IEC 62325-450

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Framework for energy market communications – Part 450: Profile and context modelling rules

Cadre pour les communications pour le marché de l'énergie – Partie 450: Règles de modélisation de profils et de contextes

IEC 62325-450:2013

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Framework for energy market communications –
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

Part 450: Profile and context modelling rules

FOREWORD

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The text of this standard is based on the following documents:

FDIS	Report on voting
57/1324/FDIS	57/1340/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 62325 series, published under the general title *"Framework for energy market communications",* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- replaced by a revised edition, or
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INTRODUCTION

This standard is one of the IEC 62325 series which define protocols for deregulated energy market communications.

The principal objective of the IEC 62325 series of standards is to produce standards which facilitate the integration of market application software developed independently by different vendors into a market management system, between market management systems and market participant systems. This is accomplished by defining message exchanges to enable these applications or systems access to public data and exchange information independent of how such information is represented internally.

The common information model (CIM[1]) specifies the basis for the semantics for this message exchange.

The profile specifications specify the content of the messages exchanged. This document provides the profile and context modelling rules for these message profile specifications that support the design of all electricity markets.

1 Footnote 1 applies only to the French version.

FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

Part 450: Profile and context modelling rules

1 Scope

This part of IEC 62325 defines how to create a profile from the common information model and the context modelling rules related to this task.

This standard is to be applied to IEC 62325 series. An harmonised standard, IEC 62361-101, is presently under development, which will supersede this current standard.

The common information model (CIM) is an abstract model that represents all the major objects in an electric utility enterprise. The CIM IEC 62325-301 caters for the introduction of the objects required for the operation of electricity markets.

It is important to note that the definition of a complete and detailed energy market model is beyond the scope of the IEC 62325 series standards since energy markets do not necessarily have the same approach to market operations.

However, in relation to information interchange, an extensible and adaptable core set of information model definitions in UML can be defined. The information model definitions can be used as a controlled vocabulary to enable utilities to interface with the market along with the use of standardised XML schema design rules to ensure consistent mapping between the UML model and the XML implementation schema as well as a uniform identification scheme.

By providing a standard way of representing all these components as object classes and attributes, along with their relationships, the CIM facilitates the integration of market management system (MMS[2]) applications developed independently by different vendors, between entire MMS systems, or between an MMS system and other systems concerned with different aspects of energy market operations. In particular, CIM enables the efficient integration of information interchanges between electricity market actors participating in various market business processes irrespective of the MMS system supplier for each independent business process.

The CIM facilitates integration by defining a common language (i.e. semantics and syntax) based on the CIM to enable these applications or systems to access public data and exchange information without depending on the internal representation of the information.

This document provides the modelling rules necessary to ensure that contextual models derived from the CIM are in conformity with the CIM model.

It ensures modelling consistency and avoids ambiguity between objects by providing a clear understanding on what they are based within the CIM.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For

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2 Footnote 2 applies only to the French version.

undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62325-301, *Framework for energy market communications – Part 301: Common Information Model (CIM) extensions for markets*[3]

IEC 62361-100, *Power systems management and associated information exchange – Interoperability in the long term – Part 100: Naming and design rules for CIM profiles to XML schema mapping*

ISO/IEC 11404, *General-Purpose Datatypes (GPD)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
aggregate business information entity
ABIE
re-use of an aggregate core component (ACC) in a specified business

Note 1 to entry: This note applies only to the French version.

[SOURCE: ISO 15000-5]

3.2
aggregate core component
ACC
collection of related pieces of business information that together convey a distinct business meaning, independent of any specific business context

Note 1 to entry: Expressed in modelling terms, this is the representation of an object class, independent of any specific business context.

Note 2 to entry: This note applies only to the French version.

[SOURCE: ISO 15000-5]

3.3
assembly model
model that prepares information in a business context for assembly into electronic documents for data interchange

3.4
based on
IsBasedOn
use of an artefact that has been restricted according to the requirements of a specific business context

3.5
business context
specific business circumstance as identified by the values of a set of context categories, allowing different business circumstances to be uniquely distinguished

[SOURCE: UN/CEFACT]

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3 To be published.

3.6
information model
representation of concepts, relationships, constraints, rules, and operations to specify data semantics for a chosen domain of discourse

Note 1 to entry: This can provide shareable, stable, and organized structure of information requirements for the domain context.

3.7
profile
basic outline of all the information that is required to satisfy a specific environment

4 General

4.1 The two methods used to generate profiles

There are at least two methods currently used to generate contextual profiles and message generation and assembly. Figure 1 presents the two methods.

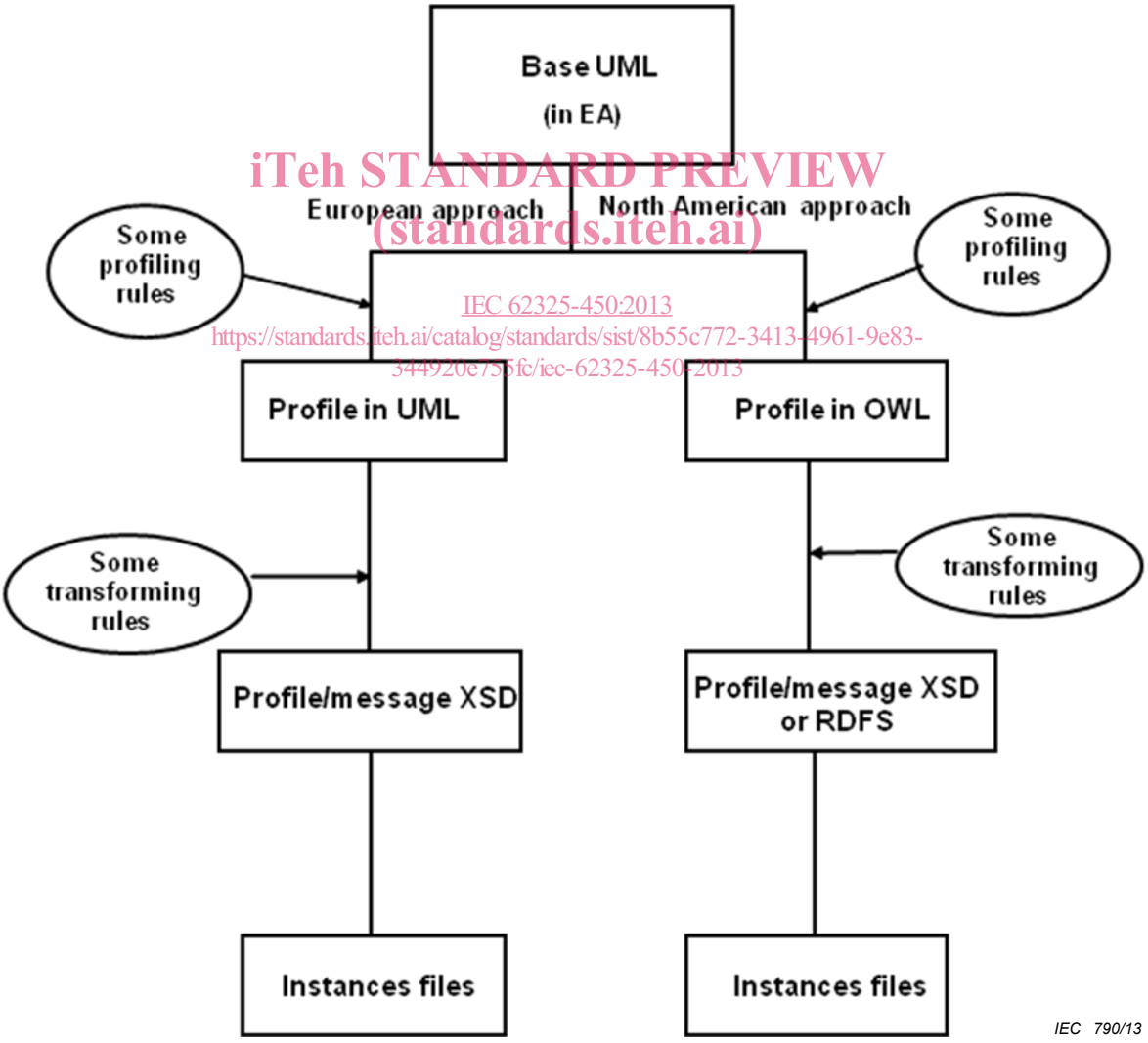


Figure 1 – Differences between European and American approach

This document is primarily concerned with the profile and contextual modelling rules using the European path; however, there is nothing in this document that would prohibit the use of the

American path. The rules defined within this document do not preclude the use of either path shown in the figure above and any conflicts are unintentional. In the event a rule exists that precludes the use of either path, that rule should be considered invalid and will be removed from this document in future revisions.

From an UML or OWL profile, the transforming rules to generate a XSD schema shall comply with IEC 62361-100.

4.2 Overview

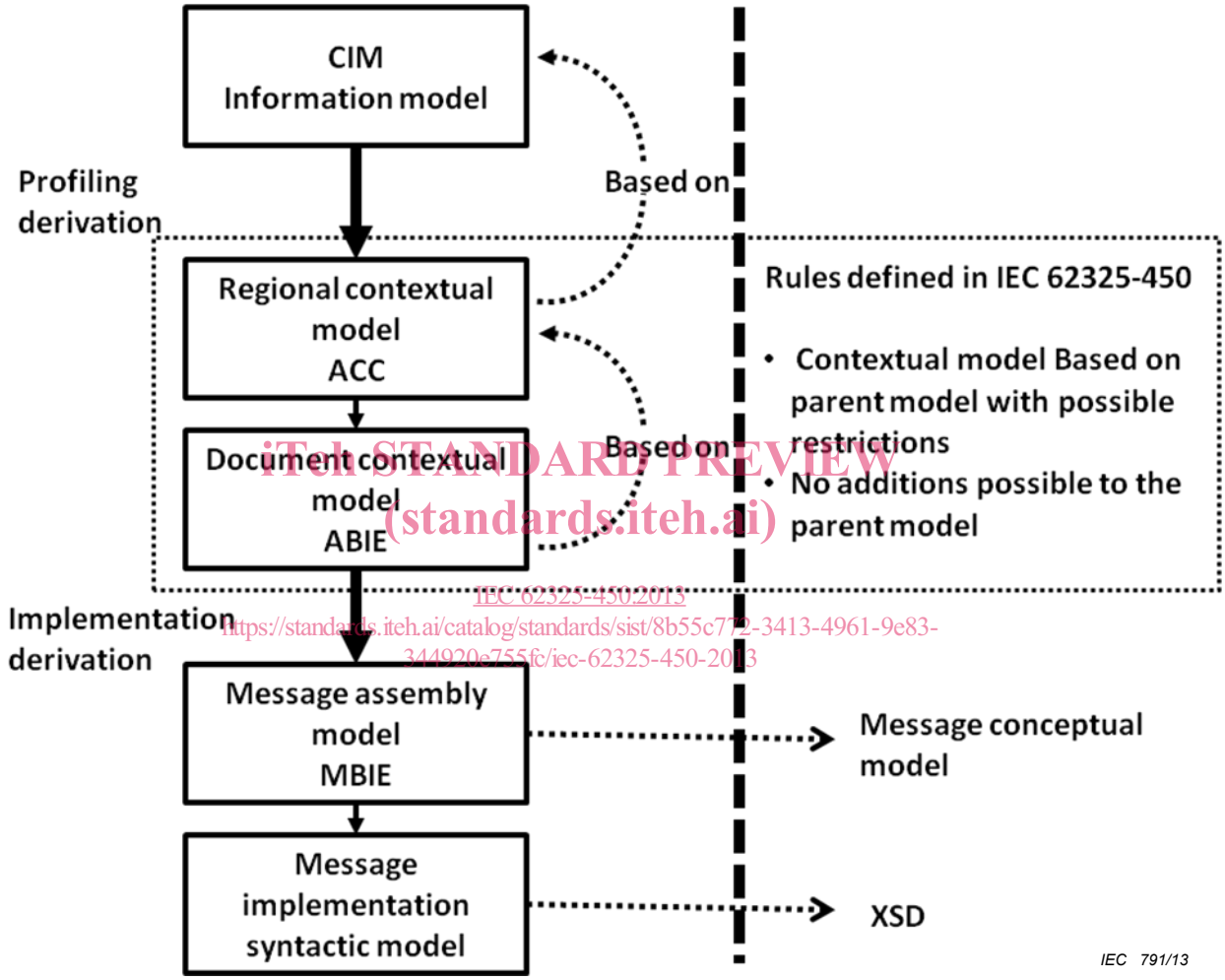


Figure 2 – Modelling framework principles

The basic principle underlying the modelling of different regional contextual models and their subsequent contextualized documents for information exchange is based on the scheme outlined in Figure 2.

At the top of the figure the common information model (CIM[4]) provides the overall semantic model for the electricity industry and covers both power system component and market information interchange requirements. IEC 62325-301 extends the original CIM in order to meet market needs for information interchange between actors participating in various market business processes. The CIM is therefore, the basis on which all information interchange requirements are built independently of the regional contextual model being used.

4 Footnote 4 applies only to the French version.

From the CIM, regional contextual models are built to cover the market information interchange requirements for a given Region (i.e. the Business Context).

A region may be a continent where common electricity market designs are used for the exchange of information (Europe, North America, Asia, etc.). It may also be a specific country or an organization that has particular needs and wishes to benefit from the CIM.

The regional contextual models are based on the CIM artefacts. However, a particular artefact may be refined respecting a set of defined rules to cater for specific regional requirements. The specific regional artefacts themselves cannot contradict the CIM artefacts on which they are built.

From the regional contextual model, specific contextualised documents may be derived to cater for specific information interchange functional requirements. The document contextual models cannot contradict the regional contextual model on which they are built. They may however introduce additional constraints to cater for the specific information requirements of the context in which the documents are to be used.

The final modelling step applies standardised message assembly rules in order to provide an optimised information structure for information interchange. All syntax specific electronic documents are built from the message assembly models. This last level is not covered by this standard.

The objective of this document is to provide the rules that ensure that each level of contextual model refinement maintains coherence with the level on which it is based.

4.3 Example of modelling principles usage

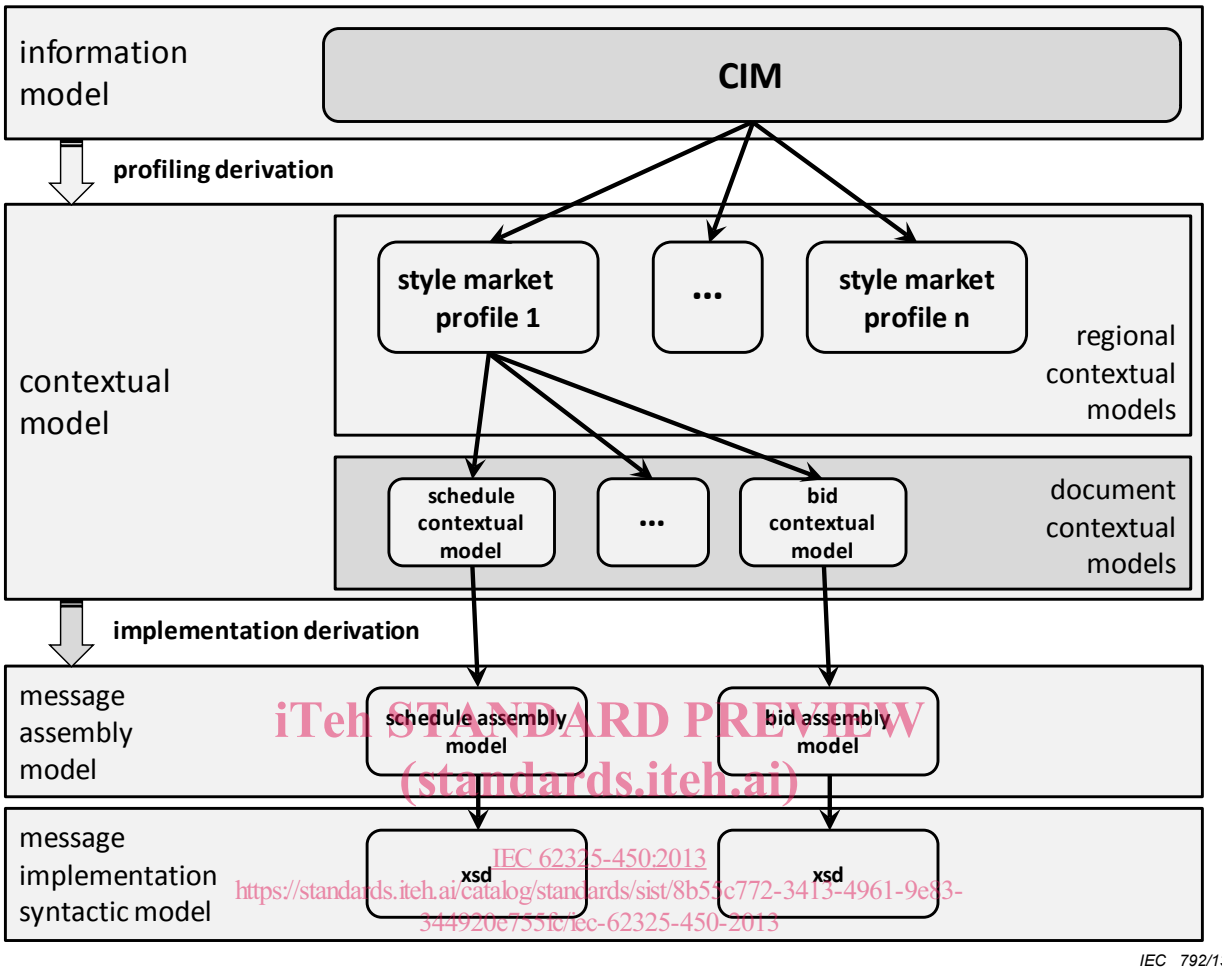
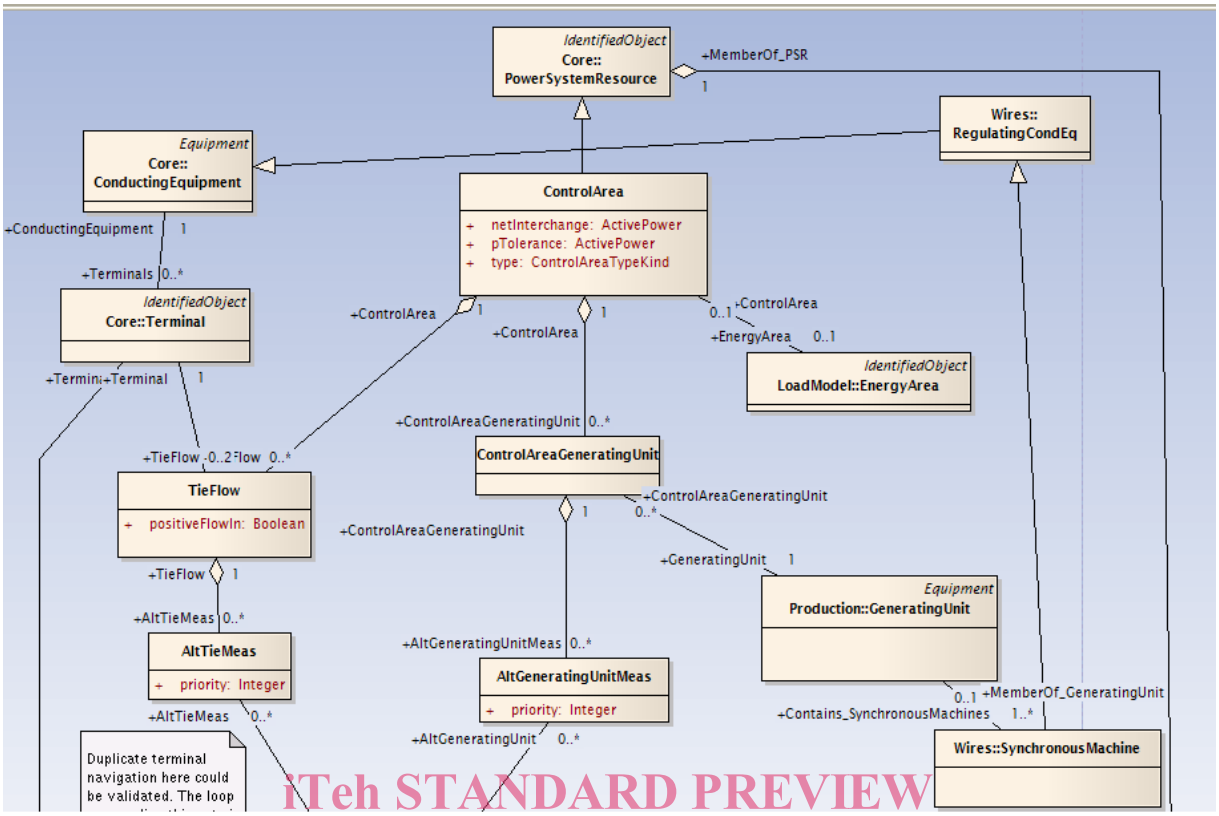


Figure 3 – Example of modelling principles usage

Figure 3 gives an example of modelling principles usage. The application of modelling principles enables the emergence of a single commonly shared CIM for market requirements independent of any specific regional market designs. This single shared information model is therefore generic and regional market designs are defined as a contextual model derivation by constraining the generic CIM.

5 Rule breakdown structure

The CIM uses a class diagram as outlined in Figure 4 to describe the artefacts that are a part of the information model.



IEC 793/13

Figure 4 – CIM UML class diagram

In order to fully understand the rules defined in this document it is necessary to understand the artefacts that are used in the CIM class diagram. These artefacts shall be used as the basis for the establishment of the rules for creating contextualised regional or document models. CIM as an abstract model is not intended for direct implementation.

The CIM UML diagram makes use of the following artefacts:

a) "Package" artefacts are used to group objects and provide namespace for the grouped objects. Each object may be owned by at most one namespace.

b) "Class" artefacts provide a description of a set of objects that share the same attributes, operations, methods, relationships, and semantics. It represents a particular type of object such as "ControlArea".

c) "Attribute" artefacts are features within a class that describe a range of values that instances of the class may hold. For example the class artefact "ControlArea" has as one of its attribute artefacts "netInterchange". An attribute artefact has a type, named datatype that describes its value sets.

d) "Relationship" artefacts enable one class artefact to be related to another. A "Relationship" artefact can be broken down into the following types of relationships:

   (1) "Association" provides the semantic relationship between two or more classes that specifies connections among their instances as shown in Figure 5.