



European Network of
Transmission System Operators
for Electricity

GENERATION AND LOAD SHIFT KEY DOCUMENT UML MODEL AND SCHEMA

2019-12-11
APPROVED DOCUMENT
VERSION 2.2

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Revision History

Version	Release	Date	Comments
0	0	2015-12-18	First drafting of the document based on discussion with CGMES project team on data exchanges.
0	1	2016-01-16	Version taking into account the comments issued after WG EDI review.
1	0	2016-01-21	Version approved by the Market Committee.
2	0	2016-09-22	Addition of the interconnection shift key business type. Addition of Reason class at various levels to identify inconsistencies and errors in the sent document. Version approved by Market Committee
2	1	2017-03-23	Addition of docStatus, Status and received_MarketDocument in the header to provide an anomaly report following the receiving of a GLSK document. Addition of Status attribute within RegisteredResource class to enable an action on a network element. Version submitted to Market Committee for approval
2	2	2019/12/11	Move parts to Coordinated Capacity Calculation implementation guide. Keep UML document and schema part. Approved by MC.

68

69 1 Objective

70 The purpose of this document is to provide the contextual and assembly UML models and the
71 schema of the generation and load shift key (GLSK).

72 The schema of the GLSK_MarketDocument could be used in various business processes.

73 Especially, the GSK and LSK are computed by the TSO in charge of the area and provided to
74 the actors who needs to carry out network studies; these network studies could be coordinated
75 capacity calculation, flow-based market coupling, network studies, etc.

76 It is not the purpose of this document to describe all the use cases, sequence diagrams,
77 business processes, etc. for which this schema is to be used.

78 This document shall only be referenced in an implementation guide of a specific business
79 process. The content of the business process implementation guide shall be as follows:

- 80 • Description of the business process;
- 81 • Use case of the business process;
- 82 • Sequence diagrams of the business process;
- 83 • List of the schema (XSD) to be used in the business process and versions of the
84 schema;

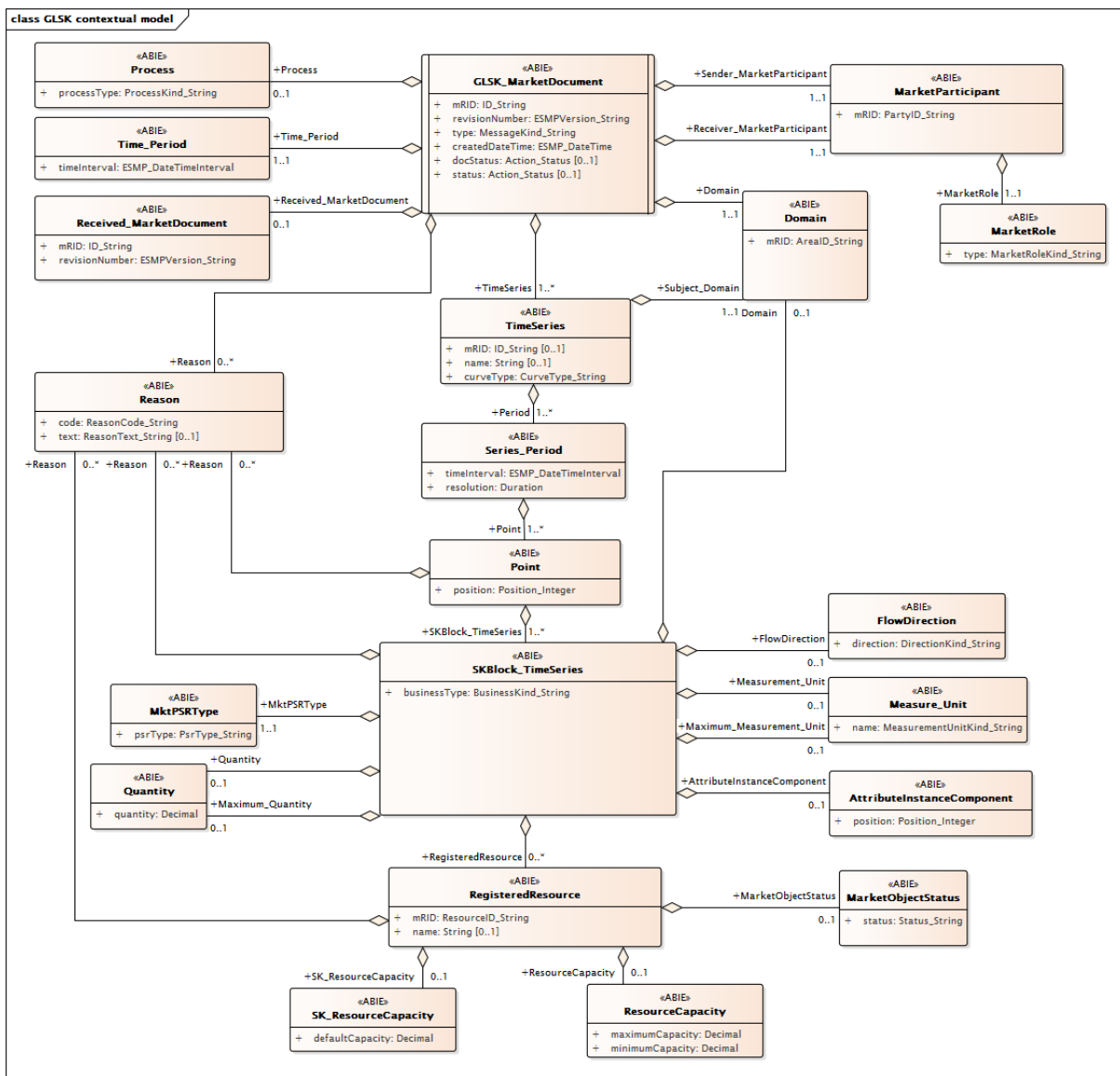
85 For each schema, dependency tables providing the necessary information for the generation of
86 the XML instances, i.e. when the optional attributes are to be used, which codes from which
87 ENTSO-E codelist are to be used.

88 **2 GLSK contextual and assembly models t**

89 **2.1 GLSK contextual model**

90 **2.1.1 Overview of the model**

91 Figure 1 shows the model.



92

93

Figure 1 - GLSK contextual model

94

95 **2.1.2 IsBasedOn relationships from the European style market profile**

96 Table 1 shows the traceability dependency of the classes used in this package towards the
97 upper level.

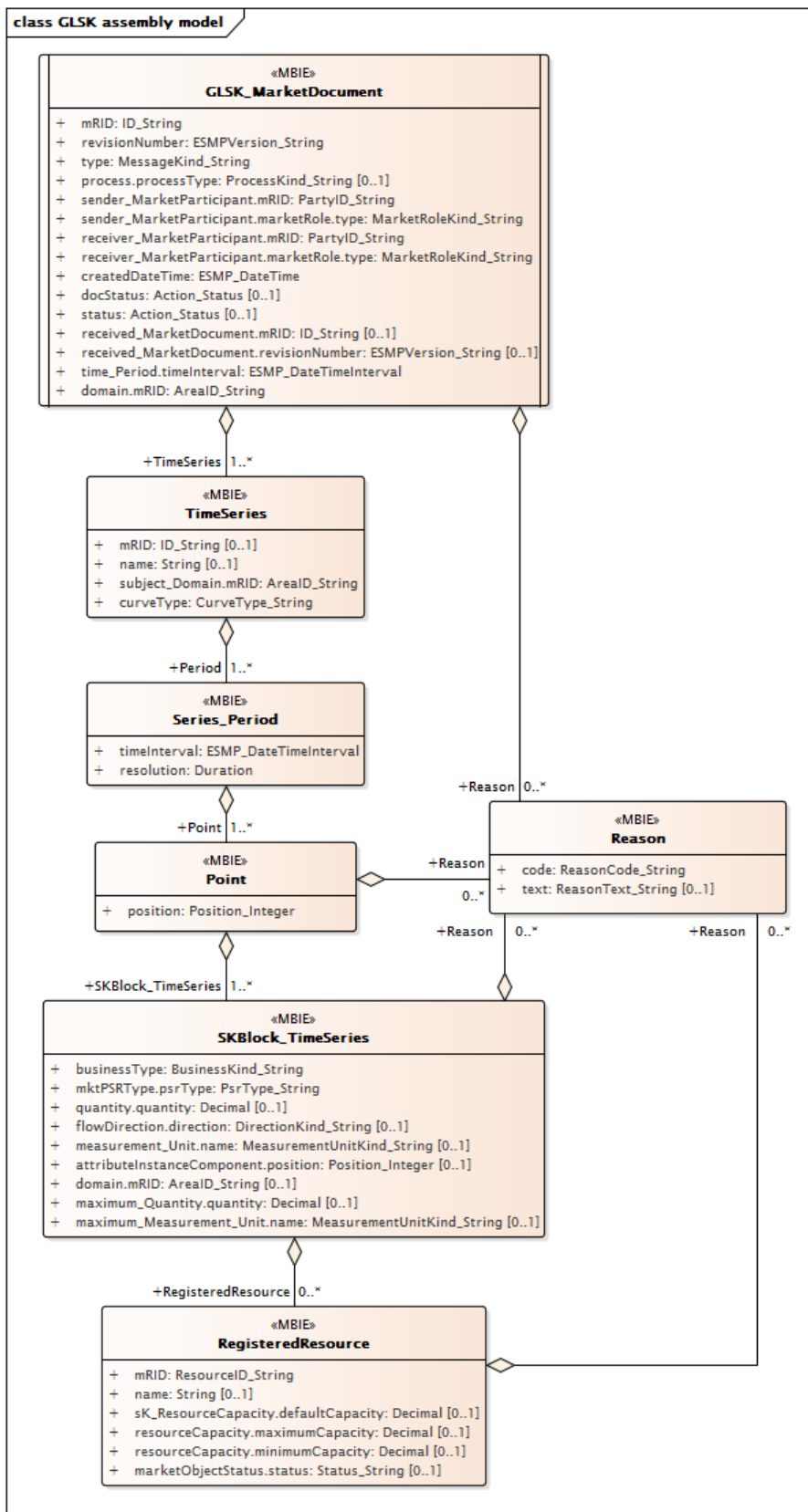
98

Table 1 - IsBasedOn dependency

Name	Complete IsBasedOn Path
AttributeInstanceComponent	TC57CIM::IEC62325::MarketManagement::AttributeInstanceComponent
Domain	TC57CIM::IEC62325::MarketManagement::Domain
FlowDirection	TC57CIM::IEC62325::MarketManagement::FlowDirection
GLSK_MarketDocument	TC57CIM::IEC62325::MarketManagement::MarketDocument
MarketObjectStatus	TC57CIM::IEC62325::MarketManagement::MarketObjectStatus
MarketParticipant	TC57CIM::IEC62325::MarketCommon::MarketParticipant
MarketRole	TC57CIM::IEC62325::MarketCommon::MarketRole
Measure_Unit	TC57CIM::IEC62325::MarketManagement::Unit
MktPSRType	TC57CIM::IEC62325::MarketManagement::MktPSRType
Point	TC57CIM::IEC62325::MarketManagement::Point
Process	TC57CIM::IEC62325::MarketManagement::Process
Quantity	TC57CIM::IEC62325::MarketManagement::Quantity
Reason	TC57CIM::IEC62325::MarketManagement::Reason
Received_MarketDocument	TC57CIM::IEC62325::MarketManagement::MarketDocument
RegisteredResource	TC57CIM::IEC62325::MarketCommon::RegisteredResource
ResourceCapacity	TC57CIM::IEC62325::MarketCommon::ResourceCapacity
Series_Period	TC57CIM::IEC62325::MarketManagement::Period
SK_ResourceCapacity	TC57CIM::IEC62325::MarketCommon::ResourceCapacity
SKBlock_TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries
Time_Period	TC57CIM::IEC62325::MarketManagement::Period
TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries

99

- 100 **2.2 GLSK assembly model**
- 101 **2.2.1 Overview of the model**
- 102 Figure 2 shows the model.



- 103
- 104

Figure 2 - GLSK assembly model

105 **2.2.2 IsBasedOn relationships from the European style market profile**

106 Table 2 shows the traceability dependency of the classes used in this package towards the
107 upper level.

108 **Table 2 - IsBasedOn dependency**

Name	Complete IsBasedOn Path
GLSK_MarketDocument	TC57CIM::IEC62325::MarketManagement::MarketDocument
Point	TC57CIM::IEC62325::MarketManagement::Point
Reason	TC57CIM::IEC62325::MarketManagement::Reason
RegisteredResource	TC57CIM::IEC62325::MarketCommon::RegisteredResource
Series_Period	TC57CIM::IEC62325::MarketManagement::Period
SKBlock_TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries
TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries

109

110 **2.2.3 Detailed GLSK assembly model**

111 **2.2.3.1 GLSK_MarketDocument root class**

112 This document enables to exchange information about the GSK and LSK factors.

113 - Generation shift key (GSK): list specifying those generators that shall contribute to the shift.

114 - Load shift key (LSK): list specifying those load that shall contribute to the shift in order to take
115 into account the contribution of generators connected to lower voltage levels.

116 If GSK and LSK are defined, a participation factor is also given:

117 - G(a) Participation factor for generation nodes

118 - L(a) Participation factor for load nodes

119 The sum of G(a) and L(a) for each area has to be to 1 (i.e. 100%).

120 An electronic document containing the information necessary to satisfy the requirements of a
121 given business process.

122 Table 3 shows all attributes of GLSK_MarketDocument.

123 **Table 3 - Attributes of GLSK assembly model::GLSK_MarketDocument**

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	mRID ID_String	The unique identification of the document being exchanged within a business process flow.
1	[1..1]	revisionNumber ESMPVersion_String	The identification of the version that distinguishes one evolution of a document from another.
2	[1..1]	type MessageKind_String	The coded type of a document. The document type describes the principal characteristic of the document.
3	[0..1]	process.processType ProcessKind_String	The identification of the nature of process that the document addresses.
4	[1..1]	sender_MarketParticipant.mRID PartyID_String	The identification of a party in the energy market. --- Document owner.
5	[1..1]	sender_MarketParticipant.marketRole.type MarketRoleKind_String	The identification of the role played by a market player. --- Document owner.

Order	mult.	Attribute name / Attribute type	Description
6	[1..1]	receiver_MarketParticipant.mRID PartyID_String	The identification of a party in the energy market. --- Document recipient.
7	[1..1]	receiver_MarketParticipant.marketRole.type MarketRoleKind_String	The identification of the role played by a market player. --- Document recipient.
8	[1..1]	createdDateTime ESMP_DateTime	The date and time of the creation of the document.
9	[0..1]	docStatus Action_Status	The status of the document.
10	[0..1]	status Action_Status	The kind of network data provided in the document
11	[0..1]	received_MarketDocument.mRID ID_String	The unique identification of the received document
12	[0..1]	received_MarketDocument.revisionNumber ESMPVersion_String	The identification of the version of the received document
13	[1..1]	time_Period.timeInterval ESMP_DateTimeInterval	The start and end date and time for a given interval. --- The beginning and ending date and time of the period covered in the document.
14	[1..1]	domain.mRID AreaID_String	The unique identification of the domain. --- The identification of the domain that is covered in the document.

124

125 Table 4 shows all association ends of GLSK_MarketDocument with other classes.

126 **Table 4 - Association ends of GLSK assembly model::GLSK_MarketDocument with**
127 **other classes**

Order	mult.	Class name / Role	Description
15	[1..*]	TimeSeries TimeSeries	The time series that is associated with an electronic document. Association Based On: GLSK contextual model::TimeSeries.TimeSeries[1..*] ----- GLSK contextual model::GLSK_MarketDocument.[]
16	[0..*]	Reason Reason	Association Based On: GLSK contextual model::Reason.Reason[0..*] ----- GLSK contextual model::GLSK_MarketDocument.[]

128

129 2.2.3.2 Point

130 The identification of the values being addressed within a specific interval of time.

131 Table 5 shows all attributes of Point.

132 **Table 5 - Attributes of GLSK assembly model::Point**

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	position Position_Integer	A sequential value representing the relative position within a given time interval.

133

134 Table 6 shows all association ends of Point with other classes.

135 **Table 6 - Association ends of GLSK assembly model::Point with other classes**

Order	mult.	Class name / Role	Description
1	[1..*]	SKBlock_TimeSeries SKBlock_TimeSeries	TheTimeSeries provides additional information related to a Position within a given time interval. Association Based On: GLSK contextual model::SKBlock_TimeSeries.SKBlock_TimeSeries[1..*] ----- GLSK contextual model::Point.[]
2	[0..*]	Reason Reason	The Reason information associated with a Point providing motivation information. Association Based On: GLSK contextual model::Reason.Reason[0..*] ----- GLSK contextual model::Point.[]

136

137 **2.2.3.3 Reason**

138 The motivation of an act.

139 Table 7 shows all attributes of Reason.

140 **Table 7 - Attributes of GLSK assembly model::Reason**

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

141

142 **2.2.3.4 RegisteredResource**

143 A resource that is registered through the market participant registration system. Examples
144 include generating unit, load, and non-physical generator or load.

145 Table 8 shows all attributes of RegisteredResource.

146 **Table 8 - Attributes of GLSK assembly model::RegisteredResource**

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	mRID ResourceID_String	The unique identification of a resource.
1	[0..1]	name String	The name is any free human readable and possibly non unique text naming the object.
2	[0..1]	sK_ResourceCapacity.defaultCapacity Decimal	Default capacity value of shift key.
3	[0..1]	resourceCapacity.maximumCapacity Decimal	The maximum capacity is used with the remaining available capacity, or merit order methods.
4	[0..1]	resourceCapacity.minimumCapacity Decimal	The minimum capacity is used with the remaining available capacity, or merit order methods.
5	[0..1]	marketObjectStatus.status Status_String	The action that can be realized on a registered resource like start/stop. --- The status of the registered resource, e.g. connected, disconnected, outage, ...

147

148 Table 9 shows all association ends of RegisteredResource with other classes.

149 **Table 9 - Association ends of GLSK assembly model::RegisteredResource with other**
150 **classes**

Order	mult.	Class name / Role	Description
6	[0..*]	Reason Reason	The reason information associated with a RegisteredResource providing motivation information. Association Based On: GLSK contextual model::Reason.Reason[0..*] ----- GLSK contextual model::RegisteredResource.[]

151

152 2.2.3.5 Series_Period

153 The identification of the period of time corresponding to a given time interval and resolution.

154 Table 10 shows all attributes of Series_Period.

155 **Table 10 - Attributes of GLSK assembly model::Series_Period**

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	timeInterval ESMP_DateTimeInterval	The start and end time of the period.
1	[1..1]	resolution Duration	The definition of the number of units of time that compose an individual step within a period.

156

157 Table 11 shows all association ends of Series_Period with other classes.

158 **Table 11 - Association ends of GLSK assembly model::Series_Period with other classes**

Order	mult.	Class name / Role	Description
2	[1..*]	Point Point	The Point information associated with a given Series_Period.within a TimeSeries. Association Based On: GLSK contextual model::Point.Point[1..*] ----- GLSK contextual model::Series_Period.[]

159

160 2.2.3.6 SKBlock_TimeSeries

161 The type of shift keys is defined in the BusinessType codelist.

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

163 In the ESMP profile, the TimeSeries provides not only time-ordered quantities but also time-
164 ordered information.

165 Table 12 shows all attributes of SKBlock_TimeSeries.

166

Table 12 - Attributes of GLSK assembly model::SKBlock_TimeSeries

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	businessType BusinessKind_String	The identification of the nature of the time series.
1	[1..1]	mktPSRType.psrType PsrType_String	The coded type of a power system resource. --- The identification of the type of resource associated with a TimeSeries.
2	[0..1]	quantity.quantity Decimal	The quantity value. The association role provides the information about what is expressed. --- The shift key value applicable to all resources. This is a value in the range [0,1]. The quantity information associated to a TimeSeries.
3	[0..1]	flowDirection.direction DirectionKind_String	The coded identification of the direction of energy flow. --- For the merit order list (GSK or LSK), provide the information if the registered resource contributes either as "UP" or "DOWN" units.
4	[0..1]	measurement_Unit.name MeasurementUnitKind_String	The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measure of the attributes based on ResourceCapacity class.
5	[0..1]	attributeInstanceComponent.position Position_Integer	A sequential value representing a relative sequence number. --- To be used only for merit order participation factor. This attribute provides the identification of order in which the groups are called (1 is the first, 2 the second, etc.)
6	[0..1]	domain.mRID AreaID_String	The unique identification of the domain. --- For interconnection shift key, the domain is used to identify the area contributing to the GLSK. The domain associated with a TimeSeries.
7	[0..1]	maximum_Quantity.quantity Decimal	The quantity value. The association role provides the information about what is expressed. --- The maximum quantity that can be exchanged for interconnection shift key. The quantity information associated to a TimeSeries.
8	[0..1]	maximum_Measurement_Unit.name MeasurementUnitKind_String	The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measure for the maximum quantity in SKBlock_TimeSeries. The unit of measure associated with the quantities in a TimeSeries.

167

168 Table 13 shows all association ends of SKBlock_TimeSeries with other classes.

169 **Table 13 - Association ends of GLSK assembly model::SKBlock_TimeSeries with other**
170 **classes**

Order	mult.	Class name / Role	Description
9	[0..*]	RegisteredResource RegisteredResource	The identification of a resource associated with a TimeSeries. Association Based On: GLSK contextual model::RegisteredResource.RegisteredResource[0..*] ----- GLSK contextual model::SKBlock_TimeSeries.[]
10	[0..*]	Reason Reason	The reason information associated with a TimeSeries providing motivation information. Association Based On: GLSK contextual model::Reason.Reason[0..*] ----- GLSK contextual model::SKBlock_TimeSeries.[]

171 **2.2.3.7 TimeSeries**

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

173 Table 14 shows all attributes of TimeSeries.

174 **Table 14 - Attributes of GLSK assembly model::TimeSeries**

Order	mult.	Attribute name / Attribute type	Description
0	[0..1]	mRID ID_String	A unique identification of the time series.
1	[0..1]	name String	The name is any free human readable and possibly non unique text naming the object.
2	[1..1]	subject_Domain.mRID AreaID_String	The unique identification of the domain. --- The identification of the area.
3	[1..1]	curveType CurveType_String	The identification of the coded representation of the type of curve being described.

175

176 Table 15 shows all association ends of TimeSeries with other classes.

177 **Table 15 - Association ends of GLSK assembly model::TimeSeries with other classes**

Order	mult.	Class name / Role	Description
4	[1..*]	Series_Period Period	The time interval and resolution for a period associated with a TimeSeries. Association Based On: GLSK contextual model::Series_Period.Period[1..*] ----- GLSK contextual model::TimeSeries.[]

178

179 **2.2.4 Datatypes**

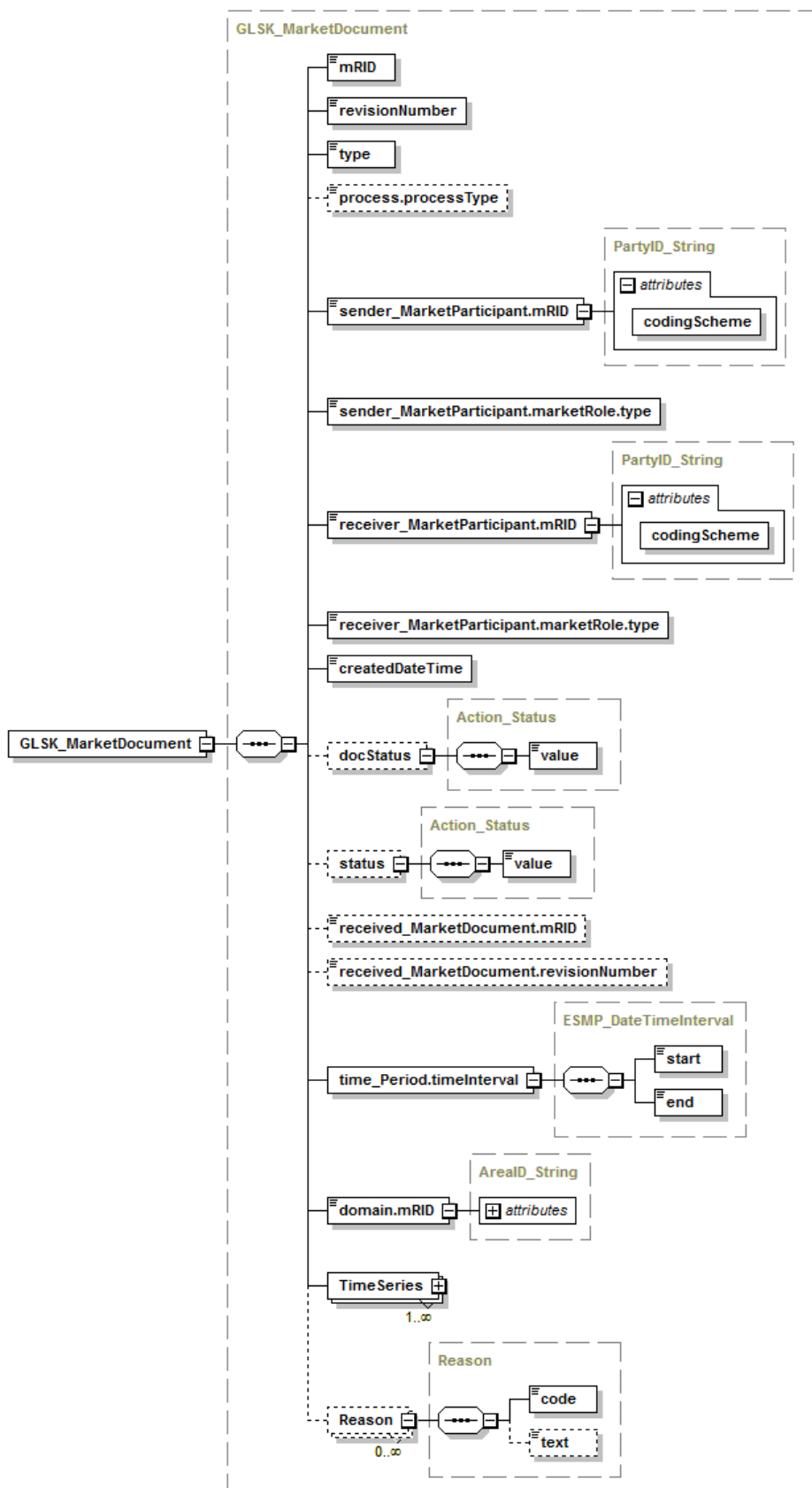
180 The list of datatypes used for the GLSK assembly model is as follows:

- 181 • Action_Status compound
- 182 • ESMP_DateTimeInterval compound
- 183 • AreaID_String datatype, codelist CodingSchemeTypeList
- 184 • BusinessKind_String datatype, codelist BusinessTypeList
- 185 • CurveType_String datatype, codelist CurveTypeList
- 186 • DirectionKind_String datatype, codelist DirectionTypeList
- 187 • ESMP_DateTime datatype
- 188 • ESMPVersion_String datatype
- 189 • ID_String datatype
- 190 • MarketRoleKind_String datatype, codelist RoleTypeList
- 191 • MeasurementUnitKind_String datatype, codelist UnitOfMeasureTypeList
- 192 • MessageKind_String datatype, codelist MessageTypeList
- 193 • PartyID_String datatype, codelist CodingSchemeTypeList
- 194 • Position_Integer datatype
- 195 • ProcessKind_String datatype, codelist ProcessTypeList
- 196 • PsrType_String datatype, codelist AssetTypeList
- 197 • ReasonCode_String datatype, codelist ReasonCodeTypeList
- 198 • ReasonText_String datatype
- 199 • ResourceID_String datatype, codelist CodingSchemeTypeList
- 200 • Status_String datatype, codelist StatusTypeList
- 201 • YMDHM_DateTime datatype

202

203 **2.2.5 GLSK_MarketDocument XML schema structure**

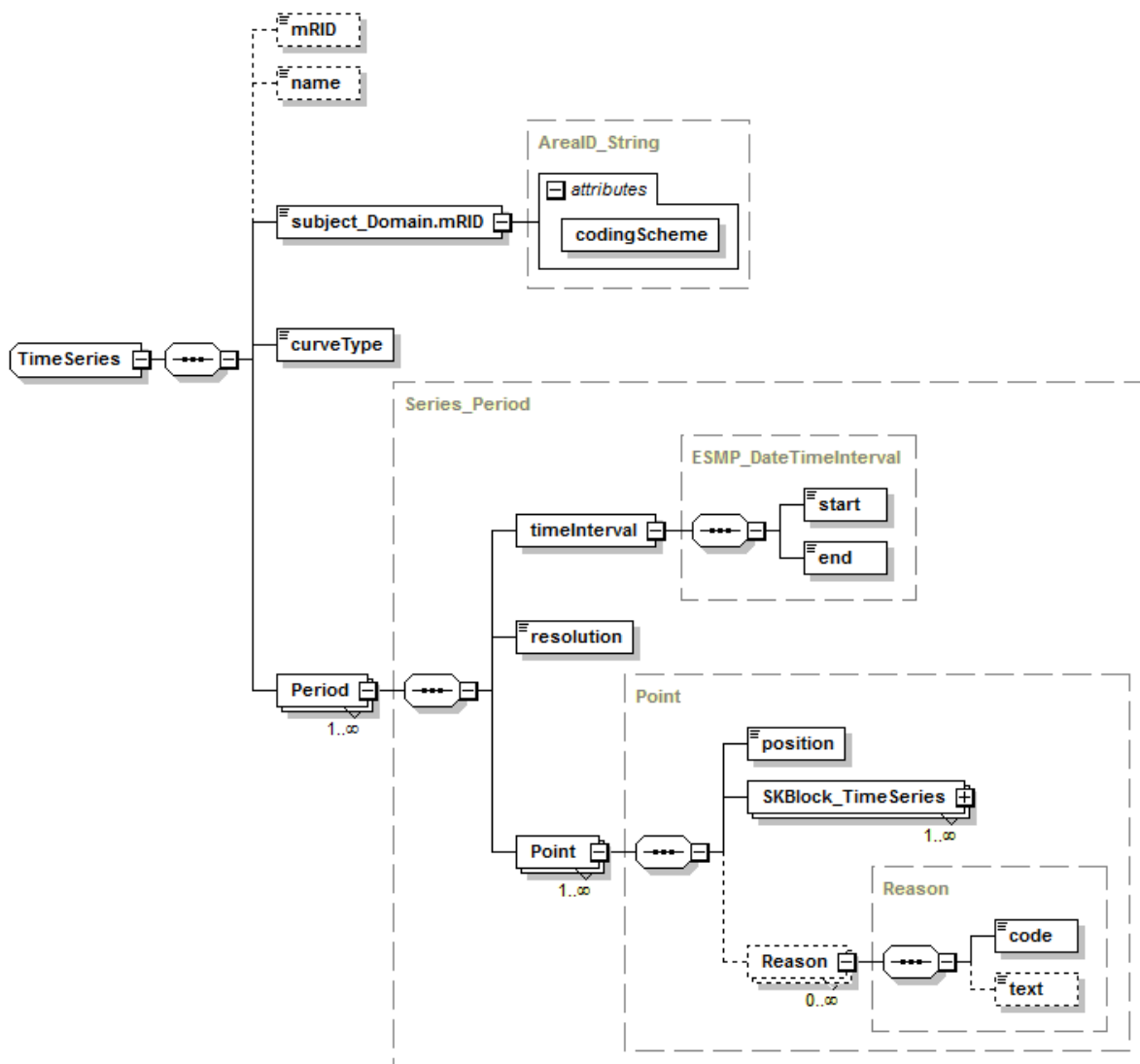
204 Figure 3 to Figure 5 provide the structure of the schema.



205

206

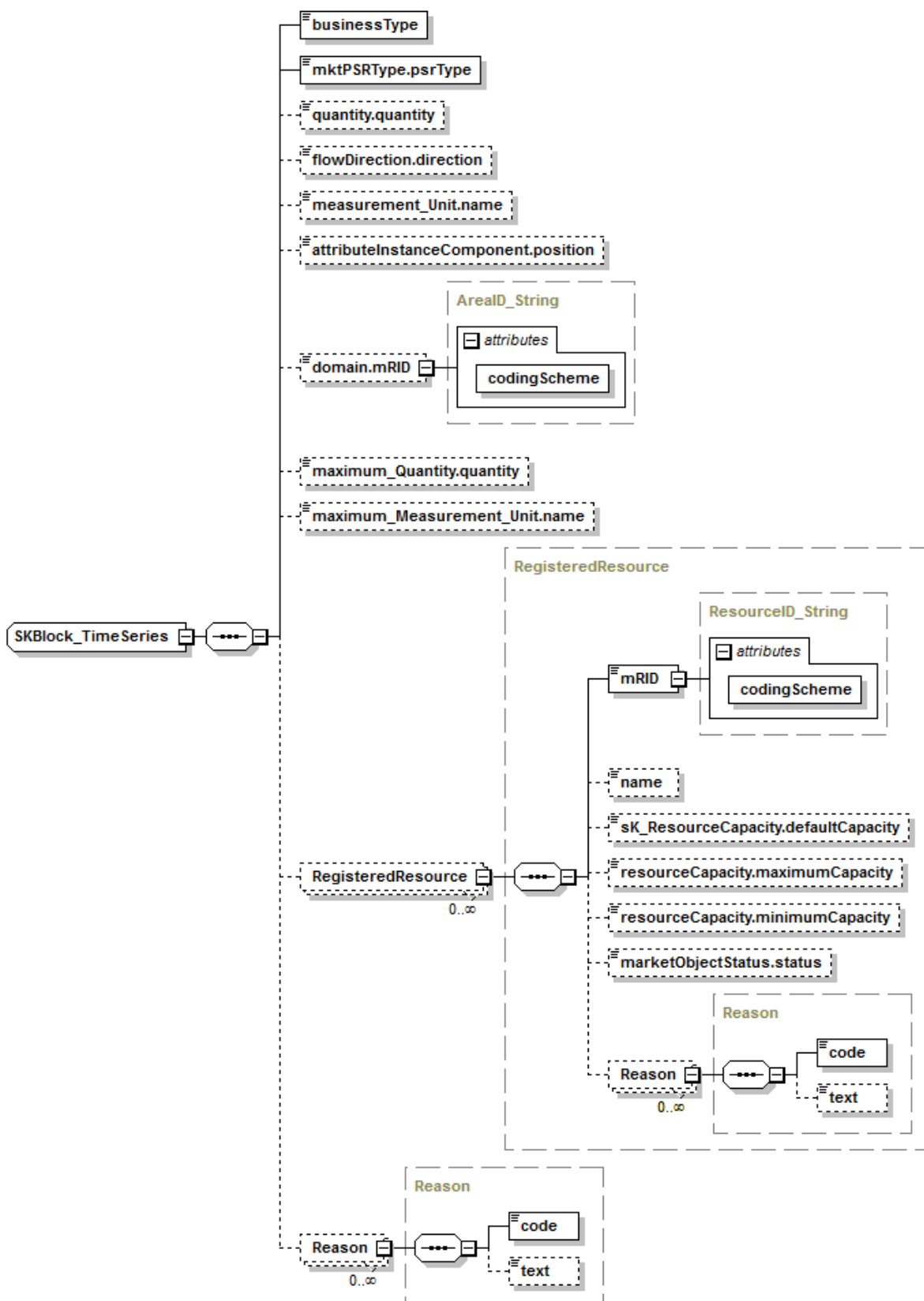
Figure 3 - GLSK schema structure 1/3



207

208

Figure 4 - GLSK schema structure 2/3



209

210

Figure 5 - GLSK schema structure 3/3

211

212 2.2.6 GLSK_MarketDocument XML schema

213 The XSD file to be used with this implementation guide is:

214 urn:iec62325.351:tc57wg16:451-n:glskdocument:2:1

```
215
216 <?xml version="1.0" encoding="utf-8"?>
217 <xs:schema xmlns:ecl="urn:entsoe.eu:wgedi:codelists"
218 xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xmlns="urn:iec62325.351:tc57wg16:451-
219 n:glskdocument:2:1" xmlns:cimp="http://www.iec.ch/cimprofile"
220 xmlns:xs="http://www.w3.org/2001/XMLSchema"
221 targetNamespace="urn:iec62325.351:tc57wg16:451-n:glskdocument:2:1"
222 elementFormDefault="qualified" attributeFormDefault="unqualified">
223   <xs:import namespace="urn:entsoe.eu:wgedi:codelists" schemaLocation="urn-
224 entsoe-eu-wgedi-codelists.xsd"/>
225   <xs:element name="GLSK_MarketDocument" type="GLSK_MarketDocument"/>
226   <xs:simpleType name="ID_String"
227 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
228     <xs:restriction base="xs:string">
229       <xs:maxLength value="35"/>
230     </xs:restriction>
231   </xs:simpleType>
232   <xs:simpleType name="ESMPVersion_String"
233 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
234     <xs:restriction base="xs:string">
235       <xs:pattern value="[1-9]([0-9]){0,2}"/>
236     </xs:restriction>
237   </xs:simpleType>
238   <xs:simpleType name="MessageKind_String"
239 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
240     <xs:restriction base="ecl:MessageTypeList"/>
241   </xs:simpleType>
242   <xs:simpleType name="ProcessKind_String"
243 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
244     <xs:restriction base="ecl:ProcessTypeList"/>
245   </xs:simpleType>
246   <xs:simpleType name="PartyID_String-base"
247 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
248     <xs:restriction base="xs:string">
249       <xs:maxLength value="16"/>
250     </xs:restriction>
251   </xs:simpleType>
252   <xs:complexType name="PartyID_String"
253 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
254     <xs:simpleContent>
255       <xs:extension base="PartyID_String-base">
256         <xs:attribute name="codingScheme"
257 type="ecl:CodingSchemeTypeList" use="required"/>
258       </xs:extension>
259     </xs:simpleContent>
260   </xs:complexType>
261   <xs:simpleType name="MarketRoleKind_String"
262 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
263     <xs:restriction base="ecl:RoleTypeList"/>
264   </xs:simpleType>
265   <xs:simpleType name="ESMP_DateTime"
266 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
267     <xs:restriction base="xs:dateTime">
268       <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02]))[\-](0[1-
269 9]|[12][0-9]|3[01]))|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|[12][0-
```

```
270 9)|30))T((([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-
271 9))Z)|((([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][0
272 48]|[02468][048][02468][048]|[02468][1235679](0)[48]|[02468][1235679][2468][048]|
273 0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T((([01][0-9]|2[0-3]):[0-
274 5][0-9]:[0-5][0-
275 9))Z)|((([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][0134578
276 9][2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[0246
277 8][1235679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-
278 9]|2[0-8])T((([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z)"/>
279 </xs:restriction>
280 </xs:simpleType>
281 <xs:simpleType name="AreaID_String-base"
282 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
283 <xs:restriction base="xs:string">
284 <xs:maxLength value="18"/>
285 </xs:restriction>
286 </xs:simpleType>
287 <xs:complexType name="AreaID_String"
288 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
289 <xs:simpleContent>
290 <xs:extension base="AreaID_String-base">
291 <xs:attribute name="codingScheme"
292 type="ecl:CodingSchemeTypeList" use="required"/>
293 </xs:extension>
294 </xs:simpleContent>
295 </xs:complexType>
296 <xs:simpleType name="Status_String"
297 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
298 <xs:restriction base="ecl:StatusTypeList"/>
299 </xs:simpleType>
300 <xs:complexType name="Action_Status"
301 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Status">
302 <xs:sequence>
303 <xs:element name="value" type="Status_String" minOccurs="1"
304 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
305 cim16#Status.value"/>
306 </xs:sequence>
307 </xs:complexType>
308 <xs:simpleType name="YMDHM_DateTime"
309 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
310 <xs:restriction base="xs:string">
311 <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02]))[\-](0[1-
312 9]|12)[0-9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|12)[0-
313 9]|30))T((([01][0-9]|2[0-3]):[0-5][0-
314 9))Z)|((([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][0
315 48]|[02468][048][02468][048]|[02468][1235679](0)[48]|[02468][1235679][2468][048]|
316 0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T((([01][0-9]|2[0-3]):[0-
317 5][0-
318 9))Z)|((([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][0134578
319 9][2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[0246
320 8][1235679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-
321 9]|2[0-8])T((([01][0-9]|2[0-3]):[0-5][0-9])Z)"/>
322 </xs:restriction>
323 </xs:simpleType>
324 <xs:complexType name="ESMP_DateTimeInterval"
325 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTimeInterval">
326 <xs:sequence>
327 <xs:element name="start" type="YMDHM_DateTime" minOccurs="1"
328 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
329 cim16#DateTimeInterval.start"/>
```

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330         <xs:element name="end" type="YMDHM_DateTime" minOccurs="1"
331 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
332 cim16#DateTimeInterval.end"/>
333     </xs:sequence>
334 </xs:complexType>
335 <xs:complexType name="GLSK_MarketDocument"
336 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketDocument">
337     <xs:sequence>
338         <xs:element name="mRID" type="ID_String" minOccurs="1"
339 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
340 cim16#IdentifiedObject.mRID"/>
341         <xs:element name="revisionNumber" type="ESMPVersion_String"
342 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
343 schema-cim16#Document.revisionNumber"/>
344         <xs:element name="type" type="MessageKind_String" minOccurs="1"
345 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
346 cim16#Document.type"/>
347         <xs:element name="process.processType"
348 type="ProcessKind_String" minOccurs="0" maxOccurs="1"
349 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
350 cim16#Process.processType"/>
351         <xs:element name="sender_MarketParticipant.mRID"
352 type="PartyID_String" minOccurs="1" maxOccurs="1"
353 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
354 cim16#IdentifiedObject.mRID"/>
355         <xs:element name="sender_MarketParticipant.marketRole.type"
356 type="MarketRoleKind_String" minOccurs="1" maxOccurs="1"
357 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type"/>
358         <xs:element name="receiver_MarketParticipant.mRID"
359 type="PartyID_String" minOccurs="1" maxOccurs="1"
360 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
361 cim16#IdentifiedObject.mRID"/>
362         <xs:element name="receiver_MarketParticipant.marketRole.type"
363 type="MarketRoleKind_String" minOccurs="1" maxOccurs="1"
364 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type"/>
365         <xs:element name="createdDateTime" type="ESMP_DateTime"
366 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
367 schema-cim16#Document.createdDateTime"/>
368         <xs:element name="docStatus" type="Action_Status" minOccurs="0"
369 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
370 cim16#Document.docStatus"/>
371         <xs:element name="status" type="Action_Status" minOccurs="0"
372 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
373 cim16#Document.status"/>
374         <xs:element name="received_MarketDocument.mRID"
375 type="ID_String" minOccurs="0" maxOccurs="1"
376 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
377 cim16#IdentifiedObject.mRID"/>
378         <xs:element name="received_MarketDocument.revisionNumber"
379 type="ESMPVersion_String" minOccurs="0" maxOccurs="1"
380 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
381 cim16#Document.revisionNumber"/>
382         <xs:element name="time_Period.timeInterval"
383 type="ESMP_DateTimeInterval" minOccurs="1" maxOccurs="1"
384 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
385 cim16#Period.timeInterval"/>
386         <xs:element name="domain.mRID" type="AreaID_String"
387 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
388 schema-cim16#IdentifiedObject.mRID"/>
```

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389         <xs:element name="TimeSeries" type="TimeSeries" minOccurs="1"
390 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
391 cim16#MarketDocument.TimeSeries"/>
392         <xs:element name="Reason" type="Reason" minOccurs="0"
393 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
394 cim16#MarketDocument.Reason"/>
395     </xs:sequence>
396 </xs:complexType>
397 <xs:simpleType name="Position_Integer"
398 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Integer">
399     <xs:restriction base="xs:integer">
400         <xs:maxInclusive value="999999"/>
401         <xs:minInclusive value="1"/>
402     </xs:restriction>
403 </xs:simpleType>
404 <xs:complexType name="Point"
405 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Point">
406     <xs:sequence>
407         <xs:element name="position" type="Position_Integer"
408 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
409 schema-cim16#Point.position"/>
410         <xs:element name="SKBlock_TimeSeries" type="SKBlock_TimeSeries"
411 minOccurs="1" maxOccurs="unbounded"
412 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
413 cim16#Point.SKBlock_TimeSeries"/>
414         <xs:element name="Reason" type="Reason" minOccurs="0"
415 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
416 cim16#Point.Reason"/>
417     </xs:sequence>
418 </xs:complexType>
419 <xs:simpleType name="ReasonCode_String"
420 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
421     <xs:restriction base="ecl:ReasonCodeTypeList"/>
422 </xs:simpleType>
423 <xs:simpleType name="ReasonText_String"
424 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
425     <xs:restriction base="xs:string">
426         <xs:maxLength value="512"/>
427     </xs:restriction>
428 </xs:simpleType>
429 <xs:complexType name="Reason"
430 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Reason">
431     <xs:sequence>
432         <xs:element name="code" type="ReasonCode_String" minOccurs="1"
433 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
434 cim16#Reason.code"/>
435         <xs:element name="text" type="ReasonText_String" minOccurs="0"
436 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
437 cim16#Reason.text"/>
438     </xs:sequence>
439 </xs:complexType>
440 <xs:simpleType name="ResourceID_String-base"
441 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
442     <xs:restriction base="xs:string">
443         <xs:maxLength value="60"/>
444     </xs:restriction>
445 </xs:simpleType>
446 <xs:complexType name="ResourceID_String"
447 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
448     <xs:simpleContent>
```

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449         <xs:extension base="ResourceID_String-base">
450             <xs:attribute name="codingScheme"
451 type="ecl:CodingSchemeTypeList" use="required"/>
452         </xs:extension>
453     </xs:simpleContent>
454 </xs:complexType>
455 <xs:complexType name="RegisteredResource"
456 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
457 cim16#RegisteredResource">
458     <xs:sequence>
459         <xs:element name="mRID" type="ResourceID_String" minOccurs="1"
460 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
461 cim16#IdentifiedObject.mRID"/>
462         <xs:element name="name" type="xs:string" minOccurs="0"
463 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
464 cim16#IdentifiedObject.name"/>
465         <xs:element name="sK_ResourceCapacity.defaultCapacity"
466 type="xs:decimal" minOccurs="0" maxOccurs="1"
467 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
468 cim16#ResourceCapacity.defaultCapacity"/>
469         <xs:element name="resourceCapacity.maximumCapacity"
470 type="xs:decimal" minOccurs="0" maxOccurs="1"
471 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
472 cim16#ResourceCapacity.maximumCapacity"/>
473         <xs:element name="resourceCapacity.minimumCapacity"
474 type="xs:decimal" minOccurs="0" maxOccurs="1"
475 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
476 cim16#ResourceCapacity.minimumCapacity"/>
477         <xs:element name="marketObjectStatus.status"
478 type="Status_String" minOccurs="0" maxOccurs="1"
479 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
480 cim16#MarketObjectStatus.status"/>
481         <xs:element name="Reason" type="Reason" minOccurs="0"
482 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
483 cim16#RegisteredResource.Reason"/>
484     </xs:sequence>
485 </xs:complexType>
486 <xs:complexType name="Series_Period"
487 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Period">
488     <xs:sequence>
489         <xs:element name="timeInterval" type="ESMP_DateTimeInterval"
490 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
491 schema-cim16#Period.timeInterval"/>
492         <xs:element name="resolution" type="xs:duration" minOccurs="1"
493 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
494 cim16#Period.resolution"/>
495         <xs:element name="Point" type="Point" minOccurs="1"
496 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
497 cim16#Period.Point"/>
498     </xs:sequence>
499 </xs:complexType>
500 <xs:simpleType name="BusinessKind_String"
501 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
502     <xs:restriction base="ecl:BusinessTypeList"/>
503 </xs:simpleType>
504 <xs:simpleType name="PsrType_String"
505 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
506     <xs:restriction base="ecl:AssetTypeList"/>
507 </xs:simpleType>
    
```

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508     <xs:simpleType name="DirectionKind_String"
509 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
510     <xs:restriction base="ecl:DirectionTypeList"/>
511 </xs:simpleType>
512     <xs:simpleType name="MeasurementUnitKind_String"
513 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
514     <xs:restriction base="ecl:UnitOfMeasureTypeList"/>
515 </xs:simpleType>
516     <xs:complexType name="SKBlock_TimeSeries"
517 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#TimeSeries">
518     <xs:sequence>
519         <xs:element name="businessType" type="BusinessKind_String"
520 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
521 schema-cim16#TimeSeries.businessType"/>
522         <xs:element name="mktPSRType.psrType" type="PsrType_String"
523 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
524 schema-cim16#MktPSRType.psrType"/>
525         <xs:element name="quantity.quantity" type="xs:decimal"
526 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
527 schema-cim16#Quantity.quantity"/>
528         <xs:element name="flowDirection.direction"
529 type="DirectionKind_String" minOccurs="0" maxOccurs="1"
530 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
531 cim16#FlowDirection.direction"/>
532         <xs:element name="measurement_Unit.name"
533 type="MeasurementUnitKind_String" minOccurs="0" maxOccurs="1"
534 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Unit.name"/>
535         <xs:element name="attributeInstanceComponent.position"
536 type="Position_Integer" minOccurs="0" maxOccurs="1"
537 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
538 cim16#AttributeInstanceComponent.position"/>
539         <xs:element name="domain.mRID" type="AreaID_String"
540 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
541 schema-cim16#IdentifiedObject.mRID"/>
542         <xs:element name="maximum_Quantity.quantity" type="xs:decimal"
543 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
544 schema-cim16#Quantity.quantity"/>
545         <xs:element name="maximum_Measurement_Unit.name"
546 type="MeasurementUnitKind_String" minOccurs="0" maxOccurs="1"
547 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Unit.name"/>
548         <xs:element name="RegisteredResource" type="RegisteredResource"
549 minOccurs="0" maxOccurs="unbounded"
550 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
551 cim16#TimeSeries.RegisteredResource"/>
552         <xs:element name="Reason" type="Reason" minOccurs="0"
553 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
554 cim16#TimeSeries.Reason"/>
555     </xs:sequence>
556 </xs:complexType>
557     <xs:simpleType name="CurveType_String"
558 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
559     <xs:restriction base="ecl:CurveTypeList"/>
560 </xs:simpleType>
561     <xs:complexType name="TimeSeries"
562 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#TimeSeries">
563     <xs:sequence>
564         <xs:element name="mRID" type="ID_String" minOccurs="0"
565 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
566 cim16#IdentifiedObject.mRID"/>
```



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567         <xs:element name="name" type="xs:string" minOccurs="0"
568 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
569 cim16#IdentifiedObject.name"/>
570         <xs:element name="subject_Domain.mRID" type="AreaID_String"
571 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
572 schema-cim16#IdentifiedObject.mRID"/>
573         <xs:element name="curveType" type="CurveType_String"
574 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
575 schema-cim16#TimeSeries.curveType"/>
576         <xs:element name="Period" type="Series_Period" minOccurs="1"
577 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
578 cim16#TimeSeries.Period"/>
579     </xs:sequence>
580 </xs:complexType>
581 </xs:schema>
```