

SNIA DEVELOPER CONFERENCE



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SNIA Swordfish®: A Unified Approach to Open Storage Management

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SNIA Vice-Chair, SSM and SMI Chair

About the Presenter



Richelle Ahlvers

Director of Ecosystem
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Richelle Ahlvers runs Ecosystem Enabling for the Datacenter / AI business for Intel, promoting and driving enablement of new technologies and standards strategies. Richelle has spent over 30 years in Enterprise R&D teams in a variety of technical roles, spanning architecture, design and development of software, firmware, and hardware, for everything from enterprise storage solutions to CPUs.

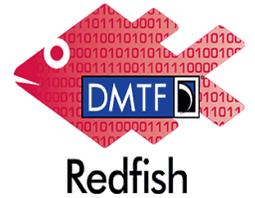
Richelle has been engaged with industry standards initiatives for many years and is actively engaged with many groups including SNIA, DMTF, NVMe, OFA and UCIe. She is Vice-Chair of the SNIA Board of Directors, Chair of the Storage Management Initiative, leads the SSM Technical Work Group developing the Swordfish Scalable Storage Management API, and is a former SNIA Technical Council Chair. She serves on the DMTF Board of Directors as the VP of Finance and Treasurer.

Abstract

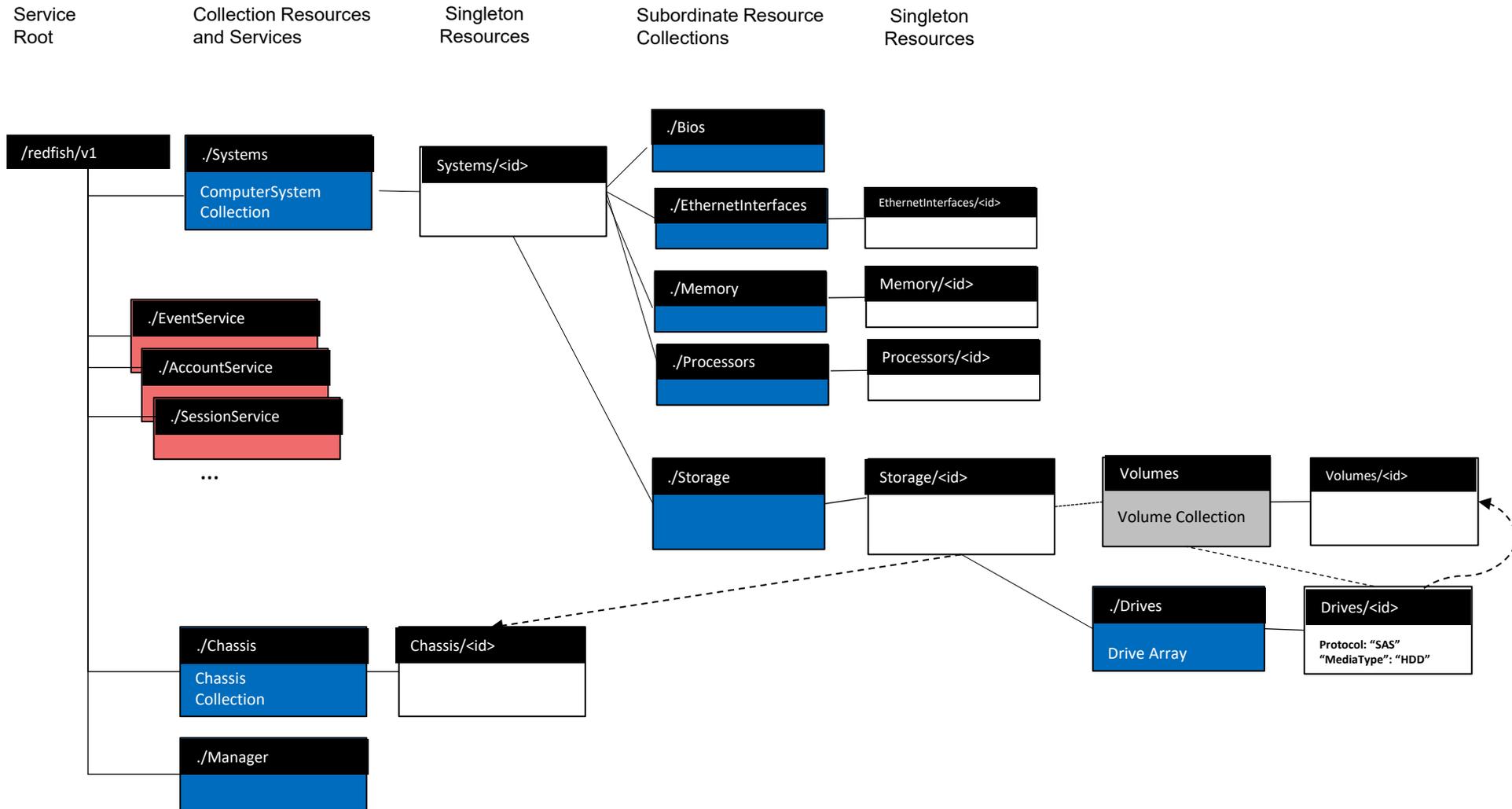
- Want to dive into what's new in storage management? This presentation provides a brief overview of DMTF Redfish® and SNIA Swordfish® and how they work together to provide a unified approach for the management of storage and servers in hyperscale and cloud environments. With the broad functionality base in Redfish and Swordfish today, there are now many capabilities available that may not be obvious at first glance. This presentation will highlight a couple of example use cases, such as leveraging the Redfish audit logging for security purposes. The presentation will also present some of the most recent functionality and use cases driving the expansion of Swordfish, including Configuration Lock capability for NVMe.

Redfish and Swordfish ...

- **DMTF Redfish®** and **SNIA Swordfish®** are both industry standards designed to simplify the management of IT infrastructure, but they serve slightly different purposes and have different scopes. Redfish provides a general-purpose framework for managing IT resources, Swordfish extends Redfish to provide a more specialized and comprehensive solution for managing scalable storage systems. By building upon the Redfish foundation, Swordfish offers the benefits of a unified management approach while also addressing the specific needs of storage environments.
- **Redfish – a Broad-Based Management Standard:** Redfish is a broader standard that aims to provide a unified interface for managing a wide range of IT resources, including servers, network devices, and more, focused on providing a common data model and RESTful API for discovering, monitoring, and managing these resources.
- **Key Features:**
 - RESTful API for easy integration with management tools
 - JSON-based data model for human-readable representation of resources
 - Support for a wide range of IT resources
 - Focus on general management tasks
- **Swordfish - extends Redfish for Scalable Storage** Swordfish is a more specialized standard that extends Redfish specifically for managing the storage components, including NVMe, as well as scalable storage systems. It provides additional APIs and data models tailored to the unique requirements of storage, including NVMe-specific properties. For storage systems, it covers managing large-scale storage pools, RAID arrays, and data replication.
- **Key Features:**
 - Builds upon the Redfish foundation
 - Provides additional APIs for storage-specific tasks
 - Supports scalable storage architectures
 - Focus on storage-centric management



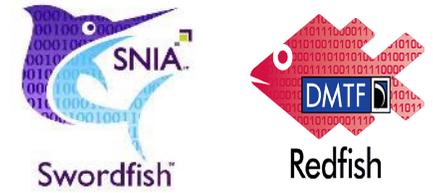
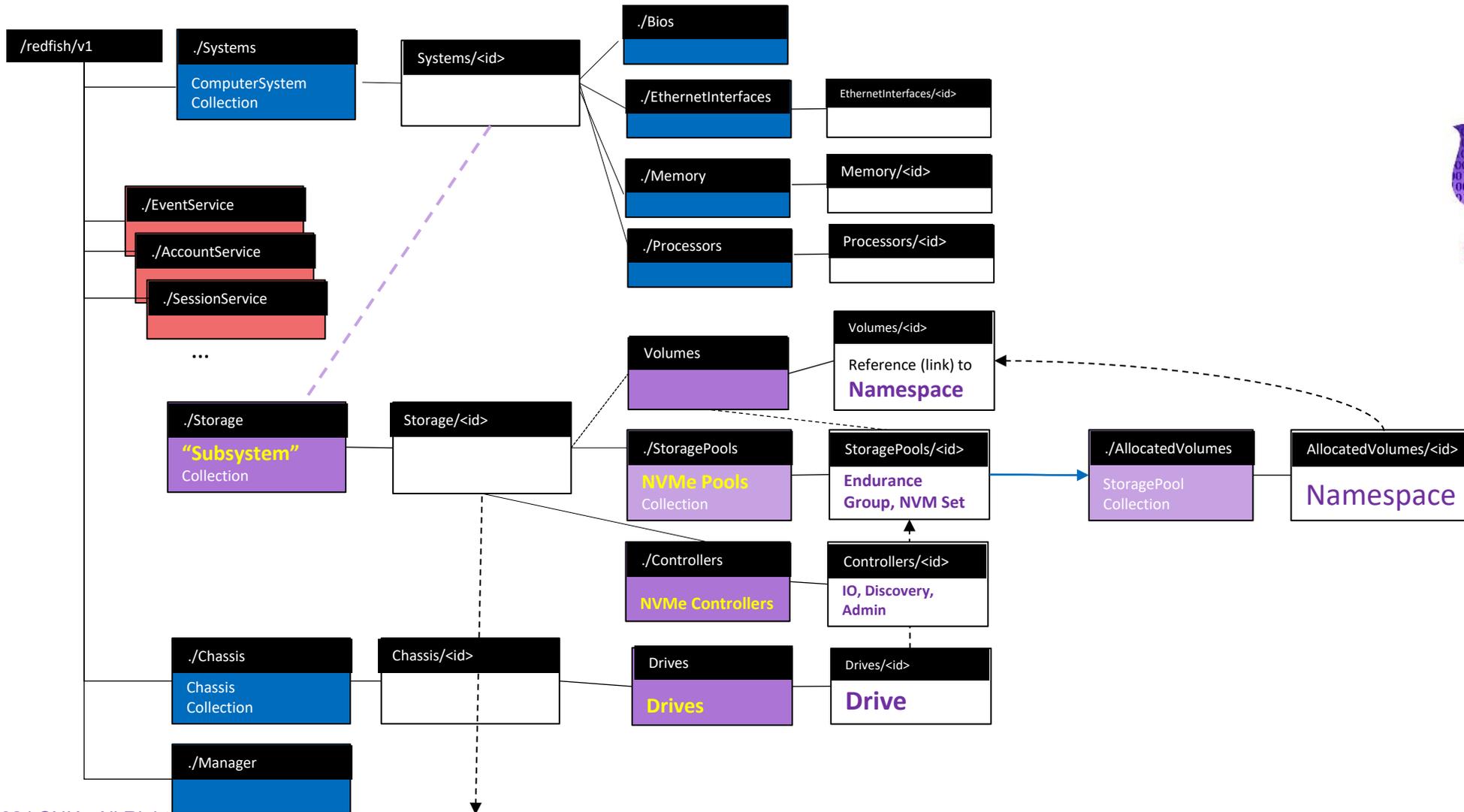
Basic Redfish System – Local / SAS Drive



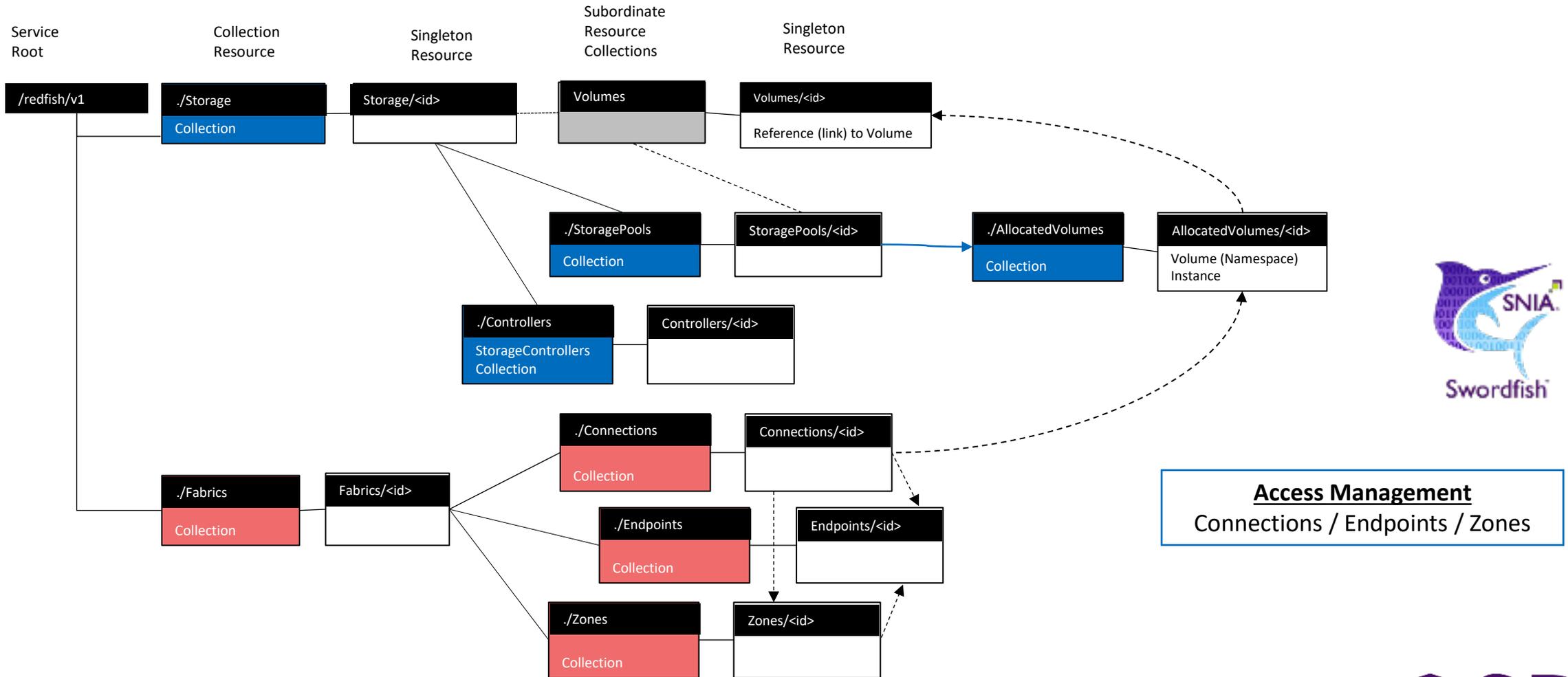
What about NVMe?

- Many different potential models for NVMe devices, so DMTF, SNIA, and NVMe worked together in a SNIA-led alliance to develop the Redfish/Swordfish model for managing devices.
 - Schema owned by ***BOTH*** DMTF and SNIA
 - SNIA develops and provides NVMe specific implementers guides and white papers (latest at snia.org/swordfish)
 - **Swordfish NVMe Model Overview and Mapping Guide**
 - **Swordfish and NVMe-oF Whitepaper**
 - **Industry defined profiles for various NVMe configurations**

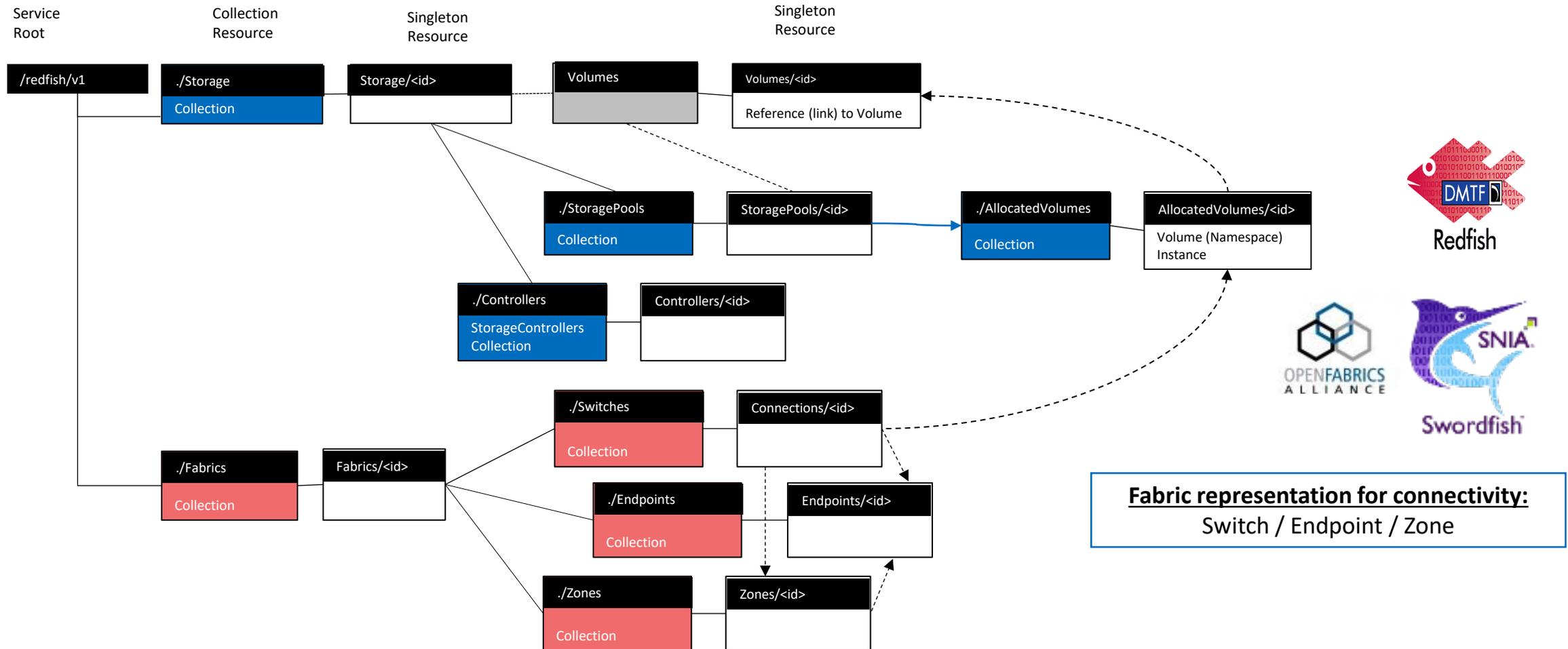
A Redfish system with NVMe Drive has "Swordfish" Content



Adding Complexity: Access Management

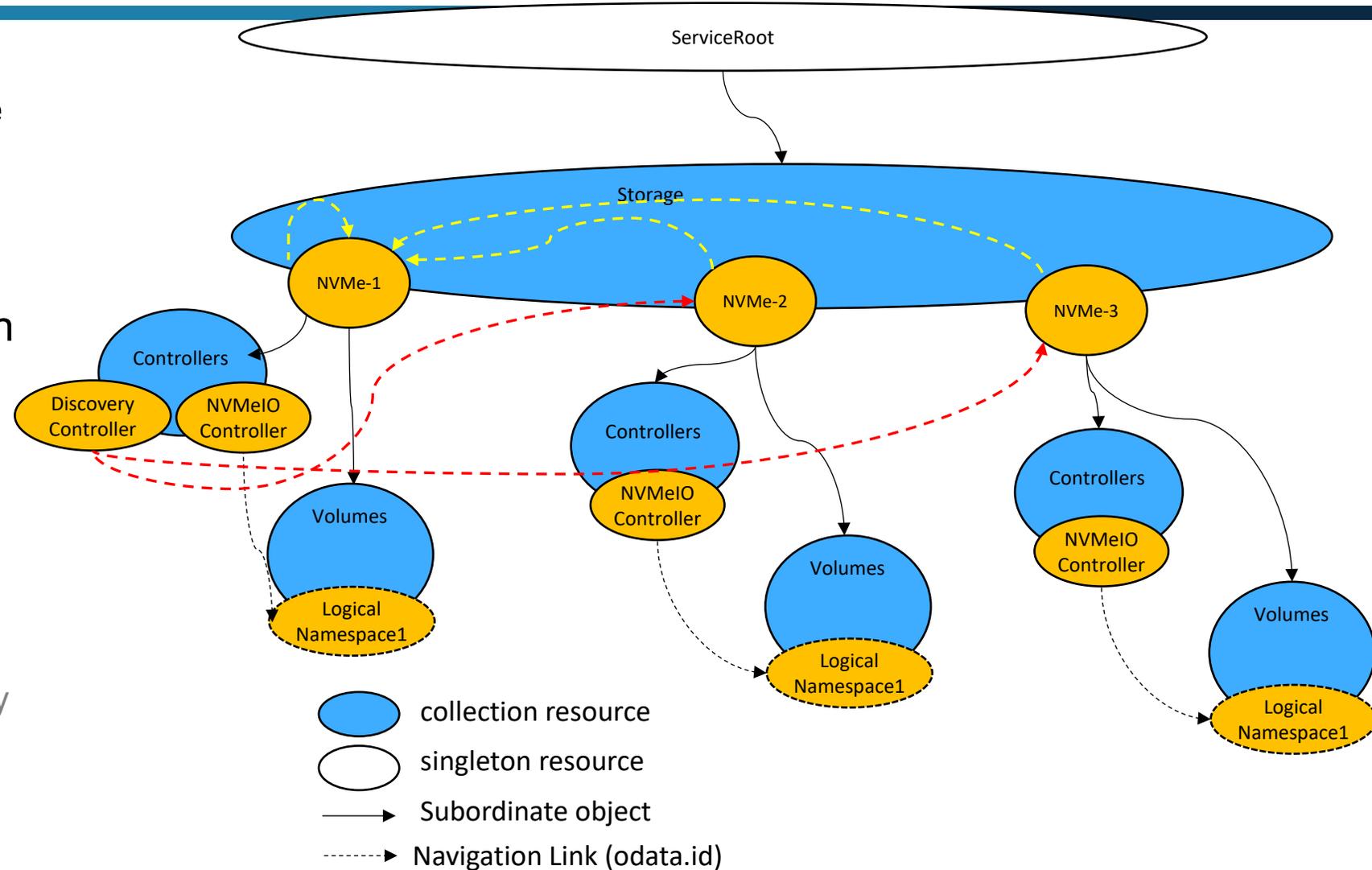


... And Connectivity



Other Use Cases: NVMe Discovery Controllers

- Discovery Controllers require no configuration by the end user / client.
- So, we have created an extremely simplified, read-only model with information in two places:
 - Subsystems.
 - Subsystems have pointers to subsystems which contain discovery controllers
 - Discovery Controllers.
 - Discovery controllers have pointers to the subsystems they have discovered



Various Configurations Described in Profiles

■ Swordfish Discovery:

- MinProtocolVersion
- Basic Items in Service Root:
 - Storage – must have at least one item
- Storage instance
 - Volumes – must have a collection, may be empty
- Must implement a FeaturesRegistry and claim support for the Swordfish Discovery feature.

■ That's it.

■ NVMeDrive

- More comprehensive. Specifies required and recommended properties. Optional properties are not included. “Do not implement” are also specified.
- Must implement a FeaturesRegistry and claim support for the Swordfish NVMeDrive feature.
- Many NVMe specific properties in Drive, Storage, and StorageController

■ IOPerformance

- Specifies the Metrics/IOWStatistics object requirements that must be implemented for the Volume, StoragePool, FileSystem, and StorageService to claim support for the Swordfish IO Performance feature as part of the VolumeMetrics, StoragePoolMetrics, StorageServiceMetrics, and FileSystemMetrics objects.
- Requires Swordfish Discovery be supported.

What's New?

ConfigurationLock for Storage Subsystems and Drives

- For NVMe, this corresponds to the Lockdown feature added in 2.0d
- ConfigurationLock, TargetConfigurationLockLevel, and ConfigurationLockState properties are jointly used to manage lockdown

Example for an NVMe Subsystem:

```
"ConfigurationLock": "Partial",
"TargetConfigurationLockLevel": "Baseline",
"NVMeSubsystemProperties": {
  "ConfigurationLockState": {
    "FirmwareCommit": "Unlocked",
    "Lockdown": "Locked",
    "SecuritySend": "LockdownUnsupported",
    "FirmwareImageDownload": "LockdownUnsupported",
    "VPDWrite": "CommandUnsupported"
  }
}
```

New Whitepapers and Guides

- **Swordfish Interoperability Guide**
 - a comprehensive reference guide to the Swordfish-specific extensions to the profile syntax, and a detailed usage guide for Swordfish features and profiles
- **Swordfish and NVMe-oF Whitepaper**
 - This paper provides a deep dive into the NVMe oF configurations, and more specifically, how these are represented in both the Swordfish client model and API.

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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