What's new in Red Hat Enterprise Linux 5

Mark Spencer
Sr. Solutions Architect, System z
Red Hat Canada

Brad Hinson
Sr. Support Engineer Lead, System z
Red Hat, Inc.

Agenda

- Red Hat
- Why Linux & Open Source
- Our Partnerships
- RHEL 4/5
- More Info
- Q & A

Red Hat

- Headquarters: Raleigh, NC
- Founded 1993, IPO 1999
  > $400M Annual subscription revenue
- Customers
  - 350 of Fortune 500
  - 99% renewal of top 100 customers

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What does Red Hat do?

- Makes Linux predictable, deployable, and sustainable
- **From an engineering standpoint**
  - Works with the community, partners, and customers
  - Develops/incorporates new features
  - Integrates open source packages, new features, drivers, bug fixes, & security updates
  - Tests, certifies, produces, and supports the result
- **From a business standpoint**
  - Engineers and sustains the platform
  - Provides services—training, consulting, support
  - Leverages the open source development model

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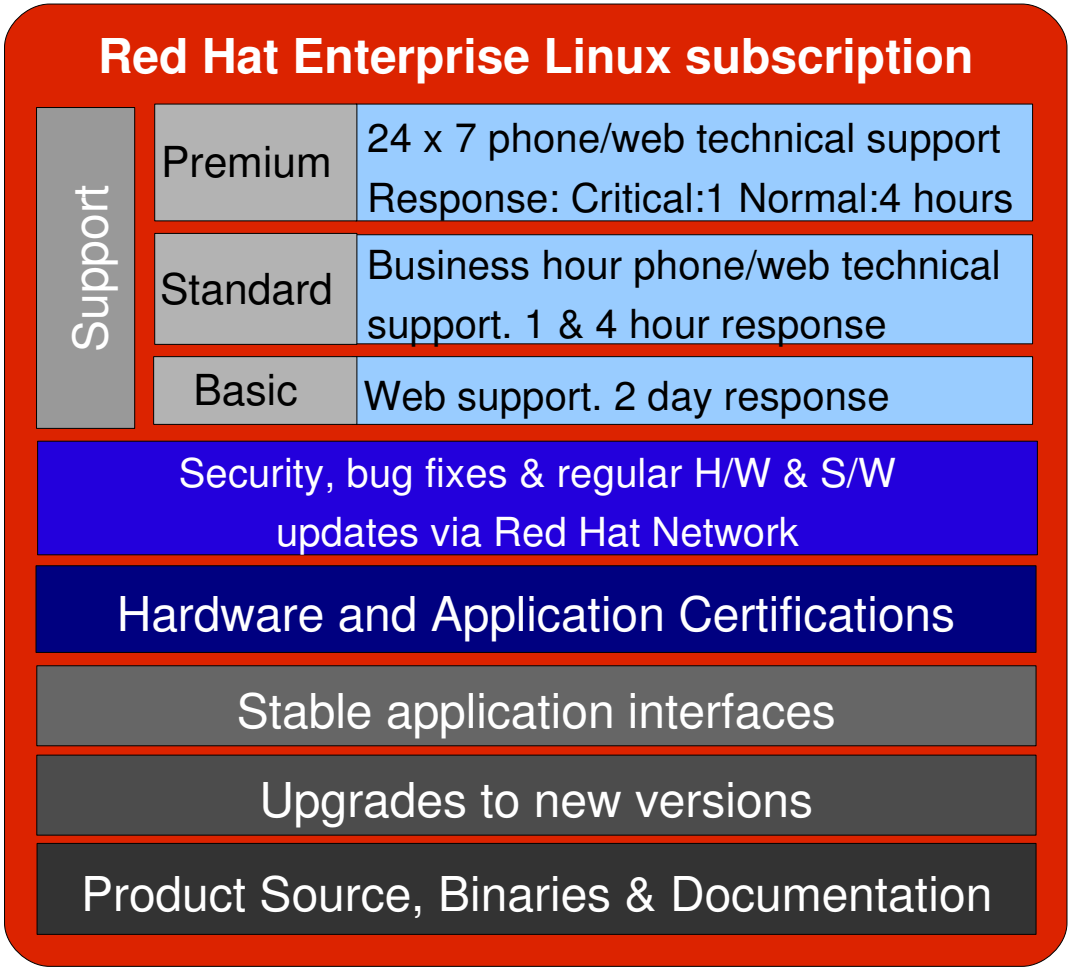
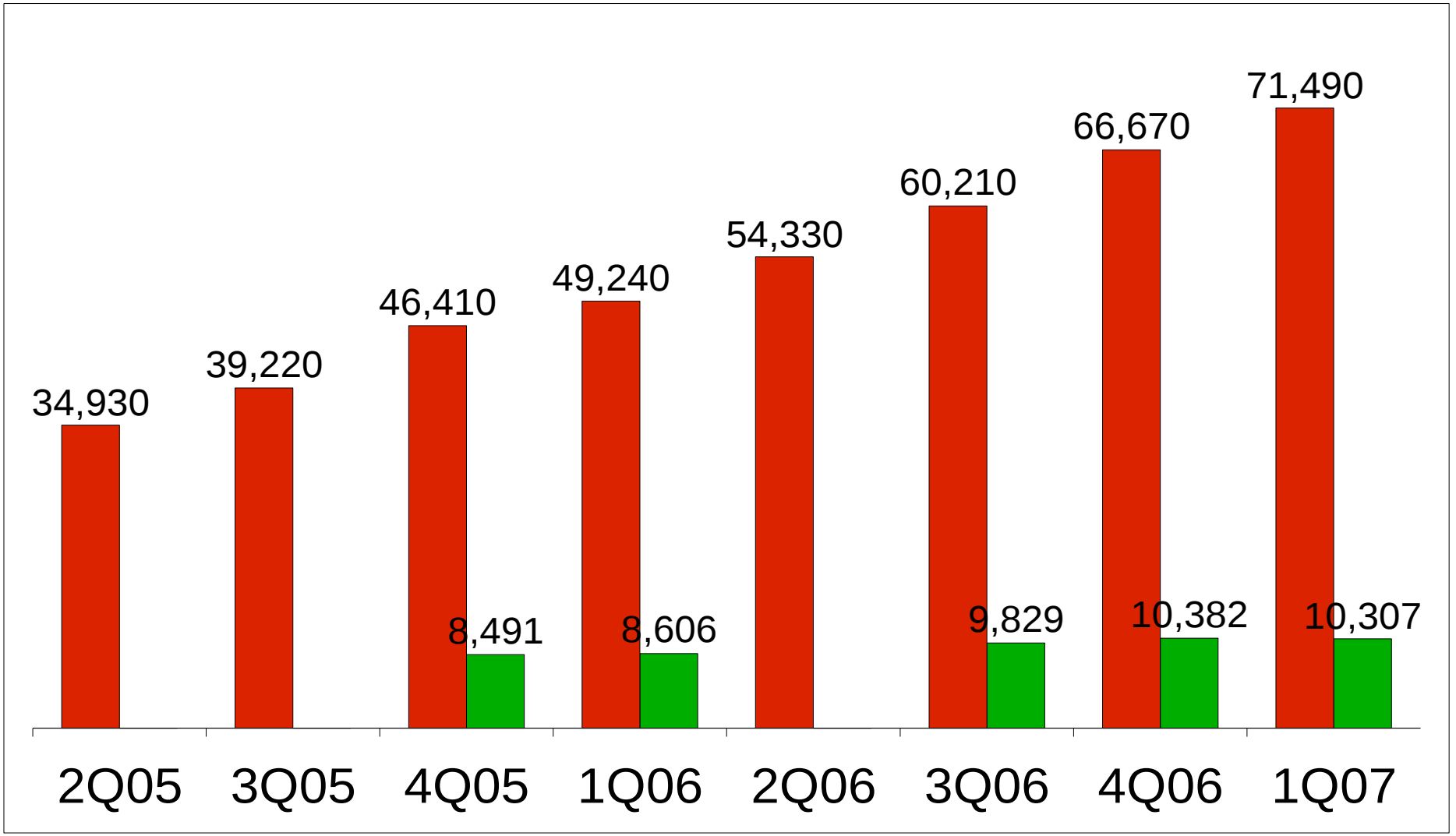
RHEL: Subscription Features

- Red Hat Enterprise Linux is provided on a per-physical-system annual subscription basis
- Benefits:
  - Fully inclusive – no additional or hidden costs
    - Unlimited support incidents
    - No Client Access Licenses
    - No Upgrade costs
  - Easy to budget
  - Provides a stable, secure, no-risk deployment
- A subscription:
  - Can be moved between systems
  - Can be used to run any version
  - Applies to any supported architecture



Linux Subscription Revenue



In $1,000's

Red Hat Subscription Model

- Red Hat software is sold as an annual subscription which includes:
  - **Technology**
    - Product & Documentation
  - **Certifications**
    - The industry's widest choice of certified hardware & software
  - **Maintenance**
    - Red Hat Network delivers updates and errata (e.g. security & bug fixes)
  - **Upgrades**
    - New releases at no extra charge
  - **Support**
    - Basic, Standard, Premium options available
    - Up to 24x7 with 1 hour response

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Why open source software?

OS Vendor Choice	OSS naturally creates multiple vendors
IMPROVED SECURITY	Proven security through better technology & threat response record
AUDITABILITY	Customers and industry can verify standards adherence, quality & flexibility
COST REDUCTION IN MULTIPLE DIMENSIONS	Hardware; system administration; compute transactions/watt; license management
SOLUTION ECOSYSTEM	OEM and ISV suppliers across the IT industry are focusing on delivering OSS solutions
TECHNOLOGY	All leading software technology development today is being done under the OSS model
PERFORMANCE – MATURITY – CHOICE	More suppliers than any proprietary offering = more improvements, more testing, greater selection

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Value of Open Source To Customers

Economic Value, Investment Protection, and Risk Reduction

- Purchasing Safety
- Pay for Real Value
- Customer Choice
- Low Acquisition Costs, Low TCO
- Lower Infrastructure Costs

Quality & Innovation - Open Code, Participation, Flexibility & Choice; Backed with Proof

- Unmatched Speed of Development
- Diverse Development
- Incremental Innovation
- Higher Performance
- More Secure Solutions
- Open Source software base

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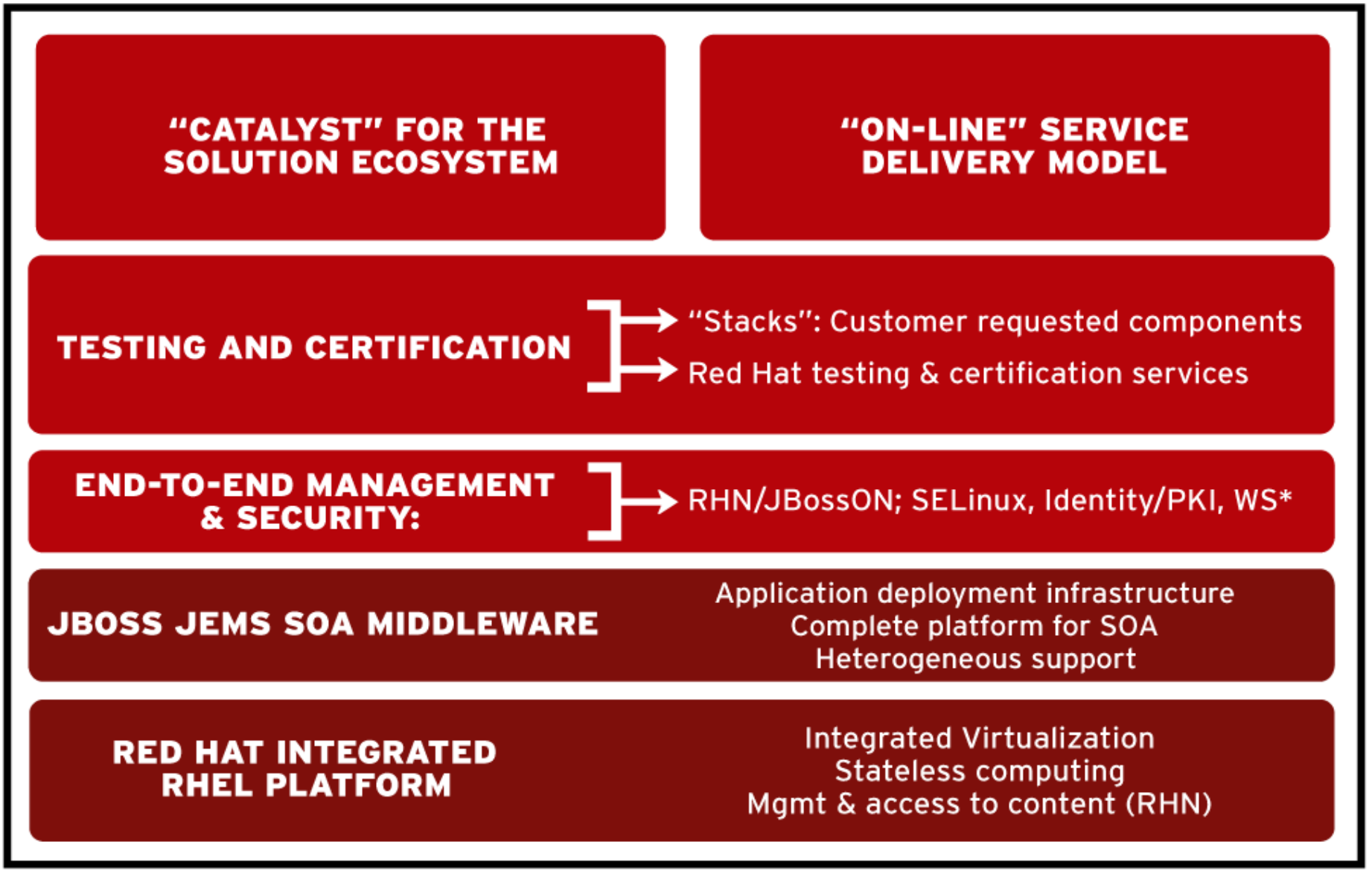
Red Hat Open Source Architecture



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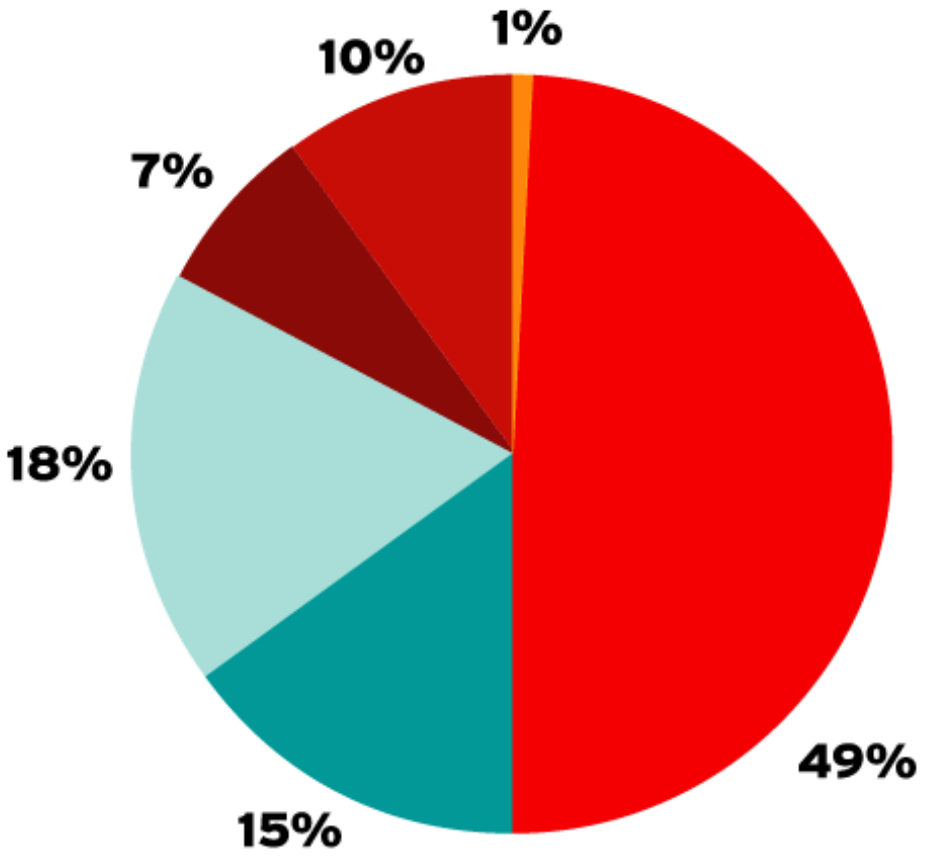
Open Source in the Enterprise



- Already in production
- In pilot stage
- Plan to invest in the next 12 months
- Plan to invest in the next 2 years
- No plan to invest at all
- Do not know

Source: IDC Emerging Technologies and Services Survey, March 2006

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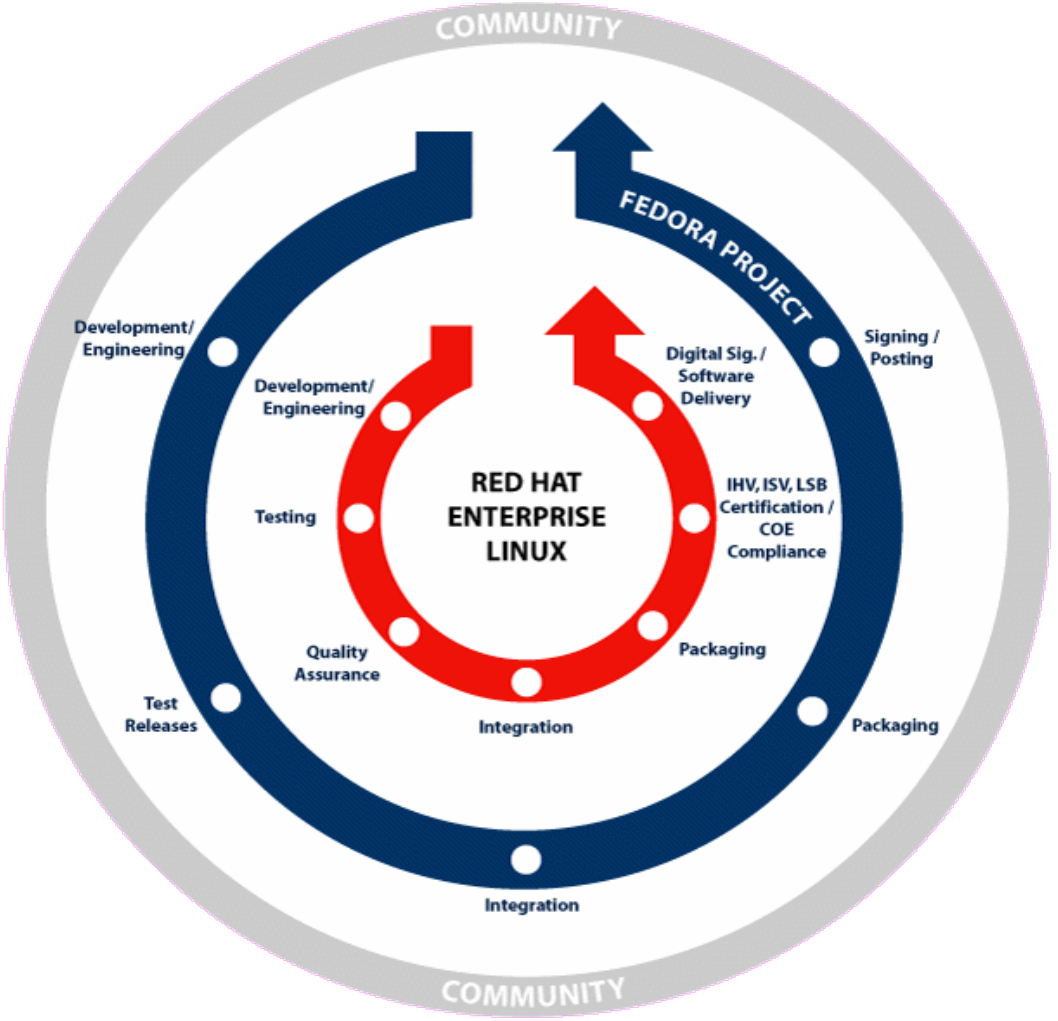
Red Hat - Making Open Source Predictable

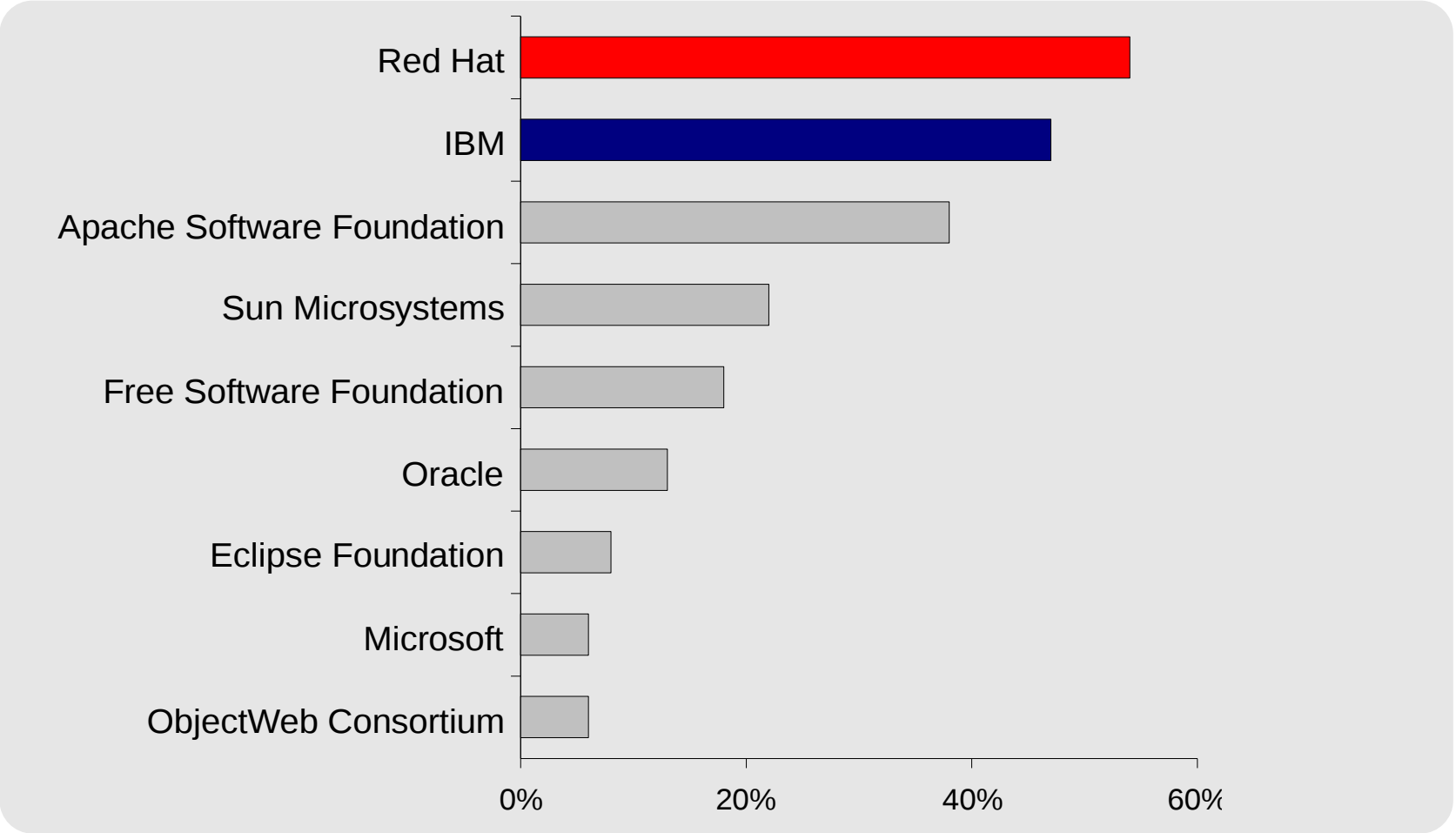
Development – Integration – Hardening - QA testing – Delivery – Benchmarking - Certifications

Risk mitigation through long-term maintenance & support



Partnering with the Linux Leader

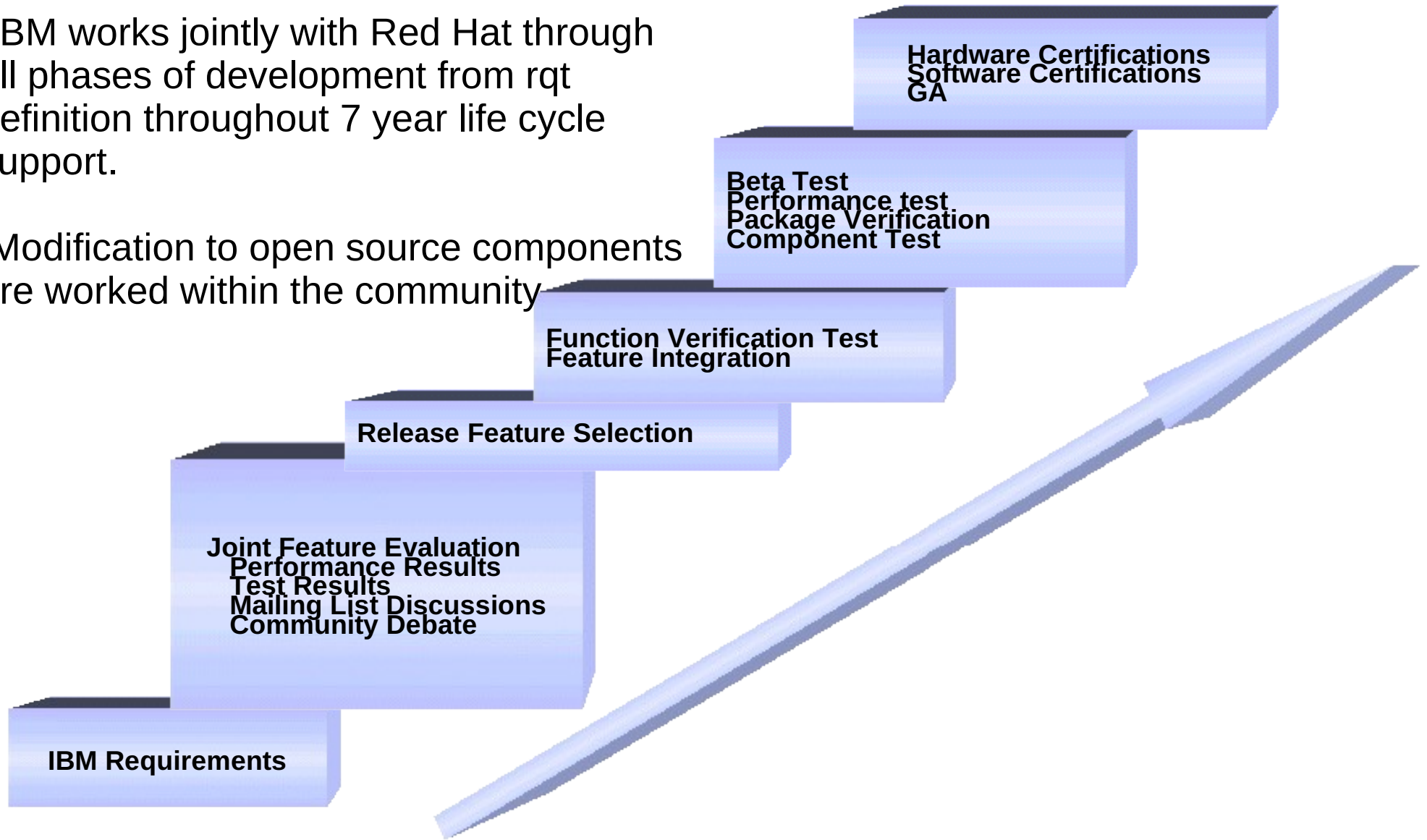
- What organizations are doing the most to advance open source software?
  - Red Hat and IBM are the clear leaders



Source: “Open Source Usage is Up, But Concerns Linger”, Forrester Research, June 23,2005

Engineering Development Relationship

- IBM works jointly with Red Hat through all phases of development from rqt definition throughout 7 year life cycle support.
- Modification to open source components are worked within the community



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Take Your Pick . . .

the same single Single Red Hat Linux code base works on all eServer Platforms

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xSeries (or other x86-based processor)

Powerful Price Performance
Horizontal Scalability

BladeCenter

Low Management Cost
Packaging Benefits

OpenPower

Mainframe RAS Features at Intel Pricing

iSeries i5

Partitioning for OS/400 interoperability

pSeries p5

High Performance Vertical Scalability

zSeries

Enterprise-wide Application Serving
Workload Consolidation

Software? There are over 250 IBM SWG applications available on Red Hat Enterprise Linux.

Rational. WebSphere. Lotus. DB2. Tivoli.

Red Hat Enterprise Linux certifications

- The Red Hat Enterprise Linux OEM and ISV certification portfolio
  - The largest is the open source industry
  - Continues to grow rapidly
  - Is unique to Red Hat Enterprise Linux product family
  - Provides unmatched coverage
- Driven by
  - Customer demand
  - Platform consistency
  - Support longevity
  - Product qualities
    - Performance, Security & Scalability

Thousands of certified applications

IBM System z9 and zSeries Servers – Combining Open Computing with the most reliable server platform

- Mainframe qualities of service
- The ability to scale up and out
- The ability to add processing power quickly, when it's needed
- zSeries virtualization for consolidation and control
- To help reduce the cost of operation
- To help reduce complexity and simplify maintenance tasks

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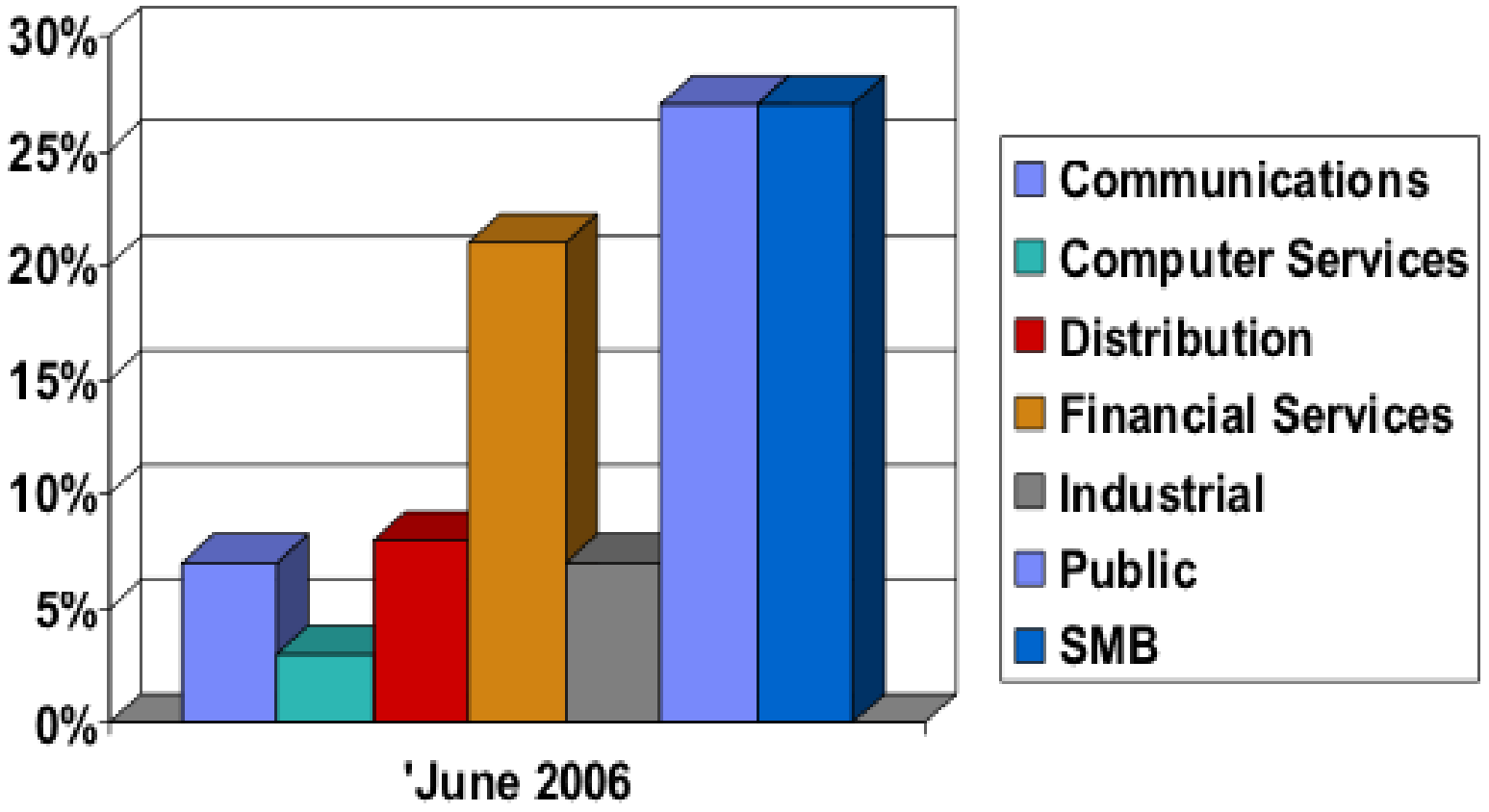
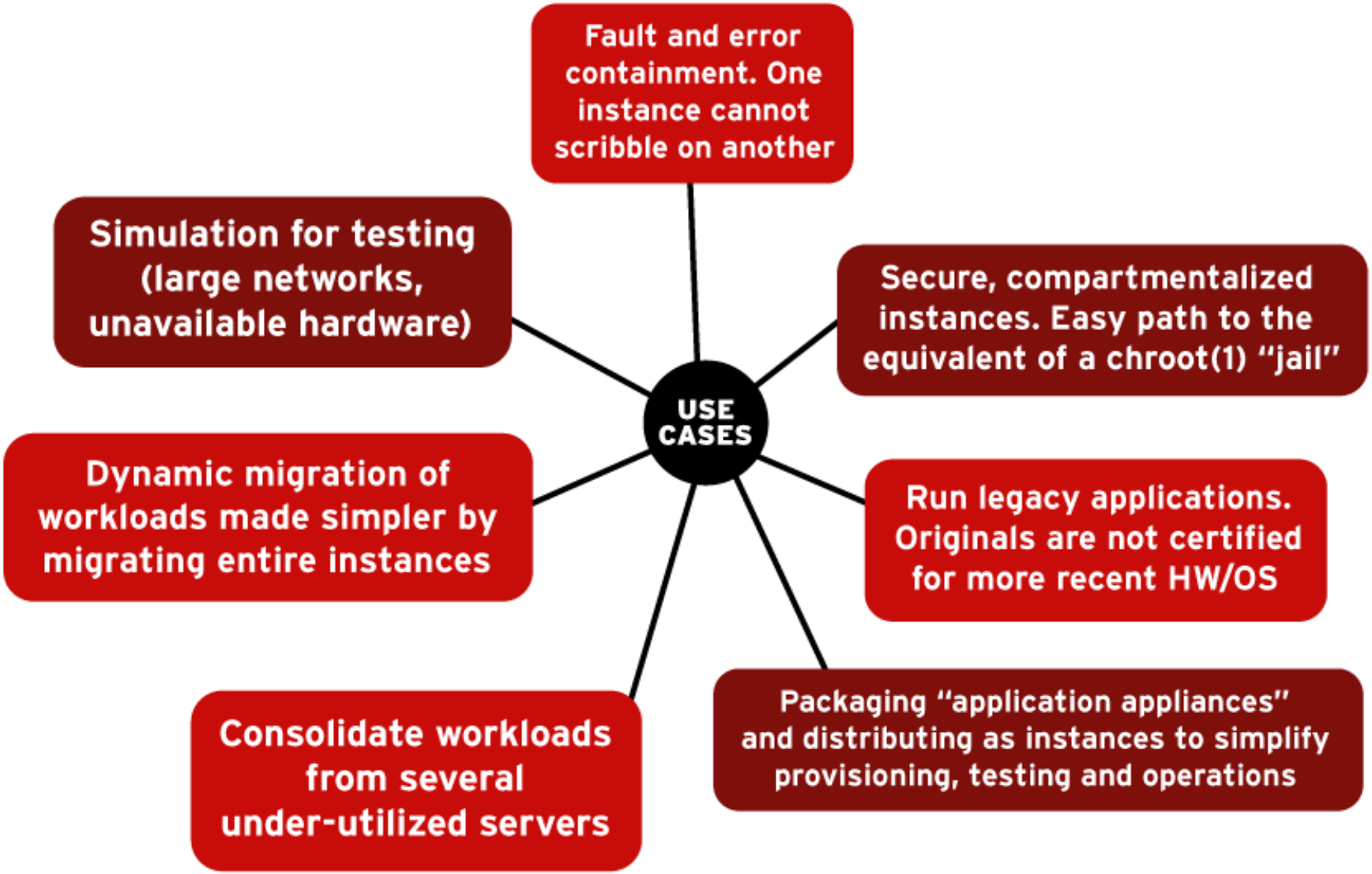
IFL Sales by Market Segment



IFL Customers by Market Segment

Virtualization Solves Business Problems



What does RHEL 4 do for IBM zSeries?

- RHEL 4 2.6 Kernel technology
- Updated I/O and memory management for faster throughput and scalability
- Faster, more scalable O(1) scheduler
- Faster, POSIX compliant threading library
- Asynchronous I/O and completion events - a big improvement for Web servers and databases
- Support for disks larger than 2 TB and for SGI's XFS enterprise file system
- ext3 with ACL support

What's new in Version 5?

- Enterprise Linux Advanced Platform
- Industry leading performance and price/performance
- Enhanced and easy to use security
- Improved networking and interoperability
- Enhanced development tools
- New SLAs

Red Hat Enterprise Linux 5: Product Summary

- Red Hat Enterprise Linux 5 comprises more than 1200 components
- Over two years of development since Red Hat Enterprise Linux 4
- Technology created by:
  - Red Hat
  - Partners
  - Community
- Packaging designed by:
  - Red Hat
  - Customers
  - Partners

Replacement of previous AS, ES and WS products with a single server and a single client
New Options provide additional server and client product capabilities
Kernel & Performance
Red Hat Enterprise Linux is based on the Linux 2.6.18 kernel
Support for multi-core processors
Broad range of new hardware support
Updated crash dump capability provided by Kexec/Kdump
Support for Intel network accelerator technology (IOAT)
Numerous enhancements for large SMP systems
Enhanced pipe buffering
IPv4/IPv6 fragmentation offload & buffer management
Dynamically switchable per-queue I/O schedulers
Kernel buffer splice capability for improved I/O buffer operations
Security
SELinux enhancements include Multi-Level Security and targeted policies for all services
SEtroubleshooter GUI simplifies SELinux management
Integrated directory & security capabilities
IPSEC enhancements improve security and performance
ExecShield enhancements, such as a call frame Canary word, strengthen hacker defenses
New Audit features provide powerful new search/reporting and realtime monitoring

Red Hat Enterprise Linux 5: Product Summary

- Features exposed to extensive testing with Fedora Core 4/5/6
  - Ensures high quality
- Application interfaces held stable for life of product

Foundational Stateless Linux features (X autoconfigure, NetworkManager, etc)
Improved ACPI support with features such as suspend to disk
Smart card login - with PKI/Kerberos authentication
Integrated multi-media support
Enhanced plug and play hardware support (cameras, printers, scanners, etc)
Network Manager provides automatic wired and wireless network configuration
Enhanced graphics using AIGLX/Compiz (with fading, transparency, etc)
Development Environment
Enhanced application development tools including SystemTap profiler and Frysk debugger
GCC 4.1 and glibc 2.4 toolchain
Storage
Support for root device multipath IO (MPIO) improves availability
Single system/guest version of Red Hat Global File System included in the base product
Block device data encryption support
Management
Numerous installer improvements make system configuration simpler
Yum/Pup-based updater for Red Hat Network
Conga cluster & storage management (with Virtualization Platform)

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Security Highlights

Red Hat Enterprise Linux 4/5 is the platform of choice for the most secure organizations in the world

- Security Enhanced Linux (SELinux)
  - Enterprise Linux 4 is the first commercial product to deliver SELinux technology
  - Red Hat has worked with the NSA to achieve this since they released code in 2000
- Additional security technology to limit consequences of buffer overflow vulnerabilities
  - Exec Shield and Position Independent Executables
- Improved auditing framework helps IT systems achieve compliance requirements
- EAL4+/CAPP certification enable new government deployments

Benefits to all customers

Tremendous ability to 'lock down' and secure systems

Specific benefits for government

EAL4+ certification enables a new wave of deployment

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Distribution Changes for RHEL 5

- No more AS/ES/WS
  - Server/Client/Workstation and AP (Advanced Platform)
- s390x (64-bit) kernel only
  - Still has s390 (31-bit) compatibility libraries
- Major kernel update
  - 2.6.9 -> 2.6.18
- s390utils update
  - v1.3.2 -> v1.5.3
- up2date -> yum
- Installation number
  - Used to filter packages, but doesn't prevent installation

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RHEL 5 Features: Changes

- 64-bit kernel only
  - 31-bit applications still run through compatibility libraries
- Deprecate CTC, NETIUCV (networking)
- GCC 4.1 with z9 instruction support
  - Default GCC options enable performance tuning for System z
- DASD access by VOLSER (label)
- QETH: set IPv4/IPv6 routers separately
- Oprofile call graph
- System z support for HAL
- Net-snmp included
  - Remote hardware monitoring

RHEL 5 Features: Performance & Measurement

- Consolidate guest monitoring data in z/VM
  - Linux-z/VM Monitor Stream
  - Write APPLDATA records
  - Kernel data
  - Application data
- Linux API to access z/VM *MONITOR records
- DCSS: discontinuous saved segment
  - Shared section of memory accessed by multiple guests
  - Allows XIP2 (execute in place) technology
  - XIP2fs integration into ext2

RHEL 5 Features: Performance & Measurement

- Accurate CPU accounting
  - Usage of CPU timer
  - Steal time
- Access to PR/SM LPAR performance data
  - CPU performance
  - hypfs filesystem
- Channel Path Measurement Data
  - Interpretation of data through SBLIM data gatherer
- Reduce virtualization overhead for FCP and networking
  - QDIO pass-thru: no z/VM intervention
- Fast minidisk access on 64-bit guests
  - Diag 250: CP performs actual I/O operations

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RHEL 5 Features: PAV/FCP

- PAV: parallel access volumes
  - Redundant paths to data through PAV aliases
  - Reliability: allows for path failover
  - Performance: overcomes channel bottleneck when accessing data
- FCP
  - Better IPL/re-IPL support
  - NPIV: N-port ID virtualization
    - Allows sharing of FCP/SCSI attached disks read/write
  - FCP debugging
    - Tool and logs available

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RHEL 5 Features: Device Support

- Device support
  - DS6000: asymmetric multipathing
  - Open source driver for 3590/3592 tape drive
- DASD support for write barriers
  - Data is reliably committed to disk
- Crypto2 Express support
  - CEX2C, CEX2A models
- System z9 SHA & AES instructions
  - In kernel and userspace

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RHEL 5 Features: Debugging

- SystemTAP / kprobes
- Dump analysis
  - Support for dump device configuration
  - s390dbf support for crash dump analysis tool
- Network problem analysis
  - Support for GuestLAN network traffic sniffer
- FCP Problem Analysis
  - ZFCP traces & logs

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What's new in 5.1

- Support for Layer 2 OSA at install
- Upstream DASD driver updates
- Upstream zFCP driver updates
  - SCSI layer change
- Many more z-specific enhancements

Contact information

- Brad Hinson, Dedicated System z Support Engineer (Raleigh) <bhinson@redhat.com>
- Mark Spencer, Dedicated System z Solutions Architect (Remote) <mspencer@redhat.com>
- Tim Deren, IBM Global Account Director (Westford)

  <tderen@redhat.com>

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Useful Links

- Technical mailing list (linux-390@vm.marist.edu)
  - Subscribe: http://www2.marist.edu/htbin/wlvindex?linux-390
  - Archive: http://www.mail-archive.com/linux-390@vm.marist.edu/
- RHEL 5 Virtualization Cookbook
  - http://www.linuxvm.org/present/misc/virt-cookbook-RH5.pdf
- RHEL 4 Virtualization Redbook
  - http://www.redbooks.ibm.com/abstracts/sg247272.html
- Presentations from SHARE user conferences and other links
  - http://www.linuxvm.org/present/
  - http://www.linuxvm.org/

Questions

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谢谢您 Grazie

Thank You

Merci Danke

Obrigado 謝謝您