



SLOVENSKI STANDARD
oSIST prEN IEC 62769-8:2022
01-maj-2022

Integracija procesne naprave (FDI) - 8. del: Preslikava EDD v OPC-UA

Field device integration (FDI) - Part 8: EDD to OPC-UA Mapping

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Ta slovenski standard je istoveten z: **prEN IEC 62769-8:2022**
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SECRETARIAT: United States of America	SECRETARY: Mr Donald (Bob) Lattimer
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:

Field device integration (FDI) - Part 8:EDD to OPC-UA Mapping

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE INTEGRATION (FDI) –

Part 8: EDD to OPC-UA Mapping

FOREWORD

- 111 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national
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140 IEC 62769-8 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of
141 IEC technical committee 65: Industrial-process measurement, control and automation. It is an International
142 Standard.

143 The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

144
145
146

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

147

The language used for the development of this International Standard is English.

148 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance
149 with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at
150 www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater
151 detail at www.iec.ch/standardsdev/publications.

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

- 155 • reconfirmed,
- 156 • withdrawn,
- 157 • replaced by a revised edition, or
- 158 • amended.

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FIELD DEVICE INTEGRATION (FDI) –

Part 8: EDD to OPC-UA Mapping

1 Scope

This part of IEC 62769 specifies how the internal view of a device model represented by the EDD can be transferred into an external view as an OPC-UA information model by mapping EDD constructs to OPC-UA objects.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the edition of the referenced document (including any amendments), which applies for a specific FDI Technology Version is defined within the FDI Technology Management Document and on the support portals of FieldComm Group and PI International.

IEC 62769-1, Field Device Integration (FDI) – Part 1: Overview

IEC 62769-5, Field Device Integration (FDI) – Part 5: FDI Information Model

IEC 62769-6, Field Device Integration (FDI) – Part 6: FDI Technology Mapping

IEC 62541-3, *OPC unified architecture – Part 3: Address Space Model*

IEC 62541-4, *OPC unified architecture – Part 4: Services*

IEC 62541-5, *OPC unified architecture – Part 5: Information Model*

IEC 62541-8, *OPC unified architecture – Part 8: Data Access*

IEC 62541-9, *OPC unified architecture – Part 9: Alarms and Conditions*

IEC 62541-17, *OPC unified architecture – Part 17: Alias Names*

IEC 62541-19, *OPC unified architecture – Part 19: Dictionary Reference*

IEC 62541-100, *OPC unified architecture – Part 100: Devices*

OPC 30081, UA CS for Process Automation Devices - PA-DIM 1.00

UN/CEFACT, UNECE Recommendation N 20, Codes for Units of Measure Used in International Trade

https://www.unece.org/cefact/codesfortrade/codes_index.html

3 Terms, definitions, abbreviated terms, acronyms and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62769-1, IEC 62769-5, IEC 62769-6, IEC 62541-3, IEC 62541-3, IEC 62541-5, IEC 62541-8, IEC 62541-9, IEC 62541-17, IEC 62541-19, IEC 62541-100, and OPC 30081 apply.

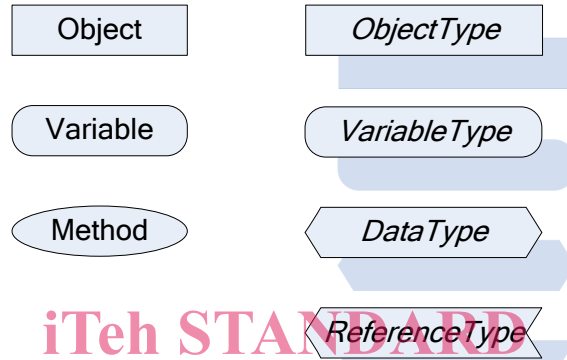
195 **3.2 Abbreviated terms and acronyms**

196 For the purposes of this document, the abbreviated terms and acronyms given in FCG TS62769-1 as well
 197 as the following apply.

PA-DIM Process Automation Device Information Model

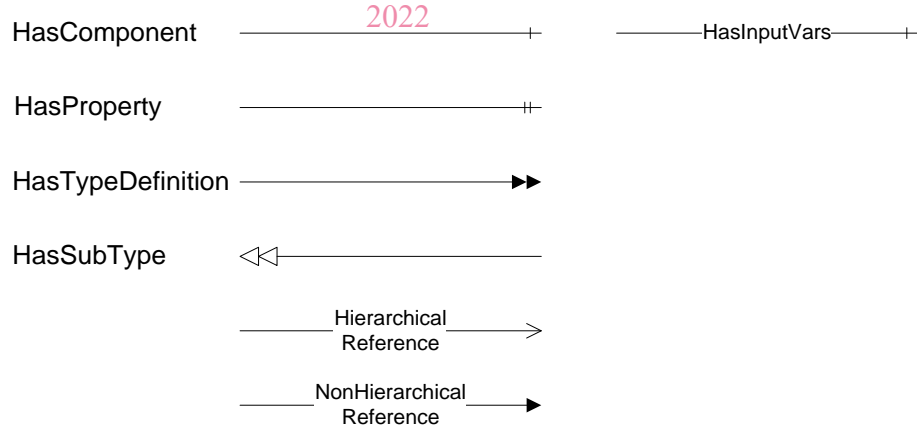
198 **3.3 Conventions for graphical notation**

199 OPC UA defines a graphical notation for an OPC UA AddressSpace. It defines graphical symbols for all
 200 NodeClasses and how different types of References between Nodes can be visualized. Figure 1 shows the
 201 symbols for the NodeClasses used in this standard. NodeClasses representing types always have a shadow.



202
 203 **Figure 1 - OPC UA Graphical Notation for NodeClasses**

204 Figure 2 shows the symbols for the ReferenceTypes used in this standard. The Reference symbol is
 205 normally pointing from the source Node to the target Node. The only exception is the HasSubType
 206 Reference. The most important References such as HasComponent, HasProperty, HasTypeDefinition and
 207 HasSubType have special symbols avoiding the name of the Reference. For other ReferenceTypes or
 208 derived ReferenceTypes the name of the ReferenceType is used together with the symbol.

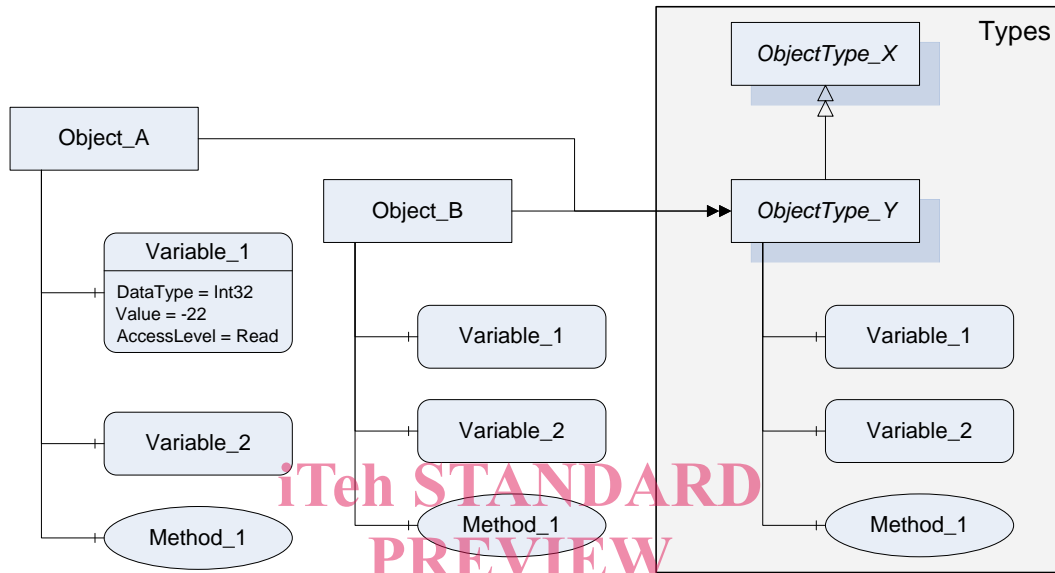


209
 210 **Figure 2 -OPC UA Graphical Notation for References**

211 Figure 3 shows a typical example for the use of the graphical notation. Object_A and Object_B are instances
 212 of the ObjectType_Y indicated by the HasTypeDefinition References. The ObjectType_Y is derived from
 213 ObjectType_X indicated by the HasSubType Reference. The Object_A has the components Variable_1,
 214 Variable_2 and Method_1.

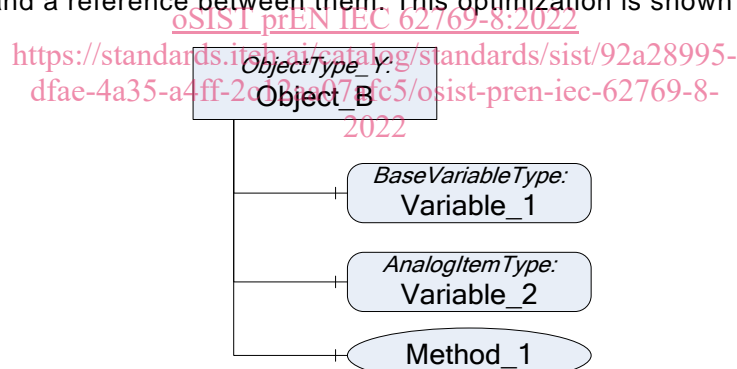
215 To describe the components of an Object on the ObjectType the same NodeClasses and References are
 216 used on the Object and on the ObjectType such as for ObjectType_Y in the example. The Nodes used to
 217 describe an ObjectType are instance declaration Nodes.

218 To provide more detailed information for a Node, a subset or all Attributes and their values can be added to
 219 a graphical symbol (see for example Variable_1, the component of Object_A in Figure 3).



220
 221 **Figure 3 - OPC UA Graphical Notation Example**

222 To improve readability, this document frequently includes the type name inside the instance box rather than
 223 displaying both boxes and a reference between them. This optimization is shown in Figure 4.



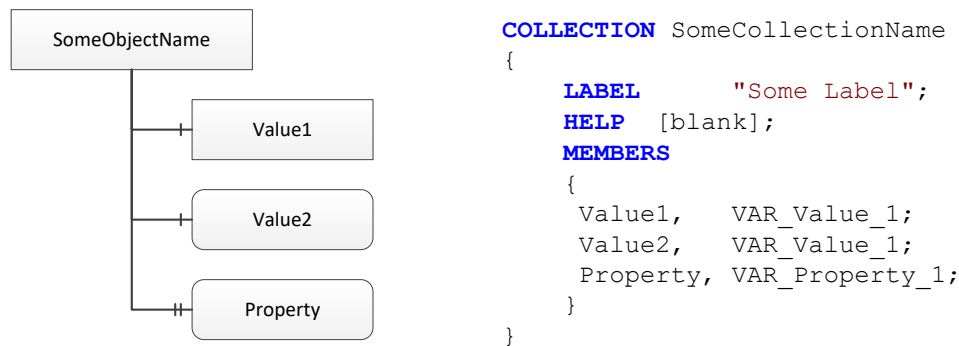
224
 225 **Figure 4 - Optimized Type Reference**

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227 4 Introduction

228 There are two types of mapping mechanisms – explicit and implicit mapping. Explicit mapping is provided
 229 by the EDD constructs SEMANTIC_MAP in combination with COLLECTIONS, METHODS and VARIABLES
 230 including the mapping of enumerations and is done by the EDD-developer. Implicit mapping is provided by
 231 the implementation of the OPC-UA server in conjunction with a FDI server and covers definitions like default
 232 casts (e.g. any number value to float64) or even the mapping of complete lists of unit codes from a fieldbus
 233 domain (HART, Profibus, ...) into an OPC-UA domain (e.g. UNECE, CDD, ...).

234 Looking at OPC-UA objects containing named data items like attributes, properties, variables and other
 235 objects, the most similar EDD objects are collections containing named data items like variables, menus
 236 and other collections (see Figure 5).



237

238

Figure 5 - Similarity of OPC-UA objects and EDD collections

239 In fact, the EDD construct collection is the key element for the basic principle of how EDD device model
 240 data shall be mapped into an OPC-UA information model. The following clauses describe and define how
 241 this must be done. Therefore this document has normative character for EDD developers and developers of
 242 OPC-servers accessing an FDI server to publish an OPC-UA information model according to a specific OPC-
 243 UA namespace and the mapping information provided by the EDD.

244 Clause 5 covers in detail how the mapping works in principle and for any OPC-UA information model based
 245 on any namespace.

246 Based on Clause 5, Clause 7 describes some details how to map the EDD into PA-DIM. Additional normative
 247 definitions how to map fieldbus specific data (e.g. identification) into PA-DIM is provided by the FDI-Profile
 248 specifications for HART, FF, PROFINET, Profibus, Modbus and ISA100.

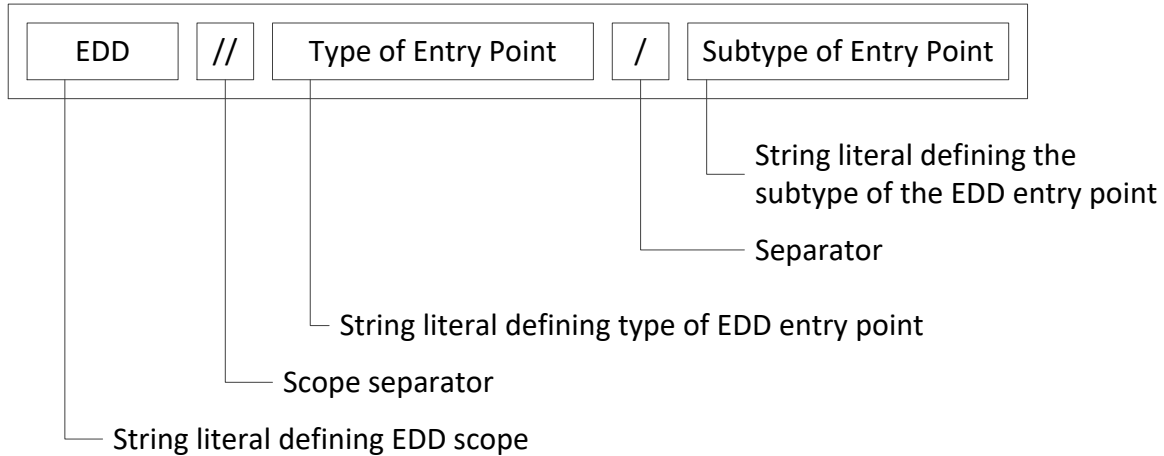
249 Before starting with doing some EDD mapping, it is strongly recommended to get a basic understanding of
 250 OPC-UA concerning how object types, variable types and reference types are defined.

251 5 Basic principles of explicit mapping

252 5.1 Semantic maps to tag EDD constructs

253 For not having to use naming conventions for EDD constructs to link a specific purpose to an EDD construct,
 254 semantic maps shall be used to kind of tag an EDD construct by a specifically defined semantic id. For the
 255 time being three syntax definitions exist for three specific purposes. The details of how to use them will be
 256 explained in the corresponding context.

257 The syntax of semantic ids for EDD entry pointers is illustrated in Figure 6.



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Figure 6 - Syntax of semantic ids for EDD entry points

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5.2 Alias collections

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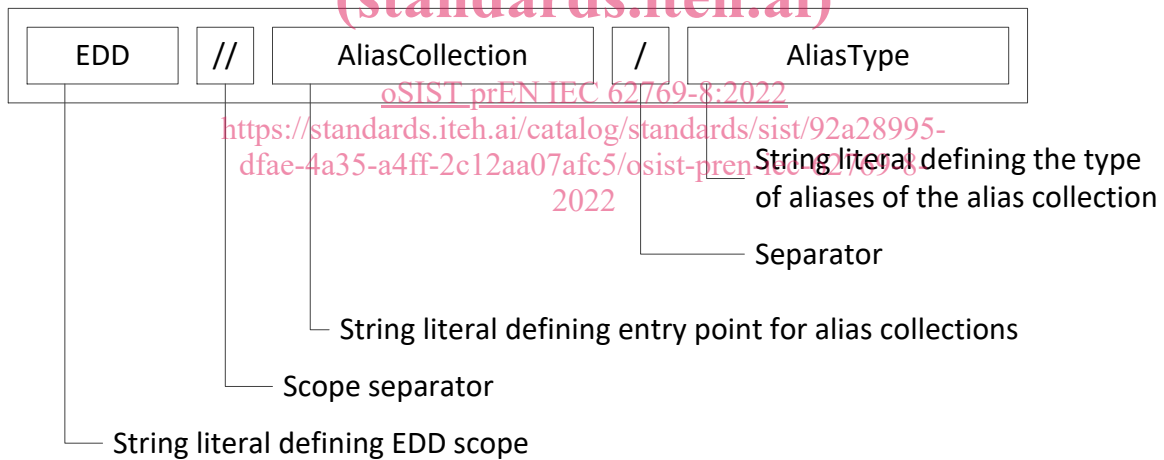
Alias collections are used to define aliases for lengthy strings having a specific meaning. The alias should be short and shall be unique across the complete EDD. Aliases will be used as member identifiers or as a part of member identifiers or in SEMANTIC_MAPs for OPC-UA type mapping. Alias collections are the main entry points to resolve EDD to OPC-UA mapping and shall not depend on each other (see 5.3 and 5.4).

265

5.2.1 Syntax of semantic id for alias mappings

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The syntax of semantic id for alias mapping is illustrated in Figure 7.



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268

Figure 7 - Syntax of semantic id for alias mapping

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5.3 Namespace Alias Collection

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To prevent name conflicts, any OPC-UA type is defined in scope of a specific namespace. A namespace collection and appropriate variables shall be defined to provide suitable names for the namespace URIs. The member identifier of the collection item shall be used as an alias wherever a namespace identifier is needed. In the following example “__UA_” represents the namespace <http://opcfoundation.org/UA/> which is defined by the default value of the referenced variable “UA_Namespace”.

276

It is mandatory to define at least one namespace collection for an EDD defining EDD to OPC-UA mapping.

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279

Definition:

The name of the namespace collection shall be tagged by a SEMANTIC_MAP with the following semantic ID:

280

“EDD//AliasCollection/Namespaces”

281
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283

The name of the namespace COLLECTION, the name of the SEMANTIC_MAP and the names of the referenced string variables can be freely chosen. The default value of the referenced string variable must contain a valid namespace.

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Figure 8 shows an EDD Namespace Collection example.

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```

SEMANTIC_MAP Namespace_Map
{
  "EDD//AliasCollection/Namespaces" : Namespace_Collection
}

COLLECTION OF VARIABLE Namespace_Collection
{
  LABEL "OPC-UA Namespaces";
  MEMBERS
  {
    __UA_,      UA_Namespace;
    __DI_,      DI_Namespace;
    __PADIM_,   PADIM_Namespace;
    UNECE,      UNECE_Namespace;
  }
}

VARIABLE UA_Namespace
{
  LABEL "UA namespace";
  HELP [blank];
  CLASS LOCAL;
  HANDLING READ;
  TYPE ASCII(100);
  DEFAULT_VALUE "http://opcfoundation.org/UA/";
}

VARIABLE DI_Namespace
{
  LABEL "DI namespace";
  HELP [blank];
  CLASS LOCAL;
  HANDLING READ;
  TYPE ASCII(100);
  DEFAULT_VALUE "http://opcfoundation.org/UA/DI/";
}

VARIABLE PADIM_Namespace
{
  LABEL "PADIM namespace";
  HELP [blank];
  CLASS LOCAL;
  HANDLING READ;
  TYPE ASCII(100);
  DEFAULT_VALUE "http://opcfoundation.org/UA/PADIM/";
}

VARIABLE UNECE_Namespace
{
  LABEL "UNECE namespace";

```

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