RED HAT ENTERPRISE LINUX ROADMAP HIGHLIGHTS

Tim Burke
Vice President, Linux Development
and Engineering Team Leaders
Red Hat, Inc.
June 27, 2012

Objectives for the Roadmap Session

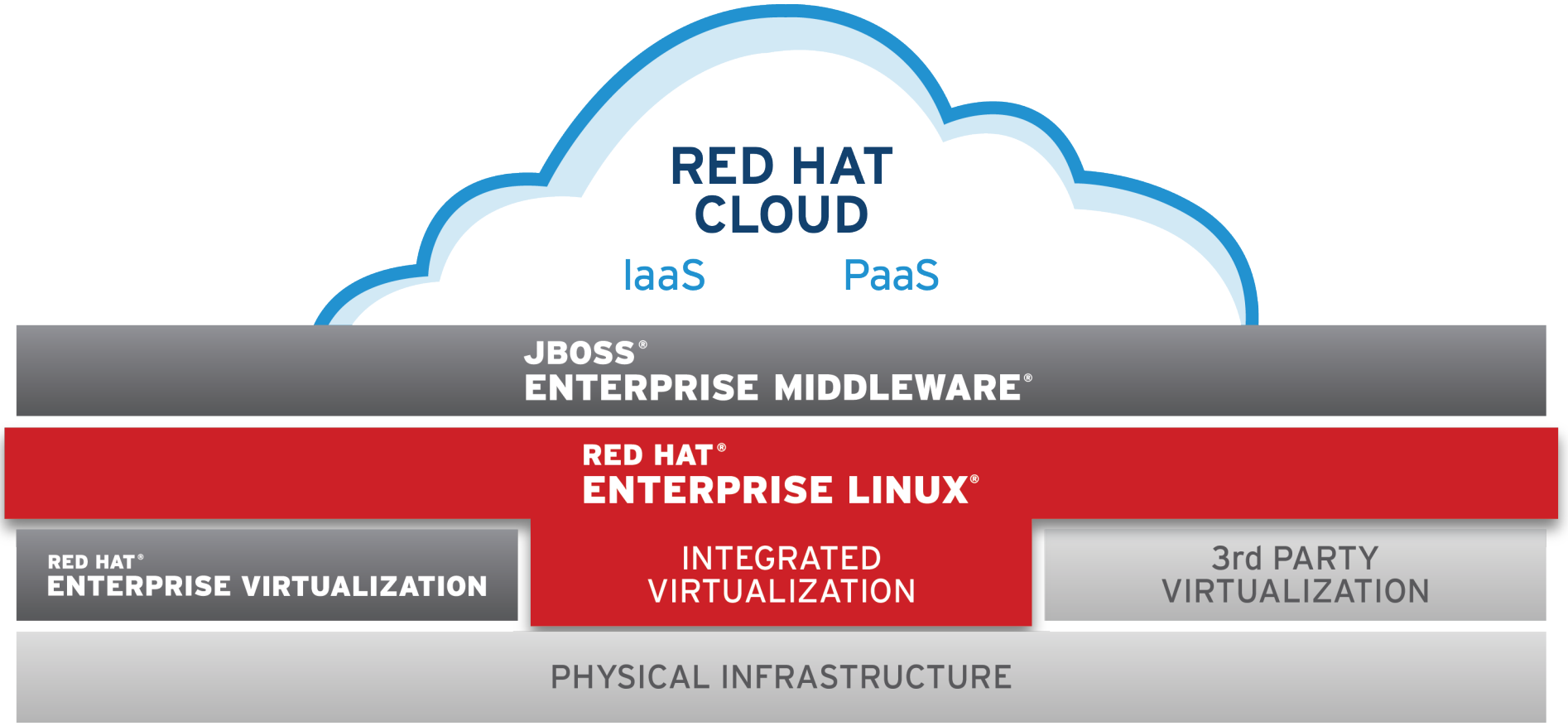
- Describe the lifecycle and each release's status
- Share highlights of upcoming features and product direction
- Session handout - Pointers to other resources and talks at the Red Hat Summit and beyond
- Meet the team
- Encourage feedback – including survey input

Disclaimer: mention of upcoming releases and features does not constitute formal product commitment and is subject to change.
Note: We have time to describe only a small subset of proposed features and themes.
TP – marks features in **technology preview** status

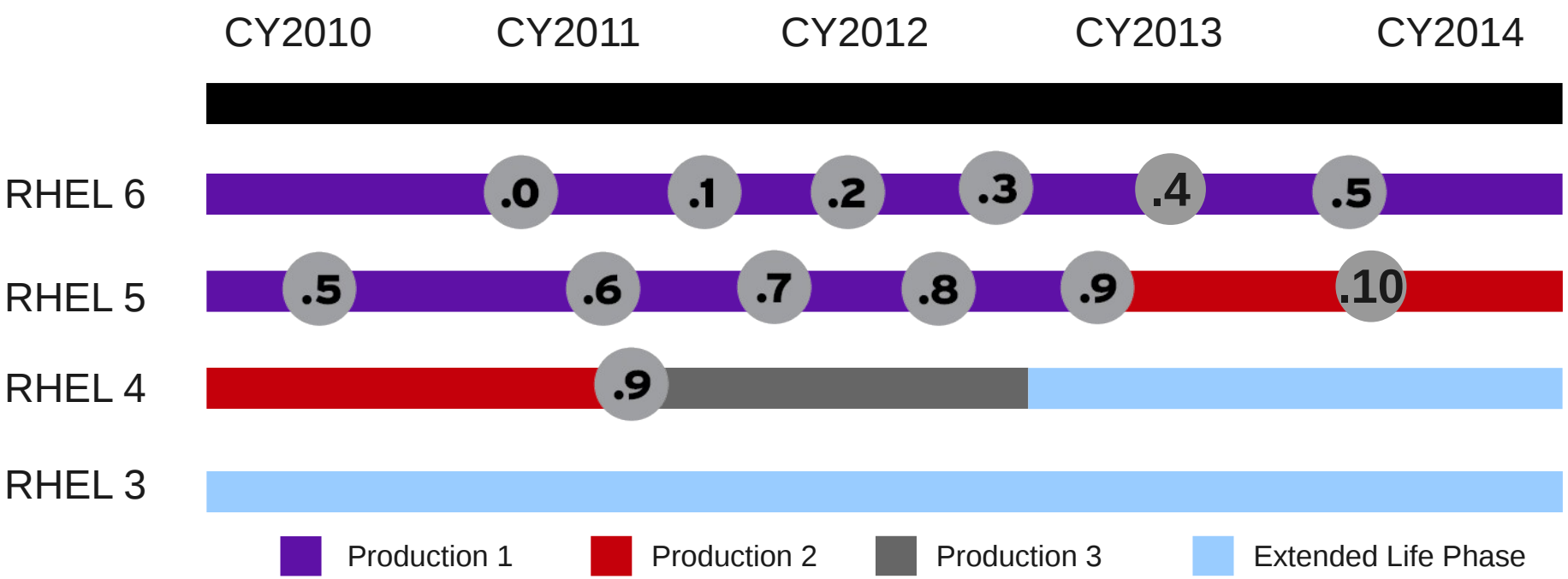
Agenda – 10-minute Segments

- Introduction – Tim Burke
- Virtualization – Dor Laor
- Kernel – Linda Wang
- Hardware Enablement – Peter Martuccelli
- Storage – Tom Coughlan
- Filesystem – Ric Wheeler
- **10 minute intermission**
- Installation, Packaging and Core Functions – Denise Dumas
- Security – Jack Rieden
- Desktop – Jonathan Blandford
- Developer Tools – Matt Newsome
- Summary and Q&A

PHYSICAL TO VIRTUAL TO CLOUD



Red Hat Enterprise Linux Life Cycle Overview



- Red Hat Enterprise Linux 5 & 6 are fully supported through the regular life cycle of 10 years from General Availability (GA)
- Divided into Production 1, 2 and 3 phases (features & fixes, transition of minor features & fixes, high priority fixes)
- Optional 3-year extension – extended life cycle support (ELS) phase after the production phase (year 7) provides software maintenance and technical support for Red Hat Enterprise Linux 3 & 4 (only)

Future release dates are approximate and subject to change

Red Hat Enterprise Linux 5 – Themes

- Concluding Production Phase 1 with RHEL5.9
- Focus on customer bug resolution – stability focus
- Basic hardware enablement
- Limited feature enhancements
  - Enablers to fit into upcoming system management initiatives – RHEV (Red Hat Enterprise Virtualization), Subscription / Entitlement services, optimized virtual guest
- Transitioning into Production Phase 2 maintenance with RHEL5.10
- RHEL5 – mature, stable base with 4.5+ years of runway

Red Hat Enterprise Linux 6 - Themes

- Active Production Phase 1 development – feature innovation + maintenance – RHEL6.3 announced June 21!
- RHEL6 is actively being deployed – production proven
- Cloud & virtualization operational efficiency enablers
  - Security containment, isolation, scalability
- Hardware platform enablement – topology optimization, reliability & fault handling
- Advanced storage – volume management – thin provisioning, FCoE, iSCSI, PNFS
- Networking & storage I/O optimizations
- Development tools & JBoss optimizations
- Common criteria government certification

Red Hat Enterprise Linux 7 - Themes

- Datacenter operational efficiency
  - System configuration interfaces – commence rollout of improved standardization
  - Facilitating Red Hat data center management offerings like RHEV, RHS & Satellite successors as well as 3rd-party and custom management frameworks
- Virtualization and cloud enhancements
  - Strengthen security isolation and fine grained capabilities
  - Enhance resource utilization controls and containers
  - Scalability and system efficiency enhancements for complex modern hardware topologies – NUMA
- Developer tools advancements
  - New compilers, OpenJDK, runtime languages, debuggers
  - Infrastructure allowing multiple versions installed

Red Hat Enterprise Linux 7 - Status

- Completed product planning
  - Customers, Focus Groups, Partners, Community
- Development currently underway – upstream & Fedora
  - Fedora 17 – shipped! - May 2012
  - Fedora 18 – Nov 2012
- RHEL7 public beta – first half 2013

Virtualization

Dor Laor
Senior Engineering Manager, RHEL Virtualization
Red Hat, Inc.

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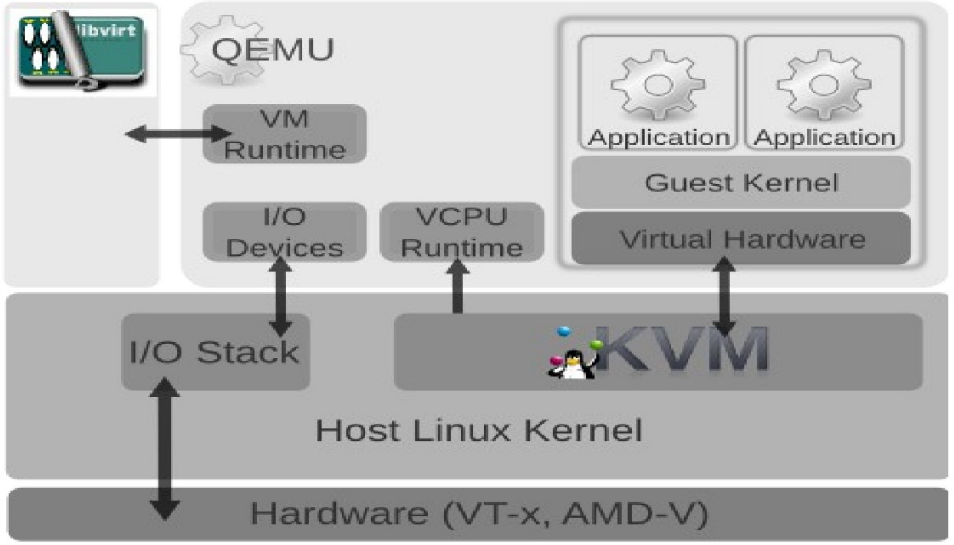
KVM



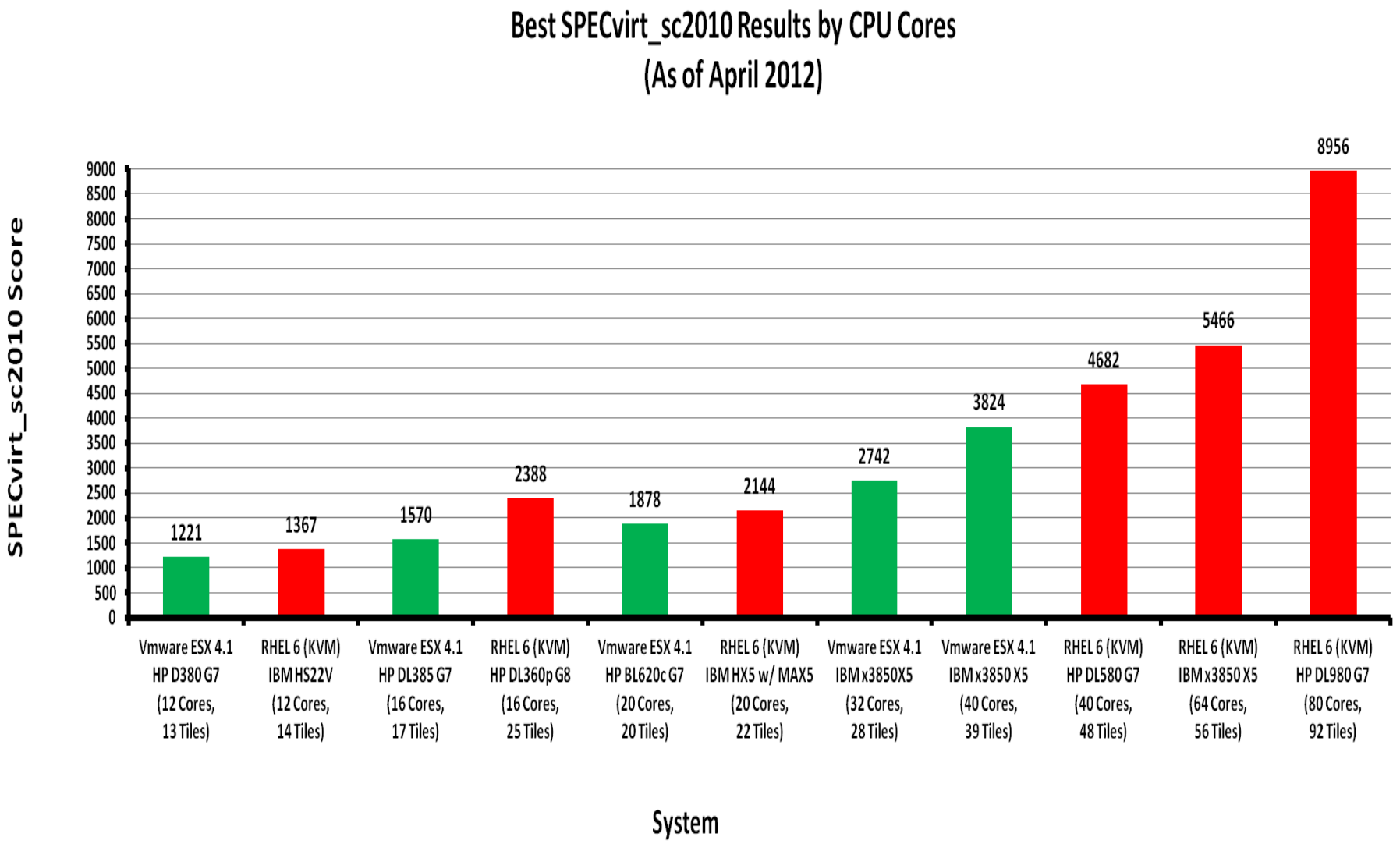
Virtualization Themes

- **Scalability** – Biggest(!) x86 guest (RHEL6.3)
- **Performance –** KVM wins all categories of specVirt
- **RAS** – SLA, online resource provisioning, etc
- **Maintenance –** Server and protect
- **Exceptional features–** Same OS for the host/guest
- **Enterprise, Cloud** – KVM address all scenarios

Virtualization Scalability – No Limits!

- Up to 160(!) virtual cpu per single VM (RHEL6.3)
- Up to 2TB RAM per single VM (RHEL6.3)
- Up to 64k block devices using virtio-scsi (RHEL6.3-TP)
- Largest cluster of virtualization hosts w/ RHEV
- Handful of others

Virtualization Performance – specVirt winner



KVM achieved a new

World record

details on

Thu. 1:20pm: KVM Virtualization Technology Update & Roadmap.. – Dor Laor and Bhavna Sarathy

Virtualization Performance – Coming

- **Non Uniform Memory Access optimization**
  - numad **(RHEL6.3-TP)**
  - AutoNuma/SchedNuma (RHEL7)
- MultiQueue virtual NICs (RHEL7)
- Zero copy networking (RHEL7)
- Virtio-scsi: new block layer (RHEL6.3-TP/RHEL7)
- Handful of new paravirt optimizations

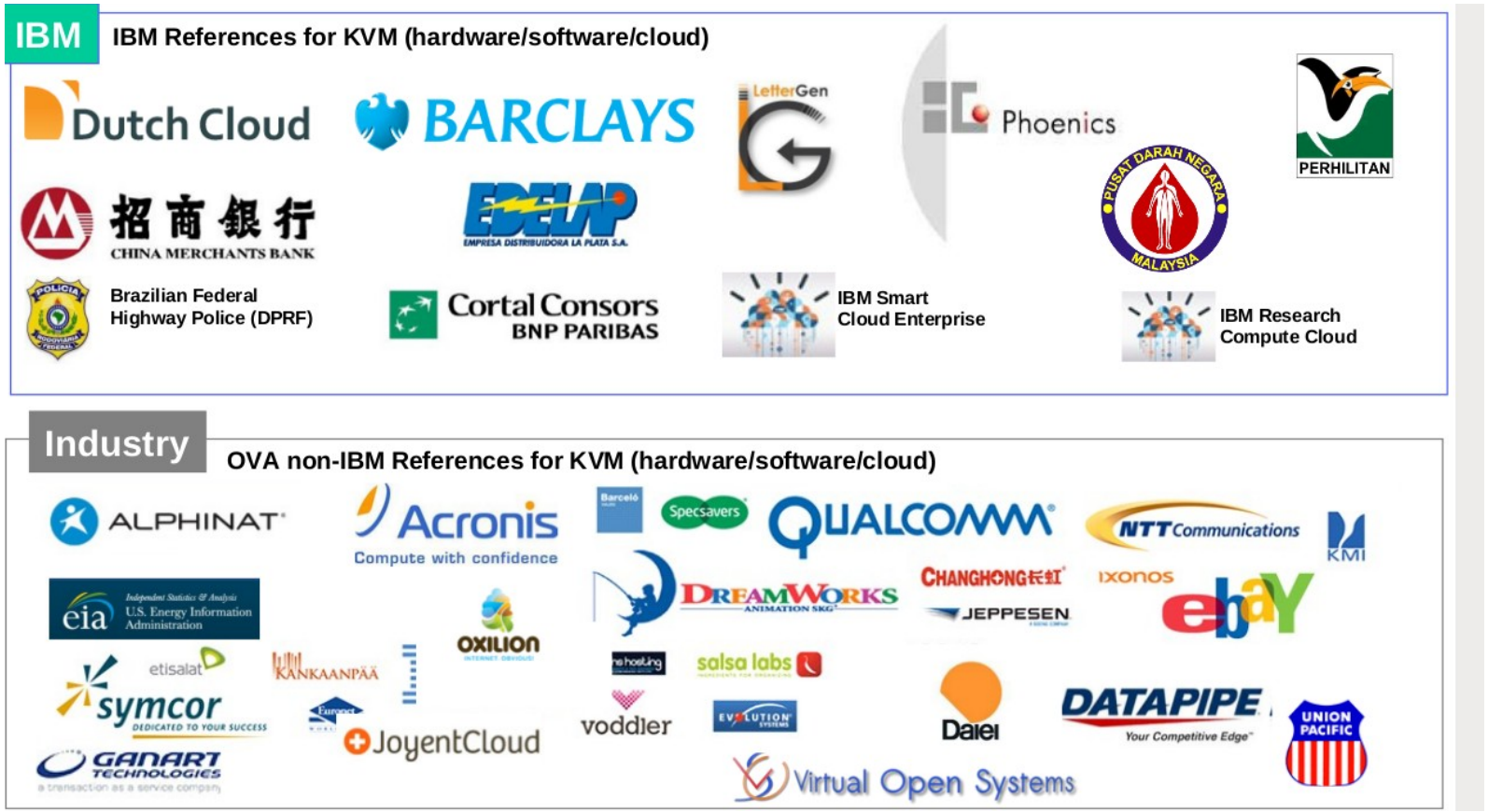
Virtualization RAS (Reliability, Availability and Serviceability)

- VCPU hotplug (RHEL6.3-TP)
- Memory hotplug (RHEL7)
- Live snapshots (RHEV3.1)
- Live block migration (RHEV3.1)
- VM power management (RHEL6.3-TP)
- Direct LUN pass through (RHEL6.4)
- vPMU (RHEL6.3-TP)
- More

Exceptional Virtualization Features

- RHEL on {host & guest}
- RAS aspects
  - Guest <–> Host channel
  - Out of the box agents(RHEL6.3-TP)
  - Paravirt clock, steal time(RHEL6.3)
  - Installer
- Performance aspects
  - Paravirt interrupts (RHEL7), pv page faults(RHEL7), performance profiles, etc.

Virtualization Deployments

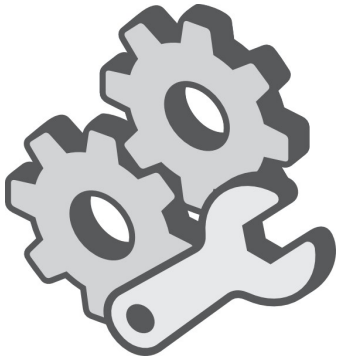


References

- Related Summit Sessions
  - **KVM Virtualization Technology Update & Roadmap** – Thursday, 1:20 pm - 2:20 pm
  - **RHEL Partner pavilion,** Wednesday 5:30pm – 8:00pm kvm/spice demo
- Resources
  - RHEL virtualization guides [1], reference architectures[2]
  - https://twitter.com/#!/OpenKVM

[1] RHEL documentation: http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/6-Beta/

[2] http://www.redhat.com/resourcelibrary/reference-architectures/



KERNEL

Linda Wang
Senior Engineering Manager, Core Kernel
Red Hat, Inc.

Core Kernel Features and Enhancements

- **Virtual Memory, Scheduler**
  - Out Of Memory/Transparent Hugepage/NUMA
  - CFS Scheduling
- **Resource Management**
  - Linux Container: control groups & namespaces
- **Networking**
  - Numerous performance enhancements
- **Debugging Mechanism**
  - Perf/tracepoint/Hardware Error Reporting Mechanism
  - Kexec kdump

Virtual Memory Enhancements

- **Manageability**
  - /proc/<pid>/oom_score_adj: To Improved OOM (out of memory) heuristic (RHEL6.2)
  - /proc/<pid>/smaps and mremap, mincore, mprotect syscalls to Transparent Hugepage (RHEL6.2)
- **Scalability**
  - Added Cross Memory Attach feature (RHEL6.3)
  - numad support (RHEL6.3-TP)
  - AutoNuma vs SchedNuma (RHEL7)

CFS Scheduler Enhancements

- **Scalability Improvement**
  - Backport various CPU scheduler changes to prevent system deadlock or delay when moving tasks between cgroups (RHEL6.3)
  - Long running tasks that do not block require periodic updates to maintain accurate share values. Therefore, applied periodic share updates to task's entity_tick() to provide fair and balanced CPU usage (RHEL6.2)

Thu. 2:30pm: Performance Analysis & Tuning of Red Hat Enterprise Linux, John Shakshober and Larry Woodman

Resource Management Improvements

- **Linux Container (a.k.a. LXC)**
  - Name Space (NS) - Tighter integration with security features
    - **RHEL6**: will stay Technical Preview
    - **RHEL7**: aim full support with Linux Container
  - Focus on needed SELinux policies and other security related improvements to make it secured
  - Gather user experience and feedback

Thu. 1:20 pm: Multi-tenancy Virtualization Challenges, Dan Walsh

Thu. 2:30 pm: Scaling & the Cloud: Operational Best Practices, Mike McGrath

Control Group Support

	RHEL6.1	RHEL6.2	RHEL6.3	RHEL 7
CPU	Proportional only	Proportional & Maximal [128]	Proportional & Maximal	Proportional & Maximal
CPUSet	Maximal only	Maximal only	Maximal only	Maximal only
Memory	Maximal only	Maximal only	Maximal only	Maximal only
Networking	Proportional & Maximal	Proportional & Maximal	Proportional & Maximal & Priority	Proportional & Maximal & Priority
Block IO	Proportional & Maximal	Proportional & Maximal	Proportional & Maximal	Proportional & Maximal

Thu. 11 am - 6 pm Partner Pavilion RHEL booth – Cgroup Demo: Linda Wang, Vivek Goyal, Larry Woodman

Core Networking Features

- **Manageability**
  - Add TCP_USER_TIMEOUT socket option (RHEL5.9)
  - IPSet: Dynamically updates iptables rules and ports (RHEL6.2+RHEL6.3)
- **Scalability and Performance Enhancement**
  - Added New QuickFairQueuing scheduling discipline for packet scheduling to provide tight service guarantees with low per packet cost. (RHEL6.3-TP)
  - Added ‘mqprio’ module for Multi-queue priority support – this scheduler exposes the underlying traffic class and allow users to configure and map socket priority to traffic class (RHEL6.3)
  - Added ‘ipmr’ module: to support multiple independent multicast routing ip tables instances (RHEL6.3)

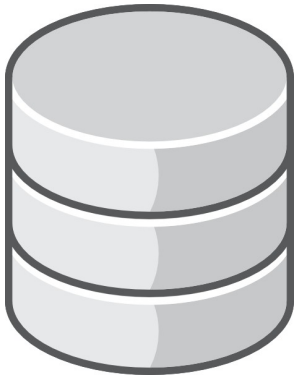
Core Networking Features (Cont.)

- **Scalability and Performance (Cont.)**
  - Improve network interfaces aggregation for better manageability and stability:
    - Team Driver & libteam support - (RHEL7)

Wed. 2:30 pm: – Achieving Top Network Performance, Mark Wagner

Kernel Debugging Mechanisms

- Perf and Oprofile Updates
  - Update perf & Oprofile to latest x86_64 support (RHEL6.2|6.3)
  - Added python-perf package (RHEL6.2)
- Added Udp, jbd2, and signal tracepoints (RHEL6.2+RHEL6.3)
- Hardware Error Reporting Mechanism (HERM) (RHEL7)
  - Add support for reporting APEI events
- Kexec Kdump Supportability
  - Added ext4, XFS, brtfs filesystem support (RHEL6.0+)
  - Lower threshold to 2G to enable more systems (RHEL6.3)
  - Added new device target such as iSCSI and Vlan over tagged bonding (RHEL6.3)
  - Multipath and FcoE target device support [RHEL7]



HARDWARE ENABLEMENT

Peter Martuccelli
Kernel Development Team
Red Hat, Inc.

Development Topics

- **RHEL 5/6/7** – limitations, new additions and beyond
- **ARM** – latest development information
- **Power Management** – latest platform results
- **Infiniband** – OFED and OFA

RHEL5

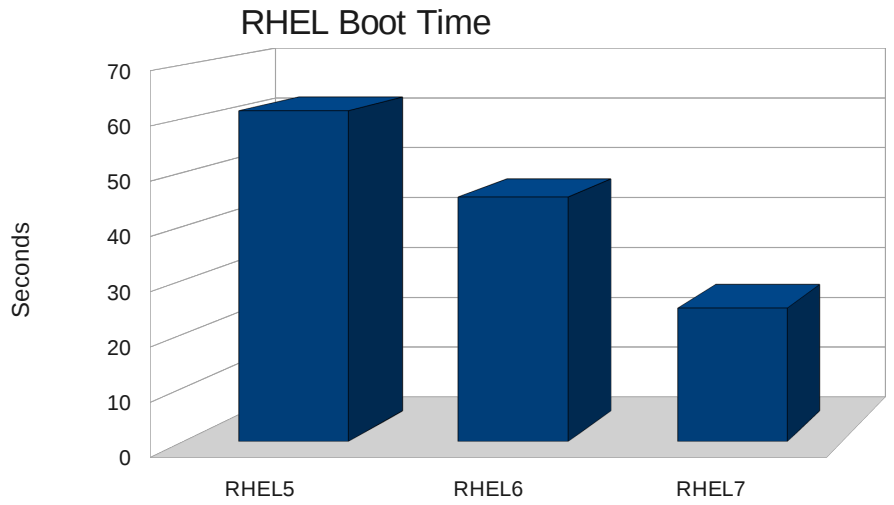
- Plan on extending hardware support in RHEL5.9
  - Intel® Micro-architecture codename IvyBridge-EX
  - Intel® Micro-architecture codename Haswell
- Haswell development includes support for its associated Platform Controller Hub, (PCH)
- Limited hardware support in RHEL5, advanced RAS features and instructions are in RHEL6, RHEL7

RHEL6

- Released support for SandyBridge-EP/4S (RHEL6.1)
- Released support for IvyBridge-EP (RHEL6.2)
- SAS Control Unit updates for Intel® C600 (RHEL6.2, RHEL6.3)
- Micron PCIe RealSSD drive support (RHEL6.3)
- FCoE ease of use (RHEL6.3)
- SR-IOV support on ConnectX-3 10/40GbE Mellanox cards (RHEL6.3)
- New x86 RDRAND instruction (RHEL6.3)
- HP's Gemini hyperscale server with Intel's low power Centerton processor (RHEL6.3-TP, full support RHEL6.4)
- 40GbE Card development vendor/upstream (RHEL6.4)
- Support planned for Intel® Micro-architecture codename Ivy Bridge-EX/Haswell (RHEL6.4)

RHEL7

- Select ACPI 5 topics under development, (additional RAS and power savings)
- Support planned for Intel® Micro-architecture codename IvyBridge-EX/Haswell
- Increased SR-IOV virtualization optimizations - for Emulex, Solarflare, Brocade, Broadcom
- Machine-readable, and device-aware system logging (new kernel printk() facility, systemd-journal).
- Systemd – central hotplug capable service manager



ARM

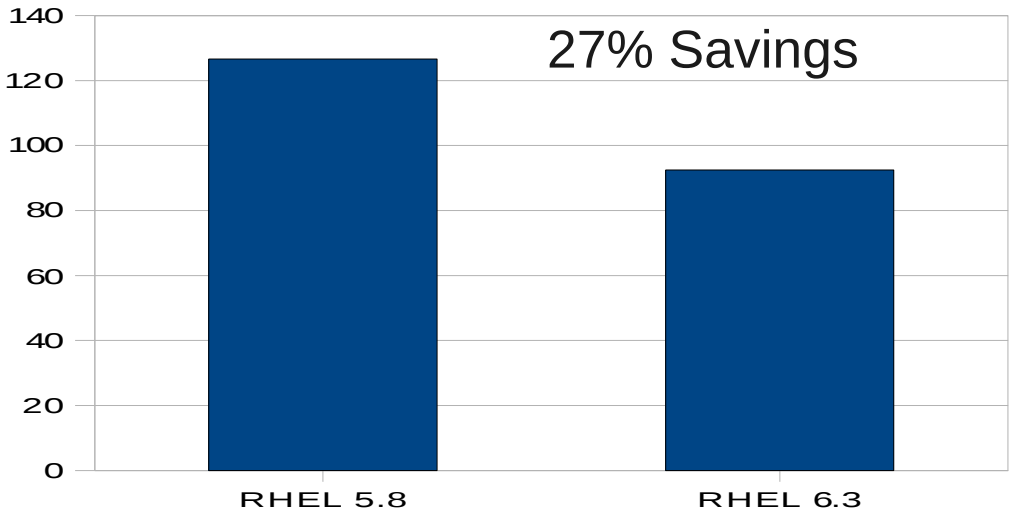
- Backing Fedora ARM Community
- F17: 11000 Packages, 5 ARM Semiconductors, in 6 months

http://fedoraproject.org/wiki/Architectures/ARM/Fedora_17_Beta

- Supports $35 Toys to Million Dollar Hyperscale Servers
- It’s not an ARM experience, it’s Red Hat.
- Kernel: Using Enterprise Configurations and Upstream Sources.
- Java: Increasing OpenJDK performance and reliability to power Hadoop and other server workloads.
- Community: Working with Linaro, ARM, others to foster the emerging ARM Linux Server ecosystem.

Power Management

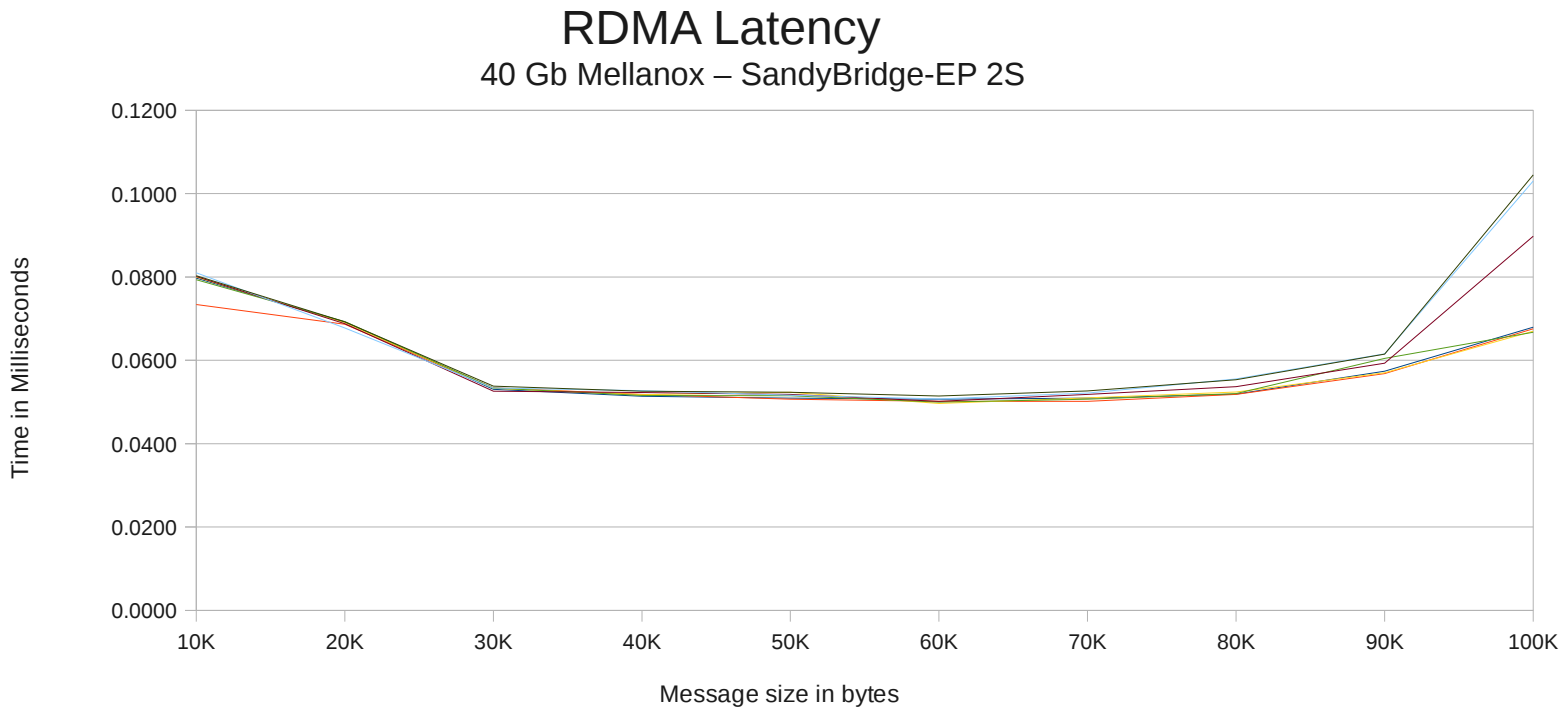
HP ProLiant DL360p Gen8 dual socket SandyBridge-EP Server

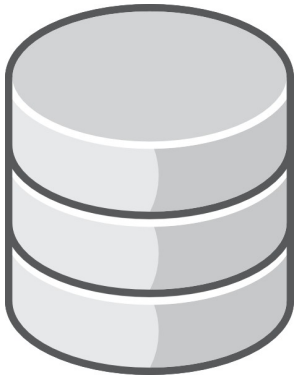


- CPU idle savings of 27% compared to RHEL 5
- ACPI 5.0 work on Memory Power State Table for additional savings

Infiniband

- Open Fabrics Enterprise Distribution (OFED) update for RHEL5.9 to 1.5.4.1
- Updated driver support, mlnx4_ib/en/core, chelsio (iw_)cxgb3/4
- Open Fabrics Alliance (OFA) and upstream kernel development in RHEL6/7





STORAGE

Tom Coughlan
Senior Engineering Manager, Kernel Storage
Red Hat, Inc.

Storage Themes

- **Scalability**
  - Scale-up and Scale-out
- **Interoperability**
  - As a storage client (FC, FCoE, iSCSI, SAS/SATA)
  - ...and as a storage server (FCoE and iSCSI target)
- **Manageability**
  - Storage virtualization – software RAID, snapshot, thin provisioning
  - Ability to manage external storage from the o.s.

Storage Interoperability

- Support drivers for the latest SAN and Combined Network (CNA) hardware
  - Fibre Channel (FC) moving from 8 Gbps to 16 Gbps. (RHEL5.9, 6.3, 7)
  - Addition of new drivers from Brocade: FC, FCoE, and 10Gb Ethernet. (RHEL5.9, 6.3, 7)
  - Add support for RHEL as an FCoE storage server. (RHEL6.3, 7)
    - Complements existing support for RHEL as an iSCSI storage server.

Storage Interoperability

- Local storage
  - HBA RAID, combining flash, SSDs, and HDDs, from LSI, HP, PMC-Sierra (Adaptec) (RHEL5.9, 6.3, 7)
  - Serial Attached SCSI (SAS) moving from 6 Gbps to 12 Gbps (RHEL7)
  - The performance requirements of PCIe flash are driving new standards (RHEL6, 7):
    - Non-Volatile Memory express (NVMe),
    - SCSI Express
      - Based on SCSI over PCIe (SOP)

Storage Manageability

- Storage virtualization with LVM
  - Addition of RAID 4,5,6 (and new RAID 1) (RHEL6.3, 7)
    - Higher RAID levels provide redundancy at lower cost.
  - Introduction of lvmetad (RHEL6.3-TP, 7)
    - Track changes dynamically with udev, to avoid scanning.
  - Introduction of LVM Thin Provisioning. (RHEL6.3-TP, 7)
    - Thin Logical Volumes (LVs) only consume Volume Group (VG) space when written to. Space is returned to the pool when data is discarded.

Storage Manageability

- New implementation of LVM Snapshot, based on LVM Thin Provisioning (RHEL6.3-TP,7)
  - Snapshot LV consumes space only when the origin is written (or the snapshot LV itself is written directly).
  - Scales better than the existing implementation.
    - If there are multiple snapshots of the same origin, then a write to the origin will cause just one copy-on-write operation to preserve the data.
    - Recursive snapshots do not require recursive table look-up.

Storage Manageability

- libStorageMgmt – an open-source vendor-agnostic API (and CLI) to manage external storage. (RHEL6.x, 7)
  - Provision a LUN, export an NFS mount-point, take a hardware snapshot, monitor status...
  - See http://sourceforge.net/apps/trac/libstoragemgmt/

References

- Related Summit Sessions
  - Lab: “Fundamentals of Storage Management with LVM” Wednesday, 3:50pm – 5:50pm
- Resources
  - http://sourceforge.net/apps/trac/libstoragemgmt/
  - Mailing lists like linux-scsi, linux-lvm, lvm-devel, dm-devel, dm-multipath

File Systems

Ric Wheeler
Senior Engineering Manager, Kernel File Systems
Red Hat, Inc.

Expanding Choices

- Early versions of RHEL5 had limited choices in the file system space
  - Ext3 is the local file system
  - NFS is your NAS choice
  - GFS1 for clustering/HA
- RHEL5 brought in ext4, GFS2, XFS and FUSE support
- RHEL6 added in a btrfs and parallel NFS (pNFS) as technology previews
  - Ongoing work to bring them to production quality

Red Hat Enterprise Linux 6 - File System Updates

- RHEL6.2
  - Clustered Samba on GFS2 brings high performance
  - Parallel NFS (pNFS) client supports new high performance NAS appliances (tech preview)
  - XFS performance gain for meta-data intensive workloads like high object count file systems
- RHEL6.3
  - GFS2 enhanced performance
  - O_DIRECT support for FUSE file systems

Red Hat Enterprise Linux 7 Will Deliver More Choices

- RHEL7 will support ext4, XFS and btrfs (boot and data)
  - Ext2/Ext3 will be fully supported & use the ext4 driver
- Storage system manager will provide a unified ease of use for all supported file systems
  - FS creation, adding disks to an FS, etc
  - http://sourceforge.net/p/storagemanager/home
- Full support for all pNFS layout types broadens the supported server types for high performance NFS

File System Scalability

- Maximum file system size needs to keep up with the ever expanding capacity of storage
- RHEL5 and RHEL6 broke the 16TB limit
  - GFS2 and XFS both raised the limit to 100TB
- RHEL7 limits jump again
  - GFS2 goal of 250TB
  - XFS goal of 500TB
  - Btrfs and ext4 will both exceed 16TB
- Our limits are tested limits, not theoretical ones!

Network File Systems: NFS and Samba

- RHEL7 NFS
  - Adds support for the broader range of high performance NFS appliances with block and object pNFS support
  - Adds support for labeled NFS to enable fine grained SELinux guests on NFS
- RHEL7 Samba & CIFS
  - New support for SMB3.0 protocol in Samba
  - Kernel CIFS module support for SMB2.1

References

- Visit storage alley and meet the core architects!
- Talks
  - Wed 10:40 - *A Deep Dive into Red Hat Storage*
  - Wed 2:30 – *Distributed File System Choices*
  - Wed 4:50 & Thurs 1:20 – *GlusterFS Overview*
  - Thurs 10:40 – *Introduction to Red Hat Storage*
  - Thurs 2:30 – *The Future of NFS*
  - Thurs 4:30 - *NFS protocol (Campground)*
  - Thurs 4:50 – *Red Hat Storage Roadmap & Futures*
  - Fri 9:45 – *Red Hat Storage Performance*

RED HAT ENTERPRISE LINUX ROADMAP HIGHLIGHTS – Part 2

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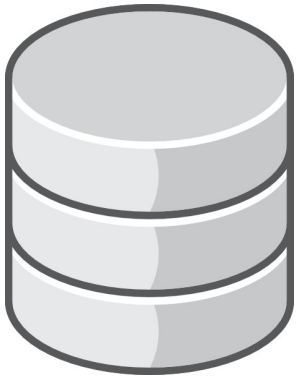


Base OS - Installation, Packaging, Core Functions

Denise Dumas
Director, BaseOS
Red Hat, Inc.

Installation New Features for RHEL6.3

- Two new options added to the kickstart volgroup command to specify initially unused space (in megabytes or percentage of the total VG size)
- Large-memory systems receive more appropriate swap sizes
- 3 retries of failed transfer on package downloads
- FCoE support - VLAN discovery option for FCoE devices, all network devices used for installation to FCoE storage devices are activated automatically after reboot

Installation Plans for RHEL7

- Totally rewritten user interface / kickstart generator
  - Hub and spoke model for simplification and streamlining - less time answering questions – 3 screens for a standard install
  - See the new User Interface and talk with the anaconda team in the campground on Wednesday 1:30 to 2:00
- Memory footprint for installation reduced to 512 MB, makes smaller guests supportable
- Stage 1 loader functionality merged into dracut so install environment boots same way as installed system
- Switching to Grub2; modern boot loader

Web-Based Enterprise Management

- Systems management technologies standardized by Distributed Management Task Force (DMTF)
- RHEL5 and RHEL 6 include both tog-pegasus and sblim “CIMOM brokers”
  - Allow access to Common Information Model (CIM) providers, mostly monitoring at the moment
- RHEL7 – looking at additional CIM providers
  - SMI-S - Storage Management Initiative
  - SMASH - Systems Management Architecture for Server Hardware
  - CIMI - Cloud Infrastructure Management Interface

Campground Breakout session, Thursday at 4:50 - taking the survey enters you to win a Red Hat keyboard!!

Performance Tuning Assistance with numad – RHEL6.3-Technology Preview (TP)

- User-level daemon to automatically improve out-of-the box NUMA system performance
- Monitors available system resources on a per-node basis and assigns significant consumer processes to aligned resources for optimum NUMA performance
- Provides pre-placement advice for the best initial process placement and resource affinity
- Not enabled by default
- Most effective for moderately loaded systems with long running processes that use significant resources, e.g, KVM guests, HPTC

Packaging Futures

- Yum/anaconda/LVM2 integration to assist RHEL6 to RHEL7 upgrade
  - Snapshot/rollback available in 6.2 via yum plugin
  - Easier and integrated via installer in RHEL7
- Yum parallel downloader
- Yum improved handling of comps groups that change between versions - understands package additions and deletions and applies during updates
- RPM: Improved performance and robustness: improved file conflict detection, more thorough input validation, added error checking and handling for GPG headers

Sample Core Package Updates – RHEL6.3

- Yum - More obvious progress indicators, transaction messages now show Updating, Cleanup, Verifying. Unprivileged user attempts with Read-only commands return graceful error
- Yum-utils added “show-changed-rco” command
- Bind updated
  - Severity of named external DNS query messages changes from “notice” to “debug”, to reduce logfile pollution
  - Named daemon uses portreserve to reserve RNDC port to avoid conflicts with other services
- Nmap upgrade to nmap-5.51-1 to fix long-term outstanding performance issue
- Rsyslog updated to 5.8.6, which includes rate limiting, daemon can now limit the number of messages it accepts through a unix socket

Sample Core Package Updates – RHEL5.9

- Ghostscript update improves support for PDF/A file format, the ISO-standardized version of PDF targeted at long-term document preservation
- Added iotop, tracks device I/O on a per-process basis
- Ksh bugfixes – many popular fixes
- Updated unixODBC64 (unixODBC version 2.2.14) and related connector packages added – install it or keep original unixODBC based on compatibility requirements
- Curl updated to include negotiate proxy support, --proxy-negotiate

References

- Related Summit Sessions
  - Manageability / CIM Campground – Thursday at 4:50 (Take the survey, you could win a Red Hat keyboard ;-)
  - Anaconda Installer – see the new User Interface in the campground, Wednesday, 1:30 to 2:00
  - Automatic Bug Reporting Tool, in the campground, Wednesday, 5:30 to 8:00
- Resources
  - See our new Yum How-to video at https://access.redhat.com/knowledge/videos/basic-yum-usage
  - Developer Day talk - Packaging: Making Life Easier with RPM
  - Watch for the numad Kbase coming soon to a Portal near you

Security

Jack Rieden
Senior Manager, Security
Red Hat, Inc.

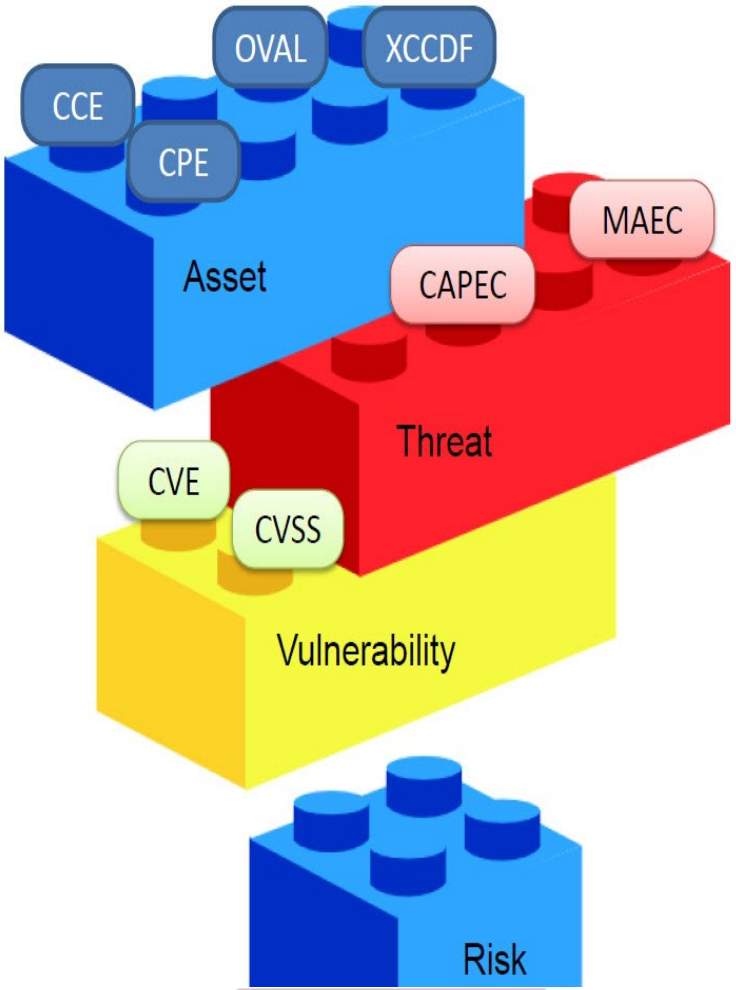
Topics

- SELinux
- Security Content Automation Protocol (SCAP)
- Software Assurance
- Standards & Certifications
- Upcoming Security Features

SELinux

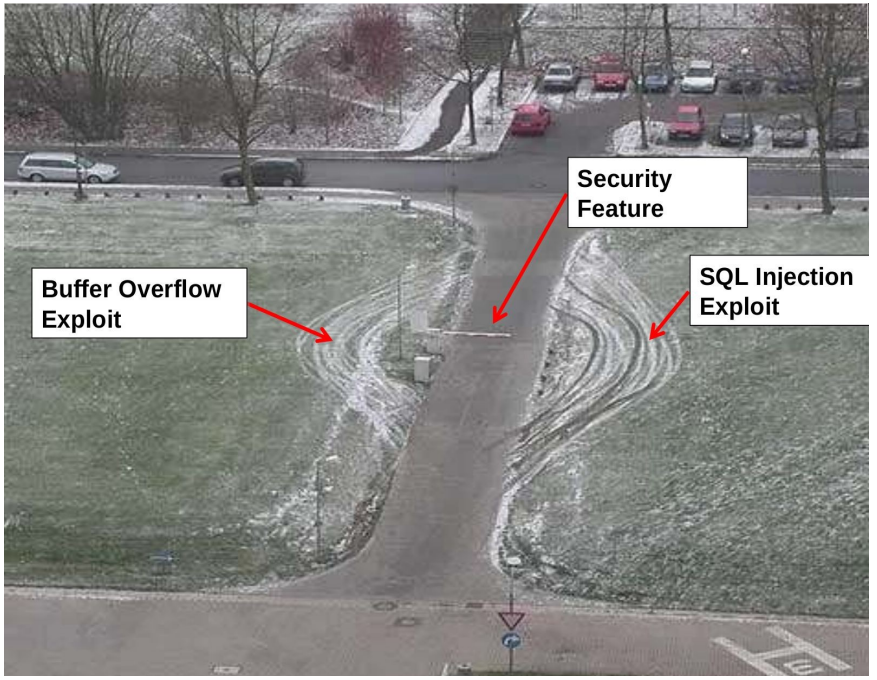
- Improvements to MLS Policy (RHEL6.2)
  - ssh, audit to meet Common Criteria Certification
- Updated Documentation (RHEL6.3)
- Usability improvements with SETroubleshoot
  - Diagnose and mitigate SELinux policy issues
- Secure Containers (RHEL7)
  - Leveraging sVirt and cgroups for multi-tenancy
- Dan Walsh Blog - “Got SELinux” http://danwalsh.livejournal.com/

Security Content Automation Protocol (SCAP)



- Benefits
  - A standardized approach to maintaining the security of enterprise systems
  - Check systems for signs of compromise
- Supported in RHEL5 and RHEL6
- OpenSCAP Library
  - Compliant with SCAP 1.1
  - SCAP 1.2 (in progress)
- Integrated with SpaceWalk
  - Upstream project for Satellite

Software Assurance



- Common Criteria Certification

  Internationally recognized certification for information assurance products

  - RHEL5.6 Virtualization-KVM
  - RHEL6.2 Base OS, Virtualization-KVM – (in Final Evaluation)
    - Advanced Audit – remote logging
    - dm-crypt – transparent disk encryption
    - Automatic Screen locking
- Static Analysis of all RHEL packages

Standards and Certifications

- FIPS 140-2

  US Government Standard used to accredit cryptographic modules

  - RHEL5.4 (NSS, OpenSSH, OpenSSL, OpenSwan, libgcrypt, Kernel Crypto API)
  - RHEL6.2 (NSS, OpenSSH, OpenSSL, OpenSwan, Libgcrypt, dm_crypt, Kernel Crypto API)

- USGv6

  Defines the base standards required for IPv6 networking in the Federal Government (Replaces IPv6 Ready Logo)

  - RHEL5
  - RHEL6.2 (OpenSwan)

- US Government Configuration Baseline (USGCB)

  Provides a minimum security configuration for software products

  - RHEL5
  - RHEL6 (coming soon)

Upcoming Security Features

- Deny Ptrace
  - SELinux will prevent a process to ptrace other processes
- Support for AES Counter Mode (CTR)
  - Supports pipeling encryption operations for improved performance
- Sudo integration
  - Look up sudoers rules stored in remote directories via System Security Services Daemon (SSSD)
- Seccomp
  - Reduce attack surface for virtualization security
- Centralized management of SSH Keys
  - Capability to deliver user's ssh public key to servers
- Windows AD Integration
  - User authentication and machine joining domain

References

- SELinux
  - Thu. 1:20 pm: Multi-tenancy Virtualization Challenges, Dan Walsh
- Red Hat Certifications
  - http://www.redhat.com/solutions/industry/government/certifications.html
- SCAP – OpenSCAP project - http://www.open-scap.org
- AD Integration - http://fedoraproject.org/wiki/Features/ActiveDirectory
- Seccomp - http://paulmoore.livejournal.com/tag/libseccomp

Desktop

Jonathan Blandford
Engineering Manager, Desktop Solutions
Red Hat, Inc.

Overall Desktop Themes

.

- **Hardware compatibility** – newer graphics, laptop support, and tablet support
- **Applications** – Upgraded application stack
- **Future** – what's coming in RHEL6.4 and RHEL7

Hardware – Graphics updates (RHEL6.2)

- New and updated graphics hardware support
  - Added updated support for XGI Volari Z9s
  - Intel Sandy Bridge and Ivy Bridge
  - AMD Cayman, Fusion, and Llano graphics
  - ServerEngines Pilot 3 graphics
  - Nvidia fermi support
- Added support for DisplayPort in nouveau drivers
  - Many laptops use this connector internally to drive LCD screens

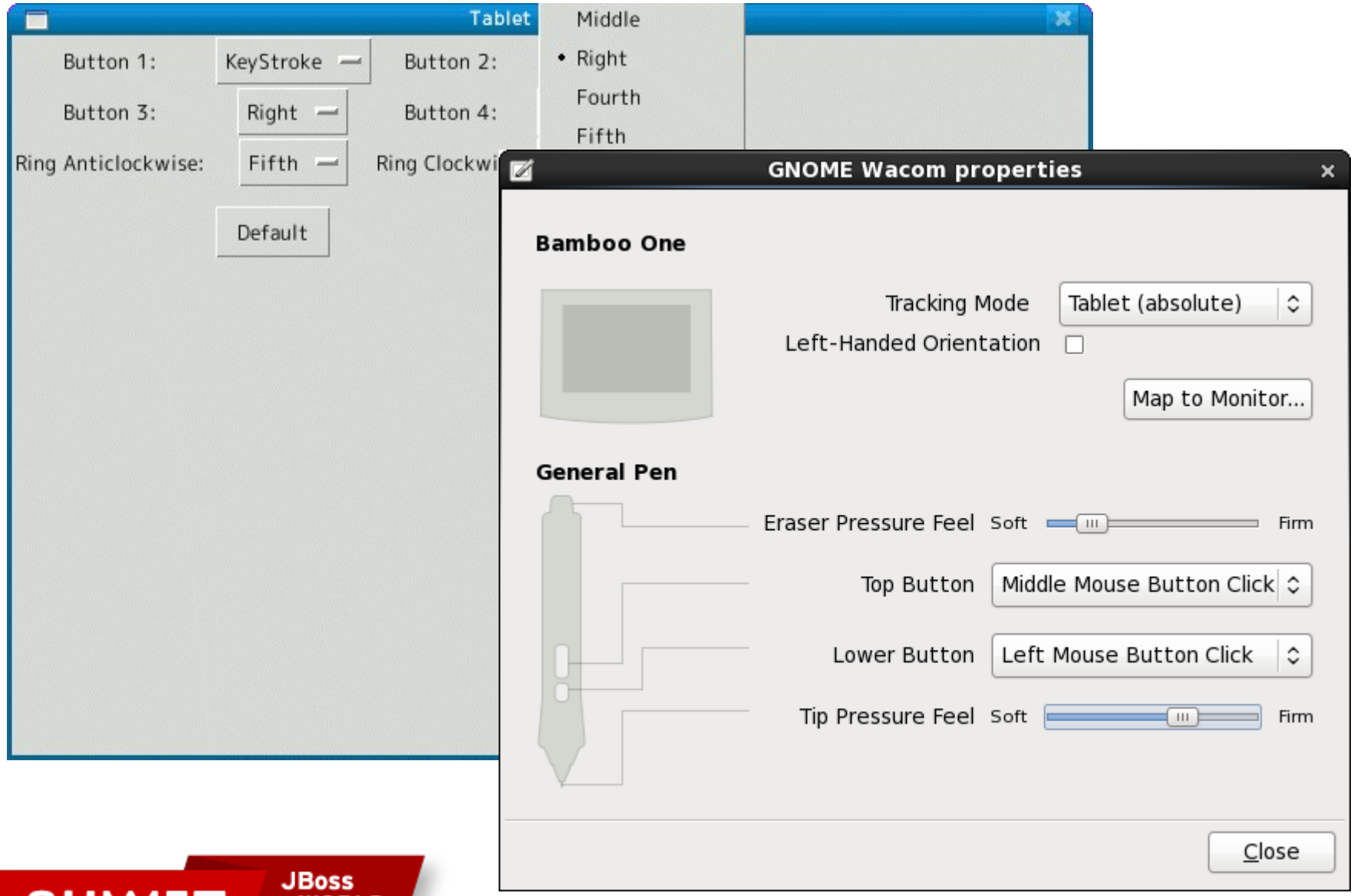
Hardware – Graphics updates (RHEL6.2)

- Improved RandR support in the mga driver
    - Means that we can hotplug monitors
- Fixed numerous suspend and resume issues across ThinkPad series of laptops
- Loads of bug fixes!
    - libGLw support, xrandr panning, dual screen display detection, etc

Hardware – Wacom Tablet (RHEL6.3)

- Modernized the experience
  - Added support for Cintiq 21/24 HD and Intuos 4 WL
  - Supports hotplug of tablets and styli
  - Tablet specific hardware database
  - Calibration, screen-mapping, and keyboard shortcuts
  - Significantly cleaner user interface
- Partnered with a customer and Wacom to do work upstream first

Hardware – Wacom Tablet (RHEL6.3)



Hardware – NetworkManager (RHEL6.3)

- Desktop networking features:
  - Wireless:
    - More reliable WiFi roaming in enterprise environments
    - Support for EAP-FAST authentication
    - Better support for token-based WiFi authentication
  - Integrated support for IP-over-Infiniband interfaces
  - Initial bonding and vlan support
    - Accessible via API and nm-cli
  - VPN cleanups and improvements

Applications – LibreOffice (RHEL6.3)

- Moved fully from OpenOffice 3.2.1 to LibreOffice 3.4.5
  - Fully compatible with the previous version
  - Significantly faster start time and lower memory usage
  - Cleaner user interface
  - Calc maximum row count increased
  - Lots and lots of little improvements

Applications – Firefox and Thunderbird (RHEL5/6)

- Upgraded Firefox and Thunderbird from 3.6 to 10-ESR
  - Supports more of the web!
  - New, much faster javascript engine which means a faster web
  - WebGL support and accelerated web rendering
  - Integrated “Do Not Track” support
  - Doing this simultaneously for both RHEL5 and RHEL6
- Looking at point release every 6 weeks to track upstream releases

Spice and Desktop Virtualization

- Updated local client: virt-viewer (RHEL6.3)
  - Replaces spicec for access to local VMs
  - Cleaner user interface
- Significantly better Linux guest support (RHEL6.2/6.3)
  - Faster rendering and working xinerama
- Local USB passthrough (with KVM) (RHEL6.3)
  - Works with all guests! No drivers needed.
  - Hotplug aware, and full host control of access
- Windows drivers fully included (RHEL6.3)

Future

- RHEL6.4
  - We are still in the planning phase – working the feature requests list with Support and Product Management right now.
  - Planning another X-server rebase to 1.13
  - NetworkManager rebase planned

Future

- RHEL7
  - Easy to use for modern life!
  - Access your data in the cloud
  - Works within your IT infrastructure
  - Integrated desktop virtualization

Come see our demo and enter to win a tablet!

TOOLS

Matt Newsome
Engineering Manager, Toolchain Team
Red Hat, Inc.

Tools Themes

- **Reliability –** Solid tools backed by dependable support
- **Leadership –** What's next for Red Hat Tools?
- **Freshness** – Newer tools on older RHEL
- **Flexibility** – Run applications on multiple RHEL

Tools Reliability and Leadership

- GNU Compiler Collection (GCC) / Debugger (GDB)
  - gcc/gdb celebrated 25th anniversary this year
  - Stability and performance to match
  - Tools in major RHEL releases actively supported for 10 years
- RHEL7 Innovations
  - Leading role in ISO C/C++11 Standard Implementation
    - Notably extensions for guaranteed atomic memory accesses
  - Parallelism and Concurrency Leadership
    - Led gcc Transactional Memory work (e.g. Intel Haswell)
      (Simpler concurrency; atomic execution of source instruction groups)
    - gdb: remote debugging capabilities for Cloud deployments

Tools Reliability and Leadership

- Java
  - OpenJDK
    - Cross-industry project
    - Free, open source implementation of the Java programming language
    - OpenJDK7 released and supported in RHEL6.3
  - IBM/Oracle JDKs also provided in RHEL5 and RHEL6 [JDK7 in RHEL6.3]
- RHEL7
  - Thermostat
    - New tool in RHEL7 for general use, including Cloud
    - Monitoring, profiling, instrumentation and management

Tools Reliability and Leadership

- Performance Tools in current RHEL5 and RHEL6
  - **systemtap** – live application analysis without rebuilding
    - RHEL6.3: remote instrumentation capabilities for Cloud
  - **oprofile** – unobtrusive, system-wide code profiler
    - RHEL6.3: new processor support for x86
  - **valgrind** – runtime analysis (particularly memory)
    - RHEL6.3: additional IBM Power support
- RHEL7
  - **systemtap** – pure userspace implementation option
  - **pcp** – new tool for system monitoring and management
  - **dyninst** – new library for runtime code-patching

Tools Reliability and Leadership

- Eclipse IDE in RHEL6
  - Unifies other tools in Integrated Development Environment
  - Best-in-class editor, code management features
  - C/C++ Development for i686 and x86_64
- RHEL7 Timeframe Plan
  - Eclipse releases via new initiative
  - Update to Eclipse 4.2 and Juno (June 2012) stack
  - Red Hat leading profiling tools unification
  - Support for remote C/C++ debug and profiling

Tools Freshness

* The life cycle time spans and dates are subject to adjustment.

- Current Toolchains:
  - RHEL5: gcc-4.1 (2006), gcc-4.4 (2009)
  - RHEL6: gcc-4.4 (2009)
- 10-year RHEL life ycle
  - High Stability
  - All use-cases, including Cloud deployment
  - Very limited access to newer GCC releases & features
- *...but our customers also want newer tools on RHEL!*

Tools Freshness

- Red Hat Developer Toolset (http://red.ht/rheldevelop)
  - Provides new versions of tools on older versions of RHEL
    - v1.0: gcc-4.7, gdb-7.4 (2012) on RHEL5 & RHEL6
    - Applications built with Toolset run on multiple RHELversions
    - Build on RHEL5.6, execute on RHEL5.6+ *and* RHEL6.0+
    - Applications dynamically link almost all libraries
    - Newer features are statically linked into your application
  - More frequent releases of tools
    - Annual major release, supported for two years
    - Minor release 6 months later with possible new components
    - Bugfix and any required security updates throughout

Tools Flexibility

- Red Hat Developer Toolset = an extra set of tools
  - Does...
    - give access to the latest gcc release on RHEL5 and RHEL6
    - allow use of cutting-edge new features
    - enable one-time build/test of applications for multiple RHEL
    - work with Eclipse in RHEL6 i686/x86_64
  - Doesn't...
    - replace existing RHEL tools (/opt hierarchy, separate releases)
    - become the default compiler, debugger, etc. ('scl' script)
    - impact existing deployed applications
    - mean RHEL toolchain fixes will reduce (parallel offering)

Tools Summary

- RHEL7
  - Great new toolchain, Java and performance tools features
  - Backed up by Red Hat's solid support for 10 years
- Developer Toolset
  - New initiative for up-to-date tools on older RHEL releases
  - Build and deploy your applications on multiple versions of RHEL
  - Availability:
    - Red Hat Developer Workstation
    - Red Hat Developer Subscriptions
    - Red Hat Developer Suite

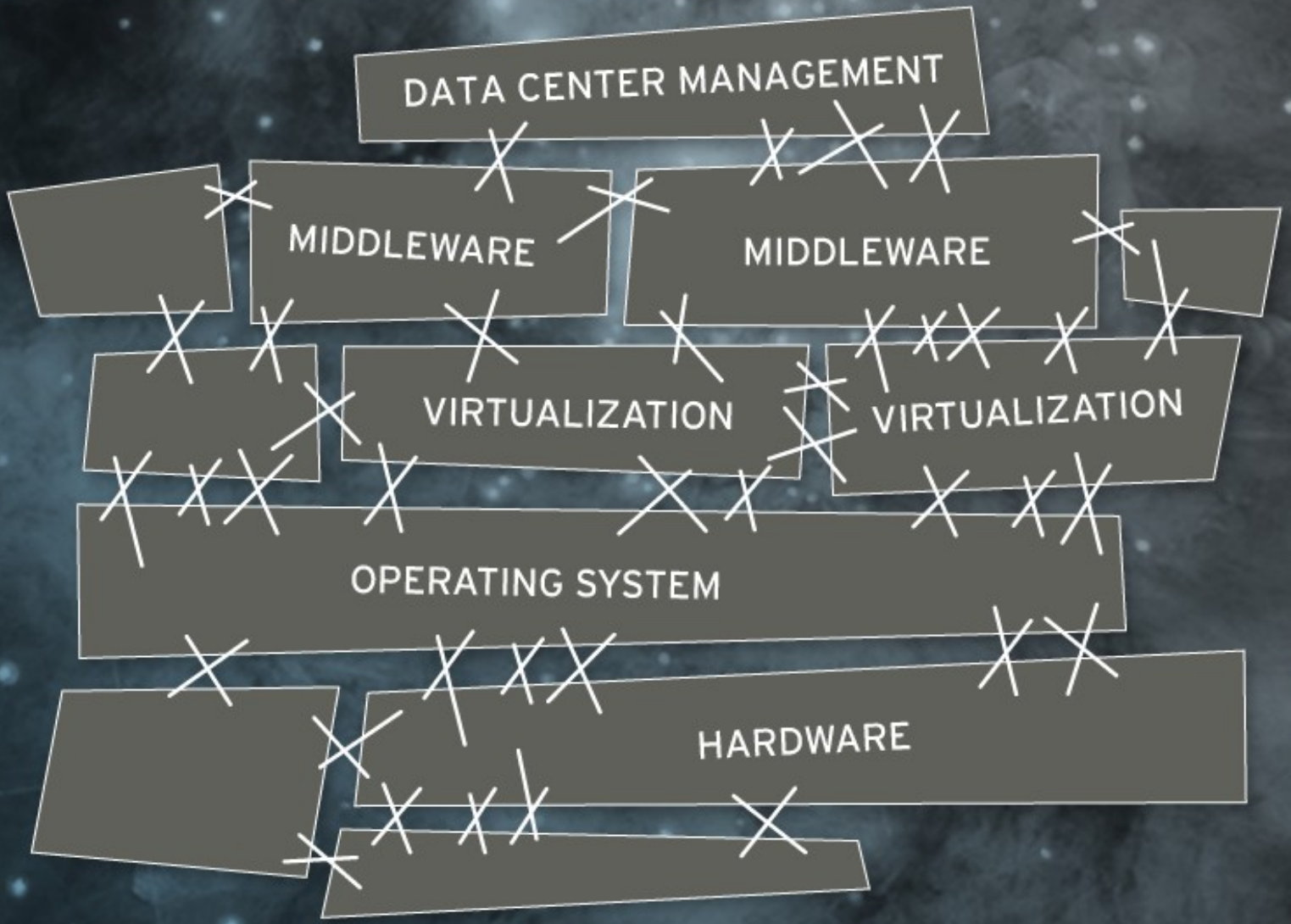
References

- Tools-Related Talks / Demo:
  - OpenJDK Talk – 1:20pm Thursday (“Emerging” track)
  - Developer Day Talk – Video will be posted online
  - Demos in the Developer Zone (Weds,Thurs)
- Contacts:
  - mattn@redhat.com, @dev_tools on Twitter
- Resources
  - Developer Program: http://red.ht/rheldevelop
  - Developer Toolset Docs: http://red.ht/devToolset

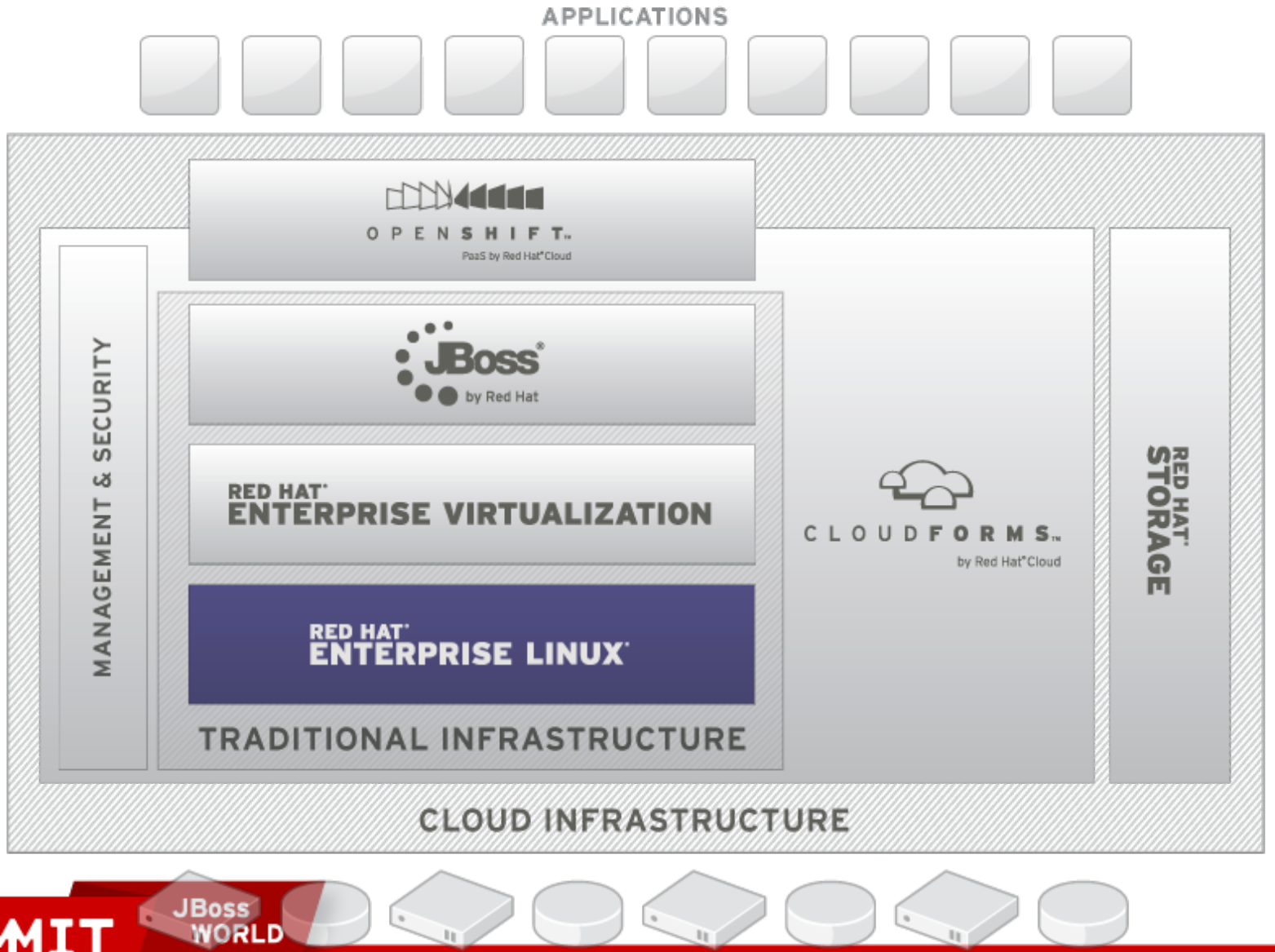
SUMMARY

Tim Burke
Vice President – Linux Development
Red Hat, Inc.

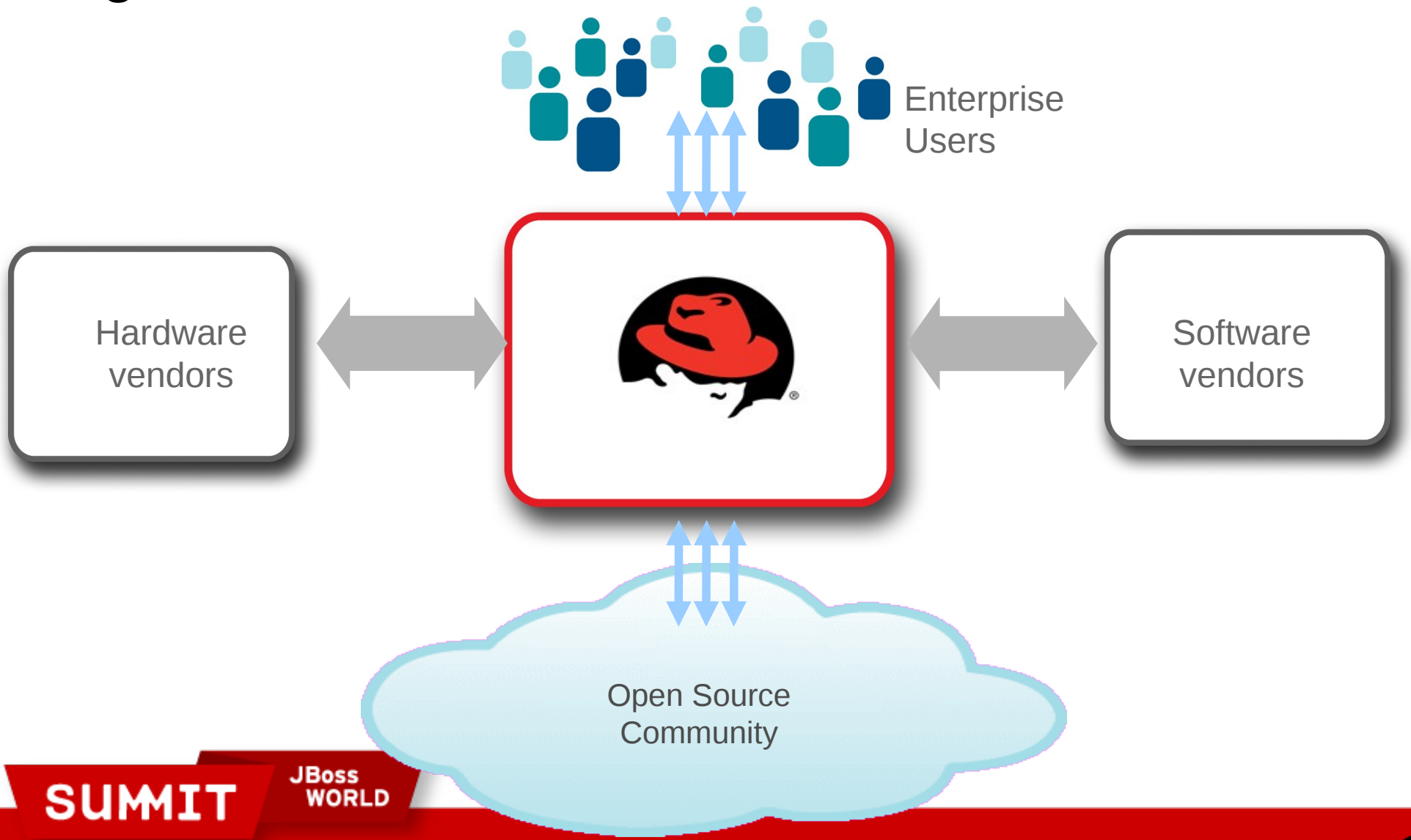
DO-IT-YOURSELF STACK



The Enterprise Platform Stack



Bringing the Community, Vendors and Users Together



A Collaborative Ecosystem

Key Takeaways

- Red Hat engineers are leading innovators in the full spectrum of datacenter infrastructure – the teams who make it happen are also the best positioned to maintain and advance the future.
- RHEL5 – mature base, wrapping up its feature advancement in 2012, transitioning to maintenance phase with ~4.5 years runway.
- RHEL6 – being heavily deployed – advanced scalability, containment, resource control, and security. Delivering on the commitment to a single distribution supporting bare metal, virtualization, and cloud.
- RHEL7 – evaluated customer input, now in development, previewed in Fedora, beta in 2013

Q&A

- Thank you for attending! Enjoy the rest of the Red Hat Summit and JBossWorld!
- Give us your session feedback please! We adapt each year. Did this format meet your expectations?
- Refer to the session handout for session referrals and resource links.
- Continue to give us your input through your Red Hat point of contact and to contribute your thoughts to the groups in the customer portal https://access.redhat.com/groups/red-hat-enterprise-linux

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