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Framework for energy market communications –
Part 451-1: Acknowledgement business process and contextual model for CIM European market

Cadre pour les communications pour le marché de l'énergie –
Partie 451-1: Processus métier d'accusé de réception et modèle contextuel pour le marché européen CIM

IEC 62325-451-1:2013

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

Part 451-1: Acknowledgement business process and contextual model for CIM European market

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

FDIS	Report on voting
57/1381/FDIS	57/1396/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.

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INTRODUCTION

This International Standard is one of the IEC 62325-451-x series for deregulated energy market data exchanges based on the European style market profile. This standard, IEC 62325-451-1, defines the document contextual model, the message assembly model as well as the XML schema to be used for the acknowledgement process.

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) described in IEC 62325-301[1], IEC 61970-301 and IEC 61968-11 specifies the basis for the semantics for message exchange.

This European style market profile is based on different parts of the CIM IEC standard and specifies the content of the messages exchanged.

This document provides for the European-style market profile the generic technical and application acknowledgement document that can be used in all European style market processes. These market processes are based on the European regulations, and on the concepts of third party access and zonal market.This standard was originally based upon the work of the European Transmission System Operators (ETSO) Task Force EDI (Electronic Data Interchange) and then on the work of the European Network of Transmission System Operators (ENTSO-E) Working Group EDI.

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[1] To be published.

FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

Part 451-1: Acknowledgement business process and contextual model for CIM European market

1 Scope

This International Standard is one of the IEC 62325-451-x series for deregulated energy market data exchanges and is applicable to European style electricity markets.

Based on the European style market contextual model (IEC 62325-351), this particular International Standard specifies a UML package for the acknowledgment business process and its associated document contextual model, assembly model and XML schema for use within the European style electricity markets.

The relevant aggregate core components (ACCs) defined in IEC 62325-351 have been contextualised into aggregated business information entities (ABIEs) to satisfy the requirements of the European style market acknowledgment business process.

The contextualised ABIEs have been assembled into the acknowledgment document contextual model.

A related assembly model and an XML schema for the exchange of acknowledgement information between market participants is automatically generated from the Assembled document contextual model.

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

IEC 61970-2:2004, *Energy management system application program interface (EMS-API) – Part 2: Glossary*

IEC 62325-351, *Framework for energy market communications – Part 351: CIM European market model exchange profile*

IEC 62325-450:2013, *Framework for energy market communications – Part 450: Profile and context modeling rules*

IEC 62361-100, *Power systems management and associated information exchange – Interoperability in the long term – Part 100: CIM profiles to XML schema mapping*[2]

3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 61970-2, as well as the following apply.

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2 To be published.

NOTE General glossary definitions can be found in IEC 60050, *International Electrotechnical Vocabulary*.

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

[SOURCE: ISO/TS 15000-5:2005, 6.1.3]

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, it is the representation of an object class, independent of any specific business context.

[SOURCE: ISO/TS 15000-5:2005, 4.6.1]

3.3
application program interface
API
set of public functions provided by an executable application component for use by other executable application components

3.4
assembly model
assembly model is a model that prepares information in a business context for assembly into electronic documents for data interchange

3.5
Based on
IsBasedOn
use of an artefact that has been restricted according to the requirements of a specific business context

[SOURCE: IEC 62325-450:2013, 3.4]

3.6
Business Context
formal description of a 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]

3.7
information model
representation of concepts, relationships, constraints, rules, and operations to specify data semantics for a chosen domain of discourse

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

3.8
market management system
MMS
computer system comprised of a software platform providing basic support services and a set of applications providing the functionality needed for the effective management of the electricity market

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Note 1 to entry: These software systems in an electricity market may include support for capacity allocation, scheduling energy, ancillary or other services, real-time operations and settlements.

3.9
message business information entity
MBIE
aggregation of a set of ABIEs that respects a define set of assembly rules

3.10
profile
basic outline of all the information that is required to satisfy a specific environment

4 Document contextual model and message assembly model basic concepts

4.1 Overview

IEC 62325-450 defines a set of Common Information Model (CIM) profiles that follows a layered modelling framework as outlined in Figure 1, going from CIM to different regional contextual models and their subsequent contextualized documents for information exchange; the final step being the message specifications for information interchange.

The regional contextual models are the basic components that are necessary to build electronic documents for information interchange. The European style market contextual model (IEC 62325-351) is, as an example, a regional contextual model. The components are also termed aggregate core components (ACCs).

A document contextual model is based upon a specific business requirements specification and is constructed from the contextualisation of the ACCs that can be found in the European style market contextual model. The contextualised ACCs at this stage are termed aggregate business Information entities (ABIEs). These ABIEs are the constructs that are assembled together into a specific electronic document to satisfy the information requirements outlined in the business requirements specification. The transformation from an ACC to an ABIE must respect the rules defined in IEC 62325-450.

Once a document contextual model has been built, that satisfactorily meets the business requirements, a message assembly model can be automatically generated from it. The automatic generation respects the rules defined in IEC 62361-100.

The XML schema then may be automatically generated from the message assembly model. If necessary, specific mapping can take place at this stage to transform the CIM class and attribute names into more market resilient names.

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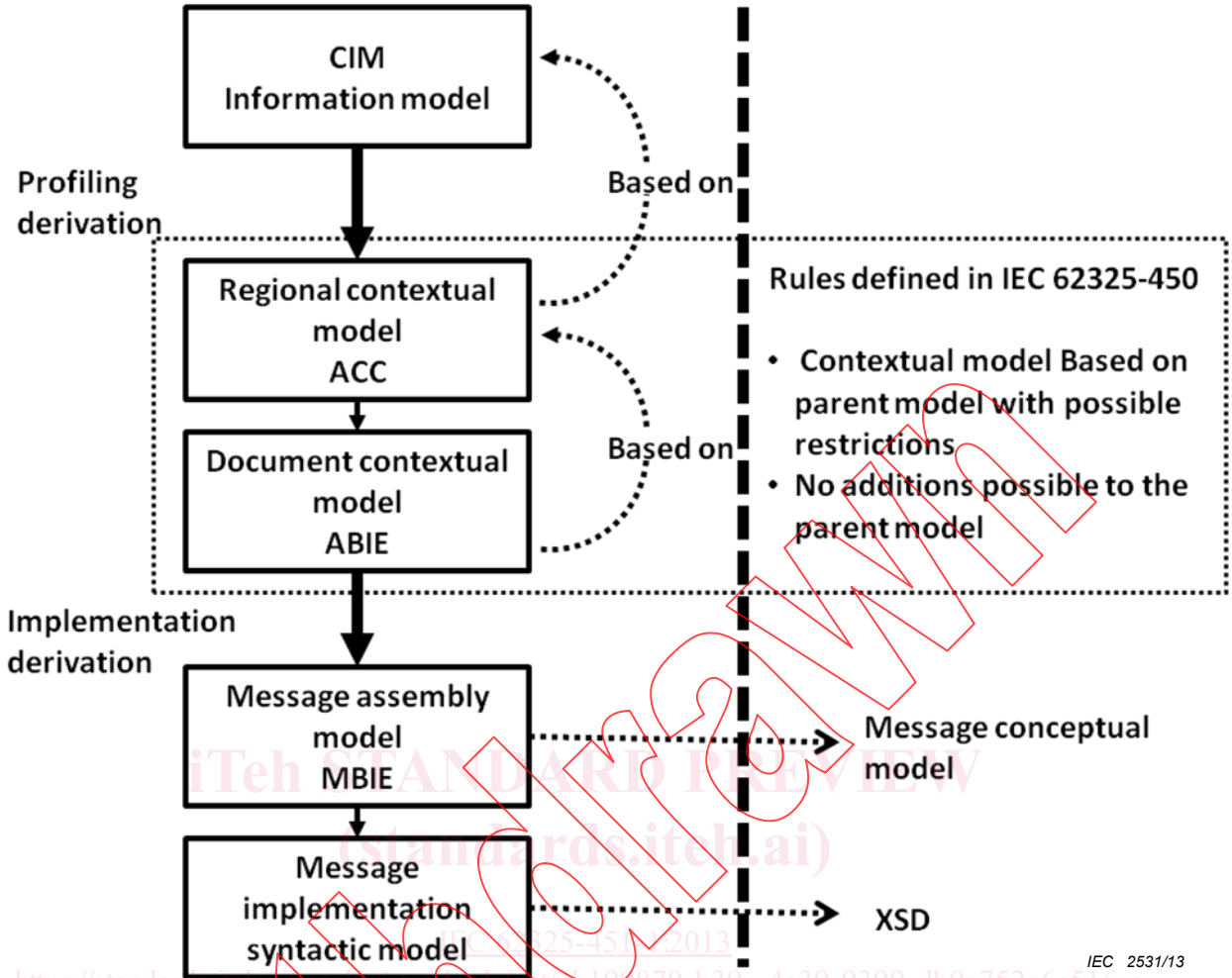

Figure 1 – IEC 62325-450 modelling framework

4.2 European style market package structure

The main package structure of the European style market profile is described in Figure 2.

For each business process, a business process package is described in an IEC 62325-451-x (x from 1 to i) standard.

A business process package contains:

- The document contextual model (ABIE) and the automatically generated message assembly model (MBIE) for each electronic document required to enable the completion of the business process. Each document is a sub contextual model derived by restriction from the European style market profile.
- The XML schema of the business document that is automatically generated from the message assembly model.

The European style market profile (ESMP), as defined in IEC 62325-351, provides the core components permitted for use in an IEC 62325-451-x standard. All ABIEs must be “based on” the IEC 62325-351 core components:

- ESMPClasses: Defining all the semi-contextual classes of the European style market profile derived by restriction from the CIM information model.
- ESMPDataTypes: Defining all the core Datatypes used within the ESMP classes.

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All the core components that are used in every electronic document structure have been harmonized and centralized in the European style market profile.

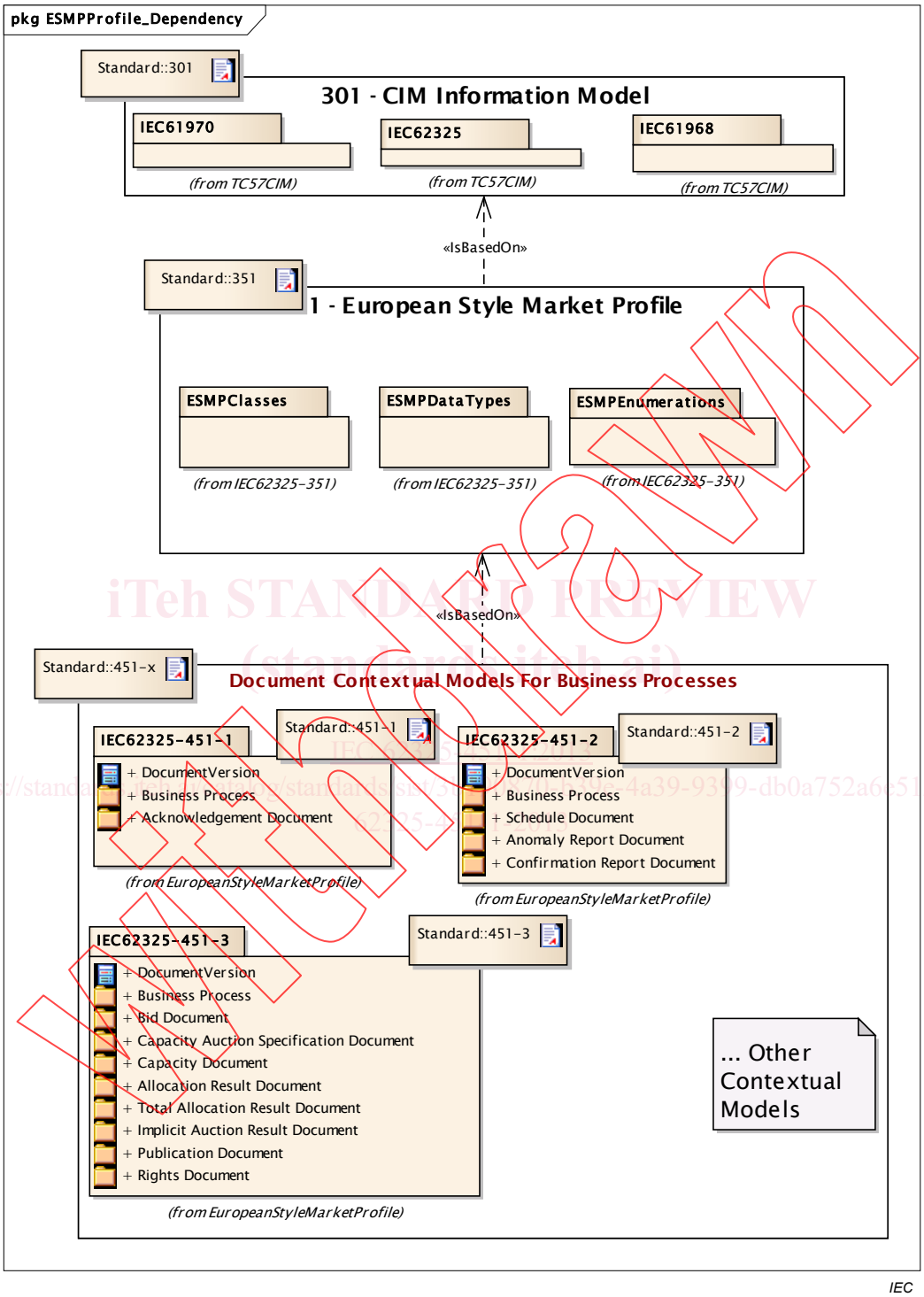

Figure 2 – Overview of European style market profile dependency

4.3 From the European style market profile to the document contextual model

The document contextual model for a given business process is constructed by an information analyst who identifies all the information requirements necessary to satisfy the business process.

Once the information requirements have been identified, the information analyst identifies the related ACCs that are available in the European style market profile and contextualises them to meet the information requirements. This contextualisation step creates a set of ABIEs.

In a final step the information analyst assembles together into a specific document contextual model package the ABIEs to form a document model satisfying the business requirements.

All document contextual models share the same core components and core datatypes. These are defined in the European style market profile (IEC 62325-351) and are contextualised and refined in all document contextual models (IEC 62325-451-x series) respecting the rules as described in IEC 62325-450.

4.4 From the document contextual model to the message assembly model

Once the document contextual model has been finalised, the message assembly model may be automatically generated.

All document contextual models share the same core components and core datatypes. These are defined in the European style market profile (IEC 62325-351) and are contextualised and refined in all document contextual models (IEC 62325-451-x series) respecting the rules as described in IEC 62325-450.

To enable this automatic generation a series of principles have been elaborated based on the underlying structures defined in the European style market profile.

The message assembly model is generated into a separate package and respects the following basic criteria:

1) There shall be one class that is not dependent through a relationship on another class. This class shall be deemed the Root class.
2) When there is a dependant class, that has a [0..1] or [1..1] multiplicity in all the dependent class association ends, then if it is a leaf class, the leaf class attributes shall be integrated into the parent class.
3) The multiplicity of the integrated attributes shall correspond to the multiplicity of the association end related to the dependent class. However, if an attribute has a multiplicity of [0..1] then this multiplicity shall become the multiplicity of the integrated attribute. For example, in Figure 3, the MarketParticipant class has a [1..1] relationship with the parent Schedule_MarketDocument for two associations (Sender_ and Receiver_) and its “mRID” has a [1..1] multiplicity, thus the resulting combination is a [1..1] multiplicity. Consequently the “mRID” attribute is moved to the parent class for these two relations respecting the [1..1] multiplicity.

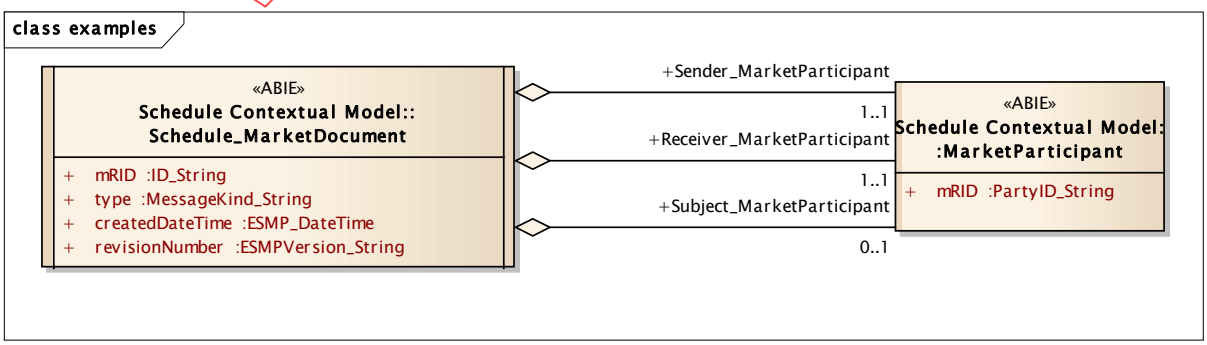

Figure 3 – Message assembly criteria

4) The name of the integrated attribute in the integrating class shall be the concatenation of the association end role name and the name of the attribute of the original class. For example, in Figure 3, there are three specific end role names,