Gone Fishing with Swordfish: Extending Data Center Control to the World of Storage

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Abstract

- Swordfish™ is an extension of the DMTF Redfish specification developed by the Storage Networking Industry Association (SNIA) to provide a unified approach for the management of storage and servers in hyperscale, cloud infrastructure, and converged infrastructure environments, making it easier for IT administrators to integrate scalable solutions into their data centers.
- This presentation shows how Swordfish extends Redfish and provides an overview of basic Swordfish concepts, and examples of standards-based automation for the data center using EnergyStar® instrumentation.

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

What are the Drivers for SNIA Swordfish™?

- Customers (and vendors) are asking for improvements in storage management APIs
  - Make them simpler to implement and consume
  - Improve access efficiency
    - Fewer transactions, with more useful information in each
  - Provide useful access via a standard browser
  - Expand coverage to include converged, hyper-converged, and hyper-scale
  - Provide compatibility with standard DevOps environments

The SNIA Swordfish™ Approach

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- **The What:**
  - Refactor and leverage SMI-S schema into a simplified model that is client oriented
  - Move to Class of Service based provisioning and monitoring
  - Cover block, file and object storage
  - Extend traditional storage domain coverage to include converged environments (covering servers, storage and fabric together)
- **The How:**
  - Leverage and extend DMTF Redfish Specification
  - Build using DMTF's Redfish technologies
    - RESTful interface over HTTPS in JSON format based on OData v4
  - Implement Swordfish as an ***extension*** of the Redfish API

Who is Developing Redfish and Swordfish?

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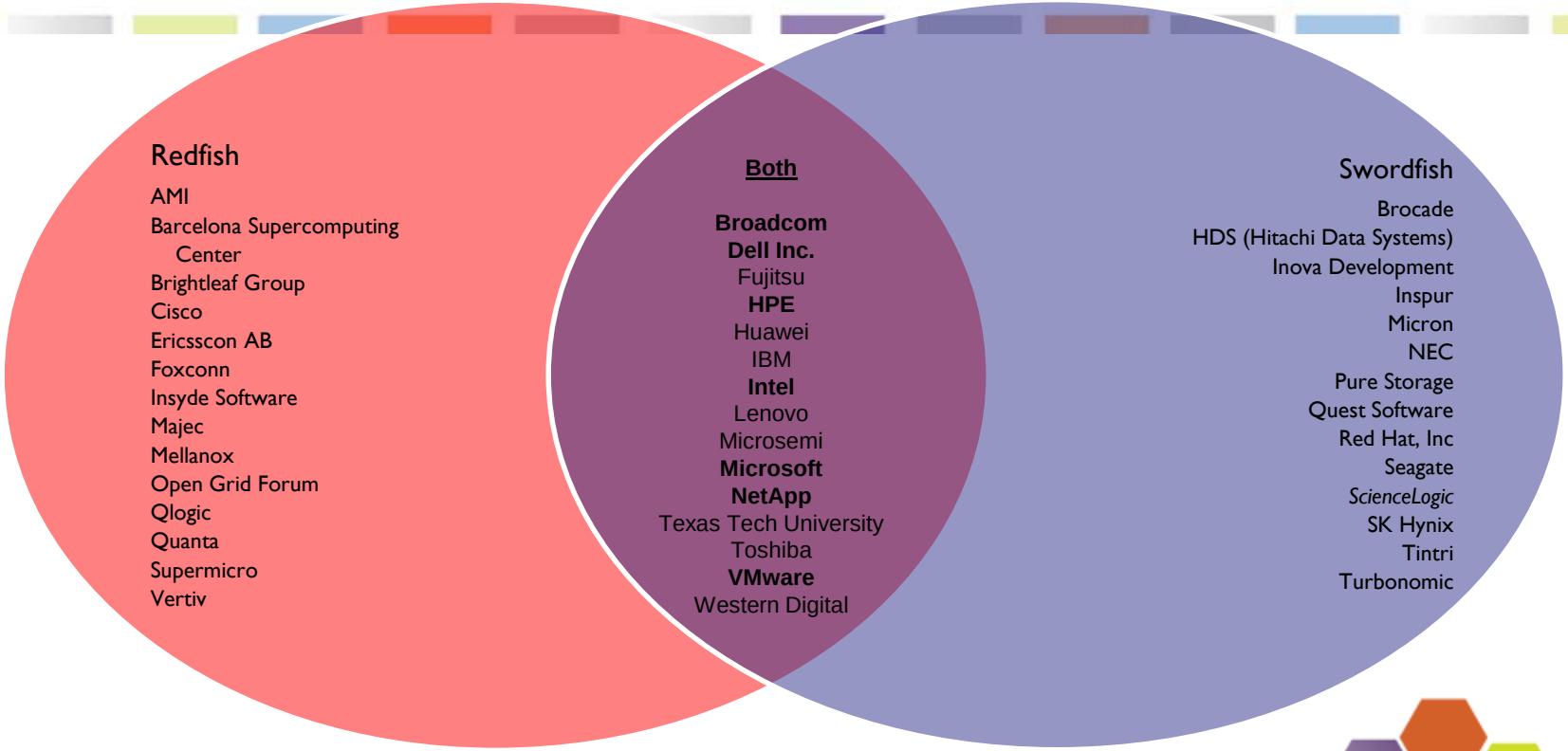

Swordfish Growth

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- SNIA Scalable Storage Management Technical Work Group (SSM TWG)

  (SSM is the group, Swordfish is the Spec)

  - Scalable Storage Management (SSM) TWG chartered in December 2015
  - v1.0 Spec Released September 2016
- 2017 Focus: validating spec, initial implementations
  - Swordfish Functionality Enhancements: Specification and Technical Content
    - Releases / Work in progress
  - Documentation and Supporting Materials
  - Open Source Tools and Infrastructure Development
  - Implementation Support
    - Plugfests

Functionality Included in the Swordfish v1.0.x API Specification

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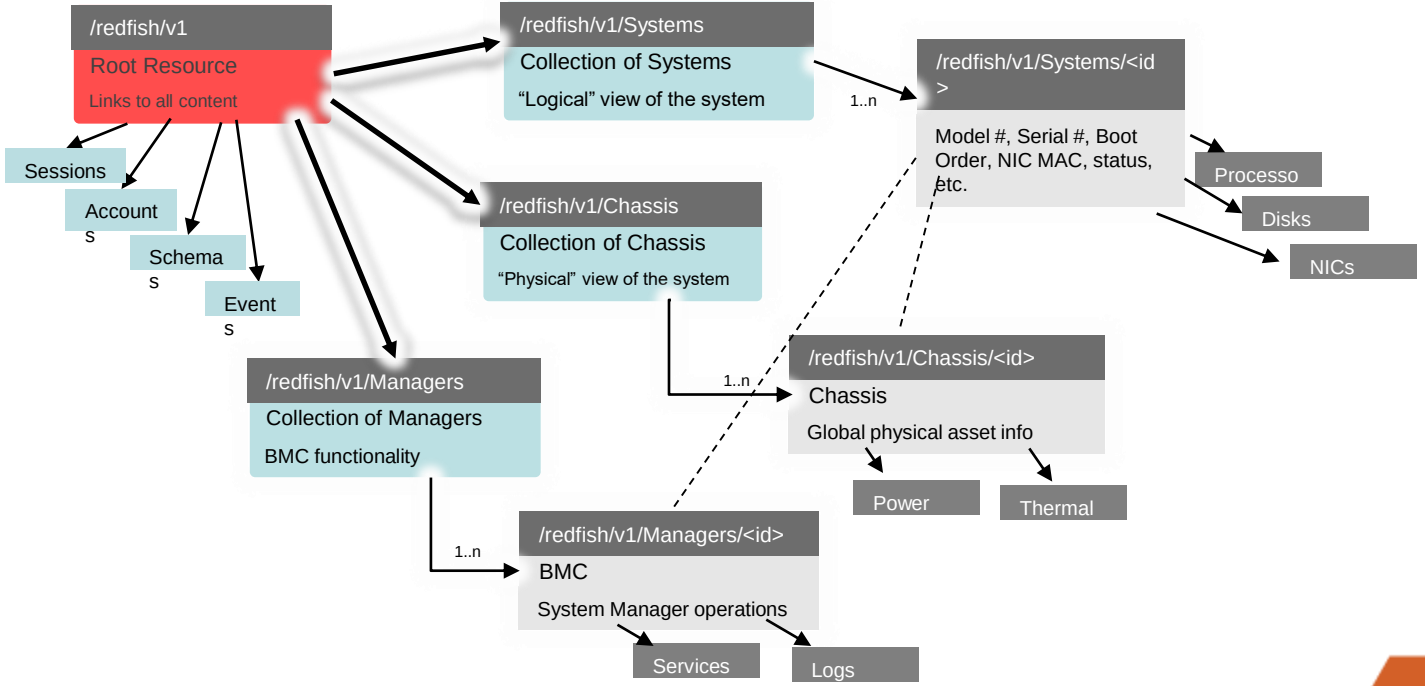
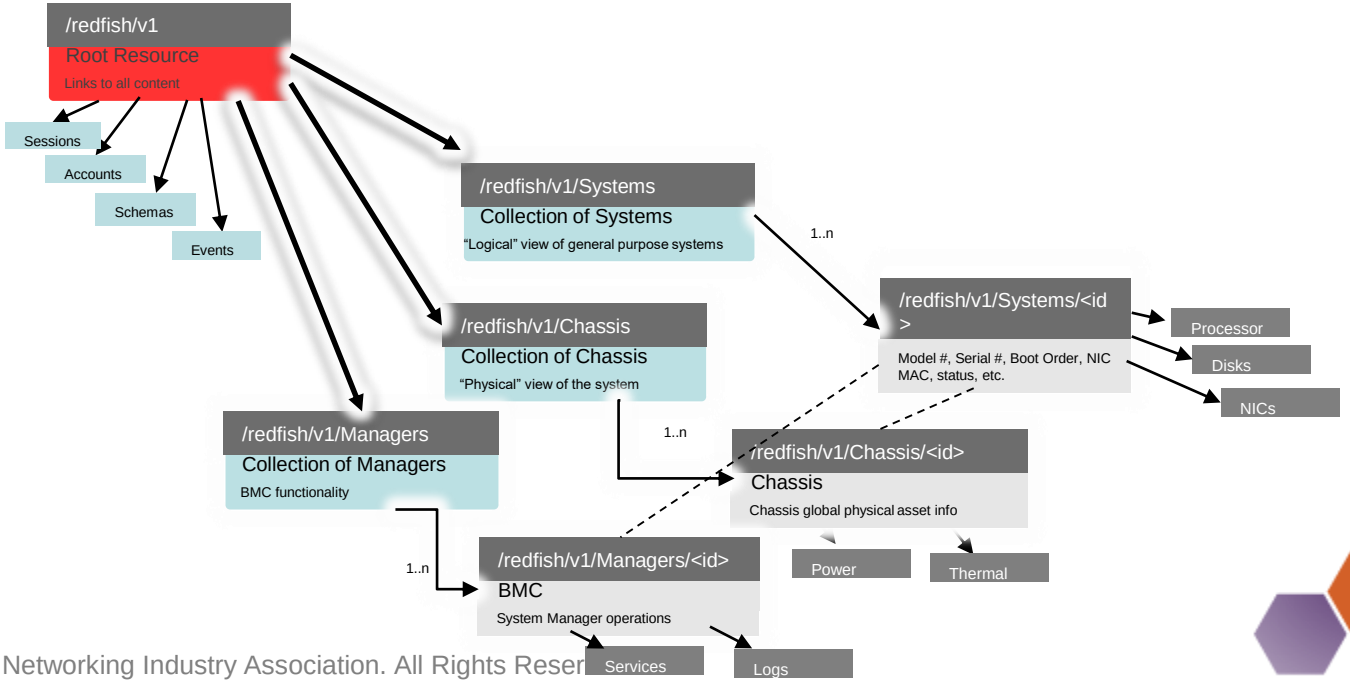
- Block storage
  - Provisioning with **class of service** control
  - Volume Mapping and Masking
  - Replication
  - Capacity and health metrics
- File system storage
  - Adds File System and File Share
  - Leverages all other concepts – provisioning with class of service, replication, …
- Additional content
  - Object drive storage

Starting with Redfish: An Overview

Redfish Resource Map



Adding Storage to Redfish…



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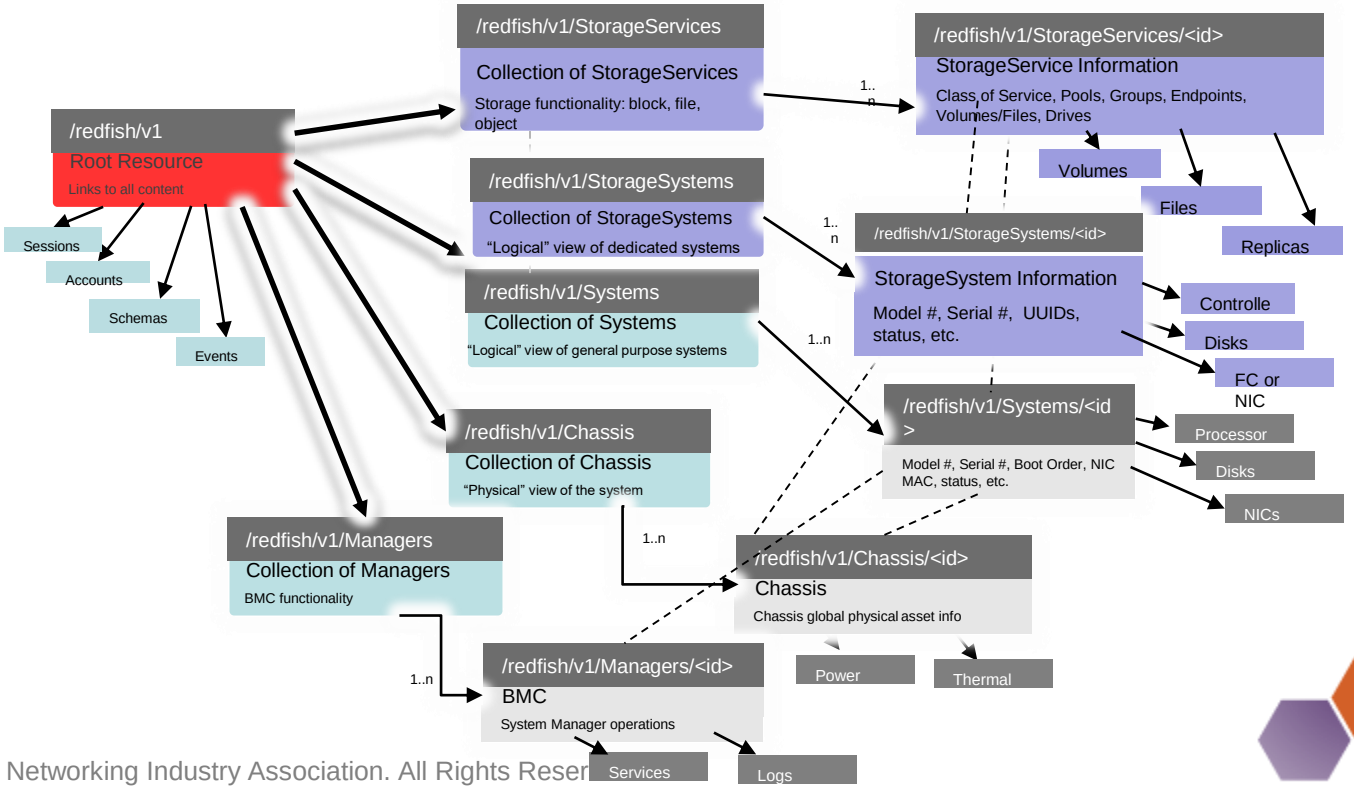

See example Swordfish configurations

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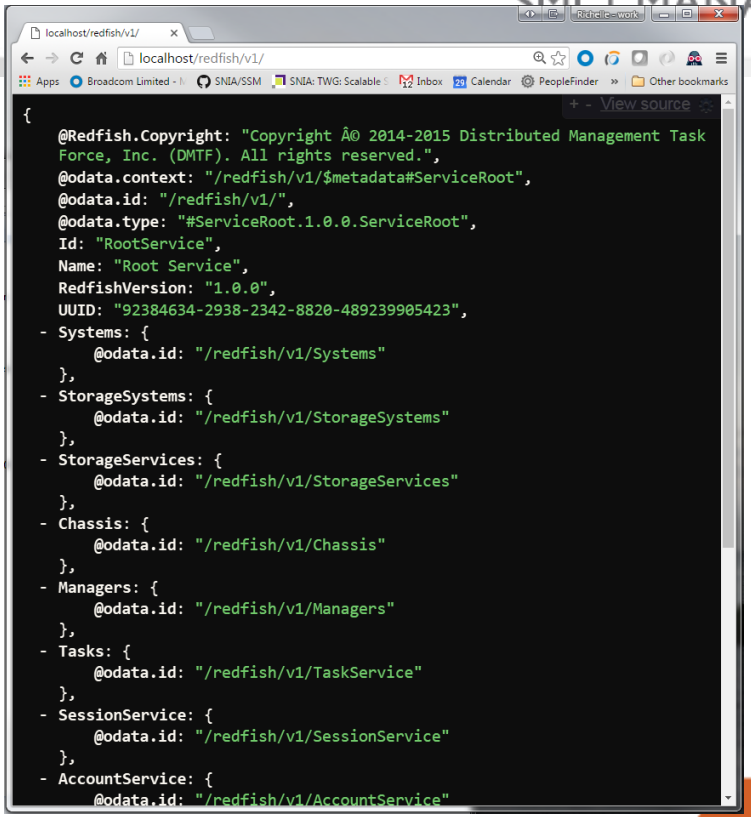
- As a work tool, the Technical Work Group (TWG) works with “mockups” (snapshots of a state in time) of different types of systems

  See swordfishmockups.com (/redfish/v1/)

- These are available as part of the public WIP releases and are published on an ongoing basis as new functionality is added to show samples to supplement documentation
  - Note: Mockups are representations of implementations, not normative

Overview of Swordfish

- Explore the Swordfish data model to see potential / typical implementation
- Navigate through the model to learn about and see various resources
- SNIA mockups show two examples of block storage systems
  - Simple: A small external array
  - Complex: all of the elements in the block storage model, with remote replication
- .. and an example of a file server with multiple file shares

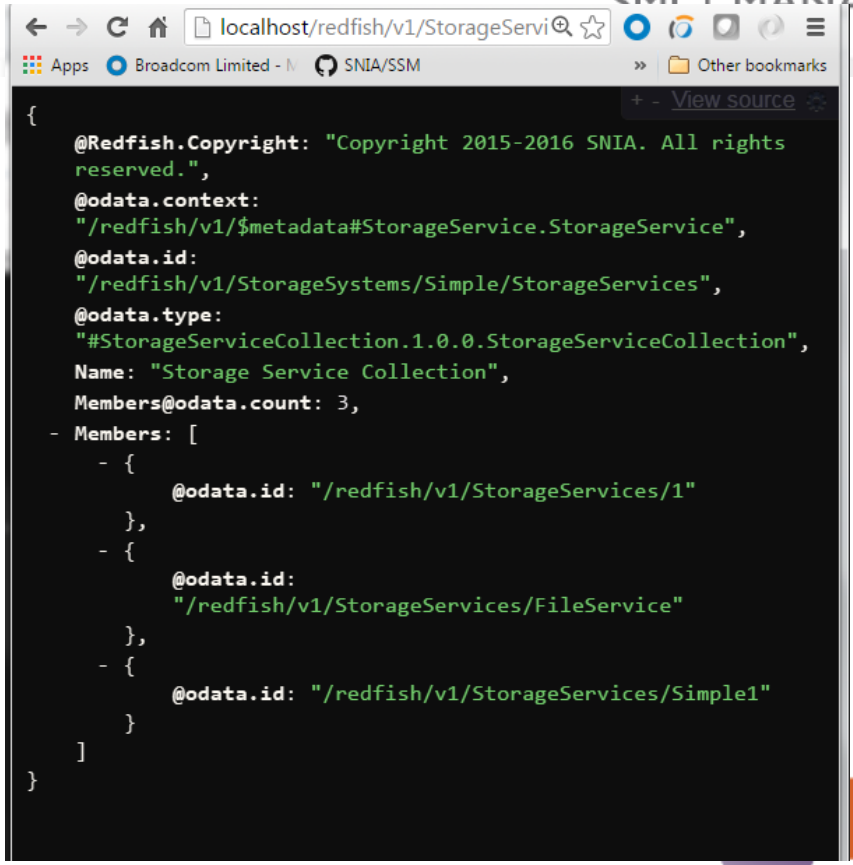


Navigating through the Mockups…

- Select the …./redfish/v1/Storage/Services link to see the “Collection” of Storage Services
- Click the “…/StorageServices/Simple” link to see the details of the Simple mockup or …

“…/StorageServices/1” to see the details of the complex storage service mockup

“…/StorageServices/FileService” to see the filesystem mockup



What's in a Storage Service? (Block)

- Available Classes Of Service
  - Lines of Service that are used to compose the Classes of Service
- Volumes
- Pools
- Groups
- Endpoints
- …
- Pointer to related resources (system, chassis,..)

What's in a Storage Service? (File)

Same structure:

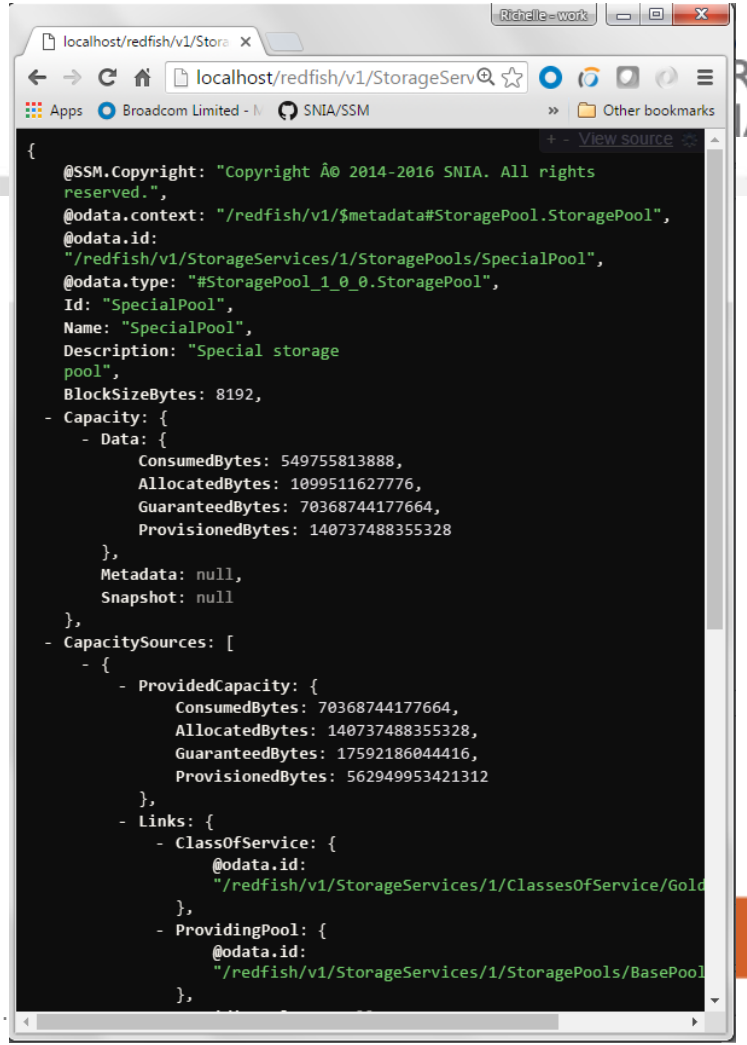
- Available Classes Of Service
- ***File systems***
- Pools
- Groups
- Endpoints
- …
- Pointer to related resources (system, chassis, **block service** or drives)

Discovery…

Let's discover something:

Do I have space to…?

1. Check the capacity in a storage pool that I have permission to allocate storage from.
2. Navigate down into "SpecialPool" and check its remaining capacity



How Do Clients Determine Swordfish Implementations They Can Support?

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- Profiles define sets of required functionality to support:
  - Basic Swordfish support
    - Direct attach + storage service configuration
    - Storage system + storage service configuration
  - Add-on functionality:
    - Local replication
    - Remote replication
  - Certification / Conformance Requirements
    - (Planned) EnergyStar Requirements: Orthogonal to functionality profiles
      - Energy and power metrics
      - Controls for on-demand instrumentation

Swordfish Specs and Technical Content... In 2017

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- v1.0.3 Release in January 2017
  - Schema updates, Spec section additions, User's guide updates: new use cases
- v1.0.4 Release in May 2017
  - Schema updates, Mockup Updates, Spec section additions
- V1.0.5 Release Fall 2017:
  - v1.0.5: Initial Swordfish Event Registry, Initial Block Performance Metrics, Bug fixes
- Work-in-progress:
  - FC Adapter and Fabric Model, Enhanced Standardized Resource Event Message Registry
  - Profile Development: Basic Swordfish Support
- Future Functionality
  - Object Storage
  - Storage-specific security roles

Documentation and Supporting Materials

- Online Practical Guide
  - SNIA Swordfish Practical Guide
- NEW! Swordfish School:
  - Swordfish School Playlist (YouTube)
- Swordfish API Specification
- Webcasts

Open Source Tools and Infrastructure Development

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- Swordfish Emulator Extensions
  - Extends the Redfish emulator – adds all Swordfish schema
- Basic Swordfish Web client
  - Discover / display Swordfish services; uses schema to overlay “Add / Edit” details
- DataDog and Power BMI Client Sample Dashboards
  - Sample implementations to show integration concepts

How to Participate: Shaping the Standard

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- Find pointers to the latest technical content:
  - http://snia.org/swordfish
  - http://www.snia.org/publicreview#swordfish
- Join the SSM TWG
  - By Joining the SNIA and SSM TWG, you can shape the standard: https://members.snia.org/apps/org/workgroup/ssmtwg
- Through the SNIA feedback portal, providing feedback on "Work In Progress"
  - As the group produces "Works In Progress", you can provide feedback at http://www.snia.org/feedback

Q&A

THANK YOU