

ISO/IEC 20919:2021-07 (E)

Information technology - Linear tape file system (LTFS) Format specification

Contents	Page
1 Introduction	15
2 Scope	16
2.1 Versions	16
2.2 Conformance.....	17
3 Normative references	18
4 Definitions and Acronyms	19
4.1 Definitions.....	19
4.2 Acronyms	21
5 Volume Layout	22
5.1 LTFS Partitions.....	22
5.2 LTFS Constructs	22
5.3 Partition Layout	23
5.4 Index Layout.....	24
6 Data Extents	27
6.1 Extent Lists	27
6.2 Extents Illustrated.....	27
6.3 Files Illustrated	29
7 Data Formats	32
7.1 Boolean format	32
7.2 Creator format	32
7.3 Extended attribute value format	32
7.4 Name format.....	32
7.5 Name pattern format	34
7.6 String format.....	34
7.7 Time stamp format	34
7.8 UUID format	35
8 Label Format	36
8.1 Label Construct	36

9	Index Format	39
9.1	Index Construct	39
9.2	Index.....	39
10	Medium Auxiliary Memory	53
10.1	Volume Change Reference	53
10.2	Volume Coherency Information.....	54
10.3	Use of Volume Coherency Information for LTFS	5433
10.4	Use of Host-type Attributes for LTFS	55
10.5	Volume Advisory Locking.....	57
	Annex A (normative) LTFS Label XML Schema.....	59
	Annex B (normative) LTFS Index XML Schemas.....	61
B.1	LTFS Full Index XML Schema	61
B.2	LTFS Incremental Index XML Schema	63
	Annex C (normative) Reserved Extended Attribute definitions.....	66
C.1	Software Metadata	66
C.2	Drive Metadata	66
C.3	Object Metadata	66
C.4	Volume Metadata	67
C.5	Media Metadata.....	69
	Annex D (informative) Example of Valid Simple Complete LTFS Volume	72
	Annex E (informative) Complete Example LTFS Full Index	73
	Annex F (normative) Interoperability Recommendations.....	78
F.1	Spanning Files across Multiple Tape Volumes in LTFS	78
F.2	File Permissions in LTFS	83
F.3	Storing File Hash Values in LTFS.....	86
F.4	LTFS Media Pools.....	87
	Annex G (informative) Character representations	89
	Annex H (informative) Incremental Indexes.....	92
H.1	Background	92
H.2	Backwards Compatibility	92
H.3	Traversing the Index Back Pointer Chain	93
H.4	Incremental Index Format	93
H.5	Processing Incremental Indexes	95
H.6	Miscellaneous.....	96
	Annex I (informative) Bibliography	98

List of Figures

Figure 1 — LTFS Partition	22
Figure 2 — Label Construct	22
Figure 3 — Index Construct	23
Figure 4 — Partition Layout	23
Figure 5 — Complete partition containing data.....	24
Figure 6 — Back Pointer example	25
Figure 7 — Back Pointer example for Incremental Indexes.....	26
Figure 8 — Extent starting and ending with full block	28
Figure 9 — Extent starting with full block and ending with fractional block.....	28
Figure 10 — Extent starting and ending in mid-block	28
Figure 11 — File contained in a single Data Extent.....	29
Figure 12 — File contained in two Data Extents.....	29
Figure 13 — Shared Blocks example	30
Figure 14 — Sparse files example	30
Figure 15 — Shared data example	31
Figure 16 — Label construct.....	36
Figure 17 — Index Construct.....	39
Figure D.1 — Content of a simple LTFS volume	72
Figure H.1 — Processing an Incremental Index (flowchart)	97

List of Tables

Table 1 — Version elements.....	16
Table 2 — Version comparisons.....	16
Table 3 — Extent list entry starting and ending with full block.....	28
Table 4 — Extent list entry starting with full block and ending with fractional block.....	28
Table 5 — Extent list entry starting and ending in mid-block.....	28
Table 6 — Extent list entry for file contained in a single Data Extent	29
Table 7 — Extent list entry for a file contained in two Data Extents	29
Table 8 — Extent lists for Shared Blocks example	30
Table 9 — Extent list for sparse files example	31
Table 10 — Extent lists for shared data example	31
Table 11 — Creator format definitions	32
Table 12 — Reserved characters for name format.....	33
Table 13 — Characters which should be avoided for name format	33
Table 14 — Name percent-encoding	33
Table 15 — Time stamp format	35
Table 16 — VOL1 Label Construct	36
Table 17 — Volume Coherency Information.....	54
Table 18 — ACSI format for LTFS.....	54
Table 19 — Relevant Host-type Attributes for LTFS.....	55
Table 20 — Example of Host-type Attributes	57
Table 21 — Volume Locked MAM Attribute.....	58
Table 22 — Volume Locked MAM Attribute Values.....	58
Table F.1 — Hash Types	86
Table G.1 — Character representations : version 2.3 or later	89
Table G.2 — Character representations : version 2.2 or earlier	90