OpenStack + VMware: Everything You Need to Know

Kilo Edition

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About Me

- Tsinghua University @ Beijing
  - BS & MS with major in Electrical Engineering

- Ex-employers: Sun Microsystems, Microsoft & AOL
  - Worked on desktop applications, Big Data, business intelligence, full stack of web sites.

- VMware, site lead of Cloud Native Infrastructure organization
  - Manage Big Data and OpenStack R&D teams at Beijing
  - Built VIO China R&D team from scratch
  - Launched Products: VMware Integrated OpenStack and vSphere Big Data Extensions

- Open Source Projects
  - OpenOffice.org, Hadoop, OpenStack

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The Ages of OpenStack

Austin (Austin)   Bexar (San Antonio)   Diablo (Santa Clara)   Essex (Boston)   Folsom (San Fran.)   Grizzly (San Diego)   Havana (Portland)   Icehouse (Hong Kong)   Juno (Atlanta)   Kilo (Paris)   Liberty (Vancouver)   "M" (Tokyo)   "N" (TBD)

Expectations vs. Reality

Age of Formation:

Let's Grow the Community!

Age of "Something for Nothing":

OpenStack gives me a cloud for free!

Age of Pragmatism:

How can OpenStack drive value in my organization?

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What Has Driven the Shift to the "Age of Pragmatists"?

Awareness of What Running OpenStack Really Means	Enterprises are Growing Percentage of Evaluators
• First-hand experience in a lab / production • Tales from operator meetups, blogs, articles, analysts, etc.	• No longer web-scale shops + SPs who building out new team of developers to maintain cloud. • Have different expectations for support, etc.

"Free" Do-it-Yourself ➔ Work with Vendor to De-risk

Hire new team ➔ Enable Current Team

Primary Focus on "Free" ➔ Primary Focus on "Developer Innovation"

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Age of the Pragmatist: Focus on Developer Innovation

Why? Businesses increasingly see software as a key differentiator

Automation enables their software developers to deliver software faster + more reliably.

How? OpenStack is a **framework** for providing developers with **cloud-style APIs** and tools on top of your team's **choice of virtual infrastructure** technologies.

# Ops Question: What is the Best Technology to Power OpenStack?

…advanced features?

$ …low total cost of ownership"

… effective operations and upgrade?"

…scalability?"

"What is the best technology choice for..."

... infrastructure and app SLAs?"

…availability and reliability?"

…security?"

… troubleshooting and support?"

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The Opportunity of OpenStack on VMware

Open and vendor-neutral APIs and tools that help your developers innovate…

+

…industry leading technologies that deliver reliable and rich compute, network, storage and management
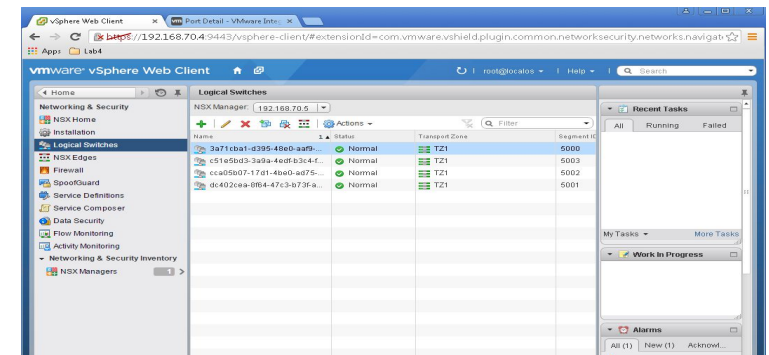
The Opportunity of OpenStack on VMware
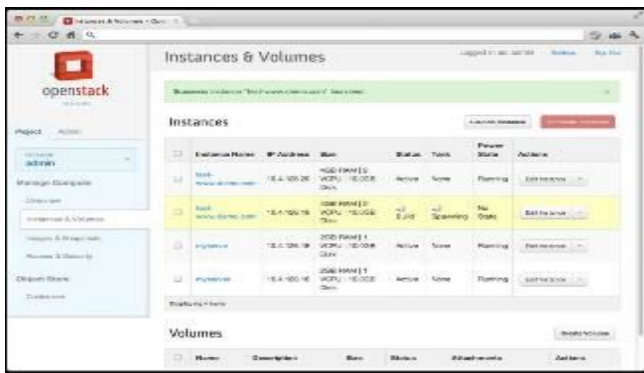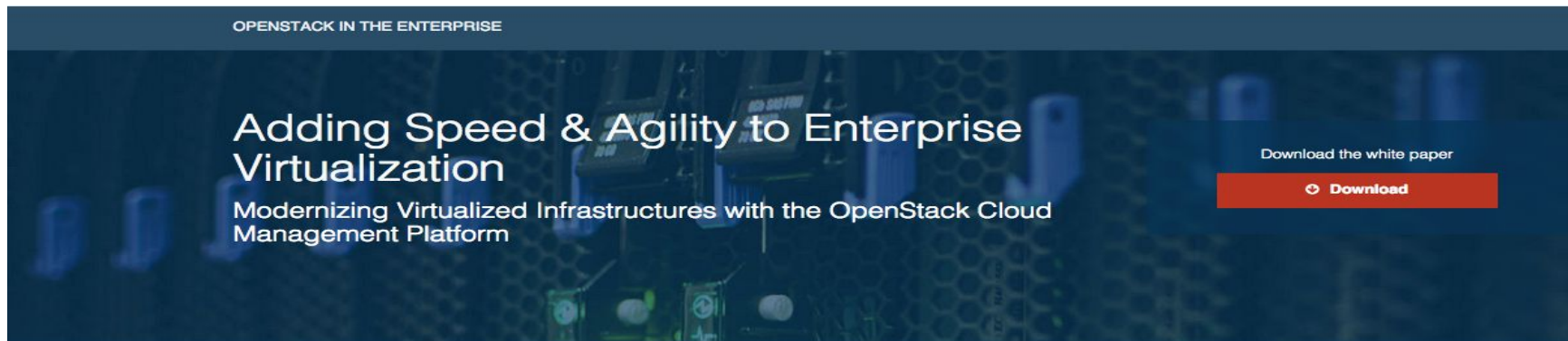

Cloud Developers

Use vendor-neutral OpenStack APIs, CLIs, and tools to provision + manage workloads

Cloud Operators

Use a robust platform and familiar tools to operate and manage the cloud infrastructure.

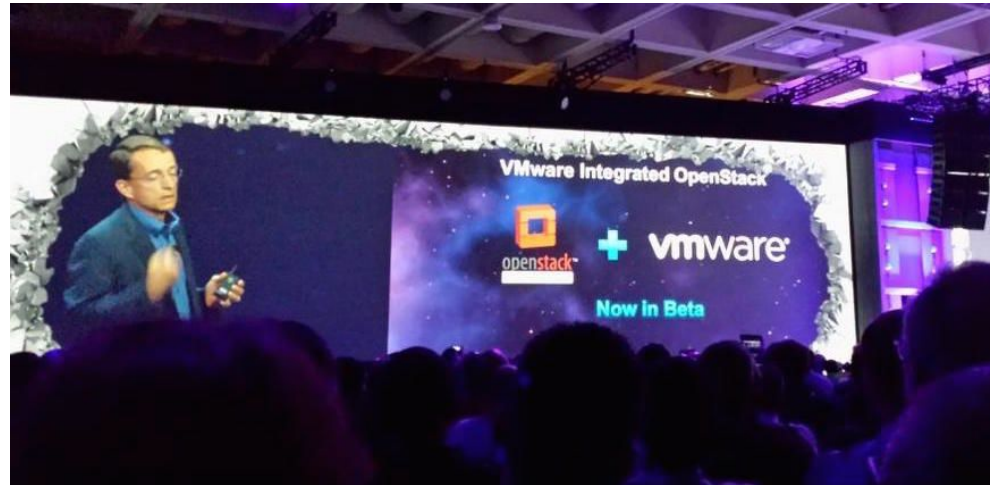**vm**ware®

The Opportunity of OpenStack on VMware

OPENSTACK IN THE ENTERPRISE

Adding Speed & Agility to Enterprise Virtualization

Modernizing Virtualized Infrastructures with the OpenStack Cloud Management Platform

Download the white paper

⟳ Download

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OpenStack Foundation Whitepaper on the Benefits of OpenStack + VMware for Enterprises:

http://www.openstack.org/enterprise/virtualization-integration/

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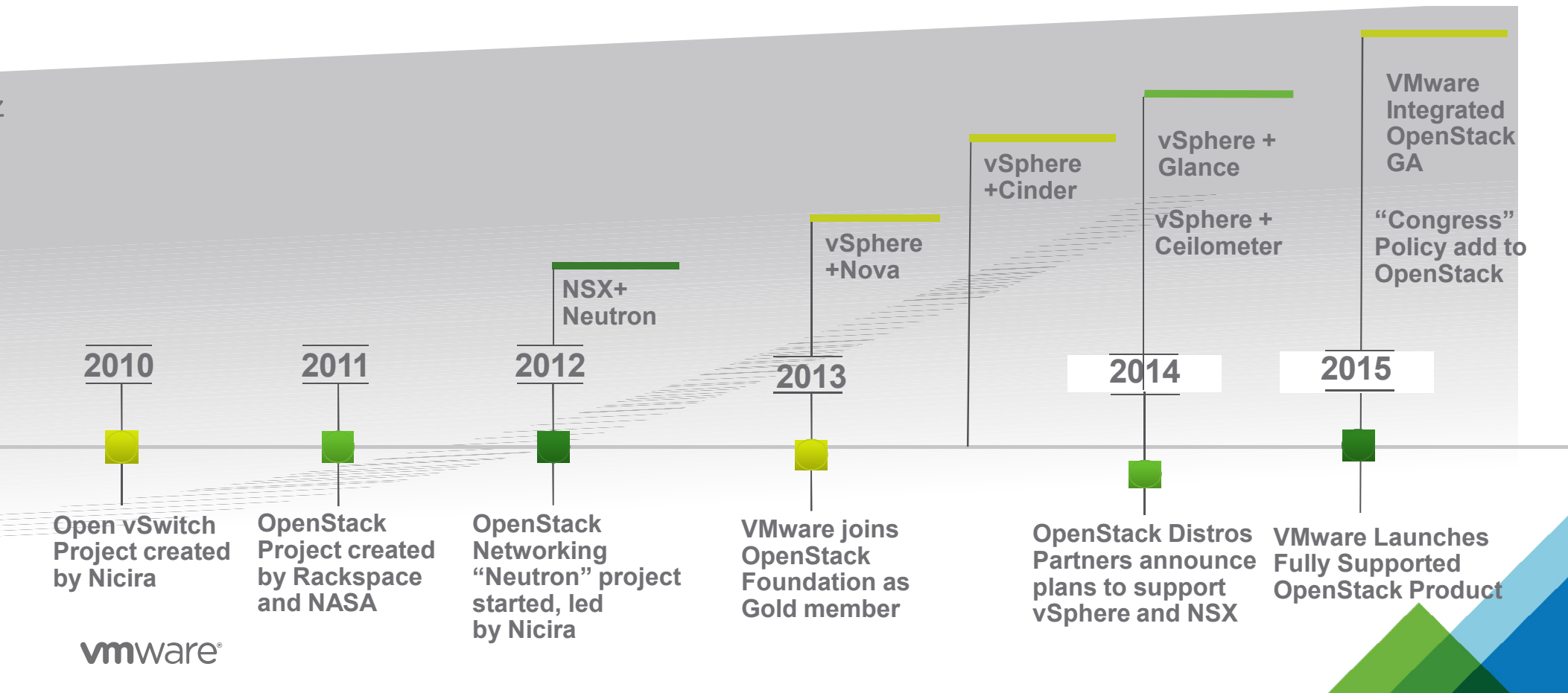# VMware's Opportunity: Making OpenStack Easy for Our Customers

VMware Integrated OpenStack (VIO)

- Announced as beta @ VMworld 2014
- VIO 1.0 went generally available in March 2015.
- FREE to vSphere Enterprise+ customers.
- Optional $200 / CPU / year for VIO support.

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A Long-Standing Commitment to the OpenStack Community

NSX+ Neutron

vSphere +Nova

vSphere +Cinder

vSphere + Glance

vSphere + Ceilometer

VMware Integrated OpenStack GA

"Congress" Policy add to OpenStack

2010   **2011**   **2012**   **2013**   **2014**   **2015**

Open vSwitch Project created by Nicira

OpenStack Project created by Rackspace and NASA

OpenStack Networking "Neutron" project started, led by Nicira

VMware joins OpenStack Foundation as Gold member

OpenStack Distros Partners announce plans to support vSphere and NSX

VMware Launches Fully Supported OpenStack Product

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Kilo VMware OpenStack Community Involvement

Main OpenStack Projects

- Top 10 contributor since 2012 (95K lines-of-code in Kilo)

- Maintain VMware drivers, assist with community efforts.

Open vSwitch (+ OVN)

- Serves as the foundation for almost all open source + vendor solutions for Neutron.

- OVN: new project launch early in 2015. VMware + Red Hat.

- http://networkheresy.com/2015/01/13/ovn-bringing-native-virtual-networking-to-ovs/

"Congress" Policy Project

- Gives cross-project capability of enforcing policy & compliance.
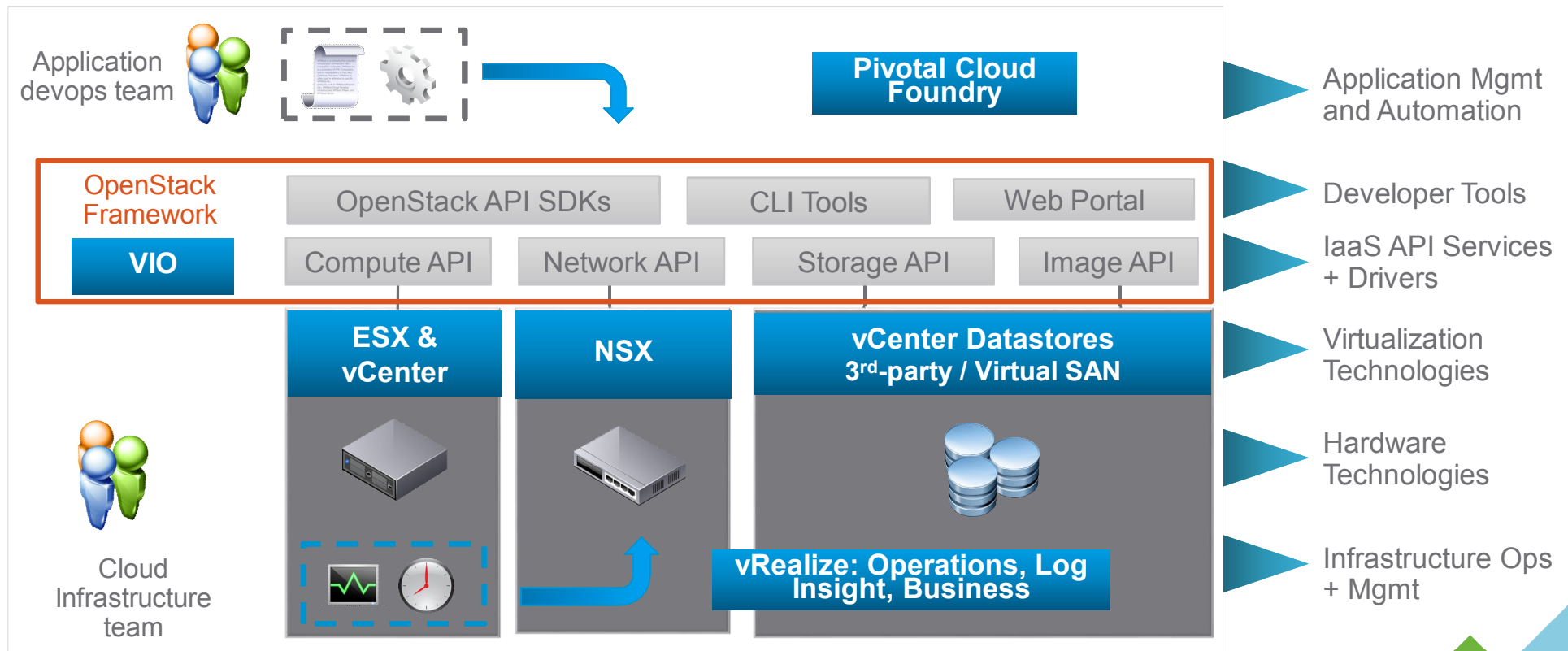- Newly accepted OpenStack project.
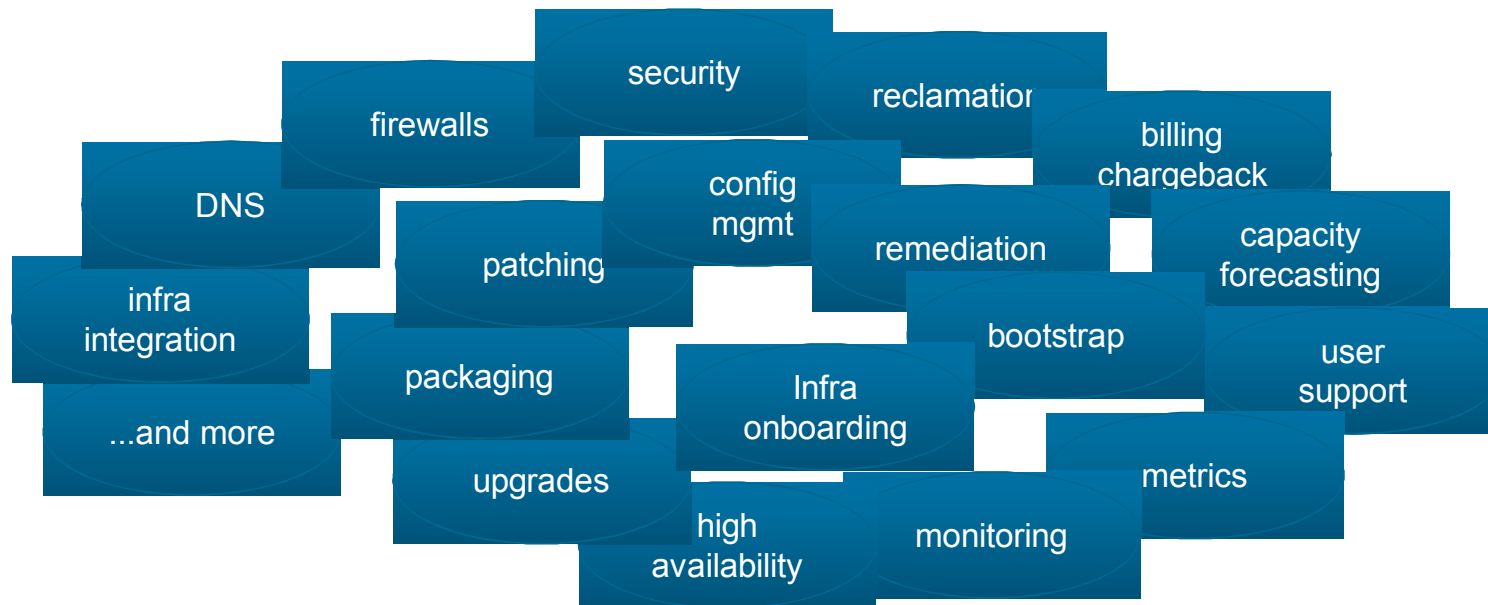

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Running OpenStack with VMware

Application devops team

Pivotal Cloud Foundry

OpenStack Framework

OpenStack API SDKs	CLI Tools	Web Portal

VIO

Compute API	Network API	Storage API	Image API

ESX & vCenter	NSX	vCenter Datastores 3rd-party / Virtual SAN

vRealize: Operations, Log Insight, Business

Cloud Infrastructure team

Application Mgmt and Automation

Developer Tools

IaaS API Services + Drivers

Virtualization Technologies

Hardware Technologies

Infrastructure Ops + Mgmt

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Mind the Gap Between Proof-of-Concept + Production

Mind the Gap Between Proof-of-Concept + Production

"…an OpenStack installation does not make a cloud…

security

firewalls

reclamation

billing chargeback

DNS

config mgmt

remediation

capacity forecasting

patching

infra integration

bootstrap

user support

packaging

Infra onboarding

…and more

upgrades

metrics

high availability

monitoring

"These activities are bound to consume a significant amount of time and effort."

Subbu Allamaraju – Chief Cloud Architect @ Ebay

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http://www.subbu.org/blog/2013/07/openstack-is-not-cloud

Operations Example: Monitor, Troubleshoot, Remediate
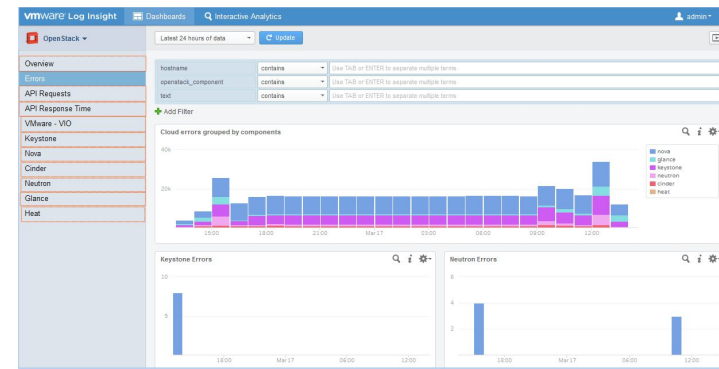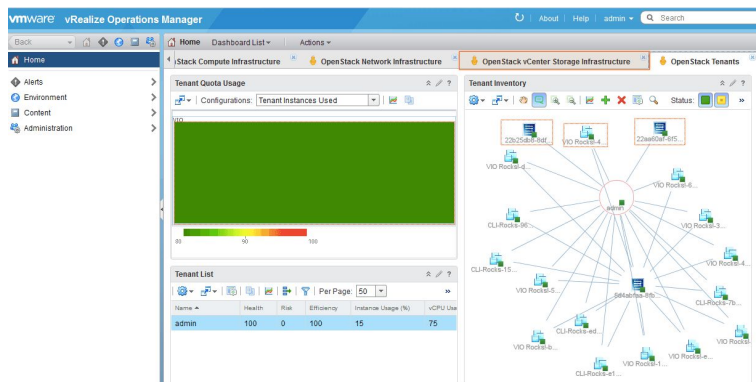
vRealize Operations:
- Monitor / Troubleshoot OpenStack Control Plane
- Map from OpenStack Servers, Volumes, and Networks down to virt + hardware layer.
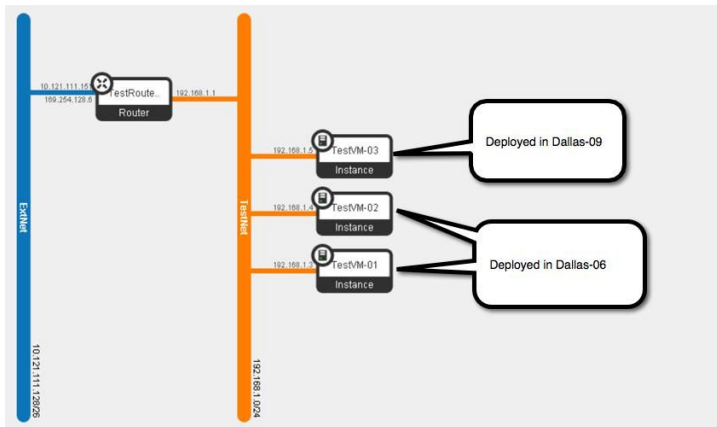
vRealize Log Insight:
- Centralized log collection + analysis.
- Pre-built and extensible dashboards tailored to OpenStack and other VMware products.
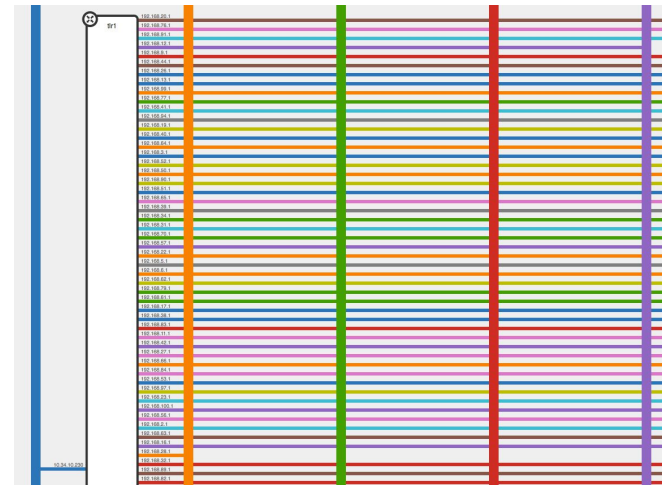
Customer Story on vRealize Log Insight:
http://darrylcauldwell.com/vrealize-log-insight-for-vmware-integrated-openstack/

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VMware NSX: Secure your applications with network virtualization

Virtual Networking demos are cool…..   Production-grade Virtual Networking is COOLER

And don't forget about making sure the system is resilient to node failures, doesn't cause VM network downtime during upgrade, is easy to troubleshoot….

400+ NSX customers

http://blogs.vmware.com/networkvirtualization/2015/05/journey-vmware-nsx-customers.html

Operations Example: Security Patching

VENOM

VIRTUALIZED ENVIRONMENT NEGLECTED OPERATIONS MANIPULATION

Discovered by Jason Geffner, CrowdStrike Senior Security Researcher

- Allows VM "break out" to hypervisor, reach other VMs and perhaps other hypervisors.

- A VERY scary bug in KVM / Xen (not VMware)

- You can't patch fast enough… but are you immediately going to take down every VM in your cloud?

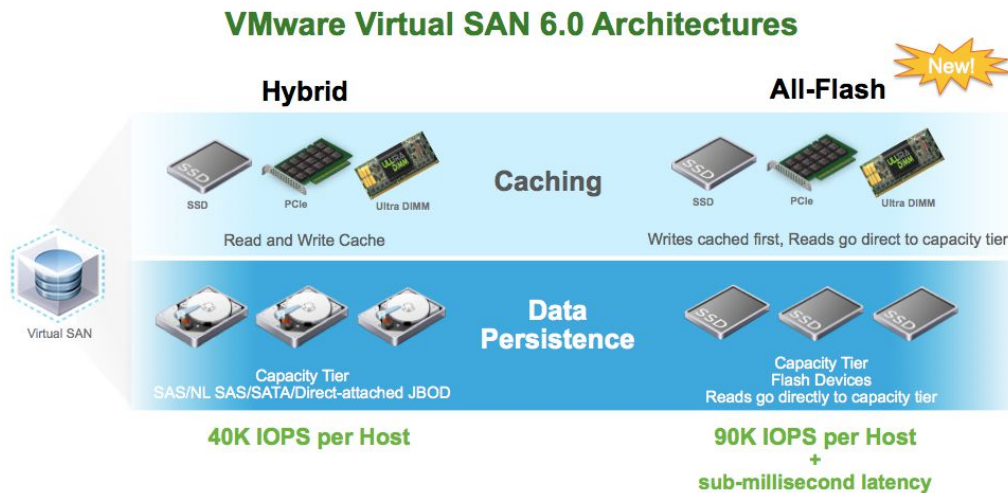- These days, even GCE avoids patch reboots.

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vSphere Maintenance Mode & Update Manager
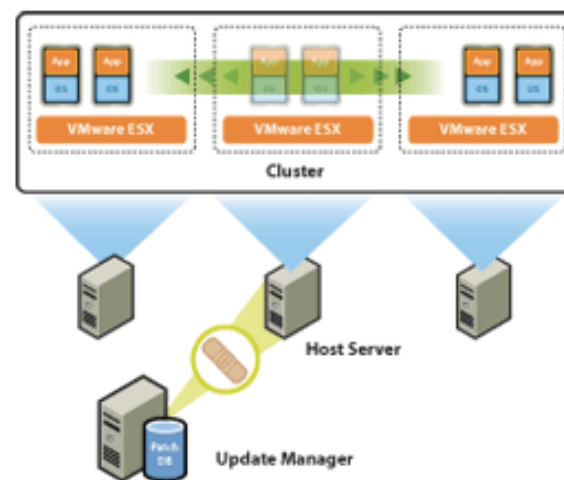
Automated, non-disruptive hypervisor patching.

VMware Virtual SAN: Powerful Cinder & Nova Storage

Performance Policy: Go "all flash" or flexibly mix spinning disk & flash, on a per-workload basis.


VMware Virtual SAN 6.0 Architectures

Hybrid — All-Flash — New!

Caching — Read and Write Cache — Writes cached first, Reads go direct to capacity tier

Data Persistence — Capacity Tier SAS/NL SAS/SATA/Direct-attached JBOD — Capacity Tier Flash Devices Reads go directly to capacity tier

40K IOPS per Host — 90K IOPS per Host + sub-millisecond latency

Virtual SAN

Random Read: 7.4M IOPs

OLTP Mix: 2.2M IOPs

64-node vSAN Cluster.
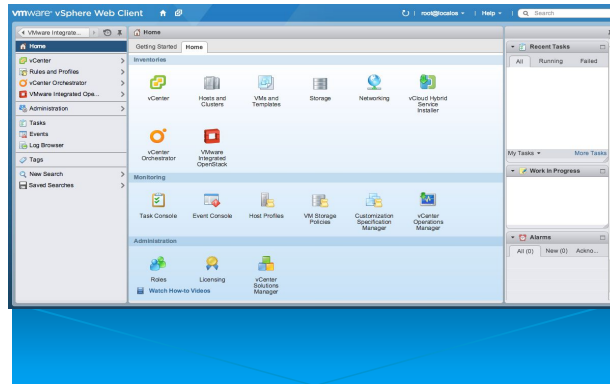http://blogs.vmware.com/storage/2015/03/17/double-vsan-performance/

Simplicity & Ops: Enabled with a few clicks in vCenter, no separate storage sub-system to manage.

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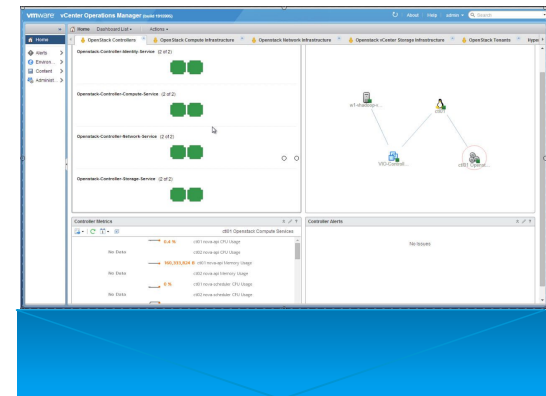# What is VMware Integrated OpenStack?
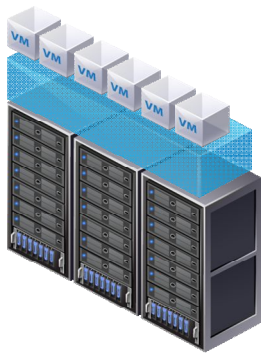
Existing vSphere environment

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OpenStack code with VMware drivers

VMware-optimized reference arch, with integrated tools for install, upgrade, etc
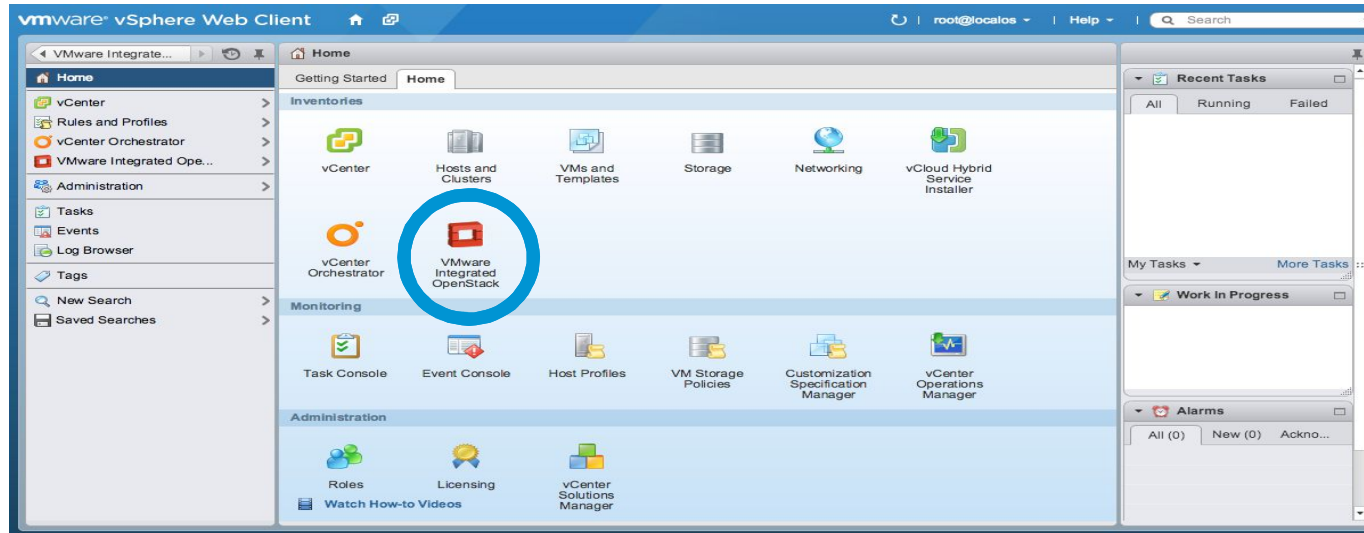
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vRealize Operations   Log Insight   vRealize Automation   vRealize Business

VMware Integrated OpenStack

OpenStack-aware Cloud Management

Single Support Contact

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Demo: VMware Integrated OpenStack with Multiple Hypervisors

The OpenStack APIs developers want

Best-of-breed compute, network, storage

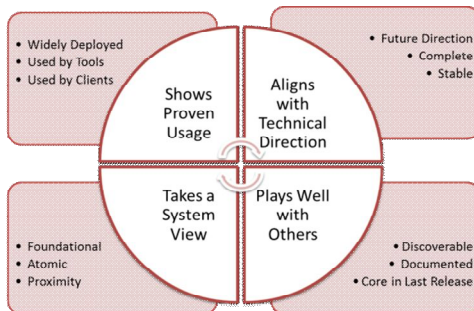Elegant, rapid, and simplified operations

OpenStack Interoperability

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Open and vendor-neutral APIs
and tools that help your
developers innovate…

+

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…industry leading technologies that
deliver reliable and rich compute,
network, storage and management

VMware Integrated OpenStack

DETAILS & SIGNUP

VMware Integrated OpenStack VIO rapidly deploys production-grade OpenStack on top of industry-leading VMware technology. VIO leverages your existing VMware investment to simplify installation, upgrade, operations, monitoring, and more.

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POWERED

This product is OpenStack Powered. It contains OpenStack software and has been validated through testing to provide API compatibility for OpenStack core services. Learn more about the testing criteria and core services here.

✔ TESTED OpenStack Powered Platform 2015.04 . See full results [+].

- http://www.openstack.org/marketplace/distros/distribution/vmware/vmware-integrated-openstack
- http://www.openstack.org/brand/interop/

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Where to Learn More

Download VIO + Learn More
- http://www.vmware.com/products/openstack

Hands-on-Lab
- Online at: http://www.vmware.com/go/openstacklab

OpenStack Training
- Free 3-hour online training course on OpenStack, geared for people with a VMware background:
- http://www.vmware.com/go/openstacktraining

Have Questions?
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- http://communities.vmware.com/community/vmtn/openstack

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Questions?