What’s New on Red Hat Enterprise Linux for System z

Filipe Miranda
fmiranda@redhat.com
Global Lead for System z
Red Hat Inc.

February 5th
12590
Agenda

Red Hat Inc.

Technical highlights for System z
  Red Hat Enterprise Linux 6.4 and 5.9

RHN Satellite

Oracle announcement

Customer References
Red Hat Inc.
The FIRST $1 BILLION DOLLAR OPEN SOURCE COMPANY in the WORLD.

5100+ Employees
0$ Debts
500 000+ Red Hat certified IT Specialists

MORE THAN 80% of FORTUNE 500 COMPANIES use RED HAT PRODUCTS & SOLUTIONS.

Source: Red Hat, Inc.

80%
MORE THAN
FORTUNE
500
COMPANIES
use
RED HAT
PRODUCTS & SOLUTIONS.

Office Worldwide

Source: Red Hat, Inc.

Complete your sessions evaluation online at SHARE.org/SFEval
PRODUCT PROCESS

PARTICIPATE
(upstream projects)

We participate in & create community-powered upstream projects.

INTEGRATE
(community platforms)

We integrate upstream projects, fostering open community platforms.

STABILIZE
(supported products platforms, & solutions)

We commercialize these platforms together with a rich ecosystem of services & certifications.
New Shipped IBM IFLs WW

- 2010
- 2011: +6%
- 2012: +28%

Source: IBM System z Global Marketing
RHEL for System z subscriptions (IFLs)
% of growth - installed base

Source: Red Hat SFDC

FY10
FY11 +11%
FY12 +68%

Complete your sessions evaluation online at SHARE.org/SFEval
Red Hat Enterprise Linux High Level Roadmap

2010

4.8

End of Life: February 29, 2012

2011

5.5

5.6

5.7

5.8

5.9

5.x EOF: 2017

2012

6.0

6.1

6.2

6.3

6.4 beta EOF: 2020

7.0 under development

Complete your sessions evaluation online at SHARE.org/SFEval
IBM zEnterprise certified for Red Hat Enterprise Linux

IBM

IBM zEnterprise EC12 (zEC12) 2827

<table>
<thead>
<tr>
<th>Version 5</th>
<th>Version 6</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-bits</td>
<td>64-bits</td>
<td></td>
</tr>
<tr>
<td>32-bits</td>
<td>64-bits</td>
<td>Red Hat Enterprise Linux</td>
</tr>
</tbody>
</table>

5.8

6.3

hardware.redhat.com | Certifications

IBM

IBM® zEnterprise™ System z196 (2817)

<table>
<thead>
<tr>
<th>Version 4</th>
<th>Version 5</th>
<th>Version 6</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-bits</td>
<td>64-bits</td>
<td>32-bits</td>
<td>64-bits</td>
</tr>
<tr>
<td>32-bits</td>
<td>64-bits</td>
<td>32-bits</td>
<td>64-bits</td>
</tr>
</tbody>
</table>

4.8

5.5

6

Red Hat Enterprise Linux

What version of Red Hat Enterprise Linux is required to run on the IBM EC12 mainframe? https://access.redhat.com/knowledge/solutions/280673

Complete your sessions evaluation online at SHARE.org/SFEval
**IBM zEnterprise certified for Red Hat Enterprise Linux**

[Image of IBM server]

**hardware.redhat.com | Certifications**

<table>
<thead>
<tr>
<th>IBM® zEnterprise™ System z114 (2818)</th>
<th>Version 5</th>
<th>Version 6</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-bits</td>
<td>64-bits</td>
<td>32-bits</td>
<td>64-bits</td>
</tr>
<tr>
<td><strong>5.5</strong></td>
<td><strong>6</strong></td>
<td></td>
<td>Red Hat Enterprise Linux</td>
</tr>
</tbody>
</table>

Complete your sessions evaluation online at SHARE.org/SFEval
Red Hat Production Technical Support

10 years of standard official technical support

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
<th>Year 7</th>
<th>Year 8</th>
<th>Year 9</th>
<th>Year 10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production I Phase</strong></td>
<td><strong>Production II Phase</strong></td>
<td><strong>Production III Phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bug fix errata</td>
<td>Transition period</td>
<td>Only urgent fixes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feature enhancements</td>
<td>Minor hardware updates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Updated hardware support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Red Hat Enterprise Linux 5.9
Target beta: Sept 11 2012
Target GA: Dec 11 2012

Mostly Bugfix release
One big feature
Enable HyperPAV for parallel I/O to ECKD DASD
Hyper PAV enablement - Licensed feature in z/VM

HyperPAV enables parallel I/O to ECKD DASDs increasing data access performance

Hyper-Parallel-Access-Volume support for Linux on System z. This is a very flexible concept to massively improve device performance by using a set of sub channels as an ALIAS-pool.

Kernel VDSO Support

Virtual Dynamically-linked Shared Object (VDSO) is a shared library provided by the kernel. This allows normal programs to do certain system calls without the usual overhead of system calls like switching address spaces.

For Linux on System z there are three functions at the moment that are accelerated in this way: gettimeofday, clock_getres, and clock_gettime. The most important one is probably gettimeofday.

Some user space application, for example the Java virtual machine, tend to call gettimeofday very often. By use of a vdso this operation can be accelerated by an factor of 4 thereby increasing the performance of the user space application.
JAVA 7

Due to EOL of Oracle JDK6 in November, Oracle Java 7 and IBM counterpart will be available to Red Hat Enterprise Linux 5. It's already included with Red Hat Enterprise Linux 6.
Red Hat Enterprise Linux 6.4
Target beta: Dec 4 2012
Target GA: around Feb 7 2013

Bugfixes
New features

RHEL 6.4 Features may change when product becomes GA

Complete your sessions evaluation online at SHARE.org/SFEval
Support of new crypto hardware

This feature provides support for new crypto hardware: CryptoExpress4S

Linux for System z support is needed to be able to use crypto applications on future System z hardware.

Data Routing for FCP

Enable FCP to pass data directly from memory to SAN (data routing) when memory on the adapter card is blocked by large and slow I/O requests.

Improved performance by increasing the I/O rate and throughput for short and fast I/O requests when memory on the adapter is blocked by large and slow I/O requests will satisfy customer expectations regarding performance.
End-To-End data consistency checking

The T10 Technical Committee introduced an enhancement to the SCSI standard (SPC-4, SBC-3) to protect against errors in user data blocks.

This line item introduces the zfcp-specific part in the Linux on System z I/O stack for E2E data consistency checking.

This RAS item provides improved service and control of data flow between adapter and storage device by introducing the zFCP specific part of the enhanced SCSI standard for E2E data consistency checking.
New Crypto Algorithms

For Customers require acceleration of complex cryptographic algorithms:

The libICA library provides an interface to cryptographic hardware. This feature adds new algorithms that support Message Security Assist (CP ACF) extension 4, on top of libica 2.1.

For block cipher DES and 3DES, the new feature will support the following modes of operation:
- Cipher Block Chaining with Ciphertext Stealing (CBC-CS)

For block cipher AES, this feature will support the following modes of operation:
- Cipher Block Chaining with Ciphertext Stealing (CBC-CS)
- Counter with Cipher Block Chaining Message Authentication Code (CCM)
- Galois/Counter (GCM)

This feature also adds support for DES Block Cipher Based Message Authentication Code (CMAC).
libhugetlbfs support for System z (LPAR)

System z support added to libhugetlbfs that is a library which provides easy access to huge pages of memory. Applications can use huge pages to fulfill malloc() requests without being recompiled.

This RAS feature allows for transparent exploitation of large pages in C/C++ programs. So ISV programs don't need changes/recompilation to profit from the performance benefits of large pages.

Support for new storage device on System z (LPAR)

Allow Linux to access a new storage device as a block device using a new interface. That includes the adaption of common IO functions to allow to attach, configure and operate the new sub channels.

This feature provides access to a future new storage device, for example: SCM via EADM sub channels. With this feature, Linux can access Storage Class Memory as a block device.
Valgrind >= 3.7.0

Valgrind has proven to be a valuable tool debugging user-space memory management problem on x86 and PPC platforms.

This tool is available for System z and besides the capabilities to debug memory problems other plugins (cachegrind) enable us to analyze the cache access patterns to get the best performance on z10 machines.

Eclipse IDE Platform

Eclipse is an open source software development project dedicated to providing a robust, full-featured, commercial-quality, industry platform for the development of highly integrated tools.

Eclipse IDE in Linux on System z will allow developers to develop eclipse application direct on Linux on System z.

Complete your sessions evaluation online at SHARE.org/SFEval
RHN Satellite Overview
Manage the lifecycle of Red Hat systems from x86 to Mainframe from a centralized console.
Simplify software updates, change of configuration files, remote access, and more.
RHN Satellite high level architecture for System z

RHN SATELLITE
Satellite System z Topology Example

Complete your sessions evaluation online at SHARE.org/SFEval
RHN Satellite console screenshots

- System Summary
  - Total systems:
  - Out of date systems:
  - Ungrouped systems:
  - Inactive systems:

- Relevant Errata
  - anaconda bug fix update
  - autofs bug fix update
  - benutil bug fix update
  - chiqurtl bug fix update
  - coreutil bug fix update

- RHSA-2005:165 - Security Advisory
  - Description:
    - The rsh package contains a set of programs that allow users to run commands on remote machines, login to other machines, and copy files between machines, using the rsh, rlogin, and rcp commands. All three of these commands use a shared-style authentication.
    - The rcp protocol allows a server to instruct a client to write to arbitrary files outside of the current directory. This could potentially cause a security issue if a user uses rcp to copy files from a malicious server.
  - This update has been rated as having low security impact by the Red Hat Security Response Team.
IDC ROI Study* of Red Hat Network Satellite

IDC conducted in-depth interviews with staff members of 10 IT organizations that have deployed RHN Satellite Server.

RED HAT NETWORK SATELLITE SERVER ROI ANALYSIS

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three-year cost of investment</td>
<td>$274,410</td>
</tr>
<tr>
<td>Annual cost savings</td>
<td>$500,905</td>
</tr>
<tr>
<td>Net present value (NPV of three-year savings)</td>
<td>$927,778</td>
</tr>
<tr>
<td>Payback period</td>
<td>4.8 months</td>
</tr>
<tr>
<td>Three-year ROI</td>
<td>338%</td>
</tr>
</tbody>
</table>

SALT RIVER PROJECT MIGRATES TO RED HAT ENTERPRISE LINUX ON IBM MAINFRAMES FOR FLEXIBILITY AND PERFORMANCE

**FAST FACTS**

<table>
<thead>
<tr>
<th>Industry:</th>
<th>Utilities, Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography:</td>
<td>Arizona</td>
</tr>
<tr>
<td>Challenge:</td>
<td>Searched for a replacement for proprietary software for its IBM mainframe servers that could provide greater flexibility, manageability, and utilization opportunities</td>
</tr>
<tr>
<td>Migration Path:</td>
<td>HP-UX to Red Hat® Enterprise Linux®</td>
</tr>
<tr>
<td>Software:</td>
<td>Red Hat Enterprise Linux, Red Hat Network Satellite</td>
</tr>
<tr>
<td>Hardware:</td>
<td>IBM® System z® mainframe servers</td>
</tr>
<tr>
<td>Benefits:</td>
<td>Experienced cost savings, boosted performance, stable and reliable management, consolidation, and valuable technical support after migrating to Red Hat Enterprise Linux on IBM System z</td>
</tr>
</tbody>
</table>

Complete your sessions evaluation online at SHARE.org/SFEval
Oracle Announcement
Oracle Database 11.2.0.3.0 is certified on IBM: Linux on System z Red Hat Enterprise Linux 6

Oracle Real Application Clusters 11.2.0.3.0 is certified on IBM: Linux on System z Red Hat Enterprise Linux 6

Complete your sessions evaluation online at SHARE.org/SFEval
Customers Reference
# Banco Pastor Reduces Costs and Improves Scalability with Red Hat, SAP®, and IBM Solutions

## Fast Facts

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>Financial Services: Banking</td>
</tr>
<tr>
<td>Geography</td>
<td>EMEA: Headquarters in Spain</td>
</tr>
<tr>
<td>Business</td>
<td>Improve payroll and human resource systems management and achieve cost savings and performance improvements with an upgrade of the email infrastructure</td>
</tr>
<tr>
<td>Challenge</td>
<td></td>
</tr>
<tr>
<td>Migration Path</td>
<td>From distributed platform to Red Hat Enterprise Linux on IBM System z10 Business Class mainframes</td>
</tr>
<tr>
<td>Solution</td>
<td>The implementation of Red Hat Enterprise Linux running on IBM System z10 Business Class mainframes to run SAP NetWeaver®, SAP ERP, and IBM Lotus Notes software</td>
</tr>
<tr>
<td>Software</td>
<td>Red Hat Enterprise Linux Server v5.3, SAP NetWeaver 7.0 SR3, SAP ERP 6.0 SR3, and IBM Lotus Notes for Collaboration 7.0.2</td>
</tr>
<tr>
<td>Hardware</td>
<td>Two IBM System z10 Business Class mainframes, with three and four IFLs试</td>
</tr>
<tr>
<td>Benefits</td>
<td>The new email platform reduced recurrent costs by 30 percent, improved performance for IBM Lotus Notes for Collaboration software and SAP applications, and guaranteed an exhaustive and scalable control of resources</td>
</tr>
</tbody>
</table>

Complete your sessions evaluation online at SHARE.org/SFEval
# Allianz Updates IT Infrastructure with Red Hat Enterprise Linux on IBM System Z and JBoss Enterprise Middleware

## Fast Facts

<table>
<thead>
<tr>
<th>Company</th>
<th>Allianz Australia Insurance Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>JBoss Innovation Award</td>
<td>Carved Out Costs</td>
</tr>
<tr>
<td>Industry</td>
<td>Insurance</td>
</tr>
<tr>
<td>Geography</td>
<td>Australia</td>
</tr>
<tr>
<td>Business Challenge</td>
<td>Rebuild Allianz's IT infrastructure based on a flexible and scalable platform that could leverage new virtualisation technology to generate hardware and support savings, and reduce its underlying software and operations costs for several strategic business application projects</td>
</tr>
<tr>
<td>Migration Path</td>
<td>Windows-based infrastructure to Red Hat Enterprise Linux on IBM System z10 mainframe and from Websphere to JBoss Enterprise Middleware on Intel processor based HP ProLiant servers</td>
</tr>
<tr>
<td>Hardware</td>
<td>IBM System z10 mainframe, HP ProLiant servers</td>
</tr>
<tr>
<td>Benefits</td>
<td>Significant reduction in middleware software and support costs, reallocation of IT budget from software licensing to staff and resources, resolved data centre power limitations with new capacity for growth, superior workload management and operational efficiency, reduced carbon footprint, increased flexibility, scalability, and freedom from vendor lock-in</td>
</tr>
</tbody>
</table>

Complete your sessions evaluation online at SHARE.org/SFEval
# BANK OF NEW ZEALAND REDUCES CARBON FOOTPRINT WITH RED HAT ON THE MAINFRAME

## FAST FACTS

<table>
<thead>
<tr>
<th>Industry</th>
<th>Financial Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography</td>
<td>New Zealand</td>
</tr>
<tr>
<td>Business Challenge</td>
<td>Address environmental and space issues in the datacentre and achieve the corporate goal of becoming carbon neutral by 2010</td>
</tr>
<tr>
<td>Migration Path</td>
<td>From distributed Intel and SUN SPARC servers to Red Hat Enterprise Linux 5 running under z/VM on IBM z9 and z10 mainframes</td>
</tr>
</tbody>
</table>
| Solution            | **Software:** Red Hat Enterprise Linux 5, Red Hat Network (RHN) Satellite, Oracle database, WebSphere Application Server, ESB, Process Server, TX and MQ  
                      **Hardware:** 1x IBM z9 and 1x IBM z10 mainframe (with 3 x IFL engines in each) |
| Benefits            | • Recovered 30 percent of datacenter floor space  
                      • Reduced power consumption by 38 percent  
                      • 20 percent return on investment (ROI) over the life of the platform  
                      • Simplified, more efficient deployment |
Citigroup: Red Hat Innovation Award Winner

June 17, 2010
Customer: Citigroup Global Markets, Inc.

Industry: Financial Services (/solutions/industry/financial/)
Geography: North America
Country: United States

Business Challenge:
Reconciling two independently developed and supported Linux platforms to run mission-critical applications for Citi's globally distributed business units

Software:
Red Hat Enterprise Linux

Hardware:
x86 servers, IBM System z mainframes

Benefits:
By delivering a common global Linux build across the enterprise that can be leveraged across both x86 and IBM mainframe platforms, Citi has been able to retire a number of one-off infrastructure software products and their associated costs.

Complete your sessions evaluation online at SHARE.org/SFEval
Thank you
Vielen Danke
Gracias
Grazie
Obrigado

Filipe Miranda
fmiranda@redhat.com
Global Lead for System z
Red Hat Inc.
High Availability and Clustered FileSystem

New ISV Support
• Sine Nomine Associates: zLinux R&D company

• Support High Availability/GFS2 for RHEL on System z

• Also support 3 other clustered file systems (AFS, Ceph, GLusterFS).

• Contacts: Filipe Miranda <fmiranda@redhat.com>
Sine Nomine directly <info@sinenomine.net>