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Framework for energy market communications

Part 451-1: Acknowledgement business process and contextual model for CIM European market

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National foreword

This British Standard is the UK implementation of EN 62325-451-1:2013. It is identical to IEC 62325-451-1:2013.

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.

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English version

Framework for energy market communications - Part 451-1: Acknowledgement business process and contextual model for CIM European market

(IEC 62325-451-1:2013)

Cadre pour les communications pour le marché de l'énergie -
Partie 451-1: Processus métier d'accusé de réception et modèle contextuel pour le marché européen CIM
(CEI 62325-451-1:2013)

Kommunikation im Energiemarkt -
Teil 451-1: Geschäftsprozessnachweis und kontextbezogenes CIM-Modell für den europäischen Markt
(IEC 62325-451-1:2013)

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Foreword

The text of document 57/1381/FDIS, future edition 1 of IEC 62325-451-1, 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 62325-451-1:2013.

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)	2014-08-11
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-11-11

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 62325-451-1:2013 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 62325-301	NOTE	Harmonised as EN 62325-301.
IEC 62325-451 (series)	NOTE	Harmonised as EN 62325-451 (series).
ISO 15000-5	NOTE	Harmonised as EN ISO 15000-5.

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.

Publication	Year	Title	EN/HD	Year
IEC/TS 61970-2	2004	Energy management system application program interface (EMS-API) - Part 2: Glossary	CLC/TS 61970-2	2005
IEC 62325-351	-	Framework for energy market communications - Part 351: CIM European market model exchange profile	FprEN 62325-351[1)]	-
IEC 62325-450	2013	Framework for energy market communications - Part 450: Profile and context modelling rules	EN 62325-450	2013
IEC 62361-100	-	Harmonization of quality codes across TC 57 - Part 100: Naming and design rules for CIM profiles to XML schema mapping	FprEN 62361-100[1)]	-

[1)] At draft stage.

CONTENTS

INTRODUCTION

This International Standard is one of the IEC 62325-451-x series for deregulated energy market data exchanges based on the European style market profile. This standard, IEC 62325-451-1, defines the document contextual model, the message assembly model as well as the XML schema to be used for the acknowledgement process.

The principal objective of the IEC 62325 series of standards is to produce standards which facilitate the integration of market application software developed independently by different vendors into a market management system, between market management systems and market participant systems. This is accomplished by defining message exchanges to enable these applications or systems access to public data and exchange information independent of how such information is represented internally.

The Common Information Model (CIM) described in IEC 62325-301[1], IEC 61970-301 and IEC 61968-11 specifies the basis for the semantics for message exchange.

This European style market profile is based on different parts of the CIM IEC standard and specifies the content of the messages exchanged.

This document provides for the European-style market profile the generic technical and application acknowledgement document that can be used in all European style market processes. These market processes are based on the European regulations, and on the concepts of third party access and zonal market.This standard was originally based upon the work of the European Transmission System Operators (ETSO) Task Force EDI (Electronic Data Interchange) and then on the work of the European Network of Transmission System Operators (ENTSO-E) Working Group EDI.

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1 To be published.

FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

Part 451-1: Acknowledgement business process and contextual model for CIM European market

1 Scope

This International Standard is one of the IEC 62325-451-x series for deregulated energy market data exchanges and is applicable to European style electricity markets.

Based on the European style market contextual model (IEC 62325-351), this particular International Standard specifies a UML package for the acknowledgment business process and its associated document contextual model, assembly model and XML schema for use within the European style electricity markets.

The relevant aggregate core components (ACCs) defined in IEC 62325-351 have been contextualised into aggregated business information entities (ABIEs) to satisfy the requirements of the European style market acknowledgment business process.

The contextualised ABIEs have been assembled into the acknowledgment document contextual model.

A related assembly model and an XML schema for the exchange of acknowledgement information between market participants is automatically generated from the Assembled document contextual model.

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 61970-2:2004, *Energy management system application program interface (EMS-API) – Part 2: Glossary*

IEC 62325-351*, Framework for energy market communications – Part 351: CIM European market model exchange profile*

IEC 62325-450:2013, *Framework for energy market communications – Part 450: Profile and context modeling rules*

IEC 62361-100, *Power systems management and associated information exchange – Interoperability in the long term – Part 100: CIM profiles to XML schema mapping*[2]

3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 61970-2, as well as the following apply.

2 To be published.

NOTE General glossary definitions can be found in IEC 60050, *International Electrotechnical Vocabulary*.

3.1
aggregate business information entity
ABIE
re-use of an aggregate core component (ACC) in a specified business context

[SOURCE: ISO/TS 15000-5:2005, 6.1.3]

3.2
aggregate core component
ACC
collection of related pieces of business information that together convey a distinct business meaning, independent of any specific business context

Note 1 to entry: Expressed in modelling terms, it is the representation of an object class, independent of any specific business context.

[SOURCE: ISO/TS 15000-5:2005, 4.6.1]

3.3
application program interface
API
set of public functions provided by an executable application component for use by other executable application components

3.4
assembly model
assembly model is a model that prepares information in a business context for assembly into electronic documents for data interchange

3.5
Based on
IsBasedOn
use of an artefact that has been restricted according to the requirements of a specific business context

[SOURCE: IEC 62325-450:2013, 3.4]

3.6
Business Context
formal description of a specific business circumstance as identified by the values of a set of context categories, allowing different business circumstances to be uniquely distinguished

[SOURCE: UN/Cefact]

3.7
information model
representation of concepts, relationships, constraints, rules, and operations to specify data semantics for a chosen domain of discourse

Note 1 to entry: It can provide shareable, stable, and organized structure of information requirements for the domain context.

3.8
market management system
MMS
computer system comprised of a software platform providing basic support services and a set of applications providing the functionality needed for the effective management of the electricity market

Note 1 to entry: These software systems in an electricity market may include support for capacity allocation, scheduling energy, ancillary or other services, real-time operations and settlements.

3.9
message business information entity
MBIE
aggregation of a set of ABIEs that respects a define set of assembly rules

3.10
profile
basic outline of all the information that is required to satisfy a specific environment

4 Document contextual model and message assembly model basic concepts

4.1 Overview

IEC 62325-450 defines a set of Common Information Model (CIM) profiles that follows a layered modelling framework as outlined in Figure 1, going from CIM to different regional contextual models and their subsequent contextualized documents for information exchange; the final step being the message specifications for information interchange.

The regional contextual models are the basic components that are necessary to build electronic documents for information interchange. The European style market contextual model (IEC 62325-351) is, as an example, a regional contextual model. The components are also termed aggregate core components (ACCs).

A document contextual model is based upon a specific business requirements specification and is constructed from the contextualisation of the ACCs that can be found in the European style market contextual model. The contextualised ACCs at this stage are termed aggregate business Information entities (ABIEs). These ABIEs are the constructs that are assembled together into a specific electronic document to satisfy the information requirements outlined in the business requirements specification. The transformation from an ACC to an ABIE must respect the rules defined in IEC 62325-450.

Once a document contextual model has been built, that satisfactorily meets the business requirements, a message assembly model can be automatically generated from it. The automatic generation respects the rules defined in IEC 62361-100.

The XML schema then may be automatically generated from the message assembly model. If necessary, specific mapping can take place at this stage to transform the CIM class and attribute names into more market resilient names.

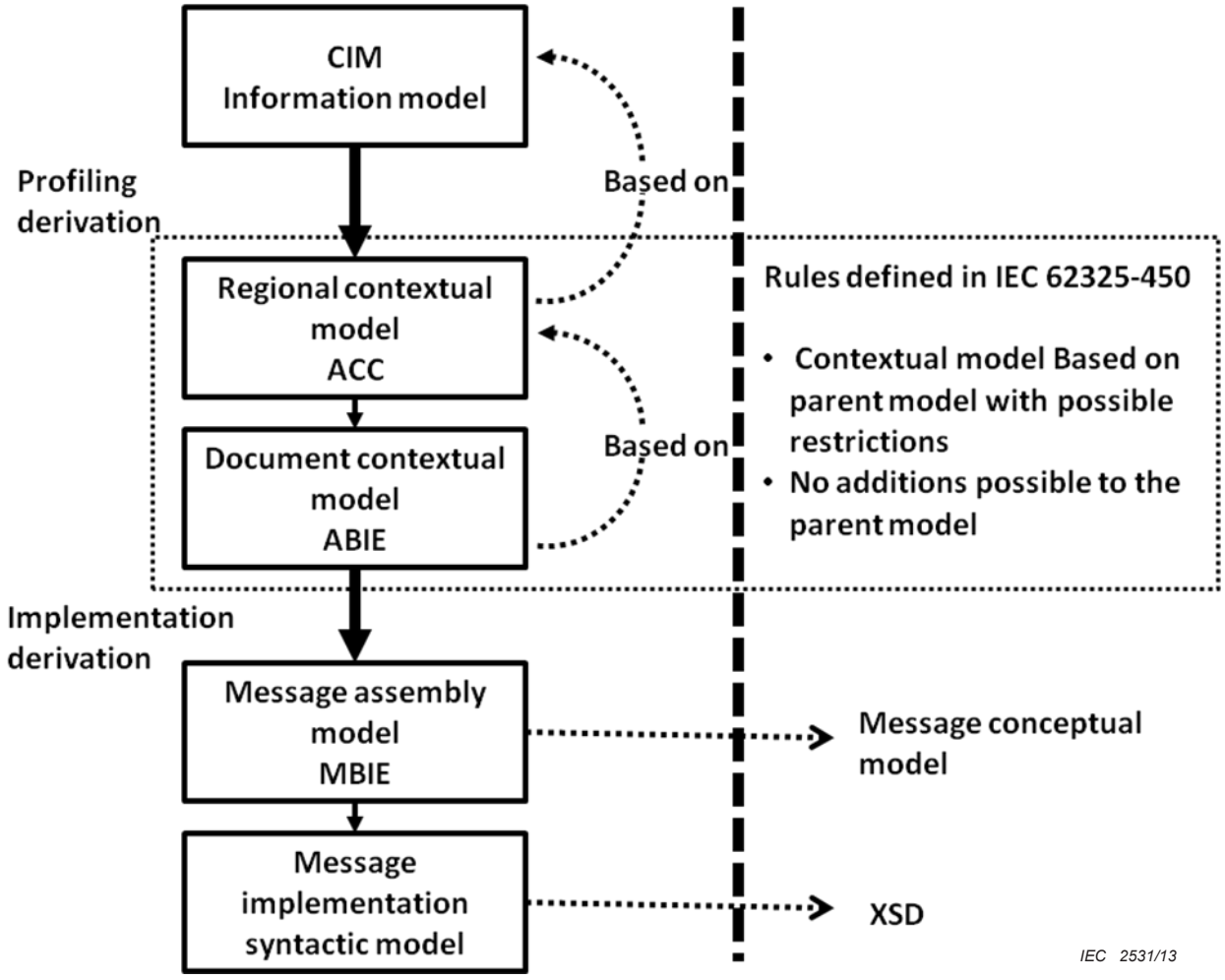

Figure 1 – IEC 62325-450 modelling framework

4.2 European style market package structure

The main package structure of the European style market profile is described in Figure 2.

For each business process, a business process package is described in an IEC 62325-451-x (x from 1 to i) standard.

A business process package contains:

- The document contextual model (ABIE) and the automatically generated message assembly model (MBIE) for each electronic document required to enable the completion of the business process. Each document is a sub contextual model derived by restriction from the European style market profile.
- The XML schema of the business document that is automatically generated from the message assembly model.

The European style market profile (ESMP), as defined in IEC 62325-351, provides the core components permitted for use in an IEC 62325-451-x standard. All ABIEs must be “based on” the IEC 62325-351 core components:

- ESMPClasses: Defining all the semi-contextual classes of the European style market profile derived by restriction from the CIM information model.
- ESMPDataTypes: Defining all the core Datatypes used within the ESMP classes.

All the core components that are used in every electronic document structure have been harmonized and centralized in the European style market profile.

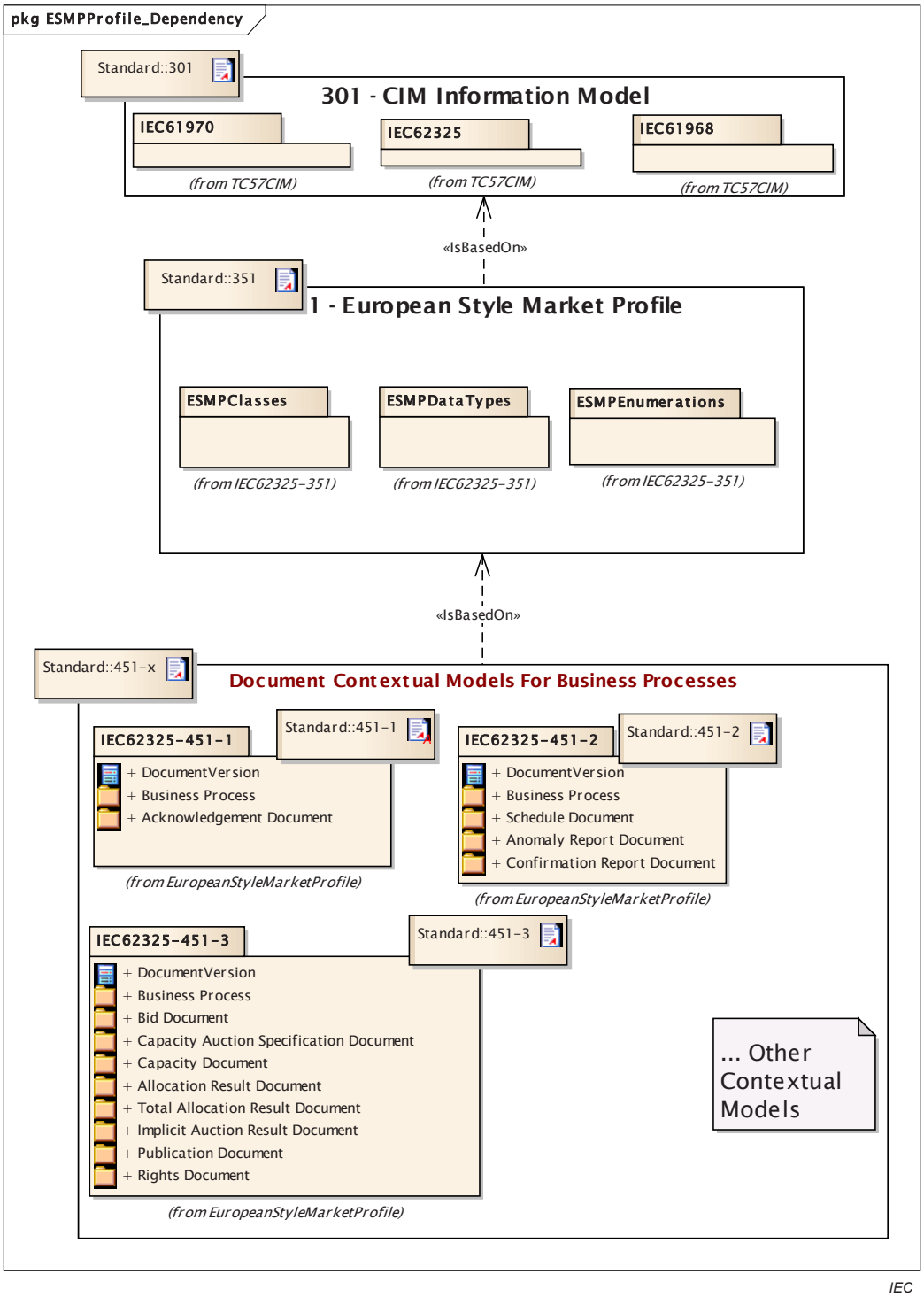

Figure 2 – Overview of European style market profile dependency

4.3 From the European style market profile to the document contextual model

The document contextual model for a given business process is constructed by an information analyst who identifies all the information requirements necessary to satisfy the business process.

Once the information requirements have been identified, the information analyst identifies the related ACCs that are available in the European style market profile and contextualises them to meet the information requirements. This contextualisation step creates a set of ABIEs.

In a final step the information analyst assembles together into a specific document contextual model package the ABIEs to form a document model satisfying the business requirements.

All document contextual models share the same core components and core datatypes. These are defined in the European style market profile (IEC 62325-351) and are contextualised and refined in all document contextual models (IEC 62325-451-x series) respecting the rules as described in IEC 62325-450.

4.4 From the document contextual model to the message assembly model

Once the document contextual model has been finalised, the message assembly model may be automatically generated.

All document contextual models share the same core components and core datatypes. These are defined in the European style market profile (IEC 62325-351) and are contextualised and refined in all document contextual models (IEC 62325-451-x series) respecting the rules as described in IEC 62325-450.

To enable this automatic generation a series of principles have been elaborated based on the underlying structures defined in the European style market profile.

The message assembly model is generated into a separate package and respects the following basic criteria:

1) There shall be one class that is not dependent through a relationship on another class. This class shall be deemed the Root class.
2) When there is a dependant class, that has a [0..1] or [1..1] multiplicity in all the dependent class association ends, then if it is a leaf class, the leaf class attributes shall be integrated into the parent class.
3) The multiplicity of the integrated attributes shall correspond to the multiplicity of the association end related to the dependent class. However, if an attribute has a multiplicity of [0..1] then this multiplicity shall become the multiplicity of the integrated attribute. For example, in Figure 3, the MarketParticipant class has a [1..1] relationship with the parent Schedule_MarketDocument for two associations (Sender_ and Receiver_) and its “mRID” has a [1..1] multiplicity, thus the resulting combination is a [1..1] multiplicity. Consequently the “mRID” attribute is moved to the parent class for these two relations respecting the [1..1] multiplicity.

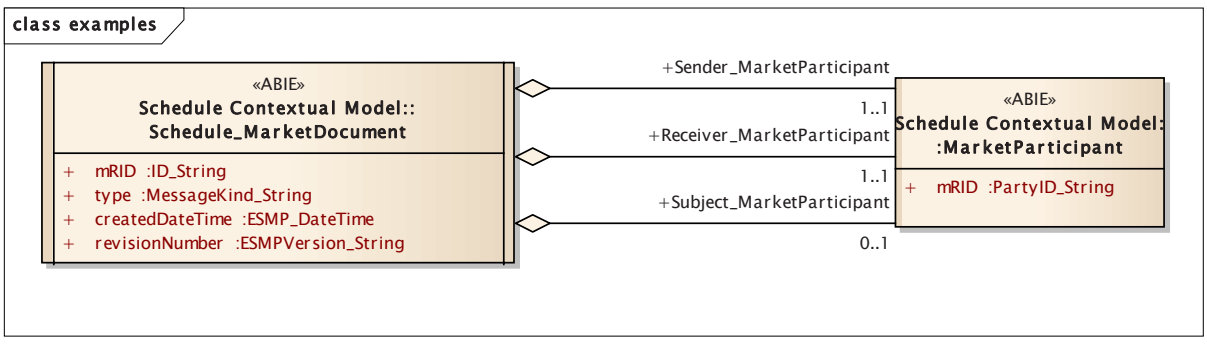

Figure 3 – Message assembly criteria

4) The name of the integrated attribute in the integrating class shall be the concatenation of the association end role name and the name of the attribute of the original class. For example, in Figure 3, there are three specific end role names,

"Sender_MarketParticipant", "Receiver_MarketParticipant" and "Subject_MarketParticipant". Consequently the "mRID" attribute to be integrated into the parent class shall be "Sender_MarketParticipant.mRID" and "Receiver_MarketParticipant.mRID" with a multiplicity of [1..1] and "Subject_MarketParticipant.mRID" with a multiplicity of [0..1].

5) The attributes that are integrated into a class shall maintain the same datatypes as defined in the dependant class.
6) The parent class could have associations with more than one leaf class. The integration rule is applied for each leaf class that fulfil the association requirement of 0..1 or 1..1.
7) In the case where there is a hierarchy of dependant classes, the integration process is iterative starting from the leaf classes.
8) Attributes and Associations are ordered.

The resulting message assembly model shall be the model used for the creation of technological implementations such as XML schema.

4.5 From the assembly model to the XML schema

The final modelling step applies a standardized set of criteria in order to generate a uniform XML schema from the assembly model. This transformation process respects the rules defined in IEC 62361-100.

5 The acknowledgment business process

5.1 Business process definition

5.1.1 General

The acknowledgment business process is generic and can be used in all the electricity market business processes at two levels:

- System level: To detect syntax errors (XML parsing errors, etc.);
- Application level: To detect semantic errors (invalid data, wrong process, etc.).

If there is a problem encountered at the first level, then a technical acknowledgement may be sent to inform the originator of the problem.

If errors are encountered at the second level or if the application can successfully process the information, then an application acknowledgement may be sent to inform the originator of the situation.

Figure 4 provides an overview of the acknowledgement process.

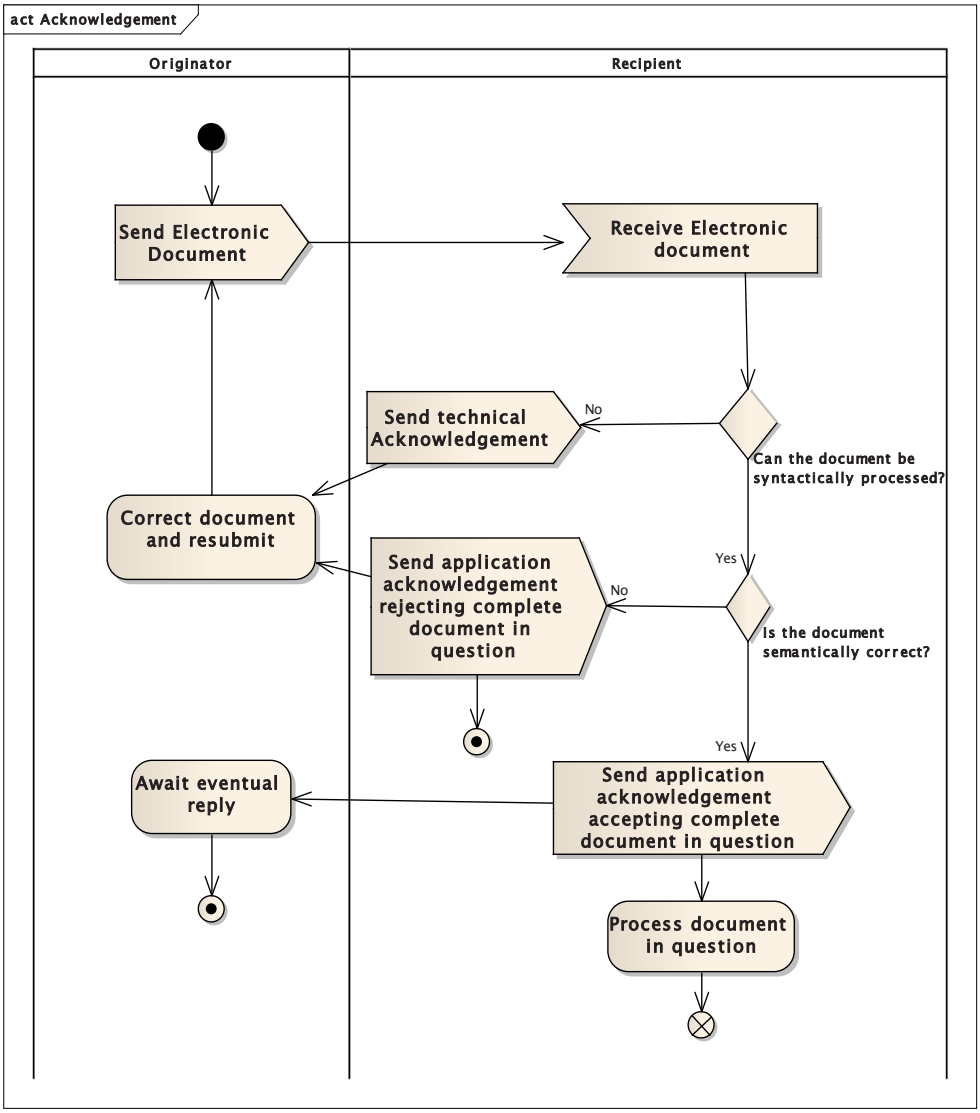

Figure 4 – Acknowledgement process

5.1.2 Technical acknowledgment

A technical acknowledgement occurs when an XML document is received that cannot be correctly processed for submission to the application. Such an error could occur for example whenever the XML parser cannot correctly parse the incoming document. Other instances could be the incapacity to correctly identify the originator of the document in relation to the process requested.

In such a case a technical acknowledgement can be sent to the document originator providing the information that the XML document in question cannot be correctly processed by the system.

5.1.3 Application acknowledgment

Within each business process of European style markets, business rules are to be defined stating whether or not an application acknowledgment is to be sent upon reception of an electronic document.

In particular, where the originator is in an “operator” type role (system operator, market operator, interconnection capacity allocator, etc.) and the recipient is in a “market participant” type role, all electronic documents sent by entities in the role of an operator shall be

considered as received and correct, and the acknowledgement process is not required unless an acknowledgment document is required by a specific process.

Otherwise, upon reception, checks are to be carried out at the application level to assess that the received document can be correctly processed by the application. The originator is informed that:

- its document, which is stated as valid after this verification, is ready to be processed by the reception of an acknowledgement document accepting the document in question;
- its document is rejected for processing by the reception of an acknowledgement document rejecting the document in question with details on the level of errors.

5.2 Business rules for the acknowledgment document

5.2.1 General

All the business rules described in IEC 62325-351 are also valid for this standard. Additional rules are provided hereafter.

5.2.2 Time

For all time intervals, the start date and time is included in the scope of the interval whereas the end date and time is excluded from the scope of the interval, i.e. [start date and time, end date and time].

5.2.3 Reason

5.2.3.1 General

There shall be at least one Reason class at the document header level that provides the information to either accept or reject the document.

If there are no errors, i.e., the received document is fully accepted, then there shall be no reason text attribute in the Reason class in order to enable an automated processing of the acknowledgement in such a case.

If there are errors at the TimeSeries level as many Reason classes as necessary may be used to provide the details of the error. Specifically it shall be used:

- To identify a TimeSeries which has been completely rejected;
- To identify a TimeSeries where there are selective errors at the Time_Period level.

A timeInterval that is in error shall be identified in relation to its position in the incoming document.

If there are errors at the Time_Period level as many Reason classes as necessary shall be used to identify the error.

5.2.3.2 Reason code examples

Table 1, Table 2 and Table 3 provide examples of the possible combinations of the use of reason codes:

Table 1 – Codes used at the document header level

Code	Reason
A01	Message fully accepted
A02	Message fully rejected
A03	Message contains errors at the time series level
A51	Message identification or version conflict
A52	Time series missing from new version of message
A53	Receiving party incorrect
A94	Document cannot be processed by receiving system

Table 2 – Codes used at the TimeSeries level when there is a Reason code of A03 at the document header level

Code	Reason
A20	Time series fully rejected
A21	Time series accepted with specific time interval errors
A41	Resolution inconsistency
A50	Senders timeseries version conflict
A54	Global position not in balance
A55	Time series identification conflict
A56	Corresponding time series not netted
A57	Deadline limit exceeded
A59	Not compliant with local market rules

Table 3 – Codes used at the Period level when there is a Reason code A03 at the document header level and a code A21 at the TimeSeries level

Code	Reason
A42	Quantity inconsistency
A46	Quantities must not be signed values
A49	Position inconsistency
A59	Not compliant with local market rules

6 Contextual and assembly models

6.1 Acknowledgement contextual model

6.1.1 Overview of the model

Figure 5 shows the model.

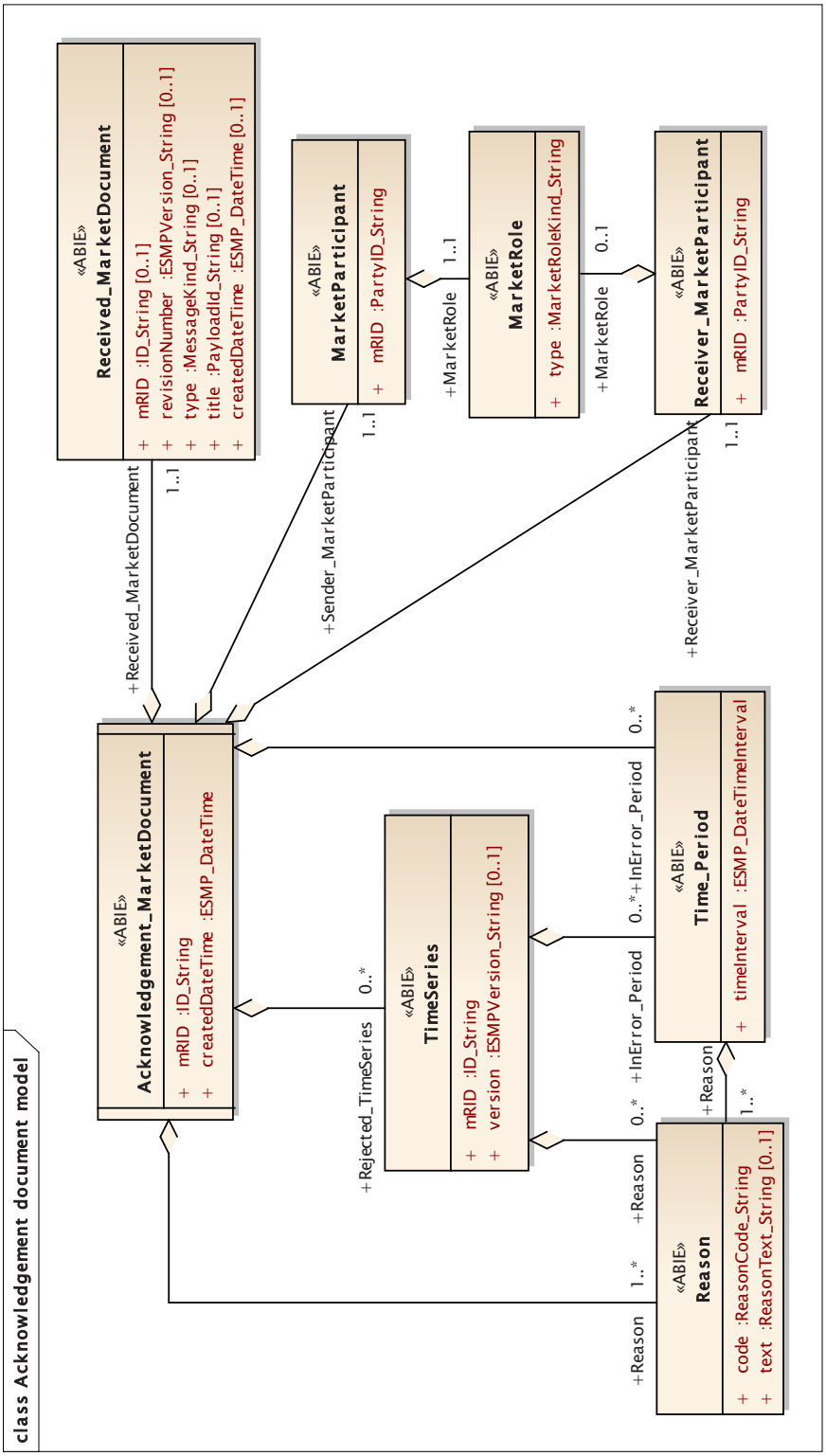

Figure 5 – Acknowledgement contextual model

6.1.2 IsBasedOn relationships from the European style market profile

Table 4 shows the traceability dependency of the classes used in this package towards the upper level.

Table 4 – IsBasedOn dependency

Name	Is BasedOn Class	Complete IsBasedOn Path
Acknowledgement_MarketDocument	ESMPClasses::MarketDocument	62325\ESMPClasses
MarketParticipant	ESMPClasses::MarketParticipant	62325\ESMPClasses
MarketRole	ESMPClasses::MarketRole	62325\ESMPClasses
Reason	ESMPClasses::Reason	62325\ESMPClasses
Received_MarketDocument	ESMPClasses::MarketDocument	62325\ESMPClasses
Receiver_MarketParticipant	ESMPClasses::MarketParticipant	62325\ESMPClasses
Time_Period	ESMPClasses::Time_Period	62325\ESMPClasses
TimeSeries	ESMPClasses::TimeSeries	62325\ESMPClasses

6.1.3 Detailed Acknowledgement contextual model

6.1.3.1 Acknowledgement_MarketDocument root class

An electronic document that is used to acknowledge the reception of a document and to provide information concerning its basic validity.

IsBasedOn: ESMPClasses::MarketDocument

Table 5 shows all attributes of Acknowledgement_MarketDocument.

Table 5 – Attributes of Acknowledgement contextual model::Acknowledgement_MarketDocument

mult.	Attribute name	Attribute type	Description
[1..1]	createdDateTime	ESMP_DateTime	The date and time of the creation of the document.
[1..1]	mRID	ID_String	The unique identification of the document being exchanged within a business process flow.

Table 6 shows all association ends of Acknowledgement_MarketDocument with other classes.

Table 6 – Association ends of Acknowledgement contextual model::Acknowledgement_MarketDocument with other classes

mult.	Role	Class type name	Description
[0..*]	InError_Period	Time_Period	The time interval that is associated with the received document and which contains error. Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::Time_Period.Period[0..*]
[1..*]	Reason	Reason	In case of a received document without error, only one Reason element is necessary to acknowledge it. However, if there are errors then there may be as many Reason elements as are necessary to describe any errors discovered in the received document. At least one reason element must appear associated with the header part of the document. The Reason associated with the electronic document header providing different motivations for the creation of the document. Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::Reason.Reason[0..*]
[1..1]	Received_MarketDocument	Received_MarketDocument	This information identifies the document that has been received. The information is extracted from the received document. Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketDocument.MarketDocument[0..*]
[1..1]	Receiver_MarketParticipant	Receiver_MarketParticipant	The identification of the party who is the recipient of the acknowledgement. The recipient of the document is identified by a unique coded identification. This value should be the same as that found in the sender identification of the document being acknowledged. The MarketParticipant that receives the electronic document. Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketParticipant.MarketParticipant[0..*]
[0..*]	Rejected_TimeSeries	TimeSeries	The time series in the received document that has been rejected during the initial validation process. Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::TimeSeries.TimeSeries[0..*]
[1..1]	Sender_MarketParticipant	MarketParticipant	The identification of the party that is the originator of the acknowledgement. The originator of the acknowledgement is identified by a unique coded identification. This value should be the same as that found in the receiver identification of the document being acknowledged. The MarketParticipant that transmits the electronic document. Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketParticipant.MarketParticipant[0..*]

6.1.3.2 MarketParticipant

The identification of the party participating in the energy market business processes.

IsBasedOn: ESMPClasses::MarketParticipant

Table 7 shows all attributes of MarketParticipant.

Table 7 – Attributes of Acknowledgement contextual model::MarketParticipant

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	PartyID_String	The identification of a party in the energy market.

Table 8 shows all association ends of MarketParticipant with other classes.

Table 8 – Association ends of Acknowledgement contextual model:: MarketParticipant with other classes

mult.	Role	Class type name	Description
[1..1]	MarketRole	MarketRole	The role associated with a MarketParticipant. Association Based On: ESMPClasses::MarketParticipant.[] ----- ESMPClasses::MarketRole.MarketRole[0..1]

6.1.3.3 MarketRole

The identification of the intended behaviour of a market participant played within a given business process.

IsBasedOn: ESMPClasses::MarketRole

Table 9 shows all attributes of MarketRole.

Table 9 – Attributes of Acknowledgement contextual model::MarketRole

mult.	Attribute name	Attribute type	Description
[1..1]	type	MarketRoleKind_String	The identification of the role played by a market player.

6.1.3.4 Reason

The motivation of an act.

IsBasedOn: ESMPClasses::Reason

Table 10 shows all attributes of Reason.

Table 10 – Attributes of Acknowledgement contextual model::Reason

mult.	Attribute name	Attribute type	Description
[1..1]	code	ReasonCode_String	The motivation of an act in coded form.
[0..1]	text	ReasonText_String	The textual explanation corresponding to the reason code.

6.1.3.5 Received_MarketDocument

The identification of the electronic document that has been received and which is the object of this acknowledgement.

IsBasedOn: ESMPClasses::MarketDocument

Table 11 shows all attributes of Received_MarketDocument.

Table 11 – Attributes of Acknowledgement contextual model::Received_MarketDocument

mult.	Attribute name	Attribute type	Description
[0..1]	createdDateTime	ESMP_DateTime	The date and time of the creation of the document.
[0..1]	mRID	ID_String	The unique identification of the document being exchanged within a business process flow.
[0..1]	revisionNumber	ESMPVersion_String	The identification of the version that distinguishes one evolution of a document from another.
[0..1]	title	PayloadId_String	The identification of the name of the file or the payload that has been transmitted.
[0..1]	type	MessageKind_String	The coded type of a document. The document type describes the principal characteristic of the document.

6.1.3.6 Receiver_MarketParticipant

The identification of the party participating in the energy market business processes.

IsBasedOn: ESMPClasses::MarketParticipant

Table 12 shows all attributes of Receiver_MarketParticipant.

Table 12 – Attributes of Acknowledgement contextual model::Receiver_MarketParticipant

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	PartyID_String	The identification of a party in the energy market.

Table 13 shows all association ends of Receiver_MarketParticipant with other classes.

Table 13 – Association ends of Acknowledgement contextual model::Receiver_MarketParticipant with other classes

mult.	Role	Class type name	Description
[0..1]	MarketRole	MarketRole	The role associated with a MarketParticipant. Association Based On: ESMPClasses::MarketParticipant.[] --- ESMPClasses::MarketRole.MarketRole[0..1]

6.1.3.7 Time_Period

The identification of a time interval with errors. It should be noted that the relative position transmit in the original document will have been converted to an absolute time interval whenever errors occur at this level in the acknowledgement document.

IsBasedOn: ESMPClasses::Time_Period

Table 14 shows all attributes of Time_Period.

Table 14 – Attributes of Acknowledgement contextual model::Time_Period

mult.	Attribute name	Attribute type	Description
[1..1]	timeInterval	ESMP_DateTimeInterval	The start and end date and time for a given interval.

Table 15 shows all association ends of Time_Period with other classes.

Table 15 – Association ends of Acknowledgement contextual model:: Time_Period with other classes

mult.	Role	Class type name	Description
[1..*]	Reason	Reason	If there are errors at the Time_Period level as many Reason elements as necessary may be used. The reason information associated with a Time_Period providing motivation information. Association Based On: ESMPClasses::Time_Period.[] --- ESMPClasses::Reason.Reason[0..*]

6.1.3.8 TimeSeries

The TimeSeries stated as being in error.

A set of time-ordered quantities being exchanged in relation to a product.

IsBasedOn: ESMPClasses::TimeSeries

Table 16 shows all attributes of TimeSeries.

Table 16 – Attributes of Acknowledgement contextual model::TimeSeries

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	ID_String	A unique identification of the time series.
[0..1]	version	ESMPVersion_String	The identification of the version of the time series.

Table 17 shows all association ends of TimeSeries with other classes.

Table 17 – Association ends of Acknowledgement contextual model:: TimeSeries with other classes

mult.	Role	Class type name	Description
[0..*]	InError_Period	Time_Period	The time interval in a TimeSeries that is in error. Association Based On: ESMPClasses::TimeSeries.[] ----- ESMPClasses::Time_Period.Period[0..*]
[0..*]	Reason	Reason	If there are errors at the TimeSeries level as many Reason elements as necessary may be found at that level. The reason information associated with a TimeSeries providing motivation information. Association Based On: ESMPClasses::TimeSeries.[] ----- ESMPClasses::Reason.Reason[0..*]

6.2 Acknowledgement assembly model

6.2.1 Overview of the model

Figure 6 shows the model.

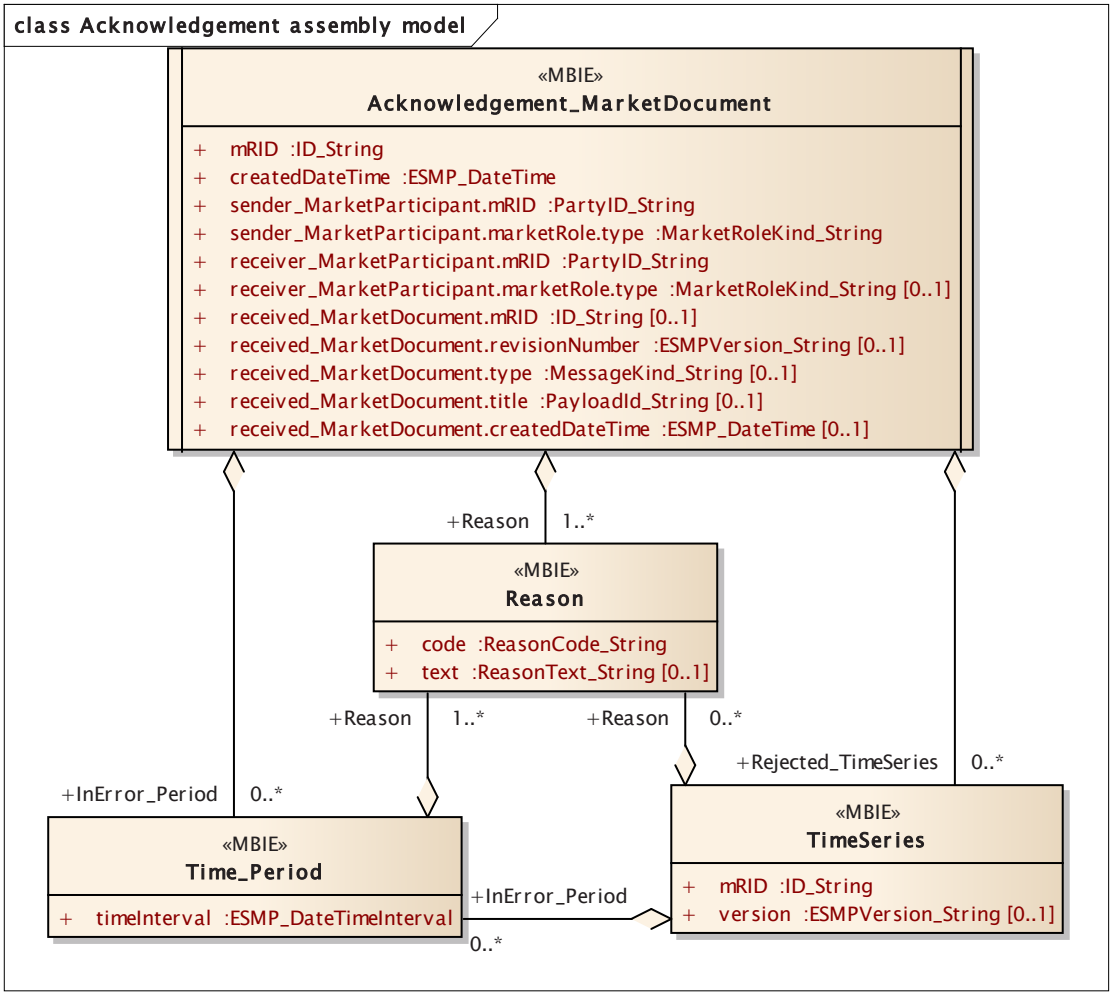

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Figure 6 – Acknowledgement assembly model

6.2.2 IsBasedOn relationships from the European style market profile

Table 18 shows the traceability dependency of the classes used in this package towards the upper level.

Table 18 – IsBasedOn dependency

Name	Is BasedOn Class	Complete IsBasedOn Path
Acknowledgement_MarketDocument	Acknowledgement contextual model::Acknowledgement_MarketDocument	62325\Acknowledgement contextual model
Reason	Acknowledgement contextual model::Reason	62325\Acknowledgement contextual model
Time_Period	Acknowledgement contextual model::Time_Period	62325\Acknowledgement contextual model
TimeSeries	Acknowledgement contextual model::TimeSeries	62325\Acknowledgement contextual model

6.2.3 Detailed Acknowledgement assembly model

6.2.3.1 Acknowledgement_MarketDocument root class

An electronic document that is used to acknowledge the reception of a document and to provide information concerning its basic validity.

IsBasedOn: Acknowledgement contextual model::Acknowledgement_MarketDocument

Table 19 shows all attributes of Acknowledgement_MarketDocument.

Table 19 – Attributes of Acknowledgement assembly model::Acknowledgement_MarketDocument

mult.	Attribute name	Attribute type	Description
[1..1]	createdDateTime	ESMP_DateTime	The date and time of the creation of the document.
[1..1]	mRID	ID_String	The unique identification of the document being exchanged within a business process flow.
[0..1]	received_MarketDocument.createdDateTime	ESMP_DateTime	The date and time of the creation of the document. --- This information identifies the document that has been received. The information is extracted from the received document.
[0..1]	received_MarketDocument.mRID	ID_String	The unique identification of the document being exchanged within a business process flow. --- This information identifies the document that has been received. The information is extracted from the received document.
[0..1]	received_MarketDocument.revisionNumber	ESMPVersion_String	The identification of the version that distinguishes one evolution of a document from another. --- This information identifies the document that has been received. The information is extracted from the received document.
[0..1]	received_MarketDocument.title	PayloadId_String	The identification of the name of the file or the payload that has been transmitted. --- This information identifies the document that has been received. The information is extracted from the received document.
[0..1]	received_MarketDocument.type	MessageKind_String	The coded type of a document. The document type describes the principal characteristic of the document. --- This information identifies the document that has been received. The information is extracted from the received document.
[0..1]	receiver_MarketParticipant.marketRole.type	MarketRoleKind_String	The identification of the role played by a market player. --- The identification of the party who is the recipient of the acknowledgement. The recipient of the document is identified by a unique coded identification. This value should be the same as that found in the sender identification of the document being acknowledged. The MarketParticipant that receives the electronic document. --- The role associated with a MarketParticipant.

mult.	Attribute name	Attribute type	Description
[1..1]	receiver_MarketParticipant.mRID	PartyID_String	The identification of a party in the energy market. --- The identification of the party who is the recipient of the acknowledgement. The recipient of the document is identified by a unique coded identification. This value should be the same as that found in the sender identification of the document being acknowledged. The MarketParticipant that receives the electronic document.
[1..1]	sender_MarketParticipant.marketRole.type	MarketRoleKind_String	The identification of the role played by a market player. --- The identification of the party that is the originator of the acknowledgement. The originator of the acknowledgement is identified by a unique coded identification. This value should be the same as that found in the receiver identification of the document being acknowledged. The MarketParticipant that transmits the electronic document. --- The role associated with a MarketParticipant.
[1..1]	sender_MarketParticipant.mRID	PartyID_String	The identification of a party in the energy market. --- The identification of the party that is the originator of the acknowledgement. The originator of the acknowledgement is identified by a unique coded identification. This value should be the same as that found in the receiver identification of the document being acknowledged. The MarketParticipant that transmits the electronic document.

Table 20 shows all association ends of Acknowledgement_MarketDocument with other classes.

Table 20 – Association ends of Acknowledgement assembly model::Acknowledgement_MarketDocument with other classes

mult.	Role	Class type name	Description
[0..*]	InError_Period	Time_Period	The time interval that is associated with the received document and which contains error. Association Based On: Acknowledgement contextual model::Acknowledgement_MarketDocument.[] ----- Acknowledgement contextual model::Time_Period.InError_Period[0..*]
[1..*]	Reason	Reason	In case of a received document without error, only one Reason element is necessary to acknowledge it. However, if there are errors then there may be as many Reason elements as are necessary to describe any errors discovered in the received document. At least one reason element must appear associated with the header part of the document. The Reason associated with the electronic document header providing different motivations for the creation of the document. Association Based On: Acknowledgement contextual model::Acknowledgement_MarketDocument.[] ----- Acknowledgement contextual model::Reason.Reason[1..*]
[0..*]	Rejected_TimeSeries	TimeSeries	The time series in the received document that has been rejected during the initial validation process. Association Based On: Acknowledgement contextual model::Acknowledgement_MarketDocument.[] ----- Acknowledgement contextual model::TimeSeries.Rejected_TimeSeries[0..*]

6.2.3.2 Reason

The motivation of an act.

IsBasedOn: Acknowledgement contextual model::Reason

Table 21 shows all attributes of Reason.

Table 21 – Attributes of Acknowledgement assembly model::Reason

mult.	Attribute name	Attribute type	Description
[1..1]	code	ReasonCode_String	The motivation of an act in coded form.
[0..1]	text	ReasonText_String	The textual explanation corresponding to the reason code.

6.2.3.3 Time_Period

The identification of a time interval with errors. It should be noted that the relative position transmit in the original document will have been converted to an absolute time interval whenever errors occur at this level in the acknowledgement document.

IsBasedOn: Acknowledgement contextual model::Time_Period

Table 22 shows all attributes of Time_Period.

Table 22 – Attributes of Acknowledgement assembly model::Time_Period

mult.	Attribute name	Attribute type	Description
[1..1]	timeInterval	ESMP_DateTimeInterval	The start and end date and time for a given interval.

Table 23 shows all association ends of Time_Period with other classes.

Table 23 – Association ends of Acknowledgement assembly model:: Time_Period with other classes

mult.	Role	Class type name	Description
[1..*]	Reason	Reason	If there are errors at the Time_Period level as many Reason elements as necessary may be used. The reason information associated with a Time_Period providing motivation information. Association Based On: Acknowledgement contextual model::Time_Period.[] ----- Acknowledgement contextual model::Reason.Reason[1..*]

6.2.3.4 TimeSeries

The TimeSeries stated as being in error.

A set of time-ordered quantities being exchanged in relation to a product.

IsBasedOn: Acknowledgement contextual model::TimeSeries

Table 24 shows all attributes of TimeSeries.

Table 24 – Attributes of Acknowledgement assembly model::TimeSeries

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	ID_String	A unique identification of the time series.
[0..1]	version	ESMPVersion_String	The identification of the version of the time series.

Table 25 shows all association ends of TimeSeries with other classes.

Table 25 – Association ends of Acknowledgement assembly model:: TimeSeries with other classes

mult.	Role	Class type name	Description
[0..*]	InError_Period	Time_Period	The time interval in a TimeSeries that is in error. Association Based On: Acknowledgement contextual model::TimeSeries.[] --- Acknowledgement contextual model::Time_Period.InError_Period[0..*]
[0..*]	Reason	Reason	If there are errors at the TimeSeries level as many Reason elements as necessary may be found at that level. The reason information associated with a TimeSeries providing motivation information. Association Based On: Acknowledgement contextual model::TimeSeries.[] --- Acknowledgement contextual model::Reason.Reason[0..*]

6.2.4 Datatypes

6.2.4.1 ESMP_DateTimeInterval compound

This datatype enables to express the start date and time, and the end date and time of a time interval with a specific pattern. This pattern is the YYYY-MM-DDThh:mmZ.

Table 26 shows all attributes of ESMP_DateTimeInterval.

Table 26 – Attributes of ESMPDataTypes::ESMP_DateTimeInterval

mult.	Attribute name	Attribute type	Description
[1..1]	start	YMDHM_DateTime	The start date and time of the interval with a minute resolution.
[1..1]	end	YMDHM_DateTime	The end date and time of the interval with a minute resolution.

6.2.4.2 ESMP_DateTime datatype

In ESMP, the dateTime must be expressed in UTC as YYYY-MM-DDThh:mm:ssZ.

Table 27 shows all attributes of ESMP_DateTime.

Table 27 – Attributes of ESMPDataTypes::ESMP_DateTime

mult.	Attribute name	Attribute type	Description
[1..1]	value	DateTime	Main Core value Space.

6.2.4.3 ESMPVersion_String datatype

In ESMP, the coded value is restricted to digits.

A code that distinguishes one evolution of an identified object from another. Information about a specific object may be sent several times, each transmission being identified by a different version number.

Table 28 shows all attributes of ESMPVersion_String.

Table 28 – Attributes of ESMPDataTypes::ESMPVersion_String

mult.	Attribute name	Attribute type	Description
[1..1]	value	String	Main Core value Space.

6.2.4.4 ID_String datatype

A code to uniquely distinguish one occurrence of an entity from another.

In the ESMP context, the code is defined either by:

– an authorized issuing office that provides an agreed identification coding scheme for market participant, domain, measurement point, resources (generator, lines, substations, etc.) identification

– an emitting company that provides an agreed identification unique within a business context such as capacity auction identification, market agreement identification, etc.

– a party (originator of the exchange) that provides a unique identification in the framework of a business exchange such as document identification, time series identification, bid identification, ...

Table 29 shows all attributes of ID_String.

Table 29 – Attributes of ESMPDataTypes::ID_String

mult.	Attribute name	Attribute type	Description
[1..1]	value	String	Main Core value Space.

6.2.4.5 MarketRoleKind_String datatype

The identification of the role played by a party.

Table 30 shows all attributes of MarketRoleKind_String.

Table 30 – Attributes of ESMPDataTypes::MarketRoleKind_String

mult.	Attribute name	Attribute type	Description
[1..1]	value	RoleTypeList	Main Core value Space.

6.2.4.6 MessageKind_String datatype

The coded type of a document.

Table 31 shows all attributes of MessageKind_String.

Table 31 – Attributes of ESMPDataTypes::MessageKind_String

mult.	Attribute name	Attribute type	Description
[1..1]	value	MessageTypeList	Main Core value Space.

6.2.4.7 PartyID_String datatype

The identification of an actor in the energy market.

In the ESMP context, it is an authorized issuing office that provides an agreed identification coding scheme for market participant identification.

Table 32 shows all attributes of PartyID_String.

Table 32 – Attributes of ESMPDataTypes::PartyID_String

mult.	Attribute name	Attribute type	Description
[1..1]	codingScheme	CodingSchemeTypeList	DomainQualification.
[1..1]	value	String	Main Core value Space.

6.2.4.8 PayloadId_String datatype

The name of a file or the payload identification.

Table 33 shows all attributes of PayloadId_String.

Table 33 – Attributes of ESMPDataTypes::PayloadId_String

mult.	Attribute name	Attribute type	Description
[1..1]	value	String	Main Core value Space.

6.2.4.9 ReasonCode_String datatype

The coded motivation of an act.

Table 34 shows all attributes of ReasonCode_String.

Table 34 – Attributes of ESMPDataTypes::ReasonCode_String

mult.	Attribute name	Attribute type	Description
[1..1]	value	ReasonCodeTypeList	Main Core value Space.

6.2.4.10 ReasonText_String datatype

The textual explanation of an act as a string of characters.

Table 35 shows all attributes of ReasonText_String.

Table 35 – Attributes of ESMPDataTypes::ReasonText_String

mult.	Attribute name	Attribute type	Description
[1..1]	value	String	Main Core value Space.

6.2.4.11 YMDHM_DateTime datatype

In ESMP, the date and time as "YYYY-MM-DDThh:mmZ", which conforms with the ISO 8601 UTC time zone. This date and time is without the seconds.

Table 36 shows all attributes of YMDHM_DateTime.

Table 36 – Attributes of ESMPDataTypes::YMDHM_DateTime

mult.	Attribute name	Attribute type	Description
[1..1]	value	DateTime	The date and time as "YYYY-MM-DDThh:mmZ", which conforms with the ISO 8601 UTC time zone.

6.2.5 Enumerations

The list of enumerations used for the Acknowledgement assembly model is as follows:

- CodingSchemeTypeList
- MessageTypeList
- ReasonCodeTypeList
- RoleTypeList

7 XML schema

7.1 XML schema URN Namespace rules

In order to provide a generic and stable means of declaring a URN for the European style market profile XML Schemas, the namespace will be composed in the following manner:

urn:iec62325.351:tc57wg16:<process>**:<**document>**:**<version>**:**<release>

where:

- iec62325.351 shall be the stem of all European style market profile XML schema namespaces.
- tc57wg16 identifies the organisation or group of organisations within IEC that owns the object being referenced. In the case of TC57 this shall be the WG16.
- <process> identifies the specific process where the object is situated, e.g. the part of the IEC 62325 standards in which the XML schema is defined, e.g. 451-1, 451-2, 451-3, etc.
- <document> identifies the electronic document schema.
- <version> identifies the version of the document schema.
- <release> identifies the release of the document schema.

Every XML schema representing an electronic document shall have a default namespace corresponding to the namespace that identifies the document and respects the above URI namespace construction.

Every XML schema representing an electronic document shall have a targetNamespace corresponding to the default namespace.

Every XML schema shall have an elementFormDefault as “qualified”.

Every XML schema shall have an attributeFormDefault as “unqualified”.

7.2 Code list URN namespace rules

In the case of the codelist library that shall be used for the European style market profile the URN shall be as follows: **urn:entsoe.eu:wgedi:codelists**.

7.3 URI rules for model documentation

7.3.1 Datatype

In the case of the base data type library that shall be used for the European style market profile, the URI shall use the sawsdl:modelReference as follows:

http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#[datatype-name]

where:

- <CIM-version-year> is the year of the released CIM version used for generating market profile.
- <cimxx> is the CIM version name.
- [datatype-name] is the name of the CIM datatype or primitive.

Examples are provided hereafter:

- http://iec.ch/TC57/2012/CIM-schema-cim16#String
- http://iec.ch/TC57/2012/CIM-schema-cim16#Money

7.3.2 Class

In the case of the base class library that shall be used for the European style market profile, the URI shall use the sawsdl:modelReference as follows:

http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#[class-name]

where:

- <CIM-version-year> is the year of the released CIM version used for generating market profile
- <cimxx> is the CIM version name
- [class-name] is the name of the CIM class

Example is provided hereafter:

- http://iec.ch/TC57/2012/CIM-schema-cim16#TimeSeries

7.3.3 Attribute

In the case of the base attribute library that shall be used for the European style market profile, the URI shall use the sawsdl:modelReference as follows:

http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#[class-name].[attribute-name]

where:

- <CIM-version-year> is the year of the released CIM version used for generating market profile
- <cimxx> is the CIM version name
- [class-name] is the name of the CIM class

- [attribute-name] is the name of a class attribute

Example is provided hereafter:

- http://iec.ch/TC57/2012/CIM-schema-cim16#TimeSeries.product

7.3.4 Association end role name

In the case of the base association library that shall be used for the European style market profile, the URI shall use the sawsdl:modelReference as follows:

http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#[class-name].[association-end-role-name]

where:

- <CIM-version-year> is the year of the released CIM version used for generating market profile
- <cimxx> is the CIM version name
- [class-name] is the name of the CIM class
- [association-end-role-name]

Example is provided hereafter:

- http://iec.ch/TC57/2012/CIM-schema-cim16#MarketDocument.TimeSeries

7.4 Acknowledgement_MarketDocument schema

7.4.1 Schema Structure

Figure 7 and Figure 8 provide the structure of the schema.

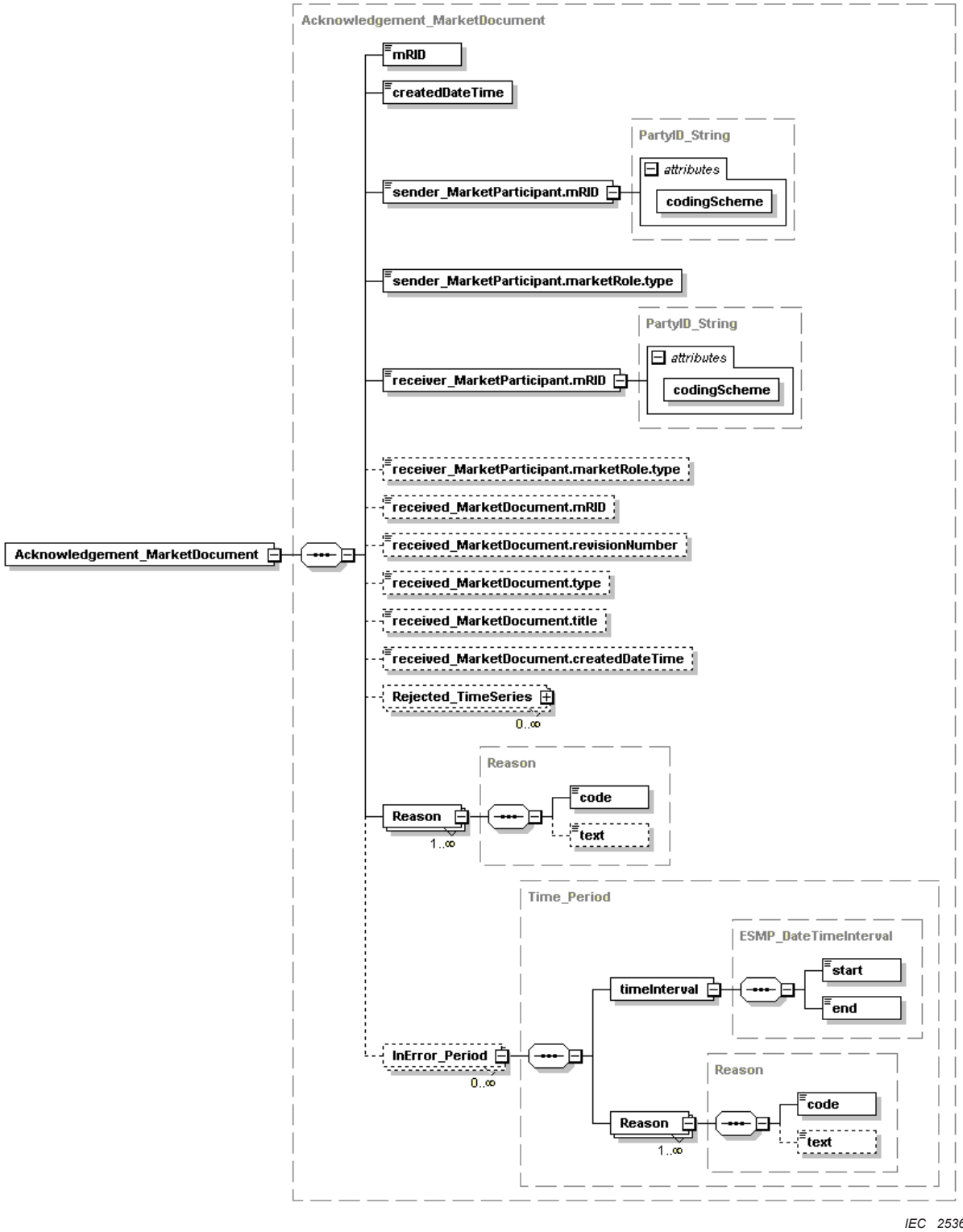

Figure 7 – Acknowledgement_MarketDocument XML schema structure – 1/2

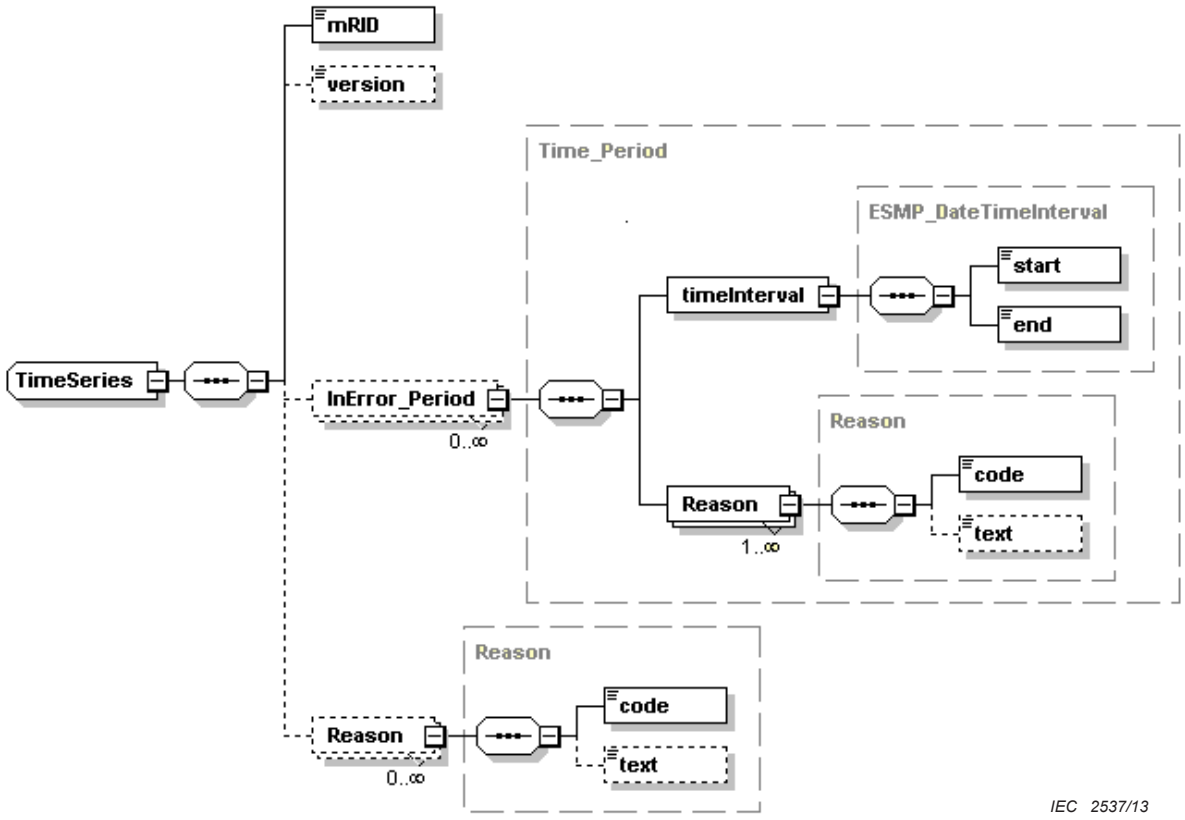

Figure 8 – Acknowledgement_MarketDocument XML schema structure – 2/2

7.4.2 Schema description

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:cl="urn:entsoe.eu:wgedi:codelists" xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
xmlns="urn:iec62325.351:tc57wg16:451-1:acknowledgementdocument:7:0"
xmlns:cimp="http://www.iec.ch/cimprofile" attributeFormDefault="unqualified" elementFormDefault="qualified"
targetNamespace="urn:iec62325.351:tc57wg16:451-1:acknowledgementdocument:7:0"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:import schemaLocation="wgedi-codelists.xsd" namespace="urn:entsoe.eu:wgedi:codelists" />
  <xs:element name="Acknowledgement_MarketDocument" type="Acknowledgement_MarketDocument" />
  <xs:simpleType name="ID_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#String">
    <xs:restriction base="xs:string">
      <xs:maxLength value="35" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="ESMP_DateTime" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#DateTime">
    <xs:restriction base="xs:dateTime">
      <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-9]|[12][0-9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-
9]|[12][0-9]|30))T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-
9])Z)|(([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][048]|[02468][048][02468][048]|[
02468][1235679](0)[48]|[02468][1235679][2468][048]|[0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-
9]|2[0-3]):[0-5][0-9]:[0-5][0-
9])Z)|(([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][01345789][2468][1235679]|[02468][0
48][02468][1235679]|[02468][1235679](0)[01235679]|[02468][1235679][2468][1235679]|[0-9][0-
9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-9]|2[0-8])T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z)" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="PartyID_String-base" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#String">
    <xs:restriction base="xs:string">
      <xs:maxLength value="16" />
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="PartyID_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#String">
    <xs:simpleContent>
      <xs:extension base="PartyID_String-base">
        <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList" use="required" />
```

```
    </xs:extension>
   </xs:simpleContent>
  </xs:complexType>
  <xs:simpleType name="MarketRoleKind_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#String">
   <xs:restriction base="cl:RoleTypeList" />
  </xs:simpleType>
  <xs:simpleType name="ESMPVersion_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#String">
   <xs:restriction base="xs:string">
    <xs:pattern value="[1-9]([0-9]){0,2}" />
   </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="MessageKind_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#String">
   <xs:restriction base="cl:MessageTypeList" />
  </xs:simpleType>
  <xs:simpleType name="PayloadId_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#String">
   <xs:restriction base="xs:string">
    <xs:maxLength value="150" />
   </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="Acknowledgement_MarketDocument"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#MarketDocument">
   <xs:sequence>
    <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ID_String"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#IdentifiedObject.mRID">
    </xs:element>
    <xs:element minOccurs="1" maxOccurs="1" name="createdDateTime" type="ESMP_DateTime"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#Document.createdDateTime">
    </xs:element>
    <xs:element minOccurs="1" maxOccurs="1" name="sender_MarketParticipant.mRID" type="PartyID_String"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#IdentifiedObject.mRID">
    </xs:element>
    <xs:element minOccurs="1" maxOccurs="1" name="sender_MarketParticipant.marketRole.type"
type="MarketRoleKind_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#MarketRole.type">
    </xs:element>
    <xs:element minOccurs="1" maxOccurs="1" name="receiver_MarketParticipant.mRID" type="PartyID_String"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#IdentifiedObject.mRID">
    </xs:element>
    <xs:element minOccurs="0" maxOccurs="1" name="receiver_MarketParticipant.marketRole.type"
type="MarketRoleKind_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#MarketRole.type">
    </xs:element>
    <xs:element minOccurs="0" maxOccurs="1" name="received_MarketDocument.mRID" type="ID_String"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#IdentifiedObject.mRID">
    </xs:element>
    <xs:element minOccurs="0" maxOccurs="1" name="received_MarketDocument.revisionNumber"
type="ESMPVersion_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#Document.revisionNumber">
    </xs:element>
    <xs:element minOccurs="0" maxOccurs="1" name="received_MarketDocument.type"
type="MessageKind_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#Document.type">
    </xs:element>
    <xs:element minOccurs="0" maxOccurs="1" name="received_MarketDocument.title" type="PayloadId_String"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#Document.title">
    </xs:element>
    <xs:element minOccurs="0" maxOccurs="1" name="received_MarketDocument.createdDateTime"
type="ESMP_DateTime" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#Document.createdDateTime">
    </xs:element>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="Rejected_TimeSeries" type="TimeSeries"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#MarketDocument.Rejected_TimeSeries">
    </xs:element>
    <xs:element minOccurs="1" maxOccurs="unbounded" name="Reason" type="Reason"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#MarketDocument.Reason">
    </xs:element>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="InError_Period" type="Time_Period"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#MarketDocument.InError_Period">
    </xs:element>
   </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="ReasonCode_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#String">
   <xs:restriction base="cl:ReasonCodeTypeList" />
```

```
  </xs:simpleType>
  <xs:simpleType name="ReasonText_String" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#String">
    <xs:restriction base="xs:string">
      <xs:maxLength value="512" />
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="Reason" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#Reason">
    <xs:sequence>
      <xs:element minOccurs="1" maxOccurs="1" name="code" type="ReasonCode_String"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#Reason.code">
      </xs:element>
      <xs:element minOccurs="0" maxOccurs="1" name="text" type="ReasonText_String"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#Reason.text">
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="YMDHM_DateTime" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#DateTime">
    <xs:restriction base="xs:string">
      <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-9]|[12][0-9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-
9]|[12][0-9]|30))T(([01][0-9]|2[0-3]):[0-5][0-
9])Z)|(([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][048]|[02468][048][02468][048]|[
02468][1235679](0)[48]|[02468][1235679][2468][048]|[0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-
9]|2[0-3]):[0-5][0-
9])Z)|(([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][01345789][2468][1235679]|[02468][0
48][02468][1235679]|[02468][1235679](0)[01235679]|[02468][1235679][2468][1235679]|[0-9][0-
9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-9]|2[0-8])T(([01][0-9]|2[0-3]):[0-5][0-9])Z)" />
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="ESMP_DateTimeInterval" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#DateTimeInterval">
    <xs:sequence>
      <xs:element minOccurs="1" maxOccurs="1" name="start" type="YMDHM_DateTime"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#ESMP_DateTimeInterval.start">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1" name="end" type="YMDHM_DateTime"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#ESMP_DateTimeInterval.end">
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Time_Period" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#Period">
    <xs:sequence>
      <xs:element minOccurs="1" maxOccurs="1" name="timeInterval" type="ESMP_DateTimeInterval"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#Period.timeInterval">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="unbounded" name="Reason" type="Reason"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#Period.Reason">
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="TimeSeries" sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-
cim16#TimeSeries">
    <xs:sequence>
      <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ID_String"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#IdentifiedObject.mRID">
      </xs:element>
      <xs:element minOccurs="0" maxOccurs="1" name="version" type="ESMPVersion_String"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#TimeSeries.version">
      </xs:element>
      <xs:element minOccurs="0" maxOccurs="unbounded" name="InError_Period" type="Time_Period"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#TimeSeries.InError_Period">
      </xs:element>
      <xs:element minOccurs="0" maxOccurs="unbounded" name="Reason" type="Reason"
sawsdl:modelReference="http://iec.ch/tc57/2012/CIM-schema-cim16#TimeSeries.Reason">
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Bibliography

IEC 62325-301, *Framework for energy market communications – Part 301: Common Information Model (CIM) extensions for markets*[3]

IEC 62325-451-x series, *Framework for energy market communications*

ISO 15000-5, *Electronic Business Extensible Markup Language (ebXML) – Part 5: ebXML Core Components Technical Specification, Version 2.10 (ebCCTS)*

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