Switch Light™ is a thin switching software platform for merchant silicon-based physical switches and virtual switches within hypervisors. Switch Light is based on the Indigo Project, an open source effort within Project Floodlight (www.projectfloodlight.org), that provides software to support thin switching and provides a consistent and interoperable implementation of the OpenFlow protocol. Switch Light liberates you from historically proprietary, closed networking architectures, and enables radically reduced cost of operations by centralizing and automating traditional provisioning, configuration, and policy management functions. Switch Light provides an OpenFlow data plane implementation for software-defined networking, and completes the Big Switch Networks Open SDN™ Suite, simultaneously enabling open source systems within the SDN developer community and commercially supported solutions for production networks.

**Challenge**

The basic framework for distributed networking systems has not changed for decades; its initial structure persists today in the form of distributed network elements that must be managed independently, device by device. Modern network devices have combined this distributed control plane architecture with a complex array of proprietary network protocols that drive unacceptable vendor lock-in. Dramatic changes in scalability combined with the requirements of modern cloud computing architectures have created problems for these distributed networking systems and their associated plethora of network protocols. With traditional approaches, architects of large data centers are confronted with a dilemma. You can drive L3 switches to the top-of-rack, choosing a pod design, where you maximize network scalability, control, and availability at the expense of compute density and large L2 domains required to support VM mobility.
Alternatively, you can drive towards large L2 domains, achieving large L2 domains that support increased VM mobility and compute density, but at the expense of stability, security and manageability. Each of these approaches has unacceptable trade-offs. There are a variety of vendor solutions that attempt to address these problems, but each requires the use of proprietary protocols that create unacceptable vendor lock-in.

In traditional systems, protocols are tightly coupled to the networking equipment. Network engineers need to deal with manually pulling VLANs to isolate L2 traffic. Manually configuring a large number of switches, device by device, interface by interface, quickly becomes unmanageable. VLANs and VLAN trunks can quickly get out of hand. The traditional constructs of L2 and L3 distributed networking pose a barrier to your innovation and productivity. The problems increase as your compute density, VM mobility and scale increases.

Traditional networks simply cannot operate at the speed of business requirements in your modern data centers. They pose a barrier to the applications and workloads that drive business. Server virtualization, cloud computing and a decade of rapid data center software innovation have manifestly changed the nature of your data center applications and workloads. As a result of the dynamic and automated nature of the modern data center and the increased rate of change, network change management demands up to eighty percent of your network operations resources. With workloads growing at double-digit rates annually, the situation is worsening and driving you to work faster and faster to keep up with business demands.

Solution

The solution to this problem is to adopt the same approach and architectures that have been so beneficial in other areas of the data center. Replacing vertically integrated, proprietary systems with a centralized, automated and programmable network control plane makes the need for manual, device-by-device configuration of proprietary protocols a thing of the past.

Switch Light from Big Switch Networks™ is an open source, OpenFlow-based thin switching platform for Open Software-Defined Networking (Open SDN), which can operate on merchant silicon-based physical switches or virtual switches operating within server hypervisors. Switch Light enables a common, OpenFlow-based thin switching feature set that can be centrally provisioned and which automates policy configuration across your entire network fabric, including both physical and virtual switches.

Switch Light enables dramatic reductions in the cost of your network operations and eliminates time-consuming, manual procedures by enabling central provisioning and automation of both switching platforms and service definitions. Centralized deployment provisioning and day-to-day network automation eliminates most of your service-request and change-management tasks, freeing you to complete more valuable work and more innovative projects. In addition to improving network agility and enabling network automation, Switch Light frees you from the shackles of proprietary network stacks and eliminates proprietary vendor lock-in, because thin switching supports a variety of switching platforms and implements a standards-based implementation of OpenFlow across the entire network fabric, including physical and virtual switches. Big Switch Networks provides support for the Switch Light firmware free of charge when you purchase a subscription license to applications in the Big Switch Open SDN Suite.

Switch Light operates in coordination with an OpenFlow controller, which provides centralized switch programming and forwarding instructions and moves network operations in a new, innovative direction. Centralized control over a variety of data plane devices through a thin-switching software layer enables an operating environment for network applications and enables network-oriented programming.

Switch Light leverages a data plane abstraction with support for a variety of device-driver modules that enables operation on a range of underlying physical and virtual switches and brings to the network the advances that modern compute environments have enjoyed for years. Leveraging these data plane abstractions, Switch Light has been applied to a variety of physical switch platforms that employ Broadcom’s high performance switching silicon, as well as open source Linux software distributions utilizing the KVM virtual machine. Switch Light and the Open SDN architecture enable you to evolve their data center networks into the modern era of data center automation.
Dramatically Lower Costs with Zero-Touch Networking

Secure Boot and Discovery
- Hardware-verified system boot improves network security. Discovers the image repository on the controller and securely bootstraps and loads the Switch Light software. Upgrades managed centrally and without configuring each device independently.

Centralized Firmware Management
- Re-locates firmware image management to controller, compatible with virtual and physical switches, provides a consistent OpenFlow implementation across the entire network fabric.

Centralized Programmability and Control
- Re-locates configuration and policy management to controller via Big Network Controller™, which maintains policy and computes forwarding decisions across entire network fabric.

Multi-Controller Discovery Support
- Support multi-controller discovery via DHCP for zero-touch deployment and failover. Switch Light automatically connects to the discovered controller and supports priority-based fail over based on the list of discovered controllers. (The controller can also be set by configuration.)

Choice in Networking Hardware

Open Source, Standards-Based Implementation
- Standardized, open, and interoperable data-plane element. Support for OpenFlow 1.3 [backwards compatible with OpenFlow 1.0]. Available as open source, through partners and as a free download from bigswitch.com.

Supported Platforms
- Switch Light for Broadcom supports switching platforms from the following manufacturers: Accton*, Celestica*, Extreme* and Quanta.
- Switch Light for Linux supports the Kernel-based Virtual Machine (KVM) hypervisor on Linux distributions from Canonical and Redhat.
- Switch Light is based on the Indigo Virtual Switch open source project, which is available at http://www.projectfloodlight.org/.

Centralized Control of SDN Fabric

Centralized Monitoring and Alerts
- Consistent monitoring of mixed hardware environments. Supports SNMP v2 and exposes monitoring information for hardware components. Implements DEVICE-MIB, SNMP MIB (RFC3418), Host Resources MIB (RFC 2790), Entity Sensor MIB (RFC 3433).

Minimlist, Configurable User Interface
- Move beyond device-by-device management models. Device CLI is minimalist, and nearly all interaction can be completed through the Big Network Controller. Local interface used to troubleshoot connectivity issues or boot sequence issue.

Secure, Role-Based Administration
- Supports ‘operator’ and ‘administrator’ roles. Operators have read-only access. Administrators can execute all commands. Roles can be mapped via AAA servers and system configuration.

Secure Management
- Supports TLS communication with controller over redundant, dedicated management links.

* Future release

About Big Switch Networks

Big Switch Networks is the leader in open source Software-Defined Networking (SDN) products, delivering unmatched network agility, automated network provisioning, and dramatic reductions in the cost of network operations. The company’s Open SDN™ platform offers an OpenFlow switch fabric that can run on bare metal switches and hypervisor virtual switches, and enables a wide variety of SDN network applications including data center network virtualization and network monitoring.

For more information, visit www.bigswitch.com

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