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Information technology — Computer graphics — Metafile for the storage and transfer of picture description information —

Part 1: Functional specification

AMENDMENT 1: Rules for profiles

Technologies de l'information — Infographie — Métafichier de stockage et de transfert des informations de description d'images —

Partie 1: Description fonctionnelle

AMENDEMENT 1: Règles pour profils

Reference number
ISO/IEC 8632-1:1992/Amd.1:1994(E)

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. 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.

Amendment 1 to International Standard ISO/IEC 8632-1:1992 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee 24, *Computer graphics and image processing*.

Information technology — Computer graphics — Metafile for the storage and transfer of picture description information —

Part 1:
Functional specification

AMENDMENT 1: Rules for profiles

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Replace clause 7 in the Contents by:

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Clause 2: Add the following to the list of references:

"ISO 8601:1988 *Data elements and interchange formats — Information interchange - Representation of dates and time.*

ISO 8859-1:1987 *Information processing — 8-bit single-byte coded graphic character sets - Latin alphabet No. 1.*

ISO/IEC TR 10000-1:1992 *Information technology — Framework and taxonomy of International Standardized Profiles - Part 1: Framework.*

ISO/IEC TR 10000-2:1992 *Information technology — Framework and taxonomy of International Standardized Profiles - Part 2: Taxonomy of profiles.*"

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Clause 3.1: Add the following to the list of definitions:

"3.1.99 **colour device:** A device which offers more than two colours.

3.1.100 **grey-scale device:** A special case of colour device where hue and saturation are the same for all colours (generally saturation = 0).

3.1.101 **geometric degeneracy:** The degeneracy is intrinsic to the parameterization of the element. A degeneracy which results when parameterization for the geometry does not provide sufficient information to draw the intended primitive.

3.1.102 **interoperability:** The generator and the interpreter have the same understanding of the encodings, the syntax, and the semantics of the metafile.

3.1.103 **monochrome device:** A device which has only two colours, a foreground and a background colour. The background colour is the colour of the display surface after it has been cleared.

3.1.104 **Profile Proforma (PPF):** A template consisting of profile specifications, which is used by writers of profiles for generating instances of a profile. A completed PPF specifies the rules and options of a profile of ISO/IEC 8632."

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Clause 3.2: Add the following to the list of abbreviations:

"ISP International Standardized Profile
PPF Profile Proforma"

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Replace Clause 7 with the following new clause.

"7 Profiles and conformance

7.1 Introduction

7.1.1 Objectives

This clause provides rules for defining valid profiles of ISO/IEC 8632. Profiles are used as a method for defining subsets of ISO/IEC 8632 by identifying the CGM elements, parameters, options, and implementation requirements necessary for meeting a particular set of requirements.

The primary objectives of the profile rules are:

a) to promote interoperability by minimizing arbitrary subsets of ISO/IEC 8632;

b) to provide the framework for developing profiles;

c) to promote uniformity in the development of conformance tests;

d) to supplement ISO/IEC TR10000 for International Standardized Profiles (ISPs) for the CGM standard;

e) to provide a basis for evaluating profiles as potential ISPs.

7.1.2 Scope

This clause:

a) defines the concept of profiles of ISO/IEC 8632;

b) provides rules for defining profiles of ISO/IEC 8632;

c) provides conformance criteria for profiles of ISO/IEC 8632;

d) provides conformance criteria for metafiles, metafile generators, and metafile interpreters;

e) defines criteria on which to evaluate profiles of ISO/IEC 8632;

f) provides a Profile Proforma (PPF) and Model Profile.

This clause addresses the CGM data stream and implementation requirements. Implementation requirements address the latitude allowed by CGM generators and interpreters. This clause does not directly address the environmental, performance, or resource requirements of the generator or interpreter.

This clause does not define the application requirements or dictate application functional content of a profile — the latter is the purview of application constituencies.

The scope of this clause is limited to rules for valid profiles for open interchange of graphical picture metafiles.

7.1.3 Concept and purpose of profiles for CGM

A major goal of ISO/IEC 8632 is to facilitate the transfer of picture information between computers, sites, and applications.

Profiles provide a means to:

a) improve interoperability between implementations by inhibiting the proliferation of private subsets of ISO/IEC 8632;

b) provide a foundation for testing and promote uniformity of conformance tests;

c) enhance the availability of consistent implementations of profiles.

A profile of ISO/IEC 8632 defines the options, elements, and parameters of ISO/IEC 8632 necessary to accomplish a particular function and maximize the probability of interchange between systems

implementing the profile. Profiles are defined by application constituencies who agree to adhere to the same subset of CGM for the purpose of graphical data interchange using ISO/IEC 8632. Alternatively, profiles of ISO/IEC 8632 may be part of a set of interrelated standards and profiles assembled for the purpose of accomplishing a larger functional purpose.

A profile may:

d) give the meaning of implementation dependent semantics of some elements;

e) enforce common resolution of ambiguous semantics of ISO/IEC 8632;

f) ensure that identical use of identical elements and parameter values has the same meaning;

g) specify subsets or groupings of registered items from the appropriate ISO/IEC registers;

h) prohibit undefined or ill-defined elements or parameter values.

A profile of ISO/IEC 8632, according to the taxonomy of ISO/IEC TR10000-2, is an FCG Profile, that is, an interchange format and representation profile of CGM.

A profile of ISO/IEC 8632 shall not specify any requirement that would contradict or cause non-conformance to ISO/IEC 8632. Any metafile conforming to a profile of ISO/IEC 8632 conforms to ISO/IEC 8632.

Profiles address metafile requirements, as well as implementation requirements for metafile generators and metafile interpreters. Profiles define maximum requirements for generators and minimum requirements for interpreters.

7.1.4 Purpose of the Model Profile

The Model Profile serves two purposes:

1) It is a usable, implementable instance of a profile of ISO/IEC 8632. It is the only instance contained in ISO/IEC 8632. While it is designed to be implementable on a range of systems, it is also designed with modest limits that will not preclude its implementation in limited environments (low to mid-range computing systems). The Model Profile may not be suitable for application communities with more advanced and demanding requirements.

2) It is a guide to writing profiles. As an instance of a profile, the Model Profile is a starting point from which an application-specific profile should be defined, for those application communities for which the Model Profile itself does not suffice. Writers of profiles should consider each of the specifications of the Model Profile and either accept the specifications where they are adequate, or modify them when not.

7.2 Conformance

7.2.1 Conformance of profiles

A profile of ISO/IEC 8632

a) shall meet all requirements specified in ISO/IEC 8632;

b) shall be structured in accordance with the structural components and presentation rules defined in 7.4;

c) shall not specify any requirements that would contradict or cause non-conformance to ISO/IEC 8632;

d) may contain a conformance clause that adds requirements that are more specific and limited in scope than ISO/IEC 8632;

e) shall meet the conformance requirements for a FCG Profile as defined in ISO/IEC TR10000-1;

f) shall meet all the specific rules in this clause.

7.2.2 Conformance of metafiles

Conformance of metafiles to ISO/IEC 8632 is defined in terms of conformance to profiles. A metafile conforms to ISO/IEC 8632 if it conforms to a profile.

In order to conform to a profile of ISO/IEC 8632, a metafile

a) shall be a syntactically correct metafile for a specific version;

b) shall conform to all profile requirements defined for that version.

A metafile is a syntactically correct version of ISO/IEC 8632 if the following conditions are met.

c) The metafile contains exactly one correct METAFILE VERSION element.

d) All graphical elements contained therein match the functional specification of the corresponding elements of ISO/IEC 8632-1 for that version. The metafile shall obey the relationships defined in the formal grammar for that version, the state tables, and all other syntactic requirements for that version.

e) The sequence of elements in the metafile obeys the relationships specified in ISO/IEC 8632-1 for that version, producing the structure specified in ISO/IEC 8632-1. For example, the metafile must begin with BEGIN METAFILE and end with END METAFILE, and include exactly one metafile descriptor at the beginning which contains at least all the required elements.

f) No elements appear in the metafile other than those specified in ISO/IEC 8632-1 for that version, unless required for the encoding technique. All non-standardized elements are encoded using the ESCAPE or GDP elements or the external elements APPLICATION DATA and MESSAGE.

g) The metafile is encoded according to the rules in one of the standardized encodings specified in ISO/IEC 8632-2, ISO/IEC 8632-3, or ISO/IEC 8632-4.

7.2.3 Conformance of metafile generators

Conformance of metafile generators is defined in terms of conformance to a particular profile of CGM.

If ***P*** is a profile of CGM which conforms to the rules of this clause, then a metafile generator is a conforming ***P*** generator if it:

a) generates only metafiles which conform to the requirements of profile ***P*** or is directed to operate in a mode where only such metafiles can be generated;

b) maps the graphical characteristics of the pictures onto a set of CGM elements which define those pictures within the accuracy and latitude defined by the Generator Implementation Requirements in the profile ***P***.

A metafile generator which conforms to the Model Profile for a specific version, shall:

c) generate no syntax in violation of that version of ISO/IEC 8632;

d) generate metafiles which conform to that version of the Model Profile;

e) map the graphical characteristics of application pictures onto a set of CGM elements which define those pictures within the latitude allowed by the Generator Implementation Requirements of the Model Profile.

7.2.4 Conformance of metafile interpreters

Conformance of metafile interpreters is defined in terms of conformance to a particular profile of CGM.

If ***P*** is a profile of CGM which conforms to the rules of this clause, then a metafile interpreter is a conforming ***P*** interpreter if it:

a) is able to read any metafile which conforms to the requirements of profile ***P***;

b) renders the graphical characteristics of the CGM elements in any such metafile into a graphical image or picture within the accuracy and latitude defined by the Interpreter Implementation Requirements in the profile ***P***.

A metafile interpreter which conforms to the Model Profile for a specific version, shall:

c) be able to read any metafile which conforms to that version of the Model Profile of ISO/IEC 8632;

d) render the graphical characteristics of the CGM elements in any such metafile into a graphical image or picture within the latitude defined by the Interpreter Implementation Requirements of the Model Profile.

7.3 Criteria for designing profiles

The following criteria provide the means for determining the appropriateness and correctness of proposed profiles. The objective is to limit the proliferation of profiles and ensure the quality of those profiles.

7.3.1 Criteria on the profile in its entirety

The following criteria shall be applied to a proposed profile.

a) The application constituency and functional purpose of a proposed profile shall be well defined.

b) The functional purpose of a proposed profile shall not be satisfied by an existing profile. If the functional purpose of a proposed profile can be satisfied by a derivative of an existing profile, it shall be so defined — significant subsets shall not be replicated.

c) The proposed profile shall meet the identified functional requirements.

7.3.2 Criteria for the technical content of the profile

The following criteria shall be applied to the technical content of a proposed profile.

a) A proposed profile shall not specify requirements that violate ISO/IEC 8632.

b) A proposed profile shall place requirements on the CGM and not on the internal behaviour, structure, or performance of implementations (e.g., generators and interpreters).

c) A proposed profile may contain requirements on the functional and graphical characteristics of implementations claiming conformance to the profile.

d) A proposed profile shall be consistent in its requirements regarding CGM elements and parameters. For example, if a profile places no restrictions on the number of indexes defined by the CHARACTER SET LIST element, then it is inconsistent to place a restriction on CHARACTER SET INDEX.

e) A proposed profile shall not specify requirements which are conflicting, unnecessary, or redundant.

7.4 Form and format of a profile

A profile of ISO/IEC 8632 shall contain the following components:

a) a concise definition of the scope and purpose of the profile;

b) a scenario illustrating the profile's use and applicability;

c) all references to ISO/IEC 8632, i.e., approved amendments, errata, and registers.

d) references to any other relevant source documents;

e) specification of the set of elements, parameters, implementation requirements, and features of ISO/IEC 8632, presented in the format and according to the rules of 7.5.

f) a definintion of conformance of metafiles and implementations to the profile.

The content and layout of the profile shall conform to the *Rules for Drafting and Presentation of International Standardized Profiles* in annex A of ISO/IEC TR10000-1.

7.5 Profile rules, proforma, and model profile

7.5.1 Overview

This clause presents:

a) rules for defining CGM profiles;

b) a Profile Proforma (PPF);

c) a definition of the Model Profile.

The PPF is a set of tables which are a template for writing profiles. Most of the profile rules are inherent in the structure of the PPF. For example, the PPF requires certain information to be completed — each such case is a statement, equivalent to the rule, "Profiles shall specify ...".

All CGM profiles shall include a completed PPF.

This clause contains the completed PPF of the Model Profile.

The following subcluases address

— General Principles which apply to all profiles.

— Metafile Rules, which apply to the general characteristics of a conforming metafile.

— Multi-element Rules, which apply to several elements.

— Individual Element Rules, which apply to the elements one by one. A rule is described for each element defined in clause 5. Each rule in this subclause specifies whether a profile must address the rule, whether a profile may optionally address the rule, or whether the profile shall not restrict the use of the element in any manner.

— Generator Implementation Requirements, which apply to the behaviour of CGM generator implementations.

— Interpreter Implementation Requirements, which apply to the behaviour of CGM interpreter implementations.

Rules which address encoding issues are described in parts 2, 3, and 4 of ISO/IEC 8632.

The PPF is presented in tabular form supplemented by descriptive material. The PPF template and the Model Profile are presented together.

7.5.2 General principles

7.5.2.1 Self-identification of profiles

It is required that the METAFILE DESCRIPTION element identify the profile, and its edition, to which the metafiles conform. The edition indicates the version or release date of the profile.

7.5.2.2 Source identification of profiles

The optional information of the PPF, for the METAFILE DESCRIPTION element, allows profiles to require that metafiles identify their source (e.g., vendor, product, product version).

7.5.2.3 Private encodings

The "encodings" item of the PPF effectively prohibits profiles from specifying private encodings.

7.5.2.4 Restrictions on grammar and state tables

In completing the PPF, profile writers may restrict the use of some elements by restricting the formal grammar or the state tables.

EXAMPLE — A profile may specify that segments are not allowed in Picture Body by either:

1) restricting the formal grammar:

Replace
<picture content> ::= <picture element> |
with
<picture content> ::= <picture element>.

2) modifying the state table:

Remove the "X" in the POS column of table 8 in "BEGIN SEGMENT".

3) making the statement:

Segments are not permitted to appear in the Picture Body.

7.5.2.5 Defining subsets

It is a principal role of profiles to define subsets of the options of ISO/IEC 8632. However, defining subsets of ISO/IEC 8632 shall not be arbitrary and shall have a clear connection to the achievement of one or more of the defined goals of the profile.

7.5.2.6 Metafile defaults

Clause 6 addresses all elements which have default values. While no profile can change these values, an equivalent effect may be achieved by use of the METAFILE DEFAULTS REPLACEMENT element. Profiles may require that a metafile contain a METAFILE DEFAULTS REPLACEMENT element with well-defined content.

For default values in clause 6 which are listed as "device dependent" or "interpreter dependent", if there is a element for setting the value of such an element, then profiles shall require the use of such elements. The appropriate element shall be included in the METAFILE DEFAULTS REPLACEMENT element or in the metafile body. For such elements, profiles shall not assign implicit defaults. These elements include:

<u>For profiles of Version 2 (and above)</u>
LINE REPRESENTATION
MARKER REPRESENTATION
TEXT REPRESENTATION
FILL REPRESENTATION
EDGE REPRESENTATION

Specifying the default value for elements which specify colour values shall be consistent with the rules for colour (see 7.5.4.1). Specifically, if all colours used within the metafile shall be defined, then the element for setting the colour value shall be used; otherwise, the element shall not be used. The elements affected by this rule are:

BACKGROUND COLOUR
COLOUR TABLE

<u>When specified as a direct colour:</u>
LINE COLOUR
MARKER COLOUR
TEXT COLOUR
FILL COLOUR
EDGE COLOUR

If no element exists to set the value, then the profile shall define the default values to be used. The elements affected by this rule, because they do not exist in Version 1 include:

For profiles of Version 1 (only)
LINE REPRESENTATION
MARKER REPRESENTATION
TEXT REPRESENTATION
FILL REPRESENTATION
EDGE REPRESENTATION

7.5.2.7 Restricting element values

In those cases where it is necessary to restrict an element to its default value in order to meet the goals of a profile, the restriction shall be achieved by allowing the element to appear in conforming files and restricting its value to the default rather than prohibiting the element.

NOTE — The implementation burden necessary to implement this guideline is small compared to the interoperability gain. Many implementations, even if only interested in the default value, consider such a "defensive" strategy to be good insurance against mistakes of other implementations in realizing the defaults of ISO/IEC 8632.

7.5.2.8 Classification of elements and parameter values

Elements and parameter values can be classified as either standard, registered, profile-defined, or private.

- Standard refers to elements and parameter values which have been defined in ISO/IEC 8632.
- Registered refers to elements and parameter values which have been entered into a registry and thus, have an internationally recognized definition and have undergone a standardization process.
- Profile-defined refers to elements such as ESCAPEs and GDPs, whose syntax, semantics, and identifier are defined within the profile.
- Private refers to truly private elements and parameter values, that is, known only by prior agreement between generators and interpreters.

Profiles shall limit metafiles to standard, registered, and profile-defined metafile elements and/or parameter values.

Profiles shall limit the use of ESCAPE and GDP elements to those which are registered or profile-defined.

Profiles shall prohibit private elements and parameter values which produce graphical effect. Profiles may allow private elements and parameter values which produce no graphical effect, (e.g., APPLICATION DATA).

7.5.2.9 Registered elements and values

Profiles shall specify the set of registered elements and parameter values which are allowed. Registered elements and parameter values are those which have been entered into any registry which is referenced in a normative manner by ISO/IEC 8632 (see 4.12). Profiles shall refer to these registered items using their registered identifier and definition.

If a CGM profile exists which contains profile-defined, non-registered elements with values which are affected by the ISO International Register of Graphical Items, then the elements shall be registered first before such a profile is approved as an ISP.

7.5.2.10 Generator and interpreter behaviour

Profiles of CGM shall address implementation conformance requirements. Profiles shall not address the internal structure, performance or other internal behavioural characteristics of implementations of generators or interpreters. These issues may be addressed by the application community in supplemental documentation.

7.5.2.11 Physical media

Physical file format and other issues of media, delivery, or networking are beyond the scope of ISO/IEC 8632 and shall not be specified by profiles of ISO/IEC 8632. These issues may however be important for successful interoperability and if addressed by the application commmunity, shall be addressed in specifications other than the profiles.

7.5.3 Metafile rules

The metafile rules are completely contained in the PPF table 13. These rules apply to the entire metafile.

7.5.4 Multi-element rules

The information in this subclause explains and supplements the rules in the PPF tables 14 through 23.

7.5.4.1 Colour

The PPF requires that profile writers choose one of the following rules.

a) For each metafile, either all colours used within the metafile, including background and foreground colours, shall be defined or none shall be defined.

b) For all metafiles, all colours used within the metafile, including background and foreground colours, shall be defined.

c) For all metafiles, no colours shall be defined.