



ISO/IEC 24775-5

Edition 1.0 2014-12

INTERNATIONAL STANDARD



Information technology – Storage management –
Part 5: Filesystems



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2014 ISO/IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about ISO/IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 55 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

generated by EVS



ISO/IEC 24775-5

Edition 1.0 2014-12

INTERNATIONAL STANDARD



Information technology – Storage management –
Part 5: Filesystems

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

H

ICS 35.200

ISBN 978-2-8322-1924-9

Warning! Make sure that you obtained this publication from an authorized distributor.

FOREWORD	21
Introduction	23
1 Scope	25
2 Normative references	26
3 Terms definitions and abbreviations.....	27
3.1 Terms and definitions.....	27
3.2 Abbreviations	28
4 Typographical conventions.....	29
4.1 Maturity model.....	29
4.2 Experimental maturity level.....	29
4.3 Implemented maturity level	29
4.4 Stable maturity level.....	30
4.5 Finalized maturity level.....	30
4.6 Deprecated material.....	30
5 File Export Profile	32
5.1 Description	32
5.1.1 Synopsis.....	32
5.1.2 Overview	32
5.1.3 Implementation.....	32
5.2 Health and Fault Management Consideration.....	34
5.2.1 General.....	34
5.2.2 OperationalStatus for FileShares	34
5.3 Cascading Considerations	34
5.4 Supported Profiles, Subprofiles, and Packages.....	34
5.5 Methods of the Profile	34
5.5.1 Extrinsic Methods of the Profile.....	34
5.5.2 Intrinsic Methods of the Profile	35
5.6 Client Considerations and Recipes	35
5.7 CIM Elements.....	35
5.7.1 General.....	35
5.7.2 CIM_ConcreteDependency	36
5.7.3 CIM_ElementSettingData (FileShare)	36
5.7.4 CIM_ExportedFileShareSetting (Setting)	36
5.7.5 CIM_FileShare (Exported File Share)	37
5.7.6 CIM_HostedShare.....	38
5.7.7 CIM_SAPAvailableForElement	38
5.7.8 CIM_SharedElement.....	39
6 File Export Manipulation Subprofile.....	40
6.1 Description	40
6.1.1 Synopsis.....	40
6.1.2 Overview	40
6.1.3 Instance Diagrams	41
6.2 Health and Fault Management Considerations.....	45
6.2.1 General.....	45
6.2.2 OperationalStatus for FileExportService	45
6.2.3 OperationalStatus for File Server ComputerSystem	46
6.3 Cascading Considerations	46
6.4 Supported Subprofiles and Packages.....	46
6.5 Methods of the Profile	47
6.5.1 Extrinsic Methods of the Profile.....	47
6.5.2 Signature and Parameters of ModifyExportedShare.....	54
6.5.3 Signature and Parameters of ReleaseExportedShare	57
6.5.4 Intrinsic Methods of the Profile	57

6.6	Client Considerations and Recipes	58
6.6.1	General.....	58
6.6.2	Creation of a FileShare for Export.....	58
6.6.3	Modification of an Exported FileShare	63
6.6.4	Removal of an Exported FileShare	66
6.6.5	File Export Manipulation Supported Capabilities Patterns	68
6.7	CIM Elements.....	69
6.7.1	General.....	69
6.7.2	CIM_ConcreteDependency	71
6.7.3	CIM_ElementCapabilities (FES Configuration)	71
6.7.4	CIM_ElementSettingData (FileShare Setting).....	71
6.7.5	CIM_FileStorage (Subelement).....	72
6.7.6	CIM_HostedService	72
6.7.7	CIM_LogicalFile (Subelement).....	73
6.7.8	CIM_SAPAvailableForElement	73
6.7.9	CIM_ServiceAffectsElement.....	74
6.7.10	SNIA_ElementCapabilities (FES Capabilities)	74
6.7.11	SNIA_ExportedFileShareCapabilities (FES Capabilities).....	74
6.7.12	SNIA_ExportedFileShareSetting (FileShare Setting)	75
6.7.13	SNIA_ExportedFileShareSetting (Pre-defined)	77
6.7.14	SNIA_FileExportCapabilities (FES Configuration)	79
6.7.15	SNIA_FileExportService.....	79
6.7.16	SNIA_FileShare (Exported File Share)	80
6.7.17	SNIA_HostedShare	81
6.7.18	SNIA_SettingsDefineCapabilities (Pre-defined)	81
6.7.19	SNIA_SharedElement	81
7	File Server Manipulation Subprofile.....	83
7.1	Synopsis.....	83
7.2	Description	83
7.2.1	Overview	83
7.2.2	Instance Diagrams	85
7.2.3	Health and Fault Management Consideration	88
7.2.4	Cascading considerations	89
7.3	Supported Profiles, Subprofiles, and Packages.....	89
7.4	Methods of the Profile	89
7.4.1	General.....	89
7.4.2	FileSystemCapabilities.CreateGoalSettings.....	89
7.4.3	Signature and Parameters of FileServerConfigurationService.CreateFileServer....	92
7.4.4	Signature and Parameters of FileServerConfigurationService.ModifyFileServer....	94
7.4.5	Signature and Parameters of FileServerConfigurationService.DeleteFileServer....	95
7.4.6	Signature and Parameters of FileServerConfigurationService.AddIPInterface	95
7.4.7	Signature and Parameters of FileServerConfigurationService.ModifyIPInterface...	96
7.4.8	Signature and Parameters of FileServerConfigurationService.DeleteIPInterface...	97
7.5	Client Considerations and Recipes	97
7.6	Registered Name and Version	98
7.7	CIM Elements.....	98
7.7.1	General.....	98
7.7.2	CIM_ConcreteComponent (FileServerSettings to CIFSSettingData).....	100
7.7.3	CIM_ConcreteComponent (FileServerSettings to DNSSettingData).....	101
7.7.4	CIM_ConcreteComponent (FileServerSettings to IPInterfaceSettingData).....	101
7.7.5	CIM_ConcreteComponent (FileServerSettings to NFSSettingData).....	101
7.7.6	CIM_ConcreteComponent (FileServerSettings to NISSettingData)	102
7.7.7	CIM_DNSSettingData	102
7.7.8	CIM_ElementCapabilities (FileServerConfigurationService to FileServerCapabilities).....	102

7.7.9	CIM_ElementCapabilities (FileServerConfigurationService to FileServerConfigurationCapabilities)	103
7.7.10	CIM_ElementSettingData (ComputerSystem FileServer to FileServerSettings) ...	103
7.7.11	CIM_ElementSettingData (IPInterfaceSettingData to IPProtocolEndpoint)	103
7.7.12	CIM_HostedDependency	104
7.7.13	CIM_HostedService (Hosting Computer System to FileServerConfigurationService)	104
7.7.14	CIM_MemberOfCollection (The IPProtocolEndpoint to NetworkVLAN)	104
7.7.15	CIM_NetworkVLAN	105
7.7.16	CIM_SettingsDefineCapabilities (CIFSettingData)	105
7.7.17	CIM_SettingsDefineCapabilities (DNSSettingData)	105
7.7.18	CIM_SettingsDefineCapabilities (FileServerSettings)	106
7.7.19	CIM_SettingsDefineCapabilities (IPInterfaceSettingData)	106
7.7.20	CIM_SettingsDefineCapabilities (NFSSettingData)	106
7.7.21	CIM_SettingsDefineCapabilities (NISSettingData)	107
7.7.22	CIM_SettingsDefineState (ComputerSystem FileServer to FileServerSettings) ...	107
7.7.23	SNIA_CIFSSettingData	107
7.7.24	SNIA_FileServerCapabilities	108
7.7.25	SNIA_FileServerConfigurationCapabilities	109
7.7.26	SNIA_FileServerConfigurationService	110
7.7.27	SNIA_FileServerSettings	111
7.7.28	SNIA_IPInterfaceSettingData	111
7.7.29	SNIA_NFSSettingData	112
7.7.30	SNIA_NISSettingData	113
8	File Storage Profile	114
8.1	Description	114
8.1.1	Synopsis	114
8.1.2	Overview	114
8.1.3	Implementation	114
8.2	Health and Fault Management Consideration	115
8.3	Cascading Considerations	115
8.3.1	General	115
8.3.2	Cascaded Resources	115
8.3.3	Ownership Privileges	116
8.3.4	Limitations on Cascading Subprofile	116
8.4	Supported Profiles, Subprofiles, and Packages	117
8.5	Methods of the Profile	117
8.5.1	Extrinsic Methods of the Profile	117
8.5.2	Intrinsic Methods of the Profile	117
8.6	Client Considerations and Recipes	117
8.7	CIM Elements	117
8.7.1	General	117
8.7.2	CIM_ResidesOnExtent	117
9	Filesystem Profile	119
9.1	Description	119
9.1.1	Synopsis	119
9.1.2	Instance Diagrams	119
9.2	Health and Fault Management Consideration	122
9.2.1	General	122
9.2.2	OperationalStatus for Filesystems	122
9.3	Cascading Considerations	122
9.4	Supported Profiles, Subprofiles, and Packages	123
9.5	Methods of the Profile	123
9.5.1	Extrinsic Methods of the Profile	123

9.5.2	Intrinsic Methods of the Profile	123
9.6	Client Considerations: Use Cases	123
9.6.1	General.....	123
9.6.2	List Existing FileSystems hosted by the Referencing Profile (parent filesystem related profile1)	123
9.6.3	Get FileSystemSettings for a FileSystem	125
9.6.4	Get the ComputerSystem that hosts a FileSystem	126
9.6.5	Get all File Servers and Access Paths that have Local Access to this FileSystem.....	127
9.6.6	Get the Access Path to this FileSystem on the specified File Server.....	127
9.6.7	Get the Local Access Settings for this FileSystem on the specified File Server ...	128
9.6.8	Get the FileShares and shared File path of this FileSystem on all File Servers....	130
9.6.9	Get the FileShares and shared File path of this FileSystem on the specified FileServer	131
9.7	CIM Elements.....	132
9.7.1	General.....	132
9.7.2	CIM_Dependency (Uses Directory Services From).....	133
9.7.3	CIM_ElementSettingData (FileSystem).....	134
9.7.4	CIM_ElementSettingData (Local Access Required).....	134
9.7.5	CIM_FileStorage	134
9.7.6	CIM_FileSystemSetting.....	135
9.7.7	CIM_HostedDependency (Local Access Required)	136
9.7.8	CIM_HostedFileSystem (LocalFileSystem).....	136
9.7.9	CIM_LocalFileSystem	137
9.7.10	CIM_LogicalFile.....	138
9.7.11	SNIA_LocalAccessAvailable	138
9.7.12	SNIA_LocalFileSystem.....	139
9.7.13	SNIA_LocallyAccessibleFileSystemSetting.....	140
10	Filesystem Copy Services Profile	145
10.1	Description	145
10.1.1	Synopsis.....	145
10.1.2	Overview	145
10.1.3	Instance Diagrams	145
10.2	Health and Fault Management Consideration.....	148
10.2.1	Status for Point In Time Copy	148
10.2.2	Status for Copy In Progress	149
10.3	Cascading Considerations	149
10.4	Supported Profiles, Subprofiles, and Packages.....	149
10.5	Methods of the Profile	149
10.5.1	Extrinsic Methods of the Profile.....	149
10.6	Use Cases.....	153
10.7	Registered Name and Version	157
10.8	CIM Elements.....	157
10.8.1	General.....	157
10.8.2	CIM_ElementCapabilities (FileSystemCopyConfigurationService to FileSystemCopyConfigurationCapabilities)	158
10.8.3	SNIA_AllocatedFrom (PointInTimeCopy to PointInTimeCopyReserve).....	158
10.8.4	SNIA_CopyInProgress	158
10.8.5	SNIA_CopyOf (FileSystem to PointInTimeCopy)	159
10.8.6	SNIA_FileSystemCopyConfigurationCapabilities.....	159
10.8.7	SNIA_FileSystemCopyConfigurationService	160
10.8.8	SNIA_FileSystemCopyPITSettings	160
10.8.9	SNIA_HasExternalSpace (FileSystem to PointInTimeCopyReserve).....	161
10.8.10	SNIA_PointInTimeCopy	161
10.8.11	SNIA_PointInTimeCopyReserve.....	162
10.8.12	SNIA_ResidesOnLogicalDisk (PointInTimeCopyReserve to LogicalDisk).....	162

11	Filesystem Manipulation Subprofile.....	164
11.1	Description	164
11.1.1	Synopsis.....	164
11.1.2	Overview	164
11.1.3	Instance Diagrams	165
11.2	Health and Fault Management Considerations.....	171
11.2.1	General.....	171
11.2.2	OperationalStatus for FileSystemConfigurationService	171
11.2.3	OperationalStatus for LocalFileSystem	171
11.3	Cascading Considerations	172
11.4	Supported Subprofiles and Packages.....	172
11.5	Methods of the Profile	173
11.5.1	Extrinsic Methods of the Profile.....	173
11.5.2	Signature and Parameters of CreateFileSystem.....	182
11.5.3	Signature and Parameters of ModifyFileSystem	187
11.5.4	Signature and Parameters of DeleteFileSystem	190
11.5.5	Intrinsic Methods of the Profile	191
11.6	Client Considerations and Recipes	191
11.6.1	General.....	191
11.6.2	Creation of a FileSystem on a Storage Extent	192
11.6.3	Increase the size of a FileSystem	196
11.6.4	Modify a FileSystem's Settings	200
11.6.5	Delete a FileSystem and return underlying StorageExtent	204
11.6.6	Make a FileSystem Locally Accessible from a File Server ComputerSystem	206
11.6.7	Get the Local Access Setting for a FileSystem on a File Server ComputerSystem.....	208
11.6.8	Filesystem Manipulation Supported Capabilities Patterns	210
11.7	CIM Elements.....	211
11.7.1	General.....	211
11.7.2	CIM_Dependency (Uses Directory Services From).....	214
11.7.3	CIM_ElementCapabilities (FS Configuration Capabilities)	214
11.7.4	CIM_ElementCapabilities (Local Access Configuration Capabilities).....	215
11.7.5	CIM_ElementCapabilities (Non-Default)	215
11.7.6	CIM_ElementSettingData (Attached to FileSystem)	215
11.7.7	CIM_ElementSettingData (Local Access Required).....	215
11.7.8	CIM_HostedDependency (Attached to File System).....	216
11.7.9	CIM_HostedDependency (Predefined Capabilities).....	216
11.7.10	CIM_HostedDependency (Predefined Setting)	216
11.7.11	CIM_HostedFileSystem	217
11.7.12	CIM_HostedService	217
11.7.13	SNIA_ElementCapabilities (Default)	217
11.7.14	SNIA_FileSystemCapabilities	218
11.7.15	SNIA_FileSystemConfigurationCapabilities	218
11.7.16	SNIA_FileSystemConfigurationService.....	221
11.7.17	SNIA_FileSystemSetting (Attached to FileSystem)	222
11.7.18	SNIA_FileSystemSetting (Predefined FS Settings)	223
11.7.19	SNIA_LocalAccessAvailable	225
11.7.20	SNIA_LocalFileSystem	225
11.7.21	SNIA_LocallyAccessibleFileSystemCapabilities	227
11.7.22	SNIA_LocallyAccessibleFileSystemSetting	229
11.7.23	SNIA_SettingsDefineCapabilities (Predefined FS Settings)	232
11.7.24	SNIA_SettingsDefineCapabilities (Predefined Local Access Settings).....	233
12	Filesystem Performance Profile.....	235
12.1	Synopsis.....	235
12.2	Description	235

12.3	Implementation.....	236
12.3.1	Performance Additions Overview	236
12.3.2	Summary of FileSystemStatisticsData support by Profile	238
12.3.3	Profile Registration Profile Support for the Filesystem Performance Subprofile ...	238
12.3.4	Default Manifest Collection.....	239
12.3.5	Client Defined Manifest Collection	239
12.3.6	Capabilities Support for Filesystem Performance Subprofile	239
12.3.7	Health and Fault Management Consideration.....	240
12.3.8	Cascading Considerations	240
12.4	Methods of the Profile	241
12.4.1	Extrinsic Methods of the Profile.....	241
12.4.2	Intrinsic Methods of this Profile	245
12.5	Use Cases.....	246
12.5.1	Summary of Statistics Support by Element	246
12.5.2	Formulas and Calculations	247
12.5.3	Filesystem Performance Supported Capabilities Patterns	247
12.5.4	Client Considerations and Recipes	248
12.6	CIM Elements.....	248
12.6.1	General.....	248
12.6.2	CIM_ElementCapabilities	250
12.6.3	CIM_ElementStatisticalData (Exported File Share Stats)	250
12.6.4	CIM_ElementStatisticalData (Exporting Port Stats)	251
12.6.5	CIM_ElementStatisticalData (Local Filesystem Stats)	251
12.6.6	CIM_ElementStatisticalData (OTHER Element Type Stats)	252
12.6.7	CIM_HostedCollection (Client Defined).....	252
12.6.8	CIM_HostedCollection (Default).....	253
12.6.9	CIM_HostedCollection (Provider Supplied).....	253
12.6.10	CIM_HostedService	254
12.6.11	CIM_MemberOfCollection (Member of client defined collection)	254
12.6.12	CIM_MemberOfCollection (Member of predefined collection)	254
12.6.13	CIM_MemberOfCollection (Member of statistics collection)	255
12.6.14	CIM_StatisticsCollection	255
12.6.15	SNIA_AssociatedFileSystemStatisticsManifestCollection (Client defined collection).....	256
12.6.16	SNIA_AssociatedFileSystemStatisticsManifestCollection (Provider defined collection)	256
12.6.17	SNIA_FileSystemStatisticalData	257
12.6.18	SNIA_FileSystemStatisticsManifest (Client Defined)	260
12.6.19	SNIA_FileSystemStatisticsManifest (Provider Support).....	261
12.6.20	SNIA_FileSystemStatisticsManifestCollection (Client Defined)	263
12.6.21	SNIA_FileSystemStatisticsManifestCollection (Provider Defined).....	263
12.6.22	SNIA_FileSystemStatisticsService.....	264
13	Filesystem Quotas Profile.....	267
13.1	Synopsis.....	267
13.2	Description	267
13.2.1	General.....	267
13.2.2	Tree Quotas	268
13.2.3	User Quotas	268
13.2.4	Group Quotas.....	268
13.2.5	Container Boundaries.....	268
13.2.6	Quota types	269
13.2.7	Class design considerations.....	269
13.2.8	Instance Diagram	270
13.3	Health and Fault Management Considerations.....	271
13.4	Supported Profiles, Subprofiles, and Packages.....	271

13.5	Methods of the Profile	271
13.5.1	General.....	271
13.5.2	FindQuotaEntries	271
13.5.3	DeleteQuotaEntry.....	272
13.5.4	ModifyQuotaEntry.....	272
13.5.5	AddQuotaEntry.....	272
13.5.6	GetQuotaReport.....	272
13.5.7	EnableQuotas.....	273
13.5.8	InitializeQuotas.....	273
13.6	Client Considerations and sample code.....	273
13.6.1	General.....	273
13.6.2	Common subroutines	274
13.6.3	Initialize quotas.....	275
13.6.4	Enable or disable quota tracking	275
13.6.5	Add a quota entry	276
13.6.6	Delete a quota entry	277
13.6.7	Modify a quota entry.....	277
13.6.8	Read the quota entries	278
13.6.9	Get a report on quota usage	279
13.7	CIM Elements.....	279
13.7.1	General.....	279
13.7.2	SNIA_FSDomainIdentity	280
13.7.3	SNIA_FSQuotaAppliesToElement	280
13.7.4	SNIA_FSQuotaAppliesToPrincipal.....	281
13.7.5	SNIA_FSQuotaAppliesToTree.....	281
13.7.6	SNIA_FSQuotaCapabilities.....	281
13.7.7	SNIA_FSQuotaConfigEntry.....	282
13.7.8	SNIA_FSQuotaIndication	283
13.7.9	SNIA_FSQuotaManagementService.....	283
13.7.10	SNIA_FSQuotaReportRecord.....	284
13.7.11	SNIA_ReportRecord	285
14	NAS Head Profile	286
14.1	Description	286
14.1.1	Synopsis.....	286
14.1.2	Overview	287
14.1.3	Implementation.....	288
14.2	Health and Fault Management Considerations.....	296
14.2.1	General.....	296
14.2.2	Standard Messages used by this Profile.....	296
14.3	Cascading Considerations	297
14.3.1	General.....	297
14.3.2	Cascading Resources for the NAS Head Profile.....	297
14.3.3	Ownership Privileges Asserted by NAS Heads.....	297
14.3.4	NAS Head Limitations on use of the Cascading Subprofile	297
14.4	Supported Subprofiles and Packages.....	297
14.5	Methods of the Profile	297
14.5.1	Extrinsic Methods of the Profile.....	297
14.5.2	Intrinsic Methods of the Profile	298
14.6	Client Considerations and Recipes	298
14.7	CIM Elements.....	298
14.7.1	General.....	298
14.7.2	CIM_ComputerSystem (Top Level System).....	299
14.7.3	CIM_ComputerSystem (Virtual File Server).....	300
14.7.4	CIM_ConcreteComponent.....	301

14.7.5	CIM_HostedDependency	302
14.7.6	CIM_LogicalDisk (LD for FS).....	302
14.7.7	CIM_StorageExtent (Primordial)	303
14.7.8	CIM_SystemDevice (Logical Disks)	305
14.7.9	CIM_SystemDevice (Storage Extents).....	305
15	Self-Contained NAS Profile	307
15.1	Description	307
15.1.1	Synopsis.....	307
15.1.2	Overview	308
15.1.3	Implementation	309
15.2	Health and Fault Management Considerations.....	314
15.2.1	General.....	314
15.2.2	Standard Messages used by this Profile	314
15.3	Cascading Considerations	314
15.4	Supported Subprofiles and Packages.....	314
15.5	Methods of the Profile	315
15.5.1	Extrinsic Methods of the Profile.....	315
15.5.2	Intrinsic Methods of the Profile	315
15.6	Client Considerations and Recipes	315
15.7	CIM Elements.....	315
15.7.1	General.....	315
15.7.2	CIM_ComputerSystem (Top Level System).....	316
15.7.3	CIM_ComputerSystem (Virtual File Server)	317
15.7.4	CIM_HostedDependency	318
15.7.5	CIM_LogicalDisk (Disk for FS)	319
15.7.6	CIM_SystemDevice (Logical Disks)	320
16	NAS Network Port Profile	321
16.1	Synopsis.....	321
16.2	Description	321
16.3	Implementation.....	321
16.3.1	General.....	321
16.3.2	The NAS TCP Interface.....	322
16.3.3	The NAS Ethernet Interface	323
16.3.4	Indication Events	325
16.3.5	Bellwether Indications – AlertIndication for NetworkPort Bellwether.....	326
16.4	Health and Fault Management Considerations.....	326
16.4.1	General.....	326
16.4.2	OperationalStatus for Network Ports	326
16.4.3	OperationalStatus for ProtocolEndpoints	326
16.4.4	Standard Messages used by this Profile	327
16.5	Cascading Considerations	327
16.6	Methods	327
16.6.1	Intrinsic Methods of the Profile	327
16.6.2	Extrinsic Methods of the Profile	327
16.7	Use Cases.....	327
16.8	CIM Elements.....	328
16.8.1	General.....	328
16.8.2	CIM_BindsTo (CIFS or NFS).....	330
16.8.3	CIM_BindsTo (TCP)	330
16.8.4	CIM_BindsToLANEndpoint	331
16.8.5	CIM_DeviceSAPImplementation (CIFS or NFS to NetworkPort)	331
16.8.6	CIM_DeviceSAPImplementation (LANEndpoint to NetworkPort).....	331
16.8.7	CIM_ElementSettingData (IPInterfaceSettingData to IPProtocolEndpoint)	332
16.8.8	CIM_HostedAccessPoint (CIFS or NFS).....	332

16.8.9	CIM_HostedAccessPoint (IP)	332
16.8.10	CIM_HostedAccessPoint (LAN)	333
16.8.11	CIM_HostedAccessPoint (TCP)	333
16.8.12	CIM_IPProtocolEndpoint	333
16.8.13	CIM_LANEndpoint	335
16.8.14	CIM_MemberOfCollection (The IPProtocolEndpoint to NetworkVLAN)	336
16.8.15	CIM_NetworkPort	336
16.8.16	CIM_NetworkVLAN	338
16.8.17	CIM_ProtocolEndpoint (CIFS or NFS)	338
16.8.18	CIM_SystemDevice (Network Ports)	339
16.8.19	CIM_TCIPProtocolEndpoint	339
16.8.20	SNIA_IPInterfaceSettingData	340
17	Host Filesystem Profile	342
17.1	Synopsis	342
17.2	Description	342
17.3	Implementation	344
17.3.1	Summary Instance Diagram	344
17.3.2	Host Filesystem Use of Filesystem Profile	345
17.3.3	Host Filesystem Use of File Export Profile	345
17.3.4	Host Filesystem Support of Cascading	346
17.3.5	Health and Fault Management Consideration	347
17.4	Methods of the Profile	347
17.4.1	Extrinsic Methods of the Profile	347
17.4.2	Extrinsic Methods in the Filesystem Profile – GetFileProperties	347
17.4.3	Extrinsic Methods in the Filesystem Manipulation Profile	347
17.4.4	Intrinsic Methods of the Profile	348
17.5	Client Considerations and Recipes – Use Cases	348
17.5.1	Discovery of the Filesystem Volumes	348
17.5.2	Expansion of a Filesystem	349
17.5.3	Replication of a Filesystem	349
17.5.4	Quiesce a Filesystem	350
17.5.5	Unquiesce a Filesystem	350
17.5.6	Filesystem quiesce timeout	351
17.5.7	Retrieve File Information	351
17.6	CIM Elements	352
17.6.1	General	352
17.6.2	CIM_ComputerSystem (Shadow)	354
17.6.3	CIM_Dependency (Systems)	354
17.6.4	CIM_ElementCapabilities (FS Configuration Capabilities)	355
17.6.5	CIM_ElementConformsToProfile (FilesystemConfigurationService to Host Filesystem RegisteredProfile)	355
17.6.6	CIM_FilterCollection (Host Filesystem Predefined FilterCollection)	356
17.6.7	CIM_HostedCollection (Allocated Resources)	356
17.6.8	CIM_HostedCollection (Host Filesystem to predefined FilterCollection)	356
17.6.9	CIM_HostedCollection (Remote Resources)	357
17.6.10	CIM_HostedService	357
17.6.11	CIM_IndicationFilter (Extent OperationalStatus)	357
17.6.12	CIM_IndicationFilter (System OperationalStatus)	358
17.6.13	CIM_LogicalDisk (Shadow)	359
17.6.14	CIM_LogicalFile	360
17.6.15	CIM_LogicalIdentity (LogicalDisk)	361
17.6.16	CIM_MemberOfCollection (Allocated Resources)	362
17.6.17	CIM_MemberOfCollection (Predefined Filter Collection to Host Filesystem Filters)	362
17.6.18	CIM_MemberOfCollection (Remote Resources)	362

17.6.19	CIM_RemoteServiceAccessPoint (Shadow)	363
17.6.20	CIM_ResidesOnExtent	363
17.6.21	CIM_SAPAvailableForElement	364
17.6.22	CIM_ServiceAffectsElement	364
17.6.23	CIM_StorageExtent (Primordial Imported Extent)	364
17.6.24	CIM_SystemDevice (LogicalDisks)	365
17.6.25	SNIA_AllocatedResources	365
17.6.26	SNIA_FileSystemConfigurationCapabilities	366
17.6.27	SNIA_FileSystemConfigurationService	367
17.6.28	SNIA_LocalFileSystem	367
18	Filesystem Remote Copy Services Profile	370
18.1	Description	370
18.1.1	Synopsis	370
18.1.2	Overview	370
18.1.3	Instances Diagrams	370
18.2	Health and Fault Management Consideration	376
18.3	Cascading Considerations	377
18.4	Supported Profiles, Subprofiles, and Packages	377
18.5	Methods of the Profile – Extrinsic Methods of the Profile	377
18.5.1	Signature and Parameters of FileSystemRemoteCopyConfigurationService. CreateOneTimeCopy	377
18.5.2	Signature and Parameters of FileSystemRemoteCopyConfigurationService. CreateOngoingCopy	378
18.5.3	Signature and Parameters of RemoteCopyInProgress.Complete	378
18.5.4	Signature and Parameters of RemoteCopyInProgress.Abort	379
18.5.5	Signature and Parameters of RemoteCopyInProgress.Restart	379
18.5.6	Signature and Parameters of OngoingCopy.Start	380
18.5.7	Signature and Parameters of OngoingCopy.Restart	380
18.5.8	Signature and Parameters of OngoingCopy.Remove	381
18.5.9	Signature and Parameters of OngoingCopy.ChangeQosParameters	381
18.6	Client Considerations and Recipes – Use Cases	382
18.7	Registered Name and Version	386
18.8	CIM Elements	386
18.8.1	General	386
18.8.2	CIM_ElementCapabilities (FileSystemRemoteCopyConfigurationService to FileSystemRemoteCopyConfigurationCapabilities)	387
18.8.3	SNIA_FileSystemCopyRemoteSystem	387
18.8.4	SNIA_FileSystemOneTimeCopySettings	388
18.8.5	SNIA_FileSystemOngoingCopySettings	388
18.8.6	SNIA_FileSystemRemoteCopyConfigurationCapabilities	389
18.8.7	SNIA_FileSystemRemoteCopyConfigurationService	390
18.8.8	SNIA_OngoingCopy	391
18.8.9	SNIA_OngoingCopyQosSettingsData	392
18.8.10	SNIA_RemoteCopyInProgress	392
Annex A (informative)	SMI-S Information Model	394
Annex B (informative)	State Transitions from Storage to File Shares	395
Bibliography		399

Figure 1 - Experimental maturity level tag	29
Figure 2 - Implemented maturity level tag.....	30
Figure 3 - Stable maturity level tag	30
Figure 4 - Deprecated tag	31
Figure 5 - File Export Instance.....	33
Figure 6 - File Export Manipulation Subprofile Instance	41
Figure 7 - Capabilities and Settings for Exported File Share Creation	44
Figure 8 - File Server Classes and Associations (Read only view)	85
Figure 9 - File Server Configuration classes and association.....	87
Figure 10 - File Storage Instance.....	114
Figure 11 - Cascading File Storage	115
Figure 12 - Filesystem Instance.....	120
Figure 13 - Filesystem Copy Services Configuration.....	146
Figure 14 - Filesystem Point In Time Copy.....	147
Figure 15 - Filesystem Independent Copy	148
Figure 16 - LocalFilesystem Creation Instance Diagram	165
Figure 17 - Capabilities and Settings for Filesystem Creation	170
Figure 18 - Filesystem Performance Subprofile Summary Instance Diagram	237
Figure 19 - Filesystem Quotas Instance Diagram.....	270
Figure 20 - NAS Head Profiles and Subprofiles.....	288
Figure 21 - NAS Head Instance	289
Figure 22 - NAS Storage Instance	291
Figure 23 - NAS Head Cascading Support Instance	293
Figure 24 - Self-Contained NAS Profile and Subprofiles	308
Figure 25 - Self-Contained NAS Instance.....	309
Figure 26 - NAS Storage Instance	311
Figure 27 - NAS Support for Front-end Network Ports	322
Figure 28 - Optional NAS TCP Interface Modeling	323
Figure 29 - Mandatory NAS Ethernet Port Modeling	324
Figure 30 - Host Filesystem Profiles, Subprofiles and Package	343
Figure 31 - Host Filesystem Instance Diagram.....	344
Figure 32 - Host Filesystem support for Cascading.....	346
Figure 33 - Filesystem Remote Copy Services Configuration	371
Figure 34 - Filesystem Remote One Time Copy, Push Model.....	372
Figure 35 - Filesystem Remote One Time Copy, Pull Model.....	373
Figure 36 - Filesystem Ongoing Copy, Push Model	374
Figure 37 - Filesystem Ongoing Copy, Pull Model.....	375
Figure B.1 State Transitions From LogicalDisk to FileShare	396

Table 1 - Related Profiles for File Export	32
Table 2 - FileShare OperationalStatus.....	34
Table 3 - CIM Elements for File Export.....	35
Table 4 - SMI Referenced Properties/Methods for CIM_ConcreteDependency	36
Table 5 - SMI Referenced Properties/Methods for CIM_ElementSettingData (FileShare)	36
Table 6 - SMI Referenced Properties/Methods for CIM_ExportedFileShareSetting (Setting)	37
Table 7 - SMI Referenced Properties/Methods for CIM_FileShare (Exported File Share)	37
Table 8 - SMI Referenced Properties/Methods for CIM_HostedShare.....	38
Table 9 - SMI Referenced Properties/Methods for CIM_SAPAvailableForElement.....	39
Table 10 - SMI Referenced Properties/Methods for CIM_SharedElement	39
Table 11 - Related Profiles for File Export Manipulation.....	40
Table 12 - Operational Status for FileExport Service.....	45
Table 13 - Operational Status for File Server ComputerSystem.....	46
Table 14 - FileExportManipulation Methods.....	47
Table 15 - Parameters for Extrinsic Method ExportedFileShareCapabilities.CreateGoalSettings.....	49
Table 16 - Parameters for Extrinsic Method FileExportServices.CreateExportedShare.....	51
Table 17 - Parameters for Extrinsic Method FileExportServices.ModifyExportedShare	54
Table 18 - Parameters for Extrinsic Method FileExportServices.ReleaseExportedShare	57
Table 19 - SMI-S File Export Supported Capabilities Patterns	69
Table 20 - CIM Elements for File Export Manipulation.....	69
Table 21 - SMI Referenced Properties/Methods for CIM_ConcreteDependency	71
Table 22 - SMI Referenced Properties/Methods for CIM_ElementCapabilities (FES Configuration)	71
Table 23 - SMI Referenced Properties/Methods for CIM_ElementSettingData (FileShare Setting)	72
Table 24 - SMI Referenced Properties/Methods for CIM_FileStorage (Subelement)	72
Table 25 - SMI Referenced Properties/Methods for CIM_HostedService.....	73
Table 26 - SMI Referenced Properties/Methods for CIM_LogicalFile (Subelement)	73
Table 27 - SMI Referenced Properties/Methods for CIM_SAPAvailableForElement.....	73
Table 28 - SMI Referenced Properties/Methods for CIM_ServiceAffectsElement.....	74
Table 29 - SMI Referenced Properties/Methods for SNIA_ElementCapabilities (FES Capabilities)	74
Table 30 - SMI Referenced Properties/Methods for SNIA_ExportedFileShareCapabilities (FES Capabilities)	75
Table 31 - SMI Referenced Properties/Methods for SNIA_ExportedFileShareSetting (FileShare Setting)	75
Table 32 - SMI Referenced Properties/Methods for SNIA_ExportedFileShareSetting (Pre-defined)	77
Table 33 - SMI Referenced Properties/Methods for SNIA_FileExportCapabilities (FES Configuration)	79
Table 34 - SMI Referenced Properties/Methods for SNIA_FileExportService	80
Table 35 - SMI Referenced Properties/Methods for SNIA_FileShare (Exported File Share).....	80
Table 36 - SMI Referenced Properties/Methods for SNIA_HostedShare	81
Table 37 - SMI Referenced Properties/Methods for SNIA_SettingsDefineCapabilities (Pre-defined).....	81
Table 38 - SMI Referenced Properties/Methods for SNIA_SharedElement	82
Table 39 - Operational Status for File Server ComputerSystem.....	88
Table 40 - Supported Profiles for File Server Manipulation	89
Table 41 - Array Element Mappings for TemplateGoalSettings and SupportedGoalSettings.....	90
Table 42 - Parameters for Extrinsic Method FileServerCapabilities.CreateGoalSettings	91
Table 43 - Parameters for Extrinsic Method FileServerConfigurationService.CreateFileServer.....	92
Table 44 - Parameters for Extrinsic Method FileServerConfigurationService.ModifyFileServer.....	94
Table 45 - Parameters for Extrinsic Method FileServerConfigurationService.DeleteFileServer	95
Table 46 - Parameters for Extrinsic Method FileServerConfigurationService.AddIPInterface	96
Table 47 - Parameters for Extrinsic Method FileServerConfigurationService.ModifyIPInterface	96
Table 48 - Parameters for Extrinsic Method FileServerConfigurationService.DeleteIPInterface	97
Table 49 - CIM Elements for File Server Manipulation	98

Table 50 - SMI Referenced Properties/Methods for CIM_ConcreteComponent (FileServerSettings to CIFSSettingData)	101
Table 51 - SMI Referenced Properties/Methods for CIM_ConcreteComponent (FileServerSettings to DNSSettingData)	101
Table 52 - SMI Referenced Properties/Methods for CIM_ConcreteComponent (FileServerSettings to IPInterfaceSettingData)	101
Table 53 - SMI Referenced Properties/Methods for CIM_ConcreteComponent (FileServerSettings to NFS-SettingData)	102
Table 54 - SMI Referenced Properties/Methods for CIM_ConcreteComponent (FileServerSettings to NISSettingData)	102
Table 55 - SMI Referenced Properties/Methods for CIM_DNSSettingData	102
Table 56 - SMI Referenced Properties/Methods for CIM_ElementCapabilities (FileServerConfigurationService to FileServerCapabilities)	103
Table 57 - SMI Referenced Properties/Methods for CIM_ElementCapabilities (FileServerConfigurationService to FileServerConfigurationCapabilities)	103
Table 58 - SMI Referenced Properties/Methods for CIM_ElementSettingData (ComputerSystem FileServer to FileServerSettings)	103
Table 59 - SMI Referenced Properties/Methods for CIM_ElementSettingData (IPInterfaceSettingData to IPProtocolEndpoint)	104
Table 60 - SMI Referenced Properties/Methods for CIM_HostedDependency	104
Table 61 - SMI Referenced Properties/Methods for CIM_HostedService (Hosting Computer System to FileServerConfigurationService)	104
Table 62 - SMI Referenced Properties/Methods for CIM_MemberOfCollection (The IPProtocolEndpoint to NetworkVLAN)	105
Table 63 - SMI Referenced Properties/Methods for CIM_NetworkVLAN	105
Table 64 - SMI Referenced Properties/Methods for CIM_SettingsDefineCapabilities (CIFSSettingData)	105
Table 65 - SMI Referenced Properties/Methods for CIM_SettingsDefineCapabilities (DNSSettingData)	106
Table 66 - SMI Referenced Properties/Methods for CIM_SettingsDefineCapabilities (FileServerSettings)	106
Table 67 - SMI Referenced Properties/Methods for CIM_SettingsDefineCapabilities (IPInterfaceSettingData)	106
Table 68 - SMI Referenced Properties/Methods for CIM_SettingsDefineCapabilities (NFSSettingData)	107
Table 69 - SMI Referenced Properties/Methods for CIM_SettingsDefineCapabilities (NISSettingData)	107
Table 70 - SMI Referenced Properties/Methods for CIM_SettingsDefineState (ComputerSystem FileServer to FileServerSettings)	107
Table 71 - SMI Referenced Properties/Methods for SNIA_CIFSSettingData	108
Table 72 - SMI Referenced Properties/Methods for SNIA_FileServerCapabilities	109
Table 73 - SMI Referenced Properties/Methods for SNIA_FileServerConfigurationCapabilities	110
Table 74 - SMI Referenced Properties/Methods for SNIA_FileServerConfigurationService	110
Table 75 - SMI Referenced Properties/Methods for SNIA_FileServerSettings	111
Table 76 - SMI Referenced Properties/Methods for SNIA_IPInterfaceSettingData	112
Table 77 - SMI Referenced Properties/Methods for SNIA_NFSSettingData	112
Table 78 - SMI Referenced Properties/Methods for SNIA_NISSettingData	113
Table 79 - Cascaded Storage	116
Table 80 - CIM Elements for File Storage	117
Table 81 - SMI Referenced Properties/Methods for CIM_ResidesOnExtent	118
Table 82 - Related Profiles for Filesystem	119
Table 83 - Filesystem OperationalStatus	122
Table 84 - CIM Elements for Filesystem	132
Table 85 - SMI Referenced Properties/Methods for CIM_Dependency (Uses Directory Services From)	134
Table 86 - SMI Referenced Properties/Methods for CIM_ElementSettingData (Filesystem)	134

Table 87 - SMI Referenced Properties/Methods for CIM_ElementSettingData (Local Access Required).....	134
Table 88 - SMI Referenced Properties/Methods for CIM_FileStorage.....	135
Table 89 - SMI Referenced Properties/Methods for CIM_FileSystemSetting.....	135
Table 90 - SMI Referenced Properties/Methods for CIM_HostedDependency (Local Access Required).....	136
Table 91 - SMI Referenced Properties/Methods for CIM_HostedFileSystem (LocalFileSystem).....	137
Table 92 - SMI Referenced Properties/Methods for CIM_LocalFileSystem.....	137
Table 93 - SMI Referenced Properties/Methods for CIM_LogicalFile.....	138
Table 94 - SMI Referenced Properties/Methods for SNIA_LocalAccessAvailable.....	139
Table 95 - SMI Referenced Properties/Methods for SNIA_LocalFileSystem.....	139
Table 96 - SMI Referenced Properties/Methods for SNIA_LocallyAccessibleFileSystemSetting.....	141
Table 97 - Operational Status for Point In Time Copy.....	148
Table 98 - Operational Status for Copy In Progress.....	149
Table 99 - Supported Profiles for Filesystem Copy Services.....	149
Table 100 - Parameters for Extrinsic Method FileSystemCopyConfigurationService.CreatePointInTimeCopy.....	150
Table 101 - Parameters for Extrinsic Method FileSystemCopyConfigurationService.CreateIndependentCopy.....	150
Table 102 - Parameters for Extrinsic Method PointInTimeCopy.Remove.....	151
Table 103 - Parameters for Extrinsic Method PointInTimeCopy.Refresh.....	151
Table 104 - Parameters for Extrinsic Method PointInTimeCopy.Restore.....	152
Table 105 - Parameters for Extrinsic Method CopyInProgress.Abort.....	152
Table 106 - Parameters for Extrinsic Method CopyInProgress.Complete.....	152
Table 107 - Create a Read-Only Point in Time Copy of Filesystem.....	153
Table 108 - Remove a Read-Only Point in Time Copy of Filesystem.....	153
Table 109 - Update a Read-Only Copy to Reflect the Current Filesystem State.....	153
Table 110 - Restore a Filesystem to the State Represented by a Read-Only Copy.....	154
Table 111 - Enumerate Read-Only Point in Time Copies.....	154
Table 112 - Create a Read-Write Point in Time Copy of Filesystem.....	154
Table 113 - Replace a Filesystem with the Contents by a Read-Write Copy.....	155
Table 114 - Remove a Read-Write Point in Time Copy of Filesystem.....	155
Table 115 - Enumerate Read-Write Point in Time Copies.....	156
Table 116 - Create an Independent Copy.....	156
Table 117 - CIM Elements for Filesystem Copy Services.....	157
Table 118 - SMI Referenced Properties/Methods for CIM_ElementCapabilities (FileSystemCopyConfigurationService to FileSystemCopyConfigurationCapabilities).....	158
Table 119 - SMI Referenced Properties/Methods for SNIA_AllocatedFrom (PointInTimeCopy to PointInTimeCopyReserve).....	158
Table 120 - SMI Referenced Properties/Methods for SNIA_CopyInProgress.....	159
Table 121 - SMI Referenced Properties/Methods for SNIA_CopyOf (FileSystem to PointInTimeCopy).....	159
Table 122 - SMI Referenced Properties/Methods for SNIA_FileSystemCopyConfigurationCapabilities.....	159
Table 123 - SMI Referenced Properties/Methods for SNIA_FileSystemCopyConfigurationService.....	160
Table 124 - SMI Referenced Properties/Methods for SNIA_FileSystemCopyPITSettings.....	161
Table 125 - SMI Referenced Properties/Methods for SNIA_HasExternalSpace (FileSystem to PointInTimeCopyReserve).....	161
Table 126 - SMI Referenced Properties/Methods for SNIA_PointInTimeCopy.....	161
Table 127 - SMI Referenced Properties/Methods for SNIA_PointInTimeCopyReserve.....	162
Table 128 - SMI Referenced Properties/Methods for SNIA_ResidesOnLogicalDisk (PointInTimeCopyReserve to LogicalDisk).....	163
Table 129 - Related Profiles for Filesystem Manipulation.....	164
Table 130 - LocalFileSystem OperationalStatus.....	171
Table 131 - Filesystem Manipulation Methods that cause Instance Creation,	

Deletion or Modification	173
Table 132 - Parameters for Extrinsic Method FileSystemCapabilities.CreateGoalSettings	175
Table 133 - Parameters for Extrinsic Method FileSystemCapabilities.GetRequiredStorageSize	176
Table 134 - Parameters for Extrinsic Method LocallyAccessibleFileSystemCapabilities.CreateGoalSettings ...	178
Table 135 - Parameters for Extrinsic Method FileSystemConfigurationService.CreateFileSystem	182
Table 136 - Parameters for Extrinsic Method FileSystemConfigurationService.ModifyFileSystem	187
Table 137 - Parameters for Extrinsic Method FileSystemConfigurationService.DeleteFileSystem	190
Table 138 - Filesystem Manipulation Supported Capabilities Patterns	210
Table 139 - CIM Elements for Filesystem Manipulation.....	211
Table 140 - SMI Referenced Properties/Methods for CIM_Dependency (Uses Directory Services From).....	214
Table 141 - SMI Referenced Properties/Methods for CIM_ElementCapabilities (FS Configuration Capabilities).....	214
Table 142 - SMI Referenced Properties/Methods for CIM_ElementCapabilities (Local Access Configuration Capabilities)	215
Table 143 - SMI Referenced Properties/Methods for CIM_ElementCapabilities (Non-Default).....	215
Table 144 - SMI Referenced Properties/Methods for CIM_ElementSettingData (Attached to Filesystem)	215
Table 145 - SMI Referenced Properties/Methods for CIM_ElementSettingData (Local Access Required).....	216
Table 146 - SMI Referenced Properties/Methods for CIM_HostedDependency (Attached to File System).....	216
Table 147 - SMI Referenced Properties/Methods for CIM_HostedDependency (Predefined Capabilities).....	216
Table 148 - SMI Referenced Properties/Methods for CIM_HostedDependency (Predefined Setting).....	217
Table 149 - SMI Referenced Properties/Methods for CIM_HostedFileSystem.....	217
Table 150 - SMI Referenced Properties/Methods for CIM_HostedService.....	217
Table 151 - SMI Referenced Properties/Methods for SNIA_ElementCapabilities (Default).....	218
Table 152 - SMI Referenced Properties/Methods for SNIA_FileSystemCapabilities	218
Table 153 - SMI Referenced Properties/Methods for SNIA_FileSystemConfigurationCapabilities	219
Table 154 - SMI Referenced Properties/Methods for SNIA_FileSystemConfigurationService	221
Table 155 - SMI Referenced Properties/Methods for SNIA_FileSystemSetting (Attached to FileSystem).....	222
Table 156 - SMI Referenced Properties/Methods for SNIA_FileSystemSetting (Predefined FS Settings).....	224
Table 157 - SMI Referenced Properties/Methods for SNIA_LocalAccessAvailable	225
Table 158 - SMI Referenced Properties/Methods for SNIA_LocalFileSystem.....	226
Table 159 - SMI Referenced Properties/Methods for SNIA_LocallyAccessibleFileSystemCapabilities	227
Table 160 - SMI Referenced Properties/Methods for SNIA_LocallyAccessibleFileSystemSetting.....	229
Table 161 - SMI Referenced Properties/Methods for SNIA_SettingsDefineCapabilities (Predefined FS Settings).....	233
Table 162 - SMI Referenced Properties/Methods for SNIA_SettingsDefineCapabilities (Predefined Local Access Settings).....	234
Table 163 - Related Profiles for Filesystem Performance.....	235
Table 164 - Summary of Element Types by Profile.....	238
Table 165 - Creation, Deletion and Modification Methods in the Filesystem Performance Subprofile	241
Table 166 - Summary of Statistics Support by Element.....	246
Table 167 - Formulas and Calculations - Calculated Statistics for a Time Interval.....	247
Table 168 - Filesystem Performance Subprofile Supported Capabilities Patterns	247
Table 169 - CIM Elements for Filesystem Performance	248
Table 170 - SMI Referenced Properties/Methods for CIM_ElementCapabilities	250
Table 171 - SMI Referenced Properties/Methods for CIM_ElementStatisticalData (Exported File Share Stats).....	251

Table 172 - SMI Referenced Properties/Methods for CIM_ElementStatisticalData (Exporting Port Stats).....	251
Table 173 - SMI Referenced Properties/Methods for CIM_ElementStatisticalData (Local Filesystem Stats).....	252
Table 174 - SMI Referenced Properties/Methods for CIM_ElementStatisticalData (OTHER Element Type Stats).....	252
Table 175 - SMI Referenced Properties/Methods for CIM_HostedCollection (Client Defined).....	253
Table 176 - SMI Referenced Properties/Methods for CIM_HostedCollection (Default).....	253
Table 177 - SMI Referenced Properties/Methods for CIM_HostedCollection (Provider Supplied).....	254
Table 178 - SMI Referenced Properties/Methods for CIM_HostedService.....	254
Table 179 - SMI Referenced Properties/Methods for CIM_MemberOfCollection (Member of client defined collection).....	254
Table 180 - SMI Referenced Properties/Methods for CIM_MemberOfCollection (Member of predefined collection).....	255
Table 181 - SMI Referenced Properties/Methods for CIM_MemberOfCollection (Member of statistics collection).....	255
Table 182 - SMI Referenced Properties/Methods for CIM_StatisticsCollection.....	256
Table 183 - SMI Referenced Properties/Methods for SNIA_AssociatedFileSystemStatisticsManifestCollection (Client defined collection).....	256
Table 184 - SMI Referenced Properties/Methods for SNIA_AssociatedFileSystemStatisticsManifestCollection (Provider defined collection).....	257
Table 185 - SMI Referenced Properties/Methods for SNIA_FileSystemStatisticalData.....	257
Table 186 - SMI Referenced Properties/Methods for SNIA_FileSystemStatisticsCapabilities.....	260
Table 187 - SMI Referenced Properties/Methods for SNIA_FileSystemStatisticsManifest (Client Defined).....	261
Table 188 - SMI Referenced Properties/Methods for SNIA_FileSystemStatisticsManifest (Provider Support).....	262
Table 189 - SMI Referenced Properties/Methods for SNIA_FileSystemStatisticsManifestCollection (Client Defined).....	263
Table 190 - SMI Referenced Properties/Methods for SNIA_FileSystemStatisticsManifestCollection (Provider Defined).....	264
Table 191 - SMI Referenced Properties/Methods for SNIA_FileSystemStatisticsService.....	265
Table 192 - Related Profiles for FileSystem Quotas.....	267
Table 193 - CIM Elements for FileSystem Quotas.....	279
Table 194 - SMI Referenced Properties/Methods for SNIA_FSDomainIdentity.....	280
Table 195 - SMI Referenced Properties/Methods for SNIA_FSQuotaAppliesToElement.....	281
Table 196 - SMI Referenced Properties/Methods for SNIA_FSQuotaAppliesToPrincipal.....	281
Table 197 - SMI Referenced Properties/Methods for SNIA_FSQuotaAppliesToTree.....	281
Table 198 - SMI Referenced Properties/Methods for SNIA_FSQuotaCapabilities.....	282
Table 199 - SMI Referenced Properties/Methods for SNIA_FSQuotaConfigEntry.....	282
Table 200 - SMI Referenced Properties/Methods for SNIA_FSQuotaIndication.....	283
Table 201 - SMI Referenced Properties/Methods for SNIA_FSQuotaManagementService.....	284
Table 202 - SMI Referenced Properties/Methods for SNIA_FSQuotaReportRecord.....	284
Table 203 - Related Profiles for NAS Head.....	286
Table 204 - InstModification Events for ComputerSystem.....	294
Table 205 - InstModification Events for LogicalDisk.....	295
Table 206 - Bellwether AlertIndication Events for ComputerSystem.....	295
Table 207 - Bellwether AlertIndication Events for LogicalDisk.....	296
Table 208 - Standard Messages used by NAS Head.....	296
Table 209 - CIM Elements for NAS Head.....	298
Table 210 - SMI Referenced Properties/Methods for CIM_ComputerSystem (Top Level System).....	300
Table 211 - SMI Referenced Properties/Methods for CIM_ComputerSystem (Virtual File Server).....	301
Table 212 - SMI Referenced Properties/Methods for CIM_ConcreteComponent.....	302
Table 213 - SMI Referenced Properties/Methods for CIM_HostedDependency.....	302
Table 214 - SMI Referenced Properties/Methods for CIM_LogicalDisk (LD for FS).....	302

Table 215 - SMI Referenced Properties/Methods for CIM_StorageExtent (Primordial).....	304
Table 216 - SMI Referenced Properties/Methods for CIM_SystemDevice (Logical Disks)	305
Table 217 - SMI Referenced Properties/Methods for CIM_SystemDevice (Storage Extents)	306
Table 218 - Related Profiles for Self-contained NAS System	307
Table 219 - InstModification Events for ComputerSystem	312
Table 220 - InstModification Events for LogicalDisk	313
Table 221 - Bellwether AlertIndication Events for ComputerSystem	313
Table 222 - Bellwether AlertIndication Events for LogicalDisk.....	314
Table 223 - Standard Messages used by NAS Head	314
Table 224 - CIM Elements for Self-contained NAS System.....	315
Table 225 - SMI Referenced Properties/Methods for CIM_ComputerSystem (Top Level System)	316
Table 226 - SMI Referenced Properties/Methods for CIM_ComputerSystem (Virtual File Server)	317
Table 227 - SMI Referenced Properties/Methods for CIM_HostedDependency	318
Table 228 - SMI Referenced Properties/Methods for CIM_LogicalDisk (Disk for FS)	319
Table 229 - SMI Referenced Properties/Methods for CIM_SystemDevice (Logical Disks)	320
Table 230 - Related Profiles for NAS Network Port	321
Table 231 - InstModification Events for NetworkPort.....	325
Table 232 - InstModification Events for ProtocolEndpoint	325
Table 233 - Bellwether AlertIndication Events for NetworkPort	326
Table 234 - NetworkPort OperationalStatus	326
Table 235 - ProtocolEndpoint OperationalStatus.....	326
Table 236 - Standard Messages used by NAS Head	327
Table 237 - CIM Elements for NAS Network Port	328
Table 238 - SMI Referenced Properties/Methods for CIM_BindsTo (CIFS or NFS).....	330
Table 239 - SMI Referenced Properties/Methods for CIM_BindsTo (TCP)	331
Table 240 - SMI Referenced Properties/Methods for CIM_BindsToLANEndpoint.....	331
Table 241 - SMI Referenced Properties/Methods for CIM_DeviceSAPImplementation (CIFS or NFS to NetworkPort)	331
Table 242 - SMI Referenced Properties/Methods for CIM_DeviceSAPImplementation (LANEndpoint to NetworkPort).....	332
Table 243 - SMI Referenced Properties/Methods for CIM_ElementSettingData (IPInterfaceSettingData to IPProtocolEndpoint).....	332
Table 244 - SMI Referenced Properties/Methods for CIM_HostedAccessPoint (CIFS or NFS).....	332
Table 245 - SMI Referenced Properties/Methods for CIM_HostedAccessPoint (IP)	333
Table 246 - SMI Referenced Properties/Methods for CIM_HostedAccessPoint (LAN)	333
Table 247 - SMI Referenced Properties/Methods for CIM_HostedAccessPoint (TCP)	333
Table 248 - SMI Referenced Properties/Methods for CIM_IPProtocolEndpoint	334
Table 249 - SMI Referenced Properties/Methods for CIM_LANEndpoint.....	335
Table 250 - SMI Referenced Properties/Methods for CIM_MemberOfCollection (The IPProtocolEndpoint to NetworkVLAN)	336
Table 251 - SMI Referenced Properties/Methods for CIM_NetworkPort	337
Table 252 - SMI Referenced Properties/Methods for CIM_NetworkVLAN	338
Table 253 - SMI Referenced Properties/Methods for CIM_ProtocolEndpoint (CIFS or NFS).....	338
Table 254 - SMI Referenced Properties/Methods for CIM_SystemDevice (Network Ports)	339
Table 255 - SMI Referenced Properties/Methods for CIM_TCPProtocolEndpoint	340
Table 256 - SMI Referenced Properties/Methods for SNIA_IPInterfaceSettingData	341
Table 257 - Related Profiles for Host Filesystem.....	342
Table 258 - Discovery of the Filesystem Volumes	348
Table 259 - Expansion of a Filesystem	349
Table 260 - Replication of a Filesystem	349
Table 261 - Quiesce a Filesystem.....	350
Table 262 - Unquiesce a Filesystem.....	350
Table 263 - Filesystem quiesce timeout.....	351

Table 264 - Retrieve File Information.....	351
Table 265 - CIM Elements for Host Filesystem.....	352
Table 266 - SMI Referenced Properties/Methods for CIM_ComputerSystem (Shadow).....	354
Table 267 - SMI Referenced Properties/Methods for CIM_Dependency (Systems).....	355
Table 268 - SMI Referenced Properties/Methods for CIM_ElementCapabilities (FS Configuration Capabilities).....	355
Table 269 - SMI Referenced Properties/Methods for CIM_ElementConformsToProfile (FilesystemConfigurationService to Host Filesystem RegisteredProfile).....	355
Table 270 - SMI Referenced Properties/Methods for CIM_FilterCollection (Host Filesystem Predefined FilterCollection).....	356
Table 271 - SMI Referenced Properties/Methods for CIM_HostedCollection (Allocated Resources).....	356
Table 272 - SMI Referenced Properties/Methods for CIM_HostedCollection (Host Filesystem to predefined FilterCollection).....	357
Table 273 - SMI Referenced Properties/Methods for CIM_HostedCollection (Remote Resources).....	357
Table 274 - SMI Referenced Properties/Methods for CIM_HostedService.....	357
Table 275 - SMI Referenced Properties/Methods for CIM_IndicationFilter (Extent OperationalStatus).....	358
Table 276 - SMI Referenced Properties/Methods for CIM_IndicationFilter (System OperationalStatus).....	359
Table 277 - SMI Referenced Properties/Methods for CIM_LogicalDisk (Shadow).....	360
Table 278 - SMI Referenced Properties/Methods for CIM_LogicalFile.....	361
Table 279 - SMI Referenced Properties/Methods for CIM_LogicalIdentity (LogicalDisk).....	362
Table 280 - SMI Referenced Properties/Methods for CIM_MemberOfCollection (Allocated Resources).....	362
Table 281 - SMI Referenced Properties/Methods for CIM_MemberOfCollection (Predefined Filter Collection to Host Filesystem Filters).....	362
Table 282 - SMI Referenced Properties/Methods for CIM_MemberOfCollection (Remote Resources).....	363
Table 283 - SMI Referenced Properties/Methods for CIM_RemoteServiceAccessPoint (Shadow).....	363
Table 284 - SMI Referenced Properties/Methods for CIM_ResidesOnExtent.....	363
Table 285 - SMI Referenced Properties/Methods for CIM_SAPAvailableForElement.....	364
Table 286 - SMI Referenced Properties/Methods for CIM_ServiceAffectsElement.....	364
Table 287 - SMI Referenced Properties/Methods for CIM_StorageExtent (Primordial Imported Extent).....	364
Table 288 - SMI Referenced Properties/Methods for CIM_SystemDevice (LogicalDisks).....	365
Table 289 - SMI Referenced Properties/Methods for SNIA_AllocatedResources.....	366
Table 290 - SMI Referenced Properties/Methods for SNIA_FileSystemConfigurationCapabilities.....	366
Table 291 - SMI Referenced Properties/Methods for SNIA_FileSystemConfigurationService.....	367
Table 292 - SMI Referenced Properties/Methods for SNIA_LocalFileSystem.....	367
Table 293 - SMI Referenced Properties/Methods for SNIA_RemoteResources.....	369
Table 294 - Operational Status for Remote Copy In Progress.....	376
Table 295 - Operational Status for Ongoing Copy.....	376
Table 296 - Supported Profiles for Filesystem Remote Copy Services.....	377
Table 297 - Parameters for Extrinsic Method FilesystemRemoteCopyConfigurationService.CreateOneTimeCopy.....	377
Table 298 - Parameters for Extrinsic Method FilesystemRemoteCopyConfigurationService.CreateOngoingCopy.....	378
Table 299 - Parameters for Extrinsic Method RemoteCopyInProgress.Complete.....	378
Table 300 - Parameters for Extrinsic Method RemoteCopyInProgress.Abort.....	379
Table 301 - Parameters for Extrinsic Method RemoteCopyInProgress.Restart.....	379
Table 302 - Parameters for Extrinsic Method OngoingCopy.Start.....	380
Table 303 - Parameters for Extrinsic Method OngoingCopy.Restart.....	380
Table 304 - Parameters for Extrinsic Method OngoingCopy.Remove.....	381

Table 305 - Parameters for Extrinsic Method OngoingCopy.Remove	381
Table 306 - Copy a Filesystem to a Remote System.....	382
Table 307 - Restart a Faulted Filesystem Remote Copy	383
Table 308 - Abort a Faulted Filesystem Remote Copy	384
Table 309 - Maintain an Ongoing Copy of a Filesystem on a Remote System.....	384
Table 310 - Modify Quality of Service Parameters for a Filesystem Copy Relationship	385
Table 311 - Remove a Filesystem Copy Relationship to a Remote System.....	385
Table 312 - CIM Elements for Filesystem Remote Copy Services	386
Table 313 - SMI Referenced Properties/Methods for CIM_ElementCapabilities (FileSystemRemoteCopyCon- figurationService to FileSystemRemoteCopyConfigurationCapabilities)	387
Table 314 - SMI Referenced Properties/Methods for SNIA_FileSystemCopyRemoteSystem	387
Table 315 - SMI Referenced Properties/Methods for SNIA_FileSystemOneTimeCopySettings	388
Table 316 - SMI Referenced Properties/Methods for SNIA_FileSystemOngoingCopySettings	389
Table 317 - SMI Referenced Properties/Methods for SNIA_FileSystemRemoteCopyConfigurationCapabilities	389
Table 318 - SMI Referenced Properties/Methods for SNIA_FileSystemRemoteCopyConfigurationService	391
Table 319 - SMI Referenced Properties/Methods for SNIA_OngoingCopy	391
Table 320 - SMI Referenced Properties/Methods for SNIA_OngoingCopyQosSettingsData	392
Table 321 - SMI Referenced Properties/Methods for SNIA_RemoteCopyInProgress	393

This document is a preview generated by EVS

**INFORMATION TECHNOLOGY –
STORAGE MANAGEMENT –
Part 5: Filesystems**

FOREWORD

- 1) ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, 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.
- 2) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees and ISO member bodies.
- 3) IEC, ISO and ISO/IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO, IEC or ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.
- 5) ISO and IEC do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. ISO or IEC are not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC National Committees or ISO member bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication of, use of, or reliance upon, this ISO/IEC Publication or any other IEC, ISO or ISO/IEC publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this ISO/IEC Publication may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 24775-5 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This International Standard, together with ISO/IEC 24775-1 to ISO/IEC 24775-4 and ISO/IEC 24775-6 to ISO/IEC 24775-8, replaces ISO/IEC 24775, second edition, published in 2011, and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition.

The list of all currently available parts of the ISO/IEC 24775 series, under the general title *Information technology – Storage management*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

This document is a preview generated by EVS

Introduction

The Filesystems part of ISO/IEC 24775 contains profiles and other clauses for management of devices and programs that support filesystems. A filesystem is a specific formatting of storage for storing and accessing files on external storage. This part describes how filesystems are created, modified and deleted, as well as how they can be found and reported. This part also describe modeling for how filesystems are exported for access from remote systems. The filesystem profiles use information from other parts of ISO/IEC 24775. Specifically, they reference profiles in the Common Profiles and the Block Devices parts of the standard. This part describes how these profiles are used in filesystem profiles.

Parts of this Standard

This International Standard is subdivided into the following parts:

- *Information technology – Storage management – Part 1: Overview*
- *Information technology – Storage management – Part 2: Common architecture*
- *Information technology – Storage management – Part 3: Common profiles*
- *Information technology – Storage management – Part 4: Block devices*
- *Information technology – Storage management – Part 5: Filesystems*
- *Information technology – Storage management – Part 6: Fabric*
- *Information technology – Storage management – Part 7: Host elements*
- *Information technology – Storage management – Part 8: Media libraries*

Changes since the Last Edition

This third edition cancels and replaces the second edition published in 2011 and constitutes a technical revision. This edition includes the following significant changes with respect to the previous edition. The changes fall into three broad categories:

- **Improved organization.** The International Standard has been reorganized into eight parts to provide more information more easily. The parts are:
 - *Part 1 Overview:* The overview book provides a high level overview of the standard.
 - *Part 2 Common Architecture:* This part covers general information about the interface, such as security and protocols.
 - *Part 3 Common Profiles:* This part covers component profiles that extend profiles in other books, such as target ports and job control.
 - *Part 4 Block Devices:* This part covers storage profiles that support various forms of disk storage.
 - *Part 5 Filesystems:* This part covers profiles that support filesystems, such as NAS (Network Attached Storage).
 - *Part 6 Fabric:* This part covers profiles that deal with interconnection of host servers and storage devices, such as switches.
 - *Part 7 Host Elements:* This part covers profiles for storage software on host servers, such as disk partitioning and Host Hardware RAID controllers.
 - *Part 8 Media Libraries:* This part covers profiles that deal with removable media such as tape libraries.
- **Maturity identification.** As material is added to the standard it goes through various stages of maturity. The initial stage is *Experimental*, which is material that has not yet been implemented and is subject to change. The other stages indicate the degree of implementations. The stages are:
 - **Experimental:** Full design review, no commercial implementations.
 - **Implemented:** Initial implementations available, may be removed at minor revision.

- **Stable:** Three or more vendors have implemented the identified material, backward compatibility assured, removed only at major revision.
- **Finalized:** Relies solely on Finalized content, deprecated only at major revision.
- **Deprecated:** Obsolete material, may be removed in future revisions.
For a more detailed explanation of each maturity level and its typographical indication, see Clause 4 Typographical Conventions.
- **Expanded scope.** The range of SAN components modeled by the profiles defined in the parts has been greatly expanded.
 - New profiles include:
 - *Part 3 Common Profiles:* Serial Attached SCSI (SAS) Target Port, Serial ATA (SATA) Target Ports, SB Target Port, SAS Initiator Ports, ATA Initiator Ports, FC-SB-x Initiator Ports, FCoE Initiator Ports, Power Supply, Fan, Sensors, Base Server, Media Access Device, Storage Enclosure, Software Inventory, Profile Registration, Proxy Server System Management, Operational Power.
 - *Part 4 Block Devices:* Block Storage Views, CKD Block Services, Erasure, Storage Server Asymmetry, Volume Composition, Storage Element Protection, Replication Services, Pools from Volumes, Group Masking and Mapping, Thin Provisioning.
 - *Part 5 Filesystems:* File Export, File Server Manipulation, File Storage, Filesystem, Filesystem Copy Services, Filesystem Performance, Filesystem Quotas, NAS Network Port, Host Filesystem, Filesystem Remote Copy Services.
 - *Part 6 Fabric:* Fibre Channel Security, Fabric Views, Virtual Fabrics, Switch Partitioning, SAS Expander, N Port Virtualizer, Inter Fabric Routing.
 - *Part 7 Host Elements:* Storage HBA, Host Hardware RAID Controller.
 - *Part 8 Media Libraries:* Partitioned Tape Library, Virtual Tape Library, Virtual Tape Library Copy and Library Views.
 - The following experimental profiles were removed from the International Standard:
 - *Part 3 Common Profiles:* Security, 3rd Party Authentication, Authorization, Credential Management, Identity Management, Security Role Based Access Control and Security Resource Ownership.
 - *Part 4 Block Devices:* Pool Management Policy.
 - The following profiles were deprecated:
 - *Part 3 Common Profiles:* Cascading (replaced by direct use of cascading classes).
 - *Part 4 Block Devices:* Volume Management (and not replaced).
 - *Part 6 Fabric:* Router (and not replaced).
 - *Part 7 Host Elements:* FC HBA (replaced by Storage HBA), SB Multipath Management (and not replaced).
 - *Part 8 Media Libraries:* InterLibraryPort Connection (and not replaced).
 - In addition, many of the existing profiles have been enhanced.

This International Standard was prepared by the SNIA (Storage Networking Industry Association)¹. The standard is often referred to as **SMI-S** (*Storage Management Initiative Specification*).

1. Storage Networking Industry Association, 425 Market Street, Suite 1020, San Francisco, CA 94105, U.S.A., <http://www.snia.org>

INFORMATION TECHNOLOGY – STORAGE MANAGEMENT – Part 5: Filesystems

1 Scope

This part of ISO/IEC 24775 defines management profiles for Autonomous (top level) profiles for programs and devices whose central function is providing support and access to file data. In addition, it provides documentation of component profiles (or subprofiles) that deal with filesystems and management interface functions that may be used by other autonomous profiles not included in this part of the standard.

There is an informative annex that describes how storage is mapped from block storage to file shares exported by the filesystem and the mechanisms involved in establishing those mappings. This annex is recommended for getting an overview of how the filesystem models work.

This part of ISO/IEC 24775 includes two autonomous profiles:

- The NAS Head Profile

This profile defines the model and functions of a NAS device that exports file shares to remote users and gets its storage from a SAN (array devices attached to the NAS Head device).

- The Self-Contained NAS Profile

This profile defines the model and functions of a NAS device that exports file shares to remote users, but gets its storage from disk drives that are internal to the NAS device (instead of externally attached arrays).

In addition to these autonomous profiles, this standard defines a number of component profiles, which are used by the autonomous NAS profiles and might also be used by other autonomous profiles that feature filesystem elements and services. The component profiles (subprofiles) defined in this version of the standard include:

- The File Export (component) Profile

This component profile defines the elements used to model the exporting of filesystems or directories for any autonomous profile that exports file data to remote systems.

- The File Export Manipulation (component) Profile

This component profile defines the elements used to model the services for creating, modifying and deleting the file shares (the representation of exported filesystems or directories) for any autonomous profile that provides manipulation of exported filesystems or directories.

- The File Storage (component) Profile

This component profile defines the elements used to model the storage of filesystems on logical disks. This profile does not have services for maintaining the mapping of filesystems to logical disks. These services are addressed in the Filesystem Manipulation Profile.

- The Filesystem (component) Profile

This component profile defines the elements used to model filesystems and its related elements, such as logical files, directories and information on how the filesystem is addressed when mounted to a specific system. The services for defining and maintaining the information in the Filesystem Profile are contained in the Filesystem Manipulation Profile.

- The Filesystem Manipulation (component) Profile

This component profile defines the elements used to model the services for creating, modifying and deleting filesystems and their related elements.

- The Filesystem Quotas (component) Profile

This component profile defines the elements used to model the elements associated with creating, maintaining and reporting on quotas on various filesystem elements.

2 Normative references

The following documents, in whole or in part, are normatively referenced in the document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document, including any amendments, applies.

ISO/IEC 24775-2:2014, *Information technology – Storage management – Part 2: Common architecture*

ISO/IEC 24775-3:2014, *Information technology – Storage management – Part 3 Common profiles*

ISO/IEC 24775-4:2014, *Information technology – Storage management – Part 4 Block devices*