

# IC Cloud Users Group

Meeting #1  
Thurs 3-NOV-2011



BUILD YOUR OPEN CLOUD TODAY

Presented by



# AGENDA

- 1030-1045: Introductions
- 1045-1145: Virtualization Technology Update
- 1145-1230: Lunch & Panel
- 1230-1345: RHEV & KVM Update
- 1345-1415: Red Hat IC Activities
- 1415-1430: Q&A and Closing





**WE CAN DO MORE  
WHEN WE WORK  
TOGETHER**



# GROUP INTRODUCTIONS

- **Reminder: Lowest clearance in the room is Top Secret.**
- **What's your name,  
what do you want to get out of today?**



# **1045-1130: TECHNOLOGY UPDATE**

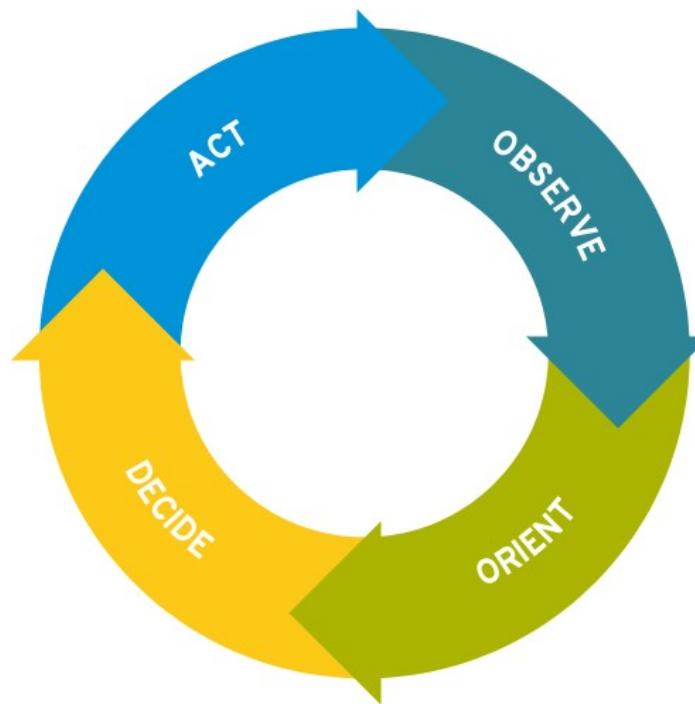
- Technology Evolution (Xen-->KVM)
- sVirt & MLS Cloud
- libvirt, VDSM, REST APIs
- Performance





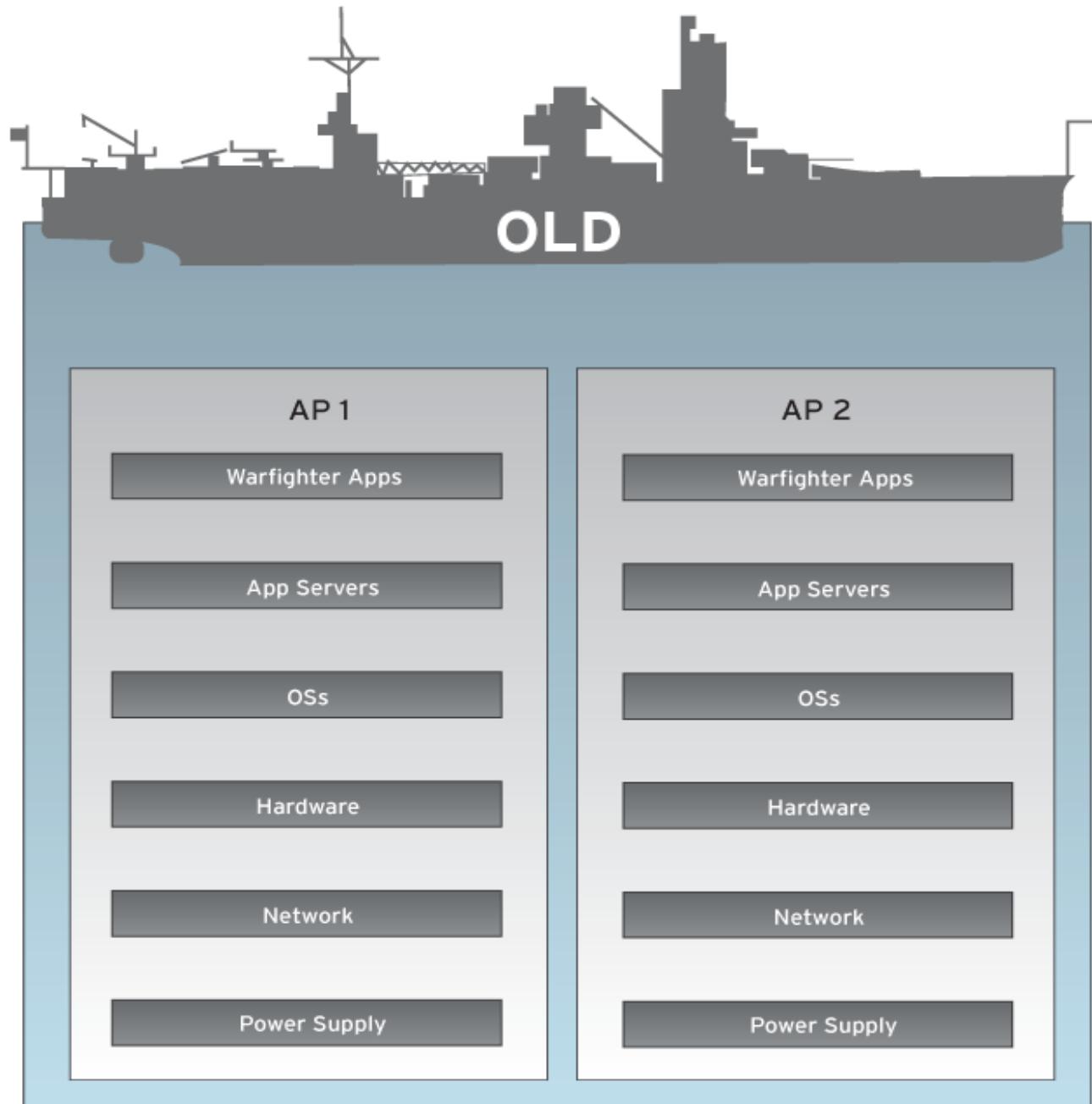
## Col. John Boyd, USAF

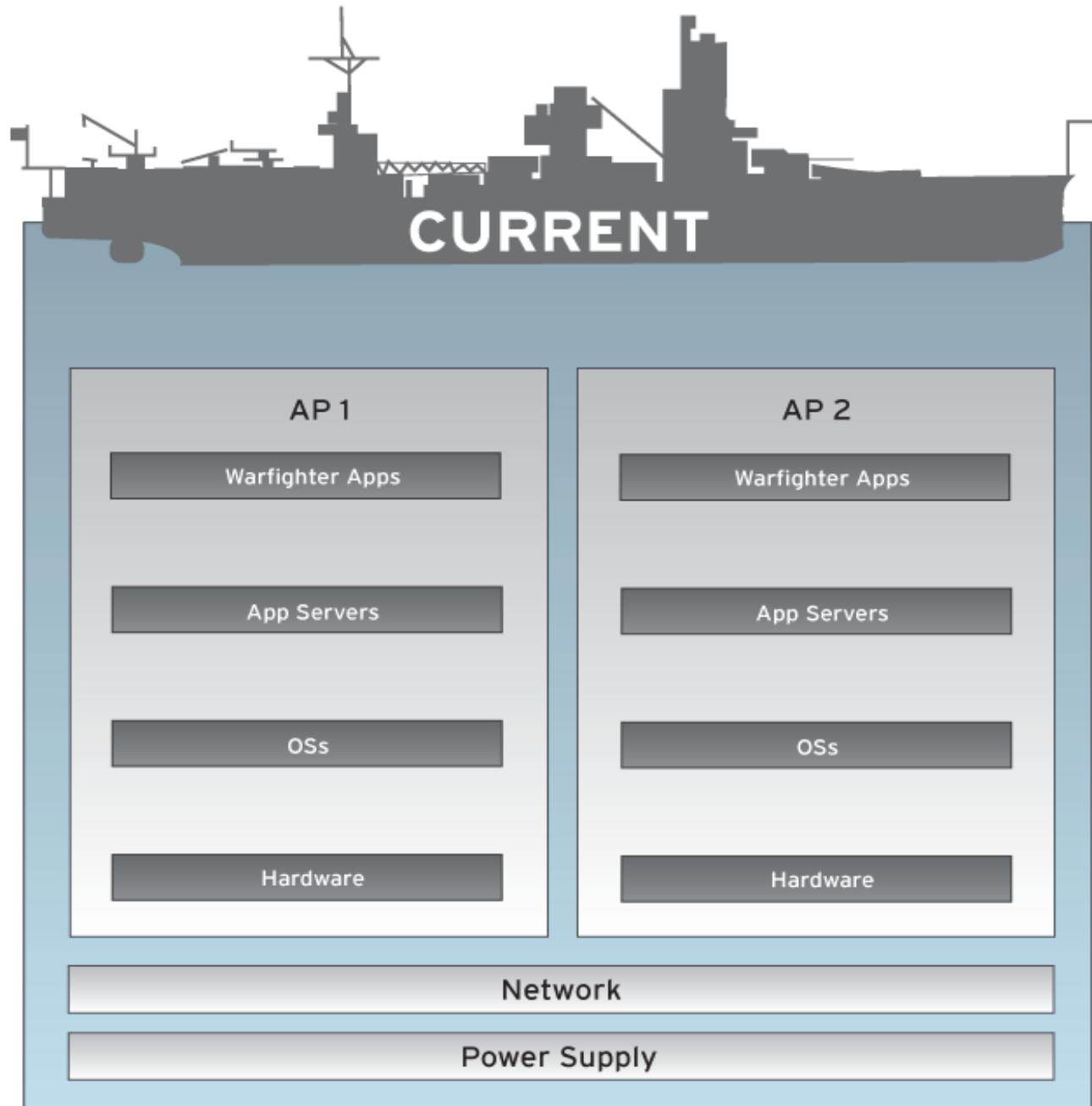
- His energy-maneuverability theory says that agility is more important than how fast or how big a plane is. His OODA Loop (Observe-Orient-Decide-Act) transformed the DoD.



# US Navy's standardization mission





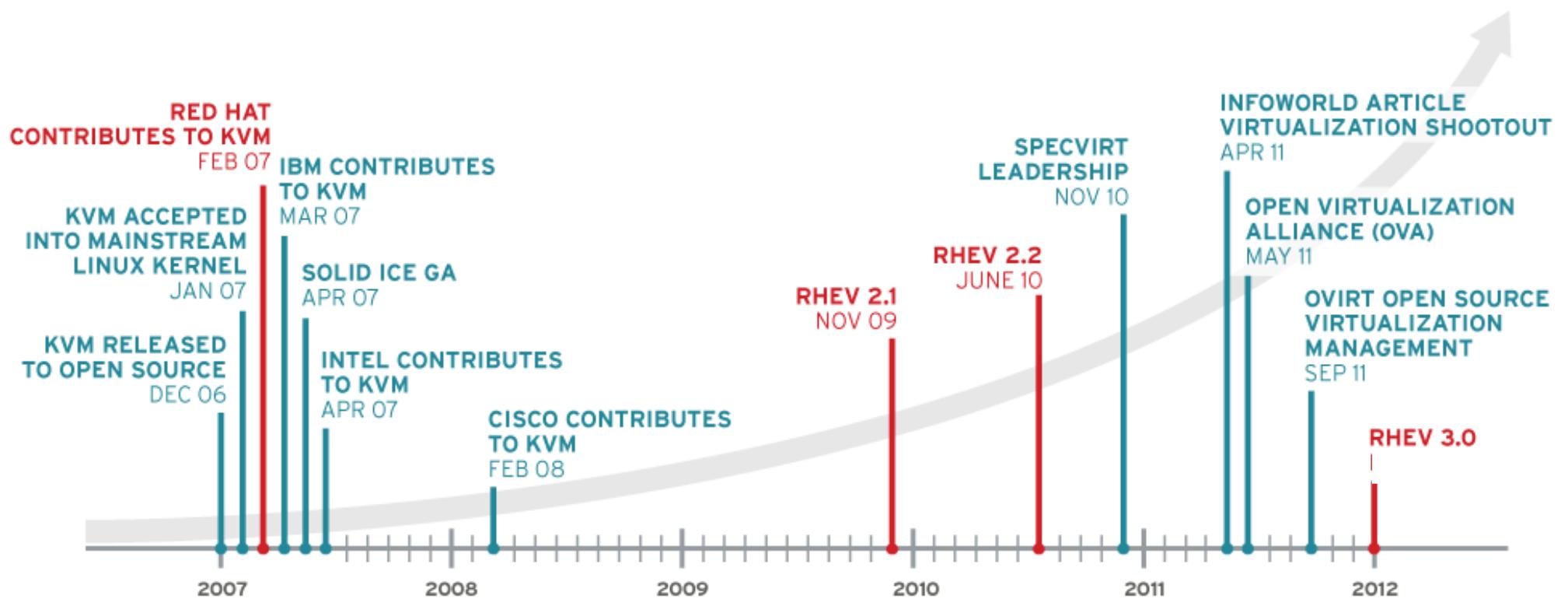


# Virtualization Decision: Xen vs KVM

- Xen
  - Rapidly was losing community traction
  - Complicated security model
  - Slow(er)
- KVM (Kernel Virtual Machine)
  - Adopted by Linux community as standard
  - Can play with SELinux natively
  - Fast(er)
  - Become foundation of Red Hat Enterprise Virtualization

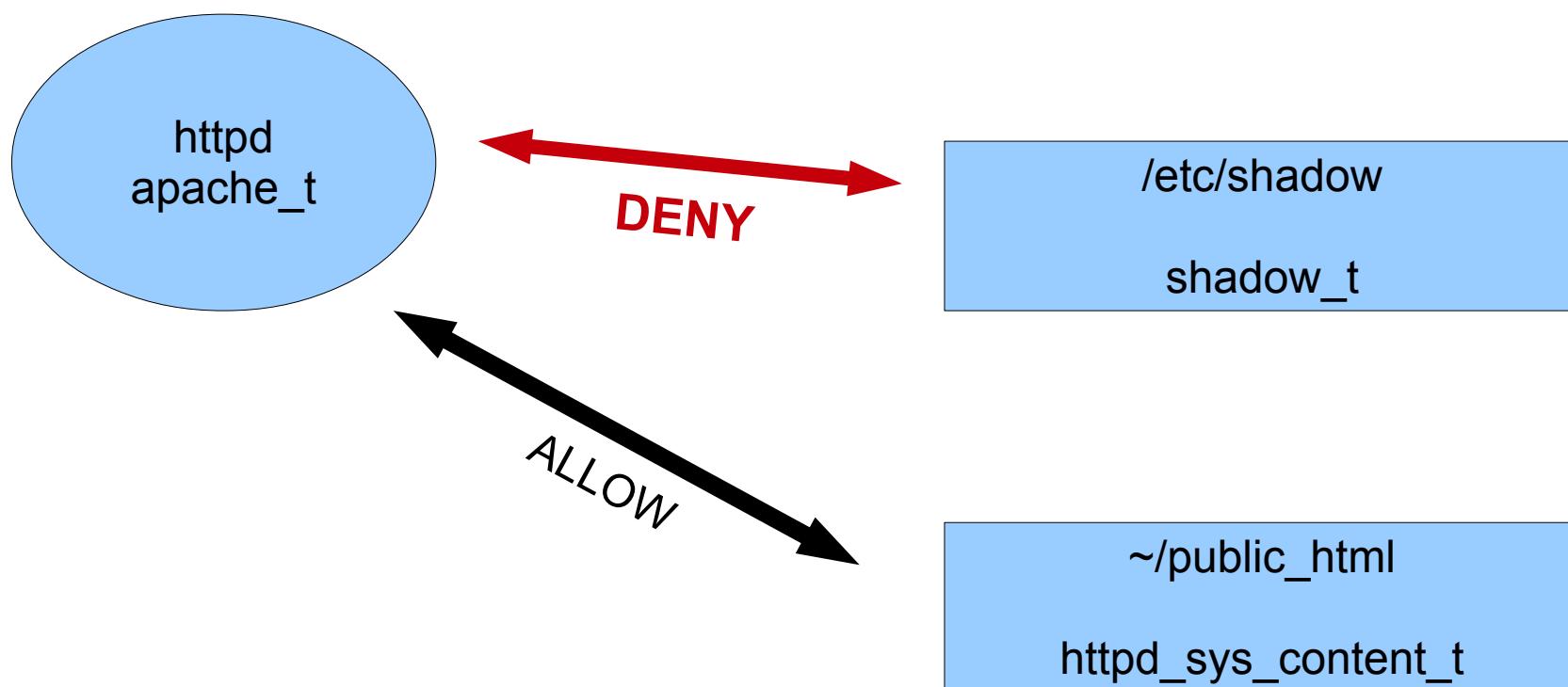


# KVM Timeline



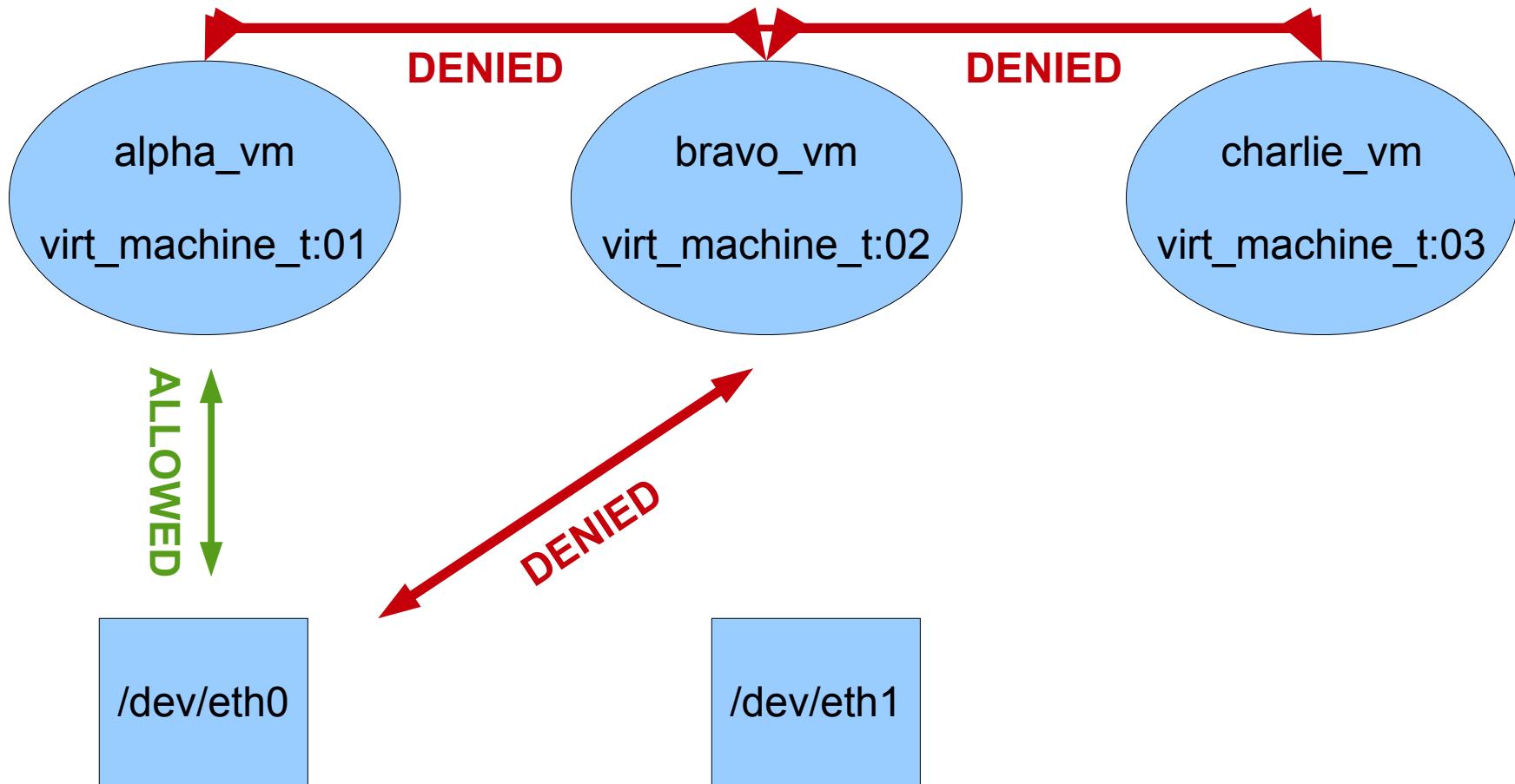
# Virtualization in a Shared Environment: sVirt

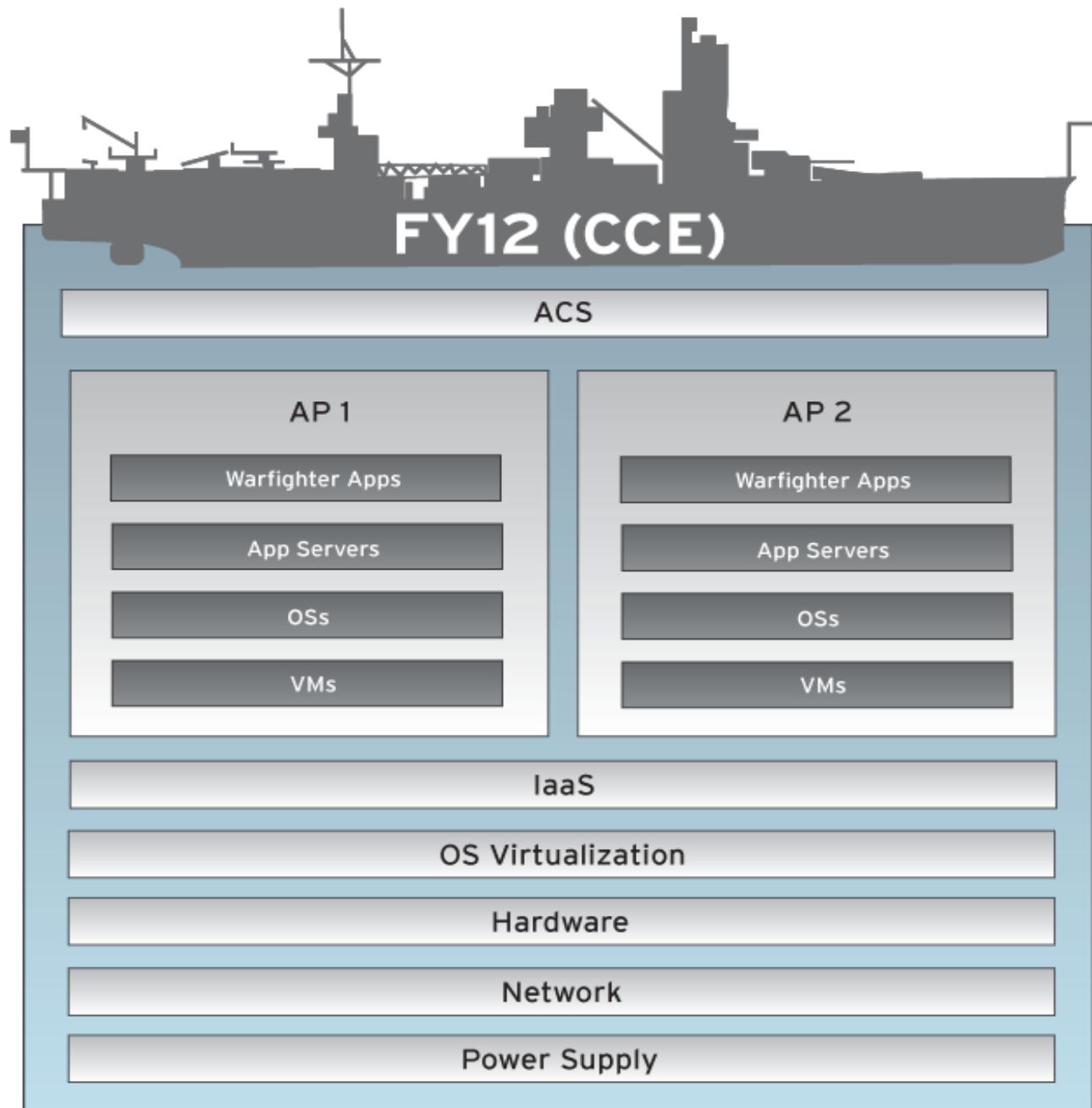
- Applies security label to all “files” on the system
  - In actuality, applies it to the inode metadata through a field called “secmark”



# Virtualization in a Shared Environment: sVirt

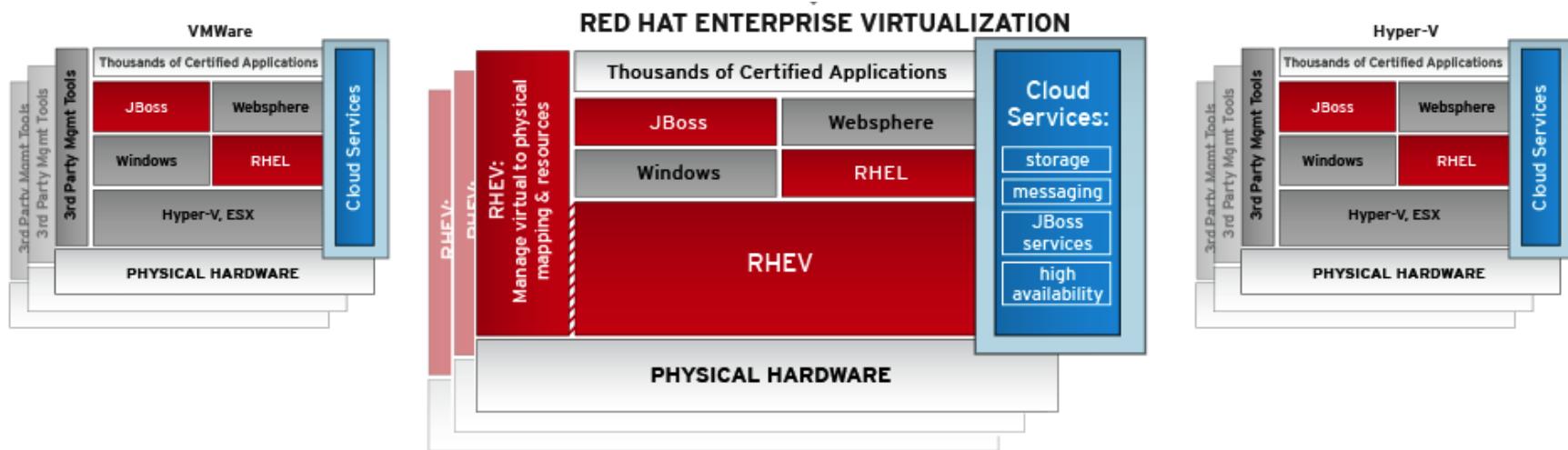
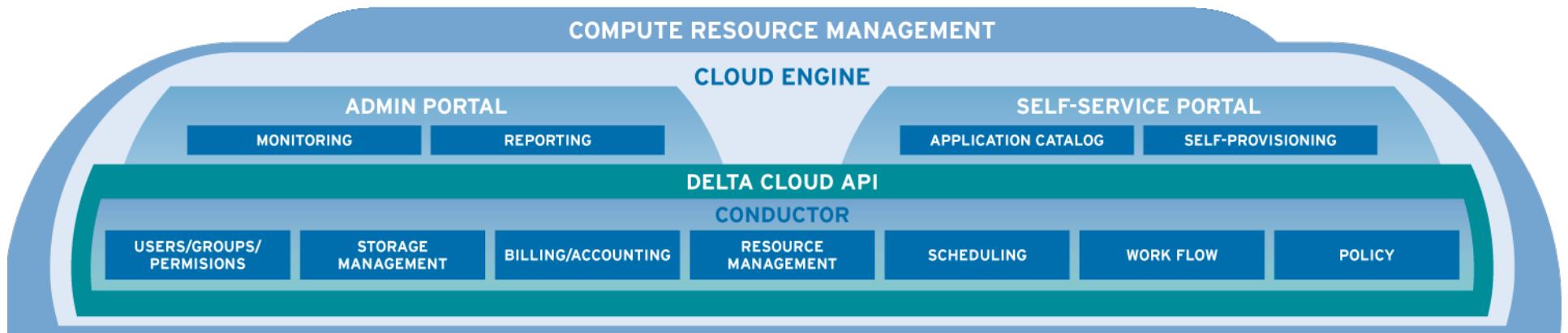
- sVirt applies SELinux framework to Virtual Machines

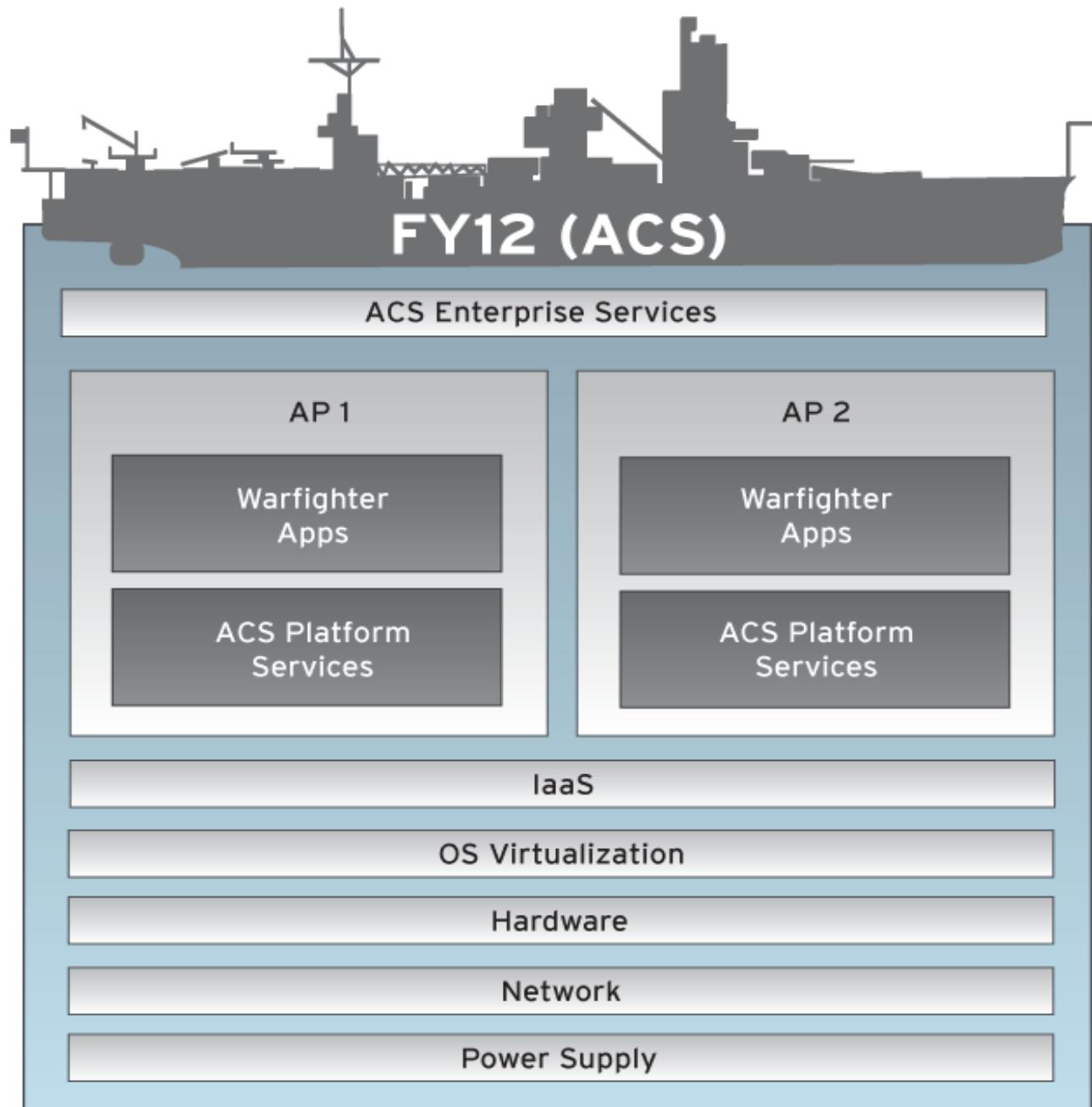




OS VIRTUALIZATION	IAAS
Provides extensive vendor tooling	Automates and removes lockin of vendor tooling
Enables live migration of VMs	Automates live migration of VMs
Allows admins to handle resource over-utilization	Automates handling resource over-utilization
Requires install and configuration of vendor products	Automates install and configuration of vendor products
Helps the admin manage the data center	Manages the data center for the admin
Red Hat Enterprise Virtualization, VMWare, Citrix	Amazon EC2



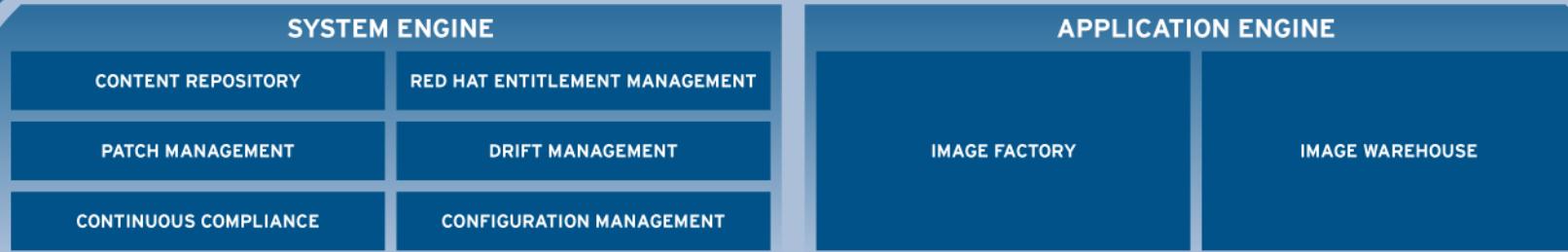




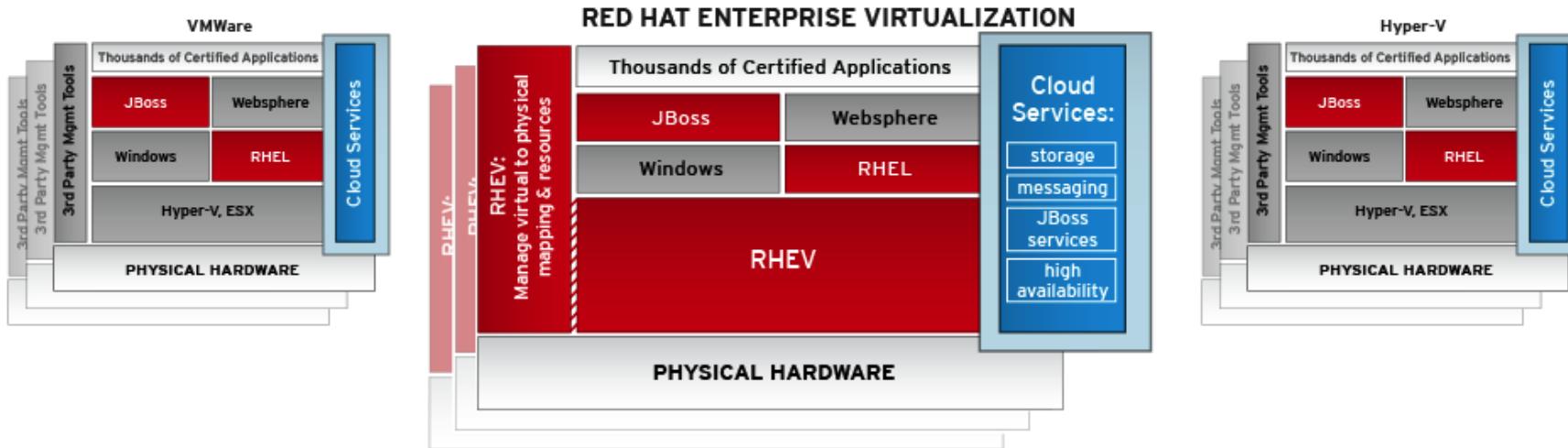
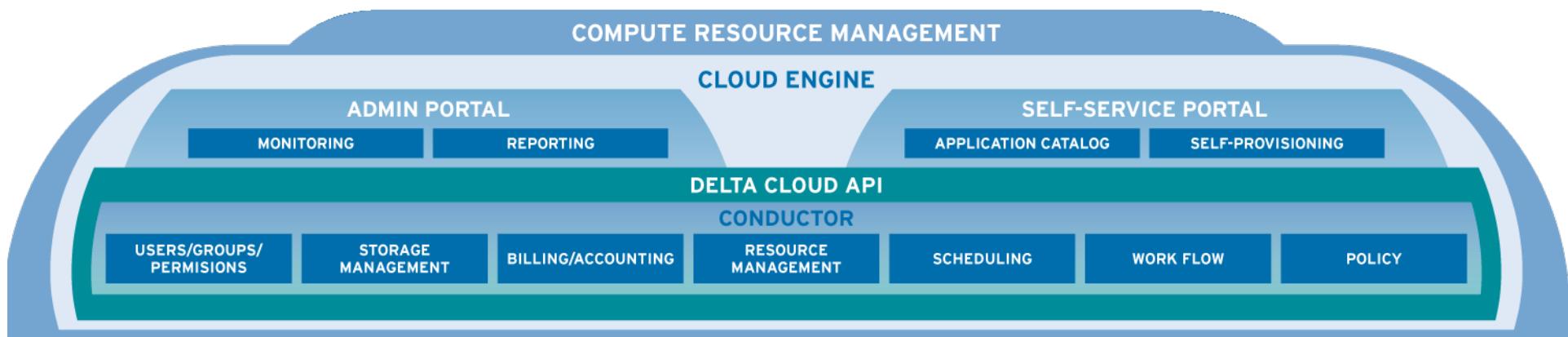
PLATFORM SERVICES	PAAS
App providers build to vendor products	App providers build to DoD standard
Changing middleware vendor requires work from all app providers	Changing middleware vendor is invisible to all app providers
Static scaling	Dynamic scaling
Makes it easier for app providers to build C&A'd environments	Removes need for app provider to build C&A'd environments
Build / deploy apps in months / years	Build / deploy apps in days
RHEL+JBoss, Windows+BEA Solaris+Oracle	Google AppEngine



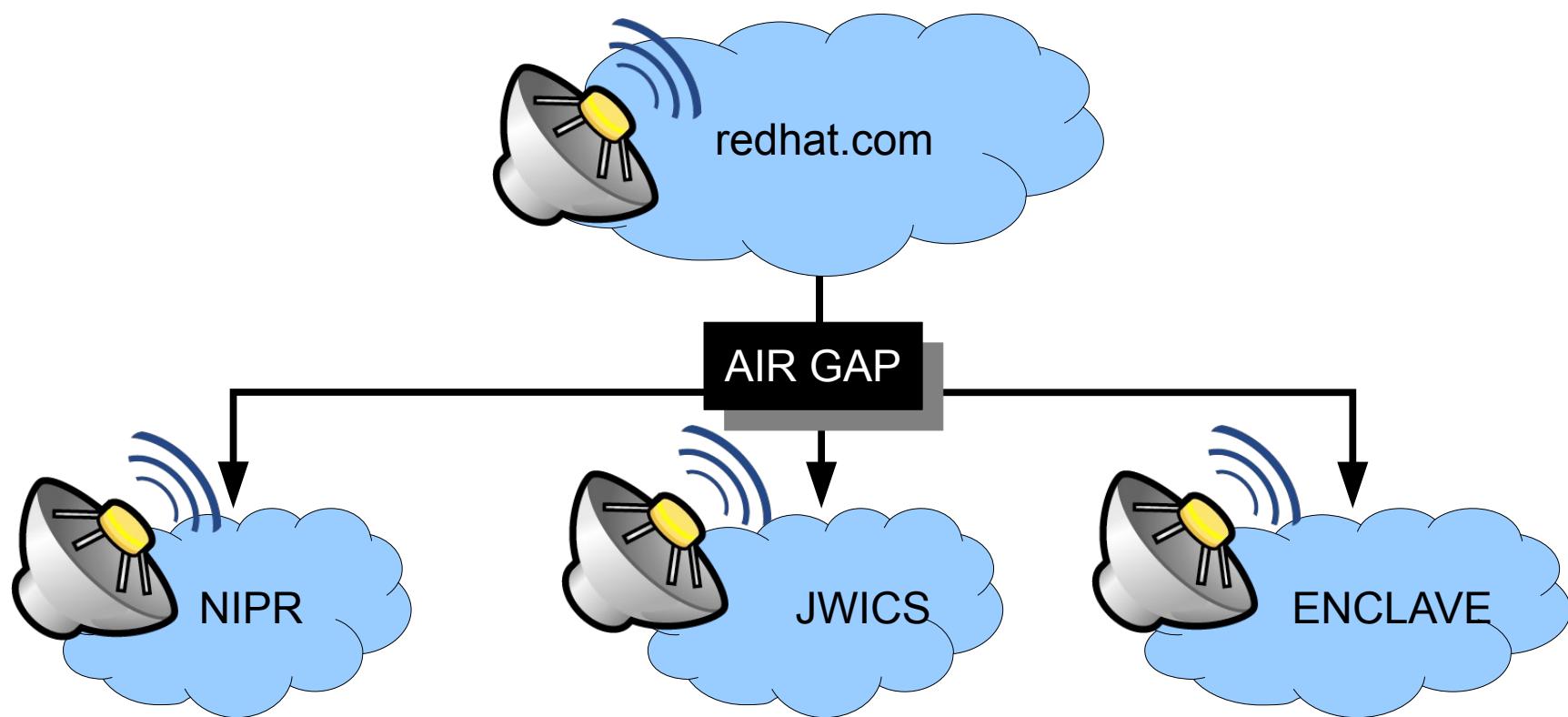
## APPLICATION LIFECYCLE MANAGEMENT



## COMPUTE RESOURCE MANAGEMENT



# RHN Satellite



# RHN Satellite

```
#!/usr/bin/perl -w
use XMLRPC::Lite;

$SATELLITE = "https://xmlrpc.rhn.redhat.com/rpc/api";
$username = "username";
$password = "password";
$SystemManagement = "http://192.168.1.100:1996/rhnsystemmanagement-4.3.0-mp-i386-server-5-pm";
my $RPC = XMLRPC::Lite->new( proxy => $SATELLITE );

my $sessionkey = $RPC -> call( 'login', $username, $password ) -> result;
my $entitlements = $RPC->call(
    "channel.software.availableEntitlements",
    $sessionkey,
    "label",
);
print "Entitlements available for channel_label:\n";
$RPC->call("auth.logout", $sessionkey);
print "\n\n\n";
```

The diagram illustrates the flow of XML-RPC requests between the RHN Satellite and four management components:

- System Management:** Represented by a cluster of three computer monitors. A red arrow labeled "XML-RPC" points from the satellite to this component.
- Software and Configuration Management:** Represented by a server tower with a person holding a clipboard and a gear icon. A red arrow labeled "XML-RPC" points from the satellite to this component.
- Integrate User Access and Controls:** Represented by a cluster of three computer monitors. A red arrow labeled "XML-RPC" points from the satellite to this component.
- Reporting:** Represented by a cluster of three computer monitors displaying line graphs. A red arrow labeled "XML-RPC" points from the satellite to this component.

A central satellite icon with a yellow antenna is shown emitting blue signal waves towards the management components.

**Integrate User Access  
and Controls**

**Reporting**



# Updates

Easily obtain security updates, patches, and new OS versions

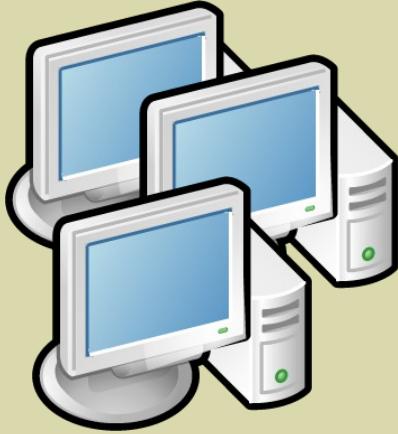


Remove undesired packages through the simple RHN web interface

Automatically update systems with the latest security fixes



# Management



Manage groups of systems as easily as a single system

Assign permissions to administrators for managing different groups or roles



Schedule updates to occur during maintenance windows



# Provisioning

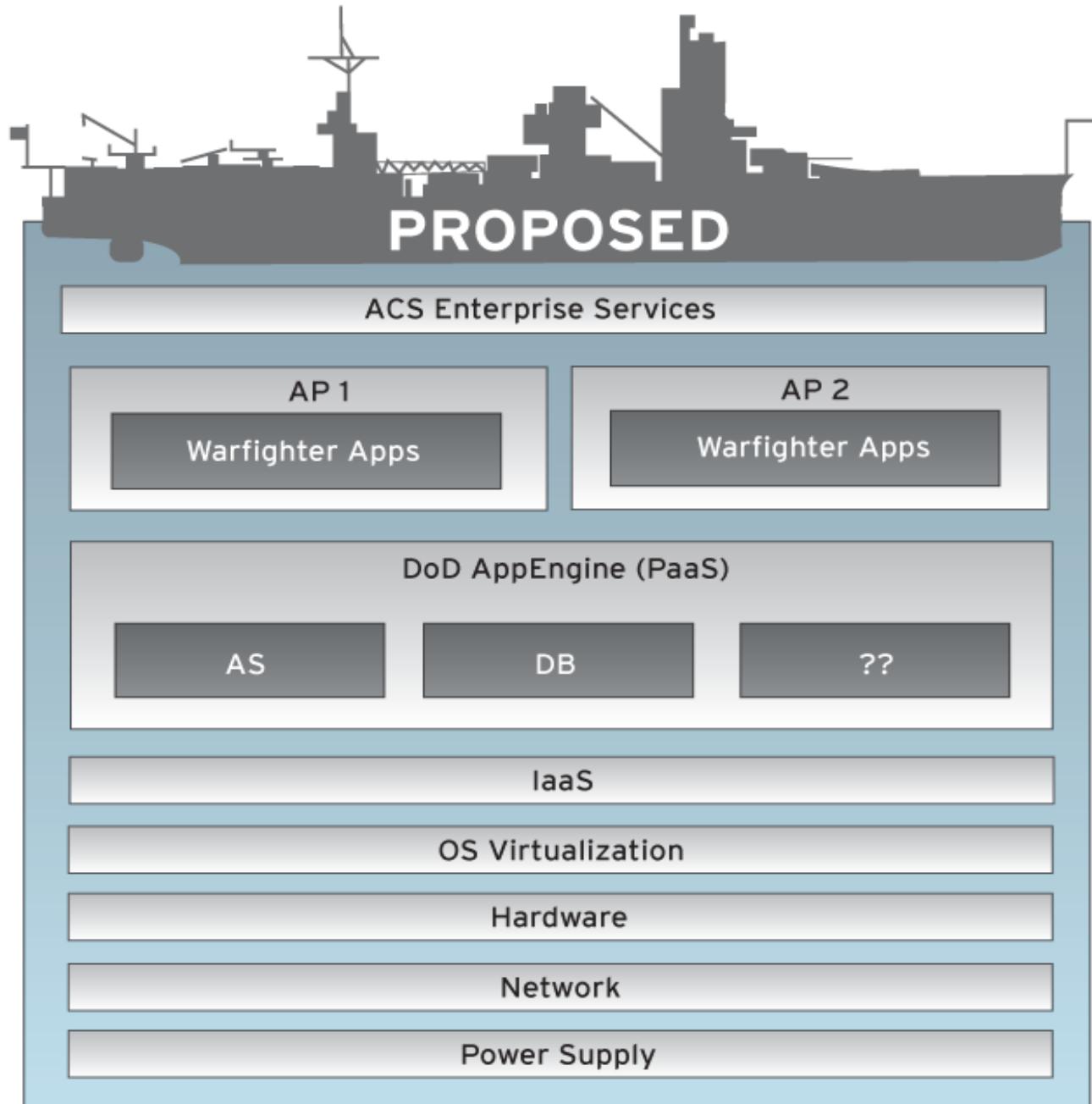
Provision existing or bare metal systems using profiles or system cloning

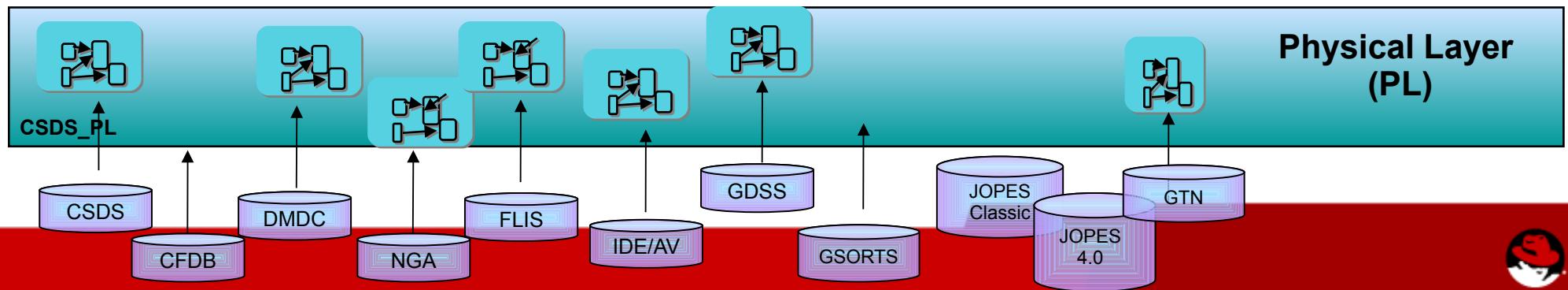


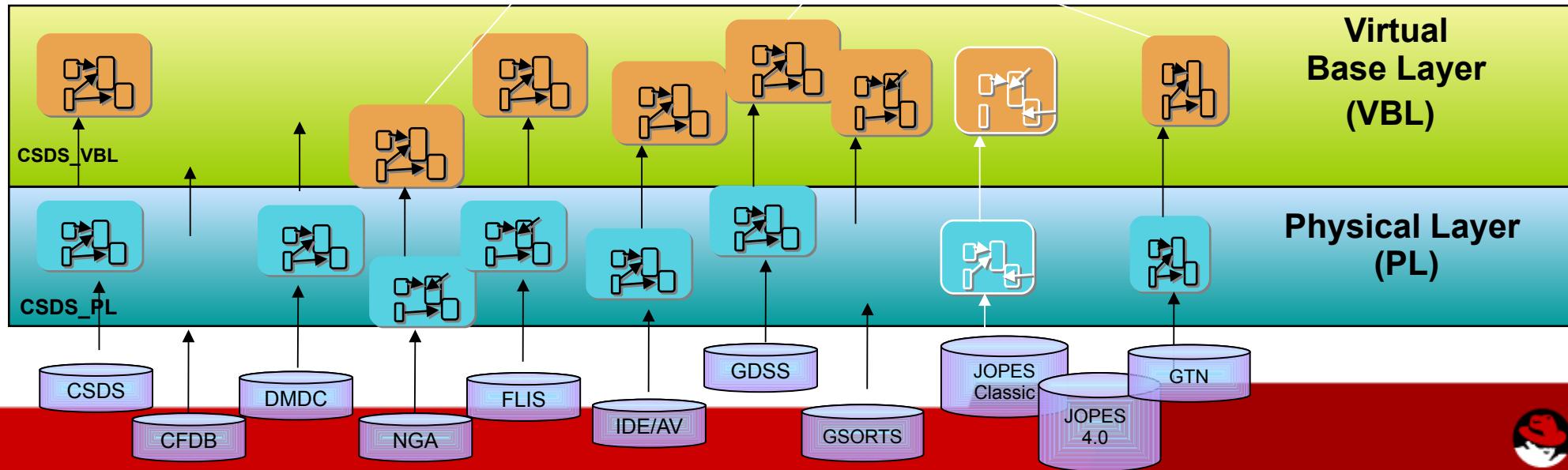
Improve consistency by using RHN to manage and deploy configuration files

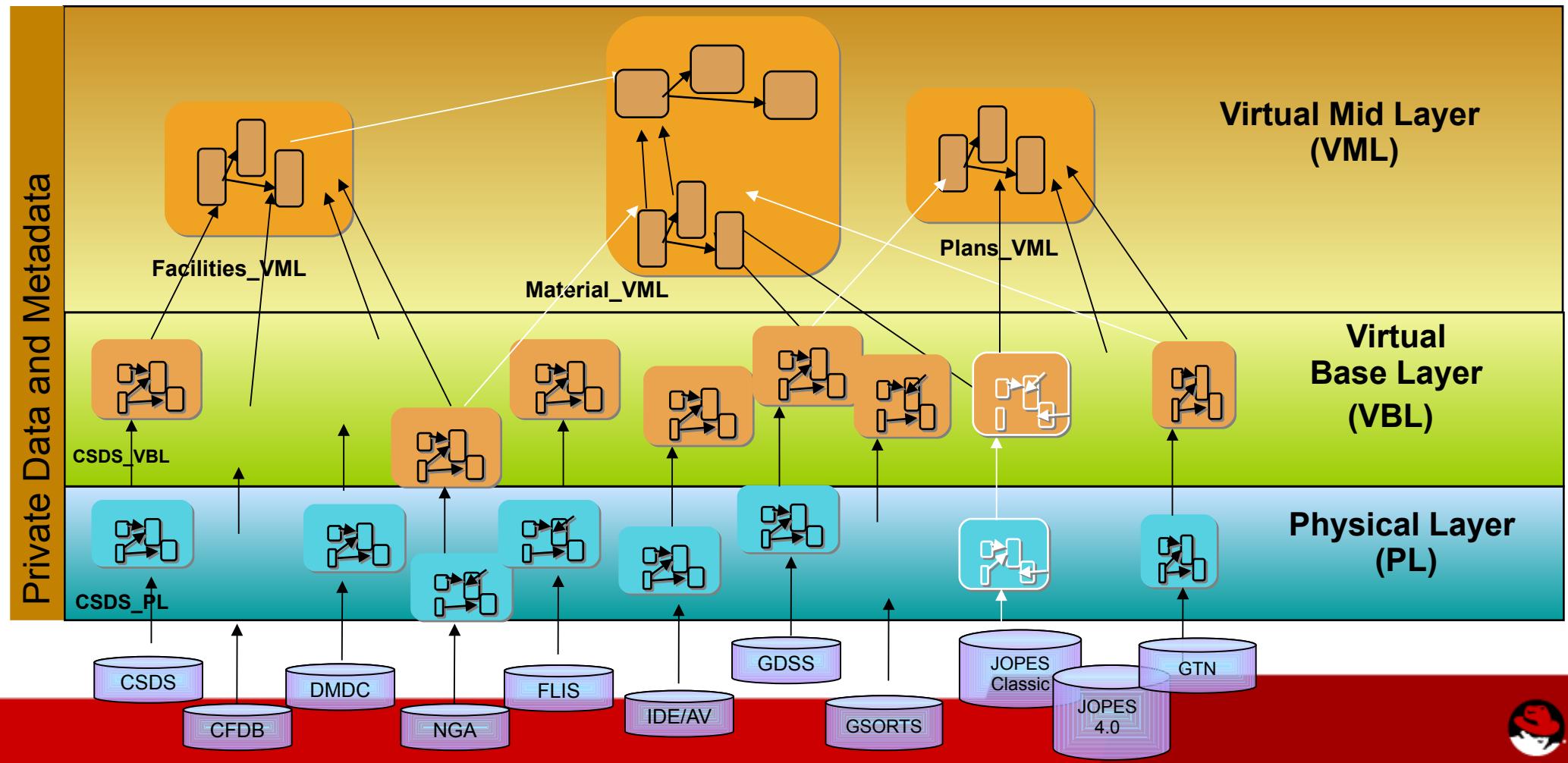
Undo problematic changes with snapshots and rollback

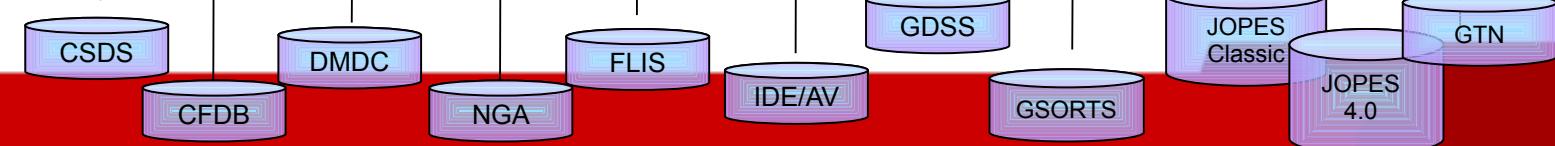
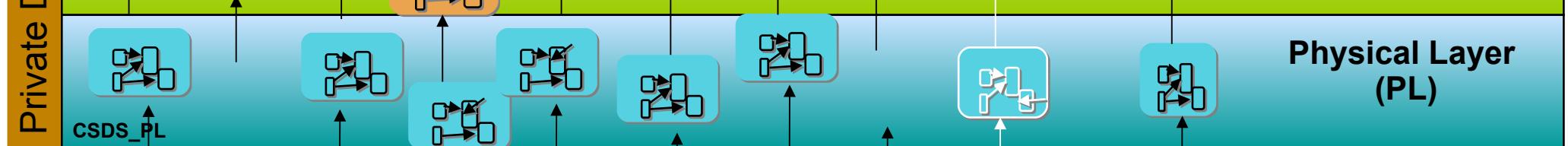
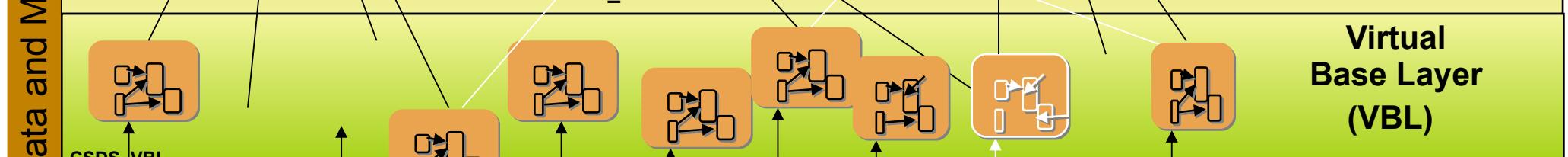
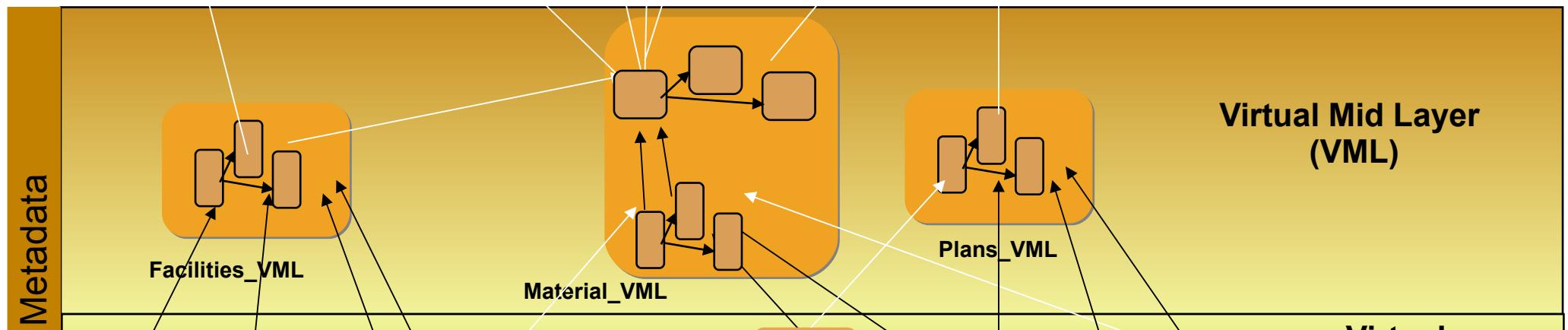
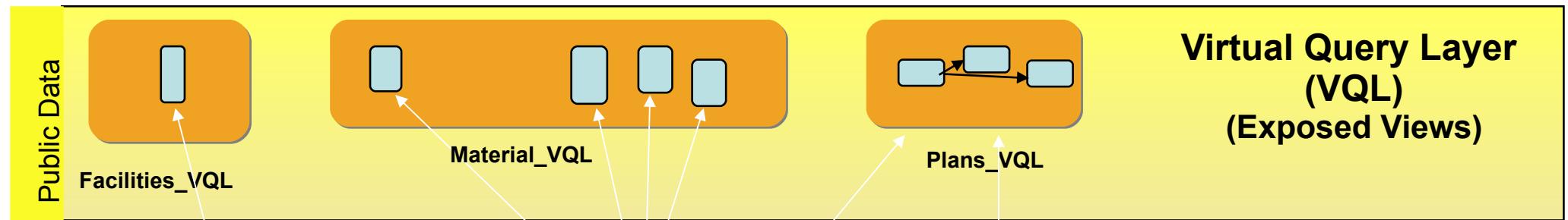












# Lunch & Panel



# Technology/Community Update

- **What is happening now in open source virtualization?**
- **What is Red Hat's focus?**
- **What can RHEV do?**
- **RHEV3 Technology Preview**
- **Future/ongoing open source technologies (Aeolus, CloudForms, etc)**

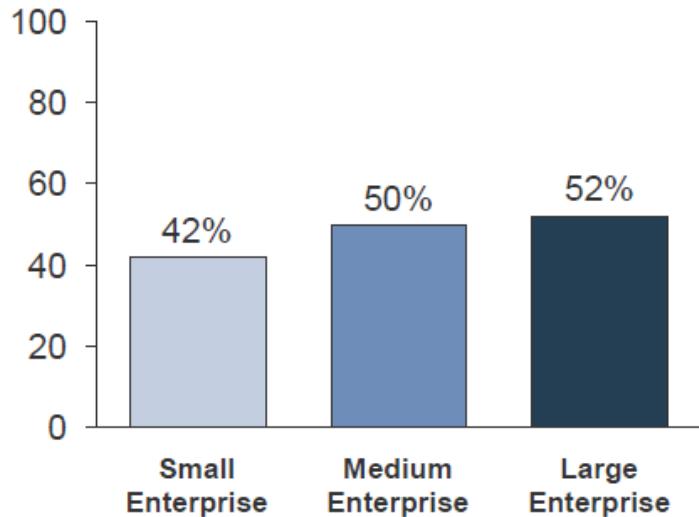


# WHAT IS HAPPENING NOW IN VIRTUALIZATION?



# CUSTOMERS APPROACHING 50% VIRTUALIZATION

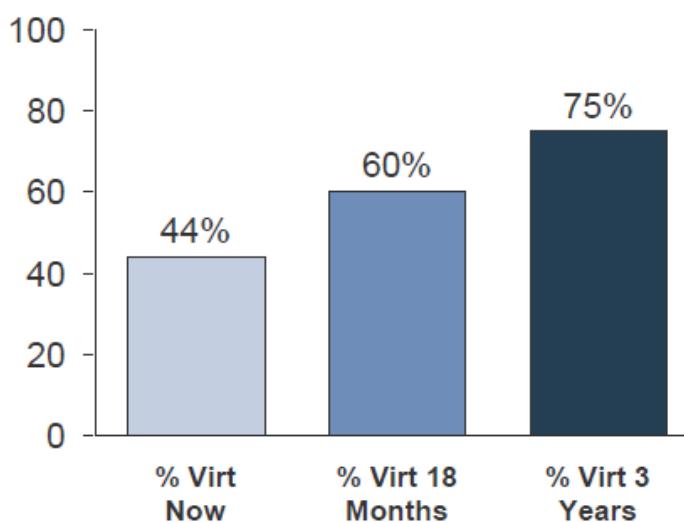
Server Virtualization by Company Size\*



The wide-ranging benefits of server virtualization for consolidation & management have led organizations of all sizes to deploy.

\*As reported by respondents; Source: Info-Tech Research Group; N = 75

Current & Projected Virtualization



Because benefits increase with further virtualization, many organizations have a “virtualize unless otherwise” policy leading to increased virtualization ratios over time.

\*As reported by respondents; Source: Info-Tech Research Group; N = 87



**NO ONE EVER GOT  
FIRED  
FOR BUYING**

**IBM Mainframes  
Proprietary UNIX  
Microsoft Windows  
VMware**



# YOU HAVE A CHOICE IN VIRTUALIZATION



“Don’t just find a vendor, find a solution; **42% of organizations use multiple hypervisors** to maximize features & minimize cost”

— InfoTech Research Group, July 2011



“VMware vSphere still leads the pack... but the gap is closing fast. If there’s one obvious result of this test, it’s that **there’s never been a better time to shop for a virtualization solution.**”

— *Virtualization Shoot-out: Citrix, Microsoft, Red Hat and VMware*, InfoWorld, April 2011



“**If I were VMware**, I wouldn’t worry most about Microsoft, with its tendency to subsume low-end, small business markets by including everything in the Windows operating system. That’s so 1990s. Rather, **I’d worry that Red Hat and KVM already have a foot in the cloud.**”

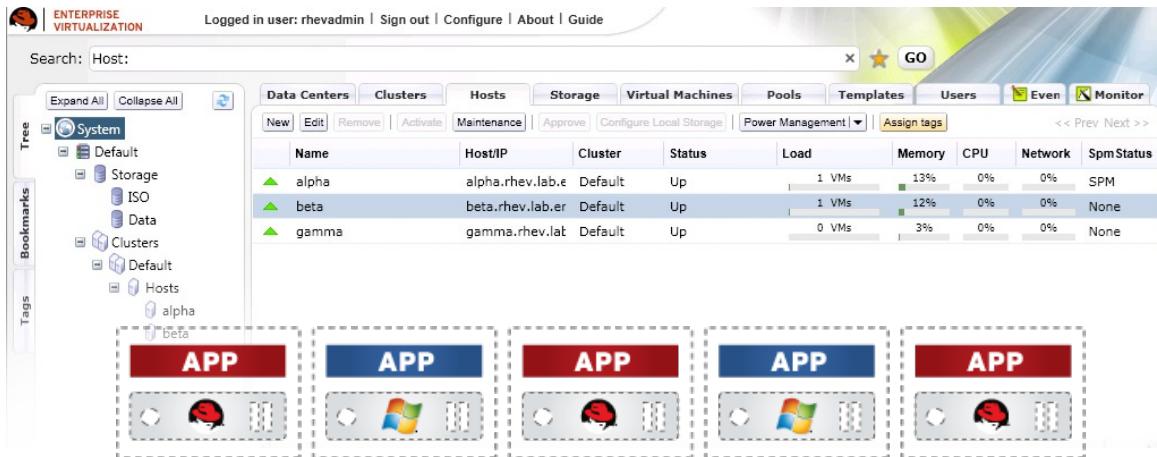
— *VMware Should Worry More About Red Hat*, InformationWeek, September 2011



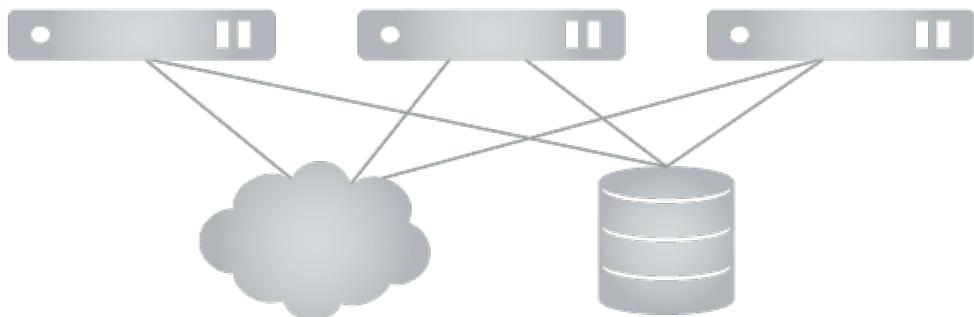
# WHAT IS RED HAT ENTERPRISE VIRTUALIZATION?



# RED HAT ENTERPRISE VIRTUALIZATION



## RED HAT ENTERPRISE VIRTUALIZATION

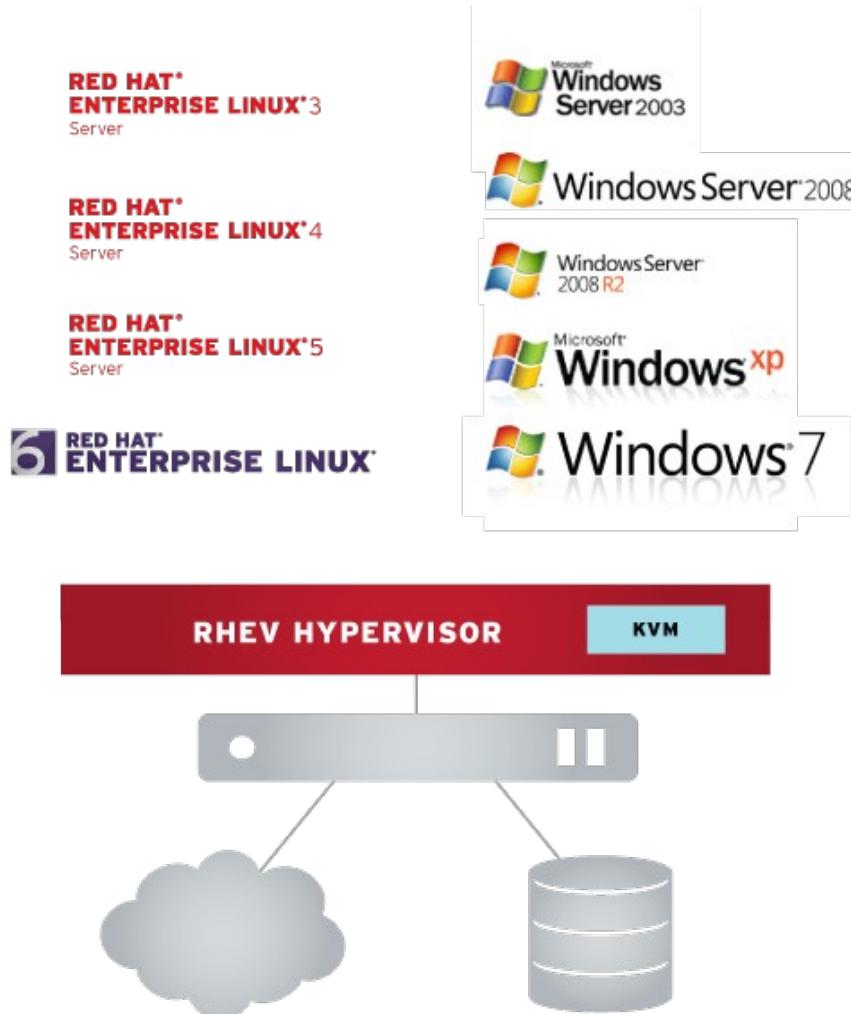


- Enterprise grade, centralized management and hypervisor for server and desktop virtualization
- Industry leading performance, scalability and security infrastructure
- Ecosystem of thousands of hardware and software vendors
- 50–70% lower cost compared to other solutions



# RHEV HYPERVISOR/KVM OVERVIEW

SMALL FORM FACTOR, SCALABLE,  
HIGH PERFORMANCE



- Host: 160 logical CPU (4,096 theoretical max), 2TB RAM (64TB theoretical max)
- Guest: 64 vCPU, 2 TB RAM
- Supports latest silicon virtualization technology: SR-IOV, *Based on the latest RHEL 6.2 kernel*
- Microsoft SVVP



# RHEV MANAGER FEATURES: ENTERPRISE VIRTUALIZATION MANAGEMENT

The screenshot shows the Red Hat Enterprise Virtualization Manager web interface. The top navigation bar includes links for 'Enterprise Virtualization', 'Logged in user: rhevadmin | Sign out | Configure | About | Guide', and a search bar for 'Host'. Below the navigation is a toolbar with buttons for 'Data Centers', 'Clusters', 'Hosts', 'Storage', 'Virtual Machines', 'Pools', 'Templates', 'Users', 'Events', and 'Monitor'. A sub-toolbar for 'Hosts' includes 'New', 'Edit', 'Remove', 'Activate', 'Maintenance', 'Approve', 'Configure Local Storage', 'Power Management', and 'Assign tags'. The main content area displays a table of hosts:

Name	Host/IP	Cluster	Status	Load	Memory	CPU	Network	SpmStatus
alpha	alpha.rhev.lab.e	Default	Up	1 VMs	13%	0%	0%	SPM
beta	beta.rhev.lab.er	Default	Up	1 VMs	12%	0%	0%	None
gamma	gamma.rhev.lat	Default	Up	0 VMs	3%	0%	0%	None

On the left, a tree view shows the system structure under 'System': Default (Storage, ISO, Data), Clusters (Default, Hosts: alpha, beta, gamma). Below the table are five icons representing virtual machines, each labeled 'APP' and showing a red head icon. At the bottom, a red banner reads 'RED HAT ENTERPRISE VIRTUALIZATION'. Below the banner is a diagram showing three hosts connected to a central cloud icon and a database cylinder.

- High Availability
- Live Migration
- *Self Service Portal*
- Load Balancing (DRS)
- Power Saver (DPM)
- Templates, thin provisioning, snapshots
- Centralized storage and networking management
- *Eco-system marketplace*

# INDEPENDENT REVIEWS SHOW RED HAT COMING ON STRONG

	Test Center Scorecard					
	Management	Performance	Reliability	Scalability	Installation	Overall Score
Citrix XenServer 5.6.1	25%	20%	20%	20%	15%	<b>7.7</b> GOOD
Microsoft Windows Server 2008 R2 Hyper-V	8	8	9	8	7	<b>8.1</b> VERY GOOD
Red Hat Enterprise Virtualization for Servers 2.2	8	8	8	9	9	<b>8.4</b> VERY GOOD
VMware vSphere 4.1	9	9	9	9	9	<b>9.0</b> EXCELLENT

Source: InfoWorld,  
*Virtualization shoot-out: Citrix, Microsoft, Red Hat, and VMware*, April 13, 2011

<http://bit.ly/rhevshootout>



# TREMENDOUS MOMENTIUM AROUND RED HAT ENTERPRISE VIRTUALIZATION

MORE AND MORE CUSTOMERS USE RED HAT ENTERPRISE VIRTUALIZATION ...



IBM Smart Business Test and Dev public cloud powered by RHEV



New cloud computing service, BizHosting Basic runs on RHEV



RHEV is the backbone for mission-critical service-oriented architecture



World's largest private chain of opticians runs strategic test/dev on RHEV



China's appliance leader runs business critical CRM applications on RHEV



RHEV powers telecom service provider's critical IT infrastructure



Wireless leader runs RHEV as a strategic virtualization platform



American financial services firm runs secure transaction cloud on RHEV



RHEV supports research and clinical care for leading US cancer institute



Strategic "Solution as a Service" infrastructure powered by RHEV



# HOW DOES RED HAT ENTERPRISE VIRTUALIZATION HELP ORGANIZATIONS BUILD THEIR CLOUDS TODAY?



# CASE: WIRELESS COMPANY BUILDS INTERNAL CLOUD BASED ON RHEV

## Wireless solutions provider

### Deployment of Red Hat Enterprise Virtualization

#### Red Hat Products

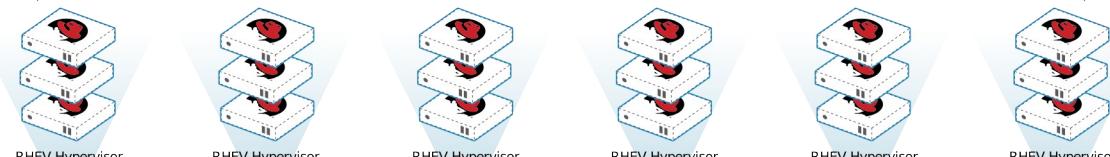
- Red Hat Enterprise Virtualization
- RHEL KVM Hypervisor
- RHEV Manager
- Red Hat Enterprise Linux

#### Workloads

- Test/Develop servers created through AutoLinux self-service portal
- Database Servers
- Custom Java-Based Application Servers
- LDAP, DNS, File Servers

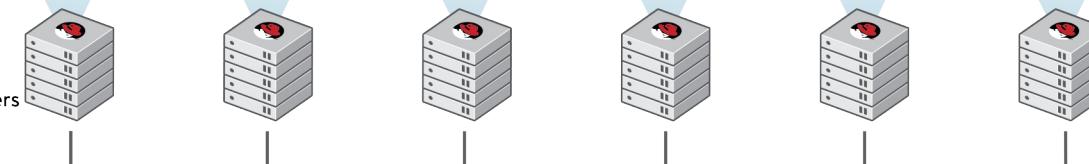
#### Virtual Machines

- Over 400 RHEL VMs distributed into 6 clusters



#### Servers

- 48 HP Proliant Blade Servers
- 2 socket quad-core x86 servers
- 72GB of RAM per server



#### Storage / Networking

- Cisco Nexus 10q Network
- Hitachi Storage
- 2 TB of shared disk per cluster



# CASE: WIRELESS COMPANY BUILDS INTERNAL CLOUD BASED ON RHEV

The screenshot shows the AutoLinux web interface. At the top left, there's a logo with the text "AutoLinux" and "create, renew, destroy Linux hosts." Below the logo, a message says "Welcome to AutoLinux! A production of SMG.UI, TNT, and GMT." It also states that users can request a Linux Host for up to 90 days to test applications or scripts. A yellow button labeled "Need Help? Click here!" is present. The main content area shows that the user is currently using 1 host(s), specifically "wolfpigeon" which expires on 4/29/2011. There are two main buttons: "Request A Host" and "Renew Host(s)". The "Request A Host" section allows users to input details for a new host, including "Host User (unix username)" (crocideagle), "Proposed Host Name" (left empty), "Template" (gv-afs-x86\_64-rhel5.5), "Help" (button), "# CPUs" (1), "Memory" (1 GB), "Disk Space" (10 GB), and "Cluster" (Select a cluster). The "Renew Host(s)" section shows the host "wolfpigeon" (expires 4/29/2011) and a "Renew" button.

Welcome to AutoLinux! A production of SMG.UI, TNT, and GMT.

You can request a Linux Host from the AutoLinux site and, in a matter of minutes, have your very own test host for up to 90 days! You can test applications or scripts that need to run on the Linux Platform.

Need Help? Click here!

You are currently using **1 host(s)**:

- wolfpigeon (expires 4/29/2011)

**Request A Host**

You may request up to 2 host(s).

Host User (unix username)  
Proposed Host Name  
Template gv-afs-x86\_64-rhel5.5  
Help  
# CPUs 1  
Memory 1 GB  
Disk Space 10 GB  
Cluster Select a cluster

**Renew Host(s)**

The following host(s) will expire in 2 weeks or less.  
Click "Renew" to renew for another 30 days.

wolfpigeon (expires 4/29/2011)      **Renew**



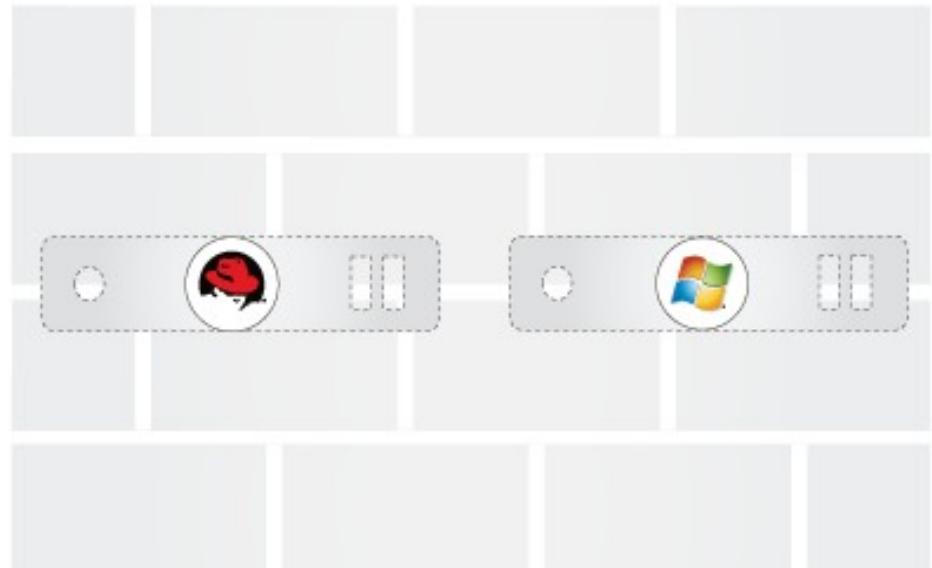
# ADVANCED SECURITY FOR YOUR VIRTUALIZATION INFRASTRUCTURE

RHEV inherits the security features of Linux and RHEL

- SELinux security policy infrastructure
- Provides protection and isolation for virtual machines and host
- Compromised virtual machine cannot access other VMs or host

## sVirt Project

- Sub-project of NSA's SELinux community. Provides “hardened” hypervisor.
- Multi-level security. Isolate guests
- Contain any hypervisor breaches

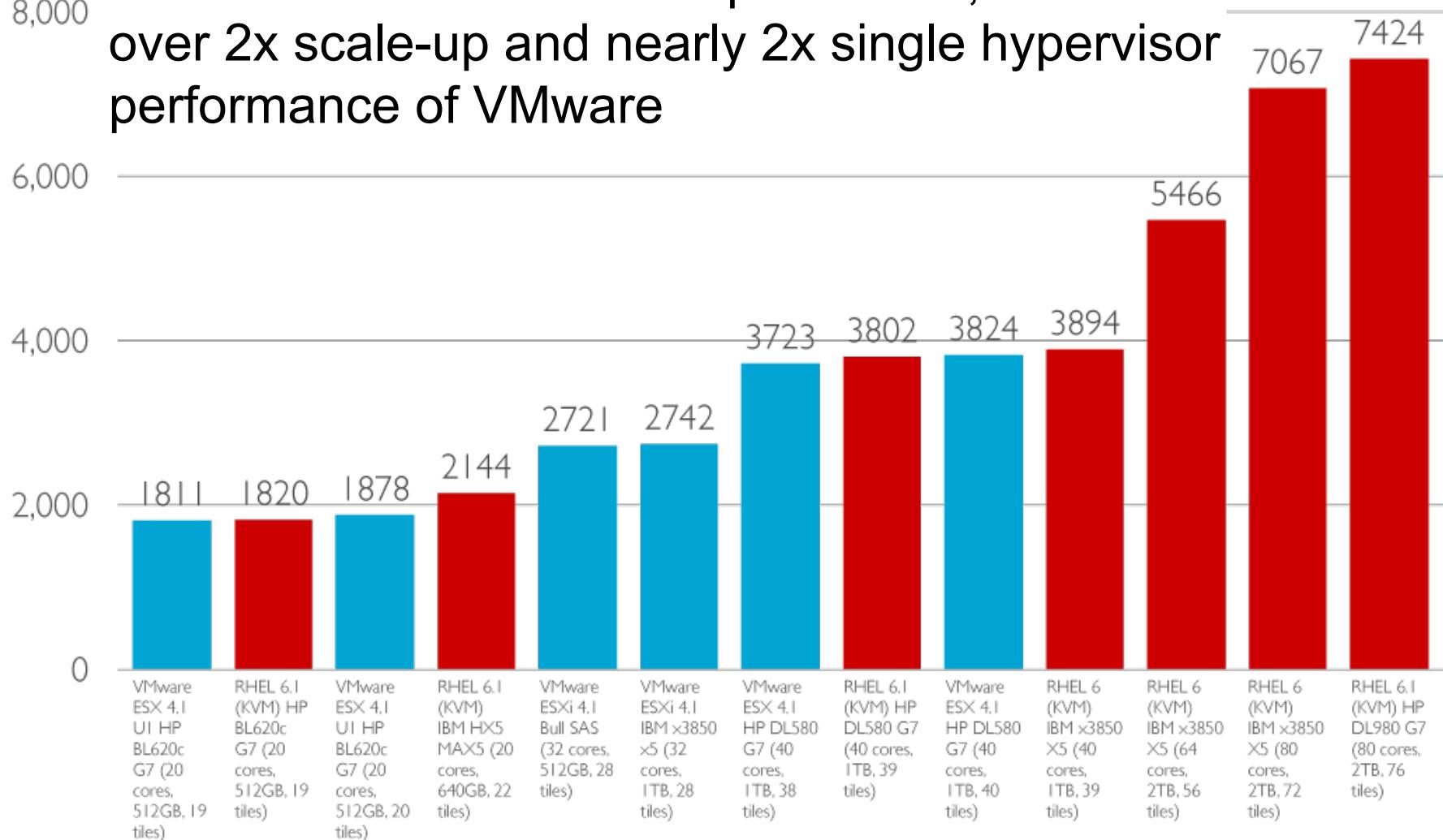


**RHEV HYPERVISOR**



# OUTSTANDING PERFORMANCE ON OPEN INDUSTRY BENCHMARKS

**SPECvirt:** RHEV claims top 4 results, delivers over 2x scale-up and nearly 2x single hypervisor performance of VMware

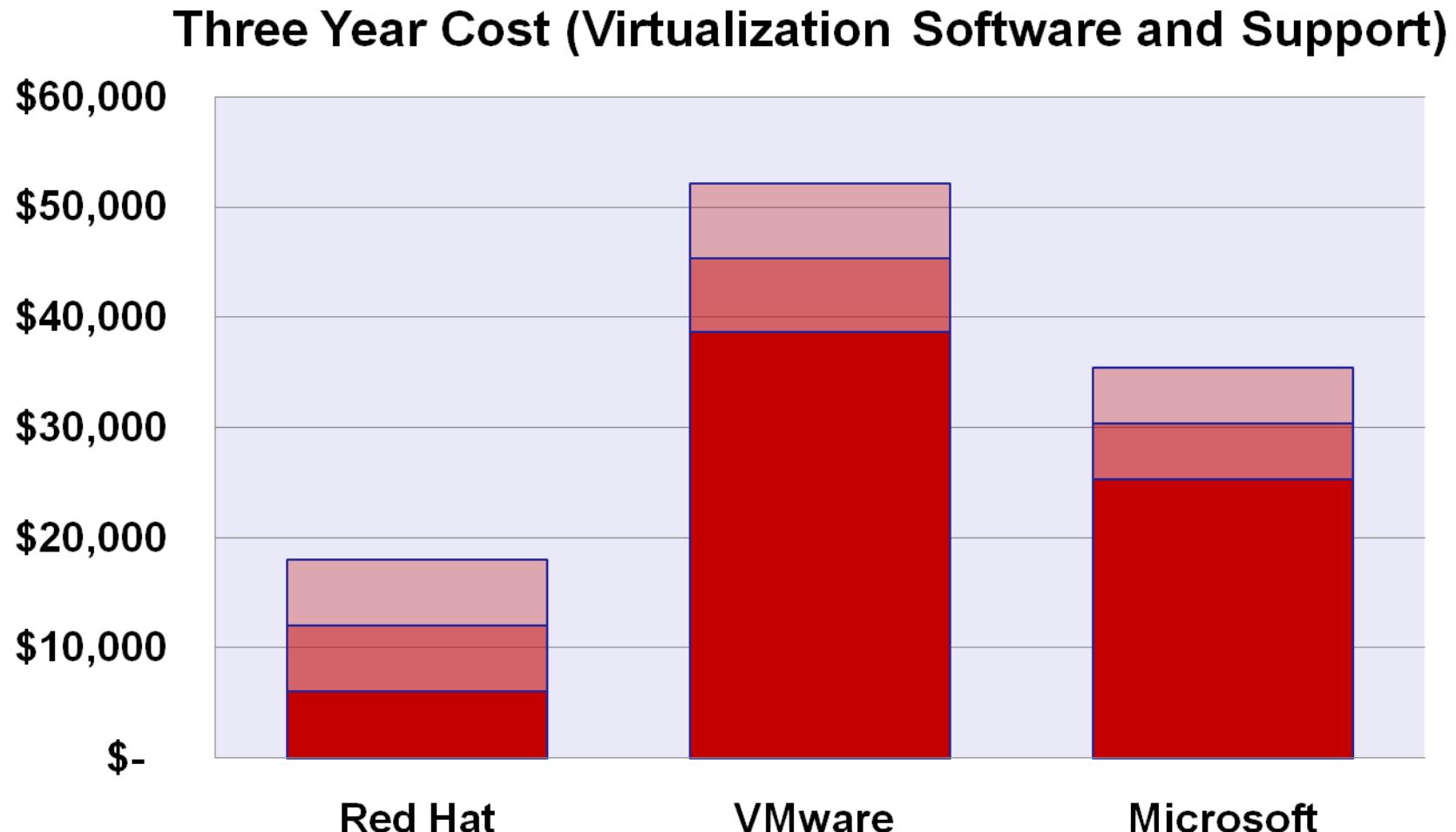


出典：[http://www.spec.org/virt\\_sc2010/results/specvirt\\_sc2010\\_perf.html](http://www.spec.org/virt_sc2010/results/specvirt_sc2010_perf.html)

2011.10



# VIRTUALIZATION BY SUBSCRIPTION



# WIRELESS COMPANY RESULTS

- Accelerated server provisioning to developer community with self-service portal while reducing demands on IT staff
- Significantly reduced their virtualization costs with Red Hat's subscription model pricing and resulting lower TCO
- Reduced OS licensing costs for virtual servers by concentrating all RHEL workloads to RHEV and all Window workloads to VMware
- Improved infrastructure productivity with increased VM density of 38% more VMs/host for RHEV versus VMware
- Server consolidation has resulted in higher ROI from better space utilization and savings on space and power



# HOW WILL RED HAT ENTERPRISE VIRTUALIZATION 3 ACCELERATE YOUR CLOUD STRATEGY?



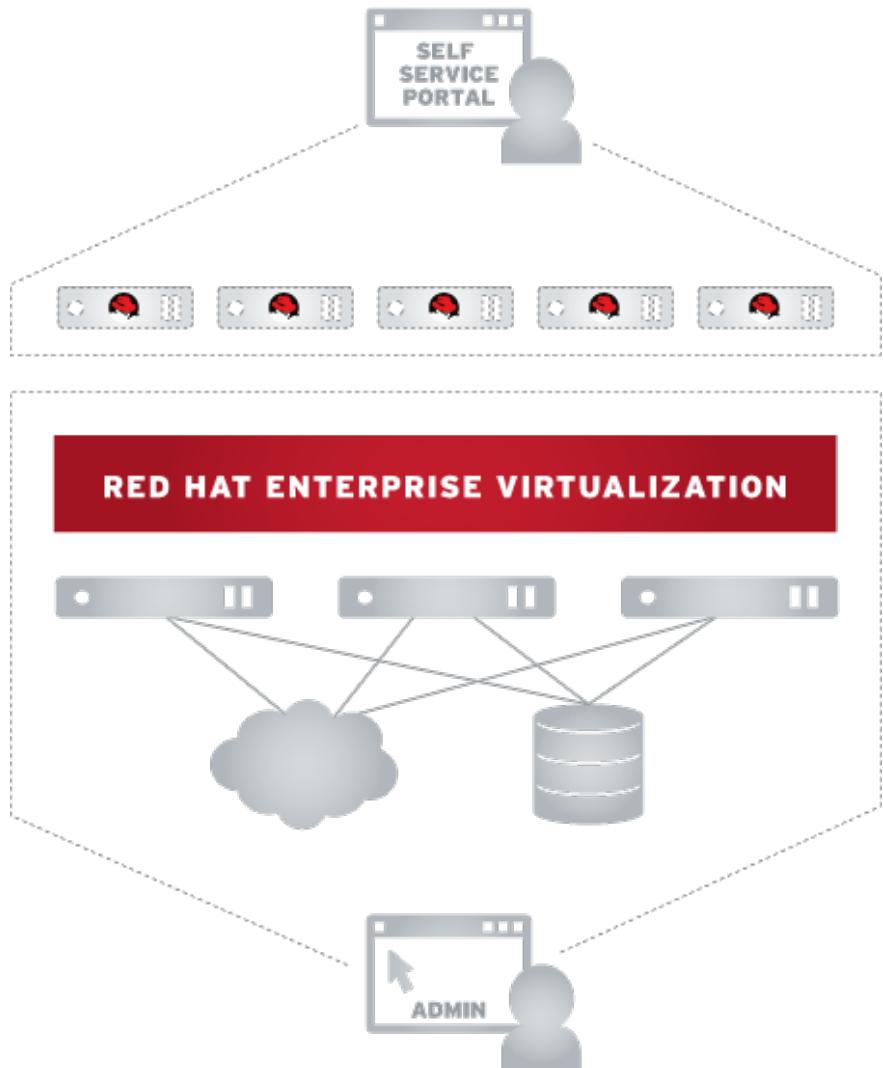
# RED HAT ENTERPRISE VIRTUALIZATION 3

- Currently in Beta
- Cloud-ready features for private cloud include
  - Power User Portal
  - Historical Database and Reporting Engine
  - REST API integration
- Integrated with CloudForms for multi-vendor private and hybrid clouds



# RED HAT ENTERPRISE VIRTUALIZATION

## RHEV 3.0 - SELF SERVICE PORTAL



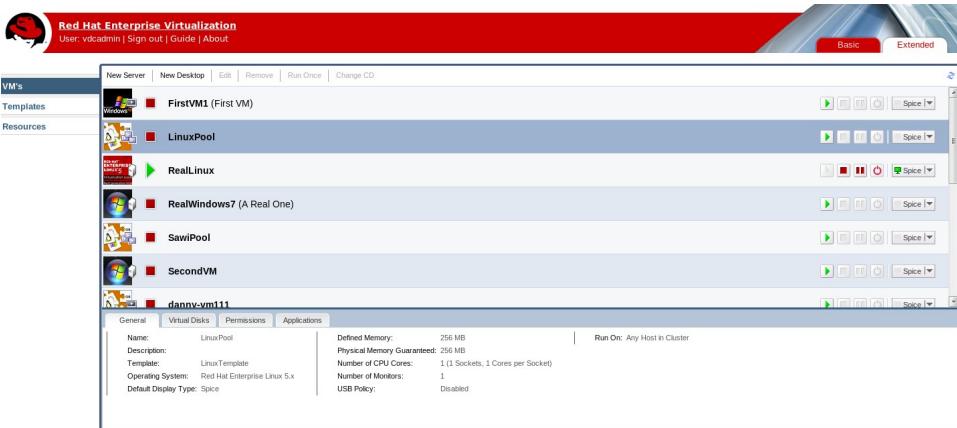
- ✓ Create, edit and remove virtual machines
- ✓ Manage virtual disks and network interfaces
- ✓ Assign user permissions to virtual machines
- ✓ Create and use templates to rapidly deploy virtual machines
- ✓ Monitor resource usage and high-severity events
- ✓ Create and use snapshots to restore virtual machines to a previous state



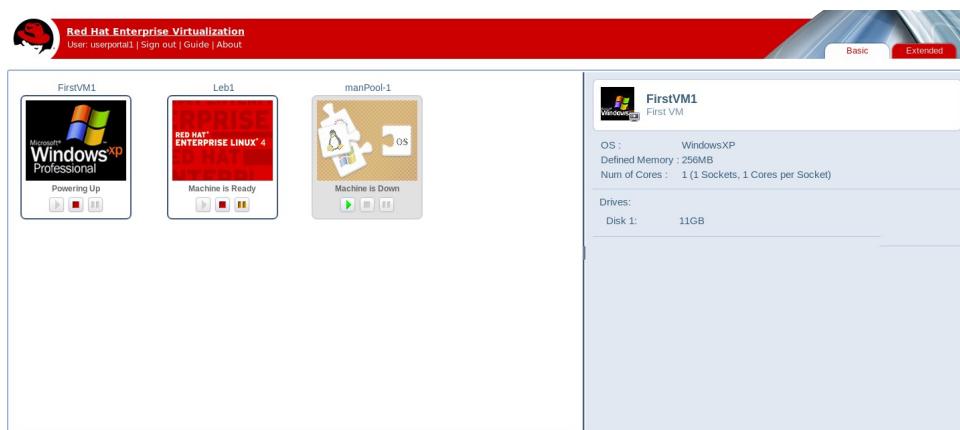
# RED HAT ENTERPRISE VIRTUALIZATION

## RHEV 3.0 - USER PORTAL

### User Portal - Advanced view



### User Portal - Basic View

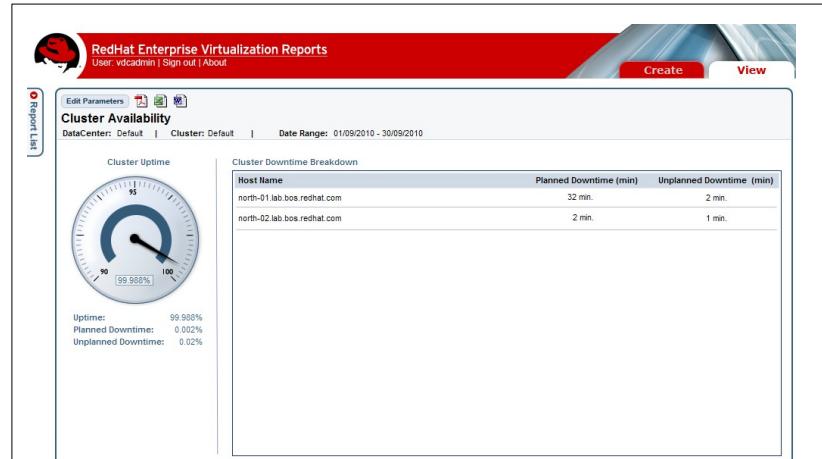


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# RED HAT ENTERPRISE VIRTUALIZATION

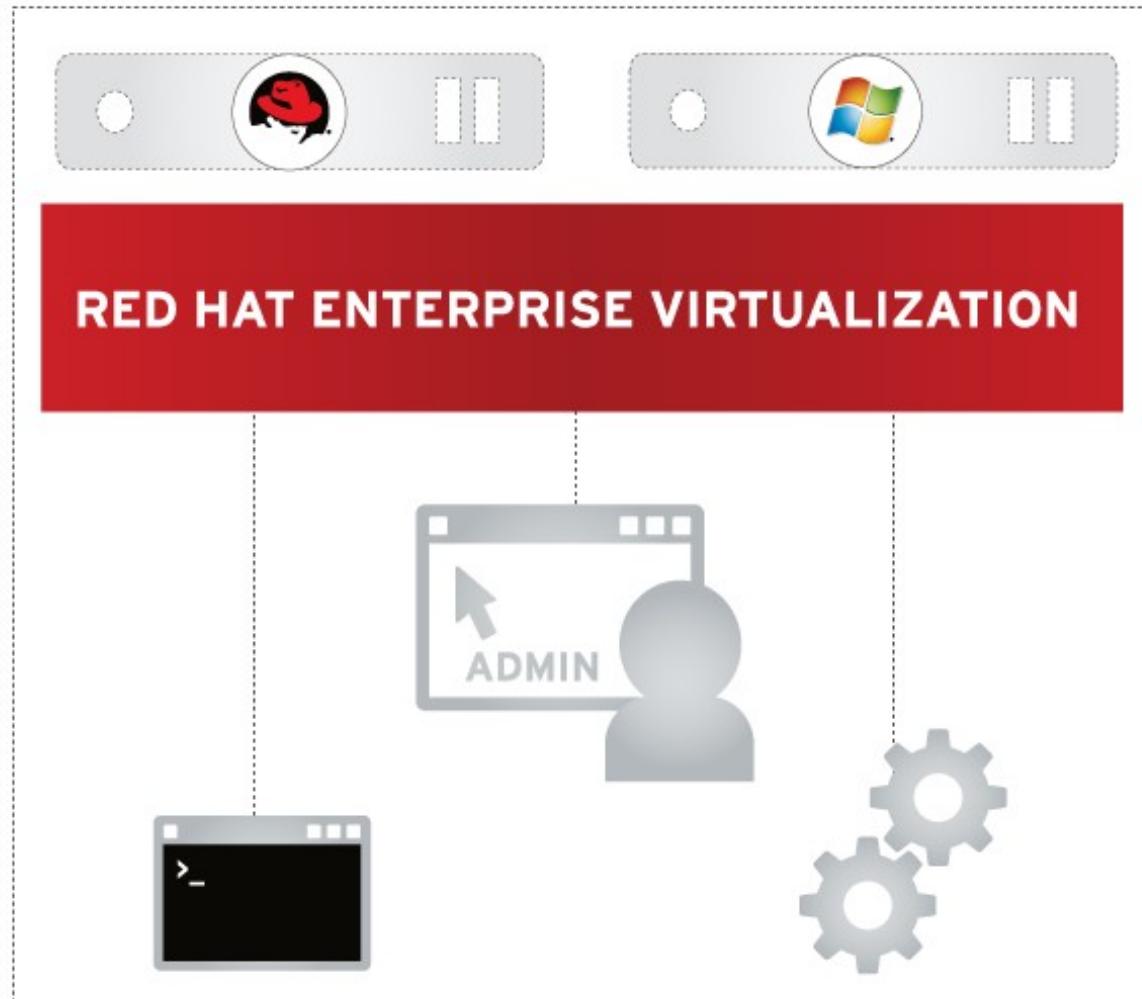
## RHEV 3.0 REPORTING

- Historical usage, trending, quality of service
- Integrated reporting engine based on Jasper reports
- Over 25 prebuilt reports and dashboards included
- Ability to create and customize reports and templates



# RED HAT ENTERPRISE VIRTUALIZATION 3.0

## INTEGRATION & AUTOMATION



- **Integration**
  - New RESTful API for integration with RHEV Manager
  - Super set of RHEV management functionality
- **Automation**
  - Linux command line interface for scripting and automation
  - Developed in upstream RHEV-M API project

# RELY ON RED HAT TO BUILD YOUR SECURE AND COST EFFECTIVE CLOUD TODAY

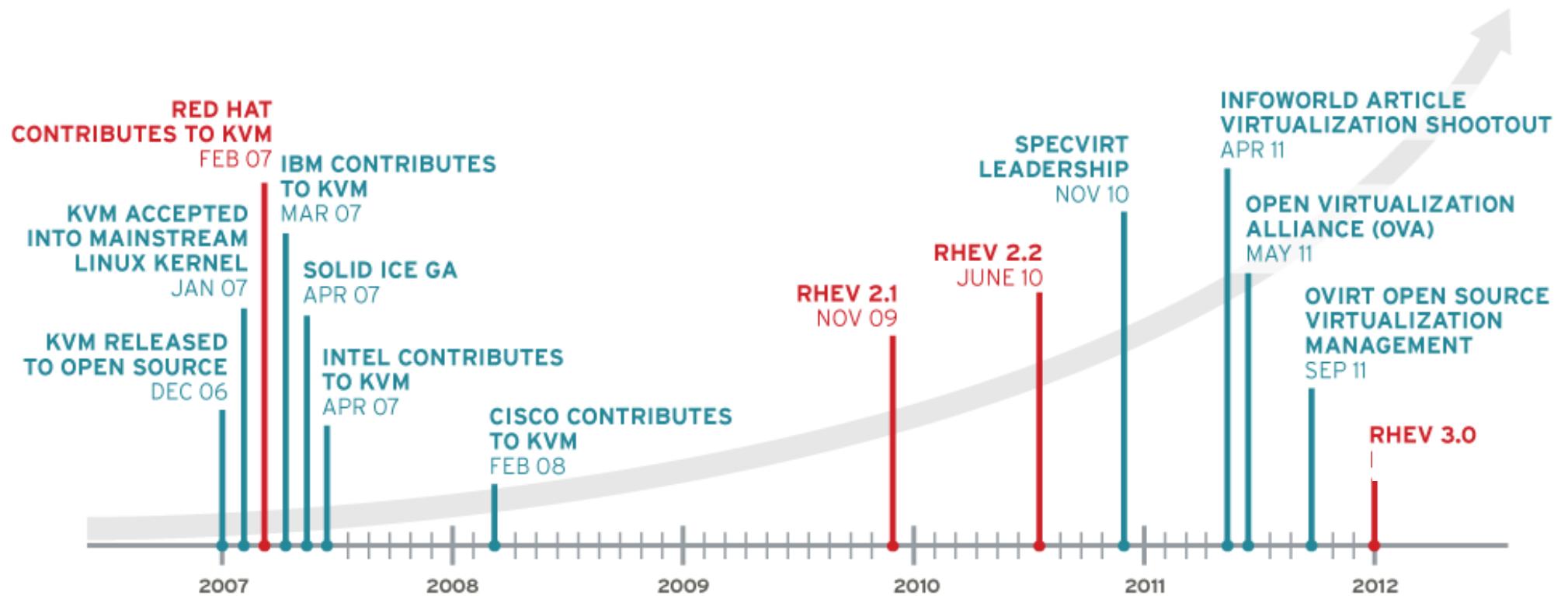
- SELinux and sVirt provide cloud-ready security
  - Built for multi-tenancy, multi-cloud environments
  - Integrated into KVM, Linux kernel
- Red Hat Enterprise Virtualization subscription model
  - Reduce your acquisition costs – do more today
  - Accelerate ROI and break-even – do the next project sooner
- RHEV 3 features enhance cloud capabilities
  - Self service, integration, and reporting features built in
  - Integrate with CloudForms for multi-hypervisor cloud use cases



# HOW WILL OPEN SOURCE ACCELERATE THE EVOLUTION OF THE CLOUD?



# OPEN SOURCE VIRTUALIZATION TIMELINE





- Open source virtualization community project
  - Deliver an open virtualization management platform
  - Hypervisor, Management engine, GUI and API
- <http://www.ovirt.org>



# OPEN VIRTUALIZATION ALLIANCE

- Fostering KVM adoption and interoperability
- <http://www.openvirtualizationalliance.org>



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# RED HAT IC & DOD ACTIVITIES



# Misc IC Activities

- OpenSCAP
- Common Criteria for Virtualization
- scap-security-guide project
- USGCB
- Others?

