A Deeper Look into the Network
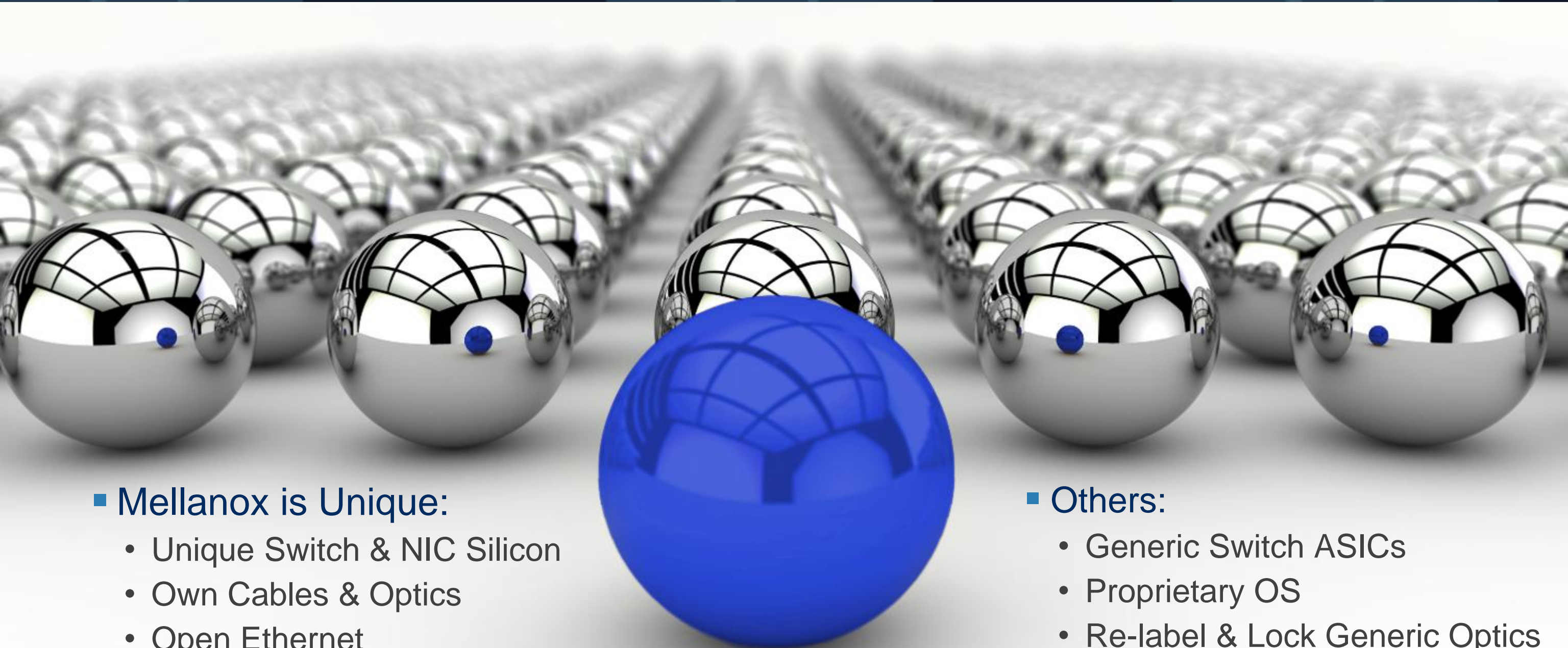
Bill Webb, Director Ethernet Switches

Mellanox® TECHNOLOGIES

Connect. Accelerate. Outperform.™

Mellanox – Not Like Other Network Vendors

Mellanox is Unique:
- Unique Switch & NIC Silicon
- Own Cables & Optics
- Open Ethernet
- First to Market with 25/40/50/100GbE

Others:
- Generic Switch ASICs
- Proprietary OS
- Re-label & Lock Generic Optics
- License Features

Challenges for High Frequency Traders

Mellanox TECHNOLOGIES

Increasing Market Data
- OPRA and Arca Market Data Feeds Peak >10Gbps
- National Market Systems Peak >10Gbps
- 40GbE Connectivity from ICE Available Today

No Low Latency Solutions >10Gbps
- Cisco 3548 Capped at 10GbE
- Arista 7150 Capped at 10GbE
- Competitors: 10x Higher Latency at 25GbE

Obscured Network Operations
- Lack of Visibility & Telemetry for Congestion
- No Hardware Based Real Time Buffer Utilization
- Congestion ➔ Increased Latency ➔ Lost Revenues

Merchant Network Silicon not aligned with HFT Market

Spectrum: Industry's First & Only Low Latency Switch Above 10Gb/s

SN2700:
32x100GbE (64x50GbE)

SN2410:
8x40/100GbE + 48x10/25GbE

SN2100:
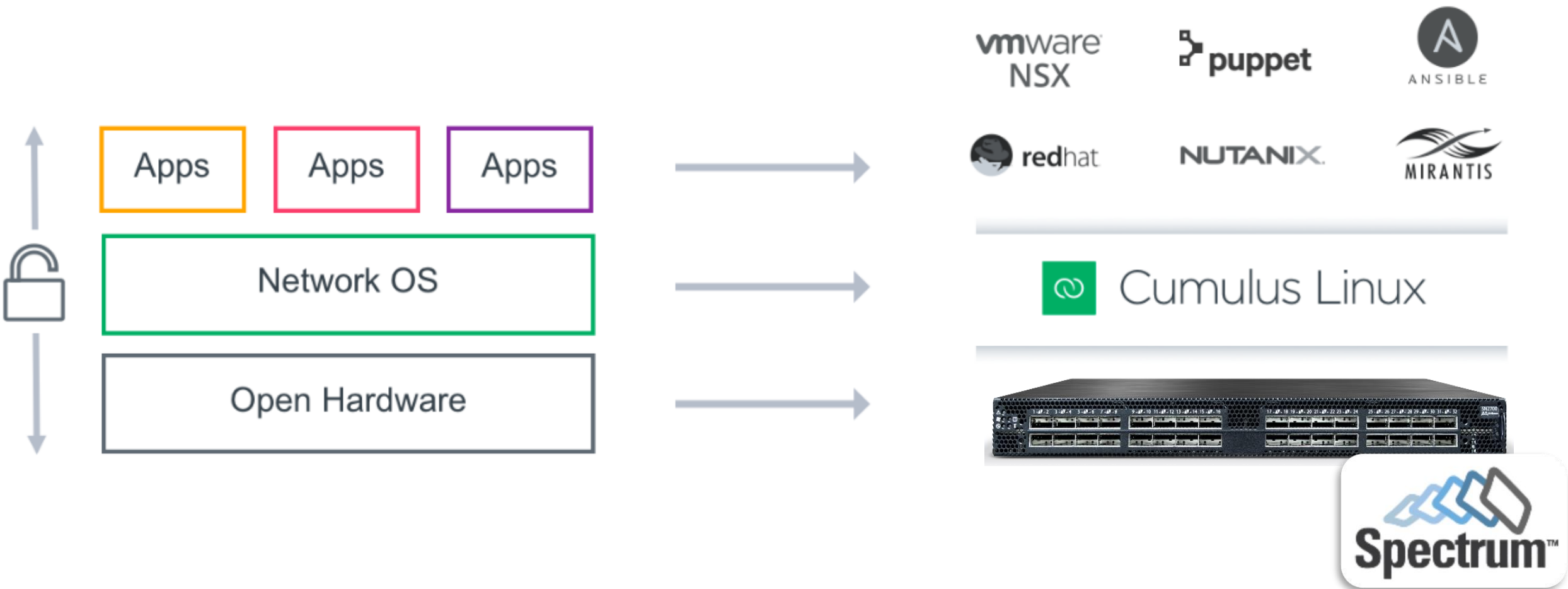**16x40/50/100GbE**
64 x 10/25GbE (Splitters)

- Full Cut-through Switching
- Consistent 300nsec Latency On All Ports, All Message Sizes, L2 & L3*
- Superior Microburst Absorption (Fully Shared Buffer)
- Full L3 Stack Including Multicast Routing

* Not STAC Benchmarks

Cumulus Linux on Mellanox Spectrum

Linux Open Operating System

Cloud Orchestration and Automation Tools

Compelling Routing Stack

Unified Automation across your Data Center

- Ansible / Puppet / Salt

- Single Point of Management

- Unify Compute + Network

- Supports on-box Agents

```
cumulus@oob-mgmt-server:~/cldemo-vxlan$ ansible-playbook main.yml --limit leaf01,leaf02

PLAY [network] ************************************************************************

TASK [setup] *************************************************************************
Monday 09 January 2017  16:25:16 +0000 (0:00:00.021)        0:00:00.021 ********
ok: [leaf01]
ok: [leaf02]

TASK [Verify Minimum Software Version] **********************************************
Monday 09 January 2017  16:25:17 +0000 (0:00:01.050)        0:00:01.072 ********
ok: [leaf01]
ok: [leaf02]

TASK [Enable Quagga Zebra] **********************************************************
Monday 09 January 2017  16:25:17 +0000 (0:00:00.094)        0:00:01.166 ********
changed: [leaf01]
changed: [leaf02]

TASK [Enable Quagga BGP] ***********************************************************
Monday 09 January 2017  16:25:18 +0000 (0:00:00.382)        0:00:01.549 ********
changed: [leaf01]
changed: [leaf02]

TASK [Copy Interfaces File] ********************************************************
Monday 09 January 2017  16:25:18 +0000 (0:00:00.336)        0:00:01.886 ********
changed: [leaf01]
changed: [leaf02]
```
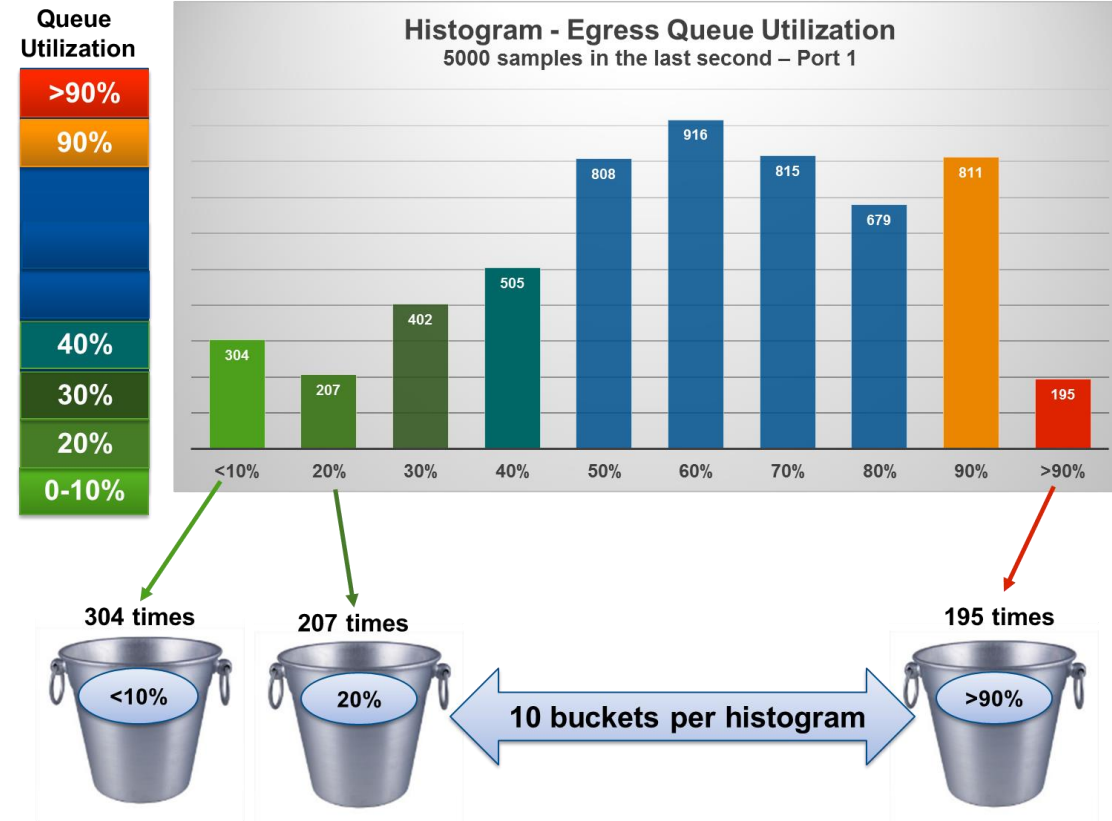
cumulusnetworks.com

Best-in-Class Instrumentation

- **Microsecond resolution Hardware based Queue Monitoring**
- **Easily Spot & Analyze Microbursts & Latency Spikes**
- **High water marks & histograms**
- **Advanced Telemetry**
  - Trigger Scripts / Syslogs on Queue Depth
  - Streaming Telemetry
    - JSON based Structured Data
    - Advanced Monitoring Tools

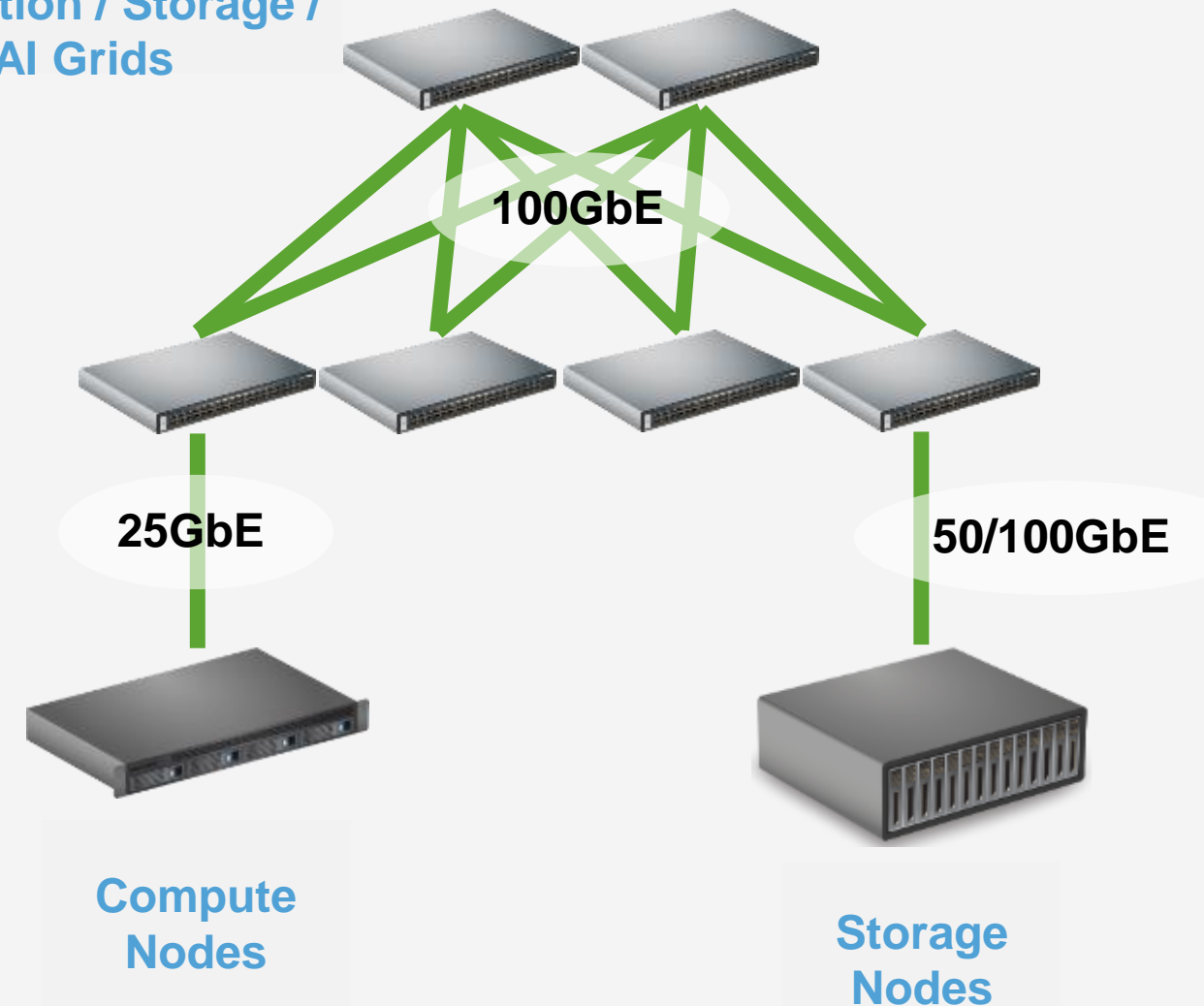# Financial Services Deploying > 10Gb/s Today

Aggregation / Market Data Distribution

Research / Simulation / Storage / AI Grids

40/100GbE

100GbE

10GbE

25/40/100GbE

25GbE
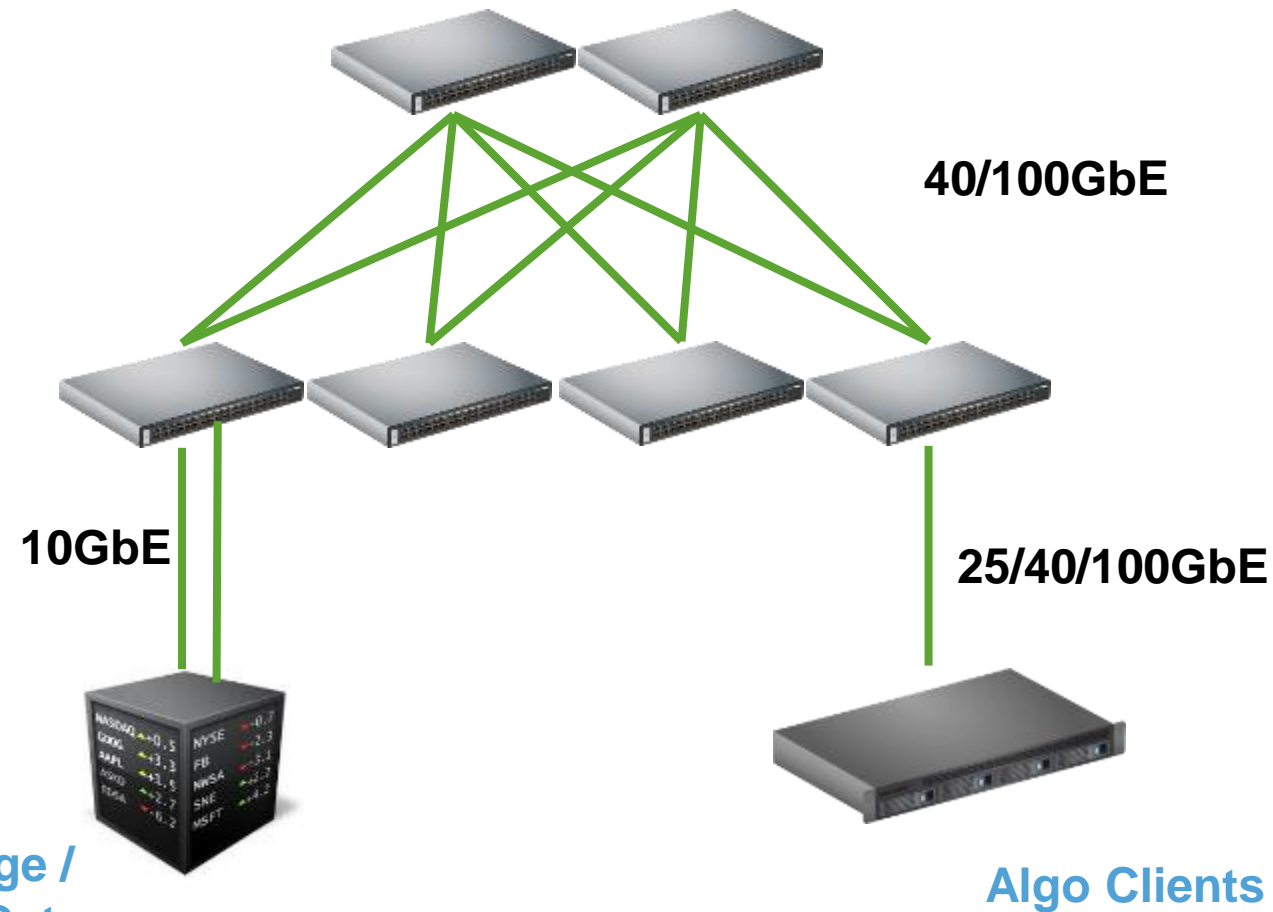
50/100GbE

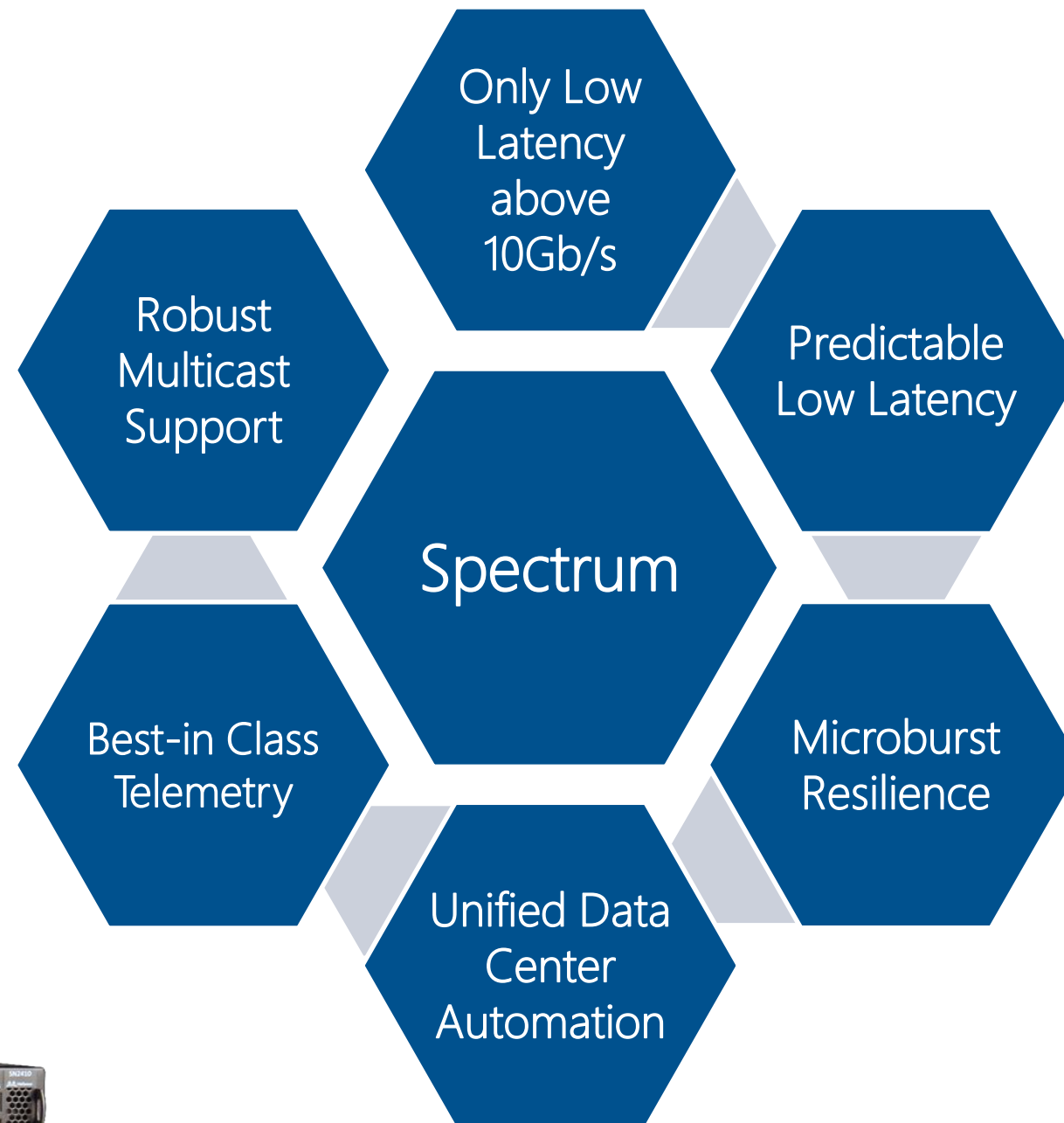**Exchange / Market Data Feed**

Algo Clients

Compute Nodes

Storage Nodes

Infrastructure Ready for 25/40/100GbE Exchange and Market Feed Connectivity

Summary: The Mellanox Low Latency Networking Solution

Spectrum

- Only Low Latency above 10Gb/s
- Predictable Low Latency
- Robust Multicast Support
- Microburst Resilience
- Best-in Class Telemetry
- Unified Data Center Automation

Thank You