Datasheet

# ConnectX-6 Dx 100G/200G Ethernet NIC

Accelerated networking for modern cloud data centers.

NVIDIA® ConnectX®-6 Dx is a highly secure and advanced network interface card (NIC) that accelerates mission-critical cloud and data center applications, including security, virtualization, software-defined networking (SDN) and network functions virtualization (NFV), big data, machine learning, and storage. ConnectX-6 Dx provides up to two ports of 100 gigabits per second (Gb/s) or a single port of 200Gb/s Ethernet connectivity and is powered by 50Gb/s (PAM4) or 25/10Gb/s (NRZ) serializer/deserializer (SerDes) technology.

## Advanced Networking and Security

ConnectX-6 Dx features virtual switch (vSwitch) and virtual router (vRouter) hardware accelerations that deliver significantly higher performance than non-accelerated solutions. ConnectX-6 Dx supports a choice of single-root input/output (IO) virtualization (SR-IOV) and VirtIO in hardware, so customers can best address their application needs. By offloading cloud networking workloads, ConnectX-6 Dx frees up CPU cores for business applications while reducing total cost of ownership.

In the face of a growing cyber threat landscape, ConnectX-6 Dx provides built-in inline encryption and decryption, stateful packet filtering, and other capabilities, bringing advanced security down to every node with unprecedented performance and scalability.

Built on the solid foundation of NVIDIA's ConnectX line of NICs, ConnectX-6 Dx offers best-in-class remote direct-memory access (RDMA) over converged Ethernet (RoCE) capabilities, enabling scalable, resilient, and easy-to-deploy RoCE solutions. For data storage, ConnectX-6 Dx optimizes a suite of storage accelerations, bringing Non-Volatile Memory Express over Fabrics (NVMe-oF) target and initiator offloads.

| Product Specifications | |
|---|---|
| **Total bandwidth** | 200Gb/s |
| **Supported Ethernet speeds** | 10/25/40/50 /100/200GbE |
| **Number of network ports** | 1 or 2 |
| **Network interface technologies** | NRZ/PAM4 |
| **Host interface** | PCIe Gen4 x16, with NVIDIA Multi-Host™ technology |
| **Platform security** | Hardware root of trust and secure firmware update |
| **Form factors** | PCIe HHHL, OCP3.0 SFF |
| **Network interfaces** | SFP56, QSFP56 |

## Features*

### Network Interface

- Dual ports of 10/25/40/50/100GbE or a single port of 200GbE
- Up to 200Gb/s total bandwidth

### Host Interface

- PCIe Gen 4.0 compatible, 16 lanes
- NVIDIA Multi-Host supports connection of up to four hosts

### Enhanced Networking

- Zero-touch RoCE
- NVIDIA Accelerated Switch and Packet Processing (ASAP2)™ for SDN and virtual network functions (VNF) acceleration
- SR-IOV
- VirtIO acceleration
- Overlay network acceleration: Virtual Extensible LAN (VXLAN), Generic Network Virtualization Encapsulation (GENEVE), Network Virtualization using Generic Routing Encapsulation (NVGRE)
- Programmable flexible parser
- Connection tracking (L4 firewall)
- Flow mirroring, sampling, and statistics
- Header rewrite
- Hierarchical quality of service (QoS)
- Stateless Transmission Control Protocol (TCP) offloads

### Cybersecurity

- Inline hardware Internet Protocol Security (IPsec) encryption and decryption
  - Advanced Encryption Standard-Galois/Counter Mode (AES-GCM) 128/256-bit key
  - RoCE over IPsec
- Inline hardware Transport Layer Security (TLS) encryption and decryption
  - AES-GCM 128/256-bit key
- Data-at-rest AES-XEX-based tweaked codebook mode with ciphertext stealing (AES-XTS) encryption and decryption
  - AES-XTS 256/512-bit key
- Platform security
  - Hardware root of trust
  - Secure firmware update

### Storage Offloads

- Block-level encryption: XTS-AES 256/512-bit key
- NVMe-oF offloads for target machine
- T10 Data Integrity Field (T10-DIF) signature handover operation at wire speed for ingress and egress traffic
- Storage protocols: Server Routing Protocol (SRP), Internet Small Computer Systems Interface (iSCSI) Extensions for RDMA (iSER), Network File System (NFS) over RDMA, Server Message Block (SMB) Direct, NVMe-oF

### Advanced Precision Time Protocol (PTP) Timing and Synchronization

- Institute of Electrical and Electronics Engineers (IEEE) 1588v2 (any profile)
- PTP hardware clock (PHC) (UTC format)
- Nanosecond-level accuracy
- Line-rate hardware timestamp (UTC format)
- Packets per second (PPS) in and configurable PPS out
- Time-triggered scheduling
- PTP-based packet pacing
- Time-based SDN acceleration ($ASAP^2$)
- Dedicated precision timing card option

### Management and Control

- Network controller sideboard interface (NC-SI), Management Component Transport Protocol (MCTP) over System Managment Bus (SMBus) and MCTP over PCIe—baseboard management controller (BMC) interface, NC-SI over reduced media independent interface (RMII)-Based Transport (RBT) in Open Compute Project (OCP) 3.0 cards
- Platform Level Data Model (PLDM) for Monitor and Control DSP0248
- PLDM for Firmware Update DSP0267
- I2C interface for device control and configuration

### Remote Boot

- Remote boot over Ethernet
- Remote boot over iSCSI
- Unified Extensible Firmware Interface (UEFI) and Preboot Execution Environment (PXE) support for x86 and Arm® servers

## Portfolio and Ordering Information

For the NVIDIA portfolio and ordering information, contact your NVIDIA sales representative or visit the online ConnectX-6 Dx user manuals: **PCIe HHHL form factor** and **OCP 3.0 form factor**.

## Ready to Get Started?

To learn more Email GOPNY@pny.com

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