Overview of Swordfish: Scalable Storage Management

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The SNIA’s Scalable Storage Management Technical Work Group (SSM TWG) is working to create and publish 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.
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](http://www.snia.org/swordfish)
What are the Drivers for 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 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 Swordfish?

- SNIA Scalable Storage Management Technical Work Group (SSM TWG)
  - SSM is the group, Swordfish is the Spec
  - Provisional TWG formed in October 2015 to investigate / scope work
  - Scalable Storage Management (SSM) TWG chartered in December 2015

- Companies Engaged in Technical Development:
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

/redfish/v1
Root Resource
Links to all content

/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

/redfish/v1/Systems
Collection of Systems
“Logical” view of the system

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

/redfish/v1/Sessions
Sessions

/redfish/v1/Accounts
Accounts

/redfish/v1/Schemas
Schemas

/redfish/v1/Events
Events

Processor
Disks
NICs

Power
Thermal

Services
Logs
Adding Storage to Redfish…

/redfish/v1
Root Resource
Links to all content

/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/Managers
Collection of Managers
BMC functionality

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

/redfish/v1/StorageSystems
Collection of StorageSystems
“Logical” view of dedicated systems

/redfish/v1/Systems/<id>
Server Information
Model #, Serial #, UUIDs, status, etc.

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

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

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

/volumes
Files
Replicas
Controller
Disks
FC or NIC
Processors
Disks
NICs

Sessions
Accounts
Schemas
Events

Services
Logs
Power
Thermal

Sessions
Accounts
Schemas
Events

Processes
Disks
NICs

1..n
1..n
1..n
Seamless Extension of **Redfish** to **Swordfish**

- Make Swordfish a seamless extension of Redfish local storage schema
- Example: Volume

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<table>
<thead>
<tr>
<th>Redfish Volume Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>VolType</td>
</tr>
<tr>
<td>CapacityBytes</td>
</tr>
<tr>
<td>Encryption / EncType</td>
</tr>
<tr>
<td>BlockSizeBytes</td>
</tr>
<tr>
<td>Operations</td>
</tr>
<tr>
<td>...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Swordfish Volume Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
</tr>
<tr>
<td>CapacitySources</td>
</tr>
<tr>
<td>LowSpaceWarningThresholdPercents</td>
</tr>
<tr>
<td>ReplicaInfos</td>
</tr>
<tr>
<td>VolumeType</td>
</tr>
<tr>
<td>...</td>
</tr>
</tbody>
</table>
Can I See What a Swordfish-based System Will Look Like?

- Yes!

  - As a work tool, the Technical Work Group (TWG) has developed “mockups” (snapshots of a state in time) of different types of systems
  - These are available as part of the WIP releases and will be published on an ongoing basis as new functionality is added to show samples to supplement documentation
Overview of Swordfish Mockups

- Explore “mockups” of the Swordfish data model in a typical implementation
- Navigate via links through the model to 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
- Volumes
- Pools
- Groups
- Endpoints
- …
- Pointer to resources (system, chassis,..)
What’s in a Storage Service? (File)

Same structure:

- Available Classes Of Service
- **File systems**
- Pools
- Groups
- Endpoints
- ...
- Pointer to 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
Progress throughout 2016…

- v0.5 Work in Progress released March 2016
  - Initial WIP release
- v0.6 Work in Progress released May 2016
  - First draft Block storage schema
- v0.8 Work in Progress (July 2016)
  - Seamless alignment with Redfish
  - File Systems, Object Drive (Chassis Type)
- v0.9 Work in Progress (August 2016)
  - First draft of Specification and User’s Guide
- v1.0 Specification (September 2016)
  - Sent Final Specification to SNIA Technical Council*

*Publicly available after SNIA IP review process complete
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
End-User Engagement

- Get more information about applying for a select position on the newly forming SNIA Executive Storage Management Customer Panel
  - Email storagemanagement@snia.org for more information
SNIA Swordfish™

- Enter to win a Phantom 3 Drone
  - Fill out entry form, return to Storage Management Initiative (SMI) table
- Look for winner beginning 9/26 at http://www.snia.org/swordfish
- Visit SNIA SMI at Microsoft Ignite Booth #2371, 9/26 – 9/30, Atlanta
THANK YOU