



Lenovo AMD 1P SR635/655 BMC Redfish RESTful API Reference



Change history

Issue	Date	Description
01	2020-12-15	This issue is the first official release.
02	2021-06-17	This issue is the second official release. Enabled 9 interface feature groups.
03	2022-05-31	This issue is the third official release: Updated according to DSP0266 1.8.0 Specification and Redfish Schema 2019.2.
04	2022-09-27	This issue is the fourth official release: Enable interface for Retimer card firmware update.
06	2023-11-06	This issue is the sixth official release: Enable interface for SNMP service, syslog remote log settings and complex password status.
07	2025-05-14	This issue is the seventh official release: Update request body that was used to disable DHCP in IPV4 and IPV6 according to different Redfish versions.

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Chapter 1. Introduction

Lenovo ThinkSystem™ Manager(TSM, the BMC of ThinkSystem SR635 and SR655 servers) provides a DMTF (Distributed Management Task Force) Redfish™ compliant set of easy-to-use RESTful APIs that can be used to access the TSM data and services from applications running outside of the TSM framework. This document provides a brief overview of Redfish and guidelines for using the TSM Redfish APIs.

The TSM Redfish implementation follows DSP0266 1.8.0 Specification and Redfish Schema 2019.2.

Authentication Methods

Redfish requires the use of a compliant TLS connection to transport the data. TSM Redfish interface supports both “Basic Authentication” and “Session Login Authentication”. Per Redfish specification, the only resource that can be accessed without requiring authentication is the service root `/redfish/v1/`.

HTTP Basic Authentication (as defined by RFC7235) uses HTTP “Authentication” header field to authenticate requests from a user agent or client (like a web browser) to TSM Redfish service. The value of this header consists of credentials containing the authentication information of the user agent for the realm of the resource being requested. Below is an example of doing this operation in curl:

```
curl https://10.10.0.128/redfish/v1/Systems/1 -X GET -k -H "Content-type: application/json" -H "Authorization: Basic VVNfUkLE0lBBU1NXMFJE"
```

The credentials in this example are base64 encoding string of “USERID:PASSWORD”.

A client or user agent can also create a Redfish login session via the Session management interface described in “Session Management” section of this guide. The client creating login session should save “session-auth-token” returned from the HTTP response header field “X-Auth-Token”. The “session-auth-token” is used to authenticate subsequent requests by setting the HTTP request header “X-Auth-Token” with the “session-auth-token”. Below is an example of doing this operation in curl:

```
curl https://10.10.0.128/redfish/v1/Systems/1 -X GET -k -H "Content-type: application/json" -H "X-Auth-Token: session-auth-token"
```

The maximum open session count is set to 16 and session could have timeout.

Lenovo Extended Registries

Registry resources assist in interpreting Redfish resources beyond what is defined in the Redfish Schema. Examples of registries include Message Registries, Event Registries and BIOS Attribute Registries.

Registries are themselves resources which provide static, read-only JSON encoded information. Standard registries published by DMTF are available for download from <https://redfish.dmtf.org/registries>. The TSM Redfish service provides a collection of Registries at `/redfish/v1/Registries`, which contain DMTF standard registries as well as Lenovo extended registries.

- Message Registry
 - In addition to standard base message registry “Base.1.4.0.json”, TSM provides the OEM registry “ExtendedError.1.1.0.json” to extend messages used by TSM Redfish service. The URI for the registry is “/redfish/v1/schemas/registries/ExtendedError.1.1.0.json”.

The registry for resource event defines messages to use for related changes on Redfish resources. The registry for task event defines the messages to use to present changes related to a Redfish task.

In firmware update processes, there are messages to present the update progress or errors encountered. Refer to the Lenovo Firmware Update Message Register (`/redfish/v1/schemas/registries/LenovoFirmwareUpdateRegistry.1.0.0.json`) to get messages defined and know resolutions.

- Event Registry
 - TSM Redfish events reference messages that are defined in various message registries. There are two types of events in TSM:
 - “platform events” that are detected by hardware and software. This is a superset of the events corresponding to IPMI SEL. These events use the Redfish registry “/redfish/v1/schemas/registries/EventRegistry.1.0.0.json”.
 - “audit events” that record actions performed by users. Audit events use the Redfish registry “/redfish/v1/schemas/registries/AuditRegistry.1.0.0.json”.
- Bios Attribute Registry
 - BIOS attributes use attribute registry file “/redfish/v1/schemas/registries/BiosAttributeRegistry.1.0.0.json”. The registry file contains inventory and configuration attribute information provided by Lenovo UEFI.
- Privilege Registry
 - The Redfish resources have access control according to privileges of an account requesting Redfish service. The privilege registry defines the required privileges to access a resource. In the registry, there are mappings between required privileges and operation types permitted.

Tools for Redfish

- “Standard REST clients” on page 2
- “Useful DMTF Redfish modules” on page 3

Standard REST clients

Tool	Description
cURL	cURL (stands for client URL) is a command-line tool to transfer data between servers. It supports various protocols such as HTTP, HTTPS, FTP, FTPS, IMAP etc. Most programming languages support cURL commands using some libraries or extensions. cURL is one of the popular methods to interact with REST API data. The tool is available at: https://github.com/curl/curl

Postman	Postman is a collaboration platform for API development. Postman's features simplify each step of building an API and streamline collaboration so you can create better APIs—faster. The tool is available at: https://www.getpostman.com/
Python	See sample scripts on Lenovo GitHub page: https://github.com/lenovo/python-redfish-lenovo
PowerShell	See sample scripts on Lenovo GitHub page: https://github.com/lenovo/powershell-redfish-lenovo
Ansible	Supports Redfish starting from version 2.7 in the form of three modules for Remote Hardware Management. These modules are tested on Lenovo ThinkSystem servers. <ul style="list-style-type: none"> redfish_facts: https://docs.ansible.com/ansible/latest/modules/redfish_facts_module.html redfish_command: https://docs.ansible.com/ansible/latest/modules/redfish_command_module.html redfish_config: https://docs.ansible.com/ansible/latest/modules/redfish_config_module.html

Useful DMTF Redfish modules

Tool	Description
Redfish Tool	The tool is available at: https://github.com/DMTF/Redfishtool
Redfish Mockup Creator	A python3.4 program that creates a Redfish Mockup folder structure from a real live Redfish service. The tool is available at: https://github.com/DMTF/Redfish-Mockup-Creator
Redfish Mockup Server	A simple Python 3.4 program that can be copied into a folder at the top of any Redfish mockup and can serve Redfish requests on the specified IP/port. The tool is available at: https://github.com/DMTF/Redfish-Mockup-Server
Redfish Service Validator	The Redfish Service Validator is a Python3 tool for checking conformance of any "device" with a Redfish service interface against Redfish CSDL schema. The tool is available at: https://github.com/DMTF/Redfish-Service-Validator
Redfish Interface Emulator	The Redfish Interface Emulator can emulate a Redfish-based interface statically (GET) or dynamically (POST, PATCH, DELETE). The tool is available at: https://github.com/DMTF/Redfish-Interface-Emulator
Python Redfish Library	Python library for interacting with devices which support a Redfish Service. The tool is available at: https://github.com/DMTF/python-redfish-library

Chapter 2. Redfish API

This section provides information about the Redfish API.

OData Support

OData Properties are used to provide information about resources, such as ID, type, context, etc. accessed by a URI. The following are the properties used in Redfish.

Table 1. OData Attributes

Name	Type	Read Only	Description
@odata.context	String	True	The value of this property shall be the context URL that describes the resource according to OData-Protocol and shall be of the form defined in the Redfish specification.
@odata.id	String	True	The value of this property shall be the unique identifier for the resource, and it shall be of the form defined in the Redfish specification.
@odata.type	String	True	The value of this property shall be an absolute URL that specifies the type of the resource and it shall be of the form defined in the Redfish specification. The type values for each Redfish Entity give the schema it follows and is mentioned in Redfish API List under the Schema column.
@odata.etag			ETags provide the ability to conditionally retrieve or update a resource. This value gives the timestamp at which the resource properties have been initialized or modified.
@odata.nextLink	String	True	Format: uri-reference The URI to the resource containing the next set of partial members. Normal Rule It is applicable only for collections and can display only 50 entries at a time. If the entries are less than 50, then <u>Members@odata.nextLink</u> property will not be displayed. For example, if only 30 logs, <u>Members@odata.nextLink</u> will not be shown. If it has 63 logs, then <u>Members@odata.nextLink</u> will show.

Notes: These ODATA properties should be present in each JSON response for all Redfish URI's mentioned in the document.

1. From RTP1.7 onwards, AMI's redfish implementation supports strong **ETag** support.
2. If a client calls PUT or PATCH to update a resource, it should include an **ETag** from a previous GET in the HTTP If-Match or If-None-Match header.
3. If a service supports the return of the **ETag** header on a resource, the service may respond with HTTP 428 status code if the If-Match or If-None-Match header is missing from the PUT or PATCH request for the same resource, as specified in RFC6585.
4. The format of the **ETag** header is: **ETag: "<string>"**
5. In addition to the return of the ETag property on each resource, a Redfish Service should return the **ETag** header on:
 - A client PUT, POST, or PATCH operation
 - A GET operation for an individual resource

Protocol Version

1. The protocol version is separate from the version of the resources or the version of the Redfish Schema supported by them.
2. The root URI for this version of the Redfish protocol shall be `/redfish/v1/`.
3. While the major version of the protocol is represented in the URI, the major version, minor version and errata version of the protocol are represented in the Version property of the Service Root resource, as defined in the Redfish Schema for that resource. The protocol version is a string of the format:
Major Version.Minor Version.Errata Version

Variable	Type	Version	Description
<i>Major Version</i>	Integer	Major	A backward-compatible class change.
<i>Minor Version</i>	Integer	Minor	A minor update. Redfish introduces new functionality but does not remove any functionality. The minor version preserves compatibility with earlier minor versions.
<i>Errata Version</i>	Integer	Errata	A fix in the earlier version.

4. Any resource discovered through links found by accessing the root service or any service or resource referenced using references from the root service shall conform to the same version of the protocol supported by the root service.

URI Query Rule

URIs, as described in RFC3986, may also contain a query (**?query**) and a frag (**#frag**) component. Queries are addressed in the clause Query Parameters as Redfish Scalable Platforms Management API Specification DSP0266 described. Fragments (frag) should be ignored by the server when used as the URI for submitting an operation.

Table 2. URI Query Method Rule Example

Resource URI	Description
<code>/redfish/v1/Systems?\$skip=1</code>	Services support the odata query parameters. \$skip, \$top, \$expand, \$select, \$filter, excerpt, only
<code>/redfish/v1/Systems?\$expand=*</code> <code>/redfish/v1/Systems?\$expand=.</code> <code>/redfish/v1/Systems?\$expand=~</code> <code>/redfish/v1/Systems?\$expand=.\$(levels=2)</code>	The \$expand query supports asterisk (*) , period (.) and tilde (~) to determine which hyperlinks should be expanded. The \$levels indicates how many levels the service should cascade the expand operation.
<code>/redfish/v1/Systems?\$except=1</code>	Implementation shall return the 501, Not Implemented, status code for any query parameters starting with "\$" that are not supported and should return an extended error indicating the requested query parameter(s) not supported for this resource.

Table 2. URI Query Method Rule Example (continued)

Resource URI	Description
/redfish/v1/Systems?only&\$expand=*	Implementations shall return the 400, Bad Request, status code if only is being combined with other query parameters.
/redfish/v1/?1	Implementations shall ignore unknown or unsupported query parameters that do not begin with "\$".
/redfish/v1/# /redfish/v1/#5555 /redfish/v1/##?\$top=1	Fragments (#frag) shall be ignored by the server when used as the URI for submitting an operation.

The response body shall reflect the evaluation of the query parameters in this order: \$skip → \$top → \$expand → excerpt → \$select.

URI Rules

Redfish Service supports a small set of defined default URIs without authentication.

Table 3. URIs Without Authentication

URI	Description
/redfish	URI used to return the version
/redfish/v1/	URI for the Redfish Service Root
/redfish/v1/odata	URI for OData Service Document
/redfish/v1/\$metadata	URI for metadata document
/redfish/v1/openapi.yaml	URI for OpenAPI document

The following Redfish URI is redirected to the Associated URI as given below:

Table 4. Associated URI

URI	Associated Redfish-Defined URI
/redfish/v1	/redfish/v1/

Notes:

- The other defined and relative Redfish URIs are accessed using basic Authentication.
- All URI with a trailing slash will be redirected to the same URI without a trailing slash and will send the response status and body as the original URI

For example: "/redfish/v1/Systems/{{system_instance}}/" with a trailing slash will be redirected to "/redfish/v1/Systems/{{system_instance}}" and both will display the same response.

URI Character Syntax

A URI should include a limited set of US-ASCII-defined characters and not include any RFC1738-defined unsafe characters.

Table 5. URI Characters

Type	Characters	Note
Allowed	digits ("0" to "9")	
	letters ("A" to "Z" / "a" to "z")	
	hyphen ("-")	
	period(".")	
	underscore("_")	
Not allowed	greater-than symbol and less-than symbol(">" and "<")	Unsafe because they are used as the delimiters around URLs in free text.
	quotation mark(" ")	Unsafe because it is used to delimit URLs in some systems.
	hash sign("#")	Unsafe and should always be encoded because it is used on World Wide Web and in other systems to delimit a URL from a fragment/anchor identifier that might follow it. Note: Do not use the character for anything other than the start of a fragment.
	percent sign("%")	Unsafe because it is used for encodings of other characters.
	<ul style="list-style-type: none"> curly braces("{ " and "}") vertical bar(" ") backslash("\") caret("^") tilde("~") tilde("[" and "]") grave accent("`") space(" ") 	Unsafe because gateways and other transport agents are known to sometimes modify such characters.

Redfish Collection

Table 6. Collection Properties

Name	Type	Read-only	Description
@odata.context	String	True	Refer to Table 11 “Resource Complex Types” on page 14.
@odata.id	String	True	
@odata.type	String	True	
@odata.etag	String	True	
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Members	Array	True	Contains the members of this collection.
Members@odata.count	Number	True	Collection members count.
Name	String	True	Name of the Collection.
Description	String	True	Provides a description of the resource.

Authorization

As per current implementation, Basic Auth is considered as first priority and Session Auth is considered as second priority and hence we will be returning Status Codes as below:

- Valid Authorization and Invalid X-Auth-Token Access Granted
- Invalid Authorization and Valid X-Auth-Token - 401 AccessDenied

Note: The ability to check for the validity of both "Authorization" and-"X-Auth-Token" headers will increase the overall response time of GET requests.

- Invalid Authorization and Invalid X-Auth-Token - 401 AccessDenied
- No Authorization and ValidX-Auth-Token Access Granted

Important: Session Authentication can be used only when no authorization headers are given in the requests.

Note: To make the Redfish password more secure, we are using dynamic salt (separate salt value for each redfish user) instead of static salt and will use SHA512 digest for generating password hash.

Read Requests (GET)

The GET method is used to retrieve a representation of a resource. That representation can either be a single resource or a collection.

- **Service Root Request**

The root URL for Redfish version 1 services shall be **"/redfish/v1/"**. The root URL for the service returns a ServiceRoot resource as defined by this specification.

- **Metadata Document Request**

Redfish services shall expose a metadata document describing the service at the **"/redfish/v1/\$metadata"** resource. The Services shall not require authentication to retrieve the metadata document.

- **OData Service Document Request**

Redfish services shall expose an OData Service Document, at the **"/redfish/v1/odata"** resource. This service document provides a standard format for enumerating the resources. Services shall not require authentication to retrieve the service document.

- **Resource Retrieval Requests**

Clients request resources by issuing GET requests to the URI for individual resource or resource collection. The URI for a resource or resource collection may be obtained from a resource identifier property returned in a previous request.

- **HEAD**

The HEAD method differs from the GET method in that it **MUST NOT** return message body information. However, all of the same meta-information and status codes in the HTTP headers will be returned as though a GET method were processed, including authorization checks. Services may support the HEAD method in order to return meta-information in the form of HTTP response headers. Services may support the HEAD method in order to verify link validity. Services may support the HEAD method in order to verify resource accessibility. Services shall not support any other use of the HEAD method. The HEAD method shall be idempotent in the absence of outside changes to the resource.

Data Modification Requests

Clients create, modify, and delete resources by issuing the appropriate Create, Update, Replace or Delete operation, or by invoking an Action on the resource. All the data modification requests will be validated in the following order.

1. **Validation for valid-URI** → 404 “StatusCode for Invalid URI’S”
2. **Validation for valid Method** → 405 “StatusCode for Invalid Method”
3. **Validation for valid request body** → 415 “StatusCode for Invalid RequestBody Type”
4. **Authorization** → 401 “StatusCode for Invalid Redfish Credentials”
5. **User Privilege** → 403 “StatusCode for Insufficient Redfish Privileges for the given Redfish Account in Authorization”

Notes:

- The maximum request size set for the request body in Redfish is 20KB.
- In the request body, if the given property value is a number and it ends with a dot (.), then it will be considered as an integer. For example, if the input value is 6. Or 6.0, then it will be saved as 6 only.

Method	Description
Update (PATCH)	<p>The PATCH method is the preferred method used to perform updates on pre-existing resources. Changes to the resource are sent in the request body. Properties not specified in the request body are not directly changed by the PATCH request. The response is either empty or a representation of the resource after the update was done. The implementation may reject the update operation on certain fields based on its own policies and, if so, shall not apply any of the updates requested.</p> <p>Notes:</p> <ul style="list-style-type: none">• From RTP 1.5 and onwards all PATCH request requires a valid precondition header (If-Match or If-None-Match) with the request as per Redfish 1.5 Specification. Any request without a precondition header will be rejected with HTTP-428-PreConditionRequired, and requests with failed precondition header will be rejected with HTTP-412-PreConditionFailed.• The size of individual properties of type "string" is by default limited to 500B. But it can be changed in the "property-size" table during build time if required.
Replace (PUT)	<p>The PUT method is used to completely replace a resource. Properties omitted from the request body are reset to their default value.</p> <p>Note: From RTP 1.5 and onwards all PUT request requires a valid precondition header (If-Match or If-None-Match) with the request as per Redfish 1.5 Specification. Any request without a precondition header will be rejected with HTTP-428-PreConditionRequired, and requests with failed precondition header will be rejected with HTTP-412-PreConditionFailed.</p>
Create (POST)	<p>The POST method is used to create a new resource. The POST request is submitted to the resource collection in which the new resource is to belong. Submitting a POST request to a resource representing a collection is equivalent to submitting the same request to the Members property of that resource.</p>

Method	Description
Delete(DELETE)	The DELETE method is used to remove a resource. Services shall support the DELETE method for resources that can be deleted.
Actions(POST)	The POST method is used to initiate operations on the object (such as Actions). Services shall support the POST method for sending actions. The POST operation may not be idempotent.

Error Response

In the case of an error, Redfish REST API responds with an HTTP status code, as defined by the HTTP 1.1 specification and constrained by additional requirements defined in this specification.

The status codes alone often do not provide enough information to determine the error cause. The Redfish REST API returns extended error information as a JSON object with a single property named error.

Table 7. Error Code Response

Attribute	Description
Message ID	String indicating a specific error or message (not to be confused with the HTTP status code). This code can be used to access a detailed message of a message registry.
Message	This is the human-readable message, if provided. This property shall contain an optional human-readable message.
Message Args	An optional array of strings representing the substitution parameter values for the message. This shall be included in the Response: if a Message ID is specified for a parameterized message.
Severity	An optional string representing the severity of the error.
Resolution	An optional string describing recommended action(s) to take to resolve the error.
Related Properties	An optional array of JSON Pointers defining the specific properties within the JSON payload described by the message.

Notes: While passing empty data in the request body of the POST call, the following error Message ID will be shown in the response.

- POST Actions which require mandatory parameters for execution:

"MessageId": "Base.1.5.ActionParameterMissing" or

"MessageId": "Base.1.5.PropertyMissing" or

"MessageId": "Base.1.5.EmptyJSON"

- POST Action which is used for the creation of resources:

"MessageId": "Base.1.5.ActionParameterMissing" or

"MessageId": "Base.1.5.PropertyMissing" or

"MessageId": "Base.1.5.EmptyJSON"

Table 8. Common error status codes

Error code	Description
404 Not Found	The request specified a URI of a resource that does not exist. This status code is returned for any of the HTTP Methods namely GET, POST, PATCH, DELETE and PUT.
400 Bad Request	The request could not be processed because it contains missing or invalid information (such as validation error on an input field, a missing required value, and so on). An extended error shall be returned in the response body, as defined in the above-mentioned table. This is typically returned with a PATCH or POST response involving request parameters.
405 Method Not Found	The HTTP verb specified in the request (e.g., DELETE, GET, HEAD, POST, PUT, PATCH) is not supported for this request URI. The response shall include an Allow header which provides a list of methods that are supported by the resource identified by the Request-URI. This is typically returned with POST, PATCH, DELETE, and PUT on the URL for which it's not supported.

Request Validation Sequence

1. Check authorization. If not granted, throw 401 "**Security.1.0. AccessDenied**".
2. Check entity privilege. If not granted, throw 403 "**Security.1.0. InsufficientPrivilege**".
3. Check if URI exists or not. If it doesn't exist, throw 404 "**Base.1.0.ResourceMissingAtURI**".
4. Check whether Redfish is in firmware update. If Redfish is in firmware update, throw 403 "**Security.1.0. FWUpdateInProgress**".
5. Check allow method. If operation not allowed, throw 405 " **HttpStatus.1.0.MethodNotAllowed**".
6. Check request body media type. If not correct, throw 415 "**HttpStatus.1.0.UnsupportedMediaType**".
7. Check request body format. If not correct, throw 400 "**Base.1.0.UnrecognizedRequestBody**".
8. If the request method is PUT/PATCH check for the precondition header and if the header is not present, throw 428 "**Ami.1.0.PreconditionHeaderMissing**".

If the header is available validate Precondition Header and throw 412 "**HttpStatus.1.0. PreconditionFailed**" if validation fails.

9. Check for property validation errors in request-body and throw a suitable 400 BadRequest error.

Resource Properties

This section describes the resource properties.

Table 9. Resource Type Definitions

Name	Type	Read Only	Description				
Id	String	True	Uniquely identifies the resource within the collection of like resources.				
Description	Null, String	True	This object represents the Name property.				
Name	String	True	Provides a description of this resource and is used for commonality in the schema definitions.				
UUID	String	True	pattern: ([0-9a-f]{8}-[0-9a-f]{4}-[0-9a-f]{4}-[0-9a-f]{4}-[0-9a-f]{12})				
Identifier	Object	True	<table> <tr> <th>Name</th><th>Type</th><th>Read Only</th><th>Description</th></tr> </table>	Name	Type	Read Only	Description
Name	Type	Read Only	Description				

Table 9. Resource Type Definitions (continued)

Name	Type	Read Only	Description			
			DurableName	String	True	This indicates the world wide, persistent name of the resource.
			DurableName Format		True	This represents the format of the DurableName property.

All EnumTypes mentioned in this table are of the "**String**" type.

Table 10. Resource - Enum Type

State	
Enum	Description
Enabled	This function or resource has been enabled.
Disabled	This function or resource has been disabled.
StandbyOffline	This function or resource is enabled, but awaiting an external action to activate it.
StandbySpare	This function or resource is part of a redundancy set and is awaiting a failover or other external action to activate it.
InTest	This function or resource is undergoing testing.
Starting	This function or resource is starting.
Absent	This function or resource is not present or not detected.
UnavailableOffline	This function or resource is present but cannot be used.
Deferring	The element will not process any commands but will queue new requests.
Quiesced	The element is enabled but only processes a restricted set of commands.
Updating	The element is updating and may be unavailable or degraded.
Reset	
On	Turn the system on.
ForceOff	Turn the system off immediately (non-graceful) shutdown.
GracefulShutdown	Perform a graceful system shutdown and power off.
ForceRestart	Perform an immediate (non-graceful) shutdown, followed by a restart of the system.
Health / HealthRollup	
OK	Normal
Warning	A condition exists that requires attention.
Critical	A critical condition exists that requires immediate attention.
IndicatorLED	
Lit	The Indicator LED is lit.

Table 10. Resource - Enum Type (continued)

State	
Enum	Description
Blinking	The Indicator LED is blinking. Note: The property Blinking indicates that indicator LED turns ON blinking to the time interval specified in IPMI.
Off	The Indicator LED is off.

Table 11. Resource Complex Types

Links			
Property	Type	Description	
Oem	Object	This object represents the Oem property. It can also contain an object of the type OemObject.	
Status			
Property	Type	Read Only	Description
State	String	True	<p>This property shall represent if this component is available or not.</p> <p>See Table 10 “Resource - Enum Type” on page 13.</p> <p>EnableD indicates the resource is available. DisableD indicates the resource has been intentionally made unavailable but it can be enabled. Offline indicates the resource is unavailable intentionally and requires action to be made available. In Test indicates that the component is undergoing testing. Starting indicates that the resource is on its way to becoming available. Absent indicates the resources are physically unavailable.</p>
HealthRollup	String	True	This property shall represent the HealthState of the resource and its dependent resources.
Health	String	True	This property shall represent the HealthState of the resource without considering its dependent resources.
Oem	Object	False	Oem extension object. This object represents the Oem properties.

Table 12. Resource.v1_8_1 schema property

Identifier				
Property Name	Type	Read Only	Description	
DurableName	String	True	This property shall contain the worldwide unique identifier for the resource.	
DurableName Format	String	True	This property shall represent the format of the DurableName property.	
			<div>Enum</div>	<div>Description</div>
			NAA	This durable name shall be a hexadecimal representation of the Name Address Authority structure as defined in the T11 Fibre Channel - Framing and Signaling - 3 (FC-FS-3) specification.

Table 12. Resource.v1_8_1 schema property (continued)

			FC_WWN	This durable name shall be a hexadecimal representation of the Worldwide Name format as defined in the T11 Fibre Channel Physical and Signaling Interface Specification.																
			UUID	This durable name shall be the hexadecimal representation of the Universal Unique Identifier as defined in the International Telecom Union's OSI networking and system aspects - Naming, Addressing and Registration Specification.																
			EUI	This durable name shall be the hexadecimal representation of the IEEE-defined 64-bit Extended Unique Identifier as defined in the IEEE's Guidelines for 64-bit Global Identifier (EUI-64) Specification.																
			iQN	This durable name shall be in the iSCSI Qualified Name format as defined in RFC 3720 and RFC 3721.																
Location																				
Name	Type	Read Only	Description																	
AltitudeMeters	Number	True	The altitude of the resource in meters.																	
Latitude	Number	True	The latitude resources.																	
Longitude	Number	True	The longitude resource in degrees.																	
Oem	Object	True	See Table 9 “resource_type_definitions” on page 12 . Note: This property will be a part of JSON response only if an OEM property is implemented according to the "How to Add OEM extensions" document.																	
Contacts	Array	True	Array of contact information.																	
			<table><tr><td>Name</td><td>Type</td><td>Read Only</td><td>Description</td></tr><tr><td>Contact</td><td>String</td><td>False</td><td>Name of this contact.</td></tr><tr><td>EmailAddress</td><td>String</td><td>False</td><td>Email address for this contact.</td></tr><tr><td>PhoneNumber</td><td>String</td><td>False</td><td>Phone number for this contact.</td></tr></table>		Name	Type	Read Only	Description	Contact	String	False	Name of this contact.	EmailAddress	String	False	Email address for this contact.	PhoneNumber	String	False	Phone number for this contact.
			Name	Type	Read Only	Description														
			Contact	String	False	Name of this contact.														
			EmailAddress	String	False	Email address for this contact.														
PhoneNumber	String	False	Phone number for this contact.																	

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Table 12. Resource.v1_8_1 schema property (continued)

PartLocation	Object	True	Postal address of the addressed resource.			
			Name	Type	Read Only	Description
			Location OrdinalValue	Number	True	The number that represents the location of the part. If LocationType is slot and this unit is in slot 2 then the LocationOrdinalValue will be 2.
			Location Type	Object	True	The type of location of the part, such as slot, bay, socket, and slot.
						Enum Description
						Slot Defines a slot as the type of location.
						Bay Defines a bay as the type of location.
						Connector Defines a bay as the type of location.
						Socket Defines a socket as the type of location.
			Orientation	Object	True	The orientation for the ordering of the slot enumeration used by the LocationOrdinalValue property.
						Enum Description
						FrontToBack Defines a slot as the type of location.
						BackToFront Defines a bay as the type of location.
						TopToBottom Defines a bay as the type of location.
						BottomToTop Defines the ordering for the LocationOrdinalValue is bottom to top.
						LeftToRight Defines the ordering for the LocationOrdinalValue is left to right.
						RightToLeft Defines the ordering for the LocationOrdinalValue is right to left.
			Reference	Object	True	Defines a reference area for the location of the part.
						Enum Description
						Top Defines the part as being in the top of the unit.

Table 12. Resource.v1_8_1 schema property (continued)

						Bottom	Defines the part as being in the bottom of the unit.
						Front	Defines the part as being in the top of the unit.
						Rear	Defines the part as being in the bottom of the unit.
						Left	Defines the part as being in the top of the unit.
						Right	Defines the part as being in the bottom of the unit.
						Middle	Defines the part as being in the middle of the unit.
			Service Label	String	True		

PostalAddress	Object	False	A place within the addressed location.				
			Name		Type	Read Only	Description
			AdditionalInfo		String	False	Area designation or other additional info.
			AdditionalCode		String	False	The value shall conform the requirements of the ADDCODE field as defined in RFC5139.
			Building		String	False	Name of the building.
			City		String	False	City, township, or shi (JP).
			Community		String	False	Postal community name.
			Country		String	False	The value shall conform the requirements of the Country field as defined in RFC5139.
			District		String	False	A county, parish, gun (JP), or district (IN).
			Division		String	False	City division, borough, city district, ward, chou (JP).
			Floor		String	False	The value shall conform the requirements of the FLR field as defined in RFC5139. It is used to provide a floor designation.
			HouseNumber		String	False	Numeric portion of house number.
			HouseNumber Suffix		String	False	House number suffix.

Table 12. Resource.v1_8_1 schema property (continued)

			Landmark	String	False	The value shall conform the requirements of the LMK field as defined in RFC5139. It is used to identify a landmark or vanity address.
			LeadingStreet Direction	String	False	A leading street direction.
			Location	String	False	Room designation or other additional info.
			Name	String	False	The value shall conform the requirements of the NAM field as defined in RFC5139. It is used to name the occupant.
			POBox	String	False	Post office box (P.O. box).
			PlaceType	String	False	A description of the type of place that is addressed.
			PostalCode	String	False	Postal code (or zip code).
			Road	String	False	A primary road or street.
			RoadBranch	String	False	Road Branch
			Road PostModifier	String	False	Road post-modifier.
			Road PreModifier	String	False	Road pre-modifier.
			RoadSection	String	False	Road Section
			Road SubBranch	String	False	Road Subbranch
			Room	String	False	Name or number of the room.
			Seat	String	False	Seat (desk, cubicle, workstation).
			Street	String	False	Street name
			StreetSuffix	String	False	Avenue, Platz, Street, Circle.
			Territory	String	False	A top-level subdivision within a country.
			TrailingStreet Suffix	String	False	A trailing street suffix.
			Unit	String	False	Name or number of the unit (apartment, suite).
			Neighborhood	String	False	Neighborhood or block.
Placement	Object	False	Postal address of the addressed resource.			
			Name	Type	Read Only	Description
			AdditionalInfo	String	False	Area designation or other additional info.
			Rack	String	False	Name of a rack location within a row.

Table 12. Resource.v1_8_1 schema property (continued)

			RackOffset	Number	False	Vertical location of the item in terms of RackOffsetUnits.	
			RackOffset Units	String	False	Enum	Description
						OpenU	Defines a rack unit as being equal to 48 mm (1.89 in).
						EIA_310	Defines a rack unit as being equal to 1.75 in (44.45 mm).
			Row	String	False	Name of row	

Table 13. Enum Types Indicator LED

Member Name	Description
Lit	The Indicator LED is lit.
Blinking	The Indicator LED is blinking.
Off	The Indicator LED is off.

Note: The properties in Resource Type are inherited by all properties.

The property Blinking indicates that indicator LED turns ON blinking to the time interval specified in IPMI.

Collection Capabilities Annotation

1. The **Collection Capabilities** annotation allows a client to discover which collections in the service support compositions, how the POST request for the collection is formatted, as well as what properties are required.
2. "**@Redfish.Collection Capabilities**" is available under the following resources:
 - Systems Collection - "redfish/v1/Systems"
 - **Resource Zone** Instance - "redfish/v1/CompositionService/ResourceZones/1"
3. The following attributes are available in **@Redfish.CollectionCapabilities** annotation.

Table 14. Collection Capabilities Annotation Property List

Name	Type	Read-only	Description
Capabilities	Array	True	<ol style="list-style-type: none"> 1. This property shall contain an array of objects that describe the capabilities of this resource collection. 2. Refer to Table 15 "Capabilities Annotation Property List" on page 19
MaxMembers	Integer	True	The maximum number of members allowed in this collection.

Table 15. Capabilities Annotation Property List

Name	Type	Read-only	Description
UseCase	String	True	This property represents the use case in which a client may issue a POST request to the collection.

Table 15. Capabilities Annotation Property List (continued)

			Enum	Description		
			ComputerSystem Composition	This capability describes a client creating a new ComputerSystem instance from a set of disaggregated hardware.		
Links(M)	Object	True	The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but not contained by (subordinate to), this resource.			
			Name	Type	Read-only	Description
			RelatedItem	Array	True	The ID(s) of the resources associated with this capability.
			TargetCollection (M)	Array	True	Reference to the collection that this capabilities structure is describing.
CapabilitiesObject	Object	True	Reference to the resource the client may GET to understand how to form a POST request for a given collection.			

Chapter 3. Service root

This resource represents the root of the Redfish service, located at the `/redfish/v1/` URI. As a hypermedia API, all other resources accessible through the Redfish interface on this device are linked directly or indirectly from the Service Root.

GET – Service Root

Use the GET method to retrieve properties in Service Root (`/redfish/v1/`) for Redfish service.

Request

GET `https://{IP}/redfish/v1/`

Content-Type: `application/json`

Response

The response of the request will be in JSON format. The properties are mentioned in the following.

Table 16. Service Root Properties

Name	Type	Read-only	Description																
ODataAttributes			Refer to “OData Support” on page 5																
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14																
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12																
Name(M)	String	True																	
Description	String	True																	
UUID	String	True																	
RedfishVersion	String	True	The value of this string shall represent the version of the Redfish service. The format of this string shall be of the format major-version.minor-version.errata in compliance with the Protocol Version Section of the Redfish specification.																
Product	String	True	The product name associated with this Redfish service.																
ProtocolFeatures Supported	Object	True	Contains information about protocol features supported by the service.																
			<table><tr><th>Name</th><th>Type</th><th>Read-only</th><th>Description</th></tr><tr><td>ExcerptQuery</td><td>Boolean</td><td>True</td><td>This indicates whether the 'excerpt' query parameter is supported.</td></tr><tr><td>ExpandQuery</td><td>Object</td><td>True</td><td>Contains information about the use of \$expand in the service. Refer to Table 17 “Expand Query Properties” on page 22</td></tr><tr><td>FilterQuery</td><td>Boolean</td><td>True</td><td>This indicates whether the \$filter query parameter is supported.</td></tr></table>	Name	Type	Read-only	Description	ExcerptQuery	Boolean	True	This indicates whether the 'excerpt' query parameter is supported.	ExpandQuery	Object	True	Contains information about the use of \$expand in the service. Refer to Table 17 “Expand Query Properties” on page 22	FilterQuery	Boolean	True	This indicates whether the \$filter query parameter is supported.
			Name	Type	Read-only	Description													
			ExcerptQuery	Boolean	True	This indicates whether the 'excerpt' query parameter is supported.													
			ExpandQuery	Object	True	Contains information about the use of \$expand in the service. Refer to Table 17 “Expand Query Properties” on page 22													
FilterQuery	Boolean	True	This indicates whether the \$filter query parameter is supported.																

Table 16. Service Root Properties (continued)

Name	Type	Read-only	Description			
			OnlyMemberQuery	Boolean	True	This indicates whether the 'only' query parameter is supported.
			SelectQuery	Boolean	True	This indicates whether the \$select query parameter is supported.
Systems(N)	Object	True	Link to a collection of Systems			
Chassis(N)	Object	True	Link to a collection of Chassis			
Managers(N)	Object	True	Link to a collection of Managers			
Tasks(N)	Object	True	Link to Task Service			
AccountService(N)	Object	True	Link to the Account Service.			
EventService(N)	Object	True	Link to the Event Service.			
SessionService(N)	Object	True	Link to the Session Service.			
Registries(N)	Object	True	Link to a collection of Registries.			
JsonSchemas(N)	Object	True	Link to a collection of Json-Schema files.			
UpdateService(N)	Object	True	Link to the Update Service.			
CompositionService	Object	True	Link to the Composition Service.			
TelemetryService	Object	True	Link to the Telemetry Service.			
Vendor	String	True	The vendor or manufacturer associated with this Redfish service.			
CertificateService	Object	True	Link to the Certificate Service.			
Links(M)	Object	True	The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but not contained by (subordinate to), this resource.			
			Name	Type	Read-only	Description
			Oem	Object	False	OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
			Session	Array	True	Link to a collection of Sessions

Table 17. Expand Query Properties

Name	Type	Read-only	Description
ExpandAll	Boolean	True	This indicates whether the \$expand support of asterisk (expand all entries) is supported.
Levels	Boolean	True	This indicates whether the expand support of the \$levels qualifier is supported by the service.
Links	Boolean	True	This indicates whether the \$expand support of tilde (expand only entries in the Links section) is supported.

Table 17. Expand Query Properties (continued)

MaxLevels	Boolean	True	This indicates the maximum number value of the \$levels qualifier in \$expand operations.
NoLinks	Boolean	True	This indicates whether the \$expand support of period (expand only entries not in the Links section) is supported.

Table 18. OEM Object of Service Root

Name	Type	Read-only	Description			
Ami	Object	True	Contains information related to AMI features supported by the service.			
			Name	Type	Read-only	Description
			@odata.type	String	True	Refer to “OData Support” on page 5
			Configurations	Object	True	A reference to AMI Oem Configurations URI. Note: Links will be available only when AMI OEM Extension feature is enabled.
			Inventory DataStatus	Object	True	A reference to the InventoryData Status URI. Note: Links will be available only when AMI OEM Host Interface feature is enabled.
			RtpVersion	String	True	This indicates the Redfish Technology Pack version.

Chapter 4. Session

GET – Session Service

This resource is used to represent the Session Service Properties of a Redfish service. It represents the properties for the service itself and has links to the actual list of sessions.

Request

GET `https://{ip}/redfish/v1/UpdateService/upload`

Content-Type: application/json

Response

The response to the request will be in JSON format. The properties are mentioned in the following parameters:

Table 19. Session Service Properties

Name	Type	Read-only	Description
ODataAttributes			Refer to “OData Support” on page 5
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
Status	Object	True	Refer to “Resource Type Definitions” on page 12 for Resource. Oem.
ServiceEnabled(C)	Boolean	False	This indicates whether this service is enabled.
SessionTimeout(C)	Number	False	This is the number of seconds of inactivity that a session may have before the session service closes the session due to inactivity. Minimum Value :30 & Maximum Value: 86400.
Sessions	Object	True	This property shall contain the link to a collection of Sessions.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.

PATCH – Session Service

Use the patch method to change properties in SessionService.

Request

PATCH `https://{IP}/redfish/v1/SessionService`

Content-Type: application/json

Request body

Please refer to the properties that are patchable in [Table 19 “Session Service Properties” on page 25](#) for which ReadOnly is False that can be sent as Request body in JSON format.

Request example

```
{  
  
  "ServiceEnabled": true,  
  
  "SessionTimeout": 250  
  
}
```

Response

The response status is a success with status code of **204** and no response body.

For Error Responses, please refer to [“Error Response” on page 11](#).

GET – Sessions

It displays the collection of links to each session.

Note: The list will be populated and point `odata.id` links to the session resources, only if the sessions are created via the below-given POST API otherwise the Members list will be empty.

Request

GET `https://{IP}}/redfish/v1/SessionService/Sessions`

Content-Type: `application/json`

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response properties.

POST – Creating New Session

Create a session resource for further access authentications.

Request

POST `https://{IP}}/redfish/v1/SessionService/Sessions`

Content-Type: `application/json`

Request example

```
{  
  
  "UserName": "Administrator",  
  
  "Password": "superuser"  
  
}
```

Response

The response status is **201** and the response body is a GET Response with the properties of the newly created Session.

For Error Responses, please refer to [“Error Response” on page 11](#).

Notes:

1. The maximum number of active sessions is limited to 10.
2. Creation of the new Session will add log in Managers EventLog.
3. New sessions cannot be created when AccountService is Disabled i.e when the property ServiceEnabled for AccountService is False. However, established sessions may continue to run.

GET – Session Properties

Use the GET method to display the Session details for the given session.

Note: This URI is available only when the session is created by the above-given POST API.

Request

GET `https://{IP}/redfish/v1/SessionService/Sessions/{session_id}`

Content-Type: application/json

Response

The response to the request will be in JSON format. The properties are mentioned in the following table.

Table 20. Session Properties

Name	Type	Read-only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
UserName	String	True	The UserName for the account for this session. The value of this property shall be the UserName that matches a registered account identified by a ManagerAccount resource registered with the Account Service.
Password	String	True	This property is used in a POST to specify a password when creating a new session. The value of this property shall be the password for this session. Note: This property would not be shown in GET Response.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.

DELETE – Session

Use the DELETE method to delete session resource for Redfish service. Remove the session established for client access.

Request

DELETE `https://{IP}/redfish/v1/SessionService/Sessions/{session_id}`

Content-Type: application/json

Response

1. The response status is 204 and no response body. For Error Responses, please refer to [“Error Response” on page 11](#).
2. Deletion of Session or Session Timeout will add log in Managers EventLog.

Chapter 5. Account

GET – Account Service

1. This resource shall be used to represent a management account service for a Redfish implementation. Allows users to create multiple accounts with different roles and privileges.
2. The maximum limit for accounts is 14.

Request

GET https://{ip}/redfish/v1/AccountService

Content-Type: application/json

Response

The response to the request will be in JSON format. The properties are mentioned in the following table.

Table 21. Account Service Property

Name	Type	Read-only	Description																
(OData Attributes)			Refer to “OData Support” on page 5																
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12.																
Name(M)	String	True																	
Description	String	True																	
Oem	Object		Specifies the AMI Oem Properties. Note: This property will be a part of JSON response only if an OEM property is implemented.																
			<table><tr><th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr><tr><td>@odata.type</td><td>String</td><td>True</td><td>Refer to “OData Support” on page 5</td></tr><tr><td>Configuration</td><td>Object</td><td>True</td><td>Refer AccountService Configuration</td></tr><tr><td>H5ViewerToken</td><td>String</td><td>True</td><td>Lenovo OEM to get H5 Viewer token to open KVM</td></tr></table>	Name	Type	Read only	Description	@odata.type	String	True	Refer to “OData Support” on page 5	Configuration	Object	True	Refer AccountService Configuration	H5ViewerToken	String	True	Lenovo OEM to get H5 Viewer token to open KVM
			Name	Type	Read only	Description													
			@odata.type	String	True	Refer to “OData Support” on page 5													
			Configuration	Object	True	Refer AccountService Configuration													
H5ViewerToken	String	True	Lenovo OEM to get H5 Viewer token to open KVM																
Status	Object	True	Refer to “Resource Properties” on page 12.																
ServiceEnabled	Boolean	False	This indicates whether this service is enabled. The default value for this property is True. If the value for this property is false, then service is disabled and Redfish. Users cannot be created, deleted, or modified, and new sessions cannot be created. However, established sessions may still continue to run. This does not affect any Authentication connections.																

Table 21. Account Service Property (continued)

AuthFailure LoggingThreshold	Number	False	<p>This is the number of authorization failures that need to occur before the failure attempt is logged into the manager log. This represents a modulo function value, thus the failure shall be logged every (n+1)th occurrence where n represents the value of this property. Minimum Value : 0.</p> <p>Notes:</p> <ul style="list-style-type: none"> • The maximum value allowed is 50, the default being 3. • When the value for this property is 0 then failures will be logged for every attempt. • When the value for this property is 1 then the failures will be logged for every 2nd attempt and so on. • It will reset back to 0 on a successful login attempt, after logging an entry and when service restarts.
MinPassword Length(C)	Number	True	<p>This property shall reference the minimum password length that the implementation will allow a password to be set to.</p> <p>Minimum Value : 0.</p>
MaxPassword Length(C)	Number	True	<p>This property shall reference the maximum password length that the implementation will allow a password to be set to.</p> <p>Minimum Value : 0.</p>
AccountLockout Threshold(C)	Number	False	<p>The number of failed login attempts before a user account is locked for a specified duration. (0=never locked) Minimum Value : 0. Default value is 5.</p> <p>Note: The maximum value allowed is 100.</p>
AccountLockout Duration(C)	Number	False	<p>This property shall reference the period of time in seconds that an account is locked after the number of failed login attempts reaches the threshold referenced by Account Lockout Threshold, within the window of time referenced by Account Lockout Counter Reset After. The value shall be greater than or equal to the value of Account Lockout Reset After. If set to 0, no lockout shall occur. Minimum Value: 0.</p> <p>Note: Maximum value allowed is 10000.</p> <p>Account Lockout feature is applicable only for redfish defined accounts not for remote accounts like LDAP, AD, RADIUS, etc.</p>
AccountLockout CounterResetAfter(C)	Number	False	<p>This property shall reference the threshold of time in seconds from the last failed login attempt at which point the Account Lockout Threshold counter (that counts the number of failed login attempts) is reset back to zero (at which point Account Lockout Threshold failures would be required before the account is locked). This value shall be less than or equal to Account Lockout Duration. The threshold counter also resets to zero after each successful login. Minimum Value: 0.</p> <p>Note: The maximum value allowed is 10000.</p> <p>Account Lockout feature is applicable only for redfish defined account not for remote accounts like LDAP, AD, RADIUS etc.</p>
Accounts	Object	True	<p>This property shall contain the link to a collection of type ManagerAccountCollection.</p>
Roles	Object	True	<p>This property shall contain the link to a collection of type RoleCollection.</p>
PrivilegeMap	Object	True	<p>This property shall contain the link to the Priviledge Registry property.</p>

Table 21. Account Service Property (continued)

Actions	Object	True	This object will contain the actions for this resource under Oem property if any.
LocalAccountAuth	String	False	<p>This property shall govern how the service uses the Accounts collection within this AccountService as part of authentication. Details about each of the modes are found in the description of the enum values.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The default value for this property shall be "LocalFirst". 2. Refer to Table 22 “Enum Properties for LocalAccountAuth” on page 31.
AccountLockoutCounterResetEnabled	Boolean	False	<p>This property shall indicate whether the threshold counter will be reset after the AccountLockoutCounterResetAfter has expired. Setting the value to false shall indicate that only a successful login will reset the threshold counter. In addition, if the user reaches the limit specified in AccountLockoutThreshold, the account shall be locked out indefinitely and only a reset by the administrator will clear the threshold counter. If this property is absent the value shall be assumed to be true.</p> <p>Notes: There are two conditions used to restrict account lockout.</p> <ol style="list-style-type: none"> 1. The first is that property AccountLockoutCounterResetEnabled cannot be patched to False when there is only an enabled Administrator account, and prevent the problem that the only available Administrator account is locked. 2. Also, if the user deletes user after patch as false (meanwhile user is more than two, not limited by the first condition). AML offers the constant to enable the last administrator account will never be locked.
LDAP	Object	False	Refer to Table 24 “LDAP Properties” on page 32.
ActiveDirectory	Object	False	Refer to Table 28 “Active Directory Properties” on page 34.
AdditionalExternalAccountProviders	Object	True	This property shall contain the additional external account providers that this Account Service uses.

LocalAccountAuth

Table 22. Enum Properties for LocalAccountAuth

Name	Description
Enabled	The service authenticates users based on the Account Service-defined accounts collection.
Disabled	<ol style="list-style-type: none"> 1. The service never authenticates users based on the Account Service-defined accounts collection. 2. The redfish implementation will not support this value.
Fallback	The service authenticates users based on the Account Service-defined accounts collection only if any external account providers are currently unreachable.
LocalFirst	The service first authenticates users based on the Account Service-defined accounts collection. If authentication fails, the Service authenticates by using external account providers.

SearchSettings

Table 23. SearchSettings Properties

Name	Type	Read only	Description
Base Distinguished Names	Array	False	The value of this property shall be a collection of base distinguished names to use when searching the LDAP service. Note: If the user gives multiple values in the patch request, only the first value of the array will be set in BMC, as BMC currently supports only one BaseDistinguishedNames.
GroupName Attribute	String	False	The value of this property shall be the attribute name that contains the name of the Group.
GroupsAttribute	String	False	The value of this property shall be the attribute name that contains the Groups for a user.
UsernameAttribute	String	False	The value of this property shall be the attribute name that contains the Username.

LDAP Properties

Table 24. LDAP Properties

Name	Type	Read only	Description			
Authentication	Object	False	LDAP properties containing authentication details			
			Name	Type	Read only	Description
			Authentication Type	String	True	The type of authentication used to connect to the external account provider. Note: Value is "Username AndPassword" for LDAP only.
			Oem	Object	True	OEM extension object
			Username	String	False	The user name for the Service.
			Password	String	False	The password for this Service. A PATCH request writes the password. This property is `null` in responses.
LDAPService	Object	False	See Table 25 “LDAPService Properties” on page 33.			
Remote RoleMapping	Array	False	See Table 26 “RoleMapping Properties” on page 33.			

Table 24. LDAP Properties (continued)

Service Addresses	Array	False	The addresses of the user account providers to which this external account provider links. The format of this field depends on the type of external account provider. Note: If the user gives multiple values in the patch request, only the first value of the array will be set in BMC, as BMC currently supports only one ServiceAddress. If the user provides ipv6 ServiceAddress, it is mandatory to provide the port number in the end.
ServiceEnabled	Boolean	True	An indication of whether this service is enabled.

LDAPService

Table 25. LDAPService Properties

Name	Type	Read only	Description
Search Settings	Object	False	The required settings to search an external LDAP service. See Table 23 “Search Setting Properties” on page 32.
Oem	Object	False	See Table 11 “Resource Complex Types” on page 14.

RoleMapping

Table 26. RoleMapping Properties

Name	Type	Read only	Description			
Remote RoleMapping	Array	False	The mapping rules to convert the external account provide account information to the local Redfish Role.			
			Name	Type	Read only	Description
			LocalRole	String	False	The name of the local Redfish Role to which to map the remote user or group.
			Remote Group	String	False	The name of the remote group, or the remote role in the case of a Redfish Service, maps to the local Redfish Role to which this entity links. Remote Group is a string maximum of 64 alphanumeric characters are allowed. Special symbols hyphen(-) and underscore(_) are allowed.
			Remote User	String	False	The name of the remote user that maps to the local Redfish Role to which this entity links. Remote User is string with maximum 64 alphanumeric characters and special symbols hyphen(-),dot(.) and underscore(_) are allowed.

Table 27. Account Service LDAP OEM Properties

Name	Type	Read only	Description
@odata.type	String	True	Refer to “OData Support” on page 5
Encryption Type	String	False	Indicates the EncryptionType used for UsernameandPassword encryption. Allowable Enums are:-“NoEncryption”, “SSL”, and “StartTLS”. Note: Uploading root CA certificate is needed for “SSL” or “StartTLS” encryption type.
Common Name Type	String	False	It represents the Server name. It contains 2 allowable values : “IPAddress”, “FQDN” Note: FQDN can be patched only when the EncryptionType is “StartTLS”

Active Directory

Table 28. Active Directory Properties

Name	Type	Read only	Description				
Authentication	Object	False	Active Directory properties containing authentication details.				
			Name	Type	Read only	Description	
			Username	String	False	The username for the Service. Username should be String with Minimum length = 1 and Maximum length = 64 of alpha-numeric characters. Username must start with an alphabetical character. Note: This property will not allow whitespaces and special characters.	
			Password	String	False	The password for this Service. The password length must be at least 6 characters long and whitespaces are not allowed. A PATCH or PUT request writes the password. This property is `null` in responses. Note: This property will not allow more than 127 characters.	
			Oem	Object	False	OEM extension object See the Account Service Active Directory OEM Properties .	

Account Service Active Directory OEM

Table 29. Account Service Active Directory OEM Properties

Name	Type	Read only	Description
@odata.type	String	True	Refer to “OData Support” on page 5
DomainName	String	False	Specify the Domain Name for the user.
DomainController ServerAddr1	String	False	IP address of Active Directory server. At least one Domain Controller Server Address must be configured. The following address formats are supported: IPv4 Address format. IPv6 Address format.
DomainController ServerAddr2	String	False	
DomainController ServerAddr3	String	False	
GroupID	String	False	GroupID of the five available roles in RoleMapping.
KVMAccess	String	False	Status of KVM access of the particular role in RoleMapping.
VMediaAccess	String	False	Status of VMedia access of the particular role in RoleMapping.

PATCH – Account Service

Request

PATCH `https://{ip}}/redfish/v1/AccountService`

Content-Type: application/json

Request body

Please refer to the properties that are patchable in [Table 21 “Account Service Property” on page 29](#) for which ReadOnly is False that can be sent as Request body in JSON format.

Request example

```
{
  "AccountLockoutCounterResetAfter":853,
  "AccountLockoutDuration":853,
  "AccountLockoutThreshold":100,
  "AuthFailureLoggingThreshold":3,
  "ServiceEnabled":true
}
```

Response

1. **Account Service** attributes like **LDAP** and **Active Directory** involve IPMI operations whereas the remaining attributes involve **RedisDB operations** alone.
2. The **Response Status Code** and the **Response Body** depend on the **Request Body** being patched and thus can be classified into the below-mentioned scenarios:
 - a. If the Request Body contains attributes, which needs both IPMI operations and RedisDB operations or IPMI operations alone, then the Response Status Code will be 200 OK and the Response Body contains an additional ExtendedInfo Message as below, in addition to the existing response body:


```
{
```

```

"@Message.ExtendedInfo": [
  {
    "@odata.type": "#Message.v1_0_8.Message",
    "Message": "Modifying the values.It may take a few seconds for the changes to reflect",
    "MessageId": "Ami.1.0.ModifyingValues",
    "Resolution": "Wait a few seconds before sending additional requests to this resource."
    "Severity": "OK"
  }
]
}

```

- b. If the Request Body contains attributes (Other than LDAP and AD attributes), which needs RedisDB operations alone, then the Response Status Code will be 204 No Content with no Response Body.
 - c. If there is a request for LDAP OEM properties, the response will return 200 with body in JSON format with the Odata properties.
3. For Error Responses, please refer to [“Error Response” on page 11](#).

PATCH – LDAP and LDAP Service

Request

PATCH `https://{ip}/redfish/v1/AccountService`

Content-Type: application/json

Request body

1. Please refer to the properties that are patchable in [Table 21 “Account Service Property” on page 29](#) for which Read-Only is False that can be sent as Request body in JSON format.
2. "RemoteRoleMapping" property can be patched separately and does not require Authentication.
3. The LDAP properties like "Authentication", "LDAPService", "ServiceAddresses" and "ServiceEnabled" are mandatory while Patching the LDAP configuration for the first time after flash.
4. The "Password" in LDAP Authentication is mandatory to be passed in the request body for patching the LDAP properties like "Username", "LDAPService", "ServiceAddresses" and "ServiceEnabled"(when the value is true in request body).
5. For updating "RemoteRoleMapping" and for updating the LDAP "ServiceEnabled" as false, "Password" is not required. LDAP properties can be patched only when LDAP "ServiceEnabled" value is true.

Request example

```

{
  "LDAP": {
    "Authentication": {
      "Username": "cn=admin,dc=testldap,dc=com",

```

```

    "Password": "ami"
  },
  "RemoteRoleMapping": [
    {
      "LocalRole": "Administrator",
      "RemoteGroup": "group1",
      "RemoteUser": "dc=coretesting,dc=com"
    },
    {
      "LocalRole": "User",
      "RemoteGroup": "group2",
      "RemoteUser": "dc=coretesting,dc=com"
    },
    {
      "LocalRole": "operator",
      "RemoteGroup": "group3",
      "RemoteUser": "dc=coretesting,dc=com"
    }
  ],
  "LDAPService": {
    "SearchSettings": {
      "BaseDistinguishedNames": [
        "dc=testldap,dc=com"
      ],
      "GroupsAttribute": "cn"
    }
  },
  "ServiceAddresses": [
    "10.0.125.48:389"
  ],

```

```

        "ServiceEnabled":true
    }
}

```

Set encryption type for LDAP service. Please refer to the properties defined in [Table 27 “Account Service LDAP OEM Properties” on page 34](#)

Example PATCH Request Body – NoEncryption

```

{
    "LDAP":{
        "Authentication":{
            "Username":"cn=admin,dc=coretesting,dc=com",
            "Password":"ertif",
            "Oem":{
                "Ami":{
                    "EncryptionType":"NoEncryption",
                    "CommonNameType":"IPAddress"
                }
            }
        },
        "LDAPService":{
            "SearchSettings":{
                "BaseDistinguishedNames":[
                    "dc=coretesting,dc=com"
                ],
                "GroupsAttribute":"cn"
            }
        },
        "ServiceAddresses":[
            "10.0.122.61:389"
        ],
        "ServiceEnabled":true
    }
}

```

```
}
```

Example PATCH Request Body – StartTLS

```
{
```

```
  "LDAP":{
    "Authentication":{
      "Username":"cn=USERID,ou=users,dc=ibmbase,dc=com",
      "Password":"Passw0rd",
      "Oem":{
        "Ami":{
          "CommonNameType":"IPAddress",
          "EncryptionType":"StartTLS"
        }
      }
    },
    "LDAPService":{
      "SearchSettings":{
        "BaseDistinguishedNames":[
          "dc=coretesting,dc=com"
        ],
        "GroupsAttribute":"cn"
      }
    },
    "ServiceAddresses":[
      "10.240.211.131:50637"
    ],
    "ServiceEnabled":true
  }
}
```

```
}
```

Example PATCH Request Body – SSL and BindingMethod : LoginCredential

```
{
```

```

"LDAP":{
  "Authentication":{
    "Oem":{
      "Ami":{
        "CommonNameType":"IPAddress",
        "EncryptionType":"SSL",
        "BindingMethod":"LoginCredential"
      }
    }
  },
  "LDAPService":{
    "SearchSettings":{
      "BaseDistinguishedNames":[
        "ou=users,dc=ibmbase,dc=com"
      ],
      "GroupsAttribute":"cn"
    }
  },
  "ServiceAddresses":[
    "10.240.210.197:50637"
  ],
  "ServiceEnabled":true
}
}

```

Response

For Error Responses, please refer to [“Error Response” on page 11](#).

PATCH – LDAP Remote Role Mapping

Behavior

1. This operation is used to configure LDAP **RemoteRoleMapping**.
2. Users can create / modify / delete the **RemoteRoleMapping** of LDAP using this Patch operation.

3. For deleting a **RemoteRoleMapping** property, users should give the remaining **RemoteRoleMapping** property in the request body of PATCH operation.
4. The maximum allowed LDAP Role is 16 (for LXCA Requirement).
5. An appropriate error will be thrown when the user tries to patch more than maximum **RemoteRoleMapping** properties.
6. Duplicating "**RemoteGroup**" name is not allowed while patching.
7. **RemoteRoleMapping** property can be patched separately and does not require Authentication. It can be patched only when LDAP "**ServiceEnabled**" value is true.
8. **RemoteRoleMapping** property cannot be set if any of the **RemoteRoleMapping** properties (**LocalRole**, **RemoteGroup**, **RemoteUser**) is patched with an invalid value.

Request

PATCH https://{ip}/redfish/v1/AccountService

Content-Type: application/json

Request example

For Creating RemoteRoleMapping:

The below example is to create three RemoteGroups "group1", "group2", and "group3".

```
{
  "LDAP": {
    "RemoteRoleMapping": [
      {
        "LocalRole": "Administrator",
        "RemoteGroup": "group1",
        "RemoteUser": "dc=coretesting,dc=com"
      },
      {
        "LocalRole": "User",
        "RemoteGroup": "group2",
        "RemoteUser": "dc=coretesting,dc=com"
      },
      {
        "LocalRole": "Administrator",
        "RemoteGroup": "group3",
        "RemoteUser": "dc=coretesting,dc=com"
      }
    ]
  }
}
```

```

    {
        "LocalRole": "Operator",
        "RemoteGroup": "group4",
        "RemoteUser": "dc=coretesting,dc=com"
    }
]
}

```

For Modifying/Deleting RemoteRoleMapping:

The below example is to modify the LocalRole of group2 as "Administrator" and to Delete the group3 Role of LDAP.

```

{
  "LDAP": {
    "RemoteRoleMapping": [
      {
        "LocalRole": "Administrator",
        "RemoteGroup": "group1",
        "RemoteUser": "dc=coretesting,dc=com"
      },
      {
        "LocalRole": "Administrator",
        "RemoteGroup": "group2",
        "RemoteUser": "dc=coretesting,dc=com"
      },
      {
        "LocalRole": "Operator",
        "RemoteGroup": "group4",
        "RemoteUser": "dc=coretesting,dc=com"
      }
    ]
  }
}

```



```
}  
}
```

Response

For Error Responses, please refer to [“Error Response” on page 11](#).

PATCH – Active Directory

Request

PATCH https://{ip}/redfish/v1/AccountService

Content-Type: application/json

Request body

1. Please refer to the properties that are patchable in [Table 21 “Account Service Property” on page 29](#) for which ReadOnly is False that can be sent as Request body in JSON format.
2. **RemoteRoleMapping** property can be patched separately and does not require Authentication.

Request example

Editing AccountService:

```
{  
  "ActiveDirectory":{  
    "Authentication":{  
      "Username":"AD1"  
      "Password":"AD@123",  
      "Oem":{  
        "Ami":{  
          "DomainName":"abc123.com",  
          "DomainControllerServerAddr1":"10.0.1.23"  
          "DomainControllerServerAddr2":"","  
          "DomainControllerServerAddr3": "  
        }  
      }  
    },  
    "ServiceEnabled":true  
  }  
}
```

Response

For Error Responses, please refer to [“Error Response” on page 11](#).

PATCH – Active Directory Remote Role Mapping

Behavior

1. This operation is used to configure Active Directory **RemoteRoleMapping**.
2. The user can create / modify / delete the **RemoteRoleMapping** of Active Directory using this Patch operation.
3. For deleting a **RemoteRoleMapping** property, the user should give the remaining **RemoteRoleMapping** property in the request body of the PATCH operation.
4. The maximum allowed Active Directory Role is 16 (for LXCA Requirement).
5. An appropriate error will be thrown when user tries to patch more than maximum **RemoteRoleMapping** properties.
6. Duplicating "**RemoteGroup**" name is not allowed while patching.

Request

PATCH https://{ip}/redfish/v1/AccountService

Content-Type: application/json

Request example

Create RemoteRoleMapping:

```
{
  "ActiveDirectory":{
    "RemoteRoleMapping": [
      {
        "LocalRole": "Administrator",
        "RemoteGroup":"redfish4",
        "RemoteUser":"Active2",
        "Oem":{
          "Ami":{
            "GroupID":2,
            "KVMAccess":"Enable",
            "VMediaAccess":"Enable"
          }
        }
      }
    ]
  }
}
```

```

    }
}

```

Modify RemoteRoleMapping:

The below example is to modify the KVMAccess of groupid 2 as "Disable".

```

{
  "ActiveDirectory":{
    "RemoteRoleMapping": [
      {
        "LocalRole": "Administrator",
        "RemoteGroup":"redfish4",
        "RemoteUser":"Active2",
        "Dem":{
          "Ami":{
            "GroupID":2,
            "KVMAccess":"Disable",
            "VMediaAccess":"Enable"
          }
        }
      }
    ]
  }
}

```

Add RemoteRoleMappings:

1. Consider we need to add RoleMappings with GroupID as 1 and 3.
2. Hence, we need to issue a PATCH request with the following request body:

```

{
  "ActiveDirectory":{
    "RemoteRoleMapping":[
      {
        "LocalRole":"Administrator",
        "RemoteGroup":"redfish1",

```

```

    "RemoteUser": "Active1",
    "Oem": {
        "Ami": {
            "GroupID": 1,
            "KVMAccess": "Enable",
            "VMediaAccess": "Disable"
        }
    },
    {
        "LocalRole": "Administrator",
        "RemoteGroup": "redfish3",
        "RemoteUser": "Active3",
        "Oem": {
            "Ami": {
                "GroupID": 3,
                "KVMAccess": "Enable",
                "VMediaAccess": "Disable"
            }
        }
    }
]
}
}

```

Add / Delete RemoteRoleMappings:

1. Again, consider we need to add RoleMapping with GroupID as 2 and delete RoleMapping with GroupID 3.
2. For this, we need to exclude RoleMapping with GroupID 3(since we need to delete it) and add existing RoleMapping with GroupID 1, along with the to-be-added RoleMapping with GroupID 2 in the request body.
3. Hence, we need to issue a PATCH request with the following request body:

```

    "ActiveDirectory": {

```

```

"RemoteRoleMapping":[
  {
    "LocalRole":"Administrator",
    "RemoteGroup":"redfish1",
    "RemoteUser":"Active1",
    "Oem":{
      "Ami":{
        "GroupID":1,
        "KVMAccess":"Enable",
        "VMediaAccess":"Disable"
      }
    }
  },
  {
    "LocalRole":"Administrator",
    "RemoteGroup":"redfish2",
    "RemoteUser":"Active2",
    "Oem":{
      "Ami":{
        "GroupID":2,
        "KVMAccess":"Enable",
        "VMediaAccess":"Disable"
      }
    }
  }
]
}

```

Delete all the RemoteRoleMappings:

1. For this, we need to pass the RemoteRoleMappings attribute under ActiveDirectory as an empty array.

2. Hence, we need to issue a PATCH request with the following request body:

```
{  
  
    "ActiveDirectory":{  
  
        "RemoteRoleMapping":[]  
  
    }  
  
}
```

Response

For Error Responses, please refer to [“Error Response” on page 11](#).

GET – External Account Provider Collection

This represents the collection of External Account Provider resources.

Request

GET https://{{ip}}/redfish/v1/AccountService/ExternalAccountProviders

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

GET – RADIUS Settings

The link to configure RADIUS server from Redfish will come under the **ExternalAccountProviders**.

Request

GET https://{{ip}}/redfish/v1/AccountService/ExternalAccountProviders/RADIUS

Content-Type: application/json

Table 30. RADIUS settings properties

Name	Type	Read only	Description	
(OData Attributes)			Refer to “OData Support” on page 5	
ServiceAddress	String	False	This property shall contain the IPv4/IPv6 address assigned to the RADIUS server.	
ServicePort	String	False	This property shall contain the port on which RADIUS Server is running. Note: The default port is 1812.	
ServiceEnabled	Boolean	False	The value of this property shall be a Boolean indicating whether this service is enabled.	
Secret	String	False	This property shall contain the text string that serves as a password between hosts. Note: This property will be displayed as null always.	
ExtendedPrivilege	Object	False	This object shall contain details of the extended privileges allowed for RADIUS users.	
			<table><tr><th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr></table>	Name
Name	Type	Read only	Description	

Table 30. RADIUS settings properties (continued)

Name	Type	Read only	Description			
			KVMAccess	Boolean	false	The value of this property shall be a Boolean indicating the KVM access to the RADIUS user.
			VMedia Access	Boolean	false	The value of this property shall be a Boolean indicating the VMedia access to the RADIUS user.
Advanced RADIUSSetting	Object	True	A reference to the resource AdvancedRADIUSSetting. Note: This property is shown only if the RADIUS server is configured.			
Timeout	Integer	True	Default timeout in seconds for RADIUS Authentication.			
AccountProvider Types	String	True	This property shall contain the type of external account provider to which this Service connects.			
			Enum		Description	
			RedfishService		The external account provider shall be a DMTF Redfish Specification-conformant service. The ServiceAddresses format shall contain a collection of URIs that correspond to a Redfish Account Service entity.	
			ActiveDirectory Service		The external account provider shall be a Microsoft Active Directory Technical Specification-conformant service. The ServiceAddresses format shall contain a collection of fully qualified domain names (FQDN) or NetBIOS names that links to the set of domain servers for the Active Directory service.	
			LDAPService		The external account provider shall be an RFC4511-conformant service. The ServiceAddresses format shall contain a collection of fully qualified domain names (FQDN) that links to the set of LDAP servers for the Service.	
			OEM		An OEM-specific external authentication or directory service.	

Response example

Error Message

Sample GET Response Body when the RADIUS server is not configured.

```
{
  "@odata.context": "/redfish/v1/$metadata#ExternalAccountProvider.ExternalAccountProvider",
  "@odata.etag": "\"1584337147\"",

```

```

"@odata.id":"/redfish/v1/AccountService/ExternalAccountProviders/RADIUS",
"@odata.type":"#ExternalAccountProvider.v1_1_2.ExternalAccountProvider",
"AuthenticationType":"OEM",
"Description":"RADIUSserversettings",
"Id":"RADIUS Server",
"Name":"RADIUSSettings",
"Oem":{
  "Ami":{
    "@odata.type":"#AMIEExternalAccountProvider.v1_0_0.AMIEExternalAccountProvider",
    "ExtendedPrivilege":{
      "KVMAccess":false,
      "VMediaAccess":false
    },
    "Secret":null,
    "ServiceAddress":null,
    "ServicePort":1812,
    "Timeout":null
  }
},
"ServiceEnabled":false
}

```

Error Message 2

Sample GET Response Body when the RADIUS server is configured.

```

{
  "@odata.context":"/redfish/v1/$metadata#ExternalAccountProvider.ExternalAccountProvider",
  "@odata.etag":"\"1584337147\"",
  "@odata.id":"/redfish/v1/AccountService/ExternalAccountProviders/RADIUS",
  "@odata.type":"#ExternalAccountProvider.v1_1_2.ExternalAccountProvider",
  "AuthenticationType":"OEM",
  "Description":"RADIUS server settings",

```



```

    "Id": "RADIUS Server",
    "Name": "RADIUS Settings",
    "Oem": {
      "Ami": {
        "odata.type": "#AMIEExternalAccountProvider.v1_0_0.AMIEExternalAccountProvider",
        "AdvancedRADIUSSettings": {
          "odata.id": "/redfish/v1/AccountService/ExternalAccountProviders/RADIUS/Oem/Ami/AdvancedRADIUSSetting"
        },
        "ExtendedPrivilege": {
          "KVMAccess": true,
          "VMediaAccess": true
        },
        "Secret": null,
        "ServiceAddress": "10.0.122.57",
        "ServicePort": 1812,
        "Timeout": 3
      }
    },
    "ServiceEnabled": "true"
  }
}

```

PATCH – RADIUS Settings

Request

PATCH https://{ip}/redfish/v1/AccountService/ExternalAccountProviders/RADIUS

Content-Type: application/json

Request example

```

{
  "Oem": {
    "Ami": {
      "ExtendedPrivilege": {
        "KVMAccess": false,

```

```

        "VMediaAccess":false
    },
    "Secret":"testing123",
    "ServiceAddress":"10.0.125.48",
    "ServicePort":1812
}
},
"ServiceEnabled":true
}

```

Response

The response status is 204 with no body. For Error Responses, please refer to [“Error Response” on page 11](#).

GET – Advanced RADIUS Settings

Request

GET <https://{ip}/redfish/v1/AccountService/ExternalAccountProviders/RADIUS/Oem/Ami/AdvancedRADIUSSetting>

Content-Type: application/json

Table 31. Advanced RADIUS Settings properties

Name	Type	Read only	Description			
(OData Attributes)			Refer to “OData Support” on page 5			
RADIUS Authorization	Object	false	This object shall contain details of the Privilege levels and associated values for RADIUS users.			
			Name	Type	Read only	Description
			Administrator	String	false	The value of this property shall be a name for the Administrator Privilege in RADIUS server and BMC.
			Operator	String	false	The value of this property shall be a name for the Operator Privilege in RADIUS server and BMC.
			User	String	false	The value of this property shall be a name for the User Privilege in RADIUS server and BMC.
			Oem	String	false	The value of this property shall be a name for the Oem Privilege in RADIUS server and BMC.
			NoAccess	String	false	The value of this property shall be a name for the No Access Privilege in RADIUS server and BMC.

Response example

```
{
  "@odata.context":"/redfish/v1/$metadata#AdvanceRADIUSSetting.AdvanceRADIUSSetting",
  "@odata.etag":"\"1584351508\"",
  "@odata.id":"/redfish/v1/AccountService/ExternalAccountProviders/RADIUS/Oem/Ami/AdvancedRADIUSSetting",
  "@odata.type":"#AdvanceRADIUSSetting.v1_0_0.AdvanceRADIUSSetting",
  "RADIUSAuthorization":{
    "Administrator":"H=4",
    "NoAccess":"H=0",
    "Oem":"H=1",
    "Operator":"H=3",
    "User":"H=2"
  }
}
```

PATCH – Advanced RADIUS Settings

Request

PATCH https://{ip}/redfish/v1/AccountService/ExternalAccountProviders/RADIUS/Oem/Ami/AdvancedRADIUSSetting

Content-Type: application/json

Request example

```
{
  "RADIUSAuthorization":{
    "Administrator":"H=4",
    "NoAccess":"H=0",
    "Oem":"H=1",
    "Operator":"H=3",
    "User":"H=2"
  }
}
```

Response

The response status is 204 with no body. For Error Responses, please refer to [“Error Response” on page 11](#).

GET – Account Collection

Request

GET https://{ip}/redfish/v1/AccountService/Accounts

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

POST – Create a new account

Behavior

1. Make sure the ServiceEnabled property in AccountService is true for creating an account.
2. If the ServiceEnabled property in AccountService is false, please use PATCH on AccountService to change ServiceEnabled to true.
3. **The maximum limit for accounts is 14.**
 - In order to follow the IPMI maximum account number, the maximum count of a Redfish account is 14.
 - IPMI maximum account ID is 15, but ID 1 is reserved for the Anonymous account which would not sync to Redfish.
 - Redfish HOSTOS and HOSTFW accounts would not be counted in the 14 accounts mentioned above.
4. While creating a new redfish account using post operation, the user can explicitly set the "**PasswordChangeRequired**" attribute to "true" or "false" in the post body.
5. If set to "true", then the password for this account must be changed before further access is allowed. If set to "false", there is not need to reset the password for allowing access.
6. If "**PasswordChangeRequired**" is not given in the post body, then by default it is considered as "true".
7. "**PasswordChangeRequired**" validation is applicable only when the request comes through Redfish URI and it will not ask to change the password when logged through BMC Web UI using the Redfish account (if Redfish accounts and IPMI accounts synchronization are enabled).
8. **UserName** and **Password** must follow the rules:
 - **UserName** only allows special characters '-'(hyphen), '_'(underscore), '@'(at sign) in **UserName**.
 - **UserName** must be a string of 1 to 16 alpha-numeric characters.
 - **UserName** must start with an alphabetical character.
 - **Password** must be a string of 8 to 20 characters.

Note: The rules of "**UserName**" and "**Password**" should follow the rules of IPMI accounts to synchronize Redfish accounts and IPMI accounts.

9. Properties and Mandatory Properties to create an account:

Table 32. Properties and Mandatory Properties

Properties which the user can configure while creating the account	Mandatory Properties	Default Values
Name		UserName given in request body
Description		"Collection of Account Details"
Enabled		false
Password	Yes	
UserName	Yes	
RoleId	Yes	
Locked		false
PasswordChangeRequired		false

Request

POST https://{ip}/redfish/v1/AccountService/Accounts

Content-Type: application/json

Request example

```
{
  "Name": "Test User Account",
  "Description": "Test User Account",
  "Enabled": true,
  "Password": "Superuser",
  "UserName": "user_account",
  "RoleId": "Operator",
  "Locked": false
}
```

Response

1. The response status is 201 and the response body is a GET Response with the properties of the newly created Account.
2. For Error Responses, please refer to [“Error Response” on page 11](#).

Manager Account

This resource represents the user accounts for the manager.

1. The maximum limit for accounts is 14.
2. As per HI specification, default accounts are **HostAutoFW**, **HostAutoOS**. **HostAutoFW** is used by BIOS to communicate and **HostAutoOS** is used by OS to communicate with redfish. BIOS will call BMC to create **HostAutoOS** at end of boot process and save it in EFI Variable. This user will be deleted in next boot by Redfish and a new password will be generated for **HostAutoOS**.
3. **HostAutoFW** and **HostAutoOS** can't be deleted or modified.

The ID number for the newly created redfish user will start from 5 if there is only one fixed IPMI user. If there are many IPMI fixed users, then the ID number generated varies accordingly. ID numbers 1 to 3 are reserved.

- ID number 1 is for default "**Administrator**" account.
- ID number 2 is for **HostAutoFW**.
- ID number 3 is for **HostAutoOS**.
- ID number 4 is for default admin IPMI fixed user.

4. Once maximum account, 20, reached on deleting and creating a new redfish account, ID number will start from 25.

Table 33. Manager Account Property

Name	Type	Read only	Description
(OData Attributes)			Refer to "OData Support" on page 5 .
Id(M)	String	True	Refer to Table 9 "Resource Type Definitions" on page 12
Name(M)	String	True	
Description	String	True	
Password(C)	String	False	The value of this property shall be the password for this account. Note: Should not be displayed in the response.
UserName(C)	String	False	The value of this property shall be the user name for this account.
RoleId	String	False	The value of this property shall be the ID of the Role resource configured for this account.
Locked	Boolean	False	<p>This property (when set to true) shall indicate that the account service has automatically locked the account due to the property accountLockoutThreshold having been exceeded.</p> <p>If Locked is set to true by account service, the account is locked and the user shall not be able to login to redfish unless the property is unlocked by the administrator.</p> <p>If set to false, the account will not be locked. A user admin shall be able to write a false to the property to clear the lockout condition, prior to the lockout duration period.</p> <p>Note: By default, the account service will set the value of Locked to false. (The account shall not be locked and the failed attempt should not exceed the accountLockedThreshold). Only the Administrator will be able to unlock the locked account in case it is set to true automatically in case of failed login attempts but setting the account as a locked account (i.e value to true) by an Administrator is an invalid operation.</p>
Enabled	Boolean	False	This property shall enable (if set to true) or disable (if set to false) the account for future logins. The value of Enable overrides the locked property.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.

Table 33. Manager Account Property (continued)

PasswordChange Required	Boolean	True	<p>Indicates that the password for this account must be changed.</p> <p>The service requires the password to be changed before access is allowed.</p> <p>The value of this property shall be true if the password for this account must be changed before further access is allowed. Access to the service may be denied by the implementation if the password has not been changed. A ManagerAccount created with an initial PasswordChangeRequired value of true may be used to force a password change before first access using the account.</p> <p>When the 'Password' property for this account is updated, the service shall set the value to false.</p> <p>PasswordChangeRequired attribute value for the default administrator account will be based on the PRJ option to disable the requirement of changing a password in the first-time login.</p> <p>Note: PasswordChangeRequired cannot be modified by PATCH because of the security concern of California Law.</p>			
Certificates	Object	True	The link to a collection of certificates used for this account.			
Links	Object		The links object contains links to other resources that are related to this resource.			
			Name	Type	Read only	Description
			Role	Object	True	A reference to the Role object defining Privileges for this account--returned when the resource is read. The ID of the role is the same as property RoleId.

GET – Account Instance

Request

GET https://{ip}/redfish/v1/AccountService/Accounts/{account_instance}

Content-Type: application/json

Response

The response of the request will be in JSON format. Please refer to [Table 33 “Manager Account Property” on page 56](#).

PATCH – Change Account Instance

Behavior

UserName and **Password** have to follow the rules:

- **UserName** only allows special characters '-'(hyphen), '_'(underscore), '@'(at sign) in **UserName**.
- **UserName** must be a string of 1 to 16 alpha-numeric characters.
- **UserName** must start with an alphabetical character.

- **Password** must be a string of 8 to 20 characters.

Note: The rules of "UserName" and "Password" should follow the rules of IPMI "Name" and "Password" in order to synchronize Redfish accounts and IPMI accounts.

Request

PATCH https://{ip}/redfish/v1/AccountService/Accounts/{account_instance}

Content-Type: application/json

Request body

Example Request Body for first-time password change:

```
{
  "Password": "Superuser2"
}
```

Please refer to the properties that are patchable in [Table 33 “Manager Account Property” on page 56](#) for which read-only is False that can be sent as Request body in the json format.

Example Request Body for Editing an Account:

HostAutoFW and **HostAutoOS** can't be deleted or modified.

```
{
  "Enabled": true,
  "Password": "superuser",
  "UserName": "user_account",
  "RoleId": "ReadOnly",
  "Locked": false
}
```

Response

The response status is 204 and no response body. For Error Responses, please refer to [“Error Response” on page 11](#).

GET – PAM Configurations

Request

GET https://{ip}/redfish/v1/AccountService/Oem/Ami/Configurations

Content-Type: application/json

Table 34. Account Service Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Id	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name	String	True	
PAMEnabled	Boolean	False	Indicates whether or not PAM authentication should be used when authenticating Redfish requests.
PAMOrder	Array	False	<ol style="list-style-type: none"> 1. Array that represents the order the PAM modules will be checked for authentication. 2. Allowable values are {“IPMI”, “LDAP”, “ACTIVE DIRECTORY”, “RADIUS”}. 3. PAMOrder can change only when PAMEnabled in true state. 4. RADIUS should be kept as last in the PAMOrder.

Response

The response of the request will return 200 with response body in JSON format with the OData properties.

PATCH – Change PAM Configurations

Request

PATCH `https://{ip}/redfish/v1/AccountService/Oem/Ami/Configurations`

Content-Type: application/json

Request example

```
{
  "PAMEnabled": true,
  "PAMOrder": [
    "ACTIVE DIRECTORY",
    "RADIUS",
    "IPMI",
    "LDAP"
    "RADIUS"
  ]
}
```

Notes:

1. PAMOrder can change only when PAMEnabled in true.

2. RADIUS should be kept as last in the PAMOrder. If the position of RADIUS is changed from last in the PAMOrder, the request will be responded with an appropriate error message.

PAMOrder can change only when PAMEnabled is true.

Response-Success

1. If the PATCH is completely successful without any extended information, the status code will be 204.
2. A message will be included in the response when the **lighttpd** web server needs to be restarted and if there is some extended info.

Response-Error

1. On error, the response status will be 400 and the body will contain the response error.
2. For Error Responses, please refer to [“Error Response” on page 11](#).

GET – Role Collection

Request

GET https://{ip}/redfish/v1/AccountService/Roles

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

POST – New Custom Role

Request

POST https://{ip}/redfish/v1/AccountService/Roles

Content-Type: application/json

Request body

1. Creation of a custom Role requires that the **RoleId** and **Name** properties be in the request body.
2. In addition to these properties, either **AssignedPrivileges**, **OemPrivileges**, or both **AssignedPrivileges** and **OemPrivileges** must be in the request body.

Request example

```
{
  "AssignedPrivileges": [
    "ConfigureUsers",
    "ConfigureManager",
    "ConfigureSelf",
    "Login",
    "ConfigureComponents"
  ],
}
```

```

    "Description": "TestRole User Role",

    "Id": "TestRole",

    "RoleId": "TestRole",

    "Name": "TestRole Role",

    "OemPrivileges": [

        "OemPowerControl",

        "OemClearLog"

    ]

}

```

Response

1. The response status is 201 and the response body is a GET Response with the properties of the newly created roles.
2. Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

GET – Role Instance

This resource shall be used to represent resources that represent the user role for the user account.

Request

GET https://{{ip}}/redfish/v1/AccountService/Roles/{{role_instance}}

Content-Type: application/json

Response

The response is a JSON object that contains the following parameters:

Table 35. Role Properties

Name	Type	Read only	Description	
(OData Attributes)			Refer to “OData Support” on page 5	
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12	
Name(M)	String	True		
Description	String	True		
IsPredefined	Boolean	True	This property is used to indicate if the Role is one of the Redfish Predefined Roles vs a Custom role.	
AssignedPrivileges	Array	False	The value of this property shall be the redfish privileges that the role includes. For pre-defined roles, this property shall be readOnly. For custom roles, some implementations may not allow writing this property.	
			Enum	Description

Table 35. Role Properties (continued)

			Login	Able to log into the service and read resources.
			ConfigureManager	Able to configure Manager resources.
			ConfigureUsers	Able to configure Users and their Accounts.
			ConfigureSelf	Able to change the password for the current user Account.
			ConfigureComponents	Able to configure components managed by this service.
OemPrivileges	Array	False	The value of this property shall be the OEM privileges that this role includes. For pre-defined roles, this property shall be readOnly. For custom roles some implementations may not allow writing this property.	
			Enum	Description
			ConfigureHostInterface	Able to configure HostInterface resources. Note: Only HostInterfaceAdministrator role is allowed to own this privilege and it cannot be assigned to another role.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.	
RoleId	String	True	This property shall contain the string name of the Role. This property shall contain the same value as the Id property.	

PATCH – Change Role Instance

Request

PATCH `https://{ip}/redfish/v1/AccountService/Roles/{role_instance}`

Content-Type: application/json

Request body

Example Request Body for Editing a role

Please refer to the properties that are patchable in [Table 35 “Role Properties” on page 61](#) for which ReadOnly is False that can be sent as Request body in JSON format.

```
{
  "AssignedPrivileges": [
    "ConfigureComponents",
    "Login",
    "ConfigureSelf"
```

```
]
}
```

Response

1. The response status is 204 with no response body. For Error Responses, please refer to [“Error Response” on page 11](#).
2. PATCH is supported for User defined Roles and is not supported for Predefined Roles.
3. Error response with 405 Method Not allowed is displayed if request body content type is chosen as application/json. Otherwise, 415 Unsupported Media Type would be displayed.

DELETE – Role Instance

Request

DELETE https://{ip}/redfish/v1/AccountService/Roles/{role_instance}

Content-Type: application/json

Note: DELETE is not supported for Predefined Roles.

Response

The response status is 204 and no response body. For Error Responses, please refer to [“Error Response” on page 11](#).

Chapter 6. Chassis

GET – Get chassis properties

Use the GET method to obtain the chassis properties.

Request URI

GET https://{{ip}}/redfish/v1/Chassis/{{chassis_instance}}

Request body

None

Response body

The response is a JSON object that contains the following parameters:

Table 36. Chassis Properties

Name	Type	Read only	Description	
Id(M)	String	True	Resource Identifier	
Name(M)	String	True	Name of the Resource	
Description	String	True	Provides description of the resource.	
ChassisType(M)	String	True	ChassisType shall indicate the physical form factor for the type of chassis.	
Manufacturer(C)	String	True	The manufacturer of this chassis.	
Model©	String	True	The model number for this chassis.	
SKU©	String	True	This is the SKU for this chassis.	
SerialNumber©	String	True	The serial number for this chassis.	
PartNumber©	String	True	The part number for this chassis.	
AssetTag	String	True	The user assigned asset tag for this chassis.	
UUID	String	True	The Universal Unique Identifier (UUID) for this Chassis.	
IndicatorLED	String	False	The state of the indicator LED, used to identify the chassis.	
			Enum	Description
			Unknown	The state of the Indicator LED cannot be determined.
			Lit	The Indicator LED is lit.
			Blinking	The Indicator LED is blinking.
			Off	The Indicator LED is off.
Links	Object	True	The links object contains the links to other resources that a related to this resource. See the Table 37 “Chassis Links Properties” on page 67.	

Table 36. Chassis Properties (continued)

Actions	Object	True	The Actions object contains the available custom actions o this resource like Chassis.Reset and OemActions if any.	
Status	Object	True	See “Resource Properties” on page 12.	
Thermal(N)	Object	True	A reference to the thermal properties (fans, cooling, sensors) for this chassis.	
Power(N)	Object	True	A reference to the power properties (power supplies, power policies, sensors) for this chassis.	
PowerState	String	True	This is the current power state of the chassis.	
			Enum	Description
			On	The components within the chassis has power on.
			Off	The components within the chassis has no power, except some components may continue to have AUX power such as management controller.
Location	Object	True	Resource. Location.	
NetworkAdapters	Object	True	A reference to the collection of NetworAkdaapters associated with this chassis.	

Table 37. Chassis links properties

Name	Type	Read only	Description
ComputerSystem s(N)	Array	True	An array of references to the computer systems contained in this chassis. This will only reference ComputerSystems that are directly and wholly contained in this chassis.
ComputerSystems@odata.count	Number	True	An integer representing the number of items in a collection
ManagedBy(N)	Array	True	An array of references to the Managers responsible for managing this chassis.
ManagedBy@odata.count	Number	True	An integer representing the number of items in a collection
Drives(N)	Array	True	An array of references to the disk drives located in this Chassis.
Drives@odata.count	Number	True	An integer representing the number of items in a collection

Table 37. Chassis links properties (continued)

Storage(N)	Array	True	An array of references to the storage subsystems connected to or inside this Chassis.
Storage@odata.count	Number	True	An integer representing the number of items in a collection
PCleDevices(N)	Array	True	An array of references to the PCIe Devices located in the Chassis
PCleDevices@odata.count	Number	True	An integer representing the number of items in a collection.
ResourceBlock(sN)	Array	True	An array of references to the Resource Blocks located in this Chassis.
ResourceBlocks@odata.count	Number	True	An integer representing the number of items in a collection
ContainedBy(N)	Array	True	A reference to the chassis that this chassis is contained by.
Contains(N)	Array	True	An array of references to any other chassis that this chassis has in it.
Contains@odata.count	Number	True	An integer representing the number of items in a collection
PoweredBy(N)	Array	True	An array of ID[s] of resources that power this chassis. Normally the ID will be a chassis or a specific set of powerSupplies.
PoweredBy@odata.count	Number	True	An integer representing the number of items in a collection
ManagersInChassis(N)	Array	True	An array of references to the managers located in this Chassis.
ManagersInChassis@odata.count	Number	True	An integer representing the number of items in a collection
Processors(N)	Array	True	An array of references to the Processors located in Chassis
Processors@odata.count	Number	True	An integer representing the number of items in a collection

Response example

When the request is successful, a message body similar to the following is returned:

```
{
  "@odata.context": "/redfish/v1/$metadata#Chassis.Chassis",
  "@odata.etag": "\"1602668680\"",
  "@odata.id": "/redfish/v1/Chassis/Self",
  "@odata.type": "#Chassis.v1_9_1.Chassis",
  "Actions": {
    "#Chassis.Reset": {
      "@Redfish.ActionInfo": "/redfish/v1/Chassis/Self/ResetActionInfo",
      "@Redfish.OperationApplyTimeSupport": {
        "@odata.type": "#Settings.v1_2_1.Settings.OperationApplyTimeSupport",
        "MaintenanceWindowDurationInSeconds": 600,
        "MaintenanceWindowResource": {
          "@odata.id": "/redfish/v1/Chassis/Self"
        }
      }
    }
  }
}
```

```

        },
        "SupportedValues": [
            "Immediate",
            "AtMaintenanceWindowStart"
        ]
    },
    "target": "/redfish/v1/Chassis/Self/Actions/Chassis.Reset"
}

},
"AssetTag": "Free form asset tag",
"ChassisType": "Other",
>Description": "Chassis Self",
"Id": "Self",
"IndicatorLED": "Off",
"IndicatorLED@Redfish.AllowableValues": [
    "Lit",
    "Blinking",
    "Off"
],
"Links": {
    "ComputerSystems": [
        {
            "@odata.id": "/redfish/v1/Systems/Self"
        }
    ],
    "ComputerSystems@odata.count": 1,
    "Drives": [
        {
            "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device7_Port1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device2_Port1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device1_Port1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device4_Port1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device3_Port1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device0_Port1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device6_Port1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device5_Port1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/SATA_Device8_Port5"
        }
    ],
    "Drives@odata.count": 9,
    "ManagedBy": [
        {
            "@odata.id": "/redfish/v1/Managers/Self"
        }
    ],

```

```

    "ManagedBy@odata.count": 1,
    "PCIeDevices": [
      {
        "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_C2_00"
      },
      {
        "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_C1_00"
      },
      {
        "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00"
      }
    ],
    "PCIeDevices@odata.count": 3,
    "PoweredBy": [
      {
        "@odata.id": "/redfish/v1/Chassis/Self/Power#/PowerSupplies/0"
      },
      {
        "@odata.id": "/redfish/v1/Chassis/Self/Power#/PowerSupplies/1"
      }
    ],
    "PoweredBy@odata.count": 2
  },
  "Location": {
    "Contacts": [
      {
        "ContactName": ""
      }
    ],
    "Placement": {
      "Rack": "",
      "RackOffsetUnits": "EIA_310",
      "RackOffsetUnits@Redfish.AllowableValues": [
        "OpenU",
        "EIA_310"
      ]
    },
    "PostalAddress": {
      "Building": "",
      "Location": "",
      "Name": "",
      "Room": ""
    }
  },
  "LogServices": {
    "@odata.id": "/redfish/v1/Chassis/Self/LogServices"
  },
  "Manufacturer": "Lenovo",
  "Model": "7Z01CT01WW",
  "Name": "Computer System Chassis",
  "NetworkAdapters": {
    "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters"
  },
  "PCIeSlots": {
    "@odata.id": "/redfish/v1/Chassis/Self/PCIeSlots"
  },
  "PartNumber": "SB27A42856",
  "Power": {
    "@odata.id": "/redfish/v1/Chassis/Self/Power"
  },
  "PowerState": "On",

```

```

"SKU": "7Z01CT01WW",
"SerialNumber": " J30159HV",
"Status": {
  "Health": "OK",
  "HealthRollup": "OK",
  "State": "Enabled"
},
"Thermal": {
  "@odata.id": "/redfish/v1/Chassis/Self/Thermal"
}
}

```

GET – Chassis Collection

This resource shall be used to represent a collection of chassis.

Request

GET https://{ip}/redfish/v1/Chassis

Content-Type: application/json

Response

Please refer to [“Redfish Collection” on page 8](#) for the JSON response properties

GET – Chassis Instance

1. Chassis resource represents the physical components properties of any system.
2. The non-CPU/device-centric parts of the schema are all accessed either directly or indirectly through this resource.
3. This one object is intended to represent racks, rack mount servers, blades, standalone, modular systems, enclosures, and all other containers.

Request

GET https://{ip}/redfish/v1/Chassis/{chassis_instance}

Content-Type: application/json

Response

The response is a JSON object that contains the following parameters:

Table 38. Chassis Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
ChassisType(M)	String	True	ChassisType shall indicate the physical form factor for the type of chassis. Refer to Table 39 “Chassis Type Enum Properties” on page 74 for allowable Enum attributes.

Table 38. Chassis Properties (continued)

Manufacturer(C)	String	True	The manufacturer of this chassis.	
Model(C)	String	True	The model number for this chassis.	
SKU(C)	String	True	This is the SKU for this chassis.	
SerialNumber(C)	String	True	The serial number for this chassis.	
PartNumber(C)	String	True	The part number for this chassis.	
PCleDevices	Object	True	A reference to the PCIe Devices Collection located in this Chassis. Refer to “GET — PCIe Device Collection” on page 177 .	
PCleSlots	Object	True	A reference to the PCIeSlots resource for Chassis. Refer to Table 86 “PCIe Slots Properties” on page 185 .	
AssetTag	String	True	The user assigned the asset tag for this chassis.	
Assembly	Object	True	The link to the assembly associated with this Chassis. Note: Northbound-only properties. Platform-specific porting needed.	
UUID	String	True	The Universal Unique Identifier (UUID) for this Chassis. Note: Platform-specific porting needed.	
IndicatorLED	String	False	The state of the indicator LED, used to identify the chassis. Note: The property Blinking indicates that indicator LED turns ON blinking to the time interval specified in IPMI.	
			Enum	Description
			Unknown	The state of the Indicator LED cannot be determined.
			Lit	The Indicator LED is lit.
			Blinking	The Indicator LED is blinking.
			Off	The Indicator LED is off.
Links	Object	True	The links object contains the links to other resources that a related to this resource. See Table 40 “Chassis Links Properties” on page 75 .	
Actions	Object	True	The Actions object contains the available custom actions o this resource like Chassis.Reset and OemActions if any.	
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14 for Resource Status.	
Thermal(N)	Object	True	A reference to the thermal properties (fans, cooling, sensors) for this chassis.	
Power(N)	Object	True	A reference to the power properties (power supplies, power policies, sensors) for this chassis.	
PowerState	String	True	This is the current power state of the chassis.	
			Enum	Description
			On	The components within the chassis have power on.
			Off	The components within the chassis have no power, except some components may continue to have AUX power such as the management controller.

Table 38. Chassis Properties (continued)

PhysicalSecurity	Object	True	Name	Type	Read only	Description	
			Intrusion Sensor Number	Number	True		
			Intrusion Sensor	String	True	This indicates the known state of the physical security sensor. By default, it will be a null value.	
						Enum	Description
						Normal	No abnormal physical security conditions are detected at this time.
						Hardware Intrusion	A door, lock, or other mechanism protecting the internal system hardware from being accessed is detected as being in an insecure state.
						Tampering Detected	Physical tampering of the monitored entity is detected.
			Intrusion Sensor ReArm	String	True	This indicates how the Normal state is restored.	
						Enum	Description
						Manual	This sensor would be restored to the Normal state by a manual rearm.
						Automatic	This sensor would be restored to the Normal state automatically as no abnormal physical security conditions are detected.
			Location	Object	True	Refer to Table 12 “Resource.v1_8_1 schema property” on page 14. Note: Northbound only properties. Platform-specific porting needed.	
HeightMm	Object	True	The height of the chassis. Note: Northbound only properties. Platform-specific porting needed.				
WidthMm	Object	True	The width of the chassis. Note: Northbound only properties. Platform-specific porting needed.				
DepthMm	Object	True	The depth of the chassis. Note: Northbound only properties. Platform-specific porting needed.				
WeightKg	Object	True	The weght of the chassis. Note: Northbound only properties. Platform-specific porting needed.				
NetworkAdapters	Object	True	A reference to the collection of NetworAkapters associated with this chassis. Refer to Table 6 “Collection Properties” on page 8 Note: Northbound only properties. Platform-specific porting needed.				
Environmental Class	String	True	The ASHRAE Environmental Class for this Chassis. Note: Northbound only properties. Platform-specific porting needed.				
			Enum		Description		

Table 38. Chassis Properties (continued)

			A1	ASHRAE Environmental Specification Class 'A1'
			A2	ASHRAE Environmental Specification Class 'A2'
			A3	ASHRAE Environmental Specification Class 'A3'
			A4	ASHRAE Environmental Specification Class 'A4'

Table 39. Chassis Type Enum Properties

Enum	Description
Rack	An equipment rack, typically a 19-inch-wide freestanding uni.
Blade	An enclosed or semi-enclosed, typically vertically oriented, system chassis which must be plugged into a multi-system chassis to function normally.
Enclosure	A generic term for a chassis that does not fit any other description.
StandAlone	A single, free-standing system, commonly called a tower or desktop chassis.
RackMount	A single system chassis designed specifically for mounting in an equipment rack.
Card	A loose device or circuit board intended to be installed in a system or other enclosure.
Cartridge	A small self-contained system intended to be plugged into a multi-system chassis.
Row	A collection of equipment racks.
Pod	A collection of equipment racks in a large, likely transportable, container.
Expansion	A chassis which expands the capabilities or capacity of another chassis.
Sidecar	A chassis that mates mechanically with another chassis to expand its capabilities or capacity".
Zone	A logical division or portion of a physical chassis that contains multiple devices or systems that cannot be physically separated.
Sled	An enclosed or semi-enclosed, system chassis which must be plugged into a multi-system chassis to function normally like a blade type chassis.
Shelf	An enclosed or semi-enclosed, typically horizontally oriented, system chassis which must be plugged into a multi-system chassis to function normally.
Drawer	An enclosed or semi-enclosed, typically horizontally oriented, system chassis which may be slid into a multi-system chassis.
Module	A small, typically removable, chassis or card which contains devices for a particular subsystem or function.
Component	A small chassis, card, or device which contains devices for a particular subsystem or function.
Other	A chassis that does not fit any of these definitions.
StorageEnclosure	A chassis which encloses storage.

Table 40. Chassis links properties

Name	Type	Read only	Description
ComputerSystem s(N)	Array	True	An array of references to the computer systems contained in this chassis. This will only reference ComputerSystems that are directly and wholly contained in this chassis.
ComputerSystems@odata.count	Number	True	An integer representing the number of items in a collection
ManagedBy(N)	Array	True	An array of references to the Managers responsible for managing this chassis.
ManagedBy@odata.count	Number	True	An integer representing the number of items in a collection
Drives(N)	Array	True	An array of references to the disk drives located in this Chassis. Note: Platform-specific porting needed.
Drives@odata.count	Number	True	An integer representing the number of items in a collection
Storage(N)	Array	True	An array of references to the storage subsystems connected to or inside this Chassis. Note: Platform-specific porting needed.
Storage@odata.count	Number	True	An integer representing the number of items in a collection.
ResourceBlock(sN)	Array	True	An array of references to the Resource Blocks located in this Chassis. Note: Platform-specific porting needed.
ResourceBlocks@odata.count	Number	True	An integer representing the number of items in a collection
ContainedBy(N)	Array	True	A reference to the chassis that this chassis is contained by. Note: Platform-specific porting needed.
Contains(N)	Array	True	An array of references to any other chassis that this chassis has in it. Note: Platform-specific porting needed.
Contains@odata.count	Number	True	An integer representing the number of items in a collection
PoweredBy(N)	Array	True	An array of ID[s] of resources that power this chassis. Normally the ID will be a chassis or a specific set of powerSupplies. Note: Platform-specific porting needed.
PoweredBy@odata.count	Number	True	An integer representing the number of items in a collection

Table 40. Chassis links properties (continued)

CooledBy(N)	Array	True	An array of ID[s] of resources that cool this chassis. Normally the ID will be a chassis or a specific set of fans. Note: Platform-specific porting needed.
CooledBy@odata.count	Number	True	An integer representing the number of items in a collection.
ManagersInChassis(N)	Array	True	An array of references to the managers located in this Chassis. Note: Platform-specific porting needed.
ManagersInChassis@odata.count	Number	True	An integer representing the number of items in a collection.
Processors(N)	Array	True	An array of references to the Processors located in Chassis. Note: Platform-specific porting needed.
Processors@odata.count	Number	True	An integer representing the number of items in a collection.

PATCH – Change Chassis Values

Request

PATCH `https://{{ip}}/redfish/v1/Chassis/{{chassis_instance}}`

Content-Type: application/json

Request body

Please refer to the properties that are patchable in [Table 38 “Chassis Properties” on page 71](#) for which ReadOnly is False that can be sent as Request body in JSON format.

Request example

```
{
  "AssetTag": "abcd",
  "IndicatorLED": "Off"
}
```

Response

The response status is 204 and no response body. For Error Responses, please refer to [“Error Response” on page 11](#).

POST – Chassis Control

Request

POST `https://{{ip}}/redfish/v1/Chassis/Self/Actions/Chassis.Reset`

Content-Type: application/json

Request body

The ResetType can be one of the following values: "On", "ForceOff", "GracefulShutdown", "ForceRestart".

Request example

```
{  
  
  "ResetType": "On"  
}
```

Response

1. The response status is 202 with the below body. For Error Responses, please refer to [“Error Response” on page 11](#).
2. Using TaskID check the TaskStatus.
3. Using MaintenanceWindowStartTime if Task is Cancelled due to invalid state Action then showing error message in Corresponding Tasks Using TaskID check the TaskStatus.

Response example

When the request is successful, a message body similar to the following is returned:

```
{  
  
  "@odata.context": "/redfish/v1/$metadata#Task.Task(TaskState,Description,Name,Id)",  
  "@odata.id": "/redfish/v1/TaskService/Tasks/1",  
  "@odata.type": "#Task.v1_2_0.Task",  
  "Description": "Task for Chassis Reset",  
  "Id": "1",  
  "Name": "Chassis Reset",  
  "TaskState": "New"  
}
```

GET – Power

Request

GET https://{ip}/redfish/v1/Chassis/{chassis_instance}/Power

Content-Type: application/json

Response

The response is a JSON object that contains the following parameters:

Table 41. Power properties

Name	Type	Read only	Description			
(OData Attributes)			Refer to “OData Support” on page 5			
Oem	Object		Specifies the AMI-defined OEM properties.			
			Name	Type	Read only	Description
			@odata.type	String	True	Refer to “OData Support” on page 5
			OwnerLUN	Number	True	<div>1. This is an OEM attribute and is a specific implementation of AMI.</div> <div>2. This attribute is used in combination with the SensorNumber attribute to display the Sensors under the MetricProperties attribute under Telemetry Service MetricDefinitions URI.</div> <div>3. This attribute can be used to differentiate sensors with identical Sensor numbers but different LUN numbers.</div>
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12			
Name(M)	String	True				
Description	String	True				
PowerControl(N)	Array	True	This is the definition of power control function (power reading/limiting). See Table 42 “Power Control Properties” on page 79.			
PowerControl@odata.count	Number	True	An integer representing the number of items in a collection			
Voltages(N)	Array	True	This is the definition of voltage sensors. See Table 44 “Voltages Properties” on page 80.			
Voltages@odata.count	Number	True	An integer representing the number of items in a collection.			
PowerSupplies(N)	Array	True	Details of a power supplies associated with this system. See Table 45 “PowerSupply Properties” on page 81. Note: Northbound only properties. Platform-specific porting needed.			
PowerSupplies@odata.count	Number	True	An integer representing the number of items in a collection			
Redundancy(N)(C)	Array	True	Redundancy information for the power subsystem of this system.			
Redundancy@odata.count	Number	True	An integer representing the number of items in a collection			
Actions	Object	True	It contains Oem Object under Oem attribute under this Actions.			

Table 42. PowerControl properties

Name	Type	Read only	Description		
Name(C)	String	True	Power Control Function name.		
MemberId	String	True	This is the identifier for the member within the collection.		
PowerConsumed Watts	Number	True	The actual power being consumed (in Watts) by the chassis. Minimum Value: 0. Note: Northbound only properties. Platform-specific porting needed.		
PowerRequested Watts	Number	True	The amount of power (in Watts) that the chassis resource is currently requesting be budgeted to it for future use. Minimum Value: 0. Note: Northbound only properties. Platform-specific porting needed.		
PowerAvailable Watts	Number	True	The amount of power capacity (in Watts) not already allocated and shall equal PowerCapacityWatts -PowerAllocatedWatts. Minimum Value: 0. Note: Northbound only properties. Platform-specific porting needed.		
PowerCapacity Watts	Number	True	The total power capacity that is available for allocation to the chassis resources. Minimum Value: 0. Note: Northbound only properties. Platform-specific porting needed.Northbound only properties. Platform-specific porting needed.		
PowerAllocated Watts	Number	True	The total power currently allocated to chassis resources. Minimum Value: 0. Note: Northbound only properties. Platform-specific porting needed.		
PowerMetrics	Object	True	Power readings for this chassis. Note: DCMI should be supported in the platform and BMC.		
			Attribute	Type	Description
			IntervallnMin	Number	The time interval (or window) in which the PowerMetrics are measured. Minimum Value: 0 Note: The unit of IntervallnMin is Minute.
			MinConsumedWatts	Number	The lowest power consumption level over the measurement window (the last IntervallnMin minutes). Minimum Value:0
			MaxConsumedWatts	Number	The highest power consumption level that has occurred over the measurement window (the last IntervallnMin minutes). Minimum Value:0
			AverageConsumed Watts	Number	The average power level over the measurement window (the last IntervallnMin minutes). Minimum Value:0
PowerLimit	Object	False	Power limit status and configuration information for this chassis.		
			Attribute	Type	Description
			LimitInWatts	Number	The Power limit in watts. Minimum Value:0.

Table 42. PowerControl properties (continued)

			LimitException	String	The action that is taken if the power cannot be maintained below the LimitInWatts. Refer to Table 43 “Chassis Power Limit Exception Enum Properties” on page 80 .
			CorrectionInMs	Number	The time required for the limiting process to reduce power consumption to below the limit.
RelatedItem(C)	Array	True	The ID(s) of the resources associated with this Power Limit		
PhysicalContext (C)	Object	True	The value of this property shall be a description of the affected device or region within the chassis to which this voltage measurement applies.		

Table 43. Chassis PowerLimitExceptionEnum Properties

Enum	Description
NoAction	Take no action when the limit is exceeded.
HardPowerOff	Turn the power off immediately when the limit is exceeded.
LogEventOnly	Log an event when the limit is exceeded but take no further action.
Oem	Take an OEM-defined action.

Table 44. Voltages Properties

Name	Type	Read only	Description
Name(C)	String	True	The name of the Voltage sensor.
MemberId	String	True	This property shall uniquely identify the member within the collection. For services supporting Redfish v1.6 or higher, this value shall contain the zero-based array index. Note: The "@odata.id" identifier for the Voltage Sensor shall start with 0 and "MemebId" property shall have the same value as the identifier.
SensorNumber(C)	Number	True	A numerical identifier for this voltage sensor which is unique within this resource.
Status	Object	True	Refer to “Resource Properties” on page 12 for Resource Oem.
ReadingVolts	Number	True	The current value of the voltage sensor.
UpperThresholdNonCritical(C)	Number	True	The current reading is above the normal range but is not critical. Units shall use the same units as the related ReadingVolts property
UpperThresholdCritical(C)	Number	True	The current reading is above the normal range but is not yet Fatal. Units shall use the same units as the related ReadingVolts property
UpperThresholdFatal(C)	Number	True	The value of this property shall indicate the CurrentReading is above the normal range and is fatal. Units shall use the same units as the related ReadingVolts property.

Table 44. Voltages Properties (continued)

LowerThresholdNonCritical(C)	Number	True	The current reading is below the normal range but is not critical. Units shall use the same units as the related ReadingVolts property
LowerThresholdCritical(C)	Number	True	The current reading is below the normal range but is not ye fatal. Units shall use the same units as the related ReadingVolts property
LowerThresholdFatal(C)	Number	True	The value of this property shall indicate the CurrentReadin is below the normal range and is fatal. Units shall use the same units as the related ReadingVolts property.
MinReadingRange	Number	True	The lowest possible value for CurrentReading. Units shall use the same units as the related ReadingVolts property.
MaxReadingRange	Number	True	The highest possible value for CurrentReading. Units shall use the same units as the related ReadingVolts property.
PhysicalContext(C)	Object	True	The affected device or region within the chassis to which this voltage measurement applies. See Table 48 “Thermal Physical Context Enum Properties” on page 86.
RelatedItem(C)	Array	True	The ID(s) of the resources associated with this Power Limit
OwnerLUN	Number	True	This is an OEM attribute and is a specific implementation o AMI. This attribute is used in combination with SensorNumberattribute to display the Sensors under the MetricPropertiesattribute under Telemetry Service MetricDefinitions URI. This attribute can be used to differentiate sensors with identical Sensor numbers but different LUN numbers.

Table 45. PowerSupply Properties

Name	Type	Read only	Description	
Name(C)	String	True	The name of the PowerSupply.	
MemberId	String	True	This is the identifier for the member within the collection.	
PowerSupplyType(C)	String	True	The Power Supply type (AC or DC)	
			Enum	Description
			Unknown	The power supply type cannot be determined.
			AC	Alternating Current (AC) power supply.
			DC	Direct Current (DC) power supply.
			ACorDC	Power Supply supports both DC and AC.
LineInputVoltageType (C)	String	True	The LineInputVoltage at which the power supply is operating.	

Table 45. PowerSupply Properties (continued)

			Enum	Description
			Unknown	The power supply line input voltage type cannot be determined.
			ACLowLine	100-127V AC input. Deprecated: Use AC120V.
			ACMidLine	200-240V AC input. Deprecated: Use AC240V
			ACHighLine	277V AC input. Deprecated: Use AC277V.
			DCNeg48V	-48V DC input.
			DC380V	High Voltage DC input (380V)
			AC120V	AC 120V nominal input.
			AC240V	AC 240V nominal input.
			AC277V	AC 277V nominal input
			ACandDCWideRange	Wide range AC or DC input.
			ACWideRange	Wide range AC input.
			DC240V	DC 240V nominal input.
LineInputVoltage(C)	Number	True	The line input voltage at which the Power Supply is operating.	
PowerCapacityWatts	Number	True	The maximum capacity of this Power Supply. Minimum Value:0.	
LastPowerOutputWatts	Number	True	The average power output of this Power Supply (in Watts). Minimum Value:0.	
Model(C)	String	True	The model number for this Power Supply.	
FirmwareVersion	String	True	The firmware version for this Power Supply.	
SerialNumber	String	True	The serial number for this Power Supply	
PartNumber(C)	String	True	The part number for this Power Supply.	
SparePartNumber(C)	String	True	The spare part number for this Power Supply.	
Status	Object	True	Refer to “Resource Properties” on page 12.	
Location(M)	Array	True	See Table 36 “Chassis Properties” on page 66 for Resource Oem.	
PowerInputWatts	Number	True	This property shall contain the value of the measured input power, in Watts, of the associated power supply.	
PowerOutputWatts	Number	True	This property shall contain the value of the measured output power, in Watts, of the associated power supply.	
EfficiencyPercent	Number	True	This property shall contain the value of the measured power efficiency, as a percentage, of the associated power supply.	
HotPluggable	Boolean	True	The value of this property shall indicate whether the device can be inserted or removed while the underlying equipment otherwise remains in its current operational state. Devices indicated as hot-pluggable shall allow the device to become operable without altering the operational state of the underlying equipment. Devices that cannot be inserted or removed from equipment in operations that cannot become operable without affecting the operational state of that equipment, shall be indicated as not hot-pluggable.	
RelatedItem(C)	Array	True	The ID(s) of the resources associated with this Power Limit	

Table 45. PowerSupply Properties (continued)

Redundancy(C)	Array	True	This structure is used to show redundancy for power supplies. The Component ids will reference the members of the redundancy groups.			
Oem	Object	True	This is an OEM property of Lenovo extended objects for power supply. Property for Lenovo as showed below.			
			Name	Type	Read Only	Description
			ManufactureDate	String	True	Manufacturer date of Power Supply
			ManufacturerName	String	True	Manufacturer Name/Id of Power Supply

PATCH – Change Power Values

Request

PATCH https://{{ip}}/redfish/v1/Chassis/{{chassis_instance}}/Power

Content-Type: application/json

Request body

Please refer to the properties that are patchable in [Table 41 “Power Properties” on page 78](#) for which Read Only is False that can be sent as Request body in JSON format.

Response

1. The response status is succesful with the status code of **200** with the GET response body.
2. For Error Responses, please refer to [“Error Response” on page 11](#).

GET – Thermal

Request

GET https://{{ip}}/redfish/v1/Chassis/{{chassis_instance}}/Thermal

Content-Type: application/json

Response

The response to the request will be in JSON format. The properties are mentioned in the following tables.

Note: The Unit for threshold values for Fan is RPM.

Table 46. Thermal Properties

Name	Type	Read only	Description			
(OData Attributes)			Refer to “OData Support” on page 5 .			
Oem	Object		Specifies the AMI defined OEM properties.			
			Name	Type	Read only	Description

Table 46. Thermal Properties (continued)

			@odata.type	String	True	Refer to “OData Support” on page 5.
			OwnerLUN	Number	True	<ol style="list-style-type: none"> 1. This is an OEM attribute and is a specific implementation of AMI. 2. This attribute is used in combination with SensorNumber attribute to display the Sensors under the MetricProperties attribute under Telemetry Service MetricDefinitions URI. 3. This attribute can be used to differentiate sensors with identical Sensor numbers but different LUN numbers.
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12			
Name(M)	String	True				
Description	String	True				
Temperatures	Array of Objects	True	This is the definition for temperature sensors. see Table 47 “Temperature Properties” on page 84.			
Fans	Array of Objects	True	This is the definition for fans. see Table 49 “Fan Properties” on page 87.			
Redundancy(N)(C)	Array	True	This structure is used to show redundancy for fans. The Component ids will reference the members of the redundancy groups.			
Actions	Object	True	It will contain actions under Oem attribute.			

Table 47. Temperature Properties

Name	Type	Read only	Description
Name(C)	String	True	The name of the Temperature sensor.
MemberId	String	True	This property shall uniquely identify the member within the collection. For services supporting Redfish v1.6 or higher, this value shall contain the zero-based array index.
SensorNumber(C)	Number	True	A numerical identifier for this temperature sensor which is unique within this resource.
Status	Object	True	Refer to “Resource Properties” on page 12 for Resource Oem.
ReadingCelsius	Number	True	The current value of the temperature sensor’s reading.
UpperThresholdNonCritical(C)	Number	True	The current reading is above the normal range but is not critical. Units shall use the same units as the related ReadingCelsius property
UpperThresholdCritical(C)	Number	True	The current reading is above the normal range but is not yet Fatal. Units shall use the same units as the related ReadingCelsius property

Table 47. Temperature Properties (continued)

UpperThresholdFatal(C)	Number	True	The current reading is above the normal range and is fatal. Units shall use the same units as the related ReadCineglsius property
LowerThresholdNonCritical(C)	Number	True	The current reading is below the normal range but is not critical. Units shall use the same units as the related ReadingCelsius property
LowerThresholdCritical(C)	Number	True	The current reading is below the normal range but is not yet fatal. Units shall use the same units as the related ReadingCelsius property
LowerThresholdFatal(C)	Number	True	The value of this property shall indicate the present reading is below the normal range and is fatal. Units shall use the same units as the related ReadingCelsius property.
MinReadingRangeTemp	Number	True	The lowest possible value for CurrentReading. Units shall use the same units as the related ReadingCelsius property.
MaxReadingRangeTemp	Number	True	The highest possible value for CurrentReading. Units shall use the same units as the related ReadingCelsius property.
PhysicalContext(C)	Object	True	The affected device or region within the chassis to which this Temperature measurement applies. see Table 48 "Thermal Physical Context Enum Properties" on page 86.
RelatedItem(C)	Array	True	The ID(s) of the resources associated with this Power Limit
DeltaReadingCelsius	Number	True	The value of this property shall be the delta of the values of the temperature readings across this sensor and the sensor DeltaPhysicalContext.
DeltaPhysicalContext	Enum	True	The value of this property shall be a description of the affected device or region within the chassis to which the DeltaReadingCelsius temperature measurement applies, relative to PhysicalContext.
MaxAllowableOperatingValue	Number	True	The value of this property shall indicate the maximum allowable operating temperature for the equipment monitored by this temperature sensor, as specified by a standards body, manufacturer, or combination.
MinAllowableOperatingValue	Number	True	The value of this property shall indicate the minimum allowable operating temperature for the equipment monitored by this temperature sensor, as specified by a standards body, manufacturer, or a combination.
AdjustedMaxAllowableOperatingValue	Number	True	The value of this property shall indicate the adjusted maximum allowable operating temperature for the equipment monitored by this temperature sensor, as specified by a standard body, manufacturer, or a combination, and adjusted based on environmental conditions present. For example, liquid inlet temperature may be adjusted based on the available liquid pressure.

Table 47. Temperature Properties (continued)

AdjustedMinAllowableOperatingValue	Number	True	The value of this property shall indicate the adjusted minimum allowable operating temperature for the equipment monitored by this temperature sensor, as specified by a standards body, manufacturer, or a combination, and adjusted based on environmental conditions present. For example, liquid inlet temperature may be adjusted based on the available liquid pressure.
OwnerLUN	Number	True	This attribute is used in combination with SensorNumberattribute to display the Sensors under the MetricPropertiesattribute under Telemetry ServiceMetricDefinitions URI. This attribute can be used to differentiate sensors with identical Sensor numbers but different LUN numbers.

Table 48. ThermalPhysicalContextEnum Properties

PhysicalContext	
Enum	Description
Room	The room
Intake	The intake point of the chassis
Exhaust	The exhaust point of the chassis
Front	The front of the chassis.
Back	The back of the chassis.
Upper	The upper portion of the chassis
Lower	The lower portion of the chassis
CPU	A Processor (CPU).
GPU	A Graphics Processor (GPU).
Backplane	A backplane within the chassis
SystemBoard	The system board (PCB).
PowerSupply	A power supply.
VoltageRegulator	A voltage regulator device
StorageDevice	A storage device
NetworkingDevice	A networking device.
ComputeBay	Within a compute bay
StorageBay	Within a storage bay.
NetworkBay	Within a networking bay.
ExpansionBay	Within an expansion bay
PowerSupplyBay	Within a power supply bay

Table 49. Fan Properties

Name	Type	Read only	Description
MemberId	String	True	This property shall uniquely identify the member within the collection. For services supporting Redfish v1.6 or higher, this value shall contain the zero-based array index Note: The "@odata.id" identifier for the Fan Sensors shall start with 0 and "MemberId" property has the same value as the identifier.
Name(C)	String	True	The name of the Fan.
PhysicalContext(C)	Object	True	The affected device or region within the chassis to which the Temperature measurement applies. see Table 48 "Thermal Physical Context Enum Properties" on page 86 .
Status	Object	True	Refer to "Resource Properties" on page 12 for Resource Oem.
Reading	Number	True	The current value of the fan sensor's reading.
UpperThresholdNonCritical(C)	Number	True	The current reading is above the normal range but is not critical. Units shall use the same units as the related Reading property.
UpperThresholdCritical(C)	Number	True	The current reading is above the normal range but is not yet Fatal. Units shall use the same units as the related Reading property.
UpperThresholdFatal(C)	Number	True	The current reading is above the normal range and is fatal. Units shall use the same units as the related Reading property.
LowerThresholdNonCritical(C)	Number	True	The current reading is below the normal range but is not critical. Units shall use the same units as the related Reading property.
LowerThresholdCritical(C)	Number	True	The current reading is below the normal range but is not yet fatal. Units shall use the same units as the related Reading property.
LowerThresholdFatal(C)	Number	True	The value of this property shall indicate the present reading is below the normal range and is fatal. Units shall use the same units as the related Reading property.
MinReadingRange	Number	True	The lowest possible value for Reading. Units shall use the same units as the related Reading property.
MaxReadingRange	Number	True	The highest possible value for Reading. Units shall use the same units as the related Reading property.
RelatedItem(C)	Array	True	The ID(s) of the resources serviced with this fan.
Redundancy(C)	Array	True	Redundancy information for the power subsystem of this system.

Table 49. Fan Properties (continued)

HotPluggable	Boolean	True	The value of this property shall indicate whether the device can be inserted or removed while the underlying equipment otherwise remains in its current operational state. Devices indicated as hot-pluggable shall allow the device to become operable without altering the operational state of the underlying equipment. Devices that cannot be inserted or removed from equipment in operation, s that cannot become operable without affecting the operational state of that equipment, shall be indicated as not hot-pluggable.
Location	Array	True	See Table 12 “Resource.v1_8_1 schema property” on page 14.
SensorNumebr	Number	True	A numerical identifier to represent the fan speed sensor.
OwnerLUN	Number	True	This is an OEM attribute and is a specific implementation o AMI. This attribute is used in combination with SensorNumberattribute to display the Sensors under the MetricPropertiesattribute underTelemetry Service MetricDefinitions URI. This attribute can be used to diferentiate sensors with identical Sensor numbers but different LUN numbers.

Chapter 7. Managers

GET – Manager Collection

Request

GET https://{ip}/redfish/v1/Managers

Content-Type: application/json

Response

Please refer to the [“Redfish Collection” on page 8](#) table for the JSON response properties.

GET – Manager Instance

1. This is the schema definition for a Manager.
2. Examples of managers are BMCs, Enclosure Managers, Management Controllers and other subsystems assigned manageability functions.

Request

GET https://{ip}/redfish/v1/Managers/{manager_instance}

Content-Type: application/json

Response

The response is a JSON object that contains the following parameters:

Table 50. Manager Properties

Name	Type	Read only	Description			
(OData Attributes)			Refer to “OData Support” on page 5			
Oem	Object		AMI Manager OEM Properties			
			Name	Type	Read only	Description
			@odata.type	String	True	Refer to “OData Support” on page 5
			VirtualMedia	Object	True	Refer to Table 51 “Managers Self OEM Properties” on page 91.
			ManagerBootConfiguration	Object	False	
			ManagerServiceInfo	Object	True	
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12			
Name(M)	String	True				
Description	String	True				
ManagerType	String	True	An enumeration property that represents the type of manager that this resource represents.			
			Enum	Description		

Table 50. Manager Properties (continued)

			BMC	A controller which provides management functions for a single computer system.
Links	Object	True	Refer to Table 52 “Link Properties” on page 92.	
ServiceEntryPoint UUID	String	True	The UUID of the Redfish Service provided by this manager. Refer to Table 9 “Resource Type Definitions” on page 12	
UUID	String	True	The Universal Unique Identifier (UUID) for this Manager. Refer to Table 9 “Resource Type Definitions” on page 12	
Model	String	True	Model number of this manager as defined by the manufacturer.	
DateTime	String	False	The current DateTime (with offset) for the manager, used to set or read time. Notes: 1. The valid range is -12:00 to +14:00. Please refer the following link for the allowable values within the above-specified range. https://en.wikipedia.org/wiki/List_of_UTC_time_offsets 2. According to UNIX time maximum date allowed to PATCH is 2038-01-18.	
DateTimeLocalOffset	String	False	The time offset from UTC that the DateTime property is set to in format: +06:00. Note: The valid range is -12:00 to +14:00. Please refer the following link for the allowable values within the above specified range. https://en.wikipedia.org/wiki/List_of_UTC_time_offsets	
FirmwareVersion	String	True	The firmware version of this Manager.	
SerialConsole	Object		Information about the Serial Console service provided by this manager. see Table 53 “Serial Console Properties” on page 93.	
CommandShell	Object		Information about the Command Shell service provided by this manager. see Table 54 “Command Shell Properties” on page 93.	
GraphicalConsole	Object		The information about the Graphical Console (KVM-IP) service of this manager. see Table 55 “Graphical Console Properties” on page 94.	
Actions	Object	True	Managers allows the user to perform Actions like Reset. It can also contain an Oem Object under this Actions if any.	
Status	Object	True	Refer to “Resource Properties” on page 12 for Resource Oem.	
EthernetInterfaces(N)	Object	True	A reference to a collection of NICs that this manager uses for network communication. It is here that clients will find NIC configuration options and settings.	
SerialInterfaces(N)	Object	True	A reference to a collection of serial interfaces that this manager uses for serial and console communication. It is here that clients will find serial configuration options and settings.	

Table 50. Manager Properties (continued)

NetworkProtocol(N)	Object	True	A reference to the network services and their settings that the manager controls. It is here that clients will find network configuration options as well as network services.
LogServices(N)	Object	True	A reference to a collection of Logs used by the manager.
VirtualMedia(N)	Object	True	A reference to the Virtual Media services for this particular manager. Note: Link will be present only when Virtual Media is enabled in the Manager, BMC in this case.
Redundancy(N)(C)	Array	True	Redundancy information for the managers of this system. Note: platform-specific porting needed.
Redundancy@odata.count	Number	True	An integer representing the number of items in a collection.
HostInterfaces(N)			This is a reference to a collection of Host Interfaces that this manager uses for local host communication. It is here that clients will find Host Interface configuration options and settings.
AutoDSTEnabled	Boolean	True	The value of this property shall contain the enabled status of the automatic Daylight-Saving Time (DST) adjustment of the manager's DateTime. It shall be true if Automatic DST adjustment is enabled and false if disabled. Note: platform-specific porting needed.
PowerState	String	True	The value of this property shall contain the power state of the Manager.

Table 51. Managers Self OEM Properties

VirtualMedia						
Name	Type	Read Only	Description			
CDInstances	Number	True	Specifies the number of CD instances allowed for redirection.			
RMediaStatus	String	True	Specifies the current status of RMedia settings.			
ManagerBootConfiguration						
Name	Type	Read Only	Description			
ManagerBoot Mode	Array	False	This property shall specify the Enum supported by ManagerBootMode.			
			Enum	Description		
			SoftReset	Added SoftReset in Boot Option		
			ResetTimeout	ResetTimeout support is Boot Option		
ManagerServiceInfo						
Name	Type	Read Only	Description			
CommandShell ServiceInfo	Object	True	The property contains objects related to CommandShell service.			
			Name	Type	Read only	Description
			IPMI	Object	True	The property contains an object that contains property MaxConcurrenceSession of protocol IPMI.

Table 51. Managers Self OEM Properties (continued)

			SSH	Object	True	The property contains an object that contains property MaxConcurrenceSession of protocol SSH. Note: This property will not be displayed in the response if the value from back-end is not applicable.
Links	Object	True	The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but not contained by (subordinate to), this resource.			
			Name	Type	Read only	Description
			Network Protocol	Object	True	The property contains an URI related to NetworkProtocol resource, “/redfish/v1/Managers/Self/NetworkProtocol”

Table 52. Link Properties

Name	Type	Read Only	Description
ManagerForServers(N)	Array	True	An array of references to the systems that this manager has control over. Note: platform-specific porting needed.
ManagerForServers@odata.count	Number	True	An integer representing the number of items in a collection.
ManagerForSwitches(N)	Array	True	An array of references to the switches that this manager has control over. Note: platform-specific porting needed.
ManagerForSwitches@odata.count	Number	True	An integer representing the number of items in a collection.
ManagerForChassis@odata.count	Number	True	An integer representing the number of items in a collection.
ManagerForChassis(N)	Array	True	An array of references to the chassis that this manager has control over. Note: platform-specific porting needed.
ManagerInChassis(N)	Array	True	This property shall contain a reference to the chassis where this manager is located.
ActiveSoftwareImage(N)	Array	True	This property shall contain a link to the SoftwareInventory resource that represent the active firmware image for this manager. Note: platform-specific porting needed.
ActiveSoftwareImage@odata.count	Number	True	An integer representing the number of items in a collection.

Table 52. Link Properties (continued)

SoftwareImages(N)	Array	True	This property shall contain an array of links to the SoftwareInventory resources that represent the firmware images that apply to this manager. Note: platform-specific porting needed.
SoftwareImages@odata.count	Number	True	An integer representing the number of items in a collection.

Table 53. Serial Console Properties

Name	Type	Read only	Description	
ServiceEnabled	Boolean	False	Indicates if the service is enabled for this manager. Notes: <div><div>1. This property will be true if any one of the protocols is enabled in the ConnectTypesSupported.</div><div>2. IPMI-SOL service can be enabled or disabled in BMC. Hence all the available services (IPMISOL, SOLSSH) will be disabled/enabled as per the user's input.</div></div>	
MaxConcurrent Sessions	String	True	Indicates the maximum number of concurrent services sessions supported by the implementation regardless of protocol. Minimum Value:0. Note: platform-specific porting needed.	
ConnectTypes Supported	Array	True	The value of ConnectTypesSupported shall be an array of the enumerations provided here.	
			Enum	Description
			Telnet (Not Supported)	The controller supports a Serial Console connection using the Telnet protocol.
			IPMI	The controller supports a Serial Console connection using the IPMI Serial-over-LAN (SOL) protocol.
			Oem (Not Supported)	The controller supports a Serial Console connection using an OEM-specific protocol.

Table 54. CommandShell Properties

Name	Type	Read only	Description
ServiceEnabled	Boolean	False	Indicates if the service is enabled for this manager. Note: This property will be true if any one of the protocols is enabled in the ConnectTypesSupported. If IPMI is present in ConnectTypesSupported then CommandShell cannot be disabled. If IPMI is not present, then this property will be true if any one of the services in the ConnectTypesSupported is Enabled. If this property is patched to true, then all the other services in ConnectTypesSupported will be enabled.

Table 54. CommandShell Properties (continued)

MaxConcurrentSessions	String	True	Indicates the maximum number of concurrent services sessions supported by the implementation regardless of protocol. Minimum Value:0. Notes: 1. platform-specific porting needed. 2. The number of SSH MaxConcurrentSessions update based the OEM API and getting the detail. So, the default MaxConcurrentSessions of ComandShell is based on the IPMI and SSH max concurrent session to display.	
ConnectTypesSupported	Array	True	The value of ConnectTypesSupported shall be an array of the enumerations provided here.	
			Enum	Description
			SSH	The controller supports a CommandShell connection using the SSH protocol. Note: There is no limit for SSH sessions and maximum session is not applicable.
			Telnet (Not Supported)	The controller supports a CommandShell connection using the Telnet protocol.
			IPMI	The controller supports a CommandShell connection using the IPMI protocol.
			Oem (Not Supported)	The controller supports a CommandShell connection using an OEM-specific protocol.

Table 55. GraphicalConsole Properties

Name	Type	Read only	Description	
ServiceEnabled	Boolean	False	Indicates if the service is enabled for this manager.	
MaxConcurrent Sessions	String	True	Indicates the maximum number of concurrent services sessions supported by the implementation regardless of protocol. Minimum Value:0.	
ConnectTypes Supported	Array	True	This object is used to enumerate the Graphical Console connection types allowed by the implementation.	
			Enum	Description
			KVMIP	The controller supports a Graphical Console connection using a KVM-IP (redirection of Keyboard, Video, Mouse over IP) protocol.
			Oem (Not Supported)	The controller supports a Graphical Console connection using an OEM-specific protocol.

PATCH – Manager Instance

Request

PATCH https://{{ip}}/redfish/v1/Managers/{{manager_instance}}

Content-Type: application/json

Request body

Please refer to the properties that are patchable in the [Table 50 “Manager Properties” on page 89](#) for which ReadOnly is False that can be sent as Request body in JSON format.

Response

The response status is 204 and no response body. For Error Responses, please refer to [“Error Response” on page 11](#).

POST – Manager Instance Reset

Request

POST `https://{ip}/redfish/v1/Managers/{manager_instance}/Actions/Manager.Reset`

Content-Type: application/json

It provides non-disruptive BMC reset.

Table 56. Property for BMC reset type

Name	type	Read only	Description
ResetType	String	False	The BMC Reset type can be the following value: “ ForceRestart “, which will do a cold reset of the BMC. “ WarmReset “, which will do a wram reset of the BMC.

Request body

```
{  
    "ResetType": "ForceRestart"  
}
```

Response

1. The response status is 202 with the below body. Check BMC restarting logs in the BMC console and wait for a few seconds for BMC restarting.
2. For Error Responses, please refer to [“Error Response” on page 11](#).

```
{  
    "@odata.context": "/redfish/v1/$metadata#Task.Task(TaskState,Description,Name,Id)",  
    "@odata.id": "/redfish/v1/TaskService/Tasks/1",  
    "@odata.type": "#Task.v1_2_0.Task",  
    "Description": "Task for ManagerReset",  
    "Id": "1",  
    "Name": "Manager Reset",  
}
```

```

    "TaskState": "New"
}

```

GET – Network Protocol

This resource is used to obtain or modify the network services managed by a given manager.

Request

GET <https://ip/redfish/v1/Managers/Self/NetworkProtocol>

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 57. Network Protocol Properties

Name	Type	Read only	Description												
(OData Attributes)			Refer to “OData Support” on page 5												
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14												
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12												
Name(M)	String	True													
Description	String	True													
HostName	String	True	The DNS Host Name of this manager, without any domain information.												
FQDN	String	True	This is the fully qualified domain name for the manager obtained by DNS including the host name and top-level domain name.												
HTTPS	Object	False	<p>This object shall contain information for the HTTPS/SSL protocol settings for this manager.</p> <p>Refer to Table 59 “Protocol Properties” on page 99.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Default Value</th></tr> <tr> <td>Protocol Enabled</td><td>Boolean</td><td>False</td><td>True</td></tr> <tr> <td>Port</td><td>Number</td><td>False</td><td>443</td></tr> </table>	Name	Type	Read only	Default Value	Protocol Enabled	Boolean	False	True	Port	Number	False	443
Name	Type	Read only	Default Value												
Protocol Enabled	Boolean	False	True												
Port	Number	False	443												
SNMP	Object	False	<p>This object shall contain information for the SNMP protocol settings for this manager.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Default Value</th></tr> <tr> <td>Protocol Enabled</td><td>Boolean</td><td>False</td><td>True</td></tr> <tr> <td>Port</td><td>Number</td><td>False</td><td>161</td></tr> </table>	Name	Type	Read only	Default Value	Protocol Enabled	Boolean	False	True	Port	Number	False	161
Name	Type	Read only	Default Value												
Protocol Enabled	Boolean	False	True												
Port	Number	False	161												

Table 57. Network Protocol Properties (continued)

VirtualMedia	Object	False	<p>This object shall contain information for the Virtual Media protocol settings for this manager.</p> <p>This property is not patchable when Single Port App feature is enabled in AMI BMC.</p> <p>VirtualMedia maps to cd-media in AMI BMC.</p> <p>Refer to Table 59 “Protocol Properties” on page 99.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Default Value</th></tr> <tr> <td>Protocol Enabled</td><td>Boolean</td><td>False</td><td>True</td></tr> <tr> <td>Port</td><td>Number</td><td>False</td><td>443</td></tr> </table>	Name	Type	Read only	Default Value	Protocol Enabled	Boolean	False	True	Port	Number	False	443
Name	Type	Read only	Default Value												
Protocol Enabled	Boolean	False	True												
Port	Number	False	443												
Telnet (Not Supported)	Object	False	<p>This object shall contain information for the Telnet protocol settings for this manager.</p> <p>Refer to Table 59 “Protocol Properties” on page 99.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Default Value</th></tr> <tr> <td>Protocol Enabled</td><td>Boolean</td><td>False</td><td>True</td></tr> <tr> <td>Port</td><td>Number</td><td>False</td><td>23</td></tr> </table>	Name	Type	Read only	Default Value	Protocol Enabled	Boolean	False	True	Port	Number	False	23
Name	Type	Read only	Default Value												
Protocol Enabled	Boolean	False	True												
Port	Number	False	23												
SSDP	Object	False	<p>This object shall contain information for the SSDP protocol settings for this manager.</p> <p>Simple Service Discovery Protocol (SSDP) is for network discovery of devices supporting the Redfish service.</p> <p>Refer to Table 59 “Protocol Properties” on page 99.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Default Value</th></tr> <tr> <td>Protocol Enabled</td><td>Boolean</td><td>False</td><td>False</td></tr> <tr> <td>Port</td><td>Number</td><td>False</td><td>1900</td></tr> </table>	Name	Type	Read only	Default Value	Protocol Enabled	Boolean	False	False	Port	Number	False	1900
Name	Type	Read only	Default Value												
Protocol Enabled	Boolean	False	False												
Port	Number	False	1900												
IPMI (Not Supported)	Object	False	<p>This object shall contain information for the IPMI over LAN protocol settings for the manager.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Default Value</th></tr> <tr> <td>Protocol Enabled</td><td>Boolean</td><td>False</td><td>True</td></tr> <tr> <td>Port</td><td>Number</td><td>False</td><td>623</td></tr> </table>	Name	Type	Read only	Default Value	Protocol Enabled	Boolean	False	True	Port	Number	False	623
Name	Type	Read only	Default Value												
Protocol Enabled	Boolean	False	True												
Port	Number	False	623												

Table 57. Network Protocol Properties (continued)

SSH	Object	False	<p>This object shall contain information for the SSH protocol settings for the manager.</p> <p>Refer to Table 59 “Protocol Properties” on page 99.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Default Value</th></tr> <tr> <td>Protocol Enabled</td><td>Boolean</td><td>False</td><td>True</td></tr> <tr> <td>Port</td><td>Number</td><td>False</td><td>22</td></tr> </table>	Name	Type	Read only	Default Value	Protocol Enabled	Boolean	False	True	Port	Number	False	22				
Name	Type	Read only	Default Value																
Protocol Enabled	Boolean	False	True																
Port	Number	False	22																
KVMIP	Object	False	<p>This object shall contain information for the KVM-IP (Keyboard, Video, Mouse) protocol settings for the manager.</p> <p>The Port field for this protocol is read only when single port app is enabled.</p> <p>Refer to Table 59 “Protocol Properties” on page 99.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Default Value</th></tr> <tr> <td>Protocol Enabled</td><td>Boolean</td><td>False</td><td>True</td></tr> <tr> <td>Port</td><td>Number</td><td>False</td><td>443</td></tr> </table>	Name	Type	Read only	Default Value	Protocol Enabled	Boolean	False	True	Port	Number	False	443				
Name	Type	Read only	Default Value																
Protocol Enabled	Boolean	False	True																
Port	Number	False	443																
Status	Object	True	Refer to “Resource Properties” on page 12 for Resource Oem.																
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.																
NTP	Object	False	<p>This object shall contain information for the NTP protocol settings for the manager.</p> <p>Refer to Table 59 “Protocol Properties” on page 99.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Default Value</th></tr> <tr> <td>Protocol Enabled</td><td>Boolean</td><td>False</td><td>True</td></tr> <tr> <td>Port</td><td>Number</td><td>False</td><td>123</td></tr> <tr> <td>NTPServers</td><td>Array</td><td>False</td><td>“pool.ntp.org”, “time.nist.gov”</td></tr> </table>	Name	Type	Read only	Default Value	Protocol Enabled	Boolean	False	True	Port	Number	False	123	NTPServers	Array	False	“pool.ntp.org”, “time.nist.gov”
Name	Type	Read only	Default Value																
Protocol Enabled	Boolean	False	True																
Port	Number	False	123																
NTPServers	Array	False	“pool.ntp.org”, “time.nist.gov”																
OEM	Object		Lenovo OEM for manager network																

Table 58. Lenovo OEM for manager network

Name	Type	Read only	Description
DNS	Object	True	Show sublink for Lenovo OEM setting for DNS

Table 58. Lenovo OEM for manager network (continued)

IOL	Object	False	This object shall contain “status” for IPMI over LAN.			
			Name	Type	Read only	Description
			status	String	True	Indicates if the Ipv4/Ipv6 IOL protocol is enabled or disabled.
PortForwarding	Object	True	Show sublink for Lenovo OEM setting for Portforwarding			

Table 59. Protocol properties

Name	Type	Read only	Description
ProtocolEnabled	Boolean	False	Indicates if the protocol is enabled or disabled
Port	Number	False	<ol style="list-style-type: none"> Indicates the port assigned for the protocol. Minimum Value:0. Value of the Port can take any value between 1 and 65535.

PATCH – Network Protocol

This resource is used to obtain or modify the network services managed by a given manager.

Notes:

- If to configure IPMI protocol, the “ProtocolEnabled” can be configured as true/false by PATCH action, it will enable/disable the IOL of Ipv4/Ipv6 at the same time rather than set them separately via redfish. And only when both the IOL of Ipv4/Ipv6 is enabled will the “ProtocolEnabled” be “true”. Otherwise, the property will be “false”.
- For the protocols that support changing “Port” to “ProtocolEnabled”, when the PATCH value is the same as the current status, it will report an error, which is different from the previous Redfish service (RTP 1.7)

Request

PATCH `https://{ip}/redfish/v1/Managers/Self/NetworkProtocol`

Content-Type: application/json

Request body

Please refer to the properties that are patchable in [Table 57 “Network Protocol Properties” on page 96](#) for which read-only is False that can be sent as Request body in the json format.

Response

The response status is 204 and no response body. For Error Responses, please refer to [“Error Response” on page 11](#).

POST – Enable the Remote Media

1. CD Media collection will be displayed under VirtualMedia only when RMedia support is enabled.
2. This EnableRMedia action is used to Enable/Disable RMedia support.
3. The POST action is not allowed when any one of the CD / HD media redirections is in progress.
4. Redirection can be initiated through WebUI / Redfish/ KVM.

Request

POST https://{ip}/redfish/v1/Managers/Self/Actions/Oem/AMIVirtualMedia.EnableRMedia

Content-Type: application/json

Request example

```
{
  "RMediaState": "Enable"
}
```

Response

The response status code should be 200 with the below message in the response.

```
{
  "@Message.ExtendedInfo": [
    {
      "@odata.type": "#Message.v1_0_8.Message",
      "Message": "EnableRMedia action has been initiated successfully.  
Please allow up to 4-5 secs and verify the value of RMediaStatus OEM property in /redfish/v1/Managers/Selfinstance",
      "MessageArgs": [
        "EnableRMedia",
        "RMediaStatus OEM",
        "/redfish/v1/Managers/Self"
      ],
      "MessageId": "Ami.1.0.DelayInActionCompletion",
      "Resolution": "Check the property value update after 4-5 seconds",
      "Severity": "OK"
    }
  ]
}
```

Chapter 8. Serial Interface

GET – Serial Interface Collection

Request

GET https://{ip}/redfish/v1/Managers/{manager_instance}/SerialInterfaces

Content-Type: application/json

Response

See the [“Redfish Collection” on page 8](#) for the JSON response properties.

Response example

When the request is successful, a message body similar to the following is returned:

```
{
  "@odata.context": "/redfish/v1/$metadata#SerialInterfaceCollection.SerialInterfaceCollection",
  "@odata.etag": "\"1578116385\"",
  "@odata.id": "/redfish/v1/Managers/Self/SerialInterfaces",
  "@odata.type": "#SerialInterfaceCollection.SerialInterfaceCollection",
  "Description": "Collection of Serial Interfaces for this System",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Managers/Self/SerialInterfaces/IPMI-SOL"
    },
    {
      "@odata.id": "/redfish/v1/Managers/Self/SerialInterfaces/ttyS0"
    },
    {
      "@odata.id": "/redfish/v1/Managers/Self/SerialInterfaces/ttyS1"
    },
    {
      "@odata.id": "/redfish/v1/Managers/Self/SerialInterfaces/ttyS2"
    },
    {
```

```

        "@odata.id": "/redfish/v1/Managers/Self/SerialInterfaces/ttyS3"
    },
    {
        "@odata.id": "/redfish/v1/Managers/Self/SerialInterfaces/ttyS4"
    }
],
"Members@odata.count": 6,
"Name": "Serial Interface Collection"
}

```

GET – Serial Interface Instance

Request

GET https://{ip}/redfish/v1/Managers/{manager_instance}/SerialInterfaces/{manager_serialifc_instance}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 60. Serial Interface Properties

Name	Type	Read Only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
InterfaceEnabled	Boolean	True	The “read-only” is false only for IPMI-SOL This indicates whether this interface is enabled.

Table 60. Serial Interface Properties (continued)

BitRate	String	True	<p>The “read-only” is false only for IPMI-SOL</p> <p>The receive and transmit rate of data flow, typically in bits-per-second (bps), over the serial connection and can take any one of the following enum values.</p> <pre>"enum": ["9600", "19200", "38400", "57600", "115200]</pre> <p>Note: BitRate property for Serial Interface in Redfish maps the non-volatile bit rate setting of IPMI SOL.</p>
Parity	String	True	<p>The type of parity used by the sender and receiver in order to detect errors over the serial connection. It can take any one of the following enum values :</p> <pre>"enum": ["None", "Even", "Odd", "Mark", "Space"]</pre>
SignalType(C) (Not Supported)	String	True	<p>The type of signal used for the communication connection- RS232 or RS485.</p> <pre>"enum": ["Rs232", "Rs485"]</pre>
ConnectorType(C) (Not Supported)	String	True	<p>The type of connector used for this interface.</p> <pre>"enum": ["RJ45.", "RJ11.", "DB9 Female.", "DB9 Male.", "DB25 Female.", "DB25 Male.", "USB.", "mUSB.", "uUSB."]</pre>

Table 60. Serial Interface Properties (continued)

PinOut(C) (Not Supported)	String	True	The physical pin configuration needed for a serial connector. "enum": ["Cisco", "Cyclades", "Digi"]	
DataBits	String	True	The number of data bits that will follow the start bit over the serial connection. "enum": ["5", "6", "7", "8"]	
StopBits	String	True	The period of time before the next start bit is transmitted. "enum": ["1", "2"]	
Actions (Not Supported)	Object	True	This object will contain the actions for this resource under Oem property if any.	
FlowControl	String	True	The type of flow control, if any, that will be imposed on the serial connection.	
			Enum	Description
			None	No flow control imposed
			Software	XON/XOFF in-band flow control imposed
			Hardware	Out of band flow control imposed

PATCH – Serial Interface Instance

Request

PATCH `https://{ip}/redfish/v1/Managers/{manager_instance}/SerialInterfaces/{manager_serialifc_instance}`

Content-Type: application/json

Request body

1. Please refer to the properties that are patchable in [Table 60 “Serial Interface Properties” on page 102](#) for which Read Only is False that can be sent as Request body in JSON format.
2. According to IPMI SPEC, Serial communication with the BMC when SOL is activated always occurs using 8bits/character, no parity, 1 stop bit, and RTS/CTS (hardware) flow control.
3. Hence the properties **Parity**, **DataBits**, **StopBits** and **FlowControl** are not patchable when the **manager_serialifc_instance** is IPMI_SOL.
4. Patch is not Supported for Serial Interface instances other than IPMI-SOL.

Request example

```
{  
    "BitRate": "9600",  
    "InterfaceEnabled": false  
}
```

Response

The response status is success with status code as 204 and no body.

For Error Responses, please refer to [“Error Response” on page 11](#).

Chapter 9. Virtual Media

How to Enable Remote Media (important)

Please refer to [“POST – Enable the Remote Media” on page 99](#) for more information.

GET – Virtual Media Collection

1. AMI's Remote Media feature redirected images and CD instances will be shown in this list Virtual Media Members will be shown to the user only when VirtualMedia is enabled in BMC.
2. **ProtocolEnabled** property for VirtualMedia in **ManagerNetworkProtocol** should have the value as "true".
3. Only CD Image Redirection is supported in Redfish.
4. Only Remote Media is supported in Redfish.
5. When CD media redirection is initiated, the response of VirtualMedia collection will be refreshed / updated. The CD Media, for which redirection is in progress will be assigned to the first CD instance (say CD1) in VirtualMedia collection.
6. For Example, Virtual Media collection has four CD instances (CD1, CD2, CD3, CD4) and all the instances are free. If the user executes InsertMedia action using CD4 instance, after the successful operation, the redirected device will be assigned to CD1 instance (i.e. CD1 inserted property value will be true). The order of the CD instances will be like BMC Web UI.

Request URI

GET `https://{ip}/redfish/v1/Managers/{manager_instance}/VirtualMedia`

Content-Type: application/json

Response

Please refer to the [“Redfish Collection” on page 8](#) table for the JSON response properties.

GET – Virtual Media Instance

1. This is the schema definition for the Virtual Media Service. This resource shall be used to represent a virtual media service for a Redfish implementation.
2. The user can initiate CD media redirection using InsertMedia action and can stop the redirection using EjectMedia action.
3. This link will be shown to the user only when VirtualMedia CD instance is redirected from Remote Media from BMC Webpage.
4. KVM Virtual Media will not be listed in Redfish Virtual Media Instance when redirected through KVM.

Request

GET `https://{ip}/redfish/v1/Managers/{manager_instance}/VirtualMedia/{virtualmedia_instance}`

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 61. Virtual Media Property

Name	Type	Read only	Description																
(OData Attributes)			Refer to “OData Support” on page 5.																
Oem	Object		AMI Virtual Media OEM Properties																
			<table><tr><td>Name</td><td>Type</td><td>Read only</td><td>Description</td></tr><tr><td>@odata.type</td><td>String</td><td>True</td><td>Refer to “OData Support” on page 5.</td></tr><tr><td>Redirection Status</td><td>String</td><td>True</td><td>Specifies the redirection status of the image.</td></tr><tr><td>BoostMode</td><td>Boolean</td><td>False</td><td>Specifies the BoostMode support status</td></tr></table>	Name	Type	Read only	Description	@odata.type	String	True	Refer to “OData Support” on page 5.	Redirection Status	String	True	Specifies the redirection status of the image.	BoostMode	Boolean	False	Specifies the BoostMode support status
			Name	Type	Read only	Description													
			@odata.type	String	True	Refer to “OData Support” on page 5.													
			Redirection Status	String	True	Specifies the redirection status of the image.													
BoostMode	Boolean	False	Specifies the BoostMode support status																
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12																
Name(M)	String	True																	
Description	String	True																	
ImageName	String	True	The current image name.																
Image	String	True	A URI providing the location of the selected image																
ConnectedVia	String	True	1. The value of this property shall indicate the current connection method from a client to the virtual media represented by this resource.																
			2. A value of NotConnected shall indicate no connection is present.																
			3. A value of URI shall indicate that a remote connection via a URI reference type is being used.																
			<table><tr><td>Enum</td><td>Description</td></tr><tr><td>NotConnected</td><td>No current connection</td></tr><tr><td>URI</td><td>Connected to a URI location</td></tr><tr><td>Applet (Not Supported)</td><td>Connected to a client application</td></tr><tr><td>Oem (Not Supported)</td><td>Connected via an OEM-defined method</td></tr></table>	Enum	Description	NotConnected	No current connection	URI	Connected to a URI location	Applet (Not Supported)	Connected to a client application	Oem (Not Supported)	Connected via an OEM-defined method						
			Enum	Description															
			NotConnected	No current connection															
URI	Connected to a URI location																		
Applet (Not Supported)	Connected to a client application																		
Oem (Not Supported)	Connected via an OEM-defined method																		
Inserted	Boolean	True	1. Indicates if virtual media is inserted in the virtual device.																
WriteProtected	Boolean	True	1. Indicates the media is write-protected.																

Table 61. Virtual Media Property (continued)

Name	Type	Read only	Description			
Actions	Object	True	<div>1. EjectMedia - This action is used to detach remote media from virtual media.</div> <div>2. InsertMedia - This action is used to attach remote media to virtual media.</div> <div>3. This action object will also contain the actions for this resource under Oem property if any.</div>			
			Action Name = InsertMedia			
			Property	Type	Description	
			Image	String	The URI of the remote media to attach to the virtual media.	
			Inserted	Boolean	<div>1. Indicates if the image is to be treated as inserted upon completion of the action.</div> <div>2. Inserted value should be true.</div>	
			TransferMethod	String	<div>1. Transfer method to use with the given Image.</div> <div>2. The allowed value for this property is "Stream".</div>	
			TransferProtocol Type	String	<div>1. Network protocol to use with the image.</div> <div>2. The allowed value for this property is "NFS" , "CIFS" and "HTTPS".</div>	
			WriteProtected	String	<div>1. Indicates if the remote media is supposed to be treated as write protected.</div> <div>2. For CD instance, WriteProtected value is always true.</div>	
			UserName	String	<div>1. The username to access the Image parameter-specified URI.</div> <div>2. This is a required property for "CIFS" and "HTTPS" protocol.</div>	
			Password	String	<div>1. The password to access the Image parameter-specified URI.</div> <div>2. This is a required property for "CIFS" and "HTTPS" protocol.</div>	
			Action Name = InsertMedia			
			Property	Type	Description	
			NA	NA	Empty parameter should be given as request data.	
			MediaType	Array	True	<div>1. The values of this array shall be the supported media types for this connection.</div>

Table 61. Virtual Media Property (continued)

Name	Type	Read only	Description								
			<div>2. Only CD MediaType is supported in Redfish</div> <table><tr><th>Enum</th><th>Description</th></tr><tr><td>CD</td><td>A CD-ROM format (ISO) image.</td></tr></table>	Enum	Description	CD	A CD-ROM format (ISO) image.				
Enum	Description										
CD	A CD-ROM format (ISO) image.										
TransferProtocol Type	String	True	<div>Network protocol to use with the image.</div> <table><tr><th>Enum</th><th>Description</th></tr><tr><td>NFS</td><td>Network File System protocol.</td></tr><tr><td>CIFS</td><td>Common Internet File System.</td></tr><tr><td>HTTPS</td><td>Hyper Text Transfer Protocol over SecureSocket Layer</td></tr></table>	Enum	Description	NFS	Network File System protocol.	CIFS	Common Internet File System.	HTTPS	Hyper Text Transfer Protocol over SecureSocket Layer
Enum	Description										
NFS	Network File System protocol.										
CIFS	Common Internet File System.										
HTTPS	Hyper Text Transfer Protocol over SecureSocket Layer										
TransferMethod	String	True	<div>1. Transfer method to use with the given Image. 2. Only Stream TransferMethod is supported in Redfish.</div> <table><tr><th>Enum</th><th>Description</th></tr><tr><td>Stream</td><td>Stream image file data from the source URI</td></tr></table>	Enum	Description	Stream	Stream image file data from the source URI				
Enum	Description										
Stream	Stream image file data from the source URI										
UserName	String	True	The username to access the Image parameter-specified URI.								

Response example

When the request is successful, a message body similar to the following is returned:

```
{
  "@odata.context": "/redfish/v1/$metadata#VirtualMedia.VirtualMedia",
  "@odata.etag": "\"1593620509\"",
  "@odata.id": "/redfish/v1/Managers/Self/VirtualMedia/CD1",
  "@odata.type": "#VirtualMedia.v1_3_2.VirtualMedia",
  "Actions": {
    "#VirtualMedia.EjectMedia": {
      "@Redfish.ActionInfo": "/redfish/v1/Managers/Self/VirtualMedia/CD1/EjectMediaActionInfo",
      "target": "/redfish/v1/Managers/Self/VirtualMedia/CD1/Actions/VirtualMedia.EjectMedia"
    },
    "#VirtualMedia.InsertMedia": {
      "@Redfish.ActionInfo": "/redfish/v1/Managers/Self/VirtualMedia/CD1/InsertMediaActionInfo",
      "target": "/redfish/v1/Managers/Self/VirtualMedia/CD1/Actions/VirtualMedia.InsertMedia"
    }
  }
}
```

```

    },
    "ConnectedVia": "NotConnected",
    "Description": "Virtual Media Instance redirected to host via this Manager",
    "Id": "CD1",
    "Image": "//10.0.121.123/home/tamil/image",
    "ImageName": "",
    "Inserted": false,
    "MediaTypes": [
        "CD"
    ],
    "Name": "CD1",
    "Oem": {
        "Ami": {
            "@odata.type": "#AMIVirtualMedia.v1_0_0.AMIVirtualMedia",
            "BoostMode": false,
            "RedirectionStatus": "None"
        }
    },
    "TransferMethod": "Stream",
    "TransferProtocolType": "NFS",
    "UserName": "",
    "WriteProtected": true
}

```

POST– Initiate CD media image redirection

Notes:

1. Make sure RMedia configuration is enabled in BMC. If not, enable it through Web UI or refer to [“POST – Enable the Remote Media” on page 99](#).
2. Make sure CD instance collection is more than 1, refer to [“GET – Virtual Media Collection” on page 107](#). If there isn't CD instance or only 1 CD instance, initiating CD media image redirection action will fail.

Request

POST https://{ip}/redfish/v1/Managers/{manager_instance}/VirtualMedia/{CD_instance}/Actions/VirtualMedia.InsertMedia

Content-Type: application/json

Request example

NFS

```
{
  "Image": "//10.0.125.169/home/tamil/images/images/ubuntu-14.04.1-desktop-amd64.iso",
  "TransferProtocolType": "NFS",
}
```

CIFS

```
{
  "Image": "//<sys_ip>/home/test/images/javatools.iso",
  "TransferProtocolType": "CIFS",
  "UserName": "<sys_username>",
  "Password": "<sys_password>"
}
```

Response

For success, the response status is **202** with a message body. For Error Responses, please refer to [“Error Response” on page 11](#).

```
{
  "@odata.context": "/redfish/v1/$metadata#Task.Task(Description,TaskState,Name,Id)",
  "@odata.id": "/redfish/v1/TaskService/Tasks/1",
  "@odata.type": "#Task.v1_4_2.Task",
  "Description": "Task for InsertMedia Action",
  "Id": "1",
  "Name": "InsertMedia Action",
  "TaskState": "New"
}
```

1. After a successful post call, using the TaskID check the TaskState in "/redfish/v1/TaskService/Tasks/<taskid>" and verify the value of "RedirectionStatus" OEM property in GET "/redfish/v1/Managers/Self/VirtualMedia/<cd_instance>".
2. Once Task created Auditlog will be generated for InsertMedia Post Action.
3. The Task is aborted due to an error, "TaskState" property value will be "Exception" and an appropriate error message will be displayed in the response of the Corresponding Task "/redfish/v1/TaskService/Tasks/<taskid>".

GET – Boost Mode and Redirection Status

Request

GET https://{ip}/redfish/v1/Managers/{manager_instance}/VirtualMedia/{CD_instance}

Content-Type: application/json

Response

OEM Object

Sample Value of **RedirectionStatus** when initiated through **BoostMode**:

```
"Oem": {  
  "Ami": {  
    "@odata.type": "#AMIVirtualMedia.v1_0_0.AMIVirtualMedia",  
    "BoostMode": true,  
    "RedirectionStatus": "Redirection started with media boost"  
  }  
}
```

PATCH – Media Boost

1. Currently, in BMC, CD image redirection using **BoostMode** support is allowed only for single CD instance.
2. Hence, if the user wants to do **InsertMedia** action using **BoostMode** support for a CD instance, then the user can patch **BoostMode** OEM property value as true for that particular instance.

Request

PATCH https://{ip}/redfish/v1/Managers/{manager_instance}/VirtualMedia/{CD_instance}

Content-Type: application/json

Request body

```
{  
  "Oem": {  
    "Ami": {  
      "BoostMode": true  
    }  
  }  
}
```

Response

Normal

The response status is successful with status code of 204 and no body. For Error Responses, please refer to [“Error Response” on page 11](#).

1. When **InsertMedia** action is initiated with **BoostMode** successfully, then **RedirectionStatus** value of the CD instance would be as mentioned below.
2. If the redirection is not initiated through **BoostMode** in the BMC side due to any other issues, then it would be initiated through normal mode.

Error

Below Error will be shown in the response if the user tries to patch **BoostMode** as true for a CD instance when already it is enabled for any other CD instance.

```
{
  "error": {
    "@Message.ExtendedInfo": [
      {
        "@odata.type": "#Message.v1_0_8.Message",
        "Message": "The operation failed because only one BoostMode redirection is currently allowed and CD1 instance BoostMode support is already enabled and can no longer take incoming requests.",
        "MessageArgs": [
          "only one BoostMode redirection is currently allowed and CD1 instance BoostMode support"
        ],
        "MessageId": "AmiOem.1.0.SupportEnabled",
        "RelatedProperties": [
          "#/BoostMode"
        ],
        "Resolution": "Disable the support and resubmit the request.",
        "Severity": "Critical",
        "retrieve_reg_id": "AmiOem.1.0.0"
      }
    ],
    "code": "AmiOem.1.0.SupportEnabled",
    "message": "The operation failed because only one BoostMode redirection is currently allowed and CD1 instance BoostMode support is already enabled and can no longer take incoming requests."
  }
}
```

POST– Release a CD Image

Request

POST `https://{ip}/redfish/v1/Managers/{{manager_instance}}/VirtualMedia/{{CD_instance}}/Actions/VirtualMedia.EjectMedia`

Content-Type: application/json

Request example

```
{ }
```

Response

The response status is 204. For Error Responses, please refer to [“Error Response” on page 11](#).

Chapter 10. BIOS

1. Bios contain properties surrounding a BIOS Attribute Registry (where the system-specific BIOS attributes are described) and the Actions needed to perform changes to BIOS settings, which typically require a system reset to apply.
2. The "**@Redfish.Settings**" property in the response of "/redfish/v1/Systems/Self/Bios", denotes that the client makes requests to change BIOS settings by modifying the Resource identified by the "**@Redfish.Settings**" property.
3. This works only with AMI Bios REST/Redfish module and Host Interface Support in BMC.

Redfish Settings

Table 62. Redfish Settings Properties

Name	Type	Read only	Description
@odata.type	String	True	Refer to " OData Support " on page 5
ETag	String	True	<ol style="list-style-type: none">1. The entity tag (ETag) of the Resource to which the settings were applied, after the application.2. This property shall contain the entity tag (ETag) of the Resource to which the settings were applied, after the application. The client can check this value against the ETag of this Resource to determine whether the Resource had other changes.
Maintenance Window Resource	Object	True	<ol style="list-style-type: none">1. The location of the maintenance window settings.2. This property shall contain a link to a Resource that contains the @Redfish.MaintenanceWindow property that governs this Resource.3. This property should be supported if the SupportedApplyTimes property contains AtMaintenanceWindowStart or InMaintenanceWindowOnReset.

Table 62. Redfish Settings Properties (continued)

Name	Type	Read only	Description																																
Messages	Array	True	This property shall contain an array of messages associated with the settings.																																
			<table><tr><th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr><tr><td>MessageId</td><td>String</td><td>True</td><td>This property shall be a key into message registry as described in the Redfish specification.</td></tr><tr><td>Message</td><td>String</td><td>True</td><td>This property shall contain an optional human readable message.</td></tr><tr><td>MessageArgs</td><td>Array</td><td>True</td><td>This property shall contain the message substitution arguments for the specific message referenced by the MessageId and shall only be included if the MessageId is present.</td></tr><tr><td>Related Properties</td><td>Array</td><td>True</td><td>This property shall contain an array of JSON Pointers indicating the properties described by the message, if appropriate for the message.</td></tr><tr><td>Severity</td><td>String</td><td>True</td><td>The value of this property shall be the severity of the error, as defined in the Status section of the Redfish specification.</td></tr><tr><td>Resolution</td><td>String</td><td>True</td><td>This property shall contain an override of the Resolution of the message in message registry, if present.</td></tr><tr><td>Oem</td><td>Object</td><td>True</td><td>Refer to Table 11 “Resource Complex Types” on page 14</td></tr></table>	Name	Type	Read only	Description	MessageId	String	True	This property shall be a key into message registry as described in the Redfish specification.	Message	String	True	This property shall contain an optional human readable message.	MessageArgs	Array	True	This property shall contain the message substitution arguments for the specific message referenced by the MessageId and shall only be included if the MessageId is present.	Related Properties	Array	True	This property shall contain an array of JSON Pointers indicating the properties described by the message, if appropriate for the message.	Severity	String	True	The value of this property shall be the severity of the error, as defined in the Status section of the Redfish specification.	Resolution	String	True	This property shall contain an override of the Resolution of the message in message registry, if present.	Oem	Object	True	Refer to Table 11 “Resource Complex Types” on page 14
			Name	Type	Read only	Description																													
			MessageId	String	True	This property shall be a key into message registry as described in the Redfish specification.																													
			Message	String	True	This property shall contain an optional human readable message.																													
			MessageArgs	Array	True	This property shall contain the message substitution arguments for the specific message referenced by the MessageId and shall only be included if the MessageId is present.																													
			Related Properties	Array	True	This property shall contain an array of JSON Pointers indicating the properties described by the message, if appropriate for the message.																													
			Severity	String	True	The value of this property shall be the severity of the error, as defined in the Status section of the Redfish specification.																													
			Resolution	String	True	This property shall contain an override of the Resolution of the message in message registry, if present.																													
Oem	Object	True	Refer to Table 11 “Resource Complex Types” on page 14																																
SettingsObject	Object	True	This property shall contain the URI of the Resource that the client may PUT or PATCH to modify the Resource.																																
Supported ApplyTimes	Array	True	The time when the settings can be applied. A service shall advertise its applytime capabilities using this property as to when a Setting resource can be applied.																																
			<table><tr><th>Enum</th><th>Description</th></tr><tr><td>Immediate</td><td>Apply immediately</td></tr><tr><td>OnReset</td><td>Apply on a reset</td></tr><tr><td>AtMaintenanceWindowStart</td><td>Apply during a maintenance window as specified by an administrator.</td></tr><tr><td>InMaintenanceWindow OnReset</td><td>Apply after a reset but within maintenance window as specified by an administrator.</td></tr></table>	Enum	Description	Immediate	Apply immediately	OnReset	Apply on a reset	AtMaintenanceWindowStart	Apply during a maintenance window as specified by an administrator.	InMaintenanceWindow OnReset	Apply after a reset but within maintenance window as specified by an administrator.																						
			Enum	Description																															
			Immediate	Apply immediately																															
			OnReset	Apply on a reset																															
AtMaintenanceWindowStart	Apply during a maintenance window as specified by an administrator.																																		
InMaintenanceWindow OnReset	Apply after a reset but within maintenance window as specified by an administrator.																																		
Time	String	True	This property shall indicate the time when the settings were applied to the Resource.																																

GET – BIOS and BIOS / SD

Request

BIOS

GET https://{ip}/redfish/v1/Systems/Self/Bios

Content-Type: application/json

This is the current setting available in BIOS.

BIOS / SD

GET https://{ip}/redfish/v1/Systems/Self/Bios/SD

Content-Type: application/json

1. This is the future setting requested by the user.
2. For the changes to apply in BIOS, system reset is required.
3. This URI will only be available if the `"/conf/redfish/bios/bios_future_setting.json"` file exists, else the implementation will throw **"404 Not Found"**.

Response

The response is a JSON object that contains the following parameters:

Table 63. Bios Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to "OData Support" on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 "Resource Complex Types" on page 14
Id(M)	String	True	Refer to Table 9 "Resource Type Definitions" on page 12
Name(M)	String	True	
Description	String	True	
AttributeRegistry	String	True	The Resource ID of the Attribute Registry for the BIOS Attributes resource.
Actions	Object	True	The Actions property contains the available actions for this resource namely ChangePassword or ResetBios. It can also contain Oem Actions.
Attributes	Object	True	BIOS Attribute settings appear as additional properties in this object and can be looked up in the AttributeRegistry by their AttributeName. This is the manufacturer/provider specific list of BIOS attributes.

Response example

When the request is successful, a message body similar to the following is returned:

```
{
  "@Redfish.Settings": {
```

```

"@odata.type": "#Settings.v1_2_1.Settings",
"SettingsObject": {
  "@odata.id": "/redfish/v1/Systems/Self/Bios/SD"
},
},
"@odata.context": "/redfish/v1/$metadata#Bios.Bios",
"@odata.etag": "\"1602668816\"",
"@odata.id": "/redfish/v1/Systems/Self/Bios",
"@odata.type": "#Bios.v1_0_6.Bios",
"Actions": {
  "#Bios.ChangePassword": {
    "@Redfish.ActionInfo": "/redfish/v1/Systems/Self/Bios/ChangePasswordActionInfo",
    "target": "/redfish/v1/Systems/Self/Bios/Actions/Bios.ChangePassword"
  },
  "#Bios.ResetBios": {
    "@Redfish.ActionInfo": "/redfish/v1/Systems/Self/Bios/ResetBiosActionInfo",
    "target": "/redfish/v1/Systems/Self/Bios/Actions/Bios.ResetBios"
  }
},
"AttributeRegistry": "BiosAttributeRegistryRome.0.0.27",
"Attributes": {
  "Q00001_Boot_Mode": "UEFI_only",
  "Q00002_Infinite_Boot_Retry": "Disabled",
  "Q00003_Bootup_NumLock_State": "On",
  "Q00004_Setup_Prompt_Timeout": 1,
  "Q00011_Minimum_password_length": 8,
  "Q00012_Password_expiration_period": 0,
  "Q00013_Password_expiration_warning_period": 0,
  "Q00014_Minimum_password_change_interval": 0,
  "Q00015_Minimum_password_reuse_cycle": 0,
  "Q00016_Maximum_number_of_login_failures": 5,

```

```

"Q00017_Lockout_period_after_maximum_login_failures": 2,
"Q00051_SMT_Mode": "Auto",
"Q00052_Core_Performance_Boost": "Auto",
"Q00053_CPU_Cores_Activated": "Auto",
"Q00054_L1_Stream_HW_Prefetcher": "Auto",
"Q00055_L2_Stream_HW_Prefetcher": "Auto",
"Q00056_Global_C_state_Control": "Enabled",
"Q00057_SVM_Mode": "Enabled",
"Q00058_IOMMU": "Auto",
"Q00059_Determinism_Slider": "Performance",
"Q00060_cTDP_Control": "Auto",
"Q00061_cTDP": 0,
"Q00081_Memory_interleaving": "Auto",
"Q00082_Memory_interleaving_size": "Auto",
"Q00083_Chipselect_Interleaving": "Auto",
"Q00101_OnBrd_Ext_VGA_Select": "Onboard",
"Q00102_Above_4G_Decoding": true,
"Q00103_SR_IOV_Support": false,
"Q00104_PCIe_ARI_Support": "Auto",
"Q00105___Slot_Present": "Enabled",
"Q00106___Slot_Present": "Enabled",
"Q00107___Slot_Present": "Enabled",
"Q00108___Slot_Present": "Enabled",
"Q00109___Slot_Present": "Enabled",
"Q00110___Slot_Present": "Enabled",
"Q00111___Slot_Present": "Enabled",
"Q00112___Slot_Present": "Enabled",
"Q00113___Slot_Present": "Enabled",
"Q00114_OCP3": true,
"Q00120_PCIe_Slot1": "Auto",

```

"Q00121_PCIe_Slot2": "Auto",
"Q00122_PCIe_Slot3": "Auto",
"Q00123_PCIe_Slot4": "Auto",
"Q00124_PCIe_Slot5": "Auto",
"Q00125_PCIe_Slot6": "Auto",
"Q00126_PCIe_Slot7": "Auto",
"Q00127_PCIe_Slot8": "Auto",
"Q00128_PCIe_Slot9": "Auto",
"Q00129___Bifurcation": "AUTO",
"Q00130___Bifurcation": "AUTO",
"Q00131___Bifurcation": "AUTO",
"Q00132___Bifurcation": "AUTO",
"Q00133___Bifurcation": "AUTO",
"Q00134___Bifurcation": "AUTO",
"Q00135___Bifurcation": "AUTO",
"Q00136___Bifurcation": "AUTO",
"Q00137___Bifurcation": "AUTO",
"Q00141_Console_Redirection": true,
"Q00142_Terminal_Type": "VT100P",
"Q00143_Bits_per_second": "Bits_per_second_115200",
"Q00144_Data_Bits": "Data_Bits_8",
"Q00145_Parity": "None",
"Q00146_Stop_Bits": "Stop_Bits_1",
"Q00147_Flow_Control": "None",
"Q00148_VT_UTF8_Combo_Key_Support": true,
"Q00149_Recorder_Mode": false,
"Q00150_Resolution_100x31": false,
"Q00151_Putty_KeyPad": "VT100",
"Q00162_Resolution": "Resolution_80x24",
"Q00163_Redirect_After_POST": "Always_Enable",
"Q00171_Console_Redirection": true,


```

"Q00173_Terminal_Type": "VT_UTF8",
"Q00174_Bits_per_second": "Bits_per_second_115200",
"Q00175_Flow_Control": "None",
"Q00181_Ipv4_PXE_Support": "Disabled",
"Q00182_Ipv4_HTTP_Support": "Disabled",
"Q00183_Ipv6_PXE_Support": "Disabled",
"Q00184_Ipv6_HTTP_Support": "Disabled",
"Q00185_PXE_boot_wait_time": 0,
"Q00186_Media_detect_count": 1,
"Q00201_Legacy_USB_Support": "Enabled",
"Q00202_Rear_USB_Port": "Enabled",
"Q00203_Front_USB_Port_0": "Enabled",
"Q00204_Front_USB_Port_1": "Enabled",
"Q00205_USB_Mass_Storage_Driver_Support": "Enabled",
"Q00211_CSM_Support": "Enabled",
"Q00212_Network": "UEFI",
"Q00213_Storage": "UEFI",
"Q00214_Video": "UEFI",
"Q00215_Other_PCI_devices": "UEFI",
"Q00301_Operating_Mode": "Maximum_Efficiency",
"Q00302_NUMA_nodes_per_socket": "NPS1",
"Q00303_EfficiencyModeEn": "Enabled",
"Q00304_Memory_Speed": "Memory_Speed_2933_MHz",
"Q00305_Package_Power_Limit_Control": "Auto",
"Q00306_Package_Power_Limit": 0,
"Q00307_Preferred_I_O_Bus_Number": 0,
"Q00308_LLC_as_NUMA_Node": "Auto",
"Q00309_Preferred_IO_Bus": "No_Priority",
"Q00999_Boot_Option_Priorities": "Windows Boot Manager,0x0000,true;",
"Q01000_Administrator_Password": "*****",

```

```
    "Q01001_User_Password": "*****"
  },
  "Description": "Current BIOS Settings",
  "Id": "Bios",
  "Name": "Current BIOS Settings"
}
```

POST – BIOS Reset

Use the POST method to reset BIOS settings.

Request

POST https://{ip}/redfish/v1/Systems/Self/Bios/Actions/Bios.ResetBios

Content-Type: application/json

Request body

```
{
  "ResetType": "Reset"
}
```

Response

The response status is 204. For Error Responses, please refer to [“Error Response” on page 11](#).

Note: Out Of Band request for this action will be blocked during the Host System Booting until the Inventory is processed by the Redfish service and the request will respond with status code 503 and Service Not Available message.

POST – Change BIOS password

Request

POST https://{ip}/redfish/v1/Systems/Self/Bios/Actions/Bios.ChangePassword

Content-Type: application/json

Request body

```
{
  "PasswordName": "SETUP001",
  "OldPassword": "old",
  "NewPassword": "new"
}
```

BIOS Security Policy

Important:

1. The password needs to follow BIOS Security Policy.
2. BMC will check the policy but will not check whether the **OldPassword** is correct.
3. The **OldPassword** will be verified by BIOS on the next system reboot.
4. Therefore, the POST operation may be successful, but it does not mean that the password can be changed successfully.
5. BIOS will take a second verification.
6. The second verification result will not be displayed here.

Response

The response status is 204. For Error Responses, please refer to [“Error Response” on page 11](#).

Note: Out Of Band request for this action will be blocked during the Host System Booting until the Inventory is processed by the Redfish service and the request will respond with status code 503 and Service Not Available message.

POST, PUT, PATCH – BIOS SD

Request

POST/PATCH/PUT `https://{ip}/redfish/v1/Systems/Self/Bios/SD`

Content-Type: `application/json`

Request example

```
{
  "Attributes": {
    "ACPI002": false,
    "ACPI003": true
  }
}
```

Notes:

- If the values of the attributes in **POST/PATCH/PUT** request body match with the existing current values in BIOS (i.e **current_bios_settings** file OR Systems/Self/Bios) then it will not be included in future settings BIOS file and hence will not be displayed in **GET** call of **Bios/SD**.
- This URI does not have any Request Body size limit for POST/PATCH/PUT methods.

Response

The response status is 204. For Error Responses, please refer to [“Error Response” on page 11](#).

Note: Out Of Band PATCH/POST/PUT request will be blocked during the Host System Booting until the Inventory is processed by the Redfish service and the request will respond with status code 503 and Service Not Available message.

Chapter 11. System

GET – System Collection

Request

GET https://{ip}/redfish/v1/Systems

Content-Type: application/json

Response

1. Please refer to [“CollectionCapabilities Annotation” on page 19](#).
2. Please refer to [“Redfish Collection” on page 8](#) for the JSON response properties.

POST – Compose a System

1. Client creates a composed system after identifying the needed ResourceBlock and the given capabilities information in the ResourceZone.
2. In the request, the client is creating a new Computer System using the Resource Blocks "ComputeBlock", "DrivesBlock" and "NetworkBlock".
3. For composing a system, an unused ResourceBlock link must be given under "ResourceBlocks" property.
4. The "ComputeBlock" must be provided in the POST request ResourceBlock property only when Processors/Memory instances are available.
5. The "DrivesBlock" must be provided in the POST request ResourceBlock property only when Storage/SimpleStorage instances are available.
6. The "NetworkBlock" must be provided in the POST request ResourceBlock property only when EthernetInterfaces instances are available.

Request

POST https://{ip}/redfish/v1/Systems

Content-Type: application/json

Request example

```
{
  "Name": "NewSystem",
  "Links": {
    "ResourceBlocks": [
      {
        "@odata.id": "/redfish/v1/CompositionService/ResourceBlocks/ComputeBlock"
      },
      {

```

```

        "@odata.id": "/redfish/v1/CompositionService/ResourceBlocks/DrivesBlock"
    },
    {
        "@odata.id": "/redfish/v1/CompositionService/ResourceBlocks/NetworkBlock"
    }
]
},
"HostName": "Intel"
}

```

Response example

The response status is 201 with below response. For Error Responses, please refer to [“Error Response” on page 11](#).

```

{
    "@odata.context": "/redfish/v1/$metadata#ComputerSystem.ComputerSystem",
    "@odata.etag": "W/\\"1593017717\"",
    "@odata.id": "/redfish/v1/Systems",
    "@odata.type": "#ComputerSystem.v1_8_0.ComputerSystem",
    "Actions": {
        "#ComputerSystem.Reset": {
            "@Redfish.ActionInfo": "/redfish/v1/Systems/Self/ResetActionInfo",
            "target": "/redfish/v1/Systems/Self/Actions/ComputerSystem.Reset"
        }
    },
    "Boot": {
        "BootSourceOverrideEnabled": "Continuous",
        "BootSourceOverrideEnabled@Redfish.AllowableValues": [
            "Disabled",
            "Once",
            "Continuous"
        ],
        "BootSourceOverrideTarget": "Pxe",
    }
}

```

```

    "BootSourceOverrideTarget@Redfish.AllowableValues": [
        "None",
        "Pxe",
        "Floppy",
        "Cd",
        "Usb",
        "Hdd",
        "BiosSetup",
        "Utilities",
        "Diags",
        "UefiShell",
        "UefiTarget",
        "SDCard",
        "UefiHttp",
        "RemoteDrive",
        "UefiBootNext"
    ]
},
"Description": "Computer System",
"HostName": "Intel",
"Id": "NewSystem",
"Links": {
    "ResourceBlocks": [
        {
            "@odata.id": "/redfish/v1/CompositionService/ResourceBlocks/ComputeBlock"
        },
        {
            "@odata.id": "/redfish/v1/CompositionService/ResourceBlocks/DrivesBlock"
        }
    ]
},

```

```

"Memory": {
    "@odata.id": "/redfish/v1/Systems/Self/Memory"
},
"Name": "NewSystem",
"PowerState": "Off",
"Processors": {
    "@odata.id": "/redfish/v1/Systems/Self/Processors"
},
"SimpleStorage": {
    "@odata.id": "/redfish/v1/Systems/Self/SimpleStorage"
},
"Storage": {
    "@odata.id": "/redfish/v1/Systems/Self/Storage"
},
"SystemType": "Composed",
"UUID": "e0128b8c-b73f-410f-a48e-0fc4930716bb"
}

```

GET – Capabilities

Capabilities Indicates the properties to be included in a composed system.

Request URI

GET <https://{{ip}}/redfish/v1/Systems/Capabilities>

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 64. Capabilities Property List

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Id	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	

Table 64. Capabilities Property List (continued)

Links(M)	Object	True	The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but no contained by (subordinate to), this resource			
			Name	Type	Read Only	Description
			ResourceBlocks	Array	False	An array of references to the Resource Blocks.
HostName	String	False	<p>The value of this property shall be the host name for the system, as reported by the operating system or hypervisor. This value typically provided to the Manager by a service running in the host operating system.</p> <p>Note: Northbound API is supported but still requires host interface and host agent support from host agent and in-band communication channel and platform specific porting needed.</p>			
Boot	Object	False	This object shall contain properties which describe boot information for the current resource. Changes to this object do not alter the BIOS persistent boot order configuration. Refer to Table 65 “List of Property Annotation and Description” on page 131 .			
			Property Annotation			Vaule
			BootSourceOverrideEnabled@AllowableValues Refer to “BootSourceOverrideEnabled” of Table 73 “Boot Properties” on page 139 .			(Array)
			BootSourceOverrideEnabled@Redfish.OptionalOnCreate			true
			BootSourceOverrideEnabled@Redfish.UpdatableAfterCreate			true
			BootSourceOverrideTarget@AllowableValues Refer to “BootSourceOverrideEnabled” of Table 73 “Boot Properties” on page 139 .			(Array)
			BootSourceOverrideTarget@Redfish.OptionalOnCreate			true
			BootSourceOverrideTarget@Redfish.UpdatableAfterCreate			true
			Boot@Redfish.OptionalOnCreate			true
			Description@Redfish.OptionalOnCreate			true
			Description@Redfish.SetOnlyOnCreate			true
			HostName@Redfish.OptionalOnCreate			true
			HostName@Redfish.UpdatableAfterCreate			true
			ResourceBlocks@Redfish.RequiredOnCreate			true
			ResourceBlocks@Redfish.UpdatableAfterCreate			true
			Links@Redfish.RequiredOnCreate			true
			Name@Redfish.RequiredOnCreate			true
Name@Redfish.SetOnlyOnCreate			true			

Table 65. List of Property Annotation and Description

Property Annotation	Description
Redfish.RequiredOnCreate	The client must provide the given property in the body of the create (POST) request.

Table 65. List of Property Annotation and Description (continued)

Redfish.OptionalOnCreate	The client may provide the property in the body of the create (POST) request.
Redfish.SetOnlyOnCreate	If the client has a specific value needed for the property, it must be provided in the body of the create (POST) request; this property is likely a "Read Only" property after the resource's creation.
Redfish.UpdatableAfterCreate	The client is allowed to update the property after the resource is created.
Redfish.AllowableValues	The client is allowed to use any of the specific values in the body of the create (POST) request for the given property.

GET – System Instance

A computer system represents a machine (physical or virtual) and the local resources such as memory, CPU and other devices that can be accessed from that machine. Information on these resources or sub systems are also linked to this resource. This resource shall be used to represent resources that represent a computing system in the Redfish specification.

Request

GET https://{ip}/redfish/v1/Systems/{system_instance}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 66. Computer System Properties-1

Name	Type	Read only	Description																				
(OData Attributes)			Refer to “OData Support” on page 5																				
Oem	Object		<div>Specifies the AMI defined OEM properties.</div> <table><tr><th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr><tr><td>@odata.type</td><td>String</td><td>True</td><td>Refer to “OData Support” on page 5</td></tr><tr><td>Bios</td><td>Object</td><td>True</td><td>This attribute specifies the system-specific information about a BIOS resource. Refer to Table 71 “BIOS Oem Properties” on page 138.</td></tr><tr><td>RtpVersion</td><td>String</td><td>True</td><td>Specifies the version of the RTP Version.</td></tr><tr><td>RedfishVersion</td><td>String</td><td>True</td><td>Specifies the version of the Redfish Version.</td></tr></table>	Name	Type	Read only	Description	@odata.type	String	True	Refer to “OData Support” on page 5	Bios	Object	True	This attribute specifies the system-specific information about a BIOS resource. Refer to Table 71 “BIOS Oem Properties” on page 138.	RtpVersion	String	True	Specifies the version of the RTP Version.	RedfishVersion	String	True	Specifies the version of the Redfish Version.
Name	Type	Read only	Description																				
@odata.type	String	True	Refer to “OData Support” on page 5																				
Bios	Object	True	This attribute specifies the system-specific information about a BIOS resource. Refer to Table 71 “BIOS Oem Properties” on page 138.																				
RtpVersion	String	True	Specifies the version of the RTP Version.																				
RedfishVersion	String	True	Specifies the version of the Redfish Version.																				
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12																				
Name(M)	String	True																					
Description	String	True																					
SystemType	String	True	An enumeration that indicates the kind of system that this resource represents.																				

Table 66. Computer System Properties-1 (continued)

			Enum		Description	
			Physical		A computer system	
			Composed		A computer system that has been created by binding resource blocks together.	
Links	Object	True	The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but not contained by (subordinate to), this resource.			
			Name	Type	Read Only	Description
			Oem	Object		Refer to Table 9 “Resource Type Definitions” on page 12 Note: It will be present in response if there is an oem property implemented according to "How to Add OEM extensions" document.
			Chassis(N)	Array	True	An array of references to th chassis in which this system is contained.
			Chassis@odata.count	Number	True	An integer representing the number of items in a collection.
			ManagedBy(N)	Array	True	An array of references to th Managers responsible for this system.
			ManagedBy@odata.count	Number	True	An integer representing the number of items in a collection.
			PoweredBy(N)	Array	True	An array of ID[s] of resources that power this computer system. Normally the ID will be a chassis or a specific set of power Supplies. Note: Platform specific porting needed.
			PoweredBy@odata.count	Number	True	An integer representing the number of items in a collection.
			CooledBy(N)	Array	True	An array of ID[s] of resources that cool this computer system. Normally the ID will be a chassis or a specific set of fans. Note: Platform specific porting needed.
			CooledBy@odata.count	Number	True	An integer representing the number of items in a collection.
			Endpoints(N)	Array	True	An array of references to th endpoints that connect to this system. Note: These will be available only as a port of FPX Produt.
			Endpoints@odata.count	Number	True	An integer representing the number of items in a collection.
AssetTag	String	False	The user definable tag that can be used to track this computer system for inventory or other client purposes. Note: This can be populated by Host Interface (Extra Bios Support is needed).			

Table 66. Computer System Properties-1 (continued)

Manufacturer	String	True	Manufacturer or OEM of this system. Note: This can be populated by Host Interface (Extra Bios Support is needed).
Model	String	True	Model number of this system. Note: This can be populated by Host Interface (Extra Bios Support is needed).
SKU	String	True	The value of this property shall contain the manufacturer Stock Keeping Unit (SKU) for the system. Note: This can be populated by Host Interface (Extra Bios Support is needed).
SerialNumber	String	True	The value of this property shall contain the serial number for this system. Note: This can be populated by Host Interface (Extra Bios Support is needed).
PartNumber	String	True	Part number for this system as defined by the manufacturer.
SubModel	String	True	This property shall contain the information about the sub-model (or config) of the system. This shall not include the model/product name or the manufacturer name.
UUID	String	True	The value of this property shall be used to contain a universal unique identifier number for the system. RFC4122 describes methods that can be used to create the value. The value should be considered to be opaque. Client software should only treat the overall value as a universally unique identifier and should not interpret any sub-fields within the UUID. Note: This can be populated by Host Interface (Extra Bios Support is needed).

Table 67. Computer System Properties-2

Name	Type	Read only	Description	
HostName	String	False	The value of this property shall be the host name for this system, as reported by the operating system or hypervisor. This value is typically provided to the Manager by a service running in the host operating system. Default it will be null value. Note: Northbound API is supported but still requires host interface and host agent support from host agent and in-band communication channel and platform specific porting needed; require specific platform libraries support and hook between specific libraries and gami module should be added.	
IndicatorLED	String	False	The value of this property shall contain the indicator light state for the indicator light associated with this system. Note: This can be populated by Host Interface (Extra Bios Support is needed).	
			Enum	Description
			Unknown	The state of the Indicator LED cannot be determined.
			Lit	The Indicator LED is Lit.
			Blinking	The Indicator LED is Blinking.
			Off	The Indicator LED is Off.
PowerState	String	True	The current power state of the system.	
			Enum	Description
			On	The system is powered on.
			Off	The system is powered off, although some components may continue to have AUX power such as management controller.

Table 67. Computer System Properties-2 (continued)

Boot	Object	False	This object shall contain properties which describe boot information for the current resource. Changes to this object do not alter the BIOS persistent boot order configuration. Note: This can be populated by Host Interface (Extra Bios Support is needed).
BiosVersion	String	True	The version of the system BIOS or primary system firmware. Note: This can be populated by Host Interface (Extra Bios Support is needed).

Table 68. Computer System Properties-3

Name	Type	Read only	Description			
Processor Summary			This object describes the central processors of the system in general detail. Note: This can be populated by Host Interface (Extra Bios Support is needed).			
			Name	Type	Read Only	Description
			Count	Number	True	The number of processors in the system.
			Model	String	True	The processor model for the primary or majority of processors in this system.
			Status	Object	True	Refer to Table 9 “Resource Type Definitions” on page 12 Note: Only supports Northbound.
Memory Summary			This object describes the central memory of the system in general detail. Note: This can be populated by Host Interface (Extra Bios Support is needed).			
			Name	Type	Read Only	Description
			TotalSystemMemoryGiB	Number	True	The total installed, operating system-accessible memory (RAM), measured in GiB.
			Status	Object	True	Refer to Table 9 “Resource Type Definitions” on page 12 Note: Only supports Northbound.
			Memory Mirroring	String	True	The ability and type of memory mirroring supported by this system. It can take any of the following values-: System, DIMM, Hybrid, None. It can take any of the following values: System, DIMM, Hybrid, None. Note: Only supports Northbound.
			Metrics	Object	True	The link to the metrics associated with all memory in this system. This can be populated by Host Interface (Extra Bios Support is needed).
			TotalSystemPersistentMemoryGiB	Number	True	The total configured, system-accessible persistent memory, measured in GiB

Table 68. Computer System Properties-3 (continued)

Actions	Object	True	ComputerSystem allows the user to perform Reset Action and it's allowable values are as given in Table 9 “Resource Type Definitions” on page 12 . Please refer Reset enum type under Resource. It can also contain an Oem Object under Oem attribute under this Actions.
Processors(N)	Object	True	A reference to the collection of Processors associated with this system.
Ethernet Interfaces(N)	Object	True	A reference to the collection of Ethernet interfaces associated w this system.
SimpleStorage (N)	Object	True	A reference to the collection of storage devices associated with the system.
LogServices(N)	Object	True	A reference to the collection of Log Services associated with this system.
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14 for Resource.Status. Note: This can be populated by Host Interface (Extra Bios Support is needed).

Table 69. Computer System Properties-4

Name	Type	Read only	Description	
TrustedModules	Array	True	This object describes the array of Trusted Modules in the system. Note: This can be populated by Host Interface (Extra Bios Support is needed).	
SecureBoot(N)	Object	True	A reference to the UEFI SecureBoot resource associated with this system. Note: This can be populated by Host Interface (Extra Bios Support is needed).	
Bios(N)	Object	True	A reference to the BIOS settings associated with this system. Note: This link will be populated only if corresponding BIO module is present.	
Memory(N)	Object	True	A reference to the collection of Memory associated with this system.	
Storage(N)	Object	True	A reference to the collection of storage device associated with this system. Note: Northbound API is supported but still requires host interface and host agent support from host agent and in-band communication channel and platform specific porting needed; require specific platform libraries support and hook between specific libraries and gami module should be added.	
NetworkInterfaces(N)	Object	True	A reference to the collection of Network Interfaces associated w this system. Note: This link will be populated only if corresponding BIO module is present.	
HostingRoles	Array	True	The hosing roles that this computer system supports.	
			Enum	Description
			ApplicationServer	The system hosts functionality that supports general purpose applications.
			StorageServer	The system hosts functionality that supports the system acting as a storage server.
			Switch	The system hosts functionality that supports the system acting as a switch.

Table 69. Computer System Properties-4 (continued)

HostedServices	Object	True	<p>The services that this computer system supports. Note: At present only Oem property is supported under it. See Table 11 “Resource Complex Types” on page 14.</p> <p>Note: It will be present in response if there is an oem proper implemented according to " How to Add OEM extensions" document.</p>	
PCleDevices(N)	Object	True	<p>A reference to a collection of PCIe Devices used by this compute system. Note: Links will be available only when Host Interface feature is enabled and the corresponding AMI BIOS Image is used.</p>	
PCleDevices@odata.count	Number	True	Number of PCIeDevcies used by this systems	
PCleFunctions(N)	Object	True	<p>A reference to a collection of PCIe Functions used by this computer system. Note: Links will be available only Host Interface feature is enabled and the corresponding AMI BIOS Image is used.</p>	
PCleFunctions@odata.count	Number	True	Number of PCIeFunctions used by this systems	
PowerRestorePolicy	String	False	This property shall indicate the desired PowerState of the system when power is applied to the system.	
			Enum	Description
			AlwaysOn	The system will always power on when power is applied.
			AlwaysOff	The system will always remain powered off when power is applied.
			LastState	The system will return to its last power state (on or off) when power is applied

Table 70. MemoryMirroringEnum Properties

Enum	Description
System	The system supports DIMM mirroring at the System level. Individual DIMMs are not paired for mirroring in this mode.
DIMM	The system supports DIMM mirroring at the DIMM level. Individual DIMMs can be mirrored.
Hybrid	The system supports a hybrid mirroring at the system and DIMM levels. Individual DIMMs can be mirrored.
None	The system does not support DIMM mirroring.

Table 71. BIOS Oem Properties

Name	Type	Read only	Description																																
@Odata.type	String	True	Refer to “OData Support” on page 5																																
Crc	Object	True	<p>Specifies the additional configuring of the Redfish service.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr> <tr> <td>GroupCrcList</td><td>Array</td><td>True</td><td>This allows additional configuring of the Redfish service.</td></tr> <tr> <td colspan="4">GroupCrcList</td></tr> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr> <tr> <td>CERTIFICATE</td><td>Number</td><td>True</td><td>This element corresponds to all data related to value of CERTIFICATE CRC.</td></tr> <tr> <td>CPU</td><td>Number</td><td>True</td><td>This element corresponds to all data related to value of Processor CRC.</td></tr> <tr> <td>DIMM</td><td>Number</td><td>True</td><td>This element corresponds to all data related to value of Memory CRC.</td></tr> <tr> <td>PCIE</td><td>Number</td><td>True</td><td>This element corresponds to all data related to values of Storage, PCIeDevices CRC.</td></tr> </table>	Name	Type	Read only	Description	GroupCrcList	Array	True	This allows additional configuring of the Redfish service.	GroupCrcList				Name	Type	Read only	Description	CERTIFICATE	Number	True	This element corresponds to all data related to value of CERTIFICATE CRC.	CPU	Number	True	This element corresponds to all data related to value of Processor CRC.	DIMM	Number	True	This element corresponds to all data related to value of Memory CRC.	PCIE	Number	True	This element corresponds to all data related to values of Storage, PCIeDevices CRC.
Name	Type	Read only	Description																																
GroupCrcList	Array	True	This allows additional configuring of the Redfish service.																																
GroupCrcList																																			
Name	Type	Read only	Description																																
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CPU	Number	True	This element corresponds to all data related to value of Processor CRC.																																
DIMM	Number	True	This element corresponds to all data related to value of Memory CRC.																																
PCIE	Number	True	This element corresponds to all data related to values of Storage, PCIeDevices CRC.																																

Table 72. TrustedModules Properties

Name	Type	Read only	Description	
FirmwareVersion	String	True	The firmware version of this Trusted Module.	
InterfaceType	String	True	This property indicates the interface type of the Trusted Module.	
			Enum	Description
			TPM1_2	Trusted Platform Module (TPM) 1.2.
			TPM2_0	Trusted Platform Module (TPM) 2.0.
			TCM1_0	Trusted Cryptography Module (TCM) 1.0.
Status	String	True	Refer to Table 9 “Resource Type Definitions” on page 12 Note: This can be populated by Host Interface(Extra Bios Support is needed).	
Oem	Object		See Table 11 “Resource Complex Types” on page 14 . Note: Platform specific porting needed.	
FirmwareVersion2	String	True	The 2nd firmware version of this Trusted Module, if applicable.	
InterfaceType Selection	String	True	The Interface Type selection supported by this Trusted Module.	
			Enum	Description

Table 72. TrustedModules Properties (continued)

			None	The TrustedModule does not support switching the InterfaceType.
			FirmwareUpdate	The TrustedModule supports switching InterfaceType via a firmware update.
			BiosSetting	The TrustedModule supports switching InterfaceType via platform software, such as a BIOS configuration Attribute.
			OemMethod	The TrustedModule supports switching InterfaceType via an OEM proprietary mechanism.

Boot Object

This object shall contain properties which describe boot information for the current resource. Changes to this object do not alter the BIOS persistent boot order configuration.

Behavior

1. Any changes in Boot properties require a host-reset to apply, so the patch to Boot Properties is supported in Future State URI only and not on the Systems/Self URI.
2. After User patches the new values for Boot in Systems/Self/SD, it will not be reflected in Systems/Self URI until the next reboot.
3. In the next boot, BIOS reads the values from this future settings URI and applies in in BIOS and patches the new data in Systems/Self URI.
4. Now the Future State URI namely Systems/Self/SD will have the same values as Systems/Self after the next reboot after the patch.

Table 73. Boot Properties

Name	Type	Read only	Description	
BootOptions	Object	True	A reference to the collection of the UEFI Boot Options associated with this Computer System. Note: This property is populated by Host Interface as part of Inventory.(Extra Bios Support is needed. See “BIOS settings” on page 117).	
CertificateService	Object	True	A reference to the collection of the CertificateServices.	
BootNext	String	False	<p>This property is the BootOptionReference of the Boot Option to perform a one time boot from when BootSourceOverride Target is UefiBootNext. Default it will be null value.</p> <p>User needs to patch this property and BIOS will read it in the next boot and apply provided AMI BIOS is used.</p> <p>Note: This property is populated by Host Interface as part of Inventory.(Extra Bios Support is needed. See “BIOS settings” on page 117).</p>	
BootSourceOverrideTarget	String	False	The current boot source to be used at next boot instead of the norm boot device, if BootSourceOverrideEnabled is true. Default it will be null value.The allowable values for this property are specified in the following table:-	
			Enum	Description
			None	Boot from the normal boot device.

Table 73. Boot Properties (continued)

			Pxe	Boot from the Pre-Boot Execution (PXE) environment.
			Floppy	Boot from the floppy disk drive.
			Cd	Boot from the CD/DVD disc.
			Usb	Boot from a USB device as specified by the system BIOS
			Hdd	Boot from a hard drive
			BiosSetup	Boot to the BIOS Setup Utility.
			Utilities	Boot the Manufacturer's Utilities Programs(s). Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS boot.
			Diags	Boot the Manufacturer's Diagnostics program.
			UefiShell	Boot to the UEFI Shell. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.
			UefiTarget	Boot to the UEFI Device specified in the UefiTargetBootSourceOverride property. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.
			SDCard	Boot from an SD Card. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.
			UefiHttp	Boot from a UEFI HTTP network location. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.
			RemoteDrive	Boot from a remote drive (e.g. iSCSI). Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.
			UefiBootNext	Boot to the UEFI Device specified in the BootNext property. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOSBoot.
BootSourceOverrideEnabled	String	False	The value of this property shall be Once if this is a one time boot override and Continuous if this selection should remain active until cancelled. If the property value is set to Once, the value will be reset back to Disabled after the BootSourceOverrideTarget actions have been completed. Default it will be null value	
			Enum	Description
			Disabled	The system will boot normally.
			Once	On its next boot cycle, the system will boot (one time) to the Boot Source OverrideTarget. The value of BootSourceOverrideEnabled is then reset back to Disabled.

Table 73. Boot Properties (continued)

			Continuous	The system will boot to the target specified in the BootSourceOverrideTarget until this property is set to Disabled
UefiTargetBootSourceOverride	String	False	<p>The value of this property shall be the UEFI device path of the override boot target. The valid values for this property are specified through the Redfish.AllowableValues annotation.</p> <p>BootSourceOverrideEnabled = Continuous is not supported for UE Boot Source Override as this setting is defined in UEFI as a one time boot only. Default it will be null value.</p>	
AliasBootOrder	Array	True	<p>Ordered array of boot source aliases representing the persistent Boot Order associated with this computer system.</p> <p>Note: Platform specific porting needed.</p>	
BootOrder	Array	False	Ordered array of BootOptionReference strings representing the persistent Boot Order associated with this computer system.	
BootOrderPropertySelection	String	True	The value of this property shall indicate which boot order property the system uses when specifying the persistent boot order.	
BootSourceOverrideMode	String	False	The value of this property shall be Legacy for non-UEFI BIOS boot or UEFI for UEFI boot from boot source specified in BootSourceOverrideTarget property.	
			Enum	Description
			Legacy	The system will boot in non-UEFI boot mode to the Boot Source Override Target.
			UEFI	The system will boot in UEFI boot mode to the Boot Source Override Target.

Additional Information

1. **BootSourceOverrideTarget** is set to a default value of "None" and can be changed only when the data is sent from BIOS (BIOS should support Redfish) or set by end-user using PATCH request (Enum values are selectively patchable with respect to Redfish support in BIOS).
2. This can also be populated by Host Interface, (Extra Bios Support is needed).
3. The Allowable values only shows the values that are supported by IPMI by default so that syncing with IPMI will work.
4. If it is detected that BIOS sent the **AttributeRegistry** file, then it is assumed that BIOS has support for using the Redfish boot options and the syncing with IPMI is disabled.
5. IPMI default support - None, Pxe, Floppy, Cd, Usb, Hdd, BiosSetup and Diags.
6. **UefiTargetBootSourceOverride** will not be displayed by default and can be changed only when the data is sent from BIOS (BIOS should support Redfish) or set by end-user using PATCH request. Until then it is acceptable to have it not displayed and the "**SelectList**" part of **odata.context** can be omitting it in order to be a valid response.
7. Patch request for Boot properties will be blocked when **FixedBootOrder** feature is enabled in BIOS, this is handled using an internal flag which will be populated from Bios.
8. This can also be populated by Host Interface (Extra Bios Support is needed).

PATCH – Systems Instance

Request

PATCH `https://{ip}/redfish/v1/Systems/{system_instance}`

Content-Type: application/json

Request body

Please refer to the rproperties that are patchable in [Table 66 “ComputerSystem Properties” on page 132](#) for which ReadOnly is False that can be sent as Request body in JSON format except for Boot Properties which can be patched only with the Systems/Self/SD or the Future Settings URI..

Request example

```
{
  "AssetTag": "Free form asset tag",
  "IndicatorLED": "Off",
  "HostName": "System1",
  "PowerRestorePolicy": "AlwaysOn"
}
```

Response

The response status is 204.

For Error Responses, please refer to [“Error Response” on page 11](#).

Note: Out Of Band PATCH for the System instances will be blocked during the Host System Booting until the inventory is processed by the redfish service and the request will respond with status code 503 and Service Not Available message.

POST – Systems Instance

Request

POST `https://{ip}/redfish/v1/Systems/Self/Actions/ComputerSystem.Reset`

Content-Type: application/json

The **ResetType** can be one of the following values: "On", "ForceOff", "GracefulShutdown", "ForceRestart".

Request example

```
{
  "ResetType": "On"
}
```

Response

```
{
```

```

"@odata.context": "/redfish/v1/$metadata#Task.Task(TaskState,Description,Name,Id)",
"@odata.id": "/redfish/v1/TaskService/Tasks/1",
"@odata.type": "#Task.v1_4_2.Task",
"Description": "Task for Computer Reset",
"Id": "1",
"Name": "Computer Reset",
"TaskState": "New"
}

```

1. For success the response status is 202 with message body. For Error Responses, please refer to [“Error Response” on page 11](#).
2. After successful post call, please allow 5 seconds and verify the value of PowerState property in /redfish/v1/Systems/Self instance.
3. Using **TaskID** check the **TaskStatus** and using **MaintenanceWindowStartTime**.
4. If Task is cancelled due to invalid state action, then showing error message in corresponding tasks using TaskID check the TaskStatus.

GET – Systems Instance FutureState (SD)

Request

GET https://{ip}/redfish/v1/Systems/{system_instance}/SD

Content-Type: application/json

1. Displays the information about the BootOptions.
2. This resource has the property values which will be applied in the next boot.
3. In BMC, BootOptions Inventory will be populated via HostInterface communication with AMI BIOS.

Response

The response of the request will be in JSON format. Please refer to [“Boot Object” on page 139](#) for more information.

PATCH – Systems Instance FutureState (SD)

Request

PATCH https://{ip}/redfish/v1/Systems/{system_instance}/SD

Content-Type: application/json

Request example

Please refer to [“Boot Object” on page 139](#) for which read-only is False that can be sent as Request body in json format.

```
{
```

```

"Boot": {
    "BootSourceOverrideEnabled": "Once",
    "BootSourceOverrideMode": "UEFI",
    "BootSourceOverrideTarget": " UefiTarget ",
    "UefiTargetBootSourceOverride": "UEFI device path 2"
}
}

```

Response

1. The response status is 204. For Error Responses, please refer to [“Error Response” on page 11](#).
2. Out Of Band request for this action will be blocked during the Host System Booting until the Inventory is processed by the redfish service and the request will respond with status code 503 and Service Not Available message.
3. Patch request for Boot properties will be blocked when FixedBootOrder feature is enabled in BIOS, this is handled using a internal flag which will be populated from Bios.

GET – BootOption Collection

Request

GET https://{{ip}}/ redfish/v1/Systems/Self/BootOptions

Content-Type: application/json

1. It displays a list of BootOption instances. This represents the collection of BootOption resources.
2. In BMC, BootOption Inventory will be populated via HostInterface communication with AMI BIOS.

Response

Please refer to [“Redfish Collection” on page 8](#) for the JSON response properties.

GET – BootOption Instance

Request

GET https://{{ip}}/ redfish/v1/Systems/Self/BootOptions/{{BootOptions_instance}}

Content-Type: application/json

1. Displays the information about the BootOptions.
2. In BMC, BootOptions Inventory will be populated via HostInterface communication with AMI BIOS.

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 74. Boot Option Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
Actions	Object	True	The available actions for this Resource.
BootOptionEnabled	Boolean	False	An indication of whether the boot option is enabled. Default it will be null value
BootOptionReference	String	True	The unique boot option.
DisplayName	String	True	The user-readable display name of the boot option that appears in the boot order list in the user interface.
RelatedItem	Array	True	An array of one or more IDs for the Resources associated with this boot option.
RelatedItem@odata.count	Number	True	Number of RelatedItems

Table 74. Boot Option Properties (continued)

Name	Type	Read only	Description																																
UefiDevicePath	String	True	The UEFI device path to access this UEFI Boot Option.																																
Alias	String	True	<div>The alias of this boot source.<table><tr><th>Enum</th><th>Description</th></tr><tr><td>None</td><td>Boot from the normal boot device.</td></tr><tr><td>Pxe</td><td>Boot from the Pre-Boot Execution (PXE) environment.</td></tr><tr><td>Floppy</td><td>Boot from the floppy disk drive.</td></tr><tr><td>Cd</td><td>Boot from the CD/DVD disc.</td></tr><tr><td>Usb</td><td>Boot from a USB device as specified by the system BIOS</td></tr><tr><td>Hdd</td><td>Boot from a hard drive</td></tr><tr><td>BiosSetup</td><td>Boot to the BIOS Setup Utility.</td></tr><tr><td>Utilities</td><td>Boot the Manufacturer's Utilities Programs(s). Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.</td></tr><tr><td>Diags</td><td>Boot the Manufacturer's Diagnostics program.</td></tr><tr><td>UefiShell</td><td>Boot to the UEFI Shell. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.</td></tr><tr><td>UefiTarget</td><td>Boot to the UEFI Device specified in the UefiTargetBootSourceOverride property. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.</td></tr><tr><td>SDCard</td><td>Boot from an SD Card. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.</td></tr><tr><td>UefiHttp</td><td>Boot from a UEFI HTTP network location. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.</td></tr><tr><td>RemoteDrive</td><td>Boot from a remote drive (e.g. iSCSI). Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.</td></tr><tr><td>UefiBootNext</td><td>Boot to the UEFI Device specified in the BootNext property. Note:</td></tr></table></div>	Enum	Description	None	Boot from the normal boot device.	Pxe	Boot from the Pre-Boot Execution (PXE) environment.	Floppy	Boot from the floppy disk drive.	Cd	Boot from the CD/DVD disc.	Usb	Boot from a USB device as specified by the system BIOS	Hdd	Boot from a hard drive	BiosSetup	Boot to the BIOS Setup Utility.	Utilities	Boot the Manufacturer's Utilities Programs(s). Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.	Diags	Boot the Manufacturer's Diagnostics program.	UefiShell	Boot to the UEFI Shell. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.	UefiTarget	Boot to the UEFI Device specified in the UefiTargetBootSourceOverride property. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.	SDCard	Boot from an SD Card. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.	UefiHttp	Boot from a UEFI HTTP network location. Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.	RemoteDrive	Boot from a remote drive (e.g. iSCSI). Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.	UefiBootNext	Boot to the UEFI Device specified in the BootNext property. Note:
Enum	Description																																		
None	Boot from the normal boot device.																																		
Pxe	Boot from the Pre-Boot Execution (PXE) environment.																																		
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Hdd	Boot from a hard drive																																		
BiosSetup	Boot to the BIOS Setup Utility.																																		
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RemoteDrive	Boot from a remote drive (e.g. iSCSI). Note: This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.																																		
UefiBootNext	Boot to the UEFI Device specified in the BootNext property. Note:																																		

Table 74. Boot Option Properties (continued)

Name	Type	Read only	Description	
			Enum	Description
				This property is patchable only when BIOS supports Redfish and BIOS should send this property to BMC at BIOS Boot.

GET – BootOption Future State (SD)

Request

GET https://{ip}/redfish/v1/Systems/Self/BootOptions/{BootOptions_instance}/SD

Content-Type: application/json

1. Displays the information about the BootOptions.
2. This resource has the property values which will be applied in the next boot.
3. In BMC, BootOptions Inventory will be populated via HostInterface communication with AMI BIOS.

Response

The response of the request will be in JSON format. The properties are mentioned in [Table 74 “BootOption Properties” on page 145](#)

PATCH – BootOption Future State (SD)

Request

PATCH https://{ip}/redfish/v1/Systems/Self/BootOptions/{BootOptions_instance}/SD

Content-Type: application/json

Request body

Please refer to the properties that are patchable in [Table 74 “BootOption Properties” on page 145](#) for which ReadOnly is False that can be sent as Request body in json format.

Request example

```
{
  "BootOptionEnabled": true
}
```

Response

1. The response status is 204. For Error Responses, please refer to [“Error Response” on page 11](#).
2. Out Of Band request for this action will be blocked during the Host System Booting until the Inventory is processed by the redfish service and the request will respond with status code 503 and Service Not Available message.

Chapter 12. Task Service

GET – Task Service

Request

GET https://{ip}/redfish/v1/TaskService

Content-Type: application/json

This resource shall be used to represent a task service for a Redfish implementation. It represents the properties for the service itself and has links to the actual list of tasks.

Response

The response of the request will be in JSON format. The properties are mentioned in the following.

Table 75. Task Service Property

Name	Type	Read only	Description						
(OData Attributes)			Refer to “OData Support” on page 5						
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14						
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12						
Name(M)(C)	String	True							
Description (C)	String	True							
CompletedTask OverWritePolicy(C)	String	True	The value of this property shall indicate how completed tasks are handled should the task service need to track more tasks.						
			<table><tr><th>Enum</th><th>Description</th></tr><tr><td>Manual</td><td>Completed tasks are not automatically overwritten.</td></tr><tr><td>Oldest</td><td>Oldest completed tasks are overwritten.</td></tr></table>	Enum	Description	Manual	Completed tasks are not automatically overwritten.	Oldest	Oldest completed tasks are overwritten.
			Enum	Description					
			Manual	Completed tasks are not automatically overwritten.					
Oldest	Oldest completed tasks are overwritten.								
DateTime	String	True	The current DateTime value for the TaskService, with offset from UTC, in Redfish Timestamp format.						
LifeCycleEventOn TaskStateChange	Boolean	True	The value of this property, if set to true, shall indicate that the service shall send a Life Cycle event to Listener Destinations registered for such events upon change of task state						
ServiceEnabled(C)	Boolean	True	This indicates whether this service is enabled.						
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14						
Tasks	Object	True	The value of this property shall be a link to a resource of type Task Collection.						
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.						

GET – Task Collection

Request

GET https://{ip}/redfish/v1/TaskService/Tasks

Content-Type: application/json

Response

Please refer to the “[Redfish Collection](#)” on page 8 for the JSON response properties.

Note: Maximum task count supported is 15.

Behavior

1. It displays the collection of links to each task.
2. If the HTTPS POST creates operations or actions that required additional time to be completed, this will map into the async task and creating task.
3. The POST response header "Location" will have the created task URI in the task collection for the task monitor.
4. The task will not be created for each Event sent to Destination.
5. The following service URI will create a task to handle the job and add a member into URI /redfish/v1/TaskService/Tasks that makes user can monitor the state of the task.

Table 76. URIs of Task Actions

Actions	URI
Reset	https://{ip}/redfish/v1/Chassis/Self/Actions/Chassis.Reset
	https://{ip}/redfish/v1/Managers/Self/Actions/Manager.Reset
	https://{ip}/redfish/v1/Systems/Self/Actions/ComputerSystem.Reset
Logservice	https://{ip}/redfish/v1/Managers/Self/LogServices/SEL/Actions/LogService.ClearLog
	https://{ip}/redfish/v1/Managers/Self/LogServices/AuditLog/Actions/LogService.ClearLog
	https://{ip}/redfish/v1/Managers/Self/LogServices/EventLog/Actions/LogService.ClearLog
	https://{ip}/redfish/v1/Chassis/Self/LogServices/Logs/Actions/LogService.ClearLog
	https://{ip}/redfish/v1/Systems/Self/LogServices/BIOS/Actions/LogService.ClearLog
Simple Update	https://{ip}/redfish/v1/UpdateService/Actions/SimpleUpdate
Submit Test	https://{ip}/redfish/v1/EventService/Actions/EventService.SubmitTestEvent
	https://{ip}/redfish/v1/TelemetryService/Actions/TelemetryService.SubmitTestMetricReport
RedisDB Reset	https://{ip}/redfish/v1/Managers/Self/Actions/Oem/AMIManager.RedfishDBReset
CSR Creation	https://{ip}/redfish/v1/CertificateService/Actions/CertificateService.GenerateCSR
Certification	https://{ip}/redfish/v1/AccountService/Accounts/Accounts_instance/Certificates/Certificates_instance/Actions/Certificate.Rekey
	https://{ip}/redfish/v1/AccountService/Accounts/Accounts_instance/Certificates/Certificates_instance/Actions/Certificate.Renew
Update Service	https://{ip}/redfish/v1/UpdateService/upload

GET – Task Instance

Request

GET https://{{ip}}/redfish/v1/TaskService/Tasks/{{task_instance}}

Content-Type: application/json

Response

1. The Response Status Code will be 200 OK, irrespective of the Task State and the Response Body of the request will be in JSON format.
2. The properties of the Response Body are mentioned in the following table.

Table 77. Task Properties

Name	Type	Read only	Description	
(OData Attributes)			Refer to “OData Support” on page 5	
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14	
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12	
Name(M)	String	True		
Description	String	True		
TaskState	String	True	The value of this property shall indicate the state of the task.	
			Enum	Description
			New	New shall be used to indicate that the task is a new task which has just been instantiated and is in the initial state and indicates it has never been started.
			Starting	Task is starting. Starting shall be used to indicate that the task is moving from the New, Suspended, or Service states into the Running state.
			Running	Task is running normally. Running shall be used to indicate that the Task is running.
			Suspended	Task has been suspended. Suspended shall be used to indicate that the Task is stopped (e.g., by a user), but can be restarted in a seamless manner.
			Interrupted	Task has been interrupted. Interrupted shall be used to indicate that the Task was interrupted (e.g., by a server crash) in the middle of processing, and the user should either re-run/restart the Task.
			Pending	Task is pending and has not started. Pending shall be used to indicate that the Task has been queued and will be scheduled for processing as soon as resources are available to handle the request.
			Stopping	Task is in the process of stopping. Stopping shall be used to indicate that the Task is in the process of moving to a Completed, Killed, or Exception state.

Table 77. Task Properties (continued)

			Completed	Task has completed. Completed shall be used to indicate that the task has completed normally.
			Killed	Task was terminated. Killed shall be used to indicate that the task has been stopped by a Kill state change request (non-graceful shutdown).
			Exception	Task has stopped due to an exception condition. Exception shall be used to indicate that the Task is in an abnormal state that might be indicative of an error condition.
			Service	Task is running as a service. Service shall be used to indicate that the Task is in a state that supports problem discovery, or resolution, or both. This state is used when a corrective action is possible.
			Cancelling	Task is in the process of being cancelled.
			Cancelled	Task has been cancelled by an operator or internal process. It will show reason for cancellation. For Error Responses, please refer to “Error Response” on page 11 .
StartTime	String	True	The date-time stamp that the task was last started. The value of this property shall indicate the time the task was started.	
EndTime	String	True	The value of this property shall indicate the time the task was completed.	
TaskStatus	String	True	The value of this property shall be the completion status of the task, as defined in the Status Section of the Redfish specification and shall not be set until the task has completed.	
Messages	Array	True	This is an array of messages associated with the task.	
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.	
HidePayload	Boolean	True	If value of this property is true will hide the contents of the Payload otherwise the Payload contents can be returned normally. North Bound Support only available.	
PercentComplete	Integer	True	Completion percentage of this Task. North Bound Support only available.	
Payload	Object	True	Refer to below table for Payload property details.	

Table 78. Payload Properties

Name	Type	Read only	Description
HttpHeaders	Array	True	HTTP Headers used in the execution of this Task.
HttpOperation	String	True	HTTP Operation to execution for this Task.
JsonBody	String	True	JSON Payload used for this Task.
TargetUri	String	True	URI of the Target for this Task.

Behavior

1. This URI represents the details of the task created. Check the response for its attributes.

2. This URI will be available only if any tasks are added onto Tasks Collection.
3. As per the Redfish DMTF Schema, the supported **Enum** values for **TaskState** are as defined below:
"New", "Starting", "Running", "Suspended", "Interrupted", "Pending", "Stopping", "Completed", "Killed", "Exception", "Service", "Cancelling", "Cancelled".
4. As per the current implementation in our Redfish Stack, we make use of the below-mentioned **Enum** values of **TaskState** :
"New", "Running", "Pending", "Completed", "Exception", "Cancelled".
5. However, we do provide support for all the Enum values as mentioned in the schema.
6. The Enum values **"Starting", "Suspended", "Interrupted", "Stopping", "Service", "Killed" and "Cancelling"** can be used by any new feature according to their needs and will be utilized as and when found appropriate with respect to the new feature request.

DELETE – Task Instance

Request

DELETE https://{{ip}}/redfish/v1/TaskService/Tasks/{{task_instance}}

Content-Type: application/json

Response

The response status is **204** and no response body. For Error Responses, please refer to [“Error Response” on page 11](#).

Chapter 13. Event Service

GET – Event Service

Request

GET https://{IP}/redfish/v1/EventService

Content-Type: application/json

Response

1. The Event Service resource contains properties for managing event subscriptions and generates the events sent to subscribers. The resource has links to the actual collection of subscriptions (called Event Destinations).
2. The response of the request will be in JSON format. The properties are mentioned in the following.

Table 79. EventService Properties

Name	Type	Read only	Description						
(OData Attributes)			Refer to “OData Support” on page 5.						
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.						
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12						
Name(M)	String	True							
Description	String	True							
ServiceEnabled(C)	Boolean	False	This indicates whether this service is enabled.						
DeliveryRetryAttempts(C)	Number	False	<div>1. The number of retries attempted for any given event to the subscription destination before the subscription is terminated.</div> <div>2. The default value is 3.</div> <div>3. The value which should be within the range 1-10.</div>						
DeliveryRetryIntervalSeconds(C)	Number	False	<div>1. The interval in seconds between the retry attempts for any given event to the subscription destination.</div> <div>2. The default value is 60.</div> <div>3. The value which should be within the range 30-300.</div>						
EventFormatTypes	Array	True	<table><tr><th>Enum</th><th>Description</th></tr><tr><td>MetricReport</td><td>The Subscription destination will receive JSON bodies as MetricReport format only when the TelemetryService has generated a new Metric Report or updated an existing Metric Report.</td></tr><tr><td>Event</td><td>The Subscription destination will receive JSON bodies as Event format for all other types of Events.</td></tr></table>	Enum	Description	MetricReport	The Subscription destination will receive JSON bodies as MetricReport format only when the TelemetryService has generated a new Metric Report or updated an existing Metric Report.	Event	The Subscription destination will receive JSON bodies as Event format for all other types of Events.
Enum	Description								
MetricReport	The Subscription destination will receive JSON bodies as MetricReport format only when the TelemetryService has generated a new Metric Report or updated an existing Metric Report.								
Event	The Subscription destination will receive JSON bodies as Event format for all other types of Events.								

Table 79. EventService Properties (continued)

RegistryPrefixes	Array	True	Prefixes of Message Registries that shall be allowed for an Event Subscription. Supported values are: [" EventLog ", " SyncAgent ", " Security ", " IPMI ", " HttpStatus ", " Base ", " Task "]	
ResourceTypes	Array	True	ResourceTypes values that shall be allowed for an Event Subscription. Supported values are: [" Systems ", " Chassis ", " AccountService ", " TelemetryService ", " Managers ", " EventService ", " TaskService "]	
SubordinateResources Supported	Boolean	True	Indicated Support the SubordinateResource property on Event Subscription. Note: Default value is false.	
Actions	Object	True	The Actions object contains the available custom actions on this resource like SubmitTestEvent or any Oem Action.	
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14	
Subscriptions(N)	Object	True	This is a reference to a collection of Event Destination resources. The value of this property shall contain the link to a collection of type EventDestinationCollection.	
ServerSentEventUri	String	True	Indicates the link to a URI for receiving Server-Sent Event representation for the events.	
SSEFilterProperties Supported	Object	True	Set of properties that are supported in the \$filter query parameter for the ServerSentEventUri.	
			Server Sent Event Filter properties	Supported
			EventFormatType	True
			MessageId	True
			MetricReportDefinition	False
			OriginResource	True
			RegistryPrefix	True
			ResourceType	True
SubordinateResources	False			

PATCH – Event Service

Request

PATCH https://{IP}/redfish/v1/EventService

Content-Type: application/json

Request body

Please refer to the [Table 79 "EventService Properties" on page 155](#) that are patchable in for which ReadOnly is False that can be sent as Request body in JSON format.

Request example

```
{  
    "ServiceEnabled": true,  
}
```

Response

The response status is success with status code as **204** and no body.

For Error Responses, please refer to [“Error Response” on page 11](#).

POST – Submit a Test Event

Request

POST <https://{{ip}}/redfish/v1/EventService/Actions/EventService.SubmitTestEvent>

Content-Type: application/json

Table 80. Test Event Parameters

Name	Type	Optional	Description																									
EventId	String	Yes	1. It will be ignored and replace it with its own. 2. The value will be autogenerated Event Id.																									
EventTimestamp	String	Yes	Timestamp																									
MessageArgs	String	Yes	Refer to “NumberOfArgs” and “ParamTypes” of specific message key in JSON files																									
MessageId	String	No	<table><tr><td>Format</td><td colspan="2">RegistryName.MajorVersion.MinorVersion. MessageKey</td></tr><tr><td rowspan="6">Registry Name</td><td>Base</td><td>https://{ip}/redfish/v1/Registries/ Base.1.5.0.json</td></tr><tr><td>Security</td><td>https://{ip}/redfish/v1/Registries/ Security.1.0.0.json</td></tr><tr><td>EventLog</td><td>https://{ip}/redfish/v1/Registries/ EventLog.1.0.0.json</td></tr><tr><td>IPMI</td><td>https://{ip}/redfish/v1/Registries/ IPMI.1.0.0.json</td></tr><tr><td>HttpStatus</td><td>https://{ip}/redfish/v1/Registries/ HttpStatus.1.0.0.json</td></tr><tr><td>SyncAgent</td><td>https://{ip}/redfish/v1/Registries/ SyncAgent.1.0.0.json</td></tr><tr><td>MajorVersion</td><td colspan="2">https://{ip}/redfish/v1/Registries/{{Registry.Major. Minor.json}}</td></tr><tr><td>MinorVersion</td><td colspan="2"></td></tr><tr><td>MessageKey</td><td colspan="2">Refer to “Messages” of JSON files</td></tr></table>	Format	RegistryName.MajorVersion.MinorVersion. MessageKey		Registry Name	Base	https://{ip}/redfish/v1/Registries/ Base.1.5.0.json	Security	https://{ip}/redfish/v1/Registries/ Security.1.0.0.json	EventLog	https://{ip}/redfish/v1/Registries/ EventLog.1.0.0.json	IPMI	https://{ip}/redfish/v1/Registries/ IPMI.1.0.0.json	HttpStatus	https://{ip}/redfish/v1/Registries/ HttpStatus.1.0.0.json	SyncAgent	https://{ip}/redfish/v1/Registries/ SyncAgent.1.0.0.json	MajorVersion	https://{ip}/redfish/v1/Registries/{{Registry.Major. Minor.json}}		MinorVersion			MessageKey	Refer to “Messages” of JSON files	
			Format	RegistryName.MajorVersion.MinorVersion. MessageKey																								
			Registry Name	Base	https://{ip}/redfish/v1/Registries/ Base.1.5.0.json																							
				Security	https://{ip}/redfish/v1/Registries/ Security.1.0.0.json																							
				EventLog	https://{ip}/redfish/v1/Registries/ EventLog.1.0.0.json																							
				IPMI	https://{ip}/redfish/v1/Registries/ IPMI.1.0.0.json																							
				HttpStatus	https://{ip}/redfish/v1/Registries/ HttpStatus.1.0.0.json																							
				SyncAgent	https://{ip}/redfish/v1/Registries/ SyncAgent.1.0.0.json																							
			MajorVersion	https://{ip}/redfish/v1/Registries/{{Registry.Major. Minor.json}}																								
			MinorVersion																									
MessageKey	Refer to “Messages” of JSON files																											

Table 80. Test Event Parameters (continued)

Name	Type	Optional	Description
OriginOfCondition	String	Yes	A reference
Severity	String	Yes	Refer to “Severity” of specific message key in JSON files

Request example

Base

```
{
  "EventTimestamp": "2019-09-20T23:04:09+02:00",
  "EventId": "1531584914",
  "OriginOfCondition": "/redfish/v1/Chassis/Self",
  "MessageId": "Base.1.5.PropertyValueNotInList",
  "MessageArgs": [
    "Lit",
    "IndicatorLED"
  ],
  "Severity": "Warning"
}
```

Security

```
{
  "EventTimestamp": "2019-09-20T23:04:09+02:00",
  "EventId": "1531584914",
  "OriginOfCondition": "/redfish/v1/Chassis/Self",
  "MessageId": "Security.1.0.AccessDenied",
  "MessageArgs": [
    "Test"
  ],
  "Severity": "Critical"
}
```

EventLog

```
{
  "MessageId": "EventLog.1.0.ResourceAdded"
```

```
}
```

IPMI

```
{  
    "MessageId": "IPMI.1.0.CommandSpecific"  
}
```

HttpStatus

```
{  
    "MessageId": HttpStatus.1.0.MethodNotAllowed"  
}
```

SyncAgent

```
{  
    "MessageId": "SyncAgent.1.0.AddressOrigin"  
}
```

Response

1. The response status is 202 Accepted with the created Task Instance as the response body.
2. For Error Responses, please refer to [“Error Response” on page 11](#).
3. Sample Response is as given below:

```
{  
    "@odata.context": "/redfish/v1/$metadata#Task.Task",  
    "@odata.id": "/redfish/v1/TaskService/Tasks/7",  
    "@odata.type": "#Task.v1_4_2.Task",  
    "Description": "Task for EventService SubmitTestEvent Action",  
    "Id": "7",  
    "Name": "EventService SubmitTestEvent Action",  
    "TaskState": "New",  
    "TaskStatus": "OK"  
}
```

Behavior

The limitation applied to this resource is that only 3 concurrent requests can be currently executing for **SubmitTestEvent** Action, at a given time. To issue an additional request, we need to wait for at least one request to finish from the earlier issued ones and so on.

For **SubmitTestEvent** Action to return 202 Accepted with Task Instance in Response Body, the following programmatic flow comes into the picture:

1. Validate all Request Body Properties.

If Error exists, throw 400 Bad Request with corresponding error body. If success, go to Step 2.

2. Check for the total count of current tasks.

- a. If `count_of_current_tasks >= Maximum_Tasks_Limit` (i.e. 15), then check for the value of `CompletedTaskOverWritePolicy` attribute.
- b. If the value of `CompletedTaskOverWritePolicy` attribute is anything other than "Overwrite", then throw 400 Bad Request with "CreateLimitReachedForResource" Error.
- c. If "Overwrite" is the value of `CompletedTaskOverWritePolicy` attribute, then check for any older tasks in the states "Completed" or "Cancelled" or "Exception". If so, then delete those tasks and create a Task and return 202 Accepted.
- d. If `count_of_current_tasks < Maximum_Tasks_Limit`, then create a Task and return 202 Accepted. In this scenario, only one task will be created, irrespective of the number of Active Subscriptions.
- e. This task will show the status of all the Failure/Success Event Destinations.

3. Check created task.

- a. The User may then give a GET Request periodically to check the status of the created Task based on the Task Instance returned in Step 2.
- b. In the background, the created task will trigger the Task Daemon and it will execute a Lua File and pass the event related data as an argument to the file. The Lua File will run as a separate thread.

4. Check active subscriptions.

- a. Inside the thread execution, we will get the list of Available Active Subscriptions first.
- b. Then we will get the list of Active Subscriptions who have "Event" as the "EventFormatType".
- c. If there are no Active Subscriptions itself, then the created task will have "NoActiveSubscriptionPresent" Error Message and the "TaskStatus" will be updated as "Warning" and "TaskState" as "Exception" and the thread will terminate.
- d. If there are no Active Subscriptions having "Event" as the "EventFormatType", then the created task will have "NoActiveSubscriptionOfFormatTypeEventPresent" Error Message and the "TaskStatus" will be updated as "Warning" and "TaskState" as "Exception" and the thread will terminate.
- e. If there are Active Subscriptions having "Event" as the "EventFormatType", Frame the Event Notification data and go to Step 5.

5. Loop the Event Subscribers one by one, do some logical-checks-done-in-event-service-daemon.

- a. If at-least one logical-checks fail, add "SubmitTestEventPreconditionsFailed" Message to the response body and proceed to the next subscriber. If all logical-checks pass, try sending the event to the corresponding event destination.
- b. If Event Notification is delivered to the destination, add "Success" Message to the response body and proceed to the next subscriber.
- c. If Event Notification fails to be delivered to the destination, add the appropriate Message from among "CouldNotEstablishConnection" and "SourceDoesNotSupportProtocol" to the response body and proceed to the next subscriber.
- d. Continue the step until we are done with all the subscribers.
- e. If the Event Notification fails to be delivered to at-least one destination, then update "TaskStatus" as "Critical" and "TaskState" as "Exception".
- f. If the Event Notification is delivered to all destination, then update "TaskStatus" as "OK" and "TaskState" as "Completed".
- g. Finally set the collective response body to the Messages attribute of the created task instance.

Server Sent Events (SSE)

Server Sent Events

1. Server-Sent Events (SSE), as defined by the Web Hypertext Application Technology Working Group, allows for a client to open a connection with a web service, and the web service can continuously push data to the client as needed.
2. **Successful Resource responses for SSE shall:**
 - a. Return the HTTP 200 status code.
 - b. Have a Content-Type header set as **"text/event-stream"** or **"text/event-stream; charset=utf-8"**.
3. **Unsuccessful Resource responses for SSE shall:**
 - a. Return an HTTP status code of 400 or greater.
 - b. Have a Content-Type header set as **"application/json"** or **"application/json; charset=utf-8"**.
 - c. Contain a JSON object in the response body, as described in Error responses, which details the error or errors.

Server Sent Events - Listener

1. ServerSent Event Listener will be listening on port 9090 and is started along with redfish server.
2. This Listener will listen for GET requests from client on the ServerSentEventUri.
3. ServerSentEventUri is a property under EventService Resource that contains the URI to which client should give a GET request to indicate that the server should send the events in the form of SSE by opening a connection with the client and to use this connection to end subsequent events as a stream with **"text/eventstream"** Content-Type header.

Server Sent Events - Workflow

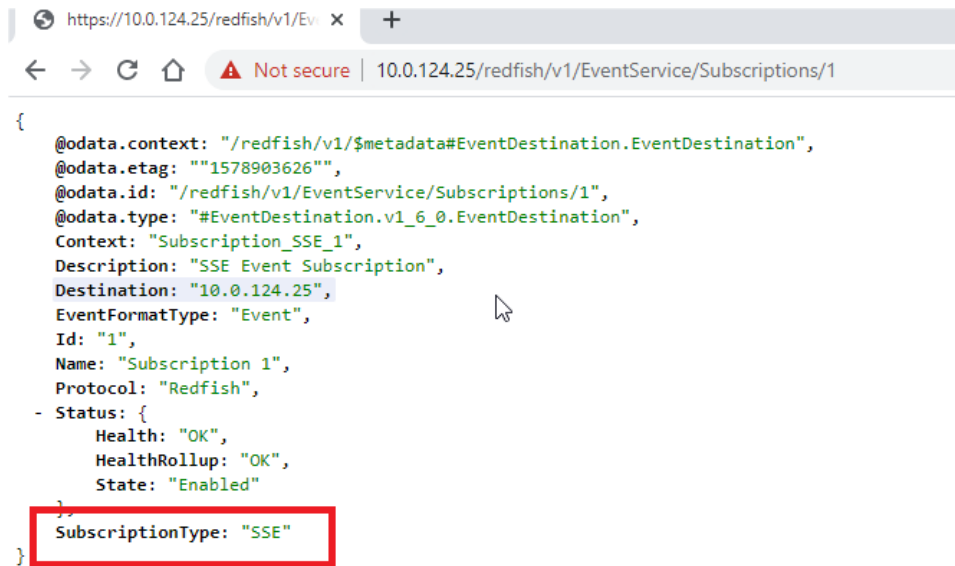
1. User can Check for the serversent URI from the property **"ServerSentEventUri"** from the following URI.
`https://{ip}}/redfish/v1/EventService`

```

{
  @odata.context: "/redfish/v1/$metadata#EventService.EventService",
  @odata.etag: "\"1578903593\"",
  @odata.id: "/redfish/v1/EventService",
  @odata.type: "#EventService.v1_4_0.EventService",
  - Actions: {
    - #EventService.SubmitTestEvent: {
      @Redfish.ActionInfo: "/redfish/v1/EventService/SubmitTestEventActionInfo",
      target: "/redfish/v1/EventService/Actions/EventService.SubmitTestEvent"
    }
  },
  DeliveryRetryAttempts: 3,
  DeliveryRetryIntervalSeconds: 60,
  Description: "Event Service",
  - EventFormatTypes: [
    "MetricReport",
    "Event"
  ],
  Id: "EventService",
  Name: "Event Service",
  - RegistryPrefixes: [
    "SyncAgent.1.0.0",
    "Base.1.5.0",
    "HttpStatus.1.0.0",
    "EventLog.1.0.0",
    "IPMI.1.0.0",
    "Security.1.0.0"
  ],
  - ResourceTypes: [
    "Managers",
    "Chassis",
    "Systems",
    "AccountService",
    "EventService",
    "TelemetryService"
  ],
  ServerSentEventUri: "/redfish/v1/EventService/SSE",
  ServiceEnabled: true,
  - Status: {
    Health: "OK",
    State: "Enabled"
  },
  SubordinateResourcesSupported: false,
  - Subscriptions: {
    @odata.id: "/redfish/v1/EventService/Subscriptions"
  }
}

```

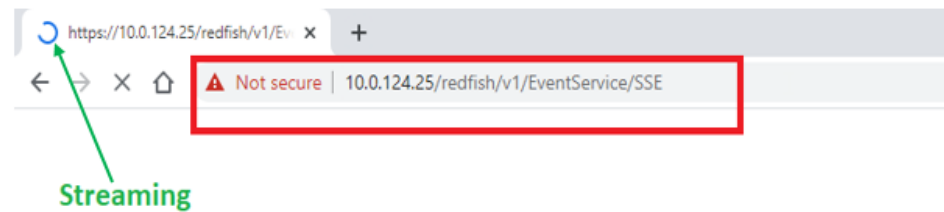
2. User Issues a GET Request to the "ServerSentEventUri".
https://{ip}/redfish/v1/EventService/SSE
3. The above requested is redirected from **lighttpd** to the **serversent** event listener which validates the request URI along with the given filter parameters if any and creates a subscription for successful validation in the following URI.
https://{ip}/redfish/v1/EventService/Subscriptions



```
{
  @odata.context: "/redfish/v1/$metadata#EventDestination.EventDestination",
  @odata.etag: "\"1578903626\"",
  @odata.id: "/redfish/v1/EventService/Subscriptions/1",
  @odata.type: "#EventDestination.v1_6_0.EventDestination",
  Context: "Subscription_SSE_1",
  Description: "SSE Event Subscription",
  Destination: "10.0.124.25",
  EventFormatType: "Event",
  Id: "1",
  Name: "Subscription 1",
  Protocol: "Redfish",
  Status: {
    Health: "OK",
    HealthRollup: "OK",
    State: "Enabled"
  },
  SubscriptionType: "SSE"
}
```

SSE Server also sends a HTTP Response with 200 Status Code along with Content-Type Header as "text/event-stream".

4. SSE client can be a curl or any browser supporting SSE as given in below link.
https://en.wikipedia.org/wiki/Server-sent_events
5. Now SSE client is continuously listening for SSE Events Subscribed for EventFormatType value given in the filter or Event as the default EventFormatType.



6. Whenever an event is triggered in Redfish, events are filtered according to the filter parameters as provided in the Event Subscription and is sent to the SSE Server. SSE Server sends the events as stream data to the SSE Event destinations.

```

id:2
data:{"subscription_id":"1","Events@odata.count":1,"Id":"2","@odata.type":"#Event.v1_4_1.Event","Events":[{"MessageArgs":
["\\redfish\\v1\\AccountService\\Roles\\TestRole"],"OriginOfCondition":{"@odata.id":"\\redfish\\v1\\AccountService\\Roles"},"EventTimestamp":"2020-01-13T06:01:37-
05:00","MemberId":"\\redfish\\v1\\AccountService\\Roles\\TestRole - 1578913297","MessageId":"EventLog.1.0.ResourceAdded","Severity":"OK","Message":"The resource at
\\redfish\\v1\\AccountService\\Roles\\TestRole was successfully added."},"EventId":"\\redfish\\v1\\AccountService\\Roles\\TestRole - 1578913297"},"Name":"Event
Array","@odata.context":"\\redfish\\v1\\$metadata#Event.Event"}

id:3
data:{"subscription_id":"1","Events@odata.count":1,"Id":"3","@odata.type":"#Event.v1_4_1.Event","Events":[{"MessageArgs":
["\\redfish\\v1\\AccountService\\Roles\\TestRole"],"OriginOfCondition":{"@odata.id":"\\redfish\\v1\\AccountService\\Roles"},"EventTimestamp":"2020-01-13T06:05:12-
05:00","MemberId":"\\redfish\\v1\\AccountService\\Roles\\TestRole1 - 1578913512","MessageId":"EventLog.1.0.ResourceAdded","Severity":"OK","Message":"The resource at
\\redfish\\v1\\AccountService\\Roles\\TestRole1 was successfully added."},"EventId":"\\redfish\\v1\\AccountService\\Roles\\TestRole1 - 1578913512"},"Name":"Event
Array","@odata.context":"\\redfish\\v1\\$metadata#Event.Event"}

```

Events are Posted from Redfish

7. Events gets filter by filter property values.

Table 81. SSE Supported / Non-Supported Filter Properties

SSE Supported Filter properties	SSE Not Supported Filter properties:
EventFormatType	MetricReportDefinition
MessageId	SubordinateResources
OriginResource	
RegistryPrefix	
ResourceType	

Event Format Type - Event

When user creates an SSE Event Destination with **EventFormatType** as Event, then SSE client will get an Event in Event format.

[https://{BMC_IP}/redfish/v1/EventService/SSE?\\$filter=EventFormatType eq Event](https://{BMC_IP}/redfish/v1/EventService/SSE?$filter=EventFormatType eq Event)

```

id:59
data:{"subscription_id":"4","Events@odata.count":1,"Id":"59","@odata.type":"#Event.v1_4_1.Event","Events":[{"MessageArgs":
["\\redfish\\v1\\AccountService\\Roles\\TestRole"],"OriginOfCondition":{"@odata.id":"\\redfish\\v1\\AccountService\\Roles\\TestRole"},"EventTimestamp":"2020-01-13T06:05:18-05:00","MemberId":"\\redfish\\v1\\AccountService\\Roles\\TestRole - 1578923899","MessageId":"EventLog.1.0.ResourceAdded","Severity":"OK","Message":"The resource at
\\redfish\\v1\\AccountService\\Roles\\TestRole was successfully added."},"EventId":"\\redfish\\v1\\AccountService\\Roles\\TestRole - 1578923899"},"Name":"Event Array","@odata.context":"\\redfish\\v1\\$metadata#Event.Event"}

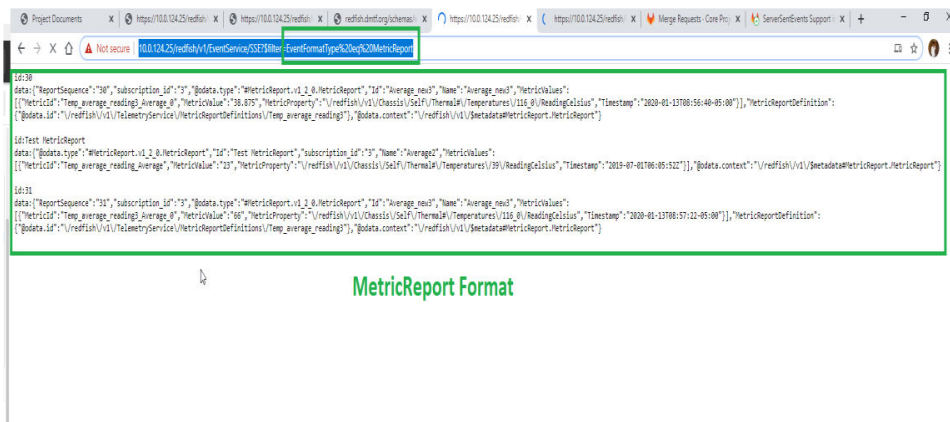
```

Event Format

Event Format Type - MetricReport

When user creates an SSE Event Destination with EventFormatType as MetricReport, then SSE client will get an Event in MetricReport format.

[https://{BMC_IP}/redfish/v1/EventService/SSE?\\$filter=EventFormatType eq MetricReport](https://{BMC_IP}/redfish/v1/EventService/SSE?$filter=EventFormatType eq MetricReport)

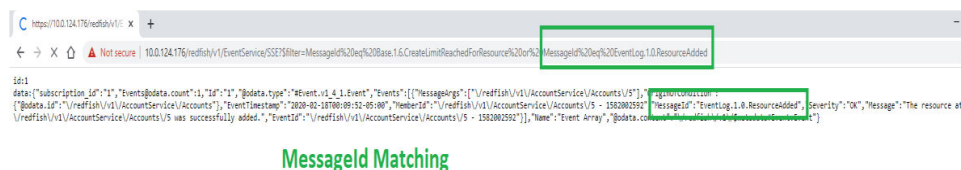


Event Format Type - MessageId

`https://{ip}/redfish/v1/Registries/{Registry_instance.json}`

When User creates an SSE Event Destination with supported MessageId in Registries then SSE client will get an event only if MessageId are matches with the generated event MessageId.

`https://{BMC_IP}/redfish/v1/EventService/SSE?filter=MessageId eq EventLog.1.0.ResourceAdded or MessageId eq Base.1.5.CreateLimitReachedForResource`

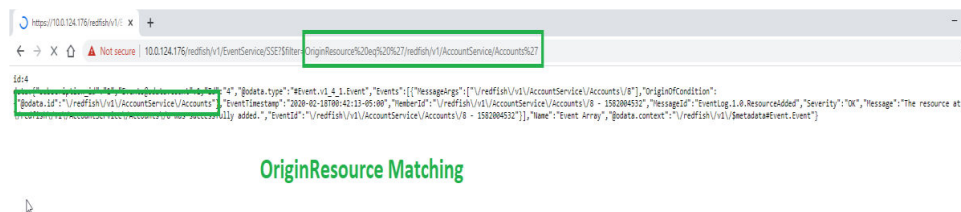


MessageId Matching

Event Format Type - OriginResource

When User creates an SSE Event Destination with OriginResource then SSE client will get an event only if OriginResource are matches with the generated event Origin of Condition.

`https://{BMC_IP}/redfish/v1/EventService/SSE?filter=OriginResource eq /redfish/v1/AccountService/Accounts`



OriginResource Matching

Event Format Type - RegistryPrefix

`https://{ip}/redfish/v1/EventService`

When User creates an SSE Event Destination with supported RegistryPrefixes, then SSE client will get an event only if RegistryPrefixes are matches with the generated event MessageId.

`https://{BMC_IP}/redfish/v1/EventService/SSE?filter=RegistryPrefix eq Base or RegistryPrefix eq Security or RegistryPrefix eq EventLog`

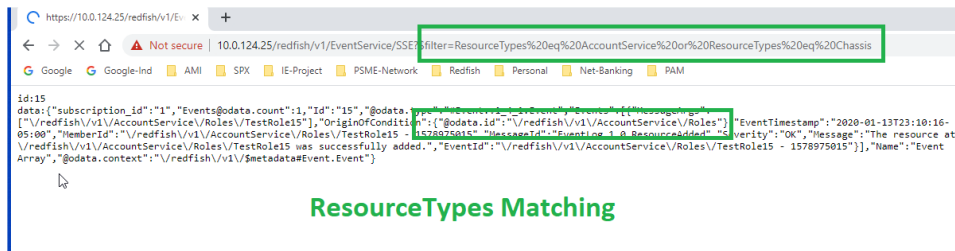


Event Format Type - ResourceType

https://{ip}/redfish/v1/EventService

When User creates an SSE Event Destination with supported ResourceTypes in EventService, client will get an event only if ResourceTypes are matches with the generated event OriginOfCondition.

https://{BMC_IP}/redfish/v1/EventService/**SSE?filter=ResourceType eq AccountService or ResourceType eq Chassis**

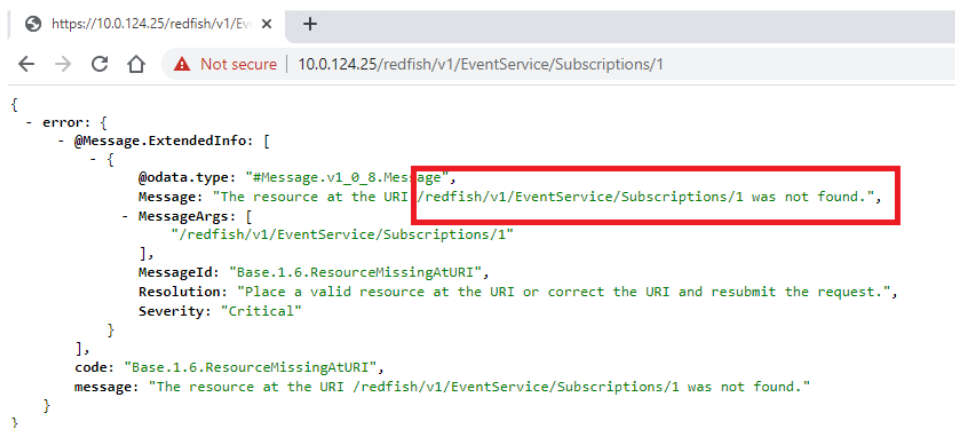


- Whenever a SSE client closes the connection will stop streaming and the subscription related to the SSE client destination is deleted.

Close SSE stream

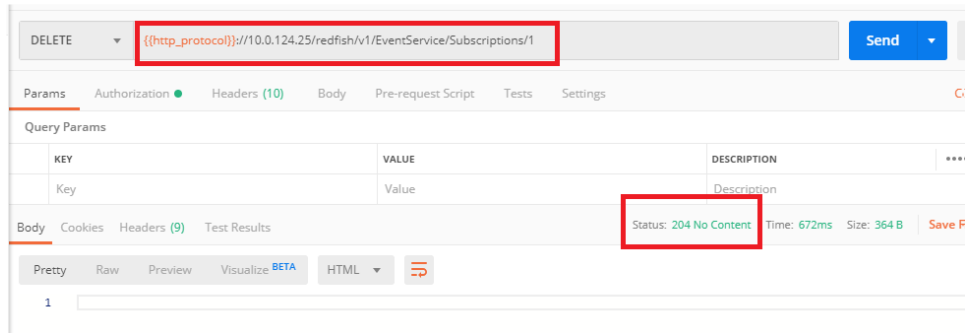


SSE Subscription gets deleted

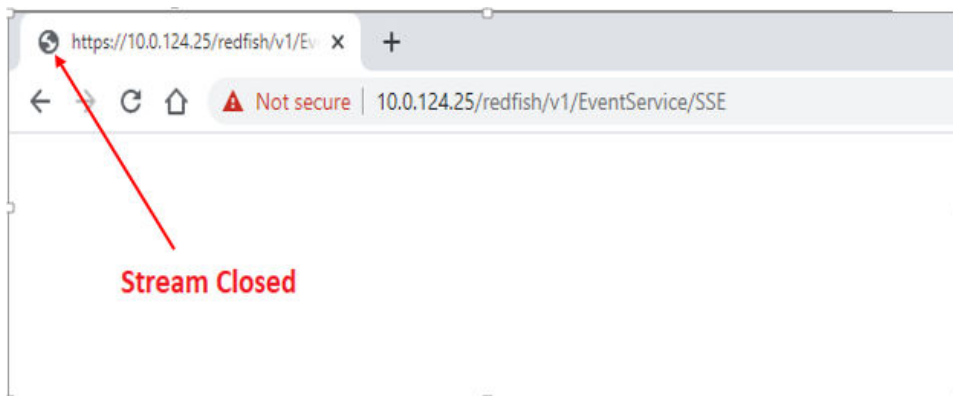


9. Similarly, whenever SSE subscription is deleted will close the respective SSE stream.

Delete SSE Subscription

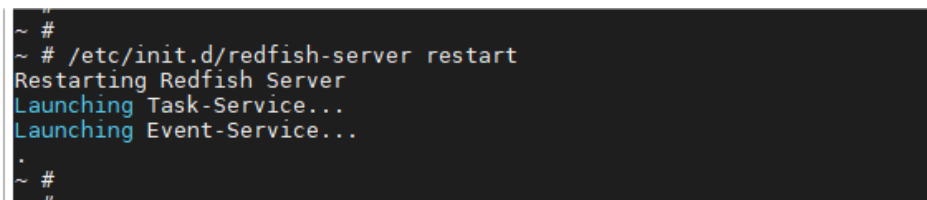


SSE Stream get closed

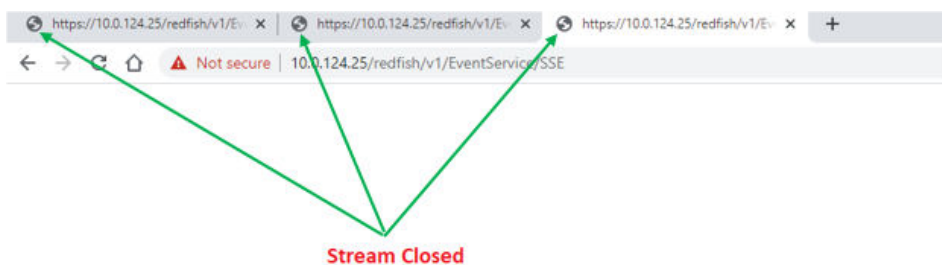


10. Whenever redfish-server stops/restart will close all connected SSE stream and all SSE related subscriptions is deleted.

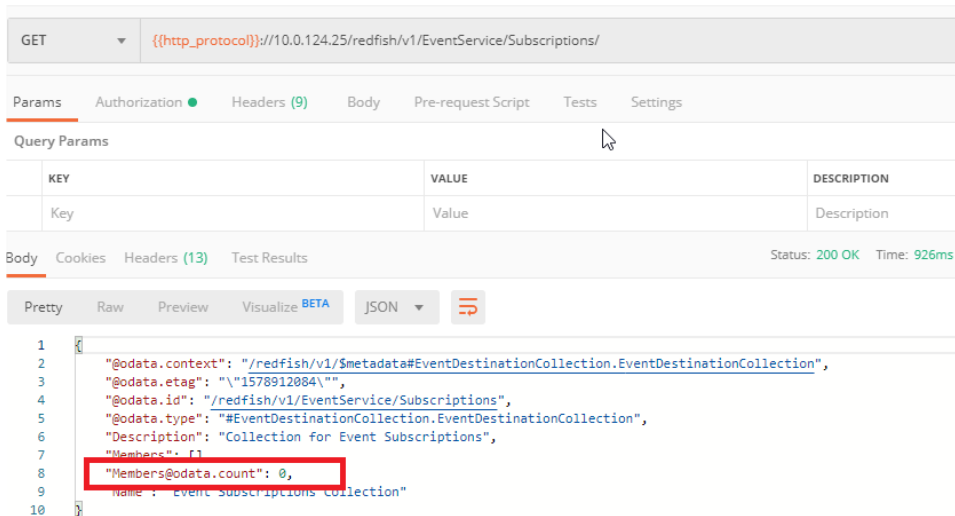
redfish-server restart



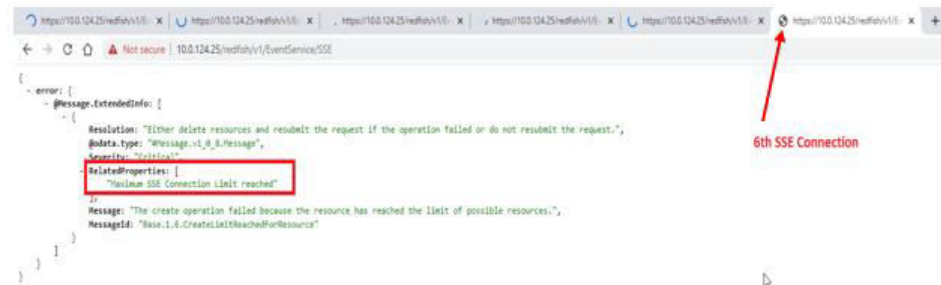
All SSE streams get closed



All SSE Subscriptions gets deleted



11. Max SSE connection allowed 5, more than 5 SSE connections are not allowed.



Limitations

1. Closing SSE Client Connection will have a delay of 2 minutes to get updated in the event subscription collection. (Step 8 in workflow of ServerSentEvents).
2. Last-Event-ID is not supported.
3. At an interval of 2 minutes, SSE server will send dummy comments to the clients to keep connection alive.

GET – Event Subscription Collection

Request

GET <https://{{ip}}/redfish/v1/EventService/Subscriptions>

Content-Type: application/json

Response

Please refer to [“Redfish Collection” on page 8](#) for the JSON response properties..

POST– Event Subscriptions

Request

POST <https://{ip}/redfish/v1/EventService/Subscriptions>

Content-Type: application/json

1. The maximum limit for events subscription is 5 and it can be increased by editing the config file(redfish-lua) as per customer requirement.
2. Creation of Event Subscriptions will not send event to Event Destination.

Request example

With EventFormatType, RegistryPrefixes and ResourceTypes

User can check the list of supported EventFormatType, RegistryPrefixes and ResourceTypes values in <https://{ip}/redfish/v1/EventService>

Request body

```
{
  "Context": "ABCDEFGH",
  "Destination": "http://10.0.145.99:5000/event",
  "EventFormatType": "Event",
  "Protocol": "Redfish",
  "RegistryPrefixes": [
    "SyncAgent",
    "Base",
    "EventLog"
  ],
  "ResourceTypes": [
    "Chassis",
    "AccountService",
    "Systems",
    "EventService"
  ]
  "Protocol": "Redfish"
}
```

Response body

```
{
```

```

"@odata.context": "/redfish/v1/$metadata#EventDestination.EventDestination",
"@odata.etag": "\"1583725738\"",
"@odata.id": "/redfish/v1/EventService/Subscriptions",
"@odata.type": "#EventDestination.v1_6_0.EventDestination",
"Context": "ABCDEFGH",
"DeliveryRetryPolicy": "TerminateAfterRetries",
"Description": "Event Subscription",
"Destination": "http://10.0.145.99:5000/event",
"EventFormatType": "Event",
"Id": 1,
"Name": "Subscription 1",
"OriginResources@odata.count": 0,
"Protocol": "Redfish",
"RegistryPrefixes": [
    "SyncAgent",
    "EventLog",
    "Base"
],
"ResourceTypes": [
    "EventService",
    "AccountService",
    "Chassis",
    "Systems"
],
"Status": {
    "Health": "OK",
    "HealthRollup": "OK",
    "State": "Enabled"
},
"SubordinateResources": false

```



```
}
```

Request example

Without EventFormatType, RegistryPrefixes and ResourceTypes

1. RegistryPrefixes, ResourceTypes values are empty or absent are accepted in POST call.
2. In this case service shall sent events to destination with any ResourceTypes or any RegistryPrefixes.
3. If EventFormatType property was absent on POST call then default value will be Event.

Request body

RegistryPrefixes & ResourceTypes are empty

```
{  
  
  "Context": "ABCDEFGH",  
  
  "Destination": "http://10.0.145.99:5000/event",  
  
  "RegistryPrefixes": [],  
  
  "ResourceTypes": [],  
  
  "Protocol": "Redfish"  
}
```

EventFormatType, RegistryPrefixes & ResourceTypes are absent

```
{  
  
  "Context": "ABCDEFGH",  
  
  "Destination": "http://10.0.145.99:5000/event",  
  
  "Protocol": "Redfish"  
}
```

Response body

```
{  
  
  "@odata.context": "/redfish/v1/$metadata#EventDestination.EventDestination",  
  
  "@odata.etag": "\"1583726231\"",  
  
  "@odata.id": "/redfish/v1/EventService/Subscriptions",  
  
  "@odata.type": "#EventDestination.v1_6_0.EventDestination",  
  
  "Context": "ABCDEFGH",  
  
  "DeliveryRetryPolicy": "TerminateAfterRetries",  
  
  "Description": "Event Subscription",  
  
  "Destination": "http://10.0.145.99:5000/event",  
  
  "EventFormatType": "Event",  
  
  "Id": 2,
```

```

    "Name": "Subscription 2",

    "OriginResources@odata.count": 0,

    "Protocol": "Redfish",

    "Status": {

        "Health": "OK",

        "HealthRollup": "OK",

        "State": "Enabled"

    },

    "SubordinateResources": false
}

```

Response

The response status is 201 and the response body is a GET Response with the properties of the newly created Event Destination Entity as given below.

For Error Responses, please refer to [“Error Response” on page 11](#).

GET – Event Subscription Instance

Request

GET https://{ip}/redfish/v1/EventService/Subscriptions/{{Subscriptions_instance}}

Content-Type: application/json

1. This resource shall be used to represent resources that represent the Event Subscriptions and conforms to the Event Destination Schema.
2. A subscription instance is shown only when events are subscribed or posted using POST Action.

Response

The response is a JSON object that contains the following parameters:

Table 82. Event Subscription Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
Destination	String	True	This property shall contain a URI to the destination where the events will be sent.

Table 82. Event Subscription Properties (continued)

Context	String	False	A client-supplied Description that is stored with the event destination subscription. This property shall contain a client supplied context that will remain with the connection through the connection's lifetime.
SubscriptionType	String	True	The value of this property shall indicate the type of subscription for events. If this property is not present, thebSubscriptionType shall be assumed to be RedfishEvent. RedfishEvent SubscriptionType indicates that the subscription follows the Redfish specification for event notifications, which is done by a service sending an HTTP POST to the subscriber's destination URI.
Protocol	String	True	The protocol type of the event connection. This property shall contain the protocol type that the event will use for sending the event to the destination. A value of Redfish shall be used to indicate that the event type shall adhere to that defined in the Redfish specification. "Enum": ["Redfish"]
MessageIds	Array	True	A list of MessageIds that the service will only send. If this property is absent or the array is empty, then Events with any MessageId will be sent to the subscriber.
OriginResources	Array	True	A list of resources for which the service will only send relateDevents. If this property is absent or the array is empty, then Events originating from any resource will be sent to the subscriber.
OriginResources@odata.count	Number	True	The number of items in a collection
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.
SubordinateResources	Boolean	True	This property specifying OriginResources when set to true. Note: Default value is false.
EventFormType	String	True	This property shall contain the types of message that will be sent to the Event destination. MetricReport: The Subscription destination will receive JSON bodies as MetricReport format only when the TelemetryService has generateDa new Metric Report or updateDan existing Metric Report. Event: The Subscription destination will receive JSON bodies as Event format for all other types of Events.
RegistryPrefixes	Array	True	A list of Prefixes for the Message Registries that contain the MessageIds.
ResourceTypes	Array	True	A list of Resource type values that corresponds to the OriginOfCondition.
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14 The state will be changed to Disabled and Health and HealthRollup to Critical when the subscription gets suspended.

Table 82. Event Subscription Properties (continued)

MetricReportDefinitions	Array	True	<div><div><div>1. This property shall specify an array of metric report definitions that are the only allowable generators of metric reports for this subscription.</div><div>2. Metric reports originating from metric report definitions not contained in this array shall not be sent to the subscriber.</div><div>3. If this property is absent or the array is empty, the service shall send metric reports originating from any metric report definition to the subscriber.</div><div>4. This property will be allowed only if the EventFormatType is MetricReport.</div><div>5. Also, the Metric Report Definition must have the ReportAction as RedfishEvent.</div></div></div>								
DeliveryRetryPolicy	String	False	<div><div><div><div>1. This property shall indicate the subscription delivery retry policy for events where the subscription type is RedfishEvent.</div><div>2. If this property is not present, the policy shall be assumed to be TerminateAfterRetries.</div></div><table><tr><th>Enum</th><th>Description</th></tr><tr><td>RetryForever</td><td>The subscription is not suspended or terminated and attempts at delivery of future events shall continue even after the after the maximum number of retries is reached.</td></tr><tr><td>SuspendRetries</td><td>The subscription is suspended after the maximum number of retries is reached.</td></tr><tr><td>TerminateAfterRetries</td><td><div><div>1. The subscription is terminated after the maximum number of retries is reached.</div><div>2. The subscription will get deleted after the retry attempts.</div></div></td></tr></table></div></div>	Enum	Description	RetryForever	The subscription is not suspended or terminated and attempts at delivery of future events shall continue even after the after the maximum number of retries is reached.	SuspendRetries	The subscription is suspended after the maximum number of retries is reached.	TerminateAfterRetries	<div><div>1. The subscription is terminated after the maximum number of retries is reached.</div><div>2. The subscription will get deleted after the retry attempts.</div></div>
Enum	Description										
RetryForever	The subscription is not suspended or terminated and attempts at delivery of future events shall continue even after the after the maximum number of retries is reached.										
SuspendRetries	The subscription is suspended after the maximum number of retries is reached.										
TerminateAfterRetries	<div><div>1. The subscription is terminated after the maximum number of retries is reached.</div><div>2. The subscription will get deleted after the retry attempts.</div></div>										

PATCH – Change subscription properties

Request

PATCH https://{ip}/redfish/v1/EventService/Subscriptions/{Subscriptions_instance}

Content-Type: application/json

Request body

Please refer to the properties that are patchable in the [Table 82 “Event Subscription Properties” on page 172](#) for which ReadOnly is False that can be sent as Request body in JSON format.

Request example

```
{
  "Context": "Event_1"
}
```

Response

The response status is success with status code as **204** and no response body.

For Error Responses, please refer to [“Error Response” on page 11](#).

DELETE – Event Subscription Instance

Request

DELETE `https://{ip}/redfish/v1/EventService/Subscriptions/{{Subscriptions_instance}}`

Content-Type: application/json

Deletion of Event Subscriptions will not send event to Event Destination.

Response

The response status is **204** and no response body. For Error Responses, please refer to [“Error Response” on page 11](#)..

POST – Event Subscription Instance

Request

POST `https://{ip}/redfish/v1/EventService/Subscriptions/{{Subscriptions_instance}}/Actions/EventDestination.ResumeSubscription`

Content-Type: application/json

1. This action shall resume a suspended event subscription, which affects the subscription status.
2. This action link is shown in the subscriptions instance only when the subscription gets suspended.

Request body

This action does not require any request body. Even if the request body is supplied, it will not be validated.

Response

The response status is success with status code as 204 and no body.

For Error Responses, please refer to [“Error Response” on page 11](#).

Chapter 14. Host — PCIe Devices

GET – PCIe Device Collection

Dependence

1. It displays the collection of PCI Express devices are available in the Chassis.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{ip}/redfish/v1/Chassis/Self/PCIeDevices

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#PCIeDeviceCollection.PCIeDeviceCollection",
  "@odata.etag": "\"1578890351\"",
  "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices",
  "@odata.type": "#PCIeDeviceCollection.PCIeDeviceCollection",
  "Description": "The Collection of PCIeDevices",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00"
    },
    {
      "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_C1_00"
    },
    {
      "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_C2_00"
    }
  ],
  "Members@odata.count": 3,
  "Name": "PCIeDevice Collection"
```

}

GET – Get PCIe Instance

Dependence

1. This is the schema definition for the PCIeDevice resource.
2. It represents the properties of a PCIeDevice attached to a System.
3. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{ip}/redfish/v1/Chassis/Self/PCIeDevices/{PCIeDevices_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 83. PCIe Device Properties

Name	Type	Read only	Description	
OData Attributes)			Refer to “OData Support” on page 5	
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14	
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12	
Name(M)	String	True		
Description	String	True		
Status	Object	True	See Table 11 “Resource Complex Types” on page 14.	
Manufacturer	String	True	This is the manufacturer of this PCIe device.	
Model	String	True	This is the model number for the PCIe device.	
SKU	String	True	This is the SKU for this PCIe device.	
SerialNumber	String	True	The serial number for this PCIe device.	
PartNumber	String	True	The part number for this PCIe device.	
AssetTag	String	False	The user assigned asset tag for this PCIe device.	
DeviceType	String	True	The device type for this PCIe device.	
			Enum	Description
			SingleFunction	A single-function PCIe device.
			MultiFunction	A multi-function PCIe device.
			Simulated	A PCIedevice which is not currently physically present, but is being simulated by the PCIe infrastructure.
FirmwareVersion	String	True	The version of firmware for this PCIe device.	
Links	Object	True	The links object contains the links to otherresources that are related to this resource.	

Table 83. PCIe Device Properties (continued)

			Name	Type	Read Only	Description
			Oem	Object		See Table 11 “Resource Complex Types” on page 14.
			Chassis	Array	True	An array of references to the chassis in which the PCIe device is contained.
			Chassis @odata.count	Number	True	An integer representing the number of items in a collection.
PCleFunctions	Object	True	An reference to PCleFunctionsCollection exposed by this device.			
PCleInterface	Object	True	This is the definition for a PCI Interface object. Refer to PCle Interface Properties.			
Assembly	Object	True	A reference to the Assembly resource associated with the PCIe device. Platform specific porting needed.			

Table 84. PCIe Interface Properties

Name	Type	Read only	Description												
LanesInUse	Number	True	This is the number of PCIe lanes in use by this device.												
MaxLanes	Number	True	This is the number of PCIe lanes supported by this device.												
MaxPCleType	String	True	<div>The highest version of the PCIe specification supported by this device.<table><tr><th>Enum</th><th>Description</th></tr><tr><td>GEN1</td><td>A PCIe v1.0 slot.</td></tr><tr><td>GEN2</td><td>A PCIe v2.0 slot.</td></tr><tr><td>GEN3</td><td>A PCIe v3.0 slot.</td></tr><tr><td>GEN4</td><td>A PCIe v4.0 slot.</td></tr><tr><td>GEN5</td><td>A PCIe v5.0 slot.</td></tr></table></div>	Enum	Description	GEN1	A PCIe v1.0 slot.	GEN2	A PCIe v2.0 slot.	GEN3	A PCIe v3.0 slot.	GEN4	A PCIe v4.0 slot.	GEN5	A PCIe v5.0 slot.
Enum	Description														
GEN1	A PCIe v1.0 slot.														
GEN2	A PCIe v2.0 slot.														
GEN3	A PCIe v3.0 slot.														
GEN4	A PCIe v4.0 slot.														
GEN5	A PCIe v5.0 slot.														
PCleType	String	True	<div>The version of the PCIe specification in use by this device.<table><tr><th>Enum</th><th>Description</th></tr><tr><td>GEN1</td><td>A PCIe v1.0 slot.</td></tr><tr><td>GEN2</td><td>A PCIe v2.0 slot.</td></tr><tr><td>GEN3</td><td>A PCIe v3.0 slot.</td></tr><tr><td>GEN4</td><td>A PCIe v4.0 slot.</td></tr><tr><td>GEN5</td><td>A PCIe v5.0 slot.</td></tr></table></div>	Enum	Description	GEN1	A PCIe v1.0 slot.	GEN2	A PCIe v2.0 slot.	GEN3	A PCIe v3.0 slot.	GEN4	A PCIe v4.0 slot.	GEN5	A PCIe v5.0 slot.
Enum	Description														
GEN1	A PCIe v1.0 slot.														
GEN2	A PCIe v2.0 slot.														
GEN3	A PCIe v3.0 slot.														
GEN4	A PCIe v4.0 slot.														
GEN5	A PCIe v5.0 slot.														
Oem	Object		See Table 11 “Resource Complex Types” on page 14.												

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#PCleDevice.PCieDevice",
```

```

"@odata.etag": "\"1619171734\"",
"@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00",
"@odata.type": "#PCIeDevice.v1_3_1.PCIeDevice",
"Description": "14E4 UNCL Slot 10",
"DeviceType": "MultiFunction",
"FirmwareVersion": "218.0.4.1",
"Id": "00_01_00",
"Links": {
  "PCIeFunctions": [
    {
      "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00/PCIeFunctions/DevType3_OCP1_DevIndexD"
    },
    {
      "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00/PCIeFunctions/DevType3_OCP1_DevIndexF"
    },
    {
      "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00/PCIeFunctions/DevType3_OCP1_DevIndexE"
    },
    {
      "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00/PCIeFunctions/DevType3_OCP1_DevIndexC"
    }
  ],
  "PCIeFunctions@odata.count": 4
},
"Manufacturer": "14E41657",
"Name": "00_01_00",
"Status": {
  "Health": "OK",
  "State": "Enabled"
}

```

}

GET – PCIe Function Collection

Dependence

1. It displays the collection of PCIeFunctions resource instances available under the PCIeDevice.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Request

GET https://{ip}/redfish/v1/Chassis/Self/PCIeDevices/{PCIeDeviceInstance}/PCIeFunctions

Content-Type: application/json

GET – PCIe Function Instance

Dependence

1. This is the schema definition for the PCIeFunction resource.
2. It represents the properties of a PCIeFunction attached to a System.
3. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{ip}/redfish/v1/Chassis/Self/PCIeDevices/{PCIeDevices_instance}/PCIeFunctions/{PCIeFunctions_instance}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 85. PCIe Function Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
Status	Object	True	See Table 11 “Resource Complex Types” on page 14 . PCIeFunction will take the State & Health values as per the parent PCIe Device.
FunctionId	Number	True	The the PCIe Function identifier.
FunctionType		True	The value of this property shall be the function type of the PC device function such as Physical or Virtual.

Table 85. PCIe Function Properties (continued)

DeviceClass		True	The value of this property shall be the device class of the PCIe device function such as Storage, Network, Memory etc.	
Deviceld	String	True	The Device ID of this PCIe function.	
VendorId	String	True	The Vendor ID of this PCIe function.	
ClassCode	String	True	The Class Code of this PCIe function.	
RevisionId	String	True	The Revision ID of this PCIe function.	
SubsystemId	String	True	The Subsystem ID of this PCIe function.	
Subsystem VendorId	String	True	The Subsystem Vendor ID of this PCIe function.	
Actions	Object	True	AmiBios.ChangeState is the only action under Oem. Note: This action is supported by ami_bios DRE using HostInterface communication. This Action will be supported only for some PCleFunctions based on the server configurations.	
Links	Object		The links object contains the links to other resources that are related to this resource.	
			Name	Type Read Only Description
			Oem	Object See Table 11 “Resource Complex Types” on page 14.
			Drives	Array True An array of references to the drives which the PCIe device produces.
			Drives@odata.count	Number True An integer representing the number of items in a collection.
			StorageControllers	Array True An array of references to the storage controllers which the PCIe device produces.
			StorageControllers@odata.count	Number True An integer representing the number of items in a collection.
			EthernetInterfaces	Array True An array of references to the ethernet interfaces which the PCIe device produces.
			EthernetInterfaces@odata.count	Number True An integer representing the number of items in a collection.
			NetworkDeviceFunctions	Array True An array of references to the Network Device Functions which the PCIe device produces. Currently, BIOS doesn't populate this data.
			NetworkDeviceFunctions@odata.count	Number True An integer representing the number of items in a collection.
			PCleDevice	Object True The value of this property shall be a reference to the resource that this function is a part of and shall reference a resource of type PCIe Device.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#PCIeFunction.PCIeFunction",
  "@odata.etag": "\"1619171734\"",
  "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00/PCIeFunctions/DevType3_OCP1_DevIndexF",
  "@odata.type": "#PCIeFunction.v1_2_2.PCIeFunction",
  "Actions": {
    "Oem": {
      "#AmiBios.ChangeState": {
        "State@Redfish.AllowableValues": [
          "Enabled",
          "Disabled"
        ],
        "target": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00/PCIeFunctions/DevType3_OCP1_DevIndexF/Actions/AmiBios.ChangeState"
      }
    }
  },
  "ClassCode": "0x020000",
  "Description": "14E4 1657 UNCL Slot 10",
  "DeviceClass": "NetworkController",
  "DeviceId": "0x1657",
  "FunctionId": 3,
  "Id": "DevType3_OCP1_DevIndexF",
  "Links": {
    "EthernetInterfaces": [
      {
        "@odata.id": "/redfish/v1/Systems/Self/EthernetInterfaces/EthernetInterface3"
      }
    ],
    "EthernetInterfaces@odata.count": 1,
  },
}
```

```

    "NetworkDeviceFunctions": [
      {
        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC3/NetworkDeviceFunctions/NetworkDeviceFunction3"
      }
    ],
    "NetworkDeviceFunctions@odata.count": 1,
    "PCIeDevice": {
      "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00"
    }
  },
  "Name": "DevType3_OCP1_DevIndexF",
  "RevisionId": "0x01",
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  },
  "SubsystemId": "0x4104",
  "SubsystemVendorId": "0x17AA",
  "VendorId": "0x14E4"
}

```

GET – PCIe Slots

Dependence

1. **PCIESlots** contains set of PCIe slot information.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Chassis/{{chassis_instance}}/PCIESlots

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table

Table 86. PCIeSlots Properties

Name	Type	Read only	Description																																
(OData Attributes)			Refer to “OData Support” on page 5																																
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14																																
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12																																
Name(M)	String	True																																	
Description	String	True																																	
HotPluggable	Boolean	True	Indicates whether the PCIe slot supports hotplug.																																
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.																																
Slots	Array	True	<p>The PCI Slots information.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr> <tr> <td>Lanes</td><td>Number</td><td>True</td><td>Maximum number of PCIe lanes supported by the slot.</td></tr> <tr> <td>Links</td><td>Object</td><td></td><td>See Table 87 “Links Properties” on page 185.</td></tr> <tr> <td>Location</td><td>Object</td><td></td><td>See Table 12 “Resource.v1_8_1 schema property” on page 14.</td></tr> <tr> <td>Oem</td><td>Object</td><td></td><td>Refer to Table 11 “Resource Complex Types” on page 14</td></tr> <tr> <td>PCleTypes</td><td>String</td><td>True</td><td>PCIe Specification supported by this slot.</td></tr> <tr> <td>SlotType</td><td>String</td><td>True</td><td>PCIe Slot type for this slot.</td></tr> <tr> <td>Status</td><td>Object</td><td>True</td><td>Refer to Table 11 “Resource Complex Types” on page 14</td></tr> </table>	Name	Type	Read only	Description	Lanes	Number	True	Maximum number of PCIe lanes supported by the slot.	Links	Object		See Table 87 “Links Properties” on page 185 .	Location	Object		See Table 12 “Resource.v1_8_1 schema property” on page 14 .	Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14	PCleTypes	String	True	PCIe Specification supported by this slot.	SlotType	String	True	PCIe Slot type for this slot.	Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14
Name	Type	Read only	Description																																
Lanes	Number	True	Maximum number of PCIe lanes supported by the slot.																																
Links	Object		See Table 87 “Links Properties” on page 185 .																																
Location	Object		See Table 12 “Resource.v1_8_1 schema property” on page 14 .																																
Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14																																
PCleTypes	String	True	PCIe Specification supported by this slot.																																
SlotType	String	True	PCIe Slot type for this slot.																																
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14																																

Table 87. Links Properties

Name	Type	Read only	Description
Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14
PCleDevice	Array	True	PCIe Devices connected in this slot.
PCleDevice@odata.count	Number	True	The number of items in PCIeDevices.

Chapter 15. Host — Network Adapters

GET – Network Adapter Collection

Dependence

1. It displays the collection of network adapter resource instances available in the system.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{ip}/redfish/v1/Chassis/Self/NetworkAdapters

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@Message.ExtendedInfo": [
    {
      "@odata.type": "#Message.v1_0_7.Message",
      "Message": "The BIOS Inventory data was partially populated
due to CONF space limitation or due to timeout between BIOS, BMC communication",
      "MessageId": "Ami.1.0.InventoryDataIncomplete",
      "Resolution": "Clean up Redfish/BMC data",
      "Severity": "Critical"
    }
  ],
  "@odata.context": "/redfish/v1/$metadata#NetworkAdapterCollection.NetworkAdapterCollection",
  "@odata.etag": "\"1619160747\"",
  "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters",
  "@odata.type": "#NetworkAdapterCollection.NetworkAdapterCollection",
  "Description": "The Collection of Network Adapters",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC2"
```

```

    },
    {
        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC1"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC3"
    }
],
"Members@odata.count": 4,
"Name": "NetworkAdapter Collection"
}

```

GET – Network Adapter Instance

Dependence

1. An Instance of Network Adapter represents the physical network adapter capable of connecting to a computer network.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Chassis/Self/NetworkAdapters/{{NetworkAdapter_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 88. NetworkAdapter Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	

Table 88. NetworkAdapter Properties (continued)

Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.
Manufacturer	String	True	The manufacturer or OEM of this network adapter.
Model	String	True	The model string for this network adapter.
SKU	String	True	The manufacturer SKU for this network adapter.
SerialNumber	String	True	The serial number for this network adapter.
PartNumber	String	True	Part number for this network adapter.
Controllers	Array		The set of network controllers ASICs that make up this NetworkAdapter. Refer to Table 89 “Controller Properties” on page 189.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.
NetworkDevice Functions(N)	Object	True	Contains a reference to the members of NetworkDeviceFunctionCollection .
NetworkPorts(N)	Object	True	Contains a reference to the members of NetworkPortCollection .
Assembly	Object	True	The link to the assembly Resource associated with this adapter. Platform specific porting needed.

Table 89. Controller Properties

Name	Type	Read only	Description												
FirmwarePackage Version	String	True	Resource Identifier												
Location	Object	True	See Table 12 “Resource.v1_8_1 schema property” on page 14.												
PCIeInterface	Object	True	The PCIe interface details for this controller. See Table 84 “PCIe Interface Properties” on page 179.												
Identifiers	Object	True	The Durable names for the network adapter. <table border="1"> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr> <tr> <td>DurableName</td><td>String</td><td>True</td><td>This indicates the worldwide, persistent name of the resource.</td></tr> <tr> <td>DurableName Format</td><td>String</td><td>True</td><td>This represents the format of the DurableName property.</td></tr> </table>	Name	Type	Read only	Description	DurableName	String	True	This indicates the worldwide, persistent name of the resource.	DurableName Format	String	True	This represents the format of the DurableName property.
Name	Type	Read only	Description												
DurableName	String	True	This indicates the worldwide, persistent name of the resource.												
DurableName Format	String	True	This represents the format of the DurableName property.												
Links	String	True	Links for this controller. <table border="1"> <tr> <th>Name</th><th>Type</th><th>Read Only</th><th>Description</th></tr> <tr> <td>PCIeDevices @odata.count</td><td>Number</td><td>True</td><td>An integer representing the number of items in a collection. Note: Require PCIe support, only northBound available.</td></tr> <tr> <td>PCIeDevices</td><td>Array</td><td></td><td>An array of references to the PCIeDevice collection. Note: Require PCIe support, only north bound available.</td></tr> </table>	Name	Type	Read Only	Description	PCIeDevices @odata.count	Number	True	An integer representing the number of items in a collection. Note: Require PCIe support, only northBound available.	PCIeDevices	Array		An array of references to the PCIeDevice collection. Note: Require PCIe support, only north bound available.
Name	Type	Read Only	Description												
PCIeDevices @odata.count	Number	True	An integer representing the number of items in a collection. Note: Require PCIe support, only northBound available.												
PCIeDevices	Array		An array of references to the PCIeDevice collection. Note: Require PCIe support, only north bound available.												

Table 89. Controller Properties (continued)

			Oem	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.
			NetworkPorts	Array	True	An array of links to the NetworkPorts associated with this Network Controller.
			NetworkPorts@odata.count	Number	True	An integer representing the number of items in a collection.
			NetworkDeviceFunctions@odata.count	Number	True	An integer representing the number of items in a collection.
			NetworkDeviceFunctions	Array		An array of references to the NetworkDeviceFunctions .
Controller Capabilities	String	True	Description of the Resource			
			Name	Type	Read Only	Description
			NetworkPortCount	Number	True	The number of physical ports on this controller.
			NetworkDeviceFunctionCount	Number	True	The maximum number of physical functions available on this controller.
			DataCenterBridging	Object		This object shall contain capability, status, and configuration values related to Data Center Bridging (DCB) for this controller. Name: Capable Type: Boolean Read only: True Description: Whether this controller is capable of Data Center Bridging (DCB).
			VirtualizationOffload	Object		This object shall contain capability, status, and configuration values related to virtualization offload for this controller. Refer to Table 90 “VirtualizationOffload Properties.” on page 191
			NPAR	Object		NIC Partitioning (NPAR) capabilities for this controller. Refer to NPAR Properties .
			NPIV	Object		N_Port ID Virtualization (NPIV) capabilities for this controller. Refer to NPIV Properties .

Table 90. VirtualizationOffload Properties

Name	Type	Read only	Description			
VirtualFunction	Object	True				
			Name	Type	Read Only	Description
			Device MaxCount	Number	True	The maximum number of Virtual Functions (VFs) supported by this controller.
			NetworkPort MaxCount	Number	True	The maximum number of Virtual Functions (VFs) supported per network port for this controller.
			Min Assignment GroupSize	Number	True	The minimum number of Virtual Functions (VFs) that can be allocated or moved between physical functions for this controller.
SRIOV	String	True	Single-Root Input/Output Virtualization (SR-IOV) capabilities.			
			Name	Type	Read Only	Description
			SRIOVVEPA Capable	Boolean	True	Whether this controller supports Single Root Input/Output Virtualization (SR-IOV) in Virtual Ethernet Port Aggregator (VEPA) mode

Table 91. NPAR Properties

Name	Type	Read only	Description
NparCapable	Boolean	True	Indicates whether or not NIC function partitioning is support by a controller.
NparEnabled	Boolean	True	When true, NIC function partitioning is active on this controller.

Table 92. NPIV Properties

Name	Type	Read only	Description
MaxDeviceLogins	Number	True	The maximum number of N_Port ID Virtualization (NPIV) logins allowed simultaneously from all ports on this controller.
MaxPortLogins	Number	True	The maximum number of N_Port ID Virtualization (NPIV) logins allowed per physical port on this controller.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#NetworkAdapter.NetworkAdapter",
  "@odata.etag": "\"1618913716\"",
  "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0",
```

```

"@odata.type": "#NetworkAdapter.v1_2_1.NetworkAdapter",
"Controllers": [
  {
    "ControllerCapabilities": {
      "NetworkDeviceFunctionCount": 1,
      "NetworkPortCount": 1
    },
    "Links": {
      "NetworkDeviceFunctions": [
        {
"@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkDeviceFunctions/NetworkDeviceFunction0"
        }
      ],
      "NetworkDeviceFunctions@odata.count": 1,
      "NetworkPorts": [
        {
          "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkPorts/
DevType7_SlotA_Instance0_PORT0"
        }
      ],
      "NetworkPorts@odata.count": 1,
      "PCIeDevices": [
        {
          "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00"
        }
      ],
      "PCIeDevices@odata.count": 1
    },
    "PCIeInterface": {
      "LanesInUse": 0,
      "MaxPCIeType": "Gen1",

```

```

        "PCIeType": "Gen1"
    }
}
],
"Id": "DevType7_NIC0",
"Name": "DevType7_NIC0",
"NetworkDeviceFunctions": {
    "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkDeviceFunctions"
},
"NetworkPorts": {
    "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkPorts"
},
"Status": {
    "Health": "OK",
    "State": "Disabled"
}
}

```

GET – Network Device Function Collection

Dependence

1. It displays the collection of NetworkDeviceFunction resource instances.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request URI

GET https://{ip}/redfish/v1/Chassis/Self/NetworkAdapters/{NetworkAdapter_instance}/NetworkDeviceFunctions

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```

{
    "@Message.ExtendedInfo": [
        {
            "@odata.type": "#Message.v1_0_7.Message",

```

```

        "Message": "The BIOS Inventory data was partially populated due to CONf space limitation
or due to timeout between BIOS, BMC communication",

        "MessageId": "Ami.1.0.InventoryDataIncomplete",

        "Resolution": "Clean up Redfish/BMC data",

        "Severity": "Critical"
    }
],

"@odata.context": "/redfish/v1/$metadata#NetworkDeviceFunctionCollection.NetworkDeviceFunctionCollection",

"@odata.etag": "\"1619160747\"",

"@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkDeviceFunctions",

"@odata.type": "#NetworkDeviceFunctionCollection.NetworkDeviceFunctionCollection",

"description": "The Collection of Network Device Functions",

"Members": [

    {

        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkDeviceFunctions/
NetworkDeviceFunction0"

    }

],

"Members@odata.count": 1,

"Name": "NetworkDeviceFunction Collection"
}

```

GET – Network Device Function Instance

Dependence

1. A Network Device Function represents a logical interface exposed by the network adapter.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Chassis/Self/NetworkAdapters/{{NetworkAdapter_instance}}/NetworkDeviceFunctions/{{NetworkDeviceFunctions_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 93. NetworkDeviceFunction

Name	Type	Read only	Description			
(OData Attributes)			Refer to “OData Support” on page 5			
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14			
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12			
Name(M)	String	True				
Description	String	True				
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.			
NetDevFuncType	String	True	The configured capability of this network device function.			
			Enum	Description		
			Disabled	Neither enumerated nor visible to the operating system.		
			Ethernet	Appears to the operating system as an Ethernet device.		
			FibreChannel	Appears to the operating system as a Fibre Channel device.		
			iSCSI	Appears to the operating system as an iSCSI device.		
			FibreChannel OverEthernet	Appears to the operating system as an FCoE device.		
DeviceEnabled	Boolean	True	Whether the network device function is enabled. Disabled network device functions shall not be enumerated or seen by the operating system.			
NetDevFunc Capabilities	Array	True	Capabilities of this network device function. Array Items are of Type NetDevFuncType.			
Ethernet	Object		This object shall contain Ethernet capabilities, status, and configuration values for this network device function.			
			Name	Type	Read Only	Description
			Permanent MACAddress	String	True	This is the permanent MAC address assigned to this network device function (physical function).
			MACAddress	String	False	This is the currently configured MAC address of the (logical port) network device function.
			VLANs	Object	True	This is a reference to a collection of VLANs and is only used if the interface supports more than one VLANs. See Table 94 “VLAN Properties” on page 197.
			MTUSize	Number	False	The Maximum Transmission Unit (MTU) configured for this network device function.
iSCSIBoot	Object		<p>This object shall contain iSCSI boot capabilities, status, and configuration values for this network device function.</p> <p>See Table 95 “iSCSI Boot Properties” on page 197.</p> <p>Note: The iSCSIBoot attributes can be deleted / removed by patching null value to each property inside iSCSIBoot object.</p>			

Table 93. NetworkDeviceFunction (continued)

FibreChannel	Object		This object shall contain Fibre Channel capabilities, status, an configuration values for this network device function. See Table 96 “Fibre Channel Properties” on page 198.			
BootMode	String	False	The boot mode configured for this network device function.			
			Enum	Description		
			Disabled	Do not indicate to UEFI/BIOS that this device is bootable.		
			PXE	Boot this device using the embedded PXE support. Only applicable if the NetworkDeviceFunctionType is set to Ethernet		
			iSCSI	Boot this device using the embedded iSCSol obt support and configuration. Only applicable if the NetworkDeviceFunctionType is set to iSCSI.		
			FibreChannel	Boot this device using the embedded Fibre Channel support and configuration. Only applicable if the NetworkDeviceFunctionType is set to FibreChannel.		
			FibreChannel OverEthernet	Boot this device using the embedded Fibre Channel over Ethernet (FCoE) boot support and configuration. Only applicable if the NetworkDeviceFunctionType is set to FibreChannelOverEthernet.		
VirtualFunctions Enabled	Boolean	True	Whether Single Root I/O Virtualization (SR-IOV) Virtual Functions (VFs) are enabled for this Network Device Function.			
MaxVirtual Functions	Number	True	The number of virtual functions (VFs) that are available for this Network Device Function.			
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.			
Assignable PhysicalPorts	Array	True	An array of physical ports to which this network device function may be assigned.			
Assignable PhysicalPorts @odata.count	Number	True	Number of AssignablePhysicalPorts available.			
Links	Object	True	Links for this controller.			
			Name	Type	Read Only	Description
			Endpoints @odata.count	Number	True	An integer representing the number of items in a collection.
			Endpoints	Array	True	An array of references to endpoints associated with this network device function. The type shall contain an array property who's members reference resources, of type Endpoint, which are associated with this network device function.
			PhysicalPort Assignment	Object	True	The physical port that this network device function is currently assigned to.
			PCleFunction	Object	True	A reference to the collection of members of this collection. Note: Will be populated through Host Interface.

Table 94. VLAN Properties

Name	Type	Read only	Description
VLANId	Number	False	This indicates the VLAN identifier for this VLAN. Minimum value: 0 Maximum value: 4094
VLANEnable	boolean	False	This indicates if this VLAN is enabled.

Table 95. iSCSI Boot Properties

Name	Type	Read only	Description	
IPAddressType	String	False	Allowable values are as following Note: Redfish.AllowableValues array should always be shown to indicate the supported allow values.	
			Enum	Description
			IPv4	IPv4 addressing is used for all IP-fields in this object.
			IPv6	IPv6 addressing is used for all IP-fields in this object.
Initiator IPAddress	String	False	The type of IP address (IPv6 or IPv4) being populated in the iSCSIBoot IP address fields.	
InitiatorName	String	False	The iSCSI boot initiator name.	
InitiatorDefault Gateway	String	False	The IPv6 or IPv4 iSCSI boot default gateway.	
InitiatorNetmask	String	False	The IPv6 or IPv4 netmask of the iSCSI boot initiator.	
TargetInfoViaDHCP	Boolean	False	Whether the iSCSI boot target name, LUN, IP address, and netmask should be obtained from DHCP.	
PrimaryTargetName	String	False	The name of the iSCSI primary boot target.	
PrimaryTarget IPAddress	String	False	The IP address (IPv6 or IPv4) for the primary iSCSI boot target.	
PrimaryTarget TCPPort	Number	False	The TCP port for the primary iSCSI boot target.	
PrimaryLUN	Number	False	The logical unit number (LUN) for the primary iSCSI boot target.	
PrimaryVLANEnable	Boolean	False	This indicates if the primary VLAN is enabled.	
PrimaryVLANId	Number	False	The 802.1qVLAN ID to use for iSCSI boot from the primary target. Minimum = "0" Maximum = "4094"	
PrimaryDNS	String	False	The IPv6 or IPv4 address of the primary DNS server for the iSCSI boot initiator.	
Secondary TargetName	String	False	The name of the iSCSIsecondary boot target.	
Secondary TargetIPAddress	String	False	The IP address (IPv6 or IPv4) for the secondary iSCSI boot target.	

Table 95. iSCSI Boot Properties (continued)

SecondaryTargetTCPPort	Number	False	The TCP port for the secondary iSCSI boot target.	
SecondaryLUN	Number	False	The logical unit number (LUN) for the secondary iSCSI boot target.	
SecondaryVLANEnable	Boolean	False	This indicates if the secondary VLAN is enabled.	
SecondaryVLANId	Number	False	The 802.1q VLAN ID to use for iSCSI boot from the seconda target. Minimum = "0" Maximum ="4094"	
SecondaryDNS	String	False	The IPv6 or IPv4 address of the secondary DNS server for the iSCSI boot initiator.	
IPMaskDNSViaDHCP	Boolean	False	Whether the iSCSI boot initiator uses DHCP to obtain the iniator name, IP address, and netmask.	
RouterAdvertisementEnabled	Boolean	False	Whether IPv6 router advertisement is enabled for the iSCSI boot target.	
AuthenticationMethod	String	False	The iSCSI boot authentication method for this network device function. Allowable values are as following Note: Redfish.AllowableValues array should always be shown to indicate the supported allow values.	
			Enum	Description
			None	No iSCSI authentication is used.
			CHAP	iSCSI Challenge Handshake Authentication Protocol (CHAP) authentication is used.
			Mutual CHAP	iSCSI Mutual Challenge Handshake Authentication Protocol (CHAP) authentication is used.
CHAPUsername	String	False	The username for CHAP authentication.	
CHAPSecret	String	False	The shared secret for CHAP authentication.	
MutualCHAPUsername	String	False	The CHAP Username for 2-way CHAP authentication.	
MutualCHAPSecret	String	False	The CHAP Secret for 2-way CHAP authentication.	

Table 96. Fibre Channel Properties

Name	Type	Read only	Description
PermanentWWPN	String	True	The value of this property shall be the permanent World-Wide Port Name (WWPN) of this network device function (physical function). This value is typically programmed during the manufacturing time. This address is not assignable.
PermanentWWNN	String	True	"The value of this property shall be the permanent World-Wide Node Name (WWNN) of this network device function (physical function). This value is typically programmed during the manufacturing time. This address is not assignable.
FibreChannelId	String	True	The Fibre Channel Id assigned by the switch for this interface.

Table 96. Fibre Channel Properties (continued)

WWPN	String	False	The value of this property shall be the effective current World - Wide Port Name (WWPN) of this network device function (physical function). If an assignable WWPN is not supported, this is a read only alias of the Permanent WWPN.			
WWNN	String	False	The value of this property shall be the effective current Wo-rld Wide Node Name (WWNN) of this network device function (physical function). If an assignable WWNN is not supported, this is a read only alias of the Permanent WWNN.			
WWNSource	String	False	The configuration source of the WWNs for this connection (WWPN and WWNN).			
			Enum		Description	
			ConfiguredLocally		The set of FC/FCoE boot targets was applied locally through API or UI.	
			ProvidedByFabric		The set of FC/FCoE boot targets was applied by the Fibre Channel fabric.	
FCoELocalVLANId	Number	False	For FCoE connections, the value of this property shall be the VLAN ID configured locally by setting this property. This value shall be used for FCoE traffic to this network device function during boot unless Allow FIPVLANDiscovery is true and a vali FCoE VLAN ID is found via the FIP VLAN Discovery Protocol. Minimum = "0" Maximum = "4094"			
AllowFIPVLANDiscovery	Boolean	False	For FCoE connections, the value of this property shall be a boolean indicating whether the FIP VLAN Discovery Protocol is used to determine the FCoE VLAN ID selected by the network device function for the FCoE connectionl.f true, and the FIP VLAN Discovery succeeds, the FCoEActiveVLANId property shall reflect the FCoE VLAN ID to be used for all FCoE traffic. If false, or if the FIP VLAN Discovery protocol fails, the FCoELocalVLANId shall be used for all FCoE traffic and the FCoEActiveVLANId shall reflect the FCoELocalVLANId.			
FCoEActiveVLANId	Number	True	For FCoE connections, the value of this property shall be null or a VLAN ID currently being used for FCoE traffic. When the FCoE link is down this value shall be null. When the FCoE link is up this value shall be either the FCoELocalVLANId property or a VLAN discovered via the FIP protocol. Minimum = "0" Maximum = "4094"			
BootTargets	Array	False	An array of Fibre Channel boot targets configured for this network device function.			
			Name	Type	Read Only	Description
			WWPN	String	False	The World-Wide Port Name to boot from.
			LUNID	String	False	The Logical Unit Number (LUN) ID to boot from on the device referred to by the corresponding WWPN.

Table 96. Fibre Channel Properties (continued)

			BootPriority	Number	False	The value of this property shall be the relative priority for this entry in the boot targets array. Lower numbers shall represent higher priority, with zero being the highest priority. The BootPriority shall be unique for all entries of the BootTargets array.
--	--	--	--------------	--------	-------	---

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#NetworkDeviceFunction.NetworkDeviceFunction",
  "@odata.etag": "\"1618913716\"",
  "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkDeviceFunctions/NetworkDeviceFunction0",
  "@odata.type": "#NetworkDeviceFunction.v1_3_2.NetworkDeviceFunction",
  "AssignablePhysicalPorts": [
    {
      "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkPorts/DevType7_SlotA_Instance0_PORT0"
    }
  ],
  "BootMode@Redfish.AllowableValues": [
    "Disabled",
    "PXE",
    "iSCSI",
    "FibreChannel",
    "FibreChannelOverEthernet"
  ],
  "Ethernet": {
    "MACAddress": "B0:26:28:E5:24:88",
    "MTUSize": 1500,
    "PermanentMACAddress": "B0:26:28:E5:24:88"
  },
  "FibreChannel": {
    "WWNSource@Redfish.AllowableValues": [
```

```

        "ConfiguredLocally",
        "ProvidedByFabric"
    ]
},
"Id": "NetworkDeviceFunction0",
"Links": {
    "Endpoints@odata.count": 0,
    "PCIeFunction": {
        "@odata.id": "/redfish/v1/Chassis/Self/PCIeDevices/00_01_00/PCIeFunctions/DevType3_OCP1_DevIndex10"
    },
    "PhysicalPortAssignment": {
        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkPorts/DevType7_SlotA_Instance0_PORT0"
    }
},
"Name": "NetworkDeviceFunction0",
"NetDevFuncType@Redfish.AllowableValues": [
    "Disabled",
    "Ethernet",
    "FibreChannel",
    "iSCSI",
    "FibreChannelOverEthernet"
],
"iSCSIBoot": {
    "AuthenticationMethod@Redfish.AllowableValues": [
        "None",
        "CHAP",
        "MutualCHAP"
    ],
    "IPAddressType@Redfish.AllowableValues": [
        "IPv4",

```

```

        "IPv6"
    ]
}
}

```

GET – Network Port Collection

Dependence

1. It displays the collection of Network Port resource instances available in the system.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Chassis/Self/NetworkAdapters/{{NetworkAdapter_instance}}/NetworkPorts

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```

{
    "@Message.ExtendedInfo": [
        {
            "@odata.type": "#Message.v1_0_7.Message",
            "Message": "The BIOS Inventory data was partially populated due to CONf space limitation or due to timeout between BIOS, BMC communication",
            "MessageId": "Ami.1.0.InventoryDataIncomplete",
            "Resolution": "Clean up Redfish/BMC data",
            "Severity": "Critical"
        }
    ],
    "@odata.context": "/redfish/v1/$metadata#NetworkPortCollection.NetworkPortCollection",
    "@odata.etag": "\"1619160747\"",
    "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkPorts",
    "@odata.type": "#NetworkPortCollection.NetworkPortCollection",
    "Description": "The Collection Network Ports",
    "Members": [

```



```

    {
        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkPorts/
DevType7_SlotA_Instance0_PORT0"
    }
],
"Members@odata.count": 1,
"Name": "NetworkPort Collection"
}

```

GET – Network Port Instance

Dependence

1. A Network Port represents a discrete physical port capable of connecting to a network.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Chassis/Self/NetworkAdapters/{{NetworkAdapter_instance}}/NetworkPorts/{{NetworkPort_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 97. Network Port Instance Properties

Name	Type	Read only	Description	
(OData Attributes)			Refer to “OData Support” on page 5	
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14	
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12	
Name(M)	String	True		
Description	String	True		
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14	
PhysicalPort Number	String	True	The physical port number label for this port.	
LinkStatus	Object	True	The status of the link between this port and its link partner.	
			Enum	Description
			Down	The port is enabled but link is down.
			Up	The port is enabled and link is good (up).

Table 97. Network Port Instance Properties (continued)

SupportedLink Capabilities	Array of Objects	True	This object shall describe the static capabilities of the port, irrespective of transient conditions such as cabling, interface module presence, or remote link parter status or configuration.				
			Name	Type	Read Only	Description	
			LinkNetwork Technology	String	True	The self-described link network technology capabilities of this port.	
						Enum	Description
						Ethernet	The port is capable of connecting to an Ethernet network.
						InfiniBand	The port is capable of connecting to an InfiniBand network.
			Fibre Channel	The port is capable of connecting to a Fibre Channel network.			
CapableLink SpeedMbps	Number	True	The set of link speed capabilities of this port.				
AutoSpeed Negotiation	Boolean	True	An indication of whether the port is capable of aut-o negotiating speed.				
ActiveLink Technology	String	True	Network Port Active Link Technology.				
			Enum	Description			
			Ethernet	The port is capable of connecting to an Ethernet network.			
			InfiniBand	The port is capable of connecting to an InfiniBand network.			
			FibreChannel	The port is capable of connecting to a Fibre Channel network.			
Supported Ethernet Capabilities	String	True	The value of this property shall be an array of zero or more Ethernet capabilities supported by this port.				
			Enum	Description			
			WakeOnLAN	Wake on LAN (WoL) is supported on this port.			
			EEE	IEEE 802.3az Energy Efficient Ethernet (EEE) is supported on this port.			
NetDevFunc MinBWAlloc	Array of Objects	True	The array of minimum bandwidth allocation percentages for the Network Device Functions associated with this port.				
			Name	Type	Read Only	Description	
			MinBWAlloc Percent	Number	True	The minimum bandwidth allocation percentage allocated to the corresponding network device function instance.	
			Network Device Function	Object	True	Contains the members of this collection.	
NetDevFunc MaxBWAlloc	Object	True	The array of maximum bandwidth allocation percentages for the Network Device Functions associated with this port.				

Table 97. Network Port Instance Properties (continued)

			Name	Type	Read Only	Description
			MaxBWAlloc Percent	Number	True	The maximum bandwidth allocation percentage allocated to the corresponding network device function instance.
			Network Device Function	Object	True	Contains the members of this collection.
Associated Network Addresses	Array	True	The array of configured network addresses (MAC or WWN) that are associated with this Network Port, including the programmed address of the lowest numbered Network Device Function, the configured but not active address if applicable, the address for hardware port teaming, or other network addresses.			
EEEEnabled	Boolean	True	Whether IEEE 802.3az Energy Efficient Ethernet (EEE) is enabled for this network port.			
WakeOnLAN Enabled	Boolean	True	Whether Wake on LAN (WoL) is enabled for this network port.			
Port MaximumMTU	Number	True	The value of this property shall be the largest maximum transmission unit (MTU) that can be configured for this network port.			
FlowControl Status	String	True	The value of this property shall be the 802.3x flow control behavior negotiated with the link partner for this network port (Ethernet-only). Enums are same as FlowControlConfiguration given below.			
FlowControl Configuration	String	True	The value of this property shall be the locally configured 802.3x flow control setting for this network port.			
			Enum	Description		
			None	No IEEE 802.3x flow control is enabled on this port		
			TX	IEEE 802.3x flow control may be initiated by this station.		
			RX	IEEE 802.3x flow control may be initiated by the link partner.		
			TX_RX	IEEE 802.3x flow control may be initiated by this station or the link partner.		
SignalDetected	Boolean	True	The value of this property shall be a boolean indicating whether the port has detected enough signal on enough lanes to establish link.			
CurrentLink SpeedMbps	Number	True	The value of this property shall be the current configured link speed of this port.			
FCFabricName	String	True	The FC Fabric Name provided by the switch.			
FCPort ConnectionType	String	True	This is the connection type of this port.			
			Enum	Description		
			ExtenderFabric	This port connection type is an extender fabric port.		
			Generic	This port connection type is a generic fabric port.		
			NPort	This port connects via an N-Port to a switch.		
			NotConnected	This port is not connected.		
			PointToPoint	This port connects in a Point-to-point configuration.		
			PrivateLoop	This port connects in a private loop configuration.		
			PublicLoop	This port connects in a public configuration.		

Table 97. Network Port Instance Properties (continued)

MaxFrameSize	Number	True	The maximum frame size supported by the port.
Number Discovered RemotePorts	Number	True	The number of ports not on this adapter that this port has discovered.
VendorId	String	True	The Vendor Identification for this port.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#NetworkPort.NetworkPort",
  "@odata.etag": "\"1618913716\"",
  "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkPorts/DevType7_SlotA_Instance0_PORT0",
  "@odata.type": "#NetworkPort.v1_2_2.NetworkPort",
  "ActiveLinkTechnology": "Ethernet",
  "ActiveLinkTechnology@Redfish.AllowableValues": [
    "Ethernet",
    "InfiniBand",
    "FibreChannel"
  ],
  "AssociatedNetworkAddresses": [
    "B0:26:28:E5:24:88"
  ],
  "FlowControlConfiguration@Redfish.AllowableValues": [
    "None",
    "TX",
    "RX",
    "TX_RX"
  ],
  "Id": "DevType7_SlotA_Instance0_PORT0",
  "LinkStatus": "Down",
  "Name": "DevType7_SlotA_Instance0_PORT0",
  "PhysicalPortNumber": "PortNumber_1",
```

```
"PortMaximumMTU": 1500,  
"Status": {  
    "Health": "OK",  
    "State": "Disabled"  
}  
}
```

Chapter 16. BMC — Ethernet

GET – Ethernet Interface Collection

Request

GET https://{ip}/redfish/v1/Managers/{manager_instance}/EthernetInterfaces

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

```
{
  "@odata.context": "/redfish/v1/$metadata#EthernetInterfaceCollection.EthernetInterfaceCollection",
  "@odata.etag": "\"947030781\"",
  "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces",
  "@odata.type": "#EthernetInterfaceCollection.EthernetInterfaceCollection",
  "Description": "Collection of Ethernet Interfaces for this Manager",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces/usb0"
    },
    {
      "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces/eth1"
    },
    {
      "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces/eth0"
    },
    {
      "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces/bond0"
    }
  ],
  "Members@odata.count": 4,
  "Name": "Ethernet Network Interface Collection"
```

}

GET – Ethernet Interface Instance

Request

GET https://{ip}/redfish/v1/Managers/{manager_instance}/EthernetInterfaces/{manager_ethifc_instance}

Content-Type: application/json

Response

1. The response of the request will be in JSON format. The properties are mentioned in the following table.
2. Manager Ethernet Interface typically supports at max one VLAN per interface for a single BMC.

Table 98. Ethernet Interface Properties

Name	Type	Read Only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
UefiDevicePath	String	True	The UEFI devicepath for this interface (port). Platform specific porting needs.
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.
InterfaceEnabled	Boolean	False	This indicates whether this interface is enabled.
Permanent MACAddress	String	True	The value of this property shall be the Permanent MAC Address of this interface (port). This value is typically programmed during the manufacturing time. This address is not assignable.
MACAddress	String	True	<p>The value of this property shall be the effective current MAC Address of this interface. If an assignable MAC address is not supported, this is a read only alias of the PermanentMACAddress.</p> <p>Note: Eventhough the ReadOnly attribute in Redfish schema for managers is specified as "False", in Redfish API, patching MACAddress is not allowed.</p> <p>Changing MACAddress will change the IP address and if user is using redfish in remote with no access to host/BMC, it will be an issue in obtaining new IP address and also change in MACAddress could result mac address collision if there is a device on the local network with the same mac address.</p>
SpeedMbps	Number	False	<p>The current link speed of the interface in Mbps.</p> <p>Note: Platform specific porting needed; require specific platform libraries support and hook between the specific libraries and gami module should be added.; require specific platform libraries support and hook between the specific libraries and gami module should be added, Please refer Manager EthernetInterface under Platform specific Properties in "How to Add OEM extensions" document.</p>
StatelessAddress AutoConfig	Object	False	This object shall contain the IPv4 and IPv6 Stateless Address Automatic Configuration (SLAAC) properties for this interface.

Table 98. Ethernet Interface Properties (continued)

			Name	Type	Read Only	Description
			IPv4AutoConfigEnabled	Boolean	True	This property shall indicate whether IPv4 Stateless Address Au-to Configuration (SLAAC) is enabled for this interface.
			IPv6AutoConfigEnabled	Boolean	True	This property shall indicate whether IPv6 Stateless Address Au-to Configuration (SLAAC) is enabled for this interface.
AutoNeg	Boolean	False	The value of this property shall be true if auto negotiation of speed and duplex is enabled on this interface and false if it is disabled.			
FullDuplex	Boolean	False	The value of this property shall represent the duplex status of the Ethernet connection on this interface.			
MTUSize	Number	False	<p>The value of this property shall be the size in bytes of largest Protocol Data Unit (PDU) that can be passed in an Ethernet (MAC) frame on this interface..</p> <p>MTU (Maximum Transmission Unit.)</p> <p>Maximum size limit is 1500</p> <p>Minimum size limit is 576</p>			
HostName	String	False	<p>DNS Hostname without any domain information.</p> <p>Maximum string size limit is 64</p> <p>Minimum string size limit is 2</p>			
FQDN	String	False	<p>This is the complete, fully qualified domain name obtained by DNS for this interface.</p> <p>Note: DomainName should contain minimum two words with "." seperated.</p>			
MaxIPv6StaticAddresses	Number	True	This indicates the number of array items supported by Ipv6StaticAddresses.			
VLAN	Object	False	If this Network Interface supports more than one VLAN, this property will not be present and the client should look for VLAN collection in the link Section of this resource.			
			Name	Type	Read Only	Description
			VLANEnable	Boolean	False	This indicates if this VLAN is enabled.
			VLANId	Number	False	This indicates the VLAN identifier for this VLAN. Minium value : 0 and Maximum value: 4094.
Ipv4Addresses	Array of Objects	True	This array of objects represents all of the Ipv4 static addresses to be assigned on this interface. Refer to Ipv4 Addresses Properties .			
Ipv6Addresses	Array of Objects	True	This array of objects enumerates all of the currently assigned Ipv6 addresses on this interface. Refer to Ipv6 Addresses Properties .			
Ipv6DefaultGateway	String	True	This is the Ipv6 default gateway address that is currently in use on this interface.			

Table 98. Ethernet Interface Properties (continued)

NameServers	Array [Items of type String]	True	This represents DNS name servers that are currently in use on this interface.	
StaticNameServers	Array [Items of type String]	False	Statically-defined set of DNS server IPv4 and IPv6 addresses.	
VLANs(N)	Object	True	This is a reference to a collection of VLANs and is only used if the interface supports more than one VLANs.	
LinkStatus	String	True	The value of this property shall be the link status of this interface(port).	
			Enum	Description
			LinkUp	The link is available for communication on this interface.
			NoLink	There is no link or connection detected on this interface.
			LinkDown	There is no link on this interface, but the interface is connected.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.	
DHCPv4	Object	False	This property shall contain the configuration of DHCP v4 as given in DHCPv4 properties .	
DHCPv6	Object	False	This property shall contain the configuration of DHCP v6 as given in DHCPv6 properties .	
IPv6StaticDefault Gateways	Array	False	The values in this array shall represent the IPv6 static default gateway addresses for this interface.	
IPv6Static Addresses	Array of Objects	False	The value of this property shall be an array of objects used to represent the IPv6 static connection characteristics for this interface. Refer to IPv6 Static Addresses Properties .	
IPv4Static Addresses	Array of Objects	False	The value of this property shall be an array of objects used to represent all IPv4 static addresses assigned (but not necessarily use) to this interface. Addresses in use by this interface shall also appear in the IPv4Addresses property. Refer to IPv6 Static Addresses Properties . Note: Only one set of IPv4StaticAddresses can be patched multiple IPv4StaticAddresses patch is not supported.	
IPv6Address PolicyTable	Array of Objects	False	1. The value of this property represents the RFC6724-defined address selection policy table. 2. Refer to IPv6AddressPolicyTable Properties .	

Table 99. Ipv4 Addresses Properties

Name	Type	Read Only	Description
Address	String	True	This is the Ipv4 address. If DHCPv4 is enabled on the interface, this property becomes read-only.
SubnetMask	Object	True	<p>This is the Ipv4 address. If DHCPv4 is enabled on the interface, this property becomes read-only.</p> <p>String with pattern "^(?:[0-9]{1,3}\.){3}[0-9]{1,3}\$"</p>
AddressOrigin	String	True	This is the Ipv4 gateway for this address.

Table 99. Ipv4 Addresses Properties (continued)

			Enum	Description
			Static	A static address as configured by the user.
			DHCP	Address is provided by a DHCPv4 service
			BOOTP	Address is provided by a BOOTP service.
			Ipv4LinkLocal	Address is valid only for this network segment (link).
Gateway	String	True	This is the Ipv4 default gateway address for this interface. If DHCPv4 is enabled on the interface and is configured to set the Ipv4 default gateway address, this property becomes read-only.	

Table 100. Ipv6 Addresses Properties

Name	Type	Read Only	Description	
Address	String	False	A static Ipv6 address that is currently assigned on a network interface.	
PrefixLength	Number	True	Provides the Ipv6 network prefix length in bits for this address. , Max:128 Note: Due to constraint of schema IPAddresses.v1_0_0.json, PrefixLength = 0 will be reported as ValidationError.	
AddressOrigin	String	True	This is the Ipv6 address origin for this interface.	
			Enum	Description
			Static	A static address as configured by the user
			DHCPv6	Address is provided by a DHCPv6 service.
			LinkLocal	Address is valid only for this network segment (link).
			SLAAC	Address is provided by a Stateless Address AutoConfiguration (SLAAC) service.

Table 101. DHCPv4 properties

Name	Type	Read Only	Description
DHCPEnabled	Boolean	False	Determines whether DHCPv4 is enabled on this interface
UseDNSServers	Boolean	True	Determines whether to use DHCPv4-supplied DNS servers. Note: Only supports Northbound.
UseGateway	Boolean	True	Determines whether to use a DHCPv4-supplied gateway. Note: Only supports Northbound.
UseDomainName	boolean	True	Determines whether to use a DHCPv4-supplied domain name. Note: Only supports Northbound.
UseNTPServers	boolean	True	Determines whether to use DHCPv4-supplied NTP servers. Note: Only supports Northbound.
UseStaticRoutes	boolean	True	Determines whether to use DHCPv4-supplied static routes. Note: Only supports Northbound.

Table 102. DHCPv6 properties

Name	Type	Read Only	Description
OperatingMode	boolean	False	This property shall control the operating mode of DHCPv6 on this interface. DHCPv6 stateful mode is used to configure addresses, and when it is enabled, stateless mode is also implicitly enabled.
UseDNSServer	Boolean	True	When enabled, DNS server addresses supplied through DHCPv6 stateless mode will be used. Note: Only supports Northbound.
UseDomainName	Boolean	True	When enabled, the domain name supplied through DHCPv6 stateless mode will be used. Note: Only supports Northbound.
UseNTPServers	Boolean	True	When enabled, NTP server addresses supplied through DHCPv6 stateless mode will be used. Note: Only supports Northbound.
UseRapidCommit	Boolean	True	Determines whether to use DHCPv6 rapid commit mode for stateful mode address assignments. Do not enable in networks where more than one DHCPv6 server is configured to provide address assignments. Note: Only supports Northbound.

Table 103. IPv6 Static Addresses Properties

Name	Type	Read Only	Description
Address	String	False	A static Ipv6 address that is currently assigned on a network interface.
PrefixLength	Number	False	Provides the Ipv6 network prefix length in bits for this address. Min:1,Max:128 Note: Due to constraint of schema IPAddresses.v1_0_0.json, PrefixLength = 0 will be reported as ValidationError.
Oem	Object	True	StaticIPAddressIndex under Spec.

Table 104. IPv4 Static Addresses Properties

Name	Type	Read Only	Description
Address	String	False	This is the Ipv4 address. If DHCPv4 is enabled on the interface, this property becomes read-only.
SubnetMask	Object	False	1. This is the Ipv4 address. If DHCPv4 is enabled on the interface, this property becomes read-only. 2. String with pattern "^(?:[0-9]{1,3}\.){3}[0-9]{1,3}\$"

Table 104. IPv4 Static Addresses Properties (continued)

AddressOrigin	String	True	This is the Ipv4 gateway for this address.	
			Enum	Description
			Static	A static address as configured by the user.
			DHCP	Address is provided by a DHCPv4 service
			BOOTP	Address is provided by a BOOTP service.
			Ipv4LinkLocal	Address is valid only for this network segment (link).
Gateway	String	False	This is the Ipv4 default gateway address for this interface. If DHCPv4 is enabled on the interface and is configured to set the Ipv4 default gateway address, this property becomes read-only.	

Table 105. IPv6AddressPolicyTable Properties

Name	Type	Read Only	Description
Address	Integer	False	This property shall contain the IPv6 label value for this table entry, as defined in RFC6724. Note: Northbound only support.
Precedence	Integer	False	This property shall contain the IPv6 precedence value for this table entry, as defined in RFC6724. Note: Northbound only support.
Prefix	Integer	False	This property shall contain the IPv6 address prefix for this table entry, as defined in RFC6724. Note: Northbound only support.

PATCH – Ethernet Interface Instance

Request

PATCH `https://{ip}/redfish/v1/Managers/{manager_instance}/EthernetInterfaces/{manager_ethifc_instance}`

Content-Type: application/json

Request body

Please refer to the properties that are patchable in [Table 98 “Ethernet Interface Properties” on page 210](#) for which Read Only is False that can be sent as Request body in JSON format.

Note: DomainName should contain minimum two words with "." separated.

Note: {manager_ethifc_instance} If this instance is usb0, PATCH is not supported. PATCH on the instance for changing network settings will cause the current connection to be terminated. Patch is not allowed for Ipv6/Ipv4 properties in DHCP mode. Patch of IPV6/IPV4 properties is allowed only in Static mode.

MACAddress/PermanentMACAddress is not allowed to patch and considered as read-only property Patch for ethernet interface can be applied in particular set. Patch set :IPv4Addresses, IPv6Addresses/IPv6StaticAddresses, VLAN, FQDN, HostName.AutoNeg,SpeedMbps,FullDuplex,MTUSize->InterfaceEnabled.

The reason is, as per the current design in BMC, if any changes applied in the network setting, the changes will be written in the network related files and network will restart. At that time other changes cannot be written.

For example if ipv4 and hostname/FQDN is applied at same time, for ipv4 details the changes will be written in the interface files and network will restart. At that time hostname/FQDN changes cannot be made.

So the restrictions were made to allow patch for particular set. Patching Interface Enabled for eth0/eth1.

Case 1: Bond is Enabled. Eth0 and eth1 cannot be patched and an error will be thrown as follows:

```
{
  "error": {
    "@Message.ExtendedInfo": [
      {
        "@odata.type": "#Message.v1_0_5.Message",
        "Message": "Since bond0 is enabled. InterfaceEnabled value of eth0/eth1 cannot be PATCHed until bond0 is disabled.",
        "MessageArgs": [
          "InterfaceEnabled"
        ],
        "MessageId": "SyncAgent.1.0.BondEnabled",
        "RelatedProperties": [
          "#/InterfaceEnabled"
        ],
        "Resolution": "Disable Bond and try enabling/disabling eth0/eth1 the interface",
        "Severity": "Warning"
      }
    ],
    "code": "SyncAgent.1.0.BondEnabled",
    "message": "Since bond0 is enabled. InterfaceEnabled value of eth0/eth1 cannot be PATCHed until bond0 is disabled."
  }
}
```

Case 2: Bond is Disabled. Eth0 and eth1 can be patched i.e enabled or disabled.

Note: Behaviour of DHCPv6->OperatingMode

If only SLAAC IP (stateless) --> OperatingMode display Stateless.

1. If only DHCPv6 IP (stateful) --> OperatingMode display Stateful.
2. If only LinkLocal IP --> OperatingMode display Stateless.
3. If having combination of all IP's --> OperatingMode display Stateless

Before applying any patch by user, OperatingMode will maintain the address-origin value. (ex: If we have dhcp ip's then address-origin will be DHCP and OperatingMode will be Stateful) Once user apply patch, address-origin will have the actual outcome and OperatingMode will maintain the patched value(desired outcome) (ex: if patch is applied to change to stateless and we have no radvd server running, after successful patch we get only dhcp ip's, in that case we will show address-origin as DHCP and OperatingMode as Stateless)

Request example

Sample patch request body for ethernet-interface properties for interface instance uri, Ex: PATCH https://{ip}/redfish/v1/Managers/Self/EthernetInterfaces/eth0.

To modify hostname and fqdn:

```
{
  "FQDN": "NEWHOST.us.megatrends.com",
  "HostName": "NEWHOST"
}
```

To disable autoneg or to change FullDuplex/SpeedMbps we need to provide three properties:

```
{
  "AutoNeg": false,
  "FullDuplex": true,
  "SpeedMbps": 10
}
```

To enable autoneg values:

```
{
  "AutoNeg": true
}
```

To patch MTUSize:

```
{
  "MTUSize": 1450
}
```

To disable dhcp for IPv4Address:

```
{
```

```

"DHCPv4": {
    "DHCPEnabled": false
},
"IPv4StaticAddresses": [
    {
        "Address": "10.0.124.86",
        "Gateway": "10.0.120.1",
        "SubnetMask": "255.255.248.0"
    }
]
}

```

Note: If the Redfish version is 1.7 or earlier version, follow below body to change DHCP status from “true” to “false”.

```

{
    "DHCPv4": {
        "DHCPEnabled": false
    },
    "IPv4Addresses": [
        {
            "Address": "10.0.124.86",
            "Gateway": "10.0.120.1",
            "SubnetMask": "255.255.248.0"
        }
    ]
}

```

To modify IPv4StaticAddress details:

```

{
    "IPv4StaticAddresses": [
        {
            "Address": "10.0.124.86",
            "Gateway": "10.0.120.1",

```



```

        "SubnetMask": "255.255.248.0"
    }
}

```

To Enable DHCP in IPv4 when False value is disable DHCP.

```

{
    "DHCPv4": {
        "DHCPEnabled": true
    }
}

```

To enable/disable interface

```

{
    "InterfaceEnabled": true
}
{
    "FQDN": "NEWHOST.us.megatrends.com",
    "FullDuplex": true,
    "AutoNeg": false,
    "MTUSize": 1450,
    "SpeedMbps": 10,
    "HostName": "NEWHOST",
    "MACAddress": "00:1a:2b:11:11:11",
    "IPv4Addresses": [
        {
            "Address": "172.16.97.178",
            "Gateway": "172.16.96.1",
            "SubnetMask": "255.255.248.0"
        }
    ],
    "IPv6Addresses": [
        {

```

```

        "Address": "2001:db8:1:0:21a:2bff:fe11:1111"
    }
],
    "InterfaceEnabled": true
}

```

To Disable DHCP in IPV6Address DHCPv6 OperatingMode Allowable values -- allowable values disabled,stateless,stateful

```

{
    "DHCPv6": {
        "OperatingMode": "Disabled"
    },
    "IPv6StaticAddresses": [
        {
            "Address": "2001:b021:2d:0:475e:a232:7e1d:7438",
            "Oem": {
                "Ami": {
                    "StaticIPAddressIndex": 10
                }
            }
        }
    ]
}

```

Note: If the Redfish version is 1.7 or earlier version, follow below body to disable DHCP in IPV6Address.

```

{
    "DHCPv6": {
        "OperatingMode": "Disabled"
    },
    "IPv6Addresses": [
        {
            "Address": "2001:b021:2d:0:475e:a232:7e1d:7438",
            "Oem": {

```

```

        "Ami": {
            "StaticIPAddressIndex": 10
        }
    }
}
]
}

```

To modify IPv6StaticAddress details:

```

{
    "IPv6StaticAddresses": [
        {
            "Address": ":b021:2d:0:475e:a232:7e1d:7438",
            "PrefixLength": 64,
            "Oem": {
                "Ami": {
                    "StaticIPAddressIndex": 10
                }
            }
        }
    ]
}

```

To modify multi IPv6StaticAddress details:

```

{
    "IPv6StaticAddresses": [
        {
            "Address": "2001:b021:2d:0:475e:a232:7e1d:7438",
            "Oem": {
                "Ami": {
                    "StaticIPAddressIndex": 9
                }
            }
        }
    ]
}

```

```

    },
    "PrefixLength": 64
  },
  {
    "Address": "2001:b021:2d:0:475e:a232:7e1d:7440",
    "Oem": {
      "Ami": {
        "StaticIPAddressIndex": 10
      }
    },
    "PrefixLength": 64
  }
]
}

```

To clear IPv6StaticAddress details:

```

{
  "IPv6StaticAddresses": [
    {
      "Address": null,
      "PrefixLength": 0,
      "Oem": {
        "Ami": {
          "StaticIPAddressIndex": 10
        }
      }
    }
  ]
}

```

To Enable DHCP in IPv6 when False value is to disable DHCP.

```

{

```

```
"DHCPv6": {  
    "OperatingMode": "Stateless"  
}  
}
```

For StaticNameServers.

```
{  
    "StaticNameServers": [  
        "10.0.0.33",  
        "10.0.0.34",  
        "10.0.0.35"  
    ]  
}
```

Response

The response status is 202 with newly created Task details.

For Error Responses, refer to [“Error Response” on page 11](#).

Notes:

1. To make all settings for Ethernet interface effective, after the success of the PATCH method, the network service will restart. During this time (about 30s), BMC network is unreachable.
2. Checking PATCH settings is different from previous Redfish service (RTP 1.7). The current Redfish service (RTP 1.8) will check if the settings are duplicated. If yes, it will report error.

Chapter 17. Log

GET – Log Service Collection

Request

Chassis

GET https://{{ip}}/redfish/v1/Chassis/{{chassis_instance}}/LogServices

Content-Type: application/json

Manager

GET https://{{ip}}/redfish/v1/Managers/{{manager_instance}}/LogServices

Content-Type: application/json

System

GET https://{{ip}}/redfish/v1/Systems/{{system_instance}}/LogServices

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response properties.

GET – Log Service Instance

Request

Chassis

GET https://{{ip}}/redfish/v1/Chassis/{{chassis_instance}}/LogServices/{{chassis_log_instance}}

Content-Type: application/json

Manager

GET https://{{ip}}/redfish/v1/Managers/{{manager_instance}}/LogServices/{{manager_log_instance}}

Content-Type: application/json

System

GET https://{{ip}}/redfish/v1/Systems/{{system_instance}}/LogServices/{{system_log_instance}}

Content-Type: application/json

Telemetry

GET https://{{ip}}/redfish/v1/TelemetryService/LogService

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 106. Log Service Properties

Name	Type	Read only	Description				
(OData Attributes)			Refer to “OData Support” on page 5				
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.				
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12				
Name(M)	String	True					
Description	String	True					
ServiceEnabled	Boolean	True	Indicates whether this service is enabled.				
MaxNumber OfRecords(C)	Number	True	<div>1. The maximum numbers of LogEntries this service can have.</div> <div>2. This value is by default configured as 150 for AuditLog, SEL, BIOS Logs and 100 for Telemetry Service Logs.</div>				
OverWritePolicy(C)	String	True	<div>Indicates the policy of the log service when the MaxNumberOfRecords has been reached or when the log is full.</div> <table><tr><td>Enum</td><td>Description</td></tr><tr><td>WrapsWhenFull</td><td>When full, new entries to the Log will overwrite previous entries.</td></tr></table>	Enum	Description	WrapsWhenFull	When full, new entries to the Log will overwrite previous entries.
Enum	Description						
WrapsWhenFull	When full, new entries to the Log will overwrite previous entries.						
DateTime	String	False	<div>1. The current DateTime (with offset from UTC) for the log service in Redfish Timestamp format.</div> <div>2. The valid range is -12:00 to +14:00.</div> <div>3. Please refer the following link for the allowable values within the above specified range.</div> <div>https://en.wikipedia.org/wiki/List_of_UTC_time_offsets</div> <div>4. According to UNIX time maximum date allowed to PATCH is 2038-01-18</div>				
DateTimeLocal Offset	String	False	<div>1. The time offset from UTC that the DateTime property is set to in format: +06:00.</div> <div>2. The valid range is -12:00 to +14:00.</div> <div>3. Please refer the following link for the allowable values within the above specified range.</div> <div>https://en.wikipedia.org/wiki/List_of_UTC_time_offsets</div>				
Action	Object	True	The Actions property shall contain the available actions for this resource like LogService.ClearLog or any other OEM Actions.				
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.				
Entries(N)	Object	True	The value of this property shall reference a collection of resources of type LogEntry .				

Table 106. Log Service Properties (continued)

Name	Type	Read only	Description	
LogEntryType	String	True	The format of the log entries.	
			Enum	Description
			Event	The log contains Redfish-defined messages (events).
			SEL	The log contains legacy IPMI System Event Log (SEL) entries.
			Multiple	The log contains multiple Log Entry types, or a single-entry type cannot be guaranteed by the Log Service.
OEM	The log contains entries in an OEM-defined format.			

PATCH – Log Service Instance

Request

Chassis

PATCH https://{ip}/redfish/v1/Chassis/{chassis_instance}/LogServices/{chassis_log_instance}

Content-Type: application/json

Manager

PATCH https://{ip}/redfish/v1/Managers/{manager_instance}/LogServices/{manager_log_instance}

Content-Type: application/json

System

PATCH https://{ip}/redfish/v1/Systems/{system_instance}/LogServices/{system_log_instance}

Content-Type: application/json

Telemetry

PATCH https://{ip}/redfish/v1/TelemetryService/LogService

Content-Type: application/json

Request body

Please refer to the properties that are patchable in [Table 106 “Log Service Properties” on page 226](#) for which read-only is False that can be sent as Request body in json format.

Example

```
{
  "ServiceEnabled": true
}
```

```
}
```

Response

1. The response status 204, means success and the response body should not be return.
2. The response status 200 means success and the response body is a GET Response with the changed values specified in the Patchable properties in Request body.

POST– Log Service Instance

Request

Chassis

```
POST https://{ip}/redfish/v1/Chassis/{chassis_instance}/LogServices/{chassis_log_instance}/Actions/LogService.ClearLog
```

```
Content-Type: application/json
```

Manager

```
POST https://{ip}/redfish/v1/Managers/{manager_instance}/LogServices/{manager_log_instance}/Actions/LogService.ClearLog
```

```
Content-Type: application/json
```

System

```
POST https://{ip}/redfish/v1/Systems/{system_instance}/LogServices/{system_log_instance}/Actions/LogService.ClearLog
```

```
Content-Type: application/json
```

Telemetry

```
POST https://{ip}/redfish/v1/TelemetryService/LogService/Actions/LogService.ClearLog
```

```
Content-Type: application/json
```

Request body

```
{  
  "ClearType": "ClearAll"  
}
```

Response

The response of the request will be in JSON format with the success status code as 202.

For Error Response, please refer to [“Error Response” on page 11](#).

Response example

```
{  
  "@odata.context": "/redfish/v1/$metadata#Task.Task(TaskState,Description,Name,Id)",  
  "@odata.id": "/redfish/v1/TaskService/Tasks/1",  
}
```

```
"@odata.type": "#Task.v1_4_2.Task",
"Description": "Task for Chassis LogService",
"Id": "1",
"Name": " Chassis LogService ",
"TaskState": "New"
}
```

GET – Log Entry Collection

Request

Chassis

GET https://{ip}/redfish/v1/Chassis/{{chassis_instance}}/LogServices/{{chassis_log_instance}}/Entries

Content-Type: application/json

Manager

GET https://{ip}/redfish/v1/Managers/{{manager_instance}}/LogServices/{{manager_log_instance}}/Entries

Content-Type: application/json

System

GET https://{ip}/redfish/v1/Systems/{{system_instance}}/LogServices/{{system_log_instance}}/Entries

Content-Type: application/json

Telemetry

GET https://{ip}/redfish/v1/TelemetryService/LogService/Entries

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

GET – Log Entry Instance

Request

Chassis

GET https://{ip}/redfish/v1/Chassis/{{chassis_instance}}/LogServices/{{chassis_log_instance}}/
Entries/{{chassis_logentry_instance}}

Content-Type: application/json

Manager

GET https://{ip}/redfish/v1/Managers/{manager_instance}/LogServices/{manager_log_instance}/Entries/{manager_logentry_instance}

Content-Type: application/json

System

GET https://{ip}/redfish/v1/Systems/{system_instance}/LogServices/{system_log_instance}/Entries/{system_logentry_instance}

Content-Type: application/json

Telemetry

GET https://{ip}/redfish/v1/TelemetryService/LogService/Entries/{logentry_instance}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 107. Log Entry Property

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
Severity	String	True	1. This is the severity of the log entry. 2. It can take any one of the Enum values: OK, Warning or Critical.
Created	String	True	The time the log entry was created.
EventId	String	True	1. If present, this LogEntry records an Event and the value shall indicate a unique identifier for the event, the format of which is implementation dependent. 2. This property will be populated only for EventLogs. 3. EventId format is implementation dependent, and value will be string of a positive integer.
EventTimestamp	String	True	If present, this LogEntry records an Event and the value shall be the time the event occurred.
EntryType(M)	String	True	1. This property shall represent the type of LogEntry. 2. If the resource represents an IPMI SEL log entry, the value shall be SEL. 3. If the resource represents an Event log, the value shall be Event. 4. If the resource represents an OEM log format, the value shall be Oem. Enum can be Event,SEL or Oem.

Table 107. Log Entry Property (continued)

Name	Type	Read only	Description												
EntryCode	String	True	<ol style="list-style-type: none"> 1. This property shall be present if the EntryType value is SEL. 2. Refer to Table 108 “EntryCode Strings” on page 232 												
SensorType	String	True	<ol style="list-style-type: none"> 1. This property shall be present if the EntryType value is SEL. 2. Refer to Table 109 “SensorType Strings” on page 233 												
SensorNumber	Number	True	This property decodes from EntryType: If it is SEL, it is the sensor number, if Event it is not applicable. Otherwise, it is Oem specific												
Message	String	True	<ol style="list-style-type: none"> 1. This property shall be the Message property of the event and decodes from EntryType. 2. If EntryType is "Event" then it is a message description. 3. If EntryType is "SEL" then it contain SEL Specific message otherwise "Oem" specific Log entry. 4. In most cases, this property contains actual Log Entry. 5. EntryType is "SEL" then Message contain SEL message format specified in Table 41-1 SEL Event Records in IPMI Specification v2.0 revision 1.1 												
MessageId	String	True	<ol style="list-style-type: none"> 1. This property shall the MessageId property of the event and decodes from EntryType. 2. If EntryType is "Event" then it is a Redfish Specification-defined MessageId. 3. If EntryType is "SEL" then it contain Event Data otherwise "Oem" specific information. <p>Populated for all logs.</p> <ol style="list-style-type: none"> 1. EntryType is "Event" then MessageId format will be RegistryName.MajorVersion.MinorVersion.MessageKey 2. EntryType is "SEL" then MessageId format will be ^0[xX]([a-fA-F][0-9]){2}{3}\$ <p>i.e. first byte is EventData1 second byte is EventData2 and third byte is EventData 3.</p>												
MessageArgs	Array	True	<ol style="list-style-type: none"> 1. This contains message arguments to be substituted into the message included or in the message looked up via a registry. 2. Populated only for AuditLog, EventLog and MetricReportLog. 												
Link	Object		<p>Contains references to other resources that are related to this resource.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr> <tr> <td>Oem</td><td>Object</td><td></td><td>Refer to Table 11 “Resource Complex Types” on page 14.</td></tr> <tr> <td>OriginOfCondition</td><td>Object</td><td>True</td><td> <ol style="list-style-type: none"> 1. This is the URI of the resource that caused the log entry. 2. Refer idRef in odata4.0.0. json. </td></tr> </table>	Name	Type	Read only	Description	Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14 .	OriginOfCondition	Object	True	<ol style="list-style-type: none"> 1. This is the URI of the resource that caused the log entry. 2. Refer idRef in odata4.0.0. json.
Name	Type	Read only	Description												
Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14 .												
OriginOfCondition	Object	True	<ol style="list-style-type: none"> 1. This is the URI of the resource that caused the log entry. 2. Refer idRef in odata4.0.0. json. 												

Table 107. Log Entry Property (continued)

Name	Type	Read only	Description
OemLogEntry Code	String	True	1. If the LogEntryCode type is OEM, this will contain the OEM-specific entry code. 2. Northbound only support.
OemSensorType	String	True	1. If the Sensor Type is OEM, this will contain the OEM-specific sensor type. 2. Northbound only support.

Table 108. EntryCode Strings

Assert	Transition to Busy	Informational	Redundancy Degraded
Deassert	State Deasserted	Device Removed / Device Absent	Non-redundant:Sufficient Resources from Redundant
Lower Non-critical - going low	State Asserted	Device Inserted / Device Present	Non-redundant:Sufficient Resources from Insufficient Resources
Lower Non-critical - going high	Predictive Failure deasserted	Device Disabled	Non-redundant:Insufficient Resources
Lower Critical - going low	Predictive Failure asserted	Device Enabled	Redundancy Degraded from Fully Redundant
Lower Critical - going high	Limit Not Exceeded	Transition to Running	Redundancy Degraded from Nonredundant
Lower Non-recoverable - going low	Limit Exceeded	Transition to In Test	D0 Power State
Lower Non-recoverable - going high	Performance Met	Transition to Power Off	D1 Power State
Upper Non-critical - going low	Performance Lags	Transition to On Line	D2 Power State
Upper Non-critical - going high	Transition to OK	Transition to Off Line	D3 Power State
Upper Critical - going low	Transition to Non-Critical from OK	Transition to Off Duty	
Upper Critical - going high	Transition to Critical from less severe	Transition to Degraded	
Upper Non-recoverable - going low	Transition to Non-recoverable from less severe	Transition to Power Save	
Upper Non-recoverable - going high	Transition to Critical from Nonrecoverable	Install Error	

Table 108. EntryCode Strings (continued)

Transition to Idle	Transition to Non-recoverable	Fully Redundant	
Transition to Active	Monitor	Redundancy Lost	

Table 109. SensorType Strings

Platform Security Violation Attempt	Other Units-based Sensor	Microcontroller/Coprocessor	OEM
Temperature	Memory	Add-in Card	
Voltage	Drive Slot/Bay	Chassis	
Current	POST Memory Resize	ChipSet	
Fan	System Firmware Progress	Other FRU	
Physical Chassis Security	Event Logging Disabled	Management Subsystem Health	
Processor	System Event	Battery	
Power Supply / Converter	Critical Interrupt	Session Audit	
PowerUnit	Button/Switch	Version Change	
CoolingDevice	Module/Board	FRUState	

Chapter 18. System Inventory

GET – Ethernet Interface Collection

Dependence

1. This resource shall be used to represent the collection of host side NIC resources.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{ip}/redfish/v1/Systems/{{Systems_Instance}}/EthernetInterfaces

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

When the request is successful, a message body similar to the following is returned:

```
{
  "@odata.context": "/redfish/v1/$metadata#EthernetInterfaceCollection.EthernetInterfaceCollection",
  "@odata.etag": "\"1578911960\"",
  "@odata.id": "/redfish/v1/Systems/Self/EthernetInterfaces",
  "@odata.type": "#EthernetInterfaceCollection.EthernetInterfaceCollection",
  "Description": "Collection of ethernet interfaces for this system",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Systems/Self/EthernetInterfaces/EthernetInterface0"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/EthernetInterfaces/EthernetInterface1"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/EthernetInterfaces/EthernetInterface2"
    },
    {

```

```

        "@odata.id": "/redfish/v1/Systems/Self/EthernetInterfaces/EthernetInterface3"
    }
],
"Members@odata.count": 4,
"Name": "Ethernet Interface Collection"
}

```

GET – Ethernet Interface Instance

Dependence

1. This resource shall be used to represent host side NIC resources. This requires host agent support from OS and in-band communication channel.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Systems/{{system_instance}}/EthernetInterfaces/{{system_ethifc_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Note: System Ethernet Interface typically supports at max one VLAN per interface for a single BMC.

Table 110. Ethernet Interface Properties

Name	Type	Read Only	Description
(OData Attributes)			Refer to “OData Support” on page 5 .
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14 .
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
UefiDevice-Path	String	True	<ol style="list-style-type: none"> 1. The UEFI device path for this interface (port). 2. Platform specific porting needs.
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14 .
InterfaceEnabled	Boolean	False	This indicates whether this interface is enabled.
Permanent-MACAddress	String	True	The value of this property shall be the Permanent MAC Address of this interface (port). This value is typically programmed during the manufacturing time. This address is not assignable.

Table 110. Ethernet Interface Properties (continued)

Name	Type	Read Only	Description			
MACAddress	String	True	The value of this property shall be the effective current MAC Address of this interface. If an assignable MAC address is no supported, this is a read only alias of the PermanentMACAddress. Note: Even though the ReadOnly attribute in Redfish schema for managers is specified as "False", In Redfish API, patching MACAddress is not allowed. Changing MACAddress will change the IP address and if user is using redfish in remote with no access to host/BMC, it will be issue in obtaining new IP address and also change in MACAddress could result in mac address collision if the a device on the local network with the same mac address.			
Ipv4Address-es	Array of Objects	True	This array of objects represents all the Ipv4 static addresses to be assigned on this interface. Refer to IPv4AddressesProperties .			
Ipv6Address-es	Array of Objects	True	This array of objects enumerates all the currently assigned Ipv6 addresses on this interface. Refer to IPv6AddressesProperties .			
Ipv6Default-Gateway	String	True	This is the Ipv6 default gateway address that is currently in use on this interface.			
VLANs(N)	Object	True	This is a reference to a collection of VLANs and is only used if the interface supports more than one VLANs.			
LinkStatus	String	True	The value of this property shall be the link status of this interface (port).			
			Enum		Description	
			LinkUp		The link is available for communication on this interface.	
			NoLink		There is no link or connection detected on this interface.	
			LinkDown		There is no link on this interface, but the interface is connected.	
Links	Object	True	The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but not contained by (subordinate to), this resource.			
			Name	Type	Read Only	Description
			Oem	Object	True	Refer to Table 11 “Resource Complex Types” on page 14 .

Table 110. Ethernet Interface Properties (continued)

			Chassis(N)	Array	True	The value of this property shall be a reference to a resource of type Chassis that represent the physical container associated with this Ethernet Interface.
			Endpoints@odata.count	Number	True	An integer representing the number of items in a collection.
			Endpoints(N)	Array	True	The value of this property shall be a reference to the resources that this ethernet interface is associated with and shall reference a resource of type Endpoint. Note: These will be available only as a part of FPX Product.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.			
DHCPv4	Object	False	This property shall contain the configuration of DHCP v4. Refer to DHCPv4Properties .			
DHCPv6	Object	False	This property shall contain the configuration of DHCP v6. Refer to DHCPv6Properties .			

GET – Network Interface Collection

Dependence

1. It displays the collection of network interface resource instances available in the system.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET <https://{{ip}}/redfish/v1/Systems/Self/NetworkInterfaces>

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#NetworkInterfaceCollection.NetworkInterfaceCollection",
  "@odata.etag": "\"1619183398\"",
  "@odata.id": "/redfish/v1/Systems/Self/NetworkInterfaces",
  "@odata.type": "#NetworkInterfaceCollection.NetworkInterfaceCollection",
  "Description": "The Collection for Network Interfaces",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Systems/Self/NetworkInterfaces/DevType7_NIC2"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/NetworkInterfaces/DevType7_NIC0"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/NetworkInterfaces/DevType7_NIC1"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/NetworkInterfaces/DevType7_NIC3"
    }
  ],
  "Members@odata.count": 4,
  "Name": "NetworkInterface Collection"
}
```

GET – Network Interface Instance

Dependence

1. A **NetworkInterface** contains references linking **NetworkAdapter**, **NetworkPort**, and **NetworkDeviceFunction** resources and represents the functionality available to the containing system.

2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET `https://{ip}}/redfish/v1/Systems/Self/NetworkInterfaces/{NetworkInterface_instance}`

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 111. NetworkInterface Properties

Name	Type	Read only	Description			
(OData Attributes)			Refer to “OData Support” on page 5			
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.			
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12			
Name(M)	String	True				
Description	String	True				
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.			
Links	Object	True	Links for this controller.			
			Name	Type	Read Only	Description
			Network Adapter(N)	Object	True	A reference to the collection of NetworkAdapter associated with this NetworkInterface.
NetworkDevice Functions(N)	Object	True	Refer to Table 93 “NetworkDeviceFunction” on page 195			
NetworkPorts (N)	Object	True	Refer to Table 97 “Network Port Instance Properties” on page 203.			
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.			

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#NetworkInterface.NetworkInterface",
  "@odata.etag": "\"1619171738\"",
  "@odata.id": "/redfish/v1/Systems/Self/NetworkInterfaces/DevType7_NIC0",
  "@odata.type": "#NetworkInterface.v1_1_2.NetworkInterface",
  "Description": "NetworkInterface instance",
  "Id": "DevType7_NIC0",
  "Links": {
```

```

    "NetworkAdapter": {
        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0"
    },
    "Name": "DevType7_NIC0",
    "NetworkDeviceFunctions": {
        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkDeviceFunctions"
    },
    "NetworkPorts": {
        "@odata.id": "/redfish/v1/Chassis/Self/NetworkAdapters/DevType7_NIC0/NetworkPorts"
    },
    "Status": {
        "Health": "OK",
        "State": "Disabled"
    }
}

```

GET – Processor Collection

Dependence

1. It displays a list of Processor instances in the ComputerSystem(Host).
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

Processor

GET https://{ip}/redfish/v1/Systems/{system_instance}/Processors

Content-Type: application/json

Sub Processor

GET https://{ip}/redfish/v1/Systems/{system_instance}/Processors/{system_processor_instance}/SubProcessors

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
```

```

"@odata.context": "/redfish/v1/$metadata#ProcessorCollection.ProcessorCollection",
"@odata.etag": "\"1612418315\"",
"@odata.id": "/redfish/v1/Systems/Self/Processors",
"@odata.type": "#ProcessorCollection.ProcessorCollection",
"Description": "Collection of processors",
"Members": [
    {
        "@odata.id": "/redfish/v1/Systems/Self/Processors/DevType1_CPU1"
    }
],
"Members@odata.count": 1,
"Name": "Processors Collection"
}

```

GET – Processor Instance

Dependence

1. It represents the properties of a processor attached to aSystem.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

Processor

GET https://{ip}/redfish/v1/Systems/{system_instance}/Processors/{system_processor_instance}

Content-Type: application/json

Sub Processor

https://{ip}/redfish/v1/Systems/{system_instance}/Processors/{system_processor_instance}/SubProcessors/{sub_processor_instance}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 112. Processor properties

Name	Type	Read Only	Description
(OData Attributes)			Refer to “OData Support” on page 5.

Table 112. Processor properties (continued)

Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.			
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12			
Name(M)	String	True				
Description	String	True				
Socket	String	True	Identifies the physical location or socket of the processor.			
Status	Object	True	Name	Type	Read Only	Description
			State	String	True	Refer to Table 11 “Resource Complex Types” on page 14.
			Health	String	True	
ProcessorType	String	True	Identifies the type of processor contained in this Socket.			
			Enum	Description		
			CPU	A Central Processing Unit.		
			GPU	A Graphics Processing Unit.		
			FPGA	A Field Programmable Gate Array.		
			DSP	A Digital Signal Processor.		
			Accelerator	An Accelerator		
			OEM	An OEM-defined Processing Unit.		
			Core	A Core in a Processor.		
			Thread	A Thread in a Processor.		
Processor Architecture	String	True	Identifies the architecture of the processor contained in this Socket			
			Enum	Description		
			x86	x86 or x86-64		
			IA-64	Intel Itanium.		
			ARM	ARM		
			MIPS	MIPS		
			OEM	OEM-defined		
InstructionSet	String	True	This property shall contain the string which identifies the instruction set of the processor contained in this socket. Note: Only supports Northbound.			
			Enum	Description		
			x86	x86 32-bit		
			x86-64	x86 64-bit		
			IA-64	Intel IA-64		
			ARM-A32	ARM 32-bit		
			ARM-A64	ARM 64-bit		
			MIPS32	MIPS 32-bit		
			MIPS64	MIPS 64-bit		

Table 112. Processor properties (continued)

			OEM	OEM-defined			
ProcessorId	Object		This object shall contain identification information for this processor.				
			Name	Type	Read only	Description	
			VendorId	String	True	This property shall indicate the Vendor Identification string information as provided by the manufacturer of this processor.	
			IdentificationRegisters	String	True	The contents of the Identification Registers (CPUID) for this processor.	
			EffectiveFamily	String	True	The effective Family for this processor	
			EffectiveModel	String	True	This property shall indicate the effective Model information as provided by the manufacturer of this processor.	
			Step	String	True	This property shall indicate the Step or revision string information as provided by the manufacturer of this processor.	
			MicrocodeInfo	String	True	This property shall indicate the Microcode Information as provided by the manufacturer of this processor.	
Manufacturer	String	True	The manufacturer of the processor				
Model	String	True	This property shall indicate the model information as provided by the manufacturer of this processor.				
MaxSpeedMHz	Number	True	The maximum clock speed of the processor.				
TotalCores	Number	True	The total count of independent processor cores contained within this processor.				
TotalThreads	Number	True	The total count of independent execution threads supported by this processor.				
Links	Object	True	The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but not contained by (subordinate to), this resource				
				Name	Type	Read Only	Description
				Oem	Object	False	Refer to Table 11 “Resource Complex Types” on page 14.
				ConnectedProcessors	Array	True	An array of links to the processors directly connected to this processor.
				ConnectedProcessors@odata.count	Number	True	The count of Processors directly connected to this processor.

Table 112. Processor properties (continued)

			Chassis(N)	Object	True	The value of this property shall be a reference to a resource of type Chassis that represent the physical container associated with this Processor.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.			
SubProcessors	Object	True	<ol style="list-style-type: none"> 1. The value of this property shall be a link to a collection of type ProcessorCollection. 2. Refer to “GET – Processor Collection” on page 241. 			
Location	Object	True	See Table 12 “Resource.v1_8_1 schema property” on page 14. Note: Northbound is supported and platform specific porting needed.			
Acceleration Functions(N)	Object	True	A reference to the collection of Acceleration Functions associated with this Processor.			
Assembly	Object	True	<ol style="list-style-type: none"> 1. A reference to the Assembly resource associated with this Processor. 2. Northbound is supported and platform specific porting needed. 			
MaxTDPWatts	Number	True	The maximum Thermal Design Power (TDP) in watts.			
Metrics(N)	Object	True	A reference to the Metrics associated with this Processor.			
TDPWatts	Number	True	The nominal Thermal Design Power (TDP) in watts.			
TotalEnabled Cores	Number	True	The total number of enabled cores contained in this processor.			
UUID	String	True	The universal unique identifier (UUID)for this processor.			
FPGA	Object	True	The properties specific for Processors of type FPGA Refer to FPGA Properties.			
Processor Memory	Array	True	The memory directly attached or integrated witin this Processor.			
			Name	Type	Read Only	Description
			CapacityMiB	Number	True	The memory capacity in MiB.
			IntegratedMemory	Boolean	True	This indicates whether this memory is integrated within the Processor.
			MemoryType	String	True	The type of memory used by this processor. Refer to Enum values of Memory Type.
			SpeedMHz	Number	True	The operating speed of the memory in MHz.

Table 113. FPGA properties

Name	Type	Read Only	Description
FirmwareId	String	True	The value of this property shall contain a string describing the FPGA firmware identifier.
Firmware Manufacturer	String	True	The FPGA firmware manufacturer.

Table 113. FPGA properties (continued)

FirmwareVersion	String	True	The FPGA firmware version.			
FpgaType	String	True	The value of this property shall be a type of the FPG device.			
			Enum	Description		
			Discrete	The discrete FPGA device.		
			Integrated	The FPGA device integrated with other processor in the single chip.		
Model	String	True	The value of this property shall be a model of the FPGA device.			
PCleVirtual Functions	Number	True	The number of the PCIe Virtual Functions.			
Programmable FromHost	Boolean	True	This flag indicates if the FPGA firmware can b reprogrammed from the host using system software.			
Reconfiguration Slots	Array	True	An array of the FPGA reconfiguration slots. reconfiguration slot is used by an FPGA to contain acceleration function that can change as the FPGA being provisioned.			
			Name	Type	Read Only	Description
			Acceleration Function	Object	True	A link to the Acceleration Function provided by the code programmed into a reconfiguration slot.
			Programmable FromHost	Boolean	True	This flag indicates if the reconfiguration slot can be reprogrammed from the host using system software.
			SlotId	String	True	The FPGA reconfiguration slot identifier.
			UUID	String	True	The universal unique identifier (UUID) for this reconfiguration slot.
HostInterface	Object	True	The FPGA interface to the host. Refer to FPGA interface properties .			
External Interfaces	Array	True	An array of the FPGA external interfaces. Refer to FPGA interface properties .			

Table 114. FPGA interface properties

Name	Type	Read Only	Description			
Ethernet	Object	True	Describes the Ethernet related information about this FPGA interface.			
			Name	Type	Read Only	Description
			MaxLanes	Number	True	This is the number of lanes supported by this interface.
			MaxSpeed Mbps	Number	True	The maximum speed supported by this interface.
InterfaceType	String	True	The FPGA interface type.			
			Enum	Description		

Table 114. FPGA interface properties (continued)

			Ethernet	An Ethernet interface.
			OEM	An OEM defined interface.
			PCIe	A PCI Express interface.
			QPI	The Intel QuickPath Interconnect.
			UPI	The Intel UltraPath Interconnect.
PCIe	Object	True	Describes the PC-Ie related information about this FPGA interface. Refer to Table 84 “PCIe Interface Properties” on page 179.	

Table 115. Enum values of Memory Type

Enum	Description
DDR	Double data rate synchronous dynamic random-access memory
DDR2	Double data rate type two synchronous dynamic random - access memory
DDR3	Double data rate type three synchronous dynamic random - access memory
DDR4	Double data rate type four synchronous dynamic random - access memory
DDR5	Double data rate type five synchronous dynamic random - access memory
Flash	Flash memory
GDDR	Synchronous graphics random-access memory
GDDR2	Double data rate type two synchronous graphics random - access memory
GDDR3	Double data rate type three synchronous graphics random - access memory
GDDR4	Double data rate type four synchronous graphics random - access memory
GDDR5	Double data rate type five synchronous graphics random - access memory
GDDR5X	Double data rate type five synchronous graphics random - access memory
GDDR6	Double data rate type five e synchronous graphics random - access memory
HBM1	High Bandwidth Memory
HBM2	The second generation of High Bandwidth Memory
HBM3	The third generation of High Bandwidth Memory
L1Cache	L1 cache
L2Cache	L2 cache
L3Cache	L3 cache
L4Cache	L4 cache
L5Cache	L5 cache
L6Cache	L6 cache
L7Cache	L7 cache
OEM	OEM-defined
SDRAM	Synchronous dynamic random-access memory

Table 115. Enum values of Memory Type (continued)

SGRAM	Synchronous graphics RAM
SRAM	Static random-access memory

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#Processor.Processor",
  "@odata.etag": "\"1619181000\"",
  "@odata.id": "/redfish/v1/Systems/Self/Processors/DevType1_CPU1/SubProcessors/DevType1_CPU1_Core3_Thread0",
  "@odata.type": "#Processor.v1_5_0.Processor",
  "Id": "DevType1_CPU1_Core3_Thread0",
  "Links": {
    "Chassis": {
      "@odata.id": "/redfish/v1/Chassis/Self"
    }
  },
  "MaxSpeedMHz": 3200,
  "Name": "DevType1_CPU1_Core3_Thread0",
  "ProcessorType": "Thread",
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  }
}
```

GET – Memory Collection

Dependence

1. This represents the collection of Memory resources.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET <https://{{ip}}/redfish/v1/Systems/Self/Memory>

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#MemoryCollection.MemoryCollection",
  "@odata.etag": "\"1577838105\"",
  "@odata.id": "/redfish/v1/Systems/Self/Memory",
  "@odata.type": "#MemoryCollection.MemoryCollection",
  "Description": "Collection of Memories for this system",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Systems/Self/Memory/DevType2_DIMM7"
    }
  ],
  "Members@odata.count": 1,
  "Name": "Memory Collection"
}
```

GET – Memory Instance

Dependence

1. Displays the information about the Memory devices like DIMM supported by the host connected to the BMC.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Systems/Self/Memory/{{Memory_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 116. Memory properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5 .
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14 .

Table 116. Memory properties (continued)

Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12		
Name(M)	String	True			
Description	String	True			
MemoryType	String	True	The Type of Memory. Note: Platform specific porting needed in BIOS. Purley platform supports this SMBIOS data and BIOS provides MemoryType only when "Extended Type 17 Structure" enabled in BIOS.		
			Enum	Description	
			DRAM	DRAM	
			NVDIMM_N	NVDIMM_N as defined by JEDEC.	
			NVDIMM_F	NVDIMM_F as defined by JEDEC.	
			NVDIMM_P	NVDIMM_P as defined by JEDEC.	
			IntelOptane	The memory module is Intel Optane DC Persistent Memory and composed of a combination of non-volatile and volatile memory.	
MemoryDeviceType	String	True	Type details of Memory. Allowable values are :		
			DDR	LPDDR4_SDRAM	DDR_SDRAM
			DDR2	DDR3_SDRAM	ROM
			DDR3	LPDDR3_SDRAM	SDRAM
			DDR4	DDR2_SDRAM	EDO
			DDR5	DDR2_SDRAM_FB_DIMM	FastPageMode
			DDR4_SDRAM	DDR2_SDRAM_FB_DIMM_PROBE	PipelinedNibble
			DDR4E_SDRAM	DDR_SGRAM	Logical
BaseModuleType	String	True	The base module type of Memory. Note: Northbound only properties.		
			Enum	Description	
			RDIMM	Registered DIMM.	
			UDIMM	UDIMM	
			SO_DIMM	SO_DIMM	
			LRDIMM	Load Reduced	
			Mini_RDIMM	Mini_RDIMM	
			Mini_UDIMM	Mini_UDIMM	
			SO_RDIMM_72b	SO_RDIMM_72b	
			SO_UDIMM_72b	SO_UDIMM_72b	
			SO_DIMM_16b	SO_DIMM_16b	
			SO_DIMM_32b	SO_DIMM_32b	
MemoryMedia	Array	True	Media of this memory. Note: Northbound only properties.		

Table 116. Memory properties (continued)

			Enum		Description	
			DRAM		DRAM media.	
			NAND		NAND media.	
			Proprietary		Proprietary media.	
CapacityMiB	Number	True	The value of this property shall be thMe emory capacity in MiB			
DataWidthBits	Number	True	The value of this property shall be the bus width in bits			
BusWidthBits	Number	True	The value of this property shall be the bus width in bits			
Manufacturer	String	True	The manufacturer of the Memory.			
SerialNumber	String	True	The serial number as provided by the manufacturer of this Memory.			
PartNumber	String	True	The part number as provided by the manufacturer of this Memory.			
AllowedSpeedsMHz	Array	True	Speed bins supported by this Memory.			
Assembly	Object	True	1. The link to the assembly associated with this DIMM. 2. Northbound only properties, platform specific porting needed.			
FirmwareRevision	String	True	Revision of firmware on the Memory controller. Note: Northbound only properties. Platform specific porting needed; require specific platform libraries support and ho between the specific libraries and gami module should be added.			
FirmwareApiVersion	String	True	Version of API supported by the firmware. Note: Northbound only properties. Platform specific porting needed; require specific platform libraries support and ho between the specific libraries and gami module should be added.			
FunctionClasses	Array of Items of type String	True	Function Classes by the Memory. Note: Northbound only properties. Platform specific porting needed; require specific platform libraries support and ho between the specific libraries and gami module should be added.			
MaxTDPMilliWatts	Array of type number	True	The value of this property shall be the maximum power budge supported by the Memory in milli Watts. Note: Northbound only properties. Platform specific porting needed; require specific platform libraries support and hook between the specific libraries and gami module should be added.			
SecurityCapabilities	Object	True	This object shall contain properties which describe the security capabilities of the Memory.			
			Name	Type	Read Only	Description
			Passphrase Capable	Boolean	True	Memory passphrase set capability
			MaxPassphrase Count	Number	True	Maximum number of passphrases supported fo this Memory.
			Passphrase LockLimit	Number	True	Maximum number of incorrect passphrase attempts allowed before memory is locked.

Table 116. Memory properties (continued)

			Configuration LockCapable	Boolean	True	Support for locking the configuration.
			DataLock Capable	Boolean	True	Support for data locking.
SpareDeviceCount	Number	True	The value of this property shall be the number of unused spare devices available in the Memory. If memory devices fails, the spare device could be used.			
ConfigurationLocked	Boolean	True	Indicates that the configuration of this memory has been lock			
RankCount	Number	True	The value of this property shall be number of ranks available i the Memory. The ranks could be used for spare or interleave. Note: Northbound only properties. Platform specific porting needed; require specific platform libraries support and ho between the specific libraries and gami module should be added.			
DeviceLocator	String	True	Location of the Memory in the platform, typically marked in the silk screen.			
MemoryLocation	Object	True	Memory connection information to sockets and memory controllers. Note: Northbound only properties, platform specific porting needed.			
			Name	Type	Read Only	Description
			Socket	Number	True	Socket number in which Memory is connected.
			Memory Controller	Number	True	Memory controller number in which Memory is connected.
			Channel	Number	True	Channel number in which Memory is connected.
			Slot	Number	True	Slot number in which Memory is connected.
ErrorCorrection	String	True	The value of this property shall be the error correction scheme supported for this memory.			
			Enum		Description	
			NoECC		No ECC available.	
			SingleBitECC		Single bit Data error can be corrected by ECC	
			MultiBitECC		Multi-bit Data errors can be corrected by ECC.	
			AddressParity		Address Parity errors can be corrected	
OperatingSpeedMhz	Number	True	Operating speed of Memory in MHz			
VolatileRegion SizeLimitMiB	Number	True	The value of this property shall be the total size of volatile regions in MiB. Note: Northbound only properties, platform specific porting needed.			
PersistentRegion SizeLimitMiB	Number	True	The value of this property shall be the total size of persistent regions in MiB. Note: Northbound only properties, platform specific porting needed.			
Regions	Array	True	The value of this property shall be the memory region information within the Memory.			
			Name	Type	Read Only	Description
			RegionId	String	True	Unique region ID representing a specific region within the Memory

Table 116. Memory properties (continued)

			OffsetMiB	Number	True	Offset with in the Memory that corresponds to the starting of this memory region in MiB	
			Passphrase Enabled	Boolean	True	The value of this property shall be a boolean indicating if the passphrase is enabled for this region.	
			SizeMiB	Number	True	Size of this memory region in MiB.	
			Memory Classification	String	True	Enum	Description
						Volatile	Volatile memory
						ByteAccessible Persistent	Byte accessible persistent memory
						Block	Block accesible memory
OperatingMemory Modes	Array	True	The value of this property shall be the memory modes supported by the Memory. Note: Northbound only properties, platform specific porting needed.				
			Enum		Description		
			Volatile		Volatile memory.		
			PMEM		Persistent memory, byte accesible through system address space.		
			Block		Block accessible system memory.		
PowerManagement Policy	Object	True	This object shall contain properties which describe the power management policy for the current resource.				
			Name	Type	Read Only	Description	
			PolicyEnabled	Boolean	True	Power management policy enabled status.	
			MaxTDP MilliWatts	Number	True	Maximum TDP in milli watts.	
			Peak PowerBudget MilliWatts	Number	True	Peak power budget in milli watts. Unit is mW.	
			Average PowerBudget MilliWatts	Number	True	Average power budget in milli watts. Unit is mW.	
IsSpareDevice Enabled	Boolean	True	Spare device enabled status.				
IsRankSpare Enabled	Boolean	True	Rank spare enabled status.				

Table 116. Memory properties (continued)

VolatileRegionNumberLimit	Number	True	Total number of volatile regions this Memory can support.			
PersistentRegionNumberLimit	Number	True	Total number of persistent regions this Memory can support.			
VolatileRegionSizeMaxMiB	Number	True	Maximum size of a single volatile region in MiB			
PersistentRegionSizeMaxMiB	Number	True	Maximum size of a single persistent region in MiB			
AllocationIncrementMiB	Number	True	The size of the smallest unit of allocation for a memory region, thus it is the multiple in which regions are actually reserved			
AllocationAlignmentMiB	Number	True	The boundary which memory regions are allocated on, measured in MiB			
Links	Object		Contains references to other resources that are related to this resource.			
			Name	Type	Read Only	Description
			Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14.
			Chassis(N)	Array	True	A reference to the Chassis which contains this Memory.
Status	Object		Name	Type	Read Only	Description
			Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14.
			OriginOfCondition	Object	True	This is the URI of the resource that caused the log entry. Refer to ID Ref in odata4.0.0.json.
ModuleManufacturerID	String	True	The value of this property shall be the two byte manufacturer ID of this memory module as defined by JEDEC in JEP-106.			
ModuleProductID	String	True	The value of this property shall be the two byte product ID of this memory module as defined by the manufacturer.			
MemorySubsystemControllerManufacturerID	String	True	The value of this property shall be the two byte manufacturer ID of the memory subsystem controller of this memory module as defined by JEDEC in JE-P106.			
MemorySubsystemControllerProductID	String	True	The value of this property shall be the two byte product ID of the memory subsystem controller of this memory module as defined by the manufacturer.			
VolatileSizeMiB	Number	True	The value of this property shall be the total size of the volatile portion memory in MiB.			
NonVolatileSizeMiB	Number	True	The value of this property shall be the maximum size of a single volatile regions in MiB.			
CacheSizeMiB	Number	True	The value of this property shall be the total size of the cache portion memory in MiB.			
LogicalSizeMiB	Number	True	The value of this property shall be the total size of the logical memory in MiB.			

Table 116. Memory properties (continued)

Location(M)	Array	True	See Table 12 “Resource.v1_8_1 schema property” on page 14.
Metrics(N)	Object	True	This property will have reference to the MemoryMetrics Resource which is populated under this MemoryInstance. Note: For out-of-band request this Metrics reference will be displayed in response only if the MemoryMetrics is populated for the MemoryInstance and for-in band request it will be displayed by default irrespective of MemyMoretrics availability for the MemoryInstance.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#Memory.Memory",
  "@odata.etag": "\"1614903196\"",
  "@odata.id": "/redfish/v1/Systems/Self/Memory/DevType2_DIMM7",
  "@odata.type": "#Memory.v1_7_1.Memory",
  "Actions": {
    "Oem": {
      "#AmiBios.ChangeState": {
        "State@Redfish.AllowableValues": [
          "Enabled",
          "Disabled"
        ],
        "target": "/redfish/v1/Systems/Self/Memory/DevType2_DIMM7/Actions/AmiBios.ChangeState"
      }
    }
  },
  "AllowedSpeedsMHz": [
    2933
  ],
  "BaseModuleType": "RDIMM",
  "BusWidthBits": 72,
  "CacheSizeMiB": 0,
  "CapacityMiB": 16384,
  "DataWidthBits": 64,
```

```

"DeviceLocator": "DIMM 1",
"Id": "DevType2_DIMM7",
"Links": {
    "Chassis": {
        "@odata.id": "/redfish/v1/Chassis/Self"
    }
},
"LogicalSizeMiB": 0,
"Manufacturer": "Micron Technology",
"MemoryDeviceType": "DDR4",
"MemoryLocation": {
    "Channel": 3,
    "MemoryController": 0,
    "Slot": 1,
    "Socket": 0
},
"MemoryType": "DRAM",
"ModuleManufacturerID": "0x2C80",
"Name": "DevType2_DIMM7",
"NonVolatileSizeMiB": 0,
"OperatingMemoryModes": [
    "Volatile"
],
"OperatingSpeedMhz": 2933,
"PartNumber": "18ASF2G72PDZ-2G9E1  ",
"RankCount": 2,
"SecurityCapabilities": {
    "ConfigurationLockCapable": false,
    "DataLockCapable": false,
    "PassphraseCapable": false
},

```

```
"SerialNumber": "1B5BAB32",  
"Status": {  
    "Health": "OK",  
    "State": "Enabled"  
},  
"VolatileSizeMiB": 16384  
}
```

POST– Memory Instance

Dependence

These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

POST https://{ip}/redfish/v1/Systems/{{Systems_instance}}/Memory/{{memory_instance}}/Actions/AmiBios.ChangeState

Content-Type: application/json

POST Action for Memory Instance AmiBios.ChangeState will be available only with HostInterface support in Redfish.

Request body

```
{  
    "State": "Disabled"  
}
```

If all the memory instances are disabled, the Host System will not bootup in the next boot.

Response

The response status is 204 with no body. For Error Responses, please refer to [“Error Response” on page 11](#).

GET – Memory Domain Collection

Dependence

1. This represents the collection of Memory resources.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET <https://{ip}/redfish/v1/Systems/Self/MemoryDomains>

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#MemoryDomainCollection.MemoryDomainCollection",
  "@odata.etag": "\"1619181000\"",
  "@odata.id": "/redfish/v1/Systems/Self/MemoryDomains",
  "@odata.type": "#MemoryDomainCollection.MemoryDomainCollection",
  "Description": "Collection of Memory Domains",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Systems/Self/MemoryDomains/MemoryDomain_SystemMemory_0"
    }
  ],
  "Members@odata.count": 1,
  "Name": "MemoryDomain Collection"
}
```

GET – Memory Domain Instance

Dependence

1. Displays the information about the Memory devices like DIMM supported by the host connected to the BMC.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Systems/Self/MemoryDomains/{{MemoryDomain_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 117. Memory Domain Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5 .
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14 .

Table 117. Memory Domain Properties (continued)

Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12			
Name(M)	String	True				
Description	String	True				
AllowsMemoryChunkCreation	Boolean	True	Indicates if this Memory Domain supports the creation of Memory Chunks.			
AllowsBlockProvisioning	Boolean	True	Indicates if this Memory Domain supports the provisioning of blocks of memory.			
InterleavableMemorySets	Array		This is the interleave sets for the memory chunk.			
			Name	Type	Read only	Description
			MemorySet@odata.count	Number	true	Count of MemorySets
			MemorySet	Array of Objects	True	This is the collection of memory for a particular interleave set
MemoryChunks	Object	True	A reference to the collection of Memory Chunks associated with this Memory Domain.			
AllowsMirroring	Boolean	True	Indicates if this Memory Domain supports the creation of Memory Chunks with mirroring enabled.			
AllowsSparing	Boolean	True	Indicates if this Memory Domain supports the creation of Memory Chunks with sparing enabled.			
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.			

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#MemoryDomain.MemoryDomain",
  "@odata.etag": "\"1614903197\"",
  "@odata.id": "/redfish/v1/Systems/Self/MemoryDomains/MemoryDomain_SystemMemory_0",
  "@odata.type": "#MemoryDomain.v1_2_2.MemoryDomain",
  "AllowsBlockProvisioning": false,
  "AllowsMemoryChunkCreation": false,
  "AllowsMirroring": false,
  "AllowsSparing": false,
  "Id": "MemoryDomain_SystemMemory_0",
  "InterleavableMemorySets": [
    {
      "MemorySet": [
```

```

        {
            "@odata.id": "/redfish/v1/Systems/Self/Memory/DevType2_DIMM7"
        }
    ],
    "MemorySet@odata.count": 1
}

],
"MemoryChunks": {
    "@odata.id": "/redfish/v1/Systems/Self/MemoryDomains/MemoryDomain_SystemMemory_0/MemoryChunks"
},
"Name": "MemoryDomain_SystemMemory_0"
}

```

GET – Memory Chunks Collection

Dependence

1. This represents the collection of Memory resources.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{ip}/redfish/v1/Systems/Self/MemoryDomains/{{MemoryDomain_instance}}/MemoryChunks

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```

{
    "@odata.context": "/redfish/v1/$metadata#MemoryChunksCollection.MemoryChunksCollection",
    "@odata.etag": "\"1619181000\"",
    "@odata.id": "/redfish/v1/Systems/Self/MemoryDomains/MemoryDomain_SystemMemory_0/MemoryChunks",
    "@odata.type": "#MemoryChunksCollection.MemoryChunksCollection",
    "Description": "Collection of MemoryChunks",
    "Members": [
        {

```

```

        "@odata.id": "/redfish/v1/Systems/Self/MemoryDomains/MemoryDomain_SystemMemory_0/MemoryChunks/
MemoryDomain_SystemMemory_0_Chunk_0"

    }

],

    "Members@odata.count": 1,

    "Name": "MemoryChunks Collection"
}

```

GET – Memory Chunks Instance

Dependence

1. Displays the information about the Memory devices like DIMM supported by the host connected to the BMC.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Systems/Self/MemoryDomains/{{MemoryDomain_instance}}/MemoryChunks/{{MemoryChunks_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 118. Memory Chunks Properties

Name	Type	Read only	Description	
(OData Attributes)			Refer to “OData Support” on page 5.	
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.	
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12	
Name(M)	String	True		
Description	String	True		
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.	
MemoryChunkSizeMiB	Number	True	Size of the memory chunk in MiB.	
AddressRangeType	String	True	Memory type of this memory chunk	
			Enum	Description
			Volatile	Volatile memory.
			PMEM	Byte accessible persistent memory.
			Block	Block accesible memory.
InterleaveSets	Array		This is the interleave sets for the memory chunk.	

Table 118. Memory Chunks Properties (continued)

			Name	Type	Read only	Description
			RegionId	String	True	DIMM region identifier.
			OffsetMiB	Number	True	Offset within the DIMM that corresponds to the start of this memory region, with units in MiB.
			SizeMiB	Number	true	Size of this memory region in MiB.
			MemoryLevel	Number	true	Level of the interleave set for multi- level tiered memory.
			Memory	Objects	True	Ref. to memory device of the interleave set
IsSpare	Boolean	True	Spare enabled status.			
IsMirrorEnabled	Boolean	True	Mirror Enabled status.			
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.			

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#MemoryChunks.MemoryChunks",
  "@odata.etag": "\"1614903197\"",
  "@odata.id": "/redfish/v1/Systems/Self/MemoryDomains/MemoryDomain_SystemMemory_0/MemoryChunks/MemoryDomain_SystemMemory_0_Chunk_0",
  "@odata.type": "#MemoryChunks.v1_2_3.MemoryChunks",
  "AddressRangeType": "Volatile",
  "Id": "MemoryDomain_SystemMemory_0_Chunk_0",
  "InterleaveSets": [
    {
      "Memory": {
        "@odata.id": "/redfish/v1/Systems/Self/Memory/DevType2_DIMM7"
      },
      "MemoryLevel": 0,
      "RegionId": "MemoryDomain_SystemMemory_0_Chunk_0_Volatile_7",
      "SizeMiB": 16384
    }
  ]
}
```

```
],  
  "IsMirrorEnabled": false,  
  "IsSpare": false,  
  "MemoryChunkSizeMiB": 16384,  
  "Name": "MemoryDomain_SystemMemory_0_Chunk_0"  
}
```

Chapter 19. Storage

GET – Simple Storage Collection

Dependence

1. This represents the collection of Simple Storage resources.
2. These resources are populated by Host Interface, and Northbound API Support is needed.

Request

GET https://{ip}/redfish/v1/Systems/{system_instance}/SimpleStorage

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#SimpleStorageCollection.SimpleStorageCollection",
  "@odata.etag": "\"1619183398\"",
  "@odata.id": "/redfish/v1/Systems/Self/SimpleStorage",
  "@odata.type": "#SimpleStorageCollection.SimpleStorageCollection",
  "Description": "Collection of simple storage for this system",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Systems/Self/SimpleStorage/USB_Controller1"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/SimpleStorage/SATA_Controller_2"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/SimpleStorage/USB_Controller0"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/SimpleStorage/SATA_Controller_3"
    }
  ]
}
```

```

],
"Members@odata.count": 4,

"Name": "Simple Storage Collection"
}

```

GET – Get Simple Storage Instance

Dependence

1. It represents the properties of a storage controller and its directly attached devices.
2. These resources are populated by Host Interface, and Northbound API Support is needed.

Request

GET https://{{ip}}/redfish/v1/Systems/{{system_instance}}/SimpleStorage/{{system_simplestorage_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 119. Simple Storage Properties

Name	Type	Read Only	Description												
(OData Attributes)			Refer to “OData Support” on page 5.												
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.												
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12												
Name(M)	String	True													
Description	String	True													
UefiDevicePath	String	True	The UEFI device path used to access this storage controller. This path is used to identify and locate the specific storage controller.												
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.												
Links	Object	True	The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but not contained by (subordinate to), this resource												
			<table><tr><th>Name</th><th>Type</th><th>Read Only</th><th>Description</th></tr><tr><td>Oem</td><td>Object</td><td>False</td><td>Refer to Table 11 “Resource Complex Types” on page 14.</td></tr><tr><td>Chassis(N)</td><td>Array</td><td>True</td><td>The value of this property shall be a reference to a resource of type Chassis that represent the physic container associated with this Simple Storage.</td></tr></table>	Name	Type	Read Only	Description	Oem	Object	False	Refer to Table 11 “Resource Complex Types” on page 14.	Chassis(N)	Array	True	The value of this property shall be a reference to a resource of type Chassis that represent the physic container associated with this Simple Storage.
			Name	Type	Read Only	Description									
			Oem	Object	False	Refer to Table 11 “Resource Complex Types” on page 14.									
Chassis(N)	Array	True	The value of this property shall be a reference to a resource of type Chassis that represent the physic container associated with this Simple Storage.												

Table 119. Simple Storage Properties (continued)

Actions	Object	True	This object will contain the actions for this resource under Oem property if any.			
Devices	Array of Objects	True	Name	Type	Read Only	Description
			Oem	Object	False	Refer to Table 11 “Resource Complex Types” on page 14.
			Name(M)	String	True	Name of the resource or array element
			Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.
			Manufacturer	String	True	Name of the manufacturer of this storage device.
			CapacityBytes	Number	True	The value of this property shall represent the size (in bytes) of the Storage Device.
			Model	String	True	Model number of this device.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#SimpleStorage.SimpleStorage",
  "@odata.etag": "\"1619171742\"",
  "@odata.id": "/redfish/v1/Systems/Self/SimpleStorage/SATA_Controller_2",
  "@odata.type": "#SimpleStorage.v1_2_2.SimpleStorage",
  "Id": "SATA_Controller_2",
  "Links": {
    "Chassis": {
      "@odata.id": "/redfish/v1/Chassis/Self"
    }
  },
  "Name": "SATA_Controller_2",
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  },
  "UefiDevicePath": "PciRoot(0x1)/Pci(0x8,0x2)/Pci(0x0,0x0)"
}
```

GET – Get Storage Collection

Dependence

1. It displays the collection of storage resource instances available in the system.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Systems/Self/Storage

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#StorageCollection.StorageCollection",
  "@odata.etag": "\"1619183398\"",
  "@odata.id": "/redfish/v1/Systems/Self/Storage",
  "@odata.type": "#StorageCollection.StorageCollection",
  "Description": "Collection of Storage resource instances",
  "Members": [
    {
      "@odata.id": "/redfish/v1/Systems/Self/Storage/1"
    }
  ],
  "Members@odata.count": 1,
  "Name": "Storage Collection"
}
```

GET – Get Storage Instance

Dependence

1. It displays the collection of storage resource instances available in the system.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Systems/Self/Storage/{{Storage_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 120. Storage Properties

Name	Type	Read only	Description			
(OData Attributes)			Refer to “OData Support” on page 5.			
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.			
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12			
Name(M)	String	True				
Description	String	True				
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.			
Links	Object	True	Contains references to other resources that are related to this resource.			
			Name	Type	Read Only	Description
			Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14.
			Enclosures@odata.count	Number	True	An integer representing the number of items in a collection.
			Enclosures(N)	Array	True	An array of references to the chassis to which this storage subsystem is attached
StorageControllers@odata.count	Number	True	An integer representing the number of items in a collection.			
StorageControllers	Array	True	A collection that indicates all the storage controllers that this resource represents. Refer to Storage Controller Properties .			
Drives@odata.count	Number	True	An integer representing the number of items in a collection.			
Drives	Array	True	A collection that indicates all the drives attached to the storage controllers that this resource represents.			
Volumes	Object	True	A collection that indicates all the volumes produced by the storage controllers that this resource represents.			
Redundancy@odata.count	Number	True	An integer representing the number of items in a collection.			
Redundancy(N)	Array	True	Redundancy information for the storage subsystem. Note: Redundancy information can be configured through redis commands.			

Table 121. Storage Controller Properties

Name	Type	Read only	Description
MemberId	String	True	This is the identifier for the member within the collection.

Table 121. Storage Controller Properties (continued)

Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.			
Assembly	Object	True	The link to the assembly associated with this storage controller. Northbound only properties, platform specific porting needed.			
ControllerRates			This type describes the various controller rates used for processes such as Volume Rebuild or Consistency Checks.			
			Name	Type	Read Only	Description
			Consistency CheckRatePercent	Number	True	The percentage of controller Resources used for performing a data consistency check on volumes.
			Rebuild RatePercent	Number	True	The percentage of controller Resources used for rebuilding/repairing volumes.
			Transformation RatePercent	Number	True	The percentage of controller Resources used for transforming volumes from one configuration to another.
Name	String	True	The name of the Storage Controller.			
SpeedGbps	Number	True	The value of this property shall represent the speed of the Storage bus interface (in Gigabits per second).			
FirmwareVersion	String	True	The firmware version of this storage Controller.			
Manufacturer	String	True	This is the manufacturer of this storage controller.			
Model	String	True	This is the model number for the storage controller.			
SKU	String	True	This is the SKU for this storage controller.			
SerialNumber	String	True	The serial number for this storage controller.			
PartNumber	String	True	The part number for this storage controller.			
AssetTag	String	False	The user assigned asset tag for this storage controller.			
Supported ControllerProtocols	Array	True	Refer to Protocol Properties for allowed Enum in Array.			
Supported DeviceProtocols	Array	True	Refer to Protocol Properties for allowed Enum in Array.			
Identifiers	Array	True	This property shall contain a list of all known durable names for the associated storage controller. See Table 12 “Resource.v1_8_1 schema property” on page 14.			
Location	Object	True	See Table 12 “Resource.v1_8_1 schema property” on page 14.			
CacheSummary	Object	True	This object describes the cache memory of the storage control in general detail.			
			Name	Type	Read Only	Description
			Persistent CacheSizeMiB	Number	True	The portion of the cache memory that is persistent, measured in MiB.
			Total CacheSizeMiB	Number	True	The total configured cache memory, measure in MiB.

Table 121. Storage Controller Properties (continued)

			Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14
PCleInterface	Object		The PCIe interface details for this controller. Refer to PCIe Interface Properties .			
Supported RAIDTypes	Array	True	This object describes the RAID Types supported by the storage controller.			
			Enum	Description		
			RAID00	A placement policy that creates a RAID 0 stripe set over two or more RAID 0 sets		
			RAID01	A data placement policy that creates a mirrored device (RAID 1) over a set of striped devices (RAID 0)		
			RAID1	A placement policy where each logical block of data is stored on more than one independent storage device		
			RAID10	A placement policy that creates a striped device (RAID 0) over a set of mirrored devices (RAID 1)		
			RAID10E	A placement policy that uses a RAID 0 stripe set over two or more RAID 10 sets		
			RAID10Triple	A placement policy that uses a striped device (RAID 0) over a set of triple mirrored devices (RAID 1Triple)		
			RAID1E	A placement policy that uses a form of mirroring implemented over a set of independent storage devices where logical blocks are duplicated on a pair of independent storage devices so that data is uniformly distributed across the storage devices		
			RAID1Triple	A placement policy where each logical block of data is mirrored three times across a set of three independent storage devices		
			RAID3	A placement policy using parity-based protection where logical bytes of data are uniformly distributed across a set of independent storage devices and where the parity is stored on a dedicated independent storage device		
			RAID4	A placement policy using parity-based protection where logical blocks of data are uniformly distributed across a set of independent storage devices and where the parity is stored on a dedicated independent storage device		
			RAID5	A placement policy using parity-based protection for storing stripes of 'n' logical blocks of data and one logical block of parity across a set of 'n+1' independent storage devices where the parity and data blocks are interleaved across the storage devices		
			RAID50	A placement policy that uses a RAID 0 stripe set over two or more RAID 5 sets of independent storage devices		
			RAID6	A placement policy using parity-based protection for storing stripes of 'n' logical blocks of data and two logical blocks of independent parity across a set of 'n+2' independent storage devices where the parity and data blocks are interleaved across the storage devices		

Table 121. Storage Controller Properties (continued)

			RAID60	A placement policy that uses a RAID 0 stripe set over two or more RAID 6 sets of independent storage devices		
			RAID6TP	A placement policy that uses parity-based protection for storing stripes of 'n' logical blocks of data and three logical blocks of independent parity across a set of 'n+3' independent storage devices where the parity and data blocks are interleaved across the storage devices. This is commonly referred to as Triple Parity RAID. Data stored using this form of RAID is able to survive any three independent storage device failures without data loss		
Links	Object	True	Contains references to other resources that are related to this resource.			
			Name	Type	Read Only	Description
			Endpoints@odata.count	Number	True	An integer representing the number of items in a collection.
			Endpoints(N)	Array	True	The value of this property shall be a reference to the resources that this system is associated with and shall reference a resource of type Endpoint. Note: These will be available only as a part of FPX Product.

Table 122. Protocol Properties

Member Name	Description
PCIe	PCI Express (Vendor Proprietary).
AHCI	Advanced Host Controller Interface.
UHCI	Universal Host Controller Interface.
SAS	Serial Attached SCSI.
SATA	Serial AT Attachment.
USB	Universal Serial Bus.
NVMe	Non-Volatile Memory Express.
FC	Fibre Channel.
iSCSI	Internet SCSI.
FCoE	Fibre Channel over Ethernet.
NVMeOverFabrics	NVMe over Fabrics.
SMB	Server Message Block (aka CIFS Common Internet File System).
NFSv3	Network File System version 3.
NFSv4	Network File System version 4.
HTTP	Hypertext Transport Protocol.
HTTPS	Secure Hypertext Transport Protocol.

Table 122. Protocol Properties (continued)

FTP	File Transfer Protocol.
SFTP	Secure File Transfer Protocol.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#Storage.Storage",
  "@odata.etag": "\"1619171741\"",
  "@odata.id": "/redfish/v1/Systems/Self/Storage/1",
  "@odata.type": "#Storage.v1_7_0.Storage",
  "Drives": [
    {
      "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device2_Port1"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device0_Port1"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device5_Port1"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device4_Port1"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device8_Port0"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device1_Port1"
    },
    {
      "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device7_Port1"
    },
  ],
}
```

```

    {
        "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device6_Port1"
    },
    {
        "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device3_Port1"
    }
],
"Drives@odata.count": 9,
"Id": "1",
"Links": {
    "Enclosures@odata.count": 0
},
"Name": "Local Storage Controller",
"Redundancy@odata.count": 0,
"StorageControllers": [
    {
        "@odata.id": "/redfish/v1/Systems/Self/Storage/1#/StorageControllers/0",
        "AssetTag": "(USB_Controller_0)",
        "FirmwareVersion": "1.10",
        "MemberId": "0",
        "Name": "USB_Controller0",
        "PCIeInterface": {
            "LanesInUse": 0,
            "MaxPCIeType": "Gen1",
            "PCIeType": "Gen1"
        },
        "SpeedGbps": 3,
        "Status": {
            "Health": "OK",
            "State": "Enabled"
        }
    },

```



```

    "SupportedControllerProtocols": [
        "USB",
        "PCIe"
    ],
    "SupportedDeviceProtocols": [
        "USB"
    ]
},
{
    "@odata.id": "/redfish/v1/Systems/Self/Storage/1#/StorageControllers/1",
    "AssetTag": "(USB_Controller_1)",
    "FirmwareVersion": "1.10",
    "MemberId": "1",
    "Name": "USB_Controller1",
    "PCIeInterface": {
        "LanesInUse": 0,
        "MaxPCIeType": "Gen1",
        "PCIeType": "Gen1"
    },
    "SpeedGbps": 3,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "SupportedControllerProtocols": [
        "USB",
        "PCIe"
    ],
    "SupportedDeviceProtocols": [
        "USB"
    ]
}

```

```

    ]
  },
  {
    "@odata.id": "/redfish/v1/Systems/Self/Storage/1#/StorageControllers/2",
    "AssetTag": "(SATA_Controller_2)",
    "FirmwareVersion": "Not Available",
    "MemberId": "2",
    "Model": "Not Available",
    "Name": "SATA_Controller_2",
    "PCIeInterface": {
      "LanesInUse": 0,
      "MaxPCIeType": "Gen1",
      "PCIeType": "Gen1"
    },
    "SerialNumber": "Not Available",
    "SpeedGbps": 6,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "SupportedControllerProtocols": [
      "PCIe",
      "AHCI",
      "SATA"
    ],
    "SupportedDeviceProtocols": [
      "AHCI",
      "SATA"
    ]
  }
]

```

```

"@odata.id": "/redfish/v1/Systems/Self/Storage/1#/StorageControllers/3",
"AssetTag": "(SATA_Controller_3)",
"FirmwareVersion": "Not Available",
"MemberId": "3",
"Model": "Not Available",
"Name": "SATA_Controller_3",
"PCIeInterface": {
    "LanesInUse": 0,
    "MaxPCIeType": "Gen1",
    "PCIeType": "Gen1"
},
"SerialNumber": "Not Available",
"SpeedGbps": 6,
"Status": {
    "Health": "OK",
    "State": "Enabled"
},
"SupportedControllerProtocols": [
    "PCIe",
    "AHCI",
    "SATA"
],
"SupportedDeviceProtocols": [
    "AHCI",
    "SATA"
]
}
],
"StorageControllers@odata.count": 4,
"SupportedControllerProtocols@Redfish.AllowableValues": [

```

```

    "PCIe",
    "AHCI",
    "UHCI",
    "SAS",
    "SATA",
    "USB",
    "NVMe",
    "FC",
    "iSCSI",
    "FCoE",
    "FCP",
    "FICON",
    "NVMeOverFabrics",
    "SMB",
    "NFSv3",
    "NFSv4",
    "HTTP",
    "HTTPS",
    "FTP",
    "SFTP"
  ],
  "SupportedDeviceProtocols@Redfish.AllowableValues": [
    "PCIe",
    "AHCI",
    "UHCI",
    "SAS",
    "SATA",
    "USB",
    "NVMe",
    "FC",
    "iSCSI",

```

```

        "FCoE",
        "FCP",
        "FICON",
        "NVMeOverFabrics",
        "SMB",
        "NFSv3",
        "NFSv4",
        "HTTP",
        "HTTPS",
        "FTP",
        "SFTP"
    ],
    "Volumes": {
        "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Volumes"
    }
}

```

GET – Volume Collection

Dependence

1. It displays the collection of volume resource instances available in the system.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{ip}/redfish/v1/Systems/Self/Storage/{Storage_instance}/Volume

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```

{
    "@odata.context": "/redfish/v1/$metadata#VolumeCollection.VolumeCollection",
    "@odata.etag": "\"1619183398\"",
    "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Volumes",

```

```

"@odata.type": "#VolumeCollection.VolumeCollection",

"Description": "The Collection for Volumes",

"Members": [

    {

        "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Volumes/VOL0"

    }

],

"Members@odata.count": 1,

"Name": "Volume Collection"

}

```

GET – Volume Instance

Dependence

1. Volume contains properties used to describe a volume, virtual disk, LUN, or other logical storage entity for any system.
2. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Systems/Self/Storage/{{Storage_instance}}/Volumes/{{Volume_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 123. Volume Properties

Name	Type	Read only	Description	
(OData Attributes)			Refer to “OData Support” on page 5.	
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.	
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12	
Name(M)	String	True		
Description	String	True		
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.	
CapacityBytes	Number	True	This property shall contain the size in bytes of the associated volume.	
VolumeType	String	True	This property shall contain the type of the associated Volume.	
			Enum	Description

Table 123. Volume Properties (continued)

			RawDevice			The volume is a raw physical device without any RAID or other virtualization applied.			
			NonRedundant			The volume is a non-redundant storage device.			
			Mirrored			The volume is a mirrored device.			
			StripedWithParity			The volume is a device which uses parity to retain redundant information.			
			SpannedMirrors			The volume is a spanned set of mirrored devices.			
			SpannedStripesWithParity			The volume is a spanned set of devices which uses parity to retain redundant information.			
Encrypted	Boolean (False)	True	This property shall contain a boolean indicator if the Volume is currently utilizing encryption or not. Default it will be null						
EncryptionTypes	Array	True	This property shall contain the types of encryption used by this Volume.						
			Enum			Description			
			NativeDriveEncryption			The volume is utilizing the native drive encryption capabilities of the drive hardware.			
			ControllerAssisted			The volume is being encrypted by the storage controller entity.			
			SoftwareAssisted			The volume is being encrypted by software running on the system or the operating system.			
Identifiers	Array	True	This property shall contain a list of all known durable names for the associated volume.						
BlockSizeBytes	Number	True	The size of the smallest addressable unit (Block) of this volume in bytes.						
Operations	Array		The operations currently running on the Volume.						
			Name		Type	Read only		Description	
			Operation Name		String	True		The name of the operation.	
			Percentage Complete		Number	True		The percentage of the operation that has been completed.	
			Associated Task		Object	True		A reference to the task associated with the operation if any.	
OptimumIO SizeBytes	Number	True	This property shall contain the optimum IO size to use when performing IO on this volume. For logical disks, this is the stripe size. For physical disks, this describes the physical sector size.						
Links			An array of references to the drives which contain this volume. This will reference Drives that either wholly or only partly contain this volume.						
			Name		Type	Read only		Description	

Table 123. Volume Properties (continued)

			Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14.
			Drives@odata.count	Number	True	An integer representing the number of items in a collection.
			Drives(N)	Array	True	An array of references to the chassis to which this storage subsystem is attached
Actions	Object	True	Volume.Initialize is the available actions for this resource			

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#Volume.Volume",
  "@odata.etag": "\"1619171741\"",
  "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Volumes/VOL0",
  "@odata.type": "#Volume.v1_0_3.Volume",
  "BlockSizeBytes": 16384,
  "CapacityBytes": 31439454208,
  "Id": "VOL0",
  "Links": {
    "Drives": [
      {
        "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device8_Port0"
      }
    ],
    "Drives@odata.count": 1
  },
  "Name": "VOL0",
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  }
}
```


GET – Drive Instance

Dependence

1. This is the schema definition for the Drives.
2. It represents the properties of a Drives attached to a System.
3. These resources are populated by Host Interface, and Extra AMI BIOS Support is needed.

Request

GET https://{{ip}}/redfish/v1/Systems/Self/Storage/{{Storage_instance}}/Drives/{{Drives_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following tables.

Table 124. Drives Instance Properties

Name	Type	Read only	Description			
(OData Attributes)			Refer to “OData Support” on page 5.			
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.			
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12			
Name(M)	String	True				
Description	String	True				
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.			
Manufacturer	String	True	This is the manufacturer of this Drive			
Model	String	True	This is the model number for the Drive			
SKU	String	True	This is the SKU for this Drive.			
SerialNumber	String	True	The serial number for this Drive.			
PartNumber	String	True	The part number for this Drive.			
AssetTag	String	True	The user assigned asset tag for this Drive Default it will be null value.			
Assembly	Object	True	1. The link to the assembly associated with this Drive. 2. Northbound only properties, platform specific porting needed.			
Revision	String	True	The revision of this Drive. This is typically the firmware/hardware version of the drive.			
Links	Object	True	The links object contains the links to other resources that are related to this resource.			
			Name	Type	Read Only	Description
			Endpoints	Array	True	An array of references to the endpoints that connect to this drive.

Table 124. Drives Instance Properties (continued)

			Endpoints@odata.count	Number	True	An integer representing the number of items in a collection.
			Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14.
			Chassis	Object	True	A reference to the Chassis which contains this Drive.
			PCleFunctions	Array	True	An array of references to the PCIe Functions which the drive produces.
			PCleFunctions@odata.count	Number	True	An integer representing the number of items in a collection.
			Volumes	Array	True	An array of references to the volumes contained in this drive. This will reference Volumes that are either wholly or only partly contained by this drive.
			Volumes@odata.count	Number	True	An integer representing the number of items in a collection.
Operations	Object	True	The operations currently running on the Drive.			
			Name	Type	Read Only	Description
			OperationName	String	True	The name of the operation.
			PercentageComplete	Number	True	The percentage of the operation that has been completed.
			AssociatedTask	Object	True	A reference to the task associated with the operation if any.
StatusIndicator	String	True	The state of the status indicator, used to communicate status information about this drive.			
			Enum		Description	
			OK		The drive is OK.	
			Fail		The drive has failed.	
			Rebuild		The drive is being rebuilt.	
			PredictiveFailureAnalysis		The drive is still working but predicted to fail soon.	
			Hotspare		The drive is marked to be automatically rebuilt and used as a replacement for a failed drive.	

Table 124. Drives Instance Properties (continued)

			InACriticalArray	The array that this drive is a part of is degraded.
			InAFailedArray	The array that this drive is a part of is failed.
IndicatorLED	String	True	The state of the indicator LED, used to identify the drive.	
			Enum	Description
			Lit	The Indicator LED is lit
			Blinking	The Indicator LED is blinking.
			Off	The Indicator LED is off.
CapacityBytes	Number	True	The size in bytes of this Drive.	
FailurePredicted	Boolean	True	Is this drive currently predicting a failure in the near future.	
PhysicalLocation	Object	True	See Table 12 “Resource.v1_8_1 schema property” on page 14.	
Protocol	String	True	The protocol this drive is using to communicate to the storage controller.	
			Enum	Description
			PCIe	PCI Express (Vendor Proprietary)
			AHCI	Advanced Host Controller Interface
			UHCI	Universal Host Controller Interface
			SAS	Serial Attached SCSI
			SATA	Serial AT Attachment
			USB	Universal Serial Bus
			NVMe	Non-Volatile Memory Express
			FC	Fibre Channel
			iSCSI	Internet SCSI
			FCoE	Fibre Channel over Ethernet
			NVMeOverFabrics	NVMe over Fabrics
			SMB	Server Message Block (aka CIFS Common Internet File System)
			NFSv3	Network File System version 3
			NFSv4	Network File System version 4
			HTTP	Hypertext Transport Protocol
			HTTPS	Secure Hypertext Transport Protocol
			SFTP	Secure File Transfer Protocol
			FTP	File Transfer Protocol
MediaType	String	True	The type of media contained in this drive.	
			Enum	Description
			HDD	The drive media type is traditional magnetic platters.

Table 124. Drives Instance Properties (continued)

			SSD	The drive media type is solid state or flash memory.
			SMR	The drive media type is shingled magnetic recording.
Identifiers	Array	True	See Table 12 “Resource.v1_8_1 schema property” on page 14.	
EncryptionAbility	String	True	The encryption abilities of this drive.	
			Enum	Description
			None	The drive is not capable of self encryption.
			SelfEncryptingDrive	The drive is capable of self encryption per the Trusted Computing Group's Self Encrypting Drive Standard.
			Other	The drive is capable of self encryption through some other means.
HotspareType	String	True	The type of hotspare this drive is currently severing as.	
			Enum	Description
			None	The drive is not currently a hotspare.
			Global	The drive is currently serving as a hotspare for all other drives in the storage system.
			Chassis	The drive is currently serving as a hotspare for all other drives in the chassis.
			Dedicated	The drive is currently serving as a hotspare for a user defined set of drives.
EncryptionStatus	String	True	The status of the encryption of this drive.	
			Enum	Description
			Unencrypted	The drive is not currently encrypted. Deprecated: Use Unencrypted.
			Unlocked	The drive is currently encrypted but the data is accessible to the user unencrypted.
			Locked	The drive is currently encrypted and the data is not accessible to the user, however the system has the ability to unlock the drive automatically.
			Unencrypted	The drive is not currently encrypted.
			Foreign	The drive is currently encrypted, the data is not accessible to the user, and the system requires user intervention to expose the data
Rotation SpeedRPM	Number	True	The rotation speed of this Drive in Revolutions per Minute (RPM).	

Table 124. Drives Instance Properties (continued)

BlockSizeBytes	Number	True	The size of the smallest addressable unit (Block) of this drive in bytes.	
CapableSpeedGbs	Number	True	The speed which this drive can communicate to a storage controller in ideal conditions in Gigabits per second.	
NegotiatedSpeedGbs	Number	True	The speed which this drive is currently communicating to the storage controller in Gigabits per second.	
PredictedMediaLifeLeftPercent	Number	True	The percentage of reads and writes that are predicted to still be available for the media.	
HotspareReplacementMode	String	True	The replacement mode for the hotspare drive.	
			Enum	Description
			NonRevertible	A hotspare drive that is commissioned due to a drive failure will remain as a data drive and will not revert to a hotspare if the failed drive is replaced.
			Revertible	A hotspare drive that is commissioned due to a drive failure will revert to being a hotspare once the failed drive is replaced and rebuilt.
WriteCacheEnabled	Boolean	True	This property shall indicate whether the drive write cache is enabled.	

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#Drive.Drive",
  "@odata.etag": "\"1619171740\"",
  "@odata.id": "/redfish/v1/Systems/Self/Storage/1/Drives/USB_Device2_Port1",
  "@odata.type": "#Drive.v1_6_0.Drive",
  "BlockSizeBytes": 2048,
  "CapacityBytes": 2048,
  "EncryptionAbility": "None",
  "EncryptionStatus": "Unlocked",
  "FailurePredicted": false,
  "HotspareType": "Chassis",
  "Id": "USB_Device2_Port1",
  "Links": {
    "Chassis": {
      "@odata.id": "/redfish/v1/Chassis/Self"
    }
  },
}
```

```
    "Endpoints@odata.count": 0,
    "Volumes@odata.count": 0
  },
  "Manufacturer": "American Megatrends Inc.",
  "MediaType": "HDD",
  "Model": "Virtual Cdrom Device",
  "Name": "USB_Device2_Port1",
  "PredictedMediaLifeLeftPercent": 255,
  "Protocol": "USB",
  "Revision": "USB2.00",
  "SerialNumber": "AAAABBBBCCCC1",
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  }
}
```

Chapter 20. Telemetry

GET – Telemetry Service

Request

GET https://{ip}/redfish/v1/TelemetryService

Content-Type: application/json

1. This resource shall be used to represent a Metrics Service for a Redfish implementation.
2. It represents the properties for the service itself and has links to collections of metric definitions and metric report definitions.

Response

1. The response of the request will be in JSON format. The properties are mentioned in the following table.
2. The “ServiceEnabled” attribute was introduced to DMTF Redfish Schema version 2019.4.
3. Hence, in the case of Telemetry Service Root URI alone, to support “ServiceEnabled” attribute, we are migrating to 2019.4 for supporting this attribute alone from DMTF Redfish Schema versioned 2019.2 for supporting this attribute alone from DMTF Redfish Schema versioned 2019.2, which is currently supported by RTP version 1.8.a.
4. Remaining URIs under Telemetry Service is implemented based on the Redfish Schema versioned 2019.2.

Table 125. Telemetry Service Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5 .
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14 .
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	Array	True	
Description	Array	True	
MetricDefinitions	Array	True	<ol style="list-style-type: none">1. A collection of Metric definitions that describes metrics properties.2. The entries shall be resources of type MetricDefinitionCollection.
MetricReport Definitions	Array	True	<ol style="list-style-type: none">1. A collection of MetricReportDefinitions.2. The value shall be a link to a resource of type MetricReportDefinitionCollection.
MetricReports	Array	True	A collection of MetricReport resources, that relate to MetricReportDefinition.
Triggers	Array	True	<ol style="list-style-type: none">1. A collection of triggers, which apply to metrics.2. The value shall be a link to a resource of type TriggersCollection.3. Not allowed to create more than 5 triggers, restricted internally.

Table 125. Telemetry Service Properties (continued)

Status	Object	True	<ol style="list-style-type: none"> 1. Refer to Table 11 “Resource Complex Types” on page 14. 2. If “ServiceEnabled” attribute has a value true, the value of “State” under “Status” attribute will be enabled. 3. If “ServiceEnabled” attribute has a value false, the value of “State” under “Status” attribute will be disabled.
Name	String	True	Name of the Collection
MaxReports	Number	True	The maximum number of MetricReports that are supported by this service. If present, the value shall specify the maximum number of metric collectors that can be supported by this service. Limited to 25.
MinCollectionInterval	String	True	The minimum supported time interval between collections. If present, the value shall be an ISO 8601 duration specifying the minimum time interval between collections. Limited to PT5S.
SupportedCollectionFunctions	Array	False	Function to perform over each sample. If present, the metric value shall be computed according to this function. over the collection duration. [Minimum,Summation,Average and Maximum are the supported collection functions]
Actions	Object	True	The Actions object contains the available custom actions on this resource like SubmitTestMetricReport or any Oem Action.
LogService	Object	True	This is a reference to a Log Service used by the Telemetry Service. The value of this property(i.e. MetricReportLog) shall contain a reference to a LogService for the use by this Telemetry Service.
ServiceEnabled	Boolean	False	This property shall indicate whether the telemetry service is in enabled state or not. The default value for this attribute will be true.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#TelemetryService.TelemetryService",
  "@odata.etag": "\"1581328430\"",
  "@odata.id": "/redfish/v1/TelemetryService",
  "@odata.type": "#TelemetryService.v1_2_1.TelemetryService",
  "Actions": {
    "#TelemetryService.SubmitTestMetricReport": {
      "@Redfish.ActionInfo": "/redfish/v1/TelemetryService/SubmitTestMetricReportActionInfo",
      "target": "/redfish/v1/TelemetryService/Actions/TelemetryService.SubmitTestMetricReport"
    }
  },
  "Description": "TelemetryService",
  "Id": "TelemetryService",
  "LogService": {
```



```

    "@odata.id": "/redfish/v1/TelemetryService/LogServices/MetricReportLog"
  },
  "MaxReports": 5,
  "MetricDefinitions": {
    "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions"
  },
  "MetricReportDefinitions": {
    "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions"
  },
  "MetricReports": {
    "@odata.id": "/redfish/v1/TelemetryService/MetricReports"
  },
  "MinCollectionInterval": "PT5S",
  "Name": "TelemetryService",
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  },
  "ServiceEnabled": true,
  "SupportedCollectionFunctions": [
    "Summation",
    "Minimum",
    "Maximum",
    "Average"
  ],
  "SupportedCollectionFunctions@Redfish.AllowableValues": [
    "Average",
    "Maximum",
    "Summation",
    "Minimum"
  ]
}

```

```

    ],
    "Triggers": {
        "@odata.id": "/redfish/v1/TelemetryService/Triggers"
    }
}

```

POST – Telemetry Service

Request

POST https://{ip}/redfish/v1/TelemetryService/Actions/TelemetryService.SubmitTestMetricReport

Content-Type: application/json

Request example

```

{
    "MetricReportName": "Average2",
    "GeneratedMetricReportValues": [
        {
            "MetricId": "Temp_average_reading_Average",
            "MetricProperty": "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",
            "MetricValue": "23",
            "Timestamp": "2019-07-01T06:05:52+00:00"
        }
    ]
}

```

Response

1. The response status is 202 Accepted with the created Task Instance as the response body.
2. For Error Responses, please refer to [“Error Response” on page 11](#).

```

{
    "@odata.context": "/redfish/v1/$metadata#Task.Task(TaskState,Description,Name,Id)",
    "@odata.id": "/redfish/v1/TaskService/Tasks/1",
    "@odata.type": "#Task.v1_4_2.Task",
    "Description": "Task for TelemetryService SubmitTestMetricReport Action",
    "Id": "1",
    "Name": "TelemetryService SubmitTestMetricReport Action",
}

```

```

    "TaskState": "New"
}

```

Behavior

- The limitation applied to this resource is that only 3 concurrent requests can be currently executing for **SubmitTestEvent** Action, at a given time. To issue an additional request, we need to wait for at least one request to finish from the earlier issued ones and so on.
- For **SubmitTestEvent** Action to return 202 Accepted with Task Instance in Response Body, the following programmatic flow comes into the picture:
 1. Validate all Request Body Properties.

If Error exists, throw 400 Bad Request with corresponding error body. If success, go to Step 2.
 2. Check for the total count of current tasks.
 - a. If `count_of_current_tasks >= Maximum_Tasks_Limit`(i.e. 15), then check for the value of `CompletedTaskOverWritePolicy` attribute.
 - b. If the value of `CompletedTaskOverWritePolicy` attribute is anything other than "Overwrite", then throw 400 Bad Request with "CreateLimitReachedForResource" Error.
 - c. If "Overwrite" is the value of `CompletedTaskOverWritePolicy` attribute, then check for any older tasks in the states "Completed" or "Cancelled" or "Exception". If so, then delete those tasks and create a Task and return 202 Accepted.
 - d. If `count_of_current_tasks < Maximum_Tasks_Limit`, then create a Task and return 202 Accepted. In this scenario, only one task will be created, irrespective of the number of Active Subscriptions.
 - e. This task will show the status of all the Failure/Success Event Destinations.
 3. Check created task.
 - a. The User may then give a GET Request periodically to check the status of the created Task based on the Task Instance returned in Step 2.
 - b. In the background, the created task will trigger the Task Daemon and it will execute a Lua File and pass the event related data as an argument to the file. The Lua File will run as a separate thread.
 4. Check active subscriptions.
 - a. Inside the thread execution, we will get the list of Available Active Subscriptions first.
 - b. Then we will get the list of Active Subscriptions who have "Event" as the "EventFormatType".
 - c. If there are no Active Subscriptions itself, then the created task will have "NoActiveSubscriptionPresent" Error Message and the "TaskStatus" will be updated as "Warning" and "TaskState" as "Exception" and the thread will terminate.
 - d. If there are no Active Subscriptions having "Event" as the "EventFormatType", then the created task will have "NoActiveSubscriptionOfFormatTypeEventPresent" Error Message and the "TaskStatus" will be updated as "Warning" and "TaskState" as "Exception" and the thread will terminate.
 - e. If there are Active Subscriptions having "Event" as the "EventFormatType", Frame the Event Notification data and go to Step 5.
 5. Loop the Event Subscribers one by one, do some logical-checks-done-in-event-service-daemon.
 - a. If at-least one logical-checks fail, add "SubmitTestEventPreconditionsFailed" Message to the response body and proceed to the next subscriber. If all logical-checks pass, try sending the event to the corresponding event destination.
 - b. If Event Notification is delivered to the destination, add "Success" Message to the response body and proceed to the next subscriber.

- c. If Event Notification fails to be delivered to the destination, add the appropriate Message from among "CouldNotEstablishConnection" and "SourceDoesNotSupportProtocol" to the response body and proceed to the next subscriber.
- d. Continue the step until we are done with all the subscribers.
- e. If the Event Notification fails to be delivered to at-least one destination, then update "TaskStatus" as "Critical" and "TaskState" as "Exception".
- f. If the Event Notification is delivered to all destination, then update "TaskStatus" as "OK" and "TaskState" as "Completed".
- g. Finally set the collective response body to the Messages attribute of the created task instance.

PATCH – Telemetry Service

Request

PATCH https://{ip}/redfish/v1/TelemetryService

Content-Type: application/json

Request body

Please refer to the properties that are patchable in [Telemetry Service Properties](#) for which read-only is False that can be sent as Request body in json format.

Request example

Editing ServiceEnabled

```
{
  "ServiceEnabled": < Either true or false >
}
```

Editing SupportedCollectionFunctions

```
{
  "SupportedCollectionFunctions": [
    "Maximum",
    "Minimum",
    "Summation"
  ]
}
```

Behavior

1. If the value of the **ServiceEnabled** attribute available under the Telemetry Service Resource (i.e./redfish/v1/TelemetryService) is true, it signifies that the Telemetry Service is in Enabled state and the PATCH Request will succeed.
2. If it is false, it signifies that the Telemetry Service is in Disabled state and it will fail with an error message stating, the operation failed because this service is disabled can no longer take incoming requests.

- Two attributes are patchable **ServiceEnabled** and **SupportedCollectionFunctions**, out of which the above mentioned scenario applies to **SupportedCollectionFunctions** attribute alone.

Response

The response status is success with status code as 204 and no body.

For Error Responses, please refer to [“Error Response” on page 11](#).

GET – Metric Definition Collection

Request

GET https://{ip}/redfish/v1/TelemetryService/MetricDefinitions

Content-Type: application/json

- Redfish represents metrics as resource properties (sensor readings, statistics).
- Metric Definitions are the metadata of the metrics and provides details about characteristics of readings and calculation for statistics.
- It displays a collection of Metric Definitions.

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@odata.context": " /redfish/v1/$metadata#MetricDefinitionCollection.MetricDefinitionCollection",
  "@odata.etag": "\"1527512499\"",
  "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions",
  "@odata.type": "#MetricDefinitionCollection.MetricDefinitionCollection",
  "Members": [
    {
      "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/Fan_Reading"
    },
    {
      "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/Voltage_Reading"
    },
    {
      "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/Temperature_Reading"
    }
  ],
}
```

```

"Members@odata.count": 3,

"Name": "MetricDefinitions"

}

```

GET – Metric Definition Instance

Request

GET https://{ip}/redfish/v1/TelemetryService/MetricDefinitions/{metric_instance}

Content-Type: application/json

1. Redfish represents metrics as resource properties (sensor readings, statistics).
2. Metric Definitions are the metadata of the metrics and provide details about characteristics of readings and calculation for statistics.
3. It displays a collection of Metric Definitions.

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 126. Metric Definition Instance Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Id (M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name	String	True	
Description	String	True	
MetricDataType	String	True	The data type of the related metric values. The property provides information to the client on the nature of the metric reading. The value shall be the data type of the related metric values as defined by JSON data types. Boolean,DateTime,Decimal,Integer,String,Enumeration
MetricType	String	True	Only "Numeric" is supported. The value of the metric shall be a real number with a float format.
Implementation	String	True	"Physical" for sensors and "Calculated" for metrics The value of this property shall designate how the sensor is implemented.
Units	String	True	Units of measure for this metric.
IsLinear	Boolean	True	The value shall specify that the corresponding metric values shall be linear or non-linear.

Table 126. Metric Definition Instance Properties (continued)

MetricProperties	Array	True	<p>A collection of URI for the properties on which this metric definition is defined.</p> <p>Note: Each value under "MetricProperties" attribute depicts either a Temperature/Fan/Voltage Sensor and ea of them is represented as a combination of its Sensor Number and Owner LUN Number.</p> <p>For e.g., If a FanSensor has Sensor Number as 48 and LUN Number as 0, then it will be displayed under the MetricProperties attribute as a combination of its Sensor Number and Owner LUN Number as mentioned below:</p> <p>/redfish/v1/Chassis/Self/Thermal#/Fans/48_0/ReadingRPM</p>
Precision	Number	True	<p>The value of the property shall specify the number of significant digits in the MetricValue. A value shall not be present if MetricType is Discrete.</p> <p>Default value is 3.</p>
Accuracy	Number	True	<p>The value of the property shall be the percent error +/- of the measured vs. actual values. A value shall not be present if MetricType is Discrete.</p> <p>Default value is 5.</p>
Calculable	String	True	<p>The value of the property shall specify the types of calculations which can be applied to the metric reading. This property provides information to the client on the suitability of calculation using the metric reading.</p> <p>NonCalculatable: No calculations should be performed on the metric reading.</p> <p>NonSummable: The sum of the metric reading across multiple instances is not meaningful.</p> <p>Summable: The sum of the metric reading across multiple instances is meaningful.</p> <p>Note: North Bound Support only available.</p>
CalculationAlgorithm	String	True	<p>The value of this property shall specify the calculation performed to obtain the metric. The time interval referred her shall be the value of the Calculation Time Interval property.</p> <p>Average: The metric shall be calculated as the average of a metric reading over a sliding time interval.</p> <p>Minimum: The metric shall be calculated as the minimum of a metric reading over a sliding time interval.</p> <p>Note: North Bound Support only available.</p>
CalculationTimeInterval	String	True	<p>The value of this property shall specify the time interval over the metric calculation is performed. The format of the value shall conform to the Duration format.</p> <p>Note: North Bound Support only available.</p>
PhysicalContext	String	True	<p>The value of this property shall specify the physical context of the metric.</p> <p>Note: North Bound Support only available.</p>

Example

Fan_Reading

GET https://{ip}/redfish/v1/TelemetryService/MetricDefinitions/Fan_Reading

Content-Type: application/json

Response

Fan_Reading

```
{
  "@odata.context": "/redfish/v1/$metadata#MetricDefinition.MetricDefinition",
  "@odata.etag": "\"1581501930\"",
  "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/Fan_Reading",
  "@odata.type": "#MetricDefinition.v1_0_2.MetricDefinition",
  "Accuracy": 5,
  "Id": "Fan_Reading",
  "Implementation": "PhysicalSensor",
  "IsLinear": true,
  "MetricDataType": "Integer",
  "MetricProperties": [
    "/redfish/v1/Chassis/Self/Thermal#/Fans/48_0/ReadingRPM",
    "/redfish/v1/Chassis/Self/Thermal#/Fans/58_0/ReadingRPM",
    "/redfish/v1/Chassis/Self/Thermal#/Fans/54_0/ReadingRPM",
    "/redfish/v1/Chassis/Self/Thermal#/Fans/50_0/ReadingRPM",
    "/redfish/v1/Chassis/Self/Thermal#/Fans/56_0/ReadingRPM",
    "/redfish/v1/Chassis/Self/Thermal#/Fans/52_0/ReadingRPM"
  ],
  "MetricType": "Numeric",
  "Name": "Fan Reading",
  "Precision": 3,
}
```

GET – Metric Report Definition Collection

Request

GET `https://{ip}/redfish/v1/TelemetryService/MetricReportDefinitions`

Content-Type: application/json

1. This resource specifies a set of metrics that shall be collected into a metric report.
2. It displays a collection of Metric Report Definitions.

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#MetricReportDefinitionCollection.MetricReportDefinitionCollection",
  "@odata.etag": "\"1581503501\"",
  "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions",
  "@odata.type": "#MetricReportDefinitionCollection.MetricReportDefinitionCollection",
  "Members": [
    {
      "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/AverageTemperatureReport"
    },
    {
      "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/TemperatureReport"
    }
  ],
  "Members@odata.count": 2,
  "Name": "MetricReportDefinitions"
}
```

POST – Change Metric Report Definitions

Behavior

1. The following properties are mandatory to change a metric report definition.
 - ID
 - Name

- Schedule.RecurrenceInterval
 - MetricReport
 - MetricReportDefinitionType
 - MetricProperties or Metrics
2. If the value of the **ServiceEnabled** attribute available under the Telemetry Service Resource (i.e./redfish/v1/TelemetryService) is true, it signifies that the Telemetry Service is in Enabled state and the POST Request will succeed.
 3. If it is false, it signifies that the Telemetry Service is in Disabled state and it will fail with an error message stating, the operation failed because this service is disabled can no longer take incoming requests.
 4. Status->State and Status->Health are read-only attributes and cannot be passed in the POST Request Body.
 5. Only a maximum of 25 MetricReportDefinitions can be created.
 6. MaxReports Limit is 25.
 - a. Maximum Number of MetricReportDefinitions that can be created by issuing POST Request is 25 (considered internally)
 - b. Maximum number of Metric Reports that is generated internally is also 25.
 7. **Consider the following scenario:**
 - a. Suppose a MetricReportDefinition is created with "**SuppressRepeatedMetric**" = **false** and "**ReportUpdates**" = "**NewReport**" and "**RecurrenceInterval**" = "**PT20S**".
 - b. In this case, new Metric Report shall be generated every 20 seconds.
 - c. After a certain duration, the count of Metric Reports will definitely reach the **MaxReports** Limit (i.e. 25).
 - d. Once the count of Metric Reports reaches the **MaxReports** Limit, no further Metric Reports will be generated until the user deletes any or all of the existing Metric Reports.
 - e. Also, a Log Entry will be added under Telemetry Log Service indicating that Count of MetricReports has reached the **MaxReports** Limit and that no further Metric Reports will be generated until the user deletes any or all of the existing Metric Reports.
 8. When a request is issued to create a MetricReportDefinition, the following conditions come into the picture:
 - a. **MetricReportDefinition** gets created if neither the count of **MetricReports** nor the count of **MetricReportDefinitions** has reached the **MaxReports** Limit.
 - b. Throw "CreateLimitReachedForResource" error if the count of MetricReportDefinitions has reached the MaxReports Limit.
 - c. Throw "CreateLimitReachedForMetricReportsResource" error if the count of MetricReports has reached the MaxReports Limit.
 9. Consider the following cases of creation of MetricReportDefinitions:
 - Assume MetricReportDefinitions Count has reached the MaxReports Limit irrespective of whether Count of MetricReports has reached the MaxReports Limit or not.
 - a. Create any MRD is not allowed.
 - Condition1: with **ReportActions** = ["RedfishEvent", "LogToMetricReportsCollection"]
 - Condition2: with **ReportActions** = ["RedfishEvent"]
 - Condition3: with **ReportActions** = ["LogToMetricReportsCollection"]
 - Assume MetricReportDefinitions count has not reached the MaxReports Limit but Count of MetricReports has reached the MaxReports Limit.

- a. Create MRD with **ReportActions** = ["RedfishEvent", "LogToMetricReportsCollection"] is not allowed.
- b. Create MRD with **ReportActions** = ["LogToMetricReportsCollection"] is not allowed.
- c. Create MRD with **ReportActions** = ["RedfishEvent"] is allowed.

Request

POST https://{ip}/redfish/v1/TelemetryService/MetricReportDefinitions

Content-Type: application/json

Request body

Request Body Temperature Report:

```
{
  "Id": "TemperatureReport",
  "Name": "Temperature_Report",
  "Schedule": {
    "RecurrenceInterval": "PT20S"
  },
  "MetricReportDefinitionType": "Periodic",
  "MetricReport": {
    "@odata.id": "/redfish/v1/TelemetryService/MetricReports/TemperatureReport"
  },
  "MetricProperties": [
    "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",
    "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius"
  ]
}
```

Request Body Average Temperature Report:

```
{
  "Id": "AverageTemperatureReport",
  "Name": "Average_Temperature_Report",
  "Schedule": {
    "RecurrenceInterval": "PT40S"
  },
  "MetricReportDefinitionType": "Periodic",
```

```

"MetricReport": {
    "@odata.id": "/redfish/v1/TelemetryService/MetricReports/AverageTemperatureReport"
},
"Metrics": [
    {
        "MetricId": "AverageTemperature",
        "CollectionTimeScope": "Interval",
        "MetricProperties": [
            "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius",
            "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius"
        ],
        "CollectionDuration": "PT40S",
        "CollectionFunction": "Average"
    }
]
}

```

Request body with MetricReportHeartbeatInterval, SuppressRepeatedMetricValue and MetricReportDefinitionEnabled:

```

{
    "Id": "AverageTemperatureReport",
    "Name": "Average_Temperature_Report",
    "Schedule": {
        "RecurrenceInterval": "PT20S"
    },
    "MetricReportDefinitionType": "Periodic",
    "SuppressRepeatedMetricValue": true,
    "MetricReportDefinitionEnabled": true,
    "MetricReportHeartbeatInterval": "PT30S",
    "MetricReport": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricReports/AverageTemperatureReport"
    },
}

```

```

"Metrics": [
  {
    "MetricId": "AverageTemperature",
    "CollectionTimeScope": "Interval",
    "MetricProperties": [
      "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius",
      "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius"
    ],
    "CollectionDuration": "PT20S",
    "CollectionFunction": "Average"
  }
]
}

```

Request example

```

{
  "Id": "TemperatureReport",
  "Name": "Temperature_Report",
  "Schedule": {
    "RecurrenceInterval": "PT20S"
  },
  "MetricReportDefinitionType": "Periodic",
  "MetricReport": {
    "@odata.id": "/redfish/v1/TelemetryService/MetricReports/TemperatureReport"
  },
  "MetricProperties": [
    "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",
    "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius"
  ]
}

```

Response body

The response status is **201** and the response body is a GET Response with the properties of the newly created Session.

Response example

When the request is successful, a message body similar to the following is returned:

HTTP/1.1 201 Created

Location:

https://<ip>/redfish/v1/TelemetryService/MetricReportDefinitions/TemperatureReport
{

```
"@odata.context": "/redfish/v1/$metadata#MetricReportDefinition.MetricReportDefinition(ReportUpdates,
MetricReportDefinitionEnabled,Id,Status,Name,MetricProperties,ReportActions,MetricReportDefinitionType,MetricReport,Schedule)",
"@odata.etag": "\"1581503147\"",
"@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/TemperatureReport",
"@odata.type": "#MetricReportDefinition.v1_2_0.MetricReportDefinition",
"Id": "TemperatureReport",
"MetricProperties": [
    "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius",
    "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius"
],
"MetricReport": {
    "@odata.id": "/redfish/v1/TelemetryService/MetricReports/TemperatureReport"
},
"MetricReportDefinitionEnabled": true,
"MetricReportDefinitionType": "Periodic",
"Name": "Temperature_Report",
"ReportActions": [
    "LogToMetricReportsCollection"
],
"ReportUpdates": "Overwrite",
"Schedule": {
    "RecurrenceInterval": "PT20S"
},
"Status": {
```

```

        "Health": "OK",
        "State": "Enabled"
    }
}

```

Response for Average Temperature Report:

HTTP/1.1 201 Created

Location:

<https://<ip>/redfish/v1/TelemetryService/MetricReportDefinitions/AverageTemperatureReport>

```

{
    "@odata.context": "/redfish/v1/$metadata#MetricReportDefinition.MetricReportDefinition(ReportUpdates,
MetricReportDefinitionEnabled,Id,Status,Name,ReportActions,MetricReportDefinitionType,MetricReport,Schedule,Metrics)",
    "@odata.etag": "\"1581503501\"",
    "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/AverageTemperatureReport",
    "@odata.type": "#MetricReportDefinition.v1_2_0.MetricReportDefinition",
    "Id": "AverageTemperatureReport",
    "MetricReport": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricReports/AverageTemperatureReport"
    },
    "MetricReportDefinitionEnabled": true,
    "MetricReportDefinitionType": "Periodic",
    "Metrics": [
        {
            "CollectionDuration": "PT40S",
            "CollectionFunction": "Average",
            "CollectionTimeScope": "Interval",
            "MetricId": "AverageTemperature",
            "MetricProperties": [
                "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",
                "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius"
            ]
        }
    ],
    "Name": "Average_Temperature_Report",

```

```

"ReportActions": [
    "LogToMetricReportsCollection"
],
"ReportUpdates": "Overwrite",
"Schedule": {
    "RecurrenceInterval": "PT40S"
},
"Status": {
    "Health": "OK",
    "State": "Enabled"
}
}

```

Response for MetricReportHeartbeatInterval, SuppressRepeatedMetricValue and MetricReportDefinitionEnabled:

```

{
    "@odata.context": "/redfish/v1/$metadata#MetricReportDefinition.MetricReportDefinition(ReportUpdates,
MetricReportDefinitionEnabled,Id,Status,Name,SuppressRepeatedMetricValue,MetricReportDefinitionType,MetricReport,
Metrics,MetricReportHeartbeatInterval,Schedule,ReportActions)",
    "@odata.etag": "\"1583757340\"",
    "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/AverageTemperatureReport",
    "@odata.type": "#MetricReportDefinition.v1_2_0.MetricReportDefinition",
    "Id": "AverageTemperatureReport",
    "MetricReport": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricReports/AverageTemperatureReport"
    },
    "MetricReportDefinitionEnabled": true,
    "MetricReportDefinitionType": "Periodic",
    "MetricReportHeartbeatInterval": "PT30S",
    "Metrics": [
        {
            "CollectionDuration": "PT20S",

```



```

    "CollectionFunction": "Average",
    "CollectionTimeScope": "Interval",
    "MetricId": "AverageTemperature",
    "MetricProperties": [
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius"
    ]
}
],
"Name": "Average_Temperature_Report",
"ReportActions": [
    "LogToMetricReportsCollection"
],
"ReportUpdates": "Overwrite",
"Schedule": {
    "RecurrenceInterval": "PT20S"
},
"Status": {
    "Health": "OK",
    "State": "Enabled"
},
"SuppressRepeatedMetricValue": true
}

```

GET – Metric Report Definition Instance

Request

GET https://{{ip}}/redfish/v1/TelemetryService/MetricReportDefinitions/{{metric_report_def_instance}}

Content-Type: application/json

1. The Metric Report Definition resource specifies the metric report that the Redfish service will create.
2. The Metric Reports are updated periodically based on the recurrence interval specified.

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 127. Metric Report Definition Instance Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Id (M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name	String	True	
Description	String	True	
Schedule	Object	True	<ol style="list-style-type: none"> 1. Only Recurrence Interval is supported currently. 2. If present, A metric values collected starting at each scheduled interval and for the time specified by Duration. No more than Schedule.MaxOccurrences values shall be collected for this metric. 3. If not present, the corresponding metric values shall be collected when the related metric report is retrieved.
MetricReport DefinitionType	String	True	<ol style="list-style-type: none"> 1. Only Periodic is supported currently. 2. The value shall specify when the corresponding metric values are collected by the underlying instrumentation. 3. If not present, the GatheringType is not known.
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14 . The property Status/State will be changed to Disabled when MetricReportDefinitionEnabled is false.
MetricProperties	Array	True	<ol style="list-style-type: none"> 1. This property shall list the metric properties to include in the metric report. 2. If this attribute is present, Metrics attribute should not be present. 3. MetricProperties only support the value defined under the reading of https://{{ip}}/redfish/v1/TelemetryService/MetricDefinitions.
MetricReport	Object	True	The value of this property shall be a reference to the resource where the resultant metric report is placed.
MetricReport DefinitionEnabled	Boolean	False	<ol style="list-style-type: none"> 1. The value of this property shall be a Boolean indicating whether this MetricReportDefinition is enabled for generating new MetricReports. 2. Default value is true.
SuppressRepeated MetricValue	Boolean	False	<ol style="list-style-type: none"> 1. The value of this property shall indicate whether suppression of Metric information has been enabled or not. 2. A value of true indicates that any Metric in the MetricReport currently be generated will be suppressed and not included in the MetricReport when the value of the Metric equals the value of the same Metric in the previously generated MetricReport. 3. A value of false means that the suppression mechanism is not applied to the MetricReport being generated. 4. A MetricReport may be generated with no MetricProperty array values if all Metrics had the same values as in the previously generated MetricReport. This scenario is applicable only when attribute "ReportUpdates" has a value "NewReport". 5. Default value is true.

Table 127. Metric Report Definition Instance Properties (continued)

MetricReport HeartbeatInterval	String	False	<ol style="list-style-type: none"> 1. This property specifies an interval to send complete MetricReport regardless of whether values have changed. It is used in addition to the ReccuranceInterval where SuppressRepeatedMetricValue is Enabled, and the Redfish client desired to be refreshed with metric data occasionally regardless of whether the data is changed or not. 2. The property value shall be a Redfish Duration describing the time interval between generation of the unsuppressed MetricReport. 3. It shall always be a value greater than the ReccuranceInterval of a MetricReport and should only be applicable when the SuppressRepeatedMetricValue property is Enabled. 4. The value of this attribute shall be a Redfish Duration in the below mentioned format: "-?P(T(\d+H)?(\d+M)?(\d+(\d+)S)?)?" 5. There is no default value.
ReportTimespan	String	False	<ol style="list-style-type: none"> 1. This property shall specify the timespan duration that this metric report covers. The value of ReportTimespan attribute shall be a Redfish Duration in the below mentioned format: "-?P(T(\d+H)?(\d+M)?(\d+(\d+)S)?)?" 2. This property specifies the amount of time, MetricReports will be generated for a MetricReportDefinition. If the value for this property is specified during the creation of the MetricReportDefinition, the service will stop creating MetricReport once the specified amount of time has reached from the creation of MetricReportDefinition. If the user 3. modifies this attribute at a later period of time, then the ReportTimespan will be measured from the point of time the PATCH request was issued. 4. There is no default value. 5. This property will not update the value of MetricReportDefinitionEnabled or Status
AppendLimit	Integer	True	<ol style="list-style-type: none"> 1. This property shall contain a number that indicates the maximum number of entries that can be appended to a metric report. When the metric report reaches its limit, its behavior shall be dictated by the ReportUpdates property. This property shall be required if ReportUpdates is either AppendWrapsWhenFull or AppendStopsWhenFull. 2. By default, this limit is configured to 50. It cannot be modified or passed in the request body to POST MetricReportDefinitions.
ReportActions	Array	True	<ol style="list-style-type: none"> 1. This property specifies the set of actions to perform when a metric report is generated and should be any one of the Enum values LogToMetricReportsCollection , RedfishEvent. 2. By default, this property will have the value LogToMetricReportCollection. 3. Also, MetricReportDefinitions and MetricReports update or the generation will not add any log entries inside MetricReportLogs. 4. "ReportUpdates" attribute will not be supported if "RedfishActions" attribute has a value of "RedfishEvent" alone. 5. For "ReportUpdates" attribute to be supported, "RedfishActions" attribute must have the value "LogToMetricreportsCollection" with/ without the value "RedfishEvent".

Table 127. Metric Report Definition Instance Properties (continued)

ReportUpdates	String	True	<div><div>1. This property shall contain how subsequent metric reports are handled in relationship to an existing metric report created from the metric report definition. It specifies whether to overwrite, append, or create a report Resource.</div><div>2. The allowable values for this property are - Overwrite, AppendWrapsWhenFull, AppendStopsWhenFull, NewReport.</div><div>3. The default value is "Overwrite".</div><div>4. If we want to create a MetricReportDefinition with the ReportUpdates property having value as "NewReport", then it is mandatory that the ReportActions property must have "LogToMetricReportsCollection" as one of its members.</div></div>																
Links	Object	True	<div>The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but not contained by (subordinate to), this resource.</div> <table><tr><td>Name</td><td>Type</td><td>Read only</td><td>Description</td></tr><tr><td>Oem</td><td>Object</td><td></td><td>Refer to Table 11 “Resource Complex Types” on page 14.</td></tr><tr><td>Triggers</td><td>Array</td><td>True</td><td>The value shall be a set of references to triggers that will cause this metric report definition to generate a new metric report upon a trigger occurrence when the TriggerActions property contains the value RedfishMetricReport.</td></tr><tr><td>Triggers@odata.count</td><td>Integer</td><td>True</td><td>An integer representing the number of items in a collection.</td></tr></table>	Name	Type	Read only	Description	Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14.	Triggers	Array	True	The value shall be a set of references to triggers that will cause this metric report definition to generate a new metric report upon a trigger occurrence when the TriggerActions property contains the value RedfishMetricReport .	Triggers@odata.count	Integer	True	An integer representing the number of items in a collection.
Name	Type	Read only	Description																
Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14.																
Triggers	Array	True	The value shall be a set of references to triggers that will cause this metric report definition to generate a new metric report upon a trigger occurrence when the TriggerActions property contains the value RedfishMetricReport .																
Triggers@odata.count	Integer	True	An integer representing the number of items in a collection.																
Metrics	Object	True	<div><div>1. A collection of metrics specifying the CollectionFunction and the MetricProperties to apply these functions.</div><div>2. If this attribute is present, MetricProperties attribute should not be present.</div></div> <table><tr><td>Properties</td><td>Description</td></tr><tr><td>MetricId</td><td>Id of the metric</td></tr><tr><td>CollectionDuration</td><td>Time interval</td></tr><tr><td>CollectionFunction</td><td>Minimum, Maximum, Average or Summation</td></tr><tr><td>CollectionTimeScope</td><td><div><div>1. Only Interval is supported.</div><div>2. The time scope of the corresponding metric values. If not present, the time scope was not qualified by the metric designer or is unknown to the provider.</div></div></td></tr><tr><td>MetricProperties</td><td><div>1. A collection of URI for the metric properties to include in the metric report.</div></td></tr></table>	Properties	Description	MetricId	Id of the metric	CollectionDuration	Time interval	CollectionFunction	Minimum, Maximum, Average or Summation	CollectionTimeScope	<div><div>1. Only Interval is supported.</div><div>2. The time scope of the corresponding metric values. If not present, the time scope was not qualified by the metric designer or is unknown to the provider.</div></div>	MetricProperties	<div>1. A collection of URI for the metric properties to include in the metric report.</div>				
Properties	Description																		
MetricId	Id of the metric																		
CollectionDuration	Time interval																		
CollectionFunction	Minimum, Maximum, Average or Summation																		
CollectionTimeScope	<div><div>1. Only Interval is supported.</div><div>2. The time scope of the corresponding metric values. If not present, the time scope was not qualified by the metric designer or is unknown to the provider.</div></div>																		
MetricProperties	<div>1. A collection of URI for the metric properties to include in the metric report.</div>																		

Table 127. Metric Report Definition Instance Properties (continued)

			<p>2. MetricProperties only support the values defined under the Members of MetricDefinitions URI https://{{ip}}/redfish/v1/TelemetryService/MetricDefinitions.</p>
--	--	--	--

Request

Average Temperature Report

GET <https://{{ip}}/redfish/v1/TelemetryService/MetricReportDefinitions/AverageTemperatureReport>

Content-Type: application/json

Response

Average Temperature Report

```
{
  "@odata.context": "/redfish/v1/$metadata#MetricReportDefinition.MetricReportDefinition(ReportUpdates,
MetricReportDefinitionEnabled,Id,Status,Name,ReportActions,MetricReportDefinitionType,MetricReport,Schedule,Metrics)",
  "@odata.etag": "\"1581503942\"",
  "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/AverageTemperatureReport",
  "@odata.type": "#MetricReportDefinition.v1_2_0.MetricReportDefinition",
  "Id": "AverageTemperatureReport",
  "MetricReport": {
    "@odata.id": "/redfish/v1/TelemetryService/MetricReports/AverageTemperatureReport"
  },
  "MetricReportDefinitionEnabled": true,
  "MetricReportDefinitionType": "Periodic",
  "Metrics": [
    {
      "CollectionDuration": "PT40S",
      "CollectionFunction": "Average",
      "CollectionTimeScope": "Interval",
      "MetricId": "AverageTemperature",
      "MetricProperties": [
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius"
      ]
    }
  ]
}
```

```

        ]
    }
},
"Name": "Average_Temperature_Report",
"ReportActions": [
    "LogToMetricReportsCollection"
],
"ReportUpdates": "Overwrite",
"Schedule": {
    "RecurrenceInterval": "PT40S"
},
"Status": {
    "Health": "OK",
    "State": "Enabled"
}
}

```

DELETE – Metric Report Definition Instance

Request

DELETE https://{ip}/redfish/v1/TelemetryService/MetricReportDefinitions/{metric_report_def_instance}

Content-Type: application/json

1. The DELETE operation is used to delete a particular Metric Report Definition Instance.
2. When a Metric Report Definition Instance is deleted, the corresponding Metric Report Instance is also deleted.
3. If the value of the **ServiceEnabled** attribute available under the Telemetry Service Resource (i.e./redfish/v1/TelemetryService) is true, it signifies that the Telemetry Service is in Enabled state and the DELETE Request will succeed.
4. If it is false, it signifies that the Telemetry Service is in Disabled state and it will fail with an error message stating, the operation failed because this service is disabled can no longer take incoming requests.

Request – Delete a metric report definition

DELETE https://{ip}/redfish/v1/TelemetryService/MetricReportDefinitions/AverageTemperatureReport

Content-Type: application/json

Response

HTTP/1.1 204 No Content

PATCH – Metric Report Definition Instance

Request

PATCH `https://{ip}/redfish/v1/TelemetryService/MetricReportDefinitions/{metric_report_def_instance}`

Content-Type: application/json

1. If the value of the **ServiceEnabled** attribute available under the Telemetry Service Resource (i.e./redfish/v1/TelemetryService) is true, it signifies that the Telemetry Service is in Enabled state and the PATCH Request will succeed.
2. If it is false, it signifies that the Telemetry Service is in Disabled state and it will fail with an error message stating, the operation failed because this service is disabled can no longer take incoming requests.
3. The properties mentioned in the below table are patchable and can be sent in the Request Body in JSON Format.

Name	Type	Read only	Description
MetricReportDefinitionEnabled	Boolean	False	The value of this property shall be a Boolean indicating whether this MetricReportDefinition is enabled for generating new MetricReports .
SuppressRepeatedMetricValue	Boolean	False	<ol style="list-style-type: none">1. The value of this property shall indicate whether suppression of Metric information has been enabled or not.2. A value of true indicates that any Metric in the MetricReport currently be generated will be suppressed and not included in the MetricReport when the value of the Metric equals the value of the same Metric in the previously generated MetricReport.3. A value of false means that the suppression mechanism is not applied to the MetricReport being generated.4. A MetricReport may be generated with no MetricProperty array values if all Metrics had the same values as in the previously generated MetricReport. This scenario is applicable only when attribute "ReportUpdates" has a value "NewReport".
MetricReportHeartbeatInterval	String	False	<ol style="list-style-type: none">1. This property specifies an interval to send complete MetricReport regardless of whether values have changed. It is used in addition to the RecurranceInterval where SuppressRepeatedMetricValue is Enabled, and the Redfish client desired to be refreshed with metric data occasionally regardless of whether the data is changed or not.2. The property value shall be a Redfish Duration describing the time internal between generation of the unsuppressed MetricReport.3. It shall always be a value greater than the RecurranceInterval of a MetricReport and should only be applicable when the SuppressRepeatedMetricValue property is Enabled.

Request example

```
{  
  
  "MetricReportDefinitionEnabled": true,  
  
  "SuppressRepeatedMetricValue": true,
```

```
"MetricReportHeartbeatInterval": "PT45S"
}
```

Response

HTTP/1.1 204 No Content

Behavior

The below mentioned scenarios are taken into consideration while generating Metric Reports 1. If value of attribute **RecurrenceInterval** is specified (say PT[x]S) and **SuppressRepeatedMetricValue** attribute has a value of "false", then the suppression mechanism is not applied to the **MetricReport** being generated and every PT[x]S, the **MetricReport** will be generated for all the **MetricProperties**.

1. A **MetricReport** may be generated with no **MetricProperty** array values if all Metrics had the same values as in the previously generated **MetricReport**. This scenario is applicable only when attribute "**ReportUpdates**" has a value "**NewReport**".
2. If value of attribute **RecurrenceInterval** is specified (say PT[x]S) and **SuppressRepeatedMetricValue** attribute has a value of "true", then the suppression mechanism is applied to the **MetricReport** being generated (i.e. any Metric in the **MetricReport** currently be generated will be suppressed and not included in the **MetricReport** when the value of the Metric equals the value of the same Metric in the previously generated **MetricReport**).
3. If value of attribute **MetricReportHeartbeatInterval** is specified (say PT[y]S) and **SuppressRepeatedMetricValue** attribute has a value of "true", then every PT[y]S, the complete **MetricReport** will be generated and sent regardless of whether values have changed.
4. If value of attribute **MetricReportHeartbeatInterval** is specified (say PT[y]S) and **SuppressRepeatedMetricValue** attribute has a value of "false", then this functionality is disabled and **MetricReports** will be generated at an interval specified by the **RecurrenceInterval**.
5. **MetricProperties** only support the values defined under the Members of **MetricDefinitions** URI /redfish/v1/TelemetryService/MetricDefinitions.
6. If the "**ReportUpdates**" property has the value "**AppendStopsWhenFull**" and if the number of Metric Objects in the **MetricValues** array of **MetricReport** Instance has reached the **AppendLimit**, then no more Metric Objects will be appended to the **MetricValues**. But still the **ReportSequence** will get updated in each cycle specified by **RecurrenceInterval** or **MetricReportHeartbeatInterval**.
7. The default value for the property **MetricReportDefinitionEnabled** is true. The **MetricReportDefinition** and its corresponding **MetricReports** will not be updated/created if the value for this property is false. The user can create a **MetricReportDefinition** with **MetricReportDefinitionEnabled** as false. In this case the **MetricReports** will only be generated after PATCH ing **MetricReportDefinitionEnabled** to true.
8. The property Status/State will be changed to Disabled when **MetricReportDefinitionEnabled** is false.

GET – Metric Report Collection

Request

GET https://{ip}/redfish/v1/TelemetryService/MetricReports

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#MetricReportCollection.MetricReportCollection",
  "@odata.etag": "\"1581503942\"",
  "@odata.id": "/redfish/v1/TelemetryService/MetricReports",
  "@odata.type": "#MetricReportCollection.MetricReportCollection",
  "Members": [
    {
      "@odata.id": "/redfish/v1/TelemetryService/MetricReports/AverageTemperatureReport"
    },
    {
      "@odata.id": "/redfish/v1/TelemetryService/MetricReports/TemperatureReport"
    }
  ],
  "Members@odata.count": 2,
  "Name": "MetricReports"
}
```

GET – Metric Report Instance

Request

GET https://{ip}/redfish/v1/TelemetryService/MetricReports/{metric_report_instance}

Content-Type: application/json

1. The Metric Report Instance resource specifies the metric report that the Redfish service will create, corresponding to the Metric Report Definition.
2. The Metric Reports are updated periodically based on the recurrence interval specified.

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 128. Metric Report Instance Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	

Table 128. Metric Report Instance Properties (continued)

Name	Type	Read only	Description															
MetricReportDefinition	Object	True	The value shall be reference to the metric definition for this metric.															
Timestamp	String	True	<div><div>1. This property represents time associated with the metric report in its entirety.</div><div>2. This property shall contain the time when the metric report was generated.</div></div>															
ReportSequence	String	True	<div><div>1. This property will get updated each time when the Metric Report updates.</div><div>2. When the ReportUpdates property for the MetricReportDefinition associated with the MetricReport is NewReport, then ReportSequence will be "1" always and for all other values of ReportUpdates, the ReportSequence will be incremented by 1 for each update in the MetricReport.</div></div>															
MetricValues	Object	True	<div>The values shall be metric values for this MetricReport.</div> <table><tr><th>Property</th><th>Type</th><th>Description</th></tr><tr><td>MetricId</td><td>String</td><td>The value shall be the Identifier of the source metric within the associated MetricDefinition.</td></tr><tr><td>MetricValue</td><td>String</td><td>The value of the metric represented as a string.</td></tr><tr><td>TimeStamp</td><td>String</td><td><div><div>1. The value shall be an ISO 8601 date time for when the metric value was computed.</div><div>2. That this may be different from the time when this instance is created.</div></div></td></tr><tr><td>MetricProperty</td><td>String</td><td>The value shall be an OData conformant URI to a property contained in the scope of the MetricScope.</td></tr></table>	Property	Type	Description	MetricId	String	The value shall be the Identifier of the source metric within the associated MetricDefinition .	MetricValue	String	The value of the metric represented as a string.	TimeStamp	String	<div><div>1. The value shall be an ISO 8601 date time for when the metric value was computed.</div><div>2. That this may be different from the time when this instance is created.</div></div>	MetricProperty	String	The value shall be an OData conformant URI to a property contained in the scope of the MetricScope.
Property	Type	Description																
MetricId	String	The value shall be the Identifier of the source metric within the associated MetricDefinition .																
MetricValue	String	The value of the metric represented as a string.																
TimeStamp	String	<div><div>1. The value shall be an ISO 8601 date time for when the metric value was computed.</div><div>2. That this may be different from the time when this instance is created.</div></div>																
MetricProperty	String	The value shall be an OData conformant URI to a property contained in the scope of the MetricScope.																

Request example

```
GET https://{ip}/redfish/v1/TelemetryService/MetricReports/AverageTemperatureReport
```

```
Content-Type: application/json
```

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#MetricReport.MetricReport",
  "@odata.etag": "\"1581503942\"",
  "@odata.id": "/redfish/v1/TelemetryService/MetricReports/AverageTemperatureReport",
  "@odata.type": "#MetricReport.v1_2_0.MetricReport",
```

```

    "Id": "AverageTemperatureReport",
    "MetricReportDefinition": {
      "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/AverageTemperatureReport"
    },
    "MetricValues": [
      {
        "MetricId": "AverageTemperature",
        "MetricProperty": "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius",
        "MetricValue": "0",
        "Timestamp": "2020-02-12T05:39:02+00:00"
      },
      {
        "MetricId": "AverageTemperature",
        "MetricProperty": "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",
        "MetricValue": "0",
        "Timestamp": "2020-02-12T05:39:02+00:00"
      }
    ],
    "Name": "Average_Temperature_Report",
    "ReportSequence": "1",
    "Timestamp": "2020-02-12T05:39:02+00:00"
  }
}

```

GET – Trigger Collection

Request

GET https://{ip}/redfish/v1/TelemetryService/Triggers

Content-Type: application/json

1. Triggers is an entity which senses or measures any sort of change/deviation in properties of various redfish resources.
2. There are two types of triggers-numeric and discrete triggers.
3. Triggers is not just limited to Voltage, Temp, and Fan sensors. Any property can be monitored through triggers.

Response example

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

```
{
  "@odata.context": "/redfish/v1/$metadata#TelemetryService/Triggers(Members,Name,Members@odata.count)",
  "@odata.etag": "\"1527512499\"",
  "@odata.id": "/redfish/v1/TelemetryService/Triggers",
  "@odata.type": "#TriggersCollection.TriggersCollection",
  "Members": [
    {
      "@odata.id": "/redfish/v1/TelemetryService/Triggers/TemperatureTrigger"
    },
    {
      "@odata.id": "/redfish/v1/TelemetryService/Triggers/ChassisLED"
    }
  ],
  "Members@odata.count": 2,
  "Name": "Triggers Collection"
}
```

POST – Trigger

Rules

1. The following properties are mandatory to create a Trigger :
 - Id
 - Name
 - MetricType
 - TriggerActions
 - NumericThresholds or (DiscreteTriggerCondition & DiscreteTriggers)
 - MetricProperties
2. If the value of the **ServiceEnabled** attribute available under the Telemetry Service Resource (i.e./redfish/v1/TelemetryService) is true, it signifies that the Telemetry Service is in Enabled state and the POST Request will succeed.
3. If it is false, it signifies that the Telemetry Service is in Disabled state and it will fail with an error message stating, the operation failed because this service is disabled can no longer take incoming requests.
4. **Status->State** and **Status->Health** are read-only attributes and cannot be passed in the POST Request Body.
5. Only a maximum of 5 triggers can be created.

6. For creation of Numeric Triggers, **NumericThresholds** attribute is mandatory. Four sub-attributes are supported under **NumericThresholds** attribute **LowerCritical**, **LowerWarning**, **UpperCritical** and **UpperWarning**. Not all four sub-attributes are mandatory for Numeric Triggers creation but at least one sub-attribute should be present. It is entirely left up to the Redfish User's choice to have one or more sub-attributes.
7. Under each of these four sub-attributes, we again have support for three sub attributes - **Activation**, **DwellTime** and **Reading**. These three attributes are mandatory for each of the four sub-attributes, if specified in the request body.
8. For creation of Discrete Triggers, if value of **DiscreteTriggerCondition** attribute is changed, then **DiscreteTriggers** attribute should not be present and if value of **DiscreteTriggerCondition** attribute is specified, then **DiscreteTriggers** attribute should be present.
9. **DiscreteTriggers** attribute should consist of an array of objects where each object can have the following four sub attributes - **Name**, **Value**, **Severity** and **DwellTime**. The sub-attributes **Value**, **Severity** and **DwellTime** are mandatory ones whereas **Name** is an optional one.

Request

Create Numeric Triggers

POST https://{ip}/redfish/v1/TelemetryService/Triggers

Content-Type: application/json

```
{
  "Id": "TemperatureTrigger",
  "Name": "Temperature Trigger",
  "MetricType": "Numeric",
  "TriggerActions": [
    "LogToLogService",
    "RedfishEvent"
  ],
  "NumericThresholds": {
    "LowerCritical": {
      "Activation": "Either",
      "DwellTime": "PT1M",
      "Reading": 30
    },
    "LowerWarning": {
      "Activation": "Decreasing",
      "DwellTime": "PT1M30S",
      "Reading": 50
    }
  }
}
```

```

    "UpperCritical": {
        "Activation": "Increasing",
        "DwellTime": "PT1M50S",
        "Reading": 80
    },
    "UpperWarning": {
        "Activation": "Increasing",
        "DwellTime": "PT30S",
        "Reading": 70
    }
},
"MetricProperties": [
    "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",
    "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius"
]
}

```

Response

Create Numeric Triggers

HTTP/1.1 201 Created

Location: http://<IP>/redfish/v1/TelemetryService/Triggers/TemperatureTrigger

Content-Type: application/json
{

 "@odata.context": "/redfish/v1/\$metadata#TelemetryService.Triggers(Name,TriggerActions,MetricProperties,Id,Status,Links,MetricType,NumericThresholds)",

 "@odata.etag": "\"1573457484\"",

 "@odata.id": "/redfish/v1/TelemetryService/Triggers/TemperatureTrigger",

 "@odata.type": "#Triggers.v1_1_1.Triggers",

 "Id": "TemperatureTrigger",

 "Links": [],

 "MetricProperties": [

 "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",

```

    "/redfish/v1/Chassis/Self/Thermal#/Temperatures/117_0/ReadingCelsius"
  ],
  "MetricType": "Numeric",
  "Name": "Temperature Trigger",
  "NumericThresholds": {
    "LowerCritical": {
      "Activation": "Either",
      "DwellTime": "PT1M",
      "Reading": 30
    },
    "LowerWarning": {
      "Activation": "Decreasing",
      "DwellTime": "PT1M30S",
      "Reading": 50
    },
    "UpperCritical": {
      "Activation": "Increasing",
      "DwellTime": "PT1M50S",
      "Reading": 80
    },
    "UpperWarning": {
      "Activation": "Increasing",
      "DwellTime": "PT30S",
      "Reading": 70
    }
  },
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  },
  "TriggerActions": [

```

```

        "RedfishEvent",
        "LogToLogService"
    ]
}

```

Request

Create Discrete Triggers

POST https://{ip}/redfish/v1/TelemetryService/Triggers

Content-Type: application/json

```

{
    "ChassisIndicatorLED",
    "Name": "Chassis_IndicatorLED",
    "MetricType": "Discrete",
    "TriggerActions": [
        "LogToLogService",
        "RedfishEvent"
    ],
    "DiscreteTriggerCondition": "Specified",
    "DiscreteTriggers": [
        {
            "Name": "LED_Blinking",
            "Value": "Blinking",
            "Severity": "Critical",
            "DwellTime": "PT30S"
        }
    ],
    "MetricProperties": [
        "/redfish/v1/Chassis/Self#/IndicatorLED"
    ]
}

```

Response

Create Discrete Triggers

HTTP/1.1 201 Created

Location: http://<IP>/redfish/v1/TelemetryService/Triggers/ChassisIndicatorLED

Content-Type: application/json
{

 "@odata.context": "/redfish/v1/\$metadata#TelemetryService.Triggers(Id,Status,Links,Name,MetricProperties,DiscreteTriggerCondition,DiscreteTriggers,TriggerActions,MetricType,Description)",

 "@odata.etag": "\"1583924493\"",

 "@odata.id": "/redfish/v1/TelemetryService/Triggers/ChassisIndicatorLED",

 "@odata.type": "#Triggers.v1_1_1.Triggers",

 "Description": "TelemetryService-Triggers-ChassisIndicatorLED",

 "DiscreteTriggerCondition": "Specified",

 "DiscreteTriggers": [

 {

 "DwellTime": "PT30S",

 "Name": "LED_Blinking",

 "Severity": "Critical",

 "Value": "Blinking"

 }

 "Id": "ChassisIndicatorLED",

 "Links": [],

 "MetricProperties": [

 "/redfish/v1/Chassis/Self#/IndicatorLED"

],

 "MetricType": "Discrete",

 "Name": "Chassis_IndicatorLED",

 "Status": {

 "Health": "OK",

 "State": "Enabled"

 },

 "TriggerActions": [

 "RedfishEvent",

 "LogToLogService"

```
]
}
```

The triggers created can be either numeric or discrete in nature. During each polling cycle of telemetry handler, the current value of each of the metric properties specified in trigger is compared with the specified trigger value.

Behavior

1. Whenever a trigger condition occurs for each of the metric properties, the initial point of measurement of dwell time duration is noted.
2. For each subsequent polling cycle, if the trigger condition persists, the time duration between the current time and the initial point of measurement of dwell time is calculated and compared with the **DwellTime** value and if the time difference is greater than or equal to the **DwellTime** value, the actions specified by the **TriggerActions** attribute from amongst these ("**LogToLogService**", "**RedfishEvent**" and "**RedfishMetricReport**") is being performed.
3. The current value for the specific **MetricProperty** is also noted, in order to avoid triggering of actions for the same set of **MetricProperty-MetricValue** pair in the subsequent polling cycles.
4. For example, if we do create a numeric trigger with the below mentioned Temperature **MetricProperties**.

```
{
    .....
    ,
    "NumericThresholds": {
        "UpperWarning": {
            "Activation": "Increasing",
            "DwellTime": "PT20S",
            "Reading": 10
        }
    },
    "MetricProperties": [
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/250_0/ReadingCelsius",
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/116_0/ReadingCelsius",
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/92_0/ReadingCelsius",
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/120_0/ReadingCelsius",
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/33_0/ReadingCelsius",
        "/redfish/v1/Chassis/Self/Thermal#/Temperatures/39_0/ReadingCelsius"
    ],
    .....
}
```

}

5. During each polling cycle, the current value of each of the **MetricProperties** (for e.g. "/redfish/v1/Chassis/Self/Thermal#/Temperatures/250_0/ReadingCelsius") specified above is compared with the specified trigger value (refer value of attribute "Reading" i.e. 10).
6. Whenever a trigger condition occurs (say, "**ReadingCelsius**" value of Sensor Number 250 goes above 10), the initial point of measurement of dwell time duration is noted.
7. For each subsequent polling cycle, if the trigger condition persists (i.e. "**ReadingCelsius**" value of Sensor Number 250 is still above 10), the time duration between the current time and the initial point of measurement of dwell time is calculated and compared with the **DwellTime** value (i.e. 20 seconds) and if the time difference is greater than or equal to the **DwellTime** value, the actions specified by the **TriggerActions** attribute from amongst these ("**LogToLogService**", "**RedfishEvent**" and "**RedfishMetricReport**") is being performed.
8. The current value for the specific **MetricProperty** ("/redfish/v1/Chassis/Self/Thermal#/Temperatures/250_0/ReadingCelsius") is also noted. The **DwellTime** logic is applicable to both numeric and discrete triggers.

Trigger conditions

1. In Numeric Triggers, under the below mentioned scenarios, the trigger condition is met:
 - a. If Numeric Threshold Activation attribute value is "Increasing", the threshold is activated when the reading changes from a value lower than the threshold to a value higher than the threshold.
 - b. If Numeric Threshold Activation attribute value is "Decreasing", the threshold is activated when the reading changes from a value higher than the threshold to a value lower than the threshold.
 - c. If Numeric Threshold Activation attribute value is "Either", the threshold is activated when either the Increasing or Decreasing conditions are met.
2. In Discrete Triggers, under the below mentioned scenarios, the trigger condition is met:
 - a. If the value of **DiscreteTriggerCondition** attribute is "Changed", whenever the value of any **MetricProperty** changes, the current value of the **MetricProperty** is compared with the previous value. If there is a change, trigger action is taken. In this case, any value provided under "**DiscreteTriggers**" attribute is ignored.
 - b. If the value of **DiscreteTriggerCondition** attribute is "Specified", whenever the value of any Metric Property matches the specified trigger value, trigger action is taken.
3. In the case of Numeric Triggers, **MetricProperties** only support the values defined under the Members of **MetricDefinitions** URI "/redfish/v1/TelemetryService/MetricDefinitions".
4. In the case of Discrete Triggers, **MetricProperties** can support URI properties with value type "string".

GET – Trigger Instance

Request

GET https://{ip}/redfish/v1/TelemetryService/Triggers/{trigger_instance}

Content-Type: application/json

It displays a trigger instance which can be either a numeric or a discrete one.

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 129. Trigger Instance Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
MetricType	String	True	<ol style="list-style-type: none"> 1. The value of this property shall specific the type of trigger and should be any one of the Enum values Numeric, Discrete. 2. When value of MetricType is "Numeric", DiscreteTriggerCondition and DiscreteTriggers attributes are not allowed. 3. When value of MetricType is "Discrete", NumericThresholds attribute is not allowed.
TriggerActions	Array	True	<ol style="list-style-type: none"> 1. This property denotes the actions to be performed when a trigger condition is met. Supported Values are "LogToLogService", "RedfishEvent", "RedfishMetricReport". 2. LogToLogService: This value indicates that when a trigger condition is met, the Service shall log the occurrence of the condition to the log that the LogService property in the TelemetryService Resource describes. 3. RedfishEvent: This value indicates that when a trigger condition is met, the Service shall send an event to subscribers. 4. RedfishMetricReport: This value indicates that when a trigger condition is met, the Service shall force the metric reports specified by the MetricReportDefinitions property to be updated, regardless of the MetricReportDefinitionType property value. The actions specified in the ReportActions property of each MetricReportDefinition shall be performed.

Table 129. Trigger Instance Properties (continued)

Name	Type	Read only	Description			
Numeric Thresholds	Object	True	This property shall contain list of triggers to which a sensor reading will be compared.			
			Name	Type	Read only	Description
			Lower Critical	Object	True	<div>1. The value of this property shall indicate the Reading is below the normal range and may require attention.</div> <div>2. The units shall be the same units as the Reading.</div> <div>3. Refer to Table 130 “Numeric Thresholds Sub-Attributes” on page 330 under this property.</div>
			Lower Warning	Object	True	<div>1. The value of this property shall indicate the Reading is below the normal range.</div> <div>2. The units shall be the same units as the Reading.</div> <div>3. Refer to Table 130 “Numeric Thresholds Sub-Attributes” on page 330 under this property.</div>
			Upper Critical	Object	True	<div>1. The value of this property shall indicate the Reading is above the normal range and may require attention.</div> <div>2. The units shall be the same units as the Reading.</div> <div>3. Refer to Table 130 “Numeric Thresholds Sub-Attributes” on page 330 under this property.</div>
			Upper Warning	Object	True	<div>1. The value of this property shall indicate the Reading is above the normal range.</div> <div>2. The units shall be the same units as the Reading.</div> <div>3. Refer to Table 130 “Numeric Thresholds Sub-Attributes” on page 330 under this property.</div>

Table 129. Trigger Instance Properties (continued)

Name	Type	Read only	Description																
			<table> <tr> <td></td><td></td><td></td><td> Sub-Attributes on page 330 under this property. </td></tr> </table>				Sub-Attributes on page 330 under this property.												
			Sub-Attributes on page 330 under this property.																
Links	Object	True	<p>The Links property, as described by the Redfish Specification, shall contain references to resources that are related to, but not contained by (subordinate to), this resource.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr> <tr> <td>Oem</td><td>Object</td><td></td><td>Refer to Table 11 “Resource Complex Types” on page 14.</td></tr> <tr> <td>MetricReport Definitions</td><td>Array</td><td>True</td><td> <p>The value shall be a set of references to existing MetricReportDefinitions that will generate new metric reports when the TriggerActions property contains the value</p> <p>RedfishMetricReport and a trigger condition is met.</p> </td></tr> <tr> <td>MetricReport Definitions @odata.count</td><td>Integer</td><td>True</td><td>An integer representing the number of items in a collection.</td></tr> </table>	Name	Type	Read only	Description	Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14.	MetricReport Definitions	Array	True	<p>The value shall be a set of references to existing MetricReportDefinitions that will generate new metric reports when the TriggerActions property contains the value</p> <p>RedfishMetricReport and a trigger condition is met.</p>	MetricReport Definitions @odata.count	Integer	True	An integer representing the number of items in a collection.
Name	Type	Read only	Description																
Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14.																
MetricReport Definitions	Array	True	<p>The value shall be a set of references to existing MetricReportDefinitions that will generate new metric reports when the TriggerActions property contains the value</p> <p>RedfishMetricReport and a trigger condition is met.</p>																
MetricReport Definitions @odata.count	Integer	True	An integer representing the number of items in a collection.																
DiscreteTrigger Condition	String	True	<ol style="list-style-type: none"> 1. This property shall contain the conditions when a discrete metric needs to trigger. Supported Values are "Specified" and "Changed". 2. Changed: A discrete trigger condition is met whenever the metric value changes. 3. Specified: A discrete trigger condition is met when the metric value becomes one of the values that the DiscreteTriggers property lists. 4. If the value for this attribute is "Changed", then the attribute "DiscreteTriggers" itself should not be present. 																
Status	Object	True	Refer to Table 11 “Resource Complex Types” on page 14.																

Table 129. Trigger Instance Properties (continued)

Name	Type	Read only	Description																				
Metricproperties	Array	True	<ol style="list-style-type: none"> 1. A collection of URI for the properties on which this metric definition is defined. 2. In the case of Numeric Triggers, MetricProperties only support the values defined under the Members of MetricDefinitions URI "/redfish/v1/TelemetryService/MetricDefinitions". 3. In the case of DiscreteTriggers, MetricProperties can support URI properties with value type "string". 																				
DiscreteTriggers	Array	True	<ol style="list-style-type: none"> 1. This property shall contain list of triggers to which a sensor reading will be compared. The list of triggers is limited to a maximum count of 10 (i.e. the DiscreteTriggers Array can have a maximum count of 10 values). 2. If the value for "DiscreteTriggerCondition" attribute is "Specified", then the attribute "DiscreteTriggers" should be present. If the value for "DiscreteTriggerCondition" attribute is "Changed", then the attribute "DiscreteTriggers" should not be present. <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr> <tr> <td>Name</td><td>String</td><td>True</td><td>Name of discrete trigger</td></tr> <tr> <td>Value</td><td>String</td><td>True</td><td> <ol style="list-style-type: none"> 1. This property shall contain the discrete metric value that constitutes a trigger event. 2. The DwellTime shall be measured from this point in time. 3. This attribute is mandatory for Specified Discrete Trigger creation. </td></tr> <tr> <td>Severity</td><td>Resource Health</td><td>True</td><td> <ol style="list-style-type: none"> 1. The value of this property is used for the Severity property in the Event message 2. This attribute is mandatory for Specified Discrete Trigger creation. </td></tr> <tr> <td>DwellTime</td><td>Number</td><td>True</td><td> <ol style="list-style-type: none"> 1. This property shall contain the amount of time that a trigger event persists before the MetricAction is performed. 2. Supported format for DwellTime is "-?(P)(T(\d+H)?(\d+M)?(\d+(\.\d+)?S)?)" 1. This attribute is mandatory for Specified Discrete Trigger creation. In the current implementation for DwellTime, Days(D) are not supported and Hours(H), </td></tr> </table>	Name	Type	Read only	Description	Name	String	True	Name of discrete trigger	Value	String	True	<ol style="list-style-type: none"> 1. This property shall contain the discrete metric value that constitutes a trigger event. 2. The DwellTime shall be measured from this point in time. 3. This attribute is mandatory for Specified Discrete Trigger creation. 	Severity	Resource Health	True	<ol style="list-style-type: none"> 1. The value of this property is used for the Severity property in the Event message 2. This attribute is mandatory for Specified Discrete Trigger creation. 	DwellTime	Number	True	<ol style="list-style-type: none"> 1. This property shall contain the amount of time that a trigger event persists before the MetricAction is performed. 2. Supported format for DwellTime is "-?(P)(T(\d+H)?(\d+M)?(\d+(\.\d+)?S)?)" 1. This attribute is mandatory for Specified Discrete Trigger creation. In the current implementation for DwellTime, Days(D) are not supported and Hours(H),
Name	Type	Read only	Description																				
Name	String	True	Name of discrete trigger																				
Value	String	True	<ol style="list-style-type: none"> 1. This property shall contain the discrete metric value that constitutes a trigger event. 2. The DwellTime shall be measured from this point in time. 3. This attribute is mandatory for Specified Discrete Trigger creation. 																				
Severity	Resource Health	True	<ol style="list-style-type: none"> 1. The value of this property is used for the Severity property in the Event message 2. This attribute is mandatory for Specified Discrete Trigger creation. 																				
DwellTime	Number	True	<ol style="list-style-type: none"> 1. This property shall contain the amount of time that a trigger event persists before the MetricAction is performed. 2. Supported format for DwellTime is "-?(P)(T(\d+H)?(\d+M)?(\d+(\.\d+)?S)?)" 1. This attribute is mandatory for Specified Discrete Trigger creation. In the current implementation for DwellTime, Days(D) are not supported and Hours(H), 																				

Table 129. Trigger Instance Properties (continued)

Name	Type	Read only	Description				
			<table border="1"> <tr> <td></td><td></td><td></td><td>Minutes(M) and Seconds(S) alone are supported.</td></tr> </table>				Minutes(M) and Seconds(S) alone are supported.
			Minutes(M) and Seconds(S) alone are supported.				

Table 130. Numeric Thresholds Sub-Attributes

Name	Type	Read only	Description
Reading	String	False	<ol style="list-style-type: none"> 1. This property shall indicate the Reading value of this Sensor that triggers the threshold. 2. The units of this property shall follow the same units as the property described by MetricProperties. 3. This attribute is mandatory for Numeric Trigger creation.
DwellTime	String	False	<ol style="list-style-type: none"> 1. This property shall indicate the time interval over which the sensor reading must have passed through this Threshold value before the threshold is violated. 2. This attribute is mandatory for Numeric Trigger creation. 3. In the current implementation for DwellTime, Days(D) are not supported and Hours(H), Minutes(M) and Seconds(S) alone are supported.
Activation	String	False	<ol style="list-style-type: none"> 1. This property shall indicate the direction of crossing of the Reading value for this Sensor that triggers the threshold. Supported Values can be either of these: "Increasing", "Decreasing" or "Either". 2. Decreasing: This threshold is activated when the reading changes from a value higher than the threshold to a value lower than the threshold. 3. Either: This threshold is activated when either the Increasing or Decreasing conditions are met. 4. Increasing: This threshold is activated when the reading changes from a value lower than the threshold to a value higher than the threshold. 5. This attribute is mandatory for Numeric Trigger creation.

Request

GET https://{ip}/redfish/v1/TelemetryService/Triggers/ChassisIndicatorLED

Content-Type: application/json

Response

```
{
  "@odata.context": "/redfish/v1/$metadata#TelemetryService.Triggers(Id,Status,Links,Name,MetricProperties,DiscreteTriggerCondition,DiscreteTriggers,TriggerActions,MetricType,Description)",
  "@odata.etag": "\"1583924493\"",
  "@odata.id": "/redfish/v1/TelemetryService/Triggers/ChassisIndicatorLED",
```



```

"@odata.type": "#Triggers.v1_1_1.Triggers",
"Description": "TelemetryService-Triggers-ChassisIndicatorLED",
"DiscreteTriggerCondition": "Specified",
"DiscreteTriggers": [
  {
    "DwellTime": "PT30S",
    "Name": "LED_Blinking",
    "Severity": "Critical",
    "Value": "Blinking"
  }
],
"Id": "ChassisIndicatorLED",
"Links": [],
"MetricProperties": [
  "/redfish/v1/Chassis/Self#/IndicatorLED"
],
"MetricType": "Discrete",
"Name": "Chassis_IndicatorLED",
"Status": {
  "Health": "OK",
  "State": "Enabled"
},
"TriggerActions": [
  "RedfishEvent",
  "LogToLogService"
]
}

```

DELETE – Trigger Instance

Request

```
DELETE https://{ip}/redfish/v1/TelemetryService/Triggers/{trigger_instance}
```

Content-Type: application/json

1. The DELETE operation is used to delete either a numeric or a discrete trigger.
2. If the value of the **ServiceEnabled** attribute available under the Telemetry Service Resource (i.e./redfish/v1/TelemetryService) is true, it signifies that the Telemetry Service is in Enabled state and the DELETE Request will succeed.
3. If it is false, it signifies that the Telemetry Service is in Disabled state and it will fail with an error message stating, the operation failed because this service is disabled can no longer take incoming requests.

Request example

DELETE https://{ip}/redfish/v1/TelemetryService/Triggers/ChassisIndicatorLED

Content-Type: application/json

Response

HTTP/1.1 204 No Content

GET – Telemetry Log Service

Request

GET https://{ip}/redfish/v1/TelemetryService/LogService

Content-Type: application/json

1. This resource represents the log service for the resource or service to which it is associated.
2. This resource shall be used to represent a log service for a Redfish implementation.
3. Metric Report Logs are supported under Telemetry Log Services.
4. Maximum number is limited to 100.

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 131. Telemetry Log Service Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14 .
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
ServiceEnabled	Boolean	False	Indicates whether this service is enabled. Default it will be null value

Table 131. Telemetry Log Service Properties (continued)

Name	Type	Read only	Description				
DateTime	String	False	<div><div><div><div>1. The current DateTime (with offset from UTC) for the log service in Redfish Timestamp format.</div><div>2. The valid range is -12:00 to +14:00.</div><div>3. Please refer the following link for the allowable values within the above specified range. https://en.wikipedia.org/wiki/List_of_UTC_time_offsets</div><div>4. According to UNIX time maximum date allowed to PATCH is 2038-01-18</div></div></div></div>				
DateTimeLocalOffset	String	False	<div><div><div><div>1. The time offset from UTC that the DateTime property is set to in format: +06:00.</div><div>2. The valid range is -12:00 to +14:00.</div><div>3. Please refer the following link for the allowable values within the above specified range. https://en.wikipedia.org/wiki/List_of_UTC_time_offsets</div></div></div></div>				
MaxNumberOfRecords (C)	Number	True	<div><div><div><div>1. The maximum numbers of LogEntries this service can have.</div><div>2. Min value:0 , Maximum number is limited to 100.</div></div></div></div>				
OverWritePolicy(C)	String	True	<div><div><div>Indicates the policy of the log service when the MaxNumberOfRecords has been reached or when the log is full.</div><table><tr><td>Enum</td><td>Description</td></tr><tr><td>WrapsWhenFull</td><td>When full, new entries to the Log will overwrite previous entries.</td></tr></table></div></div>	Enum	Description	WrapsWhenFull	When full, new entries to the Log will overwrite previous entries.
Enum	Description						
WrapsWhenFull	When full, new entries to the Log will overwrite previous entries.						
Actions	Object	True	<div><div><div>The Actions property shall contain the available actions for this resource like “POST - Log Service Instance” on page 228 - LogService.ClearLog or any other OEMActions.</div></div></div>				
Status	Object	True	<div><div><div>Refer to Table 11 “Resource Complex Types” on page 14</div></div></div>				
Entries(N)	Object	True	<div><div><div>The value of this property shall reference a collection of resources of type Table 132 “Log Entry Property” on page 334.</div></div></div>				

GET – Get SEL Log Service

Request

POST <https://{ip}/redfish/v1/TelemetryService/LogService>

Content-Type: application/json

Request example

```
{
  "ClearType": "ClearAll"
}
```

Response

The response of the request will be in JSON format with the success status code as 202.

For Error Responses, please refer to [“Error Response” on page 11](#).

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#Task.Task(TaskState,Description,Name,Id)",
  "@odata.id": "/redfish/v1/TaskService/Tasks/1",
  "@odata.type": "#Task.v1_4_2.Task",
  "Description": "Task for Telemetry LogService",
  "Id": "1",
  "Name": " Telemetry LogService ",
  "TaskState": "New"
}
```

GET – Telemetry Log Entry Collection

Request

GET https://{{ip}}/redfish/v1/TelemetryService/LogService/Entries

Content-Type: application/json

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

GET – Telemetry Log Entry

Request

GET https://{{ip}}/redfish/v1/TelemetryService/LogService/Entries/{{metricreport_logentry_instance}}

Content-Type: application/json

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 132. Log Entry Property

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12

Table 132. Log Entry Property (continued)

Name	Type	Read only	Description												
Name(M)	String	True													
Description	String	True													
Severity	String	True	<ol style="list-style-type: none"> 1. This is the severity of the log entry. 2. It can take any one of the Enum values: OK, Warning or Critical. 												
Created	String	True	The time the log entry was created.												
EntryType(M)	String	True	<ol style="list-style-type: none"> 1. This property shall represent the type of LogEntry. 2. If the resource represents an IPMI SEL log entry, the value shall be SEL. 3. If the resource represents an Event log, the value shall be Event. 4. If the resource represents an OEM log format, the value shall be Oem. Enum can be Event, SEL or Oem. 												
EntryCode	String	True	<ol style="list-style-type: none"> 1. This property shall be present if the EntryType value is SEL. 2. Refer to Table 108 “EntryCode Strings” on page 232 												
Message	String	True	<ol style="list-style-type: none"> 1. This property shall be the Message property of the event and decodes from EntryType: If it is Event then it is a message Description. Otherwise, it is SEL or Oem specific. In most cases, this will be the actual Log Entry. 2. Populated only for AuditLogs. 												
MessageId	String	True	<ol style="list-style-type: none"> 1. This property shall the MessageId property of the event and decodes from EntryType: If it is Event then it is a message id. Otherwise, it is SEL or Oem specific. 2. This value is only used for registries - for more information, see the specification. 3. The value will be "Ipmit.2.0.GeneralEventData" for managers SEL and Systems BIOS. 												
MessageArgs	Array	True	This attribute contains a link to the sensor resource that has exceeded/receded the specified threshold values.												
Link	Object		<p>Contains references to other resources that are related to this resource.</p> <table> <tr> <th>Name</th><th>Type</th><th>Read only</th><th>Description</th></tr> <tr> <td>Oem</td><td>Object</td><td></td><td>Refer to Table 11 “Resource Complex Types” on page 14.</td></tr> <tr> <td>OriginOf Condition</td><td>Object</td><td>True</td><td> <ol style="list-style-type: none"> 1. This is the URI of the resource that caused the log entry. 2. Refer idRef in odata4.0.0.json. </td></tr> </table>	Name	Type	Read only	Description	Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14 .	OriginOf Condition	Object	True	<ol style="list-style-type: none"> 1. This is the URI of the resource that caused the log entry. 2. Refer idRef in odata4.0.0.json.
Name	Type	Read only	Description												
Oem	Object		Refer to Table 11 “Resource Complex Types” on page 14 .												
OriginOf Condition	Object	True	<ol style="list-style-type: none"> 1. This is the URI of the resource that caused the log entry. 2. Refer idRef in odata4.0.0.json. 												

Chapter 21. Update Service

GET – Firmware Inventory Collection

This resource shall be used to represent a collection of firmware inventory.

Table 133. Firmware inventory collection properties

Name	type	Read only	Description
Name	string	true	Name of the Collection
Members	array	true	Contains the members of this collection
Members@odata.count	number	true	Members@odata.count

Request

GET https://{ip}/redfish/v1/UpdateService/FirmwareInventory

Content-Type: application/json

Response

The response of the request will be in JSON format.

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#SoftwareInventoryCollection.SoftwareInventoryCollection",
  "@odata.etag": "W/\"1572679179\"",
  "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory",
  "@odata.type": "#SoftwareInventoryCollection.SoftwareInventoryCollection",
  "Description": "Collection of Firmware Inventory resources available to the UpdateService",
  "Members": [
    {
      "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/PSU2"
    },
    {
      "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/BMC-Primary"
    },
    {
      "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
    }
  ]
}
```

```

    },
    {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/UEFI"
    },
    {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/LXPM"
    },
    {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/LXPMLinuxDriver1"
    },
    {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/PSU1"
    },
    {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/LXPMWindowsDriver1"
    }
],
"Members@odata.count": 8,
"Name": "Firmware Inventory Collection"
}

```

GET – Firmware inventory instance

1. Chassis resource represents the physical components properties for any system.
2. The non-CPU/device centric parts of the schema are all accessed either directly or indirectly through this resource.
3. This one object is intended to represent racks, rack mount servers, blades, standalone, modular systems, enclosures, and all other containers.
4. Lenovo Supported instance: BMC-Primary, BMC-Backup, UEFI, LXPM, LXPMLinuxDriver1, LXPMWindowsDriver1, PSU1, PSU2

Request

GET https://{{ip}}/redfish/v1/UpdateService/FirmwareInventory /{{firmwareinventory_instance}}

Content-Type: application/json

Response

Table 134. FirmwareInventory Properties

Name	Type	Read only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14 .
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Updateable	Boolean	True	An indication of whether the Update Service can update this firmware.
Version	String	True	The version of this software.
SoftwareId	String	True	Software ID of this firmware. The property is not supported in PSU firmware inventory.
Status	object	True	Status contains Health, State
ReleaseDate	string	True	Release date of this firmware.

Request

to get BMC-Primary

`https://{ip}/redfish/v1/UpdateService/FirmwareInventory/BMC-Primary`

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#UpdateService/FirmwareInventory/Members/$entity",
  "@odata.etag": "\"1591921955\"",
  "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/BMC-Primary",
  "@odata.type": "#SoftwareInventory.v1_2_0.SoftwareInventory",
  "Id": "BMC-Primary",
  "Name": "BMC-Primary Firmware",
  "RelatedItem": [
    {
      "@odata.id": "/redfish/v1/Managers/Self"
    }
  ],
  "RelatedItem@odata.count": 1,
  "ReleaseDate": "2020:11:16",
  "SoftwareId": "BMC_TEST",
  "Status": {
```

```
    "Health": "OK",  
    "State": "Enabled"  
  },  
  "Updateable": true,  
  "Version": "1.73"  
}
```

Chapter 22. Certificate Service

GET – Certificate Service

Certificate Service describes a Certificate Service that represents the actions available to manage certificates and links to the certificates.

Request

GET `https://{{ip}}/redfish/v1/CertificateService`

Content-Type: `application/json`

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Response example

Table 135. Certificate Service Property

Name	Type	Read Only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14 . Note: This property will be a part of JSON response only if an oem property is implemented.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
CertificateLocations	Object	True	This object describes a Resource that an administrator can use in order to locate all certificates installed on a given service.

GET – Certificate Locations

Certificate Locations describes a Resource that an administrator can use in order to locate all certificates installed on a given service.

Request

GET `https://{{ip}}/redfish/v1/CertificateService/CertificateLocations`

Content-Type: `application/json`

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Response example

Table 136. Certificate Locations Property

Name	Type	Read Only	Description												
(OData Attributes)			Refer to “OData Support” on page 5												
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14 . Note: This property will be a part of JSON response only if an oem property is implemented.												
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.												
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12												
Name(M)	String	True													
Description	String	True													
Links	Object	True	Contains references to other resources that are related to this resource. <table><tr><td>Name</td><td>Type</td><td>Read Only</td><td>Description</td></tr><tr><td>Certificates</td><td>Array</td><td>True</td><td>An array of links to the certificates installed on this service.</td></tr><tr><td>Certificates@odata.count</td><td>Number</td><td>True</td><td>An integer representing the number of items in a collection.</td></tr></table>	Name	Type	Read Only	Description	Certificates	Array	True	An array of links to the certificates installed on this service.	Certificates@odata.count	Number	True	An integer representing the number of items in a collection.
Name	Type	Read Only	Description												
Certificates	Array	True	An array of links to the certificates installed on this service.												
Certificates@odata.count	Number	True	An integer representing the number of items in a collection.												

GET – Certificate Collection

Certificate Collection describes a collection of Certificate Resource instances.

Request

GET `https://{ip}/redfish/v1/AccountService/Accounts/{ManagerAccountId}/Certificates`

GET `https://{ip}/redfish/v1/Managers/{ManagerId}/NetworkProtocol/HTTPS/Certificates`

GET `https://{ip}/redfish/v1/Systems/{ComputerSystemId}/Boot/Certificates`

GET `https://{ip}/redfish/v1/AccountService/LDAP/Certificates`

GET `https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates`

Content-Type: application/json

Note: `https://{ip}/redfish/v1/AccountService/LDAP/Certificates` is the collection URI for viewing root CA certificate collection required for LDAP authentication `https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates` is the collection URI for viewing client certificate collection required for LDAP authentication

Response

Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

POST – Creating New Certificate

Request

POST <https://{ip}/redfish/v1/AccountService/Accounts/{ManagerAccountId}/Certificates>

POST <https://{ip}/redfish/v1/Managers/{ManagerId}/NetworkProtocol/HTTPS/Certificates>

POST <https://{ip}/redfish/v1/Systems/{ComputerSystemId}/Boot/Certificates>

POST <https://{ip}/redfish/v1/AccountService/LDAP/Certificates>

POST <https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates>

Content-Type: application/json

Notes:

1. Performing POST operation to <https://{ip}/redfish/v1/AccountService/LDAP/Certificates> will create/upload root CA certificate required for LDAP authentication.
2. Performing POST operation to <https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates> will create/upload root CA certificate required for LDAP authentication. The private key required to upload into BMC will a part of the POST body in this URI.
3. Please ref <https://ubuntu.com/server/docs/service-ldap-with-tls> on how to generate LDAP certificate key.

Request Body will be in JSON format. The properties are mentioned in the following table.

Table 137. Certificate Collection POST Request Property

Name	Type	Description
CertificateString(M)	String	<p>This parameter shall contain the string of the certificate, and the format shall follow the requirements specified by the CertificateType property value. If the certificate contains any private keys, they shall be removed from the string in responses. If the service does not know the private key for the certificate and it is needed to use the certificate, the client shall provide the private key as part of the string in the POST request.</p> <p>Notes:</p> <ol style="list-style-type: none">1. Only support PKCS#1 and PKCS#8 (not encrypted) for private key string.2. CertificateString should reserve all end-of-line string from certificate file or from private key file, and they should be replaced as \n in request body.3. Only certificate or private key in correct CertificateType format will be recognized. The other strings which don t follow CertificateType format will be ignored.
CertificateType(M)	String	<p>The link to the Certificate Resource Collection where the certificate is installed.</p> <p>Note: Certificate Type property only supports PEM format.</p>

Request example

```
{  
  "CertificateString": "-----BEGINCERTIFICATE-----"
```

```

nMIIC2DCCAoICCQDrKFHkCkpC2zANBgqhkiG9w0BAQsFADCB8jELMAkGA1UEBhMC\nVVMxDzAN
BgNVBAGMBk9yZWdvbjcERMA8GA1UEBwwIUg9ydGxhbmQxEDA0BgNVBAoM\nB0NvbnRvc28xDDAKBg
NVBAsMA0FCQzEcMBoGA1UEAwTbWYuYldlcj5jb250b3Nv\nLm9yZzEgMB4GCSqGSIb3DQEJARYRYW
RtaW5AY29udG9zb3V5cmcxGjAYBgNVBCKM\nEXRlc3RDb250YWN0UGVyc29uMRYYFAYDVQQqDA10ZX
NOR2L2ZW50YW1lMRUwEwYD\nVQrDAxOZXXN0SW5pdGhbmHMxFDASBgNVBAQMC3Rlc3RTdXJuYW1
LMB4XDTE5MTIx\nl0TAyNTg0NV0XDTIwMDExODAgNTg0NVowgfIxZzAJBgNVBAYTALVTMQ8wDQYD
VQQI\nnDAZPcmVnb24xETAPBgNVBACMCFBvcnRsYW5kMRAwDgYDVQKDAAdDb250b3NvMQww\nnCgY
DVQQLDANBQkMxHDAaBgNVBAMME21hbmFnZXIuY29udG9zb3V5cmcxIDAeBgkq\nlhkiG9w0BCQEW
WfkbWluQGNvbnRvc28ub3JnMR0wGAYDVQKQDBF0ZXN0Q29udGFj\nndFBlcnNvb3JlZW50b3V5cmcxIDAeBgkq\nlhkiG9w0BCQEW
dGVzdEdpdmdVtMfTzTEVMBMGA1UEKwwMdGVzdElu\nnaXRpYWxzMRQwEgYDVQKQEDAT0ZXN0U3Vy
bmFtZTBcMA0GCSqGSIb3DQEBAQUAA0sA\nnMEgCQC2vTAZtvPrByReb065z6E/n7Rv8ymt4Goowjet6s0kf
m/WnJumTt0/eJfk\nn2j5c+XSG6q1wgmZOZA+NZVL7DFUjAgMBAAEwDQYJKoZIhvcNAQELBQADQCCsYgR
Y\nn3RX7fsLQR0M/LgHCHF9ke9mF8KsockAQLZLkXuwSZHe6+0b7p60eWrdiul6cpm0\nnb32QIGFrKwq8JXD
+ \n-----ENDCERTIFICATE-----\n-----BEGINPRIVATEKEY-----
\nMIIBVgIBADANBgqhkiG9w0BAQEFAASCAUAgggE8AgEAAKEAtr0wGbbz6wckXm90\nnuc+hP5+0b/Mpre
BqKMI3rerNJH5v1pybpk7dP3iX5No+XPL0o0qtciJmTmQPjWVS\nn+wxVIwIDAQABAKEAn6j0WcNL0LF/KTM/
KYGLdTdoQ1fFVrH4jtwCIeZajlygCLiT\nnKcb1A0s0/jxKFaK/ZUUVk5LWomxnZBy641r+AQIhANpX0+K7kUU
m4L7x1VgFfRUh\nnal8ns1MneAkbl0z0j+NjAiEA1kFjsAJIki1fkakXtixdiZz9GdRbgLBfM4cZJXtT\nn00ECIQCN
kCIwBTI7BMNWghD4JMfryGjFj8DK/Tkmo6Ja4sbFwIhAKF1FwcNyXh2\nnvt06qsa6uiZY6pbLY8UfkJabCUUo
oevBAiAzW38GApvYqlQeSRQcHTMx/LN6a6NY\nnJlxeauXwCcsIuw=\n-----ENDPRIVATEKEY-----\n",
"CertificateType": "PEM"
}

```

Notes:

1. HTTPS Certificate Collection DID NOT support POST operation because Lighttpd only accept one certificate.
2. Maximum allowed size of CertificateString for all Boot Certificate Instance is 20 KB.
3. Maximun number of Certificate Instance for ManagerAccount Certificate is 5.

Response

The response status is 201 and the response body is a GET Response with the properties of the newly created Certificate. For Error Responses, please refer to [“Error Response” on page 11](#).

GET – Certificate

Certificate describes a certificate that proves the identify of a component, account, or service.

Request

GET https://{ip}/redfish/v1/AccountService/Accounts/{ManagerAccountId}/Certificates/{CertificateId}

GET https://{ip}/redfish/v1/Managers/{ManagerId}/NetworkProtocol/HTTPS/Certificates/{CertificateId}

GET https://{ip}/redfish/v1/Systems/{ComputerSystemId}/Boot/Certificates/{CertificateId}

GET https://{ip}/redfish/v1/AccountService/LDAP/Certificates/1

GET https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1

Content-Type: application/json

Notes:

1. https://{ip}/redfish/v1/AccountService/LDAP/Certificates/1 is the root CA certificate required for LDAP authentication uploaded into BMC
2. https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1 is the client certificate required for LDAP authentication uploaded into BMC
3. Since single certificate is maintained in BMC for root ca, or the client certificate required for LDAP authentication, single certificate instance is maintained from Redfish as well.

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 138. Certificate Property

Name	Type	Read Only	Description
(OData Attributes)			Refer to “OData Support” on page 5
Oem	Object		OEM Extension (Optional), Refer to Table 11 “Resource Complex Types” on page 14.
Actions	Object	True	This object will contain the actions for this resource under Oem property if any.
Id(M)	String	True	Refer to Table 9 “Resource Type Definitions” on page 12
Name(M)	String	True	
Description	String	True	
Issuer	Object	True	The issuer of the certificate. Please refer to Table 139 “The identifier information about a certificate” on page 347

Table 138. Certificate Property (continued)

Name	Type	Read Only	Description	
KeyUsage	Array	True	The key usage extension, which defines the purpose of the public keys in this certificate.	
			Enum	Description
			CRLSigning	Verifies signatures on certificate revocation lists (CRLs).
			Client Authentication	TLS WWW client authentication.
			CodeSigning	Signs downloadable executable code.
			Data Encipherment	Directly enciphers raw user data without an intermediate symmetric cipher.
			DecipherOnly	Deciphers data while performing a key agreement.
			DigitalSignature	Verifies digital signatures, other than signatures on certificates and CRLs.
			EmailProtection	Email protection.
			EncipherOnly	Enciphers data while performing a key agreement.
			KeyAgreement	Key agreement.
			KeyCertSign	Verifies signatures on public key certificates.
			KeyEncipherment	Enciphers private or secret keys.
			NonRepudiation	Verifies digital signatures, other than signatures on certificates and CRLs, and provides a nonrepudiation service that protects against the signing entity falsely denying some action.
			OCSPSigning	Signs OCSP responses.
			Server Authentication	TLS WWW server authentication.
Timestamping	Binds the hash of an object to a time.			
Subject	Object	True	The subject of the certificate. Please refer to Table 139 “The identifier information about a certificate” on page 347.	
ValidNotAfter	String	True	The date when the certificate is no longer valid.	
ValidNotBefore	String	True	The date when the certificate becomes valid.	
CertificateString	String	True	This parameter shall contain the string of the certificate, and the format shall follow the requirements specified by the CertificateType property value. If the certificate contains any private keys, they shall be removed from the string in responses. If the service does not know the private key for the certificate and it is needed to use the certificate, the client shall provide the private key as part of the string in the POST request.	
CertificateType	String	True	The format of the certificate.	

Table 139. The identifier information about a certificate

Name	Type	Read only	Description
City	String	True	The city or locality of the organization of the entity.
CommonName	String	True	The fully qualified domain name of the entity.
Country	String	True	The country of the organization of the entity.
Email	String	True	The email address of the contact within the organization of the entity.
Organization	String	True	The name of the organization of the entity.
Organizational Unit	String	True	The name of the unit or division of the organization of the entity.
State	String	True	The state, province, or region of the organization of the entity.

DELETE – Certificate Instance

Certificate describes a certificate that proves the identify of a component, account, or service.

Request

DELETE `https://{ip}/redfish/v1/AccountService/Accounts/{ManagerAccountId}/Certificates/{CertificateId}`

DELETE `https://{ip}/redfish/v1/Managers/{ManagerId}/NetworkProtocol/HTTPS/Certificates/{CertificateId}`

DELETE `https://{ip}/redfish/v1/Systems/{ComputerSystemId}/Boot/Certificates/{CertificateId}`

DELETE `https://{ip}/redfish/v1/AccountService/LDAP/Certificates/1`

DELETE `https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1`

Content-Type: application/json

Notes:

1. HTTPS Certificate Instance DID NOT support DELETE operation because Lighttpd should always have one certificate.
2. Default certificates from BIOS (that keys matched Lighttpd keys) should not be deleted from Boot Certificate Instance.
3. DELETE operation on `https://{ip}/redfish/v1/AccountService/LDAP/Certificates/1` and `https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1` cannot be performed when LDAP configuration is saved for SSL and StartTLS. User has to change the LDAP configuration to NoEncryption and can perform DELETE operation to delete, root ca, client certificate and the private key used for LDAP authenticationResponse

Response

The response status is 204 and no response body. Please refer to [Table 6 “Collection Properties” on page 8](#) for the JSON response property.

POST – Certificate Rekey

Rekey action generates a new key pair for an existing certificate by using the existing certificate data. The response contains a Certificate Signing Request (CSR) that is used to be signed by a Certificate Authority (CA).

Request

POST https://{ip}/redfish/v1/AccountService/Accounts/{ManagerAccountId}/Certificates/{CertificateId}/Actions/Certificate.Rekey

POST https://{ip}/redfish/v1/Managers/Self/NetworkProtocol/HTTPS/Certificates/{CertificateId}/Actions/Certificate.Rekey

POST https://{ip}/redfish/v1/Systems/Self/Boot/Certificates/{CertificateId}/Actions/Certificate.Rekey

POST https://{ip}/redfish/v1/AccountService/LDAP/Certificates/1/Actions/Certificate.Rekey

POST https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1/Actions/Certificate.Rekey

Content-Type: application/json

Request Body will be in JSON format. The properties are mentioned in the following table.

Table 140. Rekey Action Request Body Property

Name	Type	Description
ChallengePassword	String	The challenge password to apply to the certificate for revocation requests.
KeyBitLength	Number	<p>The length of the key, in bits</p> <p>Notes:</p> <ol style="list-style-type: none">1. If KeyBitLength is not specific, the default value is 2048.2. The maximum value of KeyBitLength is 2048.3. The minimum value of KeyBitLength is 512.

Notes:

1. If using Rekey action for Boot Certificate Collection, then the Oem OwnerGuid property will set one default Guid value from 00000000-0000-0000-0000-000000000000 to 00000000-0000-0000-0000-FFFFFFFFFFFF.
2. HTTPS Certificate Instance should follow these limitation that based on Lighttpd :
 - a. Max server certificate size is 10240.
 - b. Max server private key size is 10240.
 - c. Min server public key and private key size is 2048.
 - d. Private key should not be encrypted.
 - e. Certificate should not expire.

Request example

```
{  
    "KeyBitLength": 512,  
    "ChallengePassword": "challengepassword"  
}
```

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 141. Rekey Action Response Property

Name	Type	Read Only	Description
CSRString(M)	String	True	The string for the certificate signing request.
Certificate(M)	Object	True	The link to the certificate being rekeyed.
Messages	Array	True	This property shall contain an array of messages associated with the settings.

After successful post call, the new Task will be created and please check the certificate signing result in TaskService.

The Messages property will contain the Task information.

POST – Certificate Renew

Renew action shall generate a certificate signing request using the existing information and key-pair of the certificate. The response shall contain a signing request that a certificate authority (CA) must sign. The service should retain the private key that this request generates for when the certificate is installed. The private key should not be part of the response.

Request

POST https://{ip}/redfish/v1/AccountService/Accounts/{ManagerAccountId}/Certificates/{CertificateId}/Actions/Certificate.Renew

POST https://{ip}/redfish/v1/Managers/Self/NetworkProtocol/HTTPS/Certificates/{CertificateId}/Actions/Certificate.Renew

POST https://{ip}/redfish/v1/Systems/Self/Boot/Certificates/{CertificateId}/Actions/Certificate.Renew

POST https://{ip}/redfish/v1/AccountService/LDAP/Certificates/1/Actions/Certificate.Renew

POST https://{ip}/redfish/v1/AccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1/Actions/Certificate.Renew

Content-Type: application/json

Request Body will be in JSON format. The properties are mentioned in the following table.

Table 142. Renew Action Request Body Property

Name	Type	Description
ChallengePassword	String	The challenge password to apply to the certificate for revocation requests.

Request example

```
{
  "ChallengePassword": "challengepassword"
}
```

Response

The response of the request will be in JSON format. The properties are mentioned in the following table.

Table 143. Renew Action Response Property

Name	Type	Read Only	Description
CSRString(M)	String	True	The string for the certificate signing request.
Certificate(M)	Object	True	The link to the certificate being rekeyed.
Messages	Array	True	This property shall contain an array of messages associated with the settings.

Chapter 23. AMI OEM

Manager Redfish DB Reset

Behavior

1. The **RedfishDBReset** action in Redfish will clear the Redfish database, repopulate it with default values using **db_init** and then repopulate data from IPMI to Redfish.
2. On a successful "**RedfishDBReset**" action, the **db_init** will repopulate the default values of several modules like **Action-Info**, **AccountService**, **TelemetryService**, **TaskService**, **EventService**, **CompositionService** etc.
3. And the properties of modules like **VirtualMedia**, **NetworkProtocol**, **LDAP**, **SEL LogServices**, **SerialInterfaces** will be repopulated with the values synced with IPMI.
4. If Unified User Account is enabled, then the ManagerAccount properties will not be reset to default after they have synced with IPMI.

Request

POST https://{ip}/redfish/v1/Managers/Self/Actions/Oem/AMIManager.RedfishDBReset

Content-Type: application/json

Request example

```
{
  "RedfishDBResetType": "ResetAll"
}
```

Response

1. The response of the request will be 202 with below content.
2. This URI is used for debugging purpose (DEBUG ONLY FEATURE).
3. System inventories like processor, memory etc. provided by BIOS will be cleared from database and needs host reboot for BIOS to populate data again.
4. Using **TaskId** Can check the **TaskStatus**.

```
{
  "@odata.context": "/redfish/v1/$metadata#Task.Task(TaskState,Description,Name,Id)",
  "@odata.id": "/redfish/v1/TaskService/Tasks/1",
  "@odata.type": "#Task.v1_4_2.Task",
  "Description": "Task for RedfishDBReset Task",
  "Id": "1",
  "Name": "RedfishDBReset Task",
  "TaskState": "New"
}
```

```
}
```

Manager Configure CD Instance Action

Behavior

1. This **ConfigureCDInstance** action is used to configure the number of CD/DVD devices that are to be supported for Virtual Media redirection. If it is set to 0 , no CD instances will be displayed under **Virtualmedia** collection.
2. The default value of CD instance is 4.
3. The **CDInstance** values ranges from zero to four.
4. The POST action is not allowed when any one of the CD / HD media redirection is in progress. Redirection can be initiated through WebUI/ Redfish/ KVM.

Request

```
POST https://{ip}/redfish/v1/Managers/Self/Actions/Oem /AMIVirtualMedia.ConfigureCDInstance
```

```
ConfigureCDInstance
```

Request example

```
{  
  "CDInstance": 4  
}
```

Response body

The response status code should be **200** with the below message in the response.

When the CD instance is modified through Redfish, it will also be reflected in Web UI.

```
{  
  "@Message.ExtendedInfo": [  
    {  
      "@odata.type": "#Message.v1_0_8.Message",  
      "Message": " ConfigureCDInstance action has been initiated successfully.Please allow upto 4-5 secs  
and verify the value of CDInstances OEM property in /redfish/v1/Managers/Self instance",  
      "MessageArgs": [  
        "ConfigureCDInstance",  
        "CDInstances OEM",  
        "/redfish/v1/Managers/Self"  
      ],  
      "MessageId": "Ami.1.0.DelayInActionCompletion",  
      "Resolution": "Check the property value update after 4-5 seconds",  
      "Severity": "OK"  
    }  
  ]  
}
```

```
}  
]  
}
```

POST – Enable RMedia Action

Please refer to [“POST – Enable the Remote Media” on page 99](#) for more information.

Chapter 24. Lenovo OEM

BMC Firmware update

Request

POST `https://{ip}/redfish/v1/UpdateService/upload`

Content-Type: `application/json`

Table 144. BMC update properties

Name	Type	Read only	Description
FlashType	Strings	False	HPMFwUpdate . It means performing the HPMFwUpdate action.
UploadSelector	String	False	Default . It's a fixed value for this version.
Targets	String	False	An URI that indicates where to apply the update image.

Procedure

1. Open postman, select the **POST** method, and type the URL below:
`https://{ip}/redfish/v1/UpdateService/upload`
2. On the **Body** tab for the POST action, select **form-data**, provide the key name as **UpdateFile**, and change the type to **File**.
3. In the value section, select the firmware image that is available in the local machine.
4. Create a JSON file `parameters.json` with the following content:

```
{
  "Targets": [
    "/redfish/v1/Managers/Self"
  ]
}
```

5. Create a JSON file `oem_parameters.json` with the following content:

```
{
  "FlashType": "HPMFwUpdate",
  "UploadSelector": "Default"
}
```

6. Provide key name **UpdateParameters** and select `parameters.json` created in step 4.
7. Provide key name **OemParameters** and select `oem_parameters.json` created in step 5.
8. Click **Send**.

Response

The response content is 202 Accepted.

If the update started before BMC booting finished, the response will be 400 error as below. Please wait a moment and try again.

```
{
  "error": {
    "@Message.ExtendedInfo": [
      {
        "@odata.type": "#Message.v1_0_7.Message",
        "Message": "Action UpdateService.MultipartPush firmware update is failed.",
        "MessageArgs": [
          "UpdateService.MultipartPush"
        ],
        "MessageId": "AmiOem.1.0.BMCNotReadyForFirmwareUpdate",
        "Resolution": "Wait for BMC ready.",
        "Severity": "Warning"
      }
    ],
    "code": "AmiOem.1.0.BMCNotReadyForFirmwareUpdate",
    "message": "Action UpdateService.MultipartPush firmware update is failed."
  }
}
```

If the BMC update started before other redfish upgrade action finished, the response will be 400 as below. Please wait it finished and try again.

```
{
  "error": {
    "@Message.ExtendedInfo": [
      {
        "@odata.type": "#Message.v1_0_7.Message",
        "Message": "The action is terminated since /redfish/v1/TaskService/Tasks/5 is being upgraded via UEFIFwupdate of UpdateService.MultipartPush at the same time.",
        "MessageArgs": [
          "/redfish/v1/TaskService/Tasks/5",
          "UEFIFwupdate of UpdateService.MultipartPush"
        ]
      }
    ]
  }
}
```

```

    ],
    "MessageId": "AmiOem.1.0.AlreadyInUpdateMode",
    "Resolution": "Resubmit action after FwUpdate completed.",
    "Severity": "Warning"
  }
],
  "code": "AmiOem.1.0.AlreadyInUpdateMode",
  "message": "The action is terminated since /redfish/v1/TaskService/Tasks/5 is being upgraded
via UEFIFwupdate of UpdateService.MultipartPush at the same time."
}
}

```

If FW version is lower than 2.51 and there is no “FlashTarget”: “Force” in the file oem_parameters.json.

```

{
  "error": {
    "@Message.ExtendedInfo": [
      {
        "@odata.type": "#Message.v1_0_7.Message",
        "Message": "The action UpdateService.MultipartPush was submitted but rejected
because the version will accept different target of FlashTarget.",
        "MessageArgs": [
          "UpdateService.MultipartPush"
        ],
        "MessageId": "AmiOem.1.0.InvalidFlashTarget",
        "Resolution": "Resubmit the request with the valid FlashTarget",
        "Severity": "Warning"
      }
    ],
    "code": "AmiOem.1.0.InvalidFlashTarget",
    "message": "The action UpdateService.MultipartPush was submitted but rejected
because the version will accept different target of FlashTarget."
  }
}

```

Update Status Query

When the FW update request was sent successfully, there is a URL bonded to a task in response to query update status. And the “TaskState” and “TaskStatus” in the response of this query URL will display update status after BMC bootup.

Request

```
GET https://{ip}/redfish/v1/TaskService/Tasks/{id}
```

```
Content-Type: application/json
```

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#Task.Task",
  "@odata.etag": "\"1585121674\"",
  "@odata.id": "/redfish/v1/TaskService/Tasks/ID",
  "@odata.type": "#Task.v1_4_1.Task",
  "Description": "Task for Update Service Task",
  "Id": "ID",
  "Messages": [
    {
      "@odata.type": "#Message.v1_0_7.Message",
      "Description": "The operation is complete and completed sucessfully or with warnings.",
      "Message": "Task /redfish/v1/UpdateService/Upload has completed.",
      "MessageArgs": [
        "/redfish/v1/UpdateService/Upload"
      ],
      "MessageId": "Task.1.0.Completed",
      "Resolution": "None",
      "Severity": "OK"
    },
    {
      "@odata.type": "#Message.v1_0_7.Message",
      "Description": "Indicates that device firmware update is completed.",
      "Message": "Action /redfish/v1/UpdateService/Upload firmware update is completed.",
      "MessageArgs": [
```

```

        "/redfish/v1/UpdateService/Upload"
    ],
    "MessageId": "UpdateService.1.0.FirmwareUpdateCompleted",
    "Resolution": "None",
    "Severity": "OK"
}
],
"Name": "Update Service Task",
"TaskState": "Completed",
"TaskStatus": "OK"
"

```

UEFI Firmware update

Request

POST https://{ip}/redfish/v1/UpdateService/upload

Content-Type: application/json

Table 145. UEFI update properties

Name	Type	Read only	Description
FlashType	Strings	False	UEFIUpdate , it means performing UEFI update action.
UploadSelector	String	False	Default . It's a fixed value for this version.
Targets	String	False	An URI that indicates where to apply the update image.

Procedure

1. Open postman, select the **POST** method, and type the URL below:

https://{ip}/redfish/v1/UpdateService/upload

2. In the Body tab for post action, select form-data and provide the key name as "UpdateFile" and change the type to "File".
3. Then in the value section, select the firmware image file that is available in the local machine.
4. Create a JSON file parameters.json with content as below:

```

{
    "Targets": [
        "/redfish/v1/Managers/Self"
    ]
}

```

```
}
```

5. Create a JSON file `oem_parameters.json` with the following content:

```
{  
    "FlashType": "UEFIUpdate",  
    "UploadSelector": "Default"  
}
```

6. Provide key name **UpdateParameters** and select `parameters.json` created in step 4.
7. Provide key name **OemParameters** and select `oem_parameters.json` created in step 5.
8. Click **Send**.

Response

The response content is 202 Accepted.

Note: If the update started before BMC booting finished, the response will be 400 as below. Please wait a moment and try again.

```
{  
    "error": {  
        "@Message.ExtendedInfo": [  
            {  
                "odata.type": "#Message.v1_0_7.Message",  
                "Message": "Action UpdateService.MultipartPush firmware update is failed.",  
                "MessageArgs": [  
                    "UpdateService.MultipartPush"  
                ],  
                "MessageId": "AmiOem.1.0.BMCNotReadyForFirmwareUpdate",  
                "Resolution": "Wait for BMC ready.",  
                "Severity": "Warning"  
            }  
        ],  
        "code": "AmiOem.1.0.BMCNotReadyForFirmwareUpdate",  
        "message": "Action UpdateService.MultipartPush firmware update is failed."  
    }  
}
```

Update Status Query

When the FW update request was sent successfully, there is a URL bonded to a task in response to query update status. And the “TaskState” and “TaskStatus” in the response of this query URL will display update progress , and its percentage of the action.

Request

```
GET https://{ip}}/redfish/v1/TaskService/Tasks/{id}
```

Content-Type: application/json

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#Task.Task",
  "@odata.etag": "\"1585275010\"",
  "@odata.id": "/redfish/v1/TaskService/Tasks/2",
  "@odata.type": "#Task.v1_4_1.Task",
  "Description": "Task for Update Service Task",
  "Id": "2",
  "Messages": [
    {
      "@odata.type": "#Message.v1_0_7.Message",
      "Message": "Task /redfish/v1/UpdateService/Upload has completed.",
      "MessageArgs": [
        "/redfish/v1/UpdateService/Upload"
      ],
      "MessageId": "Task.1.0.Completed",
      "Resolution": "None",
      "Severity": "OK"
    },
    {
      "@odata.type": "#Message.v1_0_7.Message",
      "Message": "Action /redfish/v1/UpdateService/Upload firmware update is completed.",
      "MessageArgs": [
        "/redfish/v1/UpdateService/upload"
      ],
      "MessageId": "UpdateService.1.0.FirmwareUpdateCompleted",
    }
  ]
}
```

```

        "Resolution": "None",

        "Severity": "OK"

    }

],

    "Name": "Update Service Task",

    "TaskState": "Progress",

    "TaskStatus": "0%"

```

BP PSOC Firmware Update

This resource shall be used to update BP PSOC firmware.

Upload BP PSOC Image File

1. Open postman, select the **POST** method, and type the URL below:
https://{ip}/redfish/v1/UpdateService/Actions/Oem/UpdateService.UploadFirmwareImage
2. In the Body tab for post action, select **form-data** and provide the key name as “image_file” and change the type to “File”.
3. Then in the value section, select the firmware image file that is available in the local machine.
4. Click **Send**.

Request

POST https://{ip}/redfish/v1/UpdateService/Actions/Oem/UpdateService.UploadFirmwareImage

Content-Type: application/json

Response

The response content is 204.

Update BP PSOC Firmware

Table 146. BP PSOC update properties

Name	type	Read only	Description
FlashAction	String	False	Start. It's a fixed value for this version
UploadSelector	String	False	Default. It's a fixed value for this version
FlashPercentage	String	True	The percentage as firmware update
UpdateStatus	String	True	The status as firmware update
UpdateTarget	String	True	The component is selected to firmware update

Request

POST https://{ip}/redfish/v1/UpdateService/Actions/Oem/UpdateService.BPFwUpdate

Content-Type: application/json

Request body

```
{  
  
    "FlashAction": "Start",  
  
    "UploadSelector": "Default"  
  
}
```

Response

The response content is 202 Accepted.

GET BP PSOC Update Status

The update status can be reflected as below URL.

Request

GET https://{ip}/redfish/v1/UpdateService

Content-Type: application/json

Response

```
1 {  
2   "@odata.context": "/redfish/v1/$metadata#UpdateService.UpdateService",  
3   "@odata.etag": "\"1586927556\"",  
4   "@odata.id": "/redfish/v1/UpdateService",  
5   "@odata.type": "#UpdateService.v1_5_0.UpdateService",  
6   "Actions": {  
7     "Oem": {  
8       "#UpdateService.BMCFWUpdate": {  
9         "@Redfish.ActionInfo": "/redfish/v1/UpdateService/BMCFWUpdateActionInfo",  
10        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.BMCFWUpdate"  
11      },  
12      "#UpdateService.BPFWUpdate": {  
13        "@Redfish.ActionInfo": "/redfish/v1/UpdateService/BPFWUpdateActionInfo",  
14        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.BPFWUpdate"  
15      },  
16      "#UpdateService.PSUFWUpdate": {  
17        "@Redfish.ActionInfo": "/redfish/v1/UpdateService/PSUFWUpdateActionInfo",  
18        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.PSUFWUpdate"  
19      },  
20      "#UpdateService.UEFIUpdate": {  
21        "@Redfish.ActionInfo": "/redfish/v1/UpdateService/UEFIUpdateActionInfo",  
22        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.UEFIUpdate"  
23      },  
24      "#UpdateService.UploadFirmwareImage": {  
25        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.UploadFirmwareImage"  
26      }  
27    }  
28  },  
29  "Description": "Redfish Update Service",  
30  "FirmwareInventory": {  
31    "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory"  
32  },  
33  "Id": "UpdateService",  
34  "MaxImageSizeBytes": 78764032,  
35  "MultipartHttpPushUrl": "/redfish/v1/UpdateService/upload",  
36  "Name": "Update Service",  
37  "Oem": {  
38    "AMIUpdateService": {  
39      "@odata.type": "#UpdateService.v1_0_0.AMIUpdateService",  
40      "FlashPercentage": null,  
41      "UpdateComponent": "BMC",  
42      "UpdateStatus": "Done",  
43      "UpdateTarget": "BP"  
44    }  
45  },  
46  "ServiceEnabled": true,  
47  "Status": {  
48    "Health": "OK",  
49    "State": "Enabled"  
50  }  
51 }  
52  
53 }
```

PSU Firmware Update

This resource shall be used to update PSU firmware.

Upload PSU Image File

1. Open postman, select the **POST** method, and type the URL below:

https://{ip}/redfish/v1/UpdateService/Actions/Oem/UpdateService.UploadFirmwareImage

2. In the Body tab for post action, select **form-data** and provide the key name as “image_file” and change the type to “File”.
3. Then in the value section, select the firmware image file that is available in the local machine.
4. Click **Send**.

Request

POST https://{ip}/redfish/v1/UpdateService/Actions/Oem/UpdateService.UploadFirmwareImage

Content-Type: application/json

Response

The response content is 204.

Update PSU Firmware

Table 147. PSU update properties

Name	Type	Read only	Description
FlashAction	String	False	Start. It's a fixed value for this version
UploadSelector	String	False	Default. It's a fixed value for this version
FlashPercentage	String	True	The percentage as firmware update
UpdateStatus	String	True	The status as firmware update
UpdateTarget	String	True	The component is selected to firmware update

Request

POST https://{ip}/redfish/v1/UpdateService/Actions/Oem/UpdateService.PSUFwUpdate

Content-Type: application/json

Request body

```
{
  "FlashAction": "Start",
  "UploadSelector": "Default"
}
```

Response

The response content is 202 Accepted.

GET PSU Update Status

The update status can be reflected as below URL.

Request

GET https://{ip}/redfish/v1/UpdateService

Content-Type: application/json

Response

```
{
  "@odata.context": "/redfish/v1/$metadata#UpdateService.UpdateService",
  "@odata.etag": "\"1586927556\"",
  "@odata.id": "/redfish/v1/UpdateService",
  "@odata.type": "#UpdateService.v1_5_0.UpdateService",
  "Actions": {
    "Oem": {
      "#UpdateService.BMCFWUpdate": {
        "@Redfish.ActionInfo": "/redfish/v1/UpdateService/BMCFWUpdateActionInfo",
        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.BMCFWUpdate"
      },
      "#UpdateService.BPFWUpdate": {
        "@Redfish.ActionInfo": "/redfish/v1/UpdateService/BPFWUpdateActionInfo",
        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.BPFWUpdate"
      },
      "#UpdateService.PSUFWUpdate": {
        "@Redfish.ActionInfo": "/redfish/v1/UpdateService/PSUFWUpdateActionInfo",
        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.PSUFWUpdate"
      },
      "#UpdateService.UEFIUpdate": {
        "@Redfish.ActionInfo": "/redfish/v1/UpdateService/UEFIUpdateActionInfo",
        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.UEFIUpdate"
      },
      "#UpdateService.UploadFirmwareImage": {
        "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.UploadFirmwareImage"
      }
    }
  },
  "Description": "Redfish Update Service",
  "FirmwareInventory": {
    "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory"
  },
  "Id": "UpdateService",
  "MaxImageSizeBytes": 78764032,
  "MultipartHttpPushUrl": "/redfish/v1/UpdateService/upload",
  "Name": "Update Service",
  "Oem": {
    "AMIUpdateService": {
      "@odata.type": "#UpdateService.v1_0_0.AMIUpdateService",
      "FlashPercentage": null,
      "UpdateComponent": "BMC",
      "UpdateStatus": "Done",
      "UpdateTarget": "PSU"
    }
  },
  "ServiceEnabled": true,
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  }
}
```

BMC Configuration Backup

Request URI

POST https://{ip}/redfish/v1/Managers/Self/Actions/Oem/Lenovo/Backup.start

Content-Type: application/json

Table 148. BMC configuration backup action properties

Name	Type	Read only	Description
BackupType	String	False	The service configuration which needs to be stored off, which can be SNMP, KVM, NetworkAndServices, IPMI, NTP, Authentication, or SYSLOG .
serverIP	String	False	The HTTP server IP address which will receive a backup file after the store off operation.
serverPort	Number	False	The port in the HTTP server for the store off action.
password	String	False	Password to encrypt the BMC configuration backup file, which must contain 9 to 32 characters.
folderPath	String	False	The folder path of the HTTP server for the store off action. If there is no need to assign a specific folder for the action, this property should be specified as nil .

Request example

```
{
  "BackupType": "SNMP, KVM, NetworkAndServices, IPMI, NTP, Authentication, SYSLOG",

```

```

"serverIP" : "192.168.101.54",

"serverPort" : 80,

"password" : "1qaz2wsx3e",

"folderPath" : "HFS"

}

```

Response body

The following is the example response body. Click the **TaskService** link to check the status of this operation with **TaskState** and **TaskStatus**.



Response code

The response content is 202 Accepted.

BMC Configuration Restore

Request

POST https://{ip}/redfish/v1/Managers/Self/Actions/Oem/Lenovo/Restore.start

Content-Type: application/json

Table 149. BMC configuration restore properties

Name	Type	Read only	Description
RestoreFileName	String	False	The name of the restore file which should be saved in the HTTP server.
serverIP	String	False	The HTTP server IP address which contains the restore file for the restore action.
serverPort	Number	False	The port in the HTTP server for the restore action.
password	String	False	Password to decrypt the BMC configuration backup file, which must contain 9 to 32 characters.
folderPath	String	False	The folder path of the HTTP server for the restore action. If there is no need to assign a specific folder for the action, this property should be specified as nil .

Request example

```

{

```

Response body

Body Cookies (4) Headers (14) Test Results Status: 202 Accepted Time: 2280 ms

Pretty Raw Preview JSON   Save Response

```
1 {
2   "@odata.context": "/redfish/v1/$metadata#Task_Tasks(Description,TaskState,Name,Id)",
3   "@odata.id": "/redfish/v1/TaskService/Tasks/3",
4   "@odata.type": "#Task.v1_4_1.Task",
5   "Description": "Task for Restore Config Task",
6   "Id": "3",
7   "Name": "Restore Config Task",
8   "TaskState": "New"
9 }
```

The response content is 202 accepted

Table 150. DNS settings properties

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Get DNS Settings

Request

GET https://{ip}/redfish/v1/Managers/{manager_instance}/NetworkProtocol/Oem/Lenovo/DNS

Content-Type: application/json

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#ManagerNetworkProtocol.ManagerNetworkProtocol",
  "@odata.etag": "\"1583393604\"",
  "@odata.id": "/redfish/v1/Managers/Self/NetworkProtocol/Oem/Lenovo/DNS",
  "@odata.type": "#ManagerNetworkProtocol.v1_4_1.ManagerNetworkProtocol",
  "Actions": {
    "#DNS.Reset": {
      "ResetType@Redfish.AllowableValues": [
        "restart"
      ],
      "target": "/redfish/v1/Managers/Self/NetworkProtocol/Oem/Lenovo/DNS/Actions/DNS.reset"
    }
  },
  "DNSDHCP": "DHCP",
  "DNSIndex": "Eth1",
  "DNSStatus": "enable",
  "DomainDHCP": "DHCP",
  "DomainIndex": "Eth1",
  "DomainPriority": "IPv4",
  "HostName": "TSM3CE1A1C7E7DA",
  "IPPriority": "IPv4",
  "Id": "DNS",
  "Name": "Network Protocol DNS"
```

Change DNS Settings

After completing all the DNS patch action as following, it has to post the DNS.reset to restart the DNS service.

Request

PATCH https://{ip}/redfish/v1/Managers/{manager_instance}/NetworkProtocol/Oem/Lenovo/DNS

Content-Type: application/json

Request body

DNS properties should be patched individually. See the following example patch body:

DNS status:

```
{
  "DNSStatus" : "disable"
}
```

DNS hostname:

```
{
  "DNSHostname": "AMI202923333328"
}
```

DNS setting:

- DHCP mode

```
{
  "DNSDHCP" : "DHCP",
  "DNSIndex" : "eth1",
  "IPPriority" : "ipv4"
}
```

- Static mode

```
{
  "DNSDHCP": "static",
  "DNSIndex": "none",
  "IPPriority": "none"
}
```

DNS Domain name setting

-DHCP mode

```
{
  "DomainDHCP": "DHCP",
  "DomainIndex": "eth1",
}
```

```

    "DomainPriority": "ipv4"
  }

  -Static mode

  {
    "DomainDHCP": "static",
    "DomainName": "USI.com.tw"
  }

DNS server ip

  {
    "DNSServerIP1": "10.2.0.12",
    "DNSServerIP2": "10.2.0.11",
    "DNSServerIP3": "10.2.0.20"
  }

```

Reset DNS

Request

POST https://{{ip}}/redfish/v1/Managers/Self/NetworkProtocol/Oem/Lenovo/DNS/Actions/DNS.reset

Content-Type: application/json

Request body

```

{
  "ResetType": "restart"
}

```

Response

The response content is 200 with no body.

Note: After the DNS reset request is executed successfully, the DNS service will restart, and the network service will also restart, so the network will be unavailable for a short time (about 30 seconds).

NCSI configuration

Table 151. NCSI configuration properties

Field	Type	Read only	Description
Mode	String	False	There are two modes for NCSI configuration: <ul style="list-style-type: none">• Auto Failover mode• Manual Switch mode
Interface	String	False	Ethernet interface for NCSI configuration.
PackageID	Number	False	Package ID for this interface.
ChannelNum	Number	False	Channel number for the corresponding package ID.

Get NCSI Configuration

Request

GET https://{ip}/redfish/v1/Managers /Self/Oem/Lenovo/NCSIConfig

Content-Type: application/json

Response

```
{
  "@odata.context": "/redfish/v1/$metadata#Manager.Manager",
  "@odata.etag": "W/\"1535355197\"",
  "@odata.id": "/redfish/v1/Managers/Self/Oem/Lenovo/NCSIConfig",
  "@odata.type": "#Manager.v1_3_1.Manager",
  "ChannelNum": "0",
  "Id": "NCSIConfig",
  "Interface": "eth0",
  "Mode": " Manual Switch mode",
  "Name": "Lenovo NCSI Config",
  "PackageID": "0"
}
```

PATCH NCSI Configuration

Request

PATCH https://{ip}/redfish/v1/Managers /Self/Oem/Lenovo/NCSIConfig

Content-Type: application/json

Request body

Mode, **Interface**, **PackageID**, and **ChannelNum** should be patched individually. See the following example patch body:

- Auto Failover mode

```
{  
  "Mode" : "Auto Failover mode",  
  "Interface" : "share"  
}
```

- Manual Switch mode

```
{  
  "Mode" : "Manual Switch mode",  
  "Interface" : "share",  
  "PackageID" : 0,  
  "ChannelNum" : 0  
}
```

Response

The response content is 204 with no body.

Security for AD Configuration

AD General Setting

Table 152. AD general setting properties

Field	Type	Read only	Description
Status	String	False	Indicator of whether the AD service is enabled
RacUserName	String	False	User name of an administrator of the AD server
RacUserPassword	String	False	Password of the administrator
RacDomain	String	False	Domain for the user
DCserver1	String	False	IP address of the AD server 1
DCserver2	String	False	IP address of the AD server 2
DCserver3	String	False	IP address of the AD server 3

Get AD General Setting

Request

GET https://{ip}/redfish/v1/AccountService/Oem/Lenovo/AD/GeneralSetting

Content-Type: application/json

Response

```
{
  "@odata.context":
    "/redfish/v1/$metadata#AccountService.AccountService
    (DCServer3,@odata.id,Status,DCServer1,Name,RacUserName,DCServer2,Id,RacDomain)",
  "@odata.etag": "\"1583375634\"",
  "@odata.id": "/redfish/v1/AccountService/Oem/Lenovo/AD/GeneralSetting",
  "@odata.type": "#AccountService.v1_5_0.AccountService",
  "DCServer1": "192.168.101.253",
  "DCServer2": "192.168.101.254",
  "DCServer3": "192.168.101.255",
  "Id": "AD Config",
  "Name": "AccountService AD Config",
  "RacDomain": "lenovo.com",
  "RacUserName": "LNV023",
  "Status": "enable"
}
```

PATCH AD General Setting

Request

PATCH https://{ip}/redfish/v1/AccountService/Oem/Lenovo/AD/GeneralSetting

Content-Type: application/json

Request body

The properties of this URL should be patched in a group. See the following example patch body:

```
{
  "Status" : "enable",
  "RacUserName" : "LNV024",
  "RacUserPassword" : "pw2324",
  "RacDomain" : "lenovo.com",
  "DCServer1" : "192.168.101.253",
  "DCServer2" : "192.168.101.254",
  "DCServer3" : "192.168.101.255"
}
```

Response

The response content is 204 with no body.

AD Role Group Setting

Note: id of the AD role group could be 1 to 16

Table 153. AD role group setting properties

Field	Type	Read only	Description
RoleGroupName	String	False	Role group name.
RoleGroupDomain	String	False	Role group domain.
RoleGroupPrivilege	Number	False	Privilege can be none , User , Operator , Administrator , or Oem .
RoleGroupExtendPrivilege	String	False	Extended privilege, which can be configured as none , KVM enable , Vmedia enable , or both KVM and Vmedia enable .

Get AD Role Group Setting

Request

GET https://{ip}/redfish/v1/AccountService/Oem/Lenovo/AD/RoleGroup/{id}

Content-Type: application/json

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#AccountService.AccountService",
  "@odata.etag": "\"1583378837\"",
  "@odata.id": "/redfish/v1/AccountService/Oem/Lenovo/AD/RoleGroup/5",
  "@odata.type": "#AccountService.v1_5_0.AccountService",
  "Id": "AD USER",
  "Name": "AccountService AD User",
  "RoleGroupDomain": "lenovo.com",
  "RoleGroupExtendPrivilege": "Vmedia enable",
  "RoleGroupName": "LNV023",
  "RoleGroupPrivilege": "Operator"
}
```

PATCH AD Role Group Setting

Request

PATCH https://{ip}/redfish/v1/AccountService/Oem/Lenovo/AD/RoleGroup/{id}

Content-Type: application/json

Request body

The properties of this URL should be patched in a group. See the following example patch body:

```
{
  "RoleGroupName": "LNVGP1",
  "RoleGroupDomain": "lenovo.com",
  "RoleGroupPrivilege": "Administrator",
  "RoleGroupExtendPrivilege": "KVM enable"
}
```

Response

The response content is 204 with no body.

NMI Triggered

Request

POST https://{ip}/redfish/v1/Managers/Self/Actions/Manager.NMIButton

Content-Type: application/json

Request body

```
{
  "NMIButtonType": "Push"
}
```

Response

The response content is 200 with no body.

Fast and accurate power metering

Request

GET https://{ip}/redfish/v1/Chassis/{chassis_instance}/Power/Dem/Lenovo/HistoryPowerMeter/{power meter type}

Content-Type: application/json

Note: *power meter type* could be PsuAC, PsuDC, CPU, DIMM, OCP, PCIE, or GPUexternal.

Table 154. Power metering properties

Field	Type	Read only	Description
Name	String	True	Power control function name
historyPower	Table	True	Historical power records, with each entry containing the timestamp, min power, max power, and average power of the power metering duration

Table 154. Power metering properties (continued)

Field	Type	Read only	Description
timeStamp	String	True	Local time for each power meter history record created
minPower	Value	True	Min power of this device in the power metering duration
maxPower	Value	True	Max power of this device in the power metering duration
avgPower	Value	True	Average power of this device in the power metering duration

Example to get CPU power metering info:

GET https://{ip}/redfish/v1/Chassis/{chassis_instance}/Power/Oem/Lenovo/HistoryPowerMeter/CPU

Content-Type: application/json

Response example

```
{
  "@odata.context": "/redfish/v1/$metadata#Power.Power",
  "@odata.etag": "\"1583833912\"",
  "@odata.id": "/redfish/v1/Chassis/Self/Power/Oem/Lenovo/HistoryPowerMeter/CPU",
  "@odata.type": "#Power.v1_5_3.Power",
  "Id": "lenovo CPU power meter",
  "Name": "lenovo CPU power meter",
  "historyPower": [
    {
      "avgPower": "44",
      "maxPower": "44",
      "minPower": "44",
      "timeStamp": "2020-03-11 16:10:44"
    },
    {
      "avgPower": "44",
      "maxPower": "44",
      "minPower": "44",
      "timeStamp": "2020-03-11 16:11:14"
    },
    ...
  ]
}
```

}

Download MiniFFDC

Table 155. Download miniFFDC properties

Name	Type	Read only	Description
ExportURI	String	False	The SFTP server IP which will receive a miniFFDC file after ServiceData action.
Username	Number	False	The username in SFTP server for the ServiceData action.
Password	String	False	The password in SFTP server for the ServiceData action.

Request

POST https://{ip}/redfish/v1/Managers/Self/Actions/Oem/Lenovo/ServiceData/LenovoServiceData.ExportFFDCData

Content-Type: application/json

Request body

```
{
  "ExportURI" : "192.168.101.43",
  "Username" : "tester",
  "Password" : "password"
}
```

Response body

The following is the example response body. Click the **TaskService** link to check the status of this operation with **TaskState** and **TaskStatus**.



LDAP CertificateCollection

The section is to keep the old APIs for customers who still use. After Redfish was updated to 1.8.a, there are new APIs for CertificateCollection, please refer to [Chapter 22 “CertificateService” on page 341](#) response.

Get LDAP CertificateCollection

Request

GET https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates

GET https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/Oem/Ami/ClientCertificates

Content-Type: application/json

Note: `https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates` is the collection URI for viewing root CA certificate collection required for LDAP authentication `https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/Oem/Ami/ClientCertificates` is the collection URI for viewing client certificate collection required for LDAP authentication

POST Upload LDAP Certificate

Request

POST `https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates`

POST `https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/Oem/Ami/ClientCertificates`

Content-Type: application/json

Notes:

1. Performing POST operation to `https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates` will create/upload root CA certificate required for LDAP authentication.
2. Performing POST operation to `https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/Oem/Ami/ClientCertificates` will create/upload root CA certificate required for LDAP authentication. The private key required to upload into BMC will a part of the POST body in this URI.

Request body

Table 156. Lenovo OEM CertificateCollection POST Request Property

Name	Type	Description
CertificateString(M)	String	The string for the certificate signing request. Notes: <ol style="list-style-type: none"> 1. <i>CertificateString must contain certificate string and private key string. Only support PKCS#1 and PKCS#8 (not encrypted) for private key string.</i> 2. <i>CertificateString should reserve all end-of-line string from certificate file or from private key file, and they should be replaced as \n in request body.</i> 3. <i>CertificateString should concatenate certificate string and private key string with \n, and certificate string should be in front of private key string.</i>
CertificateType(M)	String	The link to the Certificate Resource Collection where the certificate is installed. Note: CertificateType property only supports PEM format.

Example POST Request Body:

```
{
  "CertificateString": "-----BEGINCERTIFICATE-----
MIID1TCCAr2gAwIBAgIU5AJJEAguieIjqeIYlgOF43wA4aMwDQYJKoZIhvcNAQEL
BQAwEgTELMAkGA1UEBhMCVVMxZzAVBgNVBAGTDk5vcnRoIENhcm9saW5hMRwwDgYD
VQQHEwdSYWxlaWdoMSUwIiwYDVQQKExxHZW5lcmlF0ZWQgYnkgU2VydmlVIEZpcml3
YXJlMQkwBwYDVQQLEwAxDTALBgNVBAMTBExYQ0EwIBcNNzAwMTAxMDAwMDAwWhgP
MjA2OTEyMzEyMzU5NTlaMHkxCzAJBgNVBAYTALVTMRcwFQYDVQIEw50b3J0aCBD
```



```

YXJvbGluYTEQMA4GA1UEBxMHUmfSZWlnaDELmCMGA1UEChMcR2VuZXJhdGVkIGJ5
IFNlcnZlciBGaXJtd2FyZTEJMAcGA1UECzMAMQowCwYDVQQDEWRMWNBMIIIBjAN
BgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAsfWK7ywcwc/yjDyYdUB80L+0WrvA
N2UGkcWuQJDL7AuWZ7gpwGKyhvDicENJkv0oHBWBWgo1I6Ec1+tnDkSoAvh1Z0S5
bGNzGvLVZ+VQWR0V/SzmEKbN6Q2YkdsYurx4jZ0DYtIPMdsT99J5LXU6VR0LJIn+
Zh0ypurXefZc+10ew5gsM1qhEKgxDfflLn0Lkfxj7uxtSjVezTpFUUC2Ps3z9+/c
lEx/vo6AdLhsDRViSjzIYxnMIy2JLUkTk6LfymjoPb9AlucNf/Eaelt0XnE9dgzE
15hZcEQImurreJhsQXEIQigRB8W/+F0KfQapm2AwUIhiqLHkRvWmp6EaazQIDAQAB
o1MwUTAPBgNVHRMBAf8EBTADAQH/MB0GA1UdDgQWBBS9XeuvFwRq6jQESvpIueF
npbDmzAfBgNVHSMEGDAWgBS9XeuvFwRq6jQESvpIueFnpbDmzANBgkqhkiG9w0B
AQsFAAOCAQEALmKnJHR9dcUZwV+a7gaFLYFfkz2m5F+jZrkapujj3S0x94KU1su
GukAdvzQJwsDwoXFEIpIQKorfRUxY0YrRkBDJrN/pKsYfgtnNMH1JyKg3yxo0uCf
x+VrtVZTPHIl0thINqo6PL9pXChaGLRbXX17KsclC33Ca1DfZALEkNBZSdfJeJP9
zbvG7E3PS1evxrlCGvcUpP60AvzHHqfgMi/8whhnSmCCvf5JLTXk2Ewp5fr7bLUd
70W+p0zLSgNK4tMsyXj/ok+obVHcGM6lqdeTMuoCt6olVp8AzsPcthnY0zQP1C50
se3jPZxN+eRXuL6R5qMsLDHd4vGx02Vm0g==
-----ENDCERTIFICATE-----",
"CertificateType": "PEM",
"Oem": {
"Ami": {
"CACert": true
}
}
}

```

Response

The response status is 201 and the response body is a GET Response with the properties of the newly created Certificate.

LDAP Certificate

The Certificate describes a certificate that proves the identify of a component, account, or service.

Get LDAP Certificate Instance

Request

GET https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/1

GET https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1

Content-Type: application/json

Notes:

1. <https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/1> is the root CA certificate required for LDAP authentication uploaded into BMC
2. <https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1> is the client certificate required for LDAP authentication uploaded into BMC
3. Since single certificate is maintained in BMC for root ca, or the client certificate required for LDAP authentication, single certificate instance is maintained from Redfish as well.

Response

The response of the request will be in JSON format. The properties are mentioned in [Table 138 “Certificate Property” on page 345](#).

Delete LDAP Certificate Instance

Request

DELETE https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/1

DELETE https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1

Content-Type: application/json

Note: DELETE operation on

<https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/1> and <https://{ip}/redfish/v1/Managers/Self/RemoteAccountService/LDAP/Certificates/Oem/Ami/ClientCertificates/1> cannot be performed when LDAP configuration is saved for **SSL** and **StartTLS**. User has to change the LDAP configuration to **NoEncryption** and can perform DELETE operation to delete, root ca, client certificate and the private key used for LDAP authentication.

Response

The response status is 204 and no response body.

Port Forwarding Feature

The section is described how to set and get configurations of port forwarding.

Note: IPv6 not support

Table 157. Port forwarding properties

Name	type	Read only	Description
Ipv4	Table	true	The history Ipv4 records.

Table 157. Port forwarding properties (continued)

Index	Value	false	Interface Service index value. Index range 1~14, 1~10 are used for forwarding direction: Client -> BMC -> OS, and 11~14 are used for forwarding direction: OS -> BMC -> Client
ServiceEnable	String	false	Indicates if the Service is enabled or disabled.
Address	String	false	Specify destination Ipv4 address: OS or remote client device.
DestinationHostPort	Value	false	DestinationHostPort value of Operation System listened.
Protocol	String	false	Protocol string can use TCP or UDP
SourcePort	Value	false	SourcePort value of BMC.

Get Port Forwarding settings

Request

GET https://{ip}/redfish/v1/Managers/Self/NetworkProtocol/Oem/Lenovo/PortForwarding

Content-Type: application/json

Response

ServiceEnable: Disable Case

```
{
  "@odata.context": "/redfish/v1/$metadata#ManagerNetworkProtocol.ManagerNetworkProtocol",
  "@odata.etag": "\"1602826076\"",
  "@odata.id": "/redfish/v1/Managers/Self/NetworkProtocol/Oem/Lenovo/PortForwarding",
  "@odata.type": "#ManagerNetworkProtocol.v1_4_1.ManagerNetworkProtocol",
  "Description": "Port Forwarding Configurations",
  "Ipv4": [
    ...
    {
      "Index": "3",
      "ServiceEnable": "Disable"
    },
    ...
  ]
  ...
}
```

ServiceEnable: Enable Case

```
{
```

```

"@odata.context": "/redfish/v1/$metadata#ManagerNetworkProtocol.ManagerNetworkProtocol",
"@odata.etag": "\"1602826076\"",
"@odata.id": "/redfish/v1/Managers/Self/NetworkProtocol/Oem/Lenovo/PortForwarding",
"@odata.type": "#ManagerNetworkProtocol.v1_4_1.ManagerNetworkProtocol",
"Description": "Port Forwarding Configurations",
"Ipv4": [
    ...
    {
        "Address": "169.254.0.18",
        "DestinationHostPort": 6990,
        "Index": "3",
        "Protocol": "TCP",
        "Protocol@Redfish.AllowableValues": [
            "TCP",
            "UDP"
        ],
        "ServiceEnable": "Enable",
        "ServiceEnable@Redfish.AllowableValues": [
            "Enable",
            "Disable"
        ],
        ...
    ]
    ...
}

```

PATCH Port Forwarding settings

Request

PATCH https://{ip}/redfish/v1/Managers/Self/NetworkProtocol/Oem/Lenovo/PortForwarding

Content-Type: application/json

Example for patch body

```

{
    "Ipv4": [

```

```

{
    "Address": "169.254.0.18",
    "DestinationHostPort": 8080,
    "Index": 3,
    "Protocol": "TCP",
    "ServiceEnable": "Enable",
    "SourcePort": 8080
}
]
}

```

Response

The response content is 204 with no body.

H5Viewer Token

Login H5Viewer via a validate token which is valid for two minutes. The token can be obtain by following request. The responding properties are mentioned in [Table 21 “Account Service Property” on page 29](#)

Request

GET https://{ip}/redfish/v1/AccountService

Content-Type: application/json

Response

```

{
    "@odata.context": "/redfish/v1/$metadata#AccountService.AccountService",
    "@odata.etag": "\"1603782946\"",
    "@odata.id": "/redfish/v1/AccountService",
    "@odata.type": "#AccountService.v1_5_0.AccountService",
    "AccountLockoutCounterResetAfter": 30,
    "AccountLockoutCounterResetEnabled": true,
    "AccountLockoutDuration": 30,
    "AccountLockoutThreshold": 5,
    "...",
    "Oem": {
        "Ami": {

```

```

...
    "H5ViewerToken": "z5rrFApI1bdVtKqX",
    ...
}

...

}

...

}

```

Active Event Log

Table 158. Active Event Log properties

Name	type	Read only	Description
Id	string	true	Id of the Collection
Name	string	true	Name of the Collection
ServiceEnabled	boolean	true	Indicates whether this service is enabled.
MaxNumberOfRecords	number	true	The maximum numbers of LogEntries this service can have.
DateTime	string	true	The current DateTime (with offset from UTC) for the log service in Redfish Timestamp format.
DateTimeLocalOffset	string	true	The time offset from UTC that the DateTime property is set to in format: +06:00.
Status	object	true	Status of the log service
Entries	objec	true	Collection of resources of type LogEntry.
LogEntryType	string	true	The format of the log entries.

Request

GET https://{ip}}/redfish/v1/Systems/Self/LogServices/ActiveLog

Content-Type: application/json

Response

```

{
    "@odata.context": "/redfish/v1/$metadata#LogService.LogService",
    "@odata.etag": "\"999999999\"",
    "@odata.id": "/redfish/v1/Systems/Self/LogServices/ActiveLog",
    "@odata.type": "#LogService.v1_1_2.LogService",
    "DateTime": "2020-12-03T14:57:22+08:00",

```

```

    "DateTimeLocalOffset": "+08:00",
    "AccountLockoutDuration": 30,
    "Description": "ActiveLog for this systems",
    "Entries": {
        "@odata.id": "/redfish/v1/Systems/Self/LogServices/ActiveLog/Entries"
    },
    "Id": "ActiveLog",
    "LogEntryType": "Oem",
    "MaxNumberOfRecords": 150,
    "Name": "System ActiveLog Log Service",
    "ServiceEnabled": true,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    }
}

```

Get Active Event Log Collection

Table 159. Active Event Log Collection Properties

Name	type	Read only	Description
Id	string	True	Id of the Collection
Name	string	True	Name of the Collection
Members	array	True	Contains the members of this collection
Members@odata.count	number	True	Members@odata.count

Request

PATCH https://{ip}/redfish/v1/Systems/Self/LogServices/ActiveLog/Entries

Content-Type: application/json

Response

```

{
    "@odata.context": "/redfish/v1/$metadata#LogEntryCollection.LogEntryCollection",
    "@odata.etag": "\"1606974846\"",

```

```

"@odata.id": "/redfish/v1/Systems/Self/LogServices/ActiveLog/Entries",
"@odata.type": "#LogEntryCollection.LogEntryCollection",
"Description": "Collection of entries for this log service",
"Members": [
  {
    "@odata.id": "/redfish/v1/Chassis/Self/LogServices/Logs/Entries/12"
    "@odata.type": "#LogEntry.v1_4_2.LogEntry",
    "Created": "2020-12-30T16:50:11+08:00",
    "Description": "LOG 21",
    "EntryCode": "Upper Non-critical - going high",
    "EntryType": "SEL",
    "EventTimestamp": "2020-12-30T16:50:03+08:00",
    "Id": "21",
    "Links": {
      "OriginOfCondition": {
        "@odata.id": "/redfish/v1/Chassis/Self/Thermal"
      }
    },
    "Message": "0x57253C",
    "MessageId": "AmiIpmiOem.1.0.GeneralEventData",
    "Name": "LOG 21",
    "Oem": {
      "Lenovo": {
        "@odata.id": "/redfish/v1/Chassis/Self/LogServices/Logs/Entries/12",
        "@odata.type": "#LenovoLogEntry.LenovoLogEntry",
        "CommonEventID": "A01810407"
      }
    },
    "SensorNumber": 6,
    "SensorType": "Temperature",
    "Severity": "Warning"
  }
]

```



```

    }
    ...

  ],

  "Members@odata.count": 6,

  "Name": "Log Service Entries Collection"

}

```

Get Active Event Log Instance

Table 160. Active Event Log Instance Properties

Name	type	Read only	Description
Id	string	True	Resource Identifier
Name	string	True	Name of the Resource
Severity	string	True	This is the severity of the log entry. Enum values are OK, Warning or Critical.
Created	string	True	The time the log entry was created.
EntryType	string	True	This property shall represent the type of LogEntry. Enum can be Event, SEL or Oem.
EntryCode	string	True	This property shall be present if the EntryType value is SEL.
Message	string	True	This property shall be the Message property of the event and decodes from EntryType:
MessageId	string	True	This property shall be the MessageId property of the event and decodes from EntryType.
MessageArgs	array	True	This attribute contains a link to the sensor resource that has exceeded/receded the specified threshold values.
Sensortype	string	True	The sensor type of resource that generates the the log entry
Sensornumber	string	True	The sensor number of resource that generates the the log entry
EventTimestamp	string	True	The time stamp as created the event.
Links	object	True	Contains references to other resources that are related to this resource.
Oem	object	True	Contains Oem extention objects
- Lenovo	object	True	Lenovo extended objects
-- CommonEventID	object	True	Represents the unified event ID

Request

PATCH <https://{{ip}}/redfish/v1/Systems/Self/LogServices/ActiveLog/Entries/{ID}>

Content-Type: application/json

Response

```
{
  "@odata.id": "/redfish/v1/Chassis/Self/LogServices/Logs/Entries/12",
  "@odata.type": "#LogEntry.v1_4_2.LogEntry",
  "Created": "2020-12-30T16:50:11+08:00",
  "Description": "LOG 21"
  "EntryCode": "Upper Non-critical - going high",
  "EntryType": "SEL"
  "EventTimestamp": "2020-12-30T16:50:03+08:00",
  "Id": "21",
  "Links": {
    "OriginOfCondition": {
      "@odata.id": "/redfish/v1/Chassis/Self/Thermal"
    }
  },
  "Message": "0x57253C",
  "MessageId": "AmiIpmiOem.1.0.GeneralEventData",
  "Name": "LOG 21",
  "Oem": {
    "Lenovo": {
      "@odata.id": "/redfish/v1/Chassis/Self/LogServices/Logs/Entries/12",
      "@odata.type": "#LenovoLogEntry.LenovoLogEntry",
      "CommonEventID": "A01810407"
    }
  },
  "SensorNumber": 6,
  "SensorType": "Temperature",
  "Severity": "Warning"
}
```

BMC shall provide Retimer card firmware update

Table 161. Retimer card firmware update properties

Name	Type	Read only	Description
FlashType	String	False	RetimerUpdate , it means performing Retimer card FW update action.
UploadSelector	String	False	Default . It's a fixed value for this version
FlashCard	String	False	1,2,3 . 1-retimer card on riser 1, 2-retimer card on riser 2 slot 1, 3-retimer card on riser 2 slot 2
Targets	String	False	An URI that indicated where to apply the update image

Firmware upload and update

Follow the following steps:

1. Open postman and select POST method and type below URL.

`https://{ip}/redfish/v1/UpdateService/upload`

2. In the Body tab for post action, select form-data and provide the key name as "UpdateFile" and change the type to "File".
3. Then in the value section, select the firmware image file that is available in the local machine.
4. Create a JSON file parameters.json with content as below:

```
{  
  "Targets": [  
    "/redfish/v1/Managers/Self"  
  ]  
}
```

5. Create a JSON file oem_parameters.json with content as below: Please make sure retimer card in system and match index in "FlashCard"

```
{  
  "FlashType": "RetimerUpdate",  
  "UploadSelector": "Default",  
  "FlashCard": "1,2,3"  
}
```

6. Like step 2 and 3, provide key name UpdateParameters and select parameters.json created in step 4.
7. Like step 2 and 3, provide key name OemParameters and select oem_parameters.json created in step 5.
8. Click **Send**.

Response code

The response content is 202 accepted.

Note: If the update started before BMC booting finished, the response will be 400 as below. Please wait a moment and try again.

```
{
  "error": {
    "@Message.ExtendedInfo": [
      {
        "@odata.type": "#Message.v1_0_7.Message",
        "Message": "Action UpdateService.MultipartPush firmware update is failed.",
        "MessageArgs": [
          "UpdateService.MultipartPush"
        ],
        "MessageId": "AmiOem.1.0.BMCNotReadyForFirmwareUpdate",
        "Resolution": "Wait for BMC ready.",
        "Severity": "Warning"
      }
    ],
    "code": "AmiOem.1.0.BMCNotReadyForFirmwareUpdate",
    "message": "Action UpdateService.MultipartPush firmware update is failed."
  }
}
```

Update Status

Check below URL <https://{ip}/redfish/v1/TaskService/Tasks/{id}> in response. The "TaskState" and "TaskStatus" will display update status.

```
{
  "@odata.context": "/redfish/v1/$metadata#Task.Task",
  "@odata.etag": "\"1655879574\"",
  "@odata.id": "/redfish/v1/TaskService/Tasks/13",
  "@odata.type": "#Task.v1_4_2.Task",
  "Description": "Task for Update Service Task",
  "Id": "13",
  "Messages": [
```

```

{
    "@odata.type": "#Message.v1_0_8.Message",
    "Message": "Task /redfish/v1/UpdateService/upload is running normally.",
    "MessageArgs": [
        "/redfish/v1/UpdateService/upload"
    ],
    "MessageId": "Task.1.0.Running",
    "Resolution": "None",
    "Severity": "OK"
},
{
    "@odata.type": "#Message.v1_0_8.Message",
    "Message": "Device is preparing flash area for action /redfish/v1/UpdateService/upload.",
    "MessageArgs": [
        "/redfish/v1/UpdateService/upload"
    ],
    "MessageId": "UpdateService.1.0.PrepareFlashArea",
    "Resolution": "None",
    "Severity": "OK"
}
],
    "Name": "Update Service Task",
    "StartTime": "2022-06-22T14:32:53+08:00",
    "TaskState": "Running",
    "TaskStatus": "OK"
}

```

Syslog Remote Log Settings

Table 162. Syslog remote log settings properties

Field	Type	Read only	Description
Status	String	False	Status for remote syslog: <ul style="list-style-type: none">• enable• disable
PortType	String	False	Port type allowed for remote syslog: <ul style="list-style-type: none">• UDP• TCP
HostName	String	False	Host name of remote log server. Server address support the following: <ul style="list-style-type: none">• IP Address (Both Ipv4 and Ipv6 format)• FQDN (Fully qualified domain name) format
PortNumber	Number	False	Port number of remote log server

Get Syslog Remote Log Settings

Request

GET https://{ip}/redfish/v1/Managers/Self/LogServices/Oem/Lenovo/Syslog

Content-Type: application/json

Response

```
{
  "@odata.context": "/redfish/v1/$metadata#LenovoSyslog.LenovoSyslog",
  "@odata.etag": "\"1579438309\"",
  "@odata.id": "/redfish/v1/Managers/Self/LogServices/Oem/Lenovo/Syslog",
  "@odata.type": "#LenovoSyslog.LenovoSyslog",
  "HostName": "none",
  "Id": "Syslog",
  "Name": "LogService Syslog Settings",
  "PortNumber": 0,
  "PortType": "none",
  "Status": "disable"
}
```

Change Syslog Remote Log Settings

Request

PATCH `https://{ip}/redfish/v1/Managers/Self/LogServices/Oem/Lenovo/Syslog`

Content-Type: application/json

Request body

Disable remote syslog:

```
{
  "Status": "disable"
}
```

Enable remote syslog:

```
{
  "Status": "enable",
  "PortType": "UDP",
  "HostName": "remote.log.com",
  "PortNumber": 514
}
```

Response code

The response content is 204 accepted with no body.

Note: If entering port number 0, it will set port number as default. The default port number is 514.

Complex Password status

Table 163. Complex Password status properties

Field	Type	Read only	Description
ComplexPassword	String	False	Complex password status: <ul style="list-style-type: none">• enable• disable

Get Complex Password status

Request

GET `https://{ip}/redfish/v1/Managers/Self/Oem/Lenovo/ComplexPW`

Content-Type: application/json

Response example

```
{
```

```
"@odata.context": "/redfish/v1/$metadata#UserManagement.UserManagement",
"@odata.etag": "\"1580645047\"",
"@odata.id": "/redfish/v1/Managers/Self/Oem/Lenovo/ComplexPW",
"@odata.type": "#LenovoComplexPW.LenovoComplexPW",
"ComplexPassword": "enable",
"Id": "ComplexPW",
"Name": "User Manager Complex Password Settings"
}
```

Change Complex Password status

Request

PATCH https://{ip}/redfish/v1/Managers/Self/Oem/Lenovo/ComplexPW

Content-Type: application/json

Request body

```
{
  "ComplexPassword": disable
}
```

Response code

The response content is 204 accepted with no body.

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