

Aruba Data Center Networking: Automation and Security

*Network Automation and Security through Aruba's
Software-Defined Orchestration*

"Alexa, create VLAN 100"



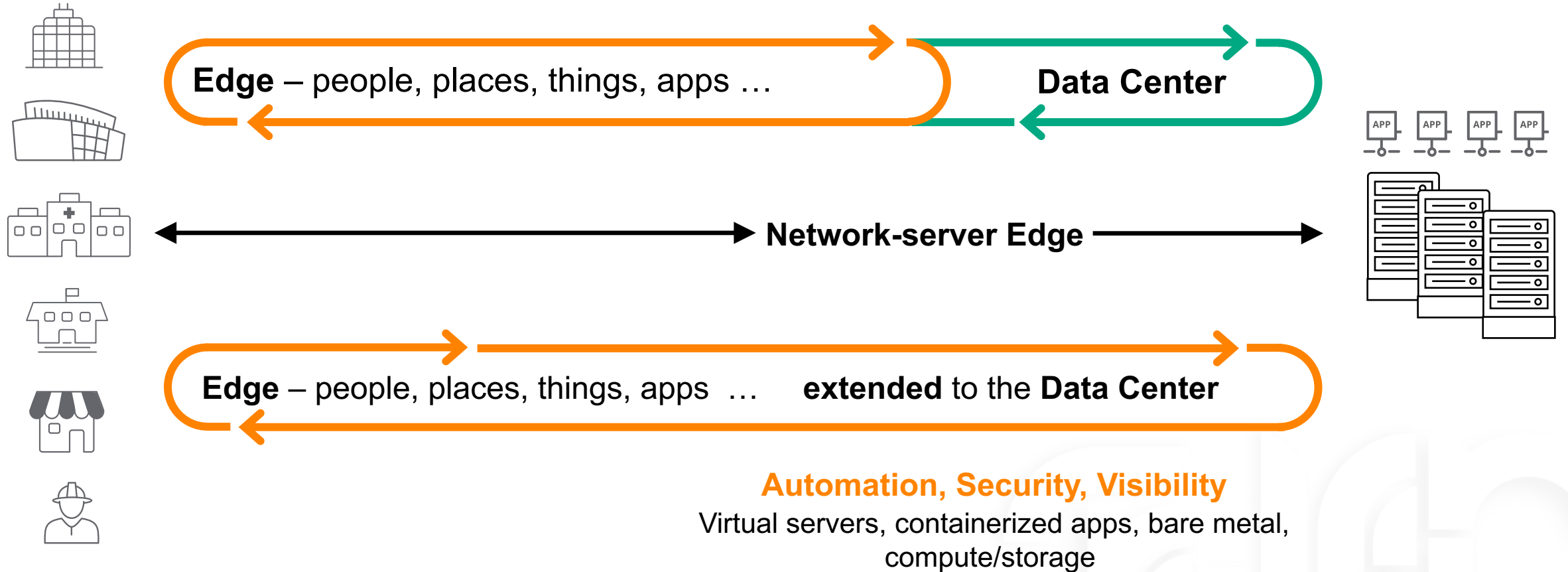
Create VLAN 100

Agenda

- 1 Aruba's Strategy and Investment in the DC
- 2 Software Defined Automation
- 3 Software Defined Distributed Security

Extending the Network Edge to the Data Center Edge

55 billion devices
will be connected by 2025¹



Aruba's Investment, Commitment, and Value in the DC Space

– Delivering value in modern DC networking solutions

AOS-CX

Cloud native switching architecture



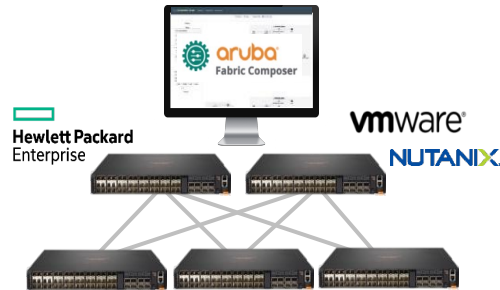
Common operational model from
Edge access to data center

Broad Switching Portfolio

- Optimized form-factors
- Consistent OS train
- Micro Services-based operating system
- Flexible automation options
- No licensing

Aruba Fabric Composer (AFC)

Software-defined fabric automation & orchestration



Simplify and speed IT
provisioning to accelerate application
& service delivery

Software-Defined Automation

- Simplifies fabric deployments
- Integration modules for 3rd party systems that provide an automated cloud-like experience.
- End-to-End physical & virtual network visibility

Distributed Services Switch

Integrated Pensando technology

Aruba CX 10000



CX-OS

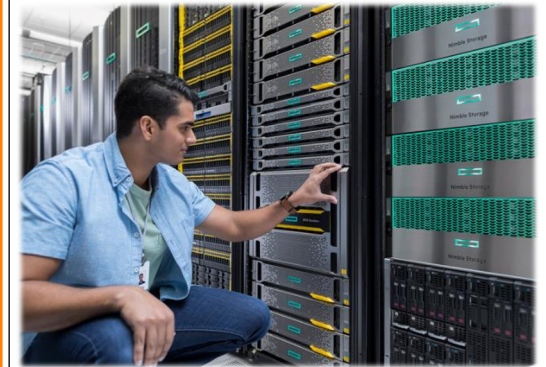


Software Defined, Distributed Security

- Network functions + 800G Stateful Firewall
 - Integrated Pensando DPU chips
- Granular visibility thru real-time telemetry
- Distributed Security where it's need most

Innovative full IT stack solutions

Pre-engineered integrations with HPE



Validated Full Stack Solutions

- **25+** Solution Guides validated by HPE Labs
- Friction free ordering, configuration and support
- Flexible consumption and delivery options
- **Certified for IP Storage Fabric deployments**

- Recently announced the CX9300



32-port 400G 1U switch

“100 times the scale at 10 times the performance of
our nearest competitor and at one-third the TCO.”
– John Chambers

Software Defined DC Network Automation



aruba®

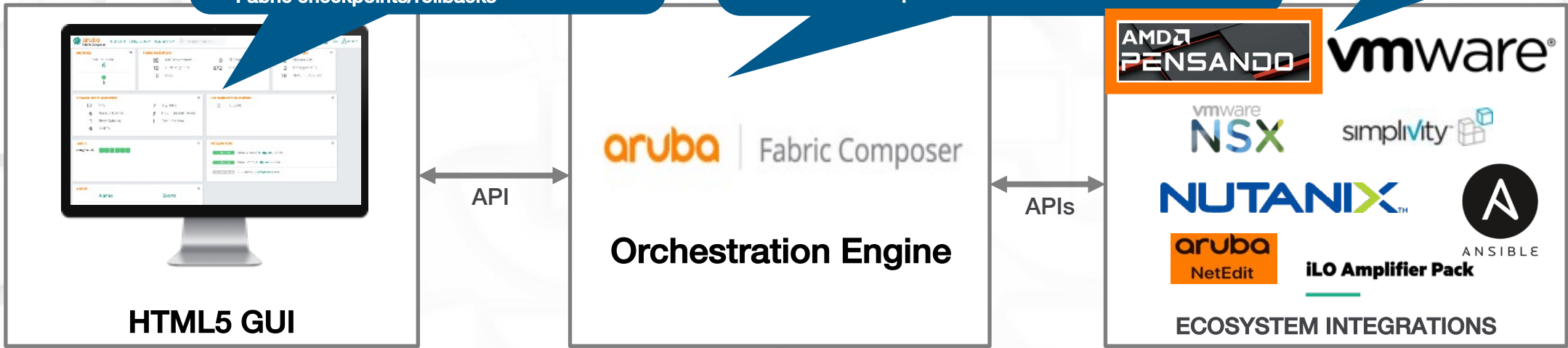
Fabric Composer

EVENT-DRIVEN, SOFTWARE-DEFINED AUTOMATION ... PROVIDING a CLOUD-LIKE EXPERIENCE for your Network, Apps, & Security

- System Interface**
- Day-to-day Network & Security configurations, and operations.
 - Fabric-wide visibility and troubleshooting
 - Fabric checkpoints/rollbacks

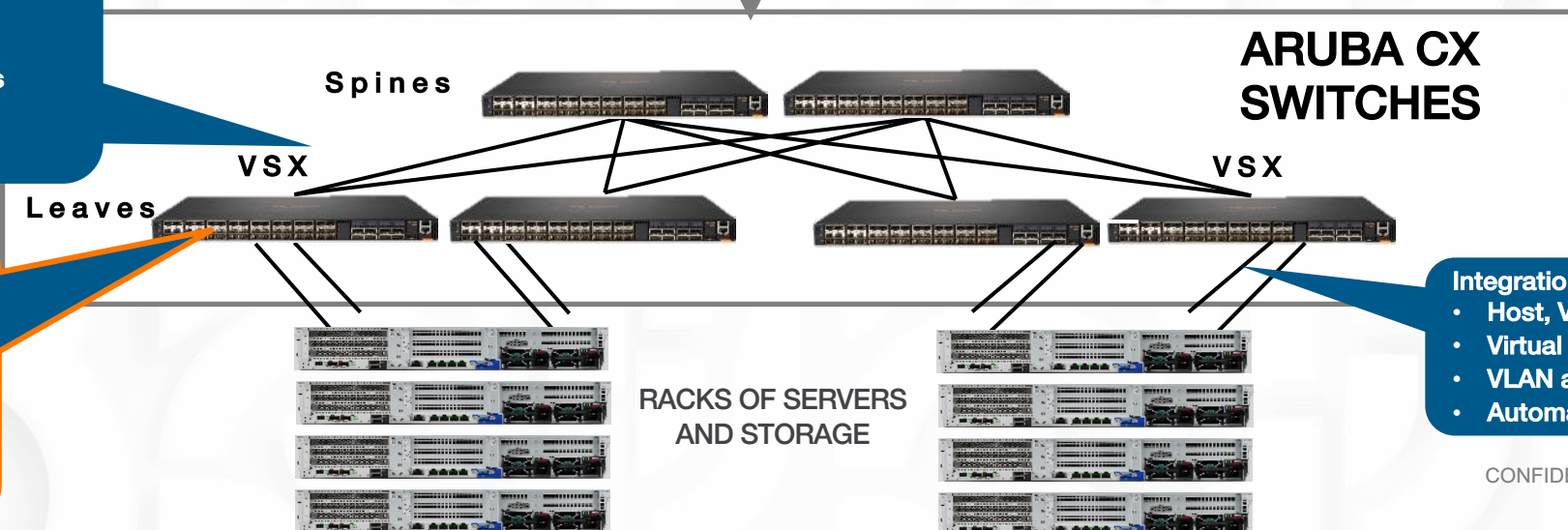
- Management and Orchestration engine
- Light weight VM (single or HA cluster)
- Manages fabric as a single entity.
- Single API integration point for Fabric automation.
- Not in the data plane

- Integration Packs for easy integration into 3rd party solutions.



- Automated Fabric deployment**
- Simply connect and discover
 - Built-in deployment workflows
 - Supports L2 and L3 architectures
 - Underlay/Overlay configurations
 - VSX deployment workflow

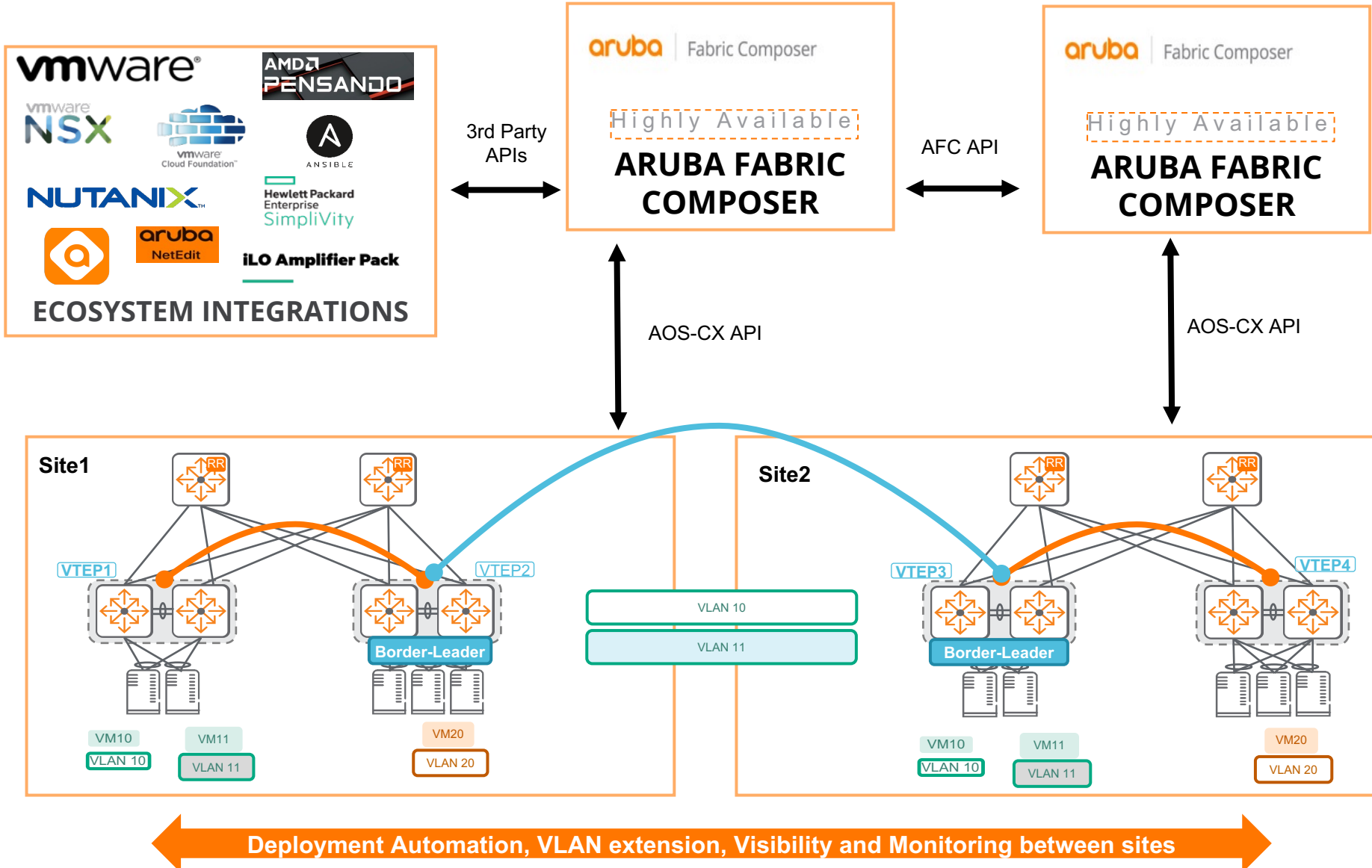
- Aruba CX10K (Pensando)**
- Distributed Security Services
 - 800G stateful FW, Macro/Micro-Seg and Telemetry services.
 - AFC Network & Policy management



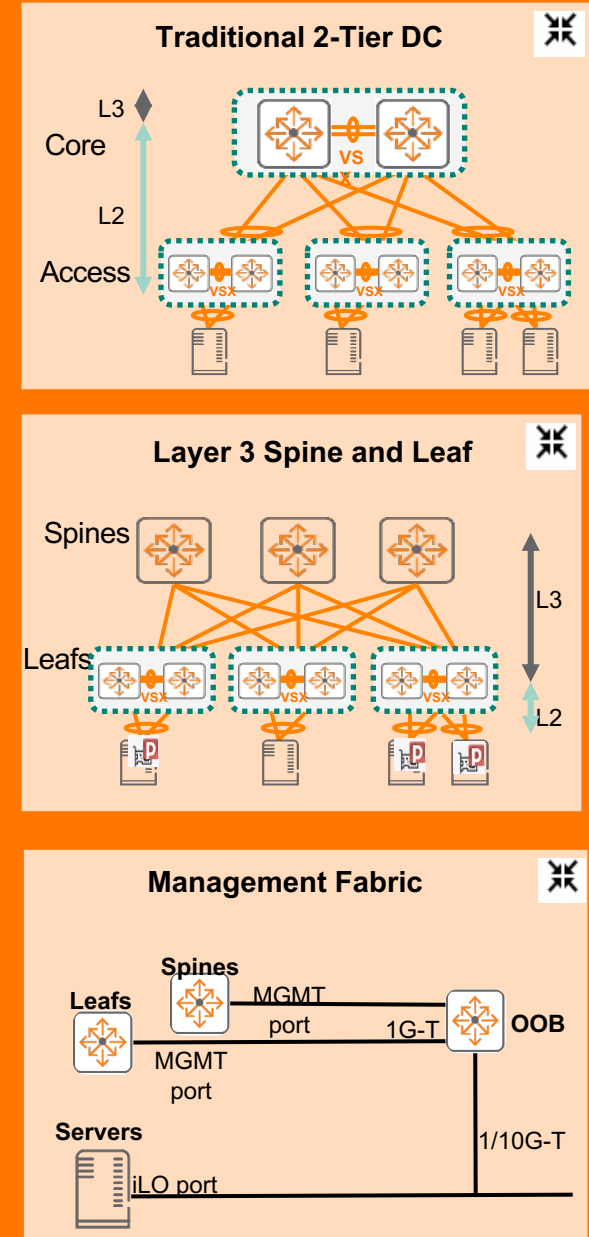
- Integration packs automate...**
- Host, VM, and topology discovery.
 - Virtual and Physical visibility.
 - VLAN automation for VM lifecycle.
 - Automatic vSAN traffic protection

Multi-Fabric/Multi-Site Support

Deployment workflows for easy automation



AFC Fabrics

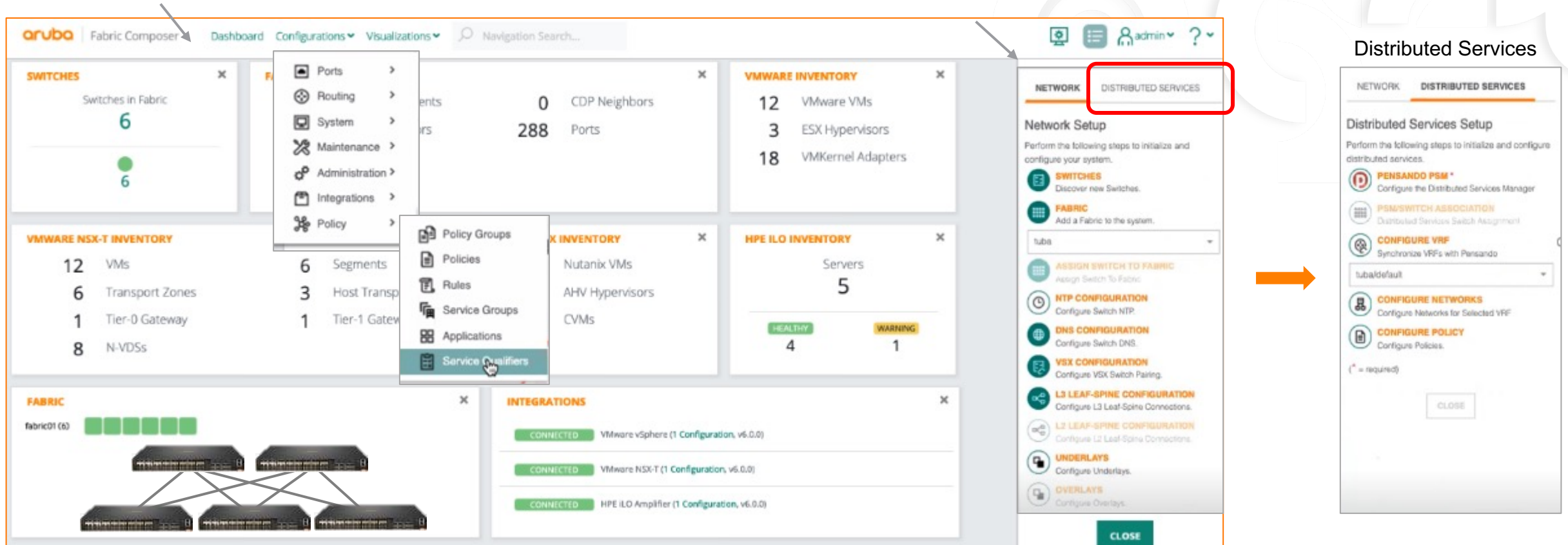


Dashboard View

Includes information about fabrics, switches, hosts, VMs, and Security

Workflow Automations and Guided Setup

Point and click GUI streamlines and automates away complexity



The screenshot displays the Aruba Fabric Composer Dashboard. The top navigation bar includes 'aruba Fabric Composer', 'Dashboard', 'Configurations', 'Visualizations', and a 'Navigation Search...' field. The main content area is divided into several sections:

- SWITCHES:** Shows 'Switches in Fabric' with a count of 6 and a green status indicator.
- VMWARE NSX-T INVENTORY:** Lists 12 VMs, 6 Transport Zones, 1 Tier-0 Gateway, and 8 N-VDSs.
- FABRIC:** Shows 'Fabric01 (6)' with a green status indicator and a network topology diagram.
- INTEGRATIONS:** Lists connected components: VMware vSphere (1 Configuration, v6.0.0), VMware NSX-T (1 Configuration, v6.0.0), and HPE iLO Amplifier (1 Configuration, v6.0.0).
- VMWARE INVENTORY:** Lists 12 VMware VMs, 3 ESX Hypervisors, and 18 VMKernel Adapters.
- HPE ILO INVENTORY:** Shows 5 Servers with 4 'HEALTHY' and 1 'WARNING' status.
- Navigation Menu:** A dropdown menu is open, showing options like Ports, Routing, System, Maintenance, Administration, Integrations, Policy, Policy Groups, Policies, Rules, Service Groups, Applications, and Service Qualifiers.
- Workflow Automations and Guided Setup:** A panel on the right shows a 'DISTRIBUTED SERVICES' tab with a list of setup steps: SWITCHES, FABRIC, ASSIGN SWITCH TO FABRIC, NTP CONFIGURATION, DNS CONFIGURATION, VSX CONFIGURATION, L3 LEAF-SPINE CONFIGURATION, L2 LEAF-SPINE CONFIGURATION, UNDERLAYS, and OVERLAYS.

Network and Switch Visualization

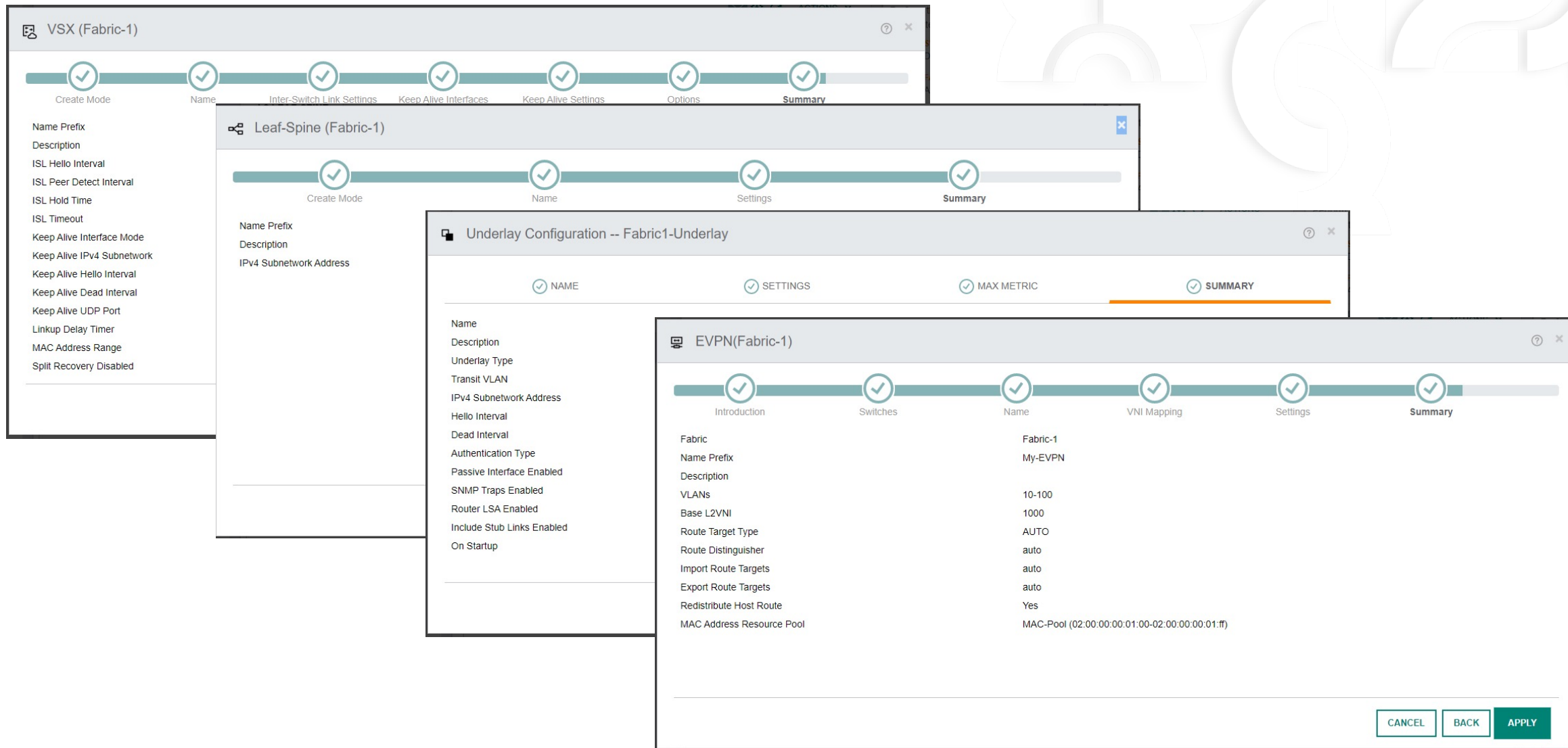
Hosts, MAC, Neighbors, Switch inventory, health status

API level integrations with various environments

Including HPE, Aruba, VMware vSphere, ESX, NSX and Nutanix

Fabric Workflows for Easy Intent-based Deployments

Automate thousands of CLI commands, deploy in minutes, using best-practices, and error free.
Not ZTP... No config templates, no merging of variables, no copy/past, no spreadsheets...



The screenshot displays the Aruba Fabric Composer interface with four overlapping workflow windows, each showing a progress bar with checkmarks indicating completed steps.

- VSX (Fabric-1)**: Progress bar shows 8 steps completed (Create Mode, Name, Inter-Switch Link Settings, Keep Alive Interfaces, Keep Alive Settings, Options, Summary).
- Leaf-Spine (Fabric-1)**: Progress bar shows 4 steps completed (Create Mode, Name, Settings, Summary).
- Underlay Configuration -- Fabric1-Underlay**: Progress bar shows 4 steps completed (NAME, SETTINGS, MAX METRIC, SUMMARY).
- EVPN(Fabric-1)**: Progress bar shows 6 steps completed (Introduction, Switches, Name, VNI Mapping, Settings, Summary).

The EVPN(Fabric-1) window displays the following configuration details:

Field	Value
Fabric	Fabric-1
Name Prefix	My-EVPN
Description	
VLANs	10-100
Base L2VNI	1000
Route Target Type	AUTO
Route Distinguisher	auto
Import Route Targets	auto
Export Route Targets	auto
Redistribute Host Route	Yes
MAC Address Resource Pool	MAC-Pool (02:00:00:00:01:00-02:00:00:00:01:ff)

At the bottom right of the EVPN window, there are three buttons: CANCEL, BACK, and APPLY.

Automating the hand-over-hand troubleshooting process.

- View the fabric as one system
- Similar look and feel to the CLI
- Regex filters to quickly identify data of interest
- Organize data output by header fields in an easy to consume manner
- User can stay in AFC to monitor/troubleshoot commonly used IP commands

IP INTERFACES

IP STATIC ROUTES

UNDERLAYS

OVERLAYS

ARP TABLES

IP ROUTE TABLES

Switch	Route Type	Prefix	Next Hop Address	Protocol
Enter Switch...	Select Route Type...	1.1.1.10	Enter Regex for Next Hop Adc	Select Protocol...
cedar-sw-01	Forward	1.1.1.10/32	2.2.2.2 via 1/1/49 2.2.2.10 via 1/1/50	OSPF
cedar-sw-02	Forward	1.1.1.10/32	2.2.2.12 via 1/1/50 2.2.2.4 via 1/1/49	OSPF

```
cedar-sw-01# show ip route
Displaying ipv4 routes selected for forwarding
'[x/y]' denotes [distance/metric]
1.1.1.6/32, vrf default
    via 2.2.2.2, [110/1], ospf
1.1.1.7/32, vrf default
    via 2.2.2.2, [110/2], ospf
    via 2.2.2.10, [110/2], ospf
1.1.1.8/32, vrf default
    via 2.2.2.10, [110/1], ospf
1.1.1.9/32, vrf default
    via 2.2.2.2, [110/2], ospf
    via 2.2.2.10, [110/2], ospf
```

Easy to Configure Automation Integrations

We've done all the development work, so you don't have to.

API level Integrations with Various Environments

- Environment awareness and auto-discovery
- Event based automation
- Workload traffic optimization
- Unprecedented visualization and improved troubleshooting

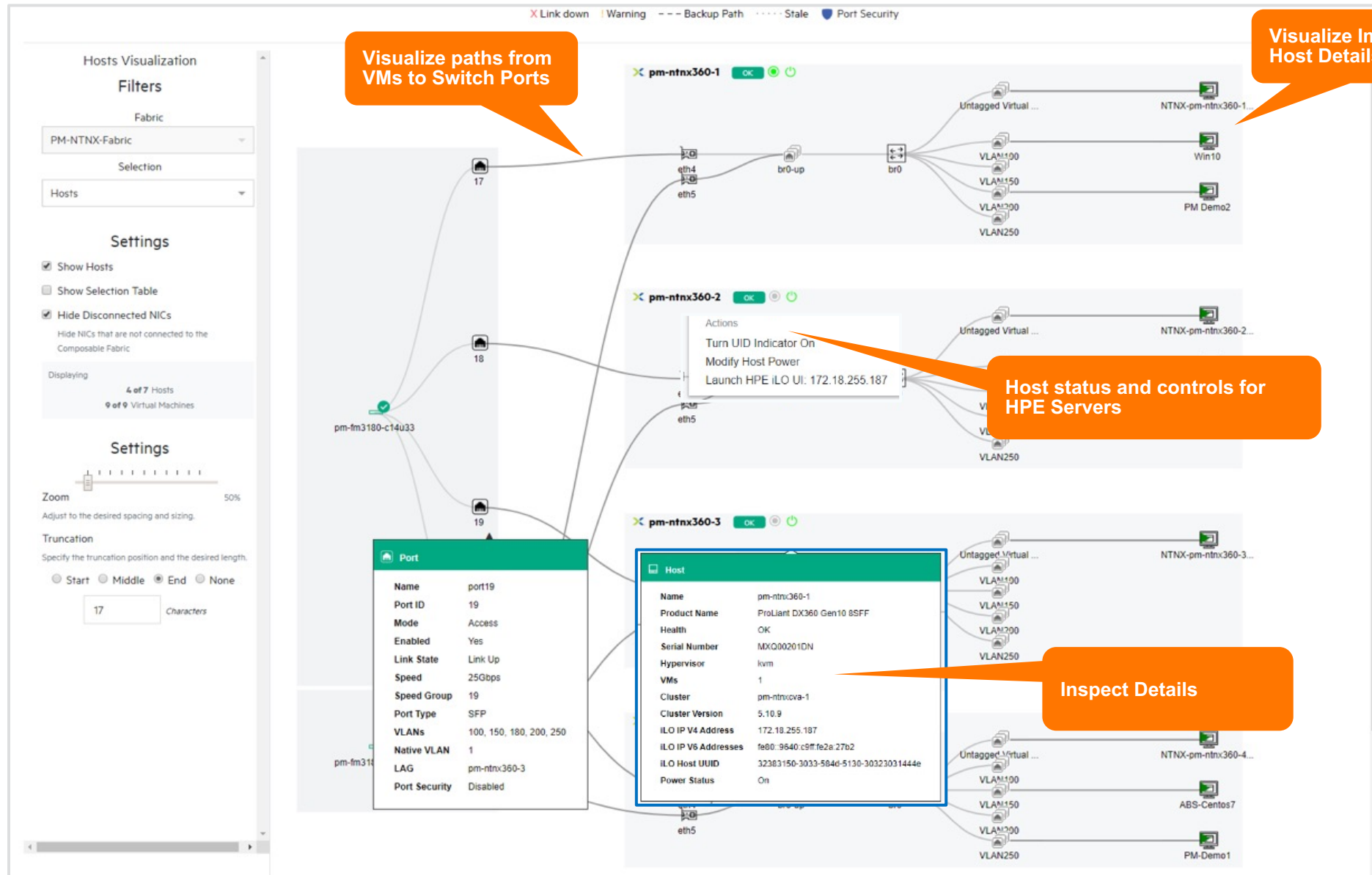


Aruba Fabric Composer Dashboard Configurations Visualizations Navigation Search...

Aruba NetEdit HPE iLO Amplifier Nutanix Prism VMware NSX-T VMware vSphere

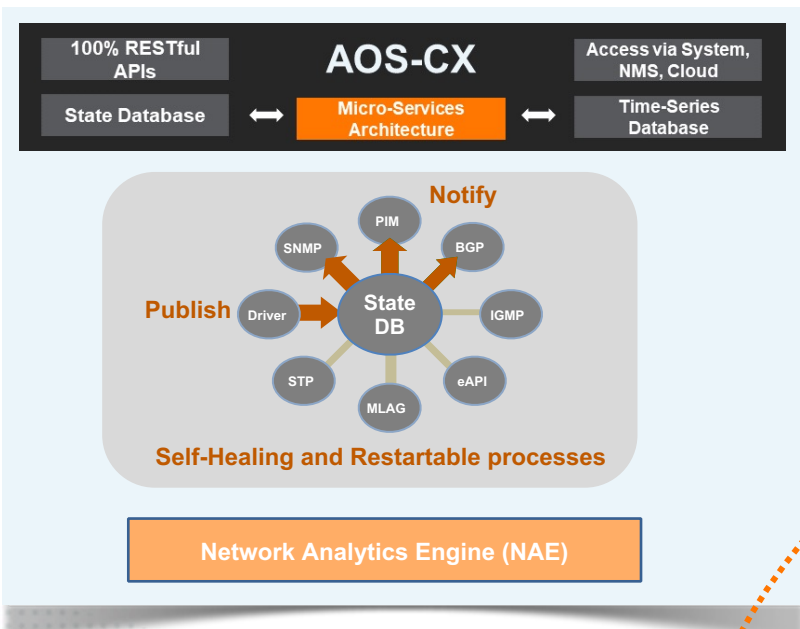
Configuration / Integrations / VMware vSphere

	STATUS	HOST	USERNAME	ENABLED	PROVISIONING	AUTOMATED OPTIMIZATION OF VSAN
	SELECT STATUS...	Enter Regex for Host...	Enter Regex for Username...	SELECT ENABLED...	Enter Regex for Provisioning...	SELECT AUTOMATED OPTIMI...
<input type="radio"/>	CONNECTED	se-vcsa7-2.selab.plexxi.com	administrator@vsphere.local	Yes	VLAN (Direct Attach)	Yes



Aruba CX Portfolio: End-to-End Enterprise Switching

Access - Aggregation - Core - DC/Cloud



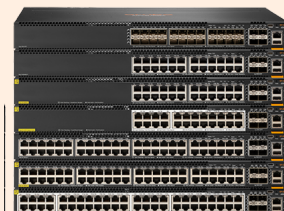
Common Operating Model
built on Cloud Native Principles



Aruba CX 6100
Aruba CX 6000



Aruba CX 6200



Aruba CX 6300

DC OOBM
CX6300M due to airflow options

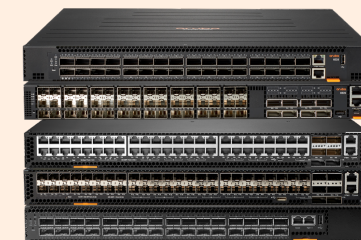


Aruba CX 6400

Supported in AFC



Aruba CX 10000



Aruba CX 8300



Aruba CX 8400

DC Spine/Leaf

- CX9300 32-port 400G 1U switch (Aug/Sept '22)

** CX8320 not supported due to lack of EVPN support

Ruggedized
Aruba CX 4100i



← Same OS code train from Campus Edge to DC, with no OS licensing →

Aruba CX10K

Software Defined Distributed Security



Aruba AOS-CX and 3.2Tbps, 48-Port 10/25G x 6 100G uplinks

Full Network functionality, plus 800G Firewall performance

A stateful firewall behind every switch port with built-in Telemetry streaming



Inside



FIREWALL



TELEMETRY



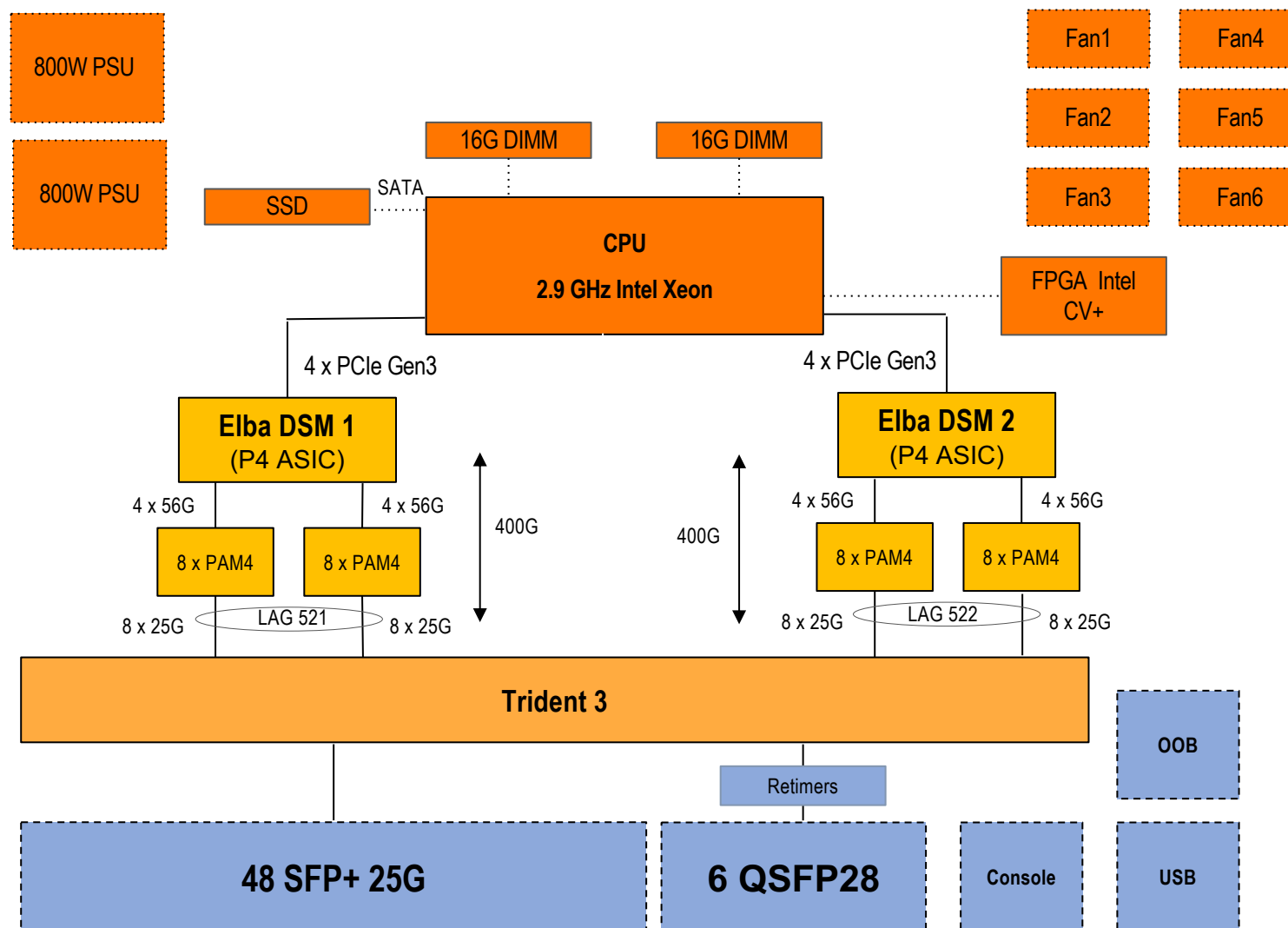
ENCRYPTION

Distributed Services Switch – CX10K

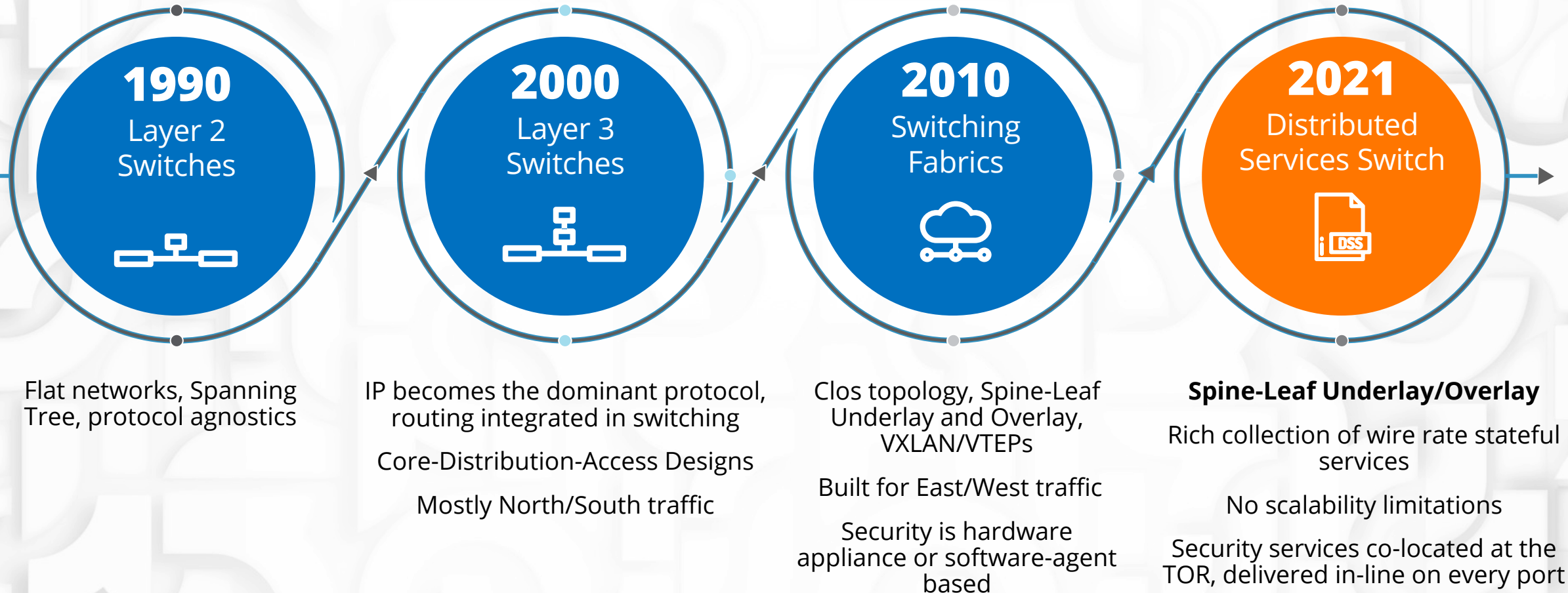


All forwarding is performed by TD3 ASIC, Elba only delivers stateful services.

- **Each Elba has 400G connection to TD3**
 - These are 4x100G links, part of internal LAG 521 and 522.
 - Hashing algorithm uses L3/L4 information to LB packets on internal links.
 - Internal links are not visible in regular CX-OS commands.
- **Elba shell access from x86 space is via internal PCIe interface, not the user-ports.**
 - Accessed with CX-OS shell or diag CLI



NETWORK ARCHITECTURE EVOLUTION

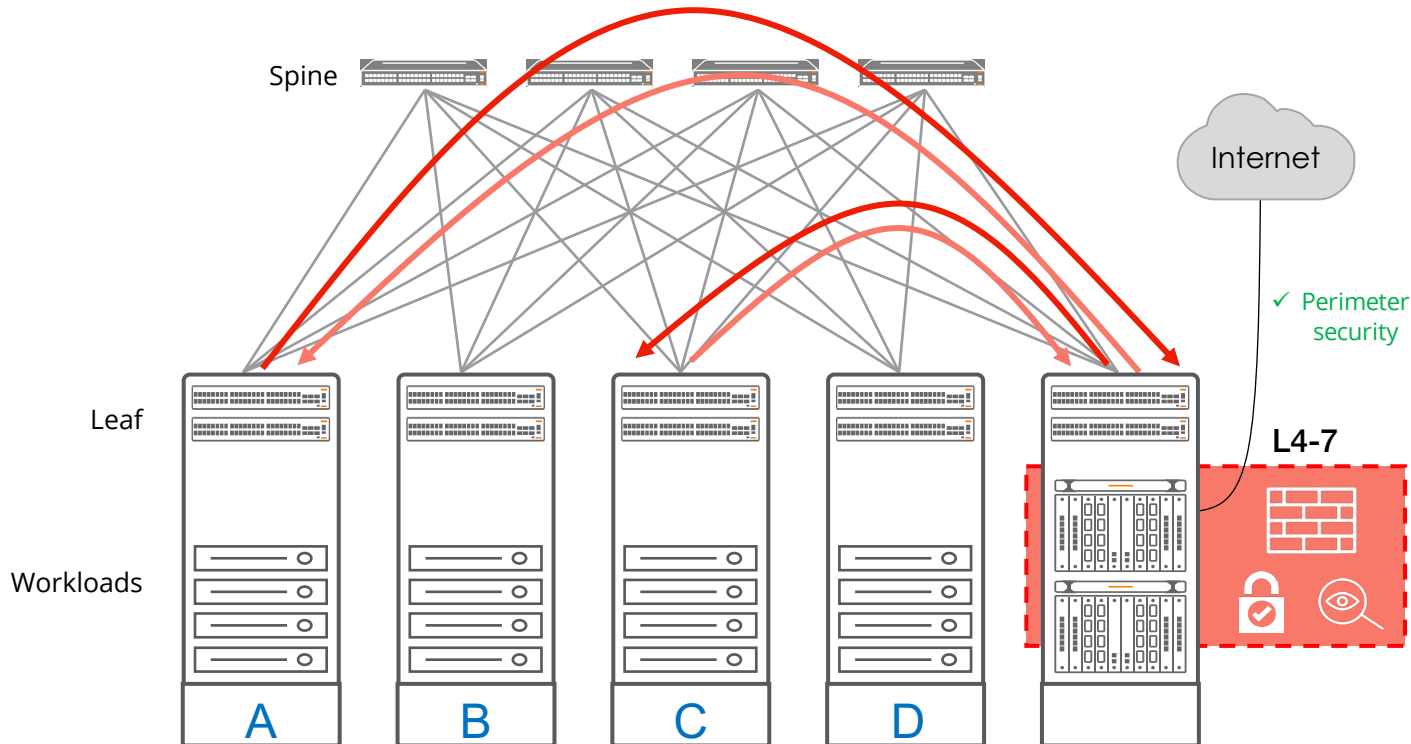


High Speed Data Center Fabric

Current approaches to securing high speed data center fabrics

Up to 80% of all DC traffic is East/West

CENTRALIZED SERVICES: Problem Statement



CENTRALIZED SERVICES ARCHITECTURE

Current approaches to securing E/W traffic:

Software (Agent / Hypervisor-Based)	Centralized Appliances
CISCO ACI illumio vmware NSX	paloalto FORTINET Check Point SOFTWARE TECHNOLOGIES LTD

Issues with Centralized Services Model:

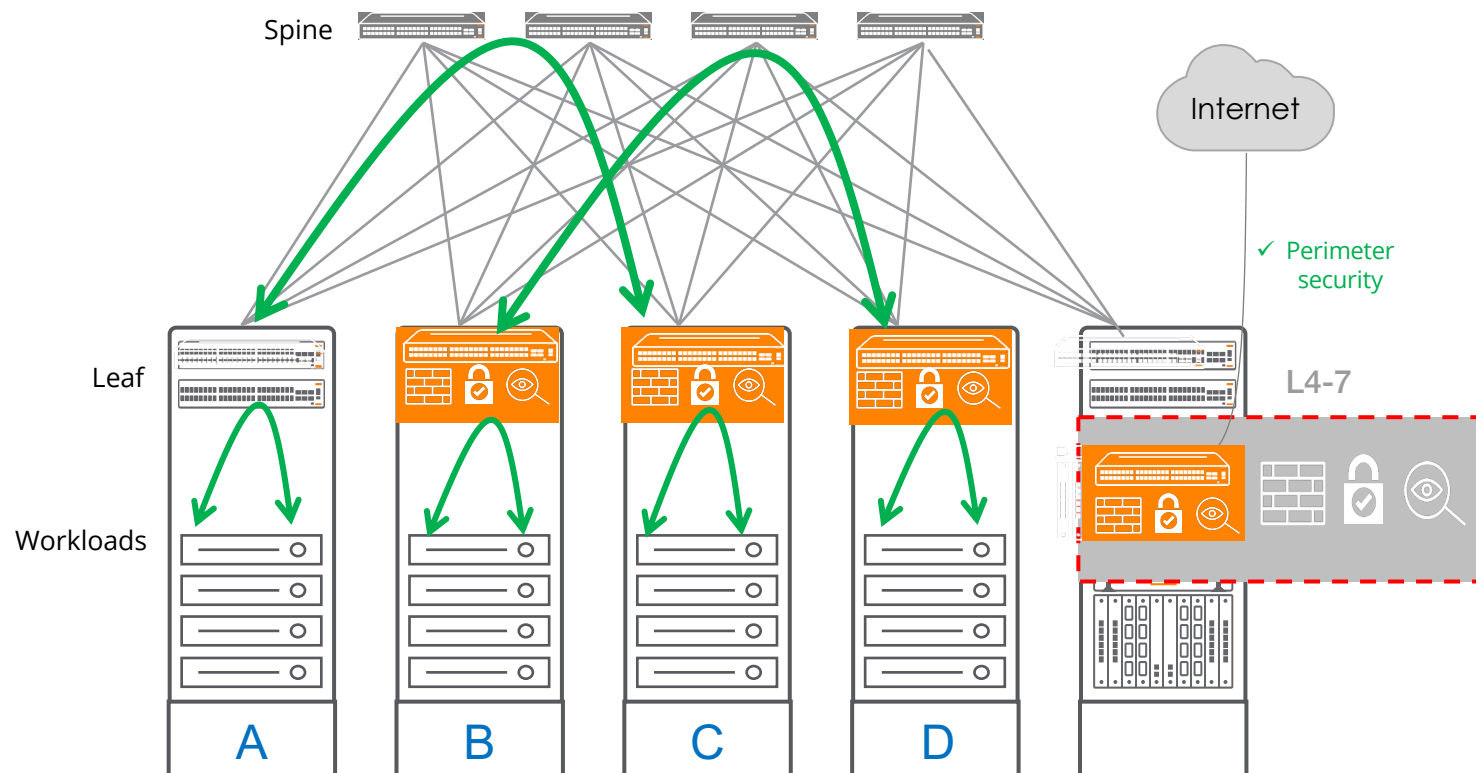
- Unable to scale to match volume/velocity E-W traffic
- Inefficient use of bandwidth
- Congestion & added latency
- Diminishes the value of the Spine/Leaf architecture
- Complexity increases with scale
- Difficult to design & troubleshoot
- Limited visibility
- Very expensive

Distributed Services Architecture

Software Defined Distributed Security

There's a better way:

Distributing intelligent services closer to your applications



DISTRIBUTED SERVICES ARCHITECTURE

Distributed Intelligence Advantage

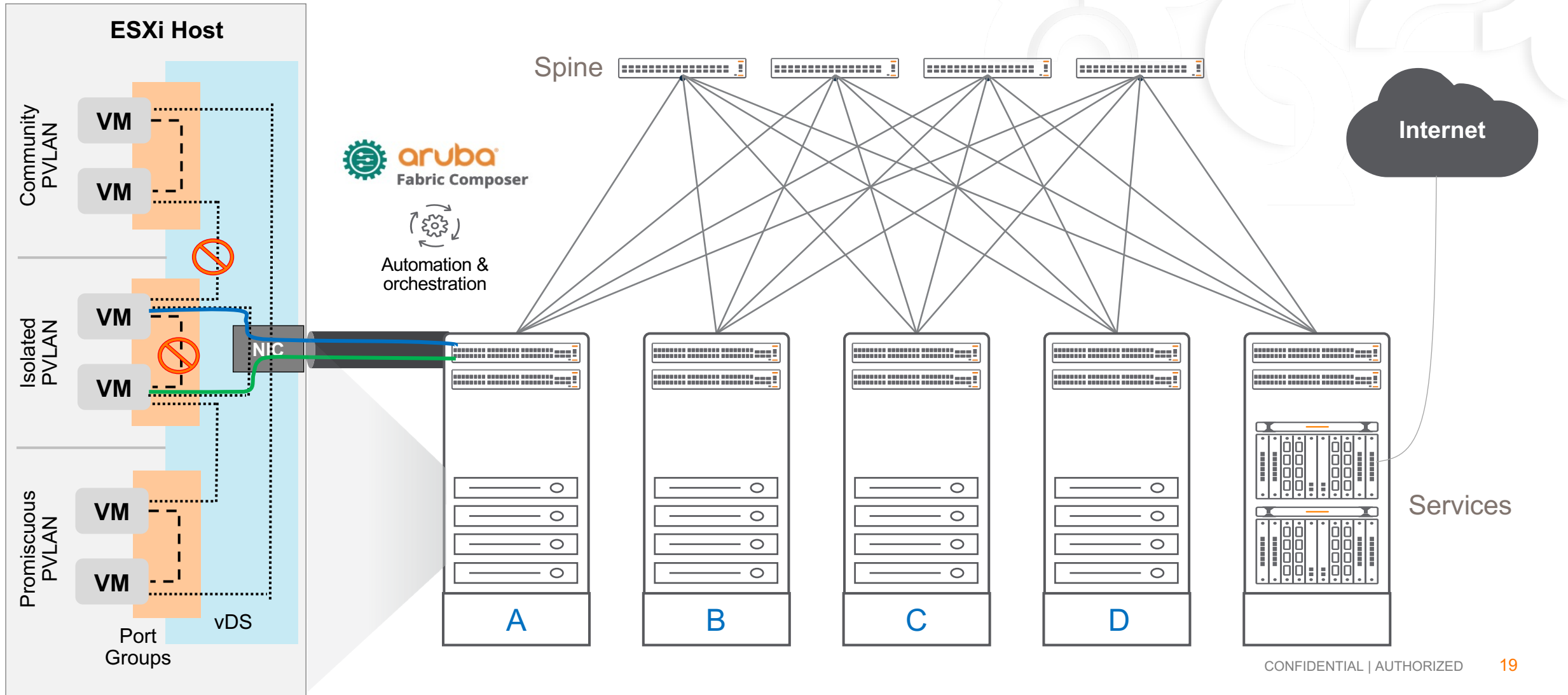
- Integrated 800G stateful F/W at every TOR
- Pervasive Security – Everywhere
- Both Macro & Micro Segmentation support
- Improved traffic flows & performance
- Reduced complexity
- Reduced costs
- Scale services as you add racks
- Centralized management via AFC
- Improved visibility w/integrated telemetry

Note: Perimeter Security solution stays in place

“100 times the scale at 10 times the performance of our nearest competitor and at one-third the TCO.”
– John Chambers

Distributed Services Architecture

Micro-Segmentation



Distributed Services Platform

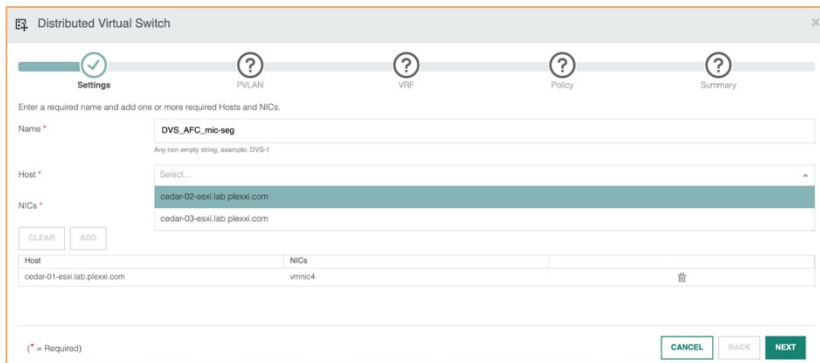
AFC Workflows for Micro-Segmentation and VM Tag-based Policies



Integration

AFC Micro-Segmentation Workflow

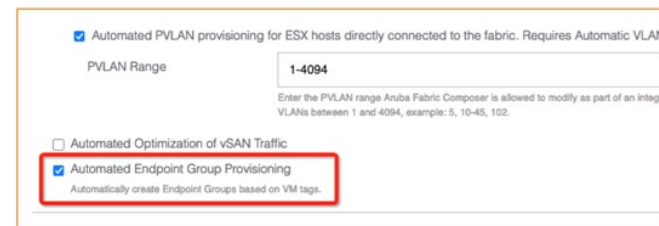
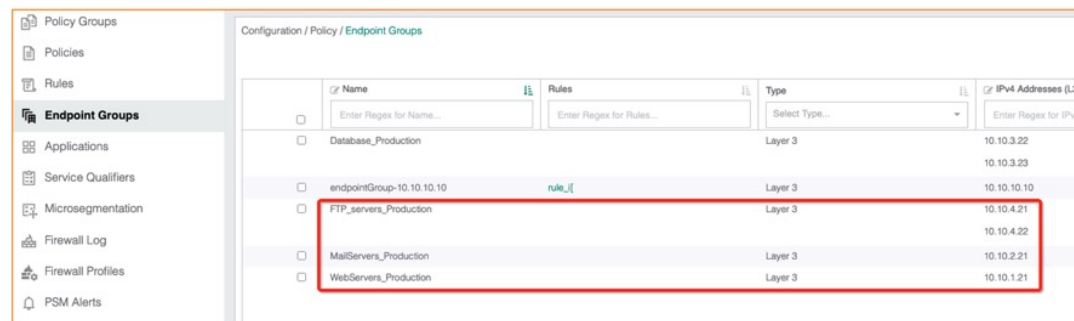
- Micro-segmentation workflow
- Combines steps to create fully functional micro-segmentation policy in a single 'super-wizard'
- 1. Create DvS – user can select multiple hosts/vnics in the single screen
- 2. Create PVLAN – Primary and Isolated PGs
- 3. Create Network and SVI – contains prepopulated fields
- 4. Create Policy and Rules



Footer content

AFC VM Tag-based Policy Workflow

- Dynamic VMware tagged based policies
- Automation enabled at the vSphere integration level
- AFC dynamically tracks vSphere TAG for newly added VMs
- Policy updated dynamically for the newly added VMs

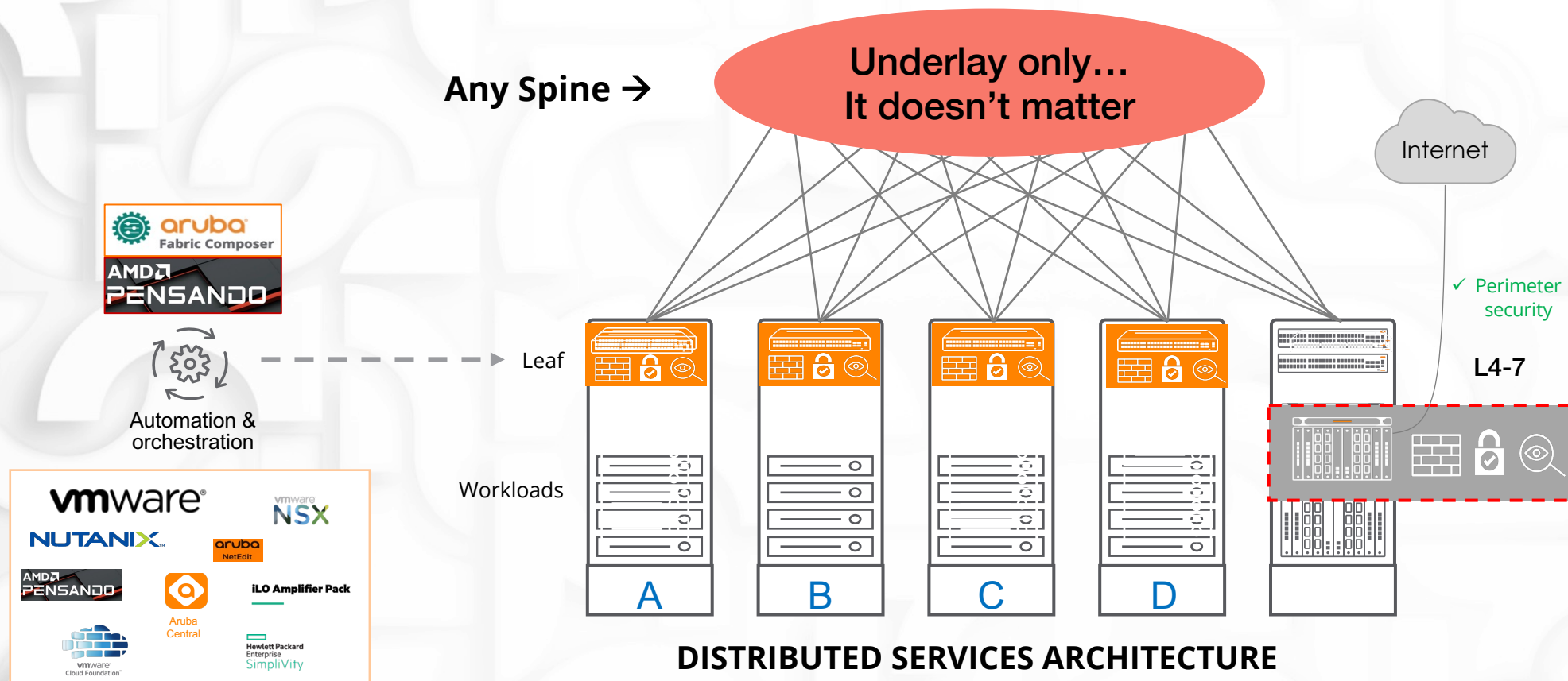
Name	Rules	Type	IPv4 Addresses (L3)
Database_Production		Layer 3	10.10.3.22 10.10.3.23
endpointGroup-10.10.10.10	rule_1	Layer 3	10.10.10.10
FTP_servers_Production		Layer 3	10.10.4.21 10.10.4.22
MailServers_Production		Layer 3	10.10.2.21
WebServers_Production		Layer 3	10.10.1.21



Distributed Services Switch

Can be used as a TOR solution only if preferred

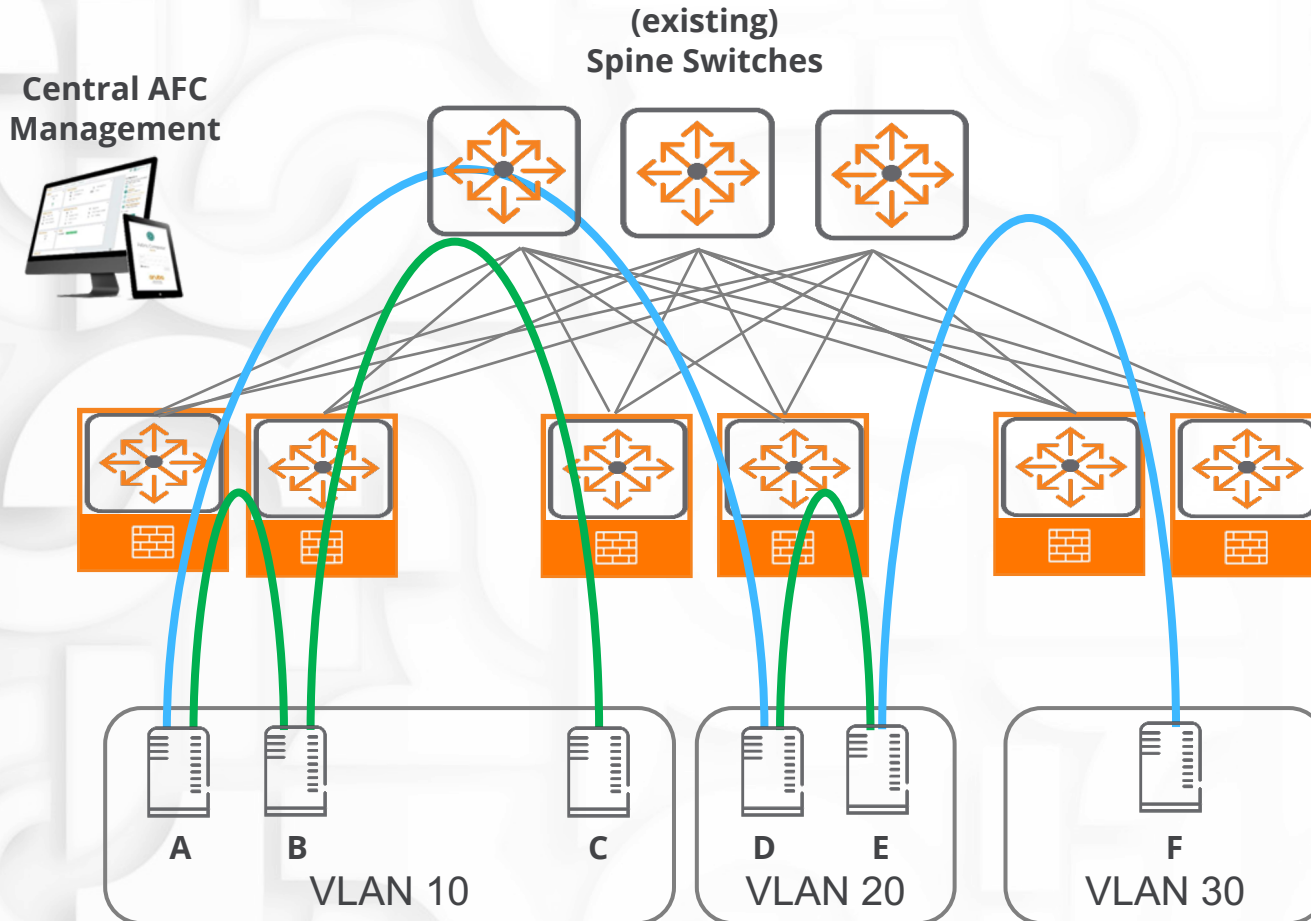
We prefer Aruba at the Spine, but it can be any vendor.



- Unlike other vendors, this is not a proprietary forklift proposition.
 - Deploy CX10K at every TOR, or as a TOR point solution.
 - Automation thru AFC Integration Packs are still supported

Distributed Services Platform

Software Defined Distributed Security – Deployment Flexibility



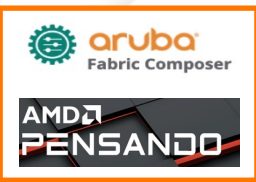
Deploy as standard TOR with no security policies

Enable Macro-Segmentation

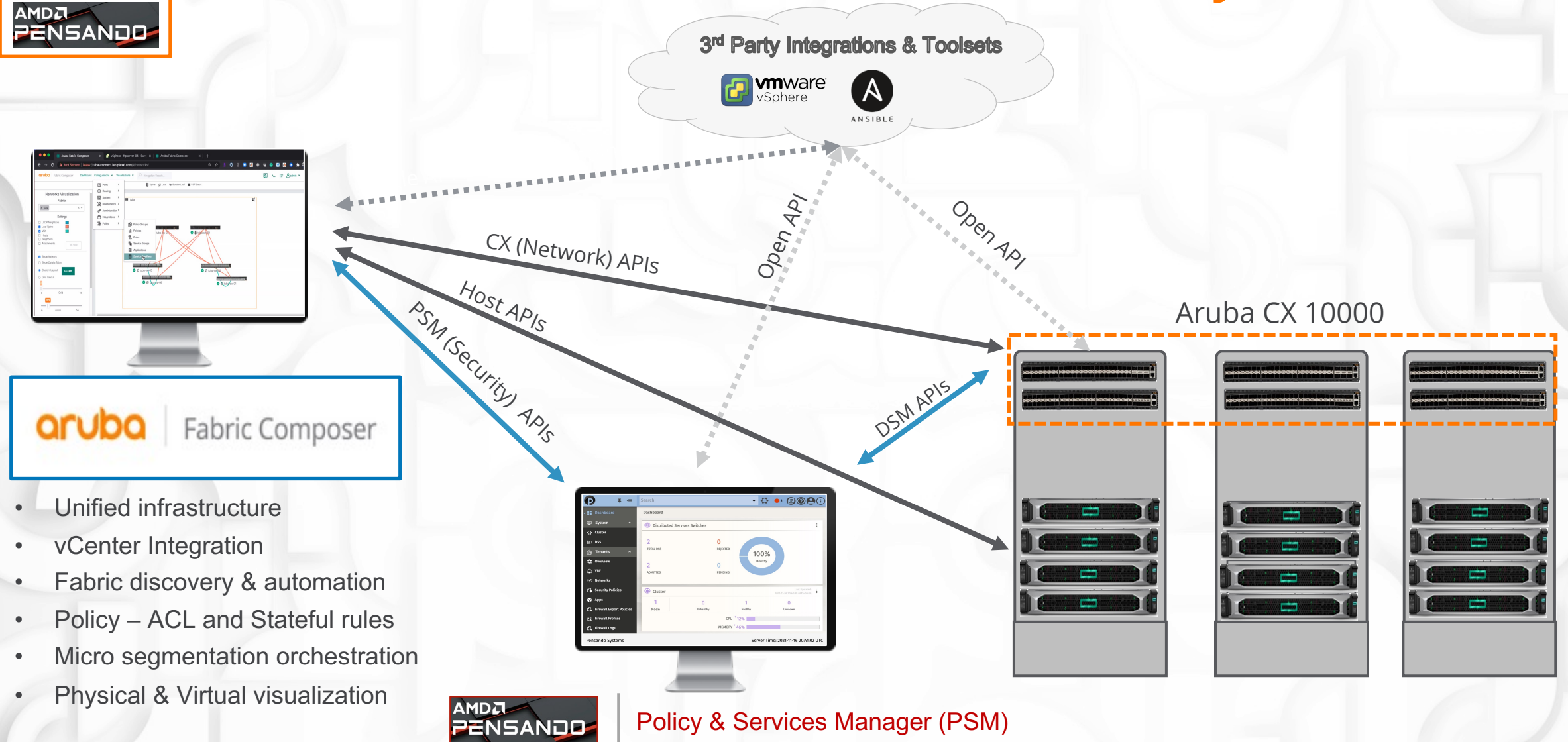
Need to ensure all servers requiring security are in different VLANs
Intra-VLAN traffic is never inspected

Enable Micro-Segmentation

Secure between any workloads
Can build on macro-segmentation policy



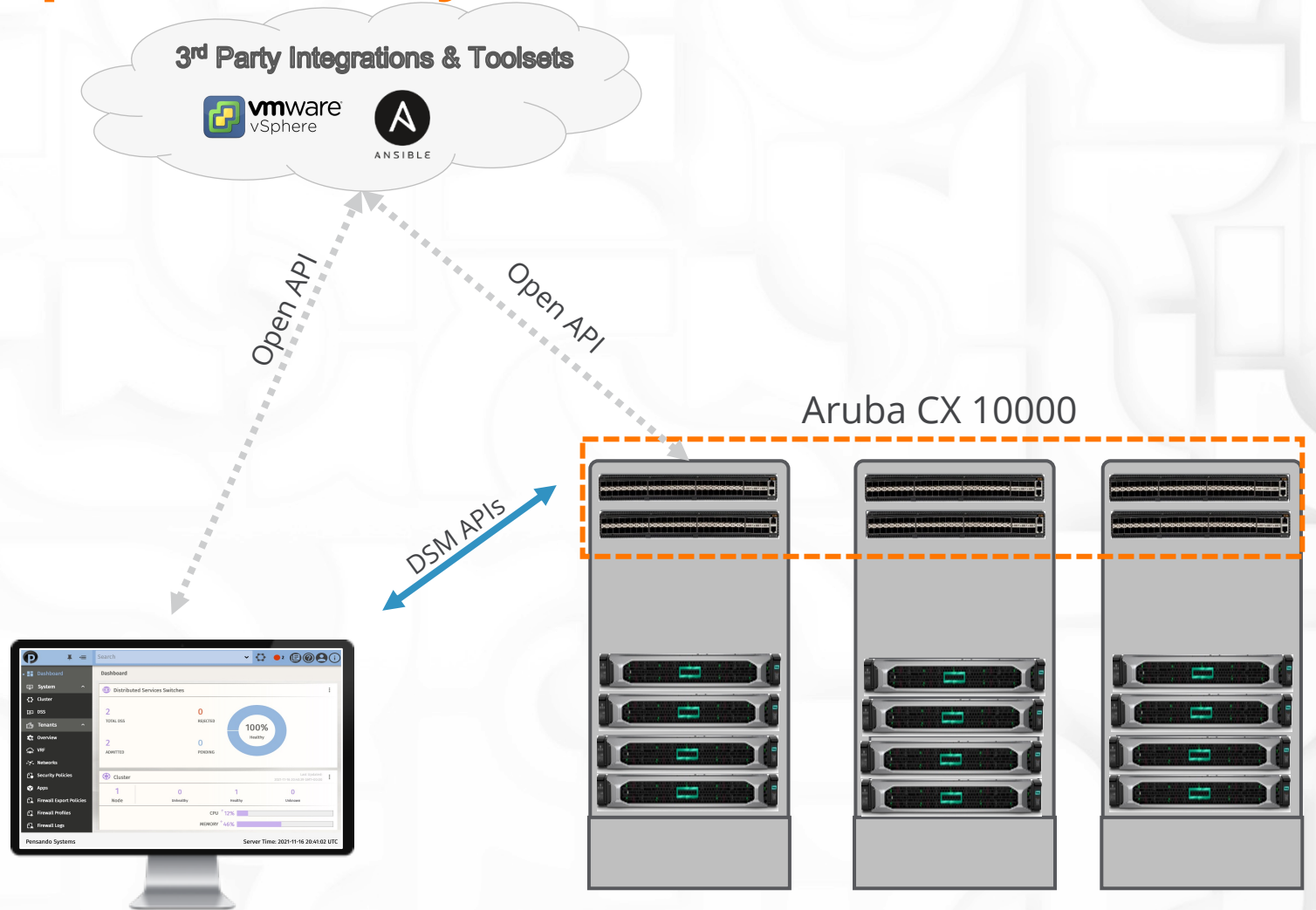
Unified API-Driven Automation & Security Architecture



- Unified infrastructure
- vCenter Integration
- Fabric discovery & automation
- Policy – ACL and Stateful rules
- Micro segmentation orchestration
- Physical & Virtual visualization

- Security policy deployment
- FW Logs and Telemetry
- Diagnostics

CX10K as a pure Security solution

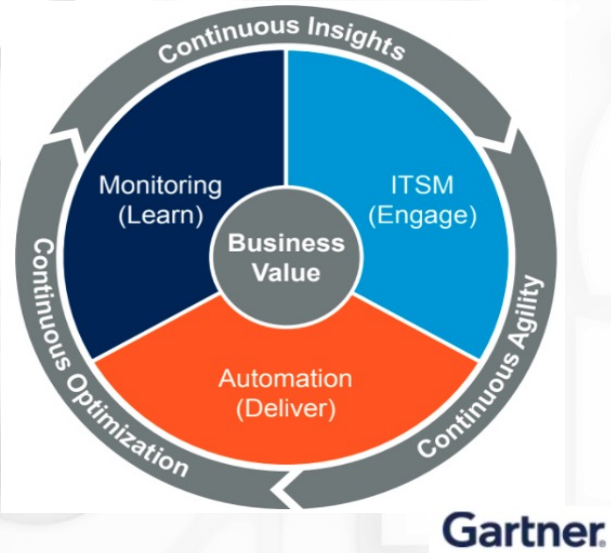


- Security policy deployment
- FW Logs and Telemetry
- Diagnostics

Network Automation begins with Rich Telemetry

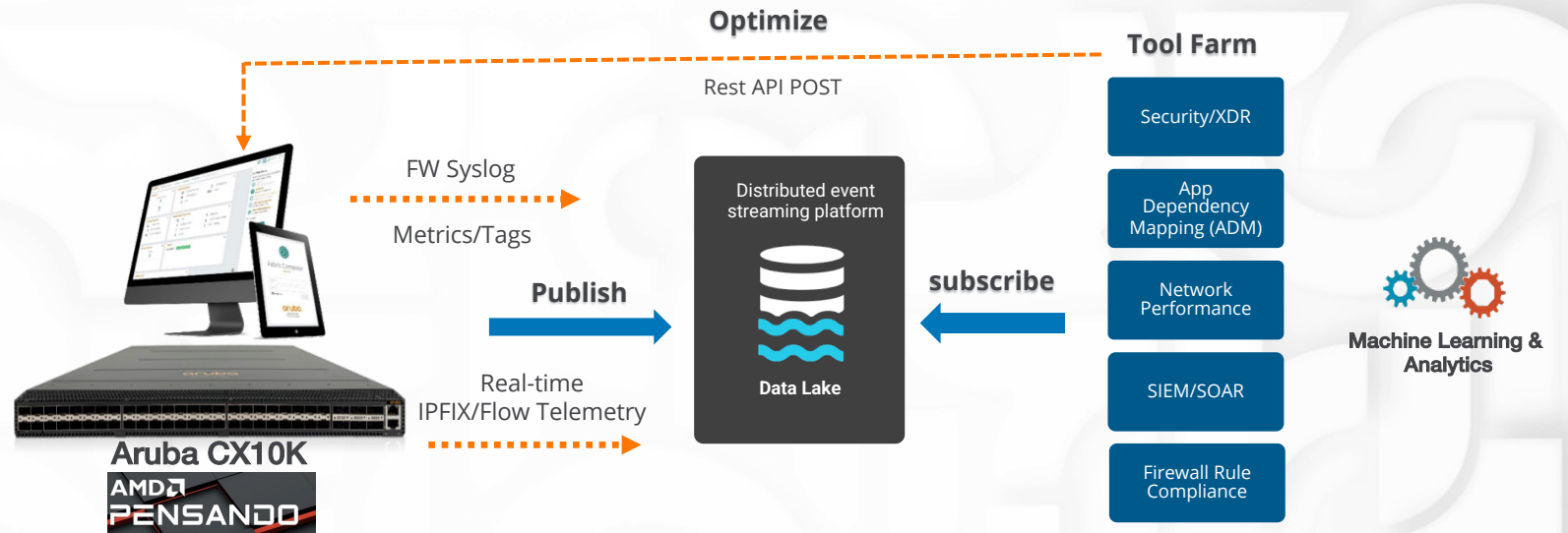


Automation Process for Business Value



“By 2025, 25% of enterprises will automate more than half of their network activities, an increase from less than 8% of enterprises from early 2022.”
– Gartner

1. Automation is king, and part of every Data Center discussion
2. Automation requires Machine Learning to determine what should be automated
3. Machine Learning requires telemetry data (lots of it)
4. Tools are only as good as the information provided to them



ARUBA FABRIC COMPOSER & CX10K for Automation & Security

PROVIDING HYPERSCALE EFFICIENCIES for the Enterprise

Deployment Automation for Aruba Data Center fabrics. Build DC fabrics in minutes with built-in workflows (super wizards).

Easy to install API Integration Packs enable automation, visualization, and monitoring of attached hypervisors, VMs, and Host networking environment.

Automate everyday networking tasks, including VLAN auto-provisioning for VM life-cycle. No tickets, no friction, rapid deployments.

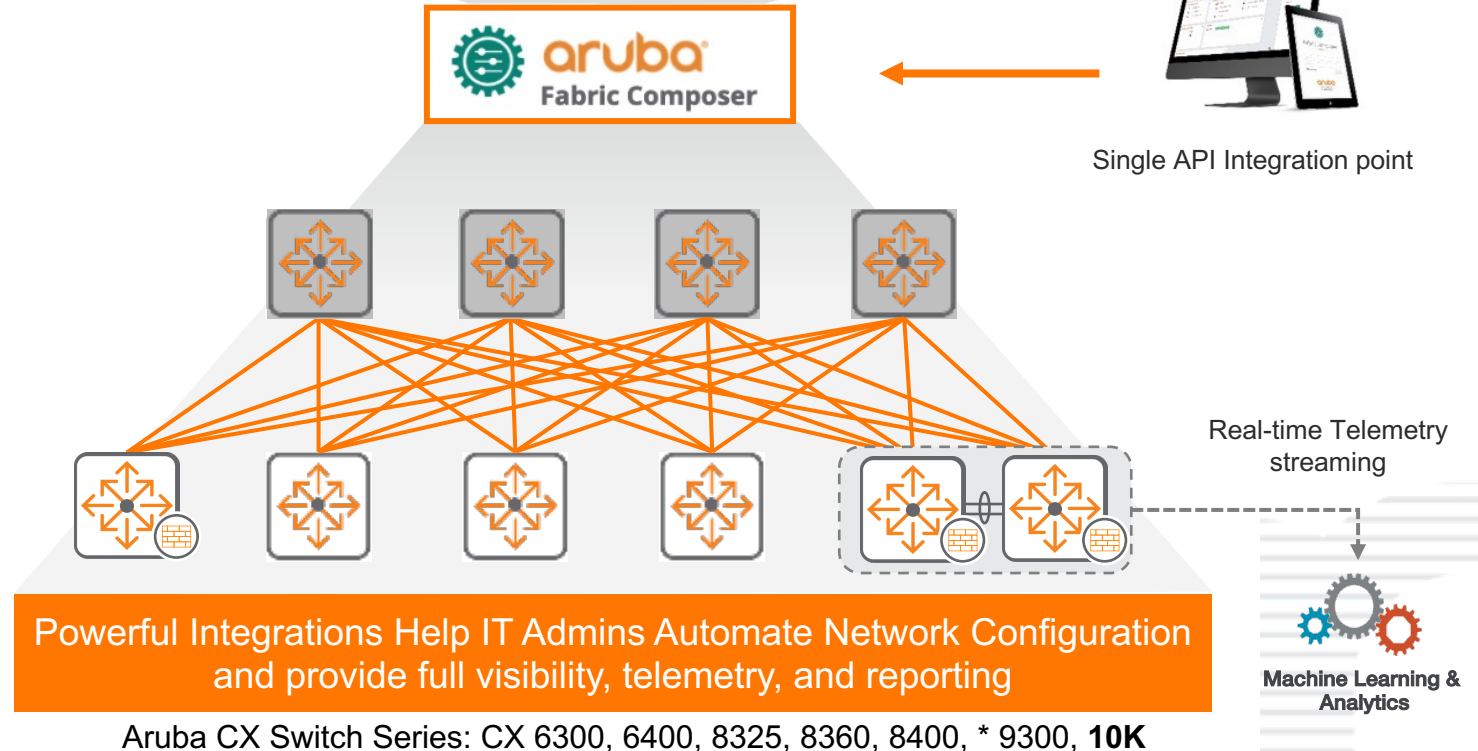
Simplified troubleshooting thanks to a deep insight into flows and end-to-end connectivity.

Centralized policy management for stateful Macro & Micro Segmentation Services.

Real-time Telemetry streaming for visibility into every flow.



ECOSYSTEM INTEGRATIONS



Arrange a follow up or demo today!

Thank You!