OCP 40GE Network Interface Cards

OCP Summit | Jan 2014
End to End Provider of Smart, Fast, Open Interconnects

**Software Defined Networks**

**Open Platform**

**Overlay Network Tunnels**

<table>
<thead>
<tr>
<th>ICs</th>
<th>Adapter Cards</th>
<th>Switches/Gateways</th>
<th>Host/Fabric Software</th>
<th>Metro / WAN</th>
<th>Cables/Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="ICs" /></td>
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<td><img src="image6" alt="Cables/Modules" /></td>
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</tbody>
</table>
Open Compute Project - NIC

- First 40GbE adapter for OCP
- Open platform drives high volumes
- High performance OCP adapters
- Single and dual port 40GbE options
- Servers from multiple ODMs
ConnectX-3 Pro Adapters for Open Compute Project (OCP)

- 40/56GbE, dual port, QSFP cages
- 40/56GbE, single port, QSFP cage
40GbE OCP – Overview

- Single / Dual Port OCP Adapter
  - PCIe Gen3 x8
  - 10Gb/s / 40Gb/s / 56Gb/s data rates support
  - <1usec latency

- Unmatchable Performance in the Market
  - Up to 4 times higher throughput than comparable 10GbE
  - Up to 4 times message rate

- Advanced Features
  - RoCE (RDMA over Converged Ethernet)
  - SR-IOV support with embedded switch
  - NVGRE / VXLAN Stateless Offloads

- Host Management
  - SMB / NC-SI Baseband Management Controller Interface
  - PXE and UEFI
  - IPv6 Support
RDMA over Converged Ethernet (RoCE)

- **Highest performance in the industry**
  - Latency as low as 1us
  - Reliable/unreliable, connected/datagram
  - Unicast and multicast

- **Fast storage access**
  - RoCE and iSER support for storage access

- **RoCE for virtualized environments**
  - RoCE for SR-IOV connected VMs
  - Near 40GbE throughput in virtualized environments
Leading Solution for Virtualized Environments

- Single Root I/O Virtualization (SR-IOV) support

- Highest throughput available
  - Enabling more VMs on single machine
  - Highest traffic rate for each VM

- Overlay networks offloads
  - NVGRE and VXLAN
  - Breaking the 10GbE throughput barrier

- CPU offloads
  - SR-IOV enables application-direct access
  - Improving CPU utilization
OCP with Offload Engines for Overlay Network Protocols

- **Overlay Networks Offload**
  - Enabling unmatched throughput for virtualized environments
  - VXLAN and NVGRE supported

- **Mellanox unique hardware offload of Overlay protocols**
  - Checksums, LSO, Flow ID calculation, VLAN Stripping / insertion
  - Combined with steering mechanisms: RSS, VMQ

- **Mellanox offloads increase application performance**
  - Up to ~30Gb/s when NVGRE offload enabled
  - Above 60% decrease in CPU usage when NVGRE offload enabled
# OCP Cards – Product Family

<table>
<thead>
<tr>
<th>Ethernet</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>MCX341A-X</strong> (single port)</td>
<td><strong>MCX345A-B</strong> (single port)</td>
</tr>
<tr>
<td><strong>MCX342A-X</strong> (dual port)</td>
<td><strong>MCX346A-B</strong> (dual port)</td>
</tr>
<tr>
<td><strong>Connector and Port Speed</strong></td>
<td><strong>Port Speed</strong></td>
</tr>
<tr>
<td>SFP+ 10GbE</td>
<td>QSFP 40/56GbE</td>
</tr>
<tr>
<td><strong>PCle 3.0 Speed</strong></td>
<td>8.0GT/s (52Gb/s)</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>ConnectX-3 and ConnectX-3 Pro Flavors</td>
</tr>
<tr>
<td><strong>OS Support</strong></td>
<td>RHEL, CentOS, SLES, OEL, Windows, ESX/vSphere, Ubuntu, Citrix, Fedora</td>
</tr>
</tbody>
</table>
Thank You
Additional Information

- **Low Power**
  - Typical 2-port 40GbE OCP - 8.68W

- **Temperature (according to spec)**
  - Operational: 0°C to 35°C
  - Non-operational: 0°C to 70°C
## Tests Setups

<table>
<thead>
<tr>
<th>Linux tests (slides 5-7)</th>
<th>Windows tests (NVGRE, slide 8)</th>
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</thead>
<tbody>
<tr>
<td>Gen3 System</td>
<td>IBM X3650 M4</td>
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<tr>
<td></td>
<td>HP DL380 Gen 8</td>
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<tr>
<td>CPU</td>
<td>Intel(R) Xeon(R) CPU E5-2690 0 @ 2.90GHz</td>
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<tr>
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<td>Intel(R) Xeon(R) CPU E5-2690 0 @ 2.90GHz</td>
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<tr>
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<tr>
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<td>Windows server 2012 R2</td>
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<tr>
<td>40GbE Adapter</td>
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