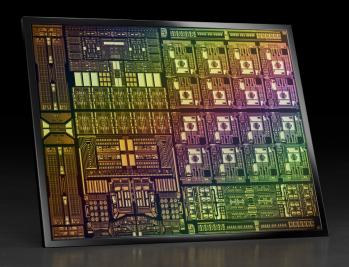


# **NVIDIA BLUEFIELD-3 DPU**

PROGRAMMABLE DATA CENTER INFRASTRUCTURE ON-A-CHIP



The NVIDIA® BlueField®-3 data processing unit (DPU) is the 3<sup>rd</sup>-generation data center infrastructure-on-a-chip that enables organizations to build software-defined, hardware-accelerated IT infrastructures from cloud to core data center to edge. With 400Gb/s Ethernet or NDR 400Gb/s InfiniBand network connectivity, BlueField-3 DPU offloads, accelerates, and isolates software-defined networking, storage, security, and management functions in ways that profoundly improve data center performance, efficiency, and security.

Providing powerful computing, and a broad range of programmable acceleration engines in the I/O path, BlueField-3 is perfectly positioned to address the infrastructure needs of the most demanding applications, while delivering full software backward compatibility through the NVIDIA DOCA $^{\text{\tiny{M}}}$  software framework.

BlueField-3 DPUs transform traditional computing environments into secure and accelerated virtual private clouds, allowing organizations to run application workloads in secure, multi-tenant environments. Decoupling data center infrastructure from business applications, BlueField-3 enhances data center security, streamlines operations and reduces total cost of ownership. Featuring NVIDIA's in-network computing technology, BlueField-3 enables the next generation of supercomputing platforms, delivering optimal bare-metal performance and native support for multi-node tenant isolation.

## **Portfolio**

- > 1, 2, 4 ports with up to 400Gb/s connectivity
- > 16GB on-board DDR5 memory
- > Form factors: HHHL, FHHL
- > M.2 / U.2 connectors options for direct attached storage
- > 1GbE out-of-band management port



BlueField-3 DPU - 2x 200Gb/s FHHL form factor

# KEY SOFTWARE-DEFINED, HARDWARE-ACCELERATED APPLICATIONS



### **Cloud Networking**

Cloud overlay, SDN acceleration, NAT, load balancer, NFV, video streaming



#### Storage

NVMe™ over Fabrics (NVMe-oF™), NVMe/ TCP™, elastic storage, hyper converged infrastructure (HCI), encryption, data integrity, data deduplication, decompression, erasure coding/RAID



## Security

Distributed nextgeneration firewall, IDS/ IPS, root of trust, microsegmentation, DDOS prevention



#### HPC / AI

Cloud-native supercomputing, multi-tenancy and security, communication accelerations



## Telco and Edge

Cloud RAN, virtualized edge gateways, VNF acceleration, edge microservers

## **FEATURES**

## **Network and Host Interfaces**

#### **Network Interfaces**

- > Ethernet 1, 2, 4 ports with up to 400 Gb/s connectivity
- InfiniBand Single port of NDR (400Gb/s), or dual ports of NDR200 / HDR (200Gb/s)

#### **PCI Express Interface**

- > 32 lanes of PCIe Gen 5.0
- > PCIe switch bi-furcation of up to 16 downstream ports
- > Non-transparent bridging (NTB) support

# Compute and Memory

#### **Arm CPU Cores**

- > Up to 16 Armv8.2+ A78 Hercules cores (64-bit)
- > 8MB L2 cache
- > 16MB LLC system cache

## **Programmable Datapath Accelerator**

- > 16 cores, 256 threads
- > Programmability through DOCA
- > Heavy multi-threading applications acceleration

## **DDR DIMM Support**

- > Dual DDR5 5600MT/s DRAM controllers
- > 16GB on-board DDR5
- > ECC error protection support

## Hardware Accelerations

## Security

- > Secure boot with Public key accelerator (PKA) root-of-trust
  - > Secure firmware update
  - > Flash encryption
  - > Cerberus compliant

### > Functional isolation layer

- > Regular expression (RegEx) matching processor
- > MACsec/IPsec/TLS data-in-motion encryption
  - > AES-GCM 128/256-bit key
- > AES-XTS 256/512-bit data-at-rest encryption
- > Connection tracking for stateful firewall
- > Public key accelerator (PKA)
  - > RSA, Diffie-Hellman, DSA, ECC, EC-DSA, EC-DH
- > True random number generator (TRNG)

#### Storage

- > BlueField SNAP Elastic block storage -NVMe<sup>™</sup> and VirtIO-blk
- > NVMe-oF<sup>™</sup> and NVMe/TCP<sup>™</sup> acceleration
- > Decompression engine
- > Erasure coding for RAID implementation
- > M.2 / U.2 connectors for direct attached storage

## **Networking**

- > RoCE, Zero Touch RoCE
- > ASAP<sup>2</sup> 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

# **HPC/AI Accelerations**

- > HPC / Al All-to-All engine
- > NVIDIA GPUDirect
- > NVIDIA GPUDirect Storage (GDS)

# > HPC MPI Tag Matching

# Advanced Timing and Synchronization

- > IEEE 1588v2 (any profile)
- > G.8273.2 Class C
- > PTP hardware clock (PHC)
- > Line rate hardware timestamp
- > SyncE
- > G.8262.1 (eEEC)
- > Configurable PPS In and PPS Out
- > Time triggered scheduling
- > Time-based SDN acceleration

### **Boot Options**

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

### **Management**

- > 1GbE out-of-band management port
- » NC-SI, MCTP over SMBus, and MCTP over PCIe
- > PLDM for Monitor and Control DSP0248
- > PLDM for Firmware Update DSP026
- > I<sup>2</sup>C interface for device control and configuration
- > SPI interface to flash
- > eMMC memory controller
- > UART
- > USB

# ORDERING INFORMATION

For information about NVIDIA ordering information, please contact your NVIDIA sales representative.

Support: For information about NVIDIA support packages, please contact your NVIDIA sales representative or visit our Support Index page.

To learn more about the NVIDIA BlueField-3 visit www.nvidia.com/dpu

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