SDC
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Baiting the Hook: Navigating the Swordfish Waters for Implementers

(How to Get Started Building Swordfish)

George Ericson

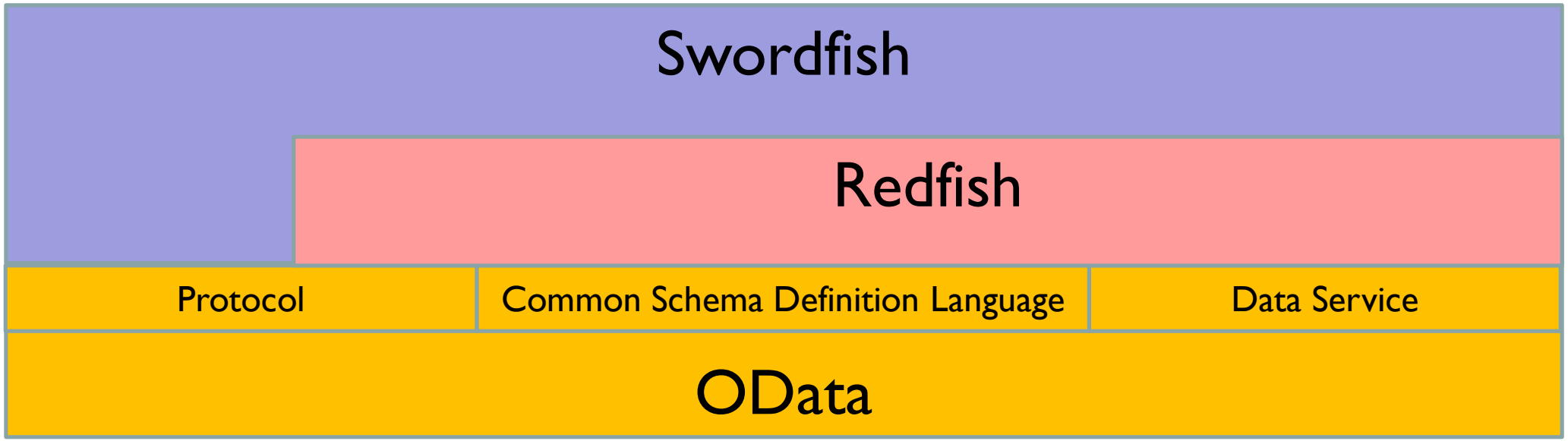
Dell Inc.

This Session

- Get pointers to online resources, communities and tools
- Learn the different elements of the Swordfish distribution package how to use them
  - From the spec, to the mockups, to the user's guide
- Learn resources for building a Swordfish service
- Experience… so far

Building blocks

- The implementer should not expect to just read the Swordfish spec's and then start implementing
- Both OData and Redfish are critical to understanding Swordfish



Specifications and examples

Before and during implementation… Read the documentation…

OData	Redfish	Swordfish
Protocol	Specifications	Specifications
URL Conventions	White Papers	User's Guide
CSDL XML	Mockups	Mockups
CSDL JSON	Schemas	Schemas
JSON Format		Practical Guide
Vocabularies		
Tutorials		

The embedded URLs locate content distributed with each of these standards.

Your first steps

- Understand the use cases that you want to support
- Decide what elements of the models need to be implemented
  - Do you need events, logging, task management?
  - What features are you implementing
  - So on…
- Look at the Mockup examples

Mockup considerations

- Mockups are illustrative
  - Do not expected a mockup to represent a complete real system
  - Mockups are simplified snapshots of some portion of an implementation
  - Mockup values represent state at a particular point in time
- Mockups use a simple key structure to make implementation on a filesystem easy
  - Real implementations should use globally unique keys where possible
    - Solves several real life issues, including scale, reuse, and uniqueness
  - Real implementations should use the parenthesized key style
  - Mockups use the 'key as segment' style
    - OK, but not as robust
    - Mockup keys are often simple ordinal indexes.

Next, choose an implementation infrastructure

- We have worked with several variants:
  - Redfish native
    - RackHD
    - Mockups
    - other
  - OData native
    - Olingo
    - JayStack
    - ODatacpp-Server
- Commercial Redfish frameworks are becoming available
  - Example: Insyde software

Redfish service infrastructures

- We've used several existing infrastructures that already had some Redfish support
  - Each utilized simple URL matching and processing
  - No built-in understanding OData metaschema
  - Some support projection (i.e. Select)
- These implementations were NOT easily extended to support enterprise class use cases

OData service infrastructures

- Olingo
  - This is an open source Java implementations
  - Fully supports the OData metaschema
  - Fully supports the OData query language
  - We have implemented a Swordfish API
- Jaystack
  - This is an open source Node.js implementation
  - Fully supports the OData metaschema
  - Fully supports the OData query language
  - We do not have implementation experience with Jaystack
- Odatacpp-server
  - This is an open source C++ based implementation
  - After some work, we found that it is not sufficiently complete to serve as a base for our implementations
    - Based on GitHub history, we don't expect that this to change

Discovery

- Redfish requires the Simple Service Discovery Protocol (SSDP)
  - Assure that your IT administrators will allow the SSDP traffic on their networks

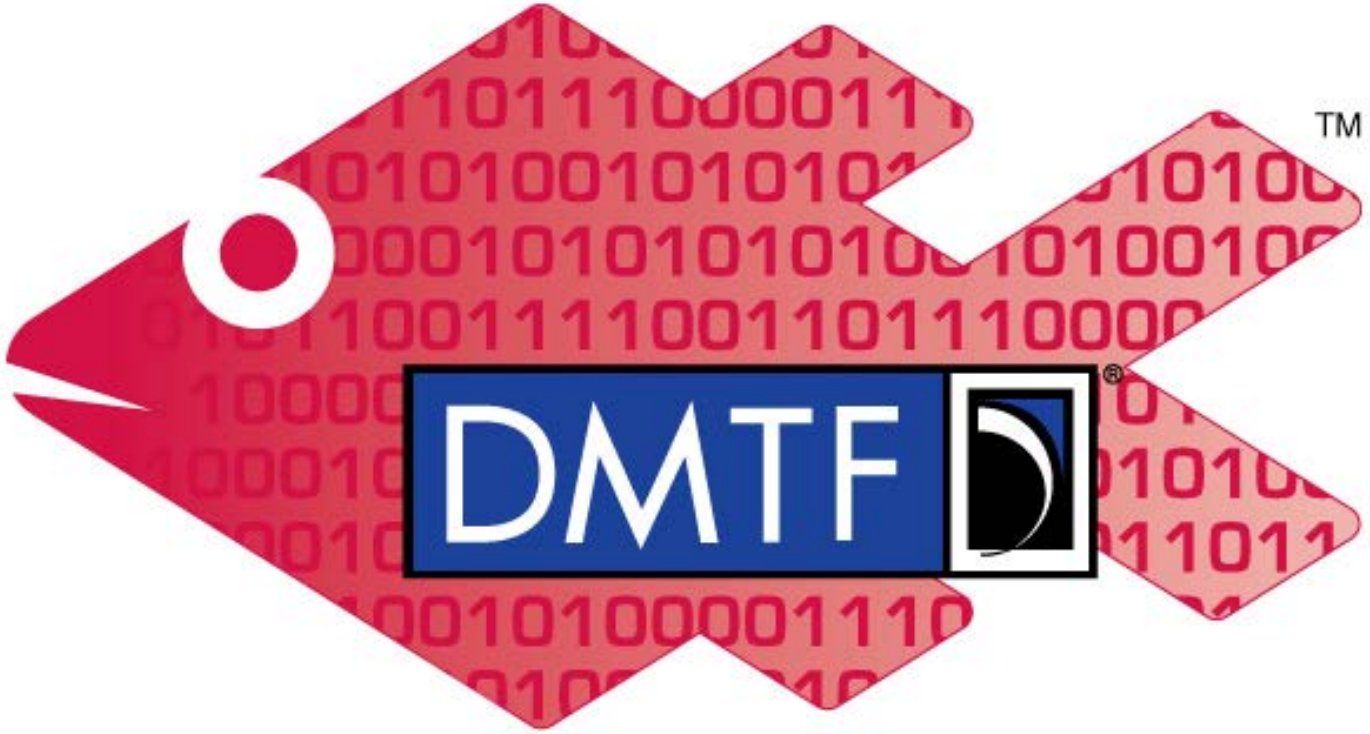
Implementation considerations

When to use Swordfish extensions

- For management of storage systems including:
  - Arrays
  - Virtualizers
  - File Servers
  - Volume managers
- If the managed systems support
  - Replication
  - Service based provisioning
  - Mapping volumes to hosts
  - Storage pools
- If consistent interfaces are required to span a wide range of supported storage products, from simple to advanced

Swordfish implementation considerations

- A Swordfish data service is a Redfish data service
- Classes of service should be used to avoid exposing implementation details via the user interface
  - Examples include critical data protection and IO performance features
- Implementation feedback is requested
  - Fixes and enhancements can be made rapidly, but only if you request them.
    - For example, one implementer commented that when multiple actions are supported against a resource, the choice of organizing properties by-value vs by-reference can make important differences in ease of use.
      - However, no specific examples were cited… => POST an ISSUE…



Implementation considerations

When to use a Redfish data service

- For management of compute infrastructure, including
  - Bare-metal discovery
  - System Configuration
  - Monitoring and management of all common hardware components
- As a base for accessing network management services
- As a base to support Swordfish APIs

Redfish data service considerations

- Redfish requirements specify a subset of an OData data service
- Provides interfaces for common auxiliary services, including authorization, event, log, and task management
- Must allow http://host/redfish/v1/ to address the Redfish entity type named ServiceRoot
  - ServiceRoot extends (by copy) the OData service root named ServiceContainer
  - The OData service root is at http://host/redfish/v1/odata
- Implementers should be aware that the value of the "odata.id" of each entity must identify that entity within at most one Singleton or EntitySet
- Most Redfish features are optional.
  - For example, you can decide whether or not to support managing and updating installed software, including operating system software and device drivers

Choosing implementation infrastructure

- Redfish native implementations are sufficient to implement the features specified by Redfish
  - More complex implementations may require additional features
- Recommendation: Services that require additional features should utilize an OData conformant service infrastructure
- OData conformant service implementations must consider
  - Subtypes of the Redfish resource collection have special rules and behaviors
  - The semantics implied by the placement of NavigationProperties, either inside or not inside a complex type named "Links"

Considerations for the 'Links' complex type

- An OData native implementation will not enforce the semantics associated with complex types named Links
  - Redfish divides related entities into two classes
    1. The entity referenced by a NavigationProperty is directly contained (subordinate) in the referencing entity
       - CSDL specifies this case with the attribute *ContainsTarget="true"*
    2. The entity referenced by a NavigationProperty is not directly contained in the referencing entity
  - References to entities of the:
    - First type are placed in the main body of an entity type
    - Second type are placed in the body of a complex type
      - This becomes a property in the main body of an entity type
      - In most cases, this complex type is named "Links"
    - If used, "Links" may only contain NavigationProperties of the second type

Considerations for 'ResourceCollection' types

- An OData native implementation will not natively understand the Redfish defined special rules for ResourceCollection
  - Each subtype has exactly one NavigationProperty.
    - It is a collection named Members
  - A POST to a resource collection resource is specified to have the same OData semantics as a POST to its Members collection
- In all other respects, resource collection subtypes are conformant with OData

Additional considerations

- Backwards compatibility to legacy tools
  - Events can utilize MessageArgs to hold additional information
  - Additional information may be placed in OEM properties
- Be aware of ongoing work in progress
  - For example: Communicating the implementation limits on numbers of Accounts, Roles or Event subscriptions
  - Participate in Redfish and Swordfish standards

End