



# Redfish Interoperability Profiles

DMTF Scalable Platforms Management Forum  
October 2017



## Disclaimer

- The information in this presentation represents a snapshot of work in progress within the DMTF.
- This information is subject to change without notice. The standard specifications remain the normative reference for all information.
- For additional information, see the Distributed Management Task Force (DMTF) website.



## Goals

- An “Interoperability Profile” provides a common ground for Service implementers, client software developers, and users
  - A profile would apply to a particular category or class of product (e.g. “Front-end web server”, “NAS”, “Enterprise-class database server”)
  - It specifies Redfish implementation requirements, but **is not** intended to mandate underlying hardware/software features of a product
  - Provides a target for implementers to meet customer requirements
  - Provide baseline expectations for client software developers utilizing Redfish
  - Enable customers to easily specify Redfish functionality / conformance in RFQs
- Create a machine-readable Profile definition
  - Document must be human-readable
  - Can be created by dev/ops personnel and non-CS professionals
- Enable authoring of Profiles by DMTF, partner organizations, and others
- Create open source tools to document and test conformance



## Implementation

- Redfish Interoperability Profile is a Machine-readable JSON document
  - Schema-backed (RedfishProfile.v1\_0\_0) JSON definition
  - This file will be read by conformance and documentation tools
- DMTF specification (DSP0272) provides instructions to create a profile
- Creating open source tools for conformance testing
  - Leverages existing Redfish Conformance tools and applies profile requirements
- Creating a tool for generating profile documentation
  - Documentation generator produces profile-specific schema/property view
  - Uses a combination of the JSON profile document and a Markdown 'supplement'
  - Supplemental text provides context and clarification on the Profile's purpose
  - Tool can produce 'for review' output that shows schemas and properties that are not included (no requirements) in the profile definition



## Profile Document Functionality

- Required resources (schema), objects, or properties
  - Simple requirements apply to every instance of the Resource
  - Conditional requirements make additions for specific cases
- “If Implemented” resources, object, or properties
  - Must appear if underlying feature is implemented in the product
    - Example: Fan[] array required in Chassis that have fans...
  - “If Implemented” conformance usually not testable by automated tools
- Conditional Requirements
  - Items required under certain circumstances or for sub-classes of products
  - Based on values of adjacent properties or location in the resource tree
    - Example: EthernetInterface resource required under each ‘Manager’
- Registry Requirements
  - Support for standard messages for errors and events



Redfish Interoperability Profiles

# JSON DOCUMENT FORMAT



## Redfish Interoperability Profile Document

- JSON document with simple structure to list resources and properties
  - Format allows easy comparison to a retrieved Redfish payload
    - Ex. “PropertyRequirements” object with Redfish properties
  - Can build definition on top of other Profile(s)
  - Apply requirements to Redfish Protocol features, Resources (Schemas), Properties, Actions and Registries.
- Versioning support in both Profile and Resource requirements
  - Profile is a static definition once published
    - Does not increase in scope as schemas are revised
  - Recommend that changes to profile occur with “major” revisions
    - Allow for errata, but Profile should be built for longevity
    - Example: “Basic Server v1”, “Basic Server v2”





## Profile document structure

Profile info, Protocol requirements

Resource #1 requirements

Resource #2 requirements

...

Resource #N requirements

Registry #1 requirements

Registry #N requirements

- Each section a JSON object
- Resource (schema) and Registry objects follow the names of the defining schema
  - e.g. “EthernetInterface”
- Property-level requirement nested within Resource requirements, named to follow the defined property name
  - e.g. “AssetTag”, “SpeedMbps”





## Profile-level information and Protocol Requirements

```
"ProfileName": "Anchovy",
"Version": "1.0.2",
"Author": "Pizza Box Project",
"Purpose": "This is a sample Redfish profile.",
>ContactInfo": "pizza@contoso.com",
"RequiredProfiles": {
  "DMTFBasic": {
    "MinVersion": "1.0.0",
  },
  "ContosoPizza": {
    "OwningEntity": "Other",
    "OwningEntityName": "Contoso"
    "Source": "contoso.com/profiles",
    "MinVersion": "1.0.0"
  }
},
"ProtocolRequirements": {
  "MinVersion": "1.0.0",
  "DiscoveryRequired": false
},
```

- Basic information
  - Name, version, author, etc.
- Ability to include other Profiles to build upon past work
  - But profile cannot loosen requirements included from other profiles, only add additional requirements
- “Protocol requirements” are Redfish features which are not part of the JSON response payload(s).



## Resource (schema) level requirements

```
"ContosoTimeMachine": {  
  "OwningEntity": "Other",  
  "OwningEntityName": "Contoso",  
  "Repository": "www.contoso.com/schemas",  
  "ReadRequirement": "Mandatory",  
  "MinVersion": "1.2.0",  
  "PropertyRequirements": {  
    "CurrentTime": {},  
    "DestinationTime": {},  
    "IsGrandfatherAlive": {  
      "Requirement": "Recommended"  
    },  
    "ParadoxDetected": {  
      "Requirement": "IfImplemented"  
    }  
  }  
}
```

- Organized by schema name
- Profile can include requirements from any number of standard or OEM-defined schemas
- Resource level “ReadRequirement” sets need for schema-required properties
- Property level requirements contained in resource-level object
- “MinVersion” – minimum schema version required

## Property level - basic features

```
"ComputerSystemCollection": {
  "PropertyRequirements": {
    "Members": {
      "MinCount": 1
    }
  }
},
"ComputerSystem": {
  "MinVersion": "1.1.0",
  "PropertyRequirements": {
    "SystemType": {
      "Values": ["Physical"],
      "ReadRequirement": "Mandatory"
    },
    "AssetTag": {
      "ReadRequirement": "Mandatory",
      "WriteRequirement": "Mandatory"
    },
    "Manufacturer": {},
    "Model": {
      "ReadRequirement": "Recommended"
    }
  },
  . . .
```

- JSON objects follow property names
  - Un-listed properties have no requirements
  - Empty objects are by default 'Mandatory'
- "ReadRequirement":
  - Default value is 'Mandatory'
  - Recommended, If-Implemented, and Conditional support
- "MinCount":
  - Minimum count of non-NULL items in array
- "WriteRequirement":
  - If property must support PATCH or PUT
- "Values":
  - Require specific or "any of" values for a property. Also supports arrays



## Property level – Conditional requirements

```
"EthernetInterface": {
  "PropertyRequirements": {
    "MACAddress": {},
    "HostName": {
      "ReadRequirement": "Recommended",
      "ConditionalRequirements": [{
        "SubordinateToResource":
          ["ComputerSystem",
           "EthernetInterfaceCollection"],
        "ReadRequirement": "Mandatory"
      }]
    },
    "IPv4Addresses": {
      "ReadRequirement": "Mandatory",
      "MinCount": 1,
      "ConditionalRequirements": [{
        "SubordinateToResource":
          ["ComputerSystem",
           "EthernetInterfaceCollection"],
        "ReadRequirement": "Mandatory"
      }]
    }
  }
}
```

- ‘ConditionalRequirements’ apply to the property if one or more conditions are met
- ‘Purpose’ text provides justification for the conditional requirement
- SubordinateToResource
  - If resource matches the parent hierarchy, requirement applies
- Comparison Property / Values
  - Using another property within the resource as key, add requirement if value of the key matches a list

## Property level – ‘Conditional’ Value example

```
"IndicatorLED": {  
  "ReadRequirement": "Recommended",  
  "WriteRequirement": "Recommended",  
  "Conditions": [{  
    "Purpose": "Physical and composed Systems  
must have a writable Indicator LED",  
    "ReadRequirement": "Mandatory",  
    "WriteRequirement": "Mandatory",  
    "Comparison": "AnyOf",  
    "CompareProperty": "SystemType",  
    "CompareValues": ["Physical", "Composed"]  
  }]  
}
```

- ‘Comparison’ provides test
- ‘CompareProperty’ name
  - May be at current object level or in parent objects (no peers)
- ‘CompareValues’ – one or more values to test against
- Requirement – applies if condition met
- ‘ConditionalRequirements’ is an array, allowing multiple conditions for a given property



## Action level features

```
"ActionRequirements": {  
  "Reset": {  
    "ReadRequirement": "Mandatory",  
    "Parameters": {  
      "ResetType": {  
        "MinSupportedValues": ["Force0ff", "PowerCycle"]  
      }  
    }  
  }  
}
```

- Organized by Action name within each Resource (schema)
- Allows for parameter requirements
- AllowableValues support



## Registry level features

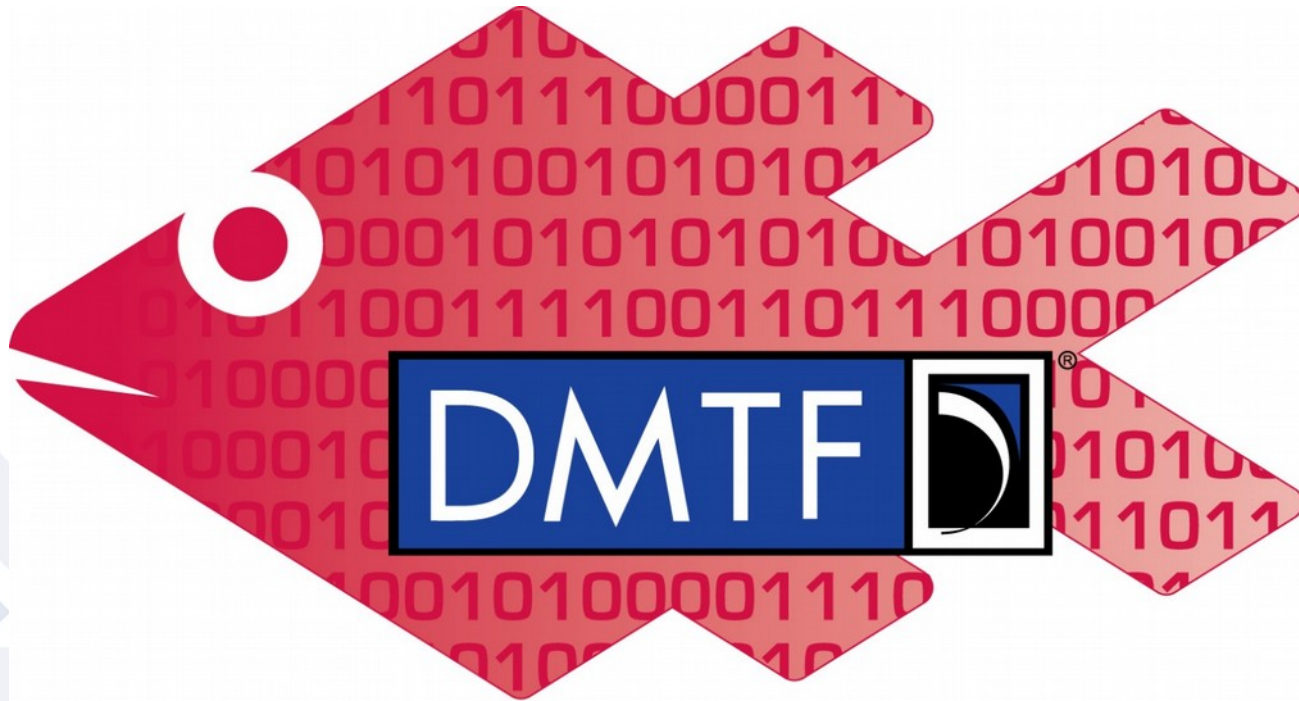
```
"Registries": {
  "Base": {
    "MinVersion": "1.0.0",
    "Source": "redfish.dmtf.org/registries",
    "Messages": {
    "Success": {},
    "GeneralError": {},
    "Created": {},
    "PropertyDuplicate": {}
    }
  },
  "ContosoPizzaMessages": {
    "OwningEntity": "Other",
    "OwningEntityName": "Contoso",
    "Repository": "contoso.com/registries",
    "ReadRequirement": "Mandatory"
  }
}
```

- Organized by registry name
- Allows for multiple registries
- Ability to include OEM registries
- Resource level  
“ReadRequirement” sets need for full Registry requirement
- Messages listed with individual ‘Requirement’ as needed





## Q&A & Discussion



# Redfish