The evolution of OpenStack Networking

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Networking & Security
VMware

VMware

Actually, we love OpenStack

Open vSwitch

OpenStack

KVM

Open vSwitch

NSX-MH

Network Virtualization for KVM/XEN/etc.

OpenStack

KVM

NSX + Open vSwitch

VIO

Vmware Integrated Openstack

OpenStack

vSphere/ESX

NSX

Open Virtual Network

OpenStack

KVM

OVN

OVS

Networking is going through it’s biggest revolution of the past 20 years.

Networking Hardware is a Commodity

All of these switches have the same networking chip

Arista 7050S-64

IBM BNT Rackswitch G8264

Alcatel Lucent 6900

Juniper QFX 3500

Cisco Nexus 3064

Quanta T3048-LY2

Dell Force 10 S4810

HP5900af 48xg

Edge Core AS5600-52X

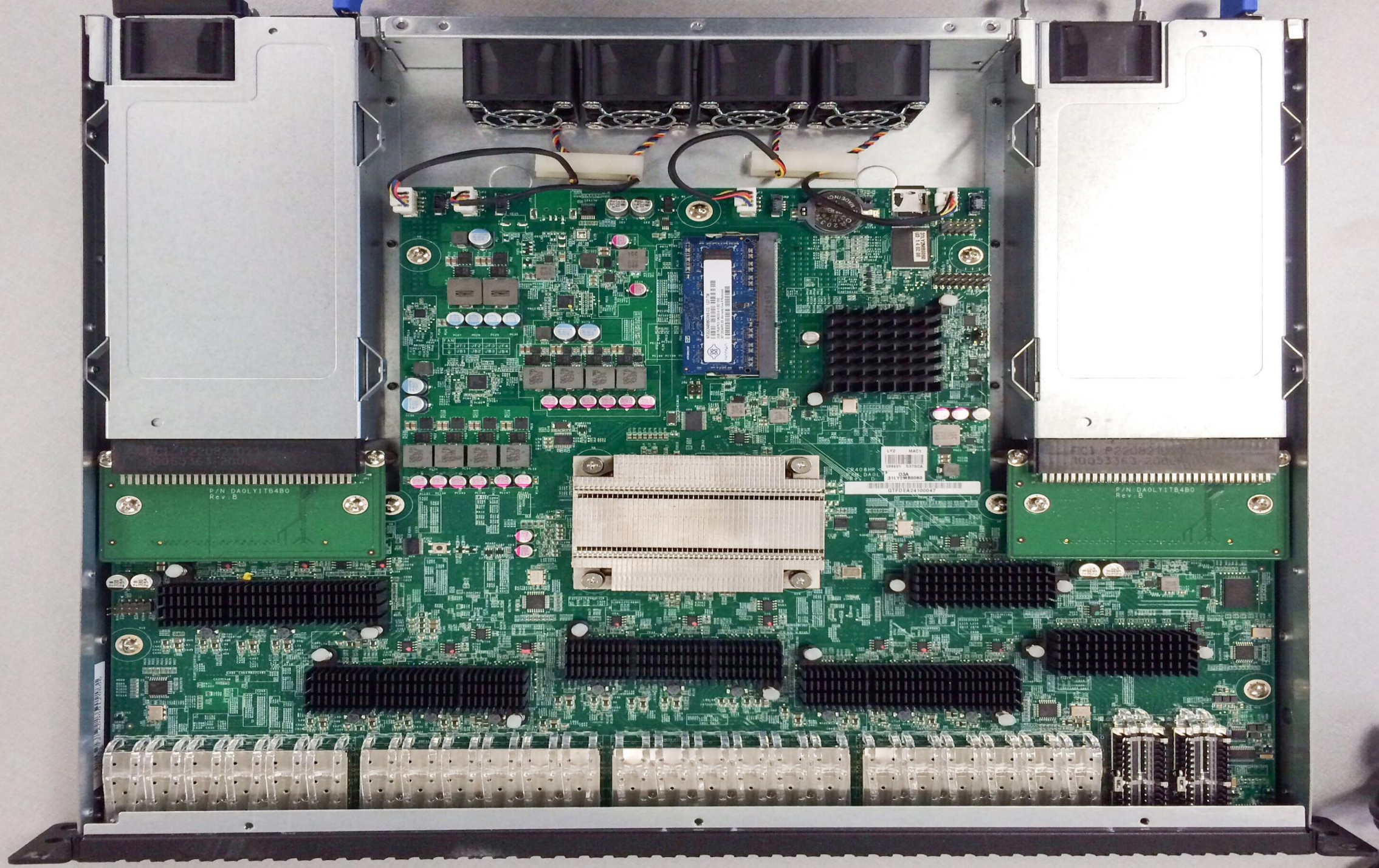
Networking Hardware is a Commodity

Broadcom dominates the silicon market (think Intel x86)

- Currently used by all major ToR switches

OEM Manufacturers build systems based on Broadcom design

- OEMs have a roadmap of upcoming systems
- In many cases, Brand vendors pick existing design and only add their software
- Switches are internally virtually identical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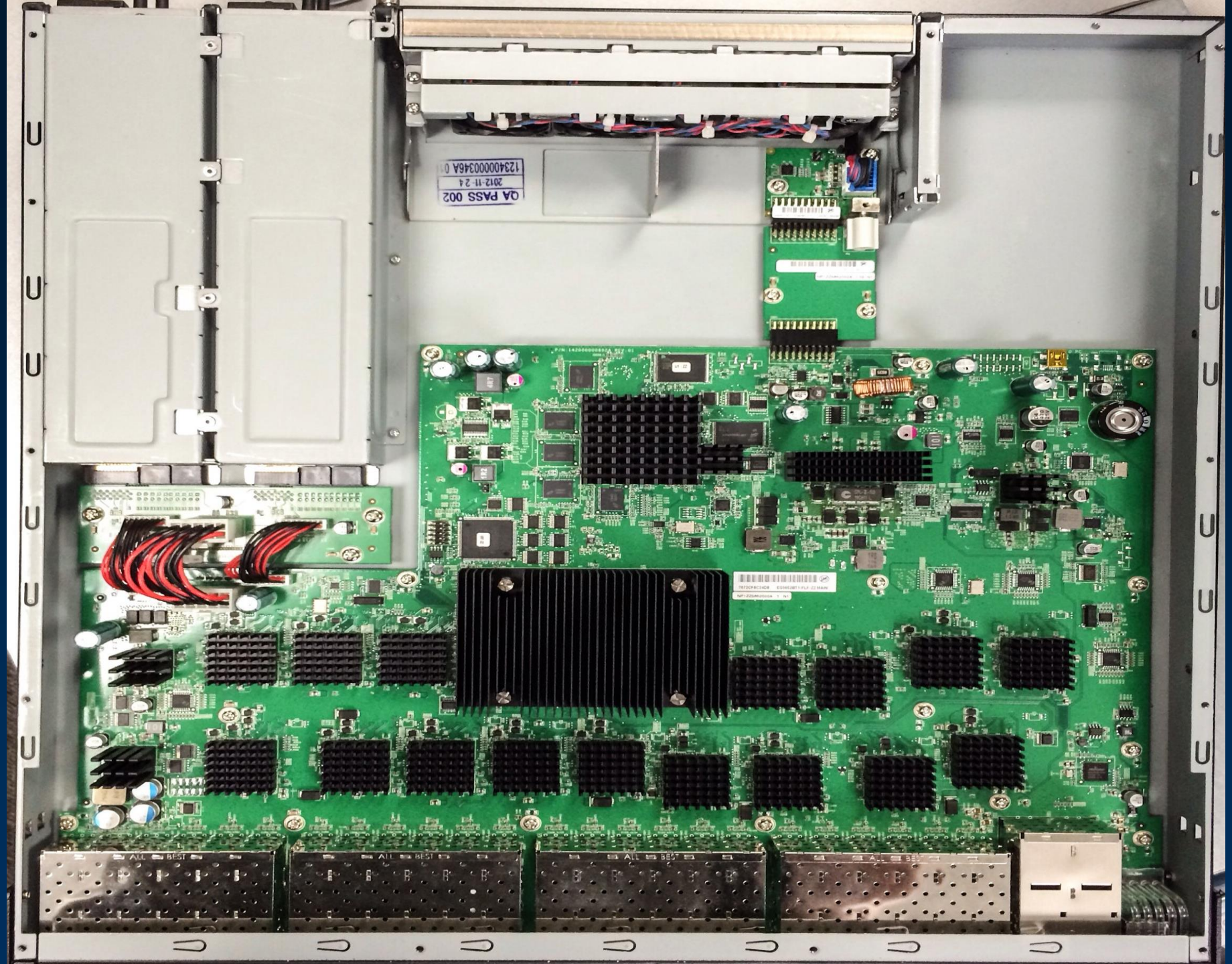
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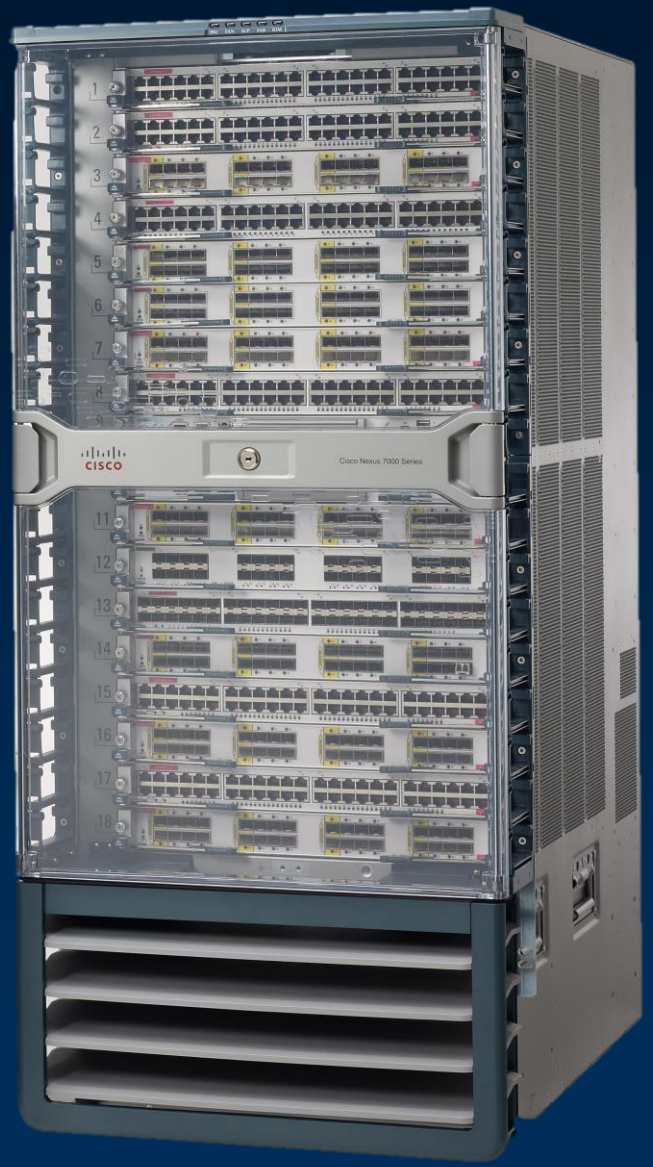


Protocols	Features
Network OS	
System	
Silicon	

VM #1	VM #2

Hypervisor

System

Silicon

Originally: Server Virtualization

Automated Operational Model

Create,
Snapshot,
Store,
Move,
Delete,
Restore

Applications

Virtual Machines

Server Virtualization

Software

- Intelligence in the virtualization layer
- Vendor independent x86 capacity
- Transformative operational model
- Automated configuration & management

Hardware

Compute Capacity

Manual Operational Model

Network

Storage

Intelligence in hardware
Dedicated, vendor specific infrastructure
Manual configuration & management

Virtual Infrastructure from Pools of Capacity

Automated Operational Model

Programmatically Create, Snapshot, Store, Move, Delete, Restore

Applications

Virtual Machines | Virtual Networks | Virtual Storage

Software

Data Center Virtualization

Hardware

Compute Capacity | Network Capacity | Storage Capacity

Pooled compute, network and storage capacity
Vendor independent, best price/performance
Simplified configuration & management

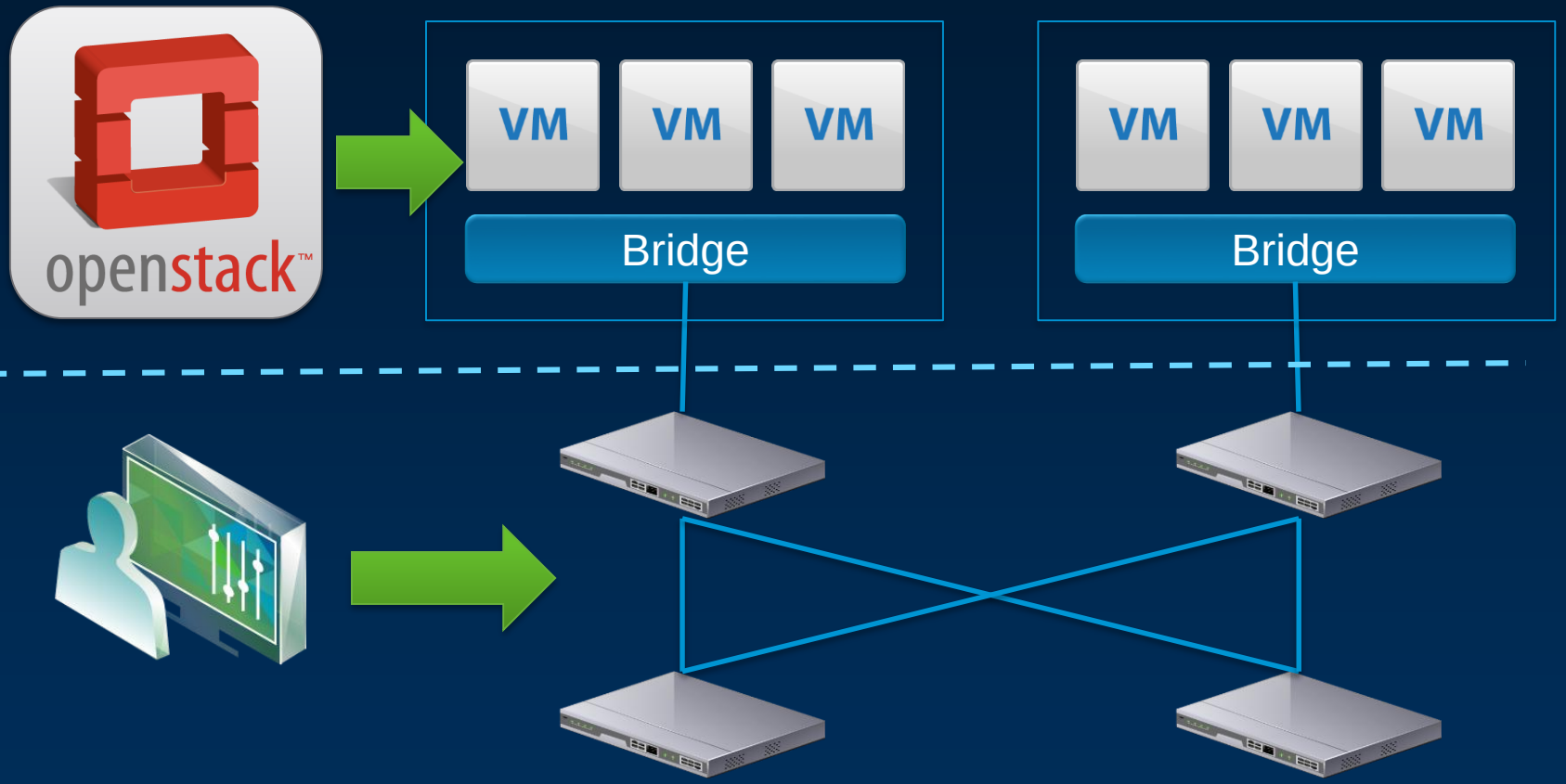
Location Independence

OpenStack Networking Models

Early Days: Flat & Manual Networks

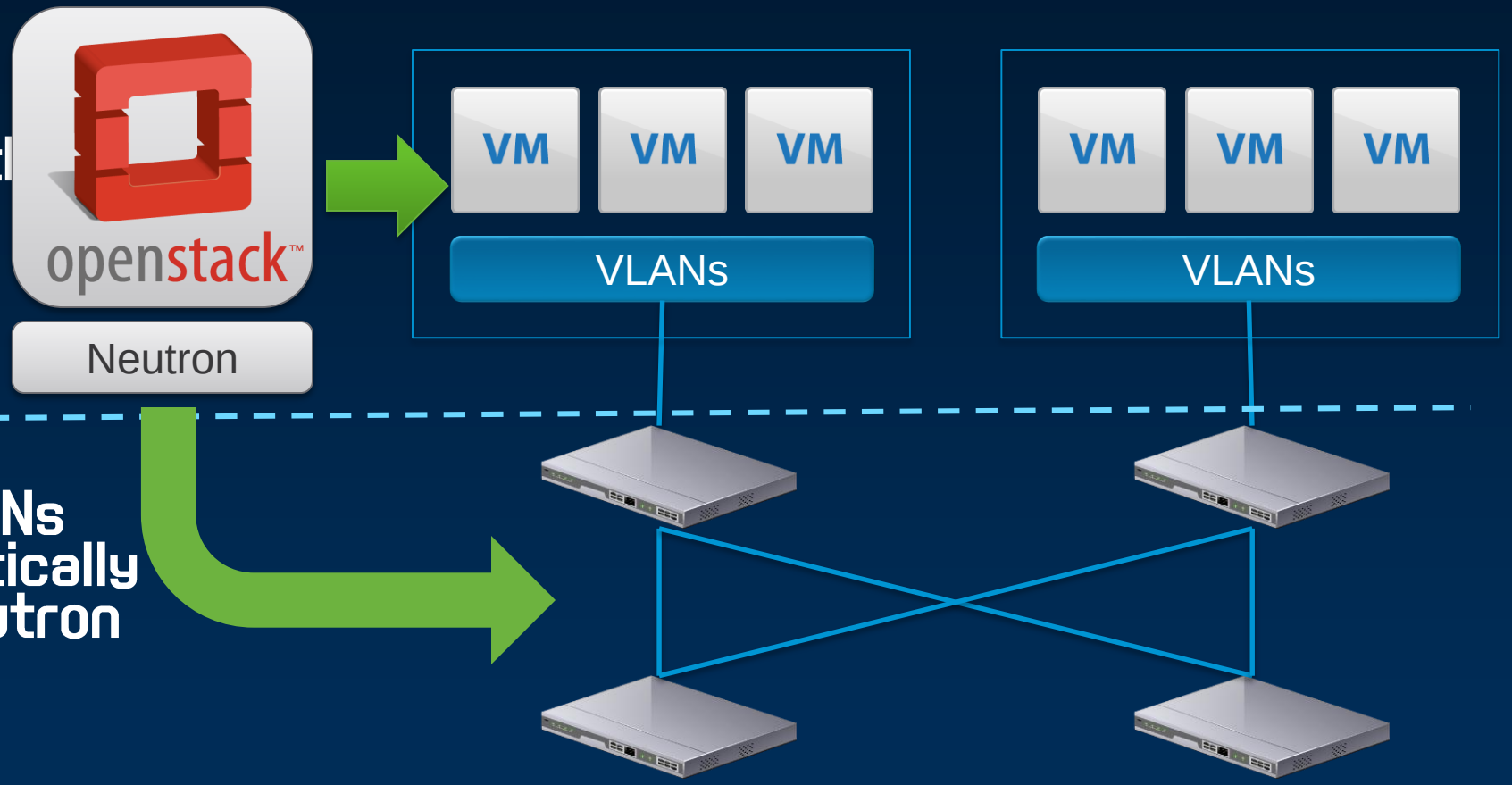
Virtual Machines
- Directly connected to network

Physical Network
- Flat L3 Network
- Manual Network provisioning



Physical Network via Neutron

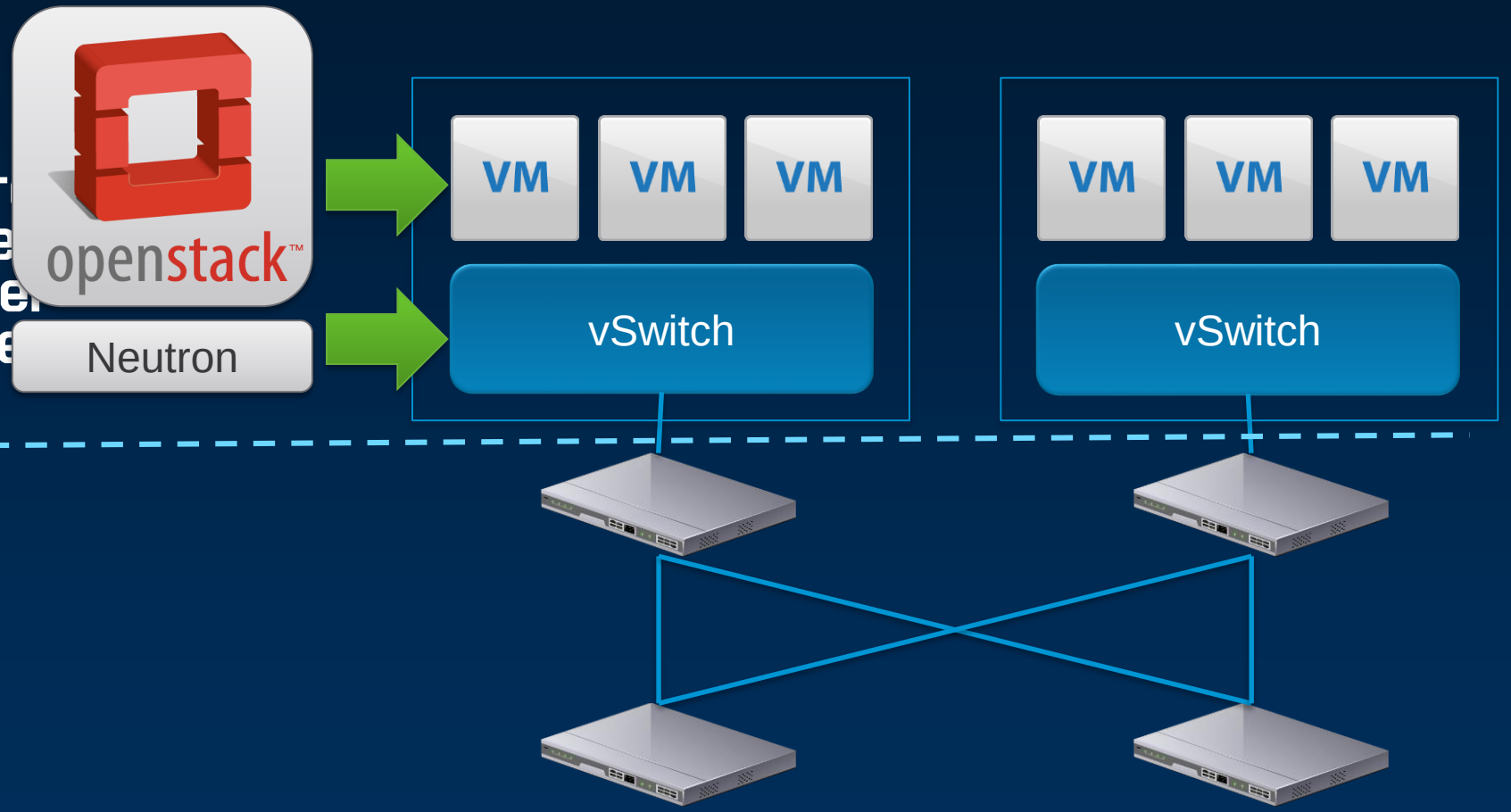
Virtual Machines
- VMs are tagged with VLAN tags



Physical Network
- Divided up into VLANs
- VLANs are automatically provisioned via Neutron

Virtual Networks via Neutron

Virtual Machines
- Virtual networks ar
  defined in software
- Provisioned togethe
  with virtual machine

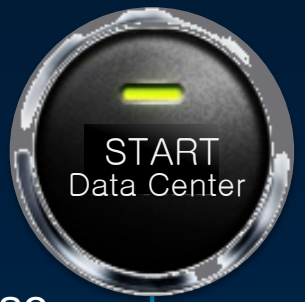


Physical Network
- Extremely Simple
- L3 only

Evolution of Software Defined Networking

Research
- OpenFlow
- Mostly in Academia
- Experimental

Products & Architecture
- Overlay Networks
- Centralized Control Planes
- Service Providers & Enterprise



Mainstream Deployments
- Operational Readiness
- Easy Deployment
- Operational Tools

2008 2010 2012 2014 2015 2016

Existing Hardware (Extend Life)

New Fabric Designs (L3, ECMP)

Bare Metal Switches

A data point from VMware

72%

of VMware customers survey plan to virtualize network in next 18 months

400

Customers on NSX Today

Top Customer Priorities

1. **POC-to-Production**
2. **Multi-vCenter Support**
3. **Train, Certification & Org**
4. **Reference Architectures**

Use Cases

Experiences from VMware

Open Source

Open vSwitch

- Open Source vSwitch for KVM, XEN, HyperV
- Apache License
- Open vSwitch open, this means:
  - It’s Used by our competitors. And that’s ok.
  - Majority of OVS use is without a VMware product. That’s ok too.

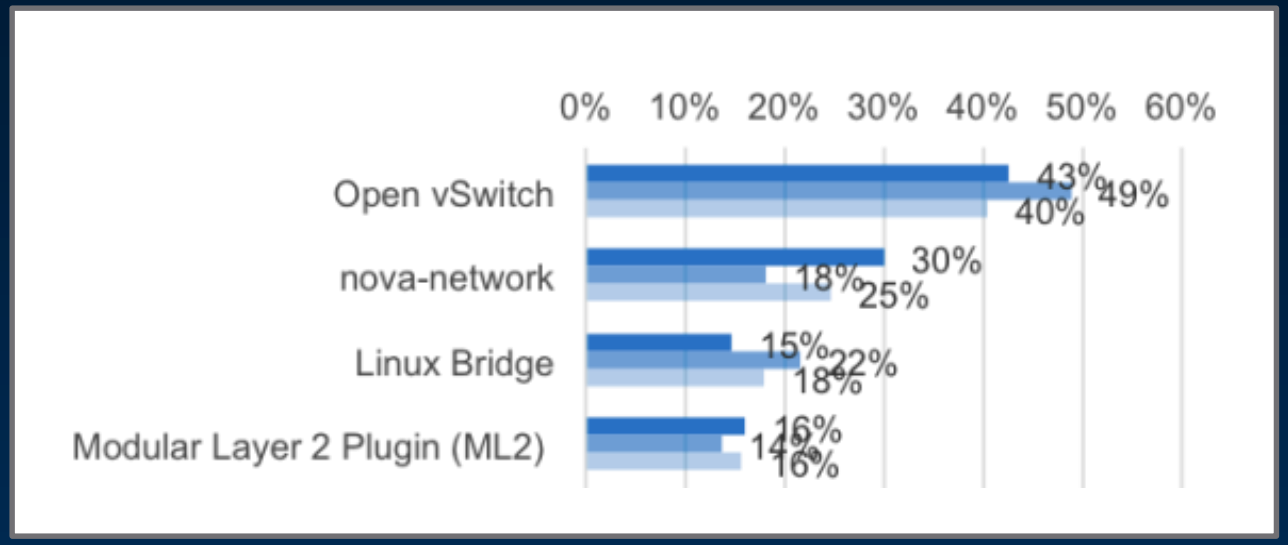
Our goal is to keep Open vSwitch as a production quality foundation for great SDN products and systems.

Open vSwitch and OpenStack

OVS is #1 for OpenStack

- 43% of Production
- 49% of Dev/QA
- 40% of PoC

OVS more popular than the “default”.



Source: 2014 OpenStack Survey

Mailing Lists

Mailing List	Subscribers
discuss@openvswitch.org	1544
announce@openvswitch.org	883
dev@openvswitch.org	839
git@openvswitch.org	175

(Incomplete) List of Contributors

Open Virtual Network (OVN)

What is OVN?

Virtual Networking for OVS

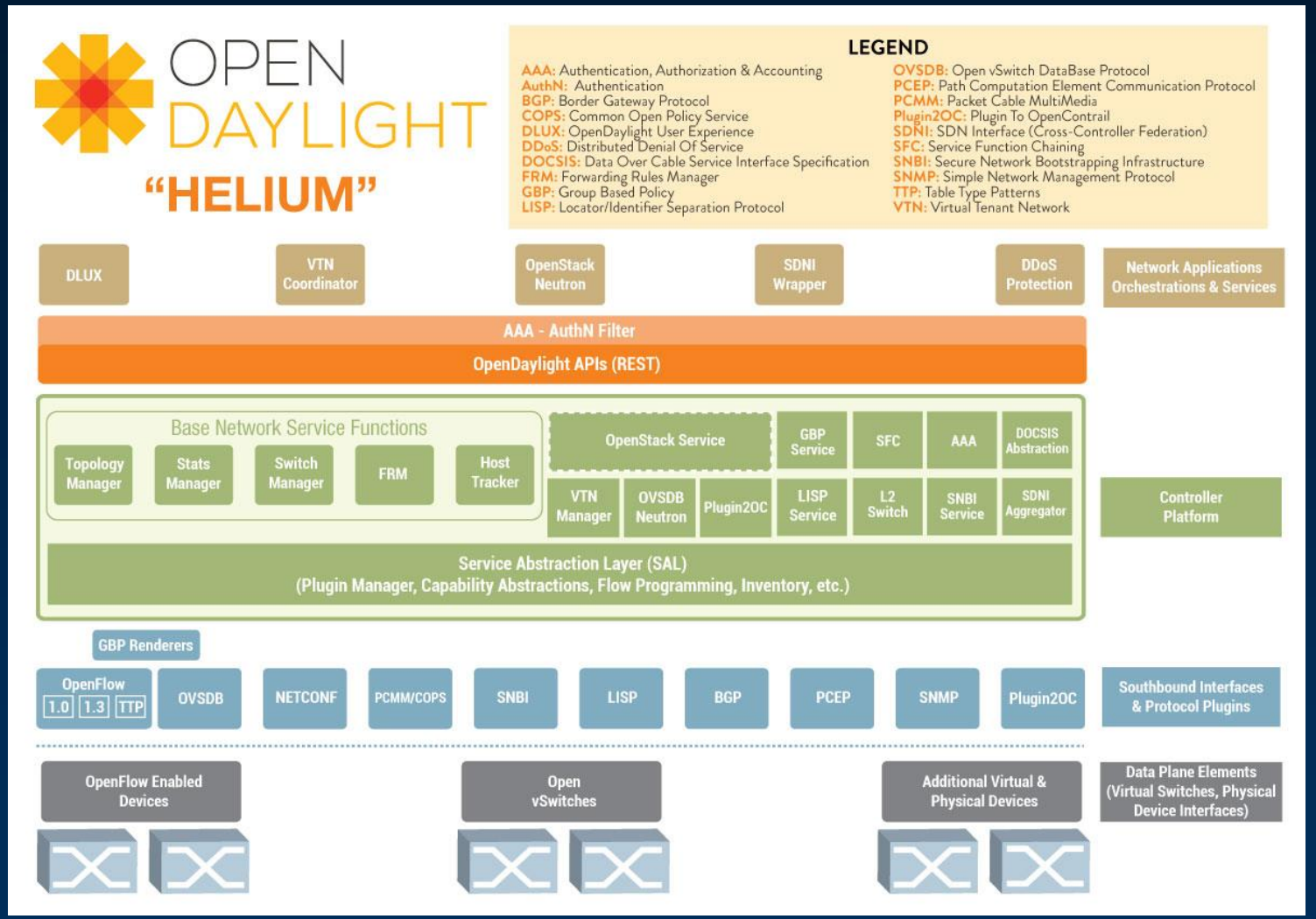
- New project from the OVS team
- Provides L2, L3 and Security Profiles
- 100% Open Source (Apache)
- Neutron Plugin
- Containers

What it is NOT!

- It's not a commercial product
- It's not a control plane for other vSwitches
- It's not an extensible controller platform like ODL, ONOS etc.

Open Virtual Network

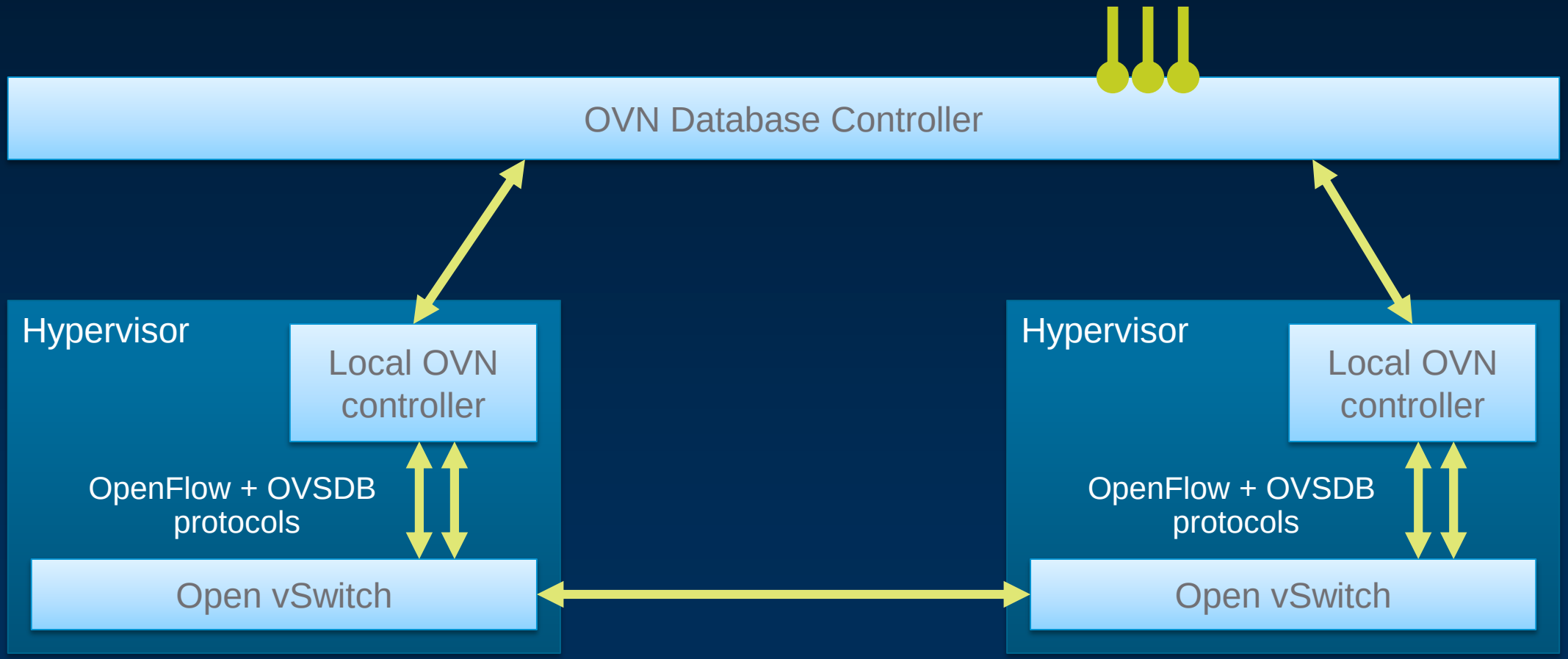
It’s not a general purpose, controller platform.



Open Virtual Network

Architecture

API's for defining:
- L2 segments
- L3 forwarding
- Security Groups



Thanks!

OVN is being developed in the open. Code will be available soon in the OVS Github repo:

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https://github.com/openvswitch/ovs
```

vmware