ICS 25.040.40, 35.100.70, 35.110

SLOVENSKÁ TECHNICKÁ NORMA

Júl 2023

STN	**Priemyselné komunikačné siete Špecifikácie prevádzkových zberníc Časť 6-24: Špecifikácia protokolu aplikačnej vrstvy Prvky typu 24**	**STN EN IEC 61158-6-24** 18 4020

Industrial communication networks - Fieldbus specifications - Part 6-24: Application layer protocol specification - Type 24 elements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 06/23

Obsahuje: EN IEC 61158-6-24:2023, IEC 61158-6-24:2023

Oznámením tejto normy sa od 28.04.2026 ruší
STN EN 61158-6-24 (18 4020) z apríla 2015

137052

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2023
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61158-6-24

May 2023

ICS 25.040.40; 35.100.70; 35.110

Supersedes EN 61158-6-24:2014

English Version

Industrial communication networks - Fieldbus specifications - Part 6-24: Application layer protocol specification - Type 24 elements (IEC 61158-6-24:2023)

Réseaux de communication industriels - Spécifications des bus de terrain - Partie 6-24: Spécification du protocole de la couche liaison de données - Eléments de type 24 (IEC 61158-6-24:2023)

Industrielle Kommunikationsnetze - Feldbusse - Teil 6-24: Protokollspezifikation des Application Layer (Anwendungsschicht) - Typ 24-Elemente (IEC 61158-6-24:2023)

This European Standard was approved by CENELEC on 2023-04-28. 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.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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 Brussels

© 2023 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

EN IEC 61158-6-24:2023 (E)

European foreword

The text of document 65C/1204/FDIS, future edition 2 of IEC 61158-6-24, prepared by SC 65C "Industrial networks" 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 61158-6-24:2023.

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) 2024-01-28
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-04-28

This document supersedes EN 61158-6-24:2014 and all of its amendments and corrigenda (if any).

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 61158-6-24:2023 was approved by CENELEC as a European Standard without any modification.

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

IEC 61158-1:2023	NOTE	Approved as EN IEC 61158-1:2023 (not modified)
IEC 61158-2	NOTE	Approved as EN IEC 61158-2
IEC 61158-3-24	NOTE	Approved as EN 61158-3-24
IEC 61158-4-24	NOTE	Approved as EN IEC 61158-4-24
IEC 61158-6 (series)	NOTE	Approved as EN 61158-6 (series)
IEC 61784-1 (series)	NOTE	Approved as EN IEC 61784-1 (series)
IEC 61784-2 (series)	NOTE	Approved as EN IEC 61784-2 (series)

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.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61158-5-24	2023	Industrial communication networks - Fieldbus specifications - Part 5-24: Application layer service definition - Type 24 elements	EN IEC 61158-5-24	2023
ISO/IEC 646	-	Information technology - ISO 7-bit coded character set for information interchange	-	-
ISO/IEC 7498-1	-	Information technology - Open Systems Interconnection - Basic reference model: The basic model	-	-
ISO/IEC 9545	-	Information technology - Open Systems Interconnection - Application layer structure	-	-
ISO/IEC 9899	-	Information technology - Programming languages - C	-	-
ISO/IEC 10731	-	Information technology - Open Systems Interconnection - Basic Reference Model - Conventions for the definition of OSI services	-	-
ISO/IEC 19501	2005	Information technology - Open Distributed Processing - Unified Modeling Language (UML) Version 1.4.2	-	-
ISO/IEC/IEEE 60559	2020	Information technology - Microprocessor Systems - Floating-Point arithmetic	-	-

IEC 61158-6-24

Edition 2.0 2023-03

INTERNATIONAL STANDARD

Industrial communication networks – Fieldbus specifications – Part 6-24: Application layer protocol specification – Type 24 elements

IEC 61158-6-24:2023-03(en)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2023 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.

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

Tel.: +41 22 919 02 11
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 corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
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 once a month by email.

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: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC 61158-6-24

Edition 2.0 2023-03

INTERNATIONAL STANDARD

Industrial communication networks – Fieldbus specifications – Part 6-24: Application layer protocol specification – Type 24 elements

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040.40; 35.100.70; 35.110

ISBN 978-2-8322-6642-7

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

CONTENTS

FOREWORD 6
INTRODUCTION 8
1 Scope 9
1.1 General 9
1.2 Specifications 9
1.3 Conformance 10
2 Normative references 10
3 Terms, definitions, symbols, abbreviated terms, and conventions 10
3.1 Referenced terms and definitions 10
3.1.1 Terms and definitions from ISO/IEC 7498-1 11
3.1.2 Terms and definitions from ISO/IEC 9545 11
3.1.3 Terms and definitions from ISO/IEC 8824-1 11
3.1.4 Terms and definitions from ISO/IEC 10731 11
3.1.5 Terms and definitions from ISO/IEC 19501 12
3.2 Additional terms and definitions 12
3.3 Abbreviations and symbols 17
3.4 Conventions 19
3.4.1 General conventions 19
3.4.2 PDU data type conventions 19
3.4.3 State machine conventions 19
4 Abstract syntax 22
4.1 Basic Data types 22
4.2 FAL PDU types 23
4.2.1 Top of APDU types: _APDU 23
4.2.2 PDUs for field device control service 24
4.2.3 PDUs for message service 37
4.3 Detailed definitions of _FDCService-PDUs 38
4.3.1 Short PDU type 38
4.3.2 Long PDU type 45
4.3.3 Enhanced PDU type 48
4.3.4 SubCommand PDU type 58
4.3.5 Short PDU type II 59
4.4 Device profile 66
5 Transfer syntax 66
5.1 Concepts 66
5.2 Encode rules 66
5.2.1 INTEGER and its subtypes 66
5.2.2 REAL type and its subtypes 68
5.2.3 BIT STRING type 69
5.2.4 OCTET STRING type and IA5String type 70
5.2.5 NULL type 71
5.2.6 Structure type and Array type 71
6 Structure of FAL protocol state machine 71
7 AP-context state machine (APC SM) 73
7.1 Overview 73
7.2 State descriptions 74

7.3 Triggering events 75
7.4 Action descriptions at state transitions 75
8 FAL service protocol machines (FSPM) 77
8.1 Overview 77
8.2 Field Device Control Protocol Machine (FDC PM) 77
8.2.1 Protocol overview 77
8.2.2 Cyclic communication mode 78
8.2.3 Event driven communication mode 82
8.2.4 Master Protocol Machine (FDCPM-M) 83
8.2.5 Slave Protocol Machine (FDCPM-S) 92
8.2.6 Monitor Protocol Machine (FDCPM-MN) 102
8.2.7 Error procedure summary 104
8.3 Message Protocol Machine (MSGPM) 106
8.3.1 Protocol overview 106
8.3.2 Requester Protocol Machine (MSGPM-RQ) 108
8.3.3 Responder Protocol Machine (MSGPM-RS) 111
9 Application relationship protocol machine (ARPM) 113
9.1 General 113
9.2 ARPM for FDC ASE 114
9.2.1 Overview 114
9.2.2 ARPM for FDC Master (ARPM-FDCM) 116
9.2.3 ARPM for FDC Slave (ARPM-FDCS) 122
9.2.4 ARPM for FDC Monitor (ARPM-FDCMN) 129
9.3 ARPM for MSG ASE (ARPM-MSG) 131
9.3.1 State descriptions 131
9.3.2 Triggering events 132
9.3.3 Action descriptions at state transitions 133
10 DLL mapping protocol machine (DMPM) 134
Annex A (informative) Device profile and FDC command sets 135
Annex B (normative) Virtual memory space and Device Information 137
B.1 Overview 137
B.2 Device Information 137
B.2.1 Device identifier area structure 137
B.2.2 Detail specifications of device IDs 138
Annex C (informative) Basic message function 144
Bibliography 145

Figure 1 – Tree structure of APDU types 24
Figure 2 – Encode of Integer subtypes 67
Figure 3 – Example of transfer of INTEGER value 67
Figure 4 – Encode of Unsigned subtypes 68
Figure 5 – $Float_{32}$ type encode 68
Figure 6 – $Float_{64}$ type encode 69
Figure 7 – Bit field definition example with named bits 70
Figure 8 – Bit field definition example with field size 70
Figure 9 – SEQUENCE type encode 71

Figure 10 – Structure of FAL protocol state machines 73
Figure 11 – Statechart diagram of APCSM 74
Figure 12 – Example communication cycle of FDC master AP 79
Figure 13 – Example communication cycle of FDC slave AP 79
Figure 14 – Synchronous command communication in sync state 80
Figure 15 – Asynchronous command communication in sync state 81
Figure 16 – Asynchronous command communication in async state 82
Figure 17 – Event-driven communication 83
Figure 18 – Statechart diagram of FDCPM-M 84
Figure 19 – Statechart diagram of FDCPM-S 93
Figure 20 – Statechart diagram of FDCPM-MN 102
Figure 21 – PDU transmission flow for user message 107
Figure 22 – PDU transmission flow for one-way message 108
Figure 23 – Statechart diagram of MSGPM-RQ 109
Figure 24 – Statechart diagram of MSGPM-RS 111
Figure 25 – Example of single transfer process 114
Figure 26 – Example of dual transfer process 114
Figure 27 – Example of Synchronous command communication 115
Figure 28 – Timing chart for individual communication cycle setting 116
Figure 29 – Statechart diagram of ARPM-FDCM 117
Figure 30 – Statechart diagram of ARPM-FDCS 123
Figure 31 – Statechart diagram of ARPM-FDCMN 129
Figure 32 – Statechart diagram of ARPM-MSG 132
Figure B.1 – Memory map of virtual memory space 137
Figure B.2 – Memory map of device ID area 138

Table 1 – State transition descriptions 20
Table 2 – Description of state machine elements 20
Table 3 – Conventions used in state machines 21
Table 4 – Mapping for Protocol State Machines 72
Table 5 – State descriptions of APC SM 74
Table 6 – Trigger event descriptions of APC SM 75
Table 7 – Transitions of APC SM 75
Table 8 – FDC protocol mode 77
Table 9 – State descriptions of FDCPM-M 84
Table 10 – Trigger event descriptions of FDCPM-M 86
Table 11 – Transitions of main SM of FDCPM-M 87
Table 12 – Transitions of submachine of FDCPM-M 89
Table 13 – State descriptions of FDCPM-S 93
Table 14 – Trigger event descriptions of FDCPM-S 94
Table 15 – Transitions of main SM of FDCPM-S 95
Table 16 – Transitions of submachine of FDCPM-S 97
Table 17 – State descriptions of FDCPM-MN 102

Table 18 – Trigger event descriptions of FDCPM-MN 103
Table 19 – Transitions of main SM of FDCPM-MN 103
Table 20 – Transitions of submachine of FDCPM-MN 104
Table 21 – State descriptions of MSGPM-RQ 109
Table 22 – Trigger event descriptions of MSGPM-RQ 110
Table 23 – Transitions of MSGPM-RQ 110
Table 24 – State descriptions of MSGPM-RS 112
Table 25 – Trigger event descriptions of MSGPM-RS 112
Table 26 – Transitions of MSGPM-RS 113
Table 27 – State descriptions of ARPM-FDCM 117
Table 28 – Trigger event descriptions of ARPM-FDCM 119
Table 29 – Transitions of main SM of ARPM-FDCM 120
Table 30 – Transitions of submachine of ARPM-FDCM 121
Table 31 – State descriptions of ARPM-FDCS 123
Table 32 – Trigger event descriptions of ARPM-FDCS 125
Table 33 – Transitions of main SM of ARPM-FDCS 126
Table 34 – Transitions of submachine of ARPM-FDCS 127
Table 35 – State descriptions of ARPM-FDCMN 129
Table 36 – Trigger event descriptions of ARPM-FDCMN 130
Table 37 – Transitions of main SM of ARPM-FDCMN 130
Table 38 – Transitions of submachine of ARPM-FDCMN 131
Table 39 – State descriptions of ARPM-MSG 132
Table 40 – Trigger event descriptions of ARPM-MSG 133
Table 41 – Transitions of ARPM-MSG 133
Table A.1 – Example of registered device profiles 135
Table A.2 – Example command list of the profile ‘00'H 136
Table B.1 – Specifications of device IDs 138
Table C.1 – Example of message command set 144

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 6-24: Application layer protocol specification – Type 24 elements

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.

Attention is drawn to the fact that the use of the associated protocol type is restricted by its intellectual-property-right holders. In all cases, the commitment to limited release of intellectual-property-rights made by the holders of those rights permits a layer protocol type to be used with other layer protocols of the same type, or in other type combinations explicitly authorized by its intellectual-property-right holders.

NOTE Combinations of protocol types are specified in the IEC 61784-1 series and the IEC 61784-2 series.

IEC 61158-6-24 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

This second edition cancels and replaces the first edition published in 2014. This edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- addition of a new PDU type which called "Short PDU type II" in 4.2;
- update of Table 4;
- addition of examples of Synchronous Command communication in 9.2.1, Figure 27 and Figure 28.

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

Draft	Report on voting
65C/1204/FDIS	65C/1245/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/publications.

A list of all parts of the IEC 61158 series, published under the general title *Industrial communication networks – Fieldbus specifications*, can be found on the IEC web site.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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.

INTRODUCTION

This document is one of a series produced to facilitate the interconnection of automation system components. It is related to other standards in the set as defined by the "three-layer" fieldbus reference model described in IEC 61158-1.

The application protocol provides the application service by making use of the services available from the data-link or other immediately lower layer. The primary aim of this document is to provide a set of rules for communication expressed in terms of the procedures to be carried out by peer application entities (AEs) at the time of communication. These rules for communication are intended to provide a sound basis for development in order to serve a variety of purposes:

- as a guide for implementers and designers;
- for use in the testing and procurement of equipment;
- as part of an agreement for the admittance of systems into the open systems environment;
- as a refinement to the understanding of time-critical communications within OSI.

This document is concerned, in particular, with the communication and interworking of sensors, effectors and other automation devices. By using this document together with other standards positioned within the OSI or fieldbus reference models, otherwise incompatible systems can work together in any combination.

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 6-24: Application layer protocol specification – Type 24 elements

1 Scope

1.1 General

The Fieldbus Application Layer (FAL) provides user programs with a means to access the fieldbus communication environment. In this respect, the FAL can be viewed as a "window between corresponding application programs".

This part of IEC 61158 provides common elements for basic time-critical and non-time-critical messaging communications between application programs in an automation environment and material specific to Type 24 fieldbus. The term "time-critical" is used to represent the presence of a time-window, within which one or more specified actions are required to be completed with some defined level of certainty. Failure to complete specified actions within the time window risks failure of the applications requesting the actions, with attendant risk to equipment, plant and possibly human life.

This document defines in an abstract way the externally visible behavior provided by the Type 24 fieldbus application layer in terms of

- the abstract syntax defining the application layer protocol data units conveyed between communicating application entities,
- the transfer syntax defining the application layer protocol data units conveyed between communicating application entities,
- the application context state machines defining the application service behavior visibly between communicating application entities, and
- the application relationship state machines defining the communication behavior visibly between communicating application entities.

The purpose of this document is to define the protocol provided to

- define the representation-on-wire of the service primitives defined in IEC 61158-5-24, and
- define the externally visible behavior associated with their transfer.

This document specifies the protocol of the Type 24 fieldbus application layer, in conformance with the OSI Basic Reference Model (ISO/IEC 7498-1) and the OSI Application Layer Structure (ISO/IEC 9545).

1.2 Specifications

The principal objective of this document is to specify the syntax and behavior of the application layer protocol that conveys the application layer services defined in IEC 61158-5-24.

A secondary objective is to provide migration paths from previously existing industrial communications protocols. It is this latter objective which gives rise to the diversity of protocols standardized in the IEC 61158-6 series.

1.3 Conformance

This document does not specify individual implementations or products, nor does it constrain the implementations of application layer entities within industrial automation systems.

Conformance is achieved through implementation of this application layer protocol specification.

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.

NOTE All parts of the IEC 61158 series, as well as the IEC 61784-1 series and the IEC 61784-2 series are maintained simultaneously. Cross-references to these documents within the text therefore refer to the editions as dated in this list of normative references.

IEC 61158-5-24:2023, *Industrial communication networks – Fieldbus specifications – Part 5-24: Application layer service definition – Type 24 elements*

ISO/IEC 646, *Information technology – ISO 7-bit coded character set for information interchange*

ISO/IEC 7498-1, *Information technology – Open Systems Interconnection – Basic Reference Model – Part 1: The Basic Model*

ISO/IEC 9545, *Information technology – Open Systems Interconnection – Application Layer structure*

ISO/IEC 9899, *Information technology – Programming languages – C*

ISO/IEC 10731, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services*

ISO/IEC 19501:2005, *Information technology – Open Distributed Processing – Unified Modeling Language (UML) Version 1.4.2*

ISO/IEC/IEEE 60559:2020, *Information technology – Microprocessor Systems – Floating-Point arithmetic*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN