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Red Hat Enterprise Linux Update for IBM System z

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Global Lead for Linux on IBM System z and Power Systems

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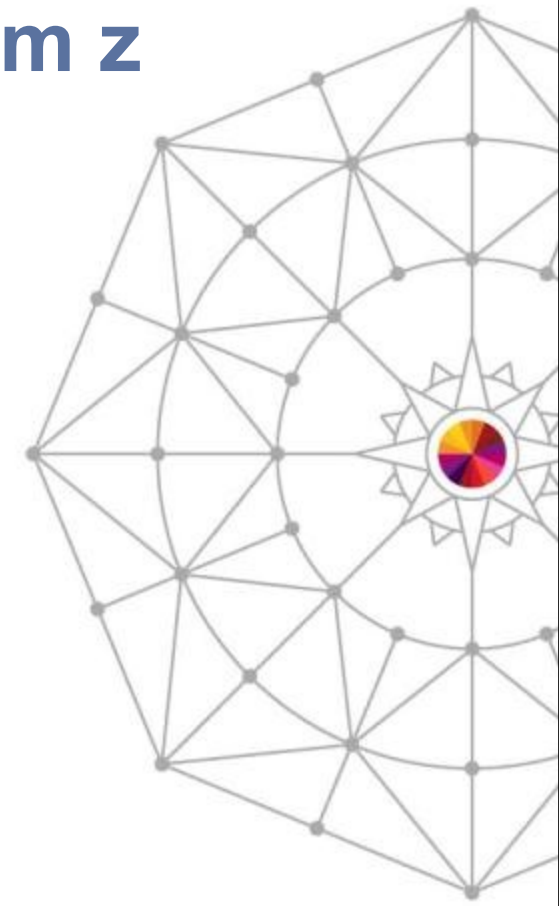
Red Hat Inc.

March 11th 2014

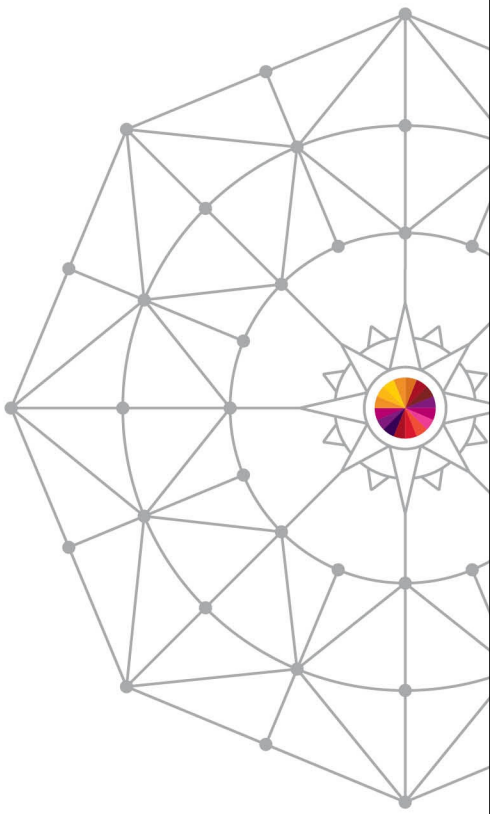
Session 14556



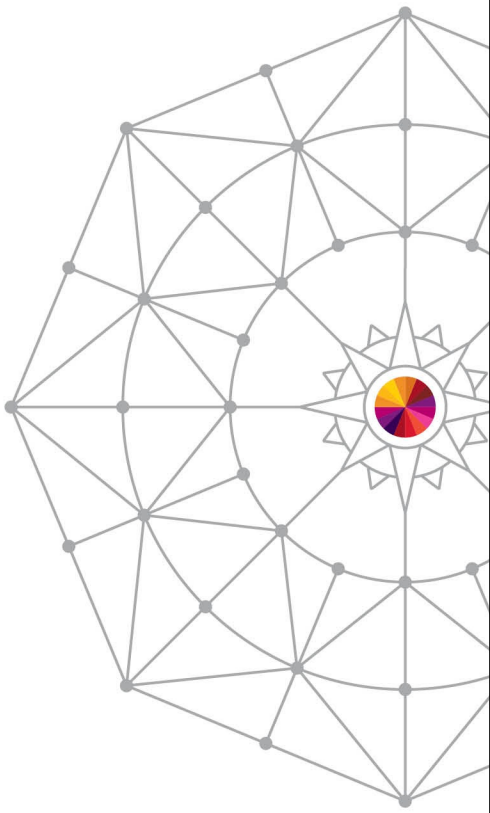
SHARE in Anaheim

Agenda

- Red Hat Inc, overview
- Red Hat Enterprise Linux 7 beta public preview
- New Customer reference
- Veristorm's data integration and Hadoop solution for RHEL on IBM System z



Red Hat Inc, overview



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Employees
Worldwide

0$
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900 000+
Red Hat certified IT
Specialists

The FIRST
$1 BILLION
DOLLAR
OPEN
SOURCE
COMPANY
in the
WORLD

Source: Red Hat Inc.

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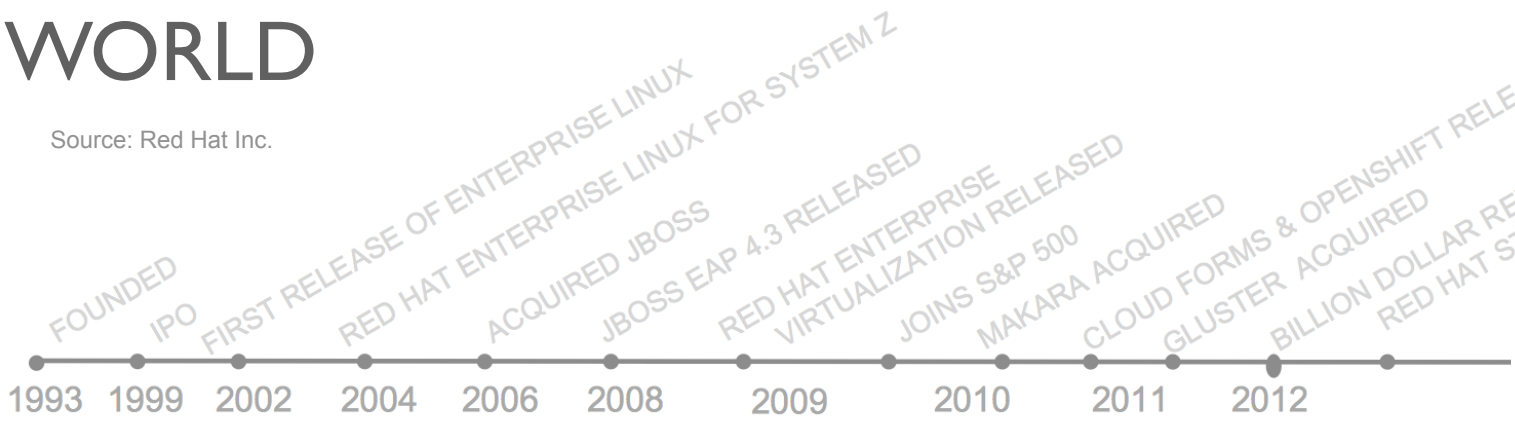
MORE THAN
90%
of
FORTUNE
500
COMPANIES
use
RED HAT
PRODUCTS &
SOLUTIONS.



More than 13 years of collaboration between Red Hat and IBM to offer choice to our customers:

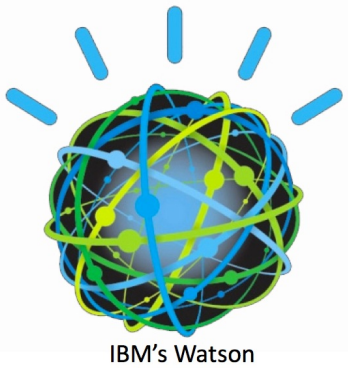
Red Hat Enterprise Linux Certified on all IBM platforms

System x

Power Systems

System z

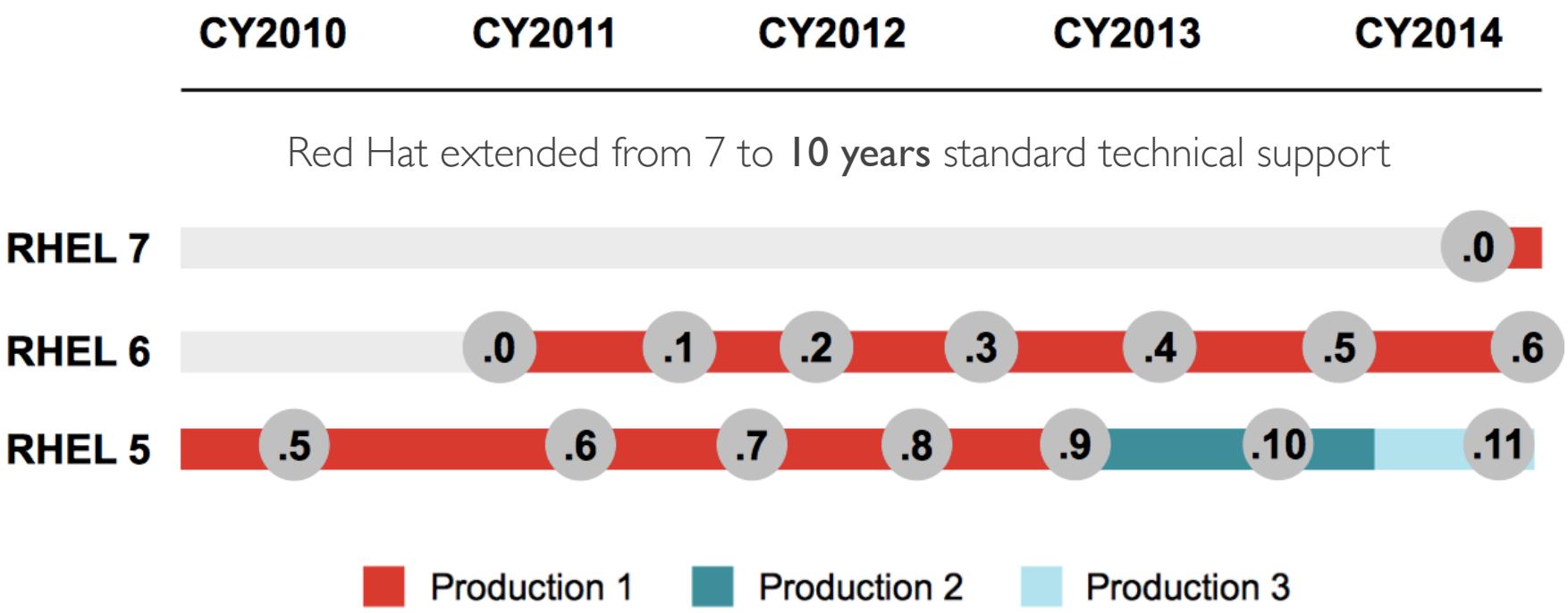
Red Hat is currently part IBM's solutions such as:



IBM's Watson

- Offered in zCloud
- Embedded as "KVM" in:
  - IBM SmartCloud
  - zBX (x86 Blades virtualization)
  - PureSystems
- Embedded in Netezza
- IBM's Watson
  - Running on Power Systems

Current Platform Lifecycle

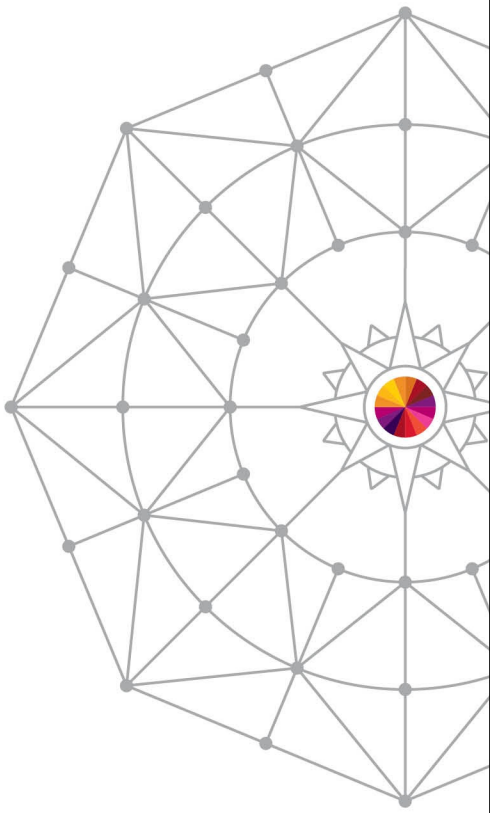


Production 1 (5 ½ years)	Prod. 2 (1 year)	Production 3 (3 ½ years)

*All dates are approximate and subject to change

Red Hat Enterprise Linux 7 beta

public preview



Red Hat Enterprise Linux 7.0

Public Beta released Dec 2013

- RHEL7 Basic Facts
- What's changed ?
  - What can we benefit from RHEL 7 on s390x?
- New Enhancements and Expanded Choices
- What's System z specific ?

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https access.redhat.com/site/products/Red_Hat_Enterprise_Linux/Get-Beta

Red Hat Enterprise Linux 7
Basic Facts

- Based on Fedora 19 and Kernel 3.10
- Supported Architectures: x86_64, IBM Power Systems and System z
- 64bit! 32-bit libraries will be made available
- Use “multilib" toolchain to create (32-bit) and 64-bit binaries

What's Changed?

Red Hat Enterprise Linux 7.0 Beta

What is new for RHEL 7 Beta on System z?

More easy to Install, Deploy and Manage

Optimal Performance and Security

File System Choice

Application Isolation with Linux Containers

Microsoft Windows Interoperability

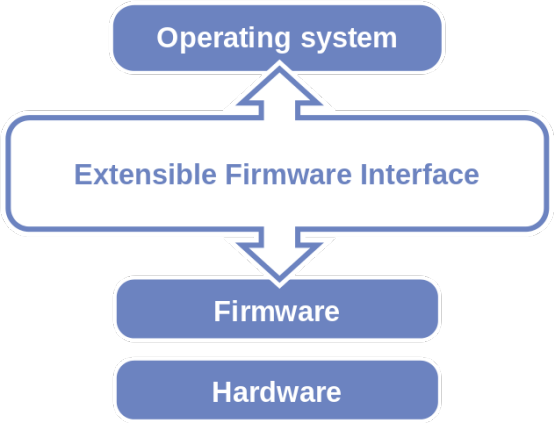
Red Hat Enterprise Linux 7:
Installer

- The RHEL 7 installation procedure presents a user friendly interface that allows RHEL to be installed a more comprehensive installation process rather than having 13 linear screens
- Easy to go back to a main page
- Warnings and errors provided to guide the user

Red Hat Enterprise Linux 7:
Installer

Red Hat Enterprise Linux 7:
GRUB2

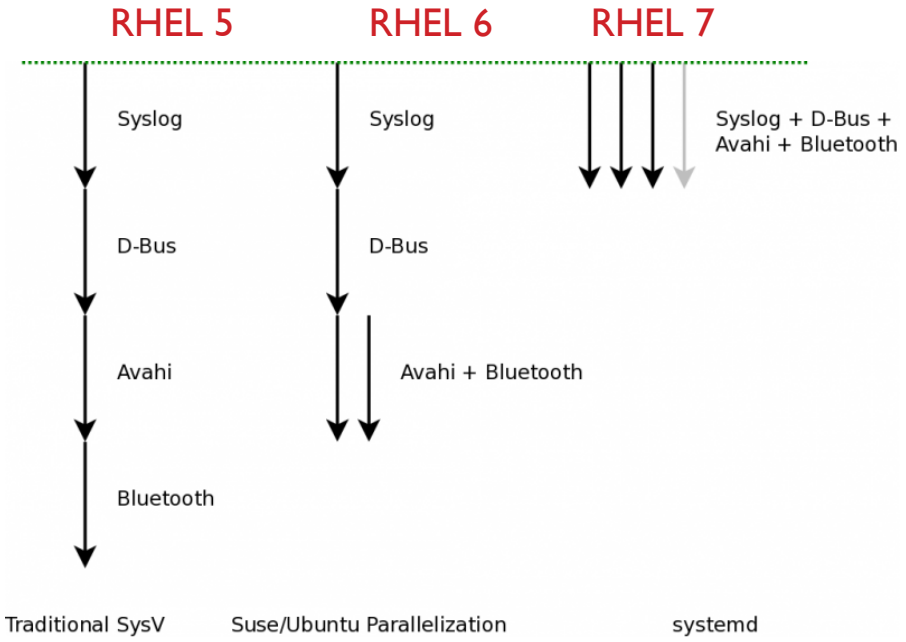
- Meet the new menu.lst : grub.cfg
- Should not be directly edited by manually.
- Changes are applied with update-grub or when new kernels are installed
- To customize Grub2
  - /etc/default/grub (default parameters)
  - /etc/grub.d/ (custom parameters)
- Secure boot (UEFI)



Red Hat Enterprise Linux 7:
System Initialization

- RHEL 7 will be based on Systemd, a system and service manager
- Compatible with SysV and LSB init scripts
- Allows more work to be done concurrently (possibly in parallel) at system startup.
  - *Result: Faster system boot times.*
- Integrates chkconfig + service

- Systemd provides aggressive parallelization capabilities,
- Uses socket and D-Bus activation for starting services
- Offers on-demand starting of daemons, keeps track of processes using Linux cgroups, supports snapshotting and restoring of the system state
- Maintains mount and automount points
- Implements an elaborate transactional dependency-based service control logic



https://access.redhat.com/site/videos/403833

http://0pointer.de/blog/projects/why.html

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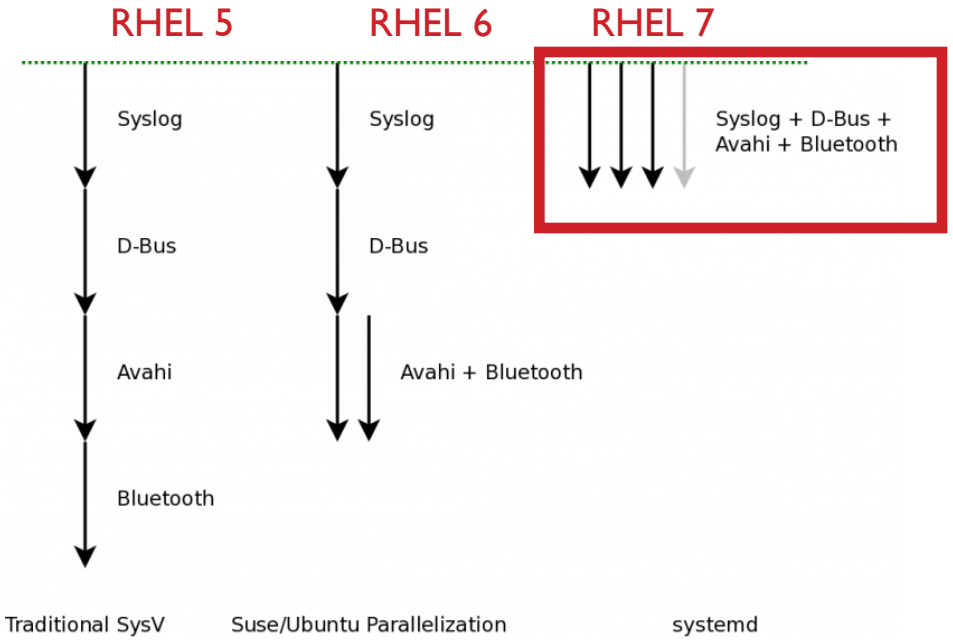

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Red Hat Enterprise Linux 7:
Systemd Crash Course

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SERVICES

service httpd start -> systemctl start httpd.service
chkconfig httpd on -> systemctl enable httpd.service

RUNLEVEL

init 3 -> systemctl isolate multi-user.target (or) systemctl isolate runlevel3.target
Init 5 -> systemctl isolate graphical.target (or) systemctl isolate runlevel5.target

DEFAULT RUNLEVEL

/etc/inittab -> systemctl enable graphical.target --force

Red Hat Enterprise Linux 7:
Systemd Crash Course

service sshd status

openssh-daemon (pid 3051) is running…

systemctl status sshd

```
[root@rhel7-mlessard cloud-user]# systemctl status sshd
sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled)
   Active: active (running) since Thu 2014-01-09 12:03:35 EST; 21h ago
  Process: 705 ExecStartPre=/usr/sbin/sshd-keygen (code=exited, status=0/SUCCESS)
 Main PID: 706 (sshd)
   CGroup: /system.slice/sshd.service
           └─706 /usr/sbin/sshd -D

Jan 10 09:12:03 rhel7-mlessard sshd[11023]: error: Could not load host key: /etc/ssh/ssh_host_ecdsa_key
Jan 10 09:12:06 rhel7-mlessard sshd[11023]: Invalid user mlessard from 10.35.201.32
Jan 10 09:12:06 rhel7-mlessard sshd[11023]: input_userauth_request: invalid user mlessard [preauth]
Jan 10 09:12:08 rhel7-mlessard sshd[11023]: Connection closed by 10.35.201.32 [preauth]
Jan 10 09:12:14 rhel7-mlessard sshd[11025]: error: Could not load host key: /etc/ssh/ssh_host_dsa_key
Jan 10 09:12:14 rhel7-mlessard sshd[11025]: error: Could not load host key: /etc/ssh/ssh_host_ecdsa_key
Jan 10 09:12:20 rhel7-mlessard sshd[11025]: Accepted publickey for root from 10.35.201.32 port 55286 ssh2: RSA 65:21:09:12:bb:a1:db:1...f:c6:6
Jan 10 09:12:30 rhel7-mlessard sshd[11033]: error: Could not load host key: /etc/ssh/ssh_host_dsa_key
Jan 10 09:12:30 rhel7-mlessard sshd[11033]: error: Could not load host key: /etc/ssh/ssh_host_ecdsa_key
Jan 10 09:12:35 rhel7-mlessard sshd[11033]: Accepted publickey for cloud-user from 10.35.201.32 port 55287 ssh2: RSA 65:21:09:12:bb:a...f:c6:6
Hint: Some lines were ellipsized, use -l to show in full.
```

Red Hat Enterprise Linux 7:
Networking

- **Network Manager**
  - New CLI interface

```
# nmcli g
STATE      CONNECTIVITY  WIFI-HW  WIFI      WWAN-HW  WWAN
connected  full          enabled  disabled  enabled  disable
```

- Support more configuration options, including Bridging, Bonding, VLANs, IPoIB (IP-over-InfiniBand), FCoE, DCB (Data center bridging), DNSEC and Trust Zones

- **Team Device**
  - Mechanism for bonding multiple network devices into a simple logical interface at the data link layer (Alternative to the existing Linux Bonding driver)

- **40 GB ethernet support**

Red Hat Enterprise Linux 7:
Security

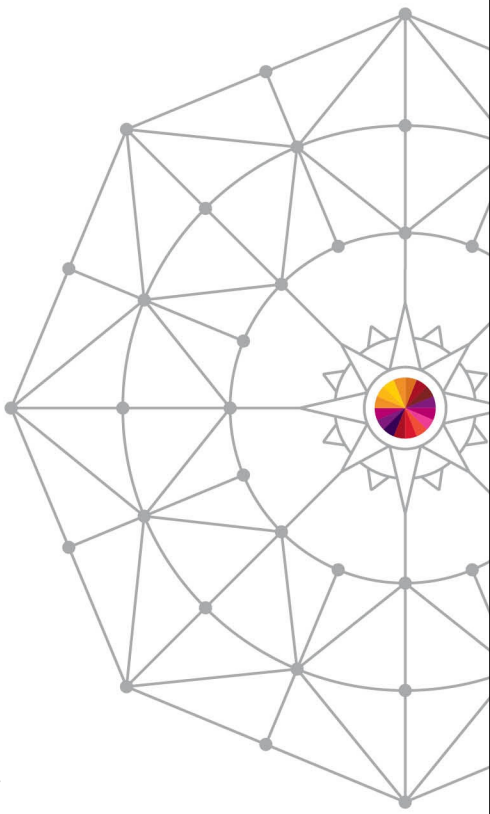
- **SELinux (Provides Government and Military level of security)**
  - Simplified tool chain for troubleshooting
  - Rich documentation set
  - Improved performance
- Firewalld
  - firewalld provides a dynamically managed firewall with support for network/firewall to define the trust level of network connections or interfaces.

```
# firewall-cmd --state
# firewall-cmd --get-active-zones
# firewall-cmd --reload
# firewall-cmd --panic-on
# firewall-cmd --zone=home --remove-service=http
# firewall-cmd --permanent --zone=home --add-port=443/tcp
```

Red Hat Enterprise Linux 7:
File Systems

Many Choices

- Ext4, XFS and btrfs (boot/root & data)
  - Ext4 provides backwards compatibility
    - Ext2/3 will use the Ext4 driver, which is mostly invisible to users
    - 50 TB
  - **XFS – New default filesystem**
    - Scalability ~500 TB
  - Btrfs: Focus is on stability over scalability
- NFS v4.1 & 3
- Full support for all pNFS client layout types
  - Add in support for vendors NAS boxes which support the pNFS file, object and block layouts



Red Hat Enterprise Linux 7:
Storage

- Upgrade/rollback with btrfs or LVM+xfs/ext4
- Storage system manager provides a unified easy to use CLI for all supported file systems

```
# ssm list filesystems
-----------------------------------------------------------------------------------------------------
Volume                          Volume size  FS     Free     Used     FS size  Type   Mount point
-----------------------------------------------------------------------------------------------------
/dev/device_pool/lvol001        100.00 GB  ext4  93.25 GB  1.75 GB  100.00 GB  linear
/dev/dm-0                        78.12 GB  ext4   2.11 GB 72.11 GB   78.12 GB  crypt  /home
btrfs_loop3                      11.05 TB  btrfs 11.05 TB 36.00 KB  11.05 TB  btrfs  /mnt/test
btrfs_loop3:2011-11-29-T113552   11.05 TB  btrfs 11.05 TB 36.00 KB  11.05 TB  btrfs  /mnt/test/2011-11-29-T113552
btrfs_loop3:new_subvolume        11.05 TB  btrfs 11.05 TB 36.00 KB  11.05 TB  btrfs  /mnt/test/new_subvolume
/dev/sda1                        19.53 GB  ext4  3.79 GB  14.77 GB  19.53 GB  part   /
```

Red Hat Enterprise Linux 7:
Linux Containers

Application isolation mechanism for light-weight, multi-tenancy environments with a single underlying OS

Benefits

- Fast Startup and shutdown
- Easy creation of container environment for isolated application deployment
- Scale out of applications Manage one RHEL system

Key Elements of RHEL Containers

- Process Isolation
- namespaces Resource Management
- cgroups Security
- SELinux Management
- libvirt

Red Hat Enterprise Linux 7:
Windows Interoperability – Server

- Cross realm Kerberos trust between Idm and Active Directory
- Out-of-the-box Linux support of direct interoperability with Active Directory
  - Automatic detection of the domain controller to join (AD/IdM)
  - Simple, integrated set-up of the authentication configuration
- Samba file server adds support for the SMB 4.0 file sharing
- Kernel support for SMB 2.1 clients of SMB servers
- IPv6 & Windows 7 domain support

Red Hat Enterprise Linux 7:
Other new features

- MariaDB replaces MySQL
- Yum - download in parallel
- Journald
  - less /var/log/message -> journalctl
  - tail -f /var/log/message -> journalctl -f
  - journalctl _COMM=sshd
- Subscription-manager only (no more rhn_register)
  - Red Hat Subscription Manager is installed on a local system and it tracks what products are installed, what subscriptions are available for the system, and what subscriptions are actually used by the system. It also tracks subscription expirations and automatically attaches new subscriptions based on the products and hardware.

Red Hat Enterprise Linux 7.0

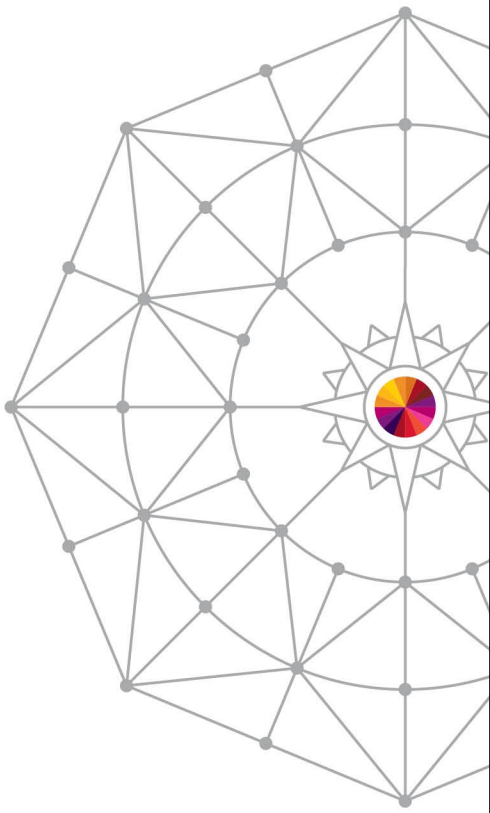
Public Beta Availability Oct 2013

Highlighted new proposed features for System z

- Enhance d DASD statistics for PAV and HPF
- DASD: add sanity check to detect path connection error
- Multiple netiucv paths for communication between z/VM- guests
- **Compiler - Architecture level set for IBM System z196 and newer**
- Support for new storage device on System z
- Support of new crypto hardware
- Crypto adapter resiliency
- Support of VEPA (Virtual Ethernet Port Aggregator) mode
- Cross Memory Attach for System z
- Provide PCHID mapping
- **Fuzzy live dump for System z**

Don't miss Martin Schwidefsky presentation about - What's New in Linux on System z!
Wednesday at 9:30am - Platinum Ballroom Salon 1

New Customer Reference



The Met Office forecasts a bright outlook for Linux on zEnterprise

Saving software licensing and hardware lifecycle costs by consolidating applications and systems

Overview

The need

The Met Office uses post-processing systems to tailor its weather forecasts for specific clients' needs. Running these systems on a distributed Linux infrastructure was becoming complex and expensive.

The solution

Following a comprehensive evaluation and benchmarking process, the Met Office decided to migrate suitable candidates from its distributed Linux landscape onto a pair of IBM® zEnterprise® 196 servers.

The benefit

Consolidating from 204 x86 processor cores to 17 IFLs cuts Oracle licensing costs by a factor of 12. Fewer physical servers means a more manageable Linux landscape and lower hardware lifecycle costs.

The Met Office is the UK's national weather service, providing weather forecasts for the public, for government, and for businesses in a wide variety of sectors. It employs 1,800 people at 60 locations around the world, and creates more than 3,000 tailored forecasts and briefings each day, as well as conducting weather- and climate-related research.

Martyn Catlow, Met Office portfolio lead for centralised IT infrastructure, comments: "We forecast for the public and a wide range of commercial sectors, and have a strong history of forecasting for the marine and aviation sectors. We also produce weather products for defence and a wide range of retail and infrastructure customers, such as national road and utility services."

Making the case for Oracle on Linux on zEnterprise

Because Oracle software licensing is currently calculated on a per-core basis, running Oracle databases in virtualised Linux partitions on IBM zEnterprise Integrated Facility for Linux (IFL) specialty engines can often lead to significant cost savings.

Richard Cains, technical lead with Met Office's mainframe team, explains: "We already had a few Oracle databases running under Linux on the mainframe, as part of a pilot program we had undertaken a couple of years ago. It proved so successful that it actually set a technical foundation for consolidating more Oracle on System z. I think that was part of our mind-set when it came down to conducting the overall technology refresh. It then came down to the cost-benefits of Linux on the mainframe platform."

Solution components

Hardware

- IBM® zEnterprise® 196

Software

- IBM z/VM®
- Oracle 11g
- Red Hat Enterprise Linux

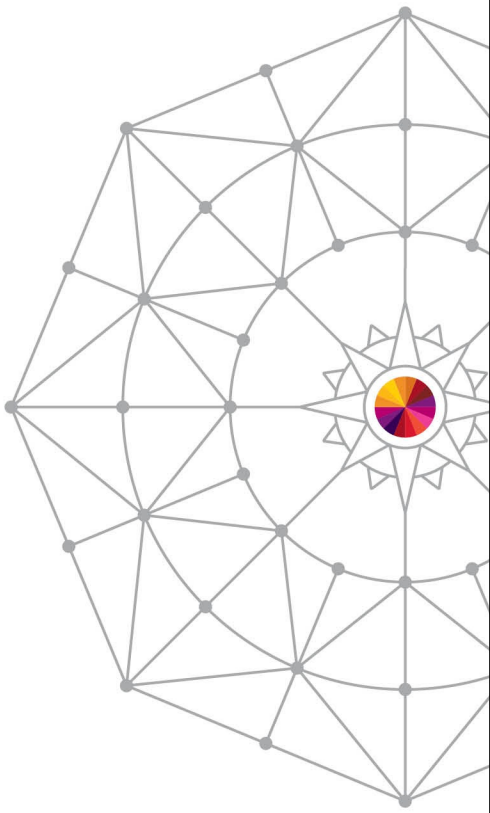
"By consolidating distributed commodity servers you can save a great deal of money. When we looked at all of the parameters, it just made sense to move the workload to the mainframe."

— Martyn Catlow, portfolio lead for centralised IT infrastructure, the Met Office


RED HAT
SUMMIT
http://www.redhat.com/summit/
San Francisco, April 14-17

Veristorm's data integration and Hadoop solution for RHEL on IBM System z

(Will be addressed by Veristorm)



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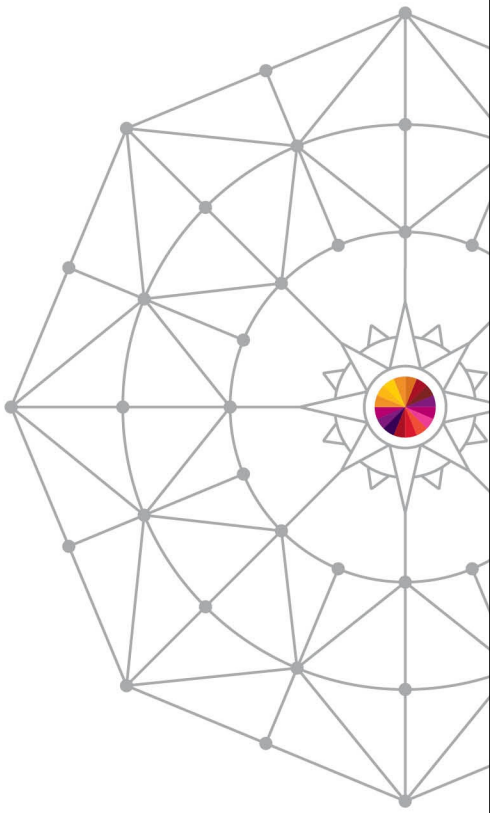
Thank you
Gracias
Grazie
Danke
Obrigado!



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