How to Compare VMware & OpenStack™

REFERENCE CHECKLIST

BUILT FOR

openstack™
CLOUD SOFTWARE

MIRANTIS
Engineering for OpenStack™ Cloud

Mirantis

www.mirantis.com

How to think about a comparison

- VMware solves for the enterprise; OpenStack solves for the cloud
  - Both technology and philosophy differ
  - Not an apples-to-apples comparison
- Select features can be compared side by side
  - This slide deck provides a reference checklist
- Complete discussion at http://www.mirantis.com/vmware-openstack

VMWare & OpenStack

VMWARE FEATURE	COMPARABLE OPENSTACK FEATURE
vMotion	KVM Live Migration
DRS	Nova Scheduler
DPM	**TBD**
Storage vMotion	**TBD**
SDRS	Nova Scheduler
HA	**TBD**
FT	**TBD**
vShield	Nova-network service
vDS	Quantum/Nova-network service
NetIOC	Quantum
SIOC	**TBD**
Storage APIs	Nova-volume service
Data Recovery	**TBD**

VMotion & KVM Live Migration

- Live migrations of VMs w/0-downtime between different physical hosts w/ broad hardware compatibility options.

- Low-latency link required
  - (max 5 ms RTT).

- Metro vMotion allows migration over metro level networks (up to 10 ms RTT) by dynamically adjusting TCP buffer.

- Other limitations include:

  - shared storage (VMFS, SAN, shared NAS) required

  - source and target nodes connected to single L2 segment

  - CPUs compatibility required on source and target.

- Live migration w/up to 2 seconds service suspend

- Migration without shared storage supported w/libvirt block migration feature

Distributed Resource Scheduler

- Manages workload 'intelligently' by grouping virtual machines;ooling resources of physical hosts and prioritizing VMs in these pools; and moving VMs between physical hosts in accordance to vMotion rules.

- Supports affinity rules governing placement of virtual machines onto physical hosts.

- Collects usage metrics from physical hosts and VMs; generates optimization recommendations executed manually or automatically – on initial placement or continuously during runtime.

- Maintenance mode supports moving workload w/vMotion live migration out of physical host to perform maintenance (in auto or manual mode).

- Not supported in OpenStack
- Can be implemented using external monitoring, FilterScheduler and Live Migration

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DRM

- Allows shut down of physical hosts not is use by VMs. Brings hosts up once workload increases and more physical hosts are required.

- *Not supported in OpenStack*

Storage vMotion

- Allows configuring datastore cluster instead of single store location.
- Provides recommendations for initial virtual disk placement (VMDK)
- Allows moving virtual disks between nodes in datastore cluster (e.g. for scheduled maintenance of a node)
- Supports affinity and anti-affinity rules for VMs/VMDKs
- Only persistent VMDKs, or raw device mapped (RDM) virtual disks can be migrated w/ Storage vMotion

- *Not supported in OpenStack*
- *Can be implemented for LVM-based persistent volumes*

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SDRS

- Allows moving volume storage workloads over datastore cluster w/Storage vMotion.

- Automated recom-mendations for moving VMDKs based on space utilization & I/O load of nodes in datastore cluster.

- Supports affinity/anti-affinity rules.

- Supports manual and auto execution of recommendations.

- Volume type-aware scheduler is in nova roadmap (scheduled for Folsom)

- Local storage of VMs resides on local disks of compute nodes

- nova-scheduler supports boot-from-volume feature that allows to use iSCSI persistent volume as boot VM device

HA

- Automated monitoring of physical servers availability, system health and restart of VMs on another or same physical server depending on the nature of the failure.

- Provides suggestions for optimal placing of restarted VMs and exposes health data to the user interface

- VM-level HA is on OpenStack roadmap for Folsom release

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FT

- Allows seamless stateful failover of protected virtual machines, ensures that protected machines are always backed by standby copies.

- Hypervisor-level 'mirroring' of instructions (vLockstep) is used to create standby clones of protected VMs.

- Supported for single VCPU VMs only.

- Instructions mirroring is not supported by KVM

- Kemari project (instructions mirroring for QEMU-KVM) seems to be dormant

vShield

- Includes components; each is a separate virtual appliance.

- Zones component provides IP-based applic.-aware stateful firewall that recognizes IP addresses, ports, protocol (5-tuple), application type.

- Edge component provides connection on network edge, including 5-tuple firewall, NAT, DHCP server for VMs, site-to-site IPSec VPN, simple load balancing.

- App component provides firewall on vitrual NIC level, w/traffic analysis and reporting.

- Endpoint component provides integrated anti-virus w/ability to scan VMs using introspection

- Supports per-VM firewall that uses 5-tuple to policy network access w/ Security Groups

- Network controller performs edge firewall, DHCP, DNS, NAT functions for VMs

- Cloudpipe allows VPN connection to VMs (OpenVPN)

- Opensource IDS/IPS can be integrated into network controller

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vDS

- End-to-end physical and virtual network management w/ Cisco Nexus 1000V.

- Teaming algorithm for virtual switch port groups.

- Enables Net IO Control

- End-to-end physical and virtual network management in Quantum w/following plugins:
  - o Cisco Nexus 1000V
  - o Nicira virtual switch
  - o Open vSwitch
  - o Linux bridges
  - o Ryu network operating system (designed for OpenStack specifically; still in early development stage)
- Nova network offers QoS API for Xen hypervisor (XenServer)

NetIOC

- Set and enforce network priorities (per VM) across the cluster.
- Bridge virtual and physical network QoS w/802.1q tagging.

- QoS support on per-tenant basis for Cisco plugin
- QoS framework exists and service can be implemented for other plugins

SIOC

- Supports and manages I/O queue to enforce priorities by dedicating more slots to VMs w/higher Storage QoS set

- iSCSI prioritizing is not supported in Linux

Storage APIs

- VASA: allows to integrate storage solution management w/vCenter for management functionality
- VAAI: allows hardware-supported acceleration features: deduplication, thin provisioning, cloning blocks
- VAMP: allows I/O path selection to storage device (multipath)
- Must be supported by storage appliance

- Driver configuration allows utilization of back-end storage appliance advanced features, including CoW, thin provisioning and deduplication (Nexenta); no API provided by OpenStack

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Data Recovery

- Provide ability to backup snapshots of VMs to any virtual datastore supported
- Automatically deduplicate backup snapshots, incremently update previous backups

- Nova-compute provides VM snapshot capability
- Implementation required for scheduled backups, automated backup upload w/Nova API
- Existing opensource backup solutions can be integrated for deduplication, incremental backups etc

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