INTERNATIONAL STANDARD

ISO/IEC 8632-1

Second edition
1992-10-01

AMENDMENT 2
1995-07-01

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

Part 1:
Functional specification

AMENDMENT 2: Application structuring extensions

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

Partie 1: Description fonctionnelle

AMENDEMENT 2: Extensions de structure d'application

Reference number
ISO/IEC 8632-1:1992/Amd.2:1995(E)

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

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

Part 1:
Functional specification

AMENDMENT 2: Application structuring extensions

Pages ii-viii

Add the following to Contents:

"4.3.5 Picture directory"
"4.5.8 Application structure directory"
"4.13 Application Structures"
"4.13.1 Introduction
4.13.2 Location of and access to Application Structures
4.13.3 Nesting of Application Structures
4.13.4 Graphical Context of Application Structures
4.13.5 Application Structure Attributes"
"5.2.18 BEGIN APPLICATION STRUCTURE
5.2.19 BEGIN APPLICATION STRUCTURE BODY
5.2.20 END APPLICATION STRUCTURE"
"5.3.24 PICTURE DIRECTORY"
"5.4.20 APPLICATION STRUCTURE DIRECTORY"
"5.11 Application structure descriptor elements
5.11.1 APPLICATION STRUCTURE ATTRIBUTE"
"I Formal grammar of the functional specification of Version 4 metafiles."

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0 Introduction

Subclause 0.9 Versions, page xiii:

Change the 4th sentence to read:

"The following versions are currently defined: Version 1 (one); Version 2 (two); Version 3 (three); Version 4 (four)."

Change Note 1 by adding a sentence before the 1st sentence:

"A valid Version 3 metafile is also a valid Version 4 metafile."

Change Note 2 by adding a sentence after the final period:

"Version 4 metafiles are defined by ISO/IEC 8632:1992/Amd.2."

1 Scope

Clause 1, Page 1:

Replace the 2nd sentence of the 1st paragraph to read:

"The file format consists of an ordered set of elements that may be used to describe pictures in a way that is compatible between systems of different architectures, compatible with devices of differing capabilities and design, and meaningful to application constituencies."

Replace the 2nd sentence of the 2nd paragraph to read:

"The elements are organized into groups that delimit major structures (metafiles, pictures, and application structures), that specify the representations used within the metafile, that control the display of the picture, that perform basic drawing actions, that control the attributes of the basic drawing actions, that allow application-specific structuring to be overlaid on the graphic content, and that provide access to non-standard device capabilities."

Replace the 3rd paragraph with:

"The metafile is defined in such a way that, in addition to sequential access to the whole metafile, random access to individual pictures and individual context-independent application structures is well-defined. Applications which require random access to pictures and/or context-independent application structures within pictures may, within the metafile, define directories to these pictures and/or context-independent application structures. The metafile may then be opened and randomly accessed without interpreting the entire metafile."

3 Definitions

Subclause 3.1, page 9:

Add the following definition:

"**3.1.105 application structure:** A sequence of metafile elements delimited by the BEGIN APPLICATION STRUCTURE and END APPLICATION STRUCTURE elements, containing

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one BEGIN APPLICATION STRUCTURE BODY element, and optionally containing one or more APPLICATION STRUCTURE ATTRIBUTE elements."

Subclause 3.2, page 9:

Add the following abbreviation to the list of abbreviations:

"APS Application Structure"

4 Concepts

4.1 Introduction

Subclause 4.1, page 10:

Change 1st sentence to read:

"The objective of the Computer Graphics Metafile (CGM) is to provide for the description, storage, and communication of graphical information together with related, application-specific information in a device-independent manner."

Change the 2nd element class in the 1st paragraph to read:

"- Metafile Descriptor Elements, which describe the functional content, default conditions, identification, and characteristics of the CGM; and optionally, define a directory."

Change the 3rd element class in the 1st paragraph to read:

"- Picture Descriptor Elements, which set the interpretation modes of attribute elements for each picture and optionally, define a directory to the application structures contained in each picture."

Replace the 9th element class in the 1st paragraph with:

"-Segment elements, which enable the grouping of graphic objects for graphical operations such as copying.

-Application structure elements, which enable the grouping of elements for retrieval, electronic linking, and other specific application-dependent operations."

Add the following sentence after the last sentence of the 4th paragraph:

"In Version 4 metafiles, graphical output primitives, attributes, control elements, and application structure attributes may be grouped in application structures."

4.2 Delimiter Elements

Subclause 4.2, page 11:

Change the 1st sentence of the 5th paragraph to read:

"In Version 2, Version 3, and Version 4 metafiles, primitives may be grouped together to form a composite primitive known as a closed figure."

Change the 1st sentence of the 6th paragraph to read:

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one BEGIN APPLICATION STRUCTURE BODY element, and optionally containing one or more APPLICATION STRUCTURE ATTRIBUTE elements."

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"In Version 2, Version 3, and Version 4 metafiles, groups of elements, called segments, are delimited by BEGIN SEGMENT and END SEGMENT."

Change the 1st sentence of the 7th paragraph to read:

"In Version 3 and Version 4 metafiles, a compound clipping and shielding region may be defined by line and filled-area elements occurring between BEGIN PROTECTION REGION and END PROTECTION REGION."

Change the 1st sentence of the 8th paragraph to read:

"In Version 3 and Version 4 metafiles, a tile array may be defined by tile elements occurring between BEGIN TILE ARRAY and END TILE ARRAY."

Add a new paragraph after the 10th (the last) paragraph as follows:

"In Version 4 metafiles, application structures consisting of groups of elements within picture bodies, are delimited by BEGIN APPLICATION STRUCTURE and END APPLICATION STRUCTURE. Between these delimiters the BEGIN APPLICATION STRUCTURE BODY element separates the APPLICATION STRUCTURE ATTRIBUTE elements in the application structure descriptor from the other elements contained in the application structure body."

4.3 Metafile descriptor elements

Subclause 4.3, page 11:

Add the following element to the element list in the 1st paragraph:

"PICTURE DIRECTORY"

Add a new Subclause 4.3.2.7 Version 4 set, page 16:

"4.3.2.7 Version 4 set

The Version 4 set may be used to indicate all the elements in Version 3 and the elements:

PICTURE DIRECTORY
APPLICATION STRUCTURE DIRECTORY
BEGIN APPLICATION STRUCTURE
BEGIN APPLICATION STRUCTURE BODY
END APPLICATION STRUCTURE
APPLICATION STRUCTURE ATTRIBUTE"

Add a new Subclause 4.3.5 Picture directory, page 21:

"4.3.5 Picture directory

The PICTURE DIRECTORY element contains locations of the pictures in a metafile. The picture directory contains a list of picture identifiers and their locations relative to the BEGIN METAFILE element. The picture directory may optionally contain the location of the APPLICATION STRUCTURE DIRECTORY element in each picture relative to the BEGIN METAFILE element. An interpreter wishing to randomly address a picture in a metafile with a picture directory need

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only interpret the Metafile Descriptor and skip to the locations of the picture specified in the PICTURE DIRECTORY. The next element read will be the desired BEGIN PICTURE."

4.4 Picture descriptor elements

Subclause 4.4, page 21:

Add the following element to the element list in the 1st paragraph:

"APPLICATION STRUCTURE DIRECTORY"

Change the 1st sentence of the 3rd paragraph (the last) to read:

"In Version 2, Version 3, and Version 4 metafiles, some of the Picture Descriptor elements may appear within the picture body."

Add a new Subclause 4.4.10 Application structure directory, page 25.

"4.4.10 Application structure directory

The APPLICATION STRUCTURE DIRECTORY element contains the locations of the various application structures in a picture. The application structure directory contains a list of application structure identifiers and their locations relative to the BEGIN PICTURE element. APSs within a metafile containing multiple pictures can be accessed directly in two steps. First, the picture directory is used to locate a picture and possibly the application structure directory for the picture. 2nd, the APSs in the picture are located using the application structure directory."

4.5 Control elements

Subclause 4.5.2, page 25:

Change the 1st sentence of the 2nd paragraph to read:

"In Version 3 and Version 4 metafiles, primitives may also be clipped against more general regions as defined by BEGIN PROTECTION REGION and END PROTECTION REGION, and as controlled by PROTECTION REGION INDICATOR (see 4.5.4)."

4.6 Graphical primitive elements

Subclause 4.6.1.5, page 34:

Change the 1st sentence of the 1st paragraph to read:

"In Version 2, Version 3, and Version 4 metafiles, line clipping is controlled by the LINE CLIPPING MODE element, which can have one of the following values: 'locus', 'shape', or 'locus then shape'."

Subclause 4.6.2.3, page 35:

Change the 1st sentence of the 3rd paragraph to read:

"In Version 2, Version 3, and Version 4 metafiles, marker clipping is controlled by the MARKER CLIPPING MODE element, which can have one of the following values: 'locus', 'shape', or 'locus then shape'."

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Full document details: ISO_IEC 8632-1_1992_Amd 2

only interpret the Metafile Descriptor and skip to the locations of the picture specified in the PICTURE DIRECTORY. The next element read will be the desired BEGIN PICTURE."

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Full document details: ISO_IEC 8632-1_1992_Amd 2

4.7 Attribute elements

Subclause 4.7.1.2, page 59:

Change Note 2 to read:

"Note 2 The LINE JOIN element is only permissible in Version 3 and Version 4 metafiles, therefore only the 'unspecified' style is available in Version 1 and Version 2 metafiles."

Change Note 3 to read:

"Note 3 The LINE TYPE CONTINUATION element is only permissible in Version 3 and Version 4 metafiles, therefore only the 'unspecified' style is available in Version 1 and Version 2 metafiles."

Subclause 4.7.2.2, page 61:

Change to read:

"There are no individual marker attributes in metafiles of Versions 1, 2, 3, and 4 -- all marker elements are bundled."

Subclause 4.7.3.2, page 76:

Change the 2nd sentence from the top of the page to read:

"Version 3 and Version 4 metafiles allow selection of one of several specific ways in which the text shall fit the box (see below)."

Subclause 4.7.3.2, page 77:

Change the 1st sentence of Note 4 to read:

"4 The RESTRICTED TEXT TYPE element, which defines the way in which the text string is to fit the box, is only defined and permitted in Version 3 and Version 4 metafiles."

Subclause 4.7.5, page 87:

Change the last sentence of the 1st paragraph to read:

"All of these modes are permitted in Version 3 and Version 4 metafiles."

Subclause 4.7.6, page 89:

Change the last sentence on the page to read:

"COLOUR TABLE may appear in the picture body for metafiles of Version 1, 2, 3, and 4, as well as in the Picture Descriptor for Version 2, 3, and 4 metafiles."

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Full document details: ISO_IEC 8632-1_1992_Amd 2

4.11 Metafile states

Subclause 4.11, page 102:

Replace the 1st sentence in the next to the last paragraph with the following:

"The states in which each element is allowed for Version 1, Version 2, Version 3, and Version 4 metafiles are described in table 8."

Subclause 4.11, Table 8, pages 103 through 110:

Replace Table 8 with the following:

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Full document details: ISO_IEC 8632-1_1992_Amd 2

4.11 Metafile states

Subclause 4.11, page 102:

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Subclause 4.11, Table 8, pages 103 through 110:

Replace Table 8 with the following:

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Full document details: ISO_IEC 8632-1_1992_Amd 2

" **Table 8 — CGM Elements by their allowed states**

		CGM Major States								
CGM Element	ver (1)	PCS	MDS	DR (3)	GSS, DSS	PDS	POS	LSS	SDS	SOS
		v1(2)	v1	v1	v2	v1	v1	v2	v4	v4
BEGIN METAFILE (4)	1									
END METAFILE	1	X	X							
BEGIN PICTURE	1	X	X							
BEGIN PICTURE BODY	1					X				
END PICTURE	1						X			
BEGIN SEGMENT(7), v2	2		X				X			X
BEGIN SEGMENT, v3/4	2		X			X	X			X
END SEGMENT	2				X			X		
BEGIN FIGURE	2				X		X	X		X
END FIGURE	2									
BEGIN PROTECTION REGION	3				X		X	X		X
END PROTECTION REGION	3									
BEGIN COMPOUND LINE	3				X		X	X		X
END COMPOUND LINE	3									
BEGIN COMPOUND TEXT PATH	3				X		X	X		X
END COMPOUND TEXT PATH	3									
BEGIN TILE ARRAY	3						X			X
END TILE ARRAY	3									
BEGIN APPLICATION STRUCTURE	4						X			X
BEGIN APPLICATION STRUCTURE BODY	4								X	
END APPLICATION STRUCTURE	4									X
METAFILE VERSION	1		X							
METAFILE DESCRIPTION	1		X							
VDC TYPE	1		X							
INTEGER PRECISION	1		X							
REAL PRECISION	1		X							
INDEX PRECISION	1		X							
COLOUR PRECISION	1		X							
COLOUR INDEX PRECISION	1		X							
MAXIMUM COLOUR INDEX	1		X							
COLOUR VALUE EXTENT	1		X							
METAFILE ELEMENT LIST	1		X							
METAFILE DEFAULTS REPLACEMENT	1		X							
FONT LIST	1		X							
CHARACTER SET LIST	1		X							
CHARACTER CODING ANNOUNCER	1		X							
NAME PRECISION	2		X							
MAXIMUM VDC EXTENT	2		X							
SEGMENT PRIORITY EXTENT	2		X							
COLOUR MODEL	3		X							
COLOUR CALIBRATION	3		X							
FONT PROPERTIES	3		X							
GLYPH MAPPING	3		X							
SYMBOL LIBRARY LIST	3		X							
PICTURE DIRECTORY	4		X							

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Table 8 — CGM Elements by their allowed states (continued)

		CGM Major States								
CGM Element	ver (1)	PCS	MDS	DR (3)	GSS, DSS	PDS	POS	LSS	SDS	SOS
		v1(2)	v1	v1	v2	v1	v1	v2	v4	v4
SCALING MODE	1			X		X				
COLOUR SELECTION MODE(7), v1	1			X		X				
COLOUR SELECTION MODE, v2/3/4	1			X	X	X	X	X		X
LINE WIDTH SPECIFICATION MODE(7), v1	1			X		X				
LINE WIDTH SPECIFICATION MODE, v2/3/4	1			X	X	X	X	X		X
MARKER SIZE SPECIFICATION MODE(7), v1	1			X		X				
MARKER SIZE SPECIFICATION MODE, v2/3/4	1			X	X	X	X	X		X
EDGE WIDTH SPECIFICATION MODE(7), v1	1			X		X				
EDGE WIDTH SPECIFICATION MODE, v2/3/4	1			X	X	X	X	X		X
VDC EXTENT	1			X		X				
BACKGROUND COLOUR	1			X		X				
DEVICE VIEWPORT	2			X		X				
DEVICE VIEWPORT MAPPING	2			X		X				
DEVICE VIEWPORT SPECIFICATION MODE	2			X		X				
LINE REPRESENTATION	2			X		X				
MARKER REPRESENTATION	2			X		X				
TEXT REPRESENTATION	2			X		X				
FILL REPRESENTATION	2			X		X				
EDGE REPRESENTATION	2			X		X				
INTERIOR STYLE SPECIFICATION MODE	3			X	X	X	X	X		X
LINE AND EDGE TYPE DEFINITION	3			X		X				
HATCH STYLE DEFINITION	3			X		X				
GEOMETRIC PATTERN DEFINITION	3			X		X				
APPLICATION STRUCTURE DIRECTORY	4					X				
VDC INTEGER PRECISION	1			X	X		X	X		X
VDC REAL PRECISION	1			X	X		X	X		X
AUXILIARY COLOUR	1			X	X		X	X		X
TRANSPARENCY	1			X	X		X	X		X
CLIP RECTANGLE	1			X	X		X	X		X
CLIP INDICATOR	1			X	X		X	X		X
LINE CLIPPING MODE	2			X	X		X	X		X
MARKER CLIPPING MODE	2			X	X		X	X		X
EDGE CLIPPING MODE	2			X	X		X	X		X
NEW REGION	2									
SAVE PRIMITIVE CONTEXT	2				X		X	X		X
RESTORE PRIMITIVE CONTEXT	2				X		X	X		X
PROTECTION REGION INDICATOR	3			X	X		X	X		X
GENERALIZED TEXT PATH MODE	3			X	X		X	X		X
MITRE LIMIT	3			X	X		X	X		X
TRANSPARENT CELL COLOUR	3			X	X	X	X	X		X

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Table 8 — CGM Elements by their allowed states (continued)

		CGM Major States								
CGM Element	ver (1)	PCS	MDS	DR (3)	GSS, DSS	PDS	POS	LSS	SDS	SOS
		v1(2)	v1	v1	v2	v1	v1	v2	v4	v4
SCALING MODE	1			X		X				
COLOUR SELECTION MODE(7), v1	1			X		X				
COLOUR SELECTION MODE, v2/3/4	1			X	X	X	X	X		X
LINE WIDTH SPECIFICATION MODE(7), v1	1			X		X				
LINE WIDTH SPECIFICATION MODE, v2/3/4	1			X	X	X	X	X		X
MARKER SIZE SPECIFICATION MODE(7), v1	1			X		X				
MARKER SIZE SPECIFICATION MODE, v2/3/4	1			X	X	X	X	X		X
EDGE WIDTH SPECIFICATION MODE(7), v1	1			X		X				
EDGE WIDTH SPECIFICATION MODE, v2/3/4	1			X	X	X	X	X		X
VDC EXTENT	1			X		X				
BACKGROUND COLOUR	1			X		X				
DEVICE VIEWPORT	2			X		X				
DEVICE VIEWPORT MAPPING	2			X		X				
DEVICE VIEWPORT SPECIFICATION MODE	2			X		X				
LINE REPRESENTATION	2			X		X				
MARKER REPRESENTATION	2			X		X				
TEXT REPRESENTATION	2			X		X				
FILL REPRESENTATION	2			X		X				
EDGE REPRESENTATION	2			X		X				
INTERIOR STYLE SPECIFICATION MODE	3			X	X	X	X	X		X
LINE AND EDGE TYPE DEFINITION	3			X		X				
HATCH STYLE DEFINITION	3			X		X				
GEOMETRIC PATTERN DEFINITION	3			X		X				
APPLICATION STRUCTURE DIRECTORY	4					X				
VDC INTEGER PRECISION	1			X	X		X	X		X
VDC REAL PRECISION	1			X	X		X	X		X
AUXILIARY COLOUR	1			X	X		X	X		X
TRANSPARENCY	1			X	X		X	X		X
CLIP RECTANGLE	1			X	X		X	X		X
CLIP INDICATOR	1			X	X		X	X		X
LINE CLIPPING MODE	2			X	X		X	X		X
MARKER CLIPPING MODE	2			X	X		X	X		X
EDGE CLIPPING MODE	2			X	X		X	X		X
NEW REGION	2									
SAVE PRIMITIVE CONTEXT	2				X		X	X		X
RESTORE PRIMITIVE CONTEXT	2				X		X	X		X
PROTECTION REGION INDICATOR	3			X	X		X	X		X
GENERALIZED TEXT PATH MODE	3			X	X		X	X		X
MITRE LIMIT	3			X	X		X	X		X
TRANSPARENT CELL COLOUR	3			X	X	X	X	X		X

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Full document details: ISO_IEC 8632-1_1992_Amd 2

Table 8 — CGM Elements by their allowed states (continued)

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		v1(2)	v1	v1	v2	v1	v1	v2	v4	v4
POLYLINE	1				X		X	X		X
DISJOINT POLYLINE	1				X		X	X		X
POLYMARKER	1				X		X	X		X
TEXT	1				X		X	X		X
RESTRICTED TEXT	1				X		X	X		X
APPEND TEXT	1									
POLYGON	1				X		X	X		X
POLYGON SET	1				X		X	X		X
CELL ARRAY	1				X		X	X		X
GDP	1				X		X	X		X
RECTANGLE	1				X		X	X		X
CIRCLE	1				X		X	X		X
CIRCULAR ARC 3 POINT	1				X		X	X		X
CIRCULAR ARC 3 POINT CLOSE	1				X		X	X		X
CIRCULAR ARC CENTRE	1				X		X	X		X
CIRCULAR ARC CENTRE CLOSE	1				X		X	X		X
ELLIPSE	1				X		X	X		X
ELLIPTICAL ARC	1				X		X	X		X
ELLIPTICAL ARC CLOSE	1				X		X	X		X
CIRCULAR ARC CENTRE REVERSED	2				X		X	X		X
CONNECTING EDGE	2									
HYPERBOLIC ARC	3				X		X	X		X
PARABOLIC ARC	3				X		X	X		X
NON-UNIFORM B-SPLINE	3				X		X	X		X
NON-UNIFORM RATIONAL B-SPLINE	3				X		X	X		X
POLYBEZIER	3				X		X	X		X
POLYSYMBOL	3				X		X	X		X
BITONAL TILE	3									
TILE	3									
LINE BUNDLE INDEX	1			X	X		X	X		X
LINE TYPE	1			X	X		X	X		X
LINE WIDTH	1			X	X		X	X		X
LINE COLOUR	1			X	X		X	X		X
MARKER BUNDLE INDEX	1			X	X		X	X		X
MARKER TYPE	1			X	X		X	X		X
MARKER SIZE	1			X	X		X	X		X
MARKER COLOUR	1			X	X		X	X		X
TEXT BUNDLE INDEX	1			X	X		X	X		X
TEXT FONT INDEX	1			X	X		X	X		X
TEXT PRECISION	1			X	X		X	X		X
CHARACTER EXPANSION FACTOR	1			X	X		X	X		X
CHARACTER SPACING	1			X	X		X	X		X
TEXT COLOUR	1			X	X		X	X		X
CHARACTER HEIGHT	1			X	X		X	X		X
CHARACTER ORIENTATION	1			X	X		X	X		X

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