Swordfish - Impact on Storage Management

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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, 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™?

• 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

**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*

Redfish
AMI
ARM, inc.
Barcelona Supercomputing Center
Cisco
Ericsson AB
Flex
Foxconn
Insyde Software
Mellanox
Open Grid Forum
OSlsoft
Quanta Computer
Quanta Solarflare
Supermicro
Vertiv
VMware

Swordfish
HDS (Hitachi Data Systems)
Inova Development
Inspur
Kalray
Micron
Microsoft
NEC
Pure Storage
Quest Software
Red Hat, Inc
ScienceLogic
Seagate
SK Hynix
Turbonomic

Both
Broadcom
Dell Inc.
Fujitsu
HPE
Huawei
IBM
Intel
Lenovo
Microsemi
NetApp
Texas Tech University
Toshiba
Western Digital

*as of Feb 15, 2018
Dimensions of Redfish & Swordfish

• Protocol
• Data model
• Behavior
Redfish Client-Server Protocol

Client

REST

HTTP(s)

Server

1..M

1..N

- HEAD
- POST
- GET
- PUT
- PATCH
- DELETE

JSON + OData v4
Starting with Redfish: An Overview

Redfish Resource Map

- **/redfish/v1**
  - Root Resource
  - Links to all content
  - Sessions
  - Accounts
  - Schemas
  - Events

- **/redfish/v1/Managers**
  - Collection of Managers
  - BMC functionality

- **/redfish/v1/Managers/<id>**
  - BMC
  - System Manager operations

- **/redfish/v1/Chassis**
  - Collection of Chassis
  - "Physical" view of the system

- **/redfish/v1/Chassis/<id>**
  - Chassis
  - Global physical asset info
  - Power
  - Thermal
  - Processes
  - Disks
  - NICs

- **/redfish/v1/Systems**
  - Collection of Systems
  - "Logical" view of the system

- **/redfish/v1/Systems/<id>**
  - Model #, Serial #, Boot Order, NIC MAC, status, etc.
Adding Storage to Redfish (2 Ways): Hosted Service Configuration

- **/redfish/v1/Managers**
  - Collection of Managers
  - BMC functionality
  - 1:n

- **/redfish/v1/Managers/<id>**
  - BMC
  - System Manager operations

- **/redfish/v1/Chassis**
  - Collection of Chassis
  - "Physical" view of the system
  - 1:n

- **/redfish/v1/Chassis/<id>**
  - Chassis
  - Chassis global physical asset info

- **/redfish/v1/Chassis/Links to all content**
  - Collection of Chassis

- **/redfish/v1/StorageServices**
  - Collection of StorageServices
  - Storage functionality: block, file, object

- **/redfish/v1/StorageSystems**
  - Collection of StorageSystems
  - "Logical" view of dedicated systems

- **/redfish/v1/StorageSystems/<id>**
  - StorageSystem Information
  - Model #, Serial #, UIDs, status, etc.

- **/redfish/v1/Systems**
  - Collection of Systems
  - "Logical" view of general purpose systems

- **/redfish/v1/Systems/<id>**
  - Server Information
  - Model #, Serial #, Boot Order, NIC MAC, status, etc.

- **/redfish/v1/Systems/1:n**
  - Power
  - Thermal

- **/redfish/v1/StorageServices/1:n**
  - Volumes
  - Files
  - Replicas

- **/redfish/v1/StorageServices/<id>**
  - StorageService Information
  - Class of Service, Pools, Groups, Endpoints, Volumes/Files, Drives

- **/redfish/v1/StorageSystems/1:n**
  - Controller
  - Disks
  - FC or NIC

- **/redfish/v1/StorageSystems/<id>**
  - StorageSystem Information
  - Model #, Serial #, UIDs, status, etc.

- **/redfish/v1/StorageSystems/1:n**
  - Processor
  - Disks
  - NICs
Adding Storage to Redfish (2 Ways): Integrated Service Configuration

/redfish/v1
Root Resource
Links to all content

/redfish/v1/Managers
Collection of Managers
BMC functionality

/redfish/v1/Chassis
Collection of Chassis
"Physical" view of the system

/redfish/v1/Systems
Collection of Systems
"Logical" view of general purpose systems

/redfish/v1/StorageServices
Collection of StorageServices
Storage functionality: block, file, object

/redfish/v1/StorageServices/<id>
StorageService Information
Class of Service, Pools, Groups, Endpoints, Volumes/Files, Drives

Volumes
Files
Replicas

Storage
Storage Controllers

Processor
Disks
NICs

Model #, Serial #, Boot Order, NIC MAC, status, etc.

Chassis
Chassis global physical asset info

/redfish/v1/Managers/<id>
BMC System Manager operations

Power
Thermal

Services
Logs

Sessions
Accounts
Schemas
Events
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
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,..)
Schema - $metadata

- Type
- Version
- Schema definition
Schema - JsonSchemas

- JSON format of resource schema
Registries

- Message
- Event
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

- 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

• Online Practical Guide
  • SNIA Swordfish Practical Guide

• NEW! Swordfish School:
  • Swordfish School Playlist (YouTube)

• Swordfish API Specification

• Webcasts
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
Open Source Tools and Infrastructure Development

• **Available:** [http://github.com/snia](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
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THANK YOU