

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

**Spécification des interfaces des outils des dispositifs de terrain (FDT) –
Partie 2: Concepts et description détaillée**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2016 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

**Spécification des interfaces des outils des dispositifs de terrain (FDT) –
Partie 2: Concepts et description détaillée**

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.....	65
6.5.2	Redundancy support in Frame Application.....	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	FDT topology generation triggered by the DTM.....	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		12
Figure 2 – Abstract FDT model		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

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 OnLockInstanceData	86
Table 50 – Arguments for service OnUnlockInstanceData	86
Table 51 – Arguments for service OnInstanceDataChanged	86
Table 52 – Arguments for service OnInstanceChildDataChanged	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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 2: Concepts and detailed description

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.

International Standard IEC 62453-2 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- Clarification for categories of DTMs (e.g. new category ‘Composite Device DTM’)
- Clarification: Command functions
- New concept: Static function
- Clarification for Communication Channel and communication
- Clarifications for identification

- Clarifications for scanning and DTM assignment
- New concept: PLC tool support

The text of this standard is based on the following documents:

CDV	Report on voting
65E/334/CDV	65E/334/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 62453 series, under the general title *Field Device Tool (FDT) interface specification*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

IMPORTANT – The ‘colour inside’ logo on the cover page of this publication 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

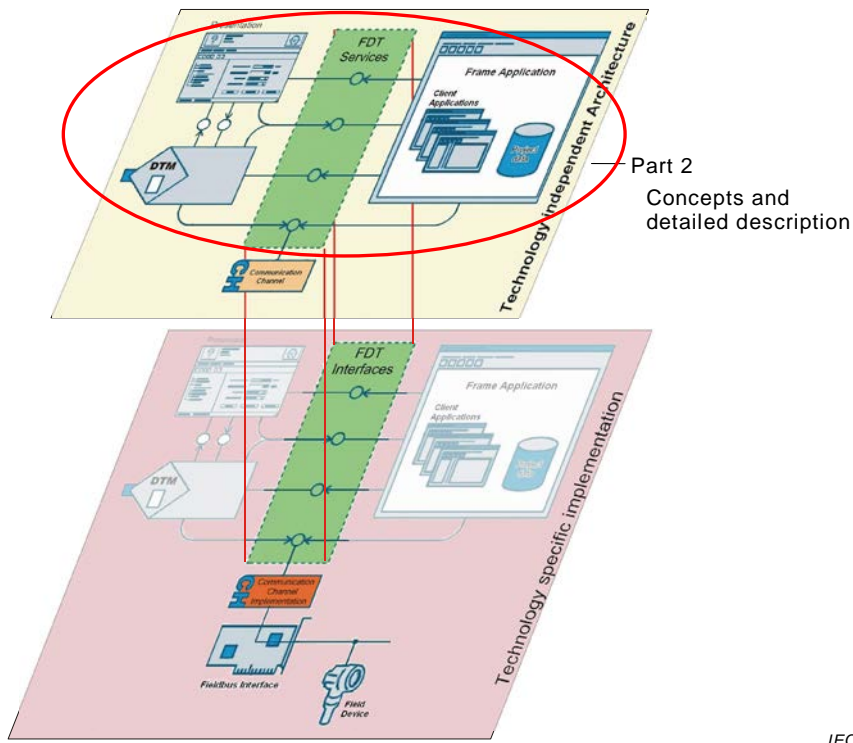
This part of IEC 62453 is an interface specification for developers of FDT (Field Device Tool) components for function control and data access within a client/server architecture. The specification is a result of an analysis and design process to develop standard interfaces to facilitate the development of servers and clients by multiple vendors that need to interoperate seamlessly.

With the integration of fieldbuses into control systems, there are a few other tasks which need to be performed. In addition to fieldbus- and device-specific tools, there is a need to integrate these tools into higher-level system-wide planning or engineering tools. In particular, for use in extensive and heterogeneous control systems, typically in the area of the process industry, the unambiguous definition of engineering interfaces that are easy to use for all those involved is of great importance.

A device-specific software component created according to this standard is called Device Type Manager (DTM). It integrates all device-specific data, functions and business rules into the system via the FDT services defined herein.

The FDT/DTM approach is open for all kind of fieldbuses and enables integration variety of devices into heterogeneous systems.

Figure 1 shows how this part of IEC 62453 is aligned in the structure of the IEC 62453 series.



IEC

Figure 1 – Part 2 of the IEC 62453 series

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 2: Concepts and detailed description

1 Scope

This part of IEC 62453 explains the common principles of the field device tool concept. These principles can be used in various industrial applications such as engineering systems, configuration programs and monitoring and diagnostic applications.

This standard specifies the general objects, general object behavior and general object interactions that provide the base of FDT.

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 61131 (all parts), *Programmable controllers*

IEC/TR 62390:2005, *Common automation device – Profile guideline*

IEC 62453-1:2016, *Field Device Tool (FDT) interface specification – Part 1: Overview and guidance*

IEC 62453-3xy (all parts), *Field Device Tool (FDT) interface specification – Part 3xy: Communication profile integration*

3 Terms, definitions, symbols, abbreviated terms and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62453-1 as well as the following apply.

3.1.1

Child DTM

DTM instance in an FDT Project, which is classified by its relation to a Parent DTM

Note 1 to entry: Any DTM which uses FDT communication may be classified as Child DTM (i.e. Device DTM, Gateway DTM, Module DTM and BTM)

3.1.2

FDT version

implementation version defined by the related technology specific organization

Note 1 to entry: The FDT version is specified in IEC TR 62453-41 or in IEC TR 62453-42.

3.1.3

monolithic DTM

one single DTM that represents the complete device with all its modules