

**SDC**<sup>19</sup>  
SNIA INDIA

May 23-24, 2019  
Bangalore, India

STORAGE DEVELOPER  
**CONFERENCE**

## **Workshop on SNIA Swordfish Tools**

**Nidhi Malhotra**  
**Microchip**

# Learning Objectives

## ❑ SNIA Swordfish tools

- ❑ Swordfish API Emulator
- ❑ Swordfish Basic Web Client
- ❑ Swordfish Sample Dashboard Datadog Integration
- ❑ Swordfish Sample Dashboard Power BI Integration



# What is Swordfish™

- ❑ Provides a unified approach for the management of storage and servers in hyperscale and cloud infrastructure environments
- ❑ SNIA Swordfish is an extension of the DMTF Redfish specification
- ❑ Swordfish was developed by SNIA SSM TWG

# Swordfish API Emulator

- ❑ Emulates a Swordfish system with storage services
- ❑ Responds to Create, Read, Update and Delete operations
- ❑ Extends the DMTF Redfish Interface Emulator
- ❑ Adds code for Swordfish resources

# Installation

- ❑ Emulator python environment
- ❑ About the emulator
- ❑ Setting up the emulator

# Emulator python environment

- ❑ Python 3.6 or above
- ❑ Virtualenv recommended but not mandatory
- ❑ Python packages required:
  - ❑ Flask, flask\_restful, flask\_httpauth, requests, aniso8601
  - ❑ markupsafe, pytz, itsdangerous, StringGenerator, urllib3

# About the emulator

- ❑ The Redfish Interface Emulator *README.md* file tells about setting
  - ❑ **Emulator.py** flags and **emulator-config.json**
- ❑ ***api\_emulator\resource\_manager.py*** file establishes which emulator resources are static and which emulator resources are dynamic
  - ❑ Static resources are read-only and cannot be changed via the emulator API. These are taken from Swordfish mockup
  - ❑ Dynamic resources can be modified by CRUD operations using tools like Postman, (<https://www.getpostman.com>)

# Setting up the Emulator

- ❑ Create a folder for the emulator
- ❑ Copy the Redfish Interface Emulator files into the emulator folder.
- ❑ Install the Python packages required by the emulator.
- ❑ Copy the Swordfish API Emulator files into the emulator folder, and allow some of the Redfish Interface Emulator files to be overwritten.
- ❑ Run with `python emulator.py`

# Running the Swordfish API Emulator

```
C:\Windows\System32\cmd.exe - python emulator.py
Microsoft Windows [Version 10.0.17134.1]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\SwordfishTools\emulator\Swordfish>python emulator.py
['Redfish']
* Redfish endpoint at localhost:5000
{'rb': '/redfish/v1/', 'sys_id': 'System-1'}
{'rb': '/redfish/v1/', 'sys_id': 'System-2'}
{'rb': '/redfish/v1/', 'sys_id': 'System-3'}
{'rb': '/redfish/v1/', 'sys_id': 'System-4'}
{'rb': '/redfish/v1/', 'sys_id': 'System-5'}
{'rb': '/redfish/v1/', 'sys_id': 'System-6'}
{'rb': '/redfish/v1/', 'sys_id': 'System-7'}
* Running in Redfish mode
* Serving Flask app "g" (lazy loading)
* Environment: production
  WARNING: Do not use the development server in a production environment.
  Use a production WSGI server instead.
* Debug mode: off
INFO:werkzeug: * Running on http://0.0.0.0:5000/ (Press CTRL+C to quit)
```

# Demo

- ❑ Emulator files and browser output

# Swordfish Basic Web Client

# Swordfish Basic Web Client

- ❑ Web client that can connect to multiple Redfish and/or Swordfish services simultaneously
- ❑ Presents the entire Swordfish hierarchy in a browser web frame
- ❑ Provides basic capabilities for viewing resources and updating properties that are writable



Swordfish Service Add Remove

No Services are available

Add Swordfish Service

IP Address:port

Domain Name

User Name

Password



DAS

Swordfish Service + Add- RemoveExplore The Resources ×DAS ➤StorageServices ➤StorageSystems ➤Systems ➤Chassis ➤Managers ➤Tasks ➤SessionService ➤AccountService ➤EventService ➤JsonSchemas ➤

Swordfish localhost:3000/#/home

DAS > StorageServices > 0000200450000D1703C19F000000

- StorageServices >
- StorageSystems >
- Systems >
- Chassis >
- Managers >
- Tasks >
- SessionService >
- AccountService >
- EventService >
- JsonSchemas >

0000200450000D1703C19F000000 >

Properties ✎ ↻

**Name :** Storage Service Collection

**Description :** Storage Service Collection

▶ ODATA

▶ LINKS

- ClassesOfService
- StorageGroups
- Endpoints
- StoragePools
- Volumes
- Drives

Properties ✎

**Name :** Storage Service

**Description :** Storage Service

**Id :** 0000200450000D1703C19F0000

**Status**

**State :** Enabled

**Health :** OK

**HealthRollUp :** OK

Swordfish × +

localhost:3000/#/home

DAS > StorageSystems

<p>Swordfish Service <span>+</span> Add <span>-</span> Remove</p>	<p>Explore The Resources <span>×</span></p>	<p>StorageSystems <span>+</span> Add <span>-</span> Remove <span>×</span></p>
<p>DAS <span>▶</span></p>	<ul style="list-style-type: none"> <li>StorageServices <span>▶</span></li> <li>StorageSystems <span>▶</span></li> <li>Systems <span>▶</span></li> <li>Chassis <span>▶</span></li> <li>Managers <span>▶</span></li> <li>Tasks <span>▶</span></li> <li>SessionService <span>▶</span></li> <li>AccountService <span>▶</span></li> <li>EventService <span>▶</span></li> <li>JsonSchemas <span>▶</span></li> </ul>	<p>00001604000000000000000000000001 <span>▶</span></p> <div data-bbox="1033 442 1709 584"> <p>▼ Properties <span>✎</span> <span>↻</span></p> <p><b>Name :</b> Storage System Collection</p> </div> <div data-bbox="1033 627 1709 671"> <p>▶ ODATA</p> </div> <div data-bbox="1033 709 1709 753"> <p>▶ LINKS</p> </div>

# Demo

- ❑ Storage services, storage pools and corresponding storage volumes

# Swordfish Datadog

# Sample Dashboard Integration

- ❑ Connects to a Swordfish service and provides an integration to the Datadog User Interface
- ❑ Displays storage system capacity information and the available storage capacity thresholds

# Sample Dashboard functionality

- ❑ Swordfish Dashboard views: Capacity data and threshold values for different collections like Volumes, Storage pools and filesystems.
- ❑ Data Collection: Using different custom metrics, Datadog will collect all the required data and visualize it in to a Graph or Gauge and later can configure to throw alerts and report events

# Steps for Datadog Integration

- ❑ Run Emulator/server in local or host machines or vm.
- ❑ Install datadog agent everywhere – vm, server, instances
- ❑ Configure datadog
- ❑ Submit custom application metrics by writing code
- ❑ Open <https://www.datadoghq.com> in browser or user agent.
- ❑ Register and login to <https://www.datadoghq.com>
- ❑ Create dashboards and show the required data in graphs

DataDog Agent 6 x +

127.0.0.1:5002

Apps New Tab



# Datadog Agent Manager

Connected to Agent Version: 6.10.1 Hostname: "David"

### Agent Info

Version: 6.10.1  
PID: 4724  
Check Workers: 4  
Log File:  
Log Level: info  
Config File: C:\ProgramData\Datadog\datadog.yaml  
Conf.d Path: C:\ProgramData\Datadog\conf.d  
Checks.d Path: C:\ProgramData\Datadog\checks.d

### System Info

System UTC Time: 2019-05-16 03:56:33.402269 IST  
Go Version: 1.11.5  
Python Version: 2.7.15

### Host Info

Boot Time: 2019-05-16 02:03:41.000000 IST  
OS: windows  
Platform: Windows Server 2012 R2 Standard Evaluation  
Platform Family: Windows Server 2012 R2 Standard Evaluation  
Platform Version: 6.3 Build 9600  
Procs: 68  
Uptime: 1h52m41s

### Hostnames

Hostname: David  
Socket-Fqdn: David

- Status
- Log
- Settings
- Checks
- Flare
- Restart Agent

# Submit custom application metrics

- ❑ After all the installation of Datadog Agent. We need to go through /etc/dd-agent folder
- ❑ We have two Directories , one is **checks.d** and **conf.d**
- ❑ **conf.d** contains **.yaml** files & checks.d contains **python files**.
- ❑ The agent checks and some logic are written in python and they rely on yaml file configuration.
- ❑ The name of the check file and the config file must match

DataDog Agent 6 x +

127.0.0.1:5002

Apps New Tab

# Datadog Agent Manager

Connected to Agent Version: 6.10.1 Hostname: "David"

Edit the configuration file, then save and reload.

Edit Enabled Checks

- cpu.d/conf.yaml.default
- disk.d/conf.yaml.default
- file\_handle.d/conf.yaml.default
- io.d/conf.yaml.default
- memory.d/conf.yaml.default
- network.d/conf.yaml.default
- ntp.d/conf.yaml.default
- swordfish.d/conf\_swordfish.y
- uptime.d/conf.yaml.default
- winproc.d/conf.yaml.default

```
1 init_config:
2   default_timeout: 20
3 instances:
4
5   - name: SNIA
6     url: 10.41.80.109:8080/redfish/v1
7     url_storage: "StorageServices/1/Volumes"
8     volumes_dump: "get_json_service"
9     url_tag1: "/Volumes/vol3"
10    timeout: 5
11    content_match: "CapacitySources"
12    process_config:
13      enabled: "true"
14    include_content: true
15    collect_response_time: true
16    skip_event: true
```

Disable Save

Activate Windows  
Go to System in Control Panel to activate Windows.

## Create dashboard



Dashboard Name:

nidhi's Dashboard 17 May 2019 16:43



### New Timeboard



**For troubleshooting and correlation**

Time-synchronized metrics and event graphs  
Automatic layout



### New Screenboard

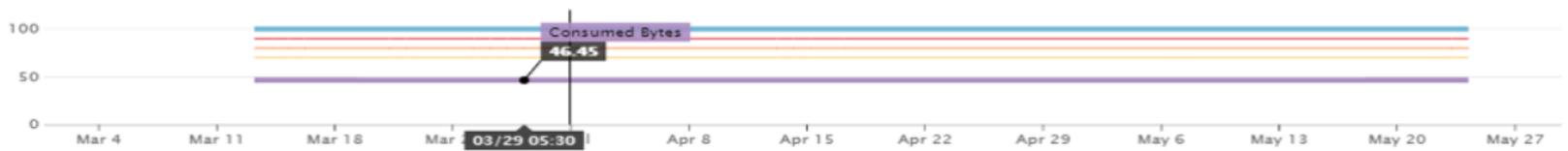


**For status boards and sharing data**

Mix widgets and timeframes  
Custom drag-and-drop layout

# Time Board

- ❑ User selects different type of graphs where just drag and drop time series widget onto dashboard
- ❑ If users want to show more flexibility with placement of graphs, can go for screenboards.



1 Select your visualization

Timeseries Heat Map Distribution Top List

2 Graph your data

Graph Primer JSON Edit

Configuration panel for the graph showing query definitions and display options.

- a Metric **SP\_Threshold\_Low** from (everywhere) avg by (everything) + as... </> ✕
- b Metric **SP\_Threshold\_Medium** from (everywhere) avg by (everything) + as... </> ✕
- c Metric **SP\_Threshold\_High** from (everywhere) avg by (everything) + as... </> ✕
- Formula, e.g. 2 \* a as... </> ✕

Buttons: Add Query + Add Formula +

Display: Lines Color: Warm Style: Solid Stroke: Thin

Partial view of a fourth query:  a Metric **SPCapacitySources\_Allocat** from (everywhere) avg by (everything) + as... </> ✕

3 Set display preferences

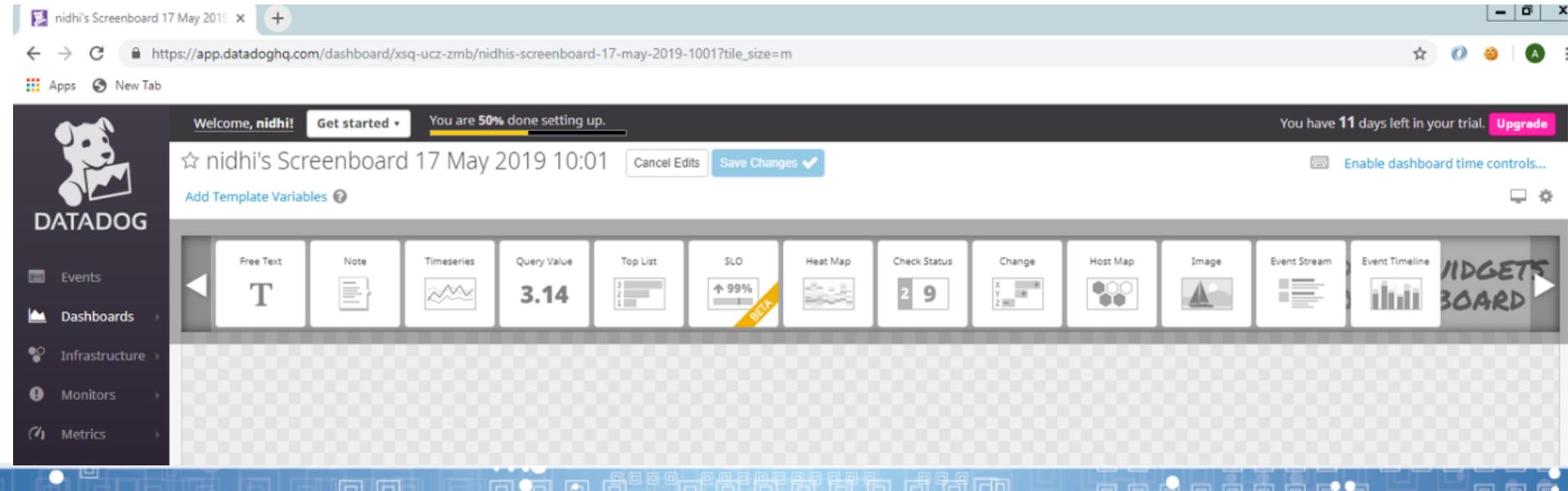
Show: The Past 3 Months  Show legend on graph Show up to 16 entries

4 Widget title

Show a title: StoragePools-3- CapacitySources & Threshold [ Size: 16 Align: [Left] [Center] [Right]

# ScreenBoard

- ❑ To create a ScreenBoard, just create a new dashboard and choose Screenboard
- ❑ User can control period shown on per graph basis



The screenshot displays the Datadog ScreenBoard interface. At the top, the browser address bar shows the URL: [https://app.datadoghq.com/dashboard/xsq-ucz-zmb/nidhis-screenboard-17-may-2019-1001?tile\\_size=m](https://app.datadoghq.com/dashboard/xsq-ucz-zmb/nidhis-screenboard-17-may-2019-1001?tile_size=m). The interface includes a navigation sidebar on the left with options like Events, Dashboards, Infrastructure, Monitors, and Metrics. The main content area features a header with the user name 'Welcome, nidhi!', a 'Get started' dropdown, and a progress indicator 'You are 50% done setting up.'. Below the header, the dashboard title 'nidhi's Screenboard 17 May 2019 10:01' is displayed, along with 'Cancel Edits' and 'Save Changes' buttons. A row of widget thumbnails is visible, including Free Text, Note, Timeseries, Query Value (showing 3.14), Top List, SLO (showing 99% with a BETA badge), Heat Map, Check Status (showing 29), Change, Host Map, Image, Event Stream, and Event Timeline. The bottom of the screen shows a grid of widget icons on a blue background.



DATADOG

Events

Dashboards

Infrastructure

Monitors

Metrics

Integrations

APM

Notebooks

Logs

Help

Team

chandramouli89...

☆ SNIA DataDog ScreenBoard

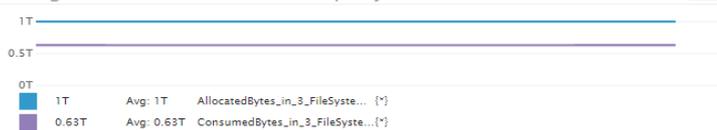
Edit Board



No template variables

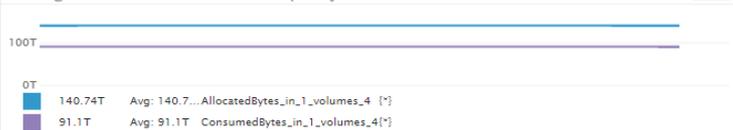
### StorageServices/3/FileServices/FS2--- Capacity Data

1 mo



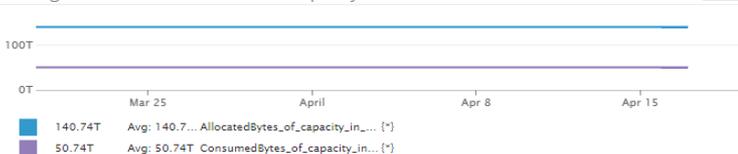
### StorageServices/1/Volumes/4 --Capacity Data

1 mo



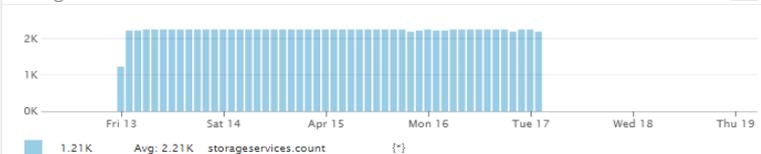
### StorageServices/3/Volumes/vol3 --Capacity Data

1 mo



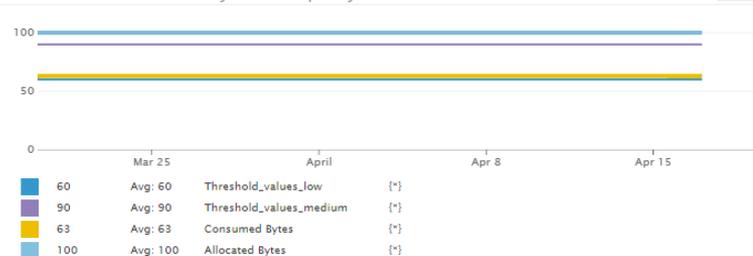
### storageservices.count

1w



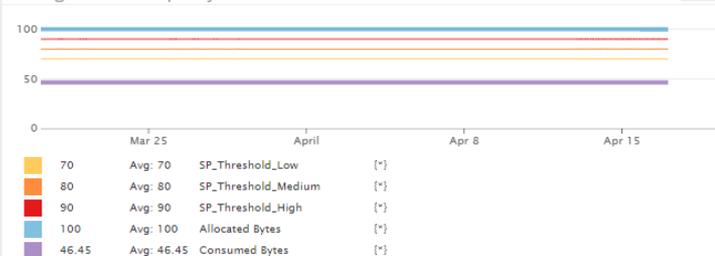
### Threshold Values for Filesystems- capacity data

1 mo



### StoragePools-3- CapacitySources & Threshold Data

1 mo



# Swordfish Power BI

# Sample Dashboard Integration

- ❑ Connects to a Swordfish service and provides an integration to the Power BI User Interface
- ❑ Displays storage system capacity information and the available storage capacity thresholds

# Access to Swordfish server

Access Web content

http://10.41.80.109:8080/redfish/v1/StorageServices/...

**!** The password won't be encrypted when sent.

Use your Windows credentials to access this Web content.

Use my current credentials

Use alternate credentials

User name

Password

Select which level to apply these settings to

Back Connect Cancel

VolumeAllocatedBytesConsumedBytes - Power BI Desktop

File Home View Modeling Help

Clipboard: Paste, Cut, Copy, Format Painter

External data: Get Data, Recent Sources, Enter Data, Edit Queries, Refresh

Insert: New Page, New Visual, Ask A Question, Buttons, Text box, Image, Shapes

Custom visuals: From Marketplace, From File

Themes: Switch Theme

Relationships: Manage Relationships

Calculations: New Measure, New Column, New Quick Measure

Share: Publish

Sign in

Category	ConsumedBytes (bn)	AllocatedBytes (bn)
Category 1	~10.5	~10.5
Category 2	~21.5	~21.5
Category 3	~10.5	~10.5

Page 1

PAGE 1 OF 1

**VISUALIZATIONS**

**VALUES**

Add data fields here

**FILTERS**

Page level filters

Add data fields here

Report level filters

Add data fields here

**DRILLTHROUGH**

Cross-report

Off

Keep all filters

**FIELDS**

Search

0000050450000D1703C19F00000

- AllocatedBytes
- ConsumedBytes
- GuaranteedBytes
- ProvisionedBytes

0000050450000D1703C19F000001

- AllocatedBytes
- ConsumedBytes
- GuaranteedBytes
- ProvisionedBytes

0000050450000D1703C19F000002

- AllocatedBytes
- ConsumedBytes
- GuaranteedBytes
- ProvisionedBytes

0000050450000D1703C19F000003

- AllocatedBytes
- ConsumedBytes
- GuaranteedBytes

# Demo

- ❑ Show bar chart creation for allocated volume and consumed bytes

## Swordfish API Emulator

- Datacenter simulation
- Test vehicle
- Development tool
- Feeder for analytics and monitoring tools



## Swordfish Basic Web Client

- Ease of data visualization
- Scripting possibility
- Development tool



## Datadog

- Data monitoring
- Data analytics
- Alerts
- Events
- Graphical representation
- Time based monitoring
- Integration with major cloud business applications



## Power BI

- Data monitoring
- Data analytics
- Business intelligence
- Feeder for ML applications
- Ease of use as based on query

# Useful links

- ❑ [www.snia.org/swordfish](http://www.snia.org/swordfish)
- ❑ <http://swordfishmockups.com/>
- ❑ <https://github.com/SNIA>
- ❑ <https://github.com/SNIA/SSM>
- ❑ <https://github.com/SNIA/Swordfish-API-Emulator>
- ❑ <https://github.com/SNIA/Swordfish-datadog-sample-dashboard-integration>
- ❑ <https://github.com/SNIA/Swordfish-basic-web-client>
- ❑ <https://github.com/SNIA/Swordfish-powerBI-sample-dashboard-integration>