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Application integration at electric utilities – System interfaces for distribution management –
Part 2: Glossary

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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APPLICATION INTEGRATION AT ELECTRIC UTILITIES – SYSTEM INTERFACES FOR DISTRIBUTION MANAGEMENT –

Part 2: Glossary

FOREWORD

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

IEC 61968-2, which is a technical specification, has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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

TS	Report on voting
57/1054/DTS	57/1088/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.

This second edition cancels and replaces the first edition published in 2003. This second edition constitutes a technical revision. It contains numerous new terms in support of IEC 61968-9, as well as revisions to terms found in the first edition.

The reader will find citations to bibliographic references within square brackets [ ] below many of the term definitions. Cross references between many related terms have also been added to this edition. These are located among the notes and begin with the words “See also.”

A list of all the 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.

A bilingual version may be issued at a later date.

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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

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, and tends to be optimized for close, real-time, synchronous connections and interactive request/reply or conversation communication models. IEC 61968, 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 is relevant to loosely coupled applications with more heterogeneity in languages, operating systems, protocols and management tools. IEC 61968 is intended to support applications that need to exchange data on an event driven basis. IEC 61968 is intended to be implemented with middleware services that broker messages among applications, and will complement, but not replace utility data warehouses, database gateways, and operational stores.

The series of standards will be using a lot of definitions, terms and abbreviations from the area of distribution management as well as from the area of Information and Communication Technology. This glossary part defines the terms and abbreviations as they are used in the context of this series of standards.

APPLICATION INTEGRATION AT ELECTRIC UTILITIES – SYSTEM INTERFACES FOR DISTRIBUTION MANAGEMENT –

Part 2: Glossary

1 Scope

This part of IEC 61968 identifies and explains terms and abbreviations used in the remaining parts of IEC 61968.

This glossary, accompanying the IEC 61968 series, is the second part in the series that, taken as a whole, defines interfaces for the major elements of an interface architecture for distribution management systems (DMS).

As used in IEC 61968, a DMS 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.

2 Terms and definitions

For the purposes of the IEC 61968 series, the following terms and definitions apply.

2.1
abstract component
smallest logical block of software considered in the IEC 61968 interface reference model

NOTE Abstract components have interfaces that will be defined in parts 3 to 10 of the IEC 61968 series. It is expected that different vendors will supply physical application components that support the interfaces for one or more abstract components.

2.2
absolute data
data which is based on a fixed sample at a prescribed moment in time

NOTE 1 The data may have been scaled and may consist of a signed value (as opposed to unsigned).

[Aclara 2008]

NOTE 2 See also: "incremental data".

2.3
account number
unique number issued by a customer information system to identify a specific customer account within a given utility

[Aclara 2008]

2.4
accuracy (of a measurement)
quality of freedom from mistake or error, that is, of conformity to truth or to a rule

NOTE 1 Accuracy is distinguished from precision as in the following example: A six-place table is more precise than a four-place table. However, if there are errors in the six-place table, it may be more or less accurate than the four-place table.

NOTE 2 The accuracy of an indicated or recorded value is expressed by the ratio of the error of the indicated value to the true value. It is usually expressed in percent. Since the true value cannot be determined exactly, the measured or calculated value of highest available accuracy is taken to be the true value or reference value. Comparison of results obtained by different measurement procedures is often useful in establishing the true value.

[IEEE 2000]

NOTE 3 See also: "resolution".

2.5
active energy
real energy
integral of active power with respect to time

NOTE In a distribution network, active energy is normally measured in kiloWatthours (kWh).

[Aclara 2008]

2.6
active power
real power
under periodic conditions, mean value, taken over one period T, of the instantaneous power p:

$$P = \frac{1}{T}\int_0^T p\,dt$$

NOTE 1 Under sinusoidal conditions, the active power is the real part of the complex power.

NOTE 2 The SI unit for active power is the watt.

[IEC 60050-131:2002, 131-11-42]

NOTE 3 Active power in a distribution network is normally expressed in kW.

2.7
adapter
object adapter
layer of software that connects one component to another component

NOTE 1 An example of a component would be an application.

NOTE 2 An example of an adapter would be an interface implementation or a middleware implementation.

2.8
advanced meter
electric meter, new or appropriately retrofitted, which is 1) capable of measuring and recording usage data in time differentiated registers, including hourly or such interval as is specified by regulatory authorities, 2) allows electric consumers, suppliers and service providers to participate in all types of price-based demand response programs, and 3) which provides other data and functionality that address power quality and other electricity service issues

[DRAM 2008]

2.9
advanced meter management
system capable of two-way communication with meters in a network for the purpose of reading and controlling the meters

NOTE See also: “automated meter reading system” and “advanced metering infrastructure”.

2.10
alarm
message which indicates an abnormal condition, or that a measurement has exceeded a preset value

[Aclara 2008]

2.11
apparent energy
integral of apparent power with respect to time

NOTE In a distribution network, apparent energy is ordinarily measured in kiloVoltAmpere hours (kVAh).

[Aclara 2008]

2.12
apparent power
product of the rms voltage *U* between the terminals of a two-terminal element or two-terminal circuit and the rms electric current *I* in the element or circuit:

$$S = UI$$

NOTE 1 Under sinusoidal conditions, the apparent power is the modulus of the complex power.

NOTE 2 The SI unit for apparent power is the voltampere.

[IEC 60050-131:2002, 131-11-41]

NOTE 3 Apparent power in the distribution network is normally expressed in kVA.

NOTE 4 See also: "real power" and "reactive power".

2.13
application component
block of software with specific functions and interfaces

NOTE A distribution management system is considered to be a set of one or more applications. Each application consists of one or more application components.

2.14
application programming interface
software specification and interface to a specific software application

NOTE This allows programmers to interface to a software application through a common interface.

[Itron 2008]

2.15
attribute
identifiable association between an object and a value

NOTE An attribute is a property of an object.

2.16
audit trail
information saved in a sequential form so that an event can be traced back to its origin

2.17
automated mapping/geofacilities
geospatial management system utilizing computer graphics technology to enter, store, and update graphic and non-graphic information

NOTE Automated mapping reduces the cost and effort in map creation and maintenance and facility record keeping. An automated mapping/ geospatial system processes geographic depictions and related non-graphic data elements for each entity stored in a digital database. The graphic representations are referenced using a coordinate system that relates to locations on the surface of the earth. Information in the database can be queried and displayed based upon either the graphic or non-graphic attributes of the entities. The system provides the utility a single, continuous electronic map of the service territory.

2.18
automated meter reading (system)
system where aggregated kWh usage, and in some cases demand, is retrieved via automated means such as a drive-by vehicle, (fixed network,) or walk-by hand-held system

[DRAM 2008]

NOTE See also: “advanced meter management” and “advanced metering infrastructure”.

2.19
advanced metering infrastructure
communications hardware and software and associated system and data management software that creates a network between advanced meters and utility business systems which allows collection and distribution of information to customers and other parties such as competitive retail suppliers, in addition to the utility itself

[DRAM 2008]

NOTE See also: “advanced meter management”.

2.20
automatic generation control
control of generation such that average hourly generation control follows a predispatch schedule

NOTE Generation levels may be changed based on improving economic operation, emergency conditions, or other improved conditions.

2.21
badge number
utility assigned number to the meter assembly

[Aclara 2008]

2.22
batch communication
communication where the function that owns the data sends information periodically in groups

NOTE In this mode there usually is a delay between the time that new information is available and when it is sent.

[MultiSpeak 2005]

2.23
big endian
ordering scheme for storing or transmitting data in which the most significant part of a multiple-octet data is stored at the lowest octet address, and transmitted first

[IEC 61375-1:2007, 1.3.16]

NOTE See also: “little endian”.

2.24
billing demand
demand upon which billing to a customer is based, as specified in a rate schedule or contract

NOTE Billing demand may be based on the contract year, a contract minimum, or a previous maximum and therefore does not necessarily coincide with the actual measured demand of the billing period.

[EEI 2005]

2.25
billing determinant
processed number, after all multiplications and adjustments are made (such as the normalization of demand for a particular time scale), against which one multiplies the rate, to determine the customer's bill

[Aclara 2008]

2.26
billing system
system to generate customer bills based upon metered data, and to provide information regarding how the bill was created

NOTE A billing system is customarily a component of a customer information system.

2.27
billing window
regulatory timeframe in which meters must be read

NOTE The metering system, meter data management system, customer information system, and possibly other systems must collaborate to read meters and deliver bills within the billing window.

[Aclara 2008]

2.28
breaker control
operator or manual opening or closing of a circuit breaker to isolate a fault or change the network configuration

2.29
busbar
low impedance conductor to which several electric circuits can be separately connected

[IEC 60050-605:1983, 605-02-01]

2.30
busbar voltage control
regulation of voltage on the distribution substation busbar by means of transformer load tap adjustments

NOTE Includes control of either single or paralleled substation transformers.

2.31
business functions
functions that form part of a business process

NOTE The functions may be performed manually and/or by one or more software applications.

2.32
cartographic map
map which displays planimetric and/or topographic information, and which may be used as a base for a thematic layer

NOTE 1 Features, which may be included on a base map, are roads, rivers, major structures (buildings), contours, etc. Feature presentation will, however, be map scale dependent.

NOTE 2 A cartographic feature is a term applied to the natural or cultural objects shown on a map or chart.

NOTE 3 See also: “geographic information system”.

2.33
channel
single flow path for digital data usually in distinction from other parallel paths

[Aclara 2008]

2.34
circuit
feeder
normal or actual configuration of a specific distribution circuit originating at a substation and extending to either normally open switches of other distribution circuits or simply terminating at different end points

2.35
class
definition of the attribute and methods for a type of object

NOTE See also: “object”.

2.36
clearance
safety permit
special authority given a person or persons working on de-energized cables, wires or equipment

2.37
client (information technology)

requester of either or both services or resources

NOTE The client is the code or process that invokes an operation on an object.

2.38
cold load pickup
<current> loading imposed on a distribution feeder after service restoration in which some loss of load diversity has occurred

[Lawhead, et. al. 2006]

<process> a controlled process used to restore power to such areas

2.39
common facilities
sets of programs and documents used by applications through a common interface

2.40
communication services
operation or function that an object and/or object class performs at the behest of another object and/or class to integrate or adapt one or more components

NOTE To connect multiple components, an integration system must reconcile network and protocol differences.

2.41
component
set of services with a well-defined interface

NOTE A component can be as large as a complete (legacy) application which implements multiple services or as small as a tiny widget which implements only one service. Components are independent software entities, which encapsulate (private) data the component needs to know to perform its business function. For example, it can perform any function that is required for distribution management. Typical categories of functions are showed in the interface reference model.

2.42
component adapter
piece of software that has the role of making non-compliant components compliant with the IEC 61968 series

NOTE 1 The component adapter only goes as far as necessary to make the component conformant to one or more specific IEC interface specifications.

NOTE 2 A component adapter is a type of wrapper.

2.43
configuration data exchange
transfer of a particular group of settings to a device to allow it to operate correctly in the network

NOTE 1 The transfer of information may be due to the commissioning of new equipment in the network, or to enable one piece of equipment to take the place of another.

NOTE 2 In SCADA applications, inter-substation computer communications may occur to transfer control/monitoring of devices to an adjacent substation due to reconfiguration or outage.

2.44
connectivity model
complete description of the electrical connections between lines, cables, switches, isolators and other network components

2.45
consumer
customer
one who consumes the service provided by the utility

NOTE The consumer may be classified as a residential, commercial, industrial, or some other type of customer; and may consume electricity, gas, water, and/or some other service.

[Aclara 2008]

2.46
consumption
metered usage of a given commodity over a specific period of time

NOTE Consumption is usually expressed in terms of a given flow direction and unit of measure.

2.47
contingency analysis
study of the effect of unexpected failure or outage of a system component

NOTE In distribution systems, it generally involves the study of how to restore power to customers when the normal supply path is unavailable.

It is also an operating application which computes the potential effect of contingencies involving the loss of generation and transmission facilities. A specific set of predefined contingencies is analyzed on a cyclic basis. It simulates a contingency and calculates the changes in busbar voltages and power flows resulting from the contingency. The base conditions for this calculation are the busbar voltages or power flows obtained from the load flow program.

2.48
continuous cumulative maximum demand
continuous cumulative demand
the sum of the previous billing period maximum demands and the present period maximum demand

[EEI 2002]

NOTE See also: “cumulative maximum demand”.

2.49
crew dispatch schedule
dynamically created schedule in which the work order for a specific crew is described

NOTE The schedule is based on the planned work or unplanned service interruptions in the infrastructure known at the moment the schedule was created.

2.50
crew management
tracking of crew details schedules, crewmembers and all general activities related to outage and general operational investigations

2.51
crew scheduling
dispatch of service people for customer service calls and distribution construction, and the recording and monitoring of time spent on each call

2.52
crew tracking reports
dynamic information about the location, and progress of field crews in dealing with the work assigned to the current control

2.53
critical peak pricing
type of dynamic pricing whereby the majority of kWh usage is priced on a TOU basis, but where certain hours on certain days where the system is experiencing high peak demand are subject to higher hourly energy prices that reflect market conditions for peak generation and delivery during peak demand periods

NOTE These critical period prices may be known to electricity customers under conditions such as "day-ahead" or "hour ahead" and are typically employed a limited number of times per year.

[DRAM 2008]

2.54
cumulative maximum demand
cumulative demand
the sum of the previous billing period maximum demand readings

NOTE 1 At the time of billing period reset, the maximum demand for the most recent billing period is added to the previously accumulated total of all maximum demands.

[EEI 2002]

NOTE 2 See also: “maximum demand”, and “continuous cumulative maximum demand”.

2.55
current control
management of circulating current in a parallel transformer configuration at the distribution substation

NOTE Current control reduces substation transformer load losses and minimizes transformer overloads by balancing loading between transformers in the same or adjacent distribution substations.

2.56
current transformer
instrument transformer designed for use in the measurement or control of current

NOTE The current transformer’s primary winding, which may be a single turn or bus bar, is connected in series with the load. It is normally used to reduce primary current by a known ratio to within the range of a connected measuring device.

[EEI 2002]