Realizing the Promise of Software-Defined Networking

PROGRAMMABILITY is the key to claiming SDN's powerful benefits.

BUSINESS MOVES FASTER TODAY THAN EVER. Architectures such as cloud computing and mobility have consumers demanding instant access to goods and services, manufacturers demanding instant access to suppliers and investors demanding instant access to trading floors and market data.

Infrastructures are more complex today than ever, too. Indeed, the number of applications supported by the average enterprise doubles every four years, according to research from analyst firm IDC.

Put those two forces together, and the result is a set of requirements that even the most skilled IT administrators can't possibly satisfy with manual techniques. The vast majority of organizations are looking to automate IT tasks, accelerate application deployment and better align their IT infrastructure with business requirements. Customers are increasingly looking to software-defined networking (SDN) as a platform capable of hosting a myriad of orchestration and IT workflow automation solutions to drive them toward their goal.

Companies must be capable of programming their network to react to shifting circumstances in ways that reflect their unique goals and challenges.

Hence the growing appeal of SDN. By abstracting network control and automating manual tasks, SDN empowers businesses to respond dynamically to resource requests, performance shifts and security threats.

Or so goes the theory, at least. To turn that theory into reality, companies must be capable of programming their network to react to shifting circumstances in ways that reflect their unique goals and challenges. That programmability must extend to the entire network, too, not just Layers 2 and 3, says Brad Casemore, IDC's research director for data center networks. These days, Layer 4 through 7 services such as load balancing and authentication play a role that is every bit as important in meeting enterprise-class performance, availability and security requirements.

"Everything in the network fits together as a continuum, and it goes all the way from Layer 2 to Layer 7," Casemore says.

The question many companies face, however, is how to implement SDN in a way that enables them to program across that entire continuum. According to Casemore and other experts, you'll need the following critical elements to get the job done:

An automation and orchestration framework

Automation and orchestration frameworks help IT organizations execute network management tasks in prearranged sequences. "You can align the infrastructure behind and in support of the application workloads, and you can do it in an automated way that's policy-based," Casemore says.

Cisco Application Centric Infrastructure (ACI) is an especially powerful example. A comprehensive SDN architecture, Cisco ACI decouples application policy from the underlying IP network and provides a common policy, management and operations interface. Cisco ACI is built on a policy language that specifies what the business applications need from the network. Unlike any other framework available, however, Cisco ACI enables IT administrators to control and automate physical or virtual networks, application services and security through a single set of centrally managed policies. The resulting efficiency and reduced operational overhead can cut application deployment times from weeks to minutes while you align your infrastructure more closely with organizational objectives.

F5 Synthesis Integration with Cisco ACI Through the F5 Device Package
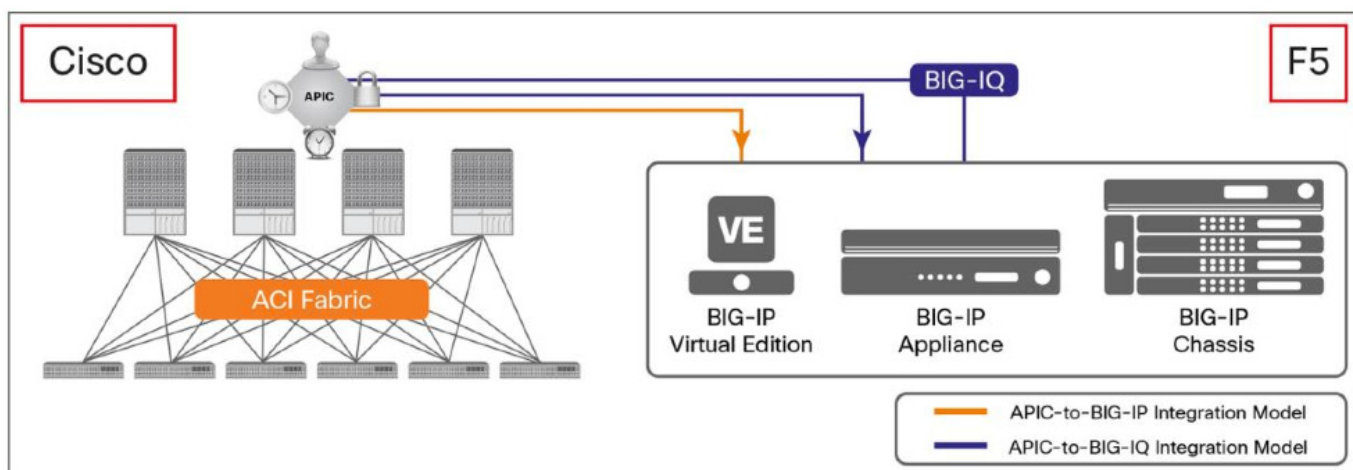
"IT can be a service only if it can move at speed. SDN helps bring the network into alignment with consumption of ITaaS."

—Brad Casemore, research director
IDC
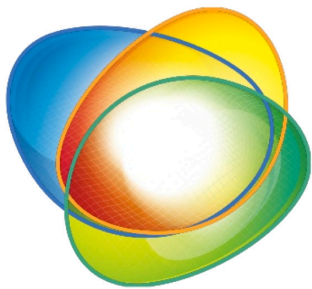
F5 Synthesis equips infrastructures to optimize, scale and secure applications as needed without administrator intervention.

Software-defined application services

Software-defined application services do for Layers 4 through 7 what automation and orchestration frameworks do for Layers 2 and 3. F5 Synthesis, for example, delivers an application services fabric that gives administrators fine-tuned automated control over any application on any virtual or physical platform, whether public or private. Deployable across hardware, software and cloud environments, Synthesis equips infrastructures to optimize, scale and secure applications as needed without administrator intervention.

Thanks to open APIs, moreover, companies can seamlessly connect F5 Synthesis with Cisco ACI to create a tightly integrated solution that provides centralized control over the entire network from top to bottom, enabling companies to deploy and deliver applications with the speed, reliability and security necessary to meet today's business challenges while protecting their existing investments in F5 BIG-IP application delivery controllers.

SDN programming technologies

Centralized control is an essential part of SDN, but companies must be capable of customizing that control to meet their applications' widely varying needs. Only a network equipped with open, services-enabled APIs and robust scripting tools can support that kind of customization.

Through its iControl API, for example, F5's BIG-IQ management platform enables companies to address application deployment and delivery issues with granular precision. With F5's iRules data plane scripting language, networks can read and act on application data flows bringing context that enables intelligent service insertion automatically. Together, iControl and iRules equip technicians to provision resources and enforce policies on the fly as operating conditions and application requirements dictate without having to master complex coding skills, resulting in decreased implementation times and reduced administrative risk.

F5's iApps technology further simplifies SDN programming by enabling technicians to create predefined application delivery templates containing all the steps involved in complex application networking tasks. Like iControl and iRules, moreover, iApps is a proven, well-documented technology backed by thorough support and a worldwide developer community.

Companies need an infrastructure with the speed, flexibility and efficiency to deliver IT as a service (ITaaS). SDN makes provisioning and operating such an infrastructure possible.

An SDN controller

Tools such as iApps define application networking tasks, and iControl and iRules implement and enforce them. Modern SDN controllers such as Cisco Application Policy Infrastructure Controller (APIC) are responsible for managing policy.

The Cisco APIC, for instance, provides a unifying point of automation and management for the Cisco ACI automation and orchestration framework. With Cisco APIC's help, organizations can centrally administer application provisioning across physical as well as virtual resources; application, tenant and topology monitoring; and scale and performance troubleshooting.

What's more, F5's BIG-IQ management platform enables organizations to supplement those Layer 2 and 3 capabilities with dynamic application- and tenant-specific Layer 4 through 7 capabilities by integrating the Cisco APIC with their F5 application services environments.

CONCLUSION

To thrive in today's lightning-paced economy, companies need an infrastructure with the speed, flexibility and efficiency to deliver IT as a service (ITaaS). SDN makes provisioning and operating such an infrastructure possible.

"IT can be a service only if it can move at speed," IDC's Casemore says. "SDN helps bring the network into alignment with consumption of ITaaS."

Meeting that goal, however, requires a combination of technologies, including an automation and orchestration framework, for coordinating Layer 2 and 3 services; software-defined application services, for automating and orchestrating Layer 4 through 7 services; open, services-enabled APIs and scripting tools, for customizing and implementing network tasks; and an SDN controller, for centrally managing network policies.

Cisco and F5 provide state-of-the-art, seamlessly integrated technologies in all those categories. Together, those solutions give companies the comprehensive network programmability they need in order to meet the ever-changing requirements of their ever-multiplying applications.

To learn more about the F5 and Cisco alliance and how their partnership and solution integration is helping companies realize the SDN vision today, visit the F5 website here and the Cisco website here.