

This is a preview - click here to buy the full publication



IEC 62769-7

Edition 3.0 2023-04
REDLINE VERSION

INTERNATIONAL STANDARD



**Field Device Integration (FDI®) –
Part 7: Communication Devices**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040.40; 35.100.05

ISBN 978-2-8322-6842-1

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	6
INTRODUCTION.....	6
1 Scope.....	9
2 Normative references	10
3 Terms, definitions, abbreviated terms, acronyms and conventions.....	10
3.1 Terms and definitions.....	10
3.2 Abbreviated terms and acronyms	11
3.3 Conventions.....	11
3.3.1 EDDL syntax.....	11
3.3.2 Capitalizations.....	11
3.3.3 Graphical notation	11
4 General Overview	11
5 FDI® Communication Package	13
5.1 General.....	13
5.2 EDD.....	13
5.2.1 General rules.....	13
5.2.2 Device component	14
5.2.3 CommunicationDevice component	15
5.2.4 Communication service provider component	17
5.2.5 Connection Point component	18
5.2.6 Connection Point collection.....	18
5.2.7 Network component.....	19
5.2.8 ValidateNetwork	20
5.2.9 ValidateModules	21
5.2.10 UIP specifics	21
5.2.11 Deployment	22
6 Communication relations	22
7 FDI® Communication Server definition	23
7.1 General.....	23
7.2 General characteristics	23
7.3 Information Model.....	23
7.3.1 General	23
7.3.2 CommunicationServerType.....	27
7.3.3 ServerCommunicationDeviceType	31
7.3.4 ServerCommunicationServiceType	36
7.4 OPC UA Server Profile for FDI® Communication Server	39
7.5 Mapping the FDI® Server Information Model to the FDI® Communication Server IM.....	40
7.5.1 General	40
7.5.2 Information Model differences.....	40
7.6 Installer.....	42
7.7 FDI® Communication Package	42
7.7.1 General	42
7.7.2 EDD for lightweight Communication Server.....	42
7.7.3 EDD for multi-channel Communication Server	42
7.7.4 COMMANDs in EDDs for FDI® Communication Servers	43

7.7.5	Documentation	44
7.8	Handling and behaviour	44
7.8.1	General	44
7.8.2	Deployment	45
7.8.3	Server configuration	45
7.8.4	Start up	46
7.8.5	Shutdown	46
7.8.6	Watchdog	46
7.8.7	Establish the OPC UA connection.....	46
7.8.8	Instantiate the Communication Server	47
7.8.9	Configure the communication hardware	47
7.8.10	Configure the Network	47
7.8.11	Parameterize	47
7.8.12	Initialize	47
7.8.13	Create the communication service object.....	47
7.8.14	Communication relation	48
7.8.15	Connect.....	48
7.8.16	Disconnect	48
7.8.17	Abort indication	49
7.8.18	Scan.....	49
7.8.19	SetAddress.....	49
8	FDI® Communication Gateway definition.....	49
8.1	General.....	49
8.2	Information Model	49
8.2.1	General	49
8.2.2	CommunicationGatewayType	50
8.2.3	GatewayCommunicationDeviceType	51
8.2.4	GatewayCommunicationServiceType	54
8.3	FDI® Communication Package	58
8.3.1	General	58
8.3.2	EDD	59
8.4	Handling and behaviour	60
8.4.1	General	60
8.4.2	Deployment	61
8.4.3	Start up	61
8.4.4	Configure the communication hardware	61
8.4.5	Configure the Network	61
8.4.6	Parameterize	61
8.4.7	Communication relation	62
8.4.8	Connect.....	62
8.4.9	Disconnect	62
8.4.10	Abort indication	62
8.4.11	Scan.....	62
8.4.12	Communication Error Handling	63
Annex A	(informative) Layered protocols.....	64
A.1	General.....	64
A.2	Convention for protocol specific annex creation	64
A.2.1	General	64
A.2.2	Connection Point	64

A.3	FDI® Communication Package definition	66
A.3.1	Communication services	66
A.3.2	Connection Point	66
A.3.3	Network	66
A.4	Representation in the Information Model	66
Annex B (normative)	Namespace and Mappings	67
Figure 1	– FDI® architecture diagram	9
Figure 2	– FDI® communication infrastructure architecture	12
Figure 3	– Communication relation	22
Figure 4	– Communication relation state chart	23
Figure 5	– FDI® Communication Server AddressSpace	26
Figure 6	– CommunicationServerType	27
Figure 7	– ServerCommunicationDeviceType	32
Figure 8	– ServerCommunicationServiceType	36
Figure 9	– Information Model differences (example)	41
Figure 10	– FDI® Communication Server state machine	45
Figure 11	– Communication relation state chart	48
Figure 12	– Gateway information model	50
Figure 13	– CommunicationGatewayType	51
Figure 14	– GatewayCommunicationDeviceType	52
Figure 15	– GatewayCommunicationServiceType	55
Figure 16	– Nested Communication	61
Table 1	– ValidateNetwork Action arguments	21
Table 2	– ValidateModules Action arguments	21
Table 3	– CommunicationServerType definition	27
Table 4	– MethodSet of CommunicationServerType	27
Table 5	– Reset Method arguments	28
Table 6	– Reset Method AddressSpace definition	28
Table 7	– Initialize Method arguments	29
Table 8	– Initialize Method AddressSpace definition	29
Table 9	– AddComponent Method arguments	30
Table 10	– AddComponent Method AddressSpace definition	30
Table 11	– RemoveComponent Method arguments	31
Table 12	– RemoveComponent Method AddressSpace definition	31
Table 13	– ServerCommunicationDeviceType definition	32
Table 14	– MethodSet of ServerCommunicationDeviceType	32
Table 15	– Scan Method arguments	33
Table 16	– Scan Method AddressSpace definition	33
Table 17	– Scan Method arguments	34
Table 18	– Scan Method AddressSpace definition	34
Table 19	– ResetScan Method arguments	34
Table 20	– ResetScan Method AddressSpace definition	35

Table 21 – SetAddress Method arguments.....	35
Table 22 – ServerCommunicationServiceType definition.....	36
Table 23 – MethodSet of ServerCommunicationServiceType	36
Table 24 – Connect Method arguments.....	37
Table 25 – Disconnect Method arguments	38
Table 26 – Transfer Method arguments.....	38
Table 27 – GetPublishedData Method arguments.....	39
Table 28 – FDI®CommunicationServer_Facet definition	40
Table 29 – CommunicationGatewayType definition	51
Table 30 – GatewayCommunicationDeviceType definition.....	52
Table 31 – MethodSet of GatewayCommunicationDeviceType	52
Table 32 – Scan Method arguments.....	53
Table 33 – Scan Method AddressSpace definition.....	53
Table 34 – ScanNext Method arguments.....	54
Table 35 – ScanNext Method AddressSpace definition	54
Table 36 – GatewayCommunicationServiceType definition.....	55
Table 37 – MethodSet of GatewayCommunicationServiceType	56
Table 38 – Connect Method arguments.....	57
Table 39 – Transfer Method arguments.....	58

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE INTEGRATION (FDI®) –

Part 7: Communication Devices

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62769-7:2021. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62769-7 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.

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 ScanExtended Method.

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

Draft	Report on voting
65E/859/CDV	65E/916/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.

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.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document 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 7: Communication Devices

1 Scope

This part of IEC 62769 specifies the elements implementing communication capabilities called Communication Devices ~~(IEC 62769-5)~~.

The overall FDI®¹ architecture is illustrated in Figure 1. The architectural components that are within the scope of this document have been highlighted in this illustration. The document scope with respect to FDI® Packages is limited to Communication Devices. The Communication Server shown in Figure 1 is an example of a specific Communication Device.

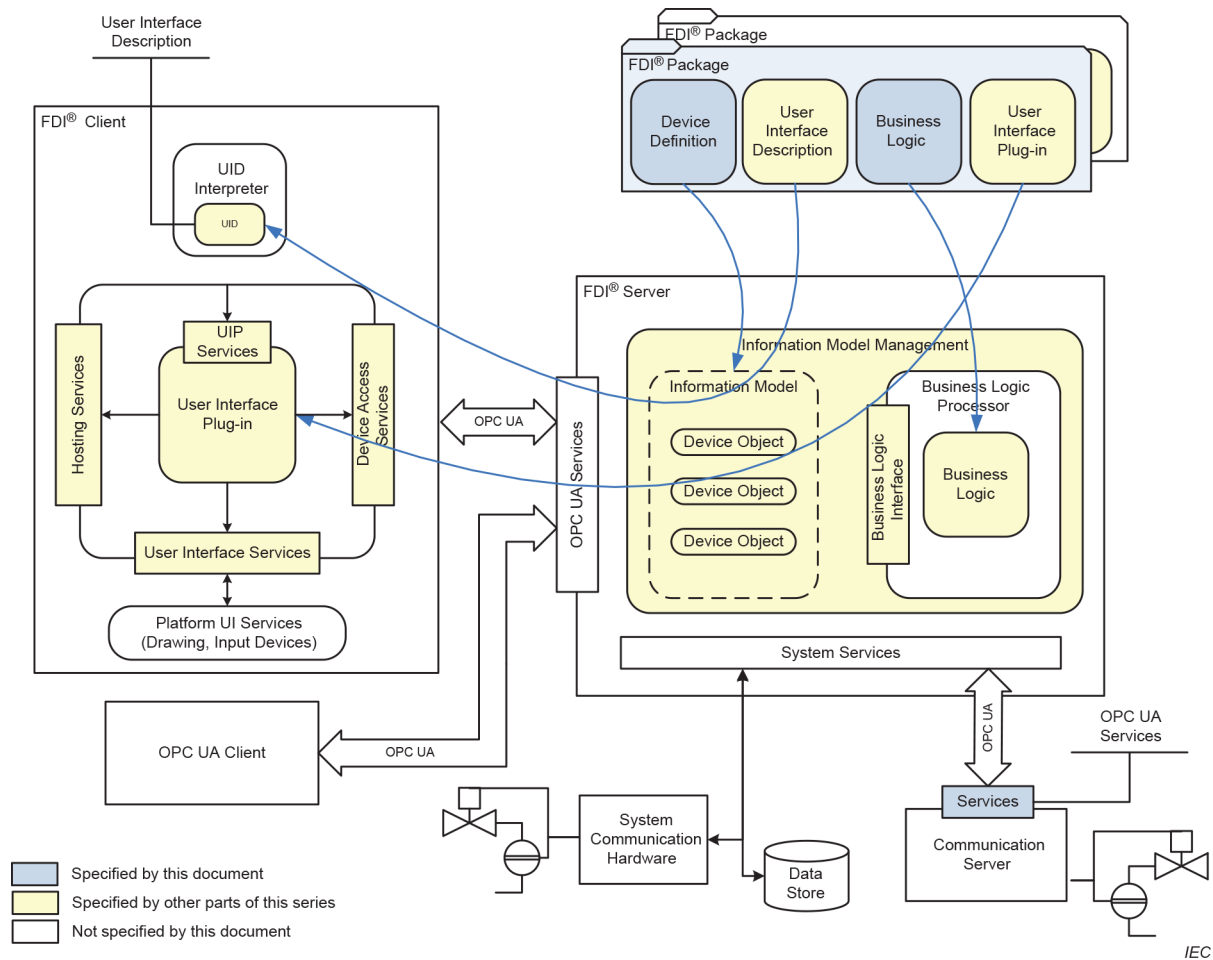


Figure 1 – FDI® architecture diagram

¹ FDI® is a registered trademark of the non-profit organization Fieldbus Foundation, Inc. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the trademark holder or any of its products. Compliance does not require use of the trade name. Use of the trade name requires permission of the trade name holder.

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 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 (all parts), OPC Unified Architecture~~

IEC TR 62541-1, *OPC Unified Architecture – Part 1: Overview and concepts*

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

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

IEC 62541-7, *OPC unified architecture – Part 7: Profiles*

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: ~~FDI~~ Client*

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

IEC 62769-4: ~~2020~~2023, *Field Device Integration (FDI®) – Part 4: FDI® Packages*

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

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Field Device Integration (FDI®) –
Part 7: Communication Devices**

**Intégration des appareils de terrain (FDI®) –
Partie 7: Appareils de Communication**



CONTENTS

FOREWORD.....	6
1 Scope.....	8
2 Normative references	9
3 Terms, definitions, abbreviated terms, acronyms and conventions.....	9
3.1 Terms and definitions.....	9
3.2 Abbreviated terms and acronyms	9
3.3 Conventions.....	10
3.3.1 EDDL syntax.....	10
3.3.2 Capitalizations	10
3.3.3 Graphical notation	10
4 Overview	10
5 FDI® Communication Package	12
5.1 General.....	12
5.2 EDD.....	12
5.2.1 General rules.....	12
5.2.2 Device component	13
5.2.3 CommunicationDevice component	14
5.2.4 Communication service provider component	15
5.2.5 Connection Point component	17
5.2.6 Connection Point collection.....	17
5.2.7 Network component.....	18
5.2.8 ValidateNetwork	19
5.2.9 ValidateModules	20
5.2.10 UIP specifics	20
5.2.11 Deployment	21
6 Communication relations	21
7 FDI® Communication Server definition	22
7.1 General.....	22
7.2 General characteristics	22
7.3 Information Model	22
7.3.1 General	22
7.3.2 CommunicationServerType.....	25
7.3.3 ServerCommunicationDeviceType	29
7.3.4 ServerCommunicationServiceType	33
7.4 OPC UA Server Profile for FDI® Communication Server	37
7.5 Mapping the FDI® Server Information Model to the FDI® Communication Server IM	38
7.5.1 General	38
7.5.2 Information Model differences.....	38
7.6 Installer.....	39
7.7 FDI® Communication Package	39
7.7.1 General	39
7.7.2 EDD for lightweight Communication Server.....	40
7.7.3 EDD for multi-channel Communication Server	40
7.7.4 COMMANDs in EDDs for FDI® Communication Servers	40
7.7.5 Documentation	41

7.8	Handling and behaviour	41
7.8.1	General	41
7.8.2	Deployment	42
7.8.3	Server configuration	42
7.8.4	Start up	43
7.8.5	Shutdown	43
7.8.6	Watchdog	43
7.8.7	Establish the OPC UA connection	43
7.8.8	Instantiate the Communication Server	44
7.8.9	Configure the communication hardware	44
7.8.10	Configure the Network	44
7.8.11	Parameterize	44
7.8.12	Initialize	44
7.8.13	Create the communication service object	44
7.8.14	Communication relation	45
7.8.15	Connect	45
7.8.16	Disconnect	45
7.8.17	Abort indication	46
7.8.18	Scan	46
7.8.19	SetAddress	46
8	FDI® Communication Gateway definition	46
8.1	General	46
8.2	Information Model	46
8.2.1	General	46
8.2.2	CommunicationGatewayType	47
8.2.3	GatewayCommunicationDeviceType	48
8.2.4	GatewayCommunicationServiceType	51
8.3	FDI® Communication Package	55
8.3.1	General	55
8.3.2	EDD	56
8.4	Handling and behaviour	57
8.4.1	General	57
8.4.2	Deployment	58
8.4.3	Start up	58
8.4.4	Configure the communication hardware	58
8.4.5	Configure the Network	58
8.4.6	Parameterize	58
8.4.7	Communication relation	59
8.4.8	Connect	59
8.4.9	Disconnect	59
8.4.10	Abort indication	59
8.4.11	Scan	59
8.4.12	Communication Error Handling	60
Annex A (informative)	Layered protocols	61
A.1	General	61
A.2	Convention for protocol specific annex creation	61
A.2.1	General	61
A.2.2	Connection Point	61
A.3	FDI® Communication Package definition	63

A.3.1	Communication services	63
A.3.2	Connection Point	63
A.3.3	Network	63
A.4	Representation in the Information Model	63
Annex B (normative)	Namespace and Mappings	64
Figure 1	– FDI® architecture diagram	8
Figure 2	– FDI® communication infrastructure architecture	11
Figure 3	– Communication relation	21
Figure 4	– Communication relation state chart	22
Figure 5	– FDI® Communication Server AddressSpace	24
Figure 6	– CommunicationServerType	25
Figure 7	– ServerCommunicationDeviceType	29
Figure 8	– ServerCommunicationServiceType	34
Figure 9	– Information Model differences (example)	38
Figure 10	– FDI® Communication Server state machine	42
Figure 11	– Communication relation state chart	45
Figure 12	– Gateway information model	47
Figure 13	– CommunicationGatewayType	48
Figure 14	– GatewayCommunicationDeviceType	49
Figure 15	– GatewayCommunicationServiceType	52
Figure 16	– Nested Communication	58
Table 1	– ValidateNetwork Action arguments	20
Table 2	– ValidateModules Action arguments	20
Table 3	– CommunicationServerType definition	25
Table 4	– MethodSet of CommunicationServerType	25
Table 5	– Reset Method arguments	26
Table 6	– Reset Method AddressSpace definition	26
Table 7	– Initialize Method arguments	27
Table 8	– Initialize Method AddressSpace definition	27
Table 9	– AddComponent Method arguments	28
Table 10	– AddComponent Method AddressSpace definition	28
Table 11	– RemoveComponent Method arguments	29
Table 12	– RemoveComponent Method AddressSpace definition	29
Table 13	– ServerCommunicationDeviceType definition	30
Table 14	– MethodSet of ServerCommunicationDeviceType	30
Table 15	– Scan Method arguments	31
Table 16	– Scan Method AddressSpace definition	31
Table 17	– Scan Method arguments	32
Table 18	– Scan Method AddressSpace definition	32
Table 19	– ResetScan Method arguments	32
Table 20	– ResetScan Method AddressSpace definition	33
Table 21	– SetAddress Method arguments	33

Table 22 – ServerCommunicationServiceType definition	34
Table 23 – MethodSet of ServerCommunicationServiceType	34
Table 24 – Connect Method arguments	35
Table 25 – Disconnect Method arguments	36
Table 26 – Transfer Method arguments	36
Table 27 – GetPublishedData Method arguments	37
Table 28 – FDI®CommunicationServer_Facet definition	37
Table 29 – CommunicationGatewayType definition	48
Table 30 – GatewayCommunicationDeviceType definition	49
Table 31 – MethodSet of GatewayCommunicationDeviceType	49
Table 32 – Scan Method arguments	50
Table 33 – Scan Method AddressSpace definition	50
Table 34 – ScanNext Method arguments	51
Table 35 – ScanNext Method AddressSpace definition	51
Table 36 – GatewayCommunicationServiceType definition	52
Table 37 – MethodSet of GatewayCommunicationServiceType	53
Table 38 – Connect Method arguments	54
Table 39 – Transfer Method arguments	55

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE INTEGRATION (FDI®) –

Part 7: Communication Devices

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 62769-7 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.

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 ScanExtended Method.

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

Draft	Report on voting
65E/859/CDV	65E/916/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.

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.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

FIELD DEVICE INTEGRATION (FDI®) –

Part 7: Communication Devices

1 Scope

This part of IEC 62769 specifies the elements implementing communication capabilities called Communication Devices.

The overall FDI®¹ architecture is illustrated in Figure 1. The architectural components that are within the scope of this document have been highlighted in this illustration. The document scope with respect to FDI® Packages is limited to Communication Devices. The Communication Server shown in Figure 1 is an example of a specific Communication Device.

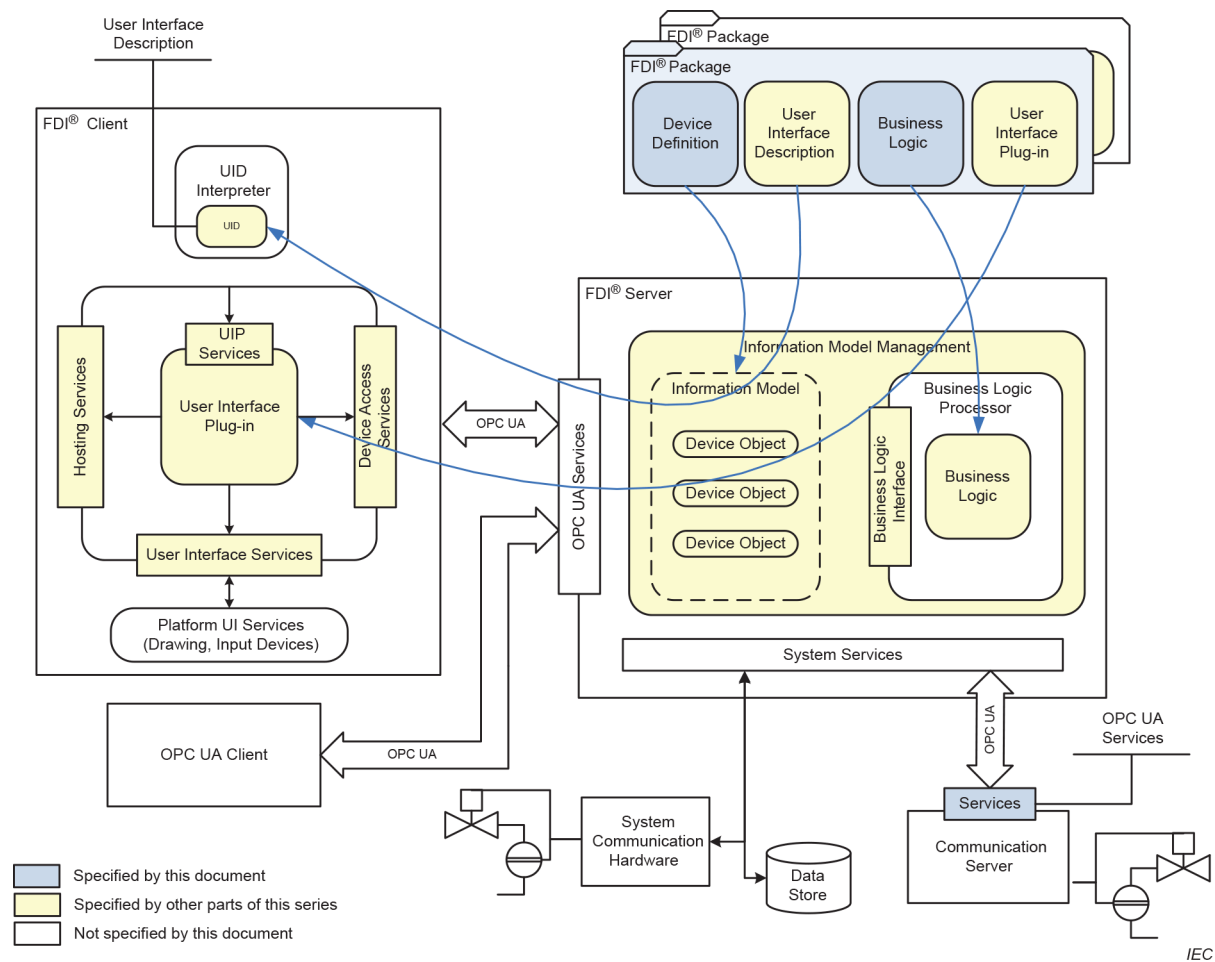


Figure 1 – FDI® architecture diagram

¹ FDI® is a registered trademark of the non-profit organization Fieldbus Foundation, Inc. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the trademark holder or any of its products. Compliance does not require use of the trade name. Use of the trade name requires permission of the trade name holder.

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 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 TR 62541-1, *OPC Unified Architecture – Part 1: Overview and concepts*

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

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

IEC 62541-7, *OPC unified architecture – Part 7: Profiles*

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 62769-4:2023, *Field Device Integration (FDI®) – Part 4: FDI® Packages*

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

SOMMAIRE

AVANT-PROPOS	70
1 Domaine d'application	72
2 Références normatives	73
3 Termes, définitions, abréviations, acronymes et conventions	73
3.1 Termes et définitions	73
3.2 Abréviations et acronymes	74
3.3 Conventions	74
3.3.1 Syntaxe EDDL	74
3.3.2 Utilisation de majuscules	74
3.3.3 Notation graphique	74
4 Vue d'ensemble	74
5 Paquetage de Communication FDI®	76
5.1 Généralités	76
5.2 EDD	76
5.2.1 Règles générales	76
5.2.2 Composant Appareil	77
5.2.3 Composant CommunicationDevice	79
5.2.4 Composant fournisseur de services de communication	80
5.2.5 Composant Point de Connexion	81
5.2.6 Collection Point de Connexion	82
5.2.7 Composant réseau	82
5.2.8 ValidateNetwork	84
5.2.9 ValidateModules	84
5.2.10 Eléments spécifiques de l'UIP	85
5.2.11 Déploiement	85
6 Relations de communication	85
7 Définition du Serveur de Communication FDI®	87
7.1 Généralités	87
7.2 Caractéristiques générales	87
7.3 Modèle d'Information	87
7.3.1 Généralités	87
7.3.2 CommunicationServerType	89
7.3.3 ServerCommunicationDeviceType	93
7.3.4 ServerCommunicationServiceType	98
7.4 Profil de Serveur d'architecture unifiée OPC pour un Serveur de Communication FDI®	102
7.5 Mapping du Modèle d'Information du Serveur FDI® au Modèle d'Information du Serveur de Communication FDI®	103
7.5.1 Généralités	103
7.5.2 Différences des Modèles d'Information	103
7.6 Programme d'Installation	105
7.7 Paquetage de Communication FDI®	105
7.7.1 Généralités	105
7.7.2 EDD pour le Serveur de Communication léger	105
7.7.3 EDD pour un Serveur de Communication multivoie	106
7.7.4 COMMAND dans les EDD pour les Serveurs de Communication FDI®	106
7.7.5 Documentation	107

7.8	Traitement et comportement	107
7.8.1	Généralités	107
7.8.2	Déploiement	108
7.8.3	Configuration du Serveur	108
7.8.4	Démarrage	109
7.8.5	Arrêt	109
7.8.6	Chien de garde	109
7.8.7	Etablissement de la connexion OPC UA	109
7.8.8	Instanciation du Serveur de Communication	110
7.8.9	Configuration du matériel de communication.....	110
7.8.10	Configuration du Réseau	110
7.8.11	Paramétrage.....	110
7.8.12	Initialize	110
7.8.13	Création de l'objet de service de communication	111
7.8.14	Relation de communication.....	111
7.8.15	Connect.....	111
7.8.16	Disconnect	112
7.8.17	Indication d'Abandon	112
7.8.18	Scan.....	112
7.8.19	SetAddress.....	112
8	Définition de la Passerelle de Communication FDI®	112
8.1	Généralités	112
8.2	Modèle d'Information.....	112
8.2.1	Généralités	112
8.2.2	CommunicationGatewayType	113
8.2.3	GatewayCommunicationDeviceType	114
8.2.4	GatewayCommunicationServiceType.....	117
8.3	Paquetage de Communication FDI®	121
8.3.1	Généralités	121
8.3.2	EDD	122
8.4	Traitement et comportement	123
8.4.1	Généralités	123
8.4.2	Déploiement	124
8.4.3	Démarrage	124
8.4.4	Configuration du matériel de communication.....	124
8.4.5	Configuration du Réseau	124
8.4.6	Paramétrage.....	125
8.4.7	Relation de communication.....	125
8.4.8	Connect.....	125
8.4.9	Disconnect	125
8.4.10	Indication d'Abandon	125
8.4.11	Scan.....	125
8.4.12	Traitement des Erreurs de Communication	126
Annexe A (informative)	Protocoles hiérarchisés	127
A.1	Généralités	127
A.2	Convention applicable à la création d'annexes spécifiques au protocole	127
A.2.1	Généralités	127
A.2.2	Point de Connexion	127
A.3	Définition du Paquetage de Communication FDI®.....	129

A.3.1	Services de communication	129
A.3.2	Point de Connexion	129
A.3.3	Réseau	129
A.4	Représentation dans le Modèle d'Information	129
Annexe B (normative)	Espace de noms et Mappings	130
Figure 1	– Diagramme de l'architecture FDI®	72
Figure 2	– Architecture de l'infrastructure de communication FDI®	75
Figure 3	– Relation de communication	86
Figure 4	– Diagramme d'états-transitions de la relation de communication	86
Figure 5	– AddressSpace du Serveur de Communication FDI®	88
Figure 6	– CommunicationServerType	89
Figure 7	– ServerCommunicationDeviceType	94
Figure 8	– ServerCommunicationServiceType	99
Figure 9	– Différences entre les Modèles d'Information (exemple)	104
Figure 10	– Diagramme d'états du Serveur de Communication FDI®	108
Figure 11	– Diagramme d'états-transitions de la relation de communication	111
Figure 12	– Modèle d'information de la passerelle	113
Figure 13	– CommunicationGatewayType	114
Figure 14	– GatewayCommunicationDeviceType	115
Figure 15	– GatewayCommunicationServiceType	118
Figure 16	– Communication imbriquée	124
Tableau 1	– Arguments de l'Action ValidateNetwork	84
Tableau 2	– Arguments de l'Action ValidateModules	85
Tableau 3	– Définition de CommunicationServerType	89
Tableau 4	– MethodSet de CommunicationServerType	90
Tableau 5	– Arguments de la Méthode Reset	91
Tableau 6	– Définition de l'AddressSpace de la Méthode Reset	91
Tableau 7	– Arguments de la Méthode Initialize	92
Tableau 8	– Définition de l'AddressSpace de la Méthode Initialize	92
Tableau 9	– Arguments de la Méthode AddComponent	92
Tableau 10	– Définition de l'AddressSpace de la Méthode AddComponent	93
Tableau 11	– Arguments de la Méthode RemoveComponent	93
Tableau 12	– Définition de l'AddressSpace de la Méthode RemoveComponent	93
Tableau 13	– Définition de ServerCommunicationDeviceType	94
Tableau 14	– MethodSet de ServerCommunicationDeviceType	95
Tableau 15	– Arguments de la Méthode Scan	95
Tableau 16	– Définition de l'AddressSpace de la Méthode Scan	96
Tableau 17	– Arguments de la Méthode Scan	96
Tableau 18	– Définition de l'AddressSpace de la Méthode Scan	96
Tableau 19	– Arguments de la Méthode ResetScan	97
Tableau 20	– Définition de l'AddressSpace de la Méthode ResetScan	97
Tableau 21	– Arguments de la Méthode SetAddress	98

Tableau 22 – Définition de ServerCommunicationServiceType.....	99
Tableau 23 – MethodSet de ServerCommunicationServiceType.....	99
Tableau 24 – Arguments de la Méthode Connect.....	100
Tableau 25 – Arguments de la Méthode Disconnect.....	101
Tableau 26 – Arguments de la Méthode Transfer.....	101
Tableau 27 – Arguments de la Méthode GetPublishedData.....	102
Tableau 28 – Définition de FDI®CommunicationServer_Facet.....	103
Tableau 29 – Définition de CommunicationGatewayType.....	114
Tableau 30 – Définition de GatewayCommunicationDeviceType.....	115
Tableau 31 – MethodSet de GatewayCommunicationDeviceType.....	115
Tableau 32 – Arguments de la Méthode Scan.....	116
Tableau 33 – Définition de l'AddressSpace de la Méthode Scan.....	116
Tableau 34 – Arguments de la Méthode ScanNext.....	117
Tableau 35 – Définition de l'AddressSpace de la Méthode ScanNext.....	117
Tableau 36 – Définition de GatewayCommunicationServiceType.....	118
Tableau 37 – MethodSet de GatewayCommunicationServiceType.....	119
Tableau 38 – Arguments de la Méthode Connect.....	120
Tableau 39 – Arguments de la Méthode Transfer.....	121

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

INTÉGRATION DES APPAREILS DE TERRAIN (FDI®) –

Partie 7: Appareils de Communication

AVANT-PROPOS

- 1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 62769-7 a été établie par le sous-comité 65E: Les dispositifs et leur intégration dans les systèmes de l'entreprise, du comité d'études 65 de l'IEC: Mesure, commande et automation dans les processus industriels. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2021. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) ajout de la Méthode ScanExtended.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
65E/859/CDV	65E/916/RVC

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/publications.

Une liste de toutes les parties de la série IEC 62769, publiées sous le titre général *Intégration des appareils de terrain (FDI®)*, se trouve sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

IMPORTANT – Le logo "colour inside" qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.

INTÉGRATION DES APPAREILS DE TERRAIN (FDI®) –

Partie 7: Appareils de Communication

1 Domaine d'application

La présente partie de l'IEC 62769 spécifie les éléments de mise en œuvre des fonctions de communication, appelés Appareils de Communication.

L'architecture FDI®¹ complète est représentée à la Figure 1. Les composants architecturaux qui relèvent du domaine d'application du présent document ont été mis en évidence dans cette représentation. Le domaine d'application du document relatif aux Paquetages FDI® est limité aux Appareils de Communication. Le Serveur de Communication représenté à la Figure 1 est un exemple d'Appareil de Communication spécifique.

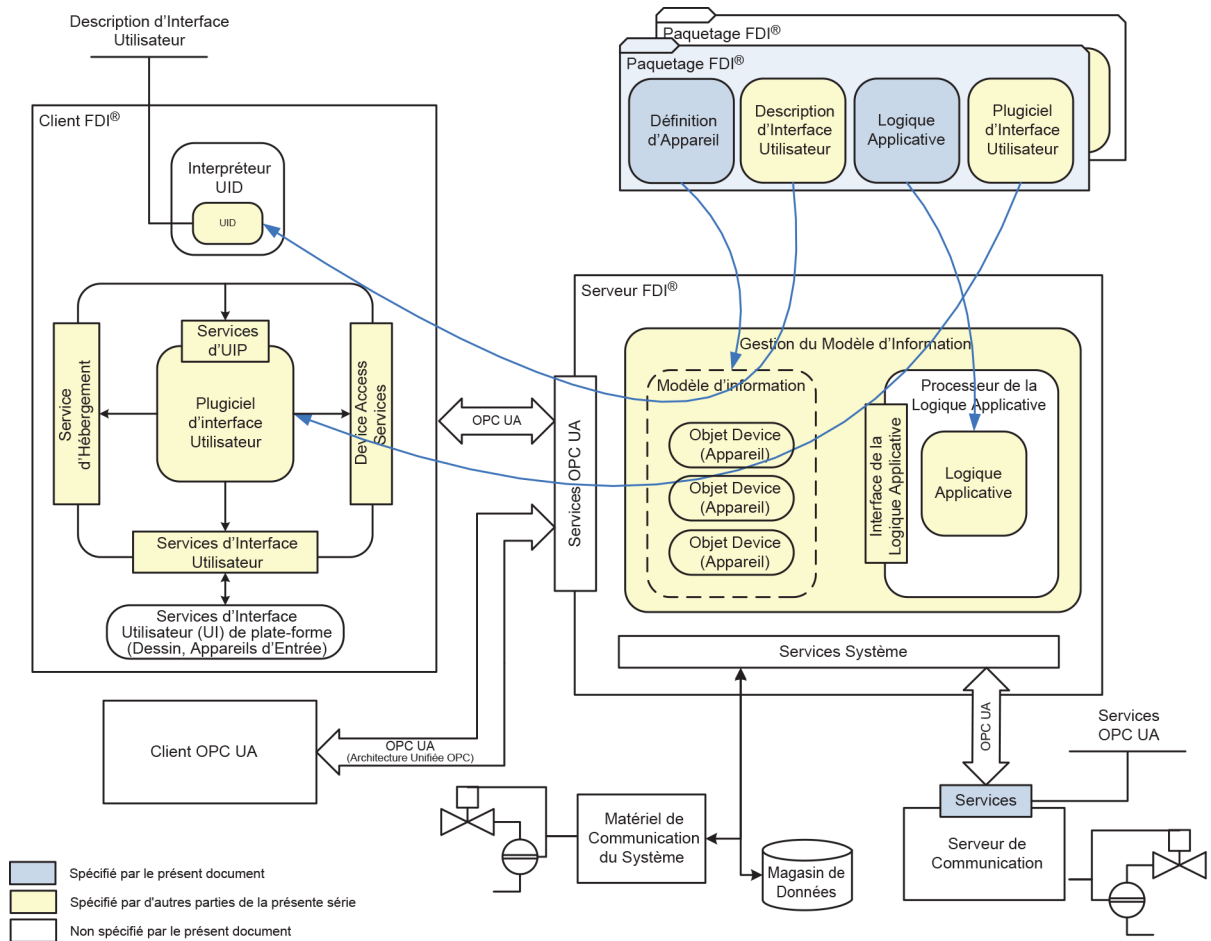


Figure 1 – Diagramme de l'architecture FDI®

¹ FDI® est une marque déposée de l'organisation à but non lucratif Fieldbus Foundation, Inc. Cette information est donnée à l'intention des utilisateurs du présent document et ne signifie nullement que l'IEC approuve le détenteur de la marque ou l'emploi de ses produits. La conformité n'exige pas l'utilisation de la marque. L'utilisation de la marque exige l'autorisation du détenteur de la marque.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 61804-3, *Les dispositifs et leur intégration dans les systèmes de l'entreprise – Blocs fonctionnels (FB) pour les procédés industriels et le langage de description électronique de produit (EDDL) – Partie 3: Sémantique et syntaxe EDDL*

IEC 61804-4, *Les dispositifs et leur intégration dans les systèmes de l'entreprise – Blocs fonctionnels (FB) pour les procédés industriels et le langage de description électronique de produit (EDDL) – Partie 4: Interprétation EDD*

IEC TR 62541-1, *OPC Unified Architecture – Part 1: Overview and concepts* (disponible en anglais seulement)

IEC 62541-4, *Architecture unifiée OPC – Partie 4: Services*

IEC 62541-6, *Architecture unifiée OPC – Partie 6: Mappings*

IEC 62541-7, *Architecture unifiée OPC – Partie 7: Profils*

IEC 62541-100, *Architecture unifiée OPC – Partie 100: Interface d'appareils*

IEC 62769-1, *Intégration des appareils de terrain (FDI®) – Partie 1: Vue d'ensemble*

IEC 62769-2, *Intégration des appareils de terrain (FDI®) – Partie 2: Client*

IEC 62769-3, *Intégration des appareils de terrain (FDI®) – Partie 3: Serveur*

IEC 62769-4:2023, *Intégration des appareils de terrain (FDI®) – Partie 4: Paquetages FDI®*

IEC 62769-5, *Intégration des appareils de terrain (FDI®) – Partie 5: Modèle d'Information FDI®*