

RHEL 7 & 8 New Features vs. RHEL 6

What's new?

Mike Pagan
Sr. Solutions Architect

RHEL 6, 7 and 8 At A Glance

	RHEL 6	RHEL 7	RHEL 8
KERNEL VERSION	2.6+	3.10+	4.18+
SYSTEM COMPILER	GCC 4.4+	GCC 4.8+	GCC 8.2, LLVM 6.0
HARDWARE ARCHITECTURES	Intel/AMD 64-bit, IBM Power BE, IBM z Systems	Intel/AMD 64-bit, IBM Power LE, IBM z Systems, ARM 64-bit	Intel/AMD 64-bit, IBM Power LE, IBM z Systems, ARM 64-bit
SERVICES MGMT	init	systemd	systemd
DEFAULT FILE SYSTEM	ext4	XFS	XFS
PACKAGE MANAGEMENT	Yum	Yum	Yum v4
TIME SYNCHRONIZATION	ntp	ntp	Chrony
NETWORKING	ifcfg	NetworkManager	NetworkManager

RHEL 6, 7 and 8 Feature Table

	RHEL 6	RHEL 7	RHEL 8
CONTAINER ENGINE	Docker 1.13	Docker 1.13, Podman	podman
FIREWALL	iptables	Iptables + firewalld	Nftables + firewalld
DEV TOOLS	Software Collecitons (SCL)	Software Collections (SCL)	AppStreams
IN_PLACE UPGRADE	No	Yes	Yes (LEAPP)
IMAGE BUILDER	No	No	Yes
ANSIBLE SYSTEM ROLES	No	Yes	Yes
UNIFIED FILESYSTEM MGMT	No	No	Stratis

RHEL 6, 7 and 8 Feature Table

	RHEL 6	RHEL 7	RHEL 8
HA CLUSTERING	Corosync	Pacemaker	Pacemaker
DEBUGGING	Systemtap	Systemtap	ebpf
TERMINAL SESSION RECORDING	No	No	Yes
STORAGE ENCRYPTION	LUKS 1.0	LUKS 1.0	LUKS 2.0
NBDE SUPPORT	No	Yes	Yes
ROLLBACK	No	Relax and Recover (ReAR) with thinsnapshot	Relax and Recover (ReAR)

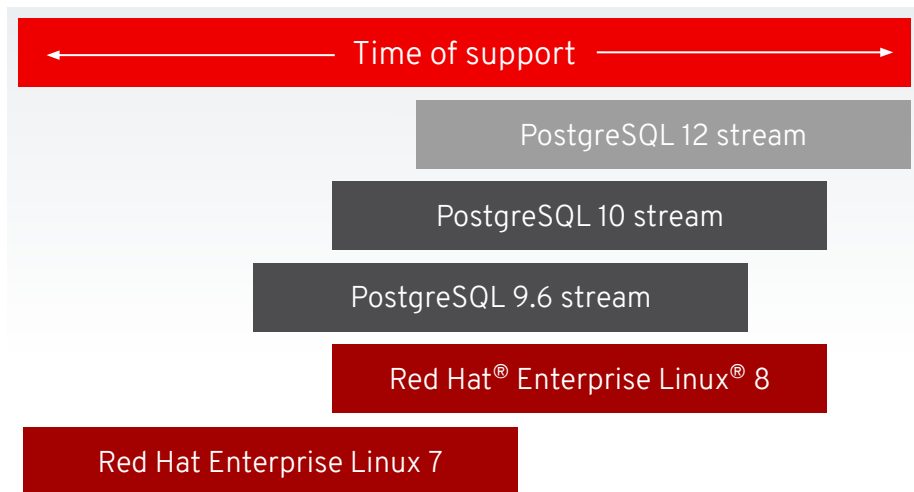
RHEL 6, 7 and 8 Feature Table

	RHEL 6	RHEL 7	RHEL 8
GUI MANAGEMENT	None	Web Console	Web Console
PERFORMANCE	Good	Good	Better
End of Life	Nov. 2020	June 2024	May 2029
Extended Lifecycle Support end date	June 2024	TBD	TBD
Bug fixes?	No	Yes	Yes
New Feature Enablement?	No	No	Yes
Critical Security patches?	Yes (requires ELS)	Yes	Yes

RHEL 6, 7 and 8 Ecosystem

	RHEL 6	RHEL 7	RHEL 8
nVIDIA DGX SUPPORT	No	Yes	Yes, + precompiled libraries
OPENSIFT SUPPORT	3.x	3.x, 4.x worker node	3.X, \$.x
CoreOS Support	no	No	Yes
MICROSOFT SQLSERVER SUPPORT	No	Yes	Yes

New Feature (RHEL 8): **Application streams**



More choice

Offers versions of the open source tools and frameworks developers need

Newer versions

Provides access to newer versions as they stabilize

Simpler access

Maintains standard locations for tools and libraries

App Streams (RHEL 8): Simplified access to software

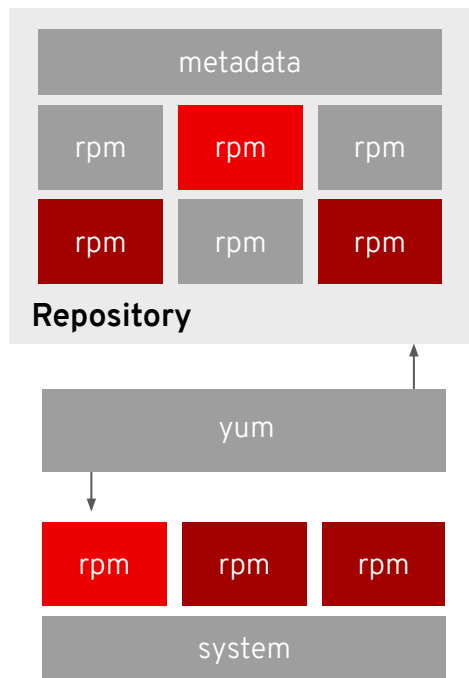
Red Hat Enterprise Linux 7 repositories



Red Hat Enterprise Linux 8 repositories



New Feature (RHEL 8): yum version 4



New technology

Maintains the same experience while adding new tools

Better dependency management

Offers faster resolution and easier minimization of what's installed

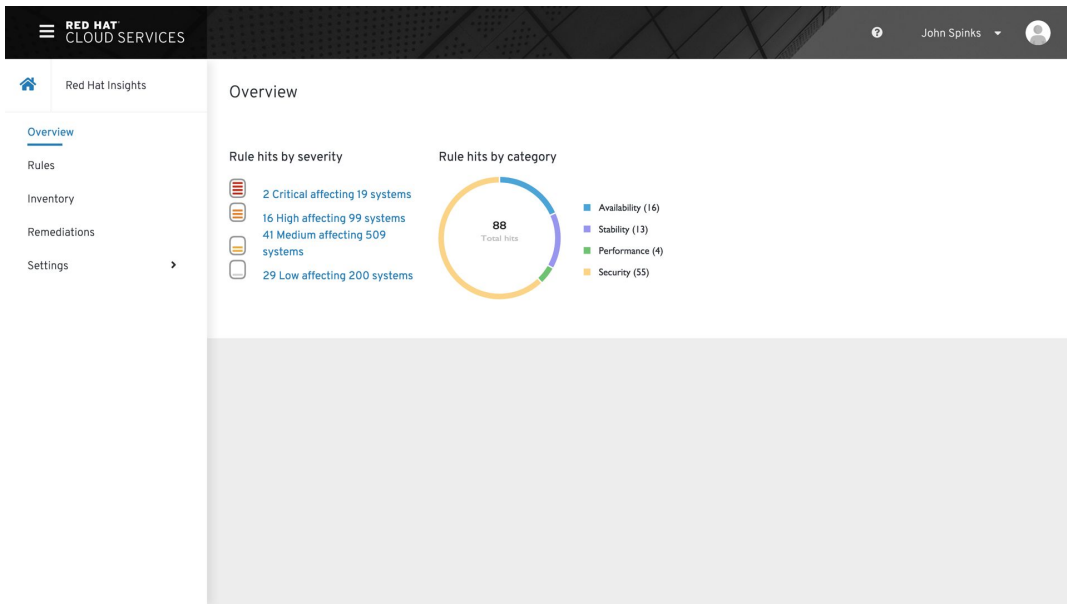
Stable API

Provides new application programming interface (API) for extending yum that will progress into the future

Lighter Weight

Enables smaller (<40 MB) system images

New Feature: Detect and fix issues with **Red Hat Insights**



Proactive advice

Identification of issues before they become problems

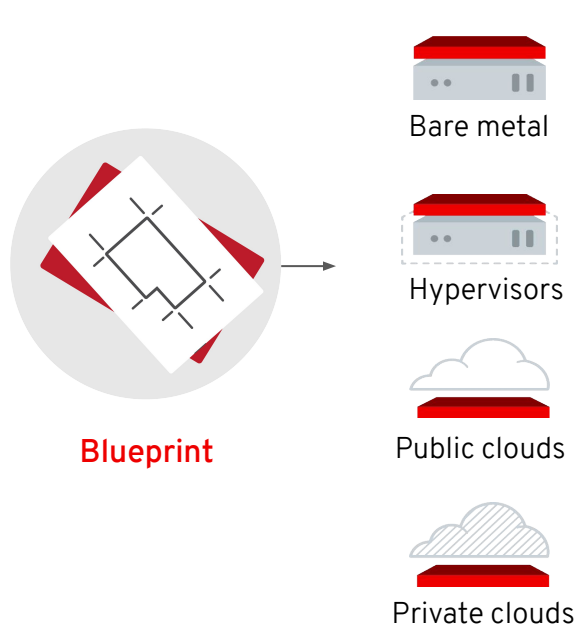
Continuous assessment

Real-world results to help find new risks

Simpler remediations

Tailored results at the host level

New Feature (RHEL 7 & 8): Create images for all your environments with **image builder**



Single source

Lets you create gold images for any environment from the same blueprint increasing stability and consistency

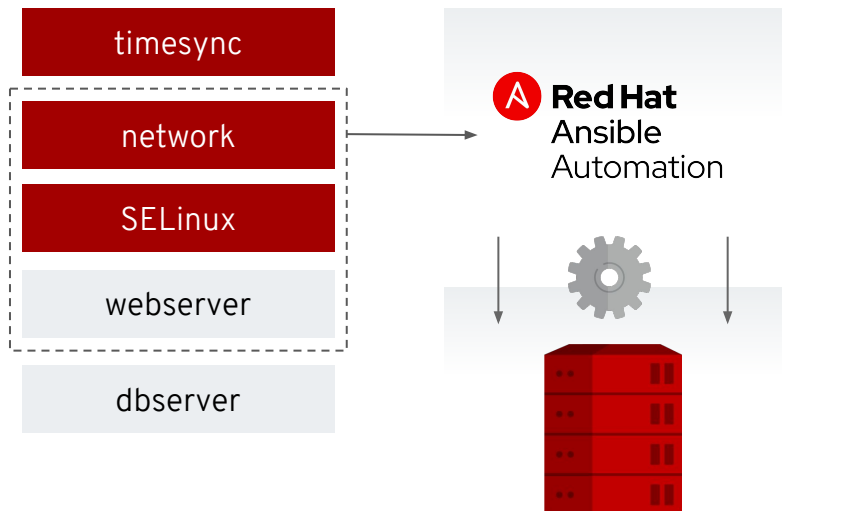
Any footprint

Supports public cloud, private cloud, enterprise hypervisors, and bare metal

Simple interface

Provides web-based view within the web console for selecting packages and creating blueprints

New Feature (RHEL 7 & 8): Speed automation creation with **system roles**



Common automation

Manage multiple versions of Red Hat Enterprise Linux from a single role

Reduced rework

Import provided roles to eliminate task creation in playbooks

Easy switching of providers

Change between default and optional tools quickly and safely

New Feature (RHEL 8): Optimized experiences for mission-critical databases

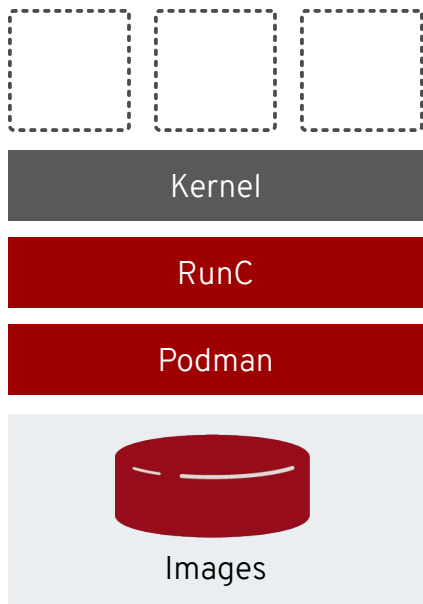
Microsoft SQL Server

- Red Hat Enterprise Linux is the reference platform for SQL Server on Linux
- Benchmark-breaking performance
- Fast deployment and portability via containers



- Red Hat Enterprise Linux is 1 of only 2 certified Linux distributions
- More than 20 years of Red Hat and SAP joint engineering collaboration
- Exceptional performance and scalability –the largest SAP install in the world runs on Red Hat Enterprise Linux

New Feature (RHEL 7 & 8): Manage containers with Podman



Fast and lightweight

No daemons required

Advanced namespace isolation

Rootless operations for container run and build

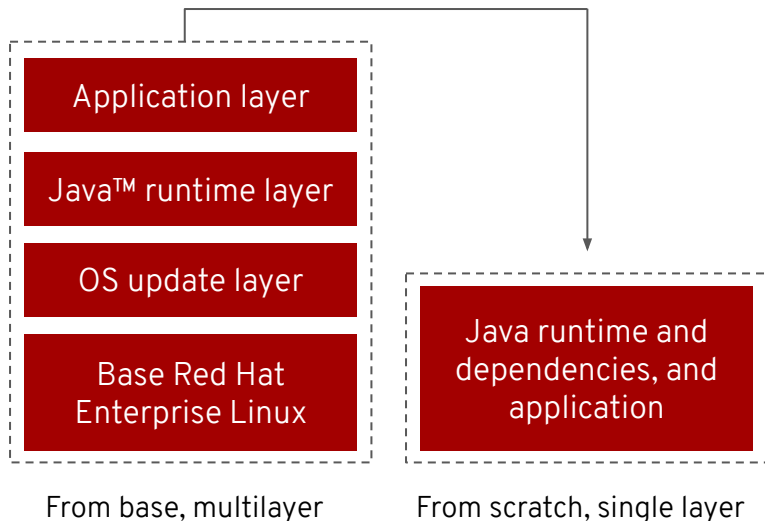
Open standards compliant

Creates and maintains any standard Open Containers Initiative (OCI) -compliant containers and pods

No root privileges required

Greater security

Create images with Buildah



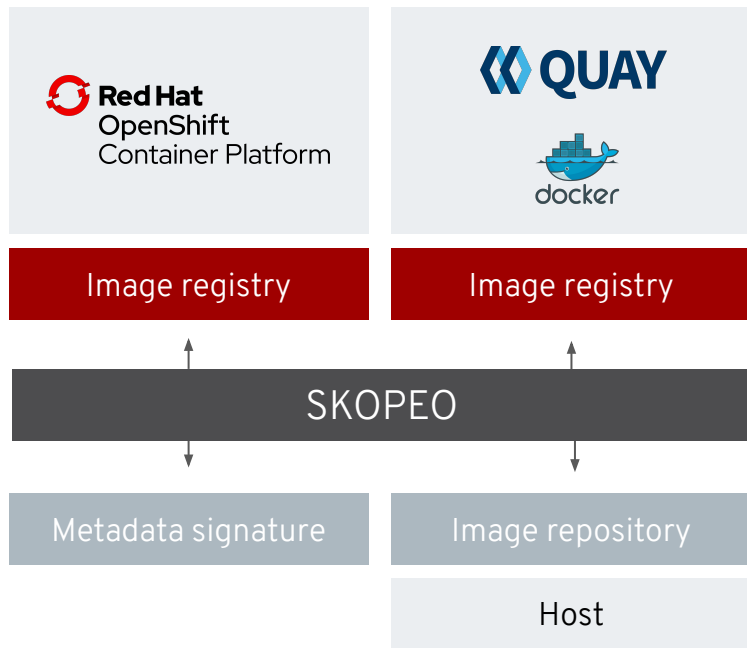
More control

Scriptable tooling for fine-grained image control, and maximum control starting from base or scratch images

Minimization of images

Elimination of unneeded dependencies by using host-based tools

Inspect and transport images with Skopeo



Inspect images remotely

Examine image metadata without needing to download

Publish and transfer images

Copy images from registries to hosts or directly between registries

Sign and verify images

Supports GPG key signing on publish

New Feature (RHEL 8): Configuring **system wide cryptographic policies**



Central configuration

Set acceptable algorithms from a single tool

Improved consistency

Covers multiple cryptographic providers and consumers like TLS, kerberos, and Java

Built-in policies

Including legacy systems requiring 64-bit security and FIPS allowed or approved algorithms

New Feature (RHEL 8): Recording user terminal sessions

The image shows two overlapping screenshots from a Red Hat Enterprise Linux 8 system. The background screenshot displays the 'General Configuration' window, where the 'Session Recording' section is visible. The foreground screenshot shows a terminal window with the following output:

```

$ ssh cloud-user@rhel8-1.example.com
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Tue Apr  2 13:10:47 2019 from 192.168.122.1

ATTENTION! Your session is being recorded!

[cloud-user@rhel8-1 ~]$ sudo ls /etc/sss/conf.d
sss-session-recording.conf
[cloud-user@rhel8-1 ~]$ sudo cat /etc/sss/conf.d/sss-session-recording.conf
[session_recording]
scope=some
users=cloud-user
groups=
[cloud-user@rhel8-1 ~]$ exit
logout

Connection to rhel8-1.example.com closed.
$
  
```

The foreground screenshot also shows the 'Session Recording' configuration window, which includes a 'Player' section for viewing recorded sessions and a 'Recording' section with details for a specific session:

```

Recording
-----
ID: 74e3069799604c2702a9705c9836674cc64523
Hostname: rhel8-1.example.com
Boot ID: 74e3069799604c2702a9705c983667
Session ID: 4
PID: 19661
Start: 2019-04-02 11:51:17
End: 2019-04-02 11:51:40
  
```

Audit activities

Create a record of actions taken for review against security policies

Create visual guides

Build run books and training materials with demonstrations

Record and play back

Logged via standard channels with multiple playback options

New Feature (RHEL 8): Improved firewall management with **nftables**



Consolidated filtering

Supports IPv4, IPv6, ARP, and Bridge filtering in a single tool

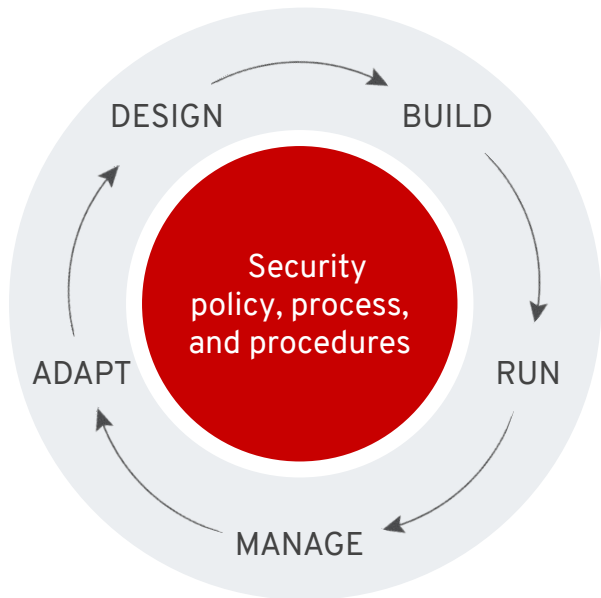
Simpler rule creation

Multiple matches and actions reduce the number of rules required

Improved tracing

Provides easier debugging and verification of actions taken on any packet

Improved **Security** (ongoing, RHEL 7 & 8)



Latest protocol support

Including TLS 1.3 via OpenSSL 1.1.1

Hardened code

Including PIE and RELRO binaries and code analysis in our pipelines

Integrated identity management

As a stand-alone provider or trusted member of an Active Directory, with expanded integrations to tools like the web console

Updated tools

Including the LUKS v2 on-disk format for encryption

Remote single-system views in the web console

The screenshot displays the Red Hat Enterprise Linux web console interface. The top navigation bar shows 'RED HAT ENTERPRISE LINUX' and user information 'Privileged Cloud User'. A left sidebar contains navigation links for System, Logs, Storage, Networking, Virtual Machines, Accounts, Services, Session Recording, Applications, Diagnostic Reports, Kernel Dump, SELinux, Software Updates, Subscriptions, and Terminal. The main content area is divided into several sections:

- Performance:** Two line graphs showing 'Reading' and 'Writing' in KIB/s over time (13:25 to 13:29).
- Filesystems:** A table listing mounted filesystems:

Name	Mount Point	Size
/dev/vda1	/	1.63 / 9.99 GiB
cidata	-	366 KiB
- NFS Mounts:** A section indicating 'No NFS mounts set up' with a '+ ' button.
- Storage Logs:** A log viewer for 'April 2, 2019' showing messages from the 'udisksd' daemon, such as 'g_object_notify: object class 'UDisksObjectS...', 'Loading module libudisks2_lvm2.so...', and 'Acquired the name org.freedesktop.UDisks2 on...'.
- RAID Devices:** A section indicating 'No storage set up as RAID' with a '+ ' button.
- Volume Groups:** A section indicating 'No volume groups created' with a '+ ' button.
- VDO Devices:** A section with an 'Install VDO support' button and the message 'VDO support not installed'.
- iSCSI Targets:** A section indicating 'No iSCSI targets set up' with a '+ ' button.
- Drives:** A list of storage devices:
 - VirtIO Disk: 10 GiB Hard Disk, R: 0 B/s, W: 0 B/s
 - QEMU DVD-ROM (QM00001): Optical Drive, R: 0 B/s, W: 0 B/s

Browser-based interface

Offers remotely accessible user interface using host security mechanisms

Consolidated view

Provides single view of tasks to speed understanding and completion

Standard management tools

Uses system tools to change state, not a separate workflow

New in the web console

The screenshot displays the Red Hat Enterprise Linux web console interface. The top navigation bar shows 'RED HAT ENTERPRISE LINUX' and user information 'Privileged Cloud User'. A left sidebar lists system components: System, Logs, Storage, Networking, Virtual Machines, Accounts, Services, Session Recording, Applications, Diagnostic Reports, Kernel Dump, SELinux, Software Updates, Subscriptions, and Terminal. The main content area is divided into several sections:

- Performance:** Two line graphs showing 'Reading' and 'Writing' speeds in KIB/s over time (13:25 to 13:29).
- Filesystems:** A table listing mounted filesystems:

Name	Mount Point	Size
/dev/vda1	/	1.63 / 9.99 GiB
cidata	-	366 KiB
- NFS Mounts:** A section indicating 'No NFS mounts set up' with a '+ ' button.
- Storage Logs:** A log viewer for 'Storage Logs' dated 'April 2, 2019'. The log entries show the 'udisksd' daemon starting and loading modules:


```

13:16 g_object_notify: object class 'UDisksObjectS... udisksd
13:16 g_object_notify: object class 'UDisksObjectS... udisksd
13:16 Loading module libudisks2_lvm2.so... udisksd
13:16 Loading module libudisks2_iscsi.so... udisksd
13:16 Acquired the name org.freedesktop.UDisks2 on... udisksd
13:16 udisks daemon version 2.8.0 starting udisksd
      
```
- RAID Devices:** A section showing 'No storage set up as RAID' with a '+ ' button.
- Volume Groups:** A section showing 'No volume groups created' with a '+ ' button.
- VDO Devices:** A section with an 'Install VDO support' button and the message 'VDO support not installed'.
- iSCSI Targets:** A section showing 'No iSCSI targets set up' with a '+ ' button.
- Drives:** A list of hardware drives:
 - VirtIO Disk: 10 GiB Hard Disk, R: 0 B/s, W: 0 B/s
 - QEMU DVD-ROM (QM00001): Optical Drive, R: 0 B/s, W: 0 B/s

Virtual machines

Create and manage virtual machines

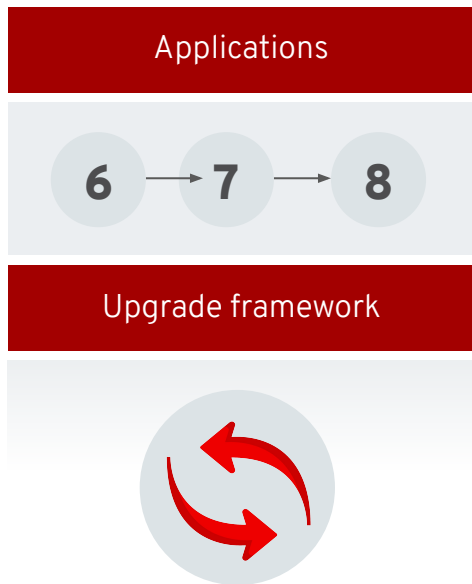
Network-bound disk encryption

Enroll disks with Tang server and manage LUKS keys

Single sign-on configuration

Automatically configure when joining a domain

New Feature (RHEL 7 & 8): **In-place upgrades** for your systems



Reduced migrations

Analyze systems to determine if upgrading in place can avoid a costly migration

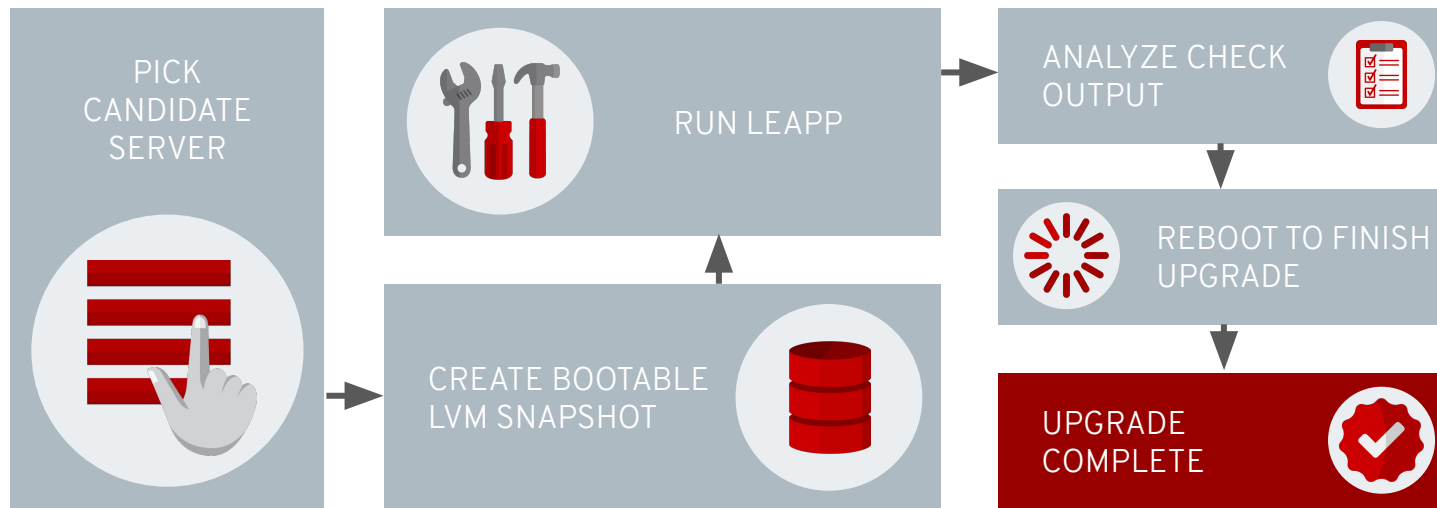
Easy rollback options

Combine with bootable LVM snapshots for safety

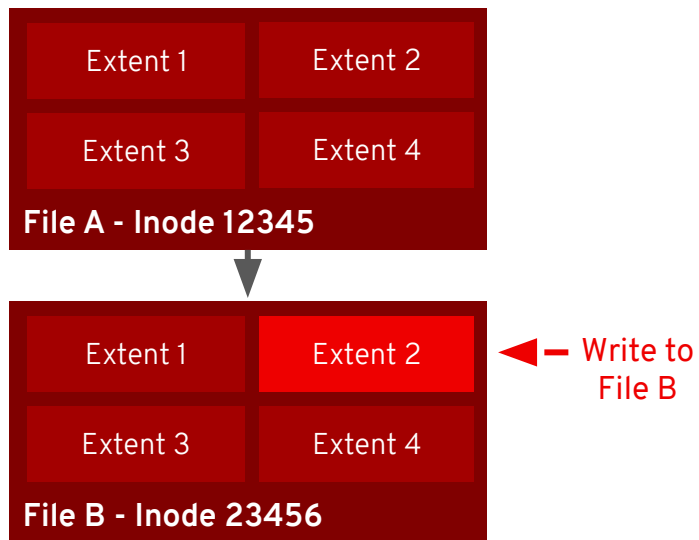
Improved framework

Get better analysis and a simplified process with a more extensible framework

Can I upgrade this host?



Now Included (RHEL 7 & 8): **Fast file copy with XFS** shared data extents



Filesystem level copy-on-write

XFS creates new extents when data is changed in a copy without additional application integrations

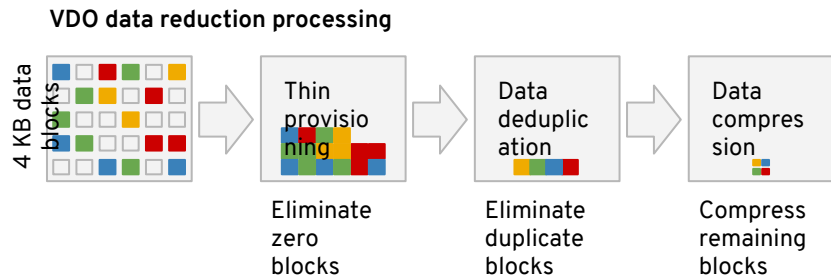
Separate metadata

Copies have unique file system metadata allowing for owner, group, and permission changes

Fast operations

XFS creates new inode and metadata instead of full data copy

Now Included (RHEL 8): **VDO** disk dedup and compression



Proven technology

Built on Permabit, now a Red Hat company, used by major disk array manufacturers

Implemented in device mapper

Usable across XFS, ext4, and all other RHEL filesystems, compression and deduplication done at the block device level

Online, On-the-fly data reduction

Typical data reduction of 50-83%

New Feature (RHEL 8) Easier ML/AI and data analytics with **precompiled nVidia drivers**



Direct support from nVidia

Provided by nVidia and supported by nVidia
(proprietary, non-open-source code)

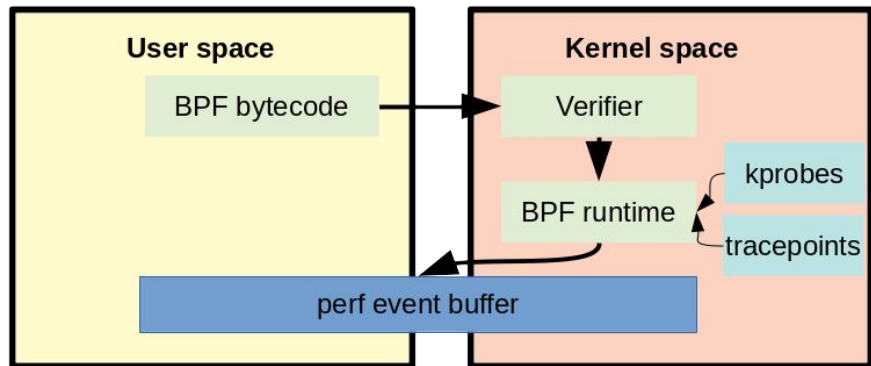
Simplifies adoption of latest GPU

No more need to compile and build drivers for
GPU support

Supports common ML/AI & Data analytics frameworks

Tensorflow, Caffe, Apache Spark...

New Feature (RHEL 8) better tracing, troubleshooting, and monitoring with **ebpf**



Ebpf = Enhanced Berkely Packet Filter

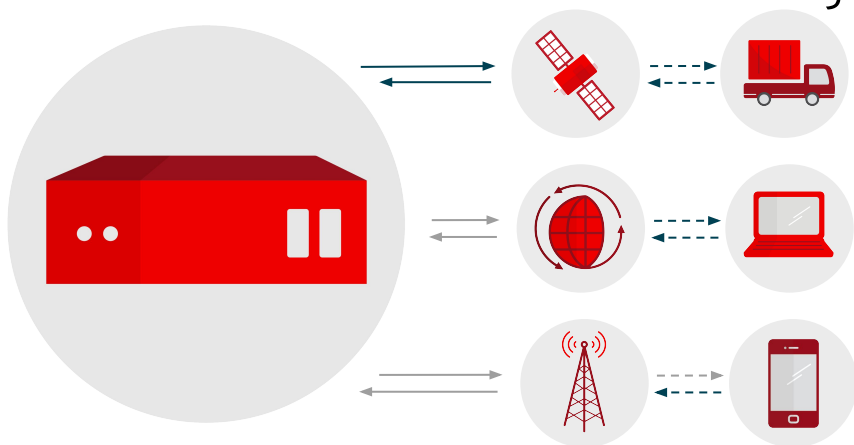
Dynamic and static tracing at kernel and user level running in a safe kernel pseudo-VM

Includes kernel level verifier for code safety

Bcc-tools examples shipped

PCP and systemtap support shipped

Improve network performance (RHEL 8) with bandwidth and round-trip propagation time congestion algorithm



End-to-end performance

Link capacity calculation and management at server do not require client end modifications

High-latency links

Improved performance over other algorithms on networks with high latency and congestion

More choices

An improved network stack combined with BBR and other algorithms lets you select the highest performance combinations

Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.



[linkedin.com/company/red-hat](https://www.linkedin.com/company/red-hat)



[youtube.com/user/RedHatVideos](https://www.youtube.com/user/RedHatVideos)



[facebook.com/redhatinc](https://www.facebook.com/redhatinc)



twitter.com/RedHat