SDC 20

BY Developers FOR Developers

Storage Developer Conference
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What's New in SNIA Swordfish™

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Disclaimer

- The information in this presentation represents a snapshot of work in progress within SNIA
- This information is subject to change without notice.
- For additional information, see the SNIA website: www.snia.org/swordfish

Abstract

If you haven't caught the new wave in storage management, it's time to dive in and catch up on the latest developments of the SNIA Swordfish™ specification.

We will cover:

- New functionality included in the latest versions of Swordfish (and functionality added in Redfish to support Swordfish)
- Schema enhancements and simplifications: Moving /Storage to the Service Root
- Adding support to map NVMe and NVMe-oF to Redfish and Swordfish
- To accelerate implementations:
  - New documents added to the Swordfish family to help developers
  - ISO Standardization
  - New mockups on swordfishmockups.com showing more possible deployment permutations
  - Enhancements to the open source tools eco-system
- New supporting programs:
  - The Swordfish Conformance Test Program

New Swordfish Functionality in 2020

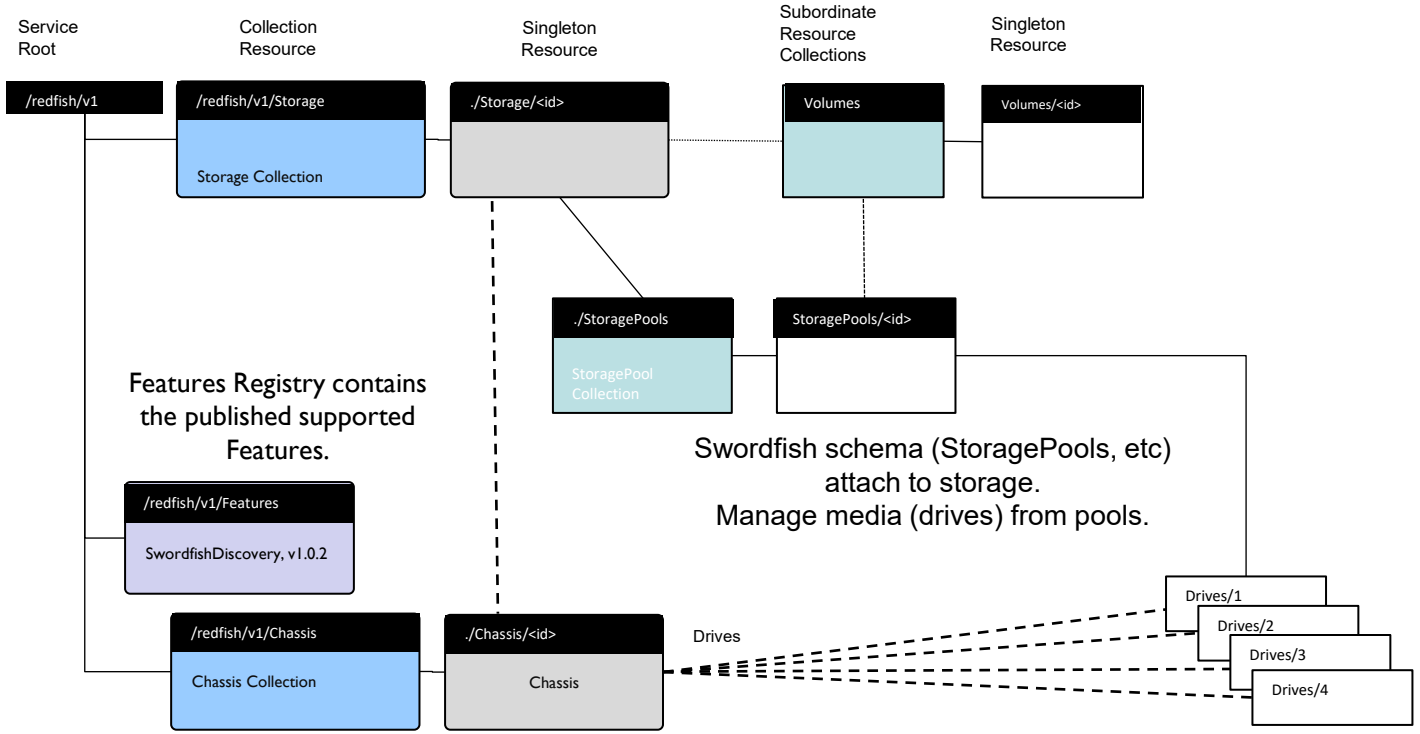
- Add /Storage at the Service Root (required)
  - Support in schema, profiles
- Support for NVMe, NVMe-oF in Redfish and Swordfish
  - Enhancements to Redfish and Swordfish schema
  - Additional mockups in SNIA and DMTF
  - New NVMe-specific documentation: Swordfish NVMe Model Overview and Mapping Guide
  - NVMe use cases added to User's Guide

- Other Updates:
  - Schema changes to support implementation feedback and enhancement requests (Volume, StoragePool, StorageGroups)

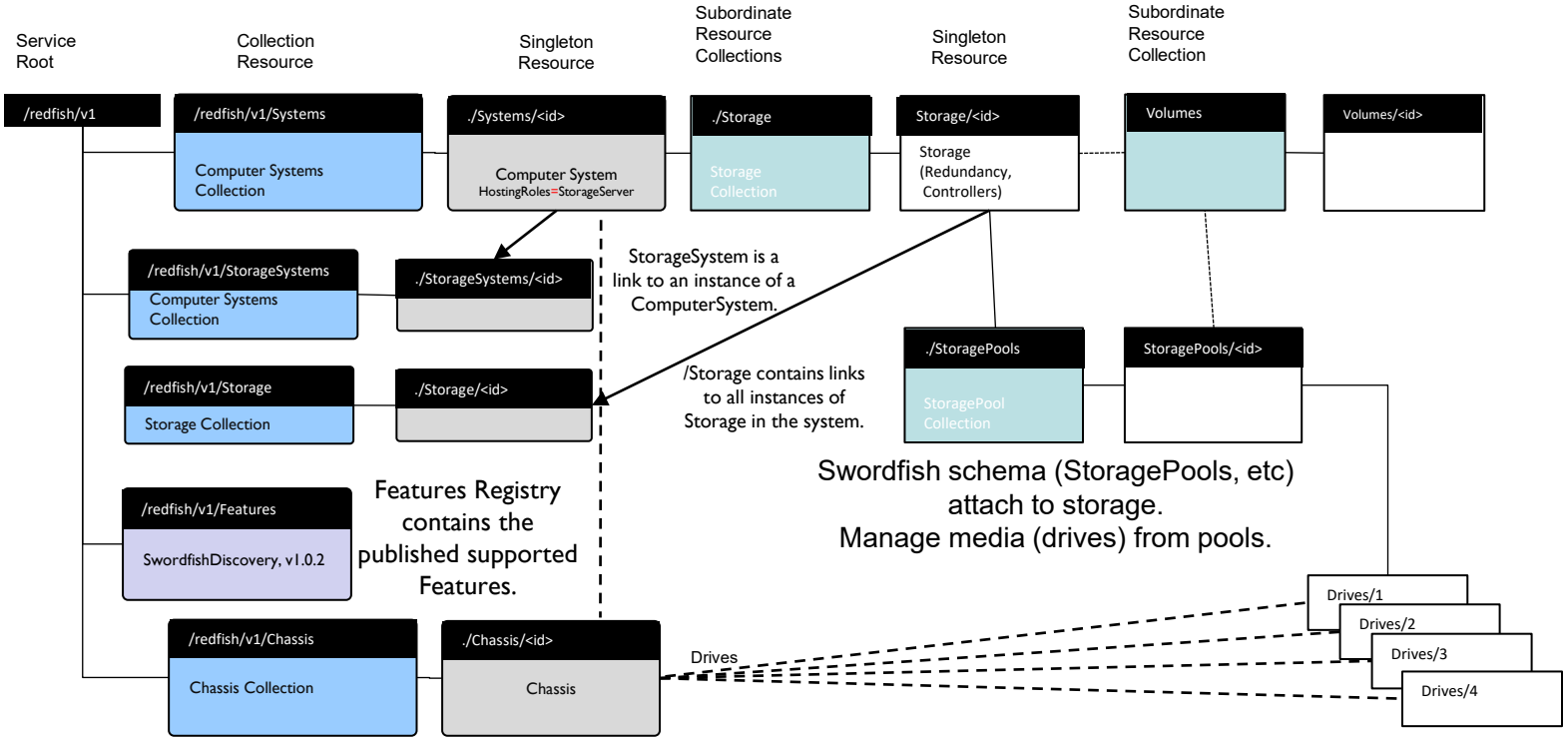
Storage at the Service Root

- Swordfish v1.2.0+: Clients will always be able to find Storage instances in /redfish/v1/Storage
- Simplifies search and system traversal
- Next two slides show two different implementation options; client can find both instances in /redfish/v1/Storage

Example 1: Standalone Configuration



Example 2: Integrated Configuration



NVMe and NVMe-oF: Mapping into Redfish and Swordfish

- A three-way joint effort between the SNIA, DMTF and NVM Express, hosted by the SNIA SSM TWG
- RF/SF use the available low-level transports to get device / transport specific information into the common models (models are transport agnostic)
  - RF/SF uses the commands that are provided in the NVMe/NVMe-oF/NVMe-MI specs
  - NVMe-MI can be used as the low-level to get the information into the high-level management environment as OOB access mechanism when appropriate
- Scope:
  - NVMe Subsystem, NVMe-oF and NVMe Domain Models

Overview of NVM Mapping: The Overall NVMe Subsystem Model

- Model reflects a unified view of all NVMe device types.
- Devices will instantiate an appropriate subset of the model

- The model diagrams do not reflect all available schema elements.

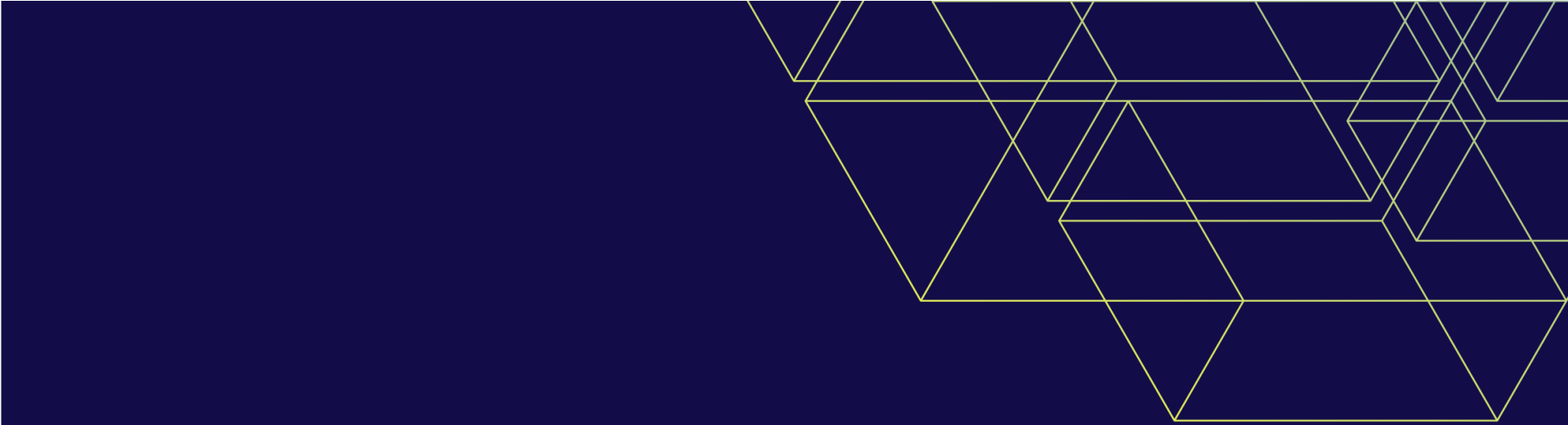
- Model leverages and coarsely maps to existing (Redfish and) Swordfish storage model

See *Swordfish NVMe Model Overview and Mapping Guide* for complete details.

Major NVM Objects Mapped to RF/SF

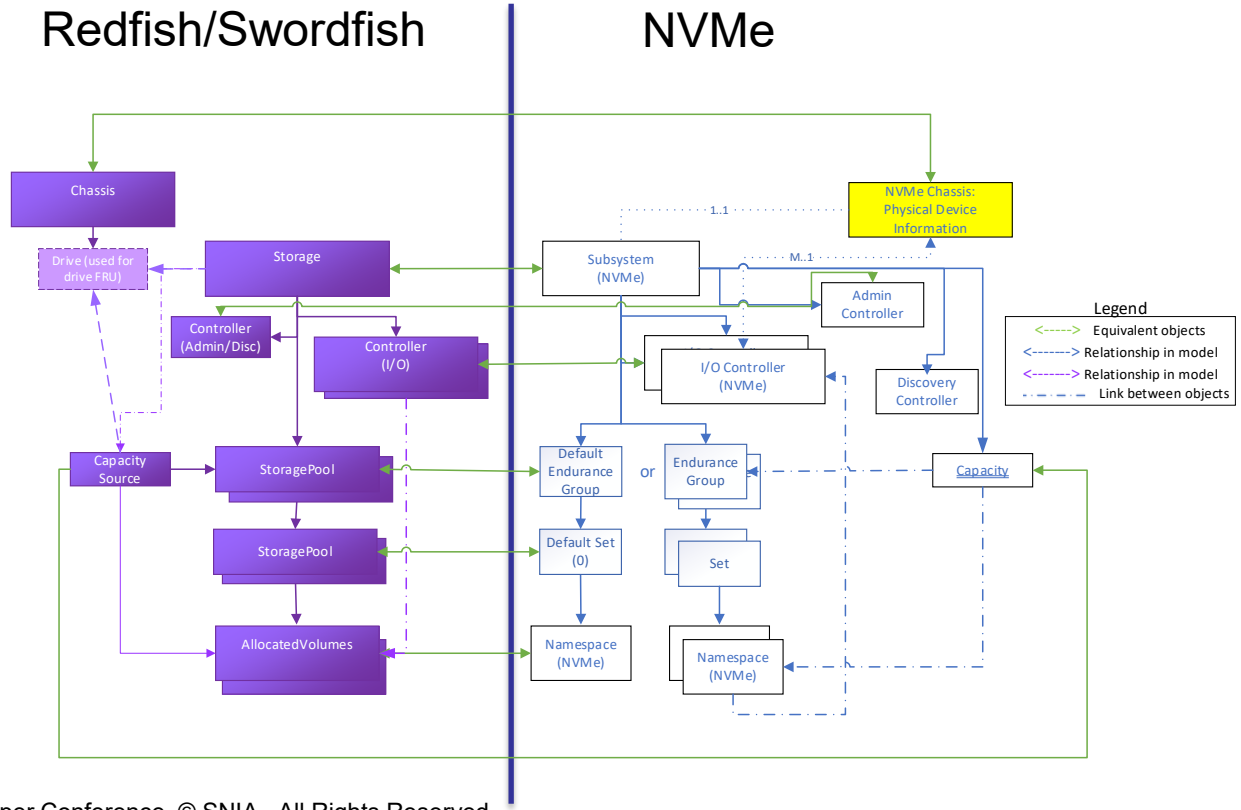
- Mapping focuses on major NVM objects:
  - NVM Subsystem
  - NVM Controller (IO, Admin and Discovery)
  - Namespace
  - Endurance Group
  - NVM Set
  - NVM Domain

Concepts mapped to existing Storage model, adding additional properties and enhancements where needed.



NVMe Subsystem: Model

NVMe Subsystem Model



Sample instantiations

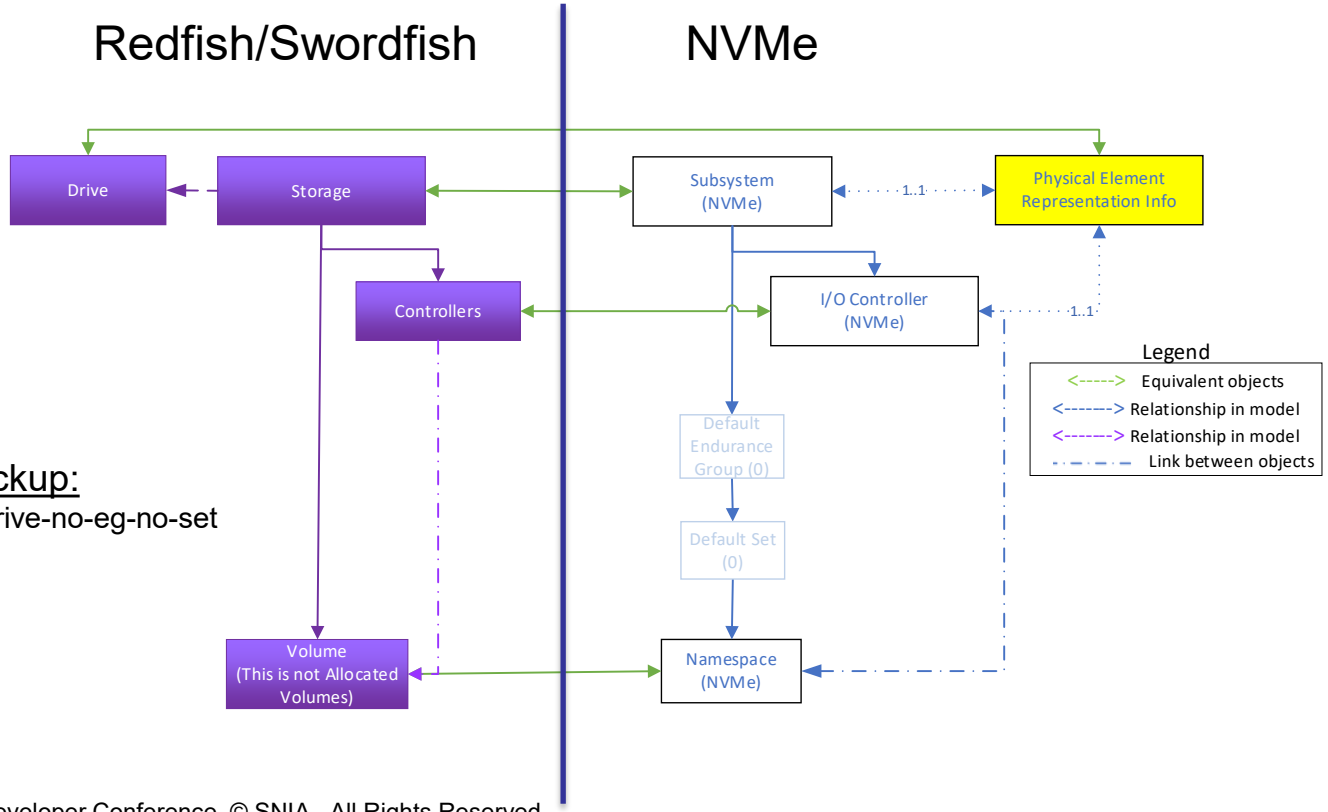
Sample Instantiations – Mockups correspond to these

Mapped Models and Documented Permutations

- Device Model – NVMe
  - Simple SSD
    - Default Endurance Group / Default Set
    - Single Endurance Group / Single Set
  - JBOF – PCIe front-end attach to set of drives
  - EBOF – Ethernet front-end attach to set of drives
  - Fabric Attach Array
    - RBOF – Simple RAID front-end attach to set of drives
  - Opaque Array
    - Front end is NVMe, back end is vendor choice (may incorporate existing technologies with NVMe)
- Subsystem (Fabric) Model – NVMe-oF
  - Fabric-attached subsystem presenting logical subsystem, controller, namespace, port and allowed host
  - Simple SSD with NVMe-oF Attach
    - Default Endurance Group / Default Set
  - NVMe Domains

Yellow – TBD Mockups

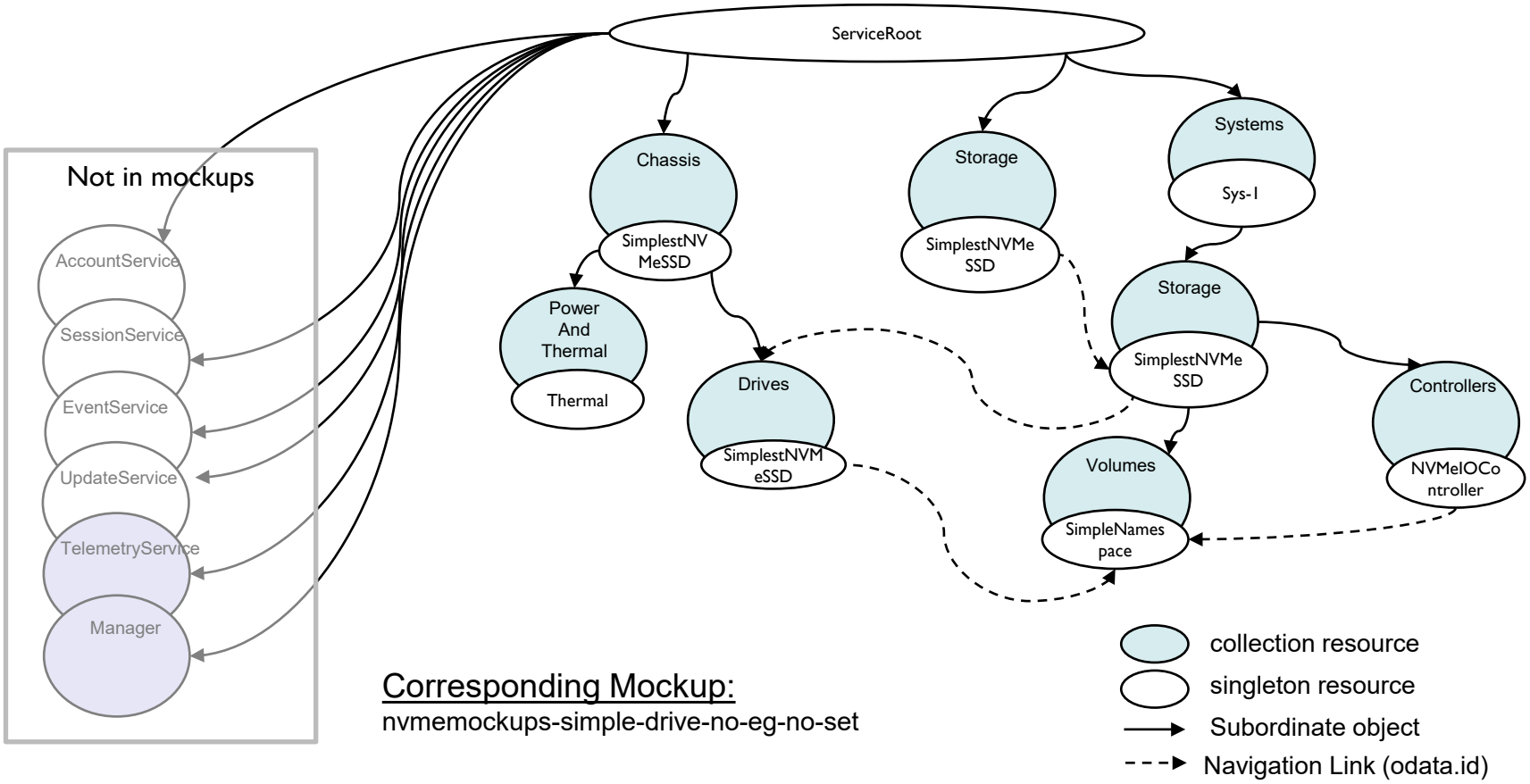
Simple SSD Implementation: Default Endurance Group and Set (Not Implemented in RF / SF)



Corresponding Mockup:

nvmemockups-simple-drive-no-eg-no-set

Simple NVMe Drive: No Namespace Mgmt, No EG, No Set

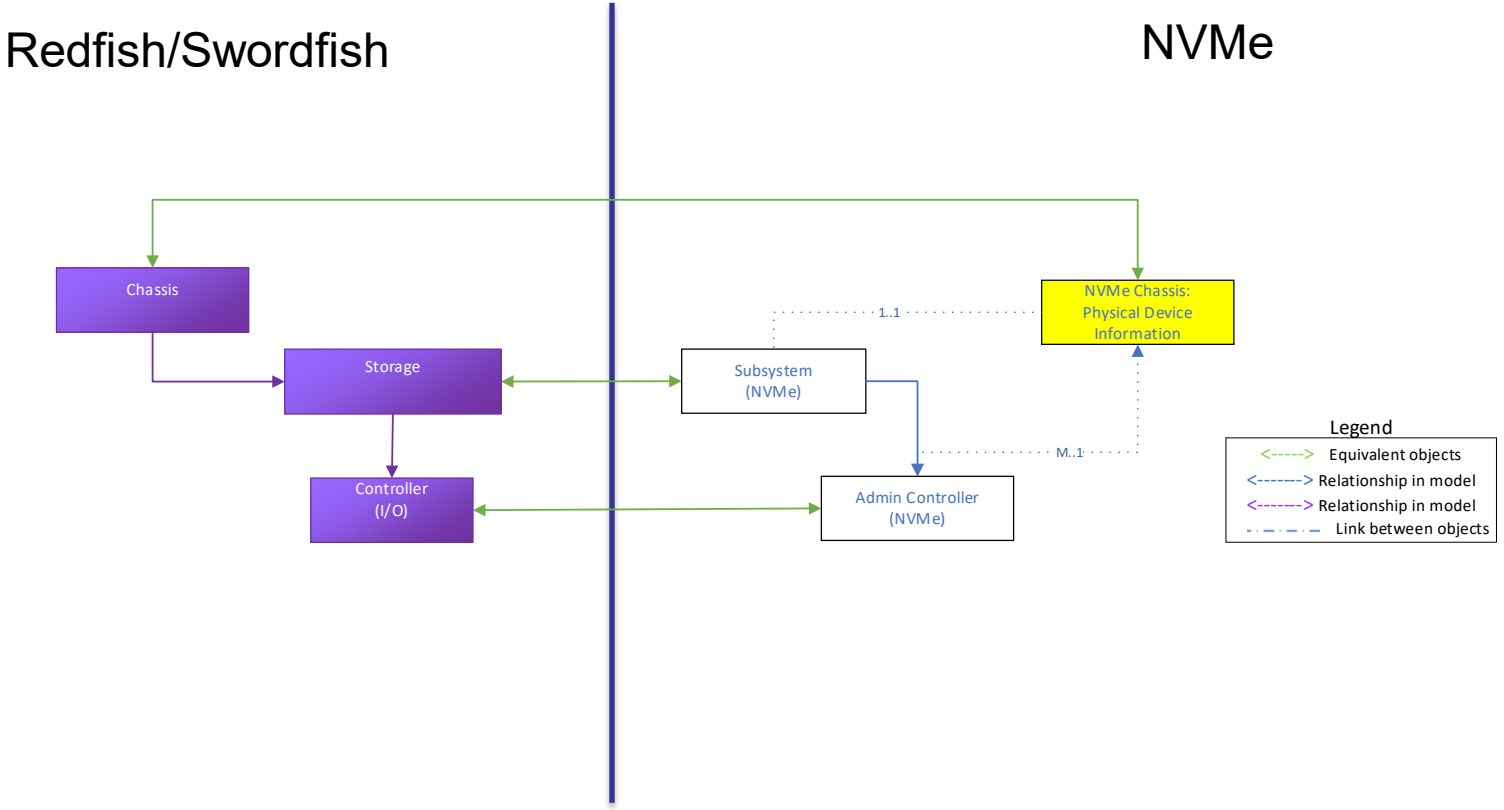


Corresponding Mockup:

nvmemockups-simple-drive-no-eg-no-set

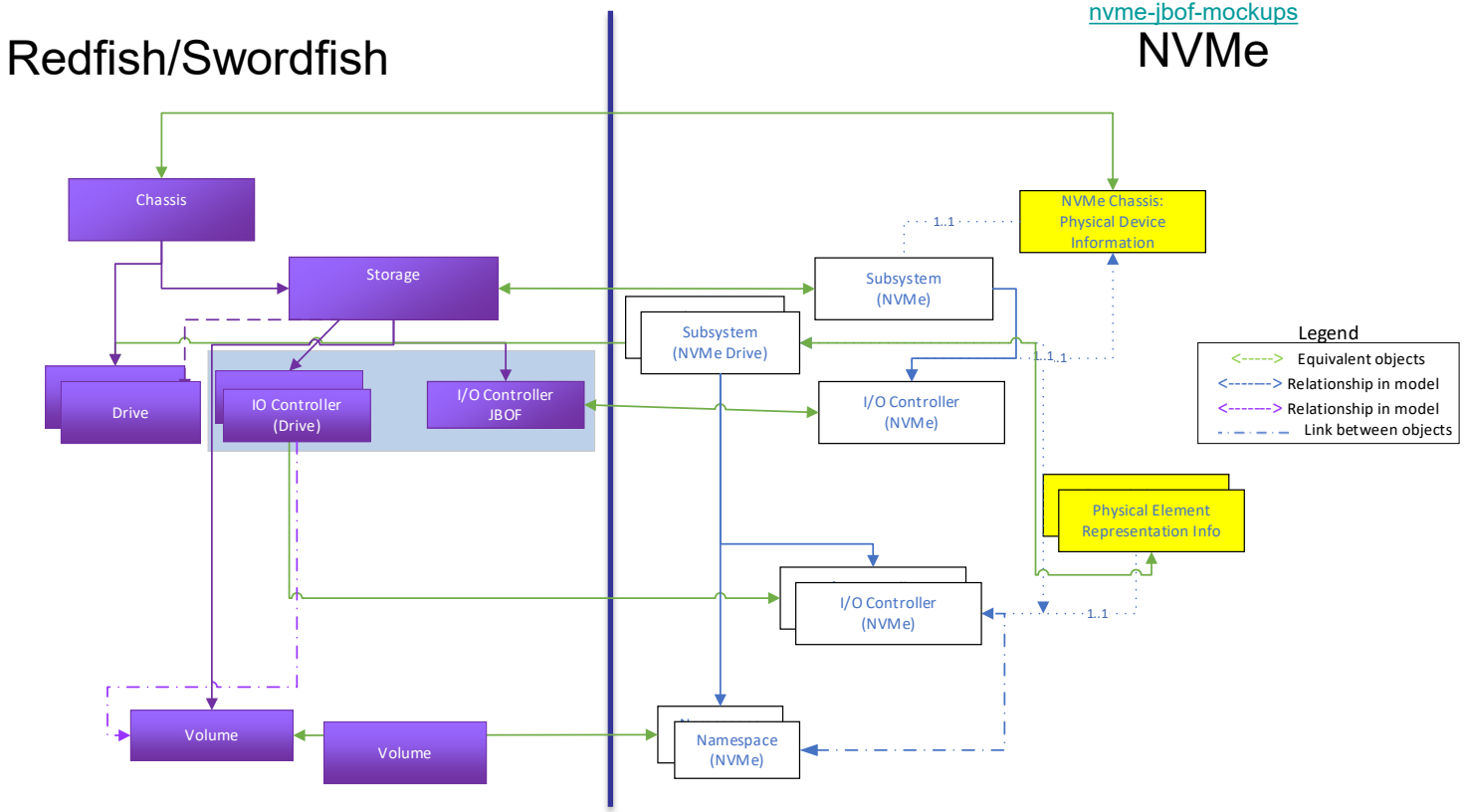
NVMe JBOF: Controller Only

Corresponding Mockup:
nvme-jbof-mockups

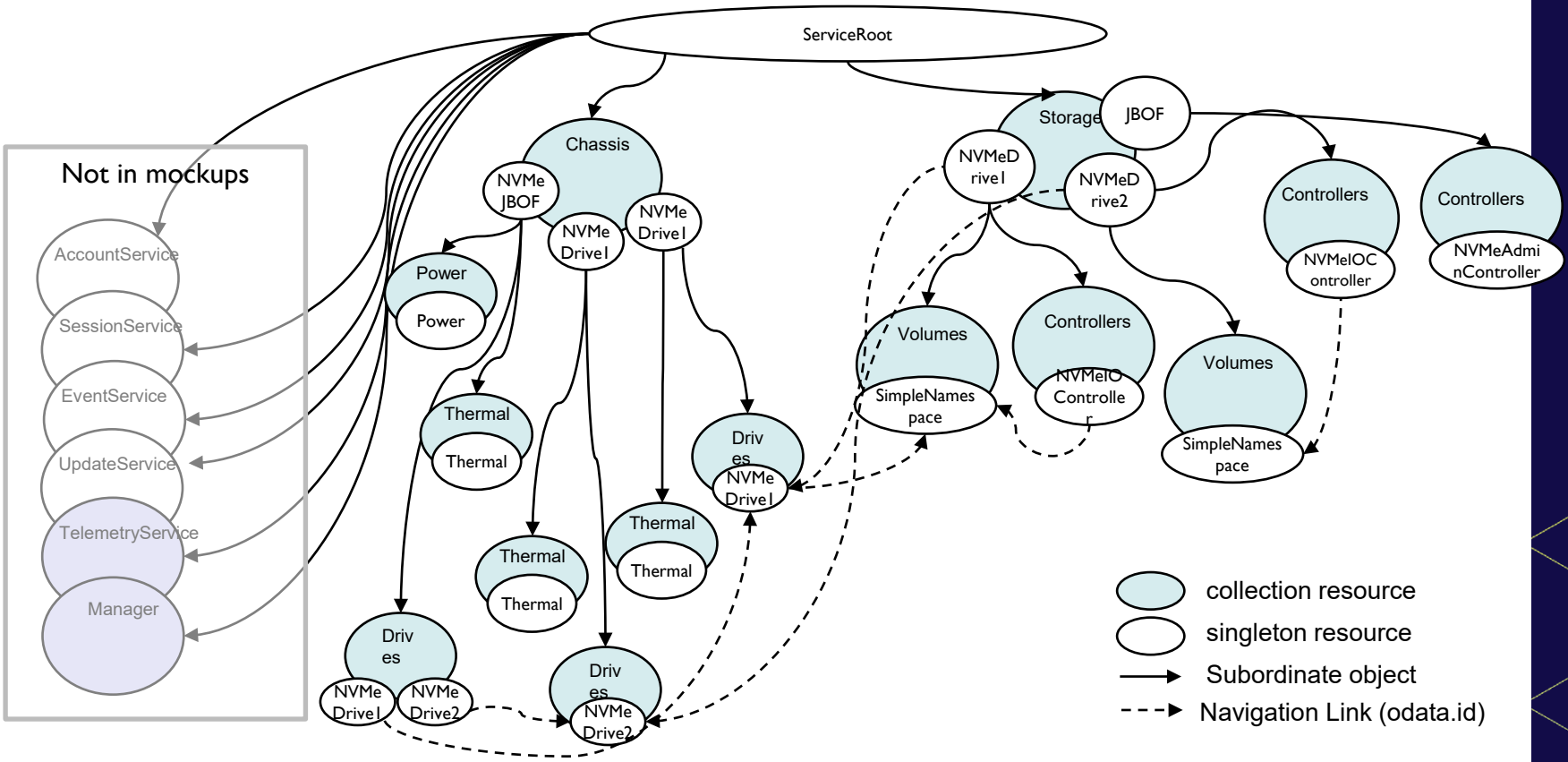


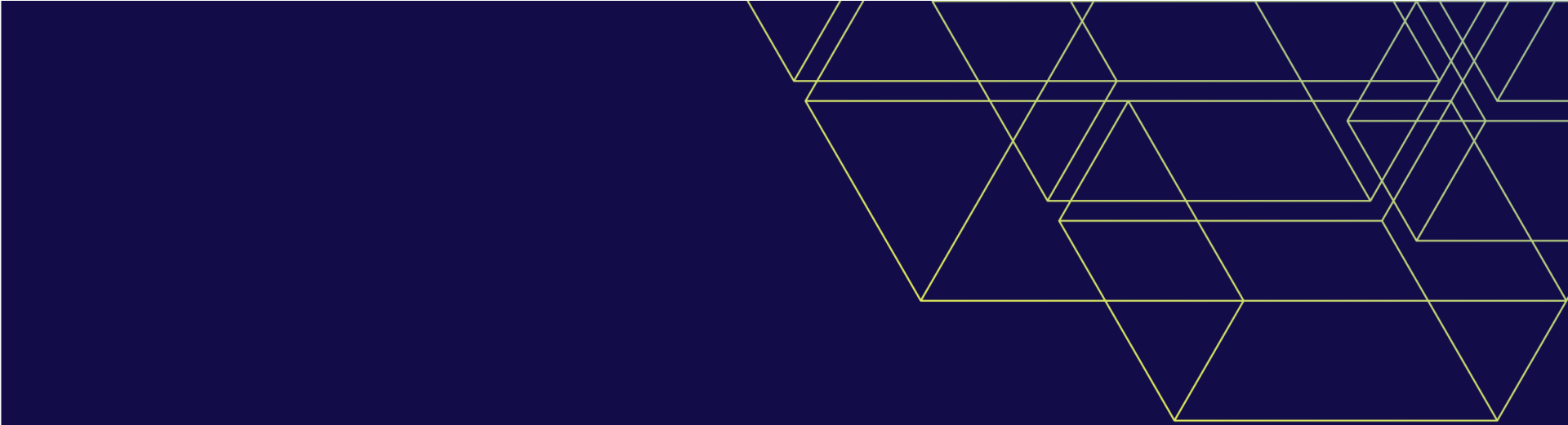
NVMe JBOF: Controller Plus Drives

Corresponding Mockup:
nvme-jbof-mockups



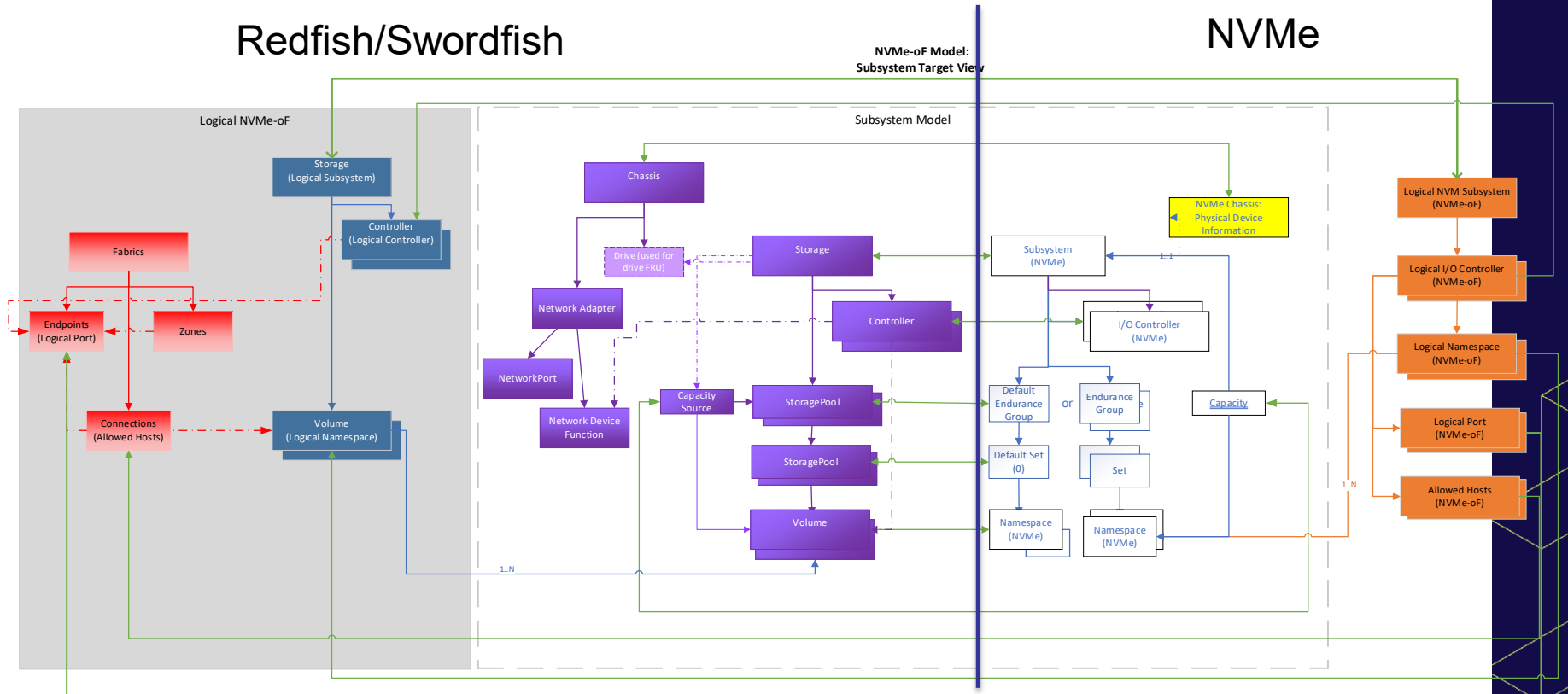
NVMe JBOF: Controller Plus Drives (2 Drives Shown)



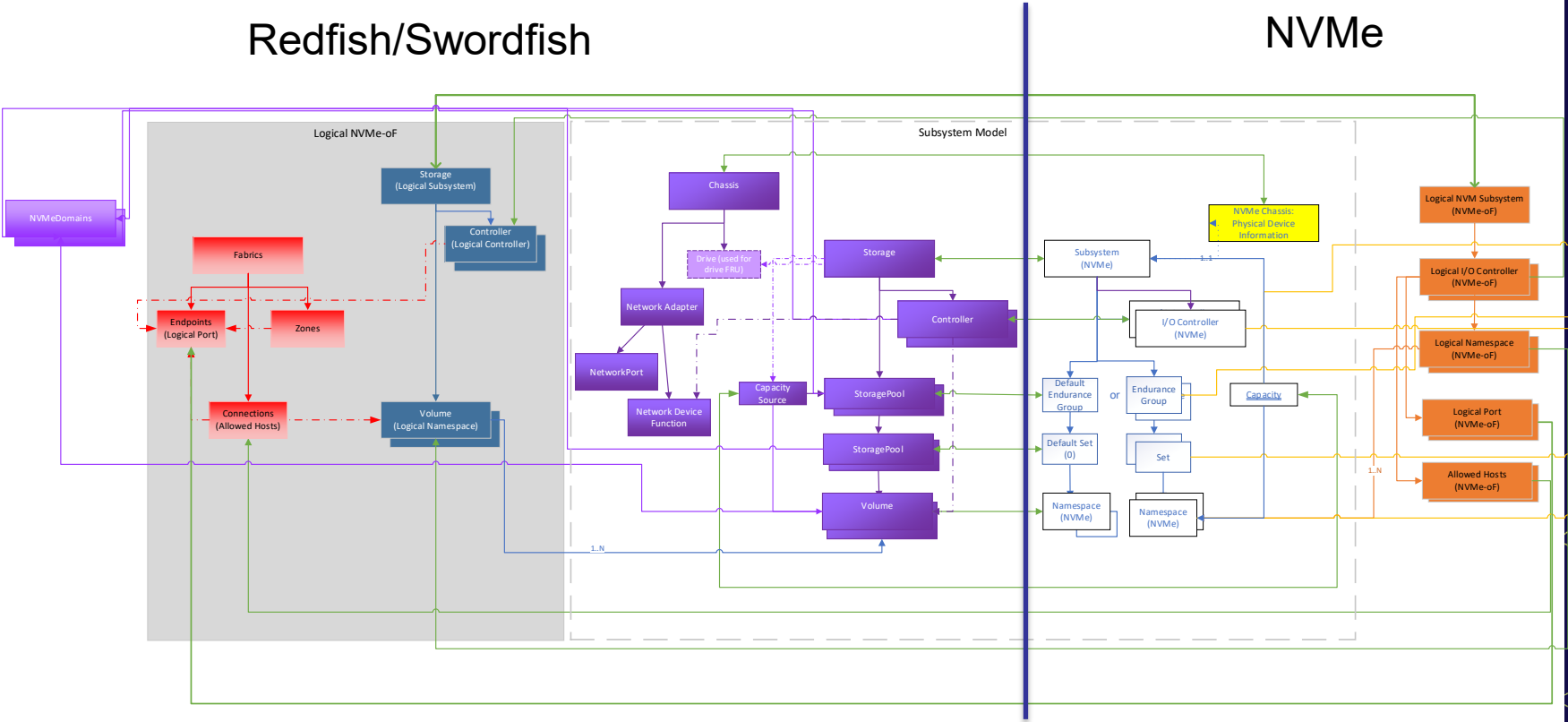


NVMe-OF: Model

NVMe-oF: Subsystem Model



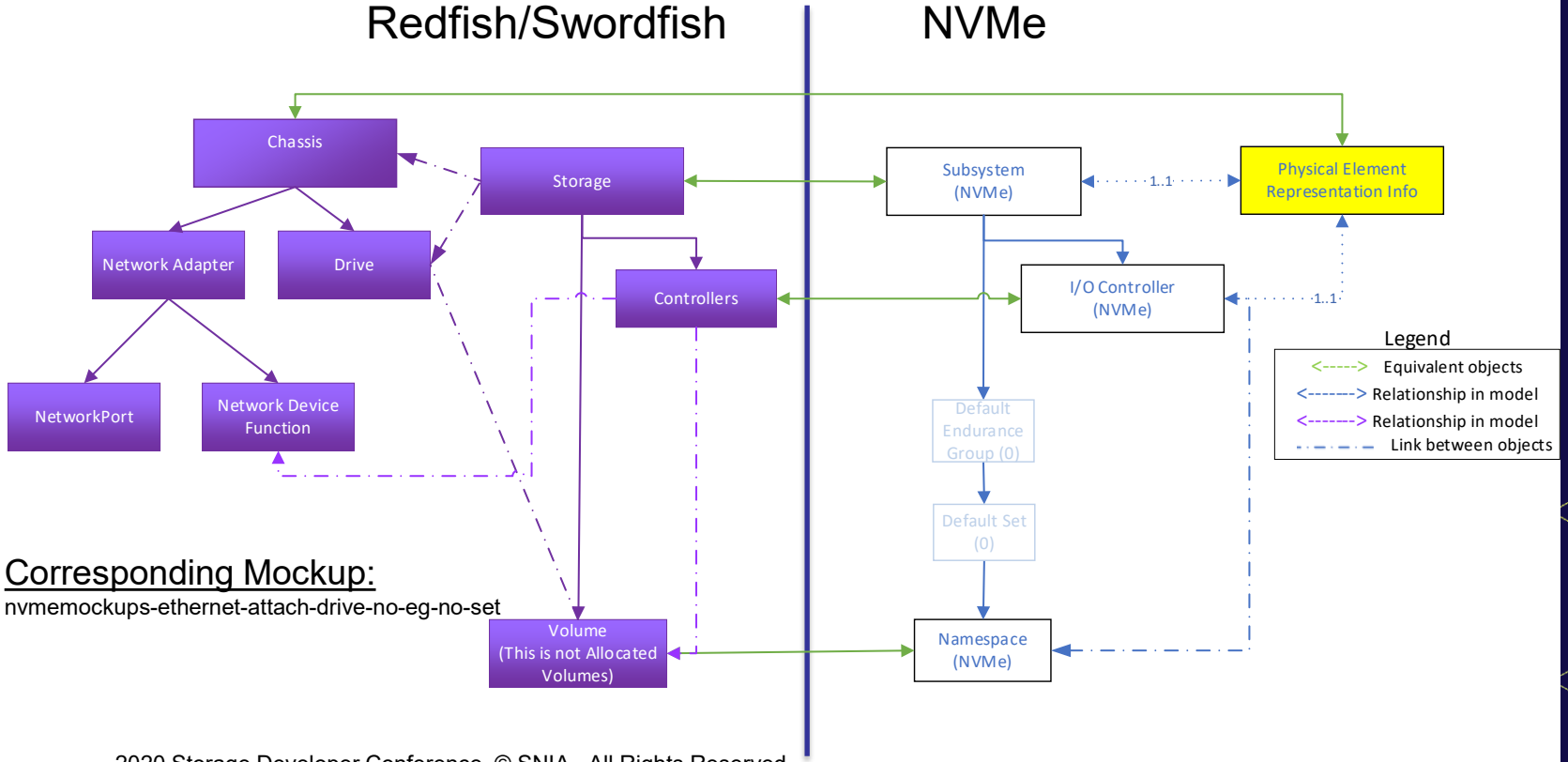
NVMe-oF: Model with Domains



Sample instantiations

Sample Instantiations – Mockups correspond to these

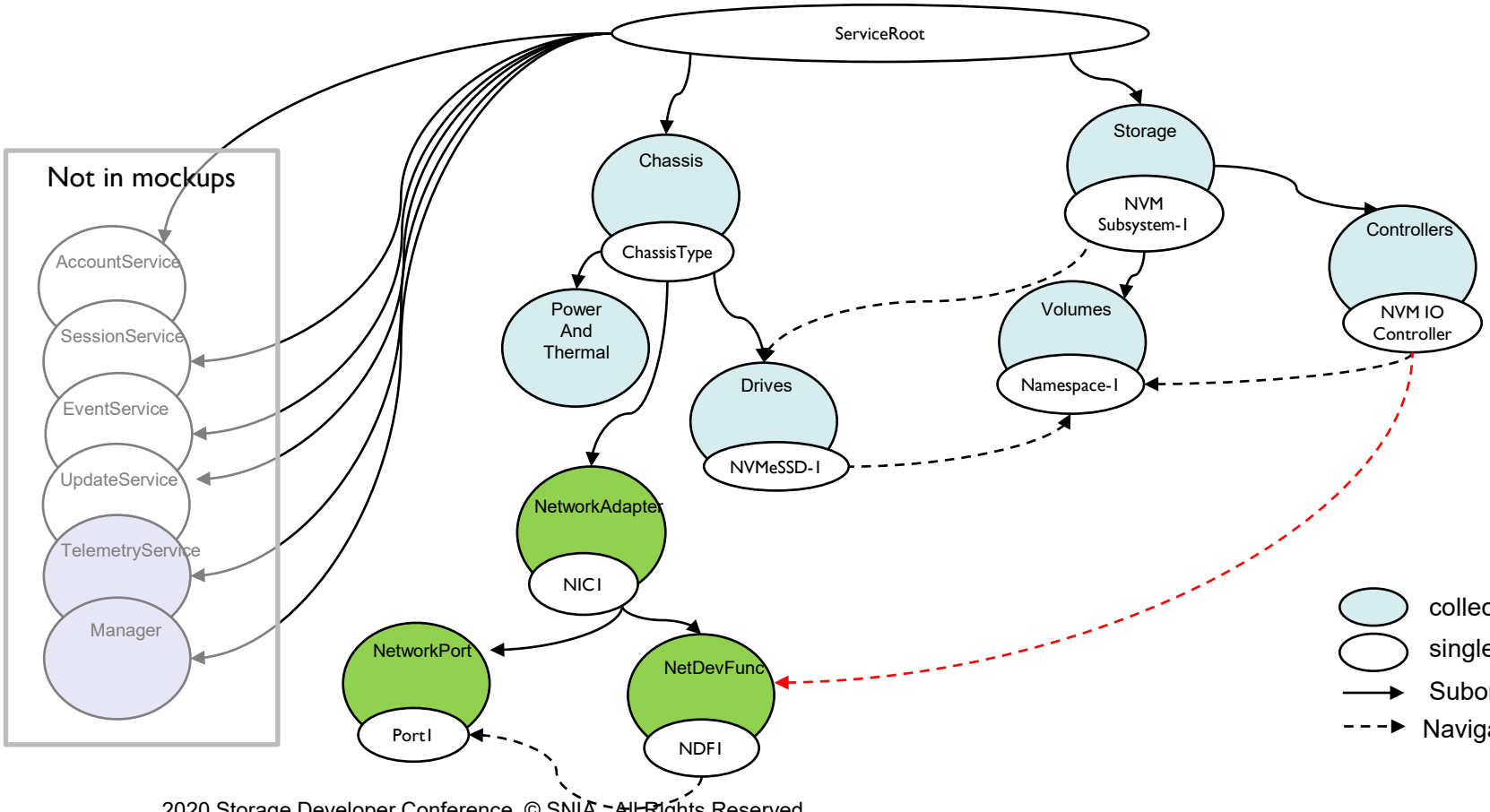
Simple SSD with NVMe-oF Attach (not NVMe TP 6011)



Corresponding Mockup:

nvmemockups-ethernet-attach-drive-no-eg-no-set

Simple NVMe Drive Network / Ethernet Attach (not TP 6011)



Additional Content

New Documents

- Swordfish Error Handling Guide
  - Provides a summary of the preferred handling of errors and error messages in a Swordfish implementation, and is targeted as a guide for implementers
- Swordfish NVMe Model Overview and Mapping Guide
  - Defines the model to manage NVMe and NVMe-oF storage systems with Redfish and Swordfish, and provides the detailed mapping information between the NVMe, NVMe-oF specifications and the Redfish and Swordfish specifications.

New Mockups Features in 2020

Revamped swordfishmockups.com site, with new mockups for v1.1.0 and v1.2.x configurations:

http://swordfishmockups.com/

Swordfish Standalone Configurations
Midrange External System Mockup
Midrange System with Replication Mockup

Swordfish Integrated Configuration
Direct-Attach Storage Mockup

Service-Based Configurations
Hosted Service Configuration Mockups

NVMe and NVMe-oF Configurations
Device Model – NVMe
NVMe SSD Configurations:
Default Endurance Group / Default Set Mockup
Single Endurance Group / Single Set Mockup
JBOF Mockup
Fabric Attach Array Mockup
Opaque Array Mockup

Subsystem (Fabric) Model – NVMe-oF
Fabric-attached subsystem Mockup
Simple SSD with NVMe-oF Attach Mockup

ISO Standardization

- The SNIA Swordfish specification has started the process to become an ISO specification (projected process completion date: sometime in 2021)
  - Availability as an international standards

Expanded Tools Ecosystem

- Automated / offline build and test infrastructure for Swordfish schema and mockup contributors
  - Multiple tests now available to test validity against schema
- New open source tools…
  - Windows Powershell toolkit – open source tools for Windows developers to accelerate Swordfish development
- (More details in tools preso)

What is Swordfish CTP?

- Swordfish CTP:
  - A vendor-neutral test suite to validate conformance to the SNIA Swordfish Specification
  - Uses the Redfish specification, Swordfish Specification and published Swordfish Profiles to determine compliance
  - Profiles define required subsets of functionality that implementations can advertise as customer “Features”
  - Each Feature corresponds to key customer functionality

Swordfish Conformance Test Program

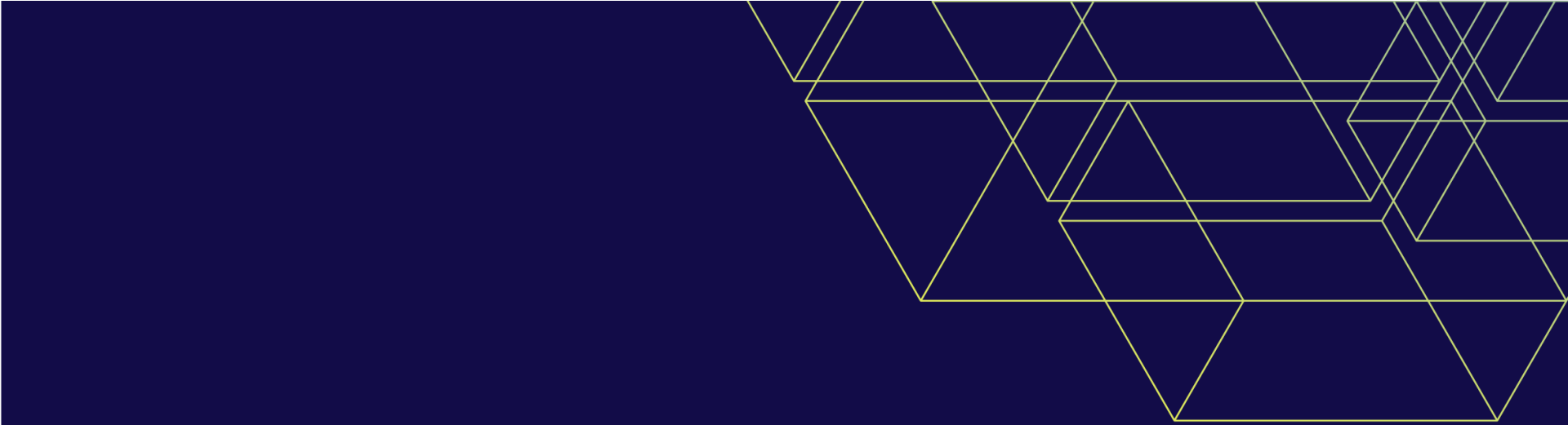
- SNIA Swordfish CTP Program in development
  - Framework and test infrastructure in place, CTP dev team working on integration of automated and enhanced tests

Ready to Participate?

- We are working with companies now to “test the tests”.
  - Please contact us at storagemanagement@snia.org if you are interested in joining the SNIA Swordfish CTP Program
- Full program launch coming soon…

Thank you for watching

- SNIA Swordfish™ Standards
  - Schemas, Specs, Mockups, Users Guide, Practical Guide & more
    https://www.snia.org/swordfish
- Redfish / Swordfish Specification Forum
  - This is where you can ask and answer questions about Redfish and 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 and 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



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