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Part 41: Data structure to be used by the ISO/IEC JTC 1/SC 35 icon database

Technologies de l'information — Icônes d'interface utilisateur —

Partie 41: Structure de données pour la base de données d'icônes du ISO/IEC JTC 1/SC 35

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

ISO/IEC/TS 11581 consists of the following parts, under the general title *Information technology — User interface icons*:

— *Part 1: Introduction to and overview of icon standards* [Technical Report]

— *Part 2: Object icons*[1)]

— *Part 3: Pointer icons*[1)]

— *Part 5: Tool icons*[1)]

— *Part 6: Action icons*

— *Part 10: Framework and general guidance*

— *Part 40: Management of icon registration*

— *Part 41: Data structure to be used by the ISO/IEC JTC 1/SC 35 icon database* [Technical Specification]

1) The main element of the title of this part was changed on publication of Parts 1, 10 and 40. It is intended that, upon revision, the main element of this title will be aligned with the main element of the titles of Parts 1, 10 and 40.

Introduction

Icons are used on Information and Communications Technology (ICT) products to facilitate interaction with their users. Icons can provide a language-independent means of communicating information to the user.

This part of ISO/IEC 11581 provides a data structure to be used by the ISO/IEC JTC 1/SC 35 icon database that is being managed by ISO/IEC 11581-40. This data structure is based on the framework provided in ISO/IEC 11581-10.

Information technology — User interface icons —

Part 41:
Data structure to be used by the ISO/IEC JTC 1/SC 35 icon database

1 Scope

This part of ISO/IEC 11581 provides guidance for developers and designers creating and/or using icons and provides a basis for the standardization of icons. It also provides a framework for creating future International Standards dealing with icons as parts of the ISO/IEC 11581 series and for identifying icon-related information to be used in any accompanying icon registries. It is intended to be used with ISO/IEC 11581-40 to create a registry of icons.

This part of ISO/IEC 11581 recognizes that icons are more than just symbols used on computer screens. Icons are interaction objects used by computer interfaces to accomplish various purposes. Icons can be rendered in various forms, including graphics, audio, tactile/haptic, or any combination thereof. This versatility in rendition can provide greater accessibility to their underlying functionalities.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 639-3, *Codes for the representation of names of languages — Part 3: Alpha-3 code for comprehensive coverage of languages*

ISO/IEC 11581-10:2010, *Information technology — User interface icons — Part 10: Framework and general guidance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 11581-10 apply.

4 Data structure overview

4.1 Entity-relationship structure

Figure 1 provides an entity-relationship diagram for the ISO/IEC JTC 1/SC 35 icon database.

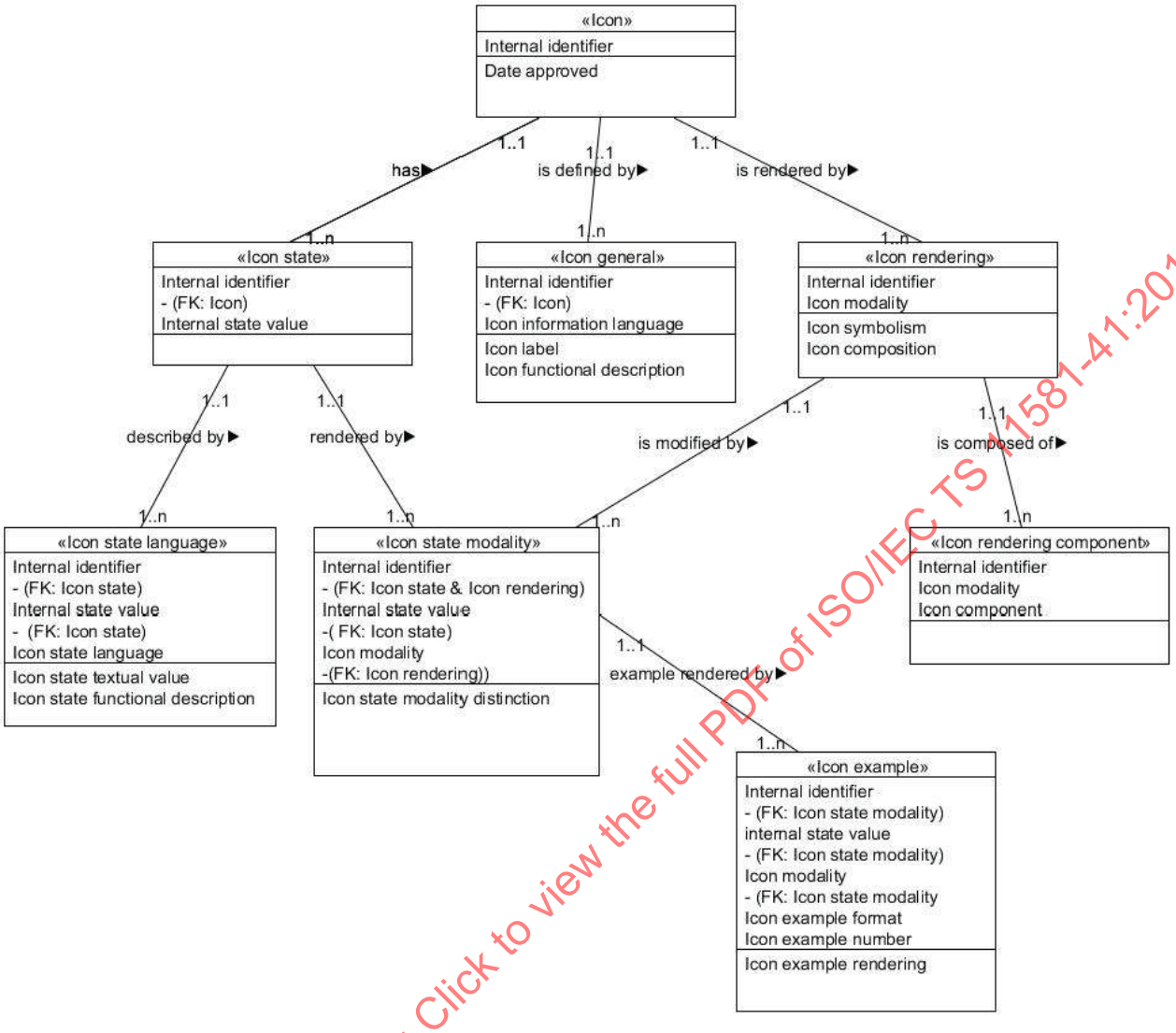

Figure 1 — Entity-relationship diagram for the ISO/IEC JTC 1/SC 35 icon database

Figure 1 uses a variation on basic entity-relationship diagramming conventions. Specifically, it uses the following conventions:

— tables are indicated by boxes, with a top, middle, and bottom section;

— table names are contained within double brackets (e.g. <<table name>>) and are located in the top section of a box;

— names of primary key attributes are contained within the middle section of a table box, and foreign key constraints are indicated below the primary key attribute name, as indicated by "– (FK: file name of where the foreign key applies);

— names of non-key attributes are contained in the bottom section of a table box;

— relationships are indicated as lines connecting table boxes, with information on the intended multiplicity or the relationship (of a complete entry for a give icon) at either end of the line.

NOTE Multiplicity is discussed in 4.3.

4.2 Records in the ISO/IEC JTC 1/SC 35 icon database for each icon

Each icon in the ISO/IEC JTC 1/SC 35 icon database shall have:

a) one icon record;

b) one or more icon general records;

c) one or more icon state records;

d) one or more icon state language records;

e) one or more icon state modality records;

f) one or more icon rendering records;

g) one or more icon rendering component records;

h) one or more sample icon records.

4.3 Multiplicity of records in the ISO/IEC JTC1/SC35 icon database

4.3.1 Icon state records

Each icon in the ISO/IEC JTC 1/SC 35 icon database shall have one or more states defined for it.

Each state of an icon shall be defined by:

a) an icon state record;

b) one or more icon state language records;

c) one or more icon state modality records;

d) one or more sample icon records.

NOTE All icons have at least one of the two states: AVAILABLE or UNAVAILABLE. Additional states include: SELECTED and ACTIVATED. Further states can be defined based on information within this part of ISO/IEC 11581 and within ISO/IEC 11581–10.

4.3.2 Icon rendering records

Each icon in the ISO/IEC JTC 1/SC 35 icon database shall have one graphical rendering defined for it and may have additional renderings defined for alternate modalities (e.g. auditory, tactile).

Each rendering of an icon shall be defined by

a) an icon rendering record,

b) one or more icon rendering component records, and

c) one or more sample icon records for each state of the icon.

5 General icon attributes

5.1 Internal identifier

5.1.1 Required internal identifier

Each icon in the ISO/IEC JTC 1/SC 35 icon database shall have a unique internal identifier that shall be used for all records relating to that icon.

NOTE Guidance on internal identifiers is provided in ISO/IEC 11581-10:2010, 8.1.1 to 8.1.3.

5.1.2 Internal identifier data structure

An internal identifier shall be a single attribute of INTEGER data type with capacity to handle all possible five digit values.

5.1.3 Internal identifier data values

The internal identifier of an icon shall be sequentially assigned (starting from 1), based on the order of approving icons being inserted into the ISO/IEC JTC 1/SC 35 icon database.

NOTE Internal identifiers with values greater than 90 000 are reserved for use by developers for icons that are not within the ISO/IEC JTC 1/SC 35 icon database.

5.1.4 Reuse of internal identifier data values

The internal identifier of an icon that has been deleted from the ISO/IEC JTC 1/SC 35 icon database shall not be reused for any other icon.

If an icon is reinserted into the ISO/IEC JTC 1/SC 35 icon database after having been deleted it shall be given its previously assigned internal identifier.

5.2 Date icon approved

5.2.1 Required date icon approved

Each icon shall have a date icon approved to indicate the latest date on which the data on records relating to that icon contained within the ISO/IEC JTC 1/SC 35 icon database was approved/confirmed for standardization.

NOTE This includes dates where any modifications were approved.

5.2.2 Date icon approved data structure

Date icon approved language shall be a single attribute of a DATE data type.

5.3 Icon definition language

5.3.1 Icon definition language data structure

Icon definition language shall be a single attribute of a CHARACTER data type with a fixed capacity of three characters.

NOTE Icon definition language values are used to implement alternate languages as identified in ISO/IEC 11581-10:2010, 8.2.6.

5.3.2 Icon definition language data values

Icon definition language values shall be based on ISO 639-3.

5.4 Icon label

5.4.1 Required icon label

Each icon shall have an icon label defined in English and may have additional icon labels defined in other languages.

NOTE Icon labels are required in 8.2.1 of ISO/IEC 11581-10:2010. Additional guidance on icon labels is provided by 8.2.9 to 8.2.12 of ISO/IEC 11581-10:2010.

5.4.2 Icon label data structure

Icon label shall be a single attribute of variable length CHARACTER data type with capacity for at least 50 characters.

5.5 Icon functional description

5.5.1 Required icon functional description

Each icon in the ISO/IEC JTC 1/SC 35 icon database shall have an icon functional description defined for use in the English language.

NOTE Icon functional descriptions are required in 8.2.3 of ISO/IEC 11581-10:2010.

5.5.2 Icon functional description data structure

Icon functional description shall be a single attribute of variable length CHARACTER data type with capacity for at least 1 000 characters.

6 Icon state attributes

6.1 Icon states

6.1.1 Required icon states

Each icon in the ISO/IEC JTC 1/SC 35 icon database shall have one or more icon states defined for it.

NOTE 1 All icons have at least one of the two icon states: AVAILABLE or UNAVAILABLE. Additional standard icon state values include: SELECTED and ACTIVATED.

NOTE 2 Various instances of using icon state information are identified within Clause 8 of ISO/IEC 11581-10:2010.

6.2 Internal state values

6.2.1 Required internal state values

Each icon state shall have one internal state value defined for it.

NOTE Internal state value is required in 8.1.5 of ISO/IEC 11581-10:2010.

6.2.2 Internal state value data structure

Internal state value shall be a single attribute of VARCHAR data type with a maximum length of 1 024 characters. It encodes all relevant properties of internal state as a space-separated property-value list as follows:

— "" (empty string) represents the internal state value of an icon if the icon has no relevant properties;

— "*prop1=value1*" represents the internal state value of an icon if the icon has exactly one relevant property ("*prop1*") with value "*value1*";

— "*prop1=value1 prop2=value2*" represents the internal state value of an icon if the icon has exactly two relevant properties with values (property *"prop1"* with value *"value1"*, and property *"prop2"* with value *"value2"*);

— "*prop1=value1 prop2=value2 prop3=value3*" represents the internal state value of an icon if the icon has exactly three relevant properties with values (property *"prop1"* with value *"value1"*, property *"prop2"* with value *"value2"*, *"prop3"* with value *"value3"*);

— ... and so forth for four and more relevant properties and values.

NOTE The internal state value does not have leading or trailing spaces.

The internal state value shall be composed of generic properties and values, as specified in 6.2.3. It shall contain all generic properties (with their values) from 6.2.3 that are relevant (i.e. applicable) for the icon. It shall not contain any property that is not relevant for the icon.

6.2.3 Internal state properties and values

Internal state property names and their values shall be case-sensitive and shall not include the equal character ("=") or the space character (" ").

NOTE 1 The equal character is reserved as delimiter between a property name and its value. The space character is reserved as delimiter between multiple property-value pairs.

The list of generic properties and pertaining values is given in Table 1.

NOTE 2 The order of the properties in Table 1 is significant for the order of the properties as listed in the internal state value.

Table 1 — List of generic internal state properties and values

Property	Description of property	Value	Description of values
Avail	Information on the availability of the icon to be used	UNAVAILABLE AVAILABLE SELECTED ACTIVATED	— UNAVAILABLE: The icon is currently unavailable for selection or activation — AVAILABLE: The icon is currently available but is not selected or activated — SELECTED: The icon is currently available and selected but is not activated — ACTIVATED: The icon is currently activated (processing)

Table 1 *(continued)*

Property	Description of property	Value	Description of values
DragDrop	Information on the availability of the icon to be used as a drop target for another icon	DRAGGING DROPTARGET NODROPTARGET	— DRAGGING: The icon is currently used as the subject of a drag operation (i.e. it can be dragged and dropped on to another icon) — DROPTARGET: The icon is currently available as a target for the currently selected icon (e.g. the currently selected icon can be dragged and dropped onto the icon) — NODROPTARGET: The icon is currently not available as a target for the currently selected icon
Failure	Failure information on an object represented by the icon	OK FAIL	— OK: the object is in the OK status — FAIL: the object is in a failure status
Move	Information on the ability of the icon to be moved	MOVABLE FIXED	— MOVABLE: the icon is currently able to be moved — FIXED: The icon is currently fixed in its location and is not currently able to be moved
Percent	Quantitative status information (as a percentage) relating to an object represented by the icon	Any integer value between 0 and 100 (e.g. 0, 10, 55, 100)	Percentage value

EXAMPLE 1 The internal state value "Avail=UNAVAILABLE" represents an icon that is currently unavailable for selection or activation. No other generic internal state properties apply to the icon.

EXAMPLE 2 The internal state value "Avail=AVAILABLE DragDrop=DROPTARGET" represents an icon that is currently available and is a potential drop target for the drag and drop operation that is currently being performed with another icon. No other generic internal state properties apply to the icon.

EXAMPLE 3 The internal state value "Avail=AVAILABLE Percent=90" represents a battery icon that is currently available and reflects a charge value of 90 % (mostly, but not fully charged). No other generic internal state properties apply to the icon.

EXAMPLE 4 The internal state value "Avail=ACTIVATED Percent=10" represents a wireless connectivity icon that has been activated by the user and a process has been started to open a wireless connectivity dialogue. Also, it reflects a connectivity level of 90 % (very weak signal). No other generic internal state properties apply to the icon.

In addition to the internal state properties listed in Table 1, icons may have icon-specific internal state properties that are defined only for a particular icon and are not universal across all icons. Icon-specific internal state properties shall have a prefix of "I_" (capital 'I' and underscore character). If icon-specific internal state properties occur in the internal state value, their meaning shall be identified in the textual state value of the icon in the English language.

In the internal state value, the order of properties shall be as follows: firstly, the relevant properties from Table 1 in their order, then the icon-specific internal state properties in alphabetical order.

EXAMPLE 5 The internal state value "Avail=SELECTED I_Paper=OutOfPaper" represents a printer icon that is currently selected and has the icon-specific state I_Paper with value "OutOfPaper".

EXAMPLE 6 The internal state value "Avail=SELECTED I_Paper=PaperSupplied I_TonerBlack=Low I_TonerCyan=Low I_TonerMagenta=Medium I_TonerYellow=High" represents an icon that is currently selected and has the following icon-specific states: I_Paper with value "PaperSupplied", I_TonerCyan with value "Low", I_TonerMagenta with value "Medium", I_TonerYellow with value "High", and I_TonerBlack with value "Low".

6.3 Icon state languages

6.3.1 Icon state language data structure

Icon state language value shall be a single attribute of CHARACTER data type with a fixed capacity of three characters.

NOTE Icon state languages are used to implement alternate languages as identified in 8.2.6 of ISO/IEC 11581-10:2010.

6.3.2 Icon state language data values

Icon state language values shall be based on ISO 639-3.

6.4 Icon state textual values

6.4.1 Required icon state textual values

Each icon state shall have an icon state textual value defined in English and may have additional icon state textual values defined in other languages.

NOTE Icon state textual values are required in 8.2.4 of ISO/IEC 11581-10:2010.

6.4.2 Icon state textual value data structure

Icon state textual value shall be a single attribute of CHARACTER data type with capacity for at least 30 characters.

6.4.3 Icon state textual data values

The following icon state textual values shall be used (in English), where applicable:

— UNAVAILABLE;

— AVAILABLE;

— SELECTED;

— EMPTY;

— NULL STATUS;

— NOT CONNECTED;

— FULL.

Additional Icon state textual values should be used consistently and may be defined as needed.

NOTE A query of all icon state textual values in the ISO/IEC JTC 1/SC 35 icon database using the qualifier UNIQUE can provide a list of currently used icon state textual values prior to the defining of new values.

6.5 Icon state functional descriptions

6.5.1 Required icon state functional description

Each icon state should have an icon state functional description defined in English and may have additional icon state functional descriptions defined in other languages

NOTE Icon state functional descriptions are not identified in ISO/IEC 11581-10, but can be very beneficial in clarifying the intended meaning of each icon state.

6.5.2 Icon state functional description data structure

Icon state functional description shall be a single attribute of CHARACTER data type with capacity for at least 300 characters.

6.6 Icon state modality

Guidance on the icon state modality distinction attribute is specified in 7.5.

7 Icon representation attributes

7.1 Icon modalities

7.1.1 Required icon modalities

Each icon in the ISO/IEC JTC 1/SC 35 icon database shall have its graphical rendering and may have renderings defined for alternate modalities.

NOTE The graphical rendering of icons is required in 6.2 of ISO/IEC 11581-10:2010. Guidance on graphical rendering is provided in 8.3 of ISO/IEC 11581-10:2010. The standardization of alternate modality renderings of icons is provided for by 6.4 of ISO/IEC 11581-10:2010.

7.1.2 Icon modality data structure

Icon modality shall be a single attribute of CHARACTER data type with capacity for at least 10 characters.

7.1.3 Icon modality data values

The following icon modality values shall be used (in English), where applicable:

— graphic;

— auditory.

Additional icon modality values should be used consistently and may be defined as needed.

NOTE Due to the wide range of tactile/haptic devices, there might be multiple possible varieties of tactile/haptic renderings, one rendering per type or family of device. In this case, the icon modality would be used to identify the type or family of tactile/haptic device.

7.2 Icon symbolism

7.2.1 Icon symbolism recommended

For each modality rendering of an icon in the ISO/IEC JTC 1/SC 35 icon database, an icon symbolism should be used to describe the reason for the design of that rendering of the icon.

NOTE 1 An icon symbolism can be a description of the actual or metaphorical object or action, and its related environment (if appropriate).

NOTE 2 While it is desirable that all renderings of a given icon make use of the same icon symbolism, this is not always possible.

NOTE 3 Guidance on icon labels is provided by 8.3.3 to 8.3.5 of ISO/IEC 11581-10:2010.

NOTE 4 In pre-2010 ISO/IEC icon standards, this attribute was referred to as "specific instance".

EXAMPLE 1 The icon symbolism for a "document/file" icon is stated as "a sheet of paper as typically used in an office".

EXAMPLE 2 The icon symbolism for an "alarm" icon is stated as " bell such as the "Liberty bell" (US) or housed in a church steeple (UK)".

7.2.2 Icon symbolism data structure

Icon symbolism shall be a single attribute of CHARACTER data type with capacity for at least 300 characters.

7.3 Icon composition

7.3.1 Required icon composition

For each modality rendering of an icon in the ISO/IEC JTC 1/SC 35 icon database, the icon composition shall be used to identify the composition of logical elements or objects that comprise the rendering.

NOTE In pre-2010 ISO/IEC icon standards, this attribute was referred to as "components".

EXAMPLE The single component of the graphical rendering of a document icon composition is stated as "a sheet of paper, rectangular with the height greater than the width. Corner folded down in a triangular shape within the sheet of paper".

7.3.2 Icon composition data structure

Icon composition shall be a single attribute of CHARACTER data type with capacity for at least 300 characters.

7.4 Icon component

7.4.1 Required icon component

For each modality rendering of an icon in the ISO/IEC JTC 1/SC 35 icon database, one or more icon components shall be used to identify the individual logical elements or objects that comprise the rendering.

NOTE A query of the ISO/IEC JTC 1/SC 35 icon database can provide a list of icon components in use and the icons (e.g. icon labels) for which they are already used in order to see for which other icons they are used. This can help in identifying and avoiding the occurrence of multiple meanings of a single icon component.

EXAMPLE "a sheet of paper"

