SLOVENSKI STANDARD
oSIST prEN IEC 62769-7:2022

01-maj-2022

Integracija procesne naprave (FDI) - 7. del: Komunikacijske naprave

Field Device Integration (FDI) - Part 7: Communication Devices

iTeh STANDARD
PREVIEW

Intégration des appareils de terrain (FDI) - Partie 7: Appareils de communication

(standards.iteh.ai)

Ta slovenski standard je istoveten z: **prEN IEC 62769-7:2022**

---

oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

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

oSIST prEN IEC 62769-7:2022 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

oSIST prEN IEC 62769-7:2022

iTeh STANDARD
PREVIEW
(standards.iteh.ai)

oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022

65E/859/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62769-7 ED3**	
DATE OF CIRCULATION: **2022-03-04**	CLOSING DATE FOR VOTING: **2022-05-27**
SUPERSEDES DOCUMENTS: **65E/826/RR**	

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: SC 65B,SC 65C	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Field Device Integration (FDI) - Part 7: Communication Devices

PROPOSED STABILITY DATE: 2025

Copyright © 2022 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

oSIST prEN IEC 62769-7:2022

NOTE FROM TC/SC OFFICERS:

iTeh STANDARD
PREVIEW
(standards.iteh.ai)

oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022

CONTENTS

FOREWORD 7
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 10
3.3 Conventions for graphical notation 11
4 General 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 16
5.2.4 Communication service provider component 17
5.2.5 Connection Point component 18
5.2.6 Connection Point collection 19
5.2.7 Network component 20
5.2.8 ValidateNetwork 21
5.2.9 ValidateModules 22
5.2.10 UIP specifics 22
5.2.11 Deployment 23
6 Communication relations 23
7 FDI Communication Server definition 24
7.1 General 24
7.2 General characteristics 24
7.3 Information Model 24
7.3.1 General 24
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 40
7.5 Mapping the FDI Server IM to the FDI Communication Server IM 41
7.5.1 General 41
7.5.2 Information Model differences 41
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 43

iTeh STANDARD PREVIEW (standards.iteh.ai)
oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022

7.7.4 COMMANDs in EDDs for FDI Communication Servers 43
7.7.5 Documentation 44
7.8 Handling and behavior 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 49
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 behavior 61
8.4.1 General 61
8.4.2 Deployment 61
8.4.3 Start up 62
8.4.4 Configure the communication hardware 62
8.4.5 Configure the Network 62
8.4.6 Parameterize 62
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

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022

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 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 67
A.4 Representation in the IM 67
Annex B (normative) Namespace and Mappings 68

Figure 1 – FDI architecture diagram 9
Figure 2 – FDI communication infrastructure architecture 12
Figure 3 – Communication relation 23
Figure 4 – Communication relation state chart 24
Figure 5 – FDI Communication Server AddressSpace 26
Figure 6 – CommunicationServerType 27
Figure 7 – ServerCommunicationDeviceType 31
Figure 8 – ServerCommunicationServiceType 37
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 51
Figure 15 – GatewayCommunicationServiceType 55
Figure 16 – Nested Communication 61

Table 1 – ValidateNetwork Action arguments 22
Table 2 – ValidateModules Action arguments 22
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

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022

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 35
Table 20 – ResetScan Method AddressSpace definition 35
Table 21 – SetAddress Method arguments 36
Table 22 – ServerCommunicationServiceType definition 37
Table 23 – MethodSet of ServerCommunicationServiceType 37
Table 24 – Connect Method arguments 38
Table 25 – Disconnect Method arguments 38
Table 26 – Transfer Method arguments 39
Table 27 – GetPublishedData Method arguments 40
Table 28 – *FDICommunicationServer_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 53
Table 35 – ScanNext Method AddressSpace definition 54
Table 36 – GatewayCommunicationServiceType definition 55
Table 37 – MethodSet of GatewayCommunicationServiceType 55
Table 38 – Connect Method arguments 57
Table 39 – Transfer Method arguments 58

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022

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

iTeh STANDARD PREVIEW (standards.iteh.ai) oSIST prEN IEC 62769-7:2022 https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b1-4219-802b-b29cf99dcf56/osist-pren-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022

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

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

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/standardsdev/publications.

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.

iTeh STANDARD
PREVIEW
(standards.iteh.ai)

oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022

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 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.

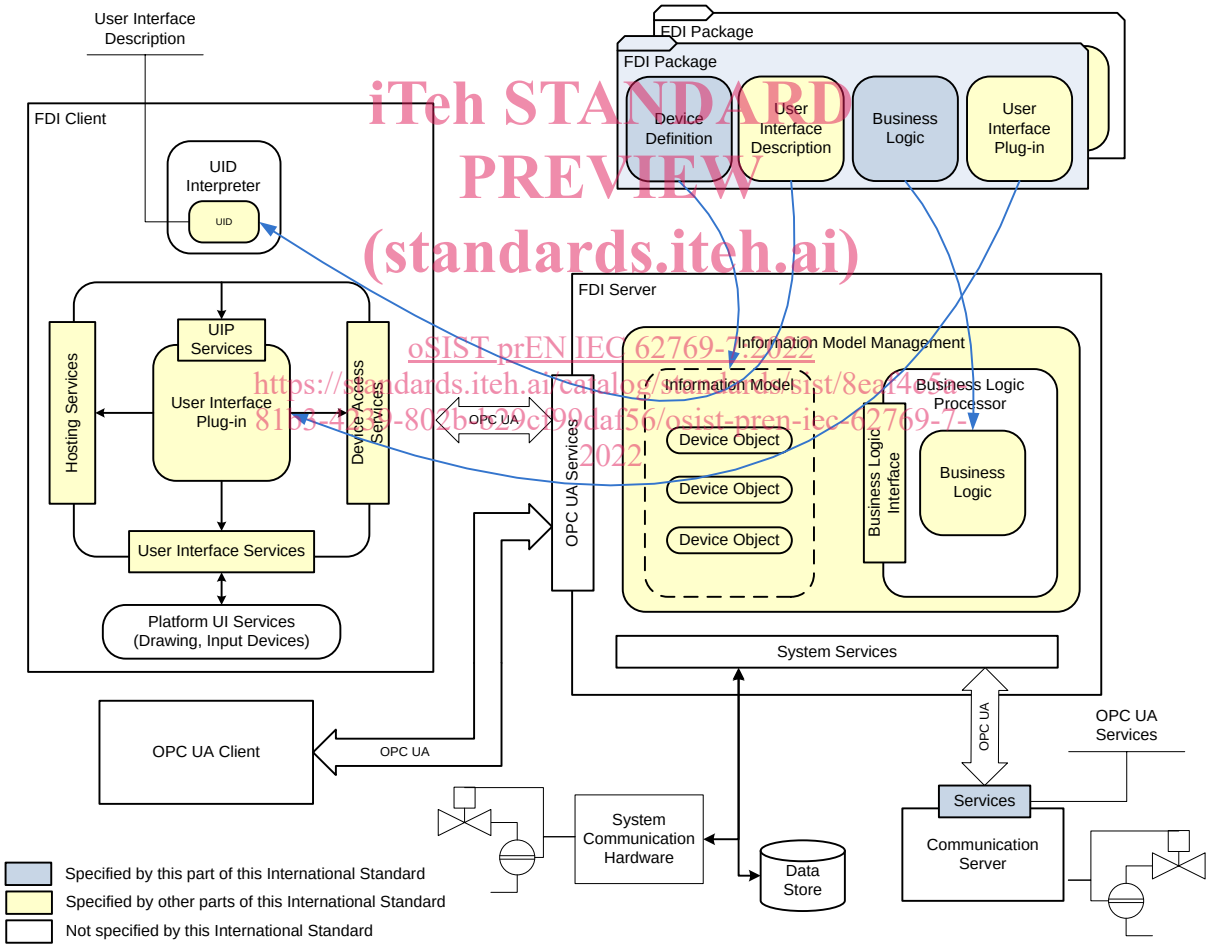


Figure 1 – FDI architecture diagram

iTeh STANDARD PREVIEW (standards.iteh.ai)
oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8ea14e5...-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022

2 Normative references

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

IEC 62769-3, *Function blocks (FB) for process control and Electronic Device Description Language (EDDL) – Part 3: EDDL syntax and semantics*

IEC 62769-4, *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: 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 62769-3, *Field Device Integration (FDI) – Part 3: FDI Server*

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

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

iTeh STANDARD PREVIEW (standards.iteh.ai)

3 Terms, definitions, abbreviated terms, acronyms and conventions

oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/0eaf4e9a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

3.1 Terms and definitions

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

3.1.1
Gateway
communication device that enables to bridge between different physical networks or different protocols

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.

HTTP	Hypertext Transfer Protocol
IP	Internet Protocol
PHY	Physical communication hardware
SNMP	Simple Network Management Protocol
TCP	Transmission Control Protocol
URI	Uniform Resource Identifier

oSIST prEN IEC 62769-7:2022

3.3 Conventions for graphical notation

This document uses the graphical notation defined in IEC 62769-5.

4 General

The abstract term FDI Communication Device represents an entity implementing communication functions over a network using a specific protocol. The group of FDI Communication Devices splits into two main groups.

a) The FDI Communication Server is a dedicated OPC UA Server providing access to one or more field device networks. The FDI Communication Server is specified in Clause 7.

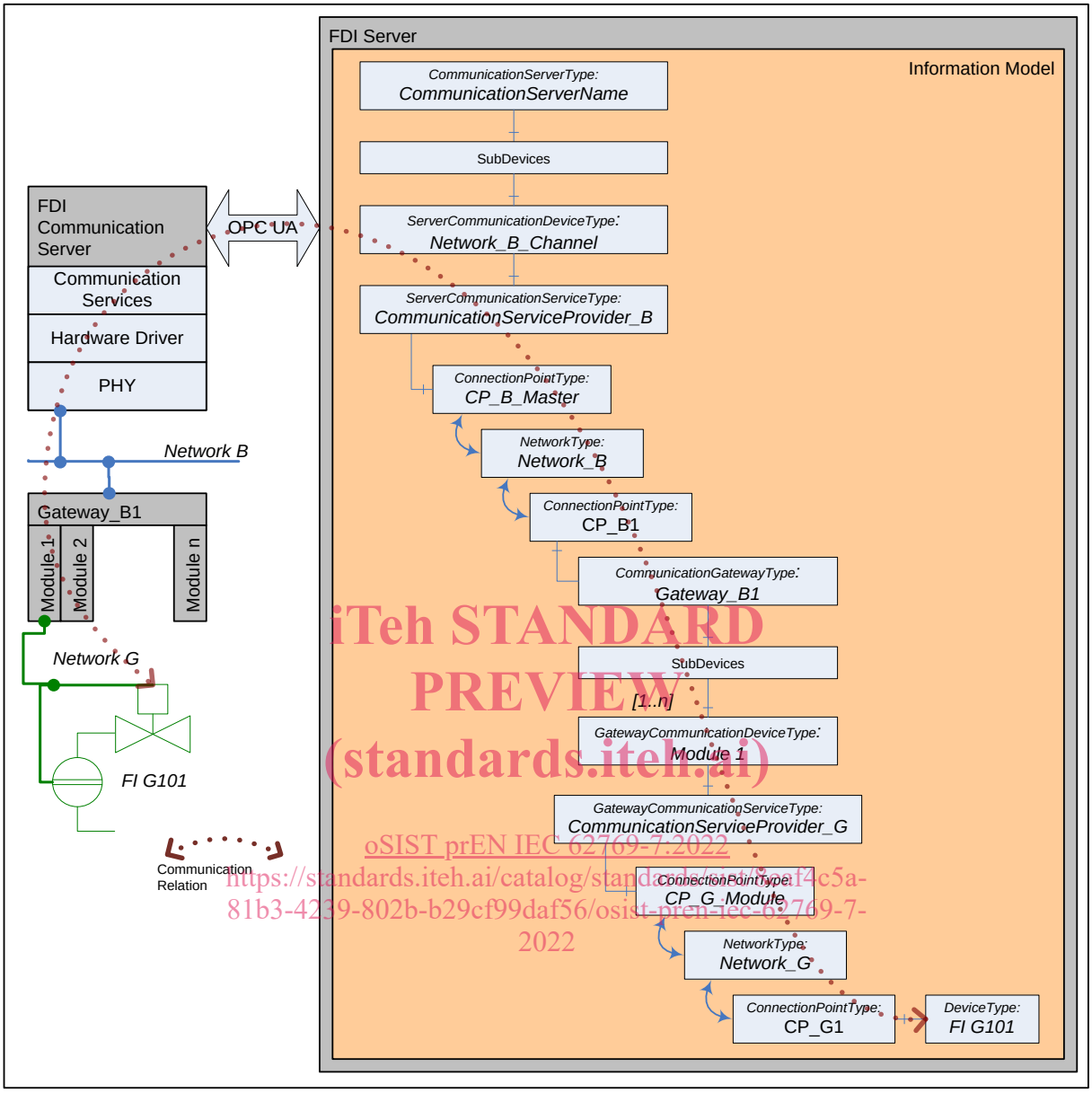
b) The FDI Communication Gateway enables to bridge between different physical networks or different protocols. The bridging business logic is implemented in the EDD component that is provided with an FDI Communication Package. The FDI Communication Gateway is specified in Clause 8.

NOTE The main differences between a Gateway and a Communication Server are: in terms of FDI the FDI Communication Server is a dedicated OPC UA Server providing access to one or more field device networks. A Gateway is a communication device that enables to bridge between different physical networks or different protocols. The logical representation of a Gateway device within the FDI Server hosted Information Model enables the FDI Server to process communication in heterogeneous network topologies.

iTeh STANDARD
PREVIEW
(standards.iteh.ai)

oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

oSIST prEN IEC 62769-7:2022



iTeh STANDARD PREVIEW (standards.iteh.ai)
oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/0eaf4c5a-81b3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

Figure 2 – FDI communication infrastructure architecture

The FDI Server hosted Information Model contains a representation of the network topology. (see also IEC 62769-5). The Information Model shown in Figure 2 is an example excerpt to illustrate how the Information Model used elements reflect the actual network topology.

1) The instance of CommunicationServerType (named CommunicationServerName) represents the FDI Communication Server. The FDI Communication Server implements physical communication network access (Communication hardware). Clause 7 describes related Information Model specifics, required FDI Communication Package content and handling of elements therein. (For subdevices see IEC 62769-5)

2) The instance of ServerCommunicationDeviceType and ServerCommunication-ServiceType (named Network_B_Channel) maps to the FDI Communication Server implemented communication services. The ServerCommunicationDeviceType is specified in 7.3.3. The ServerCommunicationServiceType is specified in 7.3.4.

oSIST prEN IEC 62769-7:2022

3) The instance of CommunicationGatewayType (named Gateway_B1) represents the physical Gateway. Clause 8 describes the related Information Model specifics, the required FDI Package content and the handling of elements therein.

4) The instance of GatewayCommunicationDeviceType (named Module 1) maps to a physical or logical module enabling communication to the network to which this module is connected. The GatewayCommunicationDeviceType is specified in 8.3.2.3. The related Gateway specifics are described in Clause 8.

5) The instance of GatewayCommunicationServiceType (named CommunicationServiceProvider_G) represents the Gateways' ability to process communication services. The Gateway specific implementation of GatewayCommunicationServiceType is based on Business Logic that enables to run communication services in heterogeneous communication networks.

6) A communication relation (more details are described in Clause 6) between a physical device and the device representation managed by the FDI Server is always associated to communication service objects that are instances of a GatewayCommunicationServiceType or ServerCommunicationServiceType. The ability of instantiating multiple communication service objects supports protocols enables to operate multiple logical connections between a bus master and a device.

7) The Information Model represents the connections between the physical devices shown on the left side of Figure 2 based on instances of ConnectionPointType NetworkType and the depicted relations. ConnectionPointType and NetworkType are specified in IEC 62769-5.

5 FDI Communication Package

iTeh STANDARD PREVIEW (standards.iteh.ai)

5.1 General

The FDI Server imports the FDI Communication Package like any other FDI Device Package. Clause 5 specifies the FDI Communication Package details.

5.2 EDD

5.2.1 General rules

oSIST prEN IEC 62769-7:2022
https://standards.iteh.ai/catalog/standards/sist/8eaf4c5a-8ff3-4239-802b-b29cf99daf56/osist-pren-iec-62769-7-2022

The FDI Communication Package contained EDD is not restricted, but bound to a protocol specific profile (see IEC 62769-4 – Annex F).

The EDD elements as specified in the protocol specific profile documents (see IEC 62769-4 – Annex F), and provided with an FDI Communication Package shall describe:

a) Parameter and parameter structures. Mandatory protocol specific parameter definitions are found in the protocol specific profile documents (see IEC 62769-4:–, Annex F). The parameters shall contain any parameter that requires adjustment for proper communication service operation.

c) Physical Layer identification. Protocol specific definitions are found in IEC 62769-4:–, Annex F.

d) Communication devices modularity: The modularity information shall be based on using the EDDL constructs COMPONENT (see IEC 62769-3).

   FDI envisions communication device modularity to cope with communication hardware providing multiple physical or logical communication channels to access multiple logical or physical communication networks. Each module element of the whole communication device shall be described by a separate EDD element.

e) The COMPONENT definition shall be used to support the system implemented topology configuration. Protocol specific definitions are found in the protocol specific profile documents (see IEC 62769-4 – Annex F). The related COMPONENT definitions are described in 5.2.2, 5.2.3, 5.2.4, and 5.2.7.