INTERNATIONAL STANDARD

ISO/IEC 9637-2

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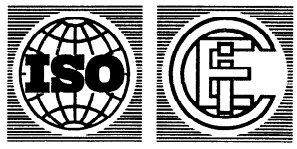
Information technology — Computer graphics — Interfacing techniques for dialogues with graphical devices (CGI) — Data stream binding —

Part 2:
Binary encoding

Technologies de l'information — Infographie — Interfaces pour l'infographie — Interface du flux de données CGI —

Partie 2: Codage binaire



Reference number
ISO/IEC 9637-2:1992(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.

International Standard ISO/IEC 9637-2 was prepared by Joint Technical Committee ISO/IEC JTC1, *Information technology.*

ISO/IEC 9637 consists of the following parts, under the general title *Information technology — Computer graphics — Interfacing techniques for dialogues with graphical devices (CGI) — Data stream binding*

— *Part 1: Character encoding*

— *Part 2: Binary encoding*

Annex A forms an integral part of this part of ISO/IEC 9637. Annex B is for information only.

Introduction

Purpose

The Binary Encoding of the Computer Graphics Interface (CGI), ISO/IEC 9636, provides a data stream representation of the CGI function syntax that can be optimized for speed of generation and interpretation, while still providing a standard means of interchange among computer systems. The encoding uses binary data formats that are more similar to the data representations used within computer systems than the data formats of the other encodings.

Some of the data formats may exactly match those of some computer systems. On most computer systems processing requirements for the Binary Encoding will be substantially lower than for the other encodings.

In cases where a computer system's architecture does not match the standard formats used in the Binary Encoding, and where absolute minimization of processing requirements is critical, and where interchange among dissimilar systems does not matter, it may be more appropriate to use a private encoding, conforming to the rules specified in ISO/IEC 9636-1.

Objectives

This encoding has the following features:

a) Partitioning of parameter lists: function/response representations are coded in the Binary Encoding by one or more partitions (see clause 4); the first (or only) partition of a representation contains the opcode (class code and id code);

b) Alignment of function representations and response representations: every function/response representation begins on a 16-bit boundary. Alignment of representations which follow partitions that require an odd number of 8-bit entities may require a partition to be padded with an 8-bit entity with all bits zero;

c) Uniformity of format: all function representations and response data records have an associated parameter length value. As a result, it is possible to ignore function representations which are not supported by the interpreter;

d) Efficiency of encoding parameter data: parameter data such as coordinates, indexes and colours are encoded as one or more 8-bit entities. The precision of every parameter is determined by the appropriate default precision or as set by a precision setting CGI function;

e) Extensibility: the arrangement of opcode class and id values has been designed to allow future growth;

f) Format of real data: real numbers are encoded using either IEEE floating point representation or a fixed-point representation;

g) Run length encoding option: if many adjacent colours have the same value, efficient encoding is possible. For each run a cell count is specified followed by the colour (or colour index);

h) Packed list encoding option: if adjacent colours do not have the same value, bit-stream lists are provided in which the values are packed as closely as possible;

i) Encoding of soliciting functions: the assignment of opcodes to functions which require a response has been designed so that all such functions can be recognized by a CGI interpreter;

j) Response Data: responses to soliciting functions have been assigned different opcodes from their associated soliciting functions. However, the response opcode can be derived in a straightforward manner from the soliciting function opcode;

k) Lists of data: there is a standard technique for representing lists of any type of data (with a few specific exceptions);

Relationship to other standards

This encoding is guided by the same objectives as the Computer Graphics Metafile Binary Encoding, ISO/IEC 8632-3:1992. For each CGI function which is identical in both semantics and parameterization to a CGM element, the encoding will be identical. That is, the opcodes will be identical and the parameters will use the same data type and appear in the same order. The extension mechanism defined in this encoding is also compatible with the CGM Binary Encoding.

The floating point representation of real data in this part of the Standard is that in ANSI/IEEE 754-1986.

The representation of character data in this part of the Standard follows the rules of ISO 646 and ISO 2022.

For certain functions and response data, the CGI defines parameter value ranges as being reserved for registration. The values and their meanings will be defined using the procedures established in ISO TR 9973.

Information technology — Computer graphics — Interfacing techniques for dialogues with graphical devices (CGI) — Data stream binding —

Part 2:
Binary encoding

1 Scope

This part of ISO/IEC 9637 specifies a Binary Encoding of the Computer Graphics Interface (CGI) data stream. For each of the function syntaxes in clause 5 and clause 6 of ISO/IEC 9636-2, ISO/IEC 9636-3, ISO/IEC 9636-4, ISO/IEC 9636-5, and ISO/IEC 9636-6, an encoding is specified in terms of an opcode and a sequence of parameters of specified data types. For each of these data types, an explicit representation in terms of bits, 8-bit and 16-bit entities is specified. For some data types, the exact representation depends on a type and/or precision for the data as used in the data stream.

The Binary Encoding of the Computer Graphics Interface data stream will, in many circumstances, reduce the effort required to generate and interpret the data stream as compared to other encodings.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 9637. At the time of publication, the editions indicated were valid. All standards are subject to revisions, and parties to agreements based on this part of ISO/IEC 9637 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 646:1991, *Information technology – ISO 7-bit coded character set for information interchange.*

ISO 2022:1986, *Information processing – ISO 7-bit and 8-bit coded character sets – Code extension techniques.*

ISO/IEC 7942:1985/Amd.1:1991, *Information processing systems – Computer graphics – Graphical Kernel System (GKS) functional description – Amendment 1*

ISO 8632-1:1992, *Information technology – Computer graphics – Metafile for the storage and transfer of picture description information – Part 1: Functional specification.*

ISO 8632-3:1992, *Information technology – Computer graphics – Metafile for the storage and transfer of picture description information – Part 3: Binary encoding.*

ISO/IEC 9636-1:1991, *Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices(CGI) – Functional specification – Part 1: Overview, profiles and conformance.*

ISO/IEC 9636-2:1991, *Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices(CGI) – Functional specification – Part 2: Control.*

ISO/IEC 9636-3:1991, *Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices(CGI) – Functional specification – Part 3: Output.*

ISO/IEC 9636-4:1991, *Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices(CGI) – Functional specification – Part 4: Segments.*

ISO/IEC 9636-5:1991, *Information technology – Computer graphics – Interfacing techniques for dialogues with graphical devices(CGI) – Functional specification – Part 5: Input and echoing.*

ISO/IEC 9636-6:1991, *Information technology - Computer graphics - Interfacing techniques for dialogues with graphical devices(CGI) - Functional specification - Part 6: Raster.*

ISO/IEC 9637-1:1992, *Information technology - Computer graphics - Interfacing techniques for dialogues with graphical devices(CGI) - Data stream binding - Part 1: Character encoding.*

ISO/IEC TR 9973:1988, *Information technology - Computer graphics - Procedures for registration of graphical items.*

ANSI/IEEE 754, *Standard for Binary Floating Point Arithmetic.*