TECHNICAL REPORT

ISO/IEC TR 24725-3

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Information technology for learning, education and training — Supportive technology and specific integration —

Part 3: Platform and Media Taxonomy (PMT)

Technologie de support ITLET et intégration de spécification — Technologie de support et intégration spécifique —

Partie 3: Taxinomie de plates-formes et de milieux

Reference number
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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

In exceptional circumstances, when the joint technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide to publish a Technical Report. A Technical Report is entirely informative in nature and shall be subject to review every five years in the same manner as an International Standard.

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

ISO/IEC TR 24725-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 36, *Information technology for learning, education and training*.

ISO/IEC TR 24725 consists of the following parts, under the general title *Information technology for learning, education and training — Supportive technology and specific integration*:

— *Part 1: Framework* [Technical Report]

— *Part 2: Rights Expression Language (REL) — Commercial applications* [Technical Report]

— *Part 3: Platform and Media Taxonomy (PMT)* [Technical Report]

Introduction

Information technologies are being employed throughout the world to support learning, education and training activities using various media (digital video, audio, etc.) and varying platform configurations. Instructors, trainers, mentors and learners can be located in different places around the world and can engage in activities synchronously or asynchronously. Teaching personnel, learners, administration and technical support staff can be separated by geographic distance and located in different time zones. With these considerations in mind, it is essential that a shared standardized vocabulary and associated taxonomy be developed to support the interoperability and sound functioning of underlying information technology (IT) structures, including media and platform applications.

The concept and structure of integrated supportive technologies and specifications that can be combined to sustain and enhance learning, education and training activities are specifed in ISO/IEC TR 24725-1. The purpose of ISO/IEC TR 24725-3 is to recommend when and how certain IT media and platform applications can be combined and used. A bundle of different media and platform technologies defines subsets or combinations of technologies that support a specific function, and can be associated with a particular application, community, and/or environment. Different bundles can be created and utilized to meet the needs of specific communities (e.g. learning communities, educational institutions, and corporate training organizations).

Several technology bundles can be developed for different operating scenarios, such as “browser platform”, “workstation platform” and “media types”. These bundles are determined by first considering the function or purpose; then, the components required are identified from the taxonomy. The identification of the technologies can include consideration of compatibility issues and recommendations to ensure interoperability across diverse IT systems. It is expected that, over time, these profiles will be updated and amended as needed to remain relevant to updates and changes resulting from the development of new and emerging technologies.

This standard profile will identify existing standards and specifications of learning technology platforms and their content. It will not specify the technical details, but limitations and enhancements to these standards and specifications.

It is recognized that the bundling of technologies to support learning, education, and training activities has certain considerations that are not within the scope of this document, including but not limited to:

a) suitability of technology bundles to meet basic requirements for

   1) teaching (teaching style, underlying learning theory (or theories) employed, etc.),

   2) learners (learning styles, previous experiences, attitudes towards technology, etc.),

   3) subject matter (subject domain, level of complexity, technical content, etc.),

   4) milieu (networked environment at a university, corporate intranet, etc.),

   5) other (privacy requirements, administrative and government reporting, etc.);

b) technical considerations (e.g., backward and forward compatibility, migration, integration with multiple systems such as Human Resource Information Systems, Student Information Systems, etc.);

c) evaluation of technology bundle effectiveness in terms of intended function.

It is anticipated that some or all of these considerations will be addressed in future editions of ISO/IEC 24725-3, in companion standards, Technical Reports, best practices guidelines, or in documents elsewhere.

Information technology for learning, education and training — Supportive technology and specific integration —

Part 3: Platform and Media Taxonomy (PMT)

1 Scope

This part of ISO/IEC TR 24725 provides standardized vocabulary, taxonomy of media and platform technologies, and a process that can be used to describe different combinations or bundles of media and platform technologies, which are needed to perform identified functions or to support a class of applications for learners within or across various information technology environments. It provides examples of how and when bundles of technologies can be defined to support learning, education and training activities.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
base standard
approved ISO or IEC International Standard or ITU-T Recommendation

[ISO/IEC TR 10000-1:1998, 3.1.1]

2.2
technology bundle
set of one or more technologies that is necessary to accomplish a particular specified function

NOTE A technology bundle might or might not include standards.

2.3
IT system interoperability
ability of two or more IT systems to exchange information and to make mutual use of the information that has been exchanged

[ISO/IEC TR 14252:1996, 2.2.2.21]

2.4
media
digital assets, which may include separately or bundled together, text, audio, video, image or graphics within an IT system

2.5
IT platform
set of resources on which an application will run

NOTE Adapted from ISO/IEC TR 11017:1998, 3.1.

2.6
software application portability
capability of a program to be executed on various types of data processing systems often involving recompiling, with little or no manual modification

[ISO 1087-2:2000]

2.7
standard
documented agreement containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose

3 Abbreviated terms

API Application Programming Interface

BMP Bitmap Format

CGM Computer Graphics Metafile

CSS Cascading Style Sheets

DOM Document Object Model

GIF Graphics Interchange Format

HTML Hypertext Markup Language

NOTE This is an ISO/IEC International Standard.

IETF Internet Engineering Task Force

ITLET Information Technology for Learning, Education and Training

JPEG Joint Picture Experts Group

NOTE A multi-part ISO/IEC International Standard.

JVM Java Virtual Machine

MPEG Moving Pictures Experts Group

NOTE A multi-part ISO/IEC International Standard.

MP3 MPEG-3 (moving picture experts group, level 3)

NOTE Part of a multi-part ISO/IEC International Standard.

ODF Open Document Format

NOTE This is an ISO/IEC International Standard.

OpenDML Open Digital Media Library

PDF Portable Document Format

NOTE A multi-part ISO/IEC International Standard.

PNG Portable Network Graphics

NOTE This is an ISO/IEC International Standard.

RFC Request For Comments

SDK Software Development Kit

SVG Scalable Vector Graphics

TIFF Tag Image File Format

NOTE A multi-part ISO/IEC International Standard.

WAV audio wave format

WMV Windows Media Video

WP Wordperfect

W3C World Wide Web Consortium

4 Platform and Media Taxonomy

4.1 Introduction

Taxonomy can be used to identify the links between a class or category and items within the class or category and is said to have the property of inheritance, which means that the items within a category or class share the properties of that class or category. In the case of the Platform and Media Taxonomy provided in 5.2, two classes or categories are provided – platform and media and the related technologies have been organized within these two categories. Subclause 5.2 provides a simplified ITLET Platform and Media Taxonomy. Subclause 5.3 provides a process for determining a platform and media bundle in order to perform a specific function. Examples of how Platform and Media Bundles can be developed to perform a specific function are provided in Annex A and a more detailed listing of technologies within the taxonomy is provided in Annex B.

4.2 Platform and Media Taxonomy (PMT)

Recognizing that new technologies are being developed over time, the structure of the ITLET Platform and Media Taxonomy has been simplified to include general categories of items. A more detailed listing of the technologies within the taxonomy framework is provided in Annex B.

NOTE The figures provided below may require modifications and improvement.

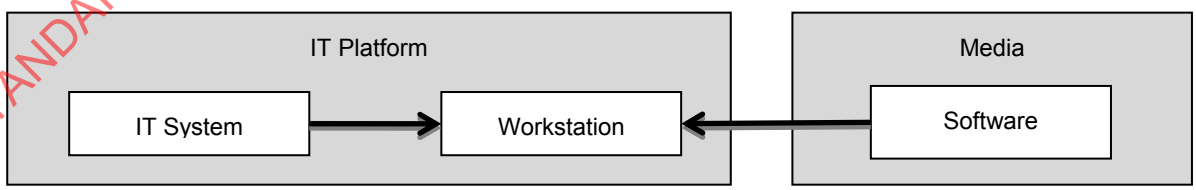

Figure 1 — Platform and Media Taxonomy

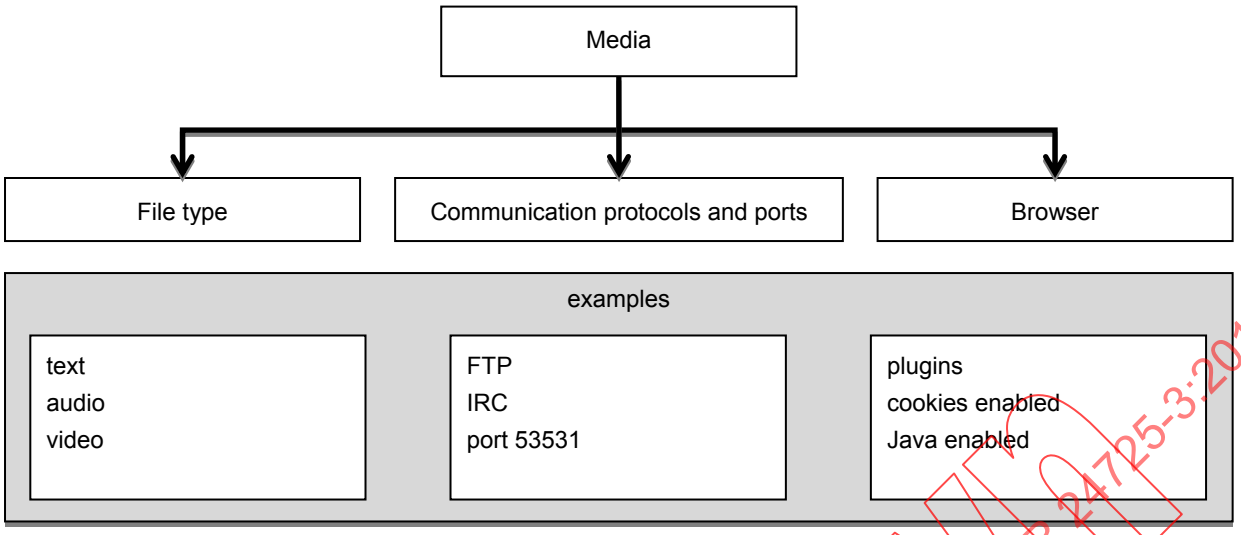

Figure 2 — Platform and Media Taxonomy Examples

4.3 Process to determine a Platform and Media Bundle based on the Platform and Media Taxonomy

Depending on the function for which technologies are being assembled, the required platform browser and workstation components are identified, as well as the media components and supportive technologies. These components are grouped together in a bundle. Communication with vendors, learners, developers, administrators, and other stakeholders may be facilitated through the use of standardized bundles of technologies that are identified to support specific ITLET functions.

5 Conformance

The vendors who have created or combined specifications referenced in these technology bundles may not claim that their formats have been standardized because they have been referenced in this part of ISO/IEC TR 24725. Some may already be international standards, others may be in the process of becoming international standards, and some may not be international standards. It is the taxonomy and the process of bundling the technologies using a common vocabulary that has been standardized within this part of ISO/IEC TR 24725. This part of ISO/IEC TR 24725 may reference technologies, specifications, and standards, and does so in the manner of a reference. The intellectual property of the referenced specifications and technologies is still retained by the respective original intellectual property holders. The technology bundles only reference documents, technologies, and specifications (just like library catalogs point to books). Content vendors may claim conformance this part of ISO/IEC TR 24725 by referencing the taxonomy and using the process specified in order to determine specific technology bundles.

Annex A
(informative)

Examples of Platform and Media Bundles

A.1 General

This informative annex provides examples of platform and media bundles that have been identified and combined to perform a specific ITLET function. First, there must be agreement on the function, then the appropriate required technologies are bundled together.

A.2 Examples of Platform and Media Bundles

A.2.1 Example 1: A common browser/viewer to support the delivery of a learning object

For example, components from Annex B may be identified and combined together to support the delivery of a learning object. The components may include elements both from the Browser component of the Platform Taxonomy (e.g., HTML 4.0, CSS1, and CSS2), technologies from the Sound component of the Media Taxonomy (WAV, MP3), the Motion component (QuickTime 4.0), and the Graphics component (JPEG 1997, GIF87a, GIF89a) from the Media Taxonomy.

- 24725.3-1-SAMPLE_1:
  - 24725.3-2-12 (HTML 4.0)
  - 24725.3-2-50 (CSS1)
  - 24725.3-2-51 (CSS2)
  - 24725.3-3-10 (WAV)
  - 24725.3-3-30 (MP3)
  - 24725.3-4-23 (QuickTime 4.0)
  - 24725.3-5-11 (JPEG 1997)
  - 24725.3-5-20 (GIF87a)
  - 24725.3-5-21 (GIF89a)

A.2.2 Example 2: A common browser/viewer to access website content for a training module

In this example, components from Annex B may be identified and combined together to support the delivery of a training module through a website. The components may include:

- 24725.3-1-SAMPLE_2:
  - 24725.3-2-12 (HTML 4.0)
  - 24725.3-2-50 (CSS1)
  - 24725.3-2-51 (CSS2)
  - 24725.3-3-10 (WAV)
  - 24725.3-3-30 (MP3)
  - 24725.3-4-23 (QuickTime 4.0)
  - 24725.3-5-11 (JPEG 1997)
  - 24725.3-5-20 (GIF87a)
  - 24725.3-5-21 (GIF89a)
  - 24725.3-6-11 (PDF 1.2)
  - 24725.3-7-12 (Java 1.2 SDK/API)
  - 24725.3-7-20 (JVM 1.0)
  - 24725.3-8-11 (JavaScript 1.2)
  - 24725.3-9-21 (MS-Word 97)

A.2.3 Example 3: A common browser/viewer is used to access content on a non-secure external website

For this example, a learner may decide to access content on a non-secure external website. The components for this example may include:

- 24725.3-1-SAMPLE_3:
  - 24725.3-2-12 (HTML 4.0)
  - 24725.3-2-50 (CSS1)
  - 24725.3-2-51 (CSS2)
  - 24725.3-3-10 (WAV)
  - 24725.3-3-30 (MP3)
  - 24725.3-4-23 (QuickTime 4.0)
  - 24725.3-5-11 (JPEG 1997)
  - 24725.3-5-20 (GIF87a)
  - 24725.3-5-21 (GIF89a)
  - 24725.3-6-19 (prohibition of PDF)
  - 24725.3-7-19 (prohibition of Java SDK/API)
  - 24725.3-7-29 (prohibition of JVM)
  - 24725.3-8-19 (prohibition of JavaScript)
  - 24725.3-9-28 (prohibition of MS-Word macros)

Annex B
(informative)

Platform and Media Taxonomy – Listing of current available technologies

B.1 ISO/IEC 24725.3- *: Overview Documents

- 24725.3-0: overview documents
- 24725.3-1: Bundles of profiles
- 24725.3-2: Markup Languages
- 24725.3-3: Audio Formats
- 24725.3-4: Video Formats
- 24725.3-5: Graphic Formats
- 24725.3-6: Page Description Languages
- 24725.3-7: Java Technologies
- 24725.3-8: JavaScript Technologies
- 24725.3-9: Word Processing Formats
- 24725.3-10: Presentation Graphics
- 24725.3-11: Spreadsheet Formats
- 24725.3-12: Document Services

B.2 ISO/IEC 24725.3-1- *: Bundles of Profiles

NOTE The numbering and nature of bundles is yet to be defined

Sample #1: A common browser/viewer might include:

- 24725.3-1-SAMPLE_1:
  - 24725.3-2-12 (HTML 4.0)
  - 24725.3-2-50 (CSS1)
  - 24725.3-2-51 (CSS2)
  - 24725.3-3-10 (WAV)
  - 24725.3-3-30 (MP3)
  - 24725.3-4-23 (QuickTime 4.0)
  - 24725.3-5-11 (JPEG 1997)
  - 24725.3-5-20 (GIF87a)
  - 24725.3-5-21 (GIF89a)

Sample #2: A common browser/viewer, including Java 1.2, JavaScript 1.2, PDF 1.2, MS-Word 97, etc, might include:

- 24725.3-1-SAMPLE_2:
  - 24725.3-2-12 (HTML 4.0)
  - 24725.3-2-50 (CSS1)
  - 24725.3-2-51 (CSS2)
  - 24725.3-3-10 (WAV)
  - 24725.3-3-30 (MP3)
  - 24725.3-4-23 (QuickTime 4.0)
  - 24725.3-5-11 (JPEG 1997)
  - 24725.3-5-20 (GIF87a)
  - 24725.3-5-21 (GIF89a)
  - 24725.3-6-11 (PDF 1.2)

- 24725.3-7-12 (Java 1.2 SDK/API)
- 24725.3-7-20 (JVM 1.0)
- 24725.3-8-11 (JavaScript 1.2)
- 24725.3-9-21 (MS-Word 97)

Sample #3: A common browser/viewer which excludes Java, JavaScript, PDF, and MS-Word macros, might include:

- 24725.3-1-SAMPLE_3:
  - 24725.3-2-12 (HTML 4.0)
  - 24725.3-2-50 (CSS1)
  - 24725.3-2-51 (CSS2)
  - 24725.3-3-10 (WAV)
  - 24725.3-3-30 (MP3)
  - 24725.3-4-23 (QuickTime 4.0)
  - 24725.3-5-11 (JPEG 1997)
  - 24725.3-5-20 (GIF87a)
  - 24725.3-5-21 (GIF89a)
  - 24725.3-6-19 (prohibition of PDF)
  - 24725.3-7-19 (prohibition of Java SDK/API)
  - 24725.3-7-29 (prohibition of JVM)
  - 24725.3-8-19 (prohibition of JavaScript)
  - 24725.3-9-28 (prohibition of MS-Word macros)

B.3 IEC/ISO 24725.3-2- *: Markup Language

- 24725.3-2-9: refers to HTML 2.0
- 24725.3-2-10: refers to HTML 3.2
- 24725.3-2-11: refers to HTML 4.01
- 24725.3-2-12: refers to ISO HTML
- 24725.3-2-13: refers to HTML 5
- 24725.3-2-14: refers to XHTML 1.0
- 24725.3-2-15: refers to XHTML Basic
- 24725.3-2-16: refers to Modularization of XHTML
- 24725.3-2-17: refers to XHTML 1.1 - Module-based XHTML1
- 24725.3-2-18: refers to XHTML 2.0
- 24725.3-2-19: refers to XHTML-Print
- 24725.3-2-20: refers to SGML 1986
- 24725.3-2-29: refers to XForms 1.1
- 24725.3-2-30: refers to XML 1.0
- 24725.3-2-31: refers to XML 1.1
- 24725.3-2-32: refers to Namespaces in XML 1.0(THird Edition)
- 24725.3-2-33: refers to XML Base(Second Edition)
- 24725.3-2-37: refers to XML Events
- 24725.3-2-39: refers to Prohibition of XML
- 24725.3-2-40: refers to MATHML 1.01
- 24725.3-2-41: refers to Mathematical Markup Language (MathML) Version 2.0
- 24725.3-2-42: refers to Mathematical Markup Language (MathML) Version 3.0
- 24725.3-2-50: refers to CSS1
- 24725.3-2-51: refers to CSS2
- 24725.3-2-52: refers to CSS2.1
- 24725.3-2-53: refers to CSS3
- 24725.3-2-57: refers to CSS Mobile Profile 1.0

B.4 ISO/IEC 24725.3-3- *: Audio Formats

- 24725.3-3-10: refers to WAV (RIFF)
- 24725.3-3-20: refers to RealAudio 1.0
- 24725.3-3-21: refers to RealAudio 2.0
- 24725.3-3-22: refers to RealAudio 3.0
- 24725.3-3-30: refers to MP3
- 24725.3-3-40: refers to MIDI

B.5 ISO/IEC 24725.3-4- *: Video Formats

- 24725.3-4-10: refers to AVI (RIFF)
- 24725.3-4-20: refers to QuickTime 1.5
- 24725.3-4-21: refers to QuickTime 2.1
- 24725.3-4-22: refers to QuickTime 3.0
- 24725.3-4-23: refers to QuickTime 4.0
- 24725.3-4-24: refers to QuickTime 5.0
- 24725.3-4-25: refers to QuickTime 6.3
- 24725.3-4-26: refers to QuickTime 7.4.1
- 24725.3-4-26: refers to QuickTime 7.6.6
- 24725.3-4-30: refers to RealVideo 1.0
- 24725.3-4-31: refers to RealVideo 2.0
- 24725.3-4-32: refers to RealVideo 3.0
- 24725.3-4-33: refers to RealVideo 4.0
- 24725.3-4-34: refers to RealVideo 7
- 24725.3-4-35: refers to RealVideo 8
- 24725.3-4-36: refers to RealVideo 9
- 24725.3-4-37: refers to RealVideo 10
- 24725.3-4-40: refers to MPEG-1
- 24725.3-4-50: refers to MPEG-2
- 24725.3-4-60: refers to MPEG-4
- 24725.3-4-61: refers to MPEG-7
- 24725.3-4-62: refers to MPEG-21
- 24725.3-4-70: refers to Microsoft Advanced Systems Format (ASF)
- 24725.3-4-80: refers to Windows Media Video (WMV)
- 24725.3-4-90: refers to Real Media (RM)

B.6 ISO/IEC 24725.3-5- *: Graphics Formats

- 24725.3-5-10: refers to JPEG 1994 (JFIF/SPIFF)
- 24725.3-5-11: refers to JPEG 1997 (JFIF/SPIFF)
- 24725.3-5-12: refers to JPEG 2000 (JFIF/SPIFF)
- 24725.3-5-20: refers to GIF87a
- 24725.3-5-21: refers to GIF89a
- 24725.3-5-30: refers to BMP
- 24725.3-5-40: refers to TIFF
- 24725.3-5-50: refers to PNG
- 24725.3-5-60: refers to CGM
- 24725.3-5-70: refers to Flash 3.0
- 24725.3-5-71: refers to Flash 4.0
- 24725.3-5-72: refers to Flash 5.0
- 24725.3-5-73: refers to Flash 6.0
- 24725.3-5-74: refers to Flash 7.0
- 24725.3-5-75: refers to Flash 8.0
- 24725.3-5-76: refers to Flash 9.0
- 24725.3-5-77: refers to Flash 10.0
- 24725.3-5-80: refers to Scalable Vector Graphics (SVG)
- 24725.3-5-90: refers to Windows Metafile Format

B.7 ISO/IEC 24725.3-6- *: Page Description Language

- 24725.3-6-10: refers to PDF 1.0
- 24725.3-6-11: refers to PDF 1.2
- 24725.3-6-12: refers to PDF 1.3
- 24725.3-6-13: refers to PDF 1.7
- 24725.3-6-14: refers to PDF 1.8
- 24725.3-6-15: refers to PDF 1.9
- 24725.3-6-19: refers to Prohibition of PDF
- 24725.3-6-20: refers to Postscript 1.0
- 24725.3-6-21: refers to Display Postscript system
- 24725.3-6-22: refers to Postscript 2.0
- 24725.3-6-23: refers to Postscript 3.0
- 24725.3-6-29: refers to Prohibition of Postscript
- 24725.3-6-30: refers to ISO/IEC 10180

B.8 ISO/IEC 24725.3-7- *: Java Technologies

- 24725.3-7-10: refers to Java 1.0 SDK/API
- 24725.3-7-11: refers to Java 1.1 SDK/API
- 24725.3-7-12: refers to Java 2 v1.2 SDK/API
- 24725.3-7-13: refers to Java 2 v1.3 SDK/API
- 24725.3-7-14: refers to Java 2 v1.4 SDK/API
- 24725.3-7-15: refers to Java 1.4 SDK/API
- 24725.3-7-16: refers to Java 1.5 SDK/API
- 24725.3-7-17: refers to Java 1.6 SDK/API
- 24725.3-7-19: refers to Prohibition of Java SDK/API
- 24725.3-7-20: refers to JVM 1.0
- 24725.3-7-21: refers to JVM 1.2
- 24725.3-7-22: refers to JVM 1.3
- 24725.3-7-23: refers to JVM 1.4
- 24725.3-7-24: refers to JVM 1.5
- 24725.3-7-25: refers to JVM 1.6
- 24725.3-7-26: refers to JVM 1.7
- 24725.3-7-27: refers to JVM 1.8
- 24725.3-7-29: refers to Prohibition of JVM
- 24725.3-7-x: refers to Java class libraries

B.9 ISO/IEC 24725.3-8- *: JavaScript Technologies

- 24725.3-8-10: refers to JavaScript 1.1
- 24725.3-8-11: refers to JavaScript 1.2
- 24725.3-8-12: refers to JavaScript 1.3
- 24725.3-8-13: refers to ECMAscript (ECMA 262)
- 24725.3-8-14: refers to ISO/IEC 16262
- 24725.3-8-15: refers to JavaScript 1.4
- 24725.3-8-16: refers to JavaScript 1.5
- 24725.3-8-17: refers to JavaScript 2.0
- 24725.3-8-19: refers to Prohibition of JavaScript