1 The problem statement process

1.1 Business context for the problem statement process

The objective of the problem statement process is to provide:

- a means of informing a party that a document could not be issued by the expected time and thus will be delayed (the approval of this delay depends upon the rules that have been established between the parties);
- an automated support in the case where an escalation procedure has to be put into place when an expected event does not occur or a critical situation has to be resolved.

Figure 1 displays the two parties involved in this kind of data exchanges:

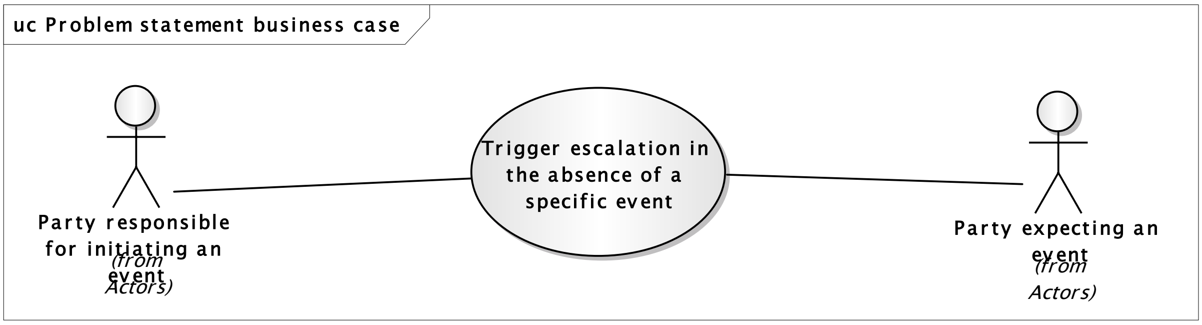
uc Problem statement business case
Party responsible for initiating an event
(from Actors)
Trigger escalation in the absence of a specific event
Party expecting an event
(from Actors)

Figure 1 – Problem statement business case

In a normal document exchange the “party responsible for initiating an event” such as the transmission of a document transmits this within a specified time period. The “party expecting an event” is waiting for the reception of the document in question within the agreed timeframe.

The problem statement business process has a two-fold purpose hereafter described.

- The first is in case where the “party responsible for initiating an event” is not in a position (IT problems, etc.) to transmit an electronic document at the expected time. This party may issue to the other party a trouble shooting document stating when he will be in a position to send the expected document. In such a case, this specific exchange is for information and depending upon the rules agreed between the parties, other data exchanges may occur such as confirmation of the time delay, etc.
- The second is in the case where the expected document does not arrive by the time specified; the “party expecting an event” triggers the transmission of an escalation document to inform the “party responsible for initiating an event” to initiate an escalation procedure instead of sending the expected document.

1.2 Business rules

1.2.1 General

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

A new version (having a greater revisionNumber) of a received document with the same document identification and without error shall completely replace the previous versions.

1.2.2 Business rules for the problem statement process

The “expected_MarketDocument.createdDateTime” attribute is to be provided when:

- The “type” attribute has the value “A35 – Trouble shooting document”
- The “code” attribute has the value “A92 – Not possible to send document on time, but estimated delivery time is provided”.

2 Contextual and assembly models

2.1 Problem statement contextual model

2.1.1 Overview of the model

Figure 2 shows the model.

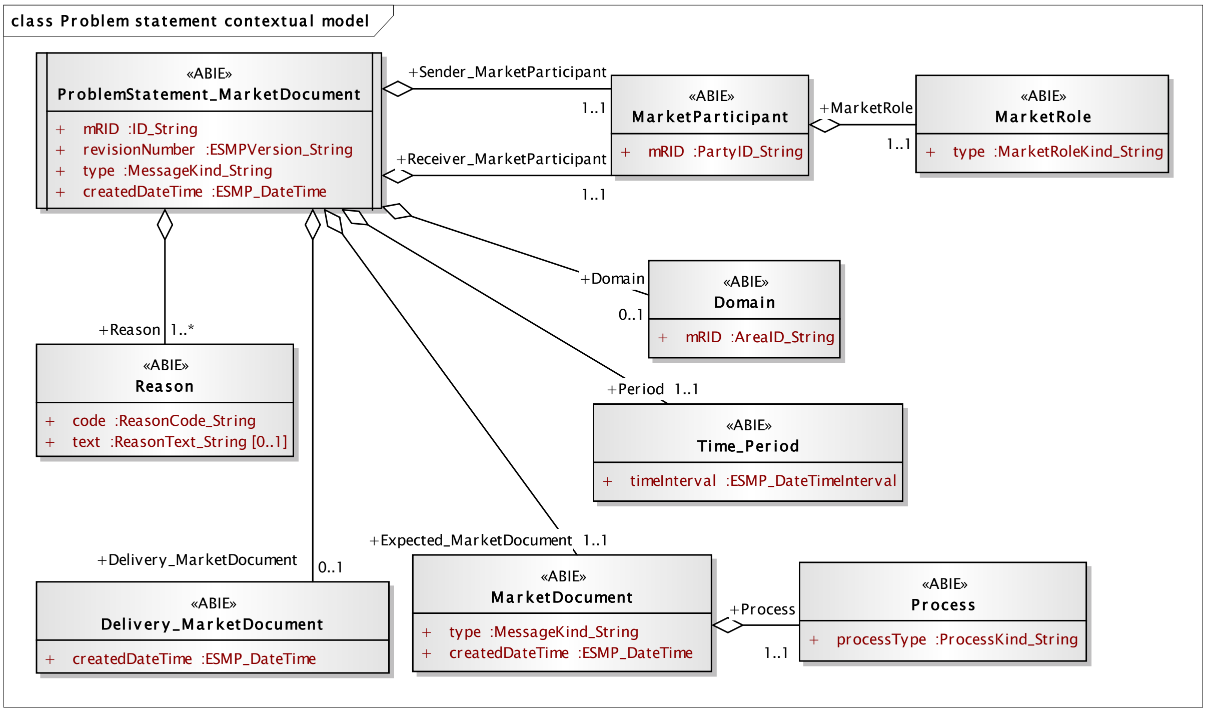
class Problem statement contextual model
«ABIE»
ProblemStatement_MarketDocument
+ mRID :ID_String
+ revisionNumber :ESMPVersion_String
+ type :MessageKind_String
+ createdDateTime :ESMP_DateTime
+Sender_MarketParticipant
1..1
+Receiver_MarketParticipant
1..1
«ABIE»
MarketParticipant
+ mRID :PartyID_String
+MarketRole
1..1
«ABIE»
MarketRole
+ type :MarketRoleKind_String
+Domain
0..1
«ABIE»
Domain
+ mRID :AreaID_String
+Reason
1..*
«ABIE»
Reason
+ code :ReasonCode_String
+ text :ReasonText_String [0..1]
+Period 1..1
«ABIE»
Time_Period
+ timeInterval :ESMP_DateTimeInterval
+Expected_MarketDocument 1..1
+Delivery_MarketDocument
0..1
«ABIE»
Delivery_MarketDocument
+ createdDateTime :ESMP_DateTime
«ABIE»
MarketDocument
+ type :MessageKind_String
+ createdDateTime :ESMP_DateTime
+Process
1..1
«ABIE»
Process
+ processType :ProcessKind_String

Figure 2 - Problem statement contextual model

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	Is BasedOn Class	Complete IsBasedOn Path
Delivery_MarketDocument	ESMPClasses::MarketDocument	62325\ESMPClasses
Domain	ESMPClasses::Domain	62325\ESMPClasses
MarketDocument	ESMPClasses::MarketDocument	62325\ESMPClasses
MarketParticipant	ESMPClasses::MarketParticipant	62325\ESMPClasses
MarketRole	ESMPClasses::MarketRole	62325\ESMPClasses
ProblemStatement_MarketDocument	ESMPClasses::MarketDocument	62325\ESMPClasses
Process	ESMPClasses::Process	62325\ESMPClasses
Reason	ESMPClasses::Reason	62325\ESMPClasses
Time_Period	ESMPClasses::Time_Period	62325\ESMPClasses

2.1.3 Detailed Problem statement contextual model

2.1.3.1 ProblemStatement_MarketDocument root class

The objective of this document is to provide either a means of informing a party that a document could not be issued by the expected time and thus will be delayed (the approval of this delay depends upon the rules that have been established between the parties) or an automated support in the case where an escalation procedure has to be put into place when an expected event does not occur or a critical situation has to be resolved.

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

IsBasedOn: ESMPClasses::MarketDocument

Table 2 shows all attributes of ProblemStatement_MarketDocument.

Table 2 - Attributes of Problem statement contextual model::ProblemStatement_MarketDocument.

mult.	Attribute name	Attribute type	Description
[1..1]	createdDateTime	ESMP_DateTime	The date and time of the creation of the document.
[1..1]	mRID	ID_String	The unique identification of the document being exchanged within a business process flow.
[1..1]	revisionNumber	ESMPVersion_String	The document version is used to identify a given version of a Problem Statement document and is used in the case of possible erroneous transmissions. The first version number for a given document identification shall normally be 1. The identification of the version that distinguishes one evolution of a document from another.
[1..1]	type	MessageKind_String	The following codes could be used - A34: Escalation document; - A35: Trouble shooting document. The coded type of a document. The document type describes the principal characteristic of the document.

Table 3 shows all association ends of ProblemStatement_MarketDocument with other classes.

Table 3 - Association ends of Problem statement contextual model::ProblemStatement_MarketDocument with other classes.

mult.	Role	Class type name	Description
[0..1]	Delivery_MarketDocument	Delivery_MarketDocument	The date and time when the document is expected to be prepared for transmission by the application of the sender. Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketDocument.MarketDocument[0..*]
[0..1]	Domain	Domain	Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::Domain.Domain[0..1]
[1..1]	Expected_MarketDocument	MarketDocument	The information enabling to identify the expected (not received) or not received (escalation) document. Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketDocument.MarketDocument[0..*]
[1..1]	Period	Time_Period	Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::Time_Period.Period[0..*]

mult.	Role	Class type name	Description
[1..*]	Reason	Reason	Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::Reason.Reason[0..*]
[1..1]	Receiver_MarketParticipant	MarketParticipant	Document recipient. Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketParticipant.MarketParticipant[0..*]
[1..1]	Sender_MarketParticipant	MarketParticipant	Document owner. Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketParticipant.MarketParticipant[0..*]

2.1.3.2 Delivery_MarketDocument

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

IsBasedOn: ESMPClasses::MarketDocument

Table 4 shows all attributes of Delivery_MarketDocument.

Table 4 - Attributes of Problem statement contextual model::Delivery_MarketDocument.

mult.	Attribute name	Attribute type	Description
[1..1]	createdDateTime	ESMP_DateTime	The date and time of the creation of the document.

2.1.3.3 Domain

A domain covering a number of related objects, such as market balance area, grid area, borders etc.

IsBasedOn: ESMPClasses::Domain

Table 5 shows all attributes of Domain.

Table 5 - Attributes of Problem statement contextual model::Domain.

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	AreaID_String	The unique identification of the domain.

2.1.3.4 MarketDocument

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

IsBasedOn: ESMPClasses::MarketDocument

Table 6 shows all attributes of MarketDocument.

Table 6 - Attributes of Problem statement contextual model::MarketDocument.

mult.	Attribute name	Attribute type	Description
[1..1]	createdDateTime	ESMP_DateTime	The date and time that the document is expected by the receiver. The date and time of the creation of the document.
[1..1]	type	MessageKind_String	The coded type of a document. The document type describes the principal characteristic of the document.

Table 7 shows all association ends of MarketDocument with other classes.

Table 7 - Association ends of Problem statement contextual model::MarketDocument with other classes.

mult.	Role	Class type name	Description
[1..1]	Process	Process	The process that the expected document is directed at. Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::Process.Process[0..*]

2.1.3.5 MarketParticipant

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

IsBasedOn: ESMPClasses::MarketParticipant

Table 8 shows all attributes of MarketParticipant.

Table 8 - Attributes of Problem statement contextual model::MarketParticipant.

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

Table 9 shows all association ends of MarketParticipant with other classes.

Table 9 - Association ends of Problem statement contextual model::MarketParticipant with other classes.

mult.	Role	Class type name	Description
[1..1]	MarketRole	MarketRole	Association Based On : ESMPClasses::MarketParticipant.[] ----- ESMPClasses::MarketRole.MarketRole[0..1]

2.1.3.6 MarketRole

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

IsBasedOn: ESMPClasses::MarketRole

Table 10 shows all attributes of MarketRole.

Table 10 - Attributes of Problem statement contextual model::MarketRole.

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

2.1.3.7 Process

The formal identification of the business process in which a flow of information is exchanged.

IsBasedOn: ESMPClasses::Process

Table 11 shows all attributes of Process.

Table 11 - Attributes of Problem statement contextual model::Process.

mult.	Attribute name	Attribute type	Description
[1..1]	processType	ProcessKind_String	The identification of the nature of process that the document addresses.

2.1.3.8 Reason

The reason code is used to identify the reason for the transmission of the document. If necessary additional information may be provided in the reason text.

The following codes have currently been identified: - A91: Expected document not received; - A92: Not possible to send document on time, but estimated delivery time is provided; - A93: Not possible to send document on time, and further more no expected time of return to normal situation.

The motivation of an act.

IsBasedOn: ESMPClasses::Reason

Table 12 shows all attributes of Reason.

Table 12 - Attributes of Problem statement contextual model::Reason.

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

2.1.3.9 Time_Period

The identification of a time interval.

IsBasedOn: ESMPClasses::Time_Period

Table 13 shows all attributes of Time_Period.

Table 13 - Attributes of Problem statement contextual model::Time_Period.

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

2.2 Problem statement assembly model

2.2.1 Overview of the model

Figure 3 shows the model.

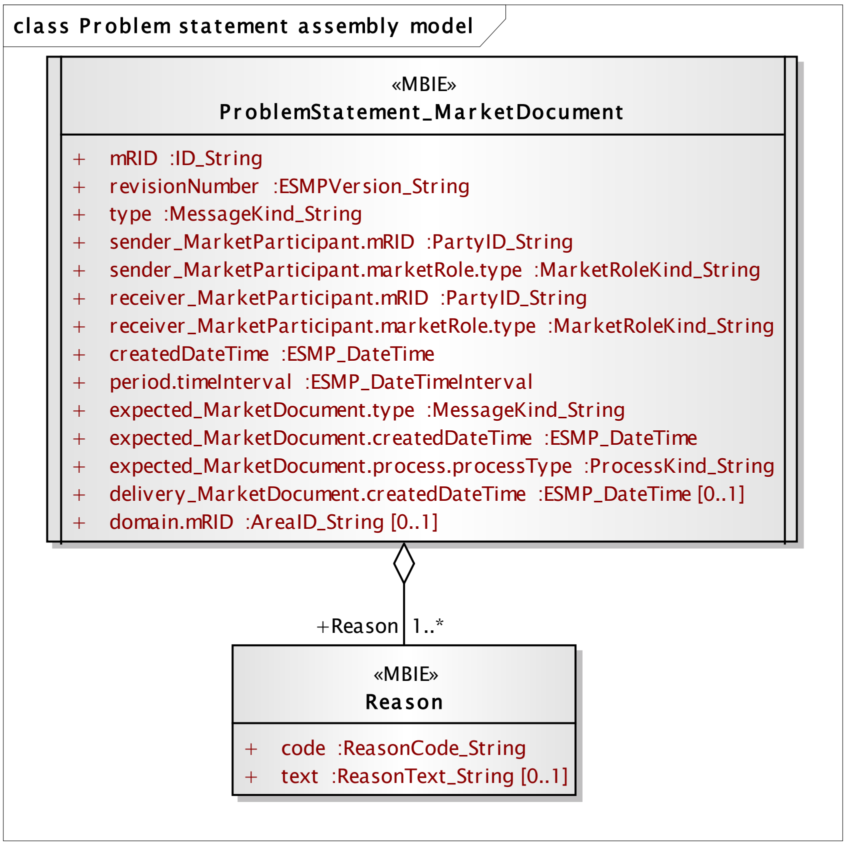
class Problem statement assembly model
«MBIE»
ProblemStatement_MarketDocument
+ mRID :ID_String
+ revisionNumber :ESMPVersion_String
+ type :MessageKind_String
+ sender_MarketParticipant.mRID :PartyID_String
+ sender_MarketParticipant.marketRole.type :MarketRoleKind_String
+ receiver_MarketParticipant.mRID :PartyID_String
+ receiver_MarketParticipant.marketRole.type :MarketRoleKind_String
+ createdDateTime :ESMP_DateTime
+ period.timeInterval :ESMP_DateTimeInterval
+ expected_MarketDocument.type :MessageKind_String
+ expected_MarketDocument.createdDateTime :ESMP_DateTime
+ expected_MarketDocument.process.processType :ProcessKind_String
+ delivery_MarketDocument.createdDateTime :ESMP_DateTime [0..1]
+ domain.mRID :AreaID_String [0..1]
+Reason
1..*
«MBIE»
Reason
+ code :ReasonCode_String
+ text :ReasonText_String [0..1]

Figure 3 - Problem statement assembly model

2.2.2 IsBasedOn relationships from the European style market profile

Table 14 shows the traceability dependency of the classes used in this package towards the upper level.

Table 14 - IsBasedOn dependency

Name	Is BasedOn Class	Complete IsBasedOn Path
ProblemStatement_MarketDocument	Problem statement contextual model::ProblemStatement_MarketDocument	62325\Problem statement contextual model
Reason	Problem statement contextual model::Reason	62325\Problem statement contextual model

2.2.3 Detailed Problem statement assembly model

2.2.3.1 ProblemStatement_MarketDocument root class

The objective of this document is to provide either a means of informing a party that a document could not be issued by the expected time and thus will be delayed (the approval of this delay depends upon the rules that have been established between the parties) or an automated support in the case where an escalation procedure has to be put into place when an expected event does not occur or a critical situation has to be resolved.

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

IsBasedOn: Problem statement contextual model::ProblemStatement_MarketDocument

Table 15 shows all attributes of ProblemStatement_MarketDocument.

Table 15 - Attributes of Problem statement assembly model::ProblemStatement_MarketDocument.

mult.	Attribute name	Attribute type	Description
[1..1]	createdDateTime	ESMP_DateTime	The date and time of the creation of the document.
[0..1]	delivery_MarketDocument.createdDateTime	ESMP_DateTime	The date and time of the creation of the document. --- The date and time when the document is expected to be prepared for transmission by the application of the sender.
[0..1]	domain.mRID	AreaID_String	The unique identification of the domain.
[1..1]	expected_MarketDocument.createdDateTime	ESMP_DateTime	The date and time that the document is expected by the receiver. The date and time of the creation of the document. --- The information enabling to identify the expected (not received) or not received (escalation) document.
[1..1]	expected_MarketDocument.process.processType	ProcessKind_String	The identification of the nature of process that the document addresses. --- The information enabling to identify the expected (not received) or not received (escalation) document. --- The process that the expected document is directed at.
[1..1]	expected_MarketDocument.type	MessageKind_String	The coded type of a document. The document type describes the principal characteristic of the document. --- The information enabling to identify the expected (not received) or not received (escalation) document.
[1..1]	mRID	ID_String	The unique identification of the document being exchanged within a business process flow.
[1..1]	period.timeInterval	ESMP_DateTimeInterval	The start and end date and time for a given interval.
[1..1]	receiver_MarketParticipant.marketRole.type	MarketRoleKind_String	The identification of the role played by a market player. --- Document recipient.
[1..1]	receiver_MarketParticipant.mRID	PartyID_String	The identification of a party in the energy market. --- Document recipient.

mult.	Attribute name	Attribute type	Description
[1..1]	revisionNumber	ESMPVersion_String	The document version is used to identify a given version of a Problem Statement document and is used in the case of possible erroneous transmissions. The first version number for a given document identification shall normally be 1. The identification of the version that distinguishes one evolution of a document from another.
[1..1]	sender_MarketParticipant.marketRole.type	MarketRoleKind_String	The identification of the role played by a market player. --- Document owner.
[1..1]	sender_MarketParticipant.mRID	PartyID_String	The identification of a party in the energy market. --- Document owner.
[1..1]	type	MessageKind_String	The following codes could be used - A34: Escalation document; - A35: Trouble shooting document. The coded type of a document. The document type describes the principal characteristic of the document.

Table 16 shows all association ends of ProblemStatement_MarketDocument with other classes.

Table 16 - Association ends of Problem statement assembly model::ProblemStatement_MarketDocument with other classes.

mult.	Role	Class type name	Description
[1..*]	Reason	Reason	Association Based On : Problem statement contextual model::Reason.Reason[1..*] ----- Problem statement contextual model::ProblemStatement_MarketDocument.[]

2.2.3.2 Reason

The reason code is used to identify the reason for the transmission of the document. If necessary additional information may be provided in the reason text.

The following codes have currently been identified: - A91: Expected document not received; - A92: Not possible to send document on time, but estimated delivery time is provided; - A93: Not possible to send document on time, and further more no expected time of return to normal situation.

The motivation of an act.

IsBasedOn: Problem statement contextual model::Reason

Table 17 shows all attributes of Reason.

Table 17 - Attributes of Problem statement assembly model::Reason.

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

2.2.4 Datatypes

2.2.4.1 ESMP_DateTimeInterval compound

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

Table 18 shows all attributes of ESMP_DateTimeInterval.

Table 18 - Attributes of ESMPDataTypes::ESMP_DateTimeInterval.

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

2.2.4.2 AreaID_String datatype

The coded identification of a domain, i.e. balance area, grid area, etc.

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

Table 19 shows all attributes of AreaID_String.

Table 19 - Attributes of ESMPDataTypes::AreaID_String.

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

Table 20 shows all restrictions applied to the attributes of AreaID_String.

Table 20 - Restrictions of attributes for ESMPDataTypes::AreaID_String.

Name	Constraint	Type	Expression of constraint
value	maxLength	OCL	inv: self->MaxLength(18)

2.2.4.3 ESMP_DateTime datatype

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

Table 21 shows all attributes of ESMP_DateTime.

Table 21 - Attributes of ESMPDataTypes::ESMP_DateTime.

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

Table 22 shows all restrictions applied to the attributes of ESMP_DateTime.

Table 22 - Restrictions of attributes for ESMPDataTypes::ESMP_DateTime.

<table>
<tr><th>Name</th><th>Constraint</th><th>Type</th><th>Expression of constraint</th></tr>
<tr><td>value</td><td>pattern</td><td>OCL</td><td>inv: self->Pattern(((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-9]|[12][0-9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|[12][0-9]|30))T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z)|(([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][048]|[02468][048][02468][048]|[02468][1235679](0)[48]|[02468][1235679][2468][048]|[0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z)|(([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][01345789][2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[02468][1235679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-9]|2[0-8])T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z))</td></tr>
</table>

2.2.4.4 ESMPVersion_String datatype

In ESMP, the coded value is restricted to digits.

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

Table 23 shows all attributes of ESMPVersion_String.

Table 23 - Attributes of ESMPDataTypes::ESMPVersion_String.

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

Table 24 shows all restrictions applied to the attributes of ESMPVersion_String.

Table 24 - Restrictions of attributes for ESMPDataTypes::ESMPVersion_String.

Name	Constraint	Type	Expression of constraint
value	pattern	OCL	inv: self->Pattern([1-9]([0-9]){0,2})

2.2.4.5 ID_String datatype

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

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

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

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

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

Table 25 shows all attributes of ID_String.

Table 25 - Attributes of ESMPDataTypes::ID_String.

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

Table 26 shows all restrictions applied to the attributes of ID_String.

Table 26 - Restrictions of attributes for ESMPDataTypes::ID_String.

Name	Constraint	Type	Expression of constraint
value	maxLength	OCL	inv: self->MaxLength(35)

2.2.4.6 MarketRoleKind_String datatype

The identification of the role played by a party.

Table 27 shows all attributes of MarketRoleKind_String.

Table 27 - Attributes of ESMPDataTypes::MarketRoleKind_String.

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

2.2.4.7 MessageKind_String datatype

The coded type of a document.

Table 28 shows all attributes of MessageKind_String.

Table 28 - Attributes of ESMPDataTypes::MessageKind_String.

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

2.2.4.8 PartyID_String datatype

The identification of an actor in the energy market.

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

Table 29 shows all attributes of PartyID_String.

Table 29 - Attributes of ESMPDataTypes::PartyID_String.

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

Table 30 shows all restrictions applied to the attributes of PartyID_String.

Table 30 - Restrictions of attributes for ESMPDataTypes::PartyID_String.

Name	Constraint	Type	Expression of constraint
value	maxLength	OCL	inv: self->MaxLength(16)

2.2.4.9 ProcessKind_String datatype

The coded identification of the nature of process.

Table 31 shows all attributes of ProcessKind_String.

Table 31 - Attributes of ESMPDataTypes::ProcessKind_String.

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

2.2.4.10 ReasonCode_String datatype

The coded motivation of an act.

Table 32 shows all attributes of ReasonCode_String.

Table 32 - Attributes of ESMPDataTypes::ReasonCode_String.

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

2.2.4.11 ReasonText_String datatype

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

Table 33 shows all attributes of ReasonText_String.

Table 33 - Attributes of ESMPDataTypes::ReasonText_String.

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

Table 34 shows all restrictions applied to the attributes of ReasonText_String.

Table 34 - Restrictions of attributes for ESMPDataTypes::ReasonText_String.

Name	Constraint	Type	Expression of constraint
value	maxLength	OCL	inv: self->MaxLength(512)

2.2.4.12 YMDHM_DateTime datatype

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

Table 35 shows all attributes of YMDHM_DateTime.

Table 35 - Attributes of ESMPDataTypes::YMDHM_DateTime.

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

Table 36 shows all restrictions applied to the attributes of YMDHM_DateTime.

Table 36 - Restrictions of attributes for ESMPDataTypes::YMDHM_DateTime.

<table>
<tr><th>Name</th><th>Constraint</th><th>Type</th><th>Expression of constraint</th></tr>
<tr><td>value</td><td>TruncationOrReduced</td><td>INV</td><td>choice=gYearMonthDayHourMinute</td></tr>
<tr><td>value</td><td>pattern</td><td>OCL</td><td>inv: self->Pattern(((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-9]|[12][0-9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|[12][0-9]|30))T(([01][0-9]|2[0-3]):[0-5][0-9])Z)|((([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][048]|[02468][048][02468][048]|[02468][1235679](0)[48]|[02468][1235679][2468][048]|[0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-9]|2[0-3]):[0-5][0-9])Z)|((([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][01345789][2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[02468][1235679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-9]|2[0-8])T(([01][0-9]|2[0-3]):[0-5][0-9])Z))</td></tr>
</table>

2.2.5 Enumerations

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

- CodingSchemeTypeList
- MessageTypeList
- ProcessTypeList
- ReasonCodeTypeList
- RoleTypeList

3 XML schema

3.1 XML schema URN namespace rules

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

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

where:

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

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

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

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

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

3.2 Code list URN namespace rules

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

3.3 URI rules for model documentation

3.3.1 Datatype

All the datatypes are documented in IEC 62325-351.

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

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

where:

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

Examples:

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

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

3.3.2 Class

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

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

where:

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

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

3.3.3 Attribute

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

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

where:

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

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

3.3.4 Association end role name

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

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

where:

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

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

3.4 ProblemStatement_MarketDocument schema

3.4.1 Schema Structure

Figure 4 provides the structure of the schema.

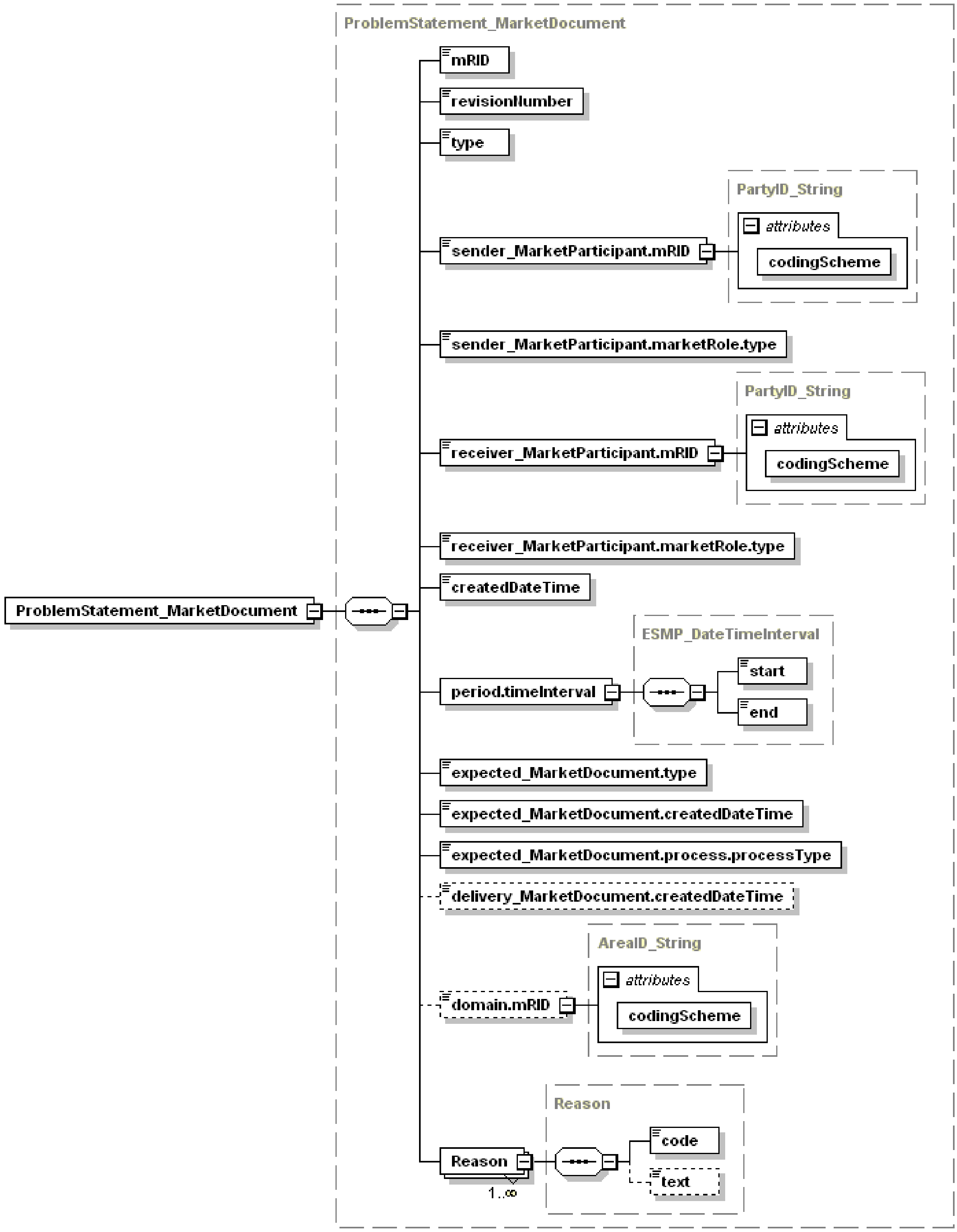
ProblemStatement_MarketDocument
ProblemStatement_MarketDocument
mRID
revisionNumber
type
PartyID_String
attributes
codingScheme
sender_MarketParticipant.mRID
sender_MarketParticipant.marketRole.type
PartyID_String
attributes
codingScheme
receiver_MarketParticipant.mRID
receiver_MarketParticipant.marketRole.type
createdDateTime
ESMP_DateTimeInterval
period.timeInterval
start
end
expected_MarketDocument.type
expected_MarketDocument.createdDateTime
expected_MarketDocument.process.processType
delivery_MarketDocument.createdDateTime
AreaID_String
attributes
codingScheme
domain.mRID
Reason
Reason
code
text
1..∞

Figure 4 – ProblemStatement_MarketDocument XML schema structure

3.4.2 Schema description

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:cl="urn:entsoe.eu:wgedi:codelists"
xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xmlns="urn:iec62325.351:tc57wg16:451-
```

```
5:problemdocument:3:0" xmlns:cimp="http://www.iec.ch/cimprofile"
attributeFormDefault="unqualified" elementFormDefault="qualified"
targetNamespace="urn:iec62325.351:tc57wg16:451-5:problemdocument:3:0"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:import schemaLocation="urn-entsoe-eu-wgedi-codelists.xsd"
namespace="urn:entsoe.eu:wgedi:codelists" />
  <xs:element name="ProblemStatement_MarketDocument"
type="ProblemStatement_MarketDocument" />
  <xs:simpleType name="ID_String" sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:restriction base="xs:string">
      <xs:maxLength value="35" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="ESMPVersion_String"
sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:restriction base="xs:string">
      <xs:pattern value="[1-9]([0-9]){0,2}" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="MessageKind_String"
sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:restriction base="cl:MessageTypeList" />
  </xs:simpleType>
  <xs:simpleType name="PartyID_String-base"
sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:restriction base="xs:string">
      <xs:maxLength value="16" />
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="PartyID_String"
sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:simpleContent>
      <xs:extension base="PartyID_String-base">
        <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
use="required" />
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
  <xs:simpleType name="MarketRoleKind_String"
sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:restriction base="cl:RoleTypeList" />
  </xs:simpleType>
  <xs:simpleType name="ESMP_DateTime"
sawsdl:modelReference="http://iec.ch/tc57#DateTime">
    <xs:restriction base="xs:dateTime">
      <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-9]|[12][0-
9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|[12][0-9]|30))T(([01][0-9]|2[0-
3]):[0-5][0-9]:[0-5][0-
9])Z)|(([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][048]
|[02468][048][02468][048]|[02468][1235679](0)[48]|[02468][1235679][2468][048]|[0-
9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-9]|2[0-3]):[0-5][0-
9]:[0-5][0-
9])Z)|(([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][01345789][
2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[02468][123
5679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-9]|2[0-
8])T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z)" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="ProcessKind_String"
sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:restriction base="cl:ProcessTypeList" />
  </xs:simpleType>
  <xs:simpleType name="AreaID_String-base"
sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:restriction base="xs:string">
      <xs:maxLength value="18" />
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="AreaID_String"
sawsdl:modelReference="http://iec.ch/tc57#String">
```

```
    <xs:simpleContent>
      <xs:extension base="AreaID_String-base">
        <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
use="required" />
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
  <xs:simpleType name="YMDHM_DateTime"
sawsdl:modelReference="http://iec.ch/tc57#DateTime">
    <xs:restriction base="xs:string">
      <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-9]|[12][0-
9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|[12][0-9]|30))T(([01][0-9]|2[0-
3]):[0-5][0-
9])Z)|(([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][048]
|[02468][048][02468][048]|[02468][1235679](0)[48]|[02468][1235679][2468][048]|[0-
9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-9]|2[0-3]):[0-5][0-
9])Z)|(([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][01345789][
2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[02468][123
5679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-9]|2[0-
8])T(([01][0-9]|2[0-3]):[0-5][0-9])Z)" />
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="ESMP_DateTimeInterval"
sawsdl:modelReference="http://iec.ch/tc57#DateTimeInterval">
    <xs:sequence>
      <xs:element minOccurs="1" maxOccurs="1" name="start" type="YMDHM_DateTime"
sawsdl:modelReference="http://iec.ch/tc57#ESMP_DateTimeInterval.start">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1" name="end" type="YMDHM_DateTime"
sawsdl:modelReference="http://iec.ch/tc57#ESMP_DateTimeInterval.end">
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="ProblemStatement_MarketDocument"
sawsdl:modelReference="http://iec.ch/tc57#MarketDocument">
    <xs:sequence>
      <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ID_String"
sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1" name="revisionNumber"
type="ESMPVersion_String"
sawsdl:modelReference="http://iec.ch/tc57#Document.revisionNumber">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1" name="type" type="MessageKind_String"
sawsdl:modelReference="http://iec.ch/tc57#Document.type">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1" name="sender_MarketParticipant.mRID"
type="PartyID_String"
sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1"
name="sender_MarketParticipant.marketRole.type" type="MarketRoleKind_String"
sawsdl:modelReference="http://iec.ch/tc57#MarketRole.type">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1" name="receiver_MarketParticipant.mRID"
type="PartyID_String"
sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1"
name="receiver_MarketParticipant.marketRole.type" type="MarketRoleKind_String"
sawsdl:modelReference="http://iec.ch/tc57#MarketRole.type">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1" name="createdDateTime"
type="ESMP_DateTime"
sawsdl:modelReference="http://iec.ch/tc57#Document.createdDateTime">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1" name="period.timeInterval"
type="ESMP_DateTimeInterval"
sawsdl:modelReference="http://iec.ch/tc57#Period.timeInterval">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1" name="expected_MarketDocument.type"
type="MessageKind_String" sawsdl:modelReference="http://iec.ch/tc57#Document.type">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1"
name="expected_MarketDocument.createdDateTime" type="ESMP_DateTime"
sawsdl:modelReference="http://iec.ch/tc57#Document.createdDateTime">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="1"
name="expected_MarketDocument.process.processType" type="ProcessKind_String"
sawsdl:modelReference="http://iec.ch/tc57#Process.processType">
      </xs:element>
      <xs:element minOccurs="0" maxOccurs="1"
name="delivery_MarketDocument.createdDateTime" type="ESMP_DateTime"
sawsdl:modelReference="http://iec.ch/tc57#Document.createdDateTime">
      </xs:element>
      <xs:element minOccurs="0" maxOccurs="1" name="domain.mRID" type="AreaID_String"
sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
      </xs:element>
      <xs:element minOccurs="1" maxOccurs="unbounded" name="Reason" type="Reason"
sawsdl:modelReference="http://iec.ch/tc57#MarketDocument.Reason">
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="ReasonCode_String"
sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:restriction base="cl:ReasonCodeTypeList" />
  </xs:simpleType>
  <xs:simpleType name="ReasonText_String"
sawsdl:modelReference="http://iec.ch/tc57#String">
    <xs:restriction base="xs:string">
      <xs:maxLength value="512" />
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="Reason" sawsdl:modelReference="http://iec.ch/tc57#Reason">
    <xs:sequence>
      <xs:element minOccurs="1" maxOccurs="1" name="code" type="ReasonCode_String"
sawsdl:modelReference="http://iec.ch/tc57#Reason.code">
      </xs:element>
      <xs:element minOccurs="0" maxOccurs="1" name="text" type="ReasonText_String"
sawsdl:modelReference="http://iec.ch/tc57#Reason.text">
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```