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Energy management system application program interface (EMS-API) – Part 405: Generic Eventing and Subscription (GES)

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

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

Part 405: Generic Eventing and Subscription (GES)

FOREWORD

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International Standard IEC 61970-405 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:

FDIS	Report on voting
57/888/FDIS	57/907/RVD

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

A list of all parts of the IEC 61970 series, 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 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- withdrawn;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.

INTRODUCTION

This part of IEC 61970 is part of the IEC 61970 series that defines Application Program Interfaces (APIs) for an Energy Management System (EMS). The IEC 61970-4XX and IEC 61970-5XX series documents comprise Component Interface Specifications (CISs). The IEC 61970-4XX series CIS are specified as Platform Independent Models (PIMs), which means they are independent of the underlying technology used to implement them. PIM specifications are also referred to as Level 1 specifications. The IEC 61970-5XX series CIS, on the other hand, are specified as Platform Specific Models (PSMs). PSM specifications are also referred to as Level 2 specifications.

IEC 61970-4XX CISs specify the functional requirements for interfaces that a component (or application) should 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 event types and message contents that can be used by applications for this purpose.

IEC 61970-405 specifies an interface for the efficient transfer of event messages and alarm acknowledge messages in a distributed environment. Small numbers of messages are transferred with short delay but also large amounts are transferred in short time but with possibly longer delay. This is a typical requirement for a SCADA system that acts as a real time data provider to other sub-systems. Other systems than SCADA may also benefit from the characteristics of Generic Eventing and Subscription (GES) interface. When short delay times as well as bulk message transfer is required, GES is a good fit.

The component interface specifications refer to entity objects for the power system domain that is defined in the IEC 61970-3XX series, including IEC 61970-301.

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

Part 405: Generic Eventing and Subscription (GES)

1 Scope

The IEC 61970-405 Generic Eventing and Subscription (GES) specification specifies a generalized interface for efficient exchange of messages. The specification takes into account the latencies caused by a Local Area Network (LAN) providing efficient data exchange also over Local Area Networks. The Generic Eventing and Subscription (GES) API is expected to provide one of the primary means for accomplishing application integration. Beyond the scope of the GES API, other APIs address the high performance, real-time interactive needs of an application within a running system as well as request/reply oriented generic data access.

IEC 61970-405 is derived from the Object Management Group (OMG) Data Acquisition from Industrial Systems section Alarms and Events (DAIS A&E) specification. OMG DAIS A&E relies on the OMG Data Access Facility (DAF) and OPC Alarms and Events (A&E) specifications. OMG DAIS A&E is a Platform Specific Model (PSM) with CORBA as the platform and OPC A&E is a PSM with Microsoft COM as the platform. Implementers wanting an introduction to OMG DAIS A&E and OPC A&E shall read these documents.

The GES interface is intended to interoperate with other IEC 61970 based interfaces. Hence it is possible to use information retrieved from other interface to access the same information using this interface, for example:

- object identifiers,
- attribute names or identifiers,
- class names or identifiers.

The way data is organized in a server implementing the GES interface can be seen by using the browse interfaces for data and meta data. It is also possible to use the data access interface directly without using the browse interfaces if the client has an *a priori* knowledge of object, class and attribute identifiers. Object identifiers may be retrieved using data from other interfaces, for example a CIMXML file or the IEC 61970-404 interface. Information on what classes and attributes are available will be described in IEC 61970-45X documents.

IEC 61970-405 describes the functionality in a technology independent way, it is a Platform Independent Specification (PIM). Hence, it explains the functionality to a level that can be used to create PSMs or be an introduction to existing PSMs, i.e. DAIS A&E and OPC A&E. Implementers wanting an introduction to OMG DAIS A&E and OPC A&E should read these documents.

IEC 61970-405 consists of two parts:

- SCADA alarms and events that is the Platform Independent Specification (PIM) derived from DAIS A&E and OPC A&E. This part is called “Generic Eventing and Subscription Alarms and Events” (GES A&E).
- Generic messaging that is a generalization of the SCADA alarms and events. This part is just called “Generic Eventing and Subscription” (GES).

IEC 61970-1 provides the EMS-API reference model upon which this standard is based. In that reference model, the terminology used in this part of IEC 61970 is introduced and the role of the CIS is explained.

IEC 61970-401 provides an overview and framework for the CIS (IEC 61970-4XX) standards.IEC 61970-402 provides the base services to be used in conjunction with other IEC 61970-4XX documents. This specification extends the Common Services to provide an event subscription oriented mechanism for applications to exchange CIM data.

The mapping of IEC 61970-405 to implementation specific technologies or Platform Specific Models (PSMs) is further described in a separate series of documents, i.e. the future IEC 61970-5XX. For actual implementations, the future IEC 61970-5XX, OMG DAIS A&E, OMG DAF or OPC A&E are used.

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 61970-1:2005, *Energy management system application program interface (EMS-API) – Part 1: Guidelines and general requirements*

IEC/TS 61970-2, *Energy management system application program interface (EMS-API) – Part 2: Glossary*

IEC 61970-301:2005, *Energy management system application program interface (EMS-API) – Part 301: Common Information Model (CIM) base*

IEC 61970-401, *Energy management system application program interface (EMS-API) – Part 401: Component Interface Specification (CIS) Framework*

IEC 61970-402, *Energy management system application program interface (EMS-API) – Part 402: Component Interface Specification (CIS) – Common Services*

Data Acquisition from Industrial Systems section Alarms and Events (DAIS A&E), OMG Adopted Specification Version1.1, formal/2005-06-01 June 2005 (Referred herein as 'OMG DAIS A&E')

Utility Management System (UMS) Data Access Facility (DAF), OMG Adopted Specification, Version 2.0.1, formal/05-06-03, July 2005 (Referred to herein as 'OMG DAF')

OPC Alarms and Events Specification, Version 1.10, OPC Foundation, October 2002 (Referred to herein as 'OPC A&E')

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC/TS 61970-2 apply.

NOTE Refer to International Electrotechnical Vocabulary, IEC 60050, for general glossary definitions.

4 Generic Eventing and Subscription (Normative)

4.1 Overview

4.1.1 General

Figure 1 illustrates the interaction between a Generic Eventing and Subscription Alarms and Events (GES A&E) client and server. A subscription means that the server has no *a priori*

knowledge of its clients. Once a connection is established, a server calls the clients back when data becomes available or updated.

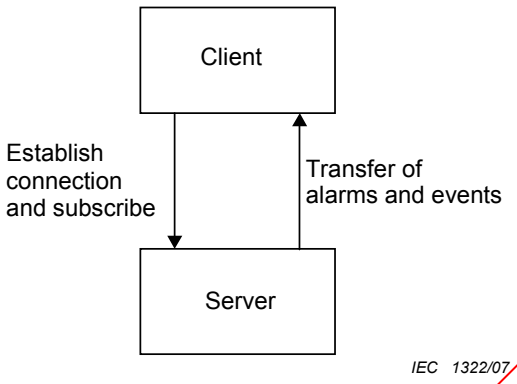

Figure 1 – Data subscription

This Clause discusses Generic Eventing and Subscription (GES) that is a generalization of the Generic Eventing and Subscription Alarms and Events (GES A&E). GES A&E is described in Clause 5. The scope of GES A&E is intended for SCADA data exchange, as described in Clause 5. GES A&E Simple Events can be applied to a much broader scope and is the basis for GES.

4.1.2 Suitability of the GES to the integration of a variety of application categories

The use of GES is not limited to SCADA oriented data. Application categories exchanging non SCADA data that GES can be applied to include:

- Outage Management Systems
- Network Applications
- Generation Control
- Geographic Information Systems
- Energy Management Systems
- Asset and Work Management Systems
- Other application categories used in the operation of a power system as listed in IEC 61970-1 (2005) Annex B.

4.1.3 Suitability of the GES to the integration beyond the control center

Though the target of this IEC standard is the control center technical domain, GES encompasses a general set of concepts that can be applied to many types of systems. Examples of these systems include:

- Customer Information Systems
- Substation Automation Systems. For integration with Substation Automation Systems, it shall be noted that several specifications related to communication already exists, for example the IEC 61850 series for substation communication and IEC 60870-5 for RTU communication. The intention of this part of IEC 61970 is to describe a service interface that may encapsulate such communication solutions.
- Other types of technically oriented operational business systems.

In recognition that the integration between applications in two or more of these systems is often necessary, the intent of this part of IEC 61970 is to meet general GES requirements to the extent that they are common to different types of systems while effectively addressing control center needs.