# Red Hat Enterprise Linux 6

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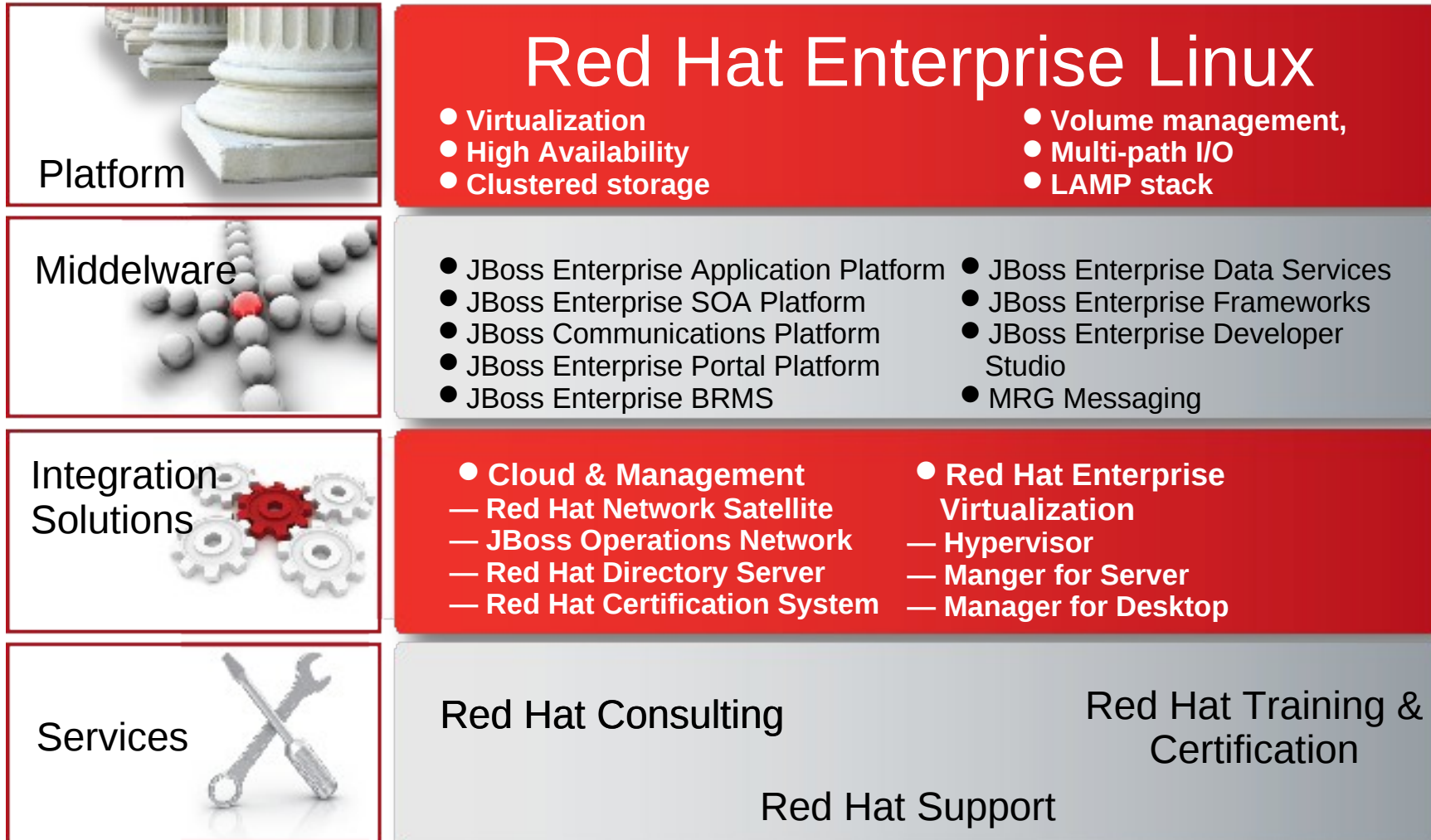
# Red Hat - an Established Global Leader



- Global development and support
- Listed on S&P 500
- 67 offices in 29 countries
- Extensive partnerships with leading enterprise hardware and software vendors
- Pioneered the open source subscription-based business model
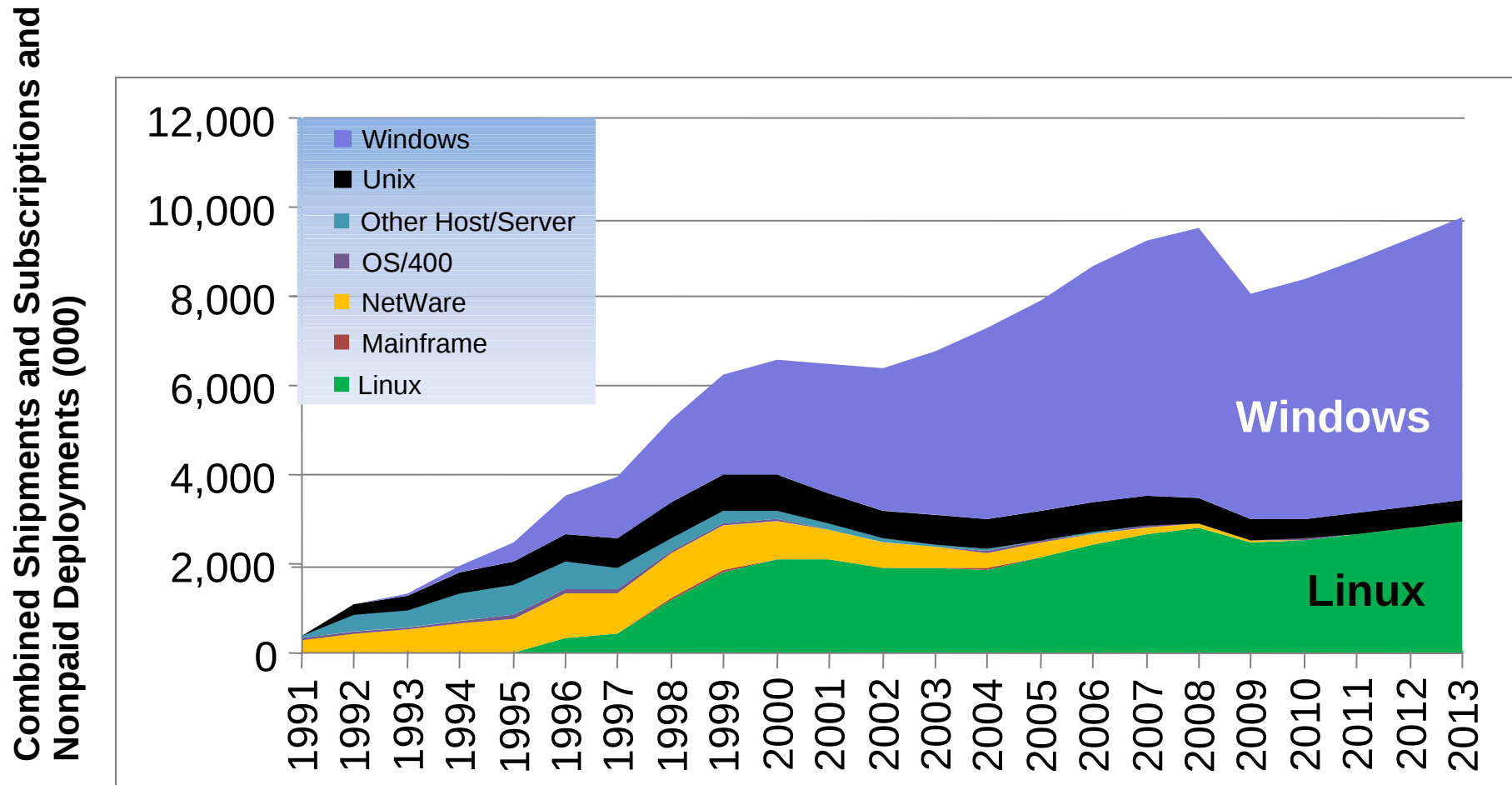- Comprehensive product portfolio for enterprise environments

**Red Hat Enterprise Linux 6**

# A Complete, Open Stack
## Products, Services, and Support for Enterprise-Class Applications

**Platform**

## Red Hat Enterprise Linux
- **Virtualization**
- **High Availability**
- **Clustered storage**
- **Volume management,**
- **Multi-path I/O**
- **LAMP stack**

**Middelware**

- JBoss Enterprise Application Platform
- JBoss Enterprise SOA Platform
- JBoss Communications Platform
- JBoss Enterprise Portal Platform
- JBoss Enterprise BRMS
- JBoss Enterprise Data Services
- JBoss Enterprise Frameworks
- JBoss Enterprise Developer Studio
- MRG Messaging

**Integration Solutions**

- **Cloud & Management**
  — **Red Hat Network Satellite**
  — **JBoss Operations Network**
  — **Red Hat Directory Server**
  — **Red Hat Certification System**
- **Red Hat Enterprise Virtualization**
  — **Hypervisor**
  — **Manger for Server**
  — **Manager for Desktop**

**Services**

Red Hat Consulting

Red Hat Training & Certification

Red Hat Support

# Only Two Server Operating Systems Will Remain

Source: IDC, 2009          **Red Hat Enterprise Linux 6**

# Red Hat Momentum in a Challenging Market

- Red Hat revenue increased 15% (bookings even more)

- Linux is deployed on ~25% of new servers**

- The UNIX Installed base continues to decline*

- ~4x more Linux than Unix being deployed**

*Red Hat is the industry leader*

* Source: IDC Worldwide Server Installed Base Forecast 2009 – 2013 Update, March 2010, #221809

** Source: IDC Worldwide & Regional Server 2009-2013 Forecast Update. Doc #221439 December 2009

# Why You Should Care

- **Huge Opportunity** – realizing dramatic cost savings.

- **Convergence of Factors:**
  - Huge performance, RAS, and scalability increases with the introduction of Nehalem-EX.
  - Addition of new mission-critical features in RHEL5 and RHEL6.
  - Oracle acquisition of Sun is motivating to migrate.

- **Linux is the Future** – In Q2 of this year, demand for Linux skills surpassed demand for Unix skills for the first time ever!
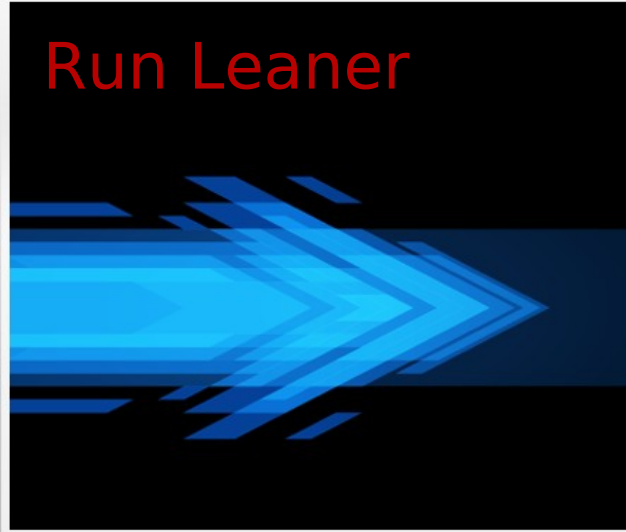
**Red Hat Enterprise Linux 6**

# Red Hat Enterprise Linux: Enabling the New Now

## Move Faster
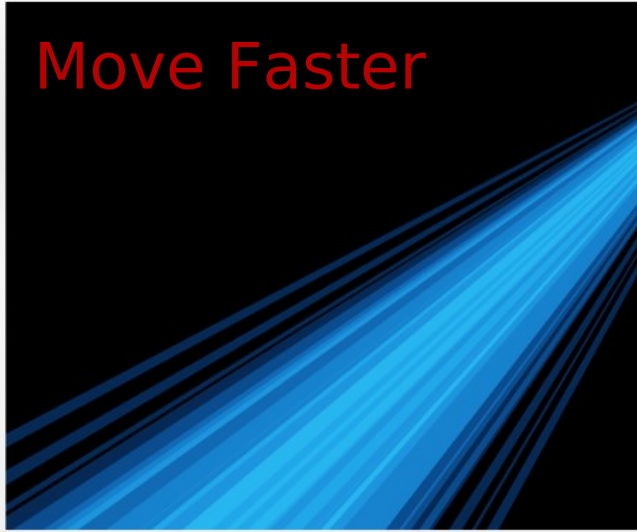
A better starting point for every project because your platform is robust, secure and ready

## Run Leaner

Data Center efficiency, performance and scalability

## Be More Flexible

Making IT nimble across physical, virtual and cloud

# Move Faster

**The platform for today and your long-term growth**

- Scalability & Performance: More cores, more memory, more data

- Freedom of choice: Optimized for the major hardware architectures and hypervisors

- Stability: Stable 10 year (plus) life cycle,

- Extensible: A portfolio of included software and enterprise Add-Ons

**Reliable across applications and workloads**

- Working across the industry

- Scale Up, Scale Out, Scale Consolidation

- Modular, flexible and robust operating system architecture that enables the latest in hardware reliability features

# Move Faster



**PERFORMANCE**

PERFORMANCE ENHANCEMENTS IN EVERY COMPONENT

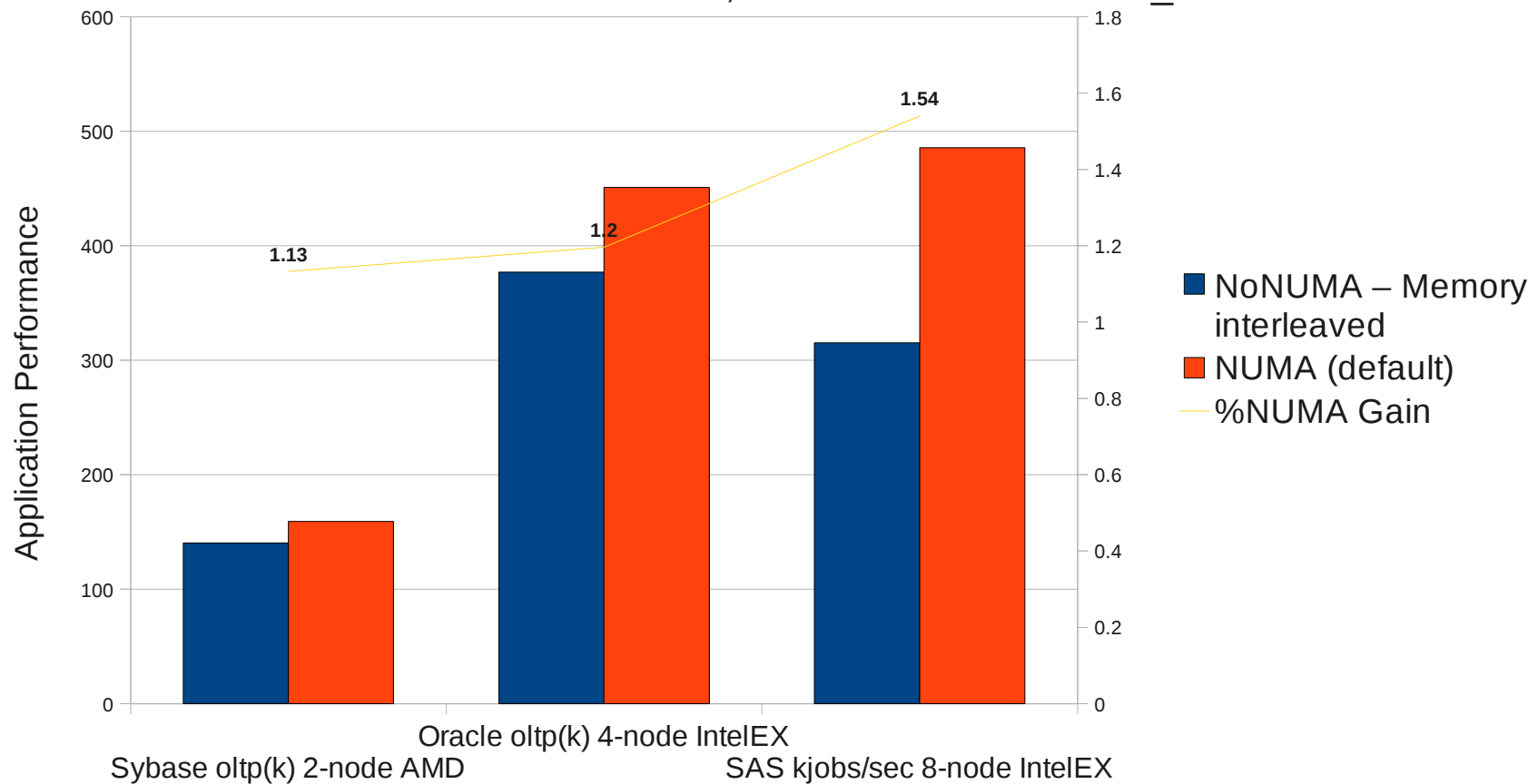| COMPONENT | FEATURE |
| --- | --- |
| CPU/Kernel | NUMA – Ticketed spinlocks; Completely fair scheduler; Extensive use of Read Copy Update (RCU) |
| Memory | Caching and NUMA enhancements Large memory optimizations: Transparent HugePages |
| Virtualization | Large SMP virtual machines: guests up to 64 CPUs Block: Async-I/O; Network: Kernel support |
| Disk/Network | Per LUN flush daemons Multi-queue Network drivers |

**Red Hat Enterprise Linux 6**

# Move Faster
## Optimized for current and future systems

**RHEL6 NUMA Application Performance**
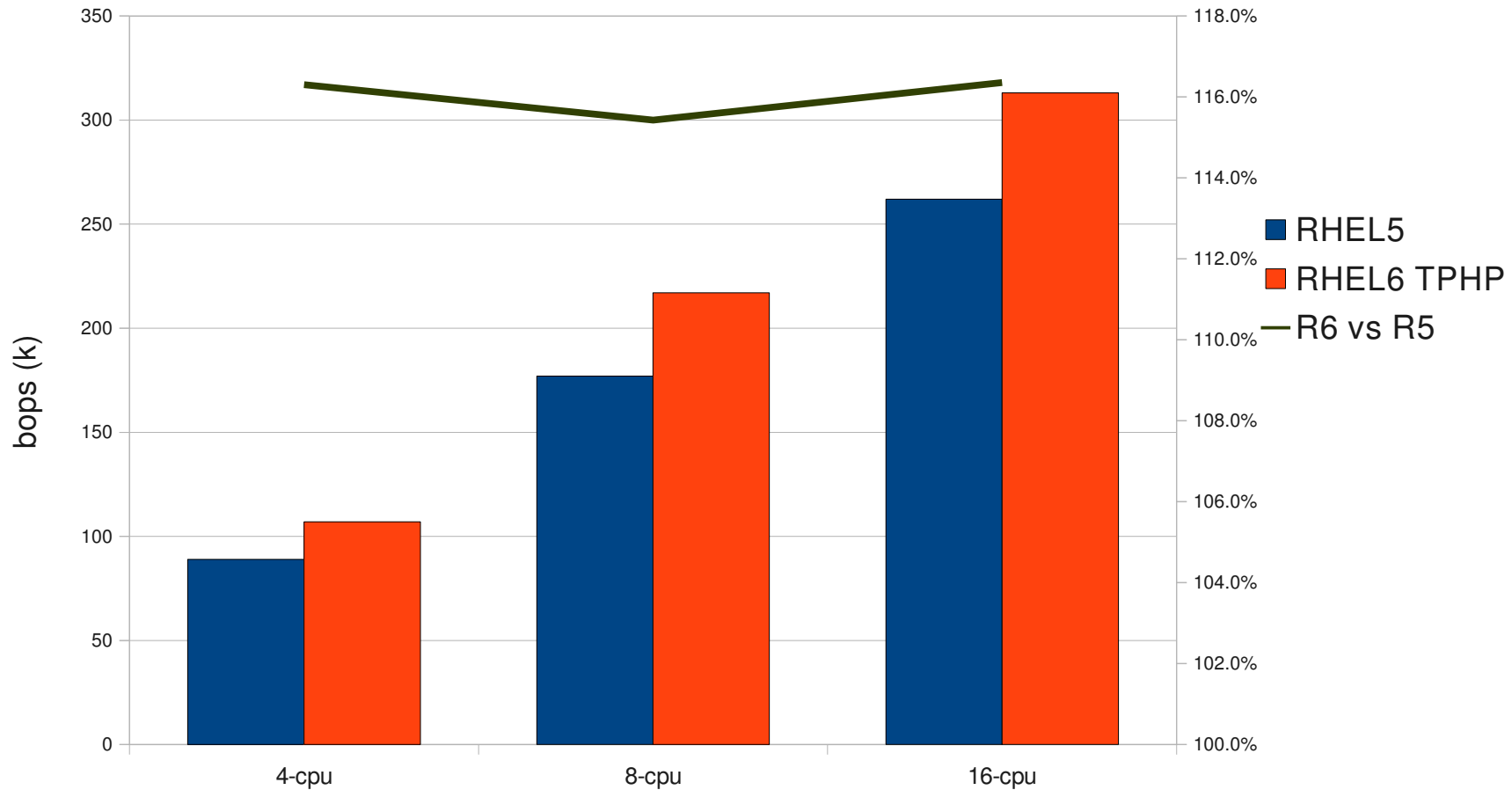
2 socket AMD MC, 4/8 socket Intel EX x86_64



Legend:
- NoNUMA – Memory interleaved
- NUMA (default)
- %NUMA Gain

**Red Hat Enterprise Linux 6**

# Move Faster

## Scale performance with enhanced memory management

### RHEL5.5 /6 SPECjbb Scaling Intel EX

Legend:
- RHEL5
- RHEL6 TPHP
- R6 vs R5

Y-axis (left): bops (k) — 0, 50, 100, 150, 200, 250, 300, 350

Y-axis (right): 100.0%, 102.0%, 104.0%, 106.0%, 108.0%, 110.0%, 112.0%, 114.0%, 116.0%, 118.0%

X-axis: 4-cpu, 8-cpu, 16-cpu

**Red Hat Enterprise Linux 6**

# Move Faster

## Support tens of thousands of files



## Fileserver Peak Throughput (jobs/min)

**Red Hat Enterprise Linux 6**
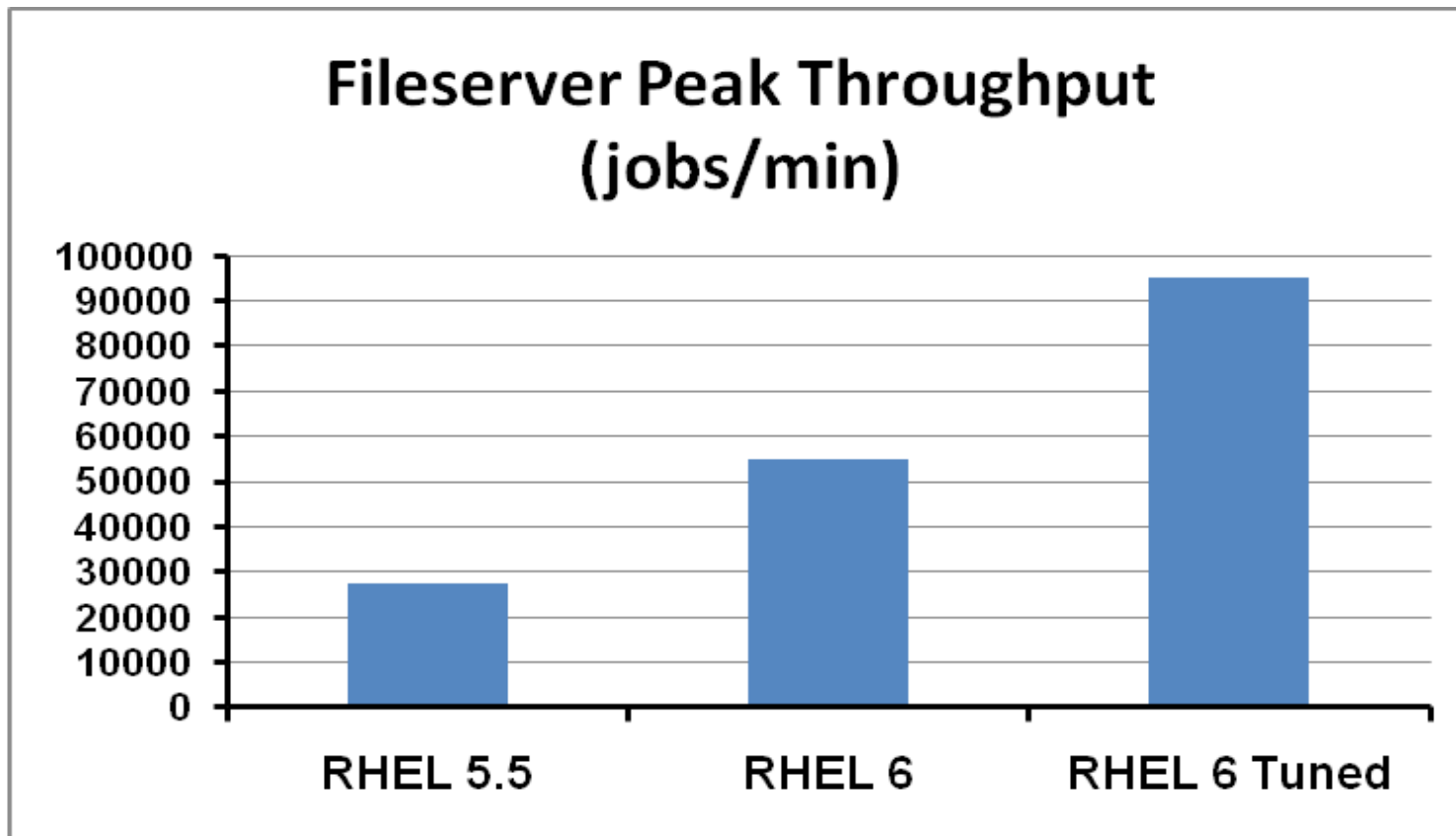
# Run Leaner
## Data Center Efficiency, Performance & Stability
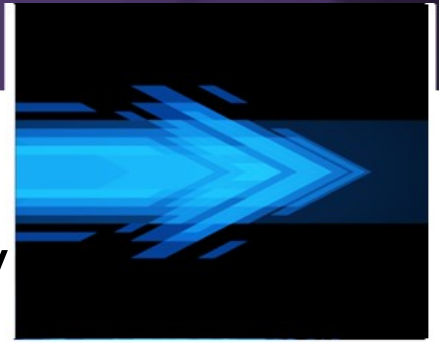
**Make the most of your new new hardware & deployment paradigms**

- **Less Power**: Advanced resource management designed to minimize and manage your data center power requirements

- **Improve virtualization**: Optimize applications on both physical and virtual platforms with hardware independent diagnostic and management tools

- **Operational excellence:** Lower provisioning and management costs while increasing utilization with enhanced management, deployment & security features
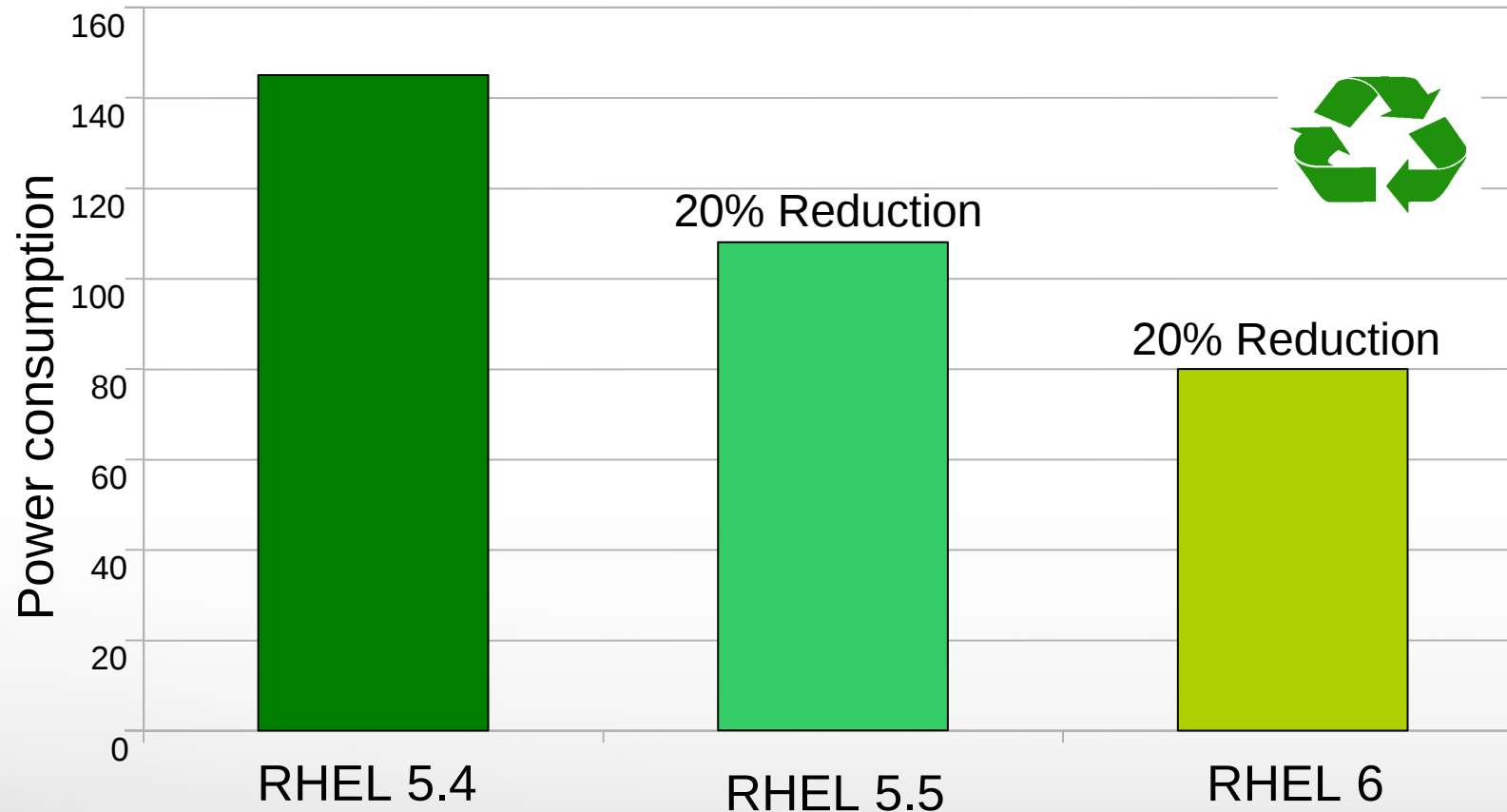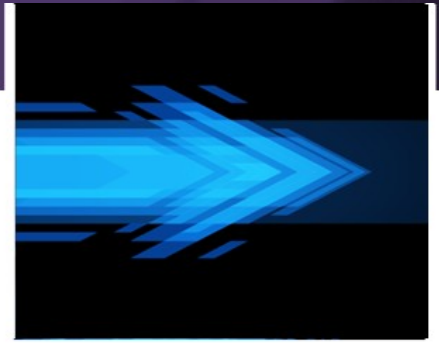
# Run Leaner
## Lower Power Consumption

**GREEN I.T.**

REDUCES POWER CONSUMPTION AT MULTIPLE LAYERS IN THE SOFTWARE STACK

| COMPONENT | FEATURE |
| --- | --- |
| Utilities | Power audit to reduce power consumption, E.G. convert utilities to event based algorithms |
| File System | Intelligent drive spin-down<br>File metadata I/O reduction: realtime mount option |
| Kernel | Tickless kernel enables extended low power states for idle systems |
| CPU | Core/CPU idling in lightly loaded SMP systems; applies for virtual guests |
| I/O | Dynamic power adjustments to PCIe and SATA links via ASPM and ALPM |

**Red Hat Enterprise Linux 6**
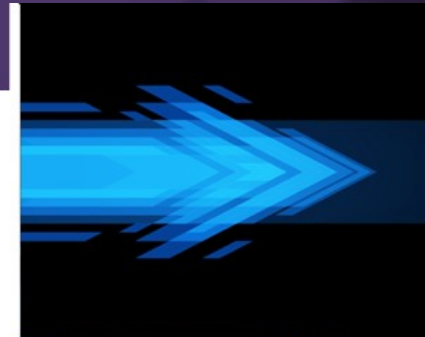
# Run Leaner
## Lower Power Consumption



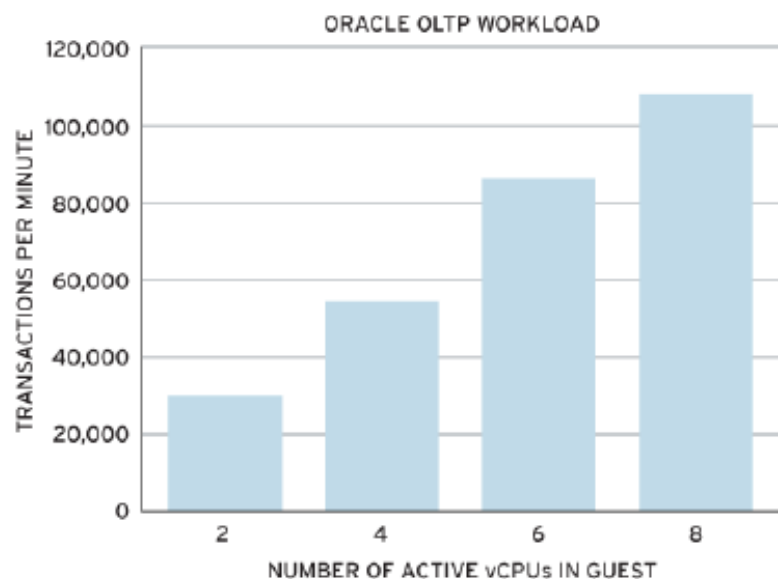Idle power consumption (W), measured on Nehalem-EP

# Run Leaner
## Get More with Virtualization

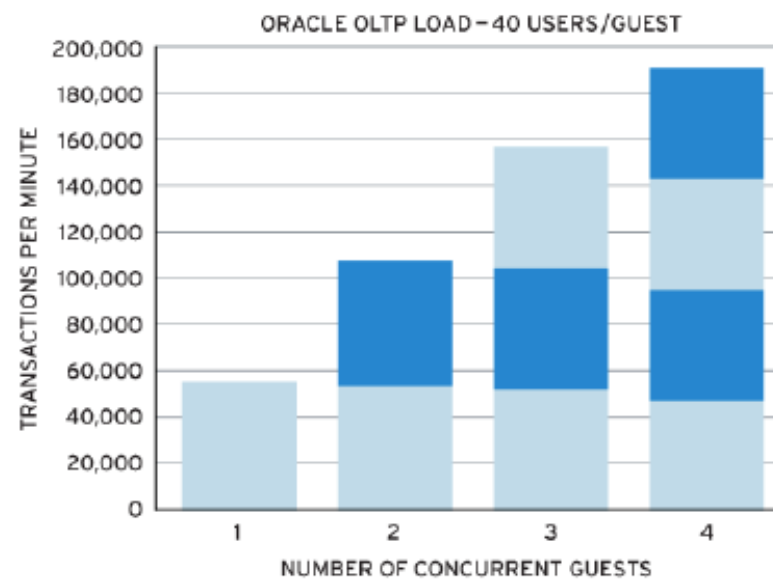Oracle scales up and out very well on Red Hat Enterprise Virtualization



SCALING vCPUs AND MEMORY ON A SINGLE GUEST

ORACLE OLTP WORKLOAD



SCALING MULTIPLE 4-vCPU GUESTS

ORACLE OLTP LOAD – 40 USERS/GUEST

Red Hat Enerprise Virtualization: Scaling Oracle Database, Oct. 2009

# Be More Flexible
## Across physical, virtual & cloud

**Consistent operating environment**

- Hardware and hypervisor independence

- Same execution environment (ABI/API) & support everywhere

- A portable, tunable, secure wrapper for all your apps

**Improve IT operations with a common foundation**

- Leverage skills, processes and operation technology

- Unified and comprehensive app & system security

- Manage to SLAs with unprecedented resource control (on x86)

**Use integrated virtualization (KVM) to maximize options**

- All RHEL features benefit the virtual environment

- Run RHEL or Windows guests confidently

- As physical or guest deployment

# Physical to Virtual to Cloud

**Red Hat Enterprise Linux 6**
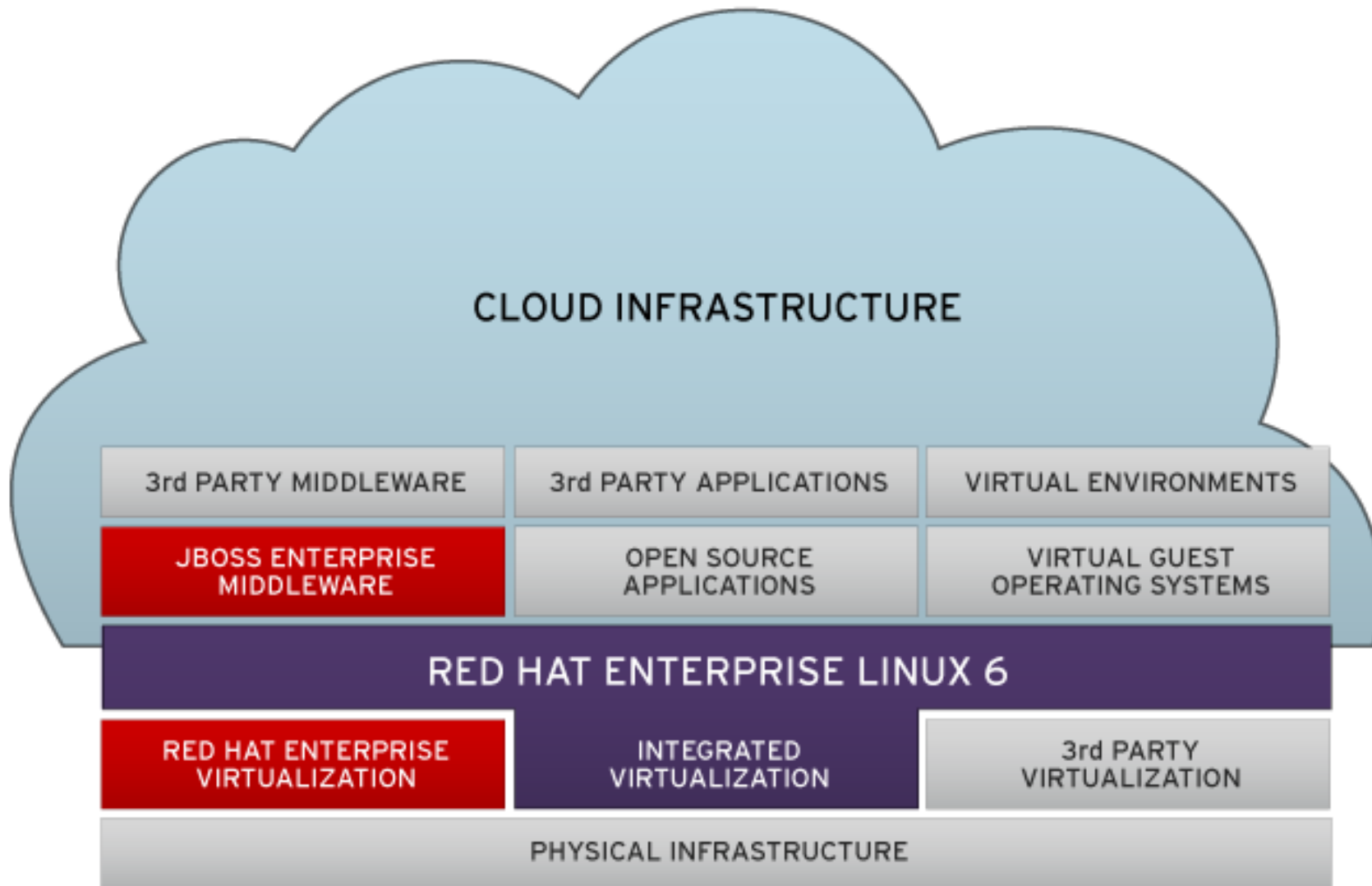
# Be More Flexible
## Red Hat Enterprise Linux with Virtualization



Virtual Machine  Virtual Machine

KVM

Linux Kernel

x86 Hardware

(intel) VT-X

AMD AMD-V

- **SMALL FOOTPRINT:** <100 MB

- **SCALABLE:** Host (96 cores, 1 TB RAM), guest (16vCPU, 64 GB RAM)
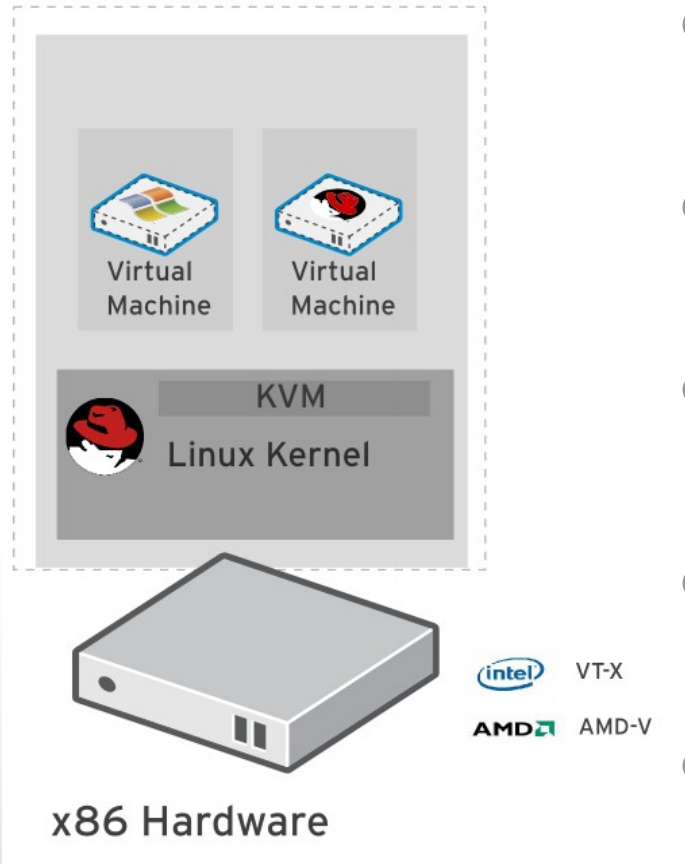
- **High Performance**
  Leading performance for virtualized enterprise applications

- **Secure**
  Comprehensive security stack with many built-in and integrated features

- **Advanced Features**
  Memory page sharing, NIC bonding, multipath I/O, power management, etc.

- **Scalability**
  Operating system unmatched efficiency with high levels of performance

- **Live Migration**
  Easily and transparently move running workloads in virtual machines from one physical host to another

# The Red Hat Enterprise Linux
# Product Portfolio

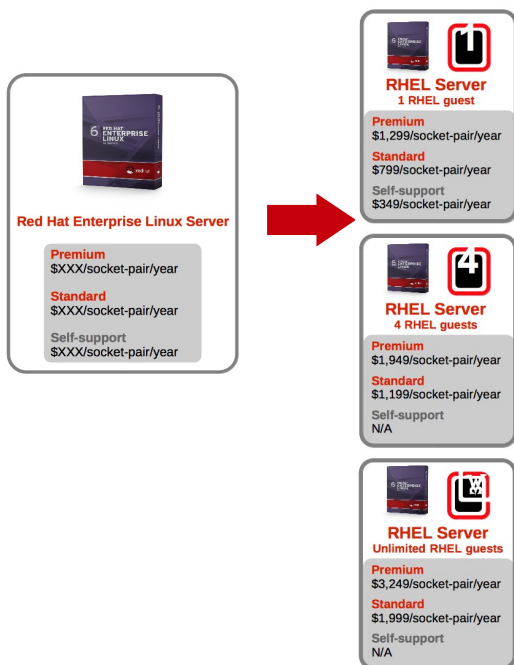| Servers (x86) | Servers (other architectures and use cases) | Add-ons (optional software) | Desktops |
|---|---|---|---|

### One solution – three editions

**Red Hat Enterprise Linux Server**

Premium
$XXX/socket-pair/year

Standard
$XXX/socket-pair/year

Self-support
$XXX/socket-pair/year

**RHEL Server**
1 RHEL guest

Premium
$1,299/socket-pair/year

Standard
$799/socket-pair/year

Self-support
$349/socket-pair/year

**RHEL Server**
4 RHEL guests

Premium
$1,949/socket-pair/year

Standard
$1,199/socket-pair/year

Self-support
N/A

**RHEL Server**
Unlimited RHEL guests

Premium
$3,249/socket-pair/year

Standard
$1,999/socket-pair/year

Self-support
N/A

### Four additional offerings

**Red Hat Enterprise Linux for IBM System z**

Premium
$18,000/IFL/year

Standard
$15,000/IFL/year

Self-support
N/A

**Red Hat Enterprise Linux for IBM POWER***

Premium
$4,300/socket-pair/year

Standard
$2,700/socket-pair/year

Self-support
N/A

*POWER
(allows up to 15 guests
per socket-pair)

**Red Hat Enterprise Linux for High-Performance Computing**

Premium for entire cluster
$79/socket-pair/year per compute node
– plus –
$2,598 per socket-pair per head node

Standard for entire cluster
$79/socket-pair/year per compute node
– plus –
$1,598 per socket-pair per head node

Self-support for compute nodes
$79/socket-pair/year per compute node

**Red Hat Enterprise Linux for SAP Applications***

Premium
$3,249/socket-pair/year

Standard
N/A

Self-support
N/A

* allows unlimited guests

### Seven add-ons

**High Availability**
$399/socket-pair/year

**Load Balancer**
$199/socket-pair/year

**Resilient Storage**
(includes high-availability)
$799/socket-pair/year

**Scalable File System**
$199/socket-pair/year

**Smart Management** *
$192/year – up to 1 guest
$288/year – up to 4 guests
$576/year – unlimited guests

**Extended Update Support**
$249/socket-pair/year

**High Performance Network**
$199/socket-pair/year

* Note: Only Smart Management can be added to a RHEL, Self-support subscription

High Availability
Scalable File System
Smart Management
Resilient Storage
Load Balancer
Extended Update Support
High Performance Network

### Two offerings

**RHEL Desktop**

Premium
N/A

Standard
N/A

Self-support
$49/desktop/year

**RHEL Workstation**

Premium
N/A

Standard
$299/workstation/year

Self-support
$179/workstation/year

**Red Hat Enterprise Linux 6**

# The Red Hat Enterprise Linux Product Portfolio

**Servers**
**(x86)**

**One solution – three editions**



Red Hat Enterprise Linux Server

**Premium**
$XXX/socket-pair/year

**Standard**
$XXX/socket-pair/year

Self-support
$XXX/socket-pair/year



**RHEL Server**
**1 RHEL guest**

**Premium**
$1,299/socket-pair/year

**Standard**
$799/socket-pair/year

Self-support
$349/socket-pair/year



**RHEL Server**
**4 RHEL guests**

**Premium**
$1,949/socket-pair/year

**Standard**
$1,199/socket-pair/year

Self-support
N/A



**RHEL Server**
**Unlimited RHEL guests**

**Premium**
$3,249/socket-pair/year

**Standard**
$1,999/socket-pair/year

Self-support
N/A

**Red Hat Enterprise Linux 6**

# The Red Hat Enterprise Linux Product Portfolio

## Servers
### (other architectures and use cases)

**Four additional offerings**

**Red Hat Enterprise Linux for IBM System z**

Premium
$18,000/IFL/year

Standard
$15,000/IFL/year

Self-support
N/A

**Red Hat Enterprise Linux for IBM POWER***

Premium
$4,300/socket-pair/year

Standard
$2,700/socket-pair/year

Self-support
N/A

*POWER
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Premium for entire cluster
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Self-support for compute nodes
$79/socket-pair/year per compute node

**Red Hat Enterprise Linux for SAP Applications***

Premium
$3,249/socket-pair/year

Standard
N/A

Self-support
N/A

* allows unlimited guests

# The Red Hat Enterprise Linux Product Portfolio

**Add-ons**
**(optional software)**

**Seven add-ons**

**High Availability**
$399/socket-pair/year

**Load Balancer**
$199/socket-pair/year

**Resilient Storage**
(includes high-availability)
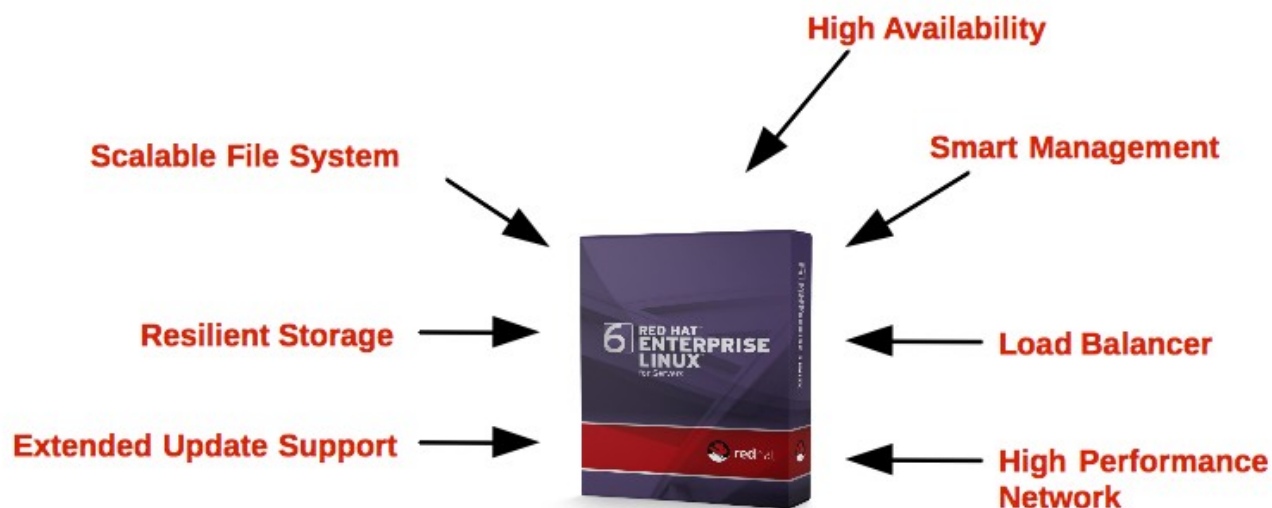$799/socket-pair/year

**Scalable File System**
$199/socket-pair/year

**Smart Management ***
$192/year – up to 1 guest
$288/year – up to 4 guests
$576/year – unlimited guests

**Extended Update Support**
$249/socket-pair/year

**High Performance Network**
$199/socket-pair/year

\* Note: Only Smart Management can be added to a RHEL, Self-support subscription

**Red Hat Enterprise Linux 6**

# The Red Hat Enterprise Linux Product Portfolio

**Desktops**

**Two offerings**

**RHEL Desktop**

**Premium**
N/A

**Standard**
N/A

**Self-support**
$49/desktop/year

**RHEL Workstation**

**Premium**
N/A

**Standard**
$299/workstation/year

**Self-support**
$179/workstation/year

# Red Hat Enterprise Linux
## Add-On's

**RED HAT ENTERPRISE LINUX**
**+High Availability**

May be configured for most applications that use customizable agents, as well as for virtual guests.

**RED HAT ENTERPRISE LINUX**
**+Load Balancer**

Provides redundancy for web serving, databases, networking, and storage.

**RED HAT ENTERPRISE LINUX**
**+Resilient Storage**

Enables a shared storage or clustered file system to access the same storage device over a network.

**RED HAT ENTERPRISE LINUX**
**+Scalable File System**

Provides support for file systems that are more than 16 terabytes in size.

**RED HAT ENTERPRISE LINUX**
**+Smart Management**

Includes management, monitoring, and provisioning support modules for Red Hat Network and Red Hat Network Satellite.

**RED HAT ENTERPRISE LINUX**
**+High Performance Network**

Delivers remote directory memory access over converged Ethernet (RoCE) for those times when low network latency and high capacity are important.

**RED HAT ENTERPRISE LINUX**
**+Extended Update Support**

Extends the support period of an update for 18 months and delivers overlapping release support to give enterprise customers more flexibility.

# Red Hat Enterprise Linux Server
## Support Options

| | Self-support* | Standard | Premium |
|---|---|---|---|
| **Hours of coverage:** | None | Business Hours | 24x7 for Severity 1 and 2 |
| **Support channel:** | None | Phone and Web | Phone and Web |
| **Number of cases:** | None | Unlimited | Unlimited |
| **Initial and ongoing response times:** | | | |
| **- Severity 1** : | None | 1 Business Hour | Initial - 1 Hour<br>Ongoing - 1 Hour** |
| **- Severity 2:** | None | 4 Business Hours | Initial – 2 Hours<br>Ongoing - 4 Hours** |
| **- Severity 3:** | None | 1 Business Day | Initial – 4 Business Hours<br>Ongoing – 8 Business Hours** |
| **- Severity 4:** | None | 2 Business Days | Initial – 8 Business Hours<br>Ongoing - 2 Business Days** |
| **Customer portal access:**<br>**Software Maintenance:**<br>**Software upgrades:** | Yes<br>Included<br>Included | Yes<br>Included<br>Included | Yes<br>Included<br>Included |

*Self-support replaces Basic support.
**or as agreed.

# Red Hat Enterprise Linux
## A Comprehensive Platform

| Features | Red Hat | Costly Vendor Alternatives |
|---|---|---|
| | **Red Hat**<br>**Enterprise Linux** | |
| Operating system | | Windows, AIX, HP-UX, Solaris |
| Multi-path I/O | | EMC PowerPath |
| High availability | | Veritas Cluster Suite |
| Systems management | | HP OpenView/Opsware, IBM Tivoli |
| Volume/storage Management | | Symantic Storage Foundation Suite |
| High Performance Networking | | Infiniband |
| Server virtualization | | Vmware, Citrix |

**Red Hat Enterprise Linux 6**

# Life-cycle – expanded stream model
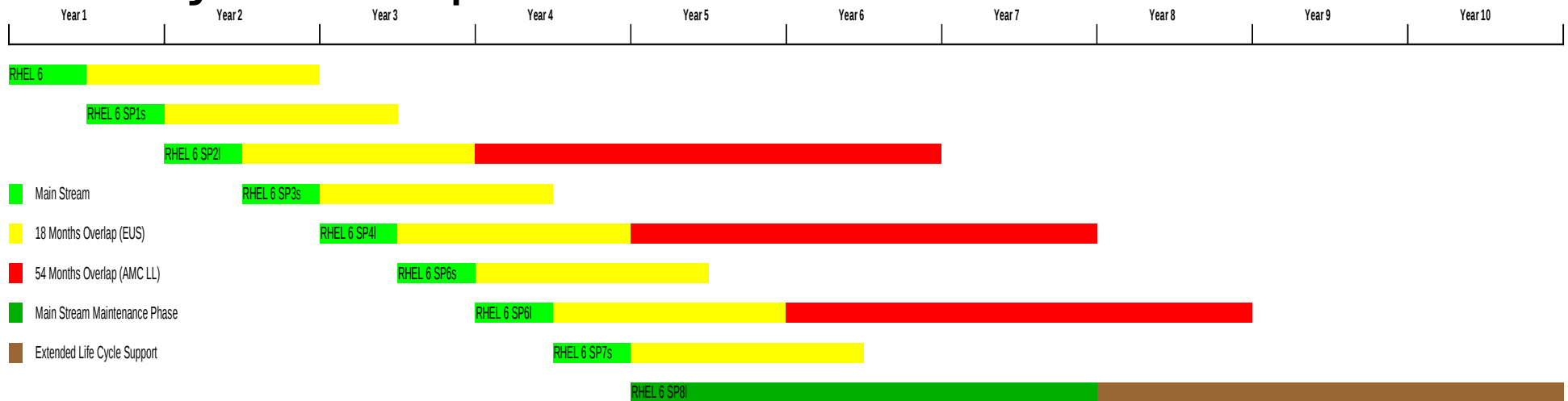


- **Service Packs with hardware enablement during Production I phase of four years.**

- **Total of seven years for the regular life-cycle**

- **3 years Extended Life-cycle Support (ELS) option**

- **8 EUS streams with 18 month overlap each**

**Red Hat Enterprise Linux 6**

**MORE OPEN**
THAN ORACLE

**MORE RELIABLE**
THAN MICROSOFT

**MORE COMPREHENSIVE**
THAN VMWARE

**Red Hat Enterprise Linux 6**