Tyan OpenPOWER product introduction and future product plan

Albert Mu, General Manager
TYAN Computer Corp.
Your First Choice
Agenda

- TYAN Profile & Success in the Fields
- TYAN Palmetto CRS (Customer Reference System)
- TYAN Habanero System
- Future OPF Product Plan
# TYAN Profile

| **Established** | July 1989 in Silicon Valley, California USA  
100% subsidiary of MiTAC Computing Tech. Corp. |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Employees</strong></td>
<td>500; 50% in R&amp;D</td>
</tr>
<tr>
<td><strong>HQ</strong></td>
<td>Taipei, Taiwan</td>
</tr>
</tbody>
</table>
| **Regional Offices** | Fremont, California USA  
Shanghai & Beijing, China  
Tokyo, Japan |
| **R&D Centers** | Taipei, Taiwan  
Shanghai, China  
Fremont, California USA |
| **Contract Manufacturer** | MSL (Shun-De, Guangdong China) |

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TYAN Strength

Product Innovation
- Front-loaded, multi-sled system (2U/4-sled; 4U/18-sled)
- Multi-GPU server system (4U/8-GPU)
- Platforms for container-based deployment

Compliant to Standard
- PCI SIG
- Serial Attached SCSI
- Server System Infrastructure

Industry-focused Design
- Design for computing density
- Design for thermal and power efficiency
- Design for server, storage, and networking convergence

Close to Customers
- Regional R&D resources
- Regional sales force
- Worldwide FAE support

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TYAN is one of the OPF founding members and the only one system ODM in the eco-system!!!
TYAN Palmetto CRS

- 2U1S Implementation. OpenPOWER reference system.
- 1x **4-Core** POWER8 Turismo SCM
  - 4.024GHz (Nominal) w/TDP 130W
  - 512KB L2/core; 8MB L3/core
- 4x R-DDR3L 4GB DIMMs
- 1x SATA 500GB HDD
- 2x 1000BASE-T LOM
- 2x HH PCI-E Gen.3 slots
  - 1x PCI-E x16 (75W)
  - 1x PCI-E x8 (75W)

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TYAN Habanero System

- 2U1S Implementation
  - 1x 8-12 cores POWER8 Turismo SCM
- Up to 1,024GB memory
  - 32x R-DDR3L DIMM slots
  - 4x IBM Centaur Memory Buffer
  - Double-drop load
- Up to 14x hot-swap HDDs
  - 2x for boot device (rear-access)
  - 12x for data storage (front-access)*
- 4x HH PCI-E Gen.3 slots
  - 1x PCI-E x16 (75W)
  - 3x PCI-E x8 (75W each)

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*: the 12x drives shall be connected to a discrete PCI-E HBA/RAID.
TYAN Habanero System

- Networking Mezzanine
  - 4x 10GBASE-T LOM
  - 2x FDR IB (planning)

- Storage Mezzanine
  - 4x SATA 6G IOC
  - 16x SATA 6G/ SAS 12G (planning)

- Redundant Cooling Fans

- Redundant Power Supplies
TYAN Habanero System

- Typical applications powered by Habanero system
  - Virtual Machine (VM)
  - High-Performance Data Analytics (HPDA)

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### Various POWER8 CPUs

<table>
<thead>
<tr>
<th></th>
<th>POWER8</th>
<th>POWER8</th>
<th>POWER8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Core #</strong></td>
<td>8 cores</td>
<td>10 cores</td>
<td>12 Cores</td>
</tr>
<tr>
<td><strong>CPU Thread #</strong></td>
<td>64</td>
<td>80</td>
<td>96</td>
</tr>
<tr>
<td><strong>CPU Freq. (max.)</strong></td>
<td>3.758GHz</td>
<td>3.425GHz</td>
<td>3.126GHz</td>
</tr>
<tr>
<td><strong>CPU Freq. (turbo)</strong></td>
<td>4.123GHz</td>
<td>3.891GHz</td>
<td>3.625GHz</td>
</tr>
<tr>
<td><strong>L2 Cache</strong></td>
<td>512KB/core</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>L3 Cache</strong></td>
<td></td>
<td></td>
<td>8MB eDRAM/core</td>
</tr>
<tr>
<td><strong>L4 Cache</strong></td>
<td></td>
<td></td>
<td>16MB/MBC (Memory Buffer Chip); up to 64MB (w/ 4x MBC deployed)</td>
</tr>
<tr>
<td><strong>DRAM Interface</strong></td>
<td></td>
<td></td>
<td>DDR3L-1600</td>
</tr>
<tr>
<td><strong>PCI Express (Gen.3)</strong></td>
<td></td>
<td>32 Lanes by 3x controllers</td>
<td></td>
</tr>
<tr>
<td><strong>SPECint</strong></td>
<td>627</td>
<td>633</td>
<td>670</td>
</tr>
<tr>
<td><strong>SPECfp</strong></td>
<td>485</td>
<td>485</td>
<td>509</td>
</tr>
<tr>
<td><strong>Power (TDP)</strong></td>
<td>190W/247W (Turbo)</td>
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</table>

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## POWER8 vs. Xeon® E5

<table>
<thead>
<tr>
<th>Feature</th>
<th>POWER8</th>
<th>Xeon® E5-2697 v3</th>
<th>POWER8</th>
<th>Xeon® E5-2699 v3</th>
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</thead>
<tbody>
<tr>
<td>CPU Cores</td>
<td>8 cores</td>
<td>14 cores</td>
<td>12 Cores</td>
<td>18 Cores</td>
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<tr>
<td>CPU Thread #</td>
<td>64</td>
<td>28</td>
<td>96</td>
<td>36</td>
</tr>
<tr>
<td>CPU Freq. (max.)</td>
<td>3.758GHz</td>
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<td>L2 Cache</td>
<td>512KB/core</td>
<td>256KB/core</td>
<td>512KB/core</td>
<td>256KB/core</td>
</tr>
<tr>
<td>L3 Cache</td>
<td>64MB</td>
<td>35MB (shared)</td>
<td>96MB</td>
<td>45MB (shared)</td>
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<tr>
<td>L4 Cache (max.)</td>
<td>64MB (4x MBC)</td>
<td>-</td>
<td>64MB (4x MBC)</td>
<td>-</td>
</tr>
<tr>
<td>DRAM Interface</td>
<td>DDR3L-1600</td>
<td>DDR4-2133</td>
<td>DDR3L-1600</td>
<td>DDR4-2133</td>
</tr>
<tr>
<td>DRAM B/W</td>
<td>102.4GB/s</td>
<td>68GB/s</td>
<td>102.4GB/s</td>
<td>68GB/s</td>
</tr>
<tr>
<td>PCI Express (Gen.3)</td>
<td>32 Lanes</td>
<td>40 Lanes</td>
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<td>687</td>
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<td>485</td>
<td>427</td>
<td>509</td>
<td>460</td>
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</tbody>
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TYAN OPF Product Plan

- Platform designed & distributed in system fashion
- POWER8: Habanero 1U for HPC & VM applications
- POWER8+: Multi-GPU adoption w/ NVLink enablement
- POWER9 and beyond technologies

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TYAN OPIO Strategy

- OPIO: OpenPOWER I/O
- Flexible OPIO selection via mezzanine implementation
- PCI-E Gen.3 x8 bandwidth allocated
- TYAN shall perform required OPIO driver compatibility test on designated OpenPOWER systems
Your First Choice to the OpenPOWER World