

Leveraging Access Switching For HPC monitoring

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Intelligent Access and Monitoring Architecture



Present a methodology and solution of leveraging ***access switching*** to overcome current and future HPC monitoring challenges

Introduction to Net Optics

Customers

- 85% of the Fortune 100
- 52% of the Fortune 500
- 7,500 Global Deployments

Highlights

- Founded in 1996, Private, Self-Funded
- 60 Quarters of Growth & Profitability
- Strong Management Team
- Sales Offices in New York, Atlanta, Germany, China

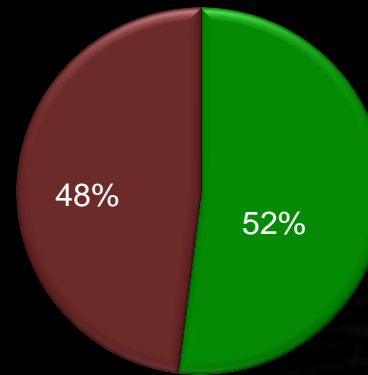
Go to Market Strategy

- 30% Direct Sales
- 25% OEM/Partner Relationship
- 45% Global Channel

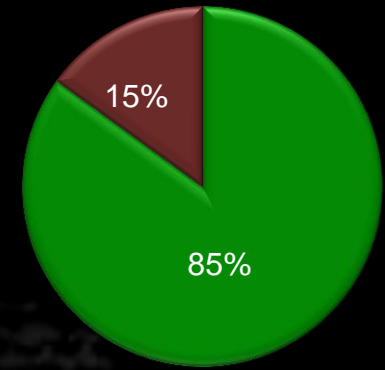
Technology

- Four new inventions each year
- 20+ patents and patent pending applications

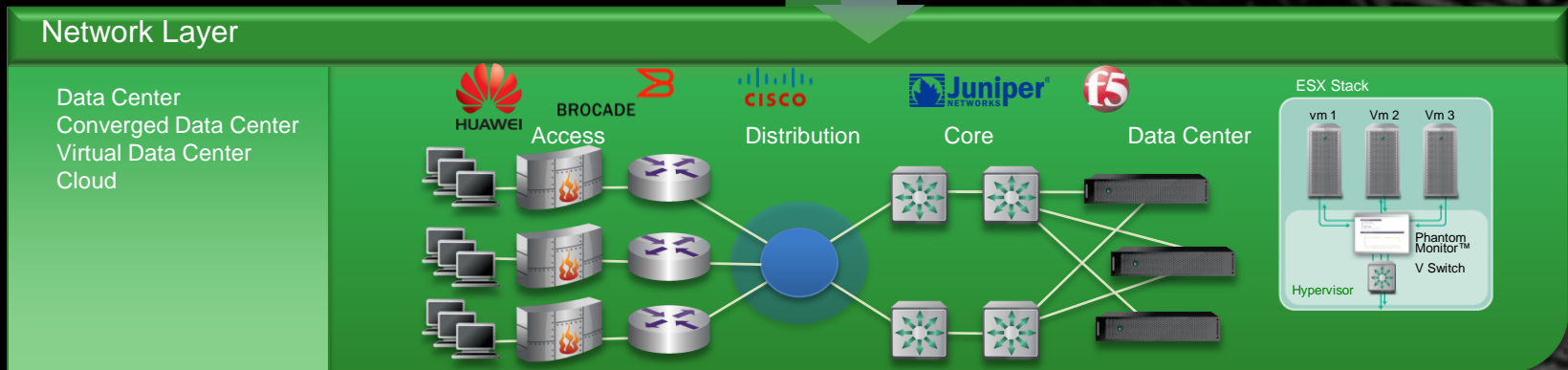
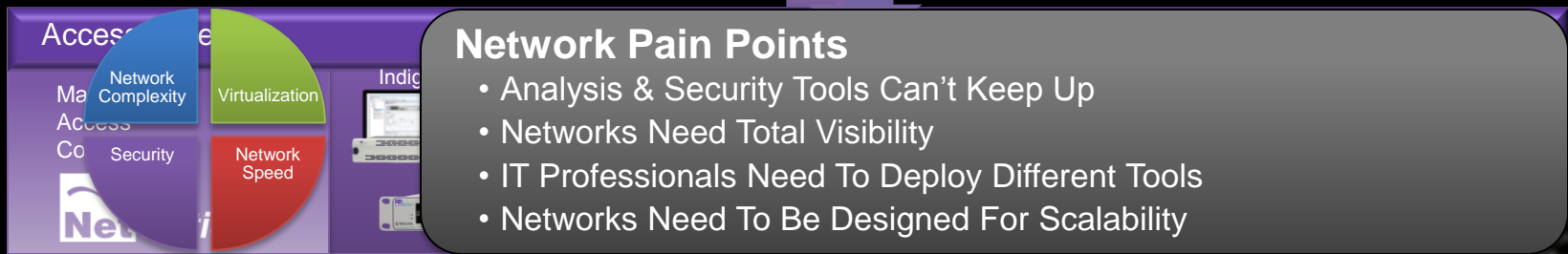
Fortune 500 Customers



Fortune 100 Customers



Net Optics Position in the Network



HPC Unique Monitoring Requirements

- HPC Infrastructure
 - Large scale monitoring of hardware, software, systems and applications
 - Complicated monitoring system (due to size of infrastructure)
 - Correlation between multiple “points of monitoring” requires to establish a monitoring network
- Application specific requirements
 - HPC applications are unique by definition

Unique Operational Challenges HPC Monitoring

Common HPC monitoring deployment challenges:

Lack of Tools

- Availability of 10G monitoring tools and 10G security tools
- Tools ability to operate at line rate with low latency

Quality

- Volumes of traffic increase complexity

Cost

- New 10G tools (not the 10G network interface cards)
- Leveraging existing investments of 1G tools
- Cost of knowledge, migration, operations = TCO

Source: Net Optics Customer Advisory Board 7/2010

Other Technical Challenges

Jitter, Oversubscription and Blocking are more severe with 10G networks:

Switching Oversubscription

- If the queue exceeds the size of the physical hardware buffer, packets are dropped

Latency and Jitter

- At any time, only one packet can be transmitted from each physical output port of a switch
- Resource contention might happen when two packets arrive from separate input ports to the same output port (e.g. uplink) at about the same time

Access Switching: Do More With Less

10/40/100 Load Balancing

- Share the load between multiple tools
- Leverage existing / cheap / 1G tools
- Plan for growth

Pre-filter with DPI to detect desired traffic on any port

- Pre-filtering is a mature technology

GRE tunneling

- Distribute the collection infrastructure

Cloud Monitoring

- Inter-VM and cloud based monitoring

Use Case: Trading Monitoring Infrastructure

- Trading environment requires the fastest monitoring architecture
- Net Optics solutions such as Director xStream, based on Fulcrum Ultra-low latency silicon provides sub-microsecond cut-through copies to the monitoring infrastructure

Net Optics Solutions for Ultra Low Latency

- Director xStream
 - Network controller switch with flexible policy mapping, aggregation, regeneration and static load balancing
- xBalancer
 - Dynamic load balancer with flexible policy mapping, aggregation, regeneration
- Ilink Agg xStream
 - Network controller switch with aggregation, regeneration mapping at best price/performance value
- Regeneration Taps
 - Silicon-less traffic regeneration

When Silicon Is Not Fast Enough

- Due to advances in HPC instrumentation, customers are asking for monitoring infrastructure solutions that are even faster than the fastest switching silicon:
 - No additional latency through the device
 - Copy packet has the exact same latency as the actual packet through the network
 - 10G of line rate scaling for copy bandwidth, with no impact on the source data

Net Optics Regeneration Tap

- Enables real-time, simultaneous monitoring of a single link or two Span ports with up to eight monitoring devices
- Provides complete full-duplex visibility at 10G, 1G, and 10/100/1000 traffic speeds without data stream interference or introducing a point of failure
- Passes all traffic (including errors) from all layers for comprehensive troubleshooting
- No IP address is needed for the Tap or monitoring device, enhancing monitoring security
- Redundant power ensures monitoring uptime
- SFP/SFP+ monitor ports support all types of monitoring tool connection media



10G Latency Results:

RG-850X: Regeneration Tap, 8x1, Inline, Fiber, 10G, LR, 8.5um, SFP+, 50:50 @ Utilization Rate=100%

Network to Network	@ 64			@ 1518			@ Random (64-1518)		
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
	10 ns	10 ns	10 ns	10 ns	10 ns	10 ns	10 ns	10 ns	10 ns

Network to Monitor	@ 64			@ 1518			@ Random (64-1518)		
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
	30 ns	30 ns	30 ns	30 ns	30 ns	30 ns	30 ns	30 ns	30 ns

Summary

Modern and advanced Access switching technology provides the scalable solution to meet monitoring challenges in HPC environments by focusing on improving collection infrastructure.

Thank You



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