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Information processing — Volume and file structure of CD-ROM for information interchange

Traitement de l'information — Structure de volume et de fichier des disques optiques compacts à mémoire fixe (CD-ROM) destinés à l'échange d'information

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Foreword

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Information processing — Volume and file structure of CD-ROM for information interchange

Section one : General

1 Scope and field of application

This International Standard specifies the volume and file structure of compact read only optical disks (CD-ROM) for the interchange of information between users of information processing systems.

This International Standard specifies

— the attributes of the volume and the descriptors recorded on it;

— the relationship among volumes of a volume set;

— the placement of files;

— the attributes of the files;

— record structures intended for use in the input or output data streams of an application program when such data streams are required to be organized as sets of records;

— three nested levels of medium interchange;

— two nested levels of implementation;

— requirements for the processes which are provided within information processing systems, to enable information to be interchanged between different systems, utilizing recorded CD-ROM as the medium of interchange; for this purpose it specifies the functions to be provided within systems which are intended to originate or receive CD-ROM which conform to this International Standard.

2 Conformance

2.1 Conformance of a CD-ROM

A CD-ROM shall be in conformance with this International Standard when all information recorded on it conforms to the requirements of section two of this International Standard. A statement of conformance shall identify the lowest level of interchange to which the contents of the CD-ROM conform.

A prerequisite to such conformance is conformance of the CD-ROM to a standard for recording (see 4.15).

2.2 Conformance of an information processing system

An information processing system shall be in conformance with this International Standard if it meets the requirements specified in sections two and three of this International Standard either for an originating system, or for a receiving system, or for both types of system. A statement of conformance shall identify which level of these requirements can be met by the system.

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3 References

ISO 646, *Information processing — ISO 7-bit coded character set for information interchange.*

ISO 1539, *Programming languages — FORTRAN.*

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

ISO 2375, *Data processing — Procedure for registration of escape sequences.*

International Register of Coded Character Sets to Be Used With Escape Sequences.

Standards for recording: This International Standard assumes the existence of a standard for recording (see 4.15).

4 Definitions

For the purposes of this International Standard, the following definitions apply :

4.1 application program : A program that processes the contents of a file, and may also process selected attribute data relating to the file or to the volume(s) on which the file is recorded.

NOTE — An application program is a specific class of user, as defined in this International Standard.

4.2 byte : A string of eight binary digits operated upon as a unit.

4.3 Data Field of a sector : A field containing the data of a sector.

4.4 data preparer : A person or other entity which controls the preparation of the data to be recorded on a volume group.

NOTE — A data preparer is a specific class of user as defined in this International Standard.

4.5 descriptor : A structure containing descriptive information about a volume or a file.

4.6 Extent : A set of logical blocks, the logical block numbers of which form a continuous ascending sequence.

4.7 file : A named collection of information.

4.8 File Section : That part of a file that is recorded in any one extent.

4.9 implementation : A set of processes which enable an information processing system to behave as an originating system, or as a receiving system, or as both types of system.

4.10 Logical Block : A group of 2^{n+9} bytes treated as a logical unit, where n equals 0 or a positive integer.

4.11 originating system : An information processing system which can create a set of files on a volume set for the purpose of data interchange with another system.

4.12 receiving system : An information processing system which can read a set of files from a volume set which has been created by another system for the purpose of data interchange.

4.13 record : A sequence of bytes treated as a unit of information.

4.14 sector : The smallest addressable part of the recorded area on a CD-ROM that can be accessed independently of other addressable parts of the recorded area.

4.15 standard for recording : A standard that specifies the recording method and the addressing method for the information recorded on a CD-ROM.

The specifications of the standard for recording that are relevant for this International Standard are

- a unique Physical Address for each recorded sector;
- the location of the Data Field within each sector;
- the length of the Data Field within each sector.

NOTE — The standard for recording used in conjunction with this International Standard is subject to agreement between the originator and the recipient of the volumes.

4.16 user : A person or other entity (for example, an application program) that causes the invocation of the services provided by an implementation.

4.17 volume : A dismountable CD-ROM.

4.18 Volume Set : A collection of one or more volumes, on which a set of files is recorded.

5 Notation

The following notation is used in this International Standard.

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5.1 Decimal and hexadecimal notations

Numbers in decimal notation are represented by decimal digits, namely 0 to 9.

Numbers in hexadecimal notation are represented by hexadecimal digits, namely 0 to 9 and A to F, shown in parentheses.

5.2 Other notation

BP : Byte position within a descriptor, starting with 1

RBP : Byte position within a descriptor field, starting with 1

ZERO : A single bit with the value 0

ONE : A single bit with the value 1

Digit(s) : Any digit from DIGIT ZERO to DIGIT NINE

Section two : Requirements for the medium

6 Volume structure

6.1 Arrangement of data on a CD-ROM

6.1.1 Physical Addresses

Each sector shall be identified by a unique Physical Address as specified in the relevant standard for recording.

6.1.2 Logical Sector

The sectors of a volume shall be organized into Logical Sectors. Each Logical Sector shall consist of a number of bytes equal to 2 048 or 2^n, whichever is larger, where n is the largest integer such that 2^n is less than, or equal to, the number of bytes in the Data Field of any sector recorded on the volume. The number of bytes in a Logical Sector shall be referred to as the Logical Sector size. Each Logical Sector shall begin in a different sector from any other Logical Sector, and shall begin with the first byte of the Data Field of the sector in which it begins. If the number of bytes of the Data Field of each sector recorded on the volume is less than 2 048, a Logical Sector shall comprise more than one sector, and the set of the Physical Addresses of its constituent sectors shall form a consecutive ascending sequence. The data of a Logical Sector shall be recorded in the Data Fields of its constituent sectors.

Each Logical Sector shall be identified by a unique Logical Sector Number. Logical Sector Numbers shall be integers assigned in an ascending sequence, in order of ascending Physical Addresses of the constituent sectors, starting with 0 for the Logical Sector containing the sector having the lowest Physical Address which may contain recorded information. The numbering shall continue through successive Logical Sectors, each of which begins with the sector with the next higher Physical Address than that of the last sector constituting the previous Logical Sector.

6.1.3 Volume Space

The information on a volume shall be recorded in the set of all Logical Sectors on the volume. This set shall be referred to as the Volume Space of the volume.

The bytes in the Volume Space shall be numbered consecutively. The numbering shall start with 1, which shall be assigned to the first byte of the first Logical Sector of the Volume Space. The numbering shall continue through successive bytes of the first Logical Sector, and then through successive bytes of each successive Logical Sector, of the Volume Space.

6.2 Arrangement of the Volume Space

6.2.1 System Area and Data Area

The Volume Space shall be divided into a System Area and a Data Area.

The System Area shall occupy the Logical Sectors with Logical Sector Numbers 0 to 15. The System Area shall be reserved for system use. Its content is not specified by this International Standard.

The Data Area shall occupy the remaining Logical Sectors of the Volume Space.

6.2.2 Logical Block

The Volume Space shall be organized into Logical Blocks. Each Logical Block shall consist of 2^{n+9} bytes, where n equals 0 or a positive integer. The number of bytes in a Logical Block shall be referred to as the Logical Block size which shall not be greater than the Logical Sector size.

Each Logical Block shall be identified by a unique Logical Block Number. Logical Block Numbers shall be integers assigned in ascending order starting with 0. Logical Block Number 0 shall be assigned to the Logical Block which begins with the first byte of the Volume Space. Each successive Logical Block Number shall be assigned to the Logical Block which begins with the byte in the Volume Space immediately following the last byte of the preceding Logical Block.

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6.3 Arrangement of the Data Area

File Sections shall be recorded in the Data Area.

The following types of descriptors shall be recorded in the Data Area to describe the use of the Data Area :

- Volume Descriptors
- File Descriptors
- Directory Descriptors
- Path Tables

The Volume Descriptors shall be recorded in consecutively numbered Logical Sectors starting with the Logical Sector having Logical Sector Number 16. The Logical Sectors in the Data Area shall be available for the assignment of Volume Partitions and the recording of File Sections, File Descriptors, Directory Descriptors and Path Tables.

Each File Section shall be recorded in an Extent, and shall be identified by a descriptor in a directory. An Extended Attribute Record can be associated with the File Section. If present, it shall be recorded in the same Extent as the associated File Section, and shall be identified by the descriptor that identifies the associated File Section. Each directory shall be recorded as a file in a single Extent, and shall be identified by a Directory Descriptor either in another directory or in a Volume Descriptor. Each directory shall also be identified by a record in a Path Table. Each Path Table shall be identified in a Volume Descriptor.