

STORAGE DEVELOPER CONFERENCE



BY Developers FOR Developers

Virtual Conference
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A SNIA[®] Event

Drive Adoption of Your Products with the Swordfish Conformance Test Program

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Storage Technology Enabling, Intel

What is Swordfish CTP?

- Swordfish CTP:

- A vendor-neutral test suite to validate conformance to the SNIA Swordfish Specification as well as conformance to the DMTF Redfish Specification
- Uses the Redfish specification, Swordfish Specification and published Swordfish Profiles to determine compliance
 - Profiles define required subsets of functionality that implementations can advertise as customer “Features”
 - Each Feature corresponds to key customer functionality and is advertised to clients
- Built using open source tools
 - Leverage pre-built tools: Redfish test framework; Redfish-URI-Validator; Redfish-Service-Validator; Redfish-Protocol-Validator; Redfish-interop-validator
 - Custom tools built to extend, verifying Swordfish-specific requirements: Swordfish Features test; Swordfish Capacity Source test
- Targeting a completely automated test submission, validation and publication process

Why Do SNIA Swordfish CTP?

- Vendor/Manufacturer benefits:
 - Reduced integration costs with partners
 - Meet customer demand for standards-based solutions
- End User/Customer benefits:
 - Objective testing verified in a vendor-neutral manner
 - Ensured product conformance to industry standards
 - Lower cost of ownership
 - Help to prevent vendor lock-in
 - Improved interoperability of multi-vendor products

Test Submission Model

- Self-test and validation
 - Participants run tests against their own equipment / software, submit test results to SNIA / SMI to validate and post on the Swordfish site as certified results
 - Current process: “Testing the tests” – companies working directly with CTP lead and testers to simplify process, debug issues
 - Process will be completely automated (with audit process) – results submitted through online portal, processed through automatic validation process, then automatic results created for review before publishing

CTP Logo and Version

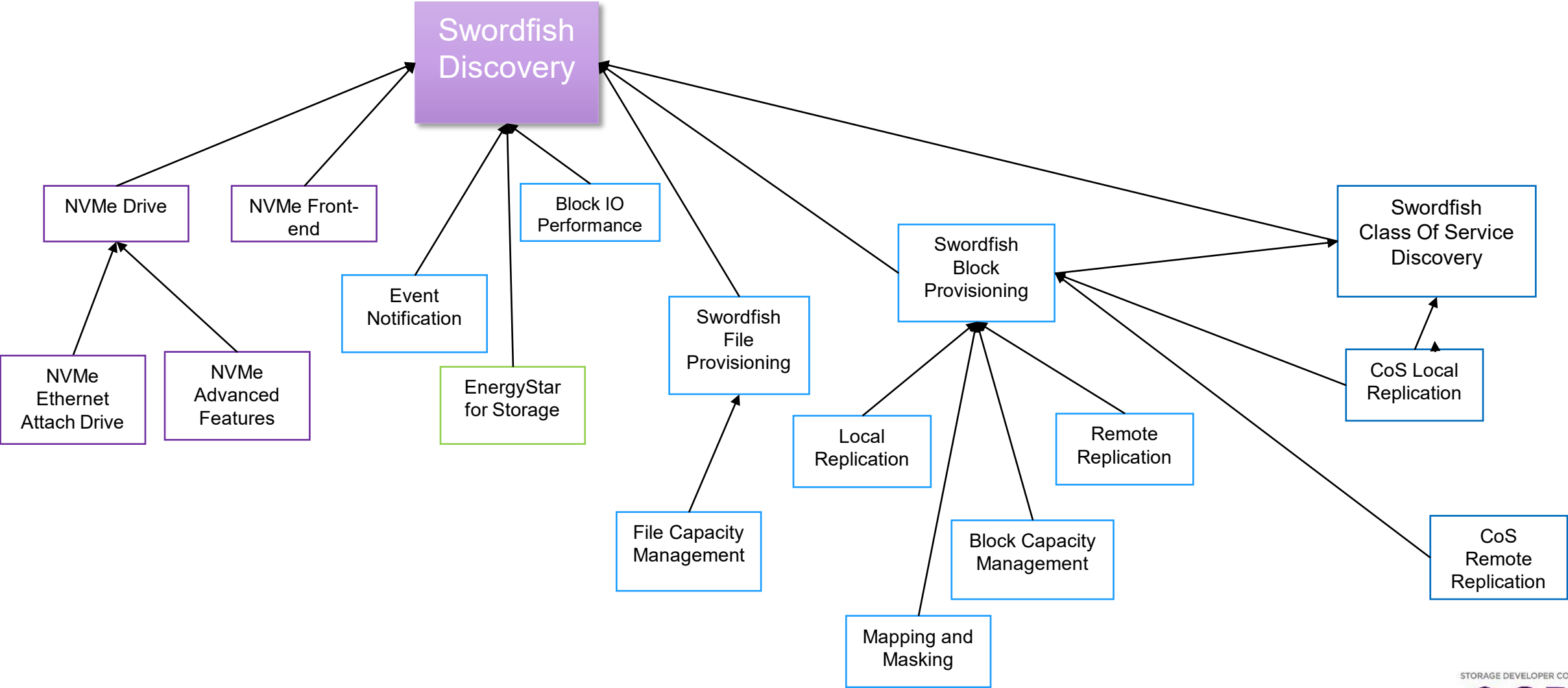
- The CTP Program logos are numbered to correspond to the versions of Swordfish that the SSM TWG chooses to release as SNIA Standards
 - Easy for clients to match your implementations with specifications
 - Identifiable logos to use in marketing materials



What is Covered by tests?

- Conformance to Redfish (and Swordfish) specifications
 - Base required functionality
 - \$metadata, odata enumerations
 - Required properties in schema
 - Check all URIs are valid (per RF/SF schema)
 - Limited functionality validation – e.g., sessions for authentication
- Conformance to requirements in Swordfish profiles
 - Each Profile contains only requirements for that feature

Swordfish Profiles Inheritance Hierarchy



Framework and Test Overview

Test Framework

- The test framework leverages the “Redfish-Test-Framework”, an open source framework from the Redfish Forum
 - No need to learn complex setup: Framework is bundled with simple command-line interface specific to Swordfish
- Test early and often
 - CTP supports checking compliance level using mockups
 - Or, use an emulator as a test / development tool: Swordfish API Emulator and DEM both being enhanced to support CTP compliance
- Enhancements (some work in progress, some TBD):
 - SNIA authenticated self-run test result mechanism (e.g., certificate based authentication for CTP members for submitted test results)

```
(.venv) [root@e7f161f18cda swordfish-ctp-tests]# python ./run_snia_test.py -h
usage: run_snia_test.py [-h] [--user USER] [--password PASSWORD]
                        [--secure SECURE] [--authtype AUTHTYPE]
                        [--profiles PROFILES [PROFILES ...]]
                        [--profile_version PROFILE_VERSION]
                        host level

Python Script for the official Swordfish CTP Testing Suite.
    The hostname provided should be a full URI, as example `https://example.com:8000`.

    The hostname may also be provided as a mockup directory as formatted for the Redfish-Mockup-Server or Redfish-Protocol-Validator

    The following test levels are available:  serviceroottest, servicetest, officialtest

    After performing the run, your test directory will be output into your Swordfish-CTP-Tests folder as "test_dir_currentdate".


positional arguments:
  host                  Full URL of System being tested (or directory of mockup)
  level                 Level of testing

optional arguments:
  -h, --help            show this help message and exit
  --user USER, -u USER Username for server
  --password PASSWORD, -p PASSWORD Password of server
  --secure SECURE, -s SECURE Ensures certificate checking on https servers
  --authtype AUTHTYPE Specify that we are using redfish session or not
  --profiles PROFILES [PROFILES ...] Specify profiles to test against service
  --profile_version PROFILE_VERSION Default version of profiles to test against

(.venv) [root@e7f161f18cda swordfish-ctp-tests]#
```

Test Results: Summary results available from individual test runs

- Each run shows results of each test run
- Submit results when desired tests are passing
 - Redfish service-level tests required
 - Swordfish Discovery feature required
- From final / validated test results, these results will be transformed into results posted online at snia.org/ctp
 - Results will be categorized as Base Redfish, and by Swordfish Feature – only “passed” features published



Conformant

SNIA Swordfish(Tm) Conformance Test Program Results

Start Time: 2021-09-10 22:48:47
Duration: 38.72 s
Summary: Total: 5, Pass: 2, Fail: 3

| Swordfish CTP Test | Status |
|----------------------------|---------------------------|
| Redfish Protocol Validator | Fail View |
| Redfish URI Validator | Fail View |
| SNIA Drives Capacity Test | Pass View |
| SNIA Registries Test | Fail View |
| SwordfishDiscovery | Pass View |

Test Results: Published Results

- Final / validated test results will be posted online at snia.org/swordfish-ctp
 - Results will be categorized as Base Redfish, and by Swordfish Feature
 - Only “passed” features published

Example Company "A"

Official SNIA Swordfish™ CTP Test Results

CTP Test version: v1.2.2

Tested Software: Example Company "A" Storage Manager v1.2

Swordfish version: v1.2.2



Swordfish Conformant Tests

Redfish Protocol Tests

Swordfish Discovery

Swordfish Block Provisioning

Swordfish NVMe SSD Drive

Swordfish NVMe SSD Drive Advanced Features

Swordfish NVMe SSD Drive Ethernet Attach

Applicable Product Family: Example Company "A" NVMe SSD Ethernet-Attached Drives

Products in Family: Product Name X01 NVMeGen3 Drive, NVMeGen4 Drive

[Company product family page.](#)

Redfish Service Tests

| /redfish/v1/ (response time: 0.003722) ServiceRoot | | | | |
|---|--|--|--------|---|
| /redfish/v1/ (response time: 0.003722) Show Results Show Payload | | Context: /redfish/v1/\$metadata#ServiceRoot.ServiceRoot File Origin: localFile:///.../metadata/ServiceRoot_v1.xml Resource Type: #ServiceRoot.v1_9_0.ServiceRoot | | GET Success HTTP Code (200) pass: 8 passGet: 1 refLink: 1 shipOptional: 25 |
| Property Name | Value | Type | Exists | Result |
| @odata.context | /redfish/v1/\$metadata#ServiceRoot.ServiceRoot | odata | Exists | PASS |
| @odata.id | /redfish/v1/ | odata | Exists | PASS |
| @odata.type | #ServiceRoot.v1_9_0.ServiceRoot | odata | Exists | PASS |
| Storage | Link: /redfish/v1/Storage | link to: StorageCollection | Yes | PASS |
| AggregationService | - | link to: AggregationService | No | Optional |
| PowerEquipment | - | link to: PowerEquipment | No | Optional |
| Facilities | - | link to: FacilityCollection | No | Optional |
| Vendor | - | string | No | Optional |
| CertificateService | - | link to: CertificateService | No | Optional |
| ResourceBlocks | - | link to: ResourceBlockCollection | No | Optional |
| JobService | - | link to: JobService | No | Optional |
| TelemetryService | - | link to: TelemetryService | No | Optional |
| Product | - | string | No | Optional |
| ProtocolFeaturesSupported | - | ServiceRoot.v1_3_0.ProtocolFeaturesSupported | No | Optional |
| CompositionService | - | link to: CompositionService | No | Optional |
| StorageSystems | - | link to: StorageSystemCollection | No | Optional |
| StorageServices | - | link to: StorageServiceCollection | No | Optional |
| Fabrics | - | link to: FabricCollection | No | Optional |
| UpdateService | - | link to: UpdateService | No | Optional |
| RedfishVersion | 1.12.0 | string | Yes | PASS |
| UUID | 92384634-2938-2342-8820-489239905423 | GUID | Yes | PASS |
| Systems | - | link to: ComputerSystemCollection | No | Optional |
| Chassis | Link: /redfish/v1/Chassis | link to: ChassisCollection | Yes | PASS |
| Managers | - | link to: ManagerCollection | No | Optional |
| Tasks | - | link to: TaskService | No | Optional |
| SessionService | Link: /redfish/v1/SessionService | link to: SessionService | Yes | PASS |
| AccountService | - | link to: AccountService | No | Optional |
| EventService | - | link to: EventService | No | Optional |
| Registries | - | link to: MessageRegistryFileCollection | No | Optional |
| JsonSchemas | - | link to: JsonSchemaFileCollection | No | Optional |
| Links | [JSON Object] | ServiceRoot.v1_0_0.Links | Yes | complex |
| Links.Sessions | Link: /redfish/v1/SessionService/Sessions | link to: SessionCollection | Yes | PASS |
| Links.Oem | - | Resource.Oem | No | Optional |
| Id | RootService | string | Yes | PASS |
| Description | - | string | No | Optional |
| Name | Root Service | string | Yes | PASS |
| Oem | - | Resource.Oem | No | Optional |
| No errors | | | | |
| No warns | | | | |

Service validator checks general conformance to schema

Troubleshooting from test results

| | | | | |
|-------------------------------------|---|------------------------------------|-----|----------|
| PhysicalPortAssignment | - | link to: NetworkPort | No | Optional |
| BootMode | Disabled | string (enum) | Yes | PASS |
| VirtualFunctionsEnabled | True | boolean | Yes | PASS |
| MaxVirtualFunctions | 16 | number | Yes | PASS |
| Links | [JSON Object] | NetworkDeviceFunction.v1_0_0.Links | Yes | complex |
| Links.EthernetInterfaces | Array (size: 1) | array of: EthernetInterface | Yes | ... |
| Links.EthernetInterfaces[0] | Link: /redfish/v1/Chassis/EBOFEnclosure/NetworkAdapters/8fd725a1/NetworkDeviceFunctions/11100/EthernetInterfaces | EthernetInterface | Yes | FAIL |
| Links.OffloadSystem | - | link to: ComputerSystem | No | Optional |
| Links.OffloadProcessors | - | Processor | No | Optional |
| Links.PhysicalNetworkPortAssignment | - | link to: Port | No | Optional |
| Links.EthernetInterface | - | link to: EthernetInterface | No | Optional |
| Links.PhysicalPortAssignment | - | link to: NetworkPort | No | Optional |
| Links.Endpoints | - | Endpoint | No | Optional |
| Links.PCIeFunction | - | link to: PCIeFunction | No | Optional |
| Links.Oem | - | Resource.Oem | No | Optional |
| Id | 11100 | string | Yes | PASS |
| Description | - | string | No | Optional |
| Name | Network Device Function View | string | Yes | PASS |
| Oem | - | Resource.Oem | No | Optional |

ERROR - Links.EthernetInterfaces[0]: Linked resource reports schema version (or namespace): EthernetInterface.EthernetInterface not found in typechain

WARNING - /redfish/v1/Chassis/EBOFEnclosure/NetworkAdapters/8fd725a1/NetworkDeviceFunctions/11101 @odata.id: Expected @odata.id to match URI link /redfish/v1/Chassis/EBOFEnclosure/NetworkAdapters/8fd725a1/NetworkDeviceFunctions/11100

- Descriptive messages show issues with any failures or warnings
- Additional log files available for more detailed reporting

Individual Features Tests

Each test run has parameters, system info

Results show PASS/FAIL for each item

SNIA Swordfish (tm) Conformance Test Report



Tool Version: 2.0.0
Fri Sep 10 22:49:25 2021
(Run time: 0:00:00)

The Swordfish CTP Test Framework is provided and maintained by the SNIA. For feedback on the Swordfish CTP framework, go to:

<https://www.snia.org/feedback>

This tool is provided and maintained by the DMTF. For feedback, please open issues in the tool's Github repository:

<https://github.com/DMTF/Redfish-Service-Validator/issues>

Description: My Target System Root Service, version 1.12.0, 92384634-2938-2342-8820-489239905423

System: http://192.168.1.42:5000

Profile: ['../profiles/SwordfishDiscovery.json']

Schema: None

authType: None, certificatebundle: None, certificatecheck: False, config: None
configuri: http://192.168.1.42:5000, debugging: False, forceauth: False, ip: http://192.168.1.42:5000
logdir: logdir, oemcheck: True, online_profiles: True, payload: None
timeout: 10, token: None, username: , usessl: False
verbose: 0, warnrecommended: False, writecheck: False

| /redfish/v1/ (response time: 0) ServiceRoot | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------|---|--------|-------------|--|---------------|-------|----------|--------|--------|-------------------------|-----------|------------|--------|------|---------------------------|-------------|------------|--------|------|--------------------------------|-------------|-----|-----|------|
| /redfish/v1/ (response time: 0) Show Results | | Context: /redfish/v1/\$metadata#ServiceRoot.ServiceRoot File Origin: None Resource Type: #ServiceRoot.v1_9_0.ServiceRoot | | GET Success | pass: 3 passGet: 1 totaltests: 3 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><th>Property Name</th><th>Value</th><th>Expected</th><th>Actual</th><th>Result</th></tr><tr><td>Storage.ReadRequirement</td><td>Mandatory</td><td>Must Exist</td><td>Exists</td><td>PASS</td></tr><tr><td>Systems.ReadRequirement</td><td>Implemented</td><td>Any</td><td>DNE</td><td>PASS</td></tr><tr><td>StorageSystems.ReadRequirement</td><td>Implemented</td><td>Any</td><td>DNE</td><td>PASS</td></tr></table> | | | | | | Property Name | Value | Expected | Actual | Result | Storage.ReadRequirement | Mandatory | Must Exist | Exists | PASS | Systems.ReadRequirement | Implemented | Any | DNE | PASS | StorageSystems.ReadRequirement | Implemented | Any | DNE | PASS |
| Property Name | Value | Expected | Actual | Result | | | | | | | | | | | | | | | | | | | | | |
| Storage.ReadRequirement | Mandatory | Must Exist | Exists | PASS | | | | | | | | | | | | | | | | | | | | | |
| Systems.ReadRequirement | Implemented | Any | DNE | PASS | | | | | | | | | | | | | | | | | | | | | |
| StorageSystems.ReadRequirement | Implemented | Any | DNE | PASS | | | | | | | | | | | | | | | | | | | | | |
| No errors | | | | | | | | | | | | | | | | | | | | | | | | | |
| No warns | | | | | | | | | | | | | | | | | | | | | | | | | |
| /redfish/v1/Storage (response time: 0) StorageCollection | | | | | | | | | | | | | | | | | | | | | | | | | |
| /redfish/v1/Storage (response time: 0) Show Results | | Context: /redfish/v1/\$metadata#StorageCollection.StorageCollection File Origin: None Resource Type: #StorageCollection.StorageCollection | | GET Success | pass: 2 passGet: 1 totaltests: 2 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><th>Property Name</th><th>Value</th><th>Expected</th><th>Actual</th><th>Result</th></tr><tr><td>Members.MinCount</td><td>1</td><td><=</td><td>1</td><td>PASS</td></tr><tr><td>Members#0.ReadRequirement</td><td>Mandatory</td><td>Must Exist</td><td>Exists</td><td>PASS</td></tr></table> | | | | | | Property Name | Value | Expected | Actual | Result | Members.MinCount | 1 | <= | 1 | PASS | Members#0.ReadRequirement | Mandatory | Must Exist | Exists | PASS | | | | | |
| Property Name | Value | Expected | Actual | Result | | | | | | | | | | | | | | | | | | | | | |
| Members.MinCount | 1 | <= | 1 | PASS | | | | | | | | | | | | | | | | | | | | | |
| Members#0.ReadRequirement | Mandatory | Must Exist | Exists | PASS | | | | | | | | | | | | | | | | | | | | | |
| No errors | | | | | | | | | | | | | | | | | | | | | | | | | |
| No warns | | | | | | | | | | | | | | | | | | | | | | | | | |
| /redfish/v1/Storage/IPAttachedDrive/Volumes (response time: 0) VolumeCollection | | | | | | | | | | | | | | | | | | | | | | | | | |
| /redfish/v1/Storage/IPAttachedDrive/Volumes (response time: 0) Show Results | | Context: /redfish/v1/\$metadata#VolumeCollection.VolumeCollection File Origin: None Resource Type: #VolumeCollection.VolumeCollection | | GET Success | pass: 2 passGet: 1 totaltests: 2 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><th>Property Name</th><th>Value</th><th>Expected</th><th>Actual</th><th>Result</th></tr><tr><td>Members.MinCount</td><td>0</td><td><=</td><td>1</td><td>PASS</td></tr><tr><td>Members#0.ReadRequirement</td><td>Mandatory</td><td>Must Exist</td><td>Exists</td><td>PASS</td></tr></table> | | | | | | Property Name | Value | Expected | Actual | Result | Members.MinCount | 0 | <= | 1 | PASS | Members#0.ReadRequirement | Mandatory | Must Exist | Exists | PASS | | | | | |
| Property Name | Value | Expected | Actual | Result | | | | | | | | | | | | | | | | | | | | | |
| Members.MinCount | 0 | <= | 1 | PASS | | | | | | | | | | | | | | | | | | | | | |
| Members#0.ReadRequirement | Mandatory | Must Exist | Exists | PASS | | | | | | | | | | | | | | | | | | | | | |
| No errors | | | | | | | | | | | | | | | | | | | | | | | | | |
| No warns | | | | | | | | | | | | | | | | | | | | | | | | | |

Ready to Participate?

- We are working with companies now to “test the tests”.
- Please contact us at storagemanagement@snia.org if you are interested in joining the SNIA Swordfish CTP Program

Relationship to SM Lab

- Swordfish SM Lab has a symbiotic relationship with the Swordfish Conformance program
 - Participants can use the SM Lab to test their own products as well as interoperability with the latest and greatest versions of other companies' products.
 - Regular automated results reporting of available infrastructure
- Multiple virtual participation options (e.g., virtual plugfests)
- Discounts for dual participation

Where to Find More Info..

SNIA Swordfish™

- **Swordfish Standards**
 - Schemas, Specs, Mockups, User and Practical Guide`s, ...
<https://www.snia.org/swordfish>
- **Swordfish Specification Forum**
 - Ask and answer questions about Swordfish
 - <http://swordfishforum.com/>
- **Scalable Storage Management (SSM) TWG**
 - Technical Work Group that defines Swordfish
 - Influence the next generation of the Swordfish standard
 - Join SNIA & participate: https://www.snia.org/member_com/join-SNIA
- **Join the SNIA Storage Management Initiative**
 - Unifies the storage industry to develop and standardize interoperable storage management technologies
 - <https://www.snia.org/forums/smi/about/join>

DMTF Redfish™

- **Redfish Standards**
 - Specifications, whitepapers, guides,...
<https://www.dmtf.org/standards/redfish>



Open Fabric Management Framework

- **OFMF Working Group (OFMFWG)**
 - Description & Links <https://www.openfabrics.org/working-groups/>
- **OFMFWG mailing list subscription**
 - <https://lists.openfabrics.org/mailman/listinfo/ofmfwg>
- **Join the Open Fabrics Alliance**
 - <https://www.openfabrics.org/membership-how-to-join/>



NVM Express

- **Specifications** <https://nvmexpress.org/developers/>
- **Join:** <https://nvmexpress.org/join-nvme/>





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