



2022 OFA Virtual Workshop

DIVING INTO THE NEW WAVE OF STORAGE MANAGEMENT


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ABSTRACT

- As the NVM Express® (NVMe®) family of specifications continue to develop, the corresponding Swordfish management capabilities are evolving: the SNIA Swordfish™ specification has expanded to include full NVMe and NVMe-oF™ enablement and alignment across DMTF™, NVMe, and SNIA for NVMe and NVMe-oF use cases.
 - The SSM TWG and OFA™ OFMFWG are working together to bring to life an open-source OpenFabrics Management Framework, with a Redfish/Swordfish management model and interface.
 - 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. These include:
 - Expanded support for NVMe and NVMe-oF Devices
 - Managing Storage Fabrics
 - This presentation provides an update on the latest NVMe-oF configuration and provisioning capabilities available through Swordfish, and an overview of the most recent work adding detailed implementation requirements for specific configurations, ensuring NVMe and NVMe-oF environments can be represented entirely in Swordfish and Redfish environments.
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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 2022



■ **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: Swordfish Property Guide – quick reference for developers
- Expanded User's Guide, Mapping Guide, Error Handling Guide
- New white paper: Metrics and Telemetry in Swordfish

EXPANDING SUPPORT FOR NVME AND NVME-OF

■ NVMe model/device support added in v1.2.0+

- *v1.2.3 last update (Q3 '21)*
- *v1.2.4 releasing April 2022*

■ 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

■ In v1.2.4:

- Specifications / profiles / mockups / use cases for: NVMe JBOF, NVMe EBOF; NVMe-oF exported logical subsystems

■ New releases will continue to track new NVM Express features

NVME FUNCTIONALITY

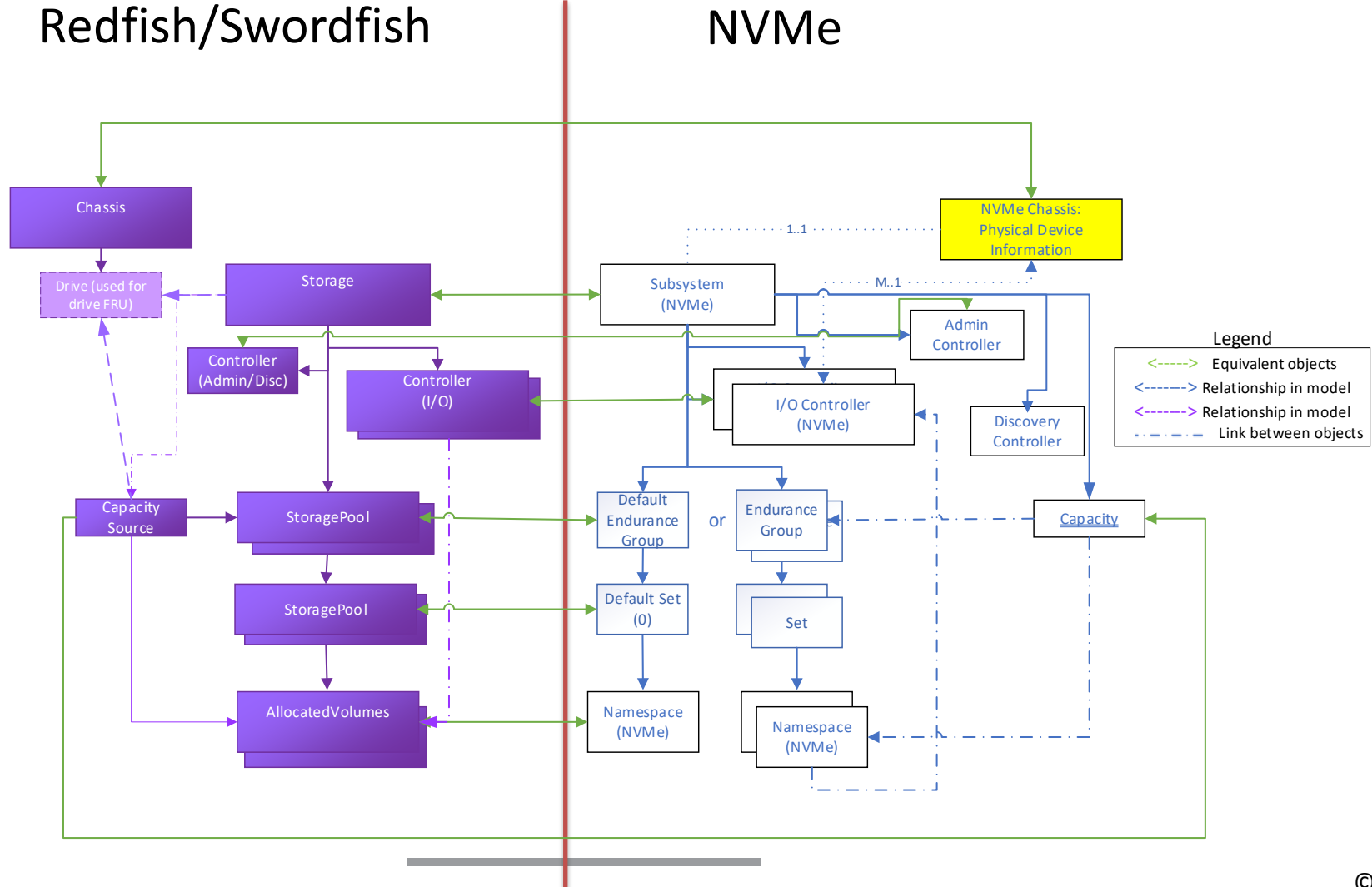
Mapped NVMe objects to existing RF/SF model

- NVM Subsystem
- NVM Controllers (IO, admin, discovery)
- Namespaces
- Endurance groups
- NVM Sets

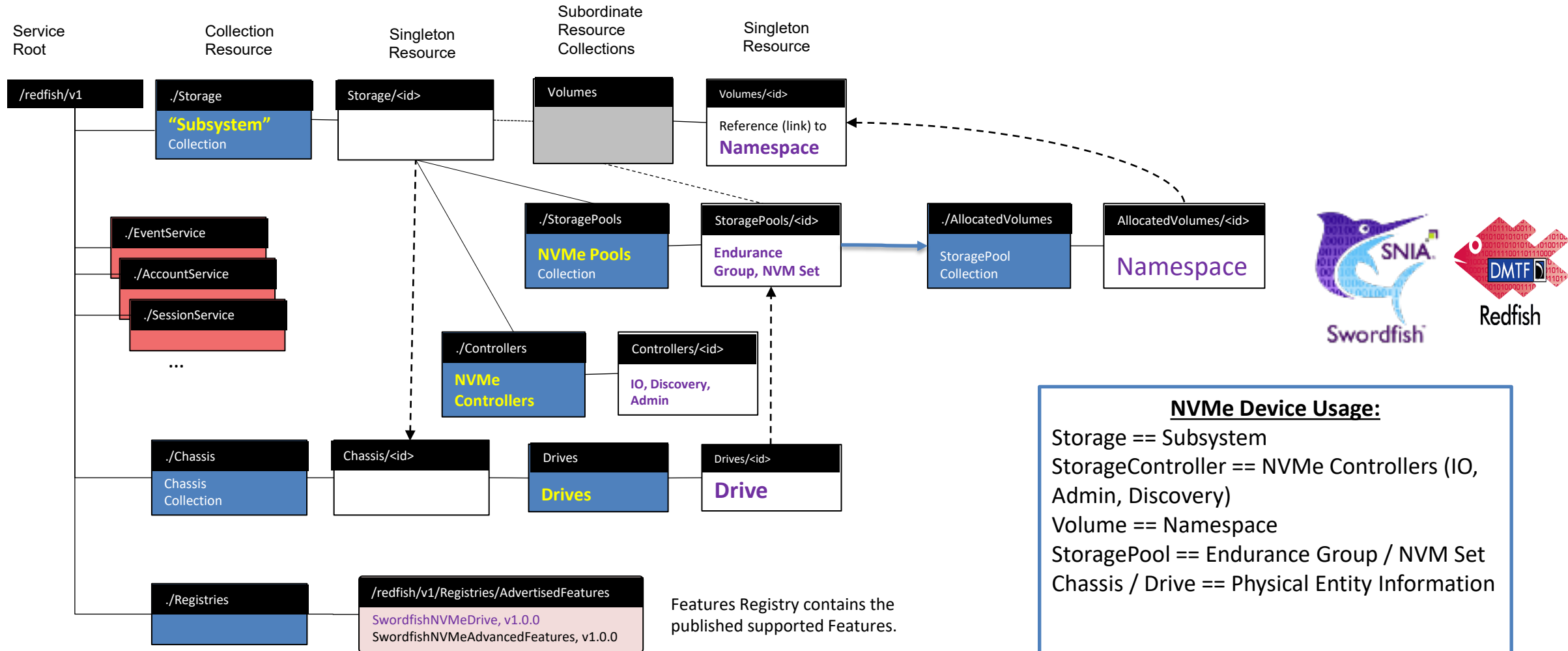
Create new objects where needed

- NVMe Domains
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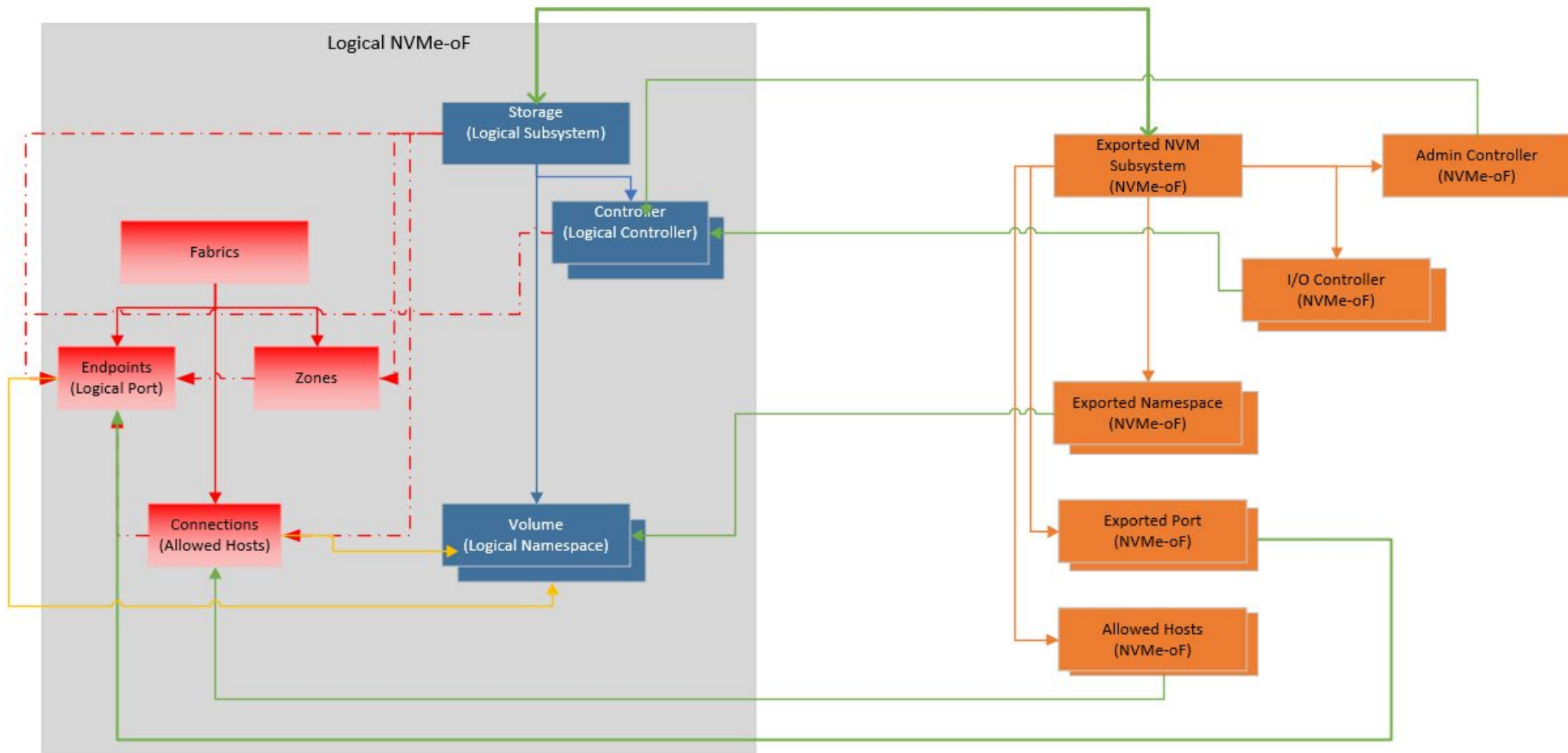
NVME SUBSYSTEM MODEL



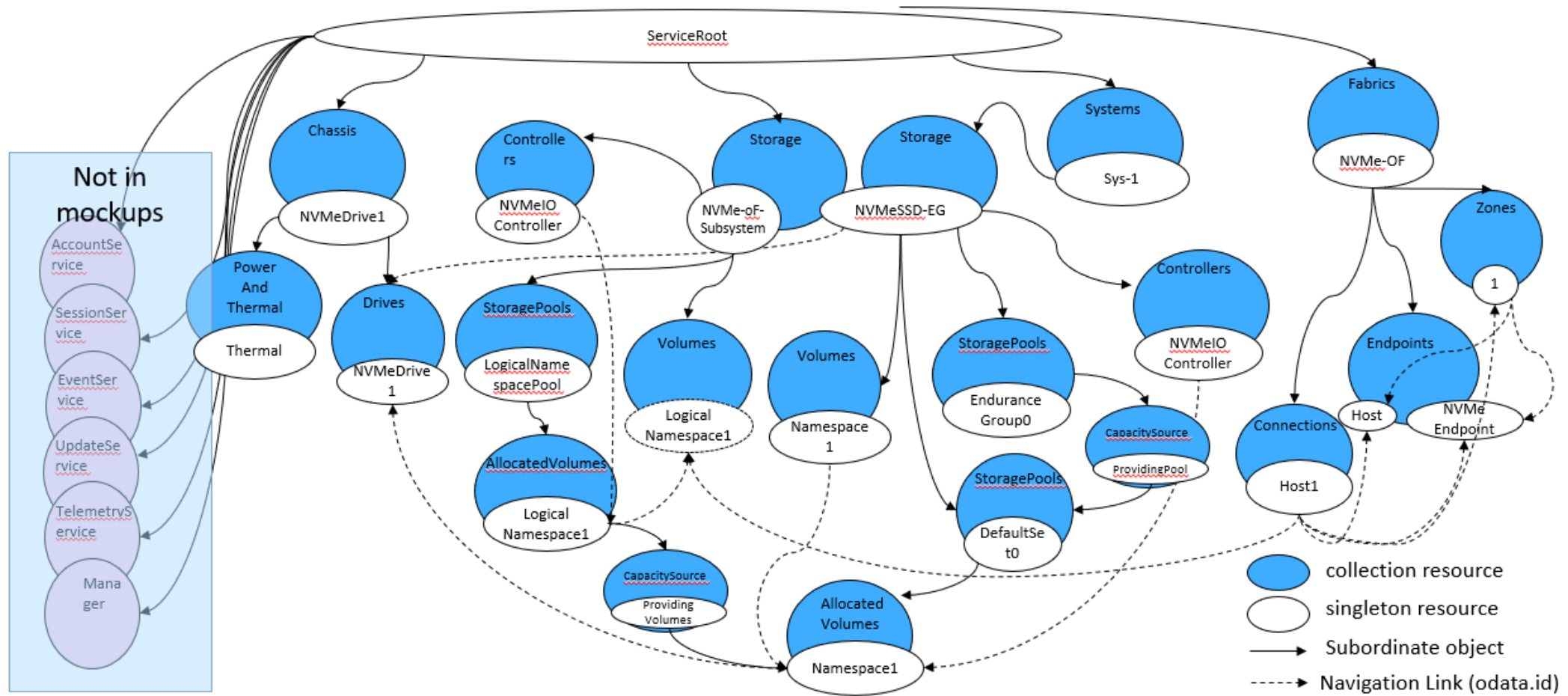
IMPLEMENTING AN NVME DRIVE IN RF / SF



NVME-OF EXPORTED LOGICAL SUBSYSTEM MODEL



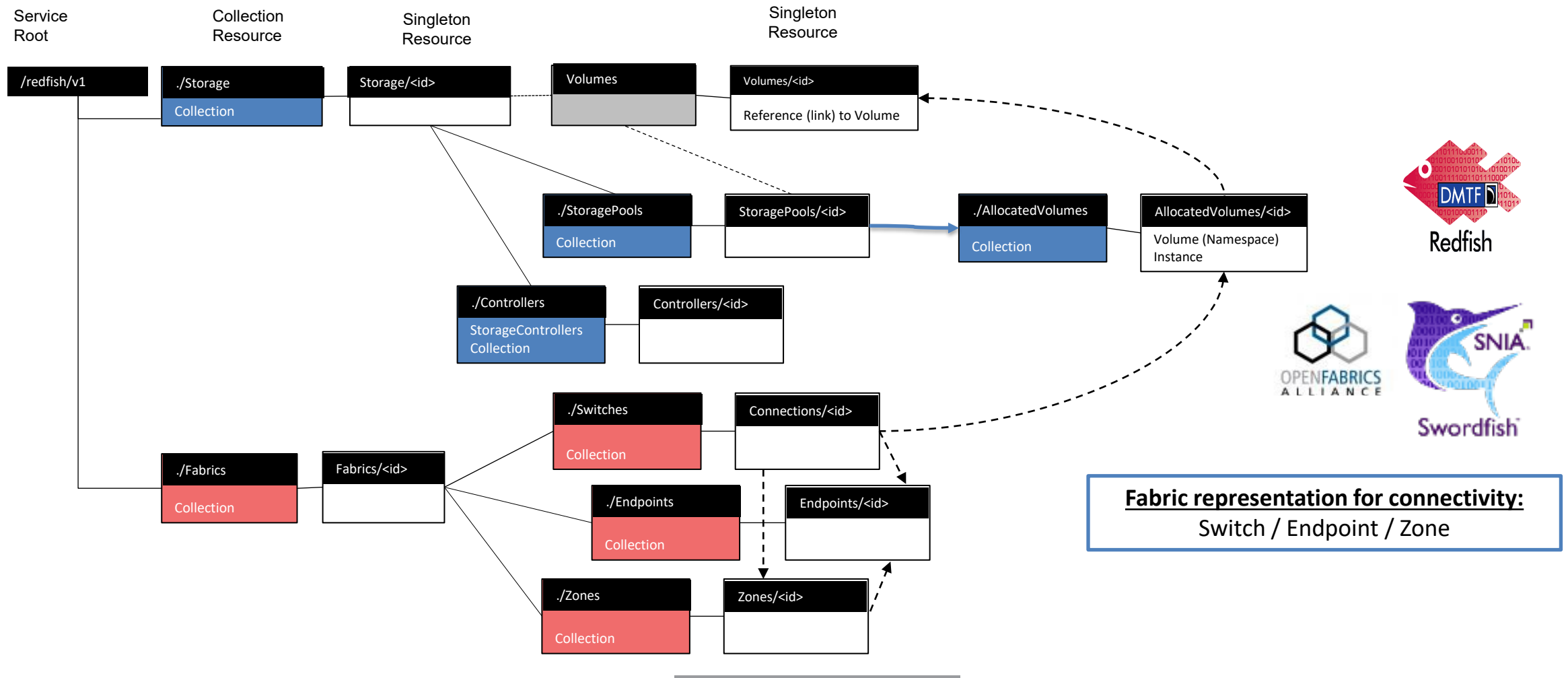
SAMPLE NVME-OF INSTANCE



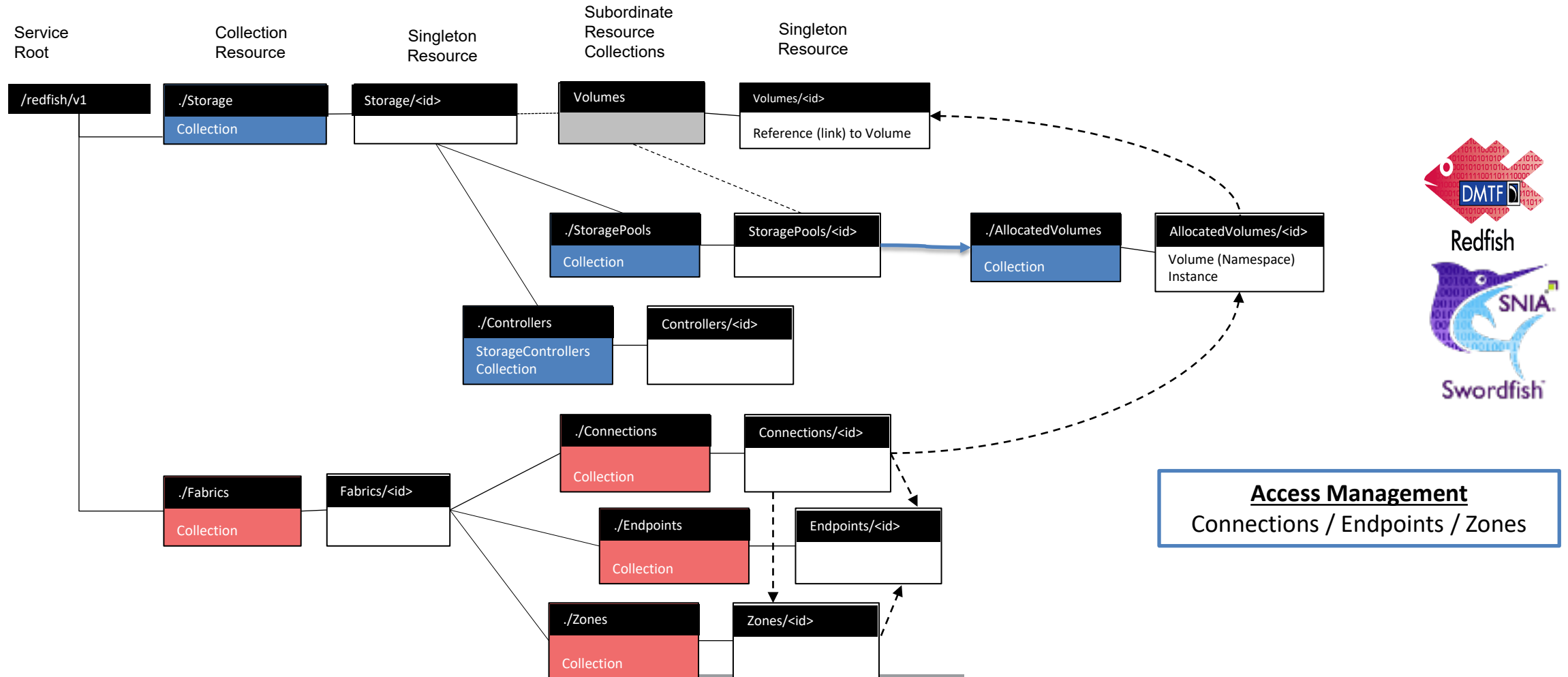
EXPANDING STORAGE FABRIC MANAGEMENT

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

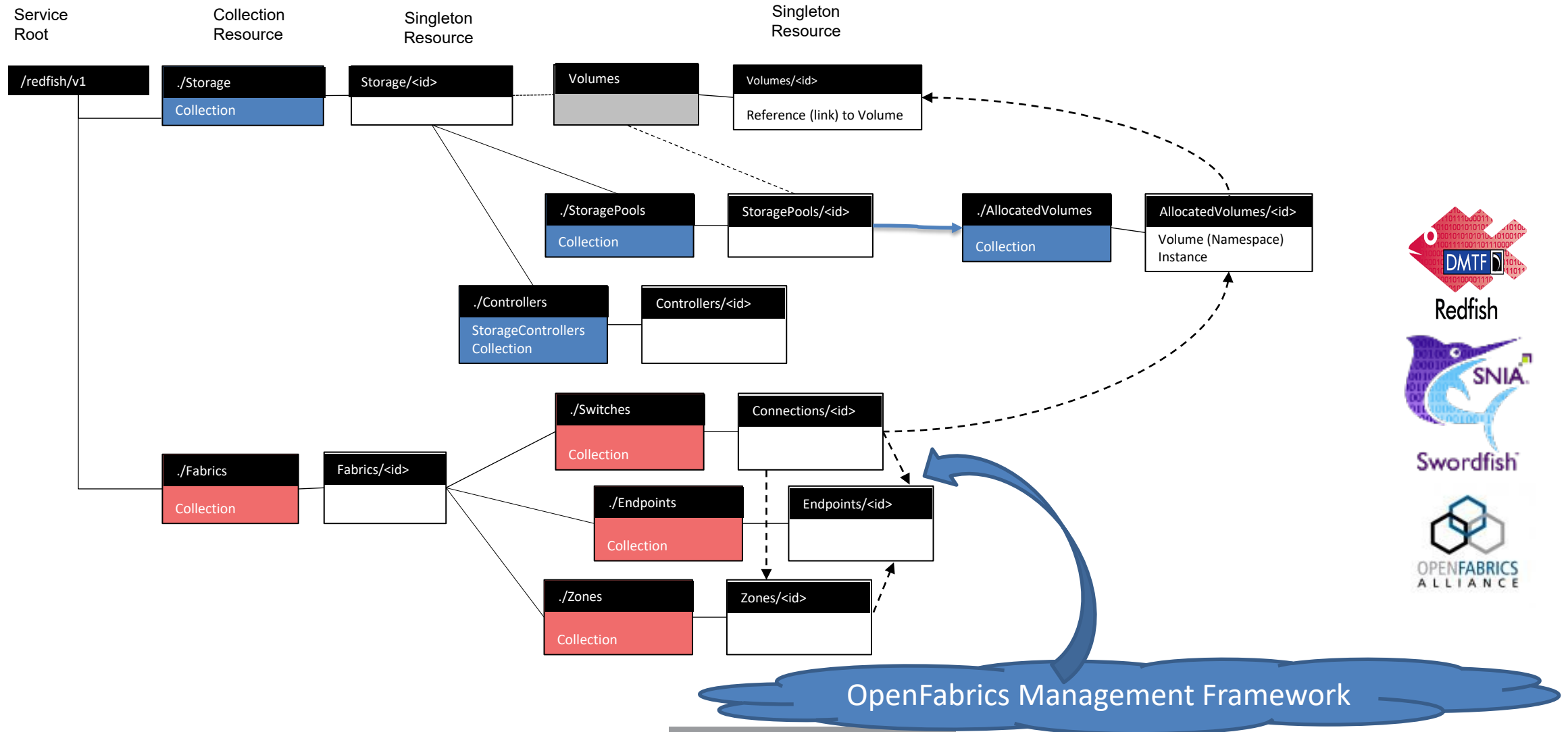
REDFISH/SWORDFISH HIERARCHY: MANAGING EXTENDED CONNECTIVITY



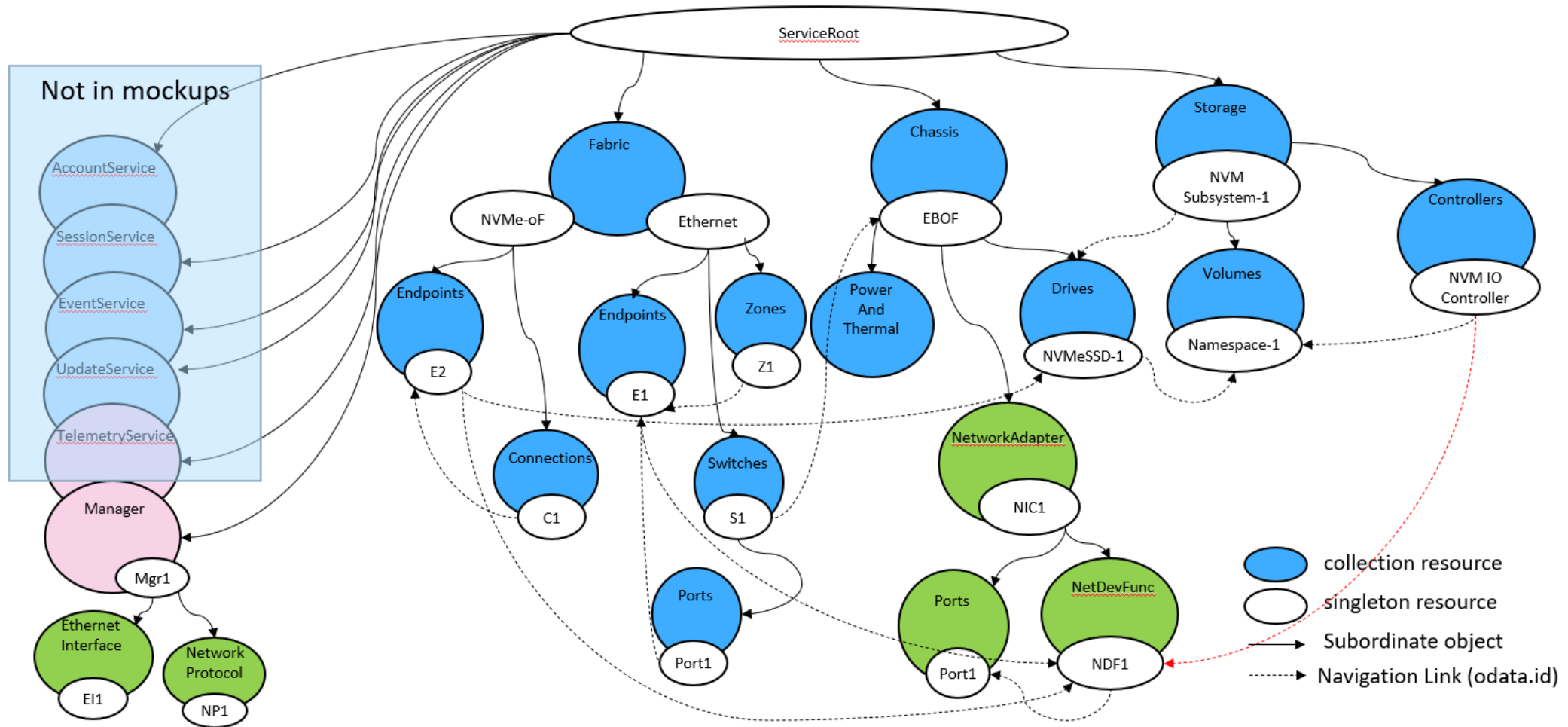
REDFISH/SWORDFISH HIERARCHY: ADDING MULTI-SYSTEM ACCESS MANAGEMENT



DEVELOPING THE OPENFABRICS FRAMEWORK AND MAPPING TO REDFISH AND SWORDFISH



DEMONSTRATING FABRIC CONNECTIVITY: EBOF



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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THANK YOU

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