aruba

a Hewlett Packard
Enterprise company

# Simplify, accelerate and secure data center networking and IT operations

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Aruba one-stop network connectivity now leads the way with a revolutionary approach for modern "Centers of Data."

Traditional enterprise data centers are quickly moving toward the edge. The steady, rapid increase of diverse internet applications and cloud-connected devices has led to an explosion of distributed and virtualized data that taxes the limits of traditional data center infrastructure.

IDC predicts that
by 2023, more than

# 55%

of enterprises will replace outdated operational models with cloud-centric approaches that facilitate, rather than inhibit, organizational collaboration, resulting in better business outcomes.[1]

Many organizations are making the shift from building traditional centralized data centers to deploying increasingly distributed, edge-cloud centric "Centers of Data." As such, these businesses also need to modernize their legacy network and security infrastructures that have become overly complex, difficult to manage, highly inefficient, and costly.

Data center network fabrics have evolved over past decade, providing higher-performing 25/100/400 Gbps leaf-spine topologies to address the volume and velocity of emerging application architectures. However, security and services architectures have not kept pace, and data center models are experiencing significant challenges.

With massive expansion in the number and diversity of applications and the amount of data generated and transported, enterprise data centers are pushing architectural limits. Traditional scale-up approaches, legacy networking designs, and sprawling security policies cannot keep up, causing performance, agility, and scale limitations.

To meet the challenges of the data explosion, the data center must be reimagined and redesigned to handle multiple centers of data from diverse and remote sources. Modernizing the distributed data center requires steady focus on meeting the performance demands that modern cloud computing requires: agility, flexibility, elastic scale, seamless integration, inherent security, and simplified management.

For the new model to work, outdated organizational structures and operational models must be reworked. Traditional IT silos must be replaced with collaborative, multidisciplinary teams aligned with software development processes.

Modern data centers must face the new reality with automation of service, secure remote data access, business-driven workflows, and a process that accounts for constant iterations and improvements.

HPE Aruba recognizes the need and urgency of addressing the challenges of modern networking. That's why our solutions are built to power unified, intelligent, and automated software-defined fabrics providing the flexibility, scalability, and resiliency needed to support modern, next generation edge-to-cloud centers of data.

[1] "IDC FutureScape: Worldwide Cloud 2021 Predictions," December 2020.

## Simplify, accelerate service deliver, and reduce risk

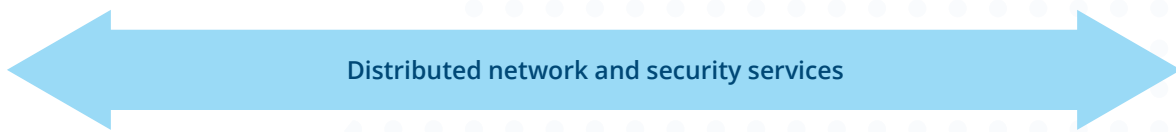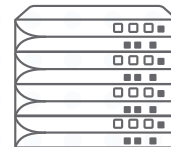Aruba delivers modern networking solutions for "Centers of Data" connectivity.

| Cloud-native switching architecture | Software-defined fabric automation | Full-stack IT solutions from a single vendor |
|---|---|---|

Distributed network and security services

| Up to 35% lower TCO | Up to 10X faster | 75% faster deployment |
|---|---|---|
| optimized form-factors and licensing | provisioning vs. traditional manual CLI models | of integrated and complex IT stacks |

# Simply a better way

The HPE Aruba data center networking portfolio is designed to simplify operations and accelerate provisioning through an integrated IT solution stack that is built to efficiently expedite application and service delivery.

Rely on Aruba innovative hardware and systems to build a better network and a better data center:

· **Simplify** network and security deployment and operation.

· **Distribute** data services closer to applications for secure, streamlined management.

· **Improve** security while limiting appliance scrawl for a lower overall cost.

· **Optimize** network bandwidth, performance, and user experience.

· **Integrate** seamlessly into existing compute, storage, and virtualized IT infrastructure.

### Aruba unified infrastructure delivers edge-to-cloud connectivity

Implement or expand data center infrastructure rapidly with unified, harmonized network operations from edge to cloud. Aruba's cloud-native software and common network operating system delivers a consistent, high-quality user experience across diverse campus, data center, and edge environments. Aruba CX series switches and AOS-CX system software work together to ensure fast data center deployment, exceptional performance, and reliably secure operations.

### Aruba software-defined orchestration simplifies network management from start to future

Accelerate and simplify network provisioning and security management from the first step of implementation to ongoing computing and storage operations to future expansion. The Aruba unique solution portfolio provides hard-working tools to automate network and fabric deployment, provide comprehensive network visibility, and manage API integration using standard IT industry hardware and software. Automating recurring, routine network management tasks results in fast network deployments with "Zero Touch" or "one touch" server-side provisioning.

**Aruba Data Center Networking Solutions are designed to reduce time, risk, and cost of validating and standing up IT solution stacks.**

## Aruba data center networking solutions - Engineered for simple, fast and secure deployment of HPE IT infrastructure

Available as a capital expenditure or Infrastructure as a service (IaaS), Aruba solutions are designed to reduce time, risk, and cost of validating and standing up IT solution stacks ranging from software-defined storage, hyperconverged infrastructure (HCI), SAP® software, virtual computing, and high-performance networking. Hybrid cloud or IaaS delivery of applications and services is simple and fast, without requiring extensive or specialized expertise. Enterprises can align stand-up cost to consumption with on-premises or pay-per-use implementations.

## Aruba distributed services apply advanced intelligence to modernize data center operations

Overcome design and security limitations from highly inefficient, costly, and complex legacy networks with an easy switch to an intelligent automated system. Aruba ESP was designed to unify, automate, and secure all network edge services across domains including remote, branch, campus, and data center.

Aruba data center solutions deliver a best-of-breed switching ASIC and platform (AOS-CX) with an industry-first services processor (AMD Pensando). Fully stateful services are delivered inline, at scale, with wire-rate performance. Critical mission workloads are managed securely, at 100x the scale, 10x the performance, and a third of the total cost of ownership.

# The right fit, perfectly

Aruba data center solutions provide flexible and highly reliable network designs to ensure efficient, reliable access to applications and data for all authorized users, while simplifying operations and accelerating service delivery.

## Customer outcomes
## Experience the ease of automated data center transformation

Expand data center connectivity with less time and less effort. Aruba transforms the data center into an agile service delivery platform that deploys with maximum efficiency and scales to size with minimum effort.

## Experience faster data center deployments — 75% faster!

Apply the proven power of Aruba network automation and orchestration to modernize data center operations and go to market quickly. Recognized as an industry leader for streamlined network management, Aruba Fabric Composer now adds distributed data center management for network connectivity and security policy management.
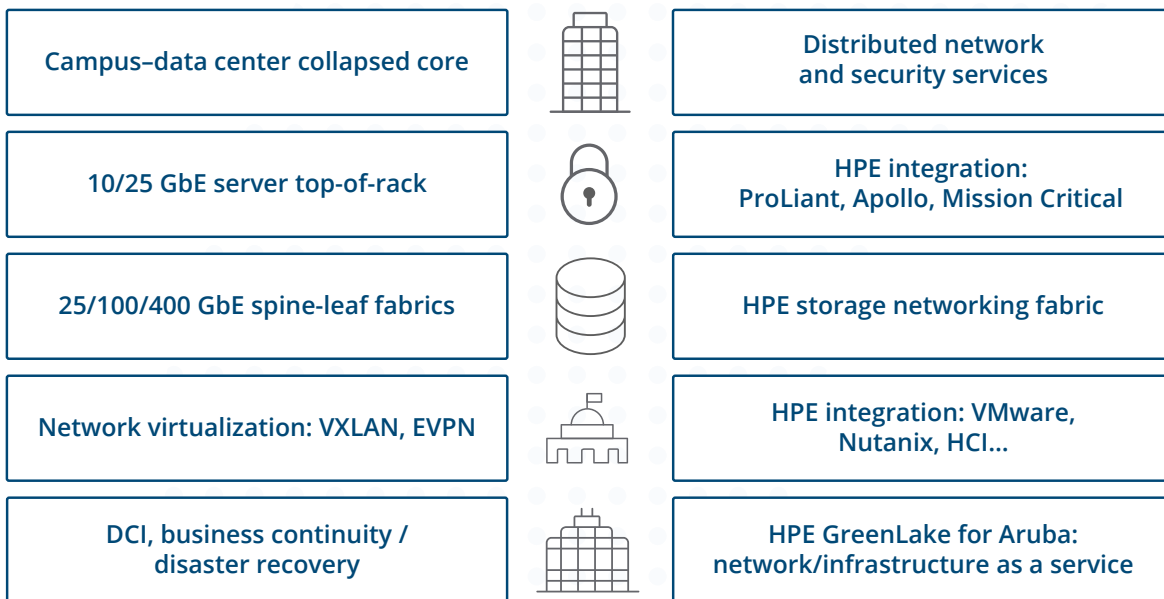
## Experience significantly lower costs of ownership

Expand the data center for less, with distributed services that require less investment in physical infrastructure, simplified licensing, and as-a-service consumption options licensing.

## Experience better user experience

Grow and improve at the same time. Address modern data management challenges and deliver higher availability, more reliable access, and heightened security at the same time.

## Aruba data center solutions address both traditional and emerging data center use cases

| Campus–data center collapsed core | | Distributed network and security services |
|---|---|---|
| 10/25 GbE server top-of-rack | | HPE integration: ProLiant, Apollo, Mission Critical |
| 25/100/400 GbE spine-leaf fabrics | | HPE storage networking fabric |
| Network virtualization: VXLAN, EVPN | | HPE integration: VMware, Nutanix, HCI... |
| DCI, business continuity / disaster recovery | | HPE GreenLake for Aruba: network/infrastructure as a service |

# Superior portfolio

Aruba products and software deliver the complete package. From small to large organizations, the Aruba comprehensive switching portfolio provides superior solutions for access, aggregation, core, and data center operations.

The AOS-CX switching software and portfolio with fixed ports or modular chassis offer non-blocking speeds from 1 GbE to 400 GbE, with the flexibility to start with a minimal port count and expand to full-density switches easily, with built-in automation and analytics. Features include high resiliency redundant management, fabric, power, and fans.

## Aruba CX Data Center switches

**Aruba CX 10000 Series**
Combining best-of-breed L2/3 switching with the industry's first hardware-accelerated services processor

**Explore series**

**Aruba CX 9300 Series**
1U fixed configuration switch supporting 32 ports of 100/200/400 GbE

**Explore series**

**Aruba CX 8360 Series**
Flexible switch options providing the ultimate in 10/25 GbE price/performance

**Explore series**

**Aruba CX 8325 Series**
High-performance 10/25/40/100 GbE data center switches

**Explore series**

**Aruba CX 6300 Series**
Out of band GbE Server Management Switch

**Explore series**

**Aruba CX 10000 Switch Series**

### Aruba CX 10000 Switch Series

The Aruba CX 10000 Series Switch with AMD Pensando is a new, next-generation data switch, merging best-of-breed Aruba data center Layer 2/3 switching with the fully programmable data processing unit (DPU) from Pensando. The Aruba CX 10000 delivers stateful software-defined services inline, at scale, with significant performance improvements at a fraction of their total operating cost.

Aruba CX 10000 enables extension of intelligent services into the data center network fabric to enable industry-standard leaf-spine networking with stateful distributed micro-segmentation, east–west firewalling, NAT, encryption, and telemetry services, all delivered inline, all the time, on every access port, closer to where critical enterprise applications run.

Aruba CX 10000 switching distributes advanced networking and security services at the network access layer edge where the applications are running.
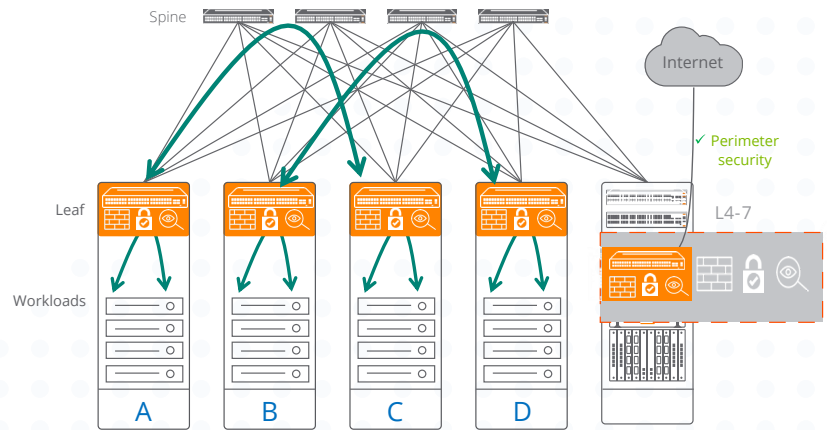
## Distributed network services

There's a better way: Distributing intelligent services closer to your applications

### Distributed network services

- ✓ Integrated 800G stateful F/W at every TOR
- ✓ Centralized management
- ✓ Improved traffic flows & performance
- ✓ Pervasive Security – Everywhere
- ✓ Macro & Micro Segmentation support
- ✓ Improved visibility w/integrated telemetry

**"100X the scale at 10X the performance nearest competitor 1/3rd the TCO."**

The solution delivers a unique blend of performance, scale, and automation for distributing advanced networking and security services where it's impractical and costly to force traffic back and forth across the network to a centralized policy enforcement point. And instead, it simply applies these services at the services network access layer edge where the applications are running.

**Aruba CX 9300 Switch Series**

Aruba CX 9300 Switch Series

### Aruba CX 9300 Switch Series

A next-generation 25.6 Tbps, 1U fixed configuration switch supporting 32 ports of 100/200/400 GbE, the Aruba CX 9300 switch is an ideal solution for flexible, cost-effective, high-density 400 GbE server, storage, and intra-fabric connectivity. Protect your current infrastructure investment while expanding server farms from 10 GbE and 10/25 GbE to 100/400 GbE EVPN-VXLAN leaf and/or spine configurations running at reduced power with a smaller footprint.

The Aruba CX 9300 supports large data center PODS of up to 6000x 25 GbE servers or up to 2000x 100 GbE servers. This is an 8x jump in scaling/density over the current Aruba CX 8325-32C, which scales to 700x 25 GbE servers.

When deployed as a spine, the Aruba CX 9300 flexibly connects to a range of leaf switches including the Aruba CX 8325, Aruba CX 8360, or Aruba CX 10000 Switch Series.

With Aruba's most recent AOS-CX release, the CX 9300-32D and CX 8325 switches provide an ideal solution for data center, cloud, and storage use cases that support top-of-rack server/storage connectivity and scale-out leaf-spine fabric topologies. These innovative AOS-CX enhancements provide storage optimization to ensure low-latency and "lossless" network quality of service (QoS) and connectivity characteristics that storage requires.

Aruba CX 8360 Switch Series

## Aruba CX 8360 Switch Series

Aruba CX 8360 v2 switches offer a flexible and innovative approach that addresses the application, security, and scalability demands of the mobile, cloud, and IoT era. The switches meet the demands of the generation core and aggregation layer, as well as emerging data center requirements at the top of rack (ToR) and end of row (EoR). They provide up to 3.6 Tbps of capacity, with line-rate Gigabit Ethernet interfaces including support for Smart Rate (1/2.5, 5 Gbps), 10 Gbps, 25 Gbps, 40 Gbps, 50 Gbps, and 100 Gbps.

The 8360 series includes industry-leading line-rate ports 1/10/25 GbE (SFP/SFP+/SFP28) and 40/100 GbE (QSFP+/QSFP28) with connectivity in a compact 1U form factor. The switches offer a fantastic investment for migrating from older 1/10 GbE to faster 25 GbE, or 10/40 GbE to 100 GbE ports.

In addition, the 48 and 32x 25G port 8360 models support low-density MACsec ports and enable secured connectivity at 10 GbE and 25 GbE over unsecured domains, and MACsec with 2x 40/100G port with the 48x 25 8360 model.



Aruba CX 8325 Switch Series

## Aruba CX 8325 Switch Series

Aruba CX  switches offer a flexible and innovative approach that addresses the application, security, and scalability demands of the mobile, cloud, and IoT era. The switches meet the demands of the generation core and aggregation layer, as well as emerging data center requirements at the ToR and EoR. They provide over 6.4 Tbps of capacity, with line-rate Gigabit Ethernet interfaces including 1 Gbps, 10 Gbps, 25 Gbps, 40 Gbps, and 100 Gbps.

The 8360 series includes industry-leading line-rate ports 1/10/25 GbE (SFP/SFP+/SFP28) and 40/100 GbE (QSFP+/QSFP28) with connectivity in a compact 1U form factor. The switches offer a fantastic investment for migrating from older 1/10 GbE to faster 25 GbE, or from 10/40 GbE to 100 GbE ports.

The switches provide an ideal solution for data center, cloud, and storage operations to support ToR server and storage connectivity and scale-out leaf-spine fabrics, with storage-optimization enhancements to ensure low-latency, lossless network and high QoS connectivity.

The Aruba CX 8325 is SPOCK (Single Point of Connectivity Knowledge) validated as part of HPE's comprehensive portfolio of servers and storage arrays to ensure end-to-end solution interoperability validated by HPE Labs. The validation removes the guesswork from SAN design, configuration, deployment, and management, helping to speed deployment and reduce both risk and need for IT expertise when deploying complex solutions.

**Aruba CX 6300M Switch Series**

### Aruba CX 6300M Switch Series

The CX 6300M 48 port power-to-port switch bundle serves as a ToR switch for 1 GbE servers and also as a 1 GbE out-of-band-management (OOBM) switch for data center server racks.

## AOS-CX cloud-native architecture

AOS-CX eliminates the complexities of managing data center networks with automation options that customize to fit any IT operating model. Proactively detect issues and speed troubleshooting with insights provided by an analytics engine embedded in every switch.

REST APIs and Python scripting provide fine-grained microservices architecture enabling full integration with other workflow systems and services. Aruba provides a collection of fully tested Ansible modules written in Python script to automate the administration of CX switches. Continual state synchronization provides superior fault tolerance and high availability. The always-on infrastructure is designed for resiliency and upgrades with zero downtime.

Full programmability and a rich feature set also enable integration with network overlays. For example, use Aruba CX switches as the underlay for VMware NSX®. Support is available for VXLAN, BGP EVPN, and other features needed by NSX.
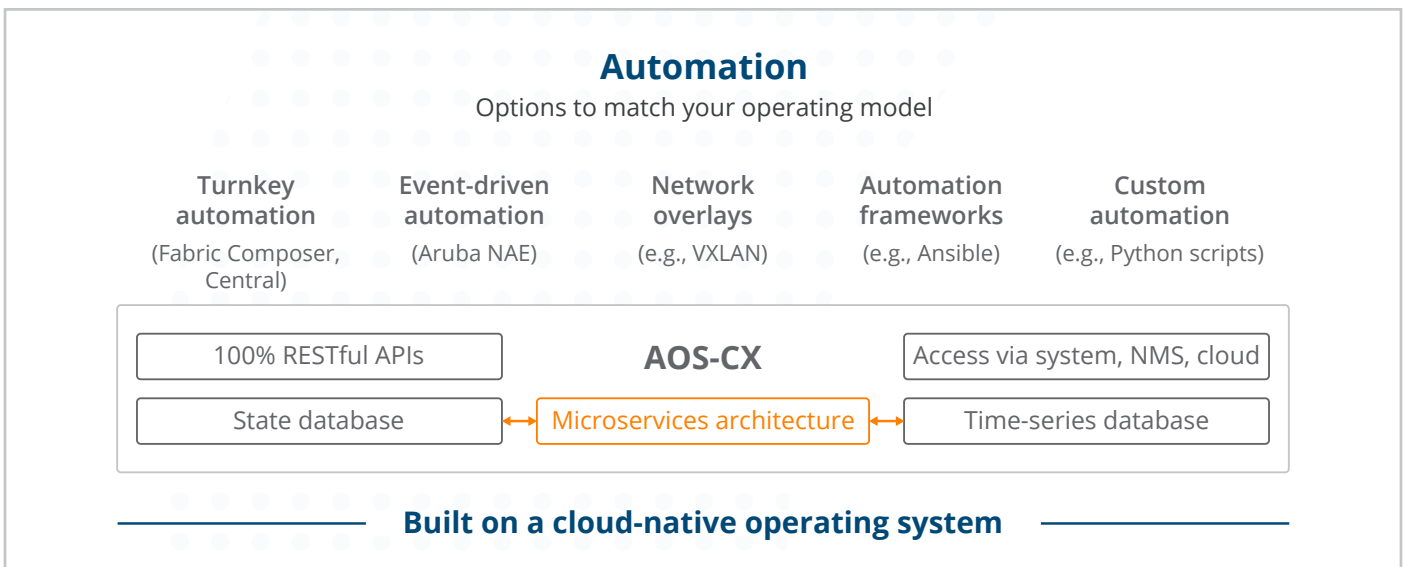


**Figure 1:** The AOS-CX switch operating system is designed with cloud-native characteristics that support many forms of automation

## Aruba Network Analytics Engine (NAE) delivers advanced telemetry and automation

Embedded into every AOS-CX switch, Aruba NEA provides an industry-leading monitoring and troubleshooting system, designed to monitor and troubleshoot network health and congestion issues.

The time series database (TSDB) stores configuration and operational state data that can be used to write troubleshooting scripts, analyze trends, identify anomalies, and predict future capacity requirements.

## AOS-CX ensures high availability and resiliency

AOS-CX maintains a synchronous state across dual control planes for a unique high-availability solution called Aruba Virtual Switching Extension (VSX). VSX redundancy is achieved by deploying two chassis with an interswitch link, with each chassis maintaining its independent control.

All software processes run as microservices that communicate through the state database of the switch, with no direct communication between microservices. If a software process crashes, the impact of the failure is limited.

VSX supports live upgrades of switch software without requiring maintenance windows. Aruba CX switches in a VSX pair can be upgraded successfully in less than an hour while continuously delivering high-performing network services without compromise.

# Aruba Fabric Composer: software-defined automation and orchestration

Aruba Fabric Composer is an intelligent, API-driven, software-defined orchestration solution that simplifies and accelerates leaf-spine network fabric provisioning across rack-scale compute and storage infrastructures. Fabric Composer increases efficiency and improves productivity for both network operators and server and virtualization administrators.

Aruba Fabric Composer software orchestrates a discrete set of switches as a single entity in a fabric topology to simplify day-to-day operations and troubleshooting. Aruba Fabric Composer works seamlessly with Aruba CX switches to optimize fabric provisioning and application performance across a wide variety of virtualized, hyperconverged, and HPE compute and storage environments.
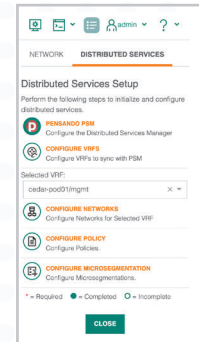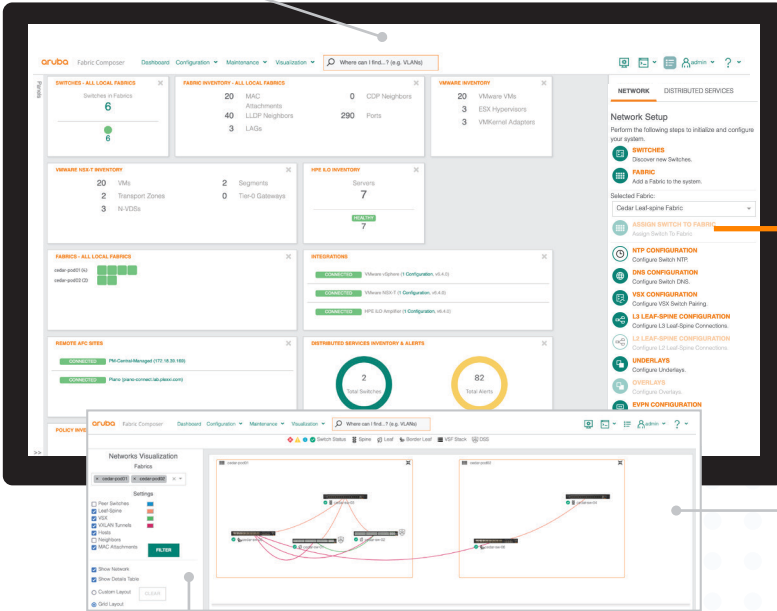
**Dashboard view**
Includes information about fabrics, switches, hosts, VMs, and security

**Workflow automations and guided setup**
Point-and-click GUI to streamline and automate away complexity

**API-level integrations with various environments**
Including HPE, Aruba, VMware vSphere, NSX, VCF, and Nutanix

**Network and switch visualization**
Hosts, MAC, neighbors, switch inventory, health status

**Figure 2:** Aruba Fabric Composer dashboard

The infrastructure- and application-aware solution also automates various configuration and lifecycle events. Aruba Fabric Composer provides a series of interactive, automated workflows to ease the administrative complexity of complex data center implementation.

## Data center ecosystem integration

Aruba Fabric Composer supports deep IT ecosystem integrations that enable administrators to manage, provision, and visualize their entire end-to-end network. An intuitive HTML5-based user interface provides a self-documenting real time map of the environment, from an end-to-end integrated view of network fabric and underlying infrastructure components such as VMs/workloads, port groups, vSwitches, and NIC cards.

A robust set of APIs and tight integration into many 3rd party data center automation stacks provide a seamless configuration and operational experience.

Aruba Fabric Composer also provides unified network and security management for the Aruba CX 10000 platform. This provides automated switch and network configurations, while also unifying security policy and distributed firewalls across the entire fabric.

# Fast and flexible IT solution integration

Aruba stands apart from other network-only vendors with HPE GreenLake hybrid cloud services and IaaS to support customer workload requirements with a variety of options: on-premises, fully managed in a pay-per-use model at the edge, in co-locations, and in the data center.

New GreenLake service offerings include VM as a service, container as a service, and SAP HANA® as a service. According to a Forrester study, customers who deployed HPE GreenLake have reported up to 80% faster time to market while deploying complex global IT projects.[2]
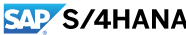
In addition to these cloud and as-a-service options, customers can select from an array of pre-engineered and tested HPE and Aruba integrations for more traditional on-premises, customer-managed options. Ready-to-deploy, custom IT data center solutions help simplify and speed IT service delivery while reducing the time, risk, and expertise needed for deployment.

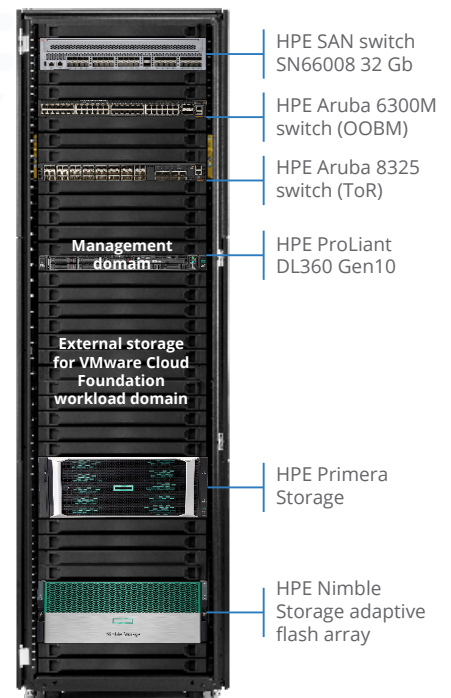According to a Forrester study, customers who deployed HPE GreenLake have reported up to

## 80%

faster time to market while deploying complex global IT projects.

## HPE Aruba 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 Aruba IT Solution Integration

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

[2] "The Total Economic Impact™ of HPE GreenLake," Forrester study commissioned by HPE, May 2022.

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New integrations span a wide range of compute, storage, HCI, high-performance computing (HPC), virtualization, and cloud offerings, including HPE ProLiant DL and DX servers, HPE Apollo servers, HPE SimpliVity, HPE Nimble Storage dHCI, HPE Synergy, HPE Superdome Flex, HPE Cray EX supercomputers, and Cray ClusterStor storage systems, as well as partner solutions with Nutanix, SAP HANA, and VMware.

## Conclusion

It is readily apparent that data centers must be modernized to remain relevant in a world where cloud technologies, operational models, and processes predominate. For the data center network, the implications are profound.

Data center network modernization requires automation for agility as well as flexibility to support modern and traditional workloads and heterogeneous infrastructure. In addition, there is a strong requirement for extensibility and API-based programmability to integrate with cloud orchestration and management platforms and other data center infrastructure (compute and storage) as well as with edge environments.

Data center network modernization requires pervasive, real-time visibility that facilitates fast troubleshooting and remediation, which in turn supports a more proactive operational posture. The network architecture and its operational model should be better aligned with the needs of ITOps, DevOps, and application developers. To serve those constituencies, the network must be simpler to provision, deploy, and manage—transparently responsive to the needs of application developers, IT Ops, and the business.

## Get ahead, quickly, with Aruba

Aruba data center networking solutions are built on a cloud-native, microservices-based platform (AOS-CX) that provides the scalability and resiliency needed for mission-critical distributed edge environments. Our strategy is to deliver solutions that help accelerate service delivery and provide a cloud-like operational experience for operators who need to rapidly provision both traditional and emerging edge data center infrastructure.

HPE and Aruba solutions help customers simplify IT (compute, storage, and network) operations by integrating directly into their existing data center IT operational frameworks to accelerate infrastructure provisioning and reduce the time, effort, and expertise it takes to deploy complex IT solution stacks.

To learn more about how Aruba data center solutions can help you refine and accelerate your edge-to-cloud strategy, visit **www.arubanetworks.com/solutions/data-center**

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Contact us at **www.arubanetworks.com/contact**

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