INTERNATIONAL STANDARD

ISO/IEC 13490-2

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Information technology — Volume and file structure of read-only and write-once compact disk media for information interchange —

Part 2:
Volume and file structure

Technologies de l'information — Structure de volume et de fichier de supports disque compact à lecture seule et à écriture unique pour l'échange d'information —

Partie 2: Structure de volume et de fichier

Reference number
ISO/IEC 13490-2:1995(E)

Contents

Foreword

ISO (the International Organisation for Standardisation) and IEC (the International Electrotechnical Commission) together form the specialised system for world-wide standardisation. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organisation to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organisations, 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 13490-2 was prepared by the European Association for Standardizing Information and Communication Systems, ECMA, (as ECMA-168) and was adopted, under a special "fast-track procedure" by joint technical committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

ISO/IEC 13490 consists of the following parts, under the general title *Information technology – Volume and file structure of read-only and write-once compact disk media for information interchange*

- *Part 1: General*
- *Part 2: Volume and File Structure*

Annex A forms an integral part of this part of ISO/IEC 13490. Annexes B and C are for information only.

Introduction

ISO/IEC 13490 can be used for both CD-ROM and CD-WO media for interchanging files. ISO/IEC 13490 is an enhancement of ISO 9660 for CD-ROM applications that has eliminated several restrictions and performance problems of ISO 9660.

ISO/IEC 13346 and ISO/IEC 13490 follow the same volume and file structure framework. ISO/IEC 13490 has common definitions with ISO/IEC 13346 regarding volume and boot block recognition, file attributes, registration procedures and record structure.

ISO/IEC 13490 is published in two parts. Part 1 - General - specifies references, definitions, notations and basic structures used in the other part. Part 2 - Volume and File Structure - specifies how to record various volume-related entities such as volumes and volume sets, and how to record and interpret files, both file data and file attributes, and file hierarchies within a volume set.

Information technology - Volume and file structure of read-only and write-once compact disk media for information interchange

Part 2:
Volume and file structure

Section 1: General

1 Scope

ISO/IEC 13490 specifies a format and associated system requirements for volume and boot block recognition, volume structure, file structure and record structure for the interchange of information between users of information processing systems using CD-WO (a write-once compact disk medium), hybrid CD-WO (a write-once compact disk with a read-only area) and CD-ROM disks.

NOTE 1 — CD-WO is an evolution of CD-ROM technology which allows the recording of information on a write-once compact disk medium.

The volume and boot block recognition is specified in ISO/IEC 13346-2 The record structure is specified in ISO/IEC 13346-5.

NOTE 2 — A volume set may be recorded that is in conformance with both ISO 9660 and ISO/IEC 13490. ISO/IEC 13490 is an enhancement of ISO 9660. ISO/IEC 13490 allows greater information interchange using CD-ROM. In addition, it supports incremental recording and updating of information stored on a CD-WO disk. Under certain restrictions (see 2/B.2.1), all of the files may be read by both a receiving system conforming to ISO 9660 and by a receiving system conforming to ISO/IEC 13490.

This part of ISO/IEC 13490 specifies a format and associated system requirements for volume and file structure by specifying:

- the attributes of a volume and the descriptors recorded on it;
- the relationship among volumes of a volume set;
- the attributes of a partition of a volume;
- the placement of files;
- the attributes of the files;
- the relationship among files of a file set;
- the relationship among file sets of a volume set;
- levels of medium interchange;
- requirements for the processes which are provided within information processing systems, to enable information to be interchanged between different systems; for this purpose it specifies the functions to be provided within systems which are intended to originate or receive media which conform to this part of ISO/IEC 13490.

2 Parts references

The first digit of a reference in ISO/IEC 13490 identifies the part. If the digit is preceded by "R", the reference is to a part and clause of ISO/IEC 13346. For example, 2/5 refers to clause 5 in ISO/IEC 13490-2 and R2/5 refers to clause 5 in ISO/IEC 13346-2. If the reference is preceded by "figure", the reference is to a figure. For example, figure 2/5 refers to figure 5 in ISO/IEC 13490-2. If the reference is preceded by "table", the reference is to a table. For example, table 2/5 refers to table 5 in ISO/IEC 13490-2.

3 Cross - reference

This clause specifies the interface of this part of ISO/IEC 13490 to other standards or parts.

3.1 Input

This part of ISO/IEC 13490 requires the specification of the following by another standard or part:

- A standard for recording (see 1/5.13).
- A volume set of one or more volumes (see 2/9.2).
- For the purposes of ISO/IEC 13346-2, a volume recognition sequence (see R2/8.3.1) shall be recorded as specified in 2/9.1.7.
- For the purposes of ISO/IEC 13346-2, the volume recognition space (see R2/8.2) shall be as specified in 2/9.1.6.
- For the purposes of ISO/IEC 13346-2, the initial sector (see R2/3.1) of the volume shall be sector number 0 of the volume as specified in 2/9.1.1.1.

3.2 Output

This part of ISO/IEC 13490 specifies the following which may be used by other standards or parts:

- A volume space for a volume (see 2/9.1.4).
- A volume set of one or more volumes (see 2/9.2).
- An indication that a volume may have been recorded according to this part of ISO/IEC 13490 (see 2/9.1.7).
- Volume partitions (see 2/9.1.4.3).
- Sessions (see 2/9.1.3).
- Logical blocks of a fixed size for a volume set (see 2/9.1.4.1).
- The size of a logical block.
- Attributes of a volume.
- Attributes of a volume partition.
- Data space of a file (see 2/13.5.2).
- Attributes of a file.
- Attributes of a directory.
- Attributes of a directory hierarchy.

4 Conformance

4.1 Conformance of a medium

A medium shall be in conformance with ISO/IEC 13490 when it conforms to a standard for recording (see 1/5.13) and all information recorded on it conforms to the specifications of ISO/IEC 13490, ISO/IEC 13346-2 and ISO/IEC 13346-5, or to ISO/IEC 13490 and ISO/IEC 13346-2. A statement of conformance shall identify the parts of ISO/IEC 13346, and the levels of medium interchange (see R2/10 and 2/16) to which the contents of the medium conform

4.2 Conformance of an information processing system

An information processing system shall be in conformance with ISO/IEC 13490 if it meets the requirements specified in ISO/IEC 13490, ISO/IEC 13346-2 and ISO/IEC 13346-5, or in ISO/IEC 13490 and ISO/IEC 13346-2 either for an originating system (see R2/12, 2/18 and R5/11) or for a receiving system (see R2/13, 2/19 and R5/12) or for both types of system. A statement of conformance shall identify the parts of ISO/IEC 13346 and the levels of the requirements for the parts of ISO/IEC 13346 and ISO/IEC 13490 which can be met by the system

5 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 13490. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 13490 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 2022:1994, *Information technology — Character code structure and extension techniques.*

ISO/IEC 6429:1992, *Information technology — Control functions for coded character sets.*

ISO 9660:1988, *Information processing — Volume and file structure of CD-ROM for information interchange.*

ISO/IEC 9945-1:1990, *Information technology — Portable Operating System Interface (POSIX) — Part 1: System Application Program Interface (API) [C Language].*

ISO/IEC 10149:1995, *Information technology — Data interchange on read-only 120 mm optical data disks (CD-ROM).*

ISO/IEC 10646-1:1993, *Information technology — Universal Multiple-Octet Coded Character Set (UCS) — Part 1: Architecture and Basic Multilingual Plane.*

ISO/IEC 13346-2:1995, *Information technology — Volume and file structure of write-once and rewritable media using non-sequential recording for information interchange — Part 2: Volume and boot block recognition.*

ISO/IEC 13346-4:1995, *Information technology — Volume and file structure of write-once and rewritable media using non-sequential recording for information interchange — Part 4: File structure.*

ISO/IEC 13346-5:1995, *Information technology — Volume and file structure of write-once and rewritable media using non-sequential recording for information interchange — Part 5: Record Structure*

ISO/IEC 13490-1:1995, *Information technology – Volume and file structure of read-only and write-once compact disk media for information interchange — Part 1: General.*

ISO/IEC 13800[1], *Information technology – Procedure for the registration of identifiers and attributes for volume and file structure.*

IEC 908:1987, *Compact disc digital audio system.*

6 Definitions

For the purposes of this part of ISO/IEC 13490, the definitions given in ISO/IEC 13490-1 (see 1/5), and the following definitions apply.

6.1 file set: A collection of files and directories.

6.2 group ID: An identification of a group of users.

6.3 logical block: The unit of allocation of a volume set.

6.4 user ID: An identification of a user.

7 Notation

The notation of ISO/IEC 13490-1 (see 1/6) applies to this part of ISO/IEC 13490.

8 Basic types

In addition to the basic types of ISO/IEC 13490-1 (see 1/7), the following basic types apply to this part of ISO/IEC 13490.

8.1 16-Bit unsigned numerical values with most significant byte first

A `Uint16MSB` value, represented by the hexadecimal representation #wxyz, shall be recorded in a two-byte field as #wx #yz.

NOTE 3 — For example, the decimal number 4 660 has #1234 as its hexadecimal representation and shall be recorded as #12 #34.

8.2 16-Bit signed numerical values with most significant byte first

An `Int16MSB` value, represented in two's complement form by the hexadecimal representation #wxyz, shall be recorded in a two-byte field as #wx #yz.

NOTE 4 — For example, the decimal number -30 875 has #8765 as its hexadecimal representation and shall be recorded as #87 #65.

[1] To be published

8.3 16-Bit unsigned numerical values with both byte orders

A `Uint16BOTH` value, represented by the hexadecimal representation #wxyz, shall be recorded in a four-byte field as #yz #wx #wx #yz.

NOTE 5 — For example, the decimal number 4 660 has #1234 as its hexadecimal representation and shall be recorded as #34 #12 #12 #34.

8.4 32-Bit unsigned numerical values with most significant byte first

A `Uint32MSB` value, represented by the hexadecimal representation #stuvwxyz, shall be recorded in a four-byte field as #st #uv #wx #yz.

NOTE 6 — For example, the decimal number 305 419 896 has #12345678 as its hexadecimal representation and shall be recorded as #12 #34 #56 #78.

8.5 32-Bit signed numerical values with most significant byte first

An `Int32MSB` value, represented in two's complement form by the hexadecimal representation #stuvwxyz, shall be recorded in a four-byte field as #st #uv #wx #yz.

NOTE 7 — For example, the decimal number -559 038 737 has #DEADBEEF as its hexadecimal representation and shall be recorded as #DE #AD #BE #EF.

8.6 32-Bit unsigned numerical values with both byte orders

A `Uint32BOTH` value, represented by the hexadecimal representation #stuvwxyz, shall be recorded in a eight-byte field as #yz #wx #uv #st #st #uv #wx #yz.

NOTE 8 — For example, the decimal number 305 419 896 has #12345678 as its hexadecimal representation and shall be recorded as #78 #56 #34 #12 #12 #34 #56 #78.

8.7 Volume structure descriptor format

Volume structure descriptors specified in this part of ISO/IEC 13490 shall be recorded in the format shown in table 2/1.

Table 1 - CD–WO Volume structure descriptor format

BP	Length	Name	Contents
0	1	Structure Type	`Uint8` (1/7.1.1)
1	5	Standard Identifier	bytes = "CDW02"
6	1	Structure Version	`Uint8` (1/7.1.1) = 2
7	2 041	Structure Data	bytes

8.7.1 Structure Type (BP 0)

This field shall specify an identification of the descriptor type. Type 0 shall specify that the format of this descriptor is not specified by this part of ISO/IEC 13490. Types 1-6 and 255 are specified as shown in table 2/2. All other types are reserved for future standardisation by this part of ISO/IEC 13490.

Table 2 - Structure Type Interpretation

Type	Identification
1	Primary Volume Descriptor (see 2/10.1)
2	Supplementary Volume Descriptor (see 2/10.2)
3	File Set Descriptor (2/12.1)
4	Implementation Use Descriptor (see 2/12.2).
5	Volume Partition Descriptor (see 2/10.3)
6	End Transaction Descriptor (see 2/10.4)
255	Terminating Descriptor (see 2/10.5)

8.7.2 Standard Identifier (BP 1)

This field shall specify "CDW02".

8.7.3 Structure Version (BP 6)

This field shall specify the version of the volume structure descriptor. The value 2 shall indicate the structure of this part of ISO/IEC 13490.

8.7.4 Structure Data (BP 7)

The interpretation of this field shall be specified by the clause identified by the Structure Type field (see 2/8.7.1).