
**Komunikacijska omrežja in sistemi za avtomatizacijo porabe (električne) energije -
7-1. del: Osnovna komunikacijska struktura - Načela in modeli**

Communication networks and systems for power utility automation - Part 7-1: Basic communication structure - Principles and models

Kommunikationsnetze und -systeme für die Automatisierung in der elektrischen Energieversorgung -- Teil 7-1: Grundlegende Kommunikationsstruktur - Grundsätze und Modelle

(standards.iteh.ai)

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques -- Partie 7-1: Structure de communication de base. Principes et modèles

Ta slovenski standard je istoveten z: EN 61850-7-1:2011

ICS:

| | | |
|-----------|---|--|
| 29.240.30 | Krmilna oprema za elektroenergetske sisteme | Control equipment for electric power systems |
| 33.200 | Daljinsko krmiljenje, daljinske meritve (telemetrija) | Telecontrol. Telemetry |

SIST EN 61850-7-1:2012**en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 61850-7-1:2012](#)

<https://standards.iteh.ai/catalog/standards/sist/5db1deff-fb34-4655-b36c-5b363dc912a4/sist-en-61850-7-1-2012>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61850-7-1

October 2011

ICS 33.200

Supersedes EN 61850-7-1:2003

English version

**Communication networks and systems for power utility automation -
Part 7-1: Basic communication structure -
Principles and models
(IEC 61850-7-1:2011)**

Réseaux et systèmes de communication
pour l'automatisation des systèmes
électriques -
Partie 7-1: Structure de communication de
base -
Principes et modèles
(CEI 61850-7-1:2011)

Kommunikationsnetze und -systeme für
die Automatisierung in der elektrischen
Energieversorgung -
Teil 7-1: Grundlegende
Kommunikationsstruktur -
Grundsätze und Modelle
(IEC 61850-7-1:2011)

**ITeH STANDARD PREVIEW
(standards.iteh.ai)**

[SIST EN 61850-7-1:2012](https://standards.iteh.ai/catalog/standards/sist/5db1deff-fb34-4655-b36c-07430c724738/en-61850-7-1:2012)

<https://standards.iteh.ai/catalog/standards/sist/5db1deff-fb34-4655-b36c-07430c724738/en-61850-7-1:2012>
This European Standard was approved by CENELEC on 2011-08-19. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

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

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

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 57/1121/FDIS, future edition 2 of IEC 61850-7-1, prepared by IEC TC 57, Power systems management and associated information exchange, was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61850-7-1:2011.

This document supersedes EN 61850-7-1:2003.

Compared to EN 61850-7-1:2003, EN 61850-7-1:2011 introduces:

- the model for statistical and historical statistical data,
- the concepts of proxies, gateways, LD hierarchy and LN inputs,
- the model for time synchronisation,
- the concepts behind different testing facilities,
- the extended logging function.

EN 61850-7-1:2011 also clarifies the following points:

- the use of numbers for data extension,
- the use of name spaces,
- the mode and behaviour of a logical node,
- the use of range and deadbanded values,
- the access to control actions and others.

The following dates are fixed:

- | | | |
|--|-------|------------|
| – latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2012-05-19 |
| – latest date by which the national standards conflicting with the document have to be withdrawn | (dow) | 2014-08-19 |

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

Endorsement notice

The text of the International Standard IEC 61850-7-1:2011 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

| | | |
|------------------|------|---|
| IEC 61346-1 | NOTE | Harmonized as EN 61346-1. |
| IEC 61346-2 | NOTE | Harmonized as EN 61346-2. |
| IEC 61400 series | NOTE | Harmonized in EN 61400 series (not modified). |

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

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

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|--------------|-------------|
| IEC/TS 61850-2 | - | Communication networks and systems in substations - Part 2: Glossary | - | - |
| IEC 61850-3 | - | Communication networks and systems in substations - Part 3: General requirements | EN 61850-3 | - |
| IEC 61850-4 | - | Communication networks and systems for power utility automation - Part 4: System and project management | EN 61850-4 | - |
| IEC 61850-5 | - | Communication networks and systems in substations - Part 5: Communication requirements for functions and device models | EN 61850-5 | - |
| IEC 61850-6 | - | Communication networks and systems for power utility automation - Part 6: Configuration description language for communication in electrical substations related to IEDs | EN 61850-6 | - |
| IEC 61850-7-2 | - | Communication networks and systems for power utility automation - Part 7-2: Basic information and communication structure - Abstract communication service interface (ACSI) | EN 61850-7-2 | - |
| IEC 61850-7-3 | - | Communication networks and systems for power utility automation - Part 7-3: Basic communication structure - Common data classes | EN 61850-7-3 | - |
| IEC 61850-7-4 | - | Communication networks and systems for power utility automation - Part 7-4: Basic communication structure - Compatible logical node classes and data object classes | EN 61850-7-4 | - |
| IEC 61850-8-1 | - | Communication networks and systems for power utility automation - Part 8-1: Specific Communication Service Mapping (SCSM) - Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3 | EN 61850-8-1 | - |

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|---|--------------|-------------|
| IEC 61850-9-2 | - | Communication networks and systems in substations - Part 9-2: Specific Communication Service Mapping (SCSM) - Sampled values over ISO/IEC 8802-3 | EN 61850-9-2 | - |
| IEC 61850-10 | - | Communication networks and systems in substations - Part 10: Conformance testing | EN 61850-10 | - |
| ISO/IEC 8802-3 | - | Information technology - Telecommunications - and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications | | - |
| ISO/IEC 8825 | Series | Information technology - ASN.1 encoding rules | | - |
| ISO 9506-1 | - | Industrial automation systems - Manufacturing - Message Specification - Part 1: Service definition | | - |
| ISO 9506-2 | - | Industrial automation systems - Manufacturing - Message Specification - Part 2: Protocol specification | | - |

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 61850-7-1:2012](https://standards.iteh.ai/catalog/standards/sist/5db1deff-fb34-4655-b36c-5b363dc912a4/sist-en-61850-7-1-2012)

<https://standards.iteh.ai/catalog/standards/sist/5db1deff-fb34-4655-b36c-5b363dc912a4/sist-en-61850-7-1-2012>



IEC 61850-7-1

Edition 2.0 2011-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Communication networks and systems for power utility automation –
Part 7-1: Basic communication structure – Principles and models**

**Réseaux et systèmes de communication pour l'automatisation des systèmes
électriques –**
Partie 7-1: Structure de communication de base – Principes et modèles

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE **XG**
CODE PRIX

ICS 33.200

ISBN 978-2-88912-555-5

CONTENTS

| | |
|--|----|
| FOREWORD..... | 8 |
| INTRODUCTION..... | 10 |
| 1 Scope..... | 11 |
| 2 Normative references..... | 12 |
| 3 Terms and definitions..... | 13 |
| 4 Abbreviated terms..... | 13 |
| 5 Overview of the IEC 61850 series concepts..... | 14 |
| 5.1 Objective..... | 14 |
| 5.2 Topology and communication functions of substation automation systems..... | 16 |
| 5.3 The information models of substation automation systems..... | 16 |
| 5.4 Applications modelled by logical nodes defined in IEC 61850-7-4..... | 18 |
| 5.5 The semantic is attached to data..... | 21 |
| 5.6 The services to exchange information..... | 23 |
| 5.7 Services mapped to concrete communication protocols..... | 24 |
| 5.8 The configuration of the automation system..... | 25 |
| 5.9 Summary..... | 26 |
| 6 Modelling approach of the IEC 61850 series..... | 27 |
| 6.1 Decomposition of application functions and information..... | 27 |
| 6.2 Creating information models by stepwise composition..... | 28 |
| 6.3 Example of an IED composition..... | 31 |
| 6.4 Information exchange models..... | 31 |
| 6.4.1 General..... | 31 |
| 6.4.2 Output model..... | 33 |
| 6.4.3 Input model..... | 36 |
| 6.4.4 Model for statistical and historical statistical data..... | 46 |
| 6.4.5 Model for system functions..... | 50 |
| 7 Application view..... | 52 |
| 7.1 General..... | 52 |
| 7.2 First modelling step – Logical nodes and data..... | 53 |
| 7.3 Mode and behaviour of a logical node..... | 57 |
| 7.4 Use of measurement ranges and alarms for supervision functions..... | 57 |
| 7.5 Data used for limiting the access to control actions..... | 58 |
| 7.6 Data used for blocking functions described by logical nodes..... | 58 |
| 7.7 Data used for logical node inputs/outputs blocking (operational blocking)..... | 58 |
| 7.7.1 General..... | 58 |
| 7.7.2 Blocking incoming commands..... | 59 |
| 7.7.3 Blocking process outputs..... | 59 |
| 7.7.4 Blocking oscillating inputs..... | 60 |
| 7.8 Data used for testing..... | 60 |
| 7.8.1 General..... | 60 |
| 7.8.2 Multicast signals used for simulation..... | 60 |
| 7.8.3 Input signals used for testing..... | 61 |
| 7.8.4 Test mode..... | 62 |
| 7.9 Logical node used for extended logging functions..... | 62 |
| 8 Device view..... | 63 |
| 8.1 General..... | 63 |

| | | |
|--------|---|-----|
| 8.2 | Second modelling step – logical device model | 64 |
| 8.2.1 | The logical device concept | 64 |
| 8.2.2 | The device nameplate | 65 |
| 8.2.3 | Gateways and proxies | 66 |
| 8.2.4 | Logical devices for monitoring external device health | 67 |
| 8.2.5 | Logical devices management hierarchy | 68 |
| 9 | Communication view | 70 |
| 9.1 | General | 70 |
| 9.2 | The service models of the IEC 61850 series | 70 |
| 9.3 | The virtualisation | 72 |
| 9.4 | Basic information exchange mechanisms | 73 |
| 9.5 | The client-server building blocks | 75 |
| 9.5.1 | Server | 75 |
| 9.5.2 | Client-server roles | 76 |
| 9.6 | Logical nodes communicate with logical nodes | 77 |
| 9.7 | Interfaces inside and between devices | 78 |
| 10 | Where physical devices, application models and communication meet | 79 |
| 11 | Relationships between IEC 61850-7-2, IEC 61850-7-3 and IEC 61850-7-4 | 80 |
| 11.1 | Refinements of class definitions | 80 |
| 11.2 | Example 1 – Logical node and data class | 81 |
| 11.3 | Example 2 – Relationship of IEC 61850-7-2, IEC 61850-7-3, and IEC 61850-7-4 | 85 |
| 12 | Formal specification method | 86 |
| 12.1 | Notation of ACSI classes | 86 |
| 12.2 | Class modelling | 87 |
| 12.2.1 | Overview | 87 |
| 12.2.2 | Common data class | 88 |
| 12.2.3 | Logical node class | 91 |
| 12.3 | Service tables | 92 |
| 12.4 | Referencing instances | 93 |
| 13 | Name spaces | 96 |
| 13.1 | General | 96 |
| 13.2 | Name spaces defined in the IEC 61850-7-x series | 97 |
| 13.3 | Specification of name spaces | 101 |
| 13.3.1 | General | 101 |
| 13.3.2 | Specification | 101 |
| 13.4 | Attributes for references to name spaces | 102 |
| 13.4.1 | General | 102 |
| 13.4.2 | Attribute for logical device name space (ldNs) | 103 |
| 13.4.3 | Attribute for logical node name space (lnNs) | 103 |
| 13.4.4 | Attribute for data name space (dataNs) | 104 |
| 13.4.5 | Attribute for common data class name space (cdcNs) | 104 |
| 14 | Common rules for new version of classes and for extension of classes | 104 |
| 14.1 | General | 104 |
| 14.2 | Basic rules | 104 |
| 14.3 | Rules for LN classes | 105 |
| 14.3.1 | Use of standardized LN classes | 105 |
| 14.3.2 | Extensions to standardized LN classes made by third parties | 106 |
| 14.3.3 | New LN classes | 106 |

| | | |
|--------------|---|-----|
| 14.3.4 | New versions of standardized LN classes made by name space owners | 107 |
| 14.4 | Rules for common data classes and control block classes | 107 |
| 14.4.1 | New common data classes and control block classes | 107 |
| 14.4.2 | New versions of standardized common data classes | 107 |
| 14.4.3 | New versions of control block classes..... | 107 |
| 14.5 | Multiple instances of LN classes for dedicated and complex functions..... | 108 |
| 14.5.1 | Example for time overcurrent..... | 108 |
| 14.5.2 | Example for PDIS | 108 |
| 14.5.3 | Example for power transformer..... | 108 |
| 14.5.4 | Example for auxiliary network | 108 |
| 14.6 | Specialisation of data by use of number extensions..... | 109 |
| 14.7 | Examples for new LNs..... | 109 |
| 14.8 | Example for new Data | 109 |
| Annex A | (informative) Overview of logical nodes and data | 110 |
| Annex B | (informative) Allocation of data to logical nodes | 113 |
| Annex C | (informative) Use of the substation configuration language (SCL) | 116 |
| Annex D | (informative) Applying the LN concept to options for future extensions | 118 |
| Annex E | (informative) Relation between logical nodes and PICOMs | 123 |
| Annex F | (informative) Mapping the ACSI to real communication systems..... | 124 |
| Bibliography | | 132 |
| Figure 1 | – Relations between modelling and mapping parts of the IEC 61850 series | 14 |
| Figure 2 | – Sample substation automation topology..... | 16 |
| Figure 3 | – Modelling approach (conceptual)..... | 17 |
| Figure 4 | – Logical node information categories | 20 |
| Figure 5 | – Build-up of devices (principle) | 20 |
| Figure 6 | – Position information depicted as a tree (conceptual) | 21 |
| Figure 7 | – Service excerpt | 23 |
| Figure 8 | – Example of communication mapping | 25 |
| Figure 9 | – Summary | 26 |
| Figure 10 | – Decomposition and composition process (conceptual)..... | 27 |
| Figure 11 | – XCBR1 information depicted as a tree..... | 30 |
| Figure 12 | – Example of IED composition..... | 31 |
| Figure 13 | – Output and input model (principle) | 32 |
| Figure 14 | – Output model (step 1) (conceptual) | 33 |
| Figure 15 | – Output model (step 2) (conceptual) | 34 |
| Figure 16 | – GSE output model (conceptual)..... | 34 |
| Figure 17 | – Setting data (conceptual) | 35 |
| Figure 18 | – Input model for analogue values (step 1) (conceptual) | 37 |
| Figure 19 | – Range and deadbanded value (conceptual)..... | 38 |
| Figure 20 | – Input model for analogue values (step 2) (conceptual) | 39 |
| Figure 21 | – Reporting and logging model (conceptual)..... | 40 |
| Figure 22 | – Data set members and reporting | 41 |
| Figure 23 | – Buffered report control block (conceptual)..... | 42 |

| | |
|--|----|
| Figure 24 – Buffer time | 43 |
| Figure 25 – Data set members and inclusion-bitstring | 44 |
| Figure 26 – Log control block (conceptual)..... | 44 |
| Figure 27 – Peer-to-peer data value publishing model (conceptual) | 45 |
| Figure 28 – Conceptual model of statistical and historical statistical data (1) | 47 |
| Figure 29 – Conceptual model of statistical and historical statistical data (2) | 49 |
| Figure 30 – Concept of the service tracking model – Example: control service tracking..... | 51 |
| Figure 31 – Real world devices | 52 |
| Figure 32 – Logical nodes and data (IEC 61850-7-2) | 53 |
| Figure 33 – Simple example of modelling..... | 55 |
| Figure 34 – Basic building blocks..... | 55 |
| Figure 35 – Logical nodes and PICOM..... | 56 |
| Figure 36 – Logical nodes connected (outside view in IEC 61850-7-x series)..... | 56 |
| Figure 37 – Mode and behaviour data (IEC 61850-7-4)..... | 57 |
| Figure 38 – Data used for limiting the access to control actions (IEC 61850-7-4) | 58 |
| Figure 39 – Data used for logical node inputs/outputs blocking (IEC 61850-7-4) | 59 |
| Figure 40 – Data used for receiving simulation signals..... | 60 |
| Figure 41 – Example of input signals used for testing | 61 |
| Figure 42 – Test mode example..... | 62 |
| Figure 43 – Logical node used for extended logging functions (GLOG) | 63 |
| Figure 44 – Logical device building block..... | 64 |
| Figure 45 – Logical devices and LLN0/LPHD | 65 |
| Figure 46 – The common data class DPL | 66 |
| Figure 47 – Logical devices in proxies or gateways..... | 67 |
| Figure 48 – Logical devices for monitoring external device health | 68 |
| Figure 49 – Logical devices management hierarchy | 69 |
| Figure 50 – ACSI communication methods..... | 71 |
| Figure 51 – Virtualisation | 73 |
| Figure 52 – Virtualisation and usage | 73 |
| Figure 53 – Information flow and modelling | 74 |
| Figure 54 – Application of the GSE model..... | 74 |
| Figure 55 – Server building blocks | 75 |
| Figure 56 – Interaction between application process and application layer (client/server) | 76 |
| Figure 57 – Example for a service..... | 76 |
| Figure 58 – Client/server and logical nodes | 77 |
| Figure 59 – Client and server roles | 77 |
| Figure 60 – Logical nodes communicate with logical nodes..... | 78 |
| Figure 61 – Interfaces inside and between devices | 79 |
| Figure 62 – Component hierarchy of different views (excerpt)..... | 80 |
| Figure 63 – Refinement of the DATA class..... | 81 |
| Figure 64 – Instances of a DATA class (conceptual) | 84 |
| Figure 65 – Relation between parts of the IEC 61850 series | 85 |

| | |
|---|-----|
| Figure 66 – Abstract data model example for IEC 61850-7-x..... | 87 |
| Figure 67 – Relation of TrgOp and Reporting..... | 90 |
| Figure 68 – Sequence diagram | 92 |
| Figure 69 – References | 93 |
| Figure 70 – Use of FCD and FCDA | 94 |
| Figure 71 – Object names and object reference | 95 |
| Figure 72 – Definition of names and semantics | 96 |
| Figure 73 – One name with two meanings..... | 97 |
| Figure 74 – Name space as class repository..... | 98 |
| Figure 75 – All instances derived from classes in a single name space..... | 99 |
| Figure 76 – Instances derived from multiple name spaces | 100 |
| Figure 77 – Inherited name spaces | 100 |
| Figure 78 – Basic extension rules diagram..... | 105 |
| Figure B.1 – Example for control and protection LNs combined in one physical device | 113 |
| Figure B.2 – Merging unit and sampled value exchange (topology)..... | 114 |
| Figure B.3 – Merging unit and sampled value exchange (data) | 114 |
| Figure C.1 – Application of SCL for LNs (conceptual) | 116 |
| Figure C.2 – Application of SCL for data (conceptual)..... | 117 |
| Figure D.1 – Seamless communication (simplified) | 118 |
| Figure D.2 – Example for new logical nodes | 119 |
| Figure D.3 – Example for control center view and mapping to substation view | 121 |
| Figure E.1 – Exchanged data between subfunctions (logical nodes)..... | 123 |
| Figure E.2 – Relationship between PICOMS and client/server model | 123 |
| Figure F.1 – ACSI mapping to an application layer..... | 124 |
| Figure F.2 – ACSI mappings (conceptual)..... | 125 |
| Figure F.3 – ACSI mapping to communication stacks/profiles | 126 |
| Figure F.4 – Mapping to MMS (conceptual)..... | 126 |
| Figure F.5 – Mapping approach | 127 |
| Figure F.6 – Mapping detail of mapping to a MMS named variable..... | 128 |
| Figure F.7 – Example of MMS named variable (process values) | 128 |
| Figure F.8 – Use of MMS named variables and named variable list..... | 129 |
| Figure F.9 – MMS information report message..... | 130 |
| Figure F.10 – Mapping example..... | 131 |
| Table 1 – LN groups | 18 |
| Table 2 – Logical node class XCBR (conceptual)..... | 29 |
| Table 3 – Excerpt of integer status setting | 36 |
| Table 4 – Comparison of the data access methods | 41 |
| Table 5 – ACSI models and services..... | 71 |
| Table 6 – Logical node circuit breaker | 82 |
| Table 7 – Controllable double point (DPC)..... | 83 |
| Table 8 – ACSI class definition | 86 |
| Table 9 – Single point status common data class (SPS)..... | 88 |

| | |
|---|-----|
| Table 10 – Quality components attribute definition | 89 |
| Table 11 – Basic status information template (excerpt) | 89 |
| Table 12 – Trigger option | 90 |
| Table 13 – GenLogicalNodeClass definition | 91 |
| Table 14 – Excerpt of logical node name plate common data class (LPL) | 103 |
| Table 15 – Excerpt of common data class | 103 |
| Table A.1 – Excerpt of data classes for measurands | 111 |
| Table A.2 – List of common data classes (excerpt) | 112 |

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 61850-7-1:2012](https://standards.iteh.ai/catalog/standards/sist/5db1deff-fb34-4655-b36c-5b363dc912a4/sist-en-61850-7-1-2012)

<https://standards.iteh.ai/catalog/standards/sist/5db1deff-fb34-4655-b36c-5b363dc912a4/sist-en-61850-7-1-2012>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**COMMUNICATION NETWORKS AND
SYSTEMS FOR POWER UTILITY AUTOMATION –**
**Part 7-1: Basic communication structure –
Principles and models**

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.

International Standard IEC 61850-7-1 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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

| | |
|--------------|------------------|
| FDIS | Report on voting |
| 57/1121/FDIS | 57/1145/RVD |

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

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

Compared to the first edition, this second edition introduces:

- the model for statistical and historical statistical data,
- the concepts of proxies, gateways, LD hierarchy and LN inputs,
- the model for time synchronisation,
- the concepts behind different testing facilities,
- the extended logging function.

It also clarifies the following points:

- the use of numbers for data extension,
- the use of name spaces,
- the mode and behaviour of a logical node,
- the use of range and deadbanded values,
- the access to control actions and others.

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

A list of all parts of the IEC 61850 series, under the general title: *Communication networks and systems for power utility automation* can be found on the IEC website.

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

- reconfirmed, [SIST EN 61850-7-1:2012](https://standards.iteh.ai/catalog/standards/sist/5db1deff-fb34-4655-b36c-5b363dc912a4/sist-en-61850-7-1-2012)
- withdrawn, <https://standards.iteh.ai/catalog/standards/sist/5db1deff-fb34-4655-b36c-5b363dc912a4/sist-en-61850-7-1-2012>
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.