



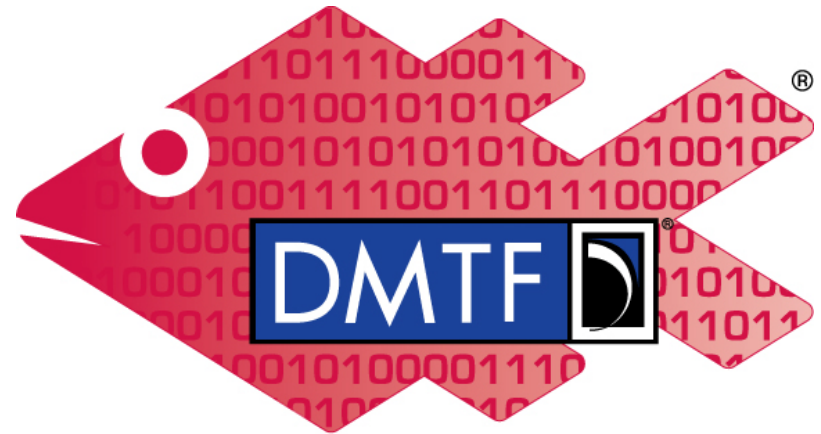
# Redfish Release 2021.2

DMTF Redfish Forum  
August 2021



# 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>



# Redfish



## Schema Guide, Property Guide, and Schema Supplement

- 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

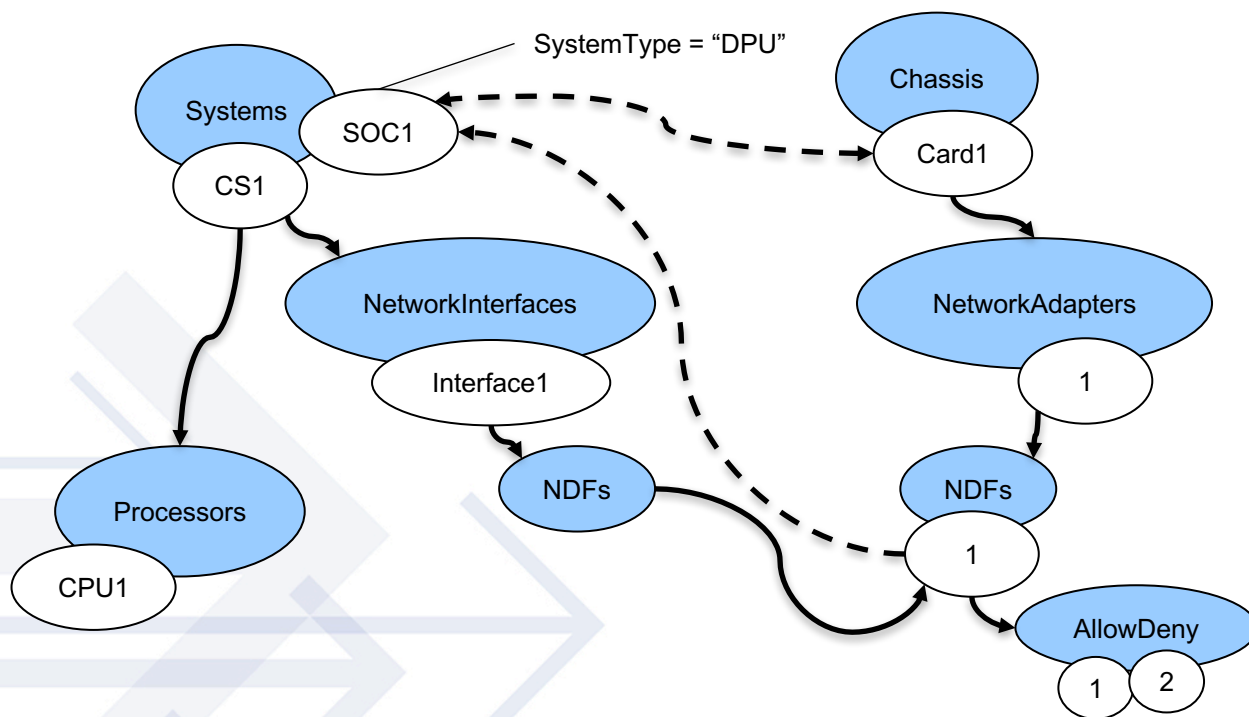


## SmartNICs

- 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



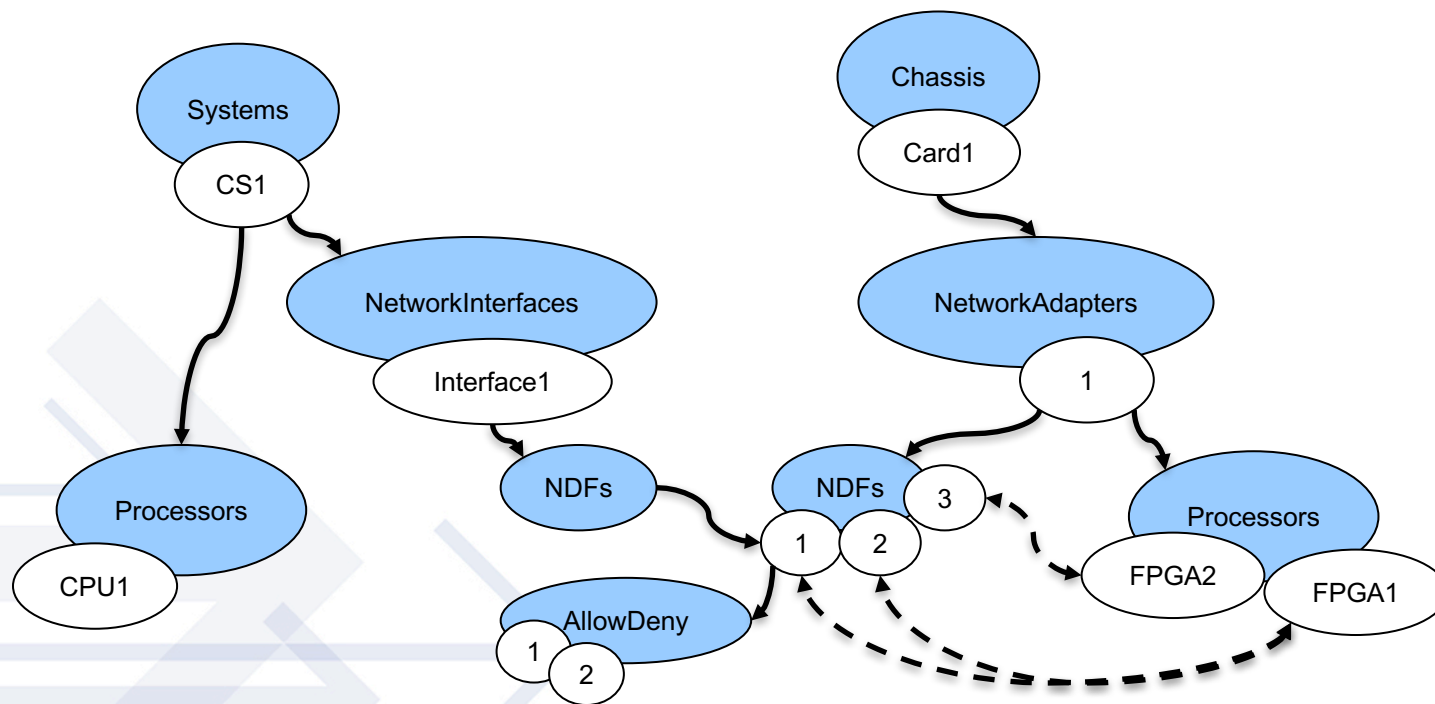
# SoC-based SmartNICs



\*NDF = Network Device Function



# FPGA-based SmartNICs



\*NDF = Network Device Function



## NEW Control schema

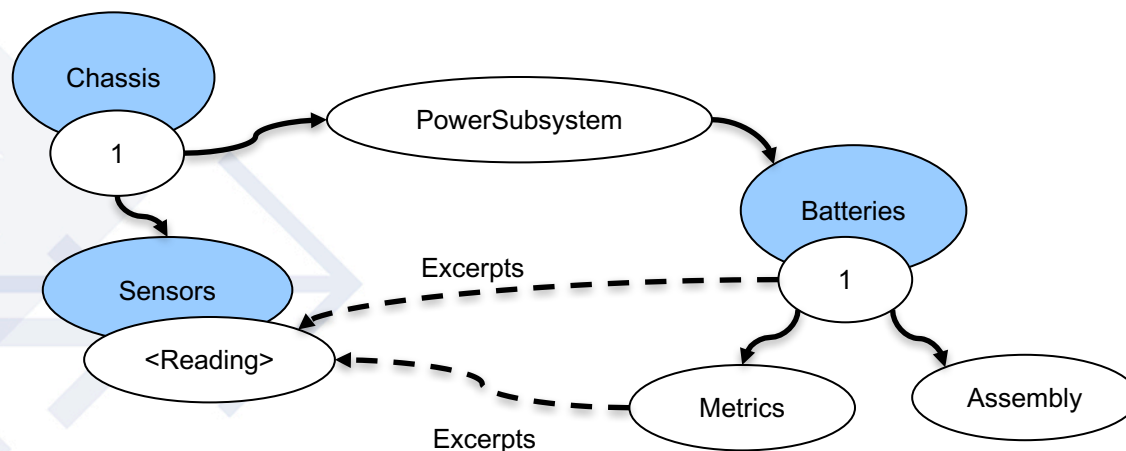
- Concepts heavily leveraged from **Sensor**
- Describes an individual control point plus associated sensor(s) that measures the effects of that control point
  - Also known as an “effector” in some specifications
- *SetPoint* is the primary focus for end users
  - The desired value for a **Sensor Reading** 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





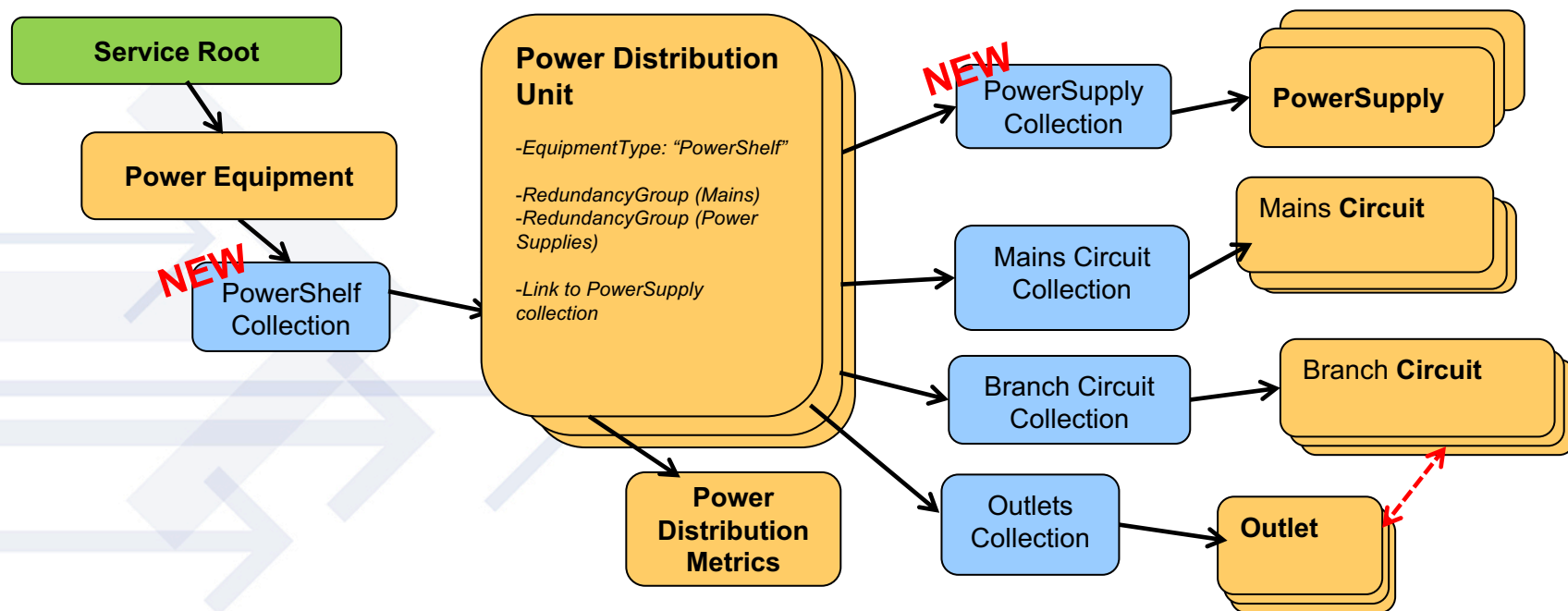
## NEW Battery and BatteryMetrics schema

- 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



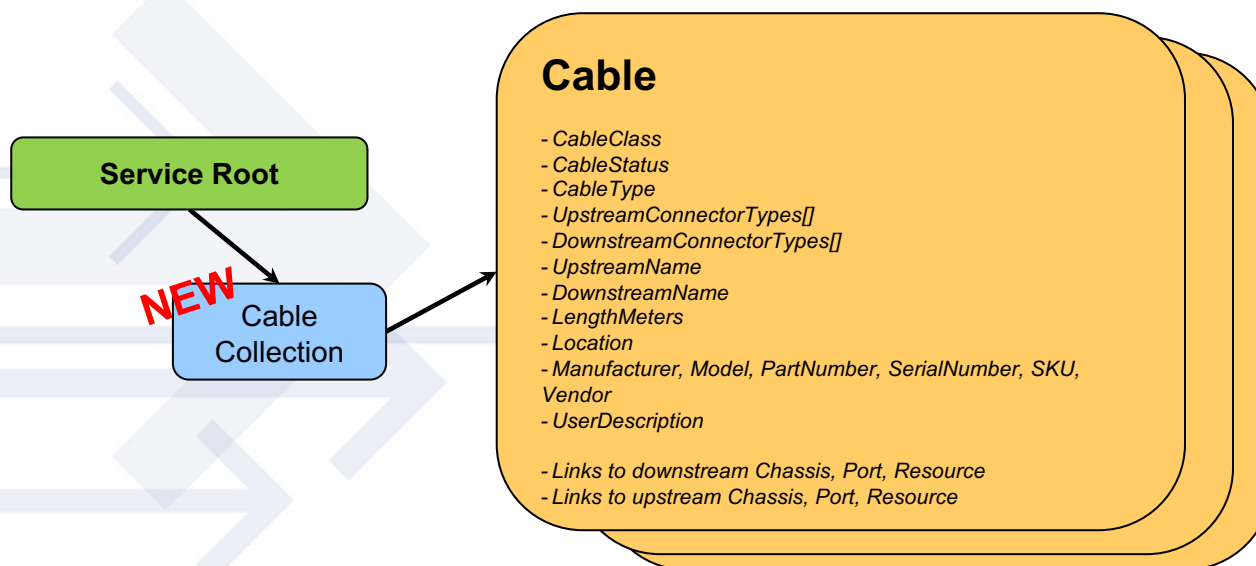
## NEW Power Shelf support

- 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**





## **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 *KMIPServers* and *KMIPCertificates* properties
  - Added “DPU” to *SystemType*
  - Deprecated *Status* in *ProcessorSummary* 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)

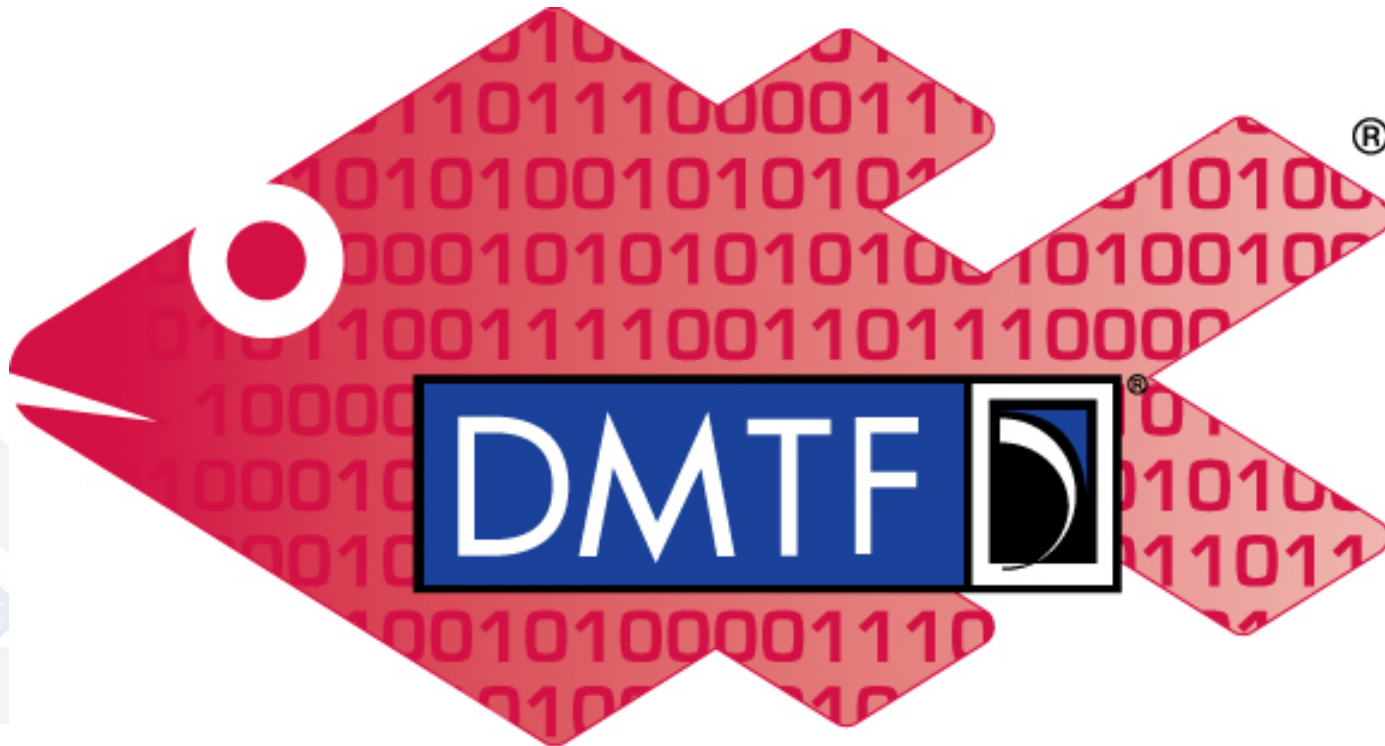
- **AccountService v1.x.x**
  - Improved the resource description to indicate that there are scenarios where services may ignore certain policies to prevent denial of service or other types of lockouts
- **ActionInfo v1.x.x**
  - Clarified that *AllowableValues*, *MinimumValue*, and *MaximumValue* describe 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





# Redfish