SDC 20
SNIA EMEA
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TEL AVIV, ISRAEL
STORAGE DEVELOPER CONFERENCE

Accelerating Swordfish Implementations

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HPE

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

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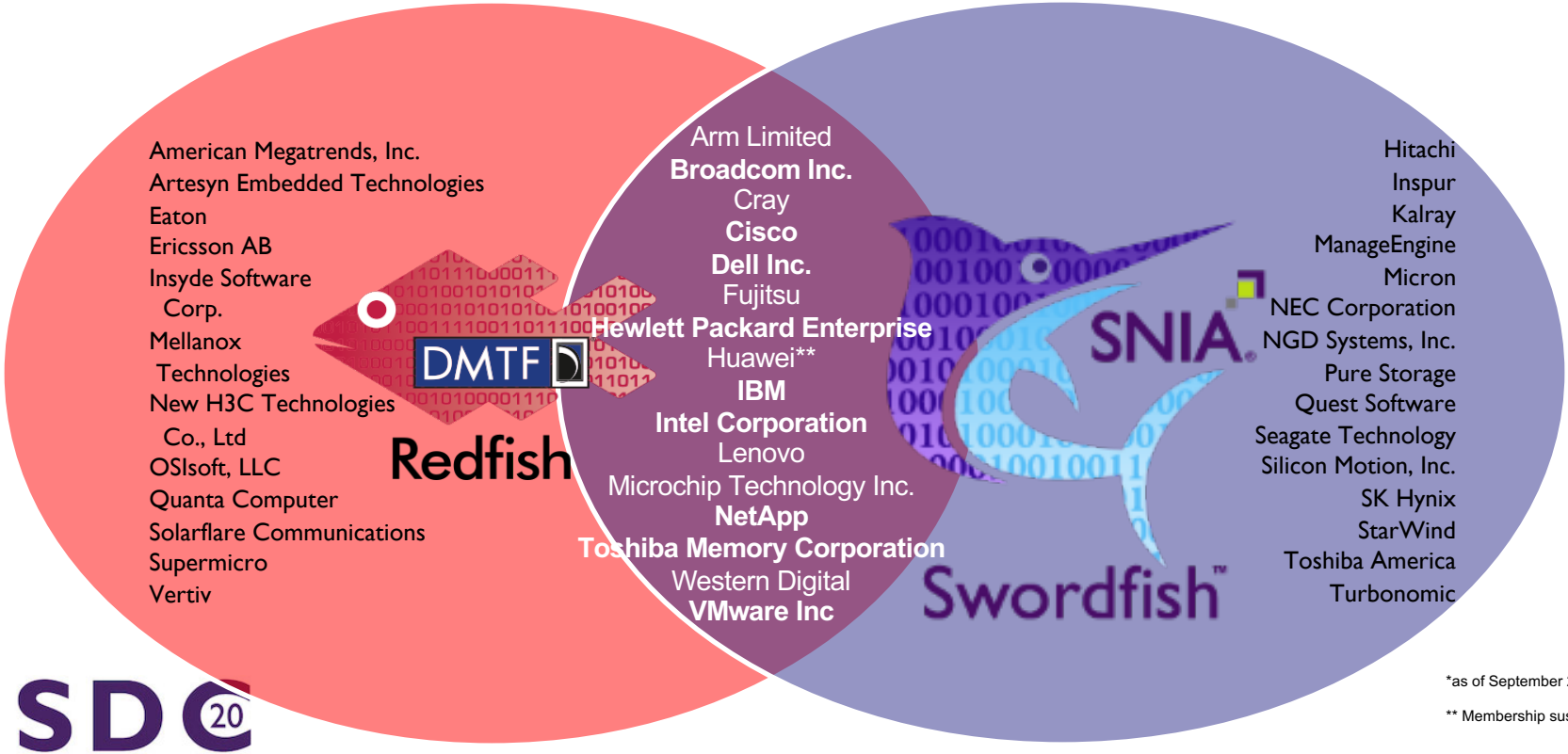
Who is Developing Redfish and Swordfish*?



*as of September 20, 2019

** Membership suspended

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Swordfish: Walking the Model

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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 (/redfish/v1/)

Note: Mockups are representations of implementations, not normative

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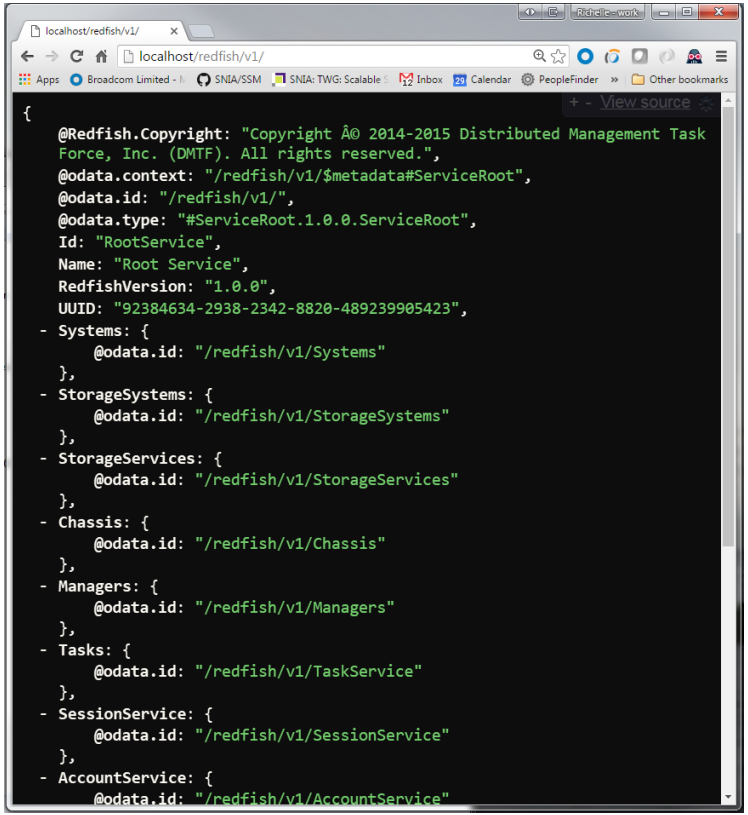
Overview of Swordfish Hierarchy

- 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



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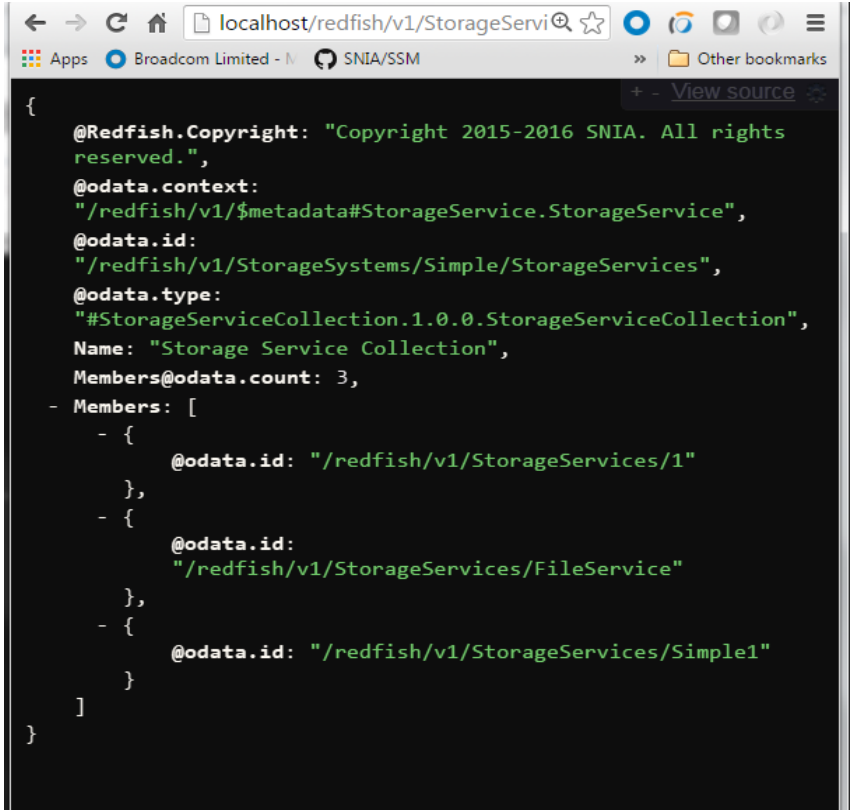
Navigating through the Mockups…

- 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)



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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,..)

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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)

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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

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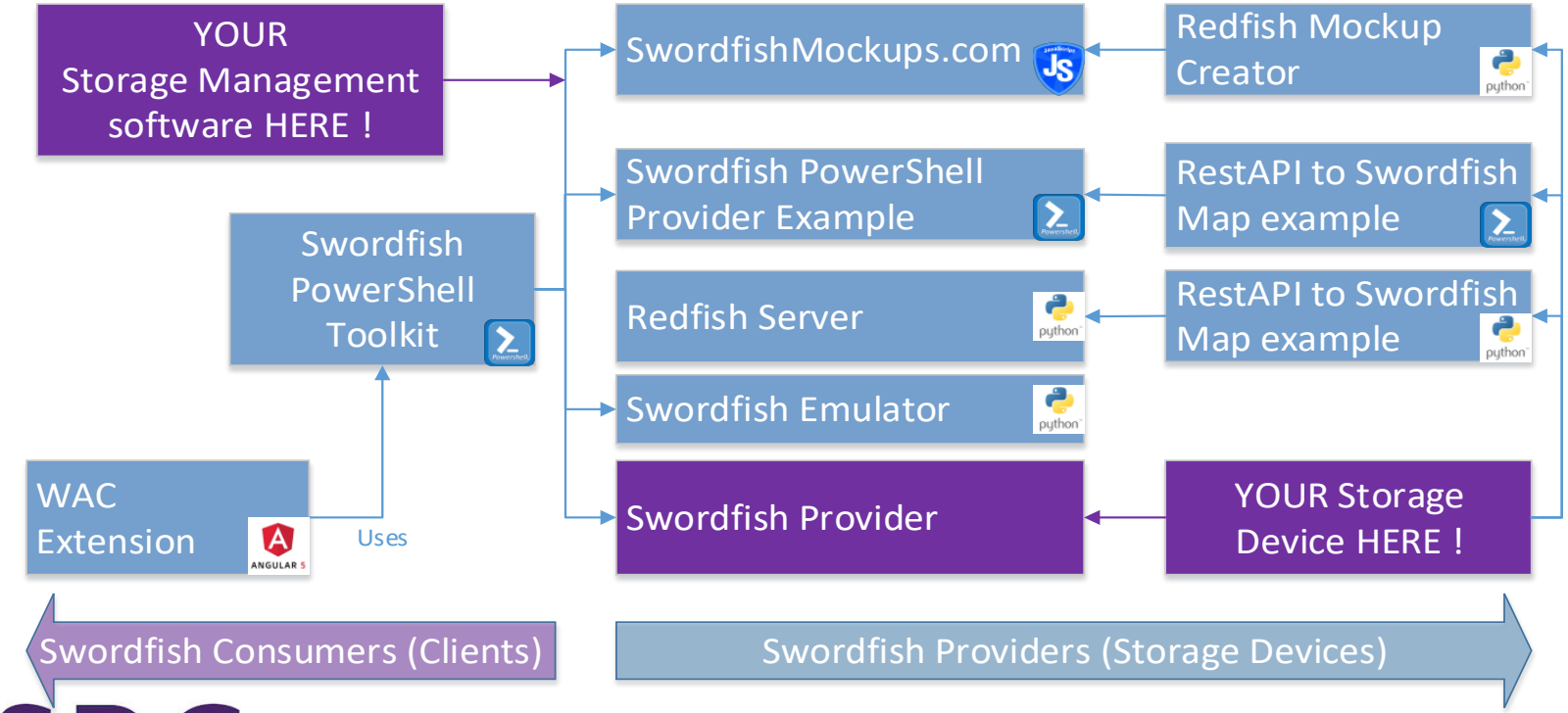
Which Tools are right for you!



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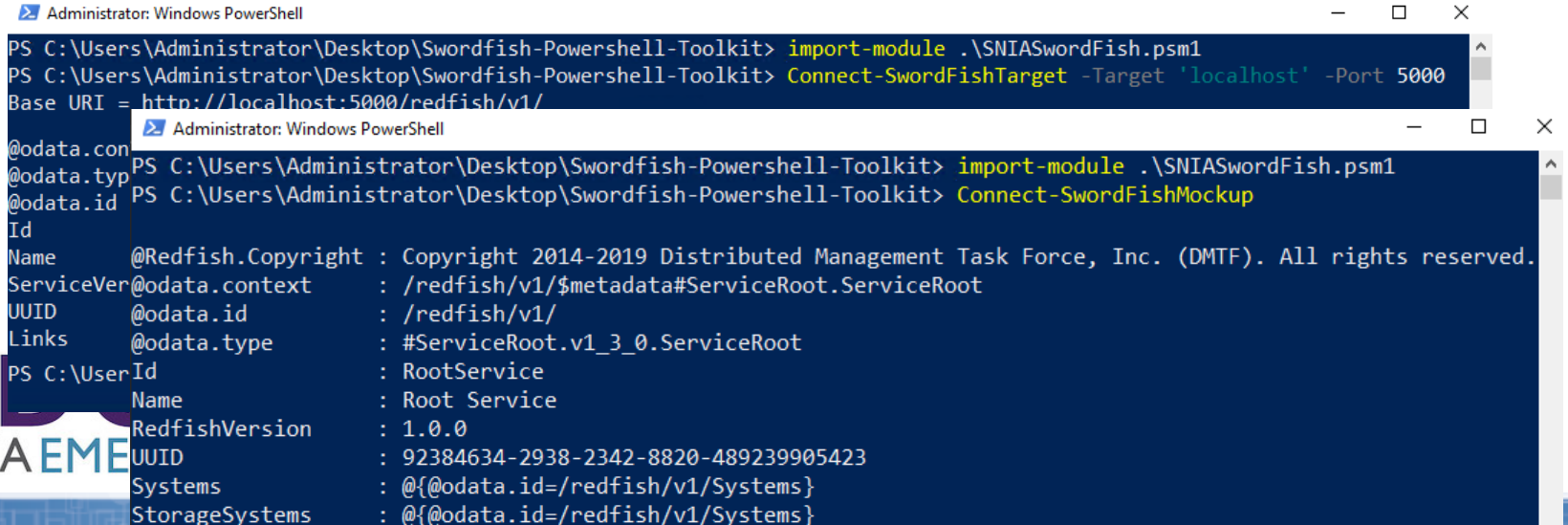
WHAT IS THE POWERSHELL TOOLKIT?

- Open source project between HPE and Pure Storage
  - 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 Tooli

- Everything is returned as obj
  - Cast to Variable `$MyVols`
  - Can filter by properties, c
    `$MyVols`
    `$MyVols`
  - Can dig deeper into sing
  - And you can even cast tl

```
PS C:\> $MyVols[4] | convertto-json
{
    "@Redfish.Copyright":  "Copyright 2014-2019 SNIA. All rights reserved.",
    "@odata.context":  "/redfish/v1/$metadata#Volume.Volume",
    "@odata.id":  "/redfish/v1/StorageServices/1/Volumes/5",
    "@odata.type":  "#Volume.v1_4_0.Volume",
    "Name":  "Volume 5",
    "Id":  "5",
    "Description":  "Volume 5.",
    "Identifiers":  [
                        {
                            "DurableNameFormat":  "NAA",
                            "DurableName":  "6545676545676100124407610012348 7"
                        }
                    ],
    "Manufacturer":  "SuperDuperSSD",
    "Model":  "Drive Model string",
    "Status":  {
                   "State":  "Enabled",
                   "Health":  "OK"
               },
    "AccessCapabilities":  [
                               "Read",
                               "Write",
                               "Append",
                               "Streaming"
                           ],
    "BlockSizeBytes":  512,
    "CapacitySources":  [
                            {
                                "@odata.id":  "/redfish/v1/StorageServices/1/Volumes/5#/CapacitySources/0"
                                "MemberId":  "0",
                                "ProvidedCapacity":  "@{ConsumedBytes=0; AllocatedBytes=10737418240; Guara
                                "ProvidingPools":  ""
                            }
                        ],
    "Capacity":  {
                     "Data":  {
                                  "ConsumedBytes":  0,
                                  "AllocatedBytes":  10737418240,
                                  "GuaranteedBytes":  536870912,
                                  "ProvisionedBytes":  1099511627776
```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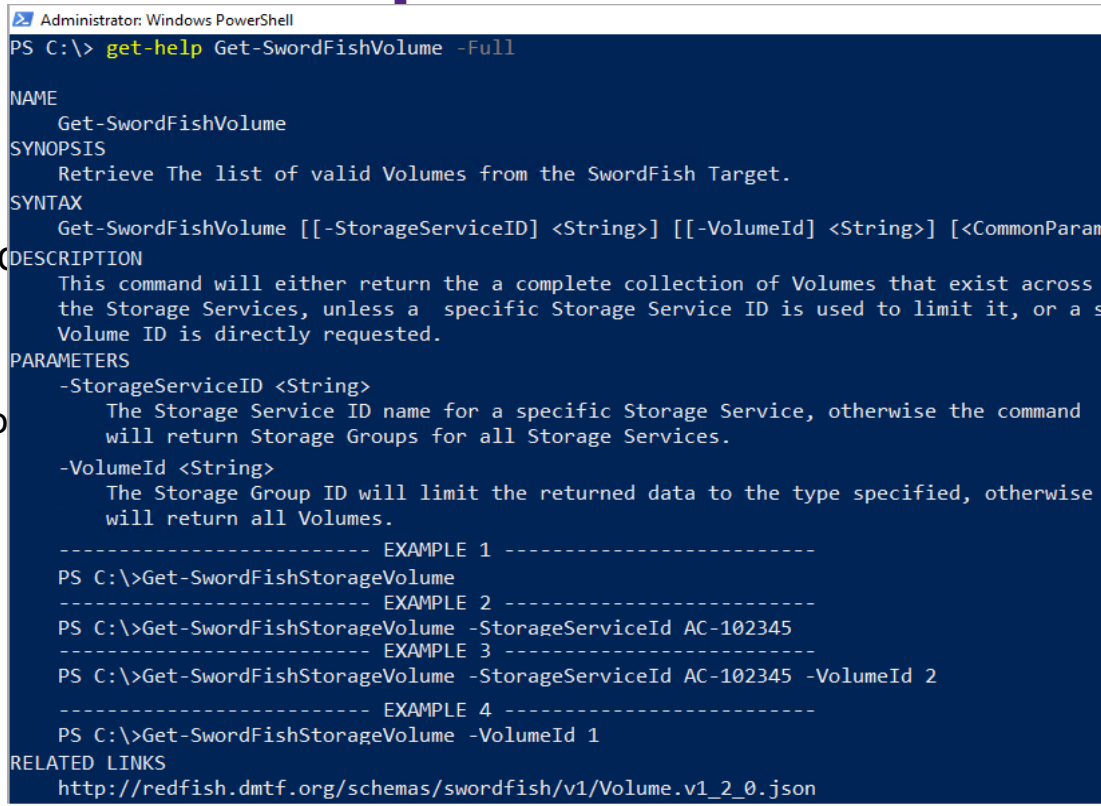
PowerShell Command Help

- Get a list of valid commands
- Get Help on a specific comman
  - Option to show examples
  - Option to show All
- Verbose option to see raw transactio



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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

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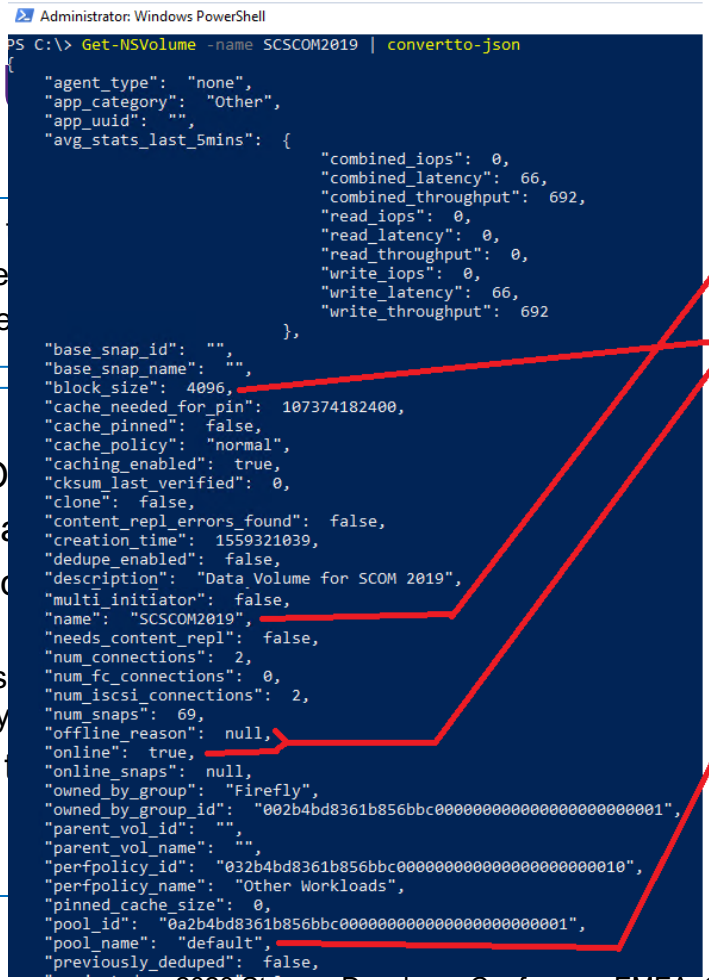
What yo

- RestAPI Documentation
- PowerShell Toolkit that e
- Basic PowerShell knowle

Steps

1. Retrieve the Volume O
2. Hold it side-by-side to a
3. Look for Matches and c similarities
   i.e. You may show the s need to know to multiply
4. Go through the rest of using your results.



Some values are hardcoded per spec

Other values are partially hardcoded with known values added

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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 you 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.

```
$VolObj =@{'@Redfish.Copyright'      =   $RedfishCopyright;
           '@odata.context'          =   '/redfish/v1/$metadata#Volumes/'+$NimbleSerial+'/Volumes/'+$Snapshot.name;
           '@odata.id'               =   '/redfish/v1/$metadata#Volumes/'+$NimbleSerial+'/Volumes/'+$Snapshot.name;
           '@odata.type'             =   '#Volumes_1_4_0.Volume';
           Id                        =   $Snapshot.id;
           Name                      =   $Snapshot.name;
           Description               =   $Snapshot.description;
           Capacity                  =   @{  AllocatedBytes  =   ($Snapshot.Size * 1024)
                                          };
           Status                    =   @{  State           =   $SnapStatus_state;
                                             Health          =   $SnapStatus_health;
                                          };
           BlockSizeBytes            =   $Volume.block_size;
           MaxBlockSizeBytes         =   $Volume.block_size;
           OptimumIOSizeBytes        =   $Volume.block_size;
           Manufacturer              =   'HPENimbleStorage';
           Encrypted                 =   $Vol_Encryption;
           EncryptionTypes           =   'ControllerAssisted';
           ProvisioningPolicy        =   'thin';
           Compressed                =   'true';
           Deduplicated              =   $Volume.dedupe_enabled;
           DisplayName               =   $Volume.Full_name+'+'+$Snap.name;
           LowSpaceWarningThresholdPercents =  $Volume.warn_level;
           VolumeType                =   'Snapshot';
           VolumeUsageType           =   "Data";
           ReadCachePolicyType       =   $Vol_CachePolicy;
           WriteCacheState           =   'Enabled'
           WriteCachePolicyType      =   "ProtectedWriteBack";
           WriteCacheStateType       =   "Protected";
           WriteHoleProtectionPolicyType = "Journaling";
```

SEE HTTPS://GITHUB.COM/CHRIS-LIONETTI/SWORDFISHMOCKUP

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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'


```
# 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
```


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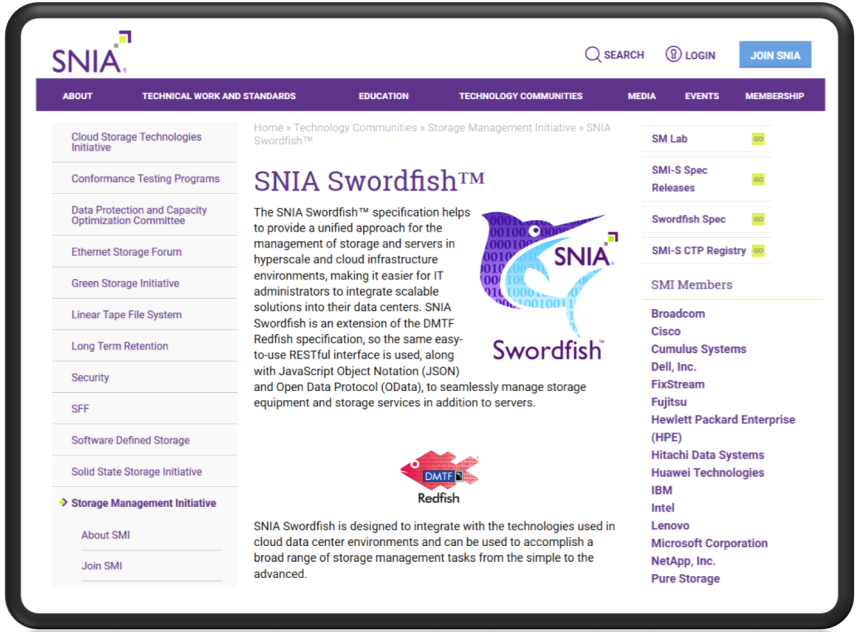
Swordfish Info: www.snia.org/swordfish

- 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



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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 MAPING 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.

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Q&A

- Thanks to the SSM TWG members for additional slide content

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