ServiceCategoryConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/ServiceCategoryConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/ServiceCategoryConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="ServiceCategoryConfig" type="m:ServiceCategoryConfig"/>
  <xs:complexType name="ServiceCategoryConfig">
    <xs:sequence>
      <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ConfigurationEvent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
      <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
      <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
      <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
      <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
      <xs:element name="severity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
    </xs:sequence>

```

```
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceCategory" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceCategory">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
    <xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.ConfigurationEvents"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="electricity"/>
    <xs:enumeration value="gas"/>
    <xs:enumeration value="heat"/>
    <xs:enumeration value="internet"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="rates"/>
    <xs:enumeration value="refuse"/>
    <xs:enumeration value="sewerage"/>
    <xs:enumeration value="time"/>
    <xs:enumeration value="tvLicence"/>
    <xs:enumeration value="water"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="Status" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>
```

H.25 ServiceLocationConfig

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/ServiceLocationConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/ServiceLocationConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="ServiceLocationConfig" type="m:ServiceLocationConfig"/>
  <xs:complexType name="ServiceLocationConfig">
    <xs:sequence>
      <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ConfigurationEvent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
      <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
      <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
      <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
      <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
      <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CoordinateSystem" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CoordinateSystem">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="crsUrn" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CoordinateSystem.crsUrn"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ElectronicAddress" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress">
    <xs:sequence>
      <xs:element name="email1" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email1"/>
      <xs:element name="email2" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email2"/>
      <xs:element name="lan" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.lan"/>
      <xs:element name="mac" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.mac"/>
      <xs:element name="password" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.password"/>
      <xs:element name="radio" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.radio"/>
      <xs:element name="userID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.userID"/>
      <xs:element name="web" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.web"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
      <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

```
<xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PositionPoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint">
  <xs:sequence>
    <xs:element name="sequenceNumber" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.sequenceNumber"/>
    <xs:element name="xPosition" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.xPosition"/>
    <xs:element name="yPosition" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.yPosition"/>
    <xs:element name="zPosition" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.zPosition"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="accessMethod" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation.accessMethod"/>
    <xs:element name="direction" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.direction"/>
    <xs:element name="geoInfoReference" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.geoInfoReference"/>
    <xs:element name="needsInspection" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation.needsInspection"/>
    <xs:element name="siteAccessProblem" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation.siteAccessProblem"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.type"/>
    <xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.ConfigurationEvents"/>
    <xs:element name="CoordinateSystem" type="m:CoordinateSystem" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.CoordinateSystem"/>
    <xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.electronicAddress"/>
    <xs:element name="mainAddress" type="m:StreetAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.mainAddress"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="phone1" type="m:PhoneNumber" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.phone1"/>
    <xs:element name="phone2" type="m:PhoneNumber" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.phone2"/>
    <xs:element name="PositionPoints" type="m:PositionPoint" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.PositionPoints"/>
    <xs:element name="secondaryAddress" type="m:StreetAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.secondaryAddress"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.status"/>
  </xs:sequence>
</xs:complexType>
```

```
<xs:complexType name="Status" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="StreetAddress" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress">
  <xs:sequence>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.status"/>
    <xs:element name="streetDetail" type="m:StreetDetail" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.streetDetail"/>
    <xs:element name="townDetail" type="m:TownDetail" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.townDetail"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="StreetDetail" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail">
  <xs:sequence>
    <xs:element name="addressGeneral" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.addressGeneral"/>
    <xs:element name="buildingName" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.buildingName"/>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.code"/>
    <xs:element name="name" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.name"/>
    <xs:element name="number" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.number"/>
    <xs:element name="prefix" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.prefix"/>
    <xs:element name="suffix" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suffix"/>
    <xs:element name="suiteNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suiteNumber"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.type"/>
    <xs:element name="withinTownLimits" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.withinTownLimits"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="TelephoneNumber" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber">
  <xs:sequence>
    <xs:element name="areaCode" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.areaCode"/>
    <xs:element name="cityCode" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.cityCode"/>
    <xs:element name="countryCode" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.countryCode"/>
    <xs:element name="extension" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.extension"/>
    <xs:element name="localNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.localNumber"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="TownDetail" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail">
  <xs:sequence>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.code"/>
    <xs:element name="country" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.country"/>
    <xs:element name="name" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.name"/>
    <xs:element name="section" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.section"/>
  </xs:sequence>
</xs:complexType>
```



```
    <xs:element name="stateOrProvince" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.stateOrProvince"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>
```

H.26 ServiceSupplierConfig

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/ServiceSupplierConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/ServiceSupplierConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="ServiceSupplierConfig" type="m:ServiceSupplierConfig"/>
  <xs:complexType name="ServiceSupplierConfig">
    <xs:sequence>
      <xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ConfigurationEvent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConfigurationEvent">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
      <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
      <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
      <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
      <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
      <xs:element name="severity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ElectronicAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ElectronicAddress">
    <xs:sequence>
      <xs:element name="email1" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email1"/>
      <xs:element name="email2" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email2"/>
      <xs:element name="lan" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.lan"/>
      <xs:element name="mac" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.mac"/>
      <xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.password"/>
      <xs:element name="radio" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.radio"/>
      <xs:element name="userID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.userID"/>
      <xs:element name="web" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.web"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
      <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
      <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
  </xs:complexType>
```

```
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Organisation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.electronicAddress"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="phone1" type="m:TelephoneNumber" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.phone1"/>
    <xs:element name="phone2" type="m:TelephoneNumber" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.phone2"/>
    <xs:element name="postalAddress" type="m:PostalAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.postalAddress"/>
    <xs:element name="streetAddress" type="m:StreetAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.streetAddress"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PostalAddress" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PostalAddress">
  <xs:sequence>
    <xs:element name="poBox" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PostalAddress.poBox"/>
    <xs:element name="postalCode" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PostalAddress.postalCode"/>
    <xs:element name="streetDetail" type="m:StreetDetail" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PostalAddress.streetDetail"/>
    <xs:element name="townDetail" type="m:TownDetail" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PostalAddress.townDetail"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceSupplier" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="issuerIdentificationNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.issuerIdentificationNumber"/>
    <xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
    <xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#OrganisationRole.ConfigurationEvents"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="Organisation" type="m:Organisation" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#OrganisationRole.Organisation"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
  </xs:sequence>
</xs:complexType>
```

```
<xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
<xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
<xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="StreetAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress">
<xs:sequence>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.status"/>
<xs:element name="streetDetail" type="m:StreetDetail" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.streetDetail"/>
<xs:element name="townDetail" type="m:TownDetail" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.townDetail"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="StreetDetail" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail">
<xs:sequence>
<xs:element name="addressGeneral" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.addressGeneral"/>
<xs:element name="buildingName" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.buildingName"/>
<xs:element name="code" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.code"/>
<xs:element name="name" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.name"/>
<xs:element name="number" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.number"/>
<xs:element name="prefix" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.prefix"/>
<xs:element name="suffix" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suffix"/>
<xs:element name="suiteNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suiteNumber"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.type"/>
<xs:element name="withinTownLimits" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.withinTownLimits"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="SupplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SupplierKind">
<xs:restriction base="xs:string">
<xs:enumeration value="other"/>
<xs:enumeration value="retailer"/>
<xs:enumeration value="utility"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="TelephoneNumber" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber">
<xs:sequence>
<xs:element name="areaCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.areaCode"/>
<xs:element name="cityCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.cityCode"/>
<xs:element name="countryCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.countryCode"/>
<xs:element name="extension" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.extension"/>
<xs:element name="localNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.localNumber"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="TownDetail" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail">
<xs:sequence>
<xs:element name="code" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.code"/>
<xs:element name="country" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.country"/>
<xs:element name="name" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.name"/>
```



```

    <xs:element name="section" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.section"/>
    <xs:element name="stateOrProvince" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.stateOrProvince"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>

```

H.27 UsagePointConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/UsagePointConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/UsagePointConfig#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="UsagePointConfig" type="m:UsagePointConfig"/>
  <xs:complexType name="UsagePointConfig">
    <xs:sequence>
      <xs:element name="ReadingType" type="m:ReadingType" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="AmiBillingReadyKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#AmiBillingReadyKind">
    <xs:restriction base="xs:string">
      <xs:enumeration value="amiCapable"/>
      <xs:enumeration value="amiDisabled"/>
      <xs:enumeration value="billingApproved"/>
      <xs:enumeration value="enabled"/>
      <xs:enumeration value="nonAmi"/>
      <xs:enumeration value="nonMetered"/>
      <xs:enumeration value="operable"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="ConfigurationEvent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ConfigurationEvent">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
      <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
      <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
      <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
      <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
      <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="MetrologyRequirement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#MetrologyRequirement">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="reason" type="m:ReadingReasonKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MetrologyRequirement.reason"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="ReadingTypes" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MetrologyRequirement.ReadingTypes">
        <xs:complexType sawsdl:modelReference="">

```

```

        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="PhaseCode" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PhaseCode">
  <xs:restriction base="xs:string">
    <xs:enumeration value="A"/>
    <xs:enumeration value="AB"/>
    <xs:enumeration value="ABC"/>
    <xs:enumeration value="ABCN"/>
    <xs:enumeration value="ABN"/>
    <xs:enumeration value="AC"/>
    <xs:enumeration value="ACN"/>
    <xs:enumeration value="AN"/>
    <xs:enumeration value="B"/>
    <xs:enumeration value="BC"/>
    <xs:enumeration value="BCN"/>
    <xs:enumeration value="BN"/>
    <xs:enumeration value="C"/>
    <xs:enumeration value="CN"/>
    <xs:enumeration value="N"/>
    <xs:enumeration value="s1"/>
    <xs:enumeration value="s12"/>
    <xs:enumeration value="s12N"/>
    <xs:enumeration value="s1N"/>
    <xs:enumeration value="s2"/>
    <xs:enumeration value="s2N"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="PricingStructure" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.code"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="RationalNumber" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber">
  <xs:sequence>
    <xs:element name="denominator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.denominator"/>
  </xs:sequence>
</xs:complexType>

```

```
        <xs:element name="numerator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.numerator"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ReadingInterharmonic" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ReadingInterharmonic">
      <xs:sequence>
        <xs:element name="denominator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.denominator"/>
        <xs:element name="numerator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.numerator"/>
      </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="ReadingReasonKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ReadingReasonKind">
      <xs:restriction base="xs:string">
        <xs:enumeration value="billing"/>
        <xs:enumeration value="demandReset"/>
        <xs:enumeration value="inquiry"/>
        <xs:enumeration value="installation"/>
        <xs:enumeration value="loadManagement"/>
        <xs:enumeration value="loadResearch"/>
        <xs:enumeration value="moveIn"/>
        <xs:enumeration value="moveOut"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="removal"/>
        <xs:enumeration value="serviceConnect"/>
        <xs:enumeration value="serviceDisconnect"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="ReadingType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingType">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="accumulation" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.accumulation"/>
        <xs:element name="aggregate" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.aggregate"/>
        <xs:element name="commodity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.commodity"/>
        <xs:element name="consumptionTier" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.consumptionTier"/>
        <xs:element name="cpp" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.cpp"/>
        <xs:element name="currency" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.currency"/>
        <xs:element name="flowDirection" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.flowDirection"/>
        <xs:element name="macroPeriod" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.macroPeriod"/>
        <xs:element name="measurementKind" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measurementKind"/>
        <xs:element name="measuringPeriod" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measuringPeriod"/>
        <xs:element name="multiplier" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.multiplier"/>
        <xs:element name="phases" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.phases"/>
        <xs:element name="tou" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.tou"/>
        <xs:element name="unit" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.unit"/>
        <xs:element name="argument" type="m:RationalNumber" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.argument"/>
        <xs:element name="interharmonic" type="m:ReadingInterharmonic" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.interharmonic"/>
        <xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ServiceCategory" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceCategory">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
```

```
        <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="electricity"/>
        <xs:enumeration value="gas"/>
        <xs:enumeration value="heat"/>
        <xs:enumeration value="internet"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="rates"/>
        <xs:enumeration value="refuse"/>
        <xs:enumeration value="sewerage"/>
        <xs:enumeration value="time"/>
        <xs:enumeration value="tvLicence"/>
        <xs:enumeration value="water"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceMultiplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceMultiplier">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:ServiceMultiplierKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier.kind"/>
        <xs:element name="value" type="xs:float" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier.value"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceMultiplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceMultiplierKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="ctRatio"/>
        <xs:enumeration value="ptRatio"/>
        <xs:enumeration value="transformerRatio"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceSupplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceSupplier">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Status">
    <xs:sequence>
        <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
        <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
        <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
        <xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
    </xs:sequence>
</xs:complexType>
```

```
<xs:simpleType name="SupplierKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SupplierKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="other"/>
    <xs:enumeration value="retailer"/>
    <xs:enumeration value="utility"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="TransformerTank" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TransformerTank">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amiBillingReady" type="m:AmiBillingReadyKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.amiBillingReady"/>
    <xs:element name="checkBilling" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.checkBilling"/>
    <xs:element name="connectionState" type="m:UsagePointConnectedKind"
minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.connectionState"/>
    <xs:element name="estimatedLoad" type="m:CurrentFlow" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.estimatedLoad"/>
    <xs:element name="grounded" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.grounded"/>
    <xs:element name="isSdp" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.isSdp"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.isVirtual"/>
    <xs:element name="minimalUsageExpected" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.minimalUsageExpected"/>
    <xs:element name="nominalServiceVoltage" type="m:Voltage" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.nominalServiceVoltage"/>
    <xs:element name="outageRegion" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.outageRegion"/>
    <xs:element name="phaseCode" type="m:PhaseCode" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.phaseCode"/>
    <xs:element name="ratedCurrent" type="m:CurrentFlow" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ratedCurrent"/>
    <xs:element name="ratedPower" type="m:ActivePower" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ratedPower"/>
    <xs:element name="readCycle" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.readCycle"/>
    <xs:element name="readRoute" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.readRoute"/>
    <xs:element name="serviceDeliveryRemark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.serviceDeliveryRemark"/>
    <xs:element name="servicePriority" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.servicePriority"/>
    <xs:element name="ConfigurationEvents" type="m:ConfigurationEvent"
minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ConfigurationEvents"/>
    <xs:element name="Equipments" type="m:TransformerTank" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.Equipments"/>
    <xs:element name="MetrologyRequirements" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.MetrologyRequirements">
      <xs:complexType sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MetrologyRequirement">
        <xs:sequence>
          <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
          <xs:element name="reason" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MetrologyRequirement.reason">
            <xs:simpleType
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingReasonKind">
              <xs:restriction base="xs:string">
                <xs:enumeration
value="billing"/>
              </xs:restriction>
            </xs:simpleType>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:sequence>
</xs:complexType>
```



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        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
  <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  <xs:element name="PricingStructures" type="m:PricingStructure" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.PricingStructures"/>
  <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ServiceCategory"/>
  <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ServiceLocation"/>
  <xs:element name="ServiceMultipliers" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ServiceMultipliers">
    <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceMultiplier">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier.kind">
          <xs:simpleType
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplierKind">
            <xs:restriction base="xs:string">
              <xs:enumeration
value="ctRatio"/>
              <xs:enumeration
value="ptRatio"/>
              <xs:enumeration
value="transformerRatio"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
        <xs:element name="value" type="xs:float" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier.value"/>
        <xs:element name="Names" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#IdentifiedObject.Names">
          <xs:complexType
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
            <xs:sequence>
              <xs:element name="name"
type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
              <xs:element name="NameType"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType">
                <xs:complexType
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
                  <xs:sequence>
                    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
                    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
                    <xs:element name="NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority">
                      <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
                        <xs:sequence>
                          <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
                          <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
                        </xs:sequence>
                      </xs:complexType>
                    </xs:element>

```

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</xs:sequence>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:sequence>
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</xs:element>
<xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ServiceSupplier"/>
<xs:element name="UsagePointLocation" type="m:UsagePointLocation" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.UsagePointLocation"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="UsagePointConnectedKind"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointConnectedKind">
<xs:restriction base="xs:string">
<xs:enumeration value="connected"/>
<xs:enumeration value="logicallyDisconnected"/>
<xs:enumeration value="physicallyDisconnected"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="UsagePointLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointLocation">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="Voltage" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Voltage">
<xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="CurrentFlow" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CurrentFlow">
<xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="ActivePower" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ActivePower">
<xs:restriction base="xs:float"/>
</xs:simpleType>
</xs:schema>

```

H.28 UsagePointLocationConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/UsagePointLocationConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/UsagePointLocationConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
<xs:element name="UsagePointLocationConfig" type="m:UsagePointLocationConfig"/>
<xs:complexType name="UsagePointLocationConfig">
<xs:sequence>
<xs:element name="UsagePointLocation" type="m:UsagePointLocation" minOccurs="0"
maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ConfigurationEvent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConfigurationEvent">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
<xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
<xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>

```



```
<xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
<xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
<xs:element name="severity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CoordinateSystem" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CoordinateSystem">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="crsUrn" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CoordinateSystem.crsUrn"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ElectronicAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress">
<xs:sequence>
<xs:element name="email1" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email1"/>
<xs:element name="email2" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email2"/>
<xs:element name="lan" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.lan"/>
<xs:element name="mac" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.mac"/>
<xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.password"/>
<xs:element name="radio" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.radio"/>
<xs:element name="userID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.userID"/>
<xs:element name="web" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.web"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
<xs:sequence>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
<xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
<xs:sequence>
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
<xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
<xs:sequence>
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="PositionPoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint">
```

```
<xs:sequence>
  <xs:element name="sequenceNumber" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.sequenceNumber"/>
  <xs:element name="xPosition" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#PositionPoint.xPosition"/>
  <xs:element name="yPosition" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#PositionPoint.yPosition"/>
  <xs:element name="zPosition" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.zPosition"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="StreetAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#StreetAddress">
  <xs:sequence>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.status"/>
    <xs:element name="streetDetail" type="m:StreetDetail" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.streetDetail"/>
    <xs:element name="townDetail" type="m:TownDetail" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.townDetail"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="StreetDetail" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#StreetDetail">
  <xs:sequence>
    <xs:element name="addressGeneral" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.addressGeneral"/>
    <xs:element name="buildingName" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.buildingName"/>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.code"/>
    <xs:element name="name" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.name"/>
    <xs:element name="number" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.number"/>
    <xs:element name="prefix" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.prefix"/>
    <xs:element name="suffix" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suffix"/>
    <xs:element name="suiteNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suiteNumber"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.type"/>
    <xs:element name="withinTownLimits" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.withinTownLimits"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="TelephoneNumber" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TelephoneNumber">
  <xs:sequence>
    <xs:element name="areaCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.areaCode"/>
    <xs:element name="cityCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.cityCode"/>
    <xs:element name="countryCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.countryCode"/>
    <xs:element name="extension" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.extension"/>
    <xs:element name="localNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TelephoneNumber.localNumber"/>
  </xs:sequence>
</xs:complexType>
```

```
<xs:complexType name="TownDetail" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail">
  <xs:sequence>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.code"/>
    <xs:element name="country" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.country"/>
    <xs:element name="name" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.name"/>
    <xs:element name="section" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.section"/>
    <xs:element name="stateOrProvince" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.stateOrProvince"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointLocation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="accessMethod" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointLocation.accessMethod"/>
    <xs:element name="direction" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.direction"/>
    <xs:element name="geoInfoReference" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.geoInfoReference"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointLocation.remark"/>
    <xs:element name="siteAccessProblem" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointLocation.siteAccessProblem"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.type"/>
    <xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.ConfigurationEvents"/>
    <xs:element name="CoordinateSystem" type="m:CoordinateSystem" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.CoordinateSystem"/>
    <xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.electronicAddress"/>
    <xs:element name="mainAddress" type="m:StreetAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.mainAddress"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="phone1" type="m:TelephoneNumber" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.phone1"/>
    <xs:element name="phone2" type="m:TelephoneNumber" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.phone2"/>
    <xs:element name="PositionPoints" type="m:PositionPoint" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.PositionPoints"/>
    <xs:element name="secondaryAddress" type="m:StreetAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.secondaryAddress"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.status"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>
```

Annex I (informative)

XML schemas for message payloads

I.1 General

The purpose of this Annex I is to provide informative XML schemas for message payloads to augment the descriptions provided earlier in this document. These XML Schemas were defined using profile definitions within CIMTool. These schemas may be extended as needed for specific implementation needs. These schemas may be revised or promoted to a normative status in a future edition.

I.2 AuxiliaryAgreementConfig

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch C57/2011/AuxiliaryAgreementConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch
C57/2011/AuxiliaryAgreementConfig#" elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="AuxiliaryAgreementConfig" type="m:AuxiliaryAgreementConfig"/>
  <xs:complexType name="AuxiliaryAgreementConfig">
    <xs:sequence>
      <xs:element name="AuxiliaryAgreement" type="m:AuxiliaryAgreement" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="AccountMovement" sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#AccountMovement">
    <xs:sequence>
      <xs:element name="amount" type="m:Money" minOccurs="0" sawSDL:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AccountMovement.amount"/>
      <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AccountMovement.dateTime"/>
      <xs:element name="reason" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AccountMovement.reason"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="AccountingUnit" sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#AccountingUnit">
    <xs:sequence>
      <xs:element name="energyUnit" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AccountingUnit.energyUnit"/>
      <xs:element name="monetaryUnit" type="m:Currency" minOccurs="0"
sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AccountingUnit.monetaryUnit"/>
      <xs:element name="multiplier" type="m:UnitMultiplier" minOccurs="0"
sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AccountingUnit.multiplier"/>
      <xs:element name="value" type="xs:float" minOccurs="0" sawSDL:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AccountingUnit.value"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="AuxiliaryAccount" sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#AuxiliaryAccount">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="balance" type="m:Money" minOccurs="0" sawSDL:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AuxiliaryAccount.balance"/>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Document.createdDateTime"/>
      <xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
      <xs:element name="principleAmount" type="m:Money" minOccurs="0"
sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AuxiliaryAccount.principleAmount"/>
      <xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Document.revisionNumber"/>
      <xs:element name="subject" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.subject"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

```
<xs:element name="title" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.title"/>
<xs:element name="type" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.type"/>
<xs:element name="Charges" type="m:Charge" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AuxiliaryAccount.Charges"/>
<xs:element name="docStatus" type="m:Status" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.docStatus"/>
<xs:element name="due" type="m:Due" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AuxiliaryAccount.due"/>
<xs:element name="lastCredit" type="m:AccountMovement" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AuxiliaryAccount.lastCredit"/>
<xs:element name="lastDebit" type="m:AccountMovement" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AuxiliaryAccount.lastDebit"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.status"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="AuxiliaryAgreement" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#AuxiliaryAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="arrearsInterest" type="m:PerCent" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AuxiliaryAgreement.arrearsInterest"/>
    <xs:element name="auxCycle" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AuxiliaryAgreement.auxCycle"/>
    <xs:element name="auxPriorityCode" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AuxiliaryAgreement.auxPriorityCode"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Document.createdDateTime"/>
    <xs:element name="fixedAmount" type="m:Money" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AuxiliaryAgreement.fixedAmount"/>
    <xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
    <xs:element name="minAmount" type="m:Money" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AuxiliaryAgreement.minAmount"/>
    <xs:element name="payCycle" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AuxiliaryAgreement.payCycle"/>
    <xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Document.revisionNumber"/>
    <xs:element name="signDate" type="xs:date" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Agreement.signDate"/>
    <xs:element name="subject" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.subject"/>
    <xs:element name="subType" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#AuxiliaryAgreement.subType"/>
    <xs:element name="title" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.title"/>
    <xs:element name="type" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.type"/>
    <xs:element name="vendPortion" type="m:PerCent" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#AuxiliaryAgreement.vendPortion"/>
    <xs:element name="vendPortionArrear" type="m:PerCent" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#AuxiliaryAgreement.vendPortionArrear"/>
    <xs:element name="AuxiliaryAccounts" type="m:AuxiliaryAccount" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#AuxiliaryAgreement.AuxiliaryAccounts"/>
    <xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Document.ConfigurationEvents"/>
    <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#AuxiliaryAgreement.CustomerAgreement"/>
    <xs:element name="docStatus" type="m:Status" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.docStatus"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="status" type="m:Status" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Document.status"/>
    <xs:element name="validityInterval" type="m:DateTimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Agreement.validityInterval"/>
  </xs:sequence>
</xs:complexType>
```



```
<xs:complexType name="Charge" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#Charge">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ChargeKind" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Charge.kind"/>
    <xs:element name="variablePortion" type="m:PerCent" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Charge.variablePortion"/>
    <xs:element name="ChildCharges" type="m:ChildCharge" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Charge.ChildCharges"/>
    <xs:element name="fixedPortion" type="m:AccountingUnit" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Charge.fixedPortion"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ChargeKind" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#ChargeKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="auxiliaryCharge"/>
    <xs:enumeration value="consumptionCharge"/>
    <xs:enumeration value="demandCharge"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="taxCharge"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ChildCharge" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#Charge">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ChargeKind" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Charge.kind"/>
    <xs:element name="variablePortion" type="m:PerCent" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Charge.variablePortion"/>
    <xs:element name="fixedPortion" type="m:AccountingUnit" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Charge.fixedPortion"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ConfigurationEvent" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#ConfigurationEvent">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
    <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#ConfigurationEvent.effectiveDateTime"/>
    <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
    <xs:element name="reason" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
    <xs:element name="severity" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
    <xs:element name="type" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#ActivityRecord.type"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="status" type="m:Status" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#ActivityRecord.status"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="Currency" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#Currency">
  <xs:restriction base="xs:string">
    <xs:enumeration value="AUD"/>
    <xs:enumeration value="CAD"/>
    <xs:enumeration value="CHF"/>
    <xs:enumeration value="CNY"/>
    <xs:enumeration value="DKK"/>
  </xs:restriction>
</xs:simpleType>
```

```
<xs:enumeration value="EUR"/>
<xs:enumeration value="GBP"/>
<xs:enumeration value="INR"/>
<xs:enumeration value="JPY"/>
<xs:enumeration value="NOK"/>
<xs:enumeration value="RUR"/>
<xs:enumeration value="SEK"/>
<xs:enumeration value="USD"/>
<xs:enumeration value="other"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#CustomerAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#DateTimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:dateTime" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
    <xs:element name="start" type="xs:dateTime" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Due" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Due">
  <xs:sequence>
    <xs:element name="arrear" type="m:Money" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Due.arrear"/>
    <xs:element name="charges" type="m:Money" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Due.charges"/>
    <xs:element name="current" type="m:Money" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Due.current"/>
    <xs:element name="interest" type="m:Money" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Due.interest"/>
    <xs:element name="principle" type="m:Money" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Due.principle"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Status.dateTime"/>
  </xs:sequence>
</xs:complexType>
</xs:sequence>
</xs:complexType>
```

```

    <xs:element name="reason" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch
C57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="UnitMultiplier" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#UnitMultiplier">
  <xs:restriction base="xs:string">
    <xs:enumeration value="G"/>
    <xs:enumeration value="M"/>
    <xs:enumeration value="T"/>
    <xs:enumeration value="c"/>
    <xs:enumeration value="d"/>
    <xs:enumeration value="k"/>
    <xs:enumeration value="m"/>
    <xs:enumeration value="micro"/>
    <xs:enumeration value="n"/>
    <xs:enumeration value="none"/>
    <xs:enumeration value="p"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="RealEnergy" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#RealEnergy">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="PerCent" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-
cim15#PerCent">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="Money" sawsdl:modelReference="http://iec.ch C57/2010/CIM-schema-cim15#Money">
  <xs:restriction base="xs:decimal"/>
</xs:simpleType>
</xs:schema>

```

I.3 ComModuleConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/ComModuleConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/ComModuleConfig#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="ComModuleConfig" type="m:ComModuleConfig"/>
  <xs:complexType name="ComModuleConfig">
    <xs:sequence>
      <xs:element name="ComFunction" type="m:ComFunction" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ComModule" type="m:ComModule" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ActivityRecord" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ActivityRecord">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
      <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
      <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="AssetModelUsageKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#AssetModelUsageKind">
    <xs:restriction base="xs:string">

```



```
<xs:enumeration value="customerSubstation"/>
<xs:enumeration value="distributionOverhead"/>
<xs:enumeration value="distributionUnderground"/>
<xs:enumeration value="other"/>
<xs:enumeration value="streetlight"/>
<xs:enumeration value="substation"/>
<xs:enumeration value="transmission"/>
<xs:enumeration value="unknown"/>
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="ComDirectionKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComDirectionKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="biDirectional"/>
    <xs:enumeration value="fromDevice"/>
    <xs:enumeration value="toDevice"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ComFunction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComFunction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrAddress" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.amrAddress"/>
    <xs:element name="amrRouter" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.amrRouter"/>
    <xs:element name="configID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.configID"/>
    <xs:element name="direction" type="m:ComDirectionKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.direction"/>
    <xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
    <xs:element name="firmwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.firmwareID"/>
    <xs:element name="hardwareID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.hardwareID"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
    <xs:element name="programID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.programID"/>
    <xs:element name="technology" type="m:ComTechnologyKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.technology"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ComModule" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComModule">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrSystem" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComModule.amrSystem"/>
    <xs:element name="initialCondition" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialCondition"/>
    <xs:element name="initialLossOfLife" type="m:PerCent" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialLossOfLife"/>
    <xs:element name="lotNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lotNumber"/>
    <xs:element name="purchasePrice" type="m:Money" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.purchasePrice"/>
    <xs:element name="serialNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.serialNumber"/>
    <xs:element name="supportsAutonomousDst" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComModule.supportsAutonomousDst"/>
    <xs:element name="timeZoneOffset" type="m:Minutes" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComModule.timeZoneOffset"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.type"/>
    <xs:element name="utcNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.utcNumber"/>
    <xs:element name="ActivityRecords" type="m:ActivityRecord" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.ActivityRecords"/>
    <xs:element name="AssetInfo" type="m:EndDeviceInfo" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.AssetInfo"/>
```

```
<xs:element name="ComFunctions" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComModule.ComFunctions">
  <xs:complexType sawSDL:modelReference="">
    <xs:attribute name="ref" type="xs:string"/>
  </xs:complexType>
</xs:element>
<xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.ConfigurationEvents"/>
  <xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.electronicAddress"/>
  <xs:element name="lifecycle" type="m:LifecycleDate" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lifecycle"/>
  <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.status"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="ComTechnologyKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComTechnologyKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="cellular"/>
    <xs:enumeration value="ethernet"/>
    <xs:enumeration value="homePlug"/>
    <xs:enumeration value="pager"/>
    <xs:enumeration value="phone"/>
    <xs:enumeration value="plc"/>
    <xs:enumeration value="rf"/>
    <xs:enumeration value="rfMesh"/>
    <xs:enumeration value="zigbee"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ConfigurationEvent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConfigurationEvent">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
    <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConfigurationEvent.effectiveDateTime"/>
    <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
    <xs:element name="severity" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="CorporateStandardKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CorporateStandardKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="experimental"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="standard"/>
    <xs:enumeration value="underEvaluation"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ElectronicAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ElectronicAddress">
  <xs:sequence>
    <xs:element name="email1" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email1"/>
    <xs:element name="email2" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email2"/>
    <xs:element name="lan" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.lan"/>
  </xs:sequence>
</xs:complexType>
</xs:element>
```

```
<xs:element name="mac" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.mac"/>
<xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.password"/>
<xs:element name="radio" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.radio"/>
<xs:element name="userID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.userID"/>
<xs:element name="web" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.web"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceInfo" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo">
  <xs:sequence>
    <xs:element name="AssetModel" type="m:ProductAssetModel" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetInfo.AssetModel"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="LifecycleDate" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate">
  <xs:sequence>
    <xs:element name="installationDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.installationDate"/>
    <xs:element name="manufacturedDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.manufacturedDate"/>
    <xs:element name="purchaseDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.purchaseDate"/>
    <xs:element name="receivedDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.receivedDate"/>
    <xs:element name="removalDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.removalDate"/>
    <xs:element name="retiredDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.retiredDate"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Manufacturer" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Manufacturer">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ProductAssetModel" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel">
  <xs:sequence>
```

```

    <xs:element name="corporateStandardKind" type="m:CorporateStandardKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ProductAssetModel.corporateStandardKind"/>
    <xs:element name="modelNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.modelNumber"/>
    <xs:element name="modelVersion" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.modelVersion"/>
    <xs:element name="usageKind" type="m:AssetModelUsageKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.usageKind"/>
    <xs:element name="Manufacturer" type="m:Manufacturer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.Manufacturer"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="Minutes" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Minutes">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="PerCent" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PerCent">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="Money" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Money">
  <xs:restriction base="xs:decimal"/>
</xs:simpleType>
</xs:schema>

```

I.4 CustomerMeterDataSet

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/CustomerMeterDataSet#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/CustomerMeterDataSet#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="CustomerMeterDataSet" type="m:CustomerMeterDataSet"/>
  <xs:complexType name="CustomerMeterDataSet">
    <xs:sequence>
      <xs:element name="Meter" type="m:Meter" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ReadingType" type="m:ReadingType" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="AccountingUnit" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#AccountingUnit">
    <xs:sequence>
      <xs:element name="energyUnit" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AccountingUnit.energyUnit"/>
      <xs:element name="monetaryUnit" type="m:Currency" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AccountingUnit.monetaryUnit"/>
      <xs:element name="multiplier" type="m:UnitMultiplier" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AccountingUnit.multiplier"/>
      <xs:element name="value" type="xs:float" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#AccountingUnit.value"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="AmiBillingReadyKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#AmiBillingReadyKind">
    <xs:restriction base="xs:string">
      <xs:enumeration value="amiCapable"/>
      <xs:enumeration value="amiDisabled"/>
      <xs:enumeration value="billingApproved"/>
      <xs:enumeration value="enabled"/>
    </xs:restriction>
  </xs:simpleType>

```

```
<xs:enumeration value="nonAmi"/>
<xs:enumeration value="nonMetered"/>
<xs:enumeration value="operable"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="AssetInfo" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetInfo">
  <xs:sequence>
    <xs:element name="AssetModel" type="m:ProductAssetModel" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetInfo.AssetModel"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="AssetModelUsageKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetModelUsageKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="customerSubstation"/>
    <xs:enumeration value="distributionOverhead"/>
    <xs:enumeration value="distributionUnderground"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="streetlight"/>
    <xs:enumeration value="substation"/>
    <xs:enumeration value="transmission"/>
    <xs:enumeration value="unknown"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="Channel" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Channel">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Channel.isVirtual"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="ReadingType" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Channel.ReadingType">
      <xs:complexType sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType">
        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Charge" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ChargeKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.kind"/>
    <xs:element name="variablePortion" type="m:PerCent"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.variablePortion"/>
    <xs:element name="ChildCharges" type="m:ChildCharge" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.ChildCharges"/>
    <xs:element name="fixedPortion" type="m:AccountingUnit" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.fixedPortion"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ChargeKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ChargeKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="auxiliaryCharge"/>
    <xs:enumeration value="consumptionCharge"/>
    <xs:enumeration value="demandCharge"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="taxCharge"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ChildCharge" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ChargeKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.kind"/>
```



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<xs:element name="variablePortion" type="m:PerCent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.variablePortion"/>
<xs:element name="fixedPortion" type="m:AccountingUnit"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.fixedPortion"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="ComDirectionKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComDirectionKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="biDirectional"/>
    <xs:enumeration value="fromDevice"/>
    <xs:enumeration value="toDevice"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ComFunction" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComFunction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrAddress" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.amrAddress"/>
    <xs:element name="amrRouter" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.amrRouter"/>
    <xs:element name="configID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.configID"/>
    <xs:element name="direction" type="m:ComDirectionKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.direction"/>
    <xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
    <xs:element name="firmwareID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.firmwareID"/>
    <xs:element name="hardwareID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.hardwareID"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
    <xs:element name="programID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.programID"/>
    <xs:element name="technology" type="m:ComTechnologyKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction.technology"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ComModule" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComModule">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrSystem" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComModule.amrSystem"/>
    <xs:element name="initialCondition" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialCondition"/>
    <xs:element name="initialLossOfLife" type="m:PerCent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialLossOfLife"/>
    <xs:element name="lotNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lotNumber"/>
    <xs:element name="purchasePrice" type="m:Money" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.purchasePrice"/>
    <xs:element name="serialNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.serialNumber"/>
    <xs:element name="supportsAutonomousDst" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComModule.supportsAutonomousDst"/>
    <xs:element name="timeZoneOffset" type="m:Minutes" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComModule.timeZoneOffset"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.type"/>
    <xs:element name="utcNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.utcNumber"/>
    <xs:element name="AssetInfo" type="m:AssetInfo" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.AssetInfo"/>
    <xs:element name="ComFunctions" type="m:ComFunction" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComModule.ComFunctions"/>
    <xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.electronicAddress"/>
```

```
<xs:element name="lifecycle" type="m:LifecycleDate" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lifecycle"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.status"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="ComTechnologyKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComTechnologyKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="cellular"/>
    <xs:enumeration value="ethernet"/>
    <xs:enumeration value="homePlug"/>
    <xs:enumeration value="pager"/>
    <xs:enumeration value="phone"/>
    <xs:enumeration value="plc"/>
    <xs:enumeration value="rf"/>
    <xs:enumeration value="rfMesh"/>
    <xs:enumeration value="zigbee"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ConnectDisconnectFunction" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ConnectDisconnectFunction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
    <xs:element name="eventCount" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConnectDisconnectFunction.eventCount"/>
    <xs:element name="isConnected" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConnectDisconnectFunction.isConnected"/>
    <xs:element name="isDelayedDiscon" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConnectDisconnectFunction.isDelayedDiscon"/>
    <xs:element name="isLocalAutoDisconOp" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConnectDisconnectFunction.isLocalAutoDisconOp"/>
    <xs:element name="isLocalAutoReconOp" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConnectDisconnectFunction.isLocalAutoReconOp"/>
    <xs:element name="isRemoteAutoDisconOp" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConnectDisconnectFunction.isRemoteAutoDisconOp"/>
    <xs:element name="isRemoteAutoReconOp" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConnectDisconnectFunction.isRemoteAutoReconOp"/>
    <xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="rcdInfo" type="m:RemoteConnectDisconnectInfo" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction.rcdInfo"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ConsumptionTariffInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ConsumptionTariffInterval">
  <xs:sequence>
    <xs:element name="sequenceNumber" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConsumptionTariffInterval.sequenceNumber"/>
    <xs:element name="startValue" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConsumptionTariffInterval.startValue"/>
    <xs:element name="Charges" type="m:Charge" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConsumptionTariffInterval.Charges"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CoordinateSystem" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CoordinateSystem">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
```

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<xs:element name="crsUrn" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CoordinateSystem.crsUrn"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="CorporateStandardKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CorporateStandardKind">
<xs:restriction base="xs:string">
<xs:enumeration value="experimental"/>
<xs:enumeration value="other"/>
<xs:enumeration value="standard"/>
<xs:enumeration value="underEvaluation"/>
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="Currency" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Currency">
<xs:restriction base="xs:string">
<xs:enumeration value="AUD"/>
<xs:enumeration value="CAD"/>
<xs:enumeration value="CHF"/>
<xs:enumeration value="CNY"/>
<xs:enumeration value="DKK"/>
<xs:enumeration value="EUR"/>
<xs:enumeration value="GBP"/>
<xs:enumeration value="INR"/>
<xs:enumeration value="JPY"/>
<xs:enumeration value="NOK"/>
<xs:enumeration value="RUR"/>
<xs:enumeration value="SEK"/>
<xs:enumeration value="USD"/>
<xs:enumeration value="other"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="Customer" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
<xs:element name="pucNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.pucNumber"/>
<xs:element name="specialNeed" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.specialNeed"/>
<xs:element name="vip" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.vip"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="Organisation" type="m:Organisation" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#OrganisationRole.Organisation"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.status"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerAccount">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="billingCycle" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount.billingCycle"/>
<xs:element name="budgetBill" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount.budgetBill"/>
<xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
<xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
<xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
<xs:element name="subject" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
<xs:element name="title" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
```



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<xs:element name="docStatus" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
    <xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
    <xs:element name="loadMgmt" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement.loadMgmt"/>
    <xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
    <xs:element name="signDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Agreement.signDate"/>
    <xs:element name="subject" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
    <xs:element name="title" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
    <xs:element name="Customer" type="m:Customer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement.Customer"/>
    <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement.CustomerAccount"/>
    <xs:element name="docStatus" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement.ServiceCategory"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
    <xs:element name="validityInterval" type="m:DateTimeInterval" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Agreement.validityInterval"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="commercialIndustrial"/>
    <xs:enumeration value="energyServiceScheduler"/>
    <xs:enumeration value="energyServiceSupplier"/>
    <xs:enumeration value="internalUse"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="pumpingLoad"/>
    <xs:enumeration value="residential"/>
    <xs:enumeration value="residentialAndCommercial"/>
    <xs:enumeration value="residentialAndStreetlight"/>
    <xs:enumeration value="residentialFarmService"/>
    <xs:enumeration value="residentialStreetlightOthers"/>
    <xs:enumeration value="windMachine"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#DateTimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
    <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ElectronicAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ElectronicAddress">
  <xs:sequence>
    <xs:element name="email1" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email1"/>
```

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<xs:element name="email2" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.email2"/>
<xs:element name="lan" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.lan"/>
<xs:element name="mac" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.mac"/>
<xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.password"/>
<xs:element name="radio" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.radio"/>
<xs:element name="userID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.userID"/>
<xs:element name="web" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ElectronicAddress.web"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDevice" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrSystem" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.amrSystem"/>
    <xs:element name="initialCondition" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialCondition"/>
    <xs:element name="initialLossOfLife" type="m:PerCent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialLossOfLife"/>
    <xs:element name="installCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.installCode"/>
    <xs:element name="isPan" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.isPan"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.isVirtual"/>
    <xs:element name="lotNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lotNumber"/>
    <xs:element name="purchasePrice" type="m:Money" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.purchasePrice"/>
    <xs:element name="serialNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.serialNumber"/>
    <xs:element name="timeZoneOffset" type="m:Minutes" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.timeZoneOffset"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.type"/>
    <xs:element name="utcNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.utcNumber"/>
    <xs:choice minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.EndDeviceFunctions">
      <xs:element name="ComFunction" sawSDL:modelReference="">
        <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ComFunction">
          <xs:attribute name="ref" type="xs:string"/>
        </xs:complexType>
      </xs:element>
      <xs:element name="ConnectDisconnectFunction" sawSDL:modelReference="">
        <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConnectDisconnectFunction">
          <xs:attribute name="ref" type="xs:string"/>
        </xs:complexType>
      </xs:element>
      <xs:element name="SimpleEndDeviceFunction" sawSDL:modelReference="">
        <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SimpleEndDeviceFunction">
          <xs:attribute name="ref" type="xs:string"/>
        </xs:complexType>
      </xs:element>
    </xs:choice>
    <xs:element name="EndDeviceInfo" type="m:EndDeviceInfo" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.EndDeviceInfo"/>
    <xs:element name="lifecycle" type="m:LifecycleDate" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lifecycle"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="Seals" type="m:Seal" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetContainer.Seals"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.status"/>
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</xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceCapability" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceCapability">
  <xs:sequence>
    <xs:element name="autonomousDst" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.autonomousDst"/>
    <xs:element name="communication" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.communication"/>
    <xs:element name="connectDisconnect" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.connectDisconnect"/>
    <xs:element name="demandResponse" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.demandResponse"/>
    <xs:element name="electricMetering" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.electricMetering"/>
    <xs:element name="gasMetering" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.gasMetering"/>
    <xs:element name="metrology" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.metrology"/>
    <xs:element name="onRequestRead" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.onRequestRead"/>
    <xs:element name="outageHistory" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.outageHistory"/>
    <xs:element name="pressureCompensation" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.pressureCompensation"/>
    <xs:element name="pricingInfo" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.pricingInfo"/>
    <xs:element name="pulseOutput" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.pulseOutput"/>
    <xs:element name="relaysProgramming" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.relaysProgramming"/>
    <xs:element name="reverseFlow" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.reverseFlow"/>
    <xs:element name="superCompressibilityCompensation" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.superCompressibilityCompensation"/>
    <xs:element name="temperatureCompensation" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceCapability.temperatureCompensation"/>
    <xs:element name="textMessage" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.textMessage"/>
    <xs:element name="waterMetering" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceCapability.waterMetering"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="EndDeviceFunctionKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceFunctionKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="autonomousDst"/>
    <xs:enumeration value="demandResponse"/>
    <xs:enumeration value="electricMetering"/>
    <xs:enumeration value="gasMetering"/>
    <xs:enumeration value="metrology"/>
    <xs:enumeration value="onRequestRead"/>
    <xs:enumeration value="outageHistory"/>
    <xs:enumeration value="relaysProgramming"/>
    <xs:enumeration value="reverseFlow"/>
    <xs:enumeration value="waterMetering"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="EndDeviceInfo" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceInfo">
  <xs:sequence>
    <xs:element name="isSolidState" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.isSolidState"/>
    <xs:element name="phaseCount" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.phaseCount"/>
    <xs:element name="ratedCurrent" type="m:CurrentFlow" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.ratedCurrent"/>
    <xs:element name="ratedVoltage" type="m:Voltage" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.ratedVoltage"/>
  </xs:sequence>
</xs:complexType>
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</xs:sequence>
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<xs:element name="AssetModel" type="m:ProductAssetModel" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetInfo.AssetModel"/>
<xs:element name="capability" type="m:EndDeviceCapability" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceInfo.capability"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="LifecycleDate" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate">
<xs:sequence>
<xs:element name="installationDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.installationDate"/>
<xs:element name="manufacturedDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.manufacturedDate"/>
<xs:element name="purchaseDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.purchaseDate"/>
<xs:element name="receivedDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.receivedDate"/>
<xs:element name="removalDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.removalDate"/>
<xs:element name="retiredDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LifecycleDate.retiredDate"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Manufacturer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Manufacturer">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="amrSystem" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.amrSystem"/>
<xs:element name="formNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter.formNumber"/>
<xs:element name="initialCondition" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialCondition"/>
<xs:element name="initialLossOfLife" type="m:PerCent" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.initialLossOfLife"/>
<xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.isVirtual"/>
<xs:element name="lotNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lotNumber"/>
<xs:element name="purchasePrice" type="m:Money" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.purchasePrice"/>
<xs:element name="serialNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.serialNumber"/>
<xs:element name="timeZoneOffset" type="m:Minutes" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.timeZoneOffset"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.type"/>
<xs:element name="utcNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.utcNumber"/>
<xs:choice minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetContainer.Assets">
<xs:element name="ComModule" type="m:ComModule" sawsdl:modelReference=""/>
<xs:element name="EndDevice" type="m:EndDevice" sawsdl:modelReference=""/>
</xs:choice>
<xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.electronicAddress"/>
<xs:choice minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.EndDeviceFunctions">
<xs:element name="ComFunction" type="m:ComFunction" sawsdl:modelReference=""/>
<xs:element name="ConnectDisconnectFunction" type="m:ConnectDisconnectFunction"
sawsdl:modelReference=""/>
<xs:element name="SimpleEndDeviceFunction" type="m:SimpleEndDeviceFunction"
sawsdl:modelReference=""/>
</xs:choice>
<xs:element name="EndDeviceInfo" type="m:EndDeviceInfo" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.EndDeviceInfo"/>
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<xs:element name="lifecycle" type="m:LifecycleDate" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.lifecycle"/>
<xs:element name="MeterMultipliers" type="m:MeterMultiplier" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter.MeterMultipliers"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="Seals" type="m:Seal" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetContainer.Seals"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.status"/>
<xs:element name="UsagePoint" type="m:UsagePoint"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.UsagePoint"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="MeterMultiplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#MeterMultiplier">
<xs:sequence>
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sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="kind" type="m:MeterMultiplierKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplier.kind"/>
<xs:element name="value" type="xs:float" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplier.value"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="MeterMultiplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#MeterMultiplierKind">
<xs:restriction base="xs:string">
<xs:enumeration value="ctRatio"/>
<xs:enumeration value="kE"/>
<xs:enumeration value="kH"/>
<xs:enumeration value="kR"/>
<xs:enumeration value="ptRatio"/>
<xs:enumeration value="transformerRatio"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="MetrologyRequirement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#MetrologyRequirement">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="reason" type="m:ReadingReasonKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MetrologyRequirement.reason"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="ReadingTypes" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MetrologyRequirement.ReadingTypes">
<xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType">
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<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
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<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
<xs:sequence>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
<xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
<xs:sequence>
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
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<xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
</xs:sequence>
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<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
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    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Organisation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Organisation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.electronicAddress"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="phone1" type="m:TelephoneNumber" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.phone1"/>
    <xs:element name="phone2" type="m:TelephoneNumber" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.phone2"/>
    <xs:element name="postalAddress" type="m:PostalAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.postalAddress"/>
    <xs:element name="streetAddress" type="m:StreetAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Organisation.streetAddress"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="PhaseCode" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PhaseCode">
  <xs:restriction base="xs:string">
    <xs:enumeration value="A"/>
    <xs:enumeration value="AB"/>
    <xs:enumeration value="ABC"/>
    <xs:enumeration value="ABCN"/>
    <xs:enumeration value="ABN"/>
    <xs:enumeration value="AC"/>
    <xs:enumeration value="ACN"/>
    <xs:enumeration value="AN"/>
    <xs:enumeration value="B"/>
    <xs:enumeration value="BC"/>
    <xs:enumeration value="BCN"/>
    <xs:enumeration value="BN"/>
    <xs:enumeration value="C"/>
    <xs:enumeration value="CN"/>
    <xs:enumeration value="N"/>
    <xs:enumeration value="s1"/>
    <xs:enumeration value="s12"/>
    <xs:enumeration value="s12N"/>
    <xs:enumeration value="s1N"/>
    <xs:enumeration value="s2"/>
    <xs:enumeration value="s2N"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="PositionPoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PositionPoint">
  <xs:sequence>
    <xs:element name="sequenceNumber" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.sequenceNumber"/>
    <xs:element name="xPosition" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.xPosition"/>
    <xs:element name="yPosition" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.yPosition"/>
    <xs:element name="zPosition" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PositionPoint.zPosition"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PostalAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PostalAddress">
  <xs:sequence>
    <xs:element name="poBox" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PostalAddress.poBox"/>
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<xs:element name="postalCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PostalAddress.postalCode"/>
<xs:element name="streetDetail" type="m:StreetDetail" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PostalAddress.streetDetail"/>
<xs:element name="townDetail" type="m:TownDetail" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PostalAddress.townDetail"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="PricingStructure" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PricingStructure">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="code" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.code"/>
<xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
<xs:element name="dailyCeilingUsage" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.dailyCeilingUsage"/>
<xs:element name="dailyEstimatedUsage" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PricingStructure.dailyEstimatedUsage"/>
<xs:element name="dailyFloorUsage" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.dailyFloorUsage"/>
<xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
<xs:element name="revenueKind" type="m:RevenueKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.revenueKind"/>
<xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
<xs:element name="subject" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
<xs:element name="taxExemption" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.taxExemption"/>
<xs:element name="title" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
<xs:element name="docStatus" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.ServiceCategory"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
<xs:element name="Tariffs" type="m:Tariff" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.Tariffs"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ProductAssetModel" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ProductAssetModel">
<xs:sequence>
<xs:element name="corporateStandardKind" type="m:CorporateStandardKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ProductAssetModel.corporateStandardKind"/>
<xs:element name="modelNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.modelNumber"/>
<xs:element name="modelVersion" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.modelVersion"/>
<xs:element name="usageKind" type="m:AssetModelUsageKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.usageKind"/>
<xs:element name="Manufacturer" type="m:Manufacturer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ProductAssetModel.Manufacturer"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="RationalNumber" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#RationalNumber">
<xs:sequence>
<xs:element name="denominator" type="xs:integer"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.denominator"/>
<xs:element name="numerator" type="xs:integer"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RationalNumber.numerator"/>
</xs:sequence>
</xs:complexType>
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<xs:complexType name="ReadingInterharmonic" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ReadingInterharmonic">
  <xs:sequence>
    <xs:element name="denominator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.denominator"/>
    <xs:element name="numerator" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingInterharmonic.numerator"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ReadingReasonKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingReasonKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="billing"/>
    <xs:enumeration value="demandReset"/>
    <xs:enumeration value="inquiry"/>
    <xs:enumeration value="installation"/>
    <xs:enumeration value="loadManagement"/>
    <xs:enumeration value="loadResearch"/>
    <xs:enumeration value="moveIn"/>
    <xs:enumeration value="moveOut"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="removal"/>
    <xs:enumeration value="serviceConnect"/>
    <xs:enumeration value="serviceDisconnect"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ReadingType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingType">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="accumulation" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.accumulation"/>
    <xs:element name="aggregate" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.aggregate"/>
    <xs:element name="commodity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.commodity"/>
    <xs:element name="consumptionTier" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.consumptionTier"/>
    <xs:element name="cpp" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.cpp"/>
    <xs:element name="currency" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.currency"/>
    <xs:element name="flowDirection" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.flowDirection"/>
    <xs:element name="macroPeriod" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.macroPeriod"/>
    <xs:element name="measurementKind" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measurementKind"/>
    <xs:element name="measuringPeriod" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measuringPeriod"/>
    <xs:element name="multiplier" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.multiplier"/>
    <xs:element name="phases" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.phases"/>
    <xs:element name="tou" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.tou"/>
    <xs:element name="unit" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.unit"/>
    <xs:element name="argument" type="m:RationalNumber" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.argument"/>
    <xs:element name="interharmonic" type="m:ReadingInterharmonic" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.interharmonic"/>
    <xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Register" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Register">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.isVirtual"/>
    <xs:element name="leftDigitCount" type="xs:integer" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.leftDigitCount"/>
```



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<xs:element name="rightDigitCount" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.rightDigitCount"/>
<xs:element name="touTierName" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.touTierName"/>
<xs:element name="Channels" type="m:Channel" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.Channels"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="touTier" type="m:TimeInterval" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Register.touTier"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="RemoteConnectDisconnectInfo"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo">
  <xs:sequence>
    <xs:element name="armedTimeout" type="m:Seconds" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.armedTimeout"/>
    <xs:element name="customerVoltageLimit" type="m:Voltage" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.customerVoltageLimit"/>
    <xs:element name="energyLimit" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.energyLimit"/>
    <xs:element name="energyUsageStartDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.energyUsageStartDateTime"/>
    <xs:element name="energyUsageWarning" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.energyUsageWarning"/>
    <xs:element name="isArmConnect" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.isArmConnect"/>
    <xs:element name="isArmDisconnect" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.isArmDisconnect"/>
    <xs:element name="isEnergyLimiting" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.isEnergyLimiting"/>
    <xs:element name="needsPowerLimitCheck" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.needsPowerLimitCheck"/>
    <xs:element name="needsVoltageLimitCheck" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.needsVoltageLimitCheck"/>
    <xs:element name="powerLimit" type="m:ActivePower" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.powerLimit"/>
    <xs:element name="usePushbutton" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RemoteConnectDisconnectInfo.usePushbutton"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="RevenueKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RevenueKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="commercial"/>
    <xs:enumeration value="industrial"/>
    <xs:enumeration value="irrigation"/>
    <xs:enumeration value="nonResidential"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="residential"/>
    <xs:enumeration value="streetLight"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="Seal" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal">
  <xs:sequence>
    <xs:element name="appliedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.appliedDateTime"/>
    <xs:element name="condition" type="m:SealConditionKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.condition"/>
    <xs:element name="kind" type="m:SealKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.kind"/>
    <xs:element name="sealNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seal.sealNumber"/>
  </xs:sequence>
```

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</xs:complexType>
<xs:simpleType name="SealConditionKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SealConditionKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="broken"/>
    <xs:enumeration value="locked"/>
    <xs:enumeration value="missing"/>
    <xs:enumeration value="open"/>
    <xs:enumeration value="other"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="SealKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SealKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="lead"/>
    <xs:enumeration value="lock"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="steel"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceCategory" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="electricity"/>
    <xs:enumeration value="gas"/>
    <xs:enumeration value="heat"/>
    <xs:enumeration value="internet"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="rates"/>
    <xs:enumeration value="refuse"/>
    <xs:enumeration value="sewerage"/>
    <xs:enumeration value="time"/>
    <xs:enumeration value="tvLicence"/>
    <xs:enumeration value="water"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceLocation" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="accessMethod" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation.accessMethod"/>
    <xs:element name="direction" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.direction"/>
    <xs:element name="geoInfoReference" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.geoInfoReference"/>
    <xs:element name="needsInspection" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation.needsInspection"/>
    <xs:element name="siteAccessProblem" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation.siteAccessProblem"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.type"/>
    <xs:element name="CoordinateSystem" type="m:CoordinateSystem" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.CoordinateSystem"/>
    <xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.electronicAddress"/>
    <xs:element name="mainAddress" type="m:StreetAddress" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.mainAddress"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="phone1" type="m:TelephoneNumber" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.phone1"/>
    <xs:element name="phone2" type="m:TelephoneNumber" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.phone2"/>
  </xs:sequence>
</xs:complexType>

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<xs:element name="PositionPoints" type="m:PositionPoint" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.PositionPoints"/>
<xs:element name="secondaryAddress" type="m:StreetAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.secondaryAddress"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.status"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceMultiplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="kind" type="m:ServiceMultiplierKind"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier.kind"/>
<xs:element name="value" type="xs:float" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier.value"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceMultiplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplierKind">
<xs:restriction base="xs:string">
<xs:enumeration value="ctRatio"/>
<xs:enumeration value="ptRatio"/>
<xs:enumeration value="transformerRatio"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceSupplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="issuerIdentificationNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.issuerIdentificationNumber"/>
<xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="Organisation" type="m:Organisation" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#OrganisationRole.Organisation"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="SimpleEndDeviceFunction" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SimpleEndDeviceFunction">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="configID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.configID"/>
<xs:element name="enabled" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.enabled"/>
<xs:element name="firmwareID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.firmwareID"/>
<xs:element name="hardwareID" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.hardwareID"/>
<xs:element name="kind" type="m:EndDeviceFunctionKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SimpleEndDeviceFunction.kind"/>
<xs:element name="password" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.password"/>
<xs:element name="programID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AssetFunction.programID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="Registers" type="m:Register" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceFunction.Registers"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status">
<xs:sequence>
<xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
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<xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
<xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
<xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="StreetAddress" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress">
<xs:sequence>
<xs:element name="status" type="m:Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.status"/>
<xs:element name="streetDetail" type="m:StreetDetail"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.streetDetail"/>
<xs:element name="townDetail" type="m:TownDetail"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.townDetail"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="StreetDetail" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail">
<xs:sequence>
<xs:element name="addressGeneral" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.addressGeneral"/>
<xs:element name="buildingName" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.buildingName"/>
<xs:element name="code" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.code"/>
<xs:element name="name" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.name"/>
<xs:element name="number" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.number"/>
<xs:element name="prefix" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.prefix"/>
<xs:element name="suffix" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suffix"/>
<xs:element name="suiteNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suiteNumber"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.type"/>
<xs:element name="withinTownLimits" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.withinTownLimits"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="SupplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#SupplierKind">
<xs:restriction base="xs:string">
<xs:enumeration value="other"/>
<xs:enumeration value="retailer"/>
<xs:enumeration value="utility"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="Tariff" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
<xs:element name="endDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff.endDate"/>
<xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
<xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
<xs:element name="startDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff.startDate"/>
<xs:element name="subject" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
<xs:element name="title" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
<xs:element name="docStatus" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
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<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
<xs:element name="TariffProfiles" type="m:TariffProfile" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff.TariffProfiles"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="TariffProfile" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TariffProfile">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
<xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
<xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
<xs:element name="subject" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
<xs:element name="tariffCycle" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TariffProfile.tariffCycle"/>
<xs:element name="title" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
<xs:element name="ConsumptionTariffIntervals" type="m:ConsumptionTariffInterval" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TariffProfile.ConsumptionTariffIntervals"/>
<xs:element name="docStatus" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
<xs:element name="TimeTariffIntervals" type="m:TimeTariffInterval" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TariffProfile.TimeTariffIntervals"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="PhoneNumber" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PhoneNumber">
<xs:sequence>
<xs:element name="areaCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PhoneNumber.areaCode"/>
<xs:element name="cityCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PhoneNumber.cityCode"/>
<xs:element name="countryCode" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PhoneNumber.countryCode"/>
<xs:element name="extension" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PhoneNumber.extension"/>
<xs:element name="localNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PhoneNumber.localNumber"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="TimeInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeInterval">
<xs:sequence>
<xs:element name="end" type="xs:time" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeInterval.end"/>
<xs:element name="start" type="xs:time" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeInterval.start"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="TimeTariffInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeTariffInterval">
<xs:sequence>
<xs:element name="sequenceNumber" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeTariffInterval.sequenceNumber"/>
<xs:element name="startTime" type="xs:time" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeTariffInterval.startTime"/>
<xs:element name="Charges" type="m:Charge" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeTariffInterval.Charges"/>
</xs:sequence>
</xs:complexType>
```



```
<xs:complexType name="TownDetail" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail">
  <xs:sequence>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.code"/>
    <xs:element name="country" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.country"/>
    <xs:element name="name" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.name"/>
    <xs:element name="section" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.section"/>
    <xs:element name="stateOrProvince" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.stateOrProvince"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="TransformerTank" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TransformerTank">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="UnitMultiplier" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UnitMultiplier">
  <xs:restriction base="xs:string">
    <xs:enumeration value="G"/>
    <xs:enumeration value="M"/>
    <xs:enumeration value="T"/>
    <xs:enumeration value="c"/>
    <xs:enumeration value="d"/>
    <xs:enumeration value="k"/>
    <xs:enumeration value="m"/>
    <xs:enumeration value="micro"/>
    <xs:enumeration value="n"/>
    <xs:enumeration value="none"/>
    <xs:enumeration value="p"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amiBillingReady" type="m:AmiBillingReadyKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.amiBillingReady"/>
    <xs:element name="checkBilling" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.checkBilling"/>
    <xs:element name="connectionState" type="m:UsagePointConnectedKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.connectionState"/>
    <xs:element name="estimatedLoad" type="m:CurrentFlow" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.estimatedLoad"/>
    <xs:element name="grounded" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.grounded"/>
    <xs:element name="isSdp" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.isSdp"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.isVirtual"/>
    <xs:element name="minimalUsageExpected" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.minimalUsageExpected"/>
    <xs:element name="nominalServiceVoltage" type="m:Voltage" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.nominalServiceVoltage"/>
    <xs:element name="outageRegion" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.outageRegion"/>
    <xs:element name="phaseCode" type="m:PhaseCode" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.phaseCode"/>
    <xs:element name="ratedCurrent" type="m:CurrentFlow" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ratedCurrent"/>
    <xs:element name="ratedPower" type="m:ActivePower" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ratedPower"/>
    <xs:element name="readCycle" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.readCycle"/>
    <xs:element name="readRoute" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.readRoute"/>
  </xs:sequence>
</xs:complexType>
```

```
<xs:element name="serviceDeliveryRemark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.serviceDeliveryRemark"/>
<xs:element name="servicePriority" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.servicePriority"/>
<xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.CustomerAgreement"/>
<xs:element name="Equipments" type="m:TransformerTank" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.Equipments"/>
<xs:element name="MetrologyRequirements" type="m:MetrologyRequirement" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint.MetrologyRequirements"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="PricingStructures" type="m:PricingStructure" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.PricingStructures"/>
<xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ServiceCategory"/>
<xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ServiceLocation"/>
<xs:element name="ServiceMultipliers" type="m:ServiceMultiplier" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint.ServiceMultipliers"/>
<xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ServiceSupplier"/>
<xs:element name="UsagePointLocation" type="m:UsagePointLocation" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.UsagePointLocation"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="UsagePointConnectedKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointConnectedKind">
<xs:restriction base="xs:string">
<xs:enumeration value="connected"/>
<xs:enumeration value="logicallyDisconnected"/>
<xs:enumeration value="physicallyDisconnected"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="UsagePointLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePointLocation">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="accessMethod" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointLocation.accessMethod"/>
<xs:element name="direction" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.direction"/>
<xs:element name="geoInfoReference" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.geoInfoReference"/>
<xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointLocation.remark"/>
<xs:element name="siteAccessProblem" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePointLocation.siteAccessProblem"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.type"/>
<xs:element name="CoordinateSystem" type="m:CoordinateSystem" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.CoordinateSystem"/>
<xs:element name="electronicAddress" type="m:ElectronicAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.electronicAddress"/>
<xs:element name="mainAddress" type="m:StreetAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.mainAddress"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="phone1" type="m:TelephoneNumber" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.phone1"/>
<xs:element name="phone2" type="m:TelephoneNumber" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.phone2"/>
<xs:element name="PositionPoints" type="m:PositionPoint" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.PositionPoints"/>
<xs:element name="secondaryAddress" type="m:StreetAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.secondaryAddress"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.status"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="Voltage" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Voltage">
```

```
<xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="CurrentFlow" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CurrentFlow">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="RealEnergy" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#RealEnergy">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="ActivePower" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ActivePower">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="Minutes" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Minutes">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="Seconds" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Seconds">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="PerCent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PerCent">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="Money" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Money">
  <xs:restriction base="xs:decimal"/>
</xs:simpleType>
</xs:schema>
```

I.5 EndDeviceGroups

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/EndDeviceGroups#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/EndDeviceGroups#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="EndDeviceGroups" type="m:EndDeviceGroups"/>
  <xs:complexType name="EndDeviceGroups">
    <xs:sequence>
      <xs:element name="DemandResponseProgram" type="m:DemandResponseProgram" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="DemandResponseProgram" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DemandResponseProgram">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DemandResponseProgram.type"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="EndDevice" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDevice">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="EndDeviceGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceGroup">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    </xs:sequence>
  </xs:complexType>
```



```

    <xs:element name="DemandResponsePrograms" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDeviceGroup.DemandResponsePrograms">
    <xs:complexType sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#DemandResponseProgram">
    <xs:attribute name="ref" type="xs:string"/>
    </xs:complexType>
    </xs:element>
    <xs:element name="EndDevices" type="m:EndDevice" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceGroup.EndDevices"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
    </xs:complexType>
    <xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
    </xs:complexType>
    <xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
    <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
    </xs:complexType>
    </xs:schema>

```

I.6 GetAuxiliaryAgreementConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetAuxiliaryAgreementConfig#"
xmlns:sawSDL="http://www.w3.org/ns/sawSDL" xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetAuxiliaryAgreementConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetAuxiliaryAgreementConfig" type="m:GetAuxiliaryAgreementConfig"/>
    <xs:complexType name="GetAuxiliaryAgreementConfig">
    <xs:sequence>
    <xs:element name="AuxiliaryAccount" type="m:AuxiliaryAccount" minOccurs="0"
maxOccurs="unbounded"/>
    <xs:element name="AuxiliaryAgreement" type="m:AuxiliaryAgreement"
minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
    <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
    <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
    <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
    <xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
    </xs:complexType>
    <xs:complexType name="AuxiliaryAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#AuxiliaryAccount">
    <xs:sequence>

```

```

        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="AuxiliaryAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#AuxiliaryAgreement">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="subType" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AuxiliaryAgreement.subType"/>
        <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Customer" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="commercialIndustrial"/>
        <xs:enumeration value="energyServiceScheduler"/>
        <xs:enumeration value="energyServiceSupplier"/>
        <xs:enumeration value="internalUse"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="pumpingLoad"/>
        <xs:enumeration value="residential"/>
        <xs:enumeration value="residentialAndCommercial"/>
        <xs:enumeration value="residentialAndStreetlight"/>
        <xs:enumeration value="residentialFarmService"/>
        <xs:enumeration value="residentialStreetlightOthers"/>
        <xs:enumeration value="windMachine"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
    <xs:sequence>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
```

```

    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
      <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
      <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
      <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ServiceLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ServiceSupplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceSupplier">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="SupplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#SupplierKind">
    <xs:restriction base="xs:string">
      <xs:enumeration value="other"/>
      <xs:enumeration value="retailer"/>
      <xs:enumeration value="utility"/>
    </xs:restriction>
  </xs:simpleType>
</xs:schema>

```

I.7 GetComModuleConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetComModuleConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL" xmlns
s:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/GetComModuleConfig#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="GetComModuleConfig" type="m:GetComModuleConfig"/>
  <xs:complexType name="GetComModuleConfig">
    <xs:sequence>
      <xs:element name="ComModule" type="m:ComModule" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ComModule" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComModule">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57
/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="amrSystem" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch
/TC57/2010/CIM-schema-cim15#ComModule.amrSystem"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawSDL:modelReference
="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>

```

```
<xs:complexType name="EndDevice" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrSystem" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.amrSystem"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceGroup">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>
```

I.8 GetCustomerMeterDataSet

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
  xmlns:m="http://iec.ch/TC57/2011/GetCustomerMeterDataSet#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://iec.ch/TC57/2011/GetCustomerMeterDataSet#" elementFormDefault="qualified"
  attributeFormDefault="unqualified">
  <xs:element name="GetCustomerMeterDataSet" type="m:GetCustomerMeterDataSet"/>
  <xs:complexType name="GetCustomerMeterDataSet">
    <xs:sequence>
      <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

```
<xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="commercialIndustrial"/>
    <xs:enumeration value="energyServiceScheduler"/>
    <xs:enumeration value="energyServiceSupplier"/>
    <xs:enumeration value="internalUse"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="pumpingLoad"/>
    <xs:enumeration value="residential"/>
    <xs:enumeration value="residentialAndCommercial"/>
    <xs:enumeration value="residentialAndStreetlight"/>
    <xs:enumeration value="residentialFarmService"/>
    <xs:enumeration value="residentialStreetlightOthers"/>
    <xs:enumeration value="windMachine"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="EndDevice" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDevice">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceGroup">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
```

```
<xs:sequence>
  <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
  <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceCategory" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceCategory">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="electricity"/>
    <xs:enumeration value="gas"/>
    <xs:enumeration value="heat"/>
    <xs:enumeration value="internet"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="rates"/>
    <xs:enumeration value="refuse"/>
    <xs:enumeration value="sewerage"/>
    <xs:enumeration value="time"/>
    <xs:enumeration value="tvLicence"/>
    <xs:enumeration value="water"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceSupplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceSupplier">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:SupplierKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceSupplier.kind"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="SupplierKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#SupplierKind">
```



```

        <xs:restriction base="xs:string">
            <xs:enumeration value="other"/>
            <xs:enumeration value="retailer"/>
            <xs:enumeration value="utility"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointGroup">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
</xs:schema>

```

I.9 GetEndDeviceGroups

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetEndDeviceGroups#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetEndDeviceGroups#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetEndDeviceGroups" type="m:GetEndDeviceGroups"/>
    <xs:complexType name="GetEndDeviceGroups">
        <xs:sequence>
            <xs:element name="DemandResponseProgram" type="m:DemandResponseProgram" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="Meter" type="m:Meter" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="DemandResponseProgram" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DemandResponseProgram">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DemandResponseProgram.type"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="EndDevice" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="EndDeviceGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDeviceGroup">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Meter" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter">

```

```

    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
      <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
      <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
      <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
      <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
      <xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>

```

I.10 GetMeterReadSchedule

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetMeterReadSchedule#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetMeterReadSchedule#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="GetMeterReadSchedule" type="m:GetMeterReadSchedule"/>
  <xs:complexType name="GetMeterReadSchedule">
    <xs:sequence>
      <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="Meter" type="m:Meter" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ReadingType" type="m:ReadingType" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="TimeSchedule" type="m:TimeSchedule" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Customer" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
    <xs:sequence>

```



```
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="commercialIndustrial"/>
        <xs:enumeration value="energyServiceScheduler"/>
        <xs:enumeration value="energyServiceSupplier"/>
        <xs:enumeration value="internalUse"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="pumpingLoad"/>
        <xs:enumeration value="residential"/>
        <xs:enumeration value="residentialAndCommercial"/>
        <xs:enumeration value="residentialAndStreetlight"/>
        <xs:enumeration value="residentialFarmService"/>
        <xs:enumeration value="residentialStreetlightOthers"/>
        <xs:enumeration value="windMachine"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DateTimeInterval">
    <xs:sequence>
        <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
        <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDevice" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDevice">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceGroup">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Meter">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
```

```
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
      <xs:sequence>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
      <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
        <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
      <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ReadingType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingType">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ServiceCategory" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceCategory">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="ServiceKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceKind">
      <xs:restriction base="xs:string">
        <xs:enumeration value="electricity"/>
        <xs:enumeration value="gas"/>
        <xs:enumeration value="heat"/>
        <xs:enumeration value="internet"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="rates"/>
        <xs:enumeration value="refuse"/>
        <xs:enumeration value="sewerage"/>
        <xs:enumeration value="time"/>
        <xs:enumeration value="tvLicence"/>
        <xs:enumeration value="water"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="TimeSchedule" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimeSchedule">
      <xs:sequence>
        <xs:element name="scheduleInterval" type="m:DateTimeInterval"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.scheduleInterval"/>
      </xs:sequence>
    </xs:complexType>
```

```

    <xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
  </xs:schema>

```

I.11 GetMeterServiceRequests

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetMeterServiceRequests#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetMeterServiceRequests#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="GetMeterServiceRequests" type="m:GetMeterServiceRequests"/>
  <xs:complexType name="GetMeterServiceRequests">
    <xs:sequence>
      <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="MeterServiceWork" type="m:MeterServiceWork" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
    <xs:sequence>

```

```

        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="commercialIndustrial"/>
        <xs:enumeration value="energyServiceScheduler"/>
        <xs:enumeration value="energyServiceSupplier"/>
        <xs:enumeration value="internalUse"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="pumpingLoad"/>
        <xs:enumeration value="residential"/>
        <xs:enumeration value="residentialAndCommercial"/>
        <xs:enumeration value="residentialAndStreetlight"/>
        <xs:enumeration value="residentialFarmService"/>
        <xs:enumeration value="residentialStreetlightOthers"/>
        <xs:enumeration value="windMachine"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="EndDevice" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDevice">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="EndDeviceGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#EndDeviceGroup">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="MeterServiceWork" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#MeterServiceWork">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
    <xs:sequence>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
        <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>

```

```

        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ServiceLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePointGroup">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

I.12 GetPricingStructureConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetPricingStructureConfig#"
xmlns:sawSDL="http://www.w3.org/ns/sawSDL" xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetPricingStructureConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetPricingStructureConfig" type="m:GetPricingStructureConfig"/>
    <xs:complexType name="GetPricingStructureConfig">
        <xs:sequence>
            <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="PricingStructure" type="m:PricingStructure" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CustomerAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">

```

```

        <xs:sequence>
          <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
          <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
        </xs:sequence>
      </xs:complexType>
      <xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
        <xs:sequence>
          <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
          <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
          <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
        </xs:sequence>
      </xs:complexType>
      <xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
        <xs:sequence>
          <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
          <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
        </xs:sequence>
      </xs:complexType>
      <xs:complexType name="PricingStructure" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure">
        <xs:sequence>
          <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
          <xs:element name="code" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.code"/>
          <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
      </xs:complexType>
      <xs:complexType name="UsagePoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
        <xs:sequence>
          <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
          <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
      </xs:complexType>
    </xs:schema>

```

I.13 GetReceiptRecord

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetReceiptRecord#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetReceiptRecord#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="GetReceiptRecord" type="m:GetReceiptRecord"/>
  <xs:complexType name="GetReceiptRecord">
    <xs:sequence>
      <xs:element name="AuxiliaryAccount" type="m:AuxiliaryAccount" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="AuxiliaryAgreement" type="m:AuxiliaryAgreement"
minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="PointOfSale" type="m:PointOfSale" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>

```



```
<xs:element name="Receipt" type="m:Receipt" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="TimeSchedule" type="m:TimeSchedule" minOccurs="0"
maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="AuxiliaryAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#AuxiliaryAccount">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="AuxiliaryAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#AuxiliaryAgreement">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
<xs:restriction base="xs:string">
<xs:enumeration value="commercialIndustrial"/>
<xs:enumeration value="energyServiceScheduler"/>
<xs:enumeration value="energyServiceSupplier"/>
<xs:enumeration value="internalUse"/>
<xs:enumeration value="other"/>
<xs:enumeration value="pumpingLoad"/>
<xs:enumeration value="residential"/>
<xs:enumeration value="residentialAndCommercial"/>
<xs:enumeration value="residentialAndStreetlight"/>
<xs:enumeration value="residentialFarmService"/>
<xs:enumeration value="residentialStreetlightOthers"/>
<xs:enumeration value="windMachine"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DateTimeInterval">
<xs:sequence>
<xs:element name="end" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
```

```

        <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
    <xs:sequence>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
        <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
    <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="PointOfSale" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PointOfSale">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="location" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PointOfSale.location"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Receipt" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Receipt">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="TimeSchedule" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimeSchedule">
    <xs:sequence>
        <xs:element name="scheduleInterval" type="m:DateTimeInterval"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.scheduleInterval"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

I.14 GetTransactionRecord

```
<?xml version="1.0" encoding="UTF-8"?>
```

```

<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetTransactionRecord#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetTransactionRecord#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="GetTransactionRecord" type="m:GetTransactionRecord"/>
    <xs:complexType name="GetTransactionRecord">
        <xs:sequence>

```



```
<xs:element name="AuxiliaryAccount" type="m:AuxiliaryAccount" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="AuxiliaryAgreement" type="m:AuxiliaryAgreement"
minOccurs="0" maxOccurs="unbounded"/>
<xs:element name="Customer" type="m:Customer" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="PointOfSale" type="m:PointOfSale" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="TimeSchedule" type="m:TimeSchedule" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="Transaction" type="m:Transaction" minOccurs="0"
maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="AuxiliaryAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#AuxiliaryAccount">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="AuxiliaryAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#AuxiliaryAgreement">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="kind" type="m:CustomerKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CustomerKind">
<xs:restriction base="xs:string">
<xs:enumeration value="commercialIndustrial"/>
<xs:enumeration value="energyServiceScheduler"/>
<xs:enumeration value="energyServiceSupplier"/>
<xs:enumeration value="internalUse"/>
<xs:enumeration value="other"/>
<xs:enumeration value="pumpingLoad"/>
<xs:enumeration value="residential"/>
<xs:enumeration value="residentialAndCommercial"/>

```

```
<xs:enumeration value="residentialAndStreetlight"/>
<xs:enumeration value="residentialFarmService"/>
<xs:enumeration value="residentialStreetlightOthers"/>
<xs:enumeration value="windMachine"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DateTimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
    <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PointOfSale" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PointOfSale">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="location" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PointOfSale.location"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="TimeSchedule" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimeSchedule">
  <xs:sequence>
    <xs:element name="scheduleInterval" type="m:DateTimeInterval"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.scheduleInterval"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Transaction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Transaction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>
```

I.15 GetUsagePointGroups

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/GetUsagePointGroups#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/GetUsagePointGroups#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="GetUsagePointGroups" type="m:GetUsagePointGroups"/>
  <xs:complexType name="GetUsagePointGroups">
    <xs:sequence>
      <xs:element name="DemandResponseProgram" type="m:DemandResponseProgram" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="DemandResponseProgram" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DemandResponseProgram">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DemandResponseProgram.type"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
      <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
      <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
      <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
      <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
      <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePointGroup">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
```

```
</xs:schema>
```

I.16 MeterReadSchedule

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
  xmlns:m="http://iec.ch/TC57/2011/MeterReadSchedule#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL" xmlns
  :xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/MeterReadSchedule#" el
  ementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="MeterReadSchedule" type="m:MeterReadSchedule"/>
  <xs:complexType name="MeterReadSchedule">
    <xs:sequence>
      <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0" maxOccurs="unbounded"/
    >
      <xs:element name="CustomerAgreement" type="m:CustomerAgreement" minOccurs="0" maxOccurs="unbound
    ed"/>
      <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="EndDeviceGroup" type="m:EndDeviceGroup" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ReadingType" type="m:ReadingType" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="TimeSchedule" type="m:TimeSchedule" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0" maxOccurs="unbounded"/
    >
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
    cim15#CustomerAccount">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57
    /2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawSDL:modelReference
    ="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CustomerAgreement" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
    cim15#CustomerAgreement">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57
    /2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawSDL:modelReference
    ="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="DateTimeInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
    cim15#DateTimeInterval">
    <xs:sequence>
      <xs:element name="end" type="xs:dateTime" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC5
    7/2010/CIM-schema-cim15#DateTimeInterval.end"/>
      <xs:element name="start" type="xs:dateTime" minOccurs="0" sawSDL:modelReference="http://iec.ch/T
    C57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="EndDevice" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
    cim15#EndDevice">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
    schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawSDL:modelReference
    ="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="EndDeviceGroup" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
    cim15#EndDeviceGroup">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawSDL:modelReference="http://iec.ch/TC57
    /2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawSDL:modelReference
    ="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
```

```
<xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
<xs:element name="NameType" type="m:NameType" minOccurs="0" sawsdl:modelReference="http://iec.ch
/TC57/2010/CIM-schema-cim15#Name.NameType"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.
ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0" sawsdl:modelRefere
nce="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
    <xs:sequence>
      <xs:element name="description" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.
ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
      <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ReadingType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingType">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57
/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference
="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="TimePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimePoint">
    <xs:sequence>
      <xs:element name="dateTime" type="xs:dateTime" minOccurs="0" sawsdl:modelReference="http://iec.c
h/TC57/2010/CIM-schema-cim15#TimePoint.dateTime"/>
      <xs:element name="relativeTimeInterval" type="m:Seconds" minOccurs="0" sawsdl:modelReference="ht
tp://iec.ch/TC57/2010/CIM-schema-cim15#TimePoint.relativeTimeInterval"/>
      <xs:element name="sequenceNumber" type="xs:integer" minOccurs="0" sawsdl:modelReference="http://
iec.ch/TC57/2010/CIM-schema-cim15#TimePoint.sequenceNumber"/>
      <xs:element name="window" type="m:DateTimeInterval" minOccurs="0" sawsdl:modelReference="http://
iec.ch/TC57/2010/CIM-schema-cim15#TimePoint.window"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="TimeSchedule" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimeSchedule">
    <xs:sequence>
      <xs:element name="disabled" type="xs:boolean" minOccurs="0" sawsdl:modelReference="http://iec.ch
/TC57/2010/CIM-schema-cim15#TimeSchedule.disabled"/>
      <xs:element name="offset" type="m:Seconds" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC
57/2010/CIM-schema-cim15#TimeSchedule.offset"/>
      <xs:element name="recurrencePattern" type="xs:string" minOccurs="0" sawsdl:modelReference="http:
//iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.recurrencePattern"/>
      <xs:element name="recurrencePeriod" type="m:Seconds" minOccurs="0" sawsdl:modelReference="http://
iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.recurrencePeriod"/>
      <xs:element name="scheduleInterval" type="m:DateTimeInterval" minOccurs="0" sawsdl:modelReferenc
e="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.scheduleInterval"/>
      <xs:element name="TimePoints" type="m:TimePoint" minOccurs="0" maxOccurs="unbounded" sawsdl:mode
lReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeSchedule.TimePoints"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57
/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference
="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePointGroup">
```

```
<xs:sequence>
  <xs:element name="mRID" type="xs:string" minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
  <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="Seconds" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Seconds">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
</xs:schema>
```

I.17 MeterServiceRequest

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#"
  xmlns:a="http://langdale.com.au/2005/Message#"
  xmlns:m="http://iec.ch/TC57/2011/MeterServiceRequests#"
  xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://iec.ch/TC57/2011/MeterServiceRequests#" elementFormDefault="qualified"
  attributeFormDefault="unqualified">
  <xs:element name="MeterServiceRequests" type="m:MeterServiceRequests"/>
  <xs:complexType name="MeterServiceRequests">
    <xs:sequence>
      <xs:element name="MeterServiceWork" type="m:MeterServiceWork"
        minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ReadingQualityType" type="m:ReadingQualityType"
        minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="ReadingType" type="m:ReadingType" minOccurs="0"
        maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ActivityRecord"
    sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord">
    <xs:sequence>
      <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
      <xs:element name="reason" type="xs:string" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
      <xs:element name="severity" type="xs:string" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
      <xs:element name="status" type="m:Status" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="kind" type="m:CustomerKind" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.kind"/>
      <xs:element name="pucNumber" type="xs:string" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.pucNumber"/>
      <xs:element name="specialNeed" type="xs:string" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.specialNeed"/>
      <xs:element name="vip" type="xs:boolean" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.vip"/>
      <xs:element name="CustomerAgreements" type="m:CustomerAgreement"
        minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.CustomerAgreements"/>
      <xs:element name="Names" type="m:Name" minOccurs="0"
        maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="status" type="m:Status" minOccurs="0"
        sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Customer.status"/>
    </xs:sequence>
  </xs:complexType>
```



```
<xs:complexType name="CustomerAgreement"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="CustomerKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="commercialIndustrial"/>
    <xs:enumeration value="energyServiceScheduler"/>
    <xs:enumeration value="energyServiceSupplier"/>
    <xs:enumeration value="internalUse"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="pumpingLoad"/>
    <xs:enumeration value="residential"/>
    <xs:enumeration value="residentialAndCommercial"/>
    <xs:enumeration value="residentialAndStreetlight"/>
    <xs:enumeration value="residentialFarmService"/>
    <xs:enumeration value="residentialStreetlightOthers"/>
    <xs:enumeration value="windMachine"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
    <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Meter">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="amrSystem" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#EndDevice.amrSystem"/>
    <xs:element name="formNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter.formNumber"/>
    <xs:element name="serialNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Asset.serialNumber"/>
    <xs:element name="MeterMultipliers" type="m:MeterMultiplier"
minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Meter.MeterMultipliers"/>
    <xs:element name="MeterReadings" type="m:MeterReading" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Meter.MeterReadings"/>
    <xs:element name="Names" type="m:Name" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="MeterMultiplier"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplier">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:MeterMultiplierKind"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplier.kind"/>
    <xs:element name="value" type="xs:float"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplier.value"/>
    <xs:element name="Names" type="m:Name" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="MeterMultiplierKind"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterMultiplierKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="ctRatio"/>
  </xs:restriction>
</xs:simpleType>
```

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<xs:enumeration value="kE"/>
<xs:enumeration value="kH"/>
<xs:enumeration value="kR"/>
<xs:enumeration value="ptRatio"/>
<xs:enumeration value="transformerRatio"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="MeterReading"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterReading">
  <xs:sequence>
    <xs:element name="Readings" type="m:Reading" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#MeterReading.Readings"/>
    <xs:element name="valuesInterval" type="m:DateTimeInterval"
minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#MeterReading.valuesInterval"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="MeterServiceWork"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterServiceWork">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:WorkKind" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Work.kind"/>
    <xs:element name="lastModifiedDateTime" type="xs:dateTime"
minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Document.lastModifiedDateTime"/>
    <xs:element name="priority" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Work.priority"/>
    <xs:element name="requestDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Work.requestDateTime"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
    <xs:element name="ActivityRecords" type="m:ActivityRecord"
minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Document.ActivityRecords"/>
    <xs:element name="Customers" type="m:Customer" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Work.Customers"/>
    <xs:element name="Meter" type="m:Meter"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterServiceWork.Meter"/>
    <xs:element name="Names" type="m:Name" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#IdentifiedObject.Names"/>
    <xs:element name="OldMeter" type="m:Meter" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterServiceWork.OldMeter"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
    <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeterServiceWork.UsagePoint"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority"
minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
```



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<xs:sequence>
  <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority.description"/>
  <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="PhaseCode" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#PhaseCode">
  <xs:restriction base="xs:string">
    <xs:enumeration value="A"/>
    <xs:enumeration value="AB"/>
    <xs:enumeration value="ABC"/>
    <xs:enumeration value="ABCN"/>
    <xs:enumeration value="ABN"/>
    <xs:enumeration value="AC"/>
    <xs:enumeration value="ACN"/>
    <xs:enumeration value="AN"/>
    <xs:enumeration value="B"/>
    <xs:enumeration value="BC"/>
    <xs:enumeration value="BCN"/>
    <xs:enumeration value="BN"/>
    <xs:enumeration value="C"/>
    <xs:enumeration value="CN"/>
    <xs:enumeration value="N"/>
    <xs:enumeration value="s1"/>
    <xs:enumeration value="s12"/>
    <xs:enumeration value="s12N"/>
    <xs:enumeration value="s1N"/>
    <xs:enumeration value="s2"/>
    <xs:enumeration value="s2N"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="Reading" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Reading">
  <xs:sequence>
    <xs:element name="reason" type="m:ReadingReasonKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Reading.reason"/>
    <xs:element name="reportedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#BaseReading.reportedDateTime"/>
    <xs:element name="source" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.source"/>
    <xs:element name="timeStamp" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MeasurementValue.timeStamp"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.value"/>
    <xs:element name="ReadingQualities" type="m:ReadingQuality"
minOccurs="0" maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#BaseReading.ReadingQualities"/>
    <xs:element name="ReadingType"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Reading.ReadingType">
      <xs:complexType sawSDL:modelReference="">
        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="timePeriod" type="m:DateTimeInterval" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BaseReading.timePeriod"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ReadingQuality"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQuality">
  <xs:sequence>
    <xs:element name="comment" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQuality.comment"/>
    <xs:element name="source" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQuality.source"/>
    <xs:element name="timeStamp" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQuality.timeStamp"/>
    <xs:element name="ReadingQualityType"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ReadingQuality.ReadingQualityType">
      <xs:complexType sawSDL:modelReference="">
        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
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        </xs:element>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ReadingQualityType"
      sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQualityType">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="category" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQualityType.category"/>
        <xs:element name="subCategory" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQualityType.subCategory"/>
        <xs:element name="systemId" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingQualityType.systemId"/>
        <xs:element name="Names" type="m:Name" maxOccurs="unbounded"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="ReadingReasonKind"
      sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingReasonKind">
      <xs:restriction base="xs:string">
        <xs:enumeration value="billing"/>
        <xs:enumeration value="demandReset"/>
        <xs:enumeration value="inquiry"/>
        <xs:enumeration value="installation"/>
        <xs:enumeration value="loadManagement"/>
        <xs:enumeration value="loadResearch"/>
        <xs:enumeration value="moveIn"/>
        <xs:enumeration value="moveOut"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="removal"/>
        <xs:enumeration value="serviceConnect"/>
        <xs:enumeration value="serviceDisconnect"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="ReadingType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
      schema-cim15#ReadingType">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="accumulation" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.accumulation"/>
        <xs:element name="aggregate" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.aggregate"/>
        <xs:element name="commodity" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.commodity"/>
        <xs:element name="consumptionTier" type="xs:integer" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.consumptionTier"/>
        <xs:element name="cpp" type="xs:integer" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.cpp"/>
        <xs:element name="currency" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.currency"/>
        <xs:element name="flowDirection" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.flowDirection"/>
        <xs:element name="macroPeriod" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.macroPeriod"/>
        <xs:element name="measurementKind" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measurementKind"/>
        <xs:element name="measuringPeriod" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.measuringPeriod"/>
        <xs:element name="multiplier" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.multiplier"/>
        <xs:element name="phases" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.phases"/>
        <xs:element name="tou" type="xs:integer" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.tou"/>
        <xs:element name="unit" type="xs:string" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.unit"/>
        <xs:element name="argument" minOccurs="0"
          sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.argument">
          <xs:complexType sawsdl:modelReference="">
            <xs:attribute name="ref" type="xs:string"/>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
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        <xs:element name="interharmonic" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ReadingType.interharmonic">
          <xs:complexType sawSDL:modelReference="">
            <xs:attribute name="ref" type="xs:string"/>
          </xs:complexType>
        </xs:element>
        <xs:element name="Names" type="m:Name" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ServiceLocation"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceLocation">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="accessMethod" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceLocation.accessMethod"/>
        <xs:element name="needsInspection" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceLocation.needsInspection"/>
        <xs:element name="siteAccessProblem" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceLocation.siteAccessProblem"/>
        <xs:element name="mainAddress" type="m:StreetAddress" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Location.mainAddress"/>
        <xs:element name="Names" type="m:Name" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ServiceMultiplier"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="kind" type="m:ServiceMultiplierKind"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier.kind"/>
        <xs:element name="value" type="xs:float"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplier.value"/>
        <xs:element name="Names" type="m:Name" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="ServiceMultiplierKind"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceMultiplierKind">
      <xs:restriction base="xs:string">
        <xs:enumeration value="ctRatio"/>
        <xs:enumeration value="ptRatio"/>
        <xs:enumeration value="transformerRatio"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Status">
      <xs:sequence>
        <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
        <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
        <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
        <xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="StreetAddress"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress">
      <xs:sequence>
        <xs:element name="streetDetail" type="m:StreetDetail" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.streetDetail"/>
        <xs:element name="townDetail" type="m:TownDetail" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetAddress.townDetail"/>
      </xs:sequence>
    </xs:complexType>
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<xs:complexType name="StreetDetail"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail">
  <xs:sequence>
    <xs:element name="addressGeneral" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.addressGeneral"/>
    <xs:element name="buildingName" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.buildingName"/>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.code"/>
    <xs:element name="name" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.name"/>
    <xs:element name="number" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.number"/>
    <xs:element name="prefix" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.prefix"/>
    <xs:element name="suffix" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suffix"/>
    <xs:element name="suiteNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.suiteNumber"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StreetDetail.type"/>
    <xs:element name="withinTownLimits" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#StreetDetail.withinTownLimits"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="TownDetail" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#TownDetail">
  <xs:sequence>
    <xs:element name="code" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.code"/>
    <xs:element name="country" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.country"/>
    <xs:element name="name" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.name"/>
    <xs:element name="section" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.section"/>
    <xs:element name="stateOrProvince" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TownDetail.stateOrProvince"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#UsagePoint">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="checkBilling" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.checkBilling"/>
    <xs:element name="grounded" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.grounded"/>
    <xs:element name="isSdp" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.isSdp"/>
    <xs:element name="isVirtual" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.isVirtual"/>
    <xs:element name="nominalServiceVoltage" type="m:Voltage" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint.nominalServiceVoltage"/>
    <xs:element name="phaseCode" type="m:PhaseCode" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.phaseCode"/>
    <xs:element name="ratedCurrent" type="m:CurrentFlow" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ratedCurrent"/>
    <xs:element name="ratedPower" type="m:ActivePower" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.ratedPower"/>
    <xs:element name="serviceDeliveryRemark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint.serviceDeliveryRemark"/>
    <xs:element name="servicePriority" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint.servicePriority"/>
    <xs:element name="Names" type="m:Name" minOccurs="0"
maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#IdentifiedObject.Names"/>
    <xs:element name="ServiceLocation" type="m:ServiceLocation"
minOccurs="0" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint.ServiceLocation"/>
  </xs:sequence>
</xs:complexType>
</xs:sequence>
</xs:complexType>
```

```

        <xs:element name="ServiceMultipliers" type="m:ServiceMultiplier"
minOccurs="0" maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint.ServiceMultipliers"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="WorkKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#WorkKind">
    <xs:restriction base="xs:string">
        <xs:enumeration value="construction"/>
        <xs:enumeration value="disconnect"/>
        <xs:enumeration value="inspection"/>
        <xs:enumeration value="maintenance"/>
        <xs:enumeration value="meter"/>
        <xs:enumeration value="other"/>
        <xs:enumeration value="reconnect"/>
        <xs:enumeration value="repair"/>
        <xs:enumeration value="service"/>
        <xs:enumeration value="test"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="CurrentFlow" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CurrentFlow">
    <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="Voltage" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Voltage">
    <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="ActivePower" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ActivePower">
    <xs:restriction base="xs:float"/>
</xs:simpleType>
</xs:schema>

```

I.18 ObjectNamesConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/ObjectNamesConfig#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/ObjectNamesConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="ObjectNamesConfig" type="m:ObjectNamesConfig"/>
    <xs:complexType name="ObjectNamesConfig">
        <xs:sequence>
            <xs:element name="AuxiliaryAgreement" type="m:AuxiliaryAgreement"
minOccurs="0"/>
            <xs:element name="ComModule" type="m:ComModule" minOccurs="0"/>
            <xs:element name="ConfigurationEvent" type="m:ConfigurationEvent"/>
            <xs:element name="Customer" type="m:Customer" minOccurs="0"/>
            <xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"/>
            <xs:element name="CustomerAgreement" type="m:CustomerAgreement"
minOccurs="0"/>
            <xs:element name="EndDevice" type="m:EndDevice" minOccurs="0"/>
            <xs:element name="Meter" type="m:Meter" minOccurs="0"/>
            <xs:element name="Name" type="m:Name" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="PricingStructure" type="m:PricingStructure" minOccurs="0"/>
            <xs:element name="ServiceLocation" type="m:ServiceLocation" minOccurs="0"/>
            <xs:element name="ServiceSupplier" type="m:ServiceSupplier" minOccurs="0"/>
            <xs:element name="TransformerTank" type="m:TransformerTank" minOccurs="0"/>
            <xs:element name="UsagePoint" type="m:UsagePoint" minOccurs="0"/>
            <xs:element name="UsagePointLocation" type="m:UsagePointLocation"
minOccurs="0"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="AuxiliaryAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#AuxiliaryAgreement">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>

```



```

    <xs:complexType name="ComModule" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ComModule">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ConfigurationEvent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ConfigurationEvent">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
        <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ConfigurationEvent.effectiveDateTime"/>
        <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
        <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
        <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
        <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
        <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Customer" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Customer">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CustomerAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAccount">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CustomerAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#CustomerAgreement">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="EndDevice" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#EndDevice">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Meter" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Meter">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>

```

```
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Name" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Name">
      <xs:sequence>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
        <xs:element name="NameType" type="m:NameType"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="NameType" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
      <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
        <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority">
      <xs:sequence>
        <xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
        <xs:element name="name" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="PricingStructure" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#PricingStructure">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ServiceLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceLocation">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ServiceSupplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#ServiceSupplier">
      <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Status">
      <xs:sequence>
        <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
        <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
        <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
        <xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="TransformerTank" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#TransformerTank">
      <xs:sequence>
```

```

        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePoint">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointLocation" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointLocation">
    <xs:sequence>
        <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
        <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
</xs:complexType>
</xs:schema>

```

I.19 PricingStructureConfig

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/PricingStructureConfig#" xmlns:sawSDL="http://www.w3.org/ns/sawSDL"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/PricingStructureConfig#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="PricingStructureConfig" type="m:PricingStructureConfig"/>
    <xs:complexType name="PricingStructureConfig">
        <xs:sequence>
            <xs:element name="PricingStructure" type="m:PricingStructure" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="AccountingUnit" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AccountingUnit">
        <xs:sequence>
            <xs:element name="energyUnit" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AccountingUnit.energyUnit"/>
            <xs:element name="monetaryUnit" type="m:Currency" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AccountingUnit.monetaryUnit"/>
            <xs:element name="multiplier" type="m:UnitMultiplier" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AccountingUnit.multiplier"/>
            <xs:element name="value" type="xs:float" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AccountingUnit.value"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="Charge" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge">
        <xs:sequence>
            <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
            <xs:element name="kind" type="m:ChargeKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.kind"/>
            <xs:element name="variablePortion" type="m:PerCent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.variablePortion"/>
            <xs:element name="ChildCharges" type="m:SimpleChildCharge" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.ChildCharges"/>
            <xs:element name="fixedPortion" type="m:AccountingUnit" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.fixedPortion"/>
            <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
        </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="ChargeKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ChargeKind">
        <xs:restriction base="xs:string">

```



```
<xs:enumeration value="auxiliaryCharge"/>
<xs:enumeration value="consumptionCharge"/>
<xs:enumeration value="demandCharge"/>
<xs:enumeration value="other"/>
<xs:enumeration value="taxCharge"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="ConfigurationEvent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.createdDateTime"/>
    <xs:element name="effectiveDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.effectiveDateTime"/>
    <xs:element name="modifiedBy" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.modifiedBy"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConfigurationEvent.remark"/>
    <xs:element name="severity" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.severity"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.type"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="status" type="m:Status" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ActivityRecord.status"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ConsumptionTariffInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConsumptionTariffInterval">
  <xs:sequence>
    <xs:element name="sequenceNumber" type="xs:integer"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConsumptionTariffInterval.sequenceNumber"/>
    <xs:element name="startValue" type="m:RealEnergy"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConsumptionTariffInterval.startValue"/>
    <xs:element name="Charges" type="m:Charge" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ConsumptionTariffInterval.Charges"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="Currency" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Currency">
  <xs:restriction base="xs:string">
    <xs:enumeration value="AUD"/>
    <xs:enumeration value="CAD"/>
    <xs:enumeration value="CHF"/>
    <xs:enumeration value="CNY"/>
    <xs:enumeration value="DKK"/>
    <xs:enumeration value="EUR"/>
    <xs:enumeration value="GBP"/>
    <xs:enumeration value="INR"/>
    <xs:enumeration value="JPY"/>
    <xs:enumeration value="NOK"/>
    <xs:enumeration value="RUR"/>
    <xs:enumeration value="SEK"/>
    <xs:enumeration value="USD"/>
    <xs:enumeration value="other"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
```

```
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
<xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
<xs:sequence>
<xs:element name="description" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
<xs:element name="name" type="xs:string" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="PricingStructure" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PricingStructure">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="code" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.code"/>
<xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
<xs:element name="dailyCeilingUsage" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.dailyCeilingUsage"/>
<xs:element name="dailyEstimatedUsage" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PricingStructure.dailyEstimatedUsage"/>
<xs:element name="dailyFloorUsage" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.dailyFloorUsage"/>
<xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
<xs:element name="revenueKind" type="m:RevenueKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.revenueKind"/>
<xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
<xs:element name="subject" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
<xs:element name="taxExemption" type="xs:boolean" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.taxExemption"/>
<xs:element name="title" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
<xs:element name="ConfigurationEvents" type="m:ConfigurationEvent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.ConfigurationEvents"/>
<xs:element name="docStatus" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="ServiceCategory" type="m:ServiceCategory" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.ServiceCategory"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
<xs:element name="Tariffs" type="m:Tariff" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.Tariffs"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="RevenueKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#RevenueKind">
<xs:restriction base="xs:string">
<xs:enumeration value="commercial"/>
<xs:enumeration value="industrial"/>
<xs:enumeration value="irrigation"/>
<xs:enumeration value="nonResidential"/>
<xs:enumeration value="other"/>
<xs:enumeration value="residential"/>
<xs:enumeration value="streetLight"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="ServiceCategory" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ServiceCategory">
<xs:sequence>
```

```
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="kind" type="m:ServiceKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceCategory.kind"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="ServiceKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ServiceKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="electricity"/>
    <xs:enumeration value="gas"/>
    <xs:enumeration value="heat"/>
    <xs:enumeration value="internet"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="rates"/>
    <xs:enumeration value="refuse"/>
    <xs:enumeration value="sewerage"/>
    <xs:enumeration value="time"/>
    <xs:enumeration value="tvLicence"/>
    <xs:enumeration value="water"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="SimpleChildCharge" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ChargeKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.kind"/>
    <xs:element name="variablePortion" type="m:PerCent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.variablePortion"/>
    <xs:element name="fixedPortion" type="m:AccountingUnit" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.fixedPortion"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Status" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status">
  <xs:sequence>
    <xs:element name="dateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.dateTime"/>
    <xs:element name="reason" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.reason"/>
    <xs:element name="remark" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.remark"/>
    <xs:element name="value" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Status.value"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Tariff" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
    <xs:element name="endDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff.endDate"/>
    <xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
    <xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
    <xs:element name="startDate" type="xs:date" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff.startDate"/>
    <xs:element name="subject" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
    <xs:element name="title" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
    <xs:element name="docStatus" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
  </xs:sequence>
</xs:complexType>
</xs:sequence>
</xs:complexType>
```

```
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
<xs:element name="TariffProfiles" type="m:TariffProfile" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff.TariffProfiles"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="TariffProfile" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TariffProfile">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
<xs:element name="lastModifiedDateTime" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDateTime"/>
<xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
<xs:element name="subject" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
<xs:element name="tariffCycle" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TariffProfile.tariffCycle"/>
<xs:element name="title" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
<xs:element name="type" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
<xs:element name="ConsumptionTariffIntervals" type="m:ConsumptionTariffInterval" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TariffProfile.ConsumptionTariffIntervals"/>
<xs:element name="docStatus" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.docStatus"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="status" type="m:Status" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.status"/>
<xs:element name="TimeTariffIntervals" type="m:TimeTariffInterval" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TariffProfile.TimeTariffIntervals"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="TimeTariffInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimeTariffInterval">
<xs:sequence>
<xs:element name="sequenceNumber" type="xs:integer" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeTariffInterval.sequenceNumber"/>
<xs:element name="startTime" type="xs:time" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeTariffInterval.startTime"/>
<xs:element name="Charges" type="m:Charge" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TimeTariffInterval.Charges"/>
<xs:element name="ConsumptionTariffIntervals" type="m:ConsumptionTariffInterval" minOccurs="0"
maxOccurs="unbounded" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TimeTariffInterval.ConsumptionTariffIntervals"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="UnitMultiplier" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UnitMultiplier">
<xs:restriction base="xs:string">
<xs:enumeration value="G"/>
<xs:enumeration value="M"/>
<xs:enumeration value="T"/>
<xs:enumeration value="c"/>
<xs:enumeration value="d"/>
<xs:enumeration value="k"/>
<xs:enumeration value="m"/>
<xs:enumeration value="micro"/>
<xs:enumeration value="n"/>
<xs:enumeration value="none"/>
<xs:enumeration value="p"/>
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="RealEnergy" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#RealEnergy">
<xs:restriction base="xs:float"/>
</xs:simpleType>
```

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    <xs:simpleType name="PerCent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#PerCent">
      <xs:restriction base="xs:float"/>
    </xs:simpleType>
  </xs:schema>

```

I.20 ReceiptRecord

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/ReceiptRecord#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://iec.ch/TC57/2011/ReceiptRecord#"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:element name="ReceiptRecord" type="m:ReceiptRecord"/>
  <xs:complexType name="ReceiptRecord">
    <xs:sequence>
      <xs:element name="Receipt" type="m:Receipt" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="BankAccountDetail" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#BankAccountDetail">
    <xs:sequence>
      <xs:element name="accountNumber" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BankAccountDetail.accountNumber"/>
      <xs:element name="bankName" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#BankAccountDetail.bankName"/>
      <xs:element name="branchCode" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BankAccountDetail.branchCode"/>
      <xs:element name="holderID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BankAccountDetail.holderID"/>
      <xs:element name="holderName" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#BankAccountDetail.holderName"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Card" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Card">
    <xs:sequence>
      <xs:element name="accountHolderName" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Card.accountHolderName"/>
      <xs:element name="cvNumber" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Card.cvNumber"/>
      <xs:element name="expiryDate" type="xs:date" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Card.expiryDate"/>
      <xs:element name="pan" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Card.pan"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Cashier" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Cashier">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CashierShift" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CashierShift">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="activityInterval" type="m:DateTimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Shift.activityInterval"/>
      <xs:element name="Cashier" type="m:Cashier" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CashierShift.Cashier"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
      <xs:element name="PointOfSale" type="m:PointOfSale"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CashierShift.PointOfSale"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Cheque" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Cheque">
    <xs:sequence>

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<xs:element name="chequeNumber" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Cheque.chequeNumber"/>
<xs:element name="date" type="xs:date" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Cheque.date"/>
<xs:element name="kind" type="m:ChequeKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Cheque.kind"/>
<xs:element name="micrNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Cheque.micrNumber"/>
<xs:element name="bankAccountDetail" type="m:BankAccountDetail"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Cheque.bankAccountDetail"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="ChequeKind" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#ChequeKind">
<xs:restriction base="xs:string">
<xs:enumeration value="bankOrder"/>
<xs:enumeration value="other"/>
<xs:enumeration value="postalOrder"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#DateTimeInterval">
<xs:sequence>
<xs:element name="end" type="xs:dateTime" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DateTimeInterval.end"/>
<xs:element name="start" type="xs:dateTime" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DateTimeInterval.start"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="LineDetail" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#LineDetail">
<xs:sequence>
<xs:element name="amount" type="m:Money" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#LineDetail.amount"/>
<xs:element name="dateTime" type="xs:dateTime"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LineDetail.dateTime"/>
<xs:element name="note" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LineDetail.note"/>
<xs:element name="rounding" type="m:Money" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#LineDetail.rounding"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="MerchantAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#MerchantAccount">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="currentBalance" type="m:Money"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAccount.currentBalance"/>
<xs:element name="provisionalBalance" type="m:Money"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAccount.provisionalBalance"/>
<xs:element name="MerchantAgreement" type="m:MerchantAgreement" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAccount.MerchantAgreement"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="Transactors" type="m:Transactor" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAccount.Transactors"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="MerchantAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#MerchantAgreement">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
<xs:sequence>
<xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
<xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
</xs:sequence>
</xs:complexType>
```



```
</xs:complexType>
<xs:complexType name="VendorShift" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#VendorShift">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="merchantDebitAmount" type="m:Money" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#VendorShift.merchantDebitAmount"/>
    <xs:element name="posted" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#VendorShift.posted"/>
    <xs:element name="activityInterval" type="m:DateTimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Shift.activityInterval"/>
    <xs:element name="MerchantAccount" type="m:MerchantAccount" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#VendorShift.MerchantAccount"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="Vendor" type="m:Vendor" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#VendorShift.Vendor"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="Money" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Money">
  <xs:restriction base="xs:decimal"/>
</xs:simpleType>
</xs:schema>
```

I.21 TransactionRecord

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/TransactionRecord#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/TransactionRecord#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="TransactionRecord" type="m:TransactionRecord"/>
  <xs:complexType name="TransactionRecord">
    <xs:sequence>
      <xs:element name="Transaction" type="m:Transaction" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="AuxiliaryAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#AuxiliaryAccount">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="balance" type="m:Money" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AuxiliaryAccount.balance"/>
      <xs:element name="principleAmount" type="m:Money" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#AuxiliaryAccount.principleAmount"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Cashier" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Cashier">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CashierShift" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#CashierShift">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="cashFloat" type="m:Money" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CashierShift.cashFloat"/>
      <xs:element name="activityInterval" type="m:DateTimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Shift.activityInterval"/>
      <xs:element name="Cashier" type="m:Cashier" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CashierShift.Cashier"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```



```
<xs:element name="PointOfSale" type="m:PointOfSale"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CashierShift.PointOfSale"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Charge" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ChargeKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.kind"/>
    <xs:element name="ChildCharges" type="m:ChildCharge" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.ChildCharges"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="ChargeKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#ChargeKind">
  <xs:restriction base="xs:string">
    <xs:enumeration value="auxiliaryCharge"/>
    <xs:enumeration value="consumptionCharge"/>
    <xs:enumeration value="demandCharge"/>
    <xs:enumeration value="other"/>
    <xs:enumeration value="taxCharge"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ChildCharge" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="kind" type="m:ChargeKind" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.kind"/>
    <xs:element name="variablePortion" type="m:PerCent" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Charge.variablePortion"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="CustomerAccount" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="billingCycle" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount.billingCycle"/>
    <xs:element name="budgetBill" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#CustomerAccount.budgetBill"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="DateTimeInterval" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval">
  <xs:sequence>
    <xs:element name="end" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.end"/>
    <xs:element name="start" type="xs:dateTime" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DateTimeInterval.start"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="LineDetail" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LineDetail">
  <xs:sequence>
    <xs:element name="amount" type="m:Money" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LineDetail.amount"/>
    <xs:element name="dateTime" type="xs:dateTime"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LineDetail.dateTime"/>
    <xs:element name="note" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LineDetail.note"/>
    <xs:element name="rounding" type="m:Money" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#LineDetail.rounding"/>
  </xs:sequence>
</xs:complexType>
```

```
<xs:complexType name="MerchantAccount" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAccount">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
    <xs:element name="currentBalance" type="m:Money" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAccount.currentBalance"/>
    <xs:element name="lastModifiedDate" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDate"/>
    <xs:element name="provisionalBalance" type="m:Money" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAccount.provisionalBalance"/>
    <xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
    <xs:element name="subject" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
    <xs:element name="MerchantAgreement" type="m:MerchantAgreement" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAccount.MerchantAgreement"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="Transactors" type="m:Transactor" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAccount.Transactors"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="MerchantAgreement" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#MerchantAgreement">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="createdDateTime" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.createdDateTime"/>
    <xs:element name="lastModifiedDate" type="xs:dateTime" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.lastModifiedDate"/>
    <xs:element name="revisionNumber" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.revisionNumber"/>
    <xs:element name="subject" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.subject"/>
    <xs:element name="title" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.title"/>
    <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Document.type"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Meter" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Meter">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
  <xs:sequence>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.name"/>
    <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
```

```
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PointOfSale" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PointOfSale">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="location" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PointOfSale.location"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PricingStructure" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="Tariffs" type="m:Tariff" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PricingStructure.Tariffs"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Receipt" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Receipt">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Tariff" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="endDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff.endDate"/>
    <xs:element name="startDate" type="xs:date" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff.startDate"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="TariffProfiles" type="m:TariffProfile" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Tariff.TariffProfiles"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="TariffProfile" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#TariffProfile">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Transaction" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="diverseReference" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.diverseReference"/>
    <xs:element name="donorReference" type="xs:string"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.donorReference"/>
    <xs:element name="kind" type="m:TransactionKind"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.kind"/>
  </xs:sequence>
</xs:complexType>
```

```
<xs:element name="receiverReference" type="xs:string"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.receiverReference"/>
<xs:element name="reversedId" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.reversedId"/>
<xs:element name="serviceUnitsEnergy" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.serviceUnitsEnergy"/>
<xs:element name="serviceUnitsError" type="m:RealEnergy" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.serviceUnitsError"/>
<xs:element name="AuxiliaryAccount" type="m:AuxiliaryAccount" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.AuxiliaryAccount"/>
<xs:element name="CashierShift" type="m:CashierShift" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.CashierShift"/>
<xs:element name="CustomerAccount" type="m:CustomerAccount" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.CustomerAccount"/>
<xs:element name="line" type="m:LineDetail" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Transaction.line"/>
<xs:element name="Meter" type="m:Meter" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.Meter"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
<xs:element name="PricingStructure" type="m:PricingStructure" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.PricingStructure"/>
<xs:element name="Receipt" type="m:Receipt" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.Receipt"/>
<xs:element name="UserAttributes" type="m:UserAttribute" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.UserAttributes"/>
<xs:element name="VendorShift" type="m:VendorShift" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Transaction.VendorShift"/>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="TransactionKind" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#TransactionKind">
<xs:restriction base="xs:string">
<xs:enumeration value="accountPayment"/>
<xs:enumeration value="auxiliaryChargePayment"/>
<xs:enumeration value="diversePayment"/>
<xs:enumeration value="meterConfigurationToken"/>
<xs:enumeration value="other"/>
<xs:enumeration value="serviceChargePayment"/>
<xs:enumeration value="taxChargePayment"/>
<xs:enumeration value="tokenCancellation"/>
<xs:enumeration value="tokenExchange"/>
<xs:enumeration value="tokenFreeIssue"/>
<xs:enumeration value="tokenGrant"/>
<xs:enumeration value="tokenSalePayment"/>
<xs:enumeration value="transactionReversal"/>
</xs:restriction>
</xs:simpleType>
<xs:complexType name="Transactor" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Transactor">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="UserAttribute" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UserAttribute">
<xs:sequence>
<xs:element name="name" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UserAttribute.name"/>
<xs:element name="sequenceNumber" type="xs:integer"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UserAttribute.sequenceNumber"/>
<xs:element name="value" type="m:StringQuantity"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UserAttribute.value"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="Vendor" sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#Vendor">
<xs:sequence>
<xs:element name="mRID" type="xs:string" minOccurs="0"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
<xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawSDL:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
</xs:sequence>
</xs:complexType>
```

```

</xs:complexType>
<xs:complexType name="VendorShift" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#VendorShift">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="merchantDebitAmount" type="m:Money" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#VendorShift.merchantDebitAmount"/>
    <xs:element name="posted" type="xs:boolean" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#VendorShift.posted"/>
    <xs:element name="activityInterval" type="m:DateTimeInterval" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Shift.activityInterval"/>
    <xs:element name="MerchantAccount" type="m:MerchantAccount" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#VendorShift.MerchantAccount"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="Vendor" type="m:Vendor" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#VendorShift.Vendor"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="RealEnergy" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#RealEnergy">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="StringQuantity" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#StringQuantity">
  <xs:restriction base="xs:string"/>
</xs:simpleType>
<xs:simpleType name="PerCent" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#PerCent">
  <xs:restriction base="xs:float"/>
</xs:simpleType>
<xs:simpleType name="Money" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Money">
  <xs:restriction base="xs:decimal"/>
</xs:simpleType>
</xs:schema>

```

I.22 UsagePointGroups

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns="http://langdale.com.au/2005/Message#" xmlns:a="http://langdale.com.au/2005/Message#"
xmlns:m="http://iec.ch/TC57/2011/UsagePointGroups#" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://iec.ch/TC57/2011/UsagePointGroups#" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="UsagePointGroups" type="m:UsagePointGroups"/>
  <xs:complexType name="UsagePointGroups">
    <xs:sequence>
      <xs:element name="DemandResponseProgram" type="m:DemandResponseProgram" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="UsagePointGroup" type="m:UsagePointGroup" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="DemandResponseProgram" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#DemandResponseProgram">
    <xs:sequence>
      <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
      <xs:element name="type" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#DemandResponseProgram.type"/>
      <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Name" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name">
    <xs:sequence>
      <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#Name.name"/>
      <xs:element name="NameType" type="m:NameType" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#Name.NameType"/>
    </xs:sequence>

```

```
</xs:complexType>
<xs:complexType name="NameType" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameType">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameType.name"/>
    <xs:element name="NameTypeAuthority" type="m:NameTypeAuthority" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameType.NameTypeAuthority"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="NameTypeAuthority" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#NameTypeAuthority">
  <xs:sequence>
    <xs:element name="description" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#NameTypeAuthority.description"/>
    <xs:element name="name" type="xs:string" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-
schema-cim15#NameTypeAuthority.name"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePoint" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePoint">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="UsagePointGroup" sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePointGroup">
  <xs:sequence>
    <xs:element name="mRID" type="xs:string" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.mRID"/>
    <xs:element name="DemandResponsePrograms" minOccurs="0"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#UsagePointGroup.DemandResponsePrograms">
      <xs:complexType sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-
cim15#DemandResponseProgram">
        <xs:attribute name="ref" type="xs:string"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="Names" type="m:Name" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#IdentifiedObject.Names"/>
    <xs:element name="UsagePoints" type="m:UsagePoint" minOccurs="0" maxOccurs="unbounded"
sawsdl:modelReference="http://iec.ch/TC57/2010/CIM-schema-cim15#UsagePointGroup.UsagePoints"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>
```


Annex J (normative)

Request parameters

J.1 General

The purpose of this Annex J is to describe filters that can be used for "GET" requests in order to filter the contents of the payload that is returned on the REPLY message. This is in effect a "query" pattern. If needed, these filters can be defined as contextual profiles in a manner similar to those used to define payloads. Those structures are then realized as XML schemas. The payloads would be used in the "any ##other" element of the request structure in a request message (see Figure J.1).

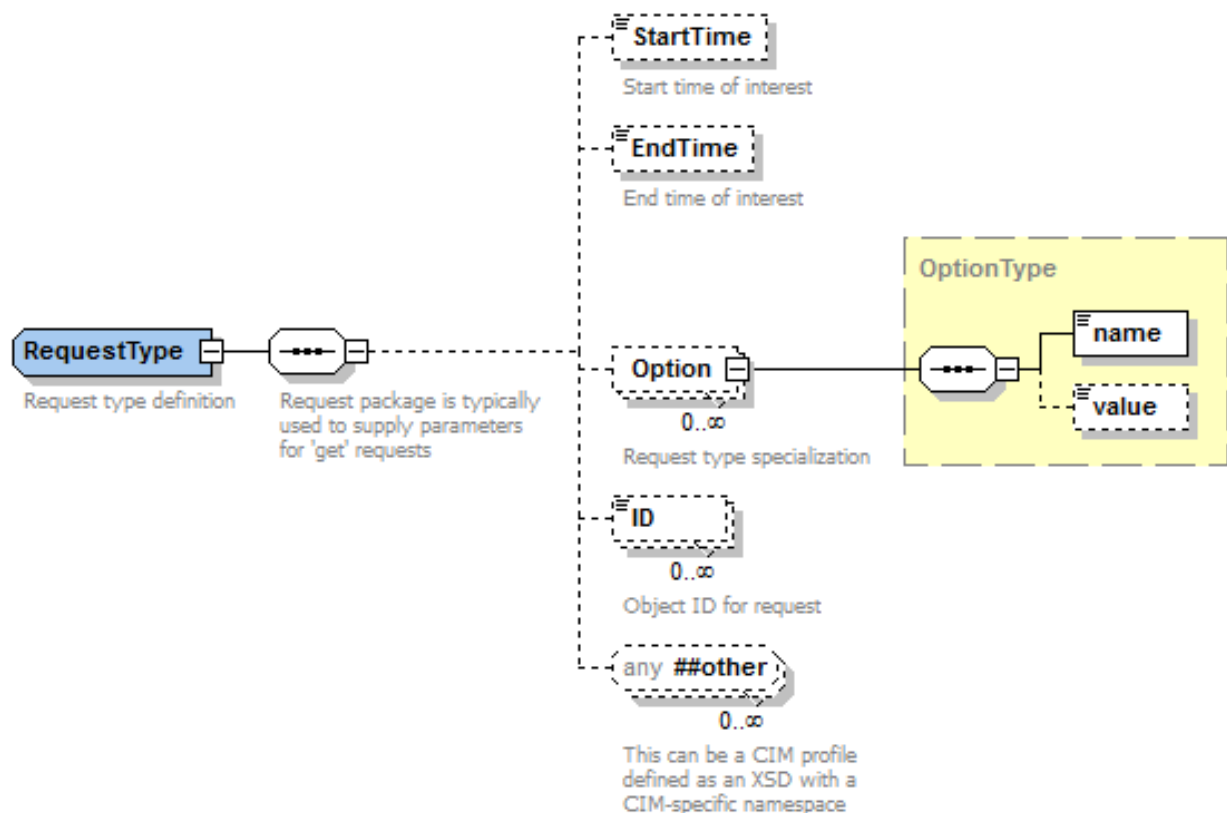


Figure J.1 – Message request structure

The "StartTime" and "EndTime" tags are often used to narrow the results to a given time interval. The "ID" tags can be used to specify the mRIDs for a set of objects of interest. The "Option" parameter provides for name/value pairs that can also be used to meet specific application needs.

Other qualifiers can be specified using the "any ##other" element as needed, which are referred to as "Get" profiles. When "Get" profiles are used, the Request.ID elements should not be used. A "Get" profile primarily is used to identify object IDs (by name or mRID) for specific classes of objects.

Clauses J.2 to J.5 describe "Get" profiles, which are named as "Get<Noun>" and corresponding XSD file name as "Get<Noun>.xsd". Except for "PrePay" profiles, the

convention for IEC 61968-9 is to define a "Get" profile for each noun. In the case of PrePay profiles, it would be possible to rename one of the existing "Get" profiles if needed. In all cases where a "Get" profile is used, the parameters defined within the "Get" profile shall be used in preference over generic parameters defined in the Request package.

J.2 GetMeterReadings

The following structure in Figure J.2 is a contextual profile that can be used to qualify "GET MeterReadings" requests. This provides a representative example of how mRIDs, names and time may be specified within a "Get" profile to qualify a query.

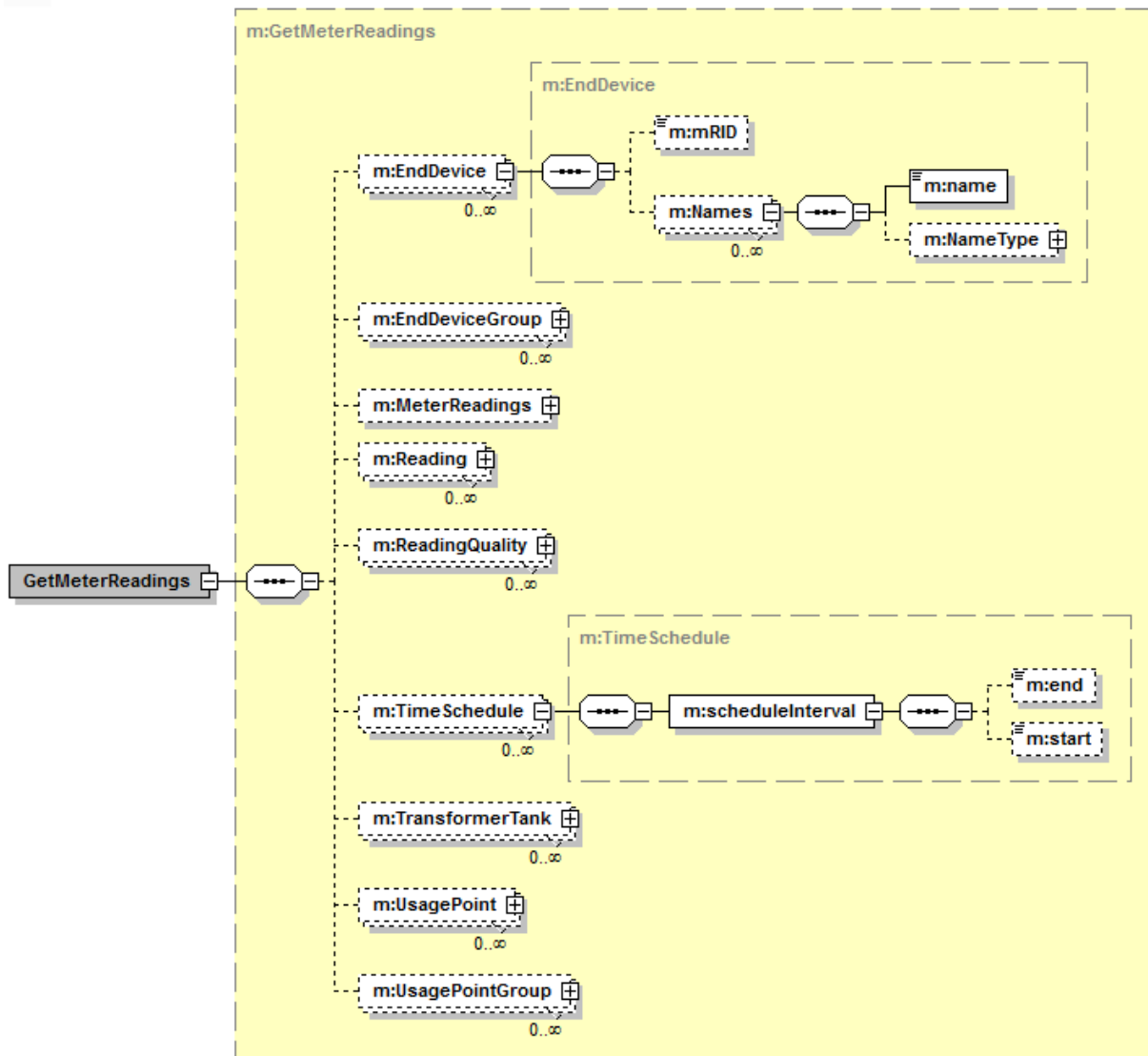


Figure J.2 – GetMeterReadings

J.3 GetEndDeviceConfig

The following structure in Figure J.3 is a contextual profile that can be used to qualify "GET EndDeviceConfig" requests.

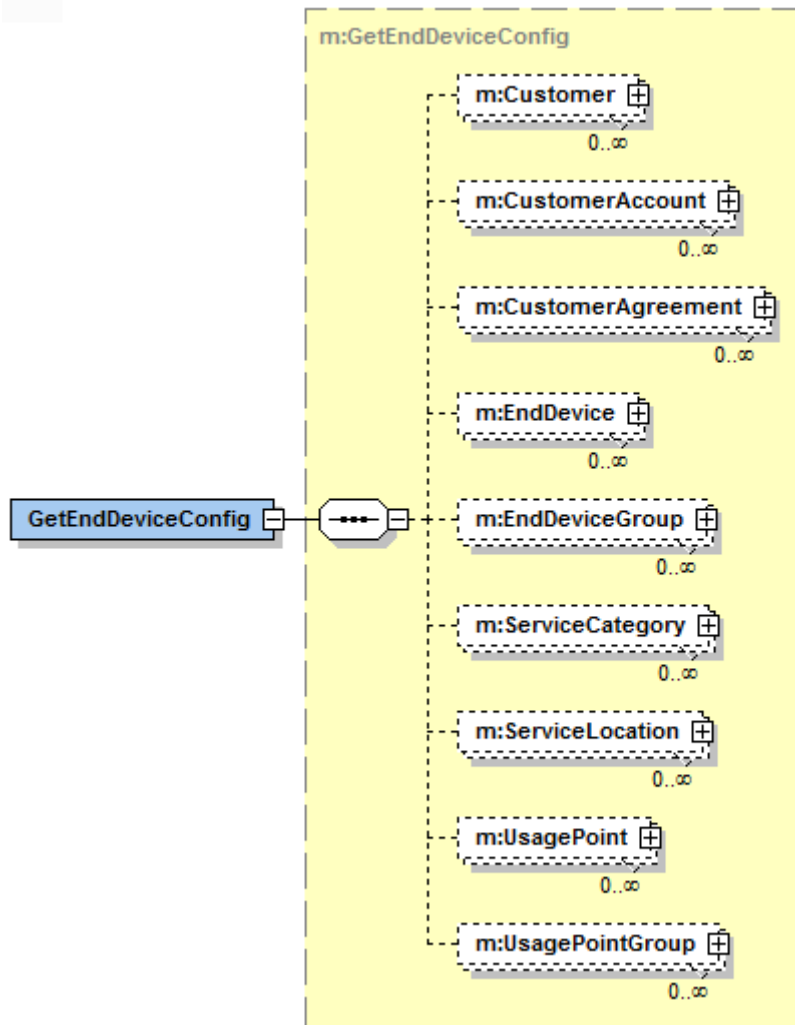


Figure J.3 – GetEndDeviceConfig

J.4 GetCustomerMeterDataSet

The following structure in Figure J.4 is a contextual profile that can be used to qualify "GET CustomerMeterDataSet" requests.

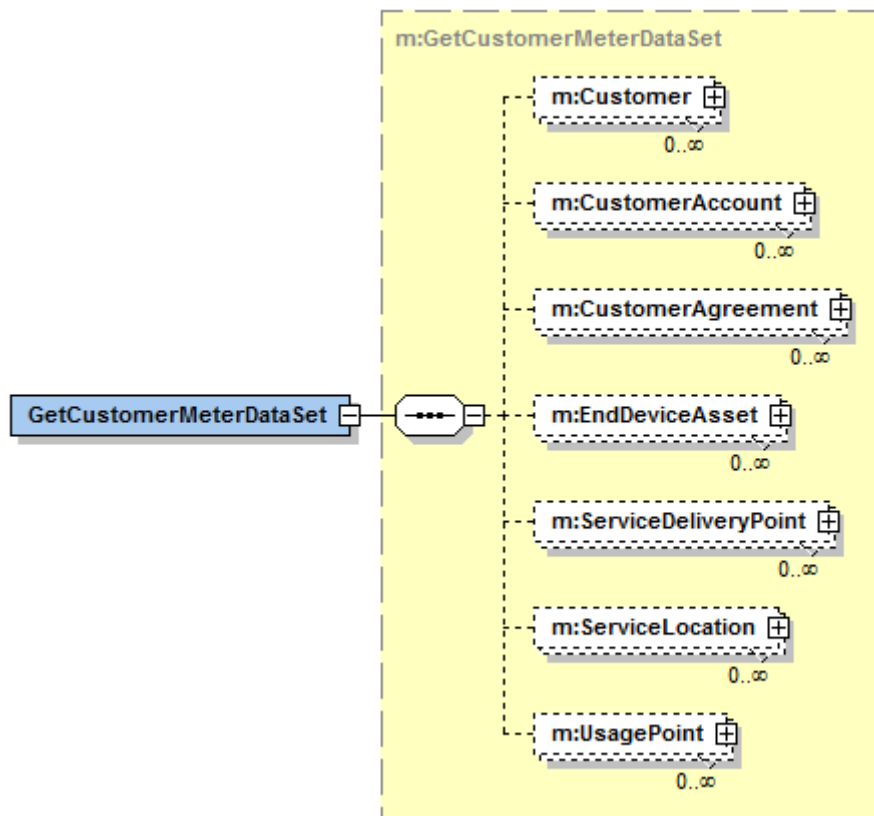


Figure J.4 – GetCustomerMeterDataSet

J.5 GetMeterServiceRequests

The following structure in Figure J.5 is a contextual profile that can be used to qualify "GET MeterService" requests.

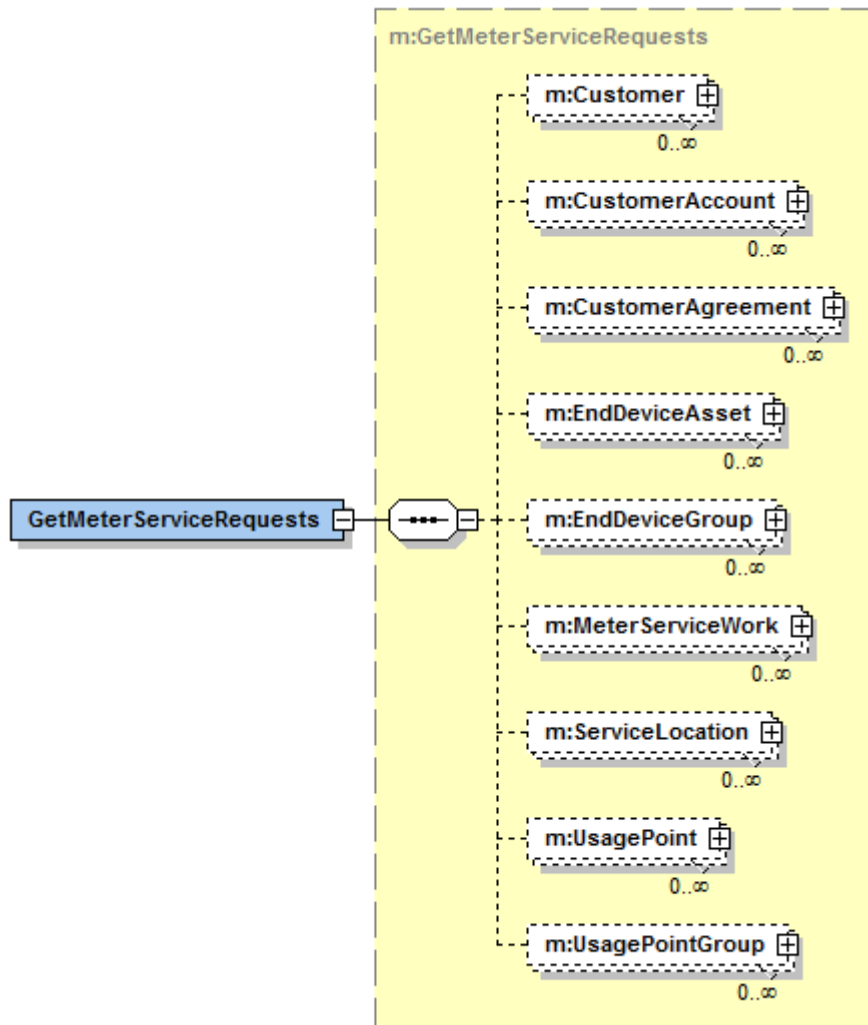


Figure J.5 – GetMeterServiceRequests

The previous ""Get" profiles are representative examples that are commonly used. The complete list of ""Get" profiles include the following:

- GetAuxiliaryAgreementConfig
- GetComModuleConfig
- GetCustomerAccountConfig
- GetCustomrAgreementConfig
- GetCustomerConfig
- GetCustomerMeterDataSet
- GetEndDeviceConfig
- GetEndDeviceControls
- GetEndDeviceEvents
- GetEndDeviceFirmware
- GetEndDeviceGroups
- GetMeterConfig
- GetMeterReadings
- GetMeterReadSchedule

- GetMeterServiceRequests
- GetPricingStructureConfig
- GetReceiptRecord
- GetServiceCategoryConfig
- GetServiceLocationConfig
- GetServiceSupplierConfig
- GetTransactionRecord
- GetUsagePointConfig
- GetUsagePointGroups
- GetUsagePointLocationConfig

The XML schemas for ""Get" profiles are provided in Annexes H and I.

Annex K (normative)

Master data management transaction processing

K.1 General

The purpose of this Annex K is to describe how transaction processing is performed in order to support the master data management needs of IEC 61968-9.

For this edition of IEC 61968-9, the Message.xsd message envelope has been extended to accommodate an OperationSet construct in both the payload and reply portions of Message.xsd. Refer to Figures K.1 and K.2 for a depiction of the OperationSet constructs.

There are two circumstances where the use of OperationSet is normative in IEC 61968-9 master data management:

- When modifying the configuration of a CIM object related to master data management (e.g. nouns including but not limited to: MeterConfig, CustomerConfig, UsagePointConfig, PricingStructureConfig, etc.) and the modification involves deleting one or more attributes or one or more instances of associated CIM objects. An example is removing a Register configuration from a Meter.
- When performing two or more related Master Data Management actions that shall be handled in a specific sequence and/or with overall transactional integrity (i.e. either all actions shall succeed or all shall be rolled back).

An IEC 61968-9 message utilizing the OperationSet construct always has a Header verb of either “execute” or “executed” and a noun of “OperationSet”. An OperationSet in turn contains one or more Operations, and each Operation has an operationId which supplements the overall message CorrelationID to provide a fine-grained ability to correlate the contents of one or more reply messages with the individual Operations in an OperationSet. Individual Operations within an OperationSet have OperationSet-level verbs and nouns. Allowable verbs are create, created, change, changed, delete and deleted.

To support circumstance a) above, each Operation in an OperationSet includes an elementOperation boolean. This boolean is to be set to “true” when the Operation verb is either “delete” or “deleted” and the intent is to delete individual attributes or individual instances of associated CIM classes from the object specified by the OperationSet noun (as opposed to deleting the entire CIM object specified by the Operation noun). It is emphasized that in this case (with an elementOperation boolean set to “true”), use of the Operation verb “delete” or “deleted” effectively modifies rather than deletes the CIM object specified by the Operation noun. If omitted, elementOperation is assumed to be “false”.

To support circumstance b) above, each OperationSet may have either an enforceMsgSequence boolean or an enforceTransactionalIntegrity boolean, or both. The enforceMsgSequence boolean is to be set to “true” when the Operations in the OperationSet shall be executed in ascending order of their operationID. The enforceTransactionalIntegrity boolean is to be set to “true” if all Operations in the OperationSet shall succeed. In this case, if all such Operations do not succeed, all shall be aborted or rolled back. If either or both of these booleans are omitted, they are assumed to be “false”.

When modifying the configuration of a CIM object related to IEC 61968-9 master data management using any of the verbs “change”, “changed”, “delete” or “deleted”, only the ID of the object being changed and the information that is being changed is to be included. This is true whether or not an OperationSet is being used. It is for this reason that almost all elements within the IEC 61968-9 Master Data Management Profiles are optional in the profiles.

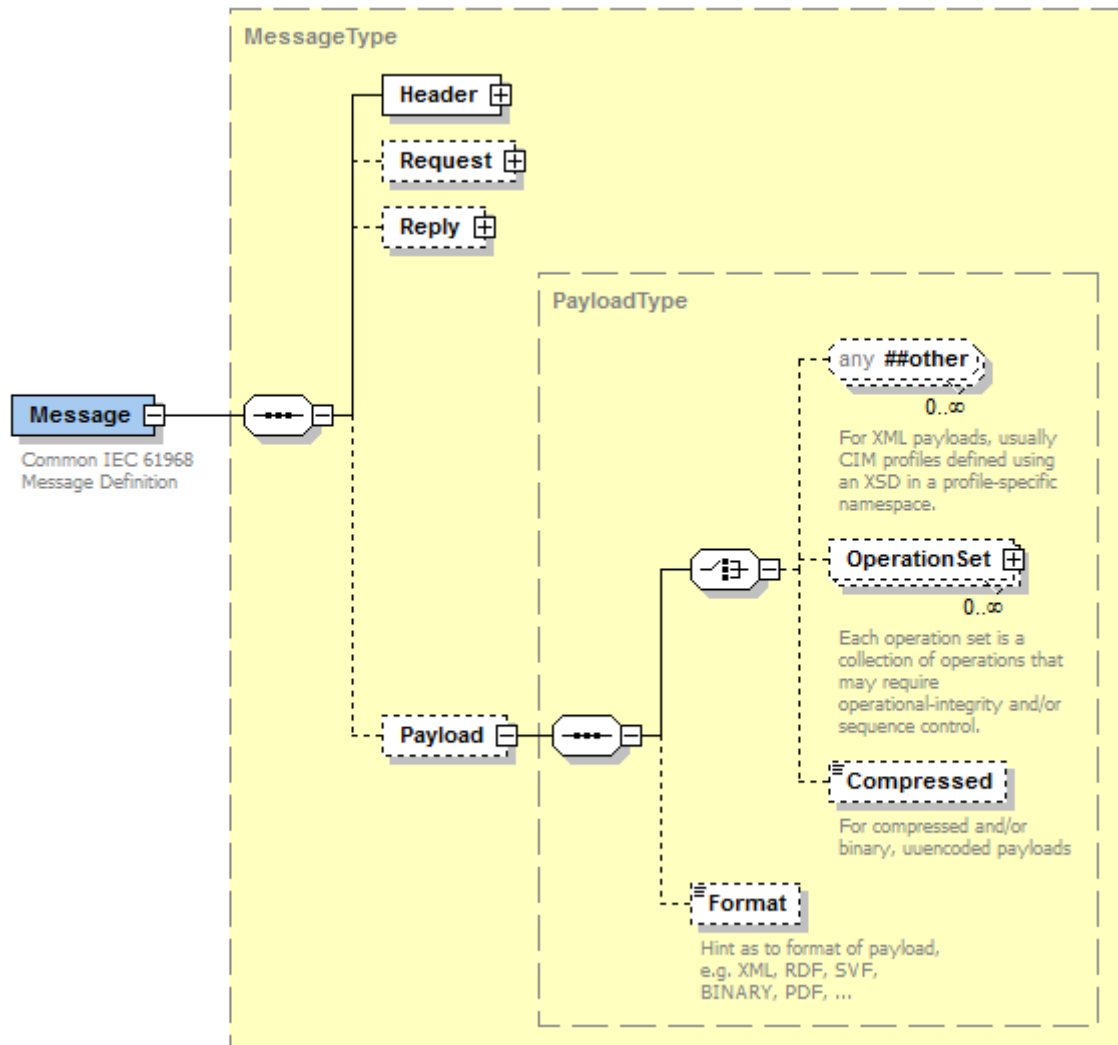


Figure K.1 – Message Envelope Extension

Only one OperationSet may be included in a single IEC 61968-9 master data management message.

It should also be noted that while this standard provides the means to convey master data management transactions using XML schema-based data structures, it is also technically possible to leverage IEC 61970-552 for transactions based upon RDF. Such capability may or may not be provided in future editions of the IEC 61968-9 and IEC 61968-100 standards.

K.2 OperationSet

The diagram in Figure K.2 describes the OperationSet element in more detail. An OperationSet can:

Require that each operation is sequentially executed by setting the enforceMsgSequence flag to "true".

Require that transactional integrity be maintained (i.e. all or nothing), by setting the enforceTransactionalIntegrity flag to "true".

Have one or more Operations, where each operation has a noun, verb and payload.

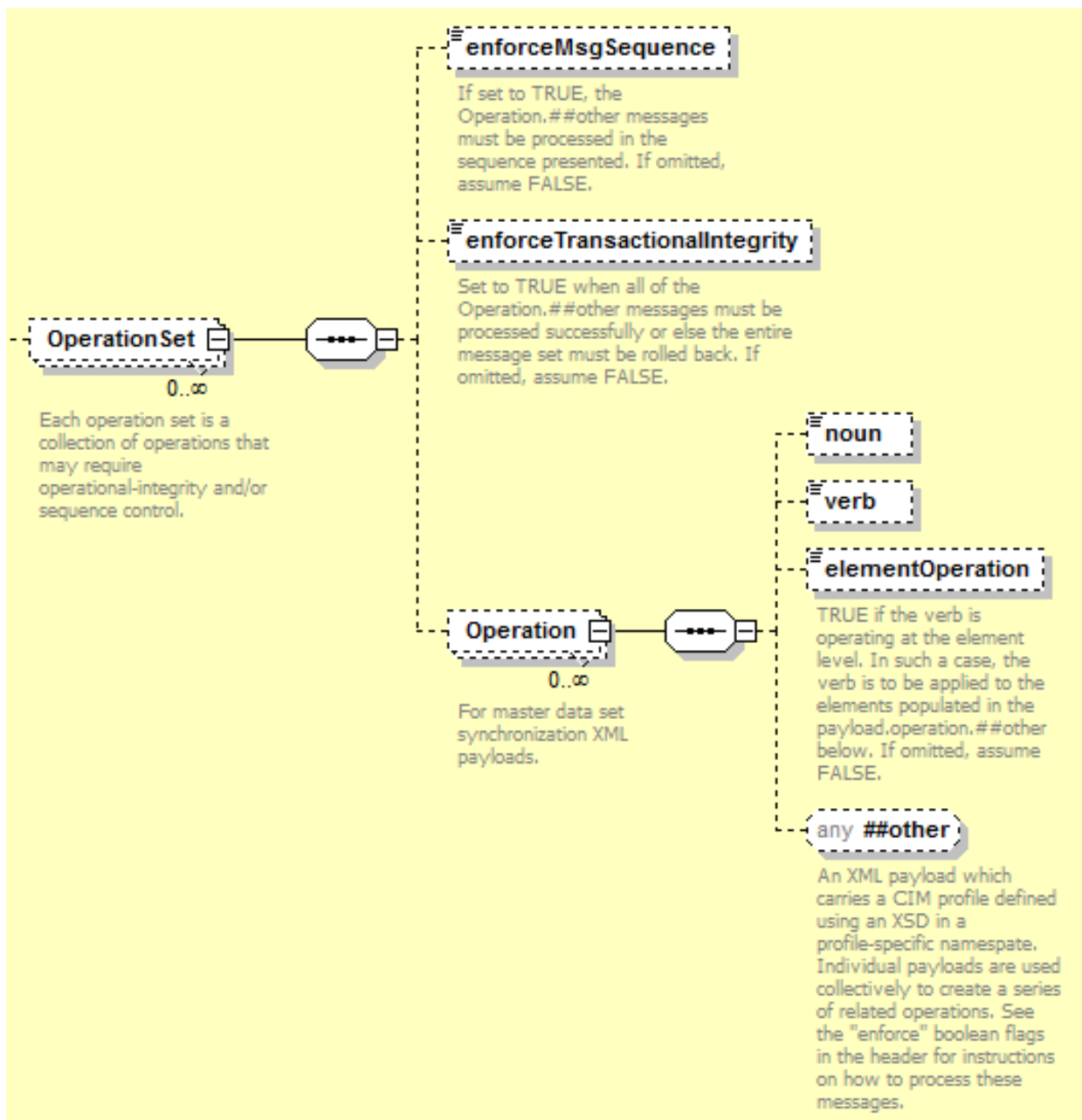


Figure K.2 – OperationSet

Within the Operation element, the noun will identify the type of the “any” element. The elementOperation value will cause the transaction to either act upon the object or elements within the object. Please refer also to examples provided at the end of Annex L.

K.3 Patterns

Any given IEC 61968-9 master data management transaction may be executed using either a request-response message pattern (request stereotype and response stereotype messages) or a published event message pattern (event stereotype messages). Four exemplary sequence diagrams effectively illustrate the possible variations.

NOTE The “source of record” for IEC 61968-9 master data management information is frequently a Customer Information System (IEC 61968-8). Recipients of this information are typically other enterprise systems such as

meter data management systems and metering systems. However, there are no restrictions on which systems may issue and receive IEC 61968-9 master data management messages.

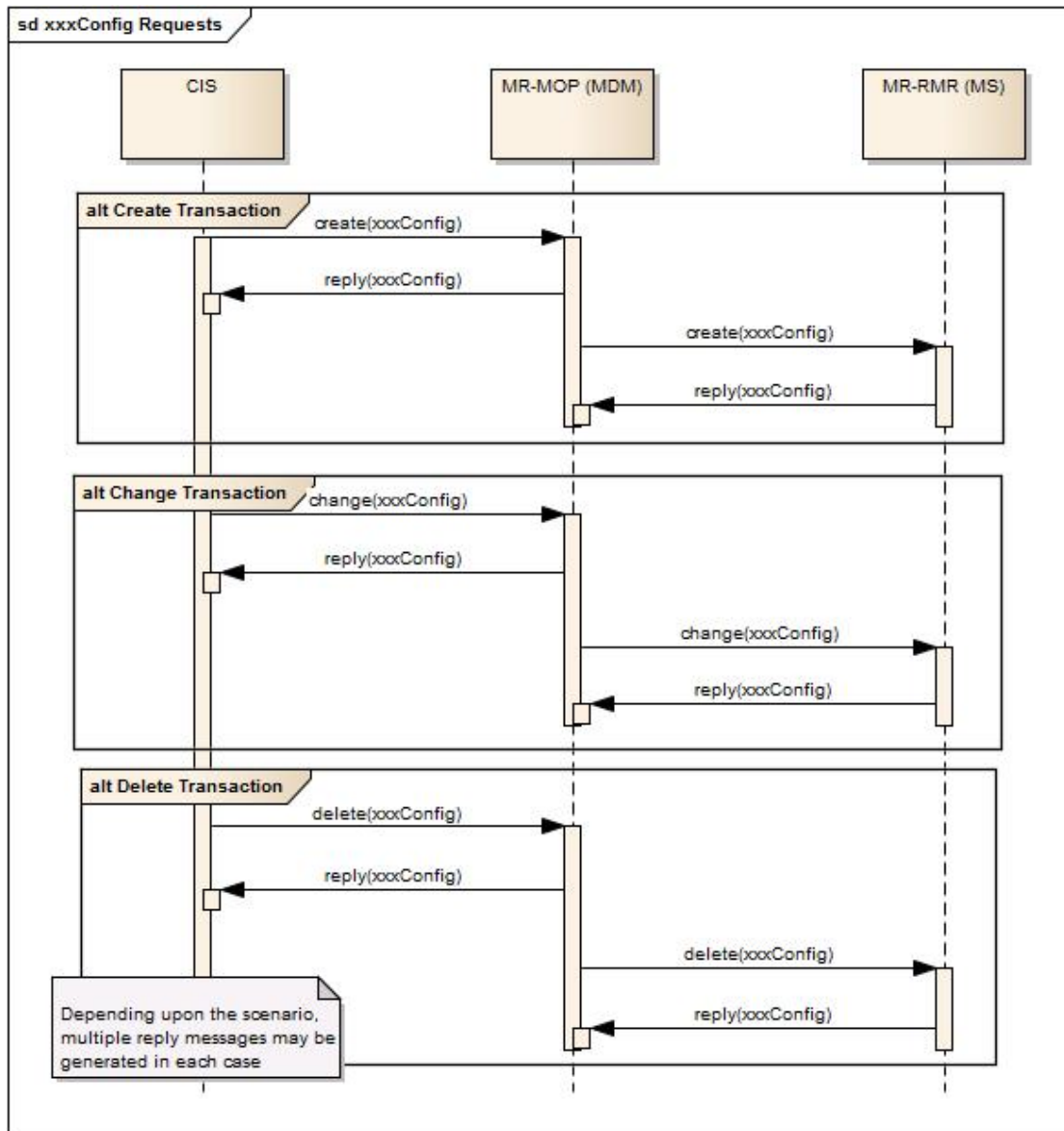


Figure K.3 – Pattern 1: Request/response (non-OperationSet)

This request / response pattern can be used for any of the Master Data Management “config” transactions identified in 5.10.3 as well as for the MasterDataLinkageConfig and ObjectNamesConfig transactions. Simply replace the occurrences of “xxxConfig” in the diagram with the appropriate profile name (noun). Allowable verbs are “create”, “change” and “delete”. Depending upon the scenario, there can be multiple replies to a given create, change, or delete message. For example, a single create message can be issued to create multiple meters. In this case, the responding system can send a single reply message for all meters or multiple reply messages with the reply data for one or more meters in each message.

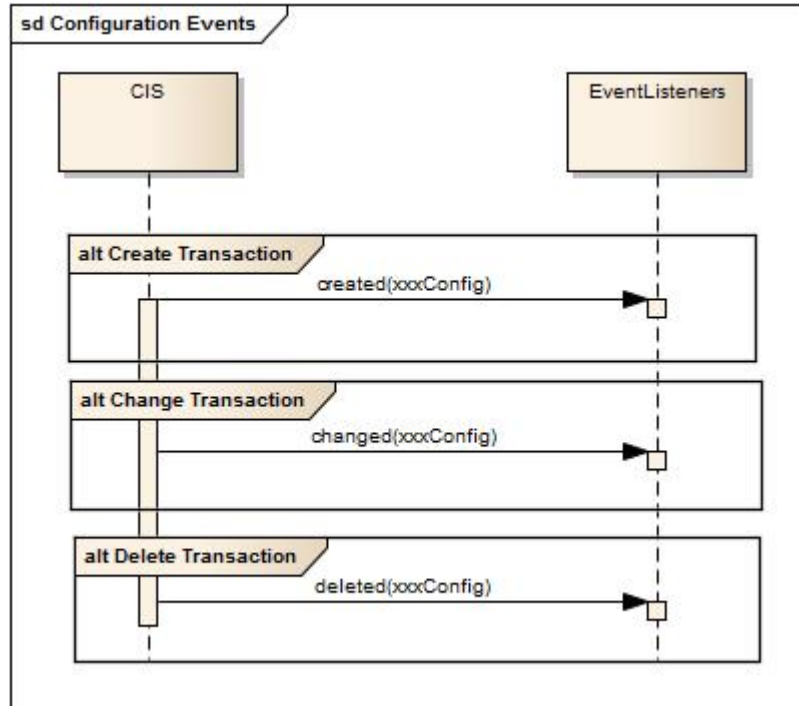


Figure K.4 – Pattern 2: published event (non-OperationSet)

This published event pattern can also be used for any of the Master Data Management “config” transactions identified in 5.10.3 as well as for the MasterDataLinkageConfig and ObjectNamesConfig transactions. Simply replace the occurrences of “xxxConfig” in the diagram with the appropriate profile name (noun). Allowable verbs are “created”, “changed” and “deleted”. Using this pattern, an enterprise system may notify one or more other enterprise systems of Master Data Management events without requiring any acknowledgment or confirmation of successful processing.

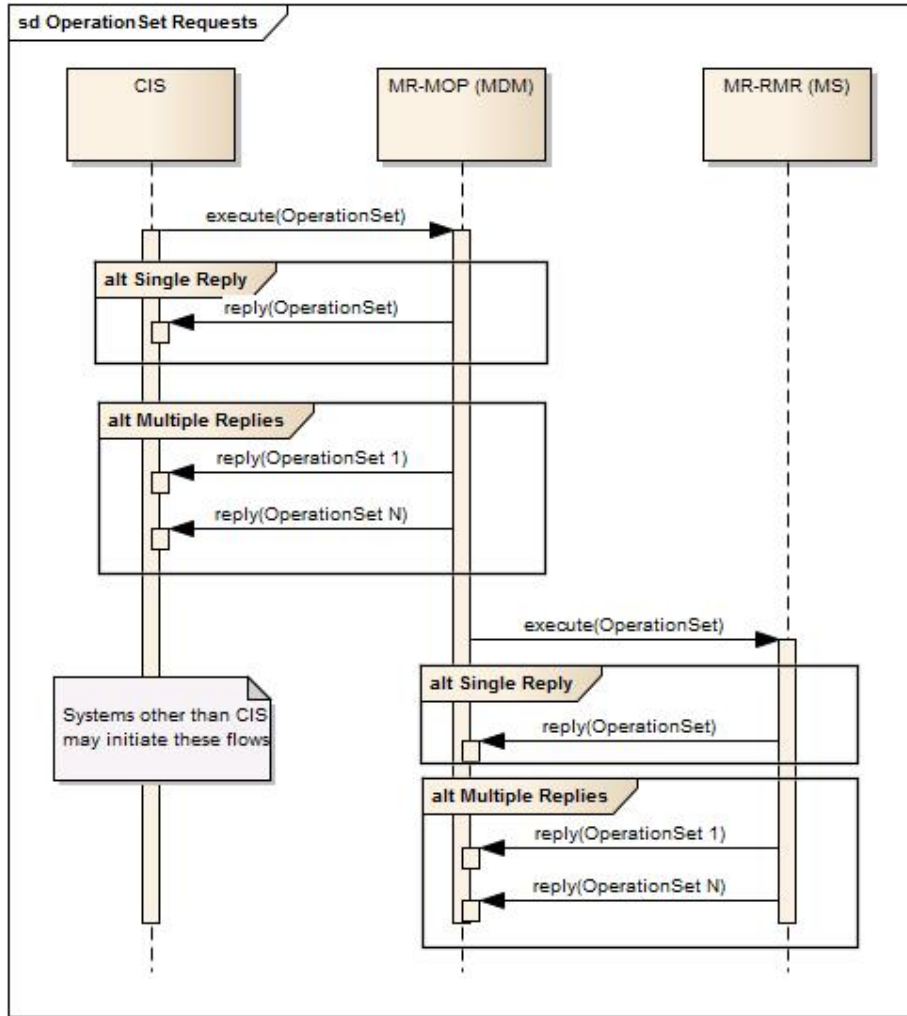


Figure K.5 – Pattern 3: Request/response (OperationSet)

This request / response pattern can be used for any Master Data Management transaction involving an OperationSet. The verb in the message Header is always “execute”. The individual Operation(s) within the Operation set can have verbs and nouns consistent with the request / response transaction in Pattern 1. Depending upon the scenario, there can be multiple replies to a given execute / OperationSet transaction. For example, a single reply message can be sent for the entire OperationSet, or multiple reply messages can be sent, each with the reply data for one or more Operations in each message. The operationID element for each Operation in the request message is supplied in the reply message(s). This is used, in conjunction with the overall CorrelationID in the message Header(s) to correlate replies with their corresponding requests.

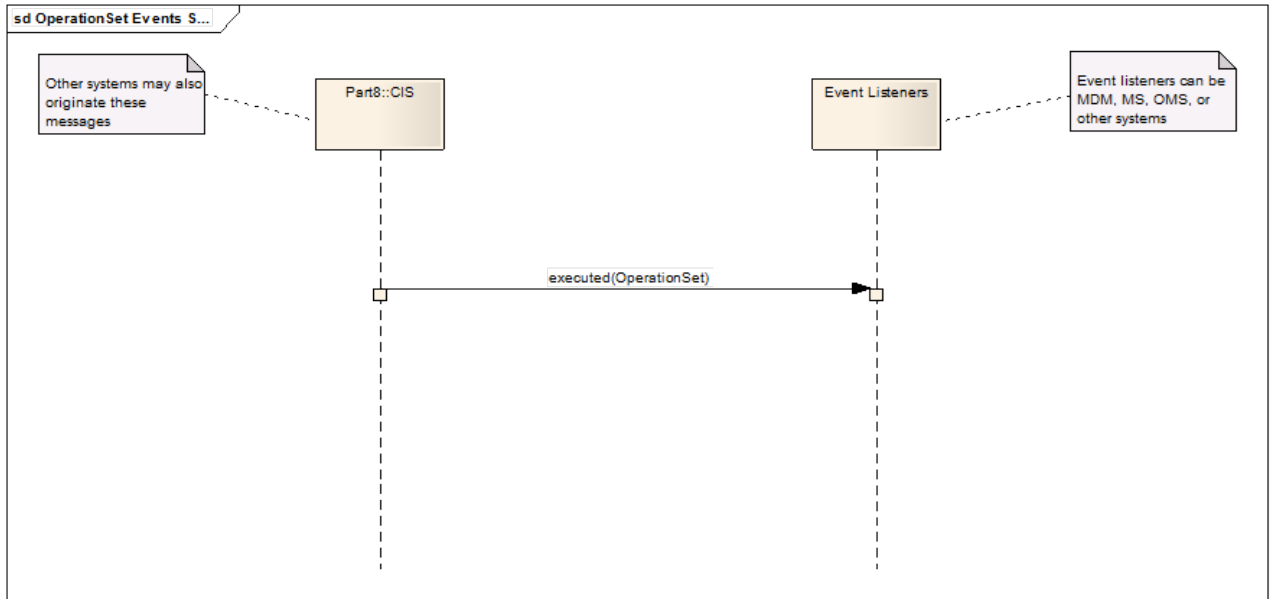


Figure K.6 – Pattern 4: published event (OperationSet)

This published event pattern can also be used for any Master Data Management transaction involving an OperationSet. The verb in the message Header is always “executed”. The individual Operation(s) within the Operation set can have verbs and nouns consistent with the published event transaction in Pattern 2. Using this pattern, an enterprise system may notify one or more other enterprise systems of Master Data Management OperationSet events without requiring any acknowledgment or confirmation of successful processing.

Annex L (informative)

Master data management use cases and sample XML

L.1 General

The purpose of this annex is to provide a description of informative use cases related to master data management. It also provides sample XML to illustrate the intended usage of the Master Data Management / Data Synchronization related profiles.

Table L.1 that follows identifies 53 exemplary Master Data Management / Data Synchronization use cases and provides guidance on how to construct and populate the request or event stereotype message for each use case.

In actual practice, use cases that utilize the request / response messaging pattern (See Annex K) will have an optional simple acknowledgment message (verb = “reply”, Result = “OK” and Reply.Error.code = “0.3”) and one or more response messages (verb = “reply”) indicating success or failure of each individual config operation in a given request message.

Following the table are sample XML examples that illustrate the messages exchanged for several exemplary use cases utilizing the request / response pattern. While only a limited number of use cases are presented with their sample XML, the examples provided are sufficient to illustrate the intended usage of all of the IEC 61968-9 master data management related profiles.

The sample XML provided includes population of the IEC 61968 elements from the Message envelope (Message.xsd from IEC 61968-100) as well as the payloads described in this standard. Including the content in the Header, Request, Reply and Payload sections of the message is necessary to illustrate the intended use of the messages, especially in the cases where OperationSet is employed.

The sample XML provided includes population of only a small subset of the attributes available for fully describing the “configurations” of Meters, UsagePoints, and other CIM objects. It is not the intent of these use cases to provide full configuration details for these objects; it is simply to illustrate the techniques involved in creating, modifying, and deleting these objects as well as the techniques for managing the relationships between these objects using the MasterDataLinkageConfig profile. Also illustrated is the use of the OperationSet in both of its two normative uses as described in 5.10 and Annex K:

- When modifying the configuration of a CIM object related to Master Data Management (e.g. nouns including but not limited to: MeterConfig, CustomerConfig, UsagePointConfig, PricingStructureConfig, etc.) and the modification involves deleting one or more attributes or one or more instances of associated CIM objects. An example is removing a Register configuration from a Meter.
- When performing two or more related Master Data Management actions that shall be handled in a specific sequence and/or with overall transactional integrity (i.e. either all actions shall succeed or all shall be rolled back).

Please refer also to 5.10, Annex K and IEC 61968-100 for additional information related to master data management / data synchronization.

Table L.1 – Exemplary master data management / data synchronization use cases

Use Case #	DS-1	DS-2	DS-3	DS-4
Use Case Description	Create a meter and / or receive meter into Inventory	Add or update one or more simple attributes for a meter in inventory	Delete one or more simple attributes for a meter in inventory	Add an additional instance of a class such as Register to a meter in inventory
Header Verb	create/created	change/changed	execute/executed	change/changed
Header Noun	MeterConfig	MeterConfig	OperationSet	MeterConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	delete/deleted	n/a
Op Set Noun	n/a	n/a	MeterConfig	n/a
Element Flag	n/a	n/a	"true"	n/a
Payload Description	1) ID of the Meter 2) As many details about the Meter as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the Meter 2) Attributes that are being added or modified 3) Effectivity dates and reason as appropriate	1) ID of the Meter 2) Attributes that are being deleted 3) Effectivity dates and reason as appropriate	1) ID of the Meter 2) ID and details of the Register being added 3) Effectivity dates and reason as appropriate
Relationship Line	n/a	n/a	n/a	n/a
Comments	Meter ID can be either an mRID and/or one or more Names.name. Present tense of verbs used for request/reply patterns; past tense used for published notifications (no reply).	Simple attributes have only one occurrence at any given location within the schema.	An OperationSet is required (even though there is only one operation specified) because it is necessary to set the Element Flag; otherwise the delete/deleted verb with the MeterConfig noun would be interpreted as deleting the Meter itself.	An OperationSet is not required because the change does not involve the concept of a "reverse" action.

Use Case #	DS-5	DS-6	DS-7	DS-8
Use Case Description	Delete an instance of a class such as Register from a meter in inventory	Configure meter to collect fwd kWh register and 15-minute interval readings	Re-configure meter to have Channel 2 of Register 1 collect 5-minute fwd kWh register readings rather than 15-minute fwd kWh interval readings	Delete a meter from inventory
Header Verb	execute/execute	change/changed	change/changed	delete/deleted
Header Noun	OperationSet	MeterConfig	MeterConfig	MeterConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	delete/deleted	n/a	n/a	n/a
Op Set Noun	MeterConfig	n/a	n/a	n/a
Element Flag	"true"	n/a	n/a	n/a
Payload Description	1) ID of the Meter 2) ID of the Register being deleted 3) Effectivity dates and reason as appropriate	1) ID of meter 2) ID of Register 1 3) As many details of Register 1 as available / desired 4) ID of Channel 1 of Register 1 5) As many details of Channel 1 of Register 1 as available / desired, including ReadingType for BulkQuantity fwd kWh 6) ID of Channel 2 of Register 1 7) As many details of Channel 2 of Register 1 as available / desired, including ReadingType for 15minute DeltaData fwd kWh 8) Effectivity dates and reason as appropriate	1) ID of meter 2) ID of Register 1 3) ID of Channel 2 of Register 1 4) As many details of Channel 2 of Register 1 as available / desired, including ReadingType for 5minute DeltaData fwd kWh 5) Effectivity dates and reason as appropriate	1) ID of meter 2) Effectivity dates and reason as appropriate
Relationship Line	n/a	n/a	n/a	n/a
Comments	An OperationSet is required (even though there is only one operation specified) because it is necessary to set the Element Flag; otherwise the delete/deleted verb with the MeterConfig noun would be interpreted as deleting the Meter itself.	An OperationSet is not required because the change does not involve the concept of a "reverse" action. (This assumes that registers and channels were not previously configured for this Meter.)	An OperationSet is not required because the change does not involve the concept of a "reverse" action. If Channel 2 was being deleted and Channel 3 was being added (rather than just modifying Channel 2), then an OperationSet would be required.	Many systems may choose not to delete meters but to mark the meters as removed and/or retired.

Use Case #	DS-9	DS-10	DS-11	DS-12
Use Case Description	Receive com module into inventory	Create a service category	Create a service supplier	Create a service location
Header Verb	create/created	create/created	create/created	create/created
Header Noun	ComModuleConfig	ServiceCategoryConfig	SupplierConfig	ServiceLocationConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the ComModule 2) As many details about the ComModule as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the ServiceCategory 2) As many details about the ServiceCategory as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the ServiceSupplier 2) As many details about the ServiceSupplier as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the ServiceLocation 2) As many details about the ServiceLocation as available / desired 3) Effectivity dates and reason as appropriate
Relationship Line	n/a	n/a	n/a	n/a
Comments	Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a ComModule after it is in inventory.	Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a ServiceCategory.	In de-regulated markets, the distribution utility and the retailer may be separate ServiceSuppliers (having different ServiceSupplier.kind) Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a ServiceSupplier.	Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a ServiceLocation.

Use Case #	DS-13	DS-14	DS-15
Use Case Description	Create a usage point location	Create a usage point	Create a customer
Header Verb	create/created	create/created	create/created
Header Noun	UsagePointLocationConfig	UsagePointConfig	CustomerConfig
Enforce Seq	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a
Payload Description	1) ID of the UsagePointLocation 2) As many details about the UsagePointLocation as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the UsagePoint 2) As many details about the UsagePoint as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the Customer 2) As many details about the Customer as available / desired 3) Effectivity dates and reason as appropriate
Relationship Line	n/a	n/a	n/a
Comments	Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a UsagePointLocation.	If the UsagePoint is also a service delivery point (point of demarcation between utility and customer ownership), set the isSdp Boolean to "true". If any of the following are to be included as part of the creation of the UsagePoint, they shall exist in advance of the create / created UsagePointConfig message: ServiceSupplier, ServiceCategory, ServiceLocation, UsagePointLocation. Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a UsagePoint.	Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a Customer.

Use Case #	DS-16	DS-17	DS-18	DS-19
Use Case Description	Create a customer account	Create a customer agreement	Create a pricing structure	Create a non-meter end device (including a PAN device)
Header Verb	create/created	create/created	create/created	create/created
Header Noun	CustomerAccountConfig	CustomerAgreementConfig	Pricing StructureConfig	EndDeviceConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the CustomerAccount 2) As many details about the CustomerAccount as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the CustomerAgreement 2) As many details about the Customer Agreement as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the PricingStructure 2) As many details about the PricingStructure as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the EndDevice 2) As many details about the EndDevice as available / desired 3) Effectivity dates and reason as appropriate
Relationship Line	n/a	n/a	n/a	n/a
Comments	Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a CustomerAccount.	Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a CustomerAgreement.	Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of a PricingStructure.	If the EndDevice is a PAN device, set the isPan Boolean to "true" or meters, see Use Case DS-1. Follow the examples of Use Cases DS-2 through DS-8 for changes to or deletion of an EndDevice.

Use Case #	DS-20	DS-21	DS-22	DS-23
Use Case Description	Shop install a com module into a meter	Remove a com module from a meter	Reflect the pairing of an end device (e.g., a PAN device) to a meter	Reflect the unpairing of an end device (e.g., a PAN device) from a meter
Header Verb	create/created	delete/deleted	create/created	delete/deleted
Header Noun	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the ComModule 2) ID of the Meter 3) Effectivity dates and reason as appropriate	1) ID of the ComModule 2) ID of the Meter 3) Effectivity dates and reason as appropriate	1) ID of the EndDevice 2) ID of the Meter 3) Effectivity dates and reason as appropriate	1) ID of the EndDevice 2) ID of the Meter 3) Effectivity dates and reason as appropriate
Relationship Line	A	A	B	B
Comments	Assumes the Meter and the ComModule already exist. ComModules may not exist for meters with integral communications capabilities. Multiple com modules (e.g., one for AMI network and a ZigBee module for Home Area Networking) may be installed into a meter. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	ComModules may not exist for meters with integral communications capabilities. This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Assumes the EndDevice and the Meter already exist. Multiple EndDevices devices may be paired with a given meter. An EndDevice may optionally be "paired" with a UsagePoint rather than a meter. This would most typically be done when the communication with a PAN device is not via the meter. See Use Case DS25. At any given time, a EndDevice should not be paired with both a Meter and a UsagePoint. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Multiple EndDevices may be paired with a given meter. Un-pairing an EndDevice does not delete the EndDevice but only takes it out-of-service for that meter. This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.

Use Case #	DS-24	DS-25	DS-26	DS-27
Use Case Description	Reflect the pairing of an end device (e.g., a PAN device) to a usage point	Reflect the unpairing of an end device (e.g., a PAN device) from a usage point	Reflect the installation of a meter at usage point	Reflect the removal of a meter from a usage point
Header Verb	create/created	delete/deleted	create/created	delete/deleted
Header Noun	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the EndDevice 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of the EndDevice 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of the Meter 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of the Meter 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate
Relationship Line	C	C	D	D
Comments	Assumes the EndDevice and the UsagePoint already exist. Multiple end devices may be paired with a given UsagePoint. A EndDevice may optionally be "paired" with a meter rather than a UsagePoint. This would most typically be done when the communication with a PAN device is via the meter. See Use Case DS-23. At any given time, an EndDevice should not be paired with both a Meter and a UsagePoint. This transaction accomplishes only the "linkage" of these objects. There is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Multiple end devices may be paired with a given Usage Point. Unpairing an EndDevice does not delete the EndDevice but only takes it out-of-service for that UsagePoint. This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Assumes that both the Meter and the UsagePoint already exist. Multiple meters may be installed at a given UsagePoint, although some enterprise systems do not support doing so. This is the master data synchronization transaction reflecting the meter installation. It may be preceded by or accompanied by another Part 9 message associated with a service request for the field work associated with the installation. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Multiple meters may be installed at a given UsagePoint, although some enterprise systems do not support doing so. Removing (uninstalling) a meter does not delete the Meter but only takes it out-of-service for that UsagePoint. This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.

Use Case #	DS-28	DS-29	DS-30	DS-31
Use Case Description	Associate a pricing structure with a usage point	Disassociate a pricing structure from a usage point	Associate a customer agreement with a usage point	Disassociate a customer agreement from a usage point
Header Verb	create/created	delete/deleted	create/created	delete/deleted
Header Noun	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the PricingStructure 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of the PricingStructure 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of the CustomerAgreement 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of the CustomerAgreement 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate
Relationship Line	G	G	H	H
Comments	Assumes that both the PricingStructure and the UsagePoint already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Assumes that both the CustomerAgreement and the UsagePoint already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.

Use Case #	DS-32	DS-33	DS-34	DS-35
Use Case Description	Associate a customer account with a usage point	Disassociate a customer account from a usage point	Associate a customer with a usage point	Disassociate a customer from a usage point
Header Verb	create/created	delete/deleted	create/created	delete/deleted
Header Noun	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the CustomerAccount 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of the CustomerAccount 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of the Customer 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of the Customer 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate
Relationship Line	K	K	L	L
Comments	Assumes that both the CustomerAccount and the UsagePoint already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Assumes that both the Customer and the UsagePoint already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.

Use Case #	DS-36	DS-37	DS-38	DS-39
Use Case Description	Associate a pricing structure with a customer agreement	Disassociate a pricing structure from a customer agreement	Associate a service location with a customer agreement	Disassociate a service location from a customer agreement
Header Verb	create/created	delete/deleted	create/created	delete/deleted
Header Noun	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the PricingStructure 2) ID of the CustomerAgreement 3) Effectivity dates and reason as appropriate	1) ID of the PricingStructure 2) ID of the CustomerAgreement 3) Effectivity dates and reason as appropriate	1) ID of the ServiceLocation 2) ID of the CustomerAgreement 3) Effectivity dates and reason as appropriate	1) ID of the ServiceLocation 2) ID of the CustomerAgreement 3) Effectivity dates and reason as appropriate
Relationship Line	N	N	O	O
Comments	Assumes that both the PricingStructure and the CustomerAgreement already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Assumes that both the ServiceLocation and the CustomerAgreement already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.

Use Case #	DS-40	DS-41	DS-42	DS-43
Use Case Description	Associate a usage point location with a service location	Disassociate a usage point location from a service location	Associate a customer account with a customer	Disassociate a customer account from a customer
Header Verb	create/created	delete/deleted	create/created	delete/deleted
Header Noun	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the UsagePointLocation 2) ID of the ServiceLocation 3) Effectivity dates and reason as appropriate	1) ID of the UsagePointLocation 2) ID of the ServiceLocation 3) Effectivity dates and reason as appropriate	1) ID of the CustomerAccount 2) ID of the Customer 3) Effectivity dates and reason as appropriate	1) ID of the CustomerAccount 2) ID of the Customer 3) Effectivity dates and reason as appropriate
Relationship Line	P	P	Q	Q
Comments	Assumes that both the UsagePointLocation and the ServiceLocation already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Assumes that both the CustomerAccount and the Customer already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.

Use Case #	DS-44	DS-45	DS-46	DS-47
Use Case Description	Associate a customer agreement with a customer account	Disassociate a customer agreement from a customer account	Associate a service supplier with a customer account	Disassociate a service supplier from a customer account
Header Verb	create/created	delete/deleted	create/created	delete/deleted
Header Noun	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the CustomerAgreement 2) ID of the CustomerAccount 3) Effectivity dates and reason as appropriate	1) ID of the CustomerAgreement 2) ID of the CustomerAccount 3) Effectivity dates and reason as appropriate	1) ID of the ServiceSupplier 2) ID of the CustomerAccount 3) Effectivity dates and reason as appropriate	1) ID of the ServiceSupplier 2) ID of the CustomerAccount 3) Effectivity dates and reason as appropriate
Relationship Line	R	R	S	S
Comments	Assumes that both the CustomerAgreement and the Customer account already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Assumes that both the ServiceSupplier and the CustomerAccount already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.

Use Case #	DS-48	DS-49	DS-50	DS-51
Use Case Description	Associate a service supplier with a customer agreement	Disassociate a service supplier from a customer agreement	Associate a customer agreement with a customer	Disassociate a customer agreement from a customer account
Header Verb	create/created	delete/deleted	create/created	delete/deleted
Header Noun	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig	MasterDataLinkageConfig
Enforce Seq	n/a	n/a	n/a	n/a
Enforce Trans	n/a	n/a	n/a	n/a
Op Set Verb	n/a	n/a	n/a	n/a
Op Set Noun	n/a	n/a	n/a	n/a
Element Flag	n/a	n/a	n/a	n/a
Payload Description	1) ID of the ServiceSupplier 2) ID of the CustomerAgreement 3) Effectivity dates and reason as appropriate	1) ID of the ServiceSupplier 2) ID of the CustomerAgreement 3) Effectivity dates and reason as appropriate	1) ID of the CustomerAgreement 2) ID of the Customer 3) Effectivity dates and reason as appropriate	1) ID of the CustomerAgreement 2) ID of the Customer 3) Effectivity dates and reason as appropriate
Relationship Line	T	T	U	U
Comments	Assumes that both the ServiceSupplier and the CustomerAgreement already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	Assumes that both the CustomerAgreement and the Customer already exist. This transaction accomplishes only the "linkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.	This transaction accomplishes only the "delinkage" of these objects. If there is a desire to update either or both of the object records, additional messages can be created. Additionally, the multiple actions may be combined with control over sequence and overall transaction integrity using the OperationSet construct in Message.xsd. This approach is illustrated in a number of separate use cases.

Use Case #		DS-52			
Use Case Description	Exchange meter 2 for meter 1 at a usage point and update the install date for meter 2 and the removal date for meter 1				
Header Verb	execute/executed				
Header Noun	OperationSet				
Enforce Seq	"true"				
Enforce Trans	"true"				
Op Set Verb	delete/deleted	create/created	change/changed	change/changed	
Op Set Noun	MasterDataLinkageConfig	MasterDataLinkageConfig	MeterConfig	MeterConfig	MeterConfig
Element Flag	"false"	"false"	"false"	"false"	"false"
Payload Description	1) ID of Meter 1 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of Meter 2 2) ID of the UsagePoint 3) Effectivity dates and reason as appropriate	1) ID of Meter 1 2) Removal date for Meter 1 3) Effectivity dates and reason as appropriate	1) ID of Meter 2 2) Installation date for Meter 2 3) Effectivity dates and reason as appropriate	
Relationship Line	D	D	n/a	n/a	n/a
Comments	Assumes creation / configuration of meter 2 occurred in advance of the meter exchange transaction. The enforceMessageSequence flag is set to "true" to ensure that meter 1 is removed before meter 2 is installed. The enforceTransactionalIntegrity flag is set to "true" to ensure that all portions of this transaction are rolled back (voided) if any of the transactions fail. This ensures overall integrity of the database in the receiving system.				

Use Case #	DS-53	
Use Case Description	Reflect the creation of a PAN device and its pairing with an existing meter	
Header Verb	execute/executed	
Header Noun	OperationSet	
Enforce Seq	"true"	
Enforce Trans	"true"	
Op Set Verb	create/created	
Op Set Noun	EndDeviceConfig	
Element Flag	"false"	
Payload Description	1) ID of the EndDevice (PAN device) 2) As many details about the EndDevice (PAN device) as available / desired 3) Effectivity dates and reason as appropriate	1) ID of the EndDevice (PAN device) 2) ID of the Meter 3) Effectivity dates and reason as appropriate
Relationship Line	n/a	B
Comments	For this Pan device example, the isPan Boolean in the EndDeviceConfig will be set to "true". Assumes the meter was created in advance of the this composite transaction. The enforceMessageSequence flag is set to "true" to ensure that the PAN device is created before it is associated with the meter. The enforceTransactionalIntegrity flag is set to "true" to ensure that all portions of this transaction are rolled back (voided) if any of the transactions fail. This ensures overall integrity of the database in the receiving system.	

L.2 Sample XML for Exemplary Master Data management use cases

The remainder of this Annex provides sample XML for a set of use cases that illustrates the intended use of the part 9 Master Data Management Transaction profile set.

Although only a small subset of the available profiles is included, the examples are applicable to the remaining Master Data Management use cases and profiles.

In most of the examples below, there are 4 steps for each use case:

- a CIS system sends a create message to the Meter Data Management System (MDMS) to synchronize certain master data,
- the MDMS sends a simple acknowledgment response message to the CIS to indicate it has received the request. (This is an optional step that is bypassed when using JMS messaging if the AckRequired in the Header of the Step 1 request message is set to "false"),
- the MDMS sends a response message to the CIS to indicate that the request was completed successfully, or
- the MDMS sends a response message to the CIS to indicate that the request failed to complete successfully.

L.2.1 Create MeterConfig – Two Meters – Step 1

```
<?xml version="1.0" encoding="UTF-8"?>
<RequestMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:m = "http://iec.ch/TC57/2011/MeterConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <xsi:import namespace = "http://iec.ch/TC57/2011/MeterConfig#" schemaLocation =
"MeterConfig.xsd"/>
  <Header>
    <Verb>create</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T09:30:47Z</Timestamp>
    <Source>CIS</Source>
    <AckRequired>true</AckRequired>
    <MessageID>8B3EF3E8-C61C-4C91-BEF0-A1775570656A</MessageID>
    <CorrelationID>8B3EF3E8-C61C-4C91-BEF0-A1775570656A</CorrelationID>
  </Header>
  <Payload>
    <m:MeterConfig>
      <m:ComFunction>
        <m:mRID>14470EB8-F28F-433E-9A34-D61C845FD976</m:mRID>
        <m:direction>biDirectional</m:direction>
        <m:technology>cellular</m:technology>
      </m:ComFunction>
      <m:Meter>
        <m:mRID>B95ED625-2EDB-437F-977C-6E2991EE61CB</m:mRID>
        <m:amrSystem>AmrSystemName</m:amrSystem>
        <m:formNumber>2S</m:formNumber>
        <m:ConfigurationEvents>
          <m:createdDateTime>2001-12-17T09:30:47Z</m:createdDateTime>
          <m:effectiveDateTime>2001-12-19T00:00:00Z</m:effectiveDateTime>
        </m:ConfigurationEvents>
        <m:electronicAddress>
          <m:mac>00:24:E8:A7:69:E7</m:mac>
        </m:electronicAddress>
        <m:ComFunction ref = "14470EB8-F28F-433E-9A34-D61C845FD976"/>
        <m:EndDeviceInfo>
          <m:isSolidState>true</m:isSolidState>
          <m:phaseCount>1</m:phaseCount>
          <m:capability>
            <m:autonomousDst>true</m:autonomousDst>
            <m:communication>true</m:communication>
            <m:connectDisconnect>false</m:connectDisconnect>
            <m:electricMetering>true</m:electricMetering>
            <m:metrology>true</m:metrology>
            <m:onRequestRead>true</m:onRequestRead>
          </m:capability>
        </m:EndDeviceInfo>
        <m:Names>
          <m:name>A47129</m:name>
          <m:NameType>
            <m:name>MeterBadgeNumber</m:name>
            <m:NameTypeAuthority>
              <m:name>UtilityXYZ</m:name>
            </m:NameTypeAuthority>
          </m:NameType>
        </m:Names>
      </m:Meter>
    </m:MeterConfig>
  </Payload>

```

```

        <m:capability>
          <m:autonomousDst>true</m:autonomousDst>
          <m:communication>true</m:communication>
          <m:connectDisconnect>false</m:connectDisconnect>
          <m:electricMetering>true</m:electricMetering>
          <m:metrology>true</m:metrology>
          <m:onRequestRead>true</m:onRequestRead>
        </m:capability>
      </m:EndDeviceInfo>
    <m:Names>
      <m:name>C57129</m:name>
      <m:NameType>
        <m:name>MeterBadgeNumber</m:name>
        <m:NameTypeAuthority>
          <m:name>UtilityXYZ</m:name>
        </m:NameTypeAuthority>
      </m:NameType>
    </m:Names>
  </m:Meter>
</m:MeterConfig>
</Payload>
</RequestMessage>

```

L.2.2 Create MeterConfig – Two Meters – Step 2

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T09:31:47Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>4AB99350-38CE-421C-8CD8-A0446D299E62</MessageID>
    <CorrelationID>8B3EF3E8-C61C-4C91-BEF0-A1775570656A</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.3</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.3 Create MeterConfig – Two Meters – Step 3

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T09:33:47Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>5624858B-9365-482E-8335-746A9A06F3FB</MessageID>
    <CorrelationID>8B3EF3E8-C61C-4C91-BEF0-A1775570656A</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.0</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.4 Create MeterConfig – Two Meters – Step 4

```
<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd"
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <Header>
    <Verb>reply</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-17T09:30:47Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>3C42D9B1-65C5-4588-972B-AEF4D6B5B86C</MessageID>
    <CorrelationID>8B3EF3E8-C61C-4C91-BEF0-A1775570656A</CorrelationID>
  </Header>
  <Reply>
    <Result>FAILED</Result>
    <Error>
      <code>2.4</code>
      <level>FATAL</level>
      <details>Meter ID already exists</details>
      <object>
        <Name>
          <name>C57129</name>
          <NameType>
            <name>MeterBadgeNumber</name>
            <NameTypeAuthority>
              <name>UtilityXYZ</name>
            </NameTypeAuthority>
          </NameType>
        </Name>
        <objectType>Meter</objectType>
      </object>
    </Error>
  </Reply>
</ResponseMessage>
```

L.2.5 Change MeterConfig (add/change details) – Step 1

```
<?xml version="1.0" encoding="UTF-8"?>
<RequestMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:m = "http://iec.ch/TC57/2011/MeterConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>change</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-18T09:30:47Z</Timestamp>
    <Source>CIS</Source>
    <AckRequired>true</AckRequired>
    <MessageID>A98D203B-35CB-44F0-AE4F-026ECC771A76</MessageID>
    <CorrelationID>A98D203B-35CB-44F0-AE4F-026ECC771A76</CorrelationID>
  </Header>
  <Payload>
    <m:MeterConfig>
      xsi:schemaLocation = "http://iec.ch/TC57/2011/MeterConfig# MeterConfig.xsd"
      xmlns:m = "http://iec.ch/TC57/2011/MeterConfig#"
      xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
      <m:Meter>
        <m:formNumber>12S</m:formNumber>
        <m:ConfigurationEvents>
          <m:createdDateTime>2001-12-18T09:30:47Z</m:createdDateTime>
          <m:effectiveDateTime>2001-12-19T00:00:00Z</m:effectiveDateTime>
          <m:Names>
            <m:name>A47129</m:name>
            <m:NameType>
              <m:name>MeterBadgeNumber</m:name>
              <m:NameTypeAuthority>
                <m:name>UtilityXYZ</m:name>
              </m:NameTypeAuthority>
            </m:NameType>
          </m:Names>
        </m:Meter>
      </m:MeterConfig>
    </Payload>
  </RequestMessage>
```

```

        </m:ConfigurationEvents>
        <m:MeterMultipliers>
            <m:kind>kH</m:kind>
            <m:value>14.4</m:value>
        </m:MeterMultipliers>
    </m:Meter>
</m:MeterConfig>
</Payload>
</RequestMessage>

```

L.2.6 Change MeterConfig (add/change details) – Step 2

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-18T09:30:48Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>FAD69463-6311-4A1E-89B4-0A22C76CA4B8</MessageID>
    <CorrelationID>A98D203B-35CB-44F0-AE4F-026ECC771A76</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.3</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.7 Change MeterConfig (add/change details) – Step 3

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-18T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>C0D5BF89-412B-43B7-8713-68993EB4B0C0</MessageID>
    <CorrelationID>A98D203B-35CB-44F0-AE4F-026ECC771A76</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.0</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.8 Change MeterConfig (add/change details) – Step 4

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd"
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <Header>
    <Verb>reply</Verb>

```

```

    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-17T09:30:47Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>3C42D9B1-65C5-4588-972B-AEF4D6B5B86C</MessageID>
    <CorrelationID>8B3EF3E8-C61C-4C91-BEF0-A1775570656A</CorrelationID>
  </Header>
  <Reply>
    <Result>FAILED</Result>
    <Error>
      <code>2.4</code>
      <level>FATAL</level>
      <details>Meter ID not found</details>
      <object>
        <Name>
          <name>C57129</name>
          <NameType>
            <name>MeterBadgeNumber</name>
            <NameTypeAuthority>
              <name>UtilityXYZ</name>
            </NameTypeAuthority>
          </NameType>
        </Name>
        <objectType>Meter</objectType>
      </object>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.9 Change MeterConfig (delete details) – Step 1

This use case deletes information concerning a Meter – not the Meter itself

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:m = "http://iec.ch/TC57/2011/MeterConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>execute</Verb>
    <Noun>OperationSet</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-20T09:30:47Z</Timestamp>
    <Source>CIS</Source>
    <AckRequired>true</AckRequired>
    <MessageID>07515735-060C-4125-9A1F-E75AEA19CA76</MessageID>
    <CorrelationID>07515735-060C-4125-9A1F-E75AEA19CA76</CorrelationID>
  </Header>
  <Payload>
    <OperationSet>
      <Operation>
        <operationId>1</operationId>
        <noun>MeterConfig</noun>
        <verb>delete</verb>
        <elementOperation>true</elementOperation>
        <m:MeterConfig
          xsi:schemaLocation = "http://iec.ch/TC57/2011/MeterConfig#
MeterConfig.xsd"
          xmlns:m = "http://iec.ch/TC57/2011/MeterConfig#"
          xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
          <m:Meter>
            <m:formNumber>12S</m:formNumber>
            <m:ConfigurationEvents>
              <m:createdDateTime>2001-12-18T09:30:47Z</m:createdDateTime>
              <m:effectiveDateTime>2001-12-19T00:00:00Z</m:effectiveDateTime>
              <m:Names>
                <m:name>A47129</m:name>
                <m:NameType>
                  <m:name>MeterBadgeNumber</m:name>
                  <m:NameTypeAuthority>
                    <m:name>UtilityXYZ</m:name>
                  </m:NameTypeAuthority>
                </m:NameType>
              </m:Names>
            </m:Meter>
          </m:MeterConfig>
        </Operation>
      </OperationSet>
    </Payload>
  </RequestMessage>

```

```

        </m:ConfigurationEvents>
        <m:MeterMultipliers>
            <m:kind>kH</m:kind>
            <m:value>14.4</m:value>
        </m:MeterMultipliers>
    </m:Meter>
</m:MeterConfig>
</Operation>
</OperationSet>
</Payload>
</RequestMessage>

```

L.2.10 Change MeterConfig (delete details) – Step 2

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>OperationSet</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-20T09:30:48Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>61BEB87B-490F-4108-A70A-FB25EA56BA0A</MessageID>
    <CorrelationID>07515735-060C-4125-9A1F-E75AEA19CA76</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.3</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.11 Change MeterConfig (delete details) – Step 3

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>OperationSet</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-20T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>280D0D3E-E899-49FE-A912-C2A4EB952546</MessageID>
    <CorrelationID>07515735-060C-4125-9A1F-E75AEA19CA76</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.0</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.12 Change MeterConfig (delete details) – Step 4

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd"
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <Header>
    <Verb>reply</Verb>

```



```

    <Noun>OperationSet</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-20T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>1D5C5DDE-9849-449A-8DF5-E8144585A9EC</MessageID>
    <CorrelationID>07515735-060C-4125-9A1F-E75AEA19CA76</CorrelationID>
</Header>
<Reply>
  <Result>FAILED</Result>
  <Error>
    <code>2.4</code>
    <level>FATAL</level>
    <details>Meter ID not found</details>
    <object>
      <Name>
        <name>C57129</name>
        <NameType>
          <name>MeterBadgeNumber</name>
          <NameTypeAuthority>
            <name>UtilityXYZ</name>
          </NameTypeAuthority>
        </NameType>
      </Name>
      <objectType>Meter</objectType>
    </object>
  </Error>
  <operationId>1</operationId>
</Reply>
</ResponseMessage>

```

L.2.13 Delete MeterConfig – Step 1

This use case deletes the Meter itself – not just information concerning a Meter. Note that this may actually involve marking the meter as deleted rather than actually purging it from a system.

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:m = "http://iec.ch/TC57/2011/MeterConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>delete</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-21T09:30:47Z</Timestamp>
    <Source>CIS</Source>
    <AckRequired>true</AckRequired>
    <MessageID>805C655B-4429-44C4-91C5-7692810627A7</MessageID>
    <CorrelationID>805C655B-4429-44C4-91C5-7692810627A7</CorrelationID>
  </Header>
  <Payload>
    <m:MeterConfig>
      xsi:schemaLocation = "http://iec.ch/TC57/2011/MeterConfig# MeterConfig.xsd"
      xmlns:m = "http://iec.ch/TC57/2011/MeterConfig#"
      xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
        <m:Meter>
          <m:ConfigurationEvents>
            <m:createdDateTime>2001-12-18T09:30:47Z</m:createdDateTime>
            <m:effectiveDateTime>2001-12-24T00:00:00Z</m:effectiveDateTime>
            <m:Names>
              <m:name>A47129</m:name>
              <m:NameType>
                <m:name>MeterBadgeNumber</m:name>
                <m:NameTypeAuthority>
                  <m:name>UtilityXYZ</m:name>
                </m:NameTypeAuthority>
              </m:NameType>
            </m:Names>
          </m:ConfigurationEvents>
        </m:Meter>
      </m:MeterConfig>
    </Payload>

```

```
</RequestMessage>
```

L.2.14 Delete MeterConfig – Step 2

```
<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-21T09:30:48Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>F5BA23D4-E1F7-4889-AB2A-CF3ED2BB06C9</MessageID>
    <CorrelationID>805C655B-4429-44C4-91C5-7692810627A7</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.3</code>
    </Error>
  </Reply>
</ResponseMessage>
```

L.2.15 Delete MeterConfig – Step 3

```
<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-21T09:30:48Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>F5BA23D4-E1F7-4889-AB2A-CF3ED2BB06C9</MessageID>
    <CorrelationID>805C655B-4429-44C4-91C5-7692810627A7</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.3</code>
    </Error>
  </Reply>
</ResponseMessage>
```

L.2.16 Delete MeterConfig – Step 3

```
<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd"
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <Header>
    <Verb>reply</Verb>
    <Noun>MeterConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-21T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>E45F5726-A4A4-4FCD-A3F2-400675911D64</MessageID>
    <CorrelationID>805C655B-4429-44C4-91C5-7692810627A7</CorrelationID>
  </Header>
  <Reply>
    <Result>FAILED</Result>
```

```

<Error>
  <code>2.4</code>
  <level>FATAL</level>
  <details>Meter ID not found</details>
  <object>
    <Name>
      <name>C57129</name>
      <NameType>
        <name>MeterBadgeNumber</name>
        <NameTypeAuthority>
          <name>UtilityXYZ</name>
        </NameTypeAuthority>
      </NameType>
    </Name>
    <objectType>Meter</objectType>
  </object>
</Error>
</Reply>
</ResponseMessage>

```

L.2.17 Create UsagePointConfig – Step 1

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:m = "http://iec.ch/TC57/2011/UsagePointConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>create</Verb>
    <Noun>UsagePointConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T09:30:47Z</Timestamp>
    <Source>CIS</Source>
    <AckRequired>true</AckRequired>
    <MessageID>530E10E4-BE8D-4BE3-B346-72013D575395</MessageID>
    <CorrelationID>530E10E4-BE8D-4BE3-B346-72013D575395</CorrelationID>
  </Header>
  <Payload>
    <m:UsagePointConfig>
      <m:UsagePoint>
        <m:amiBillingReady>amiCapable</m:amiBillingReady>
        <m:connectionState>connected</m:connectionState>
        <m:isSdp>true</m:isSdp>
        <m:isVirtual>false</m:isVirtual>
        <m:phaseCode>A</m:phaseCode>
        <m:readCycle>ReadCycleB</m:readCycle>
        <m:ConfigurationEvents>
          <m:createdDateTime>2012-12-17T09:30:47Z</m:createdDateTime>
          <m:effectiveDateTime>2012-12-18T00:00:00Z</m:effectiveDateTime>
        </m:ConfigurationEvents>
        <m:Names>
          <m:name>UP124179</m:name>
          <m:NameType>
            <m:name>ServiceDeliveryPointID</m:name>
            <m:NameTypeAuthority>
              <m:name>UtilityXYZ</m:name>
            </m:NameTypeAuthority>
          </m:NameType>
        </m:Names>
      </m:UsagePoint>
    </m:UsagePointConfig>
  </Payload>
</RequestMessage>

```

L.2.18 Create UsagePointConfig – Step 2

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"

```

```
xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
<Header>
  <Verb>reply</Verb>
  <Noun>UsagePointConfig</Noun>
  <Revision>2.0</Revision>
  <Timestamp>2012-01-17T09:30:48Z</Timestamp>
  <Source>MDMS</Source>
  <MessageID>73767FEB-A962-44A0-B0D3-79E1F21EE307</MessageID>
  <CorrelationID>530E10E4-BE8D-4BE3-B346-72013D575395</CorrelationID>
</Header>
<Reply>
  <Result>OK</Result>
  <Error>
    <code>0.3</code>
  </Error>
</Reply>
</ResponseMessage>
```

L.2.19 Create UsagePointConfig – Step 3

```
<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>UsagePointConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>AA31AE3A-1AA2-4016-96C7-548BB0688822</MessageID>
    <CorrelationID>530E10E4-BE8D-4BE3-B346-72013D575395</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.0</code>
    </Error>
  </Reply>
</ResponseMessage>
```

L.2.20 Create UsagePointConfig – Step 4

```
<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd"
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <Header>
    <Verb>reply</Verb>
    <Noun>UsagePointConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>1A8A58DF-BDC9-47C6-9FDB-E86BCF726F77</MessageID>
    <CorrelationID>530E10E4-BE8D-4BE3-B346-72013D575395</CorrelationID>
  </Header>
  <Reply>
    <Result>FAILED</Result>
    <Error>
      <code>2.12</code>
      <level>FATAL</level>
      <details>UsagePoint ID already exists</details>
      <object>
        <Name>
          <name>UP124179</name>
          <NameType>
            <name>ServiceDeliveryPointID</name>
            <NameTypeAuthority>
              <name>UtilityXYZ</name>
            </NameTypeAuthority>
          </NameType>
        </Name>
      </object>
    </Error>
  </Reply>
</ResponseMessage>
```

```

        </NameTypeAuthority>
      </NameType>
    </Name>
    <objectType>UsagePoint</objectType>
  </object>
</Error>
</Reply>
</ResponseMessage>

```

L.2.21 Create MasterDataLinkageConfig – Step 1

This use case links the previously created Meter with the previously created UsagePoint (reflecting a meter installation).

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:m = "http://iec.ch/TC57/2011/MasterDataLinkageConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>create</Verb>
    <Noun>MasterDataLinkageConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T10:00:47Z</Timestamp>
    <Source>CIS</Source>
    <AckRequired>true</AckRequired>
    <MessageID>F47F3703-D16A-4D3C-901A-553E1E26EA03</MessageID>
    <CorrelationID>F47F3703-D16A-4D3C-901A-553E1E26EA03</CorrelationID>
  </Header>
  <Payload>
    <m:MasterDataLinkageConfig>
      <m:ConfigurationEvent>
        <m:createdDateTime>2012-01-17T10:00:47Z</m:createdDateTime>
        <m:effectiveDateTime>2012-12-25T10:30:47Z</m:effectiveDateTime>
      </m:ConfigurationEvent>
      <m:Meter>
        <m:Names>
          <m:name>A47129</m:name>
          <m:NameType>
            <m:name>MeterBadgeNumber</m:name>
            <m:NameTypeAuthority>
              <m:name>UtilityXYZ</m:name>
            </m:NameTypeAuthority>
          </m:NameType>
        </m:Names>
      </m:Meter>
      <m:UsagePoint>
        <m:Names>
          <m:name>UP124179</m:name>
          <m:NameType>
            <m:name>ServiceDeliveryPointID</m:name>
            <m:NameTypeAuthority>
              <m:name>UtilityXYZ</m:name>
            </m:NameTypeAuthority>
          </m:NameType>
        </m:Names>
      </m:UsagePoint>
    </m:MasterDataLinkageConfig>
  </Payload>
</RequestMessage>

```

L.2.22 Create MasterDataLinkageConfig – Step 2

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>

```

```

    <Noun>MasterDataLinkageConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T10:00:48Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>86BDABD8-AA7F-4139-9292-050A93E3DA71</MessageID>
    <CorrelationID>F47F3703-D16A-4D3C-901A-553E1E26EA03</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.3</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.23 Create MasterDataLinkageConfig – Step 3

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>MasterDataLinkageConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>91C9B6B5-4915-4B4C-91DA-4820DD4E621F</MessageID>
    <CorrelationID>F47F3703-D16A-4D3C-901A-553E1E26EA03</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.0</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.24 Create MasterDataLinkageConfig – Step 4

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd"
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <Header>
    <Verb>reply</Verb>
    <Noun>MasterDataLinkageConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-01-17T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>3A854405-BEB6-418B-B6BC-6EEE172D1A2A</MessageID>
    <CorrelationID>F47F3703-D16A-4D3C-901A-553E1E26EA03</CorrelationID>
  </Header>
  <Reply>
    <Result>FAILED</Result>
    <Error>
      <code>2.12</code>
      <level>FATAL</level>
      <details>UsagePoint ID not found</details>
      <object>
        <Name>
          <name>UP124179</name>
          <NameType>
            <name>ServiceDeliveryPointID</name>
            <NameTypeAuthority>
              <name>UtilityXYZ</name>
            </NameTypeAuthority>
          </NameType>
        </Name>
      </object>
    </Error>
  </Reply>
</ResponseMessage>

```

```

        <objectType>UsagePoint</objectType>
    </object>
</Error>
</Reply>
</ResponseMessage>

```

L.2.25 Delete MasterDataLinkageConfig – Step 1

This use case deletes the previously created linkage between a Meter and a UsagePoint (reflecting a meter removal).

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:m = "http://iec.ch/TC57/2011/MasterDataLinkageConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>delete</Verb>
    <Noun>MasterDataLinkageConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-02-01T10:00:47Z</Timestamp>
    <Source>CIS</Source>
    <AckRequired>true</AckRequired>
    <MessageID>D0DAF9E1-D62F-4711-9C05-8698EBEC5D77</MessageID>
    <CorrelationID>D0DAF9E1-D62F-4711-9C05-8698EBEC5D77</CorrelationID>
  </Header>
  <Payload>
    <m:MasterDataLinkageConfig>
      <m:ConfigurationEvent>
        <m:createdDateTime>2012-02-01T10:00:47Z</m:createdDateTime>
        <m:effectiveDateTime>2012-02-02T00:00:00Z</m:effectiveDateTime>
      </m:ConfigurationEvent>
      <m:Meter>
        <m:Names>
          <m:name>A47129</m:name>
          <m:NameType>
            <m:name>MeterBadgeNumber</m:name>
            <m:NameTypeAuthority>
              <m:name>UtilityXYZ</m:name>
            </m:NameTypeAuthority>
          </m:NameType>
        </m:Names>
      </m:Meter>
      <m:UsagePoint>
        <m:Names>
          <m:name>UP124179</m:name>
          <m:NameType>
            <m:name>ServiceDeliveryPointID</m:name>
            <m:NameTypeAuthority>
              <m:name>UtilityXYZ</m:name>
            </m:NameTypeAuthority>
          </m:NameType>
        </m:Names>
      </m:UsagePoint>
    </m:MasterDataLinkageConfig>
  </Payload>
</RequestMessage>

```

L.2.26 Delete MasterDataLinkageConfig – Step 2

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>MasterDataLinkageConfig</Noun>
    <Revision>2.0</Revision>

```



```

    <Timestamp>2012-02-01T10:00:48Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>D83D7899-51D8-437D-AB28-328B78E57827</MessageID>
    <CorrelationID>D0DAF9E1-D62F-4711-9C05-8698EBEC5D77</CorrelationID>
</Header>
<Reply>
  <Result>OK</Result>
  <Error>
    <code>0.3</code>
  </Error>
</Reply>
</ResponseMessage>

```

L.2.27 Delete MasterDataLinkageConfig – Step 3

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>MasterDataLinkageConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-02-01T10:00:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>61C7969C-1F72-4E82-ADA5-AA7813C4E09C</MessageID>
    <CorrelationID>D0DAF9E1-D62F-4711-9C05-8698EBEC5D77</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.0</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.28 Delete MasterDataLinkageConfig – Step 4

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd"
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <Header>
    <Verb>reply</Verb>
    <Noun>MasterDataLinkageConfig</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-02-01T10:00:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>C31A2527-0DEC-476B-B10B-DAB9F2D8AC26</MessageID>
    <CorrelationID>D0DAF9E1-D62F-4711-9C05-8698EBEC5D77</CorrelationID>
  </Header>
  <Reply>
    <Result>FAILED</Result>
    <Error>
      <code>2.13</code>
      <level>FATAL</level>
      <details>Meter not installed at Usage Point</details>
      <object>
        <Name>
          <name>UP124179</name>
          <NameType>
            <name>ServiceDeliveryPointID</name>
            <NameTypeAuthority>
              <name>UtilityXYZ</name>
            </NameTypeAuthority>
          </NameType>
        </Name>
        <objectType>UsagePoint</objectType>
      </object>
    </Error>
  </Reply>
</ResponseMessage>

```

```

        <relatedObject>
          <Name>
            <name>A47129</name>
            <NameType>
              <name>MeterBadgeNumber</name>
              <NameTypeAuthority>
                <name>UtilityXYZ</name>
              </NameTypeAuthority>
            </NameType>
          </Name>
          <objectType>Meter</objectType>
        </relatedObject>
      </Error>
    </Reply>
  </ResponseMessage>

```

L.2.29 Execute OperationSet – Step 1

This use case utilizes an Operation Set to first create a Meter, then create a UsagePoint, and then link the Meter and the usagePoint (reflecting a meter installation). In essence, it performs the same functions as several of the previous uses, but does so in a single message. This example uses the appropriate Booleans to ensure that the steps are executed in the prescribed order and that all three steps shall succeed or the entire transaction shall fail.

```

<?xml version="1.0" encoding="UTF-8"?>
<RequestMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:m = "http://iec.ch/TC57/2011/MeterConfig#"
  xmlns:up = "http://iec.ch/TC57/2011/UsagePointConfig#"
  xmlns:mdlc = "http://iec.ch/TC57/2011/MasterDataLinkageConfig#"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>execute</Verb>
    <Noun>OperationSet</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-20T09:30:47Z</Timestamp>
    <Source>CIS</Source>
    <AckRequired>true</AckRequired>
    <MessageID>D921A053-80C1-4DB6-960E-2603127B7B92</MessageID>
    <CorrelationID>D921A053-80C1-4DB6-960E-2603127B7B92</CorrelationID>
  </Header>
  <Payload>
    <OperationSet>
      <enforceMsgSequence>true</enforceMsgSequence>
      <enforceTransactionalIntegrity>true</enforceTransactionalIntegrity>
      <Operation>
        <operationId>1</operationId>
        <noun>MeterConfig</noun>
        <verb>create</verb>
        <mdlc:MeterConfig>
          <mdlc:formNumber>2S</mdlc:formNumber>
          <mdlc:ConfigurationEvents>
            <mdlc:createdDateTime>2012-12-20T09:30:47Z</mdlc:createdDateTime>
            <mdlc:effectiveDateTime>2012-12-
21T00:00:00Z</mdlc:effectiveDateTime>
            <mdlc:Names>
              <mdlc:name>C34531</mdlc:name>
              <mdlc:NameType>
                <mdlc:name>MeterBadgeNumber</mdlc:name>
                <mdlc:NameTypeAuthority>
                  <mdlc:name>UtilityXYZ</mdlc:name>
                </mdlc:NameTypeAuthority>
              </mdlc:NameType>
            </mdlc:Names>
          </mdlc:ConfigurationEvents>
        </mdlc:MeterConfig>
      </Operation>
      <Operation>
        <operationId>2</operationId>

```

```

<noun>UsagePointConfig</noun>
<verb>create</verb>
<up:UsagePointConfig>
  <up:UsagePoint>
    <up:amiBillingReady>amiCapable</up:amiBillingReady>
    <up:connectionState>connected</up:connectionState>
    <up:isSdp>true</up:isSdp>
    <up:isVirtual>>false</up:isVirtual>
    <up:phaseCode>B</up:phaseCode>
    <up:readCycle>ReadCycleJ</up:readCycle>
    <up:ConfigurationEvents>
      <up:createdDateTime>2012-12-20T09:30:47Z</up:createdDateTime>
      <up:effectiveDateTime>2012-12-21T00:00:00Z</up:effectiveDateTime>
    </up:ConfigurationEvents>
    <up:Names>
      <up:name>UP43639</up:name>
      <up:NameType>
        <up:name>ServiceDeliveryPointID</up:name>
        <up:NameTypeAuthority>
          <up:name>UtilityXYZ</up:name>
        </up:NameTypeAuthority>
      </up:NameType>
    </up:Names>
  </up:UsagePoint>
</up:UsagePointConfig>
</Operation>
<Operation>
  <operationId>3</operationId>
  <noun>MasterDataLinkageConfig</noun>
  <verb>create</verb>
  <mdlc:MasterDataLinkageConfig>
    <mdlc:ConfigurationEvent>
      <mdlc:createdDateTime>2012-12-17T09:30:47Z</mdlc:createdDateTime>
      <mdlc:effectiveDateTime>2012-12-21T00:00:00Z</mdlc:effectiveDateTime>
    </mdlc:ConfigurationEvent>
    <mdlc:Meter>
      <mdlc:Names>
        <mdlc:name>C34531</mdlc:name>
        <mdlc:NameType>
          <mdlc:name>MeterBadgeNumber</mdlc:name>
          <mdlc:NameTypeAuthority>
            <mdlc:name>UtilityXYZ</mdlc:name>
          </mdlc:NameTypeAuthority>
        </mdlc:NameType>
      </mdlc:Names>
    </mdlc:Meter>
    <mdlc:UsagePoint>
      <mdlc:Names>
        <mdlc:name>UP43639</mdlc:name>
        <mdlc:NameType>
          <mdlc:name>ServiceDeliveryPointID</mdlc:name>
          <mdlc:NameTypeAuthority>
            <mdlc:name>UtilityXYZ</mdlc:name>
          </mdlc:NameTypeAuthority>
        </mdlc:NameType>
      </mdlc:Names>
    </mdlc:UsagePoint>
  </mdlc:MasterDataLinkageConfig>
</Operation>
</OperationSet>
</Payload>
</RequestMessage>

```

L.2.30 Execute OperationSet – Step 2

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>OperationSet</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-20T09:30:48Z</Timestamp>
  </Header>

```

```

    <Source>MDMS</Source>
    <MessageID>08A2E193-F5D3-4672-B26D-A99A55591799</MessageID>
    <CorrelationID>D921A053-80C1-4DB6-960E-2603127B7B92</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.3</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.31 Execute OperationSet – Step 3

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
  <Header>
    <Verb>reply</Verb>
    <Noun>OperationSet</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-20T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>A8E8FE70-6960-4724-BF1C-CE2804EEA633</MessageID>
    <CorrelationID>D921A053-80C1-4DB6-960E-2603127B7B92</CorrelationID>
  </Header>
  <Reply>
    <Result>OK</Result>
    <Error>
      <code>0.0</code>
    </Error>
  </Reply>
</ResponseMessage>

```

L.2.32 Execute OperationSet – Step 4

```

<?xml version="1.0" encoding="UTF-8"?>
<ResponseMessage
  xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd"
  xmlns = "http://iec.ch/TC57/2011/schema/message"
  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance">
  <Header>
    <Verb>reply</Verb>
    <Noun>OperationSet</Noun>
    <Revision>2.0</Revision>
    <Timestamp>2012-12-20T09:30:49Z</Timestamp>
    <Source>MDMS</Source>
    <MessageID>929BFC21-06FA-4D7E-94FE-C58B3C94EFAC</MessageID>
    <CorrelationID>D921A053-80C1-4DB6-960E-2603127B7B92</CorrelationID>
  </Header>
  <Reply>
    <Result>FAILED</Result>
    <Error>
      <code>2.12</code>
      <level>FATAL</level>
      <details>UsagePoint ID already exists</details>
      <ID idType="ServiceDeliveryPoint"
        idAuthority="UtilityXYZ" objectType="UsagePoint">UP43639</ID>
      <operationId>2</operationId>
    </Error>
    <Error>
      <code>5.9</code>
      <level>FATAL</level>
      <details>Transaction aborted to maintain transactional integrity</details>
      <ID idType="MeterBadgeNumber"
        idAuthority="UtilityXYZ" objectType="Meter">C34531</ID>
      <operationId>1</operationId>
    </Error>
    <Error>
      <code>5.9</code>
      <level>FATAL</level>

```

```
<details>Transaction aborted to maintain transactional integrity</details>
<ID idType="ServiceDeliveryPointID"
  idAuthority="UtilityXYZ" objectType="UsagePoint">UP43639</ID>
<relatedID idType="MeterBadgeNumber"
  idAuthority="UtilityXYZ" objectType="Meter">C34531</relatedID>
<operationId>3</operationId>
</Error>
</Reply>
</ResponseMessage>
```

L.2.33 Change ObjectNamesConfig

This use case utilizes the ObjectNamesConfig profile to request that the Meter identified by mRID = "B9BCE6FE-763D-4AFB-A229-79FA885AEDC1" and MfgSerialNumber = "43531" (a Names.name value with associated NameType and NameTypeAuthority) be changed in the following way:

- the MfgSerialNumber be changed to "43532", and
- a new, additional Names.name be assigned with:
- Names.name = "A1473922"
- Names.NameType.name = "BarcodeNumber", and,
- Names.NameType.NameTypeAuthority.name = "UtilityXYZ"

The usage of the ObjectNamesConfig profile can be confusing.

The rules are as follows:

- The CIM object that is to have one or more instances of its Names class information added, changed, or deleted is identified by mRID and/or one or more existing Names in the element that corresponds to the object's type (in this example use case this is the Meter structure).
- If the verb in the request message is "create", then any Names (along with NameType and NameTypeAuthority) that appear in the Names structure (at the root level) of the message become new Names class identifier(s) for the CIM object.
- If the verb in the request message is "change", then
- any Names (along with NameType and NameTypeAuthority) that appear in the element that corresponds to the object's type (in this example use case this is the Meter structure) are deleted, and
- any Names (along with NameType and NameTypeAuthority) that appear in the Names structure (at the root level) of the message become new Names class identifier(s) for the CIM object.
- If the verb in the request message is "delete", then
- nothing is to be placed in the Names structure (at the root level) of the message, and
- any Names (along with NameType and NameTypeAuthority) that appear in the element that corresponds to the object's type (in this example use case this is the Meter structure) are deleted.

mRIDs are immutable and cannot be changed.

Any attempt to use ObjectNamesConfig that leaves a CIM object with no valid identifiers (an mRID and/or one or more Names class identifiers) will fail. Similarly, any attempt to use ObjectNamesConfig that leaves a CIM object with conflicting or ambiguous Names class identifiers will fail.

```
<?xml version="1.0" encoding="UTF-8"?>
<RequestMessage
```

```

xmlns = "http://iec.ch/TC57/2011/schema/message"
xmlns:m = "http://iec.ch/TC57/2011/ObjectNamesConfig#"
xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation = "http://iec.ch/TC57/2011/schema/message Message.xsd">
<Header>
  <Verb>change</Verb>
  <Noun>ObjectNamesConfig</Noun>
  <Revision>2.0</Revision>
  <Timestamp>2012-01-17T10:00:47Z</Timestamp>
  <Source>CIS</Source>
  <AckRequired>true</AckRequired>
  <MessageID>1B37B91F-FE63-464A-A9FA-B239EB402169</MessageID>
  <CorrelationID>1B37B91F-FE63-464A-A9FA-B239EB402169</CorrelationID>
</Header>
<Payload>
  <m:ObjectNamesConfig>
    <m:ConfigurationEvent>
      <m:createdDateTime>2012-01-17T10:00:47Z</m:createdDateTime>
      <m:effectiveDateTime>2012-01-17T10:00:47Z</m:effectiveDateTime>
    </m:ConfigurationEvent>
    <m:Meter>
      <m:mRID>B9BCE6FE-763D-4AFB-A229-79FA885AEDC1</m:mRID>
      <m:Names>
        <m:name>43531</m:name>
        <m:NameType>
          <m:name>MfgSerialNumber</m:name>
          <m:NameTypeAuthority>
            <m:name>ManufacturerABC</m:name>
          </m:NameTypeAuthority>
        </m:NameType>
      </m:Names>
    </m:Meter>
    <m>Name>
      <m:name>43532</m:name>
      <m:NameType>
        <m:name>MfgSerialNumber</m:name>
        <m:NameTypeAuthority>
          <m:name>ManufacturerABC</m:name>
        </m:NameTypeAuthority>
      </m:NameType>
    </m>Name>
    <m>Name>
      <m:name>A1473922</m:name>
      <m:NameType>
        <m:name>BarcodeNumber</m:name>
        <m:NameTypeAuthority>
          <m:name>UtilityXYZ</m:name>
        </m:NameTypeAuthority>
      </m:NameType>
    </m>Name>
  </m:ObjectNamesConfig>
</Payload>
</RequestMessage>

```

The above sample XML is for a change/ObjectNamesConfig. The rules identified above explain the usage for create/ObjectNamesConfig and delete/ObjectNamesConfig.

The acknowledgment and response messages for each ObjectNamesConfig use case follow the pattern used throughout the other use case examples in this Annex.

Annex M (informative)

Notes on extended use of IEC 61968-100

The purpose of this Annex M is to describe some extended uses of IEC 61968-100 by IEC 61968-9. The usages in this Annex M are informative only, and may be subject to deprecation in the future.

In the case of "get MeterReadings", the current "GetMeterReadings" profile allows a request to be scheduled for a future time. There may sometimes be the need to cancel this request.

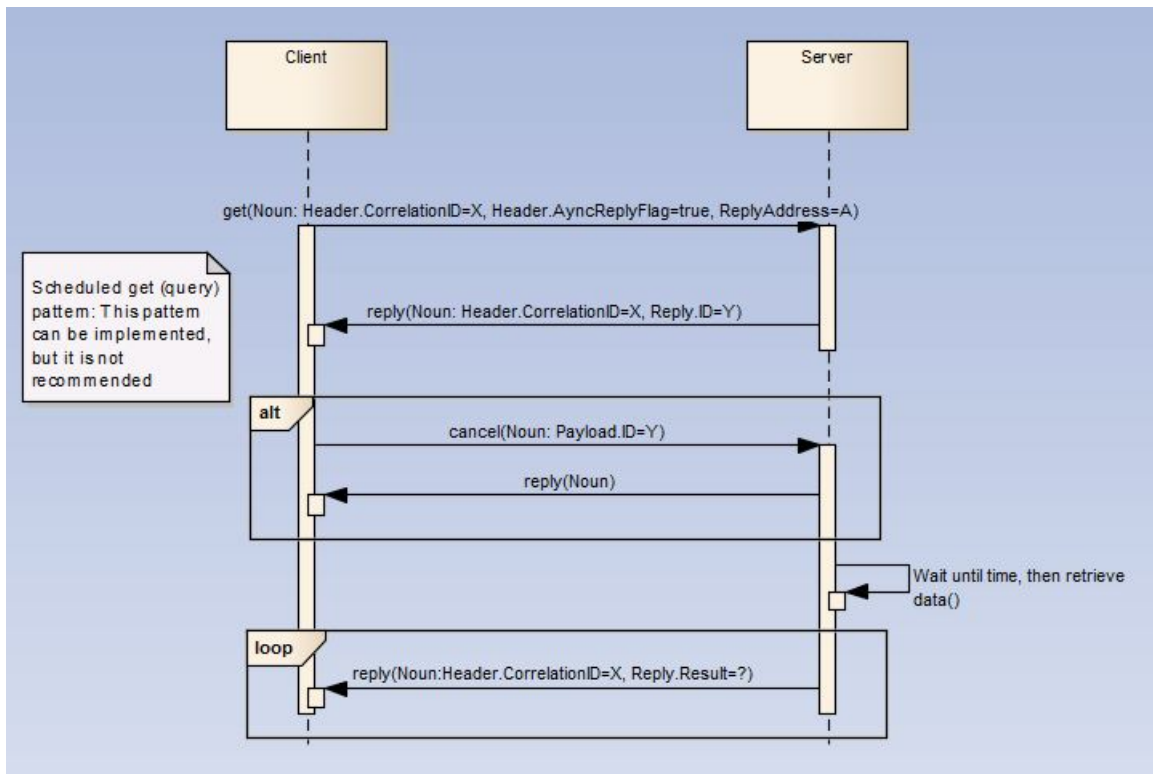


Figure M.1 – Get/cancel pattern which is not recommended

While the message structures support this "get/cancel" pattern shown in Figure M.1, a recommended approach would be through the use of a "create/cancel" pattern. In this pattern a request object is created in the target, which may be canceled. This is illustrated by the pattern in the sequence diagram in Figure M.2.

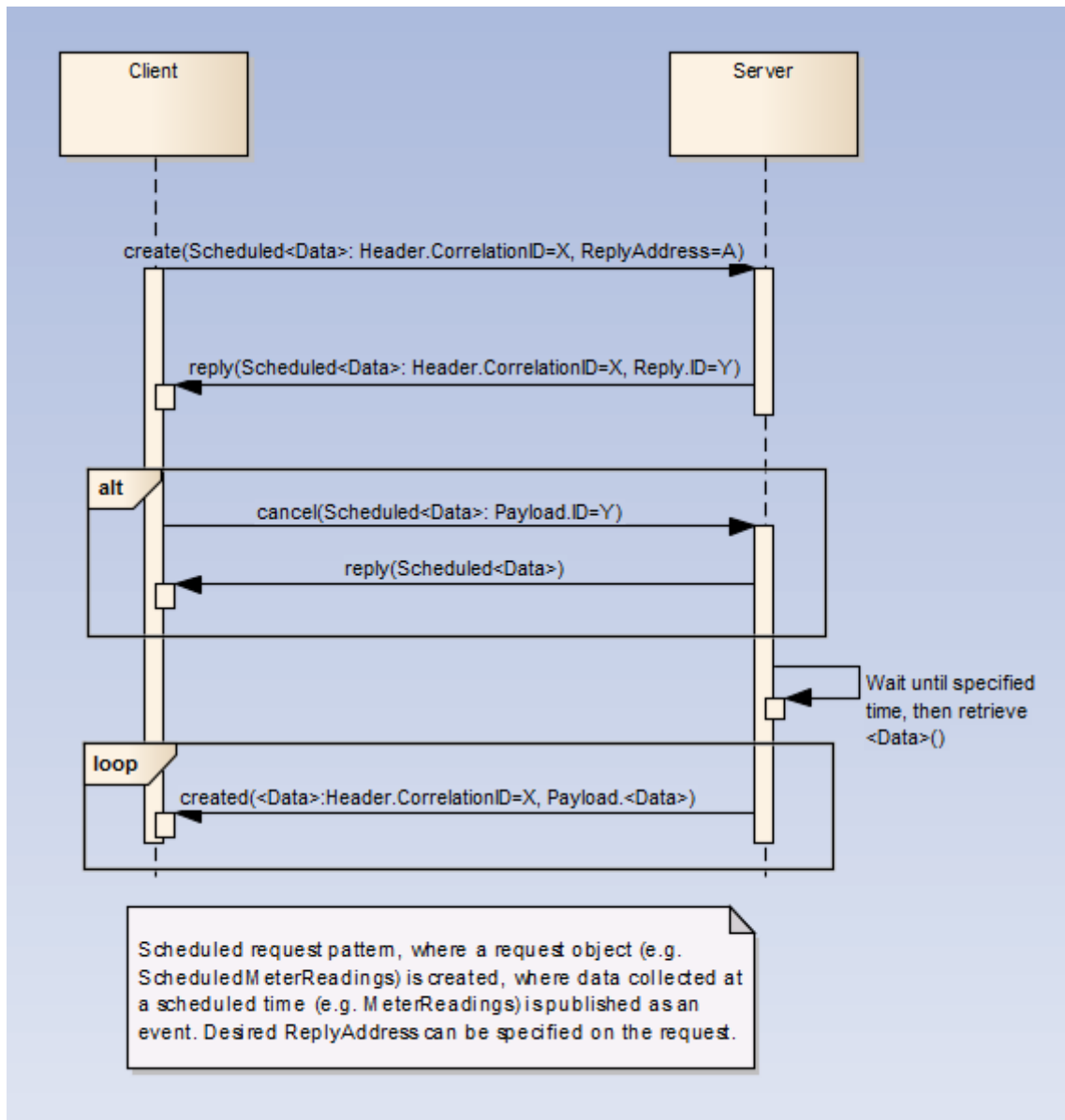


Figure M.2 – Get/cancel pattern which is recommended

Bibliography

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ISO 4217, *Codes for the representation of currencies and funds*

ANSI C12.19, *American National Standard for Utility Industry End Device Data Tables*

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