IEC 62769-5

Edition 2.0 2021-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

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

IEC 62769-5:2021-02(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIELD DEVICE INTEGRATION (FDI) –

Part 5: Information Model

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62769-5 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2015. This edition constitutes a technical revision.

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

a) support for generic protocol extension for faster adoption of other technologies;
b) support of new protocols;
c) generic protocol extension to allow adoption of other communication protocols;
d) based on generic protocol extension: Modbus RTU.

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

FDIS	Report on voting
65E/762/FDIS	65E/772/RVD

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.

A list of all parts in the IEC 62769 series, published under the general title *Field Device Integration (FDI)*, can be found on the IEC website.

This standard contains attached files in the form of XML schema. These files are intended to be used as a complement and do not form an integral part of the standard.

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.

INTRODUCTION

The IEC 62769 series has the general title *Field Device Integration (FDI)* and the following parts:

– Part 1: Overview
– Part 2: FDI Client
– Part 3: FDI Server
– Part 4: FDI Packages
– Part 5: FDI Information Model
– Part 6: FDI Technology Mapping
– Part 7: FDI Communication Devices
– Part 100: Profiles – Generic Protocol Extensions
– Part 101-1: Profiles – Foundation Fieldbus H1
– Part 101-2: Profiles – Foundation Fieldbus HSE
– Part 103-1: Profiles – PROFIBUS
– Part 103-4: Profiles – PROFINET
– Part 109-1: Profiles – HART and WirelessHART
– Part 115-2: Profiles – Protocol-specific Definitions for Modbus RTU
– Part 150-1: Profiles – ISA 100.11a

FIELD DEVICE INTEGRATION (FDI) –

Part 5: Information Model

1 Scope

This part of IEC 62769 defines the FDI 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 a 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.

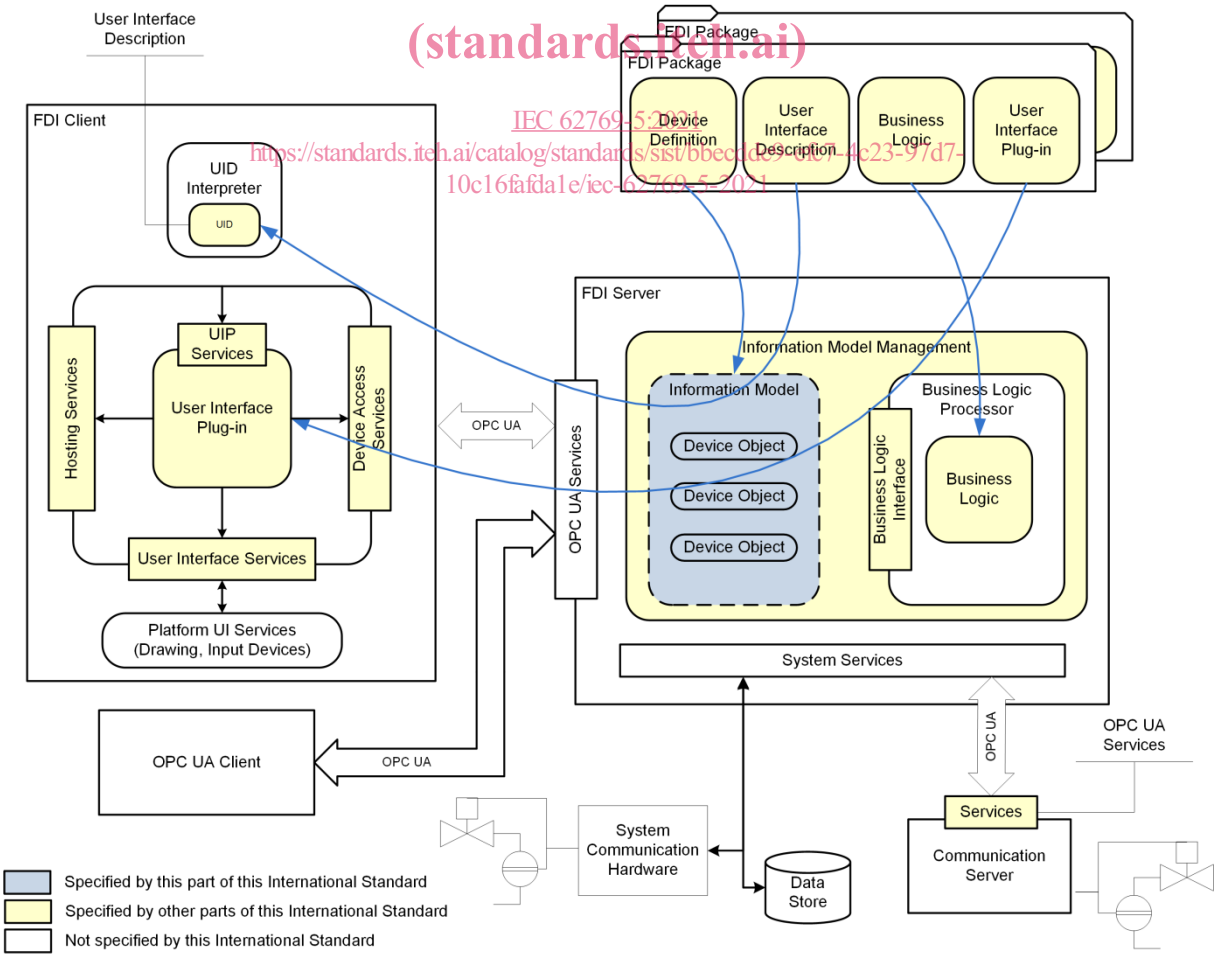

Figure 1 – FDI architecture diagram

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, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

IEC 61804-3, *Function blocks (FB) for process control and Electronic Device Description Language (EDDL) – Part 3: EDDL syntax and semantics*

IEC 61804-4, *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: OPC UA for Devices*

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

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

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

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

3 Terms, definitions, abbreviated terms and conventions

3.1 Terms and definitions

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

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

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

3.2 Abbreviated terms

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

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

3.3 Conventions

For the purposes of this document, the conventions given in IEC 62769-1 apply.

3.4 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.

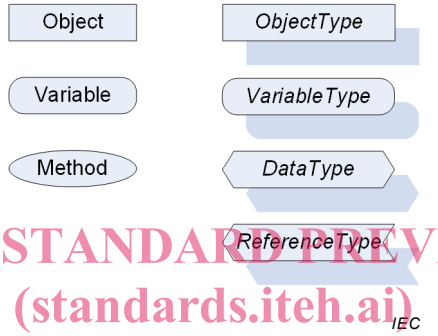

Figure 2 – OPC UA Graphical Notation for NodeClasses

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.

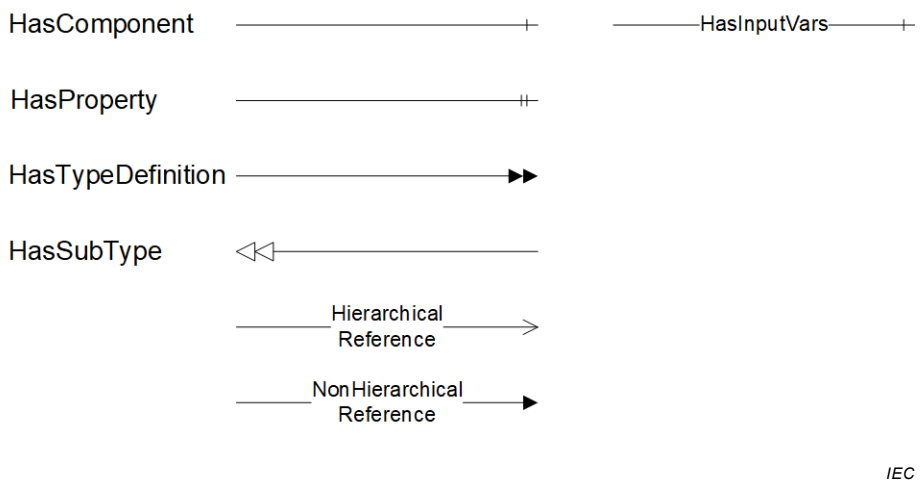

Figure 3 – OPC UA Graphical Notation for References

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).

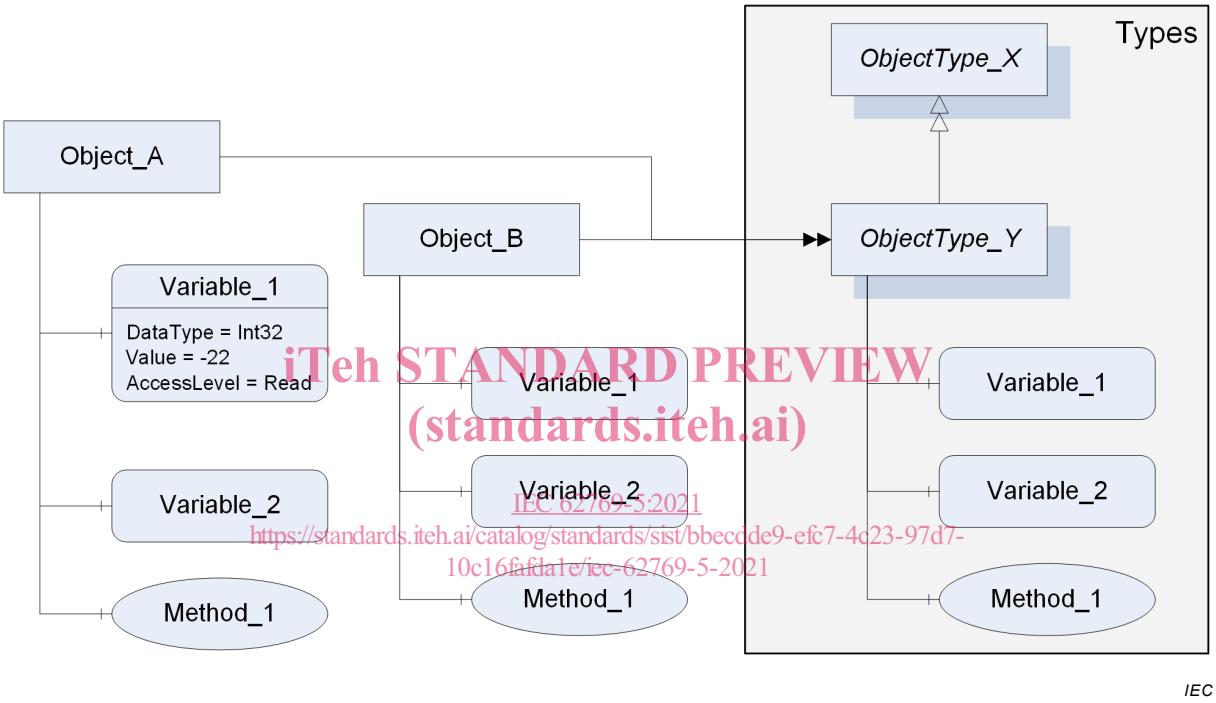

Figure 4 – OPC UA Graphical Notation Example

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.

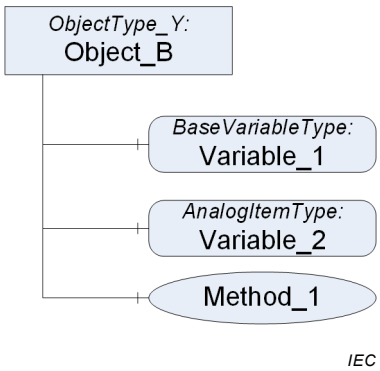

Figure 5 – Optimized Type Reference