

# 2-iloRestExamples

January 27, 2021

## 1 iLOrest examples

Version 0.58

### 1.1 Introduction

This Jupyter Notebook contains iLOrest examples as well as tips and tricks answering recurrent questions from HPE customers.

### 1.2 Environment preparation

The following cell sets environment variables and checks the connectivity toward the various BMCs used in this notebook.

```
[4]: ##### Environment preparation (Version: 0.26) #####
```

```
# Set Student ID number
Stud=675
Id=$(id --user --name)

# location and ports variables
ObmcBasePort=44000
IloDlBasePort=45000
IloSyBasePort=46000
let OpenBmcBasePort=$ObmcBasePort
let OpenBmcPort=${OpenBmcBasePort}+${Stud}
let iLO5SimulatorBasePort=$IloDlBasePort
let iLO5SimulatorPort=${iLO5SimulatorBasePort}+${Stud}
let ilo5Port=443

CacheDir="${PWD}/iLOrestCache"
LogDir="${PWD}"
LogFile="${LogDir}/iLOrest.log"

#iLO5SimulatorIP=bmcsimulators
iLO5SimulatorIP=ilo5simulators
iLOSimulator=${iLO5SimulatorIP}:${iLO5SimulatorPort}
iLO5SimulatorURI=https://${iLOSimulator}
```

```

OpenBmcIP=openbmcsimulators
OpenBmc="${OpenBmcIP}:${OpenBmcPort}"
OpenBmcURI="https://${OpenBmc}"

ilo5IP="ilo5"
ilo5="${ilo5IP}:${ilo5Port}"
ilo5URI="https://${ilo5}"

# Credentials
User="student"
Password='P@ssw0rd!'

# Miscellaneous
alias ilorest='ilorest --nologo --cache-dir ${CacheDir} --logdir ${LogDir}'
alias ResetIlo5Simulator="ssh rstsimul@${iLO5SimulatorIP} $Id_
↪${iLO5SimulatorBasePort}"
ilorest logout &>/dev/null # Clear cache

# Verify we can reach the remote Bmcs on the right HTTPS ports.
for bmc in ilo5 OpenBmc iLO5Simulator ; do
    ip="${bmc}IP" ; port=$(echo ${bmc}Port)
    nc -vz $(eval echo "\${ip}") $(eval echo "\${port}") &> /dev/null &&
    echo "$bmc is reachable" \
    || echo "WARNING: Problem reaching $bmc"
done

```

```

ilo5 is reachable
OpenBmc is reachable
iLO5Simulator is reachable

```

### 1.2.1 iLO 5 login and cache redirection

This [infrastructure](#) contains only one physical iLO 5 and prevents multiple students to perform SET actions on this unique BMC. Therefore, students have to use a DMTF BMC simulator populated with an iLO 5 mockup.

However, because iLOrest populates a cache directory during the login process, you need first to authenticate with the iLO 5 and then modify the cache files to have them pointing to the DMTF simulator. This is the role of the next cell.

```

[5]: ilorest login $ilo5 -u $User -p $Password

# Copy cache in a safe location before logging out to
# minimize opened sessions. iLO 5 is limited to 15 concurrent
# sessions.
mv ${CacheDir}/cache{,-bck}
ilorest logout

```

```
# Move back the cache
mv ${CacheDir}/cache{-bck,}

# Redirect cache toward the iLO 5 Simulator
sed -i "s?${ilo5URI}?${iLO5SimulatorURI}?" ${CacheDir}/cache/*
```

Discovering data...Done

Logging session out.

### 1.2.2 Restart iLO 5 simulator

If you need or desire to restart you iLO 5 simulator to start this workshop from scratch or for other reasons, run the following cell at any time.

```
[6]: # iLO 5 Simulator restart
ResetIlo5Simulator

# Verify we can reach the remote Bmcs on the right HTTPS ports.
for bmc in ilo5 OpenBmc iLO5Simulator ; do
    ip="${bmc}IP" ; port=$(echo ${bmc}Port)
    nc -vz $(eval echo "\${ip}") $(eval echo "\${port}") &> /dev/null &&
    echo "$bmc is reachable" \
    || echo "WARNING: Problem reaching $bmc"
done
```

```
Killing ilo5 simulator for student675 if any
Starting ilo5 simulator for student675...
```

```
ilo5 is reachable
OpenBmc is reachable
iLO5Simulator is reachable
```

### 1.3 List of examples

Note that the list of examples present in this Jupyter Notebook is changing over time. The classification is not following any strict model; it is a mix of Root service and data type locations.

Account Service - iLO users: Enforce password complexity and minimum password length

Chassis - Chassis Serial Number - Power State - Indicator LED - Chassis Asset Tag

Thermal - Server thermal information - [Thermal configuration](#)

Managers (iLO) - Enable/Disable SNMPv1 in iLO

CompuSystem - PostState and DiscoveryComplete - AMS and HostOS - Bios/RBSU Login password - Computer System Asset Tag

Resource Directory - Introduction

Security - Security Dashboard - iLO Security Mode/State - Login Security Banner

Bios - Server Serial Number

Storage - SSD Wear Status

Logout - [Logout](#)

## 1.4 Account Service

This root service models the iLO User Accounts.

### 1.4.1 iLO users: Enforce password complexity and minimum password length

API Reference document keyword: EnforcePasswordComplexity

iLO GUI location: Security - Access Settings

```
[7]: # Select DMTF data type
ilorest select AccountService

# List properties of the HPE Oem extension in json format
ilorest list Oem/Hpe --json

# Modify two AccountService parameters
ilorest set Oem/Hpe/EnforcePasswordComplexity=True
ilorest set Oem/Hpe/MinPasswordLength=5

# Retrieve the list of modified parameters
ilorest status

# Uncomment the following command to commit changes in the iLO 5 simulator.
# Note that you will not get the same answer as if done on a real iLO 5.
#ilorest commit

# Undo changes (clear cache)
ilorest select AccountService --refresh
```

```
{
  "Oem": {
    "Hpe": {
      "@odata.context":
"/redfish/v1/$metadata#HpeILOAccountService.HpeILOAccountService",
      "@odata.id": "/redfish/v1/AccountService/",
      "@odata.type": "#HpeILOAccountService.v2_3_0.HpeILOAccountService",
      "Actions": {
        "#HpeILOAccountService.ImportKerberosKeytab": {
```

```

        "target": "/redfish/v1/AccountService/Actions/Oem/Hpe/HpeiLOAccountSer
vice.ImportKerberosKeytab/"
    }
},
"AuthFailureDelayTimeSeconds": 10,
"AuthFailureLoggingThreshold": 3,
"AuthFailuresBeforeDelay": 1,
"DefaultPassword": null,
"DefaultUserName": null,
"DirectorySettings": {
    "LdapAuthenticationMode": "Disabled",
    "LdapCaCertificateLoaded": false,
    "LdapCaCertificates": {
        "@odata.id":
"/redfish/v1/AccountService/ExternalAccountProviders/LDAP/Certificates/"
    },
    "LdapServerPort": 636
},
"DirectoryTest": {
    "@odata.id": "/redfish/v1/AccountService/DirectoryTest/"
},
"EnforcePasswordComplexity": false,
"Id": "AccountService",
"KerberosSettings": {
    "KDCServerPort": 88,
    "KerberosRealm": ""
},
"MinPasswordLength": 8
}
}
}

```

Current changes found:

```

AccountService.v1_5_0(/redfish/v1/AccountService/) (Currently selected)
    Oem/Hpe/EnforcePasswordComplexity=True
    Oem/Hpe/MinPasswordLength=5

```

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; **Logout** ->

## 1.5 Chassis

This section contains parameters related to the **Chassis data type**. A Chassis represents a physical or virtual container of compute resources with attributes such as FRU information, power supplies, temperature, etc.

Complex chassis subsystems may have their own data type (i.e. Thermal)

Chassis examples: - Rack - Blade enclosure - HPE Synergy frame - Compute node chassis

### 1.5.1 Chassis Serial Number

The chassis serial number of an HPE compute node mentioned on an external label/tag with code bar/QRcode is identical to its embedded server serial number (Bios parameter). Note that the serial number of a C7000 enclosure chassis or Synergy frame chassis is unique and different to every SN of embedded compute nodes.

The following cell retrieves the serial number of an HPE compute node chassis and shows explicitly that it is a **read-only** property. The server serial number is presented here.

[API Reference document](#) keyword: `SerialNumber`

iLO GUI location: [Information - iLO Overview](#)

```
[8]: # Select data type
      ilorest select Chassis

      # Get SerialNumber from the Chassis data type
      ilorest get SerialNumber

      # Note that this property is READ-ONLY
      ilorest info SerialNumber
```

`SerialNumber=CZJ93402YV`

NAME

`SerialNumber`

DESCRIPTION

The chassis serial number.

TYPE

`string`  
`null`

READ-ONLY

`True`

### 1.5.2 Power State

The following cell retrieves the power state and information related to this parameter. Note that this parameter is read-only. If you want a more precise server state, read the `PostState` and `DiscoveryComplete` and `AMS` and `HostOS` paragraphs.

As mentioned in the [API reference documentation](#) this property is part of the `Chassis` data type.

```
[9]: # Select data type
      ilorest select Chassis

      # Get property value
      ilorest get PowerState

      # Retrieve property info with possible values.
      ilorest info PowerState
```

PowerState=On

NAME  
PowerState

DESCRIPTION  
This is the current power state of the chassis.

TYPE  
string  
null

READ-ONLY  
True

POSSIBLE VALUES  
None  
On  
Off  
Unknown  
Reset

### 1.5.3 Indicator LED

The chassis indicator LED corresponds to the blue LED that is used to identify the chassis in a rack of the datacenter.

```
[10]: # Select data type
      ilorest select Chassis

      # Get property value
      IndicatorLED=$(ilorest get --json IndicatorLED | jq -r '.IndicatorLED')
      echo "IndicatorLED=$IndicatorLED"
```

```
# Retrieve property info
ilorest info IndicatorLED
```

IndicatorLED=Off

NAME  
IndicatorLED

DESCRIPTION  
The chassis indicator LED that is used to identify the chassis.  
The user can manipulate this LED.

TYPE  
string  
null

READ-ONLY  
False

POSSIBLE VALUES  
None  
Unknown  
Lit  
Blinking  
Off

```
[11]: # Refresh cache
ilorest select Chassis --refresh

# Change the indicator LED state
LEDState=$(ilorest get IndicatorLED | cut -d= --field=2)
echo -e "LED State:$LEDState\n"

if [ "$LEDState" = "Off" ]; then
    LEDState="Lit"
else
    LEDState="Off"
fi

# Change property and commit
echo "Changing IndicatorLED to $LEDState"
ilorest set IndicatorLED="$LEDState" --commit
```



```
echo

# Validate property change
ilorest get IndicatorLED
```

LED State:Off

Changing IndicatorLED to Lit  
Skipping property indicatorled, not found in current server.  
Committing changes...  
The operation completed successfully.

IndicatorLED=Lit

#### 1.5.4 Chassis Asset Tag

The Chassis AssetTag is different from the ComputerSystem Asset Tag.

```
[12]: # Select data type
ilorest select Chassis --refresh

# Get property value
ilorest get AssetTag
```

AssetTag=""

```
[13]: # Change the Chassis Asset Tag property
ilorest set AssetTag="New Chassis Asset Tag" --commit

# Verify change
ilorest get AssetTag
```

Skipping property assettag, not found in current server.  
Committing changes...  
The operation completed successfully.  
AssetTag=New Chassis Asset Tag

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; Logout ->

## 1.6 Thermal

The **Thermal** data type describes the system thermal metrics. It provides the temperatures in different locations in the chassis as well as fan properties. It also offers the possibility to configure the fans with a specific cooling directive (Optimal, Enhanced, etc ...).

Thermal information belongs to the **Thermal** data type. However, the thermal configuration (**ThermalConfig**) is part of the **Bios** data type. Hence, to modify the **ThermalConfig** property, you will need to reboot the entire system to effectively apply this modification.

However, starting with iLO firmware **2.30**, it is possible to modify the thermal configuration using the `ThermalConfiguration` property of the `Thermal` data type without any system reset.

**NOTE:** The `Thermal` schema implemented in this iLO firmware version (2.30) is not totally accurate and only an `ilorest rawpatch` command can modify this setting. This problem will be fixed in a later update.

### 1.6.1 Server Thermal Information

The following cell retrieves both fan and sensor properties, including temperatures.

```
[14]: # Retrieve server thermal properties
ilorest list --json --select Thermal

{
  "@odata.context": "/redfish/v1/$metadata#Thermal.Thermal",
  "@odata.etag": "W/\"5039E327\"",
  "@odata.id": "/redfish/v1/Chassis/1/Thermal/",
  "@odata.type": "#Thermal.v1_1_0.Thermal",
  "Fans": [
    {
      "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Fans/0",
      "MemberId": "0",
      "Name": "Fan 1",
      "Oem": {
        "Hpe": {
          "@odata.context": "/redfish/v1/$metadata#HpeServerFan.HpeServerFan",
          "@odata.type": "#HpeServerFan.v2_0_0.HpeServerFan",
          "HotPluggable": true,
          "Location": "System",
          "Redundant": true
        }
      },
      "Reading": 11,
      "ReadingUnits": "Percent",
      "Status": {
        "Health": "OK",
        "State": "Enabled"
      }
    },
    {
      "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Fans/1",
      "MemberId": "1",
      "Name": "Fan 2",
      "Oem": {
        "Hpe": {
          "@odata.context": "/redfish/v1/$metadata#HpeServerFan.HpeServerFan",
          "@odata.type": "#HpeServerFan.v2_0_0.HpeServerFan",
          "HotPluggable": true,
```

```

        "Location": "System",
        "Redundant": true
    }
},
"Reading": 11,
"ReadingUnits": "Percent",
"Status": {
    "Health": "OK",
    "State": "Enabled"
}
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Fans/2",
    "MemberId": "2",
    "Name": "Fan 3",
    "Oem": {
        "Hpe": {
            "@odata.context": "/redfish/v1/$metadata#HpeServerFan.HpeServerFan",
            "@odata.type": "#HpeServerFan.v2_0_0.HpeServerFan",
            "HotPluggable": true,
            "Location": "System",
            "Redundant": true
        }
    },
    "Reading": 11,
    "ReadingUnits": "Percent",
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    }
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Fans/3",
    "MemberId": "3",
    "Name": "Fan 4",
    "Oem": {
        "Hpe": {
            "@odata.context": "/redfish/v1/$metadata#HpeServerFan.HpeServerFan",
            "@odata.type": "#HpeServerFan.v2_0_0.HpeServerFan",
            "HotPluggable": true,
            "Location": "System",
            "Redundant": true
        }
    },
    "Reading": 11,
    "ReadingUnits": "Percent",
    "Status": {
        "Health": "OK",

```

```

        "State": "Enabled"
    }
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Fans/4",
    "MemberId": "4",
    "Name": "Fan 5",
    "Oem": {
        "Hpe": {
            "@odata.context": "/redfish/v1/$metadata#HpeServerFan.HpeServerFan",
            "@odata.type": "#HpeServerFan.v2_0_0.HpeServerFan",
            "HotPluggable": true,
            "Location": "System",
            "Redundant": true
        }
    },
    "Reading": 11,
    "ReadingUnits": "Percent",
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    }
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Fans/5",
    "MemberId": "5",
    "Name": "Fan 6",
    "Oem": {
        "Hpe": {
            "@odata.context": "/redfish/v1/$metadata#HpeServerFan.HpeServerFan",
            "@odata.type": "#HpeServerFan.v2_0_0.HpeServerFan",
            "HotPluggable": true,
            "Location": "System",
            "Redundant": true
        }
    },
    "Reading": 11,
    "ReadingUnits": "Percent",
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    }
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Fans/6",
    "MemberId": "6",
    "Name": "Fan 7",
    "Oem": {

```

```

    "Hpe": {
      "@odata.context": "/redfish/v1/$metadata#HpeServerFan.HpeServerFan",
      "@odata.type": "#HpeServerFan.v2_0_0.HpeServerFan",
      "HotPluggable": true,
      "Location": "System",
      "Redundant": true
    }
  },
  "Reading": 11,
  "ReadingUnits": "Percent",
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  }
},
{
  "Id": "Thermal",
  "Name": "Thermal",
  "Oem": {
    "Hpe": {
      "@odata.context": "/redfish/v1/$metadata#HpeThermalExt.HpeThermalExt",
      "@odata.type": "#HpeThermalExt.v2_0_0.HpeThermalExt",
      "FanPercentMinimum": 0,
      "ThermalConfiguration": "OptimalCooling"
    }
  },
  "Temperatures": [
    {
      "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/0",
      "MemberId": "0",
      "Name": "01-Inlet Ambient",
      "Oem": {
        "Hpe": {
          "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
          "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
          "LocationXmm": 15,
          "LocationYmm": 0
        }
      },
      "PhysicalContext": "Intake",
      "ReadingCelsius": 23,
      "SensorNumber": 1,
      "Status": {
        "Health": "OK",
        "State": "Enabled"
      },
      "UpperThresholdCritical": 42,

```

```

    "UpperThresholdFatal": 47,
    "UpperThresholdUser": 0
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/1",
    "MemberId": "1",
    "Name": "02-CPU 1",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 11,
        "LocationYmm": 5
      }
    },
    "PhysicalContext": "CPU",
    "ReadingCelsius": 40,
    "SensorNumber": 2,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": 70,
    "UpperThresholdFatal": null
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/2",
    "MemberId": "2",
    "Name": "03-CPU 2",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 4,
        "LocationYmm": 5
      }
    },
    "PhysicalContext": "CPU",
    "ReadingCelsius": 40,
    "SensorNumber": 3,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": 70,
    "UpperThresholdFatal": null
  }

```

```

    },
    {
      "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/3",
      "MemberId": "3",
      "Name": "04-P1 DIMM 1-6",
      "Oem": {
        "Hpe": {
          "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
          "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
          "LocationXmm": 8,
          "LocationYmm": 4
        }
      },
      "PhysicalContext": "SystemBoard",
      "ReadingCelsius": 0,
      "SensorNumber": 4,
      "Status": {
        "State": "Absent"
      },
      "UpperThresholdCritical": null,
      "UpperThresholdFatal": null
    },
    {
      "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/4",
      "MemberId": "4",
      "Name": "05-PMM 1-6",
      "Oem": {
        "Hpe": {
          "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
          "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
          "LocationXmm": 8,
          "LocationYmm": 4
        }
      },
      "PhysicalContext": "SystemBoard",
      "ReadingCelsius": 0,
      "SensorNumber": 5,
      "Status": {
        "State": "Absent"
      },
      "UpperThresholdCritical": null,
      "UpperThresholdFatal": null
    },
    {
      "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/5",
      "MemberId": "5",

```

```

    "Name": "06-P1 DIMM 7-12",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 13,
        "LocationYmm": 4
      }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 29,
    "SensorNumber": 6,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": 90,
    "UpperThresholdFatal": null
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/6",
    "MemberId": "6",
    "Name": "07-PMM 7-12",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 13,
        "LocationYmm": 4
      }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 7,
    "Status": {
      "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/7",
    "MemberId": "7",
    "Name": "08-P2 DIMM 1-6",
    "Oem": {
      "Hpe": {

```



```

        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 1,
        "LocationYmm": 4
    }
},
"PhysicalContext": "SystemBoard",
"ReadingCelsius": 0,
"SensorNumber": 8,
"Status": {
    "State": "Absent"
},
"UpperThresholdCritical": null,
"UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/8",
    "MemberId": "8",
    "Name": "09-PMM 1-6",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 1,
            "LocationYmm": 4
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 9,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/9",
    "MemberId": "9",
    "Name": "10-P2 DIMM 7-12",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 6,

```

```

        "LocationYmm": 4
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 32,
    "SensorNumber": 10,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "UpperThresholdCritical": 90,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/10",
    "MemberId": "10",
    "Name": "11-PMM 7-12",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 6,
            "LocationYmm": 4
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 11,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/11",
    "MemberId": "11",
    "Name": "12-HD Max",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 11,
            "LocationYmm": 0
        }
    },

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    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 35,
    "SensorNumber": 12,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "UpperThresholdCritical": 60,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/12",
    "MemberId": "12",
    "Name": "13-Exp Bay Drive",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 14,
            "LocationYmm": 0
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 13,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/13",
    "MemberId": "13",
    "Name": "14-Stor Batt 1",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 5,
            "LocationYmm": 0
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 35,
    "SensorNumber": 14,

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    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "UpperThresholdCritical": 60,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/14",
    "MemberId": "14",
    "Name": "15-Front Ambient",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 9,
            "LocationYmm": 1
        }
    },
    "PhysicalContext": "Intake",
    "ReadingCelsius": 27,
    "SensorNumber": 15,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "UpperThresholdCritical": 60,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/15",
    "MemberId": "15",
    "Name": "16-VR P1",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 11,
            "LocationYmm": 3
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 34,
    "SensorNumber": 16,
    "Status": {
        "Health": "OK",

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    "UpperThresholdCritical": 115,
    "UpperThresholdFatal": 120
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/18",
    "MemberId": "18",
    "Name": "19-VR P1 Mem 2",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 13,
        "LocationYmm": 2
      }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 32,
    "SensorNumber": 19,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": 115,
    "UpperThresholdFatal": 120
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/19",
    "MemberId": "19",
    "Name": "20-VR P2 Mem 1",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 1,
        "LocationYmm": 2
      }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 34,
    "SensorNumber": 20,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": 115,
    "UpperThresholdFatal": 120
  }

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    },
    {
      "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/20",
      "MemberId": "20",
      "Name": "21-VR P2 Mem 2",
      "Oem": {
        "Hpe": {
          "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
          "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
          "LocationXmm": 6,
          "LocationYmm": 2
        }
      },
      "PhysicalContext": "SystemBoard",
      "ReadingCelsius": 40,
      "SensorNumber": 21,
      "Status": {
        "Health": "OK",
        "State": "Enabled"
      },
      "UpperThresholdCritical": 115,
      "UpperThresholdFatal": 120
    },
    {
      "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/21",
      "MemberId": "21",
      "Name": "22-Chipset",
      "Oem": {
        "Hpe": {
          "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
          "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
          "LocationXmm": 13,
          "LocationYmm": 9
        }
      },
      "PhysicalContext": "SystemBoard",
      "ReadingCelsius": 39,
      "SensorNumber": 22,
      "Status": {
        "Health": "OK",
        "State": "Enabled"
      },
      "UpperThresholdCritical": 100,
      "UpperThresholdFatal": null
    },
  ],
  {

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"@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/22",
"MemberId": "22",
"Name": "23-BMC",
"Oem": {
  "Hpe": {
    "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
    "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
    "LocationXmm": 9,
    "LocationYmm": 12
  }
},
"PhysicalContext": "SystemBoard",
"ReadingCelsius": 78,
"SensorNumber": 23,
"Status": {
  "Health": "OK",
  "State": "Enabled"
},
"UpperThresholdCritical": 110,
"UpperThresholdFatal": 115
},
{
  "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/23",
  "MemberId": "23",
  "Name": "24-BMC Zone",
  "Oem": {
    "Hpe": {
      "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
      "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
      "LocationXmm": 9,
      "LocationYmm": 13
    }
  },
  "PhysicalContext": "SystemBoard",
  "ReadingCelsius": 45,
  "SensorNumber": 24,
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  },
  "UpperThresholdCritical": 90,
  "UpperThresholdFatal": 95
},
{
  "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/24",
  "MemberId": "24",

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    "Name": "25-HD Controller",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 8,
        "LocationYmm": 9
      }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 62,
    "SensorNumber": 25,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": 100,
    "UpperThresholdFatal": null
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/25",
    "MemberId": "25",
    "Name": "26-HD Cntlr Zone",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 8,
        "LocationYmm": 8
      }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 37,
    "SensorNumber": 26,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": 85,
    "UpperThresholdFatal": 90
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/26",
    "MemberId": "26",
    "Name": "27-LOM",
    "Oem": {

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        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 7,
            "LocationYmm": 13
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 53,
    "SensorNumber": 27,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "UpperThresholdCritical": 100,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/27",
    "MemberId": "27",
    "Name": "28-LOM Card",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 14,
            "LocationYmm": 14
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 28,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/28",
    "MemberId": "28",
    "Name": "29-I/O Zone",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",

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        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 14,
        "LocationYmm": 11
    }
},
"PhysicalContext": "SystemBoard",
"ReadingCelsius": 34,
"SensorNumber": 29,
"Status": {
    "Health": "OK",
    "State": "Enabled"
},
"UpperThresholdCritical": 90,
"UpperThresholdFatal": 95
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/29",
    "MemberId": "29",
    "Name": "30-PCI 1",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 11,
            "LocationYmm": 8
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 30,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/30",
    "MemberId": "30",
    "Name": "31-PCI 1 Zone",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 11,
            "LocationYmm": 9
        }
    }
}

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    }
  },
  "PhysicalContext": "SystemBoard",
  "ReadingCelsius": 35,
  "SensorNumber": 31,
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  },
  "UpperThresholdCritical": 90,
  "UpperThresholdFatal": 95
},
{
  "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/31",
  "MemberId": "31",
  "Name": "32-PCI 2",
  "Oem": {
    "Hpe": {
      "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
      "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
      "LocationXmm": 11,
      "LocationYmm": 8
    }
  },
  "PhysicalContext": "SystemBoard",
  "ReadingCelsius": 0,
  "SensorNumber": 32,
  "Status": {
    "State": "Absent"
  },
  "UpperThresholdCritical": null,
  "UpperThresholdFatal": null
},
{
  "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/32",
  "MemberId": "32",
  "Name": "33-PCI 2 Zone",
  "Oem": {
    "Hpe": {
      "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
      "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
      "LocationXmm": 11,
      "LocationYmm": 9
    }
  },
  "PhysicalContext": "SystemBoard",

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    "ReadingCelsius": 34,
    "SensorNumber": 33,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "UpperThresholdCritical": 90,
    "UpperThresholdFatal": 95
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/33",
    "MemberId": "33",
    "Name": "34-PCI 3",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 5,
            "LocationYmm": 11
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 34,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/34",
    "MemberId": "34",
    "Name": "35-PCI 3 Zone",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 5,
            "LocationYmm": 13
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 35,
    "Status": {

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        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/35",
    "MemberId": "35",
    "Name": "37-Rear HD Max",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 14,
            "LocationYmm": 14
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 36,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/36",
    "MemberId": "36",
    "Name": "38-Battery Zone",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 7,
            "LocationYmm": 10
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 40,
    "SensorNumber": 37,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    },
    "UpperThresholdCritical": 75,

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    "UpperThresholdFatal": 80
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/37",
    "MemberId": "37",
    "Name": "39-P/S 1 Inlet",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 1,
        "LocationYmm": 10
      }
    },
    "PhysicalContext": "PowerSupply",
    "ReadingCelsius": 35,
    "SensorNumber": 38,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/38",
    "MemberId": "38",
    "Name": "40-P/S 2 Inlet",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 4,
        "LocationYmm": 10
      }
    },
    "PhysicalContext": "PowerSupply",
    "ReadingCelsius": 40,
    "SensorNumber": 39,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
  },

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{
  "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/39",
  "MemberId": "39",
  "Name": "41-P/S 1",
  "Oem": {
    "Hpe": {
      "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
      "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
      "LocationXmm": 1,
      "LocationYmm": 13
    }
  },
  "PhysicalContext": "PowerSupply",
  "ReadingCelsius": 46,
  "SensorNumber": 40,
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  },
  "UpperThresholdCritical": null,
  "UpperThresholdFatal": null
},
{
  "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/40",
  "MemberId": "40",
  "Name": "42-P/S 2",
  "Oem": {
    "Hpe": {
      "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
      "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
      "LocationXmm": 3,
      "LocationYmm": 13
    }
  },
  "PhysicalContext": "PowerSupply",
  "ReadingCelsius": 40,
  "SensorNumber": 41,
  "Status": {
    "Health": "OK",
    "State": "Enabled"
  },
  "UpperThresholdCritical": null,
  "UpperThresholdFatal": null
},
{
  "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/41",

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    "MemberId": "41",
    "Name": "43-E-Fuse",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 4,
        "LocationYmm": 9
      }
    },
    "PhysicalContext": "PowerSupply",
    "ReadingCelsius": 31,
    "SensorNumber": 42,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": 100,
    "UpperThresholdFatal": null
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/42",
    "MemberId": "42",
    "Name": "44-P/S 2 Zone",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 4,
        "LocationYmm": 7
      }
    },
    "PhysicalContext": "PowerSupply",
    "ReadingCelsius": 37,
    "SensorNumber": 43,
    "Status": {
      "Health": "OK",
      "State": "Enabled"
    },
    "UpperThresholdCritical": 75,
    "UpperThresholdFatal": 80
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/43",
    "MemberId": "43",
    "Name": "61-AHCI HD Max",

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    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 11,
        "LocationYmm": 0
      }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 44,
    "Status": {
      "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/44",
    "MemberId": "44",
    "Name": "69-PCI 1 M2",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 11,
        "LocationYmm": 8
      }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 45,
    "Status": {
      "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
  },
  {
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/45",
    "MemberId": "45",
    "Name": "70-PCI 1 M2 Zn",
    "Oem": {
      "Hpe": {
        "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",

```

```

        "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
        "LocationXmm": 11,
        "LocationYmm": 9
    }
},
"PhysicalContext": "SystemBoard",
"ReadingCelsius": 0,
"SensorNumber": 46,
"Status": {
    "State": "Absent"
},
"UpperThresholdCritical": null,
"UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/46",
    "MemberId": "46",
    "Name": "71-PCI 2 M2",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 11,
            "LocationYmm": 8
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 47,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/47",
    "MemberId": "47",
    "Name": "72-PCI 2 M2 Zn",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 11,
            "LocationYmm": 9
        }
    }
}

```

```

    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 48,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/48",
    "MemberId": "48",
    "Name": "73-PCI 3 M2",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 5,
            "LocationYmm": 11
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 49,
    "Status": {
        "State": "Absent"
    },
    "UpperThresholdCritical": null,
    "UpperThresholdFatal": null
},
{
    "@odata.id": "/redfish/v1/Chassis/1/Thermal/#Temperatures/49",
    "MemberId": "49",
    "Name": "74-PCI 3 M2 Zn",
    "Oem": {
        "Hpe": {
            "@odata.context":
"/redfish/v1/$metadata#HpeSeaOfSensors.HpeSeaOfSensors",
            "@odata.type": "#HpeSeaOfSensors.v2_0_0.HpeSeaOfSensors",
            "LocationXmm": 5,
            "LocationYmm": 13
        }
    },
    "PhysicalContext": "SystemBoard",
    "ReadingCelsius": 0,
    "SensorNumber": 50,

```

```

        "Status": {
            "State": "Absent"
        },
        "UpperThresholdCritical": null,
        "UpperThresholdFatal": null
    }
}
]
}

```

If you want only sensor information, you can use the **serverinfo** macro command like that found in the following cell

```

[15]: # Retrieve data type used by the server info macro command
      ilorest serverinfo --thermal

```

```

-----
Thermal Information:
-----

```

Sensor #1:

```

    Location: Intake
    Current Temp: 23 C
    Critical Threshold: 42 C
    Fatal Threshold: 47 C
    Health: OK

```

Sensor #2:

```

    Location: CPU
    Current Temp: 40 C
    Critical Threshold: 70 C
    Fatal Threshold: -
    Health: OK

```

Sensor #3:

```

    Location: CPU
    Current Temp: 40 C
    Critical Threshold: 70 C
    Fatal Threshold: -
    Health: OK

```

Sensor #6:

```

    Location: SystemBoard
    Current Temp: 29 C
    Critical Threshold: 90 C
    Fatal Threshold: -
    Health: OK

```

Sensor #10:

```

    Location: SystemBoard
    Current Temp: 32 C
    Critical Threshold: 90 C
    Fatal Threshold: -
    Health: OK

```

Sensor #12:  
Location: SystemBoard  
Current Temp: 35 C  
Critical Threshold: 60 C  
Fatal Threshold: -  
Health: OK

Sensor #14:  
Location: SystemBoard  
Current Temp: 35 C  
Critical Threshold: 60 C  
Fatal Threshold: -  
Health: OK

Sensor #15:  
Location: Intake  
Current Temp: 27 C  
Critical Threshold: 60 C  
Fatal Threshold: -  
Health: OK

Sensor #16:  
Location: SystemBoard  
Current Temp: 34 C  
Critical Threshold: 115 C  
Fatal Threshold: 120 C  
Health: OK

Sensor #17:  
Location: SystemBoard  
Current Temp: 37 C  
Critical Threshold: 115 C  
Fatal Threshold: 120 C  
Health: OK

Sensor #18:  
Location: SystemBoard  
Current Temp: 30 C  
Critical Threshold: 115 C  
Fatal Threshold: 120 C  
Health: OK

Sensor #19:  
Location: SystemBoard  
Current Temp: 32 C  
Critical Threshold: 115 C  
Fatal Threshold: 120 C  
Health: OK

Sensor #20:  
Location: SystemBoard  
Current Temp: 34 C  
Critical Threshold: 115 C  
Fatal Threshold: 120 C  
Health: OK

Sensor #21:  
Location: SystemBoard  
Current Temp: 40 C  
Critical Threshold: 115 C  
Fatal Threshold: 120 C  
Health: OK

Sensor #22:  
Location: SystemBoard  
Current Temp: 39 C  
Critical Threshold: 100 C  
Fatal Threshold: -  
Health: OK

Sensor #23:  
Location: SystemBoard  
Current Temp: 78 C  
Critical Threshold: 110 C  
Fatal Threshold: 115 C  
Health: OK

Sensor #24:  
Location: SystemBoard  
Current Temp: 45 C  
Critical Threshold: 90 C  
Fatal Threshold: 95 C  
Health: OK

Sensor #25:  
Location: SystemBoard  
Current Temp: 62 C  
Critical Threshold: 100 C  
Fatal Threshold: -  
Health: OK

Sensor #26:  
Location: SystemBoard  
Current Temp: 37 C  
Critical Threshold: 85 C  
Fatal Threshold: 90 C  
Health: OK

Sensor #27:  
Location: SystemBoard  
Current Temp: 53 C  
Critical Threshold: 100 C  
Fatal Threshold: -  
Health: OK

Sensor #29:  
Location: SystemBoard  
Current Temp: 34 C  
Critical Threshold: 90 C  
Fatal Threshold: 95 C  
Health: OK

Sensor #31:  
Location: SystemBoard  
Current Temp: 35 C  
Critical Threshold: 90 C  
Fatal Threshold: 95 C  
Health: OK

Sensor #33:  
Location: SystemBoard  
Current Temp: 34 C  
Critical Threshold: 90 C  
Fatal Threshold: 95 C  
Health: OK

Sensor #37:  
Location: SystemBoard  
Current Temp: 40 C  
Critical Threshold: 75 C  
Fatal Threshold: 80 C  
Health: OK

Sensor #38:  
Location: PowerSupply  
Current Temp: 35 C  
Critical Threshold: -  
Fatal Threshold: -  
Health: OK

Sensor #39:  
Location: PowerSupply  
Current Temp: 40 C  
Critical Threshold: -  
Fatal Threshold: -  
Health: OK

Sensor #40:  
Location: PowerSupply  
Current Temp: 46 C  
Critical Threshold: -  
Fatal Threshold: -  
Health: OK

Sensor #41:  
Location: PowerSupply  
Current Temp: 40 C  
Critical Threshold: -  
Fatal Threshold: -  
Health: OK

Sensor #42:  
Location: PowerSupply  
Current Temp: 31 C  
Critical Threshold: 100 C  
Fatal Threshold: -  
Health: OK



Sensor #43:

Location: PowerSupply  
Current Temp: 37 C  
Critical Threshold: 75 C  
Fatal Threshold: 80 C  
Health: OK

### 1.6.2 ThermalConfiguration

The following cells retrieve the thermal configuration from the Bios data type first, and then from the Thermal data type.

```
[16]: # Select data type
      ilorest select Bios

      # Retrieve property
      ilorest get Attributes/ThermalConfig --json | jq '.*[]'

      # Retrieve possible values for the ThermalConfig property
      #TBD

      # Change ThermalConfig
      #ilorest set ThermalConfig="EnhancedCPUCooling" --select Bios.
```

```
{
  "ThermalConfig": "OptimalCooling"
}
```

```
[17]: # Verify iLO firmware is equal or greater than 2.30
      ilorest get FirmwareVersion --select Manager.

      # Select data type
      ilorest select Thermal

      # Retrieve property
      ilorest get Oem/Hpe/ThermalConfiguration --json | jq -r '.*[]|.*[]'

      # Retrieve possible values for property
      # TBD

      # Modify property
      #ilorest set Oem/Hpe/ThermalConfiguration="MaximumCooling"
```

FirmwareVersion=iLO 5 v2.30

```
{
  "ThermalConfiguration":
    "OptimalCooling"
}
```

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; Logout ->

## 1.7 Managers

Examples in this section are related to the **Manager** data type as well as HPE Oem data types located below the `/redfish/v1/Managers/` end point like the `HpeiLOSnmpService`.

### 1.7.1 Enable/Disable SNMPv1 in iLO

**NOTE** Changing the `SNMPv1Enabled` setting appeared in iLO 5 FW **2.30**.

API Reference document keyword: "SNMPv1Enabled" \

iLO GUI location: Management --> SNMP Settings --> SNMP Alerts --> SNMPv1

```
[18]: # Select data type
ilorest select HpeiLOSnmpService

# Get current value
ilorest get SNMPv1Enabled
echo

# Set new value
ilorest set SNMPv1Enabled=False

ilorest status
```

SNMPv1Enabled=True

Current changes found:

`HpeiLOSnmpService.v2_3_0(/redfish/v1/Managers/1/SnmpService/)` (Currently selected)

`SNMPv1Enabled=False`

`Chassis.v1_6_0(/redfish/v1/Chassis/1/)`

`AssetTag=New Chassis Asset Tag`

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; Logout ->

## 1.8 HPE iLO Resource Directory

The HPE iLO Resource Directory is an HPE OEM extension that contains the exhaustive list of the data types present in a Redfish service. This directory can be used by Redfish clients to lookup resources faster. Without this extension, Redfish clients must crawl the entire Redfish tree, starting at the root entry point, to find a specific resource.

The iLOrest utility caches the HPE iLO Resource Directory locally during the login process. When you select a data type, iLOrest very quickly retrieves its location from the cached directory. Then, when you submit get or set requests against specific properties, iLOrest starts looking for them starting at the location found in the cached directory.

### 1.8.1 Introduction

The `HpeiLOResourceDirectory` data type contains an array called `Instances`. Each element of this array corresponds to a data type with associated descriptors: `@odata.id` and `HttpMethods`. The first descriptor is the entry point of the data type in the Redfish tree and the second lists the valid HTTP methods against the data type.

NOTE: The word “instance” is a synonym of “data type”. You will find it in [DMTF python programs](#) as well as [HPE programs](#).

The following cell retrieves the first data types (aka instances) of the current iLO 5.

```
[19]: # Select data type
      ilorest select HpeiLOResourceDirectory

      # List the first elements of array Instances containing data type properties
      ilorest list Instances --json | head -30
```

```
{
  "Instances": [
    {
      "@odata.id": "/redfish/v1/",
      "@odata.type": "#ServiceRoot.v1_5_1.ServiceRoot",
      "ETag": "W/\\"681BF92D\\\"",
      "HttpMethods": [
        "GET",
        "HEAD"
      ]
    },
    {
      "@odata.id": "/redfish/v1/Managers/1/",
      "@odata.type": "#Manager.v1_5_1.Manager",
      "ETag": "W/\\"913F853A\\\"",
      "HttpMethods": [
        "GET",
        "HEAD",
        "POST",
        "PATCH"
      ]
    },
    {
      "@odata.id": "/redfish/v1/Managers/",
      "@odata.type": "#ManagerCollection.ManagerCollection",
      "ETag": "W/\\"AA6D42B0\\\"",
```

```
"HttpMethods": [
  "GET",
  "HEAD"
]
```

Error accessing the file path. Verify the file path is correct and you have proper permissions.

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; [Logout](#) ->

## 1.9 Computer System

This section contains examples related to the `ComputerSystem` data type.

### 1.9.1 PostState and DiscoveryComplete

Use these state parameters to evaluate the current state of a system before modifying or viewing its resources. As explained in this [article](#), certain parameters cannot be modified if the computer is not in a specific state.

Moreover, some parameters cannot be viewed when the entire discovery of all subsystems is not complete. As an example, you will not be able to view or modify `SmartArray` and logical drive configurations if the `SmartArrayDiscovery` is not complete.

```
[20]: # Select data type
ilorest select ComputerSystem

# Retrieve and print DeviceDiscoveryComplete and PostState properties
ilorest get Oem/Hpe/DeviceDiscoveryComplete | grep -v -E 'Oem|Hpe'; echo
ilorest get Oem/Hpe/PostState | grep -v -E 'Oem|Hpe' ; echo
```

```
DeviceDiscoveryComplete=
                                AMSDeviceDiscovery=NoAMS
                                DeviceDiscovery=vMainDeviceDiscoveryComplete
                                SmartArrayDiscovery=Complete

PostState=FinishedPost
```

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; [Logout](#) ->

### 1.9.2 AMS and HostOS

When the HPE Agentless Management Service (AMS) is installed in the operating system of the host, it is possible to get various information from the `HostOS` property. This property is present only when AMS is up and running in the host OS.

Use keywords `agentless` or `ams` in the [API reference documentation](#) to get the data type related to this topic.

```
[21]: # Select type
ilorest select ComputerSystem.
```

```

# Retrieve and print AMS status
AmsStatus=$(ilorest get --json Oem/Hpe/AggregateHealthStatus/
→AgentlessManagementService | \
jq -r '.Oem.Hpe.AggregateHealthStatus.AgentlessManagementService')
echo "AMS Status: $AmsStatus" ; echo

# Retrieve and print HostOS info only if AMS is ready
if [ "$AmsStatus" == "Ready" ] ; then
    echo "Host OS properties:"
    ilorest get --json Oem/Hpe/HostOS | jq -r '.Oem.Hpe.HostOS'
fi

```

AMS Status: Unavailable

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; Logout ->

### 1.9.3 Bios/RBSU Login password

```

[22]: # Setting a password for the first time
ilorest setpassword FirstTimePassword ''''

# Removing the Bios/RBSU password
ilorest setpassword '''' FirstTimePassowrd

# No commit needed. No iLO nor system reset needed.
ilorest status

```

An invalid response body was returned: No JSON object could be decodedNo error message returned or unable to parse error response.

An invalid response body was returned: No JSON object could be decodedNo error message returned or unable to parse error response.

Current changes found:

```

HpeiLOSnmpService.v2_3_0(/redfish/v1/Managers/1/SnmpService/)
    SNMPv1Enabled=False
Chassis.v1_6_0(/redfish/v1/Chassis/1/)
    AssetTag=New Chassis Asset Tag

```

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; Logout ->

### 1.9.4 ComputerSystem Asset Tag

The ComputerSystem Asset Tag is different from the Chassis Asset Tag.

```

[23]: # Select data type and clear cache
ilorest select ComputerSystem. --refresh

# Retrieve ComputerSystem Asset Tag

```

```

ilorest get AssetTag

# Change ComputerSystem Asset Tag
ilorest set AssetTag="New ComputerSystem Asset Tag" --commit

# Verify change
ilorest get AssetTag

```

```

AssetTag=""
Committing changes...
The operation completed successfully.
The operation completed successfully.
The operation completed successfully.
AssetTag=New ComputerSystem Asset Tag

```

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; [Logout](#) ->

## 1.10 Security

### 1.10.1 Security Dashboard

The following five examples retrieve different security dashboard properties.

**Overall security dashboard status** Use keyword **Security Dashboard** or **SecurityDashboard** in the [API reference document](#) to find the overall security dashboard data type.

```

[24]: # Select data type
ilorest select HpeiLOSecurityDashboard.

# Retrieve overall security dashboard status
ilorest get

```

```

OverallSecurityStatus=Risk
ServerConfigurationLockStatus=Disabled

```

**All Security parameters and properties in json format** Use keyword **SecurityParam** to find the corresponding data type in the [API Reference Document](#).

```

[25]: # Select data type
ilorest select HpeiLOSecurityParam.

# List security params in JSON format
ilorest list --json

```

```

[
  {
    "@odata.context":
"/redfish/v1/$metadata#HpeiLOSecurityParam.HpeiLOSecurityParam",
    "@odata.etag": "W/\"A3A6BF43\"",

```

```

    "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/6",
    "@odata.type": "#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam",
    "Description": "The Password Complexity setting is disabled. This
configuration increases system vulnerability to attack.",
    "Id": "6",
    "Ignore": true,
    "IgnoredBy": "demopaq",
    "IgnoredTime": "2020-05-11T12:55:02Z",
    "Name": "Password Complexity",
    "SecurityStatus": "Risk",
    "State": "Disabled"
},
{
    "@odata.context":
"/redfish/v1/$metadata#HpeiloSecurityParam.HpeiloSecurityParam",
    "@odata.etag": "W/\"A3A6BF43\"",
    "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/7",
    "@odata.type": "#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam",
    "Id": "7",
    "Ignore": false,
    "Name": "Require Host Authentication",
    "SecurityStatus": "Ok",
    "State": "Enabled"
},
{
    "@odata.context":
"/redfish/v1/$metadata#HpeiloSecurityParam.HpeiloSecurityParam",
    "@odata.etag": "W/\"A3A6BF43\"",
    "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/8",
    "@odata.type": "#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam",
    "Id": "8",
    "Ignore": false,
    "Name": "Last Firmware Scan Result",
    "SecurityStatus": "Ok",
    "State": "Ok"
},
{
    "@odata.context":
"/redfish/v1/$metadata#HpeiloSecurityParam.HpeiloSecurityParam",
    "@odata.etag": "W/\"A3A6BF43\"",
    "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/1",
    "@odata.type": "#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam",
    "Id": "1",
    "Ignore": false,

```

```

    "Name": "IPMI/DCMI Over LAN",
    "SecurityStatus": "Ok",
    "State": "Disabled"
  },
  {
    "@odata.context":
"/redfish/v1/$metadata#HpeILOSecurityParam.HpeILOSecurityParam",
    "@odata.etag": "W/\\"A3A6BF43\\\"",
    "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/5",
    "@odata.type": "#HpeILOSecurityParam.v1_1_0.HpeILOSecurityParam",
    "Description": "The UEFI Secure Boot setting is disabled. In this
configuration, the UEFI system firmware does not validate the boot loader,
Option ROM firmware, and other system software executables for trusted
signatures. This configuration breaks the chain of trust established by iLO from
power-on",
    "Id": "5",
    "Ignore": true,
    "IgnoredBy": "demopaq",
    "IgnoredTime": "2020-05-11T16:53:22Z",
    "Name": "Secure Boot",
    "SecurityStatus": "Risk",
    "State": "Disabled"
  },
  {
    "@odata.context":
"/redfish/v1/$metadata#HpeILOSecurityParam.HpeILOSecurityParam",
    "@odata.etag": "W/\\"A3A6BF43\\\"",
    "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/9",
    "@odata.type": "#HpeILOSecurityParam.v1_1_0.HpeILOSecurityParam",
    "Description": "Management processor's default self-signed certificate is in
use.",
    "Id": "9",
    "Ignore": false,
    "Name": "Default SSL Certificate In Use",
    "RecommendedAction": "Import a certificate signed by a trusted certificate
authority.",
    "SecurityStatus": "Risk",
    "State": "True"
  },
  {
    "@odata.context":
"/redfish/v1/$metadata#HpeILOSecurityParam.HpeILOSecurityParam",
    "@odata.etag": "W/\\"A3A6BF43\\\"",
    "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/4",
    "@odata.type": "#HpeILOSecurityParam.v1_1_0.HpeILOSecurityParam",

```



```

        "Id": "4",
        "Ignore": false,
        "Name": "Authentication Failure Logging",
        "SecurityStatus": "Ok",
        "State": "Enabled"
    },
    {
        "@odata.context":
"/redfish/v1/$metadata#HpeiloSecurityParam.HpeiloSecurityParam",
        "@odata.etag": "W/\"A3A6BF43\"",
        "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/10",
        "@odata.type": "#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam",
        "Description": "SNMPv1 is enabled. This configuration increases system
vulnerability to attack.",
        "Id": "10",
        "Ignore": false,
        "Name": "SNMPv1",
        "RecommendedAction": "Disable the SNMPv1 protocol.",
        "SecurityStatus": "Risk",
        "State": "Enabled"
    },
    {
        "@odata.context":
"/redfish/v1/$metadata#HpeiloSecurityParam.HpeiloSecurityParam",
        "@odata.etag": "W/\"A3A6BF43\"",
        "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/0",
        "@odata.type": "#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam",
        "Id": "0",
        "Ignore": false,
        "Name": "Security Override Switch",
        "SecurityStatus": "Ok",
        "State": "Off"
    },
    {
        "@odata.context":
"/redfish/v1/$metadata#HpeiloSecurityParam.HpeiloSecurityParam",
        "@odata.etag": "W/\"A3A6BF43\"",
        "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/2",
        "@odata.type": "#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam",
        "Id": "2",
        "Ignore": false,
        "Name": "Minimum Password Length",
        "SecurityStatus": "Ok",
        "State": "Ok"
    },

```

```

{
  "@odata.context":
"/redfish/v1/$metadata#HpeiloSecurityParam.HpeiloSecurityParam",
  "@odata.etag": "W/\"A3A6BF43\"",
  "@odata.id":
"/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/3",
  "@odata.type": "#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam",
  "Description": "The Require Login for iLO RBSU setting is disabled. This
configuration allows unauthenticated iLO access through the UEFI System
Utilities.",
  "Id": "3",
  "Ignore": false,
  "Name": "Require Login for iLO RBSU",
  "RecommendedAction": "Enable the Require Login for iLO RBSU setting.",
  "SecurityStatus": "Risk",
  "State": "Disabled"
}
]

```

**List all security params at risk** To retrieve this list you don't need to select the data type as it is already selected.

```
[26]: ilorest list --filter SecurityStatus="Risk"
```

```

@odata.context=/redfish/v1/$metadata#HpeiloSecurityParam.HpeiloSecurityParam
@odata.etag=W/"A3A6BF43"
@odata.id=/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParam
s/6
@odata.type=#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam
Description=The Password Complexity setting is disabled. This configuration
increases system vulnerability to attack.
Id=6
Ignore=True
IgnoredBy=demopaq
IgnoredTime=2020-05-11T12:55:02Z
Name=Password Complexity
SecurityStatus=Risk
State=Disabled

```

```

@odata.context=/redfish/v1/$metadata#HpeiloSecurityParam.HpeiloSecurityParam
@odata.etag=W/"A3A6BF43"
@odata.id=/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParam
s/5
@odata.type=#HpeiloSecurityParam.v1_1_0.HpeiloSecurityParam
Description=The UEFI Secure Boot setting is disabled. In this configuration, the
UEFI system firmware does not validate the boot loader, Option ROM firmware, and
other system software executables for trusted signatures. This configuration

```

breaks the chain of trust established by iLO from power-on

Id=5

Ignore=True

IgnoredBy=demopaq

IgnoredTime=2020-05-11T16:53:22Z

Name=Secure Boot

SecurityStatus=Risk

State=Disabled

@odata.context=/redfish/v1/\$metadata#HpeILOSecurityParam.HpeILOSecurityParam

@odata.etag=W/"A3A6BF43"

@odata.id=/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/9

@odata.type=#HpeILOSecurityParam.v1\_1\_0.HpeILOSecurityParam

Description=Management processor's default self-signed certificate is in use.

Id=9

Ignore=False

Name=Default SSL Certificate In Use

RecommendedAction=Import a certificate signed by a trusted certificate authority.

SecurityStatus=Risk

State=True

@odata.context=/redfish/v1/\$metadata#HpeILOSecurityParam.HpeILOSecurityParam

@odata.etag=W/"A3A6BF43"

@odata.id=/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/10

@odata.type=#HpeILOSecurityParam.v1\_1\_0.HpeILOSecurityParam

Description=SNMPv1 is enabled. This configuration increases system vulnerability to attack.

Id=10

Ignore=False

Name=SNMPv1

RecommendedAction=Disable the SNMPv1 protocol.

SecurityStatus=Risk

State=Enabled

@odata.context=/redfish/v1/\$metadata#HpeILOSecurityParam.HpeILOSecurityParam

@odata.etag=W/"A3A6BF43"

@odata.id=/redfish/v1/Managers/1/SecurityService/SecurityDashboard/SecurityParams/3

@odata.type=#HpeILOSecurityParam.v1\_1\_0.HpeILOSecurityParam

Description=The Require Login for iLO RBSU setting is disabled. This configuration allows unauthenticated iLO access through the UEFI System Utilities.

Id=3

Ignore=False

Name=Require Login for iLO RBSU

```
RecommendedAction=Enable the Require Login for iLO RBSU setting.  
SecurityStatus=Risk  
State=Disabled
```

#### Get specific security parameter properties

```
[27]: ilorest get --filter Name="Require Login for iLO RBSU"
```

```
Ignore=False  
RecommendedAction=Enable the Require Login for iLO RBSU setting.  
SecurityStatus=Risk  
State=Disabled
```

#### Get specific property of a specific security parameter

```
[28]: ilorest get Ignore --filter Name="Minimum Password Length"
```

```
Ignore=False
```

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; Logout ->

### 1.10.2 Security Mode/State

From the iLO 5 Graphical User Interface, in the **Security** -> **Encryption** menu, you can view and modify the **SecurityState** setting. This setting is part of the **HpeSecurityService** data type as mentioned in the [API Reference Document](#).

NOTE: Software like the Smart Update Tool (SUT) may refer to this setting as **Security Mode** instead of **Security State**.

**Retrieve and modify the iLO 5 Security State setting** The following cell retrieves all the properties of the **HpeSecurityService** and modifies the **SecurityState**. A similar change on a real iLO 5 automatically triggers a reset of the iLO.

```
[29]: # Select data type and refresh cache  
ilorest select HpeSecurityService. --refresh  
  
# Retrieve all Security Service paramters  
ilorest get --json  
  
# Modify Security State  
SecurityState=$(ilorest get SecurityState | cut --delimiter== --field=2)  
echo  
  
if [ "$SecurityState" = "Production" ]; then  
    echo "Setting Security State to HighSecurity"  
    ilorest set SecurityState="HighSecurity" --commit  
else  
    echo "Setting Security State to Production"  
    ilorest set SecurityState="Production" --commit
```

```
fi
echo
ilorest get SecurityState
```

```
{
  "CurrentCipher": "ECDHE-RSA-AES256-GCM-SHA384",
  "LoginSecurityBanner": {
    "IsEnabled": false
  },
  "SSHHostKey": "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDD578WZlbtL3xzm4TcxaHosm
OgeEn5kGhvlcAlTSpYNkYJY3WYYTkrWeLj+h4A1ofkZtoiOLUwYGvz7m0JjLgtwKLsEYRP7F50Izzva4
tpw03RPZ9AB9ijgbiVkuHCdnNC0cna3tsDsCmuDjo4yu5DCtL4TABR4eGEjppMH45SNl6wj8Pz8aD1Zy
tZZUHu92EmRH4GiToxGWsIukEb/uw1l8PCuqj3iTxZScWhPdHrcCv+k34f0TtDyIqj8iEhjygtjtmc6k
N9M+ebpx2cETD5f53RySUF26tPqg81r0jh24K7Cuxwij1VcHKNDFM7T0bEGMwwf1L1kPoVWn/ewFf",
  "SecurityState": "HighSecurity",
  "SecurityState@Redfish.AllowableValues": [
    "Production",
    "HighSecurity",
    "FIPS"
  ]
}
```

```
Setting Security State to Production
Committing changes...
The operation completed successfully.
The operation completed successfully.
The operation completed successfully.
The operation completed successfully.
```

```
SecurityState=Production
```

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; **Logout** ->

### 1.10.3 Login Security Banner

From the iLO 5 Graphical User Interface, in the **Security** -> **Login Security Banner** menu, you can enable/disable and customize the `LoginSecurityBanner` setting. This setting is part of the `HpeSecurityService` data type as mentioned in the [API Reference Document](#).

**Retrieve and modify the iLO 5 Security State setting** The following cell modifies the state of the Security Login Banner and provides a message when enabled. You don't need to reset the iLO 5 to effectively modify this banner.

```
[30]: # Select data type and refresh cache
ilorest select HpeSecurityService. --refresh

# Retrieve Login Security Banner settings
```

```

ilorest get LoginSecurityBanner --json

# Modify Login Security Banner settings
LoginSecurityBanner=$(ilorest get LoginSecurityBanner/IsEnabled | cut_
↪--delimiter== --field=2)
echo

if [ $LoginSecurityBanner = False ]; then
    echo "Enabling Login Security Banner with a custom message"
    ilorest set LoginSecurityBanner/IsEnabled=True --commit
    ilorest set LoginSecurityBanner/SecurityMessage="This is My Custom Security_
↪Message" --commit
else
    echo "Disabling Login Security Banner"
    # The following set command is not required with a real iLO 5.
    # It's only there to get a "realistic" behavior of the simulator.
    ilorest set LoginSecurityBanner/SecurityMessage="" --commit
    ilorest set LoginSecurityBanner/IsEnabled=False --commit
fi

echo
ilorest get --json LoginSecurityBanner

```

```

{
  "LoginSecurityBanner": {
    "IsEnabled": false
  }
}

```

Enabling Login Security Banner with a custom message  
 Committing changes...  
 The operation completed successfully.  
 The operation completed successfully.  
 The operation completed successfully.  
 The operation completed successfully.  
 Skipping property securitymessage, not found in current server.  
 ERROR : Setting for 'loginsecuritybanner/securitymessage' is the same as the  
 current value.

```

{
  "LoginSecurityBanner": {
    "IsEnabled": true
  }
}

```

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; Logout ->

## 1.11 Bios

### 1.11.1 Server Serial Number stored in BIOS

In a computer node, the Serial Number stored in the Bios. data type corresponds to the server mother board serial number. HPE requires the change of this serial number in case of mother board replacement to match the chassis serial number.

```
[31]: # Select data type
ilorest select Bios. --refresh
echo

# Make sure SN is read-write
ilorest info Attributes/SerialNumber --latestschema
echo

# Get SerialNumber from Bios data type.
ilorest get Attributes/SerialNumber

echo "Set new SN"
ilorest set Attributes/SerialNumber="NEWSN" --commit

# Reload a fresh simulator cache
ilorest select Bios. --refresh
echo

# Validate the SN change
ilorest get Attributes/SerialNumber
```

NAME

SerialNumber

DISPLAY NAME

Serial Number

HELP TEXT

Use this option to set the system serial number. This value must always match the serial number sticker located on the chassis.

\*\*\*\*\*

WARNING

The serial number is modified by qualified service personnel and must match the serial number located on the chassis.

\*\*\*\*\*

TYPE  
String

READ-ONLY  
False

MIN LENGTH  
0

MAX LENGTH  
16

SerialNumber=CZJ93402YV  
Set new SN  
Committing changes...  
The operation completed successfully.  
The operation completed successfully.  
The operation completed successfully.  
The operation completed successfully.  
The operation completed successfully.

SerialNumber=NEWSN

## 1.12 Storage

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; [Logout](#) ->

### 1.12.1 SSD Wear Status

The `WearStatus` property belongs to the `Drive` data type as mentioned in the [API Reference Document](#).

The `Drive` data type may not exist in servers not containing suitable hardware. Unfortunately, the physical DL360 Gen10 server available in this infrastructure (and associated simulator) does not contain any SSD drive with a `WearStatus`. Hence, you will have to switch to another iLO 5 simulator.

The next cell points to another iLO 5 simulator containing suitable hardware.

```
[ ]: # Switch iLO 5 Simulator
PreviousILO5SimulatorURI=${ILO5SimulatorURI}
let ILO5SimulatorBasePort=${ILO5BasePort}
```



```

let ilo5SimulatorPort=${ilo5SimulatorBasePort}+${Stud}
ilo5Simulator=${ilo5SimulatorIP}:${ilo5SimulatorPort}
ilo5SimulatorURI=https://${ilo5Simulator}
alias ResetIlo5Simulator="ssh rstsimul@${ilo5SimulatorIP} $Id_
↳${ilo5SimulatorBasePort}"

# iLO 5 Simulator restart
ResetIlo5Simulator

# Verify all BMCs are reachable
for bmc in ilo5 OpenBmc ilo5Simulator ; do
    ip="${bmc}IP" ; port=$(echo ${bmc}Port)
    nc -vz $(eval echo "\${ip}") $(eval echo "\${port}") &> /dev/null &&
    echo "$bmc is reachable" \
    || echo "WARNING: Problem reaching $bmc"
done

# Change cache with Synergy simulator content and SSD drives
rm ${CacheDir}/cache/* &>/dev/null
tar -C ${CacheDir}/cache -x -f SSD-cache.tgz

# Redirect cache toward the iLO 5 Simulator
sed -i "s?${ilo5SimulatorBasePort}?${ilo5SimulatorPort}?" ${CacheDir}/cache/*

echo ; echo
echo "NOTE: This notebooks points now to a Synergy iLO 5 simulator"
echo "      If you want to come back to the DL360g10 iLO 5 simulator,"
echo "      restart Kernel and clear all output and run the first two cells_
↳(environment preparation and login)
echo "      at the beginning of this Notebook"
echo ; echo

```

Killing ilo5-Sy480 simulator for student675 if any  
Starting ilo5-Sy480 simulator for student675...

```

ilo5 is reachable
OpenBmc is reachable
ilo5Simulator is reachable

```

NOTE: This notebooks points now to a Synergy iLO 5 simulator  
If you want to come back to the DL360g10 iLO 5 simulator,

The Redfish service of this new simulated compute node contains several SSD disk drives. Among them, only two of them have the `WearStatus` property. The next cell identifies these two drives and then retrieves the `WearStatus` of one of them.

```
[33]: echo "Drives in the Chassis data type"
      ilorest list Links/Drives --json --select Chassis.

      echo -e "\n Wear status of drive 3d9db7a1"
      ilorest get Oem/Hpe/WearStatus --json --filter Id="3d9db7a1" --select Drive
```

```
Drives in the Chassis data type
{
  "Links": {
    "Drives": [
      {
        "@odata.id": "/redfish/v1/Chassis/1/Drives/9becfe8a/"
      },
      {
        "@odata.id": "/redfish/v1/Chassis/1/Drives/3d9db7a1/"
      }
    ]
  }
}
```

```
Wear status of drive 3d9db7a1
{
  "Oem": {
    "Hpe": {
      "WearStatus": "OK"
    }
  }
}
```

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; Logout ->

### 1.13 Logout

Always logout when your session is over. You can as well logout and restart the iLO 5 simulator if you want once again use this Jupyter Notebook.

```
[34]: ilorest logout
```

Logging session out.

<- Environment Preparation ; List of examples ; Restart iLO 5 Simulator ; Logout ->

### 1.14 Summary

In this workshop, you discovered several HPE iLOrest examples. Go to the [Conclusion Notebook](#) if you are finished.