Big Switch + Nutanix: Ideal SDN Fabric for Hyper-Converged Infrastructure

Big Switch’s Big Cloud Fabric is the ideal SDN fabric delivering Next-Gen data center switching for Nutanix Hyper Converged Infrastructure. The BCF solution for Nutanix offers unprecedented operational velocity, network automation at VM speed and end-to-end visibility for cloud-native applications deployed in the Hyper Converged environment.

THE CHALLENGE

Nutanix Hyper Converged systems natively offer converged compute, storage and virtualization for all enterprise workloads by leveraging a distributed, scale-out architecture. Through software innovation, Nutanix solutions aggregate storage capacity across multiple servers and present them as a single logical disk to applications. The HCI environment leverages software intelligence on industry standard hardware for simplified workload deployment and for streamlined operations. This modern, scale-out environment imposes the following requirements on the networking infrastructure which make it very difficult to implement with traditional networking solutions.

- Heavy east-west traffic across the Hyper-converged server/storage nodes
- Incremental scaling of capacity and performance with very less operational overhead.
- Streamlined operations through simplified workload deployment and rapid troubleshooting necessitating turn-key infrastructure for all elements including the network.
- Open, industry-standard infrastructure to lower CapEx and to enable vendor choice.

THE SOLUTION

The solution consists of Big Cloud Fabric as the networking fabric in the Nutanix Hyper Converged environment. It creates a very synergistic logical abstraction for the physical network by leveraging software-defined networking (SDN) principles to present the scale-out network fabric as a single logical switch to the applications. Big Cloud Fabric (BCF) is the ideal SDN fabric for Nutanix hyper converged DC built with open networking (britebox/white-box) switch hardware. It delivers the next-generation data center switching architecture offering unprecedented operational velocity, network automation at VM speed and end-to-end visibility, thus offering modern benefits needed for the HCI environment at the networking layer. BCF provides these benefits while offering dramatic CapEx reduction and enabling hardware vendor choice versus legacy box-based solutions that are proprietary and expensive.

BCF embraces hyperscale design principles to enable rapid innovation, operational simplicity with TCO reduction.

- **Open Networking Switch Hardware**: BCF software is implemented on multi-vendor open networking hardware (whitebox or britebox), providing vendor choice and dramatic cost advantage.

- **External SDN Control Plane**: The BCF is controlled by an SDN controller offering simplicity with a single pane of glass for fabric management and zero-touch operations. The BCF controller integrates with orchestration systems to automate physical networking as part of application provisioning workflows and also offers deep visibility through analytics and troubleshooting tools from a central dashboard.

- **Core-and-Pod Design**: BCF is deployed on a per pod basis with multiple pods connected to an existing core router. This modular approach simplifies automation, enables seamless brown-field insertion, capacity planning and rapid innovation.
THE SOLUTION BENEFITS

Built-in Network Automation
The solution streamlines application deployment workflows by automating the physical network configuration for the VM workloads. There are several Fabric automation benefits:

• **Auto Host Detection and Link Aggregation:** Nutanix nodes connected to BCF are automatically discovered by BCF controller. The BCF controller then automatically creates link aggregation groups (LAGs) with the leaf switches making this a zero-touch operation. Server/storage team can now add/move/replace Nutanix nodes at will without ever interacting with the networking team — network is no longer a barrier to scalable HCI deployment. Simultaneously, network team has full visibility to Nutanix nodes attached to the Big Cloud Fabric.
• **Auto L2 Network Creation:** As the virtual switch port-groups are created, modified, or deleted as part of application deployment process, BCF controller gets notified of these events and automatically creates, modifies or deletes the corresponding BCF Layer-2 network segments. Physical network changes during vMotion are automatically provisioned. Thus BCF enables physical fabric to operate at the speed of VMs.

End-to-end Visibility & Troubleshooting Benefits

• **VM-level Visibility:** BCF provides both VM-level and host-level visibility, including:
  - host names, host vmNICs, and the physical fabric interfaces to which the hosts are connected.
  - VM names, VM Mac & IP addresses, VM description

This granular visibility of virtualization domain enables the network admin to have a consistent view and help resolve issues rapidly during troubleshooting session with HCI/virtualization team.

• **VM-to-VM Fabric Trace:** VM-to-VM traffic visibility across the entire leaf-spine fabric can be visually displayed on the BCF controller between any two VMs, as shown below. This level of visibility to traffic, which cannot be achieved with box-by-box networking, helps rapidly determine if an application issue is network-related versus compute-related without going through tedious trouble ticket processes.
• **Fabric Analytics:** BCF provides advanced fabric analytics which captures VM-related information (name, creation time, pNIC info, port-groups), and time-series of events related to VMs. An example of vMotion event is replayed in the diagram below.

![Fabric Analytics Diagram](image)

Such historical event repository integrated with multi-vector analytics engine is a tremendous asset for troubleshooting as the administrator can get to the details of specific events for one or more VMs or can zoom into a timeslot to obtain all events that may have occurred during the period.

**ABOUT BIG SWITCH NETWORKS**

Big Switch Networks is the Next-Generation Data Center Networking Company. We disrupt the status quo of networking by designing intelligent, automated, and flexible networks for our customers around the world. We do so by leveraging the principles of software-defined networking (SDN), coupled with a choice of industry-standard hardware. Big Switch Networks has two solutions: Big Monitoring Fabric, a next-generation network packet broker, which enables pervasive security and monitoring of data center and cloud traffic for inline or out-of-band deployments and Big Cloud Fabric, the industry’s first next-generation switching fabric that allows for choice of switching hardware for OpenStack, VMware, Container, and Big Data use cases. Big Switch Networks is headquartered in Santa Clara, CA. For additional information, email info@bigswitch.com, visit www.bigswitch.com or follow us on Twitter @bigswitch, LinkedIn and YouTube.