Mellanox Update @ STAC NYC 2019
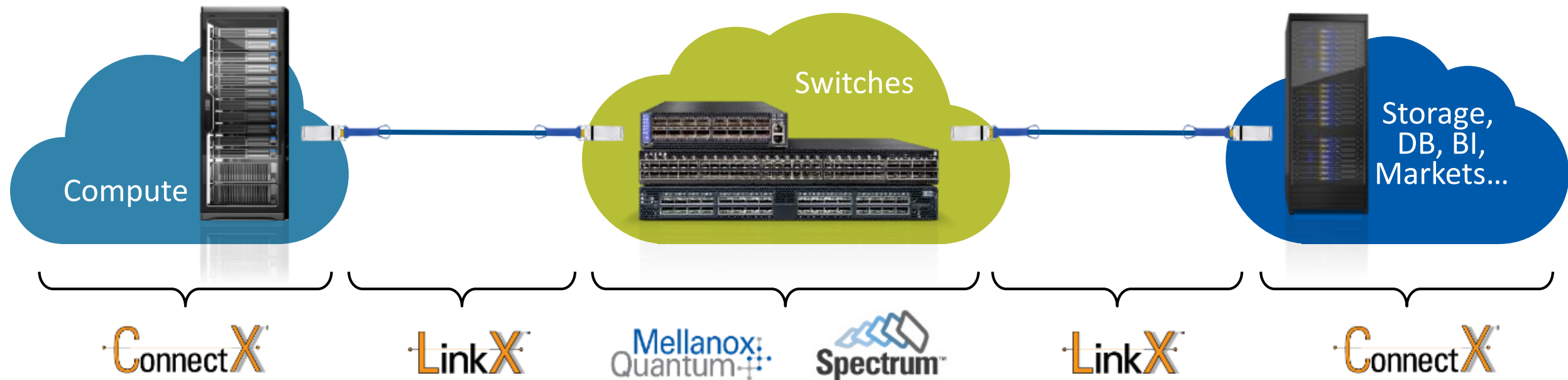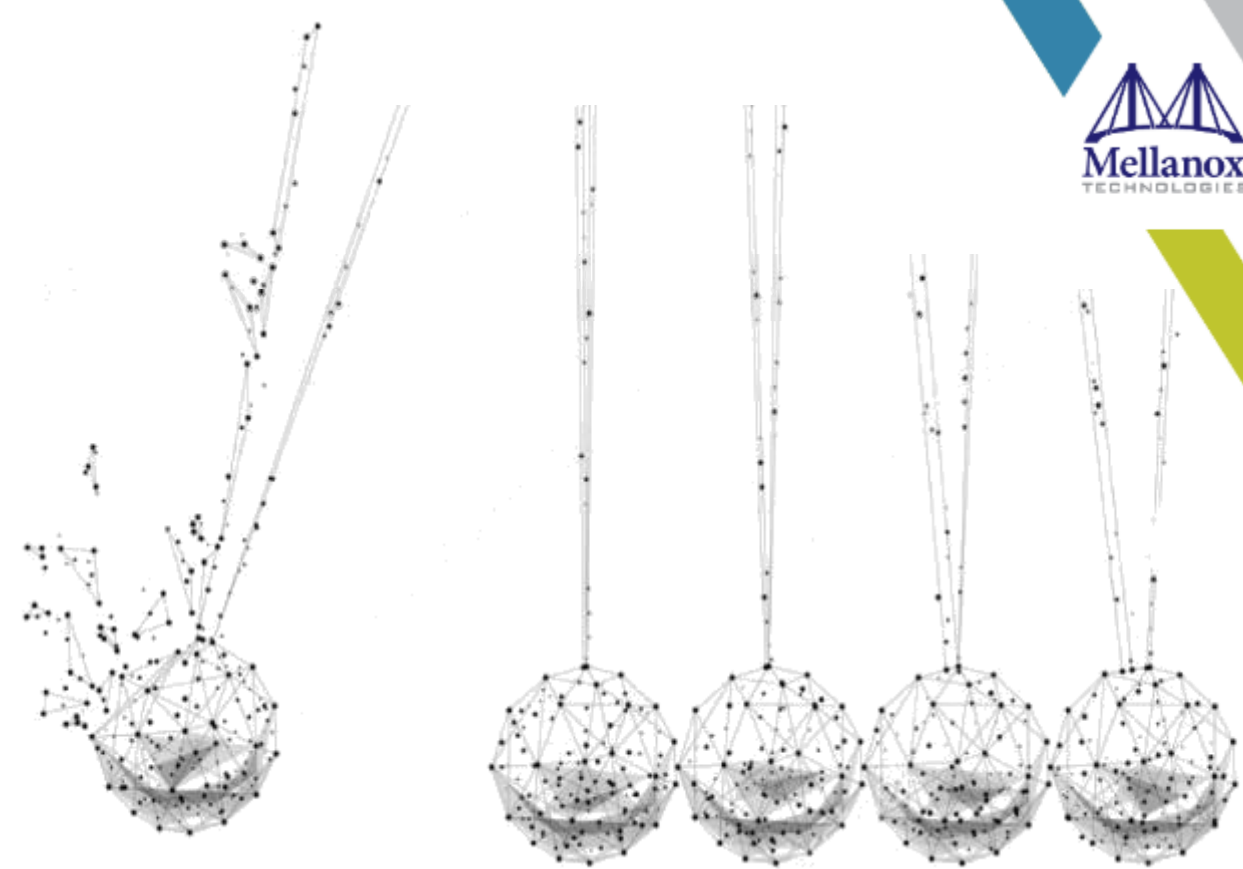
High Performance Datacenter Networking

October 2019

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Mellanox is the Leading Supplier of Standard, Open, Intelligent End-to-End Interconnect Solutions for the datacenter

10/25/40/50/100 and soon 200/400 GbE Ethernet

EDR (100Gbps) and HDR (200Gbps) InfiniBand

Compute

Switches

Storage, DB, BI, Markets…

ConnectX

LinkX

Mellanox Quantum

Spectrum

LinkX

ConnectX

Company Overview

$1.09B
2018 Revenue

$265M
2018 Cash From Operations

$439M
2018 Ending Cash & Investments

~2,800
Employees worldwide

Company HQ:

- ■ Israel (Yokneam)
- ■ USA (California)
- ■ Worldwide Offices

NASDAQ®

Ticker: MLNX

Mellanox acquisition by nVidia: Update

- We are not nVidia yet…

- Mellanox acquisition by nVidia is planned to be finalized this quarter
  - Pending Chinese regulatory approvals

- Combined company to lead the market in
  - High performance datacenter networking and processing of data
  - Best of breed AI and Deep Learning solutions
  - Efficient data movement for compute & storage

Mellanox in Numbers

1

Shipping 1 Million Ethernet NIC's every Quarter
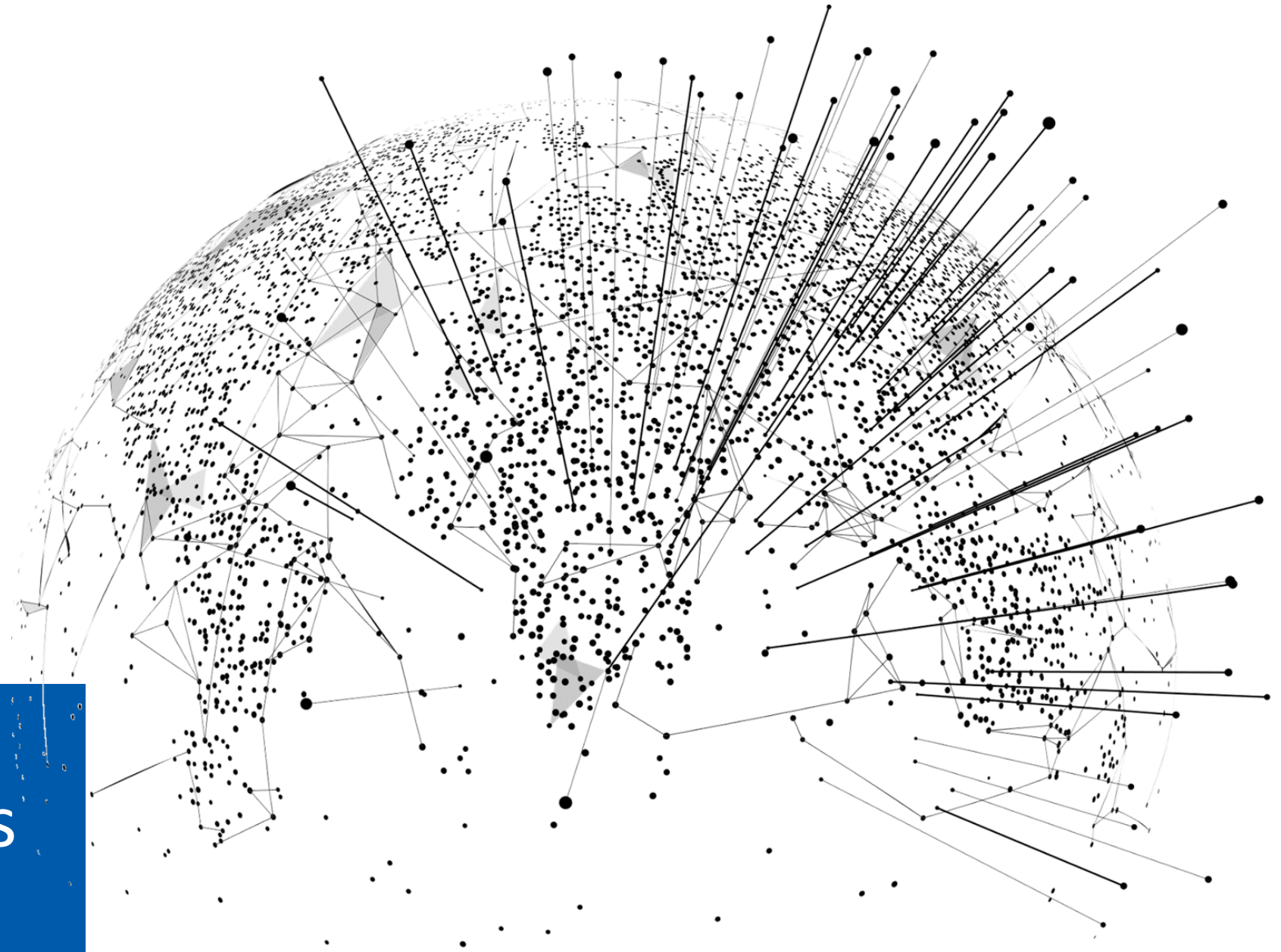
20

Mellanox Celebrating 20 Years in business

NASDAQ®
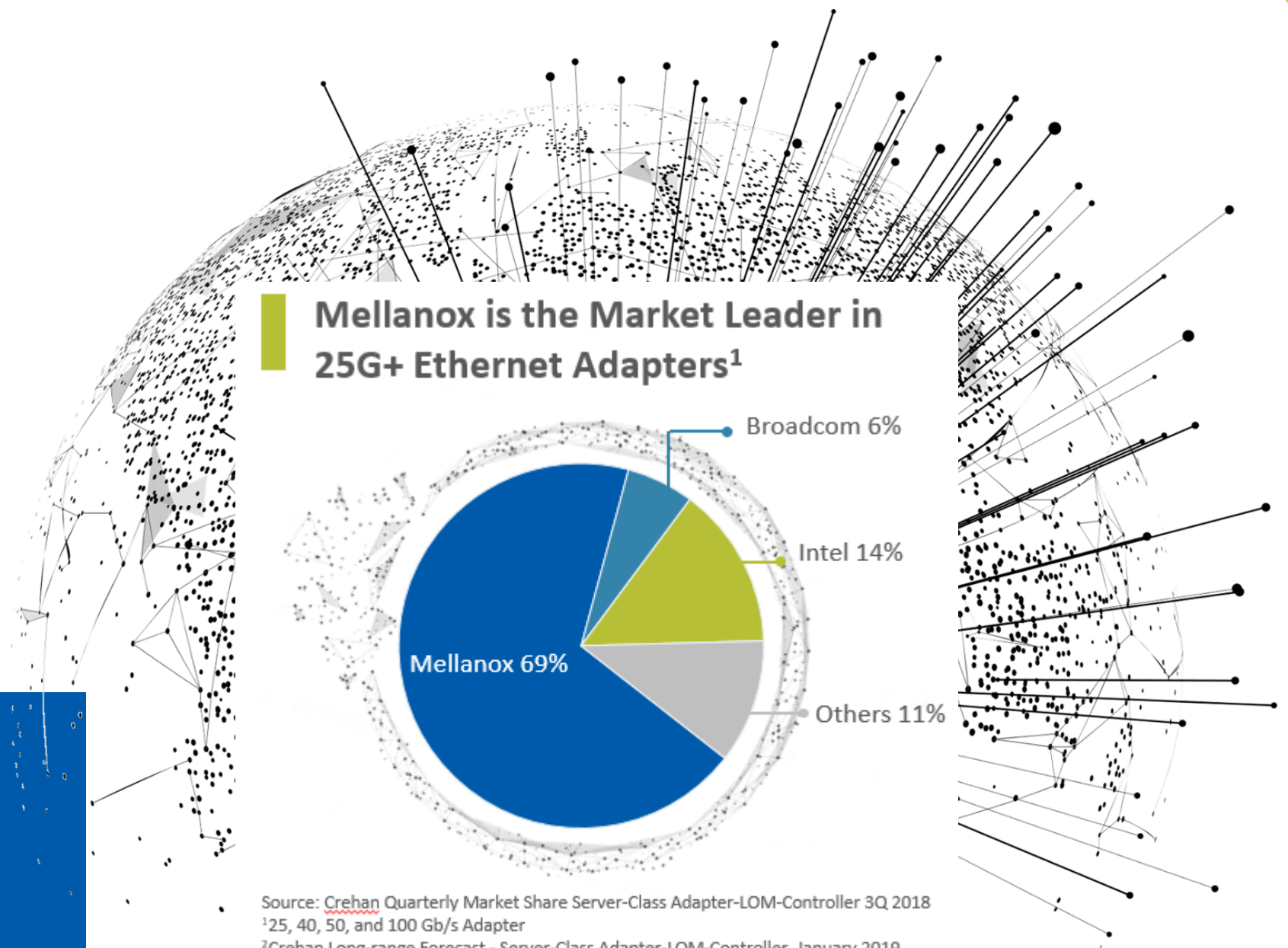
Ticker: MLNX

2

NYC-based Stock Exchanges use Mellanox

3

NYC-based Cloud Providers use Mellanox

69

69% of NIC's sold in USA (25GbE and above) are Mellanox

Mellanox is the Market Leader in 25G+ Ethernet Adapters[1]

Broadcom 6%

Intel 14%

Mellanox 69%

Others 11%

Source: Crehan Quarterly Market Share Server-Class Adapter-LOM-Controller 3Q 2018
[1]25, 40, 50, and 100 Gb/s Adapter
[2]Crehan Long-range Forecast - Server-Class Adapter-LOM-Controller, January 2019

5

Top Machine Learning Frameworks support RDMA/RoCE
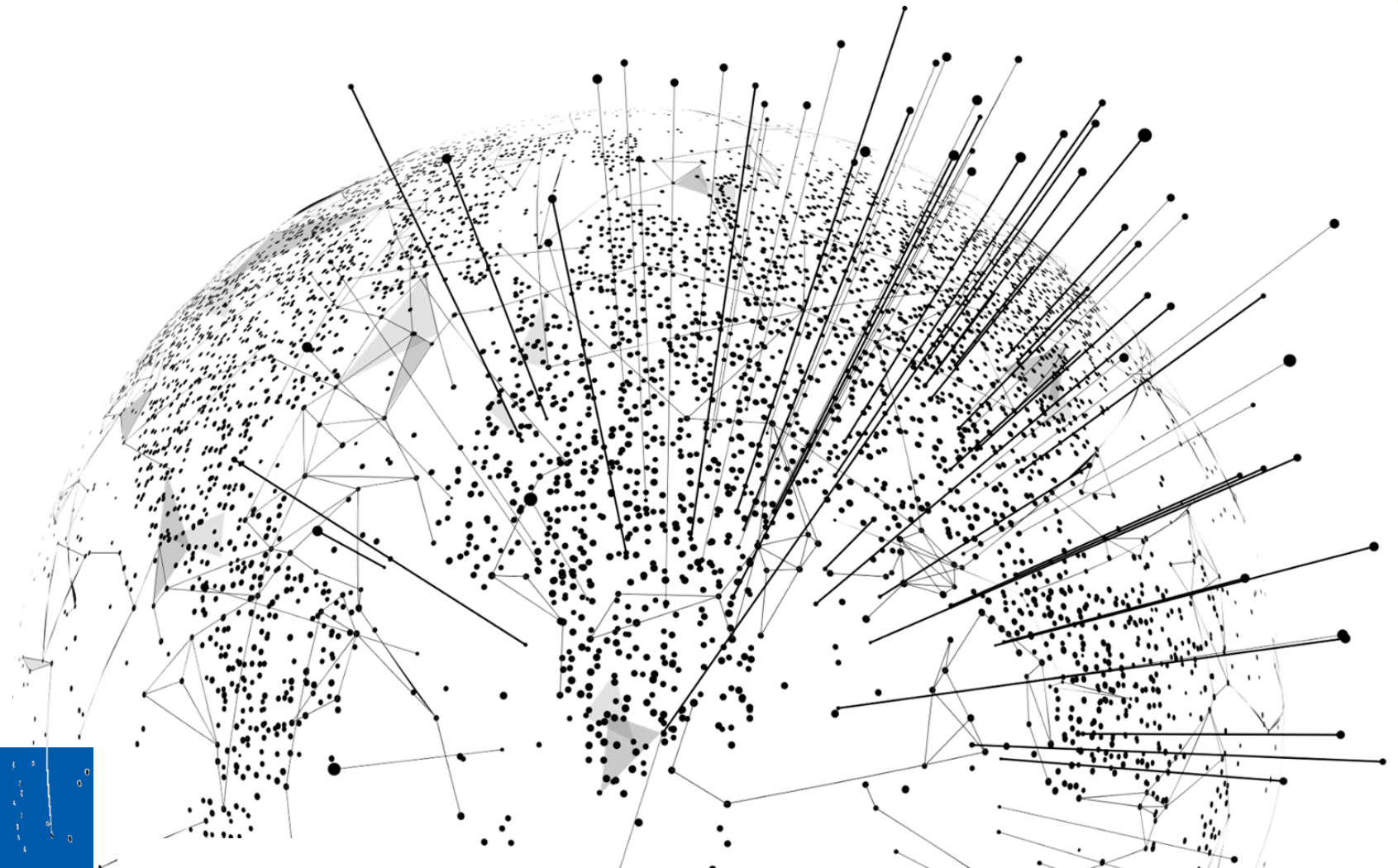
3

Among TOP 3 contributor to Linux Kernel

Source: https://lwn.net/Articles/798505/

6 Dx

Delivers Line-rate IPSEC and TLS encrypt/decrypt Acceleration in ASIC

NIC's

Mellanox ConnectX-5 Ex

- High Performance & commodity NIC "in one"
  - HFT acceleration (kernel bypass, verbs)
  - Cloud acceleration (Vxlan, OVS, DPDK acceleration in hardware)
  - Storage acceleration (NVMeF RoCE, NVMoTCP, storage encryption and erasure coding offload in hardware)

- What do you get with ConnectX-5 ?
  1. VMA Kernel Bypass: Low Latency, Open Source, use in many places in production
  2. RoCE/RDMA/Verbs for lower latency market data and messaging
  3. High Performance Capture (P2D)
  4. PTP (TimeKeeper, LinuxPTP)

- EASY to use: Linux, VMware, Windows Inbox Drivers
- 1-line to run VMA with pre-tuned profiles…
- "Upstream First" methodology = bug-free Linux Inbox Drivers, rigorous community validation
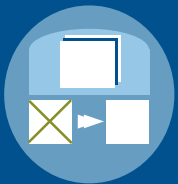
Mellanox VMA Kernel Bypass

KERNEL BYPASS

Reduce Kernel overhead with direct network adapter access
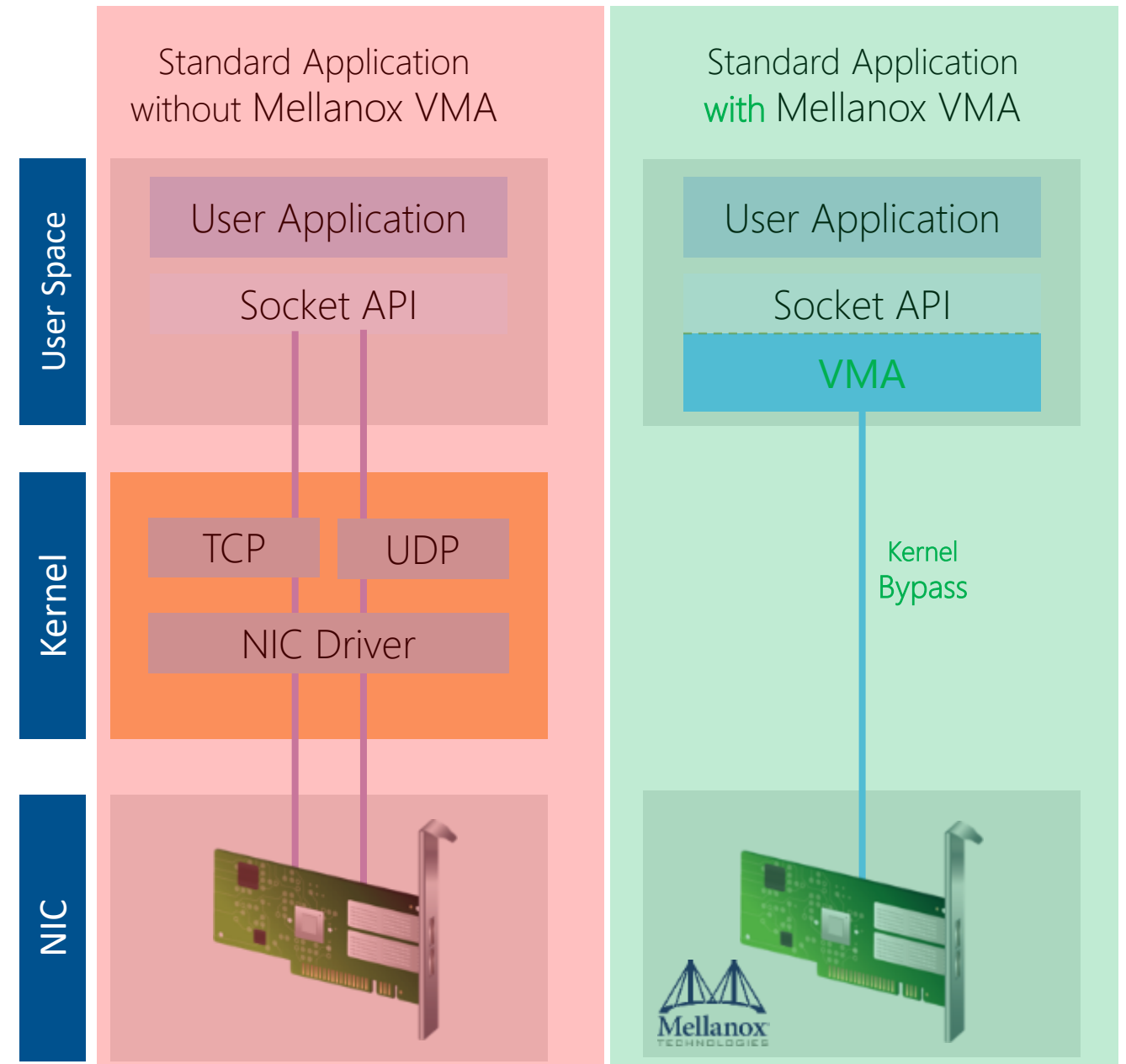
SINGLE SIDED

no application changes – Standard sockets TCP, UDP (Unicast, Multicast)

https://www.mellanox.com/related-docs/applications/SB_HighFreq_Trading.pdf

Standard Application without Mellanox VMA

Standard Application with Mellanox VMA

User Space

User Application

Socket API

User Application

Socket API

VMA

Kernel

TCP   UDP

NIC Driver

Kernel Bypass

NIC

BlueField SmartNIC

Wouldn't it be nice to have ConnectX-5 goodies plus compute cores on a NIC?

Lots of use cases come to mind...

What's in it for me?

- Host Isolation → full feature, low latency NIC, running Linux, as a true firewall on every host
  - Enterprise class agent-less isolation & micro segmentation with Guardicore

- **NVMe SNAP: simple NVMe storage disaggregation** for Linux, Windows, VMware

Call to action

- Check out Guardicore, our security partner
- Talk to us, and Pavilion and Pure on storage
- Test BlueField today – ASK ME HOW

Ethernet Switch

Mellanox Spectrum 100GbE Ethernet Switch

- Spectrum performance is proved in the <u>Tolly Report</u>

- Smart, Fully Shared Buffer, see <u>Tolly Report</u>

- In-ASIC Telemetry, Open API's to export to Cassandra, Grafana, Kibana…, for deep monitoring

- Network Virtualization (EVPN VXLAN) best-in-class scale

- Truly OPEN: supporting Cumulus, Mellanox OS, SONiC

HFT-Specific Feature in Spectrum 1/2 Switch

- Spectrum(1) leads in performance with 300 nsec p2p latency @ 100Gig (Tolly Report)

Spectrum-2 key new features:

- Hardware NAT at huge scale AND low latency (Q1 - Cumulus)

- 128 ports 10 and 25 gig on single ASIC

- Comprehensive L2 and L3 support, multicast

- Increased scale

Not STAC Benchmarks

EDR and HDR Infiniband Update

- Half of Mellanox Business is Infiniband, growing FAST in AI/ML/DL

- EDR IB
  - **Lowest E2E latency, with 90 nanos in the switch and below 700 nanos in the NIC**
  - 100Gb/s rate
  - Flat network scales to 1000's of nodes
  - Self managing, self healing, "set up and go"
  - New telemetry and monitoring capabilities

- HDR IB
  - All the EDR goodies, plus:
  - **Support for 200Gb/s per port**
  - Supports 40x 200Gig or **80x 100Gig ports on a 1U** switch, single ASIC

- NDR is coming…

Let Mellanox help you innovate

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