SVENSK STANDARD SS-EN IEC 61850-8-2

Fastställd	Utgåva	Sida	Ansvarig kommitté
2019-11-13	1	1 (1+257)	SEK TK 57

Kommunikationsnät och system för kraftföretagsautomation – Del 8-2: Specifik mappning av kommunikationstjänster (SCSM) – Mappning till XMPP

Communication networks and systems for power utility automation – Part 8-2: Specific communication service mapping (SCSM) – Mapping to Extensible Messaging Presence Protocol (XMPP)

Som svensk standard gäller europastandarden EN IEC 61850-8-2:2019. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 61850-8-2:2019.

Nationellt förord

Europastandarden EN IEC 61850-8-2:2019

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61850-8-2, First edition, 2018 - Communication networks and systems for power utility automation - Part 8-2: Specific communication service mapping (SCSM) - Mapping to Extensible Messaging Presence Protocol (XMPP)**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 33.200.00

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61850-8-2

March 2019

ICS 33.200

English Version

Communication networks and systems for power utility automation - Part 8-2: Specific Communication Service Mapping (SCSM) - Mapping to Extensible Messaging Presence Protocol (XMPP) (IEC 61850-8-2:2018)

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques - Partie 8-2: Mapping des services de communication spécifiques (SCSM) - Mapping avec le protocole XMPP (Extensible Messaging Presence Protocol) (IEC 61850-8-2:2018)

Kommunikationsnetze und -systeme für die Automatisierung der elektrischen Energieversorgung - Teil 8-2: Spezifische Abbildung von Kommunikationsdiensten (SCSM) - Abbildungen auf erweiterbares Messaging Presence Protocol (XMPP) (IEC 61850-8-2:2018)

This European Standard was approved by CENELEC on 2019-01-18. 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.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 61850-8-2:2019 E

European foreword

The text of document 57/2020/FDIS, future edition 1 of IEC 61850-8-2, 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 IEC 61850-8-2:2019.

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)	2019-10-18
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2022-01-18

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Endorsement notice

The text of the International Standard IEC 61850-8-2:2018 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 61850-7-1	NOTE	Harmonized as EN 61850-7-1
IEC 61850-7-410	NOTE	Harmonized as EN 61850-7-410
IEC 61850-7-420	NOTE	Harmonized as EN 61850-7-420

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61850	series	Communication networks and systems for power utility automation	EN 61850	series
IEC/TS 61850-2	-	Communication networks and systems in substations - Part 2: Glossary	-	-
IEC 61850-5	-	Communication networks and systems for power utility automation - 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 61850-7-1	-	Communication networks and systems for power utility automation - Part 7-1: Basic communication structure - Principles and models	EN 61850-7-1	-
IEC 61850-7-2	2010	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	2010
+ A1	2018		+A1	2018
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	2011	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	2011

+ A1	2018		-	-
IEC 62351	series	Power systems management and associated information exchange - Data and communications security	EN 62351	series
IEC 62351-4	2018	Power systems management and associated information exchange - Data and communications security - Part 4: Profiles including MMS and derivatives	EN IEC 62351-4	2018
IEC 62351-6	-	Power systems management and associated information exchange - Data and communications security - Part 6: Security for IEC 61850	-	-
IEC/TR 62357-200	-	Power systems management and associated information exchange - Part 200: Guidelines for migration from Internet Protocol version 4 (IPv4) to Internet Protocol version 6 (IPv6)	-	-
ISO/IEC 7498-1	1994	Information technology - Open Systems Interconnection - Basic reference model: The basic model	-	-
ISO/IEC 8824-1	2015	Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation	-	-
ISO/IEC 8825-4	2015	Information technology - ASN.1 encoding rules: XML Encoding Rules (XER)	-	-
ISO 9506	series	Industrial automation systems - Manufacturing Message Specification	-	series
ISO 9506-1	2003	Industrial automation systems - Manufacturing Message Specification - Part 1: Service definition	-	-
ISO 9506-2	2003	Industrial automation systems - Manufacturing Message Specification - Part 2: Protocol specification	-	-
IEEE C37.111	1999	IEEE Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems	-	-
IEEE 754	1985	IEEE Standard for Binary Floating-Point Arithmetic	-	-
RFC 768	-	User datagram protocol, IETF, available at http://www.ietf.org	-	-
RFC 791	-	Internet Protocol - DARPA Internet Program Protocol Specification	-	-
RFC 792	-	Internet control message protocol - DARPA internet program - Protocol specification, IETF, available at http://www.ietf.org	-	-
RFC 793	-	Transmission Control Protocol - DARPA Internet Program Protocol Specification	-	-
RFC 826	-	An Ethernet address resolution protocol or converting network protocol addresses to 48.bit Ethernet address for transmission on Ethernet hardware, IETF, available at http://www.ietf.org	-	-
RFC 919	-	Broadcasting internet datagrams, IETF, available at http://www.ietf.org	-	-
RFC 922	-	Broadcasting internet datagrams in the presence of subnets, IETF, available at http://www.ietf.org	-	-

RFC 950	-	Internet standard subnetting procedure, IETF, available at http://www.ietf.org	-	-
RFC 1112	-	Host extensions for IP multicasting, IETF, available at http://www.ietf.org	-	-
RFC 2460	-	Internet Protocol, Version 6 (IPv6) Specification	-	-
RFC 3629	-	UTF-8, User Datagram Protocol	-	-
RFC 4422		Simple authentication and security layer (SASL), available at http://www.ietf.org	-	-
RFC 5246	2008	The Transport Layer Security (TLS) Protocol Version 1.2	-	-
RFC 5905	-	Network Time Protocol Version 4: Protocol and Algorithms Specification	-	-
RFC 6120	-	Extensible messaging and presence protocol (XMPP): Core, available at http://www.ietf.org	-	-
RFC 6121	-	Extensible messaging and presence protocol (XMPP): Instant messaging and presence, available at http://www.ietf.org	-	-
RFC 6122	-	Extensible messaging and presence protocol (XMPP): Address format, available at http://www.ietf.org	-	-
XEP-0198	-	Stream management	-	-

NOTE This specification defines an XMPP protocol extension for active management of an XML stream between two XMPP entities, including features for stanza acknowledgements and stream resumption.

XEP-0199	-	XMPP Ping

NOTE This specification defines an XMPP protocol extension for sending application-level pings over XML streams. Such pings can be sent from a client to a server, from one server to another, or end-to-end.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 8-2: Specific Communication Service Mapping (SCSM) – Mapping to Extensible Messaging Presence Protocol (XMPP)

FOREWORD

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International Standard IEC 61850-8-2 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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

FDIS	Report on voting
57/2020/FDIS	57/2039/RVD

Full information on the voting for the approval of this International Standard 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.

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A list of all parts in the IEC 61850 series, published 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 document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document 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 part of IEC 61850 is part of a set of specifications which details layered utility communication architecture.

The usage of the IEC 61850 communication standard is largely spreading over all the domains connected to the smart grid, pushing the usage of technologies adapted to the connection of a very large number of applications and devices across the intra/inter-net. The involved domains use already well established protocols typically for exchanging data with IT level applications like resource planning, asset and maintenance management, etc. Therefore, it becomes imperative to provide an integration strategy that allows the integration of IEC 61850 into these various disparate protocols and information.

In this context, this part of IEC 61850 describes a specific communication service mapping (SCSM) over the Extensible Messaging and Presence Protocol (XMPP), providing detailed information on how to create and exchange concrete communication messages that implement abstract services and models specified in IEC 61850-7-4, IEC 61850-7-3, and IEC 61850-7-2.

This mapping is intended to be utilized between all kinds of utility Distributed Energy Resource devices and their related management systems, in particular over public networks.

NOTE This part of IEC 61850 does not provide tutorial material. For this purpose, IEC 61850-5 and IEC 61850-7-1 can be read in conjunction with IEC 61850-7-2.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 8-2: Specific Communication Service Mapping (SCSM) – Mapping to Extensible Messaging Presence Protocol (XMPP)

1 Scope

1.1 General

This part of IEC 61850 specifies a method of exchanging data through any kinds of network, including public networks. Among the various kinds of services specified in IEC 61850-7-2, only the client/server and time synchronization services are considered so far.

NOTE Client/server services of GOOSE and SMV models are mapped as well (see Table 1).

For the client/server services, the principle is to map the objects and services of the ACSI (Abstract Communication Service Interface defined in IEC 61850-7-2) to XML messages transported over XMPP. The mapping description includes mainly three aspects:

- The usage of the XMPP protocol itself, describing in details which features are really used and how they are used by the mapping (see Clause 6).
- How to achieve end-to-end secured communications (see Clause 7).
- The description of the XML payloads corresponding to each ACSI service thanks in particular to the XML Schema and XML message examples (starting at Clause 9).

NOTE 1 This document does not address the detailed usage of the XMPP protocol.

NOTE 2 This document does not address system management services.

NOTE 3 For the information of people familiar with the mapping defined in IEC 61850-8-1, the XML messages defined in the present document are derived from those defined in IEC 61850-8-1 but with an XML encoding instead of a binary one. In this way implementing gateways between IEC 61850-8-1 and IEC 61850-8-2 is very straightforward in both directions. However reading IEC 61850-8-1 is not necessary to understand the present document except when it is used in conjunction with one of the GOOSE mappings described in IEC 61850-8-1.

1.2 Namespace name and version

This new section is mandatory for any IEC 61850 namespace (as defined by IEC 61850-7-1).

The parameters which identify this release of the SCSM_8_2 namespace xmlns="http://www.iec.ch/61850/2018/SCSM_8_2" are:

- Namespace Version: 2018
- Namespace Revision: A
- Namespace Release: 1
- Namespace release date: 2018-12

Edition	Publication date	Webstore	Namespace
Edition 1.0	2018-12	IEC 61850-8-2:2018	IEC 61850-8-2:2018

1.3 Code Component distribution

The Code Components included in this IEC standard are also available as electronic machine readable file at:

http://www.iec.ch/tc57/supportdocuments/IEC_61850-8-2.2018_ed1.0.XSD.2018A1.full.zip

The Code Component(s) included in this IEC standard are potentially subject to maintenance works and users shall select the latest release in the repository located at: https://www.iec.ch/tc57/supportdocuments.

The latest version/release of the document will be found by selecting the file IEC 61850-8-2.2018_ed1.0.XSD.{VersionStateInfo}.full.zip with the filed VersionStateInfo of the highest value.

In case of any differences between the downloadable code mentioned above and the IEC pdf published content, the downloadable code(s) is(are) the valid one; it may be subject to updates. See history files.

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 61850 (all parts), *Communication networks and systems for power utility automation*

IEC TS 61850-2, *Communication networks and systems in substations – 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, *Communication networks and systems for power utility automation – Part 7-1: Basic communication structure – Principles and models*

IEC 61850-7-2:2010, *Communication networks and systems for power utility automation – Part 7-2: Basic information and communication structure – Abstract communication service interface (ACSI)*
IEC 61850-7-2:2010/AMD1:2018

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

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*

IEC 61850-8-1:2011*, 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*
IEC 61850-8-1:2011/AMD1:2018

IEC 62351 (all parts), *Power systems management and associated information exchange – Data and communications security*

IEC 62351-4:2018*, Power systems management and associated information exchange – Data and communications security – Part 4: Profiles including MMS and derivatives*[1]

IEC 62351-6, *Power systems management and associated information exchange – Data and communications security – Part 6: Security for IEC 61850*[2]

IEC TR 62357-200, *Power systems management and associated information exchange – Part 200: Guidelines for migration from Internet Protocol version 4 (IPv4) to Internet Protocol version 6 (IPv6)*

ISO/IEC 7498-1:1994, *Information technology – Open systems interconnection – Basic reference model: The basic model*

ISO/IEC 8824-1:2015 [ITU-T X.680:2015], *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*

ISO/IEC 8825-4:2015 [ITU-T X.693:2015], *Information technology – ASN.1 encoding rules: XML Encoding Rules (XER)*

ISO 9506 (all parts), *Industrial automation systems – Manufacturing message specification*

ISO 9506-1:2003, *Industrial automation systems – Manufacturing message specification – Part 1: Service definition*

ISO 9506-2:2003, *Industrial automation systems – Manufacturing message specification – Part 2: Protocol specification*

IEEE C37.111:1999, *IEEE standard common format for transient data exchange (COMTRADE) for power systems*

IEEE 754:1985, *IEEE Standard for binary floating-point arithmetic*

RFC 768, *User datagram protocol, IETF*, available at *http://www.ietf.org*

RFC 791, *Internet protocol – DARPA Internet Program – Protocol specification, IETF,* available at http://www.ietf.org

RFC 792, *Internet control message protocol – DARPA internet program – Protocol specification, IETF*, available at http://www.ietf.org

RFC 793, *Transmission control protocol – DARPA internet program – Protocol specification, IETF*, available at http://www.ietf.org

RFC 826, *An Ethernet address resolution protocol or converting network protocol addresses to 48.bit Ethernet address for transmission on Ethernet hardware, IETF*, available at http://www.ietf.org

RFC 919, *Broadcasting internet datagrams*, IETF, available at http://www.ietf.org

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[1] Under preparation. Stage at the time of publication: IEC/DECFDIS 62351-4:2018.

[2] At the time of publication, a new edition was under preparation.

RFC 922*, Broadcasting internet datagrams in the presence of subnets*, IETF, available at http://www.ietf.org

RFC 950, *Internet standard subnetting procedure*, IETF, available at http://www.ietf.org

RFC 1112, *Host extensions for IP multicasting*, IETF, available at http://www.ietf.org

RFC 2460, *Internet protocol, Version 6 (IPv6) specification, IETF*, available at http://www.ietf.org

RFC 3629, *UTF-8, a transformation format of ISO 1646 – IETF*, available at http://www.ietf.org

RFC 4422, *Simple authentication and security layer (SASL)*, available at http://www.ietf.org

RFC 5246:2008, *The TLS protocol version 1.2*, available at http://www.ietf.org

RFC 5905, *Network time protocol (NTP) Version 4: Protocol and algorithms specification, IETF*, available at http://www.ietf.org

RFC 6120, *Extensible messaging and presence protocol (XMPP): Core*, available at http://www.ietf.org

RFC 6121, *Extensible messaging and presence protocol (XMPP): Instant messaging and presence*, available at http://www.ietf.org

RFC 6122, *Extensible messaging and presence protocol (XMPP): Address format*, available at http://www.ietf.org

XEP-0198, *Stream management*

NOTE This specification defines an XMPP protocol extension for active management of an XML stream between two XMPP entities, including features for stanza acknowledgements and stream resumption.

XEP-0199, *XMPP Ping*

NOTE This specification defines an XMPP protocol extension for sending application-level pings over XML streams. Such pings can be sent from a client to a server, from one server to another, or end-to-end.