The Foundation of Next-Generation Data Centers

Modern-day applications driven by trends such as AI (artificial intelligence), ML (machine learning), and IoT (internet of things) drive our on-demand world. Profitability of any business in such an environment depends on the successful delivery of these applications, which in turn can only be guaranteed for the most part by a superior underlying networking infrastructure that supports them.

Traditional networking infrastructure (i.e., legacy routers and switches) have been stretched to their limits and need a gradual overhaul. And whether your team, and budget define “gradual” in months or in years, the starting gun has already sounded.

So, what’s next?

Supporting your digital organization will require your network to move beyond just connectivity– to become a platform for insights, automation, and security. Data centers need to keep pace with the change, diversity, and exponential complexity within your apps, users, devices, and the ever-expanding attack surface.

Modern workloads are growing more dispersed (across multi-clouds), driving more flows, and escalating network complexity. You need automation across the data center infrastructure, operations, and business processes to enable users and your business to respond faster to the application changes required in real time.

The data centers of tomorrow need to become a collection of global capabilities across multiple clouds (public/private/hybrid), as well as services (SaaS, PaaS, BPaaS) that enable the rapid development, testing, and deployment of modern applications.

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Let's dig a little deeper

Best-of-breed switches built on Cloud Scale ASIC technology

Here are the enhancements we have incorporated into our 3rd-generation product:

- Superior 16nm technology
- Significantly lower system cost, better reliability, and lower power
- Investment protection for the next decade
- Flexible port configuration with IP storage, FCOE/FC capabilities
- Native 25G/50G/100G ports to address increased server-facing traffic
- Security with segmentation at scale
- Cisco NX-OS mode for traditional architectures and consistency across the Cisco Nexus portfolio

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Considerations for next-generation data centers

Investing in new data center solutions can be a tremendous undertaking. It is a multi-dimensional decision involving technology, budget, services, support, and many other considerations unique to every customer. Before you engage in further decision-making, examine the following:

Consideration	Why it matters
Performance and scale	• TOR access transitioning from 10G to 25G – starting in 2018, servers are equipped with 25G and support diverse multi-cloud apps • 40G to 50G/100G transition at the core – support for high-density data, maintaining SLAs • DCI connectivity transitioning from 100G to 400G – better DR, active-active DC
Simplicity	• Easy deployment options – zero-touch provisioning, open APIs, GUI-based • Flexible architectures – consolidated LAN/SAN, multispeed, 2/3 tier architectures • Reduced OPEX through automation • Native support for SDN and DevOps tools
Visibility, performance, and security	• Pervasive data center security; perimeter security for north-south traffic and micro-segmentation for lateral east-west traffic • Enhanced real-time network visibility and flow visualization for faster troubleshooting and performance issue remediation • Consistent workload protection by enabling whitelist-based segmentation, behavior baselining and analysis, and detection of common vulnerabilities

Programmable network/fabric

- The industry's highest programmable switch with open APIs, making it ideal for DevOps environments
- Open programmability supports built-in DevOps automation tools such as Puppet, Chef, and Ansible
- Cisco NX-API supports a common programmatic approach across Cisco Nexus switches
- Power-on auto provisioning (POAP) enables touchless boot-up and configuration of the switch, drastically reducing provisioning time
- Onboard Python-scripting engine enables automation and remote operations
- Intelligent services such as Catena, PLB (pervasive load balancing), and iCAM (Intelligent CAM)

SDN or ACI (Application Centric Infrastructure)

- The industry's most comprehensive hypervisor independent and multi-cloud capable SDN solution
- Access to policy-driven services and infrastructure automation features from a single pane of glass

Assurance for compliance	• Prediction of change impact, more confident changes, and reduction of network failures caused by human errors • Verification of network-wide behavior and elimination of potential network outages and vulnerabilities • Checking for compliance against business rules and assurance of network security policy and compliance
Investment protection	• Built to accommodate the next decade of switching innovations • Enabled for future innovations with superior hardware performance, more speed for existing port density and granular security • Backward compatibility • Elimination of forklift upgrades

The foundation of digital transformation

By automating the network from edge to core, enterprise to data center – and embedding machine learning, analytics, and assurance at a foundational level – Cisco is leading the way in simplifying data center management. With the network as the foundation of digital transformation, you can innovate faster while reducing risk, cost, and complexity.

- Actionable insights to innovate faster
- Seamless automation and assurance to reduce cost and complexity
- End-to-end visibility and security to lower business risks
- Improved scale and high availability to address growing business needs

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Analytics for actionable insights

- Collecting comprehensive telemetry from Nexus 9000, Tetration enables DC operations teams with better network visualization, faster troubleshooting, and increased operational efficiencies.
- Harnessing the power of analytics, Tetration enables consistent workload protection that significantly reduces the attack surface, minimizes lateral movement of security incidents, and quickly identifies suspicious behavior.
- Continuous verification of DC network state and policy enables operators to predict outages and vulnerabilities, accelerate changes, and ensure compliance via Cisco's Network Assurance Engine.

Investment protection

- Operation in standalone NX-OS mode with industry-leading features at low cost
- Programmable open interfaces for DevOps with industy's best programmable features
- Policy-based services with features that surpass competitive SDN-based solutions

Powering and empowering

Cisco Nexus 9000 series switches are the engines of a powerhouse infrastructure that can accommodate the next decade of data center innovations. These industry-leading switches capably accommodate today's demands and tomorrow's unknowns.

Available in a broad range of compact form factors, Cisco Nexus 9000 series switches deliver proven high performance and density, low latency, and exceptional power efficiency. Realize dramatic system cost reduction, better reliability, industry-leading programmability, and pervasive visibility for your data center deployments.

- Unmatched scale and performance with Cloud Scale ASIC
- Rapid application deployment and simplified operations with Cisco ACI
- Dramatically improved visibility and security with Cisco Tetration
- Network assurance and compliance with Network Assurance Engine

Build with confidence

Visit Cisco Data Center Switches website to discover how Cisco Nexus 9000 series switches can help you build a future-proof data center. Realize superior performance, granular visibility, and end-to-end security to support workloads across data centers and multiple clouds.

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