SLOVENSKI STANDARD
oSIST prEN IEC 62541-8:2024

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Enotna arhitektura OPC - 8. del: Dostop do podatkov

OPC Unified Architecture - Part 8: Data Access

OPC Unified Architecture - Teil 8: Zugriff auf Automatisierungsdaten

Architecture unifiée OPC - Partie 8: Accès aux données

Ta slovenski standard je istoveten z: **prEN IEC 62541-8:2024**

ICS:

25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control
35.240.50	Uporabniške rešitve IT v industriji	IT applications in industry

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65E/1055/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62541-8 ED4**	
DATE OF CIRCULATION: **2024-01-26**	CLOSING DATE FOR VOTING: **2024-04-19**
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IEC SC 65E : DEVICES AND INTEGRATION IN ENTERPRISE SYSTEMS

SECRETARIAT: United States of America	SECRETARY: Mr Donald (Bob) Lattimer
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

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TITLE:

OPC Unified Architecture - Part 8: Data Access

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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OPC UNIFIED ARCHITECTURE –

Part 8: Data access

FOREWORD

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International Standard IEC 62541-8 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

This fourth edition cancels and replaces the third edition published in 2020. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Added a “Quantity Model” which can be referenced from EngineeringUnit Properties. The model defines quantities and assigned units. In addition it provides alternative units and the conversion to them.
b) Added additional rules for ValuePrecision Property:
   - Can also be used for other subtypes like Duration and Decimal.
   - Added rules when ValuePrecision has negative values.

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

CDV	Report on voting
65E/XX/CDV	65E/XX/RVC

Full information on the voting for the approval of this International Standard 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.

Throughout this document and the other parts of the IEC 62541 series, certain document conventions are used:

Italics are used to denote a defined term or definition that appears in the "Terms and definition" clause in one of the parts of the IEC 62541 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, with a few exceptions, 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 of 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 "http://webstore.iec.ch" in the data related to the specific document. At this date, the document 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.

OPC UNIFIED ARCHITECTURE –

Part 8: Data Access

1 Scope

This part of IEC 62541 is part of the overall OPC Unified Architecture (OPC UA) standard series and defines the information model associated with Data Access (DA). It particularly includes additional *VariableTypes* and complementary descriptions of the *NodeClasses* and *Attributes* needed for Data Access, additional *Properties*, and other information and behaviour.

The complete address space model, including all *NodeClasses* and *Attributes* is specified in IEC 62541-3. The services to detect and access data are specified in IEC 62541-4.

Annex A specifies the recommended way how the information received from OPC COM Data Access (DA) Servers shall be mapped to the model in this document.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments and errata) applies.

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

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

IEC 62541-4, *OPC Unified Architecture - Part 4: Services*

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

IEC 62541-19, OPC Unified Architecture - Part 19: Dictionary References

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 and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62541-1, IEC 62541-3, and IEC 62541-4 and the following apply.

3.1.1
DataItem
link to arbitrary, live automation data, that is, data that represents currently valid information

Note 1 to entry: Examples of such data are

- device data (such as temperature sensors),
- calculated data,
- status information (open/closed, moving),
- dynamically-changing system data (such as stock quotes),
- diagnostic data.

3.1.2
AnalogItem
DataItem that represents continuously-variable physical quantities (e.g., length, temperature), in contrast to the digital representation of data in discrete items

Note 1 to entry: Typical examples are the values provided by temperature sensors or pressure sensors. OPC UA defines specific *VariableTypes* to identify an *AnalogItem*. *Properties* describe the possible ranges of *AnalogItems*.

297 **3.1.3**
298 **DiscreteItem**
299 *DataItem* that represents data that may take on only a certain number of possible values (e.g.,
300 OPENING, OPEN, CLOSING, CLOSED)

301 Note 1 to entry: Specific *VariableTypes* are used to identify *DiscreteItems* with two states or with multiple states.
302 *Properties* specify the string values for these states.

303 **3.1.4**
304 **ArrayItem**
305 *DataItem* that represents continuously-variable physical quantities and where each individual
306 data point consists of multiple values represented by an array (e.g., the spectral response of a
307 digital filter)

308 Note 1 to entry: Typical examples are the data provided by analyser devices. Specific *VariableTypes* are used to
309 identify *ArrayItem* variants.

310 **3.1.5**
311 **EngineeringUnits**
312 units of measurement for *AnalogItems* that represent continuously-variable physical quantities
313 (e.g., length, mass, time, temperature)

314 Note 1 to entry: This standard defines *Properties* to inform about the unit used for the *DataItem* value and about
315 the highest and lowest value likely to be obtained in normal operation.

316 **3.2 Abbreviated terms**

317 DA Data Access
318 EU Engineering Unit
319 NaN „Not a Number“ defined in IEEE 754
320 UA Unified Architecture

321 # 4 Concepts

322 Data Access deals with the representation and use of automation data in *Servers*.

323 Automation data can be located inside the *Server* or on I/O cards directly connected to the
324 *Server*. It can also be located in sub-servers or on other devices such as controllers and
325 input/output modules, connected by serial links via field buses or other communication links.
326 OPC UA Data Access *Servers* provide one or more OPC UA Data Access *Clients* with
327 transparent access to their automation data.

328 The links to automation data instances are called *DataItems*. Which categories of automation
329 data are provided is completely vendor-specific. Figure 1 illustrates how the *AddressSpace* of
330 a *Server* might contain a broad range of different *DataItems*.

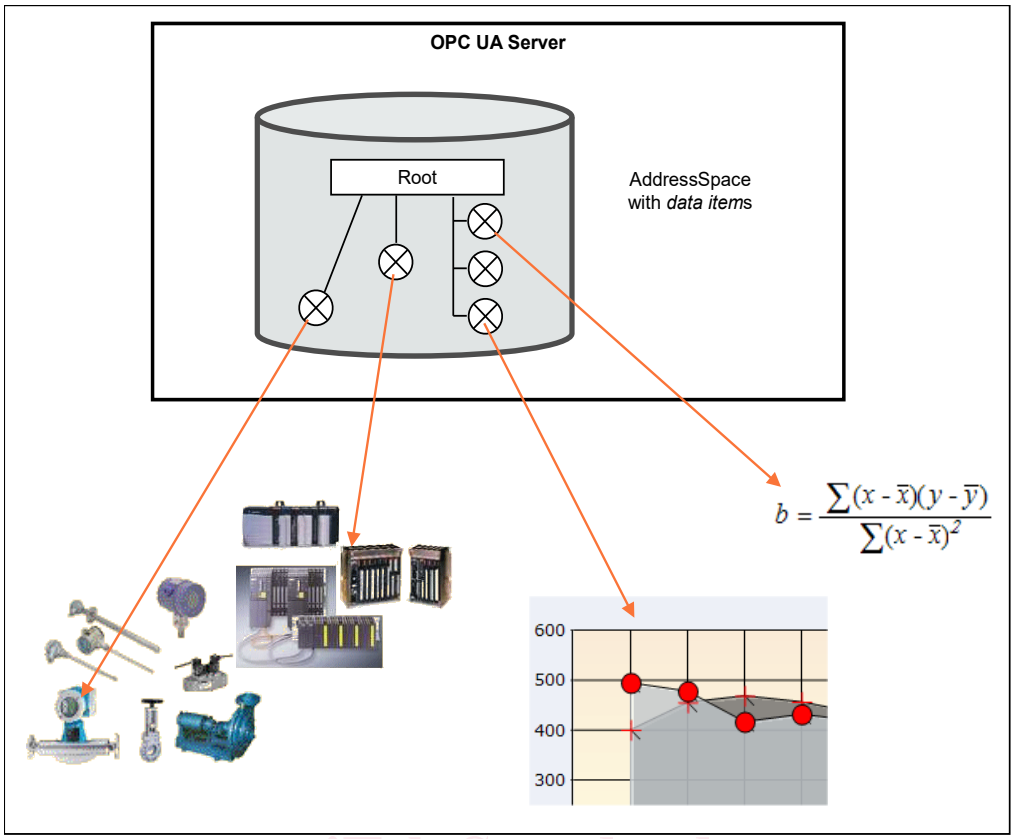

Figure 1 – OPC *DataItems* are linked to automation data

Clients may read or write *DataItems*, or monitor them for value changes. The *Services* needed for these operations are specified in IEC 62541-4. Changes are defined as a change in status (quality) or a change in value that exceeds a client-defined range called a *Deadband*. To detect the value change, the difference between the current value and the last reported value is compared to the *Deadband*.

5 Model

5.1 General

The DataAccess model extends the variable model by defining *VariableTypes*. The *DataItemType* is the base type. *ArrayItemType*, Base*AnalogType* and *DiscreteItemType* are specializations. See Figure 2. Each of these *VariableTypes* can be further extended to form domain or server specific *DataItems*.

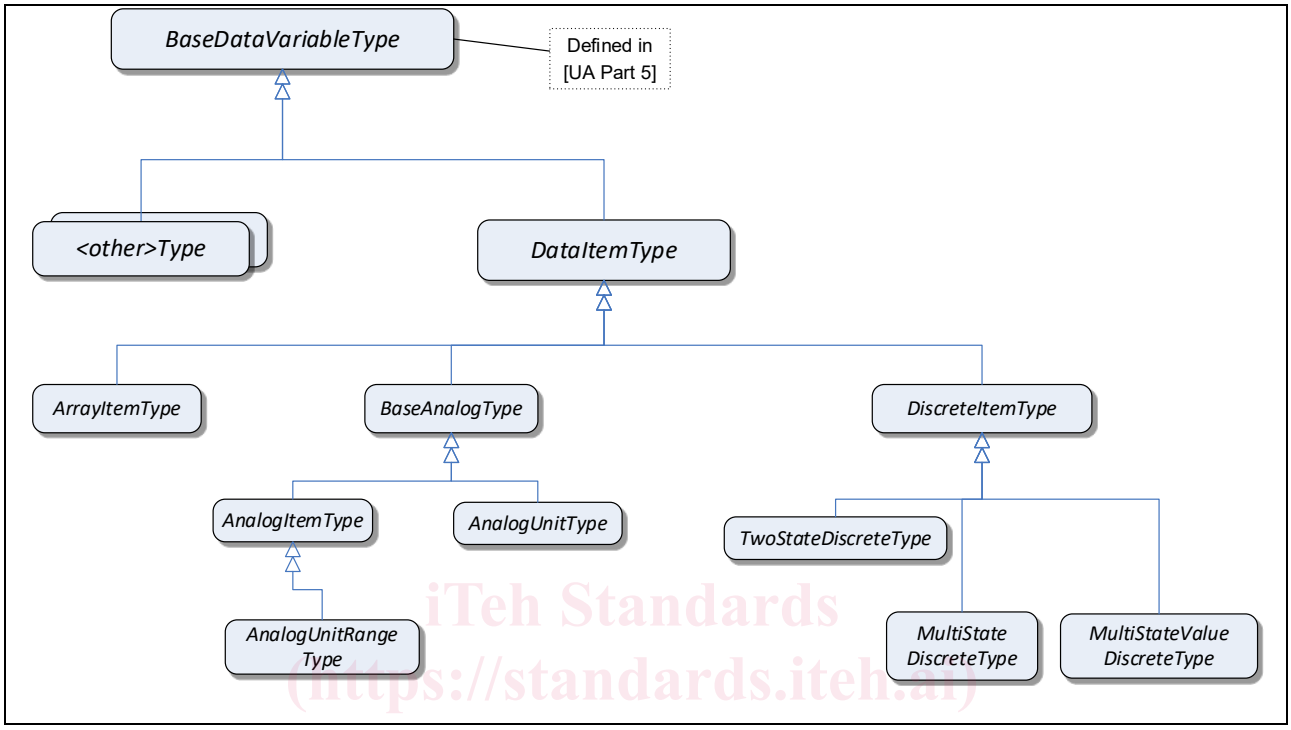

Figure 2 – *DataItem VariableType* hierarchy

5.2 SemanticsChanged

The *StatusCode* also contains an informational bit called *SemanticsChanged*.

Servers that implement Data Access shall set this Bit in notifications if certain *Property* values defined in this standard change. The corresponding *Properties* are specified individually for each *VariableType*.

Clients that use any of these *Properties* should re-read them before they process the data value.

5.3 Variable Types

5.3.1 DataItemType

This *VariableType* defines the general characteristics of a *DataItem*. All other *DataItem* Types derive from it. The *DataItemType* derives from the *BaseDataVariableType* and therefore shares the variable model as described in IEC 62541-3 and IEC 62541-5. It is formally defined in Table 1.