redhat.

Current and Future State of Red Hat Enterprise Linux

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RED HAT ENTERPRISE LINUX 6

- Before we get started...

- Linux is everywhere

AGENDA

- RHEL Lifecycle
- RHEL 6.0 Recap
- RHEL 6.1 Features
- RHEL 5.7 Features
- New cool stuff

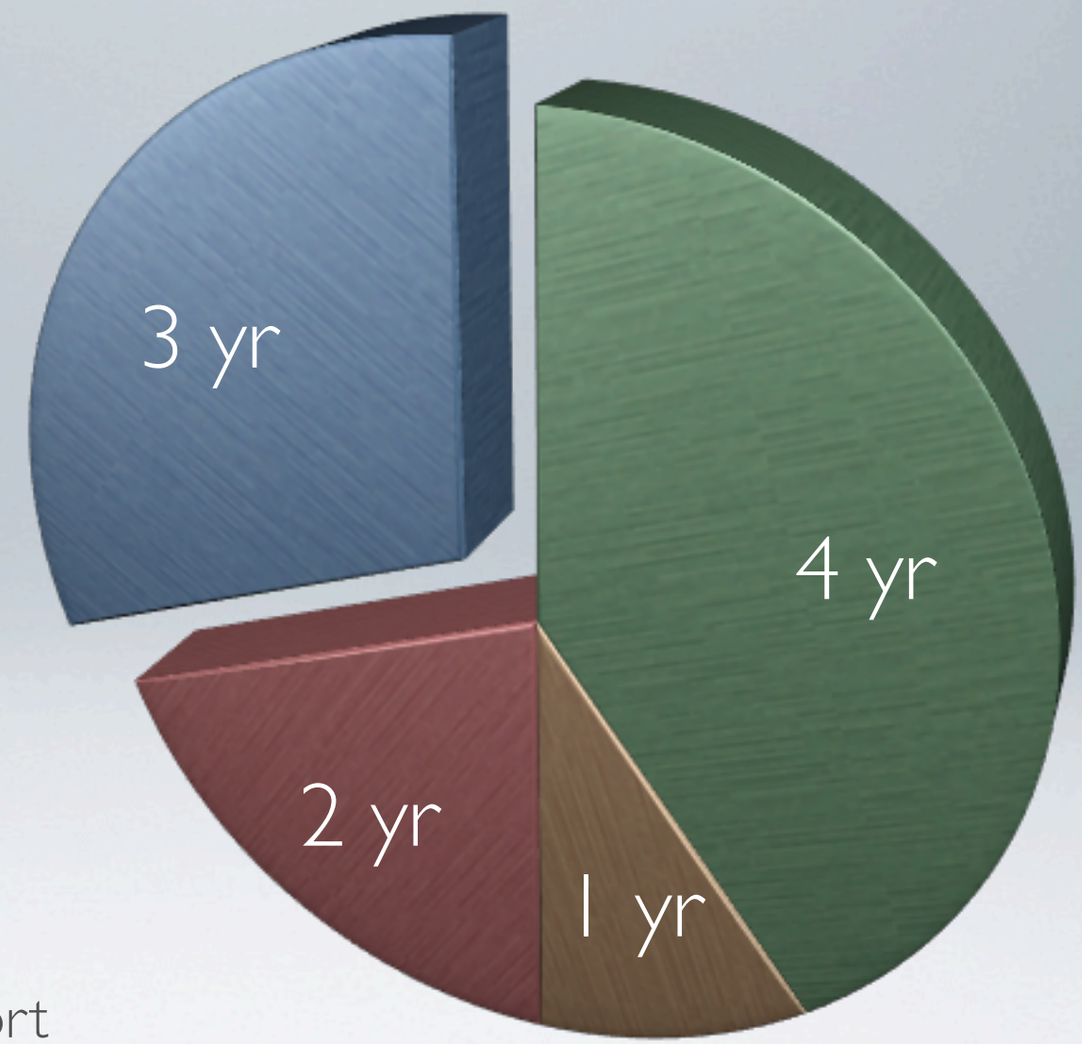
- RHEL Lifecycle

- Production I Phase
  - Bug fix errata
  - Feature enhancements
  - Updated hardware support

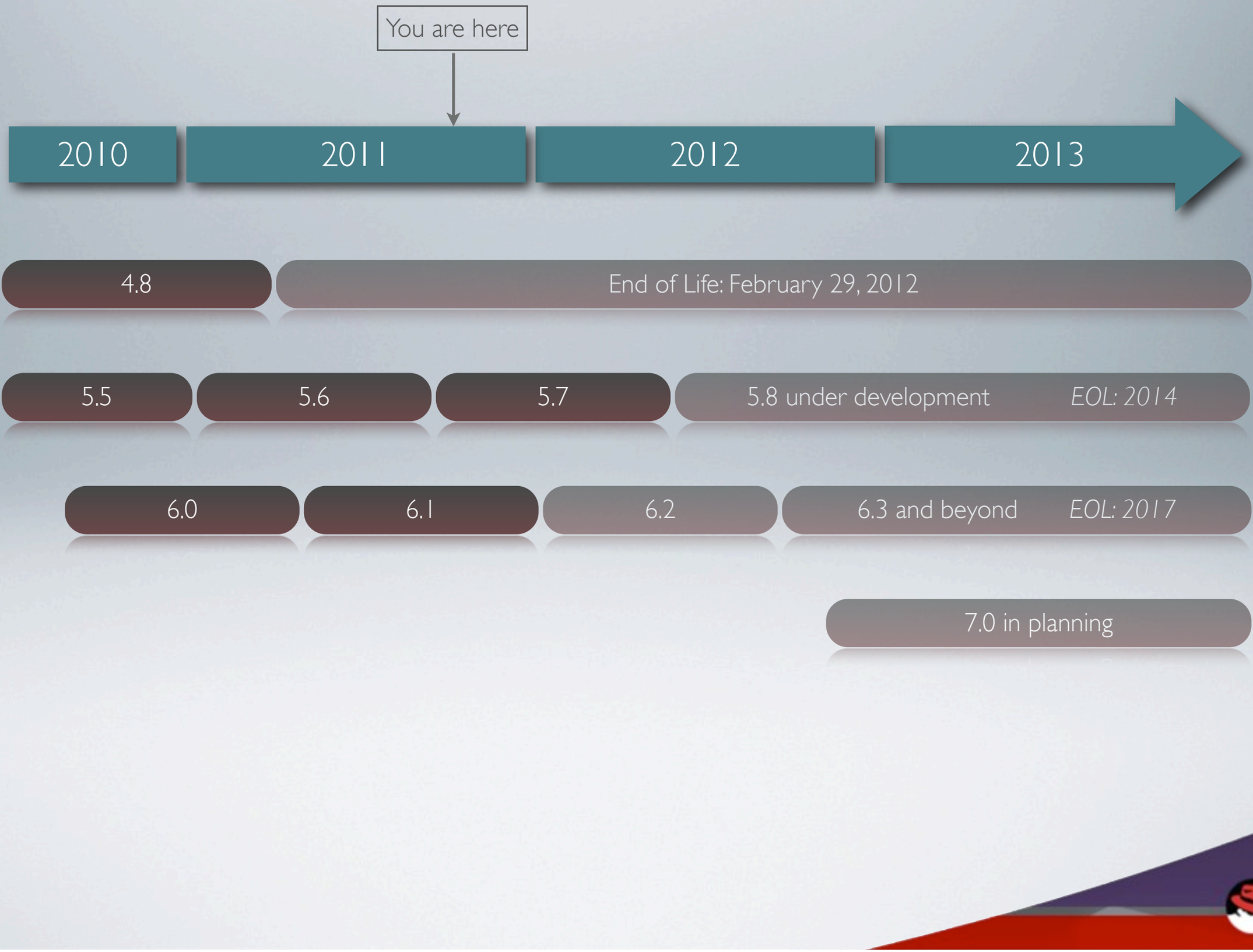
- Production II Phase
  - Transition period
  - Minor hardware updates

- Production III Phase
  - Only urgent fixes

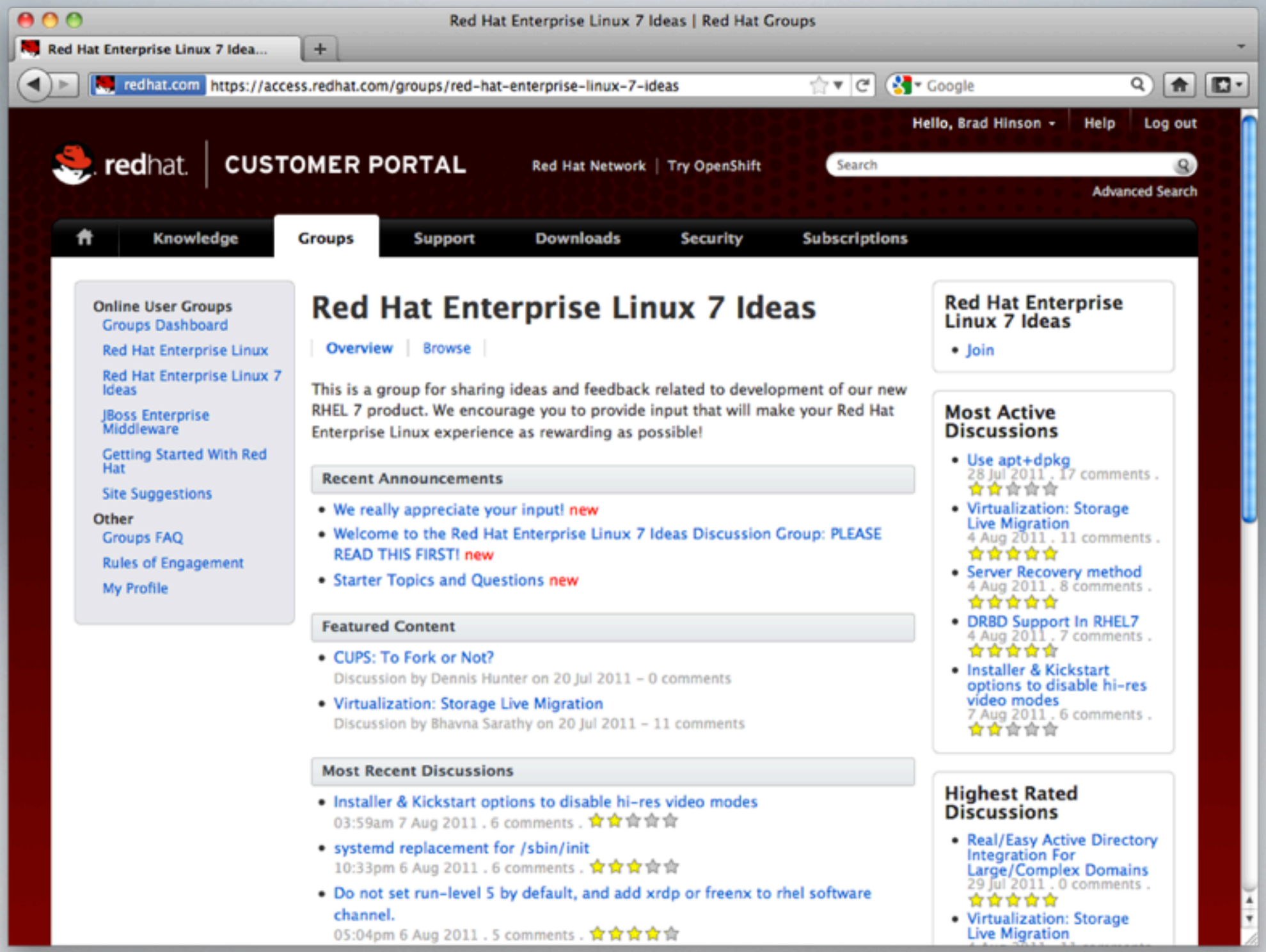
- Extended Life Cycle Phase
  - Optional add-on for additional support
  - Urgent defects and security fixes



- RHEL Lifecycle



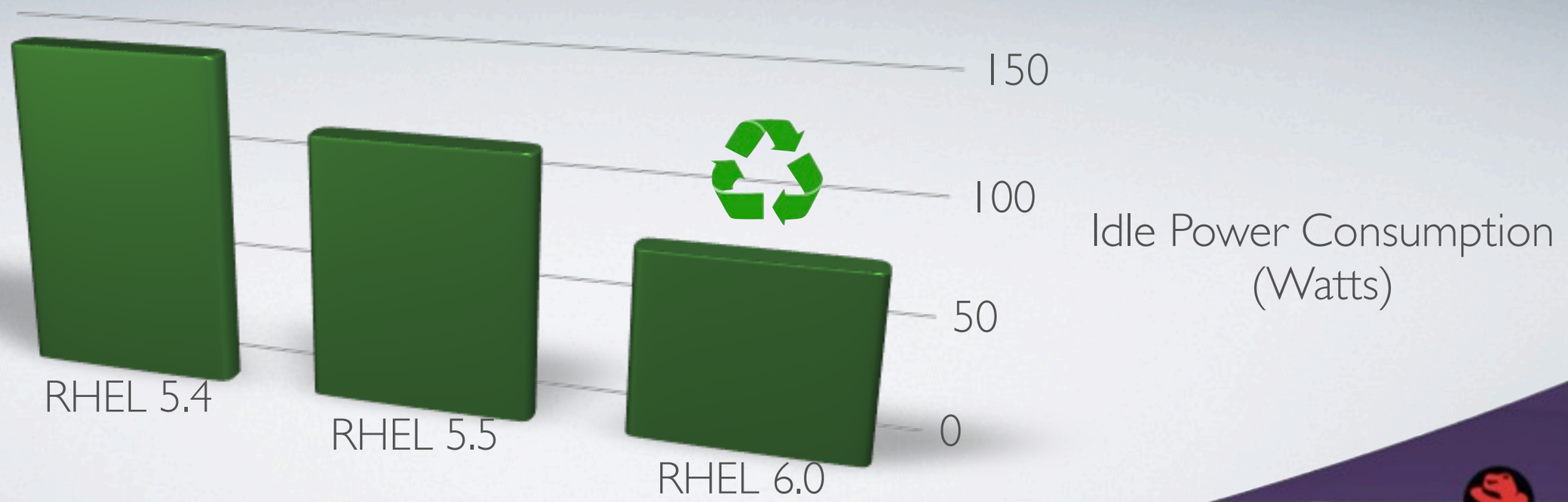
http://access.redhat.com/groups/red-hat-enterprise-linux-7-ideas



- RHEL 6.0 Recap: Key Features

Power Management

- Adaptive system tuning through new **tuned** service
- Powertop utility to measure power consumption per process/application
- Improvements through the application stack to reduce wake up events.



- RHEL 6.0 Recap: Key Features

File systems and disk

- Introduction of 2 new file systems: **ext4** and **btrfs**
  - Better scalability, higher performance

FCP automated port discovery

- WWPN (path) activated automatically when available
- LUN scanning with **lsluns** utility

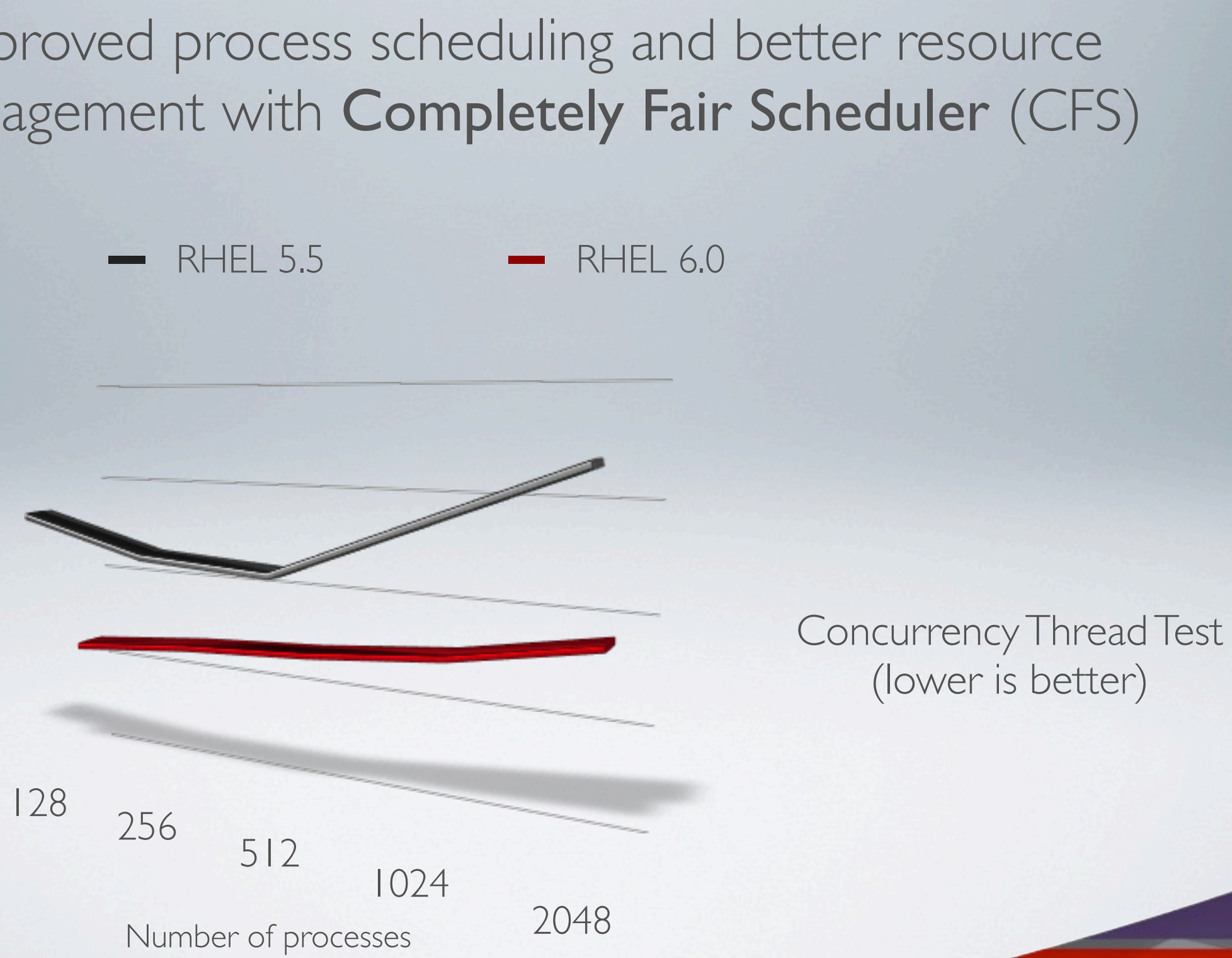
More FCP advancements

- High performance FICON reduces I/O overhead
- Dynamically adjustable queue depth
- I/O configuration support in LPAR mode

- RHEL 6.0 Recap: Key Features

Application scheduler

- Improved process scheduling and better resource management with **Completely Fair Scheduler** (CFS)

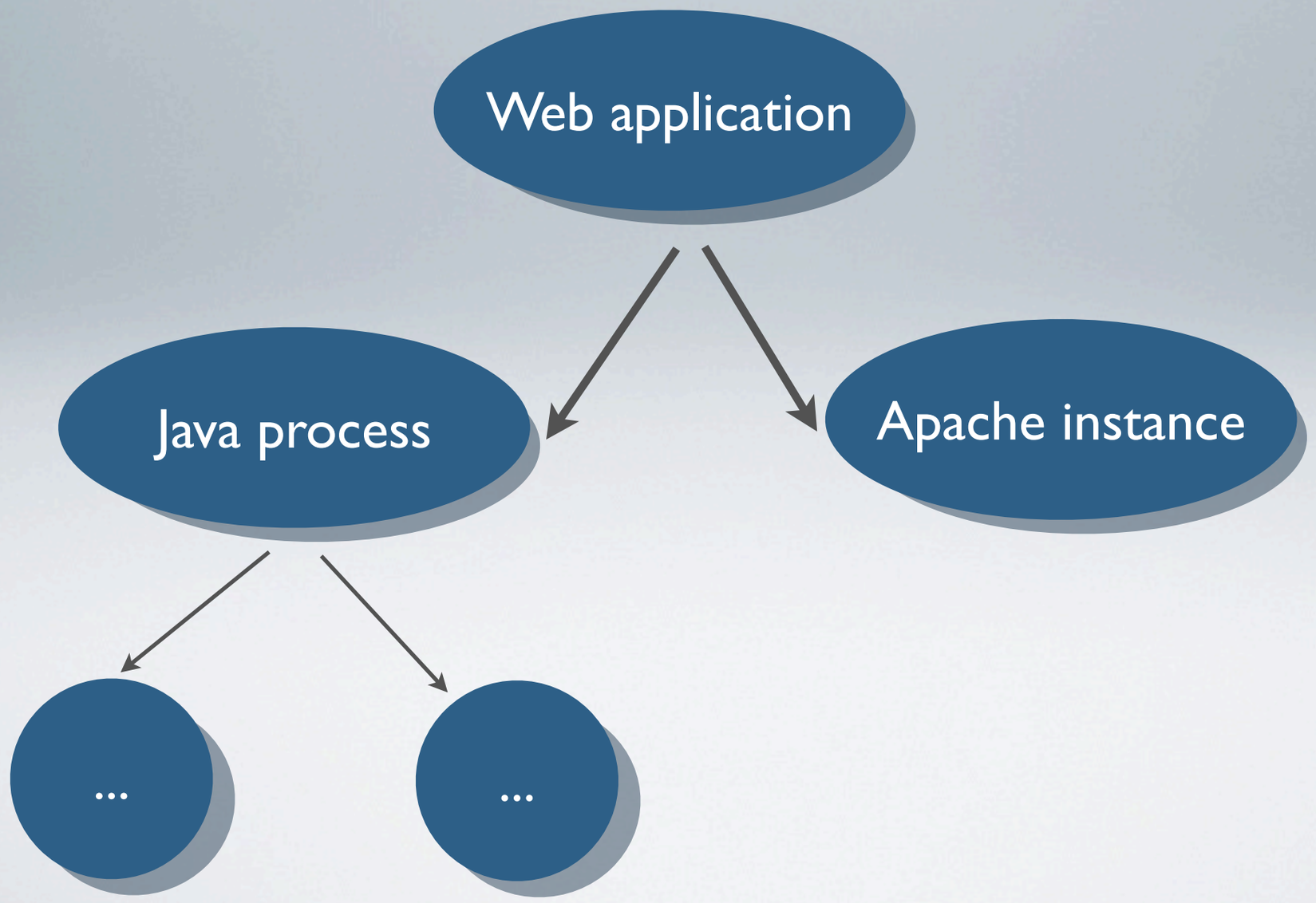


Concurrency Thread Test
(lower is better)

- RHEL 6.0 Recap: Key Features

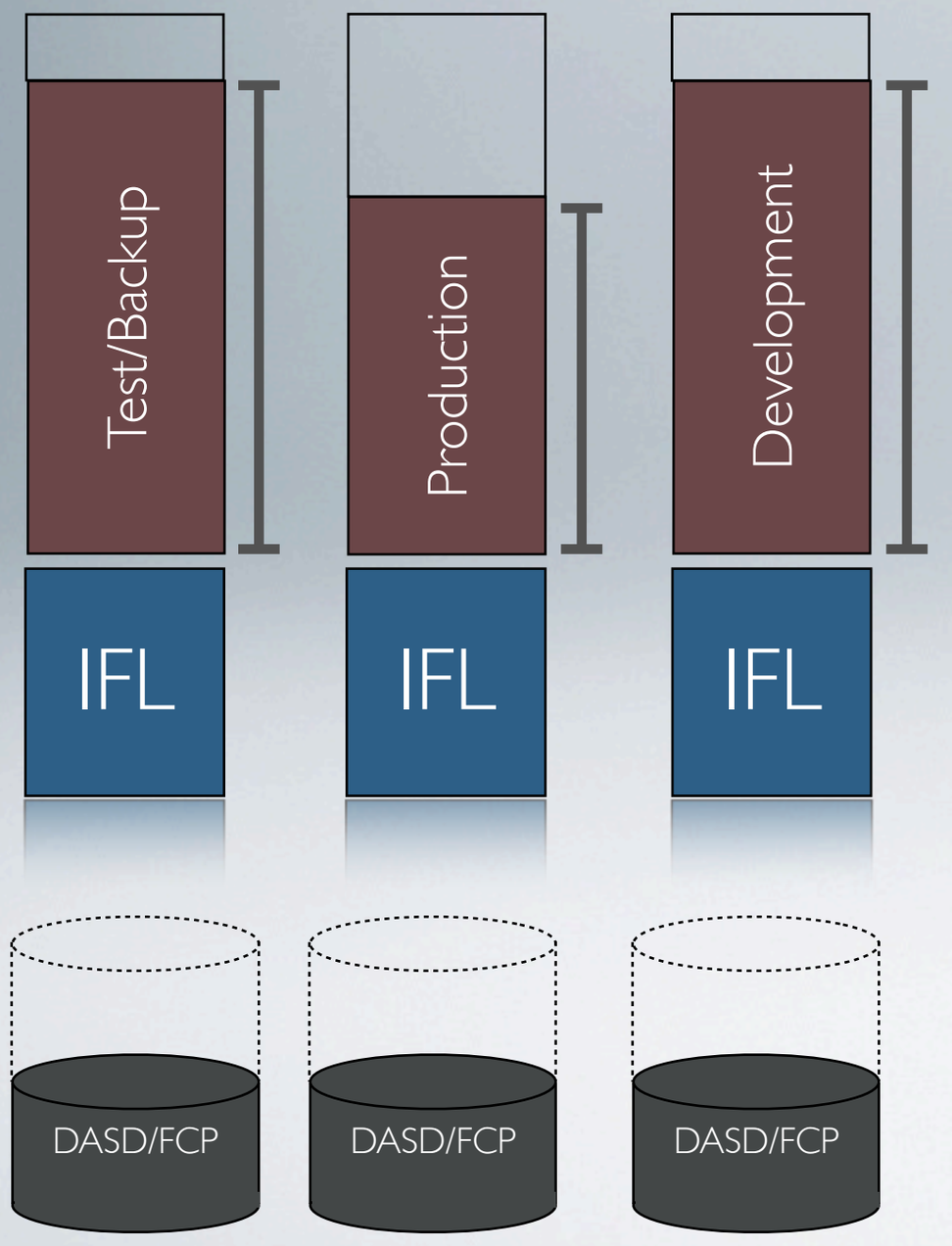
Control Groups

- Process Containers. Lets you transform groups of applications into workloads



- RHEL 6.0 Recap: Key Features

Control Groups



Isolation

- Each group has separate namespace

Prioritization

- For mission critical workloads

Resource Limiting

- Specify limits on CPU, memory, disk

Accounting

- Run report on resource utilization
- Create a chargeback model

Control

- Freeze group for checkpoint

- RHEL 6.0 Recap: Key Features

New features enabled through z/VM integration

- Better CPU utilization
- HyperPAV
- Suspend/Resume support
- Dynamic memory resizing

Development and Runtime support

- **SystemTap** allows instrumentation of running kernel
- Major updates to tool chain
  - **glibc** 2.12, **gdb** 7.1, **gcc compiler** 4.4
  - z10 optimized = 10% performance improvement

- RHEL 6.1 Features

Released 19 May, 2011
Available for download at
http://access.redhat.com

- RHEL 6.1 Features

Performance and application scheduling

CPU scheduling algorithms optimized
- 5% performance gain system-wide
- 3% performance boost for Java
- 8% gain for transaction workloads

Better concurrent processing
- **Read-Copy Update** (RCU) locking. Access shared data without traditional locks.
- Deigned for today's faster processors
- http://lse.sourceforge.net/locking/rcupdate.html

- RHEL 6.1 Features

File systems and I/O

CIFS improvements for accessing Windows shares

- Multi-user mounts for secure access
- Support for Unix-style symbolic links (mfsymlink)

Quota management

- Consolidation of quota management tools for file systems

- RHEL 6.1 Features

File systems and I/O

I/O Barriers

- Align data reads/writes to geometry
  - 4k block for ECKD
  - 512 byte for FBA/SCSI

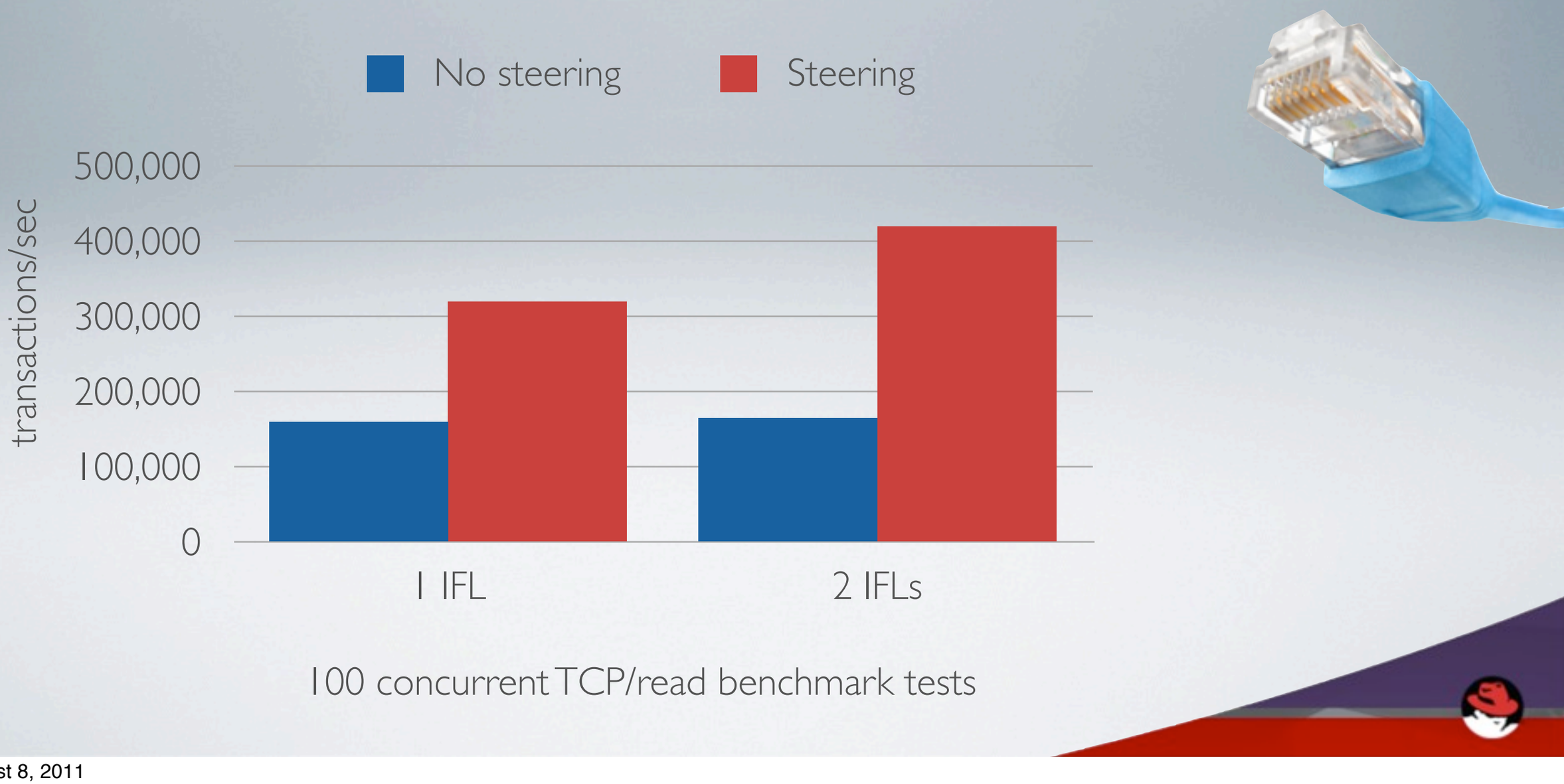
LVM

- Improved recovery times by skipping scans on failed devices
- Snapshot/rollback of mirrors
- Mirror devices on striped RAID

- RHEL 6.1 Features

Networking

Optimized network traffic processing
in multi-CPU environments

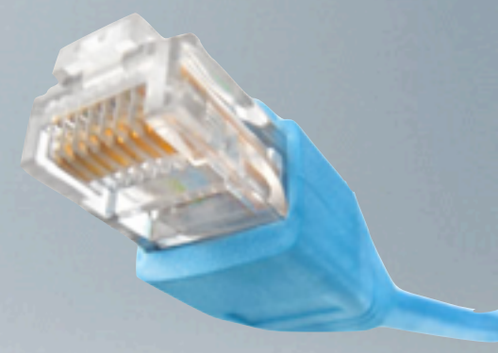


- RHEL 6.1 Features

Networking

Reduced latency for retransmission of lost packets

- Time sensitive applications



Transparent proxy support

Active-Active bonding for load sharing

- Useful for LPAR mode without VSWITCH

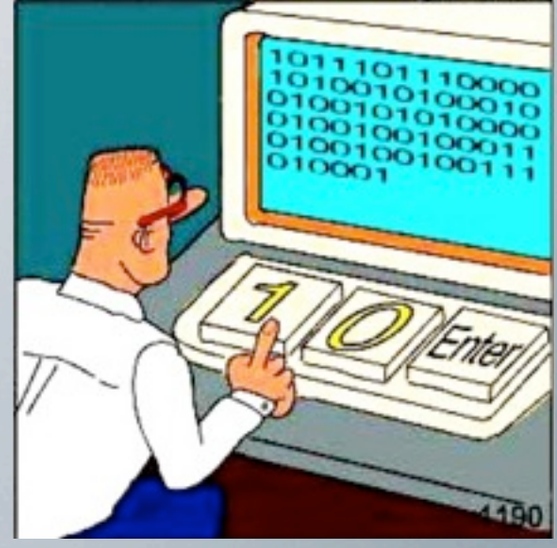
- RHEL 6.1 Features

Resource management with Control Groups

Block I/O throttling
- Limit I/O rate based on cgroup

Reduce latency for interactive tasks under CPU intensive workloads
- Prevent process from monopolizing system

- RHEL 6.1 Features



Real programmers code in BINARY

Software development

- SystemTap
  Remote scripting capability, performance optimizations

- GDB
  C++ debugging enhancements, Python support

- Valgrind
  Handle z196 with three levels of cache

- GCC compiler
  Bug fixes and optimizations

- Eclipse developer environment
  Platform update (Helios), plugins update

- RHEL 6.1 Features

Security and audit

Multiple updates to **System Security Service Daemon** (SSSD)

- SSSD integration with identity management services
- Better DNS-based discovery
- Auto renewal of Kerberos tickets, plus support for Kerberos FAST protocol
- Password obfuscation (LDAP)

- RHEL 6.1 Features

Security and audit

Identity management

- Password policy management for users and groups

Centralized management of SSH keys using LDAP

- RHEL 6.1 Features

System z specific updates

49 new features, **56** bug fixes
Here are some highlights...

- RHEL 6.1 Features

System z specific updates

Fix and recompile openSSH to enable HW Crypto

- Performance improvement.

  Enable openSSH to offload secure processing to Crypto card.

zEnterprise support for 4096-bit RSA FastPath

- Extends current RSA hardware acceleration and decryption to handle the zEnterprise Crypto Express3 card.

Installer: /boot partition on LVM & ext4

- zipl bootloader supports device-mapper (LVM & multipath) devices, and ext4

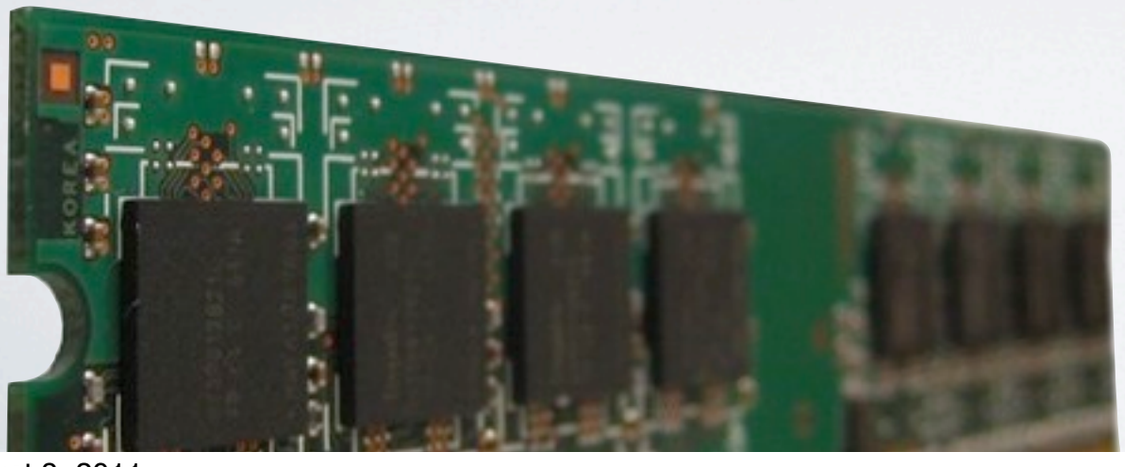
- RHEL 6.1 Features

System z specific updates

Dynamic memory resize tools: **lsmem** and **chmem**

```
# lsmem
Range                                  Size (MB)   State   Removable   Device
==========================================================================
0x0000000000000000-0x000000000fffffff  256         online  no          0
0x0000000010000000-0x000000002fffffff  512         online  yes         1-2
0x0000000030000000-0x000000003fffffff  256         online  no          3
0x0000000040000000-0x000000006fffffff  768         online  yes         4-6
0x0000000070000000-0x00000000ffffffff  2304        offline -           7-15

Memory device size  : 256 MB
Memory block size   : 256 MB
Total online memory : 1792 MB
Total offline memory: 2304 MB
```



- RHEL 6.1 Features

System z specific updates

CMSFS write support

- Support for writing to CMS file system. You can now edit your PROFILE EXEC with **vi**!

z10 prefetching instructions

- Toolchain update.
- Prefetching instructions introduced to enhance memory access

z196 out-of-order instruction scheduling

- Generate faster code sequences, using CPU facilities for better instruction scheduling

- RHEL 6.1 Features

System z specific updates

Optimized kernel parameters

- Automatic kernel tuning in /etc/sysctl.conf, optimized specifically for System z

hyptop: Hypervisor "top" shows IFL usage across LPARs

```
# hyptop
14:08:41 | H05LP30 | CPU-T: IFL(18) CP(3) UN(3)                    ? = help
cpuid   type    cpu   mgm visual.
(#)    (str)    (%)   (%) (vis)
0        IFL  96.91  1.96 |############################################## |
1        IFL  81.82  1.46 |#######################################       |
2        IFL  88.00  2.43 |##############################################|
3        IFL  92.27  1.29 |##############################################|
4        IFL  83.32  1.05 |########################################      |
5        IFL  92.46  2.59 |##############################################|
6        IFL   0.00  0.00 |                                              |
7        IFL   0.00  0.00 |                                              |
8        IFL   0.00  0.00 |                                              |
9        IFL   0.00  0.00 |                                              |
             534.79 10.78
```

- RHEL 5.7 Features

Released 21 July, 2011
Available for download at
http://access.redhat.com

- RHEL 5.7 Features

Security Content Automation Protocol (SCAP)

Open source framework for maintaining security of enterprise systems

Verify existence of patches, scan systems for signs of compromise

Includes library and set of utilities

Backported from RHEL 6

- RHEL 5.7 Features

Developer tools

CMake

- Cross-platform, cross OS development tool
- Generates native makefiles and compiler independent configuration files
- Backported from RHEL6

Buildsys-macros

- For developers building RPMs
- Backported from RHEL 6

- RHEL 5.7 Features

rsync: remote file/folder synchronization

Update to version 3.0.7

- Improved replication speed
- Replication starts while file list is still being compiled

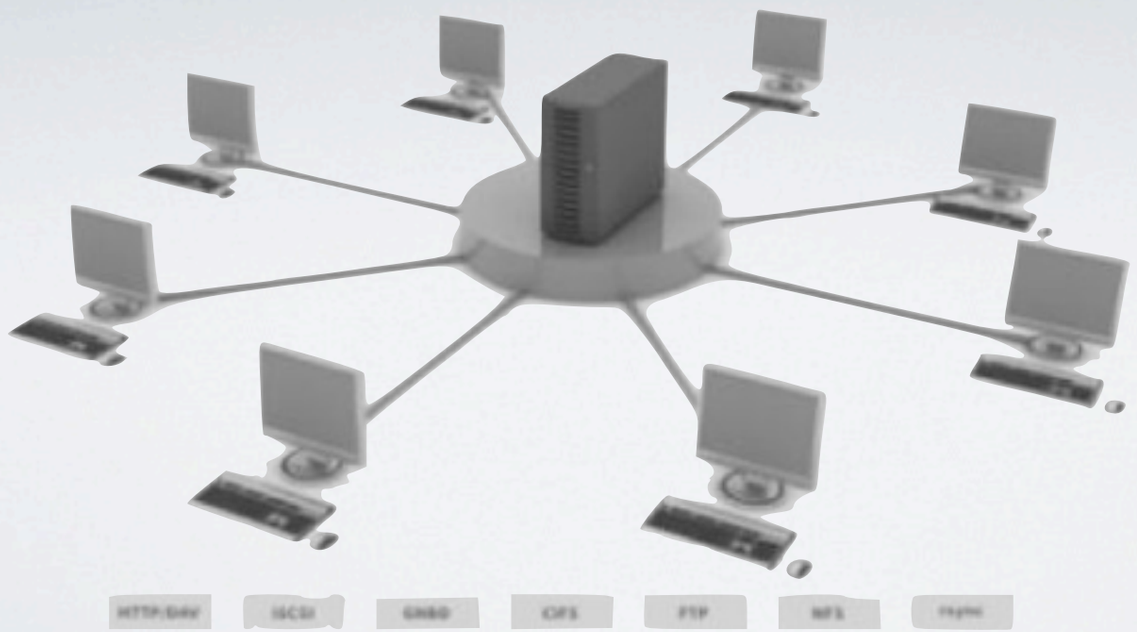
Users requiring global data set replication will see major benefits

- RHEL 5.7 Features

Remote file systems and storage

Updated automounter (**autofs**)
- Support for localityName attribute in LDAP maps
- Encrypted secret for LDAP authentication

iSCSI initiator
- Support for s390x architecture



AGENDA

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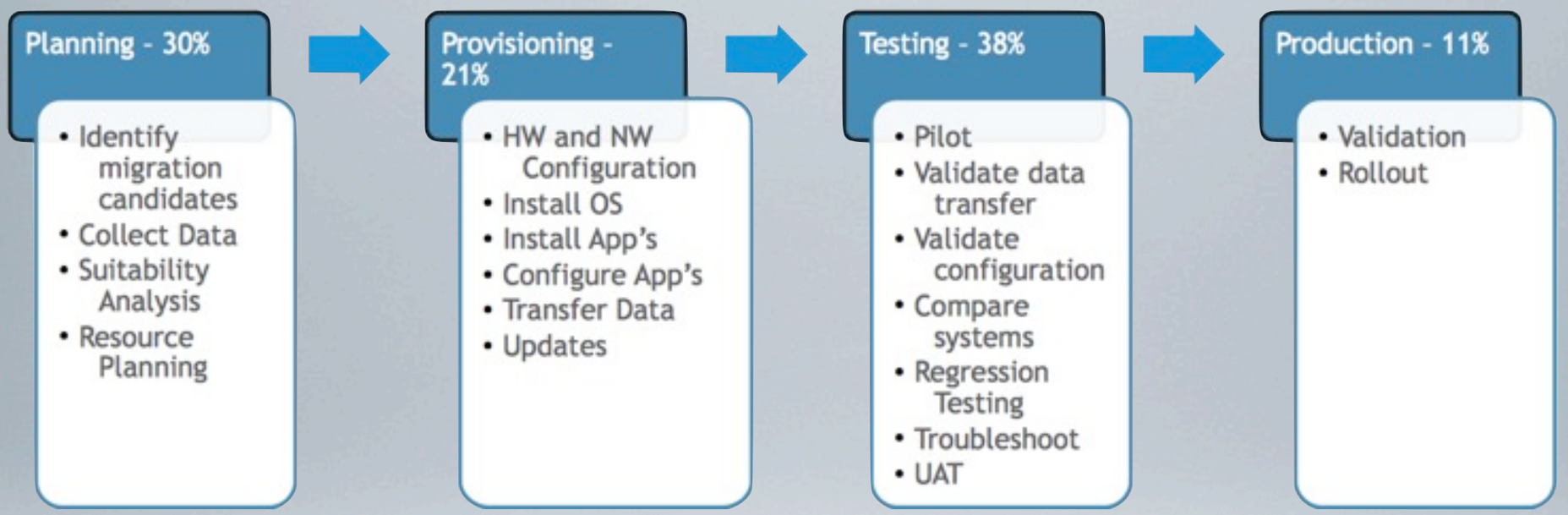
- New cool stuff

- New cool stuff

Migration tools: MoveOp



MoveOp brings automation to migrations to Linux

to like or different platforms, distributions, versions

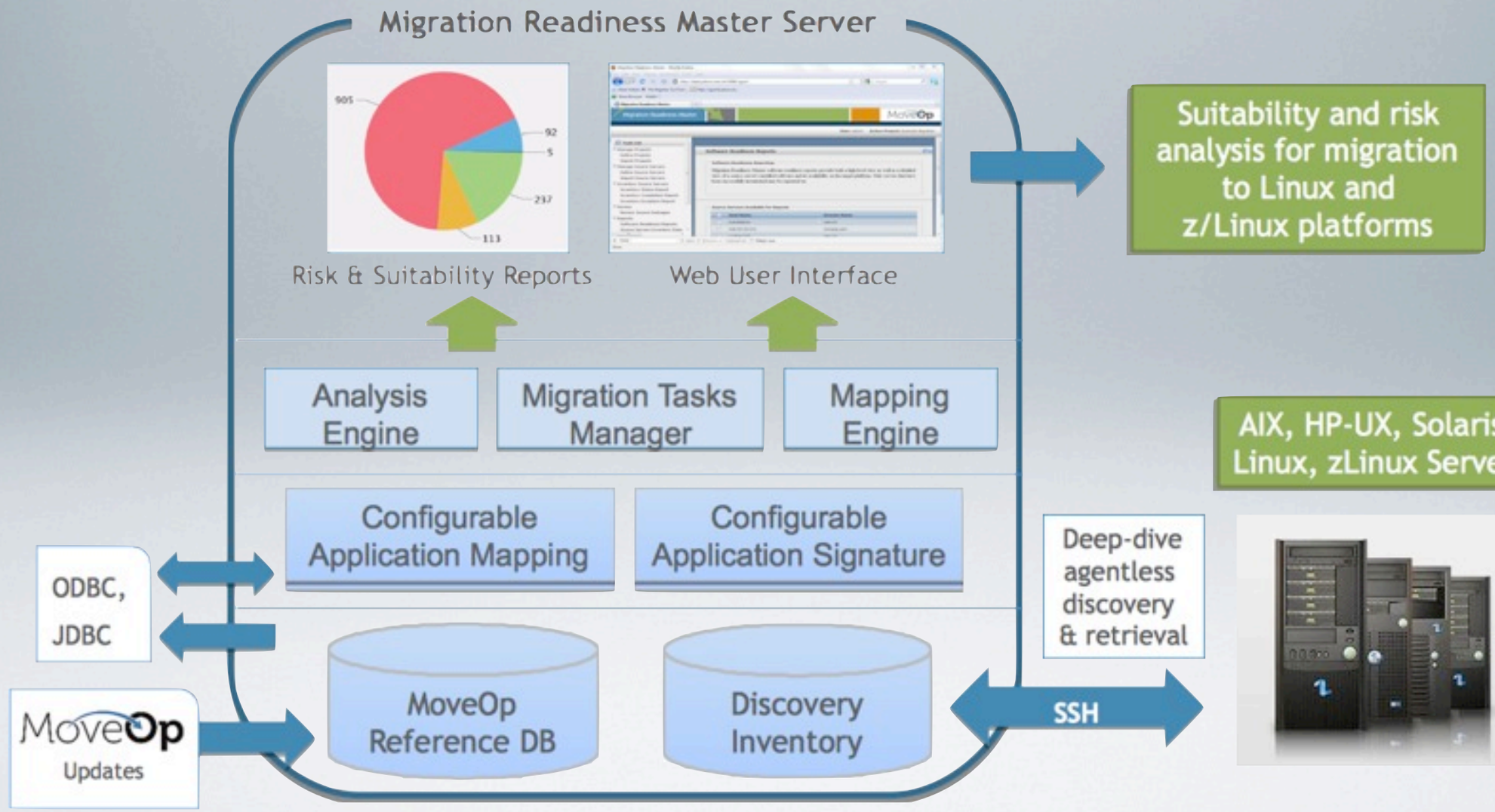
to like or different hardware (e.g. x86 -> s390)

to new environments (e.g. cloud)

to and from physical or virtual servers: P2P V2V P2V

- New cool stuff

Migration tools: MoveOp



- New cool stuff

Migration tools: MoveOp

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- New cool stuff

Clustered file systems

NFS version 4 for network file system

- Included, supported in RHEL 5, RHEL 6
- Clustered file system with support for read/write access from multiple guests simultaneously.
- Use VSWITCH for fast "network" access, or hipersockets for memory-speed transfers.

- New cool stuff

Clustered file systems

Supported file systems for RHEL on System z

- GFS http://www.redhat.com/gfs/
- OpenAFS http://www.openafs.org
- GlusterFS http://www.gluster.org
- Ceph http://ceph.newdream.net

Contact

info@sinenomine.net

- Documentation Links

Redbook, *z/VM and Linux on IBM System z: The Virtualization Cookbook for Red Hat Enterprise Linux 6.0*
http://www.redbooks.ibm.com/abstracts/sg247932.html

DeveloperWorks
http://www.ibm.com/developerworks/linux/linux390/documentation_dev.html

Red Hat Knowledgebase
http://kbase.redhat.com

Red Hat on System z
http://www.redhat.com/z