

SNIA / DMTF / NVM Express Work Register

Version 1.1

Date Initiated: 12/9/2021

This Work Register is created between the SNIA, DMTF, and NVM Express organizations to formally define the scope, benefits, and deliverables of the alliance. The register helps all organizations coordinate efforts to achieve the stated goals and objectives.

Alliance Organizations

The [Storage Networking Industry Association](#) (SNIA), [DMTF](#), and [NVM Express](#).

Background

The SNIA is an organization which develops and promotes standards, technologies, and educational services to empower the management of information in the storage domain.

The SNIA has been working on the development of Storage related standards based upon DMTF technologies for many years. Much of this work has resulted in contributions back to DMTF, and it has also resulted in the development of ANSI and ISO standards.

DMTF creates open manageability standards spanning diverse emerging and traditional IT infrastructures including cloud, virtualization, network, servers, and storage. Member companies and alliance partners worldwide collaborate on standards to improve the interoperable management of information technologies.

NVM Express® is an open collection of standards and information to fully expose the benefits of non-volatile memory in all types of computing environments from mobile to data center. NVMe™ is designed from the ground up to deliver high bandwidth and low latency storage access for current and future NVMe technologies.

Alliance Organization Assets

The goal of this work register is to coordinate standards for managing different aspects of SSD storage devices.

SNIA has the following standards:

- **Swordfish** - The specification produced by the Scalable Storage Management Technical Work Group (SSM TWG) extends the Redfish Scalable Platforms Management API Specification to cover storage management.
- **Native NVMe-oF Drive Specification** - This specification describes the features and functions of a storage device class known as Native NVMe-oF Drives. It includes a taxonomy covering the scope of involved device capabilities.

DMTF has the following standards:

- **Redfish®** - Designed to meet the expectations of end users for simple and secure management of modern scalable platform hardware, DMTF's Redfish® is an open

industry standard specification and schema that specifies a RESTful interface and utilizes JSON and OData to help customers integrate solutions within their existing tool chains.

- **MCTP/PLDM** - The Management Component Transport Protocol (MCTP) is a protocol and Platform Level Data Model (PLDM) is a low-level data model defined by the DMTF Platform Management Communications Infrastructure (PMCI) working group. MCTP is designed to support communications between different intelligent hardware components that make up a platform management subsystem that provides monitoring and control functions inside a managed system.
- **SPDM** - The Security Protocol and Data Model is a specification that defines messages, data objects, and sequences for performing secured message exchanges between devices over a variety of transport and physical media.
- **RDE** - The PLDM for Redfish Device Enablement (RDE) defines messages and data structures used for enabling PLDM devices to participate in Redfish-based management without needing to support either JavaScript Object Notation (JSON, used for operation data payloads) or the [Secure] Hypertext Transfer Protocol (HTTP/HTTPS, used to transport and configure operations).

NVM Express has the following standards:

- **NVMe-MI** - The NVMe[®] Management Interface (NVMe-MI[™]) specification defines a command set and architecture for out-of-band and in-band management of NVMe storage, making it possible to discover, monitor, configure, and update NVMe devices and NVMe enclosures. The NVMe-MI specification includes features to meet the growing management needs of the NVMe ecosystem.
- **NVMe Base specification** – The NVMe Express[®] Base specification defines how host software communicates with a non-volatile memory subsystem. This interface is optimized for all storage solutions, attached using a variety of transports. The NVMe library of specifications is divided into eight different specifications, including the NVMe Base specification, Command Set specifications, and Transport specifications.
- **NVMe boot specification (to officially be named later)** – defines a transport-agnostic architecture with transport-specific chapters and the ACPI and UEFI semantics needed to adopt booting over remote NVMe namespaces.
- **NVMe Command Set Specifications** - The individual command set specifications allow NVM Express to isolate and independently evolve command sets for emerging technologies such as Zoned Namespaces, Key Value and eventually computational storage. The NVMe specifications before NVMe 2.0 included all command set details. NVMe 2.0 separates these command sets into different specifications.

Alliance Benefits

This alliance provides the following benefits:

- Enables a holistic management experience
- Enables scale out management for NVMe devices, including SSDs
- Ensures that SNIA, NVM Express, and DMTF standards are coordinated and address all storage management requirements, including schema definition and JSON/OData interoperability
- Promotes SNIA, NVM Express, and DMTF standards to member companies
- Fosters SNIA and NVM Express participation at the DMTF Alliance Partner Technical Summit and in various working groups

Activities

The following activities may occur during the duration of this work register:

MCTP 2.0 (Management Component Transport Protocol) suite supports communications between different intelligent hardware components that make up a platform management subsystem that provides monitoring and control functions inside a managed system. The suite includes DSP0239 (MCTP IDs and Codes), DSP0238 (MCTP PCIe VDM Transport Binding Specification), DSP0237 (MCTP SMBus/I2C Transport Binding Specification), DSP0236 (MCTP Base Specification), DSP0235 (NVMe Management Messages over MCTP Binding Specification), DSP0234 (CXL™ Fabric Manager API over MCTP Binding Specification), and DSP0233 (MCTP I3C Transport Binding Specification).

DSP0218 (Platform Level Data Model (PLDM) for Redfish Device Enablement) will specify a binding from platform management to the Redfish and Swordfish mechanisms. The desire is to have standard data, firmware update and vendor specific OEM data all be transported in a common and interoperable manner as well as support for large data transfers.

DSP0267 (Platform Level Data Model (PLDM) Firmware Update) supports firmware updates of devices by using a standard method for obtaining current firmware version details, transferring a new code image to the device, and a consistent packaging format regardless of what type of device is being updated.

The SPDM (Security Protocol and Data Model suite which enables efficient access to low-level security capabilities and operations. DSP0274, the SPDM specification, defines messages, data objects, and sequences for performing message exchanges between devices over a variety of transport and physical media. The description of message exchanges includes authentication and provisioning of hardware identities, measurement for firmware identities, session key exchange protocols to enable confidentiality with integrity protected data communication and other related capabilities. Other members of the suite define mechanisms (e.g., non-PMCI- and DMTF-defined mechanisms) including: DSP0277 (Secured Messages using SPDM Specification), DSP0276 (Secured Messages using SPDM over MCTP Binding Specification), DSP0275 (Security Protocol and Data Model over MCTP Binding Specification).

DMTF will publish updates to the MCTP suite of specifications, Redfish - DSP0218 (covering both the specification and supporting open-source tools), SPDM suite of specifications, PLDM specification, Redfish Schemas, and make available work in

progress releases for use by other organizations. DMTF may extend the Redfish schema for more complete coverage of NVMe Management functionality.

SNIA will publish updates to the Swordfish NVMe Model Overview and Mapping Guide as well as Swordfish specification and schema enhancements, profiles and mockups to reflect detailed requirements for NVMe and NVMe-oF in Redfish / Swordfish. SNIA will publish updates for the Native NVMe-oF Drive Specification to reflect requirements from NVMe and NVMe-oF.

NVM Express may leverage the above work in their specifications.

Limitations

The SNIA, NVM Express and DMTF should preserve both interoperability and backward compatibility, except in major version releases.

Milestones / Dates

NVMe MCTP Binding:

Milestone/Deliverables	Timeframe
Work in Progress release (done)	1H 2018
DSP0235 1.0.1 DMTF Standard (done)	2H 2018

Platform Level Data Model for Redfish Device Enablement:

Milestone/Deliverables	Timeframe
Work in Progress release (done)	Feb 2018
DSP0218 1.0 DMTF Standard (done)	1H 2018

Security Protocol and Data Model (SPDM) Enablement:

Milestone/Deliverables	Timeframe
SPDM 1.2 (done)	Q4 2021
Work in Progress release	Q3 2022
SPDM 1.3	Q4 2022

NVMe Redfish support (working title):

Milestone/Deliverables	Timeframe
Introduce TPAR	Q2 2021
Ratified TP	Q3 2021

NVMe Model:

Milestone/Deliverables	Timeframe
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Swordfish NVMe Model Overview and Mapping Guide (done)	Aug 2020
NVMe Drives profiles (done)	Q3 2021
JBOF/EBOF and array profiles	1H 2022
Updates to Swordfish NVMe Model Overview and Mapping Guide	Ongoing
NVMe-oF Model	1H 2022
NVMe-oF profiles	1H 2022

NVMe Boot support:

Milestone/Deliverables	Timeframe
NVMe Boot Specification – ACPI Boot Firmware Table Format for NVMe-oF (NBFT)	Q2 2022
NVMe Boot Informative Annex	Q2 2022

Native NVMe-oF Drive Specification:

Milestone/Deliverables	Timeframe
Native NVMe-oF Drive Specification	2H 2022

Access

DMTF, SNIA, and the NVM Express may want to provide documentation and collateral to each other. This information can be exchanged publicly as appropriate.

Providing access to documents

- DMTF will provide access to information and specifications available by releasing and posting documents on the public DMTF website. The documents will be released as either “Work-in-Progress”, “Informational”, or “Standard”
- SNIA will share updates & Work in Progress Drafts of the specification, profiles, registries, schema, and supporting documentation produced by the Scalable Storage Management Technical Work Group
- NVM Express: will provide access to information and specifications available by releasing and posting documents on the public NVM Express website.
- NVM Express upon board approval will provide the specifications listed in the NVMe Boot support table to SNIA and DMTF under the SNIA IP policies and under the DMTF policies.

Feedback and contributions which may involve intellectual property:

- NVM Express can submit feedback and contributions to DMTF specifications via the DMTF Technology Submission Portal (dmtof.org/standards/feedback), subject to the terms of the DMTF Intellectual Property Rights Agreement set forth on such portal.

- NVM Express can submit feedback and contributions to SNIA specification through the SNIA Standards Feedback Submission Portal (snia.org/feedback) subject to the SNIA Feedback Contribution Agreement set forth on the portal.
- DMTF and SNIA can submit feedback and contributions to NVM Express specifications and proof-of-concepts through the appropriate NVM Express member company representatives and NVM Express task group members.

The following specifications will be shared by DMTF

- DSP0218 Platform Level Data Model for Redfish Device Enablement
- DSP0267 Platform Level Data Model for Firmware Update
- DSP0236 MCTP Base Specification and supporting specifications
 - DSP0235 NVMe-MI MCTP Binding
 - DSP0237 Management Component Transport Protocol (MCTP) SMBus/I2C Transport Binding Specification
 - DSP0238 MCTP PCIe VDM Transport Binding Specification
 - DSP0239 Management Component Transport Protocol (MCTP) IDs and Codes
 - Any other relevant specifications within the MCTP protocol suite, as needed
- DSP0274 SPDM standard and associated documentation, including work-in-progress releases for use by the NVMe-MI task group and SNIA SSM TWG.

The following specifications will be shared by NVM Express:

- NVMe-MI Specification
- NVMe boot specification (to be officially named later) - ACPI Boot Firmware Table Format NVMe-oF (NBFT) and NVMe boot informative annex

Work Register Review Date

The next review date is expected to be on or before January 2023.

Points of Contact/Primary Alliance Agreement Contacts:

SNIA:

- SNIA Technical Liaison to the DMTF (dmtfliaison@snia.org)
- SNIA Board Liaison to the DMTF (dmtfboardliaison@snia.org)
- SNIA Cross-Marketing Team Chair (cross_marketingteam-chair@snia.org)

DMTF:

- DMTF VP of Alliances (vp-alliances@dmtof.org)
- DMTF Contacts for NVMe-SNIA Alliance (nvme-snia-alliance@dmtof.org)

NVM Express:

- NVMe Technical Working Group Chair (peter.onufryk@intel.com)
- NVMe Management Interface Task Group Chairs (austin.bolen@dell.com, john.geldman@kioxia.com)
- NVMe Boot Task Group Chairs (phil.cayton@intel.com, rdavis@nvidia.com, Douglas.Farley@dell.com)

Corresponding SNIA Document

This document is the official SNIA alliance record.

The document was reviewed and approved by the SNIA Board: January 27, 2022.

Corresponding NVM Express Document

This document is the official NVM Express alliance record.

The document was reviewed and approved by the NVM Express Board of Directors: December 13, 2021.

Approval by the DMTF Board of Directors

Approved by the DMTF Board of Directors; Board Resolution **2022-02-04**, on 2/17/2022.