Network Virtualization: What it is, Why it Matters

Bruce Davie
Principal Engineer, VMware
Past, Present...

Past

10 weeks

Present

7 days, 2 minutes +

2 minutes

Enterprise storage
VLAN networks
Firewall, load-balancer
IDS, security, monitoring
Availability
Future

VDC

Software-defined Datacenter Services

7 days, 2 minutes

3 minutes
The Network is a Barrier to Software Defined Data Center

Software Defined Data Center

- Provisioning is slow
- Placement is limited
- Mobility is limited
- Hardware dependent
- Operationally intensive

Any Physical Infrastructure

Compute Virtualization
The Solution – Transform the Network with Virtualization

Software Defined Data Center

- Programmatic provisioning
- Place any workload anywhere
- Move any workload anywhere
- Decoupled from hardware
- Operationally efficient

Network Virtualization

Compute Virtualization

Any Physical Infrastructure

Software Defined Data Center Services

VDC

Compute, Storage & Network Hardware Independent
What is a Virtual Network?

**General Purpose Server Hardware**

- Application
- Application
- Application

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**Server Hypervisor**

- Virtual Machine
- Virtual Machine
- Virtual Machine

- **x86 Environment**

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**General Purpose IP Hardware**

- Workload
- Workload
- Workload

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**Network Hypervisor**

- Virtual Network
- Virtual Network
- Virtual Network

- **L2, L3, L4-7 Network Services**

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**Decoupled**

- Software
- Hardware

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**Requirement:** x86

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**Requirement:** IP Transport
Half of all Server Access Ports are already virtual…
…and are on track to be ~67% years in 2 years
*40% of vAdmins managing virtual switching
A Network Virtualization Platform

Virtual Network

Controller Cluster

API

Controller Cluster

Software

Hardware

Physical Network (any vendor)

Open vSwitch
vSphere Host

Open vSwitch
Xen Server

Open vSwitch
KVM

Open vSwitch
XEN

Open vSwitch
NSX Gateway

VM

VM

“NSX API”

VLAN

Bare Metal

Hardware

Software

API
Not Science Fiction ...
eBay

Transform the time it takes to deploy complex test & development environments for developers and QA.

“NVP allows us to repurpose network infrastructure on-demand, and reduces the time it takes to deploy test/dev environments from days to minutes.”

JC MARTIN
CLOUD ARCHITECT, EBAY

7 days to 30 seconds
Schuberg Philis

Transform the time to deploy complex data center infrastructures Required to support large-scale, secure enterprise applications.

NVP allows us to utilize our infrastructure as a resource pool of capacity on-demand. We can ‘click-click’ provision compute, storage & network resources through our CloudStack management framework.

EDWIN BEEKMAN
NETWORK ARCHITECT, SCHUBERG PHILIS

3-6 months to minutes
What’s next for Network Virtualization?

- Changing the operational model of networking
  - Snapshot, rollback, what-if testing, etc.

- Federation/Multi-DC use cases

- Physical/Virtual Integration
  - More network control for physical end-points
  - Underlay visibility/troubleshooting

- Advanced L4-L7 services

- Higher level policies drive networking

- Application of formal methods (e.g. Header Space Analysis)

- And many more...
Summary & The Road Ahead

- **Network virtualization** – extending benefits of server virtualization to the whole data center
  - Fully and faithfully reproducing physical networks in virtual space

- **Network virtualization brings the benefits of a programmatic operational model:**
  - Provision complex applications & topologies in software ➔ increased automation
  - Decoupled from hardware
  - Evolve new capabilities at software speeds
  - No individual device configuration – logically centralized control

- Arguably the biggest shift in networking in a generation