Cisco Launches APIC-EM Controller for LAN and WAN Service Orchestration

Cisco Makes APIC-EM Generally Available

Cisco announced the general availability of Cisco Application Policy Infrastructure Controller Enterprise Module (APIC-EM), a software-defined networking (SDN) controller designed to orchestrate and manage local-area networks (LANs) and wide-area networks (WANs) composed of Cisco infrastructure. APIC-EM is shipping initially with three network applications tailored to address specific use cases. The IWAN Application allows enterprises to provision and manage WANs based on Cisco's Intelligent WAN (IWAN) architecture. The Plug and Play Application unifies the configuration process for Cisco switches, routers, and wireless access points. Finally, the Path Trace Application is a troubleshooting tool that can help administrators analyze and diagnose trouble on the path between any two network nodes.

An SDN Controller for Enterprise LANs and WANs

APIC-EM is Cisco's flagship SDN controller for enterprise LAN and WAN networking. It might be more apt to call it a network service orchestration and operations tool. While some SDN controllers center on defining network flows for specific classes of traffic, APIC-EM contains a policy-modeling engine that translates the best practices contained within hundreds of pages of the Cisco Validated Design catalog into software controls that can be manipulated via business logic. A network manager can define simple policies and goals for a network service using a graphical user interface (GUI), and APIC-EM translates those commands into network provisioning and configurations.

In the context of SDN controllers, the protocols and application programming interfaces (APIs) used to communicate with network infrastructure are known as southbound interfaces. APIC-EM contains a southbound abstraction layer (SAL), which translates the capabilities of network devices and the protocols used to communicate with them into objects that can be manipulated by the policy-modeling engine. Today, APIC-EM's SAL component communicates with network infrastructure via Cisco's command-line interface (CLI) and the Simple Network Management Protocol (SNMP). Cisco is considering the addition of the Network Configuration Protocol (NETCONF) as another southbound interface, and it will support others as customer demand dictates.

On the northbound side of APIC-EM, Cisco will offer applications that enable specific use cases for the controller. The initial general release will ship with three applications. Cisco previewed the IWAN Application at Cisco Live this past summer. It is a WAN design application that allows network managers to provision technologies like Performance Routing and Dynamic Multipoint VPN with a handful of clicks in a GUI rather than requiring dozens or hundreds of CLI commands.

The Plug and Play Application also abstracts away CLI in favor of GUI commands, in this case for the initial configuration of newly installed Cisco switches, routers, and wireless access points.

The third APIC-EM application is Path Trace, a network visibility tool that uses 5-tuple information (source and destination addresses) to present the path that traffic is taking between two network nodes. It displays the network path on a topology map so that a network administrator troubleshooting a problem can see every hop the traffic is taking.

In addition to these applications, Cisco offers a REST API for northbound programmability. Cisco is opening the API to everyone, and the company is working with several partners on building applications on top of APIC-EM.

Cisco has certified the initial scale of APIC-EM at 2,000 network devices, which happens to be the size of Cisco's largest current production deployment. However, the product will surely scale higher in subsequent releases. It supports all Catalyst switches, ASR and ISR routers, and Aironet wireless LAN equipment released over the last few years. Though it does not manage third-party network equipment, Cisco offers APIs that allow third-party vendors to add their equipment to the system.

EMA Perspective

The advent of SDN has created a great deal of excitement and change in the networking industry, but many enterprises have been slow to adopt. They want to see SDN solutions that solve real business problems. APIC-EM addresses a business problem that has always been present in the networking industry -- complexity. The art of configuring and managing networks is a highly manual and time-consuming discipline. And while it has its value, CLI is an arcane language that does not adequately serve a business that requires infrastructure agility and flexibility. With APIC-EM, Cisco has spent nearly two years abstracting away the complexity of CLI, making complex routing protocols configurable via business logic instead of CLI commands. It has translated its Cisco Validated Designs into software controls that allow business logic to manipulate CLI transparently. This means that, in most cases, provisioning WAN architecture no longer requires a highly skilled network engineer.

SDN has prompted many networking professionals to ask themselves how they can adapt to this changing world. With networking becoming more programmable via open APIs, do engineers need to become software developers and build applications on top of SDN controllers? The short answer is no. Risk-averse enterprises are not going to adopt a new technology if it requires a significant portion of their IT organization to learn an entirely new technology discipline. Instead, SDN solutions need to ship with applications that serve specific use cases. SDN vendors have recognized this reality and APIC-EM is an example of a controller that has adapted.

The first three applications introduced with APIC-EM cover three of the basic tasks involved in network management: initial configuration, service provisioning, and troubleshooting. Enterprise Management Associates (EMA) research has found that more than half of enterprises want network management technologies that enable them to push configuration changes out to multiple devices at once. Nearly half also want the ability to use configuration templates without having to rely on scripting. With APIC-EM, Cisco has baked both of these capabilities into the Plug and Play Application with a simple GUI interface that a low-skilled administrator can use. The IWAN Application provides a provisioning tool for Cisco's software-defined WAN solution. And Path Trace is an excellent example of how simple network troubleshooting can be in an SDN environment.

While APIC-EM isn't the traditional SDN controller we all envisioned when OpenFlow first hit the scene as the next great networking technology, it is certainly a technology that solves problems for network managers. It simplifies and automates a great many manual tasks usually performed by valuable and expensive network engineers. These engineers will find themselves with far fewer manual tasks to perform on a daily basis. Instead, they will have more time to think strategically about how the network can serve the business.

Enterprises with a Cisco-based network should evaluate APIC-EM to determine if it meets their needs for a network service orchestration and management tool.