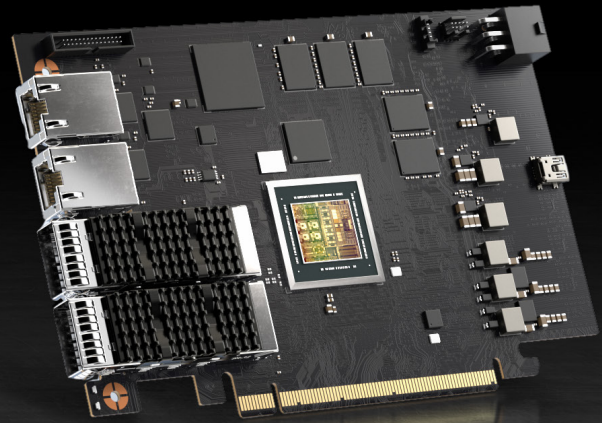# NVIDIA BLUEFIELD-2 DPU
Data Center Infrastructure on a Chip

The NVIDIA® BlueField®-2 data processing unit (DPU) is the world's first data center infrastructure-on-a-chip optimized for traditional enterprises' modern cloud workloads and high performance computing. It delivers a broad set of accelerated software-defined networking, storage, security, and management services with the ability to offload, accelerate and isolate data center infrastructure. With its 200Gb/s Ethernet or InfiniBand connectivity, the BlueField-2 DPU enables organizations to transform their IT infrastructures into state-of-the-art data centers that are accelerated, fully programmable, and armed with "zero trust" security to prevent data breaches and cyber attacks.

By combining the industry-leading NVIDIA ConnectX®-6 Dx network adapter with an array of Arm® cores and infrastructure-specific offloads, BlueField-2 offers purpose-built, hardware-acceleration engines with full software programmability. Sitting at the edge of every server, BlueField-2 empowers agile, secured and high-performance cloud and artificial intelligence (AI) workloads, all while reducing the total cost of ownership and increasing data center efficiency.

The NVIDIA DOCA™ software framework enables developers to rapidly create applications and services for the BlueField-2 DPU. NVIDIA DOCA makes it easy to leverage DPU hardware accelerators, providing breakthrough data center performance, efficiency and security.

Key Software-Defined, Hardware-Accelerated Applications

Networking
vSwitch/vRouter, NAT, load balancer, NFV

Storage
NVMe™ over fabrics (NVMe-oF™), elastic storage virtualization, hyper converged infrastructure (HCI), encryption, data integrity, compression, data deduplication

Security
Next-Generation firewall, IDS/IPS, root of trust, micro-segmentation, DDOS prevention

KEY FEATURES

Security
> Hardened isolation layer
> Hardware root of trust
> IPsec/TLS and AES-XTS encryption acceleration
> Connection tracking for stateful firewall and IDS/IPS
> Regular expression (RegEx) matching processor

Storage
> NVIDIA GPUDirect® Storage
> Elastic block storage enabled by BlueField SNAP storage virtualization
> Compression and decompression acceleration
> NVMe-oF acceleration
> VirtIO-blk acceleration

Networking
> RoCE, Zero Touch RoCE
> GPUDirect
> SDN acceleration powered by NVIDIA ASAP² - Accelerated Switching and Packet Processing®
> Overlay network offloads including VXLAN

Management
> Authenticated product life-cycle management
> Telemetry agents

Portfolio
> Dual ports of up to 100Gb/s, or a single port of 200Gb/s Ethernet or InfiniBand
> 16GB / 32GB of on-board DDR4 memory
> Card form factors: HHHL, and FHHL
> 1GbE out-of-band management port

Features

NETWORK AND HOST INTERFACES

Network Interfaces

> Ethernet - Dual ports of 10/25/50/100Gb/s, or a single port of 200Gb/s
> InfiniBand - Dual ports of EDR / HDR100, or single port of HDR

PCI Express Interface

> 8 or 16 lanes of PCIe Gen 4.0
> PCIe switch bi-furcation with 8 downstream ports

ARM/DDR SUBSYSTEM

Arm Cores

> Up to 8 Armv8 A72 cores (64-bit) pipeline
> 1MB L2 cache per 2 cores
> 6MB L3 cache with plurality of eviction policies

DDR4 DIMM Support

> Single DDR4 DRAM controller
> 16GB / 32GB of on-board DDR4
> ECC error protection support

HARDWARE ACCELERATIONS

Security

> Secure boot with hardware root-of-trust
>> Secure firmware update
>> Cerberus compliant
> Regular expression (RegEx) acceleration
> 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
> Hardware public key accelerator
>> RSA, Diffie-Hellman, DSA, ECC, EC-DSA, EC-DH
> True random number generator (TRNG)

Storage

> BlueField SNAP - NVMe™ and VirtIO-blk
> NVMe-oF™ acceleration
> Compression and decompression acceleration
> Data hashing and deduplication

Networking

> RoCE, Zero Touch RoCE
> Stateless offloads for:
>> TCP/UDP/IP
>> LSO/LRO/checksum/RSS/TSS/HDS
>> VLAN insertion/stripping
> SR-IOV
> VirtIO-net
> Multi-function per port
> VMware NetQueue support
> Virtualization hierarchies
> 1K ingress and egress QoS levels

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 MCT 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

BlueField-2 DPU - 2x 25Gb/s HHHL form factor

BlueField-2 DPU - 2x 100Gb/s FHHL form factor
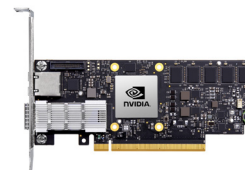
BlueField-2 DPU - 1x 200Gb/s HHHL form factor

Ordering Information

For information about NVIDIA ordering information, please contact your NVIDIA sales representative or visit our Nvidia BlueField-2 User Guide index page:

> **NVIDIA BlueField-2 Ethernet boards**
> **NVIDIA BlueField-2 InfiniBand/VPI boards**

Learn more

Find out more about NVIDIA BlueField-2 at **nvidia.com/dpu**

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