Red Hat Virtualization 4.1

Technical Presentation | May 2017

Adapted for MSP RHUG
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Who is this bald guy?

- Red Hat TAM for the financial and telco industries
- Lots of ties to the RHV community

- I want to thank Jon “Captain KVM” Benedict for putting the original version of this presentation together.

AGENDA

- Red Hat Virtualization Overview
- Red Hat Virtualization development model
- Red Hat Virtualization architecture
- Red Hat Virtualization deep dive

- And then Sam's stuff – automation to build a RHV datacenter in about 4 minutes.

RED HAT VIRTUALIZATION
OVERVIEW
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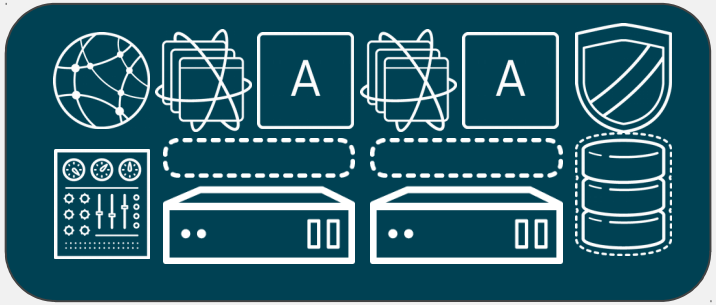
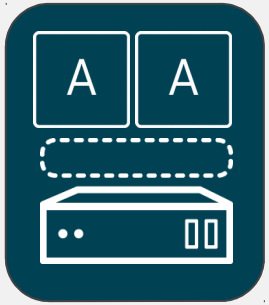
RED HAT VIRTUALIZATION OVERVIEW



Red Hat Virtualization

- Centralized Management for the KVM hypervisor as well as compute, network, and storage resources
- Enterprise features to support mission critical applications
- **RHV is built on RHEL+KVM**

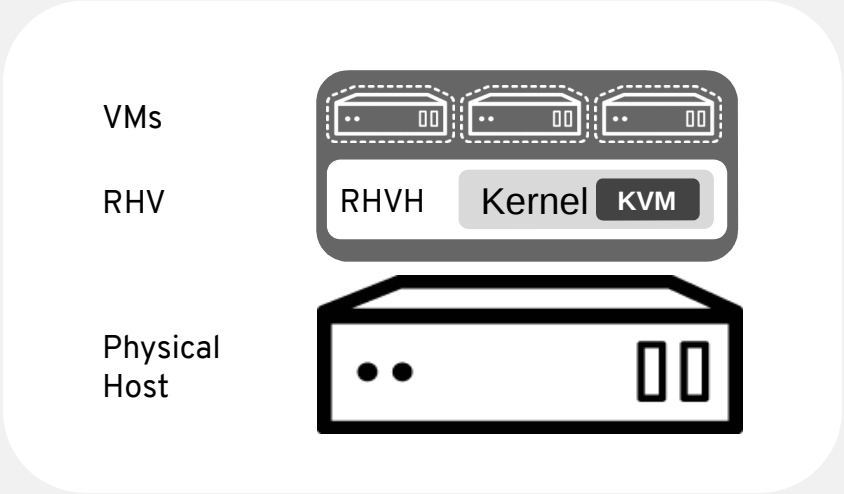


RHEL + KVM

- Basic support for KVM hypervisor
- No enterprise virtualization management features
- Limited number of VMs allowed

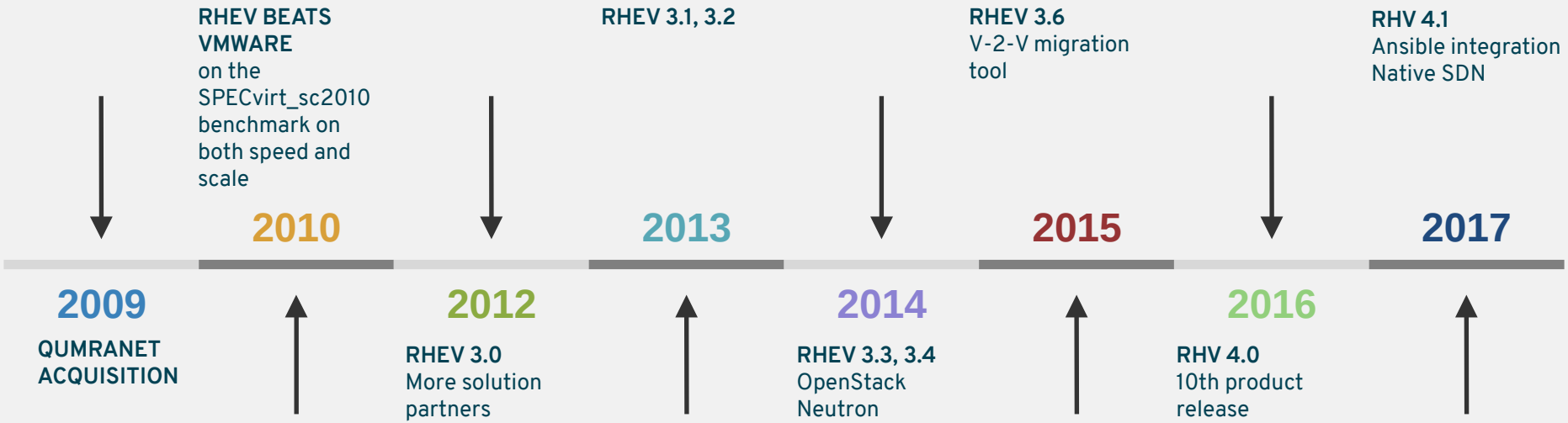
THE IMPORTANCE OF INTEGRATION WITH KVM

AS RHEL ADVANCES, RHV ADVANCES



- KVM is part of the Linux kernel
- Leverages existing features of the Linux operating system:
  - Security features
  - Memory management
  - Process scheduler
  - Device drivers
  - Network stack
- Requires integration and QE with full stack as well as support of hardware and software ecosystem

HISTORY OF RED HAT VIRTUALIZATION



RED HAT VIRTUALIZATION
DEVELOPMENT MODEL

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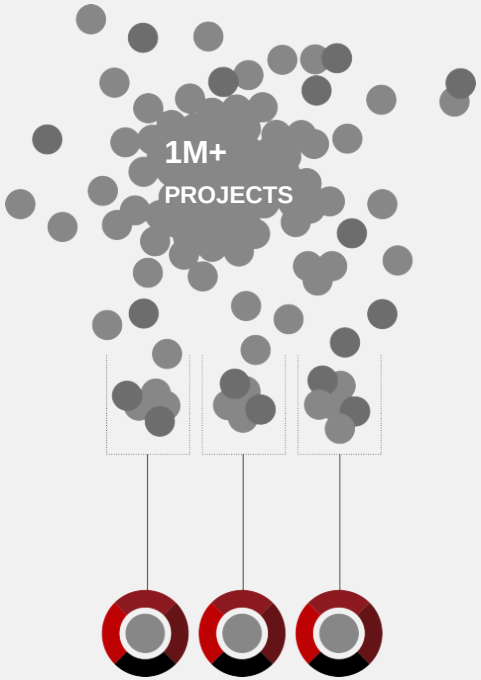
RED HAT VIRTUALIZATION DEVELOPMENT MODEL



RED HAT PRODUCT PROCESS

PARTICIPATE
(upstream **projects**)

We participate in and create community-powered upstream projects.

INTEGRATE
(community **platforms**)

We integrate upstream projects, fostering open community platforms.

STABILIZE
(supported **products platforms, and solutions**)

We commercialize these platforms together with a rich ecosystem of services and certifications.

RED HAT VIRTUALIZATION DEVELOPMENT MODEL

RED HAT VIRTUALIZATION
ARCHITECTURE
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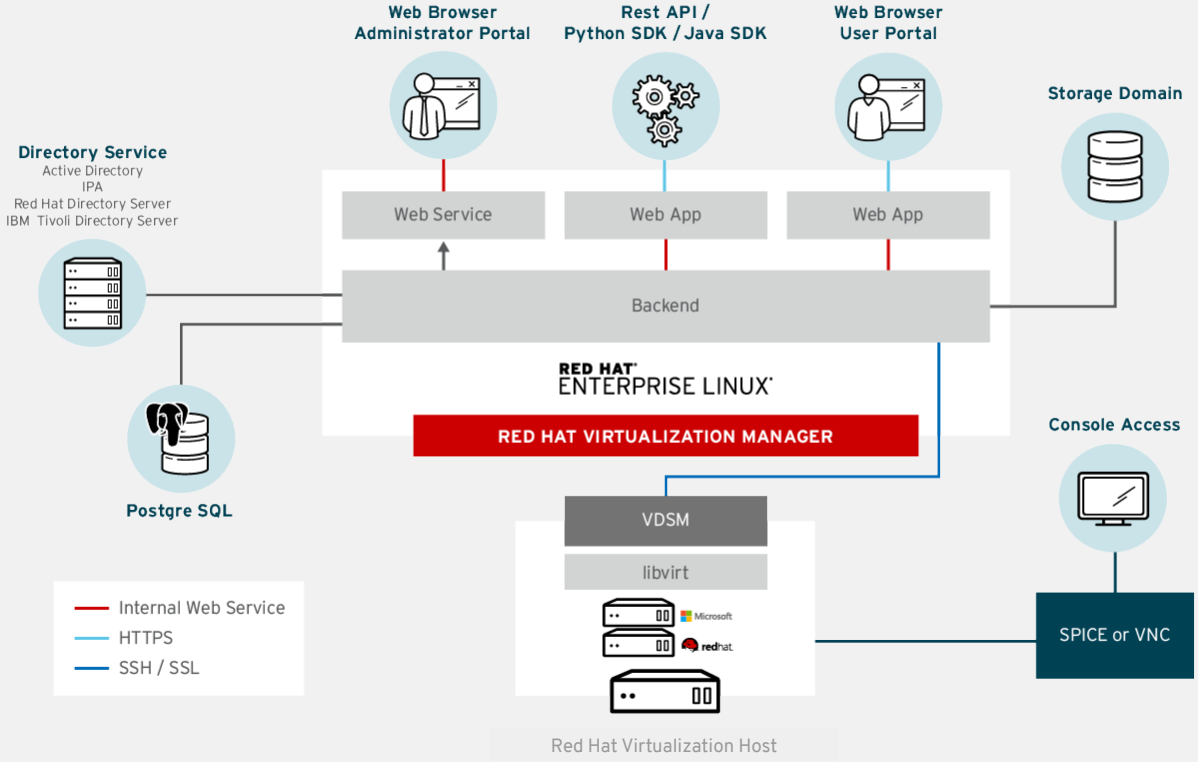
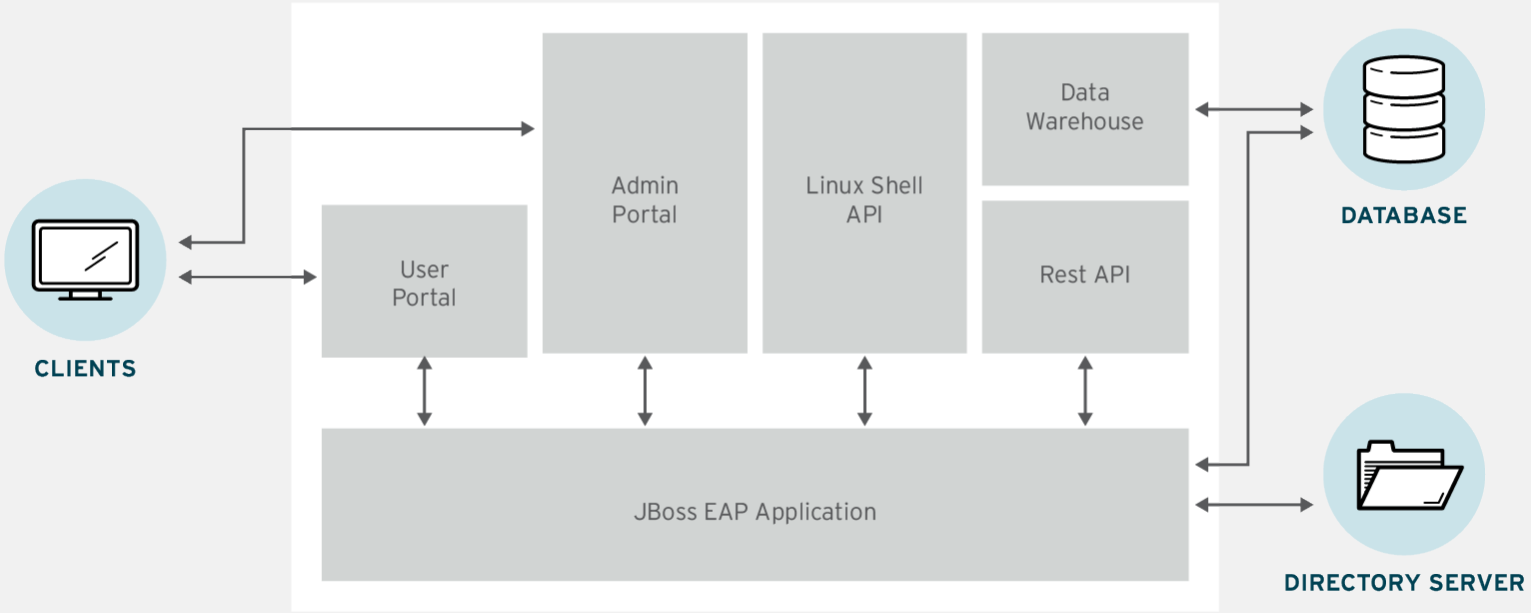
OVERVIEW OF RED HAT VIRTUALIZATION



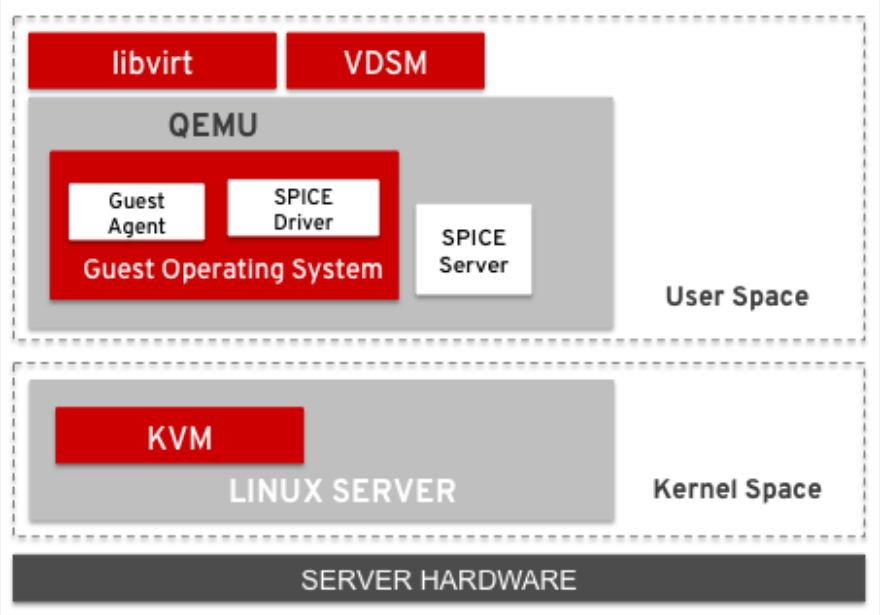
RED HAT VIRTUALIZATION ARCHITECTURE

Red Hat Virtualization Manager



RED HAT VIRTUALIZATION ARCHITECTURE

KVM

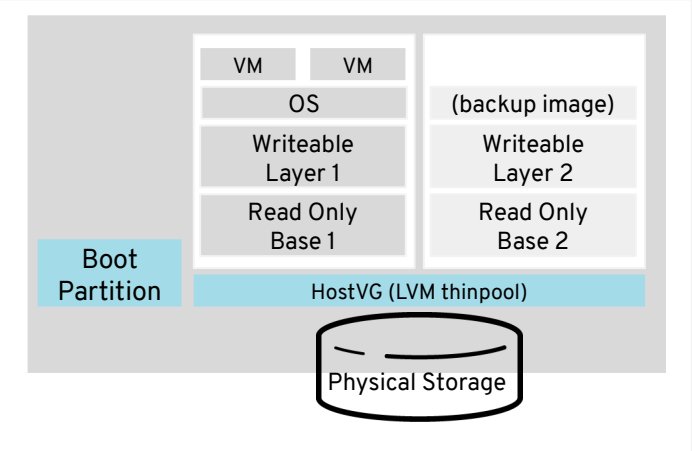


RED HAT VIRTUALIZATION ARCHITECTURE

Red Hat Virtualization Host

Lightweight Host

- RHV-H - Purpose built node built on RHEL
- Can be deployed via ISO, PXE, USB, cloned, etc
- Writable root file system
- Uses trimmed down Anaconda installer
- “Cockpit” administrative console
- Security & services are pre-tuned to support virtual machines

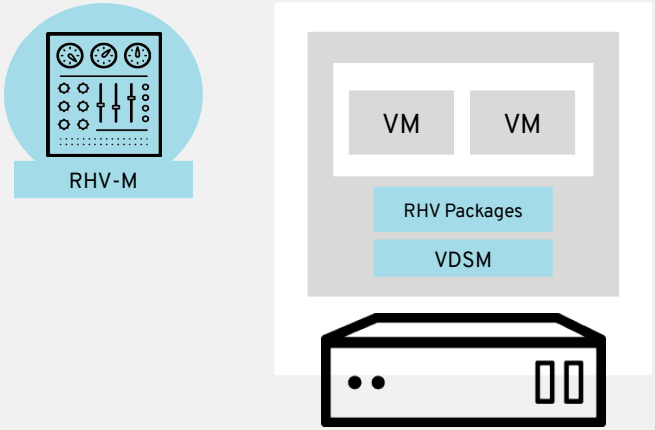


Red Hat Virtualization Host is designed around LVM Thinpools and “imgbased”, resulting in a lightweight and flexible architecture.

RED HAT VIRTUALIZATION ARCHITECTURE

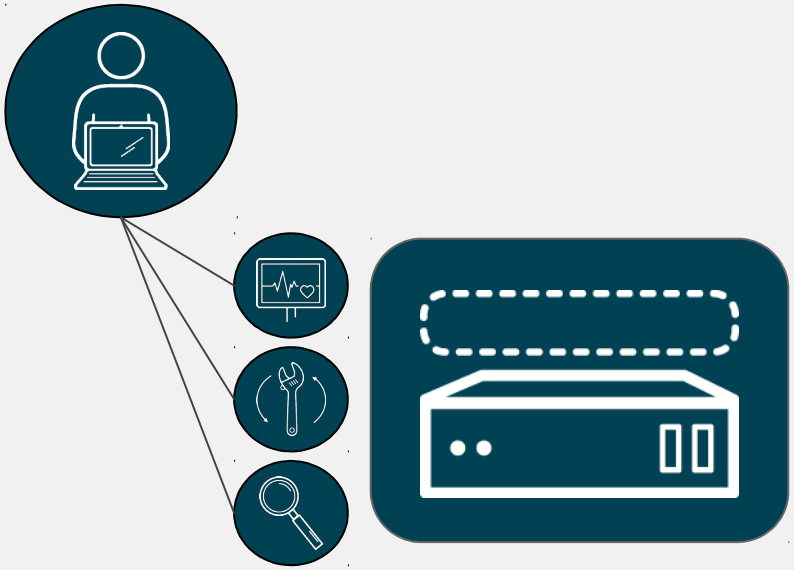
RHEL Node

"Full" Host
- RHV 4 supports RHEL 7 as a node
- Uses QEMU-KVM-RHV
- Larger footprint as compared to RHV Host
- RHV Manager will configure security & VDSM
- "Cockpit" needs to be manually installed & configured

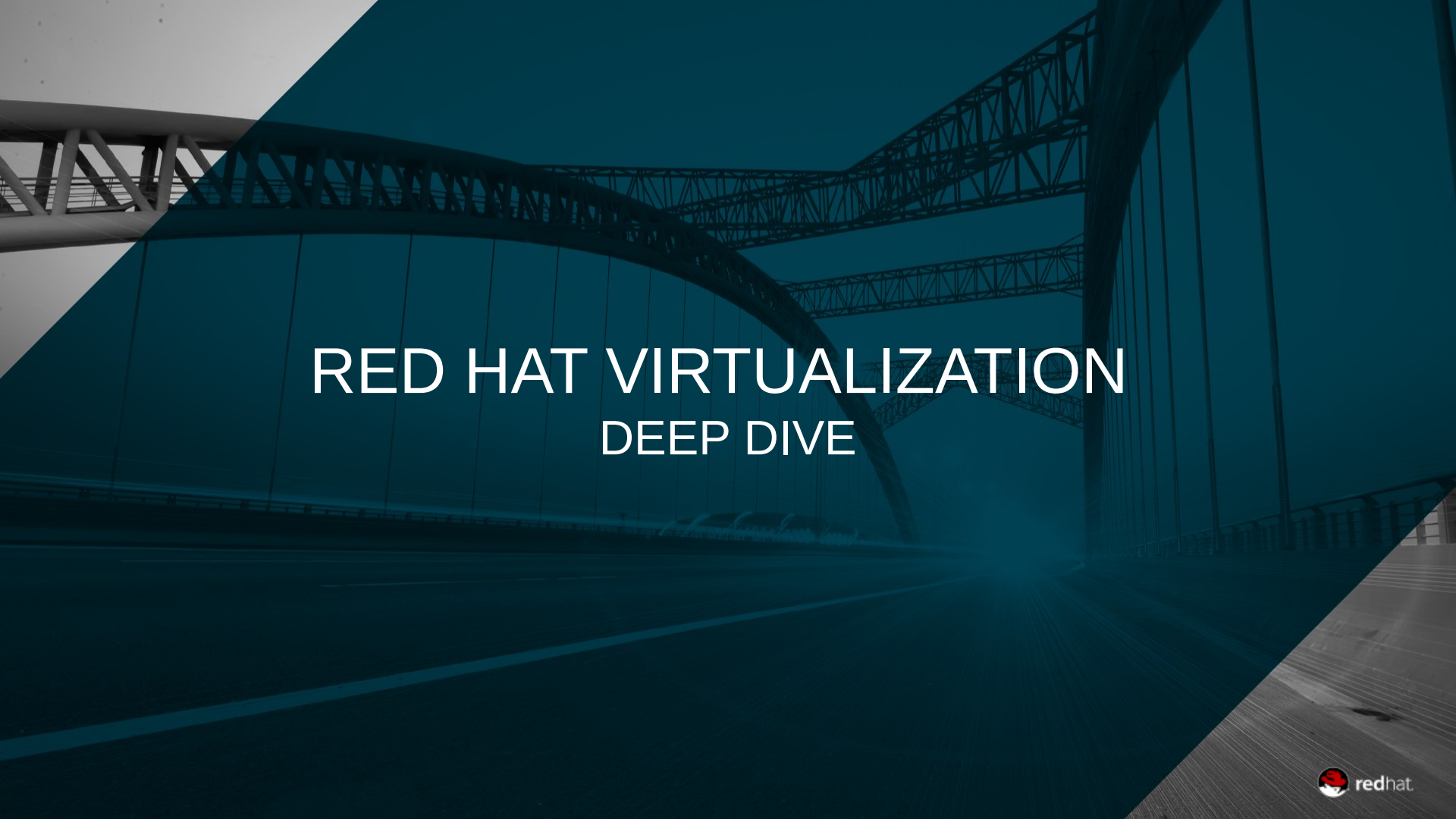


Red Hat Enterprise Linux 7 is fully supported as a host in Red Hat Virtualization. RHV-related packages and policies are deployed by RHV-M.

COCKPIT HOST ADMINISTRATION CONSOLE



- Included as part of Red Hat Virtualization Host image, can be added to RHEL host.
- Used to configure networking, storage, tuning, subscriptions, and other aspects of the host.
- Can be used to view metrics, ease troubleshooting, and provide command line access to the host.
- Can be used to deploy RHV in high availability
- Access via secure HTTP (HTTPS)


RED HAT VIRTUALIZATION
DEEP DIVE
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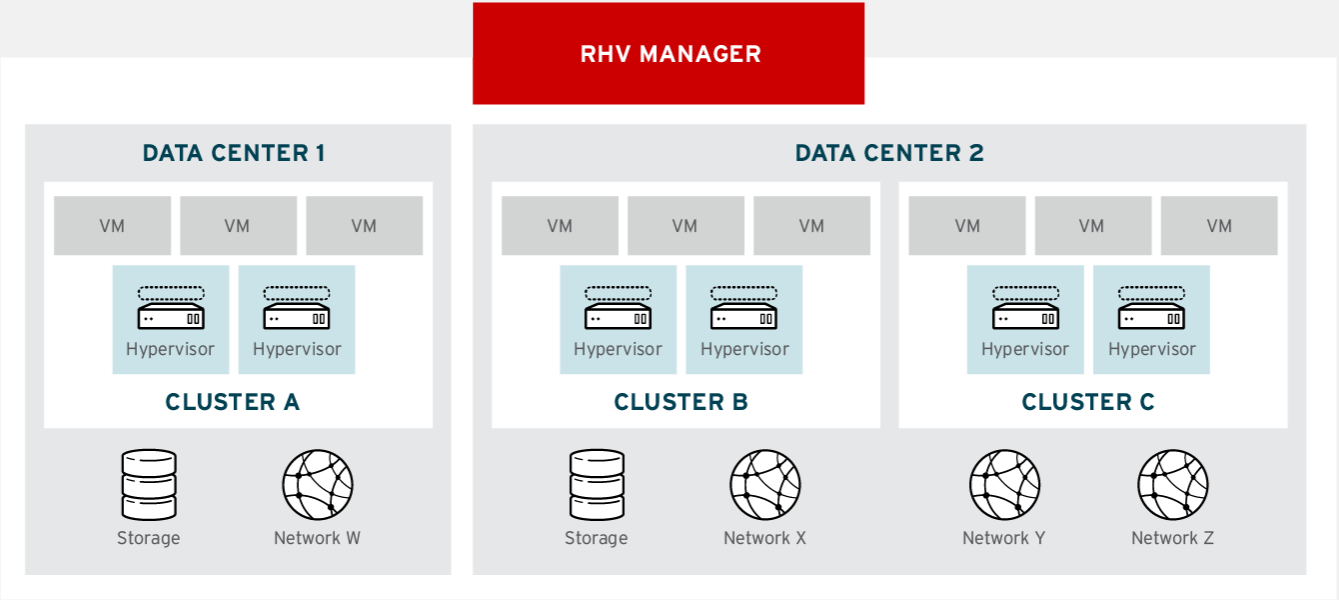
RED HAT VIRTUALIZATION DEEP DIVE

Compute



RED HAT VIRTUALIZATION DEEP DIVE

Storage

Storage Domain Types (Data Stores)

- Data Domain - Stores virtual hard disks, snapshots, OVF files
- ISO Domain - Stores ISO files and virtual floppy disks
- Export Domain - temporary storage repositories to move images between data centers and import from disparate platforms

Supported Storage Protocols

- NFS
- GlusterFS
- Fibre Channel & FCoE
- iSCSI
- POSIX compliant

RED HAT VIRTUALIZATION DEEP DIVE

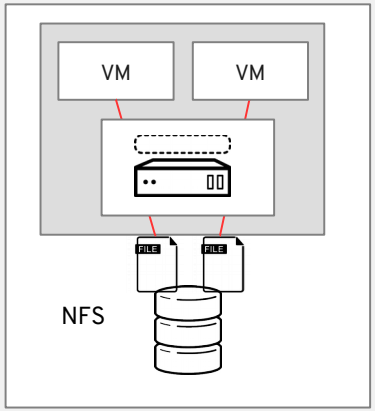
Storage – Disk Allocation & File Format

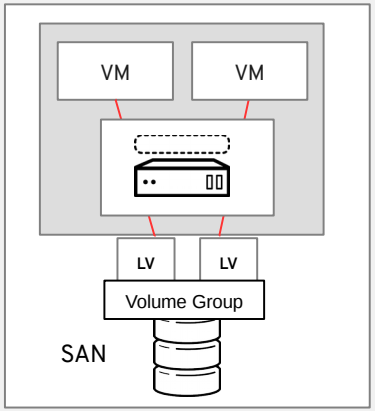
NFS

- All disks, snapshots, and templates are files
- Can be sparse

SAN

- All disks, snapshots, and templates are logical volumes
- Can be sparse or preallocated
- Virtual disks can be QCOW2 or RAW





RED HAT VIRTUALIZATION DEEP DIVE

Limits

Component	Limit
Logical CPUs per Hypervisor	288
Cores per Hypervisor	Unlimited
RAM per Hypervisor	12 TB
VMs per Hypervisor	No Hard Limit
Hosts per Cluster	250
VMs per Cluster	No Hard Limit
VCPUs per VM	240
RAM per VM	4 TB

RED HAT VIRTUALIZATION DEEP DIVE

Live VM migration policy tuning

VM & Load Example	Time to Migrate w/out Policy	Time to Migrate with New Policy
10GB VM no latency or load	53 seconds	***3 seconds***
30GB VM network load w/ iperf traffic & 10GB NIC	73 seconds	***8 seconds***

- Trade off live migration speed vs. bandwidth usage

RED HAT VIRTUALIZATION DEEP DIVE

Dev/test environments and automation

- **Easy to deploy**
  - Infrastructure deployed in hours
- **Optimized for automation**
  - Ansible 2.3 modules and roles integrated
  - Utilizes REST API
  - SDK's for Python, Ruby, and Java
  - Pair with CloudForms (add-on) for self-service catalog, quotas, chargeback, etc

Additional Documents

Red Hat Virtualization evaluation:

- https://access.redhat.com/products/red-hat-virtualization/evaluation

Blogs:

- RHEL Blog
  - http://rhelblog.redhat.com
- Captain KVM (Jon Benedict)
  - http://CaptainKVM.com

Product page:

- http://www.redhat.com/rhv

Documents:

- https://access.redhat.com/documentation/en/red-hat-virtualization

THANK YOU
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