



# Mellanox Corporate Update

Unleashing the Power of Data

April 2020

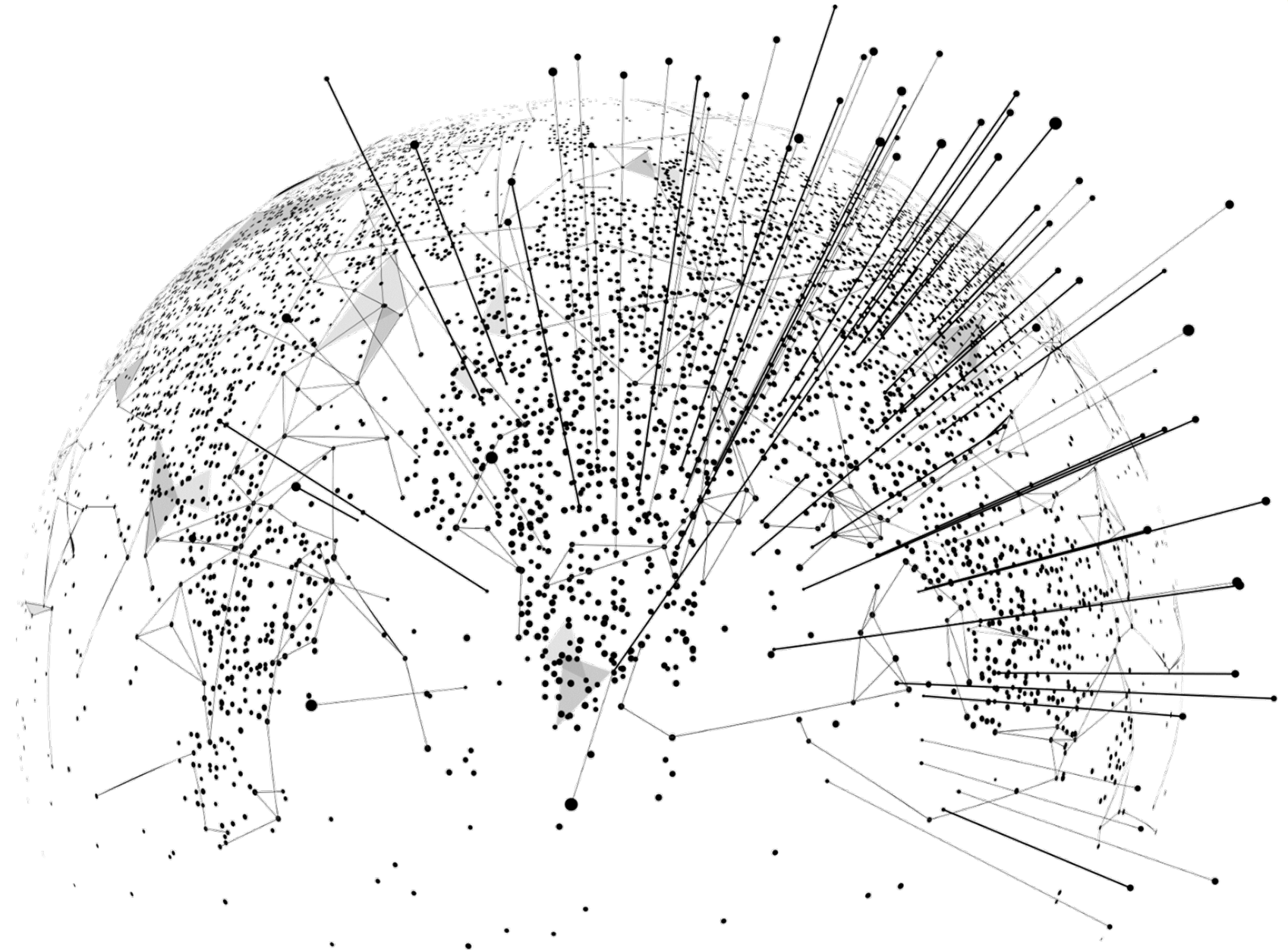


# We Live in a World of Data

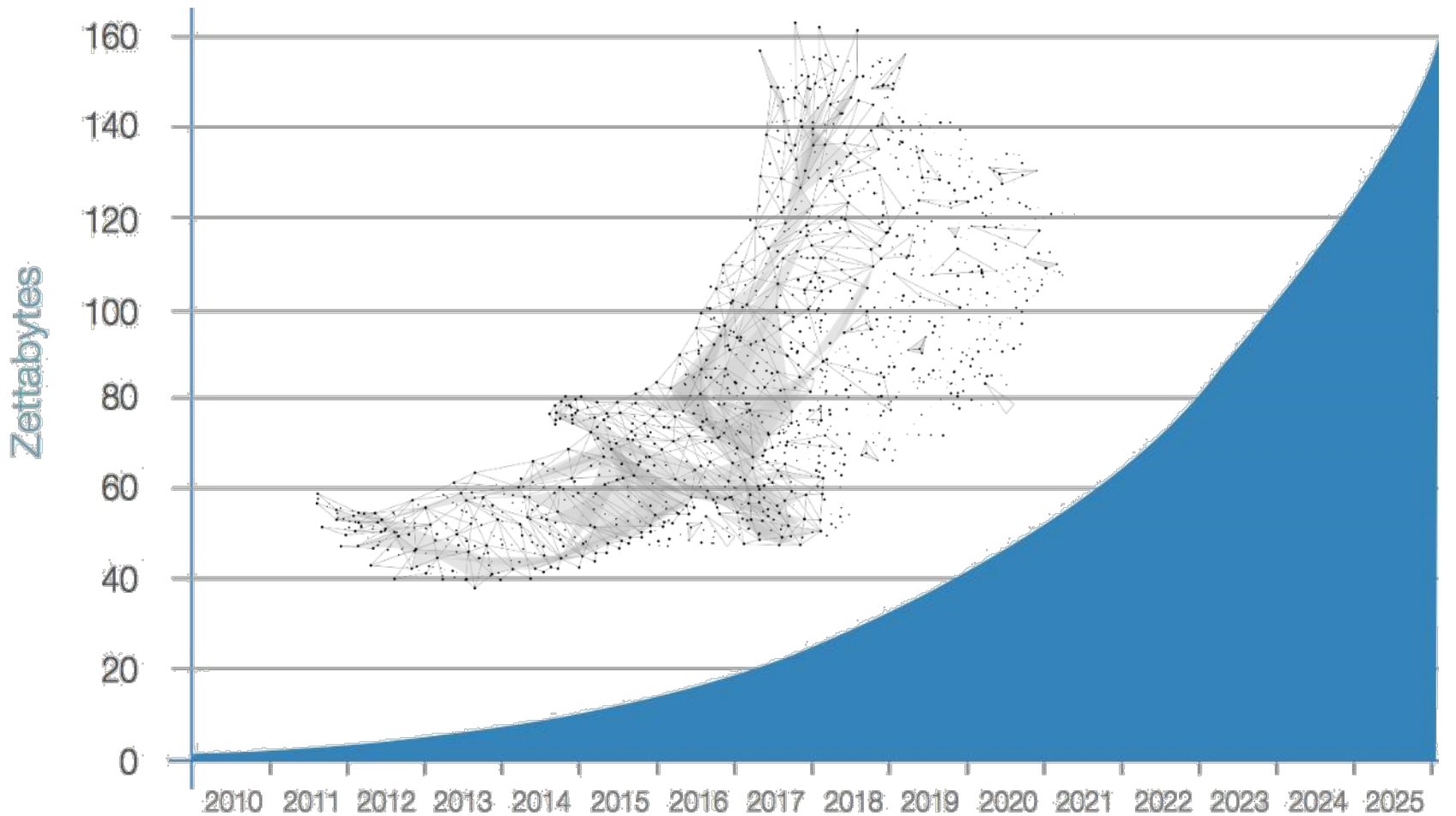
More Devices










More Applications

More Data



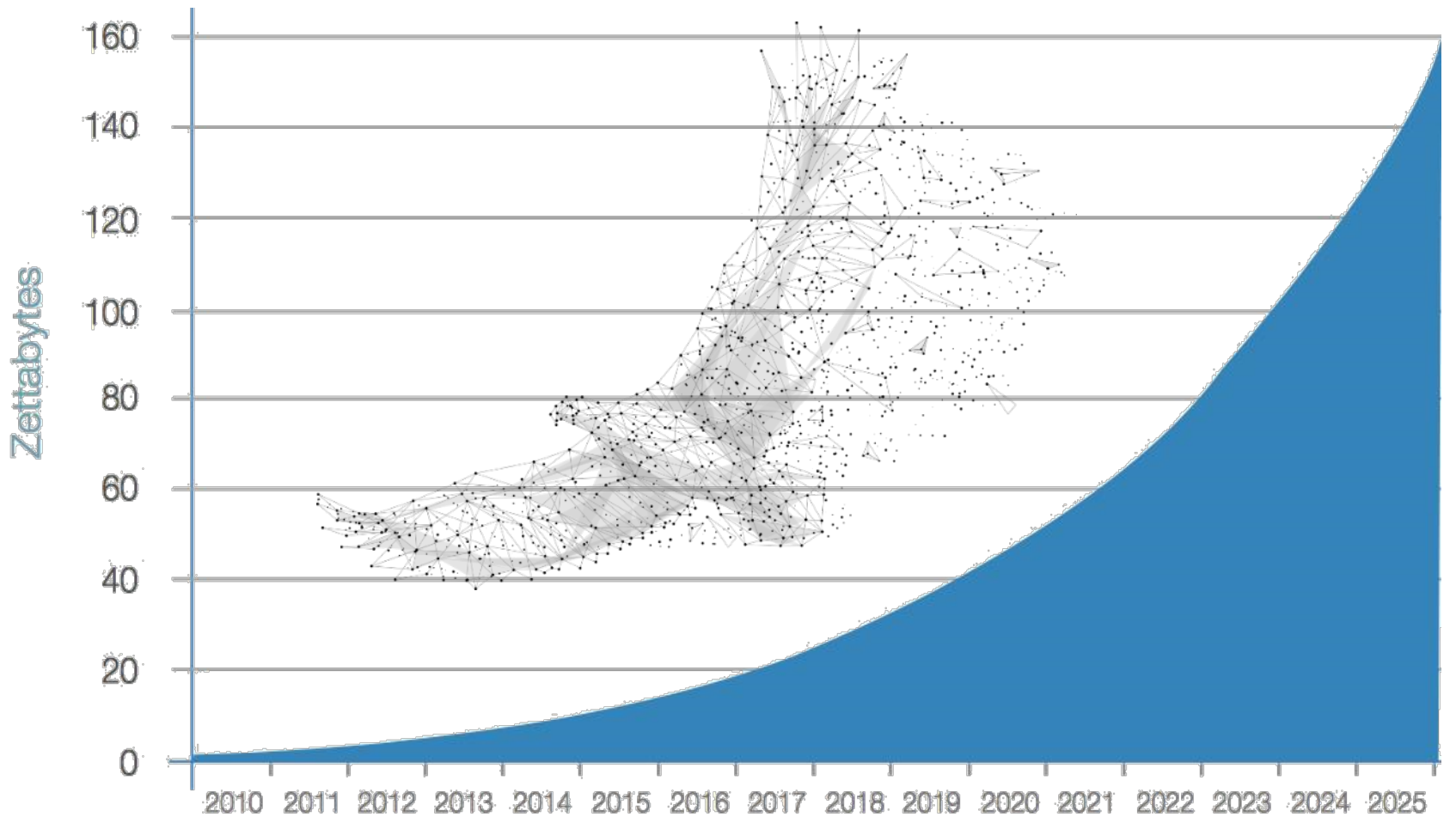
# Exponential Data Growth Everywhere



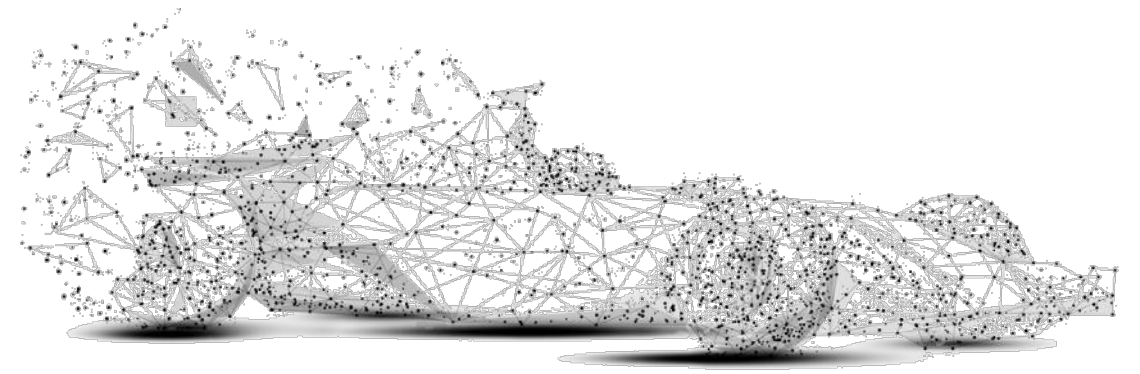
<b>Cloud &amp; Web 2.0</b> 	<b>HPC</b> 	<b>Big Data</b> 
<b>Security</b> 	<b>Internet of Things</b> 	<b>Enterprise</b> 
<b>Storage</b> 	<b>AI &amp; Machine Learning</b> 	<b>Business Intelligence</b> 

Source: IDC  
HPC: High-Performance Compute  
AI: Artificial Intelligence

# Exponential Data Growth Everywhere



**Higher** Data Speeds  
**Faster** Data Processing  
**Better** Data Security



# The More Data we Analyze, the More Powerful we get and the More we Can Do.

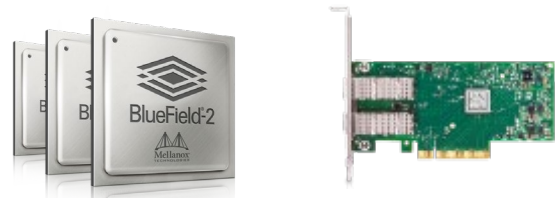
		Finance, Fraud & Insurance	<ul style="list-style-type: none"><li>■ Fraud Detection</li><li>■ Credit/Risk Analysis</li><li>■ High Frequency Trading</li></ul>
		Cloud, Web, Mobile, Retail	<ul style="list-style-type: none"><li>■ Image Tagging</li><li>■ Speech Recognition</li><li>■ Sentiment Analysis</li></ul>
		Automotive & Transportation	<ul style="list-style-type: none"><li>■ Self Driving</li><li>■ Image / Facial Recognition</li><li>■ Logistics &amp; Mapping</li></ul>
		Medicine & Genomics	<ul style="list-style-type: none"><li>■ Drug Discovery</li><li>■ Diagnostic Assistance</li><li>■ Cancer Cell Detection</li></ul>
		Security & Safety	<ul style="list-style-type: none"><li>■ Surveillance</li><li>■ Image Analysis</li><li>■ Facial Recognition and Detection</li></ul>
		Oil & Gas	<ul style="list-style-type: none"><li>■ Seismic Imaging</li><li>■ Reservoir Characterization</li><li>■ Subsurface Fault Detection</li></ul>



# Data Growth is Driving Mellanox Growth

Exponential Growth of Data & Real Time Analytics

Requires Mellanox High Throughput, Low Latency, Smart Interconnect Solutions



Software Programmable SmartNICs



I/O Processing Units (IPU)

Higher

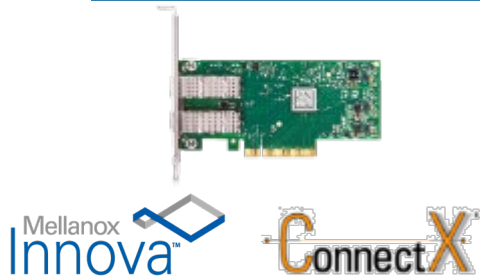
Data Speeds

Faster

Data Processing

Better

Data Security

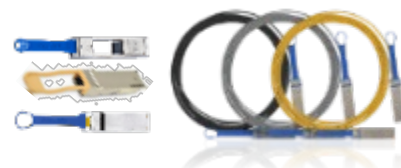


SmartNICs

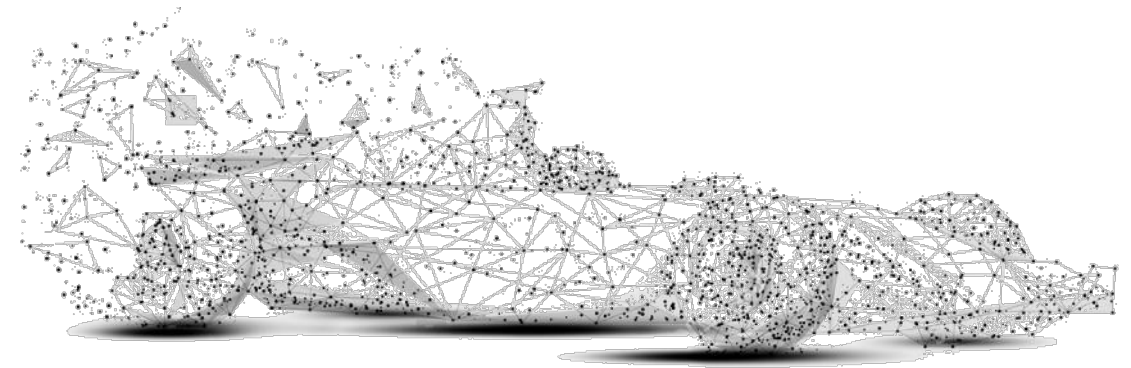


Spectrum Quantum

Switches



LinkX Cables & Transceivers



# Industry Leaders Choose Mellanox Solutions

 **5** of Top 6 **Global Banks**

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 **9** of Top 10 **Hyperscale Companies**

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 **9** of the Top 10 **Oil and Gas Companies**

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 **3** of Top 5 **Pharmaceutical Companies**

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 **10** of Top 10 **Automotive Manufacturers**

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# Business Success Depends on Mellanox

Deliver the Highest Data Center Return on Investment

Tier-1 Trading  
Institution

10x Reduction  
Of Latency

Tier-1 Fortune100  
Web 2.0 Company

97% Reduction in Database  
Recovery Time

Military  
Systems

4x Higher Performance While Reducing  
System Footprint by 50%



OPEN  
Compute Project

Yosemite Platform with Multi-Host Technology  
Lowers Total Cost of Ownership

NETFLIX

100k Concurrent Streams From a Single Server  
For the Highest Quality Viewing Experience





# Enabling Most Efficient Machine Learning Platforms

Allowing AI to Perform Critical & Real Time Decisions

■ OCP Big Sur Artificial Intelligence Platform



■ Real Time Fraud Detection



■ Machine Learning System with 400Gb/s



■ 18X Speedup For Image Recognition



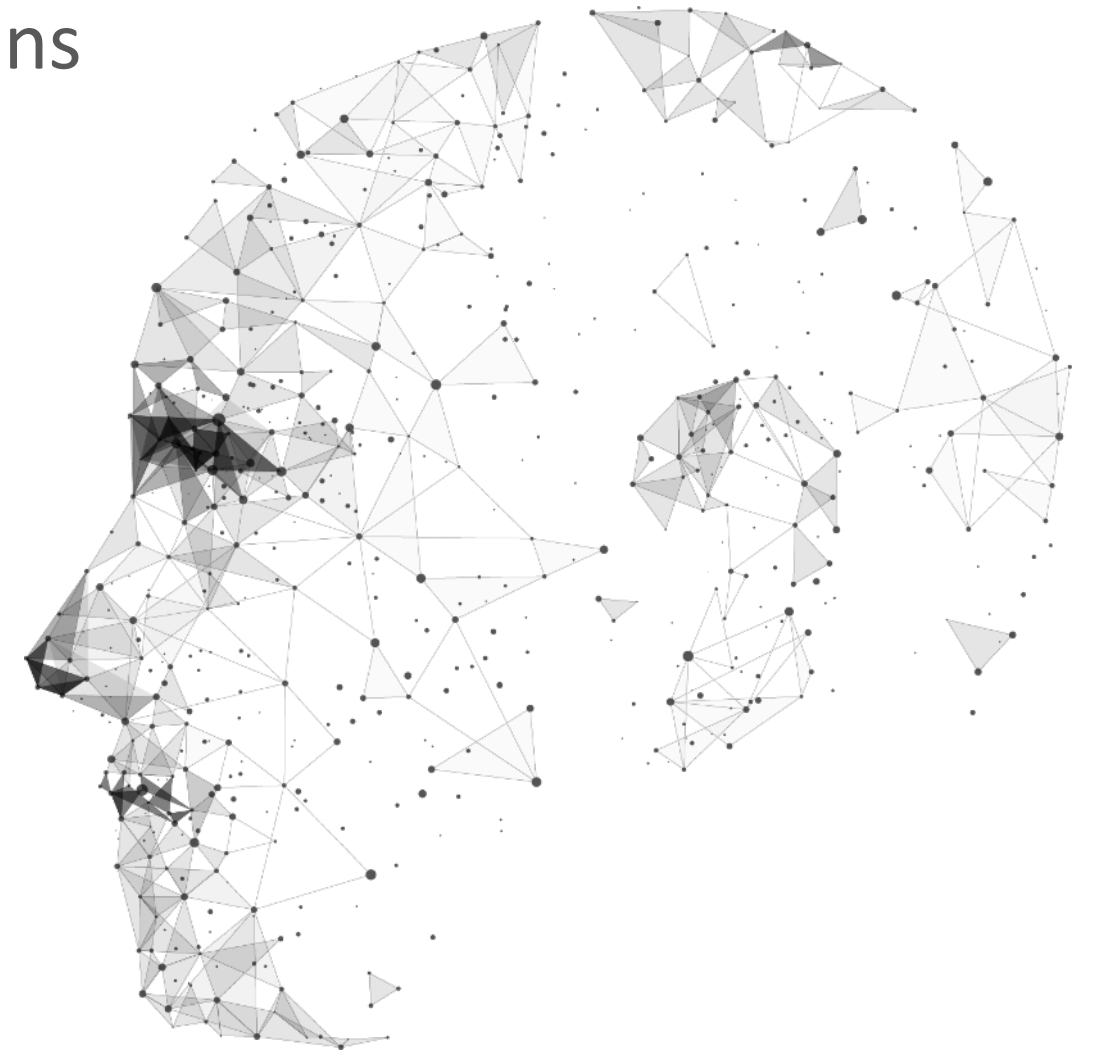
■ 4X Speedup For Image Recognition



■ Data Analytics Image Recognition



■ World Record For Data Sort, 3X Faster



# The Smart Choice for HPC and AI Platforms

Delivering the Highest Data Center Return on Investment



InfiniBand Accelerates the Fastest HPC and AI Supercomputer in the World (TOP500)



InfiniBand  
Leadership

InfiniBand Accelerates Six of the Top Ten Supercomputers in the World, Including the Top Three, and Four of the Top Five on November's TOP500



Mellanox InfiniBand and Ethernet Solutions Connect 297 Systems or 59% of Overall TOP500 Platforms, Demonstrating 12% Growth Year over Year (Nov'18-Nov'19)

HDR 200G  
InfiniBand

200G HDR InfiniBand Accelerates 31% of New InfiniBand Systems on November's TOP500, Including Fastest 2019-Built TOP500 Supercomputer

Ethernet  
Leadership

Mellanox 25 Gigabit and Faster Ethernet Solutions Connect 60% of Total Ethernet Systems, Representing 20% Growth Year over Year



# Mellanox Empowers Leading Storage Platforms

Delivering the Highest Data Center ROI



ORACLE®

TOSHIBA

DataDirect  
NETWORKS

FUJITSU

DELL EMC

Micron®

PURE STORAGE



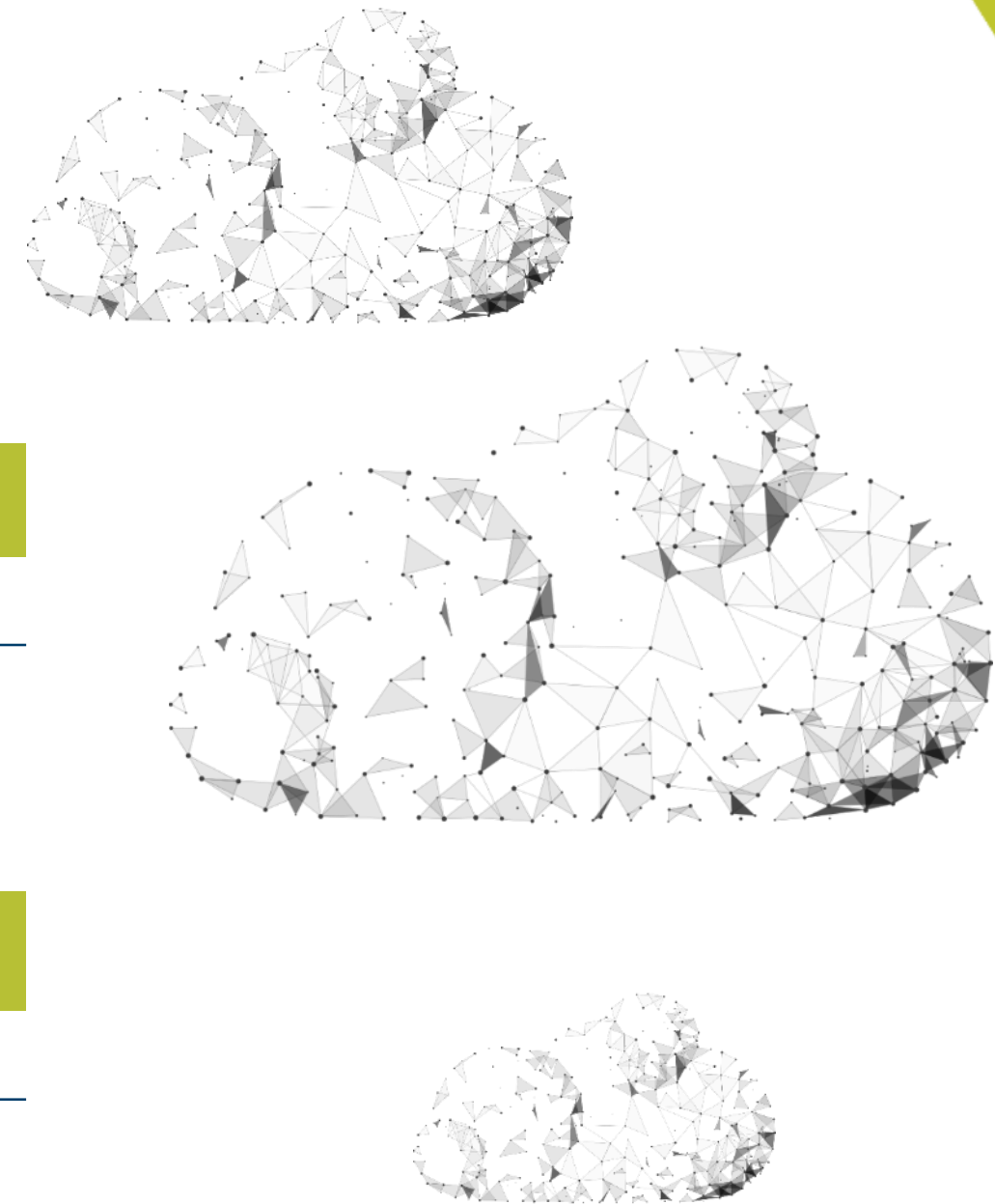
X-IO™  
technologies

TERADATA

WD Western  
Digital



# Mellanox is Enabling Data Centers of the Future - Today



Security

Data Insights

Real-Time



Software-Defined Network Intelligence

Performance

Efficiency

Scalability



Highest Performance 100Gb/s, 200Gb/s and 400Gb/s Interconnect Solutions

# Comprehensive End-to-End Portfolio

## InfiniBand and Ethernet

Software



IPU & NPU



Metro / WAN



Switches/Gateways



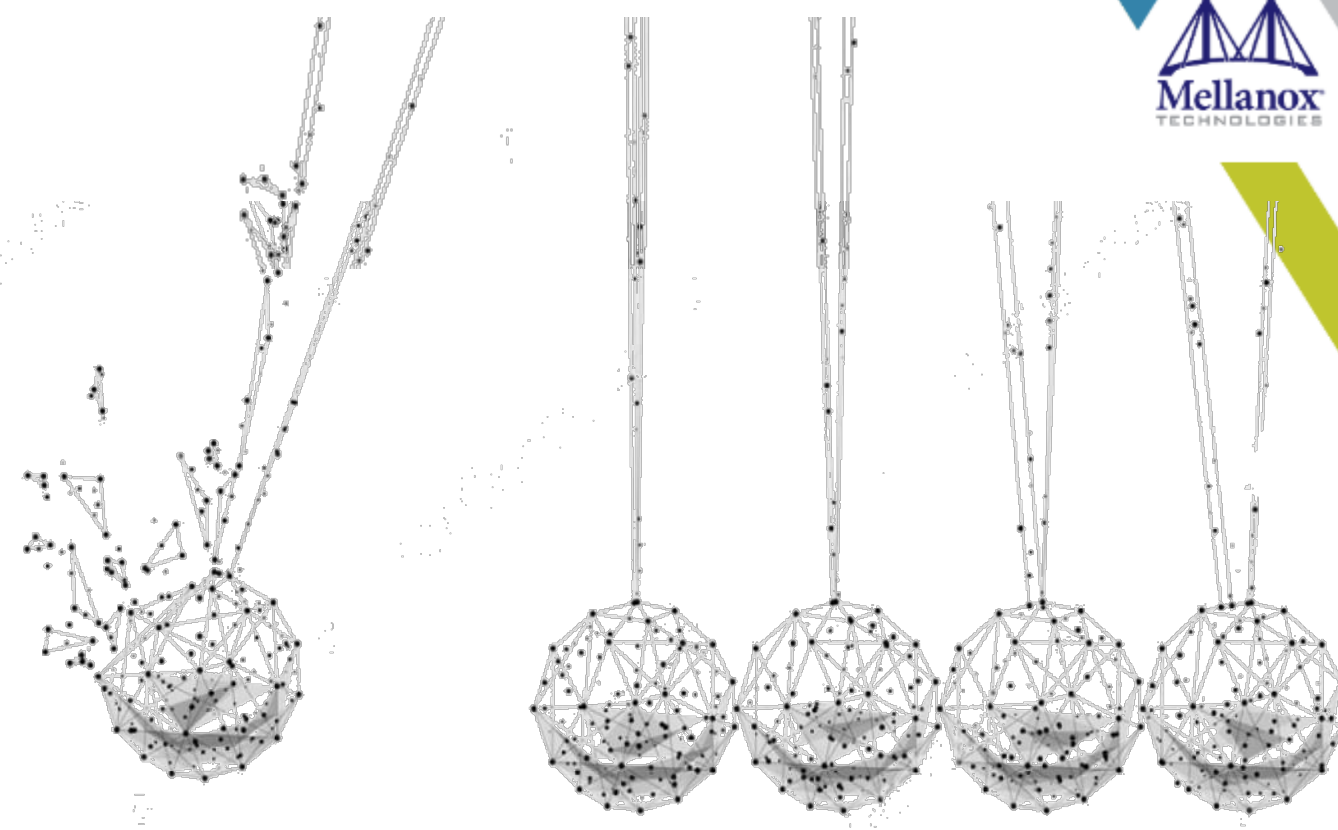
SmartNICs/Adapters



ICs

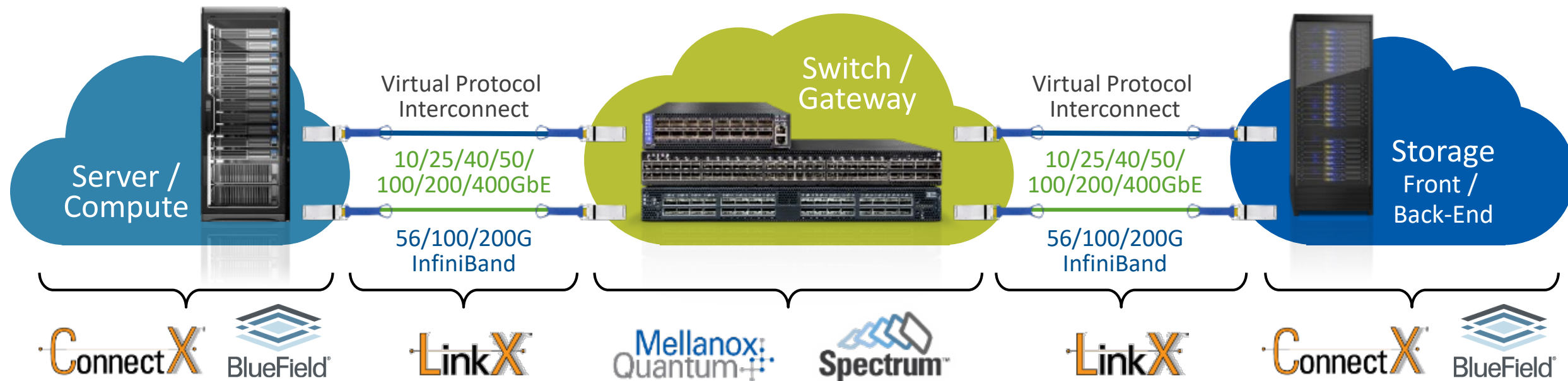
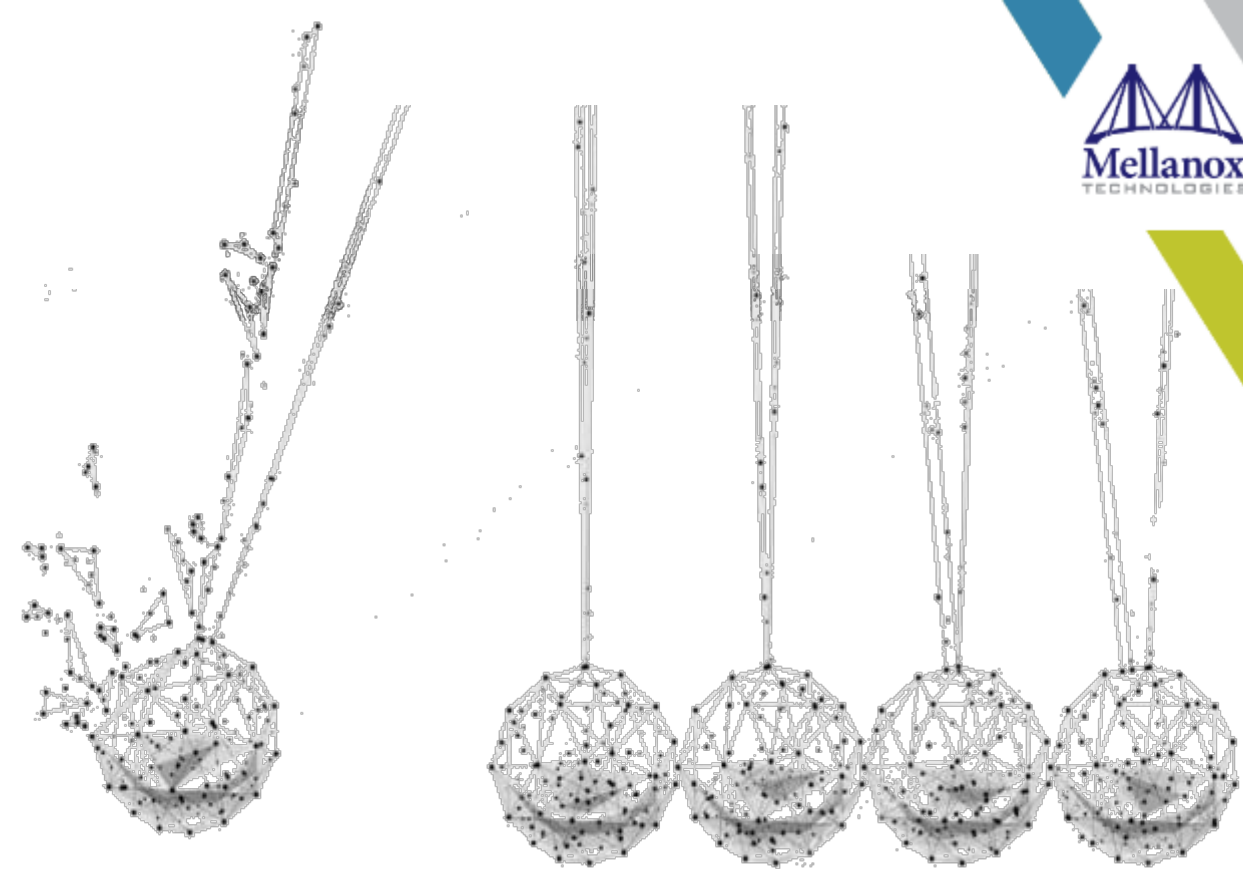


Cables/Modules



# Leading Supplier of InfiniBand and Ethernet End-to-End Interconnect Solutions

The Smart Choice for Intelligent Compute and Storage Platforms



# Highest Performance 100, 200 and 400Gb/s Interconnect Solutions

ConnectX-6 ConnectX-6 Dx  
**Adapters**

200Gb/s, 0.6us Latency  
 215 Million Messages per Second  
 (10 / 25 / 40 / 50 / 56 / 100 / 200Gb/s)



Mellanox Quantum  
**Switch**

40 HDR (200Gb/s) Ports  
 80 HDR100 (100Gb/s) Ports  
 16Tb/s Throughput, 15.6 Billion msg/sec



Spectrum-2  
**Switch**

16 400GbE Ports, 32 200GbE Ports  
 64 100GbE Ports, 128 25/50GbE Ports  
 Throughput of 6.4Tb/s



BlueField-2  
**I/O Processing Unit**

IPU and SmartNIC  
 Programmable adapter  
 Smart Offloads



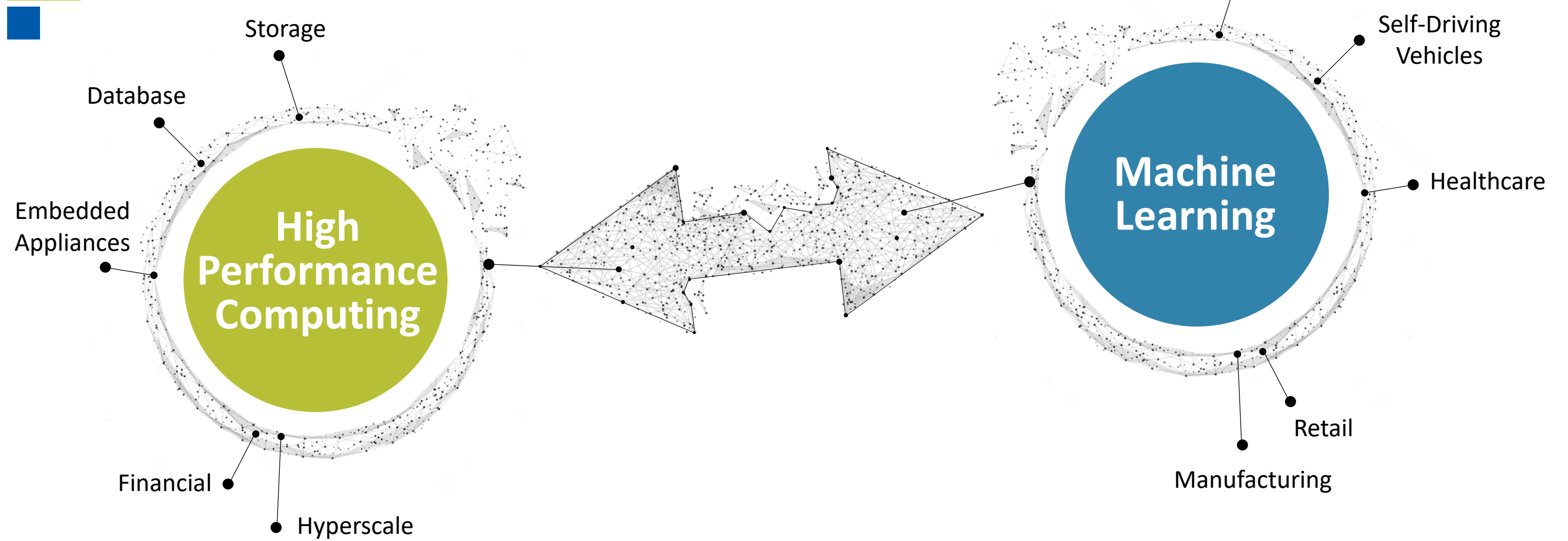
LinkX  
**Interconnect**

Transceivers  
 Active Optical and Copper Cables  
 (10 / 25 / 40 / 50 / 56 / 100 / 200 / 400Gb/s)



# Enabling the Future of Machine Learning

HPC and Machine Learning Share Same Interconnect Needs

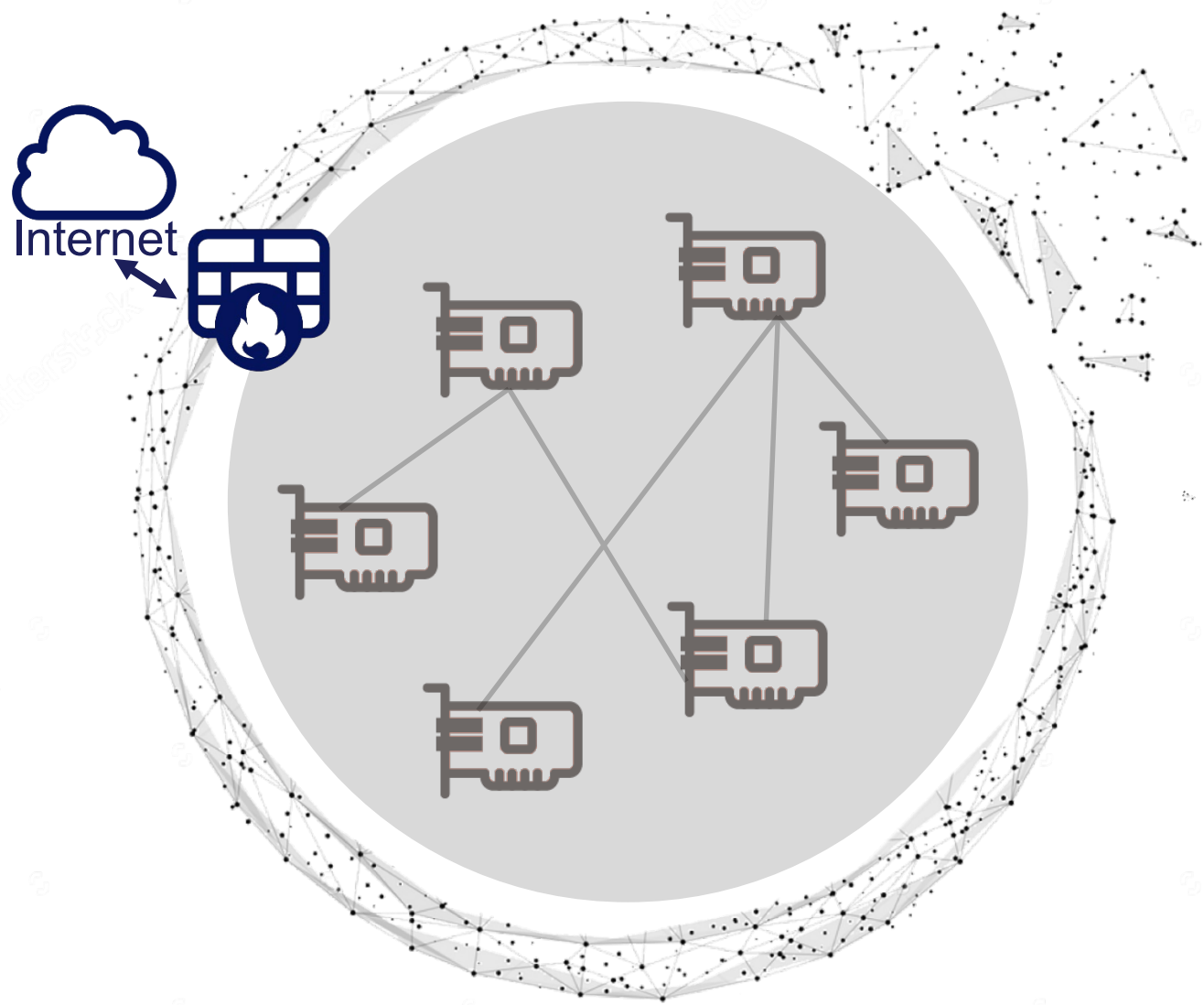




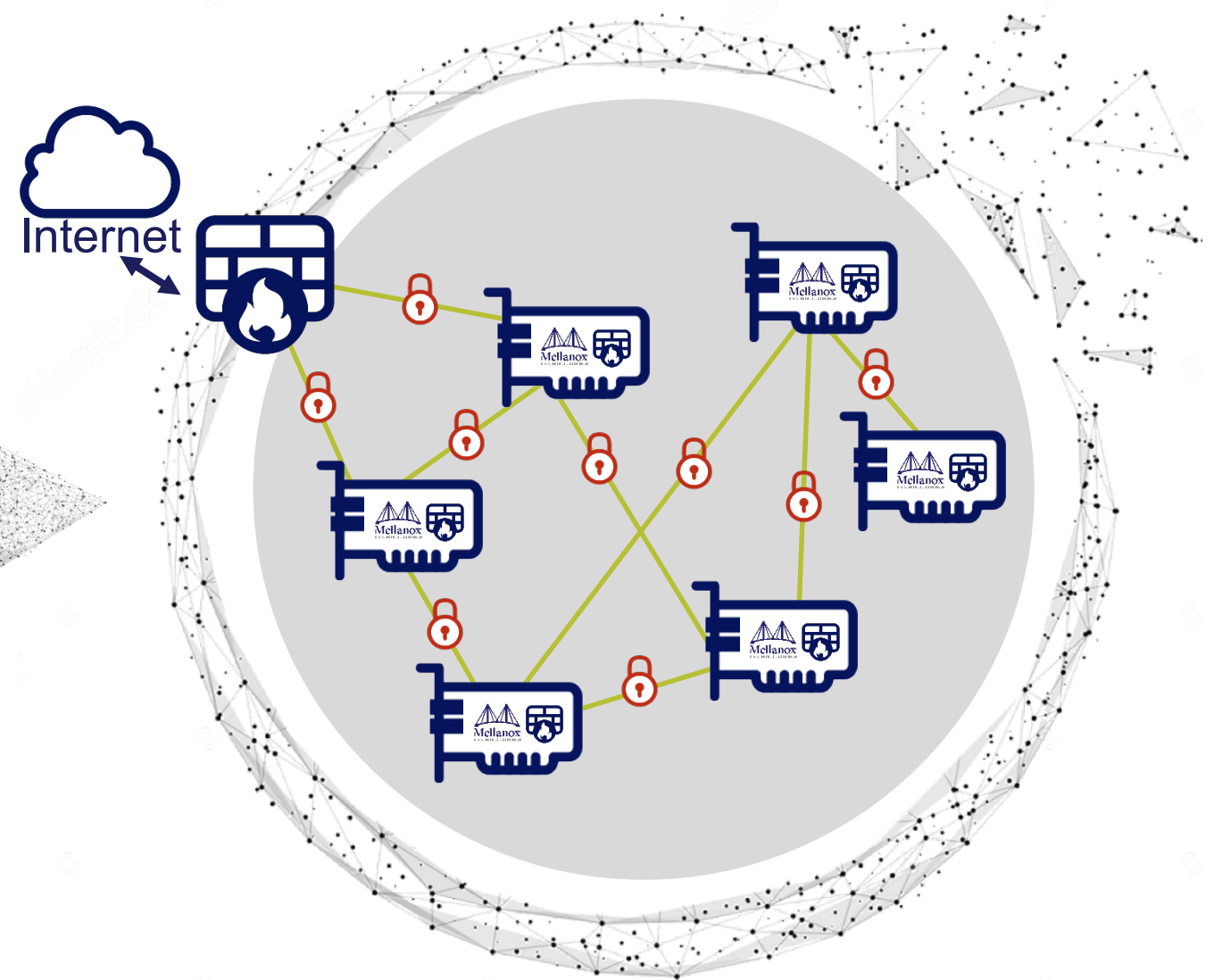
# Mellanox SmartNICs Make Secure Cloud Possible

Foundational NICs – Perimeter Security Only

Mellanox's SmartNICs – Secure Cloud



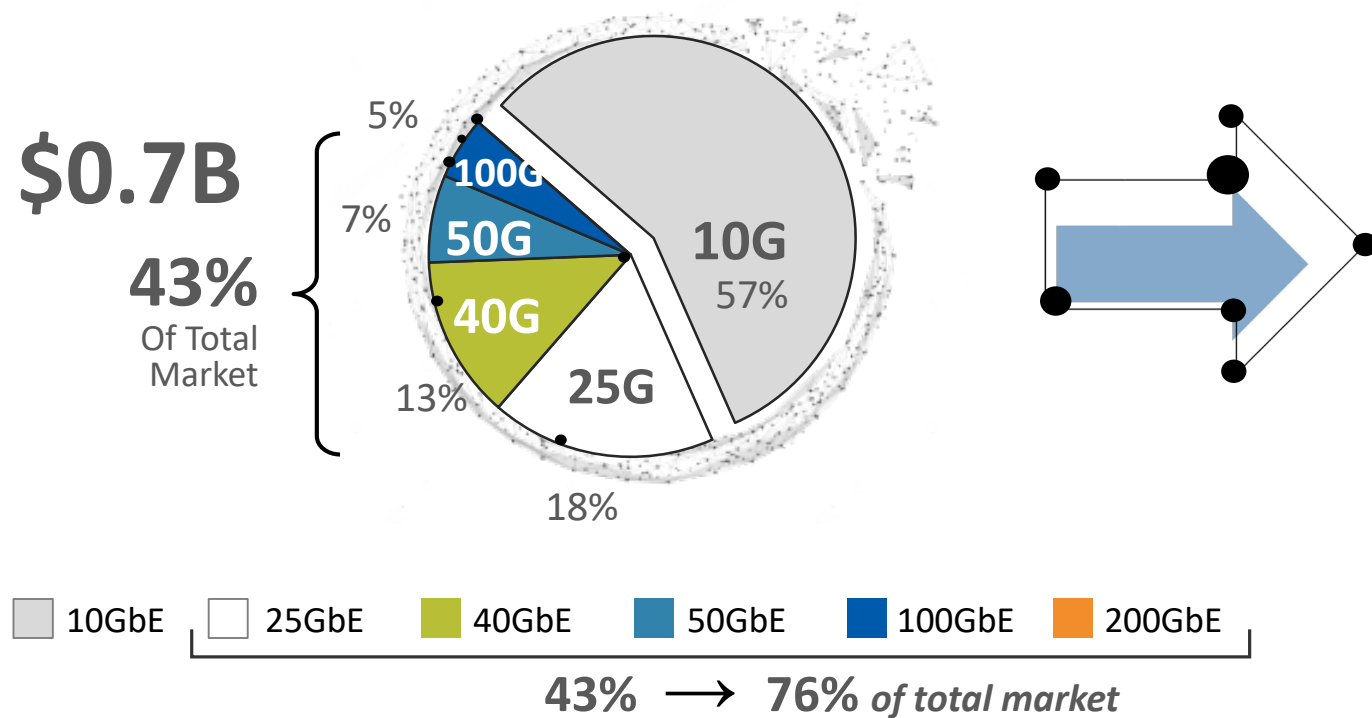
Traditional Security Model



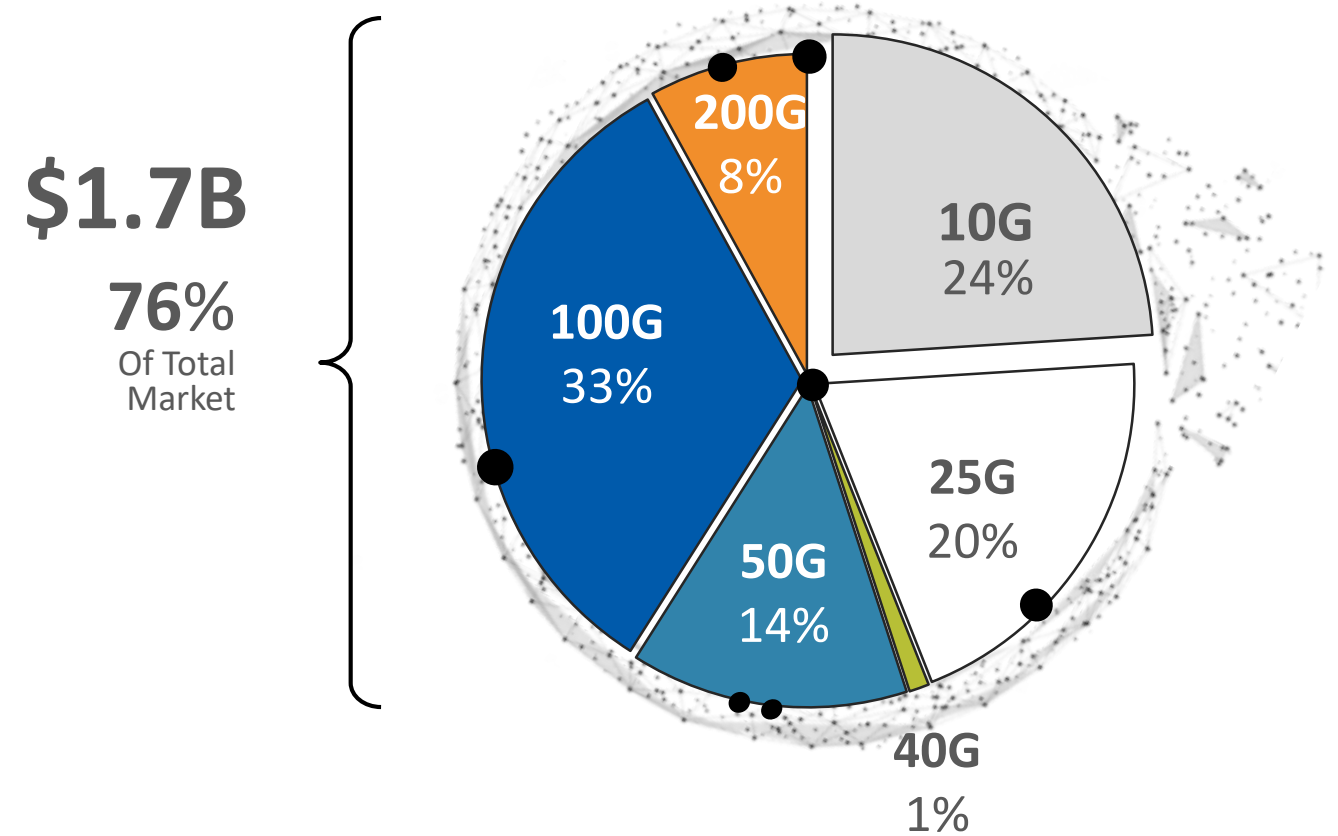
Security Everywhere

# High-Speed Ethernet Adapter Market is Significantly Growing

**2019**  
25G+ Ethernet Adapter TAM



**2023**  
25G+ Ethernet Adapter TAM



Source: Crehan Long-range Forecast - Server-Class Adapter-LOM-Controller, January 2019  
TAM: Total Available Market



# Spectrum Delivers Highest Data Center ROI

<b>Flexibility</b>	10, 25, 40, 50, 100, 200 and 400 Gigabit Speeds, Variety of Port Configurations
<b>Scalability</b>	10X Better Scalability, Optimized Data Center Utilization and End-User Experience
<b>Programmability</b>	Programmable Flexible Parser and Packet Modifier, Support User-Defined Protocols
<b>TCO</b>	1.3X Lower Power Consumption Versus Competition
<b>Performance</b>	1.4X Lower Latency Versus Competition, Enable Real-Time Data Analysis and Insights
<b>Open Ethernet</b>	





# BlueField-2 IPU Driving Future Growth

- The New Generation of I/O Processing Units for Compute and Storage
- Platforms Broad Base of Customers Using ConnectX Can Seamlessly Transition to BlueField

## Security

Data Center Infrastructure Protection

## Storage

Enabling NVMe-over-Fabric Storage Platforms

## Machine Learning

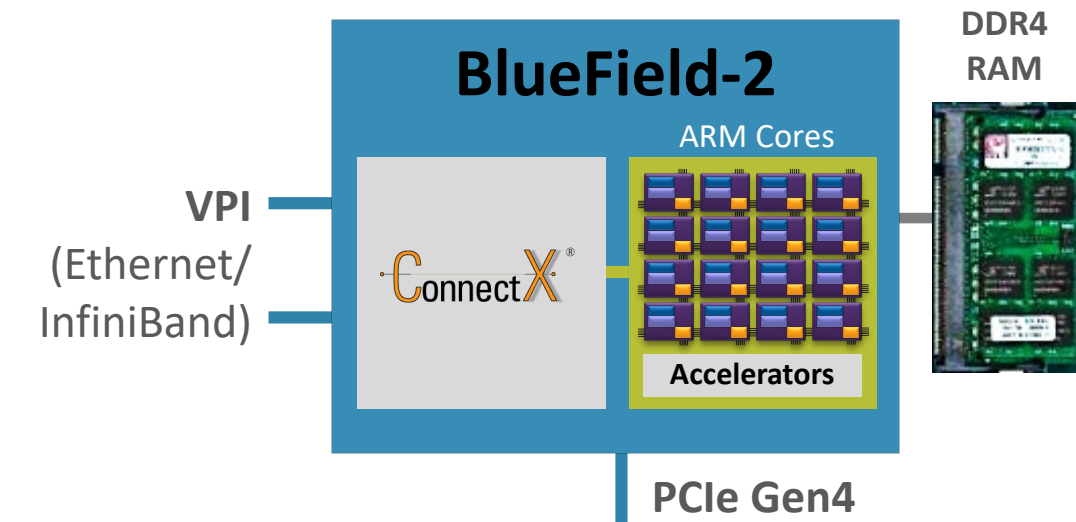
The Most Efficient Machine Learning Systems

## NFV

Higher Performance & Flexibility at Lower Cost

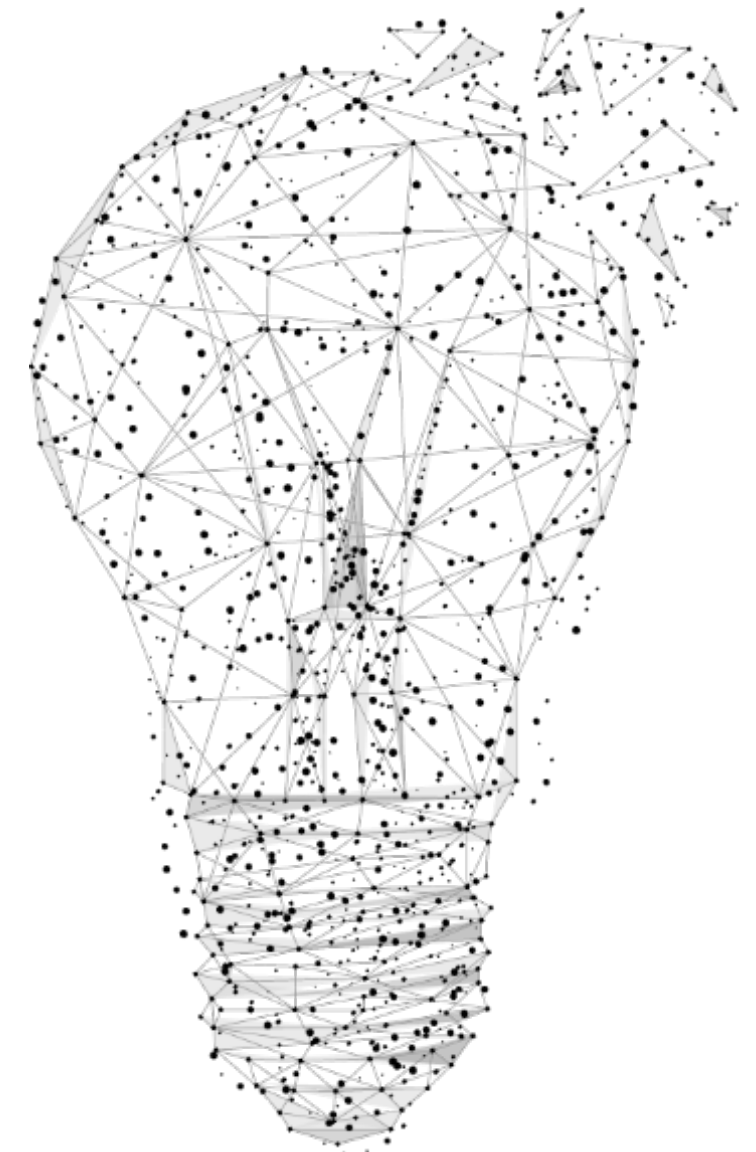
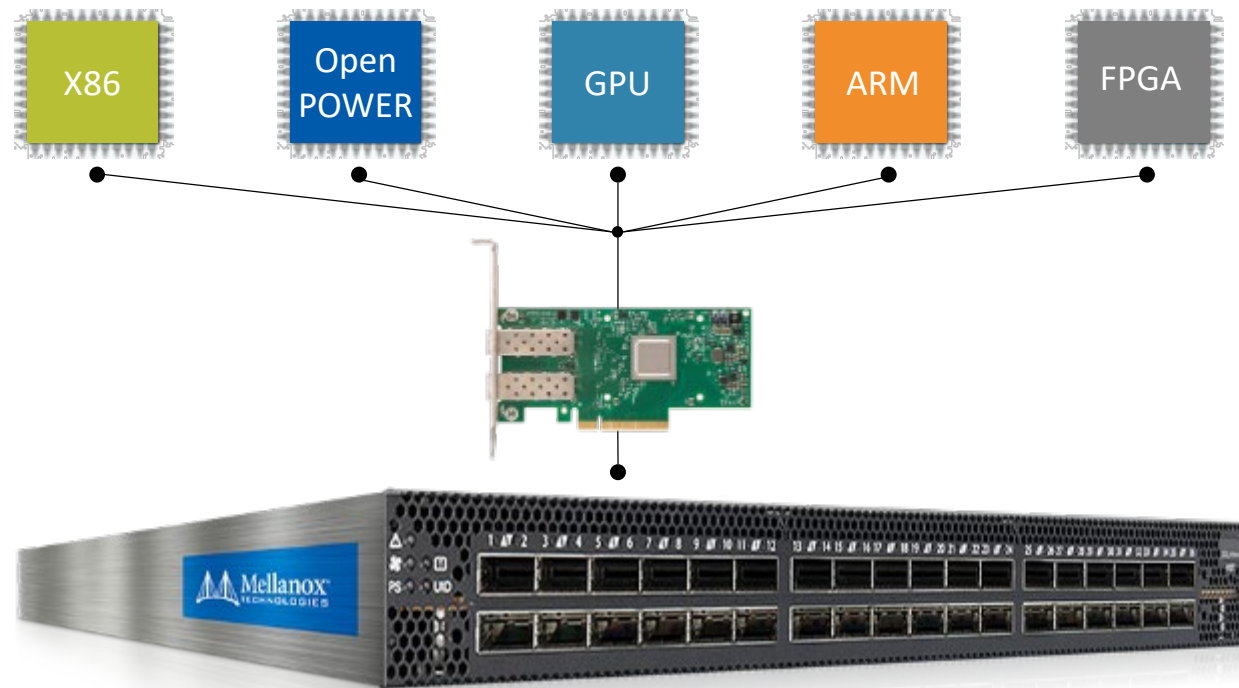
On a Single Chip, BlueField combines:

- Market Leading ConnectX Adapter Technology
- ARM v8 Multicore Processors
- DDR4 DRAM Controller
- PCIe Gen-4 Switch



# End-to-End Solutions for All Platforms

Unleashing the Power of all Compute Architectures



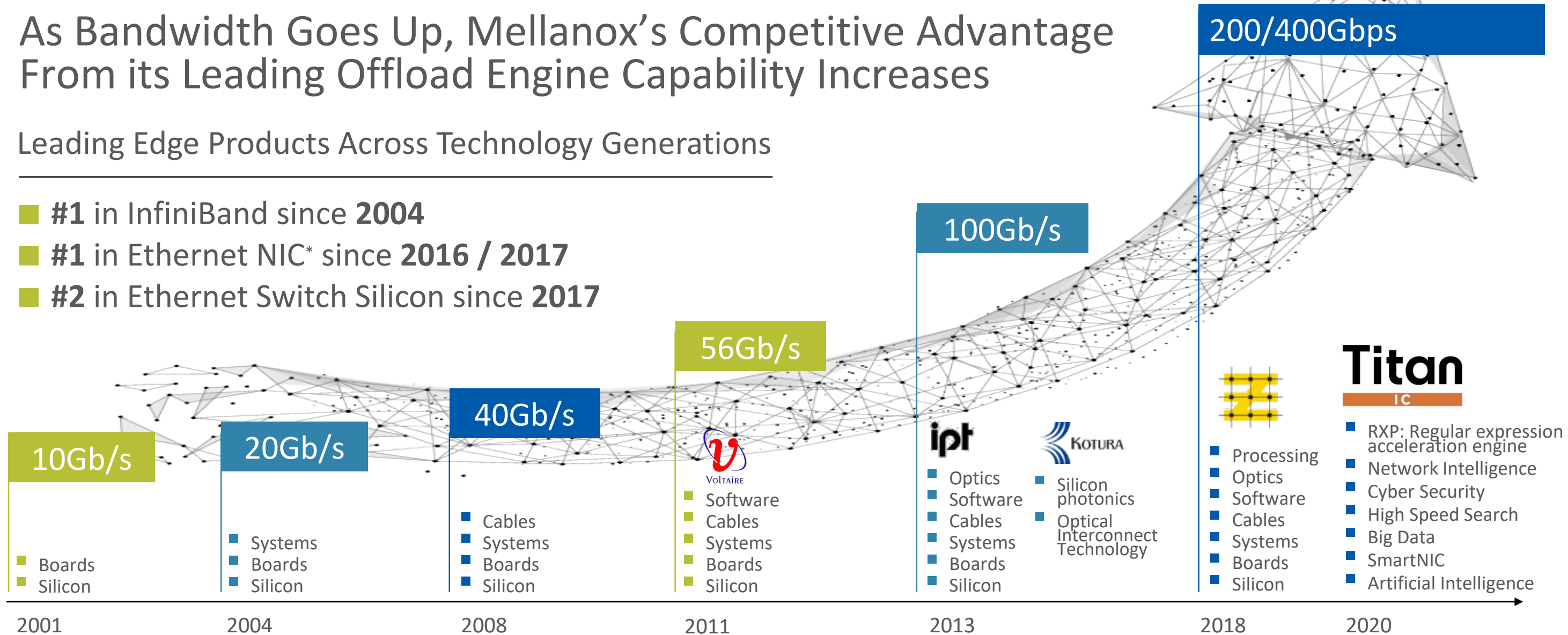
Highest Performance and Scalability for Intel, AMD, IBM Power, NVIDIA, Arm and FPGA-based Compute and Storage Platforms at 10, 20, 25, 40, 50, 100, 200 and 400Gb/s Speeds

# Mellanox Has A Long Track Record Of Delivering Breakthrough Technology

As Bandwidth Goes Up, Mellanox's Competitive Advantage From its Leading Offload Engine Capability Increases

Leading Edge Products Across Technology Generations

- #1 in InfiniBand since 2004
- #1 in Ethernet NIC\* since 2016 / 2017
- #2 in Ethernet Switch Silicon since 2017







Source: Crehan Research, Mellanox internal estimates  
 \* 25G and above

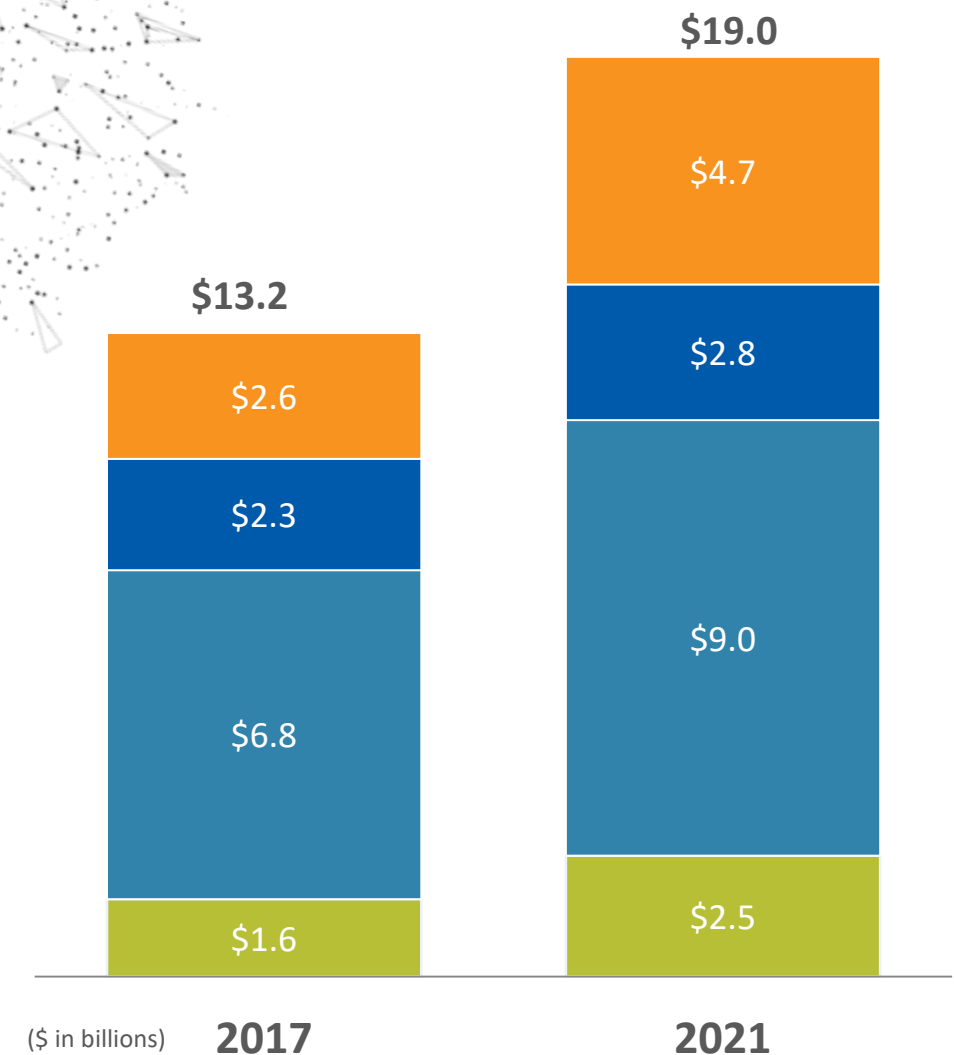
# Mellanox's Opportunity Is Significant with Multiple Growth Vectors

Mellanox's strong product cycles and share gain momentum should allow the Company to grow substantially above the market at rates of mid-double digits or higher.

Source: Crehan Research, Linley Group, LightCounting  
 Note: Market segments may not sum to total due to rounding



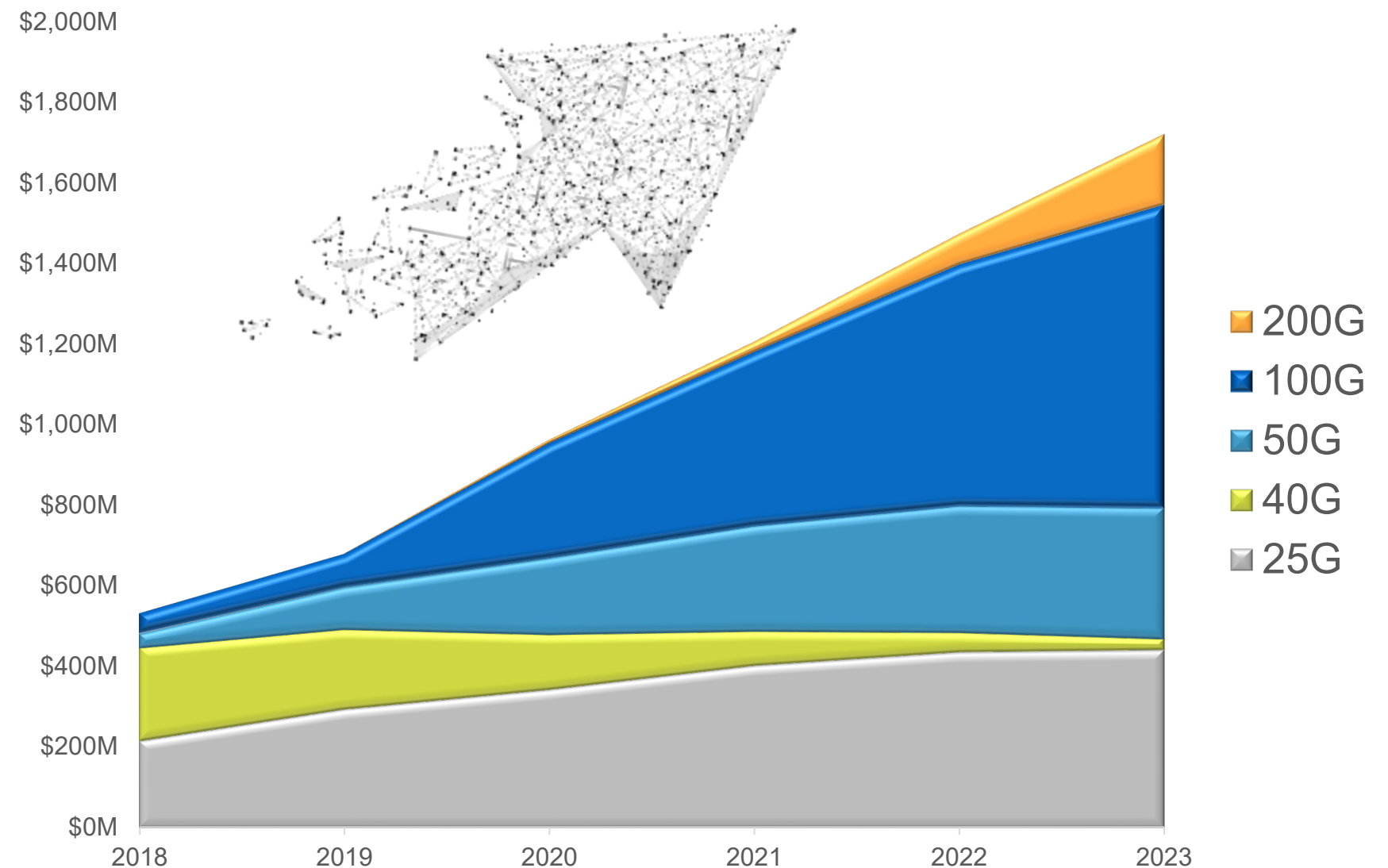
Segment	'17 – '21 CAGR
 Cables (10G+)	16%
 Multicore Processors	6%
 Switch (10G+)	7%
 Adapter (10G+)	12%
<b>Total</b>	<b>9%</b>



# Market Waves: 25 Gb/s and Above Ethernet Adapter

Each Transition to Faster Ethernet Adapter Speeds Represent a Multi-Year Growth Wave for Mellanox  
(10G → 25G → 50G → 100G...)

## 25G+ Ethernet Adapter Market Waves



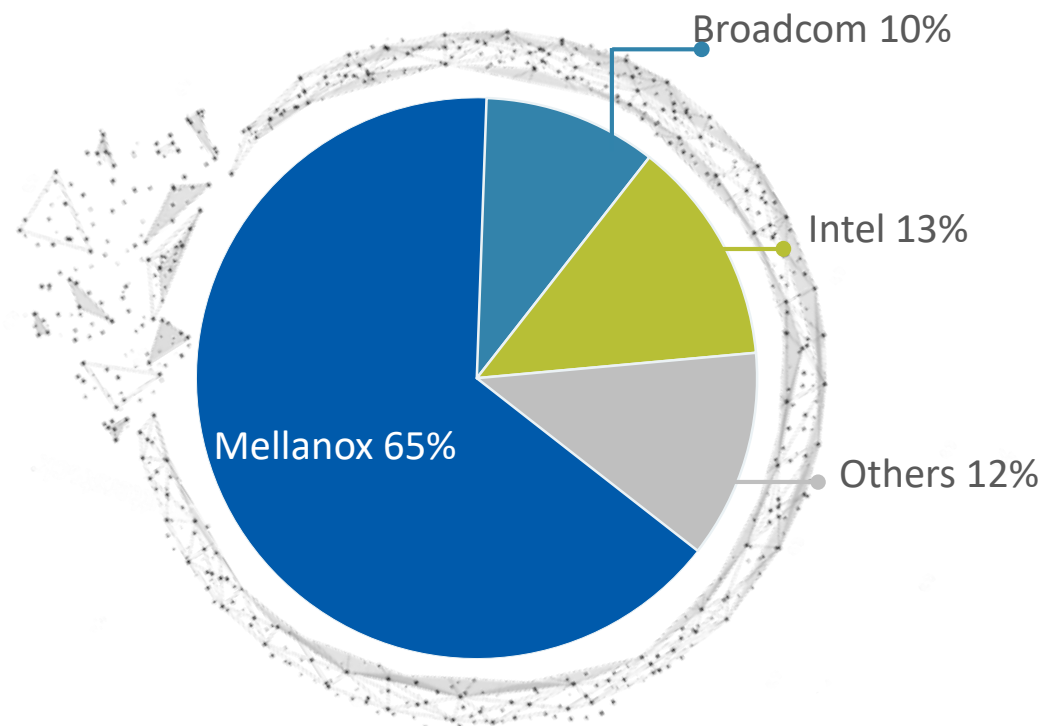




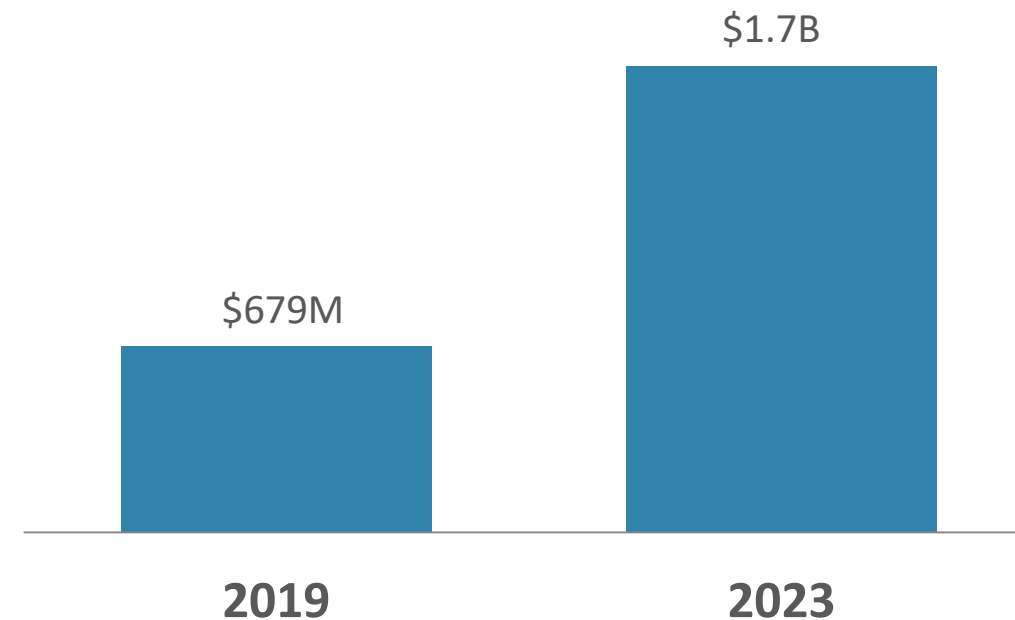
# Positioned for Significant Growth in High-Speed SmartNICs

- First to Market with 25/40/50/100/200 Gb/s Ethernet Adapters
- Broad and expanding portfolio of offload engines creates a competitive advantage - lowers TCO, improves operational efficiency

## Mellanox Is the Market Leader in 25G+ Ethernet Adapters<sup>1</sup>



## 25G+ Ethernet Adapter Market Is Growing Rapidly<sup>2</sup>

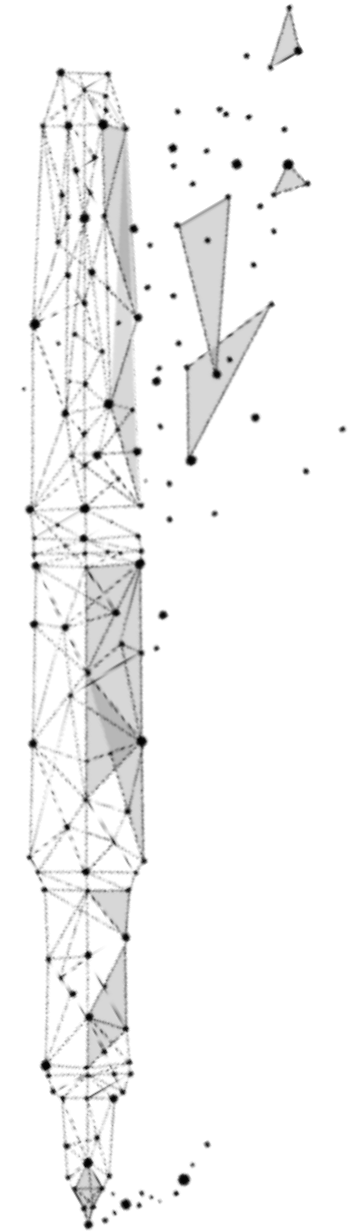


Source:  
<sup>1</sup>Crehan Quarterly Market Share Server-Class Adapter-LOM-Controller 3Q 2019 25, 40, 50, 100 and 200 Gb/s Adapter  
<sup>2</sup>Crehan Long-range Forecast - Server-Class Adapter-LOM-Controller, January 2019

# Broad Data Center Portfolio

Mellanox Now Has a Leading InfiniBand and Ethernet Product Portfolio Targeting the Data Center

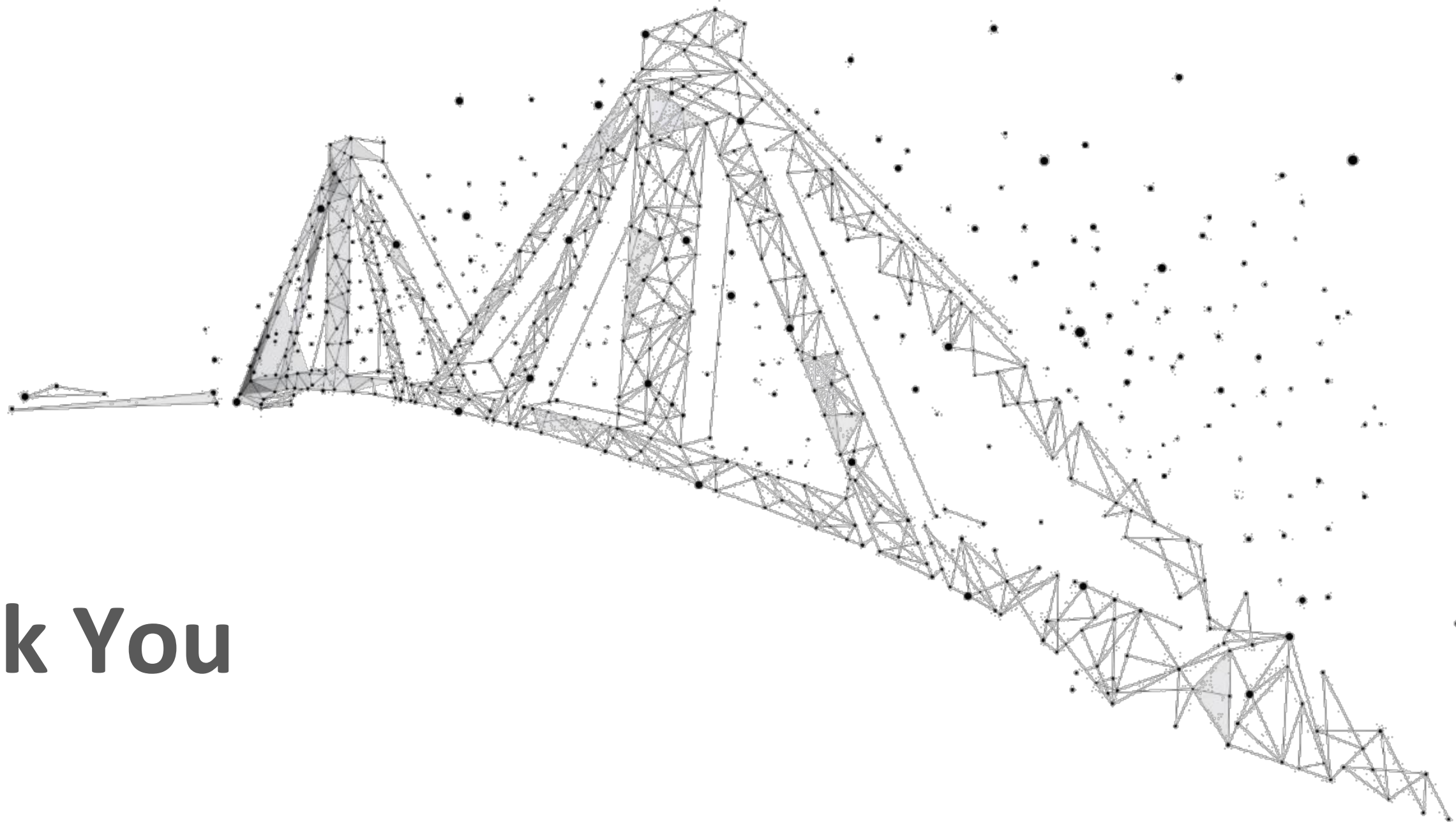
	InfiniBand	High End Ethernet NIC	High End Ethernet Switch	Smart NIC	Cables and Transceivers
	✓ #1 Since 2004	✓ #1 Since 2016	✓ #2 Since 2017	✓ New Leading Technology	✓ Rapid Share Gains
	✓	✓			
		✓	✓	✓	✓
		✓	✓	✓	



# Summary

- Exponential growth of data creating significant opportunities for Mellanox (\$19B TAM)
- Leading interconnect solutions supplier, offering technology that is critical to data center performance at the highest ROI
- Diversified business with comprehensive end-to-end Ethernet, InfiniBand and multi-core processor product portfolio
- Leading the transition to Exascale computing; first to market with 200G HDR InfiniBand with 400G NDR under development
- Benefiting from multi-year growth opportunities driven by the transition to 25G+ Ethernet technology





# Thank You

