



Redfish Release History

DMTF Redfish Forum
October 2019

Releases

- 2019.3 – October 2019
- 2019.2 – August 2019
- 2019.1 – May 2019
- 2018.3 – December 2018
- 2018.2 – August 2018
- 2018.1 – April 2018
- 2017.3 – December 2017
- 2017.2 – September 2017
- 2017.1 – May 2017
- 2016.3 – December 2016
- 2016.2 – September 2016
- 2016.1 – May 2016
- 1.0 – August 2015

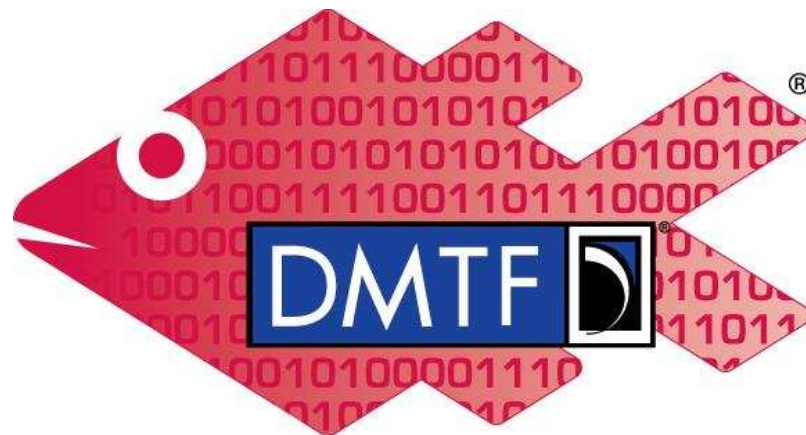


Redfish Release 2019.3

DMTF Redfish Forum
October 2019

Redfish Release 2019.3

- Redfish Host Interface v1.2.0
 - Supports for multiple SMBIOS Type 42 structures to allow specification of multiple Protocol Records
- Redfish Schema Bundle 2019.3
 - Bundle contains all released Redfish schemas
- Redfish Message Registry Bundle 2019.3
 - Bundle contains all released Redfish message registries
 - Errata releases of *Base* and *Privilege* Registries
- 14 Updated Schemas (highlights)
 - Addition of support for configuring SNMP or SMTP-based services and event delivery
 - Added *GeneratorId* in LogEntry for mapping IPMI SEL events
 - Added *Reset* action for power supplies and processors
- Download all published material at: <http://www.dmtf.org/standards/redfish>



Redfish

NEW: SNMP and SMTP support

- Ability to configure SNMP and SMTP services via Redfish
 - These services / protocols are expected to remain in production for years
 - Customers desire ability to perform all configuration tasks using Redfish
- Support added in four schemas to provide this functionality
- *EventDestination*
 - Allow destinations to receive events via SNMP Trap / Inform or by email
- *EventService*
 - Properties to configure outbound SMTP messages from the Service
- *ManagerAccount*
 - Provide configuration and credentials for accessing SNMP services
- *ManagerNetworkProtocol*
 - Enable and configure support for SNMP v1, v2c, v3 services

Redfish Schema Minor Revisions (1 of 2)

- **ComputerSystem v1.9.0**
 - Added *HttpBootUri* property to *Boot*
- **Drive v1.8.0**
 - Added *StoragePools* property to *Links*
- **EventDestination v1.7.0**
 - Added properties to support SNMP and SMTP-based event delivery
- **EventService v1.5.0**
 - Added properties to support SMTP-based event delivery
- **LogEntry v1.5.0**
 - Added *GeneratorId* property
- **ManagerAccount v1.4.0**
 - Added properties to support access to SNMP services
- **ManagerNetworkProtocol v1.5.0**
 - Added properties to support configuration of SNMP services

Redfish Schema Minor Revisions (2 of 2)

- Power v1.6.0
 - Added *PowerSupplyReset* action
- Privilege
 - Added *NoAuth* privilege
- Processor v1.6.0
 - Added *Reset* action
- Protocol
 - Added *TCP*, *UDP*, and *TFTP* protocols
- Settings v1.3.0
 - Added *OnStartUpdateRequest* to the *OperationApplyTime* enumeration
- Storage v1.8.0
 - Added *FileSystems*, *StoragePools*, *StorageGroups*, *EndpointGroups* and *ConsistencyGroups* properties
- UpdateService v1.7.0
 - Added *StartUpdate* action

Errata Schema Revisions

- **LogEntry v1.x.x**
 - Modified description of *MessageId* to include the Event Type / Event Direction byte in the string for SEL type entries
- **Privileges**
 - Clarified the description for *ConfigureSelf* to show that it's also used for users to log out of their own sessions
- **Processor v1.x.x**
 - Removed "CPUID" term from the *IdentificationRegisters* description in order to not be tied to x86 processors
- **Resource v1.8.3**
 - Removed "Excerpt" annotations from common *Name* property
- **Sensor v1.0.3**
 - Corrected units for ApparentVA and ReactiveVAR. Fixed several "Excerpt" annotations.

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

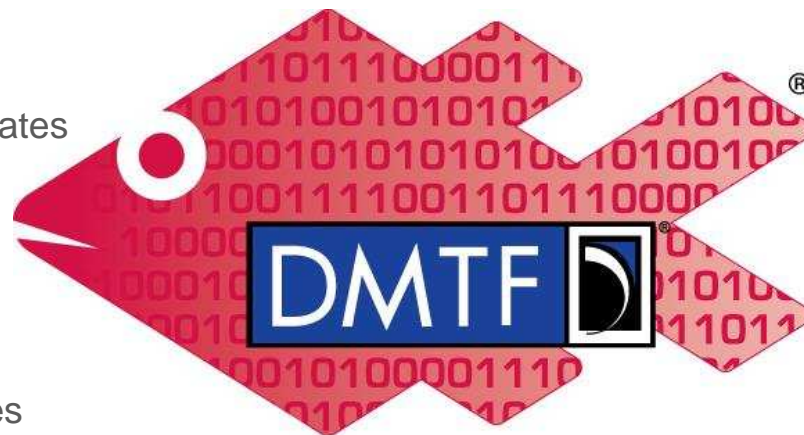


Redfish Release 2019.2

DMTF Redfish Forum
August 2019

Redfish Release 2019.2

- Redfish Specification v1.8.0
 - **NEW**: Standard multipart HTTP for software updates
 - *SubordinateResource* parameter for SSE
 - Defined URI for OpenAPI document
- Redfish Specification v1.7.1
 - Errata version of v1.7.0
 - Numerous clarifications for HTTP response codes
- Redfish Schema Bundle 2019.2
 - Bundle contains all released Redfish schemas
- Redfish Message Registry Bundle 2019.2
 - Bundle contains all released Redfish message registries
 - **NEW**: Composition Message Registry
- 17 Updated Schemas (highlights)
 - *MultipartPushUpdateUri* property in *UpdateService* to provide push-style software updates
 - Deprecated *PCleDevices* in *Links* in favor of new *PCleDevice* and *PCleFunction* Collections
- Download all published material at: <http://www.dmtf.org/standards/redfish>



Redfish

Redfish Specification v1.8.0

- **NEW:** Added support for standardized push-style software updates
 - Multipart HTTP format POST to URI specified by *MultipartHttpPushUri*
 - Form parts contain:
 - Redfish-defined JSON document for update parameters
 - Binary update file (software image)
 - OEM-defined additional data
- **NEW:** Added fixed URI location for OpenAPI document
 - /redfish/v1/openapi.yaml
- Clarified that properties that contain “Uri” in their names are accessible using the Redfish protocol semantics
- Added *SubordinateResources* \$filter parameter for SSE

Redfish Schema Minor Revisions (1 of 3)

- AccountService v1.6.0
 - Added *LocalFirst* to the *LocalAccountAuth* property
- Bios v1.1.0
 - Added *SoftwareImages* and *ActiveSoftwareImage* properties to *Links*
- Chassis v1.10.0
 - Deprecated *PCleDevices* array inside *Links* in favor of new *PCleDevices* Resource Collection
- CollectionCapabilities v1.2.0
 - Added *MaxMembers* property
- ComputerSystem v1.8.0
 - Added *Metrics* link property to *MemorySummary*
- Drive v1.7.0
 - Added *WriteCacheEnabled* property
 - Added *Reset* action

Redfish Schema Minor Revisions (2 of 3)

- **EventDestination v1.6.0**
 - Added *DeliveryRetryPolicy*, *Status*, and *MetricReportDefinitions* properties
 - Added *ResumeSubscription* action
- **EventService v1.4.0**
 - Added *SubordinateResources* property to *SSEFilterPropertiesSupported*
- **Manager v1.6.0**
 - Added *SoftwareImages* and *ActiveSoftwareImages* properties to *Links*
- **Memory v1.8.0**
 - Added *Reset* action
- **MemoryMetrics v1.2.0**
 - Added *BandwidthPercent* property
- **MetricReport v1.2.0**
 - Added *Oem* property to *MetricValues*

Redfish Schema Minor Revisions (3 of 3)

- MetricReportDefinition v1.3.0
 - Added *ReportTimespan* property
- NetworkAdapter v1.3.0
 - Added *Identifiers* property to *Controllers*
- PCIeDevice v1.4.0
 - Deprecated *PCleFunctions* array inside *Links* in favor of new *PCleFunctions* Resource Collection
- Switch v1.2.0
 - Added *FirmwareVersion* property
- UpdateService v1.6.0
 - Added *MultipartHttpPushUri* property for performing an update using HTTP multipart forms
 - Standardized push semantics specified in the Redfish Specification

Errata Schema Revisions (1 of 3)

- Complete errata details shown in the Change Log within DSP8010
- All schemas
 - Descriptions in all schemas were updated for consistency in language and terminology. Any functional changes made that are not listed in the change log are unintentional and will be treated as errata.
- Various schemas
 - Clarified that properties with “Uri” in name use Redfish protocol semantics
 - Fixed several password related properties to be "null" in all responses regardless of the operation
 - Corrected some property abilities to not return “null” value
 - Removed "@odata.id", "@odata.context", and "@odata.etag" properties from registry resources

Errata Schema Revisions (2 of 3)

- AccountService, ExternalAccountService v1.x.x
 - Clarified that the *LDAPService* property should only be used in the context of LDAP services.
- EthernetInterface v1.x.x
 - Fixed several properties to allow for "null" so that services can advertise the size of configurable arrays. Clarified the description of the *SpeedMbps* property to state that it's writable only when *AutoNeg* is false
- Event v1.x.x
 - Clarified the description of *EventId* to give guidance on its usage. Added semantics of when *EventGroupId* is 0.
- EventService v1.x.x
 - Fixed parameters in *SubmitTestEvent* so that only *MessageId* is required. Added language to *DeliveryRetryAttempts* to show how it ties to the *DeliveryRetryPolicy* property in EventDestination

Errata Schema Revisions (3 of 3)

- NetworkDeviceFunction v1.x.x
 - Added missing regex pattern for MAC address properties
- PCIeSlots v1.1.1
 - Corrected the location of the *HotPluggable* property
- ProcessorMetrics v1.0.2
 - Clarified descriptions of several properties to explain the usage when the Resource represents a summary of processors
- UpdateService v1.x.x
 - Clarified description of *ImageURI* parameter to reference RFC3986.
 - Clarified descriptions of various properties to replace 'firmware' with 'software'.

Message Registry updates

- Redfish Message Registries v2019.2
 - **DSP8011_2019.2.ZIP** – contains all published message registries
- Base v1.6.0
 - Added *QueryNotSupportedOnOperation*, *ResetRequired*, *PropertyValueConflict*, *ChassisPowerStateOnRequired*, and *ChassisPowerStateOffRequired* messages
- Composition v1.0.0
 - Initial release. Defines messages to use for composition events
- ResourceEvent v1.0.2
 - Corrected *@odata.type* and *Id* property formats.
 - Corrected cases where *ParamTypes* was incorrectly using 'value'

Schema Guide and Property Guide

- Redfish Resource and Schema Guide (DSP2046) v2019.2
 - Presents schema definition contents in a more human-readable format
 - Description text taken directly from schema files
 - Includes example payloads for each schema
 - Updated for each DSP8010 release
- Redfish Property Guide (DSP2053) v2019.2
 - 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
 - Description text taken directly from schema files
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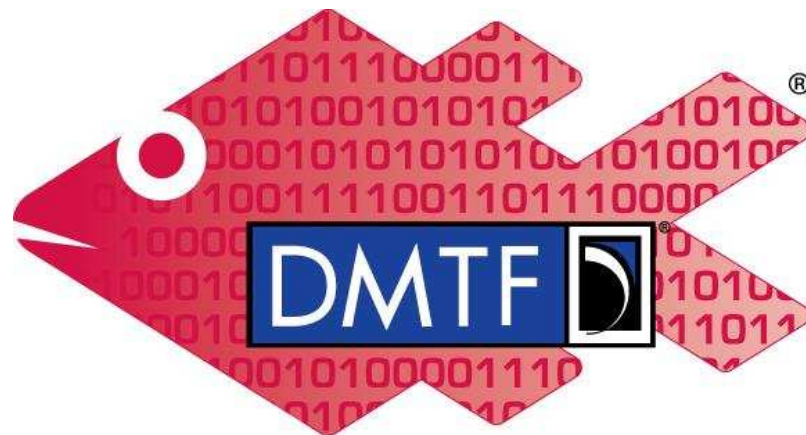


Redfish Release 2019.1

DMTF Redfish Forum
May 2019

Redfish Release 2019.1

- Redfish Specification v1.7.0
 - Significant clean-up of document for clarity
 - Improved account password management
 - Clarification of array property handling
- Redfish Schema Bundle 2019.1
 - Bundle contains all released Redfish schemas
- Redfish Host Interface v1.1.0
 - Numerous clarifications to SMBIOS table data
 - Added v2 of USB and PCIe device descriptors
- Redfish Message Registry Bundle 2019.1
 - Bundle contains all released Redfish message registries
- 19 Updated Schemas (highlights)
 - Certificate v1.1 – Added *Renew* and *Rekey* Actions
 - ManagerAccount v1.3 – Added *PasswordChangeRequired*
 - *Event* related schemas – Completed transition to new Event Subscription methods
- Download all published material at: <http://www.dmtf.org/standards/redfish>



Redfish

Redfish Specification v1.7.0

- Document renamed simply “Redfish Specification”
- **NEW:** Added Redfish Dictionary (RDE) file naming rules and repository
- **NEW:** Added Password Management clause to describe functional behavior when an account requires a password change
- **NEW:** Enhanced schema localization definitions and repository location
- Significant re-formatting and clean-up throughout document
 - Unless specifically mentioned, any change in normative language was unintentional and should be considered errata (please provide feedback)
- Protocol details now three separate clauses
 - General protocol description, Service requests, and Service responses
- Data model clause now separate from schema definition
- New clauses for each of the supported schema definition languages
 - OData CSDL, JSON schema and OpenAPI YAML

Redfish Specification v1.7.0, continued

- Normative clarifications (highlights)
 - Handling of array properties and PATCH operations on arrays
 - Clarified schema versioning methodology
 - Added missing statements regarding SSE in Event mechanism clause
 - Clarified that Event Subscriptions are persistent across service restarts
 - Clarified Task operations involving *@Redfish.OperationApplyTime* and *@Redfish.MaintenanceWindow* annotations
- See change log in document for complete list of clarifications

Redfish Schema Minor Revisions (1 of 4)

- AccountService v1.5.0
 - Added *AccountLockoutResetAfterEnabled* property
 - Deprecated *AccountProviderType* property in *LDAP* and *ActiveDirectory*
- Certificate v1.1.0
 - Added *Renew* and *Rekey* actions
- ComputerSystem v1.7.0
 - Added *Certificates* link property to *Boot*
 - Added *Metrics* link property to *ProcessorSummary*
- Drive v1.6.0
 - Added *PCleFunctions* to *Links*
- EthernetInterface v1.5.0
 - Added *FallbackAddress* property to *DHCPv4*

Redfish Schema Minor Revisions (2 of 4)

- Event Mechanism Updates
 - Finished transition to v2018.3 event subscription methods (deprecating *EventType* throughout schema)
- Event v1.4.0
 - Added *Other* to the *EventType* enumeration (transition to new methods)
- EventDestination v1.5.0
 - Deprecated *EventTypes* property (no longer a required property)
- EventService v1.3.0
 - Deprecated *EventType* related properties throughout
 - Added *EventGroupId* parameter to *SubmitTestEvent*
- ManagerAccount v1.3.0
 - Added *PasswordChangeRequired* property

Redfish Schema Minor Revisions (3 of 4)

- **MessageRegistry v1.3.0**
 - Added *LongDescription*, *ArgDescriptions* and *ArgLongDescriptions* properties
- **MetricReportDefinition v1.2.0**
 - Added *MetricReportDefinitionEnabled*, *SuppressRepeatedMetricValue*, and *MetricReportHeartbeatInterval* properties
 - Added *Triggers* to *Links*
- **PCleSlots v1.1.0**
 - Added *HotPluggable* property
- **PhysicalContext (unversioned)**
 - Added *PowerSubsystem* and *Rectifier PhysicalContext* types.
- **Processor v1.5.0**
 - Added *TotalEnabledCores* property

Redfish Schema Minor Revisions (4 of 4)

- Session v1.2.0
 - Added *SessionType* and *OEMSessionType* properties
- Storage v1.7.0
 - Added *Ports* and *ControllerRates* to *StorageControllers*
 - Added *PCleFunctions* to *Links*
- Triggers v1.1.0
 - Added *EventTriggers* property
 - Added *MetricReportDefinitions* to *Links*
 - Added *RedfishMetricReport* to *TriggerActionEnum*
- UpdateService v1.5.0
 - Added *MaxImageSizeBytes* property
- Zone v1.3.0
 - Added *ExternalAccessibility* property

Errata Schema Revisions (1 of 2)

- Complete errata details shown in the Change Log within DSP8010
- All schemas
 - JSON schemas revised to use “uri-reference” instead of “uri” as the format for properties that represent URIs.
 - Corrected several properties that allowed for “null” that were not intended
 - Various typographical corrections and improvements to descriptions
- Event v1.x.x
 - Removed *@odata.id* and *@odata.etag* properties from JSON schemas
- EventDestination v1.x.x
 - Modified rules around usage of *HttpHeaders* in a GET response to allow for an empty array

Errata Schema Revisions (2 of 2)

- Resource v1.x.x
 - Corrected regex pattern for properties inside of *Oem* to match requirements in the specification
- Sensor v1.0.1
 - Corrected descriptions and units definition for Energy reading types of "kWh" and corrected UCUM unit definition to use "kW.h"
- UpdateService v1.x.x
 - Clarified *HttpPushUri* to indicate a recommendation of using HTTP status 411 when the request does not include the "Content-Length" header

Host Interface and Message Registry updates

- Redfish Host Interface v1.1.0 (DSP0270)
 - Added version 2 of the USB and PCI/PCI-e device descriptors
 - Superset of information provided in v1 of the descriptor
 - Adds MAC Address to descriptor
 - Added bus/device/function information for PCI devices
 - Clarified byte ordering in SMBIOS structures
 - Clarified formats of Host Name and UUID
 - Clarified data and reformatted tables in Device Descriptor Table clause
 - Added Descriptor Table examples
- Redfish Message Registries v2019.1
 - **DSP8011_2019.1.ZIP** – contains all published message registries
 - Added *SubscriptionTerminated* and *PasswordChangeRequired* messages to Base v1.5.0

Schema Guide and Property Guide

- Redfish Resource and Schema Guide (DSP2046) v2019.1
 - Presents schema definition contents in a more human-readable format
 - Description text taken directly from schema files
 - **NEW**: Release list maps each schema version to a DSP8010 release
 - Includes example payloads for each schema
 - Updated for each DSP8010 release
- **NEW**: Redfish Property Guide (DSP2053) v2019.1
 - 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
 - Description text taken directly from schema files
 - Updated for each DSP8010 release

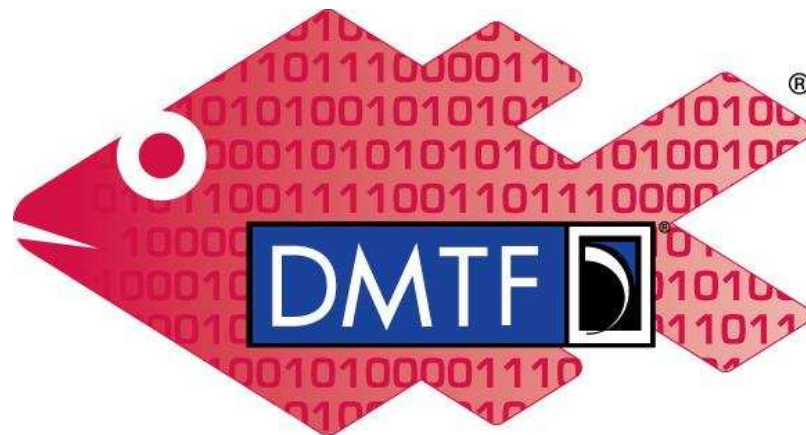


Redfish Release 2018.3

DMTF Redfish Forum
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Redfish Release 2018.3

- Redfish Specification v1.6.1
 - Errata release with numerous clarifications
- Redfish Schema Bundle 2018.3
 - **DSP8010_2018.3.ZIP**
 - Bundle contains all released Redfish schemas
- Redfish Registries 2018.2
 - Errata release of 'Task', 'Resource' registries
- Redfish Interoperability Profiles 2018.2
 - Errata releases of RedfishInteroperabilityProfile schema
- **10 NEW Schemas v1.0.0**
 - AccelerationFunction, ProcessorMetrics, Sensor, RedfishError
 - Certificate, CertificateLocations, CertificateService (plus 3 Resource Collections)
- **20 Updated Schemas (highlights)**
 - AccountService, ExternalAccountProvider, ManagerAccount – Added support for Certificates
 - ComputerSystem v1.6.0 – Added *AliasBootOrder* to allow for more usable Boot Order selection
 - Memory v1.7.0 – Replaced *SecurityStates* property with more usable properties
 - UpdateService v1.4.0 – Added *Username* and *Password* parameters to *SimpleUpdate*
 - Storage v1.6.0 – Added *SupportedRAIDTypes* to *StorageControllers*



Redfish

NEW Redfish Schemas for 2018.3

- **CertificateService – Managing Security Certificates**
 - CertificateService – Properties and Actions to manage security certificates
 - CertificateLocations – Location of all certificates within the resource tree
 - Certificate – Description of each security certificate
- **Sensor**
 - Core resource for defining a “sensor” in the Redfish data model
 - Expected usage throughout future DCIM and IoT resources
- **AccelerationFunction – FPGAs and Programmable silicon**
 - AccelerationFunction – Describes acceleration functions within a processor
 - ProcessorMetrics – Performance metrics (CPU, GPU, FPGA)
- **Three Resource Collection schemas to support all the above**
- **RedfishError**
 - Supporting schema definition useful for validating error response payloads

Certificate Management

- **NEW** Frequently-requested desire to manage certificates via the Redfish interface in an interoperable fashion
- **NEW** *CertificateService* resource off the Service Root
 - Contains service level Actions
 - GenerateCSR: Manage certificate signing requests from a user
 - ReplaceCertificate: Provide an atomic approach for deleting and adding a certificate
- **NEW** *CertificateCollection*
 - Perform standard Create and Delete operations for managing certificates
 - Collections added to resources that can have certificates installed to it
 - The location of the collection will inform the client about the relationship between the certificate and other resources in the data model
 - Able to control access to different certificate collections; some examples:
 - ConfigureSelf: Able to manage the certificates related to your account
 - ConfigureManager: Able to manage the certificates within the *Manager* tree
 - ConfigureComponents: Able to manage the certificates within the *ComputerSystem* tree
- **NEW** *CertificateLocations* resource contains links to all the certificates so administrators and auditors can easily obtain a complete set

Sensor

- **NEW** Sensor and SensorCollection is an architectural foundation for future Redfish resource definitions
 - Expect datacenter environmental equipment (e.g. power and HVAC) and IoT devices to take advantage of this model
- A Redfish Sensor is a monitoring device which produces a single reading
 - May include other related, time-coherent readings (e.g. Power, ReactiveVAR, etc.)
 - Reports physical context and other identification properties to describe its purpose
 - Metadata describing accuracy, sampling frequency, etc.
- Sensor resource includes:
 - *ReadingType* – The sensor type (temperature, voltage, etc.)
 - *Reading* – Value of the sensor (no Units in name to allow for generic software use)
 - *ReadingUnits* – Applies to all values in sensor (thresholds, reading)
 - Units shall be explicitly defined for each ReadingType to avoid mis-identification
 - Large-scale difference in magnitude handled by separate ReadingTypes (e.g. mW, kW)
 - *Thresholds* – Structured set of thresholds with a common definition
 - Severity, hysteresis, etc.

Redfish Schema Minor Revisions (1 of 5)

- AccountService v1.4.0
 - Added *Certificates* property to *LDAP* and *ActiveDirectory* objects
- AttributeRegistry v1.3.0
 - Added *Oem* property to *Attributes* and *Menus*.
 - Added *Hidden* property to *Menus*
- Chassis v1.9.0
 - Added *Sensors* and *EnvironmentalClass* properties
- ComputerSystem v1.6.0
 - Added *AliasBootOrder*, *BootOrderPropertySelection*, and *PowerRestorePolicy* properties
 - Added *AddResourceBlock* and *RemoveResourceBlock* actions
- Endpoint v1.3.0
 - Added *AccelerationFunction* to the *EntityType* enumeration

Redfish Schema Minor Revisions (2 of 5)

- Endpoint v1.2.0
 - Added *AccelerationFunction* to the *EntityType* enumeration
- ExternalAccountProvider v1.1.0
 - Added *Certificates* property
- ManagerAccount v1.2.0
 - Added *Certificates* property
- Memory v1.7.0
 - Added "Intel3DXPoint" to the *MemoryMedia* enumeration
 - Added "HBM" and "HBM2" to the *MemoryDeviceType* enumeration
 - Added "Die" to the *BaseModuleType* enumeration
 - Deprecated "Unlocked" and "Frozen" enumerations in *SecurityStates*, as well as the *SecurityStates* property in favor of the new *SecurityState*, *ConfigurationLocked*, *ConfigurationLockCapable*, *DataLockCapable*, and *PassphraseLockLimit* properties

Redfish Schema Minor Revisions (3 of 5)

- **MetricReport v1.1.0**
 - Added *Timestamp* property for the overall MetricReport.
- **MetricReportDefinition v1.1.0**
 - Deprecated *Keys* property within *Wildcards* in favor of *Values* property to align with other schemas
- **PhysicalContext (unversioned)**
 - Added "CPUSubsystem", "GPUSubsystem", "FPGA", "Accelerator", "MemorySubsystem", "CoolingSubsystem", "Motor", "Transformer", "ACUtilityInput", "ACStaticBypassInput", "ACMaintenanceBypassInput", "DCBus", "ACOutput", and "ACInput" enumerations to *PhysicalContext* types.
 - Added *PhysicalSubContext* property to allow for further differentiation within a particular context
 - Updated "Intake" and "Exhaust" descriptions to allow for calculated values over a region

Redfish Schema Minor Revisions (4 of 5)

- **Processor v1.4.0**
 - Added *TDPWatts*, *MaxTDPWatts*, *AccelerationFunctions*, and *Metrics*
 - Added various properties to support reporting and management of FPGAs
 - Added "Power" to *ProcessorArchitecture* enumerations
 - Added "PowerISA" to *InstructionSet* enumerations
- **ResourceBlock v1.3.0**
 - Added *ResourceBlockLimits* term
 - Added *Drives* property
- **ServiceRoot v1.5.0**
 - Added *Vendor*, *ResourceBlocks*, and *CertificateService* properties
- **Storage v1.6.0**
 - Added *SupportedRAIDTypes* to *StorageControllers*

Redfish Schema Minor Revisions (5 of 5)

- Task v1.4.0
 - Added *PercentComplete* property
- TelemetryService v1.1.0
 - Deprecated *MetricReportValues* parameter in *SubmitTestMetricReport* action in favor of the *GeneratedMetricReportValues* parameter in order to match the *MetricValues* definition of a *MetricReport*
- UpdateService v1.4.0
 - Added *Username* and *Password* parameters to *SimpleUpdate*
 - Added *HttpPushUriOptions* and *HttpPushUriOptionsBusy* properties
- VirtualMedia v1.3.0
 - Added *UserName*, *Password*, *TransferProtocolType*, and *TransferMethod* properties
 - Added *UserName*, *Password*, *TransferProtocolType*, and *TransferMethod* parameters to *InsertMedia* action

Errata Schema Revisions (1 of 2)

- All schemas
 - Added *Revisions* annotation to describe additions, changes, and deprecations to allow each schema file to contain a free-standing history
 - Added *Release* annotation to enable documentation generator to include Redfish release bundle information
 - Various typographical corrections and improvements to descriptions
- Complete errata details shown in the Change Log within DSP8010
- AttributeRegistry v1.x.x
 - Clarified the description for *ValueName*. Added missing Required terms for *AttributeName* and *ValueName*
- Drive v1.x.x
 - Modified references to *Volume* to point to the Swordfish definition
- JsonSchemaFile v1.x.x
 - Removed strict normative wording about the format of the schema file name in favor of pointing to the specification for the acceptable format

Errata Schema Revisions (2 of 2)

- Redundancy v1.x.x
 - Removed "Required" term on *MaxNumSupported*
- ServiceRoot v1.x.x
 - Allow *Product* property to be null
- Storage v1.x.x
 - Modified references to Volume to point to the Swordfish definition
- Triggers v1.0.1
 - Fixed description for the *RedfishEvent* enumeration
- UpdateService v1.x.x
 - Clarified *HttpPushUri* to indicate a client requires the same privileges as if performing operations on the UpdateService

Redfish Registries

- Released as **DSP8011_2018.2.ZIP**
- ResourceEvent Message Registry v1.0.1
 - Corrected *@odata.type* and *Id* property formats
 - Corrected invalid *ParamType* of “value” to use “number” or “string” as appropriate
- TaskEvent Message Registry v1.0.1
 - Corrected *@odata.type* and *Id* property formats.
 - Fixed spelling of the *TaskProgressChanged* event
 - Corrected invalid *ParamType* of “value” to use “number” or “string” as appropriate

Redfish Interoperability Profiles

- Released as **DSP8013_2018.2.ZIP**
- RedfishInteroperabilityProfile v1.0.3
 - Errata release. Corrected the type for *CompareType* to allow for booleans, numbers, and strings
- RedfishInteroperabilityProfile v1.0.2
 - Errata release. Corrected the depth of *additionalProperties* found in *Parameters* for *ActionProfile*

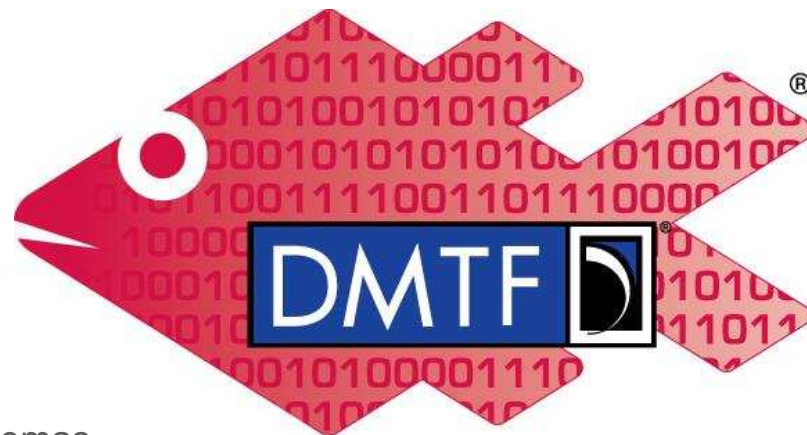


Redfish Release 2018.2

DMTF Redfish Forum
August 2018

Redfish Release 2018.2

- Redfish Specification v1.6.0
 - **NEW** OpenAPI v3.0 Support
 - **NEW** Telemetry Streaming & Eventing
 - Improved Event Subscription methods
- Redfish Specification v1.5.1
 - Errata release with numerous clarifications
- Redfish Schema Bundle 2018.2
 - **DSP8010_2018.2.ZIP** - contains all Redfish schemas
- Redfish Registries 2018.1
 - **NEW** 'Task', 'Resource' registries
 - Updated 'Base', 'Privilege' registries
- **13 NEW Schemas v1.0.0**
 - TelemetryService, MetricDefinition, MetricReportDefinition, MetricReport, Triggers
 - JobService, Job, PCIeSlots, (plus 5 Resource Collections)
- **29 Updated Schemas (highlights)**
 - Schedule v1.2.0 – Contribution from SNIA.org with minor additions
 - EventDestination v1.4.0, Event v1.3.0, MessageRegistry v1.2.0 – Improved subscriptions
 - Resource v1.7.0 – Added 'ContactInfo' array to commonly-used Location object



Redfish

Redfish for OpenAPI™ Specification v3.0

- OpenAPI Specification
 - A community-driven open specification from the OpenAPI Initiative (OAI), The Linux Foundation® Collaborative Project
 - Describes API services in a YAML-format definition document
 - Rich ecosystem of tools for developers and end users
- Supported by Redfish Specification v1.6.0
 - Added support for OpenAPI schema files (YAML)
 - Requires use of standardized URIs
 - Fixed URIs for all Redfish resources
 - Construct path to Collection member using “Id”
- Redfish Schema (DSP8010) bundle 2018.2
 - Now includes OpenAPI YAML files
 - Along with JSON Schema and CSDL files



OPENAPI
INITIATIVE

Redfish Specification v1.6.0

- Fixed or constructed URIs now specified
 - Required for OpenAPI v3.0 support
 - Previous Redfish versions allowed “hypermedia” URI structure, with each URI discovered via links in parent resources
 - Resource Collection members must use “Id” property as URI segment
 - All non-Collection resources must use URIs defined by schema
- Use *RedfishVersion* in *ServiceRoot* to check protocol version
 - Values of “1.6.0” or higher support OpenAPI and fixed URI definitions
 - For values below “1.6.0”, URI tree structure is not specified, clients continue to discover path from ServiceRoot
 - Examples:
 - “1.6.0”, “1.6.1”, “1.7.5”, “1.10.2” : supports OpenAPI
 - “1.5.1” : does not support OpenAPI – URI structure cannot be guaranteed

Redfish Message and Event Enhancements

- More flexible subscription modes
 - Subscribe to specific Registries or Resource Types instead of loosely defined classes
 - Added *SubordinateResources* which can be used in conjunction with *ResourceOrigin*
- Grouping **NEW**
 - *EventGroupId* property indicates that multiple messages share a root cause
- Telemetry support **NEW**
 - *EventFormatType* allows event delivery in either *Event* or *MetricReport* format
- SSE filtering **NEW**
 - Added support of *\$filter* for SSE event subscriptions
- New Message Registries
 - Added *Task* and *Resource* Message Registries
 - Expect more in the future that are more device/service specific.
- New Registry properties
 - Added *ClearingLogic* allowing a message to indicate that it resolves a previous situation
- OEM Registries
 - Clarified rules allowing OEMs to extend messages in the standard registries

Redfish Registries

- Released as **DSP8011_2018.1.ZIP**
- ResourceEvent Message Registry **NEW**
 - Defines messages for Resource-related events
- TaskEvent Message Registry **NEW**
 - Defines messages to use for Task-related events
- Base Message Registry v1.4.0
 - Added *NoOperation* message
- Base Message Registry v1.3.1
 - Errata release. Clarified description and message text for *GeneralError*
- Redfish Privilege Registry v1.0.3
 - Errata release correcting plurality of *ConfigureComponents* and correcting the JSON structure throughout
- Base Message Registry v1.3.0
 - Added *PropertyValueOutOfRange* and *SessionTerminated* messages
 - Previously approved for release but not posted publicly

NEW Redfish Schemas for 2018.2

- **TelemetryService** – Monitoring and reporting for Redfish
 - MetricDefinition – Defines a measurement point and its metadata
 - MetricReport – Output of the Telemetry Service
 - MetricReportDefinition – Defines the contents of a Report
 - Triggers – Methods for triggering output from the Telemetry Service
- **JobService** – Scheduled and complex tasks for Redfish
 - Job – Describes a single Job with scheduling and JSON payload
- **PCleSlots**
 - Physical PCle slot information for each Chassis
- **Five Resource Collection schemas to support Telemetry and Jobs**

Redfish Schema Minor Revisions (1 of 6)

- ActionInfo v1.1.0
 - Added *MinimumValue* and *MaximumValue* properties
- Assembly v1.2.0
 - Added *SerialNumber* and *PhysicalContext* to *AssemblyData*
- Chassis v1.8.0
 - Added *PCleSlots* resource link
- CollectionCapabilities v1.1.0
 - Added *ComputerSystemConstrainedComposition* enumeration
- CompositionService v1.1.0
 - Added *AllowOverprovisioning* and *AllowZoneAffinity* properties
- Drive v1.5.0
 - Added *HotspareReplacementMode* property

Redfish Schema Minor Revisions (2 of 6)

- Endpoint v1.2.0
 - Deprecated *PciFunctionNumber* and *PciClassCode* in favor of *FunctionNumber* and *ClassCode* inside *Pcild*
- Event v1.3.0
 - Deprecated *EventType* in favor of new subscription properties
 - Added *EventGroupId* to *EventRecord*
- EventDestination v1.4.0
 - Added *RegistryPrefixes*, *ResourceTypes*, *SubordinateResources* and *EventFormatType* properties
- EventService v1.2.0
 - Added *RegistryPrefixes*, *ResourceTypes*, *SubordinateResourcesSupported* and *EventFormatType* properties
 - Added *SSEFilterPropertiesSupported* object

Redfish Schema Minor Revisions (3 of 6)

- **HostInterface v1.2.0**
 - Added *AuthNoneRoleId* and *AuthNoneRole* properties
- **LogEntry v1.4.0**
 - Deprecated *EventType*, added *EventGroupId* properties
- **Manager v1.5.0**
 - Added *RemoteRedfishServiceUri* property
 - Added *RemoteAccountService* resource link
- **ManagerNetworkProtocol v1.3.0**
 - Added *DHCPv6*, *DRP* and *RFB* objects
- **Memory v1.6.0**
 - Added *OverwriteUnit* Action
 - Added *IntelOptane* to the *MemoryType* enumerations

Redfish Schema Minor Revisions (4 of 6)

- **MessageRegistry v1.2.0**
 - Added *ClearingLogic* property
- **NetworkAdapter v1.2.0**
 - Added *PCIeInterface* object, *NPAR* property to control NIC partitioning
- **NetworkDeviceFunction v1.3.0**
 - Added *VLAN* and *VLANs* properties to *Ethernet* object
 - Added *FibreChannelId* to *FibreChannel* object.
 - Deprecated *PhysicalPortAssignment* at root in favor of property within *Links*
- **NetworkPort v1.2.0**
 - Added properties to support Fibre Channel devices
 - Deprecated *LinkSpeedMbps* in favor of *CapableLinkSpeedMbps*
- **PCIeDevice v1.3.0**
 - Added *PCIeInterface* object and definition for external referencing

Redfish Schema Minor Revisions (5 of 6)

- Protocol (unversioned)
 - Added *I2C* protocol type
- Resource v1.7.0
 - Deprecated *Location* string within *PostalAddress* in favor of *AdditionalInfo*
 - Added *AdditionalInfo* in *Placement*
 - Added *Contacts* object array in *Location*
- ResourceBlock v1.2.0
 - Added *Expansion* to *ResourceBlockType* enumerations
 - Added *Unavailable* to *CompositionState* enumerations
- Schedule v1.2.0
 - Transitioned from SNIA to DMTF ownership
 - Added enumeration *Every* to *DayOfWeek* and *MonthOfYear*
 - Updated several properties to use *Duration* and *DateTimeOffset* types

Redfish Schema Minor Revisions (6 of 6)

- **ServiceRoot v1.4.0**
 - Added *ExcerptQuery* and *OnlyMemberQuery* to *ProtocolFeaturesSupported*
 - Added *JobService* and *TelemetryService* resource links
- **Storage v1.5.0**
 - Added *CacheSummary* and *PCleInterface* objects to *StorageController*
- **Task v1.3.0**
 - Added *Payload* object and *HidePayload* property
- **Thermal v1.5.0**
 - Added *SensorNumber* to *Fan* object
- **UpdateService v1.3.0**
 - Deprecated *NSF* enumeration in *TransferProtocolType* in favor of *NFS*

Errata Schema Revisions (1 of 2)

- All schemas
 - Numerous clarification in *Descriptions* and *LongDescriptions*
 - Corrected some cases in JSON Schema where the type *integer* should have been used instead of *number*
 - Added *@odata.id*, *@odata.type*, and *@odata.context* as required properties in JSON Schema.
 - Added *Description* and *LongDescription* terms to all schema elements where missing.
 - Added *Capabilities* and *Uris* annotations on all resources.
- Resource Collection schemas
 - Added missing *Required* annotation on *Members* properties
 - Added missing *Members@odata.nextLink* property
- Complete errata details shown in the Change Log within DSP8010

Errata Schema Revisions (2 of 2)

- Assembly v1.x.x
 - Added guidance for reporting timestamps for *ProductionDate*
- AttributeRegistry v1.x.x
 - Relaxed regex patterns for *ValueName*, *MenuName*, and *MenuPath*
- EthernetInterface v1.0.7
 - Fixed type definition of *IPv6StaticDefaultGateways* to not require *PrefixLength*
- EventService v1.x.x
 - Added clarification to *OriginOfCondition* parameter for *SubmitTestEvent* to highlight that it's a string and not a reference object
- Resource v1.6.1
 - Fixed permissions of *Longitude*, *Latitude*, and *AltitudeMeters* properties
- SoftwareInventory v1.x.x
 - Added guidance for reporting timestamps for *ReleaseDate*

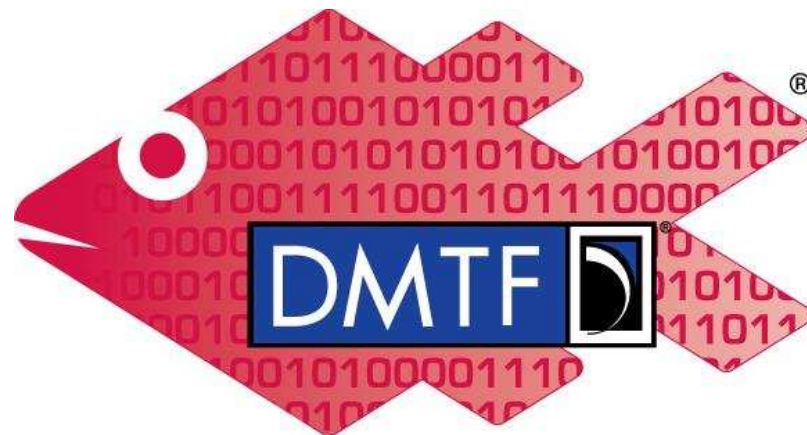


Redfish Release 2018.1

DMTF Redfish Forum
April 2018

Redfish Release 2018.1

- Redfish Specification v1.5.0
 - **NEW** Server-sent Eventing (SSE) Support
 - OperationApplyTime annotation
 - Behavior of Create, Delete or Action (POST) operations
- Redfish Specification v1.4.1
 - Errata release with numerous clarifications
- Redfish Schema Bundle 2018.1
 - **DSP8010_2018.1.ZIP** - contains current versions
- **NEW** Schemas v1.0.0
 - ExternalAccountProvider – LDAP / ActiveDirectory support
- Updated schemas (highlights)
 - AccountService – LDAP / ActiveDirectory support for Redfish
 - EventService & EventDestination – Server-sent Eventing support
 - Processor – Added “SubProcessor” information for Cores and Threads
 - Settings – Added “OperationApplyTime” and “MaintenanceWindow” support



Redfish

Redfish Specification v1.5.0 and v1.4.1

- Minor release of the Redfish Specification (DSP0266) v1.5.0
 - Adds support for Server Sent-Eventing (SSE)
 - Enables streaming events to web-based GUIs and other clients
 - OperationApplyTime annotation
 - Provides mechanism for specifying deterministic behavior for the application of Create, Delete or Action (POST) operations
 - Includes all errata from v1.4.1
- Errata release of the Specification (DSP0266) v1.4.1
 - Numerous clarifications and corrections, detailed in the Change Log

New Redfish Schemas for 2018.1

- ExternalAccountProvider v1.0.0
 - Single LDAP or ActiveDirectory instances are supported within updated AccountService resource
 - A Collection of “ExternalAccountProviders” describes additional providers, or allows for multiple LDAP/AD trees if Service supports their usage
 - Uses same properties and definitions as the single-instance LDAP and ActiveDirectory objects within AccountService

Redfish Schema Minor Revisions (1 of 3)

- AccountService v1.3.0
 - Added support for LDAP and Active Directory external account providers.
 - Provide configuration parameters to enable Redfish Services to utilize network-based authentication instead of requiring individual (local) accounts
 - Removes need to maintain separate credentials for each Redfish Service
 - Added link to additional *ExternalAccountProviders*
- Assembly v1.1.0
 - Added *Status* to *AssemblyData*
- AttributeRegistry v1.2.0
 - Added *ResetRequired*, *UefiDevicePath*, *UefiKeywordName*, and *UefiNamespaceld* attributes to registry entries.
- Chassis v1.7.0
 - Added *UUID* property
 - Added *Switches* resource link

Redfish Schema Minor Revisions (2 of 3)

- Drive v1.4.0
 - Deprecated *Location* array in favor of singular *PhysicalLocation*
- EventDestination v1.3.0
 - Added *SubscriptionType* to allow for Server-Sent Eventing support
- EventService v1.1.0
 - Added *ServerSentEventUri* to support Server-Sent Eventing (SSE)
- Manager v1.4.0
 - Added *AutoDSTEnabled* property
 - Added *Switches* resource link
- Memory v1.5.0
 - Deprecated poorly-named *PassphraseState* in *Regions* object and added *PassphraseEnabled* to replace it.

Redfish Schema Minor Revisions (3 of 3)

- **PCleFunction v1.2.0**
 - Added *NetworkDeviceFunction* resource link
- **Processor v1.4.0**
 - Added *SubProcessors* collection to provide details on 'cores' and 'threads'
 - Added 'Core' and 'Thread' to *ProcessorType*
- **ResourceBlock v1.1.0**
 - Added properties to support sharing capabilities
- **Settings v1.2.0**
 - Added *OperationApplyTimeSupport* and *MaintenanceWindow* objects to provide deterministic behavior for the application of Settings-based data
- **SoftwareInventory v1.2.0**
 - Added *Manufacturer* and *ReleaseDate* properties
- **Task v1.2.0**
 - Added *TaskMonitor* property

Errata Schema Revisions

- Description clarifications in numerous schemas
- AttributeRegistry v1.x.x
 - Corrected *regex patterns for various properties*
- EventService v1.0.7
 - Fixed permissions on *DeliveryRetryAttempts* and *DeliveryRetryIntervalSeconds* properties.
- ManagerAccount v1.x.x
 - Clarified the *RoleId* property description by stating its relation to *RoleId* in the Role resource.
- UpdateService v1.x.x
 - Regenerated JSON schema to pick up action parameters added in previous release
- Complete errata details shown in the Change Log within DSP8010



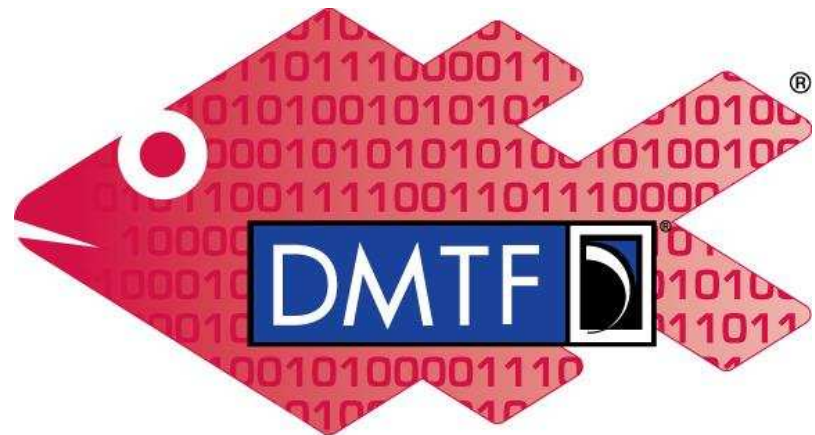
Redfish Release 2017.3

DMTF Scalable Platforms Management Forum
December 2017



Redfish Release 2017.3

- Redfish Specification v1.4.0
 - **NEW** query parameters: \$expand, \$filter, \$select
 - Clarified usage of HTTP response codes
 - Clarified HTTP header usage and requirements
 - Numerous other clarifications
- **NEW** Redfish Interoperability Profiles
 - New specification DSP0272 v1.0.0
 - New profile bundle DSP8013 v2017.1
 - Allows creation of property-level support checklist
- Redfish Schema Bundle 2017.3
 - **DSP8010_2017.3.ZIP** - contains current versions of all Redfish schema
- **NEW** Schemas v1.0.0
 - Assembly (manufacturing details), Boot Option (configure boot order)
- Updated schemas
 - Added multiple objects to EthernetInterface allowing complete DHCP configuration
 - Added properties to Power and Thermal to address feedback from ASHRAE and TGG
 - Numerous minor additions, errata and description clarifications throughout the schema



Redfish

Redfish Specification v1.4.0

- Minor release of the Specification (DSP0266)
 - Numerous clarifications and corrections, detailed in the Change Log
- Adds support for query parameters on GET requests
 - \$expand – Includes data from subordinate resources (especially collections) to allow highly-efficient data retrieval
 - \$select – Include only specified properties
 - \$filter – Include only members of a collection that match an expression
- Clarifications to HTTP header requirements and Status Code usage
 - Clarified HTTP status and payload responses after successful processing of data modification (POST, PATCH or PUT) requests
 - Added HTTP status code entries for 428 and 507 to clarify the proper response to certain error conditions
 - Detailed client's and service's HTTP header requirements and usage

Redfish Interoperability Profile Specification v1.0.0

- An “Interoperability Profile” provides a common ground for Service implementers, client software developers, and users
 - A profile applies 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 and a baseline of schema and property-level support for software developers utilizing Redfish
 - Enable customers to easily specify Redfish functionality / conformance in RFQs
- Specification (DSP0272) defines a machine-readable Profile definition
 - JSON document designed to be human-readable and easy to create
- Profiles will be created by DMTF, partner organizations, and others
 - DMTF will provide re-publication via the Redfish Developer Hub
 - Published profiles will be included in a bundle for download (DSP8013)
- DMTF open source utility available to test conformance to a Profile
 - <https://github.com/DMTF/Redfish-Interop-Validator>

New Redfish Schemas

- **BootOption v1.0.0**
 - Describes a single, bootable target device for a Computer System
 - The BootOption Collection allows for configuration of boot order
 - Does not replace the temporary *BootSourceOverride* function
 - Boot Option describes the permanent boot order
 - Override is used for temporary (usually one-time) changes to the boot order
- **Assembly v1.0.0**
 - Describes manufacturing data useful for service personnel
 - Data usually stored in EEPROMs and heavily binary-encoded
 - Does not replace product identification properties (part #, serial #, etc.)
 - Single resource allows for multiple assembly descriptions
 - Adds mechanism to extract a binary image for service/support analysis
- **Protocol**
 - Supporting schema file to contain the common *Protocol* property

Redfish Schema Minor Revisions (1 of 6)

- Chassis v1.6.0
 - Added *Assembly* resource link
 - Added *StorageEnclosure* enumeration to *ChassisType*
- ComputerSystem v1.5.0
 - Added *BootOrder* and *Assembly* resource links
 - New *SetDefaultBootOrder* Action
 - Added links to *ConsumingComputerSystems* and *SupplyingComputerSystems* for describing aggregated systems
 - Added *SubModel* to describe product model variations
 - Added *LogicalProcessorCount* to *ProcessorSummary*
- Drive v1.3.0
 - Added *Assembly* resource link
- Endpoint v1.1.0
 - Added *IPTransportDetails* object

Redfish Schema Minor Revisions (2 of 6)

- EthernetInterface v1.4.0
 - New objects to allow for full configuration of DHCP and SLAAC support
 - Configuration objects to support both *DHCPv4* and *DHCPv6* added
 - Separate *StatelessAddressAutoConfig* object added
 - New objects create a consistent configuration pattern
 - Separate objects or properties for the desired configuration vs. actual “in use”
 - New *IPv4StaticAddresses* allows for Static IP address configuration regardless of DHCP configuration or usage
 - New *IPv6StaticDefaultGateways* and *StaticNameServers* arrays
- LogEntry v1.3.0
 - Added *OemLogEntryCode* and *OemSensorType* properties to allow for legacy IPMI OEM definitions
- LogService v1.1.0
 - Added *LogEntryType* to describe the content type of a log

Redfish Schema Minor Revisions (3 of 6)

- **Memory v1.4.0**
 - Added *VolatileSizeMiB*, *NonVolatileSizeMiB*, *CacheSizeMiB*, *LogicalSizeMiB* properties to provide discrete memory size for each type
 - Added *Location* object
- **MemoryChunks v1.2.0**
 - Added *Status* object
- **NetworkAdapter v1.1.0**
 - Added *Assembly* resource link
 - Added *Location* object to *Controllers* object
- **NetworkDeviceFunction v1.2.0**
 - Added *Endpoints* resource link
- **PCIeDevice v1.2.0**
 - Added *Assembly* resource link

Redfish Schema Minor Revisions (4 of 6)

- PhysicalContext v1.3.0
 - Added additional enumerations to *PhysicalContext*
- Port v1.1.0
 - Added *Location* object
- Power v1.5.0
 - Several additions to *PowerSupplies* object array
 - Based on feedback from **ASHRAE** and **The Green Grid** industry groups
 - *PowerInputWatts*, *PowerOutputWatts*, and *EfficiencyPercent* properties
 - *Assembly* resource link
 - *Location* object
- Processor v1.2.0
 - Added *Assembly* resource link
- Redundancy v1.3.0
 - Added *NotRedundant* enumeration to *Mode* (now a read-write property)

Redfish Schema Minor Revisions (5 of 6)

- Resource v1.6.0
 - Added *Latitude*, *Longitude* and *AltitudeMeters* to *Location* object
- ServiceRoot v1.3.0
 - Added *Product* property for general product identification
 - Added *ProtocolFeaturesSupported* object to allow for discovery of supported optional Redfish protocol features
- Storage v1.4.0
 - Added *Assembly* resource link
- Switch v1.1.0
 - Added *Location* object

Redfish Schema Minor Revisions (6 of 6)

- Thermal v1.4.0
 - Added *Assembly* resource link to *Fan* object
 - Several additions to *Temperatures* object array
 - Based on feedback from **ASHRAE** and **The Green Grid** industry groups
 - *DeltaReadingCelsius* and *DeltaPhysicalContext* for describing a temperature change rather than an absolute temperature reading
 - *MaxAllowableOperatingValue*, *MinAllowableOperatingValue*, *AdjustedMaxAllowableOperatingValue*, and *AdjustedMinAllowableOperatingValue* for reporting the range of allowable operating temperatures for a given piece of equipment
- VirtualMedia v1.2.0
 - New *InsertMedia* and *EjectMedia* Actions to control virtual media usage
 - *Image*, *Inserted* and *WriteProtected* are now read-write properties
- Zone v1.2.0
 - Added *Identifiers* property

Errata Schema Revisions

- Added or corrected parameter descriptions in Action definitions throughout the schema
- Action Parameters are now described in JSON schema
- Changed internal schema location several properties to allow those commonly-defined properties to be referenced externally
- IPAddresses v1.0.6
 - Corrected *PrefixLength* in *IPv6StaticAddresses* to be a read-write property
- Memory v1.x.x
 - Corrected description of *OperatingSpeedMHz* to reflect changes in memory device reporting (value may be in MHz or MT/s, but will match published specifications in either case)
- Complete errata details shown in the Change Log within DSP8010

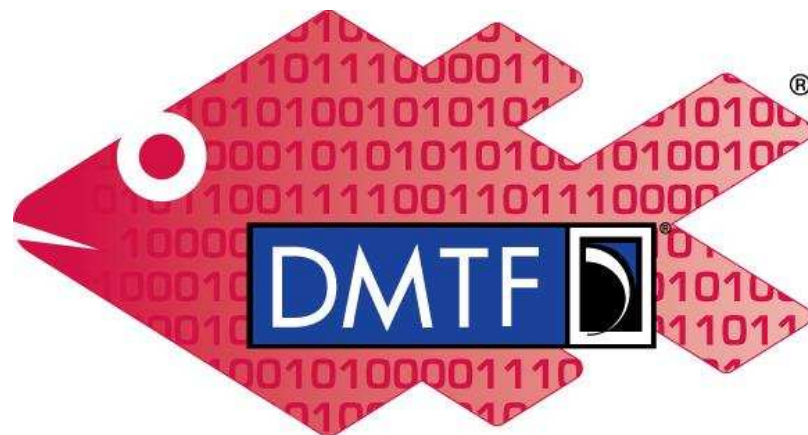


Redfish Release 2017.2

DMTF Scalable Platforms Management Forum
September 2017

Redfish Release 2017.2

- **Redfish Specification v1.3.0**
 - Adds “Apply Time” concept to Settings objects
 - Improves ETag support to avoid race conditions
 - Numerous clarifications
 - Also releasing v1.2.1 errata release
- **Redfish Schema Bundle 2017.2**
 - **DSP8010_2017.2.ZIP**
 - Contains current versions of all Redfish schema
- **Schema minor updates**
 - Expanded “Location” object definition to include physical locations at the building, room and intra-chassis levels.
 - Added "SupportedApplyTimes" to allow control over the application of Settings to a resource. This includes support for specifying maintenance windows.
 - Numerous errata and description clarifications throughout the schema
- **Base Message Registry v1.2.0**
 - Added new 'ResourceNotFound', 'ResourceExhaustion', 'StringValueTooLong' and 'EmptyJSON' messages.



Redfish

Redfish Specification v1.3.0

- Minor release of the Specification (DSP0266)
 - Service may optionally reject a PATCH or PUT operation if the If-Match or If-Match-None HTTP header is required
 - Allows Service to avoid race conditions from multiple clients performing PATCH or PUT operations, or clients using stale data from previous GETs
 - Returns HTTP 428 response code
 - Added support for a Service to describe the “Apply Time” for Settings
 - “SupportedApplyTimes” array in the “@Redfish.Settings” annotation
 - Reports available options for applying settings to that resource
 - Maintenance Window parameters available to schedule Settings
 - Clients use “@Redfish.PreferredApplyTime” annotation in request body
 - “ApplyTime” parameter describes options to apply settings
 - “Immediate”, “OnReset”, and several Maintenance Window options
 - Numerous clarifications and corrections, detailed in the Change Log
- Errata release v1.2.1 includes same clarifications and corrections

Redfish Schema Minor Revisions (1 of 2)

- **Memory v1.3.0**
 - Added memory module-centric identification properties:
 - "ModuleManufacturerID", "ModuleProductID",
"MemorySubsystemControllerManufacturerID", "MemorySubsystemControllerProductID"
 - Deprecated "FunctionClasses"
 - Duplicative, unstructured string data
 - Deprecated the PCIe-centric identification properties:
 - "VendorID", "DeviceID", "SubsystemVendorID", and "SubsystemDeviceID"
- **PhysicalContext v1.2.0**
 - Added "Chassis" and "Fan" as enumerations
- **Power v1.4.0**
 - Added "PhysicalContext" to "PowerControl" object

Redfish Schema Minor Revisions (2 of 2)

- **Resource v1.5.0**
 - Expanded the “Location” object with new sub-objects to cover in-room and intra-chassis location identification
 - Deprecated “Info” and “InfoFormat” properties in favor of these sub-objects
- **Role v1.2.0**
 - Added "RoleId" property to enable references from ManagerAccount
- **Settings v1.1.0**
 - Added "SupportedApplyTimes" to allow control over the application of Settings to a resource. This includes support for specifying maintenance windows.
- **Storage v1.2.0**
 - Added common "Name" property to "StorageController" object

Errata Schema Revisions

- Clarified usage of the “IndicatorLED” and “ServiceEnabled” enumerations throughout the data model
- Removed errant auto-expand annotations within “Redundancy”
- EventDestination v1.x.x
 - Added clarifications to "OriginResources" and "MessageId" usage
- EventService v1.x.x
 - Added clarifications to "DeliveryRetryAttempts" usage
- Manager v1.x.x
 - Corrected enumeration descriptions for "CommandShell"
- ManagerAccount v1.x.x
 - Added clarifications to "RoleId" usage.
- SerialInterface v1.x.x
 - Removed errant periods in enumeration strings

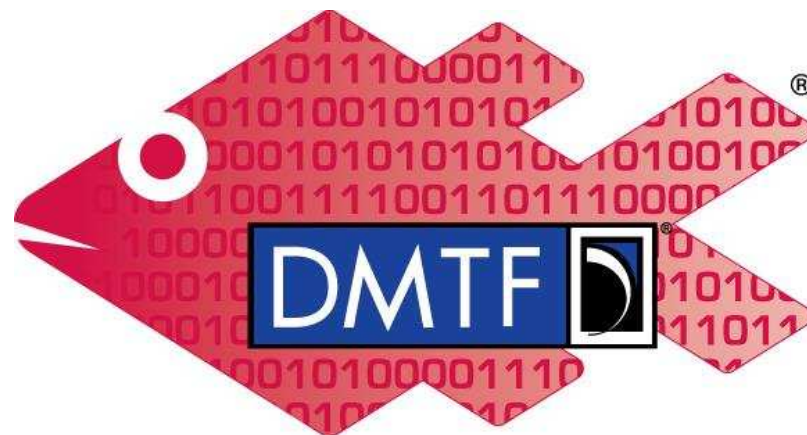


Redfish Release 2017.1

DMTF Scalable Platforms Management Forum
May 2017

Redfish Release 2017.1

- Redfish Specification v1.2.0
 - Adds Composability support
- Redfish Schema Bundle 2017.1
 - **DSP8010_2017.1.ZIP**
 - Contains current versions of all Redfish schema
- **NEW Schemas v1.0.0**
 - Composition Service
 - Resource Blocks for system composition
- Schema minor updates
 - Updates to provide support for system composition with new links between resources
 - Additions to UpdateService to support multiple targets for updates
 - Enhanced support for allocating memory regions
 - Numerous errata and description clarifications throughout the schema
- Base Message Registry Update v1.1.0
 - Added new “ResourceInStandby” message
- New mockups
 - Composability (perhaps two examples)



Redfish

Redfish Specification v1.2.0

- Minor release of the Specification (DSP0266)
 - Adds Composability to the standard
 - Numerous clarifications and corrections, detailed in the Change Log
- Composability support
 - Standardizes how services implement the Composition Service
 - Defines the types of composition requests a service is allowed to support
 - Defines the supporting resources required for each type of composition request
 - Defines baseline expectations a client can make when using the different composition requests

New Redfish v1.0.0 Schemas

- **CollectionCapabilities**
 - Allows for a service to provide an inline annotation for what a client is allowed to provide in the POST request for a Resource Collection
 - The underlying object is of the same type as the members of the collection and contains annotations for each property in terms of what's allowed in the POST request
- **CompositionService**
 - Entry point for the composition service
 - Contains sets of Resource Blocks and Resource Zones to express what's available to a client to compose
- **ResourceBlock**
 - Container object to express the building blocks available for compositions
 - Contains the composition status of the block in addition to the inventory of components that are within the block

Redfish Schema Minor Revisions (1 of 2)

- Most schemas were updated to add Actions and OemActions objects to allow for OEM extensions
- Chassis v1.5.0
 - Links entry for new ResourceBlock resources
- ComputerSystem v1.4.0
 - Links entry for new ResourceBlock resources
 - Added TotalSystemPersistentMemoryGiB to MemorySummary
- Drive v1.2.0, EthernetInterface v1.3.0
 - Links entry for Chassis resource
- Memory v1.2.0
 - Added properties for describing and allocating memory regions
- PhysicalContext v1.1.0
 - Added “Memory” as an enumeration value

Redfish Schema Minor Revisions (2 of 2)

- Resource v1.4.0
 - Added “PowerCycle” as an enumeration value for ResetType
 - Modified descriptions of ResetType to remove system-centric text
- ServiceRoot v1.2.0
 - Added CompositionService link
- Storage v1.2.0
 - Added “FCP” and “FICON” as enumeration values for Protocol
- UpdateService v1.2.0
 - Added HttpPushUriTargets and HttpPushUriTargetsBusy properties
 - Added Targets optional parameter for SimpleUpdate action

Errata Schema Revisions

- Corrected integer type properties in CSDL schemas to Int64 (from Int16 or Int32) for consistency in many schemas
- Added missing descriptions in Complex Type definitions in many schemas
- Corrected Links and Members properties (Collection schemas) in all schemas to be non-nullable in many schemas
- Removed unreferenced inclusions in many schema files
- Endpoint v1.0.2, PCIeFunction v1.0.2
 - Corrected validation pattern on PCI ID-related properties
- EventDestination v1.1.3, v1.0.4
 - Marked Context property as Required instead of RequiredOnCreate
 - Service is required to provide the Context (may be NULL), but clients are not required to specify a context when creating a new Event Destination

New Mockups

- New mockups to support Composability
- Composability
 - Shows a service with various sets of disaggregated hardware as resources
 - Provides an example composed system utilizing some of the disaggregated hardware
 - Shows how Resource Zones can provide information about binding restrictions
- Bladed Partitions
 - Shows a service with a set of ComputerSystems as their own resource blocks
 - Contains example composed systems that are created from other ComputerSystems

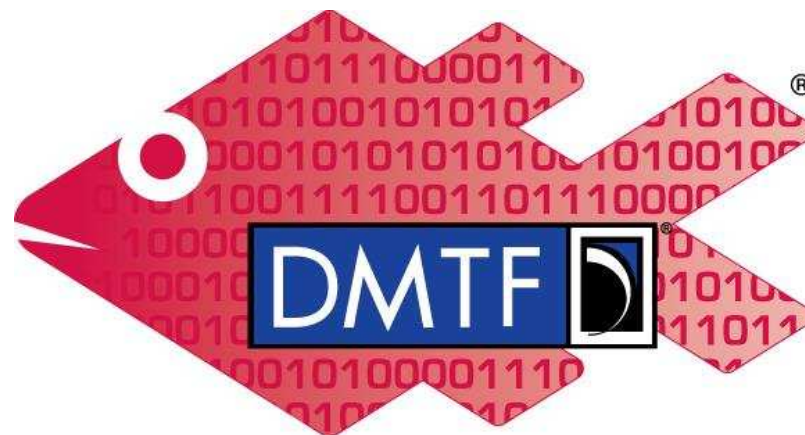


Redfish Release 2016.3

DMTF Scalable Platforms Management Forum
December 2016

Redfish Release 2016.3

- Redfish Specification v1.0.5
 - Errata release with numerous clarifications
- Redfish Specification v1.1.0
 - Adds Privilege Mapping
 - Adds Host Interface
- **NEW** Redfish Host Interface Specification
 - Describes IP / NIC-based host (OS) interface
- **NEW** Schemas v1.0.0
 - HostInterface, NetworkAdapter, NetworkInterface, NetworkDeviceFunction, NetworkPort, (collections of all the above), PrivilegeRegistry
- Schema minor updates
 - AccountService, Chassis, ComputerSystem, EthernetInterface, Manager, ManagerNetworkProtocol, Memory, MemoryDomain, Resource, SoftwareInventory, Thermal, UpdateService.
 - Numerous errata and description clarifications throughout the schema
- New mockups
 - Storage related mockups: Local Storage and SAS Fabric



Redfish

Redfish Specification v1.0.5

- Errata release of the Specification (DSP0266)
 - No new features or functionality in this release (errata only)
 - Numerous clarifications and corrections, detailed in the Change Log
- Various terminology clarifications for “Resource Collection” and “Members” so that the specification is consistent in their usage
 - Helps differentiate the general OData Collection from the Redfish Resource Collection

Redfish Specification v1.1.0

- Minor release of the Specification (DSP0266)
 - Adds Privilege Mapping to the standard
 - Adds the Host Interface to the standard
- Privilege Mapping
 - Defines a registry format for describing privileges for each type of entity, such as ComputerSystem
 - For each entity type, it maps the different roles for the different HTTP methods
 - Each entity type can also have override conditions for when to apply special sets of privileges, such as for a particular URI
- Host Interface
 - References new Host Interface specification for details

Redfish Host Interface Specification v1.0.0

- New specification (DSP0270)
- Defines an interface between a Host and its Redfish Service
 - This is to allow for local management operations similar to how a Host could collect information via IPMI over KCS
- Currently defines a network based interface
 - Extensions can be added later for different protocols as needs arise in the industry
- SMBIOS Type 42 (Management Controller Host Interface) has been expanded to add a new Interface Type (Network Host Interface)
 - The expanded type definition provides a way for the Host to find the address and credentials for its Redfish Service

New Redfish v1.0.0 Schemas

- **HostInterface**
 - Contains properties for describing and configuring a Redfish Host Interface
- **NetworkAdapter**
 - Describes general-purpose network adapters
- **NetworkInterface**
 - Provides linkages between NetworkAdapter, NetworkPort, and NetworkDeviceFunction instances
- **NetworkDeviceFunction**
 - Describes a logical interface exposed by a NetworkAdapter
- **NetworkPort**
 - Describes a discrete physical port capable of connecting to a network
- **PrivilegeRegistry**
 - Schema for definition of HTTP Operation to Privilege mapping

Redfish Schema Minor Revisions (1 of 3)

- **Chassis v1.4.0**
 - Added “RackGroup” to ChassisType enumeration
 - Added links to NetworkAdapters and PCleDevices
 - Added HeightMm, WidthMm, DepthMm, and WeightKg properties
- **ComputerSystem v1.3.0**
 - Added link to NetworkDevices
 - Added FirmwareVersion2 and InterfaceTypeSelection to TrustedModules
- **EthernetInterface v1.2.0**
 - Added link to HostInterface to support Redfish Host Interface specification
- **Manager v1.3.0**
 - Added link to HostInterfaces resource collection
- **ManagerNetworkProtocol v1.1.0**
 - Added DHCP protocol object

Redfish Schema Minor Revisions (2 of 3)

- Memory v1.1.0
 - Added Status object
- MemoryDomain v1.1.0
 - Added AllowsMirroring and AllowsSparing properties
- Resource v1.3.0
 - Added PostalAddress and Placement objects to Location, each containing numerous properties for detailed location information
- SoftwareInventory v1.1.0
 - Added SoftwareId, LowestSupportedVersion, UefiDevicePaths, and RelatedItem properties
- Thermal v1.2.0
 - Added Manufacturer, Model, SerialNumber, PartNumber, SparePartNumber, and IndicatorLED to Fan object

Redfish Schema Minor Revisions (3 of 3)

- UpdateService v1.1.0
 - Added HttpPushUri property

Errata Schema Revisions (1 of 2)

- Added explicit permissions annotations to all properties to clearly show which properties are read-write vs. read-only
- Corrected Permission annotation with invalid enumeration references
- Removed permissions annotation from embedded objects (permissions now on every property)
- Removed permission annotations from CSDL Type definitions to avoid conflicts with property definitions
- Corrected all property descriptions to always end with a period
- Corrected Reference URI links to OData v4 (errata 3)
- Added Capabilities annotations to CSDL files
- ComputerSystem v1.0.4, v1.1.2, v1.2.1
 - Corrected CSDL Type of TotalSystemMemoryGiB from Int64 to Decimal

Errata Schema Revisions (2 of 2)

- Port v1.0.1
 - Corrected CSDL Type of CurrentSpeedGbps and MaxSpeedGbps from Int64 to Decimal
- Power v1.0.3, v1.1.1, v1.2.1
 - Corrected descriptions for voltage-related properties and changed sensor descriptions to avoid use of term “current”, instead referring to “present value”
- ServiceRoot v1.1.1
 - Added missing EntityContainer for ServiceContainer in CSDL schema

New Mockups

- New mockups to show storage models
- Local Storage
 - Shows a typical 1U or 2U server with local RAID Storage
 - Uses the new “Storage” model rather than “SimpleStorage”
 - Shows a set of Drives and Volumes behind on a single Storage sub-system
- SAS Fabric
 - Represents a drive array without a ComputerSystem
 - Shows a managed SAS fabric with redundant switches
 - Shows how Switches, Ports, and Endpoints map together

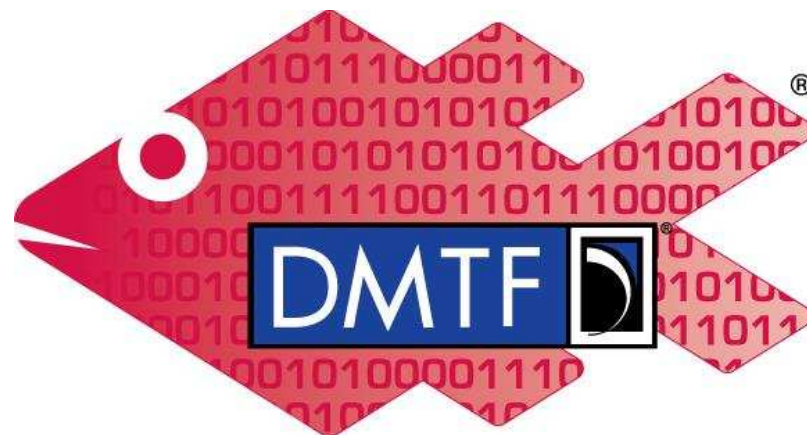


Redfish Release 2016.2

DMTF Scalable Platforms Management Forum
September 2016

Redfish Release 2016.2

- Redfish Specification v1.0.3 and v1.0.4 (errata)
- **NEW** Schemas v1.0.0
 - ActionInfo, Endpoint, Fabric, MemoryChunks, MemoryDomain, PCIeDevice, PCIeFunction, Port, SoftwareInventory, Switch, UpdateService, Zone
- Schema minor updates
 - Chassis, ComputerSystem, Drive, EthernetInterface, EventDestination, LogEntry, Manager, MemoryMetrics, Power, Redundancy, Resource, ServiceRoot, SessionService, Storage
- New mockups
 - Bladed System and Proposed OCP Profile



Redfish

Redfish Specification v1.0.3 and v1.0.4

- Errata release of the Specification (DSP0266)
 - No new features or functionality in this release (errata only)
 - Numerous clarifications and corrections, detailed in the Change Log

New Redfish v1.0.0 Schemas (1 of 3)

- **ActionInfo**
 - Describes the parameters and other information necessary to perform a Redfish Action to a particular Action target
- **Endpoint**
 - An entity that sends or receives protocol defined messages over a transport
- **Fabric**
 - Consists of one or more Switches and may include Endpoints and Zones
 - Used to describe topologies
- **MemoryChunks**
 - Describes a chunk of memory and its associated interleave sets

New Redfish v1.0.0 Schemas (2 of 3)

- **MemoryDomain**
 - Used to indicate to the client which Memory (DIMMs) can be grouped together in Memory Chunks to form interleave sets or otherwise grouped together
- **PCleDevice**
 - Describes a PCI-e Device attached to a system
- **PCleFunction**
 - Describes a PCI-e Function
- **Port**
 - Describes a Port of a Switch
 - Connects to Switches, Endpoints, or other Ports
- **SoftwareInventory**
 - Describes an inventory of software components

New Redfish v1.0.0 Schemas (3 of 3)

- Switch
 - Describes a simple fabric Switch
 - Contains a set of Ports
- UpdateService
 - Describes the Redfish Update Service
 - Contains update actions and sets of Software Inventory entities
- Zone
 - Describes a simple fabric Zone
 - Used to map associated Endpoints and Switches into different partitions

Redfish Schema Minor Revisions (1 of 3)

- Chassis v1.3.0
 - Added “IPBasedDrive” to ChassisType enumerations
- ComputerSystem v1.2.0
 - Added HostedServices and HostingRoles properties
 - Added MemoryDomains, PCleDevices, PCleFunctions, and Endpoints links
 - Added “RemoteDrive” enumeration to BootSourceOverrideTarget
- Drive v1.1.0
 - Added Operations property and Endpoints link
- EthernetInterface v1.1.0
 - Added LinkStatus property and Endpoints link
- EventDestination v1.1.0
 - Added OriginResources and MessageIds properties

Redfish Schema Minor Revisions (2 of 3)

- LogEntry v1.1.0
 - Added EventType, EventId, and EventTimeStamp properties
- Manager v1.2.0
 - Added PowerState property
- MemoryMetrics v1.1.0
 - Added PredictedMediaLifeLeftPercent property to the HealthData object
- Power v1.2.0
 - Added IndicatorLED property to PowerSupply object
- Redundancy v1.1.0
 - Added RedundancyEnabled property
- Resource v1.2.0
 - Added “Deferring”, “Quiesced”, and “Updating” to State enumerations

Redfish Schema Minor Revisions (3 of 3)

- **ServiceRoot v1.1.0**
 - Added links to Fabrics, StorageSystems, StorageServices and UpdateService
- **SessionService v1.1.0**
 - Added OEM Action capabilities
- **Storage v1.1.0**
 - Added Links object and Endpoints link

Errata Schema Revisions (1 of 2)

- **ComputerSystem v1.1.1, v1.0.3**
 - Clarified description of ComputerSystem and the UUID property
- **Drive v1.0.1**
 - Added “Unencrypted” enumeration to EncryptionStatus and deprecated misspelled enumeration
- **Event v1.1.1, v1.0.3**
 - Deprecated Context property in favor of the Event-specific Context contained within each Event
- **IPAddresses v1.0.3**
 - Corrected validation patterns for IPv4Address and SubnetMask
 - Added validation pattern for Gateway
- **Message v1.0.3**
 - Corrected MessageId to mark it as a required property

Errata Schema Revisions (2 of 2)

- Resource v1.1.1
 - Removed errant ReferenceableMember entity type
- ServiceRoot v1.0.3
 - Corrected validation pattern annotation for RedfishVersion
- Storage v1.0.1
 - Corrected type definition of the Volumes link
- Volume v1.0.1
 - Corrected description of VolumeType

New Mockups

- New mockups to a bladed system and a proposed OCP profile definition
- **Bladed System**
 - Shows an enclosure that contains a set of four blades
 - Shows how a Chassis instance can contain subordinate Chassis instances with the Contains/ContainedBy relationship
 - Each Chassis instance that represents a blade has its own ComputerSystem
- **Proposed OCP Profile**
 - An example that shows how Redfish can be adapted to meet the Open Compute Project's Hardware Management requirements
 - Contains a single system instance with a minimal set of properties required to support OCP

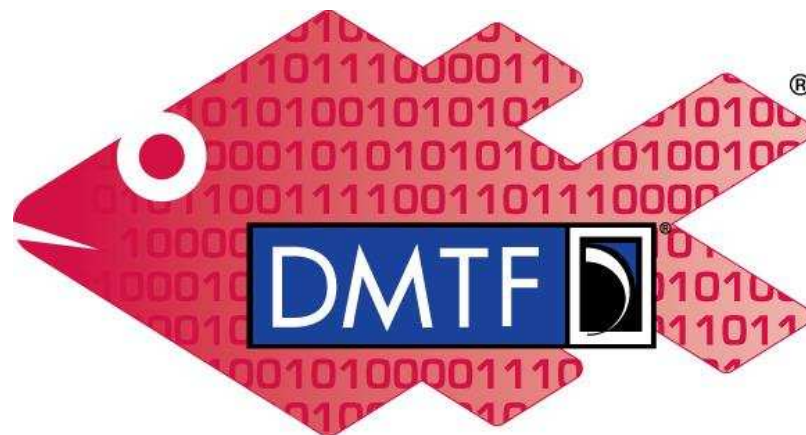


Redfish Release 2016.1

DMTF Scalable Platforms Management Forum
May 2016

Redfish Release 2016.1

- Redfish Specification v1.0.2 (errata)
- **NEW** Schemas v1.0.0
 - AttributeRegistry, Bios, Drive, Memory, MemoryCollection, MemoryMetrics, SecureBoot, Storage, StorageCollection, Volume
- Schemas v1.1.0 or v1.2.0 (minor revs)
 - Chassis, ComputerSystem, Event, Manager, Power, Resource, SimpleStorage, Thermal
- Schemas v1.x.2 (errata)



Redfish

Schema Release Bundles (posted at <http://www.dmtf.org/standards/redfish>)

DSP8010_2016.1: All new, minor, and errata 2016.1 schemas

Individual file contents also posted on <http://redfish.dmtf.org/schemas>

DSP8010_2016.0.9a: Work in Progress

New schemas under development within SPMF

Redfish Specification v1.0.2

- Errata release of the Specification (DSP0266)
 - No new features or functionality in this release (errata only)
 - Numerous clarifications and corrections, detailed in the Change Log
- Schema namespace rules were corrected
 - Schema versioning method conflicted with OData namespace definitions
 - Old: <schema name>.<major>.<minor>.<errata>
 - New: <schema name>.v<major>_<minor>_<errata>
 - Example: Chassis.v1_0_2 instead of Chassis.1.0.2
- OEM company-level property naming corrected
 - Use of colon ':' in JSON property names is problematic for some languages
 - Dot '.' separator also creates additional work for Javascript
 - Solution is to use underscore "_" instead for both of these cases
 - For compatibility, the colon and dot are allowed (but future use is discouraged)

New Redfish v1.0.0 Schemas (1 of 2)

- **Bios**
 - Allows viewing and changing System BIOS settings
 - Uses an AttributeRegistry to perform these functions
- **AttributeRegistry**
 - Adds ability to describe a large quantity of platform/vendor-specific properties (“attributes”)
 - Can describe usage and menu structures for user interface displays
- **SecureBoot**
 - Properties for managing the UEFI Secure Boot functionality of a system
- **Memory / MemoryCollection**
 - Adds detailed DIMM Inventory and status
- **Memory Metrics**
 - Statistics and performance metrics for individual memory modules

New Redfish v1.0.0 Schemas (2 of 2)

- **Storage / StorageCollection**
 - This schema defines a storage subsystem and its respective properties
 - Includes storage controller / subsystem properties and links to the resources such as volumes that can be accessed from that subsystem
- **Drive**
 - Detailed hard drive and SSD inventory and status
- **Volume**
 - Contains properties used to describe a volume, virtual disk, LUN, or other logical storage entity for any system

Redfish Schema Minor Revisions (1 of 3)

- **Chassis v1.2.0**

- Links entries for new Drive and Storage resources
- Links entry for ManagersInChassis
 - Provides reference to the Manager(s) physically located in the chassis

- **ComputerSystem v1.1.0**

- Links entries for new Bios, Memory, Storage and SecureBoot resources
- MemoryMirroring in MemorySummary object
 - Reports system-level “memory mirroring” functionality
- TrustedModule object
 - Reports status and configuration of a Trusted Platform Module (TPM)
- BootSourceOverrideMode in Boot object
 - Allows switching between UEFI and “legacy” BIOS boot modes
- New “*SDCard*” and “*UefiHttp*” enumerations to BootSourceOverrideTarget
 - Boot from SD Memory Card or use the UEFI boot from HTTP function

Redfish Schema Minor Revisions (2 of 3)

- **Event v1.1.0**

- Context property
 - Information provided by the subscriber to be included with Event payloads

- **Manager v1.1.0**

- Links entry for ManagerInChassis
 - Provides reference to the Chassis which physically contains the Manager

- **Power v1.1.0**

- InputRanges, Manufacturer in PowerSupplies
 - Describes the range of input voltage(s) supported by the power supply
 - Manufacturer of the power supply
- Improved enumerations in LineInputVoltageType in PowerSupplies
 - New values describe 'generic' input voltage ranges in place of terminology which was used inconsistently among vendors.
 - Enumerations with inconsistently-used terminology have been deprecated

Redfish Schema Minor Revisions (3 of 3)

- **Resource v1.1.0**

- Identifier, Location, and IndicatorLED objects
 - Common functionality to apply across the data model
 - Allows specifying a standards-based device identification method
 - Provides structure for reporting physical location
 - Common functionality for a simple LED indicator light
- “UnavailableOffline” enumeration added to State in Status
 - Shows a device in an invalid or incompatible configuration

- **SimpleStorage v1.1.0**

- CapacityBytes added to Device
 - Reports the capacity of a storage device - missing from the v1.0.0 release

- **Thermal v1.1.0**

- Name replaces FanName in Fan
 - Made usage of the “Name” property consistent with the data model

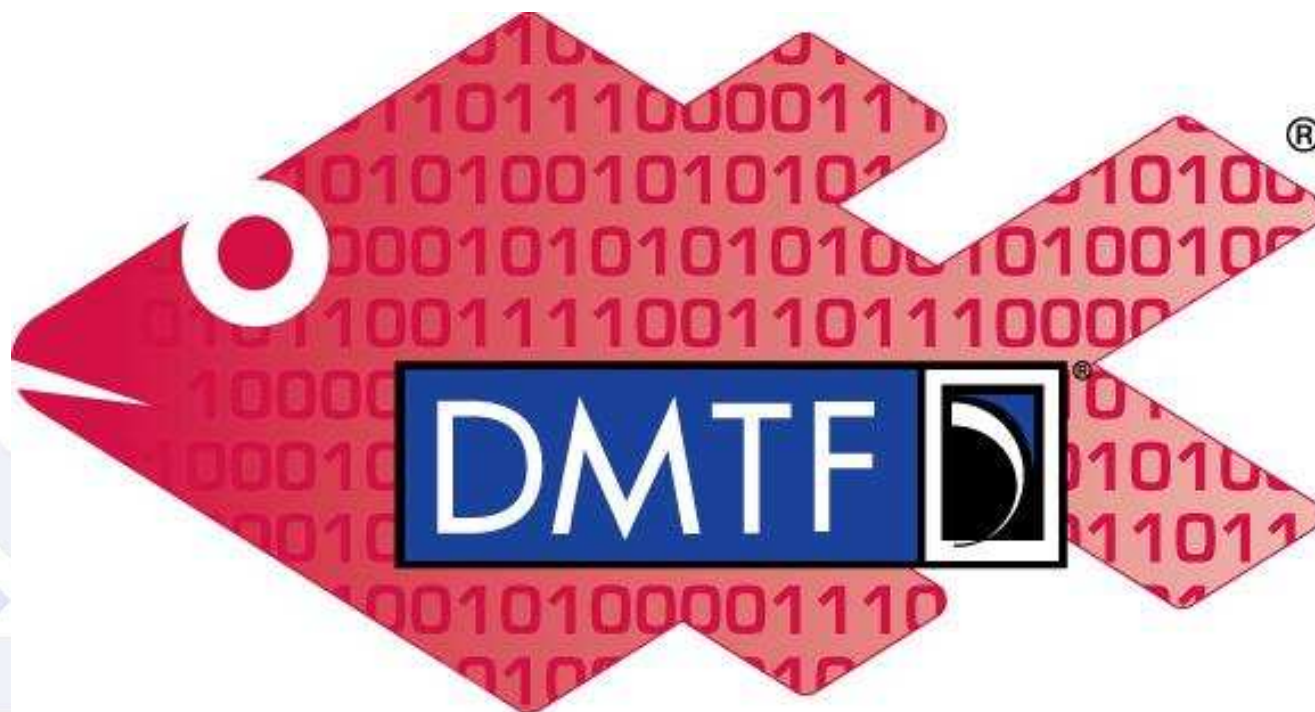
Errata Schema releases (1 of 2)

- All schemas revised to v1.x.2 for namespace convention corrections
 - CSDL (XML) files now follow <schema>_v1.xml filename format
 - json-schema files now follow <schema>.v1_x_x.json filename format
- All existing v1.x.x schemas were also re-published using the new json-schema filename structure. *Previously released schemas remain available and valid.*
- **Chassis v1.1.2**
 - Deprecates the “Unknown” value for IndicatorLED
- **ComputerSystem v1.0.2**
 - Deprecates the “Unknown” value for IndicatorLED
- **EventService v1.0.2**
 - Corrected Unit annotation(s) to match UCUM unit definitions
- **Manager v1.0.2**
 - Corrected description for ServiceEntryPointUUID to match intent

Errata Schema releases (2 of 2)

- **ManagerNetworkProtocol v1.0.2**
 - Corrected (confusing) read-write permissions on embedded objects
 - Corrected Unit annotation(s) to match UCUM unit definitions
- **Power v1.0.2**
 - Corrected (confusing) read-write permissions on embedded objects
 - Corrected Unit annotation(s) to match UCUM unit definitions
- **Resource v1.0.2**
 - Corrected missing Required annotation on 'Id' property.
 - Added 'Pattern' Redfish annotation for 'Oem' property names.
- **SessionService v1.0.2**
 - Added missing Unit annotation(s) to match UCUM unit definitions
- **SimpleStorage v1.0.2**
 - Corrected Unit annotation(s) to match UCUM unit definitions
- **Thermal v1.0.2**
 - Corrected (confusing) read-write permissions on embedded objects
 - Corrected Unit annotation(s) to match UCUM unit definitions

Q&A & Discussion



Redfish