Harnessing data center networks for manufacturing intelligence

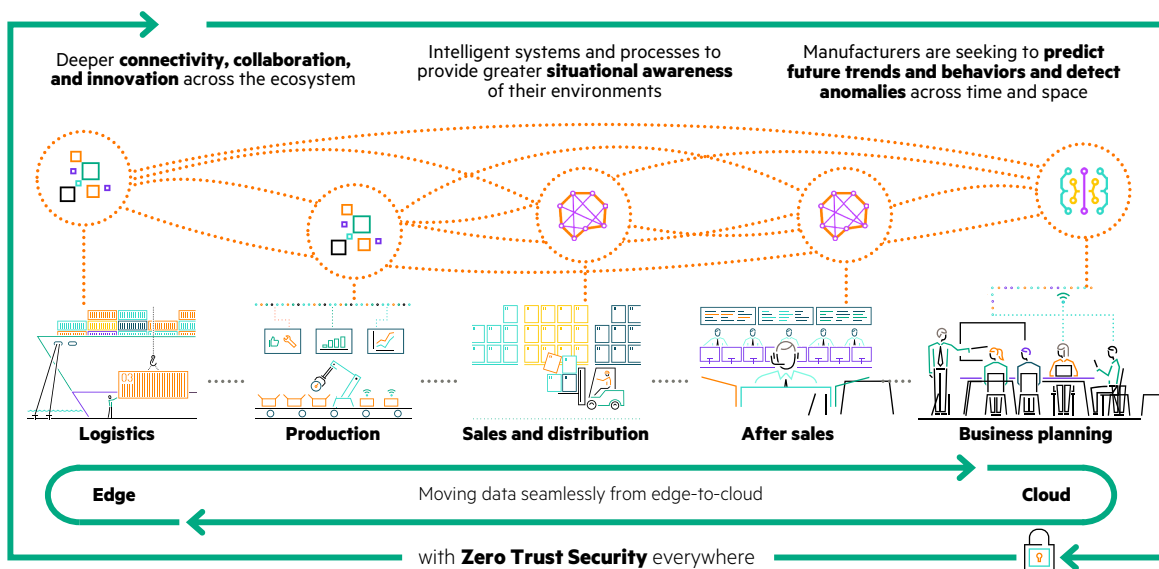# Data is at the center of the manufacturing industry

As outdated paper-based processes are transformed into digital-first smart manufacturing operations, utilization of data and analytics accelerates business insights and, ultimately, shareholder value. Placing data at the heart of manufacturing enterprises is creating skyrocketing volumes of data that require real-time data access, regardless of where the data resides.

In manufacturing, data can be housed in data centers ranging from a small handful of servers to multiple massive buildings. Regardless of footprint, data centers host critical applications spanning process control, resource management and production planning that are key to making in-spec products and delivering them to customers on-time and in-full. Further, high volumes of data drive the need for always-on, highly secure, high-performance service delivery, potentially increasing costs, using more IT resources, and creating security concerns. Manufacturers do not have the luxury of unlimited resources. To address these challenges, HPE Aruba Networking offers a security-first, next-generation data center networking solution.

Industry 4.0 can increase labor productivity by 30%, increase throughput by 30% and improve cost-of-quality by 20%.[1]

Only 30% of manufacturing companies are capturing the value from scaled-up Industry 4.0 solutions.[2]

The average cost of a data breach for the industrial sector worldwide is estimated to be about USD $4.73M.[3]

Figure 1. Data is at the center of the manufacturing industry

[1] Industry 4.0: Digital transformation in manufacturing | McKinsey

[2] Manufacturing | Automotive & Assembly | McKinsey & Company

[3] Cost of a data breach 2023 | IBM

A new era of intelligent data center networks

HPE Aruba Networking data center networking solutions provide simplified data center architecture, enhanced performance, and reduced costs—all with embedded security—delivered on the industry's first DPU-enabled switch. This unified and automated approach to data center networking offers both performance and Zero Trust Security—without sacrificing one for the other. Reduce deployment times from weeks to minutes and make better products with a data-first modernization that connects, secures, and automates your data center.

Key pillars of next generation data centers

Intrinsic security to mitigate IT and OT risks

- Increases visibility of east-west data center traffic for additional contextual information for threat detection/response.

- Reduces the risk of pivoting from IT to OT networks which could lead to catastrophic security incidents at process/production control level.

- Minimizes the need to force traffic back-and-forth across the network to a centralized policy enforcement point. This efficiency is vital in manufacturing, where latency-sensitive applications require optimized network traffic.

- Protects operations and intellectual property by boosting defense-in-depth strategy with IT and OT segmentation, while complementing controls such as VXLAN, NGFW, and DMZ, creating a multi-layered security approach tailored to the specific needs of a manufacturing organization.

Improved business continuity and app performance

- Up to 100X the scale versus traditional centralized DC designs, minimizing the risk that the network would ever become a bottleneck to handle the growing volume of data generated by IIoT assets.

- Up to 10X faster provisioning versus traditional manual CLI models.

- Uses built-in AI and machine learning (ML) to automate and accelerate IT service provisioning and for problem identification and resolution.

- Reduces troubleshooting to minutes or seconds with built-in workflows that automate thousands of CLI instructions, minimizing any network downtime required to reestablish manufacturing services or implement changes.

Streamlined and simplified to reduce costs

- Simplifies data center operating environments with unified network and security automation and policy management.

- Saves up to 70% in costs over three years using DPU-enabled core switches over traditional Next-Gen Firewalls and standard L2/3 Ethernet switches.[4]

- Reduces physical hardware by up to 50%, lowering space, cooling, and power costs making manufacturing less energy intensive and supporting Scope 1 and Scope 2 initiatives.[5]

- Provides intuitive dashboard wizards and workflows, enabling lean IT teams to keep headcounts under control while reducing operational overhead since some manufacturing sectors can struggle to hire skilled IT professionals.

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[4] TCO analysis are based on hypothetical examples, using specific industry assumptions. Individual customer configurations will vary based on specific designs and configurations. 3-year cost for next-gen firewalls and standard L2/3 TOR Ethernet switches. Assumes 500 servers, 24 server racks, 400 Gbps/rack, 8400 Gbps total bandwidth. Assumes 75% and east-west traffic needed inspection. Compared with a HPE Aruba CX10000 with AMD Pensando configuration providing accelerated stateful firewall services embedded into the L2/3 TOR switch.

[5] DG_9050a-23 DXC Secure Network Fabric.pdf

Factory data centers
Data processing and automation needs of production processes with high reliability, low-latency, redundant connectivity for uninterrupted production.

Corporate data centers
Business functions, including administrative, financial, and human resources, with robust security measures, disaster recovery capabilities, and scalability to accommodate growing business needs.

Disaster recovery data centers
Business continuity, regardless of the cause, with high availability, data replication, and a comprehensive recovery plan.

Test and development data centers
Software development, quality testing, R&D, and prototyping of new manufacturing technologies and applications, with sandboxes for testing and collaboration tools for development teams.

Co-located data centers
Shared infrastructure and services with flexibility and redundancy to offer a secure, cost-effective way to deploy services offsite.
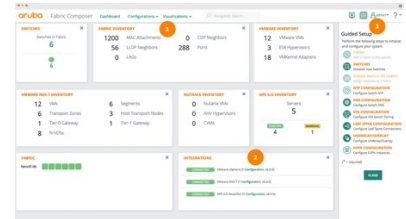
HPE Aruba Networking data center solution components

HPE Aruba Networking CX 10000

HPE Aruba Networking Central with Fabric Composer

High performing, secure, integrated: HPE Aruba Networking CX 10000 is an industry-first DPU-enabled switch with 800G of distributed stateful firewall for east-west traffic, Zero-Trust segmentation, and pervasive telemetry. Workloads are fully visible and portable. Combining the CX 10000 and HPE Aruba Networking Fabric Composer streamlines network management with an architecture that is easier, simpler, and far-reaching.

Simplified and centralized: Fabric Composer is an intelligent, API-driven, software-defined orchestration tool that automates and simplifies configurations and network provisioning. It increases efficiency and improves productivity for network operators and server and virtualization admins. Advanced segmentation and encryption drive protection deeper into the data center and scale and strengthen the security posture of network workloads.

Deploy data centers, your way

Although many manufacturers once operated fully on-premises IT infrastructures, the situation today is considerably more nuanced. Most companies maintain multiple data centers, using approaches that range from on-prem to public and private clouds. Some early public cloud adopters are even repatriating data centers back within their premises.

Regardless of the approach, the industry has fully embraced cloud-delivery models, making it critical for data center solutions to provide cloud-like performance, elasticity, security, and cost-effectiveness. This makes partnering with the right infrastructure vendor critical to gaining the flexibility you need for taking the approach that is best for your business. HPE Aruba Networking data center networking solutions meet those requirements for manufacturers in many different settings.

Managing budget and operational demands

Post-pandemic, manufacturing companies have faced increased economic volatility, reduced market entry barriers for new competitors, constrained supply chains, an aging workforce, and higher costs for labor and materials. All those factors have resulted in tighter operating margins and increased the debt/revenue ratio in the manufacturing industry. Consequently, access to credit is more difficult and IT budgets are more limited.

HPE Aruba Networking can help finance your data center and reduce budgeting complexity, while enabling you to move forward with your digital transformation initiatives and goals.

- **HPE GreenLake for Networking:** This network as a service (NaaS) offering allows you to quickly deploy and transition to a subscription based, OpEx model for better financial flexibility and improved data center network infrastructure resourcing and enables you to reserve CapEx funds for other projects.

- **Fast and flexible IT solution integration with HPE:** HPE Aruba Networking data center solutions stand apart from network-only vendors by offering a variety of deployment and integration options powered by HPE GreenLake. According to a Forrester study, customers deploying HPE GreenLake report up to 80% faster time to market when implementing complex global IT projects.
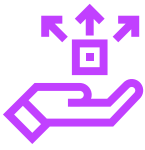
Distributed

Streamlined

Protected

Automated

Unified

In addition to cloud and as-a-service options, customers can select from an array of pre-engineered and tested HPE and HPE Aruba Networking 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.

• **HPE Financial Services:** During digital transformation, organizations typically aim to maximize technology within the available budget. Often unexplored is the flexibility to fund these new projects when the IT assets are managed across a solution's entire lifecycle. HPE Financial Services provides a suite of options to sustainably propel growth.

Why HPE Aruba Networking?

Standardize on a single vendor with tightly integrated solutions that securely connect all your enterprise domains, edge to data center to cloud, and eliminate the complexity of bolt-on and third-party additions. Gain a data-first networking modernization strategy that is grounded in five key tenets:

Distributed: puts services closer to where data/apps live. Network and security policies follow workloads and tap the power of DPU-enabled switches to offload compute.

Streamlined: breaks the cycle of "more". Subtract appliances, devices, siloed tools, and shadow monitoring networks.

Protected: drives pervasive Zero Trust defense. Supplies policy-based micro-segmentation and closes east-west traffic exposures.

Automated: eliminates manual tasks. Provides simplified orchestration, deterministic policy automation, and algo-driven infrastructure, whether physical or virtual.

Unified: provides full-stack visibility. Leverage real-time telemetry for infrastructure, applications, domains, and micro-services.

Implementing an HPE Aruba Networking data-first networking modernization strategy enables a transformational shift, powering enterprises' new era of intelligent data center networks.

Summary

Today's manufacturing landscape is flooded with data that must be processed and delivered. Many applications that use this data require real-time capabilities where incredibly low latencies are non-negotiable. Company policies enforce data handing and security policies that can be expensive and hinder performance in a legacy data center configuration. With HPE Aruba Networking solutions, you can evolve your data center network to simplify your architecture, enhance performance, and reduce costs—all with the strongest embedded security.

Our solution partners

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CSPi Technology Solutions offers Managed IT Services, Professional Services, and Cloud Services to assist clients in architecting and managing a secure, high-performance, and highly available IT infrastructure. Our engineers have industry experience and specialized certifications in networking, wireless & mobility, unified communications & collaboration, data center, and advanced security technologies, ensuring tailored solutions for our clients' needs.

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IDC Spotlight—Meeting the Need for High Performance and Security Through a Modern Datacenter Fabric

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