Introduction

to

Business Requirements

and

Information Models

Status: Approved by ETC

Version: 1.0

Revision: B

Date: October, 2015

C O N T E N T

A. About this document

This document is a generic introduction to all ebIX® models. These models are made for use in the European downstream electricity and gas market.

The document also contains the generic model elements for business processes.

A.1. Comments

If you have comments or suggestions to the document please contact Kees Sparreboom, kees.sparreboom@capgemini.com or Ove Nesvik ove.nesvik@edisys.no .

A.2. References

A.2.1. Standards

[1] UML Profile for UN/CEFACT's Modelling Methodology (UMM), Base Module, 2.0. (http://www.unece.org/cefact/umm/umm_index.html)

[2] UML Profile for UN/CEFACT's Modelling Methodology (UMM), Foundation Module, 2.0. (http://www.unece.org/cefact/umm/umm_index.html)

[3] UN/CEFACT UML Profile for Core Components Technical Specification 3.0, (http://www1.unece.org/cefact/platform/download/attachments/44204212/Specification_UPCC3_odp5_draft_20110221_3rd_iteration.pdf)

[4] UN/Cefact Core Components Technical Specification Version 3.0, (http://www.unece.org/cefact/codesfortrade/ccts_index.html)

[5] UN/CEFACT XML Naming and Design Rules Technical Specification Version 3.0, (http://www.unece.org/cefact/xml/xml_index.html)

[6] UN/Cefact Core Components Business Document Assembly Technical Specification Version 1.0, (http://www.unece.org/fileadmin/DAM/cefact/TechnicalSpecifications/CCBDA_TS_v1.0.pdf)

[7] The Harmonized Role Model (for the Electricity Market) by ebIX®, ENTSO-E, and EFET (http://www.ebix.org)

[8] UML version 2.0 (http://www.omg.org/spec/UML/2.0/)

[9] Object Constraint Language, OMG Available Specification Version 2.0 formal, 1 May 2006 (http://www.omg.org/spec/OCL/2.0/)

A.2.2. ebIX® Documents

[10] Recommended Identification Schemes for the European Energy Market (http://www.ebix.org)

[11] ebIX® Business Requirements and Business Information Models for various processes (http://www.ebix.org)

[12] ebIX® XML schemas (http://www.ebix.org)

[13] ebIX® Rules for use of OCL constraints to tailor BIEs to Business Requirements (http://www.ebix.org)

[14] ebIX® code lists (http://www.ebix.org)

[15] Manual for Transformation Tool (http://www.ebix.org)

A.2.3. Literature

[1] Executable UML, a foundation for model driven architecture, Stephen J. Mellor & Marc J. Balcer, Pearson Education, 2002

[2] Praktisch UML 3e editie, Jos Warmer & Anneke Kleppe, Pearson Eduction, 2005

[3] The Object Constraint Language second edition, Jos Warmer & Anneke Kleppe, Pearson Eduction, 2003

[4] MDA explained, the model driven architecture: practice and promise, Jos Warmer, Anneke Kleppe & Wim Bast, Pearson Eduction, 2003

[5] Model Driven Architecture with executable UML, Chris Raistrick and others, Cambridge University Press, 2004

A.3. Main changes since last version

		Old	New	Clarification	Date
Version 1.0.A					
1.	First approved version				2013-03-15
Version 1.0.B					
2.	Paragraph A.2			References have been updated	2015-01-22
3.					
4.					
5.					
6.					
7.					

8.					
9.					

1 Introduction

1.1. The European Energy Market

Presently the European Energy Market is going through a change process in most of the European countries. These changes include new legislation and a deregulation of the market. Earlier the participants in the market were in a monopoly situation. Today markets become liberalized. New responsibilities emerge and old responsibilities may be redistributed over different companies. On top of this national markets become more and more integrated within a common European Energy Market.

The change in the structure of the market and the new legislation described above has increased the need for electronic business tremendously (e.g. the exchange of EDI documents in the energy market in Sweden is more than 40 million EDI documents a year). This includes both transaction data, such as time series with production and consumption figures between the different parties, and master data. The exchange of information regards a large number of participants in many to many relationships. The number of actors that needs information exchange in the energy market, may be in the range of a few hundred companies per country (Germany has for instance about 900 grid companies).

1.2. About the ebIX® Model

The model documents for the ebIX® domains describe the harmonized exchange of data in the European Energy Market. The models will be part of an overall ebIX® model for the European Energy Market. This model is important for having a common and agreed understanding on how the exchange of data in the European Energy Market works.

ebIX® has adopted an international and open standard as a basis for the methodology: UN/CEFACT Modelling Methodology version 2.0 (UMM-2, [1] and [2])

In line with UMM-2 the ebIX® model contains 3 main parts:

1. Business requirements in the “Business Requirements View”
2. Modelled processes in the “Business Choreography View”
3. Modelled information in the “Business Information View”

The “Business Requirements View” is included in the ebIX® Business Requirements documents (BRS), [11].

The “Business Choreography View” and the “Business Information View” are combined in the ebIX® Business Information Model documents (BIM), [11].

1.2.1. Business Requirements

The data models in the Business Requirements are specified by business user groups. The ebIX® business user groups will follow ebIX® Rules for the use of UN/CEFACT Modelling Methodology version 2.0 (UMM-2) for their business requirements specification. UMM-2 uses UML as the Modelling Language.

1.2.1.1. Model elements in Business Requirements View

The intended audience for the business requirements is business people.

1.2.1.1.1. BusinessProcessUseCase

A business process use case is a set of related activities that together create value for a business partner. A business process use case might be performed by a single business partner type or by multiple business partner types crossing organizational boundaries. In the case where organizations collaborate in a business process, the business process should create value for all of its participants. A business process use case can be decomposed into sub-processes using the «include» and «extends» association stereotypes defined in UML.

ebIX® models focus on information exchange processes. In such processes at least two business partners participate. In an internal process only one business partner participates in the process.

In ebIX® models business partners are always mapped to harmonized roles (from the Harmonized Role Model [6])

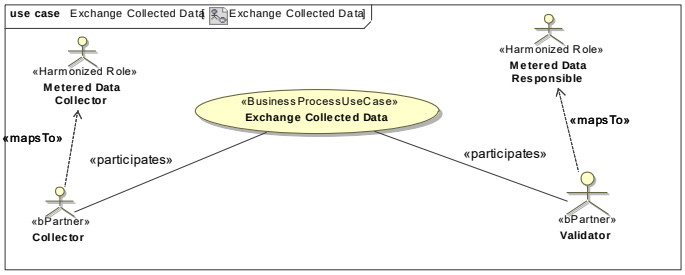


Figure 1 Example of a BusinessProcessUseCase

1.2.1.1.2. BusinessProcess

The business process describes the behaviour of a business process use case between the involved business partners. It is a tool that helps to identify the requirements for two or more business partners to collaborate. A business process refines a business process use case by describing its dynamic behaviour. The «SharedEntityState» between the two swim lanes (that each represents a business partner) reflects the new state of a business entity (e.g. a set of information within an exchanged document) as a consequence of the process.

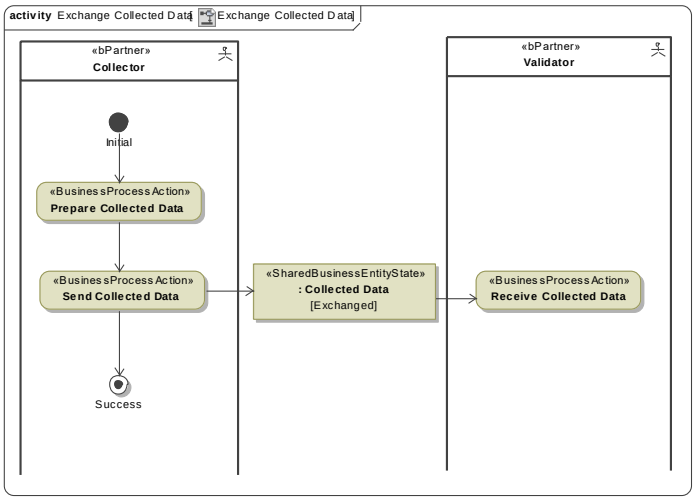


Figure 2 Example of a BusinessProcess

1.2.1.1.3. BusinessDataView

The business data view is a container for all elements needed to describe the conceptual assembly of a business entity.

A business entity is a real-world thing having business significance and that is shared among two or more business partner types in a collaborative business process (e.g. set of measured data, Metering Point, etc.).

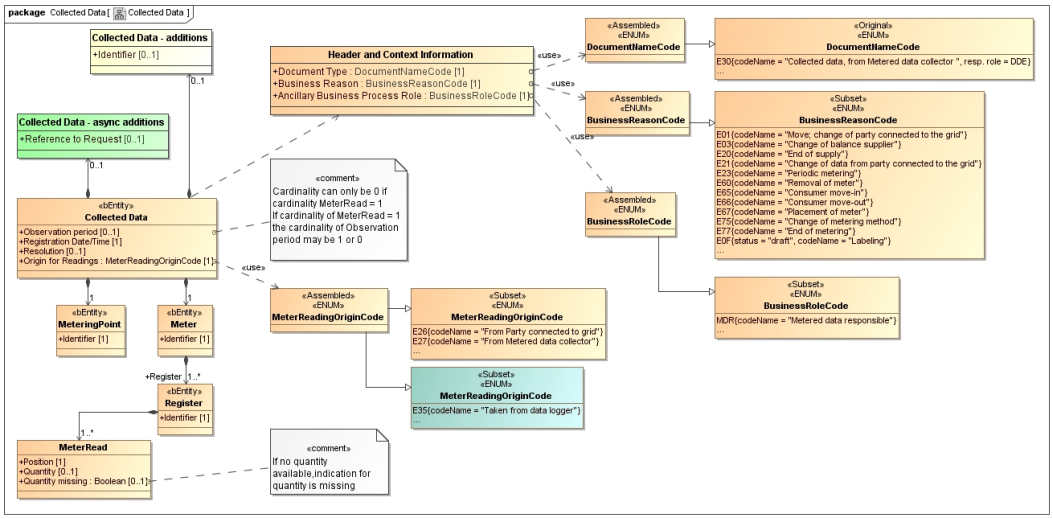


Figure 3 Example of a BusinessEntity

In the Business Data View the ebIX® work groups use the principle of specifying the core data set as business requirements. This core data set is defined as the set of information that is required when using synchronous web services as the exchange mechanism.

The information required for a-synchronous web services is added as an option.

Finally optional information may be specified.

For exchange as a stand-alone document header and context information will have to be added. But this is not regarded as a business requirement when defining the core data set, but as a requirement for technical implementation or mapping to syntax.

It is important to note that it is assumed for defining the core data set, that Metering Points are uniquely dedicated to either electricity or to gas. As a consequence the specification of the business sector is not part of core data set.

1.2.1.1.3.1. Enumerations for Electricity or for Gas

In the Business Data View enumerations are shown in three different colors indicating that the use of the literals (codes) are for electricity, for gas or for both:

Both electricity and gas	«Original» «ENUM» **EnergyProductIdentifier** 8716867000061{codeName = "Connection use"} ...
Electricity only	«Original» «ENUM» **EnergyProductIdentifier** 8716867000030{codeName = "Energy active"} ...
Gas only	«Original» «ENUM» **EnergyProductIdentifier** 5410000100016{codeName = "NaturalGas"} ...

1.2.1.1.3.2. State Diagram

For each business entity the life cycle is specified in a state diagram reflecting the successive states of the entity.

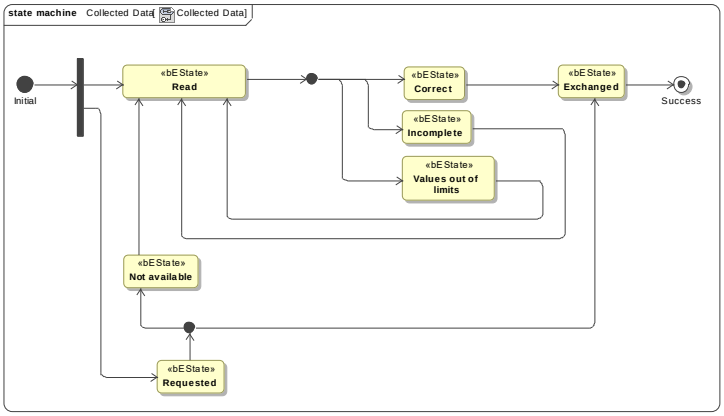


Figure 4 Example of a state diagram

1.2.1.2. National requirements

The requirements for the ebIX® model are based on mainly national procedural requirements.

For the measured data needed for imbalance settlement, requirements taken from national implementations based on ENTSO-E requirements for the imbalance settlement process, have been the basis.

1.2.2. Modelled processes

The Business Requirements as described above constitute the basis for the modelled version of the processes and information: ebIX® Business Information Model (BIM).

The processes are modelled in the Business Choreography View by the ebIX® Technical Committee using the ebIX® Rules for the use of UMM-2.

The intended audience for the ebIX® modelled processes is IT people responsible for the implementation of the ebIX® recommendations.

1.2.2.1. Model elements in Business Choreography View

The Business Choreography View is used to define and document the global choreography between collaborating business partners in an inter-organizational business process. The choreography is modelled bottom-up starting with transactions and then combining transactions in collaborations.

Within the Business Choreography View, the Business Transaction View contains and documents the requirements of Business Transaction Use Cases, and their participating Authorized Roles. The dynamics of a Business Transaction Use Case are described by a Business Transaction. A business transaction defines a simple choreography of exchanging business information between two authorized roles and an optional response. A business transaction identifies the business actions of each partner responsible for sending and receiving the business information. These actions correspond to the requirements of any solution that must be implemented on each business partner's side in service oriented collaboration architecture. Within the Business Choreography View, the Business Collaboration View contains and documents the requirements of Business Collaboration Use Cases and their participating Authorized Roles. The dynamics of a Business Collaboration Use Case are described by a Business Collaboration Protocol. A Business Collaboration Protocol choreographs the flow among business transactions, and/or nested Business Collaboration Protocols. This flow depends on the states of business entities.

When a Business Collaboration Use Case is identified, but different sets of parties may execute this collaboration, the different Realizations (executions) may be modelled within the Business Realization View, as a Business Realization Use Case.

1.2.2.1.1. Business Transaction

A business transaction is the basic building block to define choreography between authorized roles. If an authorized role recognizes an event that changes the state of a business object, it initiates a business transaction to synchronize with the collaborating authorized role. It follows that a business transaction is an atomic unit that leads to a synchronized state in both information systems. We distinguish one-way and two-way business transaction: In the former case, the initiating authorized role reports an already effective and irreversible state change that the reacting authorized role has to accept. In the other case, the initiating partner sets the business object(s) into an interim state and the final state is decided by the reacting authorized role. It is a two-way transaction, because

business information flows from the initiator to the responder to set the interim state and backwards to set the final and irreversible state change. In a business context irreversible means that returning to an original state requires another – compensating – business transaction. E.g., once a purchase order is agreed upon in a business transaction a rollback is not allowed anymore, but requires the execution of a cancel order business transaction compensating the before sent purchase order. A business transaction follows always the same pattern: A business transaction is performed between two authorized roles that are assigned to exactly one swim lane each. Each authorized role performs exactly one activity. An object flow between the requesting and the responding business activity is mandatory. In ebIX® models the reverse direction is always one flow which may contain two optional responses. The two options are then mutually exclusive (e.g., a purchase order is accepted or declined). According to the business transaction semantics, the requesting business activity does not end after sending the business information - it is still alive. The responding business activity may output the response which is returned to the still living requesting business activity.

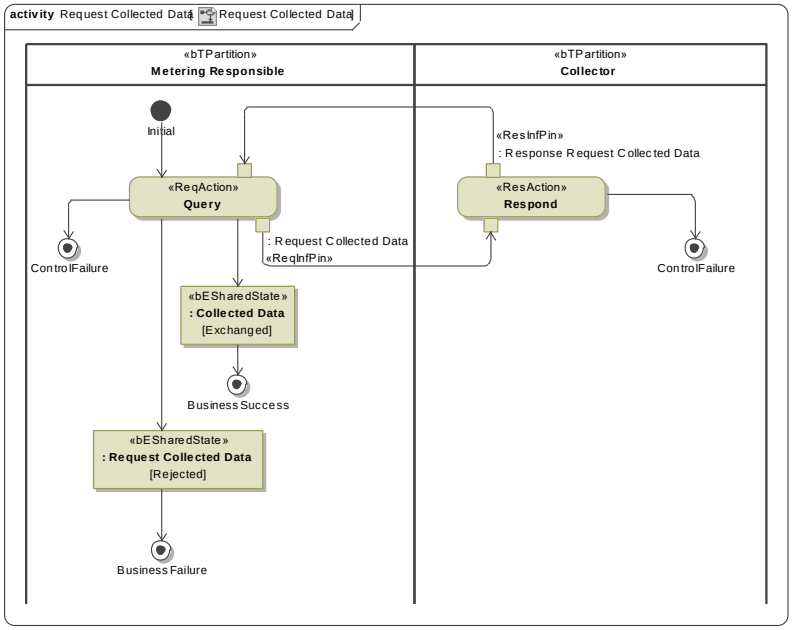


Figure 5 BusinessTransaction

1.2.2.1.2. Business Collaboration

Business collaboration describes in detail the requirements on the collaboration between two or more involved partners. Business partner types take part in a business collaboration use case by playing an authorized role in it. A business collaboration use case can be broken down into further business collaboration use cases and business transaction use cases. A business collaboration use case may extend another business collaboration use case.

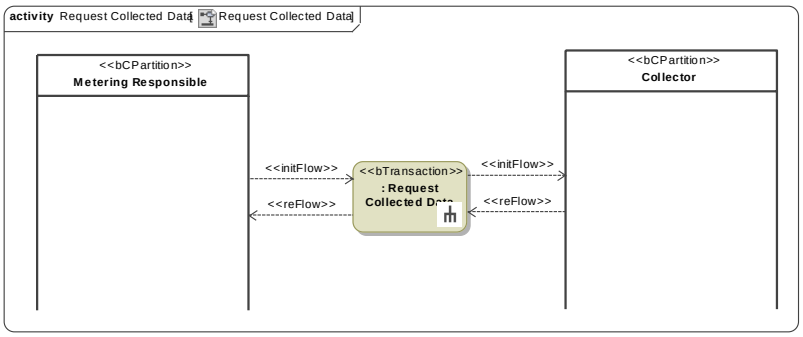


Figure 6 BusinessCollaboration

1.2.2.1.3. Business Realization

When a Business Collaboration is identified, but different sets of parties may execute this collaboration, the different Realizations (executions) may be modelled within the Business Realization View, as a Business Realization Use Cases. In ebIX® models the authorized roles must be mapped to Harmonized Roles (from the Harmonized Role Model).

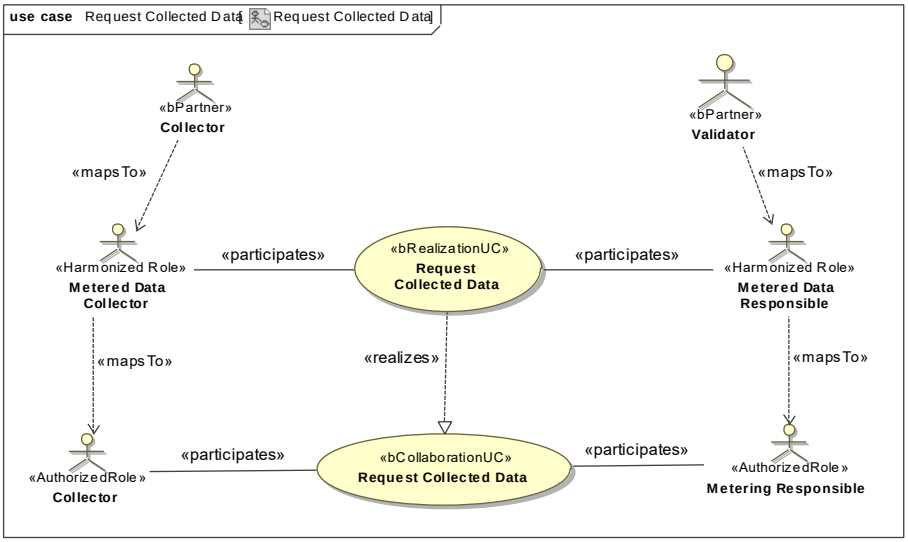


Figure 7 BusinessRealization

1.2.3. Modelled information

The information that is to be exchanged is described in the "Business Information View" by the ebIX® Technical Committee using the ebIX® Rules for the use of UMM-2. The class diagrams representing the information are constructed from Aggregated Business Information Entities (ABIEs), which are in turn based on UN/CEFACT Aggregated Core Components. For the specification of the ABIEs ebIX® follows the recommendations from UN/CEFACT [2]

The standard ABIEs in the class diagrams in the Information Models are tailored to the needs of the business requirements by means of standard OCL-statements [8]

The intended audience for the ebIX® modelled information is IT people responsible for the implementation of the ebIX® recommendations.

1.2.3.1. Model elements in Business Information View

The business information view is a container for all elements representing the exchanged information in business collaborations.

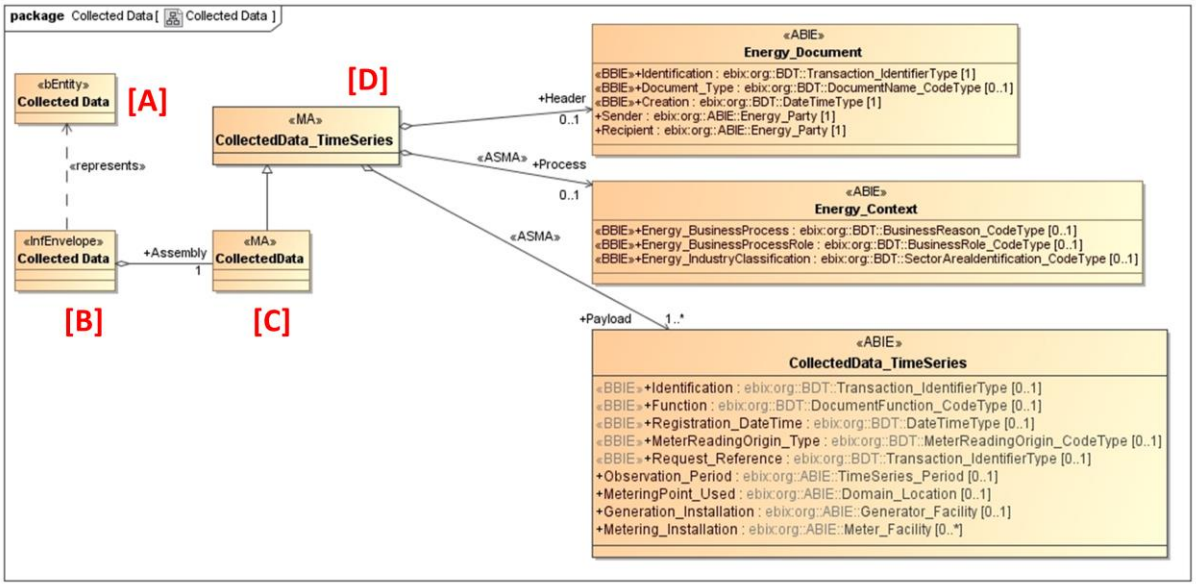


Figure 8 class diagram for Collected Data

The class diagram represents:

[A] A class stereotyped <<InfEnvelope>> (information envelope) which is used for classifying the exchange-relations in the business transaction (*see* ChoreographyView);

[B] The business entity (taken from the business requirements) that is represented by the (cluster of) ABIE(s).

[C] A class stereotyped <<MA>> (message assembly) that represents the actual information to be exchanged. This class inherits its structure from another, generic class stereotypes <<MA>> (*see [D]*)

[D] A class stereotyped <<MA>> (message assembly) that represents a generic, re-usable ebIX® Standard Document to which the ABIEs are linked that specify the structure of respectively an information payload, the context of an exchange and the header of a document.

Since an ABIE has to represent a range of various requirements, its composition will be much broader than required for each individual usage of the ABIE. Therefore an ABIE has to be narrowed down for each application in a message assembly. In ebIX® models this is done by using UML constraints that contain OCL statements. Below you find an example.

```
-- BDT Energy_Document
-- Collected Data
self.Identification.schemeIdentifier->size()=0
inv: self.Identification.schemeVersionIdentifier->size()=0
inv: self.Identification.schemeAgencyIdentifier->size()=0

inv: self.Document_Type.content=DocumentNameCode::E30
inv: self.Document_Type.listIdentifier->size()=0
inv: self.Document_Type.listAgencyIdentifier=CodeListResponsibleAgencyCode::260

inv: self.Creation.timeZoneCode->size()=0

inv: self.Recipient.Identification.schemeIdentifier->size()=0
inv: self.Recipient.Identification.schemeAgencyIdentifier=CodeListResponsibleAgencyCode::9
or self.Recipient.Identification.schemeAgencyIdentifier=CodeListResponsibleAgencyCode::305
inv: self.Sender.Identification.schemeIdentifier->size()=0
inv: self.Sender.Identification.schemeAgencyIdentifier=CodeListResponsibleAgencyCode::9 or
self.Sender.Identification.schemeAgencyIdentifier=CodeListResponsibleAgencyCode::305
```

These constraints are created as an inner element of the <<MA>> that specifies the actual information exchange as class [C] above.

The constraints and OCL statements are shown for each Business Document in the BIM document as a generic table. This is not a UMM-2 requirement.

1.2.3.2. National version of a <<MA>> in the ebIX® model

An important part of the ebIX®mission regards the option to customize ebIX® models according to national requirements. This can be done in the ebIX® UMM model by specifying asset of national constraints with updated OCL-statements that can bring the standard ebIX® payload in the model in line with the national requirements. For the generation of the national XML-schemas the transformation tool will then use the national set of constraints. And for this purpose tagged values are added to the constraints indicating which version this constraint specifies (ebIX® or national version X, Y or Z).

National customization supported by ebIX® in the UMM model is limited to the un-customized version of an ebIX® message assembly (<<MA>>). ebIX® does not support customizations beyond existing BIEs.

XML schema file names for national versions are qualified by the name of the national organization before the ebIX® name for this schema. This naming will however be handled by the transformation tool (on the basis of the tagged values added to the constraints, see above).

1.2.3.3. Naming convention

For the business requirements part of the ebIX® model no specific naming convention has been defined. It is however recommended not to concatenate words in names for model elements.

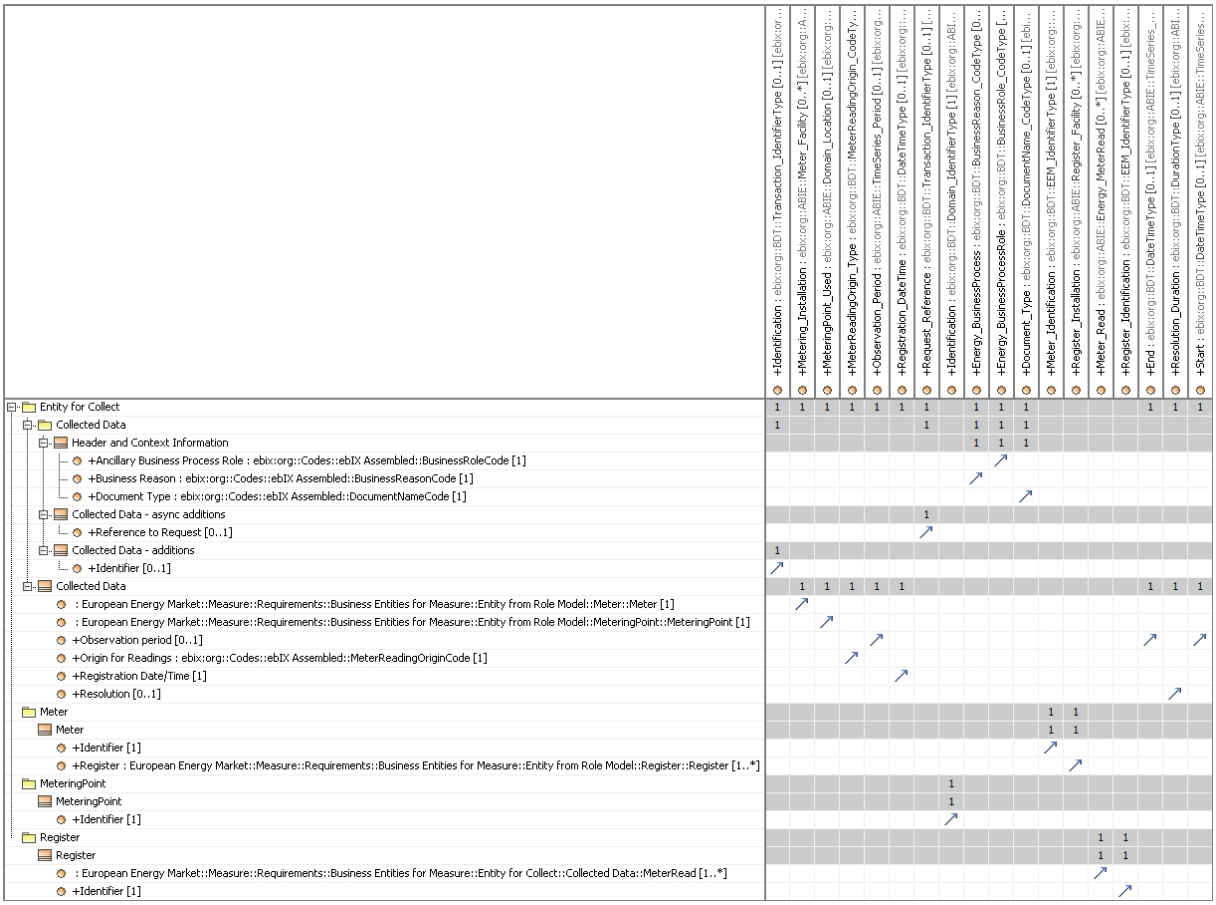
For the business information view part of the ebIX® model the naming conventions of the UN/CEFACT Core Component Technical Specification [4] are followed.

For the filenames of XML schemas derived from the ebIX® model the naming convention is described in paragraph 8 (ebIX® XML schemas) in this document.

1.2.3.4. Linking attributes from Requirements View to attributes in Information View

The links from data specified in the Business Requirements to the resulting data in the Business Information View are shown in the BIM document as a dependency table that is derived from a separate class diagram in which these dependencies are created. This is not a UMM-2 requirement.

The table below is an example.


+Identification : ebix:org::BDT::Transaction_IdentifierType [0..1]
+Metering_Installation : ebix:org::ABIE::Meter_Facility [0..*]
+MeteringPoint_Used : ebix:org::ABIE::Domain_Location [0..1]
+MeterReadingOrigin_Type : ebix:org::BDT::MeterReadingOrigin_CodeTy...
+Observation_Period : ebix:org::ABIE::TimeSeries_Period [0..1]
+Registration_DateTime : ebix:org::BDT::DateTimeType [0..1]
+Request_Reference : ebix:org::BDT::Transaction_IdentifierType [0..1]
+Identification : ebix:org::BDT::Domain_IdentifierType [1]
+Energy_BusinessProcess : ebix:org::BDT::BusinessReason_CodeType [0..
+Energy_BusinessProcessRole : ebix:org::BDT::BusinessRole_CodeType [...
+Document_Type : ebix:org::BDT::DocumentName_CodeType [0..1]
+Meter_Identification : ebix:org::BDT::EEM_IdentifierType [1]
+Register_Installation : ebix:org::ABIE::Register_Facility [0..*]
+Meter_Read : ebix:org::ABIE::Energy_MeterRead [0..*]
+Register_Identification : ebix:org::BDT::EEM_IdentifierType [0..1]
+End : ebix:org::BDT::DateTimeType [0..1]
+Resolution_Duration : ebix:org::BDT::DurationType [0..1]
+Start : ebix:org::BDT::DateTimeType [0..1]
Entity for Collect
Collected Data
Header and Context Information
+Ancillary Business Process Role : ebix:org::Codes::ebIX Assembled::BusinessRoleCode [1]
+Business Reason : ebix:org::Codes::ebIX Assembled::BusinessReasonCode [1]
+Document Type : ebix:org::Codes::ebIX Assembled::DocumentNameCode [1]
Collected Data - async additions
+Reference to Request [0..1]
Collected Data - additions
+Identifier [0..1]
Collected Data
: European Energy Market::Measure::Requirements::Business Entities for Measure::Entity from Role Model::Meter::Meter [1]
: European Energy Market::Measure::Requirements::Business Entities for Measure::Entity from Role Model::MeteringPoint::MeteringPoint [1]
+Observation period [0..1]
+Origin for Readings : ebix:org::Codes::ebIX Assembled::MeterReadingOriginCode [1]
+Registration Date/Time [1]
+Resolution [0..1]
Meter
Meter
+Identifier [1]
+Register : European Energy Market::Measure::Requirements::Business Entities for Measure::Entity from Role Model::Register::Register [1..*]
MeteringPoint
MeteringPoint
+Identifier [1]
Register
Register
: European Energy Market::Measure::Requirements::Business Entities for Measure::Entity for Collect::Collected Data::MeterRead [1..*]
+Identifier [1]

1.3. ebIX® Modeled Business Information for specific technologies

1.3.1. Introduction

Since UN/Cefact Modeling Methodology's main focus is the modeling of processes and the requirements on which these are based, the methodology for modeling information is its least elaborated part.

Given this present situation a brief explanation in which account is given for the way the business information has been modeled in ebIX® documents, is given below.

1.3.2. ebIX® model and MDA

The 3 different Views represent a "Platform Independent Model" (PIM) as described in the Model Driven Architecture (MDA) paradigm. ebIX® derives from the PIM the following "Platform Specific Models" (PSM):

- Syntax specific representation of the information to be exchanged:
  - XML schemas
  - Message Implementation Guides for Edifact UNSMs.
- Web service definitions as a technology specific representation of the exchange processes.

Platform Specific Models are derived from the Platform Independent Model by means of the ebIX® transformation tool *(see the referenced documentation in § A*.2.3*).*

1.3.3. Technology (syntax) independent information model

Key element in ebIX® modeling is to model technology (syntax) independently. So based on the business requirements a syntax independent information model is created. To this technology independent model extra information is added to enable the derivation of technology dependent models or exchange formats from that technology independent information model.

In the Information View you will find the syntax independent business information model. Additionally you will find the syntax dependent formats (XML schemas) on the ebIX® website [12].

1.3.4. Core Components in ebIX® models

The "translation" of the Business Requirements into the modeled information to be exchanged as mentioned in the previous paragraph, starts with the translation of these data into standardized re-usable Core Components in the Business Information View.

For the European Energy Market the Core Components (CCs and ABIEs) that have been defined, have a status "draft": the UN/Cefact approval process for the CCs is still ongoing.

What has been done instead for the present ebIX® models, is using the information clusters that emerged from ebIX® modeling over the past years as preliminary Core Components. These clusters have been defined in line with the UN/Cefact Core Components Technical Specification [4].

At the moment the ABIEs and BDTs used in the BIV are based on available UN/Cefact CCs and CDTs or on ebIX® proposals for new CCs or CDTs. ebIX® expects all these ABIEs and BDTs to be harmonized within the European Energy Market.

ebIX® publishes the CCs defined and used so far. In that publication the CCs are documented and references are made to either approved UN/Cefact CCs (ACC, BCC or CDT) or to ebIX® proposals for new CCs (ACC, BCC or CDT) to be approved.

Note: ebIX® and IEC are at the moment (beginning of 2015) at the start of a common development process for the specification of Core Components. A trial in which data elements from the ebIX® business requirements are to be mapped to IEC CIM data elements, is being prepared.

1.3.5. Business Document Assembly

The UN/CEFACT Core Components Business Document Assembly (CCBDA) Technical Specification (see [6]) is used in the ebIX® model for the assembly of a document. The naming convention in CCBDA for customized BIEs is used for the customized document version of XML schema. This implies that for the customized version ABIEs are replaced by MBIEs and BDTs are replaced by MDTs. These terms are reflected in the schema names for the Business Information Entities and the Data Types only (see also paragraph 1.3.5.1).

The UN/CEFACT recommendation for the Standard Business Document Header is not yet being used[1].

ebIX® documents (or an ABIE as part of a message assembly <<MA>>) do not contain a test flag (normally to be switched on for testing purposes). The transmission envelope (SOAP-header) is regarded to be a more likely place to put this indicator, at least with routing purposes in mind. And additional investigation learned that national implementations don't need a test indicator, since these implementations have separate test environments.

1.3.5.1. Message Business Information Entity and Data Type

The UN/CEFACT CCBDA recommends to distinguish the complete Business Information Entities (BIE) and Data Type (DT) from its customized version. In order to do so in UML these different versions are to be stereotyped differently (for example <<MBIE>> instead of <<ABIE>> and <<MDT>> instead of <<BDT>>). In the XML-schemas this difference is reflected in using different filenames.

In the ebIX® model the customized BIEs are not shown as such (these are defined by using constraints with OCL statements as inner elements for a <<MA>>) and therefore the stereotypes for message BIEs and message DTs are not used.

[1] At the moment UN/CEFACT is preparing an updated version for the Standard Business Document Header (version 3.0)

1.3.6. Technology of choice

1.3.6.1. Mapping to XML

The mapping to XML is done by generating XML schemas directly from the UML-model. The creation of the XML schemas follows the recommendations as published by UN/CEFACT in the Naming and Design Rules version 3.0 [5].

- Generic XML schemas:
    - code lists
    - Core Data Types (CDT)
    - UN/CEFACT specification of special formats for date/time
    - Business Data Types (BDT)
    - Reusable Aggregate Business Information (ABIE)
    - ebIX® Standard Document XML Schema. This is composed of one (or more) non-tailored ABIEs and defines the overall generic structure for "business documents" inheriting from this Standard Document in the UML model.
- Specific XML schemas for each information-exchange. These are derived from the specification of the business information.
    - ebIX® Business Document XML Schema (root schema). This schema includes:
        - A schema containing the customized BIEs (classified as MBIE)
        - A schema containing the customized DTs (classified as MDT)

  A Business Document Schema is derived from the combination of a message assembly (<<MA>>) and its inner element UML-constraints with OCL-statements.

1.3.6.2. Mapping to EDIFACT UNSM

In the past ebIX® supported EDIFACT as a syntax. Most models for switch and master data information to be exchanged could be mapped to the UN/CEFACT UNSM UTILMD (United Nations Standard Message "Utility Master Data"). Most models for metered data information to be exchanged could be mapped to the UN/CEFACT UNSM UTILTS (United Nations Standard Message "Utility Time Series").

Actual mapping of the present models to EDIFACT will depend on a request to be made for such development.

1.3.6.3. Web service definitions[2]

ebIX® wants the models to be prepared for implementation as web services. Therefore the clustering of the information in the BIV may be slightly modified compared to the BRV version.

- The header information to be used in the batch exchange as individual documents or as messages containing several documents is specifically split off from the definition of the core business data defined in the BIV. This regards the Header- and the Context-class.
- For all processes ebIX® assumes that web services will be clustered per responsible role. This implies that the attributes ReasonForTransaction and Function are regarded to be part of the payload containing the core business data, since this kind of information remains relevant for the receiver even in a synchronous web service exchange.

[2] not yet available; to be added after development based on member state request

2 Business Domain Model for the European Energy Market

The exchange of switch, master and metered data is part of the overall processes in the energy market. As a brief introduction to where in the overall European Energy Market model the harmonized information exchange for switch, master and metered data belongs, the business domain UseCases within the European Energy Market is shown below.

2.1. Overview

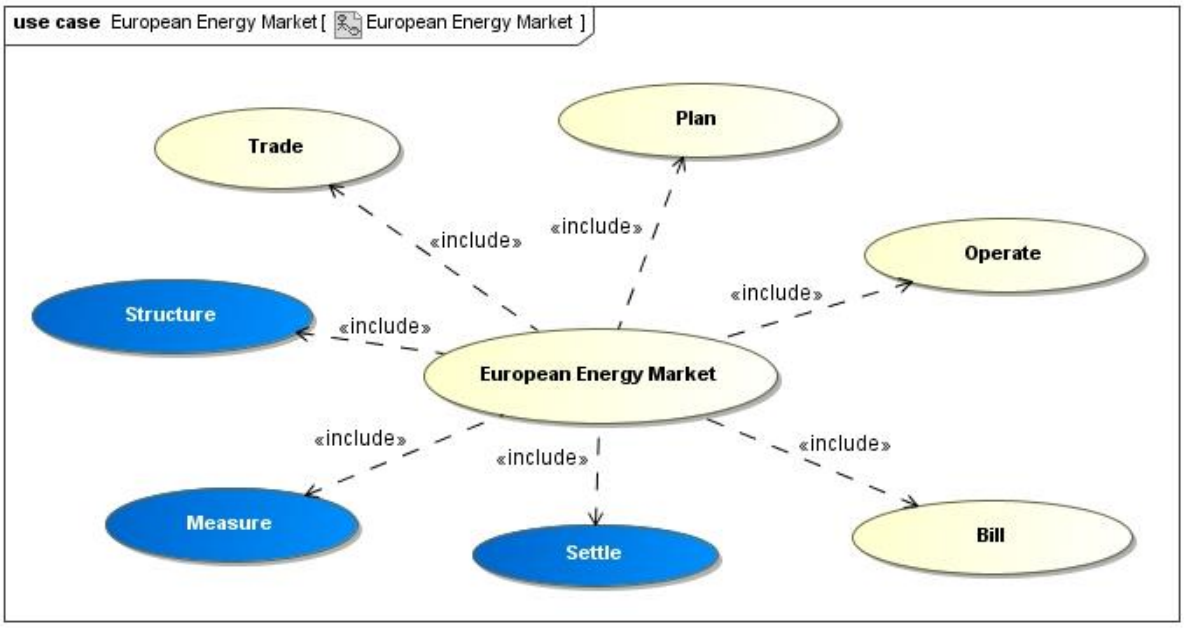


Figure 9 Business Domain Model for EEM

In the various model documents (*as listed in* § A.2.2 ebIX® Documents) the ebIX® domain models are broken down into individual processes. The blue UseCases represent the focus of the ebIX® model.

2.2. Description

The main activities within the domain UseCases are:

Structure

In the structuring phase the actors exchange information (master data) necessary for the later business processes. The different parties request creation of, changes to or deletion of energy market business objects, such as metering points, meters, contracts etc., or to its attributes. Thereafter the information related to the created, changed or deleted business object or its attributes is exchanged between relevant parties (roles). The alignment of master data between the actors in the energy market should result in all participants having the needed information to fulfil their obligations to the market.

Plan

The messages defined in these business processes enable *Balance responsible parties* (i.e. Trade responsible, Production responsible and Consumption responsible parties) to send their schedules (planned consumption, production, capacity, transport, exchange etc.) to the *System operators* and/or the *Transmission capacity allocator* (congestion management) the day ahead. The messages may also be used for the transmission of intraday schedules associated with day-ahead schedules.

Trade

In the trading phase, the *Balance responsible parties* are buying and selling energy for fulfilling their contractual obligations. The trading phase includes trade through the *Market operators* (e.g. Power exchanges). The UseCase Trade has so far not been elaborated by any common European projects.

Operate

The business process operate includes the message exchanges to handle the Balance regulation market and Ancillary services markets, e.g. the *System operator* orders up and down regulation to keep the balance in the system. Examples of processes are Bids from *Producers* or *Traders* to the *System operator* for the Balance regulation market and Ancillary services markets, and the processes of ordering up and down regulation to the *Producers* or orders to the *Grid operators* for disconnecting installations. The package Operate has so far not been elaborated by any common European projects.

Measure

The measure phase (Exchange of metered data) covers all stages from the collecting of the metered data until the settlement and reconciliation phase, with a focus on the exchange of information between *Metered data collectors, Metered data aggregators, Imbalance settlement responsible* and *Balance responsible parties*. E.g. the *Metered data collectors* read *Registers* (within *Meters*) and distribute metered data (transport, production, consumption). Thereafter the metered data are validated, aggregated and distributed to relevant roles.

Settle

The messages defined in this phase enable *Imbalance settlement responsible parties* to receive aggregated executed schedules, regulation- and metered information, and to send imbalance reports and bills (invoices) to the *Balance responsible parties* (consumption, production, capacity, etc.). The *Reconciliation responsible party* make the final reconciliation and distribute data to relevant roles.

Bill

The billing phase is the final process in the chain and includes all message exchange needed for billing the Consumers and the internal billing in the upstream energy market. I.e. invoicing and related basis documents needed for controlling purposes.

2.3. Overall sequence

There is an overall sequence in the process clusters in the domains. This sequence starts with the establishment and alignment of master data in “Structure” and ends with the billing processes. This overall sequence does not exclude the possibility of feed-back loops in the various detail processes. Below you find the overall sequence overview.

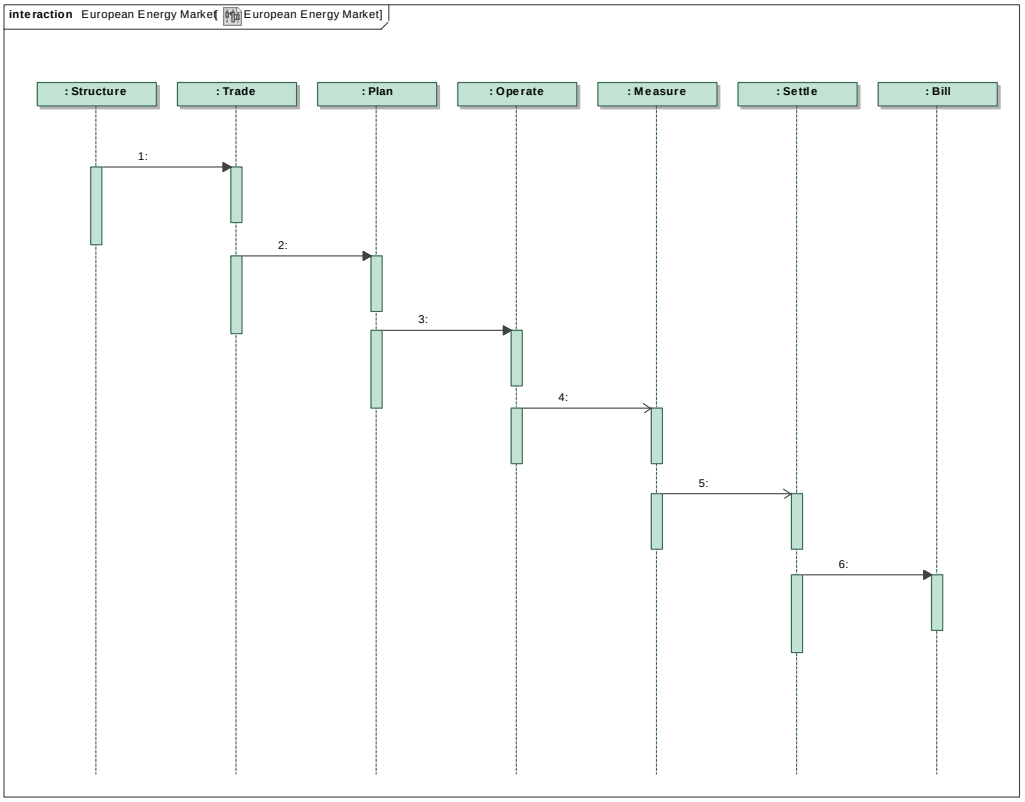


Figure 10 Sequence in Business Domains

2.4. Objectives

The objective for the overall project is to produce a model for the harmonized information exchange in the European Energy Market. The model is intended to be used to:

- Provide a basis for facilitation and harmonization in planning, trade, measuring, settlement and other processes important for the energy market.
- Make the deregulated energy market understandable for the participating parties.
- Provide a basis for a common way of exchanging business information in the energy market.
- Make the models based on accepted international and open standards, so that the result can be understood and used by as many as possible.

2.5. Limitations / prerequisites

1. In the ebIX® model documents the responsibilities are specified in line with the Harmonized Roles in the ebIX®-EFET-ETSO Role Model.

2. By present lack of European rules for the exchange of data ebIX® models are based on common harmonized national rules as found in the ebIX® member countries.

3. National rules/requirements are included as ebIX® requirements only when shared by 2 or more countries.

4. ebIX® models allow for nationals extensions to be additionally modelled by national groups.

5. A precondition for the successful implementation of the "simple" solutions described in the ebIX® models is the implementation of unique identifiers (*see also* [10])
    - Metering Point ID. If a unique Metering Point ID is not implemented, other (additional) attributes must be added to the different documents exchanged on a national basis (to assure the correct identification of the Metering Point);
    - A Metering Point is expected to be specific for either electricity or for gas;
    - Party ID;
    - Meter/Register ID. For the purposes of the processes as described in the ebIX® models meters have to be identified at least uniquely within one Metering Point. Identification of physical meters can for this purpose be based on GS1 GSAI (Global Serial Asset Identification for which identification scheme GS1 is the controlling agency).

6. In the ebIX® models special IDs for aggregated data are avoided. Instead aggregated data are specified by identifying the area for which the aggregation shall take place plus the criteria on which will be aggregated.

2.6. Scope

ebIX® models focus on the harmonized exchange of administrative data within the European Energy Market domains Measure and Structure.

The Measure part of the overall ebIX® model focuses on the exchange of metered data.

The Structure part of the overall ebIX® model focuses on the exchange of switch and master data.

The European Transmission System Operators model within their organization ENTSO-E various processes where the TSOs are directly involved. One of these processes being the imbalance settlement for which ebIX® has modelled the exchange of metered data in cooperation with ENTSO-E. The process of reconciliation is modelled by ebIX®.

UCTE as a predecessor for ENTSO-E has described some processes in which information exchange between TSOs is required. UCTE responsibilities have now been transferred to ENTSO-E (Regional Group Central Europe).

EFET has modelled elements in the exchange between traders.

2.7. Actors, parties and roles

In this document the term role originates from the ebIX®-EFET-ENTSO Harmonized Role Model. In this model roles are mainly defined in terms of responsibility. The term party refers to the (legal) entity performing the role. A party may combine more than one role. The term actor is reserved for UML and will be avoided in the ebIX® methodology.

Some examples:

A typical role cluster for the traditional **grid company** (as a party):

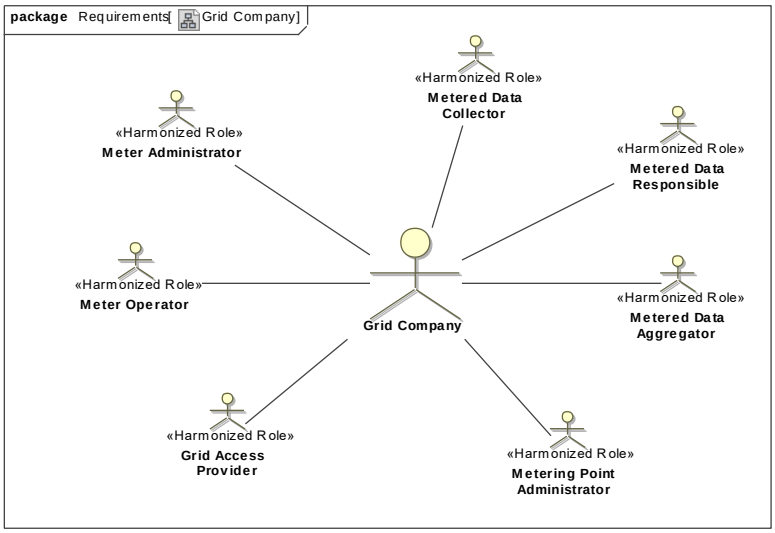


Figure 11 Role cluster Grid Company

A typical role cluster for the energy **supply company** (as a party):

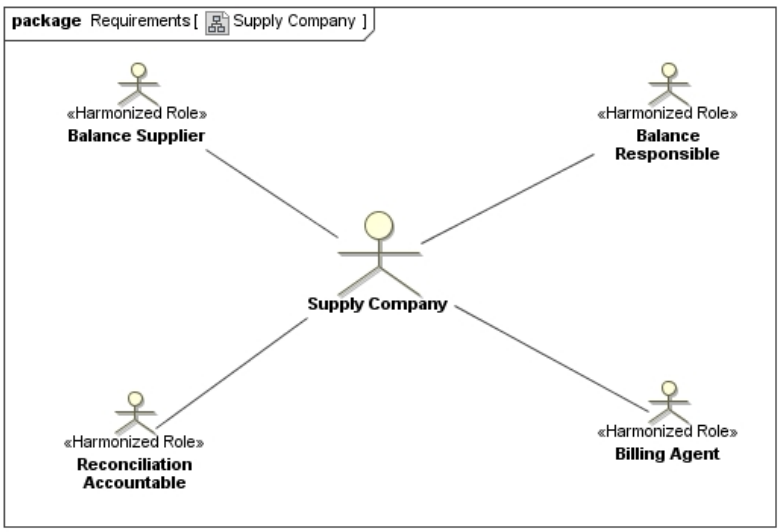


Figure 12 Role cluster Supplier

For definitions of the different actors and roles, please see the ebIX®-EFET-ETSO Harmonized Role Model (*see reference in* § A.2.1)

2.8. Remarks on all Class Diagrams

2.8.1. Naming

The classes, properties and relations in the Class Diagrams in the ebIX® models follow the UN/CEFACT Core Component Specification version 3.0 [4].

2.8.2. Options in cardinality

Usage of the classes with a cardinality of "0..1" or "0..*" is where possible avoided and where used mostly dependent on national rules. Interdependency may be specified as constraint with OCL-statements.

2.8.3. Explicit product specification

Where possible the product-ID is specified explicitly because:

- The ebIX® rule is to specify products explicitly even when there is in an instance only one product used;
- The product codes used by the European energy sector specify generic products. These products may be defined in more detail by additional characteristic codes.

2.8.4. Status in responses

In the Business Requirements View, a *Status class* is only used if not redundant with the "root class", i.e. no *Status* = *Confirmed* if the *Root class* is named *Confirmation.* For specifying the Status in the Business Information View we use the states as defined in the Business Requirements View.

In ebIX® business transactions and collaborations an undetermined status for responses shall be avoided. I.e. the status of a confirmation or rejection should always be "final" and should not have a status of "Approval pending", with a following (second) confirmation or rejection.

2.9. Remarks on Information in Models for Structure

The need for generic remarks on information in models for "Structure" has not yet arisen.

2.10. Remarks on Information in Models for Measure

2.10.1. Quality of metered data

With regard to the quality of collected, validated or aggregated data (specified by means of values from the enumeration "QuantityQualityCode"):

- "estimated" is regarded as a higher quality (more precise) than "temporary"
- "revised" may be used to indicate the correction of an already exchanged aggregation (normally based on national rules).

2.10.2. Direction

ebIX® models provide the opportunity to specify the directions explicitly:

- for exchange metering points by specifying the in- and/or out-area;
- for local metering points by specifying the type of metering point (production or consumption)
- at least one attribute has to be specified (either out area or in area)

In case the direction is only specified implicitly, the convention for signs used to specify the direction (also for combined metering point type):

- For metering grid areas: the direction is always defined relative to the specified (own) metering grid area
    - a flow out of the own metering grid area is indicated as – (minus) according to ETSO[3]-ebIX® convention and as 1 according to the OBIS-convention (Austria, Germany and Switzerland according to IEC-standard)
    - a flow into the own metering grid area is indicated as + (plus) according to ETSO-ebIX® convention and as 2 according to the OBIS-convention (Austria, Germany and Switzerland according to IEC-standard)

2.10.3. Update procedures

For metered data update procedures may differ nationally. Today all ebIX® member countries update per business document (time series).

[3] ETSO as predecessor for ENTSO-E

3 Harmonized Role Model

3.1. Section Measure (measured data)

Several roles are involved in the Measure process area. Below a class diagram where the main relations for these roles are shown.

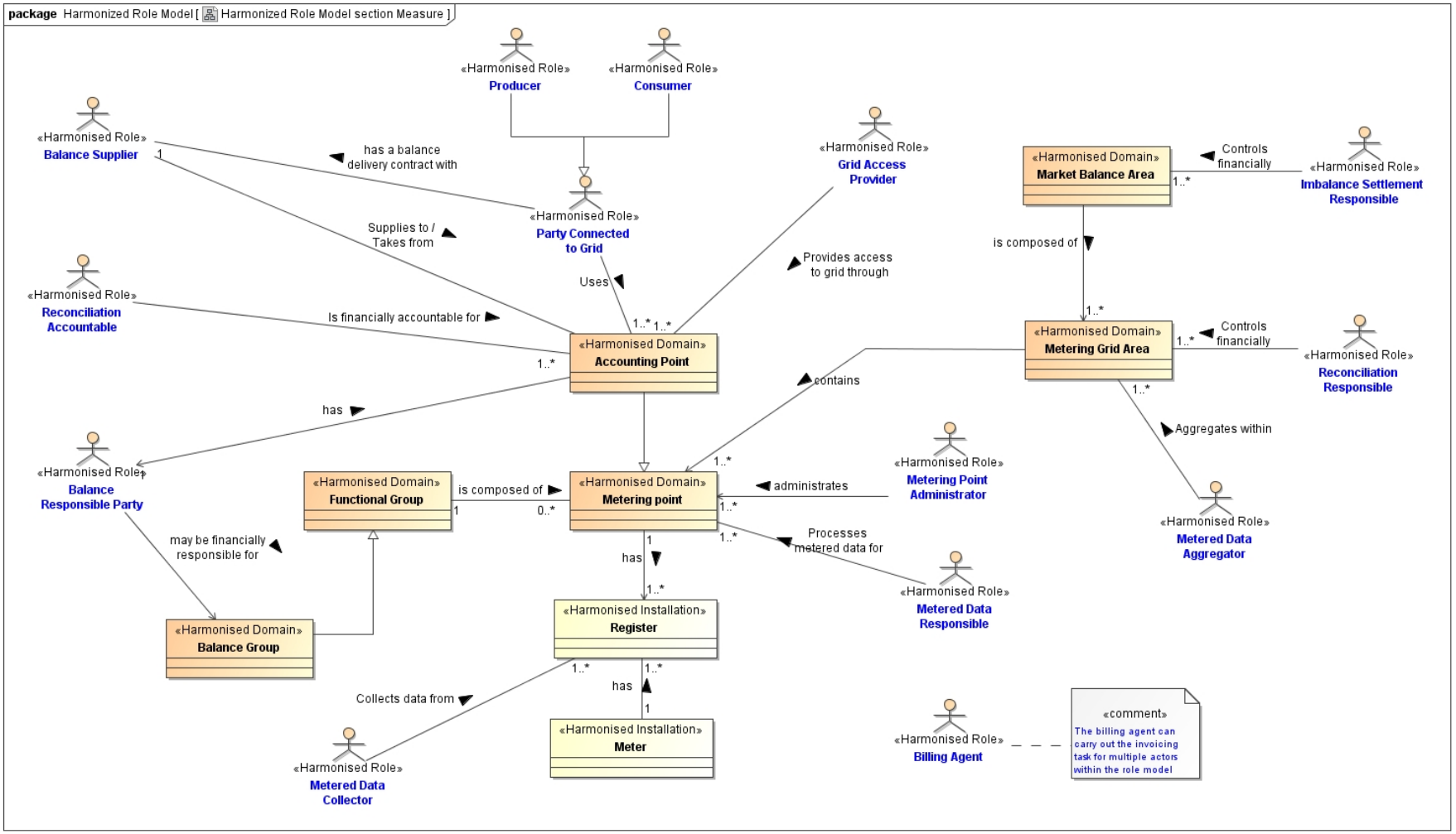


Figure 13 Class diagram – The roles and domains used for the business area Measure

For definitions of the different actors and roles, see [6]

3.2. Section Reconciliation process for the business area Settle

Several roles are involved in the Reconciliation process for the business area Settle. Below a class diagram where the main relations for these roles are shown.

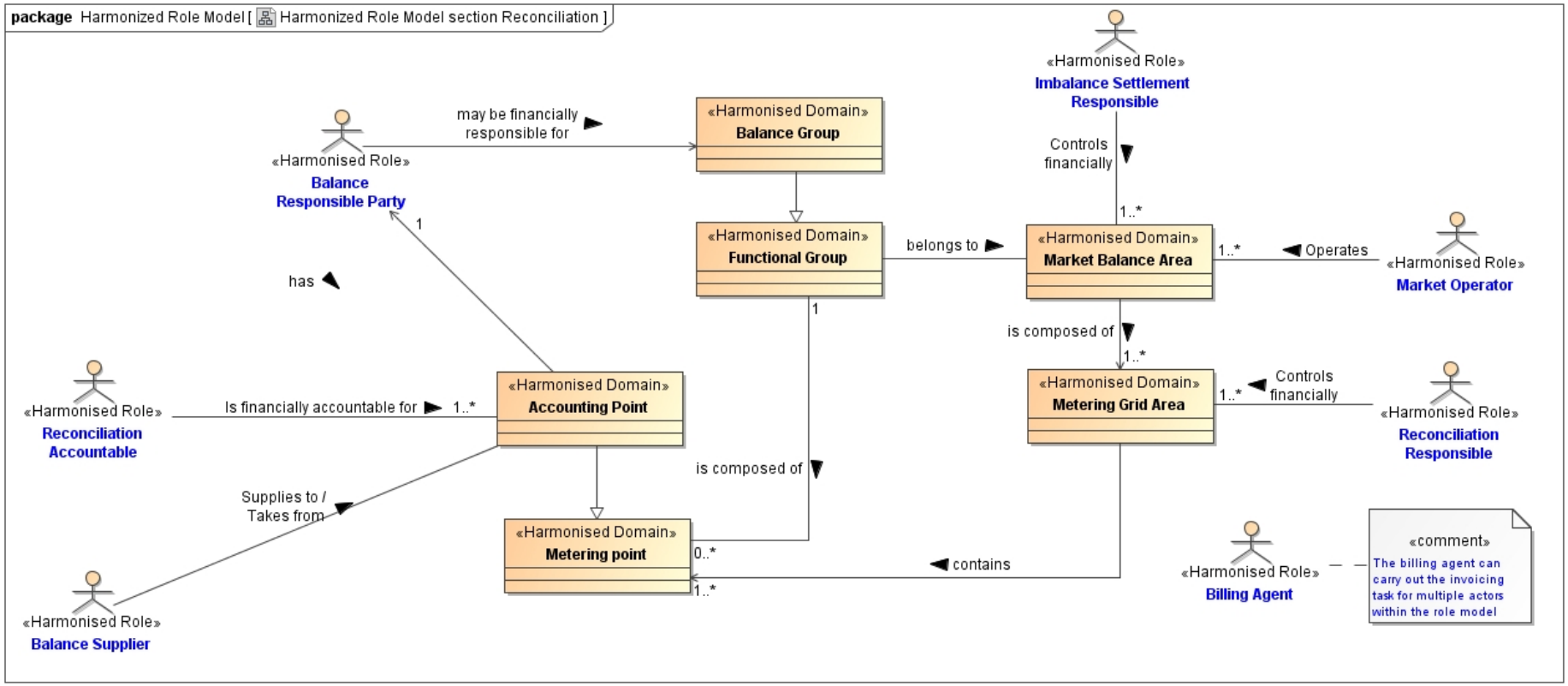


Figure 14 Class diagram – The roles and domains used for the business area Settle (ebIX® Reconciliation process)

For definitions of the different actors and roles, see [6]

3.3. Sub-Section Measure for Labeling (measured data)

Several roles are involved in the Measure for Labeling business process. Below a class diagram where the main relations for these roles are shown.

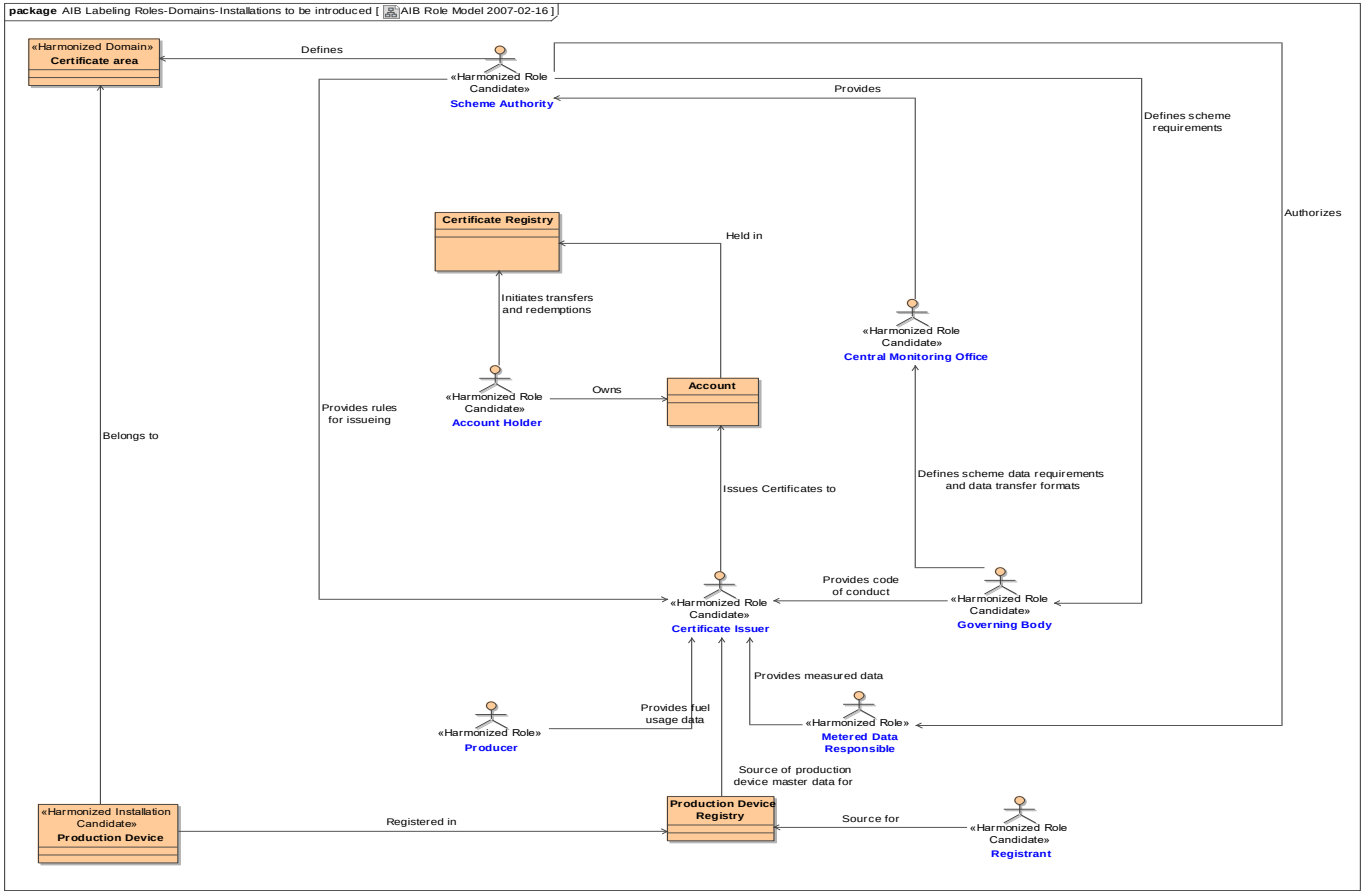


Figure 15 Class diagram – Roles-Domains-Installations for Measure for Labeling

(Based on draft AIB Role Model version 2007-02-16)

3.4. Section Structure (change- and master data)

Several roles are involved in the Structure process area. Below is shown a class diagram where the main relations for these roles are shown.

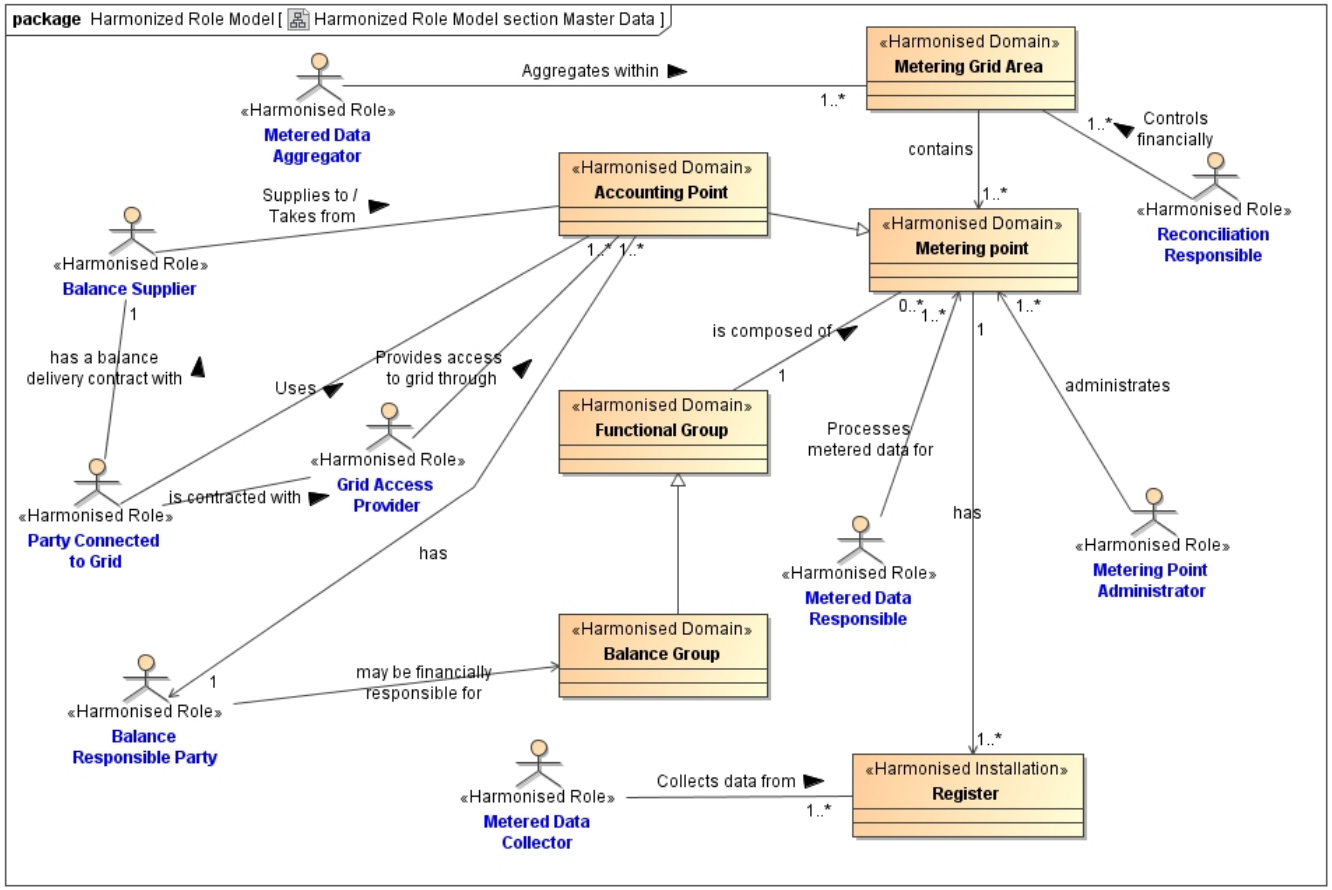


Figure 16 Class diagram – The roles and domains for the business area Structure

For definitions of the different actors and roles, [6]

4 Business Areas for Measure

According to UMM-2: “A business area usually corresponds to a division of an enterprise. Business areas might be structured recursively. A business area is a category of decomposable business areas or process areas (on the lowest UN/CEFACT – UMM [……] level of business area hierarchy). This means that a business area collates either other business areas, process areas or business process use case.” [2]

In the ebIX® model for Measure business areas contain business processes as clustered around the responsible role. In this way Collect is clustered around the Metered Data Collector, Validate is clustered around the Metered Data Responsible and Aggregate is clustered around the Metered Data Aggregator.

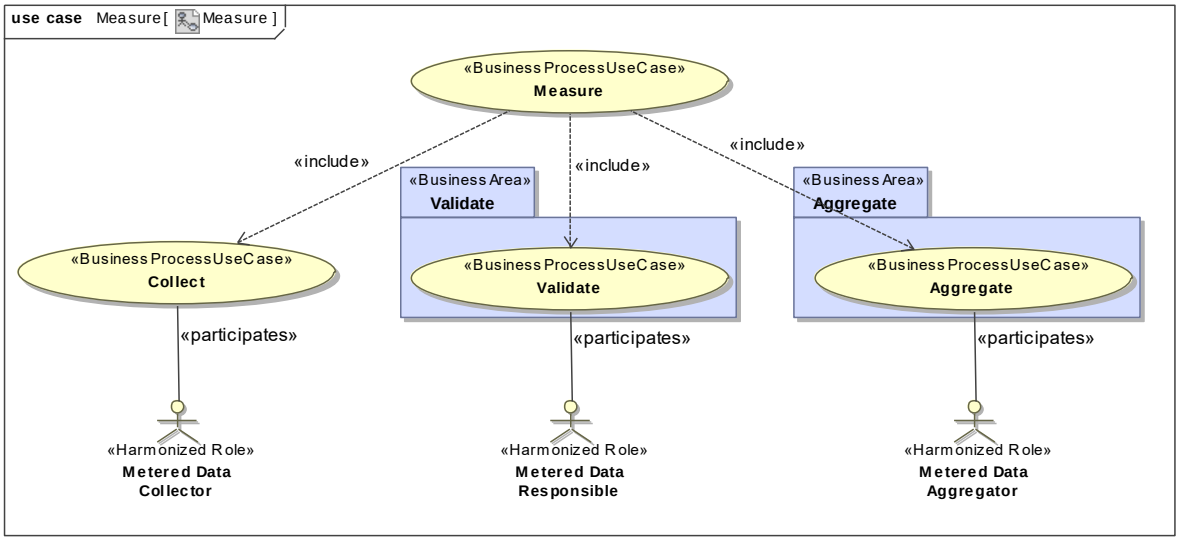


Figure 17 Business Areas for Measure

The BusinessProcessUseCase for “Collect” is regarded to represent just one business process. In contrast to “Validate” and “Aggregate” which do not represent one business process in itself. These are in contrast clusters of different (sub-)processes belonging to different business processes but having the responsible <<Harmonized Role>> role in common.

4.1. Overall sequence

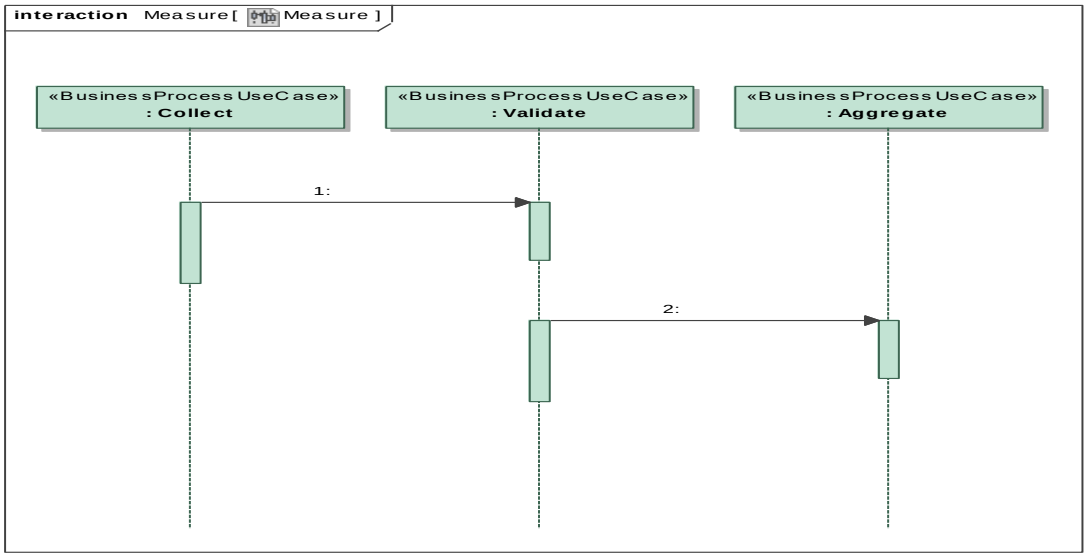


Figure 18 Sequence in Business Areas for Measure

There is an overall idea of sequence in the business processes. In overall terms Aggregate-processes are preceded by Validate-processes which are in turn normally are preceded by the Collect-process.

4.2. Business Area Validate

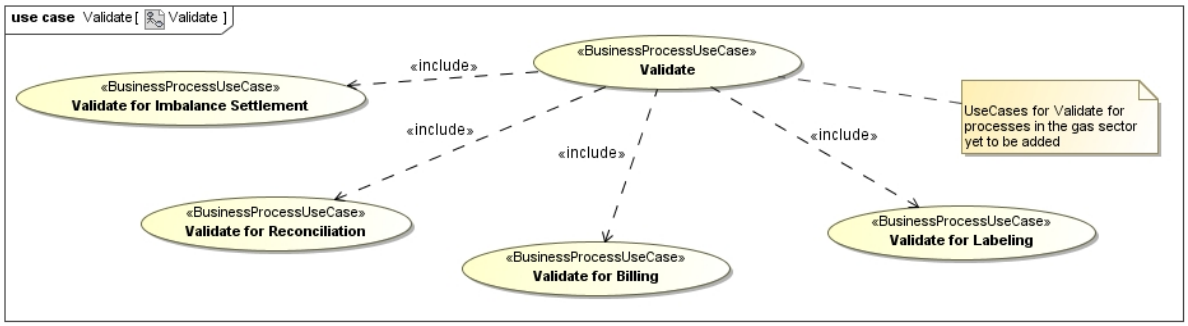


Figure 19 Business Area Validate

At the present moment the ebIX® models based on UMM-2 contain included BusinessProcessUseCases for Validate within Measure for Imbalance Settlement, Validate for Reconciliation, Validate for Billing and Measure for Labeling.

4.3. Business Area Aggregate

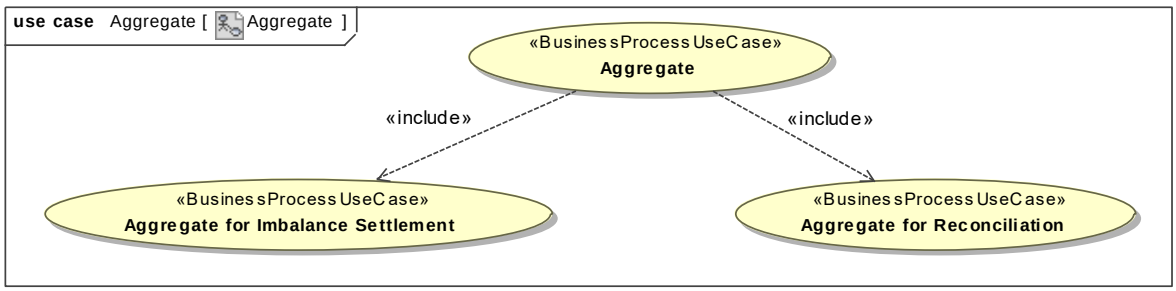


Figure 20 Business Area Aggregate

At the present moment the ebIX® models based on UMM-2 contain included BusinessProcessUsecases for Aggregate for Imbalance Settlement and for Aggregate for Reconciliation.

The various internal aggregation processes that are specified in the different models are regarded as specific for that particular process, since aggregation criteria and aggregation rules basically are specific for each process.

5 Business Requirements for re-usable processes for Measure

5.1. Collect, re-usable processes

Since Collect is regarded as a business process in itself (rather than as a clustering of (sub-) processes taken from other business processes, because these have the responsible role in common) no requirements for generic processes are included in this document.

5.2. Validate, re-usable processes

5.2.1. Validate Measurements (Business Process UseCase)

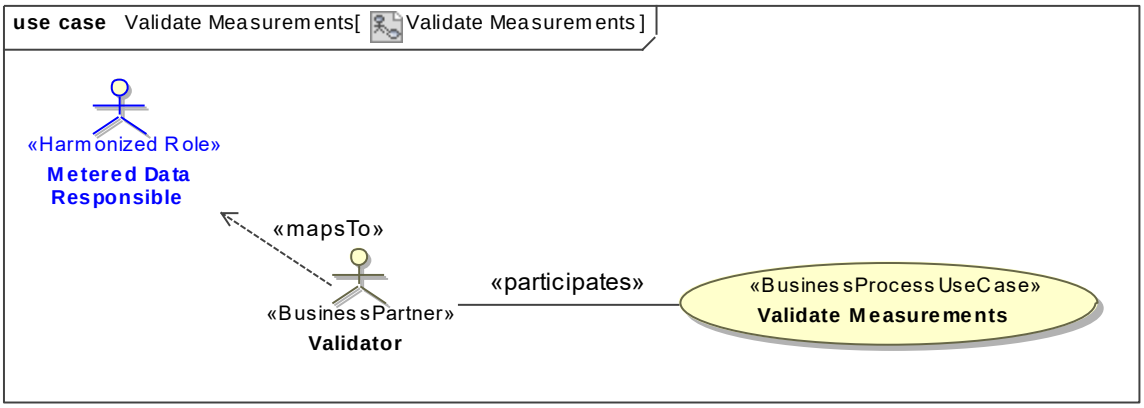


Figure 21 Validate Measurements

5.2.1.1. Description

UseCase description: Validate Measurements	
definition	A Validator processes collected data into validated metered data representing a quantity for an energy product or service and specified in a measure unit.
beginsWhen	The Validator decides to.
preCondition	Collector should have received collected data and have access to relevant master data and the metered data history.
endsWhen	The data have been validated and stored into a system.
postCondition	The validated data are available for exchange.
exceptions	• No collected data available • No master data for the register available • No metered data history available • No (national) rules for validation available

actions	See 5.2.1.2

5.2.1.2. Business Process

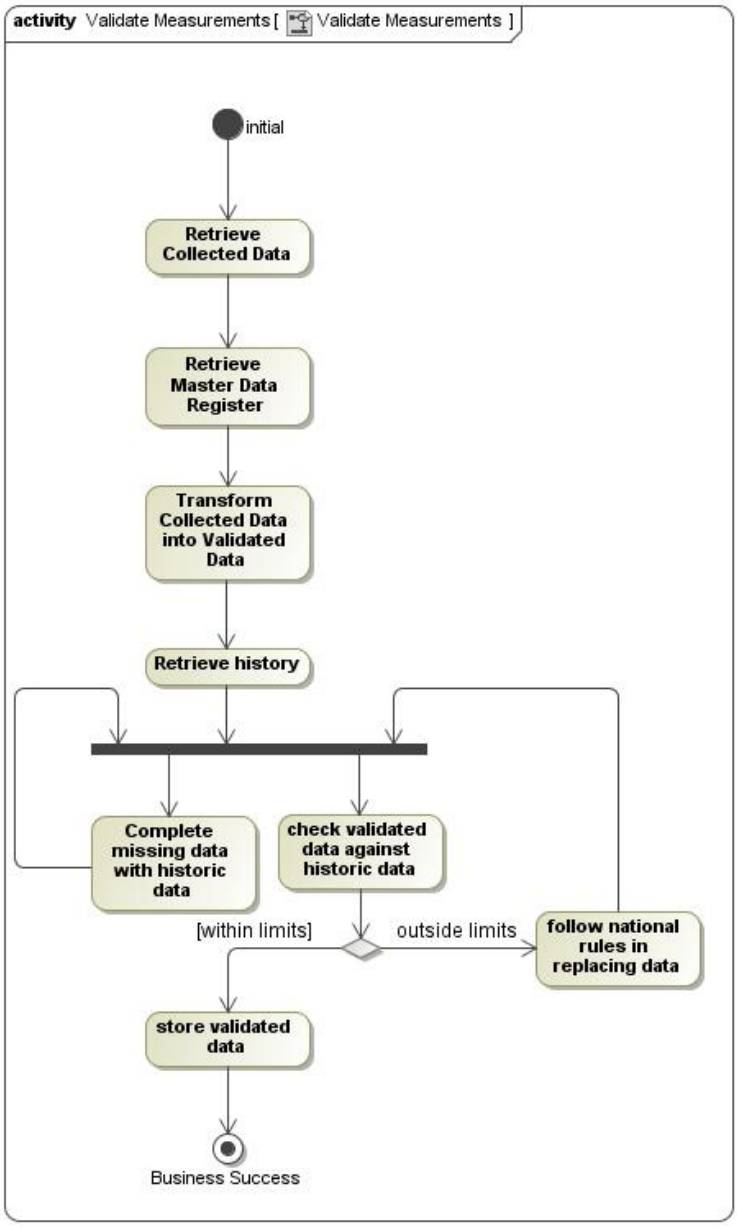


Figure 22 Business Process Validate Measurements

5.3. Aggregate, re-usable processes

No need for generic processes for Aggregate as a consequence of the business requirements as defined yet (*see also* § 4.3).

6 Business Areas for Structure

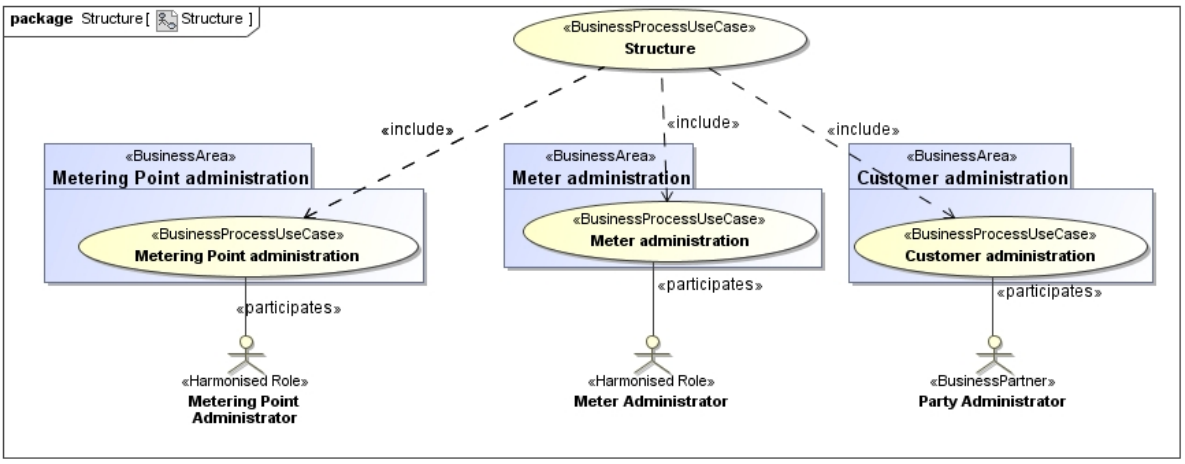


Figure 23: Business Area UseCase: Structure

The ebIX® models specify both the handling of master data for Metering Point and for Meter.

6.1. Business Area Metering Point administration

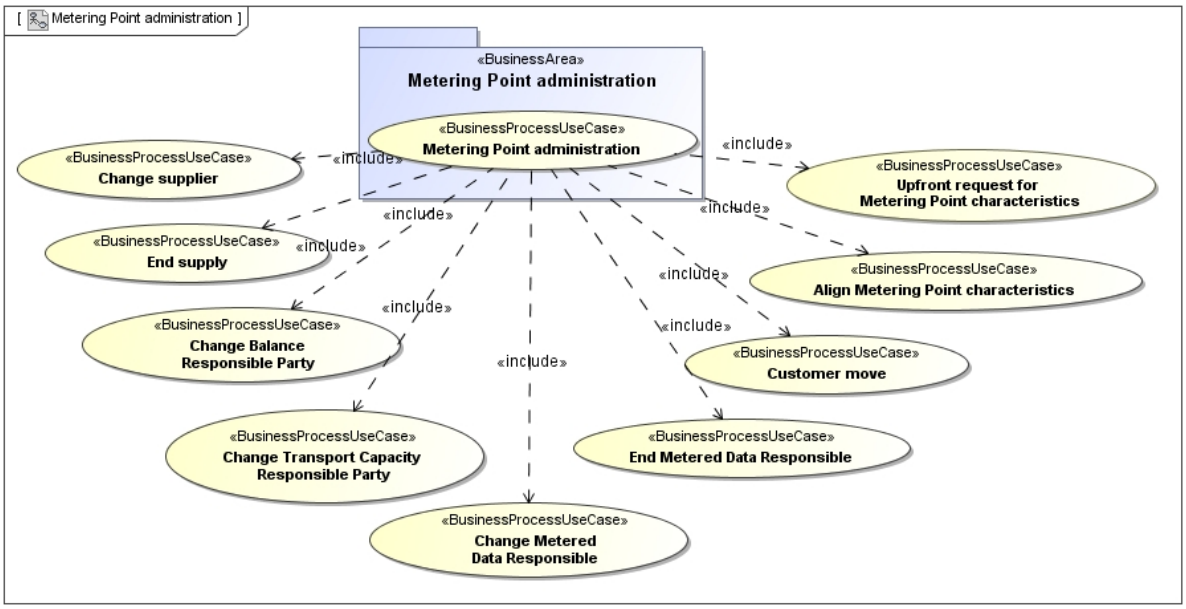


Figure 24: Business Area Metering Point Administration

6.2. Business Area Meter Administration

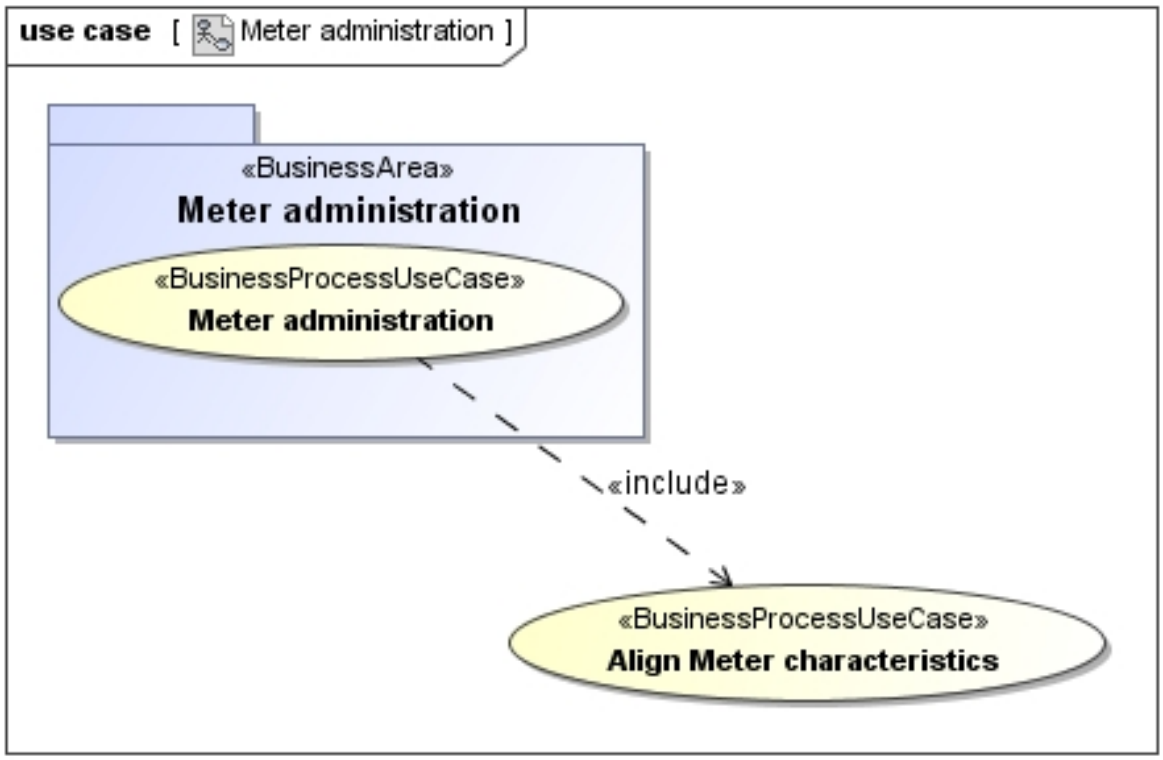
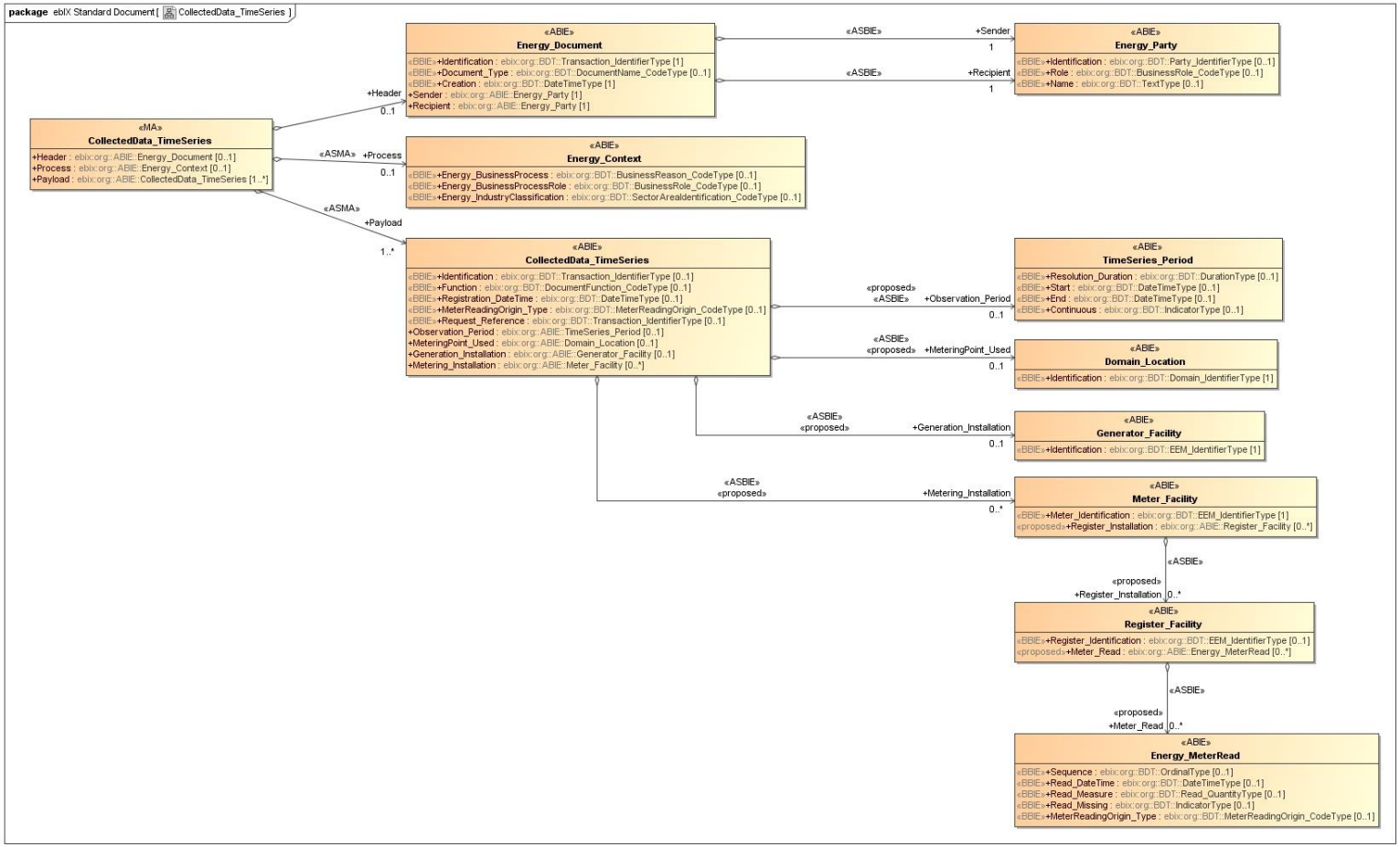


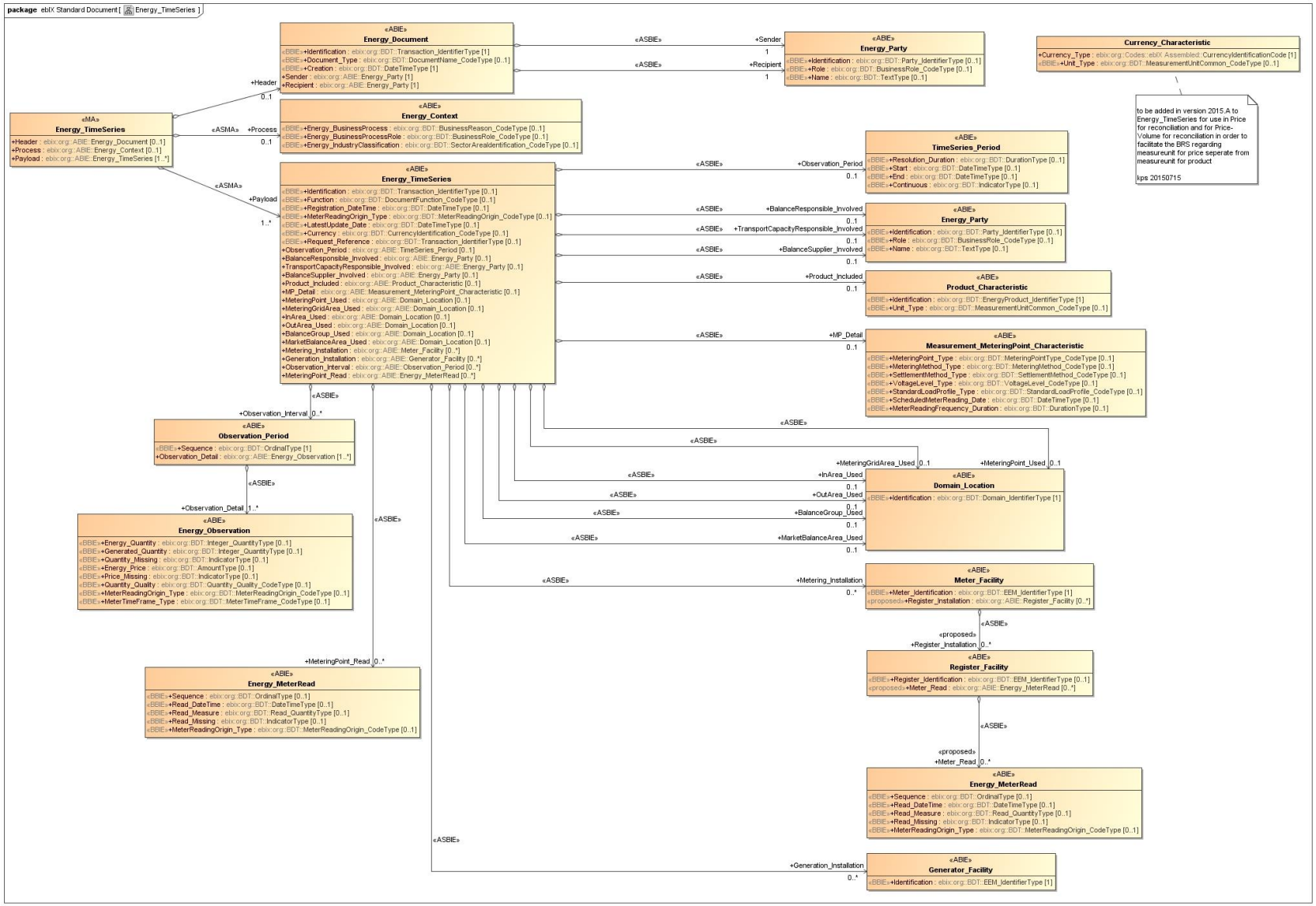
Figure 24: Business Area Meter administration

7 ebIX® Standard Documents (as a cluster of BIEs)

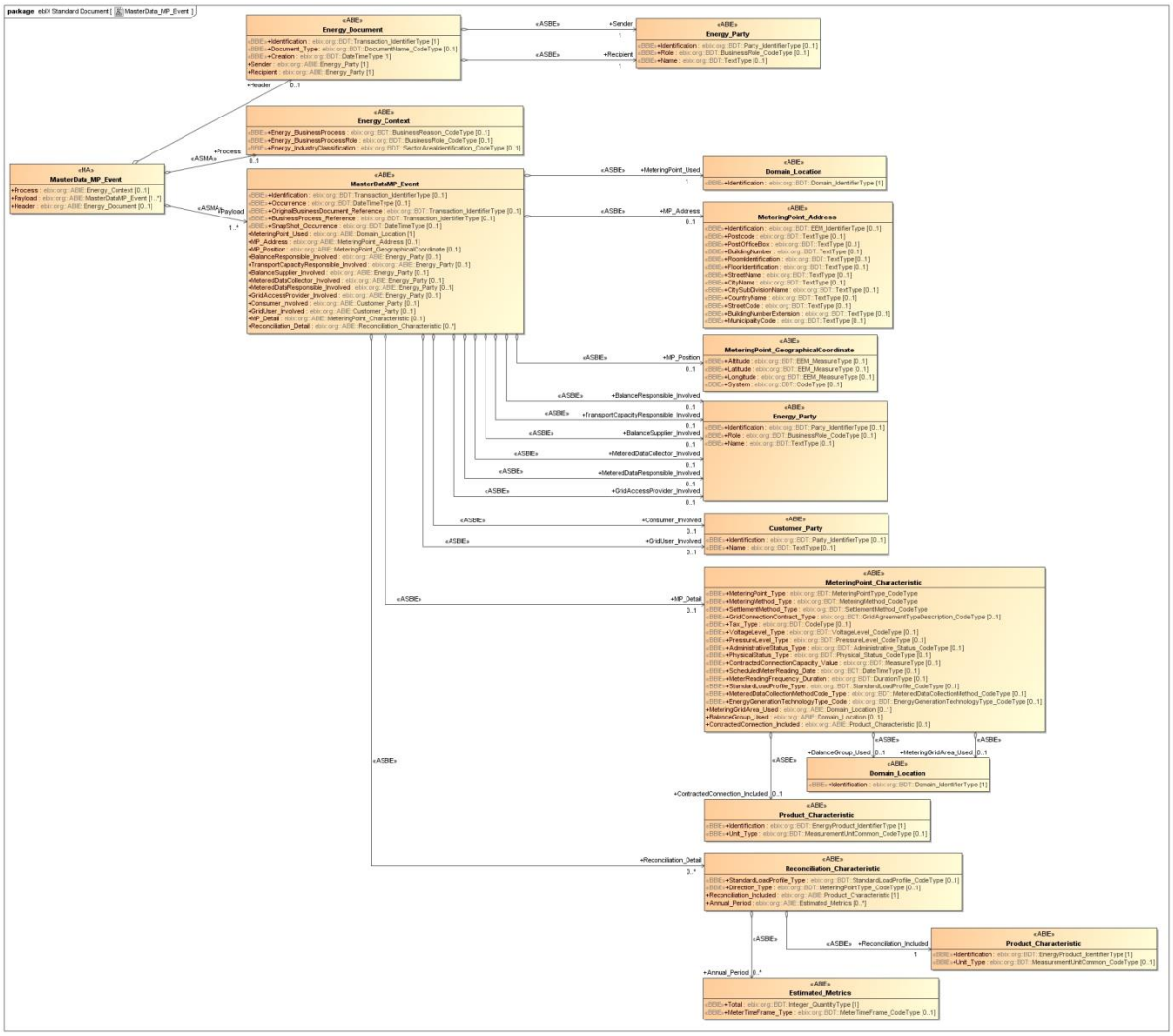
7.1. CollectedData_TimeSeries



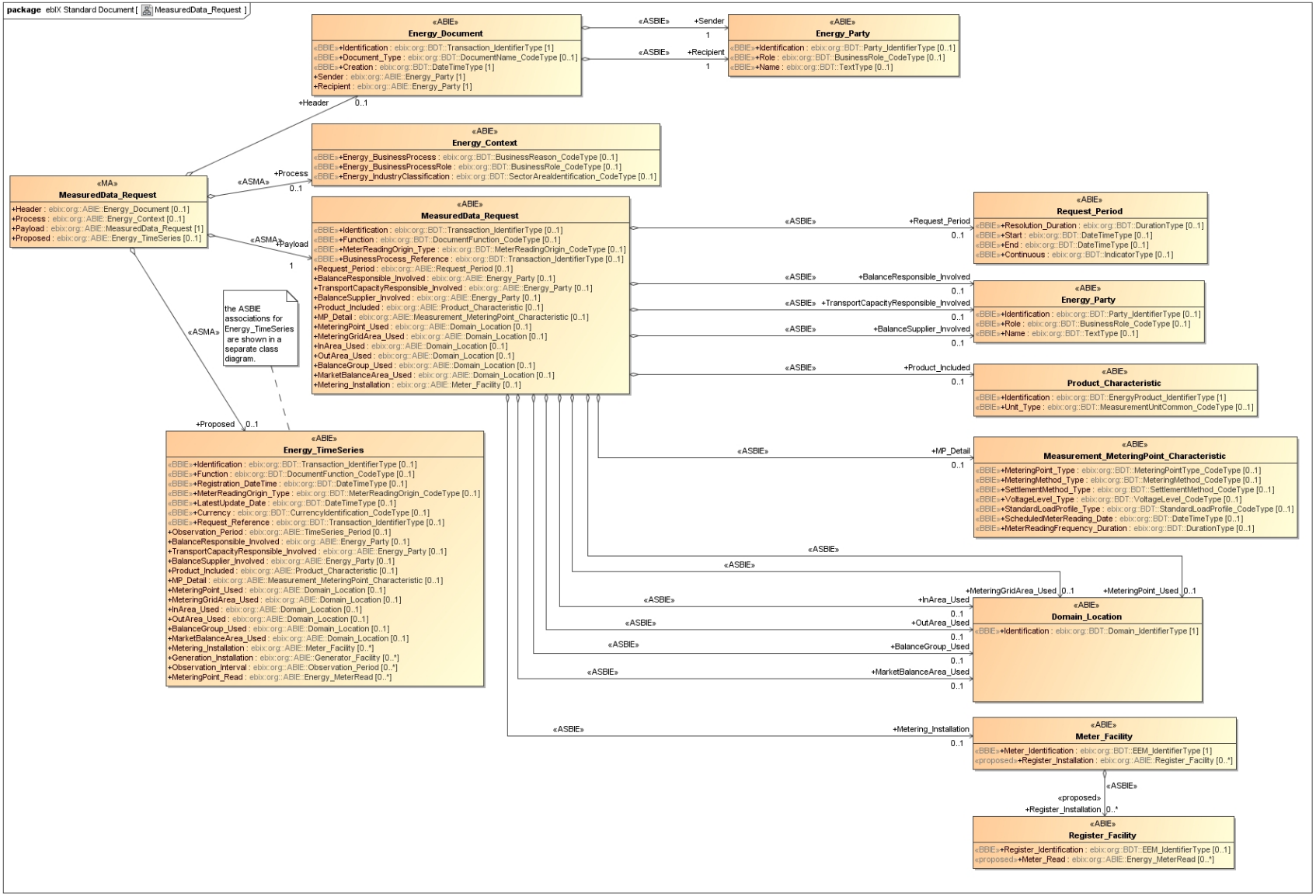
7.2. Energy_TimeSeries


package ebIX Standard Document [Energy_TimeSeries]
«ABIE» Energy_Document
«ABIE» Energy_Party
Currency_Characteristic
«MA» Energy_TimeSeries
«ABIE» Energy_Context
«ABIE» Energy_TimeSeries
«ABIE» TimeSeries_Period
«ABIE» Energy_Party
«ABIE» Product_Characteristic
«ABIE» Measurement_MeteringPoint_Characteristic
«ABIE» Observation_Period
«ABIE» Energy_Observation
«ABIE» Domain_Location
«ABIE» Meter_Facility
«ABIE» Register_Facility
«ABIE» Energy_MeterRead
«ABIE» Generator_Facility
to be added in version 2015.A to Energy_TimeSeries for use in Price for reconciliation and for Price-Volume for reconciliation in order to facilitate the BRS regarding measureunit for price seperate from measureunit for product
kps 20150715

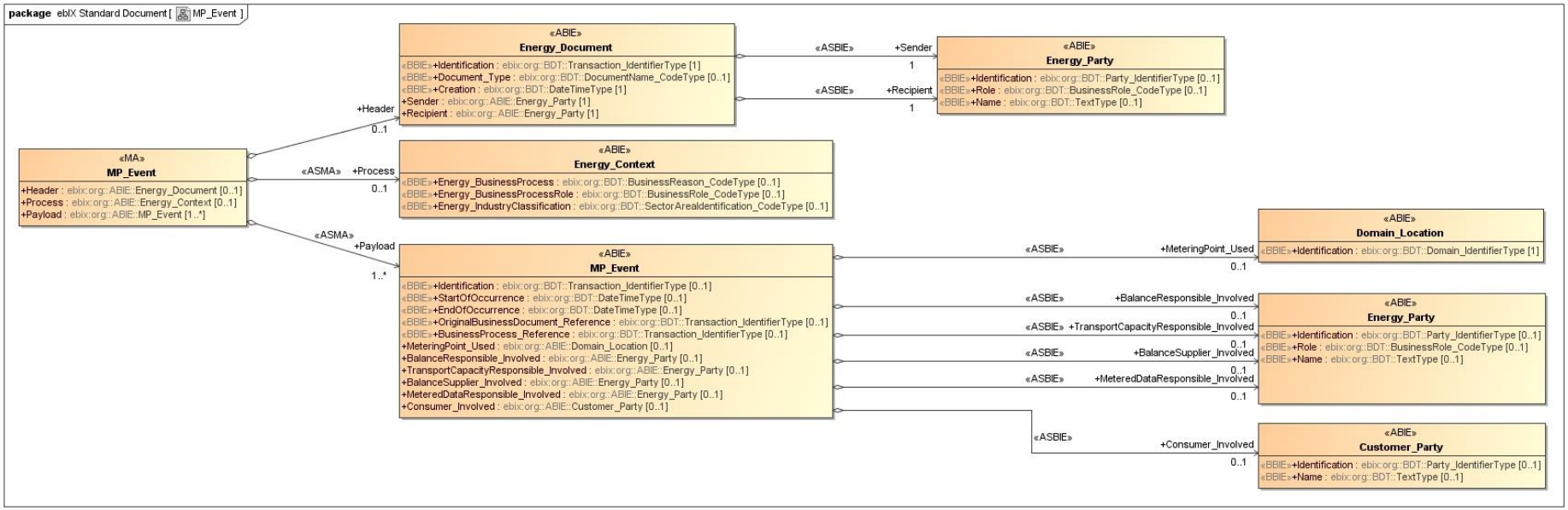
7.3. MasterData_MP_Event



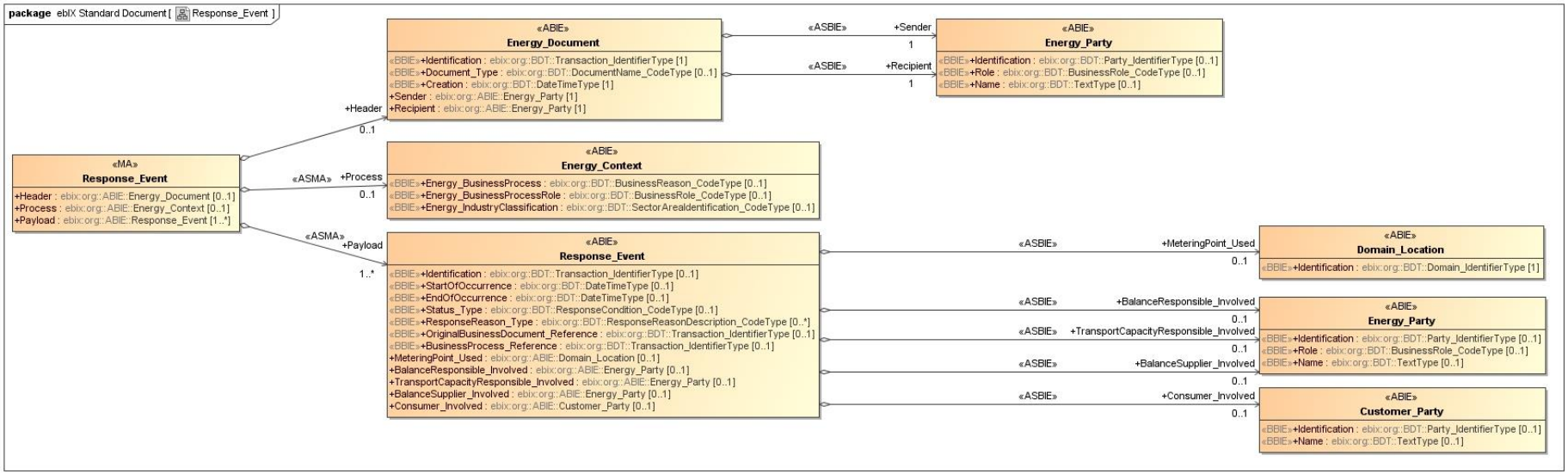
7.4. MeasuredData_Request


package ebIX Standard Document [MeasuredData_Request]
«ABIE»
Energy_Document
«BBIE»+Identification : ebix:org::BDT::Transaction_IdentifierType [1]
«BBIE»+Document_Type : ebix:org::BDT::DocumentName_CodeType [0..1]
«BBIE»+Creation : ebix:org::BDT::DateTimeType [1]
+Sender : ebix:org::ABIE::Energy_Party [1]
+Recipient : ebix:org::ABIE::Energy_Party [1]
«ASBIE» +Sender 1
«ASBIE» +Recipient 1
«ABIE»
Energy_Party
«BBIE»+Identification : ebix:org::BDT::Party_IdentifierType [0..1]
«BBIE»+Role : ebix:org::BDT::BusinessRole_CodeType [0..1]
«BBIE»+Name : ebix:org::BDT::TextType [0..1]
+Header 0..1
«ABIE»
Energy_Context
«BBIE»+Energy_BusinessProcess : ebix:org::BDT::BusinessReason_CodeType [0..1]
«BBIE»+Energy_BusinessProcessRole : ebix:org::BDT::BusinessRole_CodeType [0..1]
«BBIE»+Energy_IndustryClassification : ebix:org::BDT::SectorAreaIdentification_CodeType [0..1]
«MA»
MeasuredData_Request
+Header : ebix:org::ABIE::Energy_Document [0..1]
+Process : ebix:org::ABIE::Energy_Context [0..1]
+Payload : ebix:org::ABIE::MeasuredData_Request [1]
+Proposed : ebix:org::ABIE::Energy_TimeSeries [0..1]
«ASMA» +Process 0..1
«ASMA» +Payload 1
«ASMA»
the ASBIE associations for Energy_TimeSeries are shown in a separate class diagram.
+Proposed 0..1
«ABIE»
MeasuredData_Request
«BBIE»+Identification : ebix:org::BDT::Transaction_IdentifierType [0..1]
«BBIE»+Function : ebix:org::BDT::DocumentFunction_CodeType [0..1]
«BBIE»+MeterReadingOrigin_Type : ebix:org::BDT::MeterReadingOrigin_CodeType [0..1]
«BBIE»+BusinessProcess_Reference : ebix:org::BDT::Transaction_IdentifierType [0..1]
+Request_Period : ebix:org::ABIE::Request_Period [0..1]
+BalanceResponsible_Involved : ebix:org::ABIE::Energy_Party [0..1]
+TransportCapacityResponsible_Involved : ebix:org::ABIE::Energy_Party [0..1]
+BalanceSupplier_Involved : ebix:org::ABIE::Energy_Party [0..1]
+Product_Included : ebix:org::ABIE::Product_Characteristic [0..1]
+MP_Detail : ebix:org::ABIE::Measurement_MeteringPoint_Characteristic [0..1]
+MeteringPoint_Used : ebix:org::ABIE::Domain_Location [0..1]
+MeteringGridArea_Used : ebix:org::ABIE::Domain_Location [0..1]
+InArea_Used : ebix:org::ABIE::Domain_Location [0..1]
+OutArea_Used : ebix:org::ABIE::Domain_Location [0..1]
+BalanceGroup_Used : ebix:org::ABIE::Domain_Location [0..1]
+MarketBalanceArea_Used : ebix:org::ABIE::Domain_Location [0..1]
+Metering_Installation : ebix:org::ABIE::Meter_Facility [0..1]
«ABIE»
Energy_TimeSeries
«BBIE»+Identification : ebix:org::BDT::Transaction_IdentifierType [0..1]
«BBIE»+Function : ebix:org::BDT::DocumentFunction_CodeType [0..1]
«BBIE»+Registration_DateTime : ebix:org::BDT::DateTimeType [0..1]
«BBIE»+MeterReadingOrigin_Type : ebix:org::BDT::MeterReadingOrigin_CodeType [0..1]
«BBIE»+LatestUpdate_Date : ebix:org::BDT::DateTimeType [0..1]
«BBIE»+Currency : ebix:org::BDT::CurrencyIdentification_CodeType [0..1]
«BBIE»+Request_Reference : ebix:org::BDT::Transaction_IdentifierType [0..1]
+Observation_Period : ebix:org::ABIE::TimeSeries_Period [0..1]
+BalanceResponsible_Involved : ebix:org::ABIE::Energy_Party [0..1]
+TransportCapacityResponsible_Involved : ebix:org::ABIE::Energy_Party [0..1]
+BalanceSupplier_Involved : ebix:org::ABIE::Energy_Party [0..1]
+Product_Included : ebix:org::ABIE::Product_Characteristic [0..1]
+MP_Detail : ebix:org::ABIE::Measurement_MeteringPoint_Characteristic [0..1]
+MeteringPoint_Used : ebix:org::ABIE::Domain_Location [0..1]
+MeteringGridArea_Used : ebix:org::ABIE::Domain_Location [0..1]
+InArea_Used : ebix:org::ABIE::Domain_Location [0..1]
+OutArea_Used : ebix:org::ABIE::Domain_Location [0..1]
+BalanceGroup_Used : ebix:org::ABIE::Domain_Location [0..1]
+MarketBalanceArea_Used : ebix:org::ABIE::Domain_Location [0..1]
+Metering_Installation : ebix:org::ABIE::Meter_Facility [0..*]
+Generation_Installation : ebix:org::ABIE::Generator_Facility [0..*]
+Observation_Interval : ebix:org::ABIE::Observation_Period [0..*]
+MeteringPoint_Read : ebix:org::ABIE::Energy_MeterRead [0..*]
«ASBIE» +Request_Period 0..1
«ABIE»
Request_Period
«BBIE»+Resolution_Duration : ebix:org::BDT::DurationType [0..1]
«BBIE»+Start : ebix:org::BDT::DateTimeType [0..1]
«BBIE»+End : ebix:org::BDT::DateTimeType [0..1]
«BBIE»+Continuous : ebix:org::BDT::IndicatorType [0..1]
«ASBIE» +BalanceResponsible_Involved 0..1
«ASBIE» +TransportCapacityResponsible_Involved 0..1
«ASBIE» +BalanceSupplier_Involved 0..1
«ABIE»
Energy_Party
«BBIE»+Identification : ebix:org::BDT::Party_IdentifierType [0..1]
«BBIE»+Role : ebix:org::BDT::BusinessRole_CodeType [0..1]
«BBIE»+Name : ebix:org::BDT::TextType [0..1]
«ASBIE» +Product_Included 0..1
«ABIE»
Product_Characteristic
«BBIE»+Identification : ebix:org::BDT::EnergyProduct_IdentifierType [1]
«BBIE»+Unit_Type : ebix:org::BDT::MeasurementUnitCommon_CodeType [0..1]
«ASBIE» +MP_Detail 0..1
«ABIE»
Measurement_MeteringPoint_Characteristic
«BBIE»+MeteringPoint_Type : ebix:org::BDT::MeteringPointType_CodeType [0..1]
«BBIE»+MeteringMethod_Type : ebix:org::BDT::MeteringMethod_CodeType [0..1]
«BBIE»+SettlementMethod_Type : ebix:org::BDT::SettlementMethod_CodeType [0..1]
«BBIE»+VoltageLevel_Type : ebix:org::BDT::VoltageLevel_CodeType [0..1]
«BBIE»+StandardLoadProfile_Type : ebix:org::BDT::StandardLoadProfile_CodeType [0..1]
«BBIE»+ScheduledMeterReading_Date : ebix:org::BDT::DateTimeType [0..1]
«BBIE»+MeterReadingFrequency_Duration : ebix:org::BDT::DurationType [0..1]
«ASBIE»
«ASBIE»
+MeteringGridArea_Used 0..1
+MeteringPoint_Used 0..1
«ASBIE» +InArea_Used 0..1
«ASBIE» +OutArea_Used 0..1
«ASBIE» +BalanceGroup_Used 0..1
«ASBIE» +MarketBalanceArea_Used 0..1
«ABIE»
Domain_Location
«BBIE»+Identification : ebix:org::BDT::Domain_IdentifierType [1]
«ASBIE» +Metering_Installation 0..1
«ABIE»
Meter_Facility
«BBIE»+Meter_Identification : ebix:org::BDT::EEM_IdentifierType [1]
«proposed»+Register_Installation : ebix:org::ABIE::Register_Facility [0..*]
«ASBIE»
«proposed»
+Register_Installation 0..*
«ABIE»
Register_Facility
«BBIE»+Register_Identification : ebix:org::BDT::EEM_IdentifierType [0..1]
«proposed»+Meter_Read : ebix:org::ABIE::Energy_MeterRead [0..*]

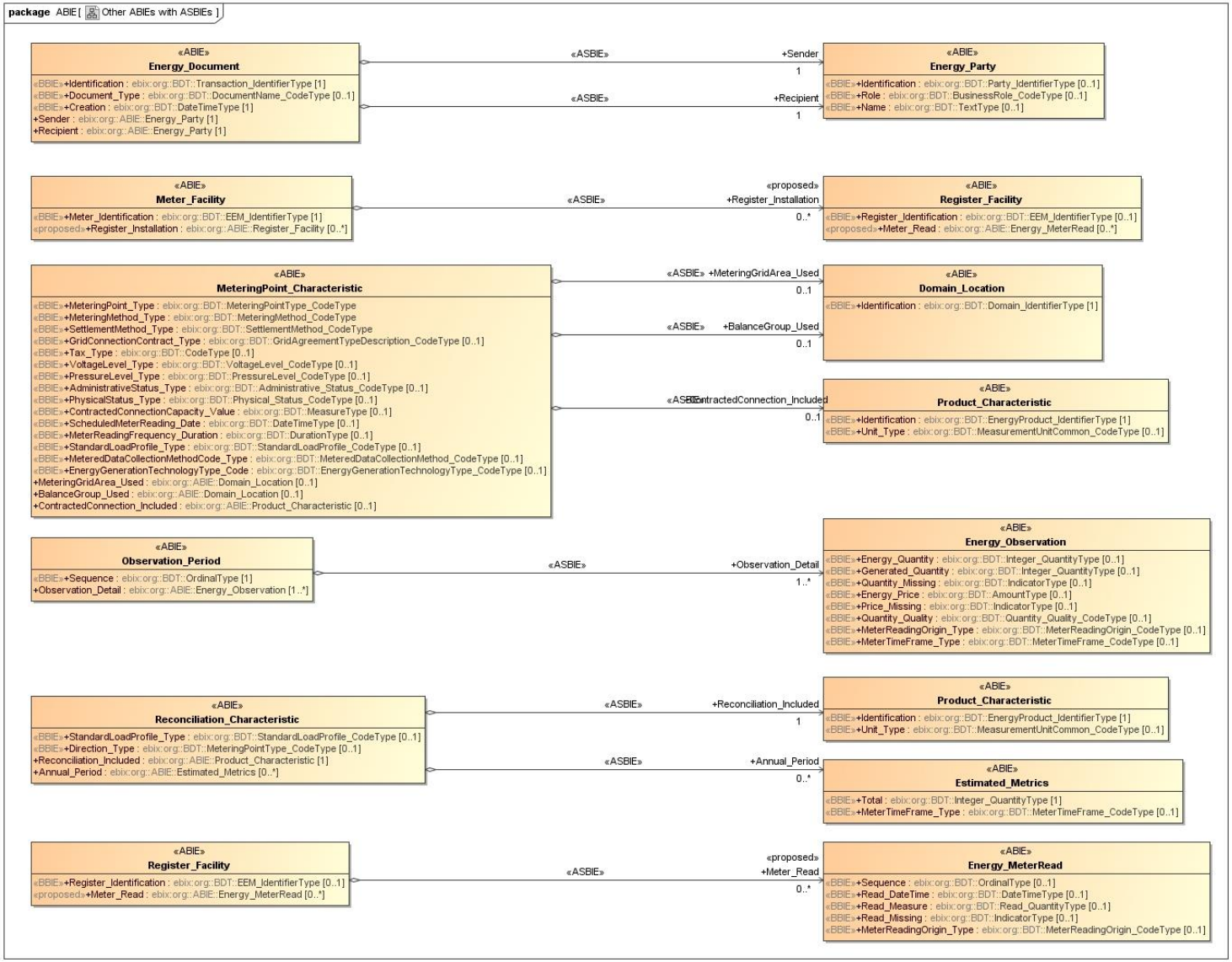
7.5. MP_Event


package ebIX Standard Document [MP_Event]
«MA»
MP_Event
+Header : ebix:org::ABIE::Energy_Document [0..1]
+Process : ebix:org::ABIE::Energy_Context [0..1]
+Payload : ebix:org::ABIE::MP_Event [1..*]
+Header
0..1
«ASMA»
+Process
0..1
«ASMA»
+Payload
1..*
«ABIE»
Energy_Document
«BBIE»+Identification : ebix:org::BDT::Transaction_IdentifierType [1]
«BBIE»+Document_Type : ebix:org::BDT::DocumentName_CodeType [0..1]
«BBIE»+Creation : ebix:org::BDT::DateTimeType [1]
+Sender : ebix:org::ABIE::Energy_Party [1]
+Recipient : ebix:org::ABIE::Energy_Party [1]
«ASBIE»
+Sender
1
«ASBIE»
+Recipient
1
«ABIE»
Energy_Party
«BBIE»+Identification : ebix:org::BDT::Party_IdentifierType [0..1]
«BBIE»+Role : ebix:org::BDT::BusinessRole_CodeType [0..1]
«BBIE»+Name : ebix:org::BDT::TextType [0..1]
«ABIE»
Energy_Context
«BBIE»+Energy_BusinessProcess : ebix:org::BDT::BusinessReason_CodeType [0..1]
«BBIE»+Energy_BusinessProcessRole : ebix:org::BDT::BusinessRole_CodeType [0..1]
«BBIE»+Energy_IndustryClassification : ebix:org::BDT::SectorAreaIdentification_CodeType [0..1]
«ABIE»
MP_Event
«BBIE»+Identification : ebix:org::BDT::Transaction_IdentifierType [0..1]
«BBIE»+StartOfOccurrence : ebix:org::BDT::DateTimeType [0..1]
«BBIE»+EndOfOccurrence : ebix:org::BDT::DateTimeType [0..1]
«BBIE»+OriginalBusinessDocument_Reference : ebix:org::BDT::Transaction_IdentifierType [0..1]
«BBIE»+BusinessProcess_Reference : ebix:org::BDT::Transaction_IdentifierType [0..1]
+MeteringPoint_Used : ebix:org::ABIE::Domain_Location [0..1]
+BalanceResponsible_Involved : ebix:org::ABIE::Energy_Party [0..1]
+TransportCapacityResponsible_Involved : ebix:org::ABIE::Energy_Party [0..1]
+BalanceSupplier_Involved : ebix:org::ABIE::Energy_Party [0..1]
+MeteredDataResponsible_Involved : ebix:org::ABIE::Energy_Party [0..1]
+Consumer_Involved : ebix:org::ABIE::Customer_Party [0..1]
«ASBIE»
+MeteringPoint_Used
0..1
«ABIE»
Domain_Location
«BBIE»+Identification : ebix:org::BDT::Domain_IdentifierType [1]
«ASBIE»
+BalanceResponsible_Involved
0..1
«ASBIE»
+TransportCapacityResponsible_Involved
0..1
«ASBIE»
+BalanceSupplier_Involved
0..1
«ASBIE»
+MeteredDataResponsible_Involved
0..1
«ABIE»
Energy_Party
«BBIE»+Identification : ebix:org::BDT::Party_IdentifierType [0..1]
«BBIE»+Role : ebix:org::BDT::BusinessRole_CodeType [0..1]
«BBIE»+Name : ebix:org::BDT::TextType [0..1]
«ASBIE»
+Consumer_Involved
0..1
«ABIE»
Customer_Party
«BBIE»+Identification : ebix:org::BDT::Party_IdentifierType [0..1]
«BBIE»+Name : ebix:org::BDT::TextType [0..1]

7.6. Response_Event



7.7. Other ABIEs with ASBIEs

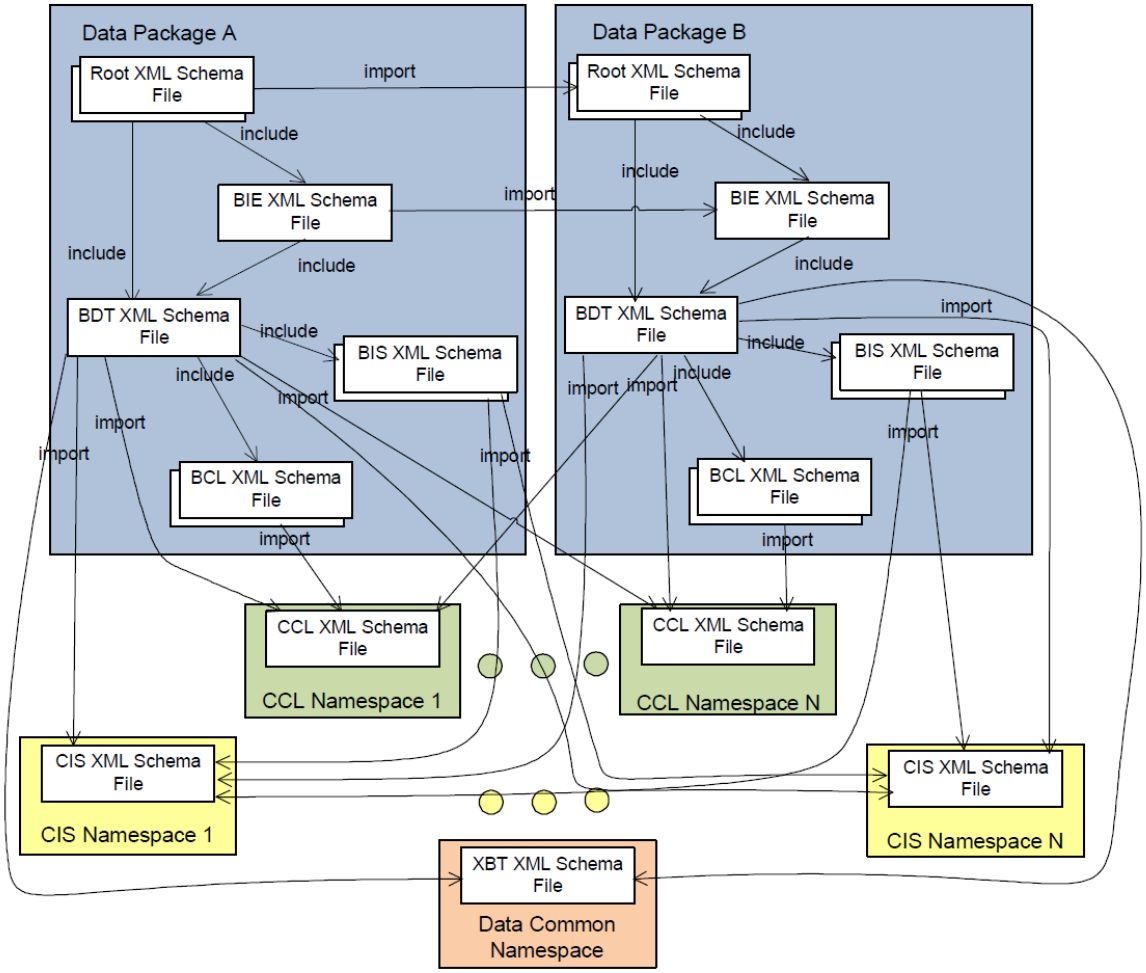

package ABIE [Other ABIEs with ASBIEs]
«ABIE»
Energy_Document
«BBIE»+Identification : ebix:org::BDT::Transaction_IdentifierType [1]
«BBIE»+Document_Type : ebix:org::BDT::DocumentName_CodeType [0..1]
«BBIE»+Creation : ebix:org::BDT::DateTimeType [1]
+Sender : ebix:org::ABIE::Energy_Party [1]
+Recipient : ebix:org::ABIE::Energy_Party [1]
«ASBIE»
+Sender
1
«ASBIE»
+Recipient
1
«ABIE»
Energy_Party
«BBIE»+Identification : ebix:org::BDT::Party_IdentifierType [0..1]
«BBIE»+Role : ebix:org::BDT::BusinessRole_CodeType [0..1]
«BBIE»+Name : ebix:org::BDT::TextType [0..1]
«ABIE»
Meter_Facility
«BBIE»+Meter_Identification : ebix:org::BDT::EEM_IdentifierType [1]
«proposed»+Register_Installation : ebix:org::ABIE::Register_Facility [0..*]
«ASBIE»
«proposed»
+Register_Installation
0..*
«ABIE»
Register_Facility
«BBIE»+Register_Identification : ebix:org::BDT::EEM_IdentifierType [0..1]
«proposed»+Meter_Read : ebix:org::ABIE::Energy_MeterRead [0..*]
«ABIE»
MeteringPoint_Characteristic
«BBIE»+MeteringPoint_Type : ebix:org::BDT::MeteringPointType_CodeType
«BBIE»+MeteringMethod_Type : ebix:org::BDT::MeteringMethod_CodeType
«BBIE»+SettlementMethod_Type : ebix:org::BDT::SettlementMethod_CodeType
«BBIE»+GridConnectionContract_Type : ebix:org::BDT::GridAgreementTypeDescription_CodeType [0..1]
«BBIE»+Tax_Type : ebix:org::BDT::CodeType [0..1]
«BBIE»+VoltageLevel_Type : ebix:org::BDT::VoltageLevel_CodeType [0..1]
«BBIE»+PressureLevel_Type : ebix:org::BDT::PressureLevel_CodeType [0..1]
«BBIE»+AdministrativeStatus_Type : ebix:org::BDT::Administrative_Status_CodeType [0..1]
«BBIE»+PhysicalStatus_Type : ebix:org::BDT::Physical_Status_CodeType [0..1]
«BBIE»+ContractedConnectionCapacity_Value : ebix:org::BDT::MeasureType [0..1]
«BBIE»+ScheduledMeterReading_Date : ebix:org::BDT::DateTimeType [0..1]
«BBIE»+MeterReadingFrequency_Duration : ebix:org::BDT::DurationType [0..1]
«BBIE»+StandardLoadProfile_Type : ebix:org::BDT::StandardLoadProfile_CodeType [0..1]
«BBIE»+MeteredDataCollectionMethodCode_Type : ebix:org::BDT::MeteredDataCollectionMethod_CodeType [0..1]
«BBIE»+EnergyGenerationTechnologyType_Code : ebix:org::BDT::EnergyGenerationTechnologyType_CodeType [0..1]
+MeteringGridArea_Used : ebix:org::ABIE::Domain_Location [0..1]
+BalanceGroup_Used : ebix:org::ABIE::Domain_Location [0..1]
+ContractedConnection_Included : ebix:org::ABIE::Product_Characteristic [0..1]
«ASBIE»
+MeteringGridArea_Used
0..1
«ASBIE»
+BalanceGroup_Used
0..1
«ASBIE»
+ContractedConnection_Included
0..1
«ABIE»
Domain_Location
«BBIE»+Identification : ebix:org::BDT::Domain_IdentifierType [1]
«ABIE»
Product_Characteristic
«BBIE»+Identification : ebix:org::BDT::EnergyProduct_IdentifierType [1]
«BBIE»+Unit_Type : ebix:org::BDT::MeasurementUnitCommon_CodeType [0..1]
«ABIE»
Observation_Period
«BBIE»+Sequence : ebix:org::BDT::OrdinalType [1]
+Observation_Detail : ebix:org::ABIE::Energy_Observation [1..*]
«ASBIE»
+Observation_Detail
1..*
«ABIE»
Energy_Observation
«BBIE»+Energy_Quantity : ebix:org::BDT::Integer_QuantityType [0..1]
«BBIE»+Generated_Quantity : ebix:org::BDT::Integer_QuantityType [0..1]
«BBIE»+Quantity_Missing : ebix:org::BDT::IndicatorType [0..1]
«BBIE»+Energy_Price : ebix:org::BDT::AmountType [0..1]
«BBIE»+Price_Missing : ebix:org::BDT::IndicatorType [0..1]
«BBIE»+Quantity_Quality : ebix:org::BDT::Quantity_Quality_CodeType [0..1]
«BBIE»+MeterReadingOrigin_Type : ebix:org::BDT::MeterReadingOrigin_CodeType [0..1]
«BBIE»+MeterTimeFrame_Type : ebix:org::BDT::MeterTimeFrame_CodeType [0..1]
«ABIE»
Reconciliation_Characteristic
«BBIE»+StandardLoadProfile_Type : ebix:org::BDT::StandardLoadProfile_CodeType [0..1]
«BBIE»+Direction_Type : ebix:org::BDT::MeteringPointType_CodeType [0..1]
+Reconciliation_Included : ebix:org::ABIE::Product_Characteristic [1]
+Annual_Period : ebix:org::ABIE::Estimated_Metrics [0..*]
«ASBIE»
+Reconciliation_Included
1
«ASBIE»
+Annual_Period
0..*
«ABIE»
Product_Characteristic
«BBIE»+Identification : ebix:org::BDT::EnergyProduct_IdentifierType [1]
«BBIE»+Unit_Type : ebix:org::BDT::MeasurementUnitCommon_CodeType [0..1]
«ABIE»
Estimated_Metrics
«BBIE»+Total : ebix:org::BDT::Integer_QuantityType [1]
«BBIE»+MeterTimeFrame_Type : ebix:org::BDT::MeterTimeFrame_CodeType [0..1]
«ABIE»
Register_Facility
«BBIE»+Register_Identification : ebix:org::BDT::EEM_IdentifierType [0..1]
«proposed»+Meter_Read : ebix:org::ABIE::Energy_MeterRead [0..*]
«ASBIE»
«proposed»
+Meter_Read
0..*
«ABIE»
Energy_MeterRead
«BBIE»+Sequence : ebix:org::BDT::OrdinalType [0..1]
«BBIE»+Read_DateTime : ebix:org::BDT::DateTimeType [0..1]
«BBIE»+Read_Measure : ebix:org::BDT::Read_QuantityType [0..1]
«BBIE»+Read_Missing : ebix:org::BDT::IndicatorType [0..1]
«BBIE»+MeterReadingOrigin_Type : ebix:org::BDT::MeterReadingOrigin_CodeType [0..1]

8 ebIX® XML schemas

The creation of ebIX® XML schemas follows the UN/CEFACT Naming and Design Rules 3.0 [5]. The XML schemas are derived from the Business Information View (BIV) in the UMM model. The schemas are generated by means of the ebIX® Transformation Tool.

8.1. Use of namespaces according to UN/CEFACT

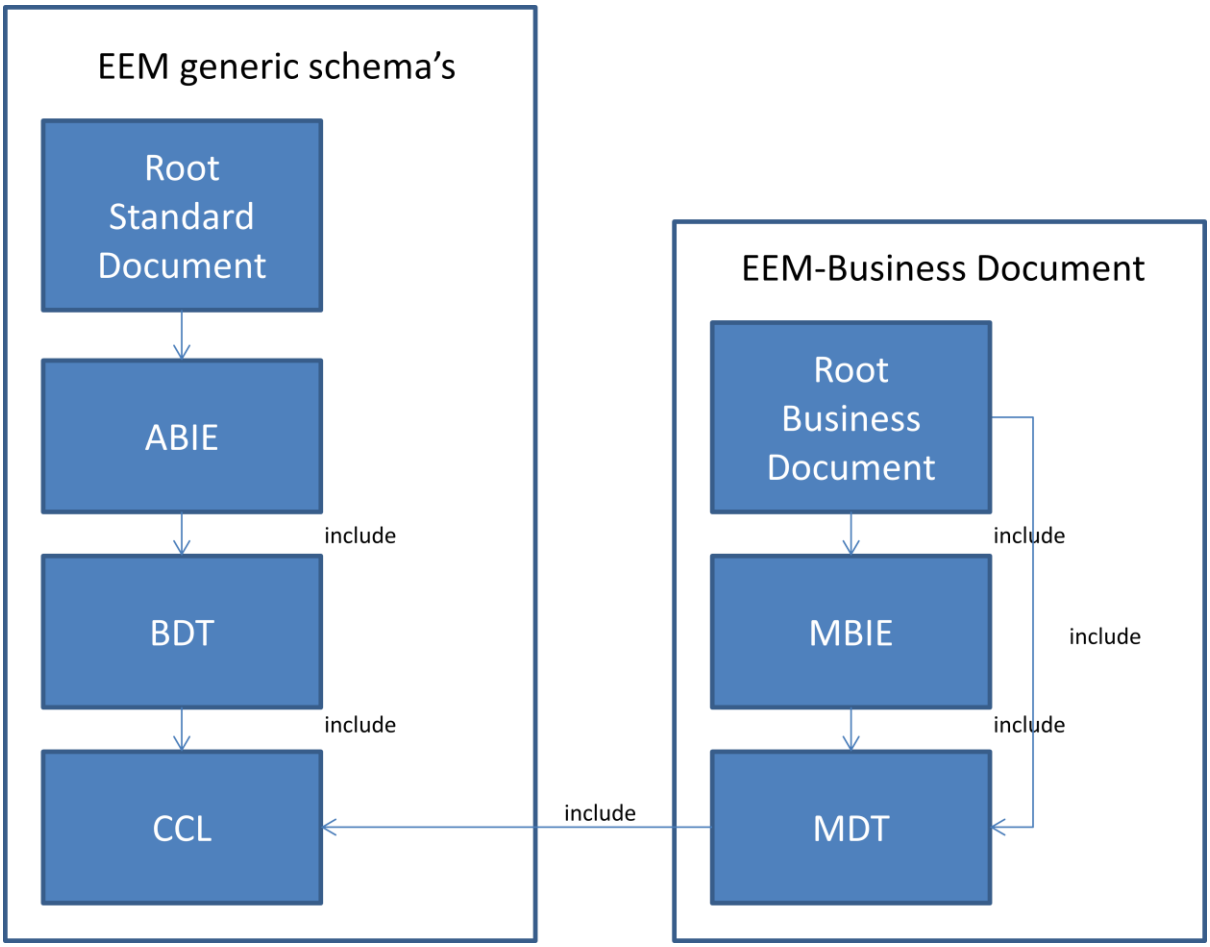
At the moment ebIX® follows the use of namespaces as specified in UN/CEFACT NDR 3.0 [5].



1549 **Figure 8-1: Imports and Includes of XML Schema Files for UN/CEFACT**
1550 **Moularity Model**

8.2. ebIX® XML Namespaces

The ebIX® schemas are set up as shown below:

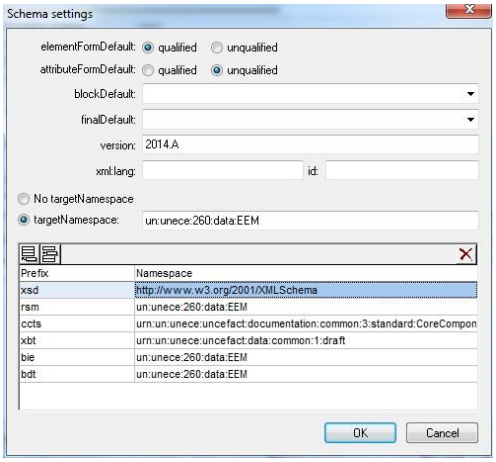


8.3. Use of XML prefixes

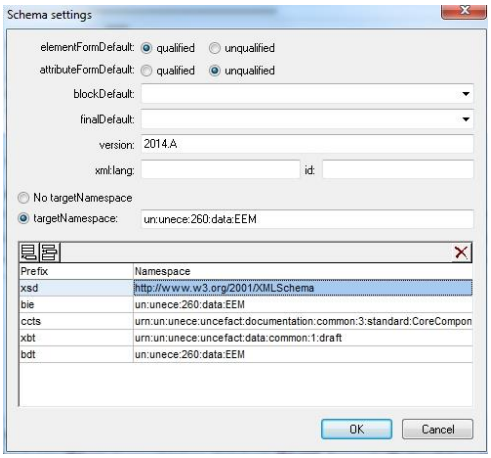
For the use the namespaces as described above, prefixes have to be defined that fit the use of MBIEs and MDTs as the customized version of the generic ABIEs and BDTs.

8.3.1. Prefixes

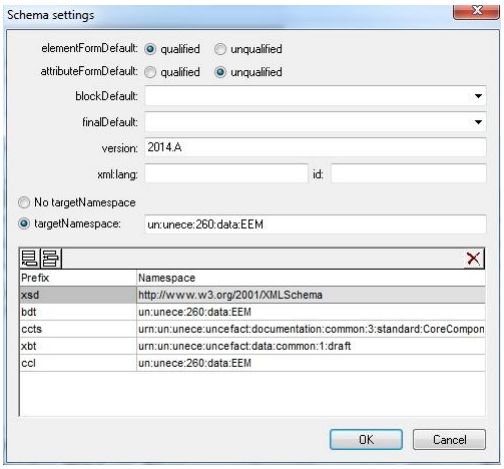
Root (generic)



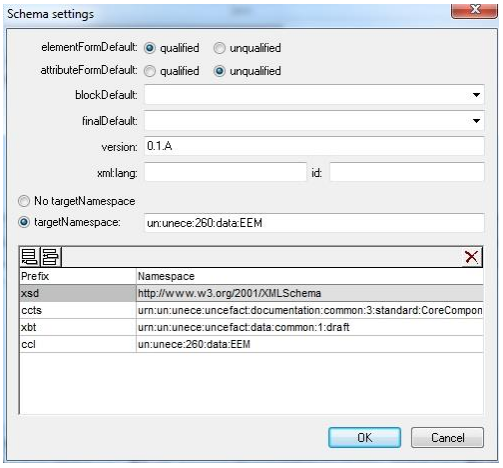
ABIE (generic)



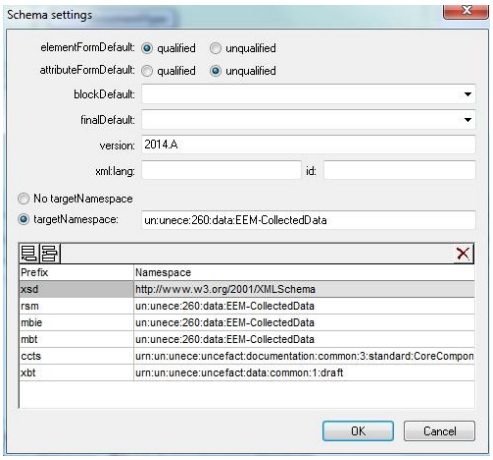
BDT (generic)



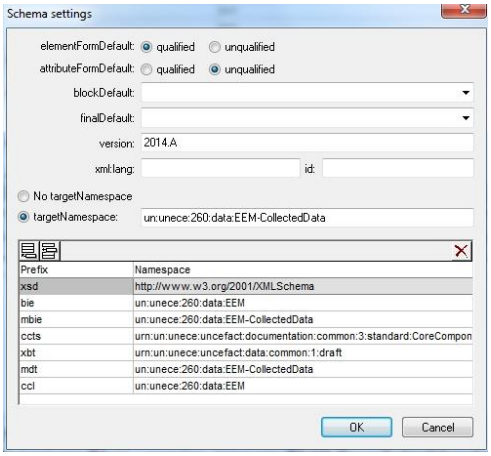
Code list (generic)



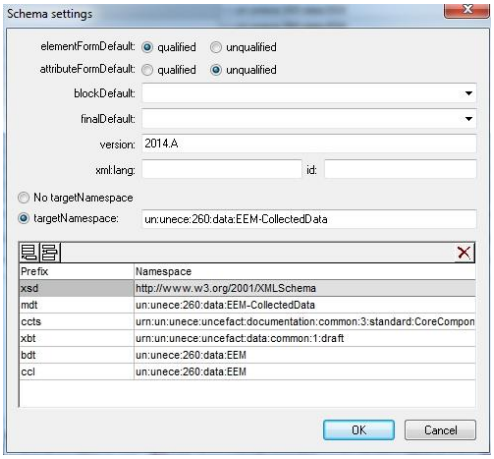
Root (customized)



MBIE (customized)



MDT (customized)



8.4. ebIX® Naming convention XML filenames

Generic	Customized	Nationally customized
Root: <ebIX>_ <className <<MA>>>_<tag bLibrary versionIdentifier>.xsd Example: ebIX_EnergyTimeSeries_2014pA.xsd **Remark:** only relevant for <<MA>>'s for ebIX® Standard Documents.	Root: <ebIX>_ <className <<MA>>>_<tag bLibrary versionIdentifier>.xsd Example: ebIX_CollectedData_2014pA.xsd	Root: <tag stereotype constraints listIdentifier>_<ebIX>_ <className <<MA>>>_<tag bLibrary versionIdentifier>.xsd Example: BEL_ebIX_CollectedData_2014pA.xsd
ABIE: <tag bLibrary owner>_<BLibrary name>_<tag bLibrary versionIdentifier>.xsd Example: ebIX_AggregatedBusinessInformationEntities_2014pA.xsd	MBIE: <tag bLibrary owner>_<MessageBusinessInformationEntities>_ <className <<MA>>>_<<tag bLibrary versionIdentifier>.xsd Example: ebIX_ MessageBusinessInformationEntities_CollectedData_2014pA.xsd	MBIE: <tag bLibrary owner>_<MessageBusinessInformationEntities>_ <className <<MA>>>_<<tag bLibrary versionIdentifier>.xsd Example: BEL_ebIX_ MessageBusinessInformationEntities_CollectedData_2014pA.xsd
BDT: <tag bLibrary owner>_<BLibrary name>_<tag bLibrary versionIdentifier>.xsd Example: ebIX_BusinessDataType_2014pA.xsd	MDT: <tag bLibrary owner>_<MessageDataType>_<className <<MA>>>_<tag bLibrary versionIdentifier>.xsd	MDT: <tag bLibrary owner>_<MessageDataType>_<className <<MA>>>_<tag bLibrary versionIdentifier>.xsd

	Example: ebIX_MessageDataType_CollectedData2014pA.xsd	Example: BEL_ebIX_MessageDataType_CollectedData2014pA.xsd
Code list: <tag ENUM codeListAgency>_<tag ENUM uniqueIdentifier>_<tag ENUM versionIdentifier>.xsd Example: 260_000086_0p1pA.xsd Additional specs for element name for code list in general <stereotypename used><tag ENUM codeListName>Code Additional specs for element name for national code list <stereotypename used><tag ENUM codeListIdentifier><tag ENUM codeListName>Code	(see first column)	(see first column)