



The ENTSO-E Transparency XML Schema use

2014-01-16

VERSION 1.0

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Revision History

Version	Release	Date	Paragraphs	Comments
1	0	2014-01-16		Initial version Approved by the Market Committee on 2014-02-04

64

65

REFERENCE DOCUMENTS

66

1. IEC 62325-301, Framework for energy market communications Common information model (CIM) Extensions for markets.

67

68

2. IEC 62325-351, Framework for energy market communications CIM European market model exchange profile.

69

70

3. IEC 62325-450, Profile and context modelling rules.

71

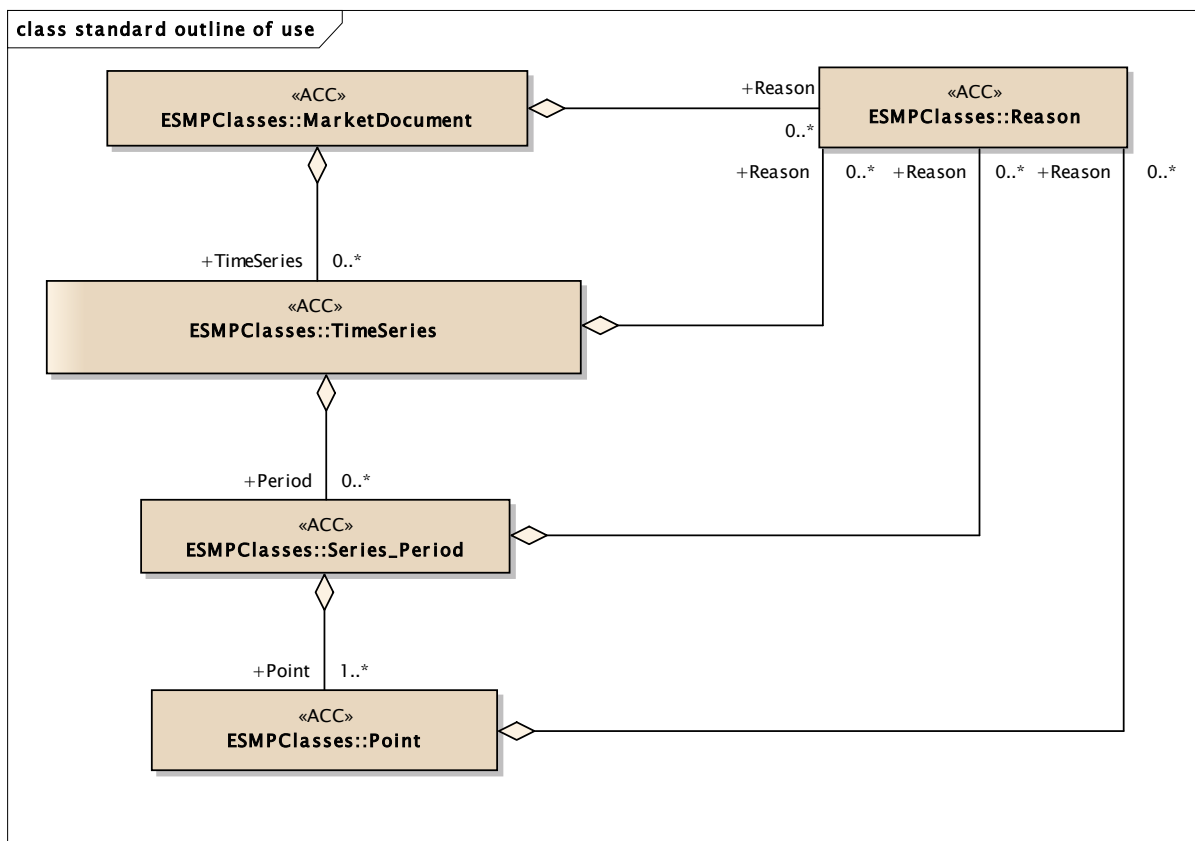
4. IEC 62361 part 100, Naming and design rules for CIM profiles to XML schema mapping.

72

73

74 **1 INTRODUCTION**

75 An XML schema has a basic outline that is common to most schemas. The basic outline can
76 be seen in figure 1.



77
78 **FIGURE 1: ENTSO-E BASIC ELECTRONIC DOCUMENT STRUCTURE**

79 The MarketDocument class describes all the basic information required for a given electronic
80 document. Here can be found information concerning the identification of the document, the
81 document type, the sender and receiver and its creation date and time. Other information
82 that concern the document as a whole may be added depending on the context in which it is
83 used.

84 The TimeSeries class describes all the information that is relative to a single time series such
85 as the type of time series, the direction of the energy flow, the objects involved and the areas
86 involved.

87 The Series_Period class describes the interval covered by the timeseries as well as the
88 resolution of the interval step.

89 The Point class describes a specific interval step, the quantities involved.

90 The Reason class provides different explanations for a given, document, timeseries, period
91 or point class.

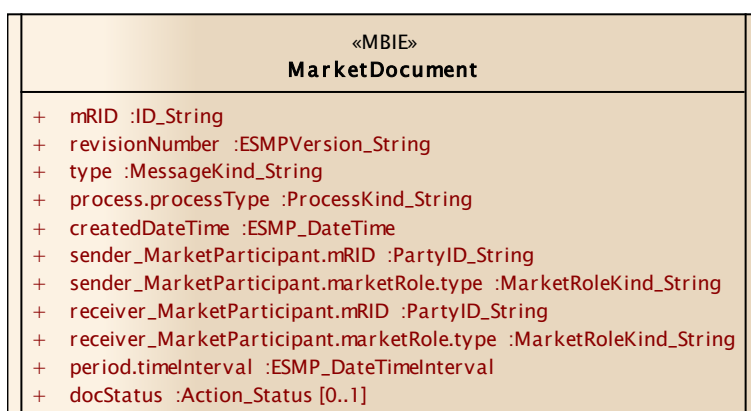
92 Within this basic structure other classes may be added to provide specific information such
93 as power system resource types identifications and characteristics.

94 In order to demonstrate the use of these different structural blocks an example of each class
95 will be provided in the sections that follow.

96 The list of current EMFIP electronic documents are only provided at the end of the document
97 for information and only reflect the initial release of EMFIP.

98 2 DOCUMENT HEADER

99 The basic document header has a structure as outlined in Figure 2.



100

101

FIGURE 2: DOCUMENT HEADER

102 The header of an XML document instance has always a format similar to that outlined in
103 Figure 3. Additional attributes may be included depending on the requirements of the
104 document being defined.

105

```

106 <?xml version="1.0" encoding="UTF-8"?>
107 <MarketDocument xmlns="urn:iec62325.351:tc57wg16:451-n:document:3:0">
108   <mRID>aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa</mRID>
109   <revisionNumber>1</revisionNumber>
110   <type>A01</type>
111   <process.processType>A01</process.processType>
112   <sender_MarketParticipant.mRID
113 codingScheme="A01">aaaaaaaaaaaaaaaa</sender_MarketParticipant.mRID>
114   <sender_MarketParticipant.marketRole.type>A01</sender_MarketParticipant.marketRole.type>
115   <receiver_MarketParticipant.mRID
116 codingScheme="A01">aaaaaaaaaaaaaaaa</receiver_MarketParticipant.mRID>
117   <receiver_MarketParticipant.marketRole.type>A01</receiver_MarketParticipant.marketRole.type>
118   <createdDateTime>2014-01-09T12:00:00Z</createdDateTime>
119   <docStatus>
120     <value>A01</value>
121   </docStatus>
122   <period.timeInterval>
123     <start>2014-01-01T00:00Z</start>
124     <end>2014-01-01T23:00Z</end>
125   </period.timeInterval>

```

FIGURE 3: XML DOCUMENT DOCUMENT HEADER

126

The document header information can be described as follows:

127

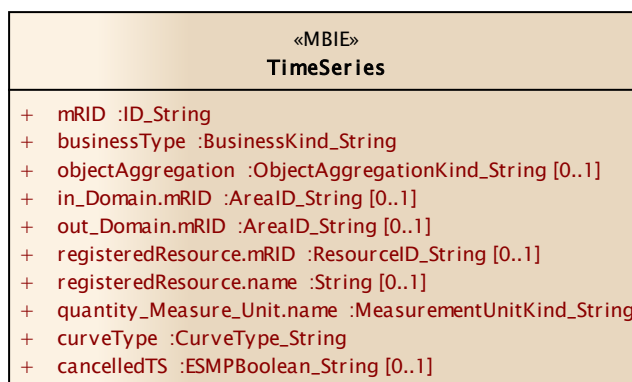
- 128 • The header part of the document (`<MarketDocument`
129 `xmlns="urn:iec62325.351:tc57wg16:451-n:document:3:0">`) provides the name of the
130 document instance ("MarketDocument") as well as the default namespace that is
131 defined in the XML Schema of the electronic document. The namespace provides
132 the exact identification of the XML Schema that is to be used for the validation of the
133 document instance.
- 134 • The elements "mRID" and "revisionNumber" provide the complete identification of a
135 document. Every time a document is modified the "mRID" does not change and the
136 "revisionNumber" is incremented. A duplicate document within the system is any
137 document received that has the same "mRID" and "revisionNumber" for a given
138 sender.
- 139 • The element "type" provides the coded identification of the type of the document
140 instance. The implementation guide provides the list of valid types for a given
141 electronic document.
- 142 • The element "process.processType" provides the coded identification of the process
143 that the document instance is addressing. The list of valid codes may be found in the
144 implementation guide for the electronic document.
- 145 • The element "sender_MarketParticipant.mRID" provides two pieces of information.
146 The attribute of the element (codingScheme) provides the coded identification of the
147 coding scheme that has been used to identify the sender. In general this has the
148 value "A01" which signifies that the EIC coding scheme has been used. The value of
149 the element itself provides the coded identification of the sender of the electronic
150 document instance.
- 151 • The element "sender_MarketParticipant.marketRole.type" provides the coded
152 identification of the role played by the sender of the document. The permitted roles
153 are identified in the implementation guide.

- 154 • The elements “receiver_MarketParticipant.mRID” and
155 “receiver_MarketParticipant.marketRole.type” correspond to the identification of the
156 receiver and the role of the receiver in a similar manner to that explained for the
157 sender.
- 158 • The element “createdDateTime” corresponds to the date and time in UTC that the
159 electronic document was generated by the issuing system.
- 160 • The element “docStatus” is a CIM compound element where the only compound
161 element used is the “value” element which is one of the attributes that belongs to the
162 compound element “docStatus”. It is the only attribute ever used within the
163 “docStatus” element. The “value” element provides the coded status of the document
164 instance.
- 165 • The element “period.timeInterval” is a compound element that provides the start date
166 and time as well as the end date and time in UTC. The “period.timeInterval”
167 describes the valid period that the information in the document refers to. All the
168 information in the document instance must be within the bounds defined by this
169 interval. The start date and time is inclusive and the end date and time is exclusive of
170 the period.

171 All the information provided at the document header level cover the whole document.

172 3 TIMESERIES

173 A typical time series class has a basic structure that is outlined in Figure 4.



174
175 **FIGURE 4: TIME SERIES CLASS**

176 The time series class provides all the information that is necessary in order to completely
177 describe it. Consequently it can have several variants. The time series in Figure 4 simply
178 provides one of the most common variants.

179 The resulting time series instance is shown in Figure 5

180

```

181     <TimeSeries>
182         <mRID>aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa</mRID>
183         <businessType>A01</businessType>
184         <objectAggregation>A01</objectAggregation>
185         <in_Domain.mRID
186 codingScheme="A01">aaaaaaaaaaaaaaaaaaaaaaaa</inBiddingZone_Domain.mRID>
187         <out_Domain.mRID
188 codingScheme="A01">aaaaaaaaaaaaaaaaaaaaaaaa</outBiddingZone_Domain.mRID>
189         <registeredResource.mRID
190 codingScheme="A01">aaaaaaaaaaaaaaaaaaaaaaaa</registeredResource.mRID>
191         <registeredResource.name>String</registeredResource.name>
192         <quantity_Measure_Unit.name>MWH</quantity_Measure_Unit.name>
193         <curveType>A01</curveType>
194         <cancelledTS>A01</cancelledTS>

```

FIGURE 5: TIME SERIES DOCUMENT INSTANCE

195

196 The time series information can be described as follows:

- 197 • The element “mRID” uniquely identifies the time series within the electronic document
- 198 instance. There is no constraint to require that this identification is unique over
- 199 several documents.
- 200 • The element “businessType” provides the coded identification of what the time series
- 201 represents. The permitted business types are identified in the implementation guide.
- 202 • The element “objectAggregation” provides the means of identifying the level of
- 203 aggregation that the time series is providing.
- 204 • The element “in_Domain.mRID” provides the identification of a domain or area where
- 205 normally the energy expressed in the time series is going. The coding scheme used
- 206 to for the identification code is defined as an attribute of the domain. In general all
- 207 elements with the beginning word “in” are used in this sense. For example if it was
- 208 “in_MarketParticipant.mRID” then this would be identifying the party that is receiving
- 209 the energy. This is not always present in a time series.
- 210 • The element “out_Domain.mRID” provides the identification of a domain or area
- 211 where normally the energy expressed in the time series is coming from. The coding
- 212 scheme used to for the identification code is defined as an attribute of the domain. In
- 213 general all elements with the beginning word “out” are used in this sense. For
- 214 example if it was “out_MarketParticipant.mRID” then this would be identifying the
- 215 party that is sending the energy. This is not always present in a time series.
- 216 • The element “registeredResource.mRID” provides the identification of a given
- 217 registered resource within a System Operator network. The coding scheme used to
- 218 for the identification code is defined as an attribute of the registeredResource. This is
- 219 not always present in a time series.
- 220 • The element “registeredResource.name” provides the textual name of the resource.
- 221 • The element “quantity_Measure_Unit.name” provides the UN ECE Recommendation
- 222 20 code for the unit of measure that all quantities in the time series are measured in.
- 223 • The element “curveType” provides an indication how the period in the time series will
- 224 be expressed. Please refer to the ENTSO-E document “The introduction of different
- 225 time series possibilities (CurveType) within ENTSO-E electronic documents” that is

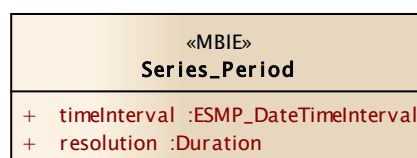
- 226 available on the ENTSO-E website. Within the transparency environment there are
227 two curve types permitted:
- 228 ○ A01, Sequential fixed size block. The CurveType A01 corresponds to a Period
229 where all the interval positions are present within the TimeInterval. The
230 resolution corresponds to the interval. Consequently the number of intervals
231 must be equal to $\frac{EndDateTime - StartDateTime}{Resolution}$.
 - 232 ○ A03, Variable sized block. The CurveType A03 differs from A01 in that only
233 the position where a block change occurs is provided. Consequently all
234 positions are not provided. This is useful in cases where the quantity is stable
235 over a long period of time. This induces the following rules:
236 Each position identifies the start of a block;
 - 237 ✓ The end of the block is the start of the next block (except for the last
238 one);
 - 239 ✓ The last block extends to the end of the TimeInterval;
 - 240 ✓ Only positions where a block change occurs are provided;
 - 241 ✓ The value of the Qty remains constant within each block;
 - 242 ✓ The block represents the start position on the horizontal axe and the
243 quantity on the vertical axe.
 - 244 ● The element “cancelledTS” provides an indication whether the time series in question
245 has been cancelled or withdrawn.

246 The time series may have other specific elements in it describing for example various start
247 and end dates, flow direction, or more detailed information associated with a resource object.

248 The time series may also have associated with it information concerning aspects related to it.
249 For example a list of associated generating units and their nominal power or the domains
250 involved. These may be seen in the class diagrams in the annex with direct relationships to
251 the time series.

252 4 SERIES_PERIOD

253 The Series_Period class is basically common to all electronic documents that decline a time
254 series in intervals. The basic structure is outlined in Figure 6.



255

256

FIGURE 6: SERIES_PERIOD STRUCTURE

257 It should be noted that a Series_Period class always has the role of “Period” in all
258 associations with a time series.

259 The resulting series period instance is shown in Figure 7.

```

260         <Period>
261             <timeInterval>
262                 <start>2014-01-01T00:00Z</start>
263                 <end>2014-01-01T23:00Z</end>
264             </timeInterval>
265             <resolution>PT60M</resolution>

```

FIGURE 7: THE PERIOD DOCUMENT INSTANCE

266 The Series_Period information can be described as follows:

- 268 • The element “timeInterval” is a compound element that contains the start date and
269 time as well as the end date and time. In general a time series can cover one to
270 several periods. The date and time of each period cannot be included in any of the
271 other periods. All the “Period” instances must be included in the time interval
272 described in the document header. The start date and time is inclusive and the end
273 date and time is exclusive of the period.
- 274 • The element “resolution” provides the precision of the interval that the different points
275 within the time series cover (for example PT15M for 15 minutes or PT60M for one
276 hour. It should be noted that the time interval PT60M could also be expressed as
277 PT1H).

278 5 POINT

279 The “Point” class provides the time series quantities. The basic structure is outlined in Figure
280 8.

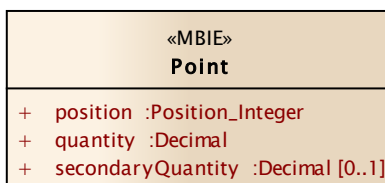


FIGURE 8: THE POINT CLASS

283 The resulting point instance is shown in Figure 9.

```

284         <Point>
285             <position>1</position>
286             <quantity>1000.0</quantity>
287             <secondaryQuantity>500.0</secondaryQuantity>
288         </Point>

```

FIGURE 9: POINT DOCUMENT INSTANCE

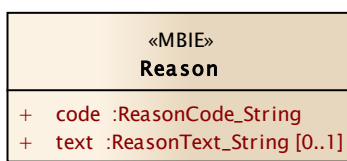
290 The point information can be described as follows:

- 291 • The element “position” provides the relative position within a time interval where the
292 point is situated. The formula used to determine where this point is situated is as
293 follows:
 - 294 ○ $Period.timeInterval.start + ((Point.position - 1) * Period.resolution(in\ minutes))$
- 295 • The element “quantity” provides the quantity expressed in units as defined by
296 “quantity_Measure_Unit.name” that is relevant for the position in question.

- 297
- 298
- 299
- 300
- 301
- The element “secondaryQuantity” provides a quantity expressed in units as defined by “quantity_Measure_Unit.name” that is relevant for the position in question and which represents a specific value that is explicitly defined in the implementation guide (for example the value for the same position in the previous year). This is not always present in a point class.

6 REASON

302 The “Reason” class provides the additional informative information for a document, time
303 series, series period or a point class. The basic structure is outlined in Figure 10.
304



305

306

FIGURE 10: THE REASON CLASS

307 The resulting reason instance is shown in Figure 11.

```

308 <Reason>
309 <code>A01</code>
310 <text>aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa</text>
311 </Reason>
    
```

312

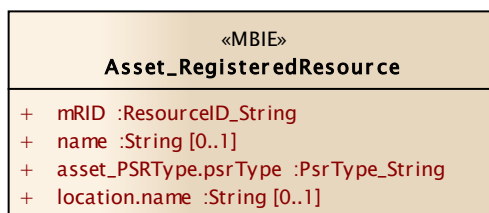
FIGURE 11: THE REASON DOCUMENT INSTANCE

313 The reason information can be described as follows:

- 314
- 315
- 316
- 317
- 318
- 319
- 320
- 321
- 322
- 323
- The element “code” provides explanatory information in a coded form that is directly exploitable by a computer application.
 - The element “text” provides complementary information that is not directly exploitable by a computer application. It should be noted that the content of this element is not the corresponding definition or description of the code provided in the “code” element. It should provide additional information that may be used to further clarify the coded explication. For example the code A10 indicates “credit limit exceeded” and is used for a reason for rejection of an electronic document. It might be useful to remind the recipient what credit limit effectively is used to validate the information. The limit may consequently be provided in the “text” element (e.g. 10000 MW).

7 OTHER CLASSES USED

324 Other classes are used in the transparency electronic documents but they all follow the same
325 basic rules and are individually explained in the relevant implementation guides. For example
326 the class Asset_RegisteredResource is used to provide information about a given resource
327 of a specific type (line, tieline, production unit, etc...). This class is defined in Figure 12.
328



329

330

FIGURE 12: THE ASSET_REGISTEREDRESOURCE CLASS

331 This class is used to describe the resources effected by an outage or to provide transmission
332 network information. The resulting instance shown in .

```

333 <Asset_RegisteredResource>
334   <mRID codingScheme="A01">aaaaaaaaaaaaaaaa</mRID>
335   <name>String</name>
336   <asset_PSRTYPE.psrType>A01</asset_PSRTYPE.psrType>
337   <location.name>String</location.name>
338 </Asset_RegisteredResource>
    
```

339

FIGURE 13: THE ASSET_REGISTEREDRESOURCE

340 This information may be described as follows:

- 341 • The element “mRID” provides the identification of a given asset within a System
342 Operator network. The coding scheme used to for the identification code is defined as
343 an attribute of the “mRID”.
- 344 • The element “name” provides the textual name of the asset. This element is not
345 always present in the class.
- 346 • The element “asset_PSRTYPE.psrType” provides the coded identification of the type
347 of the asset being described.
- 348 • The element “location.name” provides the textual name of the location of the asset.
349 The element is not always present in the class.

350 8 RELATIONSHIPS

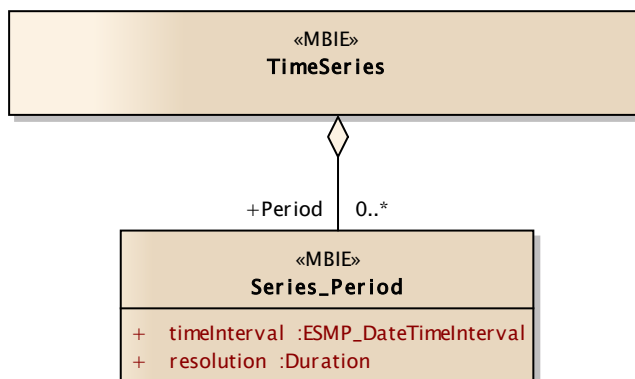
351 The relationship between two classes has to be taken into consideration when referring to an
352 XML Schema. A relationship has two ends, an association end (the one with the unfilled
353 diamond on it) and an aggregate end (the end opposed to the unfilled diamond). In all the
354 transparency models the association end contains no role or multiplicity information. The
355 aggregate end, however, contains a “role” description which depicts the use of the class in
356 the relationship and a “multiplicity” factor (sometimes called cardinality) that depicts the
357 number of occurrences permitted for the class in the relation.

358 The “multiplicity” factor can take several forms:

- 359 • 1..*, which signifies that there must be one occurrence of the class in the relation and
360 there may be an infinite number of class occurrences in the relation.
- 361 • 0..*, which signifies that the class may not be present in the relation, but if present
362 there may be multiple occurrences of the class in the relation.

- 363 • 1..1, which signifies there must be one and only one occurrence of the class in the
- 364 relation.
- 365 • 0..1, which signifies that the class may not be present in the relation, but if present
- 366 there may only be one occurrence of the class in the relation.

367 The “role” description is the name that used for the XSD element tag.



368

369

FIGURE 14: A RELATIONSHIP EXAMPLE

370 For example the relation in Figure 14 shows a relationship between the class “TimeSeries”
 371 and the class “Series_Period”. The class “Series_Period” need not exist and, if it exists, there
 372 may be multiple occurrences of the class.

373 The class “Series_Period” in its relation with the TimeSeries class plays a role of “Period”.
 374 Consequently the XML Schema tag will become the role “Period”. The name of the class
 375 “Series_Period” will not exist in the XML Schema. This can be seen in the following extract
 376 from a document instance:

```

377     <Period>
378         <timeInterval>
379             <start>2014-01-01T00:00Z</start>
380             <end>2014-01-01T23:00Z</end>
381         </timeInterval>
382         <resolution>PT60M</resolution>
383         <Point>
384             <position>1</position>
385             <quantity>10000.0</quantity>
386         </Point>
387         <Point>.....
388     </Period>
389 </TimeSeries>
    
```

390

FIGURE 15: THE PERIOD DOCUMENT INSTANCE

391 A class, such as the “Series_Period” class in Figure 14, that does not exist in a document
 392 instance signifies that no time interval information is present in the document for the time
 393 series in question. This generally means that a higher level a code has been provided that
 394 restricts the requirement for interval information. For example, in the case above there may
 395 be an indication “cancelledTS” which signifies that the time series in question has been
 396 cancelled. Consequentially no detailed information for the time series is required. This can be
 397 seen in the document instance shown in Figure 16.

398

399
400
401
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403
404
405

```

<TimeSeries>
  <mRID>aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa</mRID>
  <businessType>A01</businessType>
  <quantity_Measure_Unit.name>MAW</quantity_Measure_Unit.name>
  <curveType>A01</curveType>
  <cancelledTS>A01</cancelledTS>
</TimeSeries>

```

406
407

FIGURE 16: A TIME SERIES INSTANCE WITH NO PERIOD INSTANCE

If the “Period” class existed it would precede the closing “TimeSeries” element tag.

408

9 THE USE OF DEPENDENCY TABLES

«MBIE» TimeSeries	
+	mRID :ID_String
+	businessType :BusinessKind_String
+	objectAggregation :ObjectAggregationKind_String [0..1]
+	inBiddingZone_Domain.mRID :AreaID_String [0..1]
+	outBiddingZone_Domain.mRID :AreaID_String [0..1]
+	registeredResource.mRID :ResourceID_String [0..1]
+	registeredResource.name :String [0..1]
+	quantity_Measure_Unit.name :MeasurementUnitKind_String
+	curveType :CurveType_String
+	cancelledTS :ESMPBoolean_String [0..1]

409
410

FIGURE 17: A CLASS WITH DEPENDENT ATTRIBUTES

411
412
413
414
415
416
417
418
419

Figure 17 shows a TimeSeries class that has several attributes that are optional (all the attributes with a multiplicity of [0..1]). In order to know the conditions where these attributes may only be used it is necessary to refer to the dependency table in the implementation guide. For example in the above time series there are a number of dependent attributes. Some are uniquely used to describe a specific condition (i.e. the attribute cancelledTS is only used when a time series is withdrawn); others are dependent on either the business type of the type of document as described in the document header. In the case above the load dependency table of the Generation and Load document is used for demonstration purposes. This can be seen in Figure 18.

Load dependency table						
Article involved	LOAD Process					
	Art. 6 (b) day-ahead total load forecast	Art. 6 (c) week-ahead total load forecast	Art. 6 (d) month-ahead total load forecast	Art. 6 (e) year-ahead total load forecast	Art. 6 (a) Actual Total Load	Art. 8 Year-ahead forecast margin
DocumentType (Type)	A65 – Total Load					A70 = Load forecast margin
ProcessType (process.processType)	A01 = Day ahead	A31 = Week ahead	A32 = Month ahead	A33 = Year ahead	A16 = Realised	A33 = Year ahead
BusinessType (businessType)	A04 = Consumption	A04 = Consumption A60 = Minimum possible A61 = Maximum possible	A04 = Consumption A60 = Minimum possible Note: This must be by week A61 = Maximum possible Note: This must be by week	A04 = Consumption A60 = Minimum possible Note: This must be by week A61 = Maximum possible Note: This must be by week	A04 = Consumption	A91 = Positive forecast margin (if installed capacity > load forecast) A92 = Negative forecast margin (if load forecast > installed capacity)
InBiddingZone_Domain	Not used	Not used	Not used	Not used	Not used	Not used
OutBiddingZone_Domain	Used	Used	Used	Used	Used	Used
MeasurementUnit (measurement_Unit.name)	MAW = Megawatts					
ObjectAggregation (objectAggregation)	A01 = Area					
ResourceObjectIdentification (registeredResource.mRID)	Not used				Not used	Not used
ResourceObjectType (mktPSRType.psrType)	Not used				Not used	Not used
ResourceObjectName (registeredResource.name)	Not used				Not used	Not used
Resolution (resolution)	PT60M PT30M PT15M	P1D PT60M PT30M PT15M	P7D PT60M PT30M PT15M	P7D PT60M PT30M PT15M	PT60M PT30M PT15M	P1Y

FIGURE 18: LOAD DEPENDENCY TABLE

Looking at the table one can see that it is divided into three parts:

1. A header part that provides the condition that is to be applied (e.g. art. 6(b) day ahead total load forecast);
2. The initial column that provides the names of the attributes (elements) in the document model that are either key elements or are elements dependent on the key elements.
3. A central part that provides either a coded value, the indication “used” or the indication “not used”.
 - Whenever a coded value is provided it represents a key value for the condition in the first line (e.g. businessType is A04 for the condition in the first column of the header part).
 - The indication “not used” is provided to indicate that the element in question cannot be used in the context defined in the header part.
 - The indication “used” is provided to indicate that the element in question must be used in the context defined in the header part.

Consequently it can be seen in the first column containing rules (art. 6(b)) that the elements InBiddingZone_Domain, RegisteredResource.mRID, MktPSRType.psrType, RegisteredResource.name are not permitted. In addition the coded values for the BusinessType of A60 and A61 are not permitted.

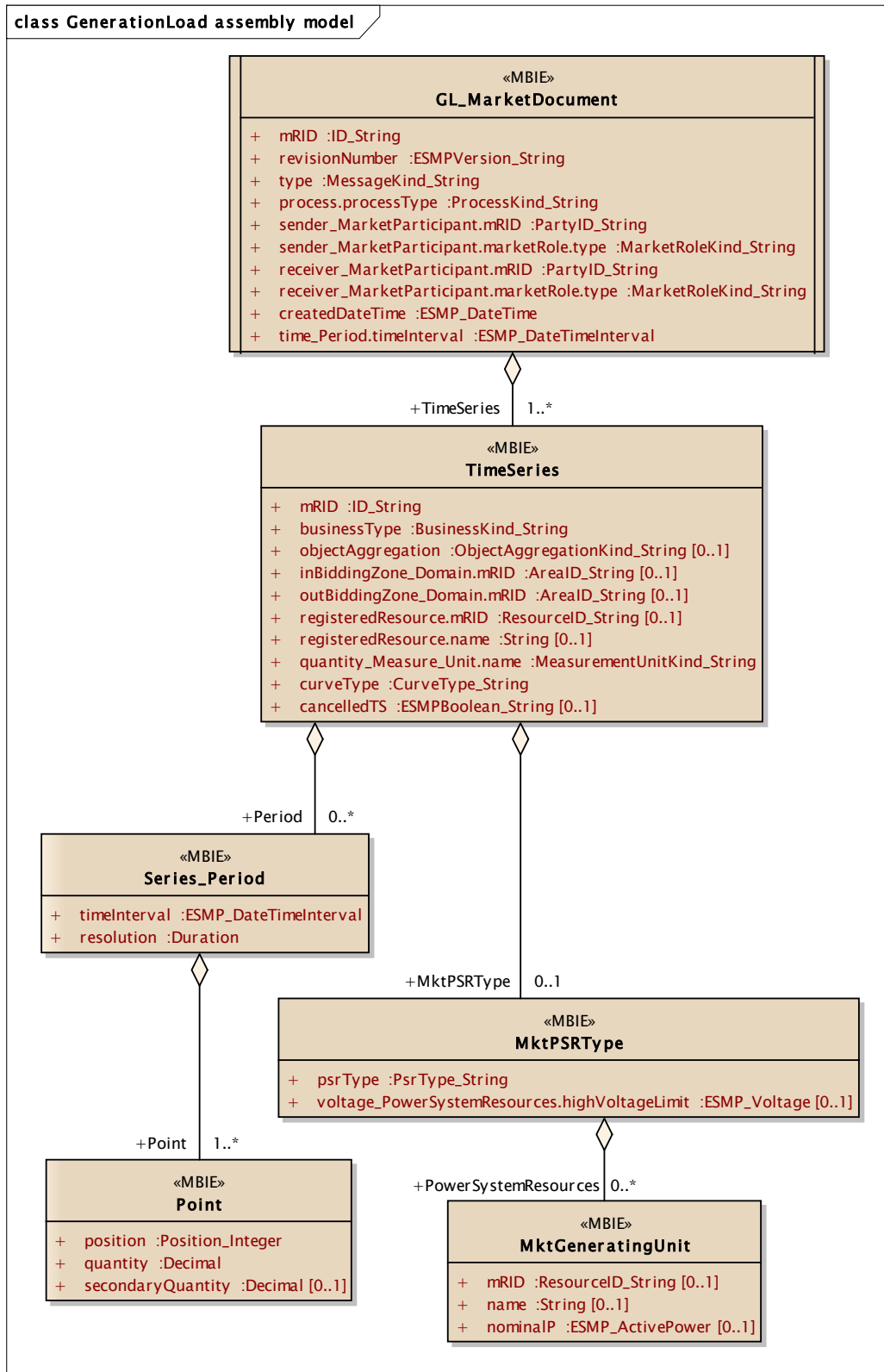
Finally the coded values for Document Type (A65), Process Type (A01), Business Type (A04), Measurement Unit (MAW) and Object Aggregation (A01) are required. In addition one of the coded values for the Resolution must be provided.

It should be noted that the BusinessType row in the above example is subdivided into 3 parts. Depending on the number of codes listed there may be as many time series as there

446 are codes identified in the respective columns (e.g. for art. 6(c) there may be one time series
447 for A04 or one for A60 and one for A61).

448

10 GENERATIONLOAD ASSEMBLY MODEL



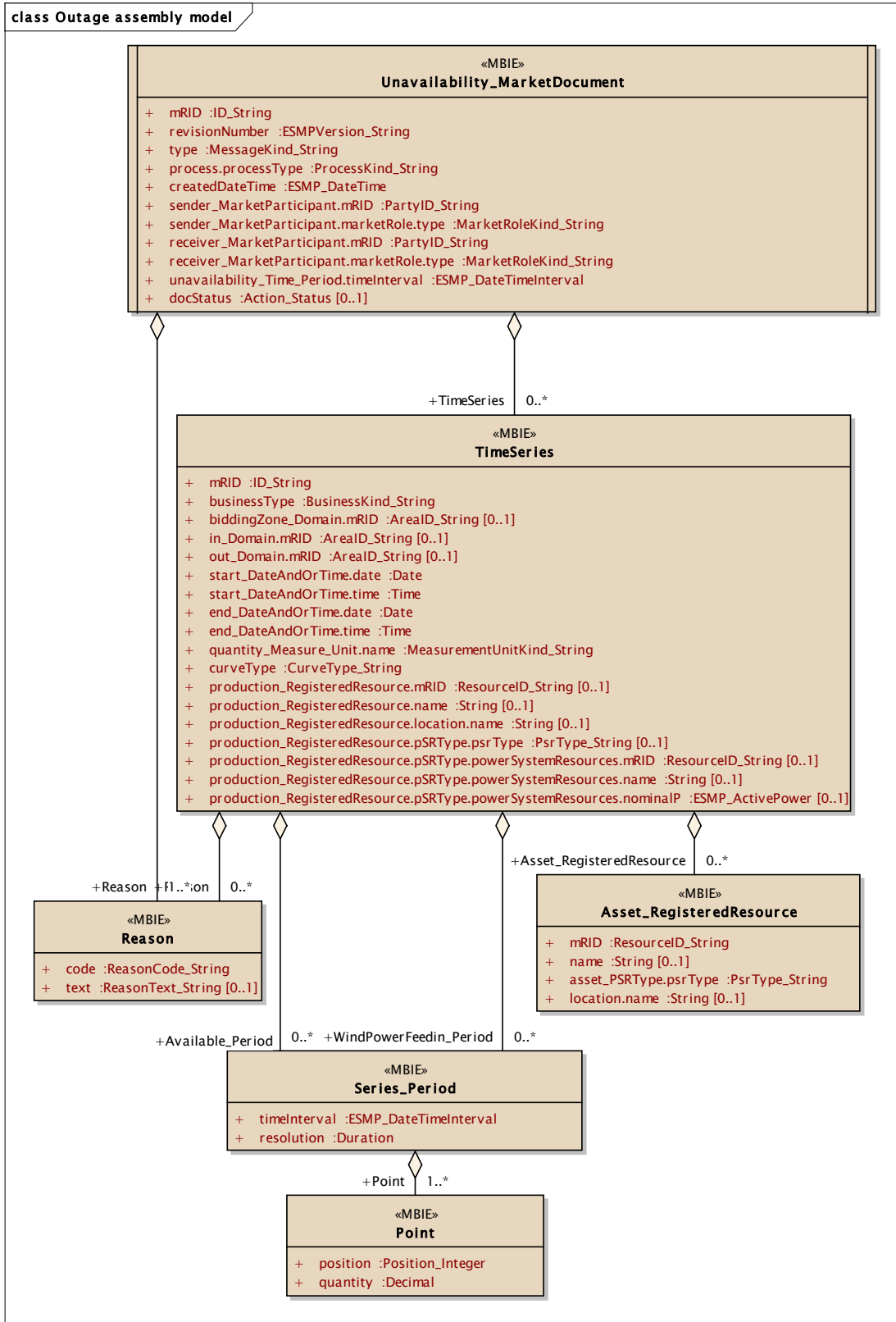
449

450

FIGURE 19: GENERATION AND LOAD MARKET DOCUMENT

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11 OUTAGE ASSEMBLY MODEL



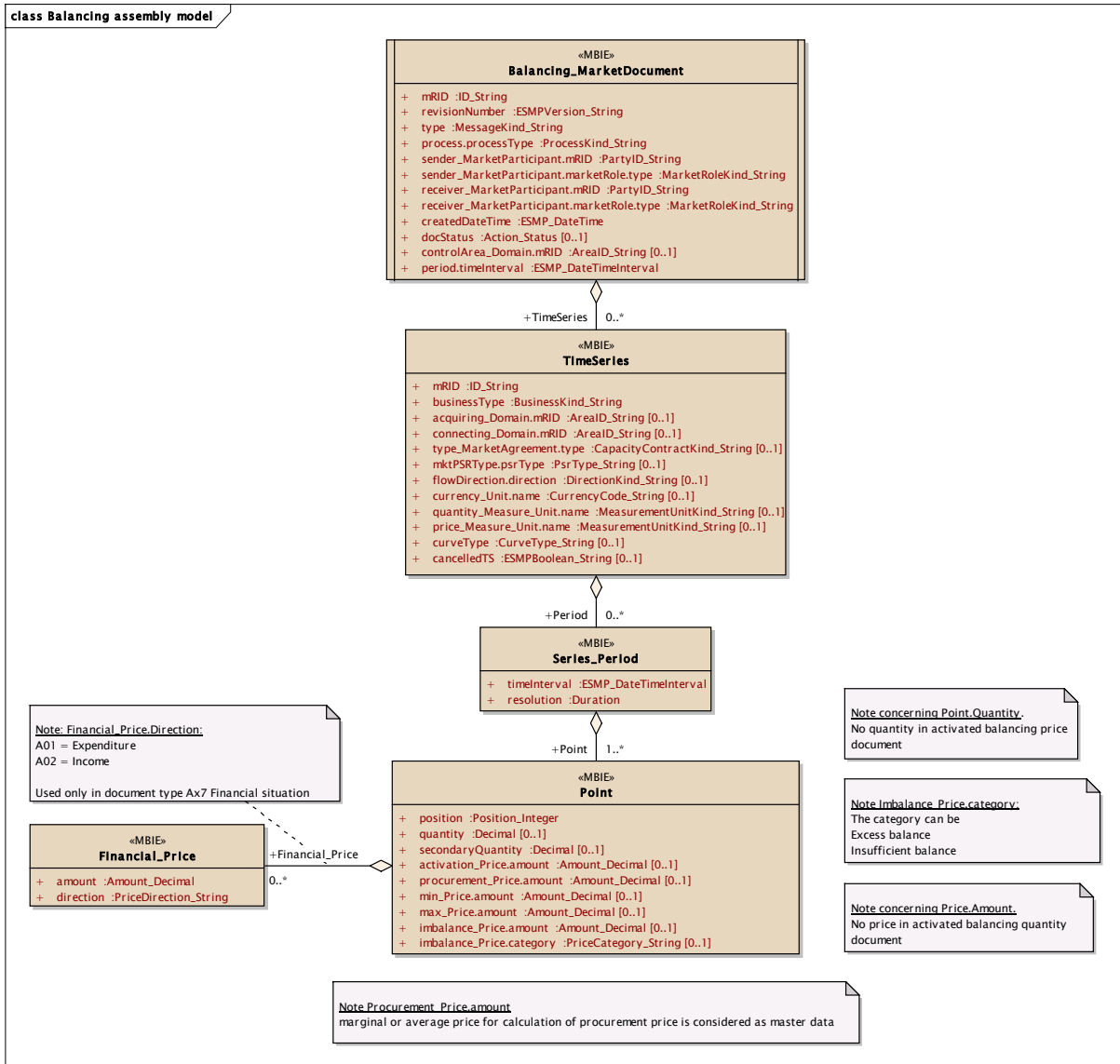
452

453

FIGURE 20: UNAVAILABILITY MARKET DOCUMENT

454

12 BALANCING ASSEMBLY MODEL



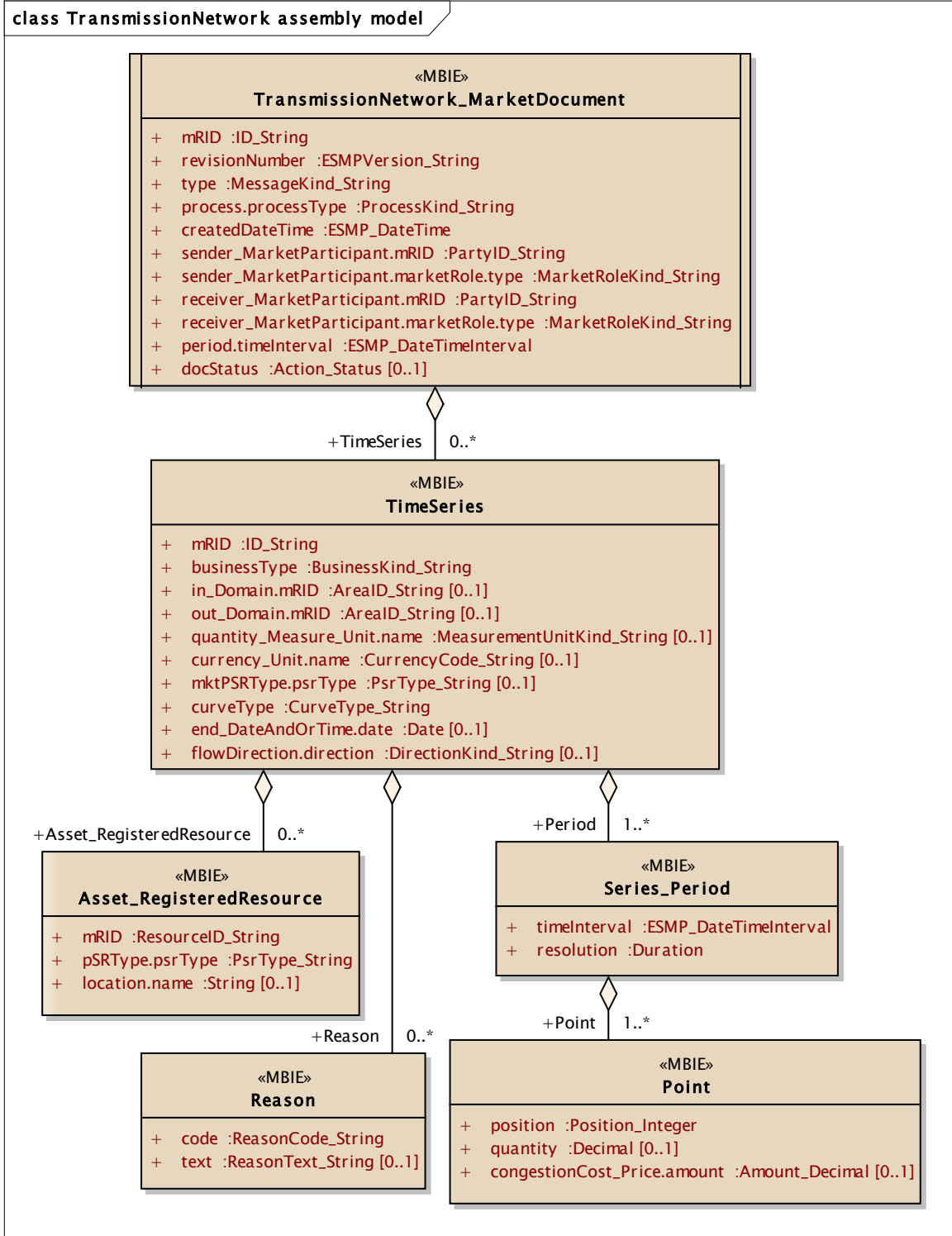
455

456

FIGURE 21: BALANCING MARKET DOCUMENT

457

13 TRANSMISSION NETWORK ASSEMBLY MODEL



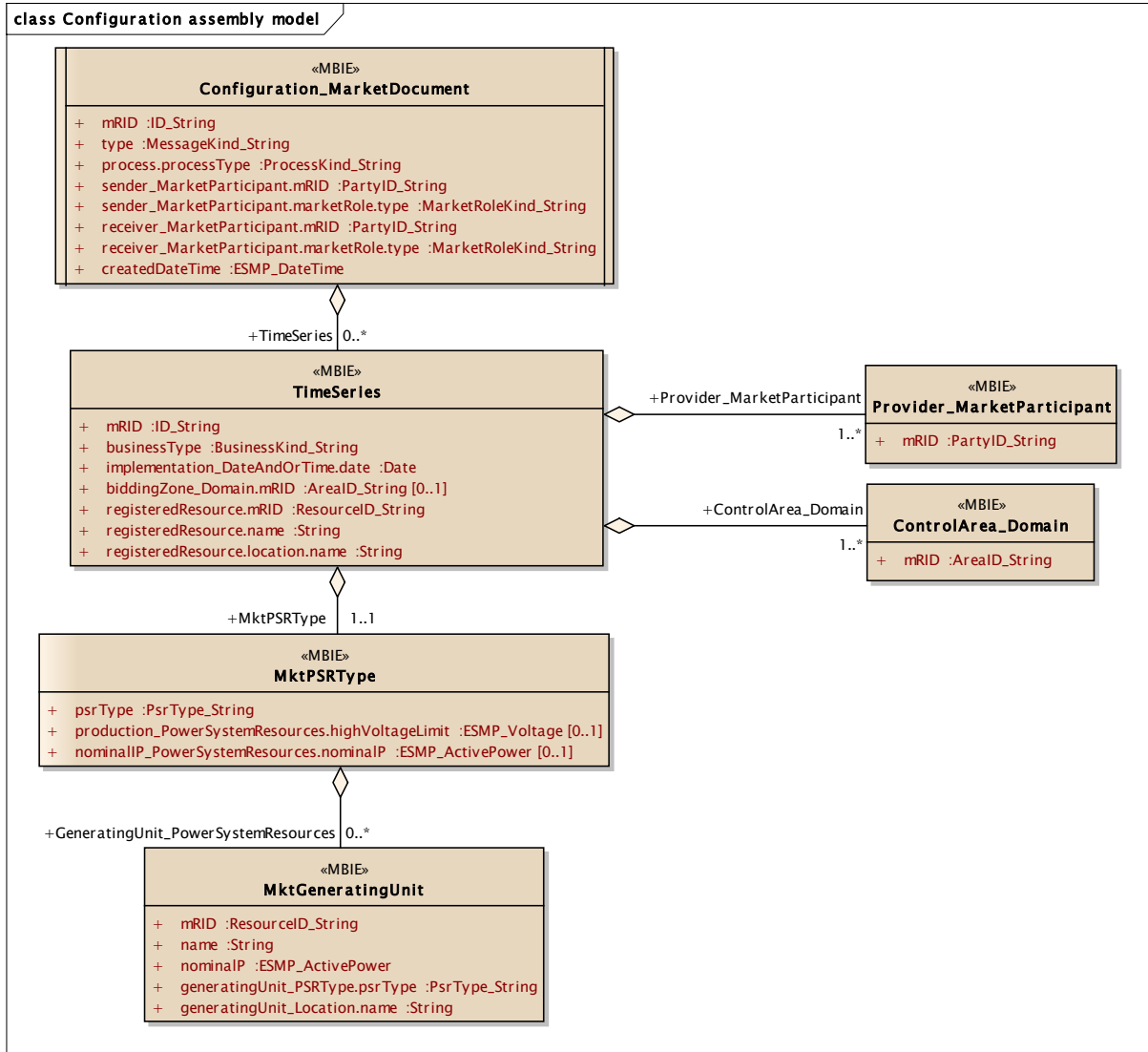
458

459

FIGURE 22: TRANSMISSION NETWORK MARKET DOCUMENT

460

14 CONFIGURATION ASSEMBLY MODEL



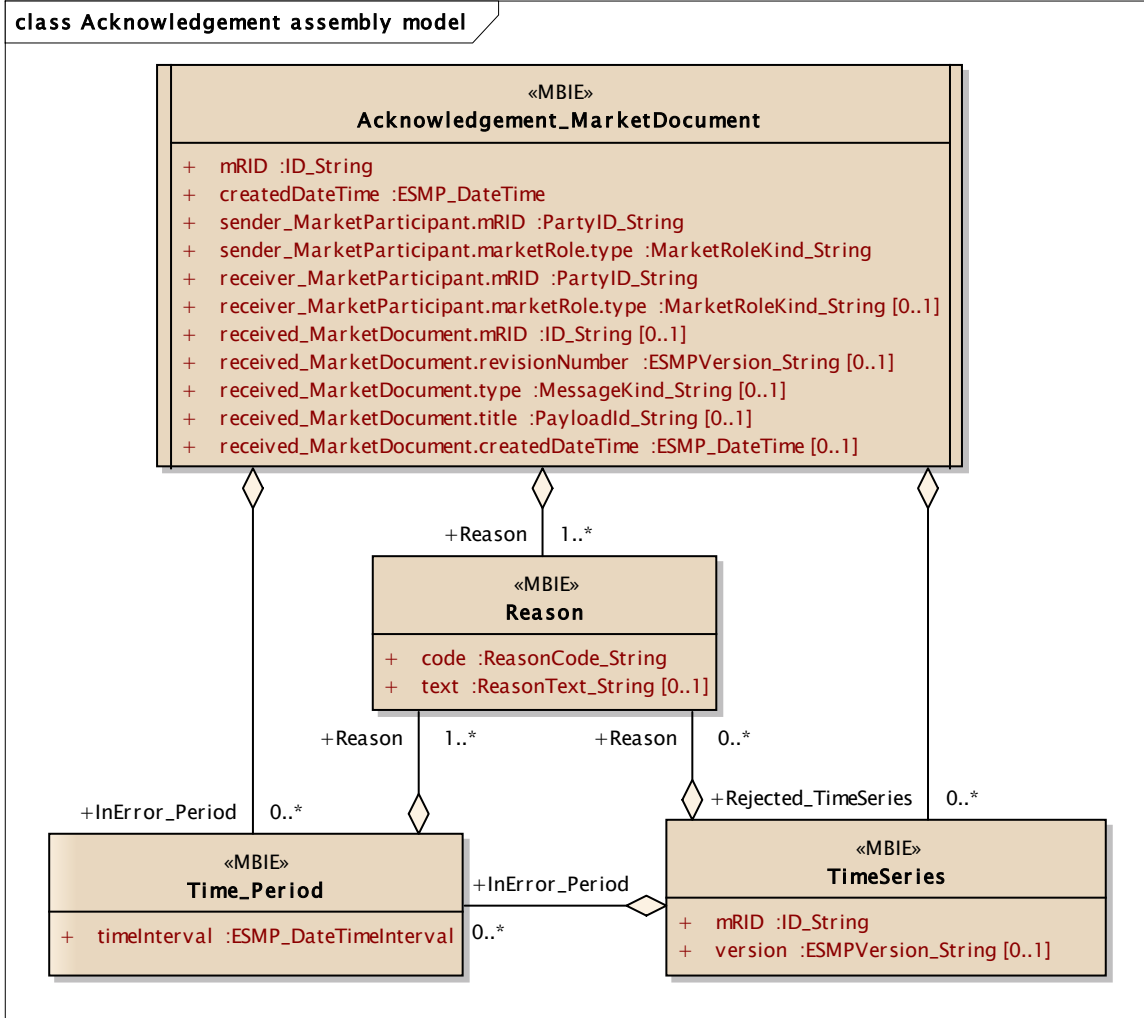
461

462

FIGURE 23: CONFIGURATION MARKET DOCUMENT

463

15 ACKNOWLEDGEMENT ASSEMBLY MODEL



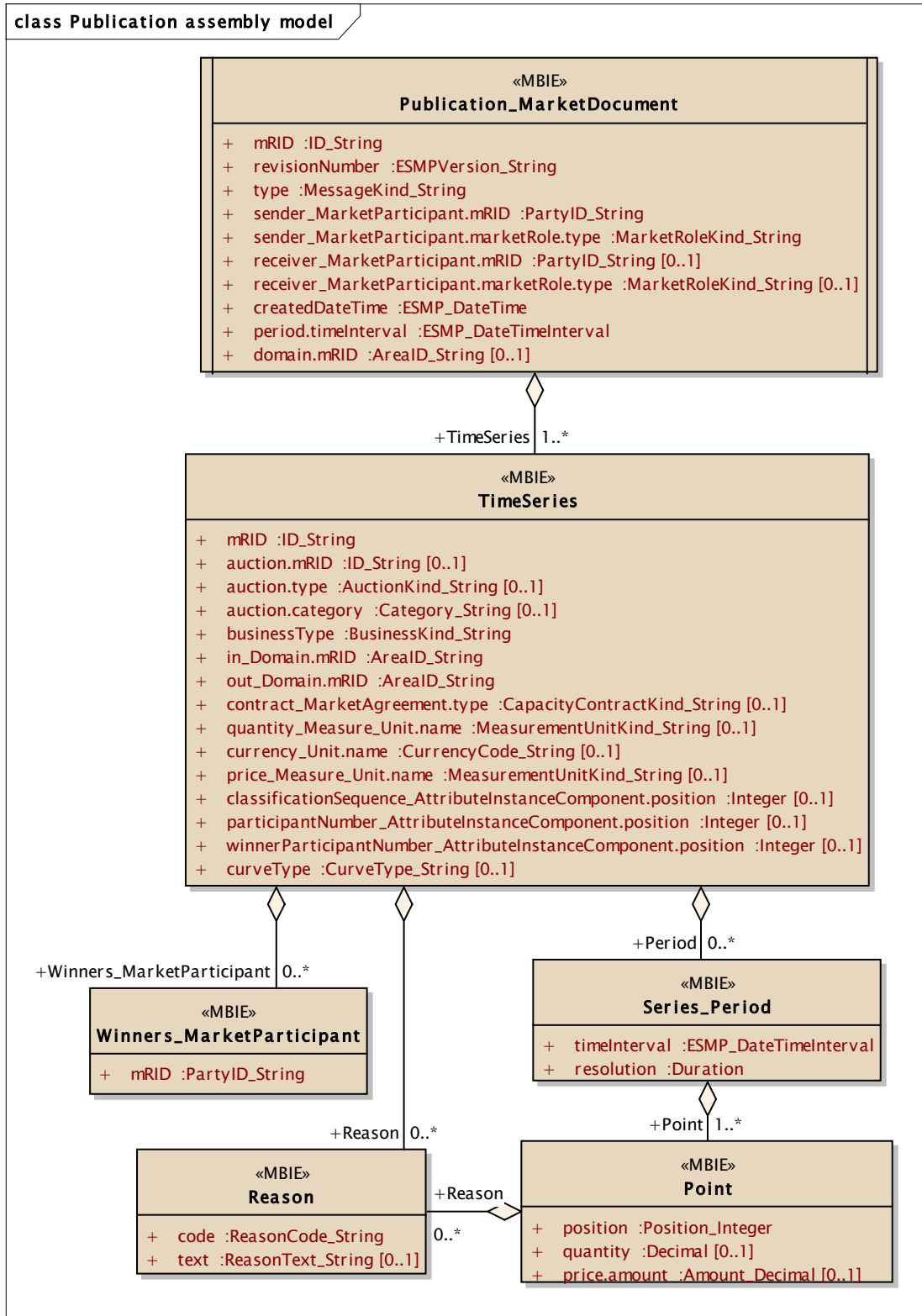
464

465

FIGURE 24: ACKNOWLEDGEMENT MARKET DOCUMENT

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16 PUBLICATION ASSEMBLY MODEL



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FIGURE 25: PUBLICATION MARKET DOCUMENT