ConnectX®-6 Lx Ethernet SmartNIC
25GbE Performance at the Speed of Lite

ConnectX-6 Lx SmartNICs deliver scalability, high-performance, advanced security capabilities and accelerated networking with the best total cost of ownership for 25GbE deployments in cloud, telco, and enterprise data centers.

Providing up to two ports of 25GbE or a single-port of 50GbE connectivity, and PCIe Gen 3.0/4.0 x8 host connectivity, ConnectX-6 Lx is a member of Mellanox’s world-class, award-winning, ConnectX family of network adapters. Continuing Mellanox’s consistent innovation in networking, ConnectX-6 Lx provides agility and efficiency at every scale. ConnectX-6 Lx delivers cutting edge 25GbE performance and security for uncompromising data centers.

Wide Selection of SmartNICs
ConnectX-6 Lx SmartNICs are available in several form factors including low-profile PCIe and OCP 3.0 cards with SFP28 connectors for 10/25GbE applications, or QSFP28 for 50GbE applications. Low-profile PCIe cards are available with tall and short brackets, while OCP3.0 cards are available with either a pull tab or an internal lock bracket.

Best-in-Class SDN Acceleration
Mellanox’s ASAP® - Accelerated Switch and Packet Processing® technology offloads the SDN data plane to the SmartNIC, accelerating performance and offloading the CPU in virtualized or containerized cloud data centers. Customers can accelerate their data centers with an SR-IOV or VirtIO interface while continuing to enjoy their SDN of choice.

ConnectX-6 Lx ASAP® rich feature set accelerates public and on-premises enterprise clouds, and boosts communication service providers (CSP) transition to NFV. ASAP® supports these communication service providers by enabling packet encapsulations, such as MPLS and GTP, along side cloud encapsulations, such as VXLAN, GENEVE and others.

Industry-leading RoCE
Following the Mellanox ConnectX tradition of industry-leading RoCE capabilities, ConnectX-6 Lx enables more scalable, resilient, and easy-to-deploy RoCE solutions – Zero Touch RoCE. ConnectX-6 Lx allows RoCE payloads to run seamlessly on existing networks without requiring network configuration (no PFC, no ECN) for simplified RoCE deployments. ConnectX-6 Lx ensures RoCE resiliency and efficiency at scale.

Secure Your Infrastructure
In an era where privacy of information is key and zero trust is the rule, ConnectX-6 Lx adapters offer a range of advanced built-in capabilities that bring infrastructure security down to every endpoint with unprecedented performance and scalability. ConnectX-6 Lx offers IPsec inline encryption/decryption acceleration, ASAP® connection-tracking hardware offload accelerates L4 firewall performance.

ConnectX-6 Lx also delivers supply chain protection with hardware Root-of-Trust (RoT) for Secure Boot as well as Secure Firmware Update using RSA cryptography and cloning-protection, via a device-unique key, to guarantee firmware authenticity.

HIGHLIGHTS

SmartNIC Portfolio
- 10/25/50 Gb/s Ethernet
- Various form factors:
  - PCIe low-profile
  - OCP 3.0 Small Form Factor (SFF)
- Connectivity options:
  - SFP28, QSFP28
  - PCIe Gen 3.0/4.0 x8
  - Crypto and non-crypto versions

Features & Applications
- Line speed message rate of 75Mpps
- Advanced RoCE
- ASAP® - Accelerated Switching and Packet Processing
- IPsec in-line crypto acceleration
- Overlay tunneling accelerations
- Stateful rule checking for connection tracking
- Hardware Root-of-Trust and secure firmware update
- Best-in-class PTP performance
- ODCC compatible

Solutions
- Enterprise data centers
- Cloud-native, Web 2.0, hyperscale
- Secured infrastructure
- Telco and Network Function Virtualization (NFV)
**Features**

- Flow update through RTE_Flow or TC_Flower
- OpenStack support
- Kubernetes support
- Rich classification engine (L2 to L4)
- Flex-Parser: user defined classification
- Hardware offload for:
  - Connection tracking (L4 firewall)
  - NAT
  - Header rewrite
  - Mirroring
  - Sampling
  - Flow aging
  - Hierarchal GoS
  - Flow-based statistics

**Stateless Offloads**

- TCP/UDP/IP stateless offload
- LSO, LRD, checksum offload
- Received Side Scaling (RSS) also on encapsulated packet
- Transmit Side Scaling (TSS)
- VLAN and MPLS tag insertion/stripping
- Receive flow steering

**Advanced Timing & Synchronization**

- Advanced PTP
  - IEEE 1588v2 (any profile)
  - PTP Hardware Clock (PHC) (UTC format)
  - Line rate hardware timestamp (UTC format)
  - Time triggered scheduling
  - PTP based packet pacing
  - Time based SDN acceleration (ASAP6)

**Storage Accelerations**

- NVMe over Fabric offloads for target
- Storage protocols: iSER, NFSoRDMA, SMB Direct, NVMe-oF, and more

**Cyber Security**

- Inline hardware IPsec encryption & decryption
- AES-GCM 128/256 bit key
- IPsec over RoCE
- Platform security
- Hardware root-of-trust
- Secure firmware update

**Network Interface**

- 2 x 10/25GbE / 1 x 50GbE

**Host Interface**

- PCIe Gen 4.0, 3.0, 2.0, 1.1
- 16.0, 8.0, 5.0, 2.5 GT/s link rate
- 8 lanes of PCIe
- MSI/MSI-X mechanisms
- Advanced PCIe capabilities

**Virtualization / Cloud Native**

- Single Root IOV (SR-IOV) and VirtIO acceleration
  - Up to 512 VFIs per port
  - 8 PFs
- Support for tunneling
- Encap/decap of VXLAN, NVGRE, GENEVE, and more
- Stateless offloads for overlay tunnels

**Mellanox ASAP**

- SDN acceleration for:
  - Core network
  - Virtualization
  - Containers
- Full hardware offload for OVS data plane

**Standards**

- IEEE 802.3ae 10 Gigabit Ethernet
- 25/50 Ethernet Consortium 25G and 50G supporting all FEC modes
- IEEE 802.3by 25G supporting all FEC modes
- IEEE 802.3ad, 802.1AX Link Aggregation
- IEEE 802.1Qaz (ETS)
- IEEE 802.1Qbg
- IEEE 802.1Qbb (PFC)
- IEEE 802.1Qbb (PFC)
- IEEE 1149.1 and IEEE 1149.6 JTAG
- IEEE 1588v2
- IEEE 802.1Qaz (ETS)
- IEEE 802.1Qbg
- IEEE 802.1Qbb (PFC)
- IEEE 802.1Qbb (PFC)
- IEEE 1149.1 and IEEE 1149.6 JTAG
- PCI Express Gen 3.0 and 4.0

**SmartNIC Portfolio & Ordering Information**

**Table 1 - PCIe HHHL Form Factor**

<table>
<thead>
<tr>
<th>Max Network Speed</th>
<th>Interface Type</th>
<th>Supported Ethernet Speeds [GbE]</th>
<th>Host Interface [PCIe]</th>
<th>OPNs Without Crypto</th>
<th>OPNs With Crypto(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x 25GbE</td>
<td>SFP28</td>
<td>25, 10, 1</td>
<td>Gen 4.0 x8</td>
<td>Contact Mellanox</td>
<td>Contact Mellanox</td>
</tr>
<tr>
<td>2 x 25GbE</td>
<td>SFP28</td>
<td>25, 10, 1</td>
<td>Gen 4.0 x8</td>
<td>MCX631102AD-ADAT</td>
<td>MCX631102AE-ADAT</td>
</tr>
<tr>
<td>1 x 50GbE</td>
<td>QSFP28</td>
<td>50, 25, 10, 1</td>
<td>Gen 4.0 x8</td>
<td>MCX631105AD-ADAT</td>
<td>MCX631105AE-ADAT</td>
</tr>
</tbody>
</table>

1. The above SmartNICs do not enforce Secure Boot by default, please contact Mellanox for models with Secure Boot enabled.
2. By default, the above products are shipped with a tall bracket mounted, and a short bracket is included as an accessory.

**Table 2 - OCP 3.0 Small Form Factor**

<table>
<thead>
<tr>
<th>Max Network Speed</th>
<th>Interface Type</th>
<th>Supported Ethernet Speeds [GbE]</th>
<th>Host Interface [PCIe]</th>
<th>OPNs Without Crypto</th>
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</tr>
</thead>
<tbody>
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<td>1 x 25GbE</td>
<td>SFP28</td>
<td>25, 10, 1</td>
<td>Gen 4.0 x8</td>
<td>Contact Mellanox</td>
<td>Contact Mellanox</td>
</tr>
<tr>
<td>2 x 25GbE</td>
<td>SFP28</td>
<td>25, 10, 1</td>
<td>Gen 4.0 x8</td>
<td>MCX631432AE-ADAB</td>
<td>MCX631432AE-ADAB</td>
</tr>
<tr>
<td>1 x 50GbE</td>
<td>QSFP28</td>
<td>50, 25, 10, 1</td>
<td>Gen 4.0 x8</td>
<td>MCX631435AE-ADAB</td>
<td>MCX631435AE-ADAB</td>
</tr>
</tbody>
</table>

1. The above SmartNICs do not enforce Secure Boot by default, please contact Mellanox for models with Secure Boot enabled.
2. The above OCP 3.0 OPNs are shipped with ThumbscREW (pull tab) brackets; contact Mellanox for additional bracket types, such as Internal Lock or Ejector latch.

† For illustration only. Actual products may vary.