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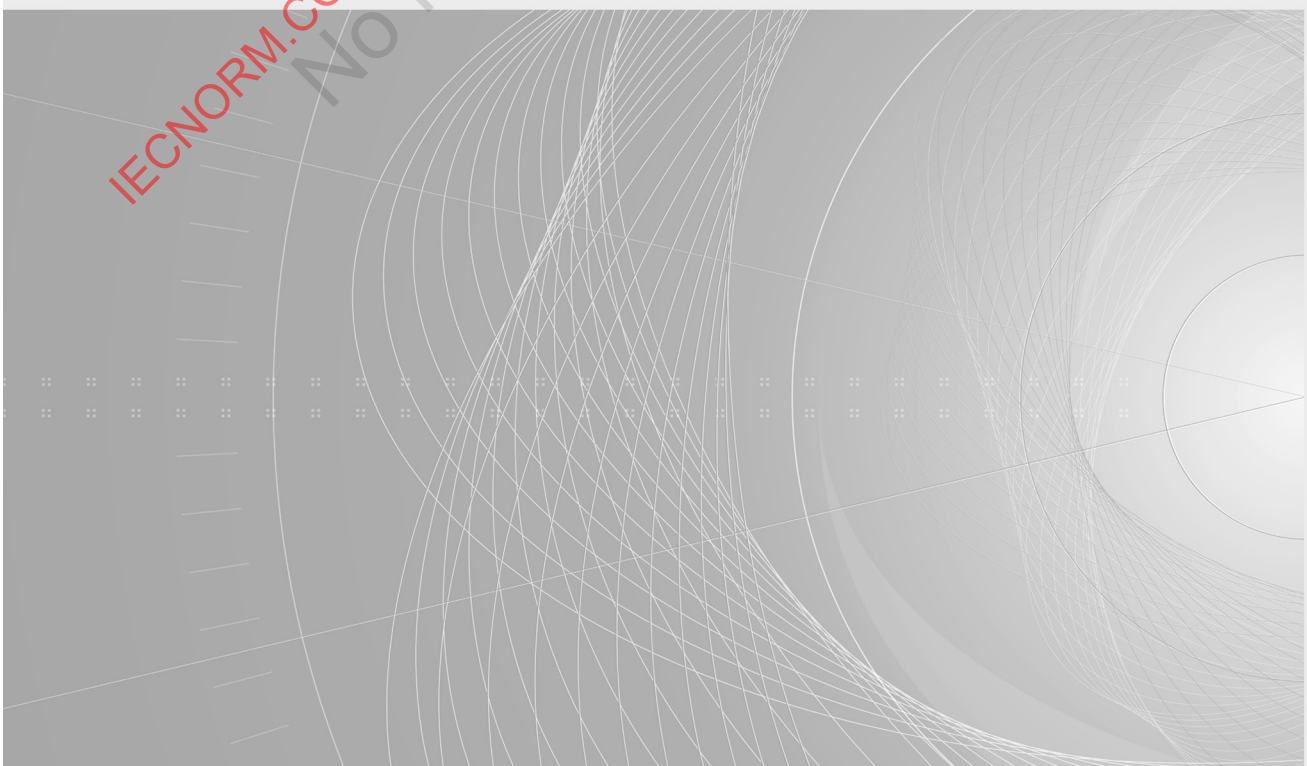
TECHNICAL SPECIFICATION

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



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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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INTERNATIONAL
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COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2: Glossary

FOREWORD

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- 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 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]

2.57
current transformer ratio
effective turns ratio of a current transformer

[Aclara 2008]

2.58
customer information system
system that maintains customer information

NOTE The customer information system may consist of a suite of applications, typically provided and integrated by a single vendor, which in addition to maintaining customer information, perform customer billing, finance, accounting functions, and possibly other services.

[MultiSpeak 2005, modified]

2.59
customer outage analysis
up-to-date information on the number of customers affected by a specific network incident

2.60
customer program
classification scheme for the sale of energy to consumers according to a particular tariff

NOTE 1 The program may specify the purpose, conditions on the time of use, the service voltage(s), the volumes consumed, and/or other terms as a condition of the sale.

NOTE 2 Utilities may promote particular programs to their industrial, commercial, agricultural, and residential customers in an effort to encourage a particular behaviour, or to make them aware of their options.

2.61
cycle day
recurring day on the calendar, within each month, upon which a meter reading is to occur

[Aclara 2008]

2.62
data element
generic term for a data item to be read from or written to a meter or other end device

NOTE A data element may be a “measurement” or a “parameter.”

[Aclara 2008, modified]

2.63
data logger
system to measure a number of variables and make written tabulations and/or record in a form suitable for computer input

[IEEE 2000]

2.64
data model
collection of descriptions of data structures and their contained fields, together with the operations or functions that manipulate them

2.65
data warehouse
repository of data

2.66
database management/security
process of maintaining the integrity of database

NOTE 1 Database security management provides the required maintenance of data elements and controls the data requirements of other subsystems.

NOTE 2 Security management encompasses access control authorization facilities and partitioning the network. Security management may also include support for encryption and maintenance of security logs

2.67
deferred synchronous request
request where the client does not wait for completion of the request, but does intend to accept results later

NOTE This is in contrast to synchronous request and one-way request.

2.68
demand
average power or a related quantity over a specified interval of time

NOTE 1 Demand (in a distribution network) is expressed in kW, kVA, kVAr, or other suitable units.

NOTE 2 An interval may be 1 min, 5 min, 10 min, 15 min, 30 min, or 60 min.

NOTE 3 “Forward energy” is generally used as the basis for a demand calculation since the primary purpose is to determine the capacity of the infrastructure required to serve the load.

NOTE 4 While meters commonly store demand data measured to the tariff-prescribed demand-interval, scaling must commonly occur before these values can be truly expressed in SI units such as kW or kVAr. It is important for data producers and data consumers to be clear regarding which scalars have been applied and which are pending.

[ANSI 2001, modified, IEEE 2000, modified, and EEI 2002, modified]

NOTE 5 See also: "load".

2.69
demand reset
the process of zeroing the maximum demand accumulator

NOTE This usually involves shifting the “present maximum demand” to become the new “previous maximum demand,” and zeroing the “present maximum demand.”

[Aclara 2008]

2.70
demand reset count
count which represents the number of times a given meter has undergone a demand reset

[Aclara 2008]

2.71
demand response
reduction of customer energy usage at times of peak usage in order to help address system reliability, reflect market conditions and pricing, and support infrastructure optimization or deferral

NOTE 1 Demand response programs may include dynamic pricing/tariffs, price-responsive demand bidding, contractually obligated and voluntary curtailment, and direct load control/cycling.

[DRAM 2008]

NOTE 2 See also: “direct load control”.

2.72
demand subinterval
portion of a demand interval used in rolling block demand calculations

NOTE A demand subinterval will always divide into a demand interval evenly. For example, a 15-minute demand interval can divide into three 5-minute subintervals. A subinterval may be 1 min, 3 min, 5 min, 10 min, 15 min, or 30 min in length, provided that it divides into the corresponding demand interval one or more (integer) times.

[Aclara 2008]

2.73
demand-side management
functions that enable the utility to manage the demand curve in an emergency or planned mode and to determine the customer load curve

NOTE Demand-side management functions include load control and load survey.

2.74
department
business function, for example handling outages, repairs on meters and repairs on the distribution network, or customer care

2.75
derived
<generic> data value calculated from one or more related measurements

NOTE 1 The calculation of the data value may be based on inputs which are of a different reading type than the resultant reading type. For example, a value for "average power" might be computed (derived) from several discrete "instantaneous power" measurements.

NOTE 2 See also: "estimated".

<inferred> data value deduced from data at related locations

NOTE 3 When a number of meters below a given service transformer are de-energized, it might be possible to infer that the service transformer and other service points below the same transformer all have an energization status of de-energized and a quality of "derived (inferred)."

2.76
detent
mechanism which permits a meter dial to spin in one direction only (i.e. "forward" or "reverse" only)

[Aclara 2008]

2.77
device operation history
data concerning the operation of electrical devices, often used in condition-based maintenance schemes

2.78
diagnostic
process by which hardware malfunctions may be detected

[IEEE 2000]

2.79
dial reading
literally, the value presented by the meter dials to a human meter reader before applying any display scalar indicated on a human readable label

[Aclara 2008]

2.80
direct load control
system or program that allows utilities, other load serving entities, or demand response service providers to control user load via (1) directly cycling discretionary load of certain end uses, (2) directly turning off such loads or (3) implementing custom load control strategies that reduce peak usage

[DRAM 2008]

NOTE See also: “demand response” and “load control”.

2.81
dispatchable generation
generation under the control of a dispatcher or system operator

2.82
dispatchable load
load under the control of a load control system

NOTE Usually, such loads are selected in advance to be "deferrable" and to have negligible adverse impact on the consumer. Examples include certain pumping, heating, and cooling applications.

2.83
dispatcher
person responsible for the controls at the master station

2.84
display multiplier
value the meter display must be multiplied by in order to obtain the metered usage

NOTE 1 The display multiplier is also known by its symbol “Kr”.

NOTE 2 The vast majority of meters have a value of Kr=1. Some meters have a value of Kr=10, or some other value.

[Aclara 2008, modified]

2.85
distributed generation
small amounts of generation or pieces of generation equipment applied to a utility's distribution system for the purpose of meeting local peak loads and/or displacing the need to build additional (or upgrade) local distribution lines and infrastructure

NOTE Distributed generation may be in the form of gas or propane generators, fuel cells, etc.

[Itron 2008]

2.86
distributed load control
load controlled with utility commands from a remote location as well as from a local controller that responds to local conditions

NOTE The customer may retain the option to override or modify the utility command.

2.87
distribution automation
actions to carry out automation of the distribution networks to enable automatic or remote operation

NOTE 1 May include retrofitting switchgear with actuators/motors and the installation of RTU's.

NOTE 2 The action to restore supply post-fault may be initiated manually via a SCADA system, or automatically by IED's, RTU's, FPI's or EFI's.

2.88
distribution management system
integration of business processes, hardware, software, and telecommunications equipment that provide effective tools to manage the operational business processes related to network management, outage management, power quality and other supporting operational practices

2.89
distribution network
distribution-voltage side of a substation including all of the lines, switches, transformers, and protective devices

[Aclara 2008]

2.90
domain
scope
<distribution management> business functions, software systems, physical equipment and staff concerned with the distribution of electrical power to consumers

<utility> software systems, equipment, staff and consumers of a single utility organization, which could be a company or a department.

NOTE It is expected that within each utility domain, the systems, equipment, staff and consumers can be uniquely identified. When information is exchanged between two utility domains, then identifiers may need extending with the identity of the utility organization in order to guarantee global uniqueness.

2.91
dynamic pricing
retail prices for energy consumed that offer different prices during different time periods and reflect the fact that power generation costs and wholesale power purchase costs vary during different time periods

NOTE Types include time-of-use pricing, critical peak pricing and real-time pricing.

[DRAM 2008]

2.92
economic dispatch (function)
<real-time mode> adjustment of generation output among committed units in order to minimize total operating cost

<study mode> scheduling of generation allocation among units in order to minimize total operating cost

NOTE 1 The economic dispatch function is closely coupled with the automatic generation control function.

NOTE 2 The study mode will examine generation allocation over a longer period of time than the real-time mode. (For example the study mode may examine a week-long schedule while real-time mode would examine only the next hour.)

2.93
edited
value modified by a human

NOTE 1 In the context of VEE, “edited” means that the value has been modified by a human.

NOTE 2 See also: “derived”, and “estimated”.

2.94
electricity meter
device that measures and registers the integral of an electrical quantity with respect to time

[IEEE 2000]

2.95
electronic billing
<process> utility back-office application which uses computers and data communications, as opposed to manual methods, to compute the customer's bill and request payment

<interface> a service provided by the utility in which there is a transmission of an electronic customer usage bill on a periodic basis (typically monthly) to customers

2.96
emergency demand response programs
programs which are dispatched by system operators when system operating reserves drop to levels such that load reductions are needed to maintain short-term system reliability

[DRAM 2008]

2.97
emergency response
off-site facility that has direct dial lines into regulatory agencies and the press for use in a nuclear emergency

2.98
end device
equipment located at the end of a communication network

NOTE This equipment is usually on the customer premises. It may perform functions such as metrology, remote connect/disconnect, load control, demand response, or other functions, and may have power relay and/or secondary communications capability.

2.99
energization (status)
state of equipment describing if it is powered ("energized," or "live") or not powered ("de-energized," or "dead")

NOTE See also: "verify meter power".

2.100
energy accounting
accounting of energy sales and purchases to and from other utilities

NOTE 1 The data collection function of energy accounting tracks the actual amount of power exchanged with other utilities.

NOTE 2 The account reconciliation function of energy accounting reports inadvertent data by comparing data from the interchange planning function (planned power exchange) with the data from the data collection function of energy accounting (actual power exchanged).

NOTE 3 The energy accounting function also includes billing co-generators and other utilities for power sold.

2.101
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

[IEC 61970-2:2004, 3.24]

2.102
estimated
data value determined from one or more measurements of the same kind taken from the same or a similar source

NOTE 1 Estimated values are generally supplied because the original value was considered bad or was missing. For example, a missing “60-minute Incremental IntervalData Net Energy (kWh)” reading might be computed (estimated) from a number of readings of the same kind, taken from the same meter a few hours prior and a few hours after.

NOTE 2 In the context of VEE, “estimated” means that the value has been determined by an algorithm that may involve interpolation, extrapolation, substitution, or other prescribed logic.

NOTE 3 See also: “derived”.

2.103
equipment characteristics
data concerning the nature and operational parameters of physical devices designed to perform particular functions

NOTE Characteristics can be viewed as a relationship between two or more variable quantities which describes the performance of a device under a given condition.

2.104
equipment operation statistics
data such as the duration of time, the number of times, or other parameters that indicate how a physical device has performed its function over a period of time

2.105
false alarm
an indicated fault where no fault exists

[IEC 62243:2005, 3.1.8]

2.106
fault
unplanned power interruption

2.107
fault analysis
review of fault records, sequence of events records, and other documentation produced upon a fault to determine the cause of the fault, its total impact, steps taken by the system to recover from the fault, and the possible avoidance of a future occurrence

NOTE The data analyzed includes pre-fault information as well as post fault information for a specified period.

2.108
fault isolation
process of isolating the segment of faulted transmission or distribution network

2.109
fault locations estimates
estimate based on the obtained information about the fault, for example Ohms from a distance relay, which is used to calculate the estimated location of the fault

2.110
fault restoration
outage restoration
process of restoring the faulted segment of transmission or distribution network

2.111
feeder
circuit
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

2.112
firmware
combination of software and data that reside on ROM, EEROM, or some similar permanent or semi-permanent storage medium

[IEEE 2000, modified]

2.113
fixed interval demand calculation
fixed block demand calculation
monitoring of demand by using a method that measures the average power over a fixed period of time

NOTE 1 Demand intervals are typically 15 min or 30 min in length.

[Aclara 2008]

NOTE 2 See also: “rolling interval demand calculation”, and “demand”.

2.114
flow direction
accounting of the way energy flows through the meter

NOTE 1 There are 4 basic flow directions for active energy: “forward”, “reverse”, “net”, and “total”.

NOTE 2 See also: "forward energy", "reverse energy", "net energy", "total energy", and “four-quadrant metering”.

2.115
forward energy US SA
positive energy US
delivered energy US
imported energy GB
exported energy AU
quantity of energy delivered by the distribution network to the electrical service

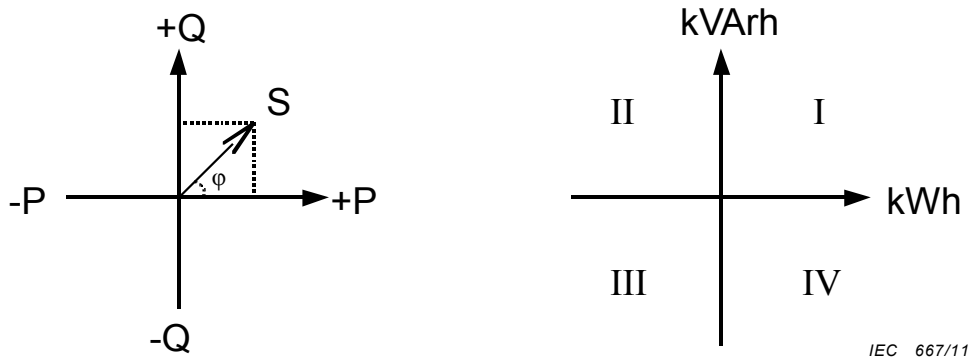
NOTE 1 “Forward energy” may refer to "active”, "apparent”, or "reactive" energies.

NOTE 2 The value may roll-over to zero at some point depending on the capability of the meter register.

[Aclara 2008, modified]

NOTE 3 See also: "reverse energy", "net energy", "total energy", “flow direction”, and “four-quadrant metering”.

2.116
four-quadrant metering
process of measuring reactive and real energy while accounting for both forward and reverse flows



NOTE 1 Power is often computed as the vector S=P+jQ, where reactive power (Q, in VAr units) is plotted on the ordinate axis, and real power (P, in Watts) is plotted on the abscissa. Four-quadrant metering is the extension of

this power-flow concept to energy. The flow of power will result in the registration of energy in quadrants that correspond to the power vector location.

NOTE 2 Quadrant I is defined as an area where both energies flow positively (both are delivered to the service). In quadrant II, reactive energy is positive and real energy flows negatively. In quadrant III, reactive and real energies flow negatively (both energies are received from the service). In quadrant IV, reactive energy flows negatively, and real energy flows positively.

NOTE 3 See also: “flow direction”.

2.117
frequency relay
device that functions on a predetermined value of frequency - either under or over normal system frequency or rate of change of frequency

NOTE When it is used to function on a predetermined value below nominal frequency, it is generally called an “under-frequency relay”, and when it functions on a predetermined value above nominal, it is called an “over-frequency relay”.

[IEEE 1986]

2.118
geographic information system
data system which provides a visualization of spatially (geographic) related data

[Kurland and Gorr 2007]

2.119
home area network
electronic network situated within the general environment of a residential dwelling and that connects enabled nodes within that dwelling

[ISO/IEC 15045-1:2004, 3.1.4, modified]

2.120
implementation
portion of a code composition that is executed, i.e. a definition that provides the information needed to create an object and allow the object to participate in providing an appropriate set of services

NOTE An implementation typically includes a description of the data structure used to represent the core state associated with an object, as well as definitions of the methods that access that data structure. It will also typically include information about the intended interface of the object.

2.121
inbound transaction
communication that is travelling (inward) from the field to the central control or main office

[Aclara 2008]

2.122
incident simulation
recreating an incident on the network for analysis and also for training

2.123
incremental data
data which is based on the difference between two data samples at two prescribed moments in time

NOTE 1 The data may have been scaled and may consist of a signed or unsigned value.

[Aclara 2008]

NOTE 2 See also: “absolute data”.

2.124
instance
<of an interface> object that provides the operations, signatures and semantics specified by that interface

<of an implementation> object whose behaviour is provided by that implementation

2.125
instantaneous (value)
value computed in a way so as to describe the measurement at the current moment

NOTE 1 Instantaneous values are usually measured over a short period of time – usually a few cycles – at most a few seconds.

NOTE 2 See also: “present value”, and “last completed value”.

2.126
inter application
between two or more applications

2.127
interactive voice response
system to process customer telephone inquiries without the need for human intervention through the use of automated query/response scripts

NOTE Human intervention can often be requested if needed. These systems are often used for trouble reporting.

2.128
interface
complete protocol used by a class for all of its messaging

NOTE 1 The interface is a listing of the operations and attributes that an object provides. This includes the signatures of the operations, and the types of the attributes.

NOTE 2 An interface definition ideally includes the semantics as well. An object satisfies an interface if it can be specified as the target object in each potential request described by the interface.

2.129
interface adapters
standards software interface that facilitates a software module to communicate and share of information with other software modules

2.130
interface profile
description of the set of interfaces for an abstract component using a specified type of middleware

2.131
interface reference model
architecture model of business functions, abstract components and middleware

2.132
ITI curve
curve which describes an AC input voltage (defined by the ITI/CBEMA application note) which typically can be tolerated (with no interruption in function) by most information technology equipment

NOTE Seven types of events are described by the composite envelope: steady-state tolerances, line voltage swell, low frequency decaying ringwave, high-frequency impulse and ringwave, voltage sags to 80 % of nominal, voltage sags to 70 % of nominal, and dropout; plus a no-damage-region and a prohibited-region are depicted in accordance with the ITI (CBEMA) application note.

[ITI 2000]

2.133
interoperabile
able to exchange information needed to properly perform their respective functions

NOTE This is normally achieved by using only published standard application program interface (API) definitions that specify compatible data definitions and exchange methods.

2.134
intra-application
within the same application

2.135
interruptible power
power made available under agreements that permit curtailment or cessation of delivery by the supplier

[EEI 2005]

2.136
interruption
loss of service to one or more customers connected to the distribution network

[IEEE 2000, modified]

2.137
interruption threshold
voltage magnitude specified for the purpose of detecting the start and the end of a voltage interruption

[IEC 61000-4-30:2008, 3.17]

2.138
interval data
interval data readings
data captured at regular intervals of time

NOTE Interval data could be captured as incremental data, absolute data, or relative data. The source for the data is usually a tariff quantity or an engineering quantity. Data is typically captured in time-tagged, uniform, fixed-length intervals of 5 min, 10 min, 15 min, 30 min, or 60 min.

[Aclara 2008]

2.139
interval data recorder
system which records metrology data in the form of a series of time-stamped readings

NOTE Some interval data recording systems are capable of simultaneously recording multiple channels of interval data.

[Aclara 2008, modified]

2.140
interval meter
meter that measures and records data on either predetermined or remotely configurable time intervals, where the intervals are in increments such as minutes or hours

NOTE The data collected is typically usage in kWh expressed as a specific flow direction (such as Net, Forward, or Reverse). Some interval meters are capable of recording multiple channels of interval data. The collection of kVArh intervals is also quite common. Usage is usually recorded as a series of incremental values, while other quantities such as voltage and current are typically recorded as absolute values.

[DRAM 2008]

2.141
inventory
list of articles, typically giving the code number, quantity, and value of each

2.142
issue (of an item)
physical movement of an item from a stocking location

NOTE An issue can result from the fulfilment of a sales order, or from a manufacturing production order, or from a work order.

2.143
lagging current
alternating current which, in each half-cycle, reaches its maximum value a fraction of a cycle later than the maximum value of the voltage which produces it

[EEI 2002]

2.144
last completed (value)
last completed calculation in a time-based series of derived quantities

NOTE See also: “present value”.

2.145
leading current
alternating current which, in each half-cycle, reaches its maximum value a fraction of a cycle sooner than the maximum value of the voltage which produces it

[EEI 2002]

2.146
little endian
ordering scheme for storing or transmitting data in which the least significant part of a multiple-octet data is stored at the lowest octet address, and transmitted first

[IEC 61375-1:2007, 1.3.85]

NOTE See also: “big endian”.

2.147
load (electric)
electric power used by devices connected to an electrical generating system

[IEEE 2000]

2.148
load analysis
modelling and prediction of loads on the distribution network

NOTE Models will frequently be based on historical usage patterns as a function of time of day, circuit topology, load flow, transmission constraints, customer demographics, and weather. Prediction may typically support analysis where scenarios show the loss of a critical asset, changes to the circuit topology, new construction, and weather forecasts. The load analysis might occur as part of an engineering analysis program, or a load analysis program running in the network operations centre.

[Aclara 2008]

2.149
load control
explicit action taken to reduce the load at a given point in time

NOTE 1 The action taken may involve: voltage reduction, switching off selected customer devices or totally interrupting supply to some customers, etc.

NOTE 2 See also: “direct load control” and “demand response”.

2.150
load control device
type of “end device” which can receive signals causing it to shed load for the purposes of maintaining network reliability and/or commercial agreements

2.151
load forecast
forecast of the expected load at a specific time and day-of-week for each feeder in the network

2.152
load forecasting
function which predicts the hourly system load

NOTE The load forecasting function typically maintains a real-time forecast and a study forecast. The real-time forecast is typically based on actual historical load and weather data and generates a load forecast for the current hour. The study forecast typically uses a completely independent set of historical and predicted data that the operator may use to set up and evaluate hypothetical situations up to seven days in the future.

2.153
load management
term used to refer to interruptible rates, curtailment programs and direct load control programs

[DRAM 2008]

2.154
load management system
system that encompasses the complete load management needs of the utility

NOTE The system will support one or more of the following functions: load control, load analysis, or demand response.

[Aclara 2008]

2.155
load profile
time series representation of the variation of load with time, usually on an hourly basis, for a particular day

[IEEE 2000, modified]

2.156
load shedding
emergency disconnection of customer loads to preserve the power network operation

NOTE Load shedding removes overloads and arrests consequent frequency decline without disrupting the utility transmission grid.

2.157
log
record of events and the time of their occurrence
[Aclara 2008]

2.158
low voltage
portion of the electrical distribution network which is below a specified voltage

2.159
maintenance
work involving inspection, cleaning, adjustment, or other service of equipment to enable it to perform better or to extend its service life

NOTE Generally, although not always, equipment must be taken out of service while it is undergoing maintenance.

2.160
maintenance scheduling
planning the specific times when a set of maintenance activities should be performed

NOTE Maintenance scheduling requires the consideration of a variety of constraining factors such as the impact of removing the equipment from service, availability and workload of maintenance crews, etc.

2.161
manually accepted
value which is perhaps questionable, but approved by a human without modification

NOTE 1 In the context of VEE, a “manually accepted” value is one which has been approved for use even though it may have failed validation checks.

NOTE 2 See also: “edited”, and “questionable”.

2.162
master resource identifier
provides a unique ID number for a named item

2.163
maximum demand
peak demand
highest demand over a selected period of time

[ANSI 2008]

2.164
message (in distribution management)
specification of the conveyance of information from one instance to another, with the expectation that activity will ensue

NOTE A message may specify the raising of a signal or the call of an operation.

2.165
message brokers
message brokers enable objects to transparently make and receive requests and responses in a distributed environment

2.166
message queue middleware
middleware which employs a message queuing mechanism to provide reliable, asynchronous and loosely coupled communication services

2.167
metadata
data that describes data

NOTE Data dictionaries and repositories are examples of metadata. The term may also refer to any file or database that holds information about another database's structure, attributes, processing or changes.

2.168
meter
type of “end device” which performs metrology and supports the tariffing of the distribution and/or transmission network

NOTE A meter could be defined as a 61850 device with logical nodes.

2.169
meter badge
utility defined area of a meter nameplate

NOTE The meter badge may contain a barcode, an AEP code, required CT and VT ratios, etc.

[Aclara 2008]

2.170
meter changeout
meter replacement
process of replacing an existing meter with a new meter

NOTE The installer will customarily follow a work order which specifies a given location, and usually requires that he or she capture readings from the old and new meters, and record the time and day in which the work was performed.

2.171
meter class (watthour meter)
identifies the maximum of the load range in amperes

[ANSI 2001, IEEE 2000]

2.172
meter communication module
component of a meter which enables participation in a communication network

[Aclara 2008]

2.173
meter data management
application component that solicits and/or aggregates meter reading data from one or more metering systems and supplies meter data to other systems

NOTE 1 The meter data management application component may perform validating, editing, and estimating (VEE) on the data.

NOTE 2 Meter readings may be warehoused for use by other applications such as billing and historical analysis.

NOTE 3 The meter data management application may manage configuration information for meters and maintain measurement histories. It may also issue configuration commands to the metering system.

NOTE 4 The meter data management application may broker control commands and issue suitable commands to the appropriate metering system.

NOTE 5 A meter data management system may include a meter data management application and other related applications.

2.174
meter data recorder
interval data recording system which records metrology data in the form of a series of incremental, absolute, or relative readings, and attributes a capture time and status to the recorded value

[Aclara 2008]

2.175
meter divergence
form of cumulative error where the AMR supplied value differs from the dial-face reading, and over time, the error grows

[Aclara 2008]

2.176
meter form
alphanumeric designation denoting the circuit arrangement for which the meter is applicable and its specific terminal arrangement

NOTE The same designation is applicable to equivalent ANSI meters of all manufacturers.

[ANSI 2001, IEEE 2000, definition of watthour meter form]

2.177
meter nameplate
nameplate placed on the meter by the manufacturer

NOTE The nameplate will contain information required by national standards such as form, volts, class, etc.; and may also have a utility defined area.

[Aclara 2008]

2.178
meter number
number assigned to the meter by the system of record in the utility

[Aclara 2008]

2.179
meter records
history of the meter usage readings on a periodic basis

NOTE Meter records will also include customers who used the power at the meter location.

2.180
meter seal
device which mechanically seals the meter and provides an indication of tampering when the seal is broken

NOTE Early seal designs simply used pressed lead to join two wires. Many modern seal designs are lead-free and have unique ID numbers, or display a company logo.

[Aclara 2008]

2.181
meter serial number
number assigned to the metrology portion of the meter by the meter manufacturer

[Aclara 2008, modified]

2.182
metershop
place where meters are inspected, repaired, tested, and adjusted

[ANSI 2001]

2.183
method
operation
single request or message made available by a server, i.e. an implementation of an operation

NOTE Methods are often implemented as code which is executed to perform a requested service. Methods associated with an object may be structured into one or more programs.

2.184
middleware adapter
software that has the role to make non-IEC compliant middleware services compliant with the IEC 61968 interface specifications

2.185
middleware services
services to allow the previous layers in the IEC 61968 service profile to interact transparently across the network with other applications or services

NOTE Middleware services can provide an application independence from communication profile services, reliable delivery, and other benefits.

2.186
net energy
flow direction that is accounted for as forward energy minus reverse energy

$$Net\ energy = |forward\ energy| - |reverse\ energy|$$

[Aclara 2008]

NOTE 1 “Net energy” may refer to "active", "apparent", or "reactive" energies.

NOTE 2 See also: “forward energy”, “reverse energy”, “total energy” and “flow direction”.

2.187
net metering
utility metering practice in which utilities measure and bill for the net electricity consumption or generation of their customers with small generators

NOTE Net metering can be accomplished through two means: (1) A single, bi-directional electric meter that turns backward when the customer’s generator is producing energy in excess of his demand and forward when the customer’s demand exceeds the energy generated or (2) By separately metering the flows of electricity into and out of the customer’s facility. Net metering provisions vary by state and utility, but usually apply only to very small generators that typically use solar or wind energy.

[EEI 2005]

2.188
network
system for delivering services

NOTE An electrical distribution network would consist of all of the interconnected electrical elements starting at the end of the transmission network, and ending at the start of the premises wiring. A communication network would consist of all interconnected or inter-related communication nodes. Some AMI systems leverage portions of the distribution network hardware in order to form a communication network, other AMI technologies establish an infrastructure to carry information which is completely separate from the electrical distribution network.

[Aclara 2008]

2.189
network calculation
suite of applications software used to analyze the capacity, efficiency and reliability of the power network

2.190
network state supervision
monitoring and supervision of feeder networks

2.191
notification
message which reports a change in the operational state of a piece of equipment

[Aclara 2008]

2.192
object
instance of a class, supporting encapsulation, inheritance and polymorphism

NOTE An object is a combination of a state and a set of methods that explicitly embodies an abstraction characterized by the behaviour of relevant requests. An object is an instance of an implementation and an interface. An object models a real-world entity, and it is implemented as a computational entity that encapsulates state and operations (internally implemented as data and methods) and responds to requests or services.

2.193
one-way (communication)
system that communicates in one direction only – from the sender to the receiver

NOTE 1 The system might be architected to move data from the central office to the communication endpoint(s) in the field (outbound-only), or it might be built to move data from the endpoint(s) in the field to the central office (inbound-only). Some systems which are capable of one-way communication are also capable of two-way communication. Some systems support two-way communication at certain levels in their architecture, and one-way communication at other levels.

[Aclara 2008, modified]

NOTE 2 See also: "two-way", "inbound", and "outbound".

2.194
on-request read
on-demand read
request by a data consumer to create a fresh reading by a data provider

NOTE The request carries with it an expectation of a near real time response.

[Aclara 2008]

2.195
optimal power flow
optimal solution of power flow calculations in a transmission or a distribution network

2.196
outage
loss of service to a consumer's electrical service due to the failure of a component

[IEEE 2000]

2.197
outage analysis
process of analyzing information from distribution automation, an energy management system, and/or a customer information system regarding trouble calls, blackouts, and circuit outages to determine service outages and assist in the power restoration process

2.198
outage management system
all related business processes and supporting technologies related to interruption of electric power supply to customers

NOTE These generally include trouble call handling, customer notification, probable device prediction, dispatching workflows for outages and general electric service problems, network management, crew management and reliability reporting.

2.199
outage mapping
process of discovering the scope of an outage as it relates to the affected service territory

[Aclara 2008]

2.200
outage report
progress report on restoration of supplies following a fault

NOTE Outage reports indicate whether each outage is a chargeable outage to the utility and must be reported in reliability statistics.

2.201
outage schedules
data which defines the time, duration, and extent of planned outages

2.202
outbound transaction
communication that is travelling (outward) away from the central control or main office

[Aclara 2008]

2.203
overflow
condition that arises when the result of an arithmetic operation exceeds the capacity of the number representation system used in a digital computer

[IEEE 2000]

2.204
overvoltage event
voltage swell
increase in the measured voltage of the power system above a predefined (critical) voltage and duration threshold

[Aclara 2008]

2.205
payment meter
electricity meter with additional functionality that can be operated and controlled to allow the flow of energy according to agreed payment modes

[IEC 62055-31:2005, 3.1.6]

2.206
peer (inter-process communication)
another process with similar capabilities of making and servicing requests

2.207
performance based rates
method of determining compensation for an electric utility based upon its performance

NOTE Reliability is often one of the measures used to compute performance.

[Aclara 2008]

2.208
performance based regulation
rate-setting mechanism which attempts to link rewards (generally profits) to desired results or targets

NOTE Performance based regulation sets rates, or components of rates, for a period of time based on external indices rather than a utility's cost-of-service. A form of rate regulation which provides utilities with better incentives to reduce their costs than does cost-of-service regulation.

[EnergyBuyer 2006]

2.209
performance monitoring
monitoring procedure implementing data acquisition processes to obtain performance data by using specialized performance testing equipment and documenting performance-monitoring results

2.210
permanent location number
number assigned to an area of land independent of any improvements upon it

[Aclara 2008]

2.211
phase imbalance
condition in which the vector sum of the electrical phases has moved significantly away from zero

[Aclara 2008]

2.212
ping, verb (in metering networks)
verify successful two-way communication using a brief message

NOTE The result of a ping determines the reachability and/or energization status of the endpoint.

2.213
planning
determines the regulating and support conditions of voltage control devices and the necessary magnitude, sign, and location of reactive power injection into an electric network to maintain desired system voltage profile; minimize system loss; maintain system stability while maximizing power transfer; reduce generation production costs; and unload transmission system equipment through reduction of reactive flows

2.214
point of common coupling
point at which the electric utility and the interface to the premises wiring occurs

NOTE 1 Typically, this point is at the utility revenue meter.

NOTE 2 See also: "service point".

2.215
power factor
ratio of real power to apparent power in an a.c. circuit

[IEC/TS 62257-7-3:2008, 3.14]

2.216
power flow
function to study control actions upon the power system

NOTE The power flow function operates in two modes. Dispatcher power flow allows the operator to determine the effects of control actions (breaker switching, tap changing, and interchange adjustments) on the system. In optimal power flow, the control actions are automatically predetermined within the limitations of the power system.

2.217
power line carrier
communication system where the utility power line is used as the primary element in the communication link

[EEI 2005]

2.218
power quality
characteristics of electricity that determine its usefulness

[EEI 2005]

2.219
precision
degree of exactness or discrimination with which a quantity is stated

NOTE 1 For example, a precision of 2 decimal places versus a precision of 5 decimal places.

[IEEE 2000]

NOTE 2 See also: “resolution”.

2.220
premises
building(s), grounds and appurtenances (belongings) under the control of the customer

[ISO/IEC 18010:2002, 3.1.10]

2.221
premises wiring
interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed

This includes (a) wiring from the service point or power source to the outlets or (b) wiring from and including the power source to the outlets where there is no service point.

NOTE Such wiring does not include wiring internal to appliances, luminaries, motors, controllers, motor control centres, and similar equipment.

[NFPA 2008]

2.222
prepaid metering
method of billing in which payment is received by the utility in advance of the sale of electricity

[Aclara 2008]

2.223
prepayment mode
payment mode in which automatic interruption occurs when available credit is exhausted

[IEC 62055-31:2005, 3.1.8]

2.224
present (value)
most recently available sampled reading

NOTE 1 While energy and power values are usually continuously available from a meter, other quantities such as demand are usually derived values. If a derived value such as “present demand” is retrieved, it should be noted that its calculation will not be complete until the end of the demand interval is reached. In such a case, it may be useful to also retrieve the “time remaining” until the end of the interval so that an estimate can be computed, or to retrieve another metric which is better suited for one’s purposes.

NOTE 2 See also: “instantaneous value”, and “last completed value”.

2.225
present energy
most recently available energy reading, as presented in the meter registers

NOTE The “present” value should represent the dial-reading of the meter, with allowances for update frequencies and communications latencies.

[Aclara 2008]

2.226
present maximum demand
largest observed demand, using the configured demand calculation method, since the last demand reset

NOTE See also: “maximum demand”, and “previous maximum demand”.

2.227
previous energy
value of the "present energy" register which was "shifted" or "frozen" at a particular moment in time

NOTE Registers are typically shifted at midnight.

[Aclara 2008]

2.228
previous maximum demand
maximum demand captured as a result of a demand reset

NOTE 1 The “present maximum demand” on record just prior to the demand reset becomes the “previous maximum demand” as the result of a demand reset.

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

2.229
primary metering
refers to metering the load on the high voltage (primary) side of the service transformer

NOTE See also: “secondary metering”.

2.230
primary voltage
voltage of the circuit supplying power to a transformer

NOTE In contrast, the output voltage, or load-supply voltage, is called the secondary voltage. In power supply practice the primary is almost always the high-voltage side and the secondary the low-voltage side of a transformer, except at generating stations.

[EEI 2005, modified]

2.231
process
individually controllable computation entity, which may go through a series of discrete process states

2.232
public utility commission
governmental agency holding regulatory power over energy pricing, and issues related thereto

[EnergyBuyer 2006]

2.233
publish / subscribe communication
communication where the server (data provider) makes available (or publishes) data stored in its system to one or more clients, which subscribe to such data

[MultiSpeak 2005]

2.234
pulse (in distribution management)
impulse
unit of consumption that operates in proportion to the flow of the substance being metered

NOTE Pulses typically are generated by devices that have mechanical motion, and may correspond to one rotation of a disk in the metering device. Many solid-state meters also maintain the tradition of generating pulses. In this case, a pulse may correspond to a Wh or some other arbitrary reference. Pulses must (usually) be scaled (by Kh and possibly other scalars) to convert the measurement into a value that has an official (SI) unit of measure.

[Aclara 2008]

2.235
pulse device
functional unit for emitting, transmitting, retransmitting, or receiving electric pulses, representing finite quantities, such as energy, normally transmitted from some form of electricity meter to a receiver unit

[IEC 62052-11:2003, 3.2.2.4]

2.236
purchase order
document authorizing the purchase of goods or services from a specific vendor

NOTE The purchase order includes the terms of the purchase, delivery requirements, identification of goods or services ordered, as well as their quantities and prices .

2.237
q-hour
quantity obtained by effectively lagging the applied voltage to a watthour meter by 60 degrees

NOTE 1 This quantity is one of the quantities used in calculating quadergy.

NOTE 2 In a distribution network, Q-hour is usually expressed in kQh.

[IEEE 2000, modified]

2.238
quadergy
reactive energy
the integral of reactive power with respect to time

NOTE In a distribution network, quadergy is usually expressed in kVArh.

[ANSI 2001, modified, IEEE 2000, modified]

2.239
quality index analysis
report on the overall performance of the utility in the supply of power to its customers

2.240
questionable
value whose quality is unknown for reasons that may include, but are not limited to, failure to pass a reasonability check

2.241
rate class
group of customers identified as a class and subject to a rate different from the rates of other groups

[EEI 2005]

2.242
rate component
tariff component
any measurable quantity which may be used to compute a consumer's bill

NOTE 1 Typical energy rate components (in a distribution network) include forward, reverse, net and/or total quantities of: real energy (kWh), apparent energy (kVAh), and/or reactive energy (kVArh).

NOTE 2 Typical power rate components (in a distribution network) include real power (kW), apparent power (kVA), and/or reactive power (kVAr).

NOTE 3 Some tariffs may also invoke a penalty calculation based on maximum demand and/or power factor (PF).

[Aclara 2008]

2.243
rate schedule
design and organization of billing charges to customers

NOTE A rate structure can comprise one or more of the rate schedules defined herein.

[EEI 2005]

2.244
reactive power
non-active power for a linear two-terminal element or two-terminal circuit

NOTE 1 Under sinusoidal conditions, the reactive power is the product of the apparent power S and the sine of the displacement angle φ: $Q = S \sin\varphi$.

NOTE 2 The SI unit for reactive power is the voltampere. The special name "var" and symbol "var" are given in IEC 60027-1.

[IEC 60050-131:2002, 131-11-44]

NOTE 3 Reactive power in the distribution network is normally expressed in kVAr.

2.245
receivable
transaction representing an invoice, credit memo or debit memo to a customer

NOTE A receivable is an open (unpaid) item in the accounts receivable ledger.

2.246
register
<electromechanical meter> a means of recording revolutions of the rotor

NOTE 1 The register is usually a mechanical assembly which is separable from other parts of the meter.

NOTE 2 The register also usually displays the recorded value.

NOTE 3 The recording is accomplished through gearings to the disk shaft. Either a clock (pointer type) or cyclometer type register may be used.

<solid-state meter> storage location for a specific data element

2.247
register constant
the factor by which the register reading must be multiplied in order to provide proper consideration of the register, or gear ratio, and of the instrument transformer ratios to obtain the registration in the desired unit

NOTE The register constant is commonly denoted by the symbol “Kr.”

[IEEE 2000]

2.248
register reading
numerical value indicated by the register

NOTE Neither the register constant nor the test dial (or dials), if any exist, is considered.

[IEEE 2000]

2.249
regulator
government agency responsible for controlling or directing economic entities through the process of rule-making and adjudication

[Aclara 2008]

2.250
release/clearance remote switch command scheduling
preparation and execution of switching plans for remote switch operations and management of necessary safety documentation

2.251
remote connect / disconnect
action to perform "connect", "disconnect", or "arm" a service remotely by means of a communication network and on-site switching hardware

[Aclara 2008]

NOTE See also: "virtual disconnect".

2.252
request
communication where the client issues a request to cause a service to be performed

NOTE A request consists of an operation (i.e. the name of a method) and zero or more parameters.

2.253
request-response transaction
request / response communication
request / reply transaction
interaction between a pair of distributed, cooperating objects, consisting of a request for service submitted to an object followed by a response conveying the result

[ISO/IEC 14776-411:1999, 3.1.67]

2.254
resolution
least value of the measured quantity that can be distinguished

NOTE When data is exchanged between systems, resolution is often expressed as the number of digits to the right of the decimal point.

[Aclara 2008]

2.255
response
reply
transaction conveying the result of a request

[ISO/IEC 14776-412:2006, 3.1.82]

2.256
restoration monitoring
process of monitoring the progress of a restoration, especially as it relates to ensuring that all affected consumers have had their service restored

[Aclara 2008]

2.257
results
information returned to the client, which may include values as well as status information indicating that exceptional conditions were raised in attempting to perform the requested service

2.258
retry
mechanism whereby a transaction that (for whatever reason) could not complete in the current operation is attempted again at a later time

[IEEE 2000]

2.259
reverse energy US SA
negative energy US
received energy US
imported energy AU
exported energy GB
quantity of energy received by the distribution network from the electrical service

NOTE 1 Reverse energy is customarily presented as a positive (unsigned, non-negative) value.

NOTE 2 Reverse energy may consist of any tariff energy quantity (active, apparent, and/or reactive energy), but active energy is the most common.

[Aclara 2008, modified]

NOTE 3 See also: "forward energy", “flow direction”, and “four-quadrant metering”.

2.260
rolling interval demand calculation
rolling block demand calculation
sliding block demand calculation
monitoring of demand by using a method that measures the average power over a sliding period of time

NOTE 1 Demand intervals are typically 15 min or 30 min in length and divided into “subintervals” which are typically 5 min in length. The process then sums adjacent subintervals together to from a value for a complete demand interval.

[Aclara 2008]

NOTE 2 See also: “fixed interval demand calculation”, and “demand”.

2.261
roll-over
process that occurs when a display or a stored unsigned integer value goes from its maximum allowed value to zero as a result of adding one

NOTE For example, when forward energy flows through a 5-dial electricity meter, its dials will go from 99999 to 00000 when it rolls-over.

[Aclara 2008]

2.262
roll-under
process that occurs when a display or a stored unsigned integer value goes from zero to its maximum allowed value as a result of subtracting one

NOTE For example, when reverse energy flows through a 5-dial electricity meter, its dials will (usually) go from 00000 to 99999 when it rolls-under.

[Aclara 2008]

2.263
sampling rate
frequency with which the event recorder regularly monitors an input channel to determine its value

[IEEE 2000]

2.264
scale, verb
to multiply the representation of a number by a factor in order to bring its range within prescribed limits

NOTE When scalars are applied there may also be a corresponding change in the unit of measure. For example, a meter reading might be converted from “pulses” to “kWh” by application of the appropriate scalar.

[IEEE 2000]

2.265
scram (in load control applications)
an action in response to an emergency in which all dispatchable load is shed as quickly as possible

NOTE The word “scram” originates from the early days of nuclear reactors and is commonly attributed to role of halting the nuclear reaction in an emergency situation. Many believe the term to be an acronym which stands for “safety control rod axe man.” The word has since found use in certain areas to identify something which requires both quick action and a full response to a critical problem.

2.266
season
calendar-specified period used for activation of rate schedules

[IEEE 2000]

2.267
secondary watthour constant
number of watthours per disk revolution

NOTE Commonly referred to as the meter “Kh.”

2.268
secondary metering (in distribution networks)
metering on the low-voltage (secondary) side of a service transformer

NOTE 1 AMI systems generally publish values which reflect the dial reading of a meter, and therefore generally publish “secondary metering” values.

NOTE 2 See also: “primary metering”.

2.269
security
information security
protection of information against unauthorized disclosure, transfer, modification, or destruction, whether accidental or intentional

[IEC 60050-721:1991, 721-08-57]

2.270
self read
process by which a meter or meter communication module can automatically capture a reading according to a schedule or other trigger mechanism

[Aclara 2008]

2.271
server
entity providing a service or resources

NOTE A server is a process implementing one or more operations on one or more objects.

2.272
server object
object providing response to a request for a service

NOTE A given object may be a client for some requests and a server for other requests.

2.273
service
<electrical> conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served

[NFPA 2008]

<information technology> operation or function that an object and/or object class performs upon request from another object and/or object class

[IEC 61158-4-12:2010, 3.4.28]

2.274
service drop
overhead service conductors from the last pole or other aerial support to and including the splices, if any, connecting to the service-entrance conductors at the building or other structure

[NFPA 2008]

2.275
service lateral
underground service conductors between the street main, including any risers at a pole or other structure or from transformers, and the first point of connection to the service-entrance conductors in a terminal box or meter or other enclosure, inside or outside the building wall

NOTE Where there is no terminal box, meter, or other enclosure, the point of connection shall be considered to be the point of entrance of the service conductors into the building.

[NFPA 2008]

2.276
service level agreement
formal written agreement made between a service provider and the service recipient which defines the basis of understanding between the two parties for delivery of the service itself

NOTE A service level agreement will generally contain clauses that define a specified level of service, support options, incentive awards for when service levels are exceeded, and/or penalty provisions when services are not provided.

[Aclara 2008]

2.277
service location
physical location served by a given electrical service

NOTE 1 A given service location may contain multiple premises, services, or meters.

NOTE 2 The data attributes normally include a description of the street address, city, state, zip, and possibly some type of map coordinate or location.

[Aclara 2008]

2.278
service delivery point
service point
point of connection between the facilities of the serving utility and the premises wiring

[NFPA 2008, NFPA 1999]

NOTE 1 The service delivery point is the point on the wiring system where the serving utility's distribution network wiring ends and where the customer's wiring begins.

NOTE 2 See also: "point of common coupling", and "transmission delivery point".

2.279
service territory
area in which a utility system is required or has the right to supply service to customers

NOTE Adapted from EEI 2005.

2.280
short circuit analysis
application program used for analysis of transmission or distribution network

2.281
solid-state meter
meter in which the metrology is performed by solid-state components (as opposed to the mechanism used in more traditional electro-mechanical meters)

[Aclara 2008]

2.282
spinning reserve
unloaded generation that is synchronized and ready to serve additional demand

[IEEE 2000]

2.283
standard meter
electromechanical or solid state meter that cumulatively measures, records and stores aggregated kWh that is periodically retrieved for use in customer billing

[DRAM 2008]

2.284
state
time-varying properties of an object that affect that object's behaviour

2.285
substation
area or group of equipment containing switches, circuit breakers, busses, and transformers for switching power circuits and to transform power from one voltage to another or from one system to another

[IEEE 2000]

2.286
substation state supervision
monitoring and control of primary substations, including the status of circuit-breakers and isolators

2.287
supply restoration assessment
analysis of switching options after a network fault to re-connect supply to as many customers as possible

2.288
switching simulation
simulating the switching operations to isolate a network section and subsequently reconnect it

2.289
switchgear
general term covering switching devices and their combination with associated control measuring, protective and regulating equipment, also assemblies, devices and equipment intended in principle for use in connection with generation, transmission, distribution and conversion of energy

2.290
system of record
system which is the authoritative data source for a given data element or piece of information

NOTE A "modelling authority" is closely related to a "system of record" in that a modelling authority organizes a set of data by CIM objects regardless of their deployment across systems, while a system of record is the authoritative source for a given category of data within the utility.

2.291
tariff
document, approved by the responsible regulatory agency, listing the terms and conditions, including a schedule of prices, under which utility services will be provided

[EnergyBuyer 2006]

2.292
telecontrol
system in which the monitored information is obtained upon request from the master station to outstations

2.293
thermal ratings
temperature operating limits of a device

2.294
time-of-use pricing
energy prices that are set for specific time periods

NOTE 1 Prices paid for energy consumed during these periods are pre-established and known to consumers in advance of such consumption, allowing them to vary their demand and usage in response to such prices and manage their energy costs by shifting usage to a lower cost period, or reducing consumption overall."

NOTE 2 Prices are pre-established and typically do not change more "than twice a year (summer and winter season). The time periods are pre-established, typically include from two to no more than four periods per day, and do not vary in start or stop times."

[DRAM 2008, modified]

2.295
total energy
secured energy
added energy
forward energy plus reverse energy

$$Total\ energy = |forward\ energy| + |reverse\ energy|$$

NOTE 1 Total energy is sometimes as a deterrent to energy theft. It is used in metering applications where the service location (and corresponding customer program and tariff) are known to not support any distributed generation.

NOTE 2 "Total energy" may refer to "active", "apparent", or "reactive" energies.

[Aclara 2008, modified]

NOTE 3 See also: "forward energy", "net energy", "reverse energy", and "flow direction".

2.296
transaction
unit of interaction between systems

[Aclara 2008]

2.297
transceiver
device that both transmits and receives data

[IEEE 2000]