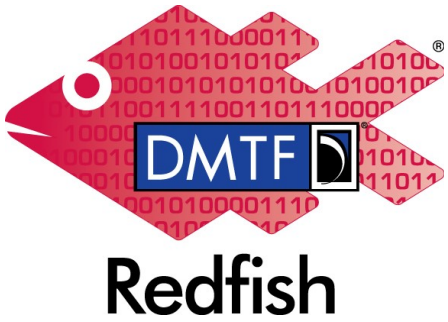


Version 0.25

Redfish Session authentication and Event Service

Introduction

This Jupyter notebook explains the Redfish session authentication mechanism as well as the Event Service (https://developer.hpe.com/blog/the-redfish-event-service) using Bash (https://www.gnu.org/software/bash/) and the cURL (https://curl.haxx.se/) tool against an HPE iLO 5. For didactic reasons, commands presented in this notebook may be not optimized and don't follow the recommended best practises (https://developer.hpe.com/blog/getting-started-with-the-redfish-api-part-2).

More details are in the HPE Redfish API Reference document (https://hewlettpackard.github.io/ilo-rest-api-docs/ilo5/#introduction).

Create environment variables

The following `bash` code defines environment variables (i.e. IP address, username, password....) depending on your student ID number stored in variable `$Stud`. It creates as well several `.json` files containing various HTTP workloads required to POST or PATCH the managed iLO.

In [1]:

```
# Create BMC related variables
iLO5_IP=172.16.50.99
iLO5_URI="https://${iLO5_IP}"
RemoteHost_IP=172.16.50.100

# iLO 5 Administrator credentials
iLO5_User="student"
iLO5_Passwd='P@ssw0rd!'

# EventReceiver
EventReceiverIP=balt

# Minimum required Redfish headers
HeaderODataVersion="OData-Version: 4.0"
HeaderContentType="Content-Type: application/json"

# Data files
ResponseHeaders="ResponseHeaders.txt"              # Used to hold HTTP response head
ers
SessionData="./CreateSession-data.json"            # Body/Workload used to create th
e Redfish session
EventSubscription="./EventSubscription-data.json" # Body/Workload used to subscribe
to events
CpuThresholds="./CpuThresholds-data.json"          # Body/Workload used to set CPU U
tilization Thresholds
TestEvent="./TestEvent-data.json"


cat > ${SessionData} << __EOF__
{
        "UserName": "$iLO5_User",
        "Password": "$iLO5_Passwd"
}
__EOF__


cat > ${EventSubscription} << __EOF__
{
    "Destination": "https://${EventReceiverIP}/RedfishEvents/EventReceiver.php",
    "EventTypes": [
    "StatusChange",
    "ResourceUpdated",
    "ResourceAdded",
    "ResourceRemoved",
    "Alert"
    ],
    "Context": "Public"
}
__EOF__


cat > ${TestEvent} << __EOF__
{
  "EventType": "ResourceAdded",
  "EventID": "myEventId",
  "EventTimestamp": "top-of-the-hour",
  "Severity": "OK",
  "Message": "This is a test message",
  "MessageID": "iLOEvents.0.9.ResourceStatusChanged",
  "MessageArgs": [ "arg0", "arg1" ],
  "OriginOfCondition": "/redfish/v1/Chassis/1/FooBar"
}
__EOF__
```

```
EventReceiver is reachable via Ping

Ncat: Version 7.50 ( https://nmap.org/ncat )
Ncat: Connected to 16.31.87.40:443.
Ncat: 0 bytes sent, 0 bytes received in 0.02 seconds.
EventReceiver listens to HTTPS requests

iLO 5 is reachable via Ping

RemoteHost is reachable via Ping
```

Accessing the Redfish RootService

Accessing the Redfish root service does not need any authentication

List the Redfish version(s) and their location(s) implemented in the managed BMC (iLO 5)

In [2]:
```
echo 'List the Redfish version(s) implemented in the managed BMC:'

curl --insecure --noproxy "localhost, 127.0.0.1" --silent \
     --header "$HeaderContentType" --header "$HeaderODataVersion" \
     --request GET ${iLO5_URI}/redfish | jq
```

```
List the Redfish version(s) implemented in the managed BMC:
{
  "v1": "/redfish/v1/"
}
```

List the content of the root service

In [3]:

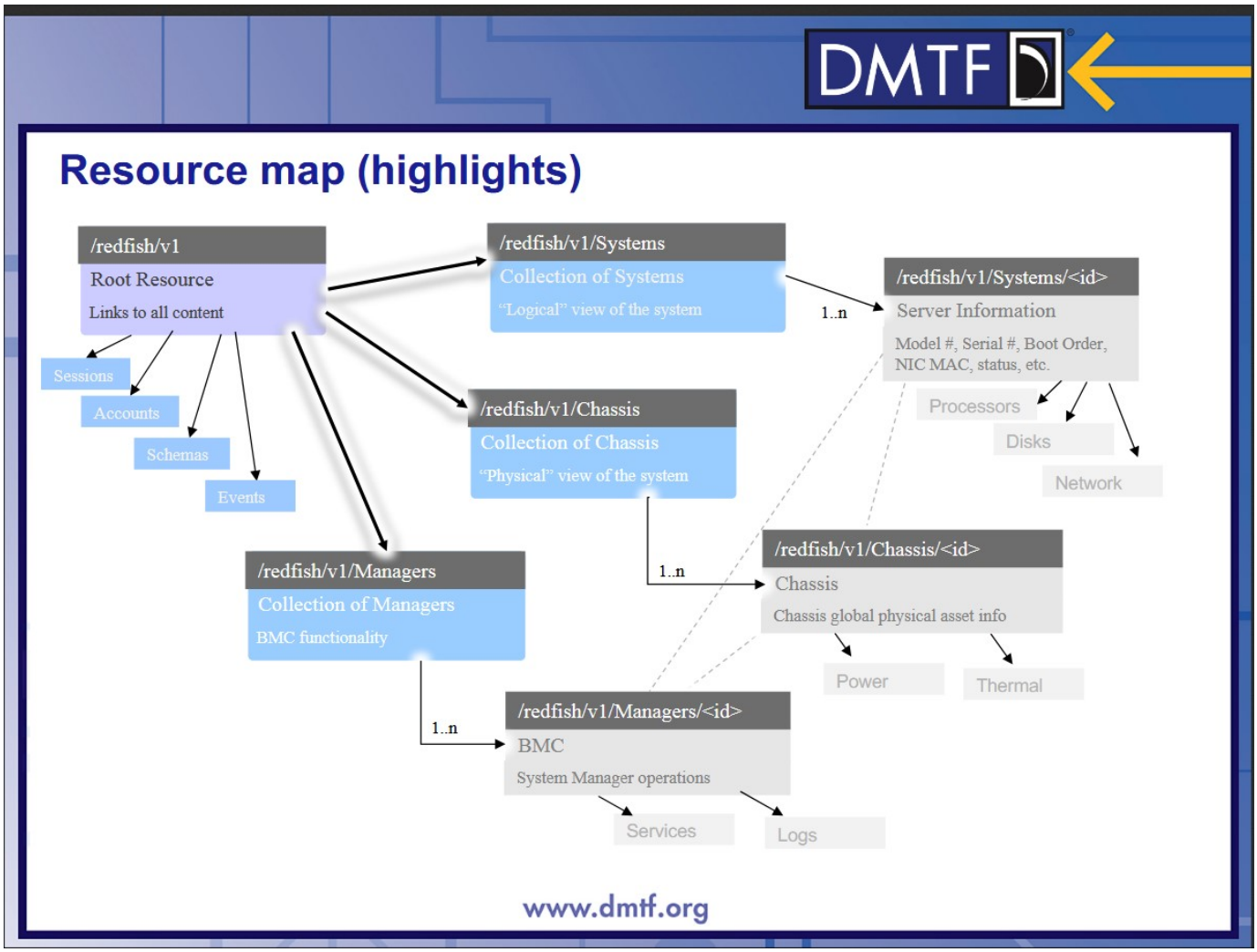
```
echo 'List the Redfish services available in Redfish v1:'

curl --insecure --noproxy "localhost, 127.0.0.1" --silent \
     --header "$HeaderContentType" --header "$HeaderODataVersion" \
     --request GET ${iLO5_URI}/redfish/v1 | jq
```

List the Redfish services available in Redfish v1:


```
{
  "@odata.context": "/redfish/v1/$metadata#ServiceRoot.ServiceRoot",
  "@odata.etag": "W/\"81F4ACAA\"",
  "@odata.id": "/redfish/v1",
  "@odata.type": "#ServiceRoot.v1_5_1.ServiceRoot",
  "Id": "RootService",
  "AccountService": {
    "@odata.id": "/redfish/v1/AccountService"
  },
  "Chassis": {
    "@odata.id": "/redfish/v1/Chassis"
  },
  "EventService": {
    "@odata.id": "/redfish/v1/EventService"
  },
  "JsonSchemas": {
    "@odata.id": "/redfish/v1/JsonSchemas"
  },
  "Links": {
    "Sessions": {
      "@odata.id": "/redfish/v1/SessionService/Sessions"
    }
  },
  "Managers": {
    "@odata.id": "/redfish/v1/Managers"
  },
  "Name": "HPE RESTful Root Service",
  "Oem": {
    "Hpe": {
      "@odata.context": "/redfish/v1/$metadata#HpeiLOServiceExt.HpeiLOServiceEx
t",
      "@odata.type": "#HpeiLOServiceExt.v2_3_0.HpeiLOServiceExt",
      "Links": {
        "ResourceDirectory": {
          "@odata.id": "/redfish/v1/ResourceDirectory"
        }
      },
      "Manager": [
        {
          "DefaultLanguage": "en",
          "FQDN": "ilo-hst360g10.b172.local",
          "HostName": "ilo-hst360g10",
          "Languages": [
            {
              "Language": "en",
              "TranslationName": "English",
              "Version": "2.10"
            }
          ],
          "ManagerFirmwareVersion": "2.10",
          "ManagerType": "iLO 5",
          "Status": {
            "Health": "OK"
          }
        }
      ],
      "Moniker": {
        "ADVLIC": "iLO Advanced",
        "BMC": "iLO",
        "BSYS": "BladeSystem",
        "CLASS": "Baseboard Management Controller",
        "FEDGRP": "DEFAULT",
        "IPROV": "Intelligent Provisioning",
```

Redfish Resource map

Read the DMTF introduction to the [Redfish Architecture (https://www.dmtf.org/sites/default/files/Redfish_School-Redfish_Architecture_Sept_2016_0.pdf)](https://www.dmtf.org/sites/default/files/Redfish_School-Redfish_Architecture_Sept_2016_0.pdf).



Create the Redfish session

Redfish allows basic authentication and session authentication. With basic authentication you need to supply the required credentials at each and every HTTP request. Session oriented authentication is achieved by requesting a `Token` that will be sent in the headers of all requests until the removal of the session.

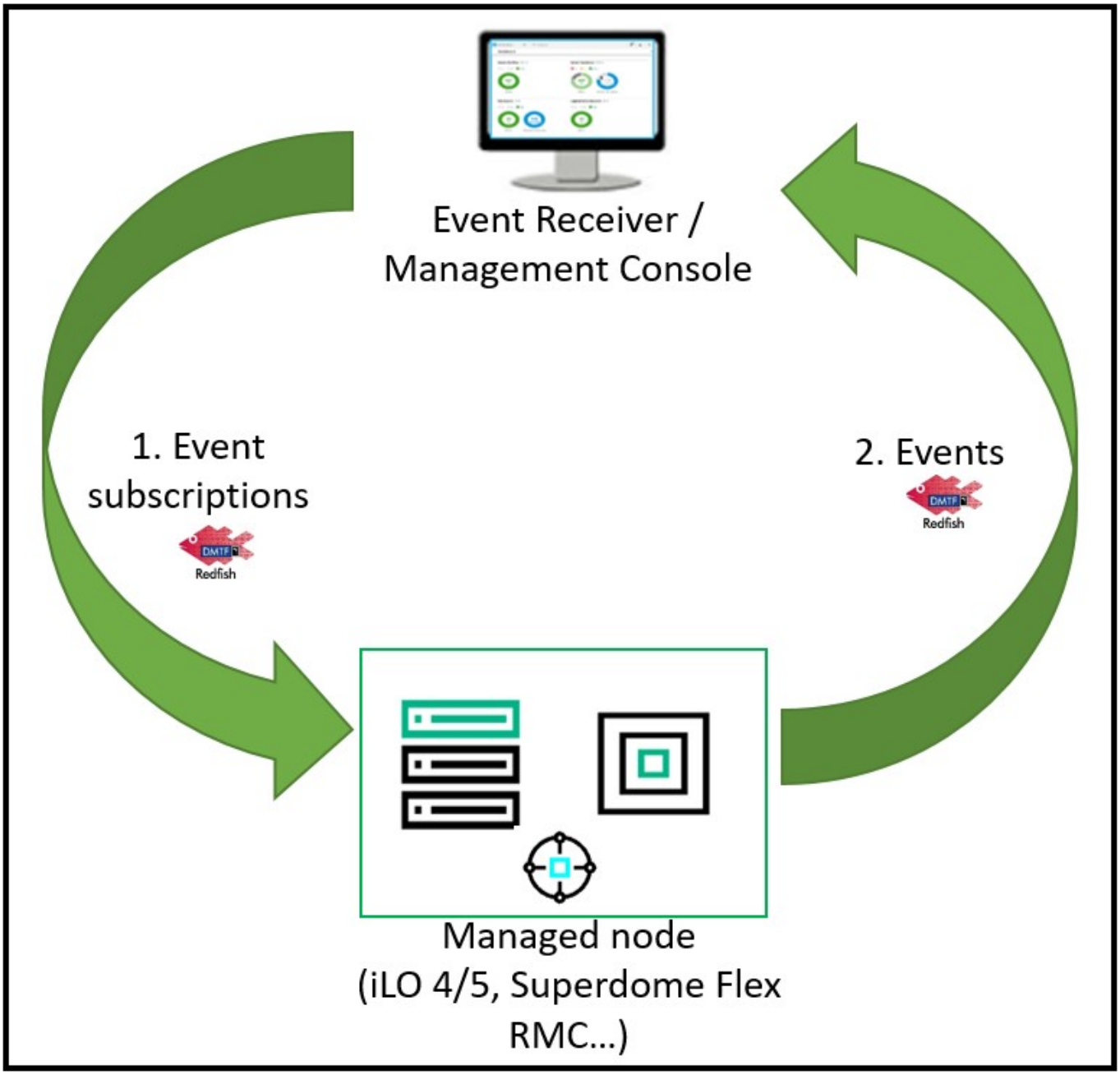
To get this `Token`, POST a session request with the remote BMC credentials in its body. The `Token` as well as the `session location` will be in the headers of the response.

In [4]:

```
echo 'Create iLO 5 Session'

curl --dump-header  $ResponseHeaders \
     --insecure --noproxy "localhost, 127.0.0.1" --silent \
     --header "$HeaderContentType" --header "$HeaderODataVersion" \
     --request POST --data "@$SessionData" \
     ${iLO5_URI}/redfish/v1/SessionService/Sessions | jq

Token=$(awk '/X-Auth-Token/ {print $NF}' $ResponseHeaders | tr -d '\r')
SessionLocation="$iLO5_URI"$(awk '/^Loca.*Se/ {gsub("https://.*/red", "/red", $NF);
print $NF}' $ResponseHeaders | tr -d '\r')

echo
echo "Token: $Token"
echo -e "Session Location: $SessionLocation\n"
```

```
Create iLO 5 Session
{
  "@odata.context": "/redfish/v1/$metadata#Session.Session",
  "@odata.etag": "W/\"4F32B6D5\"",
  "@odata.id": "/redfish/v1/SessionService/Sessions/student000000005e66110ee0c49
ba5",
  "@odata.type": "#Session.v1_0_0.Session",
  "Id": "student000000005e66110ee0c49ba5",
  "Description": "Manager User Session",
  "Name": "User Session",
  "Oem": {
    "Hpe": {
      "@odata.context": "/redfish/v1/$metadata#HpeiLOSession.HpeiLOSession",
      "@odata.type": "#HpeiLOSession.v2_1_0.HpeiLOSession",
      "AccessTime": "2020-03-09T09:49:02Z",
      "LoginTime": "2020-03-09T09:49:02Z",
      "MySession": false,
      "UserExpires": "2020-03-09T10:19:02Z",
      "UserIP": "172.22.101.1",
      "UserTag": "REST",
      "UserType": "Local"
    }
  },
  "UserName": "student"
}

Token: 2f2c12a724b5f023cce354dc2733b97b
Session Location: https://172.16.50.99/redfish/v1/SessionService/Sessions/studen
t000000005e66110ee0c49ba5
```

Event subscription



Goal of the exercise

Generate an alert when the CPU utilization of the managed server **decreases** below a specified threshold during more than a defined dwell time.

Steps

- Generate CPU load on the managed system
- Subscribe to Redfish events by providing the IP of the Event Receiver
- Verify the Event Receiver is working properly
- Subscribe and review the subsription
- Kill the load and wait until event reaches the Event Receiver

Get event subscription collection

The following command retrieves the event subscription collection using the `Token` obtained above.

In [5]:
```
echo "Retrieve Event Subscription collection:"
curl --insecure --silent --noproxy "localhost, 127.0.0.1"  \
     --header  "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request GET ${iLO5_URI}/redfish/v1/EventService/Subscriptions | jq
```

```
Retrieve Event Subscription collection:
{
  "@odata.context": "/redfish/v1/$metadata#EventDestinationCollection.EventDesti
nationCollection",
  "@odata.etag": "W/\"75983E8D\"",
  "@odata.id": "/redfish/v1/EventService/Subscriptions",
  "@odata.type": "#EventDestinationCollection.EventDestinationCollection",
  "Description": "iLO User Event Subscriptions",
  "Name": "EventSubscriptions",
  "Members": [],
  "Members@odata.count": 0
}
```

Remove event subscription if any

In [6]:
```
Subscriptions=$(curl --insecure --silent --noproxy "localhost, 127.0.0.1"  \
     --header  "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request GET ${iLO5_URI}/redfish/v1/EventService/Subscriptions | jq -r '.Memb
ers[] | ."@odata.id"')

for s in $Subscriptions ; do
curl --insecure --silent --noproxy "localhost, 127.0.0.1"  \
     --header  "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request DELETE ${iLO5_URI}${s}
done
```

Prepare Event Receiver

In [7]:
```
echo "EventReceiver source file"
ssh $EventReceiverIP "cat /opt/hpe/RedfishEventService/EventReceiver.php"

echo "Cleanup the Event Receiver log file:"
ssh $EventReceiverIP "cat /dev/null > /opt/hpe/RedfishEventService/Redfish_events.t
xt"
```

```
EventReceiver source file
<?php
// Version 0.9999
/** This PHP script receives RESTful POST events from an iLO or a Superdome Flex
RMC.
*   It reformats the JSON message with indentations and sends
*   it to a file in the current directory
**/

/*
* The JSON format functions.php comes from:
* https://github.com/GerHobbelt/nicejson-php
*/
include 'functions.php';

// iLO events will be written to $out_file
$out_file = "Redfish_events.txt" ;

// Read the Content of the POST message:
$body = file_get_contents("php://input");


// Read the headers values:
$headers = getallheaders() ;

// Get IP address of managed node
$IP_MANAGED = getenv ('REMOTE_ADDR') ;


// Write IP_MANAGED in $outfile:
file_put_contents($out_file, "IP Address of Managed node: $IP_MANAGED \n", FILE_
APPEND) ;

// Display headers and values
foreach ($headers as $header => $value) {
    file_put_contents($out_file, "$header: $value \n", FILE_APPEND) ;
}

//Insert new line to separate headers from body
file_put_contents($out_file, "\n", FILE_APPEND);


// Format message in nice and human readable format
file_put_contents($out_file, json_format($body) . "\n\n", FILE_APPEND);

?>
Cleanup the Event Receiver log file:
```

Subscribe to events

In [8]:
```
echo "POST a Subscription"

curl --insecure --noproxy "localhost, 127.0.0.1" --silent \
     --header "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request POST --data "@${EventSubscription}" \
     ${iLO5_URI}/redfish/v1/EventService/Subscriptions | jq
```

```
POST a Subscription
{
  "error": {
    "code": "iLO.0.10.ExtendedInfo",
    "message": "See @Message.ExtendedInfo for more information.",
    "@Message.ExtendedInfo": [
      {
        "MessageId": "Base.1.4.Created"
      }
    ]
  }
}
```

Test Event subscription

In [9]:
```
echo "Generate a fake event"

curl --insecure --noproxy "localhost, 127.0.0.1" --silent \
     --header "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request POST --data "@${TestEvent}" \
     ${iLO5_URI}/redfish/v1/EventService/Actions/EventService.SubmitTestEvent | jq
```

```
Generate a fake event
{
  "error": {
    "code": "iLO.0.10.ExtendedInfo",
    "message": "See @Message.ExtendedInfo for more information.",
    "@Message.ExtendedInfo": [
      {
        "MessageId": "Base.1.4.Success"
      }
    ]
  }
}
```

Verify test event reached the Event Receiver

In [10]:
```
ssh $EventReceiverIP "tail -30 /opt/hpe/RedfishEventService/Redfish_events.txt"
```

```
IP Address of Managed node: 15.186.54.125
Host: 16.31.87.40
Transfer-Encoding: chunked
Content-Type: application/json
Cache-Control: no-cache
Date: Mon, 09 Mar 2020 09:49:58 GMT
Connection: keep-alive

{
        "@odata.context": "/redfish/v1/$metadata#Event.Event",
        "@odata.type": "#Event.v1_0_0.Event",
        "Events": [
                {
                        "EventId": "myEventId",
                        "EventTimestamp": "1970-01-01T00:00:00Z",
                        "EventType": "ResourceAdded",
                        "Message": "This is a test message",
                        "MessageArgs": [
                                "arg0",
                                "arg1"
                        ],
                        "MessageId": "iLOEvents.0.9.ResourceStatusChanged",
                        "OriginOfCondition": "/redfish/v1/Chassis/1/FooBar",
                        "Severity": "OK"
                }
        ],
        "Name": "Events"
}
```

Read CPU Utilization

In [15]:

```
echo "Read CPU Utilization:"
curl --insecure --silent --noproxy "localhost, 127.0.0.1"  \
     --header  "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request GET ${iLO5_URI}/redfish/v1/TelemetryService/MetricReports/CPUUtilCus
tom1 | jq -r '[.MetricValues]'
```

Read CPU Utilization:


```
[
  [
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:44:12Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:44:32Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:44:52Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:45:12Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:45:32Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:45:52Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:46:12Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
```

Start fake load on RemoteHost

In [12]:
```
ssh $RemoteHost_IP "/usr/kits/fake_loader.sh " &
```

```
[1] 26212
```

Read CPU Utilization

In [16]:

```
echo "Read CPU Utilization:"
curl --insecure --silent --noproxy "localhost, 127.0.0.1"  \
     --header  "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request GET ${iLO5_URI}/redfish/v1/TelemetryService/MetricReports/CPUUtilCus
tom1 | jq -r '[.MetricValues]'
```

Read CPU Utilization:


```
[
  [
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:45:32Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:45:52Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:46:12Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:46:32Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:46:52Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:47:12Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
      "MetricValue": "0",
      "Timestamp": "2020-03-09T09:47:32Z"
    },
    {
      "MetricDefinition": {
        "@odata.id": "/redfish/v1/TelemetryService/MetricDefinitions/CPUUtil"
      },
      "MetricId": "CPUUtil",
```

Retrieve CPU Utilization Thresholds

In [17]:
```
echo "CPU Utilization Thresholds:"
curl --dump-header  $ResponseHeaders \
     --insecure --silent --noproxy "localhost, 127.0.0.1"  \
     --header  "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request GET ${iLO5_URI}/redfish/v1/TelemetryService/Triggers/CPUUtilTriggers
| jq

echo -e "\n\nResponse Headers:"
grep Allow $ResponseHeaders
echo
```

```
CPU Utilization Thresholds:
{
  "@odata.context": "/redfish/v1/$metadata#Triggers.Triggers",
  "@odata.etag": "W/\"BFAAE441\"",
  "@odata.id": "/redfish/v1/TelemetryService/Triggers/CPUUtilTriggers",
  "@odata.type": "#Triggers.v1_0_0.Triggers",
  "Id": "CPUUtilTriggers",
  "Description": "Triggers for CPU Utilization",
  "MetricProperties": [
    "/redfish/v1/Systems/1#SystemUsage/CPUUtil"
  ],
  "MetricType": "Numeric",
  "Name": "Triggers for CPU Utilization",
  "NumericThresholds": {
    "LowerCritical": {
      "Activation": "Decreasing",
      "DwellTime": "PT0S",
      "Reading": 0
    },
    "UpperCritical": {
      "Activation": "Increasing",
      "DwellTime": "PT0S",
      "Reading": 0
    }
  },
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  },
  "TriggerActions": [
    "LogToLogService"
  ]
}


Response Headers:
Allow: GET, HEAD, PATCH
```

Modify CPU Utilization thresholds (part of the Telemetry Service)

In [18]:
```
echo "Patching CPU Utilization Thresholds"
    curl --insecure --noproxy "localhost, 127.0.0.1" --silent \
      --header  "$HeaderContentType" --header "$HeaderODataVersion" \
      --header "X-Auth-Token: $Token" \
      --request PATCH --data "@$CpuThresholds" \
      ${iLO5_URI}/redfish/v1/TelemetryService/Triggers/CPUUtilTriggers | jq
```

```
Patching CPU Utilization Thresholds
{
  "error": {
    "code": "iLO.0.10.ExtendedInfo",
    "message": "See @Message.ExtendedInfo for more information.",
    "@Message.ExtendedInfo": [
      {
        "MessageId": "Base.1.4.Success"
      }
    ]
  }
}
```

Kill load on managed system and wait for event

In [23]:
```
ssh $RemoteHost_IP "pkill fake_loader"
sleep 20

ssh $EventReceiverIP "tail -30 /opt/hpe/RedfishEventService/Redfish_events.txt"
```


```
        "Events": [
                {
                        "EventId": "91f31abd-0f13-bafc-de4f-825dd1d891ec",
                        "EventTimestamp": "2020-03-09T09:58:12Z",
                        "EventType": "Alert",
                        "MemberId": "0",
                        "MessageArgs": [
                                "CPU Utilization"
                        ],
                        "MessageId": "iLOEvents.2.1.MetricValueBelowLowerThresho
ld",
                        "Oem": {
                                "Hpe": {
                                        "@odata.context": "/redfish/v1/$metadata
#HpeEvent.HpeEvent",
                                        "@odata.type": "#HpeEvent.v2_1_0.HpeEven
t",
                                        "CorrelatedEventNumber": 1048,
                                        "CorrelatedEventTimeStamp": "2020-03-09T
09:58:12Z",
                                        "CorrelatedEventType": "Hpe-IML",
                                        "CorrelatedIndications": [
                                                "HP:SNMP:1.3.6.1.4.1.232:6:2018:
3755959344"
                                        ],
                                        "Resource": "/redfish/v1/TelemetryServic
e/Triggers/CPUUtilTriggers"
                                }
                        },
                        "OriginOfCondition": "/redfish/v1/TelemetryService/Trigg
ers/CPUUtilTriggers",
                        "Severity": "Warning"
                }
        ],
        "Name": "Events"
}
```


Remove Event subscription

In [21]:
```
echo "Retrieve Event subscription URIs: "

EventLocations=$(curl --insecure --silent --noproxy "localhost, 127.0.0.1"  \
     --header  "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request GET ${iLO5_URI}/redfish/v1/EventService/Subscriptions | jq -r '.Memb
ers[] | ."@odata.id"')

echo -e "Event Locations : ${EventLocations}\n"

echo "Remove Event(s)"
for s in $EventLocations ; do
   echo "Processing $s"
   curl --insecure --silent --noproxy "localhost, 127.0.0.1"  \
        --header  "$HeaderContentType" --header "$HeaderODataVersion" \
        --header "X-Auth-Token: $Token" \
        --request DELETE ${iLO5_URI}${s} | jq
   echo
done

echo -e "\nVerify event(s) have been removed:"
curl --insecure --silent --noproxy "localhost, 127.0.0.1"  \
     --header  "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request GET ${iLO5_URI}/redfish/v1/EventService/Subscriptions | jq
```

```
Retrieve Event subscription URIs:
Event Locations : /redfish/v1/EventService/Subscriptions/26

Remove Event(s)
Processing /redfish/v1/EventService/Subscriptions/26
{
  "error": {
    "code": "iLO.0.10.ExtendedInfo",
    "message": "See @Message.ExtendedInfo for more information.",
    "@Message.ExtendedInfo": [
      {
        "MessageId": "iLO.2.13.EventSubscriptionRemoved"
      }
    ]
  }
}


Verify event(s) have been removed:
{
  "@odata.context": "/redfish/v1/$metadata#EventDestinationCollection.EventDesti
nationCollection",
  "@odata.etag": "W/\"75983E8D\"",
  "@odata.id": "/redfish/v1/EventService/Subscriptions",
  "@odata.type": "#EventDestinationCollection.EventDestinationCollection",
  "Description": "iLO User Event Subscriptions",
  "Name": "EventSubscriptions",
  "Members": [],
  "Members@odata.count": 0
}
```

Reset CPU thresholds

In [22]:
```
cat > ${CpuThresholds} << __EOF__
{
    "NumericThresholds": {
        "LowerCritical": {
        "DwellTime": "PT0S",
            "Reading": 0
        },
        "UpperCritical": {
        "DwellTime": "PT0S",
            "Reading": 0
        }
    }
}
__EOF__

echo "Reseting CPU Utilization Thresholds"
    curl --insecure --noproxy "localhost, 127.0.0.1" --silent \
      --header  "$HeaderContentType" --header "$HeaderODataVersion" \
      --header "X-Auth-Token: $Token" \
      --request PATCH --data "@$CpuThresholds" \
      ${iLO5_URI}/redfish/v1/TelemetryService/Triggers/CPUUtilTriggers | jq
```

```
Reseting CPU Utilization Thresholds
{
  "error": {
    "code": "iLO.0.10.ExtendedInfo",
    "message": "See @Message.ExtendedInfo for more information.",
    "@Message.ExtendedInfo": [
      {
        "MessageId": "Base.1.4.Success"
      }
    ]
  }
}
```

Delete sessions

It is extremely important to delete Redfish sessions to avoid reaching the maximum number of opened sessions in a BMC, preventing any access to it. Read this article (https://developer.hpe.com/blog/managing-ilo-sessions-with-redfish) for more detail.

In [24]:
```
echo "Body response of a session deletion:"

curl --insecure --noproxy "localhost, 127.0.0.1" --silent \
     --header "$HeaderContentType" --header "$HeaderODataVersion" \
     --header "X-Auth-Token: $Token" \
     --request DELETE $SessionLocation | jq
```

```
Body response of a session deletion:
{
  "error": {
    "code": "iLO.0.10.ExtendedInfo",
    "message": "See @Message.ExtendedInfo for more information.",
    "@Message.ExtendedInfo": [
      {
        "MessageId": "Base.1.4.Success"
      }
    ]
  }
}
```

Wrap up

In this notebook you performed the following actions:

- Discover the standard Redfish tree
- Create a Redfish session
- Subscribe to events
- Generate a fake event
- Modify a telemetry thresholds
- Generate a telemetry alert