

DIN EN IEC 62769-7



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Ersatz für
DIN EN 62769-7:2016-03
Siehe Anwendungsbeginn

**Feldgeräteintegration (FDI) –
Teil 7: FDI-Kommunikationsgeräte
(IEC 62769-7:2021);
Englische Fassung EN IEC 62769-7:2021**

Field Device Integration (FDI) –
Part 7: Communication devices
(IEC 62769-7:2021);
English version EN IEC 62769-7:2021

Intégration des appareils de terrain (FDI) –
Partie 7: Appareils de communication
(IEC 62769-7:2021);
Version anglaise EN IEC 62769-7:2021

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Anwendungsbeginn

Anwendungsbeginn für die von CENELEC am 2021-03-12 angenommene Europäische Norm als DIN-Norm ist 2023-03-01.

Für DIN EN 62769-7:2016-03 besteht eine Übergangsfrist bis 2024-03-12.

Nationales Vorwort

Vorausgegangener Norm-Entwurf: E DIN EN 62769-7:2019-06.

Für dieses Dokument ist das nationale Arbeitsgremium DKE/K 956 „Industrielle Kommunikation“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE (www.dke.de) zuständig.

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Der Zusammenhang der zitierten Dokumente mit den entsprechenden deutschen Dokumenten ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

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Da sich die Benutzer der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der EN IEC 62769-7 veröffentlicht. Zu deren Abschnitt 1, der den Anwendungsbereich festlegt und Abschnitt 3, der die Begriffe, Abkürzungen und Konventionen festlegt, wurde eine Übersetzung angefertigt und als informativer Nationaler Anhang NA der vorliegenden Norm hinzugefügt. Für die meisten der verwendeten Begriffe existieren keine gebräuchlichen deutschen Benennungen, da sich die deutschen Anwender in der Regel ebenfalls der englischen Benennungen bedienen. Diese Norm steht nicht in unmittelbarem Zusammenhang mit Rechtsvorschriften und ist nicht als Sicherheitsnorm anzusehen.

Das Original-Dokument enthält Bilder in Farbe, die in der Papierversion in einer Graustufen-Darstellung wiedergegeben werden. Elektronische Versionen dieses Dokuments enthalten die Bilder in der originalen Farbdarstellung.

Änderungen

Gegenüber DIN EN 62769-7:2016-03 wurden folgende Änderungen vorgenommen:

- a) Unterstützung der allgemeinen Protokollerweiterung zur schnelleren Einführung anderer Technologien;
- b) Unterstützung neuer Protokolle;
- c) allgemeine Protokollerweiterung zur Einführung von anderen Kommunikationsprotokollen;
- d) basierend auf der allgemeinen Protokollerweiterung: Modbus RTU.

Frühere Ausgaben

DIN EN 62769-7: 2016-03

Nationaler Anhang NA (informativ)

Auszugsweise Übersetzung

Reihenfolge und Inhalt der folgenden Abschnitte sind identisch mit denen in den jeweiligen Abschnitten der Englischen Fassung.

1 Anwendungsbereich

Dieser Teil von IEC 62769 legt die Elemente fest, mit denen die Kommunikationsleistungen erbracht und die als Kommunikationsgeräte bezeichnet werden (IEC 62769-5).

Die gesamtheitliche FDI-Architektur ist in Bild 1 dargestellt. Die im Anwendungsbereich dieses Dokuments liegenden Architekturkomponenten sind in diesem Bild hervorgehoben. Der Anwendungsbereich des Dokumentes hinsichtlich der FDI-Pakete ist auf die Kommunikationsgeräte begrenzt. Der in Bild 1 dargestellte Kommunikationsserver ist ein Beispiel für ein spezifisches Kommunikationsgerät.

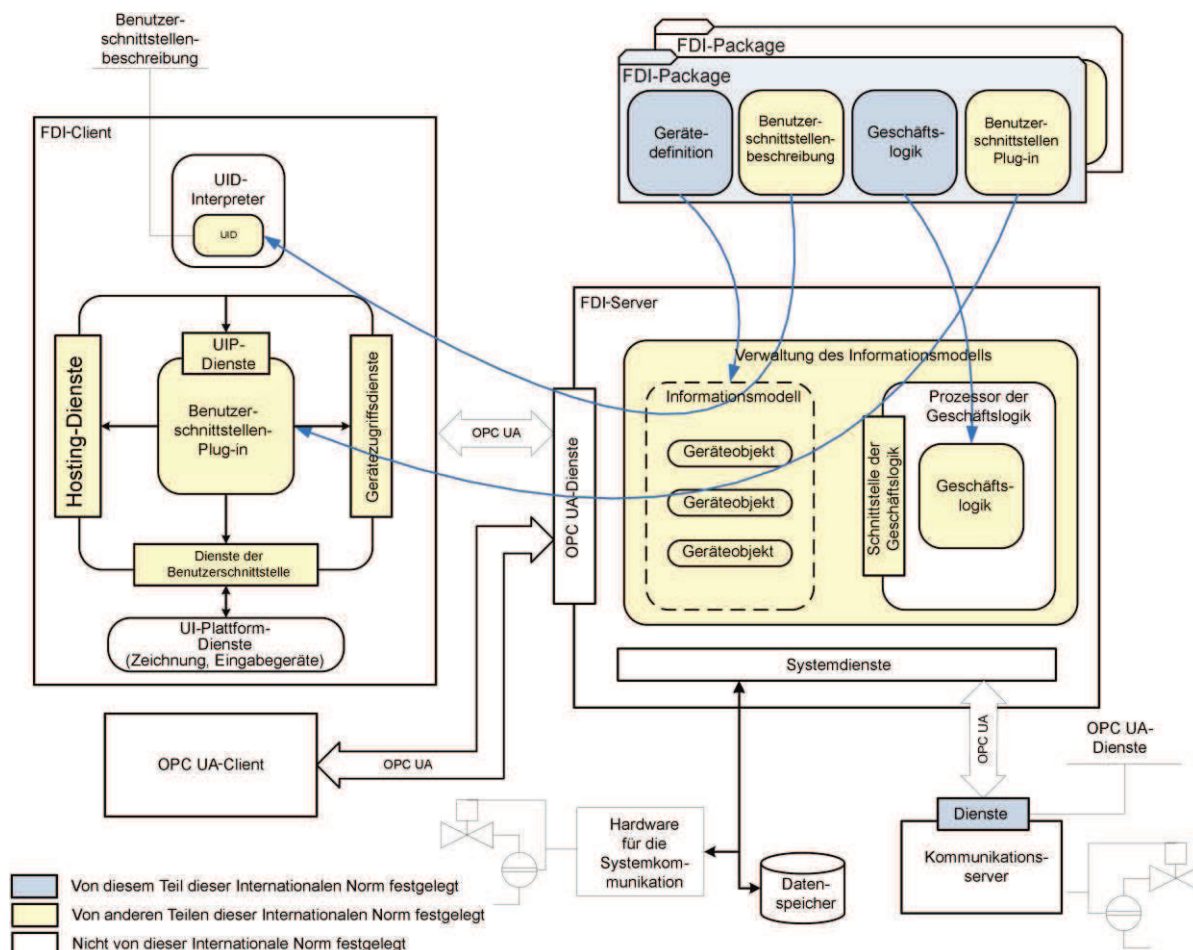


Bild 1 – FDI-Architektur

3 Begriffe, Abkürzungen und Konventionen

3.1 Begriffe

Für die Anwendung dieses Dokuments gelten die Begriffe nach IEC 62769-1 und die folgenden Begriffe.

ISO und IEC stellen terminologische Datenbanken für die Verwendung in der Normung unter den folgenden Adressen bereit:

- IEC Electropedia: verfügbar unter <http://www.electropedia.org/>
- ISO Online Browsing Platform: verfügbar unter <http://www.iso.org/obp>

3.1.1

Gateway

en **gateway**

Kommunikationsgerät, welches die Verbindung zwischen verschiedenen physikalischen Netzen oder verschiedenen Protokollen ermöglicht

3.2 Abkürzungen

Für die Anwendung dieses Dokuments gelten die Abkürzungen nach IEC 62769-1 und die folgenden Abkürzungen.

HTTP	Hypertext-Übertragungsprotokoll (en: Hypertext Transfer Protocol)
IP	Internetprotokoll (en: Internet Protocol)
PHY	Hardware für die physische Kommunikation (en: Physical communication hardware)
SNMP	Einfaches Netzwerkverwaltungsprotokoll (en: Simple Network Management Protocol)
TCP	Übertragungssteuerungsprotokoll (en: Transmission Control Protocol)
URI	Einheitlicher Quellenanzeiger (en: Uniform Resource Identifier)

3.3 Konventionen

Für die Anwendung dieses Dokuments gelten die Konventionen nach IEC 62769-1.

In diesem Dokument wird die in IEC 62769-5 festgelegte graphische Notation verwendet.

– Leerseite –

EUROPEAN STANDARD

EN IEC 62769-7

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2021

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Supersedes EN 62769-7:2015 and all of its amendments and corrigenda (if any)

English version

**Field Device Integration (FDI) – Part 7: Communication devices
(IEC 62769-7:2021)**

Intégration des appareils de terrain (FDI) –
Partie 7: Appareils de communication
(IEC 62769-7:2021)

Feldgeräteintegration (FDI) – Teil 7: FDI-Kommunikationsgeräte
(IEC 62769-7:2021)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brüssel

European foreword

The text of document 65E/764(F)/FDIS, future edition 2 of IEC 62769-7, prepared by SC 65E “Devices and integration in enterprise systems” of IEC/TC 65 “Industrial-process measurement, control and automation” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62769-7:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level (dop) 2021-12-12
by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the document (dow) 2024-03-12
have to be withdrawn

This document supersedes EN 62769-7:2015 and all of its amendments and corrigenda (if any).

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Endorsement notice

The text of the International Standard IEC 62769-7:2021 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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	EN IEC 61804-3	–
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	EN IEC 61804-4	–
IEC 62541	series	OPC Unified Architecture	EN IEC 62541	series
IEC 62769-1	–	Field Device Integration (FDI) – Part 1: Overview	EN IEC 62769-1	–
IEC 62769-2	–	Field Device Integration (FDI) – Part 2: FDI Client	EN IEC 62769-2	–
IEC 62769-3	–	Field Device Integration (FDI) – Part 3: Server	EN IEC 62769-3	–
IEC 62769-4	2021	Field Device Integration (FDI) – Part 4: FDI Packages	EN IEC 62769-4	2021
IEC 62769-5	–	Field Device Integration (FDI) – Part 5: Information Model	EN IEC 62769-5	–

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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

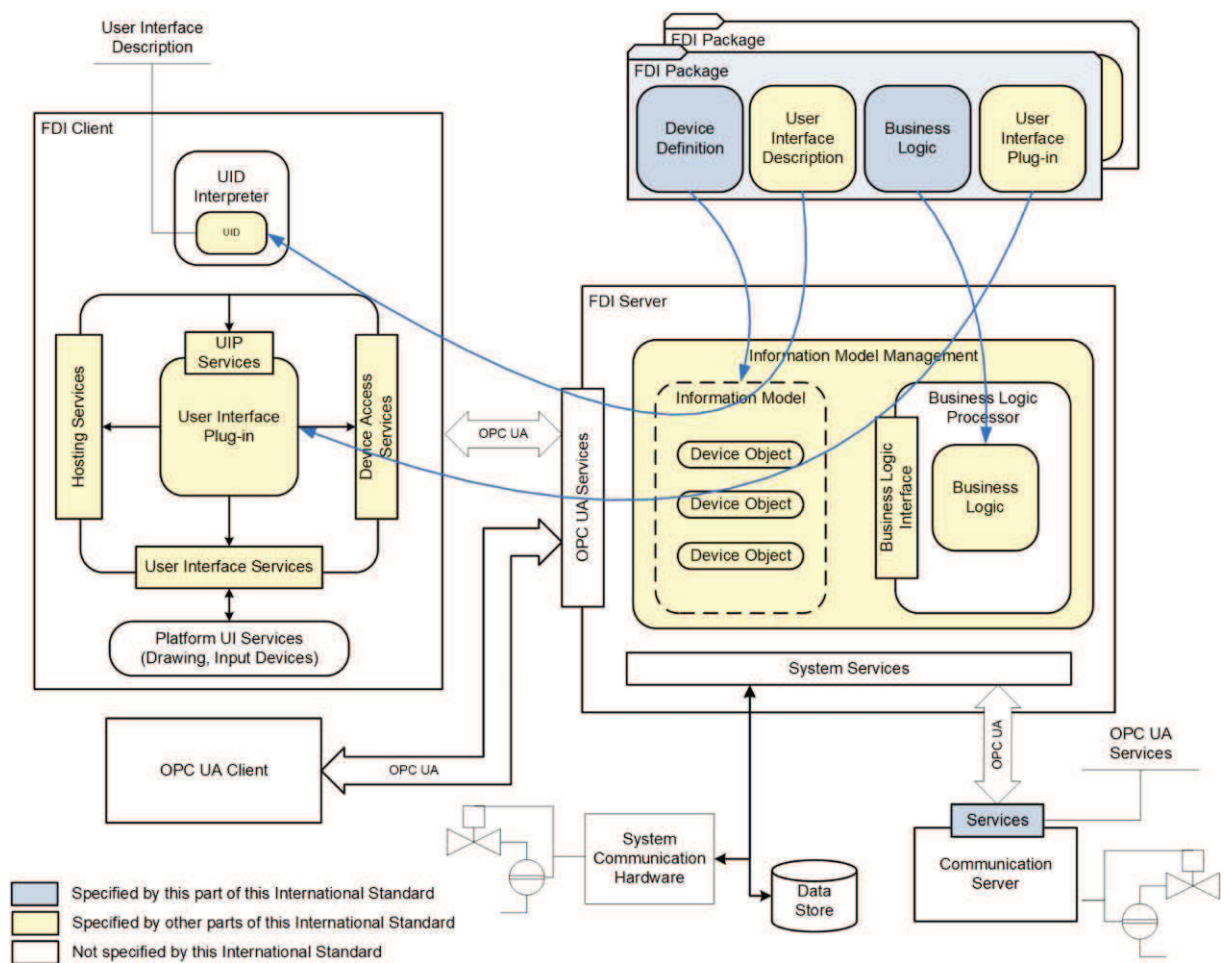
FIELD DEVICE INTEGRATION (FDI) –

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 architecture is illustrated in . 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 is an example of a specific Communication Device.



IEC

Figure 1 – FDI architecture diagram

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 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 (all parts), *OPC Unified Architecture*

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

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

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 as well as the following 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>

3.1.1

gateway

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

3.2 Abbreviated terms

For the purposes of this document, the abbreviated terms 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

3.3 Conventions

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

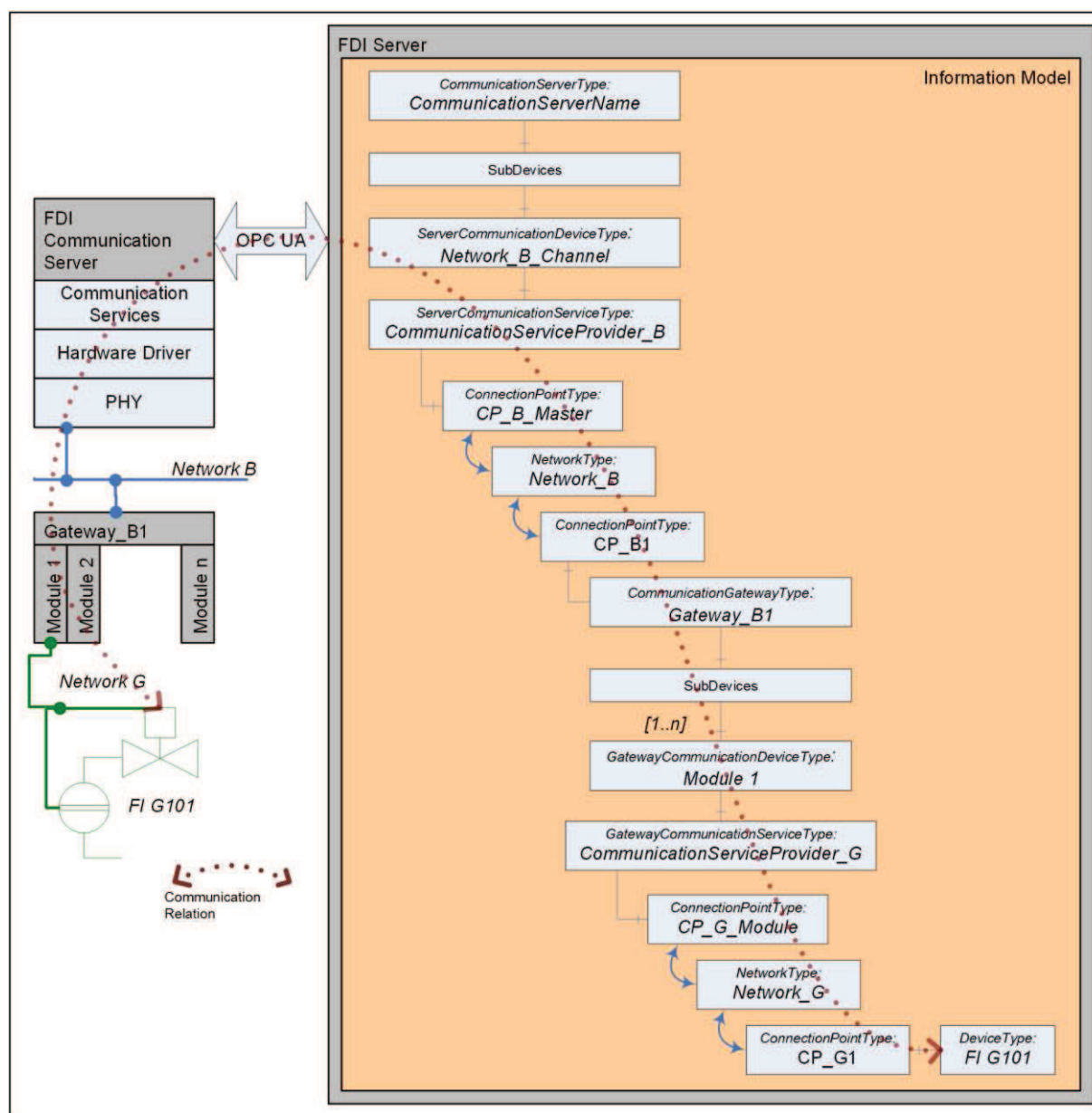
This document uses the graphical notation defined in IEC 62769-5.

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.



IEC

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 used elements of the Information Model 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 sub-devices, 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.
- 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

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

The FDI Communication Package contained EDD is not restricted, but bound to a protocol-specific annex (IEC 62769-4:2020, Annex F).

The EDD elements as specified in IEC 62769-4:2020, Annex F, and provided with an FDI Communication Package shall describe:

- a) Parameter and parameter structures. Mandatory protocol-specific parameter definitions are found in IEC 62769-4:2020, Annex F. The parameters shall contain any parameter that requires adjustment for proper communication service operation.
- b) Physical Layer identification. Protocol-specific definitions are found in IEC 62769-4:2020, Annex F.
Communication devices' modularity: The modularity information shall be based on using the EDDL constructs COMPONENT (see IEC 61804-3).
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.
- c) The COMPONENT definition shall be used to support the system implemented topology configuration. Protocol-specific definitions are found in IEC 62769-4:2020, Annex F. The related COMPONENT definitions are described in 5.2.2, 5.2.3, 5.2.4, and 5.2.7.
- d) The Business Logic shall contain a method enabled to validate the network (see 5.2.8). The validation function considers the elements only directly connected to the network. The validation function shall be referred by the EDDL specified CHECK_CONFIGURATION attribute.
- e) The Business Logic can contain a method enabled to validate the module configuration (see 5.2.9) or the network configuration (see 5.2.8). The validation function considers the elements only directly connected to the related parent element in the topology. The validation function shall be referred by the EDDL specified CHECK_CONFIGURATION attribute.

f) Connection Point data: The Connection Point (see 5.2.4 and 5.2.6) shall be described through EDDL constructs COMPONENT, COLLECTION and VARIABLE. The COMPONENT definition associates the Connection Point element to the Communication Device. The VARIABLE definitions represent the properties of a specific Connection Point. The COLLECTION represents the Connection Point structure as such. Protocol-specific definitions are found in IEC 62769-4:2020 Annex F.

g) MENU:

The Menu structure shall follow the Menu conventions for PC-based applications in accordance with IEC 61804-4, which enables access to:

- 1) FDI Communication Device Type (Bus) parameters: These parameters shall be made accessible by means of "offline_root_menu".
- 2) Topology Configuration Dialogs shall be made available by means of the menu entry point "topology_configuration".

5.2.2 Device component

Each FDI Communication Package shall contain an EDD element describing the device.

```
COMPONENT <DeviceComponentId>
{
    LABEL "<Label>";
    CAN_DELETE TRUE;
    CHECK_CONFIGURATION <ValidateModules>;
    CLASSIFICATION NETWORK_COMPONENT;
    COMPONENT_RELATIONS
    {
        <CommunicationDeviceRelationId>
    }
}

COMPONENT_RELATION <CommunicationDeviceRelationId>
{
    LABEL "Relation type description";
    RELATION_TYPE CHILD_COMPONENT;
    ADDRESSING {<AddressVar>}
    COMPONENTS
    {
        <CommunicationDeviceComponentId>
        {
            AUTO_CREATE <autoCreate>;
            REQUIRED_RANGES
            {
                <AddressVar>{ MIN_VALUE <AddrMin>; MAX_VALUE <AddrMax>;}
            }
        }
    }
    MINIMUM_NUMBER <minNumber>;
    MAXIMUM_NUMBER <maxNumber>;
}
```

<DeviceComponentId>: The COMPONENT identifier identifies the component description for the device type.

<Label>: The string value shall contain a string that allows a human user to determine the function of the FDI Communication Server object.

<ValidateModules>: The Value refers to the METHOD implementing the module topology configuration validation function. Implementation details are specified in 5.2.9.

The attribute COMPONENT_RELATIONS allows to describe how modules can be connected. The definition of the COMPONENT_RELATIONS is optional. If used, it shall describe the relations to the CommunicationDevice definitions. The construct enables generic FDI Server-driven (device) topology configuration to be performed.