OCP SUMMIT

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OPEN
Compute Project

Facebook OCP 2S Server Tioga Pass Refresh

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Agenda

- Overview
- New Features
- Configurations
- Questions

Overview

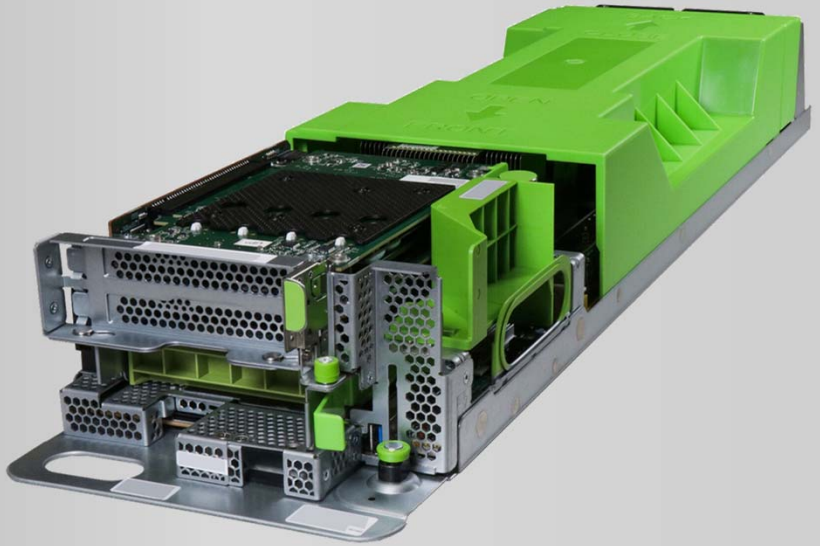
New Features

Configurations

Questions

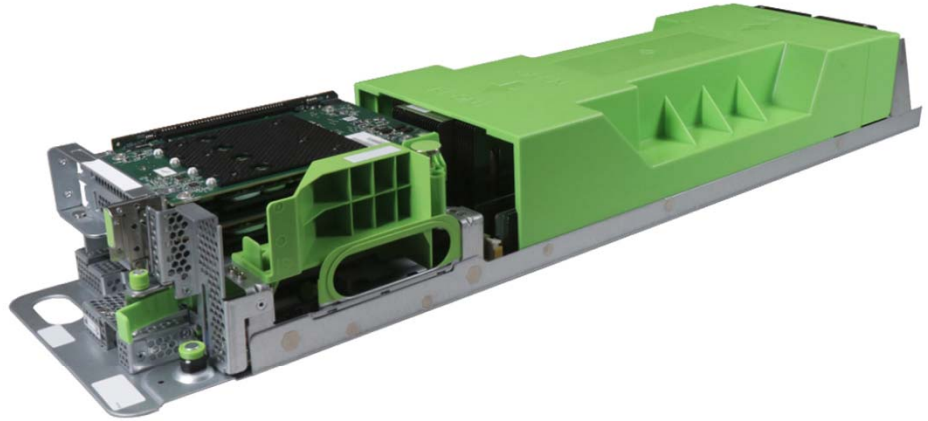
Overview

- Facebook general purpose OCP 2S server
- Higher performance over previous gen
- Modularity
- Easy to service
- Open



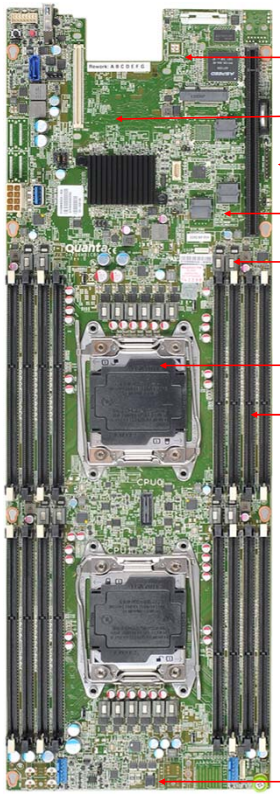
System Overview

- Intel Skylake-SP Processor up to 165w
- Single/Double Sided DIMM w/ 12 memory channels
- PCIe X32 to front I/O
- 3.5’’HDD/Nvme M.2 ssd as boot drive
- Support up to 100G OCP NIC2.0
- Half width/High density
- Open Rack V2

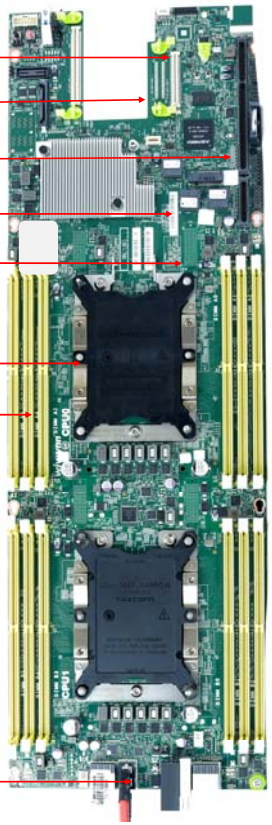


Motherboard Overview

Leopard



Tioga Pass



NIC Conn B to support up to 100G NIC

NIC Conn C to support KR Mezz

PCIe x24 slot => x32 slot

On-board mSATA=> M.2 conn.

BMC secure flash added

Intel Skylake-SP CPU

6 Memory channels for each CPU

Same 6.5”x20” Form Factor

AirMax PWR + X8 => PWR*2 + X16

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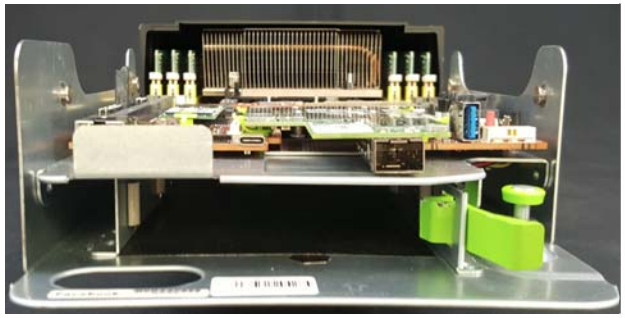
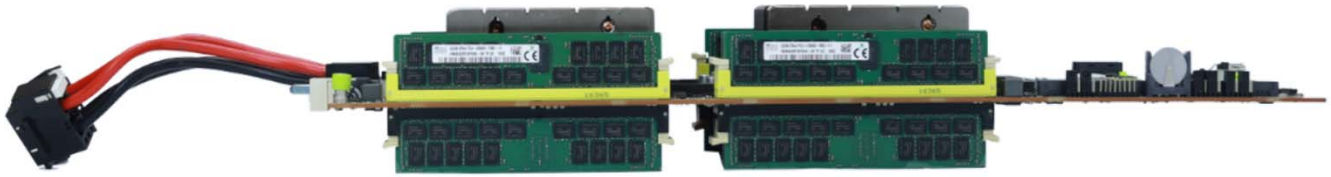
What's New – Double Sided SMT DIMM

- SMT DIMM socket on both PCB sides
- Maximum memory configuration
- Serviceability





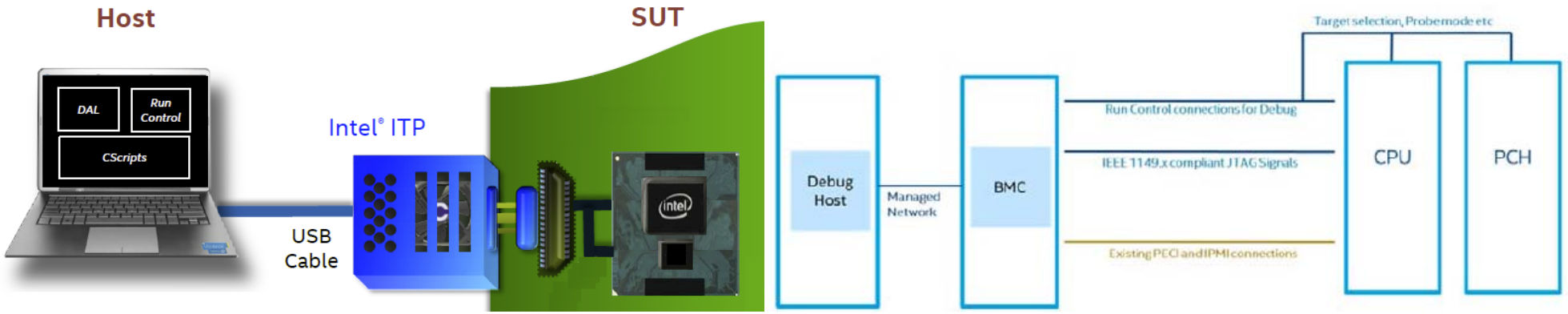
What's New – At-Scale Debug

Intel ITP/DCI debug tools

- Local HW and close-proximity problem

At Scale Debug

- Remote debug
- Based on Intel debug software to communicate with BMC
- Assumed BMC manageability network is secured



What's New – Verified Boot BMC

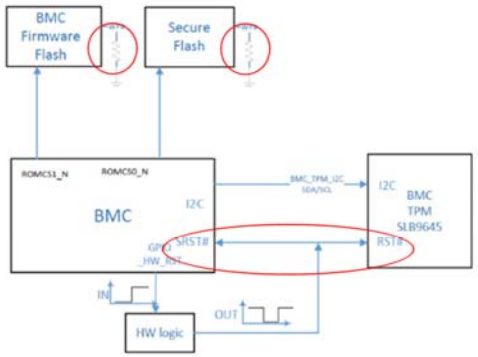
Build a secure BMC foundation

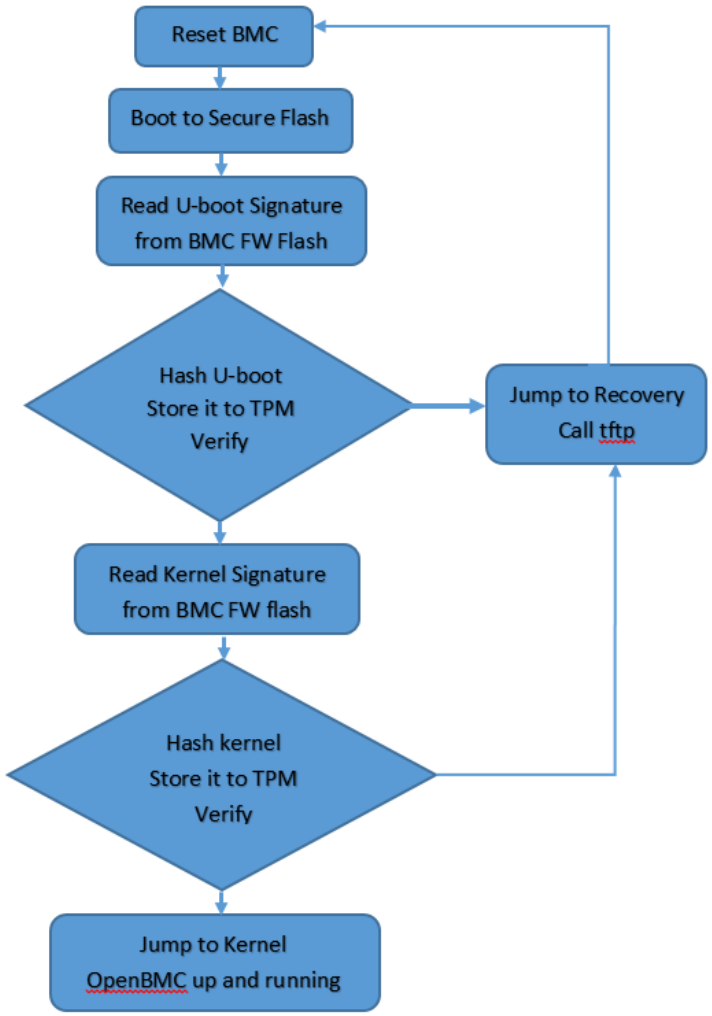
- BMC chip not support CPU-based root-of-trust
- Build with ROM based root-of-trust

HW Support

- Secure flash, w/Pkpub
- BMC FW Flash, signed w/Pkpri
- Glue Logic to reset BMC+TPM

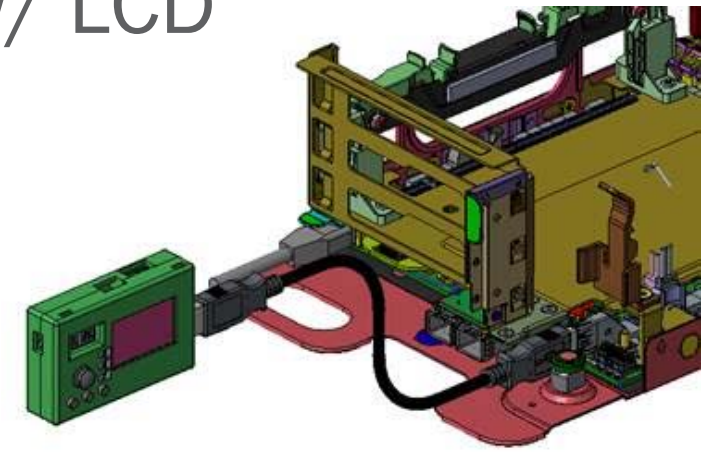
Verified boot Flow in U-boot





What's New – OCP Debug Card w/ LCD

- Remapped USB3 Interface
- User Friendly
- Console(wired/wireless)
- 7 segment Post code
- LCD content
  - Human readable Post code strings
  - System Info
  - Critical Sensors
  - Critical SEL
  - GPIO status
  - User setting
- Allow customize BMC to show debug message by needs



What's New – OpenBMC

- Facebook Open Source BMC F/W
- 1st time introduced to 2S server
- Open sourced through GitHub

	3rd Party BMC	OpenBMC
Source Code	• Proprietary, Closed	• Designed by Facebook • Open Source @ Github
User Interface	• ipmitool - Raw Bytes	• SSH to BMC Linux Shell • REST API - JSON objects
Security	• RMCP+ over UDP • Known vulnerabilities	• Secure Shell (ssh) • http(s)
Authentication/Authorization	• BMC-centric username/password database	• Centralized certificate based
Multi-Node Management	• Need to virtualize BMC with multiple IP addresses	• Supported Natively with node/slot number

@https://github.com/facebook/openbmc

Thermal Design

- Thermal kit
  - Fan redundancy at 95°F ambient
- Thermal performance
  - Fan power is 1~2.5% of combined CPU power
  - Maximized DeltaT for thermal efficiency

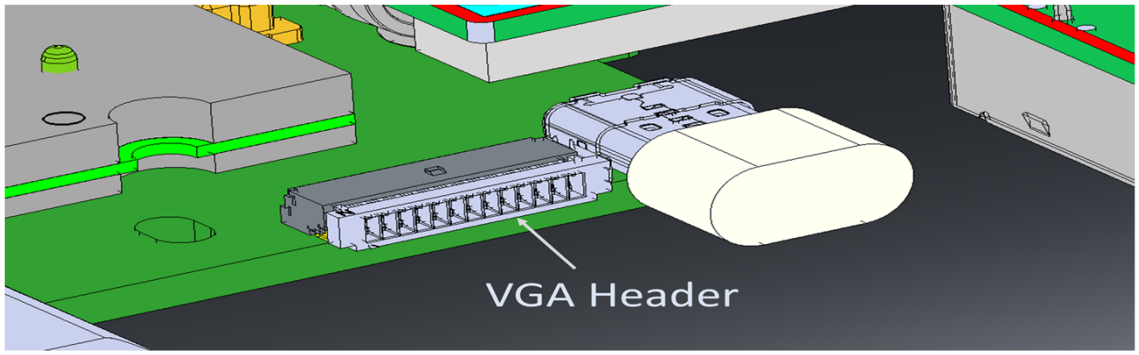
Chassis Type	Single Sided			Double Sided		
Inlet Temperature (°F)	77	86	95	77	86	95
DeltaT (°F)	41.2	33.4	27.1	36.3	30.6	26.1
CFM/W	0.079	0.097	0.120	0.089	0.106	0.124

What's New – VGA Port

- Customized VGA port

- Pin definition

	Sig
1	RED
2	RED_RTN(GND)
3	Green
4	Green_RTN (GND)
5	Blue
6	Blue_RTN (GND)
7	V-Sync
8	GND(Vsync-DDC)
9	H-Sync
10	GND(H-sync)
11	SDA
11	SCL
13	PWR



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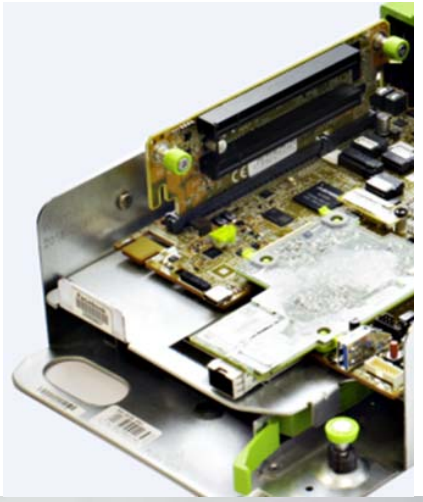
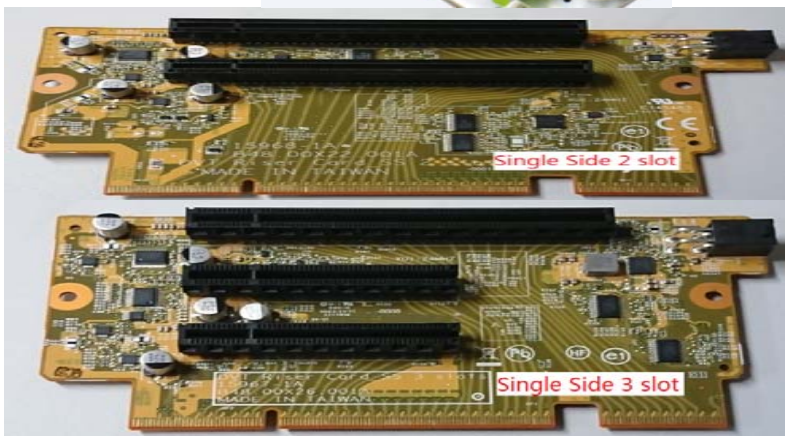
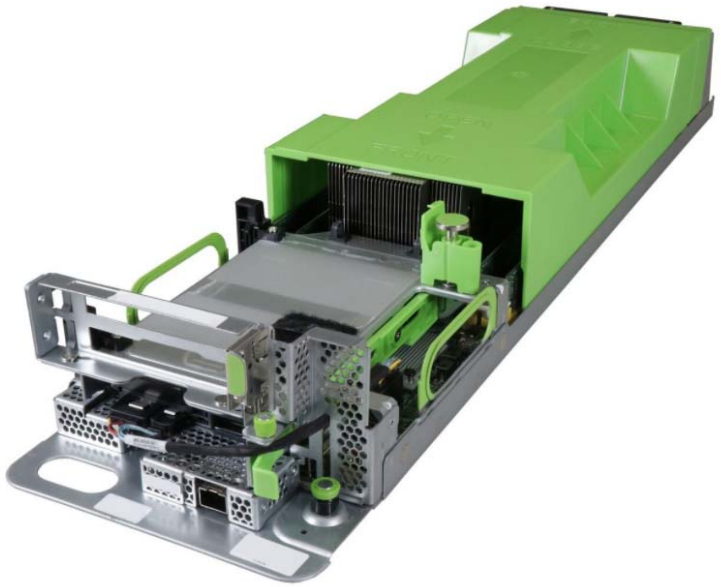
- MB Connector
  - Samtec HSEC8 200-pin
  - Samtec HSEC8 60-pin
- Riser cards
  - SS 2 slot riser
  - SS 3 slot riser
  - DS 2 slot riser
- Features
  - JTAG support
  - Host SMBUS to slot
  - USB2.0 to slot
  - Current monitor for each slot





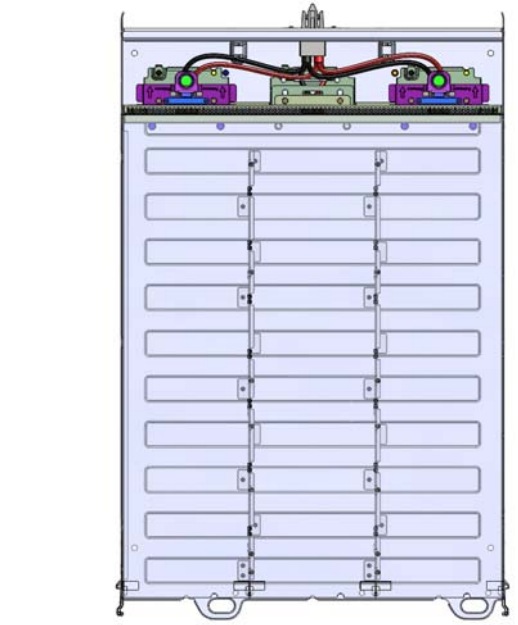
Configuration

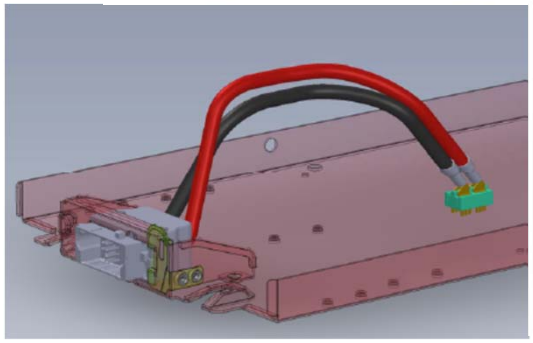
- Compute servers
- Compute server w/ PCIe AIC
- Headnode for PCIe expansion box
- Boot drive
  - 3.5’’ HDD
  - Nvme M.2 SSD
- NIC Card
  - OCP NIC2.0 25G/50G/100G
  - Intel KR Mezz Card

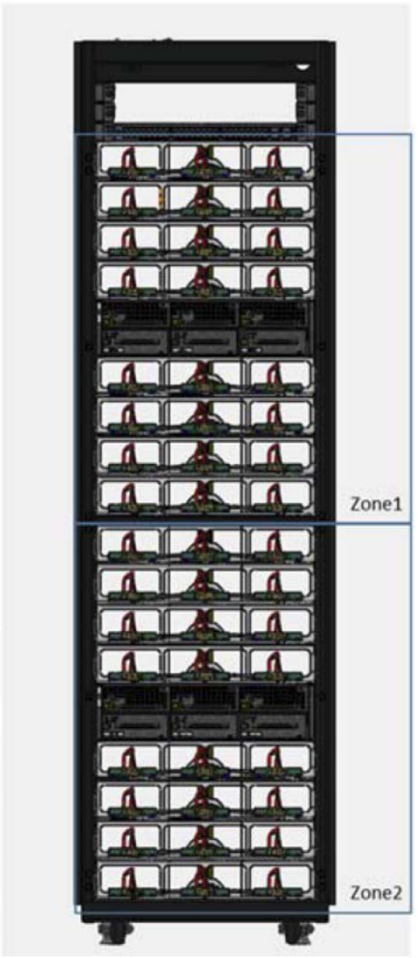


ORv2 Implementation

- 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







Questions?

More Info

- Check out the Tioga Pass hardware
  - Facebook
  - Intel
  - Quanta
  - Wiwynn
- Learn more about the Tioga Pass specification
- Come visit the Facebook booth!

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