Common IPMI User Manual

Version 1.0

1 Contents

Target Audience

This user's guide is intended for system integrators, IT professionals, and knowledgeable end users with basic knowledge of Linux. Its purpose is to assist those who wish to configure the IPMI settings supported by ASPEED AST2500/AST2600 Baseboard Management Controller, which is embedded in Advantech motherboards. The guide provides comprehensive information on how to utilize IPMI.

1 Getting Started

IPMItool is a good tool for operation and management by sending commands to BMC.

It supports both local and remote operations. The main distinction is:

Local:

- Console Redirection (it is through serial port, also known as comport, and it can also be transmitted through another outband - serial over LAN.)
- OS through System Interface (KCS) to issue ipmi command to this machine (user and password are not required).

In this scenario, you can directly issue commands on the system, this is to issue the ipmi command directly to the machine through the System Interface (KCS), no user and password required. In other word, KCS has the highest security trust level as only the system root or admin can access KCS.

Remote:

BMC dedicated LAN (It can be divided into a special independent RJ45 port for IPMI to use, and another is to use sideband to share a port with Ethernet RJ45.):

- Ethernet (Web)
- IOL (Ipmi over Lan)
- SOL (Serial over LAN)

The interface of IPMI can be divided into LAN and Serial Port, but most of the time it is managed through IOL (IPMI Over Lan).

PS: Please, refer to the device hardware user manual for details on the corresponding port to use.

To remotely control the BMC (IOL) the following parameters are required.

```
#ipmitool -I lanplus -H <hostname> [-U <username>] [-P <password>] [-C <cipher>]
```

- -I <interface>
  lanplus (applicable to IPMI 2.0, with encryption provided)

- -H <address>
  Remote BMC IP address can also be hostname.
- -U <username>
  The user account of the remote BMC.
- -P <password>
  User account password of the remote BMC.
- -C <Cipher>
- ciphersuite Cipher suite to be used by lanplus interface (-C 17 with the highest security supported by Advantech BMC).

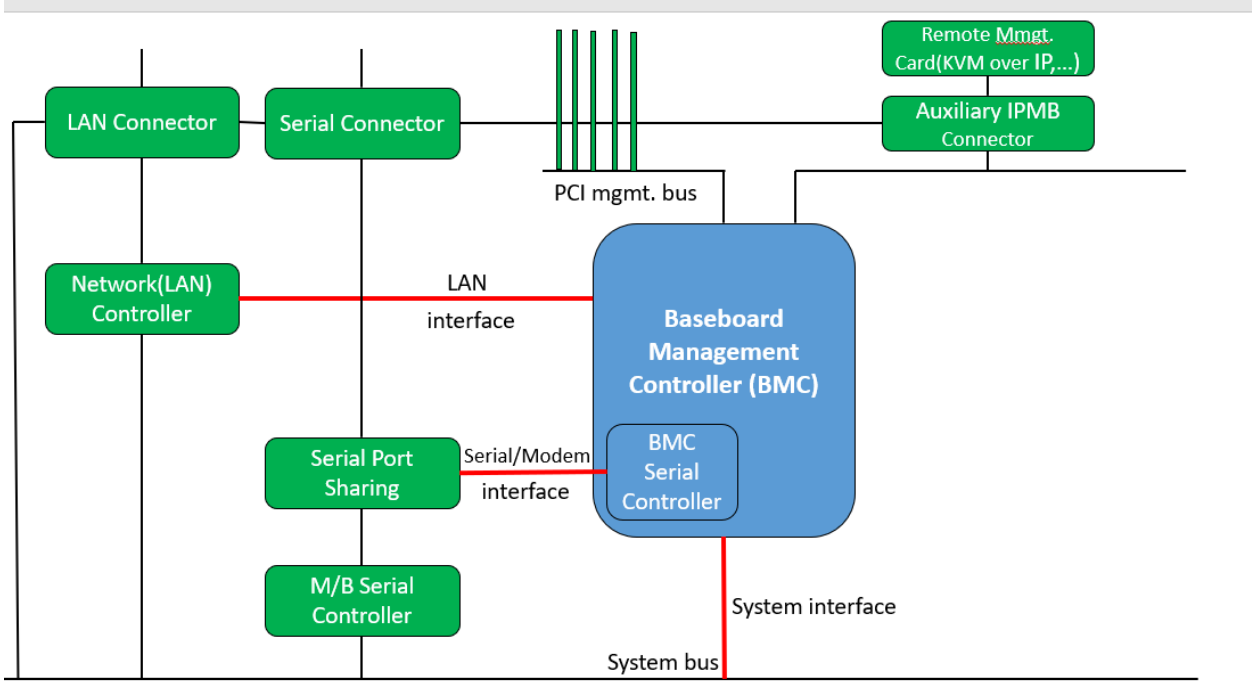

Figure 1: IPMI communication interfaces

A pure Linux OS might not include ipmitool utility, thus this tool has to be installed manually.

1.1 IPMITool installation

1.1.1 Installing on RedHat or CentOS via yum

```
[root@localhost ~]# yum -y install ipmitool
...
Installed:
  ipmitool.x86_64 0:1.8.18-7.el7

Dependency Installed:
  OpenIPMI-modalias.x86_64 0:2.0.23-2.el7

Complete!
```

Load the IPMI kernel modules

```
[root@localhost ~]# modprobe ipmi_si
[root@localhost ~]# modprobe ipmi_devintf
[root@localhost ~]# modprobe ipmi_msghandler
```

Check ipmitool essential modules are loaded and running.

```
[root@localhost ~]# lsmod | grep -i ipmi
ipmi_ssif 29487 0
ipmi_si 59571 0
ipmi_devintf 17603 0
ipmi_msghandler 56032 3 ipmi_ssif,ipmi_devintf,ipmi_si
```

1.1.2 Installing on Ubuntu via apt-get

```
[root@localhost ~]# sudo apt-get install ipmitool
```

Load the IPMI kernel modules

```
[root@localhost ~]# modprobe ipmi_si
[root@localhost ~]# modprobe ipmi_devintf
[root@localhost ~]# modprobe ipmi_msghandler
```

After installation, check ipmitool essential modules are loaded and running.

```
[root@localhost ~]# lsmod | grep -i ipmi
ipmi_ssif 29487 0
ipmi_si 59571 0
ipmi_devintf 17603 0
ipmi_msghandler 56032 3 ipmi_ssif,ipmi_devintf,ipmi_si
```

1.2 Read FRU

Advantech device comes with FRU burned in, such as x86 platforms, NMC, PSU info.... By following command, it gets all FRU information running on the system.

```
[root@localhost ~]# ipmitool fru print
 FRU Device Description : Builtin FRU Device (ID 0)
 Chassis Type           : Main Server Chassis
 Chassis Part Number    : FWA-3050
```

```
 Chassis Serial         : AKA1234567
 Board Mfg Date         : Mon Jan  1 00:00:00 1996
 Board Mfg              : Advantech
 Board Product          : NAMB-3050
 Board Serial           : AKA1234567
 Board Part Number      : 96923050000
 Product Manufacturer   : Advantech
 Product Name           : FWA-3050
 Product Part Number    : FWA30508CA1R-ES
 Product Version        : A1 01
 Product Serial         : AKA1234567

FRU Device Description : NMC_BRD-FRU (ID 1)
 Board Mfg Date        : Mon Jan  1 00:00:00 1996
 Board Mfg              : Advantech
 Board Product          : NMC-0806-08CBS
 Board Serial           : AKAG327427

FRU Device Description : PSU1-FRU (ID 2)
 Product Manufacturer   : DELTA
 Product Name           : DPS-300AB-102 A
 Product Part Number    :
 Product Version        : 00F
 Product Serial         : JFXD1846000156
 Product Extra          : 00

FRU Device Description : PSU2-FRU (ID 3)
 Product Manufacturer   : DELTA
 Product Name           : DPS-300AB-102 A
 Product Part Number    :
 Product Version        : 00F
 Product Serial         : JFXD1843000084
 Product Extra          : 00
```

For detailed info, you can command it with "-v".

```
[root@localhost ~]# ipmitool fru print -v
Running Get PICMG Properties my_addr 0x20, transit 0, target 0
Error response 0xc1 from Get PICMG Properities
Running Get VSO Capabilities my_addr 0x20, transit 0, target 0
Invalid completion code received: Invalid command
Discovered IPMB address 0x0
FRU Device Description : Builtin FRU Device (ID 0)
Retrying FRU read with request size 25
Chassis Type : Rack Mount Chassis
Chassis Part Number : FWA-3050
Chassis Serial : KSE0170699
Board Mfg Date : Mon Jan 1 00:00:00 1996
Board Mfg : Advantech
Board Product : NAMB-3050
Board Serial : KSE0170699
Board Part Number : 96923050061
```

```
Board FRU ID : fwa3050_fru_standard_0.02.xml
Product Manufacturer : Advantech
Product Name : FWA-3050
Product Part Number : FWA-3050_16A1R
Product Version : A102-1
Product Serial : KSE0170699
Product Asset Tag : CSM4700BRA
Product FRU ID : fwa3050_fru_standard_0.02.xml
OEM (Advantech) Record
FRU Device Description : PSU1-FRU (ID 2)
Retrying FRU read with request size 25
Product Manufacturer : DELTA
Product Name : DPS-300AB-102 A
Product Part Number :
Product Version : 00F
Product Serial : JFXD1852000266
Product Extra : 00
Power Supply Record
Capacity : 300 W
Peak VA : 354 VA
Inrush Current : 55 A
Inrush Interval : 5 ms
Input Voltage Range 1 : 90-140 V
Input Voltage Range 2 : 180-264 V
Input Frequency Range : 50-60 Hz
A/C Dropout Tolerance : 10 ms
Flags : 'Predictive fail' 'Power factor correction' 'Autoswitch
voltage' 'Hot swap' 'Two pulses per rotation'
Peak capacity : 354 W
Peak capacity holdup : 10 s
Combined capacity : not specified
Fan lower threshold : 13 RPS
DC Output Record
Output Number : 1
Standby power : No
Nominal voltage : 12.00 V
Max negative deviation : 11.40 V
Max positive deviation : 12.60 V
Ripple and noise pk-pk : 120 mV
Minimum current draw : 0.000 A
Maximum current draw : 24.000 A
DC Output Record
Output Number : 2
Standby power : Yes
Nominal voltage : 12.00 V
Max negative deviation : 11.40 V
Max positive deviation : 12.60 V
Ripple and noise pk-pk : 120 mV
Minimum current draw : 0.000 A
Maximum current draw : 1.500 A
```

1.3 Read SEL

SEL (System Event Log) would be generated by BMC, it is different than OS system log. It logs every event from the system, including temperature, power, time...alerts.

```
[root@localhost ~]# ipmitool sel elist
7ed | 07/10/2023 | 06:11:19 | Session Audit SESSION_AUDIT | |
Asserted
7ee | 07/10/2023 | 06:11:19 | Session Audit SESSION_AUDIT | |
Asserted
7ef | 07/10/2023 | 06:11:21 | Session Audit SESSION_AUDIT | |
Asserted
7f0 | 07/10/2023 | 06:11:21 | Session Audit SESSION_AUDIT | |
Asserted
...
```

For detailed info, you can command it with "-v".

```
[root@localhost ~]# ipmitool sel elist -v
Running Get PICMG Properties my_addr 0x20, transit 0, target 0
Discovered IPMB address 0x0
SEL Record ID : 0001
Record Type : 02
Timestamp : 10/26/2020 05:59:33
Generator ID : 0020
EvM Revision : 04
Sensor Type : System ACPI Power State
Sensor Number : 04
Event Type : Sensor-specific Discrete
Event Direction : Assertion Event
Event Data : 05ffff
Description : S5/G2: soft-off
SEL Record ID : 0002
Record Type : 02
Timestamp : 10/26/2020 05:59:35
Generator ID : 0020
EvM Revision : 04
Sensor Type : Unknown
Sensor Number : 0d
Event Type : OEM
Event Direction : Assertion Event
Event Data : a0032d
Description :

SEL Record ID : 0003
Record Type : 02
Timestamp : 10/26/2020 05:59:49
Generator ID : 0020
EvM Revision : 04
```

```
Sensor Type : System ACPI Power State
Sensor Number : 04
Event Type : Sensor-specific Discrete
Event Direction : Assertion Event
Event Data : 00ffff
Description : S0/G0: working
```

1.4 Read Sensors

Sensor values include power, temperature, FAN speed, BMC status.

```
root@FWA-6080M-efi: ~# ipmitool sensor
BMC_HEALTH       | 0x0         | discrete   | 0x0000| na         | na
| na         | na         | na         | na
VERSION_CHANGE   | 0x0         | discrete   | 0x0000| na         | na
| na         | na         | na         | na
BMC_WATCHDOG     | 0x0         | discrete   | 0x0000| na         | na
| na         | na         | na         | na
ACPI_STATE       | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
PROC_STATE       | 0x0         | discrete   | 0x0000| na         | na
| na         | na         | na         | na
SYSTEM_RESET     | 0xff        | discrete   | 0x0100| na         | na
| na         | na         | na         | na
FW_PROGRESS      | 0x0         | discrete   | 0x0000| na         | na
| na         | na         | na         | na
CASE_INTRUSION   | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
SESSION_AUDIT    | 0x0         | discrete   | 0x0000| na         | na
| na         | na         | na         | na
C0_DIMM_A1_PRSNT | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
C0_DIMM_A2_PRSNT | 0x0         | discrete   | 0x0200| na         | na
| na         | na         | na         | na
C0_DIMM_B1_PRSNT | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
C0_DIMM_B2_PRSNT | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
C0_DIMM_C1_PRSNT | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
C0_DIMM_C2_PRSNT | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
C0_DIMM_D1_PRSNT | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
C0_DIMM_D2_PRSNT | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
C0_DIMM_E1_PRSNT | 0x0         | discrete   | 0x0100| na         | na
| na         | na         | na         | na
```

```
C0_DIMM_E2_PRSNT | 0x0         | discrete    | 0x0100| na          | na
| na          | na          | na          | na
C0_DIMM_F1_PRSNT | 0x0         | discrete    | 0x0100| na          | na
| na          | na          | na          | na
C0_DIMM_F2_PRSNT | 0x0         | discrete    | 0x0100| na          | na
| na          | na          | na          | na
C0_DIMM_G1_PRSNT | 0x0         | discrete    | 0x0100| na          | na
| na          | na          | na          | na
C0_DIMM_G2_PRSNT | 0x0         | discrete    | 0x0100| na          | na
| na          | na          | na          | na
C0_DIMM_H1_PRSNT | 0x0         | discrete    | 0x0100| na          | na
| na          | na          | na          | na
C0_DIMM_H2_PRSNT | 0x0         | discrete    | 0x0100| na          | na
| na          | na          | na          | na
POWER_GOOD       | 0xff        | discrete    | 0x0000| na          | na
| na          | na          | na          | na
INTEGRITY        | 0x0         | discrete    | 0x0000| na          | na
| na          | na          | na          | na
BIOS_POST        | 0xaa        | discrete    | 0x0000| na          | na
| na          | na          | na          | na
BOARD-POWER      | 40.000      | Watts       | ok    | na          | na
| na          | na          | na          | na
CONFIG_MODE      | 0x0         | discrete    | 0x0100| na          | na
| na          | na          | na          | na
PAY_12-VOL       | 12.168      | Volts       | ok    | na          |
11.310    | na          | na          | 12.714    | na
STB_12-VOL       | 12.090      | Volts       | ok    | na          |
11.310    | na          | na          | 12.714    | na
PAY_5_0-VOL      | 5.146       | Volts       | ok    | na          | 4.714
| na          | na          | 5.312       | na
STB_5_0-VOL      | 5.113       | Volts       | ok    | na          | 4.714
| na          | na          | 5.312       | na
PAY_3_3-VOL      | 3.381       | Volts       | ok    | na          | 3.072
| na          | na          | 3.514       | na
STB_3_3-VOL      | 3.359       | Volts       | ok    | na          | 3.072
| na          | na          | 3.514       | na
BATTERY-VOL      | 2.968       | Volts       | ok    | na          | 1.908
| na          | na          | 3.519       | na
VDD_VPP_ABCD-VOL | 2.558       | Volts       | ok    | na          | 2.192
| na          | na          | 2.801       | na
VDD_VPP_EFGH-VOL | 2.558       | Volts       | ok    | na          | 2.192
| na          | na          | 2.801       | na
VDD_1_8-VOL      | 1.815       | Volts       | ok    | na          | 1.706
| na          | na          | 1.900       | na
VDD_1_8_AUX-VOL | 1.827       | Volts       | ok    | na          | 1.706
| na          | na          | 1.900       | na
DDR_MEM_ABCD-VOL | 1.243       | Volts       | ok    | na          | 1.093
| na          | na          | 1.328       | na
DDR_MEM_EFGH-VOL | 1.235       | Volts       | ok    | na          | 1.093
| na          | na          | 1.328       | na
VDDCR_CPU-VOL    | 0.760       | Volts       | ok    | na          | 0.561
| na          | na          | 1.278       | na
VDDCR_SOC-VOL    | 0.845       | Volts       | ok    | na          | 0.653
| na          | na          | 1.150       | na
```

```
CPU_SOC_AUX-VOL | 0.923      | Volts      | ok    | na        | 0.831
| na        | na        | 0.973     | na
INLET-TMP         | 29.000      | degrees C | ok    | na        | na
| na        | 55.000    | 65.000    | 75.000
OUTLET-TMP        | 34.000      | degrees C | ok    | na        | na
| na        | 65.000    | 75.000    | 85.000
CPU-TMP           | 37.000      | degrees C | ok    | na        | na
| na        | 90.000    | 100.000   | na
M2_SLOT_1-TMP     | 28.000      | degrees C | ok    | na        | na
| na        | 55.000    | 65.000    | 75.000
M2_SLOT_2-TMP     | 28.000      | degrees C | ok    | na        | na
| na        | 55.000    | 65.000    | 75.000
RIS1-TMP          | 29.000      | degrees C | ok    | na        | na
| na        | 65.000    | 70.000    | 75.000
RIS2-TMP          | 27.000      | degrees C | ok    | na        | na
| na        | 65.000    | 70.000    | 75.000
RIS1_PCIE1_PRSNT | 0x0         | discrete   | 0x0200| na        | na
| na        | na        | na        | na
RIS1_PCIE2_PRSNT | 0x0         | discrete   | 0x0200| na        | na
| na        | na        | na        | na
RIS2_PCIE1_PRSNT | 0x0         | discrete   | 0x0200| na        | na
| na        | na        | na        | na
M2_1_PRSNT        | 0x0         | discrete   | 0x0000| na        | na
| na        | na        | na        | na
M2_2_PRSNT        | 0x0         | discrete   | 0x0000| na        | na
| na        | na        | na        | na
PSU1              | 0x0         | discrete   | 0x0900| na        | na
| na        | na        | na        | na
PSU2              | 0x0         | discrete   | 0x0100| na        | na
| na        | na        | na        | na
FAN_MOD1_PRSNT    | 0x0         | discrete   | 0x0200| na        | na
| na        | na        | na        | na
FAN_MOD2_PRSNT    | 0x0         | discrete   | 0x0200| na        | na
| na        | na        | na        | na
FAN_MOD3_PRSNT    | 0x0         | discrete   | 0x0200| na        | na
| na        | na        | na        | na
PSU1_IN-POWER     | na          |            | na    | na        | na
| na        | na        | 850.000   | na
PSU1_OUT-POWER    | na          |            | na    | na        | na
| na        | na        | 850.000   | na
PSU1_IN-CUR       | na          |            | na    | na        | na
| na        | na        | 16.000    | na
PSU1_OUT-CUR      | na          |            | na    | na        | na
| na        | na        | 70.000    | na
PSU1_IN-VOL       | na          |            | na    | na        |
90.000    | na        | na        | 264.000   | na
PSU1_OUT-VOL      | na          |            | na    | na        |
11.400    | na        | na        | 12.500    | na
PSU1_INTAKE-TMP | na          |            | na    | na        | na
| na        | 50.000    | 60.000    | 70.000
PSU1_HOTSPOT-TMP | na          |            | na    | na        | na
| na        | 80.000    | 90.000    | 100.000
PSU1_FAN-SPEED    | na          |            | na    | na        |
150.000   | na        | na        | na        | na
```

```
PSU2_IN-POWER     | 50.000      | Watts       | ok     | na          | na
| na          | na          | 850.000    | na
PSU2_OUT-POWER    | 40.000      | Watts       | ok     | na          | na
| na          | na          | 850.000    | na
PSU2_IN-CUR       | 0.250       | Amps        | ok     | na          | na
| na          | na          | 16.000     | na
PSU2_OUT-CUR      | 5.000       | Amps        | ok     | na          | na
| na          | na          | 70.000     | na
PSU2_IN-VOL       | 230.000     | Volts       | ok     | na          |
90.000     | na          | na          | 264.000    | na
PSU2_OUT-VOL      | 12.100      | Volts       | ok     | na          |
11.400     | na          | na          | 12.500     | na
PSU2_INTAKE-TMP | 30.000      | degrees C | ok     | na          | na
| na          | 50.000     | 60.000     | 70.000
PSU2_HOTSPOT-TMP | 43.000      | degrees C | ok     | na          | na
| na          | 80.000     | 90.000     | 100.000
PSU2_FAN-SPEED    | 7950.000    | RPM         | ok     | na          |
150.000    | na          | na          | na         | na
FAN_1-SPEED       | 2200.000    | RPM         | ok     | na          |
1200.000 | na          | na          | na         | na
FAN_2-SPEED       | 2200.000    | RPM         | ok     | na          |
1200.000 | na          | na          | na         | na
FAN_3-SPEED       | 2200.000    | RPM         | ok     | na          |
1200.000 | na          | na          | na         | na na
```

1.5 Check sensor status

```
root@FWA-6080M-efi: ~# ipmitool sdr elist
BMC_HEALTH        | 01h | ok | 7.0 |
VERSION_CHANGE    | 02h | ok | 7.0 |
BMC_WATCHDOG      | 03h | ok | 7.0 |
ACPI_STATE        | 04h | ok | 6.0 | S0/G0: working
PROC_STATE        | 05h | ok | 3.0 |
SYSTEM_RESET      | 06h | ok | 7.0 | Initiated by power up
FW_PROGRESS       | 07h | ok | 7.0 |
CASE_INTRUSION    | 08h | ok | 23.0 | General Chassis intrusion
SESSION_AUDIT     | 09h | ok | 6.0 |
C0_DIMM_A1_PRSNT  | 0Ah | ok | 32.0 | Device Absent
C0_DIMM_A2_PRSNT  | 0Bh | ok | 32.0 | Device Present
C0_DIMM_B1_PRSNT  | 0Ch | ok | 32.0 | Device Absent
C0_DIMM_B2_PRSNT  | 0Dh | ok | 32.0 | Device Absent
C0_DIMM_C1_PRSNT  | 0Eh | ok | 32.0 | Device Absent
C0_DIMM_C2_PRSNT  | 0Fh | ok | 32.0 | Device Absent
C0_DIMM_D1_PRSNT  | 10h | ok | 32.0 | Device Absent
C0_DIMM_D2_PRSNT  | 11h | ok | 32.0 | Device Absent
C0_DIMM_E1_PRSNT  | 12h | ok | 32.0 | Device Absent
C0_DIMM_E2_PRSNT  | 13h | ok | 32.0 | Device Absent
C0_DIMM_F1_PRSNT  | 14h | ok | 32.0 | Device Absent
C0_DIMM_F2_PRSNT  | 15h | ok | 32.0 | Device Absent
```

```
C0_DIMM_G1_PRSNT | 16h | ok | 32.0 | Device Absent
C0_DIMM_G2_PRSNT | 17h | ok | 32.0 | Device Absent
C0_DIMM_H1_PRSNT | 18h | ok | 32.0 | Device Absent
C0_DIMM_H2_PRSNT | 19h | ok | 32.0 | Device Absent
POWER_GOOD       | 1Ah | ok | 6.0 |
INTEGRITY        | 1Fh | ok | 6.0 |
BIOS_POST        | 20h | ok | 34.0 |
BOARD-POWER      | 21h | ok | 6.0 | 40 Watts
CONFIG_MODE      | 22h | ok | 6.0 | State Deasserted
PAY_12-VOL       | 23h | ok | 20.0 | 12.09 Volts
STB_12-VOL       | 24h | ok | 20.0 | 12.09 Volts
PAY_5_0-VOL      | 25h | ok | 20.0 | 5.15 Volts
STB_5_0-VOL      | 26h | ok | 20.0 | 5.11 Volts
PAY_3_3-VOL      | 27h | ok | 20.0 | 3.38 Volts
STB_3_3-VOL      | 28h | ok | 20.0 | 3.36 Volts
BATTERY-VOL      | 29h | ok | 20.0 | 2.97 Volts
VDD_VPP_ABCD-VOL | 2Ah | ok | 32.0 | 2.56 Volts
VDD_VPP_EFGH-VOL | 2Bh | ok | 32.0 | 2.56 Volts
VDD_1_8-VOL      | 2Ch | ok | 20.0 | 1.82 Volts
VDD_1_8_AUX-VOL | 2Dh | ok | 20.0 | 1.83 Volts
DDR_MEM_ABCD-VOL | 2Eh | ok | 32.0 | 1.24 Volts
DDR_MEM_EFGH-VOL | 2Fh | ok | 32.0 | 1.24 Volts
VDDCR_CPU-VOL    | 30h | ok | 20.0 | 0.76 Volts
VDDCR_SOC-VOL    | 31h | ok | 3.0 | 0.84 Volts
CPU_SOC_AUX-VOL | 32h | ok | 3.0 | 0.92 Volts
INLET-TMP        | 33h | ok | 55.0 | 29 degrees C
OUTLET-TMP       | 34h | ok | 7.0 | 34 degrees C
CPU-TMP          | 35h | ok | 3.0 | 37 degrees C
M2_SLOT_1-TMP    | 36h | ok | 4.0 | 28 degrees C
M2_SLOT_2-TMP    | 37h | ok | 4.0 | 28 degrees C
RIS1-TMP         | 38h | ok | 11.0 | 29 degrees C
RIS2-TMP         | 39h | ok | 11.1 | 27 degrees C
RIS1_PCIE1_PRSNT | 3Ah | ok | 11.0 | Absent
RIS1_PCIE2_PRSNT | 3Bh | ok | 11.0 | Absent
RIS2_PCIE1_PRSNT | 3Ch | ok | 11.1 | Absent
M2_1_PRSNT       | 3Dh | ok | 26.0 |
M2_2_PRSNT       | 3Eh | ok | 26.0 |
PSU1             | 3Fh | ok | 10.0 | Presence detected, Power Supply
AC lost
PSU2             | 40h | ok | 10.1 | Presence detected
FAN_MOD1_PRSNT   | 41h | ok | 29.0 | Device Present
FAN_MOD2_PRSNT   | 42h | ok | 29.0 | Device Present
FAN_MOD3_PRSNT   | 43h | ok | 29.0 | Device Present
PSU1_IN-POWER    | 50h | ns | 10.0 | No Reading
PSU1_OUT-POWER   | 51h | ns | 10.0 | No Reading
PSU1_IN-CUR      | 52h | ns | 10.0 | No Reading
PSU1_OUT-CUR     | 53h | ns | 10.0 | No Reading
PSU1_IN-VOL      | 54h | ns | 10.0 | No Reading
PSU1_OUT-VOL     | 55h | ns | 10.0 | No Reading
PSU1_INTAKE-TMP | 56h | ns | 10.0 | No Reading
PSU1_HOTSPOT-TMP | 57h | ns | 10.0 | No Reading
PSU1_FAN-SPEED   | 58h | ns | 10.0 | No Reading
PSU2_IN-POWER    | 5Ah | ok | 10.1 | 50 Watts
PSU2_OUT-POWER   | 5Bh | ok | 10.1 | 40 Watts
```

```
PSU2_IN-CUR       | 5Ch | ok | 10.1 | 0.50 Amps
PSU2_OUT-CUR      | 5Dh | ok | 10.1 | 3 Amps
PSU2_IN-VOL       | 5Eh | ok | 10.1 | 232 Volts
PSU2_OUT-VOL      | 5Fh | ok | 10.1 | 12.10 Volts
PSU2_INTAKE-TMP | 60h | ok | 10.1 | 30 degrees C
PSU2_HOTSPOT-TMP | 61h | ok | 10.1 | 43 degrees C
PSU2_FAN-SPEED    | 62h | ok | 10.1 | 7950 RPM
FAN_1-SPEED       | 63h | ok | 29.0 | 2200 RPM
FAN_2-SPEED       | 64h | ok | 29.1 | 2200 RPM
FAN_3-SPEED       | 65h | ok | 29.2 | 2200 RPM
```

1.6 Read BMC network settings

BMC requires at least one IP address for remotely controlling, related settings could be referenced by following command.

```
[root@localhost ~]# ipmitool lan print
Set in Progress         : Set Complete
Auth Type Support       : MD5 PASSWORD
Auth Type Enable        : Callback : MD5 PASSWORD
                        : User : MD5 PASSWORD
                        : Operator : MD5 PASSWORD
                        : Admin : MD5 PASSWORD
                        : OEM :
IP Address Source       : Static Address
IP Address              : 192.168.1.1
Subnet Mask             : 255.255.255.0
MAC Address             : 00:d0:c9:b3:01:4b
SNMP Community String   :
Default Gateway IP      : 0.0.0.0
Default Gateway MAC     : 00:00:00:00:00:00
Backup Gateway IP       : 0.0.0.0
Backup Gateway MAC      : 00:00:00:00:00:00
802.1q VLAN ID          : Disabled
802.1q VLAN Priority    : 0
RMCP+ Cipher Suites     : 0,1,2,3,6,7,8,11,12,15,16,17
Cipher Suite Priv Max   : XaaaaaaaaaaaXXX
                        : X=Cipher Suite Unused
                        : c=CALLBACK
                        : u=USER
                        : o=OPERATOR
                        : a=ADMIN
                        : O=OEM
Bad Password Threshold : Not Available
```

Advantech default BMC IP address is 0.0.0.0/0. Hence, in order to setup an IP address, we'd recommend referring to 'Server Mgmt setup menu > BMC Network configuration' on the device hardware user manual.

1.7 Read BMC information

It lists BMC firmware version and supported IPMI version and others.

```
root@FWA-6080M-efi:~# ipmitool mc info
Device ID                 : 212
Device Revision           : 1
Firmware Revision         : 1.02
IPMI Version              : 2.0
Manufacturer ID           : 10297
Manufacturer Name         : Advantech
Product ID                : 24704 (0x6080)
Product Name              : FWA-6080
Device Available          : yes
Provides Device SDRs      : yes
Additional Device Support :
    Sensor Device
    SEL Device
    FRU Inventory Device
    IPMB Event Generator
    Chassis Device
Aux Firmware Rev Info     :
    0x00
    0x00
    0x00
    0x00
```

1.8 Read BMC time

SEL records are based on BMC's time, not directly front RTC. Unless you prefer to separate BMC's time and RTC, or it would synchronize with RTC whenever x86 AC cycle.

```
root@FWA-6080M-efi:~# ipmitool sel time get
07/10/2023 09:09:46
```

1.9 Read system firmware

It would show firmware version if x86 platform supports reading from IPMI. Firmware version includes activating/running version and backup version (for redundant).

```
root@1013-efi:~# ipmitool hpm check

PICMG HPM.1 Upgrade Agent 1.0.9:

-------Target Information-------
Device Id           : 0xcb
Device Revision     : 0x81
Product Id          : 0x0000
Manufacturer Id     : 0x2839 (Advantech)


------------------------------------------------------------------------
------
|ID  | Name        |                     Versions
|
|    |             |     Active      |     Backup      |
Deferred   |
------------------------------------------------------------------------
------
|   0| BL          |   0.30 00000000 | ---.-- -------- | ---.-- ----
---- |
|   1| BMC         |   0.63 00000000 |   0.63 00000000 | ---.-- ----
---- |
|   2| BMCONF      |   1.05 00000001 | ---.-- -------- | ---.-- ----
---- |
|*  3| FPGA        |   0.14 00000000 | ---.-- -------- | ---.-- ----
---- |
|*  4| BIOS        |   2.12 00000000 |   2.12 00000000 | ---.-- ----
---- |
|*  5| NVRAM       |   6.12 00000000 | ---.-- -------- | ---.-- ----
---- |
------------------------------------------------------------------------
------
(*) Component requires Payload Cold Reset
```

1.10 Reset password

Advantech BMC has default credentials. Please, get in touch with your contact window at Advantech to obtain these credentials. It is strongly recommended to change this password for security purposes. To proceed with changing the password, you will first need to list the users in order to obtain their respective IDs. Once you have the ID of the desired user, you can set a new password accordingly.

```
root@FWA-6080M-efi:~# ipmitool user list
ID  Name             Callin  Link Auth  IPMI Msg   Channel Priv
Limit
1                    false   false      false      NO ACCESS
```

```
2   callback          false   true       true       CALLBACK
3   user              false   true       true       USER
4   operator          false   true       true       OPERATOR
5   administrator     false   true       true       ADMINISTRATOR
6                     true    false      false      NO ACCESS
7                     true    false      false      NO ACCESS
8                     true    false      false      NO ACCESS
9                     true    false      false      NO ACCESS
10                    true    false      false      NO ACCESS
11                    true    false      false      NO ACCESS
12                    true    false      false      NO ACCESS
13                    true    false      false      NO ACCESS
14                    true    false      false      NO ACCESS
root@FWA-6080M-efi:~#  ipmitool user set password 3
Password for user 3:
Password for user 3:
Set User Password command successful (user 3)
```

2 Remote Monitor and Management

2.1 Set an IP address on BMC

The default Advantech BMC IP address is 0.0.0.0. It requires to set a valid IP address on LAN channel 1 for remote functions, it could go with DHCP mode.

Note: In the below commands, 1 represent channel 1, it can be 2 or 3 depending on the number of channels your device supports.

```
[root@localhost ~]# ipmitool lan set 1 ipsrc dhcp
```

Or manually set a static IP address, either one.

```
[root@localhost ~]# ipmitool lan set 1 ipsrc static

[root@localhost ~]# ipmitool lan set 1 ipaddr <IP address>
Setting LAN IP Address to <IP address>

[root@localhost ~]# ipmitool lan set 1 netmask <subnet mask>
Setting LAN Subnet Mask to <subnet mask>

[root@localhost ~]# ipmitool lan set 1 defgw ipaddr <default
gateway>
Setting LAN Default Gateway IP to <default gateway>
```

2.2 Enable IOL(IPMI Over LAN)

Following are essential conditions for using this application.

- This application is based on network. It requires network available between Advantech NC-SI supported LAN port or IPMI dedicated port and other commanding platforms with IPMI utility.
- BMC payload must be power up. (x86 AC in)

2.2.1 Remotely Read System Information

Please refer to chapter 1 for more available IPMI commands.

```
[root@localhost ~]# ipmitool -I lanplus -H <IP address> -U
<username> -P <password> fru print
```

2.2.2 Remotely Power Control

Check device power status.

```
[root@localhost ~]# ipmitool -I lanplus -H <IP address>-U <username>
-P <password> chassis power status
Chassis Power is on
```

Remotely power on a device.

```
[root@localhost ~]# ipmitool -I lanplus -H <IP address>-U <username>
-P <password> chassis power on
Chassis Power Control: Up/On
```

Remotely shutdown a device. (it is NOT a soft way to power off the device, it could cause damage to OS).

```
[root@localhost ~]# ipmitool -I lanplus -H <IP address>-U <username>
-P <password> chassis power off
Chassis Power Control: Down/Off
```

In other to soft power the device, please run the following command:

```
root@SKY-8201:~# ipmitool -I lanplus -H <IP address>-U <username> -P
<password>  power soft
```

2.3 Enable SOL (Serial Over LAN)

Following are essential conditions for using this application.

- This application is based on network. It requires network available between Advantech NC-SI supported LAN port or IPMI dedicated port, and other commanding platforms with IPMI utility.
- Advantech BMC has default credentials. Please, get in touch with your contact window at Advantech to obtain these credentials.
- BMC payload must be power up. (x86 AC in)
- Redirect OS to console

Check OS has redirected to console. (add parameters on grub, console=ttyS0,115200n8 console=tty0, ttyS0 is the first console interface by default)

```
[root@localhost ~]# cat /etc/default/grub
GRUB_CMDLINE_LINUX='console=ttyS0,115200n8 console=tty0 ...'
....
```

If parameters on above is newly added, it has to be activated and reboot.

```
[root@localhost ~]# grub2-mkconfig -o /boot/grub2/grub.cfg
[root@localhost ~]# reboot
```

The following action will also allow you commanding via KCS. It would not be only limited to IPMI commands as it will support Linux commands as well.

```
[root@localhost ~]# ipmitool -I lanplus -H <IP address>-U <username>
-P <password> sol activate

[SOL Session operational. Use ~? for help]

[root@fwa-3050 ~]#
```

Stop SOL.

```
[root@localhost ~]#ipmitool -I lanplus -H <IP address>-U <username>
-P <password> sol deactivate
```

Or you could also press [~] + [.], and press [Enter] to stop SOL.

You could use the following to check SOL channels information and change its settings as well:

```
root@SKY-7223D-efi:~# ipmitool sol info 1
Set in progress                 : set-complete
Enabled                         : true
Force Encryption                : false
Force Authentication            : false
Privilege Level                 : ADMINISTRATOR
Character Accumulate Level (ms) : 20
Character Send Threshold        : 32
Retry Count                     : 2
Retry Interval (ms)             : 1000
Volatile Bit Rate (kbps)        : 115.2
Non-Volatile Bit Rate (kbps)    : 115.2
Payload Channel                 : 14 (0x0e)
Payload Port                    : 623
```

Note: In the above command, 1 represent channel 1, it could be 2 or 3 depending on the number of channels your device supports.

```
[root@fwa-6520-efi ~]# ipmitool sol set non-volatile-bit-rate 9.6 1
```

As you can see, the above command aims to change the non-volatile bit rate to 9.6 (baud rate is 9600) on channel 1. You could find the result below:

```
[root@fwa-6520-efi ~]# ipmitool sol info 1
Set in progress                 : set-complete
Enabled                         : true
Force Encryption                : true
Force Authentication            : false
Privilege Level                 : USER
Character Accumulate Level (ms) : 150
Character Send Threshold        : 220
Retry Count                     : 7
Retry Interval (ms)             : 480
Volatile Bit Rate (kbps)        : 115.2
```

```
Non-Volatile Bit Rate (kbps)     : 9.6
Payload Channel                  : 1 (0x01)
Payload Port                     : 623
```

Note: We'd recommend changing the Volatile Bite Rate as well.

3 Use case 1: Firmware upgrade

There are different ways to upgrade firmware on Advantech platforms. We will enumerate 4 mains ways in this section. We recommend using Node Explorer or BMC IPMI Virtual LAN for faster upgrade.

PS: KCS is only recommended if there is no other option as it's the slowest method for firmware upgrade.

3.1 Node Explorer

Please, refer to Advantech Node Explorer user manual for further detailed information.

Ref:https://www.advantech.com/en/support/details/manual?id=1-1MU1KB1

3.2 BMC IPMI Virtual LAN

- Upload firmware image to OS.
- Check BMC Virtual LAN channel

You could check the virtual LAN channel by running the following command:

```
root@FWA-6080M-efi:~# r=$(ipmitool raw 0x2c 0x3e 0x00 0x02 | awk
'{print $4}'); d=$(printf %d 0x$r); b=$(echo "ibase=10; obase=2; $d"
| bc); p=${#b}; echo "The IPMI Virtual LAN Channel Is: $((p-1))"
The IPMI Virtual LAN Channel Is: 4
```

- Find the ethernet device under x86 OS

The BMC channel 4 network should be detected as a USB Ethernet device under OS (x86).

```
# ipmitool lan print 4
root@FWA-6080M-efi:~# ipmitool lan print 4
Set in Progress         : Set Complete
Auth Type Support       : MD5 PASSWORD
Auth Type Enable        : Callback : MD5 PASSWORD
                        : User     : MD5 PASSWORD
```

```
                          : Operator : MD5 PASSWORD
                          : Admin    : MD5 PASSWORD
                          : OEM      :
IP Address Source         : Static Address
IP Address                : 10.234.147.1
Subnet Mask               : 255.255.255.0
MAC Address               : 00:0b:ab:61:71:04
SNMP Community String     : ro_s3c
BMC ARP Control           : ARP Responses Enabled, Gratuitous ARP
Enabled
Default Gateway IP        : 0.0.0.0
Default Gateway MAC       : 00:00:00:00:00:00
Backup Gateway IP         : 0.0.0.0
Backup Gateway MAC        : 00:00:00:00:00:00
802.1q VLAN ID            : Disabled
802.1q VLAN Priority      : 0
RMCP+ Cipher Suites       : 1,2,3,6,7,8,11,12,15,16,17
Cipher Suite Priv Max     : aaaaaaaaaaaXXXX
                          :     X=Cipher Suite Unused
                          :     c=CALLBACK
                          :     u=USER
                          :     o=OPERATOR
                          :     a=ADMIN
                          :     O=OEM
Bad Password Threshold    : Not Available
```

We can double confirm by running the following:

a- Check whether there is a USB0 interface

```
root@FWA-6080M-efi:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: bc8p0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state
UP group default qlen 1000
    link/ether c4:00:ad:c6:15:a5 brd ff:ff:ff:ff:ff:ff
    altname eno1
    altname enp200s0
    inet 172.17.21.13/22 brd 172.17.23.255 scope global bc8p0
       valid_lft forever preferred_lft forever
    inet6 fe80::79b7:817e:1988:7fe1/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
3: bc9p0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq
state DOWN group default qlen 1000
    link/ether c4:00:ad:c6:15:a6 brd ff:ff:ff:ff:ff:ff
    altname eno2
    altname enp201s0
```

```
4: usb0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel
state UNKNOWN group default qlen 1000
    link/ether 96:ed:29:4c:37:ea brd ff:ff:ff:ff:ff:ff
    inet6 fe80::5e01:4899:343:3873/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```

b- Use “ethtool” command to confirm the interface driver is “cdc_ether”

```
root@FWA-6080M-efi:~# ethtool -i usb0
driver: cdc_ether
version: 5.15.11
firmware-version: CDC Ethernet Device
expansion-rom-version:
bus-info: usb-0000:42:00.3-2.4
supports-statistics: no
supports-test: no
supports-eeprom-access: no
supports-register-dump: no
supports-priv-flags: no
root@FWA-6080M-efi:~#
```

- Set the IP of USB Ethernet as the same domain as BMC channel 4 IP address and check the BMC IPMI LAN channel 4 connection through "ping".

```
root@FWA-6080M-efi:~# ifconfig usb0 10.234.147.100/24
root@FWA-6080M-efi:~# ping 10.234.147.1
PING 10.234.147.1 (10.234.147.1) 56(84) bytes of data.
64 bytes from 10.234.147.1: icmp_seq=1 ttl=64 time=0.568 ms
64 bytes from 10.234.147.1: icmp_seq=2 ttl=64 time=0.309 ms
64 bytes from 10.234.147.1: icmp_seq=3 ttl=64 time=0.338 ms
```

- Run below command to upgrade firmware.

```
# ipmitool -I lanplus -H 10.234.147.1 -U administrator -P advantech
hpm upgrade firmware.img
PICMG HPM.1 Upgrade Agent 1.0.9:

Validating firmware image integrity...OK
Performing preparation stage...
Services may be affected during upgrade. Do you wish to continue?
(y/n): y
OK

Performing upgrade stage:

--------------------------------------------------------------------
-----------
|ID | Name | Versions | % |
```

```
| | | Active | Backup | File | |
|----|-------------|-----------------|-----------------|-----------
-----|----|
| 1|8312 BMC | 1.03 00000000 | 1.03 00000000 | 1.03 00000000 |100%|
| |Upload Time: 03:06 | Image Size: 10414410 bytes |
-------------------------------------------------------------------
-----------
(*) Component requires Payload Cold Reset

Firmware upgrade procedure successful
```

- Activate the firmware via KCS.

```
# ipmitool hpm activate
```

- Check firmware upgrade is successful or not.

```
# ipmitool hpm check
```

3.3 IPMItool Over LAN

In this method, HPM.2 long message support is used to improve the update duration, it allows:

- Perform on external machine or local host (virtual usb eth) with IPMItool installed
- Accessible Ethernet to BMC is required
- Command contains credential info (user / password)
- Faster

Prerequisites:

- Upload firmware image to OS.
- Check BMC IP via the following command:

```
# ipmitool lan print
Set in Progress         : Set Complete
Auth Type Support       : MD5 PASSWORD
Auth Type Enable        : Callback : MD5 PASSWORD
                        : User     : MD5 PASSWORD
                        : Operator : MD5 PASSWORD
                        : Admin    : MD5 PASSWORD
                        : OEM      :
IP Address Source       : Static Address
IP Address              : 192.168.51.122
```

```
Subnet Mask              : 255.255.255.0
MAC Address              : d4:0a:ea:fe:21:99
SNMP Community String    : ro_s3c
BMC ARP Control          : ARP Responses Enabled, Gratuitous ARP
Enabled
Default Gateway IP       : 192.168.23.254
Default Gateway MAC      : 00:00:00:00:00:00
Backup Gateway IP        : 0.0.0.0
Backup Gateway MAC       : 00:00:00:00:00:00
802.1q VLAN ID           : Disabled
802.1q VLAN Priority     : 0
RMCP+ Cipher Suites      : 1,2,3,6,7,8,11,12,15,16,17
Cipher Suite Priv Max    : aaaaaaaaaaaXXXX
                         :     X=Cipher Suite Unused
                         :     c=CALLBACK
                         :     u=USER
                         :     o=OPERATOR
                         :     a=ADMIN
                         :     O=OEM
Bad Password Threshold   : Not Available
```

- Ensure that the ipmitool utility works normally and the version of ipmitool is **1.8.18 or later**.

```
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
-V
ipmitool version 1.8.18
```

- BMC bootloader:

```
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm upgrade bootloader.img
```

Then, activate as per below:

```
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm activate
```

- BMC: Please run the below command twice to upgrade and backup BMC.

```
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm upgrade sky8101_bmc_standard_1.26.img
```

Then, activate as per below:

```
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm activate
```

- FPGA: Please power cycle the system after the upgrade, then run the command again to backup FPGA. You could also reboot the device in case a graceful reboot is required.

```
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm upgrade fpga.img activate
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
chassis power cycle
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm upgrade fpga.img activate
```

- System BIOS: Please power cycle the system after the upgrade, then run the command again to back up the BIOS firmware. You could also reboot the system in case a graceful reboot is required.

```
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm upgrade bios.img activate
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
chassis power cycle
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm upgrade bios.img activate
```

- NVRAM: Please power cycle the system after the upgrade to activate the firmware. You could also reboot the system in case a graceful reboot is required.

```
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm upgrade NVRAM.img activate
```

- FW version Check:

```
# ipmitool -I lanplus -H 192.168.51.122 -U <username> -P <password>
hpm check
```

3.4 IPMItool Over KCS

KCS (Keyboard Controller Style) operates on a simple serial port interface, typically using the RS-232 protocol. It provides basic input/output operations for keyboard and text display. It is a basic interface that allows limited out-of-band management capabilities for a server or device.

Prerequisites:

- Upload firmware image to OS.
- Ensure that the ipmitool utility works normally and the version of ipmitool is **1.8.18 or later**.

```
# ipmitool -V
ipmitool version 1.8.18
```

- BMC bootloader:

```
# ipmitool hpm upgrade bootloader.img activate
```

While using the KCS command above, upgrading process can take more than 20 minutes. It will save you minutes if a buffer parameter is added, "-z 270".

- BMC: Please run the following command twice for backup BMC.

```
# ipmitool -z 270 hpm upgrade bmc.img activate
```

- FPGA: Please power cycle the system after the upgrade, then run the command again for backup FPGA. You could also reboot the system in case a graceful reboot is required.

```
# ipmitool -z 270 hpm upgrade fpga.img activate
# ipmitool chassis power cycle
# ipmitool -z 270 hpm upgrade fpga.img activate
```

- System BIOS: Please power cycle the system after the upgrade, then run the command again for backup BIOS.

```
# ipmitool -z 270 hpm upgrade bios.img activate
# ipmitool chassis power cycle
# ipmitool -z 270 hpm upgrade bios.img activate
```

- NVRAM: Please power cycle the system after the upgrade to activate the firmware. You could also reboot the system in case a graceful reboot is required.

```
# ipmitool -z 270 hpm upgrade NVRAM.img activate
```

- FW version Check:

```
# ipmitool hpm check
```

PS: The option '-z' used in the above commands stands for buffer, it allows speeding up the upgrade process. However, it optional and you can remove it if you face issues during the process.

Below is a table summarizing the action needed after performing firmware upgrade:

Firmware	BMC	BMCCONF	Boot Loader	NVRAM	BIOS	FGPA
Action	No Power Cycle	No Power Cycle	No Power Cycle	Power Cycle	Power Cycle	Power Cycle

4 Use case 2: Summary

4.1 Scenario 1: OS accessible

To collect debug data from a powered-on system, here is a summary of the most useful commands to gather information from the host system. Please run these commands on an x86 OS and save the results into a file before sending it to the support team for troubleshooting:

```
# date
# uptime
# lseth
# lscpu
# lspci
# lspci -vvv
# fdisk -l
# hdparm -I /dev/sdx
# smartctl -a /dev/sdx
# dmidecode
# cat /var/log/messages
# dmesg
# ipmitool -V
# ipmitool sel time get
# ipmitool sel elist
# ipmitool sel elist -v
# ipmitool sel list
# ipmitool sdr elist
# ipmitool sdr -v
# ipmitool sensor
# ipmitool lan print
# ipmitool fru print
# ipmitool fru print -v
# ipmitool mc info
```

```
# ipmitool hpm check
```

4.2 Scenario 2: OS is inaccessible, but BMC IP is reachable

In this scenario, the device can't be powered on, or OS is inaccessible, but you can still reach the BMC IP address.

```
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password>
advantech -V
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password>
time get
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> sel
elist
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> sel
elist -v
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> sel
list
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> sdr
elist
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> sdr
-v
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password>
sensor
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> lan
print
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> fru
print
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> fru
print -v
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> mc
info
# ipmitool -I lanplus -H 192.168.1.1 -U <username> -P <password> hpm
check
```