Big Cloud Fabric and Dell Open Networking

Big Cloud Fabric™ (BCF) is the industry's first Data Center leaf-spine Clos fabric solution built using Dell Open Networking switches. Leveraging the hardware-software disaggregation enabled by Dell and SDN designs inspired by hyperscale data center architectures, BCF provides significant cost savings and operational efficiencies for the enterprise data centers.

MODERN SDN FABRIC FOR THE ENTERPRISE DATA CENTER

Dell and Big Switch Networks introduce a modern approach to enterprise data center networking. Big Cloud Fabric, built using Dell-ON switches, expands choice and capabilities for customers looking for next-generation SDN-based networking on best-of-breed Open Switch hardware.

Features of Big Cloud Fabric:

• Modern architecture inspired by hyperscale data center design principles enables faster innovation

• L2+L3 leaf-spine Clos fabric built using Dell Open Networking switches drives reduction in CapEx

• SDN controller software enables quantum leap in automation and operational simplicity

• Rigorous approach to resiliency and high availability ensures readiness for production deployments

Each deployment includes comprehensive, single point of support services to help customers of any size every step of the way.

Get hands-on experience with our offering, register for a free online trial at:
labs.bigswitch.com/dell

For any queries, contact us at:
dell@bigswitch.com

BIG CLOUD FABRIC OVERVIEW

Big Switch's Big Cloud Fabric (BCF) is the industry's first SDN data center fabric bringing hyperscale data center design principles to all enterprise data centers. Applications can now take advantage of high east-west bisectional bandwidth, secure multi-tenancy, and workload elasticity natively provided by Big Cloud Fabric. Customers benefit from unprecedented application agility due to automation, massive operational simplification due to SDN and, dramatic cost reduction due to HW/SW disaggregation enabled by Dell Open Networking switches.

Big Cloud Fabric supports both physical and virtual (multi-hypervisor) workloads and choice of orchestration software. It provides L2 switching, L3 routing and, L4-7 service insertion and chaining while ensuring high bisectional bandwidth. The scalable fabric is fully resilient with no single point of failure and supports head-less mode operations.
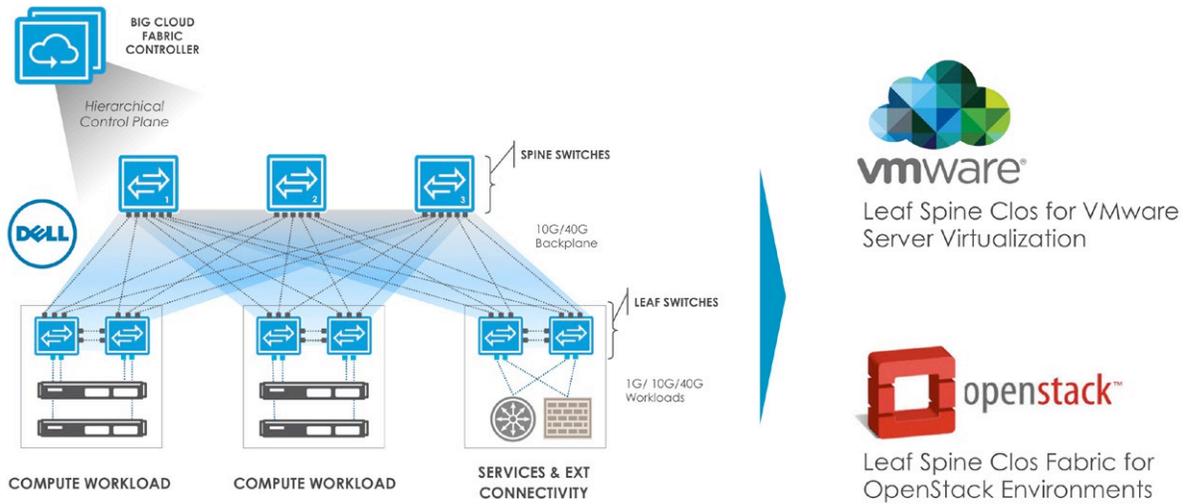
Big Cloud Fabric is available in two editions:
• **P-Clos** — Leaf-spine physical Clos fabric controlled via SDN Controller
• **Unified P+V Clos** — Leaf-spine plus virtual switches (vSwitches) controlled by SDN Controller (future release)

ARCHITECTURE: SDN SOFTWARE MEETS DELL OPEN NETWORKING

Software Defined Networking (SDN) Fabric architecture refers to a separation of the network's data and control plane, followed by a centralization of the control plane functionality. In practice, it implies that the network's policy plane, management plane and much of the control plane are externalized from the hardware device itself, using an SDN controller, with few on-device off-load functions for scale and resiliency. Controller-based designs not only bring agility via centralized programmability and automation, but they also streamline fabric designs (e.g. leaf-spine L2+L3 Clos).

The Big Cloud Fabric architecture consists of a physical switching fabric to form a leaf-spine Clos architecture. Dell's Open Networking switching portfolio supports Big Switch Networks' Switch Light™ Operating System to form the individual nodes of this physical fabric. Intelligence in the fabric is hierarchically placed: most of it in the Big Cloud Fabric Controller (where configuration, automation and troubleshooting occur), and some of it off-loaded to Switch Light for resiliency and scale-out.

Figure 1: Big Cloud Fabric: Open Networking SDN Fabric

BIG CLOUD FABRIC DEPLOYMENT SCENARIOS

Big Cloud Fabric is designed from the ground up to satisfy the networking requirements of physical, virtual or combination of physical and virtual workloads. Some of the typical Pod deployment scenarios include:

- Enterprise Data Centers / Private Clouds
- Virtual Desktop Infrastructure (VDI) Pods
- High Performance Computing Pods

OpenStack / Vmware / CloudStack Support

The Big Cloud Fabric controller natively supports integration with various Cloud Management Platforms (CMPs)—vSphere, OpenStack and CloudStack—through a single programmatic interface. This is simpler and more scalable compared to box-by-box networking which demands an exponentially larger number of programmatic interactions with CMPs.

BIG CLOUD FABRIC SOLUTION COMPONENTS

- **Big Cloud Fabric Controller Cluster**—an external, hierarchically implemented SDN controller available as a cluster of virtual machines or hardware appliances for high availability (HA)

- **Dell-ON Ethernet Switches with Switch Light OS**—to support various fabric configurations and deployments. Currently supported switches include:

HW PLATFORM	SWITCH CONFIGURATION	LEAF	SPINE
Dell S6000-ON	32x40G	✓	✓
Dell S4048-ON	48x10G + 6x40G	✓	✓

- **OpenStack Plug-In (optional) —** a BSN Neutron plug-in or ML2 Driver Mechanism for integration with various distributions of OpenStack

- **Vmware vCenter Extension** — built-in network automation and orchestration for vSphere server virtualization

- **CloudStack Plug-In (optional)**—a BSN Networking plug-in for integration with CloudStack

SOLUTION BENEFITS

Centralized Controller Reduces Management Consoles By Over 30:1

With configuration, automation and most troubleshooting done via the Big Cloud Fabric controller, the number of management consoles involved in provisioning new physical capacity or new logical apps goes down dramatically. For example, in a 16 rack pod with dual leaf switches and two spine switches, a traditional network design would have 34 management consoles. The Big Cloud Fabric design has only one—the controller console—that performs the same functions. The result is massive time savings, reduced error rates and simpler automation designs. As a powerful management tool, the controller console exposes a web-based GUI, a traditional networking-style CLI and REST APIs.

Streamlined Configuration, Enabling Rapid Innovation

In the Big Cloud Fabric design, configuration in the CLI, GUI or REST API is based on the concept of logical tenants. Each tenant has administrative control over a logical L2/L3/policy design that connects the edge ports under the tenant's control. The Big Cloud Fabric controller has the intelligence to translate the logical design into optimized entries in the forwarding tables of the leaf, and spine.

Open Networking Switch Hardware Reduces CapEx Costs By Over 50%

By adding up hardware, software, maintenance and optics/cables, a complete picture of the hard costs over three years shows that the savings are dramatic.

About Dell

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