

# IC Cloud Users Group

## Meeting #1

## Thurs 3-NOV-2011



**BUILD YOUR OPEN CLOUD TODAY**

Presented by  **redhat.**

# 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

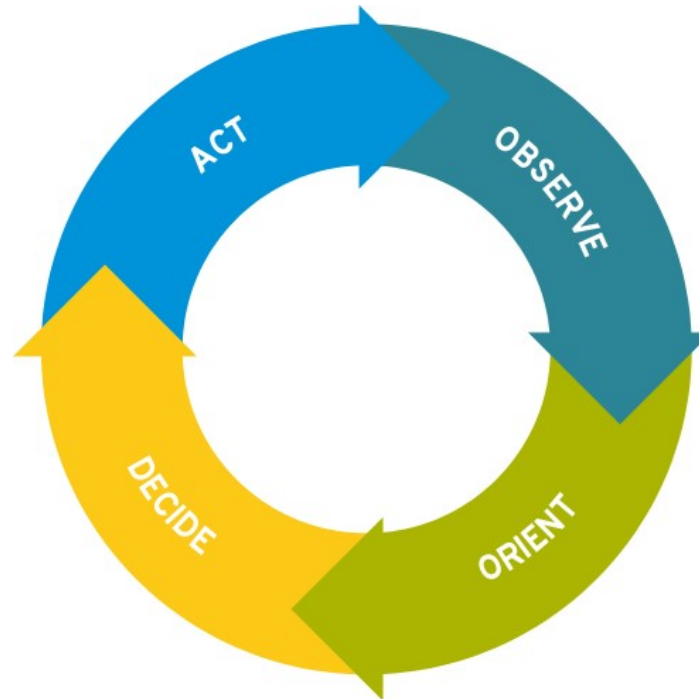
- Technology Evolution (Xen-->KVM)
- sVirt & MLS Cloud
- libvirt, VDSM, REST APIs
- Performance





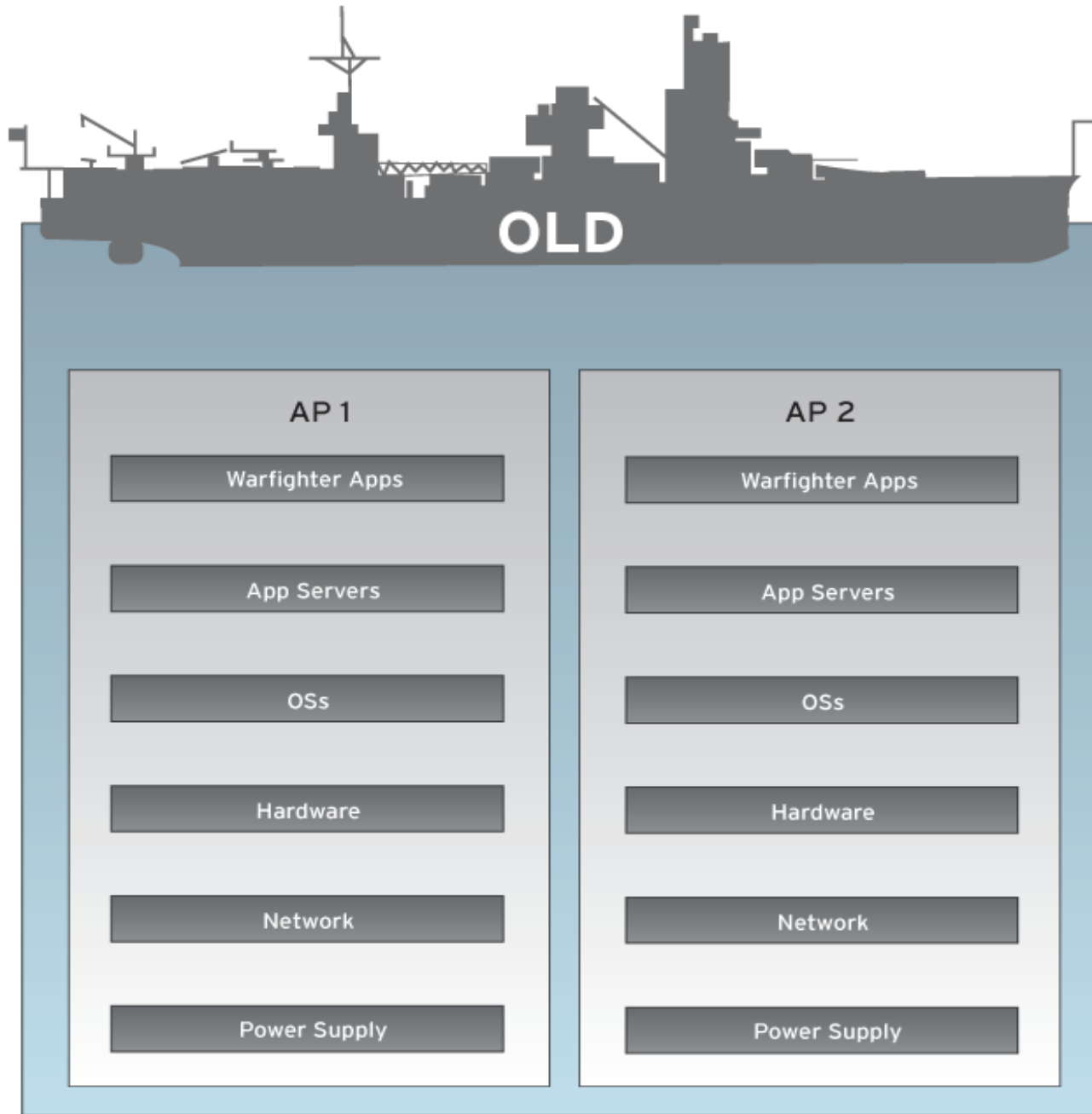
## Col. John Boyd, USAF

- 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.

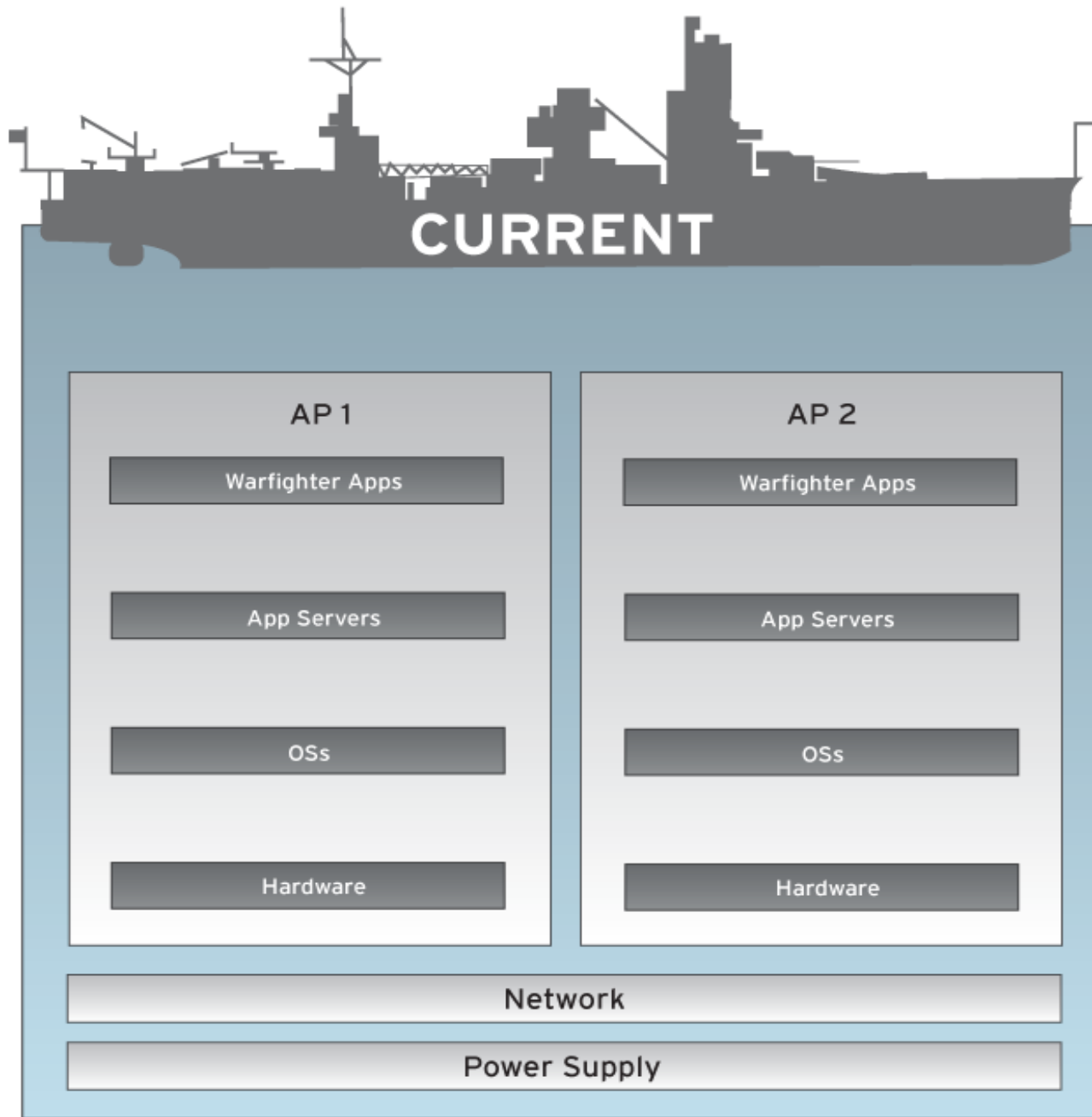


# US Navy's standardization mission







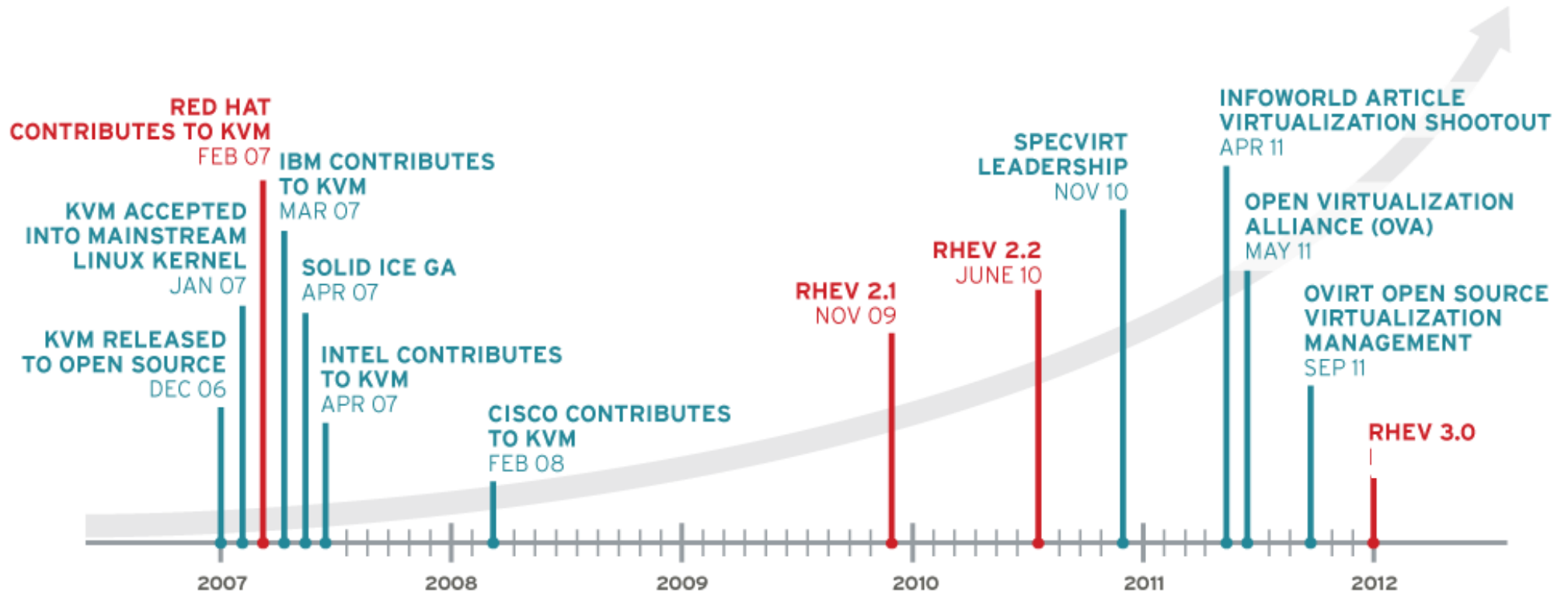


# Virtualization Decision: Xen vs KVM

- 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

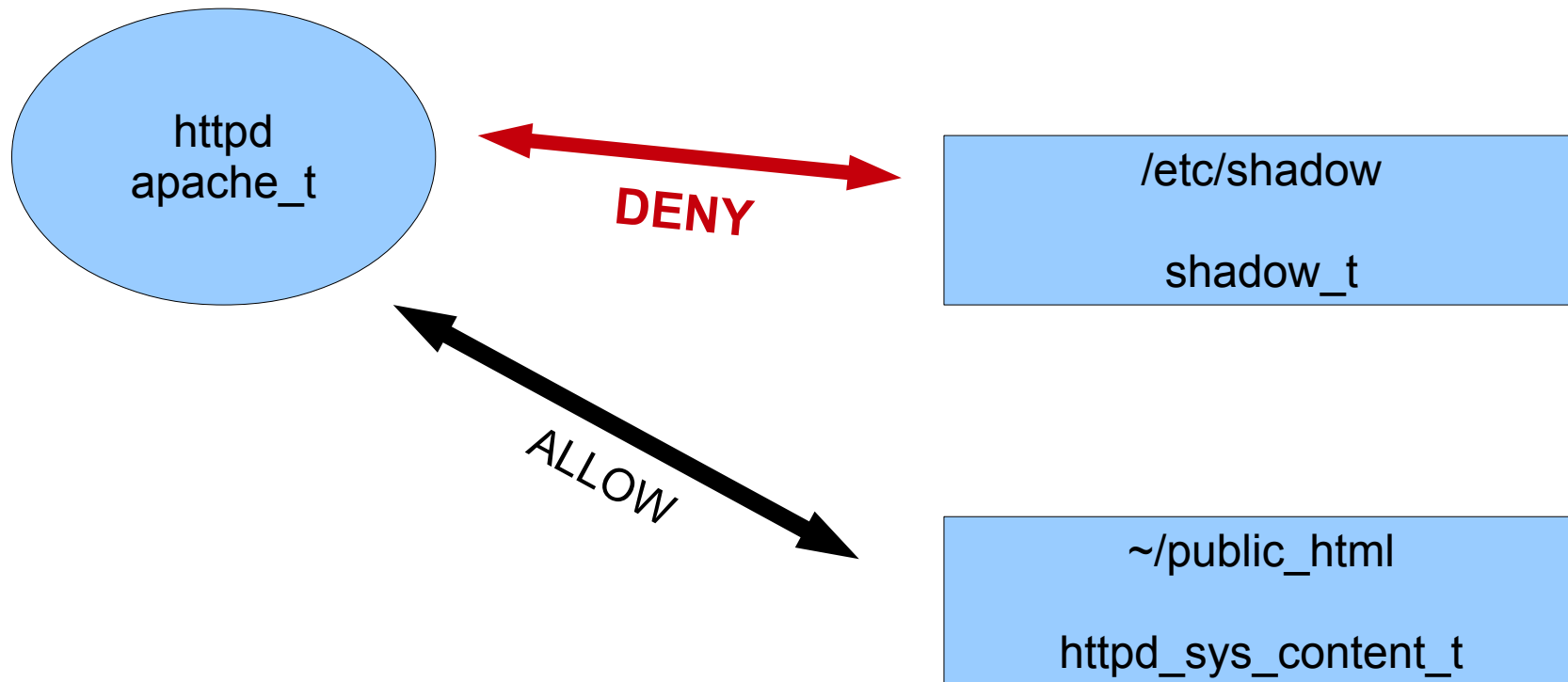


# KVM Timeline



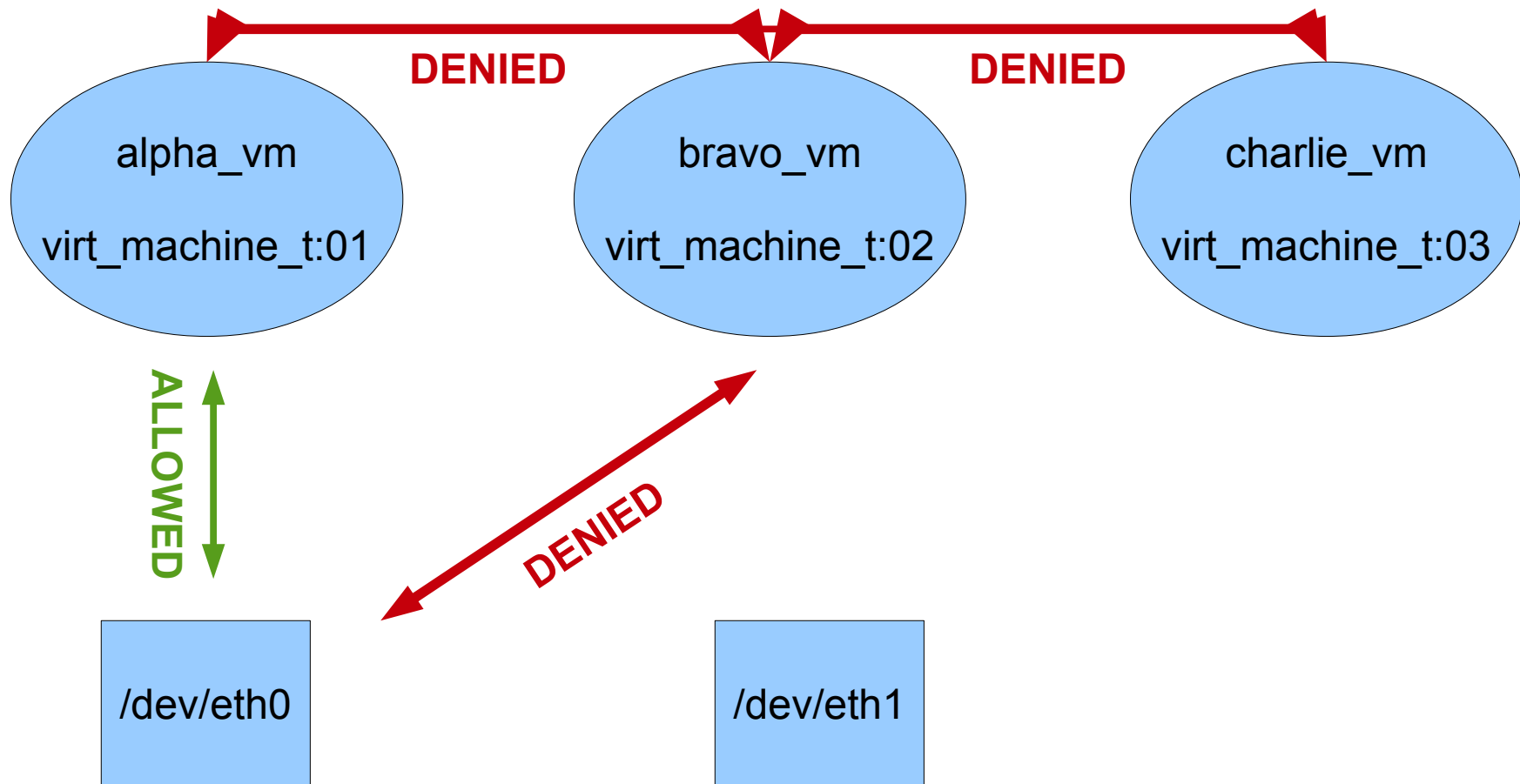
# Virtualization in a Shared Environment: sVirt

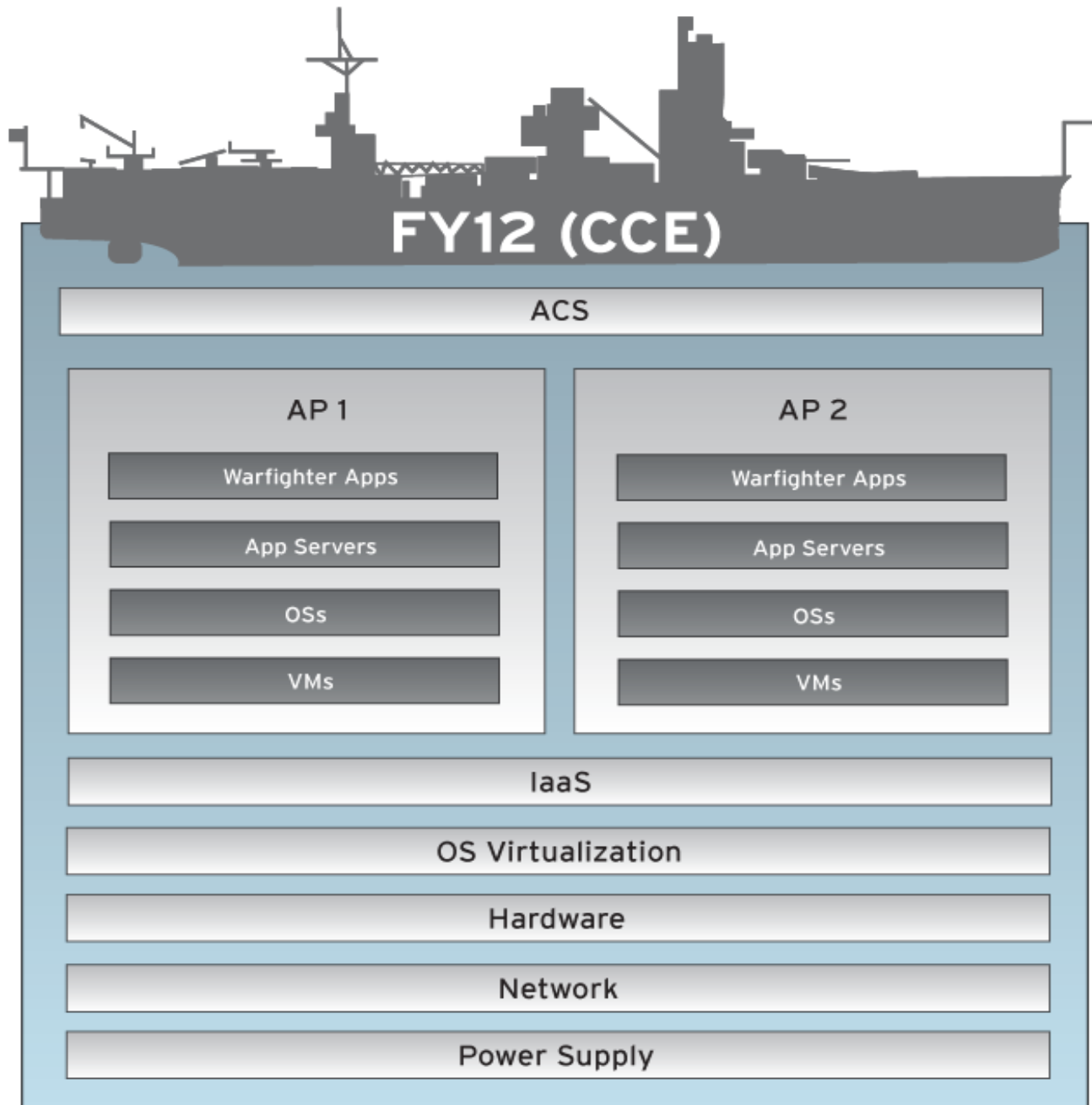
- Applies security label to all “files” on the system
  - In actuality, applies it to the inode metadata through a field called “secmark”



# Virtualization in a Shared Environment: sVirt

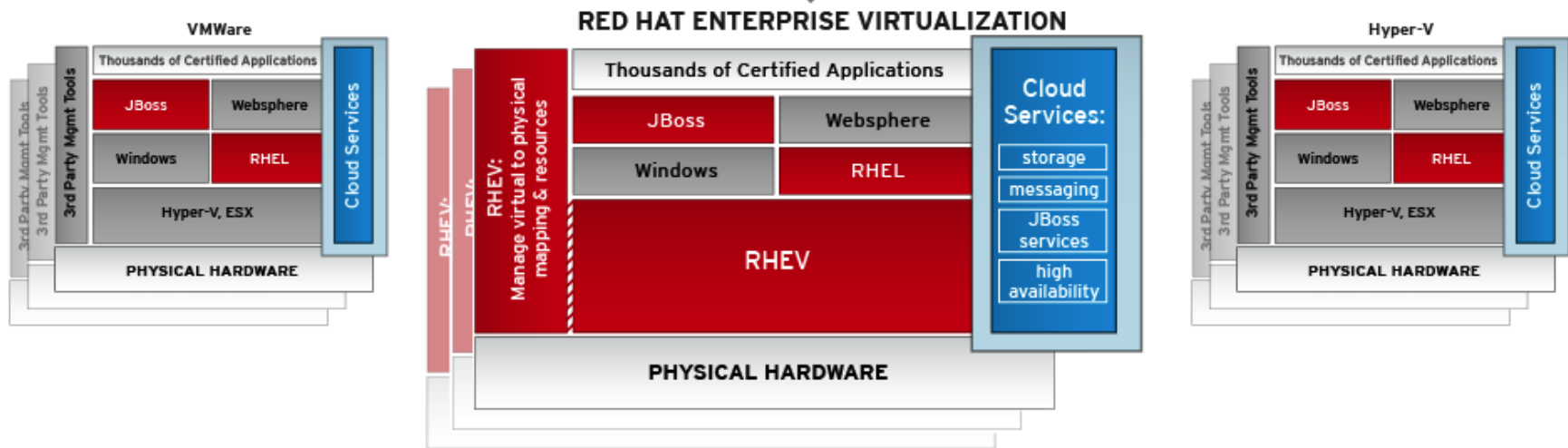
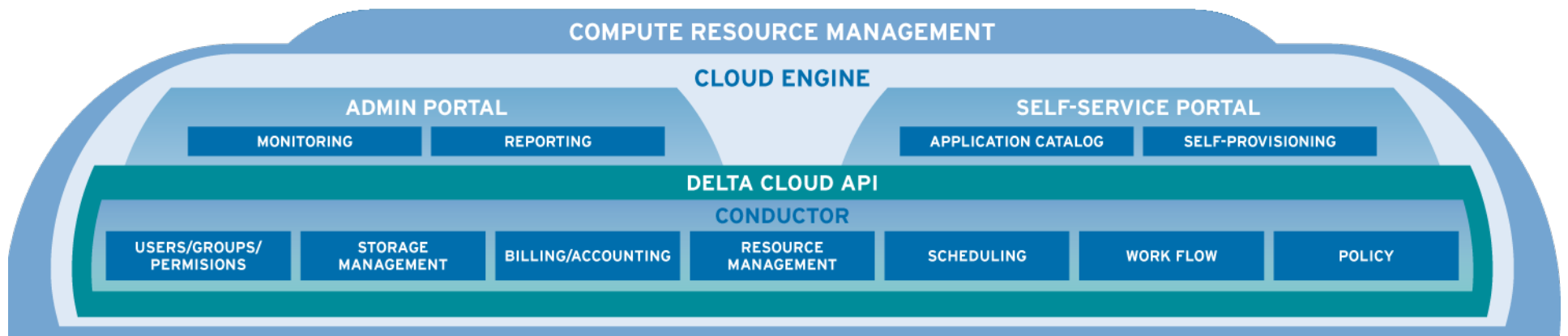
- sVirt applies SELinux framework to Virtual Machines



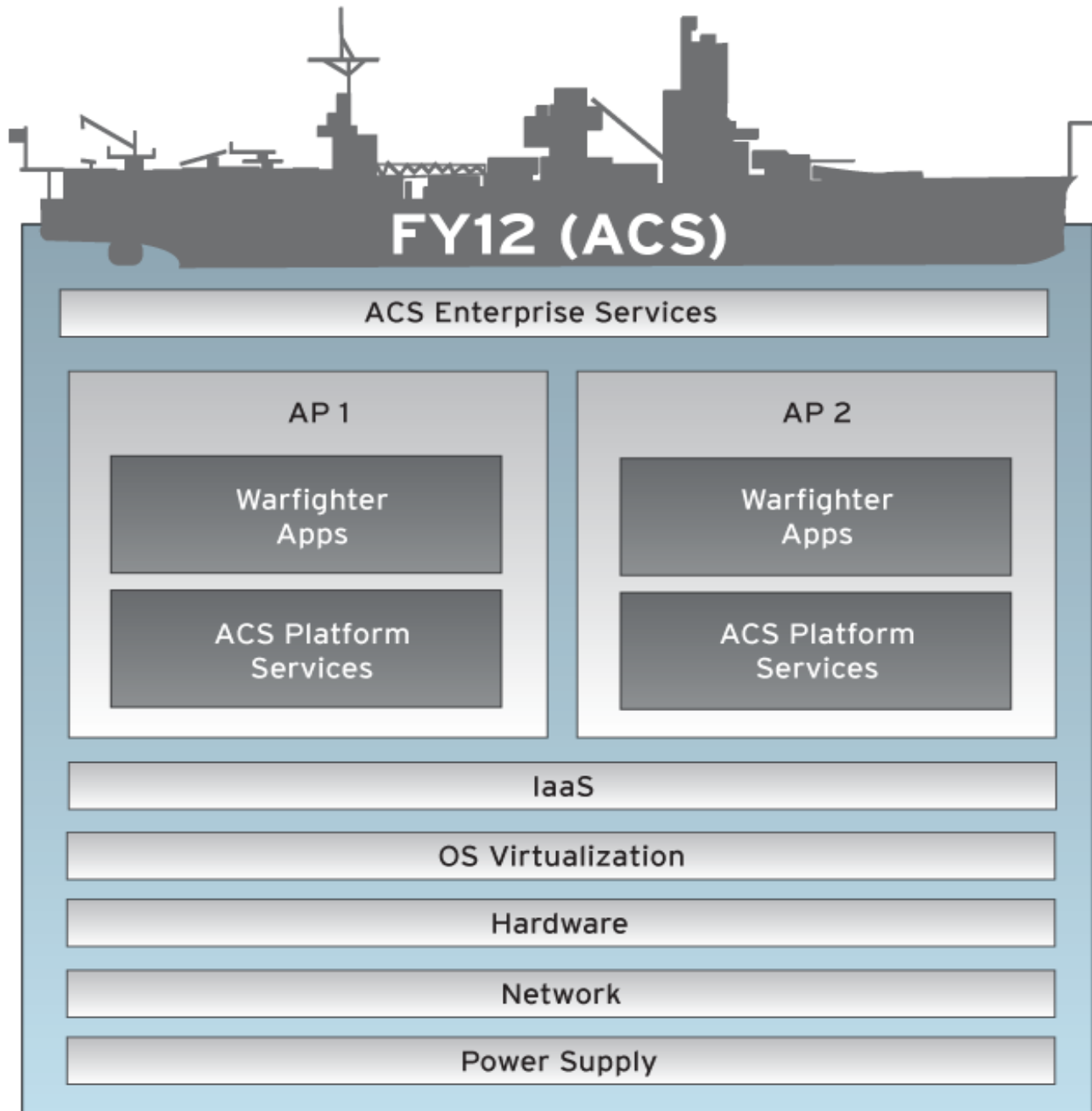


OS VIRTUALIZATION	IAAS
Provides extensive vendor tooling	Automates and removes lockin of vendor tooling
Enables live migration of VMs	Automates live migration of VMs
Allows admins to handle resource over-utilization	Automates handling resource over-utilization
Requires install and configuration of vendor 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





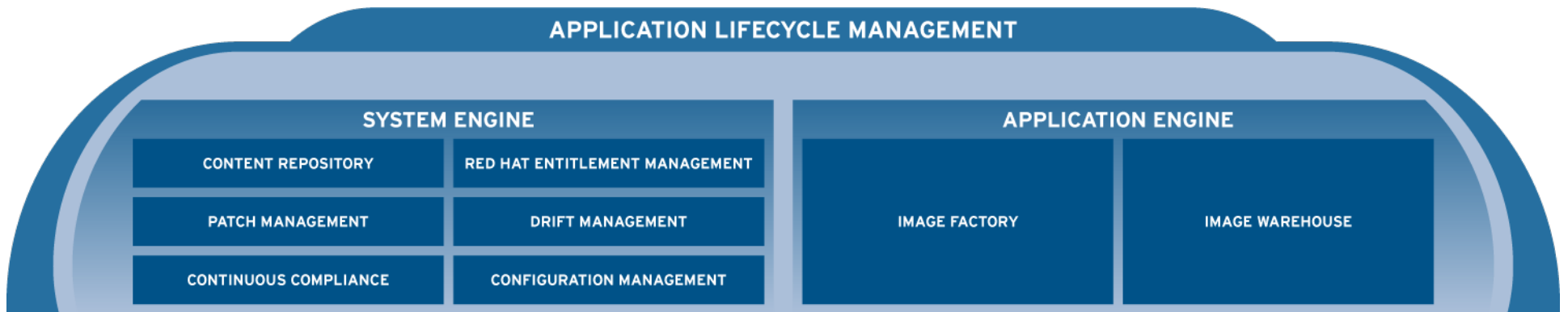




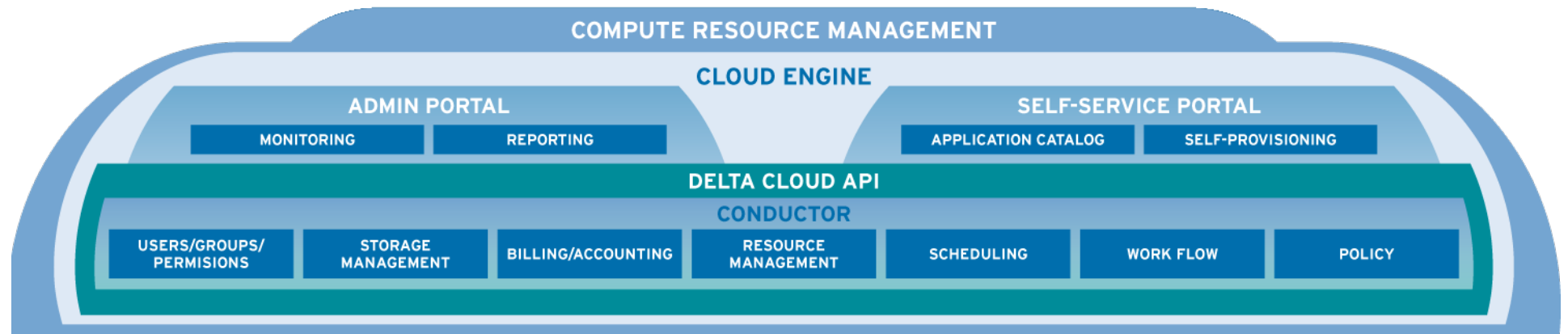
PLATFORM SERVICES	PAAS
App providers build to vendor products	App providers build to DoD standard
Changing middleware vendor requires work from all app providers	Changing middleware vendor is invisible to all app providers
Static scaling	Dynamic scaling
Makes it easier for app providers to build C&A'd 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



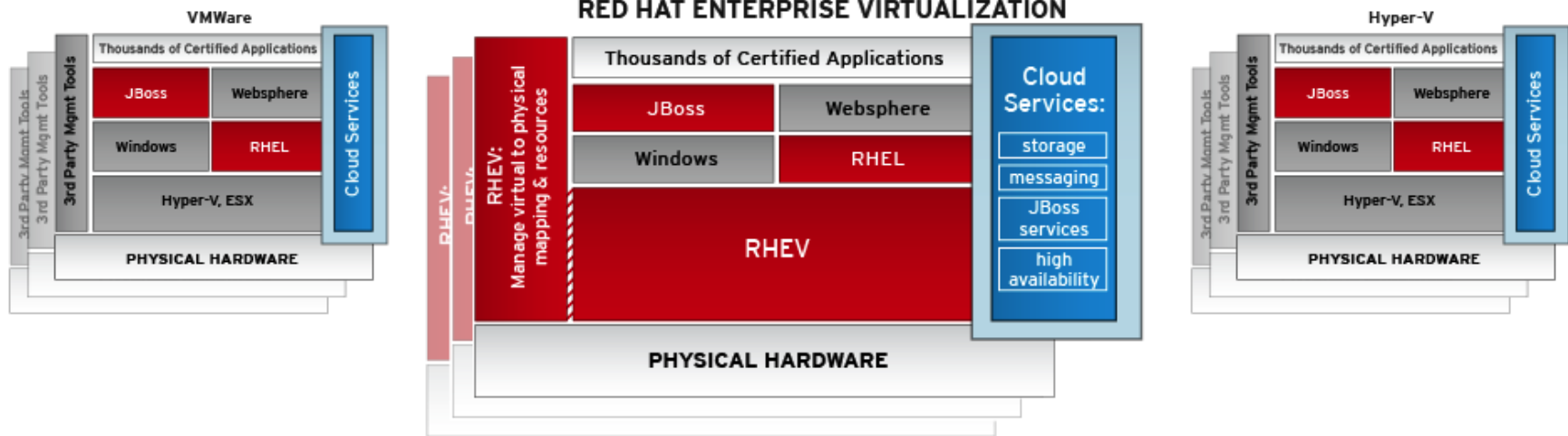
# APPLICATION LIFECYCLE MANAGEMENT



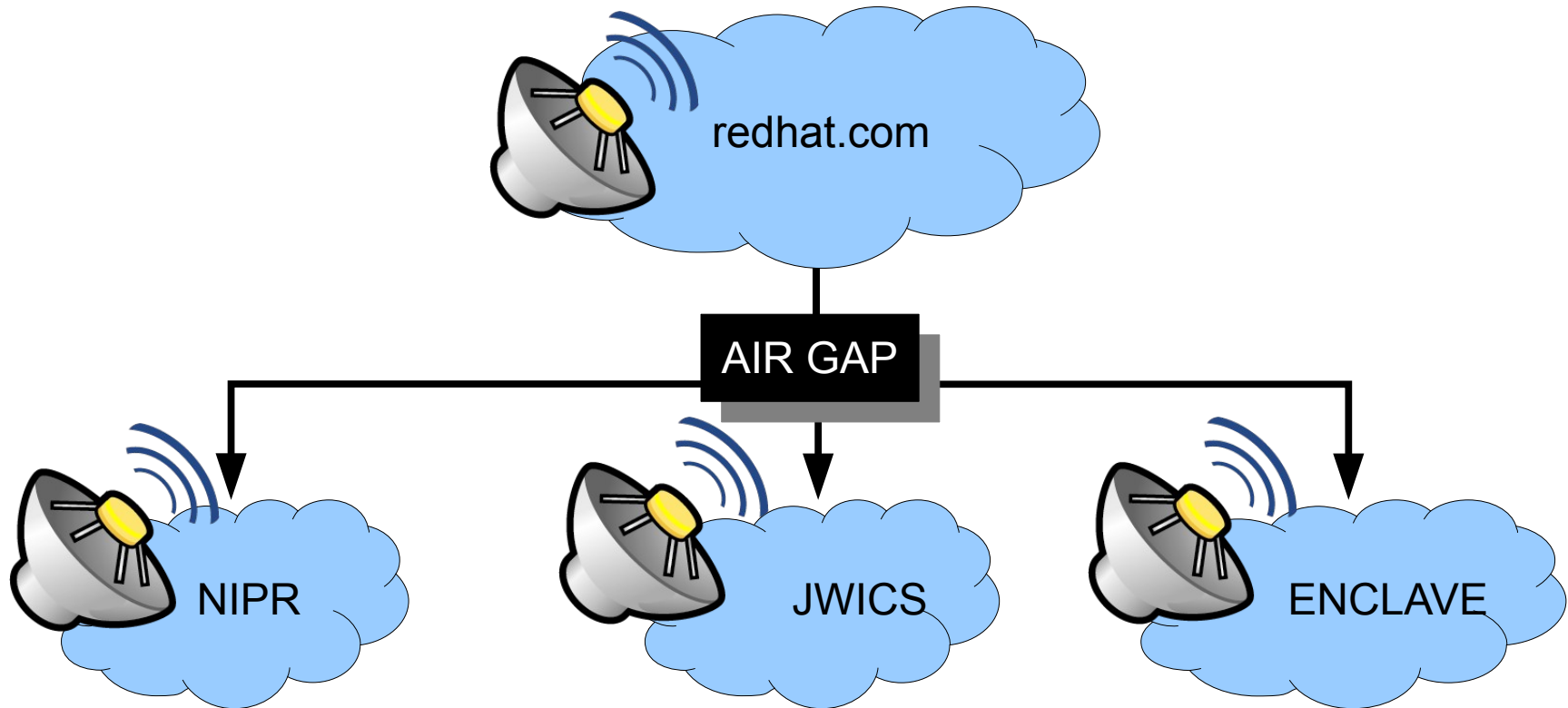
# COMPUTE RESOURCE MANAGEMENT



# RED HAT ENTERPRISE VIRTUALIZATION



# RHN Satellite



# RHN Satellite

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



**System Management**

```
$SATELLITE = XMLRPC::Lite->new( uri => "https://xmlrpc.rhn.redhat.com/rpc/api" );
```

```
$username = "username";
```

```
$password = "password";
```

```
$channel = XMLRPC::Lite->new( uri => "https://xmlrpc.rhn.redhat.com/rpc/api" );
```

```
my $RPC = XMLRPC::Lite->new( uri => "https://xmlrpc.rhn.redhat.com/rpc/api" );
```

```
my $sessionkey = $RPC->call( 'login', $username, $password )->result;
```

```
my $entitlements = $RPC->call( 'channel_software_available', $channel, $sessionkey,
```

```
    "channel.software.available", $channel );
```

```
    $sessionkey,
```

```
    $channel->label,
```

```
    $channel );
```

```
print "Entitlements available for channel: $channel->label\n";
```

```
$RPC->call( 'auth.logout', $sessionkey );
```

```
print "\n\n\n";
```



**Software and Configuration Management**



**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**

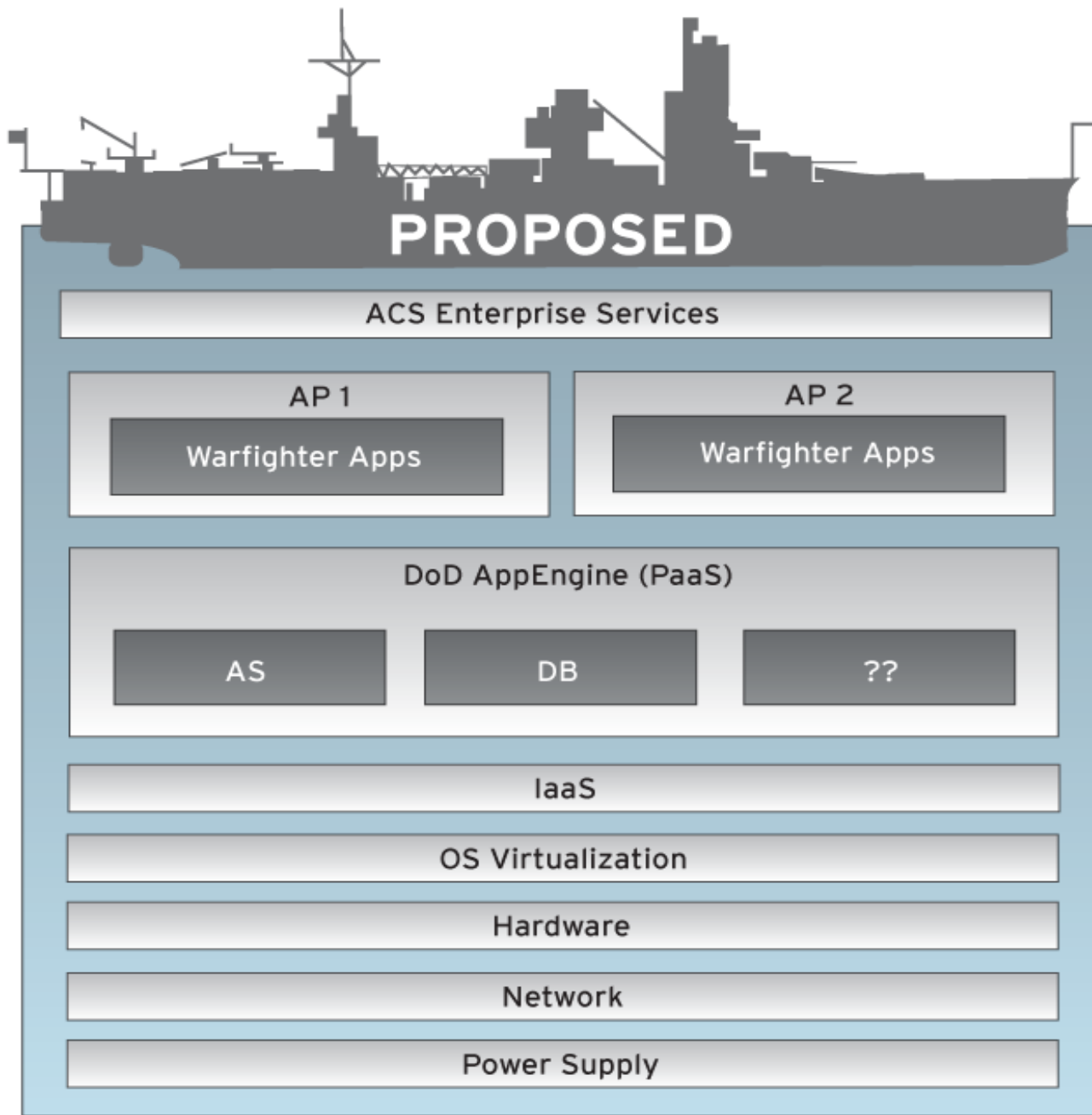


**Improve consistency by using RHN to manage and deploy configuration files**

**Undo problematic changes with snapshots and rollback**



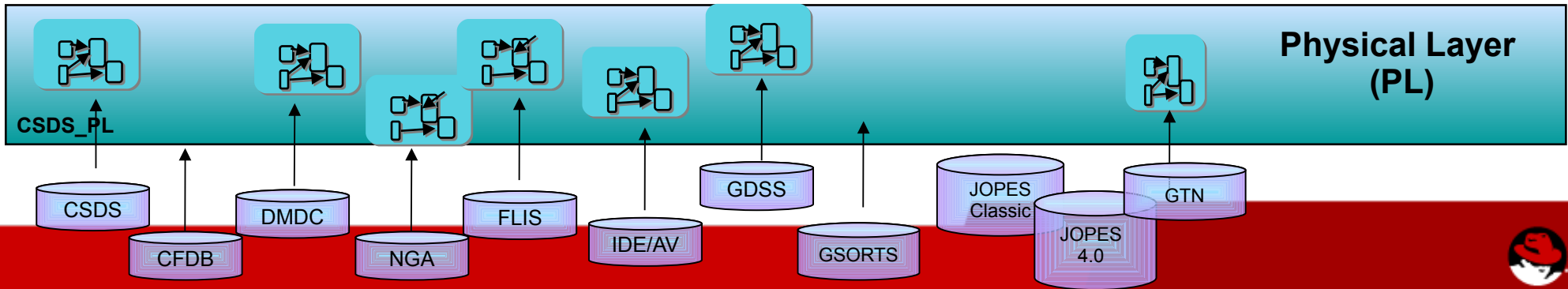


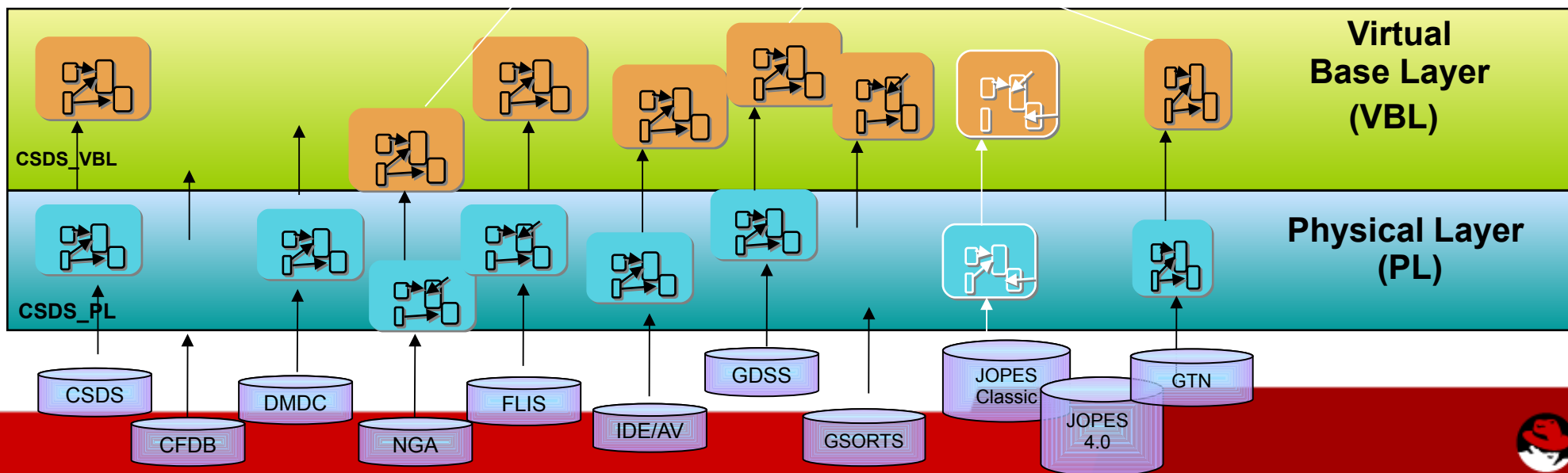


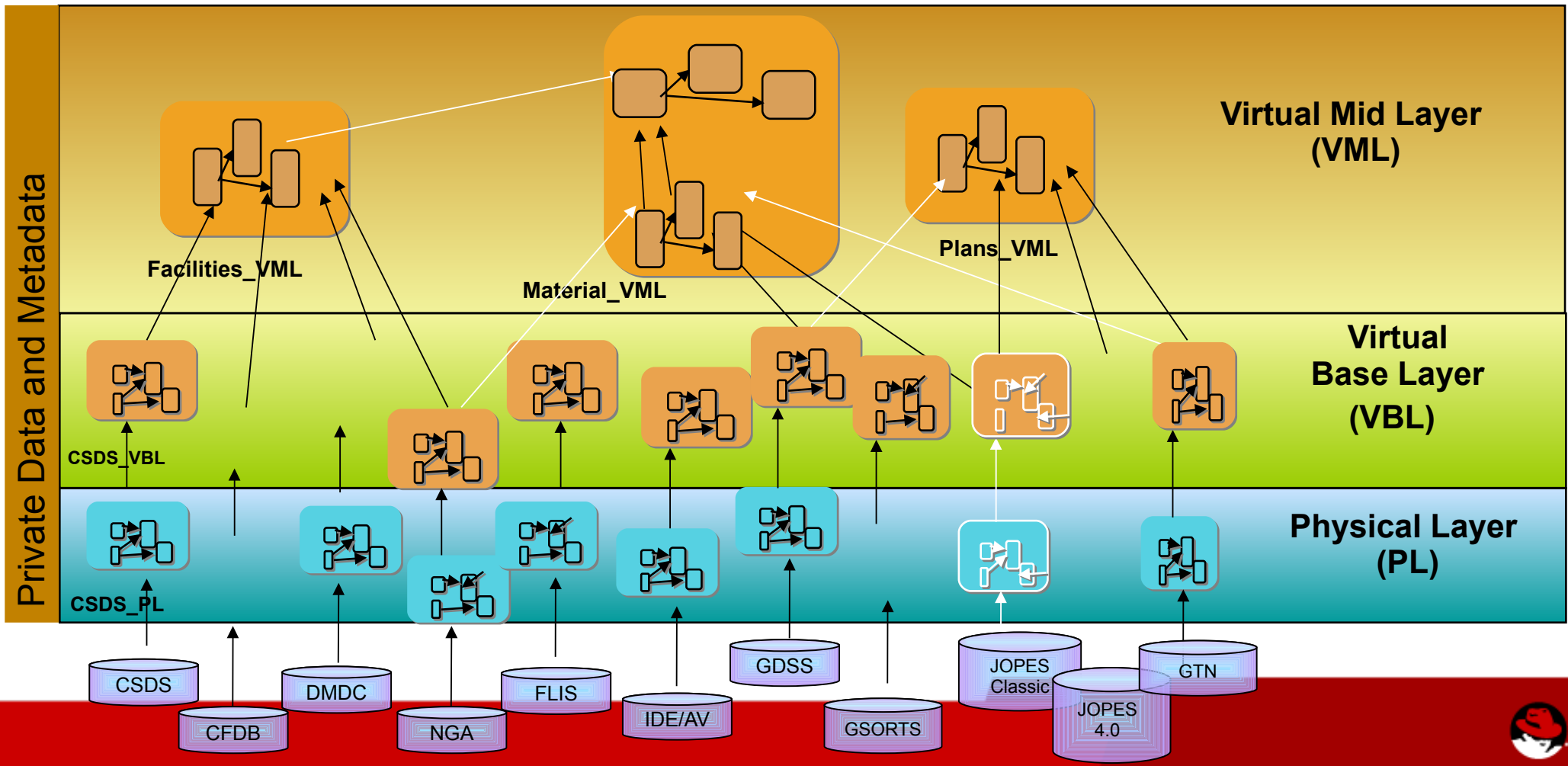
↑  
Increased common infrastructure provided to APs

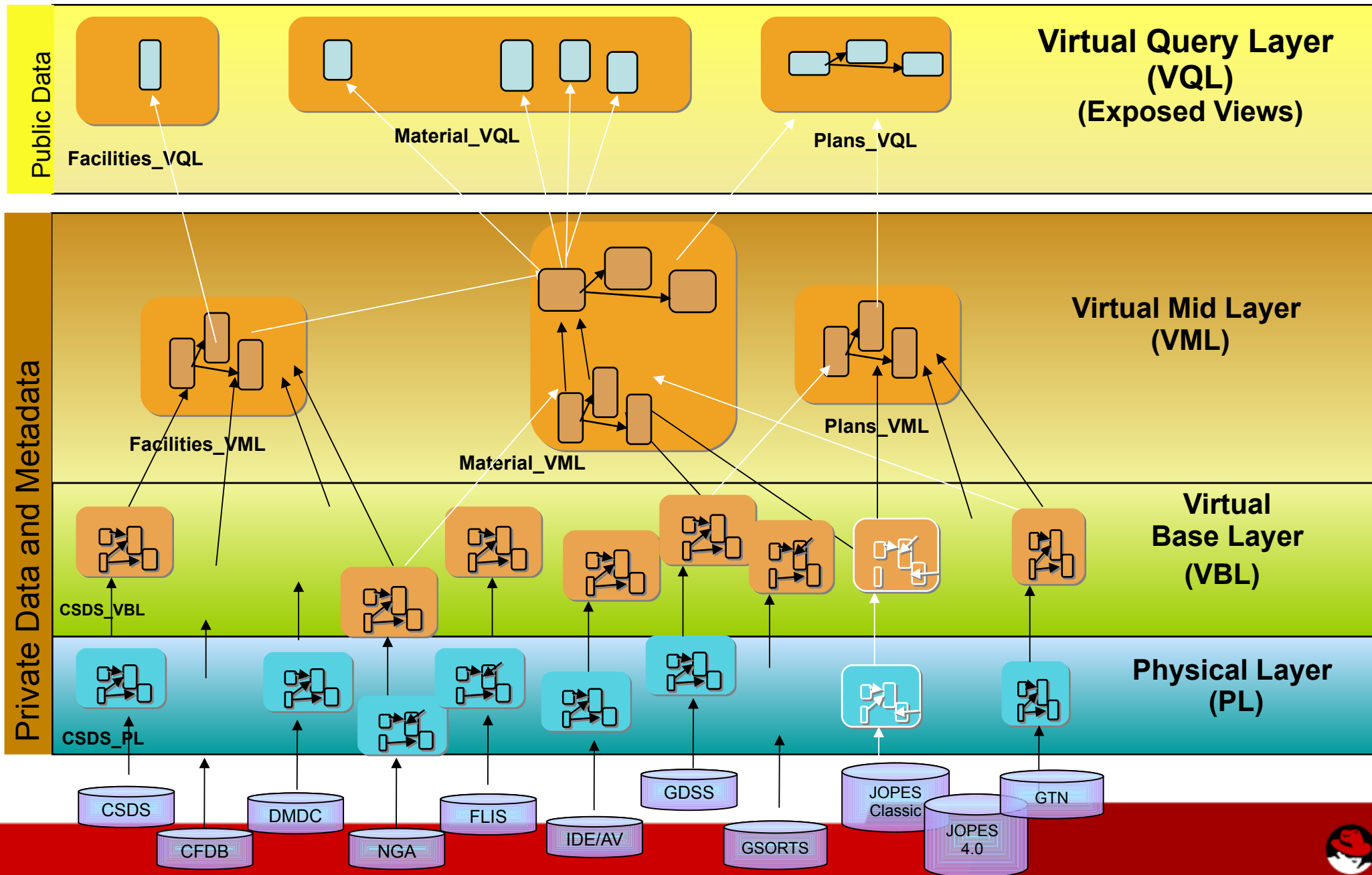
↓  
Decrease effort to provide warfighter applications











# 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)



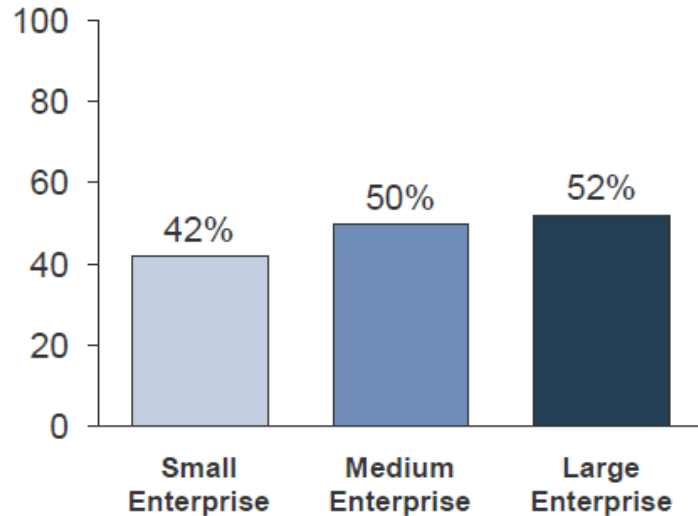
# WHAT IS HAPPENING NOW IN VIRTUALIZATION?





# CUSTOMERS APPROACHING 50% VIRTUALIZATION

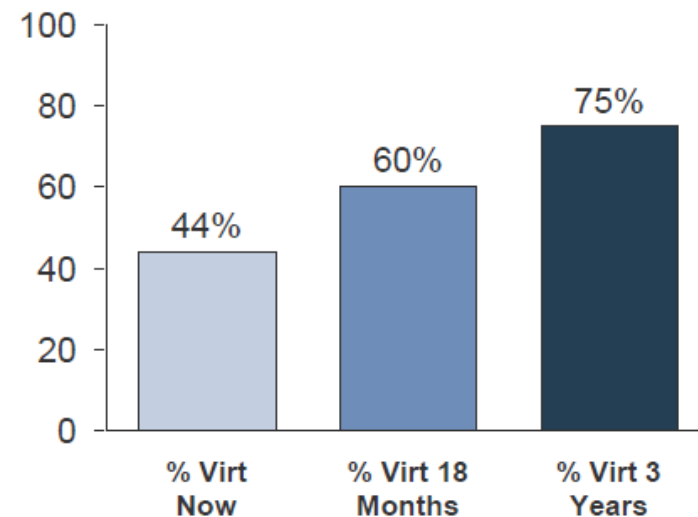
## Server Virtualization by Company Size\*



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

ENTERPRISE VIRTUALIZATION  
Logged in user: rhevadmin | Sign out | Configure | About | Guide

Search: Host: [x] [GO]

Expand All Collapse All

Tree: System, Default, Storage, ISO, Data, Clusters, Default, Hosts, alpha, beta

Tags

Data Centers Clusters Hosts Storage Virtual Machines Pools Templates Users Even Monitor

New Edit Remove Activate Maintenance Approve Configure Local Storage Power Management Assign tags << Prev Next >>

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.lab	Default	Up	0 VMs	3%	0%	0%	None

APP APP APP APP APP

**RED HAT ENTERPRISE VIRTUALIZATION**

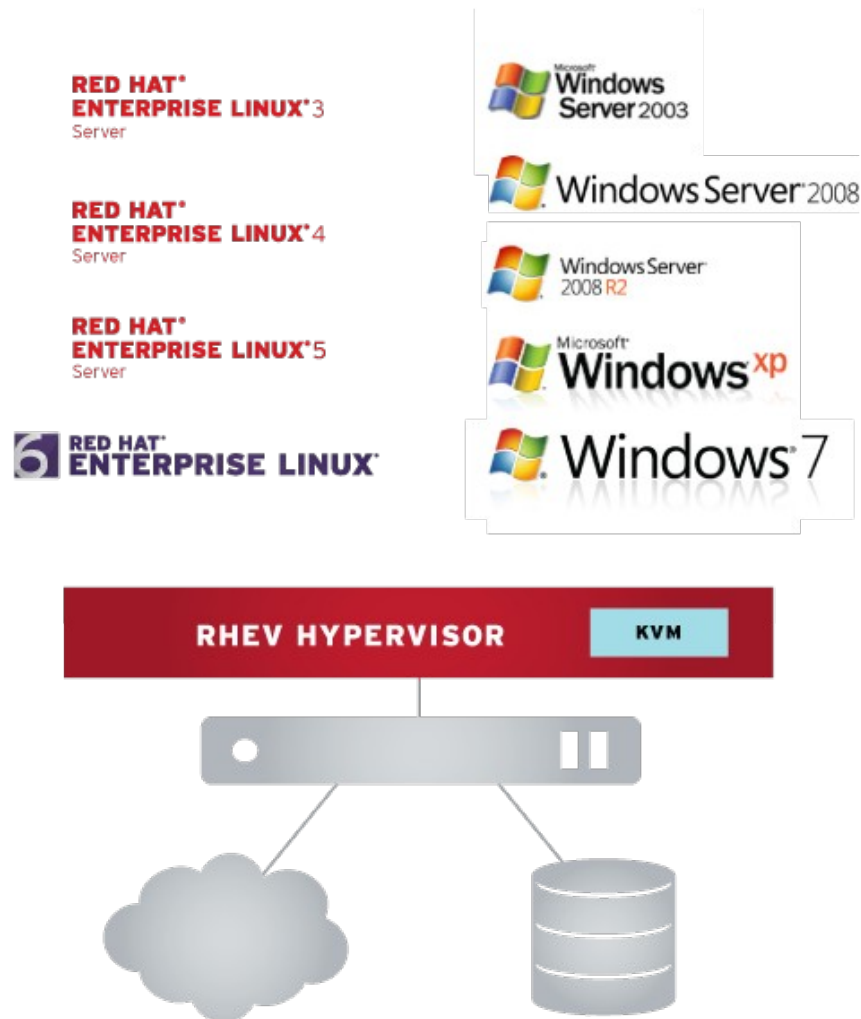


- Enterprise grade, centralized management and hypervisor for server and desktop virtualization
- Industry leading performance, scalability and security infrastructure
- Ecosystem of thousands of hardware and software vendors
- 50–70% lower cost compared to other solutions



# 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 RHEV Manager interface with a search bar for 'Host:' and a table of hosts. The table has columns for Name, Host/IP, Cluster, Status, Load, Memory, CPU, Network, and Spm Status. Below the table, there are five application icons labeled 'APP' and a diagram showing three hosts connected to a cloud and a database.

Name	Host/IP	Cluster	Status	Load	Memory	CPU	Network	Spm Status
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.lab	Default	Up	0 VMs	3%	0%	0%	None

**RED HAT ENTERPRISE VIRTUALIZATION**

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

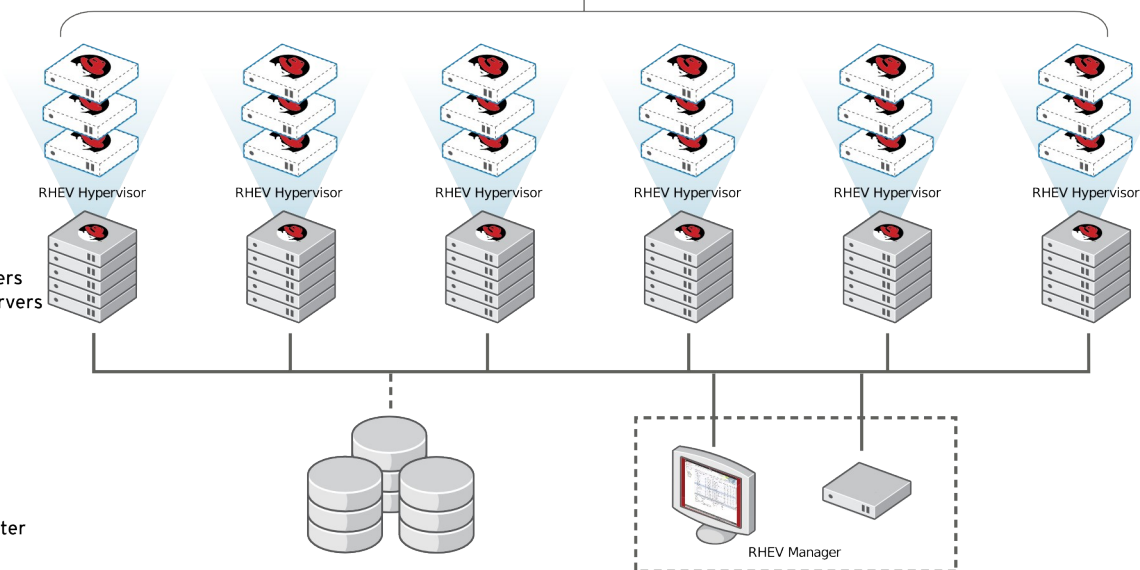
- Over 400 RHEL VMs  
distributed into 6 clusters

#### 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

**AutoLinux**  
create, renew, destroy Linux hosts.

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  [Help](#)

# CPUs

Memory

Disk Space

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)



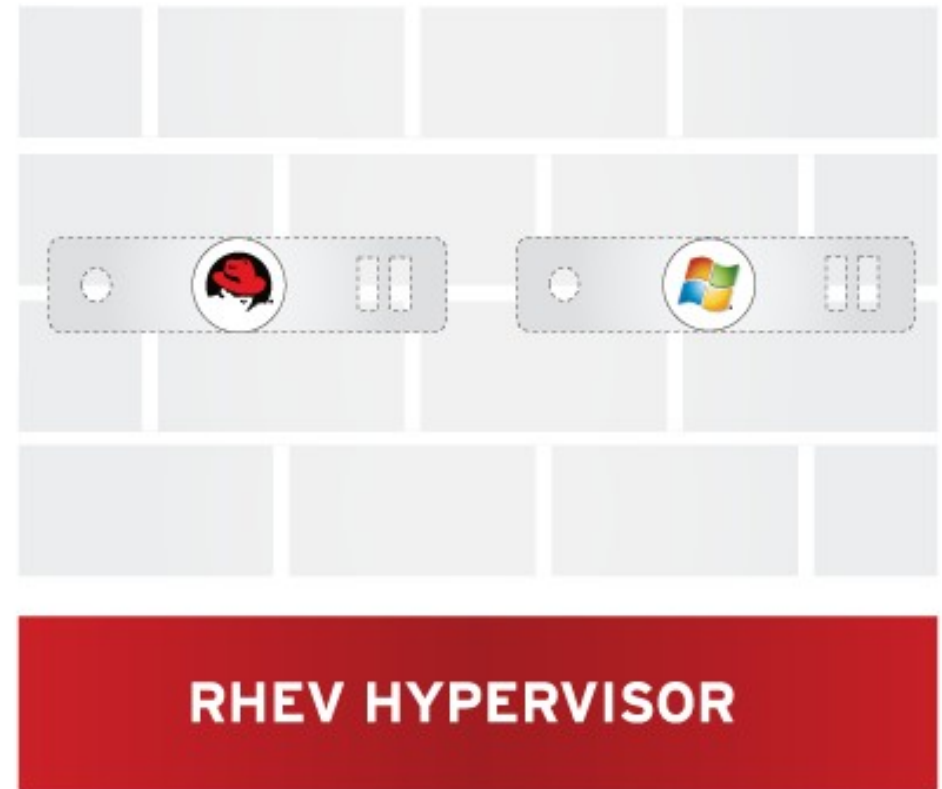
# ADVANCED SECURITY FOR YOUR VIRTUALIZATION INFRASTRUCTURE

## 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

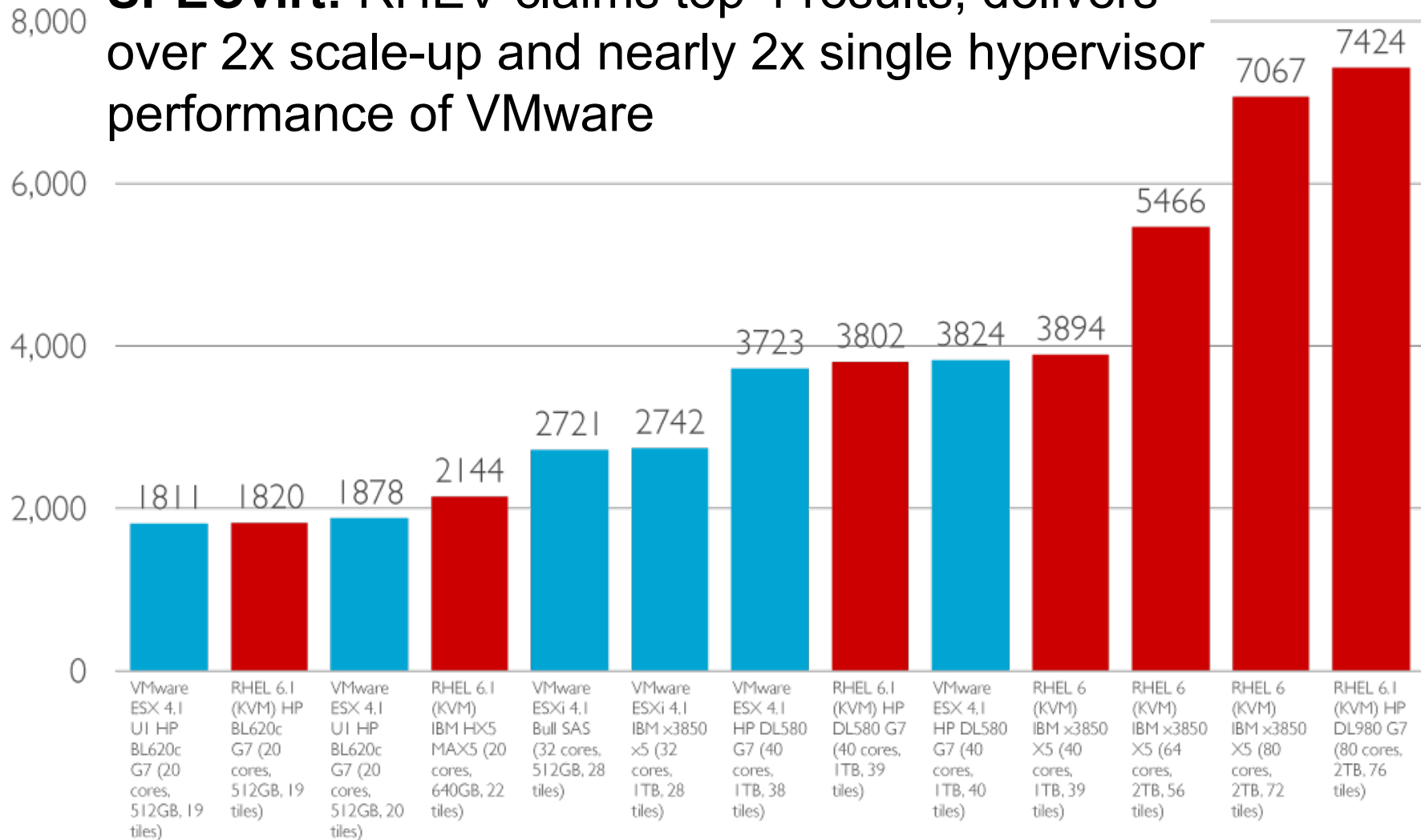
## sVirt Project

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



# 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



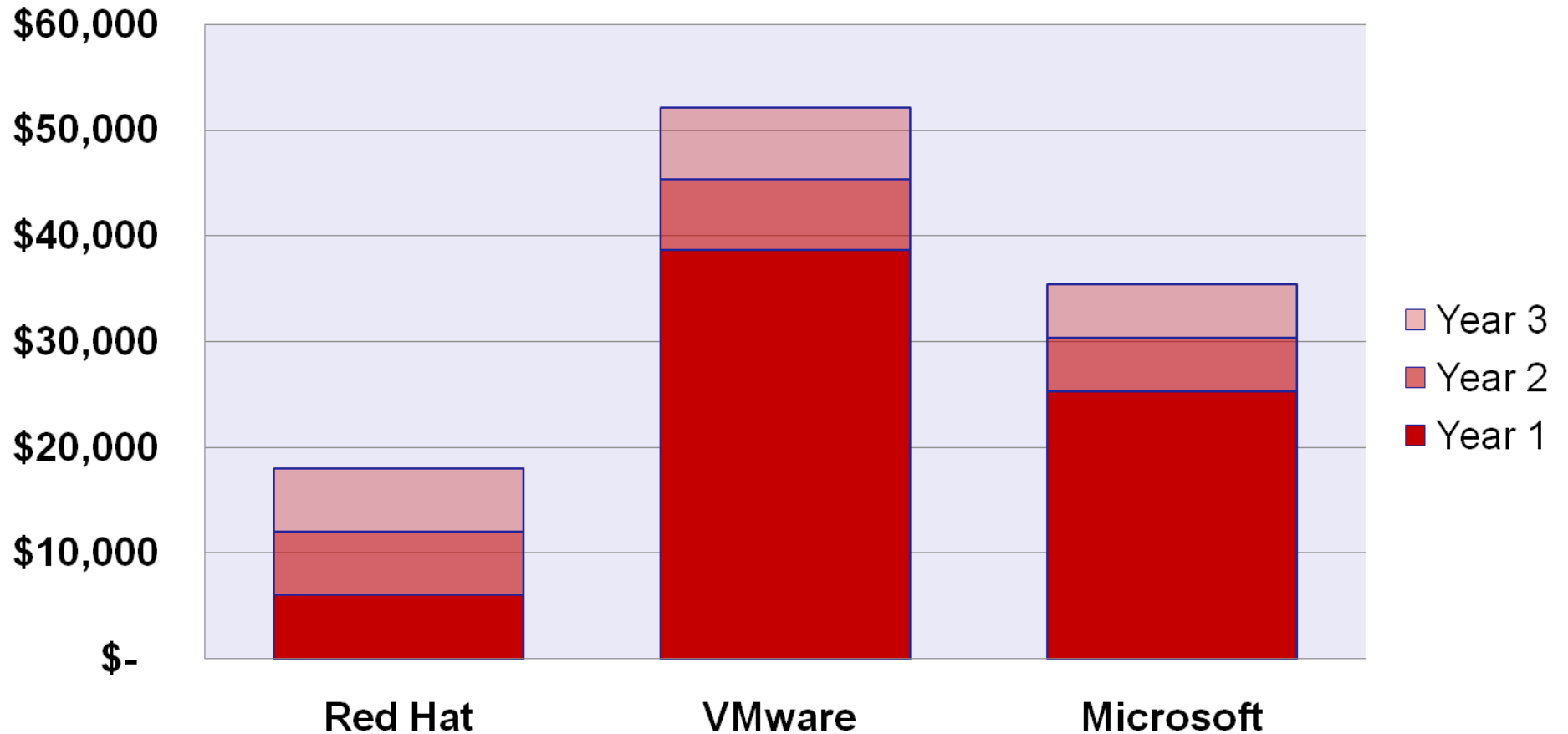
出典 : [http://www.spec.org/virt\\_sc2010/results/specvirt\\_sc2010\\_perf.html](http://www.spec.org/virt_sc2010/results/specvirt_sc2010_perf.html)

2011.10



# VIRTUALIZATION BY SUBSCRIPTION

## Three Year Cost (Virtualization Software and Support)



# 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?



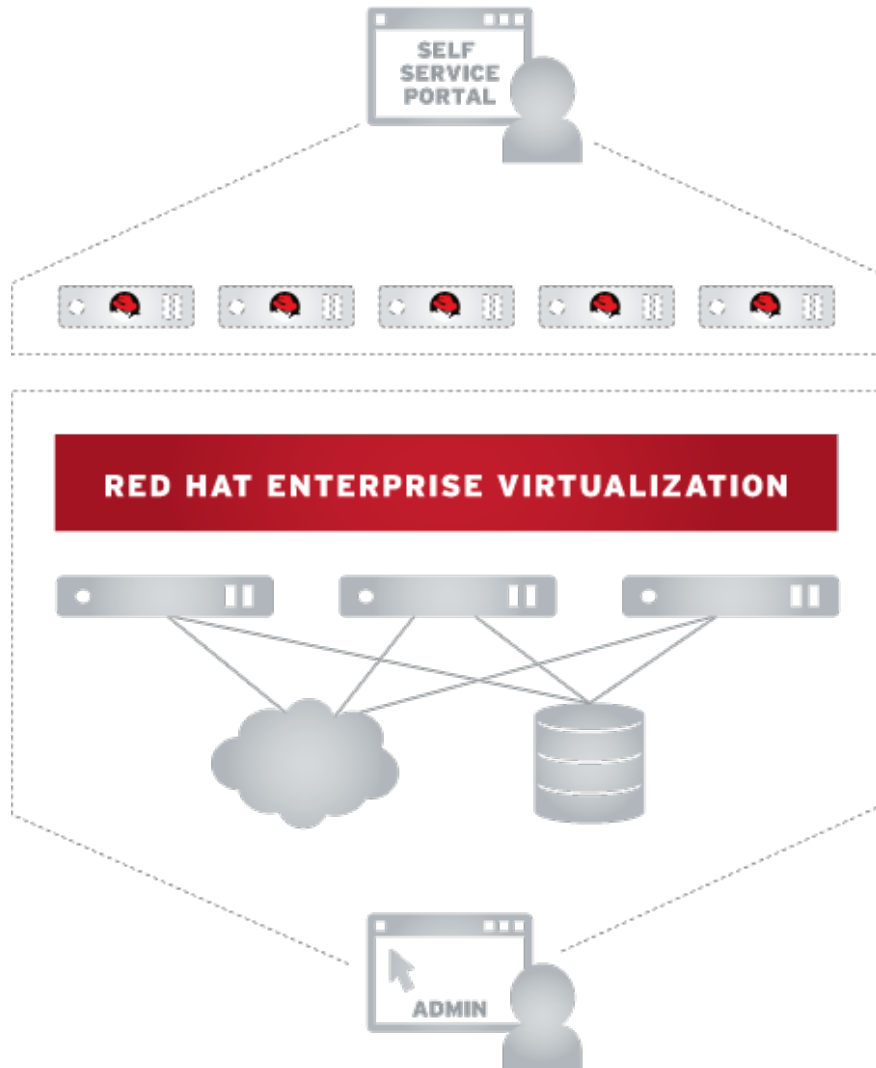
# RED HAT ENTERPRISE VIRTUALIZATION 3

- 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



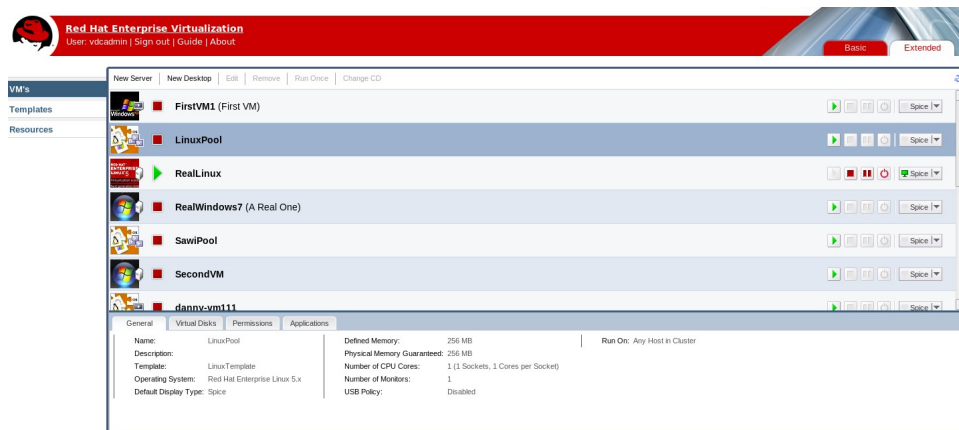
- ✓ Create, edit and remove virtual machines
- ✓ Manage virtual disks and network interfaces
- ✓ Assign user permissions to virtual machines
- ✓ Create and use templates to rapidly deploy virtual machines
- ✓ Monitor resource usage and high-severity events
- ✓ Create and use snapshots to restore virtual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



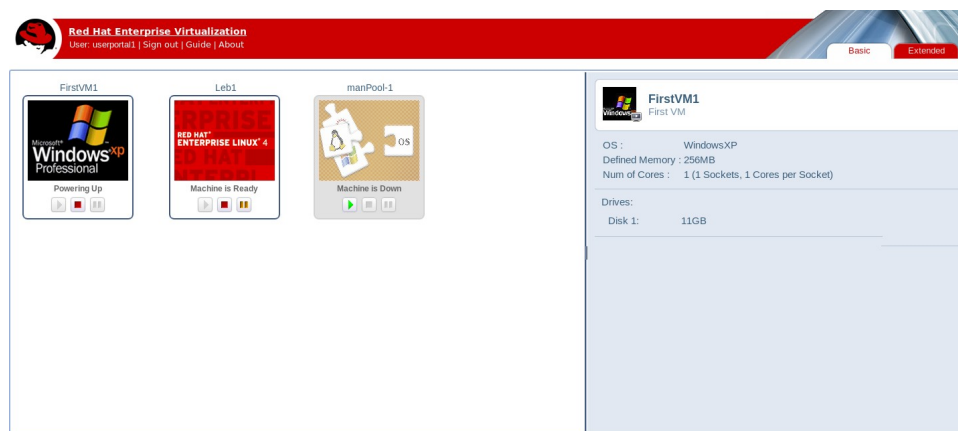
# RED HAT ENTERPRISE VIRTUALIZATION

## RHEV 3.0 - USER PORTAL

### User Portal - Advanced view



### User Portal - Basic View



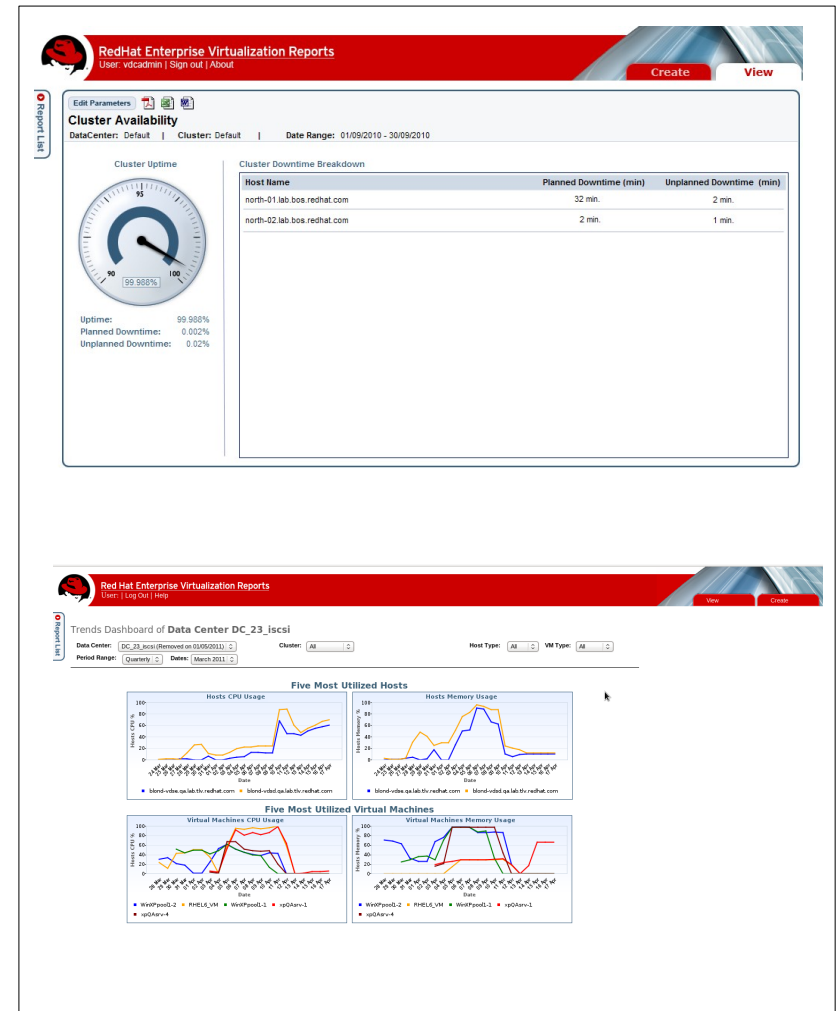
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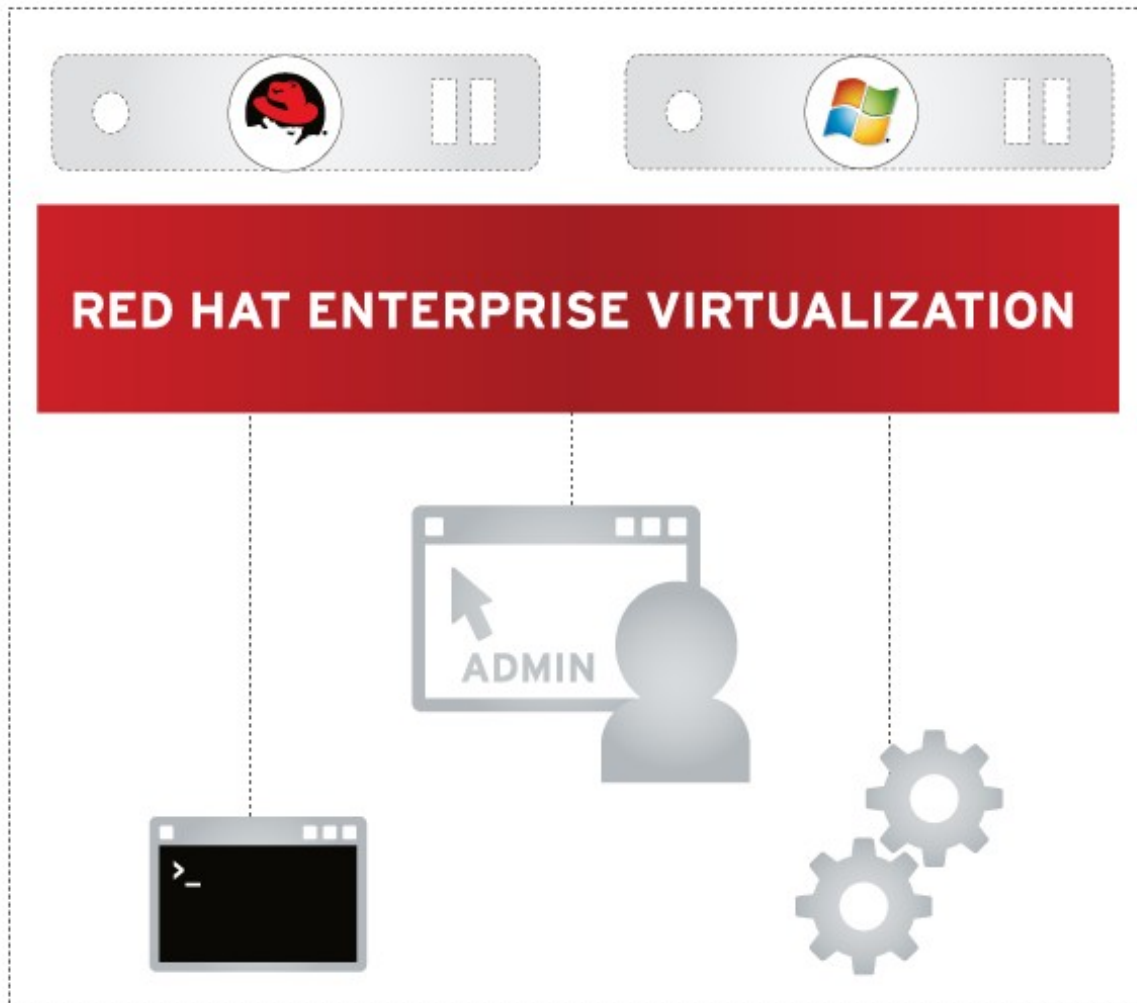
# RED HAT ENTERPRISE VIRTUALIZATION

## 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

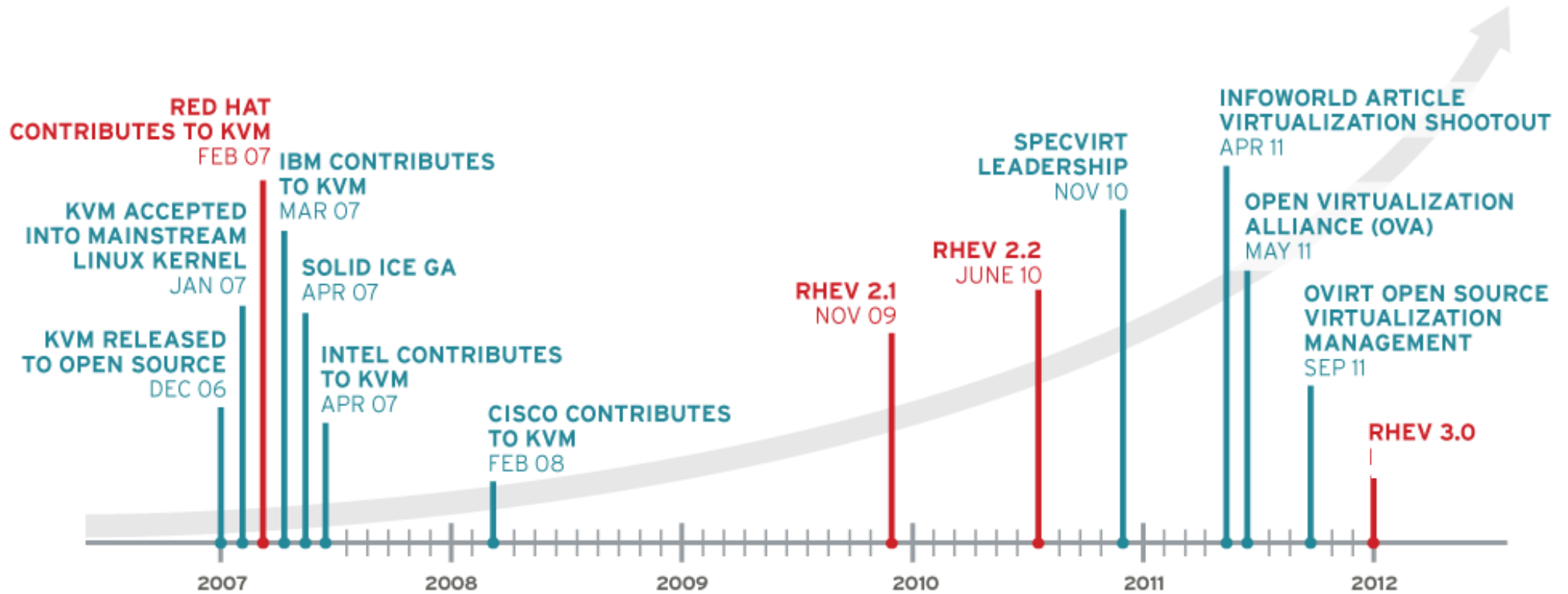


# HOW WILL OPEN SOURCE ACCELERATE THE EVOLUTION OF THE CLOUD?






# OPEN SOURCE VIRTUALIZATION TIMELINE



# oVirt



Name	Owner	Host	IP Address	Memory	CPU	Network	Status	State	Power	Logon/Logout
200-0-0	00	0002000	0000000	0000	0000	0000	Up	Up	10	
200-0-1	00	0002000	0000000	0000	0000	0000	Up	Up	10	
200-0-2	00	0002000	0000000	0000	0000	0000	Down	Down	10	
200-0-3	00	0002000	0000000	0000	0000	0000	Up	Up	10	
200-0-4	00	0002000	0000000	0000	0000	0000	Down	Down	10	
200-0-5	00	0002000	0000000	0000	0000	0000	Up	Up	10	
200-0-6	00	0002000	0000000	0000	0000	0000	Up	Up	10	
200-0-7	00	0002000	0000000	0000	0000	0000	Up	Up	10	
200-0-8	00	0002000	0000000	0000	0000	0000	Up	Up	10	
200-0-9	00	0002000	0000000	0000	0000	0000	Up	Up	10	

- 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>



Empowered by It



# RED HAT IC & DOD ACTIVITIES



# Misc IC Activities

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

