Accelerating Swordfish Implementations

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The SNIA Swordfish™ Approach

- Develop the management model
  - point-of-view of what a client needs to accomplish
  - provide information that the client needs

- Cover block, file, and object storage

- Traditional storage domain coverage & converged environments
  - covering servers, storage and fabric together

- Implement the Swordfish API as an extension of the Redfish API
  - Build using DMTF’s Redfish technologies
    - RESTful interface over HTTPS in JSON format based on OData v4
Who is Developing Redfish and Swordfish*?

Redfish:
- American Megatrends, Inc.
- Artesyn Embedded Technologies
- Eaton
- Ericsson AB
- Insyde Software Corp.
- Mellanox Technologies
- New H3C Technologies Co., Ltd
- OSIsoft, LLC
- Quanta Computer
- Solarflare Communications
- Supermicro
- Vertiv

Swordfish:
- Hitachi
- Inspur
- Kalray
- ManageEngine
- Micron
- NEC Corporation
- NGD Systems, Inc.
- Pure Storage
- Quest Software
- Seagate Technology
- Silicon Motion, Inc.
- SK Hynix
- StarWind
- Toshiba America
- Turbonomic

*as of September 20, 2019
** Membership suspended
Swordfish: Walking the Model
See Example Swordfish Configurations

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

Note: Mockups are representations of implementations, not normative
Overview of Swordfish Hierarchy

- Explore the Swordfish data model to see potential / typical implementation
- Navigate the model to learn about, and see, various resources
- SNIA mockups show 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/StorageServices` or `../redfish/v1/StorageSystems` link to see the “Collection” of Storage Services or Systems.

- Click the “../StorageSystems/Simple” link to see the details of the Simple mockup “../StorageSystems/1” to see the details of the complex storage service mockup “../StorageSystems/FileService” to see the filesystem mockup “../StorageSystems/ISC” to see the ISC mockup (look for links to the hosting system).
What’s in a Storage Service/System? (Block)

- Classes Of Service (if using Service)
  - Lines of Service that are used to compose the Classes of Service
- Volumes
- Pools
- Groups
- Endpoints
- ...
- Pointer to related resources (system, chassis,..)
What’s in a Storage Service/System? (File)

Same structure:

- Classes Of Service (if using Service)
- **File systems**
- Pools
- Groups
- Endpoints
- …
- Pointer to related resources (system, chassis, **block service** or drives)
Which Tools are right for you!

- Swordfish PowerShell Toolkit
- Swordfish to RestAPI Map
- Swordfish PowerShell Provider Framework
- Swordfish Emulator
- Swordfish Mockup website
- Redfish Mockup Creator
Which Tools are right for you!

YOUR Storage Management software HERE!

- Swordfish PowerShell Toolkit
- SwordfishMockups.com
- Redfish Mockup Creator
- RestAPI to Swordfish Map example
- Swordfish PowerShef Provider Example
- RestAPI to Swordfish Map example
- Redfish Server
- Swordfish Emulator
- YOUR Storage Device HERE!

Swordfish Providers (Storage Devices)

Swordfish Consumers (Clients)

WAC Extension

Uses
WHAT IS THE POWERSHELL TOOLKIT?

- Open source project between HPE and Pure Storage
  - [https://github.com/SNIA/Swordfish-Powershell-Toolkit](https://github.com/SNIA/Swordfish-Powershell-Toolkit)
- Supported on Windows Server, Linux and macOS
  - Can query a Swordfish Target, A simulator, or even SwordFishMockup.com
- PowerShell wrapper for REST API calls to Redfish and Swordfish
PowerShell Toolkit

- Everything is returned as objects (and nested objects)
  - Cast to Variable
  - Can filter by properties, or access like an array
  - Can dig deeper into single values
- And you can even cast the Variable back to JSON format
PowerShell Command Help

- Get a list of valid commands
- Get Help on a specific command
  - Option to show examples
  - Option to show All
- Verbose option to see raw transactions
PowerShell Toolkit Work Items

The PowerShell Toolkit commands;
- Get-SwordFishChassis (+ Power, +Thermal)
- Get-SwordFishDrive
- Get-SwordFishEndpoint
- Get-SwordFishEndpointGroup
- Get-SwordFishStoragePool
- Get-SwordFishStorageService
- Get-SwordFishVolume
- Get-SwordFishClassOfService
- Connect-SwordFishTarget
- Connect-SwordfishMockup

Command sets that need to be written;
(in order of priority)
- New/Set/Remove-SwordFishEndpoint
- New/Set/Remove-SwordFishEndpointGroup
- New/Set/Remove-SwordFishStoragePool
- New/Set/Remove-SwordFishStorageGroup
- New/Set/Remove-SwordFishConsistencyGroup
- New/Set/Remove-SwordFishVolume
- Set-SwordFishStorageService
- Set-SwordFishChassis
- Get/New/Set/Remove-*LoS
- New/Set/Remove-SwordFishClassOfService

- Common Nomenclature
  - RestAPI vs PowerShell. Create = New, Read = Get, Update = Set, Delete = Remove
- All Commands must have inline help before being checked into the build
- All Commands must work against BOTH the Swordfish Targets (directly) and SwordFishMockups.com
- All Commands are open source, no compiled code or external DLL dependencies
What you will need
- RestAPI Documentation to your Target Device
- PowerShell Toolkit that exposes your RestAPI
- Basic PowerShell knowledge
- Access to SwordfishMockups.com
- Access to the Swordfish Spec
  i.e. https://github.com/SNIA/SSM/tree/master/yaml

Steps
1. Retrieve the Volume Object from your Device and expand its JSON
2. Hold it side-by-side to a Volume Object from SwordFishMockups.com
3. Look for Matches and check the Vendor RestAPI documentation vs the Swordfish Spec for similarities
   i.e. You may show the space of a Volume as MBytes, while the Swordfish Specs uses Bytes. You would need to know to multiply your result by 1024 to before populating the relevant swordfish field
4. Go through the rest of the Swordfish Spec looking for fields that you can implement and fill in using your results.
Create a File Structure to match Swordfish

- Using PowerShell you can create a function for each thing you wish to express in SwordFish.
- Make a master script that runs your function against all things in your device.
- Create PowerShell Objects that can be converted to JSON as saved as Index.json files.
- In example to right, Variables all start with ‘$’ and constants are shown in brown.

SEE HTTPS://GITHUB.COM/CHRIS-LIONETTI/SWORDFISHMOCKUP
How to Serve Swordfish...It’s a Cookbook!

- Codebase Assumes that you have created a Mockup that runs against the output of that mockup.
  - The Mockup can be directed to pull live information for each Swordfish request.
- Code is hidden command in the Mockup called ‘Listener.ps1’

```powershell
# Create a listener on port 5000
$Listener = New-Object System.Net.HttpListener
$Listener.Prefixes.Add('http://*:5000/')
$Listener.Start()
write-host 'Listening ...To end this session connect to the IP Address with the action end'
# Run until you send a GET request to /end
```
Swordfish Info: www.snia.org/swordfish

- Resources
  - Specifications
  - User’s Guide
  - GitHub for Swordfish Tools
  - Practical Guide
  - Other Documentation
- Swordfish Mockups Site
  - ISC and HSC configurations
  - Block vs file configurations
  - Small and large configurations
- Education/Community
  - Whitepapers, Presentations
  - YouTube shorts & Webinars
- Participate
  - Join SNIA and the SSM TWG Implement
Next Steps

- Develop a Swordfish Mockup of your own & submit it to the Swordfish forum;
  - Feedback on spec adherence to validate your mockup.
  - Will be posted as an additional example in the SwordfishMockups.com site.

- Join SNIA and the SSM TWG & help define the Schema;
  - Ensure the Schema is defined sufficiently to represent your desired implementation
    - WE ARE ALWAYS LOOKING FOR FEEDBACK REGARDING YOUR IMPLEMENTATION MAPPING TO SWORDFISH!
  - Full NVMe Enablement: Functionality alignment across DMTF, NVMExpress/NVMe-MI and SNIA for NVMe use cases
  - Enhanced profile support for SNIA Alliance partner organizations

- Help define the future of this Swordfish Consumer.
  - SwordFish™ PowerShell Toolkit and follow-on Windows Admin Client Module.
  - Notable projects; Swordfish DataDog implementation & PowerBI
  - A GoLang Client library called GoFish; An EmberJS Client
  - Looking for more integration points (what can you come up with)

- Attend the SDC Swordfish Mockathon at this event.
  - BYOAPI (Bring Your Own API), walk out with working provider that you can build upon.