QCT Rackgo X
Tioga Pass
Next-Gen OCP Server Refresh
2018/10/15

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Agenda

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Overview

• Introduction
  - “QCT Rackgo X Tioga Pass” is next generation OCP general purpose compute server based on the latest Intel® Xeon® Scalable Processor family (aka Skylake-SP) CPU. The baseboard design with single sided SKU, supporting up to 12 DIMMs, which is designed to fit in the OCP Cubby chassis and mounted in ORv2 Rack.

• Contributions
  - Design package
  - Product submission to Marketplace
    - Product Recognition: Accepted level

• Specification Reference
  - Facebook 2S Server Tioga Pass Rev 1.0
Tioga Pass Chassis Mechanical Overview

Uniform Modular Design as Previous Generation

- 93.2mm (3.67”)
- 853mm (33.58”)
- 537mm (21.14”)

Modular Infrastructure Allows Simplicity and Flexibility
Add or remove building blocks as needed
Tioga Pass Sled Overview

**OCP Compute Server Refresh**

- **Intel Next Generation Platform**
  - Up to 2 Intel® Xeon® Skylake-SP Processors per Node
  - Up to 12 Memory Modules per Node

- **Maximize Performance while Reducing Eco-footprint**
  - Eco-Friendly completely Halogen free board and component design

- **Uniform Scale-up and Scale-out Building Block**
  - Scale out on Capacity and Computing

- **High Reliability, Serviceability and Availability**
  - Incredible level of business continuousness

- **Air Cooling thermal design for existing infrastructure**
  - Support up to 165W TDP processor with ambient operating temperature of up to 35°C to reduce operating cost
One System Design with Flexible Storage Options

1x LFF drive with 2x FH PCIe slots

6x SFF drives with 2x HH PCIe slots
Tioga Pass Sled Mechanical Overview
-Front View

PCle Gen3 x16 FHHL
PCle Gen3 x16 FHHL
1 LFF HDD

(Ready/Orderable)

PCle Gen3 x16 HHHL
PCle Gen3 x16 HHHL

(Planning)

2.5\textquoteleft\textquoteleft SSD slot 0
slot 1
slot 2
slot 3
slot 4
slot 5

M.2 OCP 2.0 mezz

M.2 OCP 2.0 mezz
Tioga Pass Key Part Placement

Note: This is for whole feature description only, not all features are available in orderable SKU.
## Tioga Pass High Level Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>(2) Intel®Xeon® Skylake-SP processor family per node, up to 165W</td>
</tr>
<tr>
<td>Chipset</td>
<td>Intel® C621</td>
</tr>
<tr>
<td>Memory</td>
<td>(12) 2666 MHz DDR4 RDIMM per node</td>
</tr>
<tr>
<td>Drive Bay</td>
<td>(1) 3.5&quot; fixed drive bays per node <em>(Ready/Orderable)</em> or (6) 2.5&quot; hot swapped drive bays per node <em>(Planning)</em></td>
</tr>
<tr>
<td>Network Controller</td>
<td>Support following QCT OCP mezzanine card (PCIe x16) for network option in front IO per node</td>
</tr>
<tr>
<td></td>
<td>(1) QCT 1/10GbE RJ45 dual port OCP mezzanine card</td>
</tr>
<tr>
<td></td>
<td>(1) QCT 10G/25Gb SFP+/SFP28 OCP dual port mezzanine card</td>
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<tr>
<td></td>
<td>(1) QCT 40/56G QSFP+ OCP single port mezzanine card</td>
</tr>
<tr>
<td></td>
<td>(1) QCT 100G QSFP28 OCP single port mezzanine card</td>
</tr>
<tr>
<td>Expansion Slot</td>
<td>(2) PCIe gen 3 x16 FHHL PCIe expansion slots per node with 1x LFF drive SKU <em>(Ready/Orderable)</em></td>
</tr>
<tr>
<td></td>
<td>(1) PCIe gen 3 x16 OCP mezzanine V2 slot per node</td>
</tr>
<tr>
<td></td>
<td>or (2) PCIe gen 3 x16 HHHL PCIe expansion slots per node with 6x SFF drive SKU <em>(Planning)</em></td>
</tr>
<tr>
<td></td>
<td>(1) PCIe gen 3 x16 OCP mezzanine V2 slot per node</td>
</tr>
<tr>
<td>Form Factor</td>
<td>(3) nodes in 2OU (Open Rack) Rackmount</td>
</tr>
<tr>
<td>Rack Compatible</td>
<td>Open Rack v2</td>
</tr>
<tr>
<td>Onboard Storage</td>
<td>(1) M.2 PCIe/SATA 2280/22110</td>
</tr>
<tr>
<td>Management Port</td>
<td>(1) Share NIC from OCP V2 mezzanine card, driven by BMC through RMII/NCSI</td>
</tr>
<tr>
<td>Integrated BMC chip</td>
<td>Aspeed AST2500/AST2520</td>
</tr>
<tr>
<td>Front I/O</td>
<td>(1) USB 3.0 type A port(debug)</td>
</tr>
<tr>
<td></td>
<td>(1) USB 3.0 type C port</td>
</tr>
<tr>
<td></td>
<td>(1) VGA port (with AST2500)</td>
</tr>
</tbody>
</table>
Tioga Pass Block Diagram
Compatible Components List & User Guide

- “QCT Rackgo X OCP Tioga Pass” could be operated with
  - Rackgo X OCP Debug Card with LCD
  - Rackgo X OCP AVA-4 M.2 Carrier Card
Design Files Contribution-01_Electricals

- 01_Full System Board Layout
- 02_Full System Schematic CAD
Design Files Contribution - 01_Electricals

- 03_Full System Component BOM
- 04_Manufacturing Files
Mechanical Step File

TP-SS-TOP-ASSY-20171026.zip
Software File

- 01_BIOS
  - TP_3A10.BIN

- 02_BMC
  - fbtp-v3.2.4_unsigned.zip

- 03_CPLD
  - F08_4000HC_V2_0.zip

- 04_VR FW
  - F08_DVT1_rev00_PVCCIN_VSA_8BB76549_20170208.psf
  - F08_DVT1_rev00_PVCCIO_C609F4EE_20170208.psf
  - F08_DVT1_rev00_PVNN_3DE4AF22_20170208.psf
  - F08_DVT1_rev00_VDDQ_SS_1ph_RDIMM-Pin_D2C5738D_20170208.psf
  - F08_PVT_rev00_VDDQ_DS_7FACDC07_20170721.psf
OCP Tenets/Principles

• **Efficiency**
  - Single/double sided design to breakthrough the dimension limitation to achieve the optimization of high-density compute use
  - Flexible SKU selection to support 2x FH slots with 1x LFF drive or 2x HH slots with 6x SFF drives (planning) according to the different IO & storage requirements

• **Scalability**
  - Modularized sled design to make one common infrastructure with wide application coverage

• **Openness**
  - Comply with ORv2 standard

• **Impact**
  - Single/double sided baseboard architecture, which places DIMMs on bottom side, to efficiently utilize the remaining space of the chassis
Orderable SKU plan:

- **Orderable SKU:**
  - Single sided with 2FH PCIe slots & 1x LFF drive
- **Planning SKU:**
  - Single sided SKU with 2 HH PCIe slots & 6x SFF drives
- **Design ready/No further plan:**
  - Single sided SKU with 3 PCIe slots
  - Double sided SKU with 24 DIMM & 2 PCIe slots
Thanks!!!