
**Information technology — Storage
management —**

Part 6:
Fabric



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Published in Switzerland

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by SNIA (as Storage Management Technical Specification, Part 6 Fabric, Version 1.8.0, Revision 5) and drafted in accordance with its editorial rules. It was adopted, under the JTC 1 PAS procedure, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This second edition cancels and replaces the first edition (ISO/IEC 24775-6:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

- USAGE text was revised to address code (now included in the front matter for all SNIA specifications)
- All recipes and their references were deleted.
- Instances of subprofile were changed to profile. In the annex, instances of subprofile were changed to component profile (TSG meeting voice vote).
- Profile versions and related text were updated. (TSG meeting voice vote).
- Indications have been replaced by DMTF Indications, and all affected clauses updated. (TSG meeting voice vote).
- Instances of Experimental within profiles already labeled as Experimental were removed to avoid confusion and redundancy. (Editorial change)
- CIM/XML was changed to CIM-XML (Response to ballot comments).

- Annex: SMI-S Information Model.
- The CIM schema version was changed to 2.51 for V1.8.0 Rev3.
- Blades Profile
 - Added descriptions for References in CIM_ProductPhysicalComponent.
 - Changed the version to 1.7.0.
- Enhanced Zoning and Enhanced Zoning Control Profile (SMI TWG Reviews)
 - Fixed the version numbers on the Related Profiles to match what the profiles claim.
- Fabric Profile
 - Corrected the Related Profile for FabricVirtualFabrics to be Virtual Fabrics.
 - Fixed the version numbers on the Related Profiles to match what the profiles claim.
 - Deleted the MemberOfCollections in the CIM Elements for the filter collections that were deleted.
 - Defined the condition for Peer Zoning in CIM_ZoneSettingData ZoneMembershipSettingData to Zone).
- Fabric Views Profile
 - In FCSwitchView changed OperationalStatus to SwitchOperationalStatus and FCPortEnabledState to PortEnabledState.
 - In ConcreteComponentView changed Antecedent and Dependent to GroupComponent and PartComponent.
 - Changed the version of the profile to 1.7.0.
 - Changed the Central Class from FCTopologyView to CIM_ViewCapabilities (TSG-SMIS-SCR00333).
- FCoE Fabric (TSG-SMIS-SCR00331)
 - Reworked the profile to be a component profile of the Fabric Profile.
 - Removed the classes associated with experimental indications.
 - Added a definition of CIM_EthernetPort (which was missing).
 - Fixed a number of mifgen warnings.
- FDMI Profile
 - Changed the version of the Profile to be 1.8.0, since we expanded the Speed enumerations
- Inter Fabric Routing Profile
 - Added a SystemDevice between the IFR Switch and the IFR FCPort.
 - Changed the Profile version to 1.7.0.
 - Changed the Central Class from ComputerSystem to CIM_ComputerSystem (IFR Switch) (TSG-SMIS-SCR00333).
- N Port Virtualizer Profile
 - Fixed the version numbers on the Related Profiles to match what the profiles claim.
 - Changed the Central Class from FCPort to CIM_FCPort (Fabric NPIV) (TSG-SMIS-SCR00333).

- Switch Partitioning Profile
 - Changed the name of the profile to "Switch Partitioning" to make the spec readable.
 - Changed "must" to "shall" in a number of CIM Element tables.
 - Changed the Central Class from ComputerSystem to CIM_ComputerSystem (Partitioning) (TSG-SMISSCR00333).
- Switch Profile
 - Fixed the version numbers on the Related Profiles to match what the profiles claim.
 - Changed the version of the profile to 1.8.0, due to changes to the enumeration of the Speed property.
 - Removed the Switch Configuration Data profile from Related Profiles table, since it has been removed from the spec.
 - Changed the name of the FabricSwitchPartitioning Profile to Switch Partitioning in the Related Profiles table.
 - Changed the Requirement for CIM_ElementSettingData (FCSwitchSettings to ComputerSystem) to Mandatory, since FCSwitchSettings and the Switch are Mandatory.
- Virtual Fabrics Profile
 - Changed the name of the profile to "Virtual Fabrics" to make the spec readable.
- Zone Control Profile
 - Changed the version of the Profile to be 1.8.0, since we added two methods.
- Annex B (Informative) Structure of Fabric Profiles (TSG-SMIS-SCR00331)
 - Updated Figure B.1 to show how FCoE Fabrics fits into the structure of Fabric profiles.
- References
 - Added DMTF DSP1054 v1.2.2, Indications Profile (and changed to V1.2.2 throughout book).
 - Removed SPC-2.
 - Moved SPC-3 reference from 2.2 to 2.1.

A list of all parts in the ISO/IEC 24775 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

INTENDED AUDIENCE

This document is intended for use by individuals and companies engaged in developing, deploying, and promoting interoperable multi-vendor SANs through the Storage Networking Industry Association (SNIA) organization.

CHANGES TO THE SPECIFICATION

Each publication of this specification is uniquely identified by a three-level identifier, comprised of a version number, a release number and an update number. The current identifier for this specification is version 1.8.0. Future publications of this specification are subject to specific constraints on the scope of change that is permissible from one publication to the next and the degree of interoperability and backward compatibility that should be assumed between products designed to different publications of this standard. The SNIA has defined three levels of change to a specification:

- **Major Revision:** A major revision of the specification represents a substantial change to the underlying scope or architecture of the SMI-S API. A major revision results in an increase in the version number of the version identifier (e.g., from version 1.x.x to version 2.x.x). There is no assurance of interoperability or backward compatibility between releases with different version numbers.
- **Minor Revision:** A minor revision of the specification represents a technical change to existing content or an adjustment to the scope of the SMI-S API. A minor revision results in an increase in the release number of the specification's identifier (e.g., from x.1.x to x.2.x). Minor revisions with the same version number preserve interoperability and backward compatibility.
- **Update:** An update to the specification is limited to minor corrections or clarifications of existing specification content. An update will result in an increase in the third component of the release identifier (e.g., from x.x.1 to x.x.2). Updates with the same version and minor release levels preserve interoperability and backward compatibility.

TYPOGRAPHICAL CONVENTIONS

Maturity Level

In addition to informative and normative content, this specification includes guidance about the maturity of emerging material that has completed a rigorous design review but has limited implementation in commercial products. This material is clearly delineated as described in the following sections. The typographical convention is intended to provide a sense of the maturity of the affected material, without altering its normative content. By recognizing the relative maturity of different sections of the standard, an implementer should be able to make more informed decisions about the adoption and deployment of different portions of the standard in a commercial product.

This specification has been structured to convey both the formal requirements and assumptions of the SMI-S API and its emerging implementation and deployment lifecycle. Over time, the intent is that all content in the specification will represent a mature and stable design, be verified by extensive implementation experience, assure consistent support for backward compatibility, and rely solely on content material that has reached a similar level of maturity. Unless explicitly labeled with one of the subordinate maturity levels defined for this specification, content is assumed to satisfy these requirements and is referred to as "Finalized". Since much of the evolving specification

content in any given release will not have matured to that level, this specification defines three subordinate levels of implementation maturity that identify important aspects of the content's increasing maturity and stability. Each subordinate maturity level is defined by its level of implementation experience, its stability and its reliance on other emerging standards. Each subordinate maturity level is identified by a unique typographical tagging convention that clearly distinguishes content at one maturity model from content at another level.

Experimental Maturity Level

No material is included in this document unless its initial architecture has been completed and reviewed. Some content included in this document has complete and reviewed design, but lacks implementation experience and the maturity gained through implementation experience. This content is included in order to gain wider review and to gain implementation experience. This material is referred to as “Experimental”. It is presented here as an aid to implementers who are interested in likely future developments within the SMI specification. The contents of an Experimental profile may change as implementation experience is gained. There is a high likelihood that the changed content will be included in an upcoming revision of the specification. Experimental material can advance to a higher maturity level as soon as implementations are available. Figure 1 is a sample of the typographical convention for Experimental content.

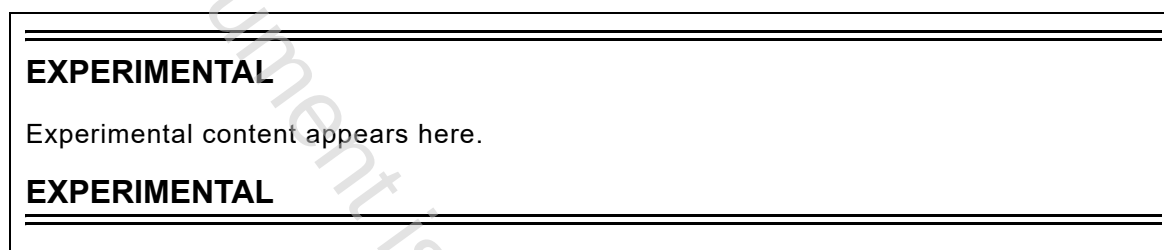


Figure 1 - Experimental Maturity Level Tag

Implemented Maturity Level

Profiles for which initial implementations have been completed are classified as “Implemented”. This indicates that at least two different vendors have implemented the profile, including at least one provider implementation. At this maturity level, the underlying architecture and modeling are stable, and changes in future revisions will be limited to the correction of deficiencies identified through additional implementation experience. Should the material become obsolete in the future, it must be deprecated in a minor revision of the specification prior to its removal from subsequent releases. Figure 2 is a sample of the typographical convention for Implemented content.

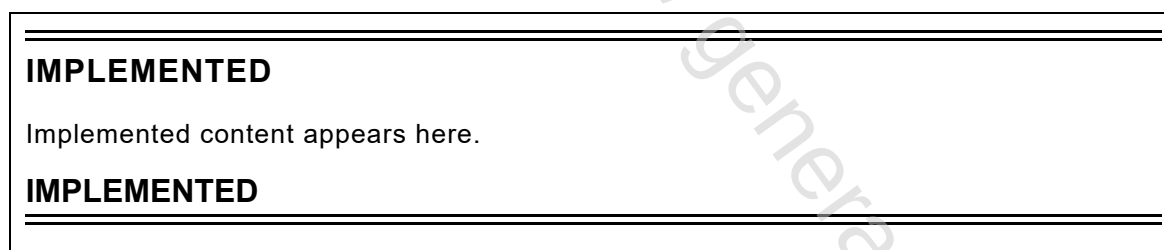


Figure 2 - Implemented Maturity Level Tag

Stable Maturity Level

Once content at the Implemented maturity level has garnered additional implementation experience, it can be tagged at the Stable maturity level. Material at this maturity level has been implemented by three different vendors, including both a provider and a client. Should material that has reached this maturity level become obsolete, it may only be deprecated as part of a minor revision to the specification. Material at this maturity level that has been deprecated may only be removed from the specification as part of a major revision. A profile that has reached this maturity level is guaranteed to preserve backward compatibility from one minor specification revision to the next. As a result, Profiles at or above the Stable

maturity level shall not rely on any content that is Experimental. Figure 3 is a sample of the typographical convention for Implemented content.

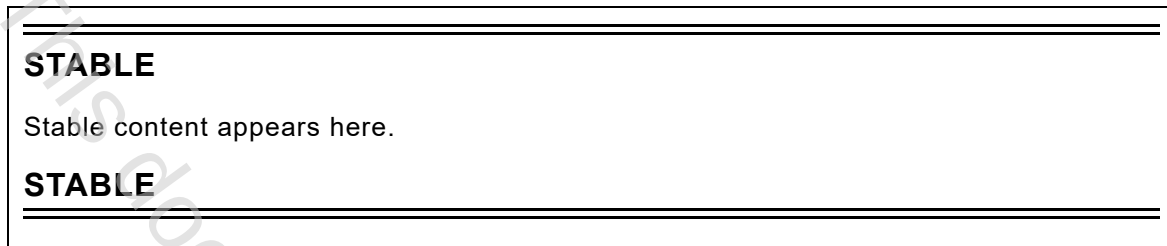


Figure 3 - Stable Maturity Level Tag

Finalized Maturity Level

Content that has reached the highest maturity level is referred to as “Finalized.” In addition to satisfying the requirements for the Stable maturity level, content at the Finalized maturity level must solely depend upon or refine material that has also reached the Finalized level. If specification content depends upon material that is not under the control of the SNIA, and therefore not subject to its maturity level definitions, then the external content is evaluated by the SNIA to assure that it has achieved a comparable level of completion, stability, and implementation experience. Should material that has reached this maturity level become obsolete, it may only be deprecated as part of a major revision to the specification. A profile that has reached this maturity level is guaranteed to preserve backward compatibility from one minor specification revision to the next. Over time, it is hoped that all specification content will attain this maturity level. Accordingly, there is no special typographical convention, as there is with the other, subordinate maturity levels. Unless content in the specification is marked with one of the typographical conventions defined for the subordinate maturity levels, it should be assumed to have reached the Finalized maturity level.

Deprecated Material

Non-Experimental material can be deprecated in a subsequent revision of the specification. Sections identified as “Deprecated” contain material that is obsolete and not recommended for use in new development efforts. Existing and new implementations may still use this material, but shall move to the newer approach as soon as possible. The maturity level of the material being deprecated determines how long it will continue to appear in the specification. Implemented content shall be retained at least until the next revision of the specialization, while Stable and Finalized material shall be retained until the next major revision of the specification. Providers shall implement the deprecated elements as long as it appears in the specification in order to achieve backward compatibility. Clients may rely on deprecated elements, but are encouraged to use non-deprecated alternatives when possible.

Deprecated sections are documented with a reference to the last published version to include the deprecated section as normative material and to the section in the current specification with the replacement. Figure 4 contains a sample of the typographical convention for deprecated content.



Figure 4 - Deprecated Tag

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FOREWORD

The Fabric Part of the *Storage Management Technical Specification* defines management profiles for Autonomous (top level) profiles for programs and devices whose central function is providing support for storage networking. The Fabric Part includes fabric management including topology and device management for switches. The Fabric part also provides management of extenders that pass fibre channel frames over other protocols as well as a gateway that maps and translates iSCSI to Fibre Channel. As part of fabric management, this specification also has controls for fibre channel zoning and fibre channel security.

Parts of this Standard

This standard is subdivided in the following parts:

- *Storage Management Technical Specification, Part 1 Overview, 1.8.0 Rev 4*
- *Storage Management Technical Specification, Part 2 Common Architecture, 1.8.0 Rev 4*
- *Storage Management Technical Specification, Part 3 Common Profiles, 1.8.0 Rev 4*
- *Storage Management Technical Specification, Part 4 Block Devices, 1.8.0 Rev 4*
- *Storage Management Technical Specification, Part 5 Filesystems, 1.8.0 Rev 4*
- *Storage Management Technical Specification, Part 6 Fabric, 1.8.0 Rev 4*
- *Storage Management Technical Specification, Part 7 Host Elements, 1.8.0 Rev 4*
- *Storage Management Technical Specification, Part 8 Media Libraries, 1.8.0 Rev 4*

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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1 Scope

The *Storage Management Technical Specification, Part 6 Fabric* defines management profiles for Autonomous (top level) profiles for programs and devices whose central function is providing support for storage networking. This version of *Storage Management Technical Specification, Part 6 Fabric* includes these autonomous profiles:

- Fabric

This profile defines the model and functions of a storage network including topology and zoning control.

- Switch

This profile defines the model and functions of a Fibre Channel Switch including state, status, and control of the device and its connections and product information,

- Extender

This profile defines the model and functions of a networking device that allows for fibre channel to be extended over other networks, and specifically over IP (FCIP).

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2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

2.1 Approved references

ISO/IEC 14776-452 SCSI Primary Commands - 3 (SPC-3) [ANSI INCITS 408-2005]

2.2 References under development

Storage Management Technical Specification, Part 2 Common Architecture, 1.8.0 Rev 4

Storage Management Technical Specification, Part 3 Common Profiles, 1.8.0 Rev 4

2.3 Other references

DMTF DSP1054 Indications Profile 1.2.2

http://www.dmtf.org/sites/default/files/standards/documents/DSP1054_1.2.2.pdf