

A large, abstract geometric graphic in the background, composed of a network of black dots connected by thin lines, forming a series of peaks and valleys that resemble a mountain range or a complex data structure.

# Mellanox

**Claudio Polla**

Country Manager - South Africa

# Mellanox Overview

**\$1.33B**  
2019 Revenue

**\$7.13**  
2019 Non-GAAP EPS

**\$425M**  
2019 Cash Flow From Operations

**\$876M**  
2019 Ending Cash & Investments

**~2,800**  
Employees worldwide

**NASDAQ®**

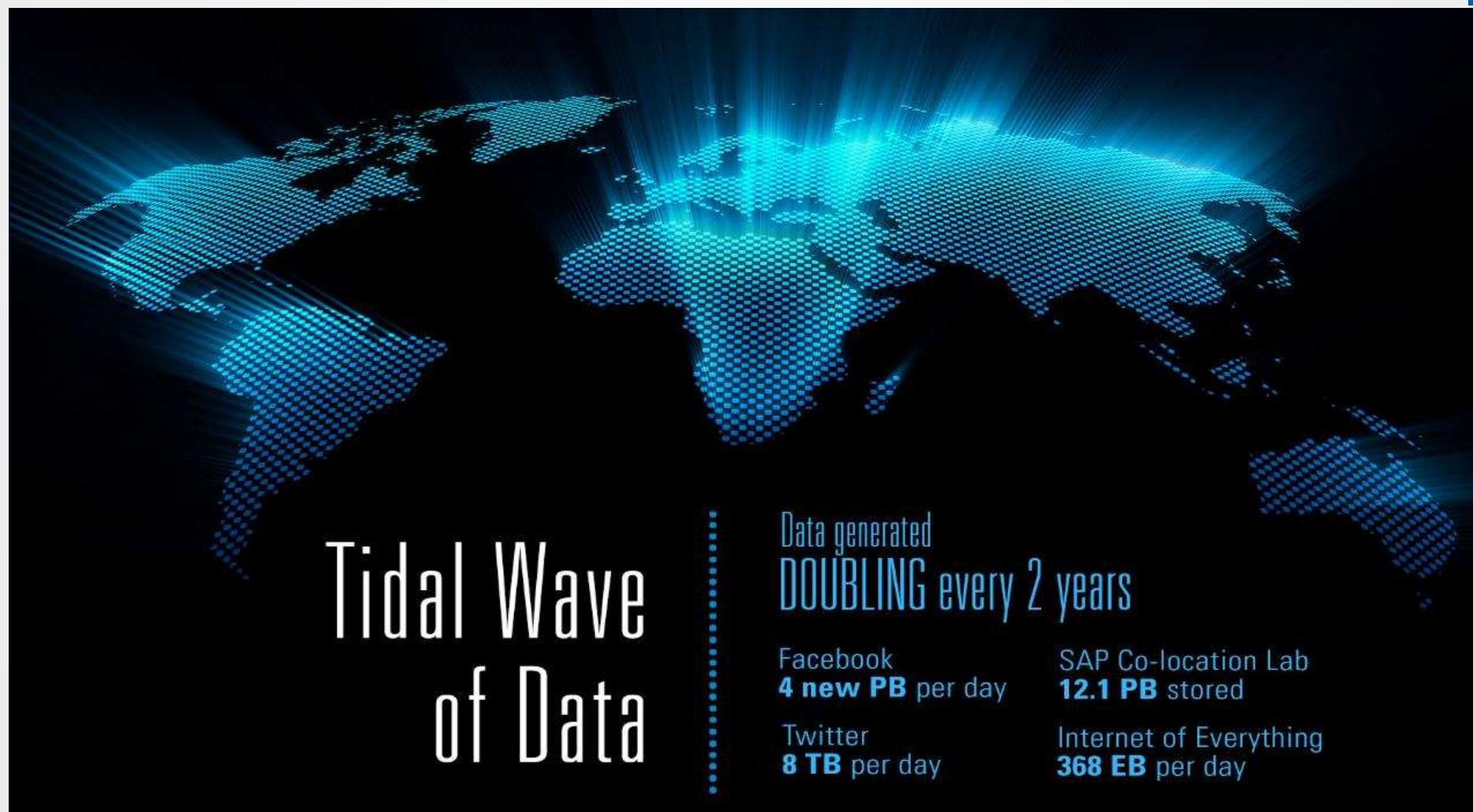
Ticker: MLNX



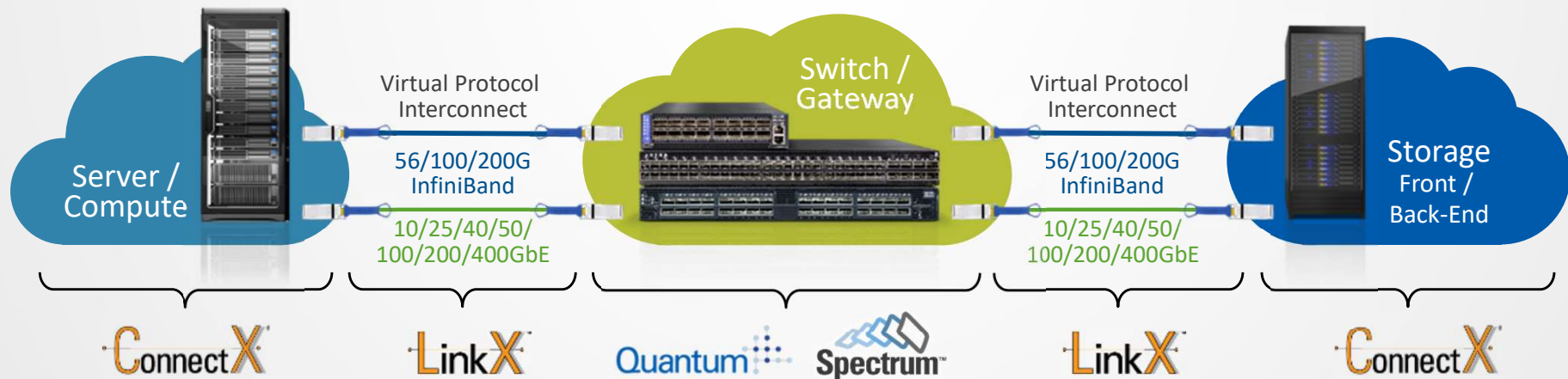
Company  
Headquarters:

- Yokneam, Israel
- Sunnyvale, California
- Worldwide Offices

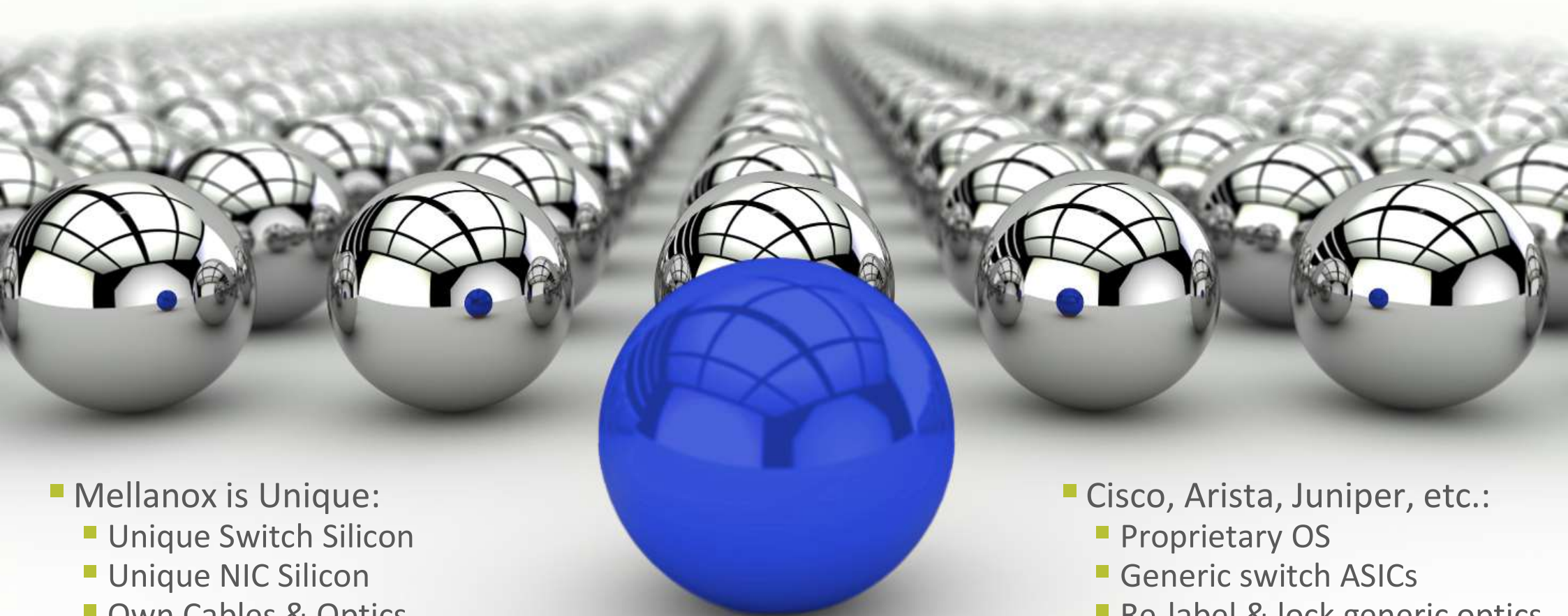
# Data Growth is NEVER Ending



# Leading Supplier of End-to-End Interconnect Solutions



# Unlike Other Network Vendors



- Mellanox is Unique:
  - Unique Switch Silicon
  - Unique NIC Silicon
  - Own Cables & Optics
  - Open Ethernet

- Cisco, Arista, Juniper, etc.:
  - Proprietary OS
  - Generic switch ASICs
  - Re-label & lock generic optics
  - License Features

# Spectrum: The Ultimate 25/100GbE Switch

The only predictable 25/50/100Gb/s Ethernet switch

Full wire speed, non-blocking switch

- Doesn't drop packets per RFC2544

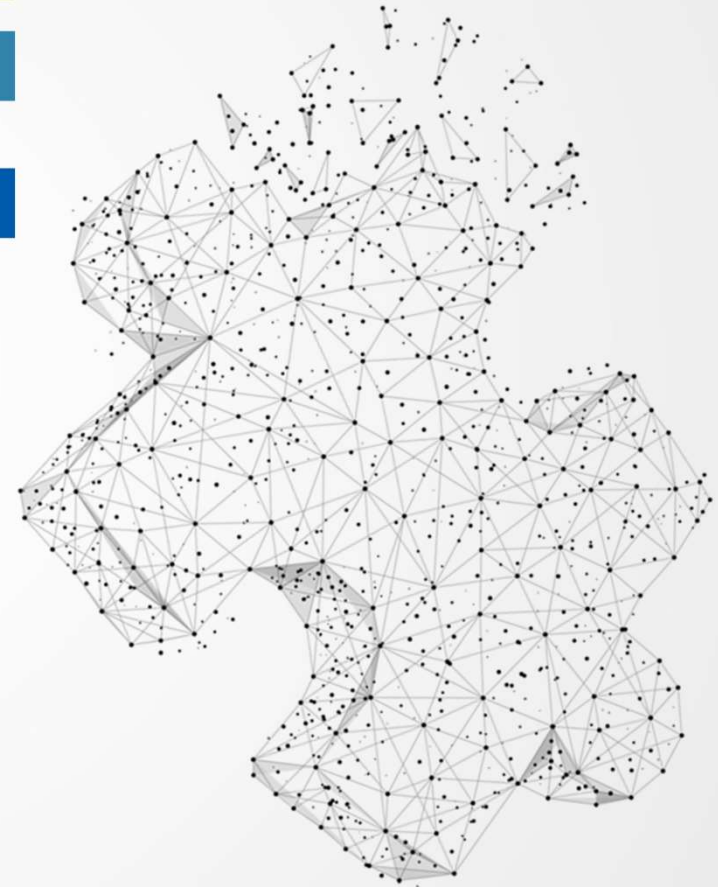
ZPL: ZeroPacketLoss for all packets sizes



**DON'T BE  
SUBJECT  
TO  
PACKET  
LOSS**

**KEEP  
ALL  
YOUR  
DATA  
INTACT**

[zeropacketloss.com](http://zeropacketloss.com)

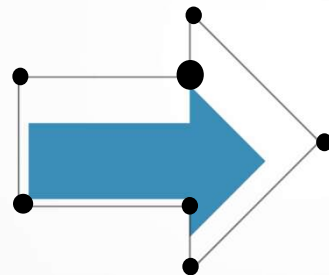
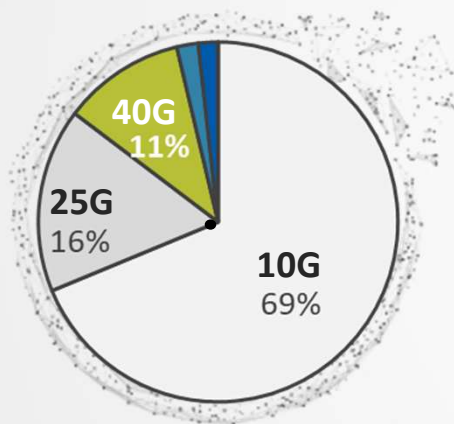


# High Speed Adapters – An Expanding Market

Mellanox ConnectX: 69% of Growing 25G+ Market of 32% 4Y CAGR

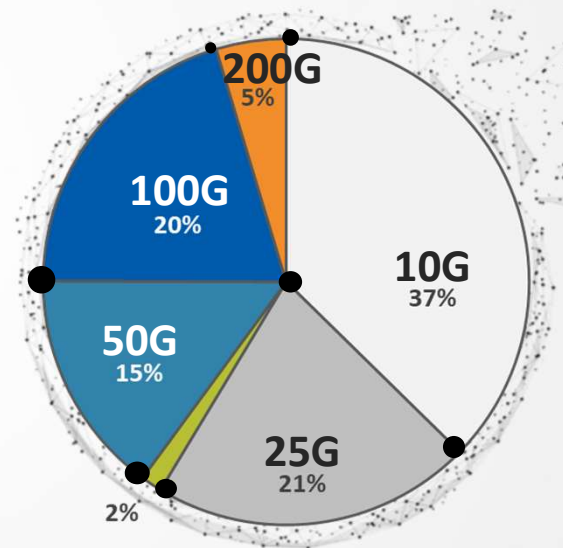
2018

25G+: 31% of Total Market



2022

25G+: 63% of Total Market



- 25G Market - \$200M, Mellanox 70%, Broadcom 17% and Intel 6%

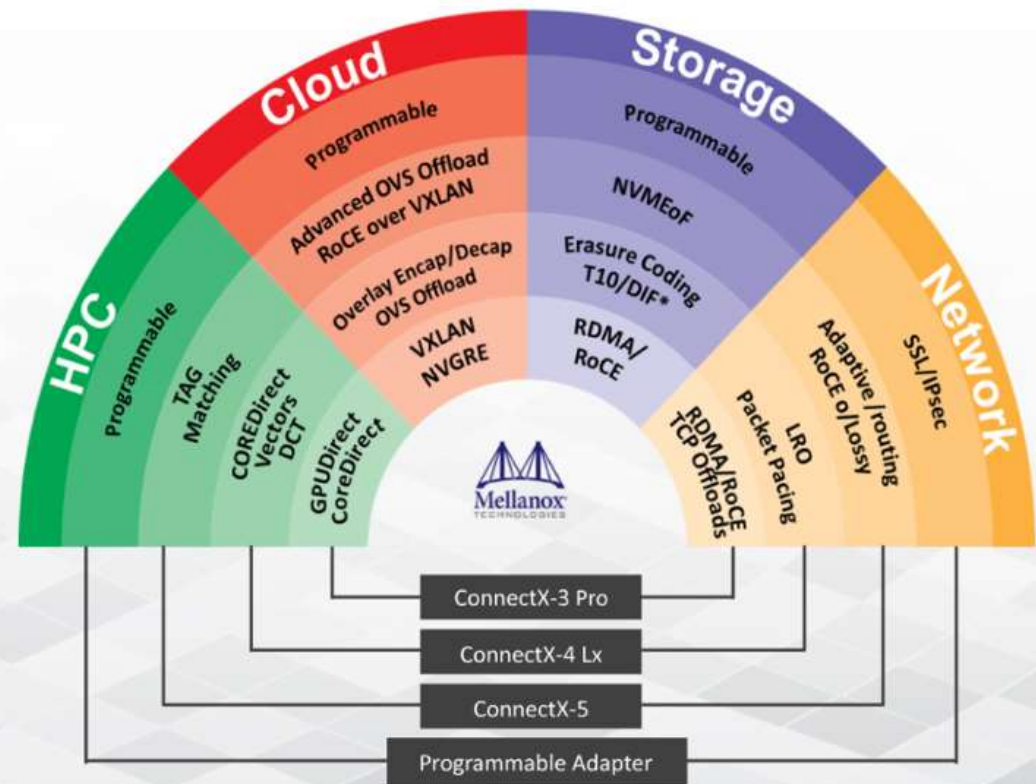
\* **2.8 Million Shipped in 2018**

# Host adapter cards

World's First 200GbE Adapter

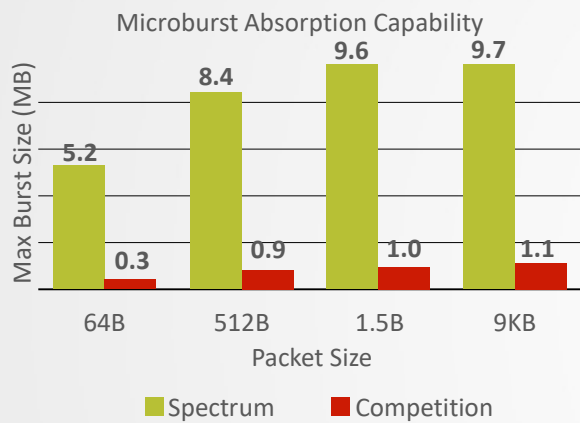


High Performance, Efficient, Scalable

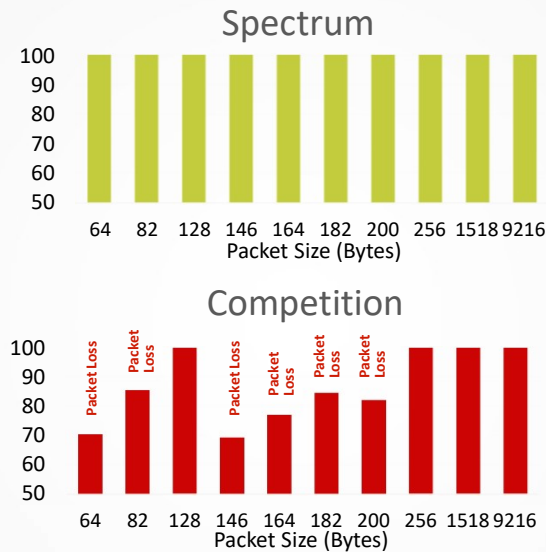


# Spectrum Switch Advantages

## Congestion Management

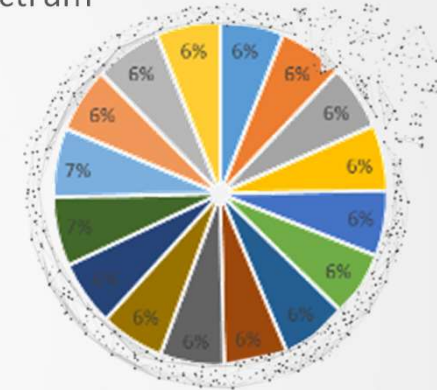


## Avoidable Packet Loss

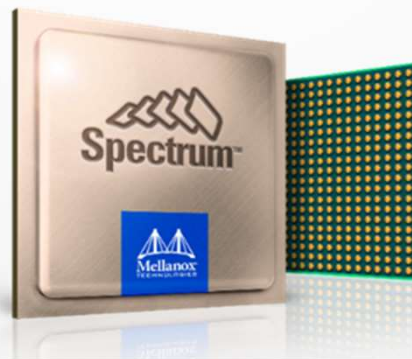
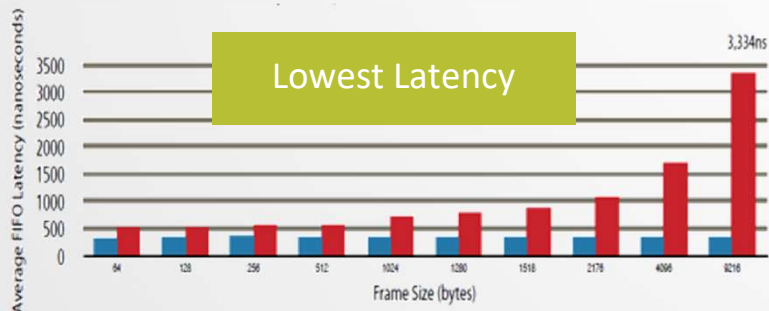
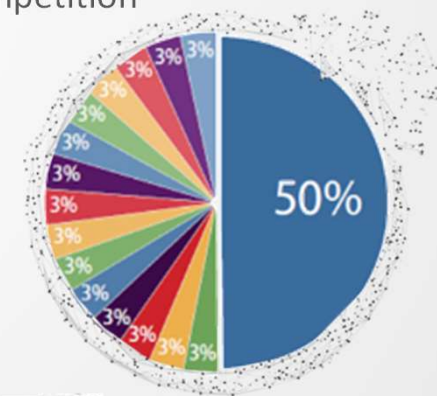


## Fairness & QoS

### Spectrum

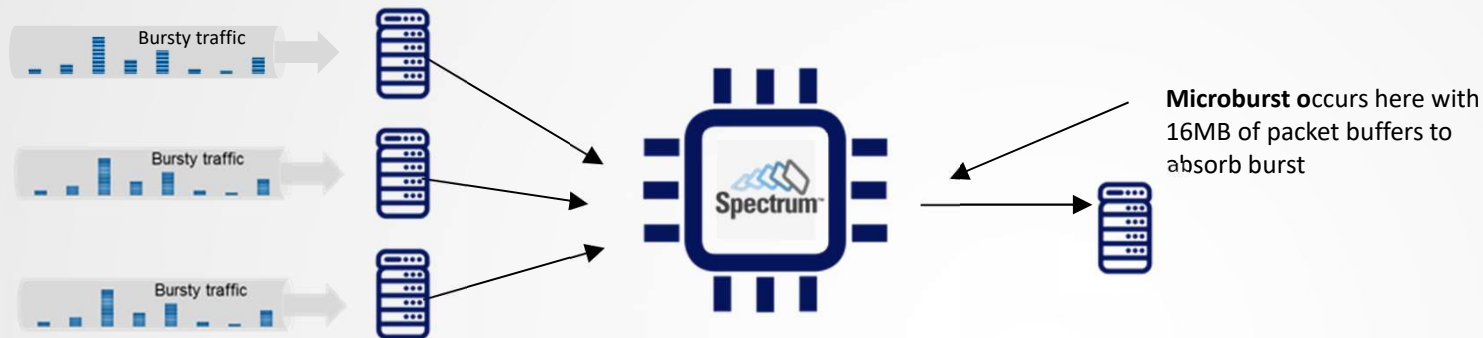


### Competition

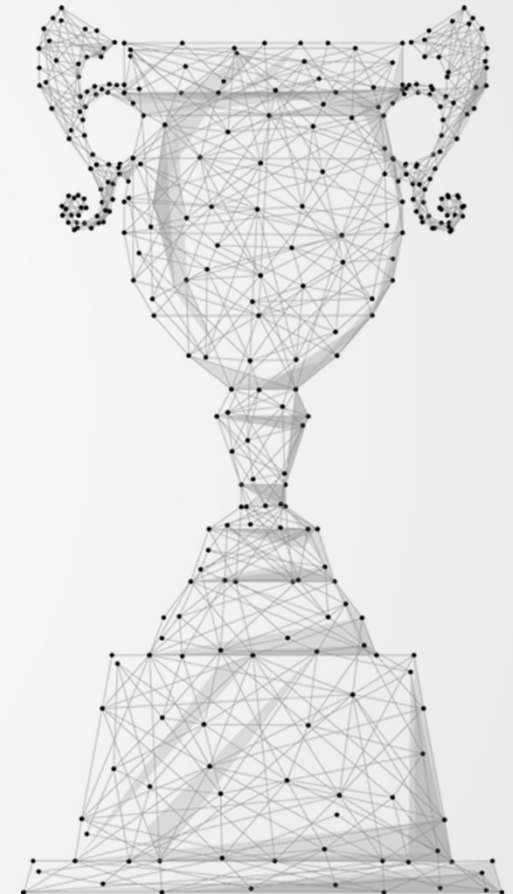


# Fully Shared Buffer is Superior

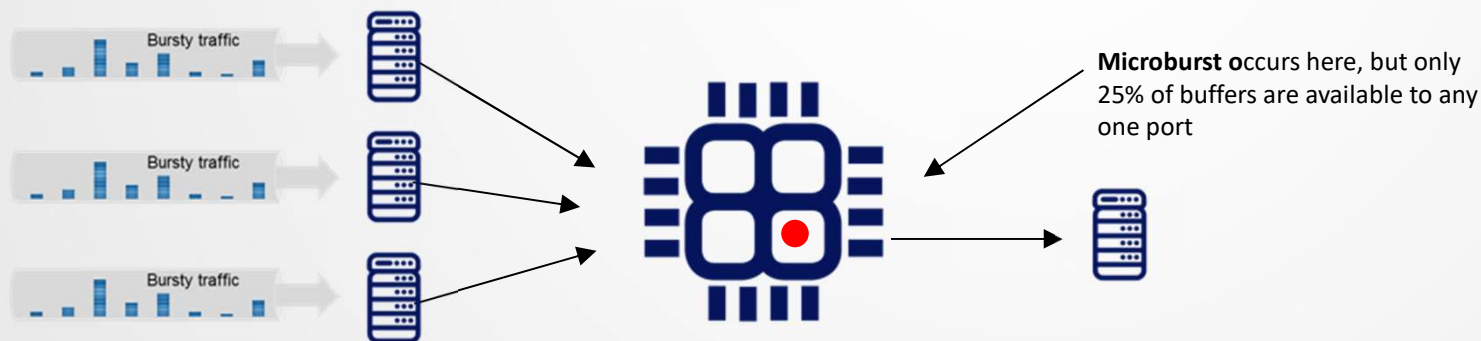
## Fully Shared Packet Buffer



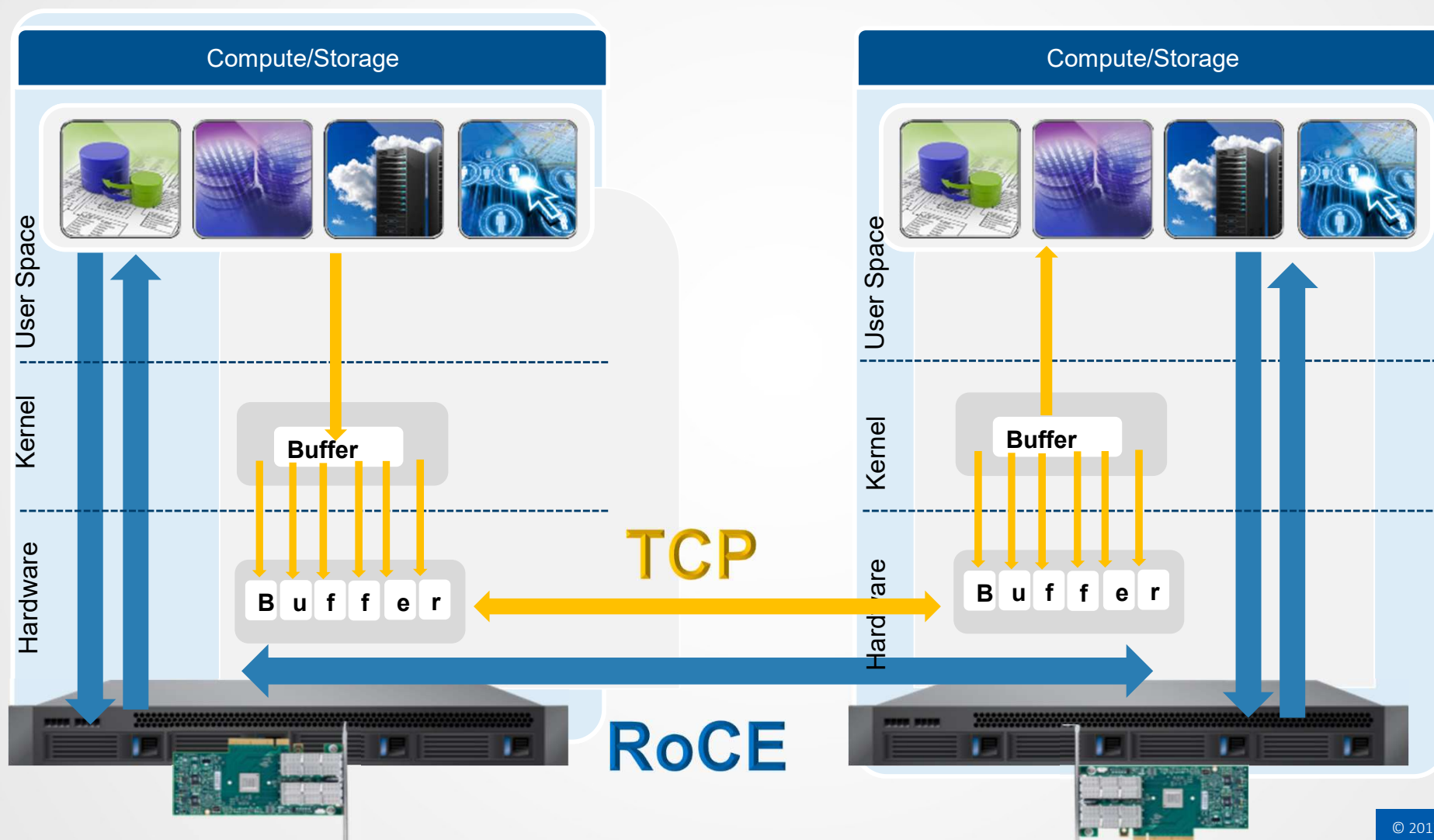
Superior Micro Burst Performance Spectrum's Fully Shared Buffer Provides **4X effective buffer size!**



## Competitor's multi-core based buffer scheme



# RoCE Vs TCP



# Microsoft: RDMA highly recommended

Presentation given to Microsoft's partners by:

[Erin Chapple](#) General Manager for Windows Server

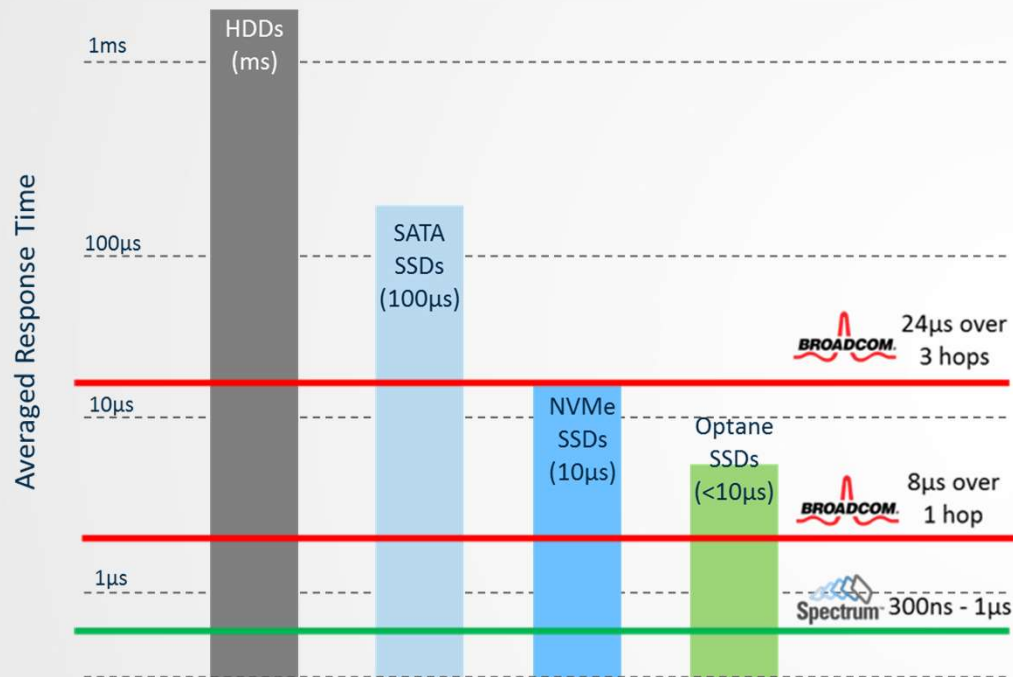
[Jeffry Soveler](#) Technical Lead Architect for the Enterprise Cloud

Delivered a clear message:

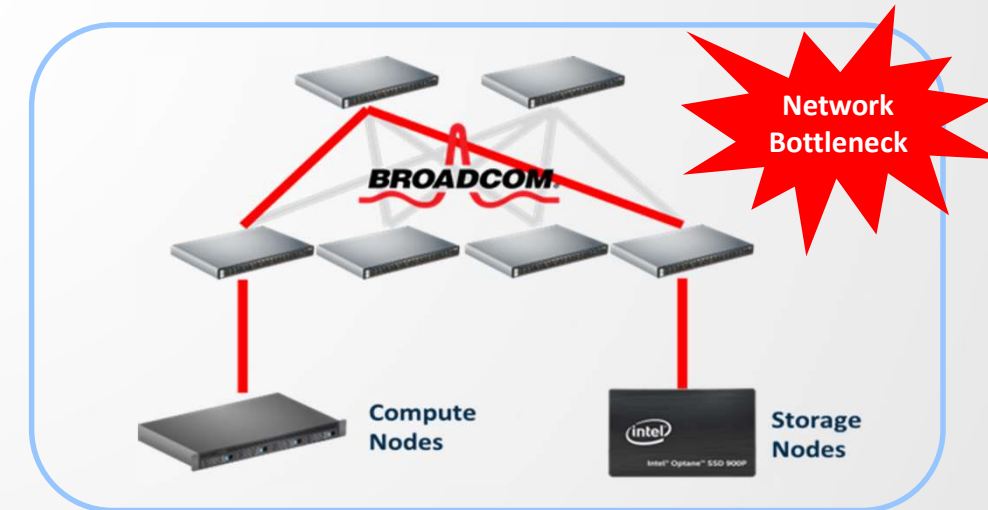
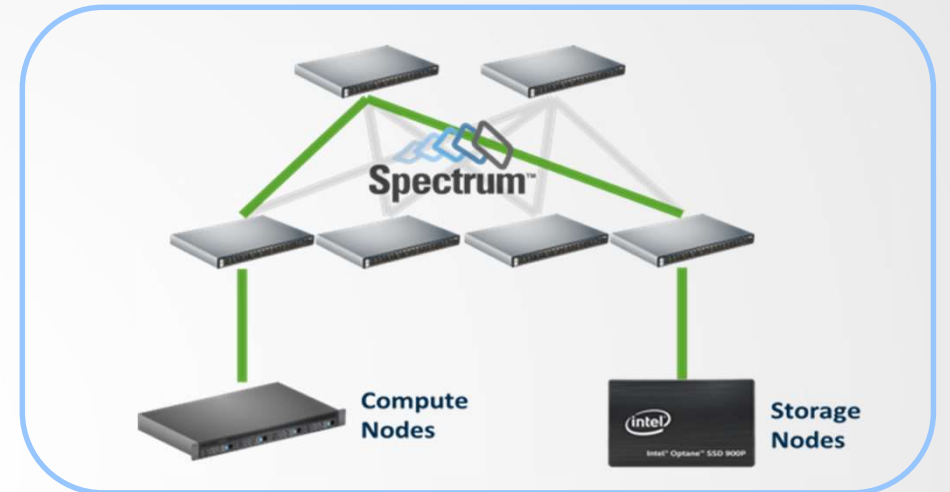
***“Don't waste your money on buying servers that don't have RDMA NICs...”, followed by a short clarification, “...since all of Microsoft's new technologies will heavily rely on RDMA capable networking”.***

<http://sqlha.com/2016/09/23/new-sql-server-benchmark-new-windows-server-feature/>

# Spectrum Unlocks the Maximum Flash Performance



Flash Storage is Getting a Lot Faster!



# Ethernet switch portfolio



**2018-2019**



**2020**



**Next on 2020**



SN2700: 32x100G



SN2410: 48x25G + 8x100G



SN2100: 16x100G



SN2010: 18x25G + 4x100G



SN3700C: 32x100G



SN3700: 32x200G



SN3420: 48x25G + 12x100G



SN3510: 48x50G + 6x400G



SN4700: 32x400G



SN4600C: 64x100G



SN4600: 64x200G



SN4800: 128x100G

# SN2000 Switch Family – Best in Class 25/100G



## SN2700 – 32x100G

The Ideal 100G ToR / Aggregation



## SN2410 – 48x25G + 8x100G

25G → 100G ToR



## SN2100 – 16x100G - up to 64x25G

Ideal Storage / Database / ML Switch



## SN2010 – 18x25G + 4x100G

Ideal Hyperconverged Switch  
10/25G → 100G half width ToR



- Predictable Performance
- Fair Traffic Distribution
- Zero Packet Loss
- Best-in-Class Throughput, Latency, Power Consumption

### 300ns

SN2700 – 169W  
SN2410 – 165W  
SN2100 – 94W  
SN2010 – 57W



Energy efficiency



# Spectrum Edge Switches

## SN2100

16x100G - up to 64x25G  
94 Watts



## SN2010

18x 25G + 4x 100G  
57 Watts



### ■ On-Switch (O-S) Network Services

- 32GB of RAM + 32GB of Storage
- Fine grain control of containers CPU & memory footprint
- Real time visibility of containers CPU & memory usage

### ■ Edge Use Cases

- O-S Edge OpenStack
- O-S Kubernetes controller
- Edge IoT
- CDN
- 5G
- NFV deployments with on-switch applications
- Any network service that makes sense in a TOR

### ■ Common Networking Microservices

- ISPEC encrypted tunnels - 100mbps
- VPN
- Firewall
- Streaming Telemetry Agent
- DNS
- DHCP
- TFTP
- Reverse Proxy
- iSCSI security gateway
- In-Rack Server/Storage Health Checks
- Bare metal boot strap services
  - Like Nutanix Foundation

# Open Ethernet SN3000 Series Switch Family

## **SN3700C – 32x100G**

100G Spine Switch



## **SN3420 – 48x25G + 12x100G**

25G → 100G Leaf Switch



## **SN3510 – 48x50G + 6x400G**

(Uplinks: 12x200G, 24x100G, 6x400G)

50G PAM4 based Leaf Switch



## **SN3700 – 32x200G**

(Flexible Speeds: 32x200G, 64x100G, 128x50G)

50G PAM4 based Spine Switch



- Predictable Performance
- Fair Traffic Distribution for Cloud
- Best-in-Class Throughput, Latency, Power Consumption
- Advanced Telemetry with WJH™
- 2X Forwarding Scale
- Wire-speed NAT

# Open Ethernet SN4000 Series

## SN4700 – 32x400G

400G super-Spine Switch



## SN4600C – 64x100G

High Density 100G Spine Switch, 2U



## SN4600 – 64x200G

200G Super-Spine Switch, 2U



## SN4800 – 4U Modular, up to 128x100G

100G, 200G, 400G speeds



- Predictable Performance
- Fair Traffic Distribution for Cloud
- Advanced Telemetry with WJH™
- Up to 25.6Tbps switching capacity

650nS



ONYX ES	ONYX GA	Cumulus GA
Available	Aug-2020	Q3-2020 CL4.3
Apr-2020	Jun-2020	Top prio Q2-2020 CL4.2
Jun-2020	Aug-2020	Q4-2020 CL5.0
Oct-2020	Jan-2021	Q1-2021

# Choice of Operating Systems

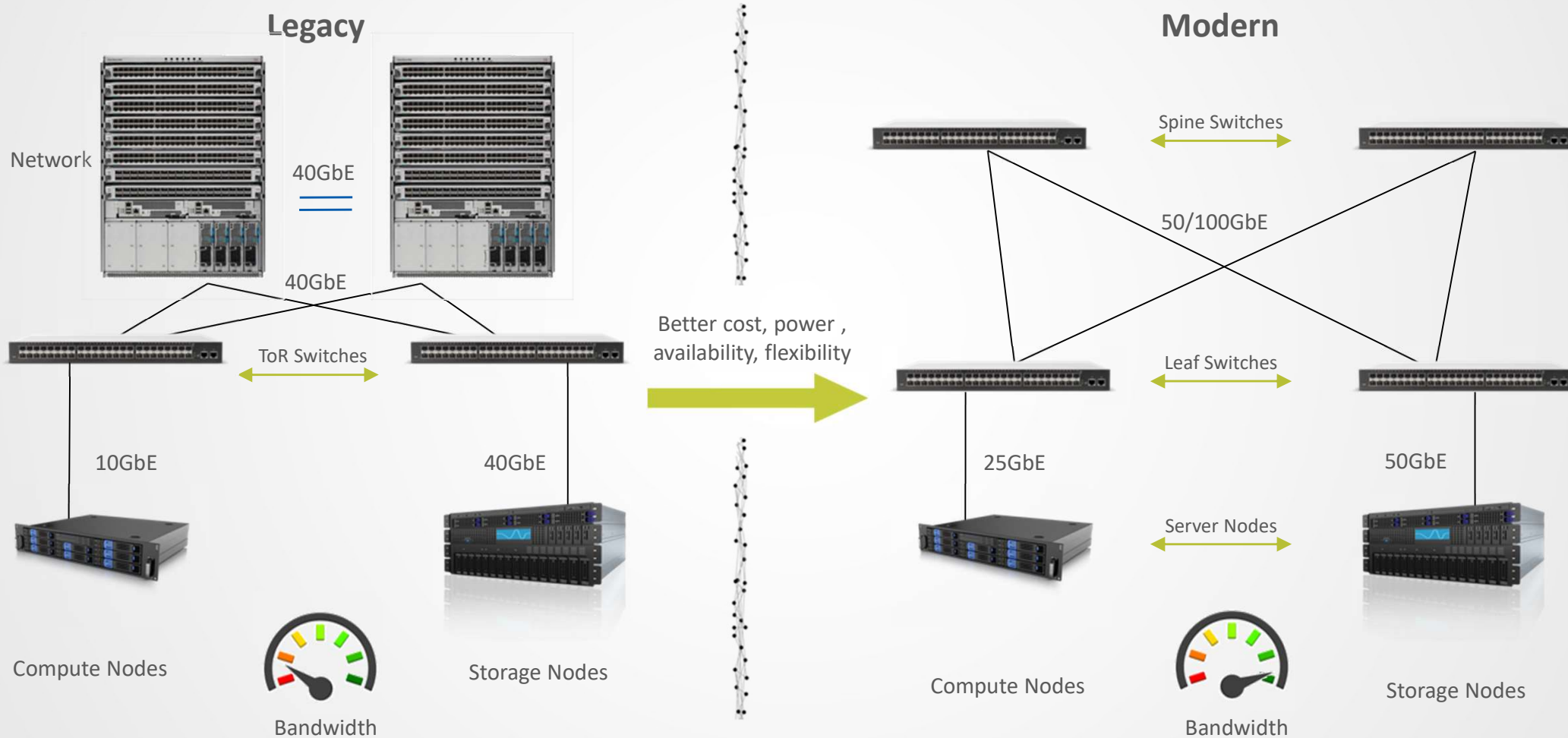


- Best for scale-out storage
- Strong layer 2/3 feature set
- Traditional networking experience
- Cisco-like command line
- OpenFlow 1.3
- Programmable & Extensible



- Overlay Networks – VXLAN/EVPN
- Solid IPv4/6 layer 3 feature set
- Native Linux experience
- Ideal for automating the datacenter
- Server provisioning & orchestration tools
- Programmable & Extensible

# From Legacy to Modern Leaf-Spine Network Design

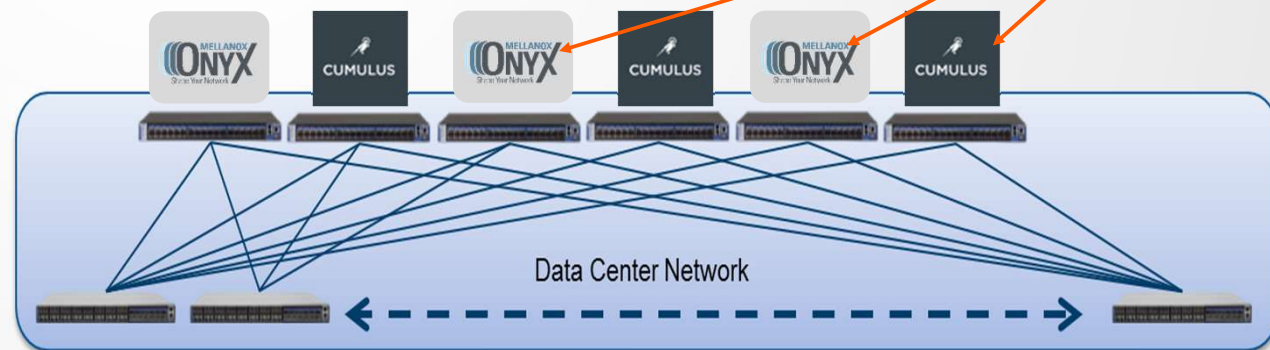


# NEO™ for Simple and Agile Networks



- ✓ Mellanox Onyx
- ✓ Cumulus Linux
- ✓ End-to-End
- ✓ RoCE Automation
- ✓ Auto-Provisioning Nutanix
- ✓ OpenStack & VMware

- Features:
  - Auto-Discovery
  - Zero-touch Provisioning (ZTP)
  - Broadcast Provisioning
  - Configuration management
  - Software Upgrades
  - Traffic Monitoring
  - Virtualization Support
  - Device Health Monitoring
  - Alerts and Notifications
  - Comprehensive RESTful API
  - Rich Web-based UI



# How Does WJH Work?

1. SDK generates:  
WJH messages

2. Agent collects data:  
Streams to Database

3. Presentation Layer:  
Shows What Just Happened

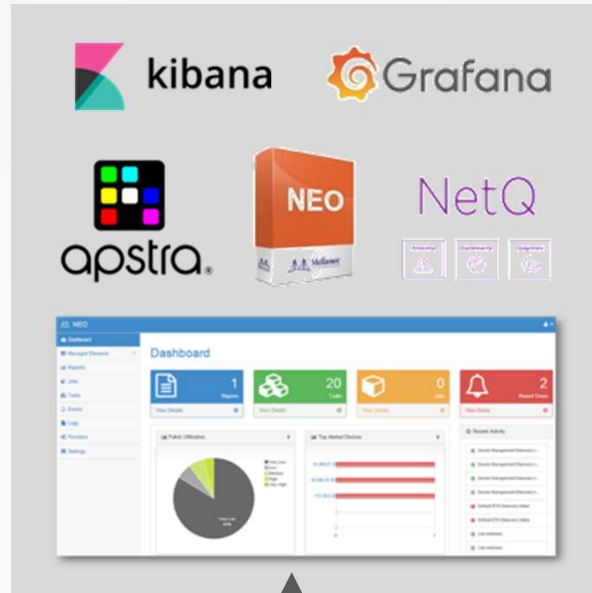
Network OS

SDK/SAI



Packet's 12 Tuple +

very detailed  
description



## The Important Questions

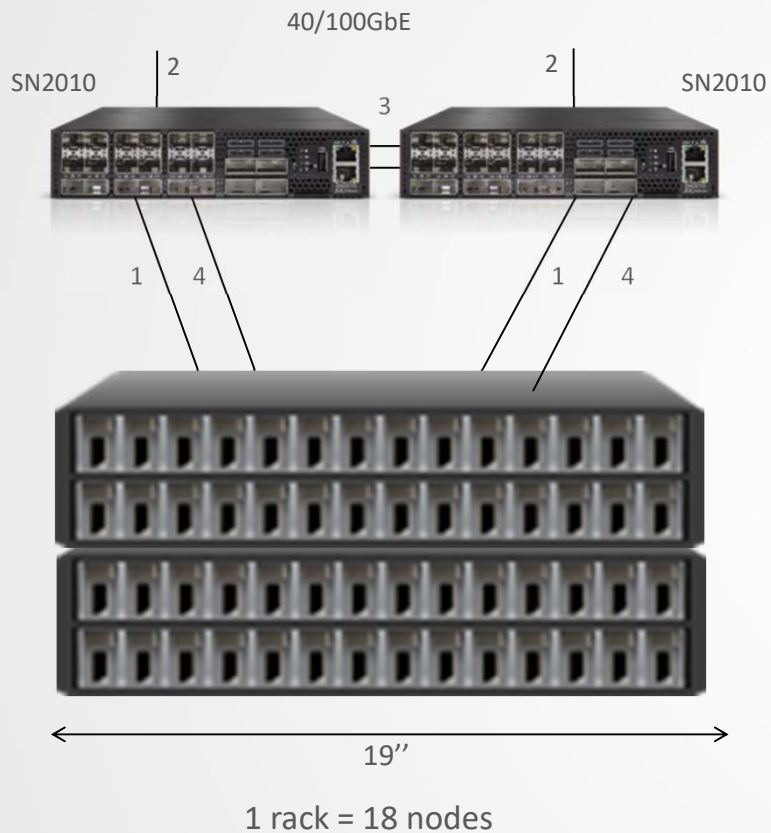
- ✓ WHO is being impacted
- ✓ WHEN it happened
- ✓ WHAT is causing the problem
- ✓ WHERE is the problem
- ✓ WHY it is happening

Root Cause + how to fix it



# Use Cases

# SN2010 – Optimized 10GbE Storage/HCI ToR



1 10/25GbE link: SFP+/28 to SFP+/28



2 40/100GbE uplink: QSFP/28 to QSFP/28



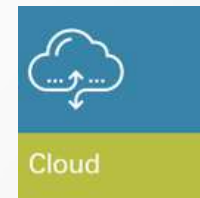
3 100GbE mLAG: QSFP28 to QSFP28



4 1GbE link: 1GbE transceiver



High Performance  
Databases



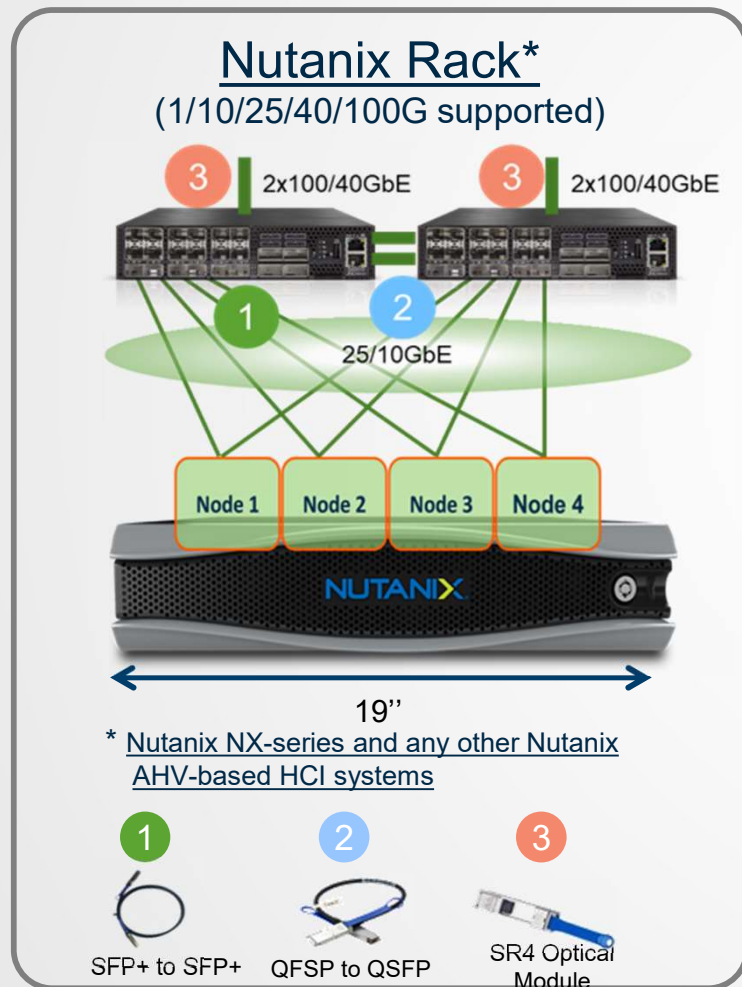
Private  
Cloud



Branch  
Offices

# Mellanox ESF for Nutanix Enterprise Cloud

SN2010 is a Purpose-Built HCI Switch for Nutanix HCI



- **Purpose-Built for Nutanix**
  - Right port count, 2 switches in 1RU
  - Built-in HA, smaller footprint and less power
- **AHV Integration**
  - VM-level network visualization
  - Automated network provisioning
  - VXLAN/EVPN for multi-clouds
- **Simple, Open and Cost Effective**
  - Complete network kit with 1-click deployment
  - Choice of NOS – Mellanox OS (ONYX) or Cumulus
  - No additional costs for any L2/L3 protocols
- **Future Proof**
  - 25/40/50/100G ready
  - RoCE for business applications



# A Better way for 48 Servers in a Rack

Switch Saving per Rack: \$10K

## Mellanox



Up to 128 10/25G ports in 1 RU

VS.

## Competition



96 10G ports in 2 RU

Cables Saving per Rack: \$1.2K



Single cable

Total = \$166

VS.



Four Cables

Total = \$216

Huge Capex Savings

Ongoing Opex Savings: Power, Space, Cooling...

# SN2100 in Storage Use Cases



## Storage Solution Performance Efficiency



[Mellanox Ethernet Alliances Portal](#)

4 RU  
2U  
2U



IOPS/RU



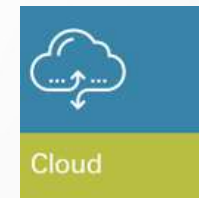
High Performance  
Databases

3 RU  
1U  
2U

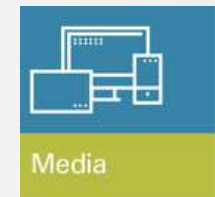


33% Better @ lower cost

IOPS/RU

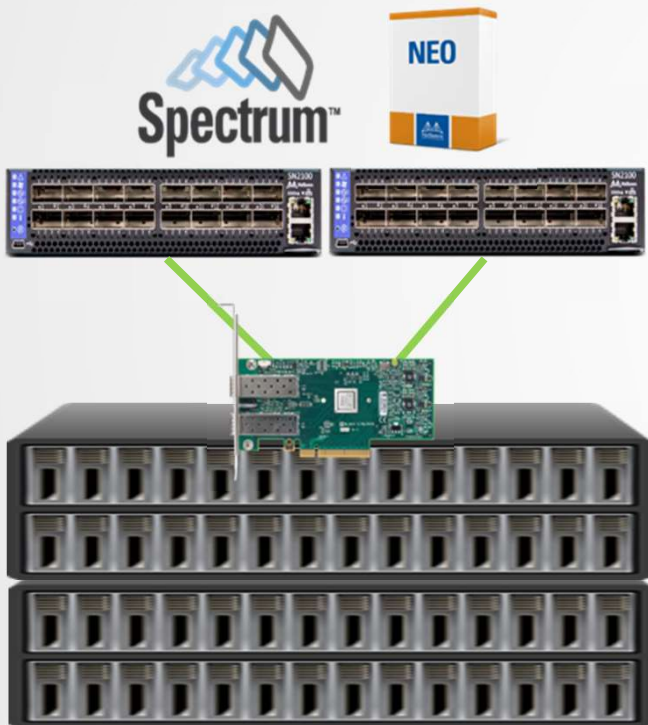


Cloud  
Infrastructure



Media  
4K+ Media  
Production

# Mellanox ESF for RoCE-based Storage



Low Latency



Easy Configuration



Guaranteed QoS

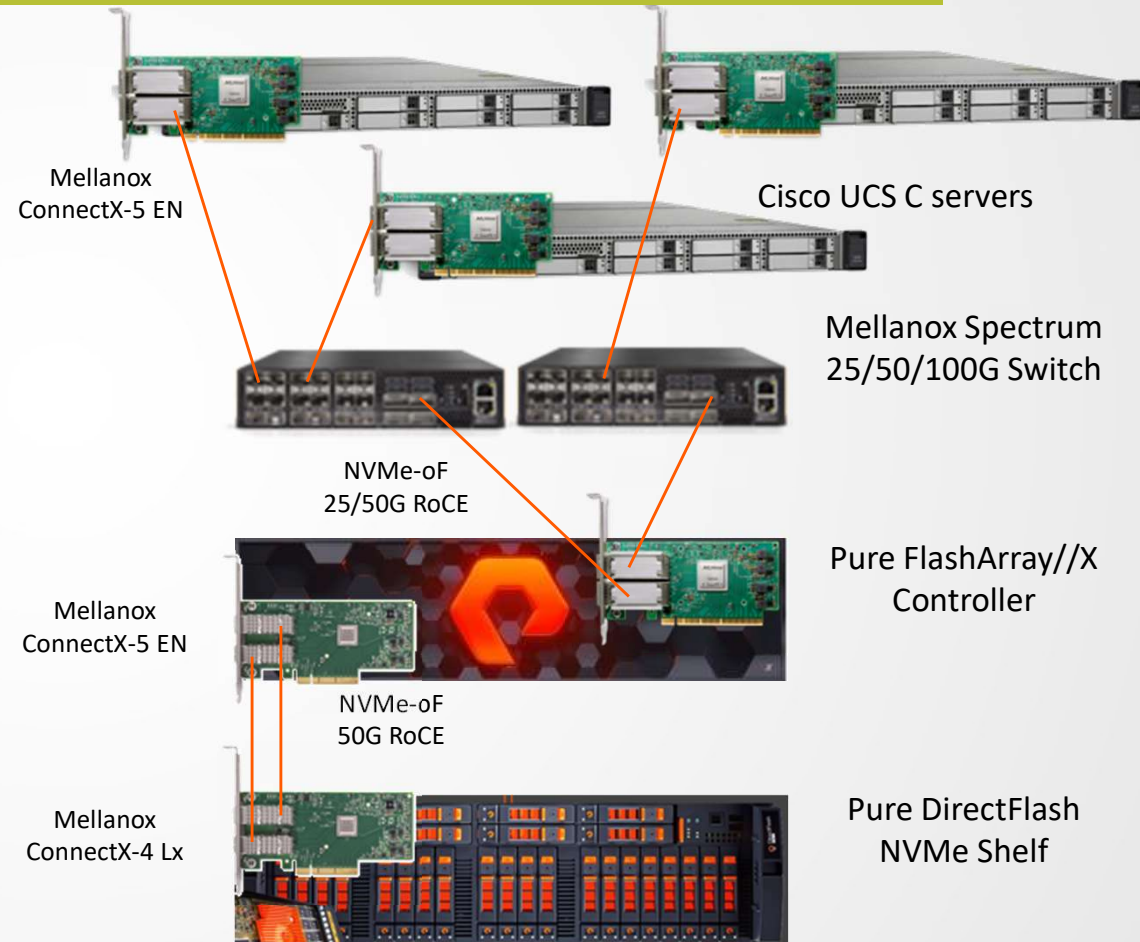


Automated Mgmt

# Pure Storage NVMe-oF Runs on Mellanox ESF

## 1<sup>st</sup> Mainstream Enterprise Flash Array Doing NVMe-oF on RoCE

- Mellanox end-to-end NVMe-oF
  - Adapters in host servers
  - Adapters in storage controller
  - Adapters in flash shelves
  - Switches for Ethernet Storage Fabric
- Pure Storage NVMe end-to-end
  - Faster performance
  - More efficient protocol
  - Built on Mellanox Ethernet Storage Fabric



# Our value prop – First to market with Disruptive technology



## Complete E2E Ethernet Solutions based on our own Silicon

- 10, 40 & 25/50/100GbE
- Lowest Power, Latency, Cost
- Highest Bandwidth
- Tolly report

## Our NICs Increase CPU utilization

- RDMA / ROCE
- Off load engines
- Applications run faster
- Better TCO

## Benefits

- Performance
- ZERO Packet Loss
- Lower Latency
- Energy & Rack Reduction
- Lowest \$ Gb/s
- Less CPU Usage

JANUARY 1 – JULY 31, 2020



# DOUBLE DOWN

2020 Channel Incentive Program



Rewards Double  
with 3 or More Switches  
on One Order

**MELLANOX ETHERNET SWITCHES – THE BEST BET**  
**DOUBLE** the rack space + **DOUBLE** the rewards!

## SN2010

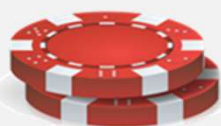
## SN3700 & SN3800

## SN2100, SN2410, & SN2700



**\$50**  
per switch

Qty 1-2



**\$100**  
per switch

Qty 3+

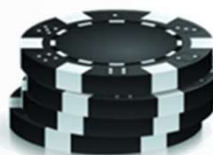


Sales Rep



System Eng

Double  
Down



**\$200**  
per switch

Qty 1-2



**\$400**  
per switch

Qty 3+



Sales Rep



System Eng

Double  
Down



**\$100**  
per switch

Qty 1-2



**\$200**  
per switch

Qty 3+



Sales Rep



System Eng

Double  
Down

OUTS LIMITED TO \$5,000 USD PER DEAL REGISTRATION / END CUSTOMER INVOICE. ONE SALES REP AND ONE SYSTEM ENGINEER ELIGIBLE FOR FULL PAYOUT PER CUSTOMER ORDER.

# DOUBLE DOWN: Terms and Conditions

Visit PartnerFIRST portal for more info: <http://partners.mellanox.com>



## WHO:

- Resellers purchasing eligible Mellanox branded switches through authorized distributors worldwide
- Sales representative and system engineer responsible for the end customer sale eligible for full payout

## WHAT:

- Ethernet switch models (SN2010, SN2100, SN2410, SN2700, SN3700, SN3800) purchased through authorized distribution.
- For reward payouts to be doubled, a quantity of 3 or more eligible Ethernet switches must be purchased by an end customer on a single deal registration / end customer invoice (PO). *Ethernet switches do not have to all be the same model number to qualify for doubling incentive.*
- Payouts are limited to \$5,000 USD per eligible individual per deal registration / end customer invoice.
- Deals with special pricing could result in being ineligible for cash incentives; consult with sales rep prior to closing sale for verification. Proof of prior approval will be required to approve final claim.

## WHEN:

- Switches must be sold and shipped between January 1<sup>st</sup> and July 31<sup>st</sup>, 2020.
- Claims must be submitted with proof of purchase and shipment within 45 days of customer invoice date on [www.mellanoxrewards.com](http://www.mellanoxrewards.com) website.

All cash incentives are intended for personal use and are not to be transferred to any customer or any third party with whom Mellanox does business and are subject to relevant country tax laws including being reported as income where applicable. Restrictions may apply. Void where prohibited. Program subject to change at any time.

# Mellanox Rewards

All cash rewards for our partners are paid via the Mellanox Rewards system that leverages re-loadable debit cards. Simply keep the Mellanox Rewards debit card in your wallet and every approved claim puts more cash on your card! The revamped Mellanox Rewards website offers many services:

- Check your card balance
- Report a lost/stolen card
- Relevant tax forms for end of year reporting

**SIGN UP TODAY!**  
[www.MellanoxRewards.com](http://www.MellanoxRewards.com)



**EASY AS:**

**1**

## Register for Rewards Site

Visit [mellanoxrewards.com](http://mellanoxrewards.com) and fill out your personal info. Provide proof of ID for tax reporting purposes.

**2**

## Enter Eligible Claims

Enter all eligible claims within 45 days of customer invoice date. Provide proof of purchase as well as shipment.

**3**

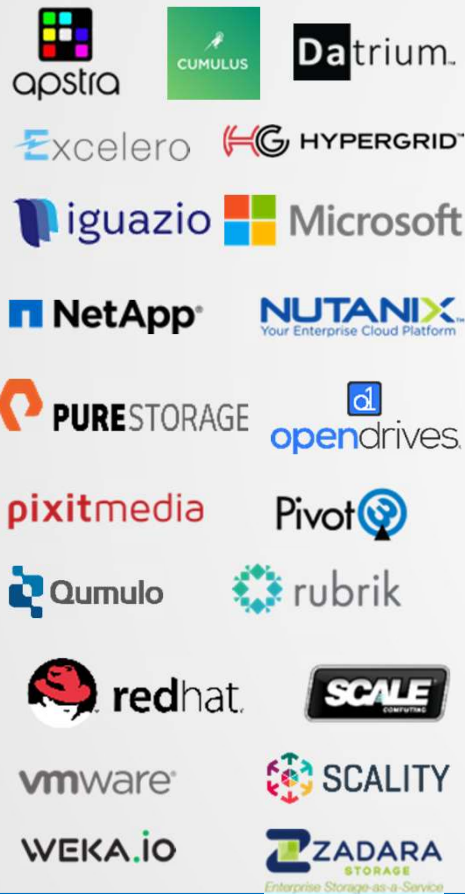
## Get & Keep Your Debit Card

Receive your debit card once first claim is approved for payment. Keep the debit card for all future claim payments.

Questions or Need Support? Email us at [mellanoxrewards@mtcperformance.com](mailto:mellanoxrewards@mtcperformance.com) or call us at 847-485-3838

# Strong Adoption in Every Segment

## Partners & Alliances



Cloud Services & Hosting	Big Data Machine Learning	Media & Entertainment	Education & Research	Health Care	Others
    	    	    	    	    	    

# Customers Span Industries

## FINANCIAL SERVICES



## ENTERTAINMENT/ MANUFACTURING



## RETAIL



## TECHNOLOGY



## EDUCATION/ PHARMACEUTICAL/ HOSPITALITY



## SERVICE PROVIDER



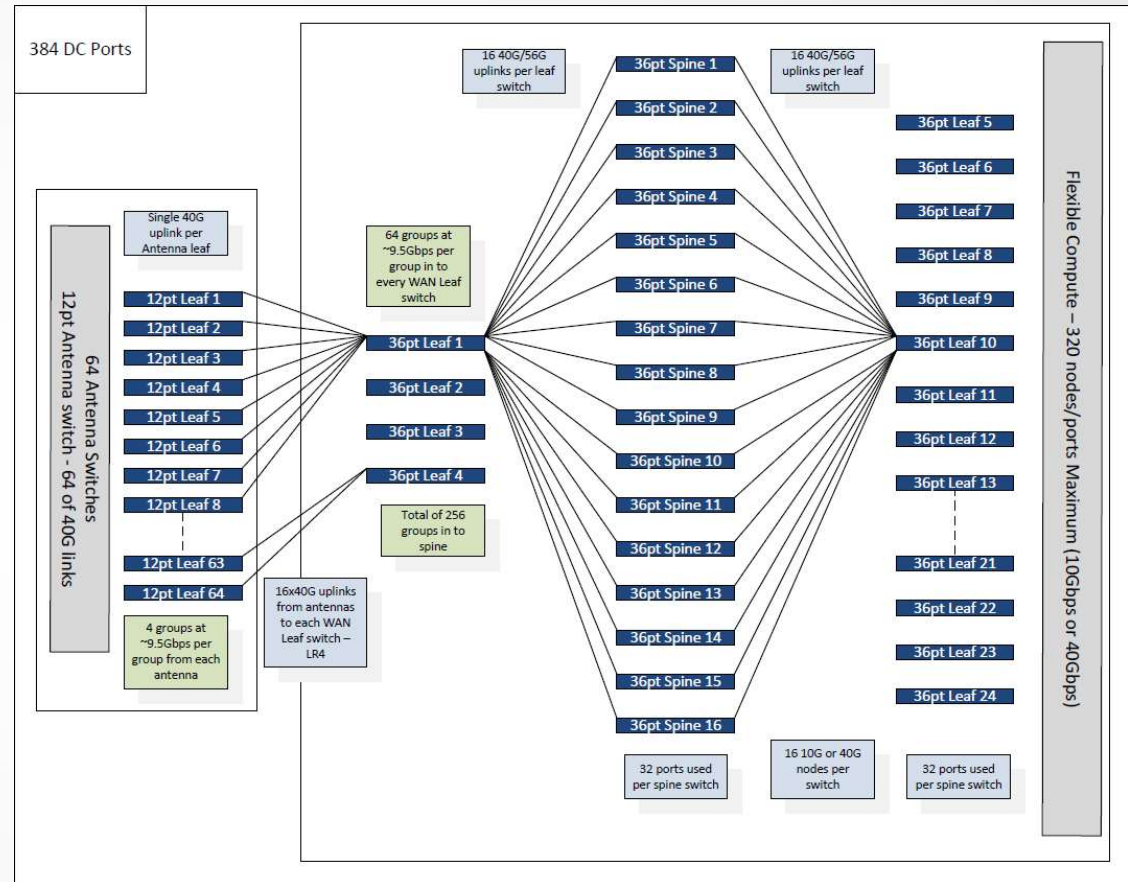
# SKA Project

- **World's Largest Radio Telescope**
- **64 x SX1012 in 64 Antenna stations connected to the data center via LR4 Optical Transceiver**
- **40 x SX1710 forming 384 ports VMS in the data center**
- **PIM-BiDir with load sharing and OSPF**



"The amount of data that will be generated by the MeerKAT antennas is equivalent to more than 5 million DVDs every day or about 64 DVDs per sec," said Francois Kapp, sub-system manager at SKA Africa. "This enormous amount of data requires high-bandwidth, low jitter networks. After a comprehensive review of the various products in the market, we concluded that Mellanox's SwitchX-2 Ethernet switches and optical cables will provide us with the best value enterprise-class Ethernet infrastructure that meets all the requirements for our systems."

[http://www.mellanox.com/page/press\\_release\\_item?id=1521](http://www.mellanox.com/page/press_release_item?id=1521)



A large, abstract wireframe graphic of a mountain range, composed of numerous black dots connected by thin lines, creating a mesh-like structure. The mountains are rendered in a perspective view, with some peaks more prominent than others. The graphic is set against a light gray background with faint, larger-scale geometric patterns.

# Thank You

Two small squares, one olive green and one blue, stacked vertically.