
FOR ALIBABA ONLY
FOR ALIBABA ONLY
FOR ALIBABA ONLY
DOCA V1.2 RELEASE
NOVEMBER 2021

DOCA 1.2 USE CASES

Extend threat protection using DOCA for Zero Trust

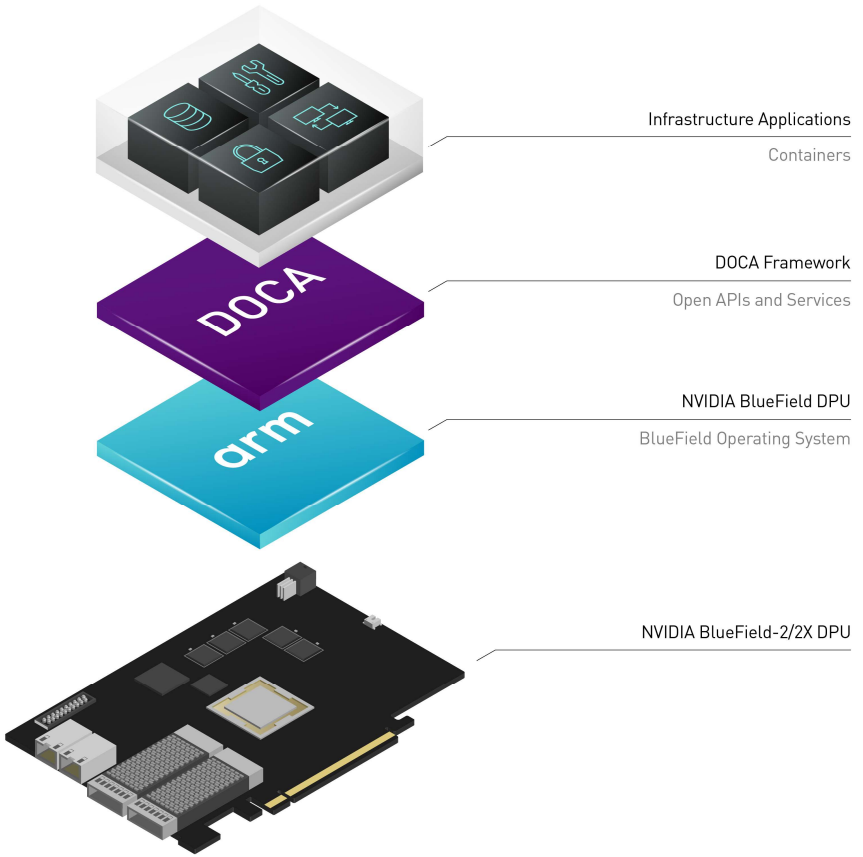
- Intelligent Next Gen Firewall offload with DOCA FLOW remote APIs
- Malicious file scan with DOCA reference application and RegEx
- User space uTLS encryption with XLIO

- High scale virtualized cloud with DPDK scalable functions
- Enhanced network visibility with DOCA Telemetry Service
- Data network gateway with DOCA FLOW APIs

- Composable storage for bare metal with lower latency using SNAP
- Local storage encryption with DPDK AES-XTS (lookaside)

DOCA 1.2

Products	DOCA v1.2
	BlueField OS v3.8 (bundled with DOCA)
Platforms	BlueField-2 DPU 25G & 100G - GA
	BlueField-2 DPU 25G & 100G w/ BMC – GA*
	BlueField-2 DPU 200G – GA
Key Features	App Shield Lib (Beta)
	FLOW Lib remote APIs for Firewall
	Telemetry service
	Base Container & Devel experience for DOCA Services
	Accelerated TLS support for OpenSSL 1.1.1
	Storage Accelerators DV API – AES-XTS & DMA Engine
	Support DPU on card BMC
Availability	Software download
Actions	Promote DOCA for Zero Trust in the cloud
	Promote early access to new DOCA services



INTRODUCING DOCA 1.2

Secures Infrastructure and Applications in the Software-Defined, Hardware-Accelerated Cloud

DOCA Zero-trust security framework & App Shield

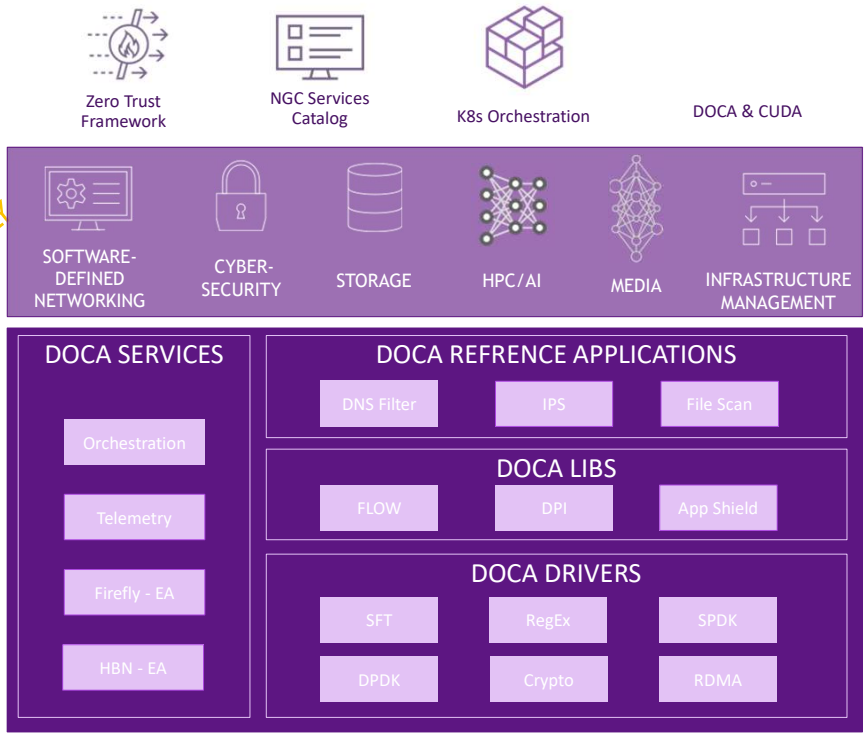
Supporting BlueField as a sensor for Morpheus

New remote APIs for DOCA FLOW and DPI libs

New security reference applications for Intrusion Protection and file scanning

New DOCA Services Infra with NGC base container for developers

DOCA Telemetry Service for real time visibility with new DOCA APIs for high performance streaming

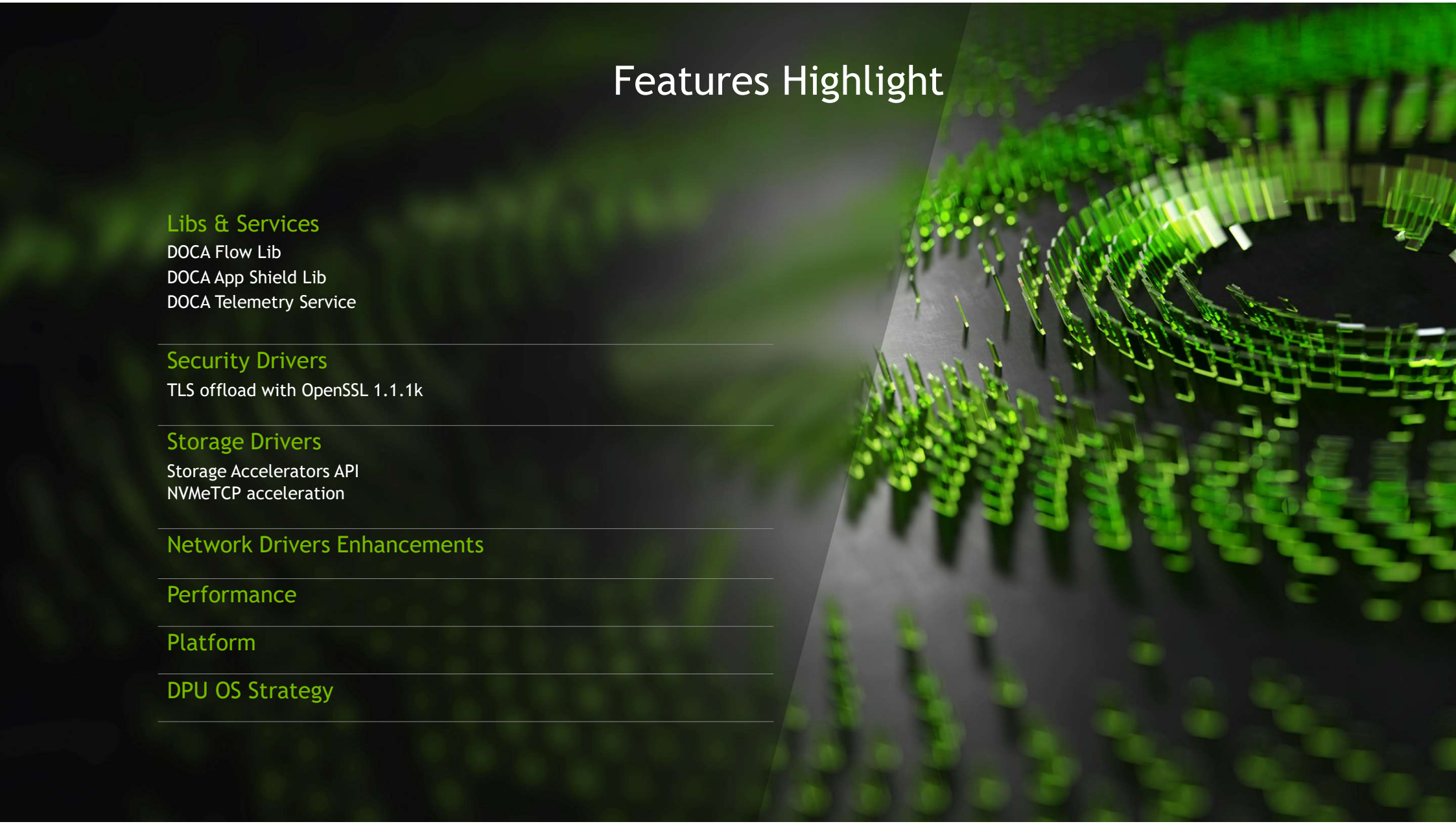


108 New DOCA APIs

DOCA Developers

NVIDIA

Features Highlight



Libs & Services

DOCA Flow Lib
DOCA App Shield Lib
DOCA Telemetry Service

Security Drivers

TLS offload with OpenSSL 1.1.1k

Storage Drivers

Storage Accelerators API
NVMeTCP acceleration

Network Drivers Enhancements

Performance

Platform

DPU OS Strategy


NVIDIA
FOR ALIBABA ONLY
FOR ALIBABA ONLY
FOR ALIBABA ONLY
LIBS & SERVICES
HIGHLIGHTED FEATURES

Programming Guide

DOCA FLOW LIBRARY (BETA)

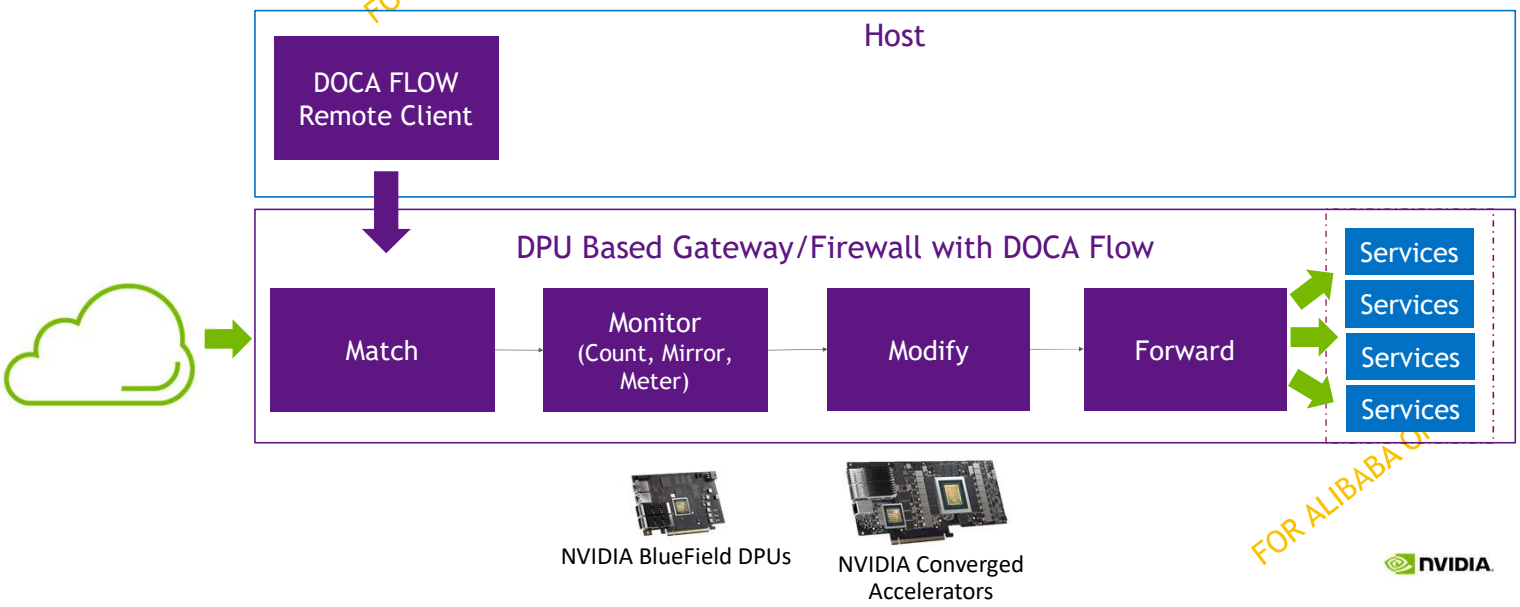
Creating Optimized and Accelerated Networking Pipes

Developer's Benefits

- New! remote API calls from host application using DOCA gRPC
- Simplicity and scale through dedicated use case APIs and logic
- Tuned for best performance and multi-threading
- VNF and Appliance
- High insertion rate

Use Cases

- L4 Firewall
- Data network gateway
- Service Load balancer
- Carrier Grade NAT



NVIDIA

DOCA APP SHIELD LIB (BETA)

Shield Your Host Services with Adaptive Cloud Security

Programming Guide

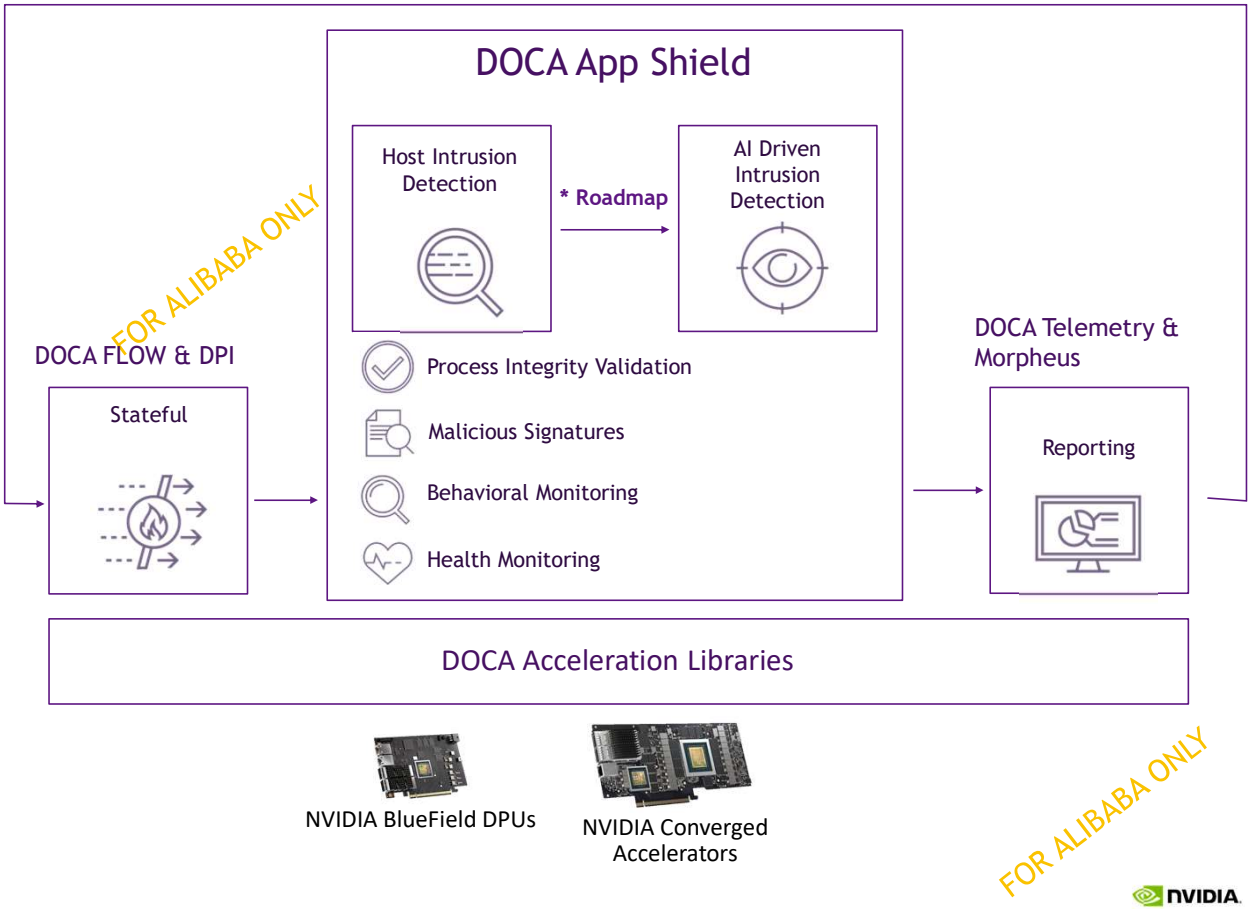
Solution Brief

Developer's Benefits

- DOCA library for enhancing Host-IDS
- Robust against attacks on a host machine or tenants
- Minimal host resources utilization leveraging DPU acceleration
- Quickly adapting to new threats with no impact on Host software

Use Cases

- Host-IDS
- Additional security layer for host/VM security services



Programming Guide

DOCA TELEMETRY SERVICE

Complete Data Center Visibility

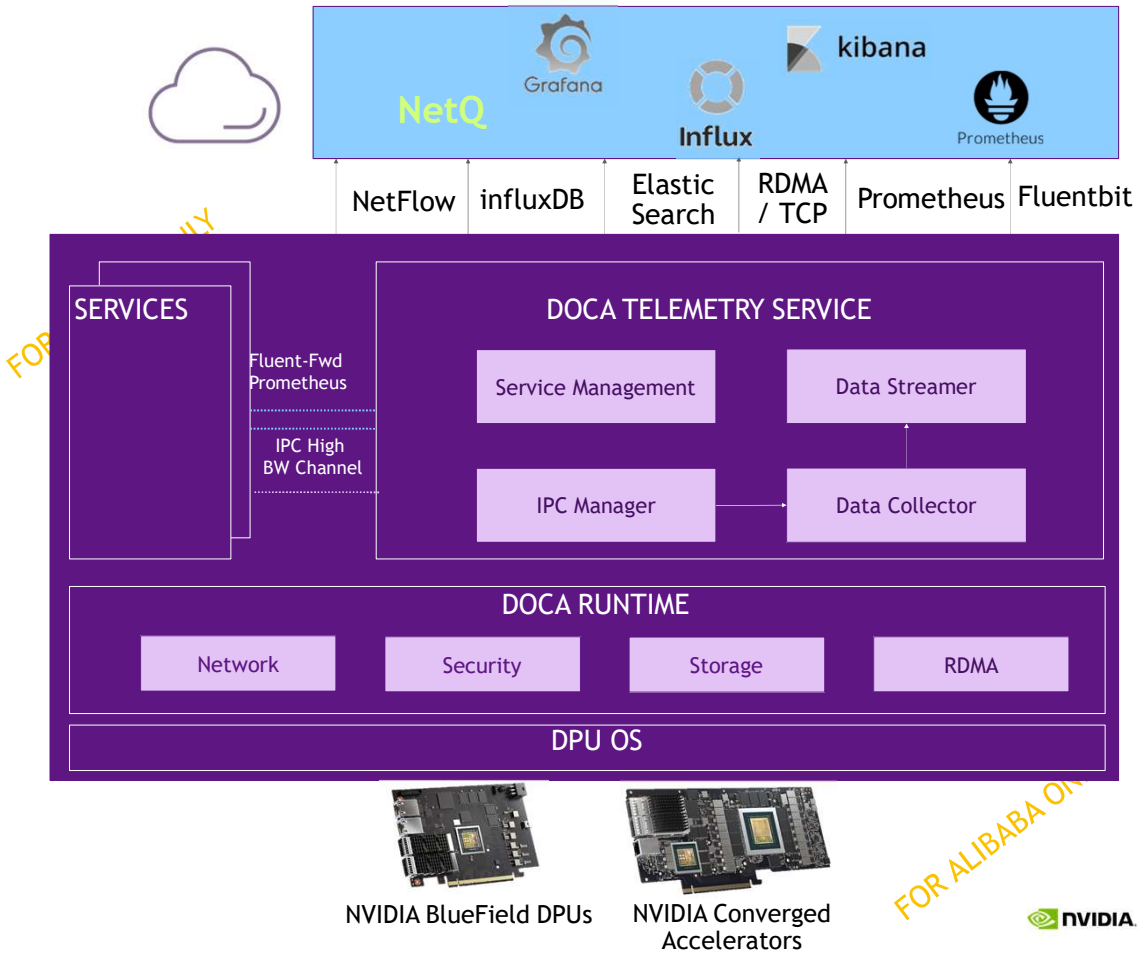
Comprehensive telemetry from DPU, GPU & Host

New! DOCA APIs for high bandwidth channel for intensive data streaming

Multiple steaming protocols supported

Hardware performance counters

DOCA telemetry aggregation support for fleet of DPUs, GPUs and Hosts




FOR ALIBABA ONLY
FOR ALIBABA ONLY
FOR ALIBABA ONLY
SECURITY DRIVERS
HIGHLIGHTED FEATURES

TLS INLINE OFFLOAD

Extending support for OpenSSL

New Support for TLS HW offload with OpenSSL 1.1.1k

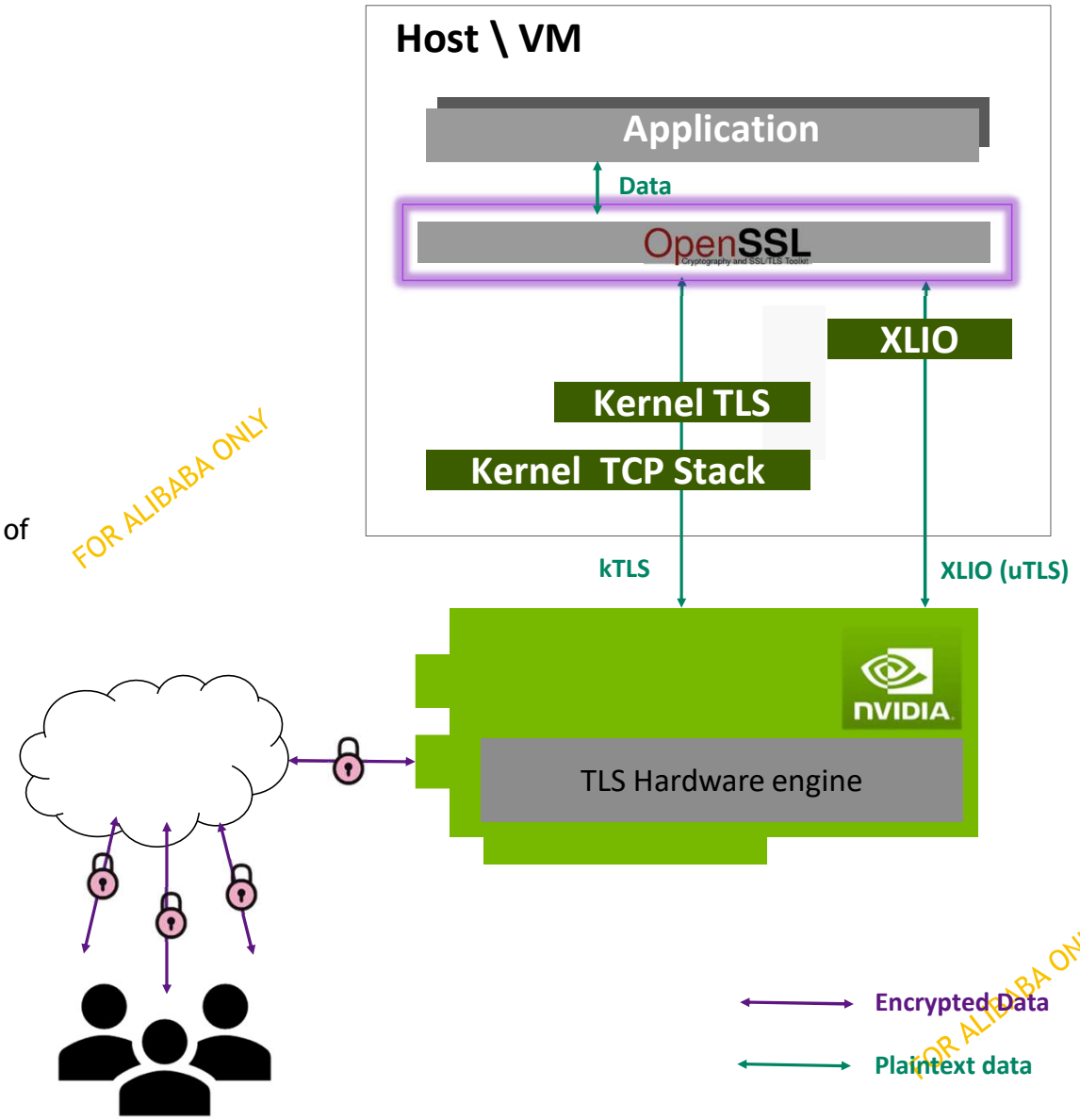
Version 1.1.1 is the most widely used and supported version of OpenSSL

On top of existing support for OpenSSL 3.0

Update: OpenSSL 3.0 is now also formally released by the community as of Sep 2021

Suitable for TLS implementation with –

- Kernel – kTLS
- User space – uTLS using the XLIO Kernel bypass library




FOR ALIBABA ONLY
NVIDIA
FOR ALIBABA ONLY
STORAGE DRIVERS
HIGHLIGHTED FEATURES
FOR ALIBABA ONLY

STORAGE ACCELERATORS API

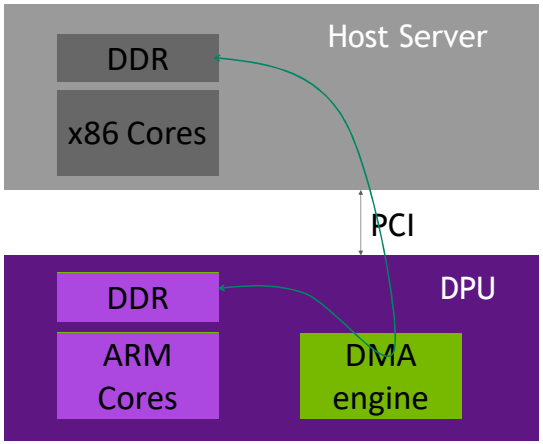
Low level user-space API is now available for DMA engine

DPU DMA engine for memory to memory copy between host and DPU arm core's memory (in any direction)

See DV API man pages - mlx5dv_wr_memcpy() documented: https://github.com/linux-rdma/rdma-core/blob/master/providers/mlx5/man/mlx5dv_wr_post.3.md

DPU DMA engine can be used in many use cases. In storage use-case this DMA engine is used with SNAP to accelerate and cut latency when moving data/control from host to DPU and back for all emulated interfaces

DPU DMA is capable of 200Gb/s



STORAGE ACCELERATORS API

AES-XTS engine is an inline engine capable of up to 200Gb/s bi-dir throughput in RoCE/RDMA traffic

Low level user-space API is now available for AES-XTS engine

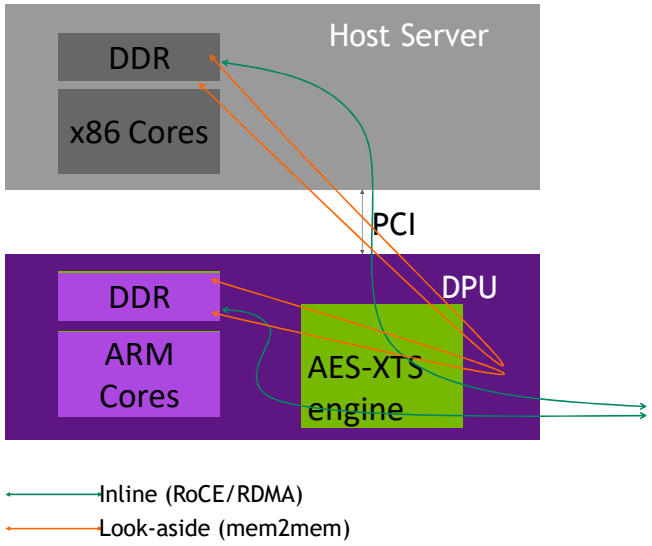
Inline (RoCE/RDMA) and look-aside (mem2mem) crypto acceleration for storage at-rest encryption/decryption – AES-XTS

- See DV API man pages - https://github.com/linux-rdma/rdma-core/blob/master/providers/mlx5/man/mlx5dv_wr_set_mkey_crypto.3.md
- Roadmap – integration with kernel NVMe-oF, fscrypt, dmcrypt and SPDK NVMe-oF

DPDK User Space look-aside storage crypto acceleration

DPDK look-aside ONLY (mem2mem) crypto acceleration for storage at-rest encryption/decryption – AES-XTS

- See DPDK.org man pages - https://doc.dpdk.org/guides/cryptodevs/mlx5.html



NVMeTCP ACCELERATION

Early Access POC

BlueField DPU SNAP use case

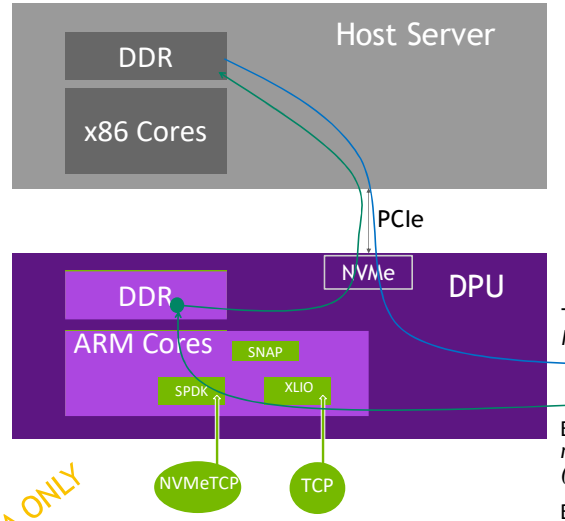
Implementing zero copy in TX and RX paths

- TX zero-copy – host buffer is sent directly to network
- BlueField-2 RX zero-copy – data lands in DPU DDR NVMeTCP stack and copied to host
- (roadmap) BlueField-3 RX zero-copy – data lands on host directly

Using SNAP (NVMe emulation), SPDK (NVMeTCP) and XLIO (user-space TCP stack)

4K block size Phase1 POC perf – TX 2MIOPS, RX 1.2MIOPS

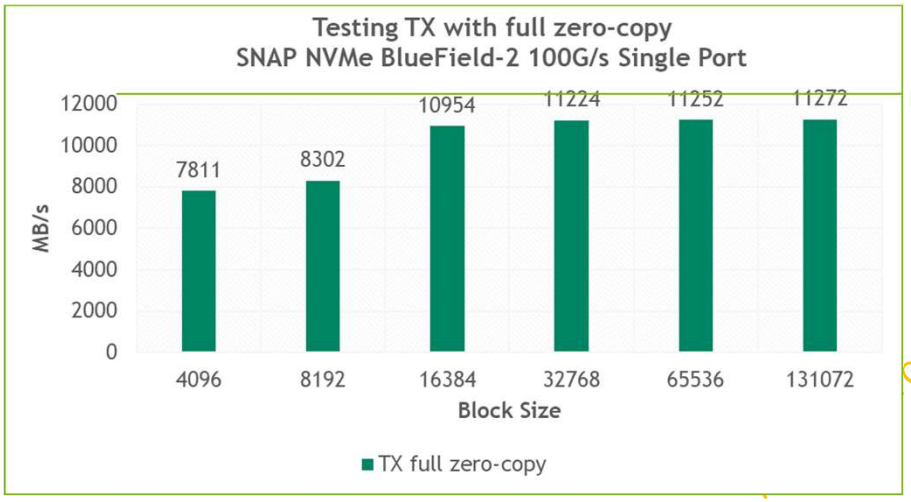
Please approach your NVIDIA support team for more detais



TX zero-copy Data path
host buffer sent directly to network

BlueField-2 RX zero-copy Data path
network data lands in NVMeTCP buffer (skipping TCP buffer), then copied to host

BlueField-3 RX zero-copy Data path
network data lands in host memory (roadmap)



100G line-rate


FOR ALIBABA ONLY
FOR ALIBABA ONLY
FOR ALIBABA ONLY
NVIDIA
NETWORKING DRIVERS
ENHANCEMENTS

CLOUD & TELCO

ACCELERATION, SCALE AND OFFLOAD UPDATES

DPDK

- DPDK API support for 256 Scalable Function (SF) interfaces per port (support more virtual interfaces)
- DPDK Look aside crypto acceleration (see storage slide for more info)

OVS-DPDK

- Support for GRE tunneling (encap/decap)

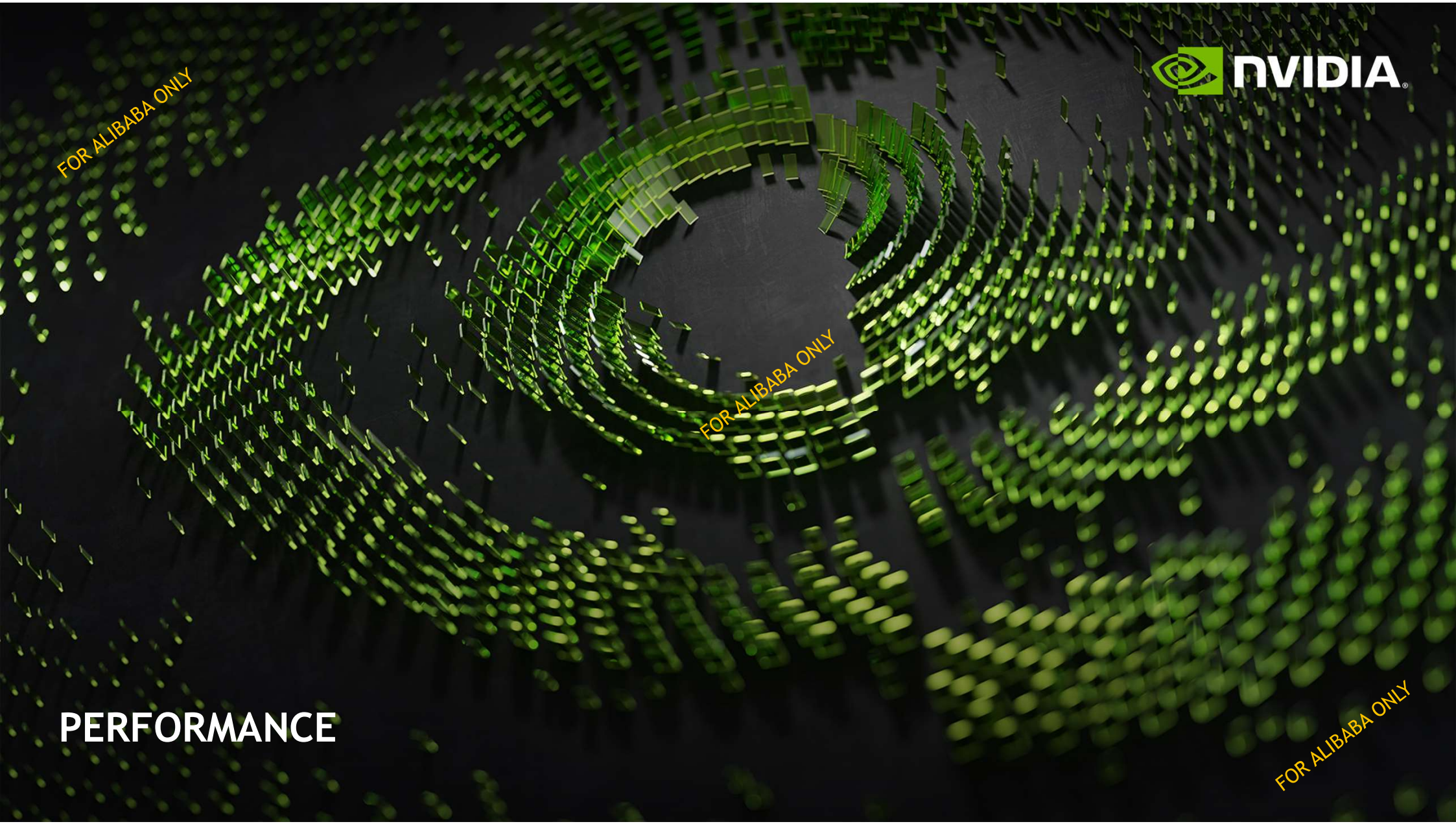
ASAP^2 Kernel

- Support forwarding to multiple destinations (<=32)
- VLAN offload (push on Rx, pop on Tx)

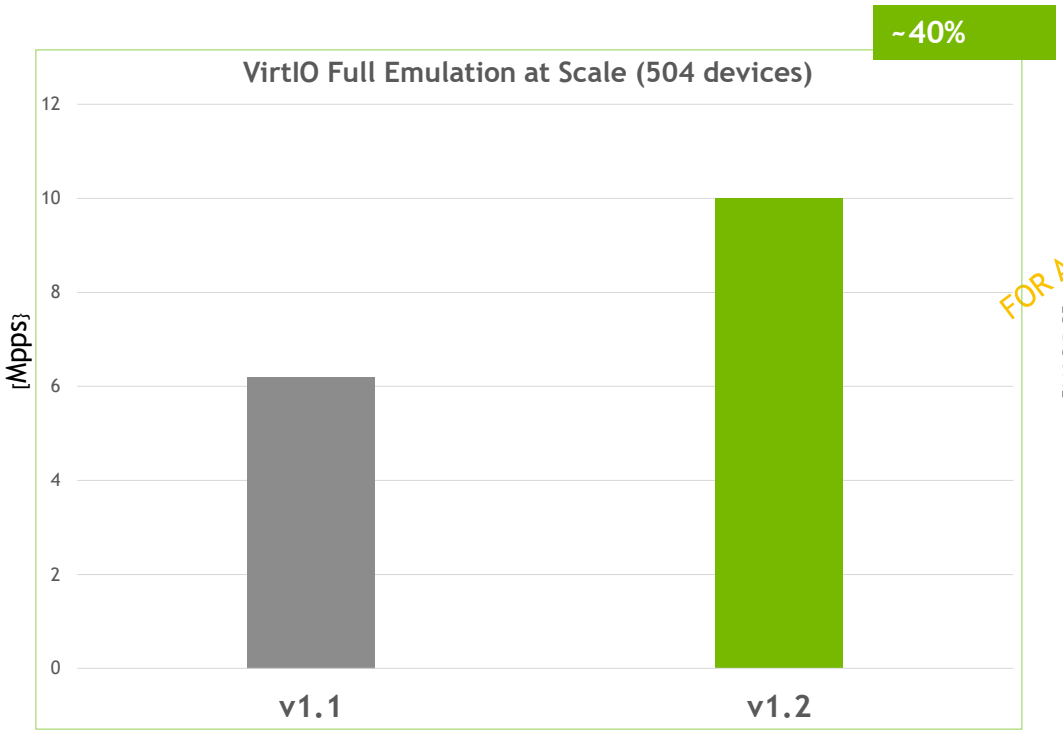
DPDK
DATA PLANE DEVELOPMENT KIT

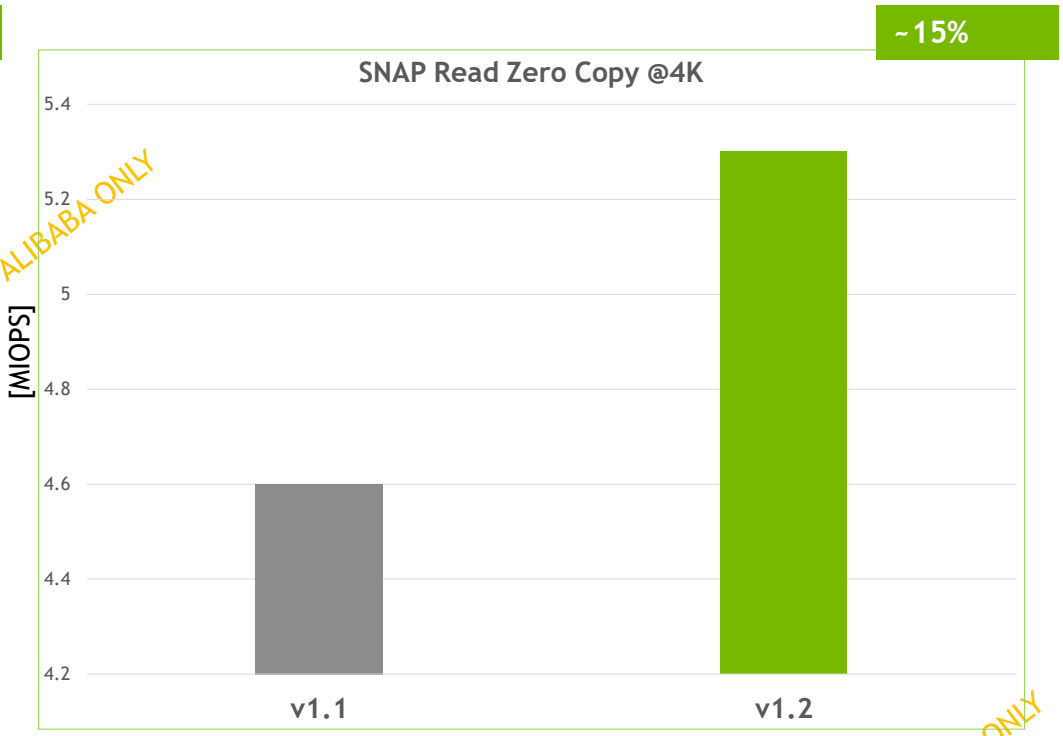
OvS
Open vSwitch

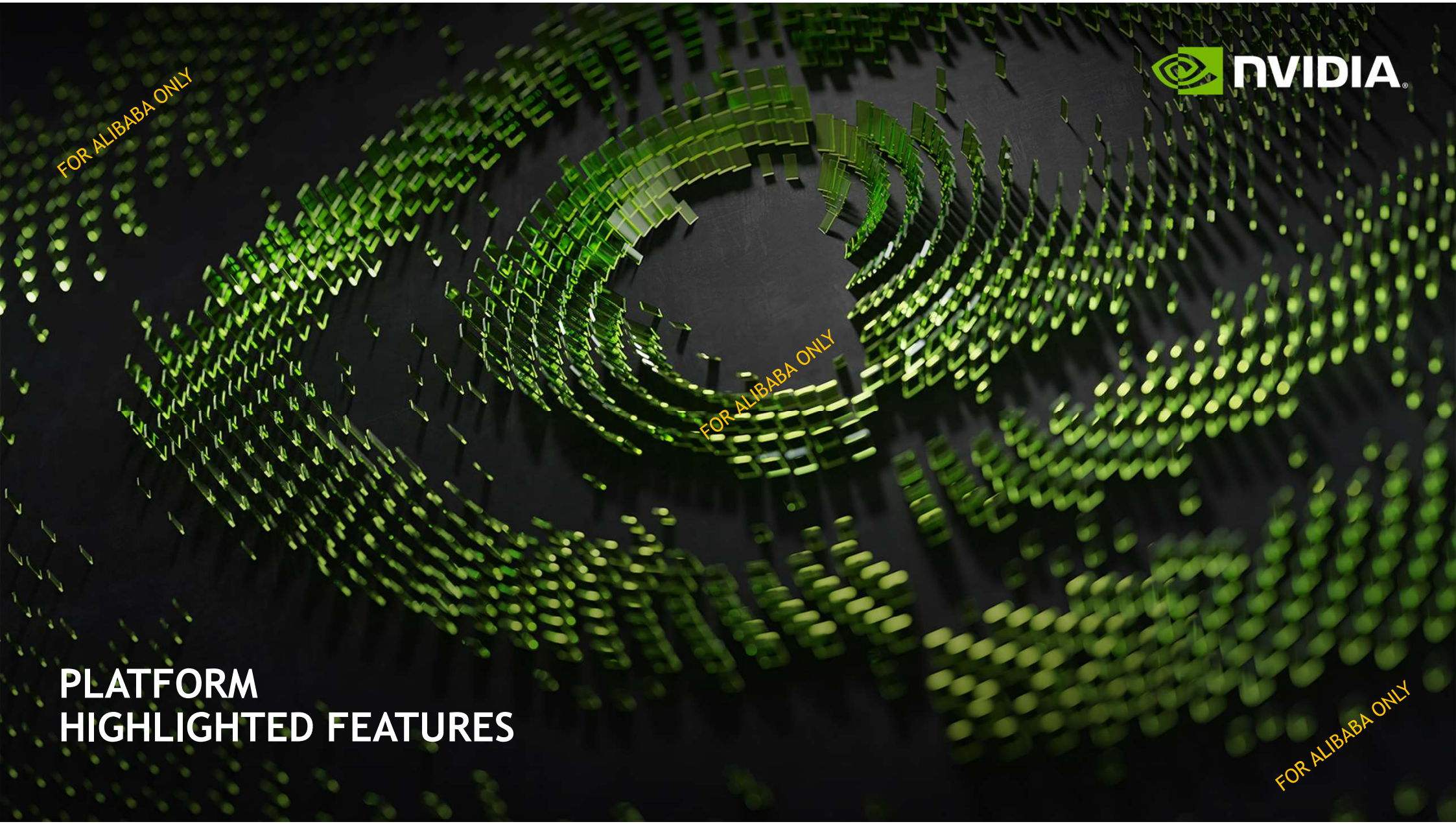
ASAP2
Accelerated Switching & Packet Processing


FOR ALIBABA ONLY
NVIDIA
FOR ALIBABA ONLY
PERFORMANCE
FOR ALIBABA ONLY

DOCA 1.2 RUNTIME PERFORMANCE IMPROVEMENTS






FOR ALIBABA ONLY
FOR ALIBABA ONLY
FOR ALIBABA ONLY
PLATFORM
HIGHLIGHTED FEATURES

DPU MANAGEMENT

Support DPU on card BMC

Secured domain for bare metal

DPU life cycle including provisioning, monitoring & telemetry

ARM software recovery in an isolated mode

Support all management interfaces to DPU w/o platform changes

Support OpenBMC, IPMI 2.0 and standard management tools

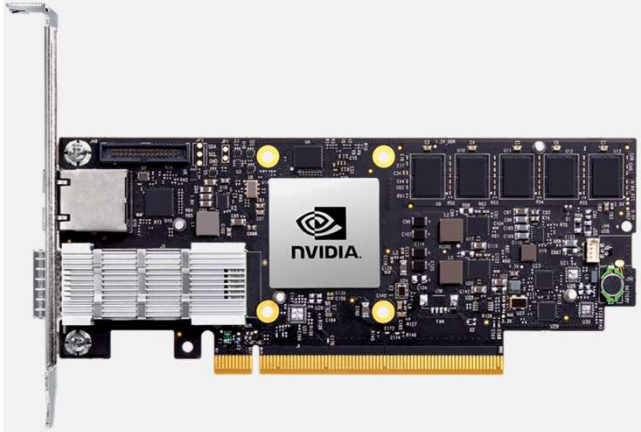
DPU BMC User Manual is now available (v2.8.2)

BLUEFIELD-2 NEW PORTFOLIO

2P X 25G WITH BMC - FHHL

2P X 100G WITH BMC - FHHL

1P X 200G - HHHL



NVIDIA DPU OPERATIONS 1.1.0

Adds capability to provision and operate DPUs with a BMC

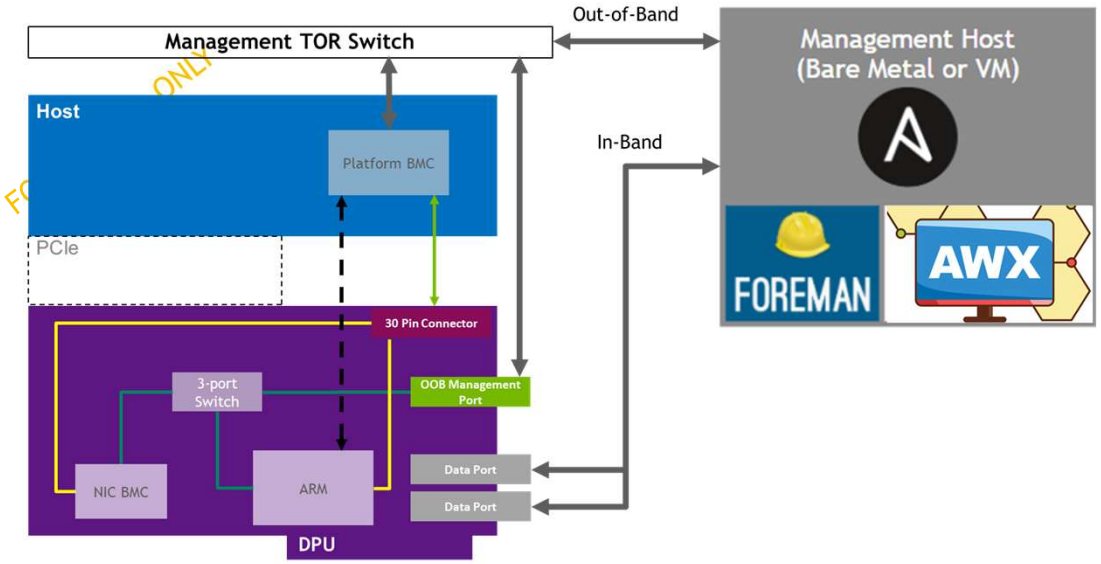
Support for BlueField-2 25GbE with BMC and 100GbE with no BMC

BlueField-2 Ubuntu Server 20.04 BFB v3.7.1

Combines the power of Ansible® and The Foreman Project to automate initial deployment and configuration of DPUs

Automated operations like initial provisioning, firmware upgrades, mode switching

Available for download upon request, please approach your NVIDIA support team



SUPPORTED OS

DPU ARM OS

- Ubuntu Server 20.04 Kernel 5.4 [default]
- CentOS 7.6 (drivers only for 5.4 LK)
  CentOS 8.2 (drivers only native LK and LK 5.4)
- Debian 10 (drivers only)

HOST OS

- Ubuntu 16.04 / 18.04 / 20.04
- RHEL/CentOS 7.5 / 7.6 / 8.0 / 8.2
- Debian 9.11
- Windows Server 2016, 2019
  (DOCA support is roadmap)


NVIDIA
FOR ALIBABA ONLY
FOR ALIBABA ONLY
FOR ALIBABA ONLY
BLUEFIELD OS STRATEGY

OS STRATEGY HIGLIGHTS

- The next slides ouline NVIDIA strategy to address the need for additional support for OS distributions and kernels other than the default OS (Ubuntu 20.04, 5.4)

- Nvidia will support the two options below:
  - **Option 1:** Supporting selected OS Vendors in certifying and releasing their OS for DPU
  - **Option 2:** Customer build their own BFB with their selected OS and Nvidia supported kernel (partially supported today)

- Start supporting date for options 1& 2: Q2 2022

- Current OS vendor support:
  - Option 1: VMware, Red Hat
  - Option 2: CentOS, Debian

OPTIONS SUMMARY

		OS build Owner	OS Seller	Cards sold w/ or w/o OS	Test & certification Owner	Support Owner	OS Pre-installed on cards by NVIDIA	Inclusion of non-upstream code
Option 1	NVIDIA supports selected OS Vendors in certifying and releasing their OS for DPU	OS Vendor [1]	OS Vendor\ customer Specific [2]	w/o	OS Vendor - primary NVIDIA - secondary	OS Vendor	No (Ubuntu is installed as default)	OS Vendor to decide
Option 2	Customer build their own BFB with their selected OS and Nvidia kernel	Customer \ Partner	None	w/o	NVIDIA for selected OS for drivers only	NVIDIA for selected OS for drivers only	No (Ubuntu is installed as default)	Yes

Option 1 & Option 2 will be supported on NVIDIA supported kernel versions only.

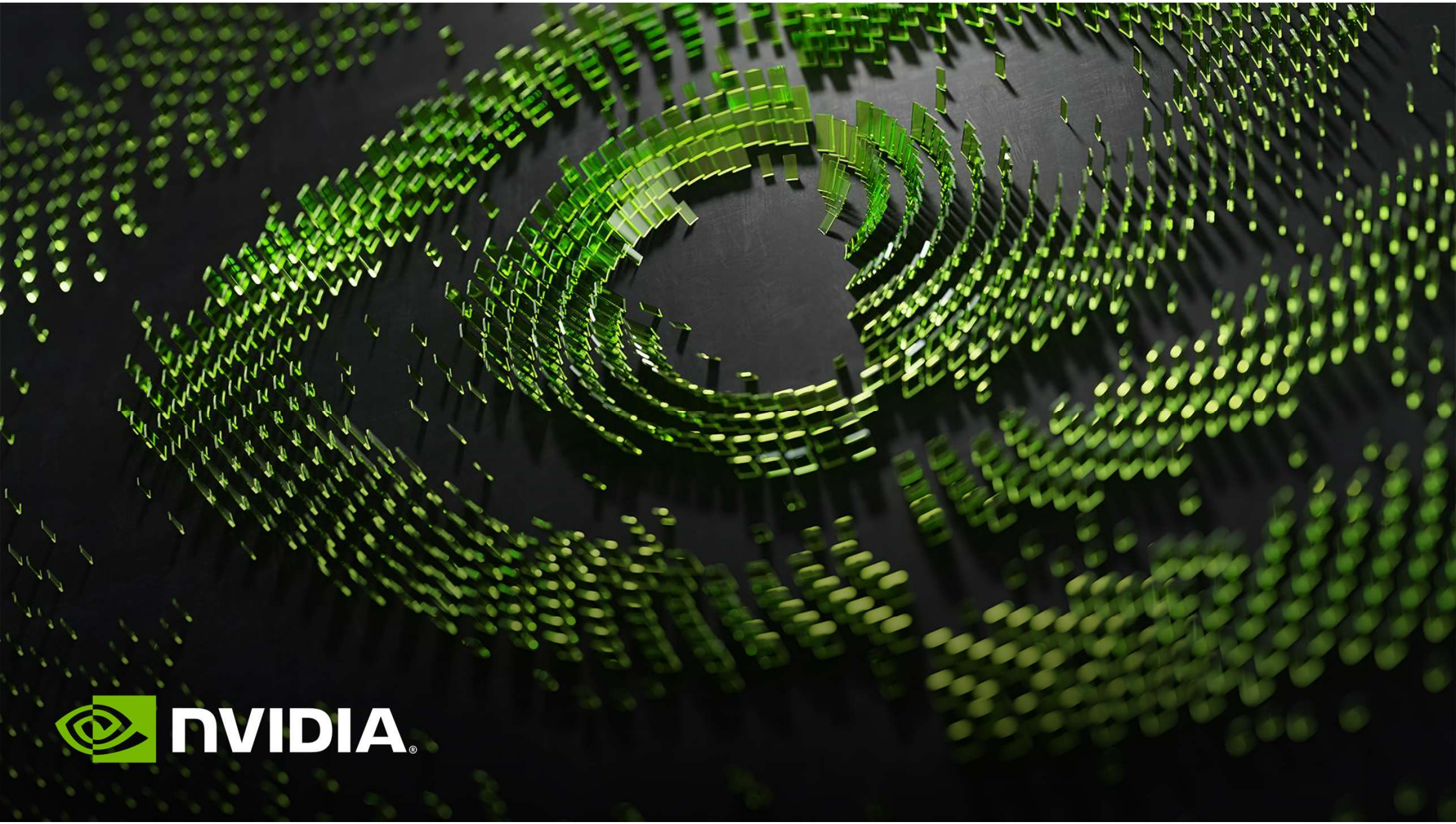
Note 1: Not including open-source OS
Note 2: In some cases, customers may need this OS for internal use only

FOR ALIBABA ONLY

OPTION 2 POLICY

- NVIDIA provides only drives + NVIDIA customized kernel for a specific list of foreign OSs[1]. The list of supported OSs is published on the NVIDIA site.
- NVIDIA has no liability or commitment to support the foreign OSs[1] used to build the BFB
- All OS security issue or any other OS bugs are to be addressed by the customer and not NVIDIA
- NVIDIA will provide instructions to build BFB to partners and customers who choose to use foreign OSs[1]
- BlueField products use secure boot. The BFB should be signed with the appropriate security key. Customers who choose to use foreign OSs[1] should sign the BFB by themselves

Note 1: Foreign OS: Any OS other than NVIDIA Ubuntu OS


NVIDIA