

# Nutanix and Big Switch: Cloud-First Networking for the Enterprise Cloud

*Is it possible to architect an enterprise cloud  
as good as a public cloud?*



Public cloud providers have spearheaded innovation in data center architecture to enable a frictionless, self-service experience for application deployment. Organizations are eager to bring the same innovation, operational agility and simplicity into managing on-premises applications. Legacy infrastructure has not been able to meet the evolving needs of enterprise applications because they are manual, complex, siloed and hardware-defined. Enterprises need cloud-like infrastructure that is built upon software-defined principles to eliminate complexity, to enable agile provisioning of applications and to dynamically scale infrastructure with the application needs.

Nutanix Enterprise Cloud is offering a hyperconverged stack that breaks down siloes of compute and storage to enable linear scaling of application performance and capacity without performance bottlenecks, expensive overprovisioning or disruptive downtime. Physical networking, however, has remained challenging with outdated, box-by-box CLI-based approach which simply cannot be operated in cloud timelines. With traditional solutions, deployment of the network takes weeks, basic ongoing operations require manual, trouble-ticketing processes and complexity multiplies when the network needs to be scaled. As a result, a significant chunk of IT effort is spent is on just scaling and managing infrastructure rather than focusing on applications and business value they provide. Achieving a self-service application model for Nutanix Enterprise Cloud requires an approach where standing up a network is as simple as acquiring a public cloud VPC, on-going network operations are completely automated, and trouble-shooting is extremely simplified.

## THE SOLUTION

Big Switch and Nutanix are transforming data centers by leveraging public cloud constructs as first principles for architecting enterprise private clouds. Big Switch's Big Cloud Fabric provides invisible (zero-touch) networking to Nutanix hyperconverged infrastructure (HCI) based on Acropolis Hypervisor (AHV). BCF leverages cloud-first networking principles in two ways: (1) leaf-spine design based on open networking switches with SDN controls, and (2) public cloud VPC-style logical networking that is API integrated with Nutanix Prism. This joint solution enables unprecedented operational velocity, network automation at VM speed and end-to-end network visibility & troubleshooting. With Big Switch + Nutanix Enterprise Cloud operating just like a public cloud in terms of economics and operational workflows, customers can now optimize app placement across public and private clouds based on app's needs for elasticity, cost and performance. In addition, the solution offers networking services through Nutanix Flow which enables simplified policy management and increased application security and visibility.

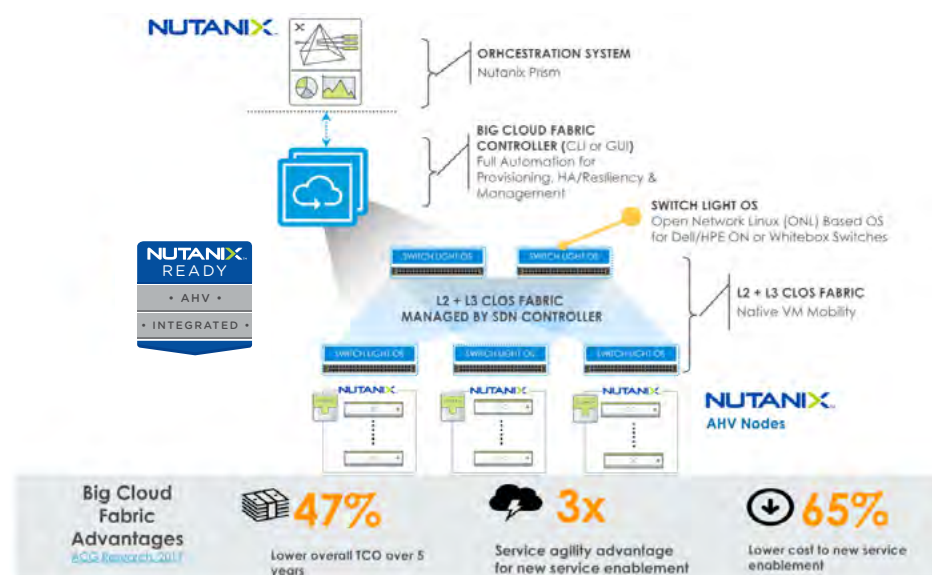
**“The networking solution for our large IT environment must allow for automation and provide engineering teams the same capabilities and efficiencies of cloud providers. BCF Enterprise-VPC everywhere empowers our engineering teams to manage their networking needs for their environments. BCF met all the original success criteria and more!”**

- Raul Robles, Director of Network Engineering at Nutanix

BCF embraces the following hyperscale design principles to enable rapid innovation, operational consistency and TCO reduction:

- **Open Networking Switch Hardware:** BCF software is implemented on multi-vendor open networking hardware (white box or brite box), providing vendor choice and dramatic cost advantage.
- **Software-Defined Principles:** 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 also acts as the single point of integration with Nutanix Prism to automate physical networking and to offer deep visibility, analytics and troubleshooting from a central dashboard.
- **Logical VPC-style networking:** BCF provides public cloud-style logical networking by offering VPCs as the unit of network automation and visibility, thus enabling the simplicity and agility of public cloud networking and consistency of networking principles across enterprise and public clouds.
- **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.

## SOLUTION ARCHITECTURE



## SOLUTION BENEFITS

The Big Cloud Fabric controller acts as a single point of integration with Nutanix Prism to offer VPC-level network automation, visibility and troubleshooting benefits.

### Network Automation for Nutanix E-VPC

#### Automatic Bootstrapping of Nutanix AHV Hosts

Nutanix bare metal nodes are bootstrapped by BCF through a dedicated Nutanix management sub-network within an infrastructure tenant. An existing AHV cluster can be migrated to BCF or a new cluster can be deployed using the Nutanix foundation tool.

#### Automatic AHV Host Detection and Fabric Admission

When BCF connects with Nutanix Prism, a Nutanix E-VPC is created as a logical construct for operations within BCF. All Nutanix hosts within the E-VPC are automatically detected through link detection mechanisms and admitted into the fabric through the creation of multi-chassis LAG to the fabric switches. In this way, the entire fabric is brought up in a zero-touch fashion.

#### Automated L2 Networking for Nutanix AHV

As networks are configured on Nutanix Prism for VMs on AHV nodes, the integrated solution enables automatic configuration of logical segments within the E-VPC for the Nutanix' endpoints in BCF. Newly created VMs are dynamically learnt as an endpoint in BCF and the corresponding network segments are automatically created within the E-VPC. When AHV VMs and the associated networks are deleted or modified on Nutanix Prism, the BCF automatically deletes or modifies the corresponding logical segments within the E-VPC.

#### Automated Distributed Logical Routing

When VMs are associated with a new, different network segment in Nutanix Prism, BCF learns this and automatically configures logical routing across various segments in the E-VPC and distributes it throughout the physical fabric. This completely redefines the operational model compared to the legacy box-by-box complex command line configurations needed to establish routing between the segments.

Tenant	Segment	MAC	Vendor	Name	Source	Shutdown Status	State	Description	IP Address	State
Nutanix-VPC	DevOps	58:60:8d:e9:78:18	Nutanix	nutanix-vm-50-6b-8d-a9-78-18	Config	Up	Active	Nutanix-VM-DevOps-2(103.1.1.3)	103.1.1.3	learned
Nutanix-VPC	DevOps	58:60:8d:e9:78:18	Nutanix	nutanix-vm-50-6b-8d-a9-78-18	Config	Up	Active	Nutanix-VM-DevOps-1(103.1.1.2)	103.1.1.2	learned

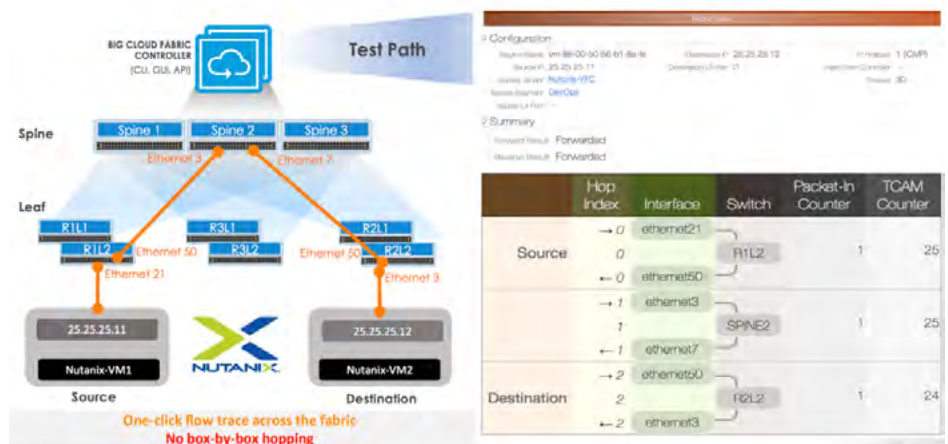
## Network Visibility, Troubleshooting & Analytics for Nutanix VPC

### Nutanix E-VPC-level Endpoint Visibility

BCF Nutanix Prism page displays information of clusters, hosts, virtual switches and the endpoints in a Nutanix E-VPC based on data provided by Prism to BCF. Different tables in BCF provide details of the AHV cluster from different view-points. While the Physical connections table provides the fabric connectivity and mapping details for Nutanix hosts, the Endpoints table provides details of the VMs and can be an excellent starting point for troubleshooting.

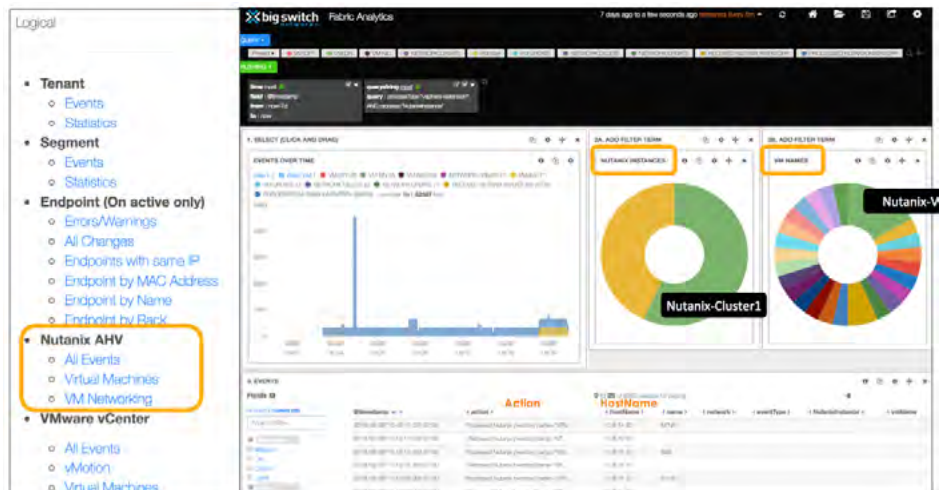
### Fabric Trace for Nutanix E-VPC

VM-to-VM traffic visibility for a Nutanix E-VPC across the entire leaf-spine fabric can be visually displayed on the BCF controller, 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 ticketing processes.



### Fabric Analytics for Nutanix E-VPC

BCF's advanced fabric analytics for a Nutanix E-VPC captures VM-related information (name, creation time, pNIC info, port-groups), and time-series of events related to VMs. This is very beneficial during troubleshooting to narrow-down the time interval when specific events occurred.



## NUTANIX READY VALIDATION

- Big Cloud Fabric 4.7.1 is validated on Nutanix AHV (AOS 5.5.x)



## RESOURCES

For more Information visit: <https://www.nutanix.com/partners/technology-alliance-program/big-switch-networks/>

## ABOUT BIG SWITCH NETWORKS

Big Switch Networks is the Cloud-First Networking company, bringing public cloud-style networking and cross-cloud consistency to any organization. BSN provides data center switching, monitoring, visibility and security solutions for on-premises enterprise cloud, public cloud and multi-cloud environments, enabling organizations to increase operational efficiency and business agility, while reducing networking costs. Big Switch's CFN portfolio includes: Big Cloud Fabric, a controller-based network switching fabric, Big Monitoring Fabric, a centralized monitoring fabric for advanced network analytics, and Multi-Cloud Director, a unified manager for consistent operations across multi-site environments.



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