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Energy management system application program interface (EMS-API) –

Part 2:
Glossary

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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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• the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 61970-2, which is a technical specification, has been prepared by IEC Technical Committee 57: Power systems management and associated information exchange.

The specific standards documents for which this glossary applies are listed in IEC 61970-1[1].

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

Enquiry draft	Report on voting
57/666/CDV	57/725/RVC

Full information on the voting for the approval of this technical specification 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.

IEC 61970 consists of the following parts, under the general title *Energy Management System Application Program Interface (EMS-API):*

Part 1:		Guidelines and general requirements[1]

Part 2:		Glossary

Part 301:	Common Information Model (CIM) Base

Part 302:	Common information model (CIM) financial, energy scheduling and reservations[1]

Part 401:	Component Interface Specification (CIS) framework

Part 402:	Component Interface Specification (CIS) – Common services[1]

Part 403:	Component Interface Specification (CIS) – Generic data access [1]

Part 404:	Component Interface Specification (CIS) – High speed data access[2]

Part 405:	Component Interface Specification (CIS) – Generic eventing and subscription[2]

Part 407:	Component Interface Specification (CIS) – Time series data access[2]

Part 453:	Exchange of graphics schematics definitions (common graphics exchange)[2]

Part 501:	Common Information Model (CIM) XML codification for programmable reference and model data exchange[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

• transformed into an International standard,

• reconfirmed,

• withdrawn,

• replaced by a revised edition, or

• amended.

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

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[1] Under consideration.

[2] Under consideration.

INTRODUCTION

This Technical specification is part of the IEC 61970 series, which defines an Application Program Interface (API) for an Energy Management System (EMS). This standard is based upon the work of the EPRI Control Center API (CCAPI) research project (RP-3654-1). The principle objectives of the EPRI CCAPI project are to:

– reduce the cost and time needed to add new applications to an EMS;

– protect the investment in existing applications that are working effectively in an EMS.

The principal task of the CCAPI project is to develop a set of guidelines, or specifications, to enable the creation of "plug-in" applications[3] in the control center environment.

This part of the IEC 61970 series provides a glossary of terms and abbreviations that are specific to the IEC 61970 series or may require interpretation as to how they were used in it.

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[3] A plug-in application is defined to be a piece of software that may be installed on a system with minimal effort and no modification of source code; i. e., the way software packages are installed on a desktop computer. The CCAPI Project goal is to at least approach that ideal by reducing the often significant efforts currently required to install third-party applications in an EMS.

ENERGY MANAGEMENT SYSTEM APPLICATION
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1 Scope

This Technical specification provides a glossary for the volume of work produced as part of the IEC 61970 series of documents. Terms and abbreviations that are either specific to the series, or that require explanation because of the way that they are used in it, are supplied.

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 61970-1, *Energy Management System Application Program Interface (EMS-API) – Part 1: Guidelines and general requirements*

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3 Terms and definitions

For the purposes of this Technical specification, the terms and definitions given below apply.

3.1
aggregation
special case of association

3.2
application
piece of software that comprises one or more components that perform some business function in a given domain. The important aspect is the functionality performed and not the packaging of the software. An example would be a word processor. It has a fairly well understood functionality but the components that are actually installed can look very different depending on the vendor.

3.3
application context
collection of applications working together as an organizational unit to accomplish some high-level objective

3.4
Application Program Interface
API
set of public functions provided by an executable application component for use by other executable application components

3.5
association
connection between classes that can be assigned a role

3.6
cardinality from
multiplicity from the class that is being described, '0' is an optional association and '*n*' means that an unspecified number of associations are allowed

3.7
cardinality to
multiplicity and cardinality of the class on the other side of the association

3.8
Common Information Model
CIM
abstract model that represents all of the major objects in an electric utility enterprise that are typically contained in an Energy Management System (EMS) information model. By providing a standard way of representing power system resources as object classes and attributes along with their relationships, the CIM facilitates the integration of EMS applications developed independently by different vendors, between entire EMS's developed independently or between an EMS and other systems concerned with different aspects of power operations, such as generation or distribution management.

3.9
CIM context
run-time environment within which all application instances operate to achieve a common objective

3.10
class
description of an object found in the real world that needs to be represented as part of the overall power system model or a set of resources to which a given set of properties apply

3.11
communication profiles
particular protocols and protocol services that are to be used for information exchange between separate server platforms in a component execution system

3.12
component
reusable software building block: a pre-built piece of encapsulated application code that can be combined with other components and with handwritten code to rapidly produce a custom application. In order to qualify as a component, the application code must provide a standard interface that enables other parts of the application to invoke its functions and to access and manipulate the data within the component. For compiled languages, a component is usually a file of executable code (*.exe or *.dll) or resource files containing data used by this or other applications. The component model defines the structure of the interface.

3.13
component adapter
piece of software that sits between the application (or component) and the component container and integration infrastructure and which provides the fundamental component support services

3.14
component container
components execute within a container. The container provides a context for one or more components and provides management and control services for the components. It also provides an operating system process or thread in which to execute the component.

3.15
component execution system
term encompassing the entire reference model from the container layer down including the component container, middleware services and communication profiles. It includes other normal platform supplied services as well, including the operating system, persistent storage, etc.

NOTE   Also known as container systems.

3.16
component model
basic architecture of a component specifying the structure of its interfaces and the mechanisms by which it interacts with its container and with other components

3.17
container
container provides a context for one or more components and provides management and control services for the components

3.18
container systems
see component execution systems

3.19
Directed Label Graph
DLG
graphical data structure consisting of vertices connected by arcs in which each arc has a direction (from one vertex to another) and is identified by a label.

3.20
document
large, rich data structure, such as an XML document, used in a form of information exchange between computer systems. This exchange is more likely to involve individual, atomic information transfers where all information on how to handle the information and/or action requested in the transfer is self-contained rather than acquired in multi-step transactions where the handling of the information transfer may be contingent upon previous information transfers or events.

3.21
Document Object Model
DOM
platform and language neutral interface defined by the World-Wide Web Consortium (W3C) that allows programs and scripts to dynamically access and exchange the content, structure and style of documents

3.22
Document Type Definition
DTD
standard for describing the vocabulary and syntax associated with an XML document

3.23
element
container enclosed between start and stop tags

3.24
energy management system
computer system comprising a software platform providing basic support services and a set of applications providing the functionality needed for the effective operation of electrical

generation and transmission facilities so as to assure adequate security of energy supply at minimum cost

3.25
event
unit of information exchange that is issued asynchronously by its source

3.26
extensible markup language
XML
subset of the Standard Generalized Markup Language (SGML), ISO 8879, for putting structured data in a text file

3.27
extensible style sheet language
XSL
language for expressing style sheets for XML documents

3.28
generalization
relationship between a more general and a more specific class where the more specific class contains additional information

3.29
HyperText Markup Language
HTML
markup language used to format and present information on the web

3.30
independent system operator
ISO
in the restructured electric energy environment, the organization charged with operating the transmission grid in a safe and secure manner

3.31
legacy application
application performing some business function that may have been purchased or developed prior to establishing a component model for integration purposes

3.32
legacy wrapper
mechanism that converts a legacy application input/output into one or more component interfaces so that the legacy application can participate in information exchange in component-based system architecture

3.33
middleware
diverse group of software products that function as an integration, conversion or translation layer. Middleware provides generic interfaces for events, messaging, data access, transactions, etc.

3.34
multiplicity constraints
documents the CIM values for allowed cardinality for a role name in an association