Redfish Extensions for Processor Operating Configurations (Work In Progress)

August 2019

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.

Background

April 2019

- The operating configuration model presented
  - For processor
  - Concepts for using for other platform components and the system, itself (general model)

July 2019 (At APTS)

- Issue
  - A processor product will deliver operating config functionality, which would be managed with the proposed operating configurations model
  - The desire is for this model to be in the standard Redfish model
- Redfish Forum Guidance
  - Release processor operating configurations model as WIP (mockup, schema, slideset), making it public. Merge into subsequent Redfish schema release.
  - Create separate slideset regarding a general model - see if there is interest
  - Depending on interest, merge operating configuration model for processor or await general model

Operating Configuration

The Redfish service allows a client to select from a set of configurations which a resource can have during operations (configs could based on perf optimization, validated configs, operational envelop, etc.)

Generic Example

- A resource (processor, memory, CS) can be configured with one of many operating configurations
- The operating configuration are predefine by the vendor/OEM
- The user may select an operating configuration to apply (upon reboot or at runtime)

Specific Example
(processor)

- The operating configurations for a processor may encapsulate trade-offs between
  - # of active cores
  - Base frequency of each core
  - Turbo frequency
  - Power consumption & TDP (thermal design point)

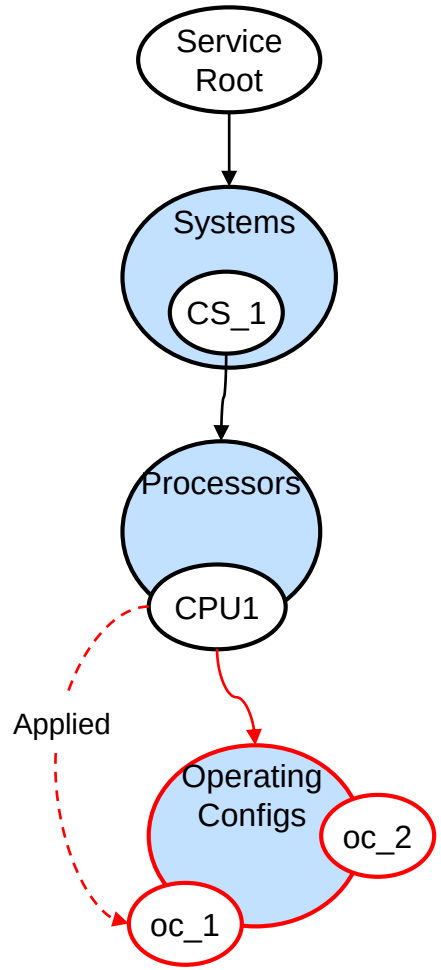
Operating Config resource for Processor


```
{
    "@odata.type": "#OperatingConfig.v1_1_0.OperatingConfig"
    "@odata.id":
"/redfish/v1/Systems/CS_1/Processors/CPU1/OperatingConfigs/0",
    "Id": "0",

    "Name": "Best Performance Processor Operating Configuration",

    "TotalAvailableCoreCount": 28,
    "TDPWatts": 150,
    "BaseSpeedMHz": 2500,
    "MaxSpeedMHz": 4100,
    "MaxJunctionTemperatureCelsius": 90,
    "TurboSettings": [ { . . . } ],
    "BaseFrequencyPrioritizationSettings": {
            "HighSpeedCoreCount": 8,
            "HighSpeedCoreAPICIDs": [0, 2, 3, 4, 5, 6, 7, 8],
            "HighSpeedCoreBaseSpeedMHz": 2900,
            "LowSpeedCoreCount": 20,
            "LowSpeedCoreBaseSpeedMHz": 2200,
    }
    …
}
```


- HighSpeedCoreCount - – Core count for HS base frequency
- HighSpeedCoreBaseSpeedMHz – HS base frequency.
- HighSpeedCoreAPICIDs – Array of cores which are able to run in HS freq.
- LowSpeedCoreCount – – Core count for LS base frequency
- LowSpeedCoreBaseSpeedMHz – LS base frequency.

Processor Operating Configurations

- Client inspects the collection of predefine operating configurations
- Client selects an operating configuration to apply
  - By POST'ing to SettingData
  - Apply during runtime or upon reboot (ApplyTime)
- Client verifies the operating configuration has been applied
  - By inspecting the AppliedOperatingConfig property



New properties in Processor model


```
{
   "@odata.type": "#Processor.v1_1_0.Processor",
   "@odata.id": "/redfish/v1/Systems/CS_1/Processors/CPU1",

   "Id": "CPU1",
   "Name": "Processor",
   "Socket": "CPU 1",
   "ProcessorType": "CPU",
   "ProcessorArchitecture": "x86",
   "InstructionSet": "x86-64",
   "Manufacturer": "Intel(R) Corporation",
   "Model": "Multi-Core Intel(R) Xeon(R) processor 7xxx Series",
  …
   "OperatingConfigs": {
        "@odata.id": "/redfish/v1/Systems/CS_1/Processors/CPU1/OperatingConfigs"
   },
   "AppliedOperatingConfig": {
        "@odata.id": "/redfish/v1/Systems/CS_1/Processors/CPU1/OperatingConfigs/0"
   },
   ...
}
```

Example message in POST to Settings resource

```
{
    "@odata.type": "#Processor.v1_1_0.Processor",
    "@odata.id": "/redfish/v1/Systems/CS_1/Processors/CPU1/Settings",
    "Id": "Settings",
    "Name": "Processor Operating Configuration",
    "@Redfish.SettingsApplyTime": {
        "@odata.type": "#Settings.v1_1_0.PreferredApplyTime",
        "ApplyTime": "OnReset"
    },
    "AppliedOperatingConfig": {
       "@odata.id": "/redfish/v1/Systems/CS_1/Processors/CPU1/OperatingConfigs/0"
    }
}
```

Schema Changes

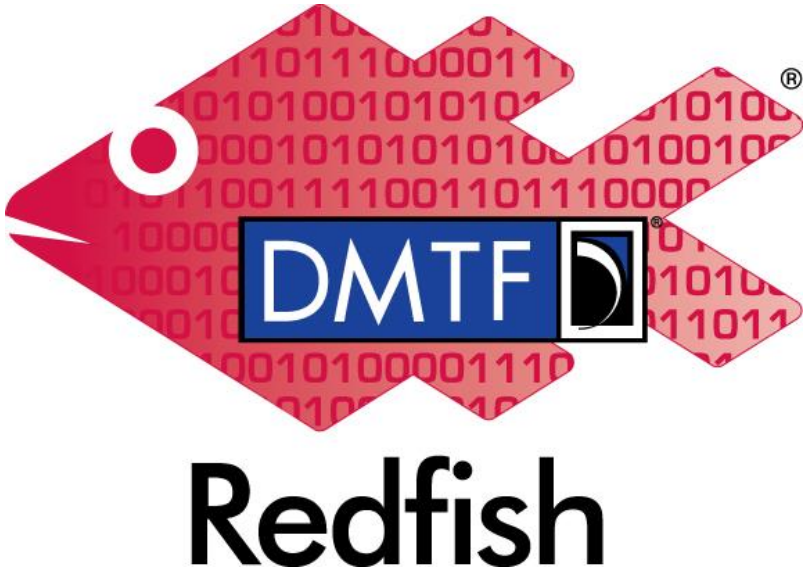
Metadata	Description
Processor_v1.xml	• Add **OperatingConfigs** property, which references the subordinate collection, **OperatingConfigCollection** • Add **AppliedOperatingConfig** property, which references that OperatingConfig which has been applied, if any
OperatingConfigCollection	New collection resource
OperatingConfig	New resource (member of collection)

Questions for the Industry

- What level of abstraction should the select have?
  - Enumerated namespace for configurations: e.g Best Performance, Better Power Efficiency
- What are the possible use cases (e.g. performance, energy efficient etc.)?
- Does this a model work for other resources?
- What level of commonality is desired for the properties in the processor operating config resource?

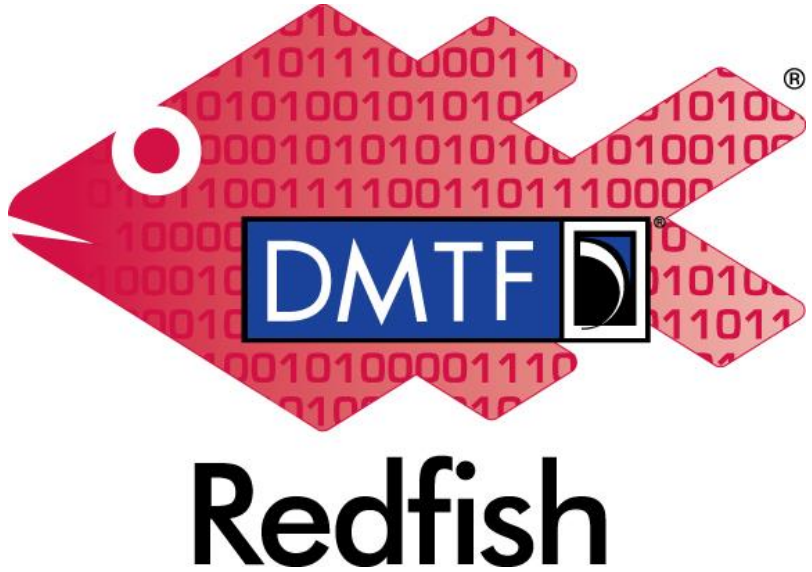
Providing Feedback

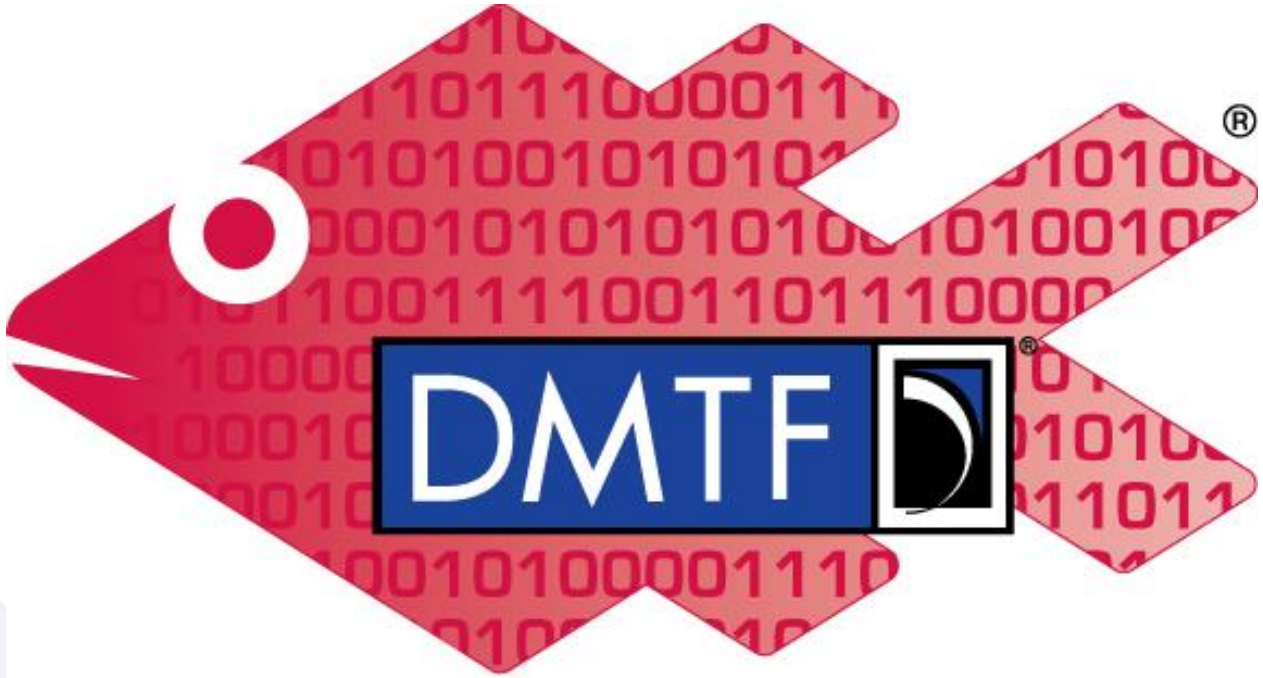
- DMTF Feedback Portal
  - "DMTF Technology Submission and Feedback Portal"
  - https://www.dmtf.org/standards/feedback
- Portal includes
  - Intellectual Property Rights Agreement
  - Copyright grant



Getting involved in Redfish

- Redfish User Forum
  - User forum for questions, suggestions and discussion of all Redfish topics
  - http://www.redfishforum.com
- Redfish Standards page
  - Schemas, Specs, Mockups, White Papers, FAQ, Educational Material & more
  - http://www.dmtf.org/standards/redfish
- Redfish Developer Portal
  - Redfish Interactive Resource Explorer
  - Educational material, Hosted Schema files, documentation & other links
  - http://redfish.dmtf.org
- DMTF Redfish Forum
  - Companies involved, Upcoming Schedules & Future work, Charter
  - Join the DMTF to get involved in future work
  - http://www.dmtf.org/standards/spmf





Redfish

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