



AMI MegaRAC® OpenEdition Ampere Altra User Guide

Revision: 0.1

Published by Software R&D



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Document Change History

| Date | Doc Version | Author | Description |
|-------------|------------------------|------------------|----------------------|
| 11-01-2021 | 0.1 | Ryon Heichelbech | Initial Draft |
| 11-08-2021 | 0.2 | Hongwei Zhang | Updated for OCP repo |
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1. Introduction

This document describes features supported by MegaRAC OpenEdition firmware on the Ampere Altra platform.

2. Building

The platform is compiled with the following steps:

- git clone -b 'oe2.2_ampere_update' <https://github.com/opencomputeproject/HWMgmt-MegaRAC-OpenEdition.git> ami_oe_ampere && cd ami_oe_ampere
- TEMPLATECONF=meta-ami/meta-jade/conf . openbmc-env
- bitbake obmc-phosphor-image

3. Supported Features in MegaRAC OpenEdition

3.1. BMC Firmware Update Flash

3.1.1. TFTP Flash

The BMC firmware can be updated by tftp in u-boot by the following set of commands:

- setenv ethact FTGMAC100#1; setenv ethladdr <MACADDR>; setenv serverip <SERVERIP>; dhcp
- tftp <FILENAME>
- protect off all; erase all; cp.b 0x83000000 0x20000000 0x4000000
- reset

3.1.2. WebUI Flash

The BMC is updatable via WebUI as follows:

- Navigate to Configuration -> Firmware

Overview

Health

Control

Configuration

Network settings

SNMP settings

Firmware

Date and time settings

SMTP settings

Platform Event Filter

Alert Policy settings

Event Filter settings

Access

LDAP

Local users

SSL certificates

Preserve settings on upgrade

☐ All

☐ Certificates

☐ Hostname

☐ IPMI

☐ LDAP

☐ Network

☐ SDR

☐ SEL

☐ User

Save

Specify image file location

Specify an image file located on your workstation or a TFTP server. An image file may contain firmware images for hardware devices. Each image that you upload will be unpacked from the image file and added to the appropriate li

- Select settings to preserve and select “Save” (if applicable and flashing full image)
- Select “Choose a file”
- Select a valid OpenBMC firmware package for upload

Upload image file from workstation

Select the image file saved on the workstation storage medium to upload to the server BMC.

Choose a file

obmc-phosphor-image-mtjade.static.mtd.all.tar

- Select “Upload firmware” and wait for firmware to upload
- Select “Activate” to activate the image

BMC images

| Boot priority | Image state | Version | Ad |
|---------------|-------------|--------------|----|
| | Functional | 2.2.14479809 | |

- Select “Continue” in the popup modal to flash the BMC

Confirm BMC firmware file activation

When you activate the BMC firmware file, 2.2.7200, the BMC must be rebooted before it new firmware code. Note that when you reboot the BMC, the BMC will be unavailable for and you must log in again.

- ☐ ACTIVATE FIRMWARE FILE WITHOUT REBOOTING BMC
- ☒ ACTIVATE FIRMWARE FILE AND AUTOMATICALLY REBOOT BMC

3.1.3. Redfish Flash

The BMC can be flashed via Redfish with the following command:

- `curl -k https://root:0penBmc@{target_ip}/redfish/v1/UpdateService -H "Content-Type: application/octet-stream" -X POST -T obmc-phosphor-image-mtjade.static.mtd.all.tar`

3.2. BIOS Update Flash

3.2.1. WebUI Flash

The BIOS is updatable via WebUI as follows:

- Navigate to Configuration -> Firmware

Overview

Health

Control

Configuration

Network settings

SNMP settings

Firmware

Date and time settings

SMTP settings

Platform Event Filter

Alert Policy settings

Event Filter settings

Access

LDAP

Local users

SSL certificates

Preserve settings on upgrade

☐ All

☐ Certificates

☐ Hostname

☐ IPMI

☐ LDAP

☐ Network

☐ SDR

☐ SEL

☐ User

Save

Specify image file location

Specify an image file located on your workstation or a TFTP server. An image file may contain firmware images for hardware devices. Each image that you upload will be unpacked from the image file and added to the appropriate location.

- Select “Choose a file”
- Select a valid BIOS package for upload

Upload image file from workstation

Select the image file saved on the workstation storage medium to upload to the server BMC.

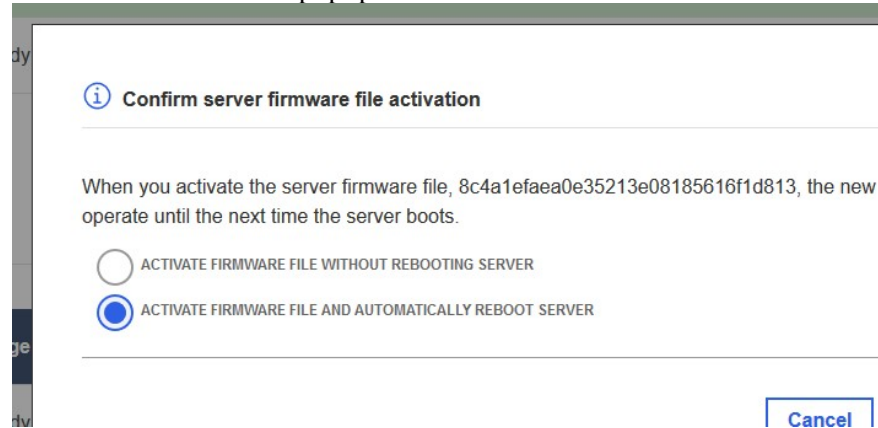
Choose a file jade_tianocore_atf_1.07.20210909.tar

- Select “Upload firmware” and wait for firmware to upload
- Select “Activate” to activate the image

Server images

| Boot priority | Image state | Version |
|---------------|-------------|----------------------------------|
| Boot | Ready | 0.4.1-500-0-25010-001050100-1010 |

- Select “Continue” in the popup modal to flash the BIOS



3.2.2. Redfish Flash

The BIOS can be flashed via Redfish with the following command:

- `curl -k https://root:OpenBmc@{target_ip}/redfish/v1/UpdateService -H "Content-Type: application/octet-stream" -X POST -T jade_tianocore_atf_1.07.20210909.tar`

3.3. Serial-over-Lan

3.3.1. SOL over SSH

SOL over SSH can be used by accessing the BMC via ssh on port 2200

```
[L%]-» ssh -p 2200 root@172.31.8.228
root@172.31.8.228's password:

ami0cp2 login: amiuser
Password:
Welcome to Ubuntu 20.04.2 LTS (GNU/Linux 5.11.0-38-generic aarch64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Fri Oct 22 18:55:35 UTC 2021

System load:          0.11
Usage of /:           5.6% of 195.86GB
Memory usage:         3%
Swap usage:           0%
Processes:            1513
Users logged in:      0
IPv4 address for enp1s0: 172.31.8.196
IPv6 address for enp1s0: fd00::a236:9fff:fe30:1124
IPv6 address for enp1s0: 1024::a236:9fff:fe30:1124
IPv6 address for enp1s0: 2001:b021:2d:0:a236:9fff:fe30:1124

 * Super-optimized for small spaces - read how we shrank the memory
   footprint of MicroK8s to make it the smallest full K8s around.

https://ubuntu.com/blog/microk8s-memory-optimisation

96 updates can be installed immediately.
1 of these updates is a security update.
```

3.3.2. Ipmitool/lanplus

SOL can be used with ipmitool with the “ipmitool -H {target_ip} -U root -P openBmc -I lanplus -C 17 sol activate” command as shown:


```
[~]-> ipmitool -H 172.31.8.228 -U root -P OpenBmc -I lanplus -C 17 sol activate
[SOL Session operational. Use ~? for help]

ami0cp2 login: amiuser
Password:
Welcome to Ubuntu 20.04.2 LTS (GNU/Linux 5.11.0-38-generic aarch64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Fri Oct 22 19:02:16 UTC 2021

System load:            0.0
Usage of /:              5.6% of 195.86GB
Memory usage:           3%
Swap usage:             0%
Processes:              1461
Users logged in:        0
IPv4 address for enp1s0: 172.31.8.196
IPv6 address for enp1s0: fd00::a236:9fff:fe30:1124
IPv6 address for enp1s0: 1024::a236:9fff:fe30:1124
IPv6 address for enp1s0: 2001:b021:2d:0:a236:9fff:fe30:1124


 * Super-optimized for small spaces - read how we shrank the memory
   footprint of MicroK8s to make it the smallest full K8s around.

https://ubuntu.com/blog/microk8s-memory-optimisation

96 updates can be installed immediately.
1 of these updates is a security update.
```

3.4. KVM

KVM can be accessed via “Control -> KVM” to control the host via the web UI.

 **mtjade**
172.31.8.228

Overview

Health

Control

Configuration

Platform Event Filter

Access

Server power operations

Manage power usage

Server LED

Reboot BMC

Restore Factory Default

Serial over LAN console

KVM

Virtual Media

IP KVM

```
Ubuntu 20.04.2 LTS ami0cp2 tty1
ami0cp2 login: amiuser
Password:
Welcome to Ubuntu 20.04.2 LTS (GNU/Linux 5.11.0-38-generic aarch64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Fri Oct 22 19:49:32 UTC 2021

System load:            0.0
Usage of /:              5.6% of 195.86GB
Memory usage:           3%
Swap usage:             0%
Processes:              1423
Users logged in:        1
IPv4 address for enp1s0: 172.31.8.196
IPv6 address for enp1s0: fd00::a236:9fff:fe30:1124
IPv6 address for enp1s0: 1024::a236:9fff:fe30:1124
IPv6 address for enp1s0: 2001:b021:2d:0:a236:9fff:fe30:1124

 * Super-optimized for small spaces - read how we shrank the memory
   footprint of MicroK8s to make it the smallest full K8s around.

https://ubuntu.com/blog/microk8s-memory-optimisation
```

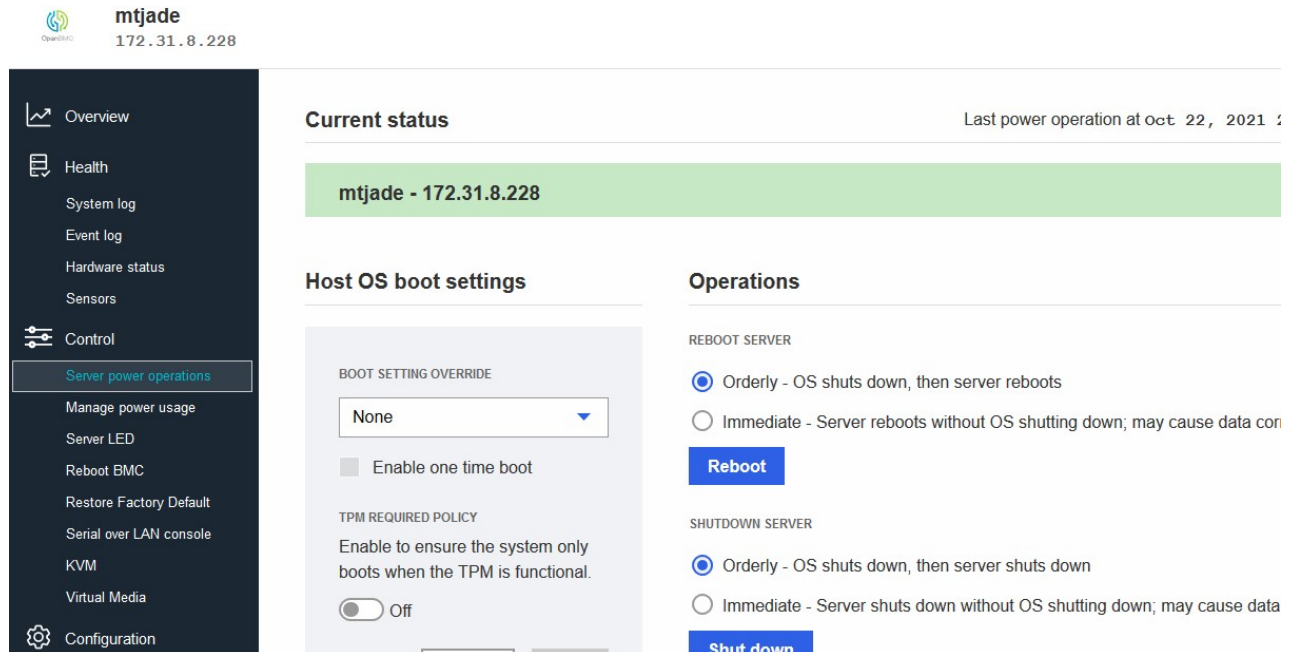
3.5. Chassis Power

3.5.1. Ipmitool

Chassis power can be controlled with the “ipmitool chassis power {on,off,cycle,reset}” commands.

3.5.2. WebUI

Chassis power can be controlled via the web UI in the Control -> Server Power Operations tab:



3.6. Ipmitool interfaces

Ipmitool can be used via many different interfaces:

3.6.1. Lanplus

Lanplus allows communicating with the BMC over a network connection (only cipher suite 17 supported):

```

Ryon@megaRAC-Test2:~$ ipmitool -H 172.31.8.194 -U root -P 0penBmc -C 17 -
Device ID                               : 32
Device Revision                         : 1
Firmware Revision                      : 2.02
IPMI Version                           : 2.0
Manufacturer ID                        : 20974
Manufacturer Name                      : AMI
Product ID                             : 0 (0x0000)
Product Name                           : Unknown (0x0)
Device Available                       : yes
Provides Device SDRs                   : yes
Additional Device Support :
    Sensor Device
    SDR Repository Device
    SEL Device
    FRU Inventory Device
    IPMB Event Receiver
    IPMB Event Generator
    Chassis Device
    ...

```

3.6.2. DBus

The Dbus interface allows the usage of IPMI from the BMC's internal console:

```
root@mtjade:~# ipmitool bmc info
Device ID : 32
Device Revision : 1
Firmware Revision : 2.02
IPMI Version : 2.0
Manufacturer ID : 20974
Manufacturer Name : American Megatrends,
Product ID : 0 (0x0000)
Product Name : Unknown (0x00)
Device Available : yes
Provides Device SDRs : yes
Additional Device Support :
    Sensor Device
    SDR Repository Device
    SEL Device
    FRU Inventory Device
    IPMB Event Receiver
    IPMB Event Generator
    Chassis Device
```

3.6.3. SSIF

SSIF is the host interface used to communicate with the BMC via IPMI from the host machine, provided the host has the appropriate drivers:

```
amiuser@ami0cp2:~$ sudo ipmitool bmc info
[sudo] password for amiuser:
Device ID                : 32
Device Revision          : 1
Firmware Revision        : 2.02
IPMI Version             : 2.0
Manufacturer ID          : 20974
Manufacturer Name        : AMI
Product ID               : 0 (0x0000)
Product Name             : Unknown (0x00)
Device Available         : yes
Provides Device SDRs     : yes
Additional Device Support :
  Sensor Device
  SDR Repository Device
  SEL Device
  FRU Inventory Device
  IPMB Event Receiver
  IPMB Event Generator
  Chassis Device
```

3.7. Sensor Support

BMC FW supports several system chassis sensors, both through web ui and ipmitool.

Overview

Health

System log

Event log

Hardware status

Sensors

Control

Configuration

Platform Event Filter

Access

mtjade

172.31.10.45

Server health >

Server

Good

Ru

Sensors

All sensors present in the system [Exp](#)

Filter Sensors

x

Filter

Filter by Severity

All

Critical

Warning

Normal

| Sensors (120) | Low critical | Low warning | Current | High warning | High critical |
|---------------|--------------|-------------|------------|--------------|---------------|
| PSU0 TEMP | N/A | N/A | 27.25 ° C | N/A | 64 ° C |
| PSU1 TEMP | N/A | N/A | 33.187 ° C | N/A | 64 ° C |
| TS1 Temp | N/A | N/A | 30.062 ° C | N/A | 65 ° C |
| TS2 Temp | N/A | N/A | 31.187 ° C | N/A | 65 ° C |

```

root@mtjade:~# ipmitool sensor
PSU0 IINPUT      | 5.664      | Amps      | ok      | na      | na      | na      | na
PSU0 IOUTPUT     | 46.800     | Amps      | ok      | na      | na      | na      | na
PSU1 IINPUT      | 0.000      | Amps      | ok      | na      | na      | na      | na
PSU1 IOUTPUT     | 0.000      | Amps      | ok      | na      | na      | na      | na
S0 Core VRD Curr | 0.000      | Amps      | ok      | na      | na      | na      | na
S0 DIMM VR1 Curr | 0.000      | Amps      | ok      | na      | na      | na      | na
S0 DIMM VR2 Curr | 0.000      | Amps      | ok      | na      | na      | na      | na
S0 RCA VRD Curr  | 0.000      | Amps      | ok      | na      | na      | na      | na
S0 SOC VRD Curr  | 0.000      | Amps      | ok      | na      | na      | na      | na
S1 Core VRD Curr | 0.000      | Amps      | ok      | na      | na      | na      | na
S1 DIMM VR1 Curr | 0.000      | Amps      | ok      | na      | na      | na      | na
S1 DIMM VR2 Curr | 0.000      | Amps      | ok      | na      | na      | na      | na
S1 RCA VRD Curr  | 0.000      | Amps      | ok      | na      | na      | na      | na
S1 SOC VRD Curr  | 0.000      | Amps      | ok      | na      | na      | na      | na
FAN3 1           | 11739.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN3 2           | 11193.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN4 1           | 19929.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN4 2           | 18473.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN5 1           | 19838.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN5 2           | 18473.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN6 1           | 19929.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN6 2           | 18382.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN7 1           | 19110.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN7 2           | 18291.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN8 1           | 19656.000  | RPM       | ok      | na      | 455.000 | na      | na
FAN8 2           | 18473.000  | RPM       | ok      | na      | 455.000 | na      | na
PSU0 fan1        | 3540.000   | RPM       | ok      | na      | na      | na      | na
PSU1 fan1        | 2714.000   | RPM       | ok      | na      | na      | na      | na
PSU0 PINPUT      | 616.200    | Watts     | ok      | na      | na      | na      | na
PSU0 POUTPUT     | 566.500    | Watts     | ok      | na      | na      | na      | na
PSU1 PINPUT      | 0.000      | Watts     | ok      | na      | na      | na      | na

```


3.8. System Event Log Support

BMC FW supports system event logging. IPMI SEL log can be managed through the standard commands.

For example: `ipmitool -U root -P openBmc -I lanplus -H <BMC IP> sel list`

```
root@mtjade:~# ipmitool sel
SEL Information
Version          : 1.5 (v1.5, v2 compliant)
Entries          : 77
Free Space       : 65535 bytes or more
Percent Used     : unknown
Last Add Time    : 10/23/21 00:38:46 UTC
Last Del Time    : Not Available
Overflow         : false
Supported Cmds   : 'Delete' 'Reserve'
root@mtjade:~# ipmitool sel list
 1 | 10/23/21 | 00:30:48 UTC | reserved |
 2 | 10/23/21 | 00:30:55 UTC | reserved |
 3 | 10/23/21 | 00:31:12 UTC | reserved |
 4 | 10/23/21 | 00:31:34 UTC | reserved |
 5 | 10/23/21 | 00:31:37 UTC | reserved |
 6 | 10/23/21 | 00:31:44 UTC | reserved |
 7 | 10/23/21 | 00:31:45 UTC | reserved |
 8 | 10/23/21 | 00:31:45 UTC | reserved |
 9 | 10/23/21 | 00:31:45 UTC | reserved |
 a | 10/23/21 | 00:31:56 UTC | reserved |
 b | 10/23/21 | 00:31:57 UTC | reserved |
 c | 10/23/21 | 00:31:57 UTC | reserved |
 d | 10/23/21 | 00:32:07 UTC | reserved |
 e | 10/23/21 | 00:32:15 UTC | reserved |
 f | 10/23/21 | 00:32:18 UTC | reserved |
10 | 10/23/21 | 00:32:29 UTC | reserved |
11 | 10/23/21 | 00:32:30 UTC | reserved |
12 | 10/23/21 | 00:34:55 UTC | reserved |
13 | 10/23/21 | 00:35:01 UTC | reserved |
14 | 10/23/21 | 00:35:04 UTC | reserved |
15 | 10/23/21 | 00:35:11 UTC | reserved |
16 | 10/23/21 | 00:35:13 UTC | reserved |
17 | 10/23/21 | 00:35:21 UTC | reserved |
18 | 10/23/21 | 00:35:22 UTC | reserved |
19 | 10/23/21 | 00:35:23 UTC | reserved |
1a | 10/23/21 | 00:35:24 UTC | reserved |
1b | 10/23/21 | 00:35:30 UTC | reserved |
```

In the **Server Health** option, click **System log** tab where SEL can be viewed on web UI as shown below.


mtjade
172.31.8.228

- Overview
- Health
 - System log
 - Event log**
 - Hardware status
 - Sensors
- Control
 - Server power operations
 - Manage power usage
 - Server LED
 - Reboot BMC

Event Logs

Select system log type: **SEL**

FILTER SEL LOGS

FILTER BY SEVERITY
 All
Critical
Warning
OK

FILTER BY DATE RANGE
 mm / dd / yyyy - mm / dd / yyyy

FILTER BY TYPE


mtjade
172.31.8.228

- Overview
- Health
 - System log
 - Event log**
 - Hardware status
 - Sensors
- Configuration
 - Platform Event Filter
- Access

Event Logs

Select system log type: **Event** × Clear Event L

FILTER EVENT LOGS

FILTER BY SEVERITY
 All
Critical
Warning
OK

FILTER BY DATE RANGE
 mm / dd / yyyy - mm / dd / yyyy

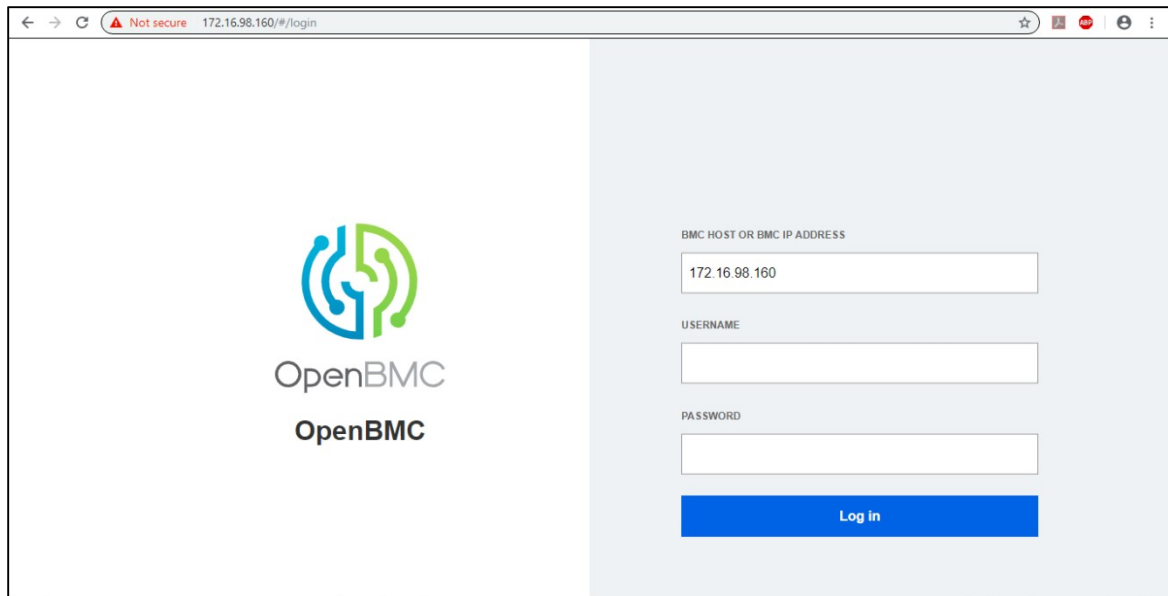
FILTER BY TYPE
 All

| ID | Timestamp | Name | Type | Severity | Description |
|----|--------------------------------|---------------------------|-------|----------|-------------------------|
| 1 | Oct 22, 2021 8:30:48 PM EDT | System Event Log Entry | Event | OK | Host system DC power is |

3.9. WebUI Support

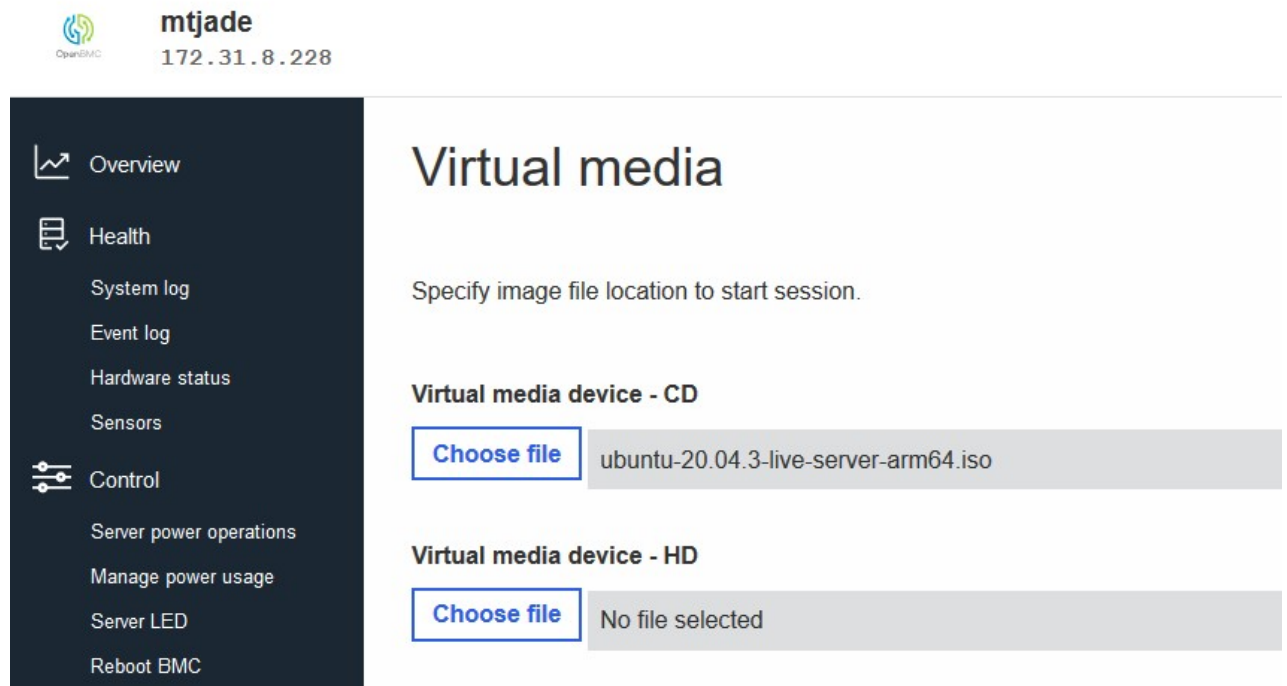
BMC FW supports a web server based on the bmweb implementation and phosphor web UI front end. This can be accessed using the BMC IP address. A sample screenshot of the login page is given below.

1. Use valid user credentials (default are root/openBmc, note it's not O, it's zero :) to login.

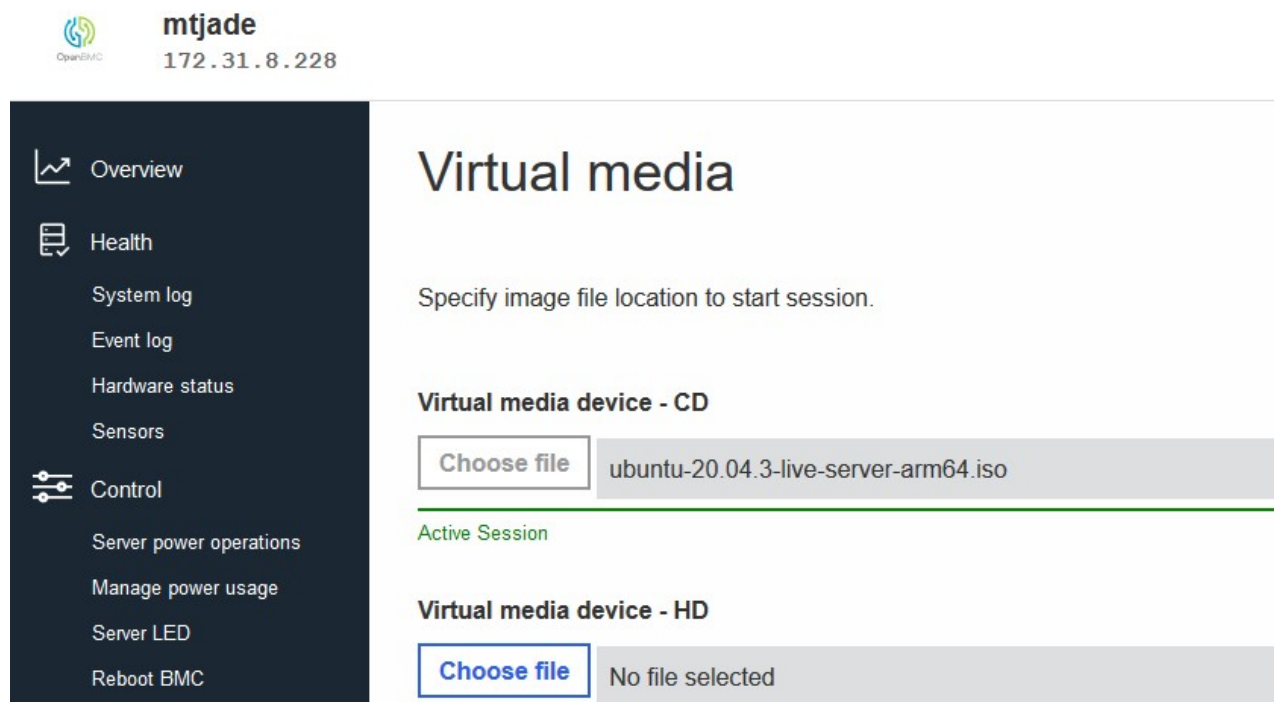


3.10. Virtual Media Support

BMC FW supports virtual media. User navigates to “Server control → Virtual Media” page, after logging in on the webUI. As shown below there will be option to choose a file.



User selects file and pushes 'start' button to establish the connection. An indicator appears to alert the user that there is an active session.

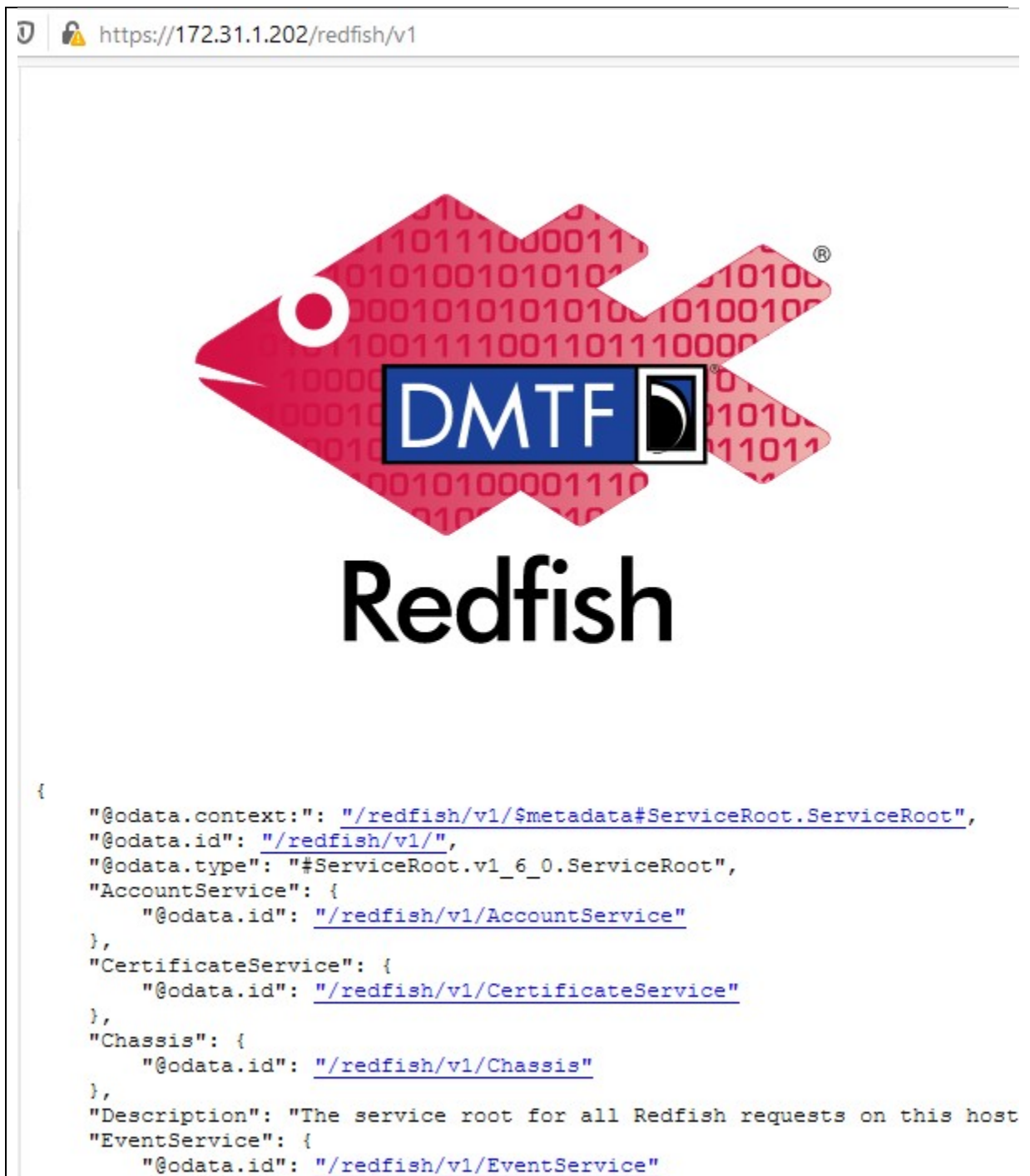


The mounted virtual media image can then be accessed from the host.

3.11. Redfish Support

BMC FW supports Redfish, here are some examples:

GET Schema Init - <http://{{ip}}/redfish/v1/>



System Collection - <http://{{ip}}/redfish/v1/Systems/>



4. Features Implemented but Not Validated

- Network settings
- SNMP settings
- SMTP settings
- LDAP
- Certificate management
- User management