Cisco and Puppet: Bringing Automation to Next-Generation Networks

Cisco Nexus 9000 Series Switches integrate with automation software from Puppet Labs to bring more operational agility, efficiency, and visibility to the data center, empowering businesses to respond to changing needs.

As businesses look to IT as a point of strategic differentiation, gaining agility and efficiency in the datacenter becomes more critical than ever. Fundamental to IT's increasing importance is its ability to respond quickly to changing business requirements. At the same time, IT professionals are continually asked to do more with flat or decreasing budgets. This confluence of factors has caused IT organizations to become eager to adopt technologies that help them deliver efficiency and agility to businesses.

Server virtualization has reduced data center costs by bringing flexibility into the management of computing resources. Automation based on server virtualization has further reduced operational expenses. However, a server-centric view of the datacenter is a limited view. The datacenter has a mix of bare-metal and virtual resources for computing, networking, network services, security, and storage. IT organizations that seek more agility are looking for ways to incorporate automation capabilities into the entire infrastructure.

The automation features incorporated into the enhanced Cisco® NX-OS Software on the Cisco Nexus® 9000 Series Switches, and the integration of powerful automation software from Puppet Labs into those switches, help IT organizations bring in the agility and efficiency that businesses want.

The Cisco Nexus 9000 Series Switches also support the Application Centric Infrastructure (ACI) mode. ACI is an innovative architecture that radically simplifies, optimizes, and accelerates the entire application lifecycle. Cisco ACI framework provides open APIs, open standards, and open source elements to enable software flexibility for development and operations (Dev Ops) teams and ecosystem partner integration. The integration with automation software from Puppet Labs with ACI will enable Application Centric automation in the infrastructure.

Solution Overview

Automation is central to achieving the vision of a truly agile datacenter. Network automation is an integral part of the overall infrastructure automation. It paves the way for the ability to deploy the infrastructure quickly, provision workloads on demand, and to efficiently manage and monitor the infrastructure. Cisco NX-OS, the full-featured, modular, and scalable network operating system that powers the Cisco Nexus 9000 Series Switches, incorporates numerous automation capabilities to help with network automation.

Power-on Auto Provisioning (POAP) is integrated into many Cisco Nexus switches. POAP automates the process of upgrading software images and installing configuration files on Cisco Nexus switches that are being deployed in the network for the first time. The switches also include numerous new programming capabilities like NX-API, a web-based API for programmatic access to the switch; advanced Python scripting, which allows for on-device and off-device Python programming; underlying Linux shell access through Bash access; and an Extensible Messaging and Presence Protocol (XMPP)-based publish-subscribe messaging bus. Each of these programming

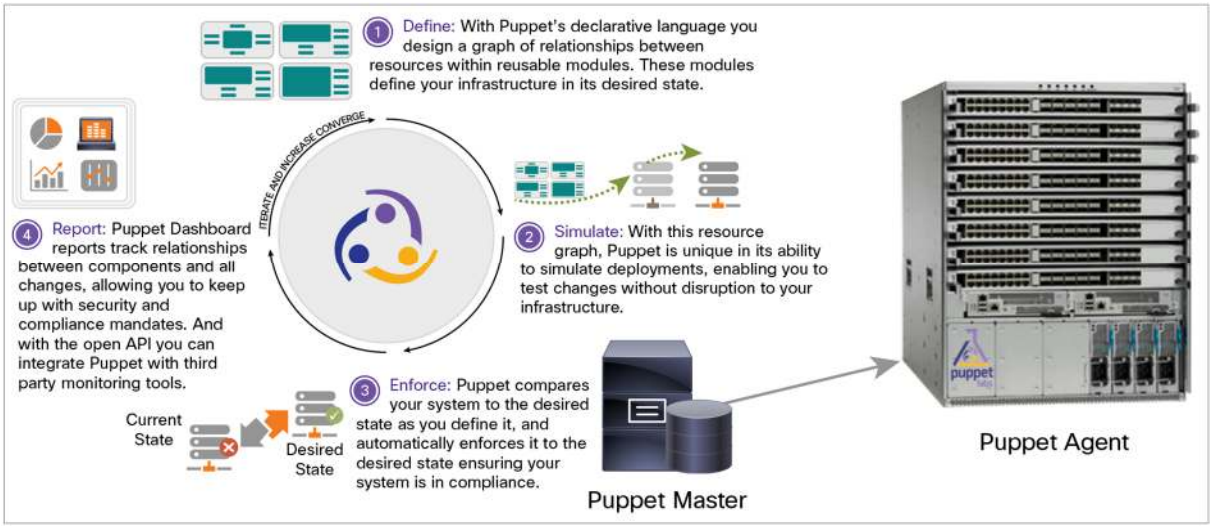
features enables automation or scripting environments to configure and manage a Cisco Nexus 9000 Series Switch.

Intent-Based Network Automation Through Puppet Enterprise

Cisco NX-OS supports intent-based automation through a built-in Puppet software agent. Automation of various network provisioning, configuration, and management tasks from a Puppet server will enable a dramatic reduction in network deployment and configuration times while eliminating manual tasks that are repetitive and error-prone.

The provisioning of network constructs like VLANs, ports, network routes, quality of service (QoS) parameters, and access control can be easily automated with this integration. Further, many ongoing management operations are made dramatically easier. Such operations include firmware management, configuration management, compliance auditing, and performance monitoring.

Figure 1. How Puppet Enterprise Automation Software Works



Puppet has a rich set of APIs for managing network devices, storage devices, and computing devices. Puppet Enterprise generates and consumes huge amounts of data about infrastructure (Figure 1). Combining Puppet Enterprise and the programmability capabilities enabled by Cisco NX-OS on Cisco Nexus 9000 Series Switches makes for an incredibly agile environment. Developers can now easily work with their operations teams to provision and manage the infrastructure as business needs change.

The joint solution provides many advantages to customers:

- **Single point of automation:** Customers are able to transparently automate and manage network, services, and security (storage and computing in the future) through their Puppet infrastructure.
- **Unified Operational Model:** Customers benefit from a unified operational model across bare-metal and virtual computing, networking, security, and network services. This integration enables IT to deploy applications faster than ever before and break down barriers between disconnected organizational departments.
- **Central management:** Customers will be able to centrally manage their physical, virtual, and cloud environments in a consistent manner through a single interface.

Summary

As businesses move toward making the data center more agile, automation plays an increasingly important role. The network automation capabilities on the Cisco Nexus 9000 Series Switches, now enhanced by their integration with automation software from Puppet Labs, enable IT organizations to achieve unprecedented operational efficiencies.

Learn More

- For more information about Cisco Nexus 9000 Series Switches, please visit: http://www.cisco.com/go/nexus9000.
- For more information about Puppet Labs, please visit: http://www.puppetlabs.com.

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Printed in USA C22-730039-00 11/13