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Technical Specification

Communication networks and systems for power utility automation

Part 7.7: Machine-processable format of IEC 61850-related data models for tools



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Energy Networks Australia
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(ii) The Scope states what the Technical Specification is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Technical Specification as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Technical Specification.

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(3) A Bibliography lists documents referenced in the Technical Specification but not as part of requirements.

Many Technical Specifications include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Technical Specification was prepared by the Standards Australia Committee EL-050, Power System Control and Communication.

The objective of this document is to specify a way to model the code components of IEC 61850 data model (e.g. the tables describing logical nodes, common data classes, structured data attributes, and enumerations) in an XML format that can be imported and interpreted by tools. The purpose of this document is limited to the publication of the XML format which should support the data model part of any IEC 61850 related standard.

This document is identical to, and has been reproduced from, IEC TS 61850-7-7:2018+AMD1:2023 CSV, *Communication networks and systems for power utility automation – Part 7-7: Machine-processable format of IEC 61850-related data models for tools*.

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Contents

Page

Preface ..... **v**
FOREWORD ..... **x**
INTRODUCTION ..... **xii**
1 Scope **1**
1.1 General 1
1.2 Namespace name and version 1
1.3 Code Component distribution 2
2 Normative references **3**
3 Terms and definitions **3**
4 Abbreviated terms **4**
5 Use cases **4**
5.1 Generation of SCL data type templates for system specification 4
5.1.1 Description of the use case 4
5.1.2 Technical details 6
5.1.3 Information exchanged 7
5.2 Generation of SCL data type templates for ICD files 7
5.2.1 Description of the use case 7
5.2.2 Technical details 9
5.2.3 Information exchanged 10
5.3 Validation of data model conformity 10
5.3.1 Description of the use case 10
5.3.2 Diagrams of use case 11
5.3.3 Technical details 12
5.4 Definition of private data model extensions by following the rules of the standard 13
5.4.1 Description of the use case 13
5.4.2 Diagrams of use case 14
5.4.3 Technical details 15
5.4.4 Information exchanged 16
5.5 Supporting the IEC 61850 data model change management 16
5.5.1 Description of the use case 16
5.5.2 Diagrams of use case 17
5.5.3 Technical details 19
5.5.4 Information exchanged 20
5.5.5 Common terms and definitions 20
6 Namespace file breakdown **21**
6.1 General 21
6.2 Namespace dependencies 21
6.3 Namespace types 22
6.3.1 General 22
6.3.2 Core namespace 22
6.3.3 Domain namespace 22
6.3.4 Technical report namespace 22
6.3.5 Private namespace 22
7 Overview of the format **23**
7.1 General 23
7.2 File types 23
7.2.1 NSD 23
7.2.2 SNSD 27
7.2.3 AppNS 28
7.2.4 NSDoc 28
7.3 NSD usage convention 29
7.3.1 General 29

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7.3.2 Element identification 29
7.3.3 Inheritance and extension 30
7.3.4 DataObject parameterization 30
7.3.5 CDC variants 31
7.4 Naming convention 32
7.4.1 File extension 32
7.4.2 File name 32
7.5 Example 33
7.5.1 General 33
7.5.2 NSD file example 33
7.5.3 SNSD file example 33
7.5.4 AppNS file example 33
7.5.5 NSDoc file example 33
8 File usage 34
8.1 General 34
8.2 System specification creation 34
8.3 Manufacturer IED creation 35
8.4 Creation of a non-standard name space 35
8.5 IED data model validation 35
8.6 Data model update management 35
Annex A Schema NSD.xsd 36
Schema IECCopyright.xsd 60
Amendment 1 62

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List of Figures

Page

Figure 1 – Generation of SCL data type templates for system specification diagrams 6
Figure 2 – Generation of SCL data type templates for ICD files diagrams 9
Figure 3 – Validation of data model conformity diagrams 12
Figure 4 – Definition of private data model extensions by following the rules of the standard diagrams 15
Figure 5 – Supporting the IEC 61850 data model change management 18
Figure 6 – Namespace dependencies 21
Figure 7 – Service Namespace usage 22
Figure 8 – Abstract LNClass hierarchy example 26
Figure 9 – Specification type creation example 34

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List of Tables

Page

Table 1 – Reference between published versions of the standard and related namespace name 62
Table 2 – Attributes of xsd namespace 62

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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

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Technical Specification IEC TS 61850-7-7 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
57/1925/DTS	57/1956/RVDTS

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

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

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.

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.

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

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

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

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.**

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INTRODUCTION

Year after year the IEC 61850 data models are extended both in depth with hundreds of new data items, and in width with tens of new parts.

In order to foster an active tool market with good quality, and at the end to improve IEC 61850 interoperability, a machine-processable file, describing data model related parts of the standard as input, is needed. This is the purpose of the new language Name Space Definition (NSD) defined by this part of IEC 61850.

This will avoid the need for any engineering tool related to the IEC 61850 data models to get the content of the standard manually entered, with a high risk of mistakes. This will also help to easily spread any corrections to the data model, as requested to reach interoperability. Tool vendors will be able to integrate NSD in their tools to distribute the standard data models directly to end users.

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Technical Specification

Communication networks and systems for power utility automation

Part 7.7: Machine-processable format of IEC 61850-related data models for tools

1 Scope

1.1 General

This part of IEC 61850, which is a Technical Specification, specifies a way to model the code components of IEC 61850 data model (e.g., the tables describing logical nodes, common data classes, structured data attributes, and enumerations) in an XML format that can be imported and interpreted by tools. The following main use cases are supported:

- Generation of SCL data type templates for system specification or ICD files.
- Validation of SCL data type templates.
- Definition of private extensions by following the rules of the standard.
- Adapting rapidly the whole engineering chain as soon as a new version of IEC 61850 data model (an addendum, a corrigenda or a Tissue) affects the content of the standard.
- Provide tool-neutral textual help to users of tools on the data model contents.
- Supporting multi-language publication, i.e., enabling the expression of the data model in different languages, through a machine processable format.

The purpose of this proposal is limited to the publication of the XML format which should support the data model part of any IEC 61850 related standard. The publication of code components themselves will be part of the related IEC 61850 part.

1.2 Namespace name and version

The new namespace name and version section is mandatory for any IEC 61850 namespace (as defined by IEC 61850-7-1:2011).

The parameters which identify this new release of the NSD namespace xmlns:nsd="http://www.iec.ch/61850/2016/NSD" are:

- Namespace Version: 2017
- Namespace Revision: A
- Namespace Release: 1
- Namespace release date: 2017/08/28

Edition	Publication date	Webstore	Namespace
Edition 1.0	2017-??	IEC 61850-7-7:2017	IEC 61850-7-7:2017A

The namespace version relates to the edition of the standard: here namespace version 2017 refers to the first edition of this document.

Then, the revision relates to amendments if any: as for the current version of this document, revision A corresponds to the original edition, without amendment. For the first amendment, the revision will be B, etc.

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Finally, namespace release indicates an update of the related code component (if any) without publication of a new version or revision of the current document. This could be used for internal release of the code component during development of a new version of the document, or to provide fixes of interoperability tissues without need to enter into a full document update process.

The namespace release date is used for information purpose, to indicate when the namespace has been created.

1.3 Code Component distribution

The Code Components included in this document are also available as electronic machine readable files at:
http://www.iec.ch/public/TC57/supportdocuments/IEC_61850-7-7.2017.NSD.2017A.full.zip

The Code Component(s) included in this document are potentially subject to maintenance works and the latest release is available 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_61850-7-7.2017.NSD.{VersionStateInfo}.full.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 IECManifest related to this publication is:

```
<IECManifest xmlns="http://www.iec.ch/CC/2017/IECManifest" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.iec.ch/CC/2017/IECManifest IECManifest.xsd">
    <Copyright>
        <Notice>
                COPYRIGHT (c) IEC, 2017. This version of this XSD is part of IEC 61850-7-7:2017; see the IEC
61850-7-7:2017 for full legal notices. In case of any differences between the here-below code and the IEC published content,
the here-below definition supersedes the IEC publication; it may contain updates. See history files. The whole document
has to be taken into account to have a full description of this code component.
        See www.iec.ch/CCv1 for copyright details.
        </Notice>
        <License uri="www.iec.ch/CCv1">IEC License</License>
    </Copyright>
  <CodeComponent id="IEC_61850-7-7.2017A.NSD.XSD" name="NSD schema 2017A" content="full" date="2017-08-09">
      <Publication name="IEC 61850-7-7.2017_ed1.0" comment="Machine-processable format of IEC 61850-related data
models for tools"/>
        <File name="NSD.xsd" category="normative" content="full" comment="Schema describing the namespace files"/>
      <File name="IECCopyright.xsd" category="normative" content="full" comment="Schema included in NSD to integrate
management of IEC Copyright notice"/>
        <File name="NSD.Doc.HTML.zip" category="normative" content="full" comment="Zip archive containing the HTML
documentation of the NSD. Contains the 'NSD.html' file and all related pictures"/>
        <HistoryFile name="History.NSD.v1.0.txt" startingDate="2015-10-12" endingDate="2017-01-25"
startingVersion="NSD.XSD.v0.3" endingVersion="NSD.XSD.v1.0"/>
        <HistoryFile name="History.NSD.v1.1.txt" startingDate="2017-01-25" endingDate="2017-06-23"
startingVersion="NSD.XSD.v1.0" endingVersion="NSD.XSD.v1.1"/>
        <HistoryFile name="History.NSD.2017A.txt" startingDate="2017-06-23" endingDate="2017-08-09"
startingVersion="NSD.XSD.v1.1" endingVersion="NSD.XSD.2017A"/>
```

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</CodeComponent></
IECManifest>

The package is identified using the following naming rule:

{RefStandard}.{CodeComponentName}.{VersionRevision}.{LightFull}{PublicationStage}.zip

For current publication, the Code Component package name is:

IEC_61850-7-7.2017.NSD.2017A.full.zip

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 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 in substations – Part 2: Glossary*

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

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, *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*

ISO 639-1:2002, *Codes for the representation of names of languages – Part 1: Alpha-2 code*

3 Terms and definitions

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

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

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

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