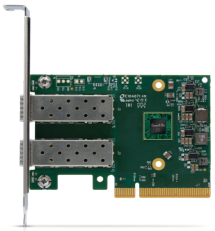
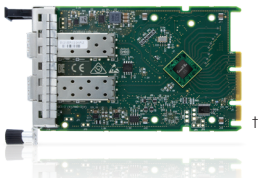
ADAPTER CARD
PRODUCT BRIEF





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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 ASAP² - 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 ASAP² rich feature set accelerates public and on-premises enterprise clouds, and boosts communication service providers (CSP) transition to NFV. ASAP² 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. ASAP² 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
- ASAP² - 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)

† For illustration only. Actual products may vary.

Features*

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 VFs per port
  - 8 PFs
- Support for tunneling
  - Encap/decap of VXLAN, NVGRE, GENEVE, and more
  - Stateless offloads for overlay tunnels

Mellanox ASAP²
- SDN acceleration for:
  - Bare metal
  - Virtualization
  - Containers
- Full hardware offload for OVS data plane
- 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 QoS
  - Flow-based statistics

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

Stateless Offloads
- TCP/UDP/IP stateless offload
- LSO, LRO, 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 (ASAP²)

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

RDMA over Converged Ethernet
- RoCE v1/v2
- Zero-Touch RoCE: no ECN, no PFC
- RoCE over overlay networks
- IPsec over RoCE
- Selective repeat
- GPUDirect®
- Dynamically Connected Transport (DCT)
- Burst buffer offload

Management and Control
- SMBus 2.0
- Network Controller Sideband Interface (NC-SI)
- NC-SI, MCTP over SMBus and MCTP over PCIe - Baseboard Management Controller interface
- PLDM for Monitor and Control DSP0248
- PLDM for Firmware Update DSP026

Remote Boot
- Remote boot over Ethernet
- Remote boot over iSCSI
- UEFI support for x86 and Arm servers
- PXE boot

* This section describes hardware features and capabilities. Please refer to the driver and firmware release notes for feature availability.

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 802.3az Energy Efficient Ethernet (supports only "Fast-Wake" mode)
- IEEE 802.3ap based auto-negotiation and KR startup
- IEEE 802.1Q, 802.1P VLAN tags and priority
- IEEE 802.1Qaz (ETS)
- IEEE 802.1Qbb (PFC)
- IEEE 802.1Qbg
- IEEE 1588v2
- 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

Max Network Speed	Interface Type	Supported Ethernet Speeds [GbE]	Host Interface [PCIe]	OPNs Without Crypto	OPNs With Crypto[1]
1 x 25GbE	SFP28	25, 10, 1	Gen 4.0 x8	Contact Mellanox	Contact Mellanox
2 x 25GbE	SFP28	25, 10, 1	Gen 4.0 x8	MCX631102AN-ADAT	MCX631102AE-ADAT
1 x 50GbE	QSFP28	50, 25, 10, 1	Gen 4.0 x8	MCX631105AN-GDAT	MCX631105AE-GDAT

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.

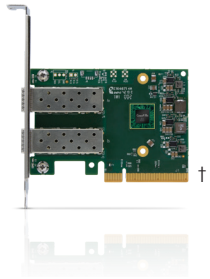
† For illustration only. Actual products may vary.

Table 2 - OCP 3.0 Small Form Factor

Max Network Speed	Interface Type	Supported Ethernet Speeds [GbE]	Host Interface [PCIe]	OPNs Without Crypto	OPNs With Crypto[1]
1 x 25GbE	SFP28	25, 10, 1	Gen 4.0 x8	Contact Mellanox	Contact Mellanox
2 x 25GbE	SFP28	25, 10, 1	Gen 4.0 x8	MCX631432AN-ADAB	MCX631432AE-ADAB
1 x 50GbE	QSFP28	50, 25, 10, 1	Gen 4.0 x8	MCX631435AN-GDAB	MCX631435AE-GDAB

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.

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