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 CLOUD

IaaS  PaaS

JBoss Enterprise Middleware

Red Hat Enterprise Linux

Red Hat Enterprise Virtualization

Integrated Virtualization

3rd Party Virtualization

Physical Infrastructure
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.
**RED HAT ENTERPRISE LINUX®**

![Diagram showing QEMU, VM Runtime, I/O Devices, VCPU Runtime, Application, Guest Kernel, Virtual Hardware, I/O Stack, Host Linux Kernel, and Hardware (VT-x, AMD-V) with KVM integration.]

**SUMMIT JBoss WORLD**
PRESENTED BY RED HAT

11
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

Best SPECvirt_sc2010 Results by CPU Cores
(As of April 2012)
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 \(\text{(RHEL6.3-TP)}\)
  - Paravirt clock, steal time \(\text{(RHEL6.3)}\)
  - Installer
- Performance aspects
  - Paravirt interrupts \(\text{(RHEL7)}\), pv page faults \(\text{(RHEL7)}\), performance profiles, etc.
Virtualization Deployments

IBM References for KVM (hardware/software/cloud)

Dutch Cloud
BARCLAYS
LetterGen
Phoenics

招商銀行
中国工商银行

Brazilian Federal Highway Police (DPRF)
Cortals Consors BNP PARIBAS
IBM Smart Cloud Enterprise

IBM Research Compute Cloud

Industry

OVA non-IBM References for KVM (hardware/software/cloud)

ALPHINAT
Acronis
Qualcomm
NTT Communications
KMI

Oxilion
DreamWorks
Jeppesen
ixos
Ebay

Symcor
Rakkaanpai
Saista labs
Daiei

Virtual Open Systems

ovirt
openstack
SUMMIT JBoss
Presented by Red Hat
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

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

<table>
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<th>RHEL6.3</th>
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**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, btrfs 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

RDMA Latency
40 Gb Mellanox – SandyBridge-EP 2S
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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Vice President, Linux Development and Engineering Team Leaders
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- Summary and Q&A
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 pipelining 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
- 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 25\textsuperscript{th} 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

- Current Toolchains:

- 10-year RHEL life cycle
  - 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](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 RHEL versions
    - 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](http://red.ht/rheldevelop)
  - Developer Toolset Docs: [http://red.ht/devToolset](http://red.ht/devToolset)
SUMMARY
Tim Burke
Vice President – Linux Development
Red Hat, Inc.
DO-IT-YOURSELF STACK

DATA CENTER MANAGEMENT

MIDDLEWARE

VIRTUALIZATION

OPERATING SYSTEM

HARDWARE
The Enterprise Platform Stack
Bringing the Community, Vendors and Users Together

Hardware vendors

Enterprise Users

Open Source Community

Software vendors
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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