

STORAGE DEVELOPER CONFERENCE



BY Developers FOR Developers

Virtual Conference
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A SNIA  Event

What's New: SNIA Swordfish™ in 2021

Richelle Ahlvers, Chair, SSM TWG, SMI

Storage Technology Enabling, Intel

What is Swordfish?



- DMTF Redfish™ covers server, data center, fabric management
 - REST API with JSON payloads; choice of CSDL, JSON and YAML schema for development
- SNIA Swordfish™: Storage Management Specification with REST Based API
 - Extends DMTF's Redfish Specification 
- Swordfish adds storage management to all of these use cases, plus storage fabric management:
 - Covers block, file, and object storage
 - Extend traditional storage domain coverage to include converged environments (servers, storage and fabric together)
 - Provides the option for implementation to utilize Class of Service (intent or service level) based provisioning, management, and monitoring

What's New in 2021



- Expanding Functionality:
 - Expanded support for NVMe and NVMe-oF Devices: Through an Alliance partnership with NVM Express®, RF/SF (Redfish and Swordfish) have added NVMe / NVMe oF manageability
 - Managing Storage Fabrics: An alliance partnership with OFA is expanding support in RF/SF for fabrics and storage fabrics management
- Enhanced Documentation
 - NEW: Standardized Capacity and Performance Metrics Management – templates, white paper
 - NEW: Swordfish Property Guide – quick reference for developers
 - Expanded User's Guide, Mapping Guide, Error Handling Guide

Expanding Support for NVMe and NVMe-oF

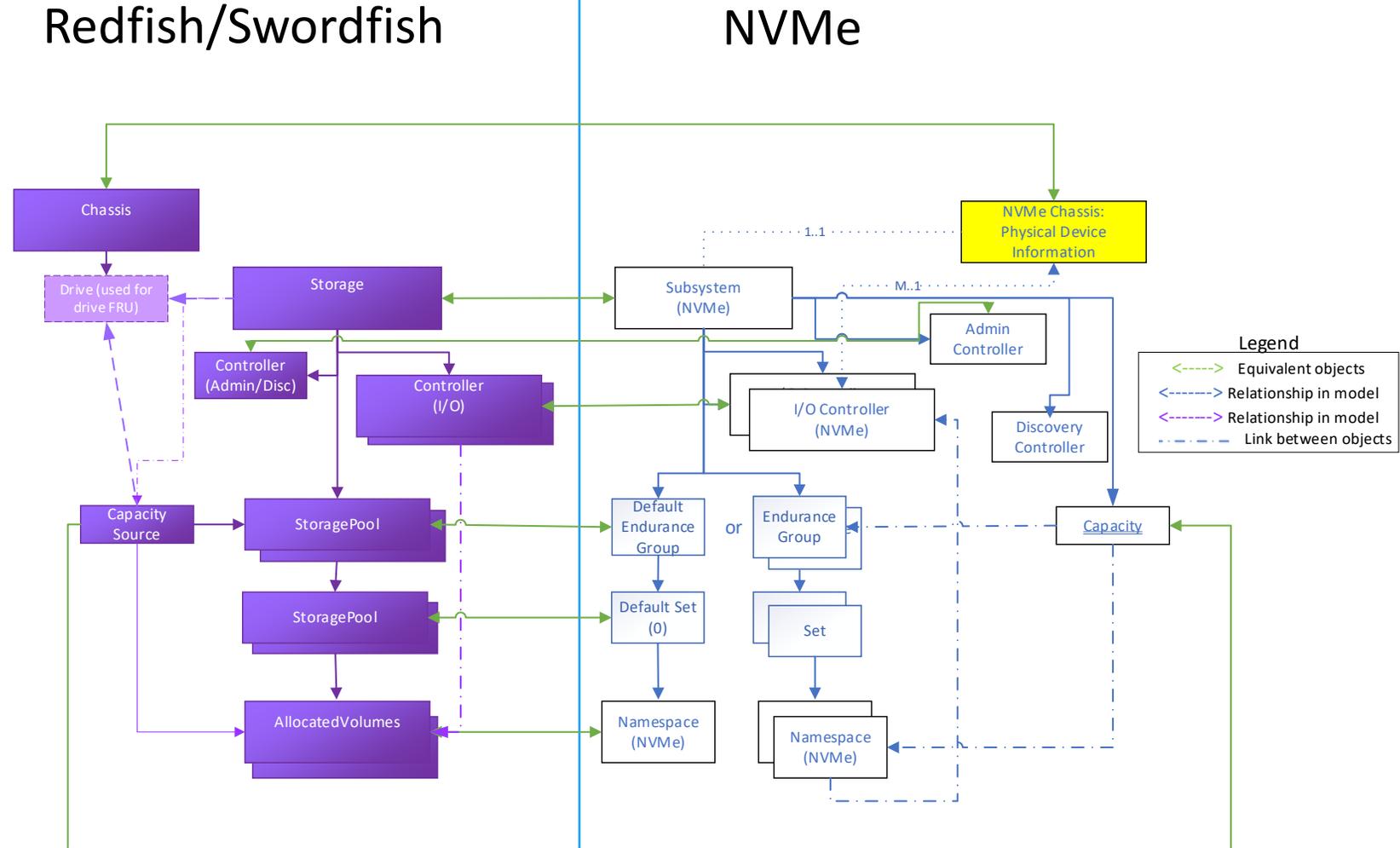
- NVMe model/device support added in v1.2.0+
v1.2.3 available now
- NVMe specific content
 - Spec / schema updates for new properties
 - Updated NVMe specific use cases in User's Guide
 - NVMe Model Overview and Mapping Guide
 - [Detailed descriptions for developers to implement NVMe management interfaces](#)
 - [NVMe and NVMe-oF management models: Models reflect a unified view of all NVMe device types \(universal model\).](#)
 - Mockups: swordfishmockups.com
 - Profiles: NVMe Drives, Ethernet-attached drives, advanced NVMe drive features; NVMe Front-End (used for complex devices such as arrays)
 - [Profiles feed Swordfish Conformance Test Program](#)
 - [CTP Testing available for NVMe Drives](#)
- Coming Soon:
 - Specifications / profiles / mockups / use cases for: NVMe JBOF, NVMe EBOF; NVMe-oF exported logical subsystems
- New releases tracking new NVM Express features

For a deeper dive, check out: Curtis Ballard "Completing the Picture for NVMe and NVMe-oF Management: Guidelines for Implementations"

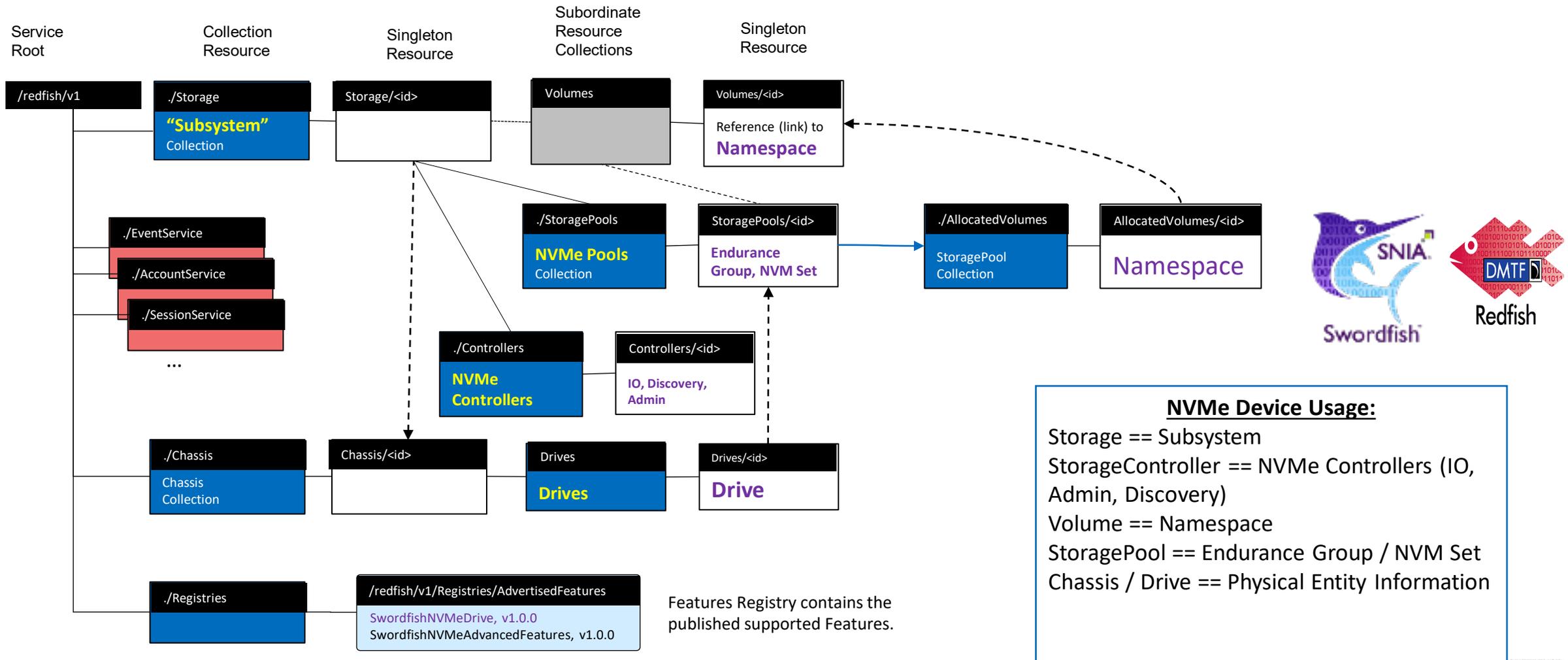
NVMe Functionality

- Mapped NVMe objects to existing RF/SF model
 - NVM Subsystem
 - NVM Controllers (IO, admin, discovery)
 - Namespaces
 - Endurance groups
 - NVM Sets
- Create new objects where needed
 - NVMe Domains

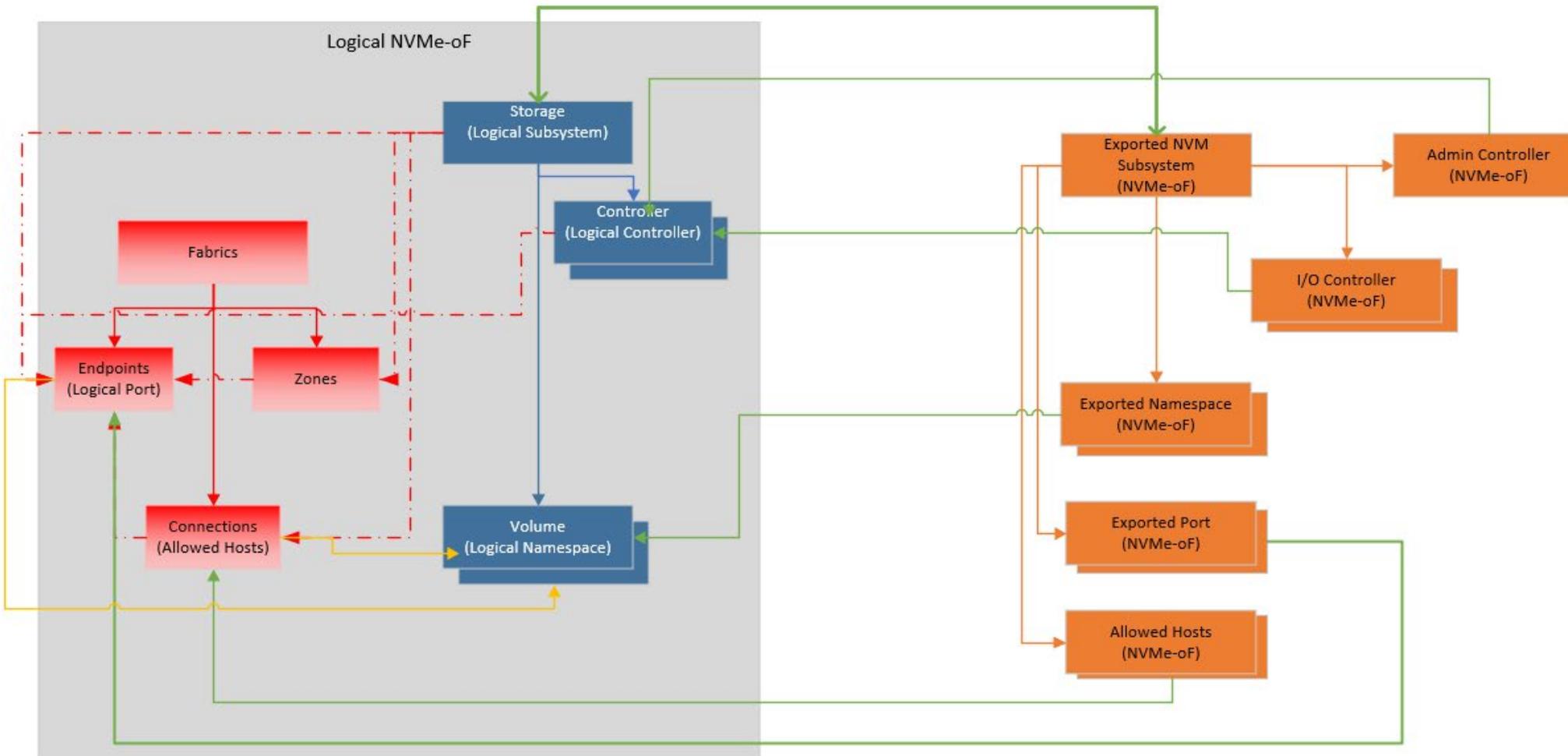
NVMe Subsystem Model



Implementing an NVMe Drive in RF / SF



NVMe-oF Exported Logical Subsystem Model



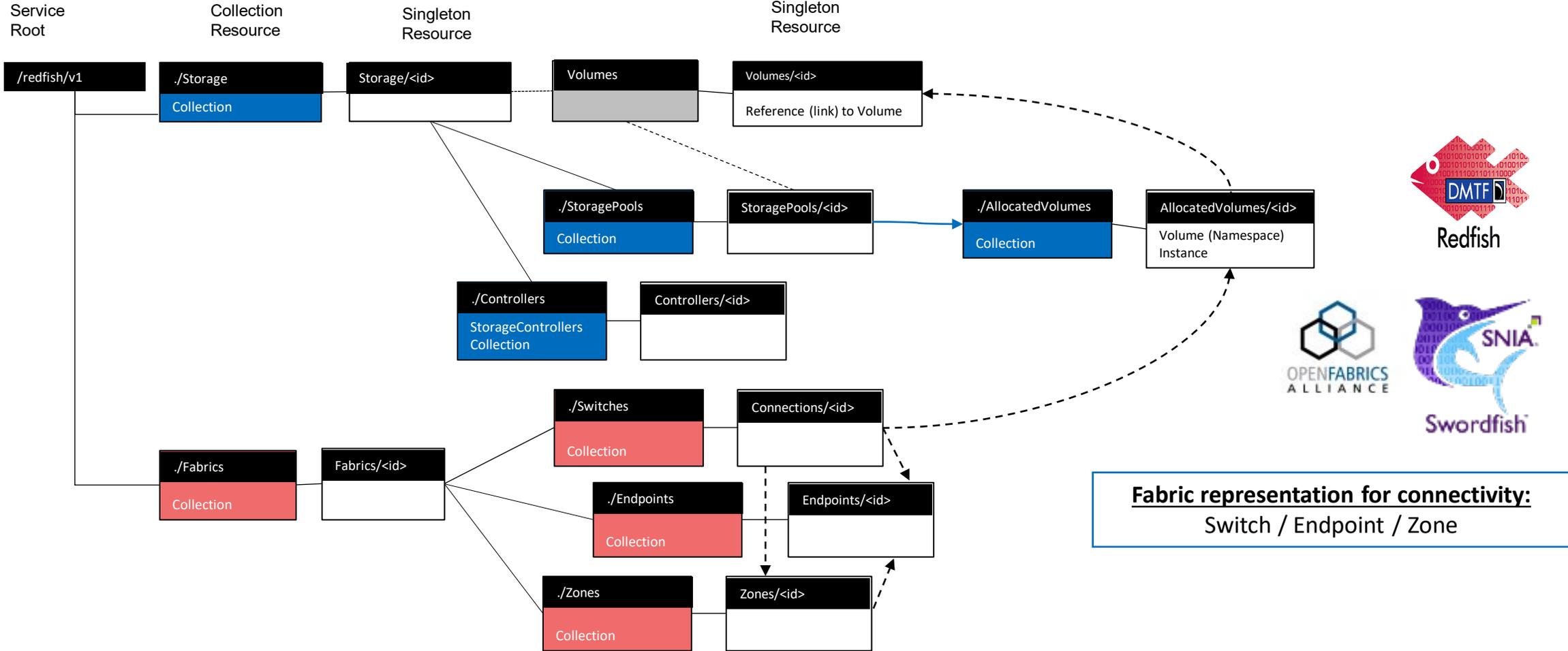
For a deeper dive, check out Phil Cayton - "Managing Exported NVMe-oF Resources and Fabrics in Swordfish and Redfish"

Storage Fabric Management

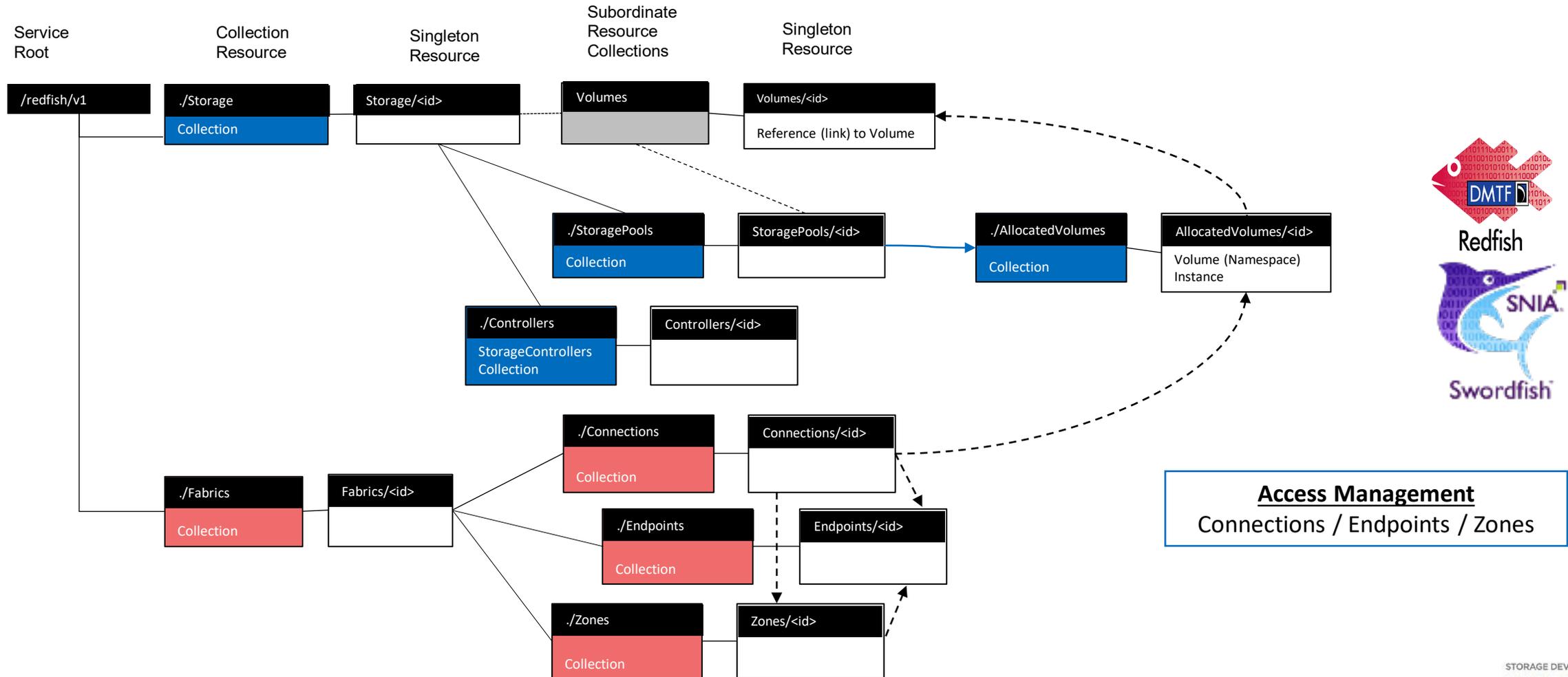
- Working with DMTF and OFA to apply (and extend) Redfish Fabric Model to multiple fabric types
 - Redfish: basic technology instrumentation
- When basics in place, add storage-specific capabilities
 - Workload optimization
 - Performance instrumentation

For a deeper dive, check out Erich Hanke's presenting "Managing Open Fabrics with a Standards-based Interface: Bringing GenZ, Redfish, and Swordfish Together"

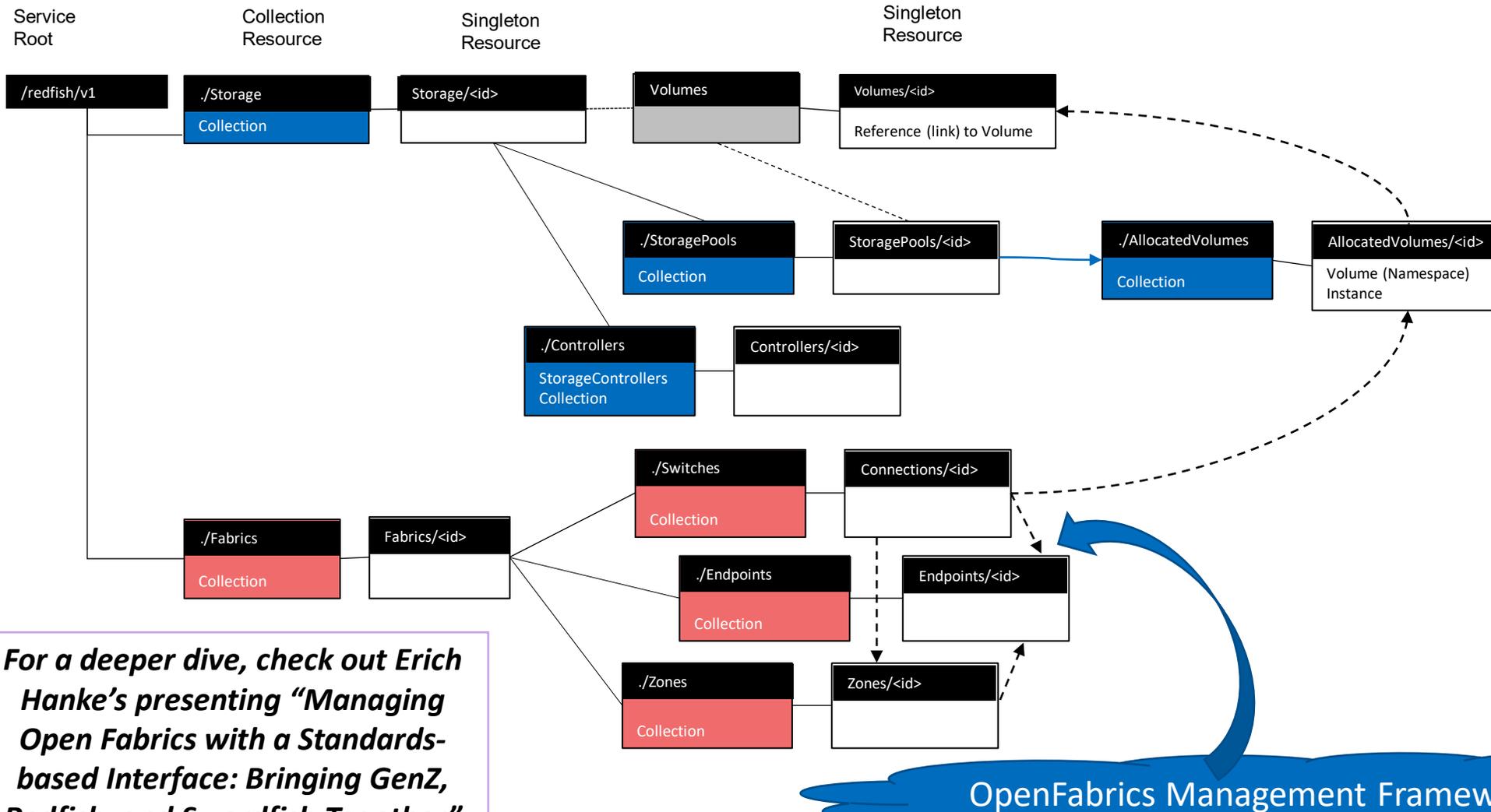
Redfish/Swordfish Hierarchy: Managing Extended Connectivity



Redfish/Swordfish Hierarchy: Adding Multi-System Access Management



Developing the OpenFabrics Framework and Mapping to Redfish and Swordfish



For a deeper dive, check out Erich Hanke's presenting "Managing Open Fabrics with a Standards-based Interface: Bringing GenZ, Redfish, and Swordfish Together"



Redfish



Swordfish



OpenFabrics Management Framework

Enhancements to Swordfish Documentation

The screenshot shows the SNIA Swordfish website. On the left is a navigation menu with categories like Cloud Storage Technologies, Computational Storage, Data Governance & Security, Networked Storage, Persistent Memory, Physical Storage, Power Efficiency Measurement, Storage Management, Storage Management Initiative, CTP, SMI Lab Program, SMI-G (SMI Spec), pvvibm, and SNIA Swordfish™. The main content area is titled 'SNIA Swordfish™' and includes a video player and text describing the specification. Below this is a 'Full Release' section with a table of components.

Bundle Component	Files
Swordfish Release Bundle The Swordfish Release Bundle contains all of the components that comprise the versioned Swordfish Release. Included documents are the Swordfish Specification, User's Guide, Error Handling Guide, and NVMe Model Overview and Mapping Guide. Included technical content: Swordfish schema bundle and Swordfish profiles bundle.	ZIP
Swordfish Scalable Storage Management API Specification Swordfish extends the Redfish Scalable Platform Management API Specification to define a comprehensive RESTful API for storage management that addresses block storage, file systems, object storage, and storage network infrastructure.	PDF, HTML
Swordfish Schema and Registries Bundle This bundle contains the schemas defined for JSON resources conforming to the Redfish Specification. Each schema definition is available in CDDL (XML), json, and yaml formats. This bundle also contains the standard dictionary files to support Redfish Device Enablement (RDE), as well as the Swordfish registry files.	ZIP
Swordfish Profile Bundle This bundle contains all the Swordfish profiles. The Swordfish Core Profiles define the set of features and the corresponding detailed profiles define the required functionality to implement Swordfish.	ZIP
Swordfish Scalable Storage Management API User's Guide This guide is intended to provide a common repository of best practices, common tasks and education for the users of the Swordfish API.	PDF, HTML
Swordfish Scalable Storage Management Error Handling Guide The Swordfish Scalable Storage Management Error Handling Guide provides a summary of the preferred handling of errors and error messages in a Swordfish implementation.	PDF, HTML
Swordfish NVMe Model Overview and Mapping Guide The Swordfish NVMe Model Overview and Mapping Guide defines the model to manage NVMe and NVMe-oF storage systems with Redfish and Swordfish. It provides the detailed mapping information between the NVMe, NVMe-oF specifications and the Redfish and Swordfish specifications.	PDF, HTML
Swordfish Property Guide The Property Guide provides a listing of the properties used in the Swordfish schema. It is intended primarily for end users and other consumers of Swordfish data to look up property definitions, without requiring a detailed knowledge of the schema as a whole.	PDF, HTML

- **NEW: Swordfish Property Guide** – quick reference for developers
- **Expanded User's Guide, Mapping Guide, and Error Handling Guide**
- *Coming Soon: Standardized Capacity and Performance Metrics Management – templates, white paper*

snia.org/swordfish

Updated Tools Ecosystem

- A focus on emulators:
 - Expanded capabilities in Swordfish API Emulator
 - Support for objects used by Swordfish implementations, and added fabric models to enable OFMFVG work. POC work done using Swordfish Emulator.
 - DEM – NVMe and NVMe-oF focused simulator and emulator
 - “fishem” – Schema-aware emulator
- Enhancements to test tools
- Updates to Powershell based tools
 - Adding support for Redfish to Swordfish, completing the models

For a deeper dive, check out Don Deel - “Expanding Development of your Swordfish Implementations Using Open Source Tools”

Where to Find More Info..

SNIA Swordfish™

- **Swordfish Standards**
 - Schemas, Specs, Mockups, User and Practical Guide`s, ...
<https://www.snia.org/swordfish>
- **Swordfish Specification Forum**
 - Ask and answer questions about Swordfish
 - <http://swordfishforum.com/>
- **Scalable Storage Management (SSM) TWG**
 - Technical Work Group that defines Swordfish
 - Influence the next generation of the Swordfish standard
 - Join SNIA & participate: https://www.snia.org/member_com/join-SNIA
- **Join the SNIA Storage Management Initiative**
 - Unifies the storage industry to develop and standardize interoperable storage management technologies
 - <https://www.snia.org/forums/smi/about/join>

DMTF Redfish™

- **Redfish Standards**
 - Specifications, whitepapers, guides,...
<https://www.dmtf.org/standards/redfish>



Open Fabric Management Framework

- **OFMF Working Group (OFMFWG)**
 - Description & Links <https://www.openfabrics.org/working-groups/>
- **OFMFWG mailing list subscription**
 - <https://lists.openfabrics.org/mailman/listinfo/ofmfwg>
- **Join the Open Fabrics Alliance**
 - <https://www.openfabrics.org/membership-how-to-join/>



NVM Express

- **Specifications** <https://nvmexpress.org/developers/>
- **Join:** <https://nvmexpress.org/join-nvme/>





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