



SDC 

STORAGE DEVELOPER CONFERENCE

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Dip your Toe in the Water: A Swordfish Introduction

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Abstract

- The SNIA's Scalable Storage Management Technical Work Group (SSM TWG) has created and published an open industry standard specification for storage management that defines a customer centric interface for the purpose of managing storage and related data services. This specification builds on the DMTF's Redfish specification using RESTful methods and JSON formatting.
- This presentation shows how Swordfish extends Redfish and provides an overview of basic Swordfish concepts.



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

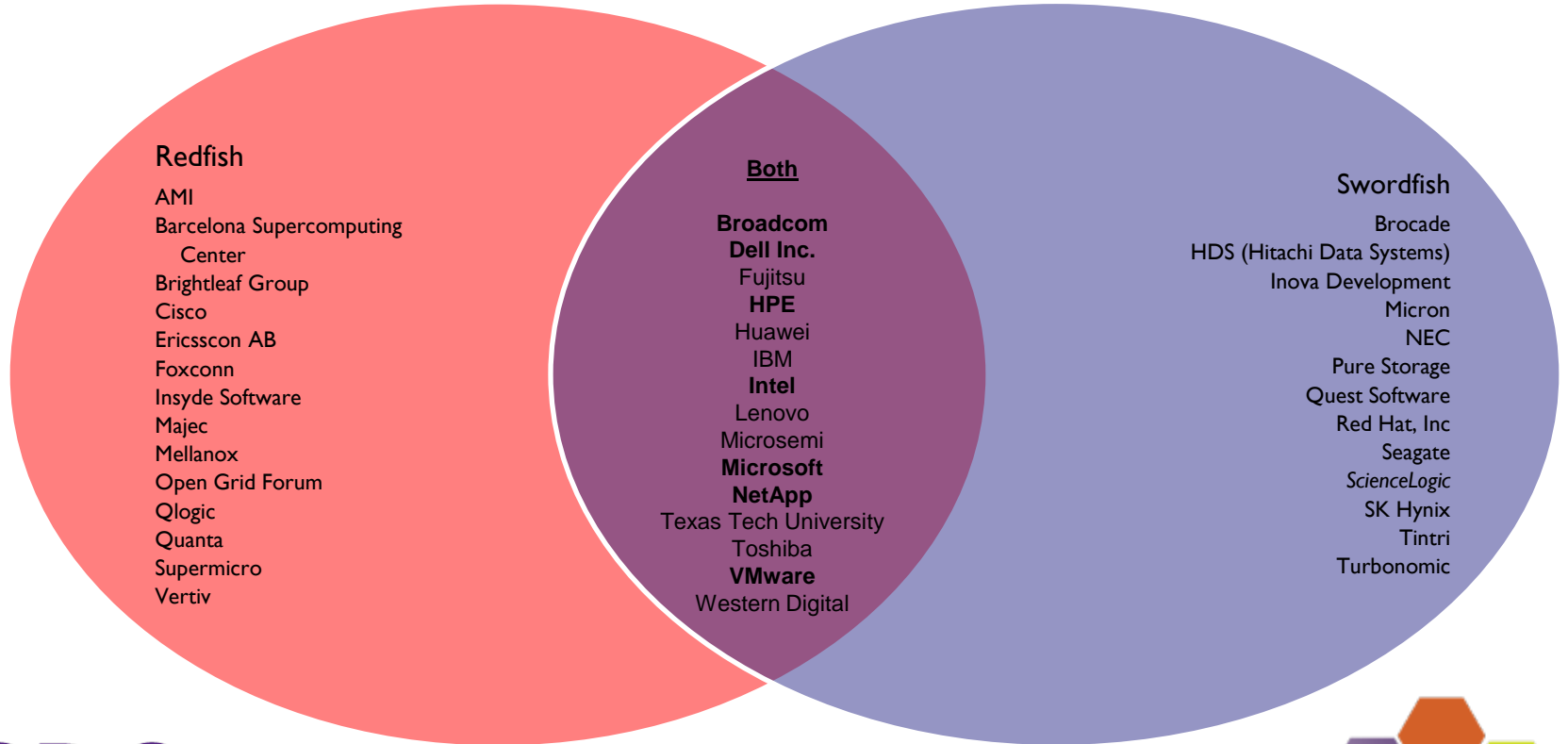


The SNIA Swordfish™ Approach

- **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?



Swordfish Growth

- 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



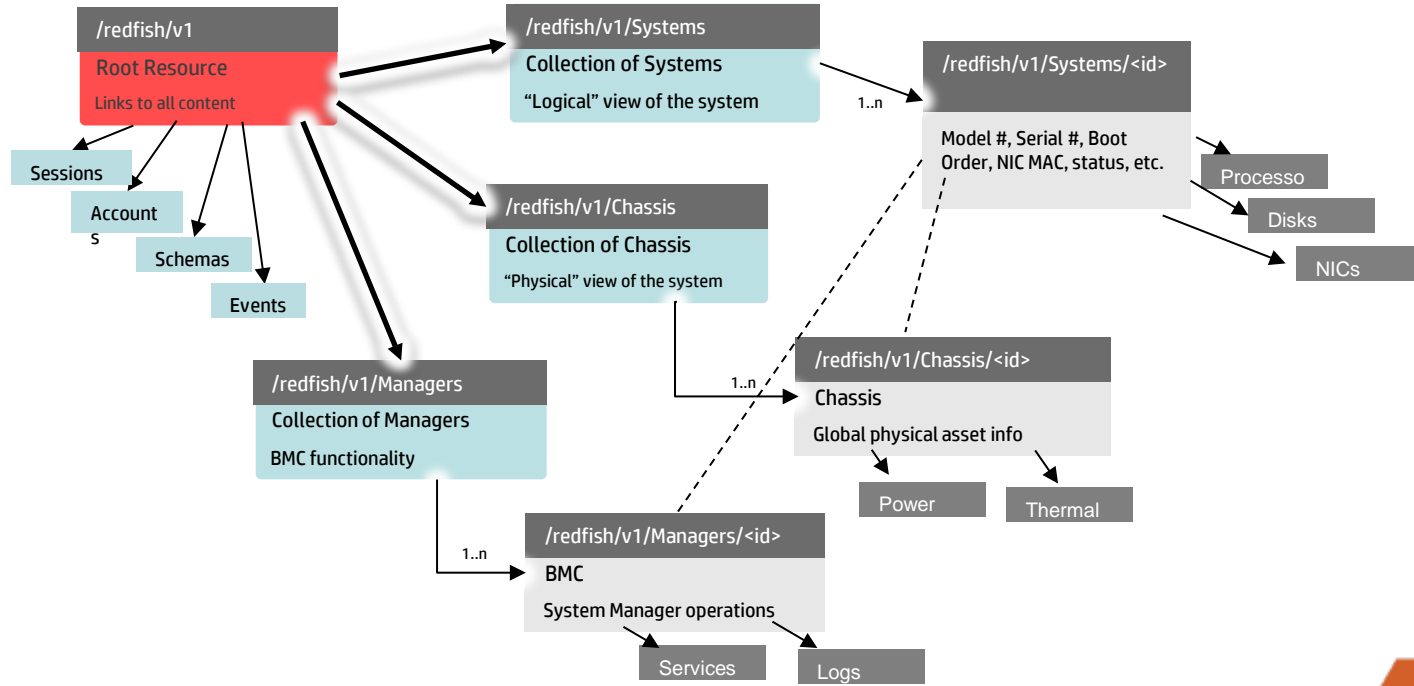
Functionality Included in the Swordfish v1.0 API Specification

- 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

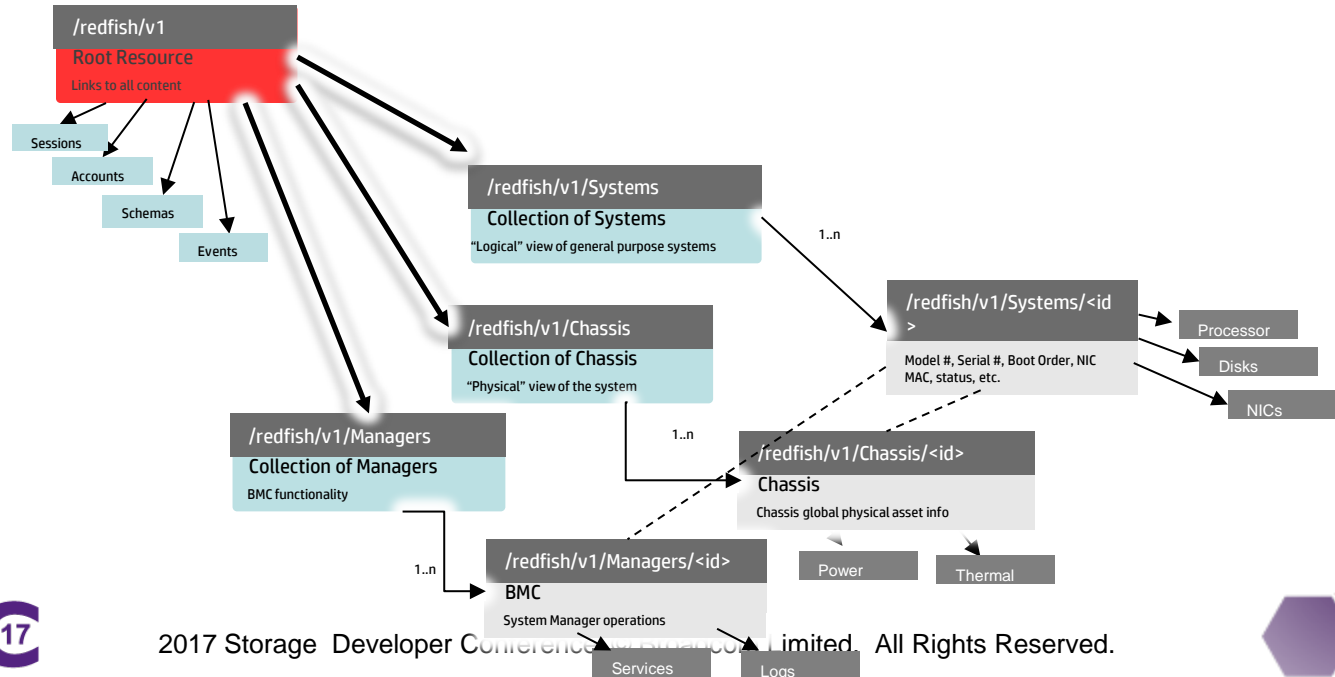


Starting with Redfish: An Overview

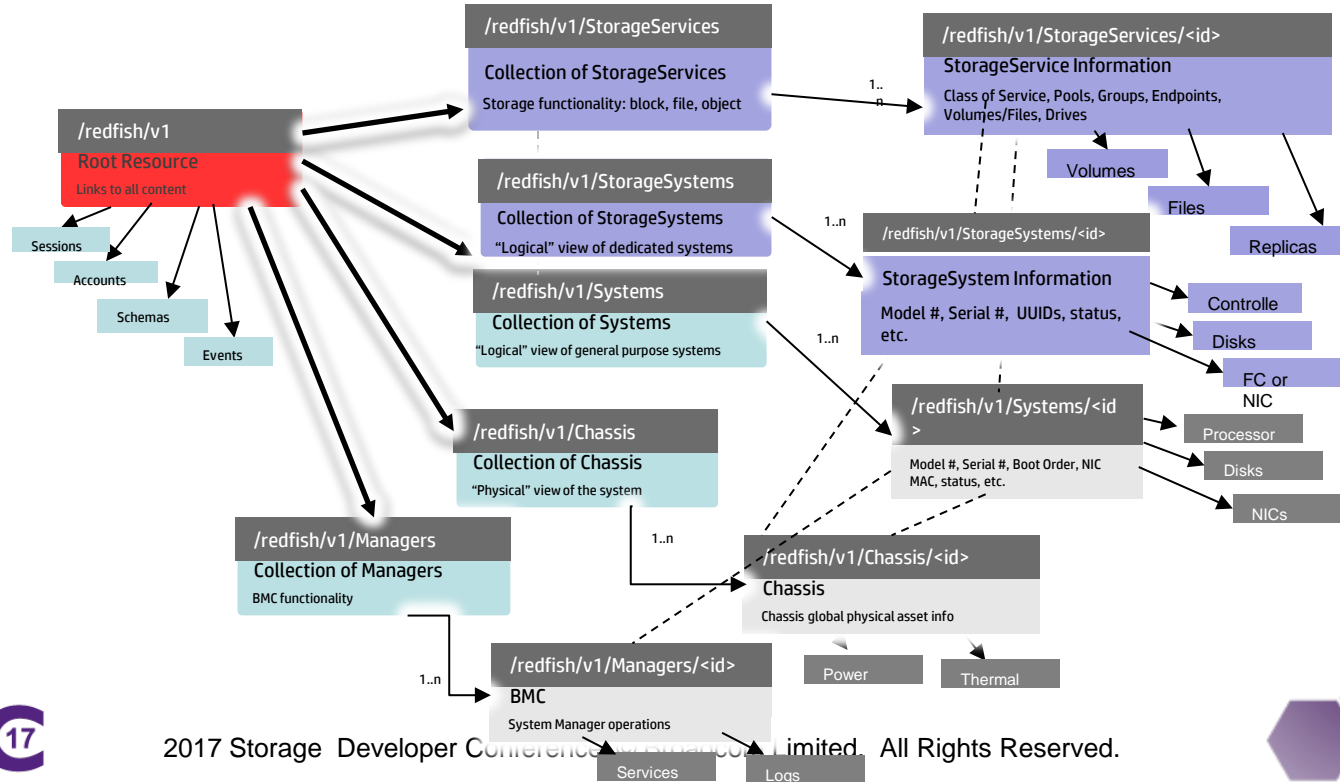
Redfish Resource Map



Adding Storage to Redfish...



Adding Storage to Redfish...



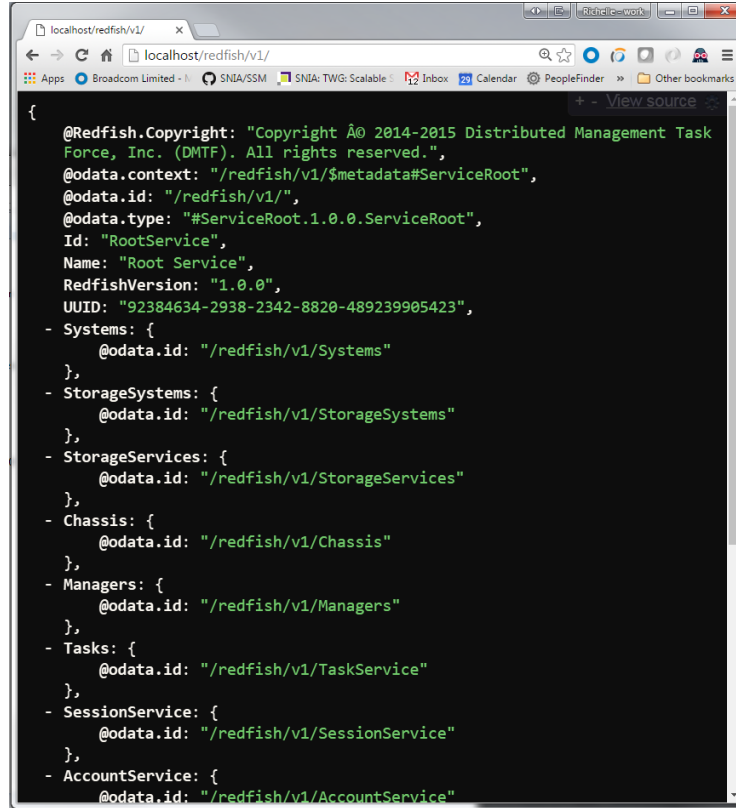
What Will a Swordfish Implementation Look Like?

- 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 \(/redfish/v1/\)](http://swordfishmockups.com (/redfish/v1/))
- These are available as part of the 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 a 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

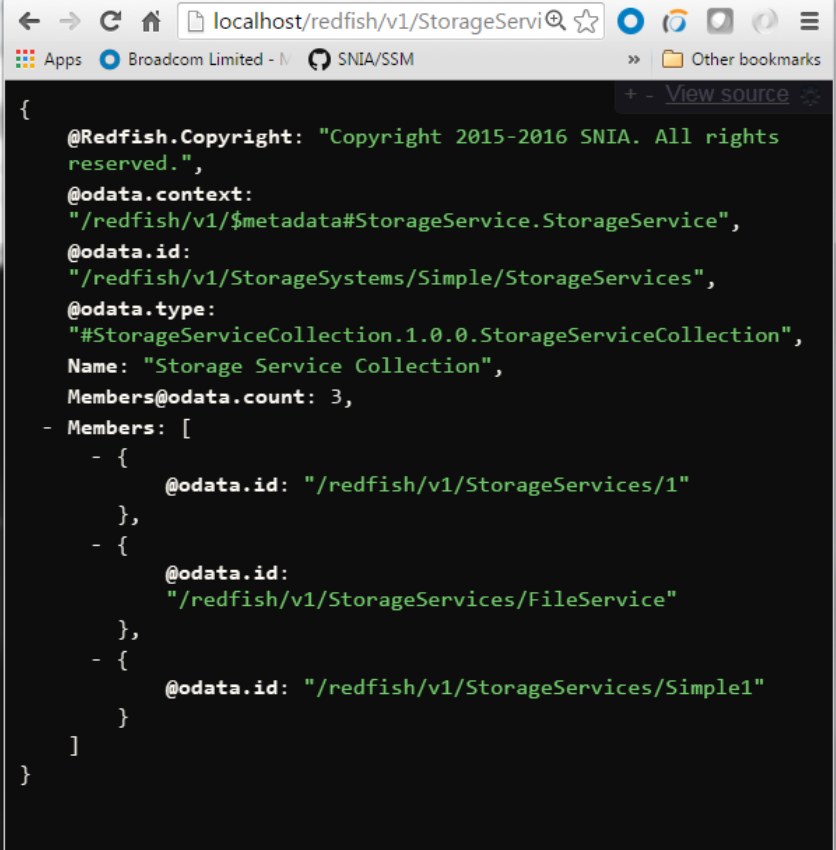


```
{
  @Redfish.Copyright: "Copyright Â© 2014-2015 Distributed Management Task
  Force, Inc. (DMTF). All rights reserved.",
  @odata.context: "/redfish/v1/$metadata#ServiceRoot",
  @odata.id: "/redfish/v1/",
  @odata.type: "#ServiceRoot.1.0.0.ServiceRoot",
  Id: "RootService",
  Name: "Root Service",
  RedfishVersion: "1.0.0",
  UUID: "92384634-2938-2342-8820-489239905423",
  - Systems: {
    @odata.id: "/redfish/v1/Systems"
  },
  - StorageSystems: {
    @odata.id: "/redfish/v1/StorageSystems"
  },
  - StorageServices: {
    @odata.id: "/redfish/v1/StorageServices"
  },
  - Chassis: {
    @odata.id: "/redfish/v1/Chassis"
  },
  - Managers: {
    @odata.id: "/redfish/v1/Managers"
  },
  - Tasks: {
    @odata.id: "/redfish/v1/TaskService"
  },
  - SessionService: {
    @odata.id: "/redfish/v1/SessionService"
  },
  - AccountService: {
    @odata.id: "/redfish/v1/AccountService"
  }
}
```



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



```
{
  @Redfish.Copyright: "Copyright 2015-2016 SNIA. All rights reserved.",
  @odata.context: "/redfish/v1/$metadata#StorageService.StorageService",
  @odata.id: "/redfish/v1/StorageSystems/Simple/StorageServices",
  @odata.type: "#StorageServiceCollection.1.0.0.StorageServiceCollection",
  Name: "Storage Service Collection",
  Members@odata.count: 3,
  - Members: [
    - {
      @odata.id: "/redfish/v1/StorageServices/1"
    },
    - {
      @odata.id: "/redfish/v1/StorageServices/FileService"
    },
    - {
      @odata.id: "/redfish/v1/StorageServices/Simple1"
    }
  ]
}
```

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,..)



```
localhost/redfish/v1/Storage x  
localhost/redfish/v1/StorageServ  
Apps Broadcom Limited - S NIA/SSM Other bookmarks  
+ - View source  
{  
  @Redfish.Copyright: "Copyright 2014-2016 SNIA. All rights reserved.",  
  @odata.context: "/redfish/v1/$metadata#StorageService.StorageService",  
  @odata.id: "/redfish/v1/StorageServices/1",  
  @odata.type: "#StorageService.1.0.0.StorageService",  
  Id: "1",  
  Name: "My Storage Service",  
  Description: "Description of storage",  
  + Status: {...},  
  + ClassesOfService: [...],  
  - Drives: {  
    @odata.id: "/redfish/v1/Chassis/StorageEnclosure1/Drives"  
  },  
  + InitiatorEndpointGroups: [...],  
  + TargetEndpointGroups: [...],  
  + Endpoints: {...},  
  + StorageGroups: [...],  
  - StoragePools: {  
    @odata.id: "/redfish/v1/StorageServices/1/StoragePools"  
  },  
  - Volumes: {  
    @odata.id: "/redfish/v1/StorageServices/1/Volumes"  
  },  
  - Links: {  
    - Enclosures: {  
      @odata.id: "/redfish/v1/Chassis/1"  
    },  
    - HostingSystem: {  
      @odata.id: "/redfish/v1/StorageSystems/Complex"  
    },  
    - DataProtectionLoSCapabilities: {  
      @odata.id: "/redfish/v1/StorageServices/1/DataProtectionLoSCapabilities"  
    },  
    - DataSecurityLoSCapabilities: {  
      @odata.id: "/redfish/v1/StorageServices/1/DataSecurityLoSCapabilities"  
    }  
  }  
}
```

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)



```
{
  @Redfish.Copyright: "Copyright 2014-2016 SNIA. All rights reserved.",
  @odata.context: "/redfish/v1/$metadata#StorageService.StorageService",
  @odata.id: "/redfish/v1/StorageServices/FileService",
  @odata.type: "#StorageService.1.0.0.StorageService",
  Id: "1",
  Name: "My Storage Service",
  Description: "Description of storage",
  - Status: {
    State: "Enabled",
    Health: "OK"
  },
  + ClassesOfService: [...],
  - FileSystems: {
    @odata.id: "/redfish/v1/StorageServices/FileService/FileSystems"
  },
  - StorageServiceCapabilities: {
    @odata.id: "/redfish/v1/StorageServices/FileService/StorageServiceCapabilities"
  },
  + StorageGroups: [...],
  + StoragePools: {...},
  - Links: {
    - Enclosures: {
      @odata.id: "/redfish/v1/Chassis/1"
    },
    - HostingSystem: {
      @odata.id: "/redfish/v1/StorageSystems/FileServer"
    }
  },
  Oem: { }
}
```


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



```
{
  @SSM.Copyright: "Copyright \u00c2\u00a9 2014-2016 SNIA. All rights reserved.",
  @odata.context: "/redfish/v1/$metadata#StoragePool.StoragePool",
  @odata.id:
  "/redfish/v1/StorageServices/1/StoragePools/SpecialPool",
  @odata.type: "#StoragePool_1_0_0.StoragePool",
  Id: "SpecialPool",
  Name: "SpecialPool",
  Description: "Special storage pool",
  BlockSizeBytes: 8192,
  - Capacity: {
    - Data: {
      ConsumedBytes: 549755813888,
      AllocatedBytes: 1099511627776,
      GuaranteedBytes: 70368744177664,
      ProvisionedBytes: 140737488355328
    },
    Metadata: null,
    Snapshot: null
  },
  - CapacitySources: [
    - {
      - ProvidedCapacity: {
        ConsumedBytes: 70368744177664,
        AllocatedBytes: 140737488355328,
        GuaranteedBytes: 17592186044416,
        ProvisionedBytes: 562949953421312
      },
      - Links: {
        - ClassOfService: {
          @odata.id:
          "/redfish/v1/StorageServices/1/ClassesOfService/Gold",
        },
        - ProvidingPool: {
          @odata.id:
          "/redfish/v1/StorageServices/1/StoragePools/BasePool"
        }
      }
    }
  ]
}
```



Swordfish Specs and Technical Content... In 2017

- 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
- Targeted Fall 2017:
 - v1.0.5: Initial Swordfish Event Registry, Initial Block Performance Metrics, Bug fixes
- Work-in-progress
 - FC Fabric Model
 - Joint Redfish/Swordfish Profiles
- Future Functionality
 - Object Storage
 - Storage-specific security roles



Documentation and Supporting Materials

- NEW! Online Practical Guide
 - [SNIA Swordfish Practical Guide](#)
- NEW! Swordfish School:
 - [Swordfish School Playlist](#) (YouTube)
- Enhancements to Spec introductory sections, ...
- Marketing Materials



Open Source Tools and Infrastructure Development

- **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



Implementation Support

- Plugfests
 - Swordfish plugfest June 2017
 - Open participation (no SMI / SNIA membership required)
 - Participants from 6 companies, contributing work on open source clients, open source emulators, and multiple swordfish services (providers)
 - SMI-Lab Plugfest (SMI-S and Swordfish): August 14-17
 - Hosted at Dell Inc. Santa Clara site
 - Swordfish portion will be “open” (no SMI / SNIA memberships required)
 - Plugfest at SDC: September 11 – 14, Santa Clara
 - Open participation, invitations also extended to Redfish



How to Participate: Shaping the Standard

- 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





Swordfish[™]

THANK YOU

