SDC 20

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Migrating OEM extensions to Swordfish for Scalable Storage Management

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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

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Agenda

- Storage Management Overview
  - Storage System Models
    - Swordfish Standalone Configuration(SSC)
    - Swordfish Integrated Configuration (SIC)
  - Typical SIC Storage Management Architecture
- Storage Management with Redfish
  - Need for OEM extensions
  - Cisco OEM extensions
- Migration from Redfish to Swordfish
  - Minimum implementation set
- Summary and wrap up

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Swordfish Storage Management

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Swordfish Storage Management

- Swordfish Scalable Storage Management API defines RESTful interfaces and a standardized data model.
- Provide scalable interfaces for managing storage and related data services.
- It is an Extension to Redfish Scalable platform management from DMTF.

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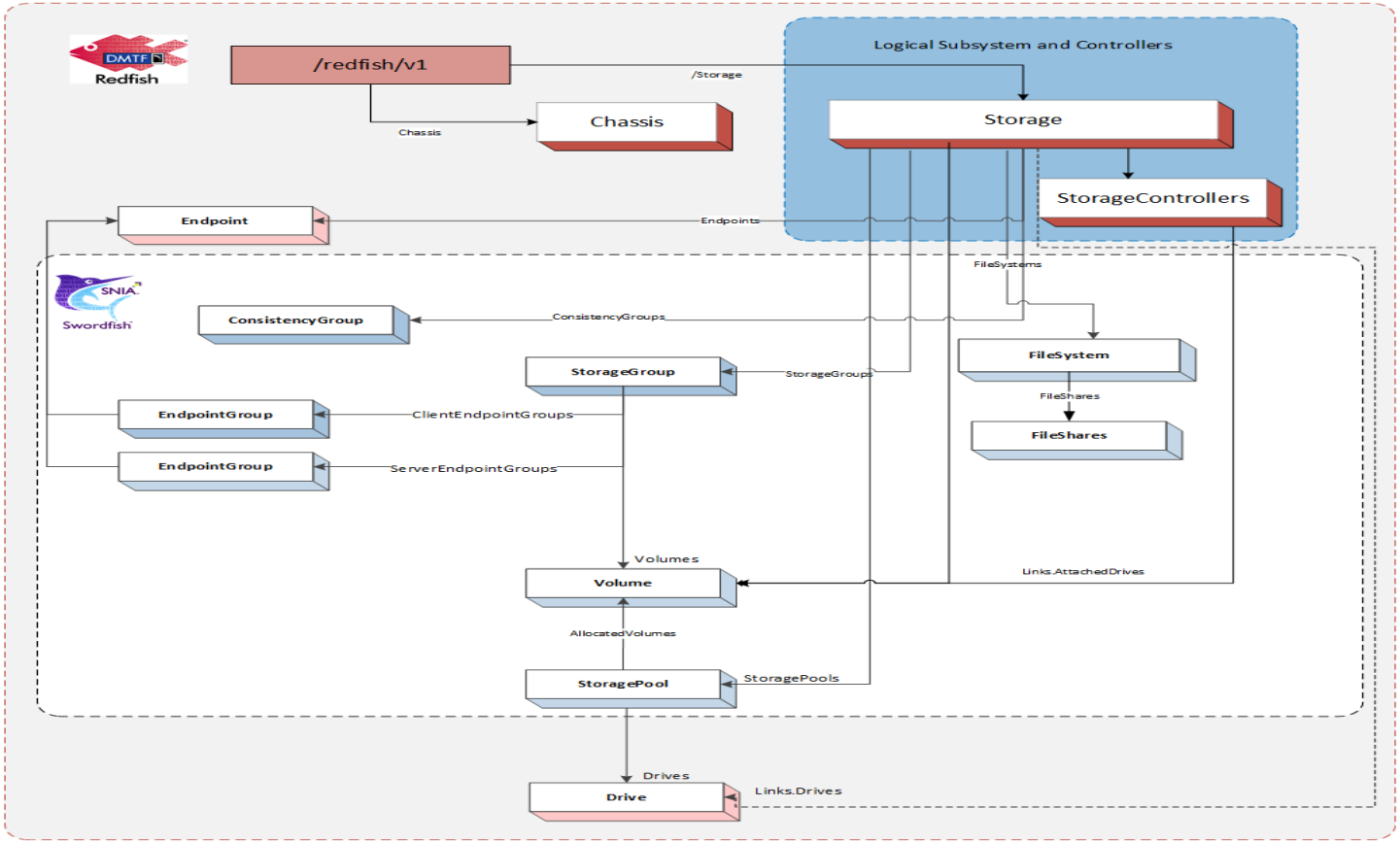
Swordfish Storage Management



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Swordfish Storage Management - SSC

- Swordfish Standalone Configuration (SSC)
  - A logical storage system is instantiated directly under Service root.
  - This logical system is modeled using Redfish Storage & StorageController resources
  - Generally applicable to storage array systems.

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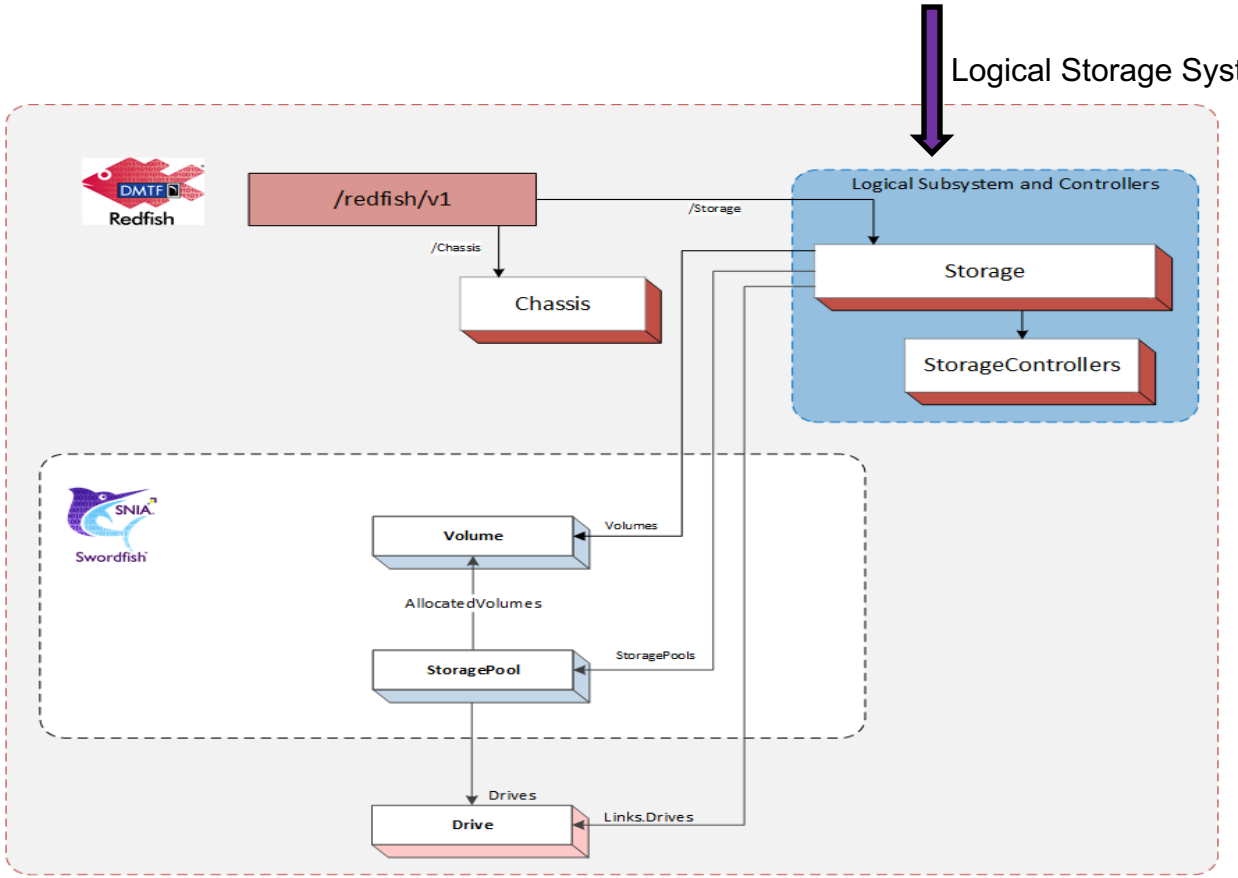
Swordfish Storage Management - SSC



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SNIA Swordfish

Swordfish Storage Management - SIC

- Swordfish Integrated Configuration (SIC)
  - Storage subsystem is contained within the ComputerSystem
  - Physical components are modelled using Redfish Chassis
  - Attached to Storage Collection in the Server system.
  - Storage management is modeled using Redfish Storage Resource and StorageControllers resource collection
  - Mainly applicable to server attached storage configurations.
  - This presentation will focus mainly on SIC configuration

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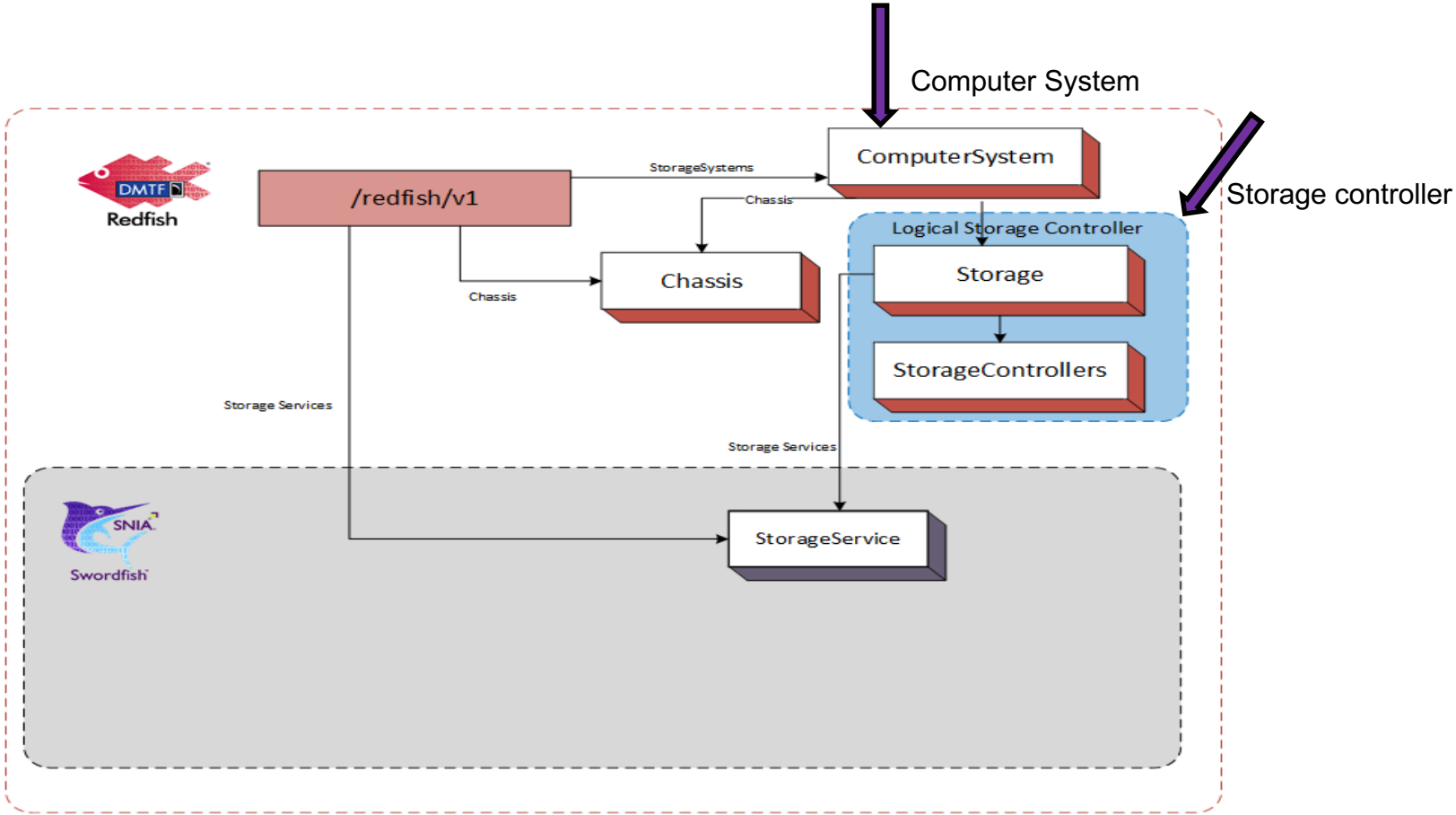
Swordfish Storage Management - SIC



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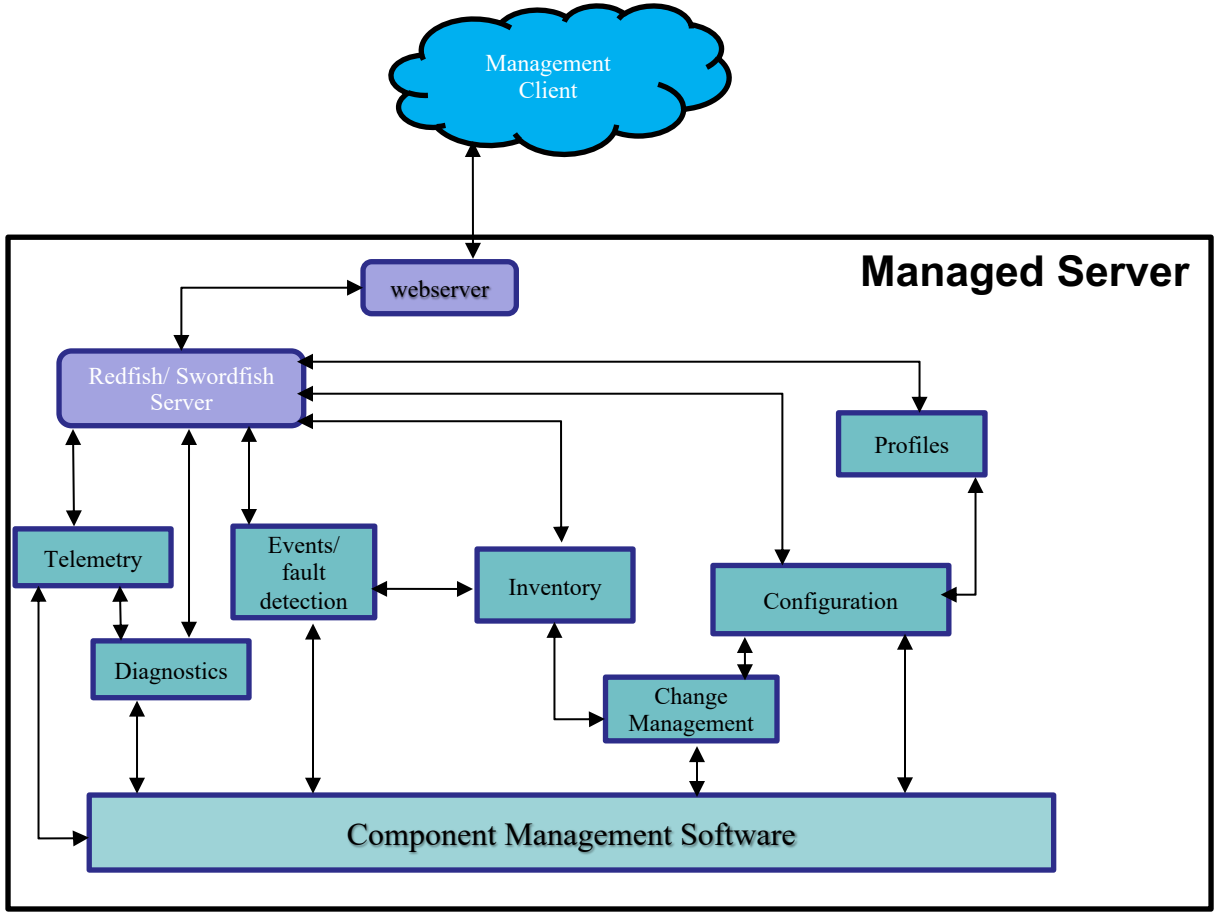
Typical Storage Management Architecture



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Cisco Storage Management Architecture

- Provides system resource inventory, configuration, change management, events, monitoring & telemetry
- Single Pane Management
  - Provisioning and configuration
  - Unified data model to manage all components and across multiple systems
  - Monitoring components and systems under one hierarchical object model.

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Cisco Storage Management Architecture

- Use of Service Profiles
  - Application use case specific configuration
  - Enables quick deployment with predefined profiles
  - At scale deployment for large number of nodes
  - Allows administrators to change service profile, providing extreme flexibility to respond to business workloads.
- Standards based
  - Interoperability with Redfish/Swordfish implementation in heterogenous environments.

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Cisco Storage Management Architecture

- Enhanced user experience through OEM extensions
  - Provides additional properties and methods/actions for better health monitoring

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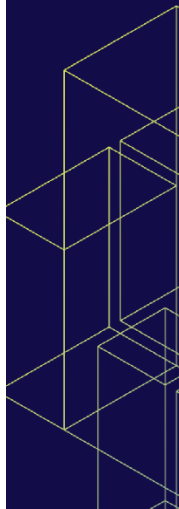
Storage Management with Redfish



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Storage Management Resources

- Storage Management resource types
  - Physical Resources
    - Storage Controllers, Physical Drives, BBUs
  - Logical Resources
    - Storage Pools, Volumes
  - Storage Services
    - Snapshots, Clones, Replicas
  - Storage Profiles/ Application Profiles
  - Storage Events/Faults

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Cisco Redfish Extensions

- Redfish provides comprehensive model for System management
- Provides limited storage management
- Storage extensions:
  - Storage Controllers
    - Enhanced Status indicators
    - Battery Back Unit (BBU) management
    - Diagnostics

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Cisco Redfish Extensions

- Physical Drives
  - Enhanced Status indicators
  - Enhanced health monitoring
    - Error counters, Failure prediction,
  - Diagnostics
    - Enhanced SMART reporting
  - Operations
    - Rebuilds, Media Patrol Reads

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Cisco Redfish Extensions

- OEM Logical Resource
  - DriveGroups
  - DriveSpans
  - PhysicalCapacity
  - Spares
- Swordfish Resource
  - Swordfish StoragePools
  - Swordfish Spans
  - Swordfish CapacitySource
  - Swordfish SpareResourceSet

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Cisco OEM – Volumes

- Enhanced Volume management
  - Additional properties & actions for enhanced Volume management
    - Cache policies
      - ✓ READ, WRITE, IO
    - Usage
      - ✓ Boot, Cache
    - Volume Operations
      - ✓ Consistency Check, Rebuild, RAID Migration

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Cisco OEM – Volumes

OEM

```
"Oem":  {
          "Cisco":       {
               “Raid-Level”: “Raid1”,
                "RequestedWriteCachePolicy":    "WriteThrough",
                 "ConfiguredWriteCachePolicy":   "WriteThrough",
                 "VolumeReadAheadPolicy":        "NoReadAhead",
                 "VolumeIoPolicy":       "DirectIo",
                  "AvailableSizeMiBytes": 220760,
                 "Bootable":     false,
                 "FullDiskEncryptionCapable":    false
               }
       }
```

Swordfish Property

- Volume->RAIDType
- Volume->WriteCachePolicyType
- Volume->WriteCachePolicyType
- Volume->ReadCachePolicyType
- Volume->ReadCachePolicyType
- StoragePool->RemainingCapacityPercent
- Volume-> VolumeUsageType
- EncryptionTypes

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Cisco OEM – Volumes

- OEM Action


```
"Actions":     {
   "#Volume.StartConsistencyCheck":  {
   "target":
"/redfish/v1/Systems/ABC1234/Storage/abc123/Volumes/0/Actions/Volume.Start
ConsistencyCheck”
},
   "#Volume.CancelConsistencyCheck":      {
   "target":
"/redfish/v1/Systems/ABC1234/Storage/abc123/Volumes/0/Actions/Volume.Can
celConsistencyCheck”
}
 "#Volume.PatrolRead":      {
   "target":
"/redfish/v1/Systems/ABC1234/Storage/abc123/Volumes/0/Actions/Volume.Patr
olRead”
},
"#Volume.RaidReconstruction":      {
   "target":
"/redfish/v1/Systems/ABC1234/Storage/abc123/Volumes/0/Actions/Volume.Raid
Reconstruction”
}
```


- Swordfish Resource

- Swordfish ConsistencyGroup

- Swordfish ConsistencyGroup

- Swordfish StorageService

- Swordfish ChangeRAIDLayout

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Cisco Redfish Extensions

OEM	Swordfish
❑ Service Profiles	❑ Swordfish Profiles
❑ Storage Events	❑ Redfish Events with Swordfish user guide

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Migration from Redfish to Swordfish

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Migration from Redfish to Swordfish

- Minimum Swordfish Implementation.
  - Should implement following “well known” URLs
    - /redfish/ and must contain one or more version properties of the Integrated Redfish and Swordfish implementation.
    - /redfish/v1/Features
  - Swordfish implementation should support:
    - GET on all system objects
    - GET on all object properties
  - Storage Collection under service root
  - Must have Storage pool collection

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Migration from Redfish to Swordfish

- Must have Capacity source
- Must have Volume collection
- Must have Features Register with at least Swordfish Discovery as SupportedFeature

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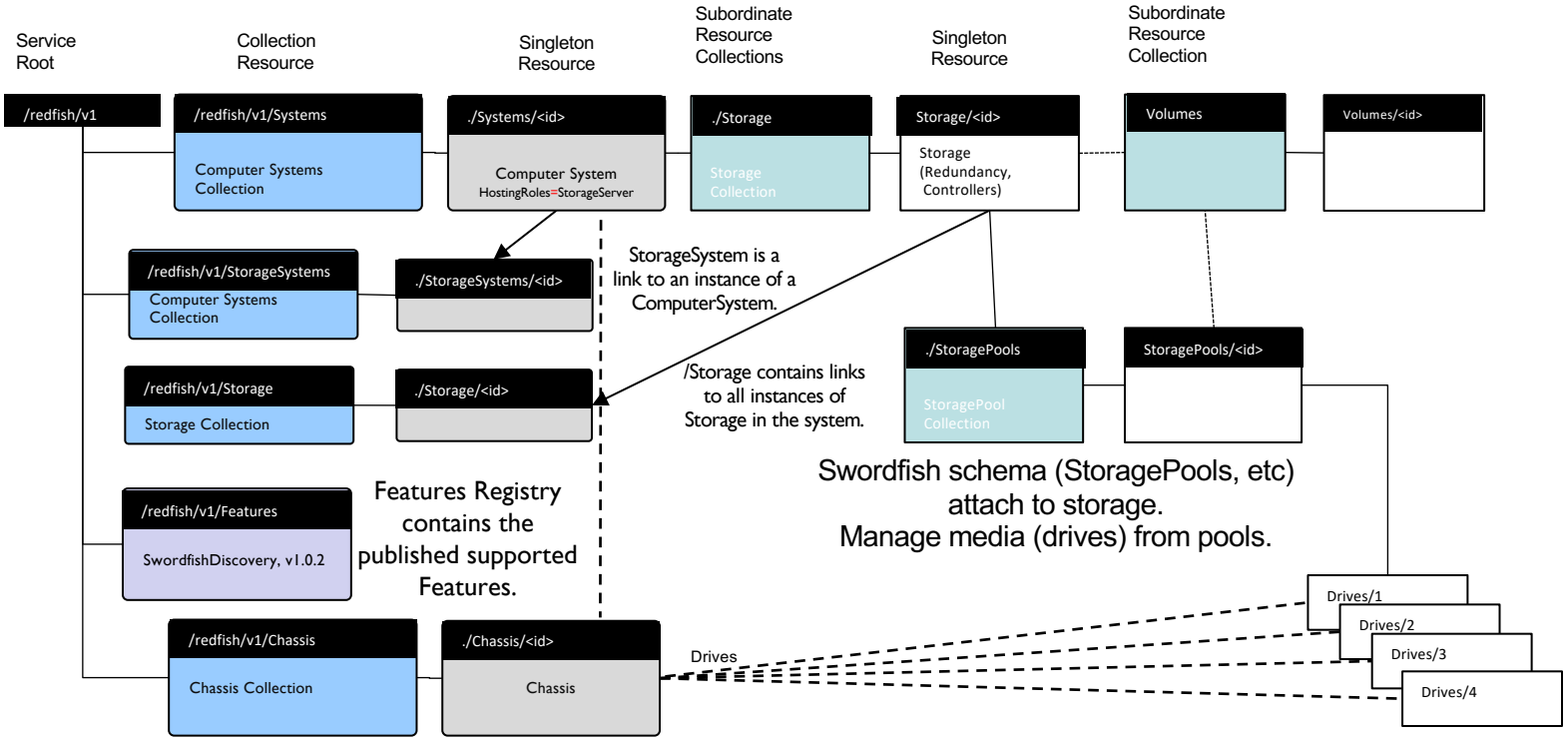
Minimum Swordfish – SIC Configuration



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Minimum Swordfish – SIC Configuration

- SIC with existing Redfish implementation:
  - Storage System is attached to ComputerSystem
    - /Redfish/v1/Systems/<System-id>/Storage
  - At least one member in StorageCollection in ComputerSystems
  - Set ComputerSystem.HostingRoles property to StorageSystem
  - Add Storage Collection under service root
    - /Redfish/v1/StorageSystems/
  - Add Features Register under service root
    - Redfish/v1/Features/
  - Implement SwordfishDiscovery service
    - /Redfish/v1/Features/SwordfishDiscovery/

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Minimum Swordfish – SIC Configuration

- Instantiate at least one StoragePool
  - /Redfish/v1/Systems/<System-id>/Storage/<Storage-id>/Storage-Pools/<StoragePool-Id>
- Instantiate Volume Collection under StoragePool
  - /Redfish/v1/Systems/<System-id>/Storage/<Storage-id>/Storage-Pools/<StoragePool-Id>/Volumes/

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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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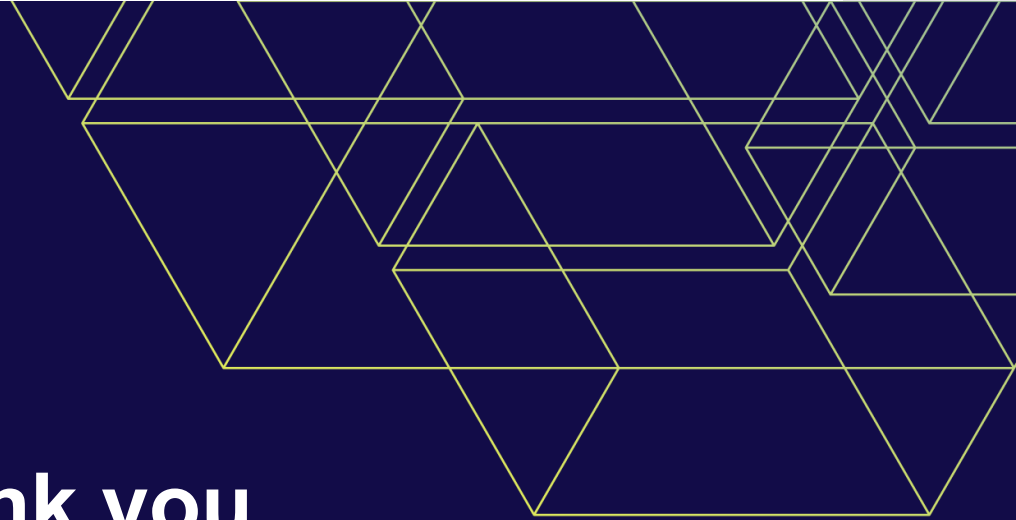

Thank you

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