



Redfish Basic Server Interoperability Profile

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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 different output formats: 'verbose', 'terse' and CSV file

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 Profile

BASIC SERVER PROFILE



Basic Server Profile

- Goals of the Profile:
 - Meet management needs of scale-out, front-end server users
 - Leverage existing OCP HW Remote Management requirement list
 - Be inclusive – shipping or expected Redfish implementations conform
 - Commonly implemented BMC features and/or IPMI-over-LAN functions
 - Requirements come mostly from Redfish v1.0.0 schemas
 - Does not require host-based software to implement required properties
- Publication
 - DMTF will provide posting on web and documentation
 - Seeking approval / endorsement from OCP
 - Would like to use OCP name in profile's name or description
 - Encourage future OCP specifications to reference
- Future effort
 - Next profile is “richer” Redfish adding properties defined in 2016-2017



Basic Server Profile Requirements (1 of 3)

- Service Root / Redfish infrastructure
 - UUID, RedfishVersion
 - Redfish Session-based connections
 - User Accounts
- Manager (BMC functions)
 - UUID, Firmware Version
 - Serial Console support – IPMI (SoL) or SSH
 - Event Log – must have ability to Clear the log
 - BMC's Ethernet / IP configuration
 - MAC Address, Link Status, Speed
 - IP address (v4 and/or v6) with gateway and subnet
 - Hostname, FQDN, Name Servers
 - Port addresses for HTTP, HTTPS
 - Port addresses for SSH and SSDP (recommended)



Basic Server Profile Requirements (2 of 3)

- Chassis (Redfish physical view of server)
 - Asset Tag (recommended)
 - SKU or Part Number – at least one of those
 - Manufacturer, Model, Serial Number
 - Power State
 - Indicator LED (recommended)
- Power
 - Power consumption, capacity
 - Power limit functionality
- Thermal
 - Fan speed and identifiers (if fans included in the design)
 - Temperature readings for “intake”, “System Board” and each CPU

Basic Server Profile Requirements (3 of 3)

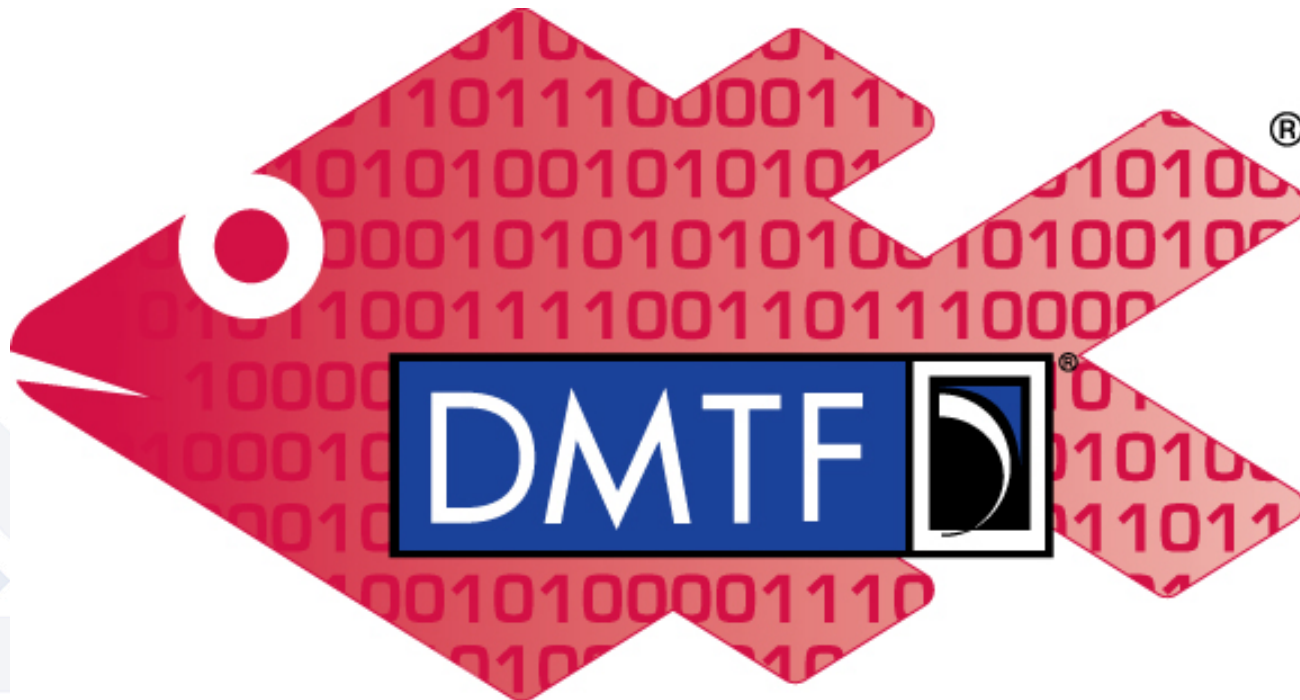
- Computer System (Redfish logical view of server)
 - Asset Tag – must be settable by user via Redfish
 - Serial Number, Manufacturer, Model
 - SKU or Part Number – at least one of those
 - UUID, BIOS Version
 - Power State
 - Indicator LED – controlled via Redfish
 - Boot Source – ability to set ‘one time boot’ option, including UEFI targets
 - CPU quantity and model
 - Total system memory
 - Host NIC information (recommended)
 - MAC Address, Link Status, Speed
 - IP address (v4 and/or v6) with gateway and subnet
 - Hostname, FQDN, Name Servers

Next Steps

- OCP Hardware Mgmt group “Approve” content of the Profile
- OCP decision on naming / usage of “OCP” in description
- DMTF to publish, complete open source tools for conformance testing



Q&A & Discussion



Redfish



BACKUP – JSON PROFILE DOCUMENT

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)
 - Also allows specification of Redfish Protocol features, Resources/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",
        "MinCount": 2
      }]
    }
  }
}
```

- ‘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": ["ForceOff", "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