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Technologies de l'information — Spécification du format de système de fichier à bande magnétique

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Linear Tape File System (LTFS) Format Specification

Version 2.2.0

This document has been released and approved by the SNIA. The SNIA believes that the ideas, methodologies and technologies described in this document accurately represent the SNIA goals and are appropriate for widespread distribution. Suggestions for revision should be directed to http://www.snia.org/feedback/

SNIA Technical Position

December 21, 2013

Revision History

Revision	Date	Sections	Originator:	Comments
2.1.0	May 18, 2012	Entire Document	David Pease	LaTeX version contributed by IBM
2.2.0 rev a	January 15, 2013	Entire document	Arnold Jones	Converted to Microsoft Word
2.2.0 rev b	March 15, 2013	Entire document	Carl Madison	Edits/Additions per TWG
2.2.0 rev c	April 4, 2013	Entire document	Carl Madison	Edits/Additions per TWG F2F
2.2.0 rev d	May 7, 2013	Entire document	Carl Madison	Diagram Replacement/edits
2.2.0 rev e	May 28, 2013	Entire document	Carl Madison	F2F edits, misc edits
2.2.0 rev f	July 16, 2013	Entire document	Carl Madison	Edits per TWG
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2.2.0 rev k	August 27, 2013	Entire Document	Carl Madison	Edits per TWG 8/27/13 mtg.
2.2.0 SNIA Technical Position	December 21, 2013* March 14, 2013**	Entire Document	Carl Madison	*2.2.0 rev k formatted as a *SNIA Technical Position* after SNIA membership approval. **Additional editorial revisions

Suggestion for changes or modifications to this document should be sent to the SNIA Linear Tape File System Technical Work Group at http://www.snia.org/feedback/.

Changes between v1.0 and v2.0.0

- Incremented version number to 2.0.0 and updated date to March 11, 2011.
- Improvements in specification text to remove ambiguity and clarify intention of the specification. These changes were made at several locations throughout the document.
- Improvements to clarify description of MAM parameters in Section 9 Medium Auxiliary Memory.
- Removed reference to a specific version of the Unicode standard in Section 6.5 Name pattern format. This removes any requirement to use specific versions of Unicode support code in an implementation.
- Improved description of Name pattern format to remove ambiguity in Section 6.5 Name pattern format.
- Added description of LTFS Format specification version numbering in Section 2.1 Versions.
- Updated XML Schema for Label and Index to match version number format in Annex A and Annex B.
- Added specification of minimum and recommended blocksize value for LTFS Volumes to Section 7.1.2 LTFS Label.
- Added definition of allowed version numbers to Section 7.1.2 LTFS Label and Section 8.2 Index.
- Added definition of fileoffset tag in Section 8.2 Index.
- Extended description in Section 5 Data Extents to support addition of fileoffset tag and associated functionality.
- Added definition of highestfileuid tag in Section 8.2 Index.
- Added definition of fileuid tag in Section 8.2 Index.

- Added definition of backuptime tag in Section 8.2 Index.
- Incremented version number in Application Client Specific Information (ACSI) structure shown in 9.3 Use of Volume Coherency Information for LTFS. This increment allows identification of LTFS Volumes written with a LTFS v1.0 compliant implementation. A widely used v1.0 implementation wrote ambiguous ACSI values due to an implementation bug.
- Added definition of extended attributes in the ltfs.* namespace in Annex C.
- Added description for handling unknown XML tags in Index to Section 8.2.10 Managing LTFS Indexes.

Changes between v2.0.0 and v2.0.1

- Incremented specification version number to 2.0.1.
- Updated specification date to August 17, 2011.
- Expanded historical record of changes between revisions of LTFS Format Specification.
- Improved description of constraints for two Indexes having the same generation number in Section 4.4.1 Generation Number to make it clear that differences in access time values is permitted between Indexes that are otherwise except for self pointer and index pointer values.
- Added note in Section 4.4.1 Generation Number to explicitly state that Index generation numbers may increase by integer values other than 1.
- Expanded description of the ltfs.sync extended attribute in Annex C . The expanded description explicitly states that this extended attribute triggers a sync of the in-memory data to the storage media. That is, the operation is analogous to a POSIX sync operation.

Changes between v2.0.1 and v2.1.0

- Incremented specification version number to 2.1.0.
- Updated specification date to October 18, 2012.
- Added definition of symlink tag in Section 8.2 Index.
- Added example of symlink tag use in Annex E (informative) Complete Example LTFS Index.
- Added symlink tag to Annex B.
- Added description of “ltfs.vendor.X.Y” extended attribute namespace in Annex C .
- Added description of software metadata section in Annex C.
- Added description of drive metadata section in Annex C.
- Added ”ltfs.labelVersion” extended attribute in Annex C.
- Added ”ltfs.indexVersion” extended attribute in Annex C
- Added ”ltfs.mediaEncrypted” extended attribute in Annex C .
- Improved description of ”ltfs.mediaStorageAlert” extended attribute in Annex C.

Changes between v2.1.0 and v2.2.0

- Incremented specification version number to 2.2.0.
- Updated specification date to July 16, 2013.
- Changed “2010” to “2013” in XML examples.
- Editorial Cleanup.

- Changed “extentinfo” definition in Section 8.2 Index.
- Changed “symlink” definition in Section 8.2 Index.
- Added additional paragraph to “symlink” definition in Section 8.2 Index.
- Added general comments at start of Section 9 Medium Auxiliary Memory.
- Added Section 9.4 Use of Host-type Attributes for LTFS.
- Removed Section 9 Certification from document.
- Added “ltfs.mamBarcode” extended attribute in Annex C.4 Volume Metadata.
- Added “ltfs.mamApplicationVendor” extended attribute in Annex C.4 Volume Metadata.
- Added “ltfs.mamApplicationVersion” extended attribute in Annex C.4 Volume Metadata.
- Added “ltfs.mamApplicationFormatVersion” extended attribute in Annex C.4 Volume Metadata.
- Added new Annex F Interoperability Recommendation and added File Spanning and File Permissions subsections

Usage

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SNIA Web Site

Current SNIA practice is to make updates and other information available through their web site at http://www.snia.org.

SNIA Address

Requests for interpretation, suggestions for improvement and addenda, or defect reports are welcome. They should be sent via the SNIA Feedback Portal at http://www.snia.org/feedback/ or by mail to the Storage Networking Industry Association, 4360 ArrowsWest Drive, Colorado Springs, Colorado 80907, U.S.A.

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Suggestions for revisions should be directed to http://www.snia.org/feedback/.

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1 Introduction

This document defines a Linear Tape File System (LTFS) Format separate from any implementation on data storage media. Using this format, data is stored in LTFS Volumes. An LTFS Volume holds data files and corresponding metadata to completely describe the directory and file structures stored on the volume.

The LTFS Format has these features:

- An LTFS Volume can be mounted and volume content accessed with full use of the data without the need to access other information sources.
- Data can be passed between sites and applications using only the information written to an LTFS Volume.
- Files can be written to, and read from, an LTFS Volume using standard POSIX file operations.

The LTFS Format is particularly suited to these usages:

- Data export and import.
- Data interchange and exchange.
- Direct file and partial file recall from sequential access media.
- Archival storage of files using a simplified, self-contained or “self-describing” format on sequential access media.