INTERNATIONAL STANDARD

ISO/IEC 13066-1

Information technology — Interoperability with assistive technology (AT) —

Part 1:
Requirements and recommendations for interoperability

Technologies de l'information — Interopérabilité avec les technologies d'assistance —

Partie 1: Exigences et recommandations pour l'interopérabilité

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Foreword

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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.

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ISO/IEC 13066-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

ISO/IEC 13066 consists of the following parts, under the general title *Information technology — Interoperability with assistive technology (AT)*:

— *Part 1: Requirements and recommendations for interoperability*

The following parts are under preparation:

— *Part 2: Windows accessibility API* [Technical Report]

— *Part 3: I-Accessible-2 accessibility API* [Technical Report]

Introduction

Interoperability involves the ability to use assistive technology (AT) to add to or augment existing components of information technology (IT) systems. Interoperability between AT and IT is best facilitated via the use of standardized, public interfaces for all IT components.

This part of ISO/IEC 13066 provides a basis for designing and evaluating interoperability between IT and AT. It formalizes the layered architecture of hardware-to-hardware, hardware-to-software, and software-to-software connections that have long been implicit in the IT definitions of ISO/IEC JTC 1. It also recognizes the central role that accessibility application programming interfaces (accessibility APIs) play in aiding this interoperability.

This part of ISO/IEC 13066 identifies a variety of APIs that are described further in other parts of ISO/IEC 13066. These APIs can be used as frameworks to support IT–AT interoperability.

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Information technology — Interoperability with assistive technology (AT) —

Part 1:
Requirements and recommendations for interoperability

1   Scope

This part of ISO/IEC 13066 defines the responsibilities of different information technology (IT) and assistive technology (AT) functional units in supporting interoperability. It recognizes that AT can be provided both as functional units that are installed or otherwise connected to a system or can be utilized by being provided as a service which is accessed via communications connections. It bases these responsibilities on fundamental IT definitions of major types of functional units. It focuses on the utilization of standard, public interfaces for functional units and on the provision of accessible documentation of their capabilities.

This part of ISO/IEC13066 recognizes that IT is implemented both in conventional computer systems and as a major component of other systems within the wider scope of information and communications technology (ICT). This part of ISO/IEC 13066 recognizes the fundamental role of operating systems and application programming interfaces (APIs), in managing interoperability, and in providing guidance to developers of other functional units. It also recognizes that different operating systems will have their own standardized methods of supporting interoperability.

This part of ISO/IEC 13066 does not define or require specific technology, commands, APIs, or hardware interfaces. It defers to other existing standards and supports the development of new standards in these areas.

It identifies a variety of common accessibility APIs that are further described in other parts of ISO/IEC 13066.

2   Terms and definitions

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

2.1
accessibility API
set of programming interfaces designed specifically to provide accessibility services

NOTE   An accessibility API is a special instance of an API.

2.2
accessibility services
services provided by an operating system or other platform software, commonly in the form of APIs (application programming interfaces) that are used by software to expose information about the user interface and events to assistive technologies and that provide two-way communication with assistive technologies, including exposing information about objects and events

NOTE   Accessibility services might provide additional information used by assistive technologies, e.g. about operating system status.

1

2.3
application programming interface
API
collection of invocation methods and associated parameters used by one piece of software to request actions from another piece of software

[ISO/IEC 18012-1, definition 3.1.1]

2.4
application software
software that is specific to the solution of an application problem

[ISO/IEC 2382-1, definition 10.04.01]

EXAMPLE   A spreadsheet program.

2.5
assistive technology
AT
hardware or software that is added to or incorporated within a system that increases accessibility for an individual

EXAMPLES   Braille displays, screen readers, screen magnification software and eye-tracking devices.

[ISO 9241-171, definition 3.5]

NOTE 1   Assistive technology can be helpful to individuals with disabilities or other specialized needs.

NOTE 2   Within this document, where assistive technology (and its abbreviation AT) is used, it is to be considered as both singular and plural, without distinction. If it is to be used in the singular only, it will be preceded by the article "an" (i.e. an assistive technology). If it is to be used in the plural only, it will be preceded by the adjective "multiple" (i.e. multiple AT).

2.6
compatibility
capability of a functional unit to meet the requirements of a specified interface without appreciable modification

[ISO/IEC 2382-1, definition 10.06.11]

2.7
computer
functional unit that can perform substantial computations, including numerous arithmetic operations and logic operations, without human intervention

[ISO/IEC 2382-1, definition 10.03.03]

NOTE   A computer can consist of a stand-alone unit or several interconnected units.

2.8
computer system
system
one or more computers, peripheral equipment, and software that perform data processing

[ISO/IEC 2382-1, definition 10.01.20]

2.9
connectivity
capability of a system or device to be attached to other systems or devices without modification

[ISO/IEC 2382-1, definition 10.03.27]

2.10
device driver
software component that permits a system to control and communicate with a peripheral device

[IEEE Std. 610.10-1994, IEEE Std. 610.12-1990, definition 3.542]

2.11
function
defined objective or characteristic action of a system or component

[IEEE Std. 610.12-1990, unnumbered definition]

EXAMPLE   A system has inventory control as its primary function.

2.12
functional unit
entity of hardware or software, or both, capable of accomplishing a specified purpose

[ISO/IEC 2382-1, definition 10.01.40]

2.13
hardware
all or part of the physical components of an information processing system

[ISO/IEC 2382-1, definition 10.01.07]

EXAMPLES   Computers and peripheral devices.

2.14
information/communication technology
ICT
technology for gathering, storing, retrieving, processing, analysing and transmitting information

[ISO 9241-20, definition 3.4]

EXAMPLE   A computer system.

2.15
interface
shared boundary between two functional units, defined by various characteristics pertaining to the functions, physical interconnections, signal exchanges, and other characteristics, as appropriate

[ISO/IEC 2382-1, definition 10.01.38]

2.16
interoperability
capability to communicate, execute programs, or transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those units

[ISO/IEC 2382-1, definition 10.01.47]

2.17
operating system
OS
software that controls the execution of programs and that may provide services such as resource allocation, scheduling, input-output control, and data management

NOTE   Although operating systems are predominantly software, partial hardware implementations are possible.

[ISO/IEC 2382-1, definition 10.04.08]

2.18
operation
process of running a computer system in its intended environment to perform its intended functions

[IEEE Std. 610.12-1990, unnumbered definition]

2.19
peripheral equipment
device that is controlled by and can communicate with a particular computer

[ISO/IEC 2382-1, definition 10.03.07]

EXAMPLES   Input–output units and external storage.

2.20
platform software
collection of software components that runs on an underlying software or hardware layer, and that provides a set of software services to applications that allow them to be isolated from the underlying software or hardware layer

NOTE   A particular software component might play the role of a platform in some situations and not in others. Platforms can include such things as internet browsers, operating systems, plug-ins to internet browsers or other software applications, and, under some situations, byte-code interpreted virtual environments and other "programming within another programming" environments.

2.21
service
functionality made available to a user electronically

[ISO/IEC 24752-1, definition 4.27]

EXAMPLES   Airline reservation service, currency translation services, weather forecasting, and restaurant recommendations.

2.22
role
semantic association which allows tools to present and support interaction with the object in a manner that is consistent with user expectations about other objects of that type

EXAMPLES   Checkbox, menu item, list item, and table column header.

2.23
software
all or part of the programs, procedures, rules, and associated documentation of an information processing system

NOTE   Software is an intellectual creation that is independent of the medium on which it is recorded.

[ISO/IEC 2382-1, definition 10.01.08]

2.24
support software
software that aids in the development, maintenance, or use of other software or provides general application-independent capability

[ISO/IEC 2382-1, definition 10.04.03]

EXAMPLES   Compilers and database management systems.

2.25
system software
application-independent software that supports the running of application software

[ISO/IEC 2382-1, definition 10.04.02]

EXAMPLE   An operating system, a Web browser, or a programming environment (e.g. Java) can be used as a platform for application software.

NOTE   Platform software (2.20) is similar to but not always the same as system software.

2.26
user interface element
user interface object
entity of the user interface that is presented to the user by the software

[ISO 9241-171 definition 3.38]

NOTE 1   User interface elements may or may not be interactive.

NOTE 2   Both entities relevant to the task and entities of the user interface are regarded as user interface elements. Different user interface element types are text, graphics and controls. A user interface element may be a representation or an interaction mechanism for a task object (such as a letter, a sales order, electronic parts, or a wiring diagram) or a system object (such as a printer, hard disk, or network connection). It may be possible for the user to directly manipulate some of these user interface elements.

EXAMPLE 1   User interface elements in a graphical user interface include such things as basic objects (such as window title bars, menu items, push buttons, image maps, and editable text fields) or containers (such as windows, grouping boxes, menu bars, menus, groups of mutually-exclusive option buttons, and compound images that are made up of several smaller images).

EXAMPLE 2   User interface elements in an audio user interface include such things as menus, menu items, messages, and action prompts.

EXAMPLE 3   User interface elements in tactile interfaces include such things as tactile dots, tactile bars, surfaces, knobs, and grips.

2.27
boundary
⟨user interface element⟩ physical display area occupied by a particular user interface element when outputting it on a display

3   Conformance

3.1   Applying the requirements

This part of ISO/IEC 13066 contains requirements and recommendations for a variety of different products. Where a requirement does not identify a particular type of product, it is expected to apply to all types of ICT products.

All requirements in Clauses 5–9 shall be implemented by the products to which they apply.

3.2   Applying the recommendations

Individual recommendations in Clauses 5–9 should be evaluated for their applicability to the particular product. The applicable recommendations shall be implemented.

NOTE   This has the effect of transforming applicable recommendations into additional requirements.

3.3   Evaluation of products

If a product is claimed to conform to this part of ISO/IEC 13066 then the procedures used to establish the product's requirements (as identified in 3.1 and 3.2), and to evaluate the product based on these requirements, shall be specified. The level of detail of the specification is a matter of negotiation between the involved parties.

4   Framework for IT-AT interoperability

4.1   Assistive technology

AT connects to ICT hardware or software components to modify, duplicate, or replace the user interface functionalities of those components.

EXAMPLE 1   A glare filter is physically attached to a display to modify the way in which a user is able to see the information on a visual display.

EXAMPLE 2   A single switch is used with an on-screen keyboard to replace the functionality of a standard keyboard.

EXAMPLE 3   A voice recognition program can provide the user with either an alternate or a duplicate method of entering data into a computer that is equipped with a microphone.

NOTE   AT can be provided as a service without the need of being installed on an individual system

4.2   Interconnection

4.2.1   Introduction to interconnection

AT typically make use of standard connections between ICT components. For interconnection to take place, it is important that standard interfaces that are expected by AT be available to them.

The use of standard interfaces means that AT do not have to interoperate with ICT in unsupported, undocumented, and non-standard methods.

NOTE   Unsupported, undocumented, and non-standard methods often lead to incompatibilities.

EXAMPLE 1   A Braille display is connected to a computer via a Universal Serial Bus (USB) interface.

EXAMPLE 2   Output from an application program is processed by screen magnification software prior to its being sent to the display driver in an operating system which forwards the magnified information to a video display device.

EXAMPLE 3   On-screen keyboard software is connected by the operating system and provided to an application for use instead of a physical keyboard.

4.2.2 Types of standard connections

Connections can be classified as:

a) Hardware-to-hardware connections;

b) Hardware-to-software connections;

c) Software-to-software connections.

4.2.3 Hardware-to-hardware connections

Hardware to hardware connections involve physical and/or logical interfaces that support the transfer or communication of information between the connected hardware or between the user and the hardware.

External hardware-to-hardware connections are intended to provide easy connection of peripheral devices (including AT) to a computer or another device. These connections benefit from being standardized. Hardware to hardware connections can be subdivided into:

a) wired connections (e.g. monitor, USB, speaker, microphone, Ethernet);

b) wireless connections (e.g. WI-FI, Bluetooth, infra-red);

c) non-electronic connections (e.g. the ability to place a glare filter over a display screen, the ability to use a key guard).

NOTE   Internal hardware-to-hardware connections within a computer are primarily intended for connecting parts of a computer to one another (e.g. the connection used for a laptop screen to the processing capabilities of the laptop). Because of their internal nature, internal hardware to hardware connections are not necessarily standardized.

4.2.4 Hardware-to-software connections

Hardware to software connections are provided by device drivers within the ICT's system software interacting with the system's external hardware to hardware connections.

While it can be possible for other programs, besides device drivers, to provide instructions directly to external hardware, this practice generally results in interconnectivity problems and is discouraged.

4.2.5 Software-to-software connections

The standard method of software to software connection with platform software is via an Application Programming Interface (API) that has been defined by the platform software.

NOTE 1   The term "platform software" can be used to refer to any system or application software that provides services to other software from the underlying layers. It could be the operating system or it could be a browser or any application runtime environment (which might also be considered as application or support software).

NOTE 2   According to ISO/IEC 2382-1 there are three classes of software:

a) System software, which includes the operating system and other instance of platform software;

b) Application software;

c) Support software.

It is important to recognize the ISO/IEC 2382-1 definition of "application-independent software that supports the running of application software" is not specific to operating systems and is not specific to software provided by operating system vendors. This definition is consistent with the common use of the term "platform software".