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Examples of mapping of Nordic XML documents from ENTSO-E to CIM format

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CONTENT

0 Executive summary

This document shows three examples of mapping between XML documents described in the ENTSO-E Scheduling System (ESS) Implementation Guide and XML documents described in the IEC 62325 Part 451-2 Scheduling business process.

The mapping examples shows that there is a one-to-one mapping between the two standards and that it will be a simple job to migrate from the older ENTSO-E versions to the newer IEC versions. The work will mainly be renaming of data elements.

However, in some of the ENTSO-E documents used in the Nordic countries today, NEG has extended the documents to fit Nordic requirements. When it is time to migrate to one of these extended documents, NTC will added these extensions to the Nordic versions of the IEC 62325 Part 451 documents.

1 Introduction

1.1 Background

ENTSO-E/WG-EDI has for some years run a project together with IEC/TC57/WG16 to move the ENTSO-E Implementation Guides (IG) to be a part of the IEC Common Information Model (CIM). The result of this project is published as a set of standards named IEC 62325.

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) specifies the basis for the semantics for this message exchange. The profile specifications, which are contained in separate parts of the IEC 62325 standards, specify the content of the messages exchanged. The CIM is an abstract model that represents all the major objects in an electric utility enterprise typically needed to model the operational aspects of a utility. The model includes public classes and attributes for these objects, as well as the relationships between them.

This document shows mapping between the older ENTSO-E documents currently used in the Nordic market and the newer document published as IEC standards. Note that it is only the elements used in the Nordic countries that are mapped.

1.2 NTC

The document is written by NTC (NEG Technical Committee), with the following members at the time of publication:

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1.3 References

[1] ENTSO-E implementation guides, see ENTSO-E, EDI Work Products Library :

- ENTSO-E Modelling Methodology, EMM
- ENTSO-E UCTE SO-SO Process
- ENTSO-E Scheduling System, ESS
- ENTSO-E Settlement Process, ESP
- ENTSO-E Reserve Resource Planning, ERRP
- ENTSO-E Capacity Allocation and Nomination, ECAN

- ENTSO-E Capacity Auction Specification document, ECAN
- ENTSO-E Publication Document, ECAN
- ENTSO-E Status Report, ESR
- ENTSO-E Acknowledgement process

[2] IEC 62325: Framework for energy market communications, Part 451 http://www.iec.ch/

- Part 451-1 Acknowledgement business process
- Part 451-2 Scheduling business process
- Part 451-3 Transmission capacity allocation business process (explicit or implicit auction)
- Part 451-4: Settlement and reconciliation business process
- Part 451-5: Problem statement and status request business processes
- Part 451-6 Publication of information on market

1.4 Terms and notation

The term *document* is used instead of *message*, when this is applicable. However when referencing ENTSO-E document names, the ENTSO-E name will be used, e.g. message, report or document.

The term *Market schedules* is used instead of the ENTSO-E term *Schedules* when this is applicable and *Operational schedules* is used instead of the ENTSO-E term *Resource schedules* when this is applicable.

When the term TSO is used in this document, it may include the Market Operator.

In this document, the term *Corridor* is used for a group of power cables/lines. In the ENTSO-E ECAN IG, the term *Connecting line* is used with similar meaning.

Documents are described by a class diagram showing the full set of attributes in the related xml schema. In addition the usage of the document is described by one or more tables detailing the usage of each attribute. Optional attributes from the class diagram, not used in the specific data exchange, are omitted from the table. In addition the cardinalities, e.g. [0..1], may be stricter in the detailed descriptions than in the original ENTSO-E documents.

1.5 Change log

Ver/rel/rev	Changed by	Date	Changes
1.1.B	Ove Nesvik	20170419	• Updated Energinet logo on the front page • Textual corrections
1.1.B	Ove Nesvik	20170213	• Updated logos on the front page • Replaced Nord Pool and NPS with Market Operator • Replaced Elspot with Day-ahead • Replaced Elbas with Intraday • Updated NTC and NEG member list

1.1.A	Ove Nesvik	20160727	• Addition of:
			  ○ ECAN Publication document
			  ○ ECAN Capacity Document
			  ○ ESP Energy Account Report
			  ○ Acknowledgement document
			• Addition of mapping to NBS BRSs for
			  ○ ESS Schedule Document
			  ○ ESS Confirmation Report

1.0.A	Ove Nesvik	20160305	First version of examples of mapping of Nordic XML documents from ENTSO-E to CIM format

2 Mapping from ENTSO-E to CIM XML format

This chapter shows the mapping between the ENTSO-E ESS Schedule Document xml schema and the related CIM xml schema.

2.1 ESS Schedule Document (Market schedules)

The *Schedule document (Market schedule document)* is used for market schedules, which later on is used in the balance settlement process. The Schedule document described below is based on the ENTSO-E ESS Schedule Document, see [1].

2.1.1 Class diagram: ENTSO-E ESS Schedule Document version 4.1

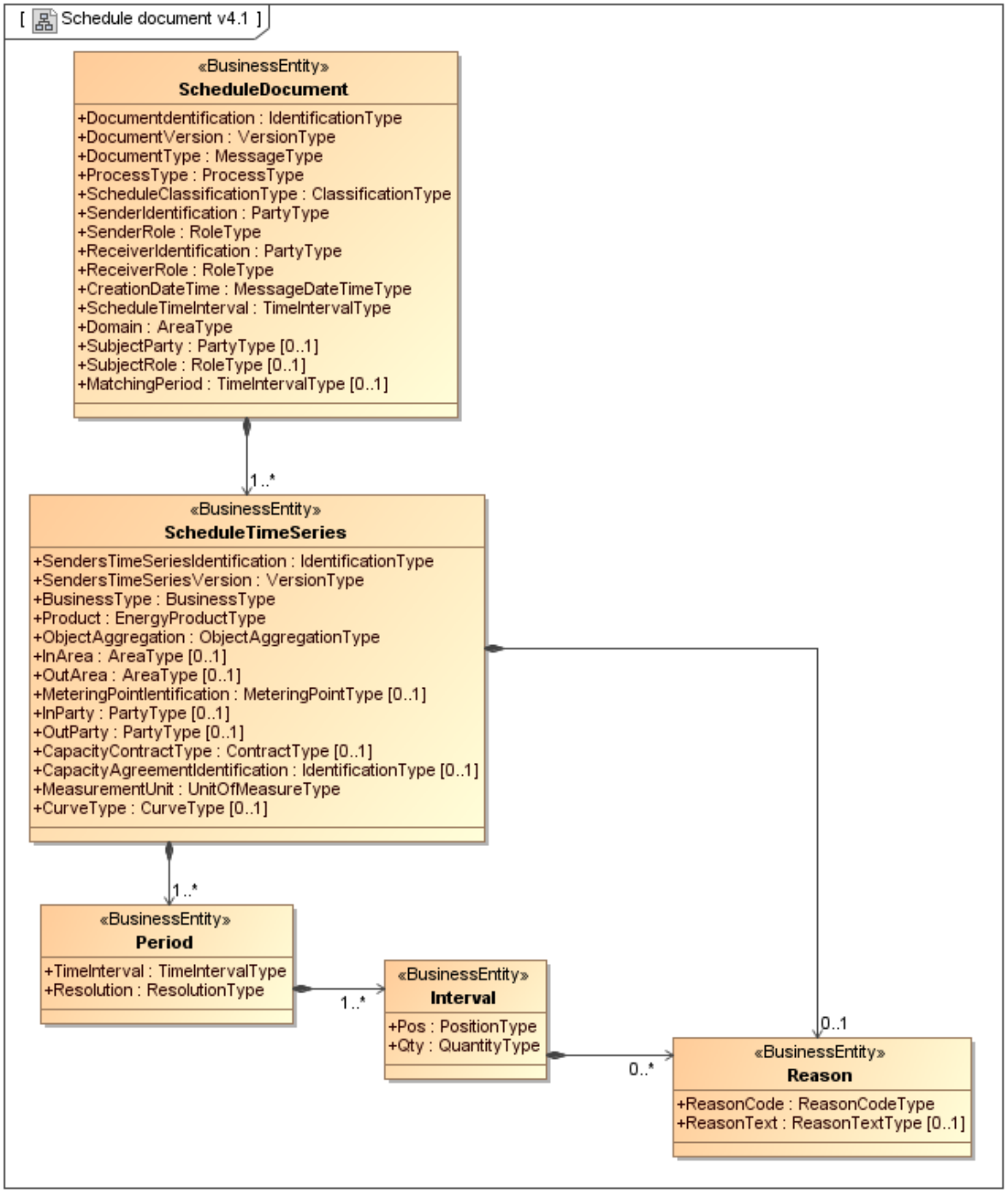

Figure 1: Class diagram: ESS Schedule Document version 4.1

2.1.2 Class diagram: CIM ESS Schedule Document Contextual Model

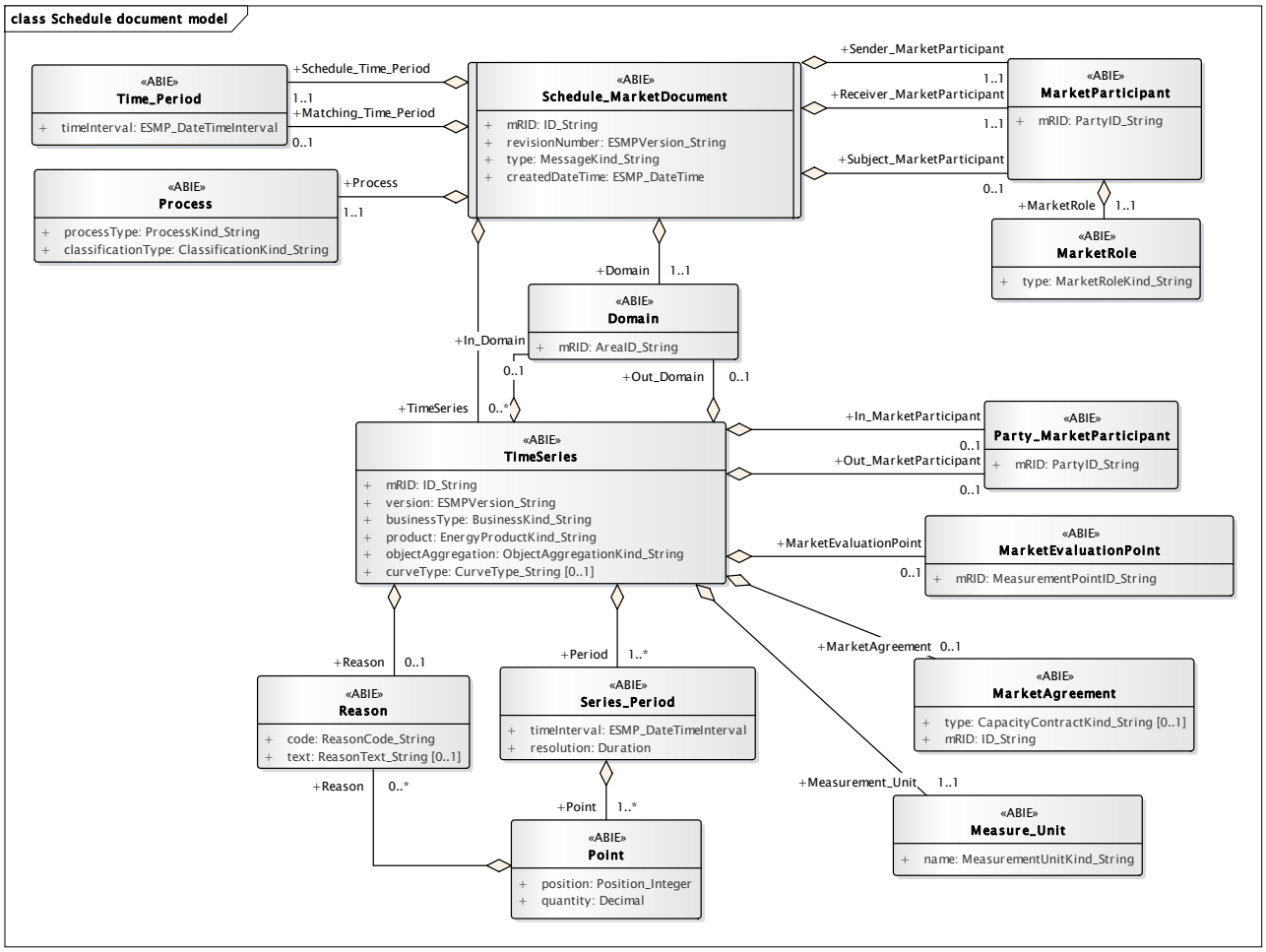

Figure 2: Class diagram: CIM ESS Schedule Document Contextual Model

2.1.3 Class diagram: CIM ESS Schedule Document Assembly Model

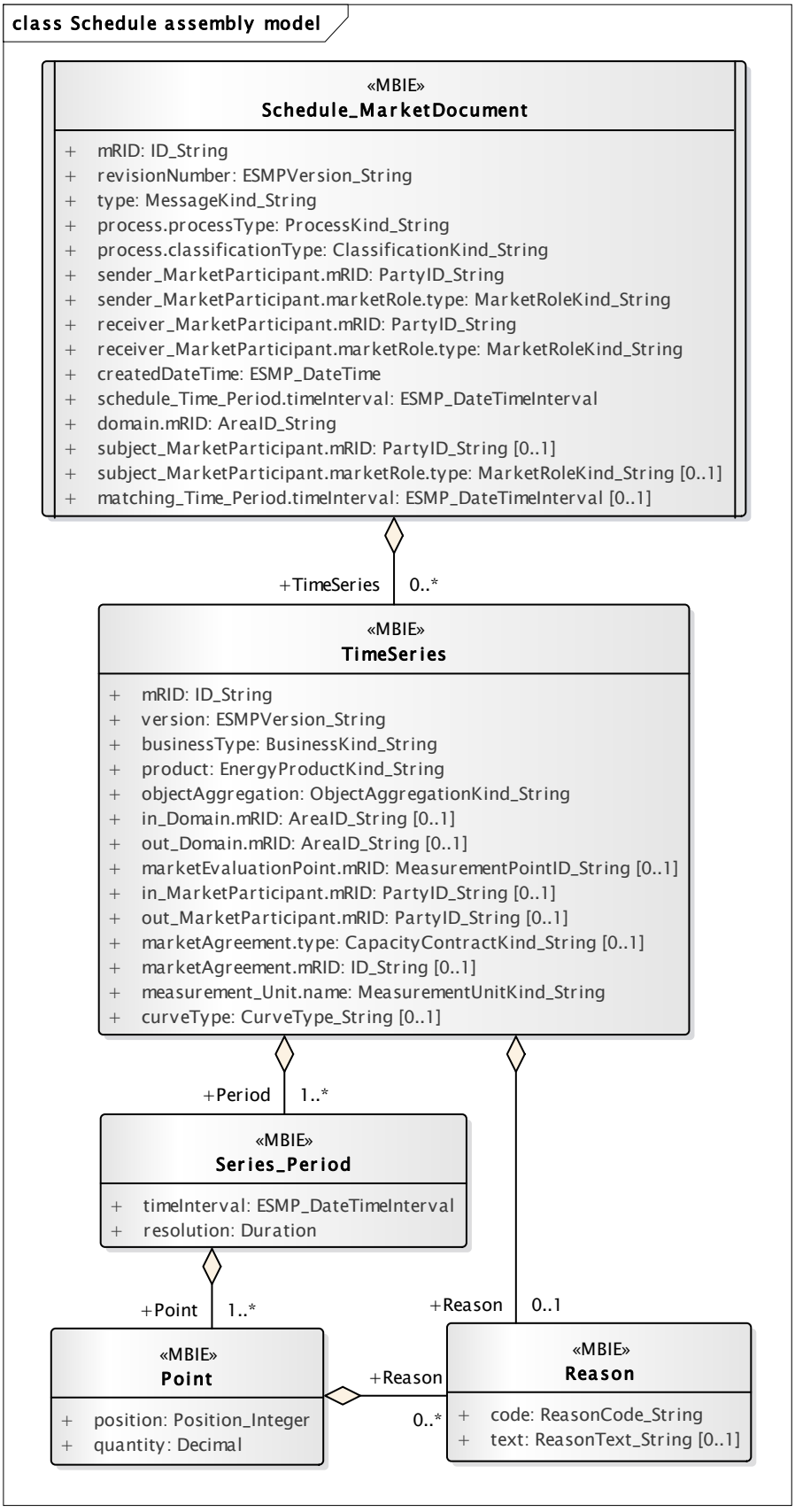

Figure 3: Class diagram: CIM ESS Schedule Document Assembly Model

2.1.4 Mapping: Balance Responsible schedule to System Operator, ESS Schedule Document

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1]	***Schedule_MarketDocument*** ***(ENTSO-E IG: Schedule Document)***
Document Identification	mRID	[1]	***CIM:*** The unique identification of the document being exchanged within a business process flow. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** Unique identification of the document **Note:** The maximum length of the ID is 35 characters.
Document Version	revisionNumber	[1]	***CIM:*** The identification of the version that distinguishes one evolution of a document from another. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** Fixed 1
Document Type	type	[1]	***CIM:*** The coded type of a document. The document type describes the principal characteristic of the document. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** **A01** Balance Responsible schedule
Process Type	process. processType	[1]	***CIM:*** The identification of the nature of process that the document addresses. --- The process dealt with in the document. ***NBS BRS:*** **Z05** Bilateral trade ***NBS BRS for TSO/Market Operator:*** **Z05** Bilateral trade ***BRS for Schedules:*** **A01** Day-ahead **A13** Post scheduling adjustment **A17** Schedule day **A19** Intraday accumulated ***A01*** *and* ***A19*** *are used for "BRPs and Traders trade in* Day-ahead *and Intraday from Market Operator to TSOs"* ***A17*** *is used for all "normal trade" from the BRPs to the System Operators* ***A13*** *is used for changes to already sent schedules, after gate closure but before settlement. Only used in Sweden*

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Schedule Classification Type	process. classificationType	[1]	***CIM:*** The classification mechanism used to group a set of objects together within a business process. The grouping may be of a detailed or a summary nature. --- The process dealt with in the document. ***NBS BRS:*** **A02** Summary type ***NBS BRS for TSO/Market Operator:*** **A02** Summary type ***BRS for Schedules:*** **A01** Detail type **A02** Summary type ***A02*** *is used together with Process Type* ***A01*** *and* ***A19****, while* ***A01*** *is used together with Process Type* ***A13*** *and* ***A17***
Sender Identification	sender_MarketParticipant. mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document owner. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** Identification of the party who is sending the document
Sender Role	sender_MarketParticipant. marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document owner. --- The role associated with a MarketParticipant. ***NBS BRS:*** **A04** System Operator **A08** Balance Responsible Party ***NBS BRS for TSO/Market Operator:*** **A04** System Operator **A08** Balance Responsible Party ***BRS for Schedules:*** **A08** Balance Responsible party **A11** Market Operator
Receiver Identification	receiver_MarketParticipant. mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document recipient. ***BRS for NBS, NBS/TSO/Market Operator and Schedules***: Identification of the party who is receiving the schedules, i.e. TSO (System Operator)
Receiver Role	receiver_MarketParticipant. marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document recipient. --- The role associated with a MarketParticipant. ***NBS BRS:*** **A05** Imbalance Settlement Responsible ***NBS BRS for TSO/Market Operator:*** **A05** Imbalance Settlement Responsible ***BRS for Schedules:*** **A04** System Operator

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Creation Date Time	createdDateTime	[1]	***CIM:*** The date and time of the creation of the document. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** The date and time that the message was prepared for transmission by the application of the sender.
Schedule Time Interval	schedule_Time_Period. timeInterval	[1]	***CIM:*** The start and end date and time for a given interval. --- This information provides the start and end date and time of the schedule time interval. All time intervals for the time series in the document shall be within the total time interval for the schedule. The receiver will discard any time intervals outside the schedule period. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** The beginning and ending date and time of the period covered by the document containing the schedule
Domain	domain.mRID	[1]	***CIM:*** The unique identification of the domain. --- The identification of the domain that is covered in the schedule document. It is in general the market balance area that is the subject of the schedule plan. ***BRS:*** Any known area from the Harmonised role model covering the areas within the time series level of the document, e.g. Market Balance Area, National Area, Nordic Market Area (10Y1001A1001A91G) etc. ***NBS BRS:*** Identification of the area covered by the document, i.e. **10Y1001A1001A91G** (Nordic market area) ***NBS BRS for TSO/Market Operator:*** Identification of the area covered by the document, i.e. **10Y1001A1001A91G** (Nordic market area) ***BRS for Schedules:*** Any known area from the Harmonised role model covering the areas within the time series level of the document, e.g. Market Balance Area, National Area, Nordic Market Area (10Y1001A1001A91G) etc.
		[1..*]	***TimeSeries*** ***(ENTSO-E IG: Schedule Time Series)***
Senders Time Series Identification	mRID	[1]	***CIM:*** A unique identification of the time series. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** Unique identification of the Time Series (unique over time for the sender in question) **Note:** The maximum length of the ID is 35 characters
Time Series Version	version	[1]	***CIM:*** The identification of the version of the time series. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** Fixed 1

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Business Type	businessType	[1]	***CIM:*** The identification of the nature of the time series. ***NBS BRS:*** **A08** Net internal trade (Within a Market balance area) (Net internal trade - where the direction from out party (seller) to in party (buyer) is positive and the opposite direction is negative (with minus signs)). ***NBS BRS for TSO/Market Operator:*** **A08** Net internal trade (Within a Market balance area) (Net internal trade - where the direction from out party (seller) to in party (buyer) is positive and the opposite direction is negative (with minus signs)). ***BRS for Schedules:*** **A01** Production **A77** Production, dispatchable (Used in DK) **A04** Consumption **A78** Consumption, dispatchable (Used in DK) **A06** External trade without explicit capacity **A08** Net internal trade (Within a Market Balance Area) **A79** Production, non-dispatchable (Used in DK) ***BRS:*** *National rules:* SE: A06 is used for external trade to Poland, Germany and for Market Operator day-ahead and intraday trade between SE and NO/DK/FI DK: A06 is used for external trade to Germany and for Market Operator day-ahead and intraday trade between DK and NO/SE NO: No *market schedules* are sent to the SO
Product	product	[1]	***CIM:*** The identification of the nature of an energy product such as power, energy, reactive power, etc. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** **8716867000030** Active energy
Object Aggregation	objectAggregation	[1]	***CIM:*** The identification of the object (party, domain, etc.) that is the common denominator used to aggregate a time series. ***NBS BRS:*** **A01** Area ***NBS BRS for TSO/Market Operator:*** **A01** Area ***BRS for Schedules:*** **A01** Area **A03** Party **A04** Agreement Identification **A01** is used together with Process Type **A01** and **A19**

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
In Area	in_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The area where the product is being delivered. ***NBS BRS:*** The Market Balance Area where the trade has taken place. ***NBS BRS for TSO/Market Operator:*** The Market Balance Area where the trade has taken place. ***BRS for Schedules:*** Market Balance Area – Usage dependent on Business Type
Out Area	out_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The area where the product is being extracted. ***BRS:*** Market Balance Area ***NBS BRS:*** The same Market Balance Area as defined in In Area, i.e. where the trade has taken place. ***NBS BRS for TSO/Market Operator:*** The same Market Balance Area as defined in In Area, i.e. where the trade has taken place. ***BRS for Schedules:*** Market Balance Area – Usage dependent on Business Type
In Party	in_MarketParticipant.mRID	[0..1]	***CIM:*** The identification of a party in the energy market. --- The identification of the party putting the product into the in area. ***BRS:*** Balance Responsible party ***NBS BRS:*** The Balance Responsible Party acting as the buyer in the bilateral trade. ***NBS BRS for TSO/Market Operator:*** The Balance Responsible Party acting as the buyer in the bilateral trade. ***BRS for Schedules:*** Balance Responsible party – Usage dependent on Business Type
Out Party	out_MarketParticipant.mRID	[0..1]	***CIM:*** The identification of a party in the energy market. --- The identification of the party taking the product out of the out area. ***BRS:*** Balance Responsible party ***NBS BRS:*** The Balance Responsible Party acting as the seller in the bilateral trade. ***NBS BRS for TSO/Market Operator:*** The Balance Responsible Party acting as the seller in the bilateral trade. ***BRS for Schedules:*** Balance Responsible party – Usage dependent on Business Type

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Capacity Contract Type	marketAgreement.type	[0..1]	***CIM:*** The specification of the kind of the agreement, e.g. long term, daily contract. --- The identification of an agreement associated with a time series. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** Not used internally in the Nordic market
Capacity Agreement Identification	marketAgreement.mRID	[0..1]	***CIM:*** The unique identification of the agreement. --- The identification of an agreement associated with a time series. ***NBS BRS:*** (Bilateral Trade ID) an ID, only used when reporting trade on a Balance Supplier (Retailer) level, identifying the two involved Balance Suppliers and the related Market Balance Area. The Bilateral Trade ID will be unique in combination with In Party, Out Party and MBA. ***NBS BRS for TSO/Market Operator:*** (Bilateral Trade ID) an ID, only used when reporting trade on a Balance Supplier (Retailer) level, identifying the two involved Balance Suppliers and the related Market Balance Area. The Bilateral Trade ID will be unique in combination with In Party, Out Party and MBA. **Note:** Currently not used ***BRS for Schedules:*** N/A
Measurement Unit	measurement_Unit.name	[1]	***CIM:*** The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measurement used for the quantities expressed within the time series. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** **MWH** MWh or **KWH** kWh
		[1..*]	***Series_Period*** ***(ENTSO-E IG: Period)***
Time Interval	timeInterval	[1]	***CIM:*** The start and end time of the period. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** The start and end date and time of the time interval of the period in question

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Resolution	resolution	[1]	***CIM:*** The definition of the number of units of time that compose an individual step within a period. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** The resolution defining the number of periods that the time interval is divided. The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g. **PT1H** or **PT60M**
		[1..*]	***Point*** ***(ENTSO-E IG: Interval)***
Pos	position	[1]	***CIM:*** A sequential value representing the relative position within a given time interval. ***BRS for NBS, NBS/TSO/Market Operator and Schedules:*** The position of the observation within the time series
Qty	quantity	[1]	***CIM:*** The principal quantity identified for a point. ***BRS:*** The quantity for the interval in question ***NBS BRS:*** Quantity The direction from out party (seller) to in party (buyer) is positive, while the opposite direction is negative (with minus signs)) The resolution is maximum in Watt, i.e. max 3 decimals for kWh and max 6 decimals for MWh ***NBS BRS for TSO/Market Operator:*** Quantity The direction from out party (seller) to in party (buyer) is positive, while the opposite direction is negative (with minus signs)) The resolution is maximum in Watt, i.e. max 3 decimals for kWh and max 6 decimals for MWh ***BRS for Schedules:*** The quantity for the interval in question

Table 1: Mapping of ESS Schedule Document, Balance Responsible schedule to System Operator, CIM ESS Schedule Document

2.2 ESS Anomaly Report (Market schedules)

Document used for reporting *Market schedules anomalies*.

2.2.1 Class diagram: ENTSO-E ESS Anomaly Report version 4.1

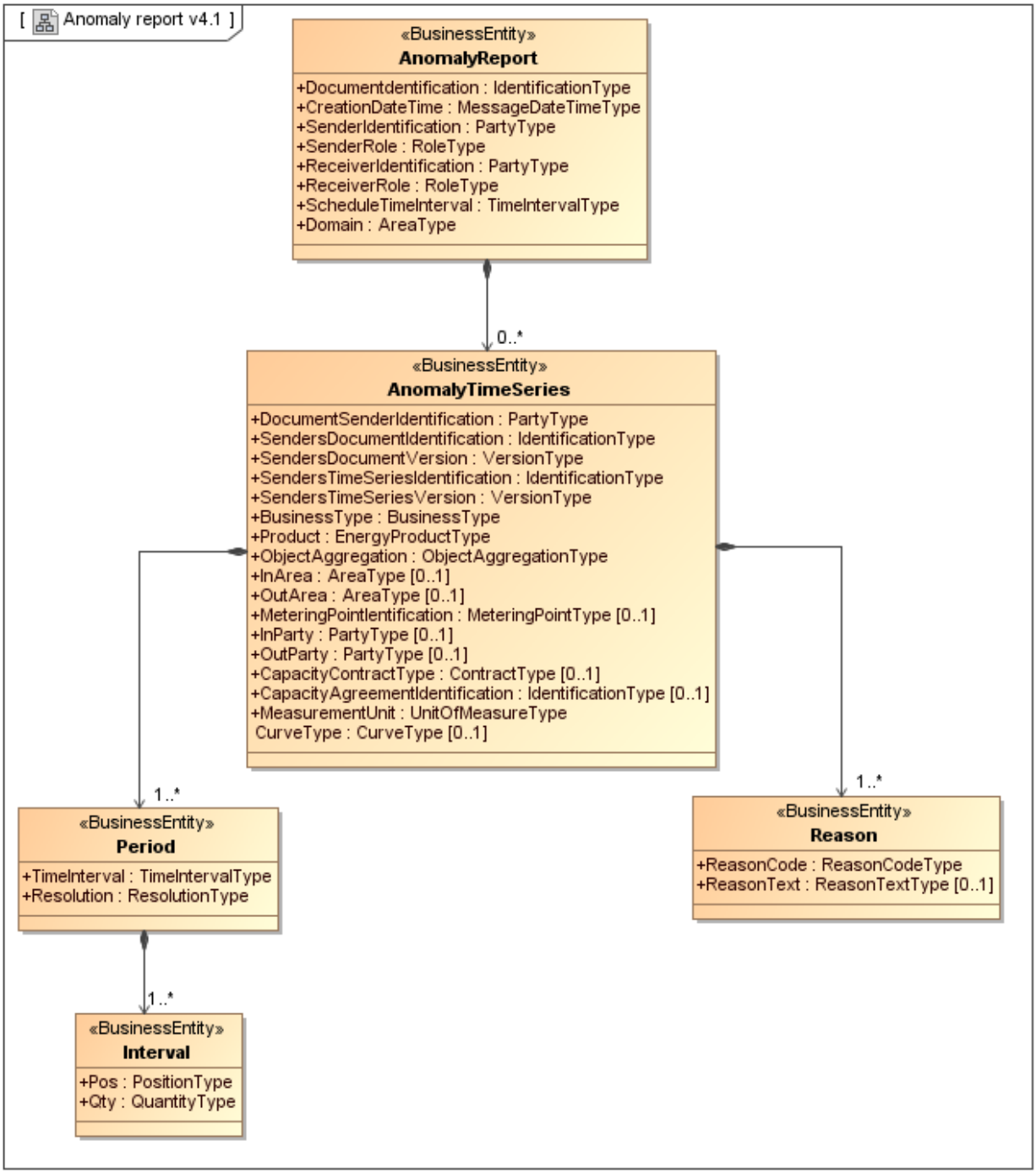

Figure 4: Class diagram: ESS Anomaly Report

2.2.2 Class diagram: CIM ESS Anomaly Report Contextual Model

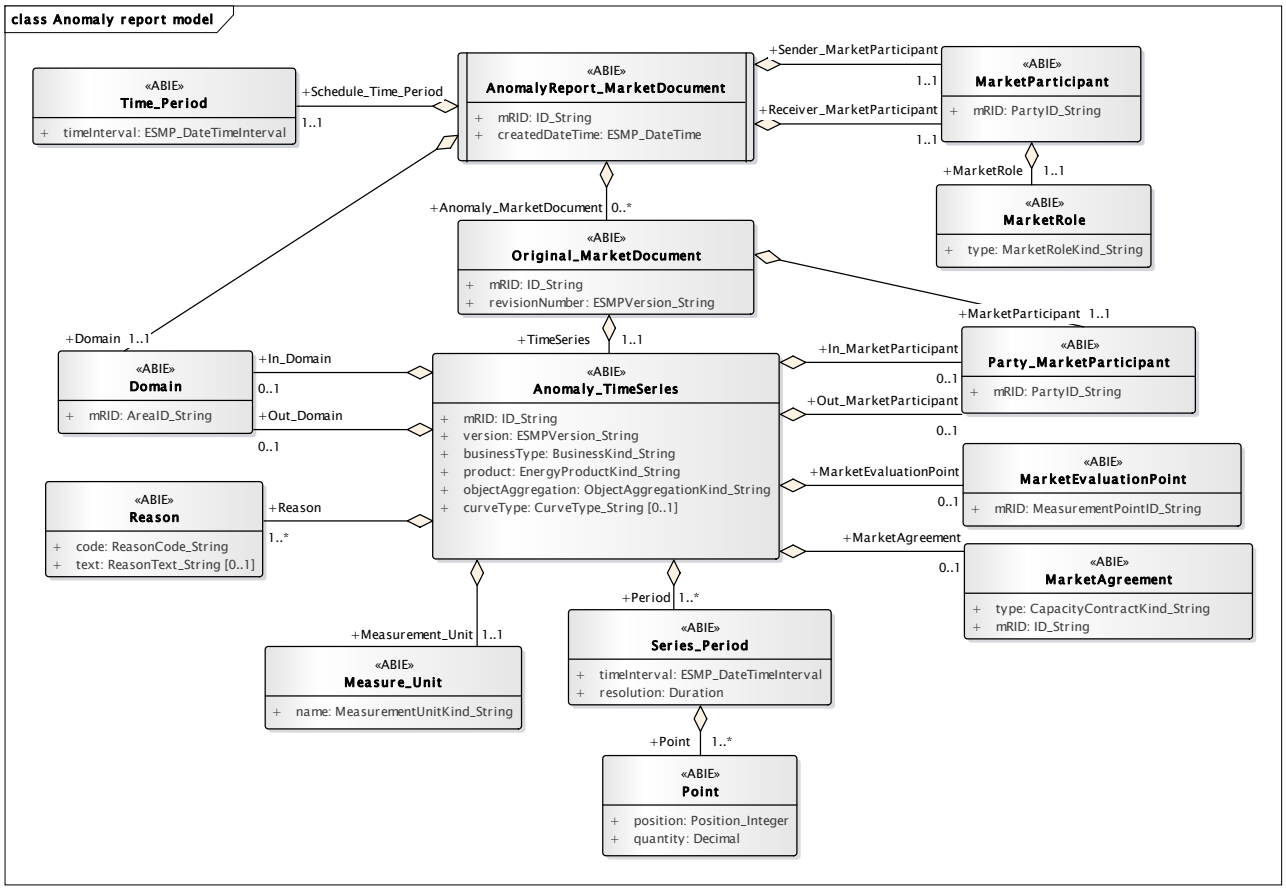

Figure 5: Class diagram: CIM ESS Anomaly Report Contextual Model

2.2.3 Class diagram: CIM ESS Anomaly Report Assembly Model

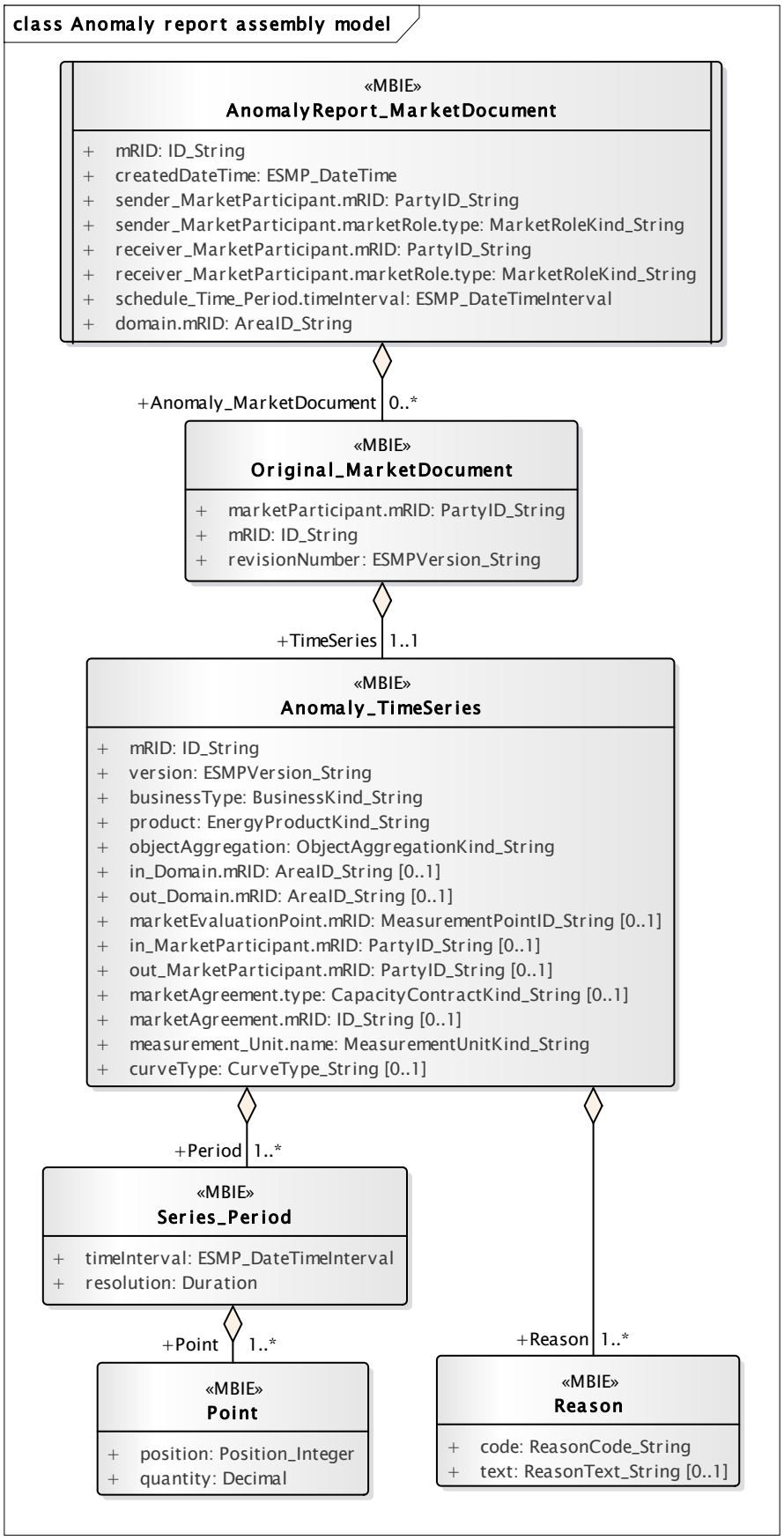

Figure 6: Class diagram: CIM ESS Anomaly Report Assembly Model

2.2.4 Mapping: ESS Anomaly Report

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1]	***AnomalyReport_MarketDocument (ENTSO-E IG: Anomaly Report)***
Document Identification	mRID	[1]	***CIM:*** The unique identification of the document being exchanged within a business process flow. ***BRS:*** Unique identification of the document
Creation Date Time	createdDateTime	[1]	***CIM:*** The date and time of the creation of the document. ***BRS:*** Date and time for transmission of the document
Sender Identification	sender_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document owner. ***BRS:*** Identification of the party who is sending the document
Sender Role	sender_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document owner. --- The role associated with a MarketParticipant. ***BRS:*** **A04** System Operator
Receiver Identification	receiver_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document recipient. ***BRS:*** Identification of the party who is receiving the schedules, i.e. TSO (System Operator)
Receiver Role	receiver_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document recipient. --- The role associated with a MarketParticipant. ***BRS:*** **A08** Balance Responsible party
Schedule Time Interval	schedule_Time_Period.timeInterval	[1]	***CIM:*** The start and end date and time for a given interval. --- This information provides the start and end date and time of the schedule period for which the anomaly report is being generated. ***BRS:*** The beginning and ending date and time of the period covered by the document containing the schedule
Domain	domain.mRID	[1]	***CIM:*** The unique identification of the domain. --- The identification of the domain that is covered in the schedule document for which the anomaly report is generated. ***BRS:*** Any known area from the Harmonised role model covering the areas within the time series level of the document, e.g. Market Balance Area, National Area, Nordic Market Area (10Y1001A1001A91G) etc.

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1..*]	***Original_MarketDocument*** ***(ENTSO-E IG: Anomaly Time Series)***
Document Sender Identification	marketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- The identification of the party who sent the "Original_MarketDocument". ***BRS:*** The identification of the party whose time series is in anomaly
Senders Document Identification	mRID	[1]	***CIM:*** The unique identification of the document being exchanged within a business process flow. ***BRS:*** The identification of the document where the time series is in error
Senders document version	revisionNumber	[1]	***CIM:*** The identification of the version that distinguishes one evolution of a document from another. ***BRS:*** Fixed 1
		[1]	***Anomaly_TimeSeries*** ***(ENTSO-E IG: Anomaly Time Series)***
Senders Time Series Identification	mRID	[1]	***CIM:*** A unique identification of the time series. ***BRS:*** The identical value of the time series in the referenced document
Senders Time Series Version	version	[1]	***CIM:*** The identification of the version of the time series. ***BRS:*** The identical value of the time series in the referenced document, i.e. Fixed 1
Business Type	businessType	[1]	***CIM:*** The identification of the nature of the time series. ***BRS:*** The identical value of the time series in the referenced document, i.e.: **A01** Production **A04** Consumption **A06** External trade without explicit capacity **A08** Net internal trade **A77** Production, dispatchable (Used in DK) **A78** Consumption, dispatchable (Used in DK) **A79** Production, non-dispatchable (Used in DK) **A80** Consumption, non-dispatchable (DK)
Product	product	[1]	***CIM:*** The identification of the nature of an energy product such as power, energy, reactive power, etc. ***BRS:*** The identical value of the time series in the referenced document, i.e.: **8716867000030** Active energy
Object Aggregation	objectAggregation	[1]	***CIM:*** The identification of the domain that is the common dominator used to aggregate a time series. ***BRS:*** The identical value of the time series in the referenced document, i.e.: **A03** Party

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
In Area	in_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The area where the product is being delivered. The domain associated with a TimeSeries. ***BRS:*** The identical value of the time series in the referenced document, i.e.: Market Balance Area, usage: see Table 2
Out Area	out_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The area where the product is being extracted. The domain associated with a TimeSeries. ***BRS:*** The identical value of the time series in the referenced document, i.e.: Market Balance Area, usage: see Table 2
Not used in the Nordics	marketEvaluationPoint. mRID	[0..1]	***CIM:*** A unique identification of the measurement point. --- The identification of the location where one or more products are metered. The identification of a measurement point associated with a TimeSeries.
In Party	in_MarketParticipant.mRID	[0..1]	***CIM:*** The identification of a party in the energy market. --- The identification of the party putting the product into the in area. The identification of a market participant associated with a TimeSeries. ***BRS:*** The identical value of the time series in the referenced document, i.e.: Balance Responsible party, usage: see Table 2
Out Party	out_MarketParticipant. mRID	[0..1]	***CIM:*** The identification of a party in the energy market. --- The identification of the party taking the product out of the out area. The identification of a market participant associated with a TimeSeries. ***BRS:*** The identical value of the time series in the referenced document, i.e.: Balance Responsible party, usage: see Table 2
Not used in the Nordics	marketAgreement.type	[0..1]	***CIM:*** The specification of the kind of the agreement, e.g. long term, daily contract. --- The identification of an agreement for the allocation of capacity to a party.
Not used in the Nordics	marketAgreement.mRID	[0..1]	***CIM:*** The unique identification of the agreement. --- The identification of an agreement for the allocation of capacity to a party.
Measurement Unit	measurement_Unit.name	[1]	***CIM:*** The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measurement used for the quantities expressed within the time series. ***BRS:*** The identical value of the time series in the referenced document, i.e.: **MWH** MWh or **KWH** kWh
Not used in the Nordics	curveType		***CIM:*** The identification of the coded representation of the type of curve being described.

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1..*]	***Point*** ***(ENTSO-E IG: Reason)***
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***BRS:*** *At the time series level:* **A09** Time series not matching **A27** Cross border capacity exceeded **A28** Counterpart time series missing **A29** Counterpart time series quantity differences
Not used in the Nordics	text	[1]	***CIM:*** The textual explanation corresponding to the reason code.
		[1..*]	***Series_Period*** ***(ENTSO-E IG: Period)***
Time Interval	timeInterval	[1]	***CIM:*** The start and end time of the period. ***BRS:*** The start and end date and time of the time interval of the period in question
Resolution	resolution	[1]	***CIM:*** The definition of the number of units of time that compose an individual step within a period. ***BRS:*** The resolution defining the number of periods that the time interval is divided. The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g. **PT1H** or **PT60M**
		[1..*]	***Point*** ***(ENTSO-E IG: Interval)***
Pos	position	[1]	***CIM:*** A sequential value representing the relative position within a given time interval. ***BRS:*** The position of the observation within the time series
Qty	quantity	[1]	***CIM:*** The principal quantity identified for a point. ***BRS:*** The quantity for the interval in question

2.2.4.1 Dependency matrix

Business type	Name	Area		Party	
		In	Out	In	Out
A01	Production	M		M	
A77	Production, dispatchable (Used in DK)	M		M	
A04	Consumption		M		M
A78	Consumption, dispatchable (Used in DK)		M		M
A80	Consumption, non-dispatchable (Used in DK)		M		M
A06	External trade without explicit capacity	M	M	M	M
A08	Net internal trade	M*)	M*)	M	M
A79	Production, non-dispatchable (Used in DK)	M		M	

Table 2: Dependency matrix for ESS Anomaly Report

*) The *In Area* and the *Out Area* are the same *Market Balance Area* if *Internal Trade*.

2.3 ESS Confirmation Report

The ESS Confirmation Report is used for reporting confirmed *Market schedules*. The ESS Confirmation Report described below is based on the ENTSO-E ESS Confirmation report, see [1].

2.3.1 Class diagram: ENTSO-E ESS Confirmation Report version 4.1

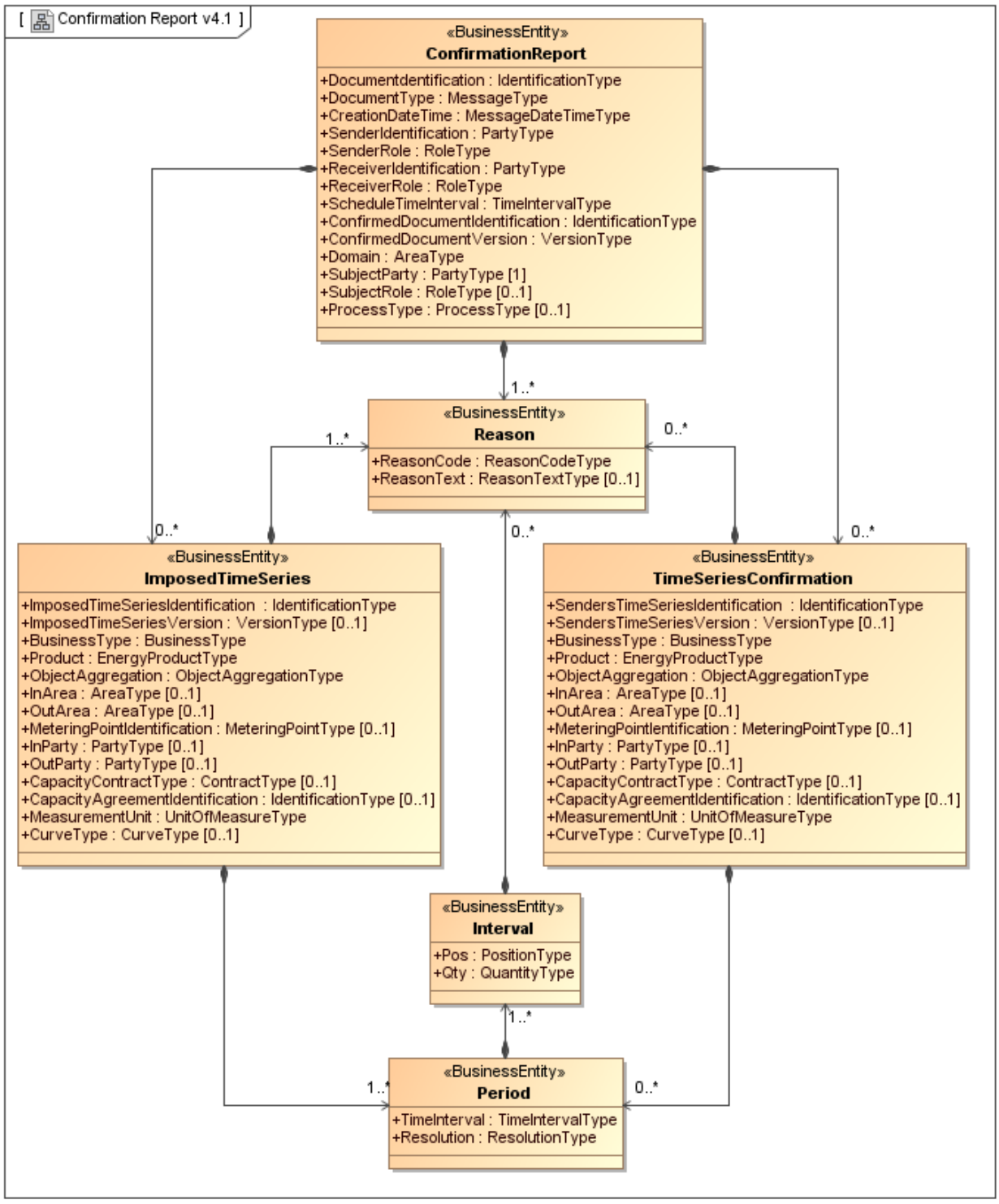

Figure 7: Class diagram: ESS Confirmation Report

2.3.2 Class diagram: CIM ESS Confirmation Report Contextual Model

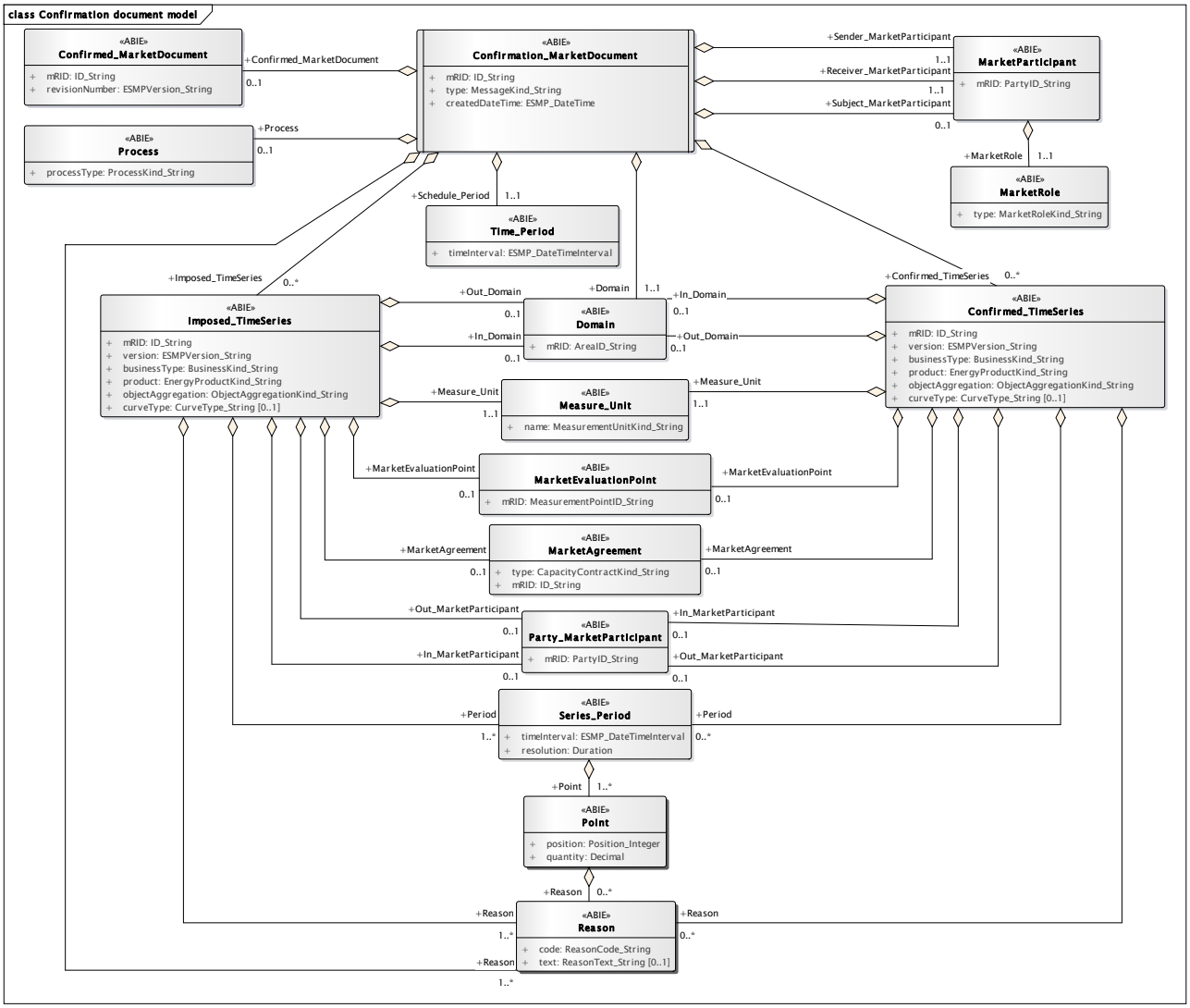

Figure 8: Class diagram: CIM ESS Confirmation Report Contextual Model

2.3.3 Class diagram: CIM ESS Confirmation Report Assembly Model

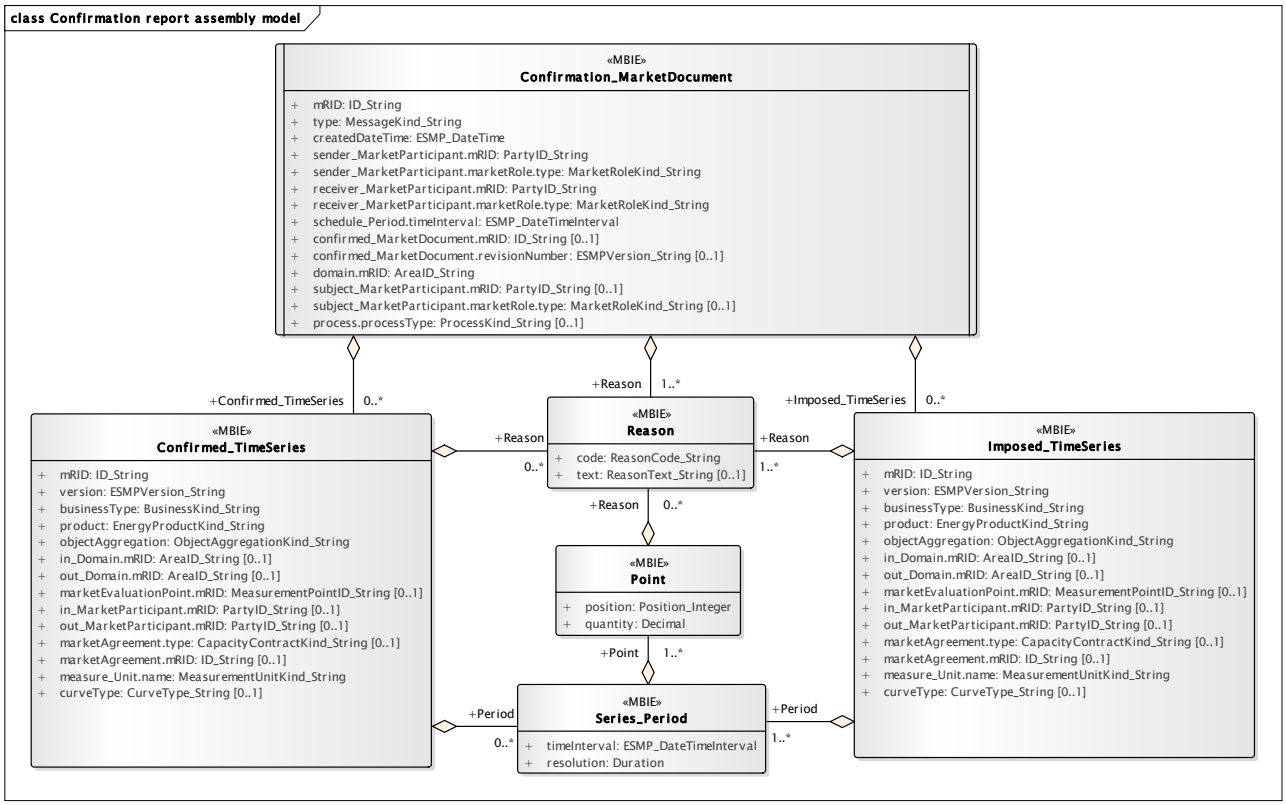

Figure 9: Class diagram: CIM ESS Confirmation Report Assembly Model

2.3.4 Mapping: ESS Confirmation Report

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1]	***Confirmation_MarketDocument (ENTSO-E IG: Confirmation Report)***
Document Identification	mRID	[1]	***CIM:*** The identification of the nature of process that the document addresses. --- The process defined in the document being confirmed. ***NBS BRS and BRS for Scheduling:*** Unique identification of the document
Document Type	type	[1]	***CIM:*** The coded type of a document. The document type describes the principal characteristic of the document. ***NBS BRS and BRS for Scheduling:*** **A07** Intermediate confirmation report **A08** Final confirmation report
Creation Date Time	createdDateTime	[1]	***CIM:*** The date and time of the creation of the document. ***NBS BRS and BRS for Scheduling:*** Date and time for creation of the document
Sender Identification	sender_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document owner. ***NBS BRS and BRS for Scheduling:*** Identification of the party who is sending the document
Sender Role	sender_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document owner. --- The role associated with a MarketParticipant. ***NBS BRS:*** **A05** Imbalance Settlement Responsible ***BRS for Scheduling:*** **A04** System Operator
Receiver Identification	receiver_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document recipient. ***NBS BRS and BRS for Scheduling:*** Identification of the party who is receiving the schedules

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Receiver Role	receiver_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document recipient. --- The role associated with a MarketParticipant. ***NBS BRS and BRS for Scheduling:*** **A08** Balance Responsible party
Schedule Time Interval	schedule_Period.timeInterval	[1]	***CIM:*** The start and end date and time for a given interval. --- This information provides the beginning date and time and the ending date and time of the schedule period for which the confirmation report is being generated. The time interval that is associated with an electronic document and which is valid for the whole document. ***NBS BRS and BRS for Scheduling:*** The beginning and ending date and time of the period covered by the document containing the schedule
Confirmed Document Identification	confirmed_MarketDocument.mRID	[0..1]	***CIM:*** The unique identification of the document being exchanged within a business process flow. --- The information about the document being confirmed. ***NBS BRS:*** N/A ***BRS for Scheduling:*** The identification of the original document containing the confirmed time series Not used for imposed time series
Confirmed Document Version	confirmed_MarketDocument.mRID	[0..1]	***CIM:*** The unique identification of the document being exchanged within a business process flow. --- The information about the document being confirmed. ***NBS BRS:*** N/A ***BRS for Scheduling:*** The version of the original document containing the confirmed time series Not used for imposed time series

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Domain	domain.mRID	[1]	***CIM:*** The unique identification of the domain. --- The identification of the domain that is covered in the document being confirmed. The Domain associated with an electronic document header. ***NBS BRS:*** Identification of the area covered by the document, i.e. **10Y1001A1001A91G** (Nordic market area) ***BRS for Scheduling:*** The identical value from the referenced document, e.g.: Market Balance Area, National area or Nordic Market Area (10Y1001A1001A91G), etc.
Subject Party	subject_MarketParticipant.mRID	[0..1]	***CIM:*** The identification of a party in the energy market. --- The party that is the subject within the document being confirmed. ***NBS BRS and BRS for Scheduling:*** N/A
Subject Role	subject_MarketParticipant.marketRole.type	[0..1]	***CIM:*** The identification of the role played by a market player. --- The party that is the subject within the document being confirmed. --- The role associated with a MarketParticipant. ***NBS BRS and BRS for Scheduling:*** N/A
Process Type	process.processType	[1]	***CIM:*** The identification of the nature of process that the document addresses. --- The process defined in the document being confirmed. ***NBS BRS:*** **Z05** Bilateral trade ***BRS for Scheduling:*** **A01** Day ahead (Sweden and Denmark) **A17** Schedule day (Sweden) **A18** Intraday total (Denmark)

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1..*]	**Confirmation Report level** ***Reason*** ***(ENTSO-E IG: Reason)***
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***NBS BRS:*** **A06** Schedule accepted **A07** Schedule partially accepted ***A06*** is used when there are no changes to a received time series, while ***A07*** is used when there are changes to a received schedule or when sending imposed time series to the counterparty ***BRS for Scheduling:*** **A06** Schedule accepted **A07** Schedule partially accepted **A08** Schedule rejected
Reason Text	text	[0..1]	***CIM:*** The textual explanation corresponding to the reason code.
		[0..*]	***Time Series Confirmation*** ***(ENTSO-E IG: Confirmed_TimeSeries)***
Senders Time Series Identification	mRID	[1]	***CIM:*** A unique identification of the time series. ***NBS BRS:*** Sender's identification of the time series instance (the same as in the referenced ESS Schedule Document) **Note:** The maximum length of the ID is 35 characters. **Note:** The confirmation report contains two time series for each trade (one with the quantity to be used in the settlement, and another with the delta value). Both time series reference the same time series from the ESS schedule document, hence the Original Time Series ID (Senders Time Series Identification) will be the same. ***BRS for Scheduling:*** Sender's identification of the time series instance
Senders Time Series Version	version	[1]	***CIM:*** The identification of the version of the time series. ***NBS BRS:*** Fixed 1 ***BRS for Scheduling:*** Sender's version of the time series instance – The same as in the referenced document

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Business Type	businessType	[1]	***CIM:*** The identification of the nature of the time series. ***NBS BRS:*** **A08** Net internal trade (Within a Market balance area) (Net internal trade - where the direction from out party (seller) to in party (buyer) is positive and the opposite direction is negative (with minus signs)). **Z64** Internal trade difference, within a Market balance area, i.e. the difference between trades reported from an out party (seller) and an in party (buyer). The internal trade difference is the delta value between what is reported by the two Balance Responsible Parties. ***BRS for Scheduling:*** **A01** Production **A02** Internal trade (used for reporting from Market Operator) **A06** External trade without explicit capacity **A08** Net internal trade *Definition:* Net internal trade - where the direction from out party (seller) to in party (buyer) is positive and the opposite direction is negative (with minus signs) **A19** Balance energy deviation **A24** Total trade **A79** Production, non-dispatchable (Used in DK) **A80** Consumption, non-dispatchable (Used in DK)
Product	product	[1]	***CIM:*** The identification of the nature of an energyproduct such as power, energy, reactive power, etc. ***NBS BRS and BRS for Scheduling:*** **8716867000030** Active energy
Object Aggregation	objectAggregation	[1]	***CIM:*** The identification of the domain that is the common denominator used to aggregate a time series. ***NBS BRS:*** **A01** Area ***BRS for Scheduling:*** **A03** Party

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
In Area	in_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The identification of the in area of the time series that has been confirmed by the system operator with the coding scheme used in the original transmission. The domain associated with a TimeSeries. ***NBS BRS:*** The Market Balance Area where the trade has taken place. ***BRS for Scheduling:*** Market Balance Area – usage described in dependency matrix
Out Area	out_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The identification of the out area of the time series that has been confirmed by the system operator with the coding scheme used in the original transmission. The domain associated with a TimeSeries. ***NBS BRS:*** The same Market Balance Area as defined in In Area, i.e. where the trade has taken place. ***BRS for Scheduling:*** Market Balance Area – usage described in dependency matrix
Metering Point Identification	marketEvaluationPoint.mRID	[0..1]	***CIM:*** A unique identification of the measurement point. --- The identification of the location where one or more products are metered of the time series that has been confirmed by the system operator with the coding scheme used and sub-value if it was in the original transmission. The identification of a measurement point associated with a TimeSeries. ***NBS BRS and BRS for Scheduling:*** N/A
In Party	in_MarketParticipant.mRID	[0..1]	***CIM:*** The identification of a party in the energy market. --- The identification of the party, which is putting the product into the area, of the time series that has been confirmed by the system operator with the coding scheme used in the original transmission. The identification of a market participant associated with a TimeSeries. ***NBS BRS:*** The Balance Responsible Party acting as the buyer in the bilateral trade. ***BRS for Scheduling:*** Balance Responsible party – usage described in dependency matrix

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Out Party	out_MarketParticipant.mRID	[0..1]	***CIM:*** PartyID_String ***NBS BRS:*** The Balance Responsible Party acting as the seller in the bilateral trade. ***BRS for Scheduling:*** Balance Responsible party – usage described in dependency matrix
Capacity Contract Type	marketAgreement.mRID	[0..1]	***CIM:*** The unique identification of the agreement. --- This information identifies the capacity agreement made between the parties for the sale or purchase of capacity. It corresponds to the information that has been confirmed by the system operator. The identification of an agreement associated with a time series. ***NBS BRS and BRS for Scheduling:*** N/A
Capacity Agreement Identification	marketAgreement.type	[0..1]	***CIM:*** The specification of the kind of the agreement, e.g. long term, daily contract. --- This information identifies the capacity agreement made between the parties for the sale or purchase of capacity. It corresponds to the information that has been confirmed by the system operator. The identification of an agreement associated with a time series. ***NBS BRS:*** N/A ***BRS for Scheduling:*** (Bilateral Trade ID) an ID, only used when reporting trade on a Balance Supplier (Retailer) level, identifying the two involved Balance Suppliers and the related Market Balance Area. The Bilateral Trade ID will be unique in combination with In Party, Out Party and MBA.
Measurement Unit	measure_Unit.name	[1]	***CIM:*** The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measure that is applied to the quantities in which the confirmed time series is expressed. The unit of measure associated with the quantities in a TimeSeries. ***NBS BRS and BRS for Scheduling:*** **MWH** MWh or **KWH** kWh

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Curve Type	curveType		***CIM:*** The identification of the coded representation of the type of curve being described. ***NBS BRS and BRS for Scheduling:*** N/A
		[0..1]	**Time Series Confirmation level** ***Reason*** ***(ENTSO-E IG: Reason)***
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***NBS BRS:*** **A85** Confirmation without adjustment (time series have been matched without change) **A86** Confirmation with adjustment (time series have been modified) ***BRS for Scheduling:*** *Only used in Denmark*: **A09** Time series not matching **A20** Time Series fully rejected **A63** Time Series modified
Reason Text	text	[0..1]	***CIM:*** The textual explanation corresponding to the reason code. ***NBS BRS and BRS for Scheduling:*** N/A
		[0..*]	***Imposed time series*** ***(ENTSO-E IG: Imposed_TimeSeries)***
Imposed Time Series Identification	mRID	[1]	***CIM:*** A unique identification of the time series. ***NBS BRS:*** Unique identification of the Time Series (unique over time for the sender in question (eSett)) **Note:** The maximum length of the ID is 35 characters. ***BRS for Scheduling:*** Identification of the original time series that is imposed, if existing. If no Time Series Identification available, the ID is given by the System operator
Imposed Time Series Version	version	[1]	***CIM:*** The identification of the version of the time series. ***NBS BRS:*** Fixed 1 ***BRS for Scheduling:*** Identification of the original time series version that is imposed, if existing. If no Time Series Version is available, the Version is given by the System operator (Fixed 1)

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Business Type	businessType	[1]	***CIM:*** The identification of the nature of the time series. ***NBS BRS:*** **A08** Net internal trade (Within a Market balance area) (Net internal trade - where the direction from out party (seller) to in party (buyer) is positive and the opposite direction is negative (with minus signs)). **Z64** Internal trade difference, within a Market balance area, i.e. the difference between trades reported from an out party (seller) and an in party (buyer). The internal trade difference is the delta value between what is reported by the two Balance Responsible Parties. ***BRS for Scheduling:*** **A01** Production **A77** Production, dispatchable (Used in DK) **A04** Consumption **A78** Consumption, dispatchable (Used in DK) **A06** External trade without explicit capacity **A08** Net internal trade **A24** Total trade **A19** Balance energy deviation **A79** Production, non-dispatchable (Used in DK) **A80** Consumption, non-dispatchable (Used in DK)
Product	product	[1]	***CIM:*** The identification of the nature of an energy product such as power, energy, reactive power, etc. ***NBS BRS and BRS for Scheduling:*** **8716867000030** Active energy
Object Aggregation	objectAggregation	[1]	***CIM:*** The identification of the domain that is the common dominator used to aggregate a time series. ***NBS BRS:*** **A01** Area ***BRS for Scheduling:*** **A03** Party

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
In Area	in_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The identification of the in area of the time series that has been imposed by the system operator with the coding scheme used in the original transmission. The domain associated with a TimeSeries. ***NBS BRS:*** The Market Balance Area where the trade has taken place. ***BRS for Scheduling:*** Market Balance Area – Usage described in dependency table
Out Area	out_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The identification of the out area of the time series that has been imposed by the system operator with the coding scheme used in the original transmission. The domain associated with a TimeSeries. ***NBS BRS:*** The same Market Balance Area as defined in In Area, i.e. where the trade has taken place. ***BRS for Scheduling:*** Market Balance Area – Usage described in dependency table
Metering Point Identification	marketEvaluationPoint.mRID		***CIM:*** A unique identification of the measurement point. --- The identification of the location where one or more products are metered of the time series that has been imposed by the system operator with the coding scheme used and sub-value if it was in the original transmission. The identification of a measurement point associated with a TimeSeries. ***NBS BRS and BRS for Scheduling:*** N/A

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
In Party	in_MarketParticipant.mRID	[0..1]	***CIM:*** The identification of a party in the energy market. --- The identification of the party, which is putting the product into the area, of the time series that has been imposed by the system operator with the coding scheme used in the original transmission. The identification of a market participant associated with a TimeSeries. ***NBS BRS:*** For Business type **A08**: The Balance Responsible Party acting as the buyer in the bilateral trade. For business type **Z64** (delta value): The Balance Responsible Party having to buy energy to get the trade in balance ***BRS for Scheduling:*** Balance Responsible party – Usage described in dependency table
Out Party	out_MarketParticipant.mRID	[0..1]	***CIM:*** The identification of a party in the energy market. --- The identification of the party, which is taking the product out of the area, of the time series that has been imposed by the system operator with the coding scheme used if it was in the original transmission. The identification of a market participant associated with a TimeSeries. ***NBS BRS:*** For Business type **A08**: The Balance Responsible Party acting as the seller in the bilateral trade. For business type **Z64** (delta value): The Balance Responsible Party having to sell energy to get the trade in balance ***BRS for Scheduling:*** Balance Responsible party – Usage described in dependency table
Capacity Contract Type	marketAgreement.type		***CIM:*** The specification of the kind of the agreement, e.g. long term, daily contract. --- This information identifies the capacity agreement made between the parties for the sale or purchase of capacity. It corresponds to the information that has been confirmed by the system operator. The identification of an agreement associated with a time series. ***NBS BRS and BRS for Scheduling:*** N/A

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Capacity Agreement Identification	marketAgreement.mRID		***CIM:*** The unique identification of the agreement. --- This information identifies the capacity agreement made between the parties for the sale or purchase of capacity. It corresponds to the information that has been confirmed by the system operator. The identification of an agreement associated with a time series. ***NBS BRS:*** (Bilateral Trade ID) an ID, only used when reporting trade on a Balance Supplier (Retailer) level, identifying the two involved Balance Suppliers and the related Market Balance Area. The Bilateral Trade ID will be unique in combination with In Party, Out Party and MBA. The Bilateral Trade ID (Capacity Agreement Identification) is metadata for trade on supplier level. The BRP sends bilateral trade with InParty = BRP1 and OutParty = BRP2. If the trade is between two suppliers, then the Bilateral Trade ID is added to the message. The Bilateral Trade ID is generated by eSett when the BRP enters (structures) which trade relations (on a supplier level) this has balance responsibility for. The suppliers can then be identified by the Bilateral Trade ID. ***BRS for Scheduling:*** N/A
Measurement Unit	measure_Unit.name	[1]	***CIM:*** The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measure that is applied to the quantities in which the confirmed time series is expressed. The unit of measure associated with the quantities in a TimeSeries. ***NBS BRS and BRS for Scheduling:*** **MWH** MWh or **KWH** kWh
Curve Type	curveType		***CIM:*** The identification of the coded representation of the type of curve being described. ***NBS BRS and BRS for Scheduling:*** N/A

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1..*]	**Imposed time series level** ***Reason*** ***(ENTSO-E IG: Reason)***
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***NBS BRS:*** **A30** Imposed Time series from nominated party's time series ***BRS for Scheduling:*** **A27** Cross border capacity exceeded **A28** Counterpart time series missing **A29** Counterpart time series quantity differences *Only used in Denmark:* **A30** Imposed Time series from nominated party's time series
Reason Text	text	[0..1]	***CIM:*** The textual explanation corresponding to the reason code. ***NBS BRS and BRS for Scheduling:*** N/A
		[1..*]	***Period*** ***(ENTSO-E IG: Series_Period)***
Time Interval	timeInterval	[1]	***CIM:*** The start and end time of the period. ***NBS BRS and BRS for Scheduling:*** The start and end date and time of the time interval of the period in question
Resolution	resolution	[1]	***CIM:*** The definition of the number of units of time that compose an individual step within a period. ***NBS BRS and BRS for Scheduling:*** The resolution defining the number of periods that the time interval is divided. The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g. **PT1H** or **PT60M**

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1..*]	***Interval*** ***(ENTSO-E IG: Series_Period)***
Pos	position	[1]	***CIM:*** A sequential value representing the relative position within a given time interval. ***NBS BRS:*** The relative position of a period within a time interval **Note:** There can be gaps in the sequence of the Position element, i.e. to be able to confirm only single hours of a day. ***BRS for Scheduling:*** The position of the observation within the time series
Qty	quantity	[1]	***CIM:*** The principal quantity identified for a point. ***NBS BRS:*** The quantity of the product for the position within the time interval in question. The direction from out party (seller) to in party (buyer) is positive, while the opposite direction is negative (with minus signs)) Rules regarding the delta value: • The delta value is defined as: Δ= Value $_{\text{BRP sale}}$ – Value $_{\text{BRP purchase}}$ • The latest received value from a party is used in the calculation of the delta value. • If a value is received from only one of the parties in a trade, the delta value is zero. • There are no delta values in the final confirmation report The resolution is maximum in Watt, i.e. max 3 decimals for kWh and max 6 decimals for MWh ***BRS for Scheduling:*** The quantity of the product for the position within the time interval in question
		[0..1]	**Interval level** ***Reason*** ***(ENTSO-E IG: Reason)***

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***NBS BRS:*** **A43** Quantity increased **A44** Quantity decreased ***BRS for Scheduling:*** *Only used in Denmark* **A43** Quantity increased **A44** Quantity decreased
Reason Text	text	[0..1]	***CIM:*** The textual explanation corresponding to the reason code. ***NBS BRS and BRS for Scheduling:*** N/A

2.4 ECAN Publication document

The *ECAN Publication document* is used for summaries from all markets within the Nordic trading system. The document is based on the *Publication Document* from the ENTSO-E ECAN IG, see [1].

2.4.1 Class diagram: ENTSO-E ECAN Publication document version 5.0

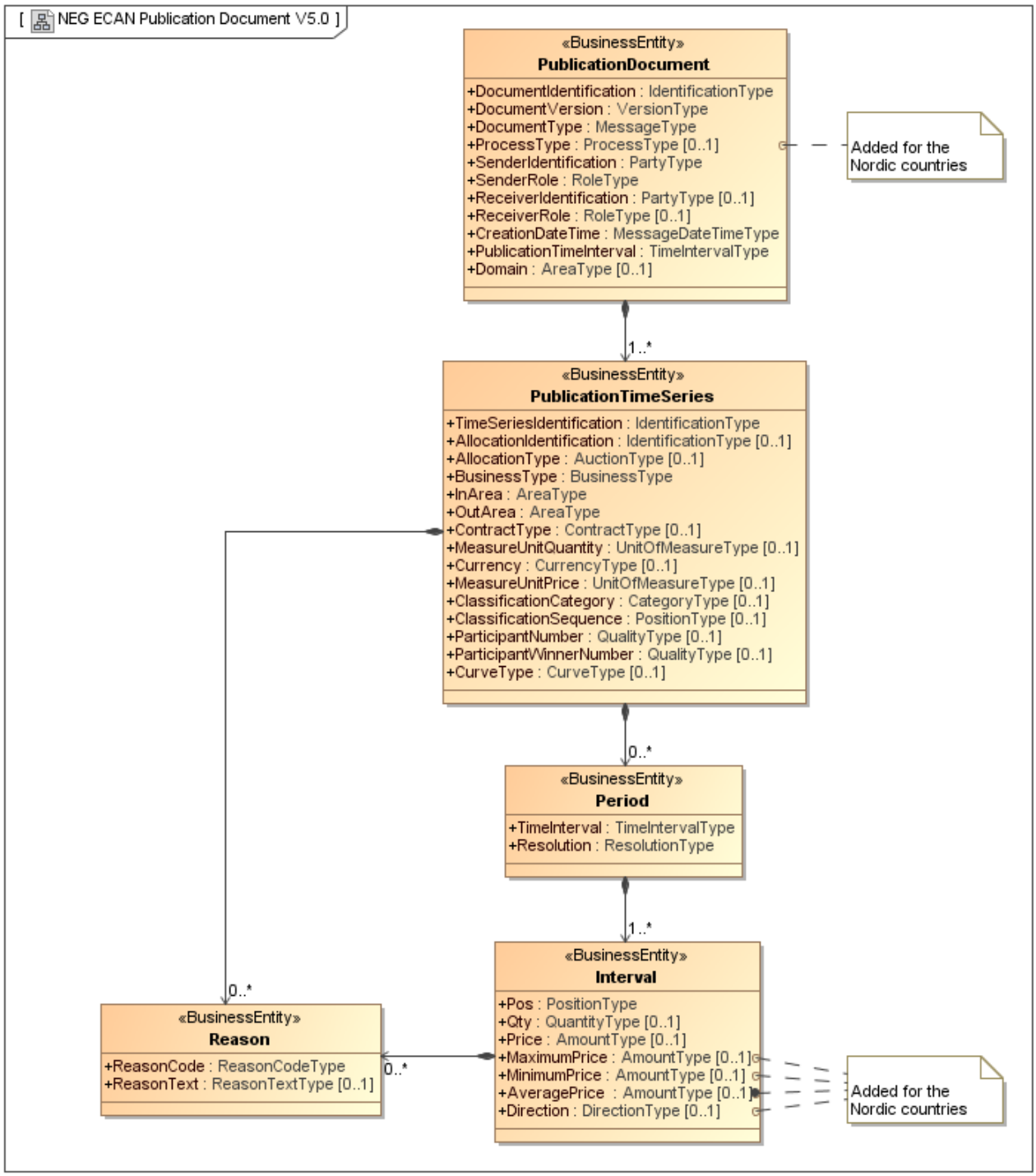

Figure 10: Class diagram: ECAN Publication document version 5.0

2.4.2 Class diagram: CIM ECAN Publication Document Contextual Model

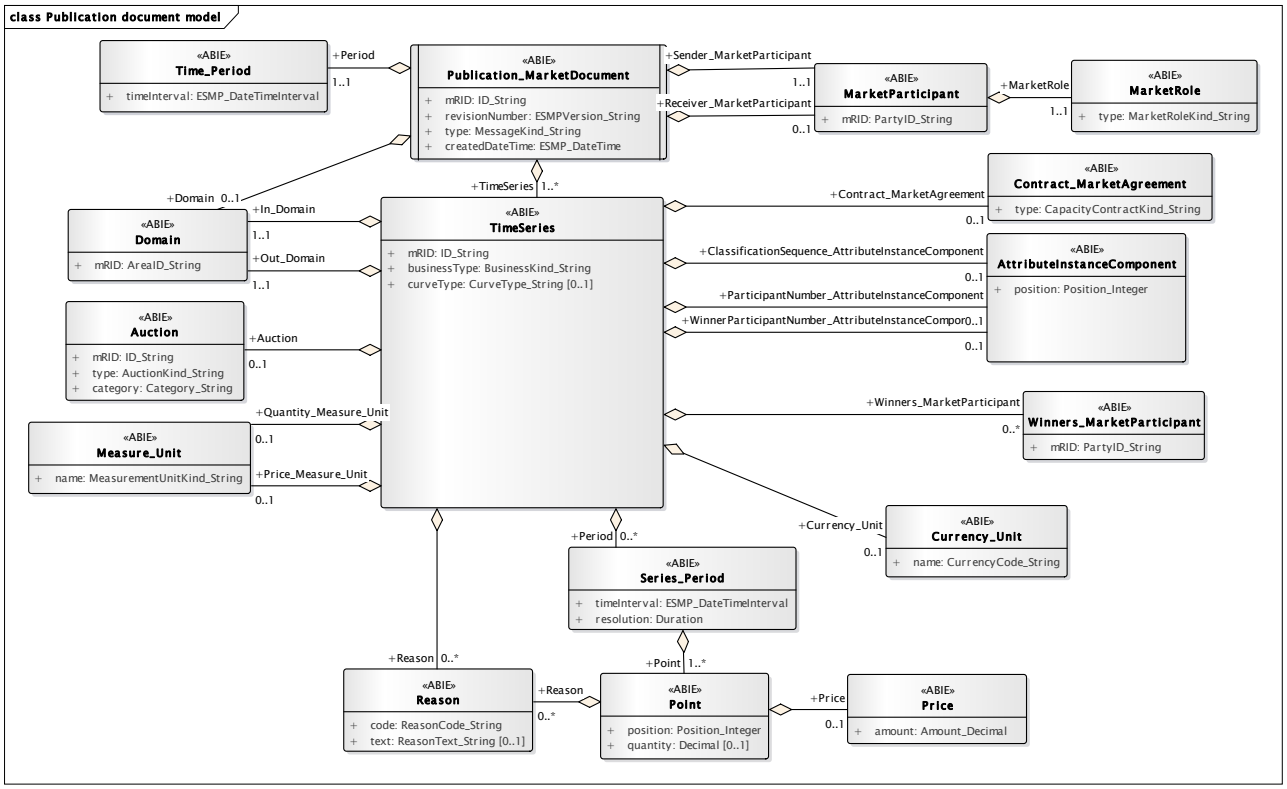

Figure 11: Class diagram: CIM ECAN Publication document Contextual Model

2.4.3 Class diagram: CIM ECAN Publication Document Assembly Model

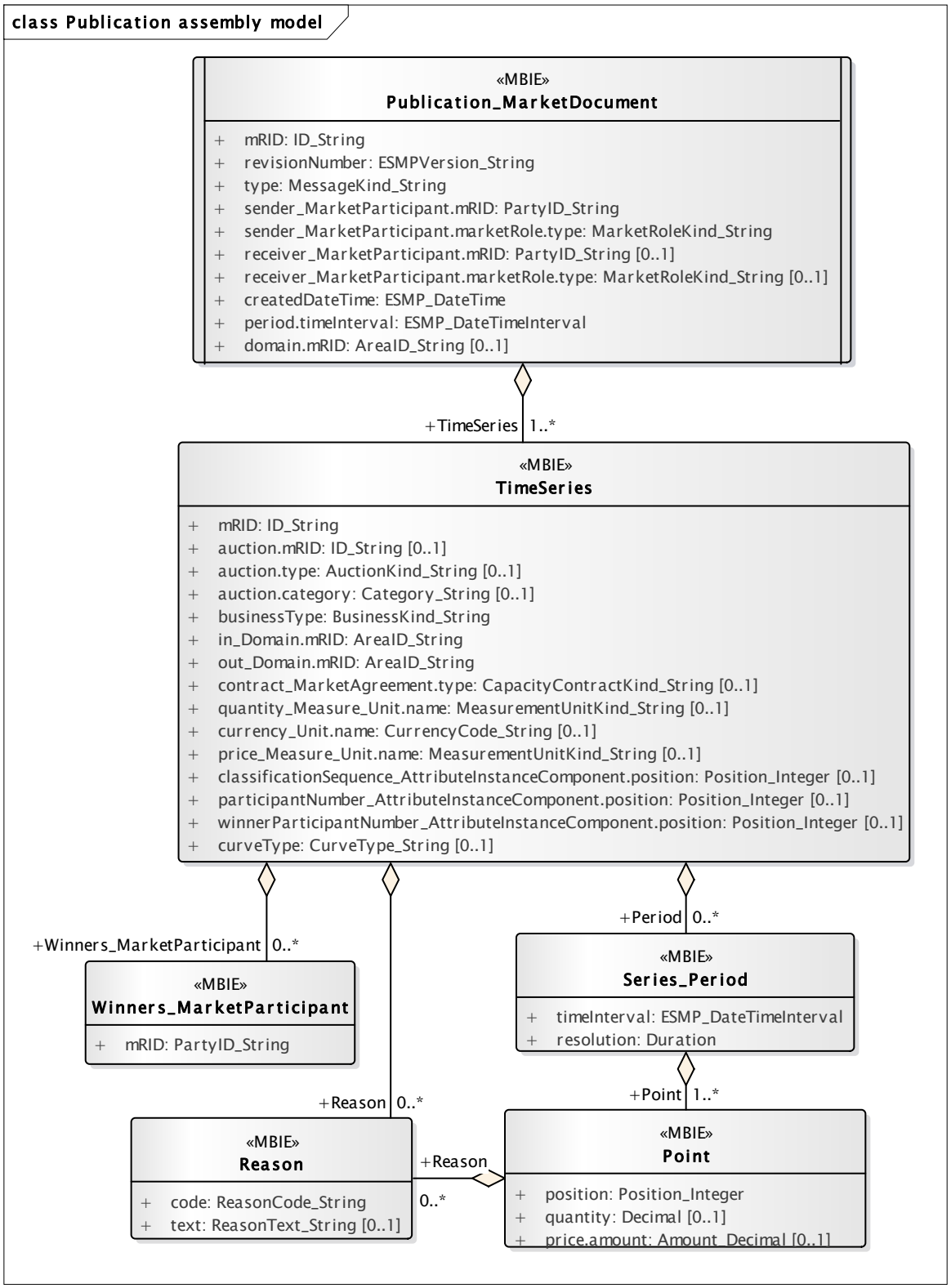

Figure 12: Class diagram: CIM ECAN Publication Document Assembly Model

2.4.4 Mapping: ECAN Publication document

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1]	***Publication_MarketDocument*** ***(ENTSO-E IG: Publication Document)***
Document Identification	mRID	[1]	***CIM:*** The unique identification of the document being exchanged within a business process flow. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** Unique identification of the document
Document Version	revisionNumber	[1]	***CIM:*** The identification of the version that distinguishes one evolution of a document from another. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** Fixed 1
Document Type	type	[1]	***CIM:*** The coded type of a document. The document type describes the principal characteristic of the document. ***BRS for NBS for TSO/Market Operator:*** **A44** Price document ***BRS for Trade:*** **A25** Allocation result
Process Type	N/A	[1]	***CIM:*** N/A ***BRS for NBS for TSO/Market Operator:*** **A01** Day-ahead **A30** Tertiary reserves process ***BRS for Trade:*** **A01** Day-ahead **A17** Schedule day - The process concerns the day ahead, intraday and eventually ex-post scheduling in a single document. The schedule will be transferred within the total position including historic information (The trade balance of a party at a given time) **A19** Intraday accumulated **A28** Primary reserve process, i.e. Frequency activated reserves market **A29** Secondary reserve process, i.e. FRR-A market **Z04** Reserve option market (Nordic code) **Z05** Bilateral trade (Nordic code)
Sender Identification	sender_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document owner. ***BRS for NBS for TSO/Market Operator:*** Identification of the party who is sending the document
Sender Role	sender_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document owner. ***BRS for NBS for TSO/Market Operator:*** **A04** System Operator **A11** Market Operator ***BRS for Trade:*** **A11** Market operator (or TSO)

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Receiver Identification	receiver_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document recipient. ***BRS for NBS for TSO/*Market Operator*:*** Identification of the party who is receiving the schedules, i.e. TSO (System Operator)
Receiver Role	receiver_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document recipient. ***BRS for NBS for TSO/*Market Operator*:*** **A05** Imbalance Settlement Responsible ***BRS for Trade:*** **A04** System operator **A08** Balance responsible party **A11** Market operator (NOIS) **Z05** Trader (non-balance responsible party)
Creation Date Time	createdDateTime	[1]	***CIM:*** The date and time of the creation of the document. ***BRS for NBS for TSO/*Market Operator*:*** The date and time that the message was prepared for transmission by the application of the sender ***BRS for Trade:*** Date and time for creation of the document
Publication Time Interval	period.timeInterval	[1]	***CIM:*** The start and end date and time for a given interval. --- The beginning and ending date and time of the period that the publication document is covering. ***BRS for NBS for TSO/*Market Operator*:*** The beginning and ending date and time of the period covered by the document.
Domain	domain.mRID	[1]	***CIM:*** The unique identification of the domain. --- The identification of the domain that is covered in the schedule document. It is in general the market balance area that is the subject of the schedule plan. ***BRS for NBS for TSO/*Market Operator*:*** Identification of the area covered by the document, i.e. **10Y1001A1001A91G** (Nordic market area) ***BRS for Trade:*** Nordic area, National Area, Market Balance Area.

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1..*]	***TimeSeries*** ***(ENTSO-E IG: Publication Time Series)***
Senders Time Series Identification	mRID	[1]	***CIM:*** A unique identification of the time series. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** Unique identification of the Time Series (unique over time for the sender in question)
N/A	auction.mRID	[0..1]	***CIM:*** The unique identification of the auction. --- A unique identification of the set of specifications that clearly defines the allocation process to which the time series is addressed. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** N/A
N/A	auction.type	[0..1]	***CIM:*** The kind of the auction (e.g. implicit, explicit, ...). --- A unique identification of the set of specifications that clearly defines the allocation process to which the time series is addressed. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** N/A
N/A	auction.category	[0..1]	***CIM:*** The product category of an auction. --- A unique identification of the set of specifications that clearly defines the allocation process to which the time series is addressed. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** N/A
Business Type	businessType	[1]	***CIM:*** The identification of the nature of the time series. ***BRS for NBS for TSO/Market Operator:*** A62 Spot price **B20** Balance up regulation price **B21** Balance down regulation price **B22** Main direction (no price) **B23** Consumption imbalance price **B24** Production sales imbalance price **B25** Production purchase imbalance price **B26** MBAs prices between Market Balance Areas (inter-TSO exchange) ***BRS for Trade:*** **A01** Production **A04** Consumption **A06** External trade without explicit capacity **A08** Net internal trade (ENTSO-E definition: "Net internal trade - where the direction from out party (seller) to in party (buyer) is positive and the opposite direction is negative (with minus signs)") **A12** Secondary control (A time series concerning secondary reserve) (**FRR-A,** earlier **LFC**) **A24** Total trade (ENTSO-E definition: "A time series concerning the total of both the internal and external trades) (Usage in Sweden: The trade balance of a party at a given time)

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
			A62 Spot Price **Z03** Frequency Containment Reserves, Normal (**FCR-N** earlier **FNR**) (Nordic code) **Z06** Frequency Containment Reserves, Disturbance (**FCR-D** earlier **FDR**) (Nordic code) **Z32** System price (including volume) (Nordic code)
In Area	in_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The area where the energy is to be put. ***BRS for NBS for TSO/Market Operator:*** Relevant Market Balance Area (MBA) for the market ***BRS for Trade:*** Relevant area for the market
Out Area	out_Domain.mRID	[0..1]	***CIM:*** The unique identification of the domain. --- The area where the energy is coming from. ***BRS for NBS for TSO/Market Operator:*** Same as In Area for all Business Types, except "**B26** MBAs prices between Market Balance Areas", where the second border-MBA is used ***BRS for Trade:*** The same area as "In-area" (Required in ECAN Publication Document)
Contract Type	contact_MarketAgreement.type	[1]	***CIM:*** The specification of the kind of the contract, e.g. long term, daily contract. --- The contract type defines the conditions under which the capacity was allocated and handled,e.g.: daily auction, weekly auction, monthly auction, yearly auction, long term contract, etc. The significance of this type is dependent on the in area and out area specific coded working methods. ***BRS for NBS for TSO/Market Operator:*** *N/A* ***BRS for Trade:*** **A01** Daily **A02** Weekly **A07** Intraday contract
Measure Unit Quantity	quantity_Measure_Unit.name	[0..1]	***CIM:*** The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measure in which the quantities in the time series are expressed., e.g. MAW. ***BRS for NBS for TSO/Market Operator:*** N/A ***BRS for Trade:*** **MWH** MWh Not used when only sending prices

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Currency	currency_Unit.name	[0..1]	***CIM:*** The identification of the formal code for a currency (ISO 4217). --- The currency in which the monetary amount is expressed. ***BRS for NBS for TSO/Market Operator:*** ISO three-digit currency code, e.g.: **DKK** Denmark, krone **EUR** European Union, Euro **NOK** Norway, krone **SEK** Sweden, krona ***BRS for Trade:*** Any valid ISO 3 letter currency code, such as: **DKK** Danish Kroner **EUR** EURO **LTL** Lithuanian Litas **NOK** Norwegian Kroner **RUB** Russian Ruble **SEK** Swedish Kronor
Measurement Unit Price	price_Measure_Unit.name	[0..1]	***CIM:*** The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measure in which the price in the time series is expressed per unit of currency (MW per unit, MWh per unit, etc.). ***BRS NBS for TSO/Market Operator and BRS for Trade:*** **MWH** MWh
N/A	classificationSequence_AttributeInstanceComponent.position	[0..1]	***CIM:*** A sequential value representing a relative sequence number. --- The sequence of a time series within a given auction category and contract type. A classification sequence is only provided in the case where there are several auctions in the same category and contract type. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** N/A
N/A	participantNumber_AttributeInstanceComponent.position	[0..1]	***CIM:*** A sequential value representing a relative sequence number. --- The number of parties that participated in the auction. It is only provided if the auction rules permit it. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** N/A
N/A	winnerParticipantNumber_AttributeInstanceComponent.position	[0..1]	***CIM:*** A sequential value representing a relative sequence number. --- The number of parties that had successful bids in the auction. This information is only provided if the auction rules permit it.. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** N/A

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
N/A	Curve.type	[0..1]	***CIM:*** The identification of the coded representation of the type of curve being described. ***BRS NBS for TSO/Market Operator and BRS for Trade:*** N/A
		[0..*]	***Series_Period*** ***(ENTSO-E IG: Period)***
Time Interval	timeInterval	[1]	***CIM:*** The start and end time of the period. ***BRS NBS for TSO/Market Operator:*** The start and end date and time of the time interval of the period in question ***BRS for Trade:*** Time Interval
Resolution	resolution	[1]	***CIM:*** The definition of the number of units of time that compose an individual step within a period. ***BRS NBS for TSO/Market Operator:*** The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. In NBS hourly resolution is used, i.e. **PT1H** or **PT60M** ***BRS for Trade:*** Resolution
		[1..*]	***Point*** ***(ENTSO-E IG: Interval)***
Pos	position	[1]	***CIM:*** A sequential value representing the relative position within a given time interval. ***BRS NBS for TSO/Market Operator:*** Position ***BRS for Trade:*** The relative position of a period within an interval
Qty	quantity	[0..1]	***CIM:*** The quantity auctioned for the interval in question. The principal quantity identified for a point. ***BRS NBS for TSO/Market Operator:*** N/A ***BRS for Trade:*** The quantity for the interval in question

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Price	price.amount	[0..1]	***CIM:*** A number of monetary units specified in a unit of currency. --- The price expressed per currency per unit of price measure. This information defines the price expressed in the unit of measurement of price per unit of quantity in compliance with the pricing scheme based on local market rules. A price may be negative in cases where it is providing the difference between in and out area market prices. The price is mandatory in the case of capacity auctions and must not be provided in the case of rule based allocations depending on local market rules. ***BRS NBS for TSO/Market Operator:*** Price ***BRS for Trade:*** The price expressed per currency per unit of price measure
Maximum Price	N/A	[1]	***CIM:*** N/A ***BRS NBS for TSO/Market Operator:*** N/A ***BRS for Trade:*** Maximum Price
Minimum Price	N/A	[1]	***CIM:*** N/A ***BRS NBS for TSO/Market Operator:*** N/A ***BRS for Trade:*** Minimum Price
Average Price	N/A	[1]	***CIM:*** N/A ***BRS NBS for TSO/Market Operator:*** N/A ***BRS for Trade:*** Average Price
Direction	N/A	[1]	***CIM:*** N/A ***BRS NBS for TSO/Market Operator:*** **A01** Up **A02** Down **A04** Stable Only used if Business Type is "***B22*** *Main direction*" ***BRS for Trade:*** N/A
		[0..*]	***Reason*** ***(ENTSO-E IG: Reason)***
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***BRS NBS for TSO/Market Operator:*** N/A ***BRS for Trade:*** N/A

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Reason Text	text	[0..1]	***CIM:*** The textual explanation corresponding to the reason code. ***BRS NBS for TSO/Market Operator:*** N/A ***BRS for Trade:*** N/A

Table 3: Mapping of ECAN Publication document

2.5 ECAN Capacity Document

The *Capacity Document* is a subset of the ENTSO-E ECAN Capacity Document and IEC Transmission capacity allocation business process, without any changes, see ENTSO-E ECAN IG [1] and IEC 62325 Framework for energy market communications, Part 451-3 Transmission capacity allocation business process (explicit or implicit auction) [2].

2.5.1 Class diagram: ENTSO-E ECAN Capacity Document version 6.0

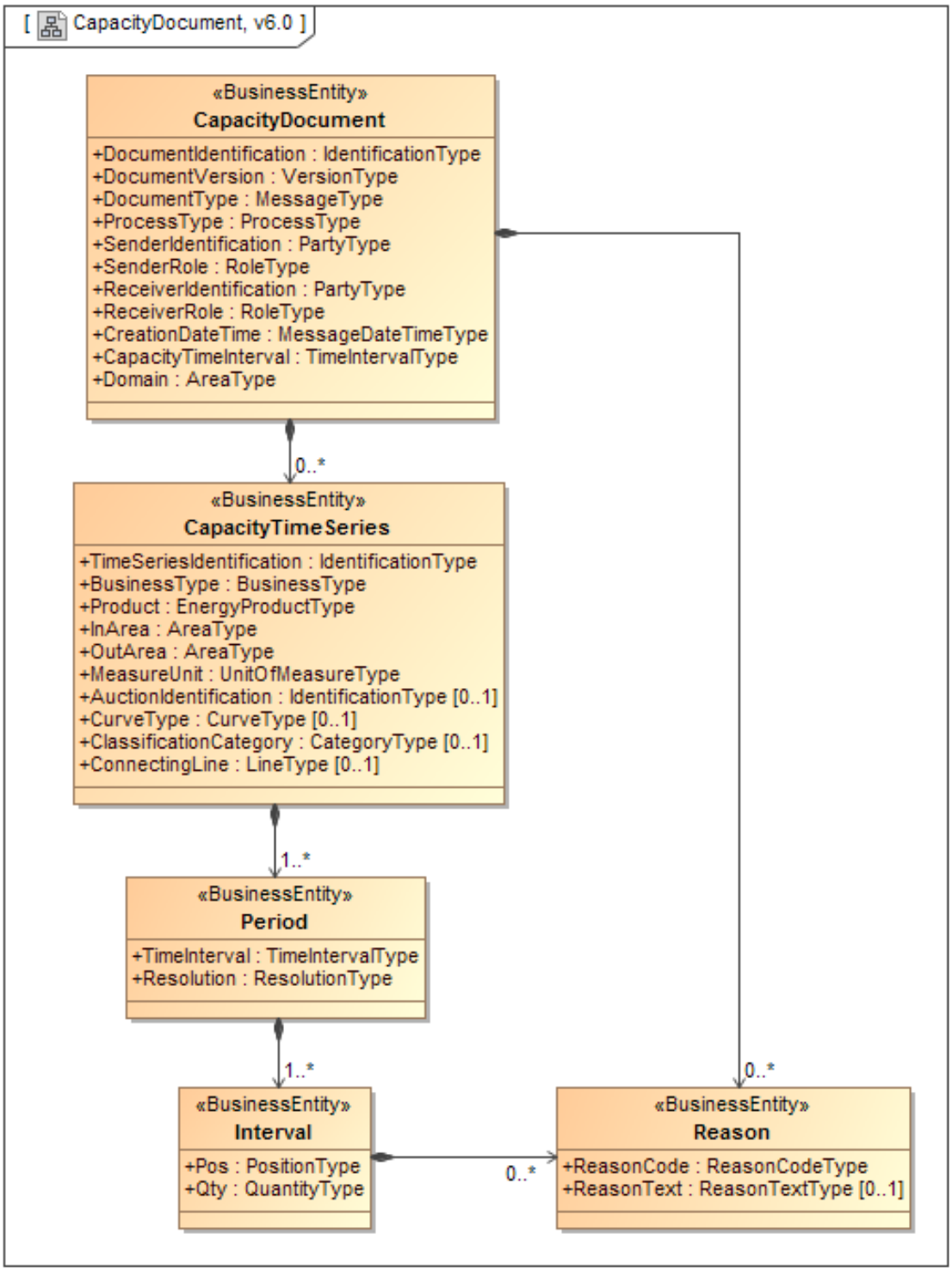

Figure 13: Class diagram: ECAN Capacity Document version 6.0

2.5.2 Class diagram: CIM Capacity Document Contextual Model

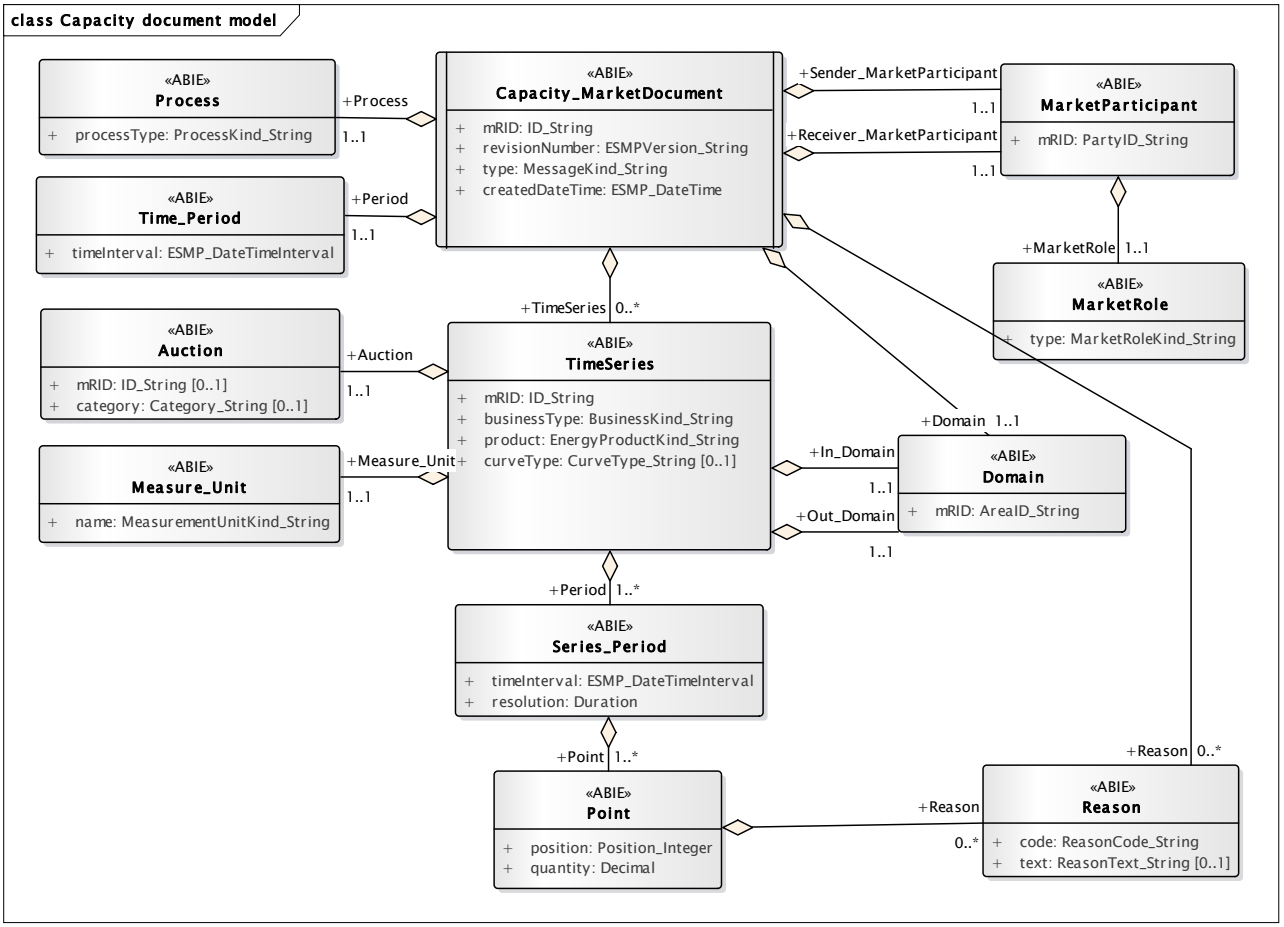

Figure 14: Class diagram: CIM Capacity Document Contextual Model

2.5.3 Class diagram: CIM Capacity Document Assembly Model

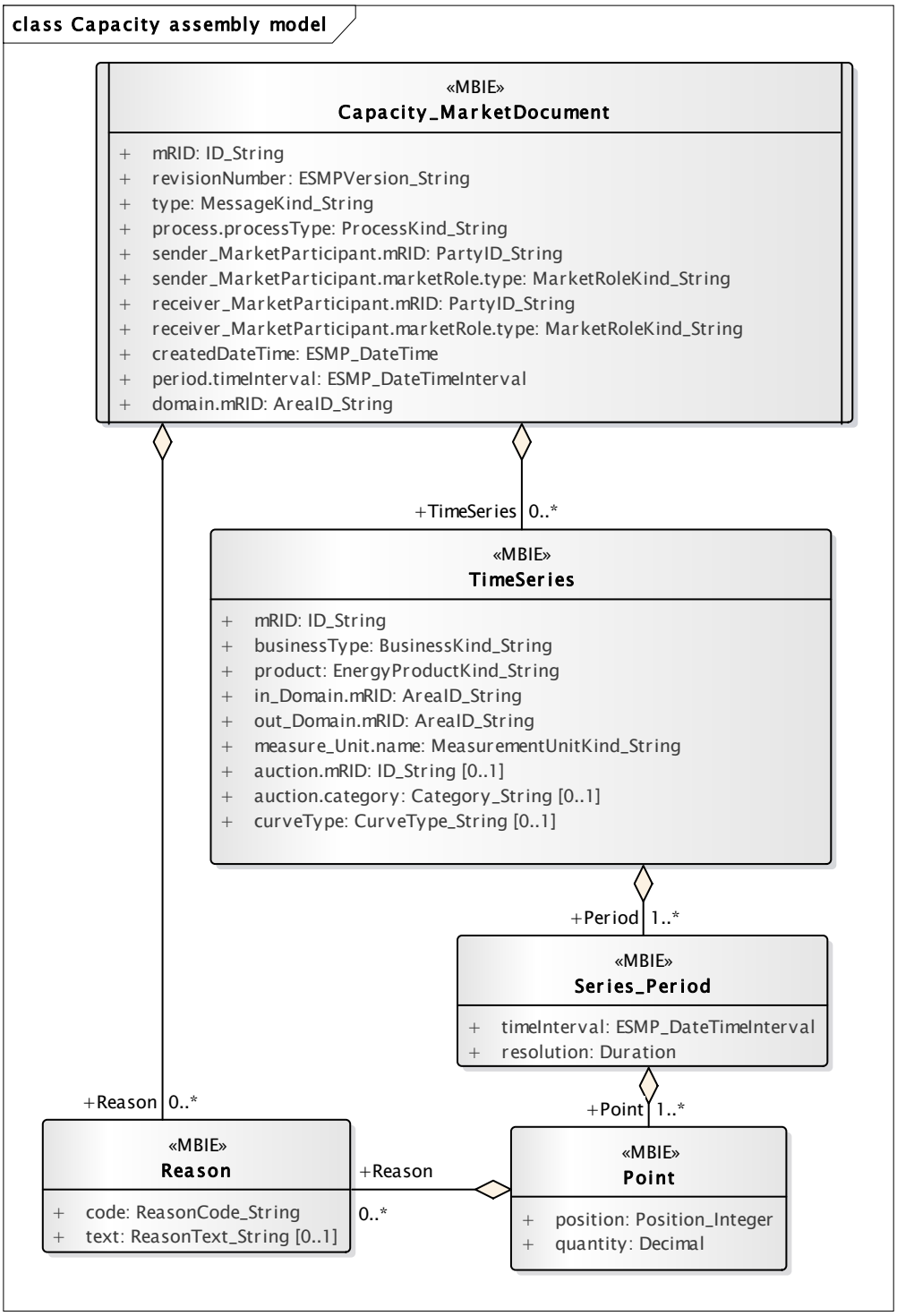

Figure 15: Class diagram: CIM Capacity Document Assembly Model

2.5.4 Mapping: ECAN/CIM Capacity Document

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1]	***Capacity_MarketDocument*** ***(ENTSO-E IG: Capacity Document)***
Document Identification	mRID	[1]	***CIM:*** The unique identification of the document being exchanged within a business process flow. ***BRS Determine Transfer Capacity:*** Unique identification of the document
Document Version	revisionNumber	[1]	***CIM:*** The identification of the version that distinguishes one evolution of a document from another. ***BRS Determine Transfer Capacity:*** Fixed 1
Document Type	type	[1]	***CIM:*** The coded type of a document. The document type describes the principal characteristic of the document. ***BRS Determine Transfer Capacity:*** **A13** Interconnection capacity **A31** Agreed capacity **A32** Proposed capacity
Process Type	N/A	[1]	***CIM:*** N/A ***BRS Determine Transfer Capacity:*** **A07** Capacity allocation **A15** Capacity determination **A40** Intraday process
Sender Identification	sender_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document owner. ***BRS Determine Transfer Capacity:*** Unique identification of the sender
Sender Role	sender_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document owner. ***BRS Determine Transfer Capacity:*** **A04** System Operator **A36** Capacity Coordinator
Receiver Identification	receiver_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document recipient. ***BRS Determine Transfer Capacity:*** Unique identification of the Receiver
Receiver Role	receiver_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document recipient. ***BRS Determine Transfer Capacity:*** **A04** System Operator **A07** Transmission Capacity Allocator **A36** Capacity Coordinator

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Creation Date Time	createdDateTime	[1]	***CIM:*** The date and time of the creation of the document. ***BRS Determine Transfer Capacity:*** The date and time that the message was prepared for transmission by the application of the sender.
Capacity Time Interval	period.timeInterval	[1]	***CIM:*** The start and end date and time for a given interval. --- The beginning and ending date and time of the perio d covered by the document. ***BRS Determine Transfer Capacity:*** The beginning and ending date and time of the period covered by the message capacity document.
Domain	domain.mRID	[1]	***CIM:*** The unique identification of the domain. --- The domain covered within the Capacity_MarketDocument. ***BRS Determine Transfer Capacity:*** Identification of the area covered by the document, e.g. Market balance area, National are or Nordic market area (10Y1001A1001A91G)
		[1..*]	***TimeSeries*** ***(ENTSO-E IG: Capacity Time Series)***
Time Series Identification	mRID	[1]	***CIM:*** A unique identification of the time series. ***BRS Determine Transfer Capacity:*** Unique identification of the Time Series (unique over time for the sender in question)
Business Type	businessType	[1]	***CIM:*** The identification of the nature of the time series. ***BRS Determine Transfer Capacity:*** **A31** Offered Capacity **A25** General capacity information **A26** Available Transfer Capacity (ATC) **A27** Net Transfer Capacity (NTC) **A29** Already Allocated Capacity (AAC) **A41** Released AAC **A81** Total Transfer Capacity (TTC)
Product	product	[1]	***CIM:*** The identification of the nature of an energy product such as power, energy, reactive power, etc. ***BRS Determine Transfer Capacity:*** **8716867000016** Active power
In Area	in_Domain.mRID	[1]	***CIM:*** The unique identification of the domain. --- The area where the energy is to be put. ***BRS Determine Transfer Capacity:*** Day-ahead or Cut area
Out Area	out_Domain.mRID	[1]	***CIM:*** The unique identification of the domain. --- The area where the energy is coming from. ***BRS Determine Transfer Capacity:*** Day-ahead or Cut area

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Measure Unit	measure_Unit.name	[1]	***CIM:*** The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measure in which the quantities in the time series are expressed., e.g. MAW. ***BRS Determine Transfer Capacity:*** **MAW** MW
Auction Identification	auction.mRID	[0..1]	***CIM:*** The unique identification of the auction. --- The identification of a set of specifications created by the auction operator. ***BRS Determine Transfer Capacity:*** Currently not used between the Nordic countries. Used between Nordic TSOs and other European TSOs (e.g. DK-DE). *From the ENTSO-E ECAN IG:* A unique identification of the set of specifications that clearly identify the auction to which the capacity is addressed.
Classification Category	auction.category	[0..1]	***CIM:*** The product category of an auction. --- The identification of a set of specifications created by the auction operator. ***BRS Determine Transfer Capacity:*** N/A
Curve Type	Curve.type	[0..1]	***CIM:*** The identification of the coded representation of the type of curve being described. ***BRS Determine Transfer Capacity:*** N/A
Connecting Line	connectingLine_RegisteredResource.mRID (added in IEC62325-451-3 Ed.2)	[0..1]	***CIM:*** The unique identification of a resource. --- The identification of a resource associated with a TimeSeries. The identification of a set of lines that connect two areas; the transmission capacity rights are related to this set of lines. ***BRS Determine Transfer Capacity:*** Day-ahead or Cut corridor
		[0..*]	***Series_Period*** ***(ENTSO-E IG: Period)***
Time Interval	timeInterval	[1]	***CIM:*** The start and end time of the period. ***BRS Determine Transfer Capacity:*** The start and end date and time of the time interval of the period in question.

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Resolution	resolution	[1]	***CIM:*** The definition of the number of units of time that compose an individual step within a period. ***BRS Determine Transfer Capacity:*** The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. E.g. **PT1H** or **PT60M**
		[1..*]	***Point*** ***(ENTSO-E IG: Interval)***
Pos	position	[1]	***CIM:*** A sequential value representing the relative position within a given time interval. ***BRS Determine Transfer Capacity:*** Position
Qty	quantity	[0..1]	***CIM:*** The principal quantity identified for a point. ***BRS Determine Transfer Capacity:*** Quantity *The quantity is always in MW without decimals*
		[0..*]	***Reason*** ***(ENTSO-E IG: Reason)***
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***BRS Determine Transfer Capacity:*** N/A
Reason Text	text	[0..1]	***CIM:*** The textual explanation corresponding to the reason code. ***BRS Determine Transfer Capacity:*** N/A

Table 4: Mapping of ECAN/CIM Capacity Document

2.6 ESP Energy Account Report

The ESP Energy Account Report Document (EAR) is sent from the Imbalance Settlement Responsible to the Balance Responsible Parties (BRP) to inform the BRPs of the result of the imbalance settlement. It is also sent from the Imbalance Settlement Responsible to the Metered Data Aggregator (DSO) to give the quality assurance of area balance (MGA imbalance) per MGA. The ENTSO-E ESP Energy Account Report Document is specified in the ENTSO-E Settlement Process (ESP) Implementation Guide [1], and the IEC version is specified in and IEC 62325 Framework for energy market communications, Part 451-4 Settlement and reconciliation business process [2].

2.6.1 Class diagram: ENTSO-E ESP Energy Account Report Document (EAR) version 1.2

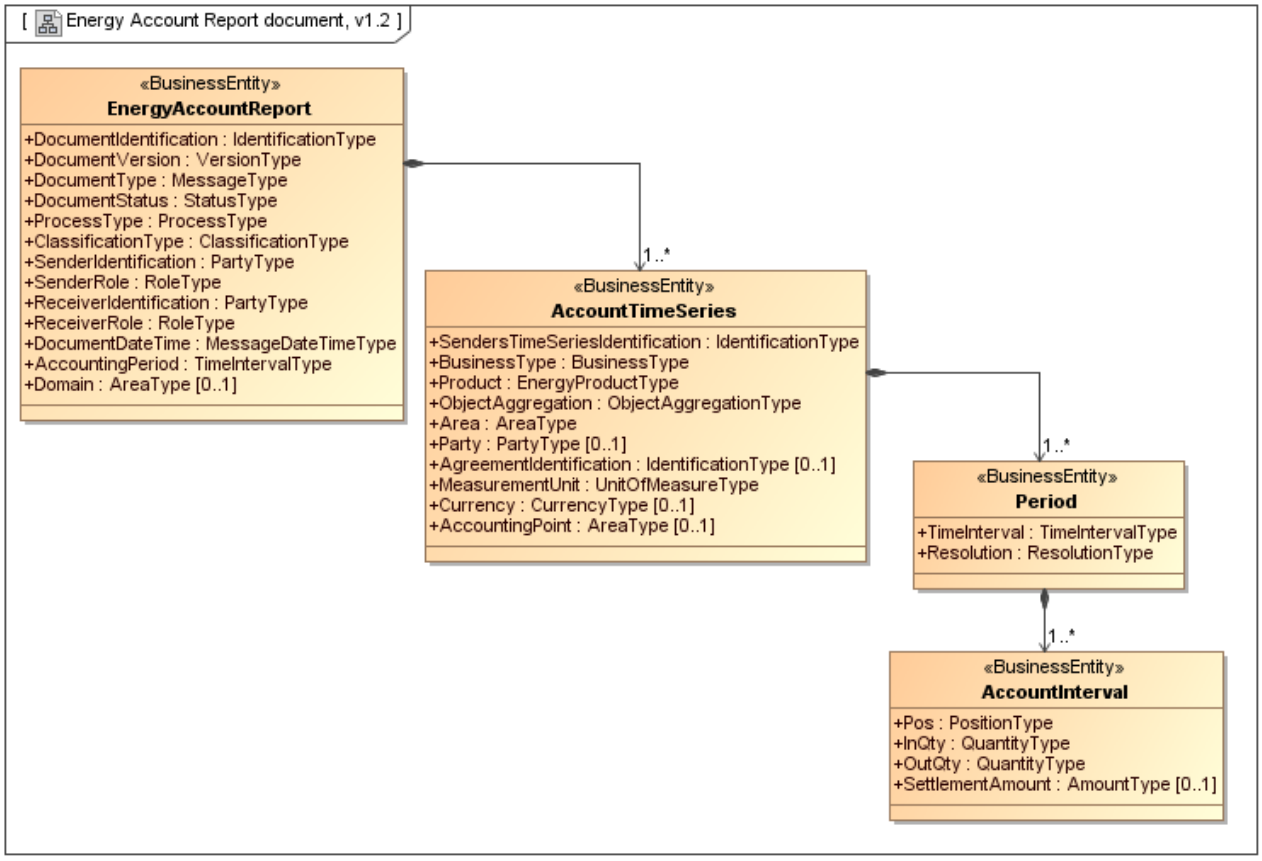

Figure 16: Class diagram: ENTSO-E ESP Energy Account Report Document (EAR) version 1.2

2.6.2 Class diagram: CIM Energy Account Document Contextual Model

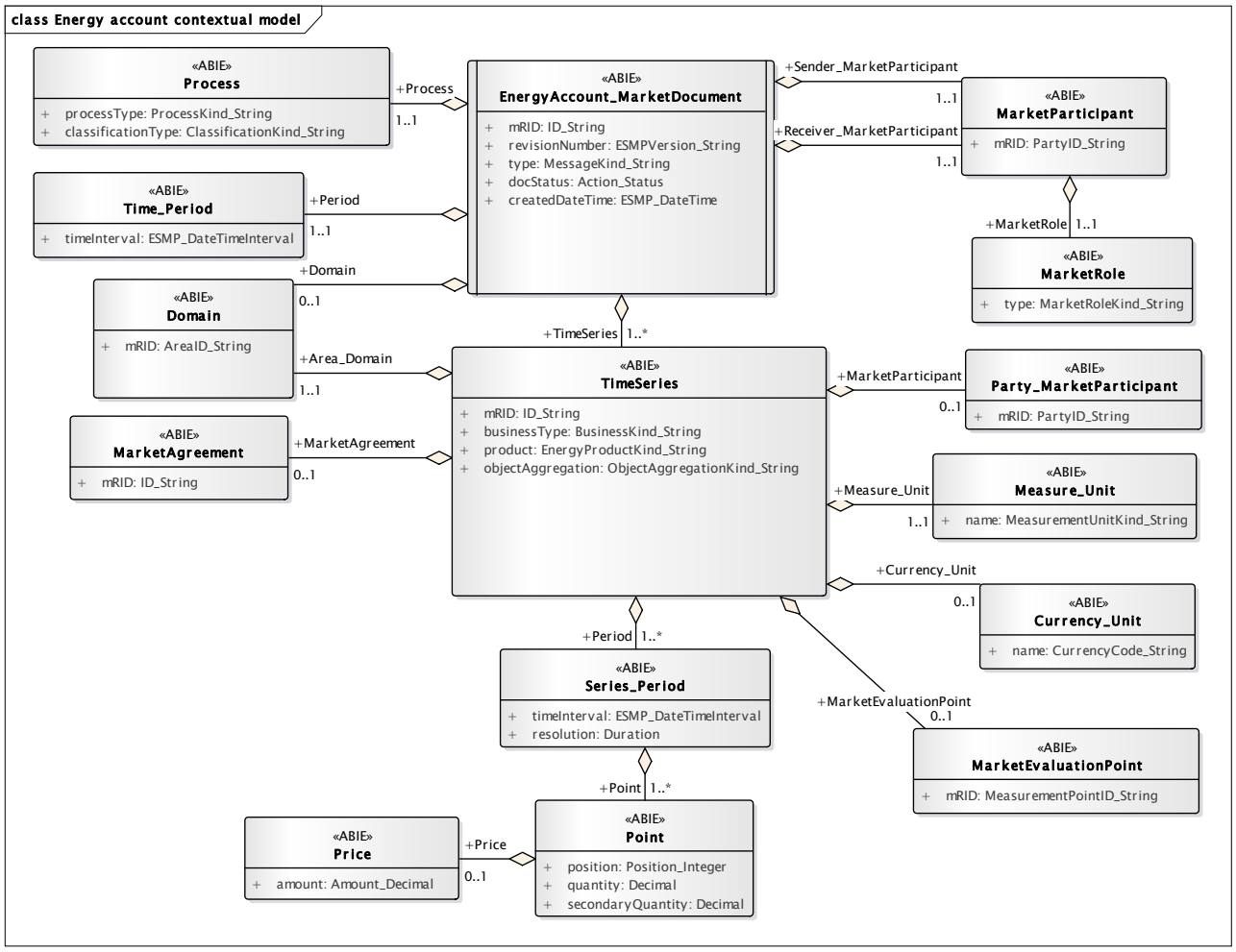

Figure 17: Class diagram: CIM Energy Account Document Contextual Model

2.6.3 Class diagram: CIM Energy Account Document Assembly Model

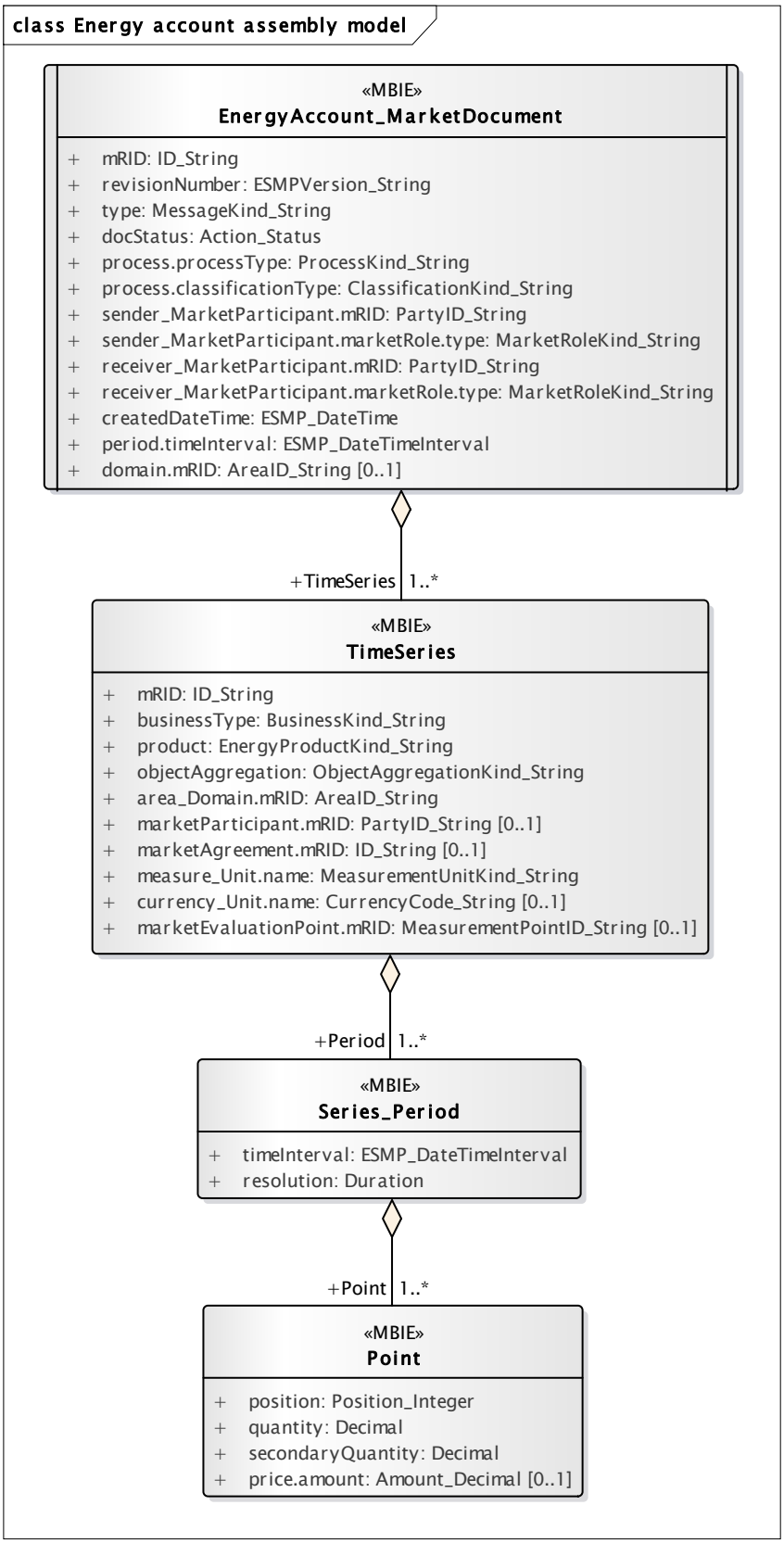

Figure 18: Class diagram: CIM Energy Account Document Assembly Model

2.6.4 Mapping: EAR/CIM Energy Account Document

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1]	***EnergyAccount_MarketDocument (ENTSO-E IG: Energy Account Report)***
Document Identification	mRID	[1]	***CIM:*** The unique identification of the document being exchanged within a business process flow. ***NBS BRS:*** Unique identification of the document **Note:** The maximum length of the ID is 35 characters.
Document Version	revisionNumber	[1]	***CIM:*** The identification of the version that distinguishes one evolution of a document from another. ***NBS BRS:*** Fixed 1
Document Type	type	[1]	***CIM:*** The coded type of a document. The document type describes the principal characteristic of the document. ***NBS BRS:*** **A12** Imbalance report
Document Status	docStatus	[1]	***CIM:*** The identification of the condition or position of the document with regard to its standing. ***NBS BRS:*** **A01** Intermediate **A02** Final
Process Type	process.processType	[1]	***CIM:*** The identification of the nature of process that the document addresses. ***NBS BRS:*** **A06** Imbalance settlement
Classification Type	process.classificationType	[1]	***CIM:*** The classification mechanism used to group a set of objects together within a business process. The grouping may be of a detailed or a summary nature. ***NBS BRS:*** **A02** Summary type
Sender Identification	sender_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document owner. ***NBS BRS:*** Unique identification of the sender
Sender Role	sender_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document owner. ***NBS BRS:*** **A05** Imbalance Settlement Responsible

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Receiver Identification	receiver_MarketParticipant.mRID	[1]	***CIM:*** The identification of a party in the energy market. --- Document recipient. ***NBS BRS:*** Unique identification of the Receiver
Receiver Role	receiver_MarketParticipant.marketRole.type	[1]	***CIM:*** The identification of the role played by a market player. --- Document recipient. ***NBS BRS:*** **A08** Balance Responsible Party **A09** Metered Data Aggregator
Creation Date Time	createdDateTime	[1]	***CIM:*** The date and time of the creation of the document. ***NBS BRS:*** The date and time that the message was prepared for transmission by the application of the sender.
Accounting period	period.timeInterval	[1]	***CIM:*** The start and end date and time for a given interval. --- This information provides the start and end date and time of the accounting period. The receiver shall completely reject documents with any time intervals outside the accounting period. ***NBS BRS:*** The beginning and ending date and time of the period covered.
Domain	domain.mRID	[1]	***CIM:*** The unique identification of the domain. --- The identification of the domain that is covered in the energy account report. This will frequently be the market balance area that is the subject of the report. However, other domains may also be used as defined by local market rules to enable the particular balancing markets to be identified. ***NBS BRS:*** Identification of the area covered by the document, i.e. **10Y1001A1001A91G** (Nordic market area)
		[1..*]	***TimeSeries*** ***(ENTSO-E IG: Account Time Series)***
Senders Time Series Identification	mRID	[1]	***CIM:*** A unique identification of the time series. ***NBS BRS:*** Unique identification of the Time Series (unique over time for the sender in question) **Note:** The maximum length of the ID is 35 characters.
Business Type	businessType	[1]	***CIM:*** The identification of the nature of the time series. ***NBS BRS:*** **B14** Production deviation **B15** Consumption deviation **B29** MGA imbalance

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
			All Business types are sent to the BRPs (if relevant). ***B29*** *MGA imbalance is in addition sent to the DSO (Metered Data Aggregator) in question*.
Product	product	[1]	***CIM:*** The identification of the nature of an energy product such as power, energy, reactive power, etc. ***NBS BRS:*** **8716867000030** Active energy
Object Aggregation	objectAggregation	[1]	***CIM:*** The identification of the domain that is the common denominator used to aggregate a time series. ***NBS BRS:*** **A01** Area
Area	area_Domain.mRID	[1]	***CIM:*** The unique identification of the domain. --- The area of concern for the imbalance settlement responsible that the time series addresses. ***NBS BRS:*** The Market Balance Area or Metering Grid Area to which the settlement result belongs
Party	marketParticipant.mRID	[0..1]	***CIM:*** The identification of a party in the energy market. --- The identification of the party of concern for the time series. ***NBS BRS:*** The Balance Responsible Party for which the imbalance settlement is calculated
Agreement Identifcation	marketAgreement.mRID	[0..1]	***CIM:*** The unique identification of the agreement. --- This provides the identification of the agreement, such as a capacity agreement, that is relative to the time series. ***NBS BRS:*** N/A
Measurement Unit	measure_Unit.name	[1]	***CIM:*** The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit if measurement is used for the quantities (quantity and secondaryQuantity attributes) expressed within the time series. ***NBS BRS:*** **KWH** kWh **MWH** MWh
Currency	currency_Unit.name	[0..1]	***CIM:*** A unique identification of the measurement point. --- The identification of the accounting point where the settlement information has been aggregated. ***NBS BRS:*** *ISO three digit currency code, e.g.:* **DKK** Denmark, krone **EUR** European Union, Euro **NOK** Norway, krone **SEK** Sweden, krona *Not used for Business type "**B29** = MGA imbalance"*

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Accounting Point	marketEvaluationPoint.mRID	[0..1]	***CIM:*** A unique identification of the measurement point. --- The identification of the accounting point where the settlement information has been aggregated. ***NBS BRS:*** N/A
		[0..*]	***Series_Period*** ***(ENTSO-E IG: Period)***
Time Interval	timeInterval	[1]	***CIM:*** The start and end time of the period. ***NBS BRS:*** The start and end date and time of the time interval of the period in question.
Resolution	resolution	[1]	***CIM:*** The definition of the number of units of time that compose an individual step within a period. ***NBS BRS:*** The resolution is expressed in compliance with ISO 8601 in the following format: PnYnMnDTnHnMnS. Where nY expresses a number of years, nM a number of months, nD a number of days. The letter "T" separates the date expression from the time expression and after it nH identifies a number of hours, nM a number of minutes and nS a number of seconds. In NBS hourly resolution is used, i.e. **PT1H** or **PT60M**
		[1..*]	***Point*** ***(ENTSO-E IG: Interval)***
Pos	position	[1]	***CIM:*** A sequential value representing the relative position within a given time interval. ***NBS BRS:*** Position
In Qty	quantity	[1]	***CIM:*** This quantity is also called the in quantity, i.e. the quantity of the product that enters the area (area_Domain.mRID) for the position within the account interval in question. The principal quantity identified for a point. ***NBS BRS:*** The quantity of the product that enters the area for the position within the account interval in question The resolution is maximum in Watt, i.e. max 3 decimals for kWh and max 6 decimals for MWh **NBS:** BRP selling quantity

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Out Qty	secondaryQuantity	[1]	***CIM:*** This quantity is also called the out quantity, i.e. the quantity of the product that leaves the area (area_Domain.mRID) for the position within the account interval in question. The secondary quantity identified for a point. ***NBS BRS:*** The quantity of the product that leaves the area. For the position within the account interval in question The resolution is maximum in Watt, i.e. max 3 decimals for kWh and max 6 decimals for MWh **NBS:** BRP buying quantity.
Settlement Amount	price.amount	[0..1]	***CIM:*** A number of monetary units specified in a unit of currency. --- The amount due for the account interval in question. This information defines the settlement amount taking into consideration the in and out quantities and the pricing scheme based on local market rules. A negative value indicates that the settlement amount is due by the party in question (party to be debited). If the amount is positive it is due by the imbalance settlement responsible (party to be credited). ***NBS BRS:*** The amount due for the account interval in question. This information defines the settlement amount taking into consideration the in and out quantities and the pricing scheme based on local market rules. A negative value indicates that the settlement amount is due by the party in question (party to be debited). If the amount is positive it is due by the imbalance settlement responsible (party to be credited). Not used for Business type "**B29 =** MGA imbalance"

Table 5: Mapping of ECAN/CIM Energy Account Document

2.7 Acknowledgement document

The Acknowledgement Document is described documented in the ENTSO-E Acknowledgement Document (EAD) Implementation Guide [1] and the IEC version is specified in IEC 62325 Framework for energy market communications, Part 451-1 1 Acknowledgement business process [2].

An Acknowledgement document, either Acknowledgement of receipt or Acknowledgement of processing, is sent to the originator of the business document to acknowledge receipt of the document identified in the acknowledgement document. For example, an Acknowledgement of processing may be sent to confirm reception of a schedule document immediately after a first level series of validations have been carried out. The originator of the acknowledgement document is the receiver of the document being acknowledged. The receiver of the acknowledgment document is the sender of the document being acknowledged.

2.7.1 Class diagram: ENTSO-E Acknowledgement Document (EAD) version 6.0

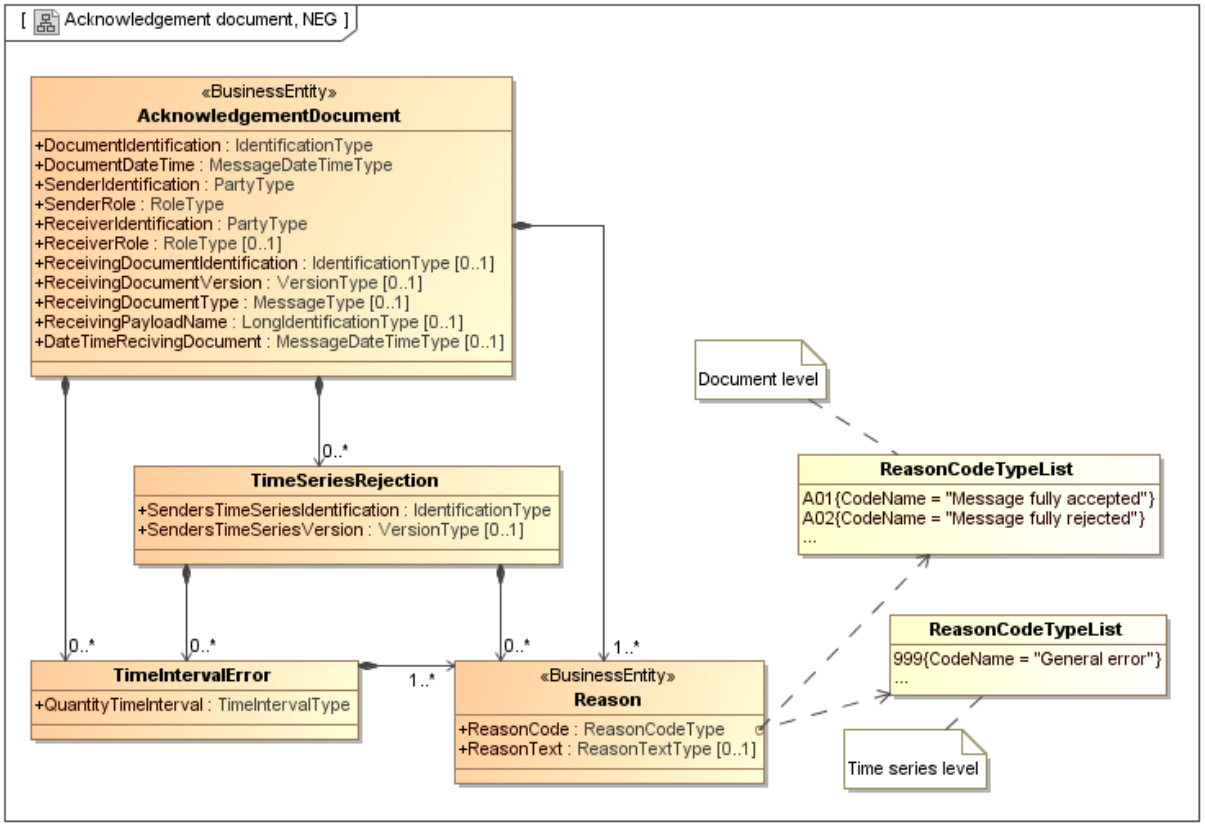

Figure 19: Class diagram: ENTSO-E Acknowledgement Document (EAD), version 6.0

2.7.2 Class diagram: CIM Acknowledgement Document Contextual Model

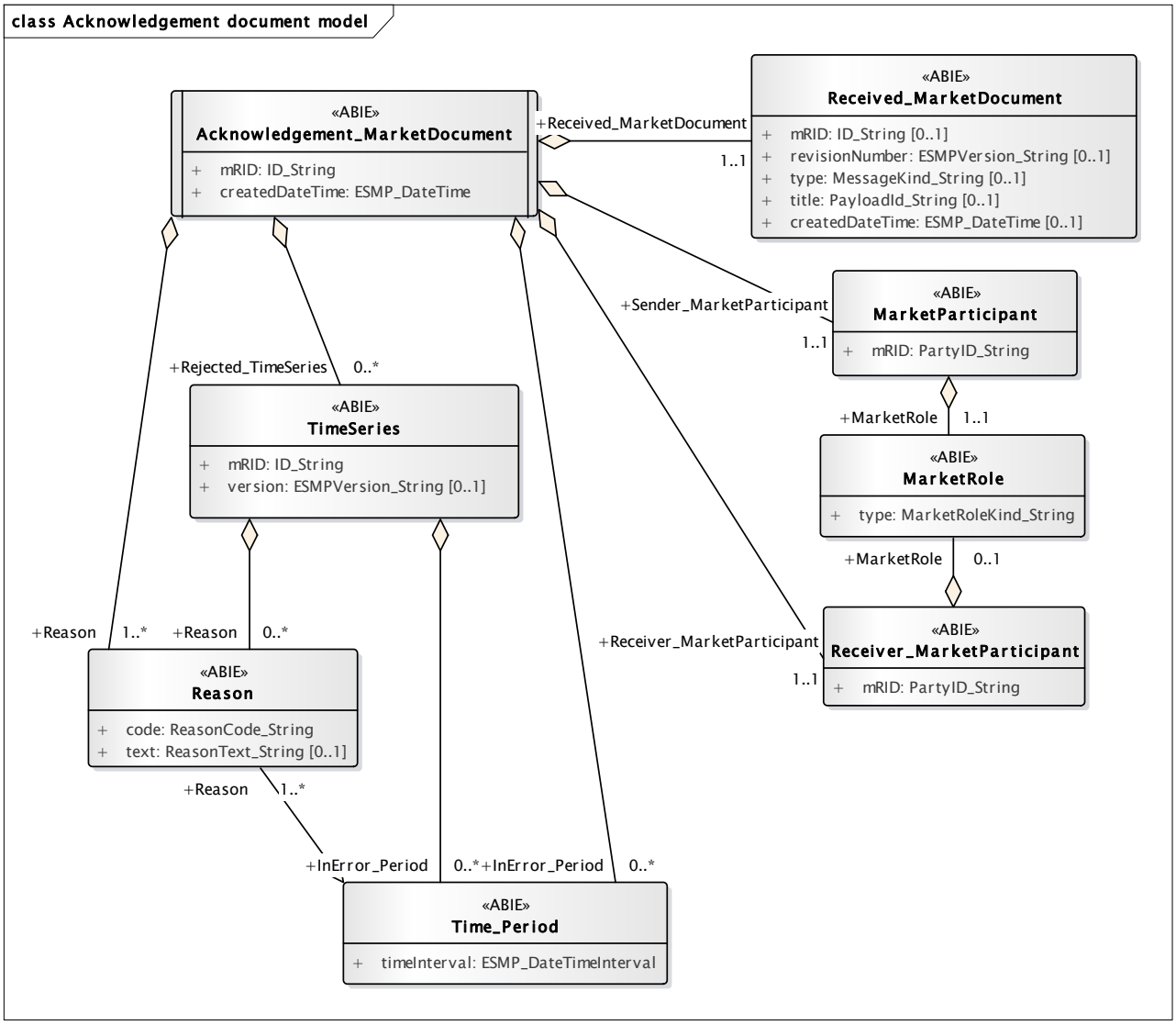

Figure 20: Class diagram: CIM Acknowledgement Document Contextual Model

2.7.3 Class diagram: CIM Acknowledgement Document Assembly Model

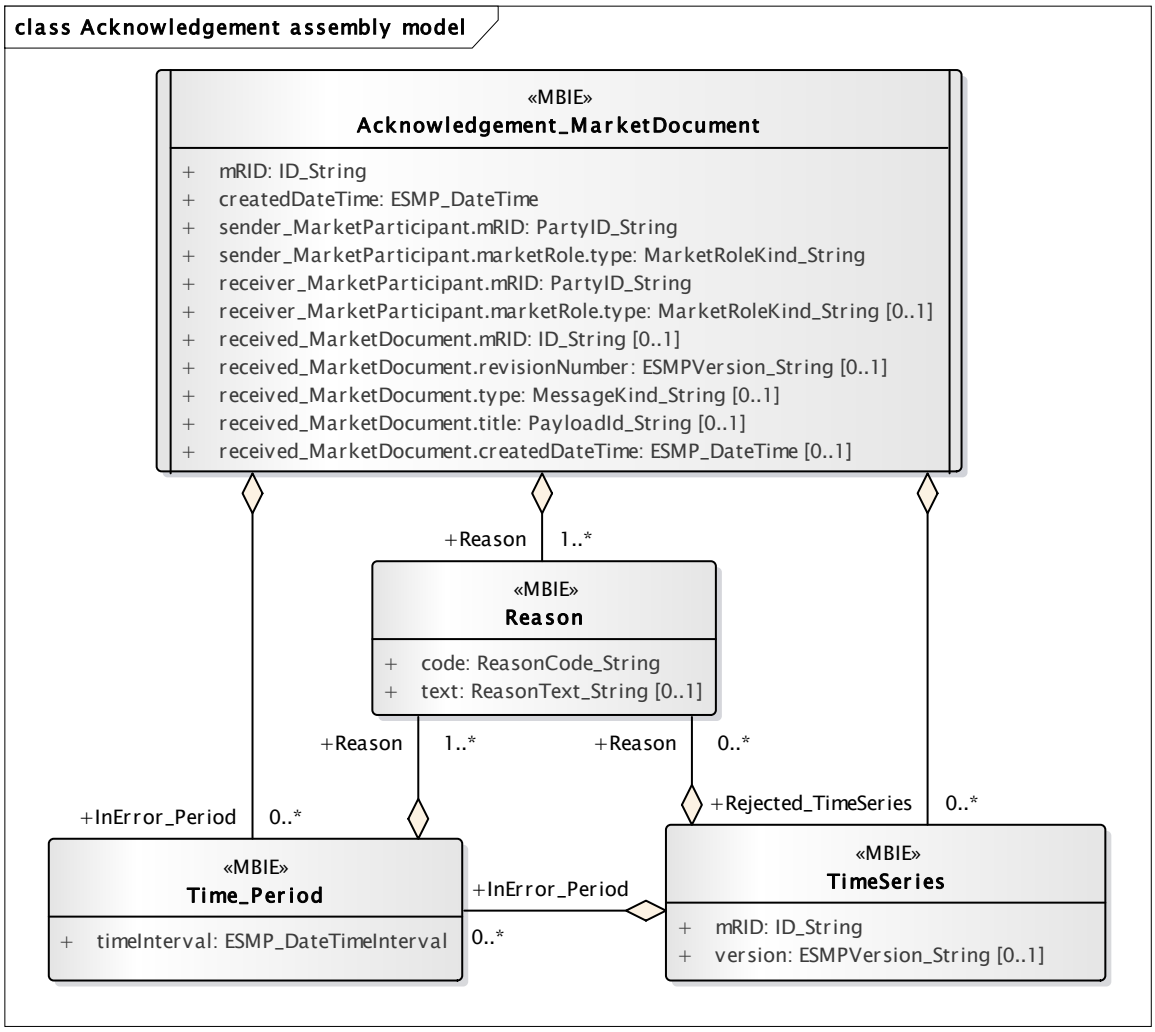

Figure 21: Class diagram: CIM Acknowledgement Document Assembly Model

2.7.4 Mapping: EAD/CIM Acknowledgement Document

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[1]	***Acknowledgement _MarketDocument (ENTSO-E IG: EAD Acknowledgement Document)***
Document Identification	mRID	[1]	***CIM:*** The unique identification of the document being exchanged within a business process flow. ***NEG Common rules and recommendations:*** Unique identification of the Acknowledgement Document
Document Date time	createdDateTime	[1]	***CIM:*** The date and time of the creation of the document. ***NEG Common rules and recommendations:*** Date and time of creation of the Acknowledgement Document

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Sender Identification	sender_MarketParticipant.mRID	[1]	***CIM:*** 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. ***NEG Common rules and recommendations:*** Unique identification of the sender of the Acknowledgement Document The Sender ID shall be the same as the Receiver ID in the original document that is acknowledged
Sender role	sender_MarketParticipant.marketRole.type	[1]	***CIM:*** 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. ***NEG Common rules and recommendations:*** The Role of the sender of the Acknowledgement Document The Sender Role shall be the same as the Receiver Role in the original document that is acknowledged.
Receiver Identification	receiver_MarketParticipant.mRID	[1]	***CIM:*** 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. ***NEG Common rules and recommendations:*** Unique identification of the receiver of the Acknowledgement Document The Receiver ID shall be the same as the Sender ID in the original document that is acknowledged

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Receiver role	receiver_MarketParticipant. marketRole.type	[0..1]	***CIM:*** 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. ***NEG Common rules and recommendations:*** The Role of the receiver of the Acknowledgement Document The Receiver Role shall be the same as the Sender Role in the original document that is acknowledged. For conversion between ebIX® and ENTSO-E Role Codes, see chapter 5.4.2 below. The Receiver role shall be used if available
Receiving Document Identification	received_MarketDocument. mRID	[0..1]	***CIM:*** 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. ***NEG Common rules and recommendations:*** Unique identification of the received business document.
Receiving Document Version	received_MarketDocument. revisionNumber	[0..1]	***CIM:*** 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. ***NEG Common rules and recommendations:*** The version of the received business document. **Note:** Only used if used in the original business document.
Receiving Document Type	received_MarketDocument. type	[0..1]	***CIM:*** 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. ***NEG Common rules and recommendations:*** The Document Type (Message type) of the received business document. **Note:** Shall be used if available, i.e. always in positive acknowledgements

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
Receiving Payload Name	received_MarketDocument.title	[0..1]	***CIM:*** 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. ***NEG Common rules and recommendations:*** N/A
Date Time Receiving Document	received_MarketDocument.createdDateTime	[0..1]	***CIM:*** 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. ***NEG Common rules and recommendations:*** N/A
		[0..*]	**Acknowledgement Document level** ***Reason*** ***(ENTSO-E IG: Reason)***
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***NEG Common rules and recommendations:*** **A01** Message fully accepted **A02** Message fully rejected
Reason Text	text	[0..1]	***CIM:*** The textual explanation corresponding to the reason code. ***NEG Common rules and recommendations:*** The *Reason Text* should be as detailed as possible, so that the recipient is able to understand why the business document have been rejected **Note:** Only used if not approved (**Reason Code ≠ A01**)
		[0..*]	***TimeSeries*** ***(ENTSO-E IG: EAD Time Series Rejection)***
Senders Time Series Identification	mRID	[1]	***CIM:*** A unique identification of the time series. ***NEG Common rules and recommendations:*** Unique identification of the Time Series (unique over time for the sender in question) **Note:** The maximum length of the ID is 35 characters.
Senders Time Series version	version	[0..1]	***CIM:*** The identification of the version of the time series. ***NEG Common rules and recommendations:*** Unique identification of the object, such as a *Time Series* or a *Transaction Id*

ENTSO-E Attribute	IEC CIM Attribute	Cl.	Code and description
		[0..*]	**TimeSeries/Time Series Rejection level** ***Reason*** ***(ENTSO-E IG: Reason)***
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***NEG Common rules and recommendations:*** **999** General error
Reason Text	text	[0..1]	***CIM:*** The textual explanation corresponding to the reason code. ***NEG Common rules and recommendations:*** The *Reason Text* should be as detailed as possible, i.e. the recipient is able to understand way the business document has been rejected
		[0..*]	***Time_Period*** ***(ENTSO-E IG: Time interval Error)***
Quantity Time Interval	timeInterval	[1]	***CIM:*** The start and end time of the period. ***NEG Common rules and recommendations:*** N/A
		[1..*]	**Time_Period level** ***Reason*** ***(ENTSO-E IG: Reason)***
Reason Code	code	[1]	***CIM:*** The motivation of an act in coded form. ***NEG Common rules and recommendations:*** N/A
Reason Text	text	[0..1]	***CIM:*** The textual explanation corresponding to the reason code. ***NEG Common rules and recommendations:*** N/A

Table 6: Mapping of ECAN/CIM Energy Account Document