Red Hat Virtualization

Status Overview and Roadmap

Yaniv Dary
Senior Technical Product Manager, Red Hat

Moran Goldboim
Senior Technical Product Manager, Red Hat

May 2017
RED HAT®
VIRTUALIZATION 4.1
HISTORY OF RED HAT VIRTUALIZATION

2008
QUMRANET ACQUISITION

RHEV BEATS VMWARE on the SPECvirt_sc2010 benchmark for both speed and scale

RHEV 3.0
More solution partners
RESTful API
memory overcommit

2010

2012

RHEV 3.1, 3.2
Windows guests
NUMA collaboration with HP

RHEV 3.3, 3.4
OpenStack Neutron integration
Hot plug CPU Affinity management
IBM Power support

2013

2014

RHEV 3.6
V-2-V migration tool

RHV 4.0
10th product release

2015

2016

RHV 4.1
Ansible integration
Native SDN

10 years KVM Foundation of Linux Virtualization

2017
THE DATA CENTER IS MOVING FORWARD
PRESSURE FROM CUSTOMERS & COMPETITORS TO MODERNIZE

NEXT-GENERATION ARCHITECTURE
New ways of developing, delivering, and integrating applications

CLOUD-NATIVE PLATFORMS
Modernize existing and build new cloud-based infrastructure

DEVOPS & CULTURAL CHANGES
A more agile process across both IT and the business functions
BALANCING INNOVATION AND OPTIMIZATION
MOST CUSTOMERS NEED BOTH VIRTUALIZATION AND CLOUD

VIRTUALIZATION
- Big stateful VM
- 1 Application -> 1-3 VMs
- VM lifecycle in years
- Increased demand -> Scale up
- High availability (HA) at the infrastructure layer

CLOUD
- Small stateless instance
- 1 Application -> many instances
- Instance lifecycle in hours to months
- Increased demand -> Scale out
- High availability (HA) at the application layer

MODE 1

MODE 2
BALANCING INNOVATION AND OPTIMIZATION
RED HAT VIRTUALIZATION FOCUS

Optimize the IT you have
Integrate apps, data, and processes
Add and manage cloud infrastructure
Build more modern applications

Leverage and integrate existing investments in order to enable future technology
IT OPTIMIZATION AND CLOUD INTEGRATION
OPEN HYBRID CLOUD CHALLENGES

Vendor Lock-In: Dependence on a specific vendor
Cost of Change: Financial, Process, Personnel
Solving the Puzzle: Determining how disparate parts fit together
Enable
Manage the virtualization infrastructure in an automated manner

Deliver
Seamlessly create, deploy and manage VMs on top of RHV

Empower
Leverage existing Ansible eco-system
ANSIBLE 2.3 INTEGRATION - RHV 4.1

Providing the building blocks

- Ansible modules for infrastructure configuration and management
- Tiered applications deployment using dynamic inventory
- Community supported Ansible Roles
- “Common API” to integrate with different entities in the datacenter like storage and networking
ANSIBLE LAB AT RED HAT SUMMIT

Hands on Lab

“Automate Red Hat Virtualization Infrastructure using Ansible”

Instructor led

Wednesday, May 3, 1:00 PM - 3:00 PM – Room 254A
**Glance**
- Use, export, and share templates and images.

**Neutron**
- Support for OSP 8/9/10.
- Assign Neutron OVS ml2 native networks to RHV virtual machines.
- Use director and composable roles to manage the Neutron agent on the RHV hosts.

**Cinder (tech preview)**
- Allows manage disks on OpenStack Cinder.
- Leverages storage offloading for improved VM provisioning performance.
**CLOUDFORMS 4.5 USER STORIES**

- **Reporting**
  - OOB reporting tool

- **Ordering Portal**
  - Ability to manage services available for users

- **VMware V2V**
  - Seamlessly migrate workloads from VMware
Playbooks as a Service

- Order, Modify & Retire
- nTier Applications
- Compute, Storage, Networking
- Configuration Management

Ansible Playbook based Policies

- Event->Condition->Playbook
- Alert->Playbook
- Custom RHV functionality extensions
- OOB playbooks (advanced functionality)
HYBRID CLOUD ENABLEMENT ROADMAP

CloudForms 4.2
Snapshot management
Live migration
2017-01

CloudForms 4.5
Integrated V2V
OSP 11 Certification
~2017-05

RHV 4.2
OSP 12 Certification
~2018-winter

CloudForms 5.x
Admin Story - Day 1 ops
Advanced VM Management
Cross RHV operations
~2017-Summer

RHV 4.1/Ansible 2.3
oVirt Ansible modules
2017-04

Subject to change

#redhat #rhsummit
HYPERCONVERGED INFRASTRUCTURE
HYPERCONVERGED INFRASTRUCTURE
REMOTE OFFICE / BRANCH OFFICE INFRASTRUCTURE

**ROBO Focused**
Improve business operations; ease of deployment and operations

**Hyperconverged**
Consolidate and improve operational efficiencies

**Scalable SDI**
3, 6, or 9-node pods
Self-Hosted Manager

Subject to change
EASILY VIRTUALIZE WORKLOADS ACROSS INTEGRATED COMPUTE AND STORAGE

MANAGE COMPUTE AND STORAGE FROM THE SAME INTERFACE
HYPERCONVERGED INFRASTRUCTURE ROADMAP

RHV 4.1.z
- 12 node PODs
- Single node POD
- Scale by less than 3 nodes

2017-Fall

RHV 4.1.z
- Red Hat Hyperconverged Infrastructure ROBO GA availability

2017-Summer

RHV 4.2
- Central management
- HCI for datacenter virtualization
- SDN default networking

2018- Winter

Subject to change
MISSION CRITICAL
VIRTUALIZATION & PERFORMANCE
MISSION CRITICAL WORKLOADS

Performance and Resilience
Unmatched performance & high availability across x86 and IBM’s Power architectures.

Long Workload Lifecycles
Scale Up/Down & migrate workload without downtime.

Monitoring and Alerting Capabilities
Ensure SLA, pinpoint bottlenecks & perform real-time monitoring.
ADVANCED POLICIES FOR LIVE MIGRATION

VM & Load Example

| 10GB VM no latency or load | 30GB VM network load w/ iperf traffic & 10GB NIC |

Migration 1 (10 minutes in the run) | 02:10.00

Migration 2 (23 minutes in the run) | 03:45.00
## Virtual Workload Scale Up/Down

<table>
<thead>
<tr>
<th>Resource</th>
<th>Hot Plug</th>
<th>Hot Unplug</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Memory</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>Disks</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Network Interfaces</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

* New in RHV 4.1
** Planned for RHV 4.2
REAL TIME GLIMPSE INTO THE INFRASTRUCTURE
Lightning Talk

“Red Hat Virtualization Analytics - Transitioning to Metrics Store”

Wednesday, May 3, 11:30 AM - 12:15 PM
Room 101
Native DR solution for stretched clusters and site to site recovery

**Active-Active Stretched Clusters**
- End to end support.
- High availability via VM storage locking (RHV 4.1).

**Site to site Failover of Different Managers**
Single click offline tool

Subject to change
MISSION CRITICAL VIRTUALIZATION & PERFORMANCE ROADMAP

RHV 4.1 GA
- HA via storage
- Postcopy/SR-IOV migration support
- Improved scale up/down options

2017-04

RHV 4.1.z
- Tech preview metrics and logging framework

2017-Summer

RHV 4.2 GA
- Native disaster recovery
- Improved backup API
- Metrics and logging framework support

2018- winter

Future

RHV 4.X
- Low latency computing
- Alerting response management

Subject to change

MISSION CRITICAL VIRTUALIZATION & PERFORMANCE ROADMAP

RHV 4.1 GA
- HA via storage
- Postcopy/SR-IOV migration support
- Improved scale up/down options

2017-04

RHV 4.1.z
- Tech preview metrics and logging framework

2017-Summer

RHV 4.2 GA
- Native disaster recovery
- Improved backup API
- Metrics and logging framework support

2018- winter

Future

RHV 4.X
- Low latency computing
- Alerting response management

Subject to change
DEV/TEST INFRASTRUCTURE
Simple & inexpensive virtualization platform

- Infrastructure deployment in matter of hours
- No additional licensing fees on advanced features

Maximizes physical infrastructure utilization

- Supports both Linux and Windows workloads
- Improved virtual workload density per hypervisor

Automation friendly

- Utilizing RESTful API
- Python, Java and Ruby software development kits
- Ansible modules and roles
STORAGE SCALE & PERFORMANCE

Storage subsystem scalability
- Number of virtual disks supported by the storage domain is increased from 250 to 1000

VM virtual disk maintenance tasks
- Speed up the removal of snapshots when the VM is not running.
- Improve VM storage deletion performance and thin provision efficiency (discard support).
- Trim VM disk size (virt-sparsify).
Storage subsystem performance

- Distribution of data operations across all hosts
- Reduced resources consumption.
- An average improvement of 38%.
NATIVE SOFTWARE DEFINED NETWORKING

● Native SDN support via Open Virtual Network for Open vSwitch (Tech preview in RHV 4.1)
  ● Exposes a Neutron-like API, enabling customers to reuse Neutron's existing automation with minimal changes.
  ● Enables overlay networking and subnet management in RHV.

● Extend SDN functionality coverage (RHV 4.2)
  ● Focus on complete security groups and routing support.
  ● Addition of user interface in administration.

Subject to change
DEVELOPMENT WORKFLOWS

Provision
- Templates - native & Glance
- Cloudinit & Windows Sysprep
- Upload\Download API

Dev/Test
- Console (Spice & serial)
- SDKs & Ansible support
- SDN

Stage
- Complete Monitoring Stack
- High density
- Tech preview nested VMs

Production
- High Availability
- Low latency features
- Scale up\down
DEV\TEST FEATURES ROADMAP

**RHV 4.1 GA**
- Disk maintenance improvements
- Native SDN (tech preview)
- Disk image upload\download

2017-04

**RHV 4.2**
- VM upload and download (template sharing)
- Native SDN support and GUI
- Self Service focus RHV/CF 5.0

2018-Summer

**RHV 4.X**
- ISO upload\download
- Improved storage performance (XCopy\SDS)

Future

Subject to change
VIRTUAL TECHNICAL WORKSTATIONS
Reduce costs for technical workstations

- No dedicated hardware per technical workstation
- Centralized Management and deployment

Maximizes physical infrastructure utilization

- Supports both Linux and Windows workloads
- Carve single GPU across several virtual technical workstations

Fast deployment and self-service

- Resource Management allowing hardware planning
- Fast deployment process for new workloads including self-service
VIRTUAL TECHNICAL WORKSTATION

vGPU Partners

- NVIDIA (GRID)
- Intel (GVT-G)

Target Markets

- Oil & Gas
- Energy
- Animation
- Sciences & Education
- Manufacturing & Engineering
vGPU ENABLEMENT ROADMAP

RHEL 7.4 GA
- vGPU kernel enablement
- RHV 4.1 vGPU Tech Preview using hooks

Late Summer 2017

RHV 4.2 GA
- full vGPU support
  (Display via 3rd party)

Late Winter 2018

End of 2017

oVirt 4.2 GA
- vGPU Support

Summer 2018

RHEL 7.5 GA
- SPICE for vGPU
  Full remote display support

Subject to change
THANK YOU

plus.google.com/+RedHat
linkedin.com/company/red-hat
youtube.com/user/RedHatVideos
facebook.com/redhatinc
twitter.com/RedHatNews

#redhat #rhsummit
LEARN. NETWORK.
EXPERIENCE
OPEN SOURCE.
vGPU OVERVIEW

- **vGPUs** are enabled through the Mediated Device (mdev) Linux kernel framework (similar to VF in SR-IOV)
- Each vGPU (mdev) is created on the RHV host, using resources of the parent device, such as Tesla
- Parent devices support multiple vGPUs for VDI or GPGPU workloads
CLOUDFORMS 5.x USER STORIES

Admin Story

Ability to configure and manage RHV datacenter to operational level.

Advanced VM Management

Edit VM functionality as it is in RHV today, including SLA features (Numa, Affinity, QOS)

Cross RHV operations

Disaster recovery, templates and image syncing
vGPU ENABLEMENT ROADMAP

RHV 4.2 GA
w/ full vGPU support
(Display via 3rd party)
~2018-02

RHEL 7.5 GA
w/SPICE for vGPU
Full remote display support
~2018-05

oVirt 4.2 GA
w/vGPU Support
~2017-11

mdev (vGPU) support in
upstream 4.10 kernel
2016-12

RHEL 7.4 GA
w/vGPU kernel enablement
RHV 4.1 limited vGPU
support using hooks
~2017-08

2016-12

Subject to change