

# TECHNICAL SPECIFICATION

---

## Communication networks and systems for power utility automation – Part 2: Glossary





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2019 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.



# TECHNICAL SPECIFICATION

---

## Communication networks and systems for power utility automation – Part 2: Glossary

IEC/TS 61850-2 Ed.2.0 - Preview only Copy via ILLNAS e-Shop

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 33.200

ISBN 978-2-8322-6799-8

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	3
1 Scope .....	6
2 Normative references.....	6
3 Terms and definitions.....	6
4 Abbreviated terms.....	32
Bibliography .....	38

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**COMMUNICATION NETWORKS AND SYSTEMS  
FOR POWER UTILITY AUTOMATION –****Part 2: Glossary**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a Technical Specification when

- 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 61850-2, which is a technical specification, has been prepared by IEC technical committee 57: Power system management and associated information exchange.

This second edition cancels and replaces the first edition, published in 2003. This edition constitutes a technical revision. This edition includes the following significant technical changes with respect to the previous edition:

- a) definition of new definitions used in the new edition of the IEC 61850 standard series (abstract data model for communication; application function; backward compatible; common data class; communication system; composition; configuration compatibility list; configured IED description CID; conformance; data object class; decomposition; documentation; domain; forward compatible; function-related naming; granularity; IED configuration tool; IED parameters; instantiated IED description IID; intelligent electronic device capability description ICD; language; local function; logical device; mandatory data attribute; mandatory data object; meta model; namespace; object reference; optional data attribute; optional data object; performance; power system; power utility automation system; PUAS installation; PUAS parameter set; PUAS product family; product-related naming; secondary system; semantic name; system configuration description SCD; system configuration language SCL; system configuration language implementation conformance statement SICS; system configuration language version; system master; system configuration tool SCT; system design specification; system extension description SED; system related test; system requirement specification; system specification description SSD; system specification tool; technical issued conformance test TICS; tool; virtualisation; extensible mark-up language schema XSD);
- b) updating of existing definitions to the new domain power utility automation of the IEC 61850 standard series and to provide homogeneity (abstract communication service interface ACSI; bay; client; data; data attribute; data object; device; distributed function; engineering tools; expandability; factory acceptance test FAT; flexibility; function; gateway; generic object-oriented system event GOOSE; generic system event model; IED parameter set; information model; instance; intelligent electronic device IED; interchangeability; logical connection; logical node; logical system; manufacturer; merging unit; model implementation conformance statement MICS; physical connection; physical device; physical system; piece of information for communication PICOM; process level functions; process related station level functions; protocol; protocol implementation conformance statement PICS; protocol implementation extra information for testing PIXIT; redundancy; scalability; server; site acceptance test SAT; specific communication service mapping SCSM; station level functions; supporting tools; system; system integrator; system life cycle; system parameters; system test; test equipment; type test);
- c) removal of deprecated definitions (logical device class; generic system state event; substation automation system);
- d) provision of clarifications and corrections to the first edition of IEC 61850-2.

The text of this Technical Specification is based on the following documents:

Draft TS	Report on voting
57/1970/DTS	57/2024/RVDTS

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

IEC 61850 consists of the following parts, under the general title *Communication networks and systems for power utility automation*.

- Part 1: Introduction and overview
- Part 2: Glossary
- Part 3: General requirements
- Part 4: System and project management
- Part 5: Communication requirements for functions and device models

- Part 6: Configuration description language for communication in electrical substations related to IEDs
- Part 7-1: Basic communication structure – Principles and models
- Part 7-2: Basic information and communication – Abstract communication service interface (ACSI)
- Part 7-3: Basic communication structure – Common data classes
- Part 7-4: Basic communication structure – Compatible logical node classes and data object classes
- Part 8-1: Specific communication service mapping (SCSM) – Mappings to MMS (ISO/IEC 9506-1 and ISO/IEC 9506-2) over ISO/IEC 8802-3
- Part 9-2: Specific communication service mapping (SCSM) – Sampled values over ISO/IEC 8802-3
- Part 9-3: Precision time protocol profile for power utility automation
- Part 10: Conformance testing

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

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

# COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

## Part 2: Glossary

### 1 Scope

This part of IEC 61850, which is a Technical Specification, applies to power utility automation systems (PUAS). It defines the communication between intelligent electronic devices (IEDs) in the power utility automation system and the related system requirements.

This document contains the glossary of specific terminology and definitions used in the context of Power Utility Automation Systems within the various parts of the standard.

This document is, by its nature, a living part since new definitions and abbreviations will be created continuously in the standard documents that are being written inside the IEC related to IEC 61850.

### 2 Normative references

There are no normative references in this document.

### 3 Terms and definitions

The following terms and definitions apply to all parts of the IEC 61850 series.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1

##### **abstract communication service interface**

##### **ACSI**

virtual interface inside an IED between the data model (objects, services) and the mapping to the communication stack

#### 3.2

##### **abstract data model for communication**

data standardized with their semantic meaning exchanged between the functions by the IEDs

Note 1 to entry: All application functions shall trust these data and perform their algorithm using this data. The formal description of the automation system by SCL is also based on this standardized data.

[SOURCE: IEC 61850-5:2013, 3.1.14]

#### 3.3

##### **access point**

communication access point to an IED

Note 1 to entry: This may be a serial port, an Ethernet connection, or a client or server address dependent on the stack being used. Each access point of an IED to a communication bus is uniquely identified. Each server has at

least one logical access point, but the maximal number is not limited by the standard but only by the actual implementation.

### 3.4

#### **application layer**

layer 7 in the OSI reference model for Open Systems Interconnection comprising the interface between the OSI environment and the IED's or user's application

[SOURCE: ISO/IEC 7498-1:1994, 7.1]

### 3.5

#### **application function**

task, which is performed in or by power utility automation systems

Note 1 to entry: Generally, a function consists of subparts which may be distributed to different IEDs, which exchange data with each other. More precisely these sub-functions implemented in the IEDs exchange data. Also between different functions data are exchanged. The exchanged data exposed to the communication system shall be standardized based on the semantic content to be understandable by the receiving function. For this purpose the standard groups the exchanged data in objects called Logical Nodes which refer to the name of the allocated functions by their mnemonic name.

[SOURCE: IEC 61850-5:2013, 3.1.1]

### 3.6

#### **association**

conveyance path established between a client and a server for the exchange of messages

### 3.7

#### **attribute**

named element of data and of a specific type

[SOURCE: IEC 61850-8-1:2011, 3.11, modified (original term was "data attribute")]

### 3.8

#### **backward compatible**

property of a newer system or product that allows interoperability with a former version of such system or product

### 3.9

#### **bay**

subpart of a substation, having some common functionality, closely connected to the other subparts, and forming a substation

[SOURCE: IEC 61850-1:2013, 3.1.2]

### 3.10

#### **bay level functions**

functions that use mainly the data of one bay and act mainly on the primary equipment of that bay

Note 1 to entry: Bay level functions communicate via logical interface 3 within the bay level and via the logical interfaces 4 and 5 to the process level, i.e. with any kind of remote input/output or with intelligent sensors and actuators.

EXAMPLES Feeder or transformer, protection, control and interlocking.

[SOURCE: IEC 61850-5:2013, 3.5.3, modified (Note 1 to entry and examples added)]

**3.11  
broadcast**

message placed onto a communication network intended to be read and acted on, as appropriate, by any IED. A broadcast message will typically contain the sender's address and a global recipient address

EXAMPLE: Time synchronising.

**3.12  
bus**

communication system connection between IEDs with communication facilities

**3.13  
class**

description of a set of objects that share the same attributes, services, relationships and semantics

[SOURCE: IEC 61850-7-3, 3.1]

**3.14  
client**

entity that uses data from a server

**3.15  
common data class**

template that groups all the possible data attributes that are parts of a data object class representing information related to status, measurements, control, settings

**3.16  
communication connection**

connection which utilises the communication mapping function of one or more resources for the conveyance of information

**3.17  
communication functions**

functions that use communication services to coordinate their actions

**3.18  
communication stack**

multi-layer stack

Note 1 to entry: In the 7 layer OSI reference model for Open Systems Interconnection, each layer performs specific functions related to Open Systems Interconnection communication.

**3.19  
communication services**

services implemented over a communication system

**3.20  
communication system**

interconnected set of all communication links

Note 1 to entry: Depending on the size it is called either LAN (local area network) as used in substations or plants, or WAN (wide area network) as used globally in the power utility system.

[SOURCE: IEC 61850-5:2013, 3.1.10]

**3.21  
composition**

process of building up devices using logical nodes