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Energy management system application program interface (EMS-API) - Part 452: CIM static transmission network model profiles

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 01/22

Obsahuje: EN IEC 61970-452:2021, IEC 61970-452:2021

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61970-452

December 2021

ICS 33.200

Supersedes EN 61970-452:2017 and all of its amendments and corrigenda (if any)

English Version

Energy management system application program interface (EMS-API) - Part 452: CIM static transmission network model profiles (IEC 61970-452:2021)

Interface de programmation d'application pour système de gestion d'énergie (EMS-API) - Partie 452: Profils du modèle de réseau de transport statique CIM (IEC 61970-452:2021)

Schnittstelle für Anwendungsprogramme für Netzführungssysteme (EMS-API) - Teil 452: CIM-Statische-Übertragungsnetzwerk-Modell-Profile (IEC 61970-452:2021)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 57/2400/FDIS, future edition 4 of IEC 61970-452, prepared by IEC/TC 57 “Power systems management and associated information exchange” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61970-452:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022–09–01
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024–12–01

This document supersedes EN 61970-452:2017 and all of its amendments and corrigenda (if any).

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Endorsement notice

The text of the International Standard IEC 61970-452:2021 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61968-13 NOTE Harmonized as EN IEC 61968-13

IEC 61970-1 NOTE Harmonized as EN 61970-1

IEC/TS 61970-2 NOTE Harmonized as CLC/TS 61970-2

IEC 61970-456 NOTE Harmonized as EN IEC 61970-456

IEC 61970-501 NOTE Harmonized as EN 61970-501

IEC 61970-552 NOTE Harmonized as EN 61970-552

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61970-301	2020	Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base	EN IEC 61970-301	2020

IEC 61970-452

Edition 4.0 2021-10

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

Interface de programmation d'application pour système de gestion d'énergie (EMS-API) – Partie 452: Profils du modèle de réseau de transport statique CIM

IEC 61970-452:2021-10(en-fr)

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INTERNATIONAL STANDARD

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

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FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61970 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

This fourth edition cancels and replaces the third edition published in 2017. This edition constitutes a technical revision. It is based on the IEC 61970 UML version ‘IEC61970CIM17v40’, dated 2020-08-24.

This edition includes the following significant technical changes with respect to the previous edition:

a) The classes PowerElectronicsConnection, PowerElectronicsUnit and PowerElectronicsWindUnit are added to the Core Equipment profile.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
57/2400/FDIS	57/2407/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all 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 document will remain unchanged until the stability date indicated on the IEC website under 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.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This part of IEC 61970 is part of the IEC 61970 series that define an application program interface (API) for an energy management system (EMS).

The IEC 61970-300 series specifies a Common Information Model (CIM). The CIM is an abstract model that represents all of the major objects in an electric utility enterprise typically needed to model the operational aspects of a utility. It provides the semantics for the IEC 61970 APIs specified in the IEC 61970-400 series of Component Interface Standards (CIS). The IEC 61970-300 series includes IEC 61970-301, *Common Information Model (CIM) base* and draft standard IEC 61970-302, *Common Information Model (CIM) for Dynamics*.

This document is one of the IEC 61970-400 series of Component Interface Standards that specify the functional requirements for interfaces that a component (or application) shall implement to exchange information with other components (or applications) and/or to access publicly available data in a standard way. The component interfaces describe the specific message contents and services that can be used by applications for this purpose. The implementation of these messages in a particular technology is described in the IEC 61970-500 series.

This document specifies the specific profiles (or subsets) of the CIM for exchange of static power system data between utilities, security coordinators and other entities participating in an interconnected power system, such that all parties have access to the modelling of their neighbour's systems that is necessary to execute state estimation or power flow applications. Currently three profiles, the CoreEquipment Profile, the Operation Profile and the Short Circuit Profile, have been defined. A companion standard, IEC 61970-552, defines the CIM XML Model Exchange Format based on the Resource Description Framework (RDF) Schema specification language. IEC 61970-552 is the common industry approach and is recommended to be used to transfer power system model data for the IEC 61970-452 profile.

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

Part 452: CIM static transmission network model profiles

1 Scope

This document is one of the IEC 61970-450 to 499 series that, taken as a whole, defines at an abstract level the content and exchange mechanisms used for data transmitted between control centres and/or control centre components, such as power systems applications.

The purpose of this document is to define the subset of classes, class attributes, and associations from the CIM necessary to execute state estimation and power flow applications. The North American Electric Reliability Council (NERC) Data Exchange Working Group (DEWG) Common Power System Modelling group (CPSM) produced the original data requirements, which are shown in Annex F. These requirements are based on prior industry practices for exchanging power system model data for use primarily in planning studies. However, the list of required data has been extended starting with the first edition of this standard to facilitate a model exchange that includes parameters common to breaker-oriented applications. Where necessary this document establishes conventions, shown in Clause 6, with which an XML data file must comply in order to be considered valid for exchange of models.

The data exchange use cases which this standard is meant to support are described in Annex A. The idea of a modelling authority as the source responsible for the modeling of a given region is described in Annex B. The concept of a boundary between regions is explained in Annex C. Annex D explains the processing of multiple profiles such as the three profiles described in this standard. The use of different curve styles to define ReactiveCapabilityCurve-s is explained in Annex E.

This document is intended for two distinct audiences, data producers and data recipients, and may be read from two perspectives.

From the standpoint of model export software used by a data producer, this document describes a minimum subset of CIM classes, attributes, and associations which must be present in an XML formatted data file for model exchange. This document does not dictate how the network is modelled, however. It only dictates what classes, attributes, and associations are to be used to describe the source model as it exists.

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.

NOTE For general glossary definitions, see IEC 60059, International Electrotechnical Vocabulary.

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