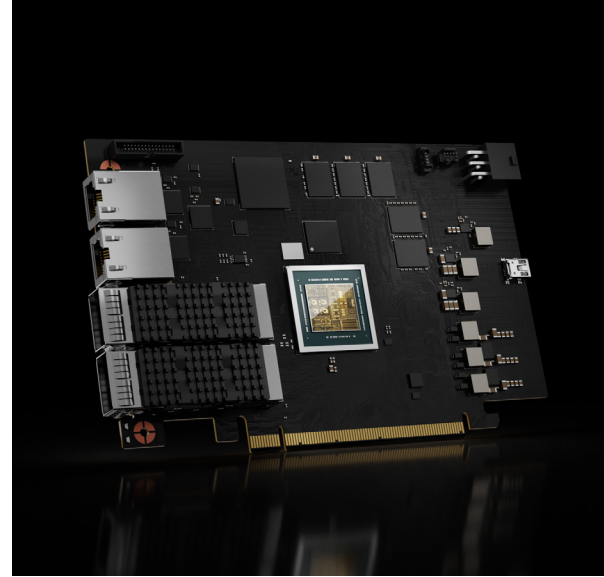Datasheet

NVIDIA.

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 accelerated computing and modern cloud workloads. It delivers a broad set of software-defined, hardware-accelerated 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 cyberattacks.

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, secure, 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, hyperconverged infrastructure (HCI), encryption, data integrity, compression, data deduplication

Security

Next-generation firewall, 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

Storage

> NVIDIA GPUDirect® Storage

> Elastic block storage enabled by BlueField SNAP storage virtualization

> Compression and decompression acceleration

> NVMe-oF acceleration

> Virtio-blk acceleration

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 a 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 onboard DDR4

> ECC error protection support

Hardware Accelerations

Security

> Secure boot with hardware root-of-trust
  - Secure firmware update
  - Cerberus compliant

> 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

> Multifunction 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

Networking

> RoCE, Zero Touch RoCE

> GPUDirect RDMA

> SDN acceleration powered by NVIDIA ASAP^2 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 onboard DDR4 memory

> Card form factors: HHHL, and FHHL

> 1GbE out-of-band management port

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
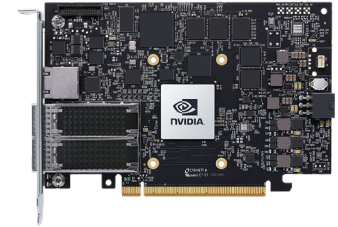
> eMMC memory controller

> UART

> USB

Ordering Information

For NVIDIA ordering information, please contact your NVIDIA sales representative or visit our NVIDIA BlueField-2 User Guide index page:
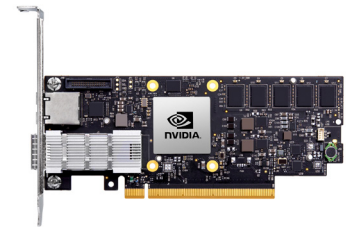
> **NVIDIA BlueField-2 Ethernet boards**

> **NVIDIA BlueField-2 InfiniBand/VPI boards**
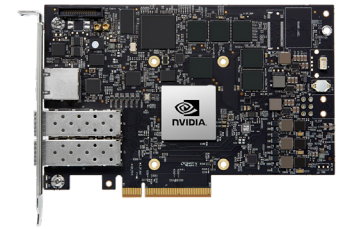
BlueField-2 DPU - 2x 25Gb/s HHHL form factor

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

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

Ready to Get Started?

To learn more about NVIDIA BlueField-2, visit **nvidia.com/dpu**

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