

CISCO SYSTEMS DELIVERS MULTI-DOMAIN, MODERN NETWORKING INFRASTRUCTURE

COMPREHENSIVE, PERVASIVE AND ADAPTABLE

EXECUTIVE SUMMARY

Enterprises seek the ability to react quickly to business demands in the digital world. In response, IT professionals today face daunting tasks in deploying and managing networking infrastructure given resource and consumption constraints. Also, connectivity is no longer relegated to the confines of office walls or the traditional centralized datacenter. Rather, businesses require connectivity to extend to the campus, branch, and network edge – anywhere the user or data resides -- given the highly distributed nature of business applications. Consequently, these networks are difficult to deploy and manage for a number of reasons. The exponential growth in users, devices, IoT, mobility, cloud, and security challenges creates management challenges and operating expense pressure. Smaller network operator staffs, growing SaaS adoption, on-premise repatriation, and data regulations, such as GDPR in Europe, are also creating a host of complexities within today's networked environments.

Software-defined networking (SDN) capabilities are delivering new levels of flexibility, agility, and visibility but are typically narrow in their functionality. Intent-based networking (IBN), on the other hand, extends SDN and adds policy-based network control, network automation at scale, and comprehensive analytics for problem detection and resolution for a more holistic approach. As a result, IBN solutions are now deployed in the campus, SD-WAN, datacenter, and the cloud, but they don't necessarily reduce the overall complexity of network management. The challenge is that enterprises also have a number of technology and deployment options today. In the datacenter alone, for example, an IT professional can choose from on-premise to private and public cloud, to converged infrastructure (CI) and hyper-converged infrastructure (HCI). The decision path is complex. One size does not fit all, and specific industry verticals, workloads, and requirements often drive a blended solution. IBN promises to narrow the multitude of options and thereby simplify networking deployments and ongoing management, given its outcome-based, closed-loop nature. However, many IBN offerings are fragmented. Most solution providers only deliver part of the necessary functionality, often with a singular emphasis on security, analytics, assurance, compliance, or automation. Further complicating the evaluation process, enterprises must support the mix of legacy vs. microservices-based architectures, the latter of which

delivers superior scalability. For enterprises to fully embrace IBN, it must be open standards-based, multi-domain, multi-cloud, and simplify deployment through automation and orchestration as well as provide centralized lifecycle management.

Cisco Systems, with its comprehensive set of IBN solutions for campus, branch, SD-WAN, and datacenter, extends to leading cloud vendors for cross-domain policy consistency to meet the demands of customers regardless of location or networking platform deployment choice. Cisco's multi-domain IBN architecture is well-positioned to deliver a comprehensive, scalable, open standards-based platform for network operators. Internal development efforts and external strategic acquisitions further enhance Cisco's vision, overall capabilities, and roadmap strategy resulting in exceptional software-defined management tools and solutions.

CISCO'S INTENT-BASED NETWORKING VISION

IBN provides a closed-loop, automated approach to network management. It is closed-loop from the standpoint of providing device visibility, monitoring, analytical support, and optimization to ensure maximum uptime through automated remediation. Automation is a compelling feature of deploying IBN, with its power to prevent problems and create network operational agility through the application of analytics, artificial intelligence, and machine learning. Automation can be applied at an IT staff's discretion, given comfort level, and can also improve user productivity through faster and more predictable access to applications. Consequently, operators empower themselves to define what a network can accomplish or intend.

Cisco's networking strategy sustains all the aforementioned core elements of IBN, and its global scale in delivering cloud-centric, multi-domain networking solutions further anchors it. This framework includes the following considerations:

- A multi-domain architecture spanning campus, branch, SD-WAN, and datacenter, supported by an expansive partner ecosystem, channel and developer community through DevNet
- Cross-domain integration includes Cisco's Application Centric Infrastructure (ACI), SD-WAN solutions tailored to network complexity and IT staffing considerations with Viptela and Meraki, and integrated security and management control designed to deliver flexibility, scalability, ease of purchase and support.
- Full lifecycle management that provides rich analytics, assurance, compliance and automation capabilities that leverage artificial intelligence (AI), machine

learning (ML) and a deep data lake that brings unparalleled depth in the underlying training models

- Multi-cloud support that massively scales and bridges the gap between business applications and infrastructure from an orchestration and management perspective

INFRASTRUCTURE THAT SCALES

Cisco embraces SDN and consistently executes on an IBN strategy that ensures “day two” operational efficiencies dating back to the launch of Cisco ACI for the datacenter in 2014. A focus on providing its customers the flexibility to deploy and operate distributed networks based on workflow and user needs is key to the company’s success. This requires a modern infrastructure architecture that is multi-cloud, web-scale, microservices-based and containerized. It should also fully integrate the hardware and software stack to ensure the highest levels of consistency, performance and uptime across the enterprise. Consequently, over the past five years, Cisco has added significant functionality through several different platforms, including Cisco ACI as a foundational base, Cisco Network Assurance Engine, Cisco Digital Network Architecture (DNA), and Cisco DNA Center. We examine each of these offerings and evaluate their potential impact.

CISCO APPLICATION CENTRIC INFRASTRUCTURE (ACI)

Cisco ACI is a software-defined architectural platform that supports multi-cloud and multi-domain environments. Its value lies in the ability to be deployed anywhere and scale massively to ease application agility and datacenter automation. At a high level, ACI promises to deliver:

- Proactive and predictive networking capabilities to address multiple use cases.
- The ability to run on any platform (hypervisor, container), at any location (on-premise, cloud and edge), and support any workload.
- A consistent policy deployment regardless of location with high availability, security, and scale.

ACI is compelling, given its flexibility, intelligence, and real-time insights capabilities all managed through a single pane of glass.

CISCO NETWORK ASSURANCE ENGINE (NAE)

Cisco Network Assurance Engine (NAE) provides continuous verification and analysis of a datacenter network to ensure intent and plays a vital role in Cisco's ACI overall offering and functionality. At a high level, NAE:

- Predicts the impact of changes for improved agility.
- Verifies network behavior and constantly analyzes its state against defined intent and policy to ensure maximum uptime.
- Assures network security policies are in place and checks against defined business rules to ensure compliance.

NAE is compelling, given it scans the entire network policy profile and builds predictive models that leverage Cisco's quarter-century of network deployment knowledge to identify potential issues and provide proactive remediation recommendations.

CISCO DIGITAL NETWORK ARCHITECTURE AND CISCO DNA CENTER

Cisco DNA is an open, extensible, software-driven architecture that accelerates and simplifies enterprise network operations while lowering costs and reducing risk. It comprises Cisco's implementation for access spanning both campus and branch as well as SD-WAN networks. Cisco DNA Center is the network controller that allows operators to design, configure, manage, optimize, and troubleshoot Cisco DNA-based networks. Cisco DNA Center features include:

- A single dashboard facilitates network design, policy creation, device visibility, multi-domain integration, and lifecycle management.
- Advanced automation that uses defined policies to create and distribute network device configurations.
- Smart analytics that use artificial intelligence and machine learning to provide actionable insights.
- Secured, group-based segmentation that extends from campus and branch to datacenters through its integration with Cisco ACI.
- Threat detection and response, as well as open APIs for streamlining business and IT processes with the network.

Cisco DNA Center warrants consideration given its overall robustness as well as its Encrypted Traffic Analytics (ETA) feature in conjunction with Cisco Stealthwatch. ETA searches for malware in encrypted traffic and uses machine learning and telemetry

information to discover infections without the need for full decryption. ETA runs on a number of Cisco routers and switches, including the Catalyst 9000, ISR, ASR, and CSR families.

LEADERSHIP THROUGH ORGANIC AND EXTERNAL GROWTH

Cisco continues to invest in a considerable number of internal development initiatives to drive robust agility, reliability, and trustworthiness that includes Cisco Network Assurance Engine and Cisco Tetration, among other offerings. The networking giant is also using strategic external acquisitions to fuel innovation and growth while simultaneously delivering enterprise agility, collaboration, security, visibility, and improved customer experience. Some examples include:

- Cisco SD-WAN, powered by Viptela and Meraki provides customers with the most flexible path for SD-WAN implementation based on the level of an organization's network topology complexity and IT staffing resources.
- July Systems and its integration into Cisco DNA Spaces bring the added depth of location-based services functionality that delivers richer customer experiences and value beyond basic Wi-Fi connectivity.
- Duo Security delivers unified access security and multi-factor authentication through the cloud, simplifying policy management, and expanding endpoint visibility.

CUSTOMER TESTIMONIAL – UNIVERSITY OF UTAH

The University of Utah has turned to Cisco to modernize its datacenter operations to reduce repetitive manual tasks such as device provisioning, to gain application and infrastructure visibility, and to ensure the highest levels of security. This is no easy feat given the school operates four teaching hospitals and twelve medical clinics that operate within ten percent of the contiguous United States.

Cisco ACI serves as the foundation of a new network architecture supporting hundreds of applications with automation capabilities that have eliminated human error and dramatically mitigated network downtime. Most importantly, according to the University of Utah, Cisco ACI has facilitated a network to application-centric transformation. As a result, the university reports that it has finally realized proactive control over network functions through a modern architecture that supports hybrid/ multi-cloud needs as well as data segmentation in a multi-tenant environment. Given this new-found agility, the IT staff is able to focus on more strategic, value-added endeavors such as the ability to

stand-up a disaster recovery center in record time and improve the overall patient care experience. To read the Cisco Systems case study, visit this [webpage](#).

CUSTOMER TESTIMONIAL – TATA CONSULTANCY SERVICES

Tata Consultancy Services (TCS), based in Mumbai, India, is one of the world's largest IT outsourcing companies. It leverages Offshore Development Centers (ODCs) to replicate a client's environment in order to optimize the design of new networks. In the past, configuring a topology that could enforce dozens of different policies within a company's campus and datacenters was a manual process requiring extensive physical rewiring each time a new ODC needed to be created or personnel changed. To solve this challenge, TCS adopted Cisco's multi-domain, intent-based networking architectures in the campus using Cisco SD-Access with Cisco DNA and in the datacenter using Cisco ACI. Both were, consequently, integrated for consistency and policy enforcement that spanned access to application deployment.

As a result of implementing these Cisco solutions, TCS reduced its ODC creation time from 40 days to 3 days. TCS also realized the agility of new-found human resources through the ability to move employees more easily among engagements, thus improving its project management execution. To learn more about the Cisco Systems and TCS strategic alliance, visit this [webpage](#).

CALL TO ACTION

Enterprises that can delight customers and bolster employee productivity stand to gain an advantage over other competitors. Robust, dependable connectivity plays a significant role in the realization of enterprise digital transformation, and IT networking staff require modern infrastructure that scales to support not only the datacenter but also the campus, branch, and network edge. Given today's highly distributed nature of business applications and IT staff resource constraints, SDN and, more importantly, IBN plays a critical role in solving these challenges and managing networking complexity. However, the number of IBN solutions available is overwhelming, and it is often difficult to discern which ones truly deliver on the promise of intent. The right solution is open, multi-domain, multi-cloud, enables automation for remediation, and then eases deployment and ongoing management.

Cisco Systems warrants consideration given its networking approach is anchored by deep deployment and operational experience in multi-tenant, multi-cloud environments. The company continues to make significant investments in its hardware, software, and

services portfolio, both organically and through acquisition, to position itself to capitalize with enterprises that wish to modernize networking infrastructure and operations. Moor Insights & Strategy recommends Cisco Systems to any enterprise seeking world-class networking agility, visibility, automation, uptime, and a desire to bolster customer experience.

IMPORTANT INFORMATION ABOUT THIS PAPER

CONTRIBUTOR

Will Townsend, Senior Analyst at [Moor Insights & Strategy](#)

PUBLISHER

Patrick Moorhead, Founder, President, & Principal Analyst at [Moor Insights & Strategy](#)

INQUIRIES

[Contact us](#) if you would like to discuss this report, and Moor Insights & Strategy will respond promptly.

CITATIONS

This paper can be cited by accredited press and analysts but must be cited in-context, displaying author's name, author's title, and "Moor Insights & Strategy." Non-press and non-analysts must receive prior written permission by Moor Insights & Strategy for any citations.

LICENSING

This document, including any supporting materials, is owned by Moor Insights & Strategy. This publication may not be reproduced, distributed, or shared in any form without Moor Insights & Strategy's prior written permission.

DISCLOSURES

This paper was commissioned by Cisco. Moor Insights & Strategy provides research, analysis, advising, and consulting to many high-tech companies mentioned in this paper. No employees at the firm hold any equity positions with any companies cited in this document.

DISCLAIMER

The information presented in this document is for informational purposes only and may contain technical inaccuracies, omissions, and typographical errors. Moor Insights & Strategy disclaims all warranties as to the accuracy, completeness, or adequacy of such information and shall have no liability for errors, omissions, or inadequacies in such information. This document consists of the opinions of Moor Insights & Strategy and should not be construed as statements of fact. The opinions expressed herein are subject to change without notice.

Moor Insights & Strategy provides forecasts and forward-looking statements as directional indicators and not as precise predictions of future events. While our forecasts and forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could cause actual results to differ materially. You are cautioned not to place undue reliance on these forecasts and forward-looking statements, which reflect our opinions only as of the date of publication for this document. Please keep in mind that we are not obligating ourselves to revise or publicly release the results of any revision to these forecasts and forward-looking statements in light of new information or future events.

©2020 Moor Insights & Strategy. Company and product names are used for informational purposes only and may be trademarks of their respective owners.