IDC ANALYST CONNECTION

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This IDC Analyst Connection discusses the elements that are required for a network operating system to support digital transformation and datacenter network modernization.

Why the Choice of Network Operating System Is Critical to Successful Datacenter Network Modernization

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Questions posed by: Dell

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Q. How does the choice of network operating system (NOS) support successful datacenter network modernization?

A. In discussions with enterprises, IDC often hears talk of the datacenter network as the proverbial long pole in the tent, the infrastructure element that inhibits the agility and flexibility of the datacenter and the applications it supports. The NOS serves as the software that enables features and functionality on network switches.

Given that datacenter network modernization involves an emphasis on intelligent automation, software has become a defining element, gaining unprecedented importance in datacenter networking. In fact, when IDC thinks of datacenter network refreshes now, we focus more on software than hardware, which is a change from the hardware-defined approach to networking that marked the client/server era.

Q. What are the specific requirements that a network operating system must meet to support digital transformation and datacenter network modernization?

A. The NOS must be capable of supporting modern network architectures and cloud-centric network operations. It should possess the openness and programmability necessary for integration with orchestration systems, software-defined networking (SDN), configuration automation systems such as Ansible, and other popular open source tools such as Telegraf, Grafana, and Prometheus. Support for OpenConfig APIs and advanced telemetry — essential for real-time monitoring and faster troubleshooting and remediation — is also important. Linux-based software is well suited for these purposes, which is why we have witnessed so much innovation in Linux-based networking, including NOS.

A related benefit is that Linux-based NOS can be managed by the same automation and management tools, if not the same teams, that manage Linux on servers. The result is tool consolidation and consistency across datacenter infrastructure — servers and network switches — which can result in lower capex costs and reduced operating costs. As a result, the datacenter network, through the adoption of Linux-based NOS, is capable of meeting the need for automated agility, flexibility, extensibility, and programmability. In many organizations, that is long overdue.

Q. What use cases are becoming more prevalent as enterprises modernize their datacenter networks in pursuit of digital resiliency and digital transformation?

A. In modernizing a datacenter network, organizations need to ensure that the initiative extends across architecture, infrastructure, and day-to-day operations. Architecturally, many organizations are seeking to emulate the topologies found in the datacenter networks of digital natives and hyperscalers. Enterprises aren't hyperscalers, but they are in the midst of digital transformation. Transformation entails adaptation of the cloud principles and architectural constructs that have been so successful in hyperscale datacenter networks that run at unprecedented scale and use comprehensive automation to achieve unsurpassed operational efficiencies.

Of course, enterprises want to have these innovations on their own terms, for their own use cases. The two most widely understood and high-value use cases in datacenter networking are a flat, highly scalable, leaf-spine Clos datacenter fabric (underlay) using the Layer 3 Border Gateway Protocol (BGP), just like a hyperscale datacenter network but adapted for enterprises; and a highly scalable, leaf-spine Clos datacenter fabric that enables Virtual Extensible LAN (VXLAN) tunneling of Layer 2 traffic over a Layer 3 Border Gateway Protocol Ethernet VPN (BGP-EVPN) network. The latter is for the vast number of enterprise datacenters that must support both traditional and modern applications, including those built with containers and microservices and orchestrated with Kubernetes.

Q. Open source SONiC has received increasing attention. How has SONiC evolved? Where is it deployed today, and what would make the technology more attractive to enterprise customers?

A. SONiC is an open source Linux NOS, first released by Microsoft in 2016 and contributed to the Open Compute Project (OCP) in 2017. It is built atop the OCP's Switch Abstraction Interface (SAI), allowing it to run across hardware platforms powered by a wide range of network silicon, which gives customers flexibility and choice in how they design, build, and manage their networks. IDC recognizes SONiC as the leading open source standard bearer for network disaggregation, which involves the decoupling of network software from underlying network hardware.

In fact, IDC has witnessed growing demand for datacenter switches that ship with or will run SONiC. We forecast a SONiC datacenter switch market worth more than $2 billion by 2024, driven by a growing community-based ecosystem and increased adoption among not only hyperscalers, where SONiC made its initial inroads, but also tier 2 clouds, telco clouds, cable MSOs, and large enterprises globally.

IDC believes that vendor support will be critical to help popularize SONiC and make it more amenable to enterprises and their requirements. Enterprises will want to ensure that SONiC is adapted for their environments, with hardened and validated features and integrations as well as a predictable, reliable road map for future enhancements. Capabilities should include extensive Layer 2/Layer 3 protocol support and integration with all the tools and platforms mentioned previously. Unlike hyperscalers, enterprises also want comprehensive service and support for network hardware and software, which is often not available to them if they use a purely open source distribution of the software on a bare metal switch from an ODM supplier.

Q. With the move to software-driven networking and cloud-centric operating models, how does a modern NOS address the concerns and priorities of various types of enterprise buyers?

A. An enterprise financial buyer will be looking at how the network and its software help reduce the cost of datacenter networks and deliver faster ROI on network investments. A CIO or other C-level technology buyer will also be concerned with capex and opex IT costs. He or she will also prioritize the operational efficiencies derived from the use of a modern Linux NOS with microservices-based modularity. CIOs might also consider how the software contributes to increased agility, especially in relation to how the network becomes better aligned with the needs of application developers and DevOps.

Cloud and IT architects will also consider how the network dovetails with application developer and DevOps cadences, processes, and requirements, but they'll also put a premium on integration with popular Linux automation tools, including Ansible and Terraform. They might also emphasize how the software facilitates network programmability for optimizations and rapid change management. In addition, modern NetOps teams will be looking at how the NOS delivers agility, flexibility, and programmability. They will want to ensure that the network and its operators can move as fast and effectively as other automated infrastructure and operations teams. Reliability and scalability also rank as perennial concerns for network operators, who will value robust Layer 2/Layer 3 protocol support and the assurance that derives from a predictable road map with a continual stream of enhancements relative to their needs.

About the Analyst

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Brad Casemore is IDC's Research Vice President, Datacenter Networks. He covers networking products and related technologies and platforms typically deployed in the datacenter. Mr. Casemore also works closely with IDC's Enterprise Networking, Server, Storage, Cloud, and Security programs to assess the impact of emerging IT and converged and hyperconverged infrastructure. He researches technology areas such as Ethernet switching in the datacenter, application delivery controllers (ADCs), SD-WAN, WAN optimization, network virtualization, network programmability, and software-defined networks (SDNs).

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