SLOVENSKI STANDARD
SIST EN 61968-1:2013

01-marec-2013

Nadomešča:
SIST EN 61968-1:2004

Združevanje aplikacij v elektropodjetjih - Sistemski vmesniki za upravljanje distribucije - 1. del: Arhitektura vmesnikov in splošne zahteve (IEC 61968-1:2012)

Application integration at electric utilities - System interfaces for distribution management - Part 1: Interface architecture and general requirements

Integration von Anwendungen in Anlagen der Elektrizitätsversorgung - Systemschnittstellen für Netzführung - Teil 1: Schnittstellenarchitektur und allgemeine Anforderungen

Intégration d'applications pour les services électriques - Interfaces système pour la gestion de distribution - Partie 1: Architecture des interfaces et recommandations générales

Ta slovenski standard je istoveten z: EN 61968-1:2013

ICS:

29.240.30	Krmilna oprema za elektroenergetske sisteme	Control equipment for electric power systems
35.200	Vmesniška in povezovalna oprema	Interface and interconnection equipment

SIST EN 61968-1:2013   **en**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61968-1

January 2013

ICS 33.200

English version

Application integration at electric utilities - System interfaces for distribution management - Part 1: Interface architecture and general recommendations
(IEC 61968-1:2012)

Intégration d'applications pour les services électriques -
Interfaces système pour la gestion de distribution -
Partie 1: Architecture des interfaces et recommandations générales
(CEI 61968-1:2012)

Integration von Anwendungen in Anlagen der Elektrizitätsversorgung -
Systemschnittstellen für Netzführung -
Teil 1: Schnittstellenarchitektur und allgemeine Anforderungen
(IEC 61968-1:2012)

This European Standard was approved by CENELEC on 2012-12-04. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61968-1:2013 E

Foreword

The text of document 57/1272/FDIS, future edition 2 of IEC 61968-1, 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 61968-1:2013.

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)   2013-09-04

* latest date by which the national standards conflicting with the document have to be withdrawn   (dow)   2015-12-04

This document supersedes EN 61968-1:2004.

EN 61968-1:2013 includes the following significant technical changes with respect to EN 61968-1:2004:

a) update of IRM table which has been out of date since the 1st edition;

b) addition of missing Advanced Metering Infrastructure (AMI) related functions;

c) alignment with newly released documents from the technical committee;

d) alignment with EN 61968-100;

e) update of annexes.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61968-1:2012 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 61968-4   NOTE Harmonized as EN 61968-4.

IEC 61970-501   NOTE Harmonized as EN 61970-501.

Annex ZA
(normative)

Normative references to international publications
with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE   When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 61968-3	-	Application integration at electric utilities - System interfaces for distribution management - Part 3: Interface for network operations	EN 61968-3	-
IEC 61968-9	-	Application integration at electric utilities - System interfaces for distribution management - Part 9: Interface for meter reading and control	EN 61968-9	-
IEC 61968-11	-	Application integration at electric utilities - System interfaces for distribution management - Part 11: Common Information Model (CIM) extensions for distribution	EN 61968-11	-
IEC 61968-13	-	Application integration at electric utilities - System interfaces for distribution management - Part 13: CIM RDF Model exchange format for distribution	EN 61968-13	-
IEC 61970-301	-	Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base	EN 61970-301	-

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IEC 61968-1

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour
inside

Application integration at electric utilities – System interfaces for distribution management –
Part 1: Interface architecture and general recommendations

Intégration d'applications pour les services électriques – Interfaces système pour la gestion de distribution –
Partie 1: Architecture des interfaces et recommandations générales

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INTERNATIONALE

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INTERNATIONAL ELECTROTECHNICAL COMMISSION
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APPLICATION INTEGRATION AT ELECTRIC UTILITIES –
SYSTEM INTERFACES FOR DISTRIBUTION MANAGEMENT –

Part 1: Interface architecture and general recommendations

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 61968-1 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

This second edition cancels and replaces the first edition published in 2003. This edition constitutes a technical revision.

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

a) update of IRM table which has been out of date since the 1st edition;

b) addition of missing Advanced Metering Infrastructure (AMI) related functions;

c) alignment with newly released documents from the technical committee;

d) alignment with IEC 61968-100;

e) update of annexes.

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

FDIS	Report on voting
57/1272/FDIS	57/1288/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61968 series, published under the general title *Application integration at electric utilities – System interfaces for distribution management*, 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 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.

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IMPORTANT – The 'colour inside' logo on the cover page of this publication 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

IEC 61968 is a series of standards:

IEC 61968 part	Title
1	Interface architecture and general recommendations
2	Glossary
3	Interface for network operation
4	Interface for records and asset management
5	Interface standard for operational planning and optimisation[1]
6	Interface for maintenance and construction[2]
7	Interface standard for network extension planning[3]
8	Interface standard for customer support[4]
9	Interface for meter reading and control
11	Common information model (CIM) extensions for distribution
13	CIM RDF model exchange format for distribution
100	Implementation profiles[5]

The IEC 61968 series is intended to facilitate inter-application integration, as opposed to intra-application integration of the various distributed software application systems supporting the management of utility electrical distribution networks. Intra-application integration is aimed at programs in the same application system, usually communicating with each other using middleware that is embedded in their underlying runtime environment. Additionally the intra-application integration tends to be optimized for close, real-time, synchronous connections and interactive request/reply or conversation communication models. IEC 61968 series by contrast, is intended to support the inter-application integration of a utility enterprise that needs to connect disparate applications that are already built or new (legacy or purchased applications) each supported by dissimilar runtime environments. Therefore, IEC 61968 series is relevant to loosely coupled applications with more heterogeneity in languages, operating systems, protocols, and management tools. IEC 61968 series is intended to support applications that need to exchange data on an event driven basis. IEC 61968 series is also intended to be implemented with middleware services that broker messages among applications and complementing, but not replacing, utility data warehouses, database gateways, and operational stores.

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[1] Under consideration.

[2] Under consideration.

[3] Under consideration.

[4] Under consideration.

[5] Under consideration.

IEC 1963/12

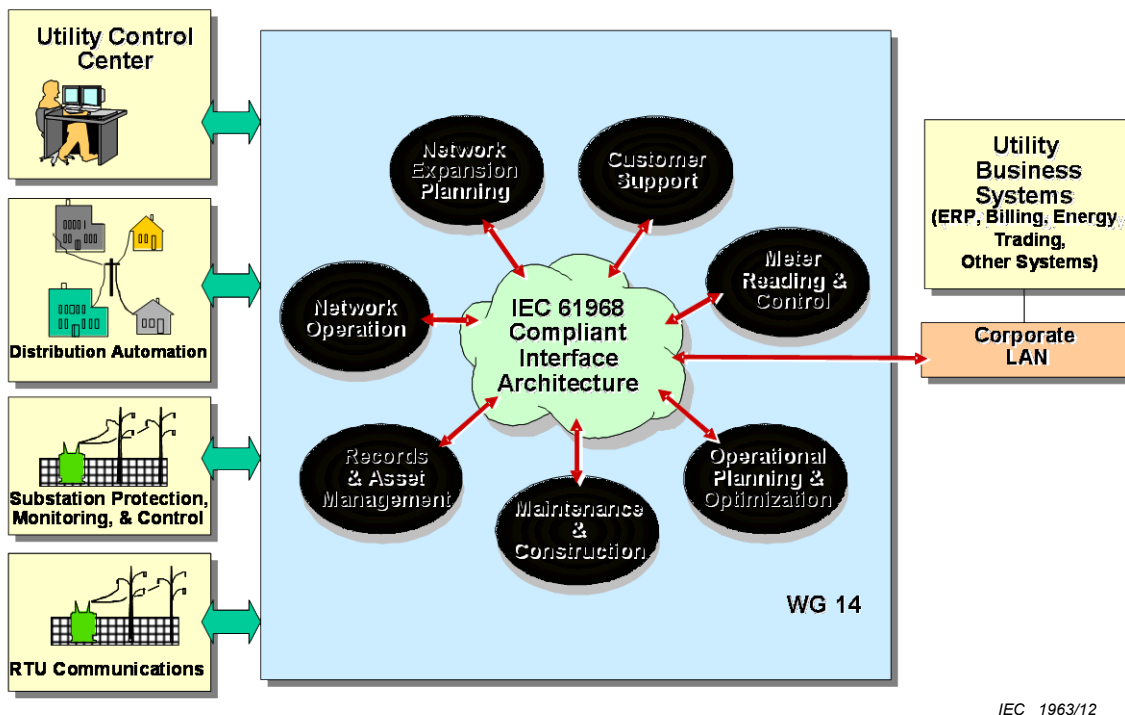**Figure 1 – Distribution management with IEC 61968 compliant interface architecture**

Figure 1 clarifies the scope of IEC 61968-1 graphically in terms of business functions and shows distribution management with IEC 61968 compliant interface architecture.

As used in IEC 61968 series, distribution management consists of various distributed application components for the utility to manage electrical distribution networks. These capabilities include monitoring and control of equipment for power delivery, management processes to ensure system reliability, voltage management, demand-side management, outage management, work management, automated mapping and facilities management. The distribution management system could also be integrated with premise area networks (PAN) through an advanced metering infrastructure (AMI) network. Standard interfaces are to be defined for each class of applications identified in Clause 3, Interface Reference Model (IRM), except for those in the group EXT (External to DMS – distribution management system).

In the distribution management domain it is important to keep in mind the basic meaning of the following terms:

- management: effective regulation and direction;

- automation: working without human participation in accordance with pre-defined rule sets;

- system: a set of organized operations working to support a particular activity (set of applications). Generally, a system in the context of this work is a computer based technology.

In the world of integrated systems, systems can also be a subset of a larger system, a system of systems or a set of federated systems. A system composed of coordinating subsystems may support activities more efficiently than the subsystems operating independently.

As the size of an organisation increases so does the complexity of the tasks and information exchange associated with the tasks. Furthermore, the deeper the data structure is within a system the less transparent it is to the end user. This suggests the need for data stewardship to avoid:

- errors arising from multiple points of data entry;

- lack of consistency with software interfaces;

- expensive changes with new or upgraded software;

- loss of governance of authorised data.

The standardisation of data facilitates the reduction of errors, reduced time for data entry, and improved process control.

IEC 61968 series recommends that the semantics (domain model) of system interfaces of a compliant utility inter-application infrastructure be defined using Unified Modelling Language (UML).

The Extensible Markup Language (XML) is a data format for structured document interchange particularly on the Internet. One of its primary uses is information exchange between different and potentially incompatible computer systems. XML is thus recommended to define grammar/syntax (profiles) of a compliant utility inter-application infrastructure.

Where applicable, IEC 61968-3 to -9 and -13 of this standard will define the information recommended for 'message payloads'. Message Payloads will be formatted using XML, with structures defined using XML Schema (IEC 61968-3 to -9) or RDF Schema (IEC 61968-13) with the intent that these payloads can be loaded on to messages of various messaging transports, such as SOAP, JMS, RESTful HTTP, or Web Services (WS). It is the intent of IEC 61968 series to be leveraged by Service-Oriented Architectures (SOA) and to encourage the usage of Enterprise Service Buses (ESB). In the future, it is possible that payload formats other than XML could be officially adopted by IEC 61968 series for specific parts or information exchanges.

Communication between application components of the IRM requires compatibility on two levels:

- message formats and protocols;

- message contents are mutually understood, including application-level issues of message layout and semantics.

Clause 5 defines abstract middleware services recommended to support communication between the applications defined in the IRM. These services are intended to be deployed, with little additional software required, by mapping them to commonly available services from various messaging technologies including Web services (WS-*) and middleware such as Message Brokers, Message Oriented Middleware (MOM), Message-Queuing Middleware (MQM), and Enterprise Service Buses (ESB). Clause 5 is organized as follows:

- Subclause 5.1 provides overview of interface profile.

- Subclause 5.2 identifies general recommendations of the applications identified in the IRM.

- Sub-clause 5.3 describes component adapters.

- Subclause 5.4 describes interface specification recommendations.

- Subclause 5.5 describes how information exchange services may either be supported directly by middleware or that software may be required to map (adapt) the utility's middleware services to the standard information exchange services.

- Subclauses 5.6 to 5.8 describe environmental recommendations for information exchange.

An example of a typical utility's implementation of IEC 61968 series is provided in Figure 2. In this example, the utility has used interface adapters as a means to integrate many of its legacy systems with other application systems that are IEC 61968 compliant. Note those legacy systems and IEC 61968 compliant systems both continue to use proprietary integration techniques among their internal applications; only information that needs to be exchanged among applications at the utility enterprise level is expected to use IEC 61968 interface services.

For purposes of this example, it is assumed that the utility's Outage Management System (OMS) already has the capability to issue controls to and gather device states from the Distribution Automation system. As it is working acceptably for the utility, this interface does not need to be changed. However, because other applications need to be notified when distribution devices change state, the Distribution Automation system publishes state changes through middleware services. Another benefit of publishing events is that they can be recorded by an event history application in a data store; this data can then be used in the generation of various types of reports. As much of the information exchanged among these systems is useful for management decision support, a data warehouse application has also been connected to the IEC 61968 middleware services so that it may receive published information.
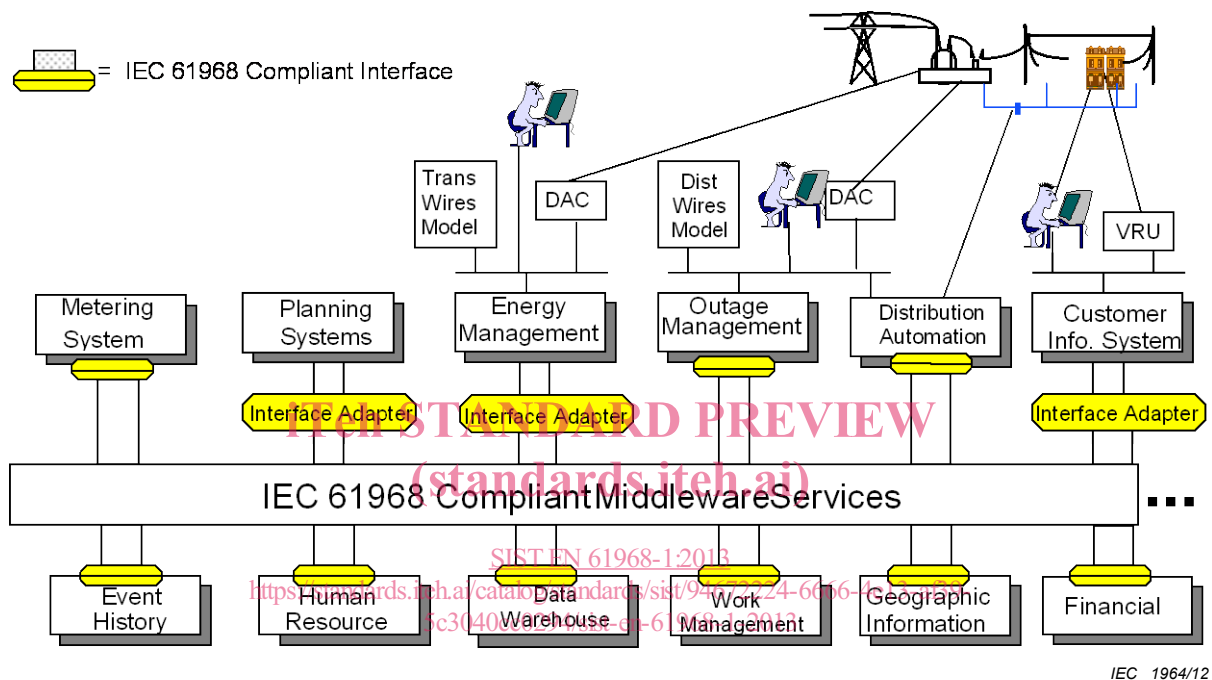
Figure 2 – Example utility implementation of IEC 61968

The organization of IEC 61968-1 is described in Table 1.