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**OPC unified architecture -
Part 19: Dictionary Reference**

**Architecture unifiée OPC -
Partie 19: Référence de dictionnaire**

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**OPC unified architecture -
Part 19: Dictionary Reference**

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IEC 62541-19 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

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

Draft	Report on voting
65E/1044/CDV	65E/1133/RVC

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

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

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

Throughout this document and the other Parts of the series, certain document conventions are used:

Italics are used to denote a defined term or definition that appears in the "Terms and definitions" clause in one of the parts of the series.

Italics are also used to denote the name of a service input or output parameter or the name of a structure or element of a structure that are usually defined in tables.

The *italicized terms* and *names* are also often written in camel-case (the practice of writing compound words or phrases in which the elements are joined without spaces, with each element's initial letter capitalized within the compound). For example, the defined term is *AddressSpace* instead of Address Space. This makes it easier to understand that there is a single definition for *AddressSpace*, not separate definitions for Address and Space.

A list of all parts in the IEC 62541 series, published under the general title *OPC Unified Architecture*, can be found on the IEC website.

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

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1 Scope

This part of IEC 62541, which is a specification, defines an Information Model of the OPC Unified Architecture. The Information Model describes the basic infrastructure to reference from an OPC UA Information Model to external dictionaries like IEC Common Data Dictionary or ECLASS.

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 62541-1, *OPC Unified Architecture - Part 1: Overview and Concepts*

IEC 62541-3, *OPC Unified Architecture - Part 3: Address Space Model*

IEC 62541-5, *OPC Unified Architecture - Part 5: Information Model*

IEC 62541-8, *OPC Unified Architecture - Part 8: Data Access*

ISO/IEC 11179-6, *Information technology - Metadata registries (MDR) - Part 6: Registration*

ISO 29002-5, *Information automation systems and integration - Exchange of characteristic data – Part 5: Identification scheme*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62541-1, IEC 62541-3, and IEC 62541-5 apply¹.

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

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

4 Dictionary Reference Information Model overview

4.1 General

This document describes the basic infrastructure an OPC UA Information Model can use to reference external dictionaries like IEC Common Data Dictionary or ECLASS. It defines *ObjectTypes*, *VariableTypes* and a *ReferenceType* and explains how they should be used.

The *ObjectTypes* are used to represent an external dictionary in an OPC UA *AddressSpace*. The *ReferenceType* is used to reference from Nodes in the *AddressSpace* to the dictionary entries. Such dictionary entries can be seen as external classification or external semantic information.

¹ All terms in this document that have been defined in IEC 62541-1, IEC 62541-3, or IEC 62541-5 are italicized.

The type system of OPC UA already provides means to express the semantic of an OPC UA Object. As an example, IEC 62541-100 defines the *DeviceType* ObjectType expressing that instances of this *ObjectType* represent devices. Subtypes of the *DeviceType* are used to add vendor specific semantic. However, the classification and additional semantic of the device in terms of an external data dictionary is not specified further. This document provides means to represent that an Object is for example a differential pressure transmitter in the context of an IEC Common Data Dictionary. This allows clients to automatically retrieve and identify such devices.

This document is an integral part of the IEC 62541 series, that is, the types defined in this document shall be used as defined. However, it is not required but strongly recommended that a Server use the types defined in this document to refer to external dictionaries. The defined types can be subtyped to refine their behaviour.

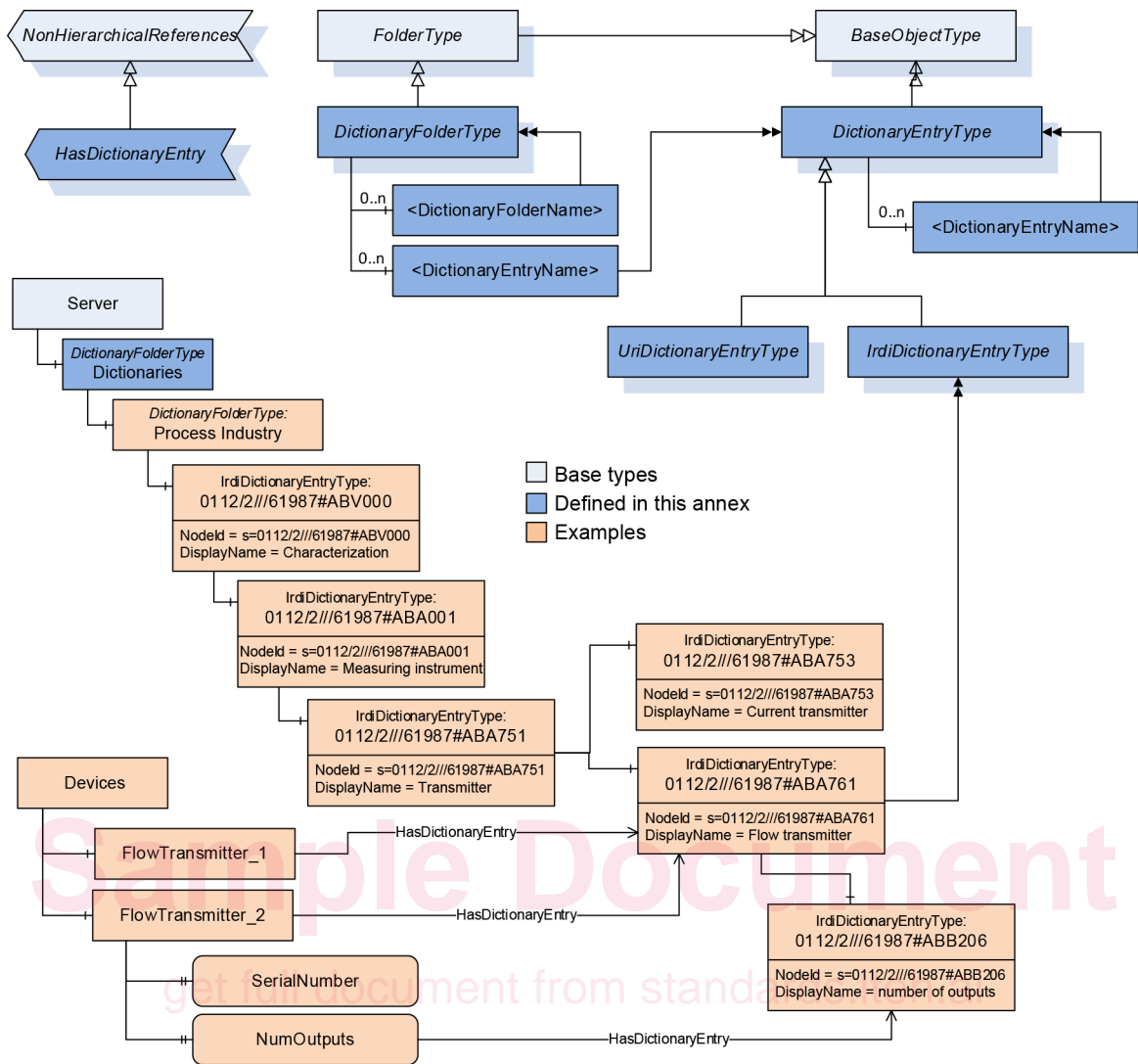
When a Server references external dictionaries using the types defined in this document, it refers from OPC UA Nodes to dictionary entries. The Server can optionally also provide the hierarchy and content of the external dictionary. Resource consumption should be considered, especially in scenarios where the OPC UA Server is part of the firmware of a device.

4.2 Overview

The types and instances defined in this document are illustrated in Figure 1. The *DictionaryEntryType* is an abstract base type for dictionary entries. The *IrdiDictionaryEntryType* and the *UriDictionaryEntryType* provide concrete types that can be used to represent dictionary entries. The *HasDictionaryEntry ReferenceType* is used to refer an OPC UA *Node* to a dictionary entry. The *DictionaryFolderType* and the *Dictionaries Object* provide an optional capability to expose the hierarchy of a referenced dictionary.

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Figure 1 – The dictionary reference types

5 OPC UA ObjectTypes

5.1 DictionaryEntryType

This abstract *ObjectType* defines the minimum information needed to identify the data dictionary entry for a respective standard (e.g. IEC Common Data Dictionary). It is formally defined in Table 1.

Concrete dictionary entry types shall inherit from the abstract *DictionaryEntryType* defining additional *Properties* and *Objects* as necessary and specified by the standard body (e.g. further definitions, versioning information etc.).

An instance of such a concrete dictionary entry *ObjectType* represents an entry in an external data dictionary.

Table 1 – DictionaryEntryType definition

Attribute	Value			
BrowseName	DictionaryEntryType			
IsAbstract	True			
References	NodeClass	BrowseName	Data Type / TypeDefinition	ModellingRule
Subtype of the BaseObjectType defined in IEC 62541-5.				
HasComponent	Object	<DictionaryEntryName>	DictionaryEntryType	OptionalPlaceholder
Conformance Units				
Address Space Dictionary Entries				

Instances of the *DictionaryEntryType* can be nested in order to create hierarchies of dictionary entries.

5.2 DictionaryFolderType

This *ObjectType* provides means to structure dictionary entry *Objects*. Multiple *Objects* of the *DictionaryFolderType* can be nested in order to create hierarchies. The *DictionaryFolderType* is formally defined in Table 2.

Table 2 – DictionaryFolderType definition

Attribute	Value			
BrowseName	DictionaryFolderType			
IsAbstract	False			
References	NodeClass	BrowseName	Data Type / TypeDefinition	ModellingRule
Subtype of the FolderType defined in IEC 62541-5.				
HasComponent	Object	<DictionaryFolderName >	DictionaryFolderType	OptionalPlaceholder
HasComponent	Object	<DictionaryEntryName>	DictionaryEntryType	OptionalPlaceholder
Conformance Units				
Address Space Dictionary Entries				

5.3 IRDI ISO/IEC 11179-6 conformant DictionaryEntryType

The *IrdiDictionaryEntryType* defined in Table 3 is used to represent dictionary entries that use standardized semantic identifiers that conform with International Registration Data Identifiers (IRDI) defined in ISO/IEC 11179-6.

Standardized semantic identifiers are local independent strings typically specified in international standards like IEC CDD (Common Data Dictionary) (IEC 61987 series). In order to avoid conflict with various name spaces in these identifiers, the registration authority identifier part of the string used shall be based on ISO 29002-5.

Figure 2 shows the general structure and syntax defined by ISO/IEC 11179-6, ISO 29002-5 and ISO/IEC 6523.