



Most Efficient SDN based Data Center Solutions

Increased Performance, Higher Scalability and Extreme Resiliency

June, 2016

 **Mellanox**
TECHNOLOGIES
Connect. Accelerate. Outperform.™

Leading Supplier of End-to-End Interconnect Solutions

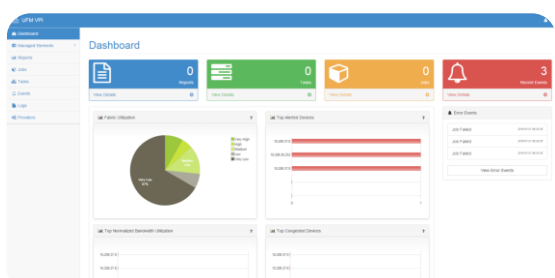


ICs	Adapter Cards	Switches/Gateways	Software and Services	Metro / WAN	Cables/Modules

Entering The Era of 25GbE, 50GbE And 100GbE



Software







Switch



32 100GbE Ports, 64 25/50GbE Ports
(10 / 25 / 40 / 50 / 56 / 100GbE)
Throughput of 6.4Tb/s



Adapter



100GbE Adapter
(10 / 25 / 40 / 50 / 56 / 100GbE)
Multi Host Solution



Interconnect





Copper (Passive, Active)

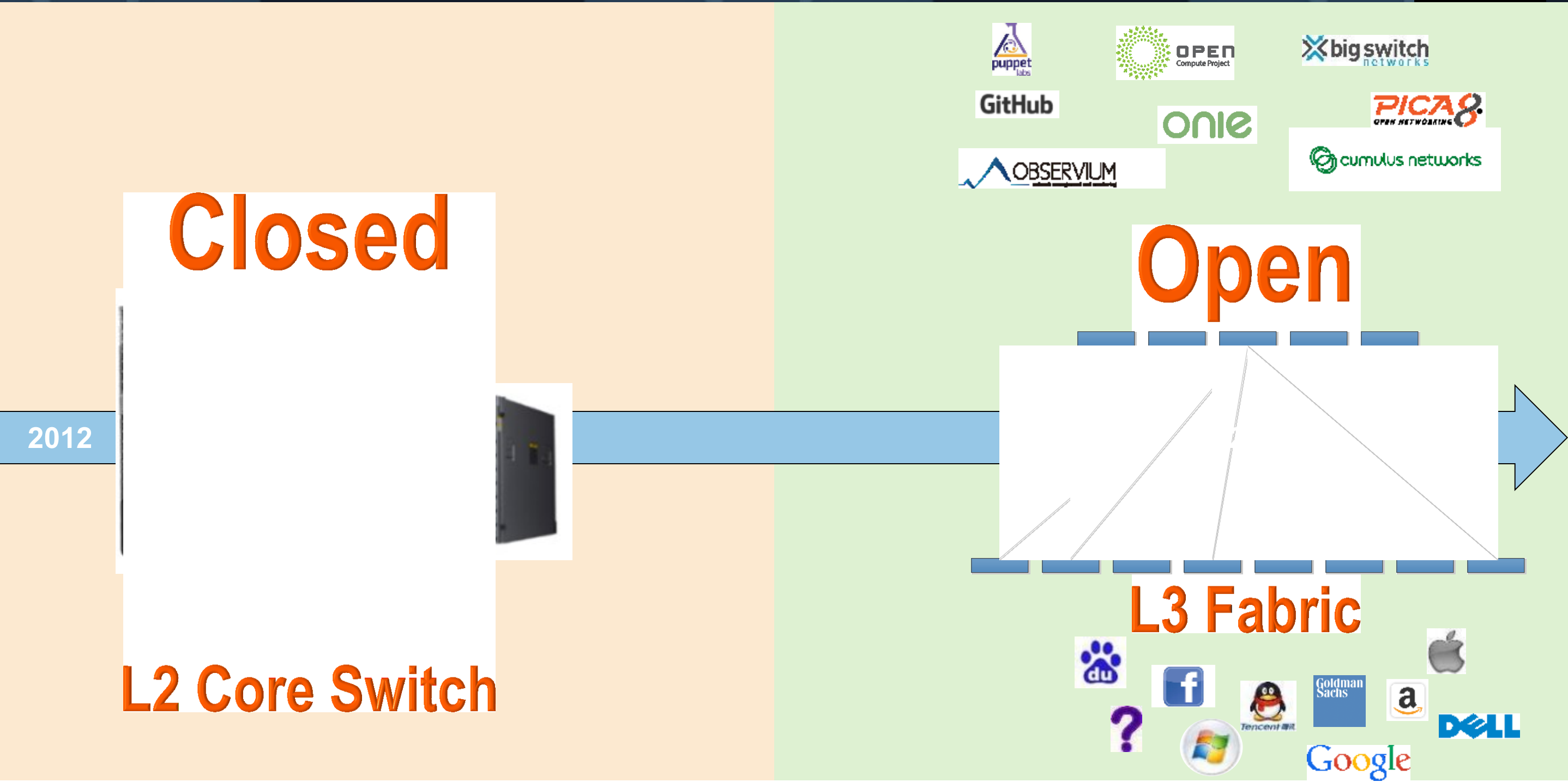


Optical Cables (VCSEL)

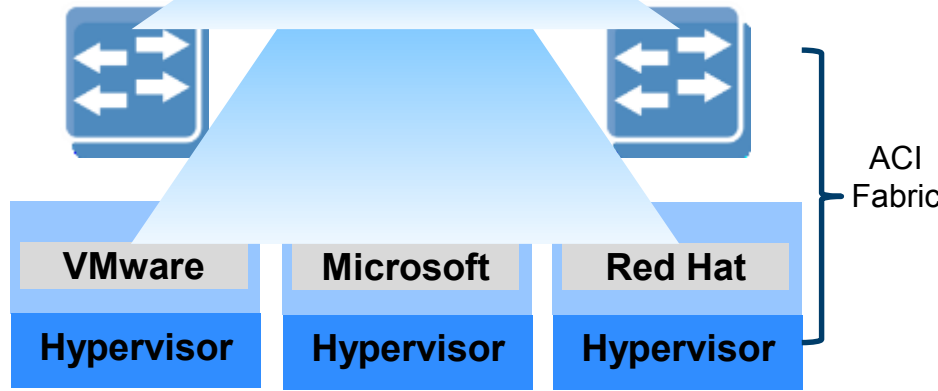


Silicon Photonics

The Market Is in Transition to Open Fabrics



Mellanox Software Defined Networking and Solutions



- OVS/Virtual Switch Acceleration
- Mellanox Ethernet switch OpenFlow support



- VXLAN/NVGRE/Geneve Offload
- OVS/Virtual Switch Acceleration
- Mellanox Ethernet switch VTEP Gateway support

- Most consider Cisco ACI as a closed hardware defined networking solution

Spectrum: The Ultimate 25/100GbE Switch



Spectrum™



- Highest Packet Forwarding Rate
- Better buffers: 10-15X better microburst performance
- Predictable behaviour
- Better latency: 50% lower
- Lower power consumption

Spectrum: The Ultimate 25/100GbE Switch



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

**KEEP
ALL
YOUR
DATA
INTACT**

zeropacketloss.com



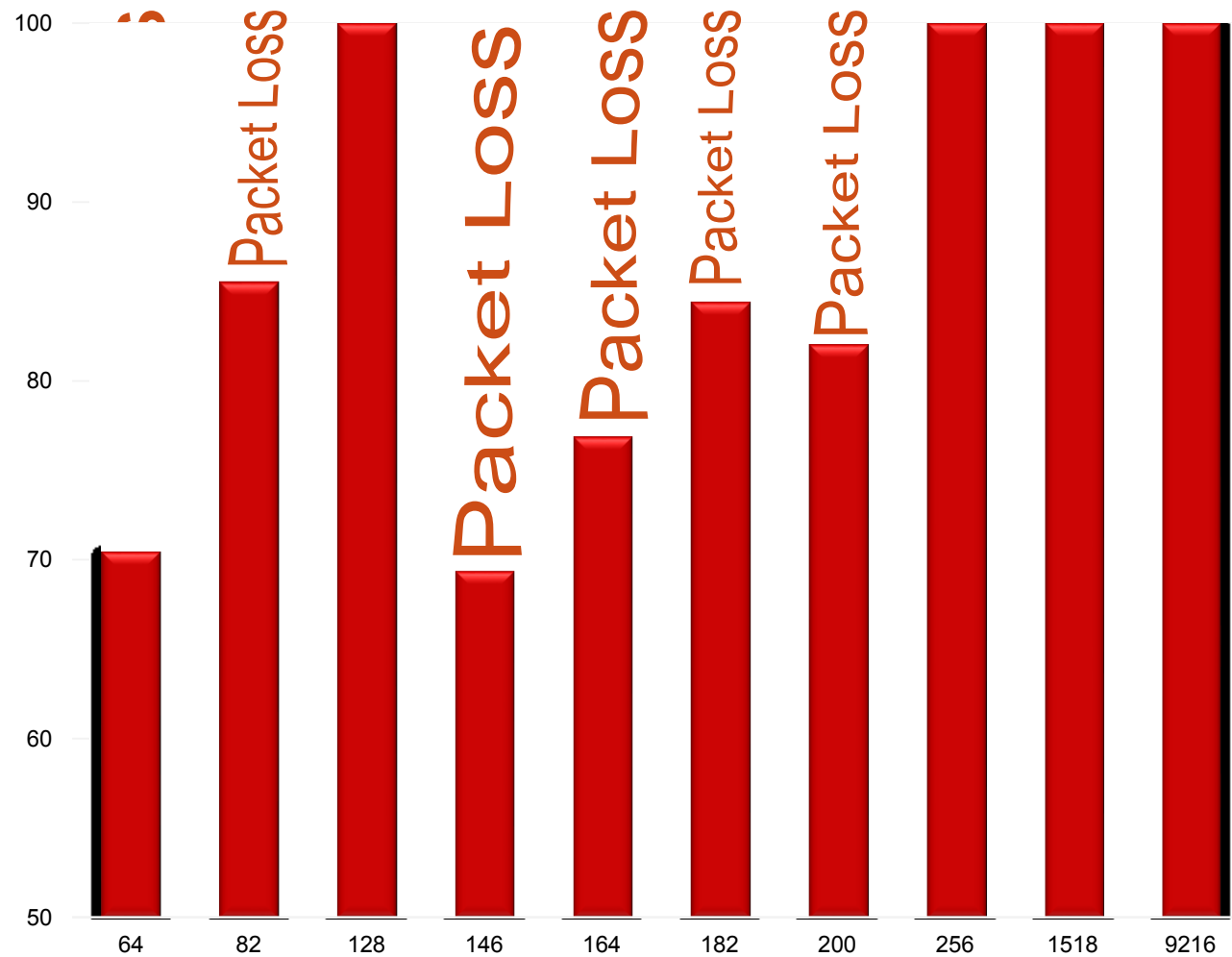
- The only predictable 25/50/100Gb/s Ethernet switch
- Full wire speed, non-blocking switch
 - Doesn't drop packets per RFC2544
- ZPL: ZeroPacketLoss for all packets sizes



Data Loss Due to Packet Forwarding Limitations

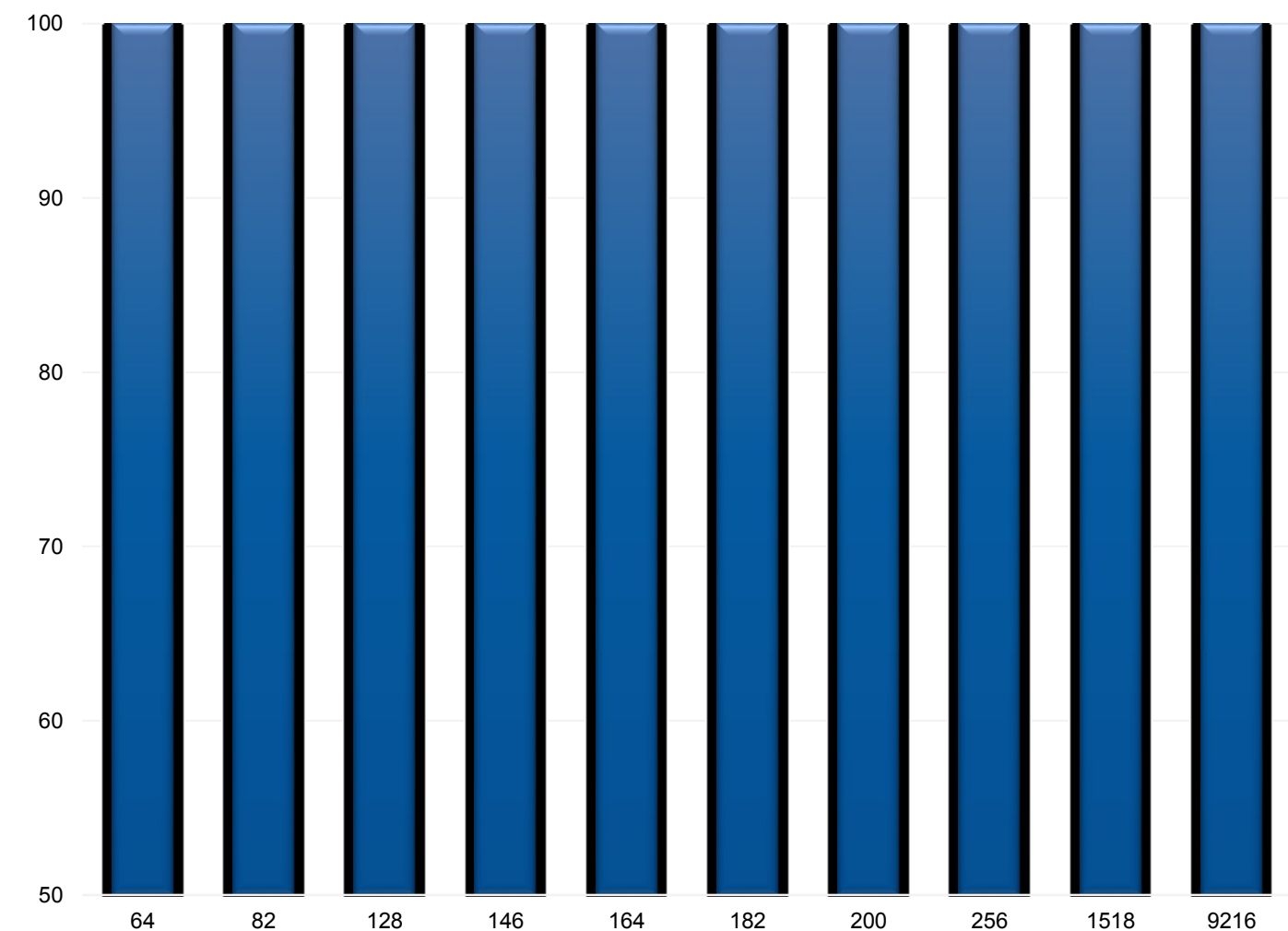


Tomahawk Throughput



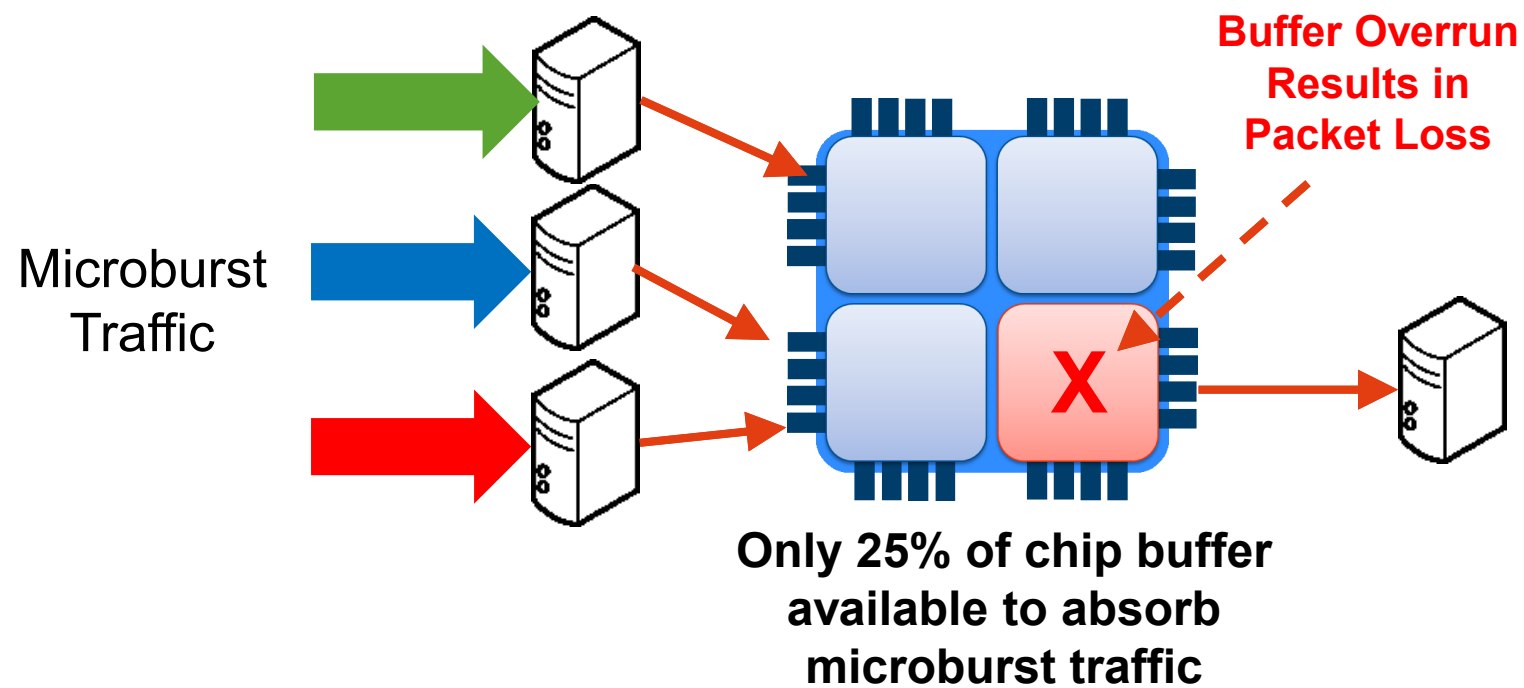
VS

Spectrum Throughput

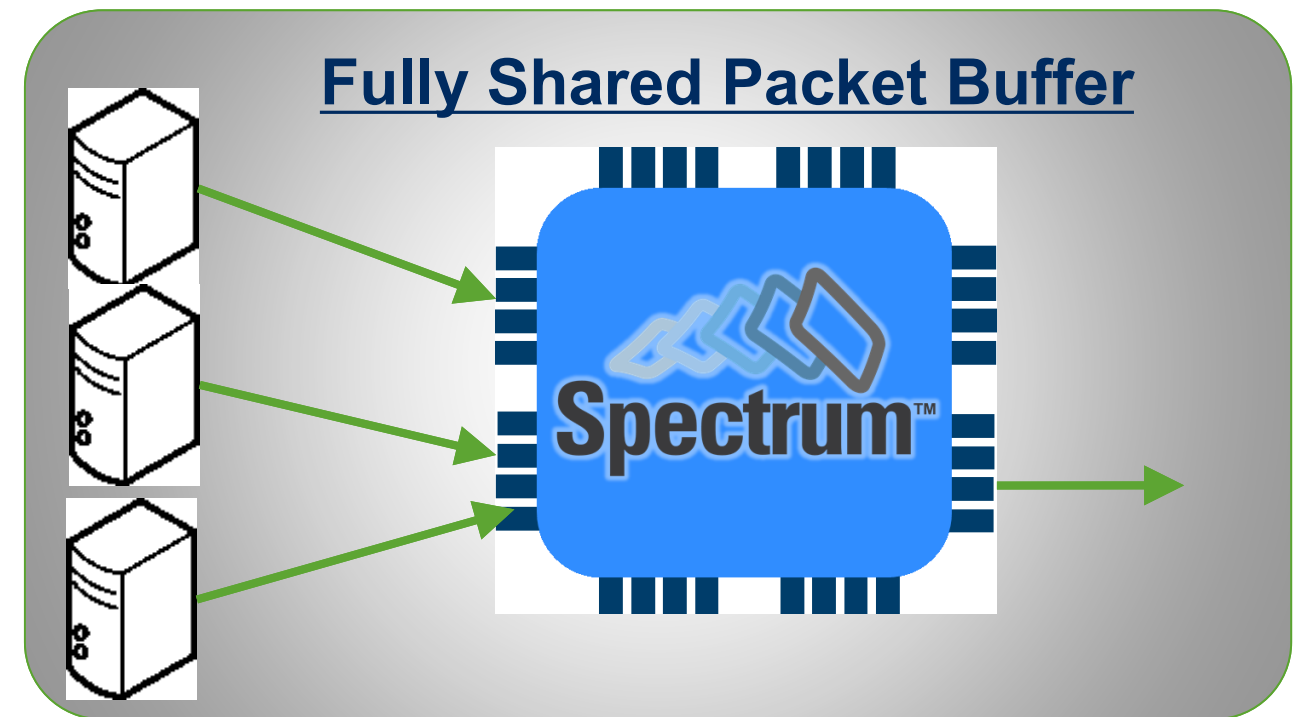


- Packet loss creates huge problems at 25, 50, & 100 Gb/s
- 32 Ports @ 100Gb/s requires 4.76 BPPS packet rate
 - Anything less will lose data when small packet microbursts occur

Poor Buffer Management Also Causes Packet Loss

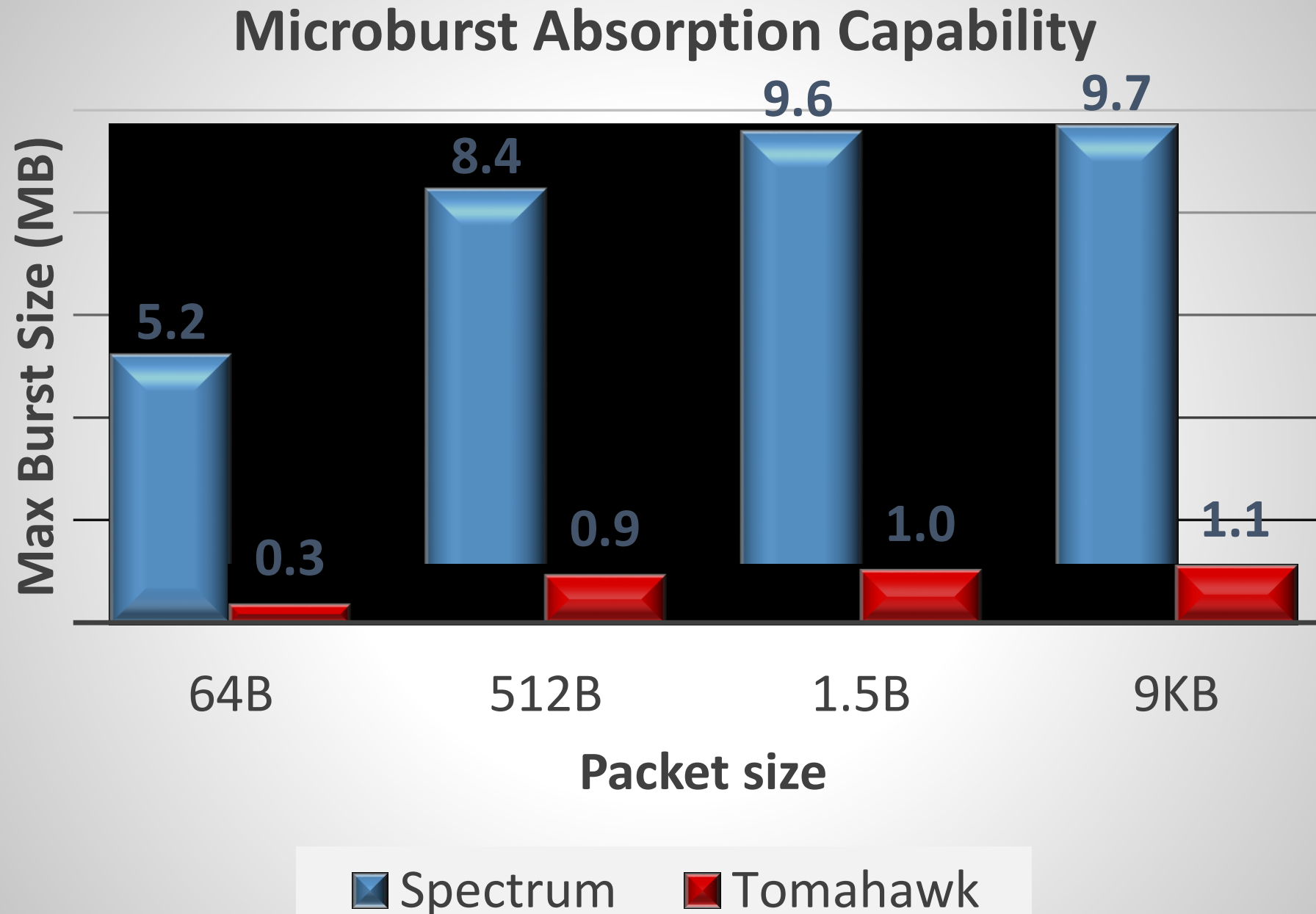


- Inefficient buffer allocation
- Only 25% of buffers available for microbursts
- Packet Loss!
 - Microbursts result in buffer overruns



- Efficient buffer allocation
- 100% of buffer available for microbursts
- No Packet Loss
 - Sufficient buffers to accommodate microbursts

Efficient Buffers Makes Microburst Packet Loss a Thing of the Past!



Spectrum provides
9X to 15X better effective
microburst capacity

SN2700 - Aggregation or TOR Switch



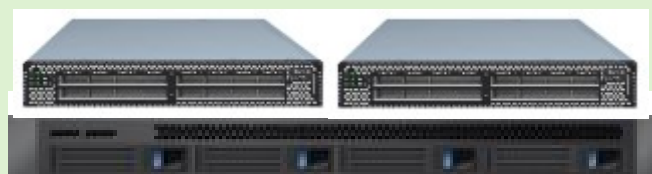
- 32 * 40G/56/100G (QSFP28)
- 64 * 10/25/50G (thru breakout cables)
- 300nsec latency
- x86 CPU
- Low power consumption

SN2410 – 25GbE Leaf or TOR Switch



- 48 * 10/25G (SFP28) + 8 * 40G/56/100G (QSFP28)
- Variety of blocking ratios
- 300nsec latency
- x86 CPU
- Low power consumption

SN2100 – Side by Side Small Scale TOR



- 16 * 40G/56/100G (QSFP28)
- Up to 64 * 25 or 32 * 50G (thru breakout cables)
- 300nsec latency
- x86 CPU
- Low power consumption

Software Flexibility



- ONIE, OCP
- White box
- SDK, SAI
- MLNX-OS®

Mellanox Adapters Roadmap



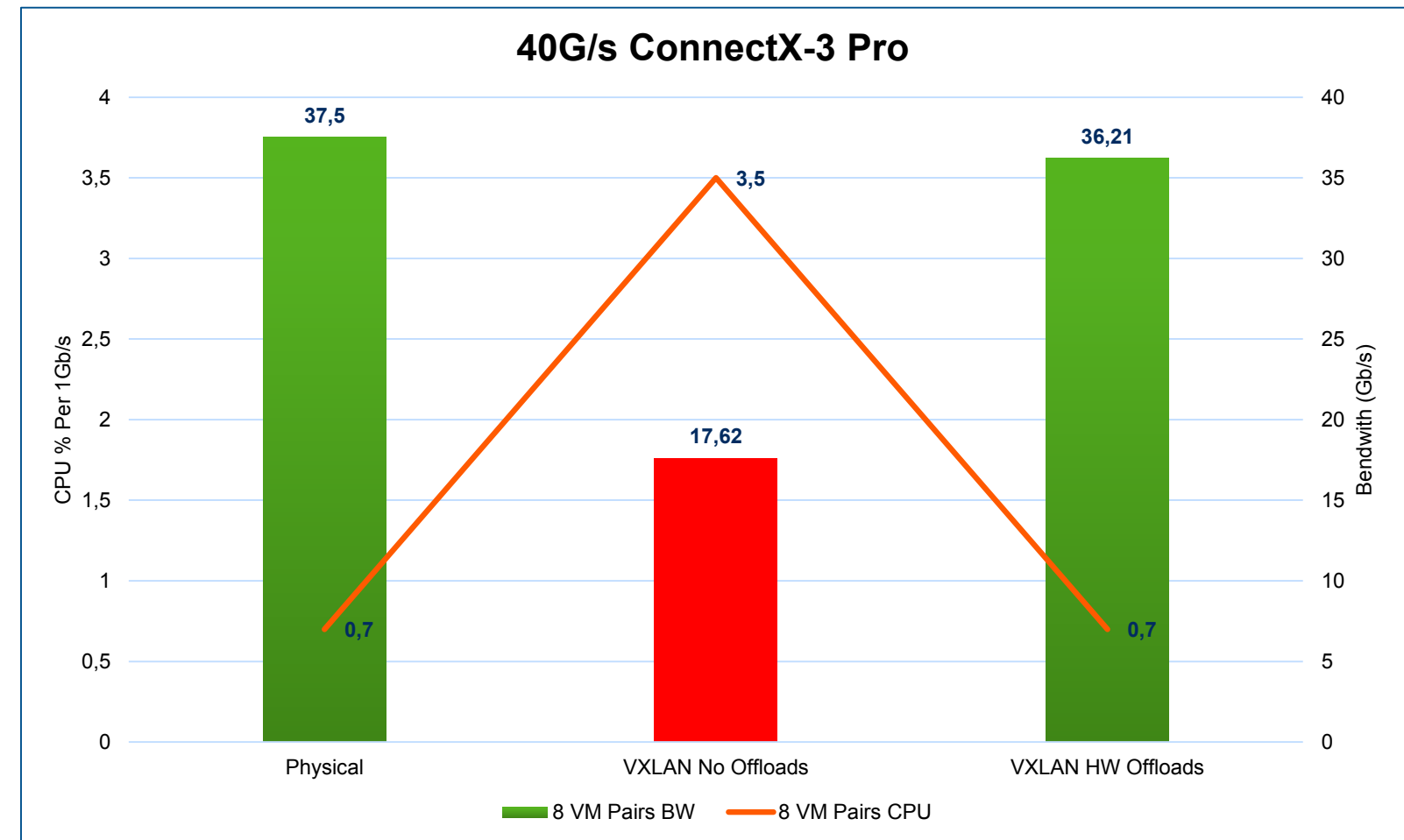
ConnectX-3 56Gb/s VPI (IB/ Eth) PCIe Gen3 x8	ConnectX-3Pro 56Gb/s VPI (IB/ Eth) PCIe Gen3 x8	Connect-IB 56Gb/s InfiniBand PCIe Gen3 x16	ConnectX-4 100Gb/s VPI (IB/ Eth) PCIe Gen3 x16	ConnectX-4 Lx 25/50 Gb/s VPI (IB/ Eth) PCIe Gen3 x8
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Turbocharge Overlay Networks



- Overlay tunnels add network processing
 - Limits bandwidth
 - Consumes CPU
- System efficiency drops 10s of percents
- For penalty free overlays, at bare-metal speed use NIC with overlay Network HW offloads
 - ConnectX-3 Pro
 - ConnectX-4 family
- Mellanox adapters also support HW VXLAN/NVGRE encap/decap

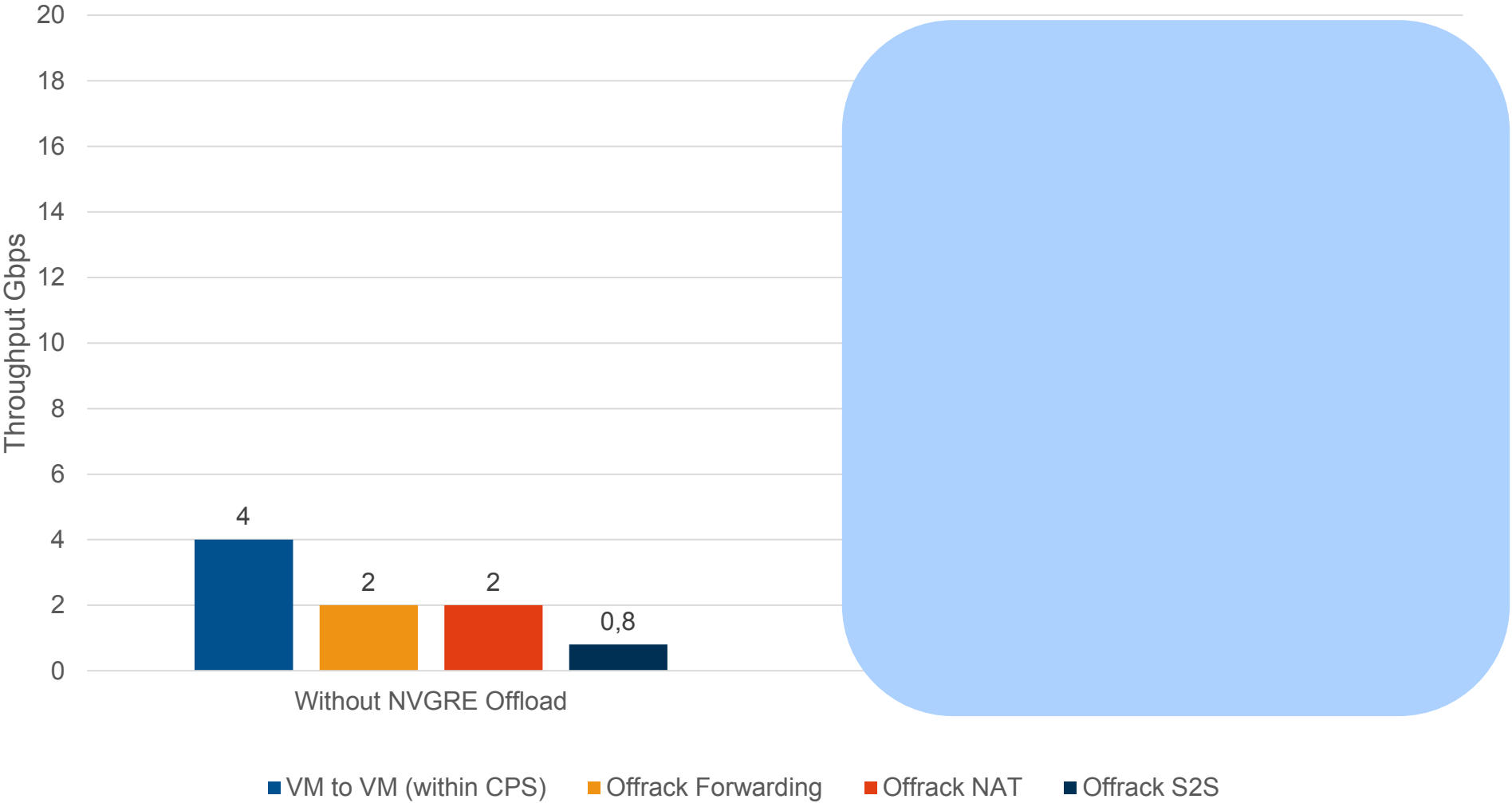


[Mellanox/Plumgrid VXLAN white paper](#)

3X Higher Microsoft Azure Pack Applications' Efficiency



Higher Performance enables higher Efficiency



- LACP teaming
- RSS enabled on Host and Guest
- VMQ enabled
- NVGRE offload

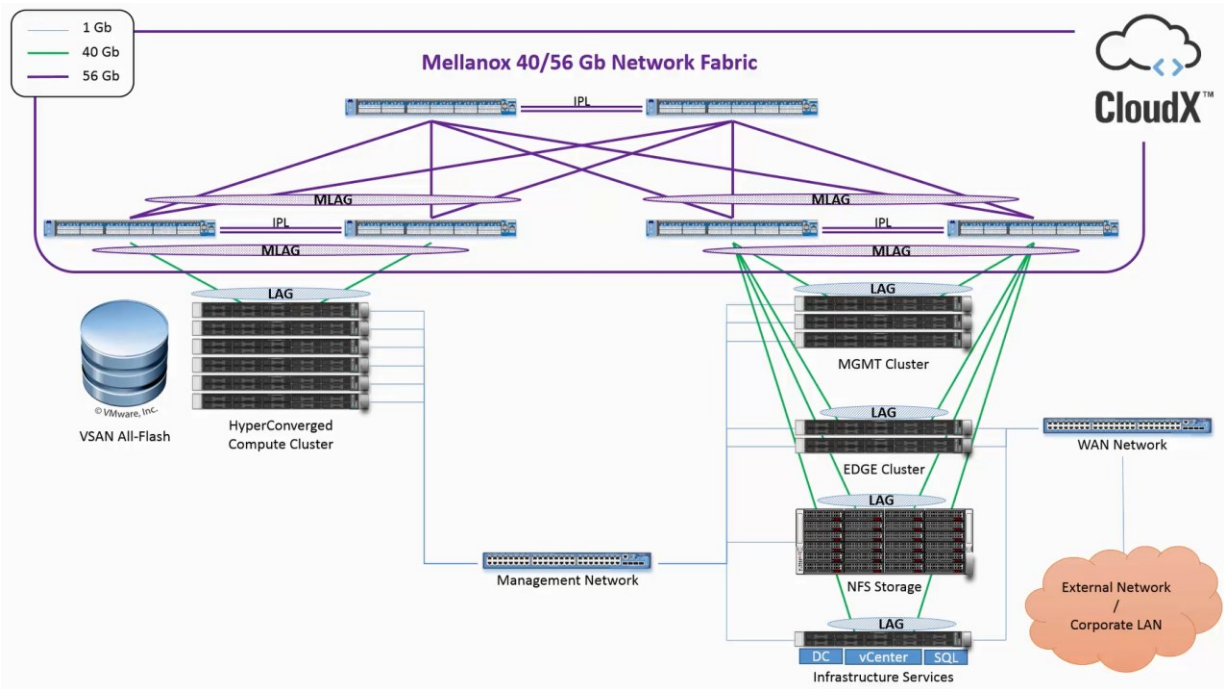
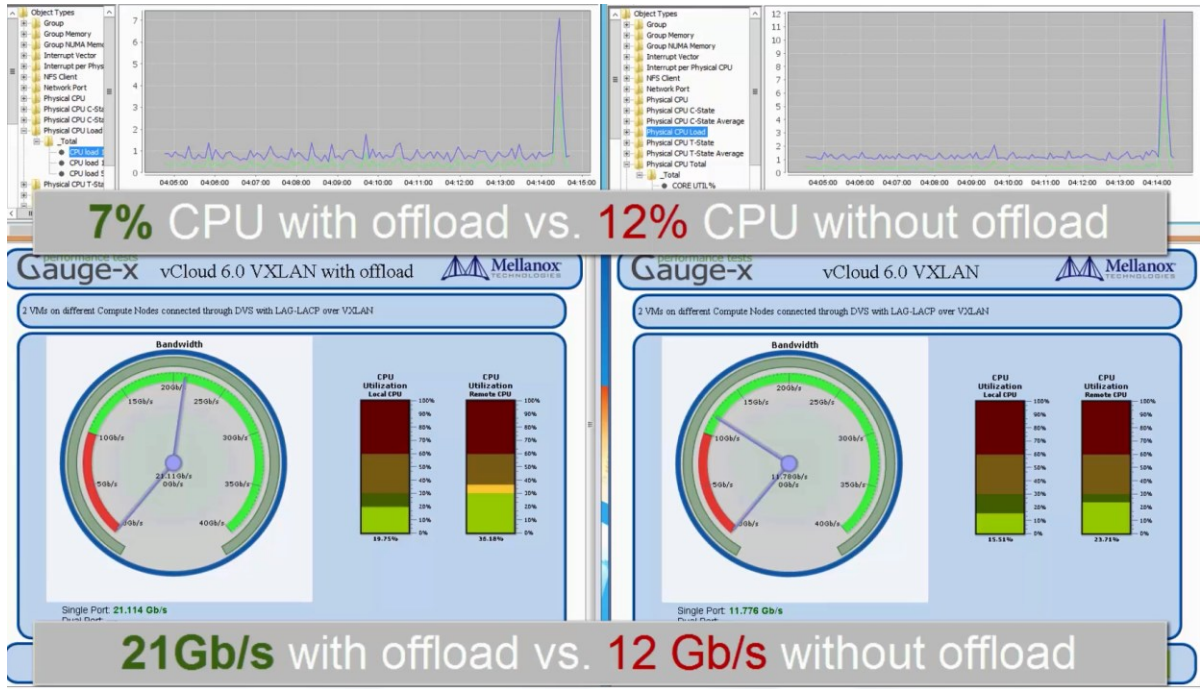


Source: Cloud Performance Systems (CPS) demo at Ignite'15

Proven Higher Efficiency EVO SDDC based System



CloudX Enterprise Hyper Converged Platform VMware® vCloud suite 6.0 with NSX and VSAN All-Flash





Thank You

Accelerated Switching And Packet Processing (ASAP²)



- Virtual switches are used as the forwarding plane in the hypervisor
- Virtual switches implement extensive support for SDN (e.g. enforce policies) and are widely used by the industry
- SR-IOV technology allows direct connectivity to the NIC, as such, it bypasses the virtual switch and the policies it can enforce

Goal

- Enable SR-IOV data plane with OVS control plane
 - In other words, enable support for most SDN controllers with SR-IOV data plane
- Offload OVS flow handling (classification, forwarding etc.) to Mellanox eSwitch

