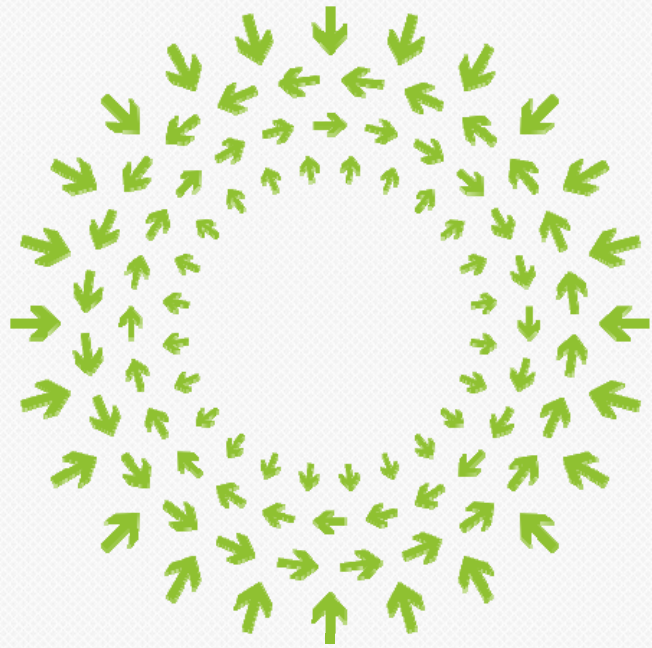




OPEN

Compute Summit

Engineering Workshop

October 30-31, 2014

Paris





Facebook OCP Server

Intel motherboard V3.0 in ORv1 and ORv2

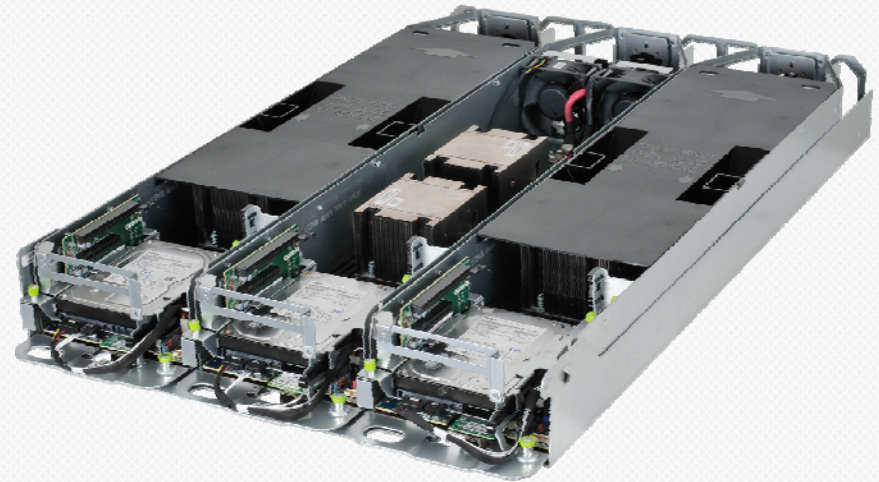
Jia Ning
Facebook
Hardware Engineer



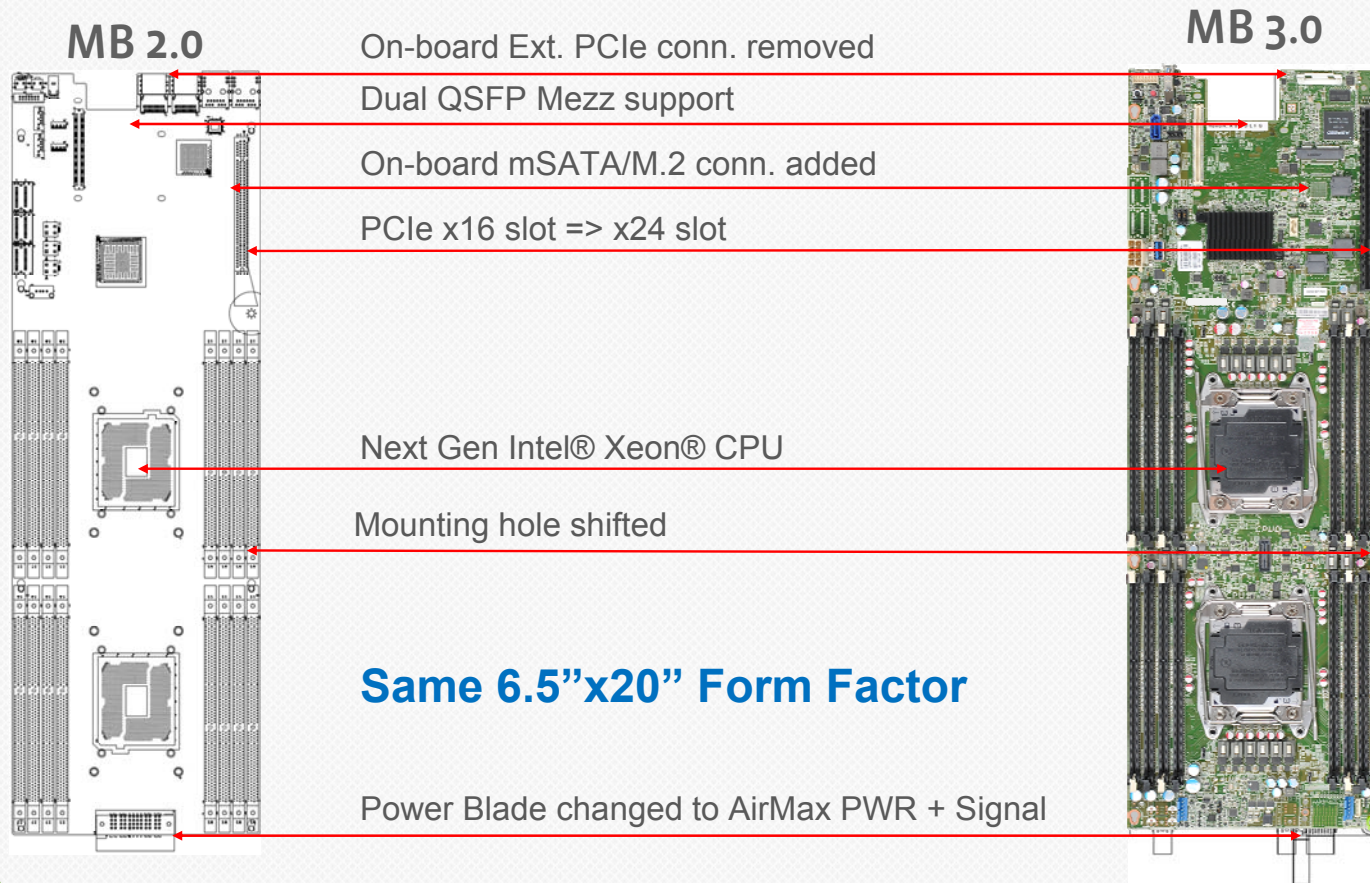
Intel Motherboard V3.0

Overview

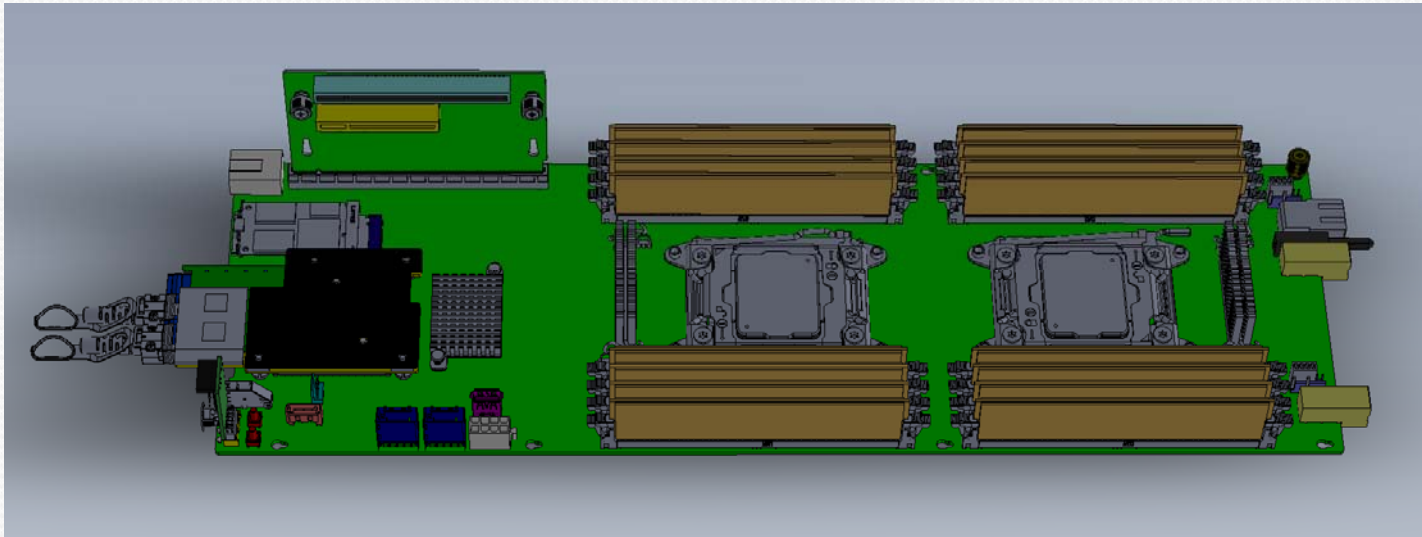
- 2S OCP server motherboard
 - 6.5"x20" (same as V2.0)
 - Xeon® E5-2600 V3
 - 16 DIMM/ NVDIMM
 - Front and Rear I/O
 - BMC
 - Open Rack V1
 - Open Rack V2



Backward Compatibility



What's New: I/O



■ Front

- X24 PCIe/M.2(2260)/mSATA/TPM
- Dual QSFP/SFP+ OCP Mezz

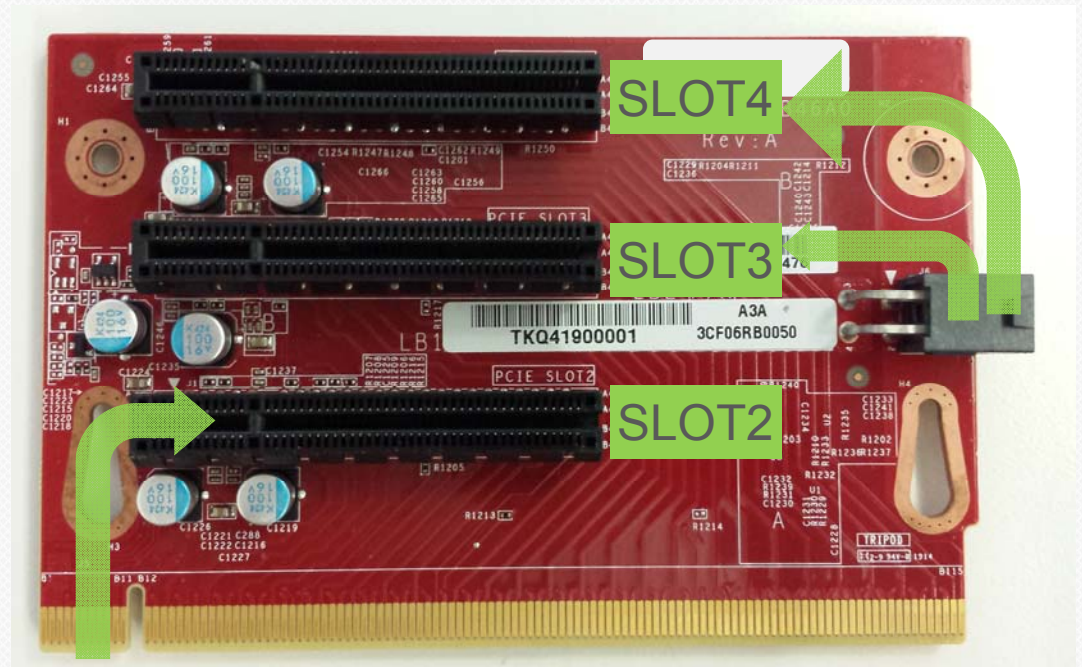
■ Rear

- x8 PCIe/SGMII
- Airmax Power



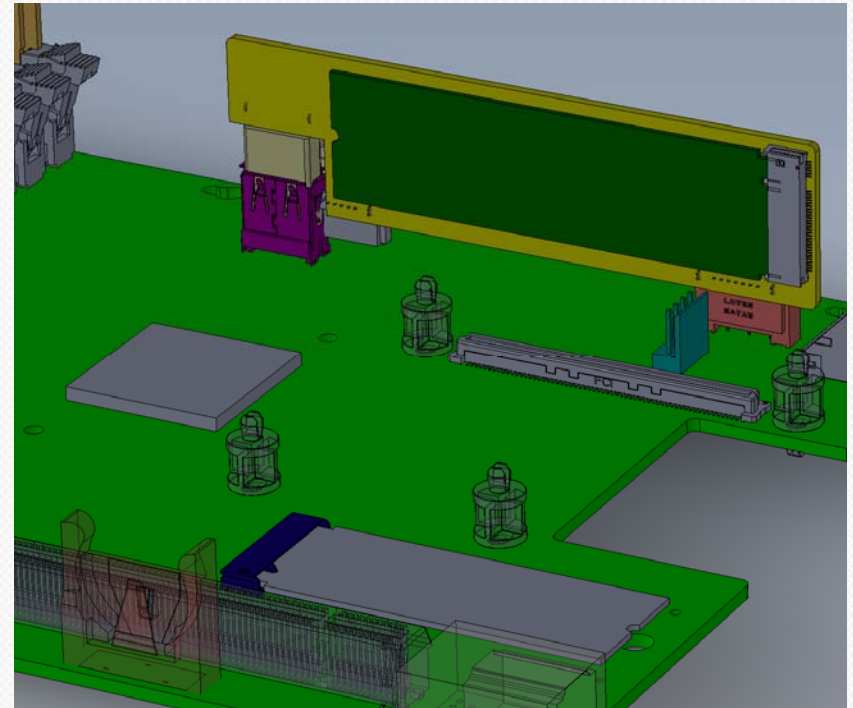
What's New: I/O – Cont.

- 3x Slot Riser
 - 3x 75W x8 PCIe slots
 - Slot2 P12V from GF
 - Slot3/4 P12v from Cable
 - No 3.5" HDD in 2U



What's New: I/O – Cont.

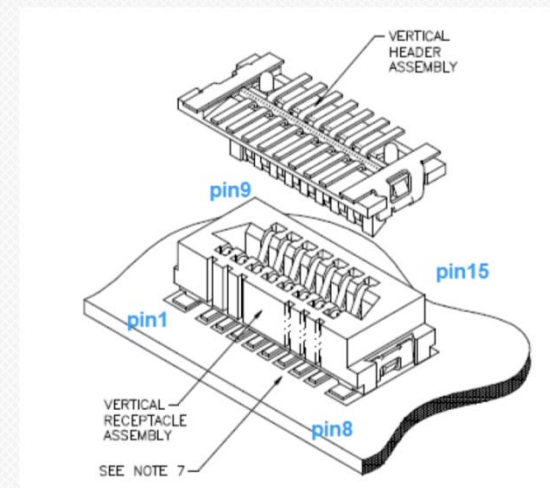
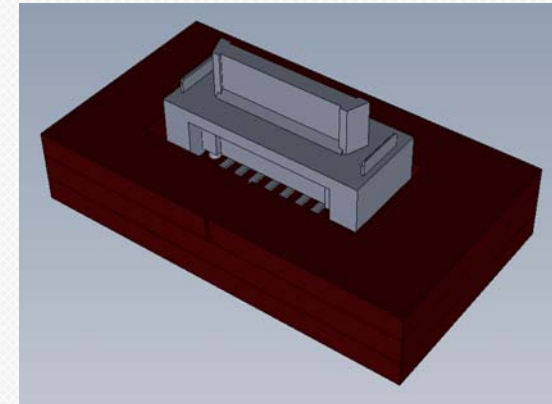
- 2242/2260 for onboard M.2
- M.2 Adaptor
 - 2280/2260/2242 DS/SS
 - SATA from SATA conn.
 - Power from USB



What's New: I/O – Cont.

- TPM Module
 - 23mm(L) x13mm(W) x 1.57mm(T)
 - LPC Interface

Pin	Description	Pin	Description
1	LPC_CLK_33M	9	P3V3
2	LPC_RST_N	10	TPM_PRSENT_N
3	LPC_LAD0	11	NC
4	LPC_LAD1	12	LPC_SERIRQ
5	LPC_LAD2	13	GND
6	LPC_LAD3	14	GND
7	LPC_FRAME_N	15	NC
8	NC		



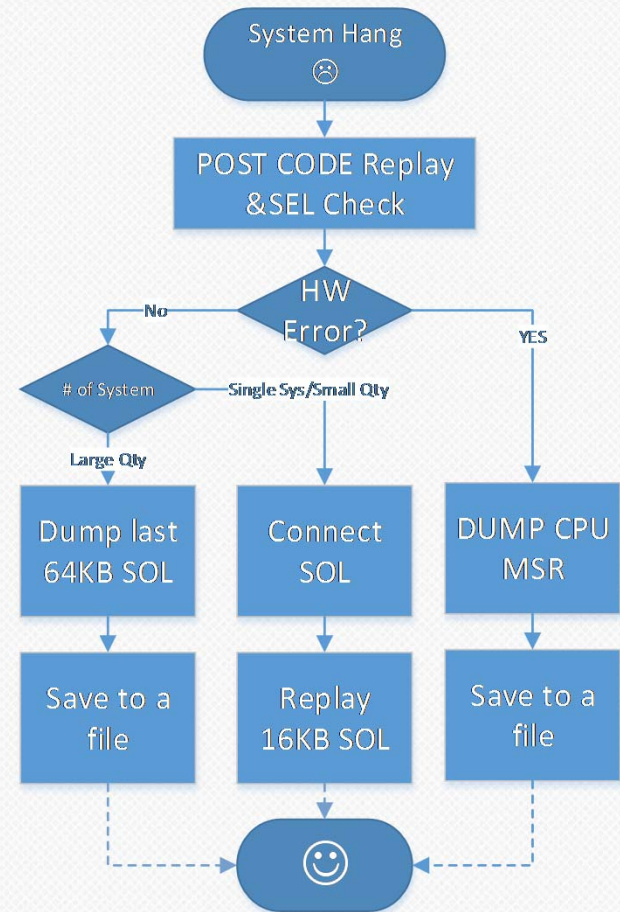
What's New: I/O – Cont.

- Midplane Sideband Header
- For System with PSU sideband interface
 - PMBus -> BMC
 - PS Fail -> BMC, NVDIMM
 - Redundancy Lost-> BMC
 - Mate detection ->HSC,NVDIMM
 - P3V3_AUX/GND



What's New: BMC

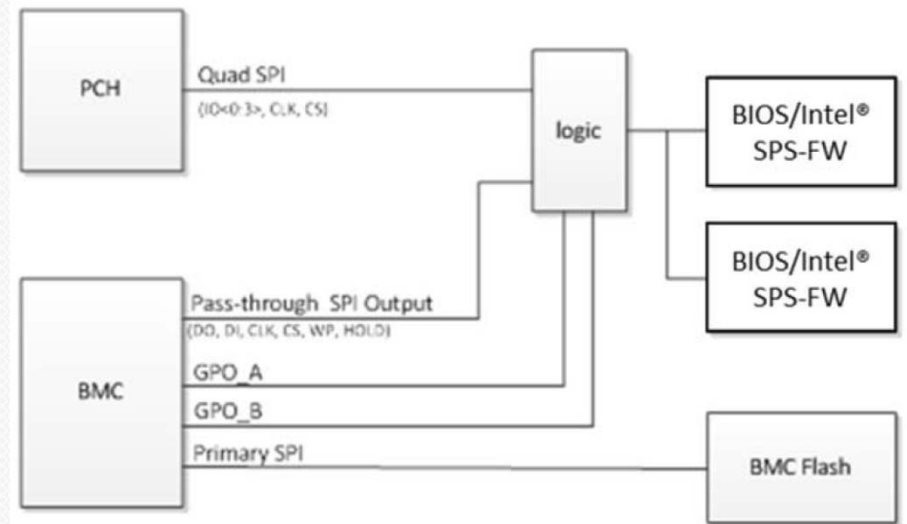
- Debug Features
 - POST CODE Buffer
 - BMC keeps 256x post codes
 - SOL buffer
 - BMC keeps last 128KB console data
 - MSR dump
 - Peci based MSR access
 - Auto Dump after IERR/MCERR
 - Dump per User Request



What's New: BMC – Cont.

- FW update
 - CPLD/VR/BMC FW update
 - Dual BIOS(UEFI FW) Update

GPO_A	GPO_B	Flash Selection
0	0	PCH SPI / BIOS Primary Flash
0	1	PCH SPI / BIOS Backup Flash
1	0	BMC SPI / BIOS Primary Flash
1	1	BMC SPI / BIOS Backup Flash



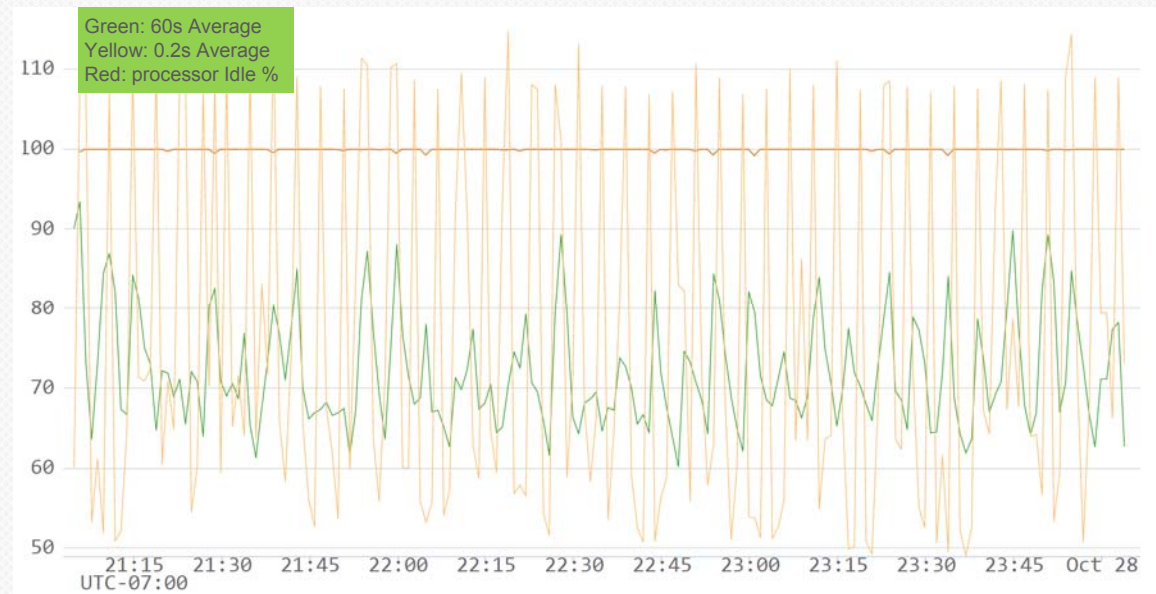
What's New: BMC – Cont.

- Average power reporting
 - User Friendly Node Power Collecting
 - PMBus READ_EIN Based
 - Keeps 600x READ_EIN in ring buffer
 - 0.1sec ~ 60.0 sec Avg. Pwr.

User defined time window
60.0Sec in this example

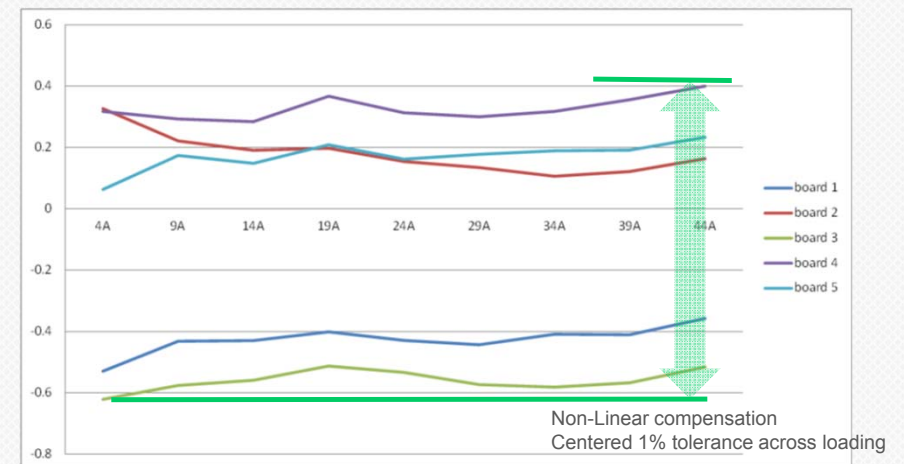
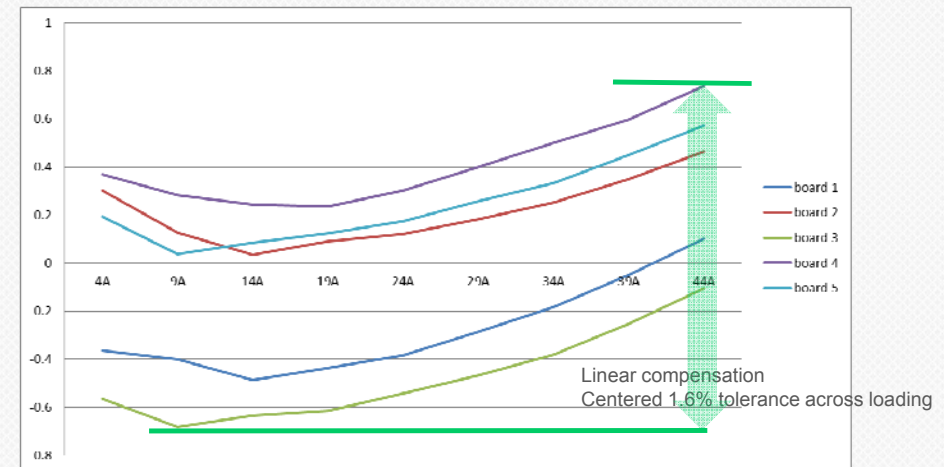
```
ipg rtptest1117-oob.prn1 raw 0x30 0xdf 0x58 0x27b 02
```

Return 123.2W; Average power in past 60 sec



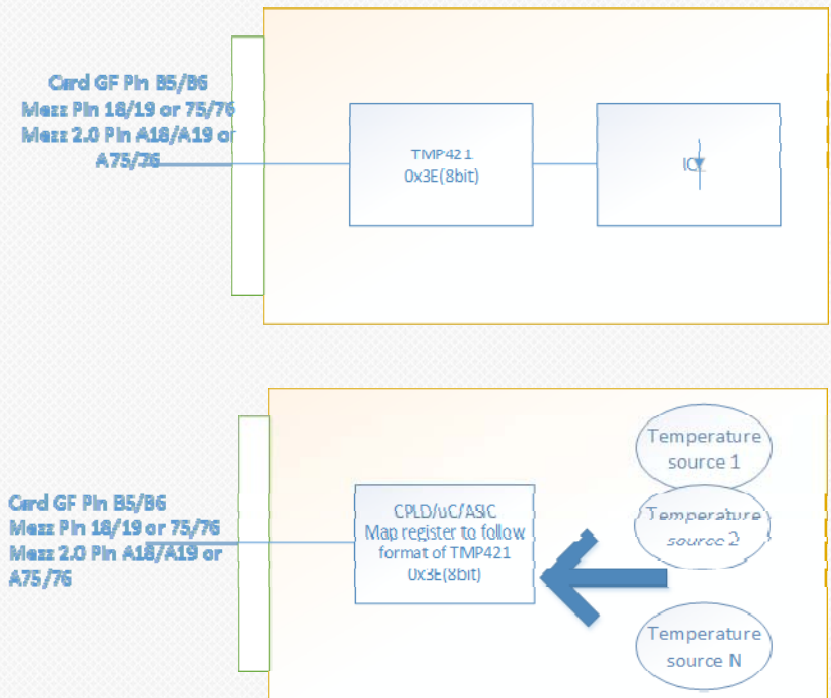
What's New: BMC – Cont.

- Node Power Reporting Tuning
 - Up to 7% error across Rsen
 - Linear compensation
 - Non-linear compensation



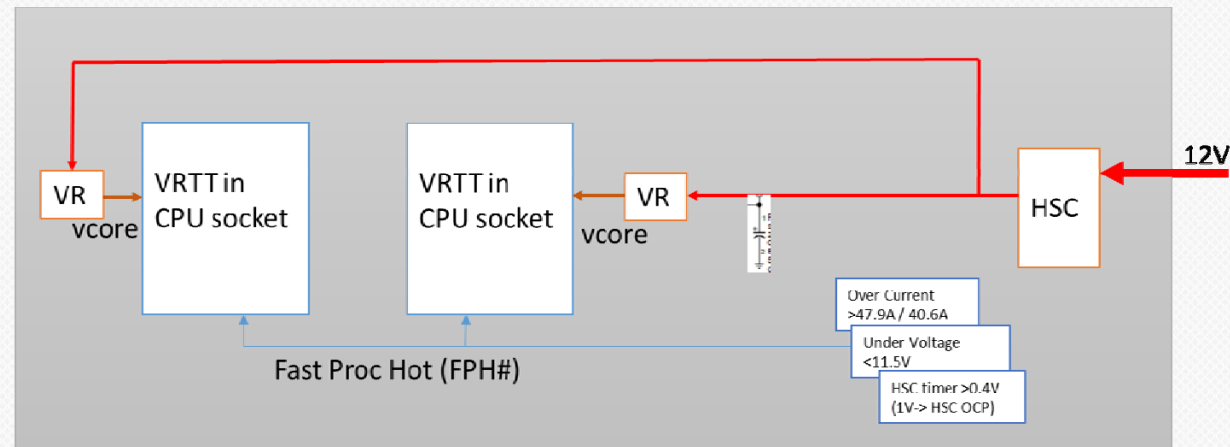
What's New: BMC – Cont.

- Card thermal reporting
 - Avoid high PWM/CFP @Idle
 - Improve CFM/Watt @Idle
 - Physical TI/TMP421 Sensor
 - Emulated Sensor
- OCP FSC Interface
 - IPMI OEM command based
 - FSC Profile read/update



What's New: Other Features

- Fast Proc Hot (FPH)
 - Over Current Based
 - Design Guide Based
 - Triggers before PSU OC
 - Cons: Performance impact
 - Under Voltage Based
 - Triggers after PSU OC condition met
 - HSC Timer Trigger
 - Triggers after HSC OC condition met



What's New: Other Features

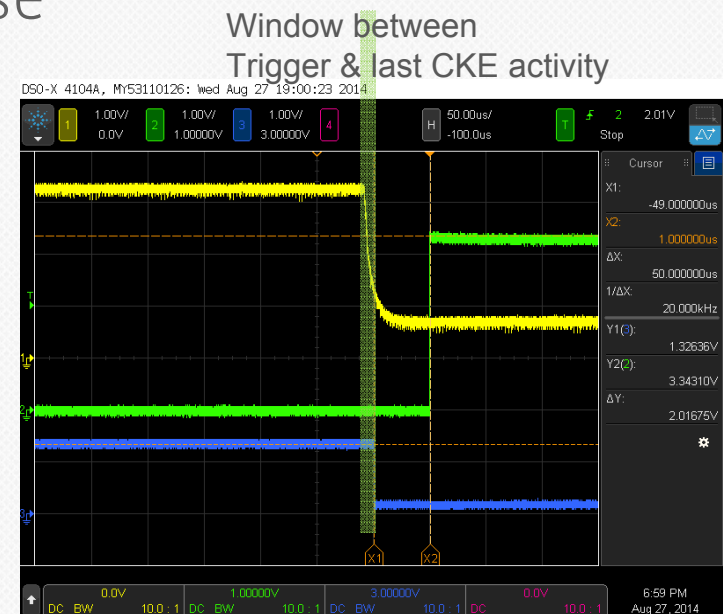
- UV based FPH
 - (1) Load increases to PSU capacity
 - (2) PSU Reacts to OC with UV
 - (3) UV triggers FPH on Load
 - (4) PSU Vout becomes normal
- Example
 - 3.8KW loading on 4x 700W PSU
 - Load throttles to ~3.0KW
 - PSU does not shut down

Green: Power Zone Current
Purple: Power Zone Power
Red: Power Zone Vout



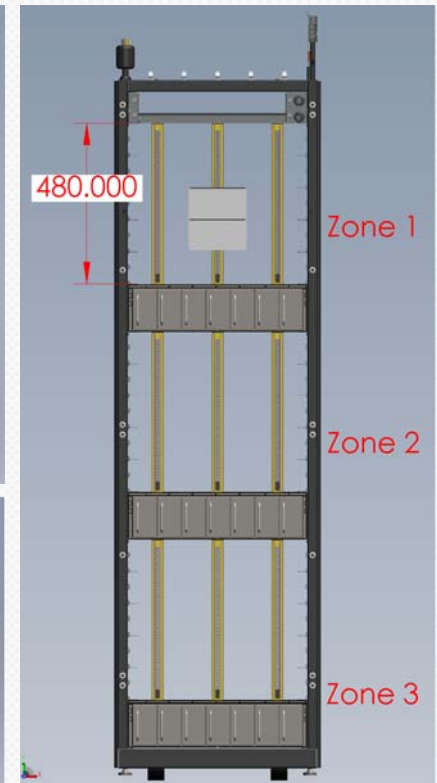
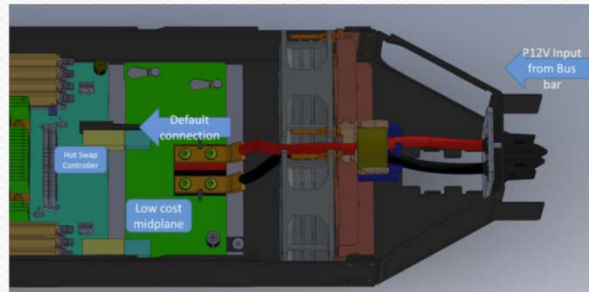
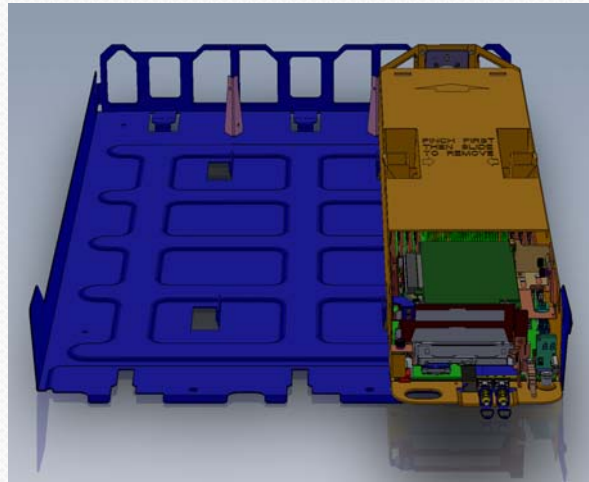
What's New: Other Features

- NVDIMM
 - UV Based (10.5V) Trigger for AC loss case
 - Protects Memory Controller WPQ
 - Does not protect CPU Cache



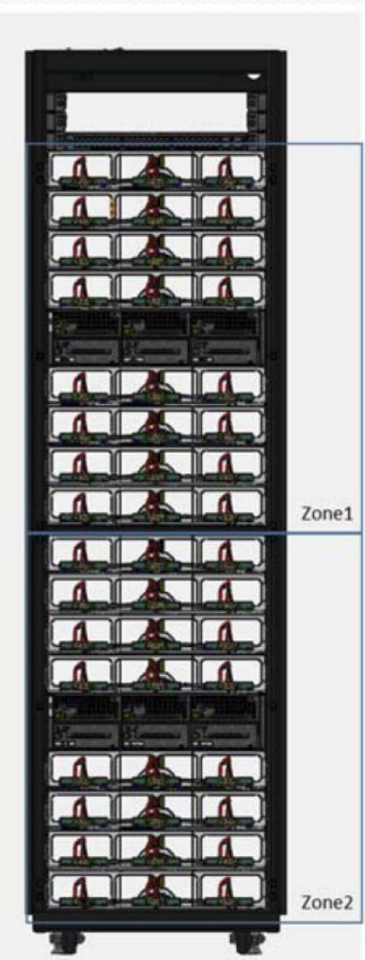
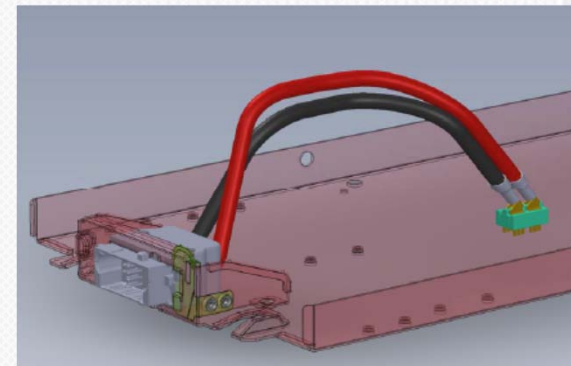
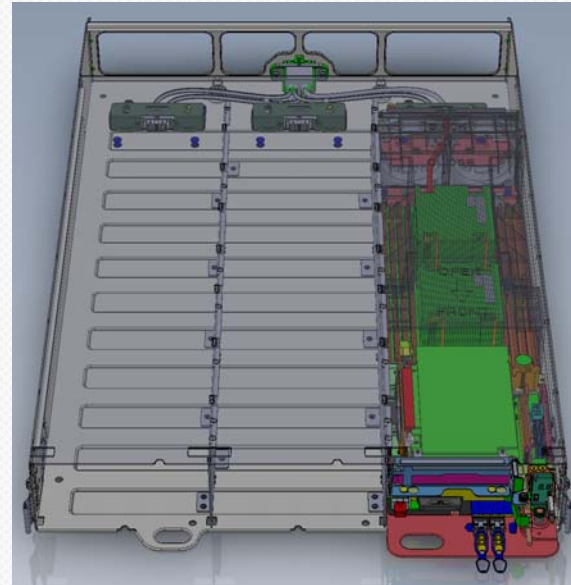
ORv1 Implementation

- 3x Zones per Rack
- 5x Shelves per Zone
- 3x Sleds per Shelf
 - Up to 45x sleds/Rack
- 12VDC Cable
- Passive midplane



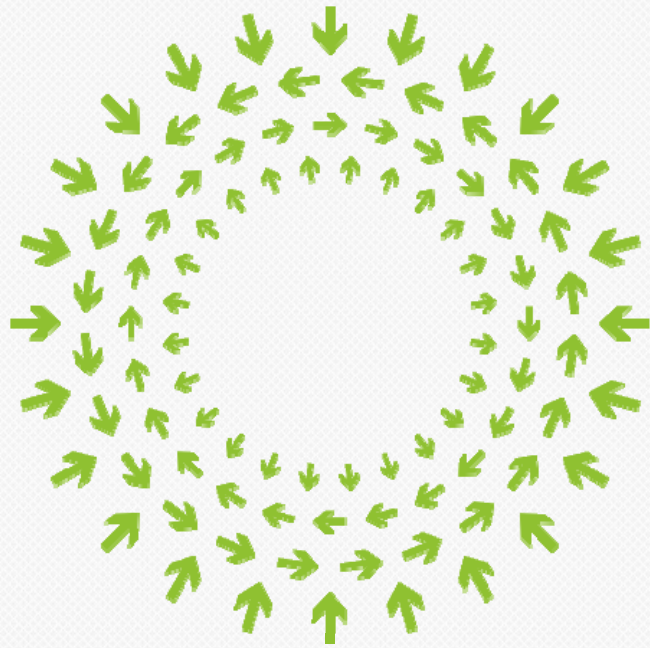
ORv2 Implementation

- 2x Zones per Rack
- 8x Chassis per Zone
- 3x Sleds per Chassis
 - up to 48x sleds per rack
- 12V Medusa Cable(1->3 split)
- Pressfit Cable



Q&A





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