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**Communication networks and systems for power utility automation –
Part 7-2: Basic information and communication structure – Abstract
communication service interface (ACSI)**

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ELECTROTECHNICAL
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CONTENTS

FOREWORD.....	12
INTRODUCTION.....	15
1 Scope.....	16
1.1 General.....	16
1.2 Namespace name and version	16
1.3 Code Component distribution	17
2 Normative references	17
3 Terms and definitions	18
4 Abbreviated terms	19
5 ACSI overview and basic concepts	20
5.1 Conceptual model of IEC 61850.....	20
5.2 The meta-meta model	21
5.3 The meta model.....	21
5.3.1 General	21
5.3.2 Information modelling classes.....	21
5.3.3 Information exchange modelling classes.....	22
5.3.4 Relations between classes	25
5.4 The domain type model.....	26
5.5 The data instance model.....	26
5.6 Conditions for element presence.....	27
5.7 Functional constraints (FcKind).....	29
5.8 Trigger options.....	32
6 Type definition.....	32
6.1 General.....	32
6.2 Data model types	35
6.2.1 General	35
6.2.2 Basic types.....	35
6.2.3 Domain types (general)	36
6.2.4 Domain types (enumerated).....	47
6.2.5 Domain types (coded enumerated)	51
6.3 ACSI – service parameter types.....	53
6.3.1 General	53
6.3.2 Basic types.....	53
6.3.3 Domain types	53
6.3.4 ACSI enumerated types.....	54
7 GenServerClass model.....	55
7.1 GenServerClass definition	55
7.2 Server class services.....	56
7.2.1 Overview of directory and GetDefinition services	56
7.2.2 GetServerDirectory	56
8 Application association model.....	57
8.1 Introduction.....	57
8.2 Concept of application associations	57
8.3 TWO-PARTY-APPLICATION-ASSOCIATION (TPAA) class model.....	58
8.3.1 TWO-PARTY-APPLICATION-ASSOCIATION (TPAA) class definition.....	58

8.3.2	Two-party application association services	59
8.4	MULTICAST-APPLICATION-ASSOCIATION (MCAA) class	62
9	GenLogicalDeviceClass model	62
9.1	GenLogicalDeviceClass definition	62
9.2	GenLogicalDeviceClass services	63
10	GenLogicalNodeClass model	63
10.1	GenLogicalNodeClass definition	63
10.1.1	GenLogicalNodeClass diagram	63
10.1.2	GenLogicalNodeClass attributes	64
10.2	GenLogicalNodeClass services	65
10.2.1	Overview	65
10.2.2	GetLogicalNodeDirectory	66
10.2.3	GetAllDataValues	66
11	Generic data object class model	67
11.1	GenDataObjectClass diagram	67
11.2	GenDataObjectClass syntax	68
11.3	GenDataObjectClass services	69
11.3.1	General definitions and overview	69
11.3.2	GetDataValues	70
11.3.3	SetDataValues	71
11.3.4	GetDataDirectory	71
11.3.5	GetDataDefinition	72
12	Generic common data class model	73
12.1	General	73
12.2	GenCommonDataClass	73
12.2.1	GenCommonDataClass diagram	73
12.2.2	GenCommonDataClass syntax	73
12.3	GenDataAttributeClass	74
12.3.1	GenDataAttributeClass diagram	74
12.3.2	GenDataAttributeClass syntax	75
12.3.3	Details of some GenDataAttributeClass attributes	76
12.4	GenConstructedAttributeClass	77
12.4.1	GenConstructedAttributeClass diagram	77
12.4.2	GenConstructedAttributeClass syntax	78
12.5	GenSubDataAttributeClass	78
12.5.1	SubDataAttributeClass diagram	78
12.5.2	SubDataAttributeClass syntax	78
12.6	Referencing data objects and their components	78
12.6.1	General	78
12.6.2	Reference syntax	79
12.6.3	Base types and their relation	79
12.6.4	Example of using references	80
13	DATA-SET class model	81
13.1	General	81
13.2	DATA-SET class definition	82
13.2.1	DATA-SET class syntax	82
13.2.2	DATA-SET class attributes	83
13.3	DATA-SET class services	84

13.3.1	Overview	84
13.3.2	GetDataSetValues	84
13.3.3	SetDataSetValues	84
13.3.4	CreateDataSet.....	85
13.3.5	DeleteDataSet	86
13.3.6	GetDataSetDirectory.....	86
14	Service tracking.....	86
14.1	General service tracking	86
14.2	Control block service tracking	87
14.3	Control service tracking	88
15	Modelling of control block classes	89
15.1	General.....	89
15.2	Control block class models	89
16	SETTING-GROUP-CONTROL-BLOCK class model	89
16.1	General.....	89
16.2	SGCB class definition	91
16.3	SGCB class services.....	92
16.3.1	Overview	92
16.3.2	SelectActiveSG.....	92
16.3.3	SelectEditSG	93
16.3.4	SetEditSGValue.....	94
16.3.5	ConfirmEditSGValues	94
16.3.6	GetEditSGValue	95
16.3.7	GetSGCBValues.....	96
17	REPORT-CONTROL-BLOCK and LOG-CONTROL-BLOCK class models	96
17.1	Overview	96
17.2	REPORT-CONTROL-BLOCK class model.....	98
17.2.1	Basic concepts	98
17.2.2	BUFFERED-REPORT-CONTROL-BLOCK (BRCB) class definition.....	98
17.2.3	BRCB class services	109
17.2.4	UNBUFFERED-REPORT-CONTROL-BLOCK (URCB) class definition.....	119
17.2.5	URCB class services	121
17.3	LOG-CONTROL-BLOCK class model.....	122
17.3.1	General	122
17.3.2	LCB class definition	123
17.3.3	LCB services	124
17.3.4	LOG class definition	126
17.3.5	Reason code for log entries	128
17.3.6	LOG services.....	128
18	Generic substation event class model (GSE).....	130
18.1	Overview	130
18.2	GOOSE-CONTROL-BLOCK (GoCB) class	131
18.2.1	GoCB definition	131
18.2.2	GOOSE service definitions	133
18.2.3	Generic object oriented substation event (GOOSE) message	135
19	Transmission of sampled value class model	136
19.1	Overview	136
19.2	Transmission of sampled values using multicast	138

19.2.1	General	138
19.2.2	MSVCB class definition	138
19.2.3	MSVCB class services	139
19.3	Transmission of sampled values using unicast	142
19.3.1	General	142
19.3.2	USVCB class definition	142
19.3.3	USVCB services	144
19.4	Sampled value format	146
20	CONTROL class model	148
20.1	General	148
20.2	Control with normal security	150
20.2.1	General	150
20.2.2	Direct control with normal security	151
20.2.3	SBO control with normal security	154
20.3	Control with enhanced security	157
20.3.1	General	157
20.3.2	Direct control with enhanced security	157
20.3.3	SBO control with enhanced security	159
20.4	Time-activated operate	163
20.5	CONTROL class service definitions	164
20.5.1	Overview	164
20.5.2	Service parameter definition	165
20.5.3	Service specification	165
21	Time and time-synchronization model	170
21.1	General	170
21.2	Information requirements	171
22	Naming conventions	172
22.1	Class naming and class specializations	172
22.2	Referencing an instance of a class	173
22.3	Scopes in IEC 61850	174
23	File transfer model	174
23.1	File class	174
23.2	File services	175
23.2.1	Overview	175
23.2.2	GetFile	175
23.2.3	SetFile	176
23.2.4	DeleteFile	176
23.2.5	GetFileAttributeValues	177
Annex A	(normative) ACSI conformance statement	178
A.1	General	178
A.2	ACSI basic conformance statement	178
A.3	ACSI models conformance statement	179
A.4	ACSI service conformance statement	182
Annex B	(normative) SCL enumerations	186
Annex C	(informative) Generic substation state event (GSSE) control block (GsCB)	187
C.1	General	187
C.2	GsCB class definition	187
C.3	Generic substation state event (GSSE) control block class attributes	188

C.3.1	GsCBName – GSSE control name	188
C.3.2	GsCBRef – GSSE control reference.....	188
C.3.3	GsEna – GSSE enable	188
C.3.4	GsID – GSSE identification.....	188
C.3.5	DataLabel [1..n].....	189
C.3.6	LSentData [1..n] – last sent data values.....	189
C.3.7	DstAddress.....	189
C.4	GSSE service definitions.....	189
C.4.1	Overview	189
C.4.2	SendGSSEMessage	189
Annex D (normative)	Clarification on usage of quality	196
D.1	Relation of the detailed quality identifiers with invalid or questionable quality	196
D.2	Quality in the client server context	196
D.3	Relation between quality identifiers.....	197
Annex E (normative)	Clarification on RCB reservation	199
E.1	General.....	199
E.2	Buffered Report Control Block.....	199
E.2.1	Instanciation of the buffered report control block from the SCL definition	199
E.2.2	Reservation of a BRCB.....	201
E.2.3	Un-reservation of a BRCB	203
E.2.4	End of association and BRCB reservation scheme.....	205
E.3	Unbuffered Report Control Block.....	208
E.3.1	Instanciation of the unbuffered report control block from the SCL definition	208
E.3.2	Reservation of a URCB.....	210
E.3.3	Un-reservation of a URCB	213
E.3.4	End of association and URCB reservation scheme	215
Annex F (normative)	Compatibility of the different revisions of the standard.....	218
F.1	General.....	218
F.2	List of the modifications to consider for backward / forward compatibility	218
F.3	Special compatibility rules.....	223
F.3.1	Leap second by server conformant to previous version of the standard	223
F.3.2	TimeAccuracy by server conformant to previous version of the standard	223
F.3.3	RCB reservation	223
Bibliography		225
Index		226
Figure 1	– Excerpt of conceptual model of IEC 61850	21
Figure 2	– Basic conceptual class model of the ACSI.....	22
Figure 3	– Conceptual service model of the ACSI	23
Figure 4	– Core of the conceptual meta model and relationship	25
Figure 5	– Data instance model (conceptual)	26
Figure 6	– P_Timestamp	38
Figure 7	– Time accuracy.....	39
Figure 8	– Overview about GetDirectory and GetDefinition services.....	56
Figure 9	– Normal operation	58
Figure 10	– Aborting association.....	58

Figure 11 – Principle of multicast application association.....	62
Figure 12 – Basic conceptual model of the GenLogicalNodeClass	64
Figure 13 – Basic conceptual class model of the GenDataObjectClass	68
Figure 14 – Excerpt of GenDataObjectClass services	70
Figure 15 – Class diagram of the GenCommonDataClass	73
Figure 16 – Conceptual Class diagram of the GenCommonDataClass.....	74
Figure 17 – Class diagram of the GenDataAttributeClass.....	75
Figure 18 – Relation of TrgOp and Reporting.....	77
Figure 19 – Class diagram of the GenConstructedAttributeClass	77
Figure 20 – Relation of types (example).....	80
Figure 21 – Example of a data object.....	81
Figure 22 – Dynamic creation of DataSet instances	82
Figure 23 – Control block service mapping.....	88
Figure 24 – Basic model of the settings model	90
Figure 25 – Basic building blocks for reporting and logging.....	97
Figure 26 – BRCB state machine	100
Figure 27 – General queue of entries for report handler	101
Figure 28 – Buffer time	103
Figure 29 – State Machine for Sequence Number Generation	104
Figure 30 – Logical state machine for general interrogation	106
Figure 31 – Report example on the use of sequence number	111
Figure 32 – Entry discard that does not cause indication of loss of information in enabled state	112
Figure 33 – Indication of loss of information due to resource constraints in enable state.....	113
Figure 34 – DataSet members and reporting.....	114
Figure 35 – Report example.....	115
Figure 36 – Log model overview	123
Figure 37 – GoCB model.....	131
Figure 38 – Model for transmission of sampled values	137
Figure 39 – Principle of the control model	148
Figure 40 – State machine of direct control with normal security	153
Figure 41 – Direct control with normal security.....	154
Figure 42 – State machine of SBO control with normal security	156
Figure 43 – State machine of direct control with enhanced security	159
Figure 44 – State machine SBO control with enhanced security	161
Figure 45 – Select before operate with enhanced security – positive case	162
Figure 46 – Select before operate with enhanced security – negative case (no status change)	162
Figure 47 – Time-activated operate.....	164
Figure 48 – Time model and time synchronization (principle)	171
Figure 49 – Specializations	172
Figure 50 – Object names and object reference	174
Figure C.1 – GsCB model	187
Figure D.1 – Quality identifiers in a single client-server relationship.....	196

Figure D.2 – Quality identifiers in a multiple client-server relationship.....	197
Figure D.3 – Interaction of substitution and validity (CL=client, Se=server) when used in a proxy model environment	198
Figure E.1 – BRCB instantiation from SCL and reservation scheme	201
Figure E.2 – BRCB reservation scheme	203
Figure E.3 – BRCB un-reservation scheme	205
Figure E.4 – BRCB reservation and end of association	207
Figure E.5 – URCB instantiation from SCL and reservation scheme	210
Figure E.6 – URCB reservation scheme	212
Figure E.7 – URCB un-reservation scheme	215
Figure E.8 – URCB reservation and end of association	217
Table 1 – Example of class instantiation	22
Table 2 – ACSI model classes with related services.....	24
Table 3 – Conditions for presence of elements within a context	27
Table 4 – Functional constraints (FcKind)	29
Table 5 – Trigger options	32
Table 6 – Type definition overview	33
Table 7 – Use of IEC 61850-6 bType	34
Table 8 – Attributes of P_Timestamp	39
Table 9 – Attributes of TimeQuality	40
Table 10 – Attributes of P_Quality.....	42
Table 11 – Attributes of DetailQual	43
Table 12 – Attributes of P_TriggerConditions	44
Table 13 – Attributes of P_RCBReportOptions	45
Table 14 – Attributes of P_LCBLogEntryOptions	45
Table 15 – Attributes of P_SVMessageOptions	46
Table 16 – Attributes of P_CheckConditions	46
Table 17 – Attributes of S_Originator	46
Table 18 – Literals of ServiceNameKind	47
Table 19 – Literals of ServiceStatusKind.....	49
Table 20 – Literals of OriginatorCategoryKind.....	49
Table 21 – Literals of ControlServiceStatusKind	50
Table 22 – Literals of SamplingModeKind	51
Table 23 – Literals of StepControlKind	52
Table 24 – Literals of DpStatusKind	52
Table 25 – Literals of SourceKind	52
Table 26 – Literals of ValidityKind.....	53
Table 27 – Attributes of ReasonForInclusionInReport	54
Table 28 – Attributes of ReasonForInclusionInLog	54
Table 29 – Literals of ACSIClassKind	55
Table 30 – GenServerClass definition	55
Table 31 – GetServerDirectory service parameters	57

Table 32 – TWO-PARTY-APPLICATION-ASSOCIATION (TPAA) class definition	59
Table 33 – Two-party-application-association services.....	59
Table 34 – Associate service parameters	60
Table 35 – Abort service parameters	61
Table 36 – Release service parameters	61
Table 37 – MULTICAST-APPLICATION-ASSOCIATION (MCAA) class definition	62
Table 38 – GenLogicalDeviceClass (GenLD) class definition	63
Table 39 – GetLogicalDeviceDirectory service parameters.....	63
Table 40 – GenLogicalNodeClass definition.....	65
Table 41 – GenLogicalNodeClass services	66
Table 42 – GetLogicalNodeDirectory service parameters	66
Table 43 – GetAllDataValues service parameters	67
Table 44 – GenDataObjectClass definition.....	69
Table 45 – GenDataObjectClass services	69
Table 46 – GetDataValues service parameters	70
Table 47 – SetDataValue service parameters	71
Table 48 – GetDataDirectory service parameters	72
Table 49 – GetDataDefinition service parameters	72
Table 50 – GenCommonDataClass definition	74
Table 51 – GenDataAttributeClass definition.....	75
Table 52 – GenConstructedAttributeClass definition	78
Table 53 – GenSubDataAttributeClass definition.....	78
Table 54 – DATA-SET (DS) class definition	83
Table 55 – DATA-SET services.....	84
Table 56 – GetDataSetValues service parameters	84
Table 57 – SetDataSetValues service parameters.....	85
Table 58 – CreateDataSet service parameters	85
Table 59 – DeleteDataSet service parameters	86
Table 60 – GetDataSetDirectory service parameters.....	86
Table 61 – CB class definition.....	89
Table 62 – SGCB class definition.....	91
Table 63 – SGCB services	92
Table 64 – SelectActiveSG service parameters.....	93
Table 65 – SelectEditSG service parameters	94
Table 66 – SetEditSGValue service parameters	94
Table 67 – ConfirmEditSGValues service parameters	95
Table 68 – GetEditSGValue service parameters	95
Table 69 – GetSGCBValues service parameters	96
Table 70 – BRCB class definition	99
Table 71 – BRCB services	109
Table 72 – Report service parameters	109
Table 73 – Report segment format specification.....	110
Table 74 – GetBRCBValues service parameters	118

Table 75 – SetBRCBValues service parameters.....	119
Table 76 – URCB class definition.....	119
Table 77 – URCB services	121
Table 78 – LCB class definition.....	124
Table 79 – LCB services	124
Table 80 – GetLCBValues service parameters	125
Table 81 – SetLCBValues service parameters	126
Table 82 – LOG class definition	126
Table 83 – LOG services	128
Table 84 – QueryLogByTime service parameters	128
Table 85 – QueryLogAfter service parameters	129
Table 86 – GetLogStatusValues service parameters	129
Table 87 – GOOSE control block class definition	132
Table 88 – GoCB services	133
Table 89 – SendGOOSEMessage service parameters	133
Table 90 – GetGoReference service parameters.....	134
Table 91 – GetGOOSEElementNumber service parameters	134
Table 92 – GetGoCBValues service parameters	135
Table 93 – SetGoCBValues service parameters.....	135
Table 94 – GOOSE message definition	136
Table 95 – MSVCB class definition	138
Table 96 – MSVCB services	139
Table 97 – SendMSVMessage service parameters.....	140
Table 98 – GetMSVCBValues service parameters.....	140
Table 99 – SetMSVCBValues service parameters	141
Table 100 – GetMsvReference service parameters	141
Table 101 – GetMSVElementNumber service parameters	142
Table 102 – USVCB class definition.....	143
Table 103 – USVCB services	144
Table 104 – SendUSVMessage service parameters	144
Table 105 – GetUSVCBValues service parameters	145
Table 106 – SetUSVCBValues service parameters	145
Table 107 – Sampled value (SV) format definition.....	147
Table 108 – Generic behavior and negative responses	149
Table 109 – Control services	164
Table 110 – Control service parameters.....	165
Table 111 – FILE class definition	175
Table 112 – File services	175
Table 113 – GetFile service parameters.....	176
Table 114 – SetFile service parameters	176
Table 115 – DeleteFile service parameters	176
Table 116 – GetFileAttributeValues service parameters	177
Table A.1 – Basic conformance statement	179

Table A.2 – ACSI models conformance statement.....	180
Table A.3 – ACSI service conformance statement.....	182
Table C.1 – GSSE control block class definition.....	188
Table C.2 – GsCB Services	189
Table C.3 – SendGSSEMessage parameter table	190
Table C.4 – GetGsReference parameter table.....	190
Table C.5 – GetGSSEDataOffset parameter table	191
Table C.6 – GetGsCBValues parameter table	192
Table C.7 – SetGsCBValues parameter table.....	193
Table C.8 – GSSE message definition	194
Table D.1 – Relation of the detailed quality identifiers with invalid or questionable quality.....	196

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 7-2: Basic information and communication structure – Abstract communication service interface (ACSI)

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61850-7-2 edition 2.1 contains the second edition (2010-08) [documents 57/1065/FDIS and 57/1083/RVD] and its amendment 1 (2020-02) [documents 57/2100/FDIS and 57/2131/RVD].

International Standard IEC 61850-7-2 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

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

- a) class diagrams have been updated;
- b) data types have been gathered in one document and harmonized with IEC 61850-6:2007B;
- c) errors and typos have been corrected;
- d) CDCs for service tracking have been moved to IEC 61850-7-3:2007B to gather all CDCs in one document;
- e) several terms have been harmonized with those in the other parts;
- f) definition and explanation of values for each attribute were moved into the class definition tables;
- g) definition and explanation of values for each service parameter were move to service parameter definition tables;
- h) harmonization of the namingscheme for Enumeration and CodedEnum types to <EnumTitle>Kind resp. <CodedEnumTitle>Kind – fully backward compatible as the value of the literal have not changed;
- i) deprecation of the USVCB model.

Compared to the second edition, this first amendment of the second edition:

- provides clarifications and corrections to the second edition of IEC 61850-7-2, based on the tissues = { 728, 730, 778, 780, 783, 786, 813, 820, 850, 852, 858, 860, 861, 869, 875, 876, 943, 970, 1038, 1050, 1061, 1062, 1071, 1091, 1092, 1116, 1122, 1127, 1145, 1154, 1194, 1202, 1232, 1242, 1252, 1276, 1283, 1307, 1308, 1319, 1338, 1341, 1356, 1377, 1386, 1428, 1432, 1433, 1435, 1439, 1455, 1569, 1589, 1622, 1630, 1650, 1652 }.

Content in some parts of Clause 6, some UML diagrams, as well as Annex B are automatically generated from the UML model.

Contrary to usual IEC practice, for ease of use in this case, all tables and figures (including those which have been added since Edition 2) have been numbered consecutively in the amendment and the consolidated version.

This IEC standard includes Code Components i.e. components that are intended to be directly processed by a computer. Such content is any text found between the markers <CODE BEGINS> and <CODE ENDS>, or otherwise is clearly labeled in this standard as a Code Component.

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

In this document, the following print types are used:

- **bold** is used to highlight defined terms,
- **Tahoma bold** is used where the difference between a capital i (I) and a small L (l) is important to see.
- Table numbering with additional characters 'N' (e.g. Table 16N) are tables following the Ed 2.1 numbering.

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 the base publication and its amendment 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

- reconfirmed,
- withdrawn,
- 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.

INTRODUCTION

This document is part of a set of definitions which details a layered utility communication architecture. This architecture has been chosen to provide abstract definitions of classes and services such that the definitions are independent of specific protocol stacks, implementations, and operating systems.

The IEC 61850 series is intended to provide interoperability between a variety of devices. Communication between these devices is achieved by the definition of a hierarchical class model (for example, logical device, logical node, data, data set, report control, or log) and services provided by these classes (for example, get, set, report, define, delete) in IEC 61850-7-x.

This document defines the abstract communication service interface (ACSI) for use in the utility application domain, which requires real-time cooperation of intelligent electronic devices. The ACSI has been defined so as to be independent of the underlying communication systems. Specific communication service mappings¹ (SCSM) are specified in IEC 61850-8-x and IEC 61850-9-x.

This document defines the abstract communication service interface in terms of

- a hierarchical class model of all information that can be accessed via a communication network,
- services that operate on these classes, and
- parameters associated with each service.

The ACSI description technique abstracts away from all the different approaches to implement the cooperation of the various devices.

This document does not provide comprehensive tutorial material. It is recommended that IEC 61850-5 and IEC 61850-7-1 be read first in conjunction with IEC 61850-7-2 and IEC 61850-7-3.

NOTE 1 Refer to International Electrotechnical Vocabulary, IEC 60050, for general glossary definitions.

NOTE 2 Abstraction in ACSI has two meanings. First, only those aspects of a real device (for example, a breaker) or a real function that are visible and accessible over a communication network are modelled. This abstraction leads to the hierarchical class models and their behaviour defined in IEC 61850-7-2, IEC 61850-7-3, and IEC 61850-7-4. Second, the ACSI abstracts from the aspect of concrete definitions on how the devices exchange information; only a conceptual cooperation is defined. The concrete information exchange is defined in the SCSMs.

NOTE 3 Examples use names of classes (for example XCBR for a class of a logical node) defined in IEC 61850-7-4 and IEC 61850-7-3. The normative names are defined in IEC 61850-7-4 and IEC 61850-7-3 only.

¹ The ACSI is independent of the specific mapping. Mappings to standard application layers or middle ware technologies are possible.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 7-2: Basic information and communication structure – Abstract communication service interface (ACSI)

1 Scope

1.1 General

This document applies to the ACSI communication for utility automation. The ACSI provides the following abstract communication service interfaces.

- a) Abstract interface describing communications between a client and a remote server for
 - real-time data access and retrieval,
 - device control,
 - event reporting and logging,
 - setting group control,
 - self-description of devices (device data dictionary),
 - data typing and discovery of data types, and
 - file transfer.
- b) Abstract interface for fast and reliable system-wide event distribution between an application in one device and many remote applications in different devices (publisher/subscriber) and for transmission of sampled measured values (publisher/subscriber).

1.2 Namespace name and version

This new clause is mandatory for any IEC 61850 namespace (as defined by the part 7-1 of IEC 61850 Edition 2).

The parameters which identify this new release of this namespace are:

- Namespace version: 2007
- Namespace revision: B
- Namespace name: “IEC 61850-7-2:2007B”
- Namespace release: 3
- Namespace release date: 2019-10-02

The table below provides an overview of all published versions of this namespace.

Edition	Publication date	Webstore	Namespace
Edition 1.0	2003-05	IEC 61850-7-2:2003	IEC 61850-7-2:2003
Edition 2.0	2010-10	IEC 61850-7-2:2010	IEC 61850-7-2:2007
Amendment 1 of Edition 2.0	2020-02	IEC 61850-7-2:2010/AMD1:2020	IEC 61850-7-2:2007B
Edition 2.1	2020-02	IEC 61850-7-2:2010+AMD1:2020 CSV	IEC 61850-7-2:2007B

1.3 Code Component distribution

The Code Component will be available in light and full version:

- Full version will contain definition of the whole Basic Types defined in this standard with the documentation associated and access will be restricted to purchaser of this part
- Light version will not contain the documentation but will contain the whole definition of the Basic Types as per full version, and this light version will be freely accessible on the IEC website for download, but the usage remains under the licensing conditions.

The link for downloading the light version of this code component is:

http://www.iec.ch/public/TC57/supportdocuments/IEC_61850-7-2.NSD.2007B3.light.zip

The Code Components for IEC 61850 data models (like basic types, presence conditions, ... definition in this IEC standard) are available as the file format NSD defined by standard IEC 61850-7-7.

The Code Component(s) included in this IEC standard are potentially subject to maintenance works and user shall select the latest release in the repository located at:

<http://www.iec.ch/TC57/supportdocuments>

The latest version/release of the document will be found by selecting the file IEC_61850-7-2.NSD.{VersionStateInfo}.light.zip with the filed VersionStateInfo of the highest value.

Each Code Component is a ZIP package containing the electronic representation of the Code Component itself, with a file describing the content of the package (IECManifest.xml).

The IECManifest contains different sections giving information on:

- The copyright notice
- The identification of the code component
- The publication related to the code component
- The list of the electronic files which compose the code component
- An optional list of history files to track changes during the evolution process of the code component

The life cycle of a code component is not restricted to the life cycle of the related publication. The publication life cycle goes through two stages, Version (corresponding to an edition) and Revision (corresponding to an amendment). A third publication stage (Release) allows publication of Code Component without need to publish an amendment.

This is useful when InterOp Tissues need to be fixed. Then a new release of the Code Component will be released, which supersedes the previous release, and distributed through the IEC TC57 web site.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC TS 61850-2, *Communication networks and systems for power utility automation - Part 2: Glossary*

IEC 61850-5, *Communication networks and systems for power utility automation - Part 5: Communication requirements for functions and device models*

IEC 61850-6, *Communication networks and systems for power utility automation - Part 6: Configuration description language for communication in electrical substations related to IEDs*

IEC 61850-7-1:2020, *Communication networks and systems for power utility automation - Part 7-1: Basic communication structure - Principles and models*

IEC 61850-7-3:2020, *Communication networks and systems for power utility automation - Part 7-3: Basic communication structure - Common data classes*

IEC 61850-7-4:2020, *Communication networks and systems for power utility automation - Part 7-4: Basic communication structure - Compatible logical node classes and data object classes*

ISO 4217, *Codes for the representation of currencies and funds*

IEEE 754, *Standard for Floating-Point Arithmetic*