European Network of
Transmission System Operators
for Electricity

EEMRM METHODOLOGY DESCRIPTION

2020-12-15

APPROVED DOCUMENT
VERSION 3.1

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NOTE CONCERNING WORDING USED IN THIS DOCUMENT

The force of the following words is modified by the requirement level of the document in which they are used.

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

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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.
3	0	2020-06-05		Updates in methodology to make it compliant with ArchiMate® v3.1 specification.
3	1	2020-12-15		Comments from RMSG members were considered. Approved by MC.

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1 Disclaimer

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

2 Objectives

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

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

The purpose of this document is to establish the methodology to be applied for the translation of network codes, in order to set up a coherent model describing roles and processes on European electricity market in a consistent way. The objective of the EEMRM is to define responsibilities assigned to the different roles described in network codes and guidelines from regulation. There is no information specifically concerning the processes allowing to fulfil these responsibilities in practice (e.g. timing considerations or sequences of events).

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

3 Modelling language

The ArchiMate® v3.1 modelling language[1] has been chosen for the description of the EEMRM, which is an open and independent enterprise architecture modelling language, also used to draft the IEC architecture reference.

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

4 Level of detail of the description

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

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

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

More specifically, it will describe the different roles identified in the network codes, the services provided for each role in the context of each process, and the Business Objects handled. Hence, only Business elements from the ArchiMate® modelling language will be used.

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

[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.

5 Modelling elements used

5.1 Overview

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

- **Active Structure Elements:** The active structure aspect of the Business Layer refers to the static structure of an organization, in terms of the entities that make up the organization and their relationships. The active entities are the subjects (e.g., Business Actors or Business Roles) that perform behaviour such as business processes or functions (capabilities).
- **Behaviour Elements** represent the dynamic aspects of the enterprise. ArchiMate® v3.1 Specification distinguishes between:
  - **Internal Behaviour element:** An internal behaviour element represents a unit of activity that can be performed by one or more active structure elements. Internal behaviour elements are not used in this methodology.
  - **External Behaviour element:** An external behaviour element, called a Business Service, represents an explicitly defined exposed behaviour.
- **Passive Structure Elements:** A passive structure element is a structural element that cannot perform behaviour. Passive structure elements are often information or data objects, but they can also represent physical objects.

The Business Layer provided by ArchiMate® modelling language v3.1 is provided in Figure 1. It describes all the elements that can be used to model Business processes.

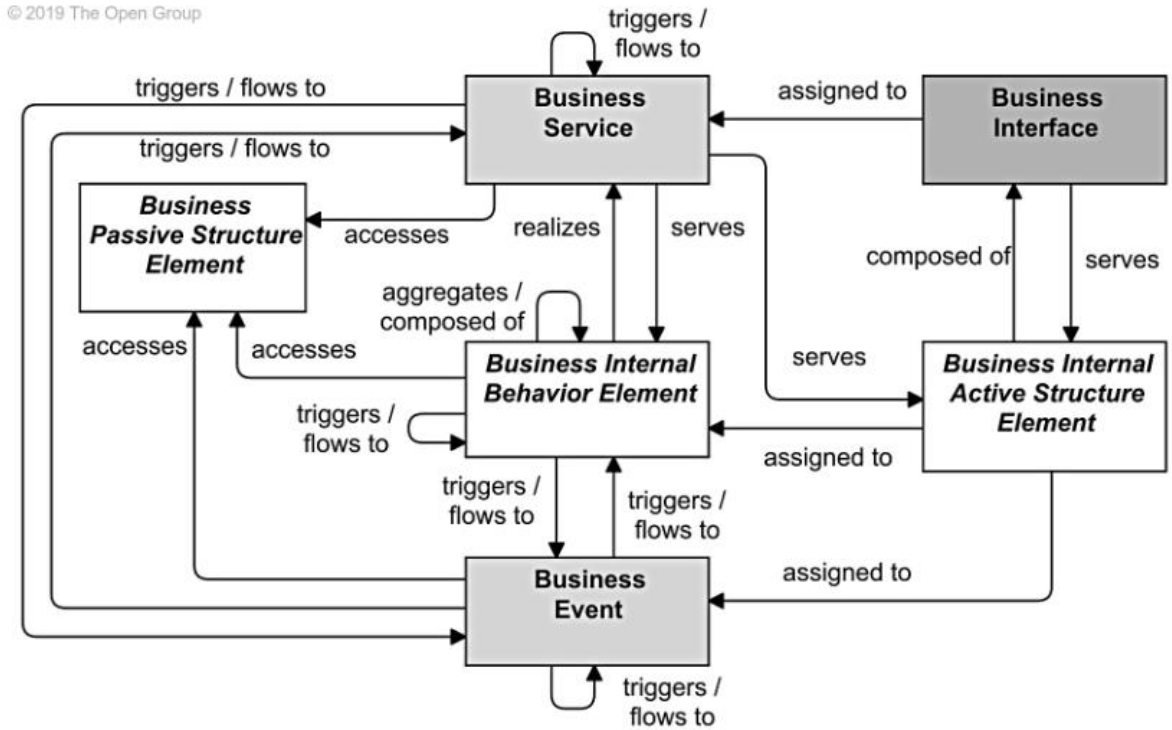


Figure 1: Business Layer metamodel

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

5.2 Viewpoint used

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

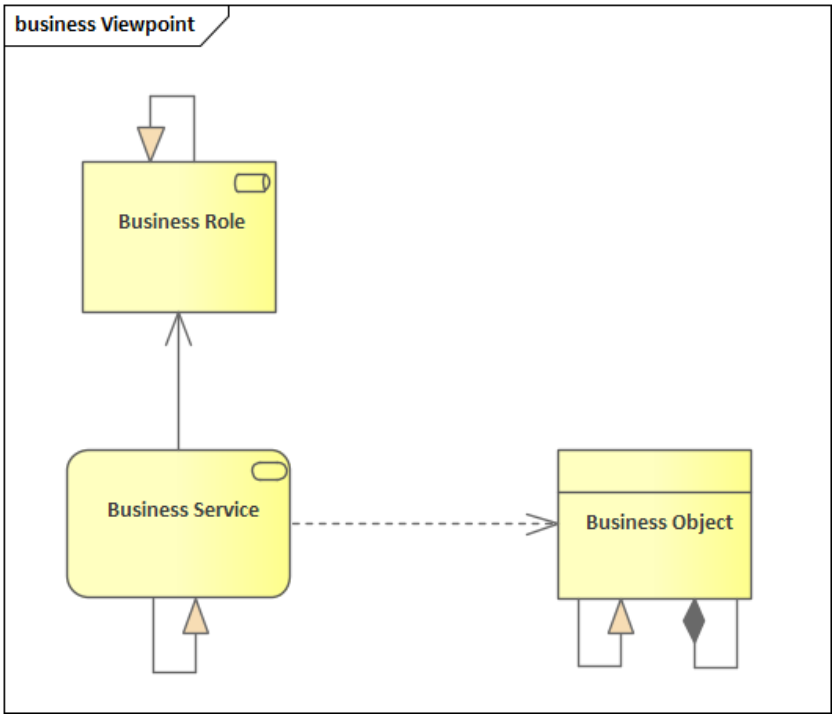


Figure 2: EEMRM viewpoint

5.3 Active elements

Business Role

The only active structure element which is used is the Business Role, represented in Figure 3. A Business Role represents the responsibility for performing specific behaviour, to which an actor can be assigned, or the part an actor plays in a particular action or event.

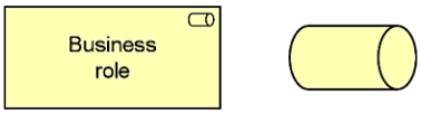


Figure 3: Business Role notation

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

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

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

5.4 Behaviour elements

Business Service

The only element used for the modelling of behaviours is the Business Service, represented in Figure 4. A Business Service represents explicitly defined behaviour that a Business Role, Business Actor, or Business Collaboration exposes to its environment.

Figure 4: Business Service notation

The Business Service is a generic element which will describe the services fulfilled by Business Roles and used by other Business Roles.

Specialisation of Business Services

The EEMRM introduces a difference between two types of Business Services:

- **EEMRM Operational Services**: services meant to carry out a core process[2] and fulfil its requirements,
- **EEMRM Strategic Services**: services meant to design a process, monitor it, and report on how it works

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

In order to properly model this distinction, a specialisation of the Business Service element into two sub-elements has been performed, as displayed in Figure 5.

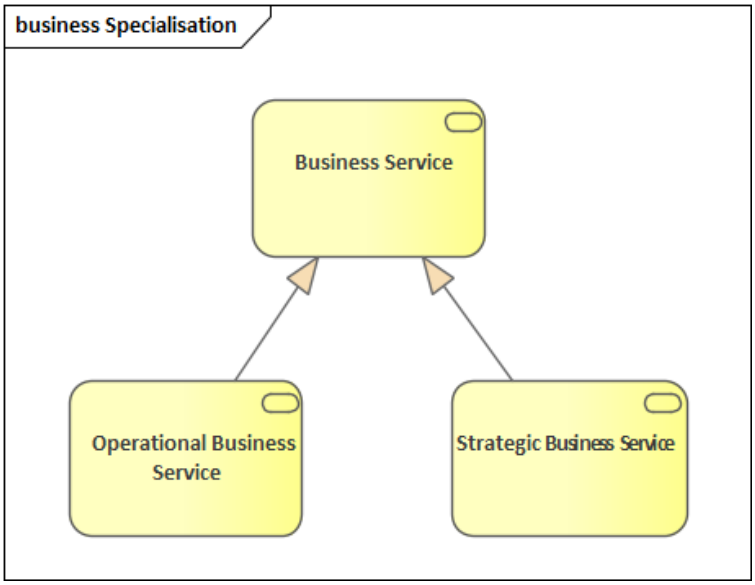


Figure 5: Specialisation of the Business Service

[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

In order to make the distinction clear in the views, a graphical distinction is made between the operational and strategic Business Services.

5.5 Passive elements

Business Object

The only necessary passive element is the Business Object, represented in Figure 6. A Business Object represents a concept used within a particular Business domain. Business Object can be generated or used by Business Service (See chapter 6).

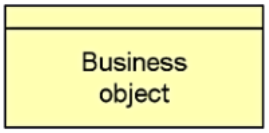


Figure 6: Business Object notation

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

5.6 Additional elements

Boundary

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

For example, a boundary surrounding two Business Objects means that these objects are created or used jointly by Business Services.

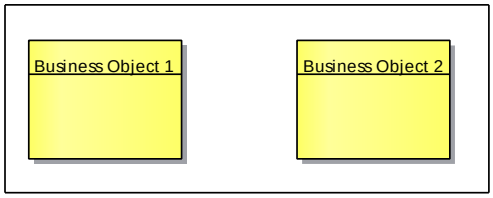


Figure 7: Example of a boundary surrounding two Business Objects

5.7 Description of source

In order to specify the source of the elements displayed in the EEMRM, two tags are added to the Business Service and Business Object elements:

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

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

6 Relationship elements used

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

226 For the development of the EEMRM, the relationships[3] listed in Table 1 will be used.

Type of Relationship	Relationship	Description	Notation	Comments
Structural	Composition	Represents that an element consists of one or more other concepts.		This will be used to describe the composition of Business Objects, e.g. areas
Dependency	Serving	Represents that an element provides its functionality to another element.		This will be used to define how a determined Business Service serves to a role.
Dependency	Access	Represents the ability of behaviour and active structure elements to observe or act upon passive structure elements. The arrowhead, indicates the creation, change, or usage of passive structure elements Note that, at the metamodel level, the direction of the relationship is always from a behaviour element (Business Service) to a passive structure element (Business Object), although the notation may point in the other direction to denote “read” access, and in both directions to denote read-write access (not used). To summarize, if the “access” arrow goes from Business Service to Business Object, it means that the Business Service is generating that Object. Else if the “access” arrow goes from Business Object to Business Service, it means that the Service is using the Business Object.		This will be used to describe how behavioural elements access passive elements.

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

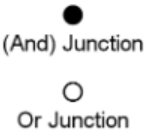
Type of Relationship	Relationship	Description	Notation	Comments
Other	Specialization	Represents that an element is a particular kind of another element.		This will be used to define specializations of an active or a passive element.
Relationship Connector	Junction	Used to connect relationships of the same type.		This will be used to connect similar relationships.

Table 1: List of relationships used

7 Modelling example

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

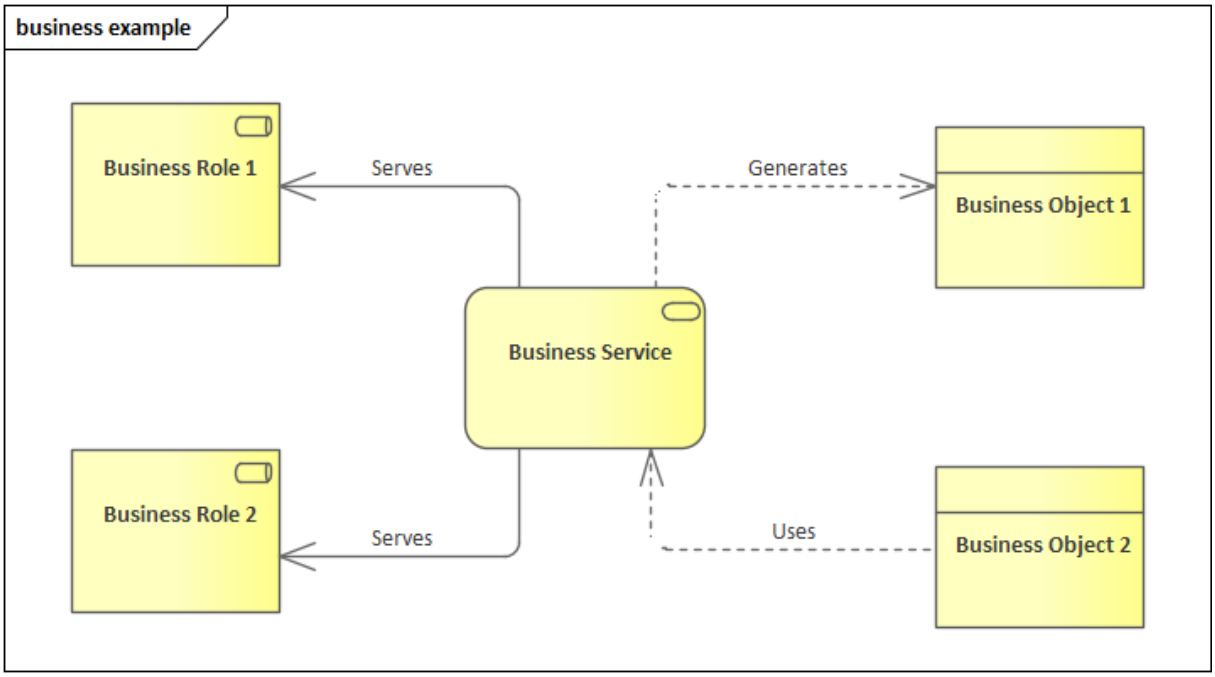


Figure 8: Modelling example

In this example, both “Business Role 1” and “Business Role 2” are served by the Business Service This Business Service accesses a first Business Object, which it generates (Business Object 1). It also accesses a second Business Object, which is only used (Business Object 2).