
Komunikacijska omrežja in sistemi v postajah - 6. del: Jezik za opisovanje konfiguracije za komunikacijo v postajah z inteligentnimi elektronskimi napravami (IED) - Dopolnila A2

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

Kommunikationsnetze und -systeme für die Automatisierung in der elektrischen Energieversorgung - Teil 6: Sprache für die Beschreibung der Konfiguration für die Kommunikation in Stationen mit intelligenten elektronischen Geräten (IED)

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques - Partie 6: Langage pour la description de configuration pour la communication dans les postes électriques, entre les dispositifs électroniques intelligents (IED)

Ta slovenski standard je istoveten z: EN 61850-6:2010/prA2:2023

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 61850-6:2010/oprA2:2023 **en**



57/2602/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

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DATE OF CIRCULATION: 2023-08-11	CLOSING DATE FOR VOTING: 2023-11-03
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IEC TC 57 : POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE	
SECRETARIAT: Germany	SECRETARY: Mr Heiko Englert
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE: Amendment 2 – Communication networks and systems for power utility automation – Part 6: Configuration description language for communication in electrical substations related to IEDs

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS: In addition to this Amendment, the working group has prepared as well a so-called consolidated edition 2.2 based on the amendment and the existing Ed. 2.1. The document with the consolidated version is circulated in parallel to this CDV as 57/2603/INF so that national committees can see the implications of the amendment to the existing edition. After the complete CDV/FDIS approval process the consolidated edition will be published together with the amendment under reference IEC 61850-6, Ed. 2.2. When preparing their comments, National Committees are kindly asked to refer to the line numbers in the consolidated version for simplicity.

Document history

Any person intervening in the present document is invited to complete the table below before sending the document elsewhere. The purpose is to allow all actors to see all changes introduced and the intervening persons.

Any important message to IEC editors should also be included in the table below.

Name of intervening person	Document received		Brief description of the changes introduced	Document sent	
	From	Date		To	Date
Ch. Brunner	C. Bloch	20.4.23	Added this first page; switch on line numbers, sent document to secretary	N. Heidger	15.6.23

This table will be removed by IEC editors before FDIS circulation (in case of IS) or before final publication (in case of TS or TR).

<https://standards.iteh.ai/catalog/standards/sist/4de4dc08-be63-42a9-a720-40ec78f9c76f/sist-en-61850-6-2010-opra2-2023>

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**COMMUNICATION NETWORKS AND SYSTEMS
FOR POWER UTILITY AUTOMATION –****Part 6: Configuration description language for communication
in power utility automation systems related to IEDs**

FOREWORD

This second amendment constitutes a technical revision.

The main changes with respect to the previous edition are as follows:

- functional extensions added based on changes in other Parts, especially Parts 7-2 and 7-3;
- functional extensions concerning the engineering process, especially for configuration data exchange between system configuration tools, added;
- provision of clarifications and corrections. Issues that require clarification are published in a database available at <https://iec61850.tissue-db.com/>. Arising incompatibilities are listed in 8.2.3.

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

A list of all the parts in the IEC 61850 series, 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.

The purchase of this IEC standard carries a copyright license for the purchaser to sell software containing Code Components from this standard directly to end users and to end users via distributors, subject to IEC software licensing conditions, which can be found at: <http://www.iec.ch/CCv1>.

If any updates are required to the published code component that needs to apply immediately and can not wait for an amendment (i.e. fixing a major problem), a new release of the Code Component will be issued and distributed through the IEC WebSite. Any new release of the Code Component related to this part will supersede any previously published Code Component including the one published within the current document.

The Code Component(s) included in this IEC standard are a set of .xsd. This Code Component is published through the IEC WebSite; for details see 1.3 of the present IEC standard.

This consolidated edition brings two distinct sets of changes:

- 1) Resolved Interop Issues (covered by the table below) which have already followed the technical issues (Tissues) process as described in IEC 61850-1 and have reached the green "status".

2) Resolved Editorial Tissues which may have lead to interoperability issues.

The resolutions of these issues which lead to these changes are described in greater detail in the Tissue database hosted at <https://iec61850.tissue-db.com/>.

The only new features compared to the original IEC 61850-6:2009 are the inclusion of the Process and Line elements supporting other application areas than substations, and necessary enhancements to fully support the amended communication related parts. Apart from this, this consolidated edition strictly respects the scope of the original edition.

Technical issues summary

N°, Subject, Clause and Paragraph are as they appear on the Tissue database hosted at <https://iec61850.tissue-db.com/> where all technical issues have been stored from the origin of IEC 61850.

“Subject” defines very briefly the topic under focus.

The Tissues which have been considered are:

N°	Subject	Clause	Paragraph
1669	Incorrect example of header	9.1	1
1672	Allow connection Server and ServerAt to the same SCL.Subnetwork	9.3.2	Below Table 50
1674	Harmonization with 62351-6	9.3.2	Services Element
1675	SCSM support capability - Harmonization with 62351-6	9.3.2	Services
1683	ICD file for IED functionality spanning for multiple VL and BAY	9.2.1	The name value is also a global identification of
1708	Presence of Sample Mode field not controllable through SmvOpts	9.3.11	Smv Options element
1729	Incorrect SCL example in (informative) Annex	D.2	2
1734	Improved schema validation	A.5	1
1740	Exceptions of enumeration types for IEC 61850-7-4	9.5.6	last in 9.5.6
1745	Definition of type and id in DataTypeTemplates not consistent	9.5.6	Table 49
1768	Server associate-request has no SCL parameters	9	Table 11
1787	There is no clear mapping of all 7-2 ACSI type to SCL basic types	9.5.4.2	1
1808	Please clarify if ix first index is 0 or 1	9.3.6 Data object (DOI) definition	Table 19 and Table 20
1813	Typo "Valkind"	9.5.4.1	Table 46
1823	Clarify iedType attribute usage in DataTypeTemplates	9.5.1	2
1832	SICS I45 not clear enough	Annex G	Table G.1
1834	SICS I211 text not inline with Service section	Annex G	Table G.1

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 web site 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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 61850-6:2010/oprA2:2023](https://standards.iteh.ai/catalog/standards/sist/4de4dc08-be63-42a9-a720-40ec78f9c76f/sist-en-61850-6-2010-opra2-2023)

<https://standards.iteh.ai/catalog/standards/sist/4de4dc08-be63-42a9-a720-40ec78f9c76f/sist-en-61850-6-2010-opra2-2023>

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 6: Configuration description language for communication in power utility automation systems related to IEDs

1. Scope

1.2. Namespace name and version

Replace existing section 1.2

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

The parameters which are identifying this new release of the SCL namespace `xmlns:scl="http://www.iec.ch/61850/2003/SCL"` are:

- Namespace Version: 2007
- Namespace Revision: C
- Namespace Release: 2
- Namespace release date: 2023/04/18

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

Edition	Publication date	Webstore	Namespace
Edition 1.0	2004-03	IEC 61850-6:2004	IEC 61850-6:2003
Edition 2.0	2009-12	IEC 61850-6:2009	IEC 61850-6:2007B
Amendment 1 of Edition 2.0	2018	IEC 61850-6:2009/AMD1:2018	IEC 61850-6:2007B4
Edition 2.1	2018	IEC 61850-6:2009+AMD1:2018 CSV	IEC 61850-6:2007B4
Amendment 2 of Edition 2.0	2023	IEC 61850-6:2009/AMD2:2023	IEC 61850-6:2007C3

1.3. Code Component distribution

Replace existing first paragraph

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

http://www.iec.ch/tc57/supportdocuments/IEC_61850-6.2023.SCL.2007C3.full.zip

Replace existing third paragraph

The latest version/release of the document will be found by selecting the file `IEC_61850-6.2023.SCL.{VersionStateInfo}.full.zip` with the filed `VersionStateInfo` of the highest value.

Replace existing sixth paragraph XML definition

```

33 <?xml version="1.0" encoding="UTF-8"?>
34 <IECManifest xmlns="http://www.iec.ch/CC/2017/IECManifest" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
35 xsi:schemaLocation="http://www.iec.ch/CC/2017/IECManifest IECManifest.xsd">
36   <Copyright>
37     <Notice>
38       COPYRIGHT (c) IEC, 2023. This version of this XSD is part of IEC 61850-6:2009/AMD2:2023; see the IEC 61850-
39 6:2009/AMD2:2023 for full legal notices. In case of any differences between the here-below code and the IEC published
40 content, the here-below definition supersedes the IEC publication; it may contain updates. See history files. The whole
41 document has to be taken into account to have a full description of this code component.
42       See www.iec.ch/CCv1 for copyright details.
43     </Notice>
44     <License uri="www.iec.ch/CCv1">IEC License</License>
45   </Copyright>
46   <CodeComponent id="IEC_61850-6.2007C3.SCL.XSD" name="IEC 61850-6 SCL schema V2007C3" content="full"
47 date="2023-04-18">
48     <Publication name="IEC_61850-6.2023_ed2.2" comment="Configuration description language for communication in
49 power utility automation systems related to IEDs"/>
50     <File name="SCL.xsd" category="normative" content="full"/>
51     <File name="SCL_Substation.xsd" category="normative" content="full"/>
52     <File name="SCL_Communication.xsd" category="normative" content="full"/>
53     <File name="SCL_IED.xsd" category="normative" content="full"/>
54     <File name="SCL_DataTypeTemplates.xsd" category="normative" content="full"/>
55     <File name="SCL_BaseTypes.xsd" category="normative" content="full"/>
56     <File name="SCL_BaseSimpleTypes.xsd" category="normative" content="full"/>
57     <File name="SCL_Enums.xsd" category="normative" content="full"/>
58     <File name="SCL.Doc.HTML.zip" category="normative" content="full" comment="Zip archive containing the HTML
59 documentation of the SCL. Contains the 'SCL.html' file and all related pictures"/>
60     <File name="Annex D - SCL example.scd" category="informative" content="full" comment="Example of SCD presented
61 in Annex D of the standard"/>
62     <HistoryFile name="history.2007C1.txt" startingDate="2018-06-07" endingDate="2023-01-05"
63 startingVersion="SCL.XSD.v2007B4" endingVersion="SCL.XSD.v2007C1"/>
64     <HistoryFile name="history.2007C2.txt" startingDate="2023-01-06" endingDate="2023-02-07"
65 startingVersion="SCL.XSD.v2007C1" endingVersion="SCL.XSD.v2007C2"/>
66     <HistoryFile name="history.2007C3.txt" startingDate="2023-02-08" endingDate="2023-04-18"
67 startingVersion="SCL.XSD.v2007C2" endingVersion="SCL.XSD.v2007C3"/>
68   </CodeComponent>
69 </IECManifest>

```

70

71 *Replace existing seventh paragraph*

72 The package is identified using the following naming rule:
73 {RefStandard}.{CodeComponentName}.{VersionRevision}.{LightFull}{PublicationStage}.zip For
74 current publication, the Code Component package name is:
75 IEC_61850-6.2023.SCL.2007C3.full.zip

76 2. Normative references

77 *Add following references*

78 IEC 61850-6-2, *Communication networks and systems for power utility automation – Part 6-2:*
79 *Configuration description language for extensions for human machine interfaces*

80 IEC 62351-4, *Power systems management and associated information exchange – Data and*
81 *communications security – Part 4: Profiles including MMS and derivatives*

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

84 IEC 62351-9, *Power systems management and associated information exchange – Data and*
85 *communications security – Part 9: Cyber security key management for power system equipment*

86 ISO/IEC 9834-8, *Information technology – Procedures for the operation of object identifier*
87 *registration authorities – Part 8: Generation of universally unique identifiers (UUIDs) and their*
88 *use in object identifiers*

89 4. Abbreviations

90 *Add following abbreviations*

SST	System Specification Tool
UUID	Universally Unique Identifier

91 5. Intended engineering process with SCL

92 5.3. Use of SCL in the engineering process

93 *Add following paragraph before Figure 1*

94 The **System Specification Tool (SST)** is an implementation independent system level tool
 95 that shall be able to create a full system topology without need to integrate real devices. It is
 96 producing System specification file to be used by the System Configurator as base for a new
 97 system or as a template.

98 6. The SCL object model

99 6.1. General

100 *Add following paragraph after the twelfth paragraph*

101 In addition to the full path used to identify any object in the SCL by its name, the SCL is
 102 introducing the UUID (Universal Unique Identifier) which can be used to identify objects
 103 independently of their name which can evolve all along the lifecycle of a system. The reference
 104 to an UUID can be inside the SCL file itself or outside to be used during external process not
 105 only dealing with SCL files (e.g. as per requirement from IEC 61850-6-2 for human machine
 106 interface engineering).

107 7. SCL description file types

108 *Replace first bullet in the second paragraph*

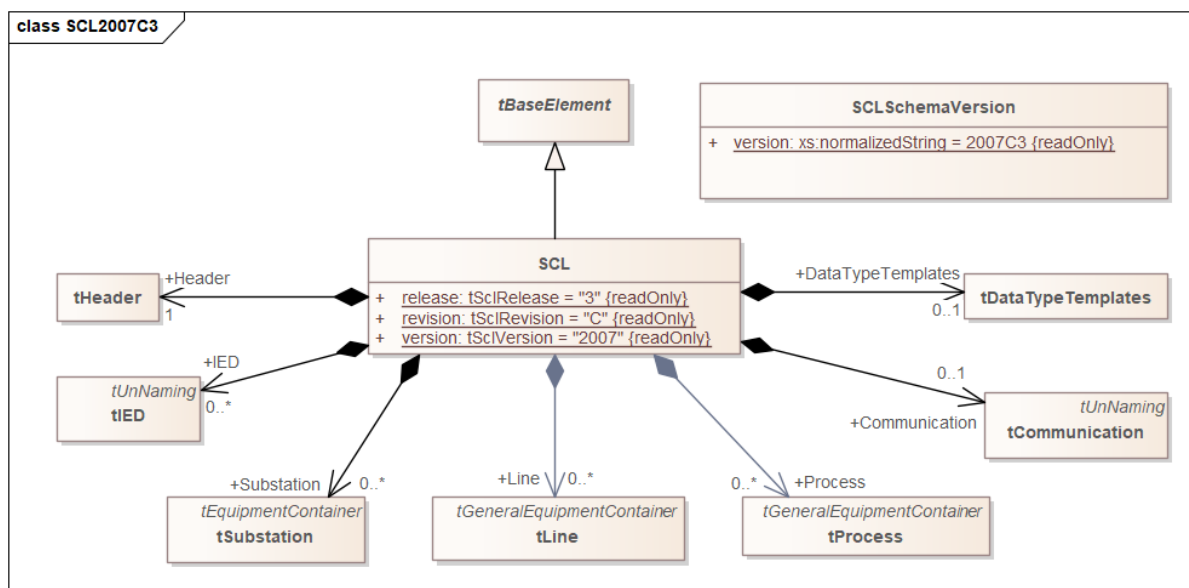
- 109 • Data exchange from the IED configurator to the system configurator (corresponding to items
 110 b) and c) of 5.1). This file describes the functional and engineering capabilities of an IED
 111 type. It shall contain exactly one IED section for the IED type whose capabilities are
 112 described. The IED name shall be **TEMPLATE**. Furthermore, the file shall contain the
 113 needed data type templates inclusive logical node type definitions, and may contain an
 114 optional process, line or substation section, where the highest level name shall be
 115 **TEMPLATE**. When importing the file into an SCT, the hierarchy of elements named
 116 TEMPLATE is used to identify the first named element to be instantiate in the project, and
 117 all element with a name different than TEMPLATE are considered to be instanciable, based
 118 on the name. If a process TEMPLATE is defined, the binding of logical node instances to
 119 primary equipment indicates a predefined functionality. Any process in which this IED shall
 120 be used, must match an appropriate process topology part (example: a CSWI LN bound to
 121 an equipment of type CBR is only allowed to control a circuit breaker; a CILO bound to a
 122 line disconnecter implements the interlocking logic for a line disconnecter). There might be
 123 an optional Communication section defining possible default addresses of the IED.
 124 A specific SCSM might make this mandatory for some address parts.

125 The file extension shall be ICD for IED Capability Description.

126 8. SCL language

127 8.1. Specification method

128 Replace Figure 9 by following figure



IEC

129 **Figure 9 – UML diagram overview of SCL schema**

130 8.3. SCL language extensions

131 8.3.5. XML name spaces

132 Add following paragraph before Notes

133 In the standard, other parts of IEC 61850 are also defining extensions of the SCL using specific
 134 XML Namespace, stored in dedicated *Private* section. This is the case for technical specification
 135 (e.g. IEC 61850-80-1 for mapping to IEC 60870-5-101/104) or technical reports (e.g. IEC 61850-
 136 90-30 for SCL function modelling). In case of technical reports, the XML extension is
 137 experimenting a new feature which may be included later in SCL namespace itself. In this
 138 context, the extension may contain references to SCL elements. In this case a user wants to
 139 use this extension, he will have to be aware that all tools implied in the engineering have to
 140 support this extension to maintains the SCL references (e.g. when an extended element
 141 references a Bay, when the Bay name is updated, all references shall be updated even within
 142 the private extensions introduced by technical reports).

143 8.3.6. Private data

144 Replace Note with following text

145 NOTE Due to the engineering process as described in clause 5 IED configurators are allowed to put Private
 146 elements into the IED section, the related ConnectedAP section and the DataTypeTemplate section for types used
 147 by the IED.

148 8.5. Object and signal designation

149 Add following section 8.5.6

150 8.5.6. Universal Unique Identifier

151 A UUID shall be generated following specification of ISO/IEC 9834-8. A UUID is an identifier
 152 composed of 16 octets, and represented by 32 hexadecimal numbers in 5 blocks separated by

153 hyphens (8-4-4-4-12). It exists different versions of the UUID with related algorithm to generate
154 it.

155 This document will not details the different algorithms to generate, it is covered by ISO/IEC
156 9834-8.

157 The UUID is optionnaly available for each SCL elements represented by a name or which needs
158 to be referenced to give the possibility to have a fixed identifier independent of the textual name.

159 If the usage of the UUID is required by a tool, the UUID will be generated by the tool which is
160 creating or instantiating the element for the first time in the context of the usage and shall
161 remains unmodified all along the lifetime of the element.

162 The different tools may need to generate an UUID for their own needs, but depending on the
163 engineering step, it may be considered as a template UUID or instance UUID. Different cases
164 may apply, as per the following examples.

165 By nature, every instance UUID in a SCL shall be unique. It is not the case for template UUID,
166 that could be instantiated several times to reference a UUID defined in an imported file
167 referenced by an ScFileReference element as per definition in 9.1.

168 An ICT which is creating an element in an ICD (e.g. for an LN) will create an UUID which may
169 be used later by the ICT. On instantiation of the IED in an SCD, the SCT will generate new
170 instance UUID in the context of the SCD and the existing ICD UUID is to be considered as a
171 template UUID and for so, the SCT will have to keep the ICD UUID as a template UUID, to allow
172 comparison with ICD if needed, by the SCT or the ICT. If the IED is preconfigured by the ICT
173 (an IID is directly created by the ICT instead of an ICD), then the instance UUIDs are directly
174 created by the ICT.

175 When an ICT imports an SCD provided by an SCT, the UUID present in the SCD shall be
176 preserved. If the ICT adds new elements in the datamodel of the IED, it shall create UUID for
177 the new elements.

178 An SST creates a system specification with its own UUID. When an SCT is creating a substation
179 based on an SSD, if an UUID has been generated by the SST assigned to the substation, then
180 the SCT will have to know how to use the original UUID, depending on the usecase. If the
181 specification is used as base for the new project (i.e. the specification is already a project
182 specification) the SCT keep this UUID in the project and all along the lifetime of the substation.
183 If the specification is used as a template (i.e. the specification is a piece of project, like a bay,
184 reusable in different projects), the SCT will keep the original UUID from the SSD as a template
185 UUID to allow recognizing the original SSD elements by the SST/SCT.

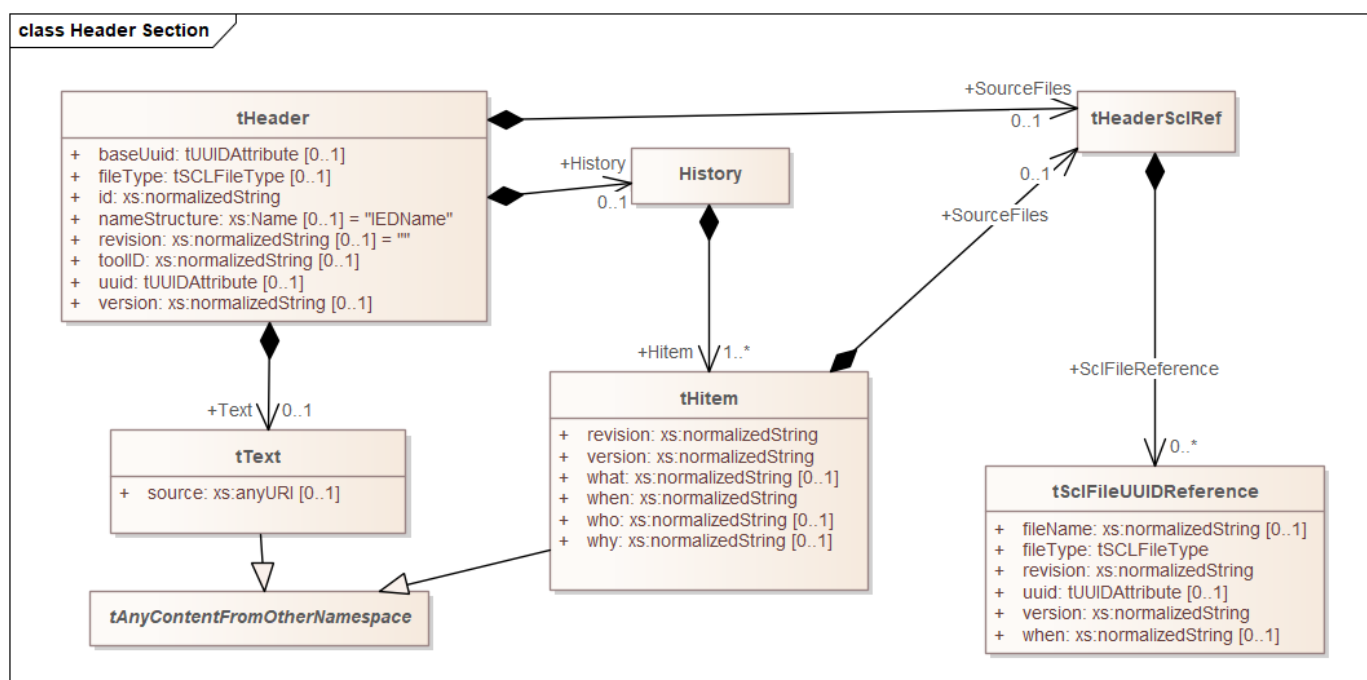
186 The rules will be detailed on the relevant parts of the document. Each elements which can be
187 referenced will have an UUID and may have a template UUID if its creation was based on the
188 instantiation of a template element identified with an unique identifier. Then all possible referring
189 elements will have an optional UUID reference attribute indicating the UUID of the referred
190 element (an instance or a template), when defined. A UUID may also be used within
191 ObjectReference to substitute part of the reference. When UUID is not defined, the naming
192 reference shall be used, and when UUID is defined the UUID reference as well as the naming
193 reference shall be used and coherency of the file has to be garanted by all SCTs.

194 **9. The SCL syntax elements**

195 **9.1. Header**

196 *Replace Figure 14 by following figure*

197



198

199

Figure 14 – UML diagram of Header section

200

Replace XML Schema extract after Figure 14 by following extract

201

```

<xs:complexType name="tHeader">
  <xs:sequence>
    <xs:element name="Text" type="tText" minOccurs="0"/>
    <xs:element name="History" minOccurs="0">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="Hitem" type="tHitem" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="SourceFiles" type="tHeaderSciRef" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="id" type="xs:normalizedString" use="required"/>
  <xs:attribute name="version" type="xs:normalizedString"/>
  <xs:attribute name="revision" type="xs:normalizedString" default=""/>
  <xs:attribute name="toolID" type="xs:normalizedString"/>
  <xs:attribute name="fileType" type="tSCLFileType" use="optional"/>
  <xs:attribute name="uuid" type="tUUIDAttribute" use="optional"/>
  <xs:attribute name="baseUuid" type="tUUIDAttribute" use="optional"/>
  <xs:attribute name="nameStructure" use="optional" default="IEDName">
    <xs:simpleType>
      <xs:restriction base="xs:Name">
        <xs:enumeration value="IEDName"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:attribute>
</xs:complexType>
  
```

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Update Table 3 to add following lines