Redfish Release History

DMTF Redfish Forum
August 2018
Releases

• 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 2018 Release 2

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August 2018
Redfish 2018 Release 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

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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

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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 PCIe 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 `ComputerSystemContrainedComposition` 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 Event*Type* in favor of new subscription properties
  - Added Event*GroupId* to Event*Record*

• **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

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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

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- **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 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

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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 `UefiNamespaceId` attributes to registry entries.

- **Chassis v1.7.0**
  - Added `UUID` property
  - Added `Switches` resource link

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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)

- PCIeFunction 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 *Roleld* property description by stating its relation to *Roleld* 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 2017 Release 3

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Redfish 2017 Release 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

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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
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

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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 IPTTransportDetails 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

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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
    - \textit{DeltaReadingCelsius} and \textit{DeltaPhysicalContext} for describing a temperature change rather than an absolute temperature reading
    - \textit{MaxAllowableOperatingValue}, \textit{MinAllowableOperatingValue}, \textit{AdjustedMaxAllowableOperatingValue}, and \textit{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
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- 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
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.
- SerialIinterface v1.x.x
  - Removed errant periods in enumeration strings

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Redfish 2017 Release 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 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

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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

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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 2016 Release 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
  - Numerous errata and description clarifications throughout the schema
- New mockups
  - Storage related mockups: Local Storage and SAS Fabric

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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

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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 PCIeDevices
  - 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

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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 2016 Release 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 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

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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, PCIeDevices, PCIeFunctions, 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

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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 2016 Release 1

DMTF Scalable Platforms Management Forum
May 2016
Redfish 2016 Release 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)

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

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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