



# oVirt Overview

Karsten Wade @quaid

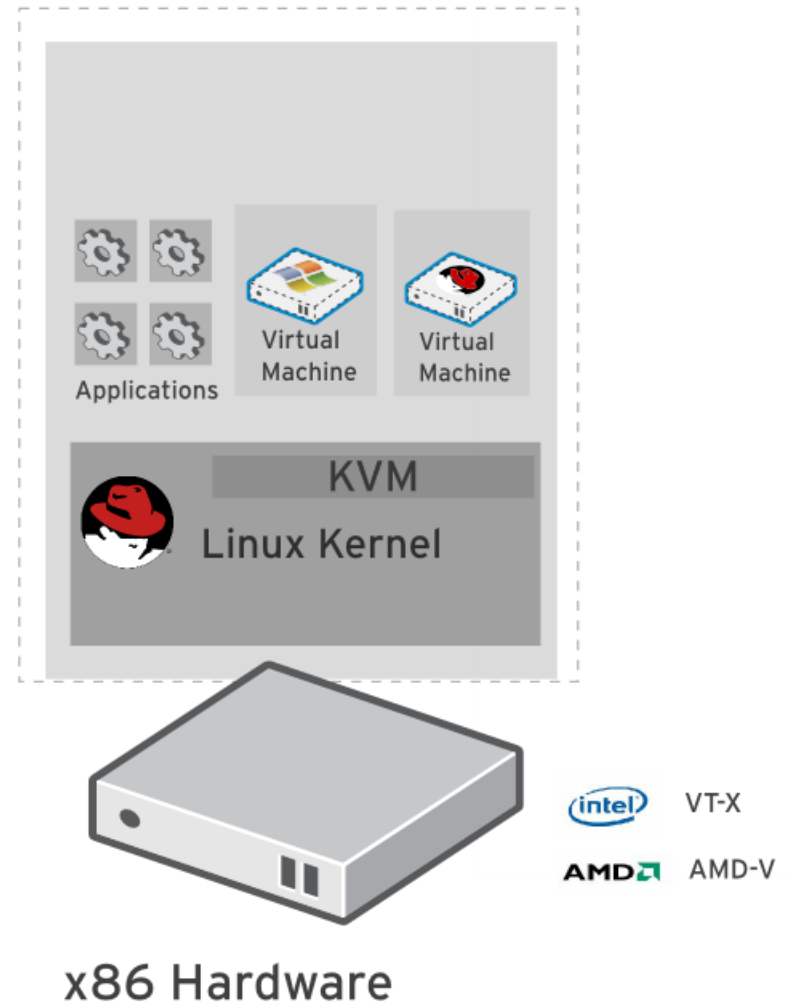
Sr. Community Architect, Red Hat

This presentation: [http://bit.ly/SCALE10x\\_oVirt](http://bit.ly/SCALE10x_oVirt)

# Kernel-based Virtual Machine (KVM)



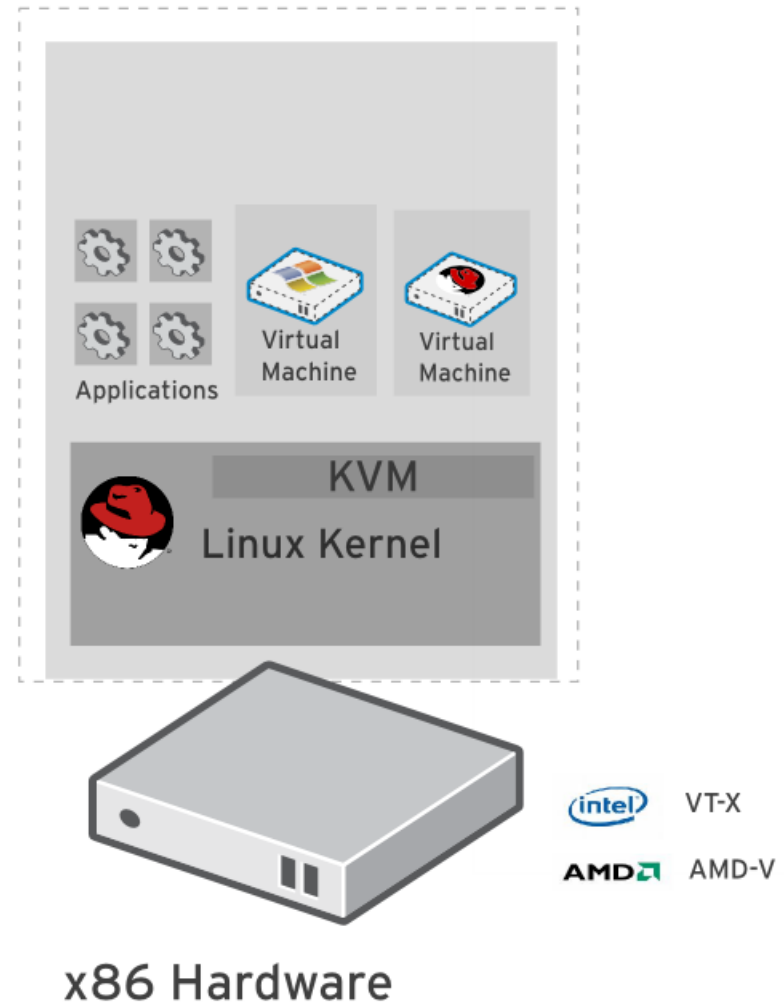
Included in Linux kernel since 2006



# Kernel-based Virtual Machine (KVM)

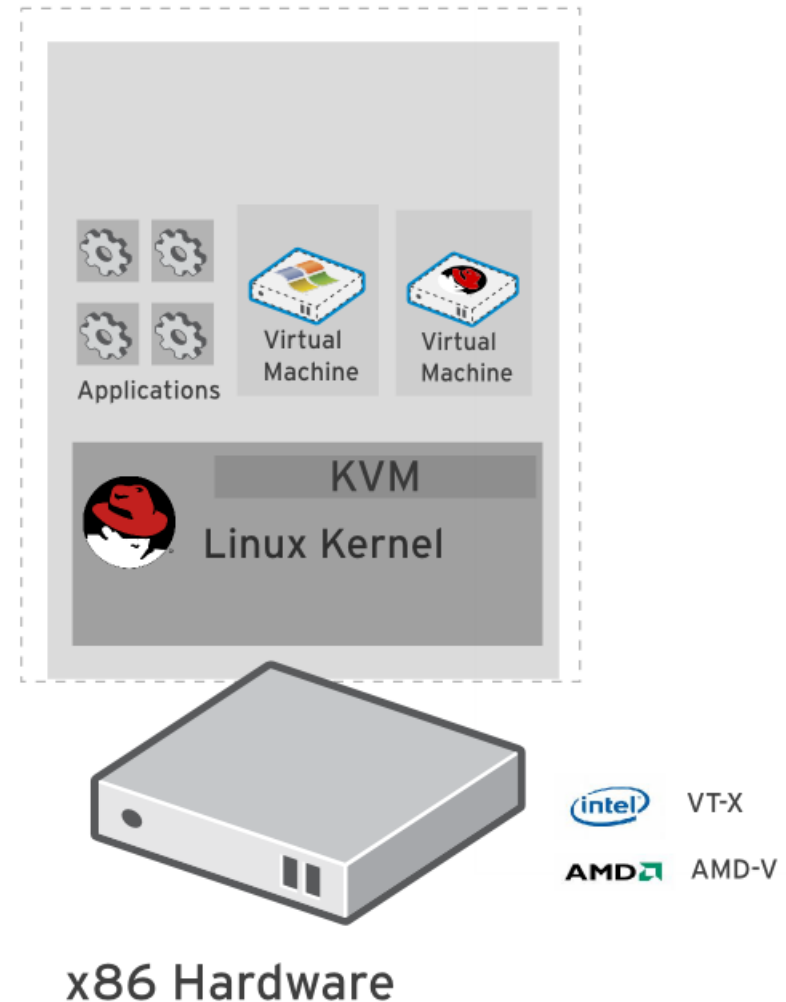


Runs Linux, Windows,  
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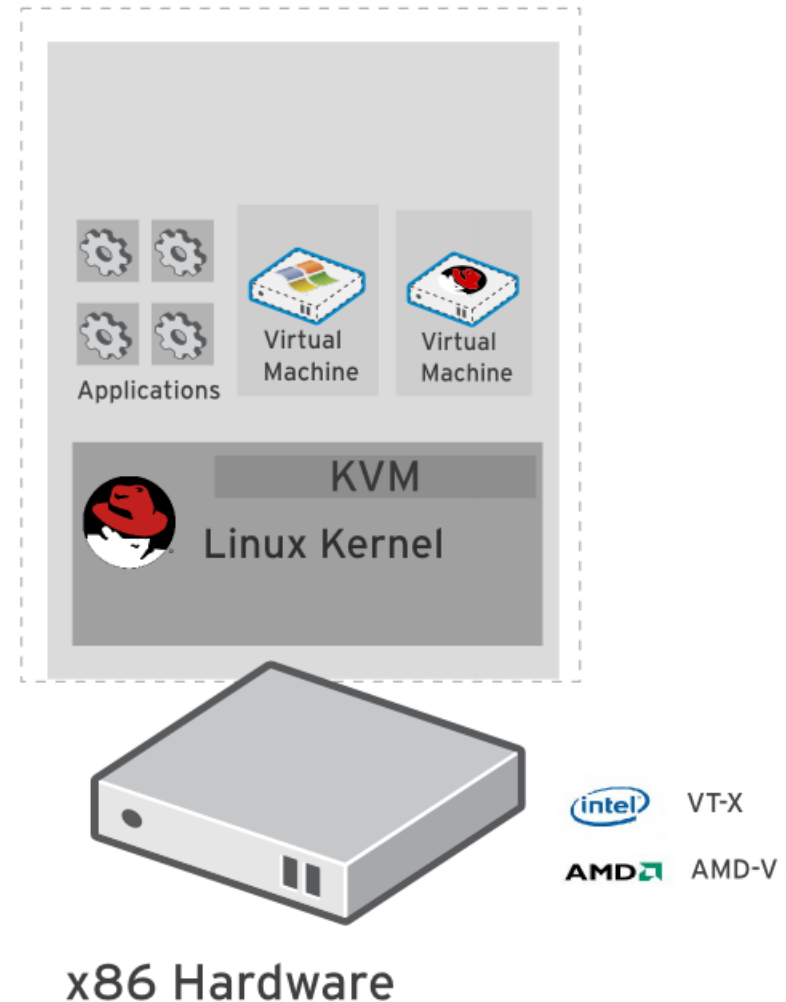
# Kernel-based Virtual Machine (KVM)

- Advanced features
  - Live migration
  - Memory page sharing
  - Thin provisioning
  - PCI Pass-through
- power of Linux



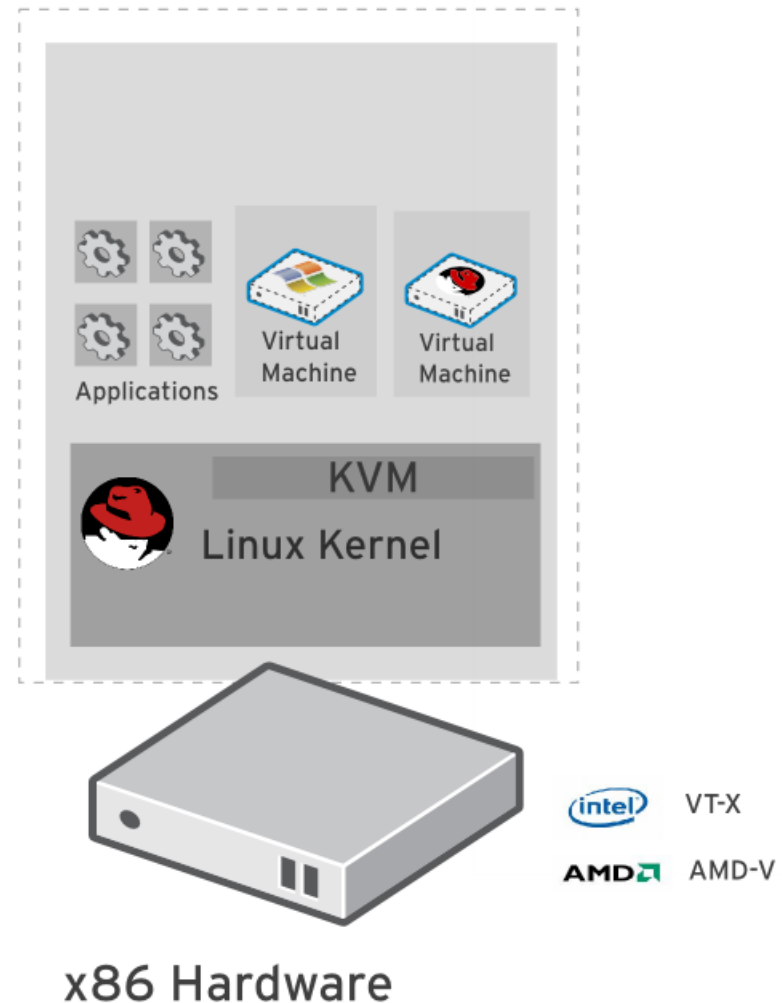
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KVM architecture provides high “feature-velocity” – leverages the power of Linux



# Kernel-based Virtual Machine (KVM) (tl;dnr) oVirt

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# Open Virtualization Alliance



Alliance formed to promote Open Virtualization

# Open Virtualization Alliance



Increase overall awareness and understanding of  
Kernel-based Virtual Machine (KVM)



# Open Virtualization Alliance



Foster the adoption of KVM as an open virtualization alternative to proprietary solutions

# Open Virtualization Alliance



Accelerate the emergence of an ecosystem of third-party solutions around KVM

# Open Virtualization Alliance



Encourage interoperability, promote best practices,  
and highlight examples of customer successes

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Formed in May 2011 with 7 founding members

As of January 2012, over 225 member organizations  
and still growing ....

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# Going beyond the Hypervisor



KVM is well established as a leading hypervisor

# Going beyond the Hypervisor



Superior performance, scalability, and security

# Going beyond the Hypervisor



Leverages large Linux ecosystem



# Going beyond the Hypervisor



But the growth of an open virtualization ecosystem requires more than just a hypervisor

# Going beyond the Hypervisor



Feature rich management platform

# Going beyond the Hypervisor



Well defined APIs throughout the stack

# Going beyond the Hypervisor



Active and OPEN development community

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Readily accessible systems and tools for all users

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3rd party products that extend the hypervisor

# Going beyond the Hypervisor (tl;dnr)



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# Goals of the oVirt project

Build a community around all levels of the virtualization stack – hypervisor, manager, GUI, API, etc.



# Goals of the oVirt project

To deliver both a cohesive complete stack and discretely reusable components for open virtualization management

# Goals of the oVirt project



Provide a release of the project on a well defined schedule

# Goals of the oVirt project



Focus on management of the KVM hypervisor, with exceptional guest support beyond Linux.

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Provide a venue for user and developer communication and coordination

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# Governance



Merit based, open governance model

# Governance



Built using the best concepts taken from Apache and Eclipse Foundations

# Governance



Governance split between board and projects

oVirt Board

Multiple projects under the oVirt brand



## Governance (tl;dnr)

- Merit based, open governance model
- Built using the best concepts taken from Apache and Eclipse Foundations
- Governance split between board and projects
  - oVirt Board
  - Multiple projects under the oVirt brand

# Governance (oVirt Board)



Define charter & goals for oVirt ecosystem

# Governance (oVirt Board)



Ratify new projects into oVirt

# Governance (oVirt Board)



Vote in new board members (based on merit criteria)

# Governance (oVirt Board)



Coordinate consolidated release schedules

# Governance (oVirt Board)



Ratify votes for smaller member projects (<3 maintainers)

# Governance (oVirt Board)



Develop the ecosystem

# Governance (oVirt Board)



Set license policies for projects:  
(ASL2.0, (L)GPL 2(+))



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# Governance (oVirt Board)



Initial board – Canonical, Cisco, IBM, Intel, NetApp,  
Red Hat, SUSE

# Governance (oVirt Board)



A few domain leaders from sub-projects

# Governance (oVirt Board)



Mentors

# Governance (oVirt Board)



There is no limit to the number of board seats

# Governance (oVirt Board)



Additional seats are voted based on merit

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# Governance (Projects)



Each member project is managed by it's maintainers



# Governance (Projects)



Maintainers have complete day to day technical management of the projects

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Vote in new maintainers based on contribution merit

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- Member project requirements
  - Integrates with the engine / APIs
  - Use of KVM
  - Commits to roll up release schedule
  - ASL2.0, and (L)GPLv2+ if linked with QEMU-KVM

## Governance (Projects)

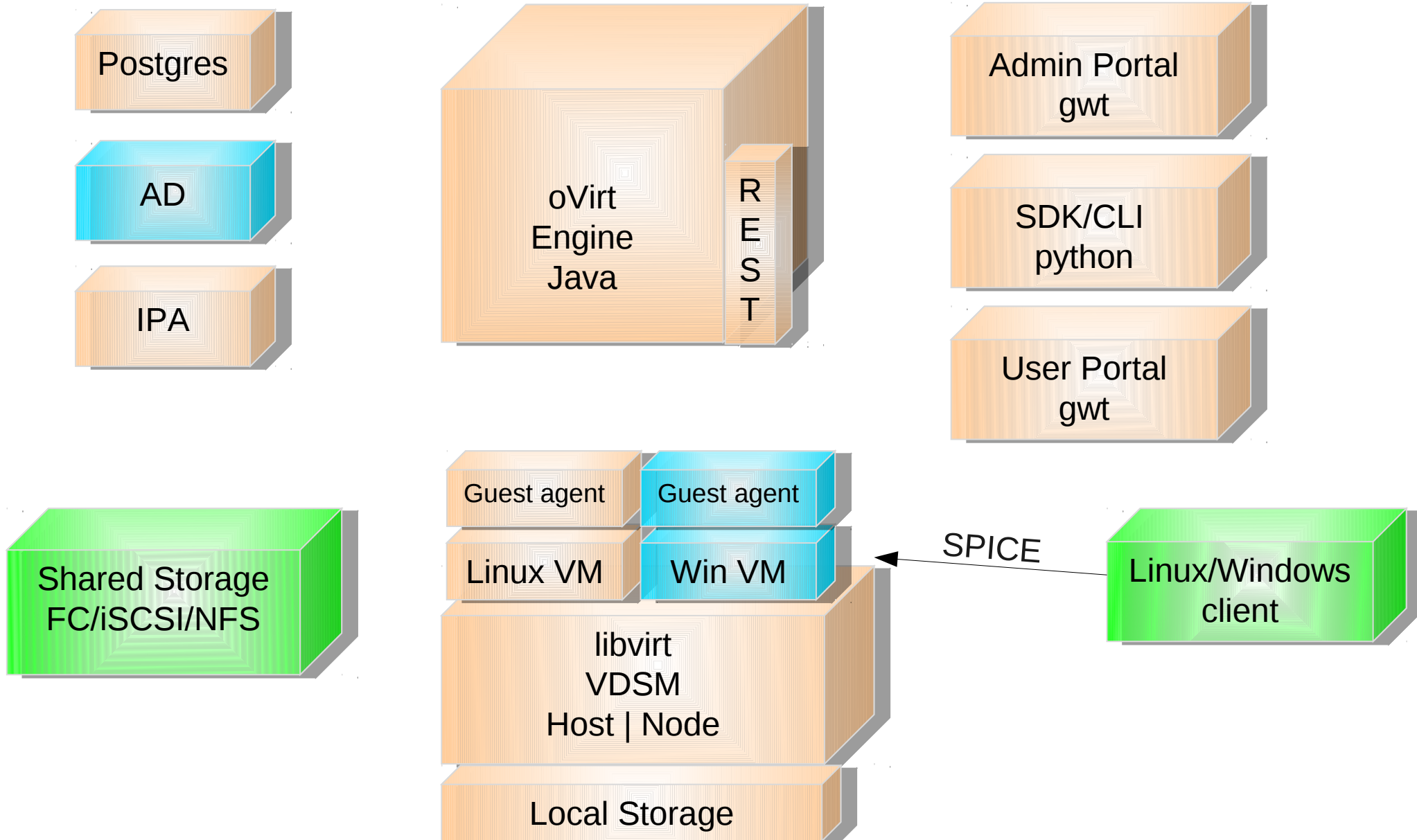
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# Management Features



Feature	Description
High Availability	Restart guest VMs from failed hosts automatically on other hosts
Live Migration	Move running VM between hosts with zero downtime
System Scheduler	Continuously load balance VMs based on resource usage/policies
Power Saver	Concentrate virtual machines on fewer servers during off-peak hours
Maintenance Manager	No downtime for virtual machines during planned maintenance windows. Hypervisor patching
Image Management	Template based provisioning, thin provisioning, and snapshots
Monitoring & Reporting	For all objects in system – VM guests, hosts, networking, storage etc.
OVF Import/Export	Import and export VMs and templates using OVF files
V2V	Convert VMs from VMware and RHEL/Xen to RHEV

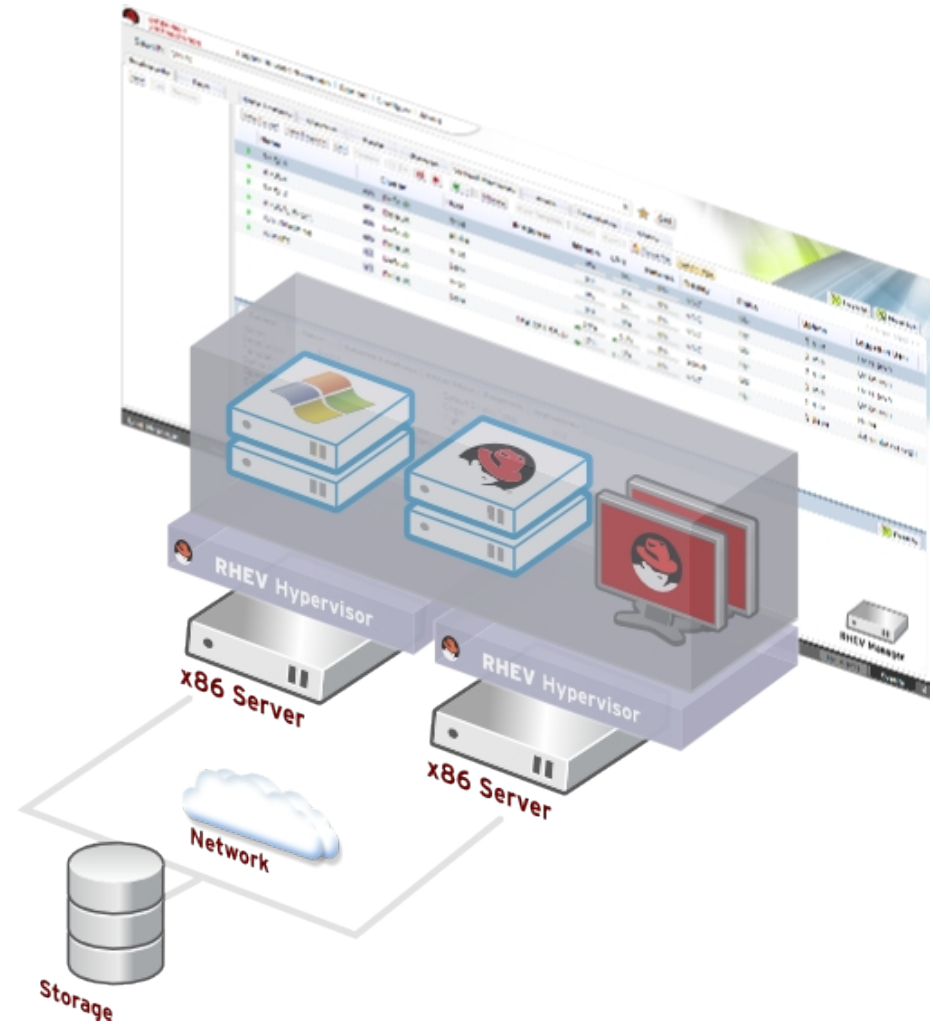
# oVirt High Level Architecture



# oVirt Engine



Large scale, centralized management for server and desktop virtualization

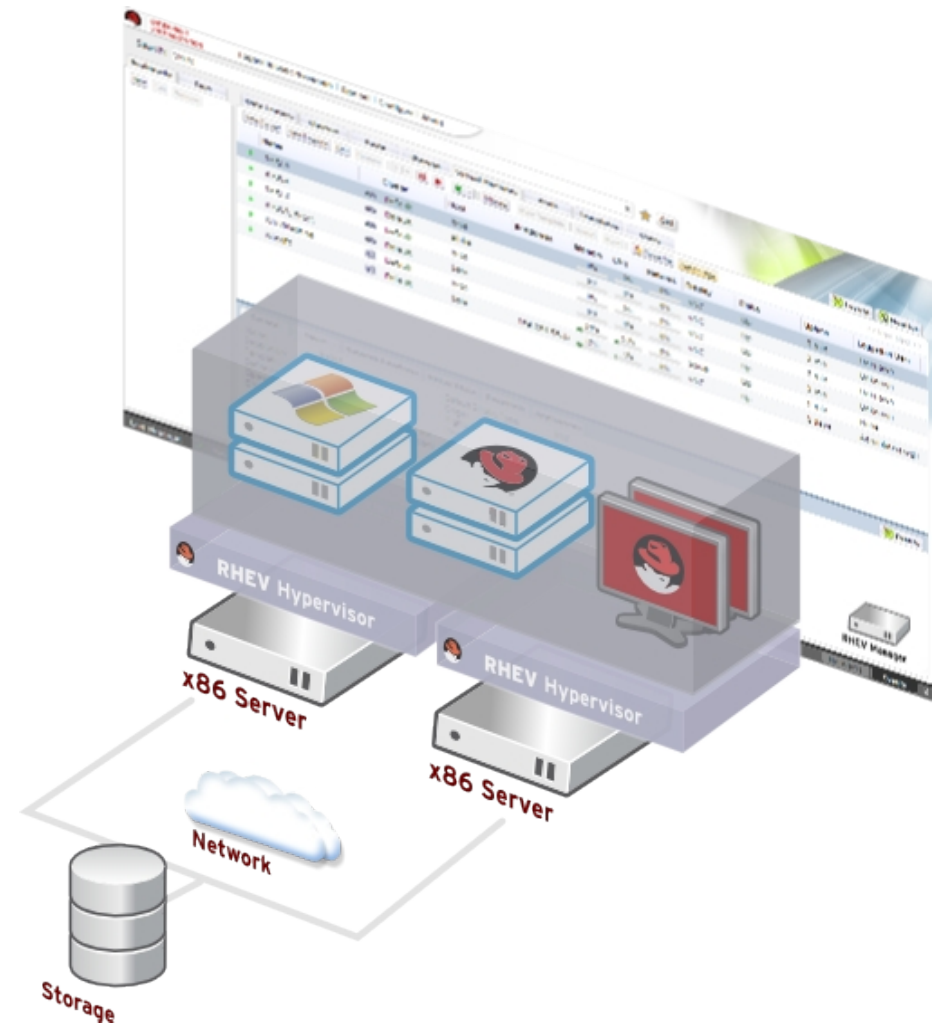




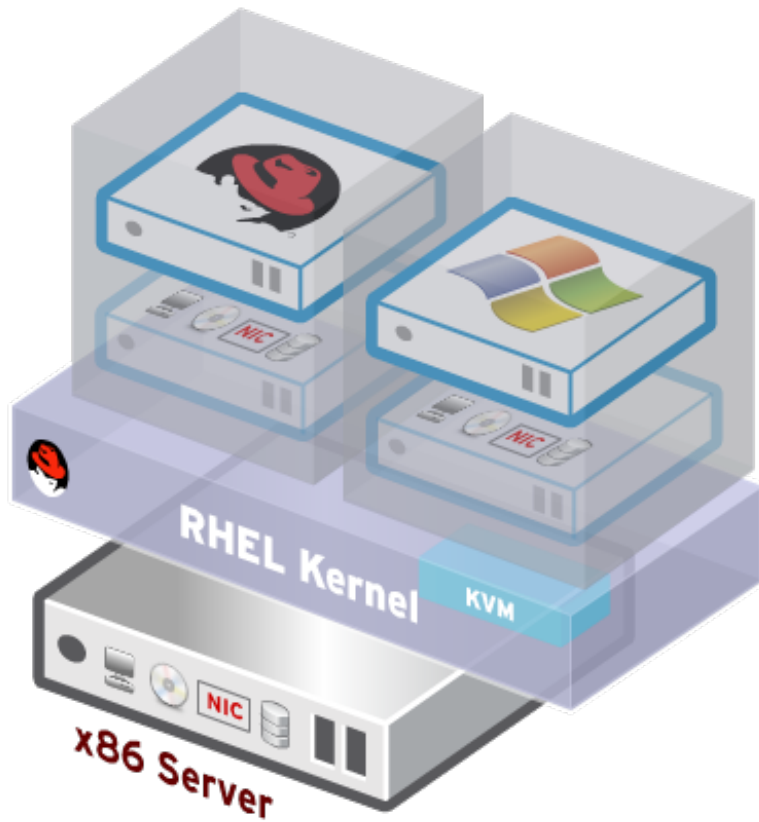
# oVirt Engine



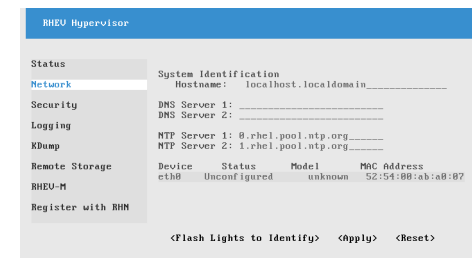
Based on leading performance, scalability, and security infrastructure technologies



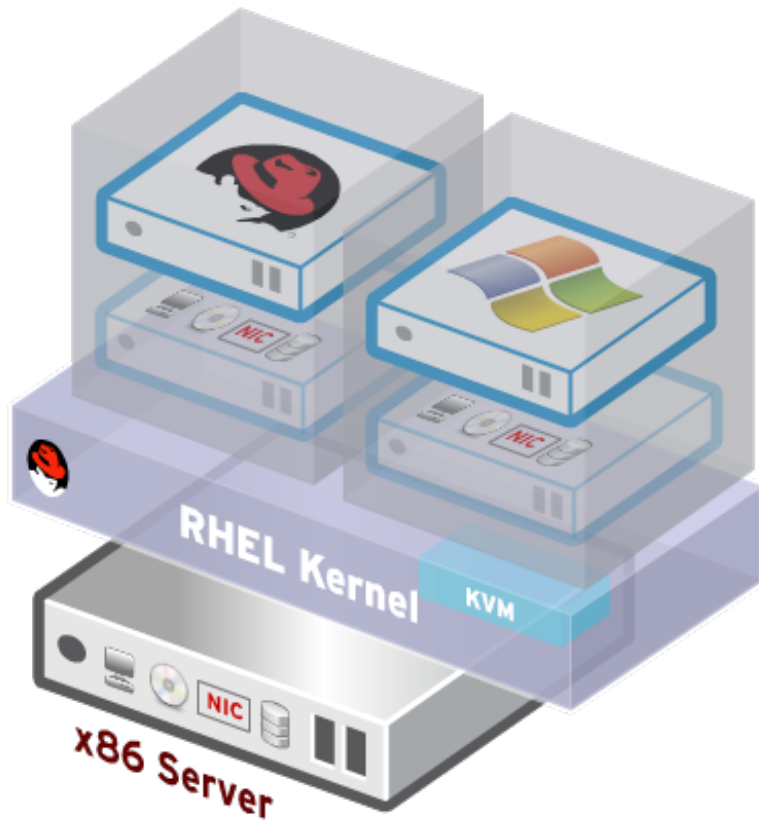
# oVirt Node



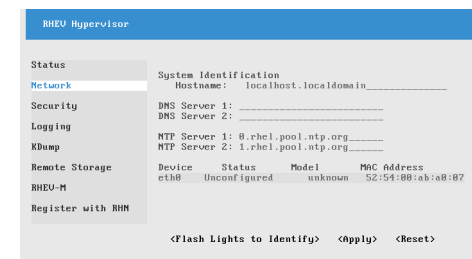
## Standalone hypervisor



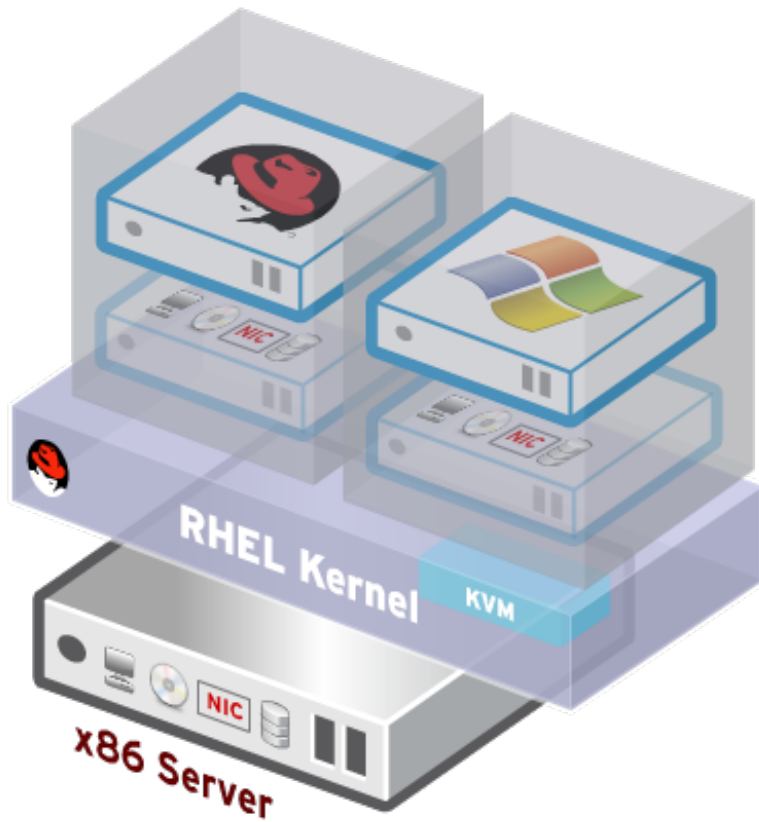
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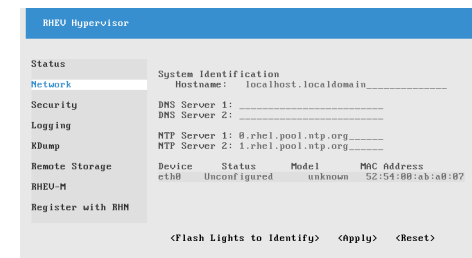
Small footprint < 100MB



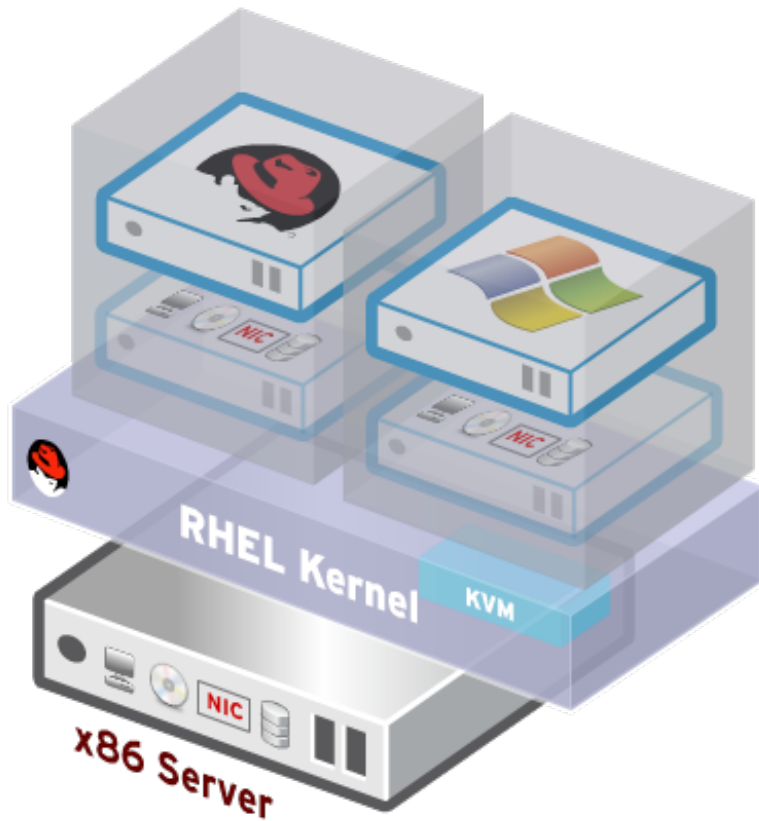
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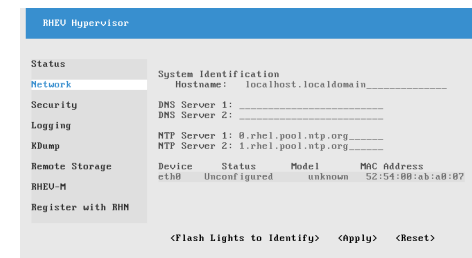
## Customized 'spin' of Fedora + KVM



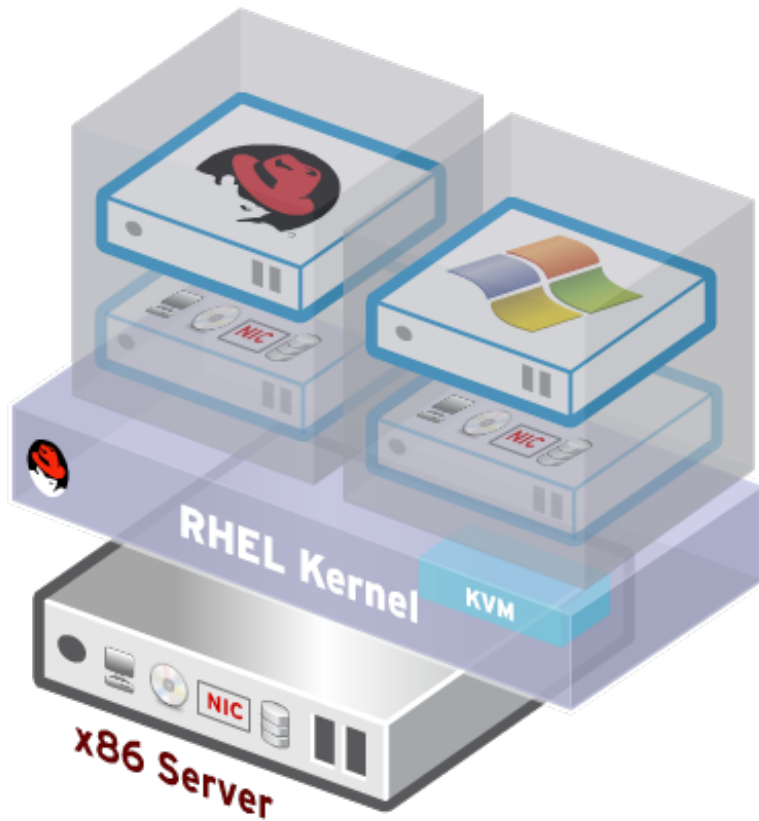
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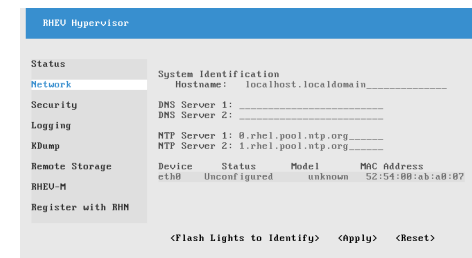
'Just enough' Fedora to run virtual machines



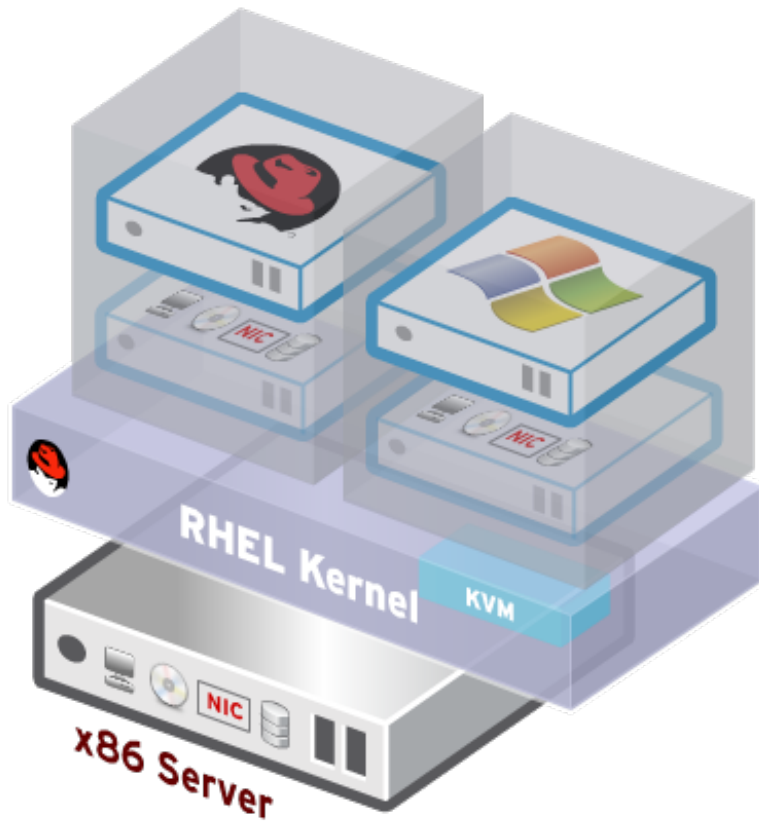
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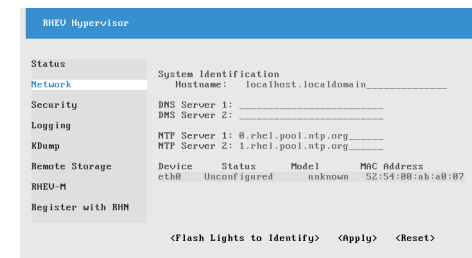
Runs on all RHEL hardware with Intel VT/AMD-V CPUs



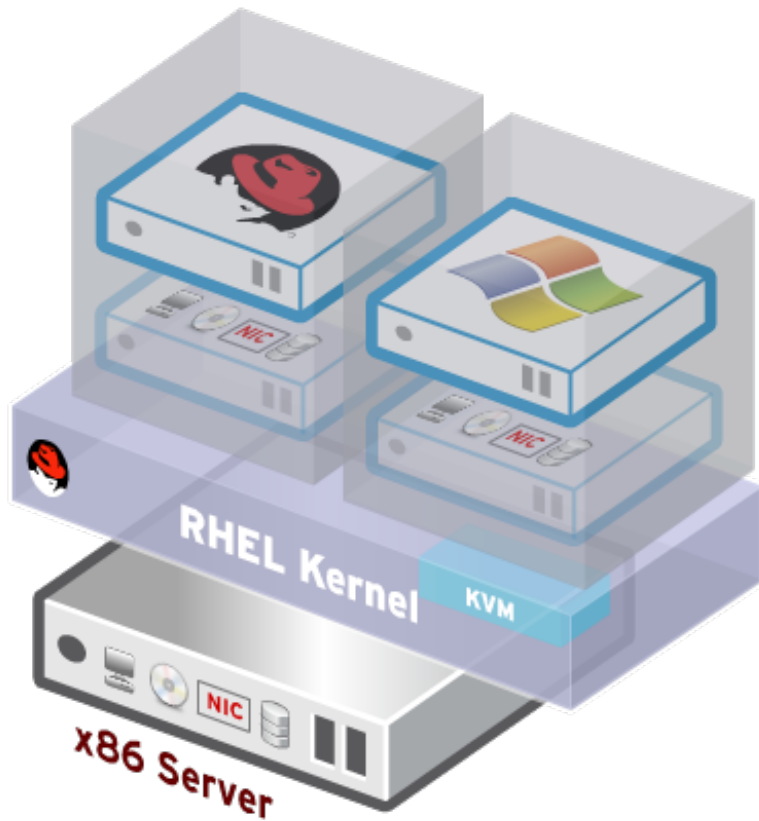
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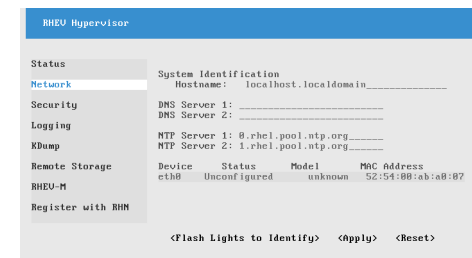
Easy to install, configure, and upgrade



# oVirt Node



PXE boot, USB boot, CD, or Hard drive

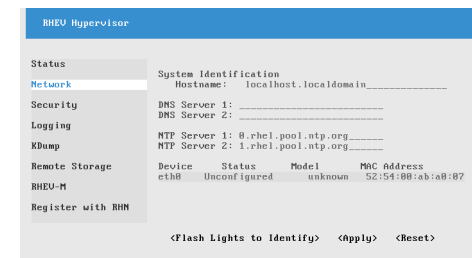
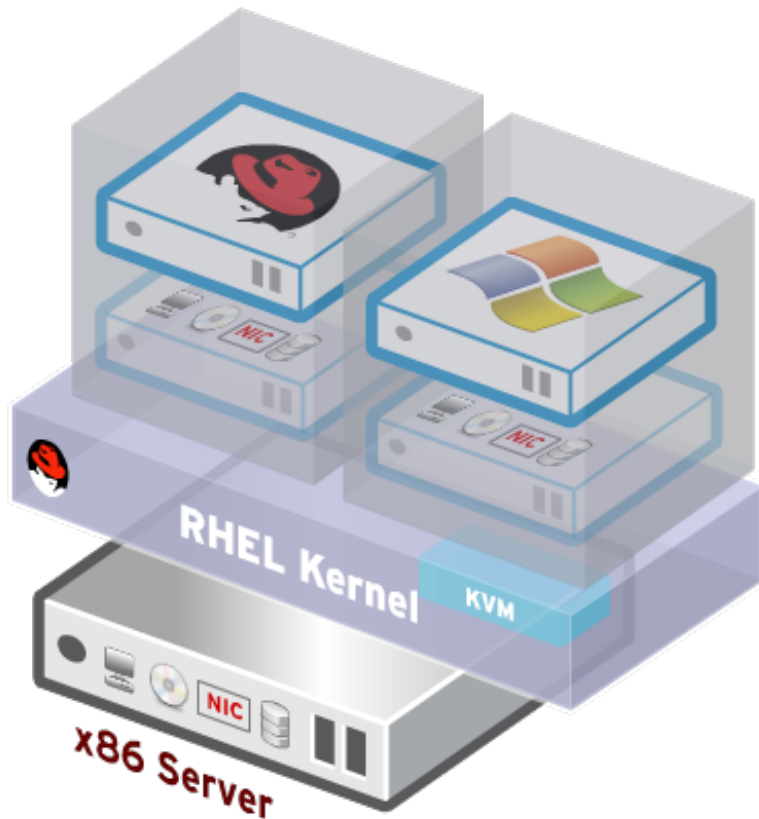




# oVirt Node (tl;dnr)



- Standalone hypervisor
  - Small footprint < 100MB
    - Customized 'spin' of Fedora + KVM
    - 'Just enough' Fedora to run virtual machines
    - Runs on all RHEL hardware with Intel VT/AMD-V CPUs
  - Easy to install, configure, and upgrade
    - PXE boot, USB boot, CD, or Hard drive



# oVirt Host Agent - VDSM



Covers all functionality required by oVirt Engine

# oVirt Host Agent - VDSM



Configures host, networking, and shared storage

# oVirt Host Agent - VDSM



Uses libvirt for VM life cycle operations

# oVirt Host Agent - VDSM



VDSM manages a Storage Pool, comprised of Storage Domains

- **Storage Pool** - a VM repository that contains meta data about storage domains, storage tasks, VMs, locks, etc.
- **Storage Domain** - a disk image repository
- **Disk Image** - a collection of volumes (chain of snapshots)
- **Volume** - stored as files in NFS, and as Logical Volumes for FC/iSCSI
- Thin provisioning for SAN supported (storage mailbox based)

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# oVirt Guest Agent



The guest agent provides additional information to oVirt Engine, such as guest memory usage, guest IP address, installed applications, and SSO

# oVirt Guest Agent



Python code, available for both Linux and Windows guests



# oVirt Guest Agent



Communication is done over virtio-serial

# oVirt Guest Agent



SSO for windows is based on a GINA module for XP and a credential provider for Windows 7

# oVirt Guest Agent



SSO for RHEL 6 is based on a PAM module with support for both KDE and GNOME

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# oVirt Data Warehouse



ETL based on [talendforge.org](http://talendforge.org)

# oVirt Data Warehouse



Periodic polling from operational DB

# oVirt Data Warehouse



Types of data

Config with version tracking

Statistics – aggregated hourly/daily

# oVirt Data Warehouse



API is view based



# oVirt Data Warehouse (tl;dnr)



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- Types of data
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Jasper allows to import/export reports definitions

# oVirt Reports



Rich reporting engine

Report scheduling

Filters

Export to various formats

Report creation studio

# oVirt Reports



Next

Integrated in web admin

## oVirt Reports (tl;dnr)

- Jasper allows to import/export reports definitions
- Rich reporting engine
  - Report scheduling
  - Filters
  - Export to various formats
  - Report creation studio
- Next
  - Integrated in web admin

# REST API



RESTful API for integration with oVirt Engine

REST interface exposed for all API functions

Developed in upstream RHEV-M API project (before oVirt)

# REST API



## Create a Virtual Machine from a Template:

```
curl -v -u "vdcadmin@example.com"  
  -H "Content-type: application/xml"  
  -d '<vm><name>my_new_vm</name><cluster id="99408929-  
82cf-4dc7-a532-9d998063fa95" /><template id="00000000-  
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  'http://1.2.3.4/rhevapi/vms'
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000000000000"/></vm>'  
'http://10.35.1.1/rhevapi/vms'
```



# On the Horizon - Features

- Live snapshots
- Live storage migration
- Quotas
- Hot plug
- Multiple storage domains
- Shared disks
- iScsi disk
- Shared file system support
- Storage array integration
- Qbg/Qbh
- virt-resize, pv-resize
- Progress bars
- Stable pci addresses
- Network types
- Backup API
- SLA
- SDM
- Many many more...

# Get Involved!

- Wiki
  - <http://www.ovirt.org/wiki>
- Mailing lists
  - [users@ovirt.org](mailto:users@ovirt.org) — oVirt Platform user list
  - [announce@ovirt.org](mailto:announce@ovirt.org) — oVirt Platform announce list
  - [arch@ovirt.org](mailto:arch@ovirt.org) — oVirt general devel/project list
  - [engine-devel@ovirt.org](mailto:engine-devel@ovirt.org) — oVirt-engine devel list
  - [node-devel@ovirt.org](mailto:node-devel@ovirt.org) — oVirt-node devel list
- IRC
  - [#ovirt](http://irc.oftc.net) on [irc.oftc.net](http://irc.oftc.net)

oVirt

**THANK YOU !**

<http://www.ovirt.org>



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Sr. Community Architect, Red Hat  
This presentation: [http://bit.ly/SCALE10x\\_oVirt](http://bit.ly/SCALE10x_oVirt)

Who I am and what I don't know.

Robyn's talk – Why OSS cloud matters – Cent D

Experience with KVM of audience?

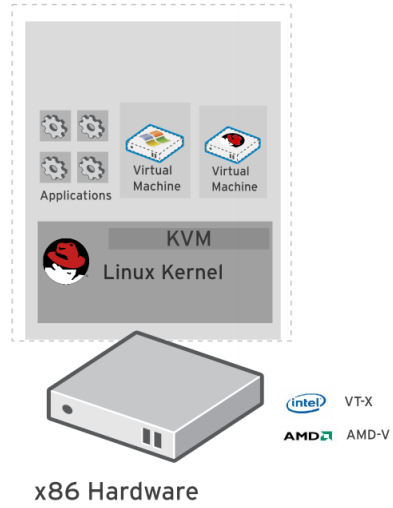
This is a new, general presentation to be used by \$anyone – thanks for being guinea pigs aka beta testers.

Go through point-by-point, then a tl;dnr version with a pause for questions..

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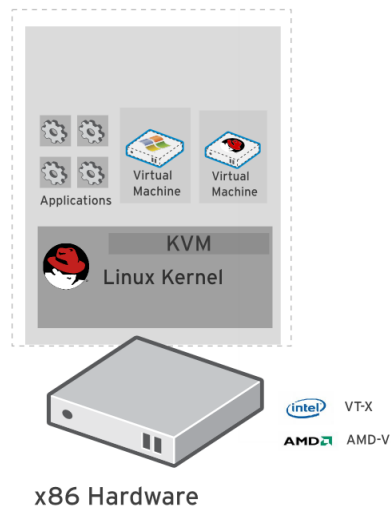
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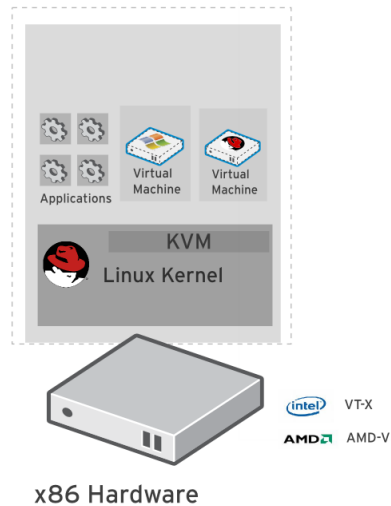


KVM is a full virtualization solution for Linux on x86 hardware containing virtualization extensions (Intel VT or AMD-V). Using KVM, you can run multiple virtual machines running unmodified Linux or Microsoft Windows images.

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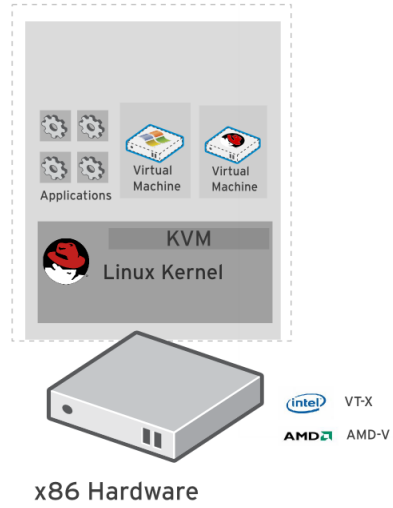


I/O performance enhancement called device (or PCI) passthrough. This innovation improves performance of PCI devices using hardware support from Intel (VT-d) or AMD (IOMMU).

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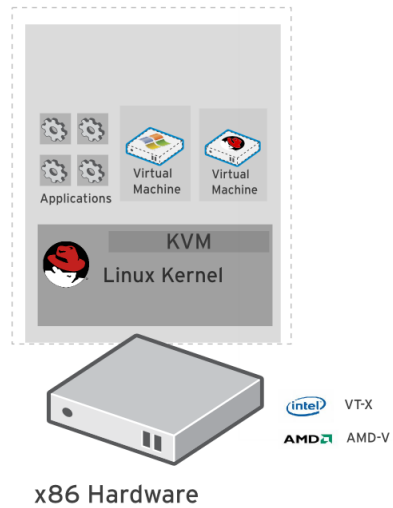
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Superior performance, scalability, and security

**Performance:** KVM holds the leading SPECvirt performance benchmarks.

**Scalability:** KVM supports significantly more processors and more memory than other x86 hypervisors.

**Security:** KVM, coupled with SELinux, enabled the advanced mandatory access control level of security.

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## Governance (oVirt Board)



Vote in new board members (based on merit criteria)

## Governance (oVirt Board)



Coordinate consolidated release schedules



## Governance (oVirt Board)



Ratify votes for smaller member projects (<3 maintainers)

## Governance (oVirt Board)



Develop the ecosystem

## Governance (oVirt Board)



Set license policies for projects:  
(ASL2.0, (L)GPL 2(+))

## Governance (oVirt Board) (tl;dnr)



- Define charter & goals for oVirt ecosystem
- Ratify new projects into oVirt
- Vote in new board members (based on merit criteria)
- Coordinate consolidated release schedules
- Ratify votes for smaller member projects (<3 maintainers)
- Develop the ecosystem
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## Governance (oVirt Board)



Initial board – Canonical, Cisco, IBM, Intel, NetApp,  
Red Hat, SUSE

## Governance (oVirt Board)



A few domain leaders from sub-projects

## Governance (oVirt Board)



Mentors

## Governance (oVirt Board)



There is no limit to the number of board seats



## Governance (oVirt Board)



Additional seats are voted based on merit

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## Governance (Projects)



Each member project is managed by it's maintainers

## Governance (Projects)



Maintainers have complete day to day technical management of the projects

## Governance (Projects)



Vote in new maintainers based on contribution merit

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## Governance (Projects)



- Member project requirements
  - Integrates with the engine / APIs
  - Use of KVM
  - Commits to roll up release schedule
  - ASL2.0, and (L)GPLv2+ if linked with QEMU-KVM

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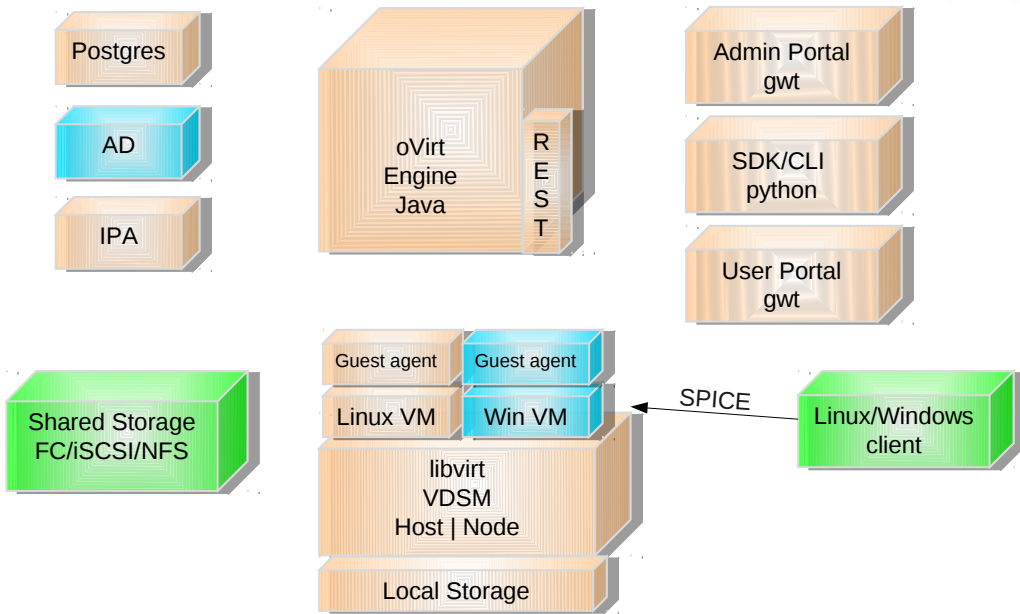


## Management Features



Feature	Description
High Availability	Restart guest VMs from failed hosts automatically on other hosts
Live Migration	Move running VM between hosts with zero downtime
System Scheduler	Continuously load balance VMs based on resource usage/policies
Power Saver	Concentrate virtual machines on fewer servers during off-peak hours
Maintenance Manager	No downtime for virtual machines during planned maintenance windows. Hypervisor patching
Image Management	Template based provisioning, thin provisioning, and snapshots
Monitoring & Reporting	For all objects in system – VM guests, hosts, networking, storage etc.
OVF Import/Export	Import and export VMs and templates using OVF files
V2V	Convert VMs from VMware and RHEL/Xen to RHEV

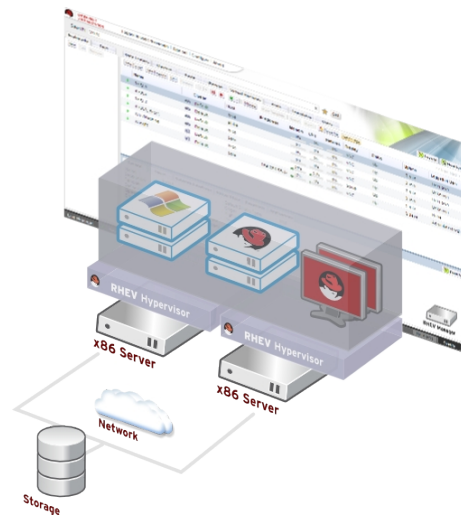
# oVirt High Level Architecture



## oVirt Engine

oVirt

Large scale, centralized  
management for server  
and desktop virtualization

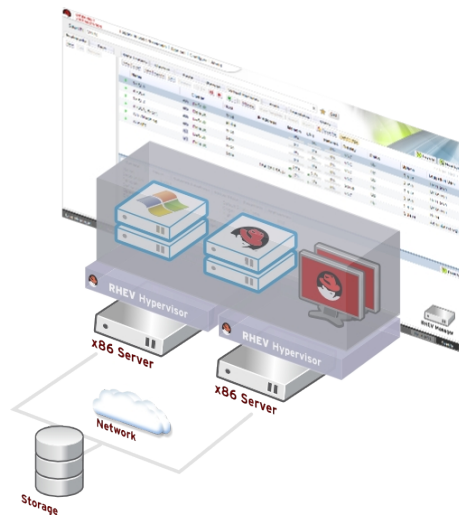


rhev-m manages rhev-h and rhel hypervisor  
Based on kvm – part of linux, benefits from linux,  
feature velocity --> leading spec results,

## oVirt Engine



Based on leading performance, scalability, and security infrastructure technologies

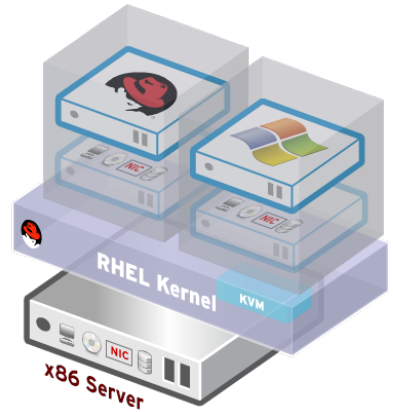


**Performance:** KVM holds the leading SPECvirt performance benchmarks.

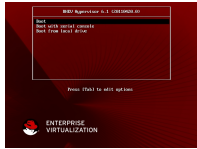
**Scalability:** KVM supports significantly more processors and more memory than other x86 hypervisors.

**Security:** KVM, coupled with SELinux, enabled the advanced mandatory access control level of security.

# oVirt Node

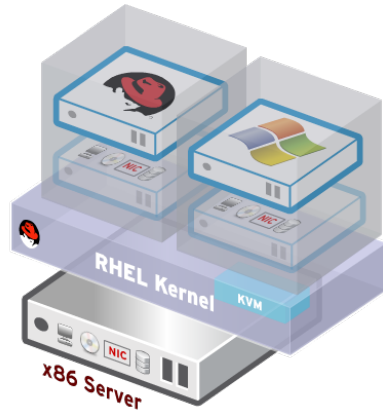


Standalone hypervisor

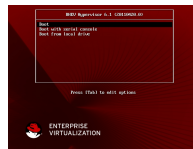




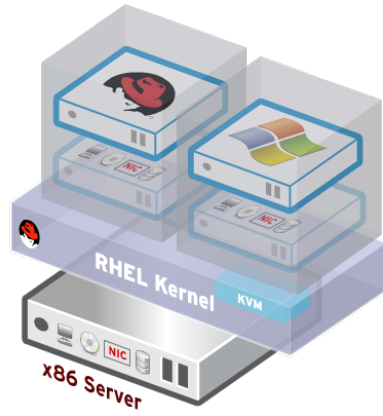
# oVirt Node



Customized 'spin' of Fedora + KVM



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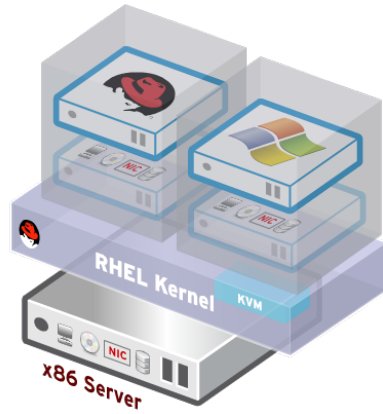


'Just enough' Fedora to run virtual machines





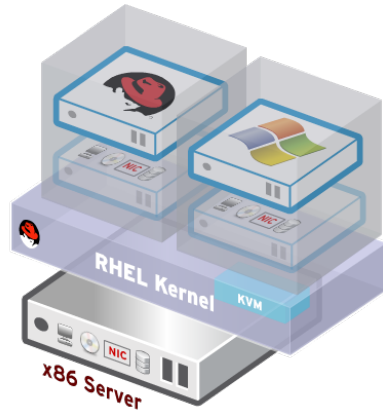
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Runs on all RHEL hardware with Intel VT/AMD-V CPUs



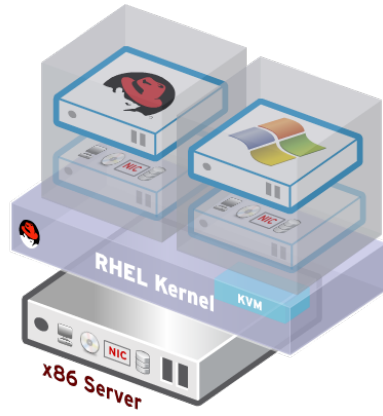
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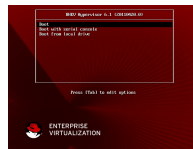
Easy to install, configure, and upgrade



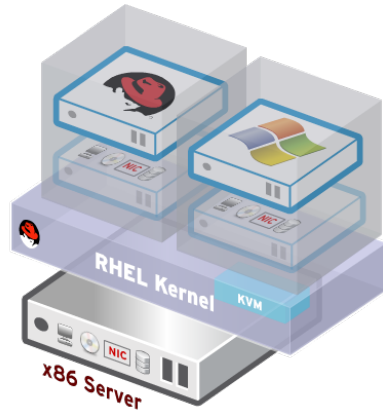
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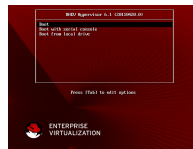
PXE boot, USB boot, CD, or Hard drive



# oVirt Node (tl;dnr)



- Standalone hypervisor
  - Small footprint < 100MB
    - Customized 'spin' of Fedora + KVM
    - 'Just enough' Fedora to run virtual machines
    - Runs on all RHEL hardware with Intel VT/AMD-V CPUs
  - Easy to install, configure, and upgrade
    - PXE boot, USB boot, CD, or Hard drive



## oVirt Host Agent - VDSM



Covers all functionality required by oVirt Engine

## Virtual desktop and server manager

Vdsm is a daemon which is required by a Virtualization Manager such as oVirt-engine or Red Hat Enterprise Virtualization Manager to manage Linux hosts and their KVM virtual machine guests. Vdsm manages and monitors the host's storage, memory and networks as well as virtual machine creation, other host administration tasks, statistics gathering, and log collection.

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Configures host, networking, and shared storage

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## oVirt Host Agent - VDSM



VDSM manages a Storage Pool, comprised of Storage Domains

- **Storage Pool** - a VM repository that contains meta data about storage domains, storage tasks, VMs, locks, etc.
- **Storage Domain** - a disk image repository
- **Disk Image** - a collection of volumes (chain of snapshots)
- **Volume** - stored as files in NFS, and as Logical Volumes for FC/iSCSI
- Thin provisioning for SAN supported (storage mailbox based)

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## oVirt Guest Agent



The guest agent provides additional information to oVirt Engine, such as guest memory usage, guest IP address, installed applications, and SSO

## oVirt Guest Agent



Python code, available for both Linux and Windows guests

## **oVirt Guest Agent**



Communication is done over virtio-serial

## oVirt Guest Agent



SSO for windows is based on a GINA module for XP and a credential provider for Windows 7

## **oVirt Guest Agent**



SSO for RHEL 6 is based on a PAM module with support for both KDE and GNOME

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## oVirt Data Warehouse



ETL based on talendforge.org

Extra, transform, load.



## oVirt Data Warehouse



Periodic polling from operational DB

Extra, transform, load.

## oVirt Data Warehouse



### Types of data

Config with version tracking

Statistics – aggregated hourly/daily

Extra, transform, load.

## oVirt Data Warehouse



API is view based

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## oVirt Data Warehouse (tl;dnr)



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- Types of data
  - Config with version tracking
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## oVirt Reports



Jasper allows to import/export reports definitions

## oVirt Reports



Rich reporting engine

Report scheduling

Filters

Export to various formats

Report creation studio

## oVirt Reports



Next

Integrated in web admin

## oVirt Reports (tl;dnr)



- Jasper allows to import/export reports definitions
- Rich reporting engine
  - Report scheduling
  - Filters
  - Export to various formats
  - Report creation studio
- Next
  - Integrated in web admin



## REST API



RESTful API for integration with oVirt Engine

- REST interface exposed for all API functions

- Developed in upstream RHEV-M API project (before oVirt)

## REST API



### Create a Virtual Machine from a Template:

```
curl -v -u "vdcadmin@example.com"  
  -H "Content-type: application/xml"  
  -d '<vm><name>my_new_vm</name><cluster id="99408929-  
82cf-4dc7-a532-9d998063fa95" /><template id="00000000-  
0000-0000-0000-000000000000"/></vm>'  
  'http://1.2.3.4/rhevapi/vms'
```

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a532-9d998063fa95" /><template id="00000000-0000-0000-0000-  
000000000000"/></vm>'  
'http://10.35.1.1/rhev-api/vms'
```

## On the Horizon - Features



- Live snapshots
- Live storage migration
- Quotas
- Hot plug
- Multiple storage domains
- Shared disks
- iScsi disk
- Shared file system support
- Storage array integration
- Qbg/Qbh
- virt-resize, pv-resize
- Progress bars
- Stable pci addresses
- Network types
- Backup API
- SLA
- SDM
- Many many more...



## Get Involved!

- Wiki
  - <http://www.ovirt.org/wiki>
- Mailing lists
  - [users@ovirt.org](mailto:users@ovirt.org) — oVirt Platform user list
  - [announce@ovirt.org](mailto:announce@ovirt.org) — oVirt Platform announce list
  - [arch@ovirt.org](mailto:arch@ovirt.org) — oVirt general devel/project list
  - [engine-devel@ovirt.org](mailto:engine-devel@ovirt.org) — oVirt-engine devel list
  - [node-devel@ovirt.org](mailto:node-devel@ovirt.org) — oVirt-node devel list
- IRC
  - [#ovirt](http://irc.oftc.net) on irc.oftc.net

oVirt

**THANK YOU !**

<http://www.ovirt.org>