IPv6 Best Operational Practices of Network Functions Virtualization (NFV) With VMware NSX

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Overview

- NSX as it pertains to NFV
- How NSX works
- NSX IPv6 Capabilities & Limitations
- How to deploy IPv6 on NSX
- Using IPv6 on NSX
- IPv6 NSX Demo!
NSX is NFV

• NSX is VMware’s answer to Network Functions Virtualization (NFV)
• It provides the same capabilities
  – Distributed switching
  – Logical routing
  – Distributed firewalling
  – Distributed load-balancing
  – VXLAN tunneling
  – VPN tunneling services

• Very comparable to OpenStack’s Neutron
NSX is NFV, cont.

• It provides this by pushing networking to the hypervisor and managing it with a controller.
How NSX Works

• Prerequisites
  – Vmware Vcenter server 5.5+
  – Vmware ESXi hypervisor 5.5+
  – Vmware Virtual Distributed Switch (vDS)
  – All ESXi hosts must:
    • Be in a Datacenter Cluster
    • Use vDS version 5.5
  – Uplinks and vDS $\rightarrow$ MTU 1550+
    • 50 bytes for VXLAN
How NSX Works, cont.

• An NSX Manager installs all of the components
  – NSX Controllers
  – VXLAN transport interfaces
  – vShield firewall
  – Edge Services Gateway

• The NSX Controllers install all of the virtual networking on the ESXi hosts in a cluster
How NSX Works, cont.
• VXLAN Transport interfaces created
• NFV tools to deploy:
  – Logical virtual switches
  – Logical virtual firewalls
  – Logical virtual routers
  – Logical virtual-load balancers
  – VPN services
How NSX Works, cont.

Physical layer-2 switch

VMware vDS

VLAN 10 — Data Transit VLAN
VXLAN subnets
**all routed internally**

Edge Services Gateway

Gateway for VXLAN subnets
- 10.0.0.1
- 192.168.0.1
- etc...

Logical virtual router

Logical virtual switch

Virtual firewall

VM1

ESXi host

VM2

802.1q Trunk
v10 — ESX management
v20 — vmotion
v10 — Data VLAN
IPv6 Capabilities with NSX

• Edge Services Gateway (ESG) can route all IPv6 traffic over VXLAN Tunnel Interfaces
• Full support for IPv6 firewall rule creation
• IPv6 routing on ESG can support full static routing
• Full support for IPv6 load-balancing
IPv6 Limitations with NSX

• Logical virtual router does not support IPv6 addressing or routing  
  – Edge Services Gateway (ESG) must route all IPv6
• ESG does not have support for IPv6 routing protocols (BGP, OSPFv3, etc)
• ESG does not send Router Advertisements or have DHCPv6 relay functionality

• This is being fixed soon!
How To Deploy IPv6 on NSX

• Create IPv6-enabled VXLAN Tunnel Interfaces (VTI) on the Edge Services Gateway
• On the Logical Virtual Switch ensure this subnet is added as a VTI in Vcenter
• Attach the VTI to the virtual machine (VM)
• Configure IPv6 firewall rules for each VM
• Configure the IPv6 address on the VM
Using IPv6 on NSX

- Provision a Logical Switch
Using IPv6 on NSX

• Provision an Edge Services Gateway
Using IPv6 on NSX

• Configure ESG routing (static)
Using IPv6 on NSX

- Configure physical route uplink routing
Using IPv6 on NSX

- Attach a virtual machine to the Logical Switch & address with 2001:470:e073:91::/64 subnet

```bash
# The primary network interface
auto eth0
iface eth0 inet static
    address 10.91.0.10
    netmask 255.255.255.0
    network 10.91.0.0
    broadcast 10.91.0.255
    gateway 10.91.0.1
# dns-* options are implemented by the resolvconf package
    dns-nameservers 8.8.8.8
    dns-search tachyondynamics.com
iface eth0 inet6 static
    address 2001:470:e073:91::10
    netmask 64
    gateway 2001:470:e073:91::1
iface eth0 inet6 auto
```
Using IPv6 on NSX

- All happy to Google
Using IPv6 on NSX

• And this is what it all looks like…
IPv6 with NSX Demo!

- Using the Vcenter Web Console
- Tachyon Dynamics live network!
Questions?

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