ARISTA

Arista Networks "A New Era of Networking"

Chris Bowles
Consolidate IT
chris.bowles@consolidate-it.eu
+44 7796 947281

Today's Networks: Designed for Email Connectivity

Classic Client-Server
6500 Northbound Traffic
Old World, Network 95134

ARISTA

Agenda

Arista Overview

Market Overview

7000 Family Overview

EOS

vEOS

Network Designs

ARISTA

Arista Networks Management Team

Ullal

President and CEO

Bechtolsheim

Chairman and CDO

Cheriton

Chief Scientist

Arista Overview

- Focus on Cloud Networking, HPC and 10 Gigabit Ethernet

- Launched Arista Networks and management team in Oct 2008

- ~100 Employees and Sales Associates

- 250+ customers

- Architectural Shift to Cloud Designs

- Award Winning Products & Differentiators

- Experienced Management and World Class Engineering Team

Arista 7124S Wins 10GbE Data Center Switch Shootout!

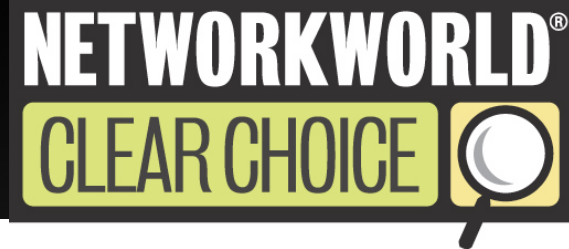**NETWORKWORLD**

Arista Networks DCS-7124S
Score: 4.29

Win vs Cisco Nexus 5010, Extreme, HP, BNT and Dell

Summary Scores: http://www.networkworld.com/reviews/2010/11810-netresults.html

Network World's Clear Choice #1 Winner

Result Excerpts

NETWORKWORLD®
CLEAR CHOICE

NETRESULTS

Product	Arista DCS-7124S	Cisco Nexus 5010	Summit X650-24x	HP ProCurve 6600-2
Vendor	Arista Networks	Cisco	Extreme Networks	HP ProCurve Networking
Price	$26,080	$67,030	$46,665	$63,594
Pros	Very low latency and jitter; extensible Linux operating system; standards-based.	Full Fibre Channel/FCoE support; extensive virtualization features.	Highest IGMP group capacity.	Largest MAC address capac
Cons	Relatively low MAC address capacity.	High latency; no Layer-3 support; some leakage in multicast tests.	Relatively high power consumption; uneven distribution in some link aggregation tests.	Low unicast and multicast throughput; relatively high late frames forwarded out of sequ
Score	4.29	3.68	3.7	3.36

Outperformed six vendors incl Cisco, Extreme, HP and others

Arista Cloud Networking Alliances

Cloud Trading Apps

Solace Systems

exegy

TIBCO

TERVELA

NYSE Technologies

Cloud Storage

NetApp

DELL EQUALLOGIC
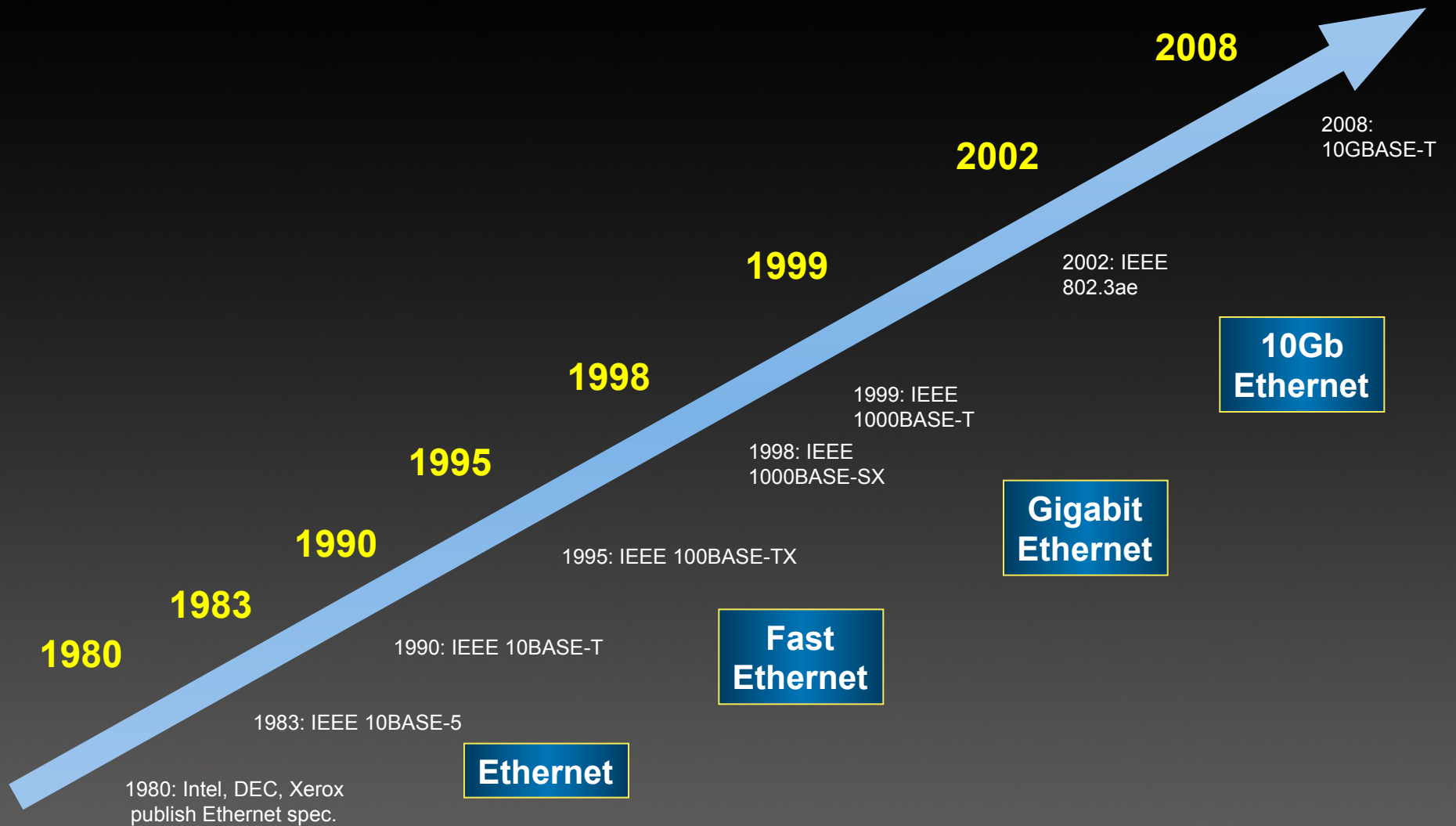
IBRIX
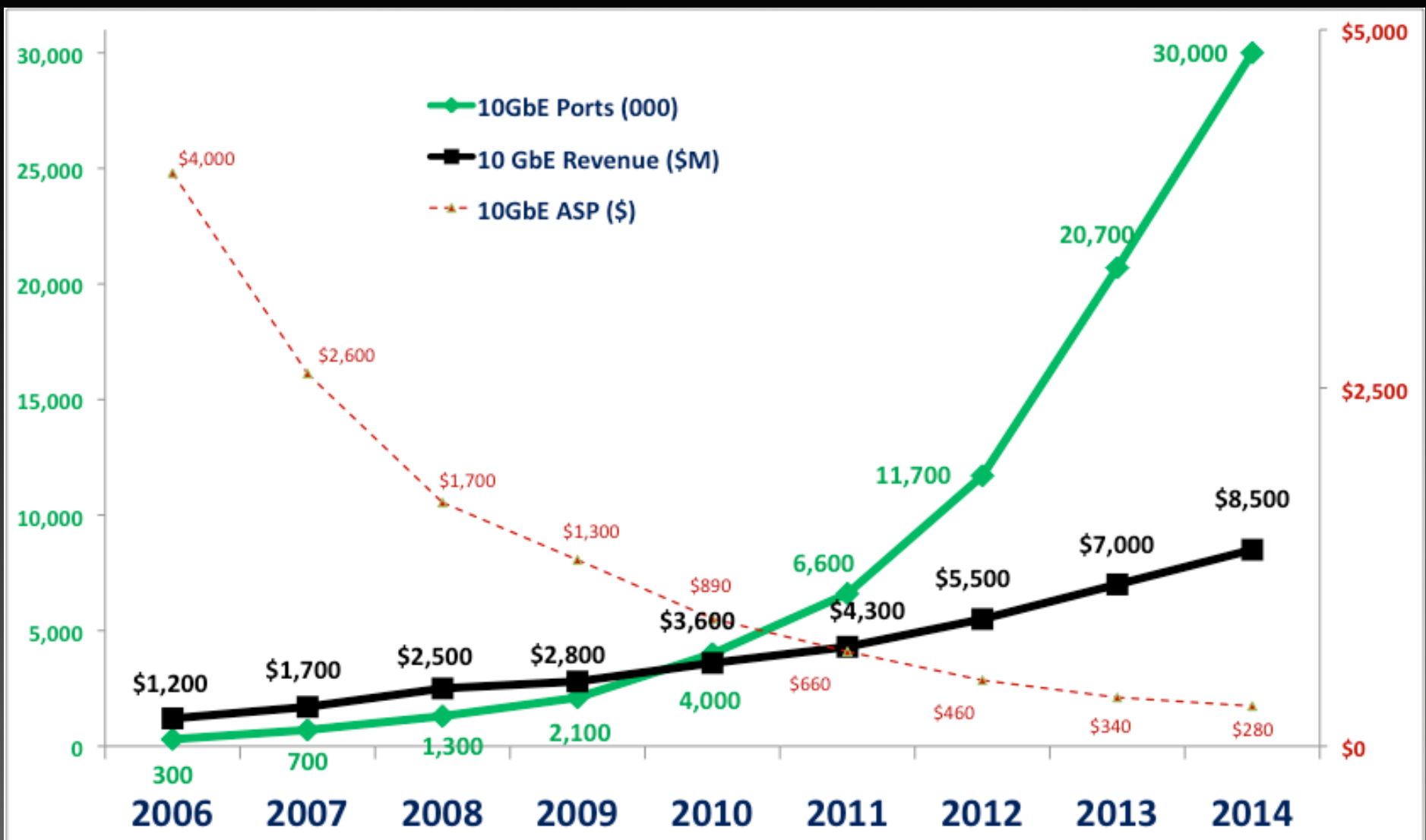
Cloud Services

CITRIX

vmware

Greenplum

Ethernet Market Evolution

2008

2008:
10GBASE-T

2002

2002: IEEE
802.3ae

1999

**10Gb
Ethernet**

1998

1999: IEEE
1000BASE-T

1995

1998: IEEE
1000BASE-SX

1990

1995: IEEE 100BASE-TX

**Gigabit
Ethernet**

1983

1990: IEEE 10BASE-T

1980

**Fast
Ethernet**

1983: IEEE 10BASE-5

Ethernet

1980: Intel, DEC, Xerox
publish Ethernet spec.

ARISTA

10 Gigabit Ethernet Market Forecast

ARISTA

Worldwide x86 Server Network Connectivity

x86 Server Forecast by Ethernet Connection Type (100G Only)

Source: Intel

10 year transition — **GbE**

10 year transition — **10GbE**

ARISTA
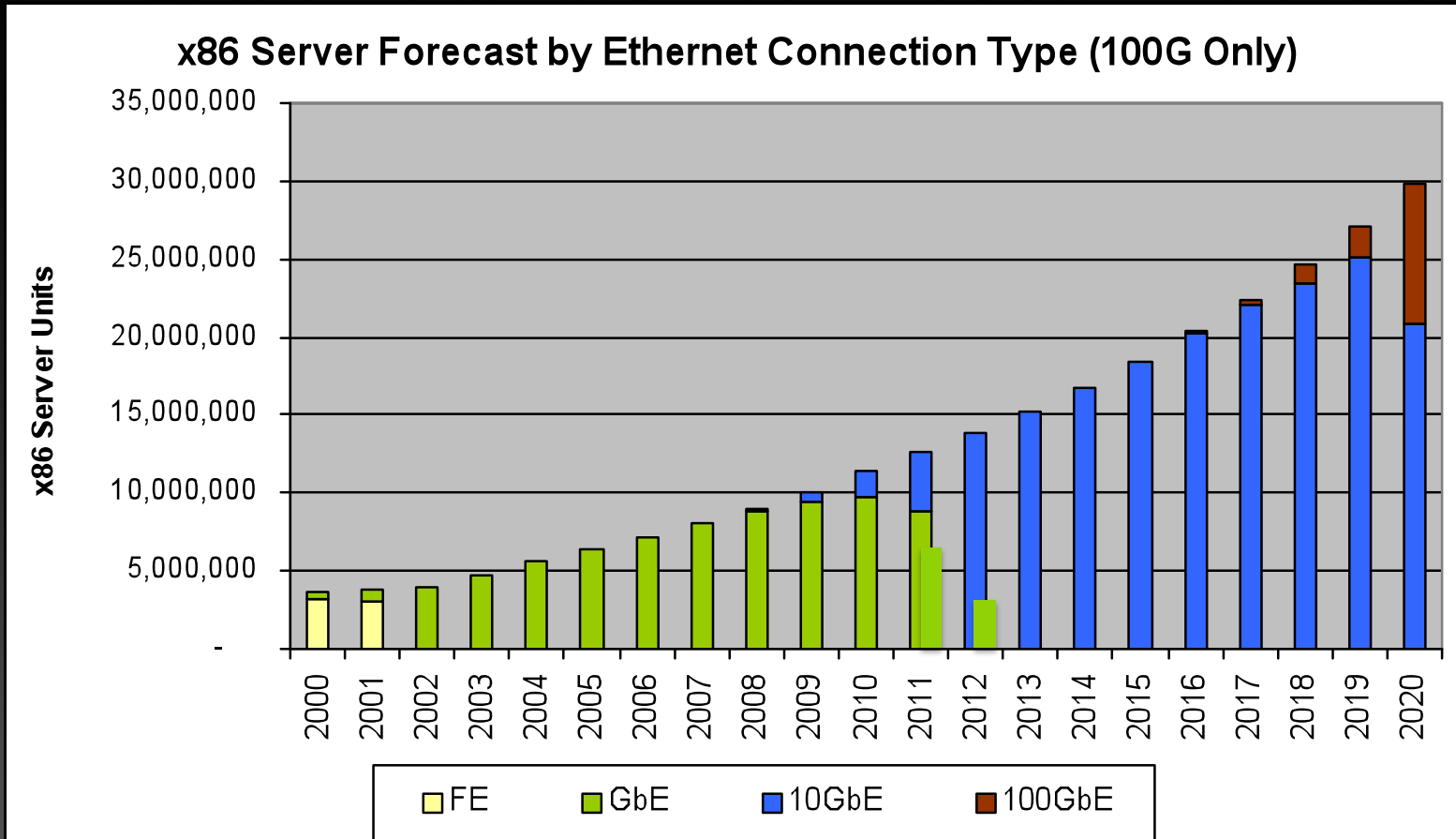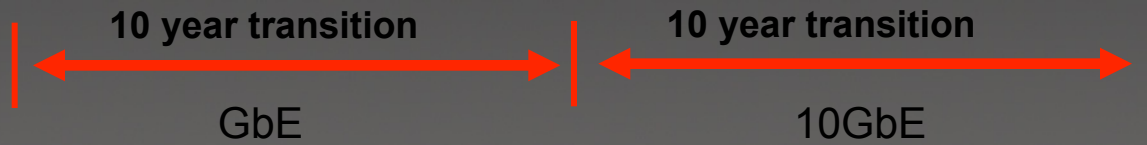
10 GbE Market Growth Drivers

10 GbE server attachment will grow dramatically in the next 24 months due to:

Storage over Ethernet (NFS, iSCSI, NAS)

Applications demanding lower latency and more throughput

Growth in high-performance/technical computing

10GbE optimized next gen server CPUs

10GbE on next generation server motherboards

Historically, the inflection point for adopting the next generation Ethernet speed was 2-3X the price per port of previous speed

ARISTA

New Applications Need New Network Behaviors

High Frequency Trading

Internet Exchange

DOE/Public Sector

Life Science
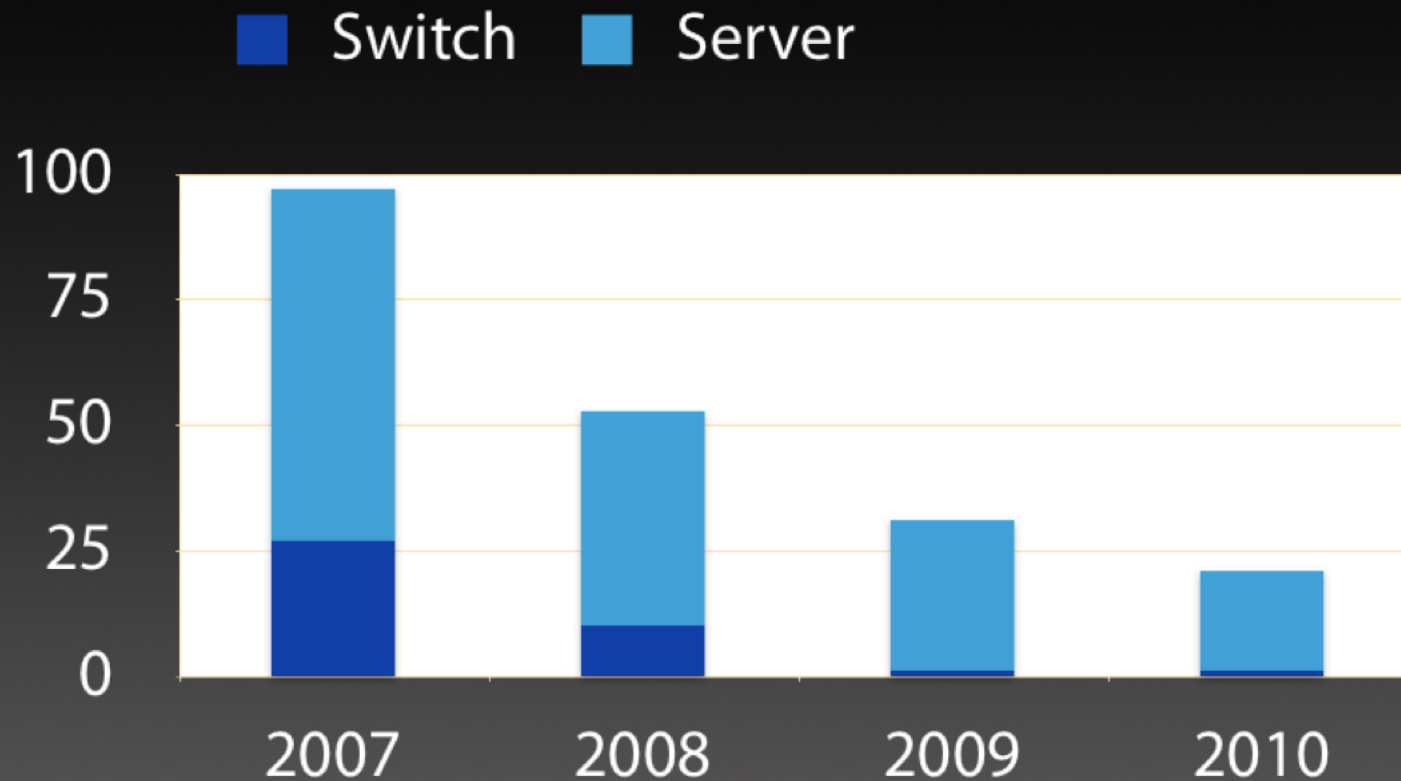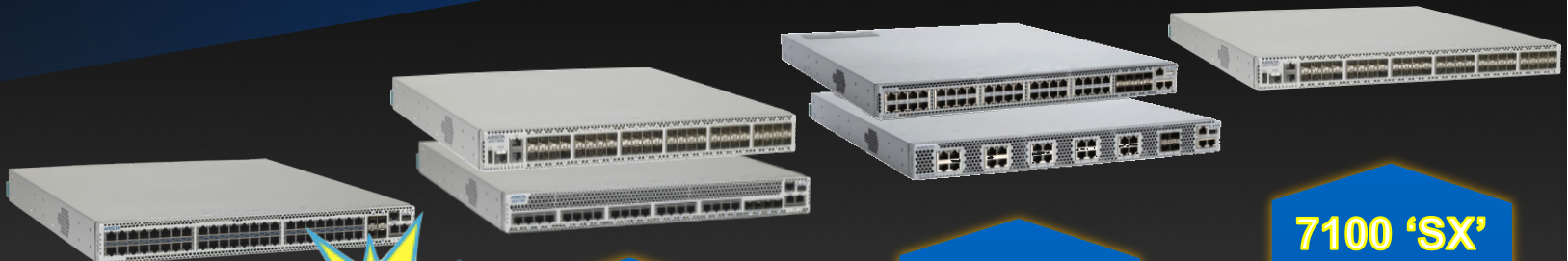
Web 2.0, Public Cloud

Petroleum

End-to-end latency

Arista Switch latency is relatively negligible

ARISTA

Arista 7000 Family Portfolio

Extensible Operating System (EOS)

vEOS

Manages VMware Virtual Switches

Provides visibility and consistency between physical, virtual, and cloud networks

NEW!

7048

48-port Data Center Class Gigabit Ethernet Switch

Advanced congestion control and avoidance for bursty and mission-critical traffic

7100 'S'

Ultra Low Latency 24/48-port 1/10Gb SFP+ Leaf Switches

Best possible performance for latency sensitive HPC and Trading Applications

7100 'T'

Dense 24/48-port 1/10GBASE-T Data Center Switches

Prepares the network for future 10Gb deployments with multi-speed 10Gb on existing cable plants

7100 'SX'

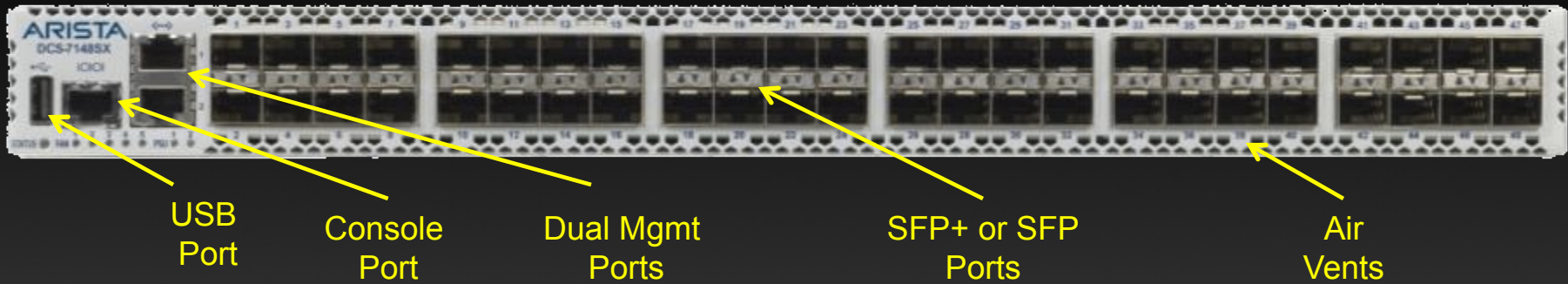48-port Wire-Rate 1/10Gb SFP+ Data Center Switch

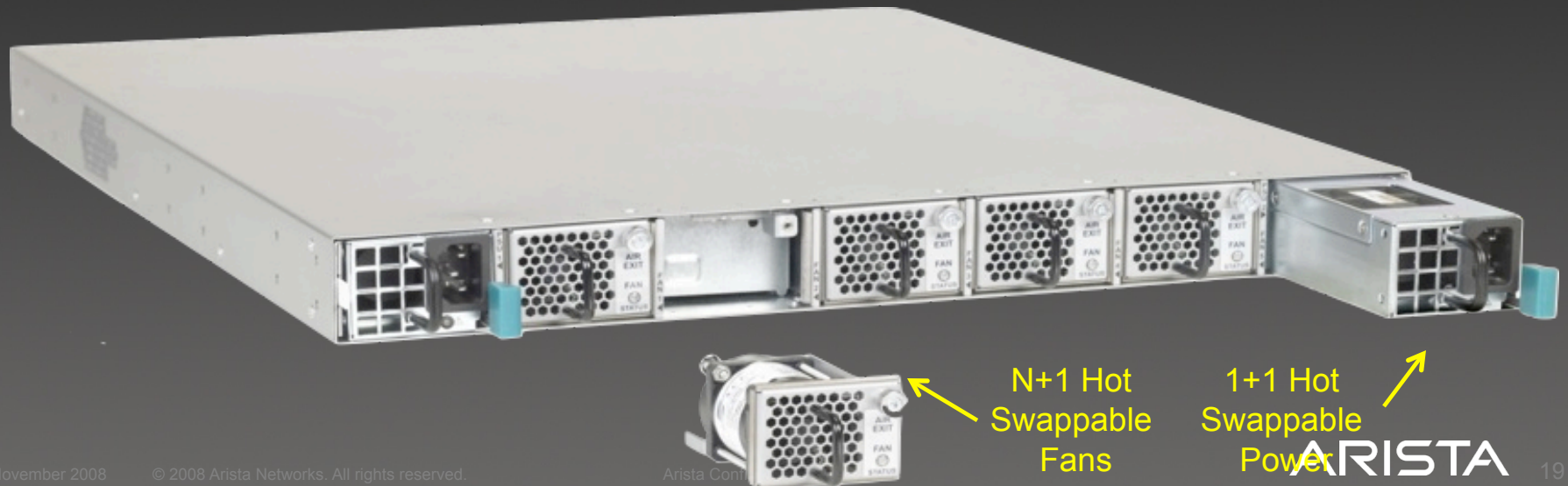Highest Density wire-rate 1/10Gb switch for high performance network aggregation

ARISTA

Common Deployments

A Closer Look – Arista 7100 Series

7148SX Front View

USB Port

Console Port

Dual Mgmt Ports

SFP+ or SFP Ports

Air Vents

7148SX Rear View

N+1 Hot Swappable Fans

1+1 Hot Swappable Power

ARISTA

Fiber Optics and Copper Cabling

10GbE SFP+

SFP+ Type	Media	Max Distance
10GBASE-SRL	50 micron MMF	100m
10GBASE-SR	50 micron MMF	300m
10GBASE-LR	9 micron SMF	10km
10GBASE-LRM	62.5 micron MMF	220m

10GbE Cables

Cable Type (SFP+ connectors at both ends)	Media	Max Distance
10GBASE-CR	Twinax Cable	1m
10GBASE-CR	Twinax Cable	2m
10GBASE-CR	Twinax Cable	3m
10GBASE-CR	Twinax Cable	5m

GbE SFP

SFP Type	Media	Max Distance
1000BASE-SX	50 micron MMF	550m
1000BASE-LX	9 micron SMF	10km
1000BASE-T	Cat-5	100m

10GBASE-T Cabling Distances
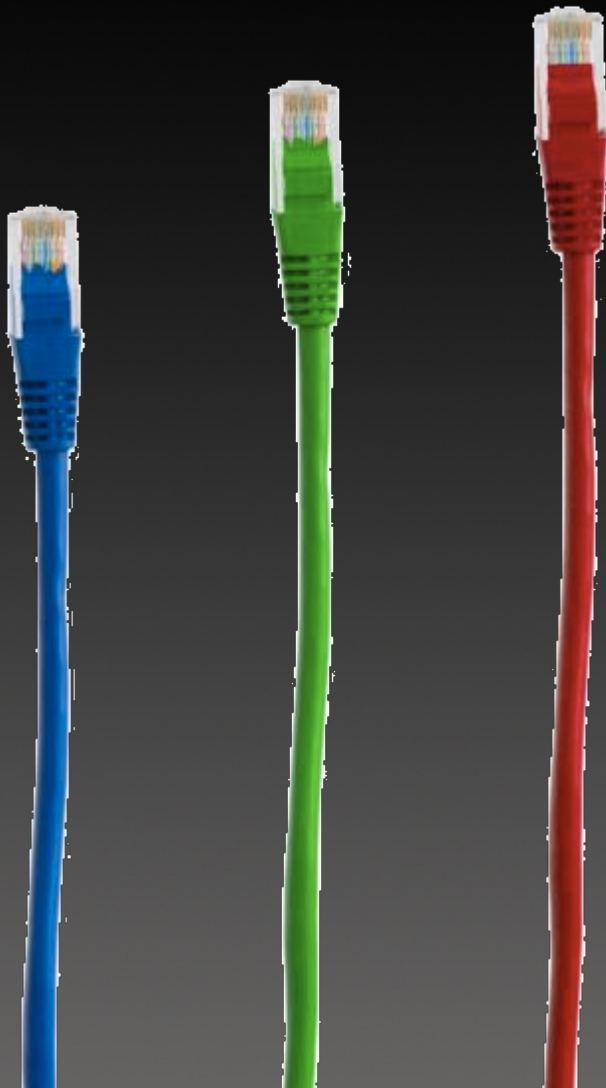
Category 5e

100m – 1000BASE-T

Up to 55m* - 10GBASE-T

Category 6

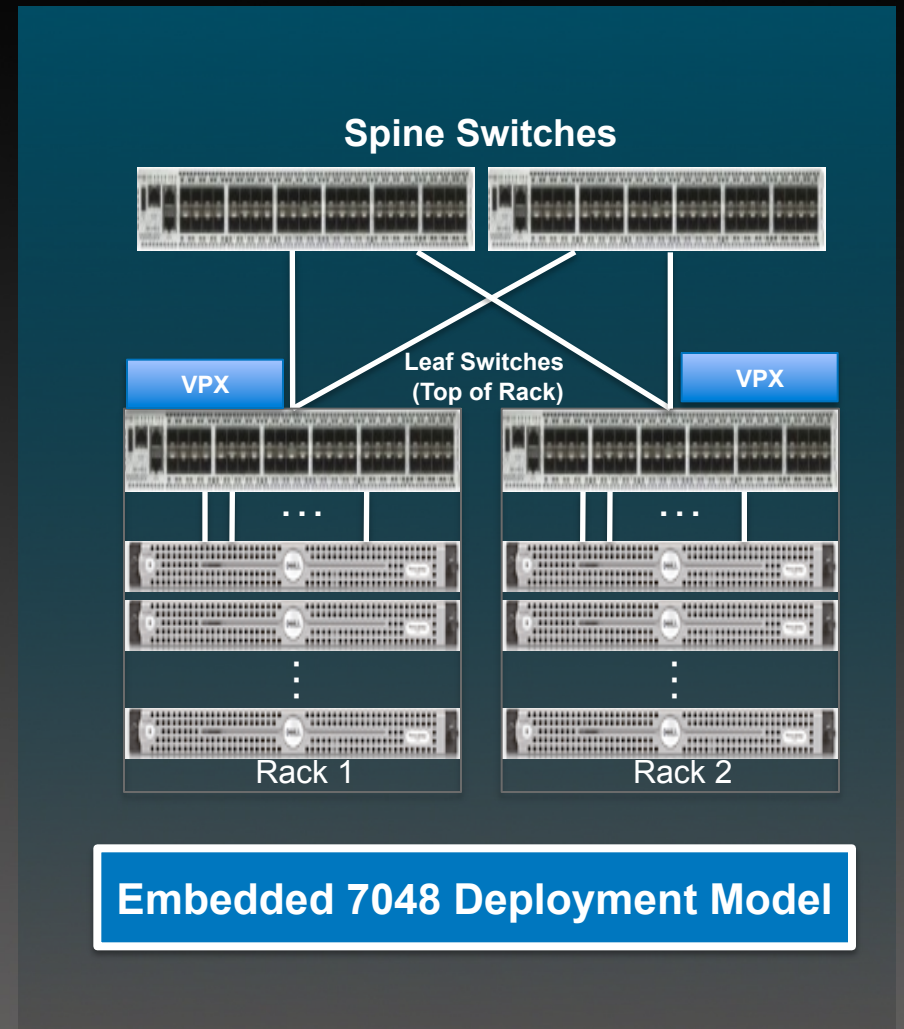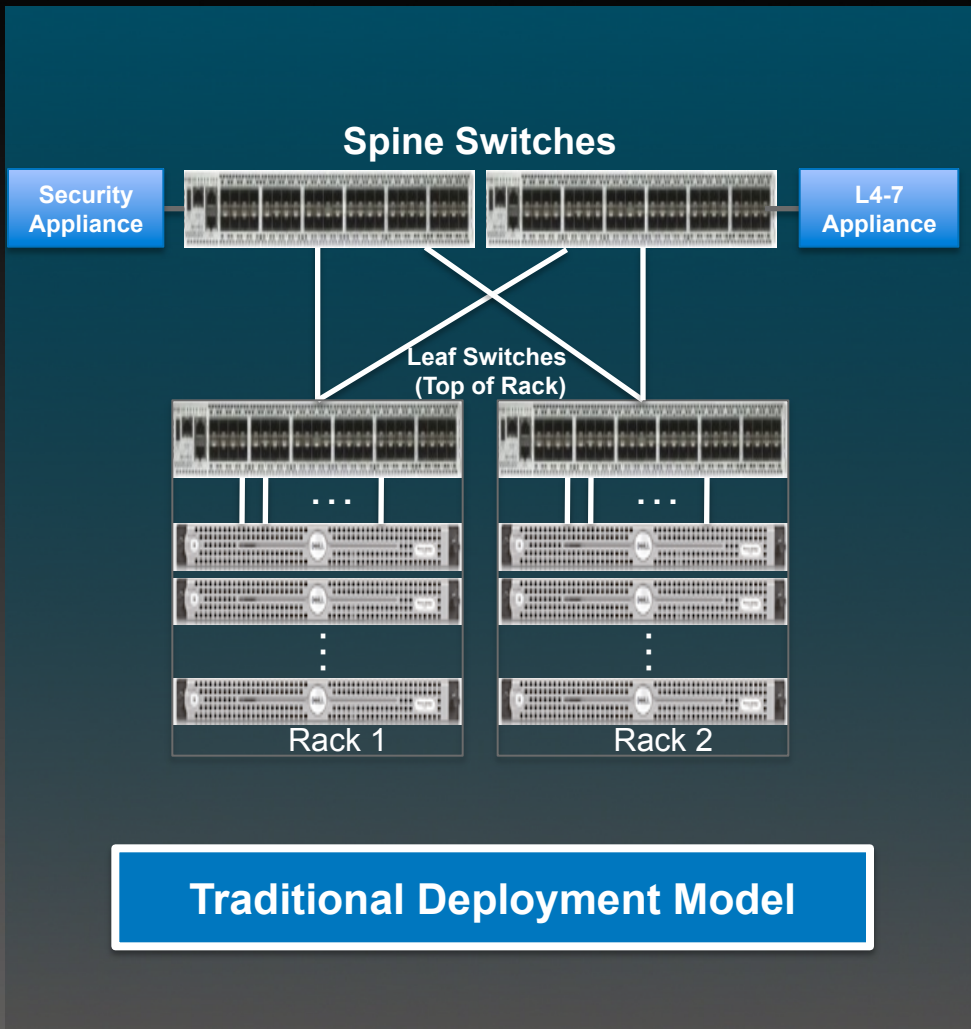**100m – 1000BASE-T**

55m - 10GBASE-T

Category 6a & 7

100m – 1000BASE-T

100m - 10GBASE-T

* Performance of 10GBASE-T over Cat-5e cabling is not specified in the standard and thus cannot be guaranteed. Field testing is recommended before deployment to establish the feasibility of using existing Cat-5e cabling

Integrated L4-L7 Citrix NetScaler

Traditional Deployment Model

Embedded 7048 Deployment Model

Spine Switches

Security Appliance

L4-7 Appliance

Leaf Switches (Top of Rack)
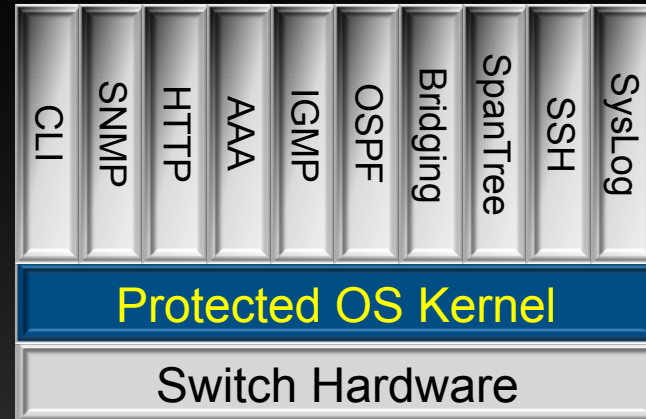
Rack 1

Rack 2

VPX

VPX

Arista EOS™ Extensible Operating System

CLI, SNMP, HTTP,
AAA, IGMP, OSPF,
Bridging, Spanning Tree
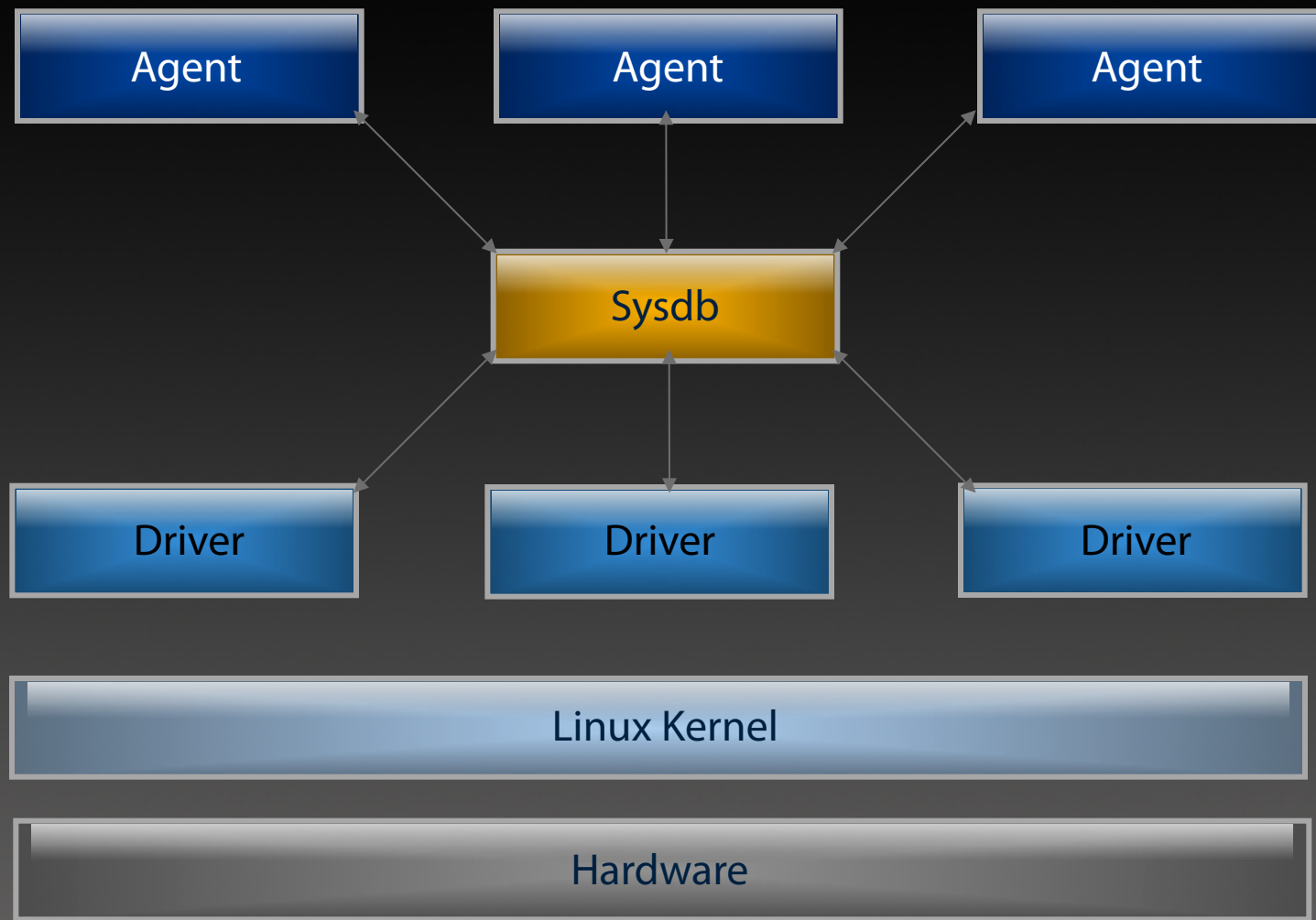Secure Shell, SysLog
on top of Real time kernel

Switch Hardware

CLI | SNMP | HTTP | AAA | IGMP | OSPF | Bridging | SpanTree | SSH | SysLog

Protected OS Kernel

Switch Hardware

Legacy Approach

All tasks directly linked to, and released as part of kernel
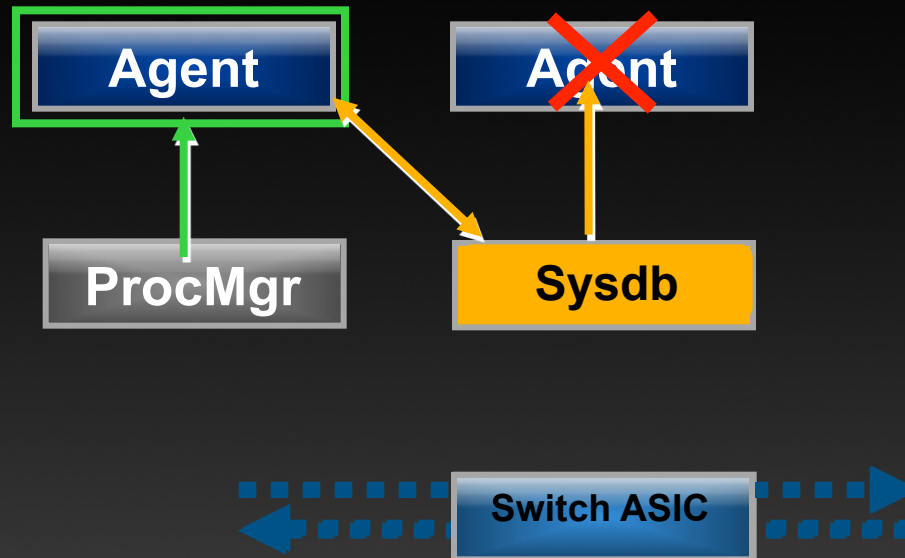
Arista EOS

All tasks separate processes on top of embedded Linux

ARISTA

# Multi-process State-sharing Architecture

Fault Containment and Self Healing

1. The agent experiences a fault.

   The agent exits without affecting packet forwarding or other processes.

2. ProcMgr detects process exit and starts a new agent instance.

   Packet forwarding continues.

3. The new agent loads its state from Sysdb without data path disruption.
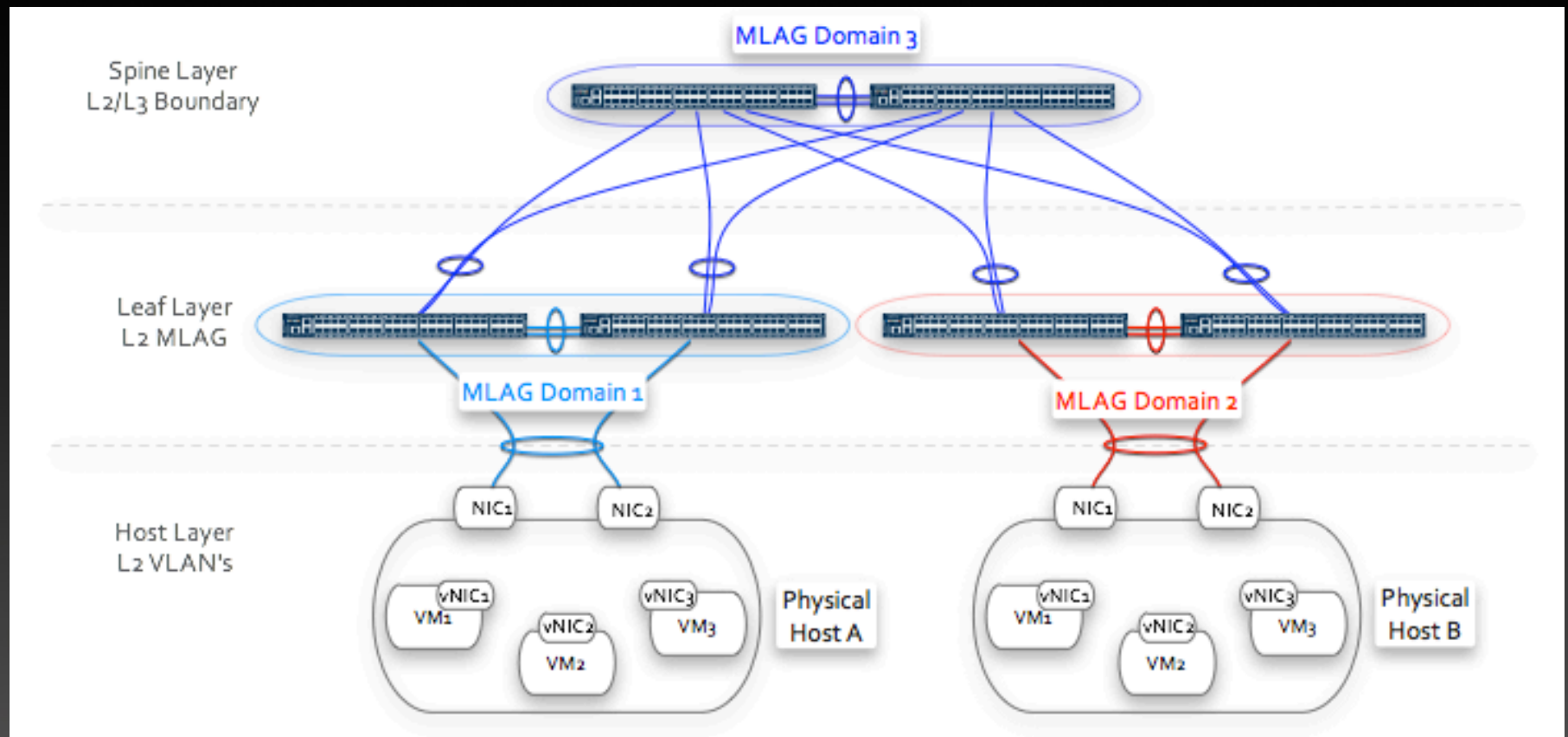
4. The system resumes normal operation.

EOS Open Extensibility
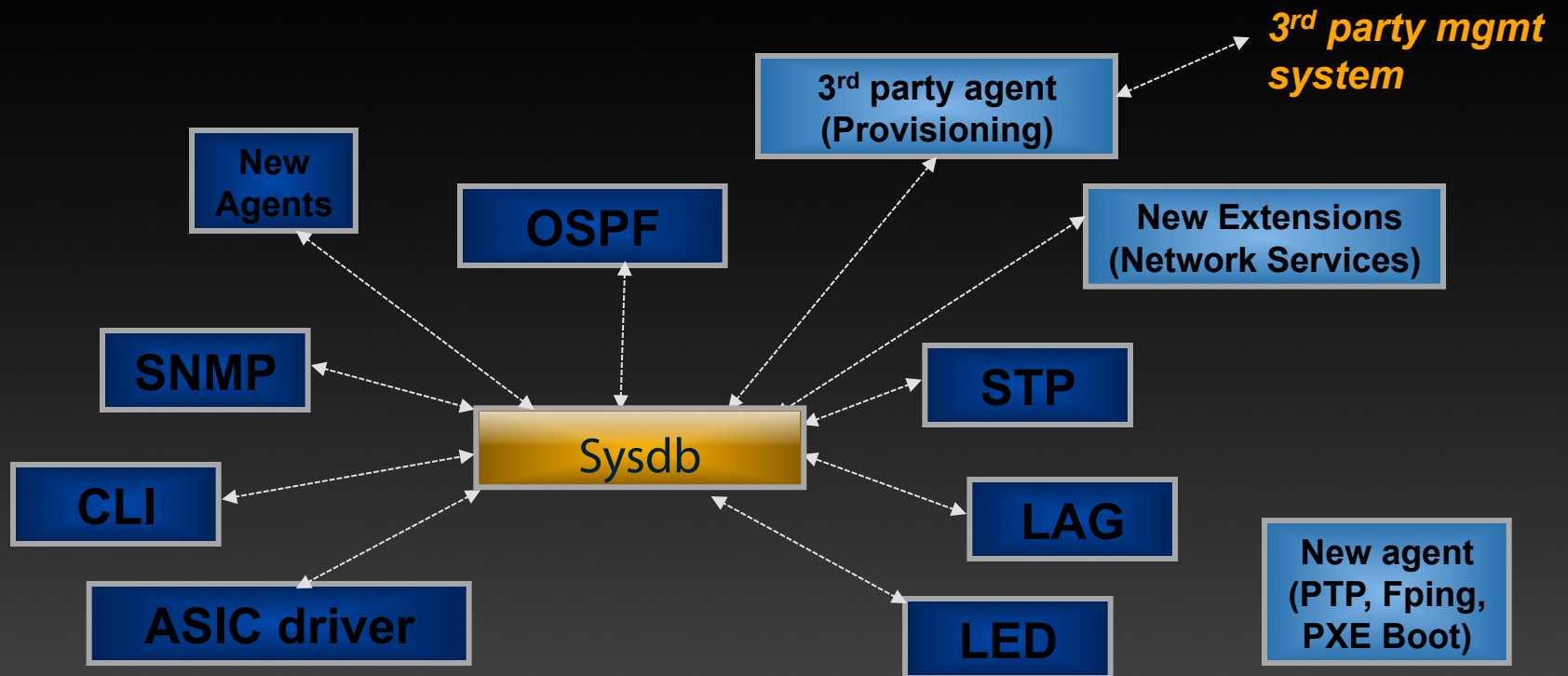
ARISTA

MLAG

# MLAG – Multichassis Link Aggregation Group

- **LAG group spread across two switches**

- **Two switches in MLAG an domain behave as logical switch**

- **STP runs in the background as a fallback only**

- **No idle links or manual load balancing**

ARISTA

vEOS Workflow and Operations

1. Provides familiar CLI to network admin
2. vSphere integration for VM admin
3. Auto-discovers virtual infrastructure
4. Integrates with vSphere/vCenter for per-VM policy assignment and vConverter P2V events
5. Creates and manages distributed port profiles for physical-virtual-cloud service mapping
6. Keeps policy and accounting consistent
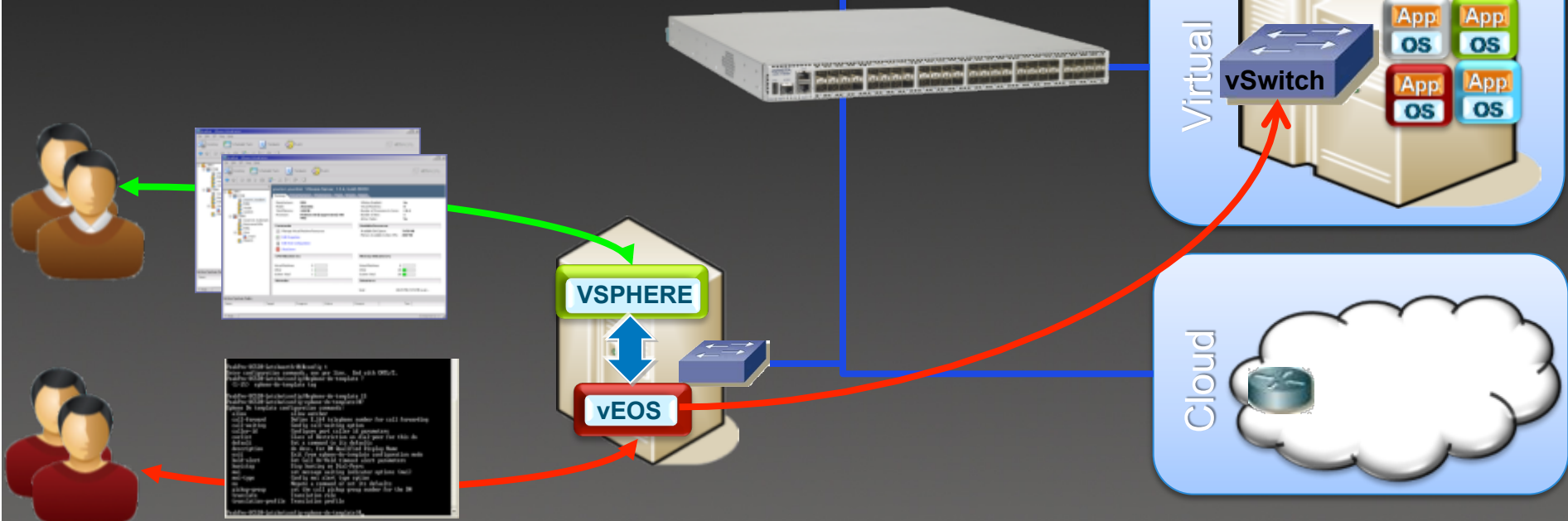
At a Glance: vEOS

form factor

Virtual appliance, or an integrated on Arista Switch

scale

64 hosts per vEOS instance

licensing

- 64-host, visibility and troubleshooting license — $0
- 64-host, network configuration license — $5000
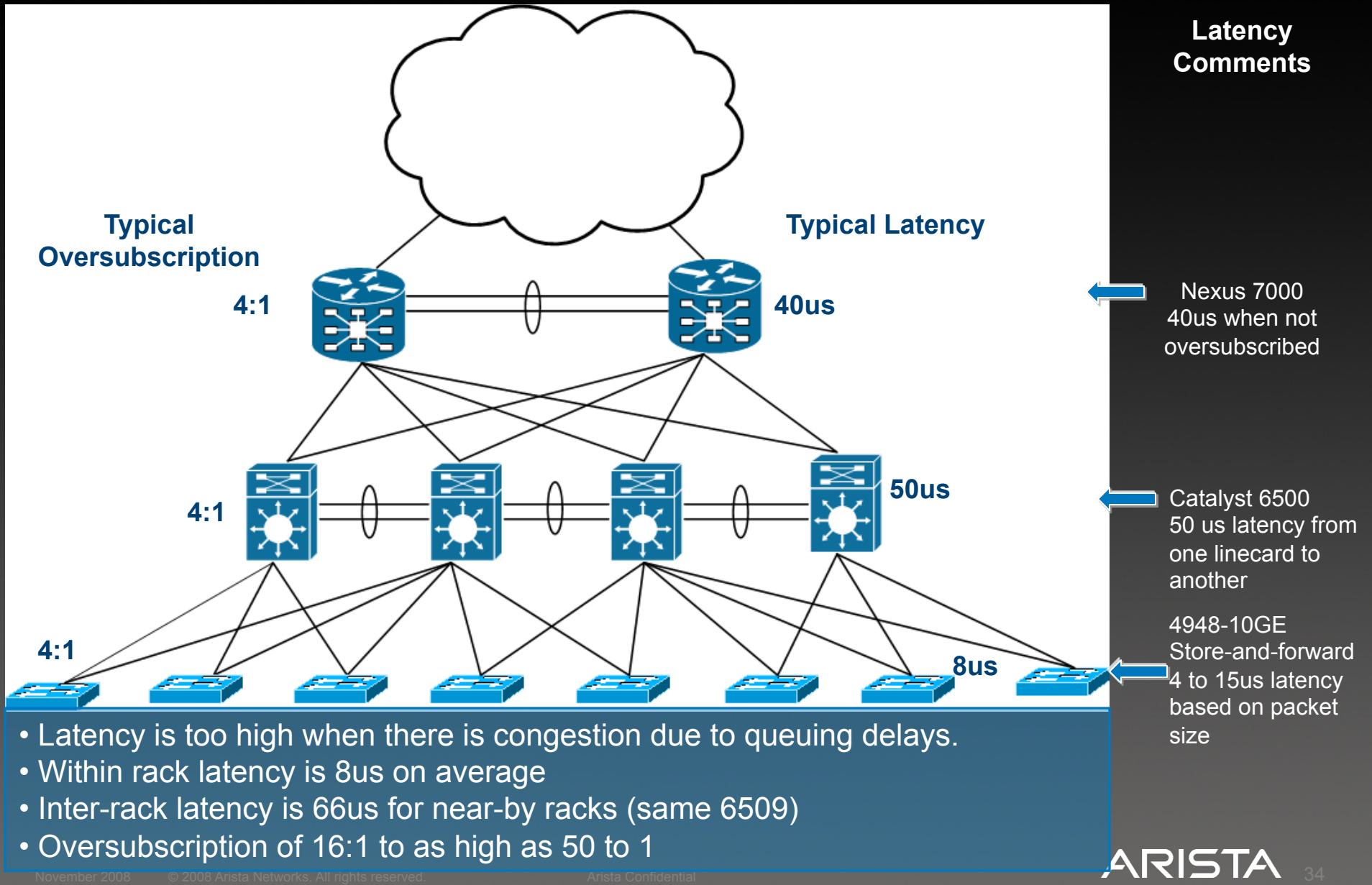- Full vEOS license in Arista 7000 Family — $0

beta

- Open Beta in Q1'10
- Register at www.aristanetworks.com/veos/beta

ARISTA

Legacy Designs

Typical Oversubscription

Typical Latency

4:1 — 40us

4:1 — 50us

4:1 — 8us

- Latency is too high when there is congestion due to queuing delays.
- Within rack latency is 8us on average
- Inter-rack latency is 66us for near-by racks (same 6509)
- Oversubscription of 16:1 to as high as 50 to 1
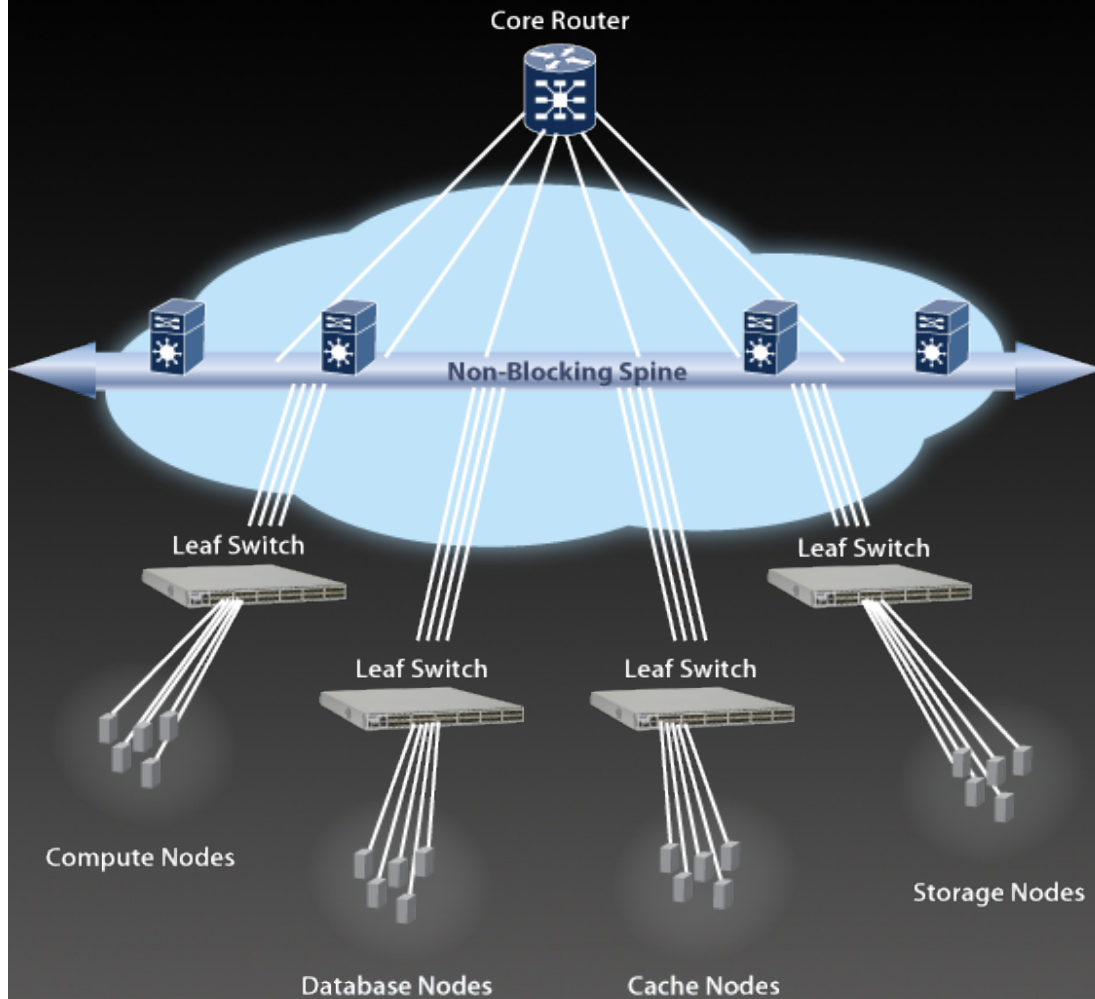
ARISTA

Cloud Networking For Next-Gen Data Centers

10Gb - 40Gb - 100Gb Spine

1Gb - 10Gb Non-Blocking Leaf Layer

High Performance Hosts

ARISTA 35

Cloud Network: Design

Non-Blocking

Typical Latency

1:1

40us
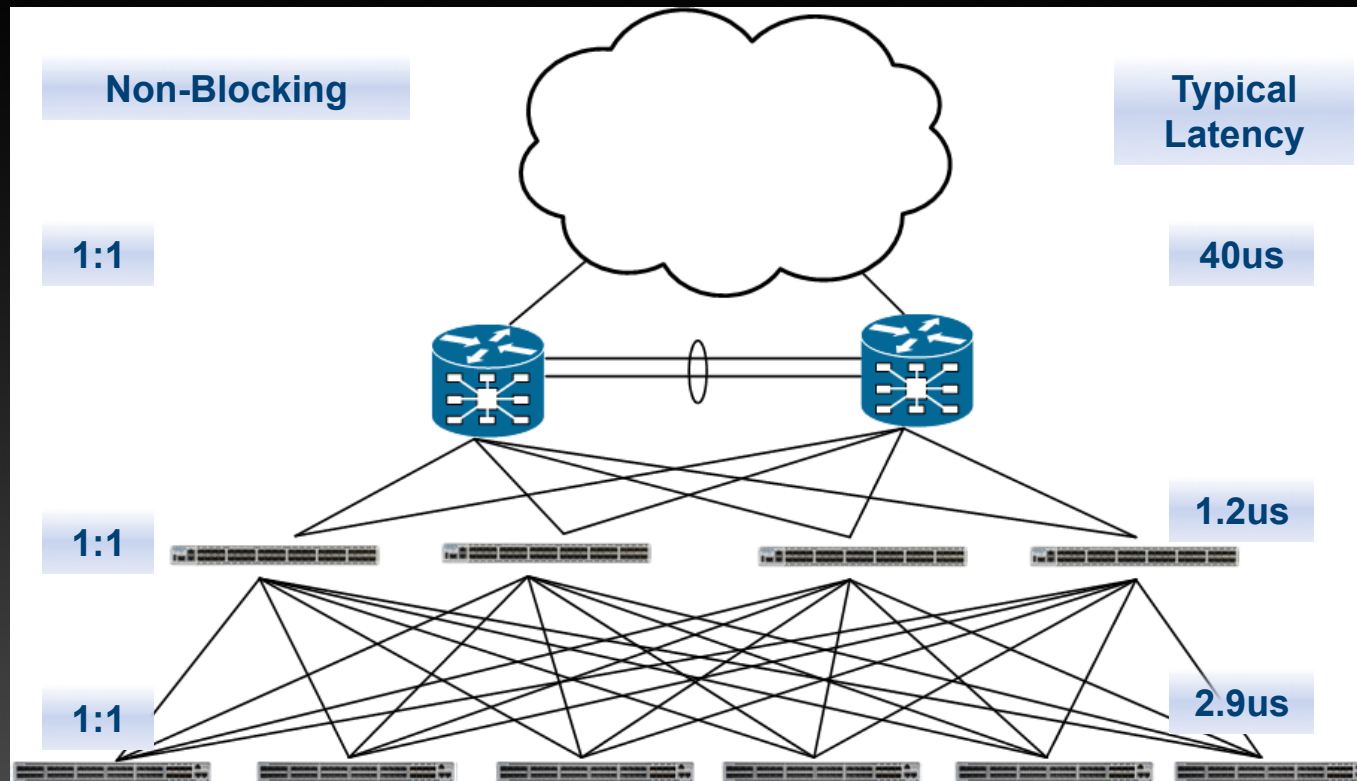
Ports provisioned based on traffic in/ out of Datacenter

1:1

1.2us

Arista 7148SX Spine

1:1

2.9us

Arista 7140T-8S Leaf

- Non-blocking & Ultra-low latency
- Within rack latency is 2.9us
- Inter-rack latency is 3.6us (7148SX leaf) or 7us (7140T leaf)
- Only touch core when going in/out of datacenter

ARISTA

Legacy Network Design vs Cloud Design

1,100 10GigE ports!
11,000 1GigE ports!
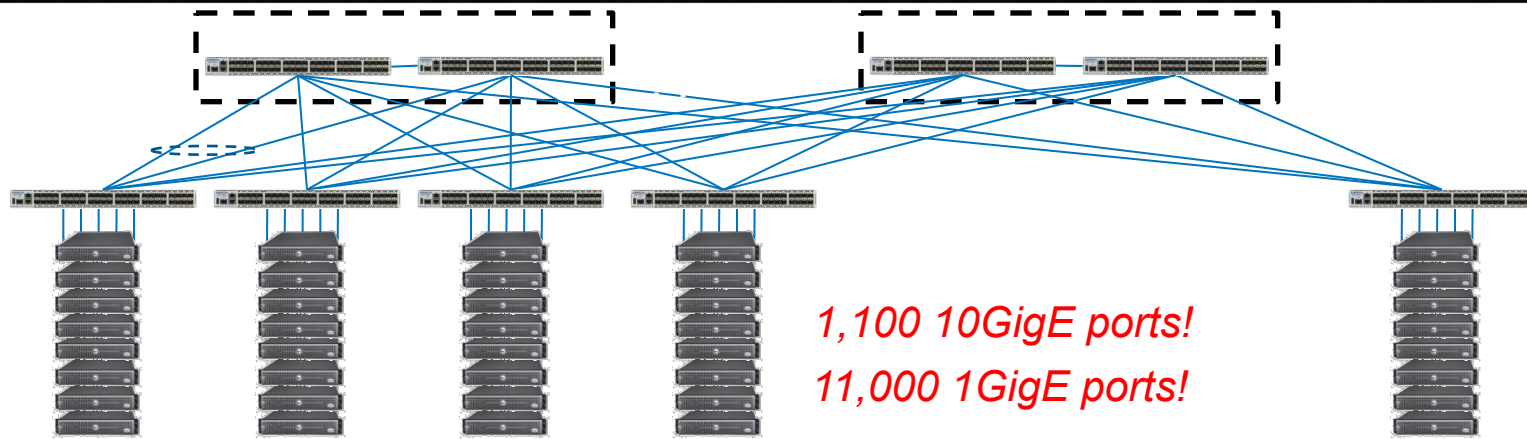
	Legacy Approach	Arista
Oversubscription	16:1	1:1 (none)
Inter-Rack Latency	66 - 136us	<7us
Price per 1 Gigabit Ethernet connection to server	> $3000	< $500

http://www.aristanetworks.com/en/Solutions

ARISTA

Comparison at Various Scales

Cost Per 100Mbps of Interconnect Bandwidth (plotted against Number of Servers)

	400	800	1600	1920	7680	15360	30720
Legacy Approach	$922	$733	$695	$689	$2,417	$2,417	$2,417
Arista - today	$77.79	$83.88	$78.66	$76.69			
Arista - future	$40	$46	$41	$34	$43	$43	$43
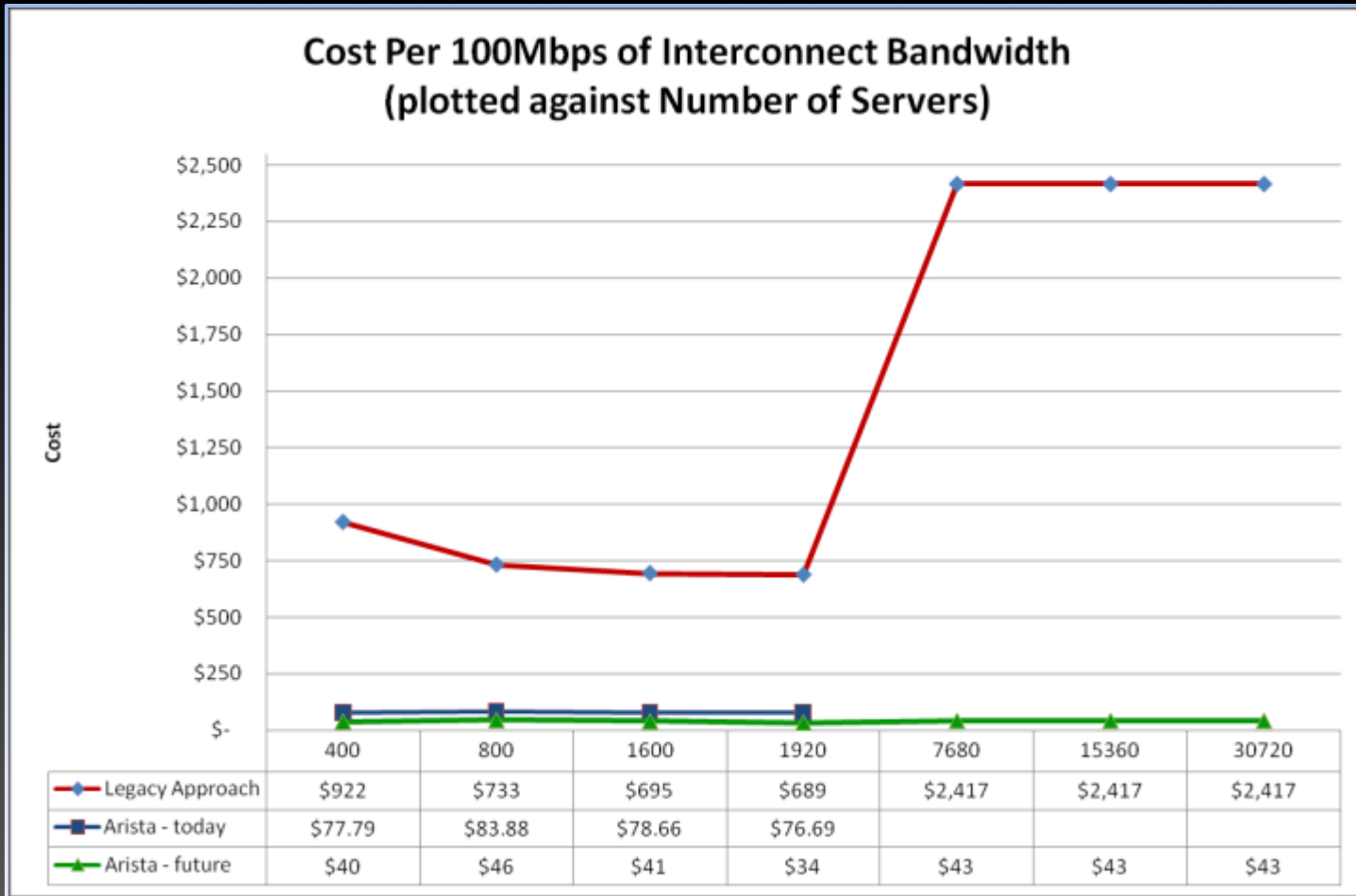
Arista solutions outperform other approaches by 10x to 20x!

ARISTA

ARISTA

Network architectures are changing

Incumbents are over-burdened supporting their legacies

Intel Nehalem, PCIe, and SSD demand a balanced network

Focus where IT is maximizing business value

Chris Bowles
Consolidate IT
chris.bowles@consolidate-it.eu
+44 7796947281