European Network of
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for Electricity

GENERATION AND LOAD SHIFT KEY DOCUMENT UML MODEL AND SCHEMA

2022-03-15
APPROVED DOCUMENT
VERSION 2.3

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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.
2	3	2022/03/15	Updates in XSD v2.2: mRID of Document, Series and Timeseries (ID_String type) was enlarged from 35 to 60 characters. Approved by MC.

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69 **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.

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88   **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.
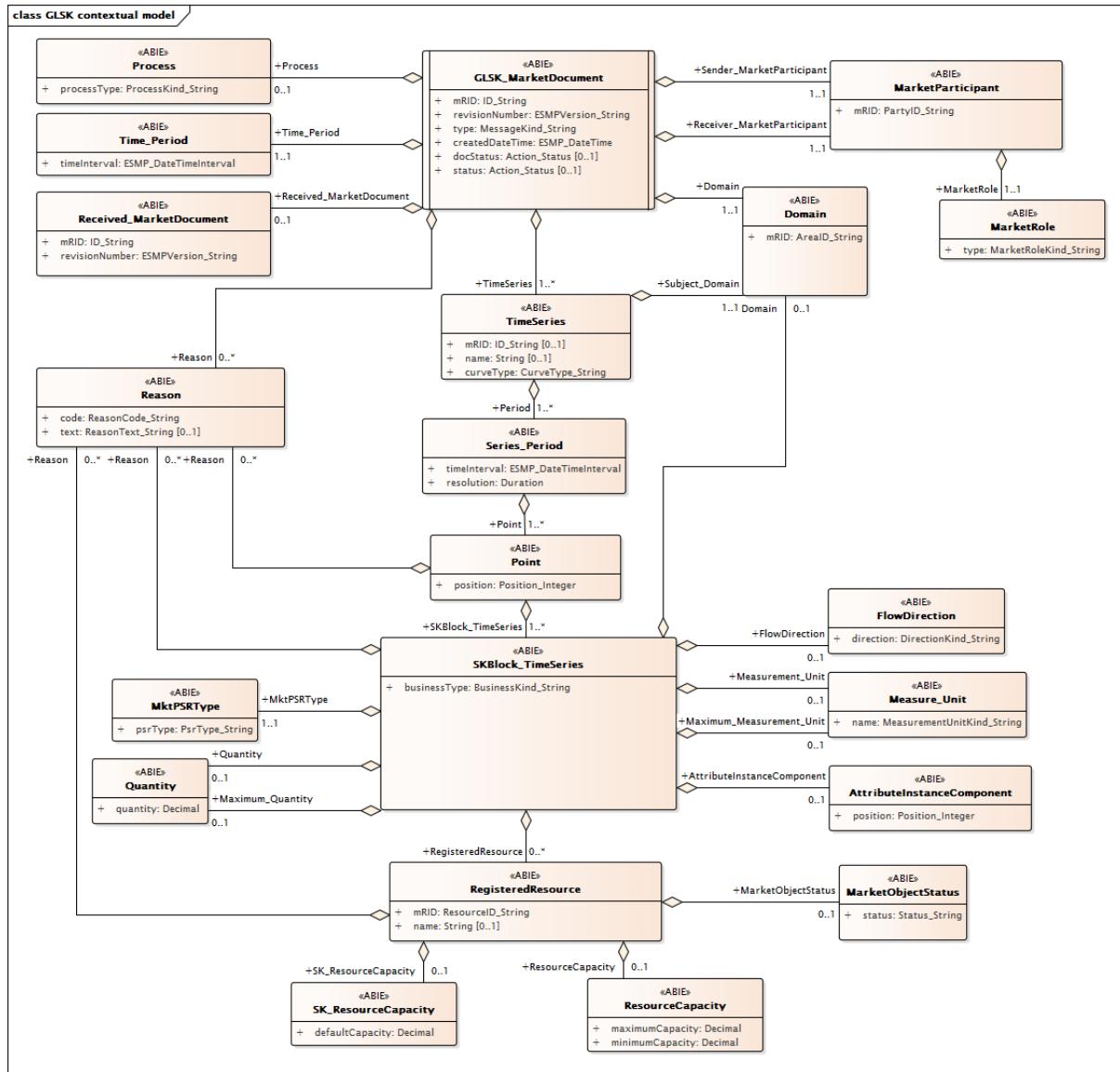
92

93   **Figure 1 - GLSK contextual model**

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94

2.1.2 IsBasedOn relationships from the European style market profile

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

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

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100 **2.2 GLSK assembly model**

101 **2.2.1 Overview of the model**

102 Figure 2 shows the model.
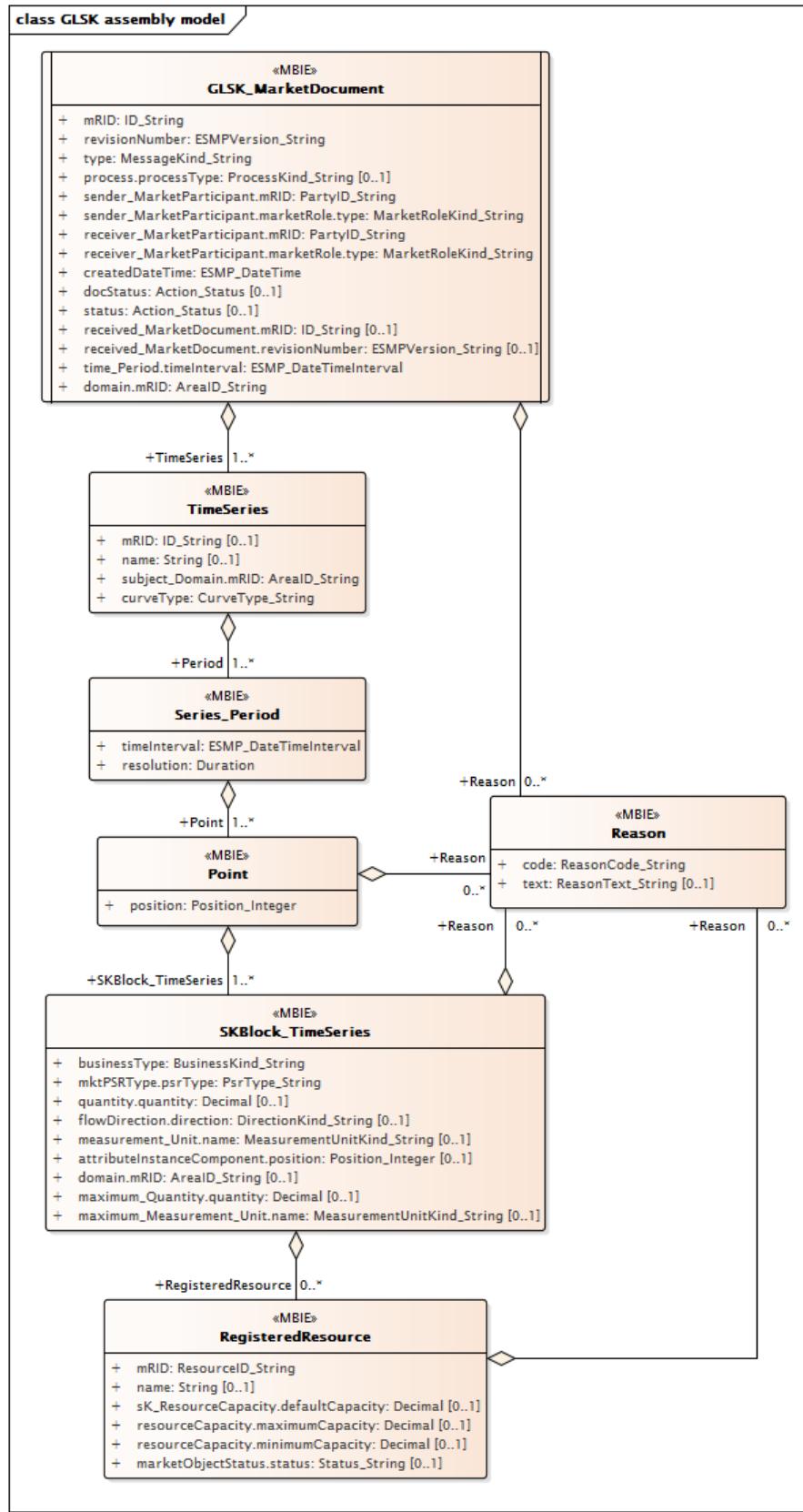
103

104 **Figure 2 - GLSK assembly model**

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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.

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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

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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

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

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, disconnedted, outage, ...

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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.

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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.[]

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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

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203 **2.2.5 GLSK_MarketDocument XML schema structure**

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

205
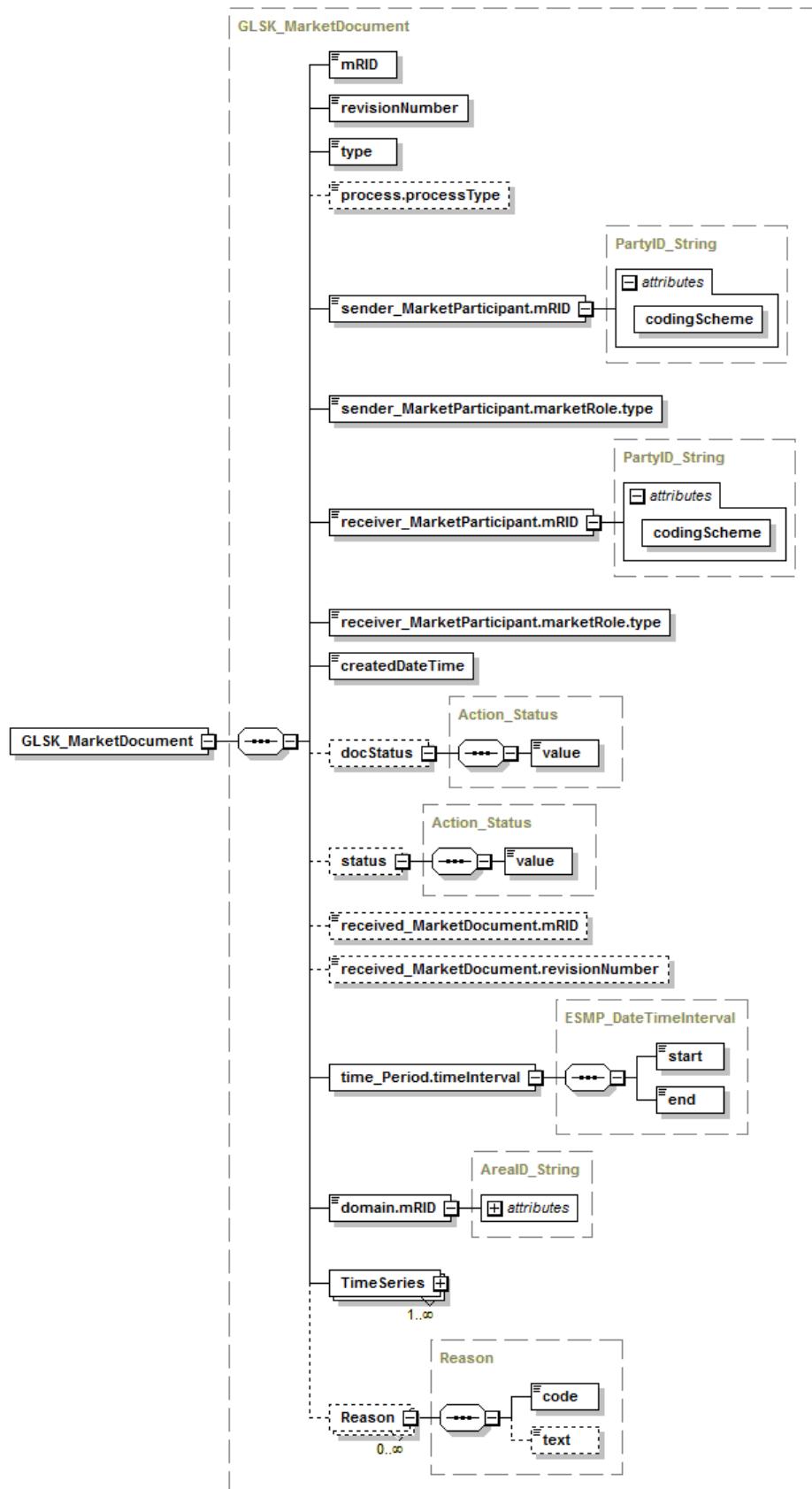
Figure 3 - GLSK schema structure 1/3

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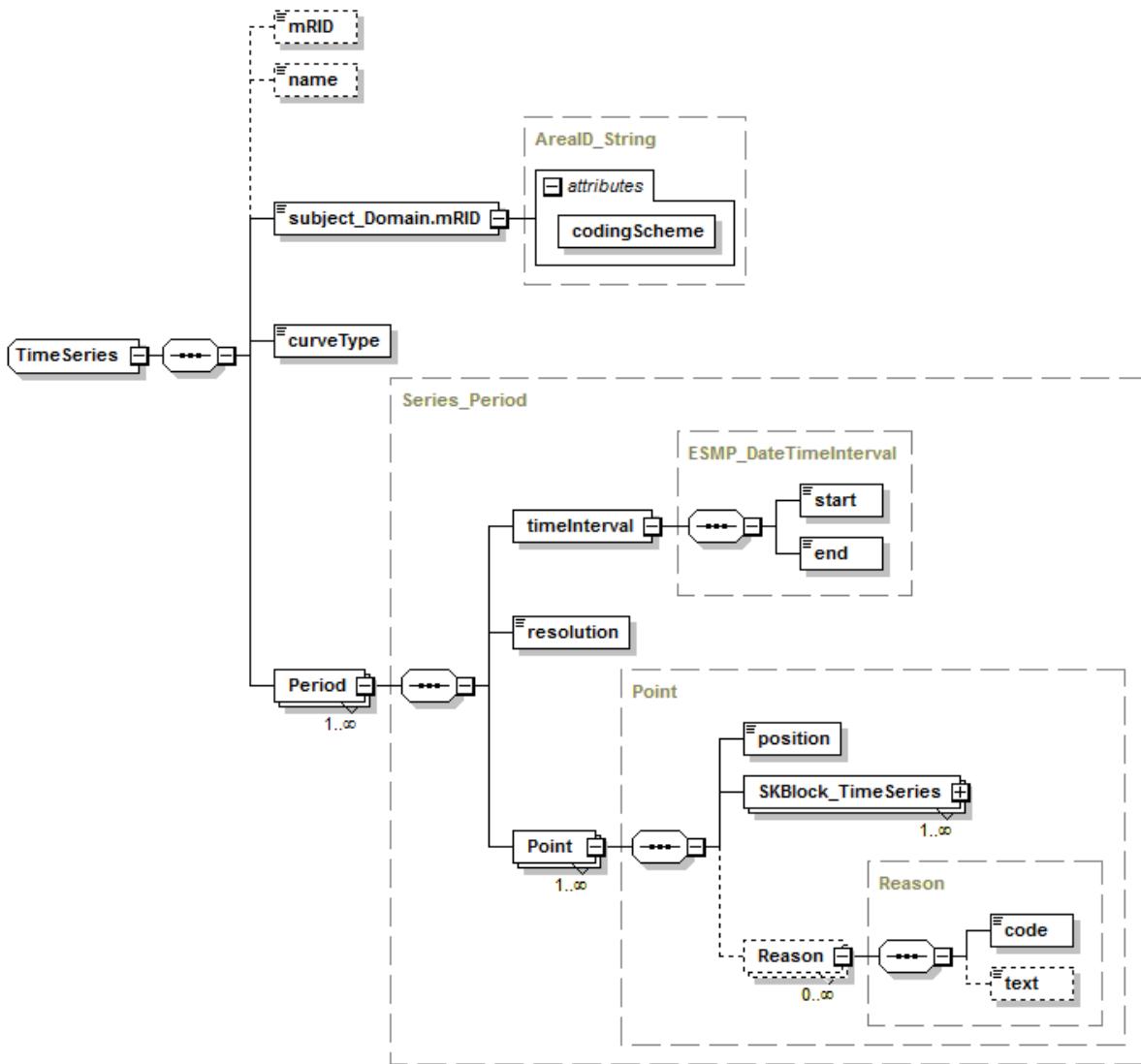
207

208   **Figure 4 - GLSK schema structure 2/3**

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209
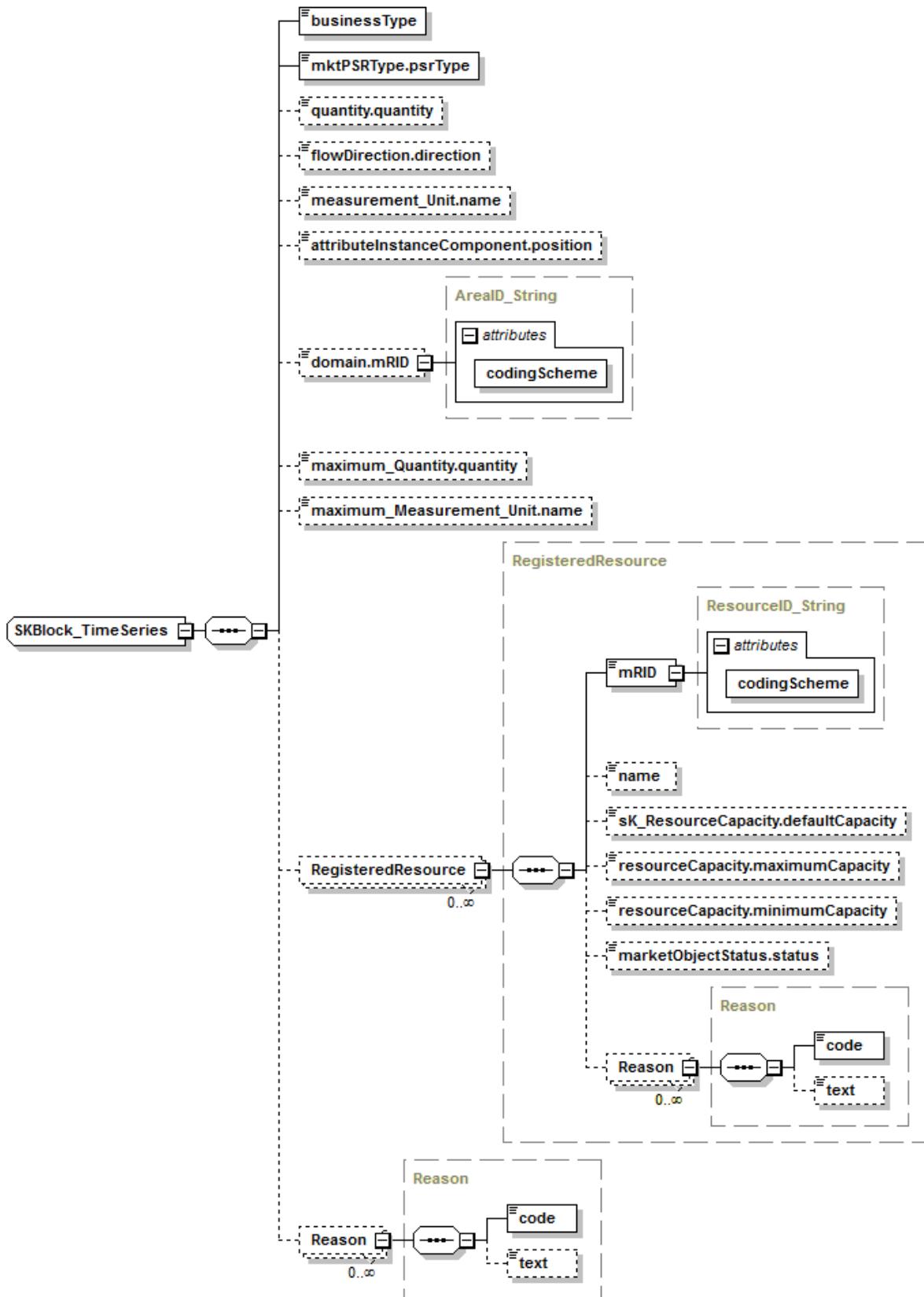
210   **Figure 5 - GLSK schema structure 3/3**

211

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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:2:2

```
215 <?xml version="1.0" encoding="utf-8"?>
216 <xs:schema xmlns:ecl="urn:entsoe.eu:wgedi:codelists"
217 xmlns="urn:iec62325.351:tc57wg16:451-n:glskdocument:2:2"
218 xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
219 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:2:2"
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="60"/>
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-
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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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```xml
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>
582
```