

Red Hat Enterprise Linux Update for IBM System z

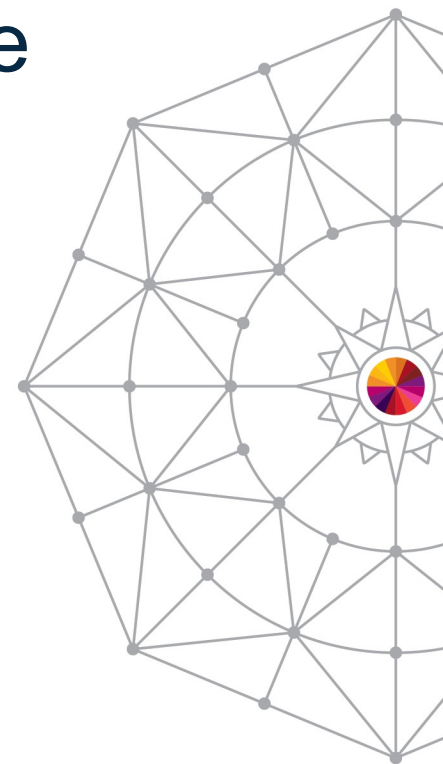
Filipe Miranda

*Global lead for Red Hat Technologies
for IBM System z and Power Systems
Red Hat Inc.*

*Tue Aug-05-2014
Session Number 15698*



#SHAREorg

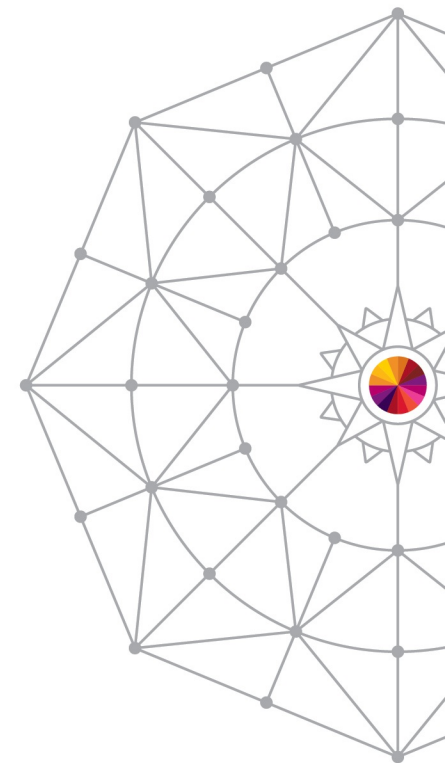


Agenda

Red Hat in a nutshell
Red Hat & IBM Collaboration

RHEL7 - System z update

Systemd Deep Dive





6200+
Employees

0\$
Debts

1M +
Red Hat certified IT Specialists

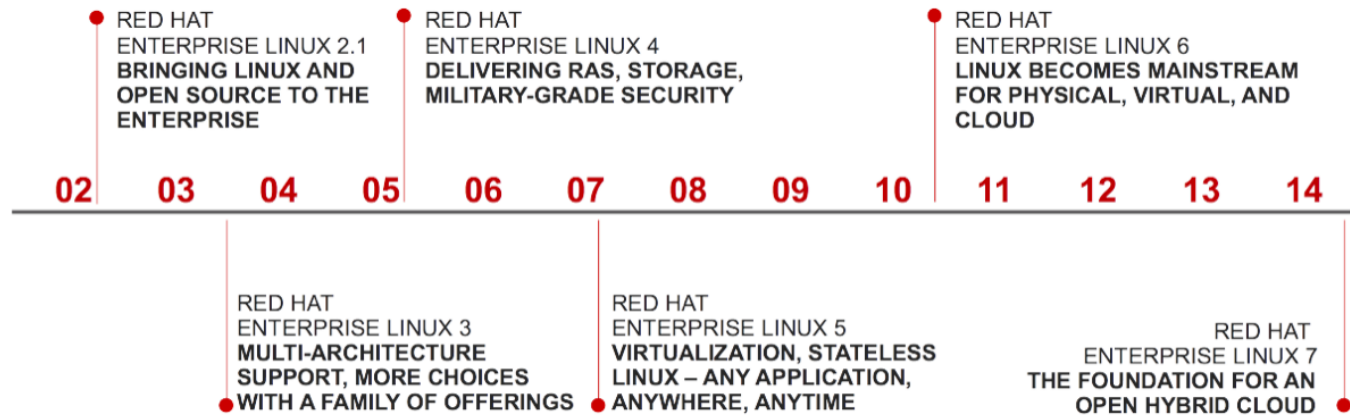


OFFICES WORLDWIDE

Fiscal Year 2014 Results:
Red Hat is growing 15% Year-over-Year*

The **FIRST**
\$1.5 BILLION
DOLLAR
OPEN
SOURCE
COMPANY
in the
WORLD

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



Source: Red Hat Inc.

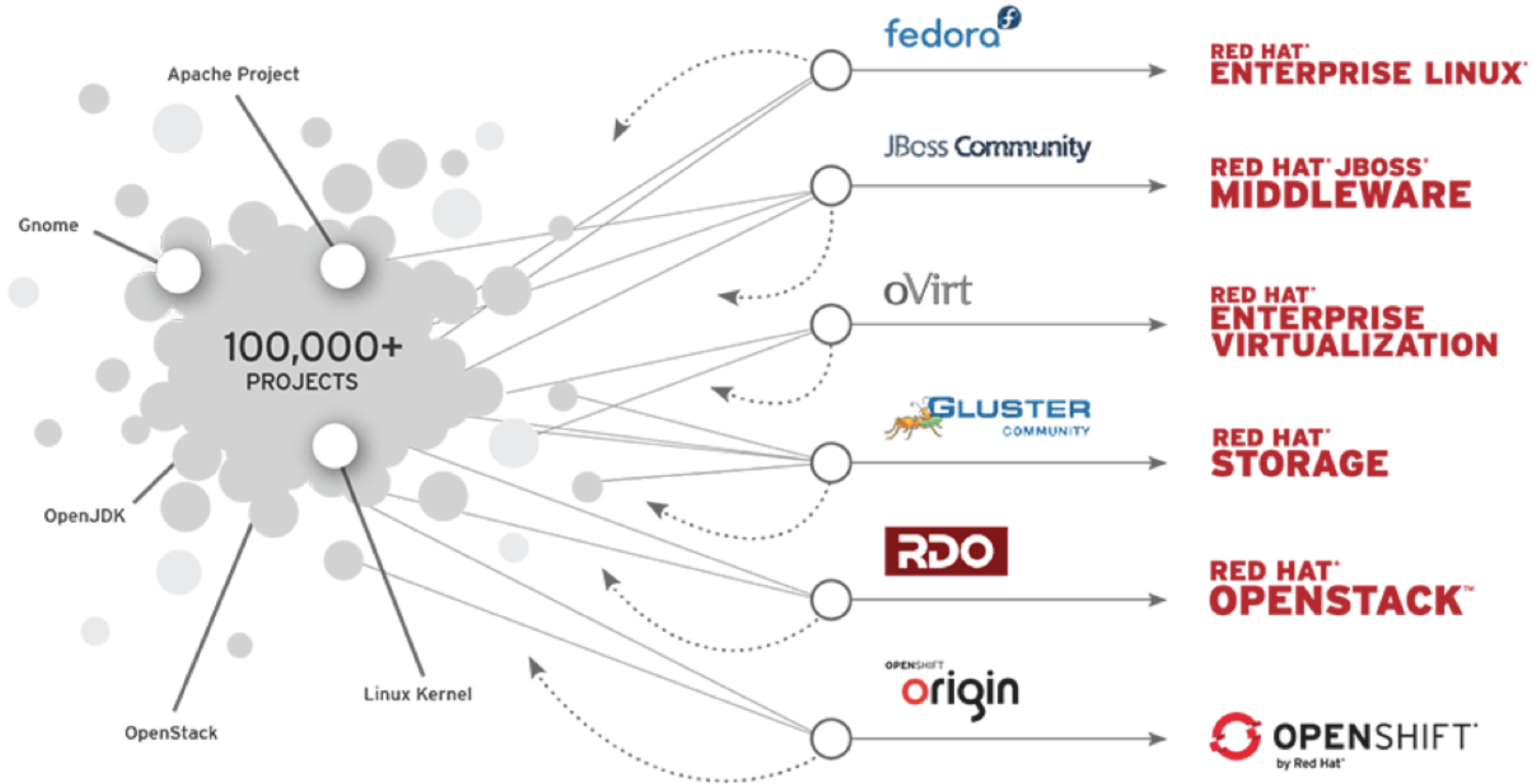
* <http://www.redhat.com/about/news/press-archive/2014/3/red-hat-reports-fourth-quarter-and-fiscal-year-2014-results>

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval



Red Hat Open Source Model

How we do it



Red Hat Development Powerhouse

Corporate Contributions to Linux (Kernel 3.3 - 3.10)

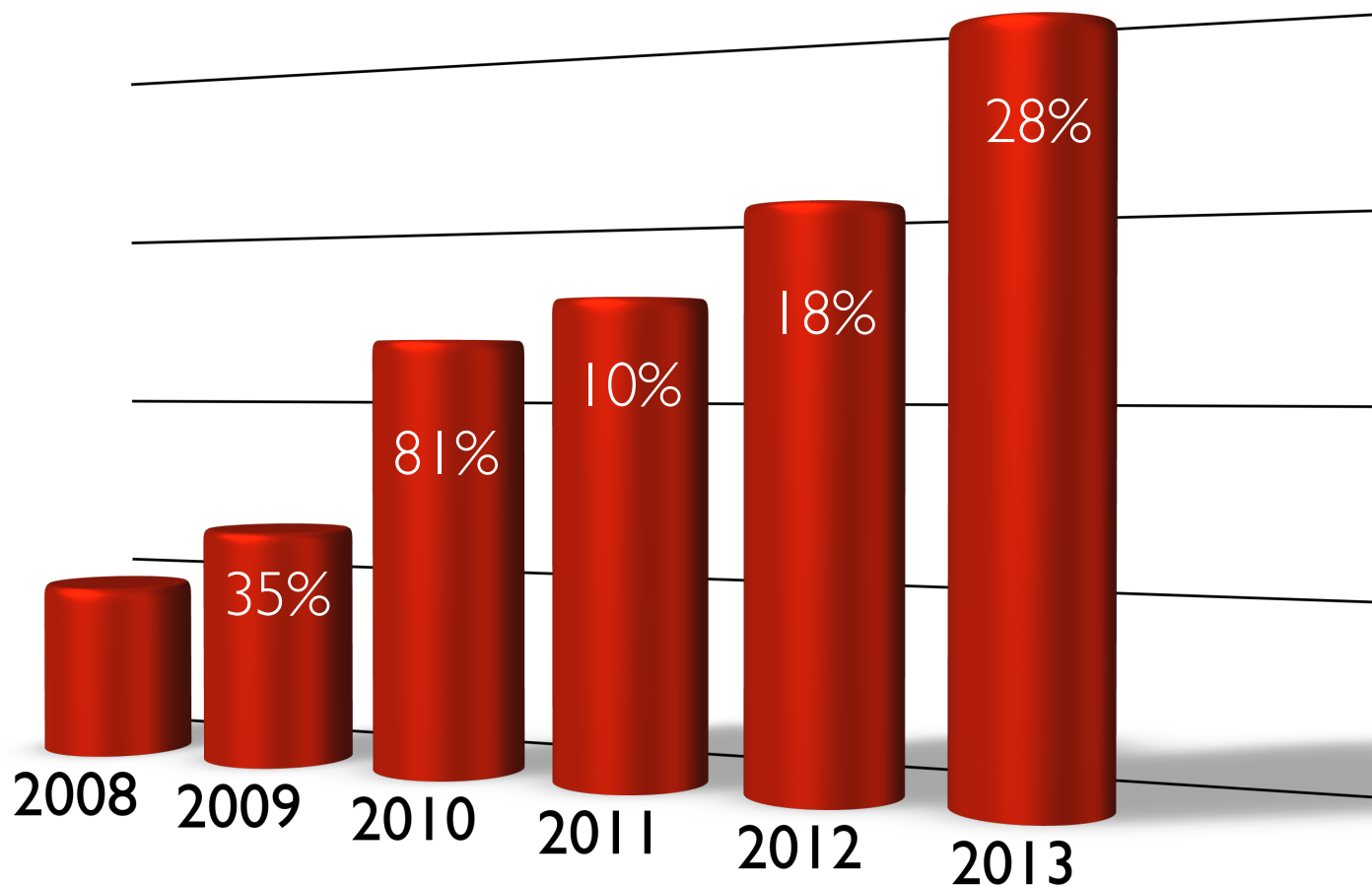
Corporate contributions to Linux (KERNEL 3.3 – 3.10)



* The developers who are known to be doing this work on their own, with no financial contribution happening from any company' are not grouped together as 'None' and instead are considered part of the 'long tail,' as are contributors of academic or unknown sponsorship.

Source:
The Linux Foundation
Linux Kernel Development
September 2013
(Pages 9)

RHEL for System z revenue growth % - installed base WW



Source: Red Hat

IBM System z Enterprise Class Servers

Red Hat Enterprise Linux Hardware Certification

z10 EC



z196



zEC12



Hardware

Red Hat
Enterprise Linux 5

Red Hat
Enterprise Linux 6

Red Hat
Enterprise Linux 7

IBM z10 Enterprise Class (2097) Server

5.1

6.0

—

IBM z196 (2817) Server

5.5

6.0

7.0

IBM zEC12 (2827) Server

5.8

6.3

7.0

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

IBM System z Business Class Servers

Red Hat Enterprise Linux Hardware Certification

z10 BC



z114



zBC12



Hardware	Red Hat Enterprise Linux 5	Red Hat Enterprise Linux 6	Red Hat Enterprise Linux 7
IBM z10 Business Class (2098) Server	5.2	6.0	—
IBM z114 (2818) Server	5.5	6.0	7.0
IBM zBC12 (2828) Server	5.8	6.3	7.0

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

JBoss adding Value to your solution

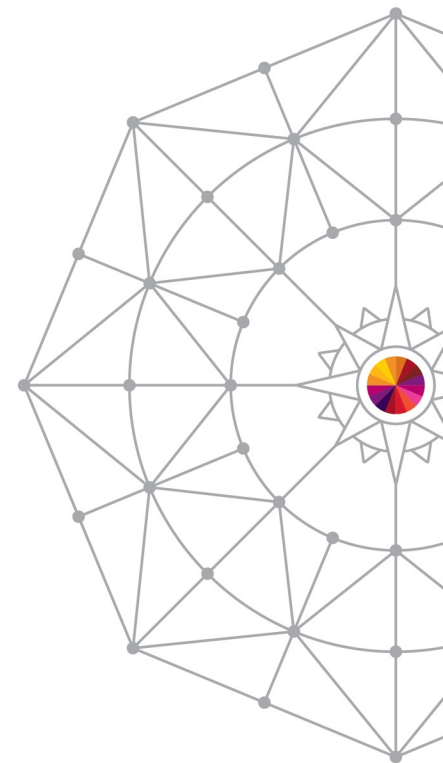
Take advantage of Java on Red Hat Enterprise Linux for IBM System z



- **JBoss® Enterprise Application Platform (JBoss EAP)** is supported on a variety of market-leading operating systems, Java™ Virtual Machines (JVMs), and database combinations.
- **IBM JDK is supported** ⁽¹⁾ and ready to run on Red Hat Enterprise Linux for IBM System z
- **Red Hat provides both production and development support for supported configurations** and tested integrations according to your subscription agreement in both physical and virtual environments.

(1) <https://access.redhat.com/site/articles/1111663>

Red Hat Enterprise Linux 7



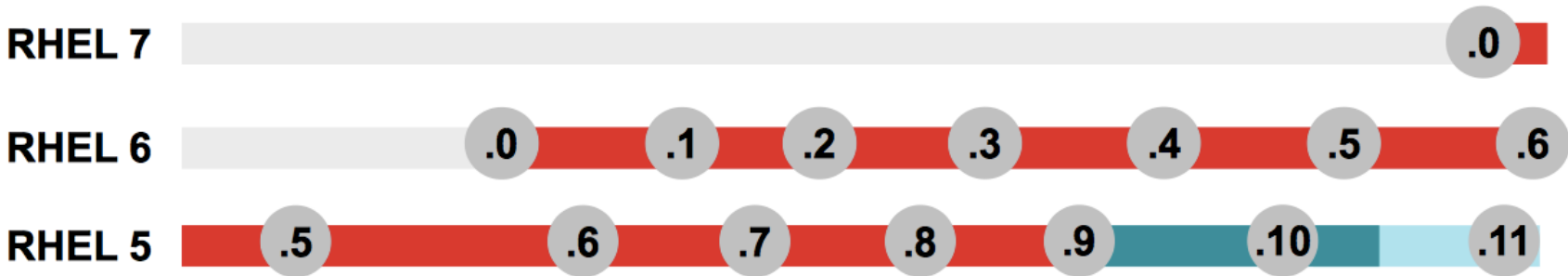
Current Platform Lifecycle

Red Hat Enterprise Linux



CY2010 CY2011 CY2012 CY2013 CY2014

Red Hat extended from 7 to 10 years standard technical support



■ Production 1
 ■ Production 2
 ■ Production 3

Production 1 (5 ½ years)	Prod. 2 (1 year)	Production 3 (3 ½ years)
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*All dates are approximate and subject to change

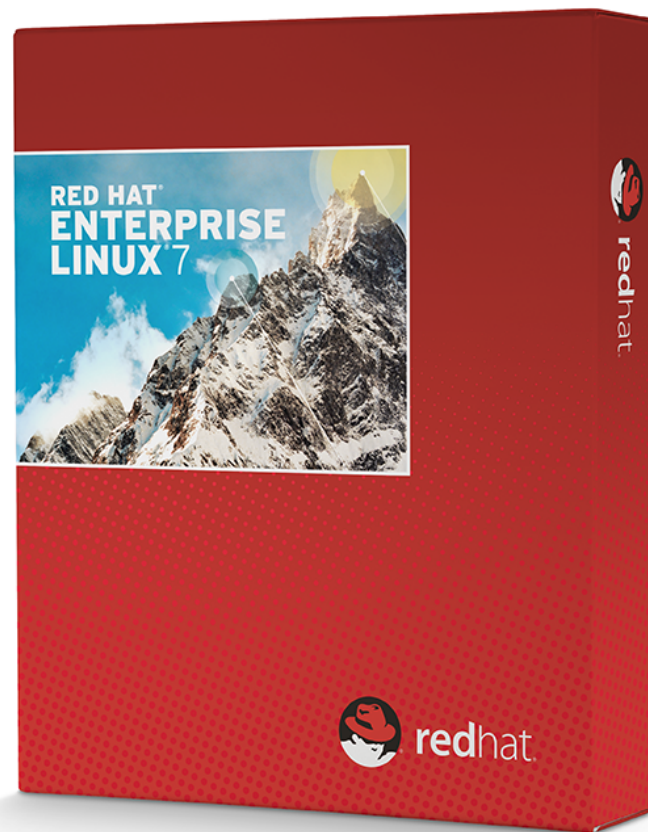
Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval



Red Hat Enterprise Linux 7.0

Public release Jun 2014

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



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



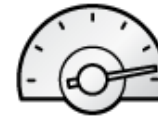
Red Hat Enterprise Linux 7.0

What is new for RHEL 7 on System z?

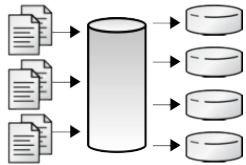
*More easy to Install,
Deploy and Manage*



*Optimal Performance
and Security*



File System Choice



*Application Isolation
with Linux Containers*



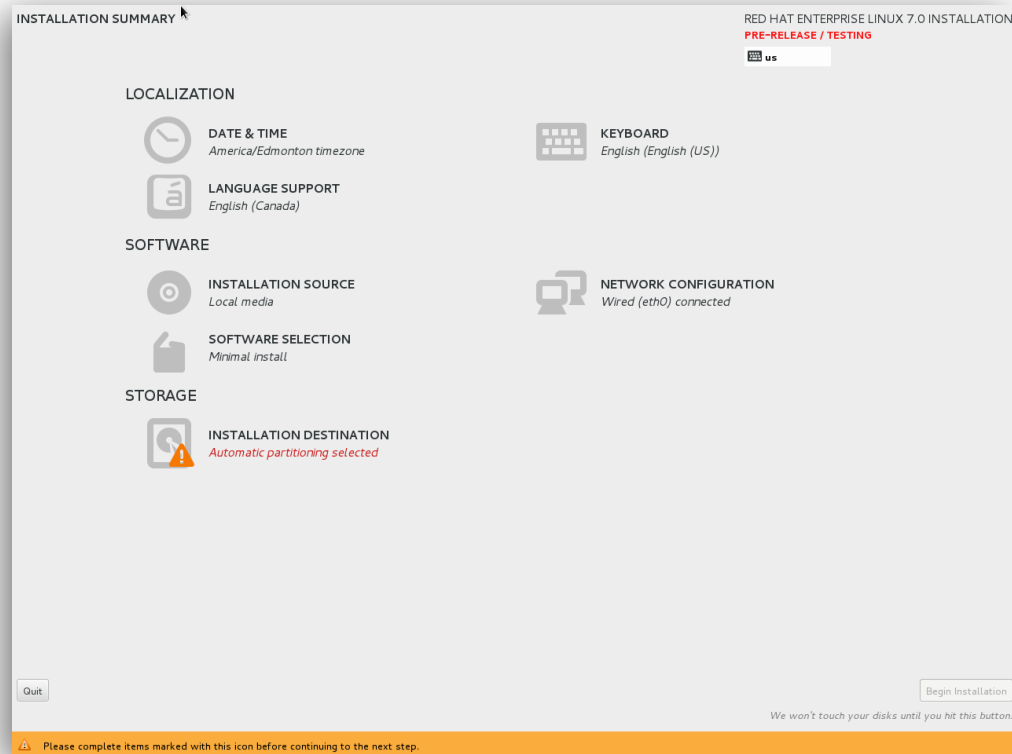
*Microsoft Windows
Interoperability*



Red Hat Enterprise Linux 7:

Installer

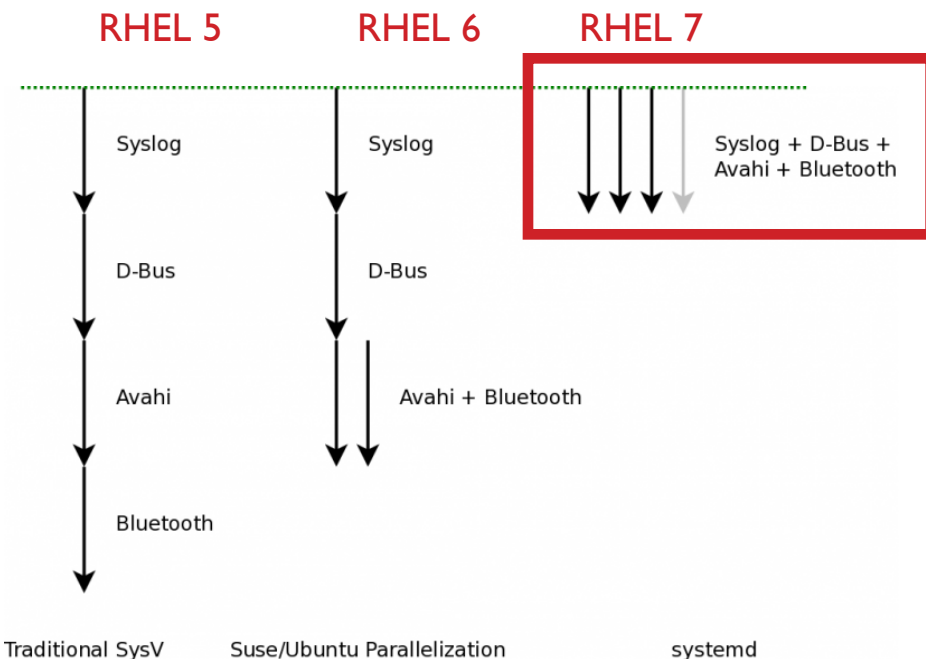
- The RHEL 7 installation procedure presents a user friendly interface that allows RHEL to be installed a more comprehensive installation process rather than having 13 linear screens
- Easy to go back to a main page
- Warnings and errors provided to guide the user



Red Hat Enterprise Linux 7:

System Initialization and service manager

- Uses Systemd, a system and service manager
- Allows more work to be done concurrently (possibly in parallel) at system startup resulting faster system boot times.
- Integrates chkconfig + service



“With systemd we can eliminate so many homegrown in-house monitoring and daemon management tools.”¹

Engineer, small business computer software company

“Systemd is my favorite feature so far. We deal with lots of init scripts currently; I’m already seeing great improvements by switching most of them to systemd.”¹

IT Architect, medium enterprise media & entertainment company

¹ Source: Research by TechValidate: www.techvalidate.com/product-research/red-hat-enterprise-linux TVID: 6D2-C98-90F

Red Hat Enterprise Linux 7:

File Systems - Many choices

- Scale file systems to 500TB with new default filesystem XFS
- Scale to 50TB with ext4
- Btrfs also available²
- Parallel NFS v4 provides improved performance and throughput

“The default XFS filesystem is just great!”¹

IT specialist,
US federal government



Type	Supported limit	Root	Boot	Comments
Single-node				
XFS	500TB	Yes	Yes	System default
ext4	50TB	Yes	Yes	Driver allow access to older versions (ext2, ext3).
btrfs ²	50TB	Yes	Yes	
Network/Multi-node				
GFS2	2-16 nodes	Yes	No	Shared-storage file system

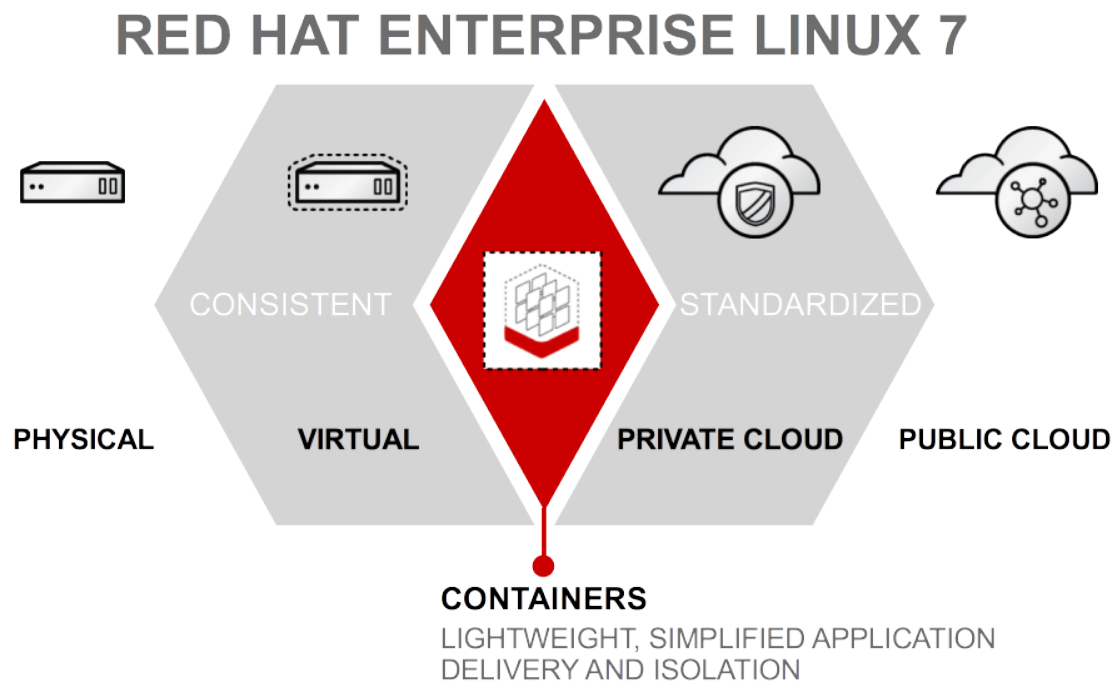
¹ Source: Research by TechValidate: www.techvalidate.com/product-research/red-hat-enterprise-linux TVID: 6D2-C98-90F

² Available as a Technology Preview

Red Hat Enterprise Linux 7:

Linux Containers - Application isolation

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

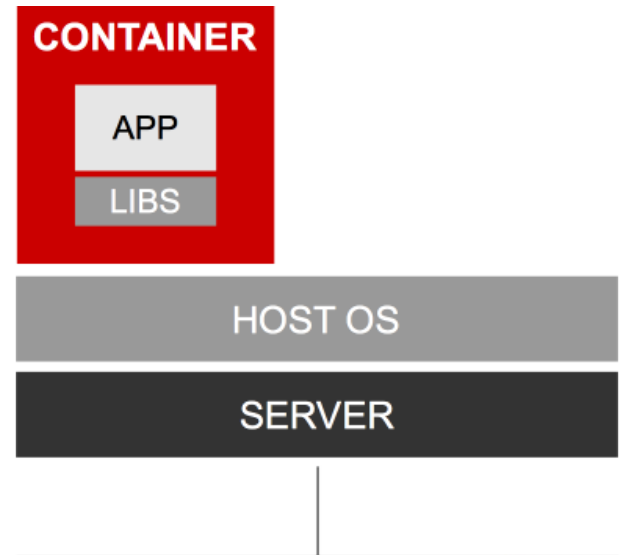


Red Hat Enterprise Linux 7:

Linux Containers - Benefits and Key Elements

Software packaging concept that typically includes an application and all of its runtime dependencies.

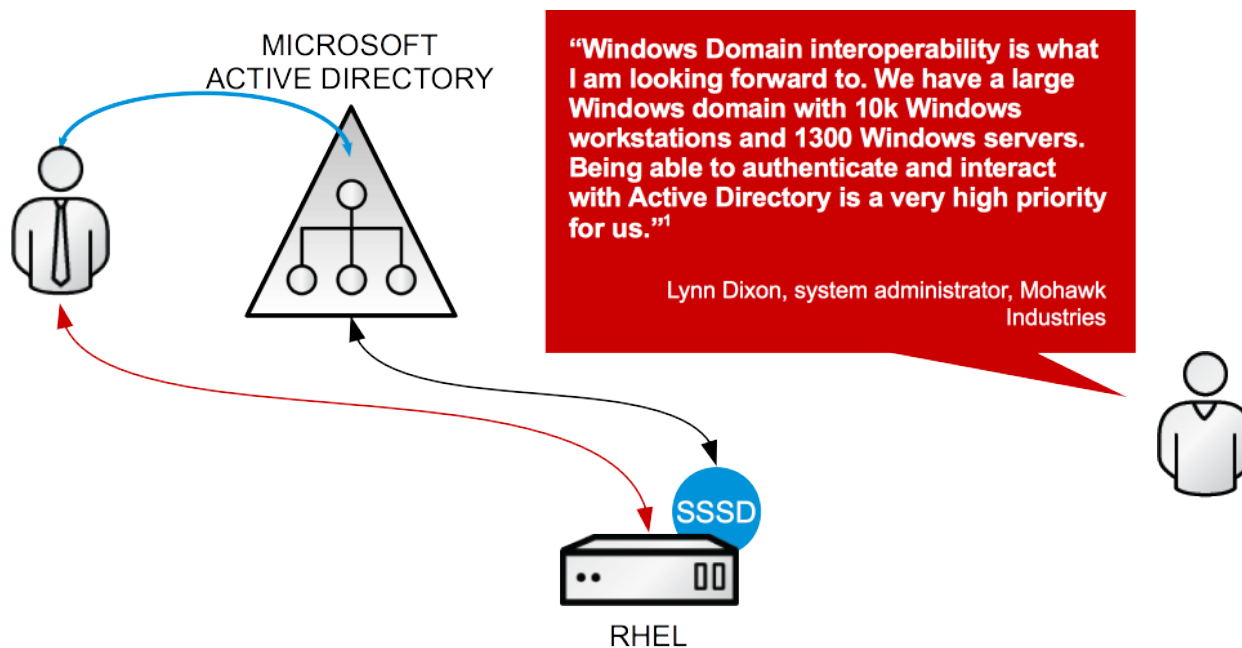
- Easy to deploy and portable across host systems
- Isolates applications on a host operating system.
- In RHEL, this is done through:
 - Control Groups (cgroups)
 - kernel namespaces
 - SELinux, sVirt



https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/7/html/Resource_Management_and_Linux_Containers_Guide/sec-Creating_a_Container.html

Red Hat Enterprise Linux 7: *Windows Interoperability*

- 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



¹Source: Research by TechValidate: www.techvalidate.com/product-research/red-hat-enterprise-linux

Red Hat Enterprise Linux 7.0

Linux on System z specific features

zFCP Specific

- End-To-End data consistency checking for zfc (Technology Preview)
- Exploitation of Data Routing for FCP
- Automated LUN scanning for NPIV only

Memory Specific

- Support of transparent large pages for System z
- libhugetlbfs support for System z
- Cross Memory Attach for System z
- Transactional memory support (for zEC12 and newer)
- Implement write protection based dirty page detection

Network Specific

- Enhancement in the configuration tool for System z network devices
- IPv6 support for qetharp tool
- Support of VEPA (Virtual Ethernet Port Aggregator)

Red Hat Enterprise Linux 7.0

Linux on System z specific features

DASD Specific

- Safe offline interface for DASD devices
- Enhanced DASD statistics for PAV and HPF
- DASD sanity check to detect path connection error
- Improve performance of dasdfmt (TP)

Crypto Specific

- Support for zEC12 Crypto Express4S
- Crypto adapter resiliency

Red Hat Enterprise Linux 7.0

Linux on System z specific features

All other features

- zipl to automatically calculate boot device ramdisk address
- Optimized compression library zlib for Linux on System z
- Kernel support to improve Java performance for Linux on System z (Technology Preview)
- Enable LLVM pipe for System z
- Architecture level set for IBM System z196 and newer
- Support for zEC12 Flash Express (TP)
- Provide PCHID mapping
- Fuzzy live dump for System z (Technology Preview)
- Two Stage Dumper (TP)
- Linux support for concurrent Flash MCL updates (TP)

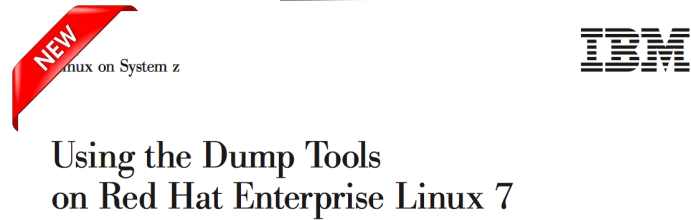
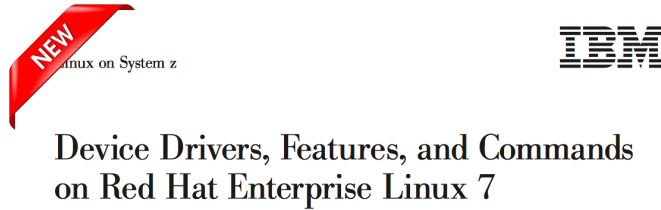
Architecture level set for IBM System z196 and newer

Based on the current market and tendency of System z customers, the majority of System z customers will be using a z196 or newer machine. With this expectation, Red Hat set the newer version of the RHEL distribution for System z so that the new instructions with z196 and newer machines are exploited.



Additional Linux on System z Documentation

DeveloperWorks

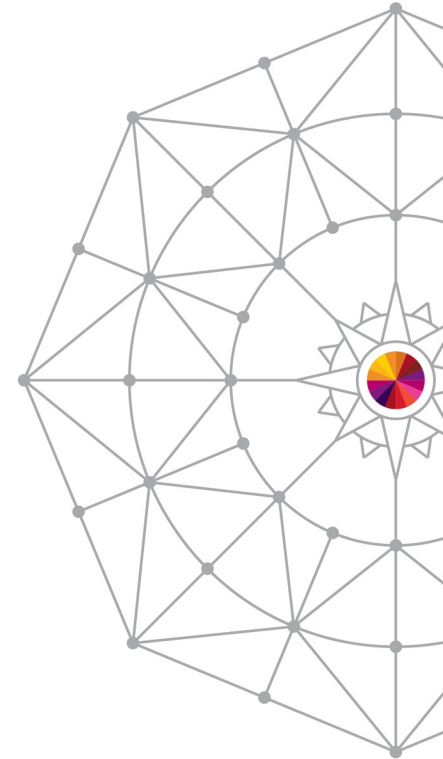


http://www.ibm.com/developerworks/linux/linux390/documentation_red_hat.html#rhel7

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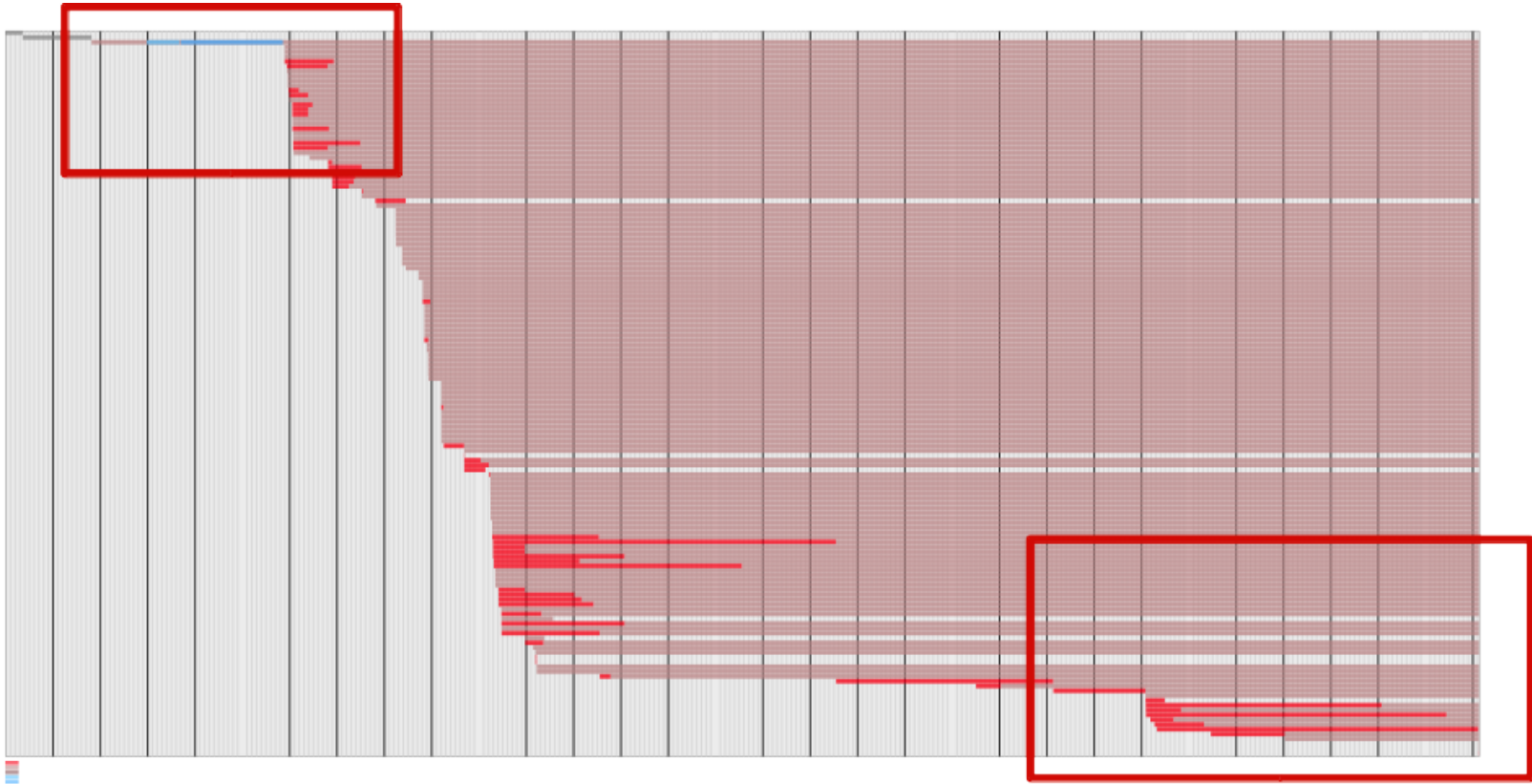


Systemd Deep Dive



Systemd startup boot time greatly enhanced

```
# systemd-analyze plot > boot.svg ; firefox ./boot.svg
```



Systemd-analyse plot: mode detail

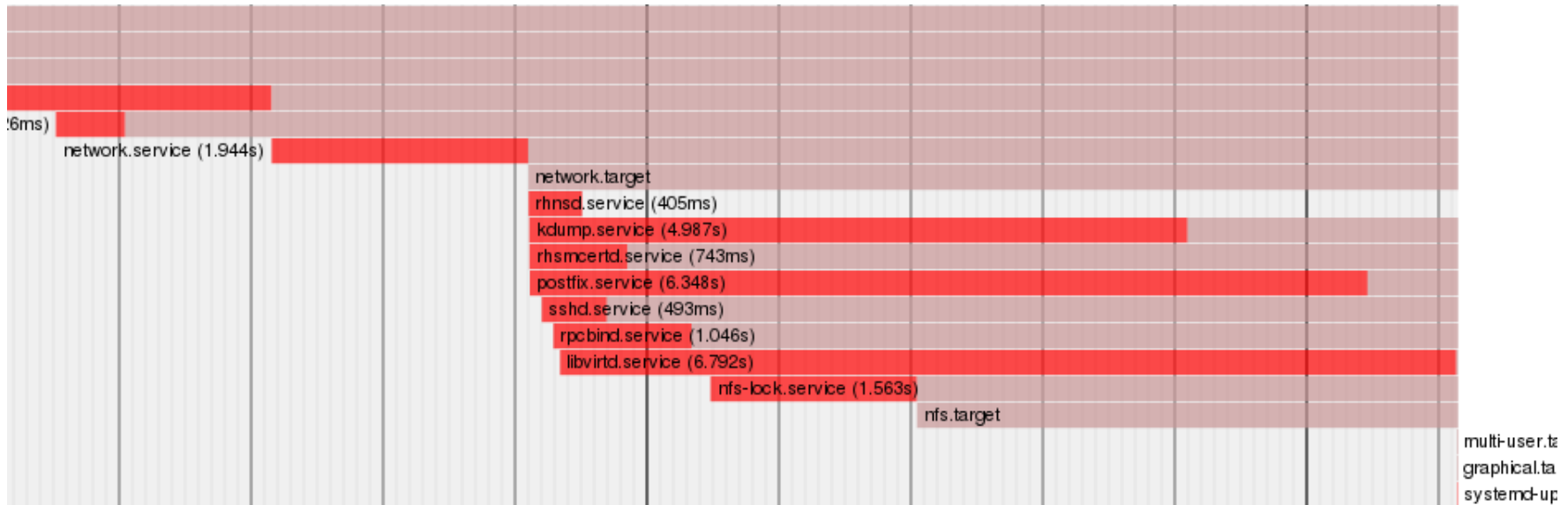
```
# systemd-analyze plot > boot.svg ; firefox ./boot.svg
```



Systemd-analyse plot: Mode Detail

Aggressive paralelization starting processes

```
# systemd-analyze plot > boot.svg ; firefox ./boot.svg
```



Checking status of a service using systemctl:

```
root@localhost:~/systemd x root@localhost:~ x
[root@localhost ~]# systemctl status postfix
postfix.service - Postfix Mail Transport Agent
  Loaded: loaded (/usr/lib/systemd/system/postfix.service; enabled)
  Active: active (running) since Qua 2014-07-30 13:49:55 BRT; 1min 52s ago
  Process: 4039 ExecStop=/usr/sbin/postfix stop (code=exited, status=0/SUCCESS)
  Process: 4067 ExecStart=/usr/sbin/postfix start (code=exited, status=0/SUCCESS)
  Process: 4064 ExecStartPre=/usr/libexec/postfix/chroot-update (code=exited, status=0/SUCCESS)
  Process: 4061 ExecStartPre=/usr/libexec/postfix/aliasesdb (code=exited, status=0/SUCCESS)
  Main PID: 4139 (master)
  CGroup: /system.slice/postfix.service
          └─4139 /usr/libexec/postfix/master -w
            └─4140 pickup -l -t unix -u
              └─4141 qmgr -l -t unix -u

Jul 30 13:49:55 localhost.localdomain systemd[1]: Starting Postfix Mail Transport Agent...
Jul 30 13:49:55 localhost.localdomain postfix/master[4139]: daemon started -- version 2.10.1, con...ix
Jul 30 13:49:55 localhost.localdomain systemd[1]: Started Postfix Mail Transport Agent.
Hint: Some lines were ellipsized, use -l to show in full.
[root@localhost ~]# systemctl status postfix █
```

Stopping a service using systemctl:

```
root@localhost:~/systemd x root@localhost:~ x
[root@localhost ~]# systemctl stop postfix
[root@localhost ~]# systemctl status postfix
postfix.service - Postfix Mail Transport Agent
  Loaded: loaded (/usr/lib/systemd/system/postfix.service; enabled)
  Active: inactive (dead) since Qua 2014-07-30 13:56:00 BRT; 4s ago
  Process: 4202 ExecStop=/usr/sbin/postfix stop (code=exited, status=0/SUCCESS)
  Process: 4067 ExecStart=/usr/sbin/postfix start (code=exited, status=0/SUCCESS)
  Process: 4064 ExecStartPre=/usr/libexec/postfix/chroot-update (code=exited, status=0/SUCCESS)
  Process: 4061 ExecStartPre=/usr/libexec/postfix/aliasesdb (code=exited, status=0/SUCCESS)
  Main PID: 4139 (code=killed, signal=TERM)

Jul 30 13:49:55 localhost.localdomain systemd[1]: Starting Postfix Mail Transport Agent...
Jul 30 13:49:55 localhost.localdomain postfix/master[4139]: daemon started -- version 2.10.1, con...ix
Jul 30 13:49:55 localhost.localdomain systemd[1]: Started Postfix Mail Transport Agent.
Jul 30 13:56:00 localhost.localdomain systemd[1]: Stopping Postfix Mail Transport Agent...
Jul 30 13:56:00 localhost.localdomain systemd[1]: Stopped Postfix Mail Transport Agent.
Hint: Some lines were ellipsized, use -l to show in full.
[root@localhost ~]# █
```

Starting a service using systemctl:

More information about the service

```
root@localhost:~/systemd x root@localhost:~ x
[root@localhost ~]# systemctl start postfix
[root@localhost ~]# systemctl status postfix
postfix.service - Postfix Mail Transport Agent
  Loaded: loaded (/usr/lib/systemd/system/postfix.service; enabled)
  Active: active (running) since Qua 2014-07-30 13:57:36 BRT; 2s ago
  Process: 4202 ExecStop=/usr/sbin/postfix stop (code=exited, status=0/SUCCESS)
  Process: 4255 ExecStart=/usr/sbin/postfix start (code=exited, status=0/SUCCESS)
  Process: 4252 ExecStartPre=/usr/libexec/postfix/chroot-update (code=exited, status=0/SUCCESS)
  Process: 4249 ExecStartPre=/usr/libexec/postfix/aliasesdb (code=exited, status=0/SUCCESS)
  Main PID: 4327 (master)
  CGroup: /system.slice/postfix.service
          └─4327 /usr/libexec/postfix/master -w
            └─4328 pickup -l -t unix -u
              └─4329 qmgr -l -t unix -u

Jul 30 13:57:36 localhost.localdomain systemd[1]: Starting Postfix Mail Transport Agent...
Jul 30 13:57:36 localhost.localdomain postfix/master[4327]: daemon started -- version 2.10.1, con...ix
Jul 30 13:57:36 localhost.localdomain systemd[1]: Started Postfix Mail Transport Agent.
Hint: Some lines were ellipsized, use -l to show in full.
[root@localhost ~]# █
```


Systemd sshd script example:

```
root@localhost:~/systemd x root@localh
[root@localhost ~]# cat /usr/lib/systemd/system/sshd.service
[Unit]
Description=OpenSSH server daemon
After=syslog.target network.target auditd.service

[Service]
EnvironmentFile=/etc/sysconfig/ssh
ExecStartPre=/usr/sbin/ssh-keygen
ExecStart=/usr/sbin/sshd -D $OPTIONS
ExecReload=/bin/kill -HUP $MAINPID
KillMode=process
Restart=on-failure
RestartSec=42s

[Install]
WantedBy=multi-user.target
[root@localhost ~]# █
```

Systemd Postfix script example:

```
root@localhost:~/systemd x root@localhost:~
[root@localhost ~]# cat /usr/lib/systemd/system/postfix.service
[Unit]
Description=Postfix Mail Transport Agent
After=syslog.target network.target
Conflicts=sendmail.service exim.service

[Service]
Type=forking
PIDFile=/var/spool/postfix/pid/master.pid
EnvironmentFile=-/etc/sysconfig/network
ExecStartPre=-/usr/libexec/postfix/aliasesdb
ExecStartPre=-/usr/libexec/postfix/chroot-update
ExecStart=/usr/sbin/postfix start
ExecReload=/usr/sbin/postfix reload
ExecStop=/usr/sbin/postfix stop

[Install]
WantedBy=multi-user.target
```

Difference in script complexity: RHEL6 and RHEL7

```
File Edit View Search Terminal Help
[root@samba4 ~]# cat /etc/redhat-release
Red Hat Enterprise Linux Server release 6.4 (Santiago)
[root@samba4 ~]# cat /etc/init.d/sshd | wc
 234   666   4534
[root@samba4 ~]# cat /etc/init.d/postfix | wc
 166   550   3852
[root@samba4 ~]# █
```

```
root@localhost:~/systemd x root@localhost:~
[root@localhost ~]# cat /etc/redhat-release
Red Hat Enterprise Linux Server release 7.0 (Maipo)
[root@localhost ~]# wc /usr/lib/systemd/system/sshd.service
 15  21 334 /usr/lib/systemd/system/sshd.service
[root@localhost ~]# wc /usr/lib/systemd/system/postfix.service
 17  23 463 /usr/lib/systemd/system/postfix.service
[root@localhost ~]# █
```

Creating your own Systemd service script:

```
root@localhost:~/systemd x root@localhost:~ x
[root@localhost ~]# cat << SERVIC0 > /etc/systemd/system/teste.service
[Unit]
Description=teste
[Service]
ExecStart=/usr/bin/sleep 300
[Install]
WantedBy=multi-user.target
SERVIC0
[root@localhost ~]# systemctl enable teste.service
ln -s '/etc/systemd/system/teste.service' '/etc/systemd/system/multi-user.target.wants/teste.service'
[root@localhost ~]# systemctl start teste.service
[root@localhost ~]# systemctl status teste.service
teste.service - teste
   Loaded: loaded (/etc/systemd/system/teste.service; enabled)
   Active: active (running) since Qua 2014-07-30 14:19:53 BRT; 9s ago
 Main PID: 4805 (sleep)
   CGroup: /system.slice/teste.service
           └─4805 /usr/bin/sleep 300

Jul 30 14:19:53 localhost.localdomain systemd[1]: Starting teste...
Jul 30 14:19:53 localhost.localdomain systemd[1]: Started teste.
[root@localhost ~]# █
```

Systemd working with CGroups

```

root@localhost:~/systemd
[root@localhost ~]# dstat
You did not select any stats, using -cdngy by default.
----total-cpu-usage---- -dsk/total- net/total- ---paging-- ---system--
usr  sys  idl  wai  hiq  siq  read  writ  recv  send  in  out  int  csw
 0    0   98    2    0    0   25k  261k    0    0    0    0   176  333
 0    6   52   43    0    0    0  7091k   66B  166B    0    0  4221  8167
 1    5   51   43    0    0    0  6617k  118B  838B    0    0  3947  7617
 0    5   52   44    0    0    0  6118k  168B  716B    0    0  3840  7048
 1    6   51   43    0    0    0  6753k  118B   66B    0    0  4019  7779
 0    4   52   44    0    0    0  5099k   66B  358B    0    0  3055  5883
 0    5   52   43    0    0    0  6319k  118B  358B    0    0  3769  7276
 1    5   52   43    0    0    0  7072k   66B  358B    0    0  4202  8146
 0    6   51   43    0    0    0  6843k  118B  358B    0    0  4071  7883
 0    5   52   44    0    0    0  6715k   66B  358B    0    0  3989  7746
 1    5   50   45    0    0    0  5962k  118B  358B    0    0  5631  6883
 0    5   52   44    0    0    0  6280k   66B  358B    0    0  3734  7242
 0    6   52   43    0    0    0  6958k  118B  358B    0    0  4139  8015
  
```

dstat – Display details of a data structure (i.e. block or sector)

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

Systemd working with CGroups:

Limiting write to IM

```

root@localhost:~/systemd x root@localhost:~
[root@localhost ~]# cat /etc/systemd/system/mybackup.service
[Unit]
Description=mybackup
[Service]
BlockIOAccounting=1
BlockIOWriteBandwidth=/dev/vda 1M
#BlockIOWeight=10
ExecStart=/usr/bin/dd if=/dev/zero of=/backupfile bs=1024 count=10000000 oflag=direct
Restart=always
[Install]
WantedBy=multi-user.target
[root@localhost ~]# systemctl daemon-reload && systemctl restart mybackup
[root@localhost ~]# dstat
You did not select any stats, using -cdngy by default.
----total-cpu-usage----  -dsk/total-  -net/total-  ---paging--  ---system--
usr  sys  idl  wai  hiq  siq| read  writ| recv  send|  in  out|  int  csw
 0   0   97   3   0   0| 24k  388k|   0   0|   0   0| 251  478
 1   1   50  49   0   0|  0 1022k| 66B 166B|   0   0| 641 1241
 0   1   50  49   0   0|  0 1027k|118B 838B|   0   0| 660 1270
 0   2   50  49   0   0|  0 1024k| 66B 358B|   0   0| 653 1245
 0   1   51  49   0   0|  0 1022k|118B 358B|   0   0| 654 1251

```

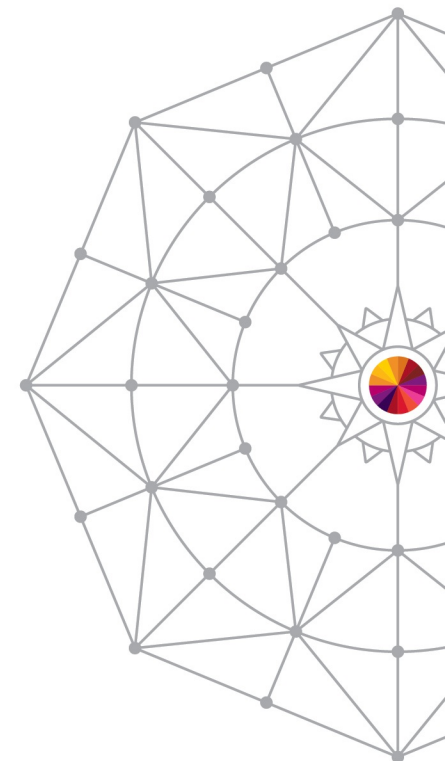
Systemd: Automatic restart of services

```
root@localhost:~/systemd x root@localhost:~
[root@localhost ~]# cat /usr/lib/systemd/system/sshd.service
[Unit]
Description=OpenSSH server daemon
After=syslog.target network.target auditd.service

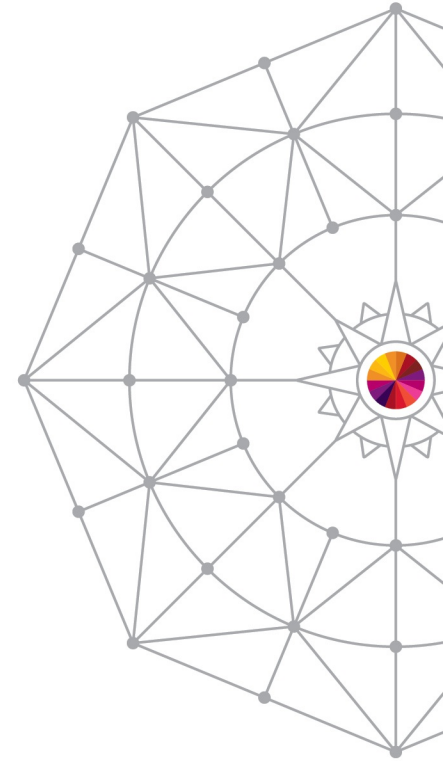
[Service]
EnvironmentFile=/etc/sysconfig/ssh
ExecStartPre=/usr/sbin/ssh-keygen
ExecStart=/usr/sbin/sshd -D $OPTIONS
ExecReload=/bin/kill -HUP $MAINPID
KillMode=process
Restart=on-failure
RestartSec=42s

[Install]
WantedBy=multi-user.target
[root@localhost ~]#
```

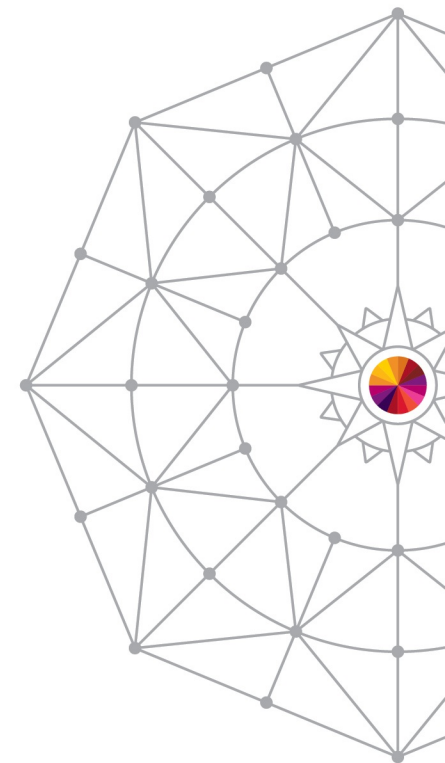
Danke
Thank you
Grazie
Obrigado
Gracias



Additional Material



Customer References



For a complete list of customer success stories please access:

http://people.redhat.com/fmiranda/powersystems/customer_references/



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 forecasts a bright outlook for Linux on zEnterprise

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

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



Overview

The need

To meet increased demand from a growing customer base, Algar Telecom needs strong, flexible IT systems that deliver high availability and reliability for a diverse range of telecommunications services.

The solution

Algar Telecom consolidated more than 90 standalone servers to Linux virtual servers running on IBM® z/VM® on a single IBM zEnterprise® 196 server, featuring the IBM zEnterprise BladeCenter® Extension.

The benefit

Provides a reliable, flexible platform for core business systems that has cut data center costs by 70 percent, reduced maintenance effort by 65 percent and boosted operational efficiency by 30 percent.

Algar Telecom gives its growing business a signal boost

With a reliable, secure IBM platform that supports growth and better service delivery

Algar Telecom is a telecommunications company headquartered in Uberlândia, Brazil. A division of the Algar Group, Algar Telecom operates the CTBC brand and maintains a strong presence in 87 municipalities. The company provides more than 800,000 customers with mobile and fixed voice telephone and broadband, as well as corporate communication and pay-tv services.

Simplified management and greater flexibility

To further simplify and reduce its hardware infrastructure's complexity, Algar Telecom deployed 24 Integrated Facility for Linux (IFL) engines on its z196 to run virtualized Red Hat Enterprise Linux servers on IBM z/VM® technology.

Solution components

Hardware

- IBM® zEnterprise® 196
- IBM zEnterprise BladeCenter® Extension
- IBM zEnterprise Unified Resource Manager
- IBM BladeCenter HX5
- IBM Power® 780
- IBM Storwize® V7000

Software

- IBM AIX® 6.1
- IBM z/VM® 6.2
- Red Hat Enterprise Linux

Services

- IBM STG Lab Services
-





“The creation of a private cloud built around the z196 servers supports our business transformation goals by enabling the rapid, seamless deployment of new computing resources to meet emerging requirements.”

— Jim Tussing, Chief Technology Officer for infrastructure and operations, Nationwide



Nationwide cuts costs in the cloud

With smart workload consolidation from IBM

In the last 80 years, Nationwide has grown from a small mutual auto insurer owned by policyholders to one of the largest insurance and financial services companies in the United States, with more than 38,000 employees. Headquartered in Columbus, Ohio, this Fortune 500-listed company is the number one provider of public-sector retirement plans and the seventh largest auto insurer in the United States.

The need for consolidation

To retain its position as a leader in a competitive industry, Nationwide wanted to increase its agility and ability to innovate, but its IT infrastructure was holding it back.

First steps

Following a rigorous analysis of various options, Nationwide decided to consolidate its distributed environment to Linux virtual servers hosted by IBM z/VM[®] on the IBM System z platform. In combination with IBM WebSphere[®] Application Server and IBM DB2[®], z/VM offered significant cost advantages over other possible platforms.

With IBM z/VM, the virtualized servers are able to use the fast I/O of the mainframe and share its resources, while simultaneously taking advantage of the traditional mainframe strengths of reliability and high availability.



Overview

The need

The City and County of Honolulu needed to increase transparency to support citizen access to government information. The city's goals were to improve community involvement, services and efficiency.

The solution

Honolulu deployed an Integrated Facility for Linux (IFL) engine running Linux on IBM System z®, an IBM XIV® Storage System, and IBM Maximo® Asset Management and IBM Tivoli® software.

The benefit

The city's new platform helped to reduce database licensing costs by 68 percent, reduce time to deploy applications from one week to a few hours and increase property tax revenue by USD\$1.4 million.

The City and County of Honolulu creates a customized cloud

Using IBM System z and reducing licensing costs by up to 68 percent

A city that evokes the image of a high-rise skyline in the middle of paradise, Honolulu, Hawaii has recently been undergoing a technological transformation. In November 2011, the Center for Digital Government recognized Honolulu as the top digital city in the US in the large-city category. This recognition is impressive, considering that in November 2004, the city evaluated its IT and network systems as being underfunded and out of date.

Increasing citizen involvement with a customized cloud

Another goal made possible by the city's new IBM deployment was an increase in citizen involvement. Using Linux and IBM z/VM® operating systems on the z10 EC system, the city created a customized cloud environment. This provided a scalable self-service platform on which city employees could develop open source applications, and it empowered the general public to create and deploy citizen-centric applications.

One of the more innovative applications supporting citizen involvement is CitySourced Honolulu 311, an application created by IBM Business Partner CitySourced that enables citizens to photograph and pinpoint the location of problems—such as broken street or traffic lights or abandoned cars—and report them to the city.



CUSTOMER CASE STUDY



RED HAT AND IBM FORM THE FOUNDATION FOR ENERGY-EFFICIENT MALAGA SMART CITY PROJECT

SOFTWARE


Red Hat Enterprise Linux for System z

HARDWARE

IBM system z10 2097-E12 servers with four IFLs and 48GB of memory

MIGRATION

New infrastructure based on IBM System z



Malaga, Spain

EUROPE
+ GLOBAL

“Thanks to the blend of Red Hat and IBM solutions, the Smart City infrastructure is the most reliable on the market, resulting in the best availability-to-cost ratio. It also ensures data security and safe access to the various components of systems.”

ANGEL MOREU GALUP
MAINFRAME EXECUTIVE, IBM

The Smart City project, Europe's largest eco-efficient city initiative, comprises 11 companies headed by Endesa, and aims to rationalise users' energy consumption and cut CO₂ emissions using new technologies. Red Hat® Enterprise Linux® is at the heart of the project ensuring reliability, availability, and serviceability (RAS) for IBM's IT systems and infrastructure.

BANK OF NEW ZEALAND REDUCES CARBON FOOTPRINT WITH RED HAT ON THE MAINFRAME

FAST FACTS

Industry	Financial Services
Geography	New Zealand
Business Challenge	Address environmental and space issues in the datacentre and achieve the corporate goal of becoming carbon neutral by 2010
Migration Path	From distributed Intel and SUN SPARC servers to Red Hat Enterprise Linux 5 running under z/VM on IBM z9 and z10 mainframes
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	<ul style="list-style-type: none">• 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 \(/solutions/industry/financial/\)](/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.

Overview

Challenge

With the growth of both Internet banking and core banking systems, Svenska Handelsbanken wanted to consolidate as many systems as possible to a simple centralized infrastructure.

Solution

By running Linux®, Java™ and database workload alongside core banking systems on an IBM System z10®, Handelsbanken benefits from a single easy-to-manage platform with rapid disaster recovery capabilities.

Benefits

- Runs hundreds of systems on a single physical machine
- Cuts Java workload costs by 15 percent per year
- Enables disaster recovery within seconds

Svenska Handelsbanken puts IBM System z at the heart of operations

Building a modern data center on mainframe technology

The growth of Linux

“We are currently running two main Red Hat Enterprise Linux systems on System z—StreamServe for printing, and Todos for online authentication,” says Rydberg. “This has been very successful, and we are now considering moving some of our other applications onto the

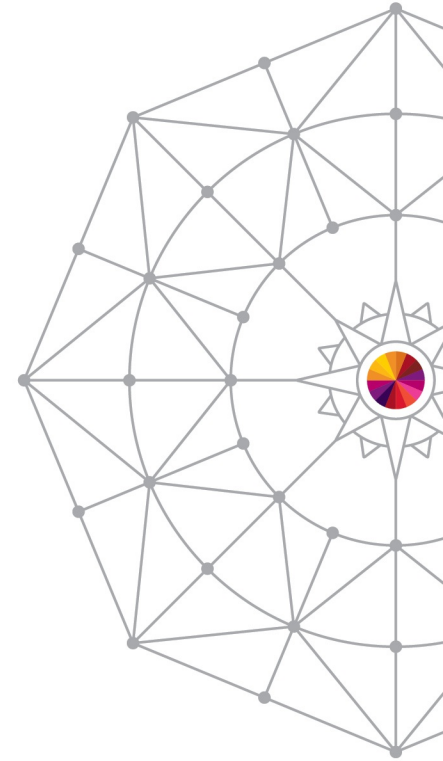
System z as well, particularly if they use Oracle or IBM DB2® databases. The licensing for these databases on Linux on System z is much more cost effective than on Microsoft Windows servers, so it would be a sensible move. I expect the Linux on z environment to grow very rapidly in the next few years.”

For more information

Contact your IBM sales representative or IBM Business Partner, or visit us at: ibm.com/systems/z/



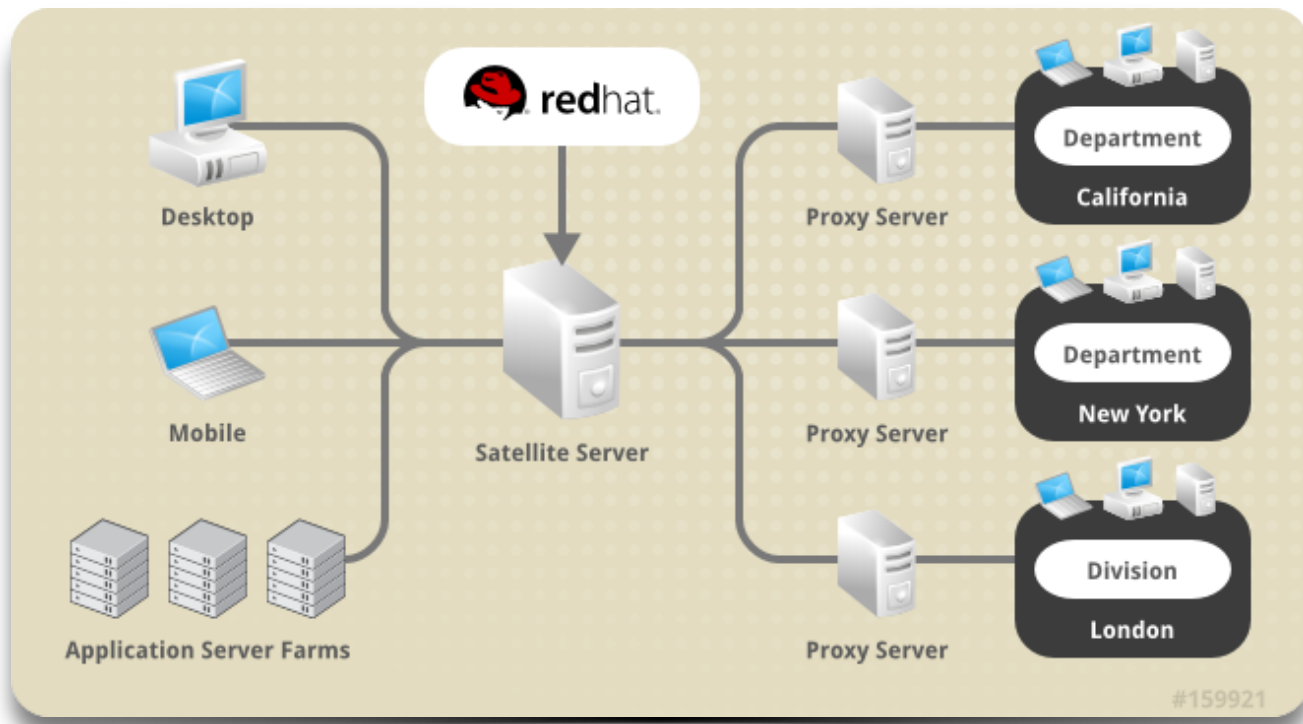
Red Hat Satellite



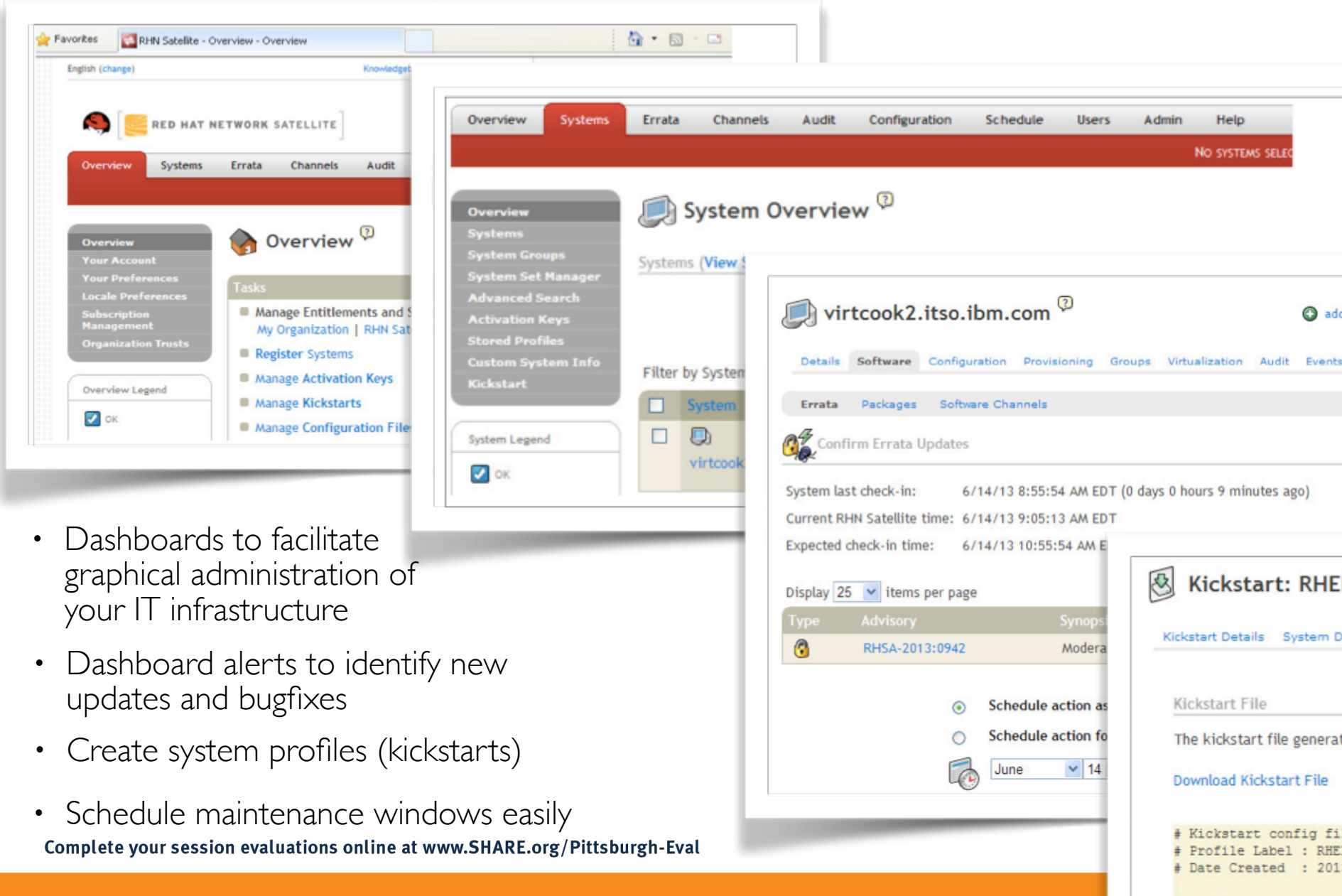
Red Hat Satellite Server

Manage the lifecycle of all Red Hat Enterprise Linux systems on x86_64, Power Systems (PPC64) and System z (s390x) from a centralized console.

- Simplify updates, change of configuration files, security alerts, deploy systems, run remote commands, audit systems, and more
- Red Hat Satellite Server is available on x86_64 and System z with supported clientes on all platforms.



Red Hat Satellite Console Screenshots



- Dashboards to facilitate graphical administration of your IT infrastructure
- Dashboard alerts to identify new updates and bugfixes
- Create system profiles (kickstarts)
- Schedule maintenance windows easily

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval



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

CATEGORY	VALUE
Three-year cost of investment	\$274,410
Annual cost savings	\$500,905
Net present value (NPV of three-year savings)	\$927,778
Payback period	4.8 months
Three-year ROI	338%

* IDC White Paper sponsored by Red Hat, Linux Management with Red Hat Network Satellite Server: Measuring Business Impact and ROI, Doc # 220346, October 2009 <https://inquiries.redhat.com/go/redhat/idc-rhn-satellite>



The NEW IBM Virtualization Cookbook features step by step on how to install and use Red Hat Satellite Server.

The Virtualization Cookbook for z/VM 6.3, RHEL 6.4 and SLES 11 SP2

Service Linux with the Red Hat Network

"The faster you go, the more you know."
— Albert Einstein

This chapter describes how to use yum to install network services. You can also use yum to install network services by the following link:

<http://access.redhat.com>

The following sections cover network services through RHN:

- ▶ "Register your system with RHN"
- ▶ "Install and updating network services"
- ▶ "Manage your system with RHN"

Installing Linux with kickstart

"We still don't know one thousandth of one percent of what nature has revealed to us."
--Albert Einstein

Kickstart is an automated file that answers installation questions.

In the previous chapters, you installed virtual servers. In this chapter, you will learn how to clone a server by using kickstart-ing a server as pre-install and post-install.

The Linux administrator can share the installation over the network.

- ▶ Configure the network
- ▶ "Configure Linux" network
- ▶ "Kickstart the network"

Install and Service Linux using Red Hat Network Satellite Server

"Insanity: doing the same thing over and over again and expecting different results."
— Albert Einstein

This chapter describes Red Hat Network Satellite Server which is an easy-to-use, advanced systems management platform for your Linux infrastructure. It is built on open standards and uses a web-based graphical interface. Its services are provided through functional modules that allow you to enhance management capabilities for Red Hat Enterprise Linux on virtualized or bare metal deployments.

For more information on Red Hat Network Satellite Server visit:

<http://www.redhat.com/satellite>