Migration Strategies from vSphere to Linux and OpenStack via a shared virtualized network

Dan Conde, Midokura
Agenda

- What’s in this talk, what’s not
- Migrating VMs running on vSphere to Linux virtualization
- Characteristics of vSphere workloads
- Hypervisor only or are management tools in the mix?
- Co-existence strategy
- Using networks to tie greenfield to brownfield
What I will not talk about

- Pricing
- Licensing
- Support
- Services
- Moving to and from AWS
- Reference: Thursday’s oVirt talk (Yaniv Bronhaim)
What I will talk about

- It’s not just about the hypervisor
  - i.e. KVM vs. ESX or ESXi
- Management matters
  - VMware: vCenter, vCloud Automation Center, etc.
  - OpenStack: Horizon, CeiloMeter, Heat

- Warning: I used to work for VMware
vSphere Workloads

- vSphere workloads tend to be more “pets” than “cattle”
- Generally a scale-up vs. scale-out difference
- Management, regulatory compliance also
Consolidation drove vSphere adoption
Targets

- Linux based virtualization (host OS, not guest OS)
  - Plain vSphere VM to KVM migration
  - Straightforward if you focus only on VMs

- OpenStack
  - Not necessarily suited for vSphere type of workloads that are not in private cloud
  - Even workloads under vCloud Suite control are not always “Cloudy” enough for move to OpenStack
vSphere Workloads

- Large proportion are pets
- Taken care of by vMotion, HA (high availability), Dynamic Resource Scheduler (DRS), etc.
- Usually not designed for failure
Strategy: Conversion

- Can I convert my vSphere based VMs (Windows or Linux) to Linux VMs (KVM?)
- What are the problems and risks?
Converting Images

- On Red Hat, use `virt-vtv`
  - Can convert from Xen, KVM and ESX/ESXi
- Export VM as OVA (Open Virtualization Format archive) format (for Oracle (It’s Xen)) from vSphere
Image format

- Consider storage format and allocation policy
  - Block (Fibre Channel, or iSCSI) vs file (NFS on NAS)

- Red Hat requires export domain to be NFS only!

- Know “COW” format (not Cattle!)
  - Copy on write
  - Affects how LUN or storage allocation was done in source system (overcommit storage)
VMware Tools

- Most Guest VMs have VMware-tools

- Note: If converting a Windows VM from VMware ESX or ESXi, uninstall VMware Tools!
  - Note: New development may be coming in Xen

- Equivalents to VMware tools in Linux
  - Virtio for IO virtualization
  - http://www.linux-kvm.org/Virtio
  - More than just paravirtualization (time sync, etc.)
Tips and Tricks

- Learn how to read .VMX files in vSphere / ESX or ESXi and not rely 100% on GUI

- If you are mostly a Linux sys admin, realize
  - that VMware has a Linux/Unix heritage,
  - vSphere does not use Linux service console anymore
  - But low level configs may look familiar
Guest OS Support Matrix

- KVM support is not as complete as vSphere especially for older Guest OS (i.e. 32-bit CentOS, RHEL 8, AMD)

- Watch out for situations where reboot from guest doesn’t correctly work

- Practically speaking: VMware workloads are probably Windows, RHEL
vMotion and other features

- vMotion used for maintenance of hosts, load balancing (DRS)
- People were hesitant to turn on DRS in beginning but commonplace now
- Shared storage needed
- Cannot replicate all policies in vSphere in KVM
- Storage DRS, FT, etc. not all available in Linux or OpenStack
System Management

- Very different models
  - vCenter vs more command line centric models
- vSphere surrounded by many management tools that not 100% parity in Linux or OpenStack
- Main question: Continue with two models or try to unify?
3 parts of infra
Plus an extra section on GRC
CPU

- Things to look out for:
- Over commit and CPU shares
- Processor affinity
- NUMA nodes
- Philosophical differences between vSphere/ESX and Linux scheduling (note: Xen is more like vSphere or ESX)
Storage

- The tricky part!

- RHEV wants to use NAS (NFS) or FC
  - But management systems from storage teams may not be familiar with Linux virtualization
  - It's not an issue of just getting a LUN: Storage teams can be picky.
    - Storage processors can get overloaded during boot storms for VDI

- vSphere has vSAN (‘14), Flash Read Cache (‘13), etc.
Virtual Switch

10 GigE

APP OS

APP OS

APP OS

iSCSI

FT

vMotion

NFS

TCP/IP

Virtual Switch

10 GigE

midokura
Networking

- Plain or distributed vSwitches are often used in vSphere, not full SDN
- Using SDN solutions to migrate
  - Examples: OpenStack built-in networking, SDN overlays
- VLANs for segregation
- Flat-networking is sufficient for starter to bridge the two worlds
Regulatory Compliance

- 4th member of the infrastructure
  - Storage, Compute, Network consideration, plus Compliance for “Pets”

- Security as common component

- GRC = Governance, Risk and Compliance

- GRC Tools: RSA Archer, Metricstream, SAP, gGRC (Google/Reciprocity) can help be a system of record
Other utilities

- Third party tools help augment what plain Linux lacks and can help with migration
  - Disk image management tools

- Operational Management tools part of vSphere
  - Update Management? Host Deployment, Host Profiles
  - Some are findings its way into oVirt, but not all are available
Performance

- vSphere performance considered generally better but gap is closing
- Should not focus solely on # of vCPUs, max virtual RAM, etc. (KVM is quite good in this respect)
- Will cost and other issues make up for that?
VDI

- KVM world has limited desktop virtualization support
  - SVGA, DirectX for vSphere
  - SPICE remote protocol for RHEV
Network Virtualization

- Generally available for OpenStack today
  - Midokura MidoNet, VMware NSX for Multi-Hypervisor and vSphere, PLUMgrid OpenStack Networking Suite, Nuage and plain OVS Plug-In

- Neutron integration available in RHEV, without OpenStack
What to do?

- Given these caveats, how do I proceed?
Strategy: Co-Existence

- A more practical approach that:
  - Enables growth using Linux for incremental workload
  - Reduces risk of messing with existing “pets”

- Leaves what’s working alone on vSphere
  - Reduces risk on issues such as storage performance, regulatory compliance

- Compromise: OpenStack on vSphere?
Strategy: Co-Existence

- Networking Bridge
  - Create consistent management plane across Linux/OpenStack and vSphere

- Split Workload across both sides – Pets on vSphere, Cattle on OpenStack

- Use of SDN to ease provisioning and management
  - HW VTEP for bare metal workloads to bridge VLANs on physical to virtual networks
Result

• Keep vSphere staff and their workloads stable
  • Example: Back-end databases, ERP’s like SAP
  • Keep management tools and scripts alone

• Make new workloads go to Linux or OpenStack
  • App servers, Web front-ends

• Bridge the two worlds

• Target the test/dev, UAT systems first, not production
Questions to ask

- What do Pets require?
  - Is community support sufficient?
  - Do Pet owners want “vendor support?”

- What are the features you absolutely need?
  - Storage vMotion (load balancing) – not in RHEV
  - Dependency on VMware management tools
  - Existing scripts – do you have PowerShell scripts?
Conclusion

- Don’t try to boil the ocean via a rip-and-replace
- It’s not all about the technology
  - People and process makes a big difference
  - Some groups will resist
- Even in the tech side, it’s not just a hypervisor issue
- Get success in a few areas and then consider conversion later on
- Co-existence is a great way to make it work – gain confidence, and then grow later
Promo: What we do

- Midokura provides SDN solutions for OpenStack
- Creates an overlay virtual network between KVM hypervisors
- Provides L2-L4 services (Distributed NAT, routing, switching, load balancing)
Contact

- dconde@Midokura.com
- @danielconde
- www.midokura.com