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**Field device integration (FDI®) –
Part 5: FDI Information Model**

Intégration des appareils de terrain (FDI®) –

Partie 5: Modèle d'Information FDI 62769-5:2023

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Part 5: FDI Information Model**

**Intégration des appareils de terrain (FDI®) –
Partie 5: Modèle d'Information FDI**

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CONTENTS

FOREWORD.....	7
1 Scope.....	9
2 Normative references	10
3 Terms, definitions, abbreviated terms, acronyms and conventions.....	11
3.1 Terms and definitions.....	11
3.2 Abbreviated terms and acronyms	11
3.3 Conventions.....	11
3.3.1 Capitalization.....	11
3.3.2 Conventions for graphical notation.....	11
4 Overview of OPC Unified Architecture	13
4.1 General.....	13
4.2 Overview of OPC UA Devices	14
5 Concepts	16
5.1 General.....	16
5.2 Device topology	16
5.3 Online/offline	17
5.4 Catalogue (Type Definitions).....	18
5.5 Communication	18
5.6 Semantic Information	18
6 AddressSpace organization.....	20
7 Device Model for FDI®	21
7.1 General.....	21
7.2 Online/offline	21
7.3 Device health.....	22
7.3.1 DeviceHealth Mapping.....	22
7.3.2 DeviceHealth Diagnostics	23
7.4 User interface elements	24
7.4.1 General	24
7.4.2 UI Description Type	24
7.4.3 UI Plug-in Type.....	25
7.5 Type-specific support information	26
7.6 Actions	27
7.6.1 Overview	27
7.6.2 Action Type	27
7.6.3 ActionService Type.....	28
7.6.4 ActionService Object	28
7.6.5 InvokeAction Method	29
7.6.6 RespondAction Method.....	30
7.6.7 AbortAction Method	31
7.6.8 Interactive Transfer to device	32
8 Network and connectivity.....	32
9 Utility functions	32
9.1 Overview.....	32
9.2 Locking	32
9.3 EditContext	33
9.3.1 Overview	33

9.3.2	EditContext Type	33
9.3.3	EditContext Object.....	33
9.3.4	GetEditContext Method.....	34
9.3.5	RegisterNodes Method	35
9.3.6	Apply Method	36
9.3.7	Reset Method	37
9.3.8	Discard Method	38
9.4	DirectDeviceAccess	39
9.4.1	General	39
9.4.2	DirectDeviceAccess Type	39
9.4.3	DirectDeviceAccess Object.....	40
9.4.4	InitDirectAccess Method	41
9.4.5	EndDirectAccess Method.....	41
9.4.6	Transfer Method	42
10	Parameter Types	43
10.1	General.....	43
10.2	ScalingFactor Property	44
10.3	Min_Max_Values Property	44
11	FDI® StatusCodes.....	45
11.1	General.....	45
11.2	Structure of the StatusCode	45
11.3	FDI® specific operation level result codes	46
12	Specialized topology elements.....	49
13	Auditing	50
13.1	General.....	50
13.2	FDI® Client-provided context information.....	50
13.3	LogAuditTrailMessage Method	50
14	FDI® Server Version	51
15	Mapping FDI® Package information to the FDI® Information Model.....	51
15.1	General.....	51
15.2	Localization	52
15.2.1	Localized text	52
15.2.2	Engineering units.....	52
15.3	Device	52
15.3.1	General	52
15.3.2	Mapping to Attributes to a specific DeviceType Node.....	52
15.3.3	Mapping to Properties.....	52
15.3.4	Mapping to ParameterSet	53
15.3.5	Mapping to Functional Groups	53
15.3.6	Mapping to DeviceTypeImage.....	53
15.3.7	Mapping to Documentation	53
15.3.8	Mapping to ProtocolSupport.....	53
15.3.9	Mapping to ImageSet.....	54
15.3.10	Mapping to ActionSet.....	54
15.3.11	Mapping to MethodSet.....	54
15.4	Modular Device	54
15.5	Block	54
15.5.1	General	54

15.5.2	Mapping to Attributes.....	54
15.5.3	Mapping to ParameterSet	55
15.5.4	Mapping to Functional Groups	55
15.5.5	Mapping to ActionSet.....	55
15.5.6	Mapping to MethodSet.....	55
15.5.7	Instantiation rules	55
15.6	Parameter	55
15.6.1	General	55
15.6.2	Private Parameters	60
15.6.3	MIN_Value and MAX_Value.....	60
15.6.4	Engineering units.....	60
15.6.5	Enumerated Parameters	60
15.6.6	Bit-enumerated Parameters	60
15.6.7	Representation of records.....	61
15.6.8	Representation of arrays, and lists of Parameters with simple data types	62
15.6.9	Representation of values arrays, and lists of RECORD Parameters	62
15.6.10	Representation of COLLECTION and REFERENCE ARRAY	63
15.6.11	SCALING_FACTOR.....	63
15.6.12	EDDL CLASS Attributes on Parameters	63
15.7	Functional Groups.....	65
15.8	AXIS elements in UIDs.....	65
15.9	Actions	65
15.10	UIPs	66
15.11	Protocols, Networks and Connection Points	66
15.12	Semantic Identifies	66
15.13	DictionaryIds Property.....	67
15.14	MultiStateDictionaryEntryDiscreteType	67
15.15	GetNodeIdsByDictionaryEntryId	68
16	Profiles.....	69
Annex A (normative) Namespace and Mappings		70
Bibliography.....		71
Figure 1 – FDI® architecture diagram		10
Figure 2 – OPC UA graphical notation for NodeClasses.....		12
Figure 3 – OPC UA graphical notation for References.....		12
Figure 4 – OPC UA graphical notation example		13
Figure 5 – Optimized Type Reference		13
Figure 6 – OPC UA Devices example: Functional Groups		15
Figure 7 – OPC UA Devices example: Configurable components		15
Figure 8 – Example of an automation system.....		16
Figure 9 – Example of a Device topology		17
Figure 10 – Example Device Types representing a catalogue		18
Figure 11 – Example of concrete DictionaryEntryType and Object		19
Figure 12 – Example of DictionaryEntries		20
Figure 13 – Online component for access to device data		21
Figure 14 – Hierarchy of user interface Types.....		24

Figure 15 – Integration of Actions within a TopologyElement	27
Figure 16 – Action Service	29
Figure 17 – EditContext type and instance	34
Figure 18 – DirectDeviceAccessType	39
Figure 19 – DirectDeviceAccess instance	40
Figure 20 – OPC UA VariableTypes including OPC UA DataAccess	44
Figure 21 – Example: Complex variable representing a RECORD	61
Figure 22 – Complex variable representing a VALUE_ARRAY of RECORDs	62
Figure 23 – Example of EDDL CLASS Attributes in the FDI® OPC UA Information Model	64
Table 1 – DeviceHealth Mapping	22
Table 2 – DeviceType definition (excerpt applicable for Subclause 7.3.1)	22
Table 3 – DeviceType definition with DeviceHealth and DeviceHealthDiagnostics	23
Table 4 – UIDescriptionType Definition	24
Table 5 – UIPlugInType Definition	25
Table 6 – ActionType Definition	28
Table 7 – ActionServiceType Definition	28
Table 8 – InvokeAction Method Arguments	30
Table 9 – InvokeAction Method AddressSpace Definition	30
Table 10 – RespondAction Method Arguments	31
Table 11 – RespondAction Method AddressSpace Definition	31
Table 12 – AbortAction Method Arguments	31
Table 13 – AbortAction Method AddressSpace Definition	32
Table 14 – EditContextType Definition	33
Table 15 – GetEditContext Method Arguments	34
Table 16 – GetEditContext Method AddressSpace Definition	35
Table 17 – RegisterNodes Method Arguments	35
Table 18 – RegisterNodes Method AddressSpace Definition	35
Table 19 – RegistrationParameters DataType Structure	36
Table 20 – RegisterNodesResult DataType Structure	36
Table 21 – Apply Method Arguments	37
Table 22 – Apply Method AddressSpace Definition	37
Table 23 – ApplyResult DataType Structure	37
Table 24 – Reset Method Arguments	38
Table 25 – Reset Method AddressSpace Definition	38
Table 26 – Discard Method Arguments	38
Table 27 – Discard Method AddressSpace Definition	38
Table 28 – DirectDeviceAccessType Definition	40
Table 29 – DirectDeviceAccess Instance Definition	41
Table 30 – InitDirectAccess Method Arguments	41
Table 31 – InitDirectAccess Method AddressSpace Definition	41
Table 32 – EndDirectAccess Method Arguments	42

Table 33 – EndDirectAccess Method AddressSpace Definition.....	42
Table 34 – Transfer Method Arguments	42
Table 35 – Transfer Method AddressSpace Definition	43
Table 36 – ScalingFactor Property Definition	44
Table 37 – Min_Max_Values Property Definition	45
Table 38 – Variant_Range DataType Structure	45
Table 39 – Variant_Range Definition.....	45
Table 40 – StatusCode Bit Assignments	46
Table 41 – DataValue InfoBits.....	46
Table 42 – Good operation level result codes	47
Table 43 – Uncertain operation level result codes	48
Table 44 – Bad operation level result codes.....	48
Table 45 – LogAuditTrailMessage Method Arguments.....	51
Table 46 – LogAuditTrailMessage Method AddressSpace Definition	51
Table 47 – FDI ServerVersion Property Definition	51
Table 48 – DeviceType Property Mapping.....	53
Table 49 – Setting OPC UA Variable Attributes from EDDL variable attributes	56
Table 50 – Correspondence between EDDL and OPC UA standard data types	57
Table 51 – Definition of EddIDictionaryType.....	63
Table 52 – Definition of EddIDictionary Object	63
Table 53 – Definition of Parameter Class Attributes	64
Table 54 – DictionaryIds Definition.....	67
Table 55 – MultiStateDictionaryEntryDiscreteType definition.....	67
Table 56 – GetNodeIdsByDictionaryEntryId Method arguments.....	68
Table 57 – GetNodeIdsByDictionaryEntryId Method result codes	68
Table 58 – GetNodeIdsByDictionaryEntryId	68
Table 59 – FDI® Server Facet Definition.....	69
Table 60 – FDI® Client Facet Definition	69

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This third edition cancels and replaces the second edition published in 2021. This edition constitutes a technical revision.

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

- a) added INTERACTIVE_TRANSFER_TO_DEVICE ACTION.

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

Draft	Report on voting
65E/858/CDV	65E/915/RVC

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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.

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FIELD DEVICE INTEGRATION (FDI®) –

Part 5: FDI® Information Model

1 Scope

This part of IEC 62769 defines the FDI®¹ Information Model. One of the main tasks of the Information Model is to reflect the topology of the automation system. Therefore, it represents the devices of the automation system as well as the connecting communication networks including their properties, relationships, and the operations that can be performed on them. The types in the AddressSpace of the FDI® Server constitute some kind of catalogue, which is built from FDI® Packages.

The fundamental types for the FDI® Information Model are well defined in OPC UA for Devices (IEC 62541-100). The FDI® Information Model specifies extensions for a few special cases and otherwise explains how these types are used and how the contents are built from elements of DevicePackages.

The overall FDI® architecture is illustrated in Figure 1. The architectural components that are within the scope of this document have been highlighted in this illustration.

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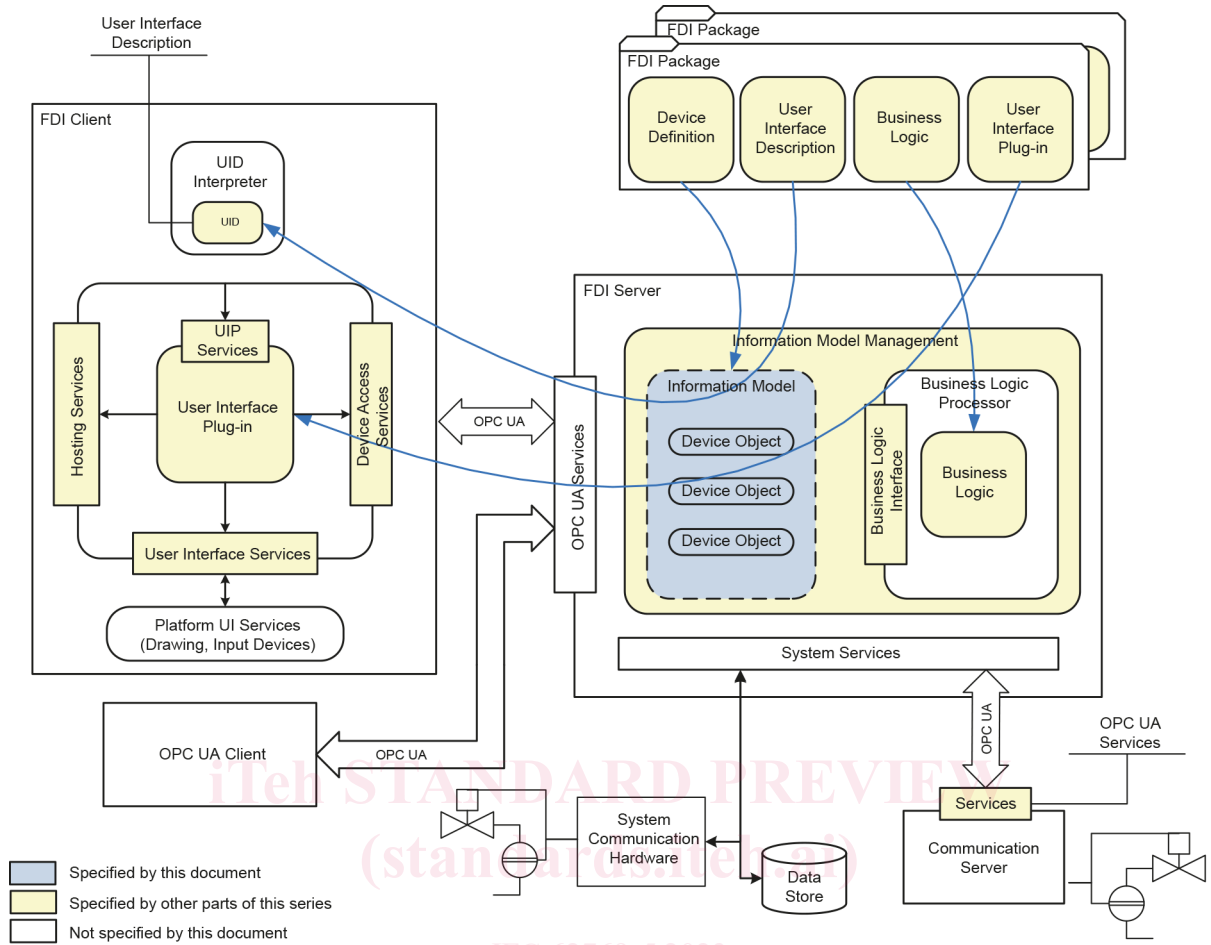


Figure 1 – FDI® architecture diagram

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 61784-1-3:2023, *Industrial networks – Profiles – Part 1-3: Fieldbus profiles – Communication Profile Family 3*

IEC 61804-3, *Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 3: EDDL syntax and semantics*

IEC 61804-4, *Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 4: EDD interpretation*

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 62541-6, *OPC Unified Architecture – Part 6: Mappings*

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

IEC 62541-100, *OPC Unified Architecture – Part 100: Device Interface*

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

IEC 62769-2, *Field Device Integration (FDI®) – Part 2: Client*

IEC 62769-3, *Field Device Integration (FDI®) – Part 3: Server*

IEC 62769-4, *Field Device Integration (FDI®) – Part 4: FDI® Packages*

IEC 62769-6, *Field Device Integration (FDI®) – Part 6: FDI® Technology Mappings*

IEC 62769-7, *Field Device Integration (FDI®) – Part 7: Communication Devices*

IEC 62769-1xx (all parts), *Field Device Integration (FDI®) – Part 1xx-y: Profiles*

OPC 10000-19, *OPC Unified Architecture – Part 19: Dictionary Reference*

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 and IEC 62769-3 apply.

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>

3.2 Abbreviated terms and acronyms

For the purposes of this document, the abbreviated terms and acronyms given in IEC 62769-1 and the following apply.

HMI	Human Machine Interface
SCADA	Supervisory Control and Data Acquisition
TCP	Transmission Control Protocol

3.3 Conventions

3.3.1 Capitalization

Capitalization of the first letter of words is used in the IEC 62769 series to emphasize an FDI® defined term.

3.3.2 Conventions for graphical notation

OPC UA defines a graphical notation for an OPC UA AddressSpace. It defines graphical symbols for all NodeClasses and how different types of References between Nodes can be visualized. Figure 2 shows the symbols for the NodeClasses used in this document. NodeClasses representing types always have a shadow.

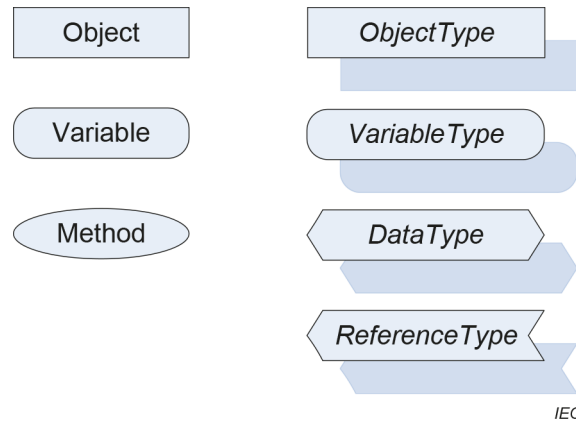


Figure 2 – OPC UA graphical notation for NodeClasses

Figure 3 shows the symbols for the ReferenceTypes used in this document. The Reference symbol is normally pointing from the source Node to the target Node. The only exception is the HasSubType Reference. The most important References such as HasComponent, HasProperty, HasTypeDefinition and HasSubType have special symbols avoiding the name of the Reference. For other ReferenceTypes or derived ReferenceTypes, the name of the ReferenceType is used together with the symbol.

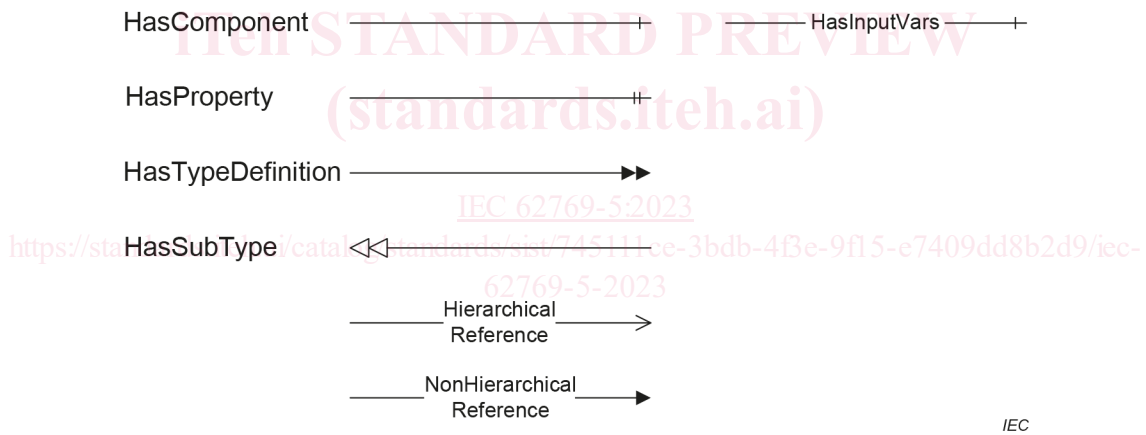


Figure 3 – OPC UA graphical notation for References

Figure 4 shows a typical example for the use of the graphical notation. Object_A and Object_B are instances of the ObjectType_Y indicated by the HasTypeDefinition References. The ObjectType_Y is derived from ObjectType_X indicated by the HasSubType Reference. The Object_A has the components Variable_1, Variable_2 and Method_1.

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

To provide more detailed information for a Node, a subset or all Attributes and their values can be added to a graphical symbol (see for example Variable_1, the component of Object_A in Figure 4).

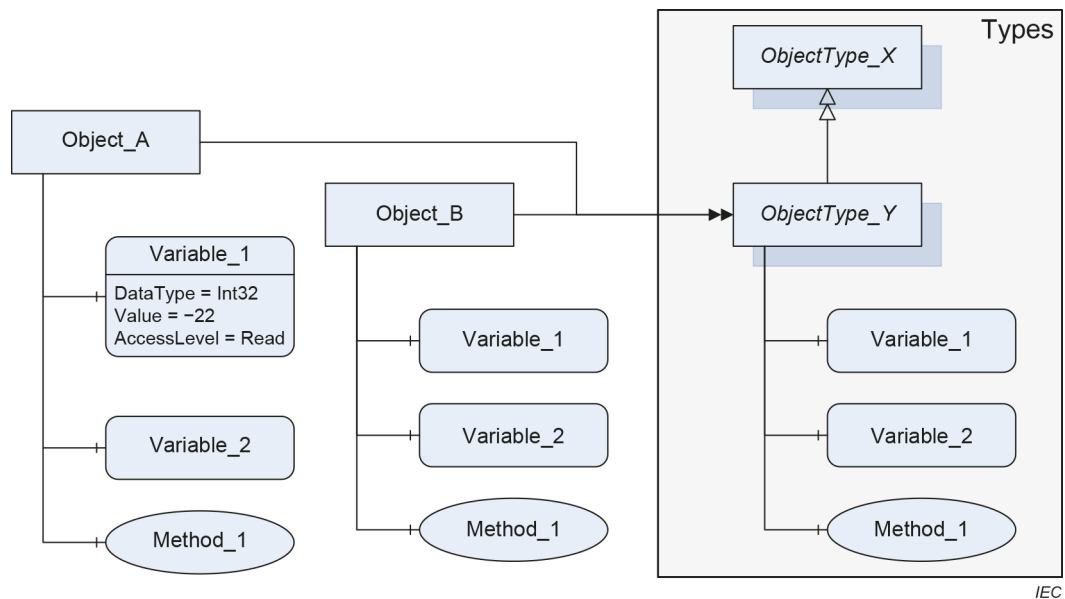


Figure 4 – OPC UA graphical notation example

To improve readability, this document frequently includes the type name inside the instance box rather than displaying both boxes and a reference between them. This optimization is shown in Figure 5.

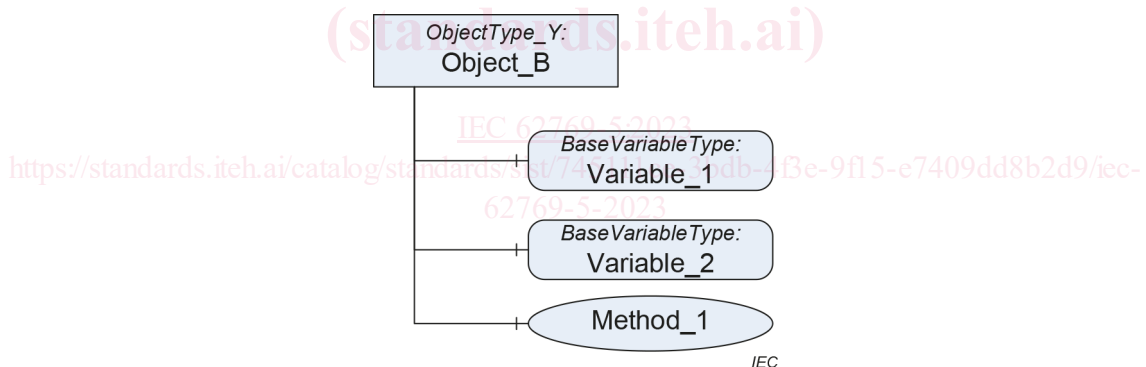


Figure 5 – Optimized Type Reference

4 Overview of OPC Unified Architecture

4.1 General

The main use case for OPC standards is the online data exchange between devices and HMI or SCADA systems. In this use case, the device data is provided by an OPC server and is consumed by an OPC client integrated into the HMI or SCADA system. OPC provides functionality to browse through a hierarchical namespace containing data items and to read, write and monitor these items for data changes.

OPC UA incorporates features like Data Access, Alarms and Historical Data via platform independent communication mechanisms and generic, extensible and object-oriented modelling capabilities for the information a system wants to expose.

The current version of OPC UA defines an optimized binary TCP protocol for high performance intranet communication as well as a mapping to Web Services. The abstract service model does not depend on a specific protocol mapping and allows adding new protocols in the future. Features like security, access control and reliability are directly built into the transport