



European Network of
Transmission System Operators
for Electricity

EEMRM METHODOLOGY DESCRIPTION

2020-03-18

APPROVED DOCUMENT
VERSION 2.0

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21 absolute requirement of the specification.
- 22 • SHALL NOT: This phrase, or the phrase "MUST NOT", means that the definition is an
23 absolute prohibition of the specification.
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25 reasons in particular circumstances to ignore a particular item, but the full implications must
26 be understood and carefully weighed before choosing a different course.
- 27 • SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED", means that there may
28 exist valid reasons in particular circumstances when the particular behaviour is acceptable
29 or even useful, but the full implications should be understood and the case carefully weighed
30 before implementing any behaviour described with this label.
- 31 • MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional.

32

33

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Revision History

Version	Release	Date	Paragraph	Comments
1	0	2017-03-14		Initial release
1	1	2017-11-10		Update related to associations and colours used
1	2	2018-01-23		Update related to the direction of relationships
1	3	2018-03-21		Modifications following update from the CIM EG
1	4	2018-04-10		Modifications following remarks from the RM SG
1	5	2018-04-26		Modifications following final remarks from the CIM EG Approved by MC.
1	6	2018-07-09		Modifications following remarks from WG16
1	7	2019-09-18		Enrichment of the methodology following the merging of individual models
1	8	2019-12-18		Update to standardise format of document
1	9	2020-02-18		Modifications following final remarks from the CIM EG.
2	0	2020-03-18		Approved by MC.

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69 **1 Disclaimer**

70 The purpose of this document is to describe the methodology used by CIM EG for
71 documenting ENTSO-E work on modelling the electricity market based on network codes and
72 regulation guidelines. Any comment on this document is highly appreciated through the usual
73 maintenance request process.

74 **2 Objectives**

75 This document was elaborated by the Role Model Subgroup (RMSG) , as a subgroup of the CIM
76 Expert Group.

77 The role of the RMSG group is to extract an European Electricity Market Role Model (EEMRM)
78 based on the network codes and guidelines from regulation.

79 The purpose of this document is to establish the methodology to be applied for the translation
80 of network codes, in order to set up a coherent model describing roles and processes on
81 European electricity market in a consistent way.

82 If flaws are identified in the chosen methodology during the EEMRM development process, this
83 document will be updated accordingly.

84

85 **3 Modelling language**

86 The ArchiMate® v2.0 modelling language¹ has been chosen for the description of the EEMRM ,
87 which is an open and independent enterprise architecture modelling language, also used to
88 draft the new IEC architecture reference.

89 This language allows for the description of several layers corresponding to different levels of
90 detail: the business layer, the application layer, and the technology layer.

91

92 **4 Level of detail of the description**

93 Various types of processes can be described using ArchiMate® modelling language, from the
94 general business overview to the detail of the technology infrastructure used.

95 As a first step, the EEMRM will only be based on the processes defined in network codes and
96 ENTSO-E guidelines. If the elements provided by these documents prove to be insufficient to
97 get an exhaustive picture of the electricity market, the description of more specific local or
98 regional implementation projects will be added to complete it.

99 Taking into consideration the first purpose of the EEMRM, which is the modelling of the high-
100 level processes described in network codes and regulations, the model will only focus on the
101 business layer metamodel.

102 More specifically, it will describe the different roles identified in the network codes, the services
103 provided by each role in the context of each process, and the business objects handled. Hence,
104 only business elements from the ArchiMate® modelling language will be used.

105 The cardinality of elements should be added only if they are clearly defined in network codes
106 and ENTSO-E guidelines.

107

¹ The use of the ArchiMate® modelling language has been approved by the EDI Working Group (continued by CIM Expert Group) during the physical meeting of the 2017-01-10.

108 **5 Modelling elements used**

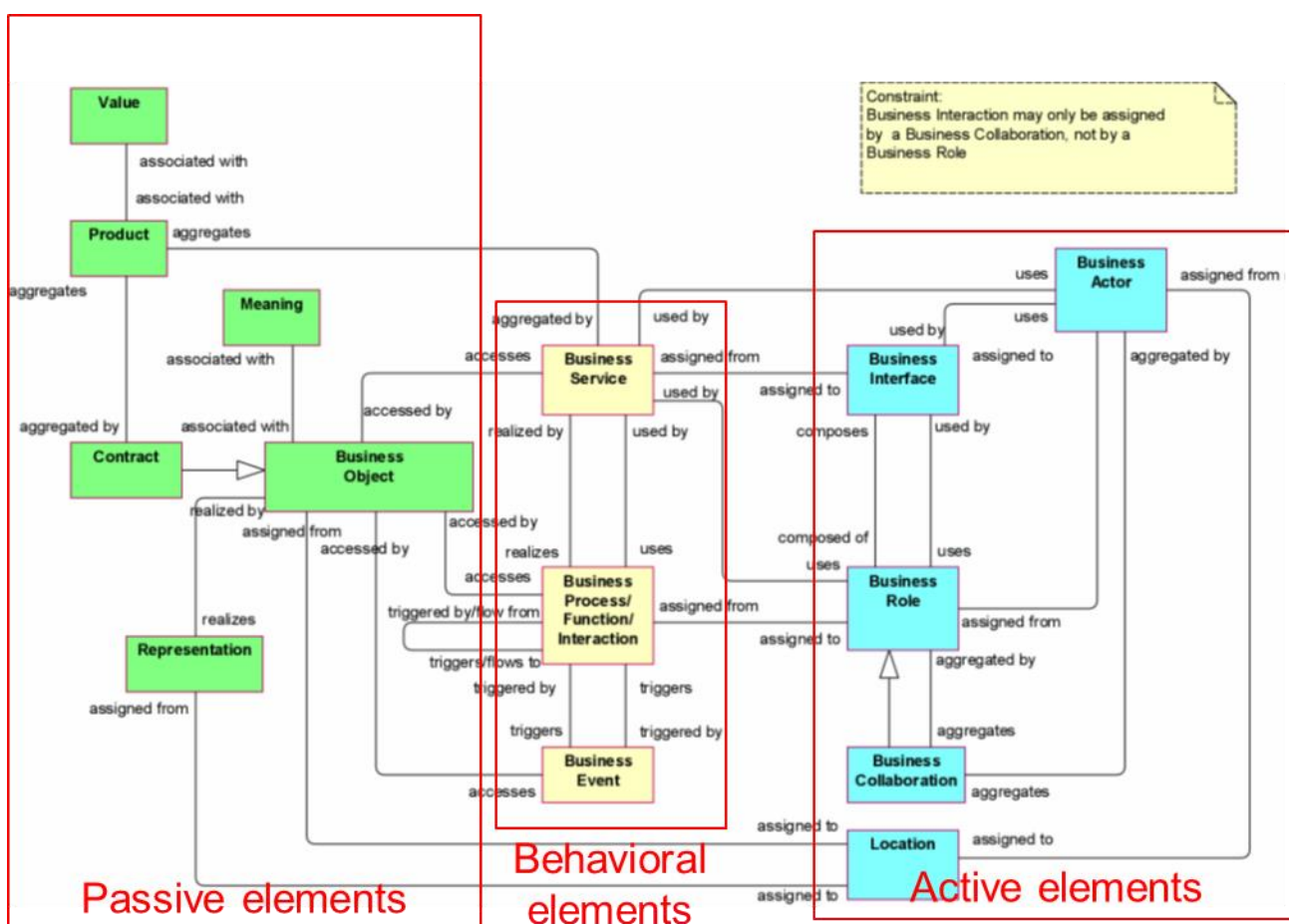
109 5.1 Overview

110 The ArchiMate® modelling language provides three types of elements which are to be used
111 jointly to describe processes:

- 112 • **Active elements** are defined as entities that are capable of performing behaviour.
- 113 • **Behaviour elements** are defined as units of activity performed by one or more active
114 elements.
- 115 • **Passive elements** are defined as objects on which behaviour is performed.

116

117 The business layer provided by ArchiMate® modelling language 2.0 is provided in Figure 1. It
118 describes all the classes that can be used to model business processes.



119

120 **Figure 1: Business layer metamodel**

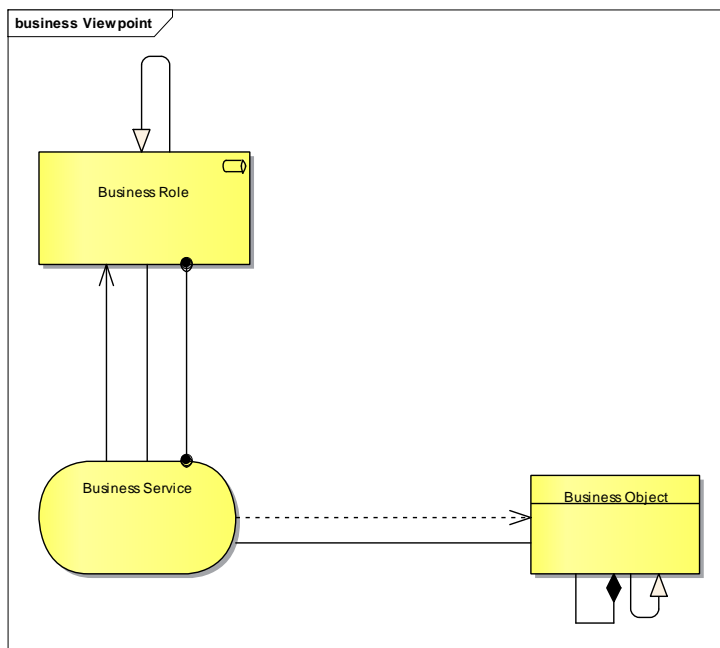
121 Not all business classes are relevant for the description of the European electricity market.
122 Hence, this chapter aims at describing the elements that will be used to model the EEMRM.
123

124

125 5.2 Viewpoint used

126 In order to describe the classes which are used to model the EEMRM, as well as the authorized
127 relationships between these classes, a viewpoint has been developed, based on the standard
128 business process viewpoint available in the ArchiMate® modelling language methodology. This
129 EEMRM viewpoint is represented in Figure 2, and the description of the used classes and
130 relationships is provided within this methodology document.

131



132

Figure 2: EEMRM viewpoint

133

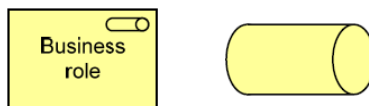
134

135 5.3 Active elements

136 **Business Role**

137 The only active element which will be used is the Business role, represented in Figure 3, which
138 is defined as the responsibility for performing specific behaviour.

139



140

Figure 3: Business role notation

141

142

143 This generic class allows to cope with roles as they are defined in network codes, and will be
144 sufficient for the description of active elements. More specifically, actors taking part in the
145 electricity market will not be described, but the roles they fulfil in the various processes will be
146 modelled.

147 If, in one of the sources documents, a described role is always fulfilled by another role, then
148 this sub-role will not be described separately.

149 Additionally, roles which are only involved in fallback processes will not be described in the
150 EEMRM.

151

152 5.4 Behaviour elements

153 The purpose of the EEMRM is to define responsibilities assigned to the different roles described
154 in network codes and guidelines from regulation. There is no information specifically concerning
155 the processes allowing to fulfil these responsibilities in practice (e.g. timing considerations or
156 sequences of events).

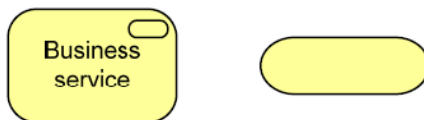
157

158 Two classes will be used to describe behaviours performed by active elements.

159

160 **Business service**

161 The main class used for the modelling of behaviours is the Business service, represented in Figure 4,
162 which is defined as a service that fulfills a business need for a customer.



163

164 **Figure 4: Business service notation**

165

166 This class is a generic element which will describe the services fulfilled by business roles, and
167 used by other business roles.

168

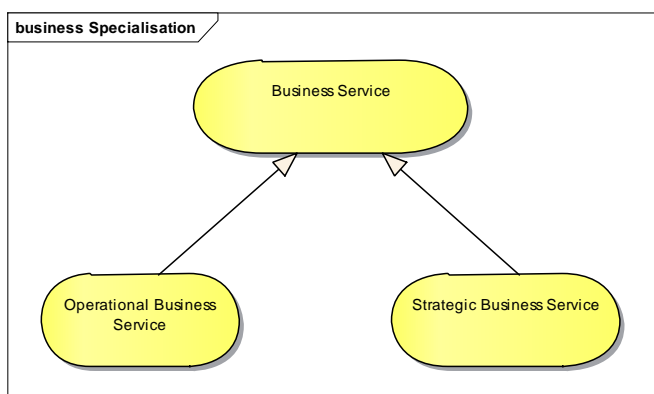
169 **Specialisation of business services**

170 The EEMRM introduces a difference between two types of business services:

- 171 • **Operational services:** services meant to carry out a core process² and fulfil its
- 172 requirements,
- 173 • **Strategic services:** services meant to design a process, monitor it, and report on how
- 174 it works

175 This distinction between operational and strategic services ensures clarity of the EEMRM as it
176 allows to create two high level views describing either the main operational tasks set up by the
177 network codes, or the strategic tasks which structure the market and the processes to be
178 fulfilled.

179 In order to properly model this distinction, a specialisation of the Business service class into
180 two sub-classes has been performed, as displayed in Figure 5.



181

182 **Figure 5: Specialisation of the business service class**

183

184 In order to make the distinction clear in the views, a graphical distinction is made between the
185 operational and strategic business services.

186

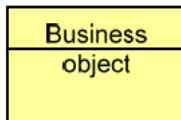
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² The core processes are the following processes described in the CACM: Harmonization for CACM to allow more efficient use of the network and increase competition, Calculation of Cross-border capacity using a CGM, Market coupling performed by the MCO (continuous in intraday, single calculation in day-ahead), Coordination of capacity calculation via methodologies, Establishment of a CGM, Preparation of an IGM by TSOs, Implicit allocation (implicit auction in day-ahead, continuous in intraday), Ensure Union-wide price coupling process

188 5.5 Passive elements

189 **Business object**

190 The only necessary passive element is the Business object, represented in Figure 6, which is
191 defined as a passive element that has relevance from a business perspective.



192

193 **Figure 6: Business object notation**

194

195 For the modelling of the electricity market from a business perspective, it is not necessary to
196 describe objects too specifically. Hence, this element allows to describe generic business
197 objects handled by behaviour elements.

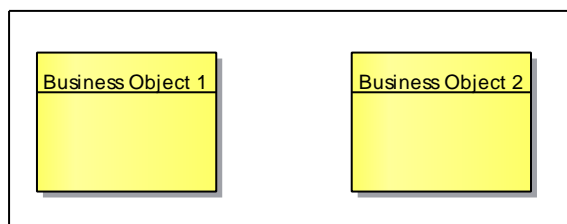
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199 5.6 Additional elements

200 **Boundary**

201 The common boundary element is used to group active, behaviour, or passive elements, which
202 have to be taken into account jointly.

203 For example, a boundary surrounding two business objects means that these objects are
204 created or used jointly by business services.



205

206 **Figure 7: Example of a boundary surrounding two business objects**

207

208 5.7 Description of source

209 In order to specify the source of the elements displayed in the EEMRM, two tags are added to
210 the business service and business object classes:

211 One tag describes the source of the elements (network code, methodology, other regulation...).

212 Whenever possible, one tag more specifically describes the article or paragraph from this
213 source where this element is mentioned.

214








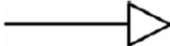
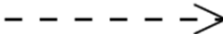
215 **6 Relationship elements used**

216 Relationship elements also have to be defined in order to link classes and to model the
217 interactions between active elements, behaviours, and passive elements.

218 For the development of the EEMRM, the relationships³ listed in Table 1 will be used.

219

³ The relationships used by ArchiMate® modelling language are the relationships developed in the UML modelling language.

Relationship	Description	Notation	Comments
Association	Association models a relationship between objects that is not covered by another, more specific relationship.		This will be used to describe generic relationships.
Access	The access relationship models the access of behavioral concepts to business or data objects.		This will be used to describe how behavioural elements access passive elements.
Used by	The used by relationship models the use of services by processes, functions, or interactions and the access to interfaces by roles, components, or collaborations.		This will be used to describe how active elements use services provided by other active elements.
Assignment	The assignment relationship links units of behavior with active elements (e.g., roles, components) that perform them, or roles with actors that fulfill them.		This will be used to link active elements with the behaviours they perform.
Composition	The composition relationship indicates that an object is composed of one or more other objects.		This will be used to describe the composition of business objects, e.g. areas
Triggering	The triggering relationship describes the temporal or causal relationships between processes, functions, interactions, and events.		This will be used to describe events that trigger behaviours.
Junction	A junction is used to connect relationships of the same type.		This will be used to connect similar relationships.
Specialization	The specialization relationship indicates that an object is a specialization of another object.		This will be used to define specializations of an active or a passive element.
Dependency	A Dependency is a relationship that shows that an element, or set of elements, requires other model elements for their specification or implementation.		Generic relationship used in detailed views.

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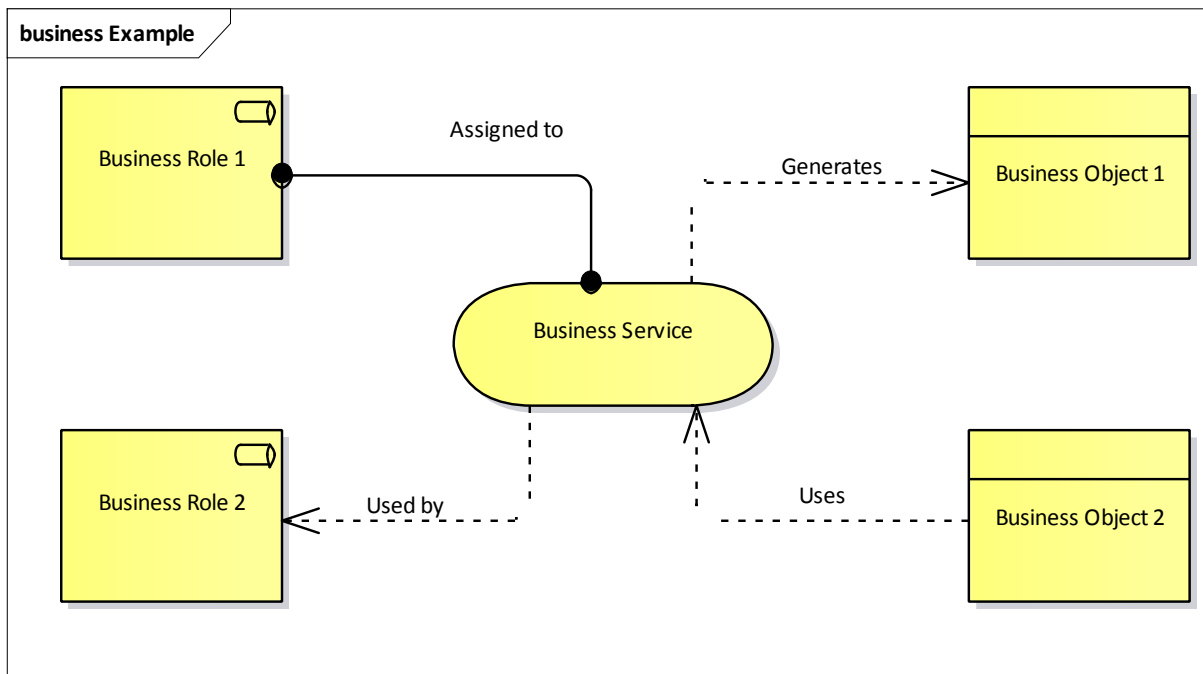
Table 1: List of relationships used

In detailed views representing the responsibilities for a give role, in order not to overload the model with too much information, only the generic “dependency” relationship will be used.

226 **7 Modelling example**

227 A very simple example showing the interactions between the ArchiMate® modelling language
228 classes and possible relationships is shown in Figure 8.

229



230

Figure 8: Modelling example

231

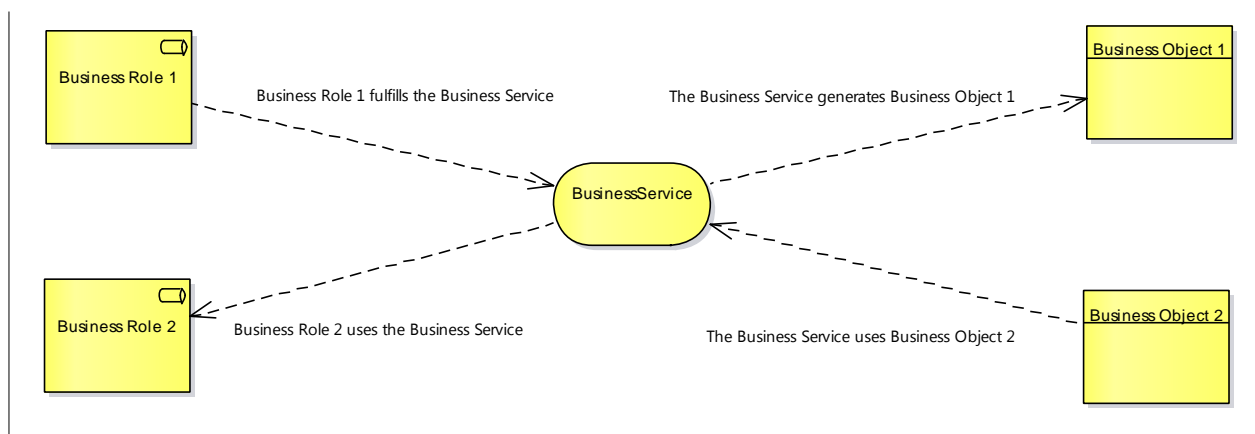
232

233 In this example, a role called “Business Role 1” provides a Business Service used by
234 “Business Role 2”. This Business Service accesses a first Business Object, which it creates
235 (Business Object 1). It also accesses a second business object, which is only used (Business
236 Object 2).

237 When the dependency relationship is used, the conventions used for the direction of the
238 corresponding arrows is described in Figure 9.

239

240



241

Figure 9: Direction conventions for the dependency relationship

242

243

244 In this example, the same situation as in Figure 8 is illustrated.

245