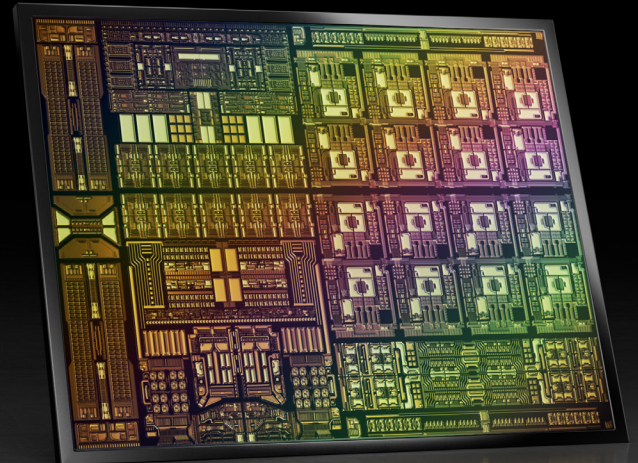




NVIDIA BLUEFIELD-3 DPU

PROGRAMMABLE DATA CENTER INFRASTRUCTURE ON-A-CHIP



The NVIDIA® BlueField®-3 data processing unit (DPU) is the 3rd-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™ 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, de-compression, erasure coding/RAID



Security

Distributed next-generation firewall, IDS/IPS, root of trust, micro-segmentation, 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™ and VirtIO-blk
- > NVMe-oF™ and NVMe/TCP™ acceleration
- > Decompression engine
- > Erasure coding for RAID implementation
- > M.2 / U.2 connectors for direct attached storage

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

HPC/AI Accelerations

- > HPC / AI 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 (eEEEC)
- > 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
- > I²C 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

© 2021 NVIDIA Corporation. All rights reserved. NVIDIA, the NVIDIA logo, Accelerated Switch and Packet Processing (ASAP²), BlueField, NVIDIA DOCA, ConnectX, GPUDirect, and BlueField SNAP are trademarks and/or registered trademarks of NVIDIA Corporation in the U.S. and other countries. Other company and product names may be trademarks of the respective companies with which they are associated. All other trademarks are property of their respective owners.

ARM, AMBA, and ARM Powered are registered trademarks of ARM Limited. Cortex, MPCore and Mali are trademarks of ARM Limited. "ARM" is used to represent ARM Holdings plc; its operating company ARM Limited; and the regional subsidiaries ARM Inc.; ARM KK; ARM Korea Limited.; ARM Taiwan Limited; ARM France SAS; ARM Consulting (Shanghai) Co. Ltd.; ARM Germany GmbH; ARM Embedded Technologies Pvt. Ltd.; ARM Norway, AS and ARM Sweden AB. APR21

