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TECHNICAL REPORT

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Power systems management and associated information exchange – Interoperability in the long term – Part 103: Standard profiling

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CONTENTS

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POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE – INTEROPERABILITY IN THE LONG TERM –

Part 103: Standard profiling

FOREWORD

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IEC TR 62361-103, which is a technical report, has been prepared by IEC technical committee 57, Power systems management and associated information exchange.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
57/1911/DTR	57/1972/RVDTR

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

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

A list of all the parts in the IEC 62361 series, published under the general title *Power systems management and associated information exchange – Interoperability in the long term,* can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE – INTEROPERABILITY IN THE LONG TERM –

Part 103: Standard profiling

1 Scope

This part of IEC 62361, which is a technical report, describes the concepts of standard profiling for Common Information Model (CIM – IEC 61970, IEC 61968, IEC 62325) and IEC 61850 standard series. It serves as an introduction to profiling concepts and methodologies for the development of profiles for providing interoperability. It describes the specific needs and requirements of the standard application domains and derives profiling concepts respectively. Moreover the document defines the foundation for more detailed descriptions in the respective standard series.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61850 (all parts), *Communication networks and systems for power utility automation*

IEC 61968 (all parts), *Application integration at electric utilities – System interfaces for distribution management*

IEC 61970 (all parts), *Energy management system application program interface (EMS-API)*

IEC 62325 (all parts), *Framework for energy market communications*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
Basic Application Profile
BAP
user agreed-upon selection and interpretation of relevant parts of the applicable standards and specifications which is intended to be used as building blocks for interoperable user/project specifications

Note 1 to entry: BAPs must not have options, all selected criteria are mandatory to achieve interoperability. For implementation in projects, BAPs might be extended or refined to meet the user specific requirements.

The term “basic” means here that an elementary application function/subfunction is the chosen context for defining the profile. The level of what is perceived as elementary is application dependant, and may include for example many Logical Node (LN) instances of many LN classes, when using IEC 61850.

[SOURCE: CEN-CENELEC-ETSI SG-CG Report on Interoperability CEN_9762_CLC_9624, 12.1, Terms and definitions]

3.2
Basic Application Interoperability Profile
BAIOP
test sequences and test cases used to extend a BAP for interoperability testing to reach the desired level of interoperability

[SOURCE: CEN-CENELEC-ETSI SG-CG Report on Interoperability CEN_9762_CLC_9624, 12.1, Terms and definitions]

3.3
canonical information model
base information model upon which the profiling process is to be applied for CIM

Note 1 to entry: A canonical information model is a semantic model that is agreed upon as a common language for information describing the power system and processes related to it

Note 2 to entry: The canonical information model is the basis for profiles that describe specific data exchanges. Many user specific profiles can be defined based on the same canonical information model.

Note 3 to entry: In case the profile has an overlap (i.e. an electrical market use registered resources that maps to physical units and this mapping is needed to run safety studies with market data, the canonical information models make sure that it is possible to describe this overlap and that data in market profiles is directly linked with profiles describing the physical units.

3.4
conformance

accordance of the implementation of a product, process or service with all specified requirements or standards

Note 1 to entry: Additional features to those in the requirements / standards may be included.

Note 2 to entry: All features of the standard/specification are implemented and in accordance, but some additional features are not covered by the standard/specification.

[SOURCE: CEN-CENELEC-ETSI SG-CG Report on Interoperability CEN_9762_CLC_9624, 12.1, Terms and definitions]

3.5
conformance testing
act of determining to what extent a single implementation conforms to the individual requirements of its base standard

Note 1 to entry: An important condition in achieving interoperability is the correct implementation of the standards. This can be verified by conformance testing.

Note 2 to entry: Determines whether an implementation conforms to a profile as written in the PICS. The latter testing can be interoperability testing if profile covers the interoperability requirements additional to the conformance testing requirements of standards applied. Conformance testing is a prerequisite for interoperability testing.

[SOURCE: CEN-CENELEC-ETSI SG-CG Report on Interoperability CEN_9762_CLC_9624, 12.1, Terms and definitions]

3.6
context
set of business conditions and circumstances that are relevant to a domain, a situation, an event or an information exchange

3.7
cyber security
measures that protect and defend information and information systems by assuring their confidentiality, integrity, access controls, availability and accuracy

Note 1 to entry: As defined in ISO/IEC 27002:2005 “Information security is the protection of information from a wide range of threats in order to ensure business continuity, minimize business risk, and maximize return on investments and business opportunities”.

3.8
interchangeability
ability of two or more devices or components to be interchanged without making changes to other devices or components in the same system and without degradation in system performance

[SOURCE: CEN-CENELEC-ETSI SG-CG Report on Interoperability CEN_9762_CLC_9624, 12.1, Terms and definitions]

3.9
interoperability
ability of two or more networks, systems, devices, applications or components to interwork, to exchange and use information in order to perform required functions.

[SOURCE: CEN-CENELEC-ETSI SG-CG Report on Interoperability CEN_9762_CLC_9624, 12.1, Terms and definitions]

3.10
interoperability testing
testing which should be performed to verify that communicating entities within a system are interoperable, i.e. they are able to exchange information in a semantically and syntactic correct way

Note 1 to entry: During interoperability testing, entities are tested against peer entities known to be correct (profiles).

[SOURCE: CEN-CENELEC-ETSI SG-CG Report on Interoperability CEN_9762_CLC_9624, 12.1, Terms and definitions]

3.11
profile
agreed-upon subset of derived from a specification

Note 1 to entry: A common profile is required for achieving interoperability especially in those cases when a specification could have more than one interpretation and there are probably many optional features.

3.12
SGAM (Smart Grid Architecture Model)
high level conceptual model of the Smart Grid describing the main actors of the Smart Grid and their main interactions

Note 1 to entry: This concept is introduced in IEC 62357-1:2016.

[SOURCE: CEN-CENELEC-ETSI SG-CG M490, Set of standards report CEN_9762_CLC_9624, Chapter 7.3, SGAM introduction]

ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SGCG_Interoperability_Report.pdf

4 Profiling concepts

4.1 General

4.1.1 Overview

A profile in the domain of power systems management and associated information exchange describes a specific usage of a published standard or a collection of published standards by restricting offered flexibility. Functional requirements may lead to the proposal of extensions to the standard. Profiling needs to support both aspects.

Two implementations engineered from the same standard may not interoperate due to them having a different set of elements offered by the flexibility of the standard.

The main goal of defining a profile is to facilitate interoperability for the data exchange between elements to achieve the functions as specified in the specific use of the standard.

Profiling may serve many objectives, depending on the project where the profile is used, but within the different objectives one could get closer to interchangeability.

Therefore a profile may contain

a) definitions of restricted flexibilities for
   - data models
   - communication services and capabilities
   - engineering related requirements
     - functional allocation
     - including optional naming rules
   - cyber-security requirements
b) functional requirements for example state machines describing required sequences of actions needed to ensure interoperability, etc.
c) testing requirements

To reduce the number of profiles related to the similar usage, architectural variants and functional variants may be needed. Wherever possible, contained profile information should be supplemented with information in machine readable form.

Complementary aims and objectives of profiling are to

- promote the re-use of defined profiles in different projects
- facilitate interoperability tests, increase the quality of interoperability and potentially increase test efficiency
- facilitate pre-engineering and commissioning focussing on interoperability related topics

The profile contents are built based on requirements derived from use cases. These use cases may have very diverse inputs including specific local use cases and national or regional regulations.

4.1.2 Framework for defining a profile

The methodology to capture the profile requirements as illustrated in Figure 1 is structured on an approach based on Business Processes which need to be further broken down into functions. Both will have to be expressed through use cases, in order to extract the requirements for information exchange.

These requirements are the main input for defining a profile, with the additional constraint to map these requirements over a selected set of standards (in current case, CIM or IEC 61850).

Besides the definition of the profile itself, it is important to capture the context of testing the defined profile.

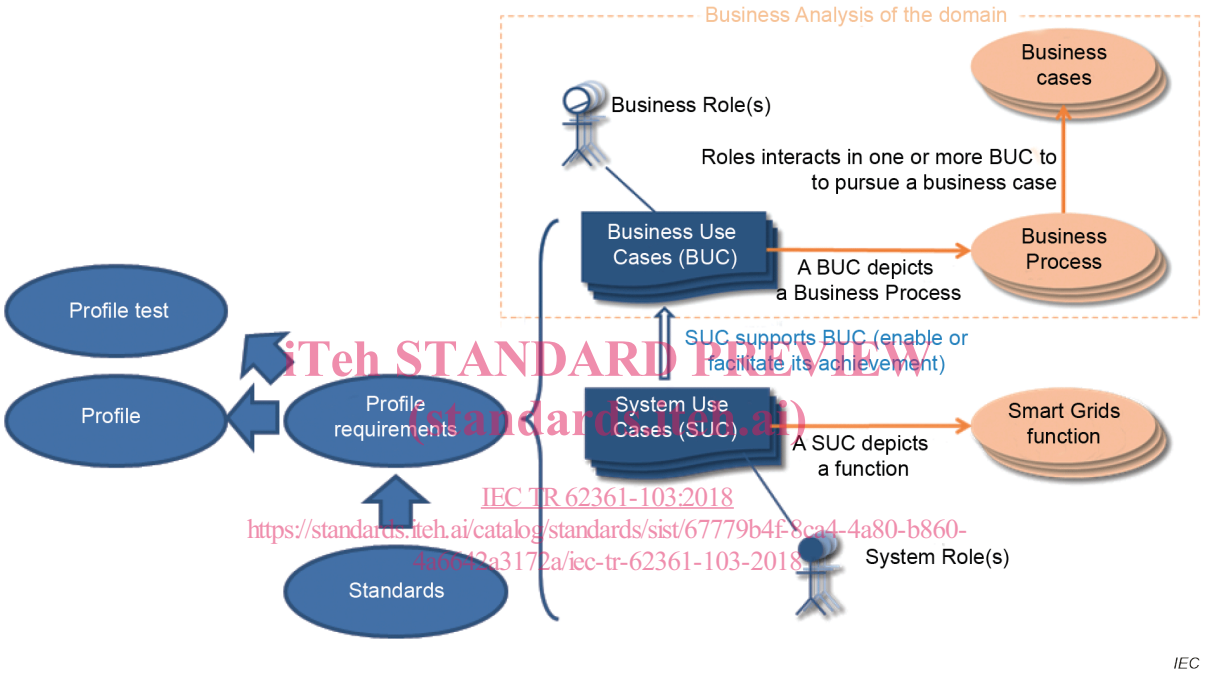

Figure 1 – Framework for defining a profile

4.1.3 Framework for profiling

Figure 2 presents an outline of standardized rules and relations between the main concepts related to profiling and its contribution to project development.

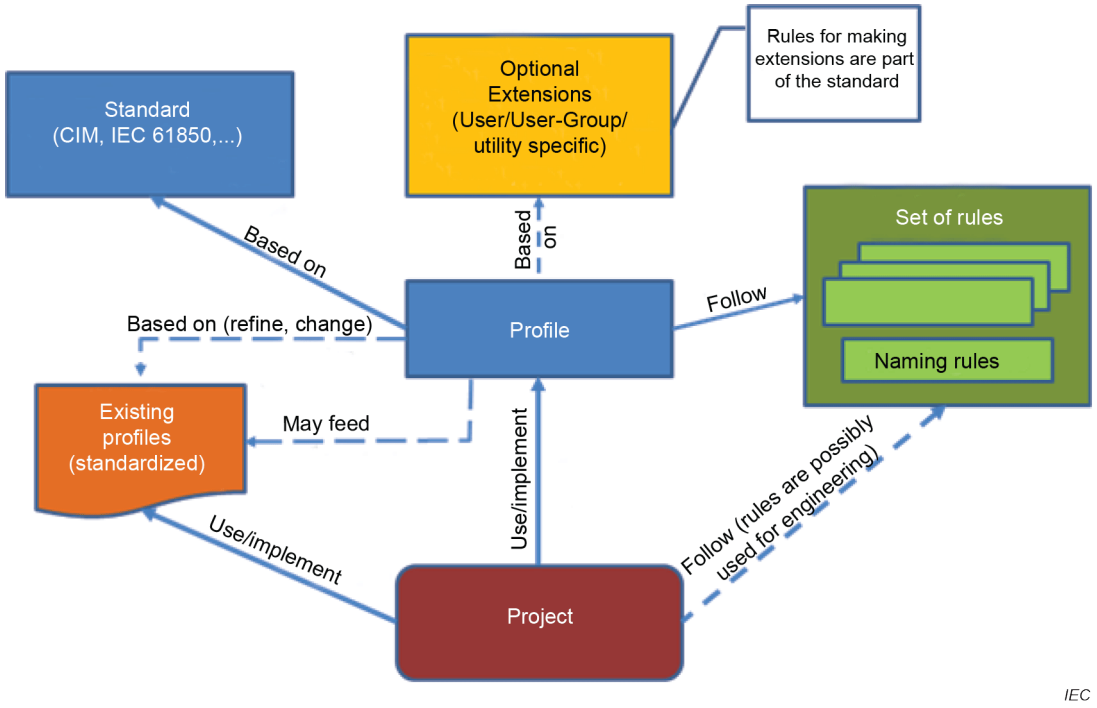

Figure 2 – Framework for profile

In principle a profile shall be defined based on the corresponding standard. The definitions of the standard might be extended optionally by User or User Group specific requirements. The optional extensions shall follow the rules which should be defined as part of the standard.

A profile shall follow a set of rules which may be additionally defined (i.e. rules for naming of objects).

A mature and proven profile can be standardized as well. If there are additional requirements or refinements to an existing standardized profile is needed the standardized profile may be extended following the rules for extension as stated above.

To facilitate interoperability in a project the use of profiles (either existing standardized profiles or project specific defined profiles) is highly recommended.

4.1.4 Framework for testing profiles

Figure 3 presents the basic framework of activities and elements needed to achieve interoperability within a project. It describes in addition the main area of involvement of standardisation activities.