



the Future of Memory and Storage

Standards-based Management from SNIA

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SSM TWG Chair



Abstract



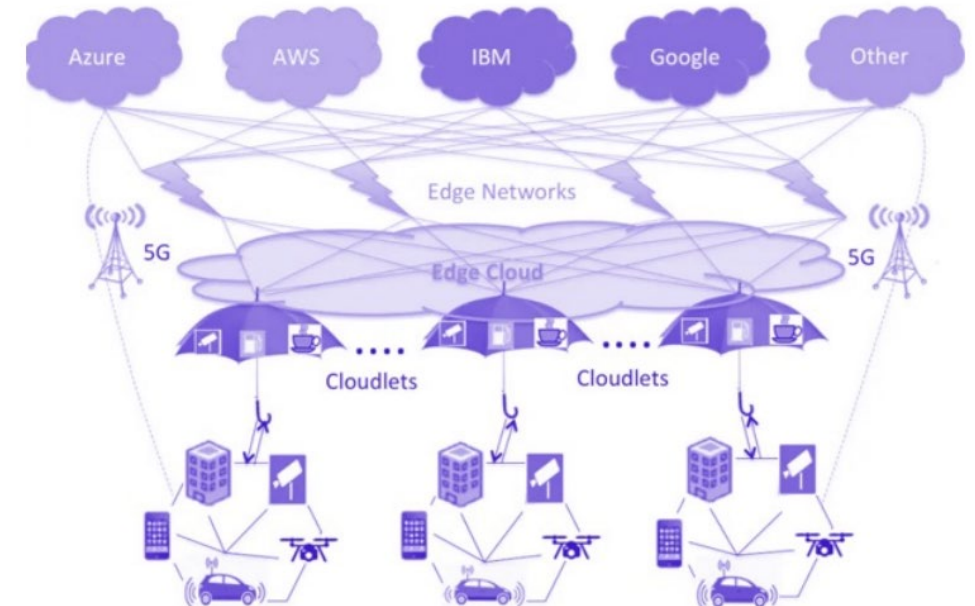
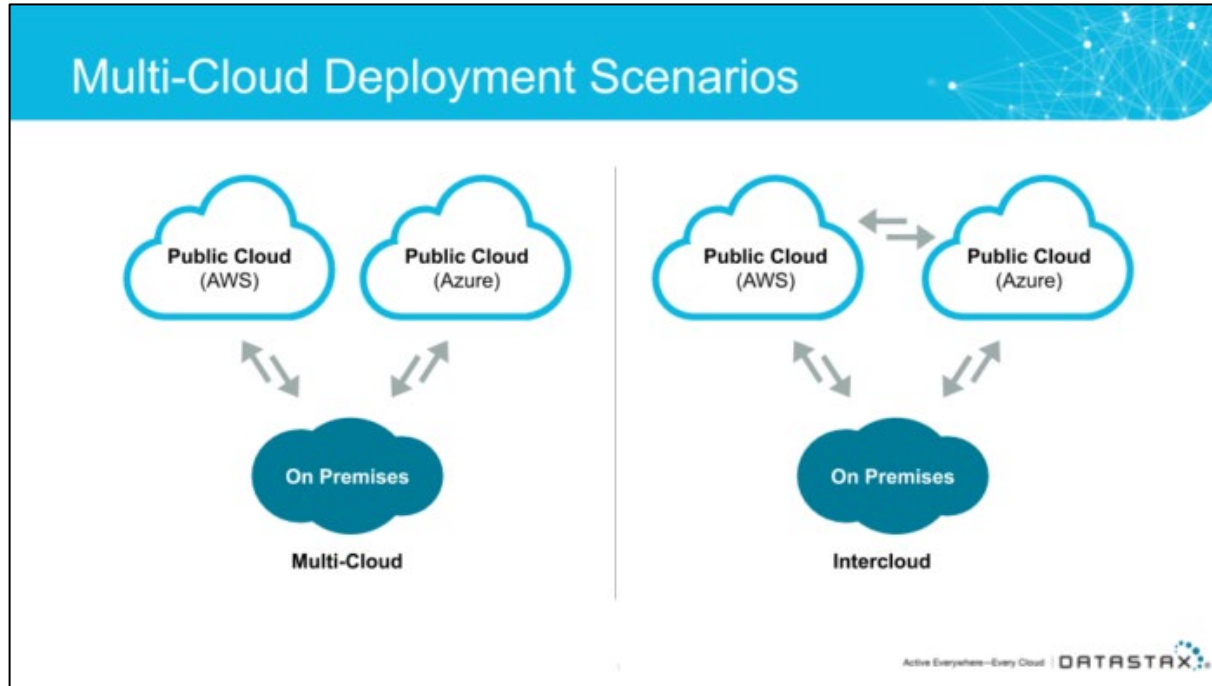
- SNIA has been the source for storage management standards for over 20 years and continues to lead with standards-based management interfaces for key use cases and configurations. From enterprise to NVMe architecture to cloud, SNIA standards enable infrastructure for applications, from traditional to bleeding edge. Learn how SNIA works with partners to rapidly adapt manageability strategies for standards with technologies like SNIA Swordfish(tm).

Where is the Data?



Centrally Managed?

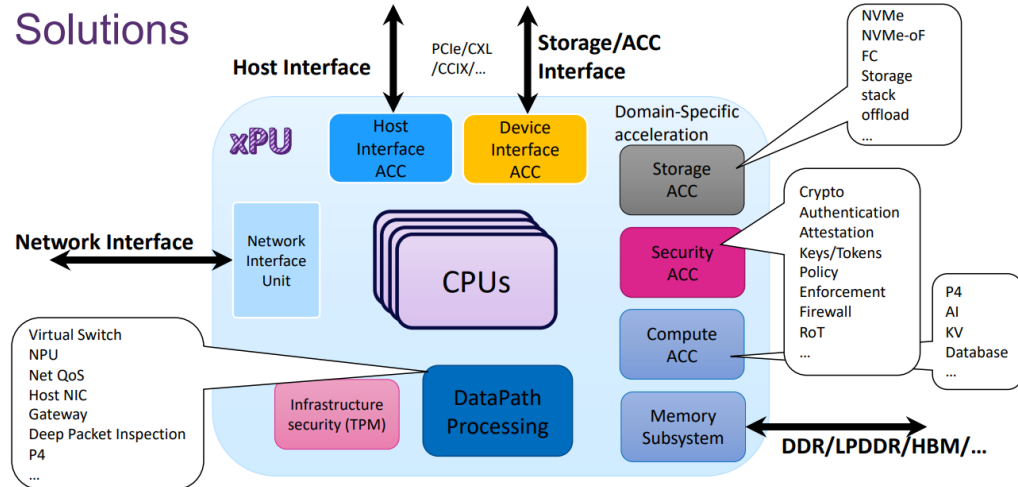
Edge?



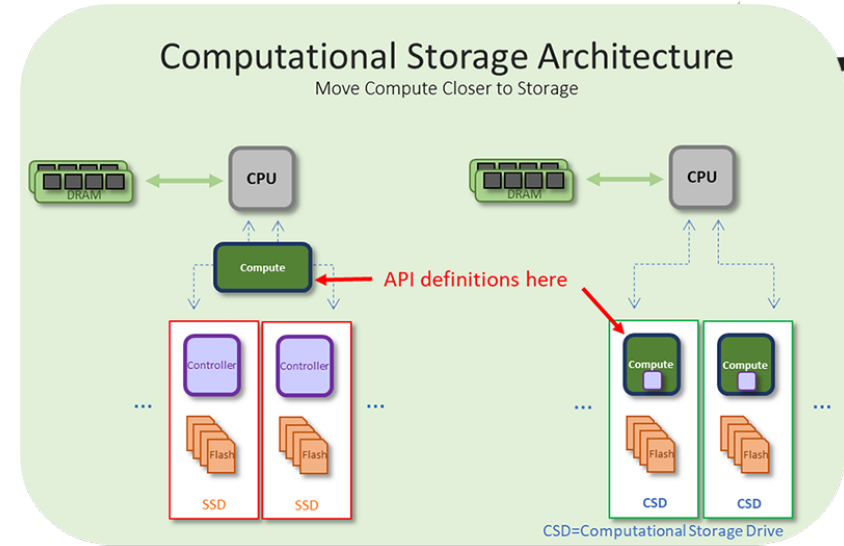
Co-locating Processing with Data



xPU Solutions

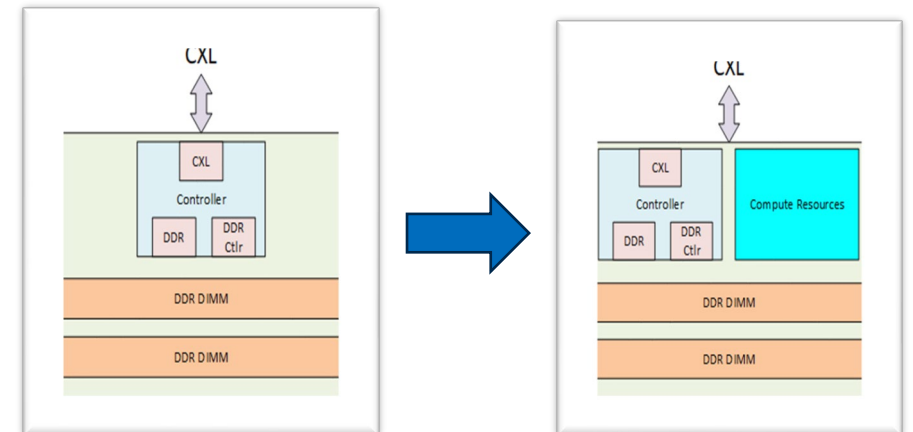
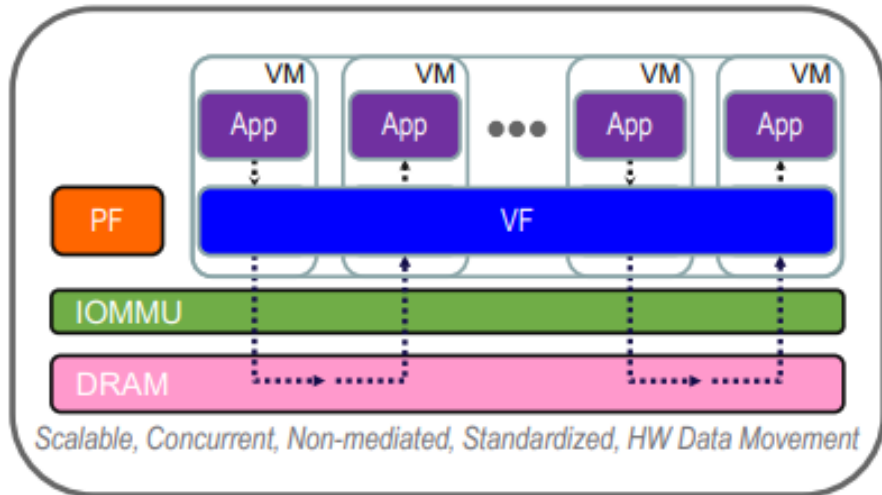


- Different flavors of xPUs vary in their specific block diagram

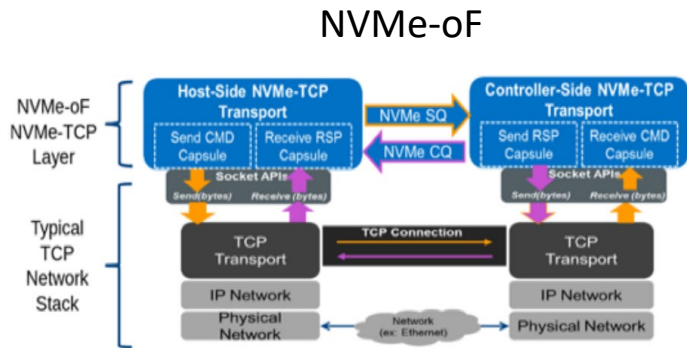


Computational Storage / Computational Memory

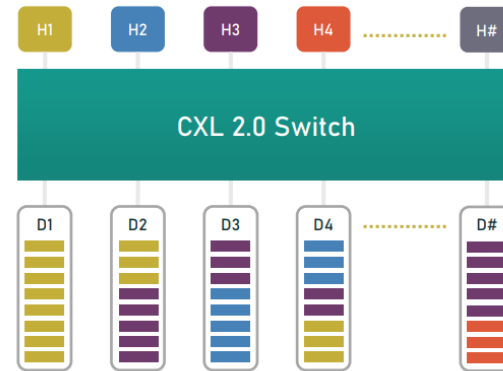
Data Accelerators



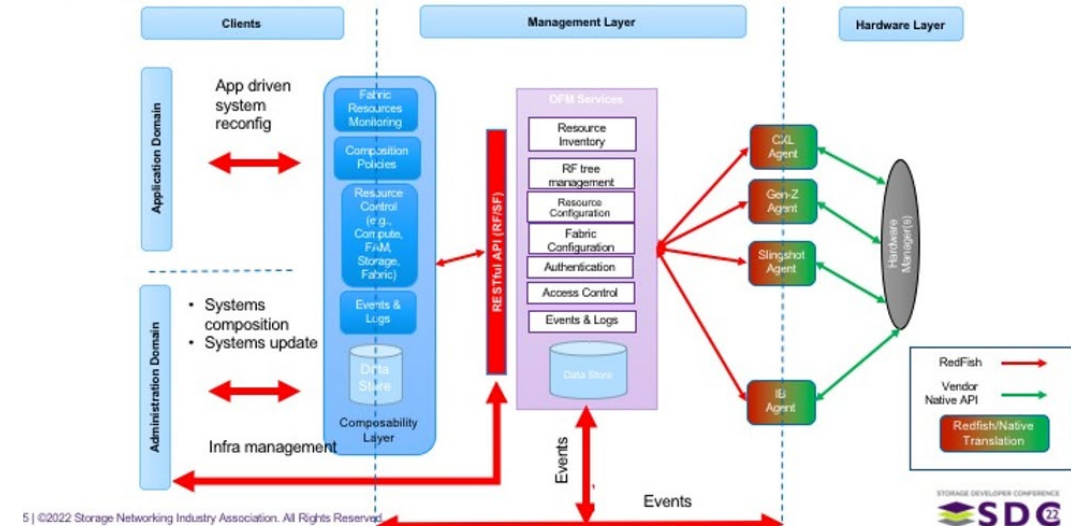
Expanding Storage Fabric Technologies



Memory Pooling with Multiple Logical Devices



Cache coherent disaggregation:
Memory, Accelerators,
memory-based storage

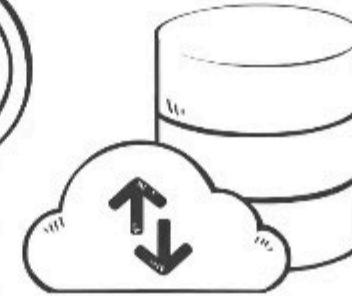


Expanding storage fabric technologies:
Dedicated fabrics to shared fabrics
AND
Managing heterogeneous fabrics

Managing CXL and storage together

New Ways to Manage Storage: AI

- Challenges with AI storage management:
 - Single vendor
 - Self-proliferating (creates more data to manage)
 - Cloud connectivity an issue for dark sites
 - New technology, poorly understood algorithms



SIMPLIFYING STORAGE ADMINISTRATION



MAINTAINING CONSISTENT PERFORMANCE



OPTIMIZING RESOURCE UTILIZATION

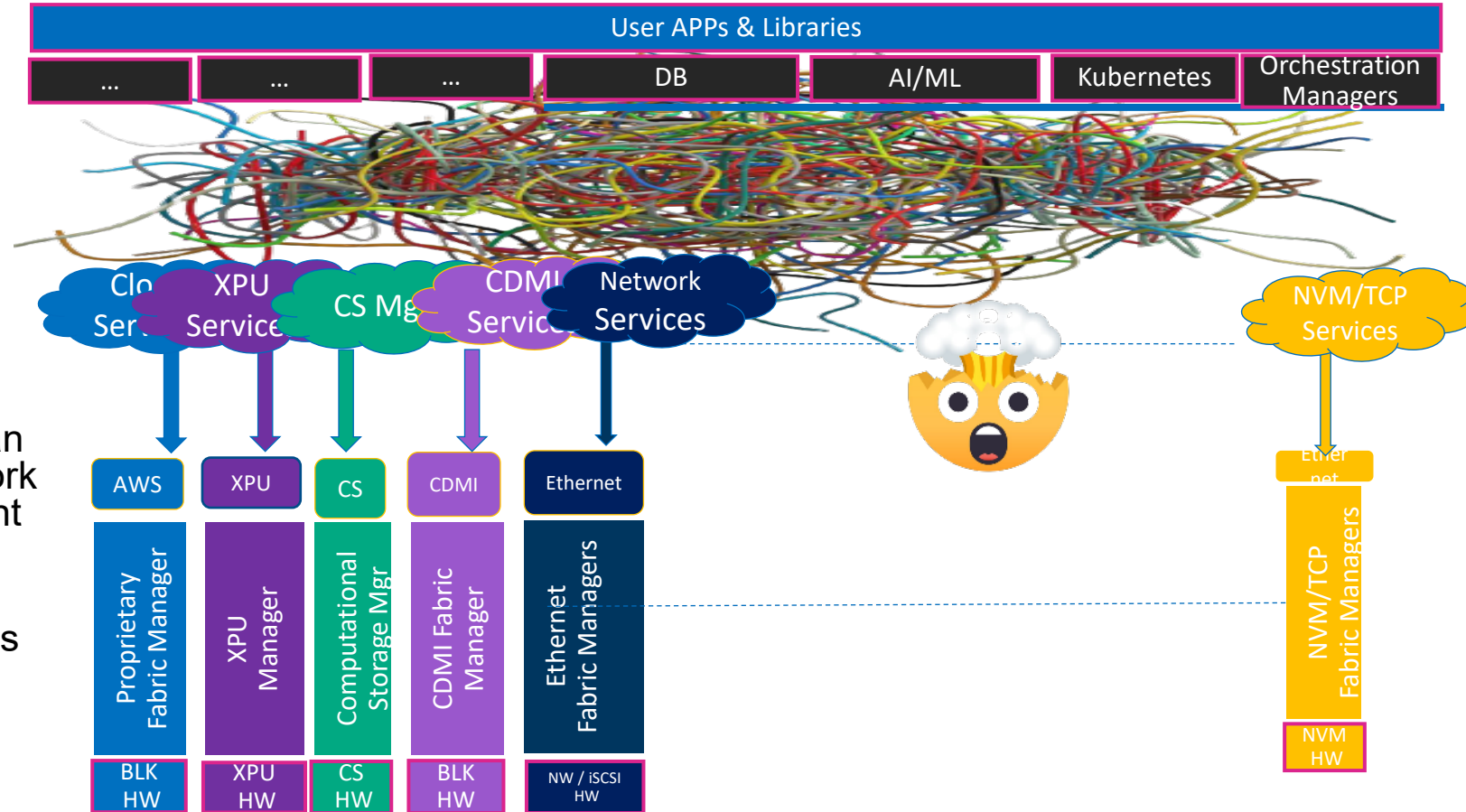


These Trends Lead to ... a Manageability Headache



Administrative Management Challenges

- Adding additional virtualization and acceleration technologies presents more flexibility and options to build a custom configuration but doing so increases the management challenges exponentially.
- Workload management and optimization is different for each type of technology, device, and vendor. Sometimes, even per version.
- Administrators are being asked to manage an increasingly heterogenous device and network infrastructure, each with its own management standard and model. DevOps, instead of specialized management domains.
- With the proliferation of different technologies and multiple vendors, standards-based management is more critical than ever to successfully develop, integrate, deploy, and manage systems and storage at scale



Organizations working on standards-based management

■ Developing Management Standards

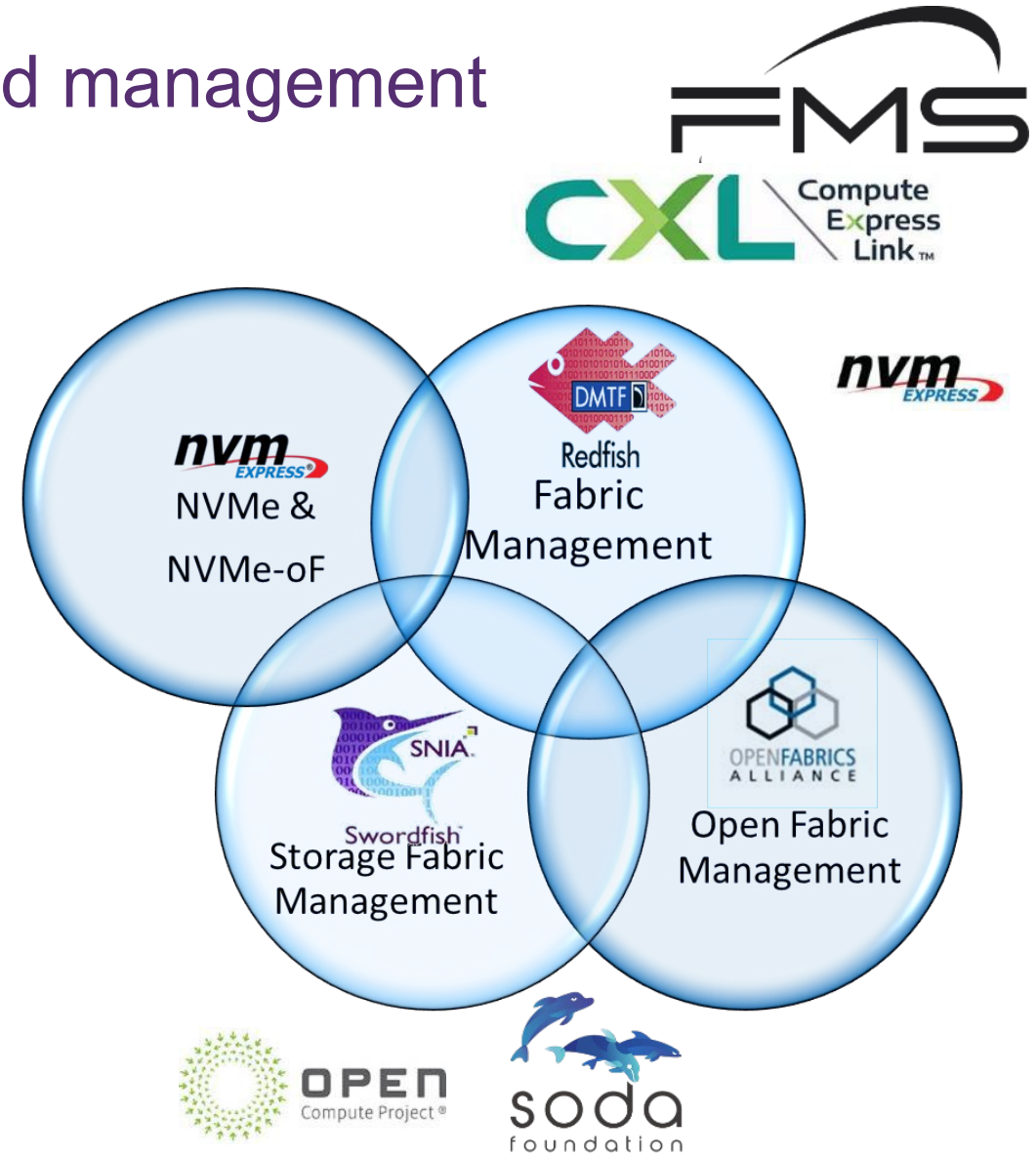
- DMTF – DMTF Redfish®
- SNIA – SNIA Swordfish®
- NVM Express – NVMe-MI®

■ Using Standards

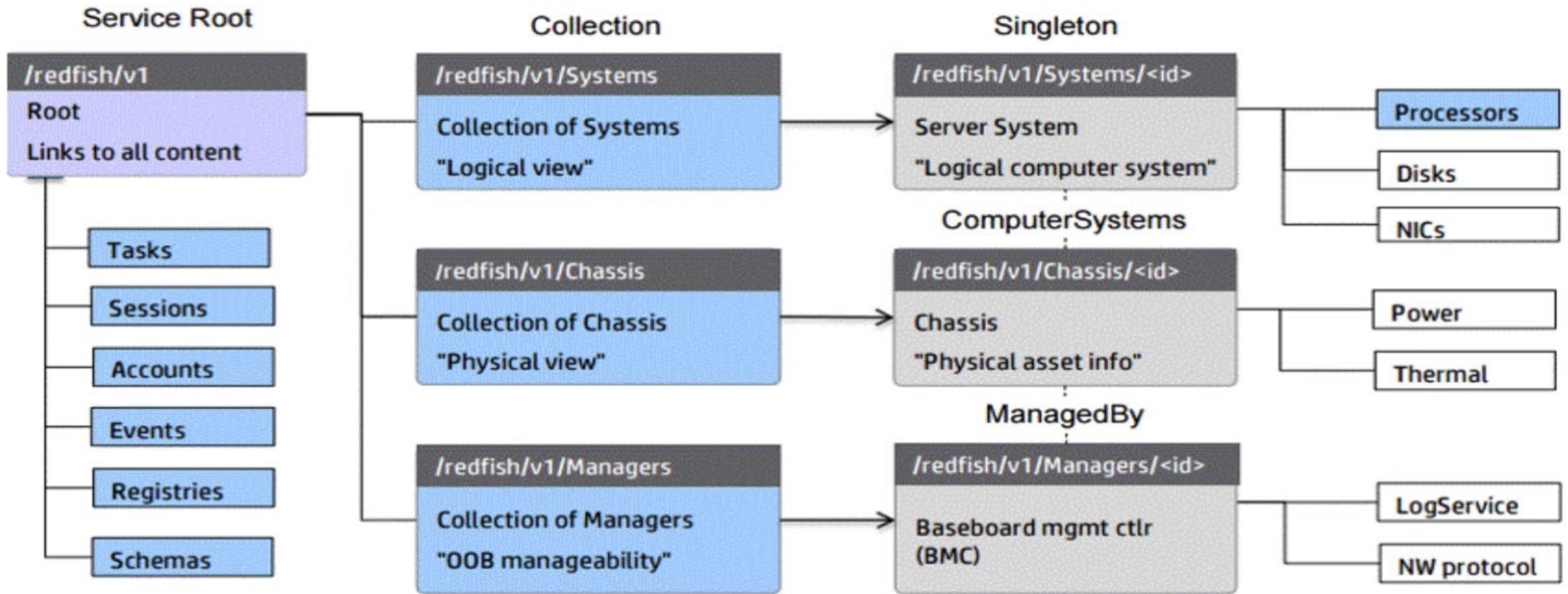
- OFA – OpenFabrics Management Framework
- SODA Foundation – Service-based orchestration

■ Partner Groups Refining the Standards:

- OCP, CXL Consortium, UCle

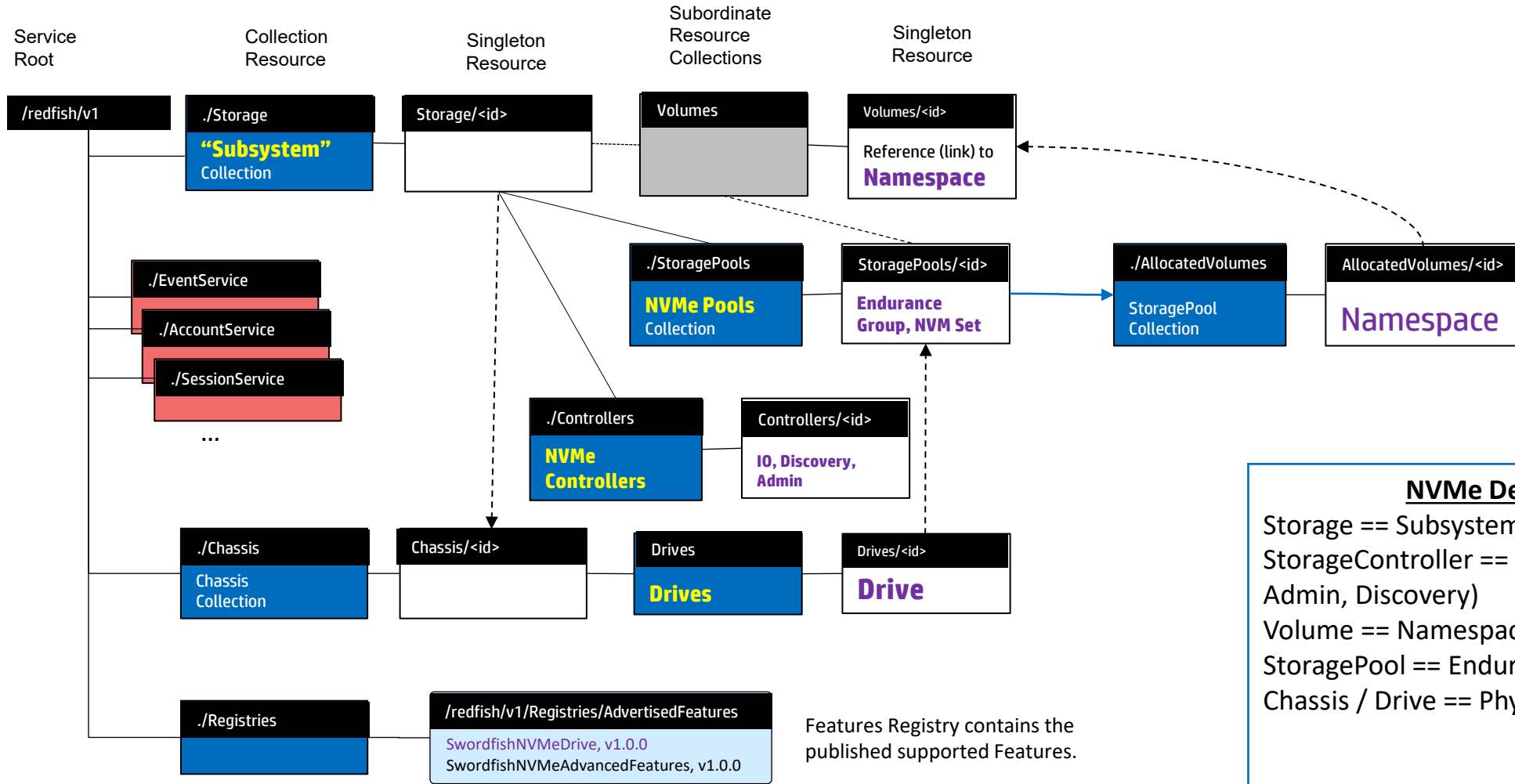


Redfish RESTful Resource Map



Swordfish: Extending Redfish

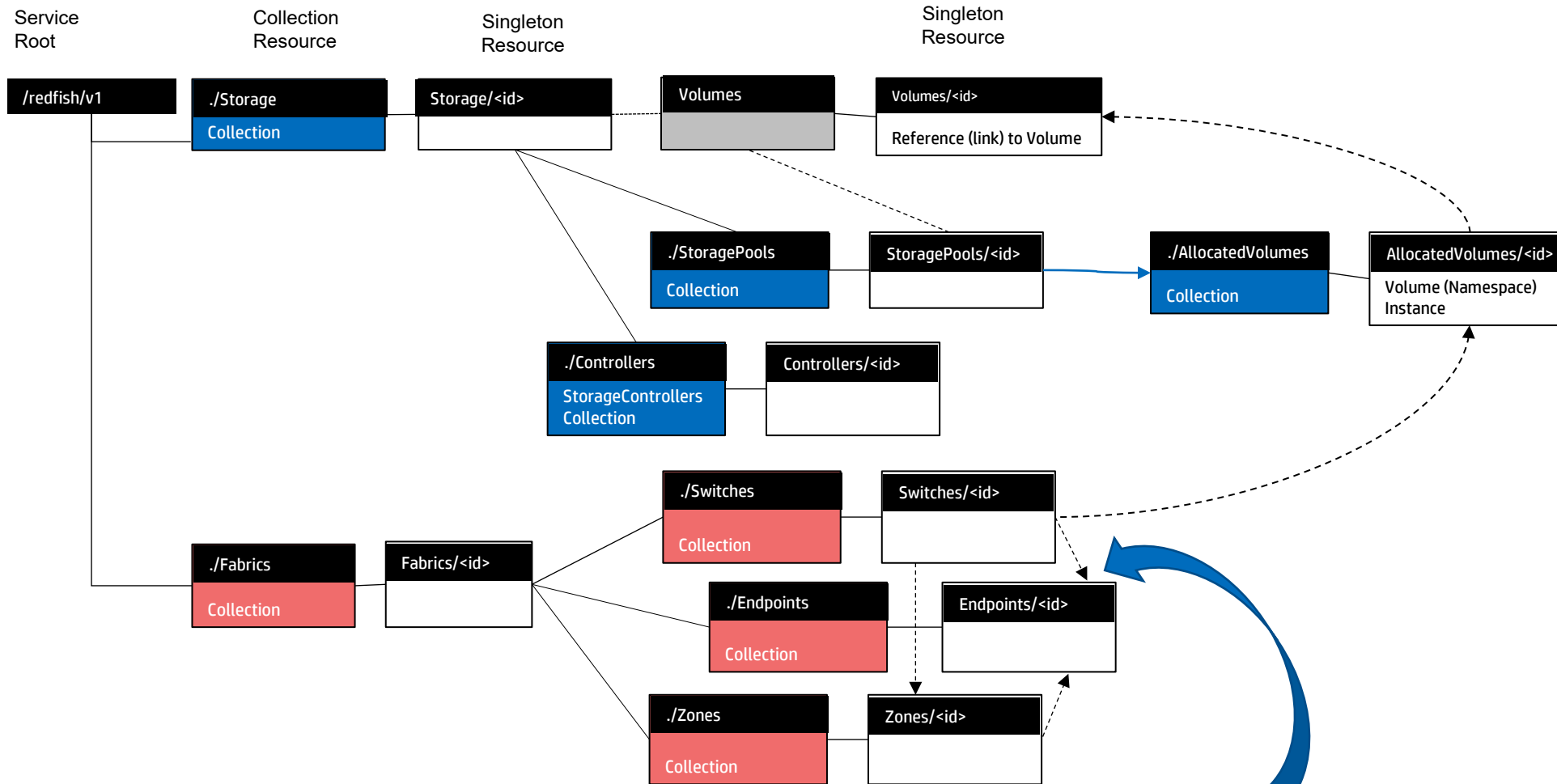
Example: NVMe Drive Model



NVMe Device Usage:

- Storage == Subsystem
- StorageController == NVMe Controllers (IO, Admin, Discovery)
- Volume == Namespace
- StoragePool == Endurance Group / NVM Set
- Chassis / Drive == Physical Entity Information

Extending Fabric Management with Redfish and Swordfish Interfaces



Redfish



Swordfish



OpenFabrics Management Framework

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/>





Thank you