ecma INTERNATIONAL

Technical Report

ECMA TR/112-1

1st Edition / December 2023

Universal Disk Format (UDF) specification – Part 1 (General)

Technical Report

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Introduction

In 1992, Ecma standardized ECMA-167, which specifies volumes and file structures for interchange of files, considering that future volume and file structure standards would conform to this framework, rather than building another incompatible format.

Ecma proposed ECMA-167 to ISO/IEC JTC 1 for international standardization with the fast-track procedure. During this international standardization, ECMA-167 was revised as a 2nd edition in 1994, and ISO/IEC 13346, equivalent to the 2nd edition, was published in 1995.

From 1992 to 2006, the Optical Storage Technology Association (OSTA) developed the Universal Disk Format (UDF) specification, which is a practical subset of ECMA-167, to maximize data interchange and minimize the cost and complexity of implementing ECMA-167. In 1997, a 3rd edition of ECMA-167 was published in conjunction with the revision of the UDF specification.

In 2022, OSTA transferred the copyright ownership to Ecma for the UDF specification to be permanently usable with ECMA-167.

This Ecma Technical Report was developed by Technical Committee 31 and was adopted by the General Assembly of December 2023.

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Universal Disk Format (UDF) specification – Part 1 (General)

1 Scope

This Technical Report describes Universal Disk Format, a widely used file system for mass-storage media such as optical disks.

This Technical Report consists of the following eight parts:

Part 1: General;

Part 2: Universal Disk Format specification revision 2.60;

Part 3: Universal Disk Format specification revision 2.50;

Part 4: Universal Disk Format specification revision 2.01;

Part 5: Universal Disk Format specification revision 2.00;

Part 6: Universal Disk Format specification revision 1.50;

Part 7: Universal Disk Format specification revision 1.02;

Part 8: Secure UDF specification revision 1.00.

2 References

The following document is referred to in the text in such a way that some or all of their content constitutes requirements of this Technical Report.

ECMA-167, *Volume and file structure for write-once and rewritable media using non-sequential recording for information interchange*

3 Terms and definitions

For the purposes of this Technical Report, the following terms and definitions apply.

3.1
file
collection of information

3.2
volume
sector address space as specified in a relevant standard for recording

NOTE 1 The standard for recording specifies the recording method and the addressing method for the information recorded on a medium. The specifications of the standard for recording that are relevant for this Technical Report are:

- a unique address for each sector;

- the length of each sector;

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- the means for determining whether a sector is read-only, write-once, or rewritable;

- for media where sectors may only be recorded once, a means for detecting whether each sector has not yet been recorded;

- whether sectors may require preprocessing prior to recording.

NOTE 2 A medium usually has a single set of sector addresses, and is therefore a single volume. A medium may have a separate set of addresses for each side of the medium, and is therefore two volumes.

3.3
pseudo overwrite
overwrite performed logically by drive on a write-once medium using sequential recording

3.4
real-time file
file that requires a minimum data-transfer rate when writing or reading

3.5
UDF bridge
multiple file structures with UDF and other file systems

4 Abbreviations

UDF universal disk format

VAT virtual allocation table

5 UDF specification

UDF is a simple and universal vendor-independent file system designed for data interchange among general operating systems including Windows, Mac OS and Linux. UDF is designed to work with all types of mass-storage media such as read-only, write-once and rewritable. UDF has been adapted to work as the official file system for CDs, DVDs and BDs on optical disks. This allows entertainment and IT contents to reside on the same medium and be accessed by AV players and recorders in the home as well as on various computer systems.

The differences between revisions of the UDF specification are as follows.

Revision 1.02 (August 1996) is:

- a basic UDF revision;

- used on DVD-Video disks.

Revision 1.50 (February 1997) is:

- added VAT structure for support for virtual rewritability on a write-once medium, sparing tables for defect management on a rewritable medium, and support for UDF bridge.

Revision 2.00 (April 1998) is:

- added support for stream files, access control lists, and power calibration.

Revision 2.01 (March 2000) is:

- added support for real-time files.

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Revision 2.50 (April 2003) is:

- added metadata partition facilitating metadata clustering and optional duplication of file system information.

Revision 2.60 (March 2005) is:

- added pseudo overwrite method for drives supporting pseudo overwrite capability on a sequentially recorded write-once medium.

Secure UDF (February 2002) is:

- a UDF specification that utilizes encryption for enhanced security.

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