Swordfish - Impact on Storage Management

Anand Nagarajan
Board Director, SNIA India

Abstract

SNIA SMI | STORAGE MANAGEMENT

- 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, details Swordfish concepts and talks about CSDL and JSON schema formats and ODATA protocol for modelling resources.

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™?

SNIA SMI | STORAGE MANAGEMENT

- Customers (and vendors) have asked 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

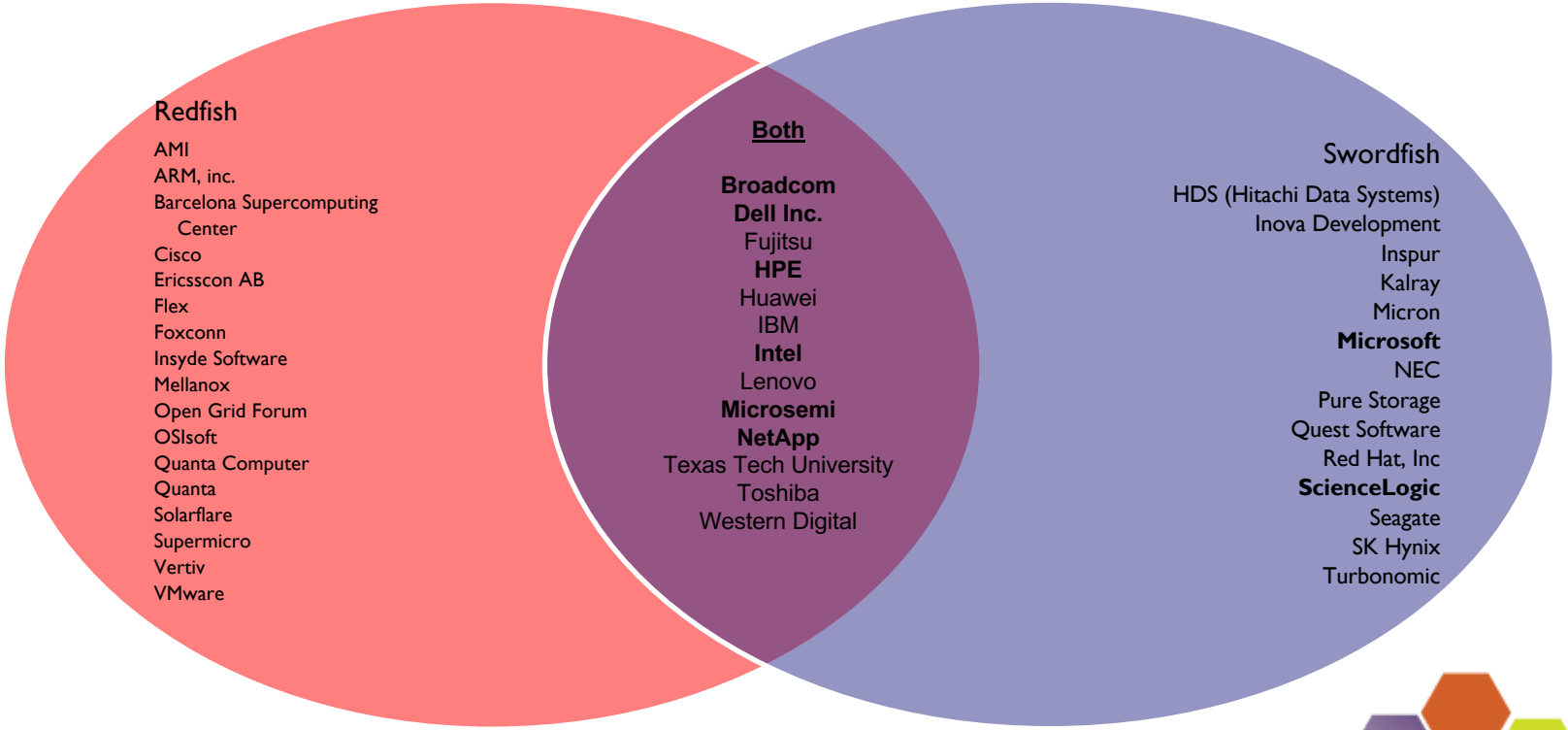
The SNIA Swordfish™ Approach

SNIA SMI | STORAGE MANAGEMENT

- **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*?

SNIA SMI | STORAGE MANAGEMENT



*as of Feb 15, 2018

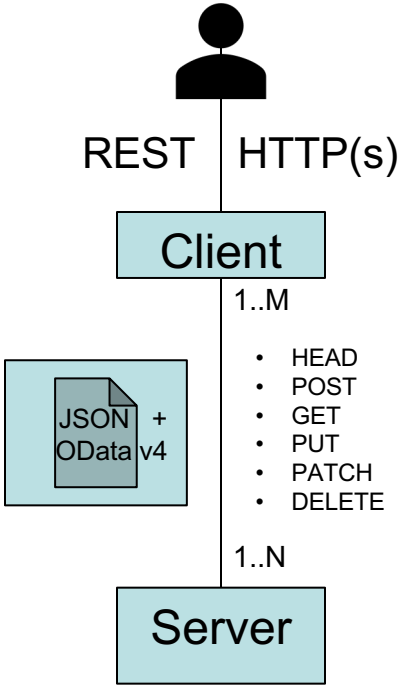
Dimensions of Redfish & Swordfish

SNIA SMI | STORAGE MANAGEMENT

- Protocol
- Data model
- Behavior

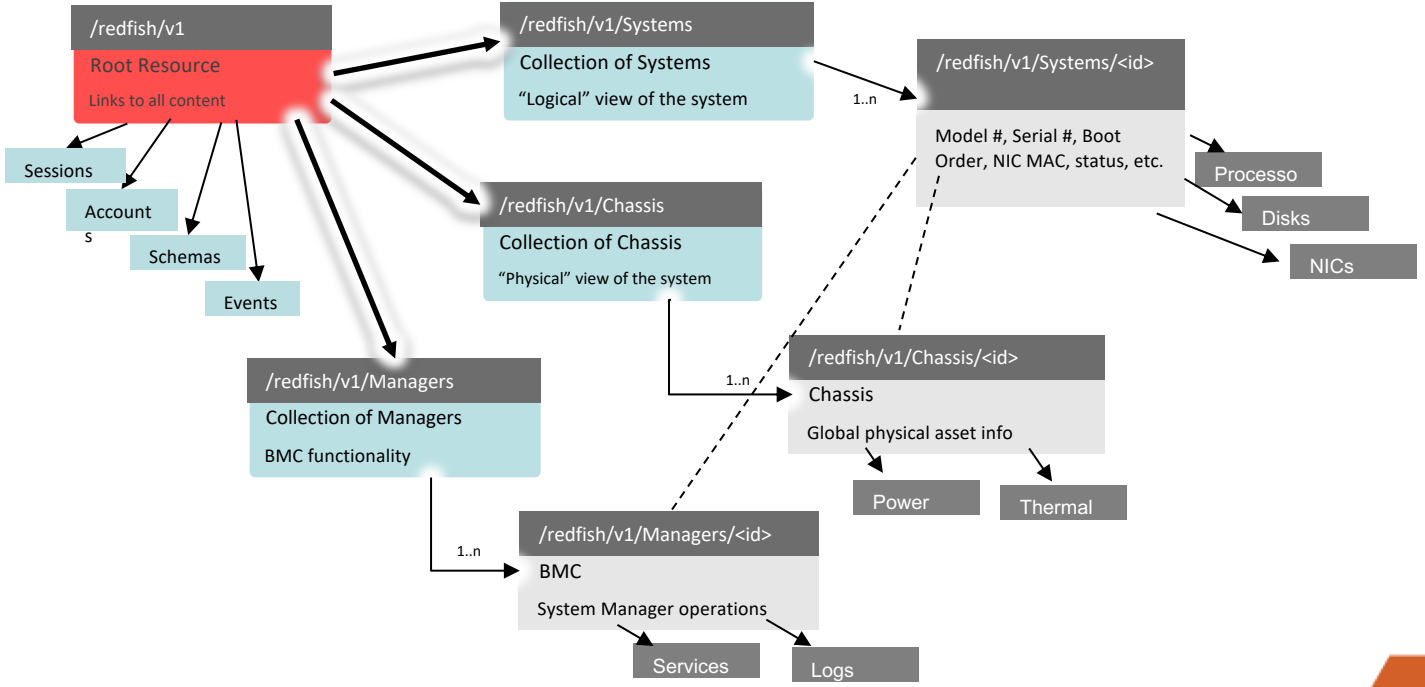
7

Redfish Client-Server Protocol

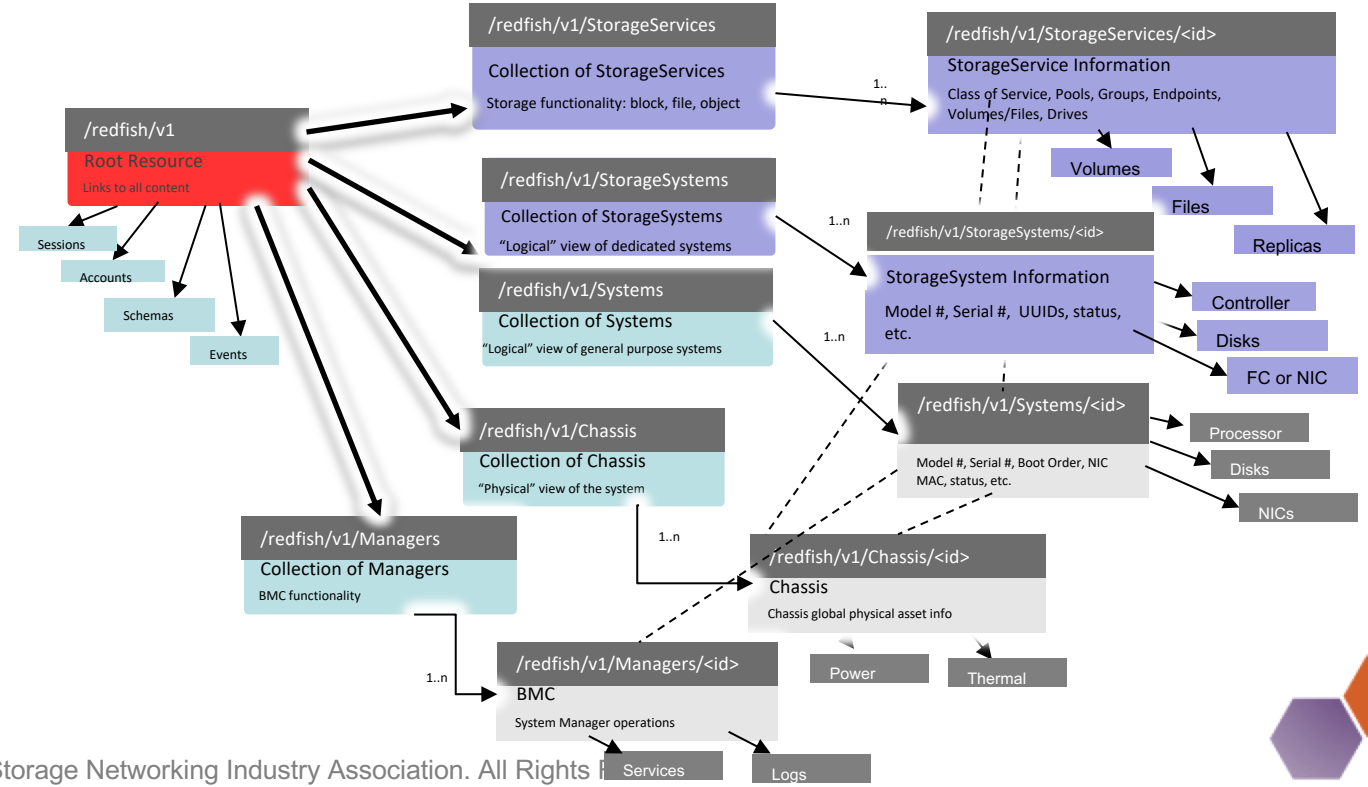


Starting with Redfish: An Overview

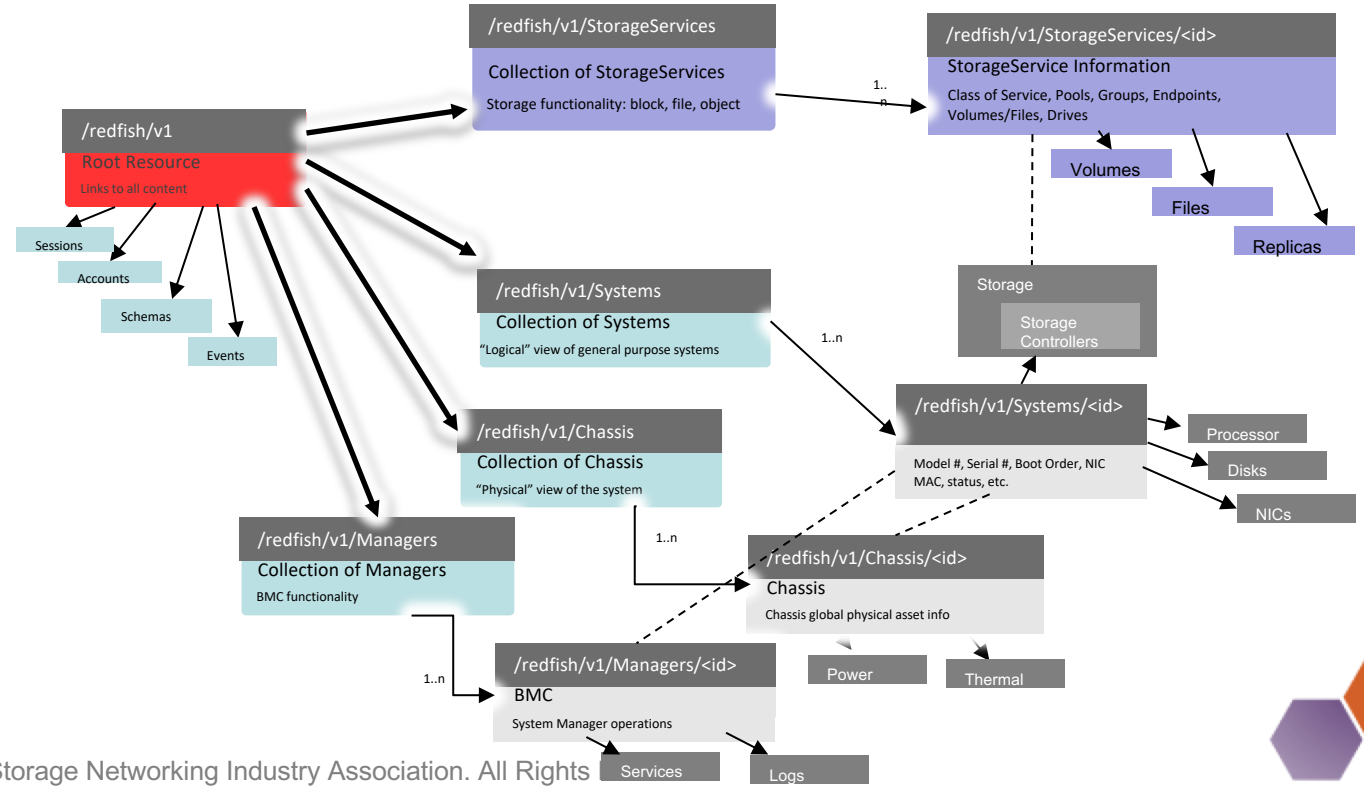
Redfish Resource Map



Adding Storage to Redfish (2 Ways):
Hosted Service Configuration



Adding Storage to Redfish (2 Ways):
Integrated Service Configuration



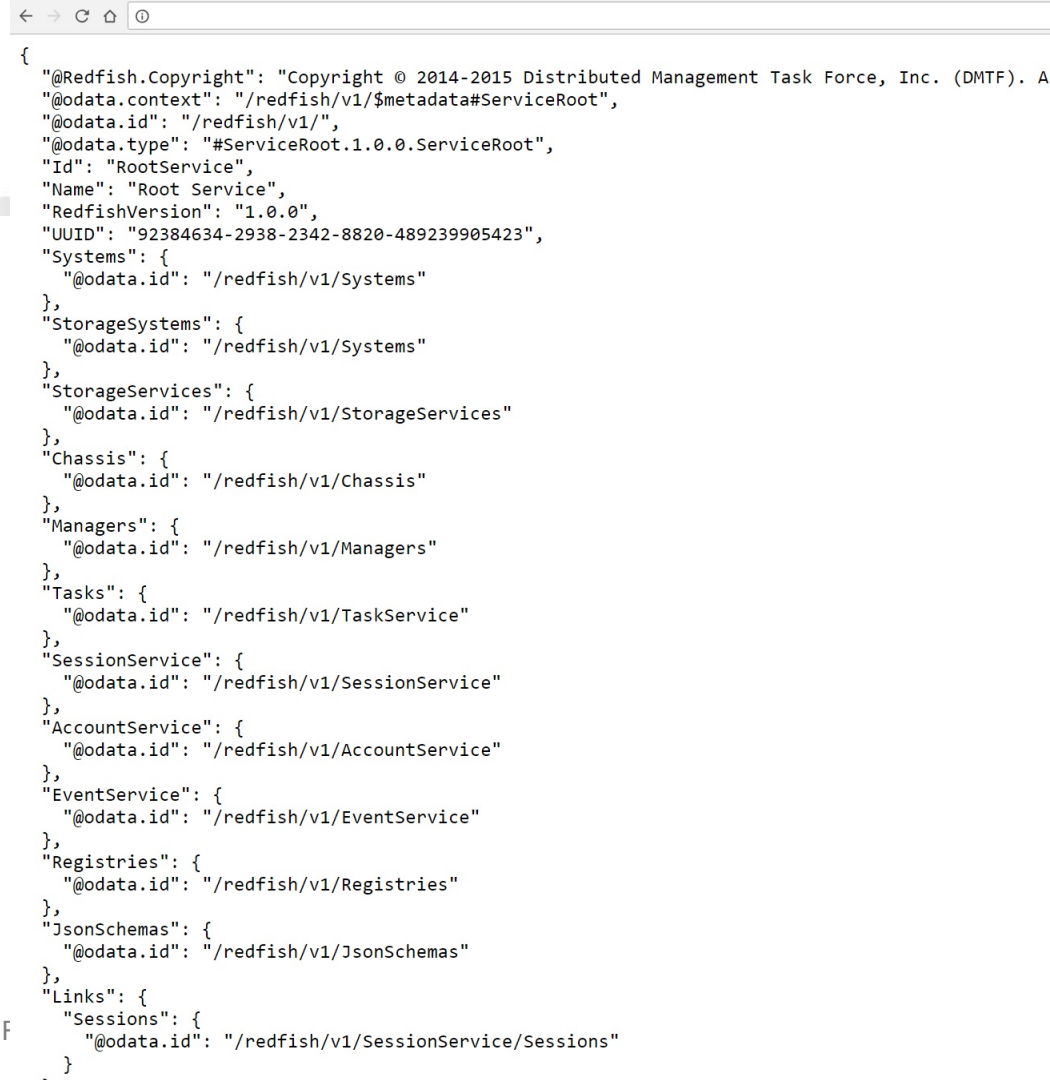
See example Swordfish configurations

- As a work tool, the Technical Work Group (TWG) works with “mockups” (snapshots of a state in time) of different types of systems
- Published at http://swordfishmockups.com (/redfish/v1/)

Note: Mockups are representations of implementations, not normative

Resource

- Navigate resources from service root.
- Json schema definition
- Base message registry




```
{
  "@Redfish.Copyright": "Copyright © 2014-2015 Distributed Management Task Force, Inc. (DMTF). A
  "@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/Systems"
  },
  "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"
  },
  "EventService": {
    "@odata.id": "/redfish/v1/EventService"
  },
  "Registries": {
    "@odata.id": "/redfish/v1/Registries"
  },
  "JsonSchemas": {
    "@odata.id": "/redfish/v1/JsonSchemas"
  },
  "Links": {
    "Sessions": {
      "@odata.id": "/redfish/v1/SessionService/Sessions"
    }
```

What's in a Storage Service?

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

file:///C:/Workspace/Swordfish/Schema_1_30/mockups/StorageServices/1/index.json


```
{
  "@Redfish.Copyright": "Copyright 2014-2016 SNIA. All rights reserved.",
  "@odata.context": "/redfish/v1/$metadata#StorageServices/1",
  "@odata.id": "/redfish/v1/StorageServices/1",
  "@odata.type": "#StorageService.1.0.0.StorageService",
  "Id": "1",
  "Name": "My Storage Service",
  "Description": "Description of storage",
  "Status": {
    "State": "Enabled",
    "Health": "OK"
  },
  "ClassesOfService": {"@odata.id": "/redfish/v1/StorageServices/1/ClassesOfService"},
  "Drives": {"@odata.id": "/redfish/v1/StorageServices/1/Drives"},
  "EndpointGroups": {"@odata.id": "/redfish/v1/StorageServices/1/EndpointGroups"},
  "Endpoints": {"@odata.id": "/redfish/v1/StorageServices/1/Endpoints"},
  "StorageGroups": {"@odata.id": "/redfish/v1/StorageServices/1/StorageGroups"},
  "StoragePools": {"@odata.id": "/redfish/v1/StorageServices/1/StoragePools"},
  "Volumes": {"@odata.id": "/redfish/v1/StorageServices/1/Volumes"},
  "StorageSubsystems": {"@odata.id": "/redfish/v1/StorageServices/1/StorageSubsystems"},
  "Links": {
    "Enclosures": {
      "@odata.id": "/redfish/v1/Chassis/1"
    },
        "HostingSystem": {
      "@odata.id": "/redfish/v1/Systems/Complex"
    },
    "DataProtectionLoSCapabilities": {
      "@odata.id": "/redfish/v1/StorageServices/1/DataProtectionLoSCapabilities"
    },
    "DataSecurityLoSCapabilities": {
      "@odata.id": "/redfish/v1/StorageServices/1/DataSecurityLoSCapabilities"
    },
    "DataStorageLoSCapabilities": {
      "@odata.id": "/redfish/v1/StorageServices/1/DataStorageLoSCapabilities"
    },
    "IOConnectivityLoSCapabilities": {
      "@odata.id": "/redfish/v1/StorageServices/1/IOConnectivityLoSCapabilities"
    },
    "IOPerformanceLoSCapabilities": {
      "@odata.id": "/redfish/v1/StorageServices/1/IOPerformanceLoSCapabilities"
    }
  },
  "Oem": {}
}
```

Schema - $metadata

- Type
- Version
- Schema definition

Schema - JsonSchemas

- JSON format of resource schema

file:///C:/Workspace/Swordfish/Schema_1_30/mockups/JsonSchemas/index.jso


```
{
  "@Redfish.Copyright": "Copyright © 2014-2015 Distributed Management Task Force, Inc.
  "@odata.context": "/redfish/v1/$metadata#JsonSchemas",
  "@odata.id": "/redfish/v1/JsonSchemas",
  "@odata.type": "#JsonSchemaFileCollection.JsonSchemaFileCollection",
  "Name": "Schema Repository",
  "Description": "Schema Repository",
  "Members@odata.count": 1,
  "Members": [
    {
      "@odata.id": "/redfish/v1/JsonSchemas/Chassis.1.00.0"
    }
  ]
}
```


file:///C:/Workspace/Swordfish/Schema_1_30/mockups/JsonSchemas/Chassis.


```
{
  "@odata.context": "/redfish/v1/$metadata#JsonSchemas/Links/Members/$entity",
  "@odata.id": "/redfish/v1/JsonSchemas/Chassis.1.0.0",
  "@odata.type": "#JsonSchemaFile.1.0.0.JsonSchemaFile",
  "Id": "Chassis.1.0.0",
  "Name": "Chassis Schema File",
  "Description": "Chassis Schema File Location",
  "Languages": [
    "en"
  ],
  "Schema": "Chassis.1.0.0",
  "Oem": {},
  "Location": [
    {
      "Language": "en",
      "ArchiveUri": "/<someuri>/Classes.gz",
      "PublicationUri": "http://redfish.dmtf.org/schemas/v1/Chassis.1.0.0.json",
      "ArchiveFile": "Chassis.1.0.0.json"
    },
    {
      "Language": "zh",
      "ArchiveUri": "/<someuri>/Classes.zh.gz",
      "PublicationUri": "http://schemas.contoso.com/Chassis.1.0.0.zh.json",
      "ArchiveFile": "Chassis.1.0.0.zh.json"
    },
    {
      "Language": "xy",
```

Registries

- Message
- Event

file:///C:/Workspace/Swordfish/Schema_1_30/mockups/Registries/index.json


```
{
  "@Redfish.Copyright": "Copyright © 2014-2015 Distributed Management Task
  "@odata.context": "/redfish/v1/$metadata#Registries",
  "@odata.id": "/redfish/v1/Registries",
  "@odata.type": "#JsonSchemaFileCollection.JsonSchemaFileCollection",
  "Name": "Registry Repository",
  "Description": "Registry Repository",
  "Members@odata.count": 1,
  "Members": [
    {
      "@odata.id": "/redfish/v1/Registries/Base.1.00.0"
    }
  ]
}
```


file:///C:/Workspace/Swordfish/Schema_1_30/mockups/Registries/Base.1.00.0/index.json


```
{
  "@Redfish.Copyright": "Copyright © 2014-2015 Distributed Management Task Force, Inc. (
  "@odata.context": "/redfish/v1/$metadata#Registries/Members/$entity",
  "@odata.id": "/redfish/v1/Registries/Base.1.00.0",
  "@odata.type": "#JsonSchemaFile.1.00.0.SchemaFile",
  "Id": "Base.1.00.0",
  "Name": "Base Message Registry File",
  "Description": "Base Message Registry File locations",
  "Languages": [
    "en"
  ],
  "Schema": "Base.1.00.0",
  "Location": [
    {
      "Language": "en",
      "ArchiveUri": "/<someuri>/Registries.gz",
      "PublicationUri": "http://schemas.redfish.org/registries/Base.1.00.0.json",
      "ArchiveFile": "Base.1.00.0.json"
    },
    {
      "Language": "zh",
      "ArchiveUri": "/<someuri>/Registries.zh.gz",
      "PublicationUri": "http://schemas.redfish.org/registries/Base.1.00.0.zh.json",
      "ArchiveFile": "Base.1.00.0.zh.json"
    },
```

Impact on Storage management

- Server implements and publishes schemas
- Resource has a link to its schema version
- Annotation driven validation
- Response lookup from base message registry
- Event lookup from event message registry

Swordfish Specs and Technical Content... In 2018

SNIA SMI | STORAGE MANAGEMENT

- v1.0.6 Released in February 2018
  - Introduction of two StorageSystem models
  - Schema updates, Spec section additions, User's guide updates: new use cases for on-demand replicas
- Work-in-progress:
  - Profile Development: Basic Swordfish Support
- Future Functionality
  - Storage-specific security roles
  - Enhanced Class of Service capabilities for Spare management, rebuild management
  - Enhanced profiles for SNIA Alliance partner organizations
  - Object Storage

Documentation and Supporting Materials

SNIA SMI | STORAGE MANAGEMENT

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

How to Participate: Shaping the Standard

SNIA SMI | STORAGE MANAGEMENT

- 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

Open Source Tools and Infrastructure Development

SNIA SMI | STORAGE MANAGEMENT

- Available: http://github.com/snia
  - 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
- Coming Soon:
  - DataDog and Power BMI Client Sample Dashboards
  - Sample implementations to show integration concepts

Q&A

anand.nagarajan@microsemi.com

THANK YOU