NVIDIA CONNECTX-7 400G ETHERNET

SMART ACCELERATION FOR CLOUD, DATA-CENTER AND EDGE

ACCELERATED NETWORKING AND SECURITY FOR THE MOST ADVANCED CLOUD AND AI WORKLOADS

The NVIDIA® ConnectX®-7 SmartNIC is optimized to deliver accelerated networking for modern cloud, artificial intelligence, and traditional enterprise workloads. ConnectX-7 provides a broad set of software-defined, hardware accelerated networking, storage, and security capabilities which enable organizations to modernize and secure their IT infrastructures.

Extending the tradition of NVIDIA's industry leading innovation for networking, ConnectX-7, is available in 1, 2, or 4-port configurations and delivers up to 400Gb/s of bandwidth. With features such as NVIDIA ASAP² - Accelerated Switching and Packet Processing®, advanced RoCE, NVIDIA GPUDirect® Storage, and in-line hardware acceleration for TLS/IPsec/MACsec encryption/decryption, ConnectX-7 empowers agile and high-performance solutions from edge to core data centers to clouds, all while enhancing network security and reducing the total cost of ownership.

Available in PCIe card and OCP3.0 form factors, ConnectX-7 empowers solutions for cloud, hyperscale, and enterprise networking.

PRODUCT SPECIFICATIONS

Maximum Total Bandwidth	**400GbE**
Supported Ethernet Speeds	**10/25/40/50/100/ 200/400GbE**
Number of Network Ports	**1/2/4**
Network Interface Technologies	**NRZ (10/25G) / PAM4 (50/100G)**
Host Interface	**PCIe Gen5.0 x16/ x32**
Cards Form Factors	**PCIe FHHL/ HHHL, OCP3.0 SFF**
Network Interfaces	**SFP56, QSFP56, QSFP56-DD, QSFP112, SFP112**

Accelerate Software-Defined Networking

NVIDIA ASAP² technology accelerates software-defined networking, delivering line-rate performance with no CPU penalty.

Provide Security from Edge to Core

Hardware engines in ConnectX-7 offload and accelerate security, with in-line encryption/decryption of TLS, IPsec, and MACsec.

Enhance Storage Performance

ConnectX-7 enables high-performance storage and data access with RoCE and GPUDirect Storage and accelerates NVMe-oF over both RoCE and TCP.

Enable Precision Timing

ConnectX-7 provides extremely accurate time synchronization for data-center applications and timing-sensitive infrastructures.

FEATURES

Network Interface

- Up to 4 network ports supporting NRZ, PAM4 (50G and 100G), in various ports configurations:
- 1 x 10/25/40/50/100/200/400GbE
- 2 x 10/25/40/50/100/200/400GbE
- 4 x 10/25/40/50/100/200GbE
- Up to 400Gb/s total bandwidth

Host Interface

- 32 lanes of PCIe Gen 5.0, compatible with PCIe Gen 2/3/4
- Integrated PCI switch
- NVIDIA Multi-Host™ (up to 8 hosts) and NVIDIA Socket Direct™
- MSI/MSI-X mechanisms
- Advanced PCIe capabilities

Networking

- RoCE, Zero Touch RoCE
- ASAP² - Accelerated Switch and Packet
- Processing® for SDN and VNF acceleration
- Single Root I/O Virtualization (SR-IOV)
- VirtIO acceleration
- Overlay network acceleration: VXLAN, GENEVE, NVGRE
- Programmable flexible parser: user-defined classification
- Connection tracking (L4 firewall)
- Flow mirroring, sampling and statistics
- Header rewrite
- Hierarchical QoS
- Stateless TCP offloads

VNF Acceleration

- Hardware offload programmable pipeline:
  - Packet classification on network layers L2 to L4 and tunneled traffic such as GTP and VXLAN
  - Packet dispatching to multiple cores
  - Multi-threaded API for concurrent update of offloaded rules
  - ASAP² accelerations/actions: counters, QoS, NAT, aging, mirroring, sampling, flow tag
  - Hairpin flow for full hardware offload
- Highly-scalable number of classifications and actions
- Application access to hardware statistics
- Application access to crypto offloads

Cyber Security

- IInline hardware IPsec encryption and decryption
  - AES-GCM 128/256-bit key
  - IPsec over RoCE
- Inline hardware TLS encryption and decryption
  - AES-GCM 128/256-bit key
- Inline hardware MACsec encryption and decryption
  - AES-GCM 128/256-bit key
  - AES-GCM-XPN 128/256-bit key
- Data-at-rest AES-XTS encryption and decryption
  - AES-XTS 256/512-bit key
- Platform security
  - Secure boot with hardware root-of-trust
  - Secure firmware update
  - On-board flash encryption

Advanced Timing and Synchronization

- Advanced PTP
  - IEEE 1588v2 (any profile)
  - Meets G.8273.2 Class C standard
  - PTP hardware clock (PHC) (UTC format)
  - 12 nanosecond accuracy
  - Line-rate hardware timestamp (UTC format)
- SyncE
  - Meets G.8262.1 (eEEC)
- Configurable PPS In and configurable PPS Out
- Time-triggered scheduling
- PTP-based packet pacing
- Time-based SDN acceleration (ASAP²)

Storage Accelerations

- NVMe™ over Fabrics (NVMe-oF) storage target offloads
- NVMe-oF™ over TCP/RoCE acceleration
- Storage protocols: iSER, NFSoRDMA, SMB Direct, NVMe-oF™, and more

HPC / AI

- All-to-All engine
- NVIDIA GPUDirect
- NVIDIA GPUDirect Storage

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
- I2C interface for device control and configuration
- General Purpose I/O pins
- SPI interface to flash
- JTAG IEEE 1149.1 and
- IEEE 1149.6

Remote Boot

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

Form Factors and Options

- PCIe HHHL/FHHL
- OCP 3.0 SFF

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