



European Network of
Transmission System Operators
for Electricity

OBJECT REGISTRY PROFILE SPECIFICATION

2022-09-21

SOC APPROVED
VERSION 2.1

1 Copyright notice:

2 **Copyright © ENTSO-E. All Rights Reserved.**

3 This document and its whole translations may be copied and furnished to others, and derivative
4 works that comment on or otherwise explain it or assist in its implementation may be prepared,
5 copied, published and distributed, in whole or in part, without restriction of any kind, provided
6 that the above copyright notice and this paragraph are included on all such copies and
7 derivative works. However, this document itself may not be modified in any way, except for
8 literal and whole translation into languages other than English and under all circumstances, the
9 copyright notice or references to ENTSO-E may not be removed.

10 This document and the information contained herein is provided on an "as is" basis.

11 **ENTSO-E DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT**
12 **LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT**
13 **INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR**
14 **FITNESS FOR A PARTICULAR PURPOSE.**

15 **This document is maintained by the ENTSO-E CIM EG. Comments or remarks are to be**
16 **provided at cim@entsoe.eu**

17 **NOTE CONCERNING WORDING USED IN THIS DOCUMENT**

18 The force of the following words is modified by the requirement level of the document in which
19 they are used.

- 20 • SHALL: This word, or the terms "REQUIRED" or "MUST", means that the definition is an
21 absolute requirement of the specification.
- 22 • SHALL NOT: This phrase, or the phrase "MUST NOT", means that the definition is an
23 absolute prohibition of the specification.
- 24 • SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid
25 reasons in particular circumstances to ignore a particular item, but the full implications must
26 be understood and carefully weighed before choosing a different course.
- 27 • SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED", means that there may
28 exist valid reasons in particular circumstances when the particular behaviour is acceptable
29 or even useful, but the full implications should be understood and the case carefully weighed
30 before implementing any behaviour described with this label.
- 31 • MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional.

32

33

Revision History

Version	Release	Date	Paragraph	Comments
1	0	2021-10-12		For CIM EG review
2	0	2021-11-15		SOC approved.
2	1	2022-09-21		SOC approved.

34	CONTENTS		
35	Copyright notice:.....		2
36	Revision History.....		3
37	CONTENTS		4
38	1 Introduction		5
39	2 Application profile specification		5
40	2.1 Version information		5
41	2.2 Constraints naming convention		5
42	2.3 Profile constraints		6
43	2.4 Metadata.....		8
44	2.4.1 Constraints		8
45	2.4.2 Reference metadata		8
46	3 Detailed Profile Specification		8
47	3.1 General.....		8
48	3.2 IdentifiedObject root class.....		9
49	3.3 Name root class		10
50	3.4 NameType root class		11
51	3.5 (NC) NamingAuthority root class		11
52	3.6 (NC) ObjectType root class		12
53	3.7 Date primitive.....		12
54	3.8 DateTime primitive		12
55	3.9 String primitive.....		12
56	Annex A (informative): Sample data		13
57	A.1 General.....		13
58	A.2 Object Registry profile		13
59			
60	List of figures		
61	Figure 1 – Class diagram ObjectRegistryProfile::ObjectRegistryProfile		9
62			
63	List of tables		
64	Table 1 – Attributes of ObjectRegistryProfile::IdentifiedObject		9
65	Table 2 – Association ends of ObjectRegistryProfile::IdentifiedObject with other		
66	classes		10
67	Table 3 – Attributes of ObjectRegistryProfile::Name.....		10
68	Table 4 – Association ends of ObjectRegistryProfile::Name with other classes		11
69	Table 5 – Attributes of ObjectRegistryProfile::NameType		11
70	Table 6 – Association ends of ObjectRegistryProfile::NameType with other classes		11
71	Table 7 – Attributes of ObjectRegistryProfile::NamingAuthority		12
72	Table 8 – Attributes of ObjectRegistryProfile::ObjectType		12
73			

74 1 Introduction

75 The object registry profile enables and exchange of different codes and names that relate to
76 elements in the model.

77 2 Application profile specification

78 2.1 Version information

79 The content is generated from UML model file CIM100_CGMES31v01_501-
80 20v02_NC21v49_MM10v01.eap.

81 This edition is based on the IEC 61970 UML version 'IEC61970CIM17v40', dated '2020-08-24'.

- 82 - Title: Object Registry vocabulary
- 83 - Keyword: OR
- 84 - Description: This vocabulary is describing the object registry profile.
- 85 - Version IRI: <http://entsoe.eu/ns/CIM/ObjectRegistry-EU/2.1>
- 86 - Version info: 2.1.0
- 87 - Prior version:
- 88 - Conforms to: urn:iso:std:iec:61970-600-2:ed-1|urn:iso:std:iec:61970-301:ed-7:amd1|file:///iec61970cim17v40_iec61968cim13v13a_iec62325cim03v17a.eap|urn:iso:std:iec:61970-401:draft:ed-1|urn:iso:std:iec:61970-501:draft:ed-2|file:///CGMES-30v25_501-20v01.eap
- 92 - Identifier: <urn:uuid:14166b65-abaa-4611-b466-34975c15c27d>

93

94 2.2 Constraints naming convention

95 The naming of the rules shall not be used for machine processing. The rule names are just a
96 string. The naming convention of the constraints is as follows.

97 "{rule.Type}:{rule.Standard}:{rule.Profile}:{rule.Property}:{rule.Name}"

98 where

99 rule.Type: C – for constraint; R – for requirement

100 rule.Standard: the number of the standard e.g. 301 for 61970-301, 456 for 61970-456, 13 for
101 61968-13. 61970-600 specific constraints refer to 600 although they are related to one or
102 combination of the 61970-450 series profiles. For CSA profiles, CSA is used.

103 rule.Profile: the abbreviation of the profile, e.g. TP for Topology profile. If set to "ALL" the
104 constraint is applicable to all IEC 61970-600 profiles.

105 rule.Property: for UML classes, the name of the class, for attributes and associations, the name
106 of the class and attribute or association end, e.g. EnergyConsumer, IdentifiedObject.name, etc.
107 If set to "NA" the property is not applicable to a specific UML element.

108 rule.Name: the name of the rule. It is unique for the same property.

109 Example: C:600:ALL:IdentifiedObject.name:stringLength

110 2.3 Profile constraints

111 This clause defines requirements and constraints that shall be fulfilled by applications that
112 conform to this document.

113 This document is the master for rules and constraints tagged "CSA". For the sake of self-
114 containment, the list below also includes a copy of the relevant rules from IEC 61970-452,
115 tagged "452".

- 116 • C:452:ALL:NA:datatypes

117 According to 61970-501, datatypes are not exchanged in the instance data. The
118 UnitMultiplier is 1 in cases none value is specified in the profile.

- 119 • R:452:ALL:NA:exchange

120 Optional and required attributes and associations must be imported and exported if they
121 are in the model file prior to import.

- 122 • R:452:ALL:NA:exchange1

123 If an optional attribute does not exist in the imported file, it does not have to be exported
124 in case exactly the same data set is exported, i.e. the tool is not obliged to automatically
125 provide this attribute. If the export is resulting from an action by the user performed after
126 the import, e.g. data processing or model update the export can contain optional
127 attributes.

- 128 • R:452:ALL:NA:exchange2

129 In most of the profiles the selection of optional and required attributes is made so as to
130 ensure a minimum set of required attributes without which the exchange does not fulfil
131 its basic purpose. Business processes governing different exchanges can require
132 mandatory exchange of certain optional attributes or associations. Optional and required
133 attributes and associations shall therefore be supported by applications which claim
134 conformance with certain functionalities of the IEC 61970-452. This provides flexibility
135 for the business processes to adapt to different business requirements and base the
136 exchanges on IEC 61970-452 compliant applications.

- 137 • R:452:ALL:NA:exchange3

138 An exporter may, at his or her discretion, produce a serialization containing additional
139 class data described by the CIM Schema but not required by this document provided
140 these data adhere to the conventions established in Clause 5.

- 141 • R:452:ALL:NA:exchange4

142 From the standpoint of the model import used by a data recipient, the document
143 describes a subset of the CIM that importing software shall be able to interpret in order
144 to import exported models. Data providers are free to exceed the minimum requirements
145 described herein as long as their resulting data files are compliant with the CIM Schema
146 and the conventions established in Clause 5. The document, therefore, describes
147 additional classes and class data that, although not required, exporters will, in all
148 likelihood, choose to include in their data files. The additional classes and data are
149 labelled as required (cardinality 1..1) or as optional (cardinality 0..1) to distinguish them
150 from their required counterparts. Please note, however, that data importers could
151 potentially receive data containing instances of any and all classes described by the
152 CIM Schema.

- 153 • R:452:ALL:NA:cardinality

- 154 The cardinality defined in the CIM model shall be followed, unless a more restrictive
155 cardinality is explicitly defined in this document. For instance, the cardinality on the
156 association between VoltageLevel and BaseVoltage indicates that a VoltageLevel shall
157 be associated with one and only one BaseVoltage, but a BaseVoltage can be associated
158 with zero to many VoltageLevels.
- 159 • R:452:ALL:NA:associations
- 160 Associations between classes referenced in this document and classes not referenced
161 here are not required regardless of cardinality.
- 162 • R:452:ALL:IdentifiedObject.name:rule
- 163 The attribute “name” inherited by many classes from the abstract class IdentifiedObject
164 is not required to be unique. It must be a human readable identifier without additional
165 embedded information that would need to be parsed. The attribute is used for purposes
166 such as User Interface and data exchange debugging. The MRID defined in the data
167 exchange format is the only unique and persistent identifier used for this data exchange.
168 The attribute IdentifiedObject.name is, however, always required for CoreEquipment
169 profile and Short Circuit profile.
- 170 • R:452:ALL:IdentifiedObject.description:rule
- 171 The attribute “description” inherited by many classes from the abstract class
172 IdentifiedObject must contain human readable text without additional embedded
173 information that would need to be parsed.
- 174 • R:452:ALL:NA:uniqueIdentifier
- 175 All IdentifiedObject-s shall have a persistent and globally unique identifier (Master
176 Resource Identifier - mRID).
- 177 • R:452:ALL:NA:unitMultiplier
- 178 For exchange of attributes defined using CIM Data Types (ActivePower, Susceptance,
179 etc.) a unit multiplier of 1 is used if the UnitMultiplier specified in this document is “none”.
- 180 • C:452:ALL:IdentifiedObject.name:stringLength
- 181 The string IdentifiedObject.name has a maximum of 128 characters.
- 182 • C:452:ALL:IdentifiedObject.description:stringLength
- 183 The string IdentifiedObject.description is maximum 256 characters.
- 184 • C:452:ALL:NA:float
- 185 An attribute that is defined as float (e.g. has a type Float or a type which is a Datatype
186 with .value attribute of type Float) shall support ISO/IEC 60559:2020 for floating-point
187 arithmetic using single precision floating point. A single precision float supports 7
188 significant digits where the significant digits are described as an integer, or a decimal
189 number with 6 decimal digits. Two float values are equal when the significant with 7
190 digits are identical, e.g. 1234567 is equal 1.234567E6 and so are 1.2345678 and
191 1.234567E0.
- 192

193 2.4 Metadata

194 ENTSO-E agreed to extend the header and metadata definitions by IEC 61970-552 Ed2. This
195 new header definitions rely on W3C recommendations which are used worldwide and are
196 positively recognised by the European Commission. The new definitions of the header mainly
197 use Provenance ontology (PROV-O), Time Ontology and Data Catalog Vocabulary (DCAT). The
198 global new header applicable for this profile is included in the metadata and document header
199 specification document.

200 The header vocabulary contains all attributes defined in IEC 61970-552. This is done only for
201 the purpose of having one vocabulary for header and to ensure transition for data exchanges
202 that are using IEC 61970-552:2016 header. This profile does not use IEC 61970-552:2016
203 header attributes and relies only on the extended attributes.

204 2.4.1 Constraints

205 The identification of the constraints related to the metadata follows the same convention for
206 naming of the constraints as for profile constraints.

- 207 • R:CSA:ALL:wasAttributedTo:usage

208 The prov:wasAttributedTo should normally be the “X” EIC code of the actor (prov:Agent).

209

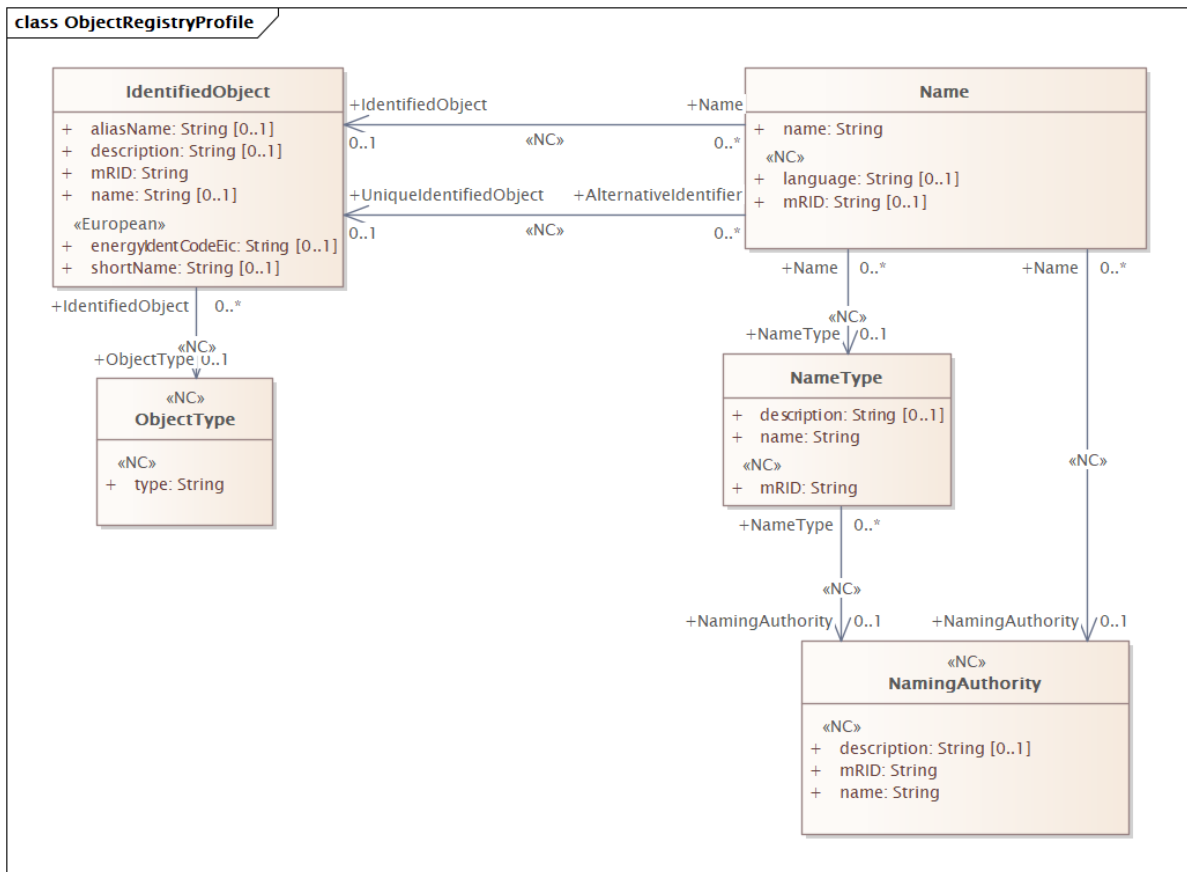
210 2.4.2 Reference metadata

211 The header defined for this profile requires availability of a set of reference metadata. For
212 instance, the attribute prov:wasGeneratedBy requires a reference to an activity which produced
213 the model or the related process. The activities are defined as reference metadata and their
214 identifiers are referenced from the header to enable the receiving entity to retrieve the “static”
215 (reference) information that is not modified frequently. This approach imposes a requirement
216 that both the sending entity and the receiving entity have access to a unique version of the
217 reference metadata. Therefore, each business process shall define which reference metadata
218 is used and where it is located.

219 3 Detailed Profile Specification

220 3.1 General

221 This package contains the equipment object registry profile.



222

223

Figure 1 – Class diagram ObjectRegistryProfile::ObjectRegistryProfile

224

Figure 1: The diagram contains main classes related to the object registry profile.

225

3.2 IdentifiedObject root class

226

This is a root class to provide common identification for all classes needing identification and naming attributes.

227

228

Table 1 shows all attributes of IdentifiedObject.

229

Table 1 – Attributes of ObjectRegistryProfile::IdentifiedObject

name	mult	type	description
aliasName	0..1	String	The aliasName is free text human readable name of the object alternative to IdentifiedObject.name. It may be non unique and may not correlate to a naming hierarchy. The attribute aliasName is retained because of backwards compatibility between CIM releases. It is however recommended to replace aliasName with the Name class as aliasName is planned for retirement at a future time.
description	0..1	String	The description is a free human readable text describing or naming the object. It may be non unique and may not correlate to a naming hierarchy.
mRID	1..1	String	Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC

name	mult	type	description
			4122, for the mRID. The use of UUID is strongly recommended. For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.
name	0..1	String	The name is any free human readable and possibly non unique text naming the object.
energyIdentCodeEic	0..1	String	(deprecated, European) The attribute is used for an exchange of the EIC code (Energy identification Code). The length of the string is 16 characters as defined by the EIC code. For details on EIC scheme please refer to ENTSO-E web site.
shortName	0..1	String	(deprecated, European) The attribute is used for an exchange of a human readable short name with length of the string 12 characters maximum.

230

231

Table 2 shows all association ends of IdentifiedObject with other classes.

232

Table 2 – Association ends of ObjectRegistryProfile::IdentifiedObject with other classes

mult from	name	mult to	type	description
0..*	ObjectType	0..1	ObjectType	(NC) The object type of the IdentifiedObject.

233

234

3.3 Name root class

235

236

237

238

The Name class provides the means to define any number of human readable names for an object. A name is not to be used for defining inter-object relationships. For inter-object relationships instead use the object identification 'mRID'.

Table 3 shows all attributes of Name.

239

Table 3 – Attributes of ObjectRegistryProfile::Name

name	mult	type	description
language	0..1	String	(NC) Shall be specified as an IETF BCP 47 language tag (e.g. en-US). Applies to the Name.name attribute. IETF language tags combine subtags from other standards such as ISO 639, ISO 15924, ISO 3166-1, and UN M.49. The tag structure has been standardized by the IETF in Best Current Practice (BCP) 47; the subtags are maintained by the IANA Language Subtag Registry.
mRID	0..1	String	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended. For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.
name	1..1	String	Any free text that used as a name or alternative identifier of the object.

240

241

Table 4 shows all association ends of Name with other classes.

242 **Table 4 – Association ends of ObjectRegistryProfile::Name with other classes**

mult from	name	mult to	type	description
0..*	IdentifiedObject	0..1	IdentifiedObject	(NC) Identified object that this name designates.
0..*	UniquelyIdentifiedObject	0..1	IdentifiedObject	(NC) Identified object that this alternative identifier designates.
0..*	NamingAuthority	0..1	NamingAuthority	(NC) Authority responsible for managing this name.
0..*	NameType	0..1	NameType	(NC) Type of this name.

243

244 **3.4 NameType root class**

245 Type of name. Possible values for attribute 'name' are implementation dependent but standard
 246 profiles may specify types. An enterprise may have multiple IT systems each having its own
 247 local name for the same object, e.g. a planning system may have different names from an EMS.
 248 An object may also have different names within the same IT system, e.g. localName as defined
 249 in CIM version 14. The definition from CIM14 is:

250 The localName is a human readable name of the object. It is a free text name local to a node
 251 in a naming hierarchy similar to a file directory structure. A power system related naming
 252 hierarchy may be: Substation, VoltageLevel, Equipment etc. Children of the same parent in
 253 such a hierarchy have names that typically are unique among them.

254 Table 5 shows all attributes of NameType.

255

Table 5 – Attributes of ObjectRegistryProfile::NameType

name	mult	type	description
name	1..1	String	Name of the name type.
description	0..1	String	Description of the name type.
mRID	1..1	String	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended. For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.

256

257 Table 6 shows all association ends of NameType with other classes.

258 **Table 6 – Association ends of ObjectRegistryProfile::NameType with other classes**

mult from	name	mult to	type	description
0..*	NamingAuthority	0..1	NamingAuthority	(NC) Authority responsible for managing this name type.

259

260 **3.5 (NC) NamingAuthority root class**

261 Authority responsible for creation and management of names of a given name type and/or
 262 name; typically an organization or an enterprise system.

263 Table 7 shows all attributes of NamingAuthority.

264

Table 7 – Attributes of ObjectRegistryProfile::NamingAuthority

name	mult	type	description
description	0..1	String	(NC) Description of the name authority.
mRID	1..1	String	(NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended. For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.
name	1..1	String	(NC) Name of the name authority.

265

3.6 (NC) ObjectType root class

267 Identifies the specialised type of an object when the instance object is serialised using a
268 generalised class. It may be useful when the object type is not otherwise included in the
269 exchange. For example, a Meter may be serialised as an EndDevice in message exchanges
270 and need to have the ObjectType.type be specified as 'Meter' to provide context to the message
271 receiver.

272 Table 8 shows all attributes of ObjectType.

273

Table 8 – Attributes of ObjectRegistryProfile::ObjectType

name	mult	type	description
type	1..1	String	(NC) The specialised type of an object when the instance object is serialised using a generalised class. For example, a Meter being serialised as an EndDevice in a message exchange should have the type attribute specified as 'Meter'.

274

3.7 Date primitive

276 Date as "yyyy-mm-dd", which conforms with ISO 8601. UTC time zone is specified as "yyyy-
277 mm-ddZ". A local timezone relative UTC is specified as "yyyy-mm-dd(+/-)hh:mm".

3.8 DateTime primitive

279 Date and time as "yyyy-mm-ddThh:mm:ss.sss", which conforms with ISO 8601. UTC time zone
280 is specified as "yyyy-mm-ddThh:mm:ss.sssZ". A local timezone relative UTC is specified as
281 "yyyy-mm-ddThh:mm:ss.sss-hh:mm". The second component (shown here as "ss.sss") could
282 have any number of digits in its fractional part to allow any kind of precision beyond seconds.

3.9 String primitive

284 A string consisting of a sequence of characters. The character encoding is UTF-8. The string
285 length is unspecified and unlimited.

286

287

288

Annex A (informative): Sample data**289 A.1 General**

290 This Annex is designed to illustrate the profile by using fragments of sample data. It is not meant
291 to be a complete set of examples covering all possibilities of using the profile. Defining a
292 complete set of test data is considered a separate activity to be performed for the purpose of
293 setting up interoperability testing and conformity related to this profile.

294 A.2 Object Registry profile

```
295 <nc:Name rdf:ID="_fd1919e8-b8f9-41d6-870e-785700665e4c">
296   <cim:Name.name>43T-LV---LN320-W</cim:Name.name>
297   <nc:Name.mRID>fd1919e8-b8f9-41d6-870e-785700665e4c</cim:IdentifiedObject.mRID>
298   <nc:Name.IdentifiedObject rdf:resource="#_00f5b7fc-e6f4-435d-8826-35abbf388ec7" />
299   <nc:Name.NameType rdf:resource="#_b025b353-1dbc-422f-88cf-d84d73d4371b" />
300   <nc:Name.NamingAuthority rdf:resource #_f4ace05a-ab03-43f5-a39d-d65b838b6c11" />
301 </nc:Name>
302
303 <nc:NameType rdf:ID="_b025b353-1dbc-422f-88cf-d84d73d4371b ">
304   <cim:NameType.name>EIC</cim:NameType.name>
305   <nc:NameType.mRID>b025b353-1dbc-422f-88cf-d84d73d4371b</nc:NameType.mRID>
306 </nc:NameType >
307 <nc:NamingAuthority rdf:ID="_f4ace05a-ab03-43f5-a39d-d65b838b6c11">
308   <cim:NamingAuthority.name>LIO</cim:NamingAuthority.name>
309   <nc:NamingAuthority.mRID>f4ace05a-ab03-43f5-a39d-d65b838b6c11</nc:NamingAuthority.mRID>
310 </nc:NamingAuthority >
311
312
313
314
315
```