Redfish Release 2021.2

- **Redfish Specification v1.14.0**
  - Adds OAuth 2.0 as a method of authorization
  - New clause describing OEM-defined query parameters

- **Redfish Specification v1.13.1**
  - Errata release

- **Redfish Schema Bundle 2021.2**
  - DSP8010 contains all released Redfish schemas

- **Redfish Message Registry Bundle 2021.2**
  - DSP8011 contains all released Redfish registries
  - **NEW** HeartbeatEvent message registry for clients desiring periodic notification

- **Redfish Interoperability Profiles v1.4.0**
  - Adds support for documenting License and ContributedBy information within a Profile document
  - Updated both DSP0272 and DSP8013

- **8 NEW Schemas, 42 updated schemas**
  - Addition of AllowDeny, Battery, BatteryMetrics, Cable, Control, Key, KeyPolicy, KeyService schemas
  - Support for “power shelf” products (requested by OCP members) added to the PowerDistribution schema
  - New PowerLimitWatts and OperatingSpeedRangeMHz properties complete transition from Power and Thermal schemas
  - Added metrics for Fibre Channel devices to PortMetrics and NetworkDeviceFunctionMetrics
  - See release notes in DSP8010 for errata details

- **Download all published material at:** [http://www.dmtf.org/standards/redfish](http://www.dmtf.org/standards/redfish)

- Guide documents are updated for each schema (DSP8010) release
  - Description text for properties taken directly from schema files
  - DMTF documentation generator creates these guide documents
- Redfish Resource and Schema Guide (DSP2046)
  - Presents schema definition contents in a more human-readable format
  - Includes example payloads for each schema
- Redfish Property Guide (DSP2053)
  - Provides an alphabetical list of all properties defined in Redfish schema
  - Useful for schema writers to locate existing definitions or properties
  - Helps avoid re-defining property names already in use
- Redfish Schema Supplement (DSP0268)
  - Presents normative (“LongDescription”) schema definition contents
  - Useful for Redfish Service developers to ensure conformance
OAuth 2.0

- The OAuth 2.0 Authorization Framework allows for authorization to be performed by an external entity
  - No usernames or passwords need to be provided by the client
- If supported by a service, configuration of the OAuth 2.0 server is performed as another type of external account provider
  - Specify the server address
  - If needed, specify the issuer string and the signing keys of the server
- Redfish services can accept signed tokens in the Authorization HTTP request header
  - Token contains identifier for the OAuth 2.0 server, client, and privileges
  - If the signature of the token is valid, the service gives the client the privileges described in the token for the operation
SmartNICs

• New additions to support modeling use cases for SmartNICs
  • AllowDenyCollection added to NetworkDeviceFunction to show firewalling configurations
  • ProcessorCollection added to NetworkAdapter to show offload processors dedicated to a SmartNIC
  • DPU (Data Processing Unit) value added to SystemType in ComputerSystem for showing a system-view of an SoC on a SmartNIC
• Establishing patterns for modeling SmartNICs with existing schemas
  • Advanced Communications Device (ACD) model is the base model
  • Each SmartNIC has its own Chassis resource
  • Processor and ComputerSystem resources are used to represent the offload capabilities of a SmartNIC
  • AddressPool in fabrics represents switching-related configurations
SoC-based SmartNICs

SystemType = “DPU”

*NDF = Network Device Function
FPGA-based SmartNICs

*NDF = Network Device Function
NEW Control schema

- Concepts heavily leveraged from **Sensor**
- Describes an individual control point plus associated sensor(s) that measures the effects of that control point
  - Also known as an “effector” in some specifications
- **SetPoint** is the primary focus for end users
  - The desired value for a **Sensor Reading** instance resulting from the **Control** setting
  - **SettingMin** and **SettingMax** can specify a range of values rather than a single point
- **ControlLoop** object exposes coefficients used in a control loop algorithm
- Schema excerpts defined in **EnvironmentMetrics**, **Memory**, and **Processor** for **PowerLimitWatts** and **OperatingSpeedRangeMHz**
  - These use cases complete the transition from the deprecated **Power** and **Thermal** schemas (fully replaced by **PowerSubsystem** and **ThermalSubsystem**)
  - **PowerLimitWatts** limits power consumption of a resource
  - **OperatingSpeedRangeMHz** provides range of allowed speeds for a **Memory** or **Processor** device
NEW Battery and BatteryMetrics schema

- Various system designs incorporate battery modules
  - Example: A battery to provide power to NVDIMMs so that DRAM contents are flushed to flash when power is lost
  - Does not include “simple” batteries, such as a coin cell battery for an RTC
- **PowerSubsystem** was updated to include a **BatteryCollection**
  - The members of the collection represent the batteries in a **Chassis**
  - Contains FRU information and metrics associated with the battery
NEW Power Shelf support

- Product category added to **PowerDistribution** schema
  - Feedback received that requested support of this OCP-defined category
- A unit intended to power a rack (or similar group) from a common output
  - Primary difference from other power equipment is the presence of power supplies
NEW Cables

- Cable resources for tracking inventory info and connectivity
  - Connectivity between Chassis, Ports, and arbitrary Resources
  - Exposes cabling without requiring extra links to report logical connections
- Properties are user-updatable for the option of manual management
  - e.g. Physical status, connectivity types, cable types, identifiers
- **CableCollection** can be found off **ServiceRoot**

**Cable**

- **CableClass**
- **CableStatus**
- **CableType**
- **UpstreamConnectorTypes[]**
- **DownstreamConnectorTypes[]**
- **UpstreamName**
- **DownstreamName**
- **LengthMeters**
- **Location**
- **Manufacturer, Model, PartNumber, SerialNumber, SKU, Vendor**
- **UserDescription**

- **Links to downstream Chassis, Port, Resource**
- **Links to upstream Chassis, Port, Resource**
NEW KeyService, Key, and KeyPolicy schemas

- A KeyService resource can be found off ServiceRoot
  - This is for configuration of keys within a service
  - External key management functions have also been added to ComputerSystem (see KeyManagement property)
- Each Key resource contains the key string and format of the key
- Each KeyPolicy resource contains administrative settings for usage of keys, such as allowed hash algorithms and cryptographic functions
- Initial use cases identified for NVMe-oF boot key management
  - KeyService contains a KeyCollection named NVMeoFSecrets for storing NVMe-oF keys to access subsystems
  - KeyService contains a KeyPolicyCollection named NVMeoFKeyPolicies for managing how system software is allowed to use the NVMe-oF keys
NVMe-oF Boot Key Management

- Clients install NVMe-oF keys by performing a POST to the `NVMeoFSecrets` collection found in `KeyService`.
- System software (UEFI and OS) access the key information in order to establish NVMe-oF connections to remote subsystems.
  - UEFI discovers the installed keys and configures ACPI entries to specify the available boot paths.
  - ACPI entries contain a reference to the URI in the Redfish model for a given key.
  - The OS uses this information to re-establish NVMe-oF connections to remote subsystems.
Redfish Schema Minor Revisions (1 of 9)

- **AccountService v1.10.0**
  - Added `OAuth2` property for configuring OAuth 2.0 authorization. Added “OAuth2” to `AccountProviderType`

- **ActionInfo v1.2.0**
  - Added `ArraySizeMinimum` and `ArraySizeMaximum` properties

- **AddressPool v1.2.0**
  - Added `Enabled` and `CIDR` to `BGPNeighbor`
  - Added `RouteDistinguisherAdministratorSubfield`, `RouteTargetAdministratorSubfield`, and `GatewayIPAddressRange` to `BGPEvpn`
  - Added `SystemMACRange` to `IPv4`

- **Certificate v1.4.0**
  - Added `PEMchain` to `CertificateType` to support chain of PEM certificates
  - Added `CertificateUsageTypes` property
  - Added `Issuer` and `Subjects` in `Links` to report how certificates are chained
Redfish Schema Minor Revisions (2 of 9)

- **Chassis v1.17.0**
  - Added *Controls* property. Added *Cables* to *Links*
- **Circuit v1.3.0**
  - Added *PowerLoadPercent* property
- **ComputerSystem v1.16.0**
  - Added *IdlePowerSaver* property
  - Added *KeyManagement* with *KMIP Servers* and *KMIP Certificates* properties
  - Added “DPU” to *SystemType*
  - Deprecated *Status* in *ProcessorySummary* and *MemorySummary* in favor of *Status* in the individual resources
- **Drive v1.13.0**
  - Added *Storage* to *Links*
- **EnvironmentMetrics v1.1.0**
  - Added *PowerLoadPercent, DewPointCelsius,* and *PowerLimitWatts* properties
Redfish Schema Minor Revisions (3 of 9)

• EthernetInterface v1.7.0
  • Deprecated VLANs in favor of using multiple EthernetInterface resources to express additional VLANs
  • Deprecated NetworkDeviceFunction in favor of NetworkDeviceFunctions in Links

• Event v1.7.0
  • Added LogEntry property

• EventDestination v1.11.0
  • Added SendHeartbeat, HeartbeatIntervalMinutes, and ClientCertificates properties

• ExternalAccountProvider v1.3.0
  • Added OAuth2Service property for configuring OAuth 2.0 authorization. Added “OAuth2” and “TACACSplus” to AccountProviderType

• FabricAdapter v1.1.0
  • Added Location property

• Facility v1.2.0
  • Added PowerShelves to Links
Redfish Schema Minor Revisions (4 of 9)

- **LogService v1.3.0**
  - Added LogEntriesETag parameter to the ClearLog action
  - Added AutoDSTEnabled property
- **Manager v1.13.0**
  - Added Certificates and Measurements properties
- **ManagerNetworkProtocol v1.8.0**
  - Added Proxy for configuring proxy settings on the manager
- **Memory v1.13.0**
  - Added Log property for showing internal device logs
    - Added OperatingSpeedRangeMHz property
- **NetworkAdapter v1.8.0**
  - Added Processors property
Redfish Schema Minor Revisions (5 of 9)

- **NetworkDeviceFunction v1.7.0**
  - Added `SAVIEEnabled`, `Limits`, and `AllowDeny` properties
  - Added `EthernetInterfaces` property to `Ethernet` for non-system related interfaces
  - Added `OffloadSystem` and `OffloadProcessors` to Links
  - Deprecated `VLANs` in favor of using multiple `EthernetInterface` resources to express additional VLANs
  - Deprecated `EthernetInterface` in favor of `EthernetInterfaces` in `Links`

- **NetworkDeviceFunction v1.1.0**
  - Added `FibreChannel` property

- **Outlet v1.2.0**
  - Added `PowerLoadPercent` property

- **Port v1.4.0**
  - Added `WakeOnLANEnabled` and `EEEEEnabled` properties. Added `Cables` to `Links`
  - Added several new values to `PortConnectionType` for Fibre Channel ports
  - Deprecated `SupportedEthernetCapabilities` in favor of showing individual properties for the configured capabilities
Redfish Schema Minor Revisions (6 of 9)

- **PortMetrics v1.2.0**
  - Added *FibreChannel* property

- **PowerDistribution v1.1.0**
  - Added “PowerShelf” to *PowerEquipmentType*
  - Added *PowerSupplies*, *PowerSupplyRedundancy*, and *MainsRedundancy* properties

- **PowerDistributionMetrics v1.2.0**
  - Added *PowerLoadPercent* property

- **PowerDomain v1.1.0**
  - Added *PowerShelves* to *Links*

- **PowerEquipment v1.1.0**
  - Added *PowerShelves* property

- **PowerSubsystem v1.1.0**
  - Added *Batteries* property
Redfish Schema Minor Revisions (7 of 9)

- Processor v1.13.0
  - Added *Ports* and *OperatingSpeedRangeMHz* properties
  - Added *ECCModeEnabled* to *MemorySummary*
  - Added *NetworkDeviceFunctions* to *Links*

- ProcessorMetrics v1.3.0
  - Added *CoreVoltage* property

- Resource v1.13.0
  - Added “Embedded” to *LocationType*
  - Added “Suspend”, “Pause”, and “Resume” to *ResetType*
  - Added “Paused” to *PowerState*
Redfish Schema Minor Revisions (8 of 9)

- **Sensor v1.4.0**
  - Added `SensorGroup`, `LowestReading`, `LowestReadingTime`, `AverageReading`, `AveragingInterval`, `AveragingIntervalAchieved`, `Calibration`, and `CalibrationTime` properties
  - Added `AssociatedControls` to `Links`
  - Added “EnergyWh” and “ChargeAh” to `ReadingType`

- **ServiceRoot v1.10.0**
  - Added `KeyService` and `Cables` properties

- **SoftwareInventory v1.5.0**
  - Added `MeasurementIndex` to `MeasurementBlock`

- **Storage v1.11.0**
  - Added `ResetToDefaults` action
  - Added `HostingStorageSystems` to `Links`

- **StorageController v1.3.0**
  - Added `NetworkDeviceFunctions` to `Links`
Redfish Schema Minor Revisions (9 of 9)

- Triggers v1.2.0
  - Added `MetricIds` property
- UpdateService v1.10.0
  - Added `ClientCertificates` property
- VirtualMedia v1.5.0
  - Added `ClientCertificates` property
- VlanNetworkInterface v1.3.0
  - Deprecated the resource representation of `VlanNetworkInterface` in favor of using multiple `EthernetInterface` resources to express additional VLANs
  - Added `Tagged` property to common VLAN object
Errata Schema Revisions (1 of 2)

- **AccountService v1.x.x**
  - Improved the resource description to indicate that there are scenarios where services may ignore certain policies to prevent denial of service or other types of lockouts

- **ActionInfo v1.x.x**
  - Clarified that `AllowableValues`, `MinimumValue`, and `MaximumValue` describe constraints on array members for array parameters

- **Drive v1.x.x**
  - Changed permissions of `HotSpareType` to be read-write
  - Specified that “Dedicated” value for `HotSpareType` is not allowed in client requests

- **EventDestination v1.x.x**
  - Clarified the usage of `SyslogFilters`

- **EventService v1.x.x**
  - Clarified the behavior of the service when `ServiceEnabled` is false

- **Endpoint v1.x.x**
  - Corrected typographic error in description of `SubsystemId`
Errata Schema Revisions (2 of 2)

- **Manager v1.x.x**
  - Clarified the ordering of `DateTime` and `DateTimeLocalOffset` when both are modified in a single request

- **Port v1.x.x**
  - Corrected the permissions of `LinkStatus` to be read-only

- **Processor v1.x.x**
  - Clarified the usage of `TotalMemorySizeMiB` in `MemorySummary`

- **ProcessorMetrics v1.x.x**
  - Clarified usage of `BandwidthPercent` to show it applies to all types of processors

- **Resource v1.x.x**
  - Corrected description of `LocationType` to remove duplicative statements

- **Sensor v1.x.x**
  - Clarified `Synthesized` usage when multiple sensors are used to calculate reading

- **VirtualMedia v1.x.x**
  - Clarified usage of the `Image` parameter in the `InsertMedia` action and the `Image` property to show that relative URIs are allowed for media local to the service