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Energy management system application program interface (EMS-API) – Part 600-2: Common Grid Model Exchange Standard (CGMES) – Exchange profiles specification



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ENERGY MANAGEMENT SYSTEM APPLICATION PROGRAM INTERFACE (EMS-API) –

Part 600-2: Common Grid Model Exchange Standard (CGMES) – Exchange profiles specification

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International Standard IEC 61970-600-2 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

This first edition cancels and replaces IEC TS 61970-600-2 published in 2017. This edition constitutes a technical revision.

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

FDIS	Report on voting
57/2361/FDIS	57/2373/RVD

Full information on the voting for the approval of this international standard 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 61970 series, published under the general title *Energy Management System Application Program Interface (EMS-API)*, 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 website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

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ENERGY MANAGEMENT SYSTEM APPLICATION PROGRAM INTERFACE (EMS-API) –

Part 600-2: Common Grid Model Exchange Standard (CGMES) – Exchange profiles specification

1 Scope

This part of IEC 61970-600 defines the profiles included in the Common Grid Model Exchange Standard (CGMES) that are based on IEC 61970-450-series and IEC 61968-13 profiles. This document refers to the IEC 61970-450-series and IEC 61968-13 profiles only in cases where they are identical. If the referenced profile is not yet published, this document includes the profile definition and related constraints' definitions. In the case where a CGMES profile makes restriction on the referenced profile, the restriction is defined in this document.

The equipment boundary profile (EQBD) is the only profile that is not part of IEC 61970-450-series and IEC 61968-13 profiles. This profile is deprecated as modifications have been made to align between EQBP and the equipment profile (EQ). Although the updated EQBD is addressing the requirement that boundary also can be located inside a substation, which will be the case for many Distribution System Operators (DSOs), additional information would need to be exchanged. For instance, system integrity protection schemes, that can be shared by multiple utility would require another way of boundary handling. In this document EQBD is included in CGMES only to create better backwards compatibility with previous version of the CGMES.

The machine-readable documentation that supports model driven development of the profiles defined in this part are generated as Resource Description Framework Schema (RDFS) according to IEC 61970-501:2006 (with some extension) and IEC 61970-501:ED2 when published.

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 61968-11, *Application integration at electric utilities – System interfaces for distribution management – Part 11: Common information model (CIM) extensions for distribution*

IEC 61968-13, *Application integration at electric utilities – System interfaces for distribution management – Part 13: CIM RDF Model exchange format for distribution*

IEC 61970-301:2020, *Energy management system application program interface (EMS-API) – Part 301: Common information model (CIM) base*

IEC 61970-302:2018, *Energy management system application program interface (EMS-API) – Part 302: Common information model (CIM) dynamics*

IEC 61970-452:2017, *Energy management system application program interface (EMS-API) – Part 452: CIM static transmission network model profiles*

IEC 61970-453:2014, *Energy management system application program interface (EMS-API) – Part 453: Diagram layout profile*

IEC 61970-456:2018, *Energy management system application program interface (EMS-API) – Part 456: Solved power system state profiles*

IEC 61970-600-1:2020, *Energy management system application program interface (EMS-API) – Part 600-1: Common Grid Model Exchange Standard (CGMES) – Structure and rules*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms, definitions and abbreviated terms 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

NOTE For definitions which are not specified in the CGMES the definitions in the IEC CIM 61970 standards shall be applied.

3.1 Terms and definitions

3.1.1
boundary point
BP
connection point between two Model Authority Sets, that has been agreed on by both relevant Model Authority

[SOURCE: IEC 61970-600-1]

3.1.2
boundary set
set containing all boundary points necessary for a merge model

[SOURCE: IEC 61970-600-1]

3.1.3
distribution
specific representation of a dataset

Note 1 to entry: A dataset might be available in multiple serializations that may differ in various ways, including natural language, media-type or format, schematic organization, temporal and spatial resolution. The level of detail in the distribution is defined by one or more profiles to which the dataset conforms.

[SOURCE: IEC 61970-600-1]

3.1.4
Common Grid Model Exchange Standard
CGMES
collection of standards defined in IEC 61970-600 series that support the exchange of power system models (e.g. individual grid model or common grid model) between model authorities (TSOs, DSOs, etc.) for the purpose of coordinated set of services to be performed on the same model according to legislation or general data exchanges in the frame of system operation, system development or utilities' projects

[SOURCE: IEC 61970-600-1]

3.1.5
European Extensions
collection of classes, attributes and associations, which either extend or are defined in the standard IEC CIM model (IEC 61970-300 series, IEC 91968-11 and IEC 62325-300 series)

Note 1 to entry: The European extensions aim at satisfying requirements by the European legislation hence not necessarily applicable to other continents. The worldwide adoption of these extensions may not be exactly the same as the defined extension.

[SOURCE: IEC 61970-600-1]

3.1.6
profile
data model to describe instance file for exchange of CIM data

Note 1 to entry: A profile is a subset of classes, associations and attributes needed to accomplish a specific type of interface and based upon a CIM data model. Profiles may impose stricter rules on original classes and associations. A profile is usually converted to schema (XSD, RDF, OWL, etc.) that can be used to create, read and validate instance files for data exchange.

Note 2 to entry: This term may be used to define either the semantic model for an instance data payload or the syntactic schema for an instance data payload. A profile may be expressed in XSD, RDF, and/or OWL files. An instance data conforming to a profile can be tested in exchanges between applications. A profile is necessary in order to “use” the canonical model.

[SOURCE: IEC 61970-600-1]

3.2 Abbreviated terms

BP	Boundary point
CIM	Common Information Model (electricity)
CGMES	Common Grid Model Exchange Standard
DL	Diagram Layout profile
DSO	Distribution System Operator
DY	Dynamics profile
ENTSO-E	European Network of Transmission System Operators for Electricity
EQ	Core Equipment profile
EQBD	Equipment boundary profile
GL	Geographical Location profile
HVDC	High Voltage Direct Current
IEC	The International Electrotechnical Commission
IOP	Interoperability Test
ISO	Independent System Operator
MAS	Model Authority Set
mRID	CIM Master Resource Identifier
OCL	Object Constraint Language
OP	Operation profile
OWL	Web Ontology Language
RCC	Regional Coordination Centres
RDF	Resource Description Framework
RDFS	RDF Schema
SC	Short-Circuit profile
SHACL	Shapes Constraint Language