Hewlett Packard
Enterprise

HPE Aruba Networking
Data center networking overview

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Today's distributed enterprise

Public

Public

Edge

Edge

DC

Edge

Public

Edge locations **Data centers** **Colocations** **Public clouds**

Digital transformation is incomplete without data-first modernization across edge to DC to cloud

Data disarray

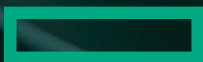**The edge is exploding**

Infrastructure and operational

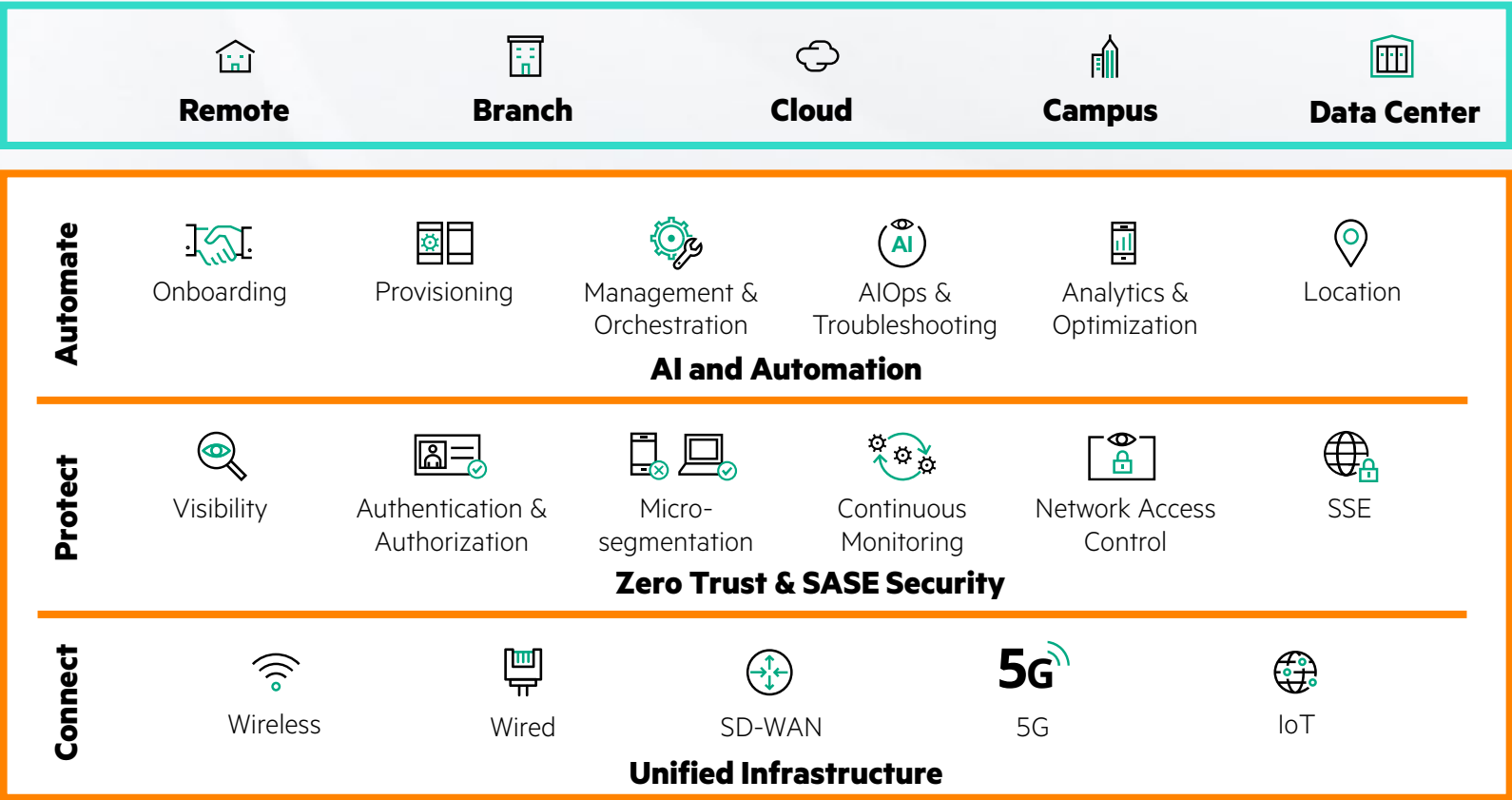**Complexity, privacy, risk**

The way forward

HPE aruba networking

Security-first, AI-powered networking

Orchestrating network services from edge-to-cloud

Powered by HPE Aruba Networking Central

HPE GreenLake as a Service

	Remote	Branch	Cloud	Campus	Data Center

Automate

Onboarding	Provisioning	Management & Orchestration	AIOps & Troubleshooting	Analytics & Optimization	Location

AI and Automation

Protect

Visibility	Authentication & Authorization	Micro-segmentation	Continuous Monitoring	Network Access Control	SSE

Zero Trust & SASE Security

Connect

Wireless	Wired	SD-WAN	5G	IoT

Unified Infrastructure

HPE aruba networking

Unified, secure, simplified network infrastructure
that **connects, protects,** and **accelerates** business outcomes

Connect + **Protect** + **Automate**

| Public cloud | Colocation | Private DC | Campus | Edge / Branches |

MPLS | SD-WAN | VPN/VPC | 25-400G/VXLAN | Wired POE/Wireless 6E | Private 5G

Simplification and accelerate service delivery and security

HPE Aruba Networking delivers modern networking solutions for "Centers of Data" connectivity

Cloud native switching architecture

Software-defined fabric automation / orchestration

Distributed services architecture

HPE Aruba Networking IT integration (compute, storage, HCI, SAP, HPE GreenLake ...)

UP TO 35% LOWER TCO
optimized form-factors and licensing

UP TO 10X FASTER provisioning vs traditional manual CLI models

UP TO 100X SCALE vs traditional centralized DC designs

Unified Infrastructure, edge-to-cloud

Data center—leaf-spine, 25/100/400G,
On premises, private cloud, colocation

HPE Aruba Networking CX 9300 -32D

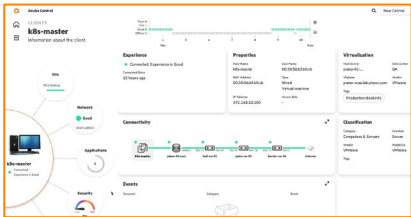HPE Aruba Networking CX 10000

NEW

HPE Aruba Networking CX 9300S-32C8D

HPE Aruba Networking
CX 8400

HPE Aruba Networking CX 8360/8100

HPE Aruba Networking CX 8325

HPE Aruba Networking
CX 6400

HPE Aruba Networking CX 6300M

HPE Aruba Networking
CX 6X00

Core

Aggregation

Access

HPE Aruba Central and AOS CX

Common operating model - campus edge to DC, cloud managed
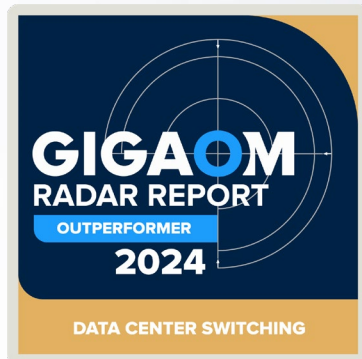
HPE Aruba Networking DCN CX switching portfolio

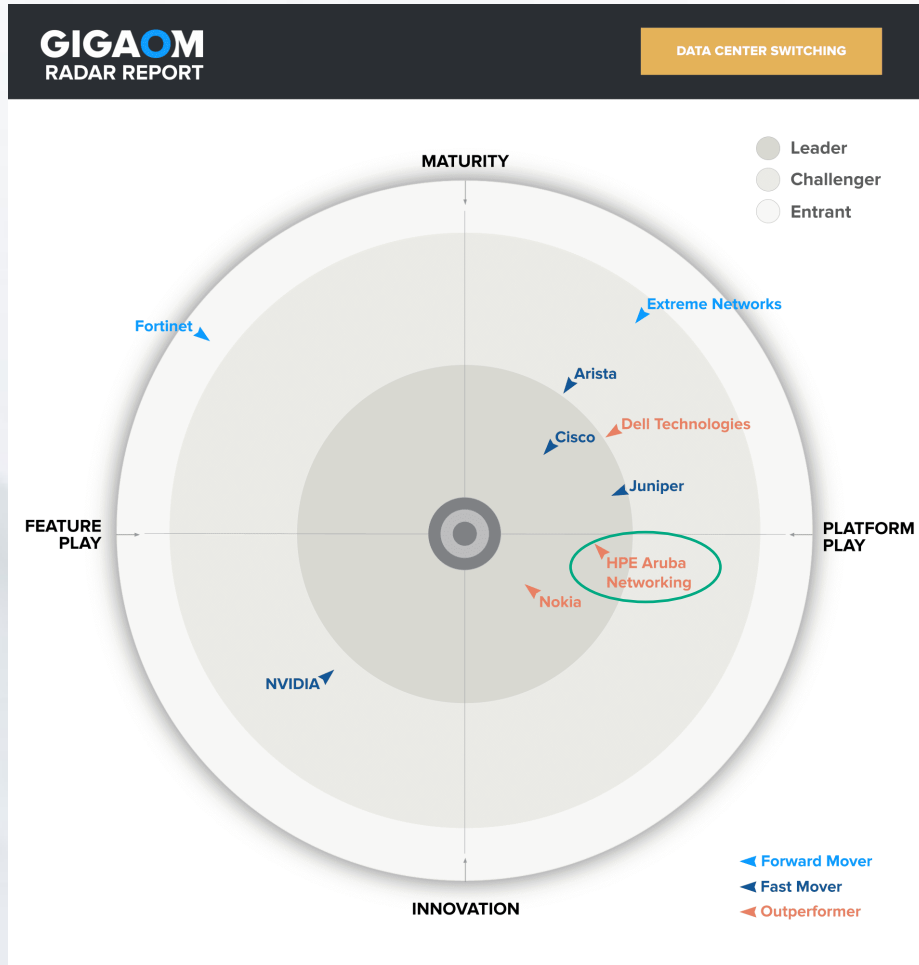|	CX 6300M	CX 8100	CX 8325	CX 8360	CX 8400	CX 9300	CX 9300S	CX 10000
Speeds	1/10/25G	1/10/40/100G	10/25/40/100G	10/25/50/100G	10/25/40/100G	100/200/400G	10/25/100/200/400	10/25/40/100G
Form factor	1U	1U models (4)	1U models (2)	1U models (6)	8 slot chassis	1U	1U	1U
Deployment	OBM GbE	DC ToR 1/10	Core, Agg Leaf/Spine	Core, Agg Leaf/Spine	Core, Agg EoR/MoR	Core, Agg Leaf/Spine	Core, Agg Leaf/Spine	Core, Agg Leaf/Spine
Onboard analytics (NAE)	✓	✓	✓	✓	✓	✓	✓	✓
API and GUI orchestration (AFC)	✓	✓	✓	✓	✓	✓	✓	✓
REST APIs, Python scripting	✓	✓	✓	✓	✓	✓	✓	✓
Virtualization (VSX), live upgrade	✓	✓	✓	✓	✓	✓	✓	✓
HA, deep buffers, large tables			NEBS/DC		✓	✓	NEBS/DC	
Hot swap, redundant power	✓	✓	✓	✓	✓	✓	✓	✓
Ethernet storage optimized			✓	✓	✓	✓	✓	✓
E-w firewall, micro-segmentation								✓
Accelerate NAT, IPSec VPN							✓	✓
MACSEC							✓	

Leader ranking in GigaOm Radar for Data Center Switching 2024

HPE aruba networking

"One of HPE Aruba's differentiating features is its Distributed Services Switch, which provides stateful firewall services at every top-of-rack configuration ..."

GIGAOM RADAR REPORT OUTPERFORMER 2024 DATA CENTER SWITCHING

QR - Get the Reprint

GIGAOM RADAR REPORT — DATA CENTER SWITCHING

MATURITY

Leader
Challenger
Entrant

Fortinet
Extreme Networks
Arista
Dell Technologies
Cisco
Juniper

FEATURE PLAY
PLATFORM PLAY

HPE Aruba Networking
Nokia

NVIDIA

INNOVATION

◄ Forward Mover
◄ Fast Mover
◄ Outperformer

https://gigaom.com/reprint/gigaom-radar-for-data-center-switching-hpe/

HPE Aruba Networking DCN use cases

← Distributed services architecture →

E-W FW, Micro seg	ZTNA / telemetry / visibility	Multi-cloud interconnect
Campus-data center Collapsed core		Cloud colocation, secure hybrid cloud connectivity
25/100 GbE Server ToR		HPE integration ProLiant, Apollo, storage
100/400 GbE Spine-leaf fabrics		HPE integration VMware, Nutanix, HCI ...
Network virtualization VXLAN, EVPN		HPE GreenLake for Aruba Network/Infrastructure as a service

Powering data-driven outcomes

Living longer, healthier lives

Helping reduce the time it takes to read mammograms by 10x from **half an hour to as little as 2 minutes with AI**

Getting us safely to our destination

Developing the next-generation of **autonomous driving software** that runs over 10,000 safety simulations every second

Helping solve the world's most complex problems

Helping solve problems that are **8x** more complex with the world's fastest supercomputers

Carnegie Clean Energy Case Study
FathomX: Case Study
Zenseact Case Study

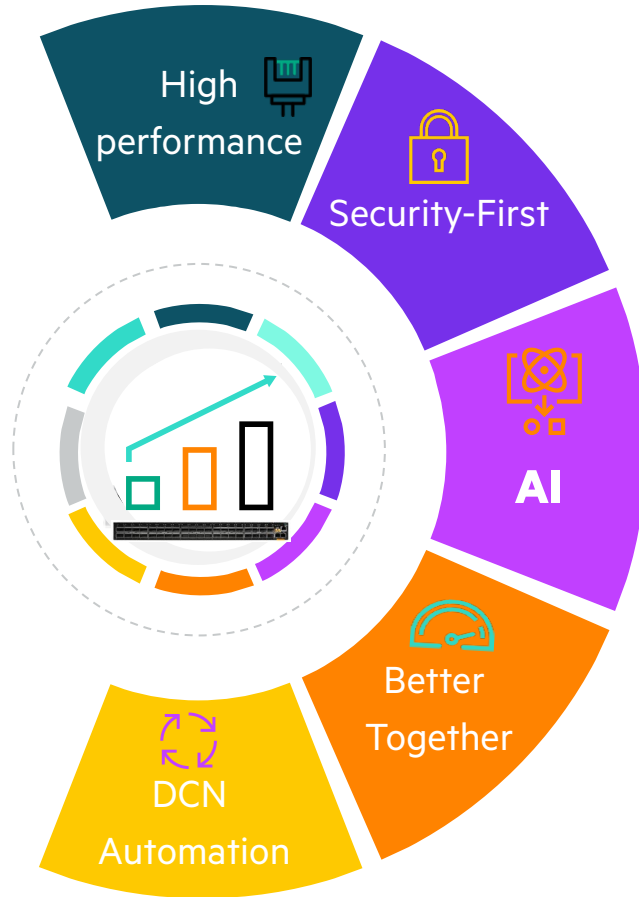# AI-Ready Data Center Switching with CX 9300 Series

Data Center Networking: HPE Aruba CX 9300 Update

Welcome AI for Networking Series of Switches 'Secure CX 9300S-32C8D'

1
- 32x10G/25G/100G/200G AI workload, server, storage connectivity.
- 8x400G inter-fabric connectivity. Complete PTP stack support**.

2
- End to End Secure-First Data Center.
- 6.4Tbps of MACsec**.
- 4.8Tbps of IPsec, VXLANsec highly secure DCI**.

3
- Accelerate your AI-powered business with CX 9300.
- Standard based RDMA over Converged Ethernet – RoCEv2 support.
- Ready for GenAI workload.

4
- Fully integrated HPE Storage, Compute, GreenLake solution.
- Secure standard based Eco-system integration.

5
- Cloud-native a single OS across enterprise.
- Cloud and on-prem DCN fabric complete automation.
- Secure API access for eco-system DCN automation and integration.

High performance
Security-First
AI
Better Together
DCN Automation

** Phy based MACSEC 10.14.1000 (July'24)
** ASIC based MACSEC (TBD)
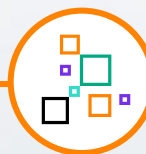**** ASIC based IPSEC (TBD)**
** PTP Support (TBD)

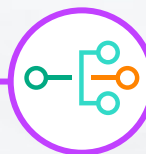# Data-first modernization requires a modern, next generation data center fabric

Require higher performing, more intelligent, secure data center fabrics
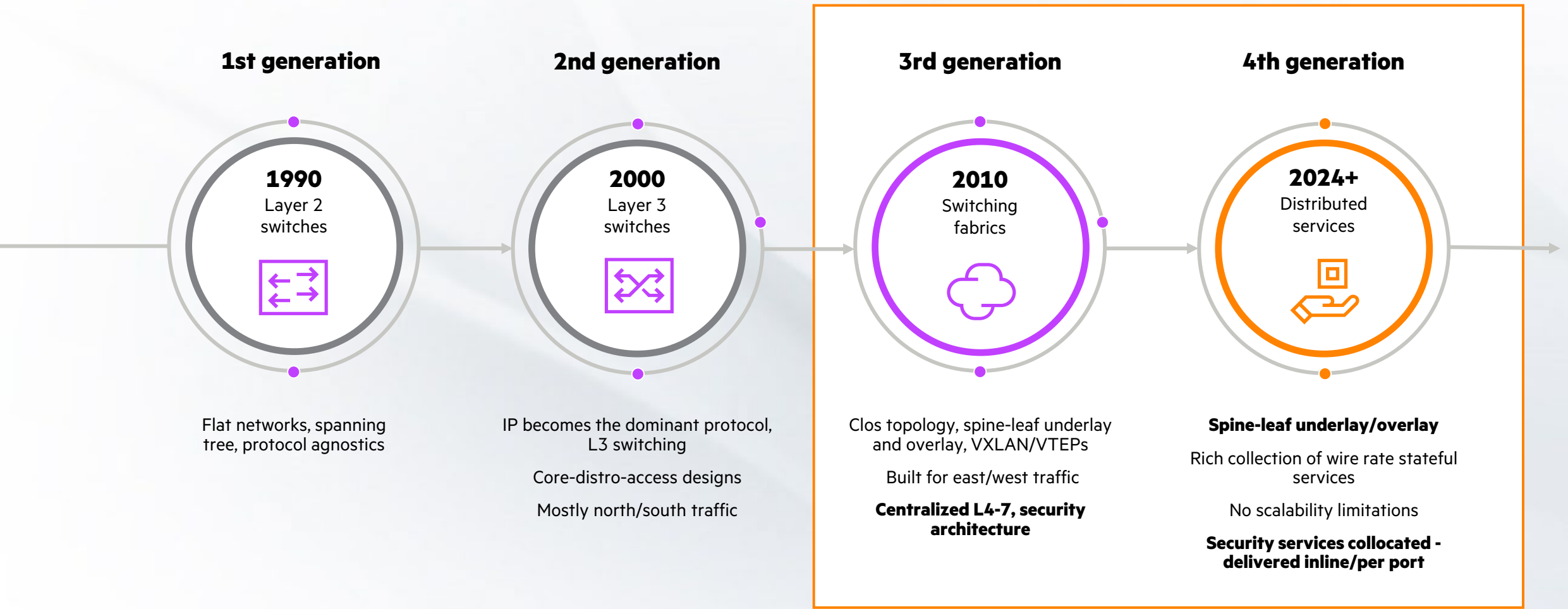

HPE Aruba Networking CX 10000

25/100, 400 GbE Fabric

Zero Trust at the server-network edge (→ SROT*)

Full visibility and telemetry *(secure fabric, policy, apps)*

10, 25, 100GbE I/O
HPE Silicon Root of Trust, RoCE, NVMe

Data center network architecture evolution

1st generation

1990
Layer 2
switches

Flat networks, spanning
tree, protocol agnostics

2nd generation

2000
Layer 3
switches

IP becomes the dominant protocol,
L3 switching

Core-distro-access designs

Mostly north/south traffic

3rd generation

2010
Switching
fabrics

Clos topology, spine-leaf underlay
and overlay, VXLAN/VTEPs

Built for east/west traffic

**Centralized L4-7, security
architecture**

4th generation

2024+
Distributed
services

Spine-leaf underlay/overlay

Rich collection of wire rate stateful
services

No scalability limitations

**Security services collocated -
delivered inline/per port**

Distributed services switch, a new switching category

HPE Aruba Networking CX 10000

AMD PENSANDO

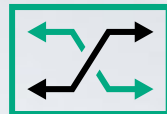L4-7 stateful software services

Firewall DDoS Telemetry Encrypt NAT SLB

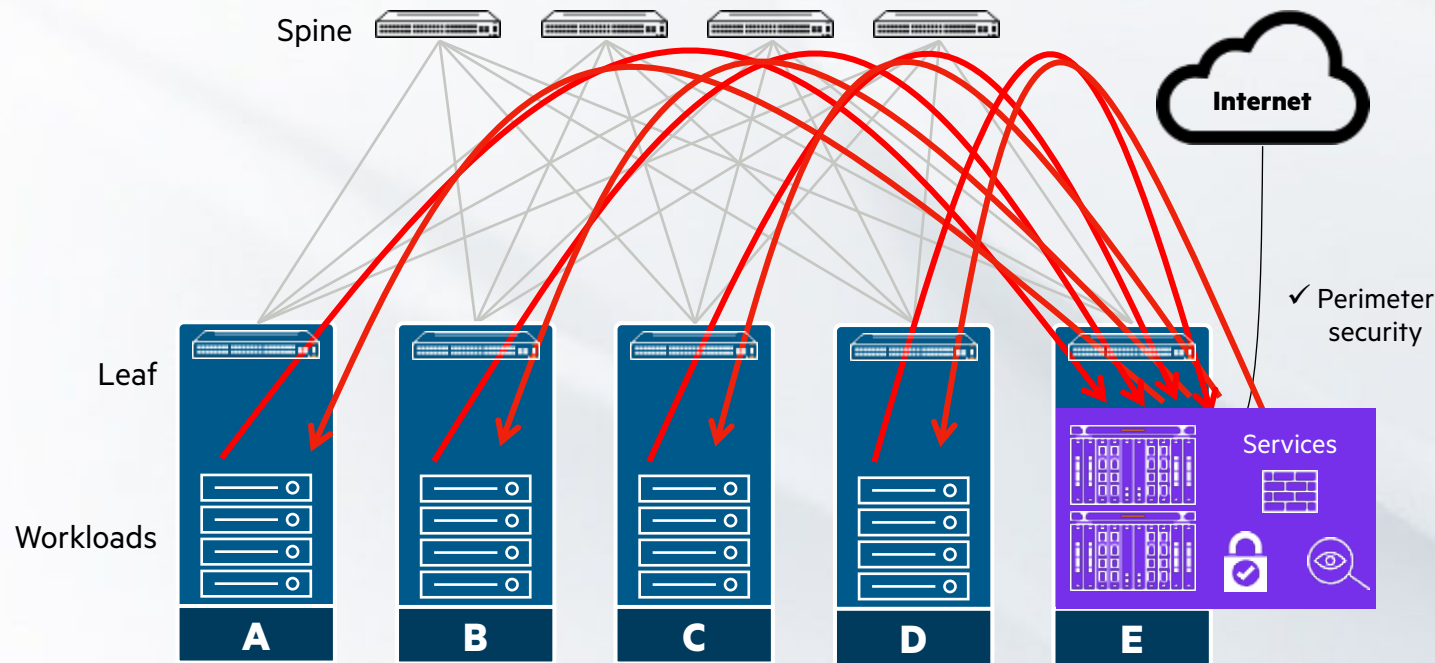## Full network functionality,
plus 800G firewall performance

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

Eliminates/reduces need for appliances and host software, delivering 100x scale, 10x performance at 1/3 TCO

Third gen: centralized services architecture

Spine

Internet

✓ Perimeter security
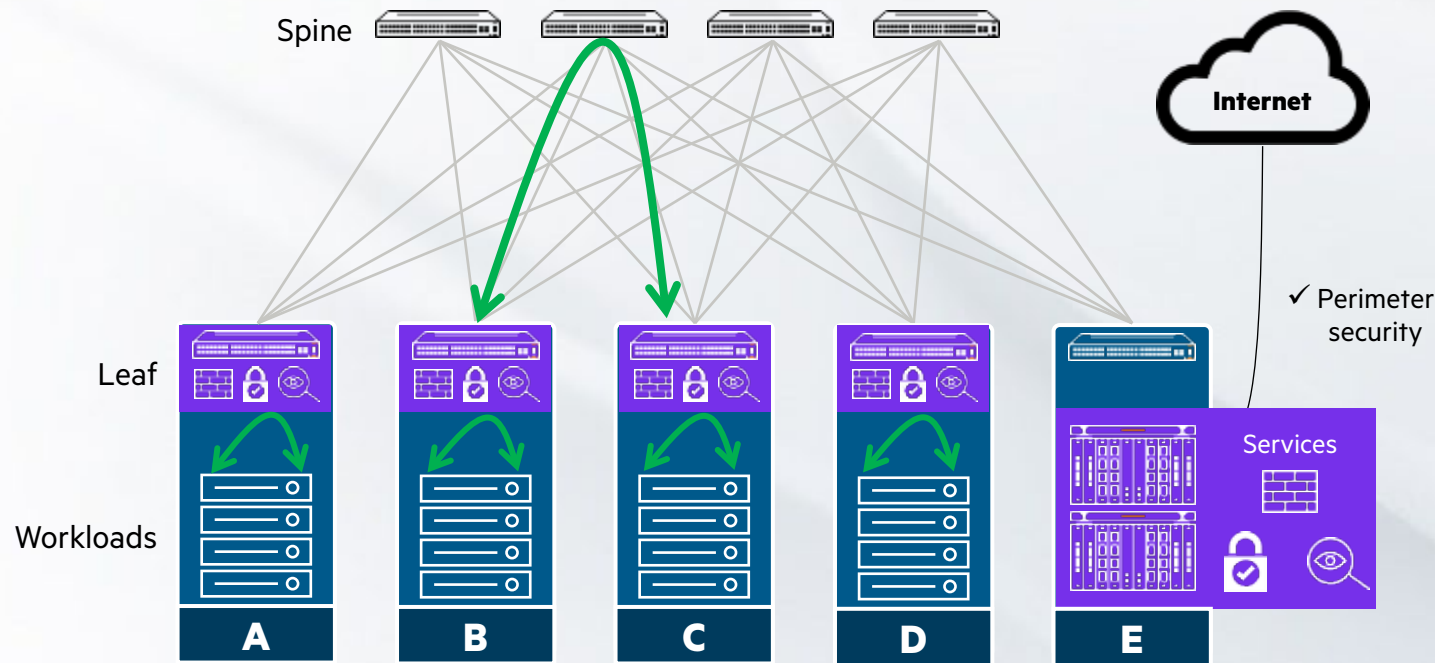
Leaf

Workloads

A B C D E

Services

Centralized services architecture

Design challenges

- Traffic having to hairpin to L4-7 services leaf/rack

- Unable to scale to match volume/velocity e-w traffic

- High and cost complexity (appliance sprawl, licensing)

Fourth gen: distributed services architecture

Spine

Leaf

Workloads

A B C D E

Internet

✓ Perimeter security

Services

Distributed services architecture

Design advantages

- Better security posture—firewall on every leaf port

- Lower TCO, retire legacy appliances/software agents

- Real-time telemetry

- Automated network and security policy and provisioning

- Improved app latency/perform

Stages of automation
In the evolution of data center operations

3rd generation

2010
Switching fabrics

agents

taps

alerts

Tap Network and Tools

Visualize

Action

4th generation

2024+
Distributed services switch

telemetry

Data Lake

ML/AI

solution
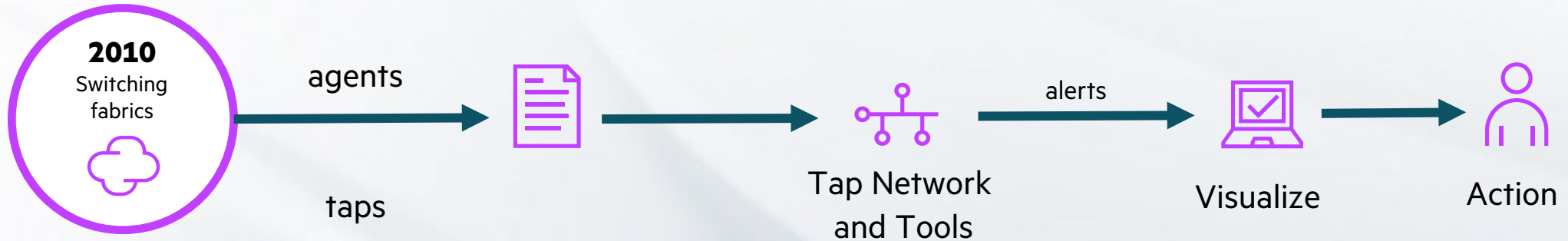
Action
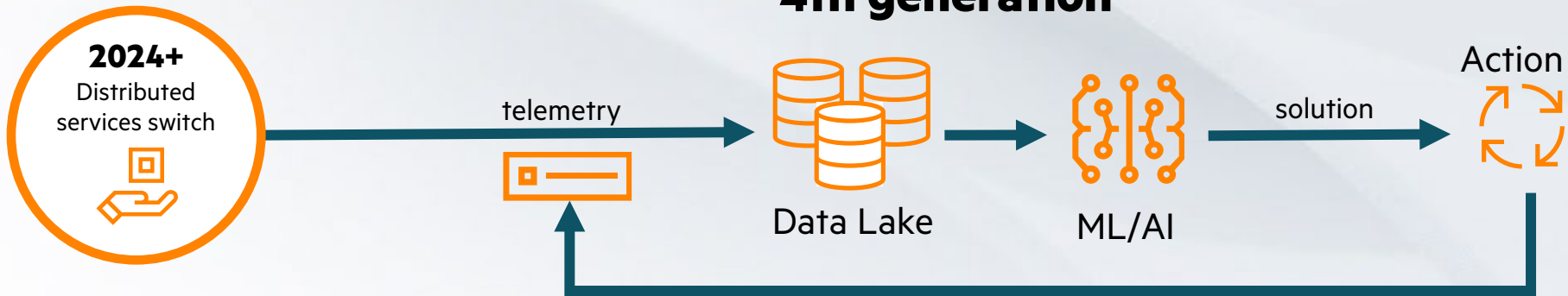
The TCO Advantage of
Fourth Generation Data Center Fabrics

3-Year TCO analysis - implementing Micro Segmentation (E-W Firewall) across 500 servers, 24 racks, 400 Gbps/rack with 75% E-W traffic

3-year costs for next gen firewall + traditional tor solution

$2.694M
Total 3-year costs

$321
Average cost per Gbps (E-W)

3-year costs for HPE ARUBA CX10000 solution

$1.052M
Total 3-year costs

$125
Average cost per Gbps

$1.069M
lower TCO
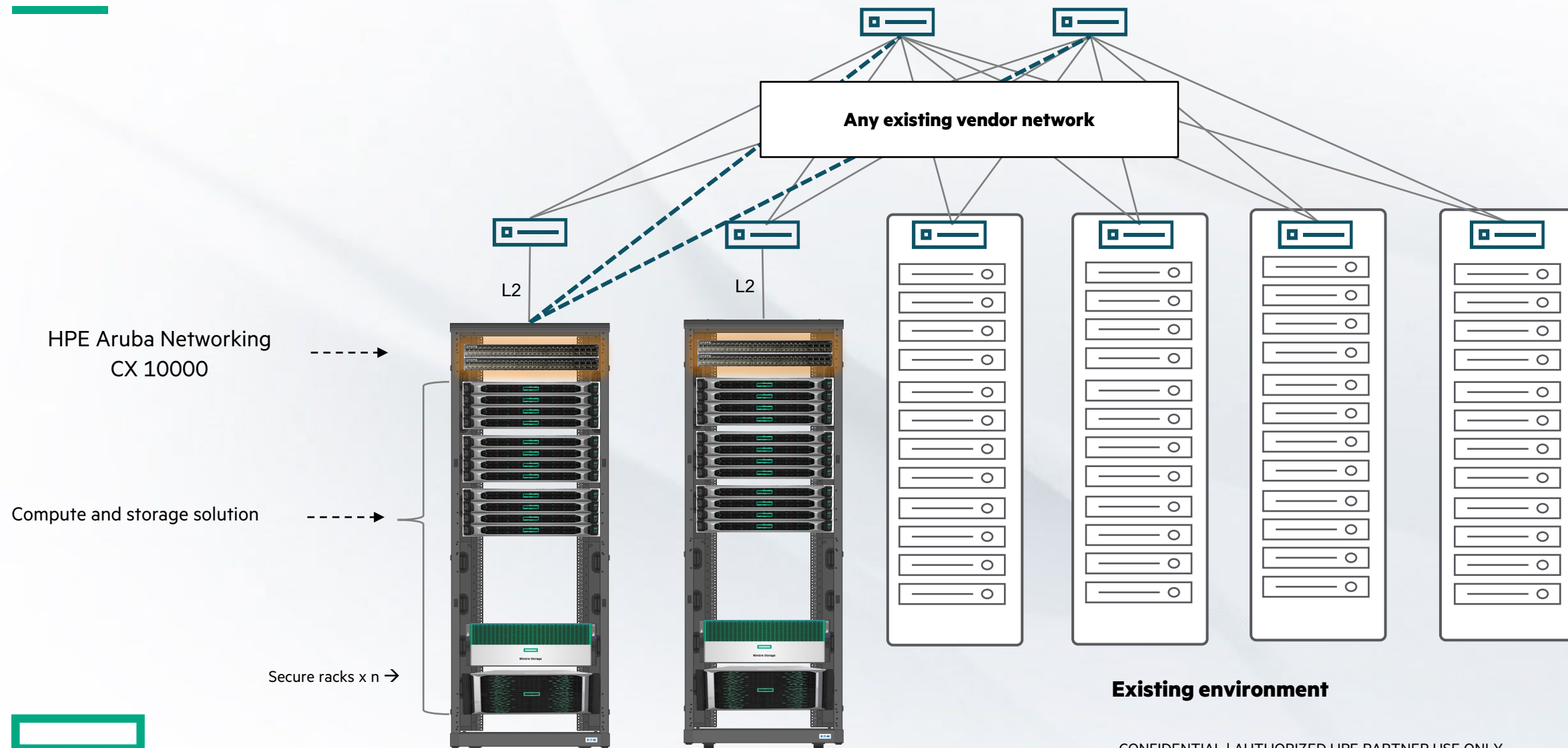or 53% savings ✓

Key advantages
53% savings with
Superior 4th Gen design -
Higher scale/performance
Future service insertion

Secure fabric Interconnect for secure racks

DCN is not a forklift proposition. Wrap networking around specific workloads.

Any existing vendor network

L2

L2

HPE Aruba Networking
CX 10000

Compute and storage solution

Secure racks x n →

Existing environment

Network and security policy automation with full visibility

Hyperscale-like efficiencies for enterprise DC/private cloud

- Deployment automation

- Easy-to-install API integration packs

- Automate everyday networking tasks

- Simplified troubleshooting

- Centralized policy management

- Real-time telemetry streaming

API ECOSYSTEM INTEGRATIONS

System console

Single API Integration point

3rd party automation and orchestration toolsets

Real-time telemetry streaming

Distributed stateful firewall, macro/micro-segmentation and real-time telemetry streaming

Machine learning & analytics
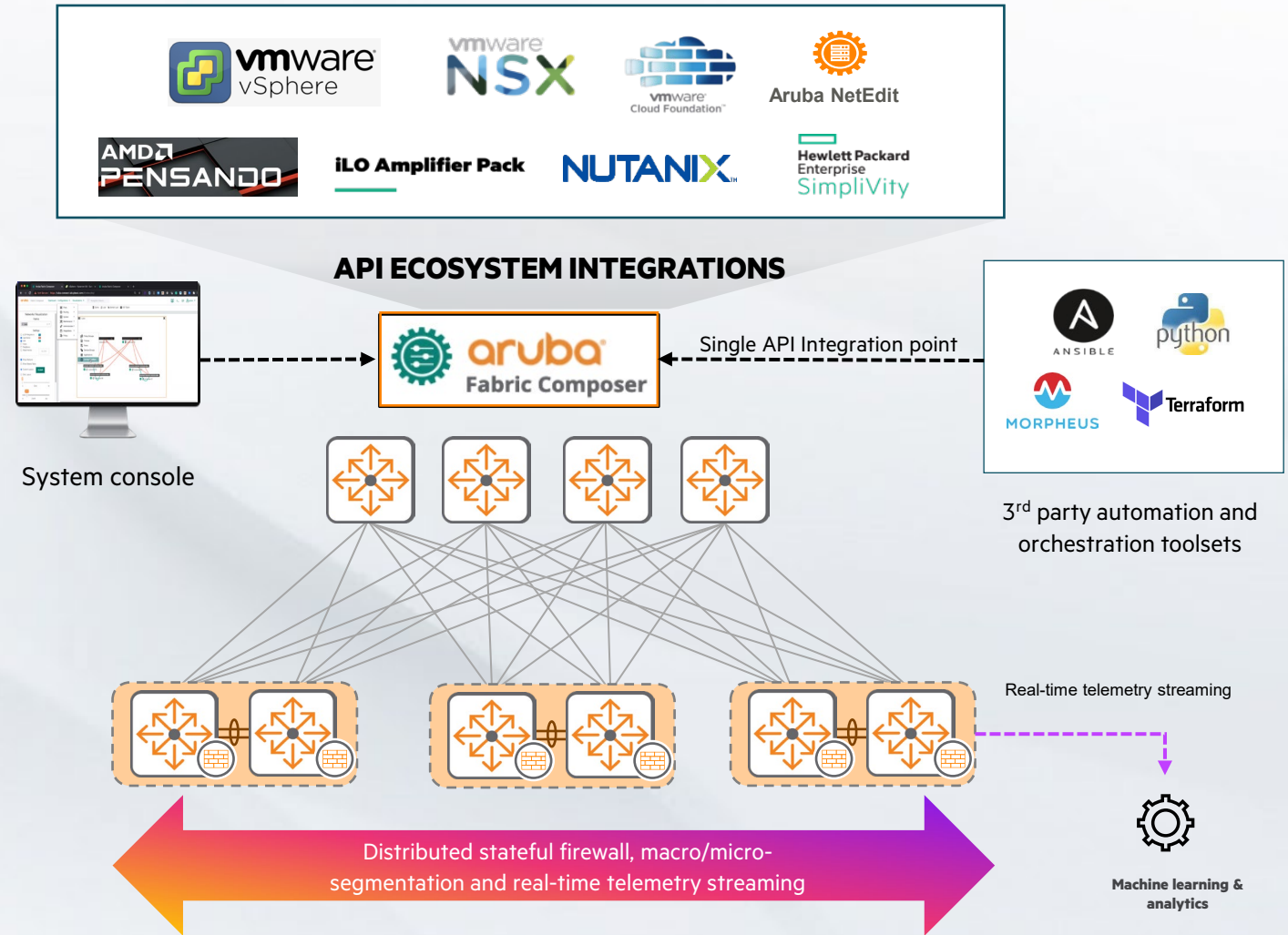
HPE Aruba Networking Central

Industry's first cloud-native unified policy orchestration & network automation for Campus, Branch, Datacenter & SD-WAN

Fabric, WAN & Policy Orchestration

ARUBA CENTRAL

SD-WAN FABRIC

VIRTUAL GW

PUBLIC CLOUD

LARGE CAMPUS & EDGE DC: DISTRIBUTED OVERLAY FABRIC

MEDIUM CAMPUS: AP-ONLY FABRIC

SMALL BRANCH CENTRALIZED OVERLAY FABRIC

REMOTE OFFICE: MICROBRANCH AP

TELE WORKER: VIA AGENT
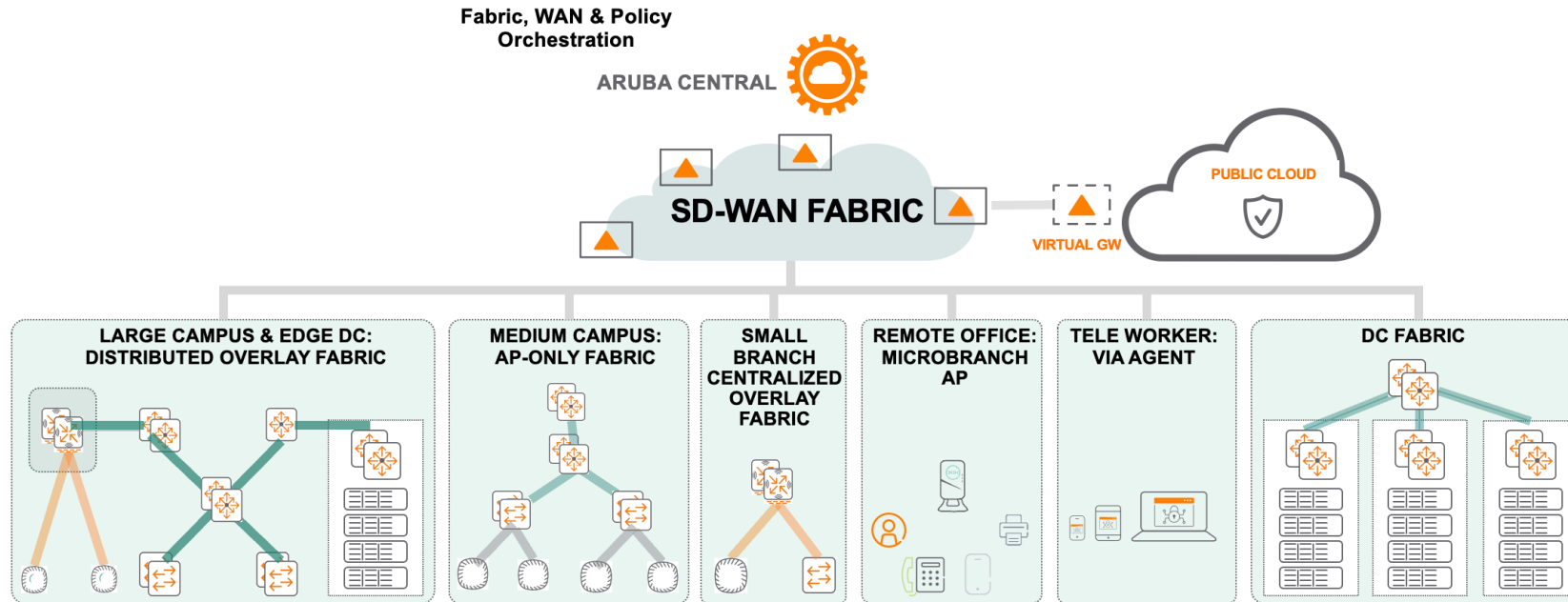
DC FABRIC

Ubiquitous Segmentation and Fabric
for performance and global scale, with choice of centralized and distributed enforcement models; standards-based technology stack (EVPN-VXLAN)

Unified Policy Orchestration and Enforcement
with stateful application role-aware policy enforcement by CX switches, APs, AOS gateways, EC SD-WAN gateways and SSE public cloud integrations; policy recommendations

Intelligent Campus, DC and Branch Automation
with intent-based workflows for automated underlay and overlay configuration

AI-Powered Assurance
for network anomaly detection, client behavior profiling, and user, workload and application experience assurance

Virtual Machine Visibility Through vSphere Integration

Install $\longrightarrow$ Discover $\longrightarrow$ Visualize

- The vSphere agent is responsible for interfacing with vSphere
- Installed within the switch container framework of CX
- Collect and cache data from vSphere, such as LLDP Neighbors, hosts, VM, virtual switches, etc.
- Respond to REST requests
  - vSphere status connection
  - vSphere host data
  - vSphere neighbor data
  - vSphere stats data

- Agent available for CX 6300 and up.
- For scale setup, CX 8300 and up is preferred.
- Single agent connect with multiple vCenter.

ARUBA CENTRAL

CX vSphere Agent   API   vSphere
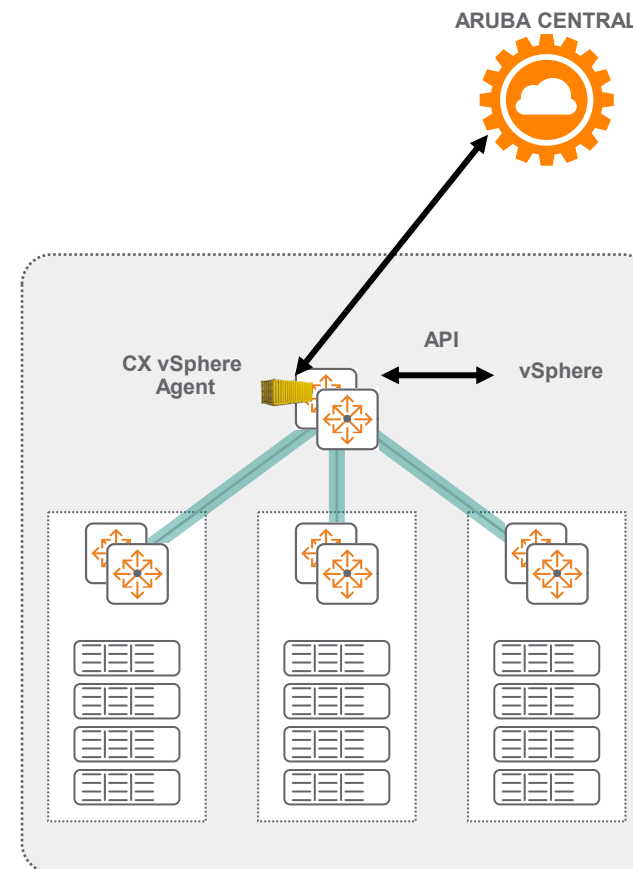
VSphere

Name
Instance name

Host
https://plugin.mycompany.com

Username
theboss@mycompany.com

Password
●●●●●●●●

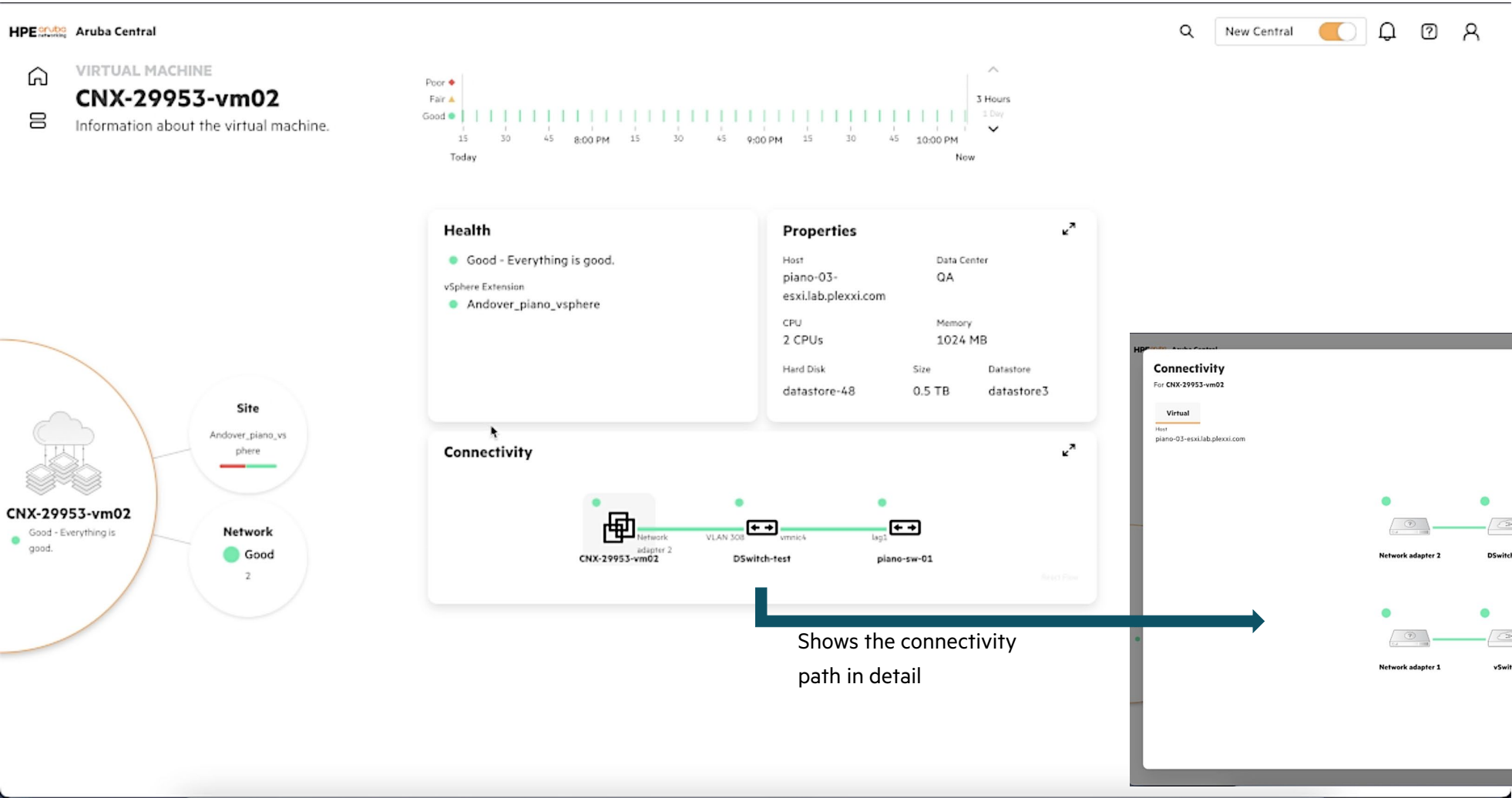vSphere Agent CX Switch
CX-Aruba-123

Connection Status
● Active   Test
Version: 7.0

Cancel   Update

Virtual Machine Visibility Through vSphere Integration

Shows the connectivity path in detail

Microsegmentation to underpin service excellence

PQR

PQR is a managed services provider based in the Netherlands. Over the last 30 years, PQR has transformed into a trusted advisor for managed services. By introducing a new data center offering with a strong focus on scalability, security first, and operational simplicity to provide everything as a service, PQR aims to position itself for the next phase of revenue growth.

Vision

- Build service revenues through the creation of a new data center offering with an emphasis on scale, security first, and operational simplicity

- Develop next-generation data center based around microsegmentation, distributed services, and automation

Outcomes

- Provides flexible, consumable, and managed data center services

- Delivers insight into all traffic and data flows

- **Reduces expensive data center firewalls costs by 50%**

Solution: distributed services

- Aruba Fabric Composer

- HPE Aruba Networking CX 10000
  - Distributed E-W firewall, NAT, IPSec

- **50% saving in total cost of ownership (TCO) compared to existing solutions**

Rethinking the power and impact of the data center

kyndryl.

With over 30 years of experience designing, building, and managing mission-critical IT environments, Kyndryl works with some of the world's largest enterprise customers. It has strategic partnerships with many of the world's leading tech companies. Kyndryl mission statement is to 'make the complex simple to enable customer innovation'

Vision

- Remove complexity for enterprise customers by streamlining access to all clouds, data centers, and edge
- Create a single pane of glass for provisioning and monitoring on-premises and cloud networks

Outcomes

- Strengthens data encryption tenfold compared to legacy architecture
- **Reduced energy costs by 90%**
- **Improves space optimization by a factor of 20**

Solution: distributed services

- HPE Aruba Networking CX 10000
  - Distributed E-W firewall, NAT, IPSec
- **Resulted in significant customer value-add up to 66% reduction in network security infrastructure**

Building the next-gen IT service delivery platform

DXC Technology (NYSE: DXC) helps global companies run their mission-critical systems and operations while modernizing IT, optimizing data architectures, and ensuring security and scalability across public, private and hybrid clouds.

Pre-deployment

- More than 100 global, multi-tenant data centers
- End-to-end Cisco ACI deployment
- **Scale-up** services appliances

Challenges

- Complexity and cost (infrastructure sprawl, overlapping IPs, inefficient traffic patterns)
- Poor security posture
  - Limited intra-data center security
  - Unencrypted flows

Solution: distributed services

- Aruba Fabric Composer
- HPE Aruba Networking CX 10000
  - Distributed E-W firewall, NAT, IPSec

- **>70% increase in workload security posture within DC**
- **Up to 83% reduction in DC security infrastructure footprint**

Gartner recommends HPE Aruba Networking

Gartner Reports...

- EOS for VMware NSX perpetual licenses is approaching.

- 10,000 customers hold NSX licenses.

- Many clients report VMware renewal costs have more than doubled since Broadcom acquisition.

- Gartner's 3-option recommendation for microsegmentation:

    1. Upgrade to VMware Cloud Foundation (VCF) +$€

    2. Migrate to another microsegmentation alternative **See Gartner's specific vendor recommendation

    3. Forgo microsegmentation

"The network switch will be the enforcement point for microsegmentation. The local network switch must also be the default gateway for all connected workloads and employ anycast to enforce microsegmentation at the switch connecting the host. Vendors: Cisco (ACI) and **Hewlett Packard Enterprise (HPE) Aruba (CX 10000)."**

*"*What Are My Options for Vmware NSX, Given the Broadcom Acquisition?*" Gartner Quick Answer research note. Nauman Raja, Andrew Lerner, Jorge Aragon. May 2024. Full report available to Gartner seat holders.

https://www.gartner.com/doc/reprints?id=1-2HZFP8QT&ct=240701&st=sb

HPE Aruba Networking

Data center, private cloud, storage solution integration

HPE Aruba Networking references architectures powering mission critical business applications

vmware®

VMware Cloud Foundation on HPE ProLiant

Microsoft

Microsoft SQL Server on HPE DL360, Primera

SAP S/4HANA

SAP HANA DB on HPE Superdome Flex 280

ORACLE®

Oracle 19c with VMware on HPE Synergy/ Primera

Red Hat

Red Hat OpenShift on HPE ProLiant DL360/380 servers

Google

Google Anthos on HPE ProLiant DL325/DL385 and HPE Nimble Storage

HPE SAN switch SN66008 32 Gb

HPE Aruba 6300M switch (OOBM)

HPE Aruba 8325 switch (ToR)

Management domain

HPE ProLiant DL360 Gen10

External storage for VMware Cloud Foundation workload domain

HPE Primera Storage

HPE Nimble Storage adaptive flash array

Expanded range of HPE GreenLake for Aruba service packs

Service Packs

Technology + services

Subscription

Standardized contract

Service packs are built on **common networking use cases**:

Wireless indoor	Wireless outdoor	Wireless remote	Wired access
Wired aggregation	Wired core	UXI	SD-Branch
Network policy	**NEW** DC Spine	**NEW** DC Leaf	
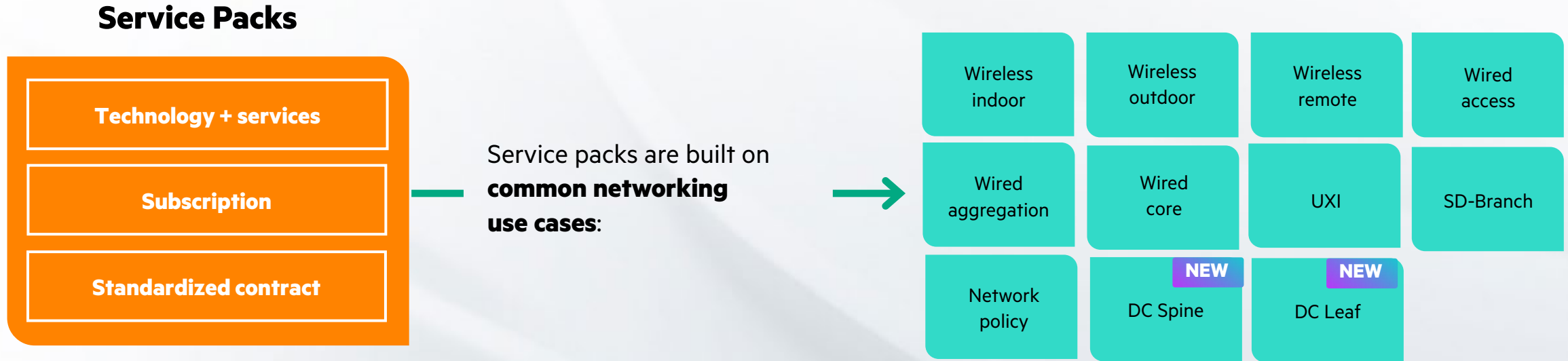
Two new service packs available for data center networking

- HPE Aruba Networking CX 8000, HPE Aruba Networking CX 9000 and HPE Aruba Networking CX 10000 available as a service (NaaS)
- Customers can consume an entire compute, storage and networking data center stack through HPE GreenLake
- Partners can expand into DCN and bundle design/delivery services with a monthly NaaS technology subscription

HPE aruba networking

HPE's Intelligent Edge BU
Founded 2002

$4B+
annual revenue

#2
Market share Enterprise   Wired
& Wireless[1]

Perennial Gartner MQ
Leader in Wired & Wireless

Global Presence
Technology Development Centers:
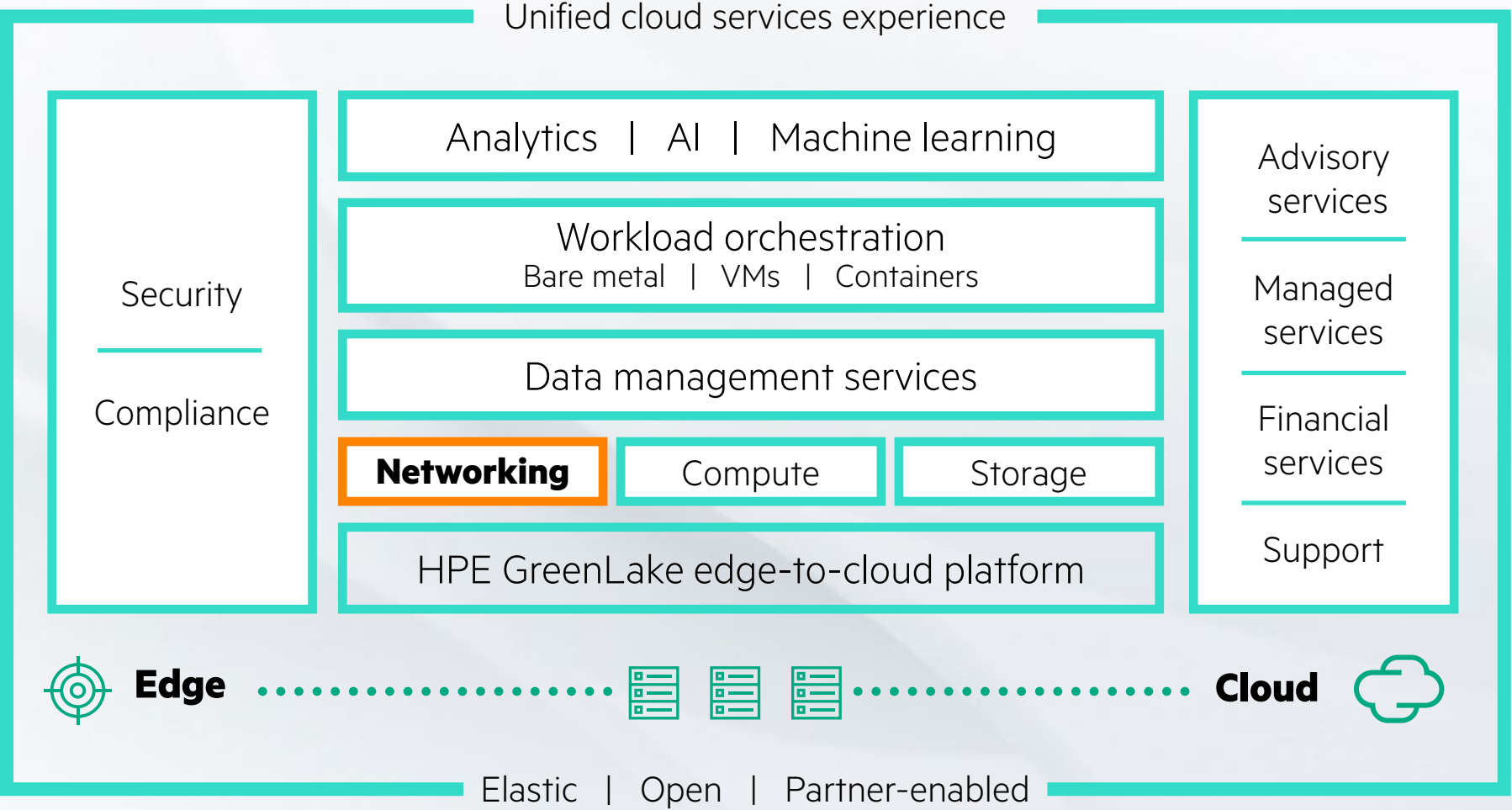San Jose CA, Bangalore, Quebec,
Costa Rica, Beijing

7,000+
employees

Dedicated sales,
engineering and support
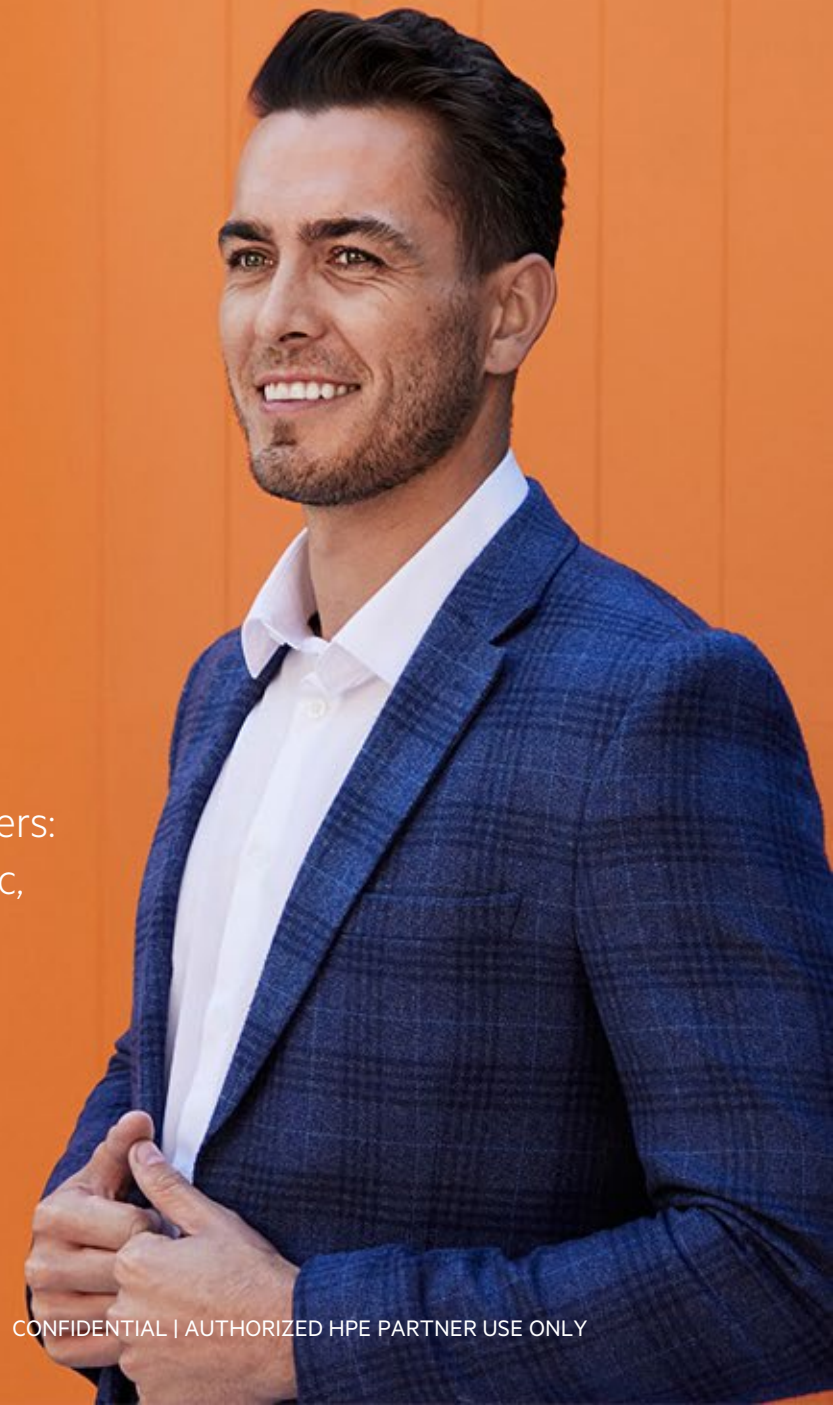
[1] Source: WWeC Revenue Marketshare - 650 Group CY2021

Two decades of leadership and innovation

Introduced controller based enterprise Wi-Fi

First customer ship in 2003

2002

Policy based BYOD, Controller-less Wi-Fi, Remote APs

iPhone flips the IT world upside down

Skype UCC QoS, Indoor Location Svcs, Adaptive Radio Mgmt

IoT and user experience change how we work

Cloud-managed networks, Aruba CX Wired OS, First 802.11ac

Aruba, a Hewlett Packard Enterprise company

2015

Cloud-based AIOps, Live Upgrades, SD-Branch, WPA3

Volume of data and devices requires automation and scale

Hybrid Work Services, As-a-Service Offerings, First 6Ghz Wi-Fi 6E

Aruba responds to acceleration of its Edge strategy and COVID-19 requirements

Next Gen Central Aruba CX 10000 NaaS

Aruba delivers next generation secure connectivity

2023

Network Mgmt	Security	Indoor Location	Wired	Security	SD-WAN	
Airwave	Avenda Amigopod	meridian	HP Networking	niara	silver peak	axis
			AI/ML RASA	UX Insights cape		athonet

Hewlett Packard Enterprise
The Edge-to-Cloud Company

**One HPE:
Better together**

Unified cloud services experience

Security Compliance	Analytics	AI	Machine learning	Advisory services
	Workload orchestration Bare metal	VMs	Containers	Managed services
	Data management services	Financial services
	Networking Compute Storage	
	HPE GreenLake edge-to-cloud platform	Support

Edge .... **Cloud**

Elastic | Open | Partner-enabled

Thank you