Richelle Ahlvers is Principal Storage Management Software Architect at Broadcom Limited, where she defines storage management integrations, solutions, and standards strategies for the Data Center Storage Group.

Richelle has spent over 20 years in Enterprise Storage R&D teams in a variety of technical roles, leading the architecture, design and development of storage array software, storage management software user experience projects including mobility, developing new storage industry categories including SAN management, storage grid and cloud, and storage technology portfolio solutions.

Richelle has been engaged with industry standards initiatives with SNIA and DMTF for many years. She served as the SNIA Technical Council Chair and on the SNIA Board of Directors and has been engaged across a breadth of technologies ranging from storage management, to solid state storage, cloud, and green storage. She currently leads the SSM Technical Work Group developing the Swordfish Scalable Storage Management API.
The SNIA’s Scalable Storage Management Technical Work Group (SSM TWG) is working to create and publish open industry standard specifications 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.
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 Swordfish?

- 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
- 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
Adding Storage to Redfish...

Root Resource
/redfish/v1

Collection of Managers
/redfish/v1/Managers
BMC functionality

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

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

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

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

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

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

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

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

Storage Systems
/redfish/v1/StorageSystems

Storage Services
/redfish/v1/StorageServices

Files
Volumes
Replicas

Controller
Disks
FC or NIC

Processors
Disks
NICs

Power
Thermal
Services
Logs

Sessions
Accounts
Schemas
Events
Seamless Extension of Redfish to Swordfish

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

Redfish Volume
VolType
CapacityBytes
Encryption
EncType
ID
BlockSizeBytes
Operations
...
Seamless Extension of Redfish to Swordfish

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

<table>
<thead>
<tr>
<th>Redfish Volume Properties</th>
<th>Swordfish Volume Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>VolType</td>
<td>Redfish Volume Properties</td>
</tr>
<tr>
<td>CapacityBytes</td>
<td>VolType</td>
</tr>
<tr>
<td>Encryption</td>
<td>CapacityBytes</td>
</tr>
<tr>
<td>EncType</td>
<td>Encryption / EncType</td>
</tr>
<tr>
<td>ID</td>
<td>BlockSizeBytes</td>
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<tr>
<td>BlockSizeBytes</td>
<td>Operations</td>
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<td>Operations</td>
<td>...</td>
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<td>...</td>
<td>Capacity</td>
</tr>
<tr>
<td>...</td>
<td>CapacitySources</td>
</tr>
<tr>
<td>...</td>
<td>LowSpaceWarningThresholdPercents</td>
</tr>
<tr>
<td>...</td>
<td>ReplicaInfos</td>
</tr>
<tr>
<td>...</td>
<td>VolumeType</td>
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<tr>
<td>...</td>
<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.
  - Go to [http://swordfish.mockable.io/redfish/v1](http://swordfish.mockable.io/redfish/v1) or download from snia.org/swordfish and install on your own web server.
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

- Click the 
  
  ```
  ./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 in 2016 ...

- v0.5 Work in Progress released March 2016
  - Initial WIP release
- **v1.0 Specification released September 2016**
  - Sent Final Specification to SNIA Technical Council*
  - * Publicly available in December after SNIA IP review process complete
- v1.01 and v1.0.2 errata releases in October and November 2016
Coming in 2017

- **v1.0.3 Release in January 2017**
  - Schema updates
  - Spec section additions
  - User’s guide updates: new use cases

- **Targeted Spring 2017:**
  - v1.1: Initial Swordfish Event Registry, FC Fabric Model, Performance Metrics, Joint Redfish/Swordfish Profiles

- **Online Implementer’s Guide**

- **Future Functionality**
  - Object Storage
  - Storage-specific security roles
How to Participate: Shaping the Standard

- Find pointers to the latest technical content:
  - [http://snia.org/swordfish](http://snia.org/swordfish)
  - [http://www.snia.org/publicreview#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](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](http://www.snia.org/feedback)

- Join the Swordfish User Community:
  - [http://swordfishforum.com](http://swordfishforum.com)
Question & Answer
To download this Webcast after the presentation, go to

http://www.snia.org/swordfish/