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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS IN SUBSTATIONS –

Part 8-1: Specific Communication Service Mapping (SCSM) –
Mappings to MMS (ISO 9506-1 and ISO 9506-2)
and to ISO/IEC 8802-3

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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International Standard IEC 61850-8-1 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:

<table>
<thead>
<tr>
<th>FDIS</th>
<th>Report on voting</th>
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<tbody>
<tr>
<td>57/692/FDIS</td>
<td>57/712/RVD</td>
</tr>
</tbody>
</table>

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 publication 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 in substations*:

- **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 for substation and feeder equipment – Principles and models
- **Part 7-2**: Basic communication structure for substation and feeder equipment – Abstract communication service interface (ACSI)
- **Part 7-3**: Basic communication structure for substation and feeder equipment – Common data classes
- **Part 7-4**: Basic communication structure for substation and feeder equipment – Compatible logical node classes and data classes
- **Part 8-1**: Specific Communication Service Mapping (SCSM) – Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3
- **Part 9-1**: Specific Communication Service Mapping (SCSM) – Sampled values over serial unidirectional multidrop point to point link
- **Part 9-2**: Specific Communication Service Mapping (SCSM) – Sampled values over ISO/IEC 8802-3
- **Part 10**: Conformance testing

This document specifies in Annex E specialized CDCs (Common Data Classes) based on CDCs defined in IEC 61850-7-3:2003.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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

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1 Under consideration.
INTRODUCTION

This document is part of a set of specifications which details layered substation communication architecture.

This part of IEC 61850 is intended to provide inter-device operation of a variety of substation and feeder devices to achieve interoperability 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.

The mapping allows for data exchange over ISO/IEC 8802-3 Local Area Networks between all kinds of substation devices. Some of the protocol stacks used within this document are routable. Therefore the actual communications path may not be restricted to the LAN. Data exchange consists of real-time monitoring and control data, including measured values, to name just a few.

NOTE This part of IEC 61850 does not provide tutorial material. It is recommended that IEC 61850-5 and IEC 61850-7-1 be read in conjunction with IEC 61850-7-2.
1 Scope

This part of IEC 61850 specifies a method of exchanging time-critical and non-time-critical data through local-area networks by mapping ACSI to MMS and ISO/IEC 8802-3 frames.

MMS services and protocol are specified to operate over full OSI and TCP compliant communications profiles. The use of MMS allows provisions for supporting both centralized and distributed architectures. This standard includes the exchange of real-time data indications, control operations, report notification.

This part of IEC 61850 specifies the mapping of the objects and services of the ACSI (Abstract Communication Service Interface, IEC 61850-7-2) to MMS (Manufacturing Message Specification, ISO 9506) and ISO/IEC 8802-3 frames.

This standard also specifies the mapping of time-critical information exchanges to non-MMS protocol. The protocol semantics are defined in IEC 61850-7-2. This standard contains the protocol syntax, definition, mapping to ISO/IEC 8802-3 frame formats, and any relevant procedures specific to the use of ISO/IEC 8802-3.

This mapping of ACSI to MMS defines how the concepts, objects, and services of the ACSI are to be implemented using MMS concepts, objects, and services. This mapping allows interoperability across functions implemented by different manufacturers.

This part of the standard defines a standardized method of using the ISO 9506 services to implement the exchange of data. For those ACSI services, defined in IEC 61850-7-2 that are not mapped to MMS, this part defines additional protocols. This standard describes real substation devices with respect to their external visible data and behaviour using an object oriented approach. The objects are abstract in nature and may be used to a wide variety of applications. The use of this mapping goes far beyond the application in the substation communications.

This part of IEC 61850 provides mappings for the services and objects specified within IEC 61850-7-2, IEC 61850-7-3, and IEC 61850-7-4.

2 Normative references

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.

IEC 60874-10-1:1997, Connectors for optical fibres and cables – Part 10-1: Detail specification for fibre optic connector type BFOC/2,5 terminated to multimode fibre type A1

IEC 60874-10-2:1997, Connectors for optical fibres and cables – Part 10-2: Detail specification for fibre optic connector type BFOC/2,5 terminated to single-mode fibre type B1
IEC 60874-10-3:1997, Connectors for optical fibres and cables – Part 10-3: Detail specification for fibre optic connector type BFOC/2,5 for single and multimode fibre

IEC 61850-2, Communication networks and systems in substations – Part 2: Glossary

IEC 61850-5, Communication networks and systems in substations – Part 5: Communication requirements for functions and device models

IEC 61850-7-1, Communication networks and systems in substations – Part 7-1: Basic communication structure for substation and feeder equipment – Part 7-1: Principles and models

IEC 61850-7-2, Communication networks and systems in substations – Part 7-2: Basic communication structure for substation and feeder equipment – Abstract communication service interface (ACSI)

IEC 61850-7-3, Communication networks and systems in substations – Part 7-3: Basic communication structure for substation and feeder equipment – Common data classes

IEC 61850-7-4, Communication networks and systems in substations – Part 7-4: Basic communication structure for substation and feeder equipment – Compatible logical node classes and data classes

IEC 61850-9-1, Communication networks and systems in substations – Part 9-1: Specific Communication Service Mapping (SCSM) – Sampled values over serial unidirectional multidrop point to point link


ISO/IEC 8602:1995, Information technology – Protocol for providing the OSI connectionless-mode transport service


ISO/IEC 8802-3:2001, 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


  Amendment 1 (2000)
  Amendment 2 (2000)


ISO/IEC 8877:1992, Information technology – Telecommunications and information exchange between systems – Interface connector and contact assignments for ISDN Basic Access Interface located at reference points S and T

ISO/IEC 9542:1988, Information processing systems – Telecommunications and information exchange between systems – End system to Intermediate system routeing exchange protocol for use in conjunction with the Protocol for providing the connectionless-mode network service (ISO 8473)


  Amendment 1 (1998)


IEEE 754:1985, IEEE Standard for Binary Floating-Point Arithmetic

IEEE 802.1Q:1998, IEEE Standards for Local and Metropolitan Networks: Virtual Bridged Local Area Networks


RFC 1123, Requirements for Internet Hosts – Application and Support, IETF, available at <http://www.ietf.org>


3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61850-2 as well as the following apply.

3.1 (n)-layer any specific layer [ISO/IEC 7498-1, 3.1]

3.2 (n)-protocol data unit unit of data specified in an (n)-protocol and consisting of (n)-protocol-control-information and possibly (n)-user-data [ISO/IEC 7498-1, 5.6.1.3]

3.3 (n)-protocol set of rules and formats (semantic and syntactic) which determines the communication behavior of (N)-entities in the performance of (n)-functions [ISO/IEC 7498-1, 5.2.1.9]

3.4 class description of a set of objects that share the same attributes, services, relationships, and semantics [IEC 61850-7-2, 3.1]