OCP Baseline Hardware Management (Redfish Profile) v0.2.0

Author: John Leung (Intel Corporation)
1. **Scope**

   This document defines the baseline hardware management Redfish model to remotely manage platforms and devices in Open Compute Project.

2. **Contents**

   1. Scope
   2. Contents
   3. Overview
      1.1 License
   4. Introduction
      1.2 Reference Documents
      1.3 Redfish
      1.4 Redfish Profile Format
   5. Redfish Profile for OCP Hardware Management Baseline
      1.5 Service Root resource
      1.6 AccountService resource
      1.7 Chassis collection resource
      1.8 Chassis resource
      1.9 Chassis/{id}/Power resource
      1.10 Chassis/{id}/Thermal resource
      1.11 Managers/{id} resource
      1.12 Managers/{id}/EthernetInterfaces/{id} resource
      1.13 Managers/{id}/ManagerNetworkProtocol
   6. OCPHardwareManagementBaseline.v0.1.json
3. Overview

Scalability in today’s data center is increasingly achieved with horizontal, scale-out solutions, which often include large quantities of simple servers. The usage model of scale-out hardware is drastically different than that of traditional enterprise platforms, and requires a new approach to management.

Designed to meet the expectations of end users for simple and secure management of modern scalable platform hardware, DMTF’s Redfish® is an open industry standard specification and schema that specifies a RESTful interface and utilizes JSON and OData to help customers integrate solutions within their existing tool chains. An aggressive development schedule is quickly advancing Redfish toward its goal of addressing all the components in the data center with a consistent API. (dmtf.org/redfish)

1.1 License

As of January 19, 2018, the following persons or entities have made this Specification available under the Open Web Foundation Final Specification Agreement (OWFa 1.0), which is available at http://www.openwebfoundation.org/legal/the-owf-1-0-agreements/owfa-1-0:

Intel Corporation

You can review the signed copies of the Open Web Foundation Agreement Version 1.0 for this Specification at http://opencompute.org/licensing/, which may also include additional parties to those listed above.

Your use of this Specification may be subject to other third party rights. THIS SPECIFICATION IS PROVIDED "AS IS." The contributors expressly disclaim any warranties (express, implied, or otherwise), including implied warranties of merchantability, non-infringement, fitness for a particular purpose, or title, related to the Specification. The entire risk as to implementing or otherwise using the Specification is assumed by the Specification implementer and user. IN NO EVENT WILL ANY PARTY BE LIABLE TO ANY OTHER PARTY FOR LOST PROFITS OR ANY FORM OF INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND WITH RESPECT TO THIS SPECIFICATION OR ITS GOVERNING AGREEMENT, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), OR OTHERWISE, AND WHETHER OR NOT THE OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
4. Introduction

1.2 Reference Documents

Redfish Whitepaper ([DSP2044 v1.0.2](https://example.com), June 2017)
Redfish Scalable Platforms API Specification ([DSP0266 v1.4.0](https://example.com), Dec 2017).
Redfish Schema ([DSP8010 v2017.3](https://example.com), Dec 2017)
Redfish Interoperability Profiles Specification ([DSP0272 v0.99.0a](https://example.com), Dec 2017, Work-in-Progress)

1.3 Redfish

The Redfish Scalable Platforms Management API ("Redfish") is a standard that uses RESTful interface semantics to access data defined in model format to perform systems management. It is suitable for a wide range of servers, from stand-alone servers to rack mount and bladed environments but scales equally well for large scale cloud environments.

1.4 Redfish Profile Format

The Redfish Interoperability Profile is a JSON document which contains Schema-level, Property-level, and Registry-level requirements. A Redfish Profile file provides a machine readable file for prescriptive requirements on an implementation.

5. Redfish Profile for OCP Hardware Management Baseline

The OCP Hardware Management Baseline is specified in this document.

The figure below shows the resources for which the OCP Hardware Management Baseline imposes requirements.
The subsequent sections specifies the requirements per resource. Each section has a mockup, which shows the properties of the resource and the properties that have requirements, which are specified in a subsequent table.

(The mockups include a superset of properties for a resource. The properties which have a requirement in this document are bold-faced. This provides context, during of this document, for decisions on whether additional (or fewer) requirements should be stated in this document.)

The Redfish Profile file which expresses these same requirements can be found in section 6.

1.5 Service Root resource

The ServiceRoot resource shall exists.

Figure 1 shows a mockup of the ServiceRoot resource. The properties in bold have requirements, which are specified in Table 1.

```
{
  "@odata.context": "'/redfish/v1/$metadata#ServiceRoot.ServiceRoot",
  "@odata.id": "'/redfish/v1/",
  "@odata.type": "#ServiceRoot.v1_3_0.ServiceRoot",
  "Id": "RootService",
  "Name": "Root Service",
  "Product": "Contoso WidgetDeluxe 8744",
  "RedfishVersion": "1.0.0",
  "UUID": "$2384634-2938-2342-8820-489239905423",
  "Chassis": { .. },
  "Managers": { .. },
  "SessionService": { .. },
  "AccountService": { .. },
  "Systems": { .. },
  "Fabrics": { .. },
  "Tasks": { .. },
  "EventService": { .. },
  "UpdateService": { .. },
  "CompositionService": { .. },
  "Registries": { .. },
  "JsonSchemas": { .. },
  "Links": {
    "Sessions": { .. }
  }
}
```

Figure 1 – Mockup of ServiceRoot resource

Table 1 - Requirement for ServiceRoot resource properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UUID</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>RedfishVersion</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>AccountService</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>SessionService</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Chassis</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Managers</td>
<td>Mandatory</td>
<td></td>
</tr>
</tbody>
</table>

1.6 AccountService resource

Figure 2 shows a mockup of the AccountService resource. The properties in bold have requirements, which are specified in Table 3.

```
"@odata.context": "/redfish/v1/$metadata#AccountService.AccountService",
"@odata.id": "/redfish/v1/AccountService",
"@odata.type": ":#AccountService.v1_0_0.AccountService",
"Id": "AccountService",
"Name": "Account Service",
"Description": "Account Service",
"Status": {
    "State": "Enabled",
    "Health": "OK"
},
"ServiceEnabled": true,
"AuthFailureLoggingThreshold": 3,
"MinPasswordLength": 8,
"AccountLockoutThreshold": 5,
"AccountLockoutDuration": 30,
"AccountLockoutCounterResetAfter": 30,
"Accounts": {
    "@odata.id": "/redfish/v1/AccountService/Accounts"
},
"Roles": {
    "@odata.id": "/redfish/v1/AccountService/Roles"
}
}

Figure 2 – Mockup of AccountService resource

Table 2 - Requirement for AccountService resource properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts</td>
<td>Mandatory</td>
<td></td>
</tr>
</tbody>
</table>

1.7 Chassis collection resource

Figure 3 shows a mockup of the Chassis collection resource. The properties in bold have requirements, which are specified in Table 3.

{
    "@odata.context": "/redfish/v1/$metadata#ChassisCollection.ChassisCollection",
    "@odata.id": "/redfish/v1/Chassis",
    "@odata.type": ":#ChassisCollection.ChassisCollection",
    "Name": "Chassis Collection",
    "Members@odata.count": 1,
    "Members": [ { ... } ]
}

Figure 3 – Mockup of Chassis collection resource

Table 3 - Requirement for Chassis collection resource properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="mailto:Members@odata.count">Members@odata.count</a></td>
<td>Mandatory</td>
<td>≥1</td>
</tr>
<tr>
<td>Members</td>
<td>Mandatory</td>
<td>≥ &lt;one item&gt;</td>
</tr>
</tbody>
</table>

1.8 Chassis resource

Figure 4 shows a mockup of the Chassis resource. The properties in bold have requirements, which are specified in Table 4.

{
    "@odata.context": "/redfish/v1/$metadata#Chassis.Chassis",
    "@odata.id": "/redfish/v1/Chassis/1",
    "Name": "Chassis",
    "Members": [ { ... } ]
}

Table 4 - Requirement for Chassis resource properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members</td>
<td>Mandatory</td>
<td>≥1</td>
</tr>
</tbody>
</table>
Figure 4 – Mockup of Chassis resource

Table 4 - Requirement for Chassis resource properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AssetTag</td>
<td>Recommended, Read/write</td>
<td></td>
</tr>
<tr>
<td>ChassisType</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>IndicatorLED</td>
<td>Recommended, Read/write</td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>SerialNumber</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>SKU</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>PartNumber</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>PowerState</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Status/State</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Status/Health</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Thermal</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>Links</td>
<td>Mandatory</td>
<td></td>
</tr>
</tbody>
</table>

http://opencompute.org
<table>
<thead>
<tr>
<th>Links/ManagedBy</th>
<th>Mandatory</th>
</tr>
</thead>
</table>

1.9 Chassis/{id}/Power resource

Figure 5 shows a mockup of the Power resource. The properties in bold have requirements, which are specified in Table 5.

```
{
  "@odata.context": "/redfish/v1/$metadata#Power.Power",
  "@odata.id": "/redfish/v1/Chassis/1/Power",
  "@odata.type": "#Power.v1_5_0.Power",
  "Id": "Power",
  "Name": "Power",
  "PowerControl": [
    {
      "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerControl/0",
      "MemberId": "0",
      "Name": "System Power Control",
      "PhysicalContext": "Chassis",
      "PowerConsumedWatts": 8000,
      "PowerRequestedWatts": 8500,
      "PowerAvailableWatts": 8500,
      "PowerCapacityWatts": 10000,
      "PowerAllocatedWatts": 8500,
      "PowerMetrics": {
        "IntervalInMin": 30,
        "MinConsumedWatts": 7500,
        "MaxConsumedWatts": 8200,
        "AverageConsumedWatts": 8000
      },
      "PowerLimit": {
        "LimitInWatts": 9000,
        "LimitException": "LogEventOnly",
        "CorrectionInMs": 42
      },
      "RelatedItem": [ { .. } ],
      "Status": {
        "State": "Enabled",
        "Health": "OK"
      },
      "Oem": {}
    }
  ],
  "Voltages": [ { .. } ],
  "PowerSupplies": [ { .. } ],
  "Redundancy": [ { .. } ]
}
```

**Figure 5 – Mockup of Power resource**

**Table 5 - Requirement for Power resource properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerControl</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>PowerControl/PowerConsumedWatts</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>PowerControl/PowerCapacityWatts</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>PowerControl/PowerLimit</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>PowerControl/PowerLimits/LimitInWatts</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>PowerControl/PowerLimits/LimitException</td>
<td>Mandatory</td>
<td></td>
</tr>
</tbody>
</table>

1.10 Chassis/{id}/Thermal resource

Figure 6 shows a mockup of the Thermal resource. The properties in bold have requirements, which are specified in Table 6.

http://opencompute.org 9
The Thermal resource version shall be "1.1.0".

```json
{
    "@odata.context": "/redfish/v1/$metadata#Thermal.Thermal",
    "@odata.id": "/redfish/v1/Chassis/1/Thermal",
    "@odata.type": ">#Thermal.v1_1_0.Thermal",
    "Id": "Thermal",
    "Name": "Thermal",
    "Temperatures": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Temperatures/0",
            "MemberId": "0",
            "Name": "CPU1 Temp",
            "SensorNumber": 42,
            "Status": {
                "State": "Enabled",
                "Health": "OK"
            },
            "ReadingCelsius": 21,
            "UpperThresholdNonCritical": 42,
            "UpperThresholdCritical": 42,
            "UpperThresholdFatal": 42,
            "LowerThresholdNonCritical": 42,
            "LowerThresholdCritical": 5,
            "LowerThresholdFatal": 42,
            "MinReadingRangeTemp": 0,
            "MaxReadingRangeTemp": 200,
            "PhysicalContext": "CPU",
            "RelatedItem": [
                {"@odata.id": "/redfish/v1/Systems/1/Processors/1" }
            ]
        }
    ],
    "Fans": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/0",
            "MemberId": "0",
            "Name": "BaseBoard System Fan",
            "PhysicalContext": "Backplane",
            "Status": {
                "State": "Enabled",
                "Health": "OK"
            },
            "Reading": 2100,
            "ReadingUnits": "RPM",
            "IndicatorLED": "Off",
            "HotPluggable": true,
            "Model": "694843-Z91",
            "Manufacturer": "Contoso FanCo",
            "SerialNumber": "2016334576",
            "PartNumber": "120000001A3a",
            "SparePartNumber": "0000001A3a",
            "UpperThresholdNonCritical": 42,
            "UpperThresholdCritical": 4200,
            "UpperThresholdFatal": 42,
            "LowerThresholdNonCritical": 42,
            "LowerThresholdCritical": 5,
            "LowerThresholdFatal": 42,
            "MinReadingRange": 0,
            "MaxReadingRange": 5000,
            "Redundancy": [
                {"@odata.id": "/redfish/v1/Chassis/1/Thermal#/Redundancy/0"}
            ],
            "RelatedItem": [
                {"@odata.id": "/redfish/v1/Systems/1" },
                {"@odata.id": "/redfish/v1/Chassis/1" }
            ]
        }
    ]
}```
Figure 6 – Mockup of Thermal resource

Table 6 - Requirement for Thermal resource properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fans</td>
<td>If Implemented</td>
<td></td>
</tr>
<tr>
<td>Fans/{id}/Status</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Fans/{id}/Name</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>Fans/{id}/Reading</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>Fans/{id}/ReadingUnit</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>Temperatures</td>
<td>If Implemented</td>
<td></td>
</tr>
<tr>
<td>Temperatures/#/ReadingCelsius</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Temperatures/#/UpperThresholdFatal</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>Temperatures/#/UpperThresholdCritical</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>Temperatures/#/UpperThresholdNonCritical</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>Redundancy</td>
<td>If Implemented</td>
<td></td>
</tr>
<tr>
<td>Redundancy/{id}/MemberID</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Redundancy/{id}/RedundancySet</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Redundancy/{id}/Node</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Redundancy/{id}/Status</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Redundancy/{id}/MinNumNeeded</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Redundancy/{id}/MaxNumSupported</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
</tbody>
</table>

1.11 Managers collection resource

Figure 3 shows a mockup of the Managers collection resource. The properties in bold have requirements, which are specified in Table 3.

Figure 7 – Mockup of Managers collection resource

Table 7 - Requirement for Managers collection resource properties
1.12 Managers/{id} resource

Figure 8 shows a mockup of the Manager resource. The properties in bold have requirements, which are specified in Table 8.

```json
{
    "@odata.context": "/redfish/v1/$metadata#Manager.Manager",
    "@odata.id": "/redfish/v1/Managers/1",
    "@odata.type": "#Manager.v1_1_0.Manager",
    "Id": "1",
    "Name": "Manager",
    "ManagerType": "BMC",
    "Description": "BMC",
    "ServiceEntryPointUUID": "92384634-2938-2342-8820-489239905423",
    "UUID": "00000000-0000-0000-0000-000000000000",
    "Model": "Joo Janta 200",
    "DateTime": "2015-03-13T04:14:33+06:00",
    "DateTimeLocalOffset": "+06:00",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "GraphicalConsole": { ... },
    "SerialConsole": { ... },
    "CommandShell": { ... },
    "FirmwareVersion": "1.00",
    "NetworkProtocol": { ... },
    "EthernetInterfaces": { ... },
    "SerialInterfaces": { ... },
    "LogServices": { ... },
    "VirtualMedia": { ... },
    "Links": {
        "ManagerForServers": [ { ... } ],
        "ManagerForChassis": [ { ... } ],
        "ManagerInChassis": [ { ... } ]
    },
    "Actions": {
        "#Manager.Reset": {
            "target": "/redfish/v1/Managers/1/Actions/Manager.Reset",
            "ResetType@Redfish.AllowableValues": {
                "ForceRestart",
                "GracefulRestart"
            }
        }
    }
}
```

![Figure 8 – Mockup of Manager resource](image)

**Table 8 - Requirement for Manager resource properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ManagerType</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>UUID</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>FirmwareVersion</td>
<td>Mandatory</td>
<td></td>
</tr>
</tbody>
</table>
### NetworkProtocol
- **Mandatory**

<table>
<thead>
<tr>
<th>EthernetInterfaces</th>
<th><strong>Mandatory</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>LogService</td>
<td><strong>Mandatory</strong></td>
</tr>
<tr>
<td>Links</td>
<td><strong>Mandatory</strong></td>
</tr>
<tr>
<td>Links/ManagedForService</td>
<td>If implemented, Read only</td>
</tr>
<tr>
<td>Links/ManagerForChassis</td>
<td>If implemented, Read only</td>
</tr>
<tr>
<td>Action</td>
<td><strong>Mandatory</strong></td>
</tr>
<tr>
<td>Action/#Manager.Reset</td>
<td><strong>Mandatory</strong></td>
</tr>
<tr>
<td>Action/#Manager.Reset/ResetType@AllowableValues</td>
<td><strong>Mandatory</strong></td>
</tr>
</tbody>
</table>

#### 1.13 Managers/([id])/EthernetInterfaces/[id] resource

Figure 9 shows a mockup of the EthernetInterface resource when it is a subordinate resource of Manager. The properties in bold have requirements, which are specified in Table 9.

```json
{
    "@odata.context": "/redfish/v1/$metadata#EthernetInterface.EthernetInterface",
    "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/1",
    "@odata.type": ":#EthernetInterface.v1_4_0.EthernetInterface",
    "Id": "1",
    "Name": "Manager Ethernet Interface",
    "Description": "Management Network Interface",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "InterfaceEnabled": true,
    "PermanentMACAddress": "1E:C3:DE:6F:1E:24",
    "MACAddress": "1E:C3:DE:6F:1E:24",
    "SpeedMbps": 100,
    "AutoNeg": true,
    "FullDuplex": true,
    "MTUSize": 1500,
    "HostName": "MyHostName",
    "FQDN": "MyHostName.MyDomainName.com",
    "MaxIPv6StaticAddresses": 1,
    "VLAN": {
        "VLANEnable": true,
        "VLANId": 101
    },
    "DHCPv4": { "..." },
    "IPv4Addresses": [ { "..." } ],
    "IPv4StaticAddresses": [ { "..." } ],
    "DHCPv6": { "..." },
    "IPv6Addresses": [ { "..." } ],
    "IPv6StaticAddresses": [ { "..." } ],
    "IPv6AddressPolicyTable": [ { "..." } ],
    "IPv6StaticDefaultGateways": [ { "..." } ],
    "IPv6DefaultGateway": "fe80::214:clff:fe4c:5c4d",
    "StatelessAddressAutoConfig": {
        "IPv4AutoConfigEnabled": false,
        "IPv6AutoConfigEnabled": true
    },
    "NameServers": [ "..." ],
    "StaticNameServers": [ "..." ],
    "@Redfish.Settings": {
        "@odata.type": ":#Settings.v1_0_0.Settings",
        "SettingsObject": {
            "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/1/SD"
        },
        "Time": "2012-03-07T14:44:30-05:00",
        "ETag": "someetag"
    }
}
```
Figure 9 – Mockup of EthernetInterface resource

Table 9 - Requirement for EthernetInterface resource properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>InterfaceEnabled</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>MACAddress</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>SpeedMbps</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>HostName</td>
<td>Mandatory, Read/write</td>
<td></td>
</tr>
<tr>
<td>FQDN</td>
<td>Mandatory, Read/write</td>
<td></td>
</tr>
<tr>
<td>DHCPv4</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>IPv4Addresses</td>
<td>Mandatory, Read/write</td>
<td></td>
</tr>
<tr>
<td>IPv4Addresses/Address</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>IPv4Addresses/SubnetMask</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>IPv4Addresses/AddressOrigin</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>IPv4Addresses/Gateway</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>IPv4StaticAddresses</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>DHCPv6</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>IPv6Addresses</td>
<td>If implemented, Read only</td>
<td></td>
</tr>
<tr>
<td>IPv6Addresses/Address</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>IPv6Addresses/PrefixLength</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>IPv6Addresses/AddressOrigin</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>IPv6Addresses/AddressState</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>IPv6StaticAddresses</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>IPv6AddressPolicyTable</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>IPv6StaticDefaultGateways</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>StaticNameServers</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
</tbody>
</table>

1.14 Managers/{id}/ManagerNetworkProtocol

Figure 10 shows a mockup of the ManagerNetworkProtocol resource. The properties in bold have requirements, which are specified in Table 10.

```json
{
    "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol",
    "@odata.type": ":ManagerNetworkProtocol.v1_2_0.ManagerNetworkProtocol",
    "Id": "NetworkProtocol",
    "Name": "Manager Network Protocol",
    "Description": "Manager Network Service Status",
}
"Status": { "": },
"HostName": "mymanager",
"FQDN": "mymanager.mydomain.com",
"HTTP": { "": },
"HTTPS": { "": },
"SSH": { "": },
"SSDP": { "": },
"IPMI": { 
  "ProtocolEnabled": true,
  "Port": 623
},
"SNMP": { 
  "ProtocolEnabled": true,
  "Port": 161
},
"VirtualMedia": { 
  "ProtocolEnabled": true,
  "Port": 17988
},
"Telnet": { 
  "ProtocolEnabled": true,
  "Port": 23
},
"KVMIP": { 
  "ProtocolEnabled": true,
  "Port": 5288
},
"NTP": { 
  "ProtocolEnabled": true,
  "NTPServers": [ 
    "0.pool.ntp.org",
    "1.pool.ntp.org",
    "time-a.nist.gov"
  ]
}

Figure 10 – Mockup of ManagerNetworkProtocol resource

Table 10 - Requirement for ManagerNetworkProtocol resource properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HostName</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>FQDN</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>HTTP</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>ProtocolEnabled</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>HTTPS</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>ProtocolEnabled</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>SSH</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>ProtocolEnabled</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>SSDP</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>ProtocolEnabled</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>NotifyMulticastIntervalSecond</td>
<td>Recommended, Read only</td>
<td></td>
</tr>
<tr>
<td>NotifyIPv6Scope</td>
<td>Mandatory</td>
<td></td>
</tr>
</tbody>
</table>
6. OCPHardwareManagementBaseline.v0.1.json

Redfish specifies that format of a 'profile' file which express the prescriptive requirements of Redfish resources. The profile file can be read by the Redfish Interoperability Tool, with will run a series of conformance tests against an implementation. This can be used to verify the conformance of the implementation to the profile.

Figure 11 shows the content of the file, OCPHardwareManagementBaseline.v0.1.json, which express the preceding requirements.

To be added