

SLOVENSKI STANDARD**SIST EN 62453-2:2017****01-september-2017****Nadomešča:****SIST EN 62453-2:2010**

Specifikacija vmesnika orodja procesne naprave (FDT) - 2. del: Osnutki in podrobna razlaga (IEC 62453-2:2016)

Field Device Tool (FDT) Interface Specification - Part 2: Concepts and detailed Description (IEC 62453-2:2016)

Field Device Tool (FDT)-Schnittstellspezifikation - Teil 2: Konzept und grundlegende Beschreibung (IEC 62453-2:2016)
(standards.iteh.ai)

Spécification des interfaces des outils de terrain (FDT) - Partie 2:
Concepts et description détaillée (IEC 62453-2:2016)
fdb7595dfe0c/sist-en-62453-2-2017

Ta slovenski standard je istoveten z: EN 62453-2:2017

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

SIST EN 62453-2:2017**en,fr,de**

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 62453-2:2017

<https://standards.iteh.ai/catalog/standards/sist/36ad557e-091c-4cee-afl7-fdb7595dfe0c/sist-en-62453-2-2017>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62453-2

March 2017

ICS 25.040.40; 35.100.05; 35.110

Supersedes EN 62453-2:2009

English Version

**Field Device Tool (FDT) Interface Specification - Part 2:
 Concepts and detailed Description
 (IEC 62453-2:2016)**

Spécification des interfaces des outils des dispositifs de
 terrain (FDT) - Partie 2: Concepts et description détaillée
 (IEC 62453-2:2016)

Field Device Tool (FDT)-Schnittstellenspezifikation - Teil 2:
 Konzept und grundlegende Beschreibung
 (IEC 62453-2:2016)

This European Standard was approved by CENELEC on 2017-01-20. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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.

iTeh STANDARD PREVIEW
 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 65E/334/CDV, future edition 2 of IEC 62453-2, 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 62453-2:2017.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-10-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-01-20

This document supersedes EN 62453-2:2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

iTeh STANDARD PREVIEW
The text of the International Standard IEC 62453-2:2016 was approved by CENELEC as a European Standard without any modification. **(standards.iteh.ai)**

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

SIST EN 62453-2:2017
<https://standards.iteh.ai/catalog/standards/sist/36ad557e-091c-4cee-aef17>
 IEC/TR 62453-41 NOTE Harmonized as CLC/TR 62453-41

Annex ZA

(normative)

**Normative references to international publications
with their corresponding European publications**

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.

NOTE 1 When 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 61131	series	Programmable controllers	EN 61131	
IEC 62453-1	2016	Field Device Tool (FDT) interface specification -- Part 1: Overview and guidance	FprEN 62453-1	2013
IEC 62453-3xy	series	Field device tool (FDT) interface specification	EN 62453-3xy	series
IEC/TR 62390	2005	Common automation device - Profile guideline	-	-

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 62453-2:2017](#)

<https://standards.iteh.ai/catalog/standards/sist/36ad557e-091c-4cee-afl7-fdb7595dfe0c/sist-en-62453-2-2017>

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 62453-2:2017

<https://standards.iteh.ai/catalog/standards/sist/36ad557e-091c-4cee-afl7-fdb7595dfe0c/sist-en-62453-2-2017>



INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Field device tool (FDT) interface specification –
Part 2: Concepts and detailed description
(standards.iteh.ai)**

**Spécification des interfaces des outils des dispositifs de terrain (FDT) –
Partie 2: Concepts et description détaillée** SIST EN 62453-2:2017
fd87595dfe0c/sist-en-62453-2-2017

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 25.040.40; 35.100.05; 35.110

ISBN 978-2-8322-3758-8

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	10
INTRODUCTION	12
1 Scope	13
2 Normative references	13
3 Terms, definitions, symbols, abbreviated terms and conventions	13
3.1 Terms and definitions	13
3.2 Symbols and abbreviated terms	14
3.3 Conventions	14
3.3.1 Use of UML	14
3.3.2 State availability statement	14
3.3.3 Data type names and references to data types	14
4 Fundamentals	14
4.1 General	14
4.2 Abstract FDT model	14
4.2.1 FDT model overview	14
4.2.2 Frame Application (FA)	18
4.2.3 Device Type Manager (DTM)	19
4.2.4 Channel object	26
4.3 Modularity	28
4.4 Bus categories	29
4.5 Identification	29
4.5.1 DTM instance identification	29
4.6 System and FDT topology	30
4.7 FDT Communication	32
4.7.1 General	32
4.7.2 Handling of communication requests	33
4.7.3 Handling of communication errors	33
4.7.4 Handling of loss of connection	33
4.7.5 Point-to-point communication	33
4.7.6 Nested communication	34
4.8 DTM, DTM Device Type and Hardware Identification Information	35
4.8.1 DTM and DTM Device Type	35
4.8.2 Supported hardware identification	36
4.8.3 Connected Hardware Identification	37
4.9 DTM data persistence and synchronization	37
4.10 DTM device parameter access	38
4.11 DTM state machine	39
4.11.1 DTM states	39
4.11.2 ‘Communication allowed’ sub-states	40
4.12 Basic operation phases	41
4.12.1 Roles and access rights	41
4.12.2 Operation phases	41
4.13 FDT version interoperability	42
4.13.1 Version interoperability overview	42
4.13.2 DTM and device versions	43
4.13.3 Persistence	43
4.13.4 Nested communication	43

5	FDT session model and use cases	44
5.1	Session model overview.....	44
5.2	Actors	45
5.3	Use cases	47
5.3.1	Use case overview.....	47
5.3.2	Observation	47
5.3.3	Operation	47
5.3.4	Maintenance.....	50
5.3.5	Planning	55
5.3.6	OEM service.....	58
5.3.7	Administration.....	58
6	General concepts	59
6.1	Address management	59
6.2	Scanning and DTM assignment.....	60
6.2.1	Scanning overview.....	60
6.2.2	Scanning	60
6.2.3	DTM assignment.....	61
6.2.4	Manufacturer specific device identification	61
6.2.5	Scan for communication hardware	62
6.3	Configuration of Fieldbus Master or Communication Scheduler	62
6.4	PLC tool support	63
6.4.1	General	63
6.4.2	Process image modifications while PLC is running.....	64
6.5	Slave redundancy	65
6.5.1	Redundancy overview catalog/standards/sist/36ad557e-091c-4cce-a1f7	65
6.5.2	Redundancy support in Frame Application (s1750-11-01-is162453-2-2017)	66
6.5.3	Parent component for redundant fieldbus.....	66
6.5.4	Redundancy support in Device DTM	66
6.5.5	Scan and redundant slaves.....	67
7	FDT service specification.....	67
7.1	Service specification overview	67
7.2	DTM services	68
7.2.1	General services.....	68
7.2.2	DTM services related to installation	70
7.2.3	DTM services related to DTM/device information	70
7.2.4	DTM services related to the DTM state machine	73
7.2.5	DTM services related to functions	75
7.2.6	DTM services related to channel objects – service GetChannels	78
7.2.7	DTM services related to documentation – service GetDocumentation	79
7.2.8	DTM services to access the instance data	79
7.2.9	DTM services to evaluate the instance data	80
7.2.10	DTM services to access the device data	81
7.2.11	DTM services related to network management information	83
7.2.12	DTM services related to online operation	84
7.2.13	DTM services related to data synchronization	85
7.2.14	DTM services related to import and export.....	87
7.3	Presentation object services	88
7.4	Channel object service.....	88
7.4.1	Channel object service overview.....	88

7.4.2	Service ReadChannelInformation.....	88
7.4.3	Service WriteChannelInformation.....	88
7.5	Process Channel object services – services for I/O related information	89
7.5.1	Service ReadChannelData.....	89
7.5.2	Service WriteChannelData	89
7.6	Communication Channel object services	90
7.6.1	Services related to communication	90
7.6.2	Services related to sub-topology management.....	93
7.6.3	Services related to GUI and functions	96
7.6.4	Service Scan	96
7.7	Frame Application services	97
7.7.1	General state availability	97
7.7.2	FA services related to general events.....	97
7.7.3	FA services related to topology management.....	98
7.7.4	FA services related to redundancy.....	101
7.7.5	FA services related to storage of DTM data	102
7.7.6	FA services related to DTM data synchronization.....	103
7.7.7	FA service related to process image validation – service ValidateProcessImage	104
7.7.8	FA services related to presentation.....	105
7.7.9	FA Services related to audit trail – service RecordAuditTrailEvent	106
8	FDT dynamic behavior.....	107
8.1	Generate FDT topology	107
8.1.1	FDT topology generation triggered by the Frame Application	107
8.1.2	<small>SIST EN 62453-2:2017 https://standards.iteh.ai/catalog/standards/sist/36ad557e-091c-4cee-a177</small>	107
8.2	Address setting	108
8.2.1	Address setting overview	108
8.2.2	Set or modify device address – with user interface	108
8.2.3	Set or modify device address – without user interface	109
8.2.4	Display or modify all child device addresses with user interface	109
8.3	Communication	110
8.3.1	Communication overview	110
8.3.2	Point-to-point communication.....	110
8.3.3	Nested communication	111
8.3.4	Device initiated data transfer	112
8.4	Scanning and DTM assignment.....	113
8.5	Multi-user scenarios	114
8.5.1	General	114
8.5.2	Synchronized and non-synchronized locking mechanism for DTMs	116
8.5.3	Additional rules	118
8.6	Notification of changes.....	118
8.7	DTM instance data state machines	118
8.7.1	Instance data set overview	118
8.7.2	Modifications state machine.....	119
8.7.3	Persistence state machine	120
8.7.4	Modification in device	120
8.7.5	Storage life cycle	121
8.8	Parent component handling redundant slave	122
8.9	DTM upgrade	124

8.9.1	General rules	124
8.9.2	Saving data from a DTM to be upgraded	124
8.9.3	Loading data in the replacement DTM	125
Annex A (normative) FDT data types definition		126
A.1	General	126
A.2	Basic data types	126
A.3	General data types	127
A.4	User information data types	144
A.5	DTM information data type	145
A.6	BTM data types	146
A.7	Device and Scan identification data types	147
A.8	Function data types	151
A.9	AuditTrail data types	154
A.10	Documentation data types	155
A.11	DeviceList data type	156
A.12	Network management data types	158
A.13	Instance data types	159
A.14	DeviceStatus data types	164
A.15	OnlineCompare data types	164
A.16	UserInterface data types	165
A.17	Fieldbus-specific data types	166
Bibliography		168

Figure 1 – Part 2 of the IEC 62453 series [IEC 62453-2:2017](#) 12

Figure 2 – Abstract FDT model <http://standards.iteh.ai/catalog/standards/sist/36ad557e-091c-4cee-aef7-fdb7595dfe0c/sist-en-62453-2-2017> 15

Figure 3 – Frame Application with integrated Communication Channel 19

Figure 4 – Device Type Manager (DTM) 19

Figure 5 – Communication DTM 20

Figure 6 – Device DTM 21

Figure 7 – Gateway DTM 21

Figure 8 – Composite Device DTM 22

Figure 9 – Module DTM 23

Figure 10 – Block Type Manager (BTM) 24

Figure 11 – Presentation object 25

Figure 12 – Channel object 26

Figure 13 – Communication Channel 27

Figure 14 – Combined Process/Communication Channel 28

Figure 15 – Identification of connected devices 30

Figure 16 – FDT topology for a simple system topology 31

Figure 17 – FDT topology for a complex system topology 32

Figure 18 – Point-to-point communication 34

Figure 19 – Nested communication 35

Figure 20 – DTM, DTM Device Type and Device Identification Information 36

Figure 21 – Connected Hardware Identification 37

Figure 22 – FDT storage and synchronization mechanisms 38

Figure 23 – DTM state machine 39

iTech STANDARD PREVIEW
(standards.iteh.ai)

Figure 24 – Substates of communication allowed	40
Figure 25 – Main use case diagram	45
Figure 26 – Observation use cases	47
Figure 27 – Operation use cases	48
Figure 28 – Maintenance use cases	51
Figure 29 – Planning use cases	55
Figure 30 – OEM service	58
Figure 31 – Administrator use cases	59
Figure 32 – Address setting via DTM Presentation object	60
Figure 33 – Fieldbus scanning	61
Figure 34 – Fieldbus master configuration tool as part of a DTM	63
Figure 35 – Process Image	64
Figure 36 – Transfer of layout information using ProcessImage services	64
Figure 37 – Redundancy scenarios	65
Figure 38 – FDT topology generation triggered by the Frame Applications	107
Figure 39 – FDT topology generation triggered by a DTM	108
Figure 40 – Set or modify device address – with user interface	108
Figure 41 – Set or modify device address – without user interface	109
Figure 42 – Set or modify all device addresses – with user interface	110
Figure 43 – Point-to-point communication	111
Figure 44 – Nested communication	112
Figure 45 – Device initiated data transfer	113
Figure 46 – Scanning and DTM assignment	114
Figure 47 – Multi-user system	115
Figure 48 – General synchronized locking mechanism	116
Figure 49 – General non-synchronized locking mechanism	117
Figure 50 – Parameterization in case of synchronized locking mechanism	117
Figure 51 – Modifications state machine of instance data	119
Figure 52 – Persistence state machine of instance data	120
Figure 53 – Management of redundant topology	123
Figure 54 – Associating data to a dataSetId	124
Figure 55 – Loading data for a supported dataSetId	125
 Table 1 – Description of FDT objects	16
Table 2 – Description of associations between FDT objects	17
Table 3 – Transitions of DTM states	40
Table 4 – Transitions of DTM ‘communication allowed’ sub states	40
Table 5 – Operation phases	42
Table 6 – Actors	46
Table 7 – Operation use cases	49
Table 8 – Maintenance use cases	52
Table 9 – Planning use cases	56
Table 10 – Administrator use cases	59

Table 11 – Arguments for service PrivateDialogEnabled	68
Table 12 – Arguments for service SetLanguage	69
Table 13 – Arguments for service SetSystemGuiLabel	70
Table 14 – Arguments for service GetTypeInformation (for DTM)	71
Table 15 – Arguments for service GetTypeInformation (for BTM)	71
Table 16 – Arguments for service GetIdentificationInformation (for DTM)	71
Table 17 – Arguments for service GetIdentificationInformation (for BTM)	72
Table 18 – Arguments for service Hardware information (for DTM)	72
Table 19 – Arguments for service GetActiveTypeInfo	72
Table 20 – Arguments for service GetActiveTypeInfo (for BTM)	73
Table 21 – Arguments for service Initialize (for DTM)	73
Table 22 – Arguments for service Initialize (for BTM)	73
Table 23 – Arguments for service SetLinkedCommunicationChannel	74
Table 24 – Arguments for service EnableCommunication	74
Table 25 – Arguments for service ReleaseLinkedCommunicationChannel	75
Table 26 – Arguments for service ClearInstanceData	75
Table 27 – Arguments for service Terminate	75
Table 28 – Arguments for service GetFunctions	76
Table 29 – Arguments for service InvokeFunctions	77
Table 30 – Arguments for service GetGuiInformation	77
Table 31 – Arguments for service OpenPresentation	77
Table 32 – Arguments for service ClosePresentation	78
Table 33 – Arguments for service GetChannels	78
Table 34 – Arguments for service GetDocumentation	79
Table 35 – Arguments for service InstanceDataInformation	79
Table 36 – Arguments for service InstanceDataRead	80
Table 37 – Arguments for service InstanceDataWrite	80
Table 38 – Arguments for service Verify	81
Table 39 – Arguments for service CompareDataValueSets	81
Table 40 – Arguments for service DeviceDataInformation	81
Table 41 – Arguments for service DeviceDataRead	82
Table 42 – Arguments for service DeviceDataWrite	82
Table 43 – Arguments for service NetworkManagementInfoRead	83
Table 44 – Arguments for service NetworkManagementInfoWrite	83
Table 45 – Arguments for service DeviceStatus (for DTM)	84
Table 46 – Arguments for service CompareInstanceDataWithDeviceData (for DTM)	84
Table 47 – Arguments for service WriteDataToDevice (for DTM)	85
Table 48 – Arguments for service ReadDataFromDevice (for DTM)	85
Table 49 – Arguments for service OnLockInstanceId	86
Table 50 – Arguments for service OnUnlockInstanceId	86
Table 51 – Arguments for service OnInstanceIdChanged	86
Table 52 – Arguments for service OnInstanceIdChildDataChanged	87
Table 53 – Arguments for service Export	87

Table 54 – Arguments for service Import.....	88
Table 55 – Arguments for service ReadChannelInformation	88
Table 56 – Arguments for service WriteChannelInformation	89
Table 57 – Arguments for service ReadChannelData	89
Table 58 – Arguments for service WriteChannelData	89
Table 59 – Arguments for service GetSupportedProtocols.....	90
Table 60 – Arguments for service Connect.....	90
Table 61 – Arguments for service Disconnect	91
Table 62 – Arguments for service AbortRequest	91
Table 63 – Arguments for service AbortIndication	92
Table 64 – Arguments for service Transaction	92
Table 65 – Arguments for service SequenceDefine	93
Table 66 – Arguments for service SequenceStart.....	93
Table 67 – Arguments for service ValidateAddChild	94
Table 68 – Arguments for service ChildAdded.....	94
Table 69 – Arguments for service ValidateRemoveChild	94
Table 70 – Arguments for service ChildRemoved	95
Table 71 – Arguments for service SetChildrenAddresses.....	95
Table 72 – Arguments for service GetChannelFunctions	96
Table 73 – Arguments for service GetGuIInformation	96
Table 74 – Arguments for service Scan.....	97
Table 75 – Arguments for service OnErrorMessage	97
Table 76 – Arguments for service OnProgress	97
Table 77 – Arguments for service OnOnlineStatusChanged	98
Table 78 – Arguments for service OnFunctionsChanged	98
Table 79 – Arguments for service GetDtmInfoList	99
Table 80 – Arguments for service CreateChild (DTM)	99
Table 81 – Arguments for service CreateChild (BTM).....	99
Table 82 – Arguments for service DeleteChild.....	100
Table 83 – Arguments for service MoveChild	100
Table 84 – Arguments for service GetParentNodes	100
Table 85 – Arguments for service GetchildNodes	101
Table 86 – Arguments for service GetDtm.....	101
Table 87 – Arguments for service ReleaseDtm.....	101
Table 88 – Arguments for service OnAddedRedundantChild	102
Table 89 – Arguments for service OnRemovedRedundantChild.....	102
Table 90 – Arguments for service SaveInstanceData	102
Table 91 – Arguments for service LoadInstanceData	103
Table 92 – Arguments for service GetPrivateDtmStorageInformation	103
Table 93 – Arguments for service LockInstanceData.....	103
Table 94 – Arguments for service UnlockInstanceData.....	104
Table 95 – Arguments for service OnInstanceDataChanged.....	104
Table 96 – Arguments for service ValidateProcessImage	105

Table 97 – Arguments for service OpenPresentationRequest	105
Table 98 – Arguments for service ClosePresentationRequest	105
Table 99 – Arguments for service UserDialog	106
Table 100 – Arguments for service RecordAuditTrailEvent	106
Table 101 – Modifications state machine of instance data	119
Table 102 – Persistence state machine of instance data	120
Table 103 – Example life cycle of a DTM	122
Table A.1 – Basic data types	127
Table A.2 – Simple general data types	128
Table A.3 – Definition of classificationId enumeration values	135
Table A.4 – General structured data types	137
Table A.5 – Simple user information data types	145
Table A.6 – Structured user information data type	145
Table A.7 – Structured DTM information data type	146
Table A.8 – Simple BTM data types	146
Table A.9 – Structured BTM data types	147
Table A.10 – Simple device identification data types	148
Table A.11 – Structured device identification data types	149
Table A.12 – Simple function data types	152
Table A.13 – Structured function data types	153
Table A.14 – Simple auditTrail data types	154
Table A.15 – Structured auditTrail data types	155
Table A.16 – Simple documentation data types	155
Table A.17 – Structured documentation data types	156
Table A.18 – Simple deviceList data type	157
Table A.19 – Structured deviceList data type	157
Table A.20 – Simple network management data types	158
Table A.21 – Structured network management data types	159
Table A.22 – Simple instance data types	160
Table A.23 – Structured instance data types	162
Table A.24 – Simple device status data types	164
Table A.25 – Structured device status data types	164
Table A.26 – Simple online compare data types	164
Table A.27 – Structured online compare data types	165
Table A.28 – Simple user interface data types	165
Table A.29 – Structured user interface data types	166
Table A.30 – Fieldbus data types	167