



NVIDIA MELLANOX BLUEFIELD-2 HIGH PERFORMANCE INFINIBAND & ETHERNET ADAPTER



NVIDIA® Mellanox® BlueField®-2 SmartNIC delivers advanced functionality, unmatched performance and agility for today's most demanding workloads. By combining the industry-leading ConnectX®-6 Dx network adapter with an array of Arm® cores, BlueField-2 delivers a perfect blend of hardware and software accelerations. BlueField-2 brings agile and high performance solutions for security, machine learning, cloud, edge computing and storage applications while reducing total cost of ownership.

BlueField-2 SmartNIC features the second generation BlueField-2 Data Processing Unit (DPU)—an innovative and high-performance programmable networking engine. The DPU integrates an array of eight powerful 64-bit Armv8 A72 cores interconnected by a coherent mesh with a DDR4 memory controller and a dual-port Ethernet or InfiniBand network adapter.

BlueField-2 SmartNIC supports dual ports of 10/25/50/100 Gb/s or a single port of 200 Gb/s Ethernet or InfiniBand, a 1 GbE out-of-band management port for the Arm subsystem, and includes an integrated 16-lane PCIe Gen 3.0/4.0 switch.

At the heart of BlueField-2 SmartNIC is the industry-leading ConnectX-6 Dx network adapter with unprecedented built-in hardware functionality, performance and resiliency. BlueField-2 hardware accelerations include advanced RDMA/RoCE capabilities as well as innovative cryptography, storage and networking accelerations. Relying on these built-in offloads, the BlueField-2 powerful array of Arm cores can be programmed for sophisticated custom accelerations and control path manipulations. BlueField-2 also benefits from the rich Arm ecosystem to deliver complete solutions to cloud operators and service providers.

Key Applications

- > Virtualized and bare metal cloud services
- > NVMe storage virtualization
- > Network Function Virtualization (NFV)
- > Security applications such as DDoS and Deep Packet Inspection (DPI)
- > Microservers built for edge computing

Portfolio

- > Dual ports of 10/25/50/100 Gb/s or a single port of 200 Gb/s
- > Supports Ethernet and InfiniBand protocols
- > 8GB/16GB on-board DDR4 memory
- > FHHL form factor

Key Features

- > Best-in-class hardware offloads with Arm processing power, including:
 - > ASAP² s- Accelerated Switch and Packet Processing[®]
 - > NVMe SNAP[™] storage emulation
 - > IPsec/TLS data-in-motion
 - > AES-XTS data-at-rest
 - > Regular expression (RegEx) and DPI accelerations
 - > SHA 256-bit hardware acceleration
- > Hardware Root of Trust (RoT)
- > 1 GbE out-of-band management port

FEATURES*

Network and Host Interfaces

Network Interfaces

- > Ethernet:
 - > Dual ports of 10/25/50/100 GbE, or
 - > Single port of 200 GbE
- > InfiniBand:
 - > Dual ports of up to EDR/HDR100 (100 Gb/s), or
 - > Single port of HDR (200 Gb/s)

PCI Express Interface

- > 8 or 16 lanes of PCIe Gen 3.0/4.0
- > PCIe switch with up to 8 downstream ports
- > Support for MSI/MSI-X

Arm/DDR Subsystem

Arm Cores

- > Up to 8 Armv8 A72 cores (64-bit) pipeline
- > Arm NEON™ 128b SIMD execution unit
- > Arm VFPv4 single and double precision floating point acceleration (IEEE 754)
- > Cache coherent mesh interconnect
- > Each 2 Arm cores share 1 MB L2 cache
- > 6 MB L3 cache with plurality of eviction policies

DDR4 DIMM Support

- > Single DDR4 DRAM controller
- > 8GB/16GB on-board DDR4
- > ECC error protection support

Hardware Accelerations

Security

- > IPsec/TLS data-in-motion encryption
 - > AES-GCM 128/256 bit key
- > AES-XTS 256/512 bit data-at-rest encryption
- > SHA 256 bit hardware acceleration
- > Regular expression (RegEx) acceleration
- > Arm A64, A32 & T32 cryptography instructions for:
 - > AES, SHA-1, SHA-224, and SHA-256
 - > Finite field arithmetic
- > Hardware Public Key Accelerator
 - > RSA, Diffie-Hellman, DSA, ECC, EC-DSA, EC-DH
- > True Random Number Generator (TRNG)
- > Hardware Root of Trust
 - > Cerberus compliant

Storage

- > NVMe SNAP™
- > NVMe over Fabric offloads

RDMA/RoCE

- > Zero-touch RoCE configuration
- > Selective repeat
- > Collective / vector collective operations
- > GPUDirect®
- > Enhanced atomic operations
- > 16 million I/O channels

TCP/IP Transport

- > Stateless offloads for:
 - > TCP/UDP/IP
 - > LSO/LRO/Checksum/RSS/TSS/HDS
 - > VLAN insertion/stripping

Hardware-based I/O Virtualization

- > SR-IOV
 - > Up to 1K Virtual Functions
 - > Up to 56 Physical Functions per host
- > VirtIO
- > Multi-function per port
- > VMware NetQueue support
- > Virtualization hierarchies
- > Virtualizing physical functions on a physical port
- > 1K ingress and egress QoS levels
- > Guaranteed QoS for VMs

Overlay Networks

- > Hardware offload of encapsulation and decapsulation of NVGRE, VXLAN and Geneve
- > Header rewrite (NAT)

Boot Options

- > Secure boot (RSA authenticated)
- > Remote boot over Ethernet/InfiniBand
- > Remote boot over iSCSI
- > PXE and UEFI

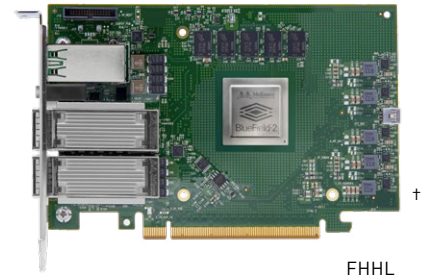
Software

Software Development Toolchain

- > Native and cross-compile GNU toolchain
- > Compatible with Arm DS-5 and other commercial development and profiling tools

Software Support

- > CentOS
- > Ubuntu Commercial Linux Distribution
- > Yocto-based Linux Distribution
- > OpenFabrics Enterprise Distribution (OFED)
- > Arm-optimized versions of all Mellanox drivers and software stack
- > IDS/IPS tools such as Snort and Suricata
- > Optimized Arm DPDK and ConnectX PMD



† For illustration only. Actual products may vary.

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

ORDERING INFORMATION

Table 1 - Part Numbers and Feature Set Breakdown

OPN	Max. Speed	No. of Ports	PCIe Support	Cores Speed	Crypto*	DDR Memory	16bE OOB	Form Factor
MBF2M526A-EENOT	100GbE/EDR	2x QSFP56	Gen 4.0 x16	2.0GHz	Crypto disabled	8GB on-board	Yes	FHHL Tall Bracket
MBF2M526A-EEEOT					Crypto enabled			
MBF2M516A-EENOT					Crypto disabled	16GB on-board		
MBF2M516A-EEEOT					Crypto enabled			
MBF2H526A-EENOT				2.5GHz	Crypto disabled	8GB on-board		
MBF2H526A-EEEOT					Crypto enabled			
MBF2H516A-EENOT					Crypto disabled	16GB on-board		
MBF2H516A-EEEOT					Crypto enabled			
MBF2H525A-HENOT**	200GbE/HDR	1x QSFP56	Gen 4.0 x16	2.5GHz	Crypto disabled	8GB on-board	Yes	
MBF2H525A-HEEOT**					Crypto enabled			

* Hardware Root of Trust (RoT) or secure boot is not supported on Crypto enabled models, please contact Mellanox for additional information.

** Please contact Mellanox for additional information.

Table 2 - Licenses Sold Separately

OPN	Description
BF1-NVMESNAP-BNS-1	One perpetual license to use NVMe SNAP on one adapter of BlueField-series. Includes Mellanox Technical Support and Warranty – Silver, 1 Year.
Contact Mellanox	One perpetual license to use RegEx acceleration on one adapter of BlueField-2. Includes Mellanox Technical Support and Warranty – Silver, 1 Year.

Support:

For information about Mellanox support packages, please contact your Mellanox Technologies sales representative or visit our [Support Index page](#).

Learn more at www.mellanox.com/products/smart_adapters

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