Lenovo

Lenovo XClarity Controller REST API Guide

Note: Before using this information, read the general information in “Notices” on page cccxlv.

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Chapter 1. Introduction

The Lenovo XClarity Controller (XCC) provides support for the industry standard Redfish Scalable Platforms Management API. The Redfish API can be used to access XCC data and services from applications running outside of the XCC. This allows for easy integration of Lenovo XCC capabilities into Lenovo or 3rd party software. Redfish uses RESTful interface semantics and JSON resource payload to perform system management via the HTTPS protocol. It is suitable for a wide range of servers, from stand-alone servers to rack mount and bladed environments, and scales equally well for large scale cloud environments.

The XClarity Controller currently supports Redfish Specification 1.15.0 and Redfish Schema Bundle 2021.4. This document explains how to use the Redfish functions of the XClarity Controller on ThinkSystem servers.

For more information on the Redfish industry standard, please refer to the following resources:

- **DMTF Redfish Forum**: http://dmtf.org/redfish
  - Schemas, Specs, Mockups, White Papers, FAQ, Educational Material & more.
- **DMTF Redfish Developer Portal**: http://redfish.dmtf.org
  - Educational material, Hosted Schema files, documentation & other links.
- **DMTF Redfish Tools**: http://github.com/dmtf
  - Open source tools and libraries to help developers get started with Redfish.
- **Redfish User Forum**: http://www.redfishforum.com
  - DMTF forum for questions, suggestions and discussion of all Redfish topics.

Authentication Methods

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

HTTP Basic Authentication (as defined by RFC7235) uses HTTP "Authorization" header field to authenticate requests from a user agent or client (like a web browser) to XCC 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 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 VVNFUklEOlBBU1NXMFJE"
```

The credentials in this example are base64 encoding string of “USERID:PASSW0RD”, which can be generated by command:
`echo -n “USERID:PASSW0RD” | base64.`

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 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"
```

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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 XCC Redfish service provides a a collection of Registries at "/redfish/v1/Registries", which contain DMTF standard registries as well as Lenovo extended registries.

- **Message Registry**
  - In addition to the standard base message registry “Base.1.8.0.json”, XCC provides the OEM registry “ExtendedError.1.2.2.json” to extend messages used by XCC Redfish service. The URIs for the registries are “/redfish/v1/schemas/registries/ExtendedError.1.2.2.json”, and "/redfish/v1/Registries/LenovoExtendedWarning.1.0.0".

    The registry for resource event ("/redfish/v1/Registries/ResourceEvent.1.0.2") defines messages to use for related changes on Redfish resources. The registry for task event ("/redfish/v1/Registries/TaskEvent.1.0.1") 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**
  - XCC Redfish events reference messages that are defined in various message registries. There are two types of events in XCC:
    - “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 uses the same registry EventRegistry.1.0.0.json as above.
- **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

Since Redfish is a REST API, standard REST clients can be used to interact with the service. This includes popular tools such as curl, as well as native access from scripting languages like Python and PowerShell. Postman is another example of an easy to use HTTP REST client tool. The tool is available from https://www.getpostman.com/.

Lenovo provides some Python and PowerShell sample scripts to use Redfish. These are available as open source code on Lenovo’s Github page http://github.com/lenovo/

- **Lenovo Python Redfish Scripts**: https://github.com/lenovo/python-redfish-lenovo
- **Lenovo PowerShell Redfish Scripts**: https://github.com/lenovo/powershell-redfish-lenovo

These scripts utilize Redfish API to manage Lenovo ThinkSystem servers. The list of scripts is growing over time. Currently, the scripts support hardware/firmware inventory, basic management of configuration and control, firmware updates, and alerts/eventing. The scripts can be used both remotely (out-of-band to the XCC Network) and locally (in-band on the ThinkSystem server, connecting to the XCC local host Network interface).

Other open source tools that support Redfish include Ansible, which added support for Redfish starting with version 2.7, in the form of three modules for Remote Hardware Management. These modules are tested on Lenovo ThinkSystem servers:

- **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

In addition, DMTF provides some open source tools for Redfish development and support. And the Redfish toolsets of DMTF grow and gain version updates over time. These are available at the DMTF Github page: https://github.com/DMTF

DMTF Redfish Tool	Description of Tool
Redfish Mockup Creator	A python3.4 program that creates a Redfish Mockup folder structure from a real live Redfish service.
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.
Redfish Tool	A Python34 program that implements a command line tool for accessing the Redfish API.
Redfish Interface Emulator	The Redfish Interface Emulator can emulate a Redfish-based interface statically (GET) or dynamically (POST, PATCH, DELETE).
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.
Python Redfish Library	Python library for interacting with devices which support a Redfish Service.

Chapter 2. Service Root

Resource ServiceRoot

The resource represents the root of the Redfish service. All other resources accessible through the Redfish interface on the XCC are linked directly or indirectly from the Service Root.

Number of Resources	1
Resource Path	/redfish/v1/
Schema file	ServiceRoot_v1.xml

GET – Service root properties

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

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/`

Request body

None

Response body

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

Field	Type	Description
Id	String	“RootService”.
Name	String	“Root Service”.
Description	String	This resource is used to represent a service root for a Redfish implementation.
Vendor	String	Lenovo
SessionService	Link	A reference link to session service resource.
Managers	Link	A reference link to a collection of managers.
RedfishVersion	String	Version of the implemented Redfish service.
UUID	String	Unique identifier for the service instance.
Chassis	Link	A reference link to chassis resource.
Tasks	Link	A reference link to a collection of tasks.
EventService	Link	A reference link to event service resource.
JsonSchemeas	Link	A reference link to Json Schema resource.
JobService	Link	A reference link to job service resource.
AccountService	Link	A reference link to account service resource.
CertificateService	Link	A reference link to certificate service resource.
Systems	Link	A reference link to a collection of systems.

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Field	Type	Description
Registries	Link	A reference link to a collection of registries.
UpdateService	Link	A reference link to update service resource.
TelemetryService	Link	A reference link to telemetry service resource.
Links	Object	Expanded.
Sessions	Link	A reference link to a collection of sessions.
ProtocolFeaturesSupported	Object	Expanded.
ExcerptQuery	Boolean	Indicates whether the 'excerpt' query parameter is supported.
FilterQuery	Boolean	Indicates whether the $filter query parameter is supported.
OnlyMemberQuery	Boolean	Indicates whether the 'only' query parameter is supported.
SelectQuery	Boolean	Indicates whether the $select query parameter is supported.
ExpandQuery	Object	Expanded.
ExpandAll	Boolean	Indicates whether the $expand support of asterisk (expand all entries) is supported.
Levels	Boolean	Indicates whether the expand support of the $levels qualifier is supported by the service.
Links	Boolean	Indicates whether the $expand support of tilde (expand only entries in the Links section) is supported.
MaxLevels	Integer	Indicates the maximum number value of the $levels qualifier in $expand operations.
NoLinks	Boolean	Indicates whether the $expand support of period (only expand entries not in the Links section) is supported.
DeepOperations	Object	Expanded.
DeepPATCH	Boolean	An indication of whether the service supports the deep PATCH operation.
DeepPOST	Boolean	An indication of whether the service supports the deep POST operation.
MaxLevels	Number	The maximum levels of resources allowed in deep operations.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Tasks": {
        "@odata.id": "/redfish/v1/TaskService"
    },
    "Chassis": {
        "@odata.id": "/redfish/v1/Chassis"
    },
```

```
"Id": "RootService",
"ProtocolFeaturesSupported": {
    "ExpandQuery": {
        "Levels": true,
        "NoLinks": true,
        "Links": true,
        "ExpandAll": true,
        "MaxLevels": 2
    },
    "OnlyMemberQuery": true,
    "DeepOperations": {
        "DeepPOST": false,
        "DeepPATCH": false,
        "MaxLevels": 2
    },
    "FilterQuery": true,
    "ExcerptQuery": true,
    "SelectQuery": true
},
"Links": {
    "Sessions": {
        "@odata.id": "/redfish/v1/SessionService/Sessions"
    }
},
"RedfishVersion": "1.10.0",
"EventService": {
    "@odata.id": "/redfish/v1/EventService"
},
"JsonSchemas": {
    "@odata.id": "/redfish/v1/JsonSchemas"
},
"Systems": {
    "@odata.id": "/redfish/v1/Systems"
},
"TelemetryService": {
    "@odata.id": "/redfish/v1/TelemetryService"
},
"UpdateService": {
    "@odata.id": "/redfish/v1/UpdateService"
},
"Registries": {
    "@odata.id": "/redfish/v1/Registries"
},
"CertificateService": {
    "@odata.id": "/redfish/v1/CertificateService"
},
"UUID": "3D03A592-79E7-11EA-9029-B1651358D6FA",
"Vendor": "Lenovo",
"Name": "Root Service",
"JobService": {
    "@odata.id": "/redfish/v1/JobService"
},
"Description": "This resource is used to represent a service root for a Redfish implementation.",
"@odata.type": "#ServiceRoot.v1_7_0.ServiceRoot",
"SessionService": {
    "@odata.id": "/redfish/v1/SessionService"
},
"@odata.id": "/redfish/v1/",
"@odata.etag": "\"9d900d0444cd31da3490c\"",
"AccountService": {
    "@odata.id": "/redfish/v1/AccountService"
```

```
    },
    "Managers": {
        "@odata.id": "/redfish/v1/Managers"
    }
}
```

Chapter 3. Session Management

Resource SessionService

The resource represents a collection of sessions for the Redfish service. All session resources accessible through the interface link from the SessionService resource.

Number of Resources	1
Resource Path	/redfish/v1/SessionService
Schema file	SessionService_v1.xml

GET – Session management properties

Use the GET method to retrieve properties in SessionService resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/SessionService
```

Request body

None

Response body

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

Field	Type	Description
Name	String	Fixed string "SessionService".
Sessions	Object	This property shall contain the link to a collection of Sessions.
ServiceEnabled	Boolean	The value of this property shall be a boolean indicating whether this service is enabled.
SessionTimeout	Number	This is the number of seconds of inactivity that a session may have before the session service closes the session due to inactivity. The value should between 30 and 86400.
Description	String	This string is used to represent the Session Service Properties for a Redfish implementation.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

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

```
{
    "Id": "SessionService",
    "Name": "SessionService",
    "@odata.context": "/redfish/v1/$metadata#SessionService.SessionService",
    "@odata.etag": "\"e863af1e936fd7556be8ebb637f07117\"",
```

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```
    "@odata.type": "#SessionService.v1_1_4.SessionService",
    "SessionTimeout": 300,
    "@odata.id": "/redfish/v1/SessionService",
    "Sessions": {
        "@odata.id": "/redfish/v1/SessionService/Sessions"
    },
    "ServiceEnabled": true,
    "Description": "This resource is used to represent a session service for a Redfish implementation."
}
```


PATCH – Update timeout property

Use the PATCH method to update timeout property in SessionService resource for Redfish service

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/SessionService`

Request body

Properties to be updated are shown as bellow

Field	Type	Description
SessionTimeout	Number	The value should be between 30 and 86400.

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.


```
{
    "SessionTimeout": 500
}
```


The following example JSON response is returned:


```
{
   "@odata.id": "/redfish/v1/SessionService",
    "Name": "SessionService",
    "ServiceEnabled": true,
    "@odata.type": "#SessionService.v1_1_6.SessionService",
    "SessionTimeout": 500,
    "Id": "SessionService",
    "Sessions": {
        "@odata.id": "/redfish/v1/SessionService/Sessions"
    },
    "@odata.etag": "\"2e82e923b1582967372\"",
    "Description": "This resource is used to represent a session service for a Redfish implementation."
}
```

Resource Session

The resource represents a session implementation for the Redfish service. XCC allows at most 16 Redfish sessions at the same time.

Number of Resources	Number of all established sessions, including Redfish sessions, web GUI sessions, Manager Console sessions, etc...
Resource Path	/redfish/v1/SessionService/Sessions/{1…N}
Schema file	Session_v1.xml

GET – Collection for sessions

Use the GET method to retrieve properties in session collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/SessionService/Sessions
```

Request body

None

Response body

Field	Type	Description
Name	String	“SessionCollection”
Members	Array	Items: A reference link to an element of sessions
Description	String	A collection of Session resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON responses are returned:

```
"Members": [
        {
            "@odata.id": "/redfish/v1/SessionService/Sessions/3"
        }
    ],
    "@odata.type": "#SessionCollection.SessionCollection",
    "@odata.id": "/redfish/v1/SessionService/Sessions",
    "Name": "SessionCollection",
    "@odata.etag": "\"23ca87ca635524230d9\"",
    "Members@odata.count": 1,
    "Description": "A collection of Session resource instances."
}
```

GET – Session properties

Use the GET method to retrieve properties in Session resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/SessionService/Sessions/{1...N}
```

Request body

None

Response body

Field	Type	Description
UserName	String	The username who creates this session.
Password	String	This property is used in a POST to specify a password when creating a new session. This property is null on a GET.
SessionType	String	Session Type string and it is depended on the session type (ex. Redfish, WebGUI, ManagerConsole … etc.) **Note:** On Purley platforms, only Redfish sessions are supported.
Name	String	A session id value.
Id	String	A session id value.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON responses are returned:

```
Redfish session
{
    "@odata.id": "/redfish/v1/SessionService/Sessions/6",
    "Password": null,
    "@odata.type": "#Session.v1_2_1.Session",
    "Id": "6",
    "SessionType": "Redfish",
    "@odata.etag": "\"1470b92b471825a097d\"",
    "Name": "6",
    "UserName": "USERID"
}

WebUI session
{
    "@odata.id": "/redfish/v1/SessionService/Sessions/7",
    "Password": null,
    "@odata.type": "#Session.v1_2_1.Session",
    "Id": "7",
    "SessionType": "WebUI",
    "@odata.etag": "\"142a4e178c5a2420877\"",
    "Name": "7",
    "UserName": "USERID"
}

CLI session
{
    "@odata.id": "/redfish/v1/SessionService/Sessions/8",
```

```
    "Password": null,
    "@odata.type": "#Session.v1_2_1.Session",
    "Id": "8",
    "SessionType": "ManagerConsole",
    "@odata.etag": "\"1647efec331f2ae0c4c\"",
    "Name": "8",
    "UserName": "USERID"
}
```

POST– Create a session

Create a session resource for further access authentications.

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/SessionService/Sessions`

Request body

Field	Type	Description
UserName	String	The username who creates this session.
Password	String	This property is used in a POST to specify a password when creating a new session. This property is null on a GET.

Response body

Field	Type	Description
UserName	String	The username who creates this session.
Password	String	This property is used in a POST to specify a password when creating a new session. This property is null on a POST response.
Session-Type	String	"Redfish"
Name	String	A session id value
Id	String	A session id value

Response header

Field	Description
Location	Link to the session resource created.
X-Auth-Token	An authentication code is generated when a new session is created.

Status code

HTTP Status Code	Error Message ID
201	Created
401	NoValidSession
403	SessionLimitExceeded
500	InternalError

Example

The following example is POST body.

```
{
   "UserName" : "USERID",
   "Password" : "PASSWORD"
}
```

The following example JSON response is returned:

```
{
    "@odata.id": "/redfish/v1/SessionService/Sessions/6",
    "Password": null,
    "@odata.type": "#Session.v1_2_1.Session",
    "Id": "6",
    "SessionType": "Redfish",
    "@odata.etag": "\"1470b92b471825a097d \"",
    "Name": "6",
    "UserName": "USERID"
}
```

DELETE– Delete a session

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

Request URL

`DELETE https://<BMC_IPADDR>/redfish/v1/SessionService/Sessions/{1...N}`

Request body

None

Response

None

Status code

HTTP Status Code	Error Message ID
204	NoContent
500	InternalError

Response example

None

Chapter 4. Account Management

Resource AccountService

The resource represents a collection of accounts and roles for the Redfish service. All existing sessions and roles resources accessible through the interface link from the AccountService resource.

Number of Resources	1
Resource Path	/redfish/v1/AccountService
Schema file	AccountService_v1.xml

GET – Account management properties

Use the GET method to retrieve properties in AccountService resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/AccountService
```

Request body

None

Response body

Field	Type	Description
AccountLockoutThreshold	Number	The number of failed login attempts before a user account is locked for a specified duration. The value should be between 0 and 10.
AccountLockoutDuration	Number	The time in seconds an account is locked after the account lockout threshold is met. If the value is 0, the property will show null, otherwise it is 60~172800
AccountLockoutCounterResetEnabled	Boolean	The value indicates whether the threshold counter will be reset before account is locked for a specified duration. This property is hidden if AccountLockoutDuration is null, otherwise it shows identically to AccountLockoutDuration does.
AccountLockoutCounterResetAfter	Number	This property is hidden if AccountLockoutDuration is null, otherwise it shows identically to AccountLockoutDuration does.
Id	String	“AccountService”.
Name	String	“AccountService”.
MaxPasswordLength	Number	The maximum password length that the implementation will allow a password to be set to. The value is 20 and cannot be modified.
MinPasswordLength	Number	The minimum password length that the implementation will allow a password to be set to. The value is 8 and cannot be modified.
Accounts	Object	This property shall contain the link to a collection of type ManagerAccount
Roles	Object	This property shall contain the link to a collection of type Role.
ServiceEnabled	Boolean	The value of this property shall be a boolean indicating whether this service is enabled. The value is “True” and cannot modified.

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Field	Type	Description
Description	String	This resource is used to represent a management account service for a Redfish implementation.
LocalAccountAuth	String	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.
LocalAccountAuth@Redfish.AllowableValues	Array	Items: string Item count: 4 The annotation is hidden on Flex platforms.
LDAP	Object	The first LDAP external account provider this AccountService supports.
AccountProviderType	String	This property contains the type of external account provider this resource references.
Authentication	Object	This property contains the authentication information for the external account provider.
AuthenticationType	String	This property contains the type of authentication used to connect to the external account provider.
Username	String	This property contains the username of authentication used to connect to the external account provider.
Password	String	This property contains the password of authentication used to connect to the external account provider.
Certificates	Link	The value of this property is a URI reference to a collection of certificates.
LDAPService	Object	This property contains additional mapping information needed to parse a generic LDAP service.
SearchSettings	Object	This property contains the settings needed to search an external LDAP service.
BaseDistinguishedNames	String	The base distinguished names to use when searching the LDAP service.
GroupNameAttribute	String	The attribute name that contains the name of the Group on the group LDAP entry.
GroupsAttribute	String	The attribute name that contains the Groups for a user on the user LDAP entry.
UsernameAttribute	String	The attribute name that contains the Username on the user LDAP entry.
PasswordSet	Boolean	This property shall be true when a non-empty value was provided to the Password property, otherwise it shall be false.
ServiceAddresses	String	This property contains the addresses of the user account providers this resource references. The format of this field depends on the Type.
RemoteRoleMapping	Array	This property shall contain a collection of the mapping rules to convert the external account providers account information to the local Redfish Role.
RemoteRoleMapping[N]	Object	Expand

Field	Type	Description
LocalRole	String	The value of this property shall contain the value of the RoleId property within a Role resource on this Redfish service in which to map the remote user or group.
RemoteGroup	String	The value of this property shall contain the name of the remote group (or in the case of a Redfish Service, remote role) that will be mapped to the local role referenced by this entity.
ServiceAddresses	String	LDAP server address, array type.
ServiceEnabled	Boolean	LDAP enablement.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "Accounts": {
        "@odata.id": "/redfish/v1/AccountService/Accounts"
    },
    "AccountLockoutThreshold": 5,
    "@odata.id": "/redfish/v1/AccountService",
    "AccountLockoutDuration": 3600,
    "ServiceEnabled": true,
    "MinPasswordLength": 10,
    "AccountLockoutCounterResetAfter": 3600,
    "Description": "This resource is used to represent a management account service for a Redfish implementation.",
    "LocalAccountAuth": "Enabled",
    "LDAP": {
        "RemoteRoleMapping": [
            {
                "LocalRole": null,
                "RemoteGroup": null
            },
            …


            {
                "LocalRole": null,
                "RemoteGroup": null
            }
        ],
        "Authentication": {
            "Username": "",
            "Password": null,
            "AuthenticationType": "UsernameAndPassword"
        },
        "PasswordSet": false,
        "Certificates": {
            "@odata.id": "/redfish/v1/AccountService/LDAP/Certificates"
        },
        "ServiceAddresses": [
            "192.168.0.227:50637",
            "0.0.0.0:389",
```

```
            "0.0.0.0:389",
            "0.0.0.0:389"
        ],
        "LDAPService": {
            "SearchSettings": {
                "BaseDistinguishedNames": [
                    "ou=Users,dc=ibmbase,dc=com"
                ],
                "UsernameAttribute": "cn",
                "GroupsAttribute": "",
                "GroupNameAttribute": "memberOf"
            }
        },
        "ServiceEnabled": true
    },
    "Name": "AccountService",
    "Roles": {
        "@odata.id": "/redfish/v1/AccountService/Roles"
    },
    "Oem": {
        …
    },
    "@odata.type": "#AccountService.v1_6_0.AccountService",
    "LocalAccountAuth@Redfish.AllowableValues": [
        "Enabled",
        "Disabled",
        "LocalFirst",
        "Fallback"
    ],
    "MaxPasswordLength": 32,
    "@odata.etag": "\"fc78176d1e9673250dac95c513f397b6\"",
    "AccountLockoutCounterResetEnabled": true,
    "Id": "AccountService"
}
```


PATCH – Update global account lockout properties and ldap properties

Use the PATCH method to update properties in AccountService resource for Redfish service.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/AccountService
```

Request body

Properties to be updated are shown as bellow.

Field	Type	Description
AccountLockoutThreshold	Number	The number of failed login attempts before a user account is locked for a specified duration. The value should be between 0 and 10.
AccountLockoutDuration	Number	The time in seconds an account is locked after the account lockout threshold is met. If the value is 0, the property will show null, otherwise it is 60~172800.
AccountLockoutCounterRese-tEnabled	Boolean	The value indicates whether the threshold counter will be reset before account is locked for a specified duration. This property is hidden if AccountLockoutDuration is null, otherwise it shows identically to AccountLockoutDuration does.
LDAP	Object	The first LDAP external account provider this AccountService supports.

Field	Type	Description
LDAPService	Object	This property contains additional mapping information needed to parse a generic LDAP service.
SearchSettings	Object	This property contains the settings needed to search an external LDAP service.
BaseDistinguishedNames	String	The base distinguished names to use when searching the LDAP service.
GroupNameAttribute	String	The attribute name that contains the name of the Group on the group LDAP entry.
GroupsAttribute	String	The attribute name that contains the Groups for a user on the user LDAP entry.
UsernameAttribute	String	The attribute name that contains the Username on the user LDAP entry.
ServiceAddresses	String	This property contains the addresses of the user account providers this resource references. The format of this field depends on the Type.
RemoteRoleMapping	Array	This property shall contain a collection of the mapping rules to convert the external account providers account information to the local Redfish Role.
Authentication	Object	This property contains authentication information for the external account provider.
Username	String	This property contains the username of authentication used to connect to the external account provider.
Password	String	This property contains the password of authentication used to connect to the external account provider.
RemoteRoleMapping[N]	Object	Expand
LocalRole	String	The value of this property shall contain the value of the RoleId property within a Role resource on this Redfish service in which to map the remote user or group.
RemoteGroup	String	The value of this property shall contain the name of the remote group (or in the case of a Redfish Service, remote role) that will be mapped to the local role referenced by this entity.

Response body

The response returns the same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body

```
{
    "AccountLockoutThreshold": 5,
    "AccountLockoutDuration": 3600,
    "AccountLockoutCounterResetAfter": 3600
}
```

The following example JSON response is returned:


```
{
    "Accounts": {
        "@odata.id": "/redfish/v1/AccountService/Accounts"
    },
    "AccountLockoutThreshold": 5,
    "@odata.id": "/redfish/v1/AccountService",
    "AccountLockoutDuration": 3600,
    "ServiceEnabled": true,
    "MinPasswordLength": 10,
    "AccountLockoutCounterResetAfter": 3600,
    "Description": "This resource is used to represent a management account service for a Redfish
implementation.",
    "LocalAccountAuth": "Enabled",
    "LDAP": {
        "RemoteRoleMapping": [
            {
                "LocalRole": null,
                "RemoteGroup": null
            },
            …

            {
                "LocalRole": null,
                "RemoteGroup": null
            }
        ],
        "Authentication": {
            "Username": "",
            "Password": null,
            "AuthenticationType": "UsernameAndPassword"
        },
        "PasswordSet": false,
        "Certificates": {
            "@odata.id": "/redfish/v1/AccountService/LDAP/Certificates"
        },
        "ServiceAddresses": [
            "192.168.0.227:50637",
            "0.0.0.0:389",
            "0.0.0.0:389",
            "0.0.0.0:389"
        ],
        "LDAPService": {
            "SearchSettings": {
                "BaseDistinguishedNames": [
                    "ou=Users,dc=ibmbase,dc=com"
                ],
                "UsernameAttribute": "cn",
                "GroupsAttribute": "",
                "GroupNameAttribute": "memberOf"
            }
        },
        "ServiceEnabled": true
    },
    "Name": "AccountService",
    "Roles": {
        "@odata.id": "/redfish/v1/AccountService/Roles"
    },
    "Oem": {
        …
```

```
    },
    "@odata.type": "#AccountService.v1_6_0.AccountService",
    "LocalAccountAuth@Redfish.AllowableValues": [
        "Enabled",
        "Disabled",
        "LocalFirst",
        "Fallback"
    ],
    "MaxPasswordLength": 32,
    "@odata.etag": "\"fc78176d1e9673250dac95c513f397b6\"",
    "AccountLockoutCounterResetEnabled": true,
    "Id": "AccountService",
    "@Message.ExtendedInfo": [
        {
            "MessageArgs": [
                "AccountLockoutCounterResetAfter"
            ],
            "Resolution": "Remove the property from the request body and resubmit the request if the operation
failed.",
            "MessageId": "Base.1.6.PropertyNotWritable",
            "Severity": "Warning",
            "Message": "The property AccountLockoutCounterResetAfter is a read only property and cannot be
assigned a value.",
            "@odata.type": "#Message.v1_0_8.Message"
        }
    ]
}
```


Resource ManagerAccount

The resource represents an account implementation for the Redfish service.

Number of Resources	Number of accounts created (1-12)
Resource Path	/redfish/v1/AccountService/Accounts/{1…12}
Schema file	ManagerAccount_v1.xml

GET – Collection for accounts

Use the GET method to retrieve properties in account collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/AccountService/Accounts
```

Request body

None

Response body

Field	Type	Description
Name	String	“ManagerAccountCollection”
Members	Array	Items: A reference link to an element of accounts.
Description	String	A collection of ManagerAccount resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/AccountService/Accounts/1"
        }
    ],
    "@odata.type": "#ManagerAccountCollection.ManagerAccountCollection",
    "@odata.id": "/redfish/v1/AccountService/Accounts",
    "Name": "ManagerAccountCollection",
    "@odata.etag": "\"2a2a4e0d98532a24d0b\"",
    "Members@odata.count": 1,
    "Description": "A collection of ManagerAccount resource instances."
}
```

GET – Account properties

Use the GET method to retrieve properties in Account resource for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/AccountService/Accounts/{1...12}`

Request body

None

Response body

Field	Type	Description
Name	String	The format is UserX (X=1~12).
Id	String	“1” ~ ”12”
Password	String	The password of the account. Display null on a GET
RoleId	String	The value of this property is the ID of the Role resource that configured for this account
Enabled	Boolean	Indicates if this account is enabled.
PasswordChangeRequired	Boolean	The value of this property is true if the password for this account must be changed before further access is allowed. **Note:** This property is not available in Intel Purley-based systems.
PasswordExpiration	String	This property indicates the date and time when this account password expires. If the value is null, the account password never expires. **Note:** This property is not available in Intel Purley-based systems.
UserName	String	The value of this property is the user name for this account.

Field	Type	Description
Locked	Boolean	This property indicates that the account has been auto-locked by the account service because the lockout threshold has been exceeded. When set to true, the account is locked. A user admin can write the property false to manually unlock, or the account service will unlock it once the lockout duration period has passed.
Description	String	This resource is used to represent an account for the manager for a Redfish implementation.
Links	Object	Expand
Role	Link	Link to the Role instance which this account is mapped to.
AccountTypes	Array	Items: string Item count: 1
AccountTypes[N]	String	“Redfish”
SNMP	Object	Expand
AuthenticationProtocol	String	This value indicates authentication conforms to the authentication protocol.
EncryptionKey	String	The secret authentication key for SNMPv3. Display null on a GET.
EncryptionKeySet	Boolean	The value of this property is true if a valid value was provided for the AuthenticationKey property. Otherwise, the value is false.
EncryptionProtocol	String	This value indicates encryption conforms to the encryption protocol.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "UserName": "USERID",
    "@odata.id": "/redfish/v1/AccountService/Accounts/1",
    "SNMP": {
        "AuthenticationProtocol": "None",
        "EncryptionKey": null,
        "EncryptionKeySet": false,
        "EncryptionProtocol": "None"
    },
    "Id": "1",
    "Enabled": true,
    "Links": {
        "Role": {
            "@odata.id": "/redfish/v1/AccountService/Roles/Administrator"
        }
    },
    "AccountTypes": [
        "Redfish"
    ],
    "Name": "User1",
```

```
    "@odata.type": "#ManagerAccount.v1_6_0.ManagerAccount",
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoManagerAccount.v1_0_0.LenovoManagerAccount",
            "SSHPublicKey": [
                "",
                "",
                "",
                ""
            ]
        }
    },
    "RoleId": "Administrator",
    "Password": null,
    "PasswordChangeRequired": false,
    "@odata.etag": "\"5b51d6d4824024ed59b\"",
    "Locked": false,
    "Description": "This resource is used to represent an account for the manager for a Redfish implementation."
}
```


POST – Create an account

Create an account resource for Redfish service by HTTP POST method. This method applies to Lenovo Intel Whitley-based systems and AMD 2 sockets systems.

Note: Before creating an account, please make sure the new account name and password follow the rules in AccountService, such as length, password complexity, changing interval, etc.

Request URL

```
POST https://<BMC_IPADDR>/redfish/v1/AccountService/Accounts
```

Request body

Field	Type	Description
UserName	String	The new account name.
Enabled	Boolean	Indicates if this account is enabled.
Password	String	The new account password.
RoleId	String	Role ID for new account.
PasswordChangeRequired	Boolean	If need to change password when the first login.
SNMP	Object	Expand
AuthenticationProtocol	String	This value indicates authentication conforms to the authentication protocol.
EncryptionKey	String	The secret authentication key for SNMPv3.
EncryptionProtocol	String	The value indicates encryption conforms to the encryption protocol.

Response body

The response returns the same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is POST body

```
{
    "UserName": "TempUser",
    "Password": "PasswOrd4U",
    "RoleId": "Administrator",
    "PasswordChangeRequired": true,
    "SNMP": {
        "AuthenticationProtocol": "HMAC_SHA96",
        "EncryptionKey": "snmpPasswOrd",
        "EncryptionProtocol": "CFB128_AES128"
    }
}
```

The following example JSON response is returned:

```
{
    "SNMP": {
        "AuthenticationProtocol": "HMAC_SHA96",
        "EncryptionKey": null,
        "EncryptionKeySet": true,
        "EncryptionProtocol": "CFB128_AES128"
    },
    "@odata.id": "/redfish/v1/AccountService/Accounts/4",
    "Links": {
        "Role": {
            "@odata.id": "/redfish/v1/AccountService/Roles/Administrator"
        }
    },
    "AccountTypes": [
        "Redfish"
    ],
    "Password": null,
    "PasswordChangeRequired": true,
    "Description": "This resource is used to represent an account for the manager for a Redfish implementation.",
    "Name": "User4",
    "UserName": "TempUser",
    "PasswordExpiration": "2021-03-22T03:40:13Z",
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoManagerAccount.v1_0_0.LenovoManagerAccount",
            "SSHPublicKey": [
                "",
                "",
                "",
                ""
            ]
        }
    },
    "RoleId": "Administrator",
    "Enabled": true,
    "@odata.type": "#ManagerAccount.v1_6_0.ManagerAccount",
    "@odata.etag": "\"5e434a32aa61272b802\"",
```

```
    "Locked": false,
    "Id": "4"
}
```

PATCH – Create an account (Applies to Intel Purley-based systems)

Create an account resource for Redfish service by HTTP PATCH method at an “empty slot” of account array. This method applies to Lenovo Intel Purley-based systems, as the “slots” of account are pre-populated on these systems. In “empty slot”, the value of property “UserName” is empty string.

Note: Before creating an account, please make sure the new account name and password follow the rules in AccountService, such as length, password complexity, changing interval, etc.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/AccountService/Accounts/{1...12}`

Request body

The request body is the same as 4.2.3.

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body

```
{
    "UserName": "TempUser",
    "Password": "PasswOrd4U",
    "RoleId": "Administrator",
    "SNMP": {
        "AuthenticationProtocol": "HMAC_SHA96",
        "EncryptionKey": "snmpPasswOrd",
        "EncryptionProtocol": "CFB128_AES128"
    }
}
```

The following example JSON response is returned:

```
{
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoManagerAccount.v1_0_0.LenovoManagerAccount",
            "SSHPublicKey": [
                null,
                null,
                null,
                null
            ]
        }
    },
    "Description": "This resource is used to represent an account for the manager for a Redfish implementation.",
```

```
    "RoleId@Redfish.AllowableValues": [
        "Administrator",
        "Operator",
        "ReadOnly",
        "CustomRole2"
    ],
    "UserName": "TempUser",
    "Id": "2",
    "Name": "User2",
    "AccountTypes": [
        "Redfish"
    ],
    "@odata.id": "/redfish/v1/AccountService/Accounts/2",
    "RoleId": "Administrator",
    "Locked": false,
    "@odata.etag": "\"d9e5633a7024f737e544883bbd1c5cc332a05d16\"",
    "SNMP": {
        "AuthenticationProtocol": "HMAC_SHA96",
        "EncryptionProtocol": "CFB128_AES128",
        "EncryptionKey": null,
        "EncryptionKeySet": true
    },
    "Enabled": false,
    "@odata.type": "#ManagerAccount.v1_6_0.ManagerAccount",
    "Password": null,
    "Links": {
        "Role": {
            "@odata.id": "/redfish/v1/AccountService/Roles/Administrator"
        }
    }
}
```


PATCH – Update userid/password/role/ PasswordChangeRequired

Use the PATCH method to update properties in Account resource for Redfish service.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/AccountService/Accounts/{1...12}`

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Description
UserName	String	The user name for this account.
Password	String	The password of the account. Display null on a PATCH response.
RoleId	String	The ID of the Role resource that configured for this account
Enabled	Boolean	Enable this account or not.
PasswordChangeRequired	Boolean	Set it to true if the password for this account must be changed before further access is allowed. **Note:** This setting is not available in Intel Purley-based systems.
SNMP	Object	Expand
AuthenticationProtocol	String	Authentication conforms to the authentication protocol.

Field	Type	Description
EncryptionKey	String	The secret authentication key for SNMPv3.
EncryptionProtocol	String	Encryption conforms to the encryption protocol.

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.

```
{
    "UserName": "USERID",
    "RoleId": "Administrator",
    "PasswordChangeRequired": false
}
```

The following example JSON response is returned:

```
{
    "AccountTypes": [
        "Redfish"
    ],
    "@odata.type": "#ManagerAccount.v1_4_0.ManagerAccount",
    "@odata.id": "/redfish/v1/AccountService/Accounts/1",
    "Password": null,
    "Links": {
        "Role": {
            "@odata.id": "/redfish/v1/AccountService/Roles/Administrator"
        }
    },
    "Name": "User1",
    "Enabled": true,
    "Id": "1",
    "Oem": {
        "Lenovo": {
            "SSHPublicKey": [
                "",
                "",
                "",
                ""
            ],
            "SNMPv3Settings": {
                "AccessType": "Get",
                "PrivacyProtocolPassword": null,
                "Destination": "",
                "AuthenticationProtocol": "None",
                "PrivacyProtocol": "None"
            },
            "@odata.type": "#LenovoManagerAccount.v1_0_0.LenovoManagerAccount"
        }
    },
```

```
    "RoleId": "Administrator",
    "UserName": "USERID",
    "PasswordChangeRequired": false,
    "@odata.etag": "\"fab97f1216ebd001a50b81fb6d23270b\"",
    "Locked": false,
    "Description": "This resource is used to represent an account for the manager for a Redfish implementation."
}
```

POST – Delete an account

Delete an account resource for Redfish service by HTTP DELETE method. This method applies to Lenovo Intel Whitley-based systems and AMD 2 sockets systems.

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/AccountService/Accounts/{1...12}`

Request body

None.

Response body

None.

Status code

HTTP Status Code	Error Message ID
204	NoContent
500	InternalError

PATCH – Delete an account (Applies to Intel Purley-based systems)

Delete an account resource for Redfish service by HTTP PATCH method and set the “UserName” of the account to empty string(“”). This method applies to Lenovo Intel Purley-based systems, as the “slots” of account are pre-populated on these systems.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/AccountService/Accounts/{1...12}`

Request body

Field	Type	Description
UserName	String	Set it to empty string. “”.

Response body

The response returns the same content as GET operation on an empty account “slot”.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body

```
{
    "UserName": ""
}
```

The following example JSON response is returned:

```
{
    "@odata.id": "/redfish/v1/AccountService/Accounts/2",
    "UserName": "",
    "Enabled": false,
    "Description": "This resource is used to represent an account for the manager for a Redfish implementation.",
    "RoleId": "CustomRole2",
    "Password": null,
    "Links": {
        "Role": {
            "@odata.id": "/redfish/v1/AccountService/Roles/CustomRole2"
        }
    },
    "SNMP": {
        "EncryptionProtocol": "None",
        "AuthenticationProtocol": "None",
        "EncryptionKeySet": false,
        "EncryptionKey": null
    },
    "Locked": false,
    "AccountTypes": [
        "Redfish"
    ],
    "@odata.type": "#ManagerAccount.v1_6_0.ManagerAccount",
    "RoleId@Redfish.AllowableValues": [
        "Administrator",
        "Operator",
        "ReadOnly",
        "CustomRole2"
    ],
    "Id": "2",
    "Name": "User2",
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoManagerAccount.v1_0_0.LenovoManagerAccount",
            "SSHPublicKey": [
                null,
                null,
                null,
                null
            ]
        }
    },
    "@odata.etag": "\"22ea0db164122f8b861444197c969a8932a05d16\""
}
```

Resource Role

The resource represents a role implementation for the Redfish service.

Number of Resources	Number of roles presented (3-32)
Resource Path	/redfish/v1/AccountService/Roles/{Administrator, Operator,ReadOnly and CustomRole{N}}
Schema file	Role_v1.xml

GET – Role properties

Use the GET method to retrieve properties in Role resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/AccountService/Roles/{Administrator,Operator,ReadOnly and $RoleId}
```

Request body

None

Response body

Field	Type	Description
Name	String	Any of “Administrator, Operator, ReadOnly, and CustomRole{N}”
Id	String	Any of "Administrator”, “Operator”, “ReadOnly”, and “CustomRole {N}"
RoleId	String	Pre-defined roles: “Administrator”, “Operator”, and “ReadOnly”
OemPrivileges	Array	The value of this property is a set of OEM privileges that this role includes. For pre-defined roles, this property shall be readOnly. The values can be "Supervisor", "ReadOnly", "UserAccountManagement", "RemoteConsoleAccess", "RemoteConsoleAndVirtualMediaAccess", "RemoteServerPowerRestartAccess", "AbilityClearEventLogs", "AdapterConfiguration_Basic", "AdapterConfiguration_NetworkingAndSecurity", "AdapterConfiguration_Advanced"
OemPrivileges[N]	String	The OEM privilege string. This value can depend on user selection. Refer to OemPrivileges@Redfish.AllowableValues.
OemPrivileges@Redfish. AllowableValues	Array	The OEM privileges allowable for UPDATE opeation. This property is displayed in custom roles and hidden for Administrator, Operator and ReadOnly.

Field	Type	Description
OemPrivileges@Redfish.AllowableValues[N]	String	The values are： “UserAccountManagement”, “RemoteConsoleAccess”, “RemoteConsoleAndVirtualMediaAccess”, “RemoteServerPowerRestartAccess”, “AbilityClearEventLogs”, “Configuration_Basic”, “Configuration_NetworkingAndSecurity”, “Configuration_Advanced”, “Configuration_UEFISecurity”
IsPredefined	Boolean	This role is pre-defined or not. **Note:** The pre-defined roles are Administrator, Operator, ReadOnly.
AssignedPrivileges	Array	The standard defined privileges for this role.
Description	String	This resource is used to represent a user role for the user account for a Redfish implementation.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON responses are returned:

Resource /AccountService/Roles/Administrator:

```
{
    "IsPredefined": true,
    "@odata.id": "/redfish/v1/AccountService/Roles/Administrator",
    "AssignedPrivileges": [
        "Login",
        "ConfigureManager",
        "ConfigureUsers",
        "ConfigureSelf",
        "ConfigureComponents"
    ],
    "Name": "Administrator",
    "@odata.type": "#Role.v1_2_4.Role",
    "OemPrivileges": [
        "Supervisor"
    ],
    "Id": "Administrator",
    "@odata.etag": "\"aade26bf7b815e38f2c05df254f8a080\"",
    "RoleId": "Administrator",
    "Description": "This resource is used to represent a user role for the user account for a Redfish implementation."
}
```

Resource /AccountService/Roles/Operator:


```
{
    "IsPredefined": true,
    "Id": "Operator",
    "AssignedPrivileges": [
        "Login",
        "ConfigureSelf",
        "ConfigureComponents"
    ],
    "Name": "Operator",
    "@odata.type": "#Role.v1_2_4.Role",
    "OemPrivileges": [
        "RemoteServerPowerRestartAccess",
        "AbilityClearEventLogs",
        "Configuration_Basic",
        "Configuration_NetworkingAndSecurity"
    ],
    "@odata.id": "/redfish/v1/AccountService/Roles/Operator",
    "@odata.etag": "\"e2f69b3d79821fd69587ccad12295c70\"",
    "RoleId": "Operator",
    "Description": "This resource is used to represent a user role for the user account for a Redfish implementation."
}
```


Resource /AccountService/Roles/ReadOnly:


```
{
    "IsPredefined": true,
    "Id": "ReadOnly",
    "AssignedPrivileges": [
        "Login",
        "ConfigureSelf"
    ],
    "Name": "ReadOnly",
    "@odata.type": "#Role.v1_2_4.Role",
    "OemPrivileges": [
        "ReadOnly"
    ],
    "@odata.id": "/redfish/v1/AccountService/Roles/ReadOnly",
    "@odata.etag": "\"aa8e529f6994a33c3a1f4c923f51c4cb\"",
    "RoleId": "ReadOnly",
    "Description": "This resource is used to represent a user role for the user account for a Redfish implementation."
}
```


Resource /AccountService/Roles/CustomRole12:


```
{
    "IsPredefined": false,
    "Id": "CustomRole12",
    "AssignedPrivileges": [
        "Login"
    ],
    "Name": "CustomRole12",
    "@odata.type": "#Role.v1_2_4.Role",
    "RoleId": "CustomRole12",
    "OemPrivileges": [
        "UserAccountManagement"
    ],
    "@odata.id": "/redfish/v1/AccountService/Roles/CustomRole12",
    "@odata.etag": "\"1cb07bd5147b5751700f2728e290e080\"",
```

```
    "OemPrivileges@Redfish.AllowableValues": [
        "UserAccountManagement",
        "RemoteConsoleAccess",
        "RemoteConsoleAndVirtualMediaAccess",
        "RemoteServerPowerRestartAccess",
        "AbilityClearEventLogs",
        "Configuration_Basic",
        "Configuration_NetworkingAndSecurity",
        "Configuration_Advanced",
        "Configuration_UEFISecurity"
    ],
    "Description": "This resource is used to represent a user role for the user account for a Redfish implementation."
}
```

POST – Create a custom role

Use the POST method to create a custom role for Redfish service. This method applies to Lenovo Intel Whitley-based systems and AMD 2 sockets systems.

Request URL

```
POST https://<BMC_IPADDR>/redfish/v1/AccountService/Roles
```

Request body

Field	Type	Description
RoleId	String	RoleId length is limited to 1~32 characters. Allowed characters: A-Z, a-z, 0-9, - (dash), . (period), and _ (underscore).
OemPrivileges	Array	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. The values can be “UserAccountManagement”, “RemoteConsoleAccess”, “RemoteConsoleAndVirtualMediaAccess”, “RemoteServerPowerRestartAccess”, “AbilityClearEventLogs”, “Configuration_Basic”, “Configuration_NetworkingAndSecurity”, “Configuration_Advanced”, “Configuration_UEFISecurity”

Response body

The response returns the same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is POST body.

```
{
   "RoleId": "CustomRole",
   "OemPrivileges" : [
      "UserAccountManagement"
   ]
}
```

The following example JSON response is returned:

```
{
    "IsPredefined": false,
    "@odata.id": "/redfish/v1/AccountService/Roles/CustomRole",
    "AssignedPrivileges": [
        "Login"
    ],
    "Name": "CustomRole",
    "@odata.type": "#Role.v1_2_4.Role",
    "RoleId": "CustomRole",
    "OemPrivileges": [
        "UserAccountManagement"
    ],
    "Id": "CustomRole",
    "@odata.etag": "\"56d3deeb04702aecf49\"",
    "OemPrivileges@Redfish.AllowableValues": [
        "UserAccountManagement",
        "RemoteConsoleAccess",
        "RemoteConsoleAndVirtualMediaAccess",
        "RemoteServerPowerRestartAccess",
        "AbilityClearEventLogs",
        "Configuration_Basic",
        "Configuration_NetworkingAndSecurity",
        "Configuration_Advanced",
        "Configuration_UEFISecurity"
    ],
    "Description": "This resource is used to represent a user role for the user account for a Redfish implementation."
}
```

PATCH – Create a custom role (Applies to Intel Purley-based systems)

Use the PATCH method to create a custom role for Redfish service. This method applies to Lenovo Intel Purley-based systems.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/AccountService/Roles/CustomRole{N}`

Request body

Field	Type	Description
OemPrivileges	Array String	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. The values can be “UserAccountManagement”, “RemoteConsoleAccess”, “RemoteConsoleAndVirtualMediaAccess”, “RemoteServerPowerRestartAccess”, “AbilityClearEventLogs”, “Configuration_Basic”, “Configuration_NetworkingAndSecurity”, “Configuration_Advanced”, “Configuration_UEFISecurity”

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.

```
{
    "OemPrivileges": [
        "RemoteConsoleAccess",
        "RemoteConsoleAndVirtualMediaAccess",
        "RemoteServerPowerRestartAccess"
    ]
}
```

The following example JSON response is returned:

```
{
    "@odata.etag": "\"66da6541a5fb25ae602\"",
    "OemPrivileges": [
        "RemoteConsoleAccess",
        "RemoteConsoleAndVirtualMediaAccess",
        "RemoteServerPowerRestartAccess"
    ],
    "OemPrivileges@Redfish.AllowableValues": [
        "Supervisor",
        "ReadOnly",
```

```
        "UserAccountManagement",
        "RemoteConsoleAccess",
        "RemoteConsoleAndVirtualMediaAccess",
        "RemoteServerPowerRestartAccess",
        "AbilityClearEventLogs",
        "AdapterConfiguration_Basic",
        "AdapterConfiguration_NetworkingAndSecurity",
        "AdapterConfiguration_Advanced"
    ],
    "RoleId": "CustomRole2",
    "IsPredefined": false,
    "AssignedPrivileges": [
        "Login"
    ],
    "Id": "CustomRole2",
    "Name": "CustomRole2",
    "@odata.type": "#Role.v1_2_4.Role",
    "@odata.id": "/redfish/v1/AccountService/Roles/CustomRole2",
    "Description": "This resource is used to represent a user role for the user account for a Redfish implementation."
}
```


PATCH – Update custom role privileges

Use the PATCH method to update properties in Role resource for Redfish service.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/AccountService/Roles/CustomRole{N}`

Request body

Properties to be updated are shown as below, all of these properties can be changed individually.

Field	Type	Description
OemPrivileges	Array	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. The values can be “UserAccountManagement”, “RemoteConsoleAccess”, “RemoteConsoleAndVirtualMediaAccess”, “RemoteServerPowerRestartAccess”, “AbilityClearEventLogs”, “Configuration_Basic”, “Configuration_NetworkingAndSecurity”, “Configuration_Advanced”, “Configuration_UEFISecurity”

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.

```
{
   "OemPrivileges" : [
      " RemoteConsoleAccess "
   ]
}
```

The following example JSON response is returned:

```
{
    "IsPredefined": false,
    "Id": "CustomRole12",
    "AssignedPrivileges": [
        "Login"
    ],
    "Name": "CustomRole12",
    "RoleId": "CustomRole12",
    "@odata.type": "#Role.v1_2_4.Role",
    "OemPrivileges": [
        "RemoteConsoleAccess"
    ],
    "@odata.id": "/redfish/v1/AccountService/Roles/CustomRole12",
    "@odata.etag": "\"7465e9c5393c1fbc1da204d67d854889\"",
    "OemPrivileges@Redfish.AllowableValues": [
        "UserAccountManagement",
        "RemoteConsoleAccess",
        "RemoteConsoleAndVirtualMediaAccess",
        "RemoteServerPowerRestartAccess",
        "AbilityClearEventLogs",
        "Configuration_Basic",
        "Configuration_NetworkingAndSecurity",
        "Configuration_Advanced",
        "Configuration_UEFISecurity"
    ],
    "Description": "This resource is used to represent a user role for the user account for a Redfish implementation."
}
```

POST – Delete a Role

Delete a role resource for Redfish service by HTTP DELETE method. This method applies to Lenovo Intel Whitley-based systems and AMD 2 sockets systems.

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/AccountService/Roles/{1...12}`

Request body

None.

Response body

None.

Status code

HTTP Status Code	Error Message ID
204	NoContent
500	InternalError

PATCH – Delete a Role (Applies to Intel Purley-based systems)

Delete a role resource for Redfish service by HTTP PATCH method and set the “OemPrivileges” of the role to default oem privilege(“ReadOnly”). This method applies to Lenovo Intel Purley-based systems, as the “slots” of role are pre-populated on these systems.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/AccountService/Accounts/{1…12}
```

Request body

Field	Type	Description
OemPrivileges	Array String	Set it to default oem privilege, “ReadOnly”. [“ReadOnly”]

Response

The response returns the same content as GET operation on an empty role “slot”.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.

```
{
    "OemPrivileges": ["ReadOnly"]
}
```

The following example JSON response is returned:

```
{
    "@odata.etag": "\"5b0d772c16cd27ed99a\"",
    "Description": "This resource is used to represent a user role for the user account for a Redfish implementation.",
    "AssignedPrivileges": [
        "Login"
    ],
    "IsPredefined": false,
    "RoleId": "CustomRole4",
    "@odata.id": "/redfish/v1/AccountService/Roles/CustomRole4",
    "Id": "CustomRole4",
    "Name": "CustomRole4",
```

```
    "@odata.type": "#Role.v1_2_4.Role",
    "OemPrivileges@Redfish.AllowableValues": [
        "Supervisor",
        "ReadOnly",
        "UserAccountManagement",
        "RemoteConsoleAccess",
        "RemoteConsoleAndVirtualMediaAccess",
        "RemoteServerPowerRestartAccess",
        "AbilityClearEventLogs",
        "AdapterConfiguration_Basic",
        "AdapterConfiguration_NetworkingAndSecurity",
        "AdapterConfiguration_Advanced"
    ],
    "OemPrivileges": [
        "ReadOnly"
    ]
}
```

Chapter 5. Chassis Management

Resource Chassis

This resource is used to represent a chassis for a Redfish implementation.

Number of Resources	1..N
Resource Path	/redfish/v1/Chassis/{1..N}
Schema file	Chassis_v1.xml

GET – Collection for chassis

Use the GET method to retrieve properties in Chassis collection for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Chassis`

Request body

None

Response body

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

Field	Type	Description
Name	String	“ChassisCollection”.
Members	Array	Items: A reference link to an element of Chassis.
Description	String	A collection of Chassis resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

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

```
{
    "@odata.id": "/redfish/v1/Chassis",
    "Name": "ChassisCollection",
    "@odata.context": "/redfish/v1/$metadata#ChassisCollection.ChassisCollection",
    "Members": [
        {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    ],
    "@odata.type": "#ChassisCollection.ChassisCollection",
    "@odata.etag": "\"af5a94479815eb5f87fe91ea08fde0ac\"",
    "Members@odata.count": 1,
    "Description": "A collection of Chassis resource instances."
```

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}

GET – Chassis properties

Use the GET method to retrieve properties in Chassis resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/{1..N}
```

Request body

None

Response body

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

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of Chassis. For the Chassis resource for the server, the Id is “1”. On High-Density system or the Flex System blades system, in Chassis resource the Id is “2”. For Chassis resource for storage backplanes equipped in server, the Id is “3” ~ “N”.
Description	String	Provides a description of this chassis resource.
LogServices	Link	A reference link to the log services resource contained in this chassis.
Memory	Link	A reference link to the memory resources located in this chassis.
PCIeDevices	Link	A reference link to the PCIe devices located in this chassis.
AssetTag	String	The user assigned asset tag for this chassis.
ChassisType	String	This property indicates the type of physical form factor of this resource. Valid values include: • RackMount. The server is a rack-mounted server. • Blade. The server is a blade-based server. • StandAlone. The server is a tower-based server.
EnvironmentalClass	String	The ASHRAE Environmental Class for this chassis.
HeightMn	Number	The height of the chassis.
IndicatorLED	String	The state of the indicator LED, used to identify the chassis. Valid values include: • Off. The Indicator LED is off. • Lit. The Indicator LED is lit. • Blinking. The Indicator LED is blinking.
Links	Object	Expanded.
ComputerSystems	Array	An array of references to the computer systems contained in this chassis.
ComputerSystems[1]	Link	A reference link to a resource of computer system.

Field	Type	Description
ContainedBy	Link	The value of this property is a URI reference to a chassis resource of the Flex System Enterprise Chassis or Lenovo D2 Enclosure.
CooledBy	Array	An array of IDs of resources that cool this chassis.
CooledBy[N]	Link	A reference link to a resource of cooling device.
Drives	Array	An array of resources to disk drives of in this chassis.
Drives[N]	Link	A reference link to a resource of disk drive.
ManagedBy	Array	An array of references to the managers responsible for managing this chassis.
ManagedBy[0]	Link	A reference link to a resource of manager responsible for managing this chassis.
ManagersInChassis	Array	An array of references to the managers contained in this chassis.
ManagerInChassis[0]	Link	A reference link to a resource of manager.
PCIeDevices	Array	An array of references to the PCIe devices located in this chassis.
PCIeDevices[N]	LInk	A reference link to a resource of PCIe device located in this chassis.
PoweredBy	Array	An array of IDs of resources that power this chassis.
PoweredBy[N]	Link	A reference link to a resource of power device.
Processors	Array	An array of references to the processors located in this chassis.
Processors[N]	Link	A reference link to a resource of processors located in this chassis.
Storage	Array	An array of references to the storage subsystems connected to or inside this chassis.
Storage[N]	Link	A reference link to a resource of storage device inside this chassis.
MaxPowerWatts	Number	The upper bound of the total power consumed by the chassis.
MinPowerWatts	Number	The lower bound of the total power consumed by the chassis.
Manufacturer	String	The manufacturer of this chassis. Always set to Lenovo or LNVO.
Model	String	The model number for the chassis.
Name	String	The name of the Chassis resource. Always set to “Chassis”.
NetworkAdapters	Link	A reference link to a collection of network adapter resources contained in this chassis.
PartNumber	String	The part number of this chassis.
Power	Link	A reference link to a resource of power device contained in this chassis.
PowerState	String	The current power state of this chassis. Valid values include: • On • Off
SKU	String	The SKU for this chassis.
Sensors	Link	A reference link to the sensor resource contained in this chassis.
SerialNumber	String	The serial number of this chassis.
Thermal	Link	A reference link to the thermal resource contained in this chassis.

Field	Type	Description
Status	Object	Contains the following elements.
Health	String	The current health of this chassis as indicated by the entries in the event log. Valid values include: • **OK**: Normal. No warning or critical events in the event log of this chassis. • **Critical**: A critical condition exists that requires immediate attention. At least one critical event in the event log of this chassis. • **Warning**: A condition exists that requires attention. At least one warning in the event log (but no critical events) of this chassis.
State	String	“Enabled”.
UUID	String	The UUID for this chassis.
Location	Object	The location of chassis.
Contacts	Array	An array of contact information.
Contacts[0]	Object	Expanded
ContactName	String	Name of this contact.
PartLocation	Object	The part location within the placement.
LocationOrdinalValue	Integer	The number that represents the location of the part. If LocationType is `slot` and this unit is in slot 2, the LocationOrdinalValue is 2.
LocationType	String	The type of location of the part, such as slot, bay and socket
ServiceLabel	String	The label of the part location, such as a silk-screened name or a printed label.
Placement	Object	A place within the addressed location.
Rack	String	The name of a rack location within a row.
RackOffset	Integer	The vertical location of the item, in terms of RackOffsetUnits.
RackOffsetUnits	String	The type of rack units in use.
PostalAddress	Object	The postal address of the addressed Resource.
Building	String	The name of the building.
Location	String	The room designation or other additional information.
Name	String	The name of the system.
Room	String	The name or number of the room.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "SerialNumber": "NARVIR073",
    "@odata.id": "/redfish/v1/Chassis/1",
```

```
    "IndicatorLED": "Lit",
    "PowerState": "On",
    "NetworkAdapters": {
        "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters"
    },
    "EnvironmentalClass": "A4",
    "Oem": {
        …
    },
    "ChassisType": "RackMount",
    "Location": {
        "PostalAddress": {
            "Location": "",
            "Room": "10F",
            "Building": "ZJ",
            "Name": "Narvi-SR860V2-1"
        },
        "Placement": {
            "RackOffset": 48,
            "Rack": "15C",
            "RackOffsetUnits": "EIA_310"
        },
        "PartLocation": {},
        "Contacts": [
            {
                "ContactName": ""
            }
        ]
    },
    "Model": "7Z59CTO1WW",
    "PCIeSlots": {
        "@odata.id": "/redfish/v1/Chassis/1/PCIeSlots"
    },
    "Description": "This resource is used to represent a chassis or other physical enclosure for a Redfish
implementation.",
    "Thermal": {
        "@odata.id": "/redfish/v1/Chassis/1/Thermal"
    },
    "Links": {
        "Drives": [],
        "CooledBy": [
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/0"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/1"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/2"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/3"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/4"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/5"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/6"
```

```
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/7"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/8"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/9"
            }
        ],
        "ComputerSystems": [
            {
                "@odata.id": "/redfish/v1/Systems/1"
            }
        ],
        "PCIeDevices": [
            {
                "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices"
            }
        ],
        "PoweredBy": [
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/0"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/1"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/2"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/3"
            }
        ],
        "Storage": [],
        "ManagersInChassis": [
            {
                "@odata.id": "/redfish/v1/Managers/1"
            }
        ],
        "Processors": [
            {
                "@odata.id": "/redfish/v1/Systems/1/Processors/1"
            },
            {
                "@odata.id": "/redfish/v1/Systems/1/Processors/2"
            }
        ],
        "ManagedBy": [
            {
                "@odata.id": "/redfish/v1/Managers/1"
            }
        ]
    },
    "AssetTag": "asset tag",
    "MaxPowerWatts": 1800,
    "MinPowerWatts": 0,
    "PCIeDevices": {
        "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices"
    },
```

```
    "Status": {
        "State": "Enabled",
        "Health": "Critical"
    },
    "Id": "1",
    "Name": "Chassis",
    "HeightMm": 177.8,
    "Power": {
        "@odata.id": "/redfish/v1/Chassis/1/Power"
    },
    "SKU": "7Z59CTO1WW",
    "@odata.type": "#Chassis.v1_12_0.Chassis",
    "PartNumber": "SB27A22721",
    "Manufacturer": "Lenovo",
    "@odata.etag": "\"f72f9435541d30ea47472\"",
    "LogServices": {
        "@odata.id": "/redfish/v1/Systems/1/LogServices"
    },
    "UUID": "55833BF4-5BBB-11E7-997F-0A94EF402C57"
}
```


PATCH – Update chassis asset tag and location LED and other location properties

Use the PATCH method to update properties in Chassis resource for Redfish service.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/Chassis/1`

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Error Message ID
AssetTag	String	The user assigned asset tag for this chassis. Maximum string length of AssetTag is 32.
IndicatorLED	String	The state of the indicator LED, used to identify the chassis. Available value is either “Lit” or “Blinking” or “Off”.
Location	Object	The location of chassis.
Contacts	Array	An array of contact information.
Contacts[0]	Object	Expanded
ContactName	String	Name of this contact.
Placement	Object	A place within the addressed location.
Rack	String	The name of a rack location within a row.
RackOffset	Integer	The vertical location of the item, in terms of RackOffsetUnits.
PostalAddress	Object	The postal address of the addressed Resource.
Building	String	The name of the building.
Location	String	The room designation or other additional information.

Field	Type	Error Message ID
Name	String	The name of the system.
Room	String	The name or number of the room.

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.

```
{
   "AssetTag" : "ABC-1-2"
}
```

After the PATCH operation runs successfully, querying the chassis resource returns below example JSON response:

```
{
    "SerialNumber": "NARVIR073",
    "@odata.id": "/redfish/v1/Chassis/1",
    "IndicatorLED": "Lit",
    "PowerState": "On",
    "NetworkAdapters": {
        "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters"
    },
    "EnvironmentalClass": "A4",
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoChassis.v1_0_0.LenovoChassisProperties",
            "FruPartNumber": "01GT946",
            "Sensors": {
                "@odata.id": "/redfish/v1/Chassis/1/Oem/Lenovo/Sensors"
            },
            "ProductName": "ThinkSystem SR860",
            "LEDs": {
                "@odata.id": "/redfish/v1/Chassis/1/Oem/Lenovo/LEDs"
            },
            "Slots": {
                "@odata.id": "/redfish/v1/Chassis/1/Oem/Lenovo/Slots"
            }
        }
    },
    "ChassisType": "RackMount",
    "Location": {
        "PostalAddress": {
            "Location": "",
            "Room": "10F",
            "Building": "ZJ",
            "Name": "Narvi-SR860V2-1"
        },
        "Placement": {
```

```
            "RackOffset": 48,
            "Rack": "15C",
            "RackOffsetUnits": "EIA_310"
        },
        "PartLocation": {},
        "Contacts": [
            {
                "ContactName": ""
            }
        ]
    },
    "Model": "7Z59CTO1WW",
    "PCIeSlots": {
        "@odata.id": "/redfish/v1/Chassis/1/PCIeSlots"
    },
    "Description": "This resource is used to represent a chassis or other physical enclosure for a
Redfish implementation.",
    "Thermal": {
        "@odata.id": "/redfish/v1/Chassis/1/Thermal"
    },
    "Links": {
        "Drives": [],
        "CooledBy": [
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/0"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/1"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/2"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/3"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/4"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/5"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/6"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/7"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/8"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/9"
            }
        ],
        "ComputerSystems": [
            {
                "@odata.id": "/redfish/v1/Systems/1"
            }
        ],
        "PCIeDevices": [
            {
```

```
            "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/ob_1"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_13"
        }
    ],
    "PoweredBy": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/0"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/1"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/2"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/3"
        }
    ],
    "Storage": [],
    "ManagersInChassis": [
        {
            "@odata.id": "/redfish/v1/Managers/1"
        }
    ],
    "Processors": [
        {
            "@odata.id": "/redfish/v1/Systems/1/Processors/1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Processors/2"
        }
    ],
    "ManagedBy": [
        {
            "@odata.id": "/redfish/v1/Managers/1"
        }
    ]
},
"AssetTag": "ABC-1-2",
"PCIeDevices": {
    "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices"
},
"Status": {
    "State": "Enabled",
    "Health": "Critical"
},
"Id": "1",
"Name": "Chassis",
"HeightMm": 177.8,
"Power": {
    "@odata.id": "/redfish/v1/Chassis/1/Power"
},
"SKU": "7Z59CTO1WW",
"@odata.type": "#Chassis.v1_10_0.Chassis",
"PartNumber": "SB27A22721",
"Manufacturer": "Lenovo",
"@odata.etag": "\"fe6783781ffb0b49d7667e84ce6a624a\"",
"LogServices": {
    "@odata.id": "/redfish/v1/Systems/1/LogServices"
```

```
    },
    "UUID": "55833BF4-5BBB-11E7-997F-0A94EF402C57"
}
```

Resource Chassis (Flex System Enterprise Chassis or Lenovo D2 Enclosure

This resource is used to represent a Flex System Enterprise Chassis or Lenovo D2 Enclosure for a Redfish implementation.

This resource is only for Platform type Iteblade and Highdense

Number of Resources	1
Resource Path	/redfish/v1/Chassis/2
Schema file	Chassis_v1.xml

GET – Collection for Flex System Enterprise Chassis or Lenovo D2 Enclosure

Use the GET method to retrieve properties in Chassis collection for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Chassis`

Request body

None

Response body

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

Field	Type	Description
Name	String	“ChassisCollection”.
Members	Array	Items: A reference link to an element of Chassis.
Description	String	A collection of Chassis resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "@odata.id": "/redfish/v1/Chassis",
    "Name": "ChassisCollection",
    "@odata.context": "/redfish/v1/$metadata#ChassisCollection.ChassisCollection",
    "Members": [
        {
            "@odata.id": "/redfish/v1/Chassis/1"
```

```
        },
        {
            "@odata.id": "/redfish/v1/Chassis/2"
        }

    ],
    "@odata.type": "#ChassisCollection.ChassisCollection",
    "@odata.etag": "\"af5a94479815eb5f87fe91ea08fde0ac\"",
    "Members@odata.count": 2,
    "Description": "A collection of Chassis resource instances."
}
```

GET – Flex System Enterprise Chassis or Lenovo D2 Enclosure properties

Use the GET method to retrieve properties in Flex System Enterprise Chassis or Lenovo D2 Enclosure resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/2
```

Request body

None

Response body

Field	Type	Description
SerialNumber	String	The serial number of this chassis.
ChassisType	String	This property indicates the type of physical form factor of this resource.
Description	String	Provides a description of this chassis resource.
Links	Object	Expanded
Contains	Array	An array of references to the chassis contained in this chassis.
Contains [N]	Link	The value of this property is a URI reference to the resource of chassis.
Model	String	The model number for the chassis.
Id	String	Uniquely identifies the resource within the collection of Chassis. Always set to “2”.
Status	Object	Contains the following elements
State	String	“Enabled”
Name	String	The name of the Chassis resource. Always set to “Chassis Enclosure”.
Power	Link	A reference link to the power resource contained in this chassis.
Manufacturer	String	The manufacturer of this chassis. Always set to Lenovo or LNVO.
Location	Object	The location of chassis.
PartLocation	Object	The part location within the placement.
LocationOrdinalValue	Integer	The number that represents the location of the part. If LocationType is `slot` and this unit is in slot 2, the LocationOrdinalValue is 2.

Field	Type	Description
LocationType	String	The type of location of the part, such as slot, bay and socket
Placement	Object	A place within the addressed location.
AdditionalInfo	String	Area designation or other additional info.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "SerialNumber": "485034927",
    "Id": "2",
    "@odata.id": "/redfish/v1/Chassis/2",
    "Status": {
        "State": "Enabled"
    },
    "Links": {
        "Contains": [
            {
                "@odata.id": "/redfish/v1/Chassis/1"
            }
        ]
    },
    "Name": "Chassis Enclosure",
    "Power": {
        "@odata.id": "/redfish/v1/Chassis/2/Power"
    },
    "Manufacturer": "Lenovo",
    "@odata.type": "#Chassis.v1_9_1.Chassis",
    "ChassisType": "Enclosure",
    "Location": {
        "PartLocation": {
            "LocationType": "Bay",
            " LocationOrdinalValue ": 1
        },
        "Placement": {
            "AdditionalInfo": "CMM"
        }
    },
    "@odata.etag": "\"92e4b90992e982ce122a657d1cc2e307\"",
    "Model": "Iteblade",
    "Description": "This resource is used to represent a physical enclosure for a Redfish implementation."
}
```

Resource Sensor

This resource is used to represent a sensor for a Redfish implementation.

Number of Resources	1..N
Resource Path	/redfish/v1/Chassis/1/Sensors/{sensor Id}
Schema file	Sensor_v1.xml

GET – Collection of Sensors

Use the GET method to retrieve properties in sensor collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/Sensors
```

Request body

None

Response body

Field	Type	Description
Name	String	“SensorsCollection”
Members	Array	Items: A reference link to an element of sensors
Members@odata.count	Number	The number of sensor elements
Description	String	A collection of sensor resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

```
{
    "Name": "SensorCollection",
    "Description": "A collection of Sensor resource instances.",
    "@odata.type": "#SensorCollection.SensorCollection",
    "@odata.id": "/redfish/v1/Chassis/1/Sensors",
    "Members": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/100L0"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/100L3"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/101L0"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/101L3"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/102L0"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/102L3"
        },
        {
```

```
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/103L0"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/103L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/104L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/105L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/106L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/107L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/108L0"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/108L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/109L0"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/109L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/10L0"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/110L0"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/110L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/111L0"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/111L3"
    },
……
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/96L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/97L0"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/97L3"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/98L0"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/Sensors/98L3"
    },
    {
```

```
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/99L3"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/9L0"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/PSU1_InputVol"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/PSU2_InputVol"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/PSU3_InputVol"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Sensors/PSU4_InputVol"
        }
    ],
    "@odata.etag": "\"5f07cdf91848d2f06b0db8\"",
    "Members@odata.count": 280,
    "@odata.context": "/redfish/v1/$metadata#SensorCollection.SensorCollection"
}
```


GET – Sensor properties

Use the GET method to retrieve properties in sensor resource.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/{sensor Id}
```

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of Sensor. The Id value should be <SensorNumber>L<OwnerLUN>, the values are obtained from SDR. e.g. 244L0, 20L1, etc.
Name	String	Sensor name, the value is obtained from SDR.
Description	String	Provides a description of this chassis resource.
ApparentVA	Number	A reference link to the log services resource contained in this chassis.
MaxAllowableOperatingValue	Number	The maximum allowable operating value for this equipment.
MinAllowableOperatingValue	Number	The minimum allowable operating value for this equipment.
PhysicalContext	String	The area or device to which this sensor measurement applies.
Precision	Number	The number of significant digits in the reading.
Reading	Number	Sensor value
ReadingRangeMax	Number	The maximum possible value for this sensor.
ReadingRangeMin	Number	The minimum possible value for this sensor.

Field	Type	Description
ReadingType	String	Sensor type
ReadingUnits	Number	The units of the reading and thresholds.
Status	Object	Expanded
State	String	Valid values: “Enabled”, “Disabled”
Health	String	Valid values: “OK”, “Warning”, “Critical”, or null
Thresholds	Object	Expanded
LowerCaution	Object	Expanded
Activation	String	“Decreasing”
Reading	Number	The value at which the Reading property is below normal range.
LowerCritical	Object	Expanded
Activation	String	“Decreasing”
Reading	Number	The value at which the Reading property is below normal range but not yet fatal.
LowerFatal	Object	Expanded
Activation	String	“Decreasing”
Reading	Number	The value at which the Reading property is below normal range and fatal.
UpperCaution	Object	Expanded
Activation	String	“Increasing”
Reading	Number	The value at which the Reading property is above normal range.
UpperCritical	Object	Expanded
Activation	String	“Increasing”
Reading	Number	The value at which the Reading property is above normal range but not yet fatal.
UpperFatal	Object	Expanded
Activation	String	“Increasing”
Reading	Number	The value at which the Reading property is above normal range and fatal.
VoltageType	String	“DC” It is hidden when not a voltage sensor.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

```
{
    "@odata.id": "/redfish/v1/Chassis/1/Sensors/1LO",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
```

```
    },
    "ReadingUnits": "",
    "Reading": 0,
    "PhysicalContext": null,
    "@odata.type": "#Sensor.v1_1_0.Sensor",
    "ReadingType": "Power",
    "Id": "1LO",
    "@odata.etag": "\"253a27c7e52c2a24abf\"",
    "Name": "Host Power",
    "Description": "This resource is used to represent a sensor for a Redfish implementation."
}
```

Chapter 6. Network Adapter Devices

Resource NetworkAdapters

This resource is used to represent network adapters for a Redfish implementation.

Number of Resources	Number of adapters
Resource Path	/redfish/v1/Chassis/1/NetworkAdapters/{Location} (Location= ob-X or slot-Y)
Schema file	NetworkAdapterCollection_v1.xml NetworkAdapter_v1.xml

GET – Collection of Network adapters

Use the GET method to retrieve properties in NetworkAdapter collection for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/NetworkAdapters`

Request body

None

Response body

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

Field	Type	Description
Name	String	“NetworkAdaptersCollection”.
Members	Array	Items: A reference link to an element of NetworkAdapters.
Description	String	A collection of NetworkAdapter resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13"
        }
    ],
    "@odata.type": "#NetworkAdapterCollection.NetworkAdapterCollection",
    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters",
    "Name": "NetworkAdapterCollection",
```

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```
    "@odata.etag": "\"7c4a52116d626ea10f04de562c990269\"",
    "Members@odata.count": 1,
    "Description": "A collection of NetworkAdapter resource instances."
}
```

GET – Network adapter properties

Use the GET method to retrieve properties in NetworkAdapter resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/NetworkAdapters/{Location}
```

{Location}: Location of the corresponding NetworkAdapter device. {Location}=ob-X or slot-Y. ob stands for onboard device and slot stands for add-on card. X is the sequence number for onboard device starting from 1. Y is the slot number of add-on card.

Request body

None

Response body

Field	Type	Description
Id	String	Only Ethernet,Fibre Channel, InfiniBand devices support to have the NetworkAdapter resource now: For add-on devices, the value is “slot-{slot number}” For on-board devices, the value is “ob-{index}”
Controllers	Array	The set of network controllers ASICs that make up this NetworkAdapter
Controllers[]	Object	Expanded
FirmwarePackage-Version	String	The version of the user-facing firmware package
PCIeInterface	Object	Expanded
LanesInUse	Number	The number of PCIe lanes in use by this device.
MaxLanes	Number	The number of PCIe lanes supported by this device.
MaxPCIeType	String	The highest version of the PCIe specification supported by this device.
PCIeType	String	The version of the PCIe specification in use by this device.
Location	Object	The location of network adapter.
PartLocation	Object	The part location within the placement.
ServiceLabel	String	The label of the part location, such as a silk-screened name or a printed label. PCIe X (X is the slot number).
LocationType	String	The type of location of network adapter. Fixed value : Slot
LocationOrdinal-Value	Integer	The number that represents the location of the part. If LocationType is `slot` and this unit is in slot 2, the LocationOrdinalValue is 2.
Info	String	The location of the Resource: Slot {N} (N is the slot number) or “OnBoard”.
Infoformat	String	The format of the Info property. “Slot X” or “OnBoard”.

Field	Type	Description
Info@Redfish.Deprecated	String	The property is deprecated. Please use PartLocation instead.
InfoFormat@Redfish.Deprecated	String	The property is deprecated. Please use PartLocation instead.
Links	Object	Links for this controller
PCIeDevices	Array	Items: link
PCIeDevices[]	Link	Link to related PCIeDevice.
NetworkPorts	Array	Items: link
NetworkPorts[]	Link	Link to related NetworkPorts.
NetworkDeviceFunctions	Array	Items: link
NetworkDeviceFunctions[]	Link	Link to related NetworkDeviceFunctions.
ControllerCapabilities	Object	The capabilities of a controller.
NetworkPortCount	Number	The count of physical ports of this adapter.
NetworkDeviceFunctionCount	Number	The count of logical ports of this adapter.
Description	String	A NetworkAdapter represents the physical network adapter capable of connecting to a computer network.
Manufacturer	String	The manufacturer or OEM of this network adapter.
Model	String	The model string for this network adapter.
SKU	String	The manufacturer SKU for this network adapter.
Name	String	The card name for this network adapter.
PartNumber	String	The part number for this network adapter.
SerialNumber	String	The serial number for this network adapter.
Status	Object	Expand
State	String	Enabled
Health	String	This represents the health state of this resource.
NetworkPorts	Link	Link to related NetworkPortsCollection.
NetworkDeviceFunctions	Link	Link to related NetworkDeviceFunctionsCollection.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
```

```
"SerialNumber": "L2NV97J018G",
"NetworkDeviceFunctions": {
    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions"
},
"Id": "slot-13",
"@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13",
"NetworkPorts": {
    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts"
},
"Status": {
    "State": "Enabled",
    "Health": "OK"
},
"Name": "Broadcom NetXtreme PCIe 1Gb 2-Port RJ45 Ethernet Adapter",
"Controllers": [
    {
        "ControllerCapabilities": {
            "NetworkDeviceFunctionCount": 2,
            "NetworkPortCount": 2
        },
        "FirmwarePackageVersion": "212.0.5.4",
        "Location": {
            "PartLocation": {
                "LocationType": "Slot",
                "ServiceLabel": "PCIe 13",
                "LocationOrdinalValue": 13
            },
            "InfoFormat": "Slot X",
            "Info": "Slot 13",
            "Info@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead.",
            "InfoFormat@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead."
        },
        "Links": {
            "NetworkPorts": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/2"
                }
            ],
            "NetworkDeviceFunctions": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions/1.1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions/2.1"
                }
            ],
            "PCIeDevices": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_13"
                }
            ]
        },
        "PCIeInterface": {
            "LanesInUse": 2,
            "MaxPCIeType": "Gen2",
            "MaxLanes": 4,
            "PCIeType": "Gen2"
        }
```

```
        }
    ],
    "PartNumber": "SN30L21970",
    "SKU": "00YK550",
    "@odata.type": "#NetworkAdapter.v1_3_0.NetworkAdapter",
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoDeviceInfo.v1_0_0.LenovoDeviceInfo",
            "UUID": "00000000000000000000B02628C5541C"
        }
    },
    "Manufacturer": "Broadcom Limited",
    "@odata.etag": "\"9b40314193f036ad3898f8482b8a3a9a\"",
    "Model": "5720",
    "Description": "A NetworkAdapter represents the physical network adapter capable of connecting to a
computer network."
}
```


Resource NetworkPort

This resource is used to represent network ports for a Redfish implementation.

Number of Resources	Number of network ports
Resource Path	/redfish/v1/Chassis/1/NetworkAdapters/{Location}/NetworkPorts/{1-N} (Location= ob-X or slot-Y)
Schema file	NetworkPortCollection_v1.xml NetworkPort_v1.xml

GET – Collection of network ports

Use the GET method to retrieve properties in NetworkPort collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/NetworkAdapters/{Location}/NetworkPorts
```

Request body

None

Response body

Field	Type	Description
Name	String	“NetworkPortsCollection”.
Members	Array	Items: A reference link to an element of NetworkPorts.
Description	String	A Collection of NetworkPort resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/1"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/2"
        }
    ],
    "@odata.type": "#NetworkPortCollection.NetworkPortCollection",
    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts",
    "Members@odata.count": 2,
    "@odata.etag": "\"8e527250b8722a01098e15a8e56f0aa4\"",
    "Name": "NetworkPortCollection",
    "Description": "A collection of NetworkPort resource instances."
}
```

GET – Network port properties

Use the GET method to retrieve properties in network port resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/NetworkAdapters/{Location}/NetworkPorts/{1-N}
```

{Location}: Location of the corresponding NetworkAdapter device. {Location}=ob-X or slot-Y. ob stands for onboard device and slot stands for add-on card. X is the sequence number for onboard device starting from 1. Y is the slot number of add-on card.

{1-N}: Index of network physical port.

Request body

None

Response body

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

Field	Type	Description
Id	String	Index.
ActiveLinkTechnology	String	Network Port Active Link Technology
AssociatedNetworkAddresses	Array	The array of configured network addresses (MAC or WWN) that are associated with this Network Port
CurrentLinkSpeedMbps	Number	Network port current link speed.
Description	String	A Network Port represents a discrete physical port capable of connecting to a network.
LinkStatus	String	The status of the link between this port and its link partner
Name	String	"Physical Port X" (X = the Id value)
NetDevFuncMaxBWAlloc	Array	The array of minimum bandwidth allocation percentages for the Network Device Functions associated with this port

Field	Type	Description
NetDevFuncMaxBWAlloc[]	Object	Expanded
MaxBWAllocPercent	Number	The maximum bandwidth allocation percentage allocated to the corresponding network device function instance
NetworkDeviceFunction	Link	Link to a NetworkDeviceFunction
PhysicalPortNumber	String	The physical port number label for this port
PortMaximumMTU	Number	The maximum transmission unit (MTU) that can be configured for this network port
Status	Object	Expand
State	String	Enabled
Health	String	OK
HealthRollup	String	This represents the health state of this resource and its dependent resources
SupprtedLinkCapabilities	Object	Expanded
CapableLinkSpeedMbps[0]	Array	The set of link speed capabilities of this port.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

The following example JSON response is returned:

```
{
    "AssociatedNetworkAddresses": [
        "B02628C5541C"
    ],
    "NetDevFuncMaxBWAlloc": [
        {
            "NetworkDeviceFunction": {
                "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions/1.1"
            },
            "MaxBWAllocPercent": null
        }
    ],
    "SupportedLinkCapabilities": {
        "CapableLinkSpeedMbps": [
            10737418240
        ]
    },
    "Id": "1",
    "Status": {
        "State": "Enabled",
        "Health": "OK",
        "HealthRollup": "OK"
    },
    "Name": "Physical Port 1",
    "CurrentLinkSpeedMbps": null,
    "ActiveLinkTechnology": "Ethernet",
    "@odata.type": "#NetworkPort.v1_2_3.NetworkPort",
```

```
    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/1",
    "PortMaximumMTU": 72000,
    "@odata.etag": "\"53ae26592e452ae923e\"",
    "PhysicalPortNumber": "1",
    "Description": "A Network Port represents a discrete physical port capable of connecting to a network."
}
```


Resource NetworkDeviceFunction

This resource is used to represent network device function for a Redfish implementation.

Number of Resources	Number of network device functions
Resource Path	/redfish/v1/Chassis/1/NetworkAdapters/{Location}/NetworkDeviceFunctions/{1-M}.{1-N} (Location= ob-X or slot-Y)
Schema file	NetworkDeviceFunctionCollection_v1.xml NetworkDeviceFunction_v1.xml

GET – Collection of Network device function

Use the GET method to retrieve properties in NetworkDeviceFunction collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/NetworkAdapters/{Location}/NetworkDeviceFunctions
```

Request body

None

Response body

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

Field	Type	Description
Name	String	“NetworkDeviceFunctionCollection”.
Members	Array	Items: A reference link to an element of NetworkDeviceFunction.
Description	String	A collection of NetworkDeviceFunction resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions/1.1"
        },
        {
```

```
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions/2.1"
        }
    ],
    "@odata.type": "#NetworkDeviceFunctionCollection.NetworkDeviceFunctionCollection",
    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions",
    "Members@odata.count": 2,
    "@odata.etag": "\"f98d64ab9ab89400faa5b2f4e0784f47\"",
    "Name": "NetworkDeviceFunctionCollection",
    "Description": "A collection of NetworkDeviceFunction resource instances."
}
```


GET – Network device PCIe functions

Use the GET method to retrieve properties in NetworkDeviceFunction resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/NetworkAdapters/{Locaton}/NetworkDeviceFunctions/{1-M}.{1-N}
```

{Location}: Location of the corresponding NetworkAdapter device. {Location}=ob-X or slot-Y. ob stands for onboard device and slot stands for add-on card. X is the sequence number for onboard device starting from 1. Y is the slot number of add-on card.

{1-M}: Index of physical network port.

{1-N}: Index of logical network port.

Request body

None

Response body

Field	Type	Description
Id	String	Physical port index +"." + the logical port index, for the associated NetworkPort resource.
AssignablePhysical-Ports	Array	Items: link
AssignablePhysical-Ports[N]	Link	Link to possible NetworkPorts
PhysicalPortAssign-ment	Link	Link to related NetworkPort
PhysicalPortAssign-ment@Redfish. Deprecated	String	The property is deprecated.
Description	String	A Network Device Function represents a logical interface exposed by the network adapter.
DeviceEnabled	Boolean	True
InfiniBand	Object	Expand
PermanentPortGUID	String	The permanent port GUID assigned to this network device function.
MTUSize	Number	The maximum transmission unit (MTU) configured for this network device function.
Ethernet	Object	Expand (If this is Ethernet, the below items will be displayed).

Field	Type	Description
PermanentMACAddress	String	This is the permanent MAC address assigned to this network device function (physical function).
MACAddress	String	This is the currently configured MAC address of the (logical port) network device function.
MTUSize	Number	The Maximum Transmission Unit (MTU) configured for this network device function.
FibreChannel	Object	Expand (If this is FibreChannel, the below items will be displayed).
PermanentWWPN	String	This is the permanent WWPN address assigned to this network device function (physical function).
WWPN	String	This is the currently configured WWPN address of the network device function (physical function).
Links	Object	Expand
EthernetInterface	Link	Link to an Ethernet interface.
PCIeFunction	Link	Link to a PCIeFunction.
PhysicalPortAssignment	Link	Link to a related NetworkPort.
Name	String	"Logical Port"+" "+logical port index.
NetDevFuncType	String	The configured capability of this network device function.
Status	Object	Expand
State	String	Enabled
Health	String	OK
HealthRollup	String	This represents the health state of this resource and its dependent resources.
@Redfish.Settings	Object	Expanded This object is supported only when NetDevFuncType is iSCSI.
Messages	Array	Items: object
Messages[N]	Object	Expanded
MessageId	String	“RebootRequired”
RelatedProperties	Array	Items: string
RelatedProperties[N]	String	The setting name of network device function. The format will be “#/iSCSIBoot/…”.
Severity	String	“Warning”
Message	String	“Changes completed successfully, but these changes will not take effect until next reboot.”
Resolution	String	“Reboot the computer system for the changes to take effect.”
SettingsObject	Link	Link to the network device function settings pending resource.
Time	String	Indicate the time when the setting resource was last applied.
SupportedApplyTimes	Array	Items: string Item count: 1

Field	Type	Description
SupportedApply-Times[0]	String	“OnReset”
iSCSIBoot	Object	Expanded
AuthenticationMe-thod	String	The iSCSI boot authentication method for this network device function.
CHAPSecret	String	The shared secret for CHAP authentication.
CHAPUsername	String	The user name for CHAP authentication.
IPAddressType	String	The type of IP address being populated in the iSCSIBoot IP address fields. Valid values: “IPv4”, “IPV6”
InitiatorDefaultGate-way	String	The IPv6 or IPv4 iSCSI boot default gateway.
InitiatorIPAddress	String	The IPv6 or IPv4 iSCSI boot default gateway.
InitiatorName	String	The iSCSI initiator name.
InitiatorNetmask	String	The IPv6 or IPv4 netmask of the iSCSI boot initiator.
MutualCHAPSecret	String	The CHAP secret for two-way CHAP authentication.
MutualCHAPUser-name	String	The CHAP user name for two-way CHAP authentication.
PrimaryLUN	Number	The logical unit number (LUN) for the primary iSCSI boot target.
PrimaryTargetIPAd-dress	String	The IPv4 or IPv6 address for the primary iSCSI boot target.
PrimaryTargetName	String	The name of the iSCSI primary boot target.
PrimaryTargetTCP-Port	Number	The TCP port for the primary iSCSI boot target.
TargetInfoViaDHCP	Boolean	An indication of whether the iSCSI boot target name, LUN, IP address, and netmask should be obtained from DHCP.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Ethernet": {
        "MACAddress": "b0:26:28:c5:54:1c",
        "PermanentMACAddress": "b0:26:28:c5:54:1c",
        "MTUSize": 72000
    },
    "Status": {
        "State": "Enabled",
        "Health": "OK",
        "HealthRollup": "OK"
    },
```

```
    "DeviceEnabled": true,
    "PhysicalPortAssignment": {
        "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/1"
    },
    "Links": {
        "PhysicalPortAssignment": {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/1"
        },
        "PCIeFunction": {
            "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_13/PCIeFunctions/slot_13.00"
        }
    },
    "Name": "Logical Port 1",
    "NetDevFuncType": "Ethernet",
    "AssignablePhysicalPorts": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/1"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/2"
        }
    ],
    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions/1.1",
    "@odata.type": "#NetworkDeviceFunction.v1_4_0.NetworkDeviceFunction",
    "Id": "1.1",
    "PhysicalPortAssignment@Redfish.Deprecated": "The property is deprecated. Please use
Links/PhysicalPortAssignment instead.",
    "@odata.etag": "\"436229ed07f09d724dcb0ec5bad22368\"",
    "AssignablePhysicalPorts@odata.count": 2,
    "Description": "A Network Device Function represents a logical interface exposed by the network adapter."
}
```


PATCH – Update network device PCIe functions resource

Use the PATCH method to update properties in NetworkDeviceFunction resource for Redfish service.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Chassis/1/NetworkAdapters/{Location}/NetworkDeviceFunctions/{1-M}.{1-N}/Pending
```

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Description
iSCSIBoot	Object	The location of chassis.
Authentication-Method	String	The iSCSI boot authentication method for this network device function.
CHAPSecret	String	The shared secret for CHAP authentication.
CHAPUser-name	String	The user name for CHAP authentication.
IPAddres-sType	String	The type of IP address being populated in the iSCSIBoot IP address fields. Valid values: “IPv4”, “IPV6”
InitiatorDe-faultGateway	String	The IPv6 or IPv4 iSCSI boot default gateway.

Field	Type	Description
InitiatorIPAddress	String	The IPv6 or IPv4 iSCSI boot default gateway.
InitiatorName	String	The iSCSI initiator name.
InitiatorNetmask	String	The IPv6 or IPv4 netmask of the iSCSI boot initiator.
MutualCHAPSecret	String	The CHAP secret for two-way CHAP authentication.
MutualCHAPUsername	String	The CHAP user name for two-way CHAP authentication.
PrimaryLUN	Number	The logical unit number (LUN) for the primary iSCSI boot target.
PrimaryTargetIPAddress	String	The IPv4 or IPv6 address for the primary iSCSI boot target.
PrimaryTargetName	String	The name of the iSCSI primary boot target.
PrimaryTargetTCPPort	Number	The TCP port for the primary iSCSI boot target.
TargetInfoViaDHCP	Boolean	An indication of whether the iSCSI boot target name, LUN, IP address, and netmask should be obtained from DHCP.

The CHAPUsername and CHAPSecret can be patched only when AuthenticationMethod is CHAP. The MutualCHAPUsername and MutualCHAPSecret can be patched only when AuthenticationMethod is MutualCHAP.

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body

```
{
    "iSCSIBoot": {
        "AuthenticationMethod": "MutualCHAP",
        "IPAddressType": "IPv4",
        "InitiatorDefaultGateway": "192.168.1.1",
        "InitiatorIPAddress": "0.0.0.0",
        "InitiatorName": "iqn.com.example",
        "InitiatorNetmask": "255.255.255.0"
        "MutualCHAPSecret": "
        "MutualCHAPUsername": "username",
        "PrimaryLUN": 0,
        "PrimaryTargetIPAddress": "192.168.1.10",
        "PrimaryTargetName": "iqn.example",
        "PrimaryTargetTCPPort": 3261,
        "TargetInfoViaDHCP": false
    }
}
```

After the PATCH operation runs successfully, querying the chassis resource returns below example JSON response:


```
{
    "Ethernet": {
        "MACAddress": "b8:59:9f:03:00:3f",
        "PermanentMACAddress": "b8:59:9f:03:00:3f",
        "MTUSize": 32768
    },
    "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions/1.1",
    "Links": {
        "PhysicalPortAssignment": {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/1"
        },
        "PCIeFunction": {
            "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_13/PCIeFunctions/slot_13.00"
        }
    },
    "Description": "A Network Device Function represents a logical interface exposed by the network adapter.",
    "iSCSIBoot": {
        "AuthenticationMethod": "MutualCHAP",
        "IPAddressType": "IPv4",
        "InitiatorDefaultGateway": "192.168.1.1",
        "InitiatorIPAddress": "0.0.0.0",
        "InitiatorName": "iqn.com.example",
        "InitiatorNetmask": "255.255.255.0"
        "MutualCHAPSecret": "
        "MutualCHAPUsername": "username",
        "PrimaryLUN": 0,
        "PrimaryTargetIPAddress": "192.168.1.10",
        "PrimaryTargetName": "iqn.example",
        "PrimaryTargetTCPPort": 3261,
        "TargetInfoViaDHCP": false
    },
    "PhysicalPortAssignment": {
        "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/1"
    },
    "DeviceEnabled": true,
    "AssignablePhysicalPorts@odata.count": 1,
    "NetDevFuncType": "iSCSI",
    "AssignablePhysicalPorts": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkPorts/1"
        }
    ],
    "@Redfish.Settings": {
        "SettingsObject": {
            "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/slot-13/NetworkDeviceFunctions/1.1/Pending"
        },
        "@odata.type": "#Settings.v1_3_0.Settings",
        "SupportedApplyTimes": [
            "OnReset"
        ],
        "Messages": [],
        "Time": null
    },
    "@odata.type": "#NetworkDeviceFunction.v1_4_0.NetworkDeviceFunction",
    "Status": {
        "State": "Enabled",
        "Health": "OK",
        "HealthRollup": "OK"
```

```
    },
    "Name": "Logical Port 1",
    "@odata.etag": "\"c583b2e1c88932caff70d\"",
    "Id": "1.1",
    "PhysicalPortAssignment@Redfish.Deprecated": "The property is deprecated. Please use
Links/PhysicalPortAssignment instead."
}
```

Chapter 7. Power, thermal and redundancy

Resource Power

This resource is used to represent power management for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/Chassis/1/Power
Schema file	Power_v1.xml

GET – Power management properties

Use the GET method to retrieve properties in Power resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/Power
```

Request body

None

Response body

Field	Type	Description
Id	String	“Power”
Name	String	The name of power resource. Always set to “Power”.
Description	String	Power Consumption and Power Limiting
PowerControl	Array	This is the definition for power control function (power reading/limiting).
PowerControl[1]	Object	This is the base type for addressable members of PowerControl array.
MemberId	String	Index of this PowerControl array.
Name	String	Power Control Function name. Always set to “Server Power Control”.
PhysicalContext	String	The area, device, or set of devices to which this power control applies.
PowerConsumedWatts	Number	The actual power being consumed by the chassis.
PowerRequestedWatts	Number	The potential power that the chassis resources are requesting which may be higher than the current level being consumed since requested power includes budget that the chassis resource wants for future use.
PowerAvailableWatts	Number	The amount of power not already budgeted and therefore available for additional allocation. (powerCapacity - powerAllocated). This indicates how much reserve power capacity is left.
PowerCapacityWatts	Number	The total amount of power available to the chassis for allocation. This may the power supply capacity, or power budget assigned to the chassis from an upstream chassis.
PowerAllocatedWatts	Number	The total amount of power that has been allocated (or budgeted) to chassis resources.

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Field	Type	Description
Status	Object	Describes the status and health of a resource and its children.
State	String	This indicates the known state of the resource, such as if it is enabled. Always set to “Enabled”.
HealthRollup	String	This indicates the health state of this power control. Valid values: • "OK": Normal • "Warning": A condition exists that requires attention • "Critical": A critical condition exists that requires immediate attention
Health	String	”OK”
PowerLimit	Object	Power limit status and configuration information for this chassis. **Note:** If the tier level of this system is less than 3 or if the platform is a blade platform or AMD Milan-based system, this object will be hidden.
LimitInWatts	Number	The Power limit in watts. Set to null to disable power capping.
LimitException	String	The action that is taken if the power cannot be maintained below the LimitInWatts. Always set to “NoAction”.
PowerMetrics	Object	Power readings for this chassis. **Note:** If the tier level of this system is less than 2, this object will be hidden.
IntervalInMin	Number	The time interval (or window) in which the PowerMetrics are measured over. Always set to 1.
MinConsumedWatts	Number	The lowest power consumption level over the measurement window (the last IntervalInMin minutes).
MaxConsumedWatts	Number	The highest power consumption level that has occurred over the measurement window (the last IntervalInMin minutes).
AverageConsumedWatts	Number	The average power level over the measurement window (the last IntervalInMin minutes).
RelatedItem	Array	An array of links to resource of chassis.
RelatedItem[1]	Link	A reference link to a resource of chassis.
PowerControl[2]	Object	This is the base type for addressable members of PowerControl array.
MemberId	String	Index of this PowerControl array.
Name	String	Power Control Function name. Always set to “CPU Sub-system Power”.
PhysicalContext	String	The area, device, or set of devices to which this power control applies. Always set to “CPUSubsystem”.
PowerConsumedWatts	Number	The actual power being consumed by the CPUSubsystem.
PowerMetrics	Object	Power readings for this CPUSubsystem. **Note:** If the tier level of this system is less than 2, this object will be hidden.
IntervalInMin	Integer	The time interval (or window) in which the PowerMetrics are measured over. Always set to 1.
MinConsumedWatts	Number	The lowest power consumption level over the measurement window (the last IntervalInMin minutes).

Field	Type	Description
MaxConsumedWatts	Number	The highest power consumption level that has occurred over the measurement window (the last IntervalInMin minutes).
AverageConsumedWatts	Number	The average power level over the measurement window (the last IntervalInMin minutes).
Status	Object	Describes the status and health of a resource and its children.
State	String	This indicates the known state of the resource, such as if it is enabled. Always set to “Enabled”.
HealthRollup	String	This indicates the health state of this power control. Valid values: • "OK": Normal • "Warning": A condition exists that requires attention • "Critical": A critical condition exists that requires immediate attention
Health	String	”OK”
RelatedItem	Array	An array of links to resource of Processors
RelatedItem[1]	Link	A reference link to a resource of Processor
PowerControl[3]	Object	This is the base type for addressable members of PowerControl array. **Note:** This object is not supported on AMD Milan-based system.
MemberId	String	Index of this PowerControl array.
Name	String	Power Control Function name. Always set to “Memory Sub-system Power”.
PhysicalContext	String	The area, device, or set of devices to which this power control applies. Always set to “MemorySubsystem”.
PowerConsumedWatts	Number	The actual power being consumed by the MemorySubsystem.
PowerMetrics	Object	Power readings for this MemorySubsystem. **Note:** If the tier level of this system is less than 2, this object will be hidden.
IntervalInMin	Integer	The time interval (or window) in which the PowerMetrics are measured over. Always set to 1.
MinConsumedWatts	Number	The lowest power consumption level over the measurement window (the last IntervalInMin minutes).
MaxConsumedWatts	Number	The highest power consumption level that has occurred over the measurement window (the last IntervalInMin minutes).
AverageConsumedWatts	Number	The average power level over the measurement window (the last IntervalInMin minutes).
Status	Object	Describes the status and health of a resource and its children.
State	String	This indicates the known state of the resource, such as if it is enabled. Always set to “Enabled”.
HealthRollup	String	This indicates the health state of this power control. Valid values: • "OK": Normal • "Warning": A condition exists that requires attention • "Critical": A critical condition exists that requires immediate attention
Health	String	”OK”

Field	Type	Description
RelatedItem	Array	An array of links to resource of chassis.
RelatedItem[1]	Link	A reference link to a resource of chassis.
PowerSupplies	Array	Details of the power supplies associated with this system or device. Items count is the number of installed power supplies in this system. If the system does not install any PSU, like Flex systems and high dense systems, this array will be hidden.
PowerSupplies[N]	Object	Details of the power supply associated with this system or device.
MemberId	String	This is the identifier for the member within the collection. The string is PSU ID, like “1”.
Name	String	The name of the Power Supply. The string starts with “PSU” and follows with PSU ID, like “PSU1”.
PowerSupply-Type	String	The Power Supply type (AC or DC). Valid values: • "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 or AC
LineInputVolta-geType	String	The line voltage type supported as an input to this Power Supply. Valid values: • "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 • "DC240V": DC 240V nominal input
LineInputVoltage	Number	The line input voltage at which the Power Supply is operating.
PowerCapacity-Watts	Number	The maximum capacity of this Power Supply.
LastPowerOut-putWatts	Number	The average power output of this Power Supply.
PowerInput-Watts	Number	The measured input power of this power supply.
PowerOutput-Watts	Number	The measured output power of this power supply.
EfficiencyPer-cent	Number	The measured efficiency of this power supply as a percentage.
HotPluggable	Boolean	An indication of whether this device can be inserted or removed while the equipment is in operation.
Location	Object	The location of the power supply.
PartLocation	Object	The part location within the placement.
ServiceLabel	String	The label of the part location, such as a silk-screened name or a printed label. Always set to “PSU” + psu_id.
LocationType	String	The type of location of the part, such as slot, bay and socket. Always set to “Slot”.
LocationOr-dinalValue	Integer	The number that represents the location of the part. If LocationType is `slot` and this unit is in slot 2, the LocationOrdinalValue is 2.
Model	String	The model number for this Power Supply.

Field	Type	Description
FirmwareVersion	String	The firmware version for this Power Supply. The firmware string consists of primary firmware version and secondary firmware version, which are defined in PowerSupply OEM section.
SerialNumber	String	The serial number for this Power Supply.
PartNumber	String	The part number for this Power Supply.
Manufacturer	String	The manufacturer of this Power Supply.
InputRanges	Array	The input ranges that the power supply can use. Item count is always set to 1.
InputRanges[1]	Object	Details for input ranges that the power supply can use.
InputType	String	Valid values: “AC”, “DC”
Maximum-Voltage	Number	The maximum line input voltage at which this power supply input range is effective.
Minimum-Voltage	Number	The minimum line input voltage at which this power supply input range is effective.
OutputWat-tage	Number	The same as the PowerCapacityWatts.
Status	Object	Describes the status and health of a resource and its children.
State	String	This indicates the known state of this power supply. Valid values: • “Enabled”: This function or resource has been enabled • “Disabled”: This function or resource has been disabled
Health	String	This indicates the health state of this power supply. Valid values: • "OK": Normal • "Warning": A condition exists that requires attention • "Critical": A critical condition exists that requires immediate attention
RelatedItem	Array	An array of links to resource of chassis.
RelatedItem[1]	Link	A reference link to a resource of chassis.
Redundancy	Array	Redundancy information for the power subsystem of this system or device. Item count is always set to 1. If the system does not install any PSU, like Flex systems and high dense systems, this array will be hidden.
Redundancy[1]	Object	Details indicating power supplies redundancy.
MemberId	String	Index of this Redundancy array.
Name	String	“PSU Redundancy”
Mode	String	“N+m”
MaxNumSup-ported	Integer	Maximum number of members allowable for this particular redundancy group.
MinNumNeeded	Integer	Minimum number of members needed for this group to be redundant. The value is 2
RedundancyEn-abled	Boolean	Indicate whether redundancy is enabled.
Status	Object	Describes the status and health of the resource and its children.

Field	Type	Description
State	String	This indicates the known state of this redundancy. Valid values: • “Enabled”: This function or resource has been enabled • “Disabled”: This function or resource has been disabled
Health	String	This indicates the health state of this redundancy. Valid values: • "OK": Normal • "Warning": A condition exists that requires attention • "Critical": A critical condition exists that requires immediate attention
RedundancySet	Array	This is the definition for redundancy set. Item count is the number of the Power’s PowerSupplies.
Redundancy-Set[N]	Link	The link to Power’s PowerSupplies.
Voltages	Array	This is the definition for voltage sensors. Item count is the number of voltage sensors in this system.
Voltages[N]	Object	The definition for a voltage sensor.
MemberId	String	Index of this Voltage array
Name	String	Voltage sensor name.
SensorNumber	Number	A numerical identifier to represent the voltage sensor.
Status	Object	Describes the status and health of a resource and its children.
State	String	This indicates the known state of this voltage sensor. Valid values: • “Enabled”: This function or resource has been enabled • “Disabled”: This function or resource has been disabled
ReadingVolts	Number	The current value of the voltage sensor. If the State of this voltage sensor is “disabled”, “ReadingVolts” will be hidden.
UpperThreshold-NonCritical	Number	Above normal range.
UpperThreshold-Critical	Number	Above normal range but not yet fatal.
UpperThreshold-Fatal	Number	Above normal range and is fatal.
LowerThreshold-NonCritical	Number	Below normal range.
LowerThreshold-Critical	Number	Below normal range but not yet fatal.
LowerThreshold-Fatal	Number	Below normal range and is fatal.
MinReading-Range	Number	Minimum value for CurrentReading.
MaxReading-Range	Number	Maximum value for CurrentReading.

Field	Type	Description
PhysicalContext	String	Describes the area or device to which this voltage measurement applies. Always set to “VoltageRegulator”. "VoltageRegulator": A voltage regulator device
RelatedItem	Array	Describes the areas or devices to which this temperature measurement applies. Item count is 2.
RelatedItem[N]	Link	The element of the array provides a link to device applied. One element links to chassis resource. One element links to system resource.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "PowerControl@odata.count": 3,
    "@odata.type": "#Power.v1_6_0.Power",
    "Id": "Power",
    "Redundancy@odata.count": 1,
    "Description": "Power Consumption and Power Limiting",
    "Name": "Power",
    "@odata.id": "/redfish/v1/Chassis/1/Power",
    "PowerSupplies@odata.count": 4,
    "PowerControl": [
        {
            "PowerLimit": {
                "LimitException": "NoAction",
                "LimitInWatts": null
            },
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerControl/0",
            "Status": {
                "HealthRollup": "OK",
                "Health": "OK",
                "State": "Enabled"
            },
            "PhysicalContext": "Chassis",
            "Name": "Server Power Control",
            "PowerMetrics": {
                "IntervalInMin": 1,
                "MinConsumedWatts": 350,
                "MaxConsumedWatts": 359,
                "AverageConsumedWatts": 354
            },
            "PowerAvailableWatts": 0,
            "Oem": {
                "Lenovo": {
                    "PowerUtilization": {
                        "MaxLimitInWatts": 1800,
```

```
                        "EnablePowerCapping": false,
                        "LimitMode": "AC",
                        "EnablePowerCapping@Redfish.Deprecated": "The property is deprecated.
Please use LimitInWatts instead.",
                        "CapacityMinAC": null,
                        "MinLimitInWatts": 0,
                        "GuaranteedInWatts": 65535,
                        "CapacityMinDC": null,
                        "CapacityMaxDC": null,
                        "CapacityMaxAC": null
                    },
                    "HistoryPowerMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerControl/0/Oem/Lenovo/HistoryPowerMetric"
                    },
                    "@odata.type": "#LenovoPower.v1_0_0.PowerControl"
                }
            },
            "RelatedItem@odata.count": 1,
            "PowerCapacityWatts": 1800,
            "PowerAllocatedWatts": 1800,
            "PowerRequestedWatts": null,
            "PowerConsumedWatts": 381,
            "MemberId": "0"
        },
        {
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Systems/1/Processors"
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerControl/1",
            "Status": {
                "HealthRollup": "OK",
                "Health": "OK",
                "State": "Enabled"
            },
            "Name": "CPU Sub-system Power",
            "PhysicalContext": "CPUSubsystem",
            "PowerMetrics": {
                "IntervalInMin": 1,
                "MinConsumedWatts": 0,
                "MaxConsumedWatts": 0,
                "AverageConsumedWatts": 0
            },
            "RelatedItem@odata.count": 1,
            "MemberId": "1",
            "PowerConsumedWatts": 0
        },
        {
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Systems/1/Memory"
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerControl/2",
            "Status": {
                "HealthRollup": "OK",
                "Health": "OK",
                "State": "Enabled"
            },
```

```
            "Name": "Memory Sub-system Power",
            "PhysicalContext": "MemorySubsystem",
            "PowerMetrics": {
                "IntervalInMin": 1,
                "MinConsumedWatts": 0,
                "MaxConsumedWatts": 0,
                "AverageConsumedWatts": 0
            },
            "RelatedItem@odata.count": 1,
            "MemberId": "2",
            "PowerConsumedWatts": 0
        }
    ],
    "Voltages": [
        {
            "MaxReadingRange": 3.32,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Systems/1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/Voltages/0",
            "Status": {
                "State": "Enabled"
            },
            "SensorNumber": 3,
            "Name": "CMOS Battery",
            "PhysicalContext": "VoltageRegulator",
            "RelatedItem@odata.count": 2,
            "LowerThresholdCritical": 2.25,
            "MinReadingRange": null,
            "ReadingVolts": 3.07,
            "MemberId": "0",
            "LowerThresholdNonCritical": 2.39
        },
        {
            "MaxReadingRange": 3.98,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Systems/1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/Voltages/1",
            "Status": {
                "State": "Enabled"
            },
            "SensorNumber": 160,
            "Name": "SysBrd 3.3V",
            "PhysicalContext": "VoltageRegulator",
            "RelatedItem@odata.count": 2,
            "LowerThresholdCritical": 2.96,
            "MinReadingRange": null,
            "ReadingVolts": 3.4,
            "UpperThresholdCritical": 3.63,
            "MemberId": "1"
```

```
        },
        {
            "MaxReadingRange": 5.87,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Systems/1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/Voltages/2",
            "Status": {
                "State": "Enabled"
            },
            "SensorNumber": 161,
            "Name": "SysBrd 5V",
            "PhysicalContext": "VoltageRegulator",
            "RelatedItem@odata.count": 2,
            "LowerThresholdCritical": 4.51,
            "MinReadingRange": null,
            "ReadingVolts": 5.01,
            "UpperThresholdCritical": 5.5,
            "MemberId": "2"
        },
        {
            "MaxReadingRange": 14.03,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Systems/1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/Voltages/3",
            "Status": {
                "State": "Enabled"
            },
            "SensorNumber": 162,
            "Name": "SysBrd 12V",
            "PhysicalContext": "VoltageRegulator",
            "RelatedItem@odata.count": 2,
            "LowerThresholdCritical": 10.62,
            "MinReadingRange": null,
            "ReadingVolts": 11.83,
            "UpperThresholdCritical": 13.2,
            "MemberId": "3"
        }
    ],
    "Oem": {
        "Lenovo": {
            "RandomDelay": false,
            "@odata.type": "#LenovoPower.v1_0_0.Capabilities",
            "LocalPowerControlEnabled": true,
            "PowerOnPermissionEnabled": true,
            "PowerRestorePolicy": "Restore",
            "WakeOnLANEnabled": true
        }
    },
    "Voltages@odata.count": 4,
```

```
"@odata.etag": "\"47c8335ea313f33bb9b799\"",
"Redundancy": [
    {
        "@odata.id": "/redfish/v1/Chassis/1/Power#/Redundancy/0",
        "Status": {
            "State": "Enabled",
            "Health": "OK"
        },
        "Name": "PSU Redundancy",
        "RedundancySet": [
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/0"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/1"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/2"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/3"
            }
        ],
        "Oem": {
            "Lenovo": {
                "NonRedundantAvailablePower": 1800,
                "PowerRedundancySettings": {
                    "EstimatedUsage": null,
                    "MaxPowerLimitWatts": 1800,
                    "PowerRedundancyPolicy": "RedundantWithThrottling",
                    "PowerFailureLimit": 0
                },
                "@odata.type": "#LenovoRedundancy.v1_0_0.LenovoRedundancyProperties"
            }
        },
        "RedundancyEnabled": true,
        "MemberId": "0",
        "RedundancySet@odata.count": 4,
        "MaxNumSupported": 2,
        "Mode": "N+m",
        "MinNumNeeded": 2
    }
],
"PowerSupplies": [
    {
        "SerialNumber": "D1DG94C009Z",
        "InputRanges": [
            {
                "InputType": "AC",
                "OutputWattage": 1800,
                "MaximumVoltage": 240,
                "MinimumVoltage": 200
            }
        ],
        "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/0",
        "PowerOutputWatts": 353,
        "RelatedItem@odata.count": 1,
        "PowerInputWatts": 381,
        "LastPowerOutputWatts": 356,
        "Location": {
            "PartLocation": {
```

```
                    "LocationType": "Slot",
                    "ServiceLabel": "PSU1",
                    "LocationOrdinalValue": 1
                }
            },
            "FirmwareVersion": "6.11",
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "EfficiencyPercent": 92,
            "Status": {
                "State": "Enabled",
                "Health": "OK"
            },
            "LineInputVoltage": 220,
            "Name": "PSU1",
            "PowerCapacityWatts": 1800,
            "MemberId": "0",
            "Oem": {
                "Lenovo": {
                    "HistoryPowerSupplyMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerSupplies/0/Oem/Lenovo/HistoryPowerSupplyMetric"
                    },
                    "Location": {
                        "Info": "Slot 1",
                        "InfoFormat": "Slot X"
                    },
                    "Location@Redfish.Deprecated": "The property is deprecated.
Please use Location instead.",
                    "FruPartNumber": "03T8714",
                    "@odata.type": "#LenovoPower.v1_0_0.PowerSupply"
                }
            },
            "HotPluggable": false,
            "PowerSupplyType": "AC",
            "Manufacturer": "DETA",
            "LineInputVoltageType": "ACMidLine",
            "Model": "LENOVO-SP57A14705",
            "PartNumber": "SP57A14705"
        },
        {
            "SerialNumber": null,
            "InputRanges": [
                {
                    "InputType": null,
                    "OutputWattage": null,
                    "MaximumVoltage": null,
                    "MinimumVoltage": null
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/1",
            "PowerOutputWatts": null,
            "RelatedItem@odata.count": 1,
            "PowerInputWatts": null,
            "PartNumber": null,
            "LastPowerOutputWatts": null,
            "FirmwareVersion": null,
            "RelatedItem": [
```

```
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "EfficiencyPercent": null,
            "Status": {
                "State": "Absent",
                "Health": null
            },
            "LineInputVoltage": null,
            "Name": "PSU2",
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PSU2",
                    "LocationOrdinalValue": 2
                }
            },
            "PowerCapacityWatts": null,
            "Oem": {
                "Lenovo": {
                    "HistoryPowerSupplyMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerSupplies/1/Oem/Lenovo/HistoryPowerSupplyMetric"
                    },
                    "Location": {
                        "Info": "Slot 2",
                        "InfoFormat": "Slot X"
                    },
                    "Location@Redfish.Deprecated": "The property is deprecated.
Please use Location instead.",
                    "FruPartNumber": null,
                    "@odata.type": "#LenovoPower.v1_0_0.PowerSupply"
                }
            },
            "HotPluggable": null,
            "PowerSupplyType": null,
            "Manufacturer": null,
            "LineInputVoltageType": null,
            "Model": null,
            "MemberId": "1"
        },
        {
            "SerialNumber": null,
            "InputRanges": [
                {
                    "InputType": null,
                    "OutputWattage": null,
                    "MaximumVoltage": null,
                    "MinimumVoltage": null
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/2",
            "PowerOutputWatts": null,
            "RelatedItem@odata.count": 1,
            "PowerInputWatts": null,
            "PartNumber": null,
            "PowerSupplyType": null,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
```

```
                }
            ],
            "FirmwareVersion": null,
            "EfficiencyPercent": null,
            "Status": {
                "State": "Absent",
                "Health": null
            },
            "LineInputVoltage": null,
            "Name": "PSU3",
            "PowerCapacityWatts": null,
            "LastPowerOutputWatts": null,
            "Oem": {
                "Lenovo": {
                    "HistoryPowerSupplyMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerSupplies/2/Oem/Lenovo/HistoryPowerSupplyMetric"
                    },
                    "Location": {
                        "Info": "Slot 3",
                        "InfoFormat": "Slot X"
                    },
                    "Location@Redfish.Deprecated":
"The property is deprecated. Please use Location instead.",
                    "FruPartNumber": null,
                    "@odata.type": "#LenovoPower.v1_0_0.PowerSupply"
                }
            },
            "HotPluggable": null,
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PSU3",
                    "LocationOrdinalValue": 3
                }
            },
            "Manufacturer": null,
            "LineInputVoltageType": null,
            "Model": null,
            "MemberId": "2"
        },
        {
            "SerialNumber": null,
            "InputRanges": [
                {
                    "InputType": null,
                    "OutputWattage": null,
                    "MaximumVoltage": null,
                    "MinimumVoltage": null
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/3",
            "PowerOutputWatts": null,
            "RelatedItem@odata.count": 1,
            "PowerInputWatts": null,
            "PartNumber": null,
            "FirmwareVersion": null,
            "MemberId": "3",
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
```

```
                }
            ],
            "EfficiencyPercent": null,
            "Status": {
                "State": "Absent",
                "Health": null
            },
            "LineInputVoltage": null,
            "Name": "PSU4",
            "LastPowerOutputWatts": null,
            "PowerCapacityWatts": null,
            "Oem": {
                "Lenovo": {
                    "HistoryPowerSupplyMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerSupplies/3/Oem/Lenovo/HistoryPowerSupplyMetric"
                    },
                    "Location": {
                        "Info": "Slot 4",
                        "InfoFormat": "Slot X"
                    },
                    "Location@Redfish.Deprecated":
"The property is deprecated. Please use Location instead.",
                    "FruPartNumber": null,
                    "@odata.type": "#LenovoPower.v1_0_0.PowerSupply"
                }
            },
            "HotPluggable": null,
            "PowerSupplyType": null,
            "Manufacturer": null,
            "LineInputVoltageType": null,
            "Model": null,
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PSU4",
                    "LocationOrdinalValue": 4
                }
            }
        }
    ]
}
```


PATCH – Update power management properties

Use the PATCH method to update properties in Power resource for Redfish service.

Note: This setting is not supported on following systems: Flex and high dense systems, AMD-based systems and systems with tier level less than 3.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/Chassis/1/Power`

Request body

Properties to be updated are shown as below, all of these properties can be changed individually.

Field	Type	Description
PowerControl	Object	Expanded.
PowerLimit	Object	Expanded.
LimitInWatts	Number	The Power limit in watts. Null means power capping disabled

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
400	PropertyValueTypeError, Conflict
500	InternalError

Example

The following example is PATCH body.

```
{
    "PowerControl": [
        {
            "PowerLimit": {
                "LimitInWatts": 800
            }
        }
    ]
}
```

After the PATCH operation runs successfully, querying the Power resource returns below example JSON response:

```
{
    "PowerControl@odata.count": 3,
    "PowerSupplies": [
        {
            "SerialNumber": "D1DG94C006R",
            "InputRanges": [
                {
                    "InputType": "AC",
                    "OutputWattage": 1800,
                    "MaximumVoltage": 240,
                    "MinimumVoltage": 200
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/0",
            "PowerOutputWatts": 69,
            "RelatedItem@odata.count": 1,
            "MemberId": "0",
            "PartNumber": "SP57A14705",
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PSU1",
                    "LocationOrdinalValue": 1
                }
            },
```

```
            "LineInputVoltageType": "ACMidLine",
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "EfficiencyPercent": 80,
            "Status": {
                "State": "Enabled",
                "Health": "OK"
            },
            "LineInputVoltage": 220,
            "Name": "PSU1",
            "LastPowerOutputWatts": 10,
            "FirmwareVersion": "6.11",
            "Oem": {
                "Lenovo": {
                    "HistoryPowerSupplyMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerSupplies/0/Oem/Lenovo/HistoryPowerSupplyMetric"
                    },
                    "Location": {
                        "Info": "Slot 1",
                        "InfoFormat": "Slot X"
                    },
                    "Location@Redfish.Deprecated":
"The property is deprecated. Please use Location instead.",
                    "FruPartNumber": "03T8714",
                    "@odata.type": "#LenovoPower.v1_0_0.PowerSupply"
                }
            },
            "HotPluggable": false,
            "PowerInputWatts": 86,
            "Manufacturer": "DETA",
            "PowerSupplyType": "AC",
            "Model": "LENOVO-SP57A14705",
            "PowerCapacityWatts": 1800
        },
        {
            "SerialNumber": null,
            "InputRanges": [
                {
                    "InputType": null,
                    "OutputWattage": null,
                    "MaximumVoltage": null,
                    "MinimumVoltage": null
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/1",
            "PowerOutputWatts": null,
            "RelatedItem@odata.count": 1,
            "MemberId": "1",
            "PartNumber": null,
            "LineInputVoltageType": null,
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PSU2",
                    "LocationOrdinalValue": 2
                }
            },
```

```
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "EfficiencyPercent": null,
            "Status": {
                "State": "Absent",
                "Health": null
            },
            "LineInputVoltage": null,
            "Name": "PSU2",
            "FirmwareVersion": null,
            "LastPowerOutputWatts": null,
            "Oem": {
                "Lenovo": {
                    "HistoryPowerSupplyMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerSupplies/1/Oem/Lenovo/HistoryPowerSupplyMetric"
                    },
                    "Location": {
                        "Info": "Slot 2",
                        "InfoFormat": "Slot X"
                    },
                    "Location@Redfish.Deprecated":
"The property is deprecated. Please use Location instead.",
                    "FruPartNumber": null,
                    "@odata.type": "#LenovoPower.v1_0_0.PowerSupply"
                }
            },
            "HotPluggable": null,
            "PowerCapacityWatts": null,
            "Manufacturer": null,
            "PowerSupplyType": null,
            "Model": null,
            "PowerInputWatts": null
        },
        {
            "SerialNumber": null,
            "InputRanges": [
                {
                    "InputType": null,
                    "OutputWattage": null,
                    "MaximumVoltage": null,
                    "MinimumVoltage": null
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/2",
            "PowerOutputWatts": null,
            "RelatedItem@odata.count": 1,
            "MemberId": "2",
            "PartNumber": null,
            "LineInputVoltageType": null,
            "PowerInputWatts": null,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "EfficiencyPercent": null,
            "Status": {
```

```
                "State": "Absent",
                "Health": null
            },
            "LineInputVoltage": null,
            "Name": "PSU3",
            "FirmwareVersion": null,
            "LastPowerOutputWatts": null,
            "Oem": {
                "Lenovo": {
                    "HistoryPowerSupplyMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerSupplies/2/Oem/Lenovo/HistoryPowerSupplyMetric"
                    },
                    "Location": {
                        "Info": "Slot 3",
                        "InfoFormat": "Slot X"
                    },
                    "Location@Redfish.Deprecated":
"The property is deprecated. Please use Location instead.",
                    "FruPartNumber": null,
                    "@odata.type": "#LenovoPower.v1_0_0.PowerSupply"
                }
            },
            "HotPluggable": null,
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PSU3",
                    "LocationOrdinalValue": 3
                }
            },
            "Manufacturer": null,
            "PowerSupplyType": null,
            "Model": null,
            "PowerCapacityWatts": null
        },
        {
            "SerialNumber": null,
            "InputRanges": [
                {
                    "InputType": null,
                    "OutputWattage": null,
                    "MaximumVoltage": null,
                    "MinimumVoltage": null
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/3",
            "PowerOutputWatts": null,
            "RelatedItem@odata.count": 1,
            "MemberId": "3",
            "PartNumber": null,
            "LineInputVoltageType": null,
            "FirmwareVersion": null,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "EfficiencyPercent": null,
            "Status": {
                "State": "Absent",
```

```
                "Health": null
            },
            "LineInputVoltage": null,
            "Name": "PSU4",
            "LastPowerOutputWatts": null,
            "PowerInputWatts": null,
            "Oem": {
                "Lenovo": {
                    "HistoryPowerSupplyMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerSupplies/3/Oem/Lenovo/HistoryPowerSupplyMetric"
                    },
                    "Location": {
                        "Info": "Slot 4",
                        "InfoFormat": "Slot X"
                    },
                    "Location@Redfish.Deprecated":
"The property is deprecated. Please use Location instead.",
                    "FruPartNumber": null,
                    "@odata.type": "#LenovoPower.v1_0_0.PowerSupply"
                }
            },
            "HotPluggable": null,
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PSU4",
                    "LocationOrdinalValue": 4
                }
            },
            "Manufacturer": null,
            "PowerSupplyType": null,
            "Model": null,
            "PowerCapacityWatts": null
        }
    ],
    "Id": "Power",
    "Redundancy@odata.count": 1,
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoPower.v1_0_0.Capabilities",
            "LocalPowerControlEnabled": true,
            "PowerOnPermissionEnabled": true,
            "PowerRestorePolicy": "Restore",
            "WakeOnLANEnabled": true
        }
    },
    "Name": "Power",
    "@odata.id": "/redfish/v1/Chassis/1/Power",
    "PowerSupplies@odata.count": 4,
    "PowerControl": [
        {
            "PowerLimit": {
                "LimitException": "NoAction",
                "LimitInWatts": 1000
            },
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
```

```
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerControl/0",
            "Status": {
                "HealthRollup": "OK",
                "Health": "OK",
                "State": "Enabled"
            },
            "PowerAllocatedWatts": 1800,
            "Name": "Server Power Control",
            "PowerAvailableWatts": 0,
            "PhysicalContext": "Chassis",
            "PowerMetrics": {
                "IntervalInMin": 1,
                "MinConsumedWatts": 8,
                "MaxConsumedWatts": 11,
                "AverageConsumedWatts": 10
            },
            "RelatedItem@odata.count": 1,
            "MemberId": "0",
            "Oem": {
                "Lenovo": {
                    "PowerUtilization": {
                        "MaxLimitInWatts": 1800,
                        "EnablePowerCapping": true,
                        "LimitMode": "AC",
                        "EnablePowerCapping@Redfish.Deprecated":
"The property is deprecated. Please use LimitInWatts instead.",
                        "CapacityMinAC": 190,
                        "MinLimitInWatts": 0,
                        "GuaranteedInWatts": 190,
                        "CapacityMinDC": 172,
                        "CapacityMaxDC": 396,
                        "CapacityMaxAC": 426
                    },
                    "HistoryPowerMetric": {
                        "@odata.id":
"/redfish/v1/Chassis/1/Power/PowerControl/0/Oem/Lenovo/HistoryPowerMetric"
                    },
                    "@odata.type": "#LenovoPower.v1_0_0.PowerControl"
                }
            },
            "PowerRequestedWatts": 426,
            "PowerConsumedWatts": 18,
            "PowerCapacityWatts": 1800
        },
        {
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Systems/1/Processors"
                }
            ],
            "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerControl/1",
            "Status": {
                "HealthRollup": "OK",
                "Health": "OK",
                "State": "Enabled"
            },
            "Name": "CPU Sub-system Power",
            "PhysicalContext": "CPUSubsystem",
            "PowerMetrics": {
                "IntervalInMin": 1,
                "MinConsumedWatts": 0,
```

```
            "MaxConsumedWatts": 0,
            "AverageConsumedWatts": 0
        },
        "RelatedItem@odata.count": 1,
        "MemberId": "1",
        "PowerConsumedWatts": 0
    },
    {
        "RelatedItem": [
            {
                "@odata.id": "/redfish/v1/Systems/1/Memory"
            }
        ],
        "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerControl/2",
        "Status": {
            "HealthRollup": "OK",
            "Health": "OK",
            "State": "Enabled"
        },
        "Name": "Memory Sub-system Power",
        "PhysicalContext": "MemorySubsystem",
        "PowerMetrics": {
            "IntervalInMin": 1,
            "MinConsumedWatts": 0,
            "MaxConsumedWatts": 0,
            "AverageConsumedWatts": 0
        },
        "RelatedItem@odata.count": 1,
        "MemberId": "2",
        "PowerConsumedWatts": 0
    }
],
"Voltages": [
    {
        "MaxReadingRange": 3.32,
        "RelatedItem": [
            {
                "@odata.id": "/redfish/v1/Systems/1"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1"
            }
        ],
        "@odata.id": "/redfish/v1/Chassis/1/Power#/Voltages/0",
        "Status": {
            "State": "Enabled"
        },
        "SensorNumber": 3,
        "Name": "CMOS Battery",
        "PhysicalContext": "VoltageRegulator",
        "RelatedItem@odata.count": 2,
        "MemberId": "0",
        "MinReadingRange": null,
        "LowerThresholdNonCritical": 2.39,
        "ReadingVolts": 3.07,
        "LowerThresholdCritical": 2.25
    },
    {
        "MaxReadingRange": 3.98,
        "RelatedItem": [
            {
```

```
            "@odata.id": "/redfish/v1/Systems/1"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    ],
    "@odata.id": "/redfish/v1/Chassis/1/Power#/Voltages/1",
    "Status": {
        "State": "Enabled"
    },
    "SensorNumber": 160,
    "Name": "SysBrd 3.3V",
    "PhysicalContext": "VoltageRegulator",
    "RelatedItem@odata.count": 2,
    "LowerThresholdCritical": 2.96,
    "MinReadingRange": null,
    "UpperThresholdCritical": 3.63,
    "ReadingVolts": 3.39,
    "MemberId": "1"
},
{
    "MaxReadingRange": 5.87,
    "RelatedItem": [
        {
            "@odata.id": "/redfish/v1/Systems/1"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    ],
    "@odata.id": "/redfish/v1/Chassis/1/Power#/Voltages/2",
    "Status": {
        "State": "Enabled"
    },
    "SensorNumber": 161,
    "Name": "SysBrd 5V",
    "PhysicalContext": "VoltageRegulator",
    "RelatedItem@odata.count": 2,
    "LowerThresholdCritical": 4.51,
    "MinReadingRange": null,
    "UpperThresholdCritical": 5.5,
    "ReadingVolts": 4.99,
    "MemberId": "2"
},
{
    "MaxReadingRange": 14.03,
    "RelatedItem": [
        {
            "@odata.id": "/redfish/v1/Systems/1"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    ],
    "@odata.id": "/redfish/v1/Chassis/1/Power#/Voltages/3",
    "Status": {
        "State": "Enabled"
    },
    "SensorNumber": 162,
    "Name": "SysBrd 12V",
    "PhysicalContext": "VoltageRegulator",
```

```
            "RelatedItem@odata.count": 2,
            "MemberId": "3",
            "MinReadingRange": null,
            "UpperThresholdCritical": 13.2,
            "ReadingVolts": 11.83,
            "LowerThresholdCritical": 10.62
        }
    ],
    "@odata.type": "#Power.v1_6_0.Power",
    "Voltages@odata.count": 4,
    "@odata.etag": "\"ee6a4e2b17f6176e60f74867634ce2bb\"",
    "Redundancy": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/Power#/Redundancy/0",
            "Status": {
                "State": "Enabled",
                "Health": "OK"
            },
            "Name": "PSU Redundancy",
            "RedundancySet": [
                {
                    "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/0"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/2"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/3"
                }
            ],
            "Oem": {
                "Lenovo": {
                    "NonRedundantAvailablePower": 1800,
                    "PowerRedundancySettings": {
                        "EstimatedUsage": "21.17%",
                        "MaxPowerLimitWatts": 1800,
                        "PowerRedundancyPolicy": "RedundantWithThrottling",
                        "PowerFailureLimit": 0
                    },
                    "@odata.type": "#LenovoRedundancy.v1_0_0.LenovoRedundancyProperties"
                }
            },
            "RedundancyEnabled": true,
            "MemberId": "0",
            "MinNumNeeded": 2,
            "MaxNumSupported": 2,
            "Mode": "N+m",
            "RedundancySet@odata.count": 4
        }
    ],
    "Description": "Power Consumption and Power Limiting"
}
```

Resource Power (Flex System Enterprise Chassis or Lenovo D2 Enclosure)

This resource is used to represent power management (Flex System Enterprise Chassis or Lenovo D2 Enclosure) for a Redfish implementation.

Resource Path	/redfish/v1/Chassis/2/Power
Schema file	Power_v1.xml

GET – Power management properties

Use the GET method to retrieve properties in Power resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/2/Power
```

Request body

None

Response body

Field	Type	Description
Id	String	“Power”.
Name	String	The name of power resource. Always set to “Power”.
Description	String	Power Consumption and Power Limiting
PowerControl	Array	This is the definition for power control function (power reading/ limiting).
PowerControl[1]	Object	This is the base type for addressable members of PowerControl array.
MemberId	String	Index of this PowerControl array.
Name	String	Power Control Function name. Always set to “Server Power Control”.
PowerConsumedWatts	Number	The actual power being consumed by the chassis.
PowerCapacityWatts	Number	The total amount of power available to the chassis for allocation. This may the power supply capacity, or power budget assigned to the chassis from an up-stream chassis.
RelatedItem	Array	An array of links to resource of chassis.
RelatedItem[1]	Link	A reference link to a resource of chassis.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "PowerControl@odata.count": 1,
```

```
    "PowerControl": [
        {
            "Name": "Server Power Control",
            "RelatedItem@odata.count": 1,
            "@odata.id": "/redfish/v1/Chassis/2/Power#/PowerControl/0",
            "MemberId": "0",
            "PowerCapacityWatts": 200,
            "PowerConsumedWatts": 150,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Chassis/2"
                }
            ]
        }
    ],
    "@odata.type": "#Power.v1_5_3.Power",
    "Id": "Power",
    "@odata.id": "/redfish/v1/Chassis/2/Power",
    "@odata.etag": "\"e6e56474dde0e18185c641e587ca1790\"",
    "Name": "Power",
    "Description": "Power Consumption and Power Limiting"
}
```


Resource Thermal

This resource is used to represent thermal management for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/Chassis/1/Thermal
Schema file	Thermal_v1.xml

GET – Thermal management properties

Use the GET method to retrieve properties in Thermal resource for a server.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/Thermal`

Request body

None

Response body

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

Field	Type	Description
Id	String	Uniquely identifies the resource within the thermal resource. Always set to “1”.
Name	String	The name of thermal resource. Always sets to “Thermal”.
Description	String	Provides a description of the thermal resource.
Status	Object	Describes the status and health of a resource and its children.
State	String	This indicates the known state of the resource, such as if it is enabled.

Field	Type	Description
HealthRollup	String	This represents the overall health state from the view of this resource.
Temperatures	Array	This is the definition for temperature sensors.
Temperatures[1]	Object	This is the definition for a specified temperature sensor.
MemberId	String	This is the identifier for the member within the collection.
Name	String	The name of this temperature sensor.
LowerThresholdCritical	Number	Below normal range but not yet fatal.
LowerThresholdFatal	Number	Below normal range and is fatal.
LowerThresholdNonCritical	Number	Below normal range.
UpperThresholdCritical	Number	Above normal range but not yet fatal.
UpperThresholdFatal	Number	Above normal range and is fatal.
UpperThresholdNonCritical	Number	Above normal range.
MinReadingRangeTemp	Number	Minimum value for ReadingCelsius.
MaxReadingRangeTemp	Number	Maximum value for ReadingCelsius.
PhysicalContext	String	Describes the area or device to which this temperature measurement applies.
ReadingCelsius	Number	Temperature.
RelatedItem	Array	Describes the areas or devices to which this temperature measurement applies.
RelatedItem[N]	Link	The element of the array provides a link to device applied. One element links to chassis resource. One element links to system resource. If the PhysicalContext is “CPU”, the array will contain an element links to related processor resource.
SensorNumber	Number	A numerical identifier to represent the temperature sensor.
Status	Object	Describes the status and health of a resource and its children.
State	String	This indicates the known state of the resource, such as if it is enabled.
Fans	Array	This is the definition for fans.
Fan[N]	Object	This is the definition for a specified fan.
MemberId	String	This is the identifier for the member within the collection.
Name	String	Name of the fan.
MaxReadingRange	Number	Maximum value for Reading.
MinReadingRange	Number	Minimum value for Reading.
PhysicalContext	String	Describes the area or device associated with this fan.
Reading	Number	Current fan speed.
ReadingUnits	String	Units in which the reading and thresholds are measured. Always set to “RPM”.
RelatedItem	Array	Describes the areas or devices to which this temperature measurement applies.

Field	Type	Description
RelatedItem[N]	Link	The element of the array provides a link to device applied. One element links to chassis resource. One element links to system resource.
Status	Object	Describes the status and health of a resource and its children.
State	String	This indicates the known state of the resource, such as if it is enabled.
Health	String	This represents the health state of this resource in the absence of its dependent resources.
UpperThresholdCritical	Number	Above normal range but not yet fatal.
UpperThresholdFatal	Number	Above normal range and is fatal.
UpperThresholdNonCritical	Number	Above normal range.
LowerThresholdCritical	Number	Below normal range but not yet fatal.
LowerThresholdFatal	Number	Below normal range and is fatal.
LowerThresholdNonCritical	Number	Below normal range.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Fans": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/0",
            "ReadingUnits": "RPM",
            "PhysicalContext": "SystemBoard",
            "LowerThresholdFatal": null,
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "Fan 1 Tach",
                    "LocationOrdinalValue": 1
                }
            },
            "UpperThresholdCritical": null,
            "MaxReadingRange": 18360,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Systems/1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "LowerThresholdCritical": 3,
            "Status": {
                "State": "Enabled",
                "Health": "OK"
            },
```

```
            "FanName": "Fan 1 Tach",
            "Name": "Fan 1 Tach",
            "Reading": 0,
            "UpperThresholdNonCritical": null,
            "Oem": {
                "Lenovo": {
                    "Location": {
                        "InfoFormat@Redfish.Deprecated": "The property is deprecated. Please use
PartLocation instead.",
                        "InfoFormat": "Slot X",
                        "Info": "Slot 1",
                        "Info@Redfish.Deprecated": "The property is deprecated. Please use PartLocation
instead."
                    }
                }
            },
            "HotPluggable": true,
            "MinReadingRange": 0,
            "MemberId": "0",
            "LowerThresholdNonCritical": null,
            "SensorNumber": 65,
            "UpperThresholdFatal": null
        }
        …
        …
    ],
    "@odata.id": "/redfish/v1/Chassis/1/Thermal",
    "Status": {
        "State": "Enabled",
        "HealthRollup": "OK"
    },
    "Name": "Thermal",
    "Id": "1",
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoThermal.v1_0_0.Thermal",
            "HistoryTempMetric": {
                "@odata.id": "/redfish/v1/Chassis/1/Thermal/Oem/Lenovo/HistoryTempMetric"
            }
        }
    },
    "@odata.type": "#Thermal.v1_5_3.Thermal",
    "Temperatures": [
        {
            "PhysicalContext": "Intake",
            "LowerThresholdCritical": null,
            "RelatedItem": [
                {
                    "@odata.id": "/redfish/v1/Systems/1"
                },
                {
                    "@odata.id": "/redfish/v1/Chassis/1"
                }
            ],
            "UpperThresholdFatal": 50,
            "Status": {
                "State": "Enabled"
            },
            "SensorNumber": 49,
            "Name": "Ambient Temp",
            "MaxReadingRangeTemp": 100,
```

```
            "UpperThresholdNonCritical": 43,
            "UpperThresholdCritical": 47,
            "LowerThresholdNonCritical": null,
            "MemberId": "0",
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Temperatures/0",
            "MinReadingRangeTemp": 0,
            "LowerThresholdFatal": null,
            "ReadingCelsius": 43
        }
        …
        …
    ],
    "Temperatures@odata.count": 40,
    "@odata.etag": "\"d605f76ecfe4632cb9e370\"",
    "Fans@odata.count": 5,
    "Description": "It represents the properties for Temperature and Cooling."
}
```

Chapter 8. BMC Management

Resource Manager

This resource is used to represent manager for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/Managers/1
Schema file	Manager_v1.xml

GET – BMC management properties

Use the GET method to retrieve properties in manager resource for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Managers/1`

Request body

None

Response body

Field	Type	Description
Id	String	Always set to 1.
Name	String	“Manager”.
Actions	Object	Expanded.
#Manager.Reset	Object	Expanded.
ResetType@Redfish.AllowableValues	Array	Items: string Item count: 2
ResetType@Redfish.AllowableValues[0]	String	“GracefulRestart”. It indicates bmc will be restart in a graceful way.
ResetType@Redfish.AllowableValues[1]	String	“ForceRestart”. It indicates bmc will be restart right away.
#Manager.ResetToDefaults	Object	Expanded
ResetType@Redfish.AllowableValues	Array	Items: string Item count: 1
ResetType@Redfish.AllowableValues[0]	String	“ResetAll”. Reset all settings to factory defaults.
AutoDSTEnabled	Boolean	true, false
CommandShell	Object	Expanded.
ServiceEnabled	Boolean	True, if SSH is enabled. False, if SSH is disabled.

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Field	Type	Description
MaxConcurrentSessions	Integer	2
ConnectTypesSupported	Array	SSH. Currently only SSH is supported.
DateTime	String	The current DateTime (with offset) for the manager, used to set or read time.
DateTimeLocalOffset	String	The time offset from UTC that the DateTime property is set to in format: +06:00 .
Description	String	This resource is used to represent a management subsystem for a Redfish implementation.
GraphicalConsole	Object	Expanded.
ServiceEnabled	Boolean	True, if FOD key is installed.
MaxConcurrentSessions	Integer	6.
ConnectTypesSupported	Array	Items: string. Item count: 1.
ConnectTypesSupported[0]	String	“KVMIP”.
ManagerType	String	This property represents the type of manager that this resource represents. This property represents the type of manager that this resource represents. The value is “BMC (A controller which provides management functions for a single computer system)”.
Model	String	The model information of this Manager as defined by the manufacturer. The value is “Lenovo XClarity Controller”.
EthernetInterfaces	Link	A link to a URI reference to collection of Ethernet interface. This is a reference to a collection of NICs that this manager uses for network communication.
HostInterfaces	Link	A link to a URI reference to collection of host interface. This is a reference to a collection of NICs that host uses for network communication.
LogServices	Link	A link to a URI reference to collection of log service which is a collection of Logs used by the manager.
NetworkProtocol	Link	A link to a URI reference to collection of network protocol which is a reference to network services and their settings that the manager controls.
SerialInterfaces	Link	A link to a URI reference to collection of serial interface that this manager uses for serial and console communication.
VirtualMedia	Link	A link to a URI reference to collection of virtual media which are for the use of this manager.
FirmwareVersion	String	Firmware version of this Manager.
Links	Object	References to resources that are related to, but not contained by (subordinate to) this resource.
ManagerForChassis	Array	An array of references to the chassis that this manager has control over."
ManagerForChassis[0]	Link	The value of this property is a URI reference to a resource of chassis.
ManagerForChassis@odata.count	Int	1

Field	Type	Description
ManagerForServers	Array	An array of references to the systems that this manager has control over.
ManagerForServers[0]	Link	The value of this property is a URI reference to a resource of computer system.
ManagerForServers@odata.count	Int	1
ActiveSoftwareImage	Link	The value of this property is a URI reference to a resource of firmware inventory.
SoftwareImages	Array	Items: link Item count: 2
SoftwareImages[N]	Link	The value of this property is a URI reference to a resource of firmware inventory.
SoftwareImages.@odata.count	Int	2
PowerState	Object	The value of this property indicates power state. It is always “On”.
SerialConsole	Object	Expanded.
ConnectTypesSupported	Array	Items: string. Item count: 2.
ConnectTypesSupported[0]	String	“IPMI”.
ConnectTypesSupported[1]	String	“SSH”.
MaxConcurrentSessions	Integer	2.
ServiceEnabled	Boolean	True, if SSH is enabled. False, if SSH is disabled.
ServiceEntryPointUUID	String	The value of this property indicates UUID of service entry point.
Status	Object	Expanded.
State	String	The value of this property indicates state of manager. It is always “Enabled”.
UUID	String	The value of this property indicates UUID of manager.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "DateTimeLocalOffset": "+00:00",
    "Id": "1",
    "AutoDSTEnabled": false,
    "ManagerType": "BMC",
    "NetworkProtocol": {
        "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol"
```

```
},
"Links": {
    "ActiveSoftwareImage": {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/BMC-Primary"
    },
    "SoftwareImages": [
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/BMC-Primary"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
        }
    ],
    "ManagerForServers@odata.count": 1,
    "ManagerForChassis": [
        {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    ],
    "ManagerForServers": [
        {
            "@odata.id": "/redfish/v1/Systems/1"
        }
    ],
    "ManagerForChassis@odata.count": 1,
    "SoftwareImages@odata.count": 2
},
"LogServices": {
    "@odata.id": "/redfish/v1/Systems/1/LogServices"
},
"SerialConsole": {
    "MaxConcurrentSessions": 2,
    "ConnectTypesSupported": [
        "IPMI",
        "SSH"
    ],
    "ServiceEnabled": true
},
"CommandShell": {
    "MaxConcurrentSessions": 2,
    "ConnectTypesSupported": [
        "SSH"
    ],
    "ServiceEnabled": true
},
"HostInterfaces": {
    "@odata.id": "/redfish/v1/Managers/1/HostInterfaces"
},
"VirtualMedia": {
    "@odata.id": "/redfish/v1/Managers/1/VirtualMedia"
},
"SerialInterfaces": {
    "@odata.id": "/redfish/v1/Managers/1/SerialInterfaces"
},
"DateTime": "2021-08-26T16:48:53+00:00",
"Actions": {
    "#Manager.ResetToDefaults": {
        "@Redfish.ActionInfo": "/redfish/v1/Managers/1/ResetToDefaultsActionInfo",
        "target": "/redfish/v1/Managers/1/Actions/Manager.ResetToDefaults",
        "title": "ResetToDefaults",
        "ResetType@Redfish.AllowableValues": [
```

```
                "ResetAll"
            ]
        },
        "#Manager.Reset": {
            "@Redfish.ActionInfo": "/redfish/v1/Managers/1/ResetActionInfo",
            "target": "/redfish/v1/Managers/1/Actions/Manager.Reset",
            "title": "Reset",
            "ResetType@Redfish.AllowableValues": [
                "GracefulRestart",
                "ForceRestart"
            ]
        }
    },
    "FirmwareVersion": "TGBT23K 1.50 2021-07-30",
    "UUID": "3D03A592-79E7-11EA-9029-B1651358D6FA",
    "Status": {
        "State": "Enabled"
    },
    "PowerState": "On",
    "Name": "Manager",
    "Description": "This resource is used to represent a management subsystem for a Redfish implementation.",
    "ServiceEntryPointUUID": "3D03A592-79E7-11EA-9029-B1651358D6FA",
    "Oem": {
        "Lenovo": {
            "ServiceAdvisor": "/redfish/v1/Managers/1/Oem/Lenovo/ServiceAdvisor",
            "AgentlessCapabilities": [
                "RaidLink",
                "OOB_PCIe",
                "RaidLinkConfig",
                "RaidLinkAlert",
                "OOB_PCIe_Config",
                "OOB_Option_Firmware_Update",
                "PreStandardPLDM",
                "StandardPLDM",
                "Storlib",
                "M2"
            ],
            "RemoteControl": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/RemoteControl"
            },
            "ServerProfile": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/ServerProfile"
            },
            "RecipientsSettings": {
                "RetryCount": 5,
                "RetryInterval": 0.5,
                "RntryRetryInterval": 0.5
            },
            "Configuration": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/Configuration"
            },
            "FoD": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/FoD"
            },
            "KCSEnabled": true,
            "Security": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/Security"
            },
            "@odata.type": "#LenovoManager.v1_0_0.LenovoManagerProperties",
            "DateTimeService": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/DateTimeService"
```

```
            },
            "release_name": "whitley_gp_21c",
            "Watchdogs": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/Watchdogs"
            },
            "RemoteMap": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/RemoteMap"
            },
            "ServiceData": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/ServiceData"
            },
            "SecureKeyLifecycleService": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/SecureKeyLifecycleService"
            },
            "OPSettings": {
                "ClientID": null,
                "AuthorizationServerUri": null,
                "SSOState": false,
                "PubKey": null,
                "UserInfoUri": ""
            },
            "Recipients": {
                "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/Recipients"
            }
        }
    },
    "@odata.type": "#Manager.v1_8_0.Manager",
    "GraphicalConsole": {
        "MaxConcurrentSessions": 6,
        "ConnectTypesSupported": [
            "KVMIP"
        ],
        "ServiceEnabled": true
    },
    "@odata.id": "/redfish/v1/Managers/1",
    "@odata.etag": "\"19824603b212f31d5e3a26\"",
    "Model": "Lenovo XClarity Controller",
    "EthernetInterfaces": {
        "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces"
    }
}
```


PATCH – Update BMC time zone and other oem properties

Use the PATCH method to update properties in Manager resource for Redfish service.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1`

Request parameters

Properties to be updated are shown as below, all of these properties can be changed individually.

Field	Type	Description
DateTime-LocalOffset	String	The time offset from UTC that the DateTime property is set to. Allowable values list as follows: “+00:00”, “+01:00”, “+02:00”, “+03:00”, “+03:30”, “+04:00”, “+04:30”, “+05:00”, “+05:30”, “+05:45”, “+06:00”, “+06:30”, “+07:00”, “+08:00”, “+09:00”, “+09:30”, “+10:00”, “+11:00”, “+12:00”, “+13:00”, “-12:00”, “-11:00”, “-10:00”, “-09:00”, “-08:00”, “-07:00”, “-06:00”, “-05:00”, “-04:30”, “-04:00”, “-03:30”, “-03:00”, “-02:00”, “-01:00” This property can’t be patched when DST is enabled or host time is local time.

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.

```
{
    "DateTimeLocalOffset" : "+08:00"
}
```

The resource updated is returned.

```
{
    "DateTimeLocalOffset": "+08 :00",
    "@odata.id": "/redfish/v1/Managers/1",
    …
}
```

POST – BMC reset

Use the POST method to reset the BMC.

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/Managers/1/Actions/Manager.Reset`

Request body

Field	Type	Description
Reset-Type	String	It indicates the reset type for bmc. Valid values: “GracefulRestart", “ForceRestart”

Response body

None

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

The following example is POST body.

```
{
    "ResetType": "GracefulRestart"
}
```

The following example JSON response is returned:

None

POST – BMC reset to factory defaults

Use the POST method to reset BMC to factory defaults.

Request URL

```
POST https://<BMC_IPADDR>/redfish/v1/Managers/1/Actions/Manager.ResetToDefaults
```

Request body

Field	Type	Description
Reset-Type	String	It indicates the reset type for bmc. Valid values: “ResetAll"

Response body

None

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

The following example is POST body.

```
{
    "ResetType": "ResetAll"
}
```

The following example JSON response is returned:

None

Resource SecureKeyLifecycleService

GET – SecureKeyLifecycleService properties

Use the GET method to retrieve properties in SecureKeyLifecycleService resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/Oem/ Lenovo/SecureKeyLifecycleService
```

Request body

None

Response body

Field	Type	Description
Id	String	“SecureKeyLifecycleService”
Description	String	This resource is used to represent a secure key lifecycle service for a Redfish implementation.
Name	String	“SecureKeyLifecycleService”
KeyRepoServers[N]	Object	Expanded **Note:** When the tier level is lower than 2, this object will not be presented.
HostName	String	A remote server address. It can be an IPv4 address, an IPv6 address, a hostname, or a FQDN.
Port	Number	A remote server port. A valid value is from 1 to 65535.
DeviceGroup	String	A string with a maximum length of 16 bytes. **Note:** When the tier level is lower than 2, this property will not be presented.
ClientCertificate	Link	The value of this property is a URI reference to a collection of certificates.
ServerCertificate	Link	The value of this property is a URI reference to a collection of certificates.
Protocol	String	Server protocol. Value: SKLM or KMIP. ST250/SR250/ST50 platform only support SKLM. **Note:** when the tier level is lower than 2, this property will not be presented.
Protocol@Redfish. AllowableValues	Array	Items: string Item count: N
Prtocol@Redfish. AllowableValues[N]	String	Expand This property is “SKLM” and “KMIP”. ST250/SR250/ST50 platform only support “SKLM”.
EKMSLocalCachedKeySettings	Object	Expanded **Note:** This object will not be presented on edge platform.

Field		Type	Description
	LocalCachedKeyEnabled	Boolean	Local cached key enabled status
	CacheExpirationTime	Number	Cache expiration time

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Name": "SecureKeyLifecycleService",
    "EKMSLocalCachedKeySettings": {
        "LocalCachedKeyEnabled": false,
        "CacheExpirationIntervalHours": 1
    },
    "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/SecureKeyLifecycleService",
    "ServerCertificate": {
        "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/SecureKeyLifecycleService/ServerCertificate"
    },
    "Description": "This resource is used to represent a secure key lifecycle service for a Redfish implementation.",
    "Protocol": "SKLM",
    "DeviceGroup": "TKLM_DEV_GROUP",
    "@odata.type": "#LenovoSecureKeyLifecycle.v1_0_0.LenovoSecureKeyLifecycle",
    "Protocol@Redfish.AllowableValues": [
        "SKLM",
        "KMIP"
    ],
    "@odata.etag": "\"71103de0be6a24f03b3\"",
    "@odata.context": "/redfish/v1/$metadata#LenovoSecureKeyLifecycle.LenovoSecureKeyLifecycle",
    "ClientCertificate": {
        "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/SecureKeyLifecycleService/ClientCertificate"
    },
    "KeyRepoServers": [
        {
            "Port": 5696,
            "HostName": ""
        },
        {
            "Port": 5696,
            "HostName": ""
        },
        {
            "Port": 5696,
            "HostName": ""
        },
        {
            "Port": 5696,
            "HostName": ""
        }
    ],
    "Id": "SecureKeyLifecycleService"
}
```

PATCH – Update KeyRepoServers and other properties

Use the PATCH method to update properties in SecureKeyLifecycleService resource for Redfish service.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/Oem/Lenovo/SecureKeyLifecycleService
```

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Error Message ID
KeyRepoServers[N]	Object	Expanded **Note:** When the tier level is lower than 2, this object will not be presented. All the item should be added to the PATCH body.
HostName	String	A remote server address. It can be an IPv4 address, an IPv6 address, a hostname, or a FQDN.
Port	Number	A remote server port. A valid value is from 1 to 65535.
DeviceGroup	String	A string with a maximum length of 16 bytes. **Note:** When the tier level is lower than 2, this property will not be presented.
Protocol	String	Server protocol. Value: SKLM or KMIP. ST250/SR250/ST50 platform only support SKLM. **Note:** When the tier level is lower than 2, this property will not be presented.
EKMSLocalCachedKeySettings	Object	Expanded **Note:** This object will not be presented on edge platform.
LocalCachedKeyEnabled	Boolean	Local cached key enabled status
CacheExpirationTime	Number	Cache expiration time

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.

```
{
```

```
    "KeyRepoServers": [
        {
            "Port": 5696,
            "HostName": ""
        },
        {
            "Port": 5696,
            "HostName": ""
        },
        {
            "Port": 5696,
            "HostName": ""
        },
        {
            "Port": 5696,
            "HostName": ""
        }
    ],
    "EKMSLocalCachedKeySettings": {
        "LocalCachedKeyEnabled": false,
        "CacheExpirationIntervalHours": 1
    },
    "Protocol": "SKLM",
    "DeviceGroup": "TKLM_DEV_GROUP"
}
```

After the PATCH operation runs successfully, querying the resource returns below example JSON response:

```
{
    "Name": "SecureKeyLifecycleService",
    "@odata.type": "#LenovoSecureKeyLifecycle.v1_0_0.LenovoSecureKeyLifecycle",
    "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/SecureKeyLifecycleService",
    "@odata.context": "/redfish/v1/$metadata#LenovoSecureKeyLifecycle.LenovoSecureKeyLifecycle",
    "Description": "This resource is used to represent a secure key lifecycle service for a Redfish implementation.",
    "EKMSLocalCachedKeySettings": {
        "LocalCachedKeyEnabled": false,
        "CacheExpirationIntervalHours": 1
    },
    "KeyRepoServers": [
        {
            "Port": 5696,
            "HostName": ""
        },
        {
            "Port": 5696,
            "HostName": ""
        },
        {
            "Port": 5696,
            "HostName": ""
        },
        {
            "Port": 5696,
            "HostName": ""
        }
    ],
    "@odata.etag": "\"711O3deObe6a24fO3b3\"",
    "ServerCertificate": {
        "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/SecureKeyLifecycleService/ServerCertificate"
    },
    "DeviceGroup": "TKLM_DEV_GROUP",
```

```
    "Protocol@Redfish.AllowableValues": [
        "SKLM",
        "KMIP"
    ],
    "Protocol": "SKLM",
    "ClientCertificate": {
        "@odata.id": "/redfish/v1/Managers/1/Oem/Lenovo/SecureKeyLifecycleService/ClientCertificate"
    },
    "Id": "SecureKeyLifecycleService"
}
```

Resource LicenseService

This resource shall represent a license service and the properties that affect the service itself for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/LicenseService
Schema file	LicenseService_v1.xml

GET – LicenseService properties

Use the GET method to retrieve properties in LicenseService resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/LicenseService
```

Request body

None

Response body

Field	Type	Description
Id	String	“LicenseService”
Name	String	“License Service”
Description	String	This resource is used to represent a License service for a Redfish implementation.
ServiceEnabled	Boolean	Always true
LicenseExpirationWarningDays	Integer	Always 0
Licenses	Link	Link to LicenseCollection

Resource License

This Resource is used to represent License for a Redfish implementation.

Number of Resources	0 ~ 2
Resource Path	/redfish/v1/LicenseService/Licenses/{Id}
Schema file	LicenseCollection_v1.xml LicenseService_v1.xml

GET – Collection of License

Use the GET method to retrieve the properties License collection resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/LicenseService/Licenses
```

Request body

None

Response body

Field	Type	Description
Description	String	A collection of Licenses resource instances.
Name	String	“LicenseCollection”
Members	Array	The members of this collection.
Members[N]	Link	Reference Licenses schema for instance number.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "@odata.etag": "\"30631cb877892a27df1\"",
    "Name": "LicenseCollection",
    "@odata.type": "#LicenseCollection.LicenseCollection",
    "@odata.id": "/redfish/v1/LicenseService/Licenses",
    "Description": "A collection of Licenses resource instances.",
    "@odata.context": "/redfish/v1/$metadata#LicenseCollection.LicenseCollection",
    "Members@odata.count": 2,
    "Members": [
        {
            "@odata.id": "/redfish/v1/LicenseService/Licenses/VROC_VMD"
        },
        {
            "@odata.id": "/redfish/v1/LicenseService/Licenses/XCC_Advanced"
        }
    ]
}
```

GET – License Properties

Use the GET method to retrieve the XCC_Advanced/XCC_Enterprised info.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/LicenseService/Licenses/XCC_Advanced|XCC_Enterprised
```

Request body

None

Response body

Field	Type	Description
Id	String	“XCC_Advanced” or “XCC_Enterprised”
Name	String	“Lenovo XClarity Controller Advanced Upgrade ” or “Lenovo XClarity Controller Enterprise Upgrade ”
Description	String	This resource is used to represent a license for a Redfish implementation.
LicenseType	String	“Production”
LicenseOrigin	String	“Installed” or “BuiltIn”
ExpirationDate	String	The expiration date of the license. If no constraints, show “null”
Removable	Boolean	The value is true, if "LincenseOrigin" equals to "Installed"; The value is false if "LincenseOrigin" equals to "BuiltIn".
Manufacturer	String	Lenovo
LicenseString	String	Null
EntitlementId	String	Machine type plus Serial No.
AuthorizationScope	String	“Service”
RemainingUseCount	Integer	Always 0
DownloadURI	String	"/LicenseDownload/license_XCC_Advanced" or “/LicenseDownload/license_ XCC_Enterprised”
Status	Object	Expanded
State	String	Mapping with Key status 0 : “Enabled”; Others: “Disabled”
Health	String	“OK”
Links	Object	Expanded
AuthorizedDevices	Link	empty

Status code

HTTP Status Code	Error Message ID
400	BadRequest
500	InternalError

Example

The following example JSON response is returned:

XCC_Advanced license:

```
{
    "Links": {
```

```
        "AuthorizedDevices": []
    },
    "Oem": {
        "Lenovo": {
            "DescTypeCode": 52,
            "IdTypes": [
                "MTSN"
            ],
            "@odata.type": "#LenovoLicense.v1_0_0.LenovoLicense"
        }
    },
    "AuthorizationScope": "Service",
    "Manufacturer": "Lenovo",
    "Name": "Lenovo XClarity Controller Advanced Upgrade",
    "@odata.type": "#License.v1_0_0.License",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "LicenseOrigin": "Installed",
    "RemainingUseCount": 0,
    "LicenseType": "Production",
    "@odata.context": "/redfish/v1/$metadata#License.License",
    "@odata.etag": "\"61949b8df02528abb0a\"",
    "Description": "This resource is used to represent a license for a Redfish implementation.",
    "Removable": true,
    "EntitlementId": "7Z721234567890",
    "@odata.id": "/redfish/v1/LicenseService/Licenses/XCC_Advanced",
    "LicenseString": null,
    "Id": "XCC_Advanced",
    "DownloadURI": "/LicenseDownload/license_XCC_Advanced"
}
```


XCC_Enterprised license:


```
{
    "Links": {
        "AuthorizedDevices": []
    },
    "Oem": {
        "Lenovo": {
            "DescTypeCode": 53,
            "IdTypes": [
                "MTSN"
            ],
            "@odata.type": "#LenovoLicense.v1_0_0.LenovoLicense"
        }
    },
    "Removable": true,
    "EntitlementId": "7Z721234567890",
    "Id": "XCC_Enterprised",
    "Name": "Lenovo XClarity Controller Enterprise Upgrade",
    "@odata.type": "#License.v1_0_0.License",
    "@odata.id": "/redfish/v1/LicenseService/Licenses/XCC_Enterprised",
    "DownloadURI": "/LicenseDownload/license_XCC_Enterprised",
    "@odata.context": "/redfish/v1/$metadata#License.License",
    "Manufacturer": "Lenovo",
    "@odata.etag": "\"63f3a04a2c28296c963\"",
    "LicenseOrigin": "Installed",
    "RemainingUseCount": 0,
    "LicenseType": "Production",
```

```
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "Description": "This resource is used to represent a license for a Redfish implementation.",
    "AuthorizationScope": "Service",
    "LicenseString": null
}
```

POST – Install a License

Use the POST method to install a license.

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/LicenseService/Licenses`

Request body

Field	Type	Description
LicenseString	String	Required. A base64 string format of license file content.

Note: User can use any base64 decode/encode tool to convert a .key file to a base64 string. The output base64 string should then be copied to the POST body.

Response body

Field	Type	Description
Description	String	A collection of Licenses resource instances.
Name	String	“LicenseCollection”.
Members	Array	Items: A reference link to a license

Status code

HTTP Status Code	Error Message ID
400	BadRequest
500	InternalError

Example

The following example is POST body:

```
{
    "LicenseString":"Aj8wTGVub3ZvIFNZU1RFTSBYIEZ....VD9u7oqr57iu5Luo6Ye1Ylrmg4TmmLgqPzM/Pw=="
}
```

The following example JSON response is returned.

```
{
    "@odata.context": "/redfish/v1/$metadata#LicenseCollection.LicenseCollection",
    "@odata.etag": "\"2a59d9ed8de02723db9\"",
    "Description": "A collection of Licenses resource instances.",
    "Members@odata.count": 1,
    "@odata.type": "#LicenseCollection.LicenseCollection",
    "@odata.id": "/redfish/v1/LicenseService/Licenses",
    "Name": "LicenseCollection",
```

```
    "Members": [
        {
            "@odata.id": "/redfish/v1/LicenseService/Licenses/XCC_Advanced" "
        }
    ]
}
```

DELETE – Delete a License

Use the DELETE method to delete a License.

Request URL

```
DELETE https://<BMC_IPADDR>/redfish/v1/LicenseService/Licenses/XCC_Advanced|XCC_Enterprised
```

Request body

None.

Response

None.

Status code

HTTP Status Code	Error Message ID
400	BadRequest
500	InternalError

Buildin license could not be removed. Delete the buildin License, 500 error code returns.

Chapter 9. Network management

Resource EthernetInterface (BMC NIC)

This resource is used to represent the BMC ethernet Interfaces for a Redfish implementation.

Number of Resources	2
Resource Path	/redfish/v1/Managers/1/EthernetInterfaces/{NIC, ToHost}
Schema file	EthernetInterfaceCollection_v1.xml EthernetInterface_v1.xml

GET – Collection of BMC ethernet interface properties

Use the GET method to retrieve properties in Ethernet interface collection resource for a BMC.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/EthernetInterfaces
```

Request body

None

Response body

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

Field	Type	Description
Members	Array	Items: A reference link of the elements of EthernetInterface.
Name	String	EthernetInterfaceCollection.
Description	String	A collection of EthernetInterface resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

The following example JSON response is returned:

```
{
    "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces",
    "Name": "EthernetInterfaceCollection",
    "@odata.context": "/redfish/v1/$metadata#EthernetInterfaceCollection.EthernetInterfaceCollection",
    "Members": [
        {
            "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/NIC"
        },
        {
            "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/ToHost"
        }
```

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```
    ],
    "@odata.type": "#EthernetInterfaceCollection.EthernetInterfaceCollection",
    "@odata.etag": "\"3a44d9cd5c02b15baae44caebe1d29fb\"",
    "Members@odata.count": 2,
    "Description": "A collection of EthernetInterface resource instances."
}
```


GET – BMC Ethernet properties

Use the GET method to retrieve properties in Ethernet interface resource for a BMC.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/EthernetInterfaces/{NIC,ToHost}
```

Request body

None

Response body

Field	Type	Description
FQDN	String	The complete, fully qualified domain name for this XCC interface
EthernetInterfaceType	String	String “Physical”.
IPv6DefaultGateway	String	The current IPv6 default gateway address that is in use on this XCC interface
Id	String	The value is “NIC” in resource for BMC Ethernet interface. The value is “ToHost" in BMC Ethernet over USB interface.
IPv6StaticAddresses	Array	An array of objects used to represent the IPv6 static connection characteristics for this XCC interface
IPv6StaticAddresses	Object	Array element
PrefixLength	Number	The Prefix Length of this IPv6 address
Address	String	A valid IPv6 address
AutoNeg	Boolean	Indicates if the speed and duplex are automatically negotiated and configured on this XCC interface: • True. Auto negotiation of speed and duplex is enabled. • False. Auto negotiation of speed and duplex is disabled.
IPv6AddressPolicyTable	Array	An array of objects used to represent the Address Selection Policy Table as defined in RFC 6724
IPv6AddressPolicyEntry	Object	Array element
Prefix	String	The prefix of IPv6 address.
Precedence	Number	Fix value “10”.
Label	Number	The label of IPv6 address.
SpeedMbps	String	The current speed in Mbps of this XCC interface (units: Mbit/s). This value is null when “AutoNeg” is true.
Status	Object	Expanded.
State	String	“Enabled” if this Ethernet interface is enabled.

Field	Type	Description
Health	String	Null
HostName	String	The host name for this XCC interface, without any domain information.
IPv6Addresses	Array	An array of objects used to represent the IPv6 connection characteristics for this XCC interface
IPv6Address	Object	Array element
Address	String	The IPv6 Address
PrefixLength	Number	The IPv6 Address Prefix Length
AddressOrigin	String	The type of the IPv6 address origin for this XCC interface: • 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.
AddressState	String	The current state of this address as defined in RFC 4862: • Preferred. This address is currently within both it's valid and preferred lifetimes as defined in RFC 4862. • Deprecated. This address is currently within it's valid lifetime, but is now outside of it's preferred lifetime as defined in RFC 4862. • Tentative. This address is currently undergoing Duplicate Address Detection testing as defined in RFC 4862 section 5.4. • Failed. This address has failed Duplicate Address Detection testing as defined in RFC 4862 section 5.4 and is not currently in use."
FullDuplex	Boolean	The duplex status of the Ethernet connection on this XCC interface. This value is null when “AutoNeg” is true.
IPv4StaticAddresses	Array	An array of objects used to represent the IPv4 connection characteristics for this XCC interface.
IPv4StaticAddress	Object	Array element
Address	String	The IPv4 Address
SubnetMask	String	The IPv4 Subnet mask.
AddressOrigin	String	Static.
Gateway	String	The IPv4 gateway for this address
IPv4Address	Array	An array of objects used to represent the IPv4 connection characteristics for this XCC interface
IPv4Address	Object	Array element
Address	String	the IPv4 Address
SubnetMask	String	the IPv4 Subnet mask.

Field	Type	Description
AddressOrigin	String	This indicates how the address was determined: • 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	IPv4 gateway for this address
NameServers	Array	DNS name servers that are currently in use on this XCC interface (IPv4 1st,2nd, 3rd ip address, IPv6 1st,2nd, 3rd ip address)
InterfaceEnabled	Boolean	A boolean indicating whether this interface is enabled
LinkStatus	String	The value of this property represents the current status of link. Valid values: 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	Expanded.
Chassis	Link	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.
HostInterface	Link	The value of this property shall be a reference to a resource of type HostInterface which represents the interface used by a host to communicate with a Manager. Only in ToHost has this property.
MACAddress	String	The currently configured MAC address of the (logical port) interface.
PermanentMACAddress	String	The permanent MAC address assigned to this interface (port).
Name	String	The name of the resource
MTUSize	Number	The currently configured Maximum Transmission Unit (MTU) in bytes on this XCC interface
VLAN	Link	The value of this property shall be the VLAN for this interface. If this interface supports more than one VLAN, the VLAN property shall not be present and the VLANS collection link shall be present instead.
VLANEnable	Boolean	The property of VLAN is Enable or not.
VLANId	Number	The Id of VLAN.
MaxIPv6StaticAddresses	Number	The maximum number of IPv6 static address.
DHCPv4	Object	Expanded.
UseDNSServers	Boolean	Use DNS servers or not.
UseDomainName	Boolean	Use Domain Name or not.
DHCPEnabled	Boolean	The DHCP is Enabled or not.
UseNTPServers	Boolean	Not used, always null.

Field	Type	Description
UseGateway	Boolean	Not used, always null.
UseStaticRoutes	Boolean	Not used, always null.
FallbackAddress	String	DHCPv4 fallback address method for this interface. Valid values: None, Static
DHCPv6	Object	Expanded
UseDNSServers	Boolean	Use DNS servers or not.
UseDomainName	Boolean	Use Domain Name or not.
OperatingMode	String	The operating mode is Stateful or Disabled.
UseNTPServers	Boolean	Not used, always null.
UseRapidCommit	Boolean	Not used, always null.
IPv6StaticDefaultGateways	Array	An array of objects used to represent the IPv6 static default gateway for this XCC interface.
Address	String	Static IPv6 default gateway address
PrefixLength	Integer	Fixed value “0”
StaticNameServers	Array	Items: string Items count: 6
StatelessAddressAutoConfig	Object	Expanded
IPv4AutoConfigEnabled	Boolean	Not used, always null.
IPv6AutoConfigEnabled	Boolean	Enable IPv6 Auto Config or not.
Description	String	Manager Ethernet Interface

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "IPv6Addresses": [
        {
            "AddressState": "Preferred",
            "AddressOrigin": "SLAAC",
            "Address": "fda4:254b:323a:70:a94:efff:feaf:4d2f",
            "PrefixLength": 64
        },
        {
            "AddressState": "Preferred",
            "AddressOrigin": "LinkLocal",
            "Address": "fe80::a94:efff:feaf:4d2f",
            "PrefixLength": 64
        }
    ],
```

```
"InterfaceEnabled": true,
"FullDuplex": null,
"SpeedMbps": null,
"MaxIPv6StaticAddresses": 1,
"IPv6DefaultGateway": "::",
"StatelessAddressAutoConfig": {
    "IPv6AutoConfigEnabled": true,
    "IPv4AutoConfigEnabled": null
},
"HostName": "XCC-7Z60-1325476891",
"AutoNeg": true,
"StaticNameServers": [
    "0.0.0.0",
    "0.0.0.0",
    "0.0.0.0",
    "::",
    "::",
    "::"
],
"Oem": {
    "Lenovo": {
        "NetworkSettingSync": true,
        "DomainName": "lenovo.com",
        "IPv6AddressAssignedby": [
            "LinkLocal",
            "DHCPv6",
            "SLAAC"
        ],
        "IPv4Enabled": true,
        "IPv6Enabled": true,
        "IPv4AddressAssignedby": "DHCPFirstThenStatic",
        "InterfaceFailoverMode": {
            "NicValue": 1,
            "FailoverMode": "None"
        },
        "InterfaceNicMode": {
            "NicMode": "Dedicated",
            "NicValue": 1
        },
        "@odata.type": "#LenovoEthernetInterface.v1_0_0.LenovoEthernetInterfaceProperties"
    }
},
"VLAN": {
    "VLANEnable": false,
    "VLANId": 1
},
"MACAddress": "08:94:ef:af:4d:2f",
"DHCPv4": {
    "UseDNSServers": true,
    "FallbackAddress": "Static",
    "UseGateway": null,
    "UseStaticRoutes": null,
    "UseNTPServers": null,
    "DHCPEnabled": true,
    "UseDomainName": true
},
"Description": "Manager Ethernet Interface",
"IPv6AddressPolicyTable": [
    {
        "Prefix": "::1/128",
        "Label": 0,
```

```
            "Precedence": 50
        },
        {
            "Prefix": "::/96",
            "Label": 3,
            "Precedence": 11
        },
        {
            "Prefix": "::ffff:0.0.0.0/96",
            "Label": 4,
            "Precedence": 35
        },
        {
            "Prefix": "2001::/32",
            "Label": 6,
            "Precedence": 10
        },
        {
            "Prefix": "2001:10::/28",
            "Label": 7,
            "Precedence": 10
        },
        {
            "Prefix": "3ffe::/16",
            "Label": 12,
            "Precedence": 1
        },
        {
            "Prefix": "2002::/16",
            "Label": 2,
            "Precedence": 30
        },
        {
            "Prefix": "fec0::/10",
            "Label": 11,
            "Precedence": 1
        },
        {
            "Prefix": "fc00::/7",
            "Label": 5,
            "Precedence": 5
        },
        {
            "Prefix": "::/0",
            "Label": 1,
            "Precedence": 40
        }
    ],
    "Name": "Manager Ethernet Interface",
    "@odata.type": "#EthernetInterface.v1_6_0.EthernetInterface",
    "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/NIC",
    "DHCPv6": {
        "UseDNSServers": true,
        "UseDomainName": true,
        "UseNTPServers": null,
        "UseRapidCommit": null,
        "OperatingMode": "Stateful"
    },
    "IPv6StaticAddresses": [
        {
            "Address": "::",
```

```
            "PrefixLength": 64
        }
    ],
    "Status": {
        "State": "Enabled",
        "Health": null
    },
    "LinkStatus": "LinkUp",
    "EthernetInterfaceType": "Physical",
    "@odata.etag": "\"1190210c0722731d50cf6a\"",
    "PermanentMACAddress": "08:94:ef:af:4d:2f",
    "NameServers": [
        "0.0.0.0",
        "0.0.0.0",
        "0.0.0.0",
        "::",
        "::",
        "::"
    ],
    "IPv6StaticDefaultGateways": [
        {
            "Address": "::",
            "PrefixLength": 0
        }
    ],
    "FQDN": "",
    "Id": "NIC",
    "IPv4StaticAddresses": [
        {
            "Gateway": "0.0.0.0",
            "AddressOrigin": "Static",
            "Address": "192.168.70.125",
            "SubnetMask": "255.255.255.0"
        }
    ],
    "Links": {
        "Chassis": {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    },
    "MTUSize": 1500,
    "IPv4Addresses": [
        {
            "Gateway": "192.168.1.1",
            "AddressOrigin": "DHCP",
            "Address": "192.168.1.2",
            "SubnetMask": "255.255.254.0"
        }
    ]
}
```


PATCH – Update BMC Ethernet configurations

Use the PATCH method to update properties in Ethernet interface resource for a BMC.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/EthernetInterfaces/NIC
```

Request body

Properties to be updated are shown below:

Field	Type	Description
InterfaceEnabled	Boolean	A boolean indicating whether this interface is enabled.
MACAddress	String	The currently configured MAC address of the (logical port) interface.
SpeedMbps	String	The current speed in Mbps of this XCC interface(units: Mbit/s) The property value should be between 10 and 100.
AutoNeg	Boolean	Indicate if the speed and duplex are automatically negotiated and configured on this XCC interface: True. Auto negotiation of speed and duplex is enabled. False. Auto negotiation of speed and duplex is disabled.
FullDuplex	Boolean	The duplex status of the Ethernet connection on this XCC interface: True. In Full Duplex mode. False. Not in Full Duplex mode.
MTUSize	Number	The currently configured Maximum Transmission Unit (MTU) in bytes on this XCC interface
HostName	String	The host name for this XCC interface, without any domain information.
IPv4StaticAddresses	Array	An array of objects used to represent the IPv4 connection characteristics for this XCC interface
IPv6StaticAddresses	Array	An array of objects used to represent the IPv6 static connection characteristics for this XCC interface
IPv6StaticDefaultGateways	Array	An array of objects used to represent the IPv6 static default gateways for this XCC interface
Address	String	The gateway address
VLAN	Link	The value of this property shall be the VLAN for this interface. If this interface supports more than one VLAN, the VLAN property shall not be present and the VLANS collection link shall be present instead.
VLANEnable	Boolean	The property of VLAN is Enable or not.
VLANId	Number	The Id of VLAN.
DHCPv4	Object	Expanded
DHCPEnabled	Boolean	The DHCP is Enabled or not.
UseDNSServers	Boolean	Use DNS servers or not.
UseDomainName	Boolean	Use Domain Name or not.
FallbackAddress	String	DHCPv4 fallback address method for this interface. Valid values: None, Static.
DHCPv6	Object	Expanded
OperatingMode	String	The property of operating mode. The value should be “Stateful” or “Disabled”.

Field	Type	Description
UseDNSServers	Boolean	Use DNS servers or not.
UseDomainName	Boolean	Use Domain Name or not.
StaticNameServers	Array	Items: string Items count: 6
StatelessAddressAutoConfig	Object	Expanded
IPv6AutoConfigEnabled	Boolean	Enable IPv6 Auto Config or not.

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
400	PropertyValueNotInList, PropertyValueFormatError, PropertyValueTypeError, PropertyNotWritable
500	InternalError

Example

The following example is PATCH body.

```
{
    "MTUSize": 1490,
    "SpeedMbps": 100,
    "FullDuplex": true
}
```

The resource after updated is returned.

```
{
    "DHCPv6": {
        "UseNTPServers": null,
        "OperatingMode": "Disabled",
        "UseDNSServers": false,
        "UseDomainName": false,
        "UseRapidCommit": null
    },
    "Links": {
        "Chassis": {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    },
    "VLAN": {
        "VLANEnable": false,
        "VLANId": 1
    },
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoEthernetInterface.v1_0_0.LenovoEthernetInterfaceProperties",
            "DomainName": "",
            "IPv4Enabled": true,
            "IPv4AddressAssignedby": "Static",
            "InterfaceNicMode": "Dedicated",
```

```
        "NetworkSettingSync": true,
        "IPv6AddressAssignedby": [],
        "InterfaceFailoverMode": "Shared",
        "IPv6Enabled": false
    }
},
"IPv6Addresses": [],
"Status": {
    "Health": null,
    "State": "Enabled"
},
"IPv6DefaultGateway": "::",
"IPv6StaticDefaultGateways": [
    {
        "Address": "::",
        "PrefixLength": 0
    }
],
"StaticNameServers": [
    "0.0.0.0",
    "0.0.0.0",
    "0.0.0.0",
    "::",
    "::",
    "::"
],
"MTUSize": 1490,
"FullDuplex": true,
"IPv4StaticAddresses": [
    {
        "AddressOrigin": "Static",
        "Gateway": "192.168.0.1",
        "Address": "192.168.0.41",
        "SubnetMask": "255.255.255.0"
    }
],
"IPv6AddressPolicyTable": [
    {
        "Label": 0,
        "Precedence": 50,
        "Prefix": "::1/128"
    },
    {
        "Label": 3,
        "Precedence": 11,
        "Prefix": "::/96"
    },
    {
        "Label": 4,
        "Precedence": 35,
        "Prefix": "::ffff:0.0.0.0/96"
    },
    {
        "Label": 6,
        "Precedence": 10,
        "Prefix": "2001::/32"
    },
    {
        "Label": 7,
        "Precedence": 10,
        "Prefix": "2001:10::/28"
```

```
        },
        {
            "Label": 12,
            "Precedence": 1,
            "Prefix": "3ffe::/16"
        },
        {
            "Label": 2,
            "Precedence": 30,
            "Prefix": "2002::/16"
        },
        {
            "Label": 11,
            "Precedence": 1,
            "Prefix": "fec0::/10"
        },
        {
            "Label": 5,
            "Precedence": 5,
            "Prefix": "fc00::/7"
        },
        {
            "Label": 1,
            "Precedence": 40,
            "Prefix": "::/0"
        }
    ],
    "PermanentMACAddress": "7c:d3:0a:5e:22:65",
    "StatelessAddressAutoConfig": {
        "IPv4AutoConfigEnabled": null,
        "IPv6AutoConfigEnabled": false
    },
    "NameServers": [
        "",
        "",
        "",
        "::",
        "::",
        "::"
    ],
    "Name": "Manager Ethernet Interface",
    "AutoNeg": true,
    "@odata.etag": "\"24596c8504c398d843823abc54214Ofa\"",
    "EthernetInterfaceType": "Physical",
    "MACAddress": "7c:d3:0a:5e:22:65",
    "FQDN": "XCC-7X00-1234567890",
    "Description": "Manager Ethernet Interface",
    "@odata.type": "#EthernetInterface.v1_5_0.EthernetInterface",
    "InterfaceEnabled": true,
    "Id": "NIC",
    "LinkStatus": "LinkUp",
    "DHCPv4": {
        "UseNTPServers": null,
        "UseDNSServers": true,
        "UseGateway": null,
        "FallbackAddress": "None",
        "DHCPEnabled": false,
        "UseDomainName": true,
        "UseStaticRoutes": null
    },
    "IPv6StaticAddresses": [
```

```
        {
            "Address": "::",
            "PrefixLength": 64
        }
    ],
    "HostName": "XCC-7X00-1234567890",
    "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/NIC",
    "IPv4Addresses": [
        {
            "AddressOrigin": "Static",
            "Gateway": "192.168.0.1",
            "Address": "192.168.0.41",
            "SubnetMask": "255.255.255.0"
        }
    ],
    "MaxIPv6StaticAddresses": 1,
    "SpeedMbps": 100
}
```


PATCH – Update BMC Ethernet over USB configurations

Use the PATCH method to update properties in Ethernet interface resource for a BMC.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/EthernetInterfaces/ToHost`

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Error Message ID
InterfaceEnabled	Boolean	A boolean indicating whether this interface is enabled.
IPv4StaticAddress-es	Array	An array of objects used to represent the IPv4 connection characteristics for this XCC interface. Only the static IPv4 address can be updated.

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.


```
{
   "InterfaceEnabled" : true,
   "IPv4StaticAddresses" : [
        {
            "Address": "169.254.95.119",
            "SubnetMask": "255.255.0.0"
        }
    ]
}
```

The resource after updated is returned.


```
{
    "FQDN": "",
    "Id": "ToHost",
    "InterfaceEnabled": true,
    "Links": {
        "Chassis": {
            "@odata.id": "/redfish/v1/Chassis/1"
        },
        "HostInterface": {
            "@odata.id": "/redfish/v1/Managers/1/HostInterfaces/1"
        }
    },
    "AutoNeg": false,
    "IPv6AddressPolicyTable": [
        {
            "Precedence": 50,
            "Prefix": "::1/128",
            "Label": 0
        },
        {
            "Precedence": 11,
            "Prefix": "::/96",
            "Label": 3
        },
        {
            "Precedence": 35,
            "Prefix": "::ffff:0.0.0.0/96",
            "Label": 4
        },
        {
            "Precedence": 10,
            "Prefix": "2001::/32",
            "Label": 6
        },
        {
            "Precedence": 10,
            "Prefix": "2001:10::/28",
            "Label": 7
        },
        {
            "Precedence": 1,
            "Prefix": "3ffe::/16",
            "Label": 12
        },
        {
            "Precedence": 30,
            "Prefix": "2002::/16",
            "Label": 2
        },
        {
            "Precedence": 1,
            "Prefix": "fec0::/10",
            "Label": 11
        },
        {
            "Precedence": 5,
            "Prefix": "fc00::/7",
            "Label": 5
        },
```

```
    {
        "Precedence": 40,
        "Prefix": "::/0",
        "Label": 1
    }
],
"SpeedMbps": 100,
"HostName": "",
"IPv6Addresses": [
    {
        "AddressState": "Preferred",
        "Address": "fe80::7ed3:aff:feed:bb1a",
        "PrefixLength": 64,
        "AddressOrigin": "LinkLocal"
    }
],
"FullDuplex": true,
"StaticNameServers": [
    "0.0.0.0",
    "0.0.0.0",
    "0.0.0.0",
    "::",
    "::",
    "::"
],
"DHCPv4": {
    "UseDNSServers": false,
    "FallbackAddress": "None",
    "UseGateway": null,
    "UseNTPServers": null,
    "UseDomainName": false,
    "DHCPEnabled": false,
    "UseStaticRoutes": null
},
"IPv4Addresses": [
    {
        "Gateway": "0.0.0.0",
        "Address": "169.254.95.118",
        "SubnetMask": "255.255.0.0",
        "AddressOrigin": "Static"
    }
],
"Description": "Management Network Interface",
"StatelessAddressAutoConfig": {
    "IPv4AutoConfigEnabled": null,
    "IPv6AutoConfigEnabled": false
},
"IPv6StaticDefaultGateways": [
    {
        "PrefixLength": 0,
        "Address": "::"
    }
],
"MTUSize": 1500,
"DHCPv6": {
    "OperatingMode": "Disabled",
    "UseNTPServers": null,
    "UseDomainName": false,
    "UseRapidCommit": null,
    "UseDNSServers": false
},
```

```
    "Status": {
        "State": "Enabled",
        "Health": null
    },
    "MACAddress": "7c:d3:0a:ed:bb:1a",
    "Name": "Manager Ethernet Over USB Interface",
    "IPv4StaticAddresses": [
        {
            "Gateway": "0.0.0.0",
            "Address": "169.254.95.119",
            "SubnetMask": "255.255.0.0",
            "AddressOrigin": "Static"
        }
    ],
    "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/ToHost",
    "Oem": {
        "Lenovo": {
            "OSIPv4Address": "169.254.95.120",
            "AddressMode": "IPv6LLA",
            "@odata.type": "#LenovoEthernetInterface.v1_0_0.LenovoEthernetInterfaceProperties",
            "PortForwarding": {
                "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/ToHost/Oem/Lenovo/PortForwarding"
            }
        }
    },
    "@odata.type": "#EthernetInterface.v1_5_1.EthernetInterface",
    "MaxIPv6StaticAddresses": 0,
    "LinkStatus": "LinkUp",
    "@odata.etag": "\"f57f676204ef32c8c907e\"",
    "PermanentMACAddress": "7c:d3:0a:ed:bb:1a",
    "NameServers": []
}
```


Resource EthernetInterface (Server NIC)

This resource is used to represent the Server Ethernet Interfaces for a Redfish implementation.

Number of Resources	Number of server Ethernet interfaces
Resource Path	/redfish/v1/Systems/1/EthernetInterfaces/NIC{1-N}, ToManager
Schema file	EthernetInterfaceCollection_v1.xml EthernetInterface_v1.xml

GET – Collection of server Ethernet interfaces

Use the GET method to retrieve properties in Ethernet interface collection resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/EthernetInterfaces
```

Request body

None

Response body

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

Field	Type	Description
Members	Array	Items: A reference link of the elements of EthernetInterface.
Name	String	EthernetInterfaceCollection.
Description	String	A collection of EthernetInterface resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

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

```
{
    "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces",
    "Name": "EthernetInterfaceCollection",
    "@odata.context": "/redfish/v1/$metadata#EthernetInterfaceCollection.EthernetInterfaceCollection",
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces/ToManager"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces/NIC1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces/NIC2"
        }
    ],
    "@odata.type": "#EthernetInterfaceCollection.EthernetInterfaceCollection",
    "@odata.etag": "\"796d097492fa96e3f9e0be275beba605\"",
    "Members@odata.count": 3,
    "Description": "A collection of EthernetInterface resource instances."
}
```

GET – Server Ethernet interface properties

Use the GET method to retrieve properties in Ethernet interface resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/EthernetInterfaces/NIC{1…N}
```

Request body

None

Response body

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

Field	Type	Description
Id	String	NIC{1..N}
SpeedMbps	String	The current speed in Mbps of this XCC interface(units: Mbit/s)
InterfaceEnabled	Boolean	A boolean indicating whether this interface is enabled

Field	Type	Description
MACAddress	String	The currently configured MAC address of the (logical port) interface.
PermanentMACAddress	String	The permanent MAC address assigned to this interface (port).
Name	String	"External Ethernet Interface"
LinkStatus	String	The link status of this interface (port)
Status	Object	Expand
State	String	The state of this ethernet interface.
Health	String	The health of this ethernet interface.
Links	Object	Expand
Chassis	Link	The value is a reference to the resource “Chassis” that represent the physical container.
Description	String	External Network Interface
FQDN	String	“” (empty string)
HostName	String	“” (empty string)
NameServers	String Array	Empty array
IPv4Addresses	Array	Empty array

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "FQDN": "",
    "Id": "NIC1",
    "NameServers": [],
    "SpeedMbps": null,
    "HostName": "",
    "IPv4Addresses": [],
    "Description": "Enternal Network Interface",
    "Status": {
        "State": "Enabled",
        "Health": “OK”
    },
    "MACAddress": "7e:d3:0a:ed:bb:1b",
    "Name": "Enternal Ethernet Interface",
    "InterfaceEnabled": true,
    "@odata.type": "#EthernetInterface.v1_5_1.EthernetInterface",
    "Links": {
        "Chassis": {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    },
    "LinkStatus": "LinkDown",
```

```
    "@odata.etag": "\"4524b3cedd2525a9e6c\"",
    "PermanentMACAddress": "7e:d3:0a:ed:bb:1b",
    "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces/NIC1"
}
```

GET – Server Ethernet over USB properties

Use the GET method to retrieve properties in Ethernet interface resource between the server and manager.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/EthernetInterfaces/ToManager
```

Request body

None

Response body

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

Field	Type	Description
Id	String	ToManager
SpeedMbps	String	The current speed in Mbps of this XCC interface(units: Mbit/s)
InterfaceEnabled	Boolean	A boolean indicating whether this interface is enabled
MACAddress	String	The currently configured MAC address of the (logical port) interface.
PermanentMACAddress	String	The permanent MAC address assigned to this interface (port).
Name	String	"Host Ethernet Interface"
LinkStatus	String	The link status of this interface (port).
Status	Object	Expand
State	String	“Enabled”
Health	String	Null
Links	Object	Expand
Chassis	Link	The value is a reference to the resource “Chassis” that represent the physical container.
HostInterface	Link	A reference to the resource “HostInterface” which represents the interface used by the host to communicate with the manager.
Description	String	Host Network Interface
FQDN	String	“” (empty string)
HostName	String	“” (empty string)
NameServers	String Array	Empty array
IPv4Addresses	Array	Empty array

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "FQDN": "",
    "Id": "ToManager",
    "NameServers": [],
    "SpeedMbps": 100,
    "HostName": "",
    "IPv4Addresses": [],
    "Description": "Host Network Interface",
    "Status": {
        "State": "Enabled",
        "Health": null
    },
    "MACAddress": "7e:d3:0a:ed:bb:1b",
    "Name": "Host Ethernet Interface",
    "InterfaceEnabled": true,
    "@odata.type": "#EthernetInterface.v1_5_1.EthernetInterface",
    "Links": {
        "Chassis": {
            "@odata.id": "/redfish/v1/Chassis/1"
        },
        "HostInterface": {
            "@odata.id": "/redfish/v1/Managers/1/HostInterfaces/1"
        }
    },
    "LinkStatus": "LinkUp",
    "@odata.etag": "\"4524b3cedd2525a9e6c\"",
    "PermanentMACAddress": "7e:d3:0a:ed:bb:1b",
    "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces/ToManager"
}
```

Resource HostInterface

Use the GET method to retrieve properties in Host interface resource for a server.

Number of Resources	1
Resource Path	/redfish/v1/Managers/1/HostInterfaces
Schema file	HostInterfaceCollection_v1.xml HostInterface_v1.xml

GET – Collection of host interface

Use the GET method to retrieve properties in HostInterface collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/HostInterfaces
```

Request body

None

Response body

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

Field	Type	Description
Name	String	“HostInterfaceCollection”
Members	Array	Items: A reference link to an element of Host interface
Description	String	A collection of HostInterface resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "@odata.id": "/redfish/v1/Managers/1/HostInterfaces",
    "Members@odata.count": 1,
    "@odata.context": "/redfish/v1/$metadata#HostInterfaceCollection.HostInterfaceCollection",
    "Members": [
        {
            "@odata.id": "/redfish/v1/Managers/1/HostInterfaces/1"
        }
    ],
    "@odata.type": "#HostInterfaceCollection.HostInterfaceCollection",
    "@odata.etag": "\"806b8bd9d1a64fa1ac993403401f40e0\"",
    "Name": "HostInterfaceCollection",
    "Description": "A collection of HostInterface resource instances."
}
```

GET – Host interface properties

Use the GET method to retrieve properties in HostInterface resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/HostInterfaces/1
```

Request body

None

Response body

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

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of Chassis. Always set to “1”.
Description	String	Provides a description of Host Interface resources.
ExternallyAccessible	Boolean	Always set to false
HostEthernetInterfaces	Link	A reference link to the collection of ethernet interfaces that the system uses for network communication with the host interface.
HostInterfaceType	String	“NetworkHostInterface”
InterfaceEnabled	Boolean	Indicates whether this interface is enabled.
Links	Object	Expanded
ComputerSystems	Array	An array of references to the computer systems connected to this host interface.
ComputerSystems[0]	Link	A reference link to a resource of computer system
ManagerEthernetInterface	Link	A reference link to a single ethernet interface that the manager uses for network communication with the host interface.
Name	String	The name of the host interface resource. Always set to “Host Interface”.
NetworkProtocol	Link	A reference link to the network services and their settings that the manager controls.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

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

```
{
    "HostInterfaceType": "NetworkHostInterface",
    "NetworkProtocol": {
        "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol"
    },
    "Id": "1",
    "InterfaceEnabled": true,
    "Links": {
        "ComputerSystems": [
            {
                "@odata.id": "/redfish/v1/Systems/1"
            }
        ]
    },
    "Name": "Host Interface",
    "@odata.context": "/redfish/v1/$metadata#HostInterface.HostInterface",
    "@odata.etag": "\"173c848afdf17b76c0b2defce1f48be7\"",
    "@odata.type": "#HostInterface.v1_2_0.HostInterface",
    "ManagerEthernetInterface": {
        "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/ToHost"
    },
    "@odata.id": "/redfish/v1/Managers/1/HostInterfaces/1",
    "ExternallyAccessible": false,
```

```
    "HostEthernetInterfaces": {
        "@odata.id": "/redfish/v1/Managers/1/HostInterfaces/1/HostEthernetInterfaces"
    },
    "Description": "This resource shall be used to represent Host Interface resources as part of the
Redfish specification."
}
```

PATCH – Enable/disable host interface

Use the PATCH method to update properties in Host Interface resource for Redfish service.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/HostInterfaces/1`

Request body

Property to be updated is shown as bellow.

Field	Type	Error Message ID
InterfaceEnabled	Boolean	Indicate whether this interface is enabled.

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

The following example is PATCH body.

```
{
   "InterfaceEnabled" : false
}
```

After the PATCH operation runs successfully, querying the host interface resource returns below example JSON response:

```
{
    "HostInterfaceType": "NetworkHostInterface",
    "NetworkProtocol": {
        "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol"
    },
    "Id": "1",
    "InterfaceEnabled": false,
    "Links": {
        "ComputerSystems": [
            {
                "@odata.id": "/redfish/v1/Systems/1"
            }
        ]
    },
    "Name": "Host Interface",
    "@odata.context": "/redfish/v1/$metadata#HostInterface.HostInterface",
```

```
    "@odata.etag": "\"3d8fd8e9aa9e2d0aa76f0ac687eecbbd\"",
    "@odata.type": "#HostInterface.v1_2_0.HostInterface",
    "ManagerEthernetInterface": {
        "@odata.id": "/redfish/v1/Managers/1/EthernetInterfaces/ToHost"
    },
    "@odata.id": "/redfish/v1/Managers/1/HostInterfaces/1",
    "ExternallyAccessible": false,
    "HostEthernetInterfaces": {
        "@odata.id": "/redfish/v1/Managers/1/HostInterfaces/1/HostEthernetInterfaces"
    },
    "Description": "This resource shall be used to represent Host Interface resources as part of the
Redfish specification."
}
```


GET – Collection of ethernet interface

Use the GET method to retrieve properties in HostEthernetInterfaces for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/HostInterfaces/1/HostEthernetInterfaces
```

Request body

None

Response body

Field	Type	Description
Name	String	"EthernetInterfaceCollection"
Members	Array	Items: A reference link to an element of Ethernet interface

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces/ToManager"
        }
    ],
    "@odata.type": "#EthernetInterfaceCollection.EthernetInterfaceCollection",
    "@odata.id": "/redfish/v1/Managers/1/HostInterfaces/1/HostEthernetInterfaces",
    "@odata.etag": "\"277e05446a7928a3f63\"",
    "Name": "EthernetInterfaceCollection",
    "Members@odata.count": 1
}
```


Resource ManagerNetworkProtocol

Use the GET method to retrieve properties in ManagerNetworkProtocol resource for a server.

Number of Resources	1
Resource Path	/redfish/v1/Managers/1/NetworkProtocol
Schema file	ManagerNetworkProtocol_v1.xml

GET – BMC network services

Use the GET method to retrieve properties definition for the network protocol in a BMC.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/NetworkProtocol
```

Request body

None

Response body

Field	Type	Description
Id	String	“NetworkProtocol”.
Name	String	“Manager Network Protocol”.
Description	String	The resource is used to represent the network service settings for the manager for a Redfish implementation.
HostName	String	The DNS Host Name of this manager, without any domain information.
FQDN	String	This is the fully qualified domain name for the manager obtained by DNS including the host name and top-level domain name.
DHCP	Object	Settings for this Manager's DHCP support.
ProtocolEnabled	Boolean	Indicate if the protocol is enabled or disabled.
DHCPv6	Object	Settings for this Manager’s DHCPv6 support
ProtocolEnabled	Boolean	Indicate if the protocol is enabled or disabled.
SNMP	Object	Settings for this Manager's SNMP support.
Port	Number	Indicates the protocol port.
EngineId	Object	The engine ID.
ArchitectureId	String	The architecture identifier.
PrivateEnterpriseId	String	The private enterprise ID.
EnableSNMPv3	Boolean	Indicates if access via SNMPv3 is enabled.
NTP	Object	Settings for this Manager's NTP support.
NTPServers	Array	Items: string List of NTP servers IP.
ProtocolEnabled	Boolean	Indicate if the protocol is enabled or disabled.
HTTP	Object	Settings for this Manager's HTTP protocol support.
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled. Fixed value “true”.

Field	Type	Description
Port	Number	Indicates the protocol port.
HTTPS	Object	Settings for this Manager's HTTPS protocol support.
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled.
Port	Number	Indicates the protocol port.
Certificates	Link	The value of this property shall be a reference to a collection of certificates.
VirtualMedia	Object	Settings for this Manager's Virtual Media support.
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled. Fixed value “true”.
Port	Number	Indicates the protocol port.
KVMIP	Object	Settings for this Manager's KVM-IP protocol support.
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled. Fixed value “true”.
Port	Number	Indicates the protocol port.
SSH	Object	Settings for this Manager's SSH (Secure Shell) protocol support.
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled.
Port	Number	Indicates the protocol port.
IPMI	Object	Settings for this Manager's IPMI-over-LAN protocol support.
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled.
Port	Number	Indicates the protocol port. Fixed port “623”
SSDP	Object	Settings for this Manager's SSDP support.
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled.Fixed value “true”.
Port	Number	Indicates the protocol port. Fixed port “1900”
NotifyMulticastIntervalSeconds	Number	Indicates how often the Multicast is done from this service for SSDP. Fixed value “60”
NotifyTTL	Number	Indicates the time to live hop count for SSDPs Notify messages. Fixed value “2”
NotifyIPv6Scope	String	Indicates the scope for the IPv6 Notify messages for SSDP. Fixed value “Organization”
Status	Object	Expanded
State	String	“Enabled”
Health		“OK”

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "FQDN": "XCC-7Z60-1325476891.lenovo.com",
    "HostName": "XCC-7Z60-1325476891",
    "SSDP": {
        "NotifyTTL": 2,
        "Port": 1900,
        "NotifyIPv6Scope": "Organization",
        "ProtocolEnabled": true,
        "NotifyMulticastIntervalSeconds": 60
    },
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "Id": "NetworkProtocol",
    "DHCPv6": {
        "ProtocolEnabled": true
    },
    "@odata.etag": "\"d822f21401ff31db011af\"",
    "IPMI": {
        "ProtocolEnabled": true,
        "Port": 623
    },
    "SSH": {
        "ProtocolEnabled": true,
        "Port": 22
    },
    "KVMIP": {
        "ProtocolEnabled": true,
        "Port": 3900
    },
    "HTTPS": {
        "ProtocolEnabled": true,
        "Port": 443,
        "Certificates": {
            "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates"
        }
    },
    "HTTP": {
        "ProtocolEnabled": true,
        "Port": 80
    },
    "Name": "Manager Network Protocol",
    "SNMP": {
        "EngineId": {
            "ArchitectureId": "04 58 43 43 2D 37 5A 36 30 2D 31 33 32 35 34 37 36 38 39 31",
            "PrivateEnterpriseId": "80 00 1f 88"
        },
        "Port": 161,
        "EnableSNMPv3": true
    },
    "VirtualMedia": {
        "ProtocolEnabled": true,
        "Port": 3900
    },
    "@odata.type": "#ManagerNetworkProtocol.v1_6_0.ManagerNetworkProtocol",
    "NTP": {
```

```
        "ProtocolEnabled": true,
        "NTPServers": [
            "10.10.10.1",
            "10.10.10.2",
            "10.10.10.3",
            ""
        ]
    },
    "DHCP": {
        "ProtocolEnabled": true
    },
    "Oem": {
        "Lenovo": {
            "SMTPClient": {
                "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/Oem/Lenovo/SMTPClient"
            },
            "CimOverHTTPS": {
                "BackendEnabled": false,
                "ProtocolEnabled": false,
                "Port": 5989
            },
            "SLP": {
                "Port": 427,
                "MulticastAddress": "239.255.255.253",
                "ProtocolEnabled": true,
                "AddressType": "Multicast"
            },
            "OpenPorts": [
                "22",
                "68",
                "80",
                "115",
                "123",
                "161",
                "427",
                "443",
                "546",
                "623",
                "1900",
                "3900"
            ],
            "@odata.type": "#LenovoManagerNetworkProtocol.v1_0_0.LenovoManagerNetworkProtocolProperties",
            "DNS": {
                "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/Oem/Lenovo/DNS"
            },
            "LDAPClient": {
                "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/Oem/Lenovo/LDAPClient"
            },
            "SNMP": {
                "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/Oem/Lenovo/SNMP"
            },
            "WebOverHTTPS": {
                "ProtocolEnabled": true
            }
        }
    },
    "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol",
    "Description": "The resource is used to represent the network service settings for
the manager for a Redfish implementation."
}
```

PATCH – Update BMC network service configurations

Use the PATCH method to update properties in the network protocol resource in a BMC.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/NetworkProtocol
```

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Description
HTTPS	Object	Settings for this Manager's HTTPS protocol support.
Port	Number	Indicates the protocol port.
SSH	Object	Settings for this Manager's SSH (Secure Shell) protocol support
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled.
Port	Number	Indicates the protocol port.
VirtualMedia	Object	Settings for this Manager's Virtual Media support
Port	Number	Indicates the protocol port.
IPMI	Object	Settings for this Manager's IPMI-over-LAN protocol support.
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled.
SSDP	Object	Settings for this Manager's SSDP support.
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled. Fixed value “true”.
NTP	Object	Settings for this Manager's NTP support
NTPServers	Array	Items: string List of NTP servers IP
ProtocolEnabled	Boolean	Indicates if the protocol is enabled or disabled.
SNMP	Object	Settings for this Manager's SNMP support
EnableSNMPv3	Boolean	Indicates if access via SNMPv3 is enabled.
Port	Number	Indicate the protocol port.
DHCP	Object	Settings for this Manager's DHCP support
ProtocolEnabled	Boolean	Indicate if the protocol is enabled or disabled.
DHCPv6	Object	Settings for this Manager’s DHCPv6 support
ProtocolEnabled	Boolean	Indicate if the protocol is enabled or disabled.

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP STATUS Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.

```
{
   "HTTPS" : {
      "Port" : 445
   }
}
```

The following example JSON response is returned:

```
{
…
     "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol",
     "HTTPS": {
          "ProtocolEnabled": true,
          "Port": 445,
          "Certificates": {
              "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates"
          }
     },
…
}
```

Chapter 10. Serial Interface Management

Resource SerialInterface

The resource represents the serial interface implementation for Redfish service.

Number of Resources	1
Resource Path	/redfish/v1/Managers/1/SerialInterfaces/1
Schema file	SerialInterfaceCollection_v1.xml SerialInterface_v1.xml

GET – Collection of BMC serial interface

Use the GET method to retrieve properties in the serial interface collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/SerialInterfaces
```

Request body

None

Response body

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

Field	Type	Description
Name	String	“SerialInterfaceCollection”
Members	Array	Items: A reference link to an element of Serial Interface

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

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

```
{
   "@odata.id": "/redfish/v1/Managers/1/SerialInterfaces",
   "Members@odata.count": 1,
   "@odata.context": "/redfish/v1/$metadata#SerialInterfaceCollection.SerialInterfaceCollection",
   "Members": [
       {
           "@odata.id": "/redfish/v1/Managers/1/SerialInterfaces/1"
       }
   ],
   "@odata.type": "#SerialInterfaceCollection.SerialInterfaceCollection",
   "@odata.etag": "\"ca33897145cbc4d601528e54e3b4ba97\"",
   "Name": "SerialInterfaceCollection",
```

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```
    "Description": "A collection of SerialInterface resource instances."
}
```

GET – BMC serial interface properties

Use the GET method to retrieve properties in the resource of serial interface for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Managers/1/SerialInterfaces/1`

Request body

None

Response body

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

Field	Type	Description
id	String	“1”
Name	String	“Serial Interface”
BitRate	String	Bit rate of the serial interface. Valid values include: 9600, 19200, 38400, 57600, 115200
SignalType	String	“Rs232”
Parity	String	Parity information for the serial interface, valid values include: None, Odd, Even.
StopBits	String	Serial interface stop bits .
DataBits	String	8
Description	String	Serial Interface of Redfish
FlowControl	String	“None”
InterfaceEnabled	Boolean	Indicates whether this interfaces is enabled.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

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

```
{
    "SignalType": "Rs232",
    "BitRate": "115200",
    "@odata.id": "/redfish/v1/Managers/1/SerialInterfaces/1",
    "InterfaceEnabled": true,
    "Description": "Serial port redirection of the host.",
    "Name": "Serial Interface",
    "@odata.context": "/redfish/v1/$metadata#SerialInterface.SerialInterface",
    "StopBits": "1",
    "Oem": {
        "Lenovo": {
```

```
            "CLIMode": "UserDefined",
            "@odata.type": "#LenovoSerialInterface.v1_0_0.LenovoSerialInterfaceProperties",
            "EnterCLIKeySequence": "^[(",
            "SerialInterfaceState": "Enabled"
        }
    },
    "@odata.type": "#SerialInterface.v1_1_3.SerialInterface",
    "DataBits": "8",
    "Id": "1",
    "@odata.etag": "\"bc5c2883051b4e001123be789f9c8034\"",
    "Parity": "None",
    "FlowControl": "None"
}
```


PATCH – Update BMC serial interface configurations

Use the PATCH method to update properties in the resource of serial interface for Redfish service.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/SerialInterfaces/1`

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Error Message ID
BitRate	String	Valid values: 9600, 19200, 38400, 57600, 115200
StopBits	String	Serial interface stop bits. Valid values: 1, 2
Parity	String	Valid values: None, Odd, Even.
InterfaceEnabled	Boolean	Valid values: True/False

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.


```
{
   "BitRate": "57600",
   "Parity": "Even"
}
```


After the PATCH operation runs successfully, querying the chassis resource returns below example JSON response:


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

```
   "BitRate" : "57600",
   "Parity" : "Even",
   "Id" : "1",
   "SignalType" : "Rs232",
   "Oem" : {
      "Lenovo" : {
         "EnterCLIKeySequence" : "^[(",
         "SerialInterfaceState" : "Enabled",
         "CLIMode" : "UserDefined"
      }
   },
   "StopBits" : "1",
   "DataBits" : "8",
   "@odata.etag" : "\"c27142bd8ebce22599a3beed29808fd3\"",
   "@odata.id" : "/redfish/v1/Managers/1/SerialInterfaces/1",
   "@odata.type" : "#SerialInterface.v1_1_3.SerialInterface",
   "Description" : "Serial port redirection of the host.",
   "Name" : "Serial Interface",
   "FlowControl" : "None",
   "InterfaceEnabled" : true
}
```

Chapter 11. Virtual Media Management

Resource VirtualMedia

This resource shall be used to represent a virtual media service for a Redfish implementation.

Number of Resources	10
Resource Path	/redfish/v1/Managers/1/VirtualMedia/{Id}
Schema file	VirtualMediaCollection_v1.xml VirtualMedia_v1.xml

GET – Collection of virtual media

Use the GET method to retrieve properties in virtual media collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/VirtualMedia
```

Request body

None

Response body

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

Field	Type	Description
Name	String	“VirtualMediaCollection”
Members	Array	Items: A reference link to an element of virtual media

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

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

```
{
    "@odata.id": "/redfish/v1/Managers/1/VirtualMedia",
    "Name": "VirtualMediaCollection",
    "@odata.context": "/redfish/v1/$metadata#VirtualMediaCollection.VirtualMediaCollection",
    "Members": [
        {
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/RDOC1"
        },
        {
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/RDOC2"
        },
        {
```

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```
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/EXT1"
        },
        {
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/EXT2"
        },
        {
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/EXT3"
        },
        {
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/EXT4"
        },
        {
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/Remote1"
        },
        {
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/Remote2"
        },
        {
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/Remote3"
        },
        {
            "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/Remote4"
        }
    ],
    "@odata.type": "#VirtualMediaCollection.VirtualMediaCollection",
    "@odata.etag": "\"c54172a08a2b5db8321ef2d79e8850b2\"",
    "Members@odata.count": 10,
    "Description": "A collection of VirtualMedia resource instances"
}
```


GET – Virtual media properties

Use the GET method to retrieve properties in virtual media resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/VirtualMedia/{Id}
```

Request body

None

Response body

Field	Type	Description
Id	String	This field shows the storage type with index value. The Id value will be any of (Remote1, …, Remote4), (RDOC1, RDOC2) or (EXT1, …, EXT4).
Description	String	This resource is used to represent a virtual media service for a Redfish implementation
Name	String	“VirtualMedia”
ImageName	String	Image name
Image	String	A URI providing the location of the selected image.
MediaTypes	Array	The media types supported as virtual media
MediaTypes[]	String	The type values for virtual disk devices.

Field	Type	Description
ConnectedVia	String	Current virtual media connection methods.
Inserted	Boolean	Indicates the virtual media is inserted in the virtual device or not.
WriteProtected	Boolean	Indicate the media is write protected
UserName	String	User name
Password	String	Null
TransferMethod	String	“Upload” or “Stream”.
TransferProtocolType	String	“HTTPS” or “NFS” or “CIFS”. For RDOC type, this property doesn’t show.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "ConnectedVia": "NotConnected",
    "Id": "RDOC1",
    "@odata.etag": "\"3da38b2209e828a948b\"",
    "MediaTypes": [
        "CD",
        "DVD",
        "Floppy",
        "USBStick"
    ],
    "Image": null,
    "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/RDOC1",
    "Name": "VirtualMedia",
    "Password": null,
    "@odata.type": "#VirtualMedia.v1_3_2.VirtualMedia",
    "WriteProtected": true,
    "Description": "This resource shall be used to represent a virtual media service for a Redfish implementation.",
    "Inserted": false,
    "ImageName": null,
    "UserName": null,
  "TransferMethod": null,
  "TransferProtocolType": null
}
```

PATCH – Insert/Eject a virtual media

Use the PATCH method to insert or eject a virtual media.

Notes: In current implementation:

- Not support to insert/eject “Remote{N}” media.
- Not support to insert “RDOC{N}” media.
- Only support to insert “EXT{N}” media via protocol HTTP or no credential required NFS.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/VirtualMedia/{id}
```

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Error Message ID
Image	String	A URI providing the location of the selected image. Set to null to eject the virtual media.
Inserted	Boolean	Indicate if virtual media is inserted in the virtual device. set to false to eject the virtual media.
WriteProtected	Boolean	Indicate the media is write protected.
UserName	String	User name
Password	String	Null

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
400	InsufficientPrivilege, Conflict, PropertyValueTypeError, PropertyMissing, PropertyNotWritable, SourceDoesNotSupportProtocol
500	InternalError

Example

The following example is PATCH body.

```
{
    "Image": "http://192.168.1.2/Core-current.iso",
    "Inserted": true,
    "WriteProtected": true,
    "UserName":"test",
    "Password":"PASSWORD"
}
```

After the PATCH operation runs successfully, querying the chassis resource returns below example

```
{
    "ConnectedVia": "URI",
    "Id": "EXT1",
    "MediaTypes": [
        "CD",
        "DVD"
    ],
    "Image": "http://192.168.1.2/Core-current.iso",
    "@odata.context": "/redfish/v1/$metadata#VirtualMedia.VirtualMedia",
    "@odata.id": "/redfish/v1/Managers/1/VirtualMedia/EXT1",
    "ImageName": "Core-current.iso",
    "@odata.type": "#VirtualMedia.v1_3_0.VirtualMedia",
    "WriteProtected": true,
```

```
    "@odata.etag": "\"5fb9f3ba323469f34cf349a889ff49cf\"",
    "Inserted": true,
    "Name": "VirtualMedia",
      "Password": null,
    "Description": "This resource shall be used to represent a virtual media service for a Redfish implementation."
    "Inserted": false,
      "UserName": "test",
    "TransferMethod": “Stream”,
    "TransferProtocolType": “HTTP”

}
```

Chapter 12. Server Management

Resource ComputerSystem

This resource is used to represent computer system for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/Systems/1
Schema file	ComputerSystemCollection_v1.xml ComputerSystem_v1.xml

GET – Collection for server

Use the GET method to retrieve properties in Systems collection for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Systems`

Request body

None

Response body

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

Field	Type	Description
Name	String	“ComputerSystemCollection”.
Members	Array	Items: A reference link to an element of Systems.
Description	String	A collection of ComputerSystem resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

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

```
{
    "@odata.id": "/redfish/v1/Systems",
    "Members@odata.count": 1,
    "@odata.context": "/redfish/v1/$metadata#ComputerSystemCollection.ComputerSystemCollection",
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1"
        }
    ],
    "@odata.type": "#ComputerSystemCollection.ComputerSystemCollection",
    "@odata.etag": "\"1daba583ad7f7510727402be8f09f081\"",
```

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```
    "Name": "ComputerSystemCollection",
    "Description": "A collection of ComputerSystem resource instances."
}
```

GET – Server properties

Use the GET method to retrieve properties in System resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1
```

Request body

None

Response body

Field	Type	Description
Id	String	“1”
Name	String	“ComputerSystem”
Description	String	This resource is used to represent a computing system for a Redfish implementation.
SystemType	String	The type of computer system represented by this resource
AssetTag	String	The asset tag of the system
Manufacturer	String	The manufacturer tag of the system
Model	String	Model of the system
SubModel	String	Sub model of the system
SKU	String	The manufacturer SKU for this system.
SerialNumber	String	Serial number of the system
PartNumber	String	Null
UUID	String	The universal unique identifier (UUID) for this system
HostName	String	The full name of this host: XCC-SubModel-SerialNumber
IndicatorLED	String	The indicator light state for the indicator light associated with this system
Boot	Object	Describes boot information for the current resource. Changes to this object do not alter the BIOS persistent boot order configuration
BootOptions	Link	The link to the collection of the UEFI boot options associated with this computer system.
BootOrder	Array	Items: string Item count: N
BootOrder[N]	String	This should be BootOptionReference strings that represent the persistent boot order for with this computer system.
BootOrderProperty-Selection	String	“BootOrder”.
BootSourceOverri-deEnabled	String	Describes the state of the Boot Source Override feature

Field	Type	Description
BootSourceOverrideMode	String	The BIOS Boot Mode (either Legacy or UEFI) to be used when BootSourceOverrideTarget boot source is booted from
UefiTargetBootSourceOverride	String	The UEFI Device Path of the device to boot from when BootSourceOverrideSupported is UefiTarget.
BootSourceOverrideTarget	String	The current boot source to be used at next boot instead of the normal boot device, if BootSourceOverrideEnabled is true
BootSourceOverrideTarget @Redfish.AllowableValues	Array	Items: string Item count: 8
BootSourceOverrideTarget @Redfish.AllowableValues[0]	String	“None”
BootSourceOverrideTarget @Redfish.AllowableValues[1]	String	“Pxe”
BootSourceOverrideTarget @Redfish.AllowableValues[2]	String	“Cd”
BootSourceOverrideTarget @Redfish.AllowableValues[3]	String	“Usb”
BootSourceOverrideTarget @Redfish.AllowableValues[4]	String	“Hdd”
BootSourceOverrideTarget @Redfish.AllowableValues[5]	String	“BiosSetup”
BootSourceOverrideTarget @Redfish.AllowableValues[6]	String	“Diags”
BootSourceOverrideTarget @Redfish.AllowableValues[7]	String	“UefiTarget”
BootSourceOverrideEnabled @Redfish.AllowableValues	Array	Items: string Item count: 2
BootSourceOverrideEnabled @Redfish.AllowableValues[0]	String	“Once”
BootSourceOverrideEnabled @Redfish.AllowableValues[1]	String	“Disabled”
BiosVersion	String	The version of the system BIOS
TrustedModules	Object	An array of trusted modules in the system. **Note:** This object is not supported on AMD Milan-based systems.
InterfaceType	String	The interface type of the Trusted Module.

Field	Type	Description
FirmwareVersion	String	The firmware version of this Trusted Module.
InterfaceTypeSelection	String	The interface type selection supported by this Trusted Module.
Status	Object	The status of this trusted module.
State	String	The state of this trusted module.
Health	String	If state is “Absent”, it is hidden, otherwise it is “OK”
ProcessorSummary	Object	This object describes the central processors of the system in general detail.
Count	Number	The number of processors in the system.
LogicalProcessorCount	Integer	The logical Processor Count.
Metrics	Link	The link to the metrics associated with all processors in this system.
Model	String	The processor model for the primary or majority of processors in this system.
Status	Object	Reflect the processor summary status
State	String	”Enabled”
HealthRollup	String	This represents the overall health state from the view of this resource.
Health	String	This represents the health state of this resource in the absence of its dependent resources.
MemorySummary	Object	This object describes the memory of the system in general detail.
Metrics	Link	The link to the metrics associated with all memories in this system.
TotalSystemMemoryGiB	Number	The total installed, operating system-accessible memory (RAM), measured in GiB
Status	Object	Reflect the memory summary status
State	String	“Enabled”.
HealthRollup	String	This represents the overall health state from the view of this resource.
Health	String	This represents the health state of this resource in the absence of its dependent resources.
Processors	Link	This object describes the processor of the system in general detail.
Status	Object	Expanded
State	String	“Enabled”
HealthRollup	String	This represents the overall health state from the view of this resource.
Health	String	This represents the health state of this resource in the absence of its dependent resources.
Links	Object	An object for reference links
ManagedBy	Array	An array of references to Managers responsible for this system
Chassis	Array	An array of references to the chassis in which this system is contained
PoweredBy	Array	An array of references to power responsible for this system
CooledBy	Array	An array of references to cooling device responsible for this system
EthernetInterfaces	Link	A reference to the collection of Ethernet interfaces associated with this system

Field	Type	Description
NetworkInterfaces	Link	A reference to the collection of network interfaces associated with this system
LogServices	Link	A reference to the collection of Log Services associated with this system
PowerState	String	Current power state of the system
Bios	Link	A reference to the BIOS settings associated with this system.
Memory	Link	A reference to the collection of memory device associated with this system.
Storage	Link	A reference to the collection of storage device with this system.
SecureBoot	Link	A reference to the SecureBoot settings associated with this system.
HostWatchdogTimer	Object	This object describes the Host Watchdog Timer functionality for this system.
FunctionEnabled	Boolean	This indicates if the Host Watchdog Timer functionality has been enabled. Additional host-based software is necessary to activate the timer function.
Status	Object	Expanded
State	String	“Disabled” or “StandbyOffline”.
TimeoutAction	String	This property indicates the action to perform when the Watchdog Timer reaches its timeout value.
TimeoutAction@ Redfish. AllowableValues	Array	Item type: string Item count: 1 Item: [“PowerCycle”]
WarningAction	String	This property indicates the action to perform when the Watchdog Timer is close (typically 3-10 seconds) to reaching its timeout value.
WarningAction@ Redfish. AllowableValues	Array	Item type: string Item count: 1 Item: [“None”]
PCIeDevices	Array	An array of references to pci devices in which this system is contained
PCIeFunctions	Array	An array of references to pci functions in which this system is contained
Actions	Object	The available actions for this resource.
#ComputerSystem. Reset	Object	This action shall perform a reset of the ComputerSystem. For systems which implement APCI Power Button functionality, the PushPowerButton value shall perform or emulate an ACPI Power Button push. The ForceOff value shall remove power from the system or perform an ACPI Power Button Override (commonly known as a 4-second hold of the Power Button). The ForceRestart value shall perform a ForceOff action followed by a On action.
@Redfish.ActionInfo	Link	/redfish/v1/Systems/1/ResetActionInfo
ResetType@Redfish. AllowableValues	Array	Items: string Item count: 7
ResetType@Redfish. AllowableValues[0]	String	“On”
ResetType@Redfish. AllowableValues[1]	String	“Nmi”

Field	Type	Description
ResetType@Redfish.AllowableValues[2]	String	“GracefulShutdown”
ResetType@Redfish.AllowableValues[3]	String	“GracefulRestart”
ResetType@Redfish.AllowableValues[4]	String	“ForceOn”
ResetType@Redfish.AllowableValues[5]	String	“ForceOff”
ResetType@Redfish.AllowableValues[6]	String	“ForceRestart”

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "SerialNumber": "NARVIR073",
    "Id": "1",
    "IndicatorLED": "Off",
    "PowerState": "On",
    "ProcessorSummary": {
        "Status": {
            "HealthRollup": "OK",
            "Health": "OK",
            "State": "Enabled"
        },
        "Metrics": {
            "@odata.id": "/redfish/v1/Systems/1/ProcessorSummary/ProcessorMetrics"
        },
        "Count": 1,
        "Model": "Genuine Intel(R) CPU 0000%@",
        "LogicalProcessorCount": 48
    },
    "NetworkInterfaces": {
        "@odata.id": "/redfish/v1/Systems/1/NetworkInterfaces"
    },
    "Storage": {
        "@odata.id": "/redfish/v1/Systems/1/Storage"
    },
    "PartNumber": null,
    "SubModel": "7Z59",
    "Bios": {
        "@odata.id": "/redfish/v1/Systems/1/Bios"
    },
    "UUID": "55833bf4-5bbb-11e7-997f-0a94ef402c57",
    "Name": "ComputerSystem",
    "HostWatchdogTimer": {
        "WarningAction": "None",
        "WarningAction@Redfish.AllowableValues": [
            "None"
```

```
    ],
    "Status": {
        "State": "Disabled"
    },
    "TimeoutAction": "PowerCycle",
    "TimeoutAction@Redfish.AllowableValues": [
        "PowerCycle"
    ],
    "FunctionEnabled": false
},
"Oem": {
    "Lenovo": {
        "ScheduledPowerActions": {
            "@odata.id": "/redfish/v1/Systems/1/Oem/Lenovo/ScheduledPowerActions"
        },
        "FrontPanelUSB": {
            "InactivityTimeoutMins": 5,
            "IDButton": "On",
            "PortSwitchingTo": "Server",
            "FPMode": "Shared"
        },
        "Sensors": {
            "@odata.id": "/redfish/v1/Chassis/1/Oem/Lenovo/Sensors"
        },
        "SystemStatus": "BootingOSOrInUndetectedOS",
        "NumberOfReboots": 22,
        "HistorySysPerf": {
            "@odata.id": "/redfish/v1/Systems/1/Oem/Lenovo/HistorySysPerf"
        },
        "@odata.type": "#LenovoComputerSystem.v1_0_0.LenovoSystemProperties",
        "TotalPowerOnHours": 219,
        "Metrics": {
            "@odata.id": "/redfish/v1/Systems/1/Oem/Lenovo/Metrics"
        },
        "BootSettings": {
            "@odata.id": "/redfish/v1/Systems/1/Oem/Lenovo/BootSettings"
        }
    }
},
"@odata.type": "#ComputerSystem.v1_9_0.ComputerSystem",
"Manufacturer": "Lenovo",
"@odata.etag": "\"42a3dfa9254124eb4ca7a70e77fb8ce7\"",
"Actions": {
    "#ComputerSystem.Reset": {
        "title": "Reset",
        "target": "/redfish/v1/Systems/1/Actions/ComputerSystem.Reset",
        "@Redfish.ActionInfo": "/redfish/v1/Systems/1/ResetActionInfo",
        "ResetType@Redfish.AllowableValues": [
            "On",
            "Nmi",
            "GracefulShutdown",
            "GracefulRestart",
            "ForceOn",
            "ForceOff",
            "ForceRestart"
        ]
    },
    "Oem": {
        "#LenovoComputerSystem.BootToBIOSSetup": {
            "title": "BootToBIOSSetup",
            "target": "/redfish/v1/Systems/1/Actions/Oem/LenovoComputerSystem.BootToBIOSSetup"
```

```
        },
        "#LenovoComputerSystem.CustomizedReset": {
            "target": "/redfish/v1/Systems/1/Actions/Oem/LenovoComputerSystem.CustomizedReset",
            "title": "CustomizedReset",
            "ResetType@Redfish.AllowableValues": [
                "On"
            ]
        }
    }
},
"EthernetInterfaces": {
    "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces"
},
"Boot": {
    "BootSourceOverrideEnabled@Redfish.AllowableValues": [
        "Once",
        "Disabled"
    ],
    "BootSourceOverrideTarget@Redfish.AllowableValues": [
        "None",
        "Pxe",
        "Cd",
        "Usb",
        "Hdd",
        "BiosSetup",
        "Diags",
        "UefiTarget"
    ],
    "UefiTargetBootSourceOverride": null,
    "BootSourceOverrideTarget": "None",
    "BootSourceOverrideEnabled": "Disabled",
    "BootSourceOverrideMode": "UEFI"
},
"@odata.id": "/redfish/v1/Systems/1",
"AssetTag": "",
"PCIeFunctions": [
    {
        "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_13/PCIeFunctions/slot_13.00"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_13/PCIeFunctions/slot_13.01"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/ob_1/PCIeFunctions/ob_1.02"
    }
],
"SystemType": "Physical",
"BiosVersion": "M5E101Q",
"HostName": "Narvi-SR860V2-1",
"MemorySummary": {
    "Status": {
        "HealthRollup": "OK",
        "Health": "OK",
        "State": "Enabled"
    },
    "Metrics": {
        "@odata.id": "/redfish/v1/Systems/1/MemorySummary/MemoryMetrics"
    },
    "TotalSystemMemoryGiB": 16
},
"Processors": {
```

```
    "@odata.id": "/redfish/v1/Systems/1/Processors"
},
"PCIeFunctions@odata.count": 3,
"SecureBoot": {
    "@odata.id": "/redfish/v1/Systems/1/SecureBoot"
},
"PCIeDevices": [
    {
        "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_13"
    },
    {
        "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/ob_1"
    }
],
"TrustedModules": [
    {
        "Status": {
            "State": "Absent"
        },
        "InterfaceType": "TPM2_0",
        "FirmwareVersion": "7.2.1.0",
        "InterfaceTypeSelection": "BiosSetting"
    }
],
"PCIeDevices@odata.count": 2,
"SKU": "7Z59CTO1WW",
"Model": "ThinkSystem SR860",
"Description": "This resource is used to represent a computing system for a Redfish implementation.",
"Links": {
    "CooledBy": [
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/0"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/1"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/2"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/3"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/4"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/5"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/6"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/7"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/8"
        },
        {
            "@odata.id": "/redfish/v1/Chassis/1/Thermal#/Fans/9"
        }
    ],
```

```
        "Chassis": [
            {
                "@odata.id": "/redfish/v1/Chassis/1"
            }
        ],
        "PoweredBy": [
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/0"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/1"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/2"
            },
            {
                "@odata.id": "/redfish/v1/Chassis/1/Power#/PowerSupplies/3"
            }
        ],
        "ManagedBy": [
            {
                "@odata.id": "/redfish/v1/Managers/1"
            }
        ]
    },
    "LogServices": {
        "@odata.id": "/redfish/v1/Systems/1/LogServices"
    },
    "Memory": {
        "@odata.id": "/redfish/v1/Systems/1/Memory"
    },
    "Status": {
        "HealthRollup": "OK",
        "Health": "OK",
        "State": "Enabled"
    }
}
```


PATCH – Update next-one-time boot configurations and other properties

Use the PATCH method to update properties in System resource for Redfish service.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/Systems/1`

Request body

Properties to be updated are shown as below.

Field		Type	Description
Boot		Object	Describes boot information for the current resource. Changes to this object do not alter the BIOS persistent boot order configuration.
	BootSourceOverrideEnabled	String	Describes the state of the Boot Source Override feature.
	BootSourceOverrideMode	String	The BIOS Boot Mode (either Legacy or UEFI) to be used when BootSourceOverrideTarget boot source is booted from.
	UefiTargetBootSourceOverride	String	The UEFI Device Path of the device to boot from when BootSourceOverrideSupported is UefiTarget.

Field	Type	Description
BootSourceOverrideTarget	String	The current boot source to be used at next boot instead of the normal boot device, if BootSourceOverrideEnabled is true
HostWatchdogTimer	Object	This object describes the Host Watchdog Timer functionality for this system.
FunctionEnabled	Boolean	This indicates if the Host Watchdog Timer functionality has been enabled. Additional host-based software is necessary to activate the timer function.
AssetTag	String	The asset tag of the system.
IndicatorLED	Object	The indicator light state for the indicator light associated with this system

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body.

```
{
   "Boot" : {
      "BootSourceOverrideMode" : "Legacy",
      "BootSourceOverrideTarget" : "Hdd",
      "BootSourceOverrideEnabled" : "Once",
      "UefiTargetBootSourceOverride" : null
   },
   "HostWatchdogTimer" : {
  "FunctionEnabled": true
   },
   "AssetTag": "asset tag",
   "IndicatorLED": "Lit"
}
```

After the PATCH operation runs successfully, querying the system resource returns below example JSON response:

```
{
    …
    "IndicatorLED": "Lit",
    "HostWatchdogTimer": {
        "WarningAction": "None",
        "WarningAction@Redfish.AllowableValues": [
            "None"
        ],
        "Status": {
            "State": "Disabled"
        },
        "FunctionEnabled": true,
        "TimeoutAction@Redfish.AllowableValues": [
            "PowerCycle"
```

```
        ],
        "TimeoutAction": "PowerCycle"
    },
    "AssetTag": "asset tag",
    "Boot": {
        "BootSourceOverrideEnabled@Redfish.AllowableValues": [
            "Once",
            "Disabled"
        ],
        "BootSourceOverrideMode": "Legacy",
        "UefiTargetBootSourceOverride": null,
        "BootSourceOverrideEnabled": "Once",
        "BootSourceOverrideTarget@Redfish.AllowableValues": [
            "None",
            "Pxe",
            "Cd",
            "Usb",
            "Hdd",
            "BiosSetup",
            "Diags",
            "UefiTarget"
        ],
        "BootSourceOverrideTarget": "Hdd"
    },
    …
}
```

POST – Server reset operations

Use the POST method for server reset operations.

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/Systems/1/Actions/ComputerSystem.Reset`

Request body

Field	Error Message ID
ResetType	System reset type, possible values: On/ForceOff/GracefulShutdown/GracefulRestart/ ForceRestart/Nmi/ForceOn

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

The following example is POST body.

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

The following example JSON response is returned:

None

Chapter 13. Log Service and Event Log

Resource LogService

This resource is used to provided Log Service and Event Log for a Redfish implementation.

Number of Resources	5 (Intel Purley-based systems) or 6 (Intel Whitley-based and AMD 2P systems)
Resource Path	/redfish/v1/ Systems/1/LogServices/{StandardLog, AuditLog, PlatformLog, ActiveLog, MaintenanceLog, SaLog, SEL}
Schema file	LogServiceCollection_v1.xml LogService_v1.xml

GET – Collection of BMC log services

Use the GET method to retrieve properties in log services resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices
```

Request body

None

Response body

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

Field	Type	Description
Name	String	The name of the log services collection. Always set to “LogServiceCollection”.
Members	Array	Contains the members of log services collection.
Description	String	A collection of LogService resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

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

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1/LogServices/PlatformLog"
        },
        {
```

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```
            "@odata.id": "/redfish/v1/Systems/1/LogServices/AuditLog"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/LogServices/ActiveLog"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/LogServices/MaintenanceLog"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/LogServices/SaLog"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/LogServices/SEL"
        }
    ],
    "@odata.type": "#LogServiceCollection.LogServiceCollection",
    "@odata.id": "/redfish/v1/Systems/1/LogServices",
    "Name": "LogServiceCollection",
    "@odata.etag": "\"45c14a3a3bee29678fb\"",
    "Members@odata.count": 6,
    "Description": "A collection of LogService resource instances."
}
```


GET – Service for BMC active logs

Use the GET method to retrieve properties in active log service resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/ActiveLog
```

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log services resource. Always set to “ActiveLog”.
Name	String	The name of the resource or array element.
DateTimeLocalOffset	String	The UTC offset that the current DateTime property value contains in the "+HH:MM" format.
MaxNumberOfRecords	Number	The maximum number of log entries this service can have. Always set to 1024.
DateTime	String	The current DateTime (with offset) for the log service, used to set or read time.
ServiceEnabled	Boolean	Indicate whether this service is enabled.
LogEntryType	String	“Multiple”
Entries	Object	References to the log entry collection.
Description	String	This resource is used to represent a log service for a Redfish implementation.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "DateTimeLocalOffset": "+00:00",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/ActiveLog",
    "Name": "LogService",
    "Entries": {
        "@odata.id": "/redfish/v1/Systems/1/LogServices/ActiveLog/Entries"
    },
    "MaxNumberOfRecords": 1024,
    "DateTime": "2020-06-03T06:33:48+00:00",
    "@odata.type": "#LogService.v1_1_3.LogService",
    "LogEntryType": "Multiple",
    "Id": "ActiveLog",
    "@odata.etag": "\"3807510e8e6b24e8f42\"",
    "ServiceEnabled": true,
    "Description": "This resource is used to represent a log service for a Redfish implementation."
}
```

GET – Service for BMC standard event logs (Apply to Intel Purley-based systems)

Use the GET method to retrieve properties in standard log service resource for a server.

Note: In Lenovo Purley-based systems, the standard event log service is consisted of Audit log service and platform log service, while in next generation products(like Whitley-based systems), the standard log service on longer exists and turns into two separate log service “Audit”(13.1.5) and “Platform”(13.1.4).

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/StandardLog`

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log services resource. Always set to “StandardLog”.
Name	String	The name of the resource or array element.
DateTimeLocalOffset	String	The UTC offset that the current DateTime property value contains in the "+HH:MM" format.
MaxNumberOfRecords	Number	The maximum number of log entries this service can have. Always set to 1024.
DateTime	String	The current DateTime (with offset) for the log service, used to set or read time.

Field	Type	Description
OverWritePolicy	String	The overwrite policy for this service that takes place when the log is full. Always set to “WrapsWhenFull” – When full, new entries to the Log will overwrite previous entries.
ServiceEnabled	Boolean	Indicate whether this service is enabled.
LogEntryType	String	“Multiple”
Entries	Object	References to the log entry collection.
Actions	Object	The available actions for this resource.
#LogService.ClearLog	Object	This action is used to clear all standard log entries.
Description	String	This resource is used to represent a log service for a Redfish implementation.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "OverWritePolicy": "WrapsWhenFull",
    "DateTime": "2021-10-13T02:18:41+00:00",
    "@odata.etag": "\"d77bd9d6dea833b5c1ad1\"",
    "Description": "This resource is used to represent a log service for a Redfish implementation.",
    "Actions": {
        "Oem": {
            "#LenovoLogService.GetLogEntriesBySequenceNumber": {
                "target":
"/redfish/v1/Systems/1/LogServices/StandardLog/Actions/Oem/LenovoLogService.GetLogEntriesBySequenceNumber",
                "title": "GetLogEntriesBySequenceNumber"
            },
            "#LenovoLogService.ClearSpecifiedLog": {
                "target":
"/redfish/v1/Systems/1/LogServices/StandardLog/Actions/Oem/LenovoLogService.ClearSpecifiedLog",
                "title": "ClearSpecifiedLog"
            },
            "#LenovoLogService.GetLogEntriesByTotalSequenceNumber": {
                "target":
"/redfish/v1/Systems/1/LogServices/StandardLog/Actions/Oem/LenovoLogService.GetLogEntriesByTotalSequenceNumber",
                "title": "GetLogEntriesByTotalSequenceNumber"
            }
        },
        "#LogService.ClearLog": {
            "target": "/redfish/v1/Systems/1/LogServices/StandardLog/Actions/LogService.ClearLog",
            "title": "ClearLog"
        }
    },
    "Entries": {
        "@odata.id": "/redfish/v1/Systems/1/LogServices/StandardLog/Entries"
    },
    "LogEntryType": "Multiple",
    "@odata.type": "#LogService.v1_1_3.LogService",
    "Id": "StandardLog",
```

```
    "@odata.id": "/redfish/v1/Systems/1/LogServices/StandardLog",
    "ServiceEnabled": true,
    "Name": "LogService",
    "MaxNumberOfRecords": 2048,
    "DateTimeLocalOffset": "+00:00",
    "Oem": {
        "Lenovo": {
            "AuditHiddenLastSeqNum": 12,
            "PlatformHiddenLastSeqNum": 5,
            "SupportedCategories": 3087007935,
            "PlatformHiddenFirstSeqNum": 1,
            "AuditLastSeqNum": 56,
            "AuditFirstSeqNum": 1,
            "PlatformFirstSeqNum": 1,
            "AuditHiddenFirstSeqNum": 1,
            "AuditLogCapabilities": [
                "None"
            ],
            "DesiredCategories": 2147483684,
            "@odata.type": "#LenovoLogService.v1_0_0.LenovoLogServiceProperties",
            "PlatformLastSeqNum": 30,
            "VMMoveCategory": [
                {
                    "VMMoveCategoryBit": 0,
                    "VMMoveCategoryType": "VMEFlag",
                    "VMMoveCategoryName": "RAS event VM movement support"
                }
            ]
        }
    }
}
```


GET – Service for BMC Platform event logs

Use the GET method to retrieve properties in Platform log service resource for a server.

Note: This resource is not available on Lenovo Purley-based systems. If you are looking for platform log service on Lenovo Purley systems, please refer to 13.1.3.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/PlatformLog
```

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log services resource. Always set to “PlatformLog”.
Name	String	The name of the resource or array element.
DateTimeLocalOffset	String	The UTC offset that the current DateTime property value contains in the "+HH:MM" format.
MaxNumberOfRecords	Number	The maximum number of log entries this service can have. Always set to 1024.

Field	Type	Description
DateTime	String	The current DateTime (with offset) for the log service, used to set or read time.
OverWritePolicy	String	The overwrite policy for this service that takes place when the log is full. Always set to “WrapsWhenFull” – When full, new entries to the Log will overwrite previous entries.
ServiceEnabled	Boolean	Indicate whether this service is enabled.
LogEntryType	String	“Multiple”
Entries	Object	References to the log entry collection.
Actions	Object	The available actions for this resource.
#LogService.ClearLog	Object	This action is used to clear all standard log entries.
Description	String	This resource is used to represent a log service for a Redfish implementation.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "DateTimeLocalOffset": "+00:00",
    "Id": "PlatformLog",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/PlatformLog",
    "ServiceEnabled": true,
    "LogEntryType": "Multiple",
    "Name": "LogService",
    "Entries": {
        "@odata.id": "/redfish/v1/Systems/1/LogServices/PlatformLog/Entries"
    },
    "MaxNumberOfRecords": 1024,
    "DateTime": "2020-06-03T06:35:36+00:00",
    "@odata.type": "#LogService.v1_1_3.LogService",
    "OverWritePolicy": "WrapsWhenFull",
    "Oem": {
        "Lenovo": {
            "HiddenFirstSeqNum": 1,
            "LastSeqNum": 316,
            "@odata.type": "#LenovoLogService.v1_0_0.LenovoLogServiceProperties",
            "FirstSeqNum": 5,
            "VMMoveCategory": [
                {
                    "VMMoveCategoryName": "RAS event VM movement support",
                    "VMMoveCategoryBit": 0,
                    "VMMoveCategoryType": "VMEFlag"
                }
            ],
            "HiddenLastSeqNum": 7,
            "SupportedCategories": 3087007930,
            "DesiredCategories": 2147483684
        }
```

```
    },
    "@odata.etag": "\"93a07843ee0d2d2672f4c\"",
    "Actions": {
        "Oem": {
            "#LenovoLogService.GetLogEntriesBySequenceNumber": {
                "title": "GetLogEntriesBySequenceNumber",
                "target": "/redfish/v1/Systems/1/LogServices/PlatformLog/Actions/Oem/LenovoLogService.
GetLogEntriesBySequenceNumber"
            }
        },
        "#LogService.ClearLog": {
            "title": "ClearLog",
            "target": "/redfish/v1/Systems/1/LogServices/PlatformLog/Actions/LogService.ClearLog"
        }
    },
    "Description": "This resource is used to represent a log service for a Redfish implementation."
}
```

GET – Service for BMC audit event logs

Use the GET method to retrieve properties in Audit log service resource for a server.

Note: This resource is not available on Lenovo Purley-based systems. If you are looking for audit log service on Lenovo Purley systems, please refer to 13.1.3.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/AuditLog
```

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log services resource. Always set to “AuditLog”.
Name	String	The name of the resource or array element.
DateTimeLocalOffset	String	The UTC offset that the current DateTime property value contains in the "+HH:MM" format.
MaxNumberOfRecords	Number	The maximum number of log entries this service can have. Always set to 1024.
DateTime	String	The current DateTime (with offset) for the log service, used to set or read time.
OverWritePolicy	String	The overwrite policy for this service that takes place when the log is full. Always set to “WrapsWhenFull” – When full, new entries to the Log will overwrite previous entries.
ServiceEnabled	Boolean	Indicate whether this service is enabled.
LogEntryType	String	“Multiple”
Entries	Object	References to the log entry collection.
Actions	Object	The available actions for this resource.

Field	Type	Description
#LogService.ClearLog	Object	This action is used to clear all standard log entries.
Description	String	This resource is used to represent a log service for a Redfish implementation.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "DateTimeLocalOffset": "+00:00",
    "DateTime": "2020-06-03T07:21:22+00:00",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/AuditLog",
    "Id": "AuditLog",
    "Entries": {
        "@odata.id": "/redfish/v1/Systems/1/LogServices/AuditLog/Entries"
    },
    "Name": "LogService",
    "ServiceEnabled": true,
    "MaxNumberOfRecords": 1024,
    "Oem": {
        "Lenovo": {
            "HiddenFirstSeqNum": 3,
            "@odata.type": "#LenovoLogService.v1_0_0.LenovoLogServiceProperties",
            "FirstSeqNum": 1,
            "HiddenLastSeqNum": 60,
            "LastSeqNum": 311
        }
    },
    "@odata.type": "#LogService.v1_1_3.LogService",
    "OverWritePolicy": "WrapsWhenFull",
    "LogEntryType": "Multiple",
    "@odata.etag": "\"7b494747f82927f1bd1\"",
    "Actions": {
        "Oem": {
            "#LenovoLogService.GetLogEntriesBySequenceNumber": {
                "title": "GetLogEntriesBySequenceNumber",
                "target": "/redfish/v1/Systems/1/LogServices/AuditLog/Actions/Oem/
LenovoLogService.GetLogEntriesBySequenceNumber"
            }
        },
        "#LogService.ClearLog": {
            "title": "ClearLog",
            "target": "/redfish/v1/Systems/1/LogServices/AuditLog/Actions/LogService.ClearLog"
        }
    },
    "Description": "This resource is used to represent a log service for a Redfish implementation."
}
```

GET – Service for BMC Maintenance event logs

Use the GET method to retrieve properties in maintenance log service resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/MaintenanceLog
```

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log services resource. Always set to “MaintenanceLog”.
Name	String	The name of the resource or array element.
DateTimeLocalOffset	String	The UTC offset that the current DateTime property value contains in the "+HH:MM" format.
MaxNumberOfRecords	Number	The maximum number of log entries this service can have. Always set to 1024.
DateTime	String	The current DateTime (with offset) for the log service, used to set or read time.
ServiceEnabled	Boolean	Indicate whether this service is enabled.
LogEntryType	String	“Multiple”
Entries	Object	References to the log entry collection.
Description	String	This resource is used to represent a log service for a Redfish implementation.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "DateTimeLocalOffset": "+00:00",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/MaintenanceLog",
    "Name": "LogService",
    "Entries": {
        "@odata.id": "/redfish/v1/Systems/1/LogServices/MaintenanceLog/Entries"
    },
    "MaxNumberOfRecords": 750,
    "DateTime": "2020-06-03T07:21:52+00:00",
    "@odata.type": "#LogService.v1_1_3.LogService",
    "LogEntryType": "Multiple",
    "Id": "MaintenanceLog",
    "@odata.etag": "\"3ac30640398727e442b\"",
    "ServiceEnabled": true,
    "Description": "This resource is used to represent a log service for a Redfish implementation."
}
```

GET – Service for BMC Service Advisor event logs

Use the GET method to retrieve properties in service advisor log service resource for a server.

Note: This API applies to Lenovo Intel Whitley-based systems and AMD 2 sockets systems. Intel Purley-based systems do not support this function.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/SaLog
```

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log services resource. Always set to “SaLog”.
Name	String	The name of the resource or array element.
DateTimeLocalOffset	String	The UTC offset that the current DateTime property value contains in the "+HH:MM" format.
MaxNumberOfRecords	Number	The maximum number of log entries this service can have. Always set to 750.
DateTime	String	The current DateTime (with offset) for the log service, used to set or read time.
ServiceEnabled	Boolean	Indicate whether this service is enabled.
LogEntryType	String	“Multiple”
Entries	Object	References to the log entry collection.
Description	String	This resource is used to represent a log service for a Redfish implementation.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "DateTimeLocalOffset": "+00:00",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/SaLog",
    "Name": "LogService",
    "ServiceEnabled": true,
    "MaxNumberOfRecords": 5,
    "DateTime": "2020-06-04T07:23:06+00:00",
    "@odata.type": "#LogService.v1_1_3.LogService",
    "LogEntryType": "Multiple",
    "Id": "SaLog",
    "@odata.etag": "\"371639a953bf2ae7845\"",
    "Entries": {
        "@odata.id": "/redfish/v1/Systems/1/LogServices/SaLog/Entries"
    },
    "Description": "This resource is used to represent a log service for a Redfish implementation."
}
```

GET – Service for IPMI SEL log

Use the GET method to retrieve properties in service advisor log service resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/SEL
```

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log services resource. Always set to “SEL”.
Name	String	The name of the resource or array element.
DateTimeLocalOffset	String	The UTC offset that the current DateTime property value contains in the "+HH:MM" format.
MaxNumberOfRecords	Number	The maximum number of log entries this service can have. Always set to 511.
DateTime	String	The current DateTime (with offset) for the log service, used to set or read time.
ServiceEnabled	Boolean	Indicate whether this service is enabled.
OverWritePolicy	String	“NeverOverWrites” or “WrapsWhenFull”.
LogEntryType	String	“Multiple”
Description	String	This resource is used to represent a log service for a Redfish implementation.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "OverWritePolicy": "NeverOverWrites",
    "Actions": {
        "#LogService.ClearLog": {
            "target": "/redfish/v1/Systems/1/LogServices/SEL/Actions/LogService.ClearLog",
            "title": "ClearLog"
        }
    },
    "DateTimeLocalOffset": "+05:00",
    "DateTime": "2021-10-11T12:02:39+05:00",
    "Description": "This resource is used to represent a log service for a Redfish implementation.",
    "MaxNumberOfRecords": 511,
    "@odata.etag": "\"51cc7189a8b227e82e7\"",
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoLogService.v1_0_0.LenovoLogServiceProperties",
```

```
            "EnableSELWrapping": false
        }
    },
    "Name": "LogService",
    "@odata.type": "#LogService.v1_1_3.LogService",
    "ServiceEnabled": true,
    "Id": "SEL",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/SEL"
}
```

GET – Service for IPMI Diagnostic log

Use the GET method to retrieve properties in service diagnostic log service resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/DiagnosticLog
```

Request body

None

Response body

Field	Type	Description
DateTimeLocalOffset	String	Current date time offset
Description	String	This resource is used to represent a log service for a Redfish implementation.
Entries	Link	Link to each log entries
Name	String	LogService
ServiceEnabled	Boolean	True
Id	String	DiagnosticLog
MaxNumberOfRecords	Integer	3 (Manager (FFDC) , OS (failure screen) and OEM(MPFA))
DateTime	String	Current date time "format": "date-time"
OverWritePolicy	String	enum string “WrapsWhenFull”
LogEntryType	String	enum string “Multiple”
Actions	Object	Expanded
#LogService.CollectDiagnosticData	Object	

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

```
{
    "@odata.type": "#LogService.v1_3_0.LogService",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/DiagnosticLog",
    "@odata.etag": "\"6ab575b7abaf242f4601\"",
    "MaxNumberOfRecords": 3,
```

```
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoLogService.v1_0_0.LenovoLogServiceProperties",
            "MPFA_LastSeqNum": 31,
            "MPFA_FirstSeqNum": 1
        }
    },
    "DateTime": "2022-12-16T00:54:51+00:00",
    "Entries": {
        "@odata.id": "/redfish/v1/Systems/1/LogServices/DiagnosticLog/Entries"
    },
    "Id": "DiagnosticLog",
    "@odata.context": "/redfish/v1/$metadata#LogService.LogService",
    "Actions": {
        "#LogService.CollectDiagnosticData": {
            "target": "/redfish/v1/Systems/1/LogServices/DiagnosticLog/Actions/LogService.CollectDiagnosticData",
            "title": "CollectDiagnosticData"
        }
    },
    "DateTimeLocalOffset": "+00:00",
    "Description": "This resource is used to represent a log service for a Redfish implementation.",
    "LogEntryType": "Multiple",
    "ServiceEnabled": true,
    "OverWritePolicy": "WrapsWhenFull",
    "Name": "LogService"
}
```


POST – Clear event logs

Use the POST method to clear event logs.

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/StandardLog/Actions/LogService.ClearLog`

Request body

None

Response body

None

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response example

The following example is POST body.

None

The following example JSON response is returned:

None

Resource LogEntry

This resource is used to provide logs of LogEntry for a Redfish implementation

Number of Resources	Number of log entries
Resource Path	/redfish/v1/Systems/1/LogServices/StandardLog/Entries /redfish/v1/ Systems/1/LogServices/PlatformLog/Entries /redfish/v1/Systems/1/LogServices/AuditLog/Entries /redfish/v1/Systems/1/LogServices/ActiveLog/Entries /redfish/v1/Systems/1/LogServices/MaintenanceLog/Entries /redfish/v1/Systems/1/LogServices/SaLog/Entries
Schema file	LogEntryCollection_v1.xml LogEntry_v1.xml

GET – BMC active log entries

Use the GET method to retrieve properties in active log entries for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/ActiveLog/Entries
```

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log entries.
Name	String	The name of the resource or array element. Always set to “LogEntry”.
Severity	String	The severity of the log entry.
Created	String	The time the log entry was created.
EventId	String	The unique instance identifier for an event.
EntryType	String	The type of log entry. Always set to “Oem”.
OemRecordFormat	String	If the entry type is Oem, this will contain more information about the record format from the Oem. Always set to Lenovo.
OemLogEntryCode	String	The OEM-specific entry code.
Message	String	The actual Log Entry.
MessageArgs	Array	Arguments for the message.
Description	String	A collection of Active LogEntry resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "Members": [
        {
            "Id": "427",
            "MessageArgs": [
                "processor 1"
            ],
            "@odata.id": "/redfish/v1/Systems/1/LogServices/ActiveLog/Entries/427",
            "Severity": "Critical",
            "EntryType": "Oem",
            "Name": "LogEntry",
            "Created": "2020-06-02T02:20:07.639+00:00",
            "OemLogEntryCode": "PLAT0062",
            "Oem": {
                "Lenovo": {
                    "RelatedEventID": "",
                    "IsLocalEvent": true,
                    "EventID": "0x806F05070301FFFF",
                    "TotalSequenceNumber": "427",
                    "EventID@Redfish.Deprecated": "The property is deprecated. Please use EventId instead.",
                    "EventFlag": 0,
                    "EventType": 0,
                    "CommonEventID": "FQXSPPU0009N",
                    "Source": "Processors",
                    "LenovoMessageID": "PLAT0062",
                    "RawDebugLogURL": "",
                    "ReportingChain": "XCC",
                    "TSLVersion": "16",
                    "@odata.type": "#LenovoLogEntry.v1_0_0.ActiveLogEntry"
                }
            },
            "EventId": "0x806F05070301FFFF",
            "OemRecordFormat": "Lenovo",
            "Message": "processor 1 has a Configuration Mismatch.",
            "@odata.etag": "\"69da974945f5296f92a\"",
            "@odata.type": "#LogEntry.v1_5_0.LogEntry",
            "Description": "This resource is used to represent a log entry for log services for a
Redfish implementation."
        }
],
"@odata.type": "#LogEntryCollection.LogEntryCollection",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/ActiveLog/Entries",
    "Members@odata.count": 1,
    "@odata.etag": "\"24e5339e3932332c8fb019\"",
    "Name": "LogEntryActiveLogEntryCollection",
    "Description": "A collection of LogEntryActiveLogEntry resource instances."
}
```

GET – BMC standard event log entries (Apply to Intel Purley-based systems)

Use the GET method to retrieve properties in standard log entries for a server.

Note: In Lenovo Purley-based systems, the standard event log entry is consisted of Audit log entry and platform log entry, while in next generation products (like Whitley-based systems), the standard log entry no longer exists and truns into two separate log entry “Audit”(13.2.4) and “Platform”(13.2.3).

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/StandardLog/Entries
```

Request body

None

Response body

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

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log entries.
Name	String	The name of the resource or array element. Always set to “LogEntry”
Severity	String	The severity of the log entry.
Created	String	The time the log entry was created.
EventId	String	The unique instance identifier for an event.
EntryType	String	The type of log entry. Always set to “Oem”.
EventGroupId	Integer	The identifier to correlate events come from a same cause. Always set to 0.
OemRecordFormat	String	If the entry type is Oem, this will contain more information about the record format from the Oem. Always set to Lenovo.
OemLogEntryCode	String	The OEM-specific entry code.
Message	String	The actual Log Entry.
MessageArgs	Array	Arguments for the message.
Description	String	A collection of Platform LogEntry resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members@odata.count": 86,
    "Members": [
        {
            "Created": "2021-09-29T09:01:47.462+00:00",
```

```
        "Oem": {
            "Lenovo": {
                "AuxiliaryData": "",
                "Source": "Power",
                "TSLVersion": "16",
                "RelatedEventID": "",
                "Hidden": false,
                "EventID": "0x806f06080a01ff03",
                "EventID@Redfish.Deprecated": "The property is deprecated. Please use EventId instead.",
                "EventSequenceNumber": 1,
                "LenovoMessageID": "DMTF0104",
                "Serviceable": "Serviceable by Customer",
                "CommonEventID": "FQXSPPW0007L",
                "TotalSequenceNumber": 2,
                "AffectedIndicatorLEDs": [
                    {
                        "LEDState": "Lit",
                        "LEDIdentifier": "85"
                    },
                    {
                        "LEDState": "Lit",
                        "LEDIdentifier": "0"
                    }
                ],
                "FailingFRU": [
                    {
                        "FRUSerialNumber": "33",
                        "FRUNumber": ""
                    }
                ],
                "LogType": "StardandLogEntry-Platform",
                "EventType": 0,
                "ReportingChain": "XCC",
                "@odata.type": "#LenovoLogEntry.v1_0_0.StandardLogEntry",
                "IsLocalEvent": true,
                "RawDebugLogURL": "",
                "EventFlag": 0
            }
        },
        "@odata.etag": "\"ejUxX1NOYW5kYXJkTG9nRW50cnkK2\"",
        "EventGroupId": 0,
        "Description": "This resource is used to represent a log entry for log services for a Redfish implementation.",
        "MessageArgs": [
            "Power Supply 1"
        ],
        "OemLogEntryCode": "DMTF0104",
        "Message": "Power Supply 1 has a Configuration Mismatch.",
        "Severity": "Critical",
        "@odata.id": "/redfish/v1/Systems/1/LogServices/StandardLog/Entries/2",
        "EntryType": "Oem",
        "Id": "2",
        "Name": "LogEntry",
        "@odata.type": "#LogEntry.v1_6_0.LogEntry",
        "OemRecordFormat": "Lenovo",
        "EventId": "0x806f06080a01ff03"
    },
    …
],
"@odata.etag": "\"2eb23540698c7c2e2296868\"",
"Description": "A collection of LogEntryStandardLogEntry resource instances.",
"@odata.type": "#LogEntryCollection.LogEntryCollection",
```

```
    "@odata.id": "/redfish/v1/Systems/1/LogServices/StandardLog/Entries",
    "Name": "LogEntryStandardLogEntryCollection"
}
```

GET – BMC Platform event log entries

Use the GET method to retrieve properties in Platform log entries for a server.

Note: This resource is not available on Lenovo Purley-based systems. If you are looking for platform log entry on Lenovo Purley systems, please refer to 13.2.2.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/PlatformLog/Entries
```

Request body

None

Response body

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

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log entries.
Name	String	The name of the resource or array element. Always set to “LogEntry”.
Severity	String	The severity of the log entry.
Created	String	The time the log entry was created.
EventId	String	The unique instance identifier for an event.
EntryType	String	The type of log entry. Always set to “Oem”.
EventGroupId	String	The identifier to correlate events come from a same cause. Always set to 0.
OemRecordFormat	String	If the entry type is Oem, this will contain more information about the record format from the Oem. Always set to Lenovo.
OemLogEntryCode	String	The OEM-specific entry code.
Message	String	The actual Log Entry.
MessageArgs	Array	Arguments for the message.
Description	String	A collection of Platform LogEntry resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
   "Members": [
       {
```

```
            "Message": "ENET[CIM:ep1] IPv6-LinkLocal:HstName=XCC-7Z60-SN, IP@=fe80::0a94:efff:feaf:4e9f ,Pref=64  .",
            "@odata.etag": "\"ejUxX1NOYW5kYXJkTG9nRW50cnkK5\"",
            "MessageArgs": [
                "CIM:ep1",
                "XCC-7Z60-SN",
                "fe80::0a94:efff:feaf:4e9f",
                "64"
            ],
            "@odata.id": "/redfish/v1/Systems/1/LogServices/PlatformLog/Entries/5",
            "Description": "This resource is used to represent a log entry for log services for a Redfish implementation.",
            "EntryType": "Oem",
            "Name": "LogEntry",
            "EventGroupId": 0,
            "OemLogEntryCode": "Lenovo0055",
            "Oem": {
                "Lenovo": {
                    "ReportingChain": "",
                    "IsLocalEvent": true,
                    "RawDebugLogURL": "",
                    "EventID@Redfish.Deprecated": "The property is deprecated. Please use EventId instead.",
                    "EventFlag": 0,
                    "AuxiliaryData": "",
                    "Source": "System",
                    "FailingFRU": [
                        {
                            "FRUSerialNumber": "",
                            "FRUNumber": ""
                        }
                    ],
                    "TSLVersion": "0",
                    "RelatedEventID": "",
                    "Serviceable": "Not Serviceable",
                    "EventID": "0x4000003700000000",
                    "EventSequenceNumber": 5,
                    "EventType": 0,
                    "@odata.type": "#LenovoLogEntry.v1_0_0.PlatformLogEntry",
                    "LenovoMessageID": "Lenovo0055",
                    "AffectedIndicatorLEDs": [],
                    "TotalSequenceNumber": 8,
                    "CommonEventID": "FQXSPNM4028I",
                    "Hidden": false
                }
            },
            "@odata.type": "#LogEntry.v1_5_0.LogEntry",
            "OemRecordFormat": "Lenovo",
            "Id": "5",
            "Severity": "OK",
            "EventId": "0x4000003700000000",
            "Created": "2019-12-20T01:51:47.819+00:00"
        },
...
],
"@odata.type": "#LogEntryCollection.LogEntryCollection",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/PlatformLog/Entries",
    "Members@odata.count": 234,
    "@odata.etag": "\"7a0c2ef50776342e2a9600f\"",
    "Name": "LogEntryPlatformLogEntryCollection",
    "Description": "A collection of LogEntryPlatformLogEntry resource instances."
}
```

GET – BMC Audit event log entries

Use the GET method to retrieve properties in Audit log entries for a server.

Note: This resource is not available on Lenovo Purley-based systems. If you are looking for audit log entry on Lenovo Purley systems, please refer to 13.2.2.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/AuditLog/Entries
```

Request body

None

Response body

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

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log entries.
Name	String	The name of the resource or array element. Always set to “LogEntry”.
Severity	String	The severity of the log entry.
Created	String	The time the log entry was created.
EventId	String	The unique instance identifier for an event.
EntryType	String	The type of log entry. Always set to “Oem”.
EventGroupId	String	The identifier to correlate events come from a same cause. Always set to 0.
OemRecordFormat	String	If the entry type is Oem, this will contain more information about the record format from the Oem. Always set to Lenovo.
OemLogEntryCode	String	The OEM-specific entry code.
Message	String	The actual Log Entry.
MessageArgs	Array	Arguments for the message.
Description	String	A collection of Platform LogEntry resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "Message": "Undefined TPM_POLICY found",
            "@odata.etag": "\"ejUxX1NOYW5kYXJkTG9nRW5OcnkK1\"",
            "MessageArgs": [],
            "@odata.id": "/redfish/v1/Systems/1/LogServices/AuditLog/Entries/1",
            "Description": "This resource is used to represent a log entry for log services for a
```

```
Redfish implementation.",
            "EntryType": "Oem",
            "Name": "LogEntry",
            "EventGroupId": 0,
            "OemLogEntryCode": "UEFI",
            "Oem": {
                "Lenovo": {
                    "ReportingChain": "UEFI",
                    "IsLocalEvent": true,
                    "RawDebugLogURL": "",
                    "EventID@Redfish.Deprecated": "The property is deprecated. Please use EventId instead.",
                    "EventFlag": 0,
                    "AuxiliaryData": "",
                    "Source": "System",
                    "FailingFRU": [
                        {
                            "FRUSerialNumber": "",
                            "FRUNumber": ""
                        }
                    ],
                    "TSLVersion": "0",
                    "RelatedEventID": "",
                    "Serviceable": "Not Serviceable",
                    "EventID": "0x0000000000000000",
                    "EventSequenceNumber": 1,
                    "EventType": 0,
                    "@odata.type": "#LenovoLogEntry.v1_0_0.AuditLogEntry",
                    "LenovoMessageID": "UEFI",
                    "AffectedIndicatorLEDs": [],
                    "TotalSequenceNumber": 1,
                    "CommonEventID": "FQXSFPU4051G",
                    "Hidden": false
                }
            },
            "@odata.type": "#LogEntry.v1_5_0.LogEntry",
            "OemRecordFormat": "Lenovo",
            "Id": "1",
            "Severity": "OK",
            "EventId": "0x0000000000000000",
            "Created": "2019-12-20T01:51:27.000+00:00"
        },
...
]
    "@odata.type": "#LogEntryCollection.LogEntryCollection",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/AuditLog/Entries",
    "Members@odata.count": 188,
    "@odata.etag": "\"601ae59a9185682d37fb812\"",
    "Name": "LogEntryAuditLogEntryCollection",
    "Description": "A collection of LogEntryAuditLogEntry resource instances."
}
```


GET – BMC Maintenance event log entries

Use the GET method to retrieve properties in Maintenance log entries for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/MaintenanceLog/Entries
```

Request body

None

Response body

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

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log entries.
Name	String	The name of the resource or array element. Always set to “LogEntry”.
Created	String	The time the log entry was created.
EntryType	String	The type of log entry. Always set to “Oem”.
EventGroupId	String	The identifier to correlate events come from a same cause.
OemRecordFormat	String	If the entry type is Oem, this will contain more information about the record format from the Oem. Always set to Lenovo.
Message	String	The actual Log Entry.
Description	String	A collection of Platform LogEntry resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1/LogServices/MaintenanceLog/Entries/3",
            "EntryType": "Oem",
            "Name": "LogEntry",
            "EventGroupId": 1,
            "Id": "1",
            "Severity": null,
            "@odata.type": "#LogEntry.v1_5_0.LogEntry",
            "OemRecordFormat": "Lenovo",
            "Message": "CPU 2(SKU NO: 01048340) is added.",
            "@odata.etag": "\"31ba8a086a922965c8b\"",
            "Created": "2019-12-20T01:52:13Z",
            "Description": "This resource is used to represent a log entry for log services for a
Redfish implementation."
        },
...
],
    "@odata.type": "#LogEntryCollection.LogEntryCollection",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/MaintenanceLog/Entries",
    "Members@odata.count": 83,
    "@odata.etag": "\"1171e4930e543e359ab966e\"",
    "Name": "LogEntryMaintenanceLogEntryCollection",
    "Description": "A collection of LogEntryMaintenanceLogEntry resource instances."
}
```

GET – BMC Service Advisor event log entries

Use the GET method to retrieve properties in Service Advisor log entries for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/SaLog/Entries
```

Request body

None

Response body

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

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the log entries.
Name	String	The name of the resource or array element. Always set to “LogEntry”.
Created	String	The time the log entry was created.
EntryType	String	The type of log entry. Always set to “Oem”.
OemRecordFormat	String	If the entry type is Oem, this will contain more information about the record format from the Oem. Always set to Lenovo.
Message	String	The actual Log Entry.
Description	String	A collection of Platform LogEntry resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1/LogServices/SaLog/Entries/1",
            "Id": "1",
            "EntryType": "Oem",
            "Name": "LogEntry",
            "Severity": "OK",
            "Created": "2020-06-05T06:26:00Z",
            "Oem": {
                "Lenovo": {
                    "EventSeverity": "INFO",
                    "CaseNumber": "N/A",
                    "EventStatus": "Pending"
                }
            },
            "EventId": "FQXSPSS4004I",
            "OemRecordFormat": "Lenovo",
            "Message": "Test Call Home Generated by user USERID.",
            "@odata.etag": "\"38fc1e1486a128a43c3\"",
            "@odata.type": "#LogEntry.v1_5_0.LogEntry",
            "Description": "This resource is used to represent a log entry for log services for a
Redfish implementation."
        }
```

```
    ],
    "@odata.type": "#LogEntryCollection.LogEntryCollection",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/SaLog/Entries",
    "Members@odata.count": 1,
    "@odata.etag": "\"64b7bffdea2a25aff8f\"",
    "Name": "LogEntryServiceAdvisorLogEntryCollection",
    "Description": "A collection of LogEntryServiceAdvisorLogEntry resource instances."
}
```


GET – BMC Service Diagnostic event log entries

Use the GET method to retrieve properties in Service diagnostic log entries for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/LogServices/DiagnosticLog/Entries
```

Request body

None

Response body

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

Field	Type	Description
Id	String	“FFDC” if data type is “Manager” “FailureScreen” if data type is “OS” “MPFA” if data type is “MPFA”
Description	String	This resource is used to represent a log entry for log services for a Redfish implementation.
Name	String	“FFDC” , “Failure Screen” or “Memory PFA Data”
Created	String	The time when this diag data is created.
EntryType	String	“Oem”
OemRecordFormat	String	Lenovo
AdditionalDataSizeBytes	Int	The file size of FFDC file or failure screenshot. Set it to 0, if the diag data is not available,
AdditionalDataURI	String	The URI where XCC HTTPS server keeps the diag data. Set it to null, if the diag data is not available.
DiagnosticDataType	String	“Manager” for XCC FFDC; “OS” for “failure screenshot”. “OEM” for MPFA.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

Get /redfish/v1/Systems/1/LogServices/DiagnosticLog/Entries/FFDC


```
{
    "@odata.type": "#LogEntry.v1_11_0.LogEntry",
    "@odata.id": "/redfish/v1/Systems/1/LogServices/DiagnosticLog/Entries/FFDC",
    "Description": "This resource is used to represent a log entry for log services for a Redfish implementation.",
    "OemRecordFormat": "Lenovo",
    "@odata.context": "/redfish/v1/$metadata#LogEntry.LogEntry",
    "@odata.etag": "\"34d175e8b88124292cd\"",
    "DiagnosticDataType": "Manager",
    "AdditionalDataSizeBytes": 0,
    "EntryType": "Oem",
    "AdditionalDataURI": null,
    "Id": "FFDC",
    "Name": "FFDC"
}
```

Chapter 14. Server Inventory

Resource Memory

This resource is used to represent memory for a Redfish implementation.

Number of Resources	Number of memories supported
Resource Path	/redfish/v1/Systems/1/Memory/{1-N}
Schema file	MemoryCollection_v1.xml Memory_v1.xml

GET – Collection of server memories

Use the GET method to retrieve properties in Memory collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Memory
```

Request body

None

Response body

Field	Type	Description
Name	String	“Memory Collection”
Members	Array	Items: A reference link to an element of memory resource
Description	String	A Collection of memory resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1/Memory/1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Memory/2"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Memory/3"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Memory/4"
```

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```
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/5"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/6"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/7"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/8"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/9"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/10"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/11"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/12"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/13"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/14"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/15"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/16"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/17"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/18"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/19"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/20"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/21"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/22"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/23"
},
{
    "@odata.id": "/redfish/v1/Systems/1/Memory/24"
}
```

```
    ],
    "Oem": {
        "Lenovo": {
            "HistoryMemMetric": {
                "@odata.id": "/redfish/v1/Systems/1/Memory/Oem/Lenovo/HistoryMemMetric"
            }
        }
    },
    "@odata.type": "#MemoryCollection.MemoryCollection",
    "@odata.id": "/redfish/v1/Systems/1/Memory",
    "Name": "Memory Collection",
    "@odata.etag": "\"a2fb3627522630e8b7fe2\"",
    "Members@odata.count": 24,
    "Description": "A collection of memory resource instances."
}
```


GET – Memory properties

Use the GET method to retrieve properties in Memory resource for Redfish service

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Memory/1-{N}`

Request body

None

Response body

Field	Type	Description
Name	String	The memory name
Description	String	This resource is used to represent a memory for a Redfish implementation.
SerialNumber	String	The serial number of this memory.
VolatileRegionSizeLimitMiB	String	Total size of volatile regions in mebibytes (MiB).
MemoryDeviceType	String	Type details of the memory device.
Id	String	The memory id.
MemorySubsystemControllerProductID	String	The product ID of the memory subsystem controller of this memory device.
Links	Object	
Chassis	Link	The link to the chassis that contains this memory device.
MemoryMedia	Array	Media of this memory device.
PartNumber	String	The product part number.
DeviceID@Redfish.Deprecated	String	The property is deprecated. Please use ModuleProductID instead.
MemoryLocation	Object	
Channel	Integer	The channel number to which the memory device is connected.
MemoryController	Integer	The memory controller number to which the memory device is connected.
Slot	Integer	The DIMM slot number to which the memory device is connected.

Field	Type	Description
Socket	Integer	The CPU socket number to which the memory device is connected.
MemorySubsystem-ControllerManufac-turerID	String	The manufacturer ID of the memory subsystem controller.
MemoryType	String	The type of memory device.
DeviceLocator	String	Location of the memory device in the platform.
RankCount	Integer	Number of ranks available in the memory device.
SubsystemVendorI-D@Redfish. Deprecated	String	The property is deprecated. Please use MemorySubsystemControllerManufacturerID instead.
VendorID	String	Vendor ID.
Regions	Array	Memory regions information within the memory device.
Regions[N]	Object	None
RegionId	String	Region Id.
MemoryClassifica-tion	String	Memory Classification.
SizeMiB	Number	Capacity value.
SecurityCapabilities	Object	Security capabilities of the memory device.
VendorID@Redfish. Deprecated	String	The property is deprecated. Please use ModuleManufacturerID instead.
Location	Object	None
PartLocation	Object	None
LocationType	String	The type of location of the part.
ServiceLabel	String	The label of the part location.
LocationOrdinal-Value	Integer	The number that represents the location of the part. If LocationType is `slot` and this unit is in slot 2, the LocationOrdinalValue is 2.
DeviceLocator@Red-fish.Deprecated	String	The property is deprecated since v4_1_0. Please use Location/PartLocation/ ServiceLabel instead.
DataWidthBits	Integer	Data width in bits.
CapacityMiB	Integer	Memory capacity in mebibytes (MiB).
Description	String	This resource is used to represent a memory for a Redfish implementation.
SubsystemDeviceI-D@Redfish. Deprecated	String	The property is deprecated. Please use MemorySubsystemControllerProductID instead.
Manufacturer	String	The memory device manufacturer.
SubsystemDeviceID	String	Subsystem device ID.
OperatingMemoryM-odes	Array	Memory modes supported by the memory device.
Status	Object	None

Field	Type	Description
State	String	The status of the resource.
Health	String	The health of the resource.
BusWidthBits	Integer	The bus width, in bits.
OperatingSpeedMhz	Integer	Operating speed of the memory device in MHz or MT/s as appropriate.
ModuleManufacturer-ID	String	The manufacturer ID of this memory device.
BaseModuleType	String	The base module type of the memory device.
SubsystemVendorID	String	SubSystem vendor ID.
AllowedSpeedsMHz	Array	Speeds supported by this memory device.
ModuleProductID	String	The product ID.
DeviceID	String	Device ID.
PersistentRegionSi-zeLimitMiB	Integer	Total size of persistent regions in mebibytes (MiB).
NonVolatileSizeMiB	Number	Total size of the non-volatile portion memory in MiB. Only present for AEP.
VolatileSizeMiB	Integer	Total size of the volatile portion memory in MiB.
CacheSizeMiB	Number	Total size of the cache portion memory in MiB. Only present for AEP.
LogicalSizeMiB	Number	Total size of the logical memory in MiB. Only present for AEP.
FunctionClasses	Array	Function classes by the memory device.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "SerialNumber": "132D7396",
    "VolatileRegionSizeLimitMiB": null,
    "MemoryDeviceType": "DDR4",
    "Id": "12",
    "MemorySubsystemControllerProductID": "0x0000",
    "Links": {
        "Chassis": {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    },
    "MemoryMedia": [
        "DRAM"
    ],
    "Location": {
        "PartLocation": {
            "LocationType": "Slot",
            "ServiceLabel": "DIMM 12",
            "LocationOrdinalValue": 11
        }
```

```
    },
    "DeviceID@Redfish.Deprecated": "The property is deprecated. Please use ModuleProductID instead.",
    "MemoryLocation": {
        "Channel": 2,
        "MemoryController": 0,
        "Slot": 12,
        "Socket": 1
    },
    "MemorySubsystemControllerManufacturerID": "0x0000",
    "MemoryType": "DRAM",
    "DeviceLocator": null,
    "DataWidthBits": null,
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoMemory.v1_0_0.LenovoMemory",
            "FruPartNumber": ""
        }
    },
    "DeviceLocator@Redfish.Deprecated": "The property is deprecated since v4_1_0.
Please use Location/PartLocation/ServiceLabel instead.",
    "RankCount": 3,
    "BaseModuleType": "LRDIMM",
    "OperatingSpeedMhz": 21333,
    "VendorID": "Micron Technology",
    "Regions": [],
    "ModuleProductID": "0x0000",
    "@odata.id": "/redfish/v1/Systems/1/Memory/12",
    "VendorID@Redfish.Deprecated": "The property is deprecated.
Please use ModuleManufacturerID instead.",
    "@odata.type": "#Memory.v1_9_1.Memory",
    "SecurityCapabilities": {},
    "@odata.etag": "\"e0116cdc90fe3599856ff\"",
    "CapacityMiB": 65536,
    "Description": "This resource is used to represent a memory for a Redfish implementation.",
    "AllowedSpeedsMHz": [
        0
    ],
    "Manufacturer": "Micron Technology",
    "SubsystemDeviceID": "0x0000",
    "OperatingMemoryModes": [
        "Volatile"
    ],
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "SubsystemDeviceID@Redfish.Deprecated": "The property is deprecated.
Please use MemorySubsystemControllerProductID instead.",
    "PartNumber": "72ASS8G72LZ-2G6B2",
    "ModuleManufacturerID": "0x2c80",
    "SubsystemVendorID@Redfish.Deprecated": "The property is deprecated.
Please use MemorySubsystemControllerManufacturerID instead.",
    "SubsystemVendorID": "0x0000",
    "DeviceID": "DIMM_12",
    "Name": "DIMM 12",
    "BusWidthBits": null,
    "PersistentRegionSizeLimitMiB": null,
    "VolatileSizeMiB": 65536,
    "FunctionClasses": [
        "Volatile"
    ]
```

GET – Server network interfaces

Use the GET method to retrieve properties in Network interface for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/NetworkInterfaces/{1-N}
```

Request body

None

Response body

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

Field	Type	Description
Id	String	Index
Description	String	A NetworkInterface contains references linking NetworkAdapter, NetworkPort, and NetworkDeviceFunction resources and represents the functionality available to the containing system.
Name	String	Network Interface X (X=1-N)
Status	Object	expand
State	String	Enabled
Health	String	OK
Links	Object	expand
NetworkAdapter	Link	Link to related NetworkAdapter.
NetworkPorts	Link	Link to related NetworkPortCollection.
NetworkDeviceFunctions	Link	Link to related NetworkDeviceFunctionCollection.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
   "@odata.context" : "/redfish/v1/$metadata#NetworkInterface.NetworkInterface",
   "Id" : "1",
   "Status" : {
      "Health" : "OK",
      "State" : "Enabled"
   },
   "NetworkPorts" : {
      "@odata.id" : "/redfish/v1/Chassis/1/NetworkAdapters/ob-1/NetworkPorts"
   },
   "Links" : {
      "NetworkAdapter" : {
         "@odata.id" : "/redfish/v1/Chassis/1/NetworkAdapters/ob-1"
      }
   },
```

```
   "NetworkDeviceFunctions" : {
      "@odata.id" : "/redfish/v1/Chassis/1/NetworkAdapters/ob-1/NetworkDeviceFunctions"
   },
   "@odata.etag" : "\"dc20bec25dc27d97279c8bada95185d6\"",
   "@odata.id" : "/redfish/v1/Systems/1/NetworkInterfaces/1",
   "@odata.type" : "#NetworkInterface.v1_1_1.NetworkInterface",
   "Description" : "A NetworkInterface contains references linking NetworkAdapter, NetworkPort, and
                    NetworkDeviceFunction resources and represents the functionality available to the
                    containing system.",
   "Name" : "Network Interface 1"
}
```

Resource PCIeDevice

This resource is used to represent PCIe device for a Redfish implementation.

Number of Resources	Number of PCIe devices
Resource Path	/redfish/v1/Chassis/1/PCIeDevices/{Location} (Location=ob_X or slot_Y)
Schema file	PCIeDevice_v1.xml

GET – Server PCIe devices

Use the GET method to retrieve properties in PCIeDevice collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/PCIeDevices/{Location}
```

Request body

None

Response body

Field	Type	Description
Id	String	The Id property uniquely identifies this PCIe device.
DeviceType	String	The device type for this PCIe device
FirmwareVersion	String	The version of firmware for this PCIe device
SKU	String	This is the SKU for this PCIe device
PCIeFunctions	Object	Link to related PCIeFunctions
Links	Object	Expand
Chassis	Link	Link to chassis resource
PCIeFunctions	Link	Link to the related PCIeFunctions
Manufacturer	String	This is the manufacturer of this PCIe device
Model	String	This is the model number for the PCIe device
Name	String	The card name in VPD for this PCIe device, if it is an on-board PCIe device, add “(onboard)” in the end. If there is no VPD data, this property will be “Adapter”.

Field	Type	Description
PartNumber	String	The part number for this PCIe device
SerialNumber	String	The serial number for this PCIe device
PCIeInterface	Object	These properties shall contain the definition for a PCIe Interface for a Redfish implementation.
LanesInUse	Integer	The number of PCIe lanes in use by this device.
MaxPCIeType	String	The highest version of the PCIe specification supported by this device.
MaxLanes	Integer	The number of PCIe lanes supported by this device.
Status	Object	Expand
State	String	Enabled
Health	String	This represents the health state of this resource
Description	String	This resource represents the properties of a PCIeDevice attached to a System.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "SerialNumber": null,
    "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_3",
    "Links": {
        "Links/PCIeFunctions@Redfish.Deprecated": "The property is deprecated. Please use PCIeFunctions instead.",
        "Chassis": [
            {
                "@odata.id": "/redfish/v1/Chassis/1"
            }
        ],
        "PCIeFunctions": [
            {
                "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_3/PCIeFunctions/slot_3.00"
            }
        ]
    },
    "PCIeFunctions": {
        "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_3/PCIeFunctions"
    },
    "PCIeInterface": {
        "LanesInUse": null,
        "MaxLanes": null,
        "MaxPCIeType": "Gen3"
    },
    "PartNumber": null,
    "Description": "This resource represents the properties of a PCIeDevice attached to a System.",
    "FirmwareVersion": null,
    "Status": {
        "State": "Enabled",
```

```
        "Health": "OK"
    },
    "Name": "Adapter",
    "Id": "slot_3",
    "Oem": {
        "Lenovo": {
            "@odata.type": "#LenovoDeviceInfo.v1_0_0.LenovoDeviceInfo",
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PCIe 3",
                    "LocationOrdinalValue": 3
                },
                "InfoFormat": "Slot X",
                "Info": "Slot 3",
                "Info@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead.",
                "InfoFormat@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead."
            }
        }
    },
    "@odata.type": "#PCIeDevice.v1_4_0.PCIeDevice",
    "SKU": null,
    "Manufacturer": null,
    "@odata.etag": "\"e7a9cb060992cf9c73f21a48370932b8\"",
    "Model": null,
    "DeviceType": "SingleFunction"
}
```


Resource PCIeFunction

This resource is used to represent PCIe function information for a Redfish implementation.

Number of Resources	Number of PCIe functions
Resource Path	/redfish/v1/Chassis/1/PCIeDevice/{Device_id}/PCIeFunctions/{Location} (Location=ob_X.YY or slot_W.ZZ)
Schema file	PCIeFunction_v1.xml

GET – Functions of server PCIe functions

Use the GET method to retrieve properties in PCIeFunction collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/PCIeDevice/{Device_id}/PCIeFunctions/{Location}
```

Request body

None

Response body

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

Field	Type	Description
Id	String	The Id property uniquely identifies this PCIe function.
ClassCode	String	The Class Code of this PCIe function
Description	String	This resource represents the properties of a PCIeFunction attached to a System.
DeviceClass	String	The class for this PCIe Function
DeviceId	String	The Device ID of this PCIe function
FunctionId	String	The PCIe Function identifier
FunctionType	String	Physical
Links	Object	Expand
Drives	Array	Link to related the Drive resources
EthernetInterfaces	Array	Link to related the EthernetInterface resources
StorageControllers	Array	Link to related the StorageController resources
PCIeDevice	Link	Link to related the PCIeDevice resource
NetworkDeviceFunctions	Link	Link to related NetworkDeviceFunctions resource
Name	String	The card name in VPD + bus number, device number, function number If there is no VPD data, using “Adapter” instead of card name.
Status	Object	Expand
State	String	Enabled
Health	String	OK
HealthRollup	String	The health of this PCIe device.
RevisionId	String	The Revision ID of this PCIe function
SubsystemId	String	The Subsystem ID of this PCIe function
SubsystemVendorId	String	The Subsystem Vendor ID of this PCIe function
VendorId	String	The Vendor ID of this PCIe function

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "VendorId": "0x14e4",
    "Id": "ob_3.01",
    "Links": {
        "Drives": [],
        "PCIeDevice": {
            "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/ob_3"
```

```
        },
        "StorageControllers": [],
        "NetworkDeviceFunctions": [],
        "EthernetInterfaces": []
    },
    "FunctionId": 1,
    "SubsystemId": "0x4042",
    "Description": "This resource represents the properties of a PCIeFunction attached to a System.",
    "FunctionType": "Physical",
    "Status": {
        "State": "Enabled",
        "Health": "OK",
        "HealthRollup": "OK"
    },
    "DeviceClass": "NetworkController",
    "Name": "Adapter 03:00:01",
    "SubsystemVendorId": "0x17aa",
    "@odata.type": "#PCIeFunction.v1_2_3.PCIeFunction",
    "DeviceId": "0x165f",
    "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/ob_3/PCIeFunctions/ob_3.01",
    "@odata.etag": "\"8c4b6c7797c87b8affd4bef11ee9df50\"",
    "RevisionId": "0x00",
    "ClassCode": "0x020000"
}
```


Resource PCIeSlot

This resource is used to represent PCIe slot for a Redfish implementation.

Number of Resources	Number of PCIe slots
Resource Path	/redfish/v1/Chassis/1/PCIeSlots
Schema file	PCIeDevice_v1.xml

GET – Server PCIe slots

Use the GET method to retrieve properties in PCIeSlots for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Chassis/1/PCIeSlots
```

Request body

None

Response body

Field	Type	Description
Id	String	“PCIeSlots”
Name	String	“PCIe Slots”
Description	String	This resource shall be used to represent a set of PCIe slot information for a Redfish implementation.
Slots	Object	An array of PCI Slot information.
Links	Object	The links to other Resources that are related to Slots.

Field	Type	Description
PCIeDevice	Link	Link to related PCIeDevice.
HotPluggable	Boolean	An indication of whether this PCIe slot supports hotplug.
Location	Object	The location of the PCIe slot.
PartLocation	Object	The part location within the placement.
ServiceLabel	String	The label of the part location, such as PCIe X (X is the slot number).
LocationType	String	The type of location of the part, such as slot.
LocationOrdinalValue	String	The number that represents the location of the part. If LocationType is `slot` and this unit is in slot 2, the LocationOrdinalValue is 2.
InfoFormat	String	The format of the Info property. Always set to “Slot X”.
Info	String	The location of the Resource: Slot X (X is the slot number)
Info@Redfish.Deprecated	String	The property is deprecated. Please use PartLocation instead.
InfoFormat@Redfish. Deprecated	String	The property is deprecated. Please use PartLocation instead.
Status	Object	The status and health of PCIeSlots.
State	String	The known state of PCIeSlots, such as, enabled, disabled.
Health	String	This represents the health state of this resource.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Name": "PCIe Slots",
    "@odata.type": "#PCIeSlots.v1_1_1.PCIeSlots",
    "@odata.id": "/redfish/v1/Chassis/1/PCIeSlots",
    "Id": "PCIeSlots",
    "@odata.etag": "\"cc0d36eadd67a45054edfaaadfbe2893\"",
    "Slots": [
        {
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PCIe 4",
                    "LocationOrdinalValue": 4
                },
                "InfoFormat": "Slot X",
                "Info": "Slot 4",
                "Info@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead.",
                "InfoFormat@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead."
            },
            "HotPluggable": false
            "Links": {
```

```
                "PCIeDevice": [
                    {
                        "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_4"
                    }
                ]
            },
            "Status": {
                "State": "Enabled",
                "Health": "OK"
            }
        }
    ],
    "Description": "This resource shall be used to represent an set of PCIe slot  information for a
Redfish implementation."
}
```


Resource Processor

This resource is used to represent processor for a Redfish implementation.

Number of Resources	Number of processors supported
Resource Path	/redfish/v1/Systems/1/Processors/{1-N}
Schema file	ProcessorCollection_v1.xml Processor_v1.xml

GET – Collection of Processors

Use the GET method to retrieve properties in Processor collection for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Processors
```

Request body

None

Response body

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

Field	Type	Description
Name	String	“ProcessorCollection”
Members	Array	Items: A reference link to an element of processor resource.
Description	String	A Collection of Processor resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1/Processors/1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Processors/2"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Processors/GPU1"
        }
    ],
    "Oem": {
        "Lenovo": {
            "HistoryCPUMetric": {
                "@odata.id": "/redfish/v1/Systems/1/Processors/Oem/Lenovo/HistoryCPUMetric"
            }
        }
    },
    "@odata.type": "#ProcessorCollection.ProcessorCollection",
    "@odata.id": "/redfish/v1/Systems/1/Processors",
    "Name": "ProcessorCollection",
    "@odata.etag": "\"3d6b38a53bed29662db\"",
    "Members@odata.count": 3,
    "Description": "A collection of Processor resource instances."
}
```

GET – CPU properties

Use the GET method to retrieve properties of CPU resource for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Processors/{1-N}`

Request body

None

Response body

Field	Type	Description
Description	String	This resource is used to represent a processor for a Redfish implementation.
TotalEnabledCores	Integer	The total number of enabled cores that this processor contains.
Id	String	1~{N}, N=1- number of processors
InstructionSet	String	null if Status.state is absent, otherwise, "x86-64".
Manufacturer	String	The processor manufacturer.
MaxSpeedMHz	Number	The maximum clock speed of the processor.
Model	String	The product model of the processor.
Name	String	"Processor {N}", N is the socket number of this processor

Field	Type	Description
SerialNumber	String	Serial number of this processor.
PartNumber	String	Part number of this processor.
Version	String	It is the same as the Model property.
ProcessorArchitecture	String	null if Status.state is absent, otherwise, "x86".
ProcessorId	Object	Expanded
EffectiveFamily	String	The effective Family for this processor.
EffectiveModel	String	The effective Model for this processor.
IdentificationRegisters	String	The contents of the Identification Registers (CPUID) for this processor.
MicrocodeInfo	String	null
Step	String	The Step value for this processor.
VendorId	String	The Vendor Identification for this processor.
ProcessorType	String	“CPU”
Socket	String	The socket or location of the processor.
Status	Object	Contains the following elements
Health	String	The health of this processor.
State	String	“Enabled”: processor is present “Absent”: processor is not present
TotalCores	Number	The total number of cores contained in this processor.
TotalThreads	Number	The total number of execution threads supported by this processor.
Location	Object	The location of the processor.
PartLocation	Object	The part location within the placement.
LocationOrdinalValue	Integer	The number that represents the location of the part. If LocationType is `slot` and this unit is in slot 2, the LocationOrdinalValue is 2.
LocationType	String	The type of location of the part, such as slot, bay and socket Here hard code to “Socket”
ServiceLabel	String	The label of the part location, such as a silk-screened name or a printed label.
TDPWatts	Integer	The nominal Thermal Design Power (TDP) in watts.
Metrics	Link	The link to the metrics associated with this processor.
ProcessorMemory	Array	The memory directly attached or integrated within this Processor.
MemoryType	String	The type of memory used by this processor.
CapacityMiB	Integer	The memory capacity in MiB.
IntegratedMemory	Boolean	An indication of whether this memory is integrated within the processor.

Field	Type	Description
SpeedMHz	Integer	The operating speed of the memory in MHz.
Links	Object	Expand
Chassis	Link	/redfish/v1/Chassis/1/

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "SerialNumber": "",
    "Id": "1",
    "Metrics": {
        "@odata.id": "/redfish/v1/Systems/1/Processors/1/ProcessorMetrics"
    },
    "Links": {
        "Chassis": {
            "@odata.id": "/redfish/v1/Chassis/1"
        }
    },
    "Version": "Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz",
    "TotalEnabledCores": 12,
    "InstructionSet": "x86-64",
    "PartNumber": "",
    "Location": {
        "PartLocation": {
            "LocationType": "Socket",
            "ServiceLabel": "CPU 1",
            "LocationOrdinalValue": 0
        }
    },
    "ProcessorArchitecture": "x86",
    "Description": "This resource is used to represent a processor for a Redfish implementation.",
    "@odata.id": "/redfish/v1/Systems/1/Processors/1",
    "Oem": {
        "Lenovo": {
            "ProcessorFamily": 179,
            "CacheInfo": [
                {
                    "InstalledSizeKByte": 768,
                    "MaxCacheSizeKByte": 768,
                    "CacheLevel": "L1"
                },
                {
                    "InstalledSizeKByte": 12288,
                    "MaxCacheSizeKByte": 12288,
                    "CacheLevel": "L2"
                },
                {
                    "InstalledSizeKByte": 16896,
                    "MaxCacheSizeKByte": 16896,
                    "CacheLevel": "L3"
                }
```

```
            ],
            "@odata.type": "#LenovoProcessor.v1_0_0.LenovoProcessor",
            "NumberOfEnabledCores": 12,
            "ExternalBusClockSpeedMHz": 100,
            "CurrentClockSpeedMHz": 2100
        }
    },
    "TotalThreads": 24,
    "MaxSpeedMHz": 3000,
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "ProcessorType": "CPU",
    "Name": "Processor 1",
    "ProcessorId": {
        "Step": "0x04",
        "VendorId": "GenuineIntel",
        "EffectiveModel": "0x55",
        "EffectiveFamily": "0x06",
        "IdentificationRegisters": "0x00050654bfebfbff",
        "MicrocodeInfo": null
    },
    "TotalCores": 12,
    "ProcessorMemory": [
        {
            "SpeedMHz": null,
            "MemoryType": "L1Cache",
            "IntegratedMemory": true,
            "CapacityMiB": 0
        },
        {
            "SpeedMHz": null,
            "MemoryType": "L2Cache",
            "IntegratedMemory": true,
            "CapacityMiB": 12
        },
        {
            "SpeedMHz": null,
            "MemoryType": "L3Cache",
            "IntegratedMemory": true,
            "CapacityMiB": 16
        }
    ],
    "@odata.type": "#Processor.v1_8_0.Processor",
    "TDPWatts": 85,
    "Manufacturer": "Intel(R) Corporation",
    "@odata.etag": "\"c04762c6eb9530eafca59\"",
    "Model": "Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz",
    "Socket": "CPU 1"
}
```


GET – GPU properties

Use the GET method to retrieve properties of GPU resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Processors/GPU{1-N}
```

Request body

None

Response body

Field	Type	Description
Description	String	This resource is used to represent a processor for a Redfish implementation.
Id	String	GPU{N}, N is the index of this processor
Manufacturer	String	The processor manufacturer.
Name	String	"Processor {N}", N is the socket number of this processor
SerialNumber	String	Serial number of this processor.
PartNumber	String	Part number of this processor.
FirmwareVersion	String	The firmware version of this GPU.
ProcessorId	Object	Expanded
VendorId	String	The Vendor Identification for this processor.
ProcessorType	String	“GPU”
Links	Object	Expand
Chassis	Link	/redfish/v1/Chassis/1/
PCIeDevice	Link	Link to this GPU PCIeDevice
PCIeFunctions	Link	Link to this GPU PCIeFunction

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "SerialNumber": "0320117104864",
    "FirmwareVersion": "86.04.55.00.01",
    "Id": "GPU1",
    "ProcessorType": "GPU",
    "Name": "GPU 1",
    "ProcessorId": {
        "VendorId": "0x10de"
    },
    "Manufacturer": "NVIDIA Corporation",
    "@odata.type": "#Processor.v1_8_0.Processor",
    "@odata.id": "/redfish/v1/Systems/1/Processors/GPU1",
    "PartNumber": "1BB3-895-A1",
    "@odata.etag": "\"4770b092045628a9743\"",
    "Links": {
        "PCIeDevice": {
            "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_1"
        },
        "Chassis": {
```

```
            "@odata.id": "/redfish/v1/Chassis/1"
        },
        "PCIeFunctions": [
            {
                "@odata.id": "/redfish/v1/Chassis/1/PCIeDevices/slot_1/PCIeFunctions/slot_1.00"
            }
        ],
        "PCIeFunctions@odata.count": 1
    },
    "Description": "This resource is used to represent a processor for a Redfish implementation."
}
```


Resource ProcessorMetric

This resource is used to represent processor for a Redfish implementation.

Number of Resources	1 + N. (N: Number of processors supported)
Resource Path	/redfish/v1/Systems/1/ProcessorSummary/ProcessorMetrics /redfish/v1/Systems/1/Processors/{1-N}/ProcessorMetrics
Schema file	ProcessorMetric_v1.xml

GET – Processor metric properties

Use the GET method to retrieve properties in Processor Metric for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/ProcessorSummary/ProcessorMetrics
```

Request body

None

Response body

Field	Type	Description
Id	String	“ProcessorMetrics”.
Name	String	"Processor Summary Metrics".
Description	String	This resource is used to represent processor summary metrics for a Redfish implementation.
BandwidthPercent	String	The CPU bandwidth as a percentage.
ConsumedPowerWatt	String	The power, in watts, that the processor has consumed.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "BandwidthPercent": 0,
    "Description": "This resource is used to represent processor summary metrics for a Redfish implementation.",
    "@odata.type": "#ProcessorMetrics.v1_0_1.ProcessorMetrics",
    "@odata.id": "/redfish/v1/Systems/1/ProcessorSummary/ProcessorMetrics",
    "Id": "ProcessorMetrics",
    "@odata.etag": "\"6de4c04fbae63c91eec00838a25f9c9b\"",
    "Name": "Processor Summary Metrics",
    "ConsumedPowerWatt": 20
}
```


Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Processors/{1-N}/ProcessorMetrics`

Request body

None

Response body

Field	Type	Description
Id	String	“ProcessorMetrics”
Name	String	“Processor Metrics”
Description	String	This resource is used to represent a processor metrics for a Redfish implementation.
ConsumedPowerWatt	Number	The consumed Power watt of this processor.
TemperatureCelsius	Number	The temperature of the processor.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "Id": "ProcessorMetrics",
    "TemperatureCelsius": 34,
    "Name": "Processor Metrics",
    "ConsumedPowerWatt": 24,
    "Description": "This resource is used to represent a processor metrics for a Redfish implementation.",
    "@odata.type": "#ProcessorMetrics.v1_1_0.ProcessorMetrics",
    "@odata.id": "/redfish/v1/Systems/1/Processors/1/ProcessorMetrics",
    "@odata.etag": "\"2c50f0353a3827e65b4\""
}
```


Resource Memory Metrics

This resource is used to represent memory metrics summary for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/Systems/1/MemorySummary/MemoryMetrics
Schema file	MemoryMetrics_v1.xml

GET – memory metrics properties

Use the GET method to retrieve properties in Memory resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/MemorySummary/MemoryMetrics
```

Request body

None

Response body

Field	Type	Description
Id	String	“MemoryMetrics”
Name	String	"Memory Summary Metrics"
Description	String	The usage and health statistics for system memory summary.
BandwidthPercent	Number	Memory average percentage
OperatingSpeedMHz	Number	Operating speed of memory in MHz or MT/s as appropriate.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "OperatingSpeedMhz": 2933,
    "BandwidthPercent": 0,
    "@odata.type": "#MemoryMetrics.v1_3_0.MemoryMetrics",
    "Id": "MemoryMetrics",
    "@odata.id": "/redfish/v1/Systems/1/MemorySummary/MemoryMetrics",
    "@odata.etag": "\"273ef9e516c225a3db1\"",
    "Name": "Memory Summary Metrics",
    "Description": "The usage and health statistics for system memory summary."
}
```

Chapter 15. Storage Management

Resource Storage

This Resource is used to represent Storage for a Redfish implementation.

Number of Resources	Number of storage controllers
Resource Path	/redfish/v1/Systems/1/Storage/{Id}
Schema file	StorageCollection_v1.xml Storage_v1.xml

GET – Collection of storage controllers

Use the GET method to retrieve the properties storage collection resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Storage
```

Request body

None

Response body

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

Field	Type	Description
Members	Array	Items: A reference link of the elements of Storage.
Name	String	StorageCollection
Description	String	A collection of storage resource instances.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot1"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Storage/HBA_Slot10"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Storage/7MM "
```

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```
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Storage/M.2 "
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/Storage/Direct_Attached_NVMe"
        }
    ],
    "@odata.type": "#StorageCollection.StorageCollection",
    "@odata.id": "/redfish/v1/Systems/1/Storage",
    "Name": "StorageCollection",
    "@odata.etag": "\"3fe649519a8f27e9c28\"",
    "Members@odata.count": 5,
    "Description": "A collection of storage resource instances"
}
```


GET – Storage controller properties

Use the GET method to retrieve the properties of storage resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Storage/{Id}
```

Response body

Field	Type	Description
Description	String	This resource is used to represent a storage for a Redfish implementation.
Id	String	The identifier of this resource.
Links	Object	Expanded.
Enclosures	Array	A URI reference to a resource of chassis.
Enclosures[N]	Object	Link. /redfish/v1/Chassis/1
Name	String	The name of this resource.
Status	Object	Expanded.
State	String	"Enabled"
HealthRollup	String	This represents the overall health state from the view of this resource.
Health	String	Total health info of selected storage, including the controller, drive and volume
StoragePools	Link	Link to the storage pool collection. **Note:** If the storage is a raid storage controller, this object will be displayed.
StorageControllers	Array	Controller info of the selected storage
StorageControllers [N]	Object	Expanded
AssetTag	String	Asset tag for this storage controller.
SupportedRAID-Types	Array	The set of RAID types supported by the storage controller.
SupportedRAID-Types[N]	String	Expanded.

Field	Type	Description
FirmwareVersion	String	Controller's firmware info. **Note:** If the storage is a NVMe storage, this object will be hidden.
PCIeInterface	Object	Expanded. **Note:** If the storage is Host Bus Adapter or 7MM, this object will be displayed.
MaxLanes	Integer	The number of PCIe lanes supported.
MaxPCIeType	Integer	The highest version of the PCIe specification supported
PCIeType	Integer	The version of the PCIe specification in use.
LanesInUse	Integer	The number of PCIe lanes in use.
Identifiers	Array	Items: the durable names of the storage controller Item count: 1 **Note:** If the storage is a NVMe storage, this object will be hidden.
Identifiers[N]	Object	Expanded.
DurableName-Format	String	"UUID" **Note:** If the storage is a NVMe storage, this object will be hidden.
DurableName	String	The UUID of this storage controller. **Note:** If the storage is a NVMe storage, this object will be hidden.
Manufacturer	String	The manufacturer of this storage controller.
Model	String	This is the model number for the storage controller
MemberId	String	This is the identifier for the member within the collection.
Name	String	The name of the Storage Controller.
Cachesummary	Object	The cache memory of the storage controller in general detail. **Note:** If the storage is 7MM or NVMe storage, this object will be hidden.
TotalCacheSize-MiB	Integer	The total configured cache memory, measured in MiB. **Note:** If the storage is 7MM or NVMe storage, this object will be hidden.
PersistentCache-SizeMiB	Integer	The portion of the cache memory that is persistent, measured in MiB. **Note:** If the storage is 7MM or NVMe storage, this object will be hidden.
Status	Object	The status for the cache summary of this storage controller.
State	String	The state for the cache summary of this storage controller.
Health	String	The health for the cache summary of this storage controller.
Location	Object	The location of the storage controller. **Note:** If the storage is NVMe storage, this object will be hidden.
PartLocation	Object	The part location within the placement.
LocationOrdi-nalValue	Integer	The number that represents the location of this storage controller.

Field	Type	Description
LocationType	String	“Slot”
ServiceLabel	String	The service label of this storage controller.
InfoFormat	String	“Slot X”. Only available on Lenovo Purley-based systems.
Info	String	The value is “Slot X“. Only available on Lenovo Purley-based systems.
SKU	String	The SKU for this storage controller. **Note:** If the storage is NVMe storage, this object will be hidden.
PartNumber	String	The part number for this storage controller. **Note:** If the storage is NVMe storage, this object will be hidden.
SerialNumber	String	The serial number for this storage controller. **Note:** If the storage is NVMe storage, this object will be hidden.
SpeedGbps	Number	The maximum speed of the storage controller's device interface.
SupportedControllerProtocols	Array	The supported set of protocols for communicating to this storage controller.
SupportedDeviceProtocols	Array	The protocols that the storage controller can use to communicate with attached devices.
Status	Object	The status for this storage controller.
State	String	The state for this storage controller.
Health	String	The health for this storage controller.
Drives	Array	Drives connected to selected controller
Drives[N]	Object	link
Volumes	Array	The volumes created by the controller
Volumes[N]	Object	link

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Drives": [
        {
            "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot18/Drives/Disk.0"
        },
        …

        {
            "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot18/Drives/Disk.11"
        }
    ],
    "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot18",
```

```
    "Volumes": {
        "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot18/Volumes"
    },
    "StorageControllers": [
        {
            "SerialNumber": "SP627P1828",
            "SupportedDeviceProtocols": [
                "SATA",
                "SAS"
            ],
            "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot18#/StorageControllers/0",
            "AssetTag": "",
            "MemberId": "0",
            "Location": {
                "PartLocation": {
                    "LocationType": "Slot",
                    "ServiceLabel": "PCI 18",
                    "LocationOrdinalValue": 18
                },
                "InfoFormat": "Slot X",
                "Info": "Slot 18",
                "Info@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead.",
                "InfoFormat@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead."
            },
            "FirmwareVersion": "51.10.0-2837",
            "Status": {
                "Health": "OK"
            },
            "SupportedControllerProtocols": [
                "PCIe"
            ],
            "Name": "ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter",
            "SKU": "01KN508",
            "Oem": {
                "Lenovo": {
                    "SupportedRaidLevels": "0/1/5/6/10/50/60",
                    "Battery": {
                        "SerialNumber": "7962",
                        "RemainingCapacity": "362J",
                        "DesignVoltageMV": 9500,
                        "CurrentMA": 0,
                        "ProductName": "CVPM05",
                        "OperationalStatus": "Operational",
                        "DesignCapacity": "306J",
                        "VoltageMV": 9829,
                        "TemperatureCelsius": 28,
                        "BatteryType": "TMMC",
                        "Manufacturer": "LSI",
                        "Chemistry": "EDLC",
                        "FirmwareDescription": "07251-00",
                        "FullChargeCapacity": "0J"
                    },
                    "Mode": "RAID/JBOD",
                    "SupportedRaidLevels@Redfish.Deprecated": "The property is deprecated. Please use
SupportedRAIDTypes instead."
                }
            },
            "Identifiers": [
                {
                    "DurableNameFormat": "UUID",
                    "DurableName": "00000000000000000500605B2016249C0"
```

```
                }
            ],
            "PartNumber": "SR17A04506",
            "SpeedGbps": 12,
            "Manufacturer": "Lenovo",
            "SupportedRAIDTypes": [
                "RAID0",
                "RAID1",
                "RAID5",
                "RAID6",
                "RAID10",
                "RAID50",
                "RAID60"
            ],
            "Model": "SAS3516",
            "CacheSummary": {
                "Status": {
                    "State": "Enabled",
                    "Health": "Warning"
                },
                "TotalCacheSizeMiB": 4096,
                "PersistentCacheSizeMiB": 128
            }
        }
    ],
    "Name": "RAID Storage",
    "StorageControllers@odata.count": 1,
    "Id": "RAID_Slot18",
    "@odata.type": "#Storage.v1_7_0.Storage",
    "Links": {
        "Enclosures": [
            {
                "@odata.id": "/redfish/v1/Chassis/1"
            }
        ]
    },
    "Drives@odata.count": 12,
    "@odata.etag": "\"f8bf8ed58a4584cf58c6a1a8eff8af13\"",
    "Status": {
        "State": "Enabled",
        "Health": "OK",
        "HealthRollup": "OK"
    },
    "Description": "This resource is used to represent a storage for a Redfish implementation."
}
```


Resource Drive

This Resource is used to represent drive information for a Redfish implementation.

Number of Resources	Number of drives managed by storage controller
Resource Path	/redfish/v1/Systems/1/Storage/Id/Drives/{DriveId}
Schema file	Drive_v1.xml

GET – Drives managed by storage controller

Use the GET method to retrieve the drive resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Storage/Id/Drives/{DriveId}
```

Request body

None

Response body

Field	Type	Description
AssetTag	String	The asset tag for this drive.
Description	String	This resource is used to represent a drive for a Redfish implementation.
BlockSizeBytes	Number	Size of the smallest addressable unit of the associated drive.
CapableS-peedGbs	Number	Fastest capable bus speed of the associated drive.
CapacityBytes	Number	Size in bytes of this Drive.
EncryptionAbility	String	“None” “SelfEncryptingDrive”
EncryptionStatus	String	“Unlocked” “Locked” “Unencrypted”
Negotiated-SpeedGbs	Number	The speed, in gigabit per second (Gbit/s), at which this drive currently communicates to the storage controller.
HotspareType	String	“None” “Global”
Id	String	Drive slot id
FailurePredicted	Boolean	Indicate this drive currently predicting a failure in the near future.
Identifiers	Array	The Durable names for the drive.
Identifiers[N]	Object	Expanded.
DurableName-Format	String	“UUID”
DurableName	String	Drive’s uuid info
Links	Object	Expanded.
Chassis	Link	A URI reference to a resource of chassis.
Volumes	Array	An array of references to the volumes contained in this drive.
Volumes[N]	Link	Link
PCIeFunctions	Array	An array of links to the PCIe functions that the drive produces.
PCIeFunctions [N]	Link	link
PhysicalLocation	Object	The location of this drive.
PartLocation	Object	The part location within the placement.

Field	Type	Description
LocationOrdinalValue	Integer	The number that represents the location of this drive.
LocationType	String	“Bay”.
ServiceLabel	String	The service label of this drive.
Info	String	Slot number of the drive. If the storage is Host Bus Adapter or RAID, this property will be displayed.
InfoFormat	String	"Slot Number". If the storage is Host Bus Adapter or RAID, this property will be displayed.
Manufacturer	String	Drive’s manufacture
MediaType	String	Drive’s media type
Model	String	Model of the drive
Name	String	Name of the drive
PredictedMediaLifeLeftPercent	Number	0-100. disk info remaining life
SKU	String	The SKU for this drive.
StatusIndicator	String	The state of the status indicator, which communicates status information about this drive. **Note:** If the storage is a NVMe AIC storage, this property will be hidden.
PartNumber	String	Part number of the drive
Protocol	String	The protocol this drive is using to communicate to storage controller.
Revision	String	Drive’s firmware/hardware version.
RotationSpeedRPM	Number	Drive’s rotation speed.
SerialNumber	String	Serial number of the drive
Status	Object	Expanded.
State	String	"Enabled"
Health	String	Drive’s health info

Note: The resource “Drive” can describe multiple types of drives. For some cases, such as NVMe added on M.2 card, partial info may not be available.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "SerialNumber": "W0K02Y42",
    "Id": "Disk.1",
    "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot18/Drives/Disk.1",
    "Revision": "L5A7",
```

```
    "AssetTag": "",
    "FailurePredicted": false,
    "BlockSizeBytes": 512,
    "HotspareType": "None",
    "CapableSpeedGbs": 12,
    "Identifiers": [
        {
            "DurableName": "",
            "DurableNameFormat": "UUID"
        }
    ],
    "StatusIndicator": null,
    "PartNumber": "SH20L60465",
    "EncryptionStatus": "Unencrypted",
    "MediaType": "HDD",
    "Description": "This resource is used to represent a drive for a Redfish implementation.",
Volumes": [],
        "Chassis": {
            "@odata.id": "/redfish/v1/Chassis/1"
        },
        "PCIeFunctions": []
    },
    "RotationSpeedRPM": 10500,
    "NegotiatedSpeedGbs": 12,
    "@odata.type": "#Drive.v1_6_0.Drive",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "Protocol": "SAS",
    "Name": "300GB 10K 12Gbps SAS 2.5 HDD",
    "PredictedMediaLifeLeftPercent": null,
    "EncryptionAbility": "None",
    "Oem": {
        "Lenovo": {
            "DriveStatus": "Unconfigured good",
            "@odata.type": "#LenovoDrive.v1_0_0.LenovoDrive"
        }
    },
    "CapacityBytes": 300000000000,
    "PhysicalLocation": {
        "PartLocation": {
            "LocationType": "Bay",
            "ServiceLabel": "Drive 1",
            "LocationOrdinalValue": 1
        },
        "InfoFormat": "Slot Number",
        "Info": "Slot 1",
        "Info@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead.",
        "InfoFormat@Redfish.Deprecated": "The property is deprecated. Please use PartLocation instead."
    },
    "Manufacturer": "LENOVO",
    "@odata.etag": "\"9ed0621341dee6bbe98b640ddee6ad61\"",
    "Model": "ST300MM0048",
    "SKU": "00FC612"
}
```

Resource Volume

This resource is used to represent volume information for a Redfish implementation.

Number of Resources	Number of volumes managed by storage controller
Resource Path	/redfish/v1/Systems/1/Storage/Id/Volumes/{VolumeId}
Schema file	Volume_v1.xml

GET – Volumes managed by storage controller

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Storage/Id/Volumes/{VolumeId}
```

Response body

Field	Type	Description
Description	String	This resource is used to represent volume in Redfish implementation.
BlockSizeBytes	Number	Size of the smallest addressable unit of the associated volume. **Note:** If the storage is 7MM or M.2, this object will be hidden.
AccessCapabilities	Array	Supported IO access capabilities. **Note:** If the storage is M.2, this object will be hidden.
CapacityBytes	Number	Size in bytes of this volume.
Id	String	Volume Id
Links	Object	Expanded.
Drives	Array	An array of references to the drives that are used to create the volume.
Drives[N]	Link	Link
RAIDType	String	The RAID type of this volume.
Name	String	volume info name
Status	Object	Expanded.
State	String	The state of this volume.
Health	String	The health of this volume.
ReadCachePolicy	String	Indicates the read cache policy setting for the Volume. **Note:** If the storage is 7MM or M.2, this object will be hidden.
ReadCachePolicy @Redfish. AllowableValues	String	"Off", "ReadAhead". **Note:** If the storage is 7MM or M.2, this object will be hidden.
WriteCachePolicy	String	Indicates the write cache policy setting for the Volume. **Note:** If the storage is 7MM or M.2, this object will be hidden.

Field	Type	Description
WriteCachePolicy @Redfish. AllowableValues	String	"WriteThrough", "UnprotectedWriteBack" and "ProtectedWriteBack". **Note:** If the storage is 7MM or M.2, this object will be hidden.
StripSizeBytes	Number	The number of blocks (bytes) in a strip in a disk array that uses striped data mapping. **Note:** If the storage is 7MM or M.2, this object will be hidden.
DisplayName	String	A user-configurable string to name the volume. **Note:** If the storage is 7MM or M.2, this object will be hidden.
Actions	Object	Expanded. **Note:** If the storage is 7MM or M.2, this object will be hidden.
#Volume.Initialize	Object	Expanded

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Id": "1",
    "Links": {
        "Drives": [
            {
                "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot14/Drives/Disk.0"
            }
        ]
    },
    "WriteCachePolicy@Redfish.AllowableValues": [
        "WriteThrough",
        "UnprotectedWriteBack",
        "ProtectedWriteBack"
    ],
    "BlockSizeBytes": 512,
    "AccessCapabilities": [],
    "DisplayName": "VD_0",
    "ReadCachePolicy": null,
    "ReadCachePolicy@Redfish.AllowableValues": [
        "Off",
        "ReadAhead"
    ],
    "@odata.type": "#Volume.v1_4_1.Volume",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "Capacity": {
        "Metadata": {},
        "Snapshot": {},
        "Data": {}
```

```
    },
    "Name": "VD_0",
    "Description": "This resource is used to represent a volume for a Redfish implementation.",
    "Actions": {
        "#Volume.Initialize": {
            "target": "/redfish/v1/Systems/1/Storage/RAID_Slot14/Volumes/1/Actions/Volume.Initialize",
            "title": "Initialize",
            "InitializeType@Redfish.AllowableValues": [
                "Fast"
            ]
        }
    },
    "Oem": {
        "Lenovo": {
            "DriveCachePolicy": "",
            "@odata.type": "#LenovoStorageVolume.v1_0_0.LenovoStorageVolume",
            "Bootable": true,
            "AccessPolicy": "",
            "IOPolicy": "",
            "RaidLevel": "RAID 0"
        }
    },
    "CapacityBytes": 238999830528,
    "RAIDType": "RAID0",
    "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot14/Volumes/1",
    "@odata.etag": "\"8a2516f626f924f192e\"",
    "StripSizeBytes": 0,
    "WriteCachePolicy": null
}
```


POST – Create Volume

Use the POST method to initialize volume.

Request URL

```
POST https://<BMC_IPADDR>/redfish/v1/Systems/1/Storage/{Id}/Volumes
```

Request body

Field	Type	Description
Name Note 1	String	The new name.
RAIDType Note 1	String	Any of [RAID0, RAID1, RAID5, RAID6, RAID1E, RAID00, RAID10, RAID50, RAID60]
CapacityBytes Note 2	String	At least 1048576
ReadCachePolicy	String	"Off" or "ReadAhead"
WriteCachePolicy	String	“WriteThrough”, "UnprotectedWriteBack" or "ProtectedWriteBack"

Note 1: This property is mandatory and should not be an empty string when creating a volume.

Note 2: It will be converted to a unit of megabyte at backend, so the property in GET operation may be different with the input value in POST operation. The minimum of the value is 1048576 (1MB = 1024 * 1024).

Response

The response returns the created volumes information.

Status code

HTTP Status Code	Error Message ID
201	Created
500	InternalError

Example

The following example is POST body

```
{
   "Name": "VD_4",
    "RAIDType": "RAID0"

}
```

The following example JSON response is returned.

```
{
    "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot2/Volumes/23",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "ReadCachePolicy@Redfish.AllowableValues": [
        "Off",
        "ReadAhead"
    ],
    "WriteCachePolicy@Redfish.AllowableValues": [
        "WriteThrough",
        "UnprotectedWriteBack",
        "ProtectedWriteBack"
    ],
    "Oem": {
        "Lenovo": {}
    },
    "@odata.type": "#Volume.v1_4_1.Volume",
    "Links": {
        "Drives": []
    },
    "Description": "This resource is used to represent a volume for a Redfish implementation.",
    "@odata.etag": "\"4eebd9cca6bc25aae12\"",
    "Actions": {
        "#Volume.Initialize": {
            "target": "/redfish/v1/Systems/1/Storage/RAID_Slot2/Volumes/23/Actions/Volume.Initialize",
            "title": "Initialize",
            "InitializeType@Redfish.AllowableValues": [
                "Fast"
            ]
        }
    },
    "AccessCapabilities": []
}
```

POST – Initialize Volume

Use the POST method to initialize volume.

Request URL

```
POST https://<BMC_IPADDR>/redfish/v1/Systems/1/Storage/{Id}/Volumes/{VolumeId}/Actions/Volume.Initialize
```

Request body

Field	Type	Description
InitializeType	String	"Fast”

Response

None

Status code

HTTP Status Code	Error Message ID
204	NoContent
500	InternalError

Example

The following example is POST body

```
{
    “InitializeType”:”Fast”
}
```

PATCH – Update Volume settings

Use the PATCH method to update properties in volume for Redfish service.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Systems/1/Storage/{Id}/Volumes/{VolumeId}
```

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Description
Name	String	The new name with at most 15 characters.
ReadCachePolicy	String	"Off" or "ReadAhead"
WriteCachePolicy	String	“WriteThrough”, "UnprotectedWriteBack" or "ProtectedWriteBack"
Oem/Lenovo/ IOPolicy	String	“DirectIO” or “CachedIO”
Oem/Lenovo/ AccessPolicy	String	“ReadWrite”, “ReadOnly” or “Blocked”
Oem/Lenovo/ DriveCachePolicy	String	“Unchanged”, “Disable” or “Enable”

Response

The response returns same content as GET operation with updated properties

Status code

HTTP Status Code	Error Message ID
200	OK
400	BadRequest
500	InternalError

Note that if the host is powered off, the 400 BadRequest with the Message ID: "ChassisPowerStateOnRequired" is returned.

Example

The following example is PATCH body

```
{
    "ReadCachePolicy": "ReadAhead"
}
```

DELETE – Delete the Volume

Use the DELETE method to delete the volume for Redfish service.

Request URL

`DELETE https://<BMC_IPADDR>/redfish/v1/Systems/1/Storage/{Id}/Volumes/{VolumeId}`

Request body

None.

Response

None.

Status code

HTTP Status Code	Error Message ID
204	NoContent
500	InternalError

Resource StoragePool

This resource is used to represent StoragePool information for a Redfish implementation.

Number of Resources	Number of StoragePool managed by storage controller
Resource Path	/redfish/v1/Systems/1/Storage/Id/StoragePools/{StoragePoolId}
Schema file	StoragePool_v1.xml

GET – StoragePool managed by storage controller

Use the GET method to retrieve the StoragePool resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Storage/Id/StoragePools/{StoragePoolId}
```

Response body

Field	Type	Description
Id	String	Volume Id
Name	String	Volume info name
Description	String	This resource is used to represent StoragePool in Redfish implementation.
AllocatedVolumes	Link	A reference to the collection of volumes allocated from this storage pool.
Capacity	Object	Capacity utilization.
Data	Object	The capacity information relating to the user data.
AllocatedBytes	Integer	The number of bytes currently allocated by the storage system in this data store for this data type.
ConsumedBytes	Integer	The number of bytes consumed in this data store for this data type.
Metadata	Object	The capacity information relating to metadata.
Snapshot	Object	The capacity information relating to snapshot or backup data.
CapacitySources	Array	An array of space allocations to this store.
CapacitySources[N]	Object	Each element of space allocations to this store.
Id	String	The resource ID of the CapacitySource.
Name	String	The resource name of the CapacitySource.
Description	String	The description of this CapacitySource.
ProvidingDrives	Link	The drive or drives that provide this space.
Status	Object	The status of this storage pool.
State	String	The state of this storage pool.
SupportedRAID-Types	Array	A collection of the RAID Types supported by the storage pool.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Capacity": {
        "Metadata": {},
        "Snapshot": {},
        "Data": {
            "AllocatedBytes": 298999349248,
            "ConsumedBytes": 298999349248
        }
    },
```

```
    "Description": "The resource is used to represent a storage pool for a Redfish implementation.",
    "Name": "Pool_1_1",
    "@odata.etag": "\"7a4f29555d192af3bb5\"",
    "CapacitySources": [
        {
            "Id": "1",
            "Name": "CapacitySources_1",
            "@odata.type": "#Capacity.v1_1_3.CapacitySource",
            "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot14/StoragePools/Pool_1_1/CapacitySources/1",
            "ProvidingDrives": {
                "@odata.id":
"/redfish/v1/Systems/1/Storage/RAID_Slot14/StoragePools/Pool_1_1/CapacitySources/1/ProvidingDrives"
            },
            "Description": "The resource is used to represent a capacity for a Redfish implementation.",
            "@odata.etag": "\"31dd7e507e4725a6be5\""
        }
    ],
    "Id": "Pool_1_1",
    "AllocatedVolumes": {
        "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot14/StoragePools/Pool_1_1/AllocatedVolumes"
    },
    "Status": {
        "State": "Enabled"
    },
    "SupportedRAIDTypes": [
        "RAID1"
    ],
    "@odata.id": "/redfish/v1/Systems/1/Storage/RAID_Slot14/StoragePools/Pool_1_1",
    "CapacitySources@odata.count": 1,
    "@odata.type": "#StoragePool.v1_5_0.StoragePool"
}
```

Chapter 16. BIOS Setting and Boot Management

Resource Bios

This resource is used to represent the BIOS setting for a Redfish implementation.

Number of Resources	2
Resource Path	/redfish/v1/Systems/1/Bios /redfish/v1/Systems/1/Bios/Pending
Schema file	Bios_v1.xml

GET – Resource for BIOS

Use the GET method to retrieve properties in BIOS resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Bios
```

Request body

None

Response body

Field	Type	Description
Id	String	“Bios”.
Name	String	“Bios”.
Description	String	System Bios
AttributeRegistry	String	”BiosAttributeRegistry.1.0.0”.
Attributes	Object	This is the manufacturer/provider specific list of BIOS attributes.
Actions	Object	Expanded
#Bios.ChangePassword	Object	Expanded
@Redfish.ActionInfo	Link	/redfish/v1/Systems/1/Bios/ChangePasswordActionInfo
PasswordName@Redfish.AllowableValues	Array	Items: string Item count: 2
PasswordName@Redfish.AllowableValues[0]	String	"UefiAdminPassword".
PasswordName@Redfish.AllowableValues[1]	String	"UefiPowerOnPassword".
#Bios.ResetBios	Object	Expanded.
@Redfish.Settings	Object	Expanded.
Messages	Array	Items: object.

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Field	Type	Description
Messages[N]	Object	Expanded
MessageId	String	“RebootRequired”.
RelatedProperties	Array	Items:string.
RelatedProperties[N]	String	The setting name of BIOS attributes. The format will be “#/Attributes/” + the name of attribute.
Severity	String	“Warning”.
Message	String	“Changes completed successfully, but these changes will not take effect until next reboot.”
Resolution	String	“Reboot the computer system for the changes to take effect.”
SettingsObject	Link	/redfish/v1/Systems/1/Bios/Pending/
Time	String	Indicate the time when the Attributes last applied.
SupportedApplyTimes	Array	Items: string Item count: 1
SupportedApplyTimes[0]	String	“OnReset”.
Links	Object	Expanded
ActiveSoftwareImage	Link	/redfish/v1/UpdateService/FirmwareInventory/UEFI
SoftwareImages	Array	Items: string Item count: 1
SoftwareImages[1]	Link	/redfish/v1/UpdateService/FirmwareInventory/UEFI
SoftwareImages@odata.count	Number	1

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "@odata.type": "#Bios.v1_0_6.Bios",
    "Actions": {
        "#Bios.ResetBios": {
            "target": "/redfish/v1/Systems/1/Bios/Actions/Bios.ResetBios",
            "title": "ResetBios"
        },
        "#Bios.ChangePassword": {
            "PasswordName@Redfish.AllowableValues": [
                "UefiAdminPassword",
                "UefiPowerOnPassword"
            ],
            "@Redfish.ActionInfo": "/redfish/v1/Systems/1/Bios/ChangePasswordActionInfo",
            "target": "/redfish/v1/Systems/1/Bios/Actions/Bios.ChangePassword",
            "title": "ChangePassword"
        }
```

```
    },
    "Id": "Bios",
    "AttributeRegistry": "BiosAttributeRegistry.1.0.0",
    "Attributes": {
        …
        …
    },
    "Name": "Bios",
    "@odata.id": "/redfish/v1/Systems/1/Bios",
    "@odata.etag": "\"610e10e486e3486d2a50c5b9e6750559\"",
    "Description": "System Bios",
    "@Redfish.Settings": {
        "@odata.type": "#Settings.v1_2_1.Settings",
        "SettingsObject": {
            "@odata.id": "/redfish/v1/Systems/1/Bios/Pending"
        },
        "Messages": [],
        "SupportedApplyTimes": [
            "OnReset"
        ],
        "Time": "2019-11-28T10:07:08+00:00"
    },
    "Links": {
        "ActiveSoftwareImage": {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/UEFI"
        },
        "SoftwareImages": [
            {
                "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/UEFI"
            }
        ],
        "SoftwareImages@odata.count": 1
    }
}
```


POST – Change BIOS password settings

Use the POST method to change BIOS password settings

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/Systems/1/Bios/Actions/Bios.ChangePassword`

Request body

Field	Type	Error Message ID
PasswordName	String	"UefiAdminPassword" or "UefiPowerOnPassword"
OldPassword	String	Configure parameter OldPassword.
NewPassword	String	Configure parameter NewPassword, empty value will clear current password. If it's not empty, the password length must be at least 8 and at most 20. The password rule shall follow the Lenovo UEFI password rule, no three continuous and same characters appear in password.

Response body

None

Status code

HTTP Status Code	Error Message ID
200	RebootRequired
400	ActionParamFormatError
403	InsufficientPrivilege
500	InternalError

Response example

The following example is POST body.

```
{
    "PasswordName" : "UefiAdminPassword",
    “OldPassword”:”*******”,
    "NewPassword" : "*******"
}
```

The following response is returned:

```
{
    "@Message.ExtendedInfo": [
        {
            "MessageArgs": [],
            "Resolution": "Reboot the computer system for the changes to take effect.",
            "MessageId": "ExtendedError.1.1.RebootRequired",
            "Severity": "Warning",
            "Message": "Changes completed successfully, but these changes will not take effect until next reboot.",
            "@odata.type": "#Message.v1_0_6.Message"
        }
    ]
}
```

POST – Reset BIOS operation

Use the POST method to reset BIOS password settings

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/Systems/1/Bios/Actions/Bios.ResetBios`

Request body

None

Response body

None

Status code

HTTP Status Code	Error Message ID
200	RebootRequired
403	Forbidden
500	InternalError
503	ServiceUnavailable

Response example

POST body is empty.

The following response is returned:

```
{
    "@Message.ExtendedInfo": [
        {
            "MessageArgs": [],
            "Resolution": "Reboot the computer system for the changes to take effect.",
            "MessageId": "ExtendedError.1.1.RebootRequired",
            "Severity": "Warning",
            "Message": "Changes completed successfully, but these changes will not take effect until next reboot.",
            "@odata.type": "#Message.v1_0_6.Message"
        }
    ]
}
```

GET – The pending BIOS settings

Use the GET method to retrieve properties in Bios resource (pending) for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/Bios/Pending
```

Request body

None

Response

Field	Type	Description
Id	String	“Pending”
Name	String	“Pending”
Description	String	Bios Pending Setting
AttributeRegistry	String	”BiosAttributeRegistry.1.0.0”
Attributes	Object	Expanded, the pending data of BIOS attributes

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Id": "Pending",
    "Name": "Pending",
    "@odata.context": "/redfish/v1/$metadata#Bios.Bios",
    "@odata.type": "#Bios.v1_0_6.Bios",
    "AttributeRegistry": "BiosAttributeRegistry.1.0.0",
    "Attributes": {
```

```
        "DevicesandIOPorts_Device_Slot6" : "Enable",
        "Memory_MemorySpeed" : "MaxPerformance",
        “Processors_CPUPstateControl" : "Autonomous",
        "Processors_CStates" : "Disable",
        …
        …
    },
    "@odata.etag": "\"55e794278a844299f0ee2f8eb5c57a9e\"",
    "@odata.id": "/redfish/v1/Systems/1/Bios/Pending",
    "Description": "Bios Pending Setting"
}
```

PATCH – Update pending BIOS settings

Use the PATCH method to update properties in BIOS resource for Redfish service.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/Systems/1/Bios/Pending`

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Description
Attributes	Object	Expanded, the pending data of BIOS attributes.

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
200	RebootRequired
403	InsufficientPrivilege
500	InternalError
503	ServiceUnavailable

Example

The following example is PATCH body.

```
{
    "Attributes":{
        "DevicesandIOPorts_Device_Slot6":"Disable"
    }
}
```

After the PATCH operation runs successfully, querying the system resource returns below example JSON response:

```
{
   "@odata.context" : "/redfish/v1/$metadata#Bios.Bios",
   "Id" : "Pending",
   "AttributeRegistry" : "BiosAttributeRegistry.1.0.0",
```

```
   "@odata.id" : "/redfish/v1/Systems/1/Bios/Pending",
   "@odata.etag" : "\"150413e15fe8f09a9a53b1f0edf68cfe\"",
   "Attributes" : {
      "DevicesandIOPorts_Device_Slot6" : "Disable",
      "Memory_MemorySpeed" : "MaxPerformance",
      "Processors_CPUPstateControl" : "Autonomous",
      …
}
}
```

PATCH – Configure AMT test options

Use the PATCH method to configure AMT test options in Bios resource for Redfish service.

Note: You can retrieve AMT test option “Memory_AdvMemTestOptions” first at the following URL: https://<BMC_IPADDR>/redfish/v1/Systems/1/Bios. 0 is the default setting.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Systems/1/Bios/Pending
```

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Description
Attributes	Object	Expanded, the pending data of BIOS attributes.

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
200	RebootRequired
403	InsufficientPrivilege
500	InternalError
503	ServiceUnavailable

Example

The following example is PATCH body.

```
{
    "Attributes": {
        "Memory_MemoryTest": "Enabled",
        "Memory_AdvMemTestOptions": 0xF0000,
        "SystemRecovery_POSTWatchdogTimer": "Disabled"
    }
}
```

After the PATCH operation runs successfully, querying the system resource returns below example JSON response:

```
{
    "Name": "Pending",
```

```
    "@odata.type": "#Bios.v1_2_0.Bios",
    "@odata.id": "/redfish/v1/Systems/1/Bios/Pending",
    "@odata.context": "/redfish/v1/$metadata#Bios.Bios",
    "AttributeRegistry": "BiosAttributeRegistry.1.0.0",
    "@odata.etag": "\"2856be2dd5340359614bb4\"",
    "Description": "Bios Pending Setting",
    "Attributes": {
        "Memory_AdvMemTestOptions": 983040,
        "Memory_MemoryTest": "Enabled",
        "SystemRecovery_POSTWatchdogTimer": "Disabled"
    },
    "Id": "Pending",
    "@Message.ExtendedInfo": [
        {
            "@odata.type": "#Message.v1_1_2.Message",
            "MessageId": "ExtendedError.1.2.RebootRequired",
            "Resolution": "Reboot the computer system for the changes to take effect.",
            "MessageArgs": [],
            "MessageSeverity": "Warning",
            "Message": "Changes completed successfully, but these changes will not take effect until next reboot."
        }
    ]
}
```


Resource AttributeRegistry

This resource is used to represent the attribute registry for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/schemas/registries/ BiosAttributeRegistry.1.0.0.json
Schema file	AttributeRegistry_v1.xml

GET – BIOS attribute registries

Use the GET method to retrieve properties in AttributeRegistry for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/schemas/registries/BiosAttributeRegistry.1.0.0.json`

Request body

None

Response body

Field	Type	Description
Id	String	“BiosAttributeRegistry.1.0.0”
Language	String	“en”
Name	String	“Bios Attribute Registry Version 1”
OwningEntity	String	Lenovo
RegistryEntries	Object	List of all attributes and their metadata for this component
Attributes	Array	The array containing the attributes and their possible values

Field	Type	Description
Attributes[N]	Object	An attribute and its possible values
Attribute-Name	String	The unique name of the attribute
CurrentValue	String	null
DefaultValue	String	The default current value of the attribute
DisplayName	String	pattr.short_desc
DisplayOrder	Number	The numeric value describing the ascending order that the attribute is displayed relative to other attributes
GrayOut	Boolean	The gray-out state of this attribute
HelpText	String	The help text for the attribute
Hidden	Boolean	The hidden state of this attribute
LowerBound	Number	The lower limit of the value of an attribute of type 'Integer'.
MaxLength	Number	The maximum character length of the value of an attribute of type 'string'
MenuPath	String	A path that describes the menu hierarchy of this attribute
MinLength	Number	The minimum character length of the value of an attribute of type 'string'
ReadOnly	Boolean	The read-only state of this attribute
ResetRe-quired	Boolean	The value shall be true for all BIOS registry attributes.
ScalarIncre-ment	Number	The amount to increment or decrement the value of an attribute of type 'Integer' each time a user requests a value change
Type	String	The type of the attribute.
UpperBound	Number	The upper limit of the value of an attribute of type 'Integer'
Value	Array	The array containing possible values for attributes of type 'Enumeration'
Value[N]	Object	Expanded
ValueDis-playName	String	A user-readable display string of the value of the attribute in the defined 'Language'
ValueName	String	The value name of the attribute
ValueExpres-sion	String	A regular expression that is used to validate the value of the attribute. This is only applicable to attributes of type 'string' or 'Integer'
WarningText	String	The warning text for changing the attribute
WriteOnly	Boolean	Defines whether this attribute is write-only. Such attributes revert back to their initial value after settings are applied
Dependencies	Array	The array containing a list of dependencies of attributes on this component
Dependencies [N]	Object	A dependency of attributes on this component
Dependency	Object	The dependency expression for one or more Attributes in this Attribute Registry
MapFrom	Array	Array of the map-from conditions for mapping dependency
MapFrom [N]	Object	A map-from condition for mapping dependency

Field	Type	Description
MapFromAttribute	String	The attribute that is used to evaluate this dependency expression
MapFromCondition	String	The condition that is used to evaluate this dependency expression
MapFromProperty	String	“CurrentValue”
MapFromValue	String	The value to use to evaluate this dependency expression.
MapTerms	String	The logical term used to combine two or more MapFrom conditions in this dependency expression
MapToAttribute	String	The Name of the attribute that is affected by this dependency expression
MapToProperty	String	The meta-data property of the attribute specified in MapFromAttribute that is used to evaluate this dependency expression
MapToValue	Boolean	TRUE
DependencyFor	String	The AttributeName of the attribute whose change triggers the evaluation of this dependency expression
Type	String	“Map”
Menus	Array	The array containing the attributes menus and their hierarchy.
Menus[N]	Object	A menu and its hierarchy
DisplayName	String	The user-readable display string of this menu in the defined 'Language'
DisplayOrder	Number	The numeric value describing the ascending order in which this menu is displayed relative to other menus
GrayOut	Boolean	FALSE
MenuName	String	The unique name string of this menu
MenuPath	String	A path that describes this menu hierarchy relative to other menus
ReadOnly	Boolean	FALSE
RegistryVersion	String	“1.0.0”
SupportedSystems	Array	Array of systems supported by this attribute registry
SupportedSystems[N]	Object	A system supported by this attribute registry
ProductName	String	Use The product name of the system
SystemId	String	The system ID of the system
FirmwareVersion	String	Firmware version

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "@odata.type": "#AttributeRegistry.v1_3_0.AttributeRegistry",
    "RegistryVersion": "1.0.0",
    "Id": "BiosAttributeRegistry.1.0.0",
    "SupportedSystems": [
        {
            "ProductName": "Lenovo ThinkSystem SR650",
            "SystemId": "7X0025Z000",
            "FirmwareVersion": "CDI340M"
        }
    ],
    "Language": "en",
    "Name": "Bios Attribute Registry Version 1",
    "@odata.id": "/redfish/v1/schemas/registries/BiosAttributeRegistry.1.0.0.json",
    "OwningEntity": "Lenovo",
    "@odata.context": "/redfish/v1/$metadata#AttributeRegistry.AttributeRegistry",
    "RegistryEntries": {
        "Dependencies": [
            {
                "Type": "Map",
                "Dependency": {
                    "MapToValue": true,
                    "MapFrom": [
                        {
                            "MapFromAttribute": "LegacyBIOS_LegacyBIOS",
                            "MapFromProperty": "CurrentValue",
                            "MapFromValue": "Enable",
                            "MapFromCondition": "EQU"
                        }
                    ],
                    "MapToProperty": "GrayOut",
                    "MapToAttribute": "BootModes_SystemBootMode"
                },
                "DependencyFor": "BootModes_SystemBootMode"
            },
            ...
            {
                "Type": "Map",
                "Dependency": {
                    "MapToValue": true,
                    "MapFrom": [
                        {
                            "MapFromAttribute": "SystemRecovery_POSTWatchdogTimer",
                            "MapFromProperty": "CurrentValue",
                            "MapFromValue": "Disable",
                            "MapFromCondition": "EQU"
                        }
                    ],
                    "MapToProperty": "GrayOut",
                    "MapToAttribute": "SystemRecovery_POSTWatchdogTimerValue"
                },
                "DependencyFor": "SystemRecovery_POSTWatchdogTimerValue"
            }
        ],
        "Menus": [
            {
                "GrayOut": false,
```

```
            "ReadOnly": false,
            "MenuPath": "./",
            "MenuName": "BiosMainMenu",
            "DisplayOrder": 1,
            "DisplayName": "BIOS Configuration"
        },
        ...
        {
            "GrayOut": false,
            "ReadOnly": false,
            "MenuPath": "./UEFILanguage/UEFILanguage_UEFILanguagepage",
            "MenuName": "UEFILanguage_UEFILanguagepage",
            "DisplayOrder": 3,
            "DisplayName": "UEFILanguage"
        }
    ],
    "Attributes": [
        {
            "GrayOut": false,
            "Type": "Enumeration",
            "HelpText": "Enable/Disable POST Watchdog Timer.",
            "DefaultValue": "Disable",
            "WarningText": "POST Watchdog Timer changes require a system reboot to take effect.",
            "DisplayName": "POST Watchdog Timer",
            "CurrentValue": null,
            "ReadOnly": false,
            "AttributeName": "SystemRecovery_POSTWatchdogTimer",
            "Value": [
                {
                    "ValueDisplayName": "Disable",
                    "ValueName": "Disable"
                },
                {
                    "ValueDisplayName": "Enable",
                    "ValueName": "Enable"
                }
            ],
            "MenuPath": "./SystemRecovery/SystemRecovery_SystemRecovery",
            "Hidden": false,
            "DisplayOrder": 1,
            "ResetRequired": true,
            "WriteOnly": false
        },
        ...
        {
            "GrayOut": false,
            "Type": "Enumeration",
            "HelpText": "Display the current secure boot mode",
            "DefaultValue": null,
            "WarningText": "Secure Boot Mode changes require a system reboot to take effect.",
            "DisplayName": "Secure Boot Mode",
            "CurrentValue": null,
            "ReadOnly": true,
            "AttributeName": "SecureBootConfiguration_SecureBootMode",
            "Value": [
                {
                    "ValueDisplayName": "UserMode",
                    "ValueName": "UserMode"
                },
                {
                    "ValueDisplayName": "SetupMode",
```

```
                        "ValueName": "SetupMode"
                    },
                    {
                        "ValueDisplayName": "AuditMode",
                        "ValueName": "AuditMode"
                    },
                    {
                        "ValueDisplayName": "DeployedMode",
                        "ValueName": "DeployedMode"
                    }
                ],
                "MenuPath": "./SecureBootConfiguration/SecureBootConfiguration_SecureBootConfiguration",
                "Hidden": false,
                "DisplayOrder": 118,
                "ResetRequired": true,
                "WriteOnly": false
            }
        ]
    }
}
```


Resource SecureBoot

This resource is used to represent secure boot information for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/Systems/1/SecureBoot
Schema file	SecureBoot_v1.xml

GET – Secure boot properties

Use the GET method to retrieve properties in SecureBoot resource for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Systems/1/SecureBoot`

Request body

None

Status code

HTTP Status Code	Error Message ID
500	InternalError

Response body

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

Field	Type	Description
Id	String	“SecureBoot”
Name	String	“Secure Boot”
Description	String	UEFI Secure Boot Configuration

Field	Type	Description
SecureBootEnable	Boolean, Null	Enable or disable UEFI Secure Boot (takes effect on next boot).
SecureBootCurrentBoot	String, Null	Secure Boot state during the current boot cycle.
SecureBootMode	String, Null	Current Secure Boot Mode Property value: • “UserMode” • “SetupMode” • “AuditMode” • “DeployedMode”
Actions	Object	Expanded.
#SecureBoot.ResetKeys	Object	Refer to the Post section.
@Redfish.ActionInfo	Link	/redfish/v1/Systems/1/SecureBoot/ResetKeysActionInfo.

Response example

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

```
{
    "SecureBootCurrentBoot": "Disabled",
    "@odata.id": "/redfish/v1/Systems/1/SecureBoot",
    "Name": "Secure Boot",
    "@odata.context": "/redfish/v1/$metadata#SecureBoot.SecureBoot",
    "Id": "SecureBoot",
    "@odata.type": "#SecureBoot.v1_0_4.SecureBoot",
    "SecureBootEnable": true,
    "SecureBootMode": "SetupMode",
    "@odata.etag": "\"9523Od5eO0821715e4de6O85f28c564e\"",
    "Actions": {
        "#SecureBoot.ResetKeys": {
            "target": "/redfish/v1/Systems/1/SecureBoot/Actions/SecureBoot.ResetKeys",
            "title": "ResetKeys",
            "@Redfish.ActionInfo": "/redfish/v1/Systems/1/SecureBoot/ResetKeysActionInfo"
        }
    },
    "Description": "UEFI Secure Boot Configuration"
}
```

PATCH – Update secure boot properties

Use the PATCH method to update properties in SecureBoot resource for Redfish service.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Systems/1/SecureBoot
```

Request body

Property to be updated is shown as bellow.

Field	Type	Description

Secure-Boot-Enable	String	Enable or disable UEFI Secure Boot (takes effect on next boot).
		
		XCC will do the RPP assert internally when receiving this cmd.
		
		If assert RPP successfully, return code 200 + @Message.ExtendedInfo
		
		“RebootRequired”:
		
		"RebootRequired": {
		
		"Description": "Indicates that one or more properties were changed, and/or actions completed successfully. However, these changes will not take effect until the next system reboot.",
		
		"Message": "Changes completed successfully, but these changes will not take effect until next reboot.",
		
		"Severity": "Warning",
		
		"NumberOfArgs": 0,
		
		"ParamTypes": [],
		
		"Resolution": "Reboot the computer system for the changes to take effect."
		
		}
		
		else return
		
		code 200 + @Message.ExtendedInfo “PhysicalPresenceError”: "PhysicalPresenceError": {
		
		"Description": "The operation failed because Physical Presence or Remote Physical Presence was not asserted.",
		
		"Message": " The operation failed because of Remote Physical Presence security requirements.",
		
		"Severity": "Warning",
		
		"NumberOfArgs": 0,
		
		"ParamTypes": [],
		
		"Resolution": "Attempt asserting Physical Presence or Remote Physical Presence, and retry the operation."
		
		}

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
200	RebootRequired
403	InsufficientPrivilege
500	InternalError

Response example

The following example is PATCH body.

```
{
"SecureBootEnable": true
}
```

Get the following response:

```
{
    "SecureBootCurrentBoot": "Disabled",
    "@odata.id": "/redfish/v1/Systems/1/SecureBoot",
    "Name": "Secure Boot",
    "@odata.context": "/redfish/v1/$metadata#SecureBoot.SecureBoot",
    "Id": "SecureBoot",
    "@odata.type": "#SecureBoot.v1_0_4.SecureBoot",
    "SecureBootEnable": true,
    "SecureBootMode": "SetupMode",
    "@odata.etag": "\"9523Od5e00821715e4de6085f28c564e\"",
    "Actions": {
        "#SecureBoot.ResetKeys": {
            "target": "/redfish/v1/Systems/1/SecureBoot/Actions/SecureBoot.ResetKeys",
            "title": "ResetKeys",
            "@Redfish.ActionInfo": "/redfish/v1/Systems/1/SecureBoot/ResetKeysActionInfo"
        }
    },
    "Description": "UEFI Secure Boot Configuration",
    "@Message.ExtendedInfo": [
        {
            "MessageArgs": [],
            "Resolution": "Reboot the computer system for the changes to take effect.",
            "MessageId": "ExtendedError.1.1.RebootRequired",
            "Severity": "Warning",
            "Message": "Changes completed successfully, but these changes will not take effect until next reboot.",
            "@odata.type": "#Message.v1_0_6.Message"
        }
    ]
}
```

POST – Reset secure boot keys

Use the POST method to reset secure boot keys.

Request URL

```
POST https://<BMC_IPADDR>/redfish/v1/Systems/1/SecureBoot/Actions/SecureBoot.ResetKeys
```

Request body

Field	Type	Description

ResetKeysType	String	This action is used to reset the Secure Boot keys(takes effect on next boot):
		
		Value:
		• “ResetAllKeysToDefault”
		• “DeleteAllKeys”
		• “DeletePK”
		
		XCC will do the RPP assert internally when receiving this cmd.
		
		If assert RPP successfully, return code 200 + @Message.ExtendedInfo “RebootRequired”:
		
		"RebootRequired": {
		
		"Description": "Indicates that one or more properties were changed, and/or actions completed successfully. However, these changes will not take effect until the next system reboot.",
		
		"Message": "Changes completed successfully, but these changes will not take effect until next reboot.",
		
		"Severity": "Warning",
		
		"NumberOfArgs": 0,
		
		"ParamTypes": [],
		
		"Resolution": "Reboot the computer system for the changes to take effect."
		
		},
		
		else return code 200 + @Message.ExtendedInfo “PhysicalPresenceError”:
		
		"PhysicalPresenceError": {
		
		"Description": "The operation failed because Physical Presence or Remote Physical Presence was not asserted.",
		
		"Message": " The operation failed because of Remote Physical Presence security requirements.",
		
		"Severity": "Warning",
		
		"NumberOfArgs": 0,
		
		"ParamTypes": [],
		
		"Resolution": "Attempt asserting Physical Presence or Remote Physical Presence, and retry the operation."
		
		},

Status code

HTTP Status Code	Error Message ID
200	RebootRequired, PhysicalPresenceError
403	Forbidden
500	InternalError

Response example

The following example is PATCH body.

```
{
"ResetKeysType": "DeletePK"
}
```

Get the following response:

```
{
    "@Message.ExtendedInfo": [
        {
            "MessageArgs": [],
            "Resolution": "Reboot the computer system for the changes to take effect.",
            "MessageId": "ExtendedError.1.1.RebootRequired",
            "Severity": "Warning",
            "Message": "Changes completed successfully, but these changes will not take effect until next reboot.",
            "@odata.type": "#Message.v1_0_6.Message"
        }
    ]
}
```

Resource BootOption

This resource is used to represent boot options for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/Systems/1/BootOptions
Schema file	BootOption_v1.xml

GET – Collection of Boot options

Use the GET method to retrieve the properties of boot options for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Systems/1/BootOptions
```

Response body

Field	Type	Description
Members	Array	Items: A reference link of the elements of boot options
Name	String	BootOptions
Description	String	A collection of boot option instances

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/Systems/1/BootOptions/Boot0001"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/BootOptions/Boot0002"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/BootOptions/Boot0003"
        },
        {
            "@odata.id": "/redfish/v1/Systems/1/BootOptions/Boot0004"
        }
    ],
    "@odata.type": "#BootOptionCollection.BootOptionCollection",
    "@odata.id": "/redfish/v1/Systems/1/BootOptions",
    "Name": "BootOptions",
    "@odata.etag": "\"36cc1ba2c2b725a43e4\"",
    "Members@odata.count": 4,
    "Description": "A Collection of BootOption resource instances."
}
```

GET – Boot options properties

Use the GET method to retrieve the properties of boot options for a server.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Systems/1/BootOptions/{Id}`

Response body

Field	Type	Description
Description	String	This resource is used to represent a single boot option contained within a system.
Id	String	Id of boot option.
Name	String	Name of the boot option
BootOptionReference	String	The unique boot option.
DisplayName	String	The user-readable display name of the boot option that appears in the boot order list in the user interface.
UefiDevicePath	String	The UEFI device path to access this UEFI Boot Option.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "@odata.id": "/redfish/v1/Systems/1/BootOptions/Boot0001",
    "BootOptionReference": "Boot0001",
    "Name": "CD_DVDRom",
    "UefiDevicePath": "VenHw_B2AD3248_4F72_4950_A966_CFE5062DB83A_02000000",
    "@odata.type": "#BootOption.v1_0_3.BootOption",
    "Id": "Boot0001",
    "@odata.etag": "\"2cb45a4be77927e33d6\"",
    "DisplayName": "CD_DVDRom",
    "Description": "This resource shall be used to represent a single boot option contained within a system."
}
```

Chapter 17. Firmware Inventory and Update Service

Resource UpdateService

This resource shall be used to represent update service information for a Redfish implementation. It represents the properties that affect the service itself.

Number of Resources	1
Resource Path	/redfish/v1/UpdateService
Schema file	UpdateService_v1.xml

GET – Properties for firmware update service

Use the GET method to retrieve the update service resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/UpdateService
```

Response body

Field	Type	Description
Id	String	“UpdateService”
Name	String	"Update Service"
Description	String	Lenovo firmware update service
ServiceEnabled	Boolean	True.
Status	Object	Expanded.
HealthRollup	String	"OK".
Health	String	"OK".
State	String	"Enabled".
Actions	Object	Expanded.
#UpdateService.SimpleUpdate	Object	Expanded.
@Redfish.ActionInfo	Link	“/redfish/v1/UpdateService/SimpleUpdateActionInfo”
target	String	A link to the involved action.
title	String	"SimpleUpdate".
Targets@Redfish. AllowableValues	Link	"/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
TransferProtocol @Redfish. AllowableValues	Array	Allowable values for SimpleUpdate action Item: string Item count: 2
TransferProtocol @Redfish. AllowableValues[N]	String	"SFTP". "TFTP".

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Field	Type	Description
HttpPushUri	Link	The URI used to perform an HTTP or HTTPS push update to the Update Service. Value is “/fwupdate”.
HttpPushUriTargets	Array	Items: string Item count: 0-1
HttpPushUriTargets[N]	String	An array of URIs that indicate where to apply the update image. It is initially blank, and the value updated by client is not kept after XCC reset.
HttpPushUriTargetsBusy	Boolean	An indication of whether any client has reserved the HttpPushUriTargets property. The value is initially false, and is not kept after XCC reset.
HttpPushUriOptions	Object	Expanded
HttpPushUriApplyTime	Object	Expanded
ApplyTime	String	“Immediate”
FirmwareInventory	Object	URI to the firmware info on the server
MultipartHttpPushUri	String	The URI used to perform an HTTPS push update to the Service with a multipart formatted request body; value is “/mfwupdate”.
MaxImageSizeBytes	Integer	250000000

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "MultipartHttpPushUri": "/mfwupdate",
    "Id": "UpdateService",
    "ServiceEnabled": true,
    "HttpPushUri": "/fwupdate",
    "HttpPushUriTargets": [],
    "Description": "Lenovo firmware update service.",
    "FirmwareInventory": {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory"
    },
    "Status": {
        "HealthRollup": "OK",
        "Health": "OK",
        "State": "Enabled"
    },
    "Name": "Update Service",
    "HttpPushUriTargetsBusy": false,
    "Oem": {
        "Lenovo": {
            "FirmwareServices": {
                "@odata.id": "/redfish/v1/UpdateService/Oem/Lenovo/FirmwareServices"
            },
            "@odata.type": "#LenovoUpdateService.v1_0_0.LenovoUpdateService"
```

```
        }
    },
    "@odata.type": "#UpdateService.v1_6_0.UpdateService",
    "Actions": {
        "#UpdateService.SimpleUpdate": {
            "target": "/redfish/v1/UpdateService/Actions/UpdateService.SimpleUpdate",
            "title": "SimpleUpdate",
            "TransferProtocol@Redfish.AllowableValues": [
                "TFTP",
                "SFTP"
            ],
            "Targets@Redfish.AllowableValues": [
                "/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
            ],
            "@Redfish.ActionInfo": "/redfish/v1/UpdateService/SimpleUpdateActionInfo"
        }
    },
    "MaxImageSizeBytes": 250000000,
    "@odata.etag": "\"593b8fa08d40fe0001e39baf3ac3094a\"",
    "HttpPushUriOptions": {
        "HttpPushUriApplyTime": {
            "ApplyTime": "Immediate"
        }
    },
    "@odata.id": "/redfish/v1/UpdateService"
}
```


PATCH– Update update service status

Use the PATCH method to update the updateservice resource properties and status.

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/UpdateService`

Request body

Field	Type	Description
HttpPushUriTargets	Array	Items: string Item count: 0-1
HttpPushUriTargets[N]	String	An array of URIs that indicate where to apply the update image. It is initially blank, and the value updated by client is not kept after XCC reset.
HttpPushUriTargetsBusy	Boolean	An indication of whether any client has reserved the HttpPushUriTargets property. The value is initially false, and is not kept after XCC reset.

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body

```
{
   "HttpPushUriTargets" : [
"/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
   ]
}
```

After the PATCH operation runs successfully, querying the update service resource returns below example JSON response:


```
{
    "MultipartHttpPushUri": "/mfwupdate",
    "Id": "UpdateService",
    "ServiceEnabled": true,
    "HttpPushUri": "/fwupdate",
    "HttpPushUriTargets": [
        "/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
    ],
    "Description": "Lenovo firmware update service.",
    "FirmwareInventory": {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory"
    },
    "Status": {
        "HealthRollup": "OK",
        "Health": "OK",
        "State": "Enabled"
    },
    "Name": "Update Service",
    "HttpPushUriTargetsBusy": false,
    "Oem": {
        "Lenovo": {
            "FirmwareServices": {
                "@odata.id": "/redfish/v1/UpdateService/Oem/Lenovo/FirmwareServices"
            },
            "@odata.type": "#LenovoUpdateService.v1_0_0.LenovoUpdateService"
        }
    },
    "@odata.type": "#UpdateService.v1_6_0.UpdateService",
    "HttpPushUriOptions": {
        "HttpPushUriApplyTime": {
            "ApplyTime": "Immediate"
        }
    },
    "MaxImageSizeBytes": 250000000,
    "@odata.etag": "\"7dd4c1a358b13e95cc1c93d70426ad56\"",
    "Actions": {
        "#UpdateService.SimpleUpdate": {
            "target": "/redfish/v1/UpdateService/Actions/UpdateService.SimpleUpdate",
            "title": "SimpleUpdate",
            "TransferProtocol@Redfish.AllowableValues": [
                "TFTP",
                "SFTP"
            ],
            "Targets@Redfish.AllowableValues": [
                "/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
            ],
            "@Redfish.ActionInfo": "/redfish/v1/UpdateService/SimpleUpdateActionInfo"
        }
    },
    "@odata.id": "/redfish/v1/UpdateService"
}
```

POST – Simple update for firmware

This action can perform an update of installed software component(s) as contained within a software image file located at a URI referenced by the ImageURI parameter.

Request URL

```
POST https://<BMC_IPADDR>/redfish/v1/UpdateService/Actions/UpdateService.SimpleUpdate
```

Request body

Parameter	Type	Error Message ID
ImageURI	String	URI for the image file
Targets	String	URIs of the resource that is expected to update That is, when you intend to update firmware for BMC (Backup), the Targets parameter must be [/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup]. This is also the exclusive case to provide a value in Targets to update firmware with Redfish, and only applicable for BMC (Backup) update. In order to update other kind of firmware, the Targets is not needed or accepts null value.
TransferProtocol	String	Network protocol used by the Service to retrieve the firmware image file
Username	String	User name to access an sftp server. It's required when the image is located on an sftp server, and username:password is not available in ImageURI.
Password	String	Password to access an sftp server. It's required when the image is located on an sftp server, and username:password is not available in ImageURI.

Response

Field	Type	Error Message ID
Id	String	The created task ID.
Name	String	Task name.
Description	String	This resource represents a task for a Redfish implementation.
TaskMonitor	String	The URI of the Task Monitor for this task.
StartTime	String	The date-time stamp that the task was last started.
TaskState	String	The state of the task.
Messages	Array	This is an array of messages associated with the task.
PercentComplete	Integer	Task completion in percent.
HidePayload	Boolean	Indicates Payload object is hidden and not returned on GET.

Status code

HTTP Status Code	Error Message ID
202	Accepted
400	BadRequest, ActionParamMissing , ActionParamTypeError , ActionParamFormatError
419	Conflict
500	InternalError

Example

The following example is the request to update BMC (Backup). The POST body is filled as below:

```
{
  "ImageURI":"sftp://192.168.1.126/tmp/xcc/lnvgy_fw_xcc_cdi338d-2.70_anyos_noarch.uxz",
  "Targets": [
    "/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
  ],
  "Username":"userid",
  "Password":"password"
}
```

The following example JSON response is returned.

```
{
   "Id" : "c13eea76-4ee3-4696-8e03-0f0b16bb6512",
   "Messages" : [],
   "TaskState" : "New",
   "@odata.etag" : "\"1577366735335\"",
   "@odata.id" : "/redfish/v1/TaskService/Tasks/c13eea76-4ee3-4696-8e03-0f0b16bb6512",
   "PercentComplete" : 0,
   "@odata.type" : "#Task.v1_4_1.Task",
   "StartTime" : "2019-12-26T13:25:35+00:00",
   "Description" : "This resource represents a task for a Redfish implementation.",
   "Name" : "Task c13eea76-4ee3-4696-8e03-0f0b16bb6512",
   "HidePayload" : true,
   "TaskMonitor" : "/redfish/v1/TaskService/0c24a202-c4ef-4bf8-9c10-2bb806ffd8a2"
}
```

In the response body, a new created “task” resource is included. Then “Get” the URI to check the updating process. The following example JSON response is returned.

```
{
    "StartTime": "2019-12-26T13:25:35+00:00",
    "TaskState": "Running",
    "HidePayload": true,
    "@odata.id": "/redfish/v1/TaskService/Tasks/c13eea76-4ee3-4696-8e03-0f0b16bb6512",
    "PercentComplete": 17,
    "Name": "Task c13eea76-4ee3-4696-8e03-0f0b16bb6512",
    "TaskMonitor": "/redfish/v1/TaskService/0c24a202-c4ef-4bf8-9c10-2bb806ffd8a2",
    "Id": "c13eea76-4ee3-4696-8e03-0f0b16bb6512",
    "@odata.type": "#Task.v1_4_1.Task",
    "@odata.etag": "\"1577366759808\"",
    "Messages": [
        {
            "@odata.type": "#Message.v1_0_7.Message",
            "Message": "The task with id c13eea76-4ee3-4696-8e03-0f0b16bb6512 has changed to progress
17 percent complete.",
            "Resolution": "None.",
            "Severity": "OK",
            "MessageId": "TaskEvent.1.0.TaskProgressChanged",
            "MessageArgs": [
                "c13eea76-4ee3-4696-8e03-0f0b16bb6512",
                "17"
            ]
        },
        {
            "@odata.type": "#Message.v1_0_7.Message",
            "Message": "Transfer 49 percent complete.",
```

```
            "Resolution": "None",
            "Severity": "OK",
            "MessageId": "LenovoFirmwareUpdateRegistry.1.0.UpdateTransferInProgress",
            "MessageArgs": [
                "49"
            ]
        }
    ],
    "Description": "This resource represents a task for a Redfish implementation."
}
```

The following example is the request to update UEFI. The POST body is filled as below:

```
{
  "ImageURI":"sftp://192.168.1.126/tmp/uefi/lnvgy_fw_uefi_ive148m-2.41_anyos_32-64.uxz",
  "Username":"userid",
  "Password":"password"
}
```

The following example JSON response for POST SimpleUpdate action is returned.

```
{
   "Id" : "5913dce0-dbc7-4ba3-a643-0f4cd4bec5e8",
   "Messages" : [],
   "TaskState" : "New",
   "@odata.etag" : "\"1577365985589\"",
   "@odata.id" : "/redfish/v1/TaskService/Tasks/5913dce0-dbc7-4ba3-a643-0f4cd4bec5e8",
   "PercentComplete" : 0,
   "@odata.type" : "#Task.v1_4_1.Task",
   "StartTime" : "2019-12-26T13:13:05+00:00",
   "Description" : "This resource represents a task for a Redfish implementation.",
   "Name" : "Task 5913dce0-dbc7-4ba3-a643-0f4cd4bec5e8",
   "HidePayload" : true,
   "TaskMonitor" : "/redfish/v1/TaskService/20c990b8-6a6b-44dd-818c-9e6348bdfc4d"
}
```

In the response body, a new created “task” resource is included. Then “Get” the URI to check the updating process. The following example JSON response is returned.

```
{
    "StartTime": "2019-12-26T13:13:05+00:00",
    "TaskState": "Running",
    "HidePayload": true,
    "@odata.id": "/redfish/v1/TaskService/Tasks/5913dce0-dbc7-4ba3-a643-0f4cd4bec5e8",
    "PercentComplete": 59,
    "Messages": [
        {
            "MessageArgs": [
                "5913dce0-dbc7-4ba3-a643-0f4cd4bec5e8",
                "59"
            ],
            "Message": "The task with id 5913dce0-dbc7-4ba3-a643-0f4cd4bec5e8 has changed to progress 59 percent
complete.",
            "MessageId": "TaskEvent.1.0.TaskProgressChanged",
            "Severity": "OK",
            "Resolution": "None.",
            "@odata.type": "#Message.v1_0_7.Message"
        },
        {
            "MessageArgs": [
```

```
                "1",
                "/redfish/v1/UpdateService/FirmwareInventory/UEFI",
                "UEFI-IVE1-6",
                "48M-2.41",
                "Unknown"
            ],
            "Message": "Assignment 1: Resource /redfish/v1/UpdateService/FirmwareInventory/UEFI SoftwareID UEFI-IVE1-6
Version 48M-2.41 to Version Unknown.",
            "@odata.type": "#Message.v1_0_7.Message",
            "Severity": "OK",
            "MessageId": "LenovoFirmwareUpdateRegistry.1.0.UpdateAssignment",
            "Resolution": "None"
        },
        {
            "@odata.type": "#Message.v1_0_7.Message",
            "Message": "Assignment 1: Apply 38 percent complete.",
            "Resolution": "None",
            "Severity": "OK",
            "MessageId": "LenovoFirmwareUpdateRegistry.1.0.PayloadApplyInProgress",
            "MessageArgs": [
                "1",
                "38"
            ]
        }
    ],
    "@odata.type": "#Task.v1_4_1.Task",
    "Name": "Task 5913dce0-dbc7-4ba3-a643-0f4cd4bec5e8",
    "Id": "5913dce0-dbc7-4ba3-a643-0f4cd4bec5e8",
    "@odata.etag": "\"1577366006339\"",
    "TaskMonitor": "/redfish/v1/TaskService/20c990b8-6a6b-44dd-818c-9e6348bdfc4d",
    "Description": "This resource represents a task for a Redfish implementation."
}
```


POST – HTTP Push update for firmware

This operation can perform an update of installed software component(s) by pushing a software image file to the URI referenced by UpdateService.HttpPushUri property. In XCC redfish service, the UpdateService. HttpPushUri property value is “/fwupdate”.

Request URL

`POST https://<BMC_IPADDR>/fwupdate`

Request body

The HTTP POST operation shall provide authentication with the sufficient privilege to access the UpdateService resource.

Response

Field	Type	Error Message ID
Id	String	The created task ID.
Name	String	Task name.
Description	String	This resource represents a task for a Redfish implementation.
TaskMonitor	String	The URI of the Task Monitor for this task.
StartTime	String	The date-time stamp that the task was last started.
TaskState	String	The state of the task.

Field	Type	Error Message ID
Messages	Array	This is an array of messages associated with the task.
PercentCom-plete	Integer	Task completion in percent.
HidePayload	Boolean	Indicates Payload object is hidden and not returned on GET.

Note: The client may optionally include "Content-Length" header in the POST request to indicate the POST body size. XCC checks this header and verity the size is supported for firmware updates. If the file size is beyond what the service can support, it returns code 413 with error messages indicating file size too large.

Http Push update may be rejected with code 503 when Multipart HTTP push update is in progress, and vice versa.

Status code

HTTP Status Code	Error Message ID
202	Accepted
400	BadRequest, ActionParamMissing , ActionParamTypeError , ActionParamFormatError
413	RequestEntityTooLarge
500	InternalError
503	ServiceUnavailable

Example

The following example with curl commands is the HTTP push update procedure for UEFI/ BMC (Backup).

- Step 1. Update HttpPushUriTargetsBusy to true.

Client should first check HttpPushUriTargetsBusy property. When the value is false, change HttpPushUriTargetsBusy property to True, in order to claim the service is occupied for firmware update. Other clients should not update firmware on this server to avoid interference.

The PATCH body is:

```
{
   "HttpPushUriTargetsBusy" : true
}
```

- Step 2. If client intends to update BMC (Backup), there is an extra step here to provide HttpPushUriTargets.

Skip this step if it is not to update BMC (Backup) firmware.

The PATCH body is:

```
   "HttpPushUriTargets" : [
      "/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
   ]
```

- Step 3. Push the firmware image to the URL in HttpPushUri property.

Sample curl command is below for HTTP push update request for UEFI.

```
curl -s -k -u USERID:PASSWORD --data-binary @/tmp/uefi/lnvgy_fw_uefi_ive148m-2.41_anyos_32-64.uxz
https://192.168.1.126:443/fwupdate
```

Note: You can add '-v' to the curl command to observe file transfer progress.

Sample curl command is below for HTTP push update request for BMC (Backup).

```
curl -s -k -u USERID:PASSWORD --data-binary @/tmp/xcc/lnvgy_fw_xcc_cdi338d-2.70_anyos_noarch.uxz
https://192.168.1.126:443/fwupdate
```

The following sample JSON response is returned.

```
{
   "Id" : "a274a218-58bc-4100-9ec3-6843dfaa486c",
   "Messages" : [],
   "TaskState" : "New",
   "@odata.etag" : "\"1577227530316\"",
   "@odata.id" : "/redfish/v1/TaskService/Tasks/a274a218-58bc-4100-9ec3-6843dfaa486c",
   "PercentComplete" : 0,
   "@odata.type" : "#Task.v1_4_1.Task",
   "StartTime" : "2019-12-24T22:45:30+00:00",
   "Description" : "This resource represents a task for a Redfish implementation.",
   "Name" : "Task a274a218-58bc-4100-9ec3-6843dfaa486c",
   "HidePayload" : true,
   "TaskMonitor" : "/redfish/v1/TaskService/d3883fd4-ed0b-45dc-8c21-f7ad45f81c5d"
}
```

In the response body, a new created task resource is included. And a task monitor resource is referenced in TaskMonitor property.

- Step 4. Client needs to periodically check the URI of task for updating progress.

In the following are sample JSON responses for continuously checking a task resource. (The task Id is ef05579b-380c-4f23-a20d-d890073fb588)

The 1st check, task overall progress 31%. It is verifying the uploaded image.

```
{
   "Id" : "ef05579b-380c-4f23-a20d-d890073fb588",
   "Messages" : [
      {
         "MessageArgs" : [
            "ef05579b-380c-4f23-a20d-d890073fb588",
            "31"
         ],
         "Resolution" : "None.",
         "Message" : "The task with id ef05579b-380c-4f23-a20d-d890073fb588 has changed to progress 31 percent
complete.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "TaskEvent.1.0.TaskProgressChanged",
         "Severity" : "OK"
      },
      {
         "MessageArgs" : [
            "0"
         ],
         "Resolution" : "None",
         "Message" : "Verify 0 percent complete.",
         "@odata.type" : "#Message.v1_0_7.Message",
```

```
         "Severity" : "OK",
         "MessageId" : "LenovoFirmwareUpdateRegistry.1.0.UpdateVerifyInProgress"
      }
   ],
   "TaskState" : "Running",
   "@odata.etag" : "\"1577225350164\"",
   "@odata.id" : "/redfish/v1/TaskService/Tasks/ef05579b-380c-4f23-a20d-d890073fb588",
   "PercentComplete" : 31,
   "@odata.type" : "#Task.v1_4_1.Task",
   "StartTime" : "2019-12-24T22:09:02+00:00",
   "Description" : "This resource represents a task for a Redfish implementation.",
   "Name" : "Task ef05579b-380c-4f23-a20d-d890073fb588",
   "HidePayload" : true,
   "TaskMonitor" : "/redfish/v1/TaskService/bf3cd02d-a77e-4ad4-8df8-f00802fc40e0"
}
```


The 2nd check, task overall progress 58%. It is applying the image.


```
{
   "Id" : "ef05579b-380c-4f23-a20d-d890073fb588",
   "Messages" : [
      {
         "MessageArgs" : [
            "ef05579b-380c-4f23-a20d-d890073fb588",
            "58"
         ],
         "Resolution" : "None.",
         "Message" : "The task with id ef05579b-380c-4f23-a20d-d890073fb588 has changed to progress 58 percent
complete.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "TaskEvent.1.0.TaskProgressChanged",
         "Severity" : "OK"
      },
      {
         "MessageArgs" : [
            "1",
            "/redfish/v1/UpdateService/FirmwareInventory/UEFI",
            "UEFI-IVE1-6",
            "48M-2.41",
            "Unknown"
         ],
         "Resolution" : "None",
         "Message" : "Assignment 1: Resource /redfish/v1/UpdateService/FirmwareInventory/UEFI SoftwareID UEFI-IVE1-6
Version 48M-2.41 to Version Unknown.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "LenovoFirmwareUpdateRegistry.1.0.UpdateAssignment",
         "Severity" : "OK"
      },
      {
         "MessageArgs" : [
            "1",
            "36"
         ],
         "Resolution" : "None",
         "Message" : "Assignment 1: Apply 36 percent complete.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "LenovoFirmwareUpdateRegistry.1.0.PayloadApplyInProgress",
         "Severity" : "OK"
      }
   ],
   "TaskState" : "Running",
```

```
   "@odata.etag" : "\"1577225369708\"",
   "@odata.id" : "/redfish/v1/TaskService/Tasks/ef05579b-380c-4f23-a20d-d890073fb588",
   "PercentComplete" : 58,
   "@odata.type" : "#Task.v1_4_1.Task",
   "StartTime" : "2019-12-24T22:09:02+00:00",
   "Description" : "This resource represents a task for a Redfish implementation.",
   "Name" : "Task ef05579b-380c-4f23-a20d-d890073fb588",
   "HidePayload" : true,
   "TaskMonitor" : "/redfish/v1/TaskService/bf3cd02d-a77e-4ad4-8df8-f00802fc40e0"
}
```


The next check, task overall progress 74%. It is further applying the image.


```
{
   "Id" : "ef05579b-380c-4f23-a20d-d890073fb588",
   "Messages" : [
      {
         "MessageArgs" : [
            "ef05579b-380c-4f23-a20d-d890073fb588",
            "74"
         ],
         "Resolution" : "None.",
         "Message" : "The task with id ef05579b-380c-4f23-a20d-d890073fb588 has changed to progress 74 percent
complete.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "TaskEvent.1.0.TaskProgressChanged",
         "Severity" : "OK"
      },
      {
         "MessageArgs" : [
            "1",
            "/redfish/v1/UpdateService/FirmwareInventory/UEFI",
            "UEFI-IVE1-6",
            "48M-2.41",
            "Unknown"
         ],
         "Resolution" : "None",
         "Message" : "Assignment 1: Resource /redfish/v1/UpdateService/FirmwareInventory/UEFI SoftwareID UEFI-IVE1-6
Version 48M-2.41 to Version Unknown.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "LenovoFirmwareUpdateRegistry.1.0.UpdateAssignment",
         "Severity" : "OK"
      },
      {
         "MessageArgs" : [
            "1",
            "61"
         ],
         "Resolution" : "None",
         "Message" : "Assignment 1: Apply 61 percent complete.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "LenovoFirmwareUpdateRegistry.1.0.PayloadApplyInProgress",
         "Severity" : "OK"
      }
   ],
   "TaskState" : "Running",
   "@odata.etag" : "\"1577225376926\"",
   "@odata.id" : "/redfish/v1/TaskService/Tasks/ef05579b-380c-4f23-a20d-d890073fb588",
   "PercentComplete" : 74,
   "@odata.type" : "#Task.v1_4_1.Task",
   "StartTime" : "2019-12-24T22:09:02+00:00",
```

```
   "Description" : "This resource represents a task for a Redfish implementation.",
   "Name" : "Task ef05579b-380c-4f23-a20d-d890073fb588",
   "HidePayload" : true,
   "TaskMonitor" : "/redfish/v1/TaskService/bf3cd02d-a77e-4ad4-8df8-f00802fc40e0"
}
```


The next check, task overall progress 100%. Image applying completed. And task state is completed.


```
{
   "Id" : "ef05579b-380c-4f23-a20d-d890073fb588",
   "Messages" : [
      {
         "MessageArgs" : [
            "ef05579b-380c-4f23-a20d-d890073fb588"
         ],
         "Resolution" : "None.",
         "Message" : "The task with id ef05579b-380c-4f23-a20d-d890073fb588 has completed.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "TaskEvent.1.0.TaskCompletedOK",
         "Severity" : "OK"
      },
      {
         "MessageArgs" : [
            null
         ],
         "Resolution" : "None",
         "Message" : "Successfully Completed Request",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "Base.1.5.Success",
         "Severity" : "OK"
      },
      {
         "MessageArgs" : [
            "1",
            "/redfish/v1/UpdateService/FirmwareInventory/UEFI",
            "UEFI-IVE1-6",
            "48M-2.41",
            "48M-2.41"
         ],
         "Resolution" : "None",
         "Message" : "Assignment 1: Resource /redfish/v1/UpdateService/FirmwareInventory/UEFI SoftwareID UEFI-IVE1-6
Version 48M-2.41 to Version 48M-2.41.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "LenovoFirmwareUpdateRegistry.1.0.UpdateAssignment",
         "Severity" : "OK"
      },
      {
         "MessageArgs" : [
            "1"
         ],
         "Resolution" : "None",
         "Message" : "Assignment 1: Apply complete",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "LenovoFirmwareUpdateRegistry.1.0.PayloadApplyCompleted",
         "Severity" : "OK"
      }
   ],
   "TaskState" : "Completed",
   "@odata.etag" : "\"1577225382166\"",
   "@odata.id" : "/redfish/v1/TaskService/Tasks/ef05579b-380c-4f23-a20d-d890073fb588",
   "TaskStatus" : "OK",
```

```
   "PercentComplete" : 100,
   "@odata.type" : "#Task.v1_4_1.Task",
   "StartTime" : "2019-12-24T22:09:02+00:00",
   "EndTime" : "2019-12-24T22:09:42+00:00",
   "Description" : "This resource represents a task for a Redfish implementation.",
   "Name" : "Task ef05579b-380c-4f23-a20d-d890073fb588",
   "TaskMonitor" : "/redfish/v1/TaskService/bf3cd02d-a77e-4ad4-8df8-f00802fc40e0",
   "HidePayload" : true
}
```


- Step 5. Client needs to check the task until its state changed to complete or exception. And handle exceptions according to task messages returned.

A sample task response with exception is below.


```
{
   "Id" : "afaef595-c15e-4085-b985-7c6c10f10812",
   "Messages" : [
      {
         "MessageArgs" : [
            "afaef595-c15e-4085-b985-7c6c10f10812"
         ],
         "Resolution" : "None.",
         "Message" : "The task with id afaef595-c15e-4085-b985-7c6c10f10812 has completed with warnings.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "TaskEvent.1.0.TaskCompletedWarning",
         "Severity" : "Warning"
      },
      {
         "MessageArgs" : [
            "7",
            "(0007): Error verifying image transferred to IMM applies to this system."
         ],
         "Resolution" : "Resubmit the request. If the problem persists, consider resetting the service.",
         "Message" : "Verify failed, return code=7 - return message: (0007): Error verifying image transferred to IMM
applies to this system.",
         "@odata.type" : "#Message.v1_0_7.Message",
         "MessageId" : "LenovoFirmwareUpdateRegistry.1.0.UpdateVerifyFailed",
         "Severity" : "Warning"
      }
   ],
   "TaskState" : "Exception",
   "@odata.etag" : "\"1577224625433\"",
   "@odata.id" : "/redfish/v1/TaskService/Tasks/afaef595-c15e-4085-b985-7c6c10f10812",
   "TaskStatus" : "Warning",
   "PercentComplete" : 31,
   "@odata.type" : "#Task.v1_4_1.Task",
   "StartTime" : "2019-12-24T21:56:55+00:00",
   "EndTime" : "2019-12-24T21:57:05+00:00",
   "Description" : "This resource represents a task for a Redfish implementation.",
   "Name" : "Task afaef595-c15e-4085-b985-7c6c10f10812",
   "TaskMonitor" : "/redfish/v1/TaskService/5254c31b-1491-40cd-bd94-cb7d9639b5d4",
   "HidePayload" : true
}
```


XCC keeps a completed/exceptional task resource for status check. Client may access the task monitor resource (the TaskMonitor reference returned in step 3), and XCC removes the corresponding tasks.

- Step 6. If the target is BMC (Backup), there is an extra step here to clear HttpPushUriTargets.

Skip this step if it is not BMC (Backup) firmware updated.

The PATCH body is:

```
{
   "HttpPushUriTargets" : [ ]
}
```

- Step 7. Update HttpPushUriTargetsBusy to false.

When the firmware update procedure is completed, change HttpPushUriTargetsBusy property to false, in order to release the service to other clients for firmware update.

The PATCH body is:

```
{
   "HttpPushUriTargetsBusy" : false
}
```

POST – Multipart HTTP Push update for firmware

This operation can perform an update of installed software component(s) by pushing a software image file to the URI referenced by UpdateService.MultipartHttpPushUri property. In XCC redfish service, the UpdateService.MultipartHttpPushUri property value is “/mfwupdate”.

Request URL

`POST https://<BMC_IPADDR>/mfwupdate`

Request body

The HTTP POST operation shall provide authentication with the sufficient privilege to access the UpdateService resource.

Response

Field	Type	Error Message ID
Id	String	The created task ID.
Name	String	Task name.
Description	String	This resource represents a task for a Redfish implementation.
TaskMonitor	String	The URI of the Task Monitor for this task.
StartTime	String	The date-time stamp that the task was last started.
TaskState	String	The state of the task.
Messages	Array	This is an array of messages associated with the task.
PercentCom-plete	Integer	Task completion in percent.
HidePayload	Boolean	Indicates Payload object is hidden and not returned on GET.

Note: The client may optionally include HTTP multipart form data in the POST body to specify the image file name as RFC2388 specified. XCC checks this header and verity the size is supported for firmware updates, and returns code 413 when file size is too large. If the client uploads multiple files in a POST request, it returns code 400 with an error message indicating the format is not supported.

Multipart HTTP push update may be rejected with code 503 when Http Push update is in progress, and vice versa.

Status code

HTTP Status Code	Error Message ID
202	Accepted
400	BadRequest, ActionParamMissing , ActionParamTypeError , ActionParamFormatError
413	RequestEntityTooLarge
500	InternalError
503	ServiceUnavailable

Example

The following example with curl commands is the multipart HTTP push update procedure for UEFI/ BMC (Backup).

- Step 1. Update HttpPushUriTargetsBusy to true.

Client should first check HttpPushUriTargetsBusy property. When the value is false, change HttpPushUriTargetsBusy property to True, in order to claim the service is occupied for firmware update. Other clients should not update firmware on this server to avoid interference.

The PATCH body is:

```
{
   "HttpPushUriTargetsBusy" : true
}
```

- Step 2. If client intends to update BMC (Backup), there is an extra step here to provide HttpPushUriTargets.

Skip this step if it is not to update BMC (Backup) firmware.

The PATCH body is:

```
   "HttpPushUriTargets" : [
      "/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup"
   ]
```

- Step 3. Push the firmware image to the URL in MultipartHttpPushUri property.

Sample curl command is below for multipart HTTP push update request for BMC (Backup).

```
curl -s -k -u USERID:PASSWORD -F 'UpdateParameters={ "Targets":[ "/redfish/v1/UpdateService/FirmwareInventory/
BMC-Backup" ],"@Redfish.OperationApplyTime":"OnStartUpdateRequest"};type=application/json' -F
'UpdateFile=@/tmp/xcc/xcc-fw.upd;type=application/octet-stream' https://192.168.1.216:443/mfwupdate
```

The following sample JSON response is returned.

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/TaskService/Tasks/1491a59d-2abb-4e6e-9e11-84fea2c89ceb"
        }
    ],
    "@odata.type": "#TaskCollection.TaskCollection",
    "@odata.id": "/redfish/v1/TaskService/Tasks",
    "Members@odata.count": 1,
```

```
    "@odata.etag": "\"1585198032333\"",
    "Name": "Task Collection",
    "Description": "This resource represents a Resource Collection of Task instances for a Redfish implementation."
}
```


In the response body, a new created task resource is included. And a task monitor resource is referenced in TaskMonitor property.

- Step 4. Client needs to periodically check the URI of task for updating progress.

In the following are sample JSON responses for continuously checking a task resource. (The task Id is 1491a59d-2abb-4e6e-9e11-84fea2c89ceb)

The 1st check, task overall progress 31%. It is verifying the uploaded image.


```
{
    "StartTime": "2020-03-26T04:47:12+00:00",
    "TaskState": "Running",
    "HidePayload": true,
    "Name": "Task 1491a59d-2abb-4e6e-9e11-84fea2c89ceb",
    "PercentComplete": 31,
    "@odata.id": "/redfish/v1/TaskService/Tasks/1491a59d-2abb-4e6e-9e11-84fea2c89ceb",
    "@odata.type": "#Task.v1_4_2.Task",
    "Id": "1491a59d-2abb-4e6e-9e11-84fea2c89ceb",
    "TaskMonitor": "/redfish/v1/TaskService/7add4883-18c6-431c-9f1b-f2f8cc4380d4c",
    "@odata.etag": "\"1585198032627\"",
    "Messages": [
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "MessageArgs": [
                "1491a59d-2abb-4e6e-9e11-84fea2c89ceb",
                "31"
            ],
            "Message": "The task with id 1491a59d-2abb-4e6e-9e11-84fea2c89ceb has changed to progress 30 percent
complete.",
            "Severity": "OK",
            "Resolution": "None.",
            "MessageId": "TaskEvent.1.0.TaskProgressChanged"
        },
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "Message": "Verify 1 percent complete.",
            "Resolution": "None",
            "Severity": "OK",
            "MessageId": "LenovoFirmwareUpdateRegistry.1.0.UpdateVerifyInProgress",
            "MessageArgs": [
                "0"
            ]
        }
    ],
    "Description": "This resource represents a task for a Redfish implementation."
}
```


The next check, task overall progress 100%. Image applying completed. And task state is completed.


```
{
    "StartTime": "2020-03-26T04:47:12+00:00",
    "TaskState": "Completed",
    "Name": "Task 1491a59d-2abb-4e6e-9e11-84fea2c89ceb",
    "EndTime": "2020-03-26T04:48:36+00:00",
```

```
    "HidePayload": true,
    "@odata.id": "/redfish/v1/TaskService/Tasks/1491a59d-2abb-4e6e-9e11-84fea2c89ceb",
    "PercentComplete": 100,
    "TaskStatus": "OK",
    "@odata.type": "#Task.v1_4_2.Task",
    "Id": "1491a59d-2abb-4e6e-9e11-84fea2c89ceb",
    "TaskMonitor": "/redfish/v1/TaskService/7add4883-18c6-431c-9f1b-f2f8cc43804c",
    "Messages": [
        {
            "MessageArgs": [
                "1491a59d-2abb-4e6e-9e11-84fea2c89ceb"
            ],
            "Message": "The task with id 1491a59d-2abb-4e6e-9e11-84fea2c89ceb has completed.",
            "Resolution": "None.",
            "Severity": "OK",
            "MessageId": "TaskEvent.1.0.TaskCompletedOK",
            "@odata.type": "#Message.v1_0_8.Message"
        },
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "MessageArgs": [],
            "Message": "Successfully Completed Request",
            "Severity": "OK",
            "Resolution": "None",
            "MessageId": "Base.1.6.Success"
        },
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "Message": "Assignment 1: Resource /redfish/v1/UpdateService/FirmwareInventory/BMC-Backup SoftwareID
BMC-TEI3-10 Version 95D-3.40 to Version 95D-3.40.",
            "Resolution": "None",
            "Severity": "OK",
            "MessageId": "LenovoFirmwareUpdateRegistry.1.0.UpdateAssignment",
            "MessageArgs": [
                "1",
                "/redfish/v1/UpdateService/FirmwareInventory/BMC-Backup",
                "BMC-TEI3-10",
                "95D-3.40",
                "95D-3.40"
            ]
        },
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "Message": "Assignment 1: Apply complete",
            "Resolution": "None",
            "Severity": "OK",
            "MessageId": "LenovoFirmwareUpdateRegistry.1.0.PayloadApplyCompleted",
            "MessageArgs": [
                "1"
            ]
        }
    ],
    "@odata.etag": "\"1585198116883\"",
    "Description": "This resource represents a task for a Redfish implementation."
}
```


- Step 5. Client needs to check the task until its state changed to complete or exception. And handle exceptions according to task messages returned.

A sample task response with exception is below.

```
{
    "StartTime": "2020-03-26T06:02:32+00:00",
    "TaskState": "Exception",
    "Name": "Task 55b1abaf-a678-4869-aef5-1a57ef76ad3b",
    "EndTime": "2020-03-26T06:02:33+00:00",
    "HidePayload": true,
    "@odata.id": "/redfish/v1/TaskService/Tasks/55b1abaf-a678-4869-aef5-1a57ef76ad3b",
    "PercentComplete": 30,
    "TaskStatus": "Warning",
    "TaskMonitor": "/redfish/v1/TaskService/edece36d-5bcd-4ee1-9a5e-3e498412d502",
    "Id": "55b1abaf-a678-4869-aef5-1a57ef76ad3b",
    "@odata.type": "#Task.v1_4_2.Task",
    "@odata.etag": "\"1585202553905\"",
    "Messages": [
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "Message": "The task with id 55b1abaf-a678-4869-aef5-1a57ef76ad3b has completed with warnings.",
            "MessageArgs": [
                "55b1abaf-a678-4869-aef5-1a57ef76ad3b"
            ],
            "Severity": "Warning",
            "Resolution": "None.",
            "MessageId": "TaskEvent.1.0.TaskCompletedWarning"
        },
        {
            "MessageArgs": [
                "57",
                "Invalid URI"
            ],
            "Message": "Verify failed, return code=57 - return message: Invalid URI",
            "Resolution": "Resubmit the request. If the problem persists, consider resetting the service.",
            "Severity": "Warning",
            "MessageId": "LenovoFirmwareUpdateRegistry.1.0.UpdateVerifyFailed",
            "@odata.type": "#Message.v1_0_8.Message"
        }
    ],
    "Description": "This resource represents a task for a Redfish implementation."
}
```


- Step 6. If the target is BMC (Backup), there is an extra step here to clear HttpPushUriTargets.

Skip this step if it is not BMC (Backup) firmware updated.

The PATCH body is:

```
{
   "HttpPushUriTargets" : [ ]
}
```

- Step 7. Update HttpPushUriTargetsBusy to false.

When the firmware update procedure is completed, change HttpPushUriTargetsBusy property to false, in order to release the service to other clients for firmware update.

The PATCH body is:

```
{
   "HttpPushUriTargetsBusy" : false
}
```

Resource FirmwareInventory

This resource shall be used to represent a single software component managed by this Redfish Service.

Number of Resources	Number of firmware entries managed
Resource Path	/redfish/v1/UpdateService/FirmwareInventory/{Id}
Schema file	SoftwareInventoryCollection_v1.xml SoftwareInventory_v1.xml

GET – Collection for firmware inventories on the server

Use the GET method to retrieve a firmware info list placed on the server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/UpdateService/FirmwareInventory
```

Response body

Field	Type	Description
Members	Array	Items: A reference link of the elements of Firmware
Name	String	SoftwareInventoryCollection
Description	String	Firmware Inventory Collection.

Note: The “FirmwareInventory” describes firmware information of multiple kinds of devices, which includes:

BMC (Primary), BMC (Backup) UEFI LXPM, LXPM Windows/Linux driver, and firmwares of Onboard and add-on adapter supporting PLDM or agentless management Disk drive managed by RAID controller (Not supported on AMD Milan-based systems) Intel® Optane™ Persistent Memory (Not supported on AMD Milan-based systems) Power supply unit

For each returned result, the properties may be partially implemented according to device specifics.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@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/LXPMWindowsDriver"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/LXPMLinuxDriver"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/Slot_7.Bundle"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/Ob_1.Bundle"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/Ob_1.1"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/Ob_1.2"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/Ob_3.1"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/Ob_4.1"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/Ob_5.1"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/Slot_7.1"
        },
        {
            "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/PSU1"
        }
    ],
    "Members@odata.count": 15,
    "@odata.type": "#SoftwareInventoryCollection.SoftwareInventoryCollection",
    "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory",
    "Members@odata.navigationLink": "/redfish/v1/UpdateService/FirmwareInventory/Members",
    "@odata.etag": "\"2f84bcae16242Of035fd84e6bb2d13a0\"",
    "Name": "SoftwareInventoryCollection",
    "Description": "Firmware Inventory Collection.",
    "@odata.context": "/redfish/v1/$metadata#SoftwareInventoryCollection.SoftwareInventoryCollection"
}
```


GET – Firmware inventory properties

Use the GET method to retrieve each firmware info.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/UpdateService/FirmwareInventory/{Id}
```

Response body

Field	Type	Description
Id	String	The Id property uniquely identifies this firmware.
Description	String	Description for the firmware.
LowestSupportedVersion	String	A string representing the lowest supported version of this software.
Name	String	The name of this firmware.
RelatedItem	Array	URI of the resources associated with this software inventory item.
RelatedItem[N]	Object	Link to the manager resource.
SoftwareId	String	A specific ID for identifying this firmware.
Manufacturer	String	A string representing the manufacturer/producer of this firmware.
ReleaseDate	String	Release date of this firmware. **Note:** If is PMem firmware info, this object will be hidden.
Status	Object	Expanded.
HealthRollup	String	"OK".
Health	String	"OK"
State	String	The firmware inventory status such as “Enabled”, “Disabled”, “StandbySpare”.
Updateable	Boolean	Indicates whether the firmware can be updated by redfish.
Version	String	The firmware version number. In order to be identified by management software, the Version property value can be different to the Version string displayed in Web or Legacy CLI.
WriteProtected	Boolean	true

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response describes the BMC (Primary) firmware information.

```
{
    "SoftwareId": "BMC-CDI3-10",
    "Updateable": true,
    "Name": "Firmware:BMC",
    "@odata.etag": "\"0d057295e35b9b29dda4595a90d7ac3f\"",
    "Version": "4OM-3.00",
    "RelatedItem@odata.count": 1,
    "LowestSupportedVersion": null,
    "@odata.type": "#SoftwareInventory.v1_2_2.SoftwareInventory",
    "WriteProtected": true,
    "Id": "BMC-Primary",
    "RelatedItem": [
        {
```

```
            "@odata.id": "/redfish/v1/Managers/1"
        }
    ],
    "Status": {
        "Health": "OK",
        "HealthRollup": "OK",
        "State": "Enabled"
    },
    "ReleaseDate": "2019-09-25T00:00:00Z",
    "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/BMC-Primary",
    "Manufacturer": "Lenovo",
    "Description": "The information of BMC (Primary) firmware."
}
```


The following example JSON response describes firmware information of a RAID adapter.


```
{
    "SoftwareId": "DEVICE-1D490500-13",
    "Updateable": true,
    "Name": "Firmware:DEVICE-ThinkSystem RAID 530-8i PCIe 12Gb Adapter",
    "@odata.etag": "\"dffae54e34119fe6bb7ce896633c58ae\"",
    "Version": "50.5.0-1510",
    "RelatedItem@odata.count": 1,
    "LowestSupportedVersion": null,
    "@odata.type": "#SoftwareInventory.v1_2_2.SoftwareInventory",
    "Id": "Slot_7.Bundle",
    "RelatedItem": [
        {
            "@odata.id": "/redfish/v1/Systems/1/PCIeDevices/slot_7"
        }
    ],
    "Status": {
        "Health": "OK",
        "HealthRollup": "OK",
        "State": "Enabled"
    },
    "ReleaseDate": "2018-06-25T00:00:00Z",
    "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/Slot_7.Bundle",
    "Manufacturer": "AVAGO Technologies",
    "Description": "The information of ThinkSystem RAID 530-8i PCIe 12Gb Adapter firmware."
}
```

Chapter 18. Task Management

Resource TaskService

The resource represents a collection of tasks for the Redfish service. All existing tasks are accessible through the links from the TaskService resource.

Number of Resources	1
Resource Path	/redfish/v1/TaskService
Schema file	TaskService_v1.xml

GET – Task service properties

Use the GET method to retrieve properties in TaskService resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/TaskService
```

Request body

None

Response body

Field	Type	Description
Id	String	“TaskService”.
Name	String	“Task Service”.
DateTime	String	The current DateTime (with offset) setting that the task service is using.
CompletedTaskOverWritePolicy	String	“Oldest”.
ServiceEnabled	Boolean	This indicates whether this service is enabled. Value: True
Status	Object	Expanded.
State	String	“Enabled”.
Health	String	“OK”.
HealthRollup	String	“OK”.
Tasks	Link	This property shall contain the link to a collection of type Task.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

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```
{
    "Tasks": {
        "@odata.id": "/redfish/v1/TaskService/Tasks"
    },
    "Id": "TaskService",
    "Status": {
        "HealthRollup": "OK",
        "Health": "OK",
        "State": "Enabled"
    },
    "Name": "Task Service",
    "ServiceEnabled": true,
    "DateTime": "2019-11-11T14:51:52+00:00",
    "@odata.type": "#TaskService.v1_1_3.TaskService",
    "CompletedTaskOverWritePolicy": "Oldest",
    "@odata.etag": "\"381031aeeabf8aa7d88a786db25df665\"",
    "@odata.id": "/redfish/v1/TaskService",
    "Description": "This resource represents a task service for a Redfish implementation."
}
```


Resource Task

The resource represents Task resource implementation for the Redfish service.

Number of Resources	Number of tasks available in Redfish service
Resource Path	/redfish/v1/TaskService/Tasks/{Id}
Schema file	Task_v1.xml

GET – Task properties

Use the GET method to retrieve properties in Task resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/TaskService/Tasks/{Id}
```

Request body

None

Response body

Field	Type	Description
Id	String	The Id property uniquely identifies this task resource.
Name	String	“Task {Id}”
Description	String	This resource represents a task for a Redfish implementation.
StartTime	String	The date-time stamp that the task was last started.
EndTime	String	The date-time stamp that the task was last completed.
HidePayload	Boolean	This property shall indicate whether the contents of the payload should be hidden from view after the task has been created.
PercentComplete	Integer	This property shall indicate the completion progress of the task, reported in percent of completion.

Field	Type	Description
TaskMonitor	Link	The URI of the Task Monitor for this task. It is a URI for deleting the task when the TaskState is Completed, Exception or Killed.
TaskState	String	The state of the task.
TaskStatus	String	The completion status of the task. The mapping between TaskState and TaskStatus: • “Completed” (TaskState) –> “OK” (TaskStatus) • “Killed”(TaskState) –> “Warning”(TaskStatus) • “Exception”(TaskState) –> “Warning”(TaskStatus) • Others (TaskState) –> Do not expose TaskStatus (TaskStatus)
Messages	Object	Expand.
Messages[N]	String	A message associated with the task..

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "StartTime": "2019-11-12T15:05:12+00:00",
    "@odata.id": "/redfish/v1/TaskService/Tasks/e809efa4-0e8f-48fc-86d9-6d4c5b0d2da0",
    "Messages": [
        {
            "@odata.type": "#Message.v1_0_7.Message",
            "MessageArgs": [
                "e809efa4-0e8f-48fc-86d9-6d4c5b0d2da0"
            ],
            "Message": "The task with id e809efa4-0e8f-48fc-86d9-6d4c5b0d2da0 has completed.",
            "Severity": "OK",
            "Resolution": "None.",
            "MessageId": "TaskEvent.1.0.TaskCompletedOK"
        },
        {
            "@odata.type": "#Message.v1_0_7.Message",
            "Message": "Successfully Completed Request",
            "MessageArgs": [
                null
            ],
            "Severity": "OK",
            "Resolution": "None",
            "MessageId": "Base.1.5.Success"
        },
        {
            "@odata.type": "#Message.v1_0_7.Message",
            "MessageArgs": [
                "1",
                "/redfish/v1/UpdateService/FirmwareInventory/BMC-Primary",
                "BMC-TEI3-10",
                "57B-1.20",
```

```
                "57B-1.20"
            ],
            "Message": "Assignment 1: Resource /redfish/v1/UpdateService/FirmwareInventory/BMC-Primary
SoftwareID BMC-TEI3-10 Version 57B-1.20 to Version 57B-1.20.",
            "Severity": "OK",
            "Resolution": "None",
            "MessageId": "LenovoFirmwareUpdateRegistry.1.0.UpdateAssignment"
        },
        {
            "@odata.type": "#Message.v1_0_7.Message",
            "Message": "Assignment 1: Apply complete",
            "MessageArgs": [
                "1"
            ],
            "Severity": "OK",
            "Resolution": "None",
            "MessageId": "LenovoFirmwareUpdateRegistry.1.0.PayloadApplyCompleted"
        }
    ],
    "Id": "e809efa4-0e8f-48fc-86d9-6d4c5b0d2da0",
    "HidePayload": true,
    "Name": "Task e809efa4-0e8f-48fc-86d9-6d4c5b0d2da0",
    "PercentComplete": 100,
    "TaskStatus": "OK",
    "TaskMonitor": "/redfish/v1/TaskService/fdcf8893-817e-4a6a-b990-264123ba4004",
    "TaskState": "Completed",
    "EndTime": "2019-11-12T15:06:33+00:00",
    "@odata.etag": "\"1573571193473\"",
    "@odata.type": "#Task.v1_4_1.Task",
    "Description": "This resource represents a task for a Redfish implementation."
}
```

Chapter 19. Event Service

Resource EventService

This Resource is used to represent event service for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/EventService
Schema file	EventService_v1.xml

GET – Event service properties

Use the GET method to retrieve properties in Event service resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/EventService
```

Request body

None

Response body

Field	Type	Description
Id	String	“EventService”
Name	String	“Event Service”
Description	String	This resource represents an event service for a Redfish implementation.
ServiceEnabled	Boolean	True
SSEFilterPropertiesSupported	Object	Expanded
SubordinateResources	Boolean	True
ResourceType	Boolean	True
EventFormatType	Boolean	True
RegistryPrefix	Boolean	True
OriginResource	Boolean	True
MetricReportDefinition	Boolean	True
MessageId	Boolean	True
DeliveryRetryAttempts	Integer	3
DeliveryRetryIntervalSeconds	Integer	60 (Unit: seconds)
ResourceTypes	Array	A list of @odata.type values (Schema names) that can be specified in a ResourceType on a subscription.
ResourceTypes[N]	String	Array element of ResourceTypes **Note:** Alert event cannot be filtered by ResourceType.

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Field	Type	Description
Actions	Object	Expanded
#EventService.SubmitTestEvent	Object	Refer to Actions
Status	Object	Expanded
State	String	“Enabled”
Health	String	“OK”
EventFormatTypes	Array	Item: string Item count: 2
EventFormatTypes[N]	String	Valid values: “Event”, “MetricReport”
SubordinateResourcesSupported	Boolean	Indicate if the service supports the SubordinateResource property on Event Subscriptions
RegistryPrefixes	Array	Item: string Item count: maps to members under the resource /redfish/v1/Registries
RegistryPrefixes[N]	String	Maps to members under the resource /redfish/v1/Registries
Subscriptions	Link	Reference to event subscriptions of EventDestinationCollection type
ServerSentEventUri	Link	“/redfish/v1/EventService/ServerSentEvent”
SMTP	Object	Expanded
Authentication	String	The authentication method for the SMTP server.
Port	Number	The destination SMTP port.
ConnectionProtocol	String	The connection type to the outgoing SMTP server.
Password	String	The password for authentication with the SMTP server. The value is `null` in responses.
ServiceEnabled	Boolean	An indication if SMTP for event delivery is enabled.
FromAddress	String	The 'from' email address of the outgoing email.
Username	String	The username for authentication with the SMTP server.
Authentication@Redfish.AllowableValues	Array	Items: string Item count: 3
Authentication @Redfish.AllowableValues[N]	String	"None", "Login","CRAM_MD5".
ConnectionProtocol@Redfish.AllowableValues	Array	Items: string Item count: 1
ConnectionProtocol @Redfish.AllowableValues[N]	String	"AutoDetect".
ServerAddress	String	The address of the SMTP server.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "IncludeOriginOfConditionSupported": true,
    "DeliveryRetryIntervalSeconds": 60,
    "DeliveryRetryAttempts": 3,
    "RegistryPrefixes": [
        "Base",
        "EventRegistry",
        "ExtendedError",
        "LenovoExtendedWarning",
        "LenovoFirmwareUpdateRegistry",
        "ResourceEvent",
        "TaskEvent"
    ],
    "SubordinateResourcesSupported": true,
    "EventFormatTypes": [
        "Event",
        "MetricReport"
    ],
    "@odata.etag": "\"b61666f78b2b2f04398a6\"",
    "SMTP": {
        "Password": null,
        "ServiceEnabled": true,
        "ConnectionProtocol@Redfish.AllowableValues": [
            "AutoDetect"
        ],
        "Authentication@Redfish.AllowableValues": [
            "None",
            "Login",
            "CRAM_MD5"
        ],
        "Username": "",
        "Port": 25,
        "ServerAddress": "0.0.0.0",
        "Authentication": "None",
        "FromAddress": null,
        "ConnectionProtocol": "AutoDetect"
    },
    "ServiceEnabled": true,
    "SSEFilterPropertiesSupported": {
        "RegistryPrefix": true,
        "OriginResource": true,
        "ResourceType": true,
        "MessageId": true,
        "EventFormatType": true,
        "SubordinateResources": true,
        "MetricReportDefinition": true
    },
    "@odata.type": "#EventService.v1_6_0.EventService",
    "Subscriptions": {
        "@odata.id": "/redfish/v1/EventService/Subscriptions"
    },
```

```
    "Id": "EventService",
    "Actions": {
        "#EventService.SubmitTestEvent": {
            "target": "/redfish/v1/EventService/Actions/EventService.SubmitTestEvent",
            "title": "SubmitTestEvent"
        }
    },
    "Name": "Event Service",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "@odata.id": "/redfish/v1/EventService",
    "ResourceTypes": [
        "LogService"
    ],
    "Description": "This resource represents an event service for a Redfish implementation.",
    "ServerSentEventUri": "/redfish/v1/EventService/ServerSentEvent"
}
```


PATCH– Update event service properties

Use the PATCH method to update the event service resource properties.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/EventService
```

Request body

Field	Type	Description
SMTP	Object	Expanded
Authentication	String	The authentication method for the SMTP server.
Port	Number	The destination SMTP port.
Password	String	The password for authentication with the SMTP server. The value is `null` in responses.
Username	String	The username for authentication with the SMTP server.
ServerAddress	String	The address of the SMTP server.
FromAddress	String	The 'from' email address of the outgoing email.

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body


```
{
```

```
    "SMTP": {
        "Password": "PASSWORD",
        "Username": "USERID",
        "Port": 25,
        "ServerAddress": "0.0.0.0",
        "Authentication": "None",
        "FromAddress": "userid@lenovo.com"
    }
}
```

After the PATCH operation runs successfully, querying the update service resource returns below example JSON response:

```
{
    "DeliveryRetryIntervalSeconds": 60,
    "DeliveryRetryAttempts": 3,
    "ServerSentEventUri": "/redfish/v1/EventService/ServerSentEvent",
    "IncludeOriginOfConditionSupported": true,
    "RegistryPrefixes": [
        "Base",
        "EventRegistry",
        "ExtendedError",
        "LenovoExtendedWarning",
        "LenovoFirmwareUpdateRegistry",
        "ResourceEvent",
        "TaskEvent"
    ],
    "SubordinateResourcesSupported": true,
    "EventFormatTypes": [
        "Event",
        "MetricReport"
    ],
    "SMTP": {
        "Password": null,
        "ServiceEnabled": true,
        "Authentication": "None",
        "Username": "USERID",
        "Port": 25,
        "ServerAddress": "0.0.0.0",
        "Authentication@Redfish.AllowableValues": [
            "None",
            "Login",
            "CRAM_MD5"
        ],
        "ConnectionProtocol": "AutoDetect",
        "FromAddress": "userid@lenovo.com",
        "ConnectionProtocol@Redfish.AllowableValues": [
            "AutoDetect"
        ]
    },
    "@odata.etag": "\"b84bdec2d6f72e14f9c04\"",
    "ServiceEnabled": true,
    "Name": "Event Service",
    "Description": "This resource represents an event service for a Redfish implementation.",
    "Id": "EventService",
    "Actions": {
        "#EventService.SubmitTestEvent": {
            "title": "SubmitTestEvent",
            "target": "/redfish/v1/EventService/Actions/EventService.SubmitTestEvent"
        }
    },
```

```
    "SSEFilterPropertiesSupported": {
        "RegistryPrefix": true,
        "OriginResource": true,
        "ResourceType": true,
        "MessageId": true,
        "EventFormatType": true,
        "SubordinateResources": true,
        "MetricReportDefinition": true
    },
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "@odata.id": "/redfish/v1/EventService",
    "@odata.type": "#EventService.v1_6_0.EventService",
    "ResourceTypes": [
        "LogService"
    ],
    "Subscriptions": {
        "@odata.id": "/redfish/v1/EventService/Subscriptions"
    }
}
```


POST – Submit a test event

Use the POST method to send a test event to subscribers.

Request URL

`POST https://<BMC_IPADDR>/redfish/v1/EventService/Actions/EventService.SubmitTestEvent`

Request body

Field	Type	Error Message ID
EventGroupId	Integer	The group id of event to be added.
EventId	String	The ID of event to be added.
EventTimes-tamp	String	The time stamp of event to be added.
Message	String	The event message text of event to be added.
MessageId	String	The message ID of event to be added.
MessageArgs	Array	The array of message arguments of event to be added.
OriginOfCon-dition	String	The URL of a valid resource caused the event to be added.

Response

None

Status code

HTTP Status Code	Error Message ID
204	NoContent
500	InternalError

Example

The following example is POST body

```
{
    "OriginOfCondition": "/redfish/v1/Systems/1/LogServices/AuditLog",
    "Message":"Login ID: USERID from web at IP address 1.1.1.1 has logged off. ----Test Test",
    "MessageArgs":["USERID","web","1.1.1.1"],
    "MessageId":"EventRegistry.1.0.FQXSPSE4032I",
    "EventTimestamp":"2020-12-31T00:00:00+00:00",
    "EventId": "0000003a",
    "EventGroupId": 1
}
```

The following example JSON response is returned:

None

The following event data received by a listener stays at the destination subscribed to Redfish service.

```
{
    "Events@odata.count": 1,
    "Id": "1",
    "Events": [
        {
            "MessageArgs": [
                "USERID",
                "web",
                "1.1.1.1"
            ],
            "Message": "Login ID: USERID from web at IP address 1.1.1.1 has logged off. ----Test Test",
            "EventGroupId": 1,
            "EventId": "1",
            "MemberId": "0001",
            "MessageId": "EventRegistry.1.0.FQXSPSE4032I",
            "EventTimestamp": "2020-12-31T00:00:00+00:00",
            "OriginOfCondition": {
                "@odata.id": "/redfish/v1/Systems/1/LogServices/AuditLog"
            }
        }
    ],
    "@odata.type": "#Event.v1_5_0.Event",
    "Name": "SubmitTestEvent",
    "Description": "This resource represents an event for a Redfish implementation."
}
```

Resource Event Subscription

This resource is used to provide event subscriptions for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/EventService/Subscriptions /redfish/v1/EventService/Subscriptions/{Subscription ID}
Schema file	EventDestination_v1.xml EventDestinationCollection_v1.xml

GET – Collection of event subscriptions

Use the GET method to retrieve the properties of event subscription collection resource for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/EventService/Subscriptions
```

Request body

None

Response body

Field	Type	Description
Members	Array	Items: A reference link of the elements of event subscriptions.
Name	String	“Subscriptions”.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/EventService/Subscriptions/EE116883"
        }
    ],
    "@odata.type": "#EventDestinationCollection.EventDestinationCollection",
    "@odata.id": "/redfish/v1/EventService/Subscriptions",
    "Members@odata.count": 1,
    "@odata.etag": "\"1554223063641\"",
    "Name": "Subscriptions",
    "@odata.context": "/redfish/v1/$metadata#EventDestinationCollection.EventDestinationCollection"
}
```

GET – Event subscriptions

Use the GET method to retrieve properties in event subscription entries for a server.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/EventService/Subscriptions/{Subscription ID}
```

Request body

None

Response body

Field	Type	Description
Id	String	Uniquely identifies the resource within the collection of the subscriptions.
Name	String	“Destination”
Description	String	This resource represents the target of an event subscription, including the types of events subscribed and context to provide to the target in the Event payload.
Destination	String	This property shall contain a URI to the destination where the events will be sent.
Context	String	A client-supplied string that is stored with the event destination subscription.
Protocol	String	“Redfish”
HttpHeaders	Array	This is for setting HTTP headers, such as authorization information. This object will be null on a GET.
HttpHeaders[N]	Object	This is for setting HTTP headers, such as authorization information. This object will be null on a GET.
MessageIds	Array	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.
MessageIds[N]	String	Message Id that the service will send
SubordinateResources	Boolean	By setting this to true and specifying OriginResources, this indicates the subscription will be for events from the OriginsResources specified and also all subordinate resources
ResourceTypes	Array	A list of @odata.type values (Schema names) that can be specified in a ResourceType on a subscription.
ResourceTypes[N]	String	Array element of ResourceTypes **Note:** Alert event cannot be filtered by ResourceType.
EventFormatType	String	Valid values: “Event”, “MetricReport” (MetricReport type event is not supported yet)
RegistryPrefixes	Array	Item: string Item count: maps to members under the resource /redfish/v1/Registries
RegistryPrefixes[N]	String	Maps to members under the resource /redfish/v1/Registries
OriginResources	Array	A list of resources for which the service will only send related events. If this property is absent or the array is empty, then Events originating from any resource will be sent to the subscriber.
OriginResources[N]	Link	Reference to the resource for which the service will only send related events.
SubscriptionType	String	Valid values: “RedfishEvent”, “SSE”

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "HttpHeaders": [],
    "Id": "3A048D0E",
    "SubordinateResources": null,
    "Context": "Test_Context",
    "MessageIds": [],
    "EventFormatType": "Event",
    "ResourceTypes": [],
    "OriginResources@odata.count": 0,
    "Protocol": "Redfish",
    "Name": "Destination",
    "@odata.id": "/redfish/v1/EventService/Subscriptions/3A048D0E",
    "RegistryPrefixes": [
        "EventRegistry"
    ],
    "@odata.type": "#EventDestination.v1_5_0.EventDestination",
    "SubscriptionType": "RedfishEvent",
    "Destination": "https://192.168.0.2:443",
    "@odata.etag": "\"1575571584025\"",
    "OriginResources": [],
    "Description": "This resource represents the target of an event subscription, including the types
of events subscribed and context to provide to the target in the Event payload."
}
```

POST – Create a subscription

Create a subscription for Redfish service to send event to subscriber.

Request URL

```
POST https://<BMC_IPADDR>/redfish/v1/EventService/Subscriptions
```

Request body

Field	Type	Description
Destination	String	This property shall contain a URI to the destination where the events will be sent.
Context	String	A client-supplied string that is stored with the event destination subscription.
Protocol	String	“Redfish”
RegistryPrefixes	Array	Item: string Item count: maps to members under the resource /redfish/v1/Registries
RegistryPrefixes[N]	String	Maps to members under the resource /redfish/v1/Registries

Response body

It responds the created subscription resource, refer the response body of Event subscription with GET method.

Status code

HTTP Status Code	Error Message ID
201	Created
400	BadRequest, PropertyValueNotInList
500	InternalError

Example

Create Redfish protocol subscription

The following example is POST body.

```
{
    "Protocol": "Redfish",
    "Context": "Test_Context",
    "Destination": "https://192.168.0.2:443",
    "RegistryPrefixes": [
        "EventRegistry"
    ]
}
```

The following example JSON response is returned:

```
{
   "SubscriptionType" : "RedfishEvent",
   "HttpHeaders" : [],
   "RegistryPrefixes" : [
      "EventRegistry"
   ],
   "EventFormatType" : "Event",
   "OriginResources@odata.count" : 0,
   "OriginResources" : [],
   "Id" : "3A048D0E",
   "Destination" : "https://192.168.0.2:443",
   "Context" : "Test_Context",
   "MessageIds" : [],
   "SubordinateResources" : null,
   "@odata.id" : "/redfish/v1/EventService/Subscriptions/3A048D0E",
   "@odata.etag" : "\"1575571584025\"",
   "@odata.type" : "#EventDestination.v1_5_0.EventDestination",
   "Protocol" : "Redfish",
   "Description" : "This resource represents the target of an event subscription, including
the types of events subscribed and context to provide to the target in the Event payload.",
   "Name" : "Destination",
   "ResourceTypes" : []
}
```

Create SMTP protocol subscription

The following example is POST body

```
{
    “Context”: “SMTP user”,
    "Destination": "mailto:userid@lenovo.com",
    "Protocol": "SMTP"
```

```
}
```

The following example JSON response is returned:

```
{
    "Protocol": "SMTP",
    "Description": "This resource represents an event destination for a Redfish implementation.",
    "EventFormatType": "Event",
    "Id": "REST-SMTP-1",
    "Status": {
        "State": "Enabled"
    },
    "Context": "SMTP user",
    "@odata.type": "#EventDestination.v1_11_0.EventDestination",
    "@odata.id": "/redfish/v1/EventService/Subscriptions/REST-SMTP-1",
    "@odata.etag": "\"363737e9a52729657ae\"",
    "Name": "REST-SMTP-1",
    "Destination": "mailto:userid@lenovo.com",
    "SubscriptionType": "RedfishEvent"
}
```

Create SNMPv1 trap subscription

The following example is POST body

```
{
    "Destination": "snmp://10.10.10.10",
    "Protocol": "SNMPv1",
     "SNMP": {
        "TrapCommunity": "test"
    }
}
```

The following example JSON response is returned:

```
{
    "Protocol": "SNMPv1",
    "Id": "REST-SNMPv1-1",
    "SNMP": {
        "TrapCommunity": "test"
    },
    "@odata.type": "#EventDestination.v1_8_0.EventDestination",
    "@odata.id": "/redfish/v1/EventService/Subscriptions/REST-SNMPv1-1",
    "Destination": "snmp://10.10.10.10",
    "Description": "This resource represents an event destination for a Redfish implementation.",
    "Context": "",
    "Name": "REST-SNMPv1-1",
    "Status": {
        "State": "Disabled"
    },
    "@odata.etag": "\"38906ed3cd672966db8\"",
    "SubscriptionType": "SNMPTrap",
    "EventFormatType": "Event"
}
```

Note that if the “State” in the response is “Disabled”, you would need to enable the SNMPv1 trap in /redfish/v1/Managers/1/NetworkProtocol /Oem/Lenovo/SNMP.

Create SNMPv2c trap subscription

The following example is POST body

```
{
```

```
    "Protocol": "SNMPv2c",
   "Destination": "snmp://10.10.10.11",
"SNMP": {
        "TrapCommunity": "TestTrapCommunity"
    }
}
```

The following example JSON response is returned:

```
{
  "SubscriptionType": "SNMPTrap",
    "Description": "This resource represents an event destination for a Redfish implementation.",
    "Destination": "snmp://10.10.10.11",
    "Context": "",
    "Status": {
        "State": "Enabled"
    },
    "EventFormatType": "Event",
    "Id": "REST-SNMPv2c-1",
    "Name": "REST-SNMPv2c-1",
    "@odata.type": "#EventDestination.v1_11_2.EventDestination",
    "@odata.id": "/redfish/v1/EventService/Subscriptions/REST-SNMPv2c-1",
    "Protocol": "SNMPv2c",
    "@odata.etag": "\"3dd4bf8b4ce72a26dff\"",
    "@odata.context": "/redfish/v1/$metadata#EventDestination.EventDestination",
    "SNMP": {
        "TrapCommunity": "TestTrapCommunity"
    }
}
```

Note that only one SNMPv1 and one SNMPv2c can be created.

Create SNMPv3 trap subscription

The following example is POST body

```
{
    "Destination": "snmp://test@10.10.10.10",
    "Protocol": "SNMPv3"
}
```

The following example JSON response is returned:

```
{
    "Protocol": "SNMPv3",
    "Id": "REST-SNMPv3-2",
    "SubscriptionType": "SNMPTrap",
    "@odata.type": "#EventDestination.v1_8_0.EventDestination",
    "@odata.id": "/redfish/v1/EventService/Subscriptions/REST-SNMPv3-2",
    "Destination": "snmp://test@10.10.10.10",
    "Description": "This resource represents an event destination for a Redfish implementation.",
    "Context": "",
    "Name": "test",
    "Status": {
        "State": "Disabled"
    },
    "SNMP": {
        "TrapCommunity": null
    },
    "@odata.etag": "\"3b17f6a279c82667a00\"",
    "EventFormatType": "Event"
}
```

Note that if the “State” in the response is “Disabled”, you would need to enable the SNMPv3 trap in /redfish/v1/Managers/1/NetworkProtocol /Oem/Lenovo/SNMP. Refer to Chapter 23 “SNMP Management” on page 339

DELETE– Delete a subscription

Use the DELETE method to delete subscription resource for Redfish service. Remove a subscription created for event to send to client listener.

Request URL

```
DELETE https://<BMC_IPADDR>/redfish/v1/EventService/Subscriptions/{Subscription ID}
```

Request body

None

Response

None

Status code

HTTP Status Code	Error Message ID
204	NoContent
500	InternalError

Example

The following example is DELETE body

None

The following example JSON response is returned:

None

SSE subscription

Create a subscription of Server-Sent Events for Redfish service to send event to client and keep the connection open.

Request URL

```
POST https://<BMC_IPADDR>/{ServerSentEventUri}
```

ServerSentEventUri: as specified in ServerSentEventUri property of EventService.

Request body

None

Response body

None

Status code

None

Example

Subscribe SSE events - curl

The following example of curl command is to create SSE connection and receive events through the connection.

```
$ curl "https://192.168.0.1/redfish/v1/EventService/ServerSentEvent" -X GET -k -u USERID:PASSWORD
```

Subscribe SSE events - browser

Use a web browser (e.g. Chrome) to access URI of https://192.168.0.1/redfish/v1/EventService/ServerSentEvent, and you will see browser displays the received events.

Event JSON data response

The following example JSON response is returned.

```
…
…

: stream keep-alive

id:2
data:{
data:    "Events@odata.count": 1,
data:    "Id": "2",
data:    "Events": [
data:        {
data:            "MessageArgs": [
data:                "USERID",
data:                "the standard password",
data:                "web",
data:                "192.168.0.2"
data:            ],
data:            "Message": "Remote Login Successful. Login ID: USERID using the standard password from web
at IP address 192.168.0.2.",
data:            "EventGroupId": 0,
data:            "Oem": {
data:                "SystemSerialNumber": "DSYM09X",
data:                "Lenovo": {
data:                    "ReportingChain": "",
data:                    "IsLocalEvent": true,
data:                    "RawDebugLogURL": "",
data:                    "AffectedIndicatorLEDs": [
data:                    ],
data:                    "EventFlag": 0,
data:                    "AuxiliaryData": "",
data:                    "Source": "System",
data:                    "FailingFRU": [
data:                        {
data:                            "FRUSerialNumber": "",
data:                            "FRUNumber": ""
data:                        }
data:                    ],
data:                    "TSLVersion": "0",
data:                    "RelatedEventID": "",
data:                    "Hidden": false,
data:                    "EventID": "0x4000000e00000000",
data:                    "EventSequenceNumber": 1616,
data:                    "EventType": 0,
```

```
data:                     "@odata.type": "#LenovoLogEntry.v1_0_0.StandardLogEntry",
data:                     "LenovoMessageID": "Lenovo0014",
data:                     "TotalSequenceNumber": 1965,
data:                     "CommonEventID": "FQXSPSE4001I",
data:                     "Serviceable": "Not Serviceable"
data:                 },
data:                 "SystemMachineTypeModel": "7X05CTO1WW",
data:                 "SystemUUID": "F0F63E94-8E25-11E8-9A5A-7ED30A5E2267"
data:             },
data:             "EventId": "16ED786F53C",
data:             "MemberId": "0001",
data:             "MessageId": "EventRegistry.1.0.FQXSPSE4001I",
data:             "MessageSeverity": "OK",
data:             "OriginOfCondition": {
data:                 "@odata.id": "/redfish/v1/Systems/1/LogServices/StandardLog"
data:             },
data:             "EventTimestamp": "2019-12-05T19:26:16+00:00"
data:         }
data:     ],
data:     "@odata.type": "#Event.v1_4_0.Event",
data:     "Name": "Redfish Event",
data:     "Description": "This resource represents an event for a Redfish implementation."
data:}

: stream keep-alive

: stream keep-alive
…
…
```

Query SSE event subscription

GET https://192.168.0.1/redfish/v1/EventService/Subscriptions, and find the new subscription of SSE is in the collection.

In the example it is “/redfish/v1/EventService/Subscriptions/C8ECC924”.

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/EventService/Subscriptions/C8ECC924"
        }
    ],
    "@odata.type": "#EventDestinationCollection.EventDestinationCollection",
    "@odata.id": "/redfish/v1/EventService/Subscriptions",
    "Members@odata.count": 1,
    "@odata.etag": "\"1554741700566\"",
    "Name": "Subscriptions",
    "@odata.context": "/redfish/v1/$metadata#EventDestinationCollection.EventDestinationCollection"
}
```

GET https://192.168.0.1/redfish/v1/EventService/Subscriptions/C8ECC924, and find the subscription properties.

```
{
    "HttpHeaders": [],
    "Id": "C8ECC924",
    "SubordinateResources": null,
    "Context": null,
    "MessageIds": [],
```

```
    "SubscriptionType": "SSE",
    "ResourceTypes": [],
    "OriginResources@odata.count": 0,
    "Protocol": "Redfish",
    "Name": "Destination",
    "RegistryPrefixes": [],
    "@odata.type": "#EventDestination.v1_5_0.EventDestination",
    "@odata.id": "/redfish/v1/EventService/Subscriptions/C8ECC924",
    "Description": "This resource represents the target of an event subscription, including the types
of events subscribed and context to provide to the target in the Event payload.",
    "@odata.etag": "\"1575573946737\"",
    "OriginResources": [],
    "EventFormatType": "Event"
}
```


Note: the “SubscriptionType” property value is “SSE”, that means an SSE subscription.

Event

This Resource is used to represent event information for a Redfish implementation.

Number of Resources	N/A
Resource Path	N/A
Schema file	Event_v1.xml

Event properties

Properties in Event service resource for Redfish service.

Request URL

N/A

Request body

None

Response body

Field	Type	Description
Id	String	Unique event Id
Name	String	“Redfish Event”
Context	String	A context can be supplied at subscription time. This property is the context value supplied by the subscriber.
Events	Array	Item: event record Item count: 1
Events[N]	Object	Expanded
EventType	String	This indicates the type of event sent, according to the definitions in the EventService.
EventGroupId	Integer	0
EventId	String	This is a unique instance identifier of an event. Client provides the EventId when it is sent with SubmitTestEvent action.

Field	Type	Description
EventTimestamp	String	This is time the event occurred.
MessageSeverity	String	Severity of the event. Valid values • “OK” • “Warning” • “Critical”
MemberId	String	This is the identifier for the member within the collection.
Message	String	Message text
MessageId	String	This is the key for this message which can be used to look up the message in a message registry.
MessageArgs	Array	Array of message arguments
MessageArgs[N]	String	Message argument
OriginOfCondition	String	“/redfish/v1/Systems/1/LogServices/StandardLog”

Status code

N/A

Example

The following is an example for event JSON data response:

```
{
   "Id" : "2",
   "Events" : [
      {
         "EventTimestamp" : "2019-12-05T19:26:16+00:00",
         "MessageArgs" : [
            "USERID",
            "the standard password",
            "web",
            "192.168.0.2"
         ],
         "Oem" : {
            "SystemUUID" : "F0F63E94-8E25-11E8-9A5A-7ED30A5E2267",
            "Lenovo" : {
               "IsLocalEvent" : true,
               "AffectedIndicatorLEDs" : [],
               "LenovoMessageID" : "Lenovo0014",
               "EventType" : 0,
               "RelatedEventID" : "",
               "RawDebugLogURL" : "",
               "AuxiliaryData" : "",
               "Source" : "System",
               "FailingFRU" : [
                  {
                     "FRUNumber" : "",
                     "FRUSerialNumber" : ""
                  }
               ],
               "EventSequenceNumber" : 1616,
               "EventFlag" : 0,
               "TSLVersion" : "0",
               "CommonEventID" : "FQXSPSE4001I",
```

```
                "TotalSequenceNumber" : 1965,
                "EventID" : "0x4000000e00000000",
                "Serviceable" : "Not Serviceable",
                "ReportingChain" : "",
                "@odata.type" : "#LenovoLogEntry.v1_0_0.StandardLogEntry",
                "Hidden" : false
             },
             "SystemMachineTypeModel" : "7X05CTO1WW",
             "SystemSerialNumber" : " DSYM09X"
          },
          "MemberId" : "0001",
          "OriginOfCondition" : {
             "@odata.id" : "/redfish/v1/Systems/1/LogServices/StandardLog"
          },
          "MessageId" : "EventRegistry.1.0.FQXSPSE4001I",
          "EventGroupId" : 0,
          "EventId" : "16ED786F53C",
          "Message" : "Remote Login Successful. Login ID: USERID using the standard password from web at
IP address 192.168.0.2.",
          "MessageSeverity" : "OK"
       }
   ],
   "@odata.type" : "#Event.v1_4_0.Event",
   "Events@odata.count" : 1,
   "Context" : "Test_Context",
   "Name" : "Redfish Event",
   "Description" : "This resource represents an event for a Redfish implementation."
}
```

Chapter 20. Telemetry Management

Resource TelemetryService

This Resource is used to represent telemetry service for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/TelemetryService
Schema file	TelemetryService_v1.xml

GET – Telemetry service properties

Use the GET method to retrieve properties in Telemetry service resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/TelemetryService
```

Request body

None

Response body

Field	Type	Description
Id	String	“TelemetryService”.
Name	String	“Telemetry Service”.
Description	String	This resource shall be used to represent a Metrics Service for a Redfish implementation.
ServiceEnabled	Boolean	If FoD is 2 or higher, the value is true, otherwise is false.
SupportedCollectionFunctions	Array	"Average", "Minimum", "Maximum"
Status	Object	The status of the telemetry service.
State	String	The state of the telemetry service.
Health	String	The health of the telemetry service.
MetricDefinitions	Link	The link to the collection of metric definitions.
MetricReportDefinitions	Link	The link to the collection of metric report definitions.
MetricReports	Link	The link to the collection of metric reports.
Actions	Object	Expanded
#TelemetryService.SubmitTestMetricReport	Object	This action generates a metric report.
target	Link	Link to invoke action.
title	String	“SubmitTestMetricReport”
@Redfish.ActionInfo	Link	Link to the info of this action.

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Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "MetricReports": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricReports"
    },
    "@odata.id": "/redfish/v1/TelemetryService",
    "Status": {
        "State": "Enabled",
        "Health": "OK"
    },
    "Name": "Telemetry Service",
  "ServiceEnabled": true,
    "SupportedCollectionFunctions": [
        "Average",
        "Minimum",
        "Maximum"
    ],
    "Id": "TelemetryService",
    "@odata.type": "#TelemetryService.v1_1_1.TelemetryService",
    "MetricDefinitions": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions"
    },
    "MetricReportDefinitions": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions"
    },
    "@odata.etag": "\"7913d34db76cc9af9c13306d210b0da7\"",
    "Actions": {
        "#TelemetryService.SubmitTestMetricReport": {
            "target": "/redfish/v1/TelemetryService/Actions/TelemetryService.SubmitTestMetricReport",
            "@Redfish.ActionInfo": "/redfish/v1/TelemetryService/SubmitTestMetricReportActionInfo",
            "title": "SubmitTestMetricReport"
        }
    },
    "Description": "This resource shall be used to represent a Metrics Service for a Redfish implementation."
}
```

GET – Action info of SubmitTestMetricReport

Use the GET method to retrieve properties in action info resource of SubmitTestMetricReport.

Request URL

```
GET https://<BMC_IPADDR>redfish/v1/TelemetryService/SubmitTestMetricReportActionInfo
```

Request body

None

Response body

Field	Type	Description
Id	String	“SubmitTestMetricReport”.
Name	String	“SubmitTestMetricReport”.
Description	String	This action is used to generate a metric report.
Parameters	Array	Items: object Item count: 2
Parameters[1]	Object	Expanded
Name	String	“MetricReportName”
DataType	String	“String”
Required	String	true
Parameters[2]	Object	Expanded
Name	String	"GeneratedMetricReportValues"
DataType	String	“ObjectArray”
ObjectDataType	String	Expanded
Required	Boolean	true

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "@odata.type": "#ActionInfo.v1_1_0.ActionInfo",
    "Id": "SubmitTestMetricReport",
    "@odata.id": "/redfish/v1/TelemetryService/SubmitTestMetricReportActionInfo",
    "Parameters": [
        {
            "Required": true,
            "Name": "MetricReportName",
            "DataType": "String"
        },
        {
            "ObjectDataType": "#TelemetryService.v1_1_0.MetricValue",
            "Required": false,
            "Name": "GeneratedMetricReportValues",
            "DataType": "ObjectArray"
        }
    ],
    "Name": "SubmitTestMetricReport",
    "Description": "This action is used to generate a metric report."
}
```

POST – Submit a test Metric Report

Use the POST method to send a test metric report. User can open a SSE stream with filter "EventFormatType eq 'MetricReport'" for getting the test metric report.

Example:

https://sseuri?$filter=EventFormatType eq 'MetricReport'

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/TelemetryService/Actions/TelemetryService.SubmitTestMetricReport
```

Request body

Field	Type	Description
MetricReportName	String	The name of the metric report in generated metric report.
GeneratedMetricReportValues	Array	Items: object Item count: 0 – N
GeneratedMetricReportValues[N]	Object	The content of the MetricReportValues in the generated metric report.
MetricDefinition	Link	The link to the metric.
MetricId	String	The metric definitions identifier for this metric.
MetricProperty	String	The URI for the property from which this metric is derived.
MetricValue	String	The metric value, as a string.
Timestamp	String	The time when the metric value is obtained.

Response

None

Status code

HTTP Status Code	Error Message ID
204	NoContent
500	InternalError

Example

The following example is POST body:

```
{
    "MetricReportName": "PowerSupplyStats",
    "GeneratedMetricReportValues": [
        {
            "MetricDefinition": "/redfish/v1/TelemetryService/MetricDefinitions/AveragePowerSupplyInput",
            "MetricId": "AveragePowerSupplyInput",
            "MetricProperty": "/redfish/v1/Chassis/1/Power#/PowerSupplies/1/PowerInputWatts",
            "MetricValue": "300",
            "Timestamp": "2029-07-10T14:08:00+00:00"
        }
    ]
}
```

Resource MetricReportDefinition

This Resource is used to represent MetricReportDefinition for a Redfish implementation.

Number of Resources	6 or 8. (Depends on machine type)
Resource Path	/redfish/v1/TelemetryService/MetricReportDefinitions/{Id}
Schema file	MetricReportDefinitionCollection_v1.xml MetricReportDefinition_v1.xml

GET – Collection of MetricReportDefinition

Use the GET method to retrieve the properties MetricReportDefinition collection resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/TelemetryService/MetricReportDefinitions
```

Request body

None

Response body

Field	Type	Description
Members	Array	Items: A reference link of the elements of MetricReportDefinition
Name	String	MetricReportDefinitions
Description	String	A Collection of MetricReportDefinition resource instances.

Note: the collection of “MetricReportDefinition” may contain members below:

CPUTemp

CPUTempEvent

InletAirTemp

InletAirTempEvent

PowerMetrics

PowerMetricsEvent

PowerSupplyStats

PowerSupplyStatsEvent

CPUPowerMetrics (Not support on Lenovo AMD 2p systems)

CPUPowerMetricsEvent (Not support on Lenovo AMD 2p systems)

CPUUtilizationStats (Not support on Lenovo AMD 2p systems)

CPUUtilizationStatsEvent (Not support on Lenovo AMD 2p systems)

MemoryUtilizationStats (Not support on Lenovo AMD 2p systems)

MemoryUtilizationStatsEvent (Not support on Lenovo AMD 2p systems)

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/CPUTemp"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/CPUTempEvent"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/InletAirTemp"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/InletAirTempEvent"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/PowerMetrics"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/PowerMetricsEvent"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/PowerSupplyStats"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/PowerSupplyStatsEvent"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/CPUUtilizationStats"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/CPUUtilizationStatsEvent"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/MemoryUtilizationStats"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/MemoryUtilizationStatsEvent"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/CPUPowerMetrics"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/CPUPowerMetricsEvent"
        }
    ],
```

```
"@odata.type": "#MetricReportDefinitionCollection.MetricReportDefinitionCollection",
"@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions",
"Name": "MetricReportDefinitions",
"@odata.etag": "\"b4e9fce087662d2afe14f\"",
"Members@odata.count": 14,
"Description": "A Collection of MetricReportDefinition resource instances."
```


GET – MetricReportDefinition properties

Use the GET method to retrieve each MetricReportDefinition info.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/TelemetryService/MetricReportDefinitions/{Id}`

Response body

Field	Type	Description
Id	String	The identifier of this resource.
Description	String	A set of metrics that are collected into a metric report.
Name	String	The name of this resource.
ReportTimespan	String	Specifies the timespan duration of the metric report.
MetricReportDefinitionType	String	Specifies when the metric report is generated.
ReportActions	Array	The set of actions to perform when a metric report is generated.
ReportUpdates	String	“AppendWrapsWhenFull” if this property exists.
AppendLimit	Integer	25920 if this property exists.
Metrics	Array	The list of metrics to include in the metric report.
Metrics[1]	Object	Specifies a metric to include in the metric report.
MetricProperties	String	The set of URIs for the properties on which this metric is collected.
CollectionTimeScope	String	The scope of time scope over which the function is applied.
CollectionDuration	String	The duration over which the function is computed.
Wildcards	Array	The set of wildcards and their substitution values for the entries in the MetricProperties property.
Status	Object	The status for this resource.
State	String	The state for this resource.
MetricReport	String	The location where the resultant metric report is placed.
Schedule	Object	The schedule for generating the metric report.
RecurrenceInterval	String	The amount of time until the next occurrence occurs.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following examples JSON response describe the PowerMetrics and PowerMetricsEvent.

```
{
    "Wildcards": [
        {
            "Name": "PWild",
            "Values": [
                "0",
                "1",
                "2"
            ]
        }
    ],
    "ReportUpdates": "AppendWrapsWhenFull",
    "Metrics": [
        {
            "MetricProperties": [
                "/redfish/v1/Chassis/1/Power#/PowerControl/{PWild}/PowerMetrics/MaxConsumedWatts",
                "/redfish/v1/Chassis/1/Power#/PowerControl/{PWild}/PowerMetrics/AverageConsumedWatts",
                "/redfish/v1/Chassis/1/Power#/PowerControl/{PWild}/PowerMetrics/MinConsumedWatts"
            ],
            "CollectionTimeScope": "Interval",
            "CollectionDuration": "PT30S"
        }
    ],
    "Description": "A set of metrics that are collected into a metric report.",
    "Name": "PowerMetrics",
    "ReportTimespan": "PT24H",
    "Id": "PowerMetrics",
    "@odata.etag": "\"648d59955bddcc7f09232753f8ea5f4b\"",
    "AppendLimit": 2592O,
    "ReportActions": [
        "LogToMetricReportsCollection"
    ],
    "MetricReport": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricReports/PowerMetrics"
    },
    "@odata.type": "#MetricReportDefinition.v1_3_0.MetricReportDefinition",
    "Status": {
        "State": "Enabled"
    },
    "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/PowerMetrics",
    "MetricReportDefinitionType": "OnRequest"
}

{
    "Wildcards": [
        {
            "Name": "PWild",
            "Values": [
                "0",
                "1",
                "2"
            ]
        }
    ],
    "ReportTimespan": "PT10M",
    "Metrics": [
        {
            "MetricProperties": [
                "/redfish/v1/Chassis/1/Power#/PowerControl/{PWild}/PowerMetrics/MaxConsumedWatts",
                "/redfish/v1/Chassis/1/Power#/PowerControl/{PWild}/PowerMetrics/AverageConsumedWatts",
                "/redfish/v1/Chassis/1/Power#/PowerControl/{PWild}/PowerMetrics/MinConsumedWatts"
```

```
            ],
            "CollectionTimeScope": "Interval",
            "CollectionDuration": "PT30S"
        }
    ],
    "Description": "A set of metrics that are collected into a metric report.",
    "Name": "PowerMetricsEvent",
    "Schedule": {
        "RecurrenceInterval": "PT10M"
    },
    "Id": "PowerMetricsEvent",
    "@odata.etag": "\"ffb0baa73f2c9f39bb6fa63236a919d7\"",
    "ReportActions": [
        "RedfishEvent"
    ],
    "@odata.type": "#MetricReportDefinition.v1_3_0.MetricReportDefinition",
    "Status": {
        "State": "Enabled"
    },
    "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/PowerMetricsEvent",
    "MetricReportDefinitionType": "Periodic"
}
```


Resource MetricReport

This Resource is used to represent MetricReport for a Redfish implementation.

Number of Resources	6 or 7. (Depends on machine type)
Resource Path	/redfish/v1/TelemetryService/MetricReports/{Id}
Schema file	MetricReportCollection_v1.xml MetricReport_v1.xml

GET – Collection of MetricReport

Use the GET method to retrieve the properties MetricReport collection resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/TelemetryService/MetricReports
```

Request body

None

Response body

Field	Type	Description
Members	Array	Items: A reference link of the elements of MetricReport
Name	String	MetricReports
Description	String	A Collection of MetricReport resource instances.

Note: the collection of “MetricReport” may contain members below:

CPUTemp

InletAirTemp

PowerMetrics

PowerSupplyStats

CPUPowerMetrics (Not support on Lenovo AMD 2p systems)

MemoryUtilizationStats (Not support on Lenovo AMD 2p systems)

CPUUtilizationStats (Not support on Lenovo AMD 2p systems)

MemoryUtilizationStats (Not supported on AMD Milan-based systems) Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Members": [
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReports/CPUTemp"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReports/InletAirTemp"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReports/PowerMetrics"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReports/PowerSupplyStats"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReports/CPUUtilizationStats"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReports/MemoryUtilizationStats"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricReports/CPUPowerMetrics"
        }
    ],
    "@odata.type": "#MetricReportCollection.MetricReportCollection",
    "@odata.id": "/redfish/v1/TelemetryService/MetricReports",
    "Name": "MetricReports",
    "@odata.etag": "\"590749d0e56a27efeb4\"",
    "Members@odata.count": 7,
    "Description": "A Collection of MetricReport resource instances."
```

GET – MetricReport properties

Use the GET method to retrieve each MetricReport info.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/TelemetryService/MetricReports/{Id}
```

Response body

Field	Type	Description
Id	String	The identifier of this resource.
Description	String	The metric definitions used to create a metric report.
Name	String	The name of this resource.
Timestamp	String	The time associated with the metric report in its entirety.
MetricReportDefinition	Link	The definitions in the metric report.
MetricValues	Array	An array of metric values for the metered items of this Metric.
MetricValues[N]	Object	A metric Value.
MetricDefinition	Link	The link to the metric.
MetricId	String	The metric definitions identifier for this metric.
MetricProperty	String	The URI for the property from which this metric is derived.
MetricValue	String	The metric value, as a string.
Timestamp	String	The time when the metric is obtained.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Name": "PowerMetrics",
    "MetricValues": [
        {
            "MetricValue": "242",
            "Timestamp": "2020-03-21T09:34:30+00:00",
            "MetricProperty": "/redfish/v1/Chassis/1/Power#/PowerControl/0/PowerMetrics/MaxConsumedWatts"
        },
        {
            "MetricValue": "223",
            "Timestamp": "2020-03-21T09:34:30+00:00",
            "MetricProperty": "/redfish/v1/Chassis/1/Power#/PowerControl/0/PowerMetrics/MinConsumedWatts"
        },
        {
            "MetricValue": "230",
            "Timestamp": "2020-03-21T09:34:30+00:00",
            "MetricProperty": "/redfish/v1/Chassis/1/Power#/PowerControl/0/PowerMetrics/AverageConsumedWatts"
        },
        ...
    ],
    "MetricReportDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricReportDefinitions/PowerMetrics"
    },
    "Id": "PowerMetrics",
    "Timestamp": "2020-03-21T09:34:57+00:00",
    "@odata.etag": "\"e941767245f49ddcf2707ee0ba3f9252\"",
    "@odata.type": "#MetricReport.v1_2_0.MetricReport",
```

```
    "Description": "The metric definitions used to create a metric report.",
    "MetricValues@odata.count": 25920,
    "@odata.id": "/redfish/v1/TelemetryService/MetricReports/PowerMetrics"
}
```

Resource MetricDefinition

This Resource is used to represent MetricDefinition for a Redfish implementation.

Number of Resources	0 or 2. (Depends on machine type)
Resource Path	/redfish/v1/TelemetryService/MetricDefinitions/{Id}
Schema file	MetricDefinitionCollection_v1.xml MetricDefinition_v1.xml

GET – Collection of MetricDefinition

Use the GET method to retrieve the properties MetricDefinition collection resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/TelemetryService/MetricDefinitions
```

Request body

None

Response body

Field	Type	Description
Members	Array	Items: A reference link of the elements of MetricDefinition
Name	String	MetricDefinitions
Description	String	A Collection of MetricDefinition resource instances.

Note: the collection of “MetricDefinition” may contain members below:

AveragePowerSupplyInput,

AveragePowerSupplyOutput,

AverageCPUUtilization, (not support on Lenovo AMD 2p systems)

AverageMemoryUtilization. (not support on Lenovo AMD 2p systems)

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
```

```
    "Name": "MetricDefinitions",
    "@odata.etag": "\"52b424e502c413c3426d0b430b95c9a1\"",
    "Members@odata.count": 4,
    "@odata.type": "#MetricDefinitionCollection.MetricDefinitionCollection",
    "Description": "A Collection of MetricDefinition resource instances.",
    "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions",
    "Members": [
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/AveragePowerSupplyInput"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/AveragePowerSupplyOutput"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/AverageCPUUtilization"
        },
        {
            "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/AverageMemoryUtilization"
        }
    ]
}
```


GET – MetricDefinition inventory properties

Use the GET method to retrieve each MetricDefinition info.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/TelemetryService/MetricDefinitions/{Id}`

Response body

Field	Type	Description
Id	String	The identifier of this resource.
Description	String	The metadata information about a metric.
Name	String	The name of this resource.
MetricType	String	The type of metric.
Implementation	String	The implementation of the metric.
PhysicalContext	String	The physical context of the metric.
MetricDataType	String	The data type of the metric.
Units	String	The units of measure for this metric.
CalculationAlgorithm	String	The calculation that is performed on a source metric to obtain the metric being defined.
CalculationTimeInterval	String	The time interval over which the metric calculation is performed.
IsLinear	Boolean	An indication of whether the metric values are linear versus non-linear.
Calculable	String	An indication of whether the metric can be used in a calculation.
Wildcards	Array	The wildcards and their substitution values for the entries in the MetricProperties array property.
MetricProperties	Array	The list of URIs with wildcards and property identifiers that this metric definition defines.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "Wildcards": [
        {
            "Name": "PWild",
            "Values": [
                "0",
                "1",
                "2",
                "3"
            ]
        }
    ],
    "CalculationTimeInterval": "PT1S",
    "Description": "The metadata information about a metric.",
    "MetricType": "Numeric",
    "PhysicalContext": "PowerSupply",
    "CalculationAlgorithm": "Average",
    "Name": "AveragePowerSupplyInput",
    "IsLinear": true,
    "MetricDataType": "Integer",
    "Id": "AveragePowerSupplyInput",
    "MetricProperties": [
        "/redfish/v1/Chassis/1/Power#/PowerSupplies/{PWild}/PowerInputWatts"
    ],
    "@odata.etag": "\"31db0d95174de283fa99ca3a69891e2c\"",
    "Calculable": "NonSummable",
    "Implementation": "Calculated",
    "@odata.type": "#MetricDefinition.v1_0_3.MetricDefinition",
    "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/AveragePowerSupplyInput",
    "Units": "W"
}
```

Chapter 21. Job Management

Resource JobService

The resource represents a collection of jobs for the Redfish service. All job resources accessible through the interface link from the JobService resource.

Number of Resources	1
Resource Path	/redfish/v1/JobService
Schema file	JobService_v1.xml

GET - Job management properties

Use the GET method to retrieve properties in JobService resource for Redfish service

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/JobService
```

Request body

None

Response body

Field	Type	Description
Description	String	The resource is used to represent the Job Service that allows scheduling of operations.
DateTime	String	The current DateTime setting of the Service with offset from UTC. Format: YYYY-MM-DDThh:mm:ss[+-]HH:MM
Id	String	Fixed string “JobService”
Jobs	Link	References to the Job collection.
Name	String	Fixed string “Job Service”
ServiceCapabilities	Object	This type shall contain properties which describe the capabilities or supported features of this implementation of JobService.
MaxJobs	Integer	Maximum number of Jobs supported. Value is 3.
MaxSteps	Integer Null	Maximum number of Job Steps supported. Value is null.
Scheduling	Boolean	The value of this property shall indicate the support of scheduling of Jobs using the Schedule object within the Job resource.
ServiceEnabled	Boolean	The value of this property shall be a boolean indicating whether this service is enabled.
Status	Object	This property shall specify a valid odata or Redfish property.
Health	String	This represents the health state of this resource in the absence of its dependent resources.

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Field	Type	Description
Health-Rollup	String	This represents the overall health state from the view of this resource.
State	String	This indicates the known state of the resource, such as if it is enabled.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Id": "JobService",
    "Status": {
        "HealthRollup": "OK",
        "Health": "OK",
        "State": "Enabled"
    },
    "Name": "Job Service",
    "ServiceEnabled": true,
    "ServiceCapabilities": {
        "MaxJobs": 3,
        "Scheduling": true,
        "MaxSteps": null
    },
    "DateTime": "2020-04-02T05:34:24+00:00",
    "@odata.type": "#JobService.v1_0_2.JobService",
    "@odata.id": "/redfish/v1/JobService",
    "@odata.etag": "\"3d92d9405f98da92492a90a1b8bb9a08\"",
    "Jobs": {
        "@odata.id": "/redfish/v1/JobService/Jobs"
    },
    "Description": "The resource is used to represent the Job Service that allows scheduling of operations."
}
```

Resource Job

The resource represents a job implementation for the Redfish service.

Number of Resources	Number of jobs established
Resource Path	/redfish/v1/JobService/Jobs/{PowerOff, PowerOn, Restart}
Schema file	Session_v1.xml, Schedule_v1.xml

GET – Job properties

Use the GET method to retrieve properties in Job resource for Redfish service

Request URL

```
GET https://<BMC_IPADDR>/v1/JobService/Jobs/{PowerOff, PowerOn, Restart}
```

Request body

None

Response body

Field	Type	Description
Description	String	The resource is used to represent the settings of scheduled {Power Off|Power On|Restart} actions for a Redfish implementation.
HidePayload	Boolean	An indication of whether the contents of the payload should be hidden from view after the job has been created. If `true`, responses do not return the payload. If `false`, responses return the payload. If this property is not present when the job is created, the default is `false`.
Id	String	PowerOff, PowerOn, Restart
JobState	String	This property shall indicate the state of the job.
JobStatus	String	This property shall indicate the health status of the job.
MaxExecutionTime	String Null	The maximum amount of time the job is allowed to execute.
Messages	Array	Items: object Item count: 0~1
Messages[N]	Object	An array of messages associated with the job.
Name	String	PowerOff, PowerOn, Restart
PercentComplete	Integer Null	The completion percentage of this job.
Schedule	Object	The schedule settings for this job.
EnabledDaysOfWeek	Array	Expand.
EnabledDaysOfWeek[N]	String	Days of the week when scheduled occurrences are enabled, for enabled days of the month and months of the year. If not present, all days of the week are enabled.
EnabledDaysOf-Week@Redfish.AllowableValues	Array	Items: string Item count: 8
EnabledDaysOf-Week@Redfish.AllowableValues[N]	String	“Monday”,“Tuesday”,“Wednesday”,“Thursday”,“Friday”,“Saturday”,“Sunday”,“Every”
InitialStartTime	Date-Time	The date and time when the initial occurrence is scheduled to occur.
RecurrenceInterval	String	The amount of time until the next occurrence occurs.
Name	String	The name of the schedule. Value: “Lenovo:{Power Off|Power On|Restart}”
StepOrder	Array	The serialized execution order of the job Steps.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:


```
{
    "MaxExecutionTime": null,
    "JobStatus": "OK",
    "Id": "Restart",
    "@odata.id": "/redfish/v1/JobService/Jobs/Restart",
    "HidePayload": true,
    "Messages": [],
    "PercentComplete": null,
    "StepOrder": [],
    "@odata.type": "#Job.v1_0_3.Job",
    "JobState": "Suspended",
    "Name": "Restart",
    "@odata.etag": "\"41754a37fca8f52fe536e42dbcf4c544\"",
    "Schedule": {
        "RecurrenceInterval": null,
        "InitialStartTime": null,
        "EnabledDaysOfWeek@Redfish.AllowableValues": [
            "Monday",
            "Tuesday",
            "Wednesday",
            "Thursday",
            "Friday",
            "Saturday",
            "Sunday",
            "Every"
        ],
        "Name": "Lenovo:Restart",
        "EnabledDaysOfWeek": []
    },
    "Description": "The resource is used to represent the settings of scheduled Restart actions for a
Redfish implementation."
}
```


PATCH – Update Schedule properties

Use the PATCH method to update properties in Job resource for Redfish service

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/JobService/Jobs/{PowerOff, PowerOn, Restart}
```

Request body

Properties to be updated are shown as bellow, all of these properties can be changed individually.

Field	Type	Description
Schedule	Object	The schedule settings for this job.
EnabledDaysOfWeek	Array	Expand.
EnabledDaysOfWeek[N]	String	Days of the week when scheduled occurrences are enabled, for enabled days of the month and months of the year. If not present, all days of the week are enabled.
InitialStartTime	Date-time	The date and time when the initial occurrence is scheduled to occur.

Response body

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body

```
{
    "Schedule": {
        "InitialStartTime": null,
        "EnabledDaysOfWeek": [
            "Monday",
            "Tuesday",
            "Wednesday",
            "Thursday",
            "Friday"
        ]
    }
}
```

The following example JSON response is returned:

```
{
    "MaxExecutionTime": null,
    "JobStatus": "OK",
    "Id": "Restart",
    "@odata.id": "/redfish/v1/JobService/Jobs/Restart",
    "HidePayload": true,
    "Messages": [],
    "PercentComplete": null,
    "StepOrder": [],
    "@odata.type": "#Job.v1_0_3.Job",
    "JobState": "Suspended",
    "Name": "Restart",
    "@odata.etag": "\"41754a37fca8f52fe536e42dbcf4c544\"",
    "Schedule": {
        "RecurrenceInterval": null,
        "InitialStartTime": null,
        "EnabledDaysOfWeek@Redfish.AllowableValues": [
            "Monday",
            "Tuesday",
            "Wednesday",
            "Thursday",
            "Friday",
            "Saturday",
            "Sunday",
            "Every"
        ],
        "Name": "Lenovo:Restart",
        "EnabledDaysOfWeek": []
    },
    "Description": "The resource is used to represent the settings of scheduled Restart actions for a
Redfish implementation."
}
```

Chapter 22. Certificate Management

Resource CertificateService

This resource is used to represent the certificate service for a Redfish implementation.

Number of Resources	1
Resource Path	/redfish/v1/Systems/1/ CertificateService
Schema file	CertificateService_v1.xml

GET – Certificate service properties

Use the GET method to retrieve properties in CertificateService resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/CertificateService
```

Request body

None

Response body

Field	Type	Description
Id	String	“CertificateService”
Name	String	"Certificate Service"
Description	String	This resource is used to represent a certificate service for a Redfish implementation.
CertificateLocations	Link	The information about the location of certificates.
Actions	Object	Expanded.
#CertificateService.GenerateCSR	Object	This action makes a certificate signing request.
KeyUsage@Redfish.AllowableValues	Array	[“DigitalSignature”, “NonRepudiation”, “KeyEncipherment”]
KeyCurveId@Redfish.AllowableValues	Array	[“TPM_ECC_NIST_P384”]
KeyPairAlgorithm@Redfish.AllowableValues	Array	[“TPM_ALG_ECDH”]
#CertificateService.ReplaceCertificate	Array	This action replaces a certificate.
CertificateType@Redfish.AllowableValues	Array	[“PEM”]

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Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "Actions": {
        "#CertificateService.GenerateCSR": {
            "KeyUsage@Redfish.AllowableValues": [
                "DigitalSignature",
                "NonRepudiation",
                "KeyEncipherment"
            ],
            "target": "/redfish/v1/CertificateService/Actions/CertificateService.GenerateCSR",
            "title": "Generate a CSR file.",
            "KeyCurveId@Redfish.AllowableValues": [
                "TPM_ECC_NIST_P384"
            ],
            "KeyPairAlgorithm@Redfish.AllowableValues": [
                "TPM_ALG_ECDH"
            ]
        },
        "#CertificateService.ReplaceCertificate": {
            "target": "/redfish/v1/CertificateService/Actions/CertificateService.ReplaceCertificate",
            "title": "Replace an existing certificate.",
            "CertificateType@Redfish.AllowableValues": [
                "PEM"
            ]
        }
    },
    "@odata.id": "/redfish/v1/CertificateService",
    "@odata.type": "#CertificateService.v1_0_2.CertificateService",
    "Id": "CertificateService",
    "CertificateLocations": {
        "@odata.id": "/redfish/v1/CertificateService/CertificateLocations"
    },
    "@odata.etag": "\"74957388648d2a308f8\"",
    "Name": "Certificate Service",
    "Description": "This resource is used to represent a certificate service for a Redfish implementation."
}
```

POST – Generate CSR

Use the POST method to generate a certificate signing request.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/CertificateService/Actions/CertificateService.GenerateCSR`

Request body

Field	Type	Description
Certificate-Collection	Object	Required. The link to the certificate collection where the certificate is installed after the certificate authority (CA) signs the certificate.
@odata.id	Link	Required. Allowable value: “/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates”

Field	Type	Description
Country	String	Required. The two-letter country code of the organization making the request.
City	String	Required. The city or locality of the organization making the request.
CommonName	String	Required. The fully qualified domain name of the component to secure.
State	String	Required. The state, province, or region of the organization making the request.
Organization	String	Required. The name of the organization making the request.
AlternativeNames	Array	Optional. The additional host names of the component to secure.
KeyUsage	Array	Optional. The usage of the key contained in the certificate.
KeyUsage [N]	String	Any of “DigitalSignature”, “NonRepudiation” or “KeyEncipherment”.
ChallengePassword	String	Optional. The challenge password to apply to the certificate for revocation requests.
ContactPerson	String	Optional. The name of the user making the request.
Email	String	Optional. The email address of the contact within the organization making the request.
GivenName	String	Optional. The given name of the user making the request.
Initials	String	Optional. The initials of the user making the request.
KeyCurveId	String	Optional. The curve ID to use with the key, if needed based on the KeyPairAlgorithm parameter value.
KeyPairAlgorithm	String	Optional. The type of key-pair for use with signing algorithms.
OrganizationalUnit	String	Optional. The name of the unit or division of the organization making the request.
Surname	String	Optional. The surname of the user making the request.
UnstructuredName	String	Optional. The unstructured name of the subject.

Response body

Field	Type	Description
CSRString	String	The string for the certificate signing request.
CertificateCollection	Link	The link to the certificate collection where the certificate is installed.

Status code

HTTP Status Code	Error Message ID
400	BadRequest, ActionParamMissing , ActionParamTypeError , ActionParamFormatError
500	InternalError

Example

The POST body is filled as below:

```
{
    "CertificateCollection": {
        "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates"
    },
    "Country": "CN",
    "City": "SH",
    "CommonName": "XCC-7Z60-SN",
    "State": "SH",
    "Organization": "Lenovo"
}
```

The following example JSON response is returned.

```
{
    "CertificateCollection": {
        "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates"
    },
    "CSRString": "-----BEGIN CERTIFICATE REQUEST-----\nMIICFDCCAZsCAQAwTjELMAkGA1UEBhMCQ04xCzAJBgNVBAgMAl
NIMQswCQYDVQQHDAJTSDEPMA0GA1UECgwGTGVub3ZvMRQwEgYDVQQDDAtYQ0MtN1o2MC1TTjB2MBAGByqGSM49AgEGBSuBBAAiA2IABOR
bulFysxyzVYaYLy4qcULlJS3fWWLPdRimFsIlrrtdoRsrDEV2B7ChQRdpvNpDr3YFVySIlIPIRUNn1wRob9vSiTb2huXBB2sP5mUh1i5v
oUVwohSAd5mlSOgLKAj7OaCBzTCBygYJKoZIhvcNAQkOMYG8MIG5MAkGA1UdEwQCMAAwCwYDVR0PBAQDAgXgMIGeBgNVHREEgZYwgZOCC
1hDQyO3WjYwLVNOhxD+gAAAAAAAAAqU7//+q5mzgilmZTgwLS1hOTQtZWZmZi1mZWFiLTk5YjMuaXB2Ni1saXRlcmFsLm5ldIcECmjFSI
cQ/oAAAAAAAAAKlO///quZtIIpZmU4MCOtYTkOLWVmZmYtZmVhYiO5OWIOLmlwdjYtbGlOZXJhbC5uZXSHBKn+X3YwCgYIKoZIzjOEAwI
DZwAwZAIwdCdbejk+ai7nKL6gz7IE2jHTXuxOGzqioC1OlQOqQAtOp4fhcM/4Gt4+w1HfxnrEAjBzIoYSlsOiLYxbOjGIJVcBg9liBOqT
bYHXPSK5WaawdKnTo6OC+jPUJr2Z5PPDB5Q=\n-----END CERTIFICATE REQUEST-----"
}
```

POST – Replace Certificate

Use the POST method to replace a certificate.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/CertificateService/Actions/CertificateService.ReplaceCertificate
```

Request body

Field	Type	Description
CertificateUri	Object	Required. The link to the certificate that is being replaced.
CertificateType	String	Required. The format of the certificate. Only allow “PEM”.
CertificateString	String	Required. The string for the certificate. Line breaks should be replaced to “\n” in this parameter.

Response body

Status code

HTTP Status Code	Error Message ID
400	BadRequest, ActionParamMissing , ActionParamTypeError , ActionParamFormatError
500	InternalError

Example

The POST body is filled as below:

```
{
```

```
    "CertificateUri": {
        "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/1"
    },
    "CertificateType": "PEM",
    "CertificateString": "-----BEGIN CERTIFICATE-----\n.MIIEhTCCA2... HoKwFzKGxRyrsQ \n-----END CERTIFICATE-----"
}
```

The following example JSON response is returned.

None.

Resource CertificateLocations

This resource is used to represent all certificates installed on a given service.

Number of Resources	1
Resource Path	/redfish/v1/Systems/1/CertificateService/CertificateLocations
Schema file	CertificateLocations_v1.xml

GET – Certificate locations properties

Use the GET method to retrieve properties in CertificateLocations resource for Redfish service.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/CertificateService/CertificateLocations`

Request body

None

Response body

Field	Type	Description
Id	String	“CertificateLocations”
Name	String	"Certificate Locations"
Description	String	This resource is used to represent the collection of certificate locations for a Redfish implementation.
CertificateLocations	Link	The information about the location of certificates.
Links	Object	Expanded.
Certificates	Array	An array of links to the certificates installed on this service.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
```

```
    "Id": "CertificateLocations",
    "@odata.type": "#CertificateLocations.v1_0_2.CertificateLocations",
    "@odata.id": "/redfish/v1/CertificateService/CertificateLocations",
    "@odata.etag": "\"362ae2eb99a12a2722d\"",
    "Links": {
        "Certificates": [
            {
                "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/1"
            }
        ]
    },
    "Name": "Certificate Locations",
    "Description": "This resource is used to represent the collection of certificate locations for a
Redfish implementation."
}
```


Resource Certificate

This resource is used to represent all certificate that proves the identify of a component, account, or service.

Number of Resources	N (depends on how many certificates installed in the system)
Resource Path	/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates /redfish/v1/AccountService/LDAP/Certificates
Schema file	Certificate_v1.xml

GET – Certificate properties

Use the GET method to retrieve properties in Certificate resource for Redfish service.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/{id}
GET https://<BMC_IPADDR>/redfish/v1/AccountService/LDAP/Certificates/{id}
```

Request body

None

Response body

Field	Type	Description
Id	String	The index of this certificate resource.
Name	String	The name of this certificate resource.
Description	String	This resource is used to represent the certificate for a Redfish implementation.
Actions	Object	Available for /redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/{id}
#Certificate.Rekey	Object	This action generates a new key-pair for a certificate and produces a certificate signing request.
KeyCurveId@Redfish.AllowableValues	Array	[“TPM_ECC_NIST_P384”].

Field	Type	Description
KeyPairAlgorithm@-Redfish.AllowableValues	Array	[“TPM_ALG_ECDH”].
#Certificate.Renew	Object	This action generates a certificate signing request by using the existing information and key-pair of the certificate.
CertificateString	String	The string for the certificate.
CertificateType	String	The format of the certificate. Only supports “PEM”.
Issuer	Object	The issuer of the certificate.
City	String	The city or locality of the organization of the entity.
CommonName	String	The fully qualified domain name of the entity.
Country	String	The country of the organization of the entity.
Email	String	The email address of the contact within the organization of the entity.
Organization	String	The name of the organization of the entity.
OrganizationalUnit	String	The name of the unit or division of the organization of the entity.
State	String	The state, province, or region of the organization of the entity.
ValidNotBefore	String	The date when the certificate becomes valid.
ValidNotAfter	String	The date when the certificate is no longer valid.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
    "ValidNotAfter": "2029-12-17T01:51:18+00:00",
    "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/1",
    "KeyUsage": [
        "DigitalSignature",
        "NonRepudiation",
        "KeyEncipherment"
    ],
    "Id": "1",
    "Name": "Certificate_HTTPS",
    "CertificateType": "PEM",
    "@odata.etag": "\"eed23a10000d2d28c9cbd\"",
    "Subject": {
        "Organization": "Lenovo",
        "Country": "US",
        "City": "RTP",
        "CommonName": "XCC-7Z60-SN",
        "State": "NC"
    },
    "@odata.type": "#Certificate.v1_1_1.Certificate",
    "ValidNotBefore": "2019-12-20T01:51:18+00:00",
    "Issuer": {
```

```
        "Organization": "Lenovo",
        "Country": "US",
        "City": "RTP",
        "CommonName": "XCC-7Z60-SN",
        "State": "NC"
    },
    "CertificateString": "-----BEGIN CERTIFICATE-----\nMIIClTCCAhqgAwIBAgIUfjeBVwa2nDdgtHJxWPn1pn/ZabcwC
gYIKoZIzjOEAwIwTzELMAkGA1UEBhMCVVMxCzAJBgNVBAgMAk5DMQwwCgYDVQQHDANSVFAxDzANBgNVBAoMBkxlbm92bzEUMBIGA1UEAw
wLWENDLTdaNjAtU04wHhcNMTkxMjIwMDE1MTE4WhcNMjkxMjE3MDE1MTE4WjBPMQswCQYDVQQGEwJVUzELMAkGA1UECAwCTkMxDDAKBgN
VBAcMA1JUUDEPMA0GA1UECgwGTGVub3ZvMRQwEgYDVQQDDAtYQ0MtN1o2MC1TTjB2MBAGByqGSM49AgEGBSuBBAAiA2IABAoScPNA/aeC
9MR9j+8wdKVW9F/+LoaNrXH4OvIB4bN7sWMBdcm8/1oF2yknMR87OTf9rtbdb5Wlbf9h+86N96vAYvOhJ1nUD9LtosCtppp/7ULDnNfSp
NRfXoZ1uSnP4aOBtjCBszAJBgNVHRMEAjAAMAsGA1UdDwQEAwIF4DCBmAYDVR0RBIGQMIGNggtYQ0MtN1o2MC1TTocQ/oAAAAAAAAAKlO
///q9On4IpZmU4MCOtYTk0LWVmZmYtZmVhZiOOZTlmLmlwdjYtbGlOZXJhbC5uZXSHEP6AAAAAAAAACpTv//6vTqCCKWZlODAtLWE5NC1
lZmZmLWZlYWYtNGVhMC5pcHY2LWxpdGVyYWwubmVOhwSp/l92MAoGCCqGSM49BAMCA2kAMGYCMQCJI5XXdOr2LvwkEgcpKp/kOlkOYnq2
Bag/E8dVFUF4JwnOHrVUY5pZTqFEUq9rX6ECMQCO6e3av/Tw2EWplx5Q+5pJmiLaoP5V8a+WGXHhqAcqY/OMyrB4oAlaocOQRQGZXdM=
\n-----END CERTIFICATE-----",
    "Actions": {
        "#Certificate.Rekey": {
            "title": "Generate a new key pair for an existing certificate and produce a CSR.",
            "KeyCurveId@Redfish.AllowableValues": [
                "TPM_ECC_NIST_P384"
            ],
            "KeyPairAlgorithm@Redfish.AllowableValues": [
                "TPM_ALG_ECDH"
            ],
            "target": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/1/Actions/Certificate.Rekey"
        },
        "#Certificate.Renew": {
            "title": "Generate a CSR using the existing information and key pair of the certificate.",
            "target": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/1/Actions/Certificate.Renew"
        }
    },
    "Description": "This resource is used to represent the certificate for a Redfish implementation."
}
```


POST – Rekey

Use the POST method to generate a new key-pair for a certificate and produces a certificate signing request.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/{id}/Actions/Certificate.Rekey
```

Request body

Field	Type	Description
KeyCurveId	String	Required. The curve ID to use with the key, if needed based on the KeyPairAlgorithm parameter value. Allowable value is “TPM_ECC_NIST_P384”.
KeyPairAlgor-ithm	String	Required. The type of key-pair for use with signing algorithms. Allowable value is “TPM_ALG_ECDH”.
KeyBitLength	Integer	Optional. The length of the key, in bits, if needed based on the KeyPairAlgorithm parameter value.
ChallengePass-word	String	Optional. The challenge password to apply to the certificate for revocation requests.

Response body

Field	Type	Description
CSRString	String	The string for the certificate signing request.
Certificate	Link	The link to the certificate being rekeyed.

Status code

HTTP Status Code	Error Message ID
400	BadRequest, ActionParamMissing , ActionParamTypeError , ActionParamFormatError
500	InternalError

Example

The POST body is filled as below:

```
{
    "KeyCurveId": "TPM_ECC_NIST_P384",
    "KeyPairAlgorithm": "TPM_ALG_ECDH"
}
```

The following example JSON response is returned.


```
{
    "Certificate": {
        "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/1"
    },
    "CSRString": "-----BEGIN CERTIFICATE REQUEST-----\nMIICpDCCAioCAQAwTzELMAkGA1UEBhMCVVMxCzAJBgNVBAgMA
k5DMQwwCgYDVQQHDANSVFAxDzANBgNVBAoMBkxlbm92bzEUMBIGA1UEAwwLWENDLTdaNjAtU04wdjAQBgcqhkjOPQIBBgUrgQQAIgNiAA
TMCJhOyPzqC7sxdTs9JiJvWNvKsOy9cocFjJnOeoijoKbMn2nSy5yQJwgoeKIoh2eBPnzGl58CI2pYd+APZSTyImltu34Hk+hGY4+ZGHJ
EI8fz5XOO+/tj7k8JEafbgumgggFaMIIBVgYJKoZIhvcNAQkOMYIBRzCCAUMwCQYDVROTBAIwADALBgNVHQ8EBAMCBeAwggEnBgNVHREE
ggEeMIIBGoILWENDLTdaNjAtU06CC1hDQyO3WjYwLVNOhxD+gAAAAAAAAAqU7//+rO6fgilmZTgwLS1hOTQtZWZmZi1mZWFmLTRlOWYua
XB2Ni1saXRlcmFsLm5ldIcQ/oAAAAAAAAAKlO///q9OoIIpZmU4MCOtYTkOLWVmZmYtZmVhZiOOZWEwLmlwdjYtbGlOZXJhbC5uZXSHBK
n+X3aHEP6AAAAAAAAACpTv//6rmbOCKWZlODAtLWE5NC1lZmZmLWZlYWItOTliMy5pcHY2LWxpdGVyYWwubmVOhwQKaMVIhxD+gAAAAAA
AAAqU7//+q5mOgilmZTgwLS1hOTQtZWZmZi1mZWFiLTk5YjQuaXB2Ni1saXRlcmFsLm5ldDAKBggqhkjOPQQDAgNoADBlAjBJrD3MgJlD
2pHV4QkaOQa8jbzl214J1rLB8IdKViaDVHgihiusCLPvUM2YCr6bSIcCMQDamvg6r6rPljcaGre8OUuojdANUWcihMVWTdIAtfzdaXHc/
d/jjhr9BN2RF59OQLU=\n-----END CERTIFICATE REQUEST-----"
}
```


POST – Renew

Use the POST method to generate a certificate signing request by using the existing information and key-pair of the certificate.

Request URL

```
GET https://<BMC_IPADDR>/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/{id}/Actions/Certificate.Renew
```

Request body

None

Response body

Field	Type	Description
CSRStrin-g	String	The string for the certificate signing request.
Certificate	Link	The link to the certificate being rekeyed.

Status code

HTTP Status Code	Error Message ID
400	BadRequest
500	InternalError

Example

The following example is POST body

None

The following example JSON response is returned:


```
{
    "Certificate": {
        "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/HTTPS/Certificates/1"
    },
    "CSRString": "-----BEGIN CERTIFICATE REQUEST-----\nMIICpDCCAioCAQAwTzELMAkGA1UEBhMCVVMxCzAJBgNVBAgMA
k5DMQwwCgYDVQQHDANSVFAxDzANBgNVBAoMBkxlbm92bzEUMBIGA1UEAwwLWENDLTdaNjAtU04wdjAQBgcqhkjOPQIBBgUrgQQAIgNiAA
QKEnDzQP2ngvTEfY/vMHSlVvRf/i6Gja1x+DryAeGze7FjAXXJvP9aBdspJzEfOzk3/a7W3W+VpW3/YfvOjferwGL9ISdZ1A/S7aLAraa
af+1Cw5zXOqTUX16Gdbkpz+GgggFaMIIBVgYJKoZIhvcNAQkOMYIBRzCCAUMwCQYDVR0TBAIwADALBgNVHQ8EBAMCBeAwggEnBgNVHREE
ggEeMIIBGoILWENDLTdaNjAtU06CC1hDQyO3WjYwLVNOhxD+gAAAAAAAAAqU7//+rO6fgilmZTgwLS1hOTQtZWZmZi1mZWFmLTRlOWYua
XB2Ni1saXRlcmFsLm5ldIcQ/oAAAAAAAAAKlO///q9OoIIpZmU4MCOtYTkOLWVmZmYtZmVhZiOOZWEwLmlwdjYtbGlOZXJhbC5uZXSHBK
n+X3aHEP6AAAAAAAAACpTv//6rmbOCKWZlODAtLWE5NC1lZmZmLWZlYWItOTliMy5pcHY2LWxpdGVyYWwubmVOhwQKaMVIhxD+gAAAAAA
AAAqU7//+q5mOgilmZTgwLS1hOTQtZWZmZi1mZWFiLTk5YjQuaXB2Ni1saXRlcmFsLm5ldDAKBggqhkjOPQQDAgNoADBlAjA7v/rOLljB
OM4GAajGtrS2yMR/Np8T5evlA5JmXYVIGmcklN7uETz+aokCOG3poSwCMQCybhvJOZmuFQjarW8brInM231OcjWN5bgZyKFAfmcHkZNvk
Cau8DB3vI5z3O9KDeQ=\n-----END CERTIFICATE REQUEST-----"
}
```

Chapter 23. SNMP Management

SNMP Trap

This doc will introduce how to create SNMPv1/v3 trap in Redfish.

GET – SNMP Protocol

Use the GET method to retrieve Oem SNMP properties definition in a BMC.

Request URL

`GET https://<BMC_IPADDR>/redfish/v1/Managers/1/NetworkProtocol/Oem/Lenovo/SNMP`

Request body

None

Response body

Field	Type	Description
Id	String	“SNMP”
Name	String	“SNMP Protocol”
Description	String	This resource is used to represent SNMP protocol for the manager for a Redfish implementation.
SNMPTraps	Object	Expanded
SNMPv1TrapEnabled	Boolean	Indicates if SNMPv1 trap is enabled.
ProtocolEnabled	Boolean	Indicates if SNMPv3 trap is enabled
Port	Number	Trap port.
AlertRecipient	Object	Expanded.
Targets	Array	Items: object Item count: {0…N}, N is 1 **Note:** Current design N is 1.
Targets[N]	Object	Expanded
Addresses	Array	Host for SNMPv1
CommunityNames	Array	Community Name for SNMPv1

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example JSON response is returned:

```
{
```

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```
    "Id": "SNMP",
    "Name": "SNMP Protocol",
    "SNMPv3Agent": {
        "Links": {
            "UsersSNMPv3Settings": {
                "@odata.id": "/redfish/v1/AccountService/Accounts"
            }
        },
        "Location": "",
        "Port": 161,
        "ProtocolEnabled": false,
        "ContactPerson": ""
    },
    "@odata.id": "/redfish/v1/Managers/1/NetworkProtocol/Oem/Lenovo/SNMP",
    "CommunityNames": [
        null
    ],
    "@odata.etag": "\"60031ede1a38272aeb0\"",
    "SNMPTraps": {
        "SNMPv1TrapEnabled": false,
        "AlertRecipient": {
            "WarningEvents": {
                "Enabled": false,
                "AcceptedEvents": []
            },
            "SystemEvents": {
                "Enabled": false,
                "AcceptedEvents": []
            },
            "CriticalEvents": {
                "Enabled": false,
                "AcceptedEvents": []
            }
        },
        "Targets": [
            {
                "Addresses": [
                    null
                ]
            }
        ],
        "ProtocolEnabled": false,
        "Port": 162
    },
    "@odata.type": "#LenovoSNMPProtocol.v1_0_0.LenovoSNMPProtocol",
    "Description": "This resource is used to represent SNMP protocol for the manager for a Redfish implementation."
}
```


PATCH – Configure SNMP Alert Filter

Use the PATCH method to update properties in SNMP resource for Redfish service.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/NetworkProtocol/Oem/Lenovo/SNMP
```

Request body

None

Response body

Field	Type	Description
SNMPTraps/AlertRecipient/CriticalEvents/Enabled	Boolean	Config to receive critical events or not.
SNMPTraps/AlertRecipient/CriticalEvents/AcceptedEvents[1]	String	Config which of those critical events to receive.
SNMPTraps/AlertRecipient/WarningEvents/Enabled	Boolean	Config to receive warning events or not.
SNMPTraps/AlertRecipient/WarningEvents/AcceptedEvents[2]	String	Config which of those warning events to receive.
SNMPTraps/AlertRecipient/SystemEvents/Enabled	Boolean	Config to receive system events or not.
SNMPTraps/AlertRecipient/SystemEvents/AcceptedEvents[3]	String	Config which of those system events to receive.

[1]AcceptedEvents for CriticalEvents:

All, AllOtherCriticalEvents, CriticalTemperatureThresholdExceeded, CriticalVoltageThresholdExceeded, CriticalPowerFailure, HardDiskDriveFailure, FanFailure, CPUFailure, MemoryFailure, HardwareIncompatibility, PowerRedundancyFailure.

[2]AcceptedEvents for WarningEvents:

All, AllOtherWarningEvents, WarningTemperatureThresholdExceeded, WarningVoltageThresholdExceeded, WarningPowerThresholdExceeded, NoncriticalFanevents, CPUinDegradedState, MemoryWarning, PowerRedundancyWarning.

[3]AcceptedEvents for SystemEvents:

All, AllOtherEvents, SuccessfulRemoteLogin, OperatingSystemTimeout, SystemPowerSwitch, OperatingSystemBootFailure, OperatingSystemLoaderWatchdogTimeout, PredictedFailure, EventLog75PercentFull, NetworkChange, AllAuditEvents.

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body

```
{
    "SNMPTraps": {
        "AlertRecipient": {
            "WarningEvents": {
                "Enabled": true,
                "AcceptedEvents": [
                 "All"
```

```
                ]
            },
            "CriticalEvents": {
                "Enabled": true,
                "AcceptedEvents": [
                    "All"
                ]
            },
            "SystemEvents": {
                "Enabled": true,
                "AcceptedEvents": [
                    "EventLog75PercentFull",
                    "NetworkChange"
                ]
            }
        }
    }
}
```

PATCH – Enable the SNMPv1 trap

Use the PATCH method to update properties in SNMP resource for Redfish service.

Request URL

```
PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/NetworkProtocol/Oem/Lenovo/SNMP
```

Request body

Field	Type	Description
SNMPTraps/ SNMPv1TrapEnabled	Boolean	To enable SNMPv1 trap or not.
SNMPTraps/Port	Number	The port of trap receiver.

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body

```
{
    "SNMPTraps": {
        "SNMPv1TrapEnabled": true,
        "Port": 162
    }
}
```

PATCH – Enable the SNMPv3 trap

Request URL

`PATCH https://<BMC_IPADDR>/redfish/v1/Managers/1/NetworkProtocol/Oem/Lenovo/SNMP`

Request body

Field	Type	Description
SNMPTraps/ProtocolEnabled	Boolean	To enable SNMPv3 trap or not.
SNMPTraps/Port	Number	The port of trap receiver.

Response

The response returns same content as GET operation with updated properties.

Status code

HTTP Status Code	Error Message ID
500	InternalError

Example

The following example is PATCH body

```
{
    "SNMPTraps": {
        "ProtocolEnabled": true,
        "Port": 162
    }
}
```

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Lenovo (United States), Inc.
1009 Think Place
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