EVERYTHING YOU WANTED TO KNOW ABOUT STORAGE, BUT WERE TOO PROUD TO ASK

Part Cyan

Storage Management

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Today’s Presenters

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Broadcom
SNIA-at-a-Glance

160 unique member companies

2,500 active contributing members

50,000 IT end users & storage pros worldwide
Agenda

- Management Processes
  - Discovery, Provisioning, Configuration
- Software-Defined Storage
- Storage Management
- Why Do We Have Storage Management Standards
  - SMI-S
  - Swordfish
Discovery, Provisioning, Configuration

Mark Rogov / Dell EMC
Management Use Cases

**Configuration**
- Create storage components and services

**Provisioning**
- Provide storage components and services to customers

**Discovery**
- Find storage components and collect information about them
Configuration

WHAT IS USABLE STORAGE? WHY?

Local
SAN Array
NAS Array

overhead
metadata
usable
mirrored
striped
Configuration

Other services to configure?

- Performance
- Security
- Backup
- Logs
Provisioning

**How much capacity do I get?**

Allocate

Client
Provisioning

How much capacity do I get?

Allocate

Record

Storage Array

Client

usable

lun
Discovery

Which storage? Where is it?

Application

Database

Object Storage
Discovery

**Which storage? Where is it?**

- Application
- Database
- Object Storage
Discovery

**Which Storage? Where is it?**

- Application
- SAN Array
- NAS Array
- Software-Defined Storage
- Local
- Object Storage
Summary

**CONFIGURATION**
- Create storage components and services

**PROVISIONING**
- Provide storage components and services to customers

**DISCOVERY**
- Find storage components and collect information about them

- Security
- Backup
- Logs
- Performance

- Usable
- I/O
- Record
- Find

- S3
- Cloud
- Storage
- Networks
Software-Defined Storage
History & Software-Defined Storage
Software-Defined Storage

Virtualized storage with a service management interface

Commodity or specialized hardware

Management (Control Plane) is separate from data (Data Plane)
Storage Management

Alex McDonald/ NetApp
“If you can’t measure it, you can’t manage it”

Storage management
- Shares in common a set of IT management philosophies
- Requires data & analysis tools
  - Open, Proprietary, Roll your own

Knowledge required (“Kipling’s Servants”):
- Drivers of resource consumption
- Relationship between drivers and the resource
- Time & Cost are the keys

I keep six honest serving men
(They taught me all I knew);
Their names are What and Why and When
And How And Where and Who.

Rudyard Kipling
Storage Management

- We have a tendency to
  - Measure things with a micrometer
  - Mark them with a crayon
  - Hit them with an ax

- Priorities
  - “What’s required?” first
  - “With what tools?” last

- Too many knobs and too many gauges
  - What is connected to what an issue
  - Ideally: 1 knob, 1 gauge
  - Often: N knobs, M gauges, lots of twiddling & fiddling
  - Not everything is in-house & readily measurable; e.g. cloud; hybrid, public, burst

- Vendors are an excellent source of information
  - Many have capacity & sizing tools that are very sophisticated and you’ve already paid for them
Example: BookABunk.com

- Low cost bunkroom booking company
- 3 primary apps;
  - Bunks webapp with pictures & details
  - Booking backend
  - Client frontend
- Several secondary apps
  - Internal help systems etc

Drivers & Metrics
- Private vs hybrid vs public cloud usage
- Static usage
  - Space, cost, transmission, recovery
- Dynamic usage
  - Transactions, peaks, response (latency & bandwidth), users
- Business demands
  - Growth, decline, market changes
  - Security, data protection, privacy

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Goals & Objectives
- Growth vs costs
- Link in with other management processes
- Essence is Time & Cost

Drivers & Resources
- Relevance; what should I measure?
  - Cost and point of measurement
  - Impact on decisions by this measurement

Typical Drivers
- Business changes & growth
- Application storage use
- Transactions, files, objects per period
- “Class of Service” required

Resources
- Capacity
- Performance (latency & bandwidth)
- Communal or dedicated
- Private, cloud or hybrid
- Money (ie how much does it cost)

Select tools that support entire IT enterprise
- Favour integration; don’t be dazzled by GUIs
- Favour simplicity; fewer knobs and dials
- Favour automation; better than human intervention
- Favour information; data is nice, but has no meaning without interpretation
What Are Storage Management Standards and Why Do We Have Them?

Richelle Ahlvers/Broadcom Limited
Why Have Storage Management Standards?

Problems:
- Customers and clients had/have too many vendor-specific ways to access the same / similar data from different (or even the same!) devices.
- Different ways to access each one
- Spending too much time and effort trying to access management information across their environments
- Vendors also spending too much time supporting multiple ways to access data

What did the industry do to address?
- Storage companies got together to agree how to represent storage systems programmatically via a common API (Application Programming Interface)

What else did they do?
- They agreed to use a common set of terms, a common set of standard functionality, and a way to let storage vendors add their unique features (in a common way)
Legacy Standards: SMI-S

- Established, broad industry support across traditional storage vendors:
  - External storage arrays
  - Tape and backup
- Storage vendor driven
- SMI-S Interface (CIM-XML)
  - HTTP/HTTPS - protocol
  - CIM-XML - format of content
What are the Drivers for Updates?

- 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

[snia.org/swordfish](snia.org/swordfish)
**The Swordfish Standard**

- **Swordfish is composed of:**
  - Interface definition
  - Model schema
- **Swordfish Interface (RESTful)**
  - HTTP/HTTPS - protocol
  - JSON – format of content
- **Swordfish Models and Schema**
  - Schema format for JSON
  - DMTF publishes the models for platforms and compute/servers
  - SNIA publishes the models for storage

[snia.org/swordfish](snia.org/swordfish)
SNIA Swordfish™
Summary

Devil in the Details
- Many moving parts, and can get mired in the “tweaking quagmire”

Management covers:
- Control Plane
- Data Plane
- Discovery
- Configuration

Standardization
- Allows for greater interoperability
- Broadly adopted SMI-S covers many different storage types
- New Swordfish Standard address modern data structures and models
Other Storage Terms Got Your Pride? This is a Series! Check Out:

- **Teal** – Buffers, Queues and Caches
  [https://www.brighttalk.com/webcast/663/241275](https://www.brighttalk.com/webcast/663/241275)

- **Rosé** - All things iSCSI
  [https://www.brighttalk.com/webcast/663/244049](https://www.brighttalk.com/webcast/663/244049)

- **Chartreuse** – The Basics: Initiator, Target, Storage Controller, RAID, Volume Manager and more
  [https://www.brighttalk.com/webcast/663/215131](https://www.brighttalk.com/webcast/663/215131)

- **Mauve** – Architecture: Channel vs. Bus, Control Plane vs. Data Plane, Fabric vs. Network
  [https://www.brighttalk.com/webcast/663/225777](https://www.brighttalk.com/webcast/663/225777)

- **Sepia** – Getting from Here to There
  [https://www.brighttalk.com/webcast/663/249431](https://www.brighttalk.com/webcast/663/249431)

- **Vermillion** – What if Programming and Networking Had a Storage Baby?
  [https://www.brighttalk.com/webcast/663/260321](https://www.brighttalk.com/webcast/663/260321)

- **Turquoise** – Where Does My Data Go?
  [https://www.brighttalk.com/webcast/663/267327](https://www.brighttalk.com/webcast/663/267327)
Storage Performance Benchmarking:

1. Introduction and Fundamentals
2. Solution under Test
3. Block Components
4. File Components

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