

INTERNATIONAL STANDARD

**Energy management system application program interface (EMS-API) –
Part 453: CIM based graphics exchange**

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**ENERGY MANAGEMENT SYSTEM APPLICATION
PROGRAM INTERFACE (EMS-API) –**
Part 453: CIM based graphics exchange

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International Standard IEC 61970-453 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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

CDV	Report on voting
57/874/CDV	57/932/RVC

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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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

- 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- withdrawn,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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INTRODUCTION

This standard is one of the IEC 61970 series that define an application program interface (API) for an Energy Management System (EMS).

The Part 3 series of IEC 61970 specify a Common Information Model (CIM): a logical view of the physical aspects of EMS information. The Part 3 series includes Part 301: Common Information Model (CIM) Base.

This standard is one of the IEC 61970, Part 4 series that define utility control center component interface specifications (CIS). Part 4 specifies 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 Part 5 of this series of standards.

Energy Management Systems display CIM data mostly in tabular lists and graphic schematic displays. The graphics schematic definitions may be included in the CIM, as defined by the location package IEC 61968, Part 11, or they may be stored in various proprietary formats.

Part 453 specifies guidelines for the exchange of graphic schematic definitions. Part 553-4 defines the SVG format for exchanging graphic schematic definitions.

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

Part 453: CIM based graphics exchange

1 Scope

This part of IEC 61970 is a member of the Part 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 center components.

Included in this part of IEC 61970 are the general use cases for exchange of graphic schematic display definitions, and guidelines for linking the schematic definitions with CIM data. Guidelines for management of schematic definitions through multiple revisions are also included.

2 Normative references

The following referenced documents are indispensable for the application 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 61970 (all parts), *Energy management system application program interface (EMS-API)*

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

IEC 61970-402, *Energy management system application program interface (EMS-API) – Part 402: Common services*

IEC 61970-501, *Energy management system application program interface (EMS-API) – Part 501: Common Information Model Resource Description Framework (CIM RDF) schema*

3 Terms and definitions

The following terms and definitions as well as the entries in the international electrotechnical vocabulary, IEC 60050, apply.

3.1

domain object

an instance of a class that models a Real-World Object with a unique identity

NOTE A domain object inherits from a CIM IdentifiedObject. A domain object is normally not a graphics object.

3.2

graphics display

electronic equivalent of a seamless paper plan

NOTE The graphics display is an identified container for the graphics objects. Examples of graphics displays include substation diagrams, transportation or distribution network orthogonal schematics, or pseudo-geographical schematics. A graphics display has a well-defined coordinate space.

3.3 graphics object

the graphics display is composed of graphics objects. The graphics objects define the representation of domain objects, static background, or user interaction elements

NOTE An example for domain objects includes breakers. An example for static background object includes lakes, and an example for user interaction elements includes buttons.

3.4 presentation logic

defines how to render graphic objects possibly based on the state of domain objects

NOTE Typically, the presentation logic is solved in a very specific way for each system.

3.5 user interaction logic

defines the possible actions a user can execute with a graphics object.

NOTE Typically, the user interaction logic is solved in a very specific way for each system.

4 General use cases for graphic exchange

Figure 1 shows a high-level view of using graphics data exchange with potential systems that can make use of the graphics data exchange.

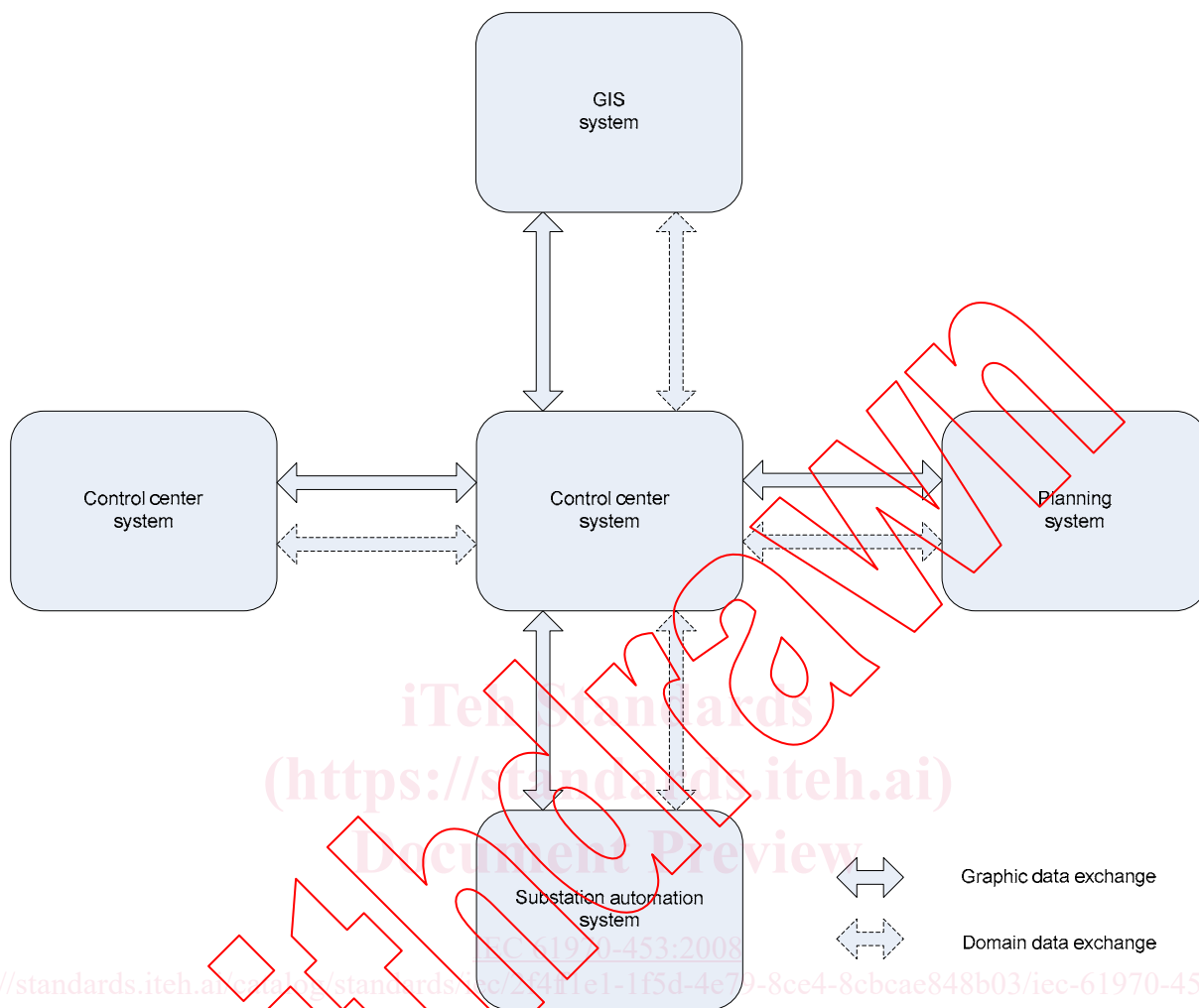


Figure 1 – System overview

With this proposed standard, instead of maintaining duplicate schematics for different applications, the schematics are exported by one system and imported by the other system. CIM based graphics exchange is an extension to the CIM XML model exchange IEC 61970-452, and it requires that references from graphics objects to domain objects can be specified by the exporting system and resolved on the importing system. In a typical case, there will always be a CIM XML model exchange followed by a CIM based graphics exchange.

This process can be applied for initial schematics construction as well as for continuous maintenance.

The importing system can create its graphics displays from the imported data, or the graphics exchange files can serve as additional documentation and means of understanding for the domain data exchange.

5 CIM based graphics exchange format

5.1 General

This standard specifies an exchange format for graphics objects with the following characteristics.