ARISTA

Redefining Data Center Networking

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About Arista Networks

10/40/100GbE Networks for the Virtualized Cloud & Data Center

➢ Founded in 2004
➢ Shipping Since Mid-2008
➢ 2000+ Customers
➢ 600+ Employees

Profitable, self-funded network infrastructure provider

Founded to build the best Network Operating System for Next Generation Data Centers

Key Executives

Andy Bechtolsheim

Founder, Chief Development Officer and Chairman

Jayshree Ullal

President and CEO

Founder of Sun Microsystems
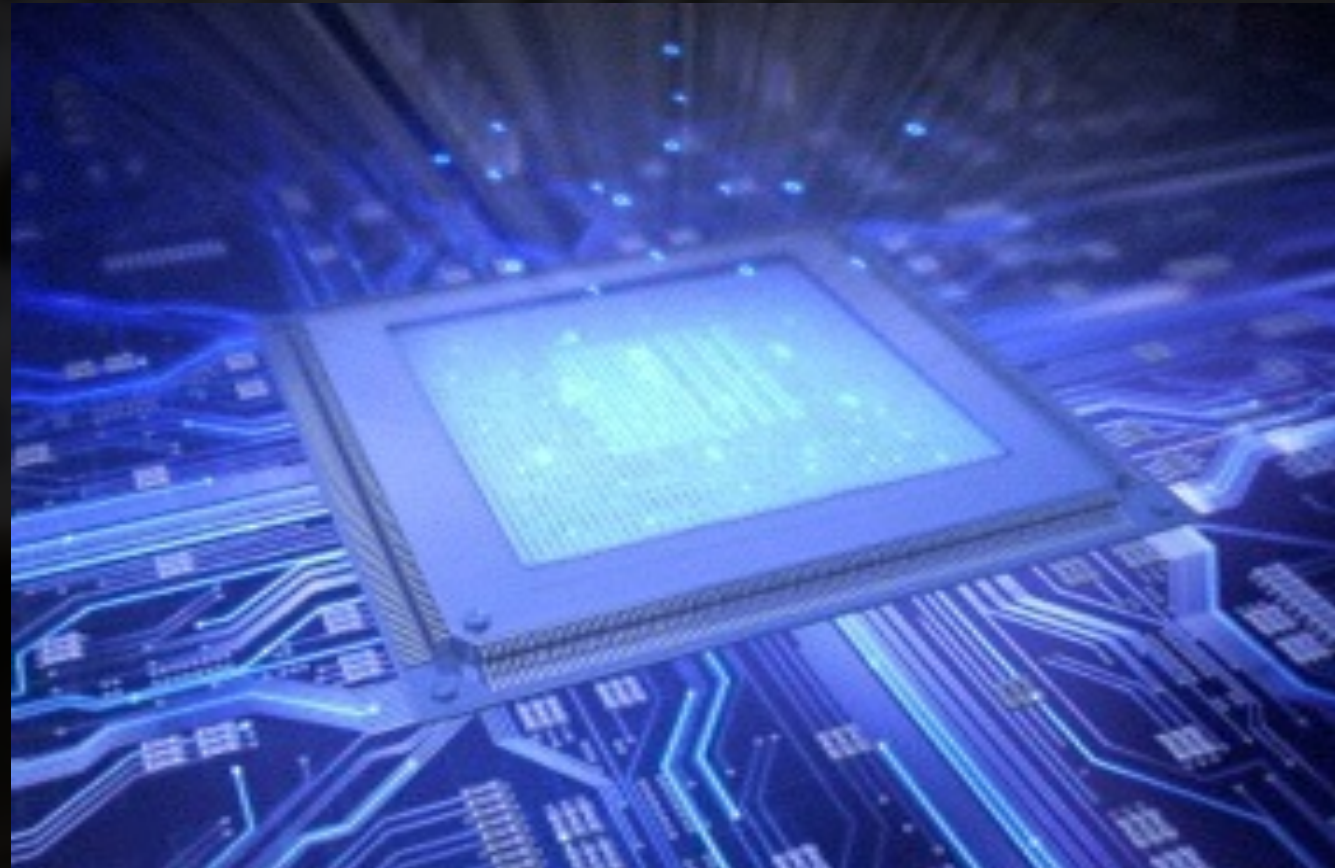
Founder of Granite Systems

Initial investor in Google, Inc.

Part of Cisco's 1st acquisition of Crescendo

15 yr Cisco SVP for Data Center, Switching & Services
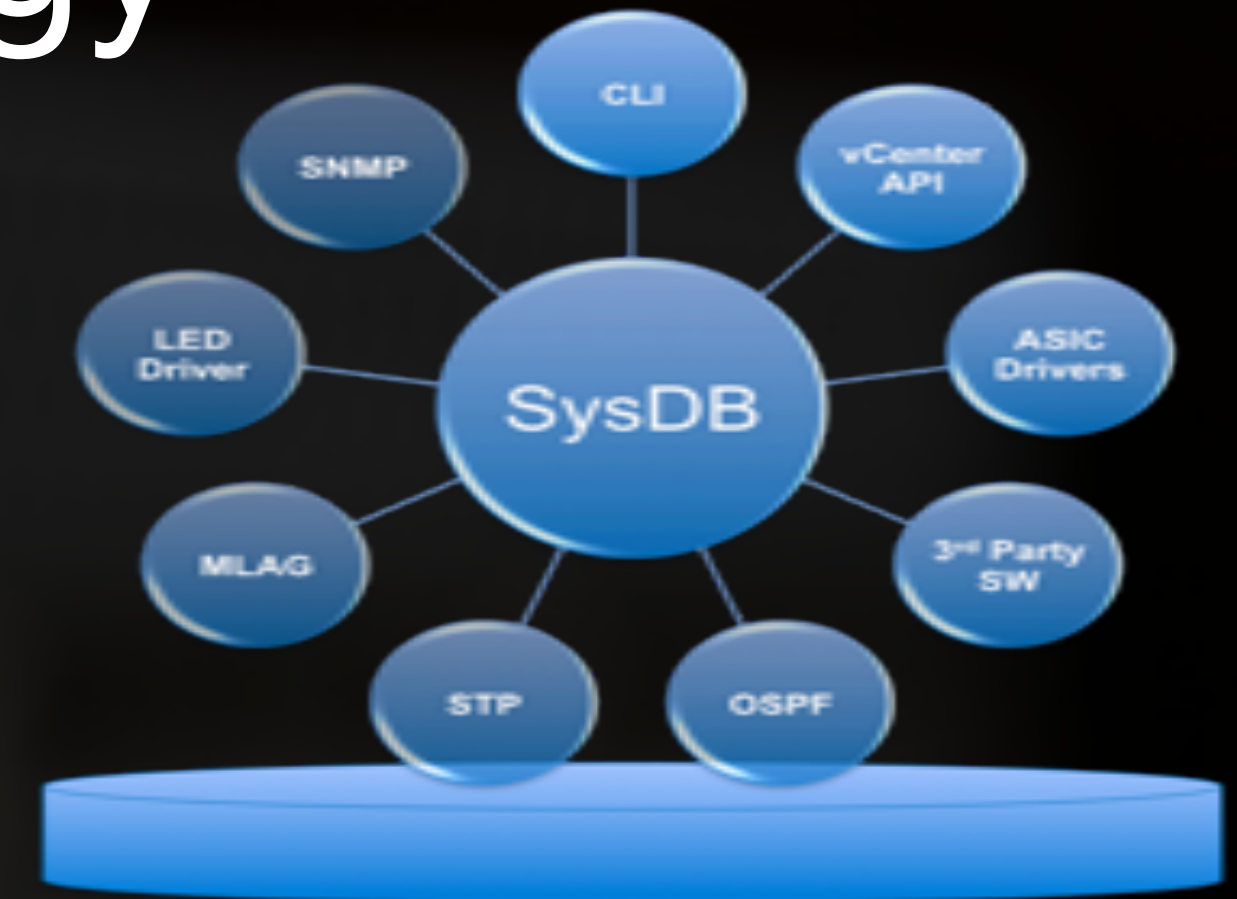
Joined Arista in 2008

Corporate Strategy

Best-of-Breed Merchant Silicon

Cloud + Data Center Focus

Best-of-Breed Software
Modern, Programmable, Open

Optimized for HPC, Web, Big
Data & Network Virtualization

Ecosystem & Channel
Partners

Global TAC and RMA Depots,
"Engineers Answer the Phone"

Arista Networks Product Portfolio

LEAF Switches
7048/7050/7150

SPLINE™
7250/7300

SPINE Switches
7500E Series

7048T

7050 Series

7150 Series

7250X

7300X

7500E

48 Port 1G
4 10G Uplinks
Deep Buffers

16/32 Port 40G
36-64 Port 1/10G-T
64/52/128 Port 10G

Ultra Low Latency
24-64 port 1G-40G
DANZ and NAT

64 Port 40G Fixed
256 Port 10G
Reversible Airflow

High Density 10G/40G
Modular Switching
Reversible Airflow
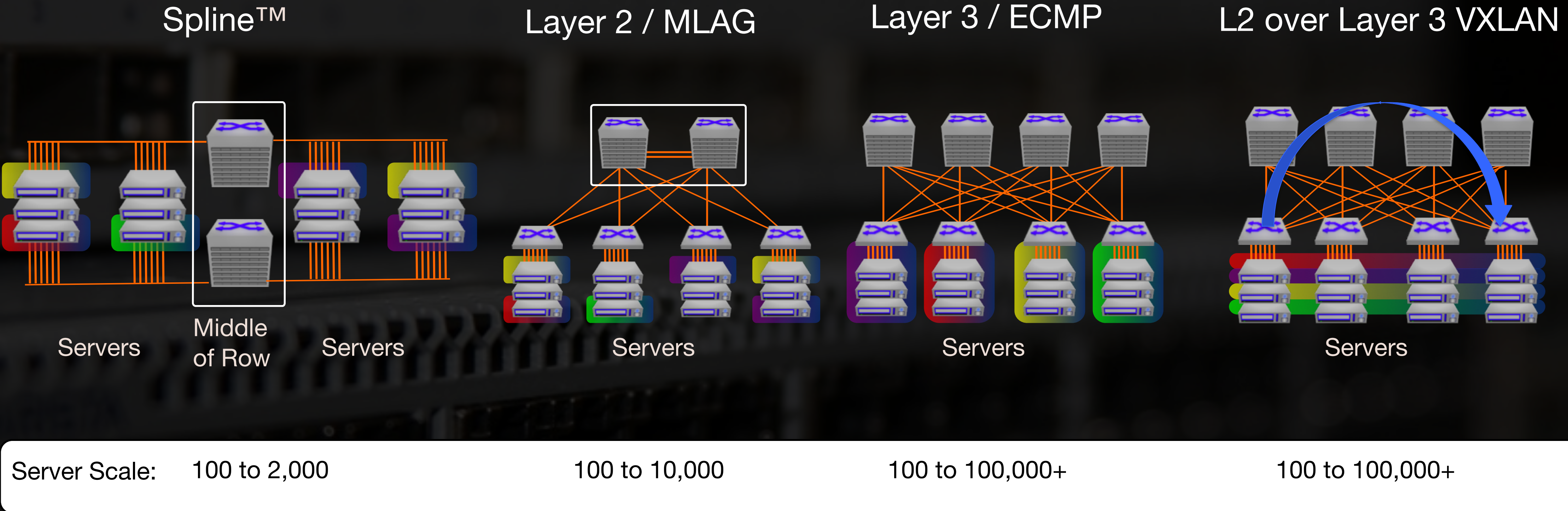
High Density 10/40/100G
Modular Switching,
Deep Buffers / Lossless

Single EOS across all platforms

Cloud Networking: Scalability That Works

Spline™

Servers   Middle of Row   Servers

Layer 2 / MLAG

Servers

Layer 3 / ECMP

Servers

L2 over Layer 3 VXLAN

Servers

Server Scale:	100 to 2,000	100 to 10,000	100 to 100,000+	100 to 100,000+

Arista EOS – Foundation for SDCN

Proven Reliability

Modular

SysDB

Cloud Vision	CLI	ASIC Driver	Third-Party Agents	STP	MLAG	OSPF/BGP

Publish
Subscribe

Resilient

Agent

New Agent

ProcMgr

SysDB

Self
Healing

Programmable

Interface Manager | Spanning Tree | ASIC Drivers | Virtual Machine

SysDB - Central State Database

Standard Linux Kernel

Arista EOS
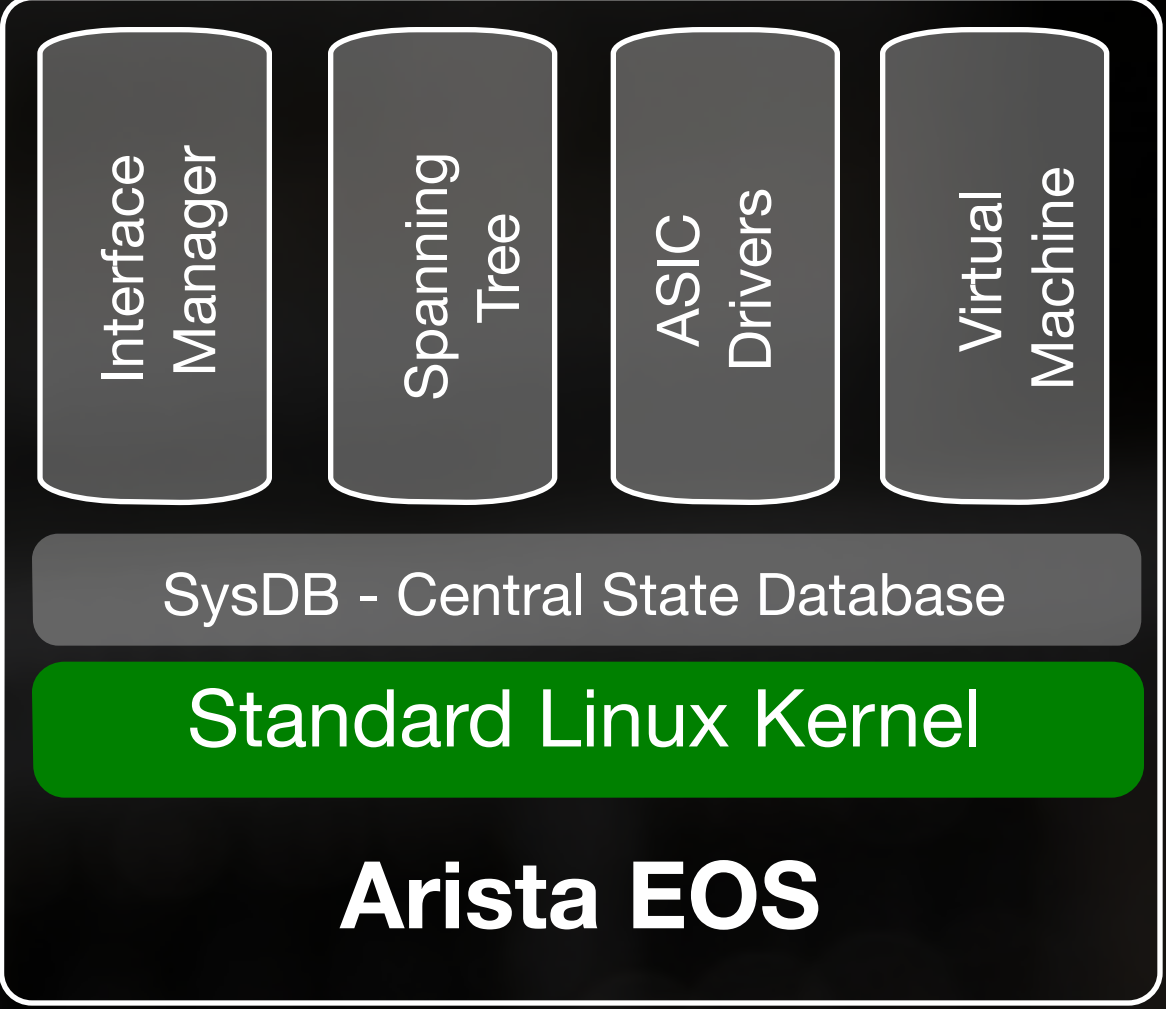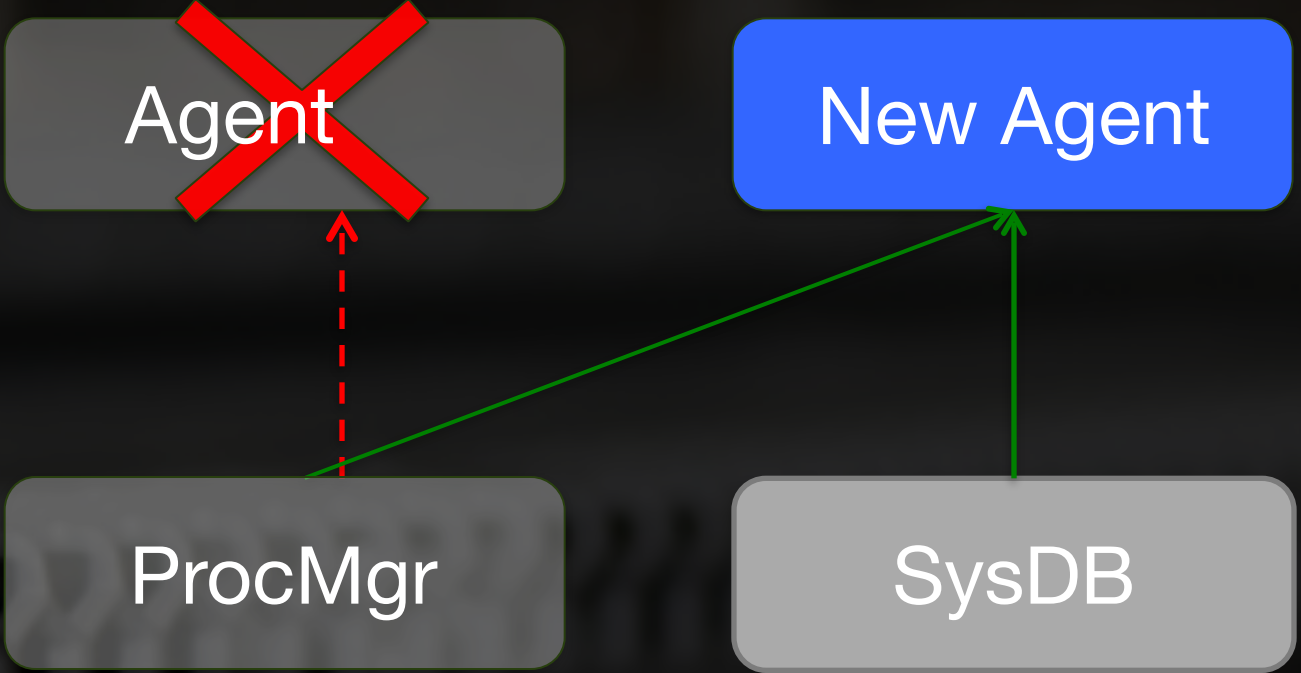
Extensible
Architecture

Feature Rich

❶ Configuring a VLAN on an Arista switch

```
tm225(config)#
tm225(config)#config t
tm225(config)#vlan 10
tm225(config-vlan-10)#name newvlan
```

❷ Viewing VLAN configuration

```
tm225#show vlan
VLAN  Name                     Status    Ports
----- ------------------------ --------- ------------------------------
1     default                  active    Cpu, Et12, Et26
10    newvlan                  active
20    data_center              active    Et15
30    user_vlan                active
```

❸ Configuring RPVST+ on the switch

```
tm225#config t
tm225(config)#spanning-tree mode rapid-pvst
tm225(config)#vlan 1-30
tm225(config-vlan-1-30)#exit
tm225(config)#spanning-tree vlan 1-10 priority 4096
tm225(config)#spanning-tree vlan 11-30 priority 8192
tm225(config)#
```

❹Viewing RPVST+ configuration

```
tm225#show spanning-tree vlan 10
VL10
  Spanning tree enabled protocol rapid-pvst
  Root ID   Priority   4097
          Address     001c.730f.8148
          Cost        40000 (Ext) 0 (Int)
          Port        15 (Ethernet15)
          Hello Time  2.000 sec  Max Age 20 sec  Forward Delay 15 sec
  Bridge ID  Priority    4106  (priority 4096 sys-id-ext 10)
          Address     001c.730f.8148
          Hello Time  2.000 sec  Max Age 20 sec  Forward Delay 15 sec
Interface       Role       State      Cost     Prio.Nbr Type
--------------- ---------- ---------- -------- -------- --------------------
Et15            root       forwarding 20000    128.15   P2p
```

❶ Configuring a port-channel – mode active

```
tm225#config t
tm225(config)#interface e12, e15
tm225(config-if-Et12,15)#channel-group 100 mode active
tm225(config-if-Et12,15)#
```

❷ Viewing port-channel configuration

```
tm225#show port-channel summary

    Flags
--------------------------------------------------------------------------
a - LACP Active         p - LACP Passive
U - In Use              D - Down
+ - In-Sync             - - Out-of-Sync        i - incompatible with agg
P - bundled in Po         s - suspended          G - Aggregable
I - Individual          S - ShortTimeout       w - wait for agg

Number of channels in use: 0
Number of aggregators:0

  Port-Channel     Protocol    Ports
  ------------------------------------------------------
   Po100(D)         LACP(a)     Et12(G-) Et15(G-)
```

❸ Configure and show port-channel load balance algorithm

```
tm225(config)#port-channel load-balance petraA fields ip ip-tcp-udp-
header
tm225(config)#show port-channel load-balance petraA fields
Source MAC address hashing for non-IP packets is ON
Destination MAC address hashing for non-IP packets is ON
Ethernet type hashing for non-IP packets is ON
Source MAC address hashing for IP packets is OFF
Destination MAC address hashing for IP packets is OFF
Ethernet type hashing for IP packets is OFF
IP source address hashing is ON
IP destination address hashing is ON
IP protocol field hashing is ON
TCP/UDP source port hashing is ON
TCP/UDP destination port hashing is ON
```

❶   When the user first logs into an Arista switch, the CLI looks exactly like Cisco's CLI as show below:

```
Arista7124SX>
Arista7124SX >en
Arista7124SX #config t
Arista7124SX(config)#?
  aaa             Authentication, Authorization, and
Accounting
  agent           Configure an agent
  alias           Add a command alias
  arp             Set a static ARP entry
  banner          Configure system banners
  boot            Modify system boot parameters
.....
```

❷   How Arista EOS also provides the user complete access to the Linux kernel of the switch. To enter it, simply enter 'bash':

```
Arista7124SX#bash

Arista Networks EOS shell

[admin@tm225 ~]$
```

❸   EOS commands are basically written in Python. CLI itself is another python script 'Cli.py' which resides in following directory :

```
[admin@tm225 site-packages]$ pwd

/usr/lib/python2.6/site-packages

[admin@tm225 site-packages]$ ls Cli*.py
Cli.py     CliExtensions.py    CliParser.py
CliAuth.py  CliInputWrapper.py  CliSave.py
```

❹ You can view the processes running on switch:

```
[admin@tm225 flash]$ ps -ef
UID      PID  PPID  C STIME TTY       TIME CMD
root      1    0  0 May09 ?        00:00:00 /sbin/init
root      2    0  0 May09 ?        00:00:00 [kthreadd]
root      3    2  0 May09 ?        00:00:00 [migration/0]
root      4    2  0 May09 ?        00:00:00 [ksoftirqd/0
...
```

❺ You can easily do a tcpdump on an Arista switch with no impact to the CPU. Below you can see ospf hello packets being received

```
tm225#bash sudo tcpdump –I e1
tcpdump: WARNING: fabric: no IPv4 address assigned
tcpdump: verbose output suppressed, use -v or -vv for full
protocol decode
listening on fabric, link-type EN10MB (Ethernet), capture size
65535 bytes
12:57:30.222171 00:1c:73:0f:80:a6 (oui Unknown) > 01:00:5e:
00:00:05 (oui Unknown                 ), ethertype 802.1Q
(0x8100), length 82: vlan 1, p 0, ethertype IPv4, 10.10.50.1
> OSPF-ALL.MCAST.NET: OSPFv2, Hello, length 44
12:57:40.222687 00:1c:73:0f:80:a6 (oui Unknown) > 01:00:5e:
00:00:05 (oui Unknown                 ), ethertype 802.1Q
(0x8100), length 82: vlan 1, p 0, ethertype IPv4, 10.10.50.1
> OSPF-ALL.MCAST.NET: OSPFv2, Hello, length 44
12:57:50.223172 00:1c:73:0f:80:a6 (oui Unknown) > 01:00:5e:
00:00:05 (oui Unknown                 ), ethertype 802.1Q
(0x8100), length 82: vlan 1, p 0, ethertype IPv4, 10.10.50.1
> OSPF-ALL.MCAST.NET: OSPFv2, Hello, length 44
```

No other switches have this capability

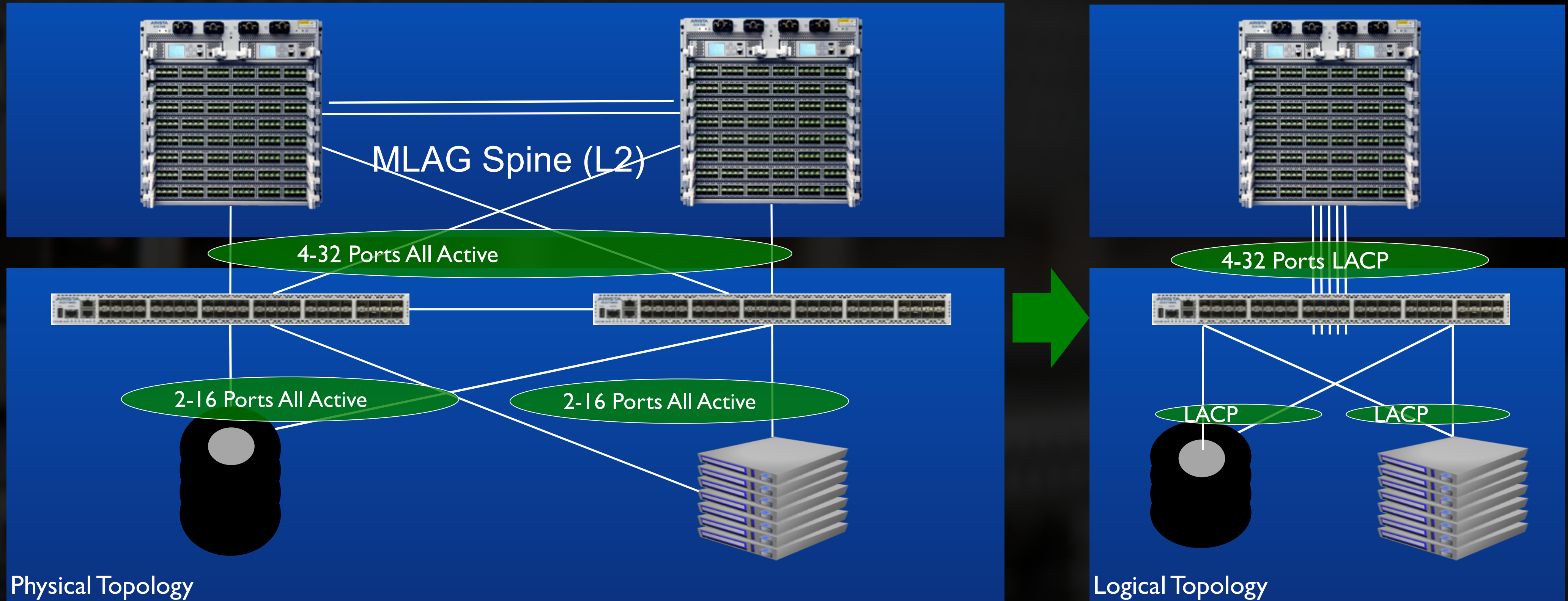❻   All images are saved in 'mnt/flash'. You can view, copy, remove, and the start-up config in bash:

```
[admin@tm225 flash]$ pwd
/mnt/flash
[admin@tm225 flash]$ cat startup-config
! device: tm225 (DCS-7048T-A, EOS-4.6.3)
!
aaa root secret 5 $1$VNh3khl/$d8oEMfdcMhSTpL2gEou0O/
aaa authentication policy local allow-nopassword-remote-
login
!
prompt %H.%D{%H:%M:%S}%P
!
hostname tm225
ip name-server 172.22.22.10
ip name-server 172.22.22.40
ip domain-name aristanetworks.com
!
```

❼You can create and add new commands by simply writing your own python script:

```
localhost# cat -n HelloCli.py
    1 import BasicCli, CliParser
    2 tokenHello = CliParser.KeywordRule( 'hello',
helpdesc='Says hello' )
    3 def doHello( mode ):
    4 print "World.\n"
    5 BasicCli.UnprivMode.addCommand( ( tokenHello,
doHello ) )
localhost>show ?
…
hello Show your hello
….
localhost>show hello ?
| Output modifiers
<cr>
localhost>show hello
Hello World.

Localhost>
```
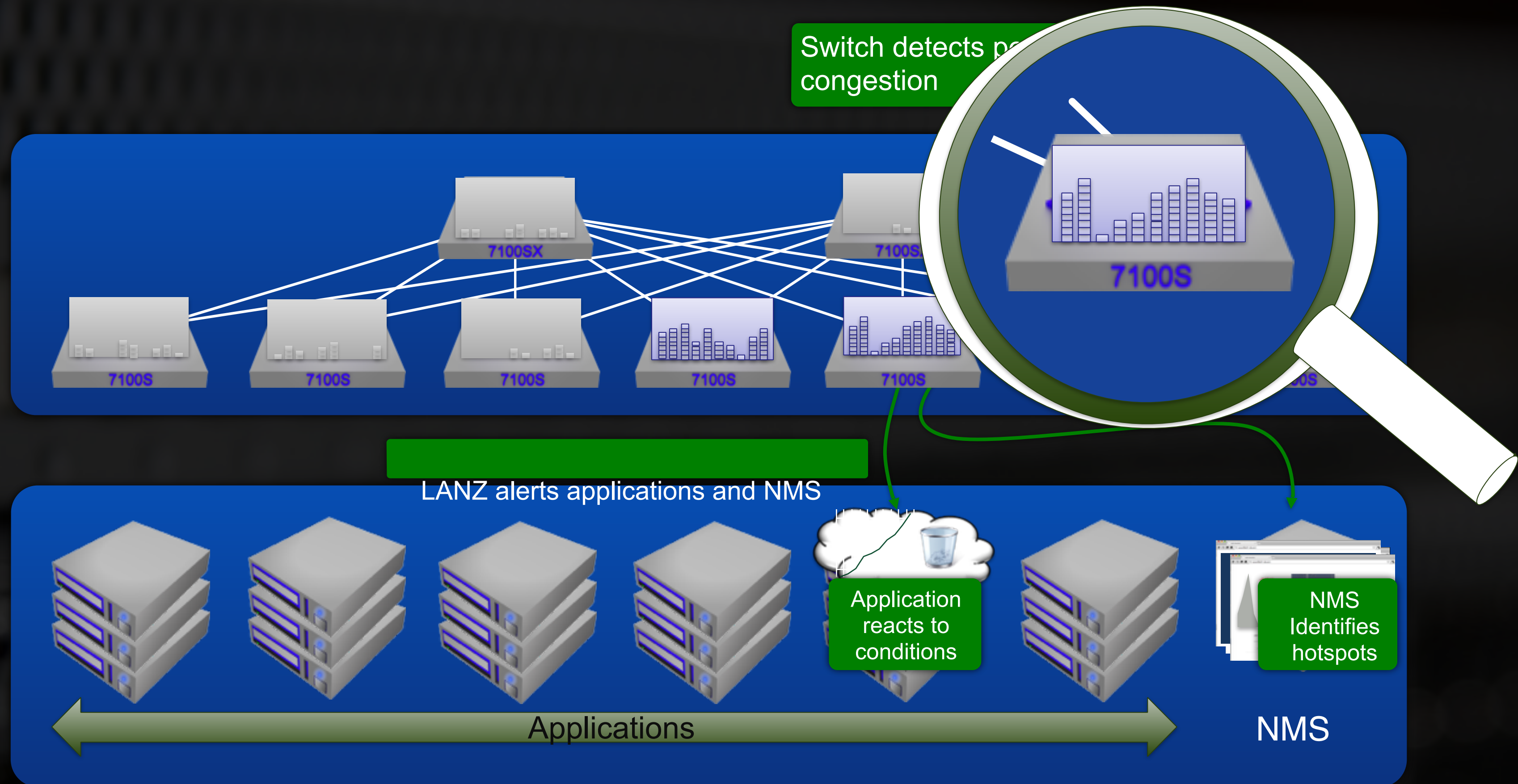
Multi-chassis Link Aggregation (MLAG)

MLAG Spine (L2)

4-32 Ports All Active

2-16 Ports All Active

2-16 Ports All Active

Physical Topology

4-32 Ports LACP

LACP

LACP

Logical Topology

- All Active Multipath for L2 and L3 (vARP Anycast Gateway)
- Standards based protocols (LACP)
- Simplifies or eliminates the Spanning Tree topology
- Simple to understand and easy to engineer traffic

LANZ TRACER Revolutionizes Network Visibility

Switch detects p...
congestion

LANZ alerts applications and NMS

Application reacts to conditions
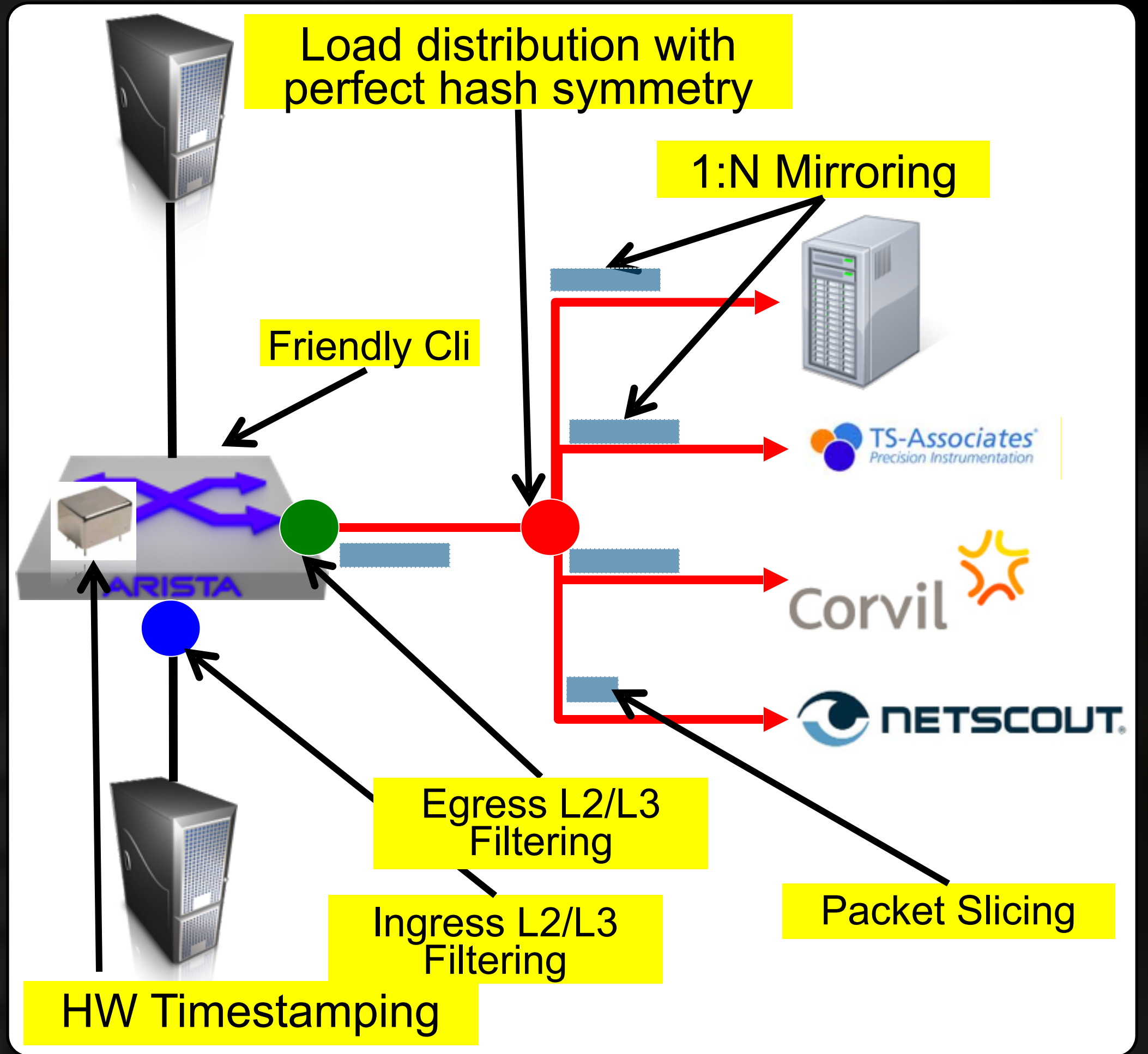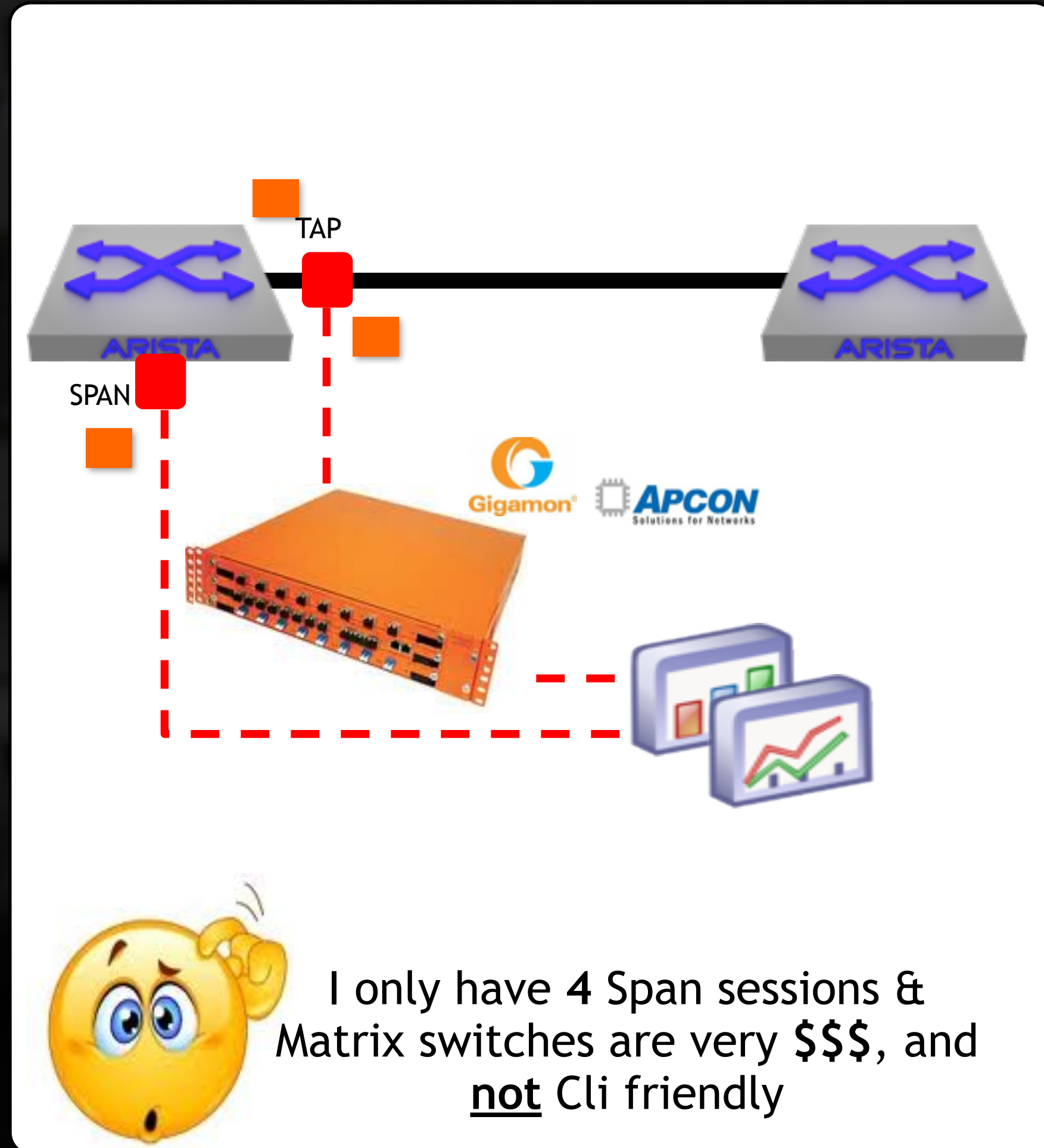
NMS Identifies hotspots

Applications

NMS

Understand the source of latency (local or remote) - Microbursting

- Alert applications to congestion trends early via LANZ streaming
- Enable pro-active response - avoid losses or latency increases
- Export data to management systems - correlate/graph historical data

DANZ (Data Analyzer)

Traditionally, customers can only use SPAN or expensive matrix switches to troubleshoot app issues

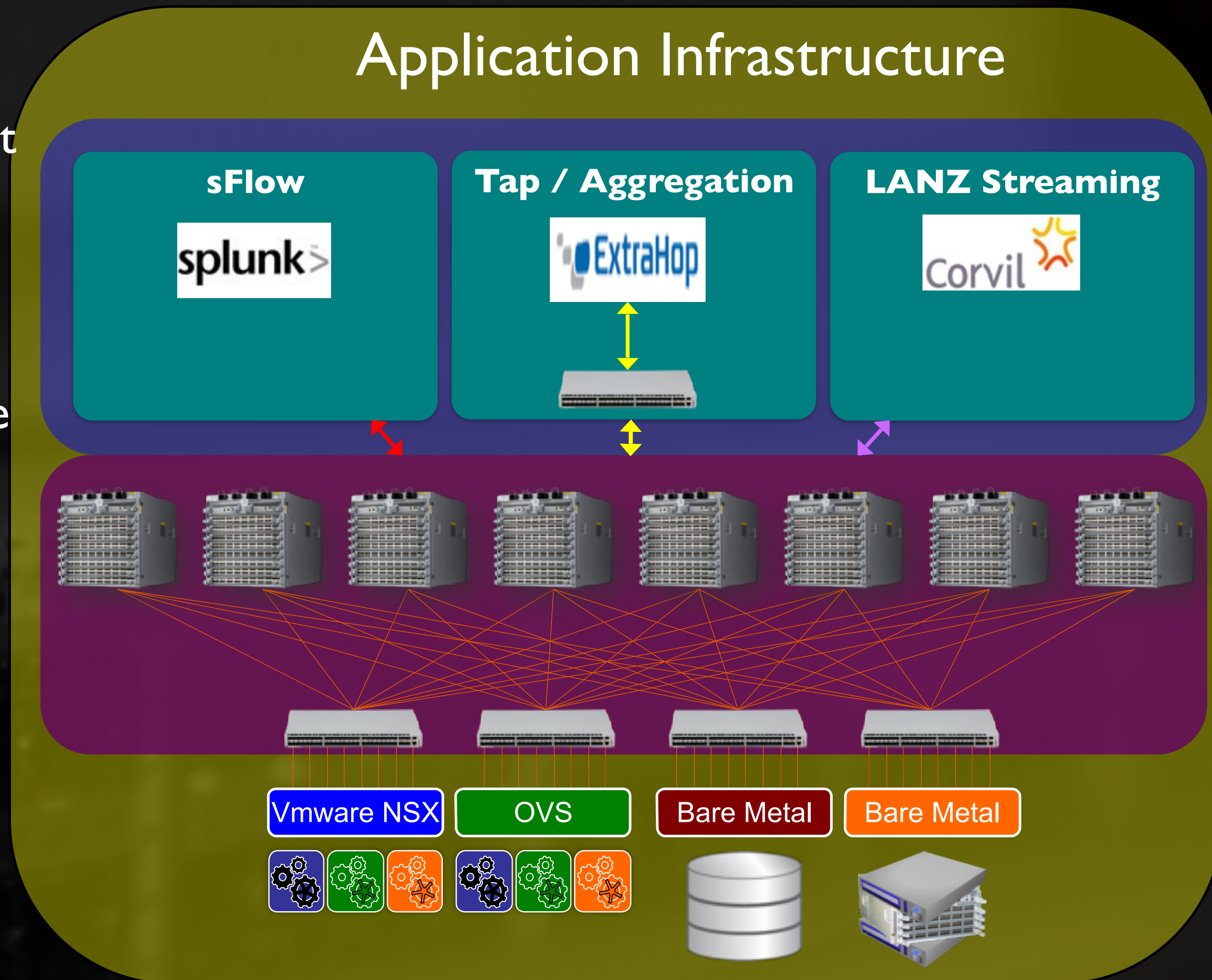Arista's 7150 has hardware Tap Aggregation feature to Be easy used as a matrix switch

TAP

SPAN

Gigamon® APCON Solutions for Networks

I only have **4** Span sessions & Matrix switches are very $$$, and <u>not</u> Cli friendly

This can become a very expensive solution quickly

Load distribution with perfect hash symmetry

1:N Mirroring

Friendly Cli

TS-Associates® Precision Instrumentation

Corvil

NETSCOUT.

Egress L2/L3 Filtering

Ingress L2/L3 Filtering

Packet Slicing

HW Timestamping

DANZ reduces$$$
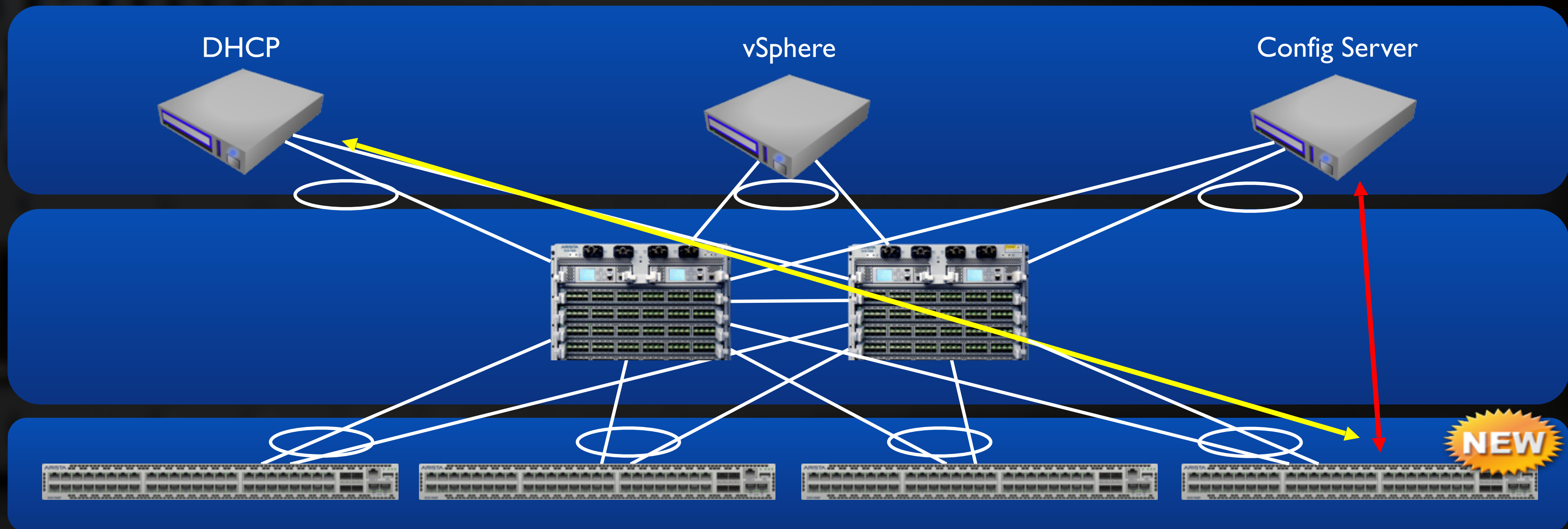
Arista Network Telemetry – Network Application

Close partnerships deliver best of breed solutions and unique / early insight into the performance of the application environment

- Utilize standards based sFlow to integrate Splunk Enterprise providing per flow analytics

- Flexible hardware enables cost effective tap aggregation with ExtraHop operational intelligence

- Real time buffer utilization monitoring provides for congestion and capacity management streaming to Corvil performance monitoring

Application Infrastructure

sFlow	Tap / Aggregation	LANZ Streaming
splunk>	ExtraHop	Corvil

Vmware NSX   OVS   Bare Metal   Bare Metal

Real-time analytics

Zero Touch Provisioning with ZTP

DHCP   vSphere   Config Server

NEW

- ZTP enables the automatic deployment of new hardware

- No proprietary protocols are required – simply DHCP and your choice of file transfer protocol (HTTP, FTP, TFTP etc.)

  - A newly installed switch boots in ZTP mode with forwarding disabled
  - After receiving an IP address and DHCP option 67 it configures an SVI
  - It retrieves a boot script from the Config Server specified in option 67
  - Script can contain cli and bash commands to download specific images and customizations
  - Switch uniquely identified by MAC, SKU, Serial number and LLDP neighbor

VMTracer Provides Integration and Visibility
VMWare, MS, and Openstack

Logging feedback to vSphere

VLAN Trunks Opened/Pruned based on allowed range

VLANs Created/Removed based on VM demand

VLAN Trunks Opened/Pruned based on VM demand

APP OS

APP OS

ESX/i Hypervisor

```
7050# show vmtracer interface Ethernet48
Ethernet48: esx1.aristanetworks.com/ndsTest/dvuplink1

VM Name          Network Adapter     VLAN Status  State
------------------------------------------------------------
Exchange         Network adapter 4   7    up/up   --
Apache           Network adapter 3   6    up/up   vMotion
MySQL            Network adapter 1   5    up/up   FT-A


7050# show vmtracer interface Ethernet48 host

Ethernet48 :  esx-1.aristanetworks.com
Manufacturer: Dell Inc.
Model:        PowerEdge 2950
CPU type:     Intel(R) Xeon(R) CPU 5110 @ 1.60GHz
CPUs :        1
CPU Cores:    2
NIC Manufacturer: NetXen
NIC Model:        NetXen NX3031 Dual Port SFP+ 10GbE
Service Tag:      ABCDEF1234
```

Scaling VM Mobility with VXLAN

• A Suite of features to scale and aggregate data centers

   • vShield manages multiple data centers

     • Supports Multi-tenancy management

   • VXLAN extends the reach of a data center

   • Tunnel beyond traditional L2 boundaries

   • Leverage underutilized resources in the extended DC

   • Simplify mirroring and DR installations
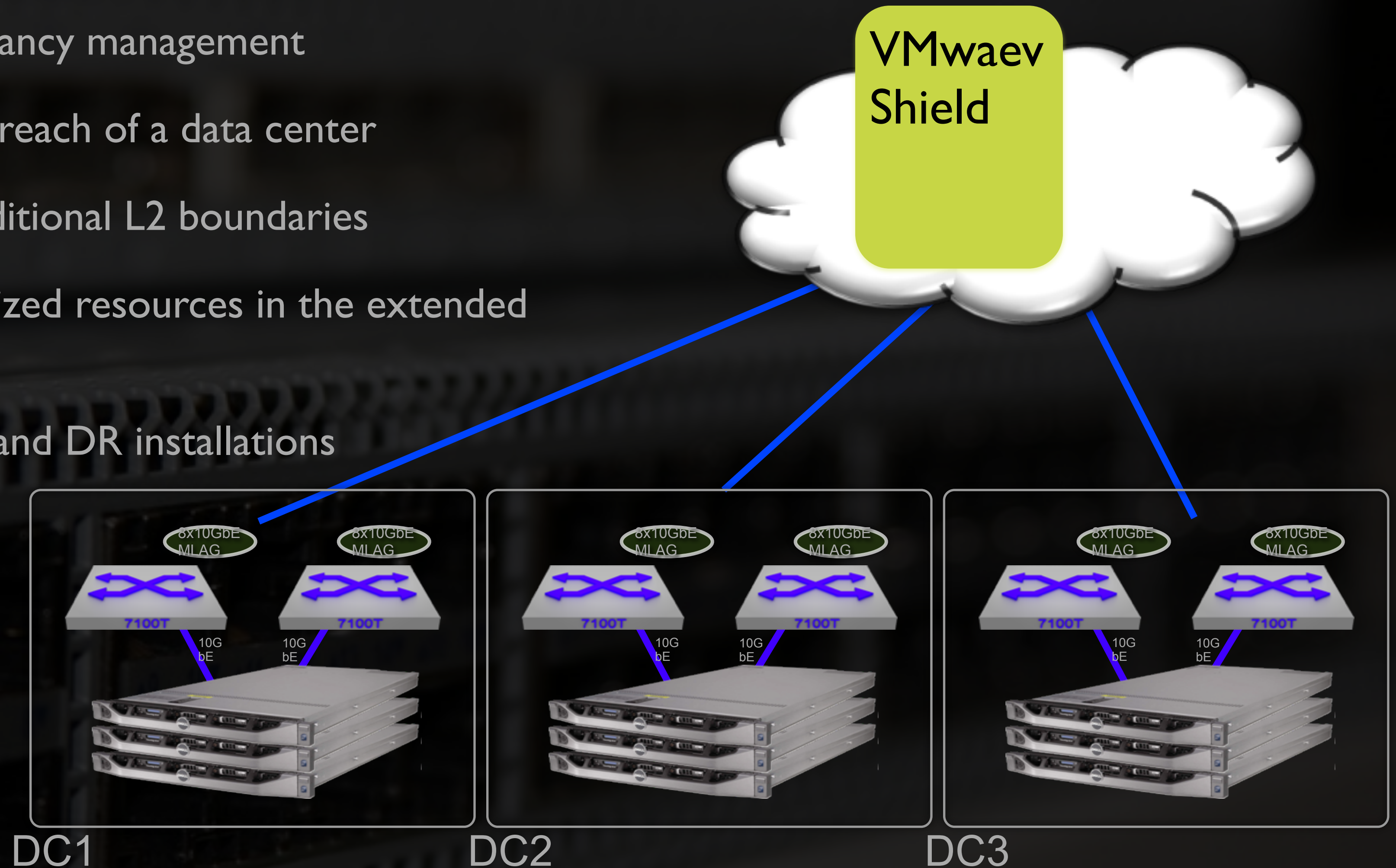
CloudVision – Truly Scalable Management
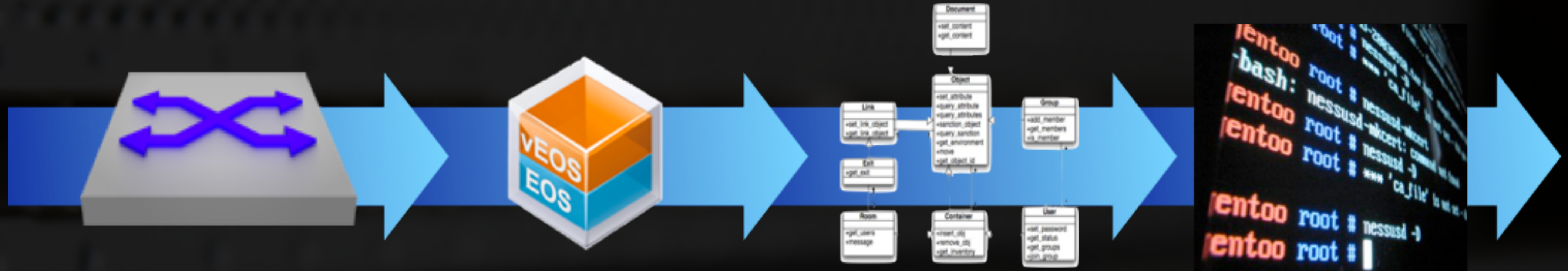
Single Device	EOS Emulator	Global Port Profiles	CloudVision
	• Validate complex configuration requirements before deploying to the network	• Object model for hierarchical configuration management in very large scale networks	• Single CLI/API for configuration, troubleshooting and automation across the infrastructure

Advanced Event Manager (AEM)

Event Management – reduce data by:
- Monitoring - Customized notifications
- Simplifying operations
- Management - Automate reaction to pre-determined events with scheduled tasks via CLI and Linux tool sets
- Predictive fault management
- Forensics of 'what happened' by looking back in time to what data-plane tables were in the past

Event

Monitor

React

Actions

Events

Triggers

Collect

Query

Correlate

ARP

MAC

Route

Query

Op Ex savings
- Troubleshooting and MTTR on a problem significantly reduced through network forensics tools provided on switch – *improved MTTR and SLAs, saves hours/money on net eng/ops team*
- Proactive monitoring and analysis provides visibility into events/problems and proactive notification before they cause an impact – *improved reliability, SLAs, MTBF and cost savings*

Introducing EOS Central

EOS Development Community Portal

- Tips and tricks
- Source code samples
- Community projects
- Developer forums, blogs
- API Access and development
- 3rd Party Extensions

Sample Projects:

- XMPP Messaging bus
- Interface/VLAN provisioning
- Automatic interface naming
- KVM Virtual machines

ARISTA EOS CENTRAL

HOME   GETTING STARTED   TECH TIPS   DEV-BLOG   PROJECTS   WIKI   FORUM

ARISTA EOS — World's Most Advanced Network O/S

Tech Tips | **Dev-Blog**

05/03/11 - Enable NTP time synchronization
Enable your Arista switch to convey timekeeping information via Network Time Protocol (NTP).

04/29/11 - Using tcpdump for troubleshooting
Overview of how to make use of the Linux tcpdump utility for troubleshooting network issues from an Arista switch.

04/25/11 - Using Arista 7124SX for SPAN/Tap Aggregation
Deploying 7124SX as a low-latency tap aggregator enhances functionality, saves money.

04/21/11 - MLAG - Advanced Configuration
How to configure multi-tier MLAG

EOS Central Community

Continuous open-source development of the world's most advanced networking OS.

Extending the capabilities of a network OS via CLI, shell, native extension, and API is creating a vibrant ecosystem and community with many developers, architects, and technologists around the world.

Arista EOSCentral offers access to development tools, examples, and support to deliver real-world solutions that bridge the gap between what vendors build and what users want. We are actively sharing code samples, engaging in collaborative forums, and posting works in progress to get early insight into use cases.

Key Highlights of EOSCentral include:

Tech Tips: Authoritative discussions on network designs, implementations, and development models

**DevBlogs:** Open discussions of development techniques, tools,

Start Here!

A-Care Service Offerings

	A-Care Software	A-Care Basic	A-Care Next Business	A-Care 4 Hour
Unlimited 24x7 TAC access	✓	✓	✓	✓
Software Download	✓	✓	✓	✓
Online Case Management	✓	✓	✓	✓
Arista Community Forums	✓	✓	✓	✓
A-Tools Access	-	✓	✓	✓
RMA service level	-	*Return to Factory*	*Next Business Day*	***4 hours***

Standard Limited Hardware Warranty: 1 year return to factory
Standard Limited Software Warranty: 90 days

ARISTA WARRIOR
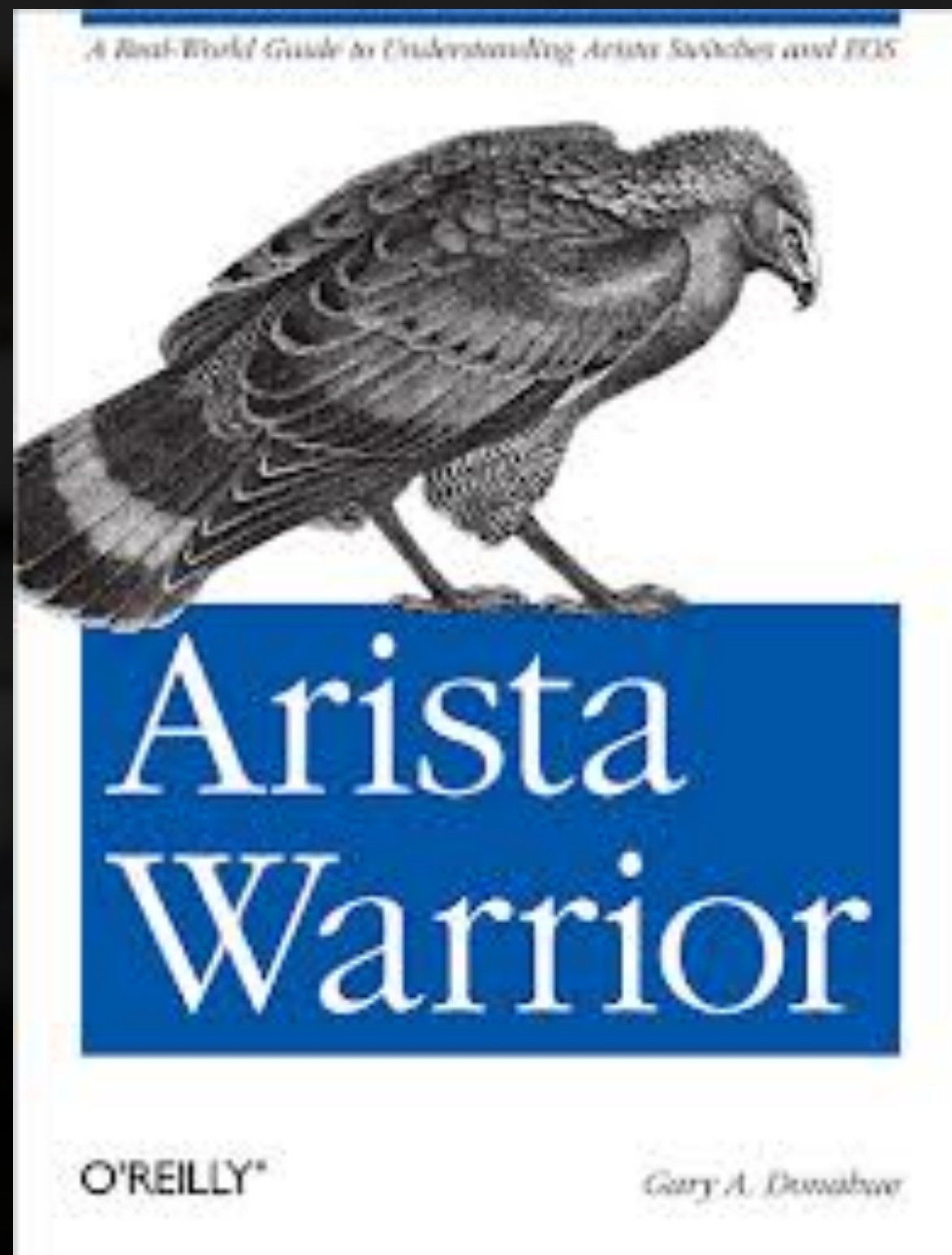
Gary A. Donahue (GAD) is a working consultant and writer who has been in the computer industry for almost 30 years. Gary has worked as a programmer, mainframe administrator, Technical Assistance Center engineer, network administrator, network designer, and consultant. Gary has worked as the Director of Network Infrastructure for a national consulting company and has been the president of his own New Jersey consulting company; GAD Technology, L.L.C.
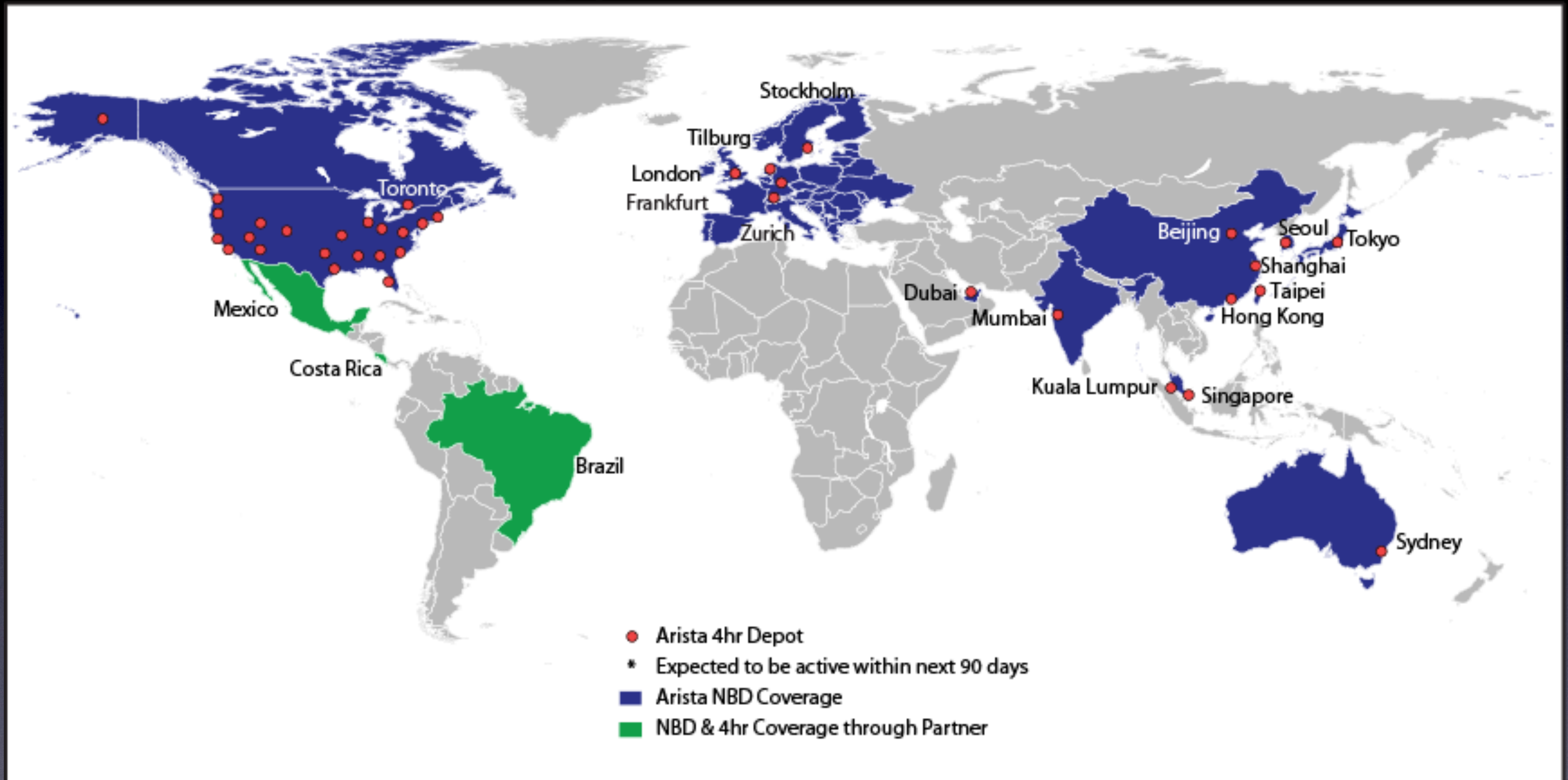
ARISTA

Thank You

Arista Support: Global Locations

- Arista 4hr Depot
- * Expected to be active within next 90 days
- Arista NBD Coverage
- NBD & 4hr Coverage through Partner

•38 4-hour RMA depots now active worldwide
•1000+ cities covered by Next Business Day support