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colour inside

Field device integration (FDI®) – Part 6: FDI® Technology Mappings

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IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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CONTENTS

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FIELD DEVICE INTEGRATION (FDI®) –

Part 6: FDI® Technology Mappings

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62769-6:2021. 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 62769-6 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) Separated each technology mapping out to subparts of Part 6 (i.e., Part 6-xxx)

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

Draft	Report on voting
65E/867/CDV	65E/924/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/standardsdev/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 "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- withdrawn,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 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 6: FDI® Technology Mappings

1 Scope

This part of IEC 62769 specifies the technology mapping for the concepts described in the Field Device Integration (FDI®[1]) standard. The technology mapping focuses on implementation of the components FDI® Client and User Interface Plug-in (UIP) ~~that are specific only to~~ in the specified technologies for the WORKSTATION platform~~/.NET~~ and the MOBILE platform as defined in IEC 62769-4. There are individual subparts for the currently supported technologies .NET and HTML5.

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 (all parts), *Function blocks (FB) for process control and Electronic Device Description Language (EDDL)*~~

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 62769-6-100, *Field Device Integration (FDI®) – Part 6-100: Technology Mapping – .NET*

IEC 62769-6-200, *Field Device Integration (FDI®) – Part 6-200: Technology Mapping – HTML5*

~~IEC 62541 (all parts), *OPC Unified Architecture*~~

FCG TS10099, *Field Device Integration (FDI®) – Technology Management*

HTML5, W3C Recommendation. World Wide Web Consortium (W3C) (2014)

~~ISO/IEC 19505-1, *Information technology – Object Management Group Unified Modeling Language (OMG UML) – Part 1: Infrastructure*~~

~~ISO/IEC 29500, (all parts) *Information technology – Document description and processing languages – Office Open XML File Formats*~~

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[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.

ECMA-262, *ECMAScript 2016 Language Specification*

3 Terms, definitions, abbreviated terms, ~~symbols~~ acronyms 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 terminology databases for use in standardization at the following addresses:

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

~~**3.1.1**~~
~~**Application Domain**~~
~~isolated environment where applications execute~~

~~**3.1.2**~~
~~**FDI Type Library**~~
~~assembly that contains the interfaces and data types that are used for the data exchange and interaction between a UIP and an FDI Client~~

~~**3.1.3**~~
~~**Global Assembly Cache**~~
~~machine-wide code cache that stores Assemblies specifically designated to be shared by several applications~~

~~**3.1.4**~~
~~**Windows Registry**~~
~~system-defined database in which applications and system components store and retrieve configuration data~~

3.2 Abbreviated terms and acronyms

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

CLR	Common Language Run-time
~~MSI~~	~~Microsoft Installer~~
~~WPF~~	~~Windows Presentation Foundation~~
UML	Unified Modeling Language

~~**3.3 Symbols**~~

~~Figures in this document use graphical symbols in accordance with ISO/IEC 19505-1 (UML 2.0).~~

~~**3.4 Conventions**~~

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

~~The description of Non-blocking service execution in 4.8.2 uses italics to identify a generic operation name the internal function is being applied to.~~

4 Technical concepts

4.1 General

4.1.1 Overview

In 4.1.2, 4.2, 4.3, 4.4, and 4.5, this document describes first the technology base for UIP implementation, the hardware and software environment including the related implementation rules. Clause 4 follows a life-cycle (use case) oriented approach.

Subclause 4.6 describes the copy deployment procedures and related implementation rules for the UIP and the FDI Client. UIP executable instantiation and termination is described in 4.7. Subclause 4.8 defines the rules about interaction between the FDI Client and the UIP. Security related definitions are written in 4.9. The service interface definitions for the FDI Client and the UIP are found in Clause 5.

4.1.2 Platforms

The UIP and FDI Client shall be built upon the Microsoft .NET Framework and executed in the .NET Common Language Run-time.

The minimum set of workstation-supported I/O devices is: mouse, keyboard, and color screen resolution of 1024 × 768 pixels.

The following Table 1 lists all the technologies and their editions that are consistent with FDI components.

Table 1 – Technology edition reference

Technology	Standard	Edition
.NET	N/A	CLR4 for UIP Implementation
EDDL	IEC 61804	2016
OPC UA (Parts 1-8)	IEC 62541	2015
Open Packaging Convention	ISO/IEC 29500	2016
Extensible Markup Language (XML)	N/A	W3C, 1.0 (fifth edition)

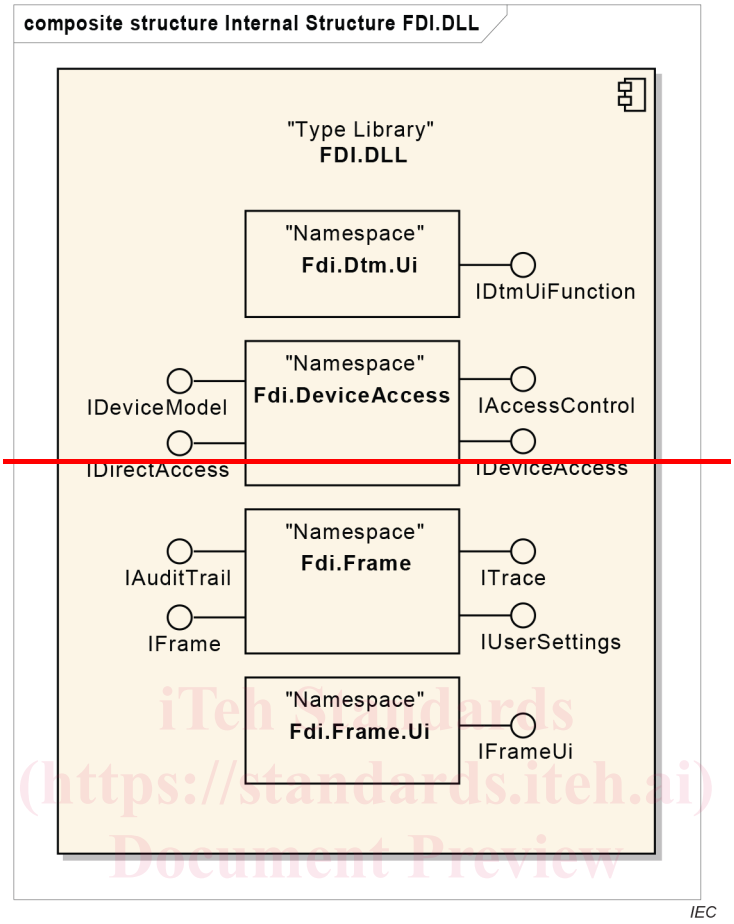
4.1.3 FDI Type Library

The Device Access Services and the UIP Services can be modelled as .NET interfaces passing .NET data type arguments. These interfaces and data types are used for the data exchange and interaction between the UIP and the FDI Client. For runtime error handling purposes during interface method calls, .NET exceptions classes are defined.

The FDI .NET interfaces, data types, and exception classes are defined in a single FDI Type Library. The FDI Type Library is a strong-named Assembly. The file name of this Assembly shall be 'fdi.dll'. The fdi.dll shall be versioned as per IEC 62769-1:2020, 8.1. The FDI Type Library is part of the FDI Core Technology as per IEC 62769-1:2020, 8.3.2.1 and therefore directly influences the FDI Technology Version. All Compatible changes of the fdi.dll lead to an increase of the minor portion of the FDI Technology Version. Incompatible changes lead to an increase of the major portion of the FDI Technology Version (see IEC 62769-1:2020, 8.3.2.2).

The FDI Type Library is signed with a single unique key by the issuer of the file. The FDI Type Library shall be installed separately as part of every FDI Client installation. User Interface Plug-Ins (UIP) and the FDI Client Application shall use this instance of the fdi.dll. UIPs shall not carry or deploy the FDI Type Library. The FDI Client is responsible to provide means to allow updates of this type library over time.

Figure 1 shows the FDI Type Library structure.



NOTE The composite structure diagram shows only the core interfaces that implement the interfaces defined in IEC 62769-2.

Figure 1 – FDI Type Library structure

4.2 UIP representation

The UIP Variant can contain either a single or multiple runtime modules (.NET Assembly) and their related supplementary files (for example: resource files). The runtime module of the UIP Variant is called "UIP executable". The supplementary file(s) of the UIP Variant is/are called "UIP supplement(s)".

UIP supplement(s) is/are stored under (a) subfolder(s) of the UIP executable installation directory.

EXAMPLE Resource files and application configuration data.

The RuntimeId of a UIP Variant shall be ".NET Framework CLR4", see IEC 62769-4. FDI Clients supporting this RuntimeId shall support the .NET Framework 4.6.1 or higher using the CLR4 and UIPs with this RuntimeId shall use the .NET Framework 4.6.1 or lower supporting the CLR4 (meaning .NET Framework 4.0 up to .NET Framework 4.6.1).

The UIP Variant shall be self-contained. All UIP required libraries (.NET Assemblies) required by a UIP Variant are stored within the same Folder.