



Red Hat Enterprise Linux 8

Technical overview

Alfred Bach
Principal Solution Architect
Cloud and Infrastructure



Red Hat Enterprise Linux 8

Build your future on a stable, high-performing platform that can scale to meet the needs of your organization today and tomorrow.

At a glance

| | |
|------------------------|--|
| KERNEL VERSION | 4.18+ |
| SYSTEM COMPILER | GCC 8.2, LLVM 6.0 |
| HARDWARE ARCHITECTURES | Intel/AMD 64-bit, IBM Power LE, IBM z Systems, ARM 64-bit |
| DEFAULT FILE SYSTEM | XFS |
| PACKAGE MANAGEMENT | Yum v4 |
| TIME SYNCHRONIZATION | Chrony |
| NETWORKING | NetworkManager |

Predictable updates

3 years

Major releases

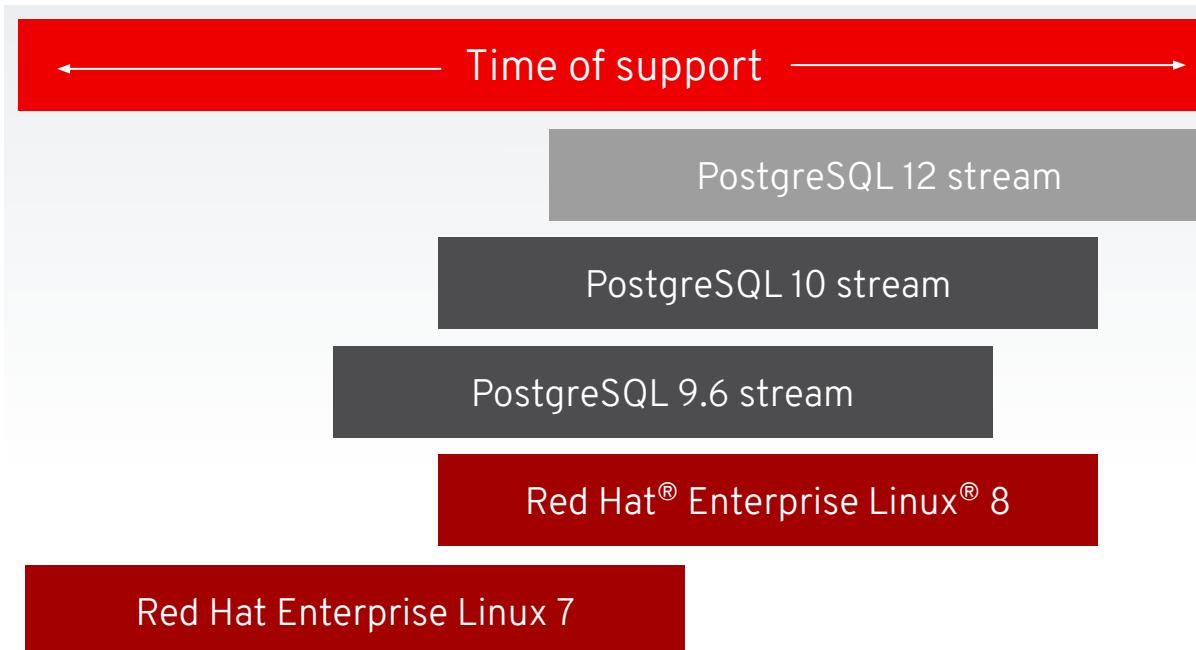
6 months

Minor updates

2 phases

Support life cycle

Application streams



More choice

Offers versions of the open source tools and frameworks developers need

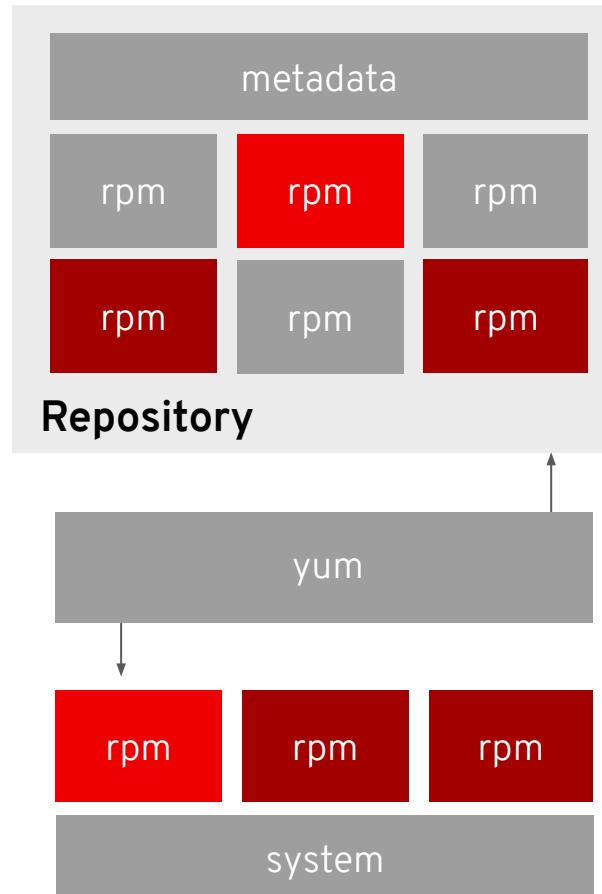
Newer versions

Provides access to newer versions as they stabilize

Simpler access

Maintains standard locations for tools and libraries

The newest yum package manager: 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

The future of
infrastructure is hybrid,
multicloud



Faster and more consistent delivery in any deployment

Improve automation

Automation expertise from the engineers who wrote the platform

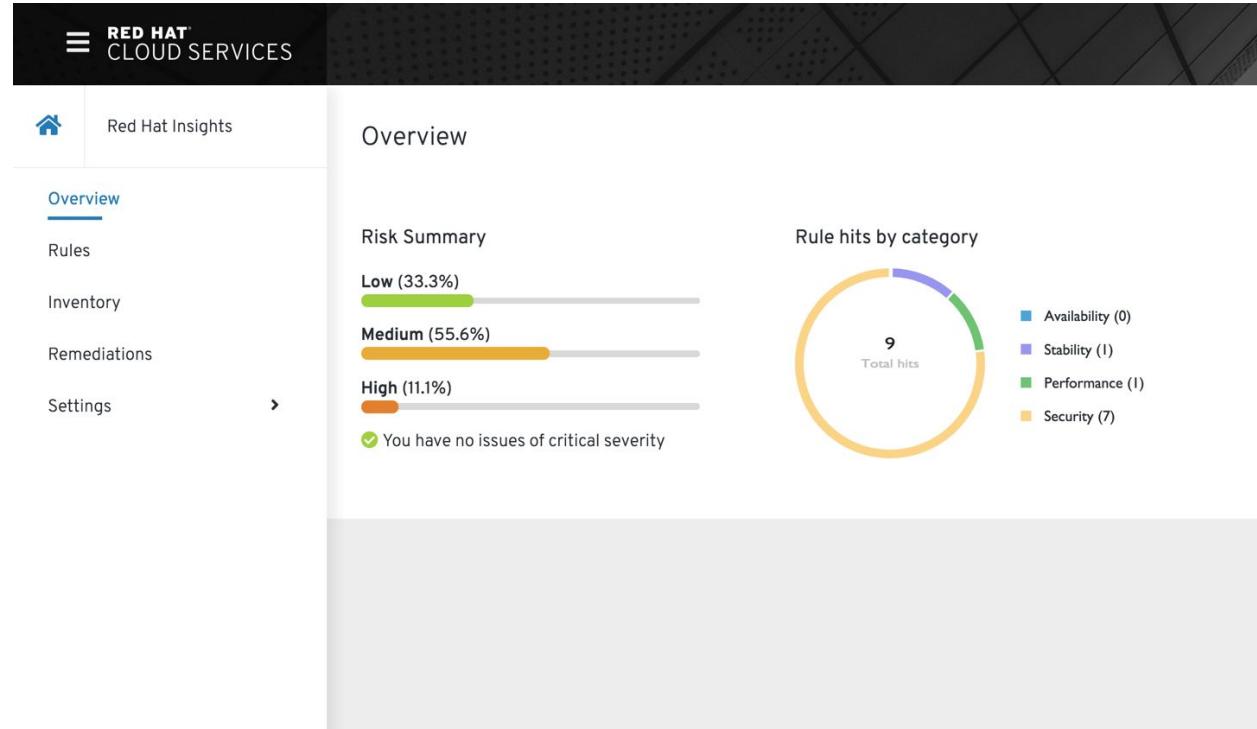
Gain rapid intelligence

Information that helps you focus on business initiatives, not fighting fires

Maintain standards

Simple common machine images for any environment

Detect and fix issues with Red Hat Insights



Proactive advice

Identification of issues before they become problems

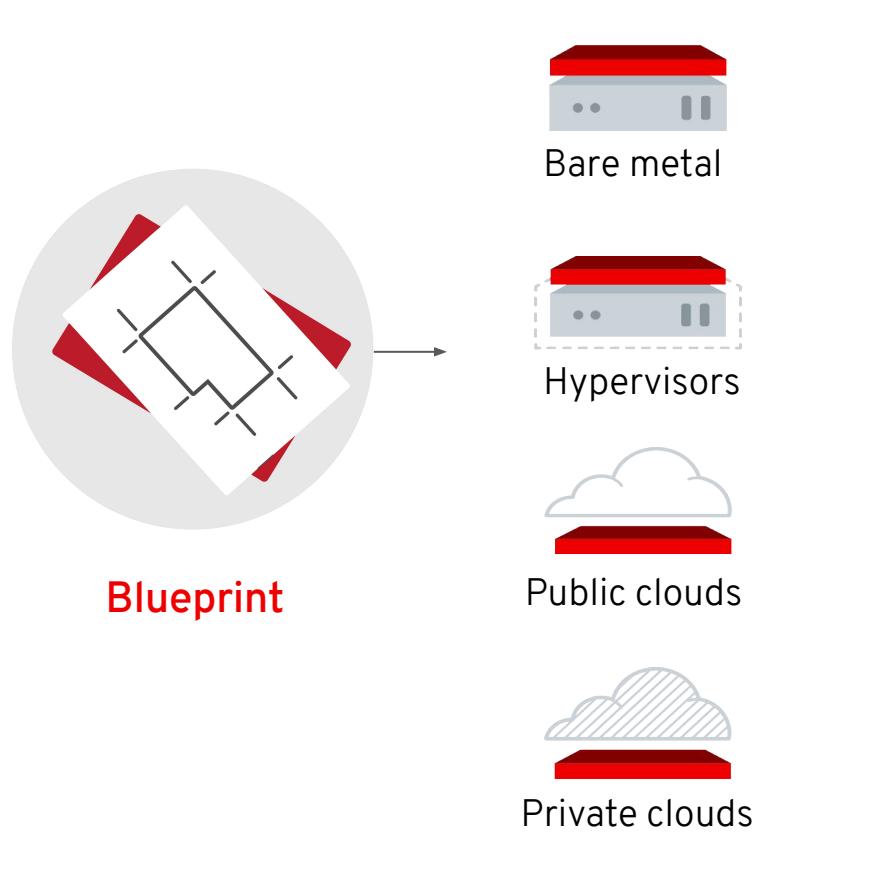
Continuous assessment

Real-world results to help find new risks

Simpler remediations

Tailored results at the host level

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

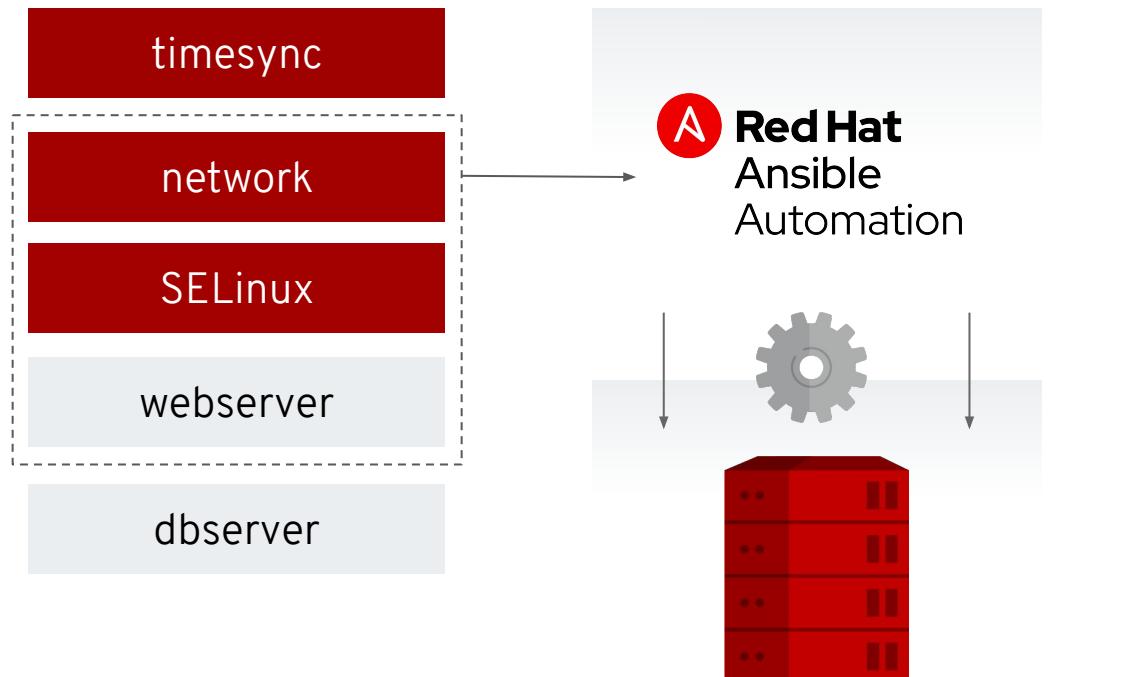
Any footprint

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

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

Enterprise workloads
require a trusted set of
partners



Trusted partner

Speed integration with common platforms

Ease management and integration of your business applications

Focus on your business

We focus on support and engineering so you don't have to

Innovate faster

Get to your next big thing without building ours

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

Hardware partner ecosystem



Red Hat Certified Cloud and Service Providers



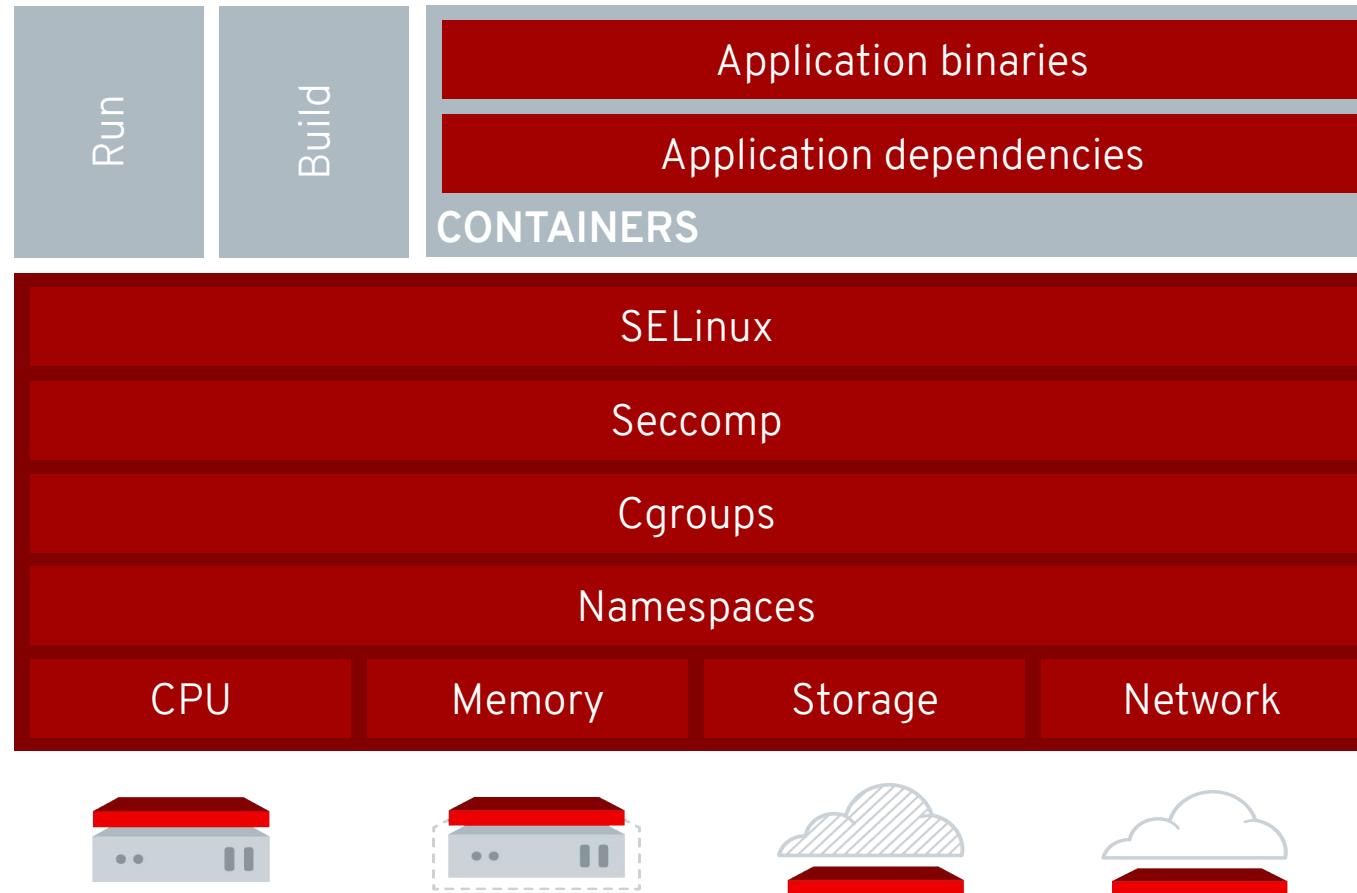
Google Cloud



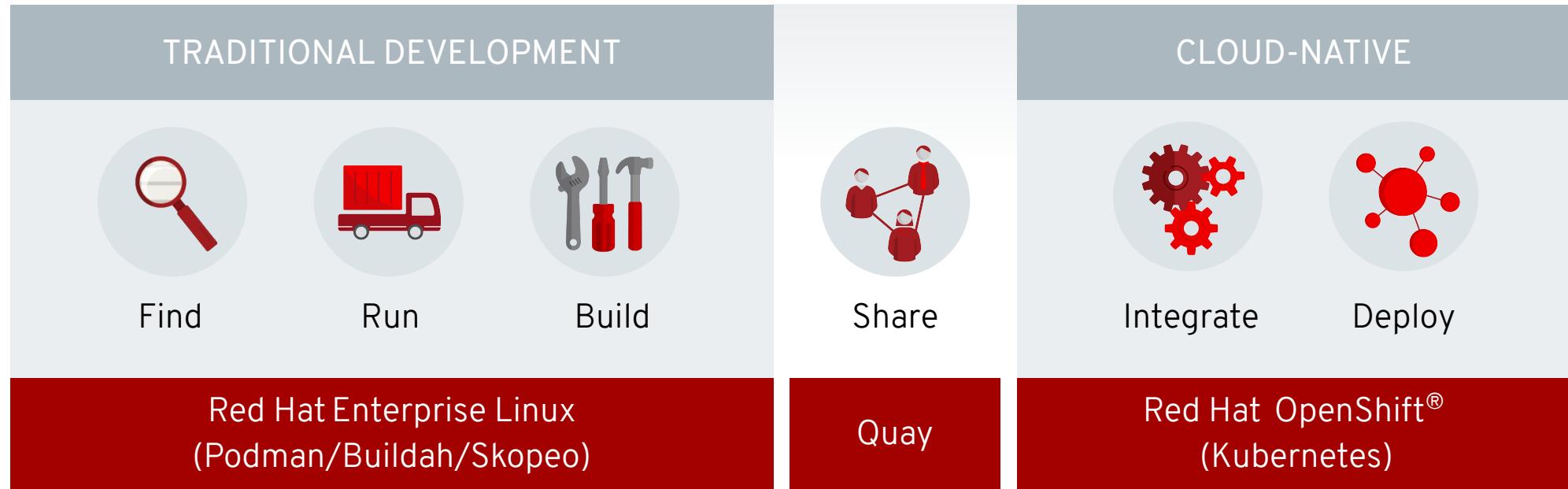
Microsoft
Azure

Power the adoption of containers

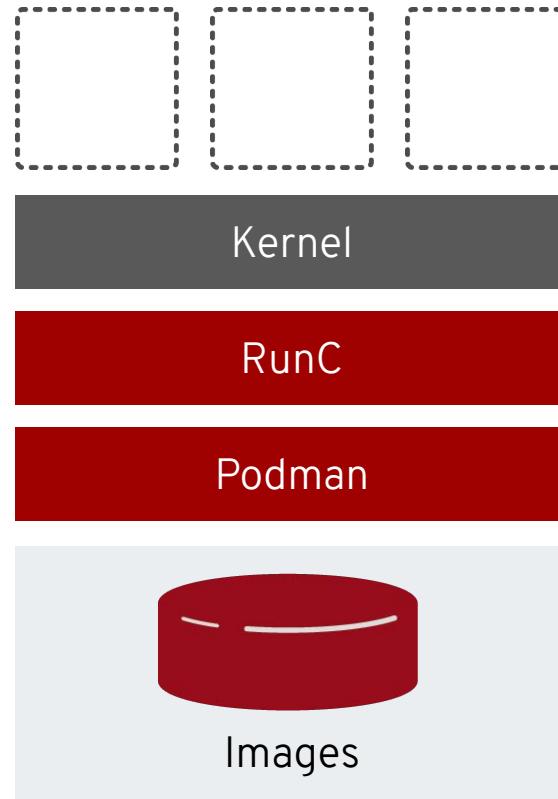
Containers are Linux



Powering the adoption of containerized workloads



Manage containers with Podman



Fast and lightweight

No daemons required

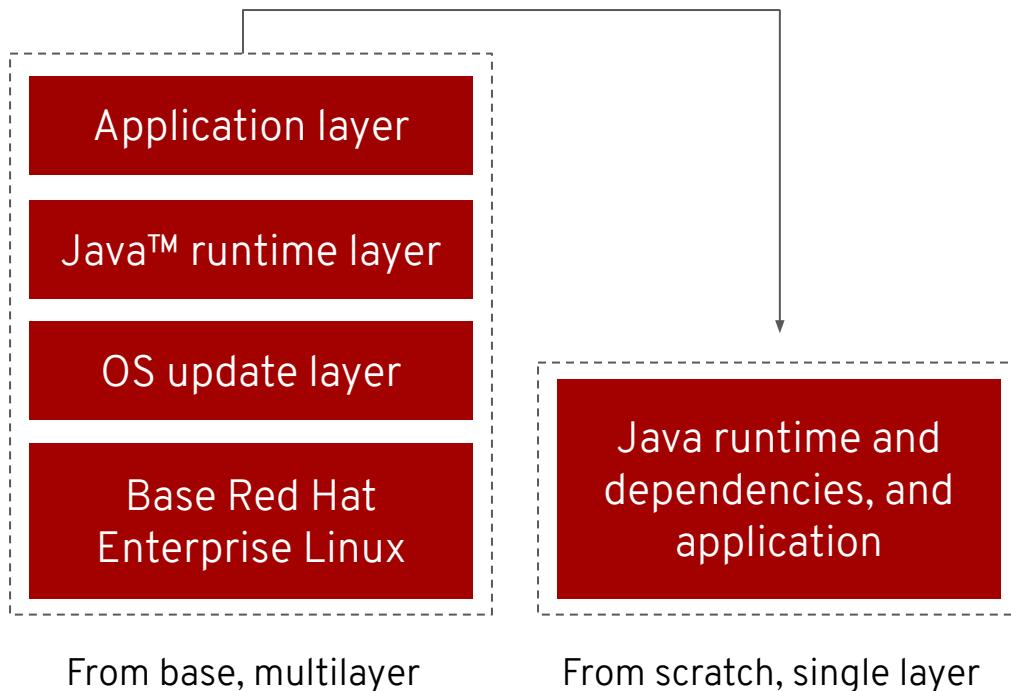
Advanced namespace isolation

Rootless operations for container run and build

Open standards compliant

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

Create images with Buildah



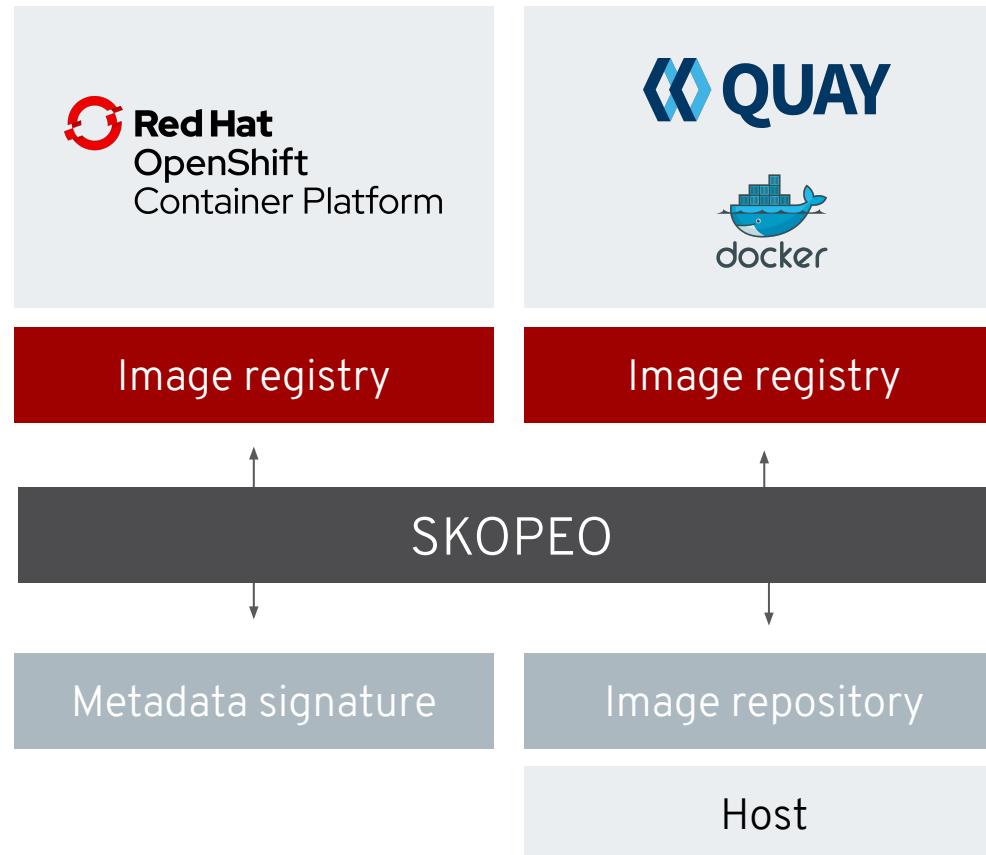
More control

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

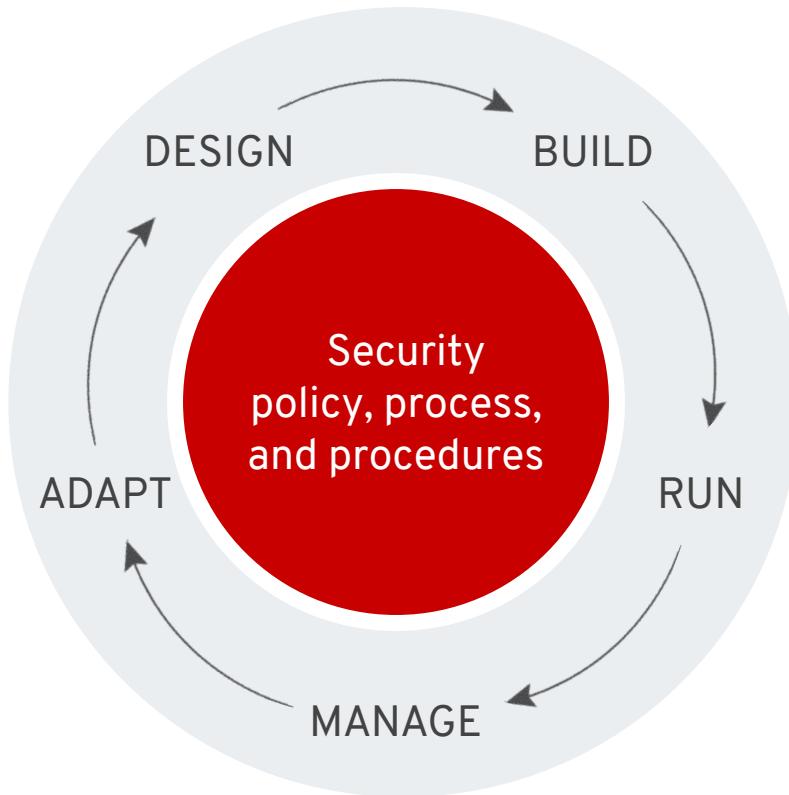
Copy images from registries to hosts or directly between registries

Sign and verify images

Supports GPG key signing on publish

New capabilities can't
come at the expense
of security

A highly secure platform



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

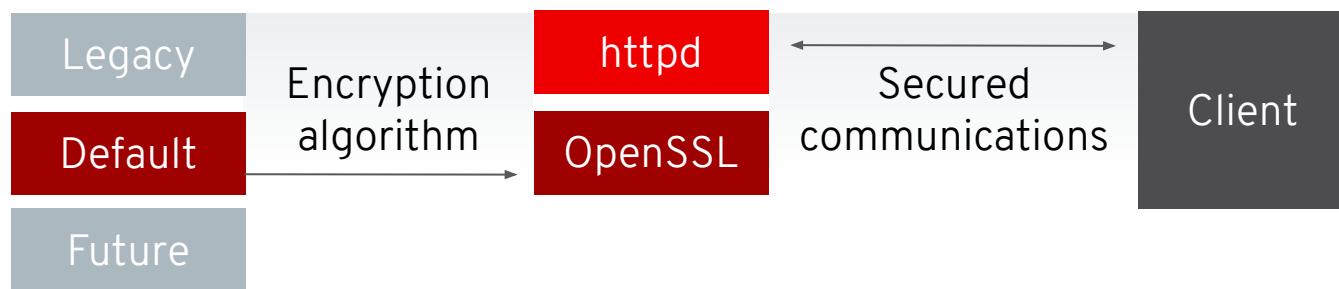
Integrated identity management

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

Configuring systemwide cryptographic policies



Central configuration

Set acceptable algorithms from a single tool

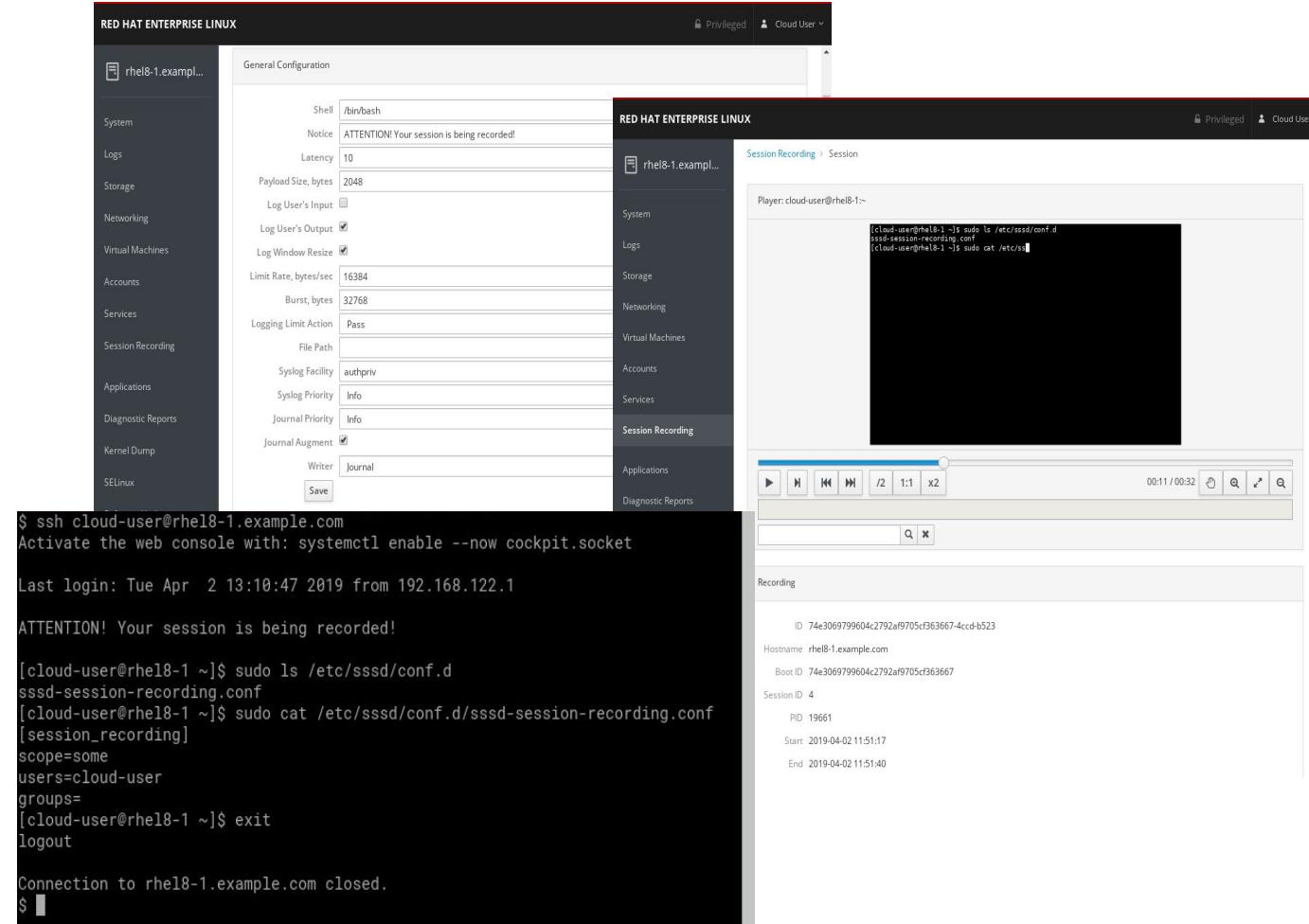
Improved consistency

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

Recording user terminal sessions



Audit activities

Create a record of actions taken for review against security policies

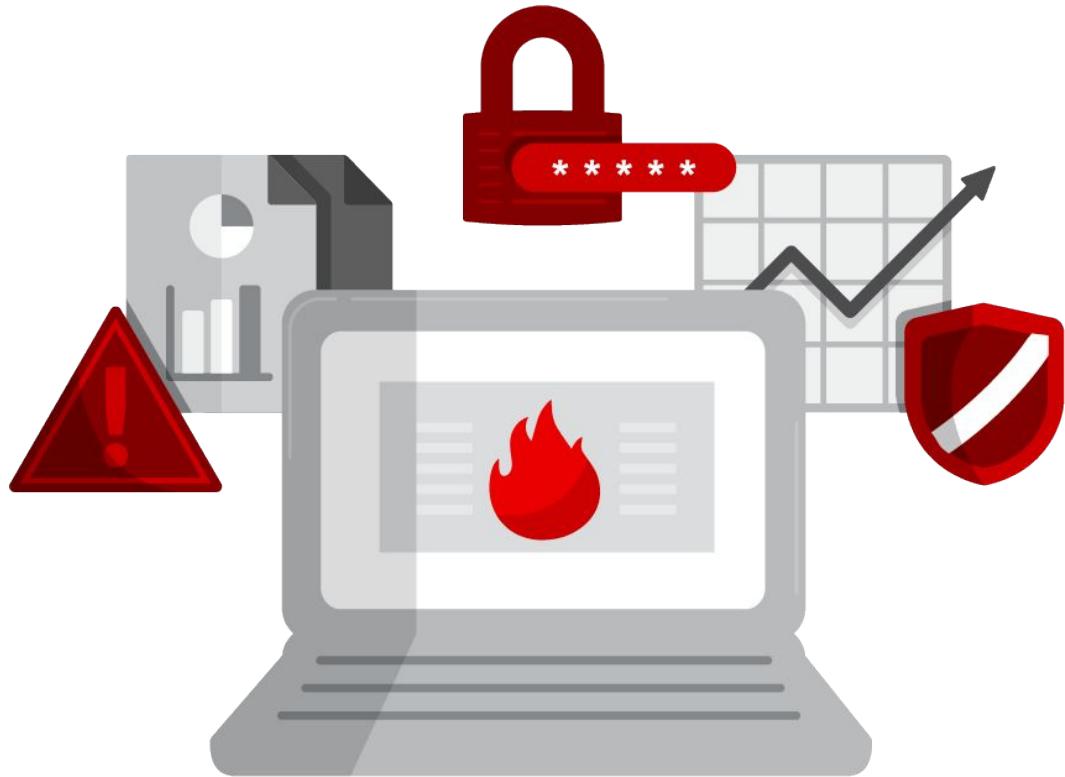
Create visual guides

Build run books and training materials with demonstrations

Record and play back

Logged via standard channels with multiple playback options

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 service
delivery brings Linux
to more new users

Remote single-system views in the web console

The screenshot shows the Red Hat Enterprise Linux 8 web console interface. The left sidebar contains navigation links: System, Logs, Storage, Networking, Virtual Machines, Accounts, Services, Session Recording, Applications, Diagnostic Reports, Kernel Dump, SELinux, Software Updates, Subscriptions, and Terminal. The main area displays several cards:

- Reading/Writing:** Two charts showing disk activity over time (13:25 to 13:29). The top chart is for Reading (Kib/s) with values 0, 32, 64, 96. The bottom chart is for Writing (Kib/s) with values 0, 32, 64, 96.
- Filesystems:** A table showing mounted file systems. One entry is /dev/vda1 mounted at / with a size of 1.63 / 9.99 GiB.
- NFS Mounts:** A card stating "No NFS mounts set up".
- Storage Logs:** A log entry for April 2, 2019, showing system boot logs related to udisksd and libudisks2 modules.
- RAID Devices:** A card stating "No storage set up as RAID".
- Volume Groups:** A card stating "No volume groups created".
- VDO Devices:** A card with a "Install VDO support" button and a message "VDO support not installed".
- iSCSI Targets:** A card stating "No iSCSI targets set up".
- Drives:** A table showing two 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 |

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 shows the Red Hat Enterprise Linux 8 web console. The left sidebar includes 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 area displays several cards:

- Storage**: Shows Reading and Writing Kib/s charts from 13:25 to 13:29.
- Filesystems**: Lists /dev/vda1 (mount point /) and cidata (mount point -).
- NFS Mounts**: Shows "No NFS mounts set up".
- Storage Logs**: Displays log entries for April 2, 2019, including "13:16 g_object_notify: object class 'UDisksObjects...' udisksd" and "13:16 Loading module libudisks2_lvm2.so... udisksd".
- RAID Devices**: Shows "No storage set up as RAID".
- Volume Groups**: Shows "No volume groups created".
- VDO Devices**: Shows "Install VDO support" and "VDO support not installed".
- iSCSI Targets**: Shows "No iSCSI targets set up".
- Drives**: Lists "VirtIO Disk" (10 GiB Hard Disk, R: 0 B/s, W: 0 B/s) and "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

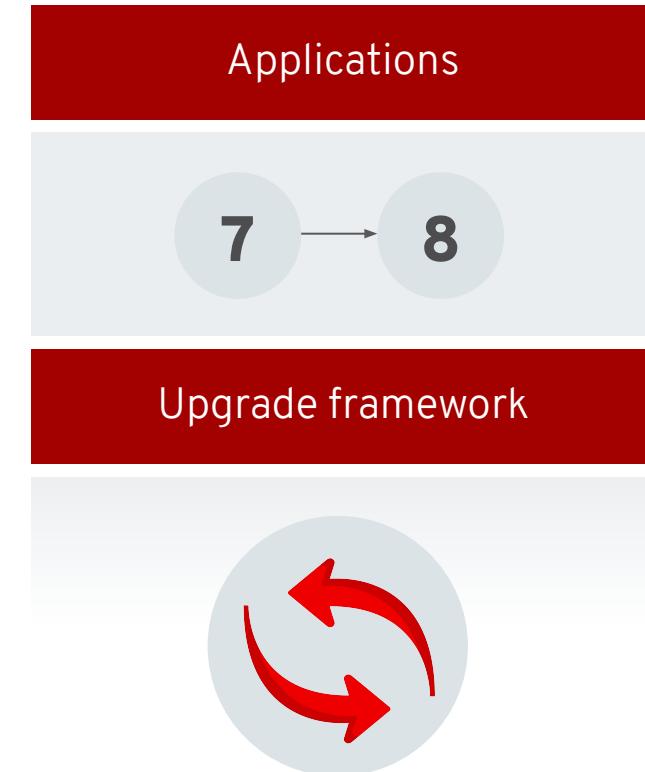
Enroll disks with Tang server and manage LUKS keys

Single sign-on configuration

Automatically configure when joining a domain

Gain new capabilities
while giving up nothing

In-place upgrades for your systems



Reduced migrations

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

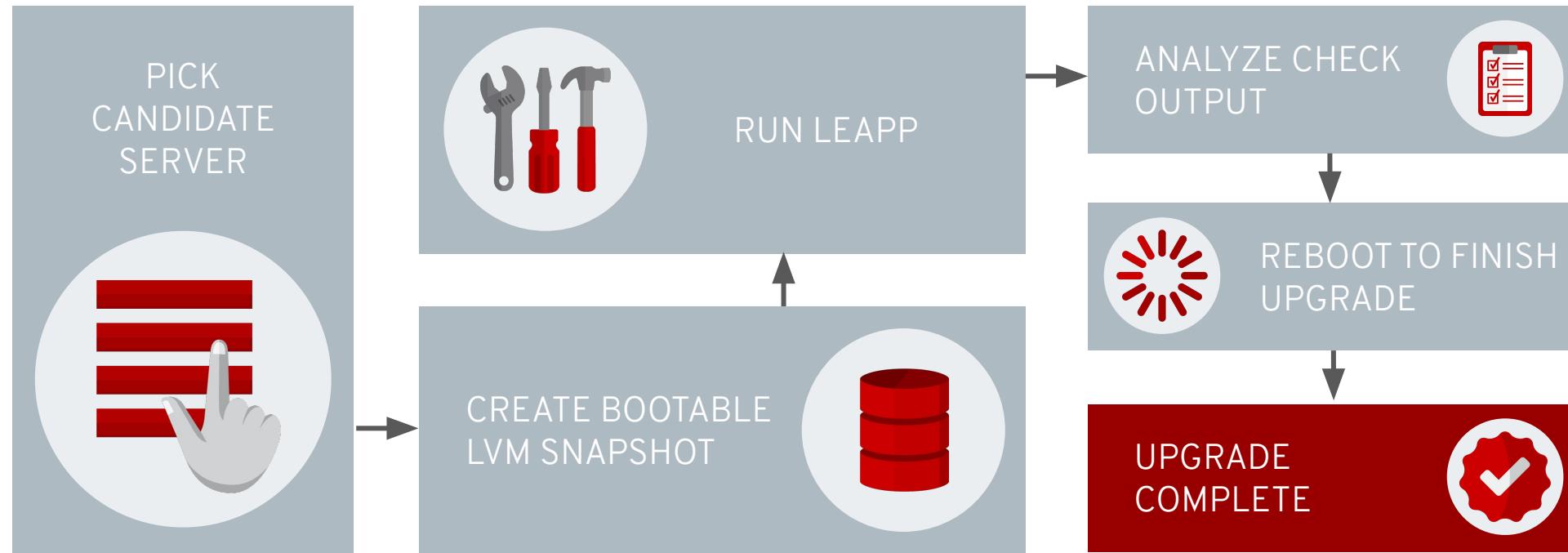
Easy rollback options

Combine with bootable LVM snapshots for safety

Improved framework

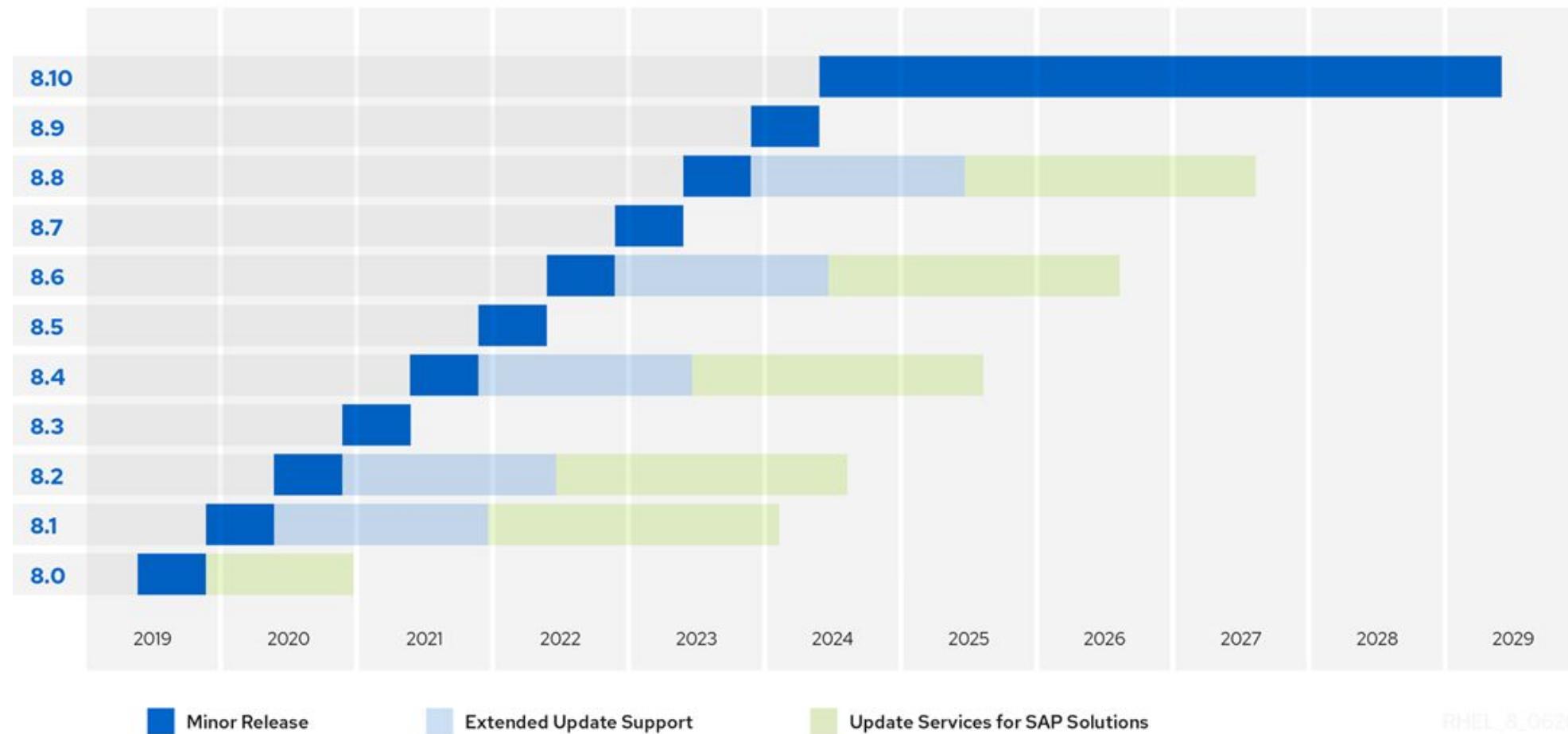
Get better analysis and a simplified process with a more extensible framework

Can I upgrade this host?



Red Hat Enterprise Linux 8.4 and the future

RHEL 8 - Published Life Cycle



Red Hat Enterprise Linux 8.4

Stability plus Innovation



Innovate

Application Streams and enhanced RHEL Container Tools offer developers the flexibility to build where and how they need AND easily deploy on RHEL



Optimize

Performance Co-Pilot, Web Console, System Roles, and Red Hat Insights services provide guidance and expertise for configuring RHEL and workloads running on RHEL to achieve optimal performance, increase efficiency and streamline management at scale



Transform

Simplify and accelerate transformation of workloads to the cloud and edge. Purpose built tools ensure your workloads are optimized regardless of where they are deployed



Protect

SCAP Profiles, System Roles and the Red Hat Insights Vulnerability service help mitigate risk by identifying vulnerabilities and simplifying the enforcement of security configurations

Innovate

The flexibility to build where and how needed and easily deploy on RHEL



Application Streams

Empowers developers to innovate using supported versions of the latest tools while still having access to earlier versions to maintain production applications

Universal Base Image(UBI) Micro

Provides a lightweight yet dynamic container image that empowers IT teams to build a wider variety of containers while standardizing on the reliable, stable, and secure RHEL foundation

RHEL Container Tools Automatic Container Image Updates

Delivers automatic updates that allow users to manage container versions centrally from a registry no matter where they choose to deploy



Delivering new language and software choices with application streams

- Redis 6
- Postgresql 13
- MariaDB 10.5
- Python 3.9
- Dev Tools 2021.2
 - Golang 1.15
 - Rust 1.49
 - LLVM 11.0

Podman 3.0

A major update for podman functionality



Automatic container image updates

Podman 3.0 ships with `podman-auto-update.service` `systemd` unit. Triggered daily, by default, checks registry and pulls updated container image, then restarts affected containers using `systemd`

Docker volume support

Podman now supports Docker volumes, a method for persistent container storage, further making podman a drop-in replacement

Secure short names

When using a shortname without the container registry, users will be asked to verify the pull prior to execution

Included in `container-tools:rhel8` and `container-tools:3.0`



UBI Micro

Available from the Red Hat Container Catalog

A super-small base container image:

- Low overhead, install what you want
- Reduced attack surface
- More deployment efficiency

New experiences: lab.redhat.com



New: Resolving issues with Red Hat Insights Advisor

Register systems and proactively resolve potential issues with Insights Advisor.

<https://lab.redhat.com/insights-workshop>

Coming Soon: Performance Co-Pilot (PCP) on Red Hat Enterprise Linux

Configure Performance Co-Pilot (PCP) on RHEL to capture and analyze system and application metrics

<https://lab.redhat.com/pcp-intro>



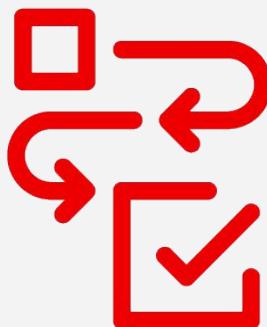
Coming Soon: Configuring and updating system configurations with System Roles

Utilize System Roles to apply and update configurations across your system population

<https://lab.redhat.com/systemroles-soe>

Transform

Simplify and accelerate the transformation of workloads to the cloud and edge



RHEL for the Edge

Streamlines OS image generation and simplifies management of deployments using container images

Red Hat Insights Subscriptions

Provides a single view of where subscriptions are deployed, even in the public cloud, giving administrators and procurement at-a-glance reporting of usage against capacity for their entire RHEL estate

Register and Run Subscription Experience

Simplifies subscription management by removing complexity and automating connections to Red Hat updates and Red Hat Insights, delivering analysis of system configurations, updates, and compliance status.

Leapp In-place Upgrades

Red Hat Enterprise Linux 7.9

Red Hat Enterprise Linux 8.4



Improved SAP Customer Experience

SAP® Certified
Integration with SAP S/4HANA®

With every release of RHEL, we provide improved capabilities to ensure that you are able to get the most of your operating system for running your mission-critical SAP workloads.

- ▶ Updated RHEL System Roles include system validation options
- ▶ RHEL HA Cluster Monitoring (via Performance Co-Pilot integration)
- ▶ In-place Leapp upgrades from RHEL 7.7 to RHEL 8.2
- ▶ RHEL HA multi-site HA cluster support (Multi Target Replication)
- ▶ IBM Power + Intel 64 HW enablement for SAP HANA



Transform

—
**Simplify and accelerate the
transformation of workloads
to the cloud and edge**

—
Consistency and ease of management
regardless of the deployment
footprint

Extend the skills and practices of the
datacenter to all footprints

Red Hat Enterprise Linux for the Edge

Ensured stability and deployment flexibility



Containerized Deployment

Package RHEL for the Edge image content
in a container for quick and easy deployment



ISO/USB Installer Images

RHEL for the Edge images built as installable
media [ISO or USB]
Deploy RHEL for the Edge in disconnected
environments

Hybrid Cloud Your Way



Add a cloud source
Register your provider to manage your Red Hat products in the cloud.

1 Name source
2 Select application
3 Enable account access

Create IAM policy
Create IAM role
Enter ARN

4 Review details

Select application
Select an application to connect to your source. You can connect additional applications after source creation.

Cost Management
Analyze, forecast, and optimize your Red Hat OpenShift cluster costs in hybrid cloud environments.

RHEL management Bundle
Red Hat Gold Images
Unlock cloud images in AWS and bring your own subscription instead of paying hourly.
High precision subscription watch data
View precise public cloud usage data in subscription watch.
Autoregistration
Cloud instances automatically connect to cloud.redhat.com when provisioned.
Red Hat Connector
Simplified set up and registration of connected hosts.

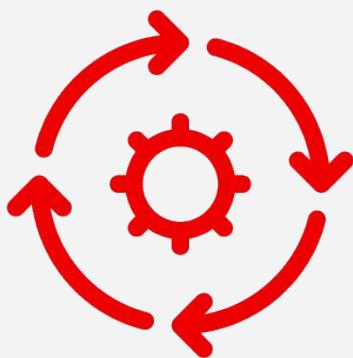
No application

Next Back Cancel

- Simplified Cloud Experience **significantly** reduces the number of steps required to run RHEL on the public cloud.
- Configure account-level link and get:
 - Gold Images
 - High precision (<1 day) subscription reporting
 - Auto-registration of provisioned systems
 - Red Hat Insights

Optimize

Guidance and expertise for configuring RHEL for optimal performance,
increased efficiency and streamlined management at scale



RHEL System Roles Collection

Improves accessibility and ease of automation by delivering RHEL system roles as a certified collection in Red Hat Ansible Automation Hub

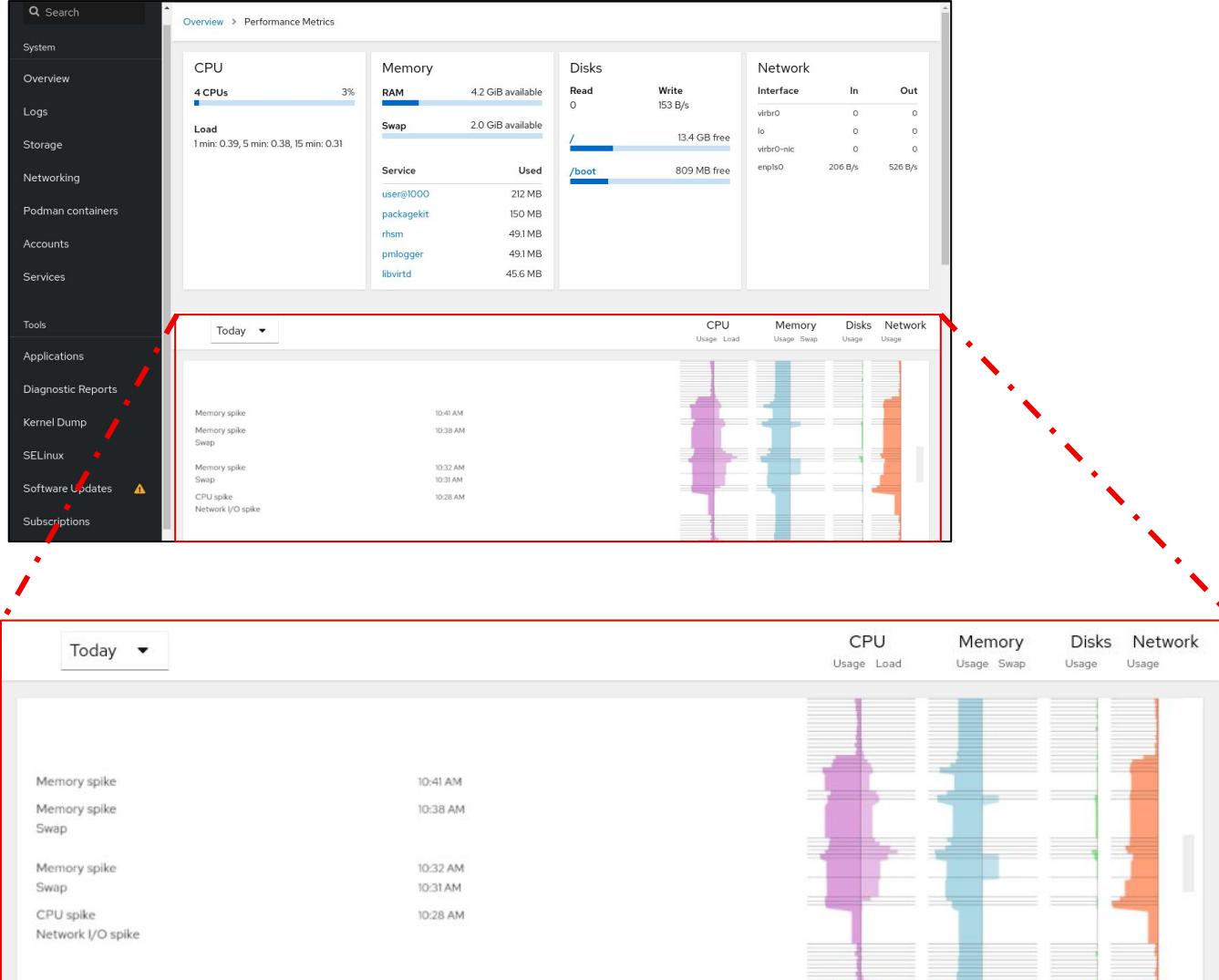
Powerful Data Visualization

Creates simple visualizations from complex system performance data using the RHEL web console and Grafana dashboards using Red Hat Performance Co-Pilot (PCP) logs

Red Hat Insights Rules and System Roles for SAP

Simplifies administration and verifies configuration of RHEL and SAP workloads using rule-based analytics and ansible playbooks to automate fixes

Web Console Update



- Enhanced Web Console performance graphics (pictured)
 - Quickly interpret system utilization data
 - Important events automatically logged
- Improved update management with tracer integration

"These are big improvements for users of these tools. Systemtap 4.4 brings significant performance and stability improvements... Dyninst 10.2.1 gives us support for improved debugging workflows and better instrumentation of large binaries and parallelized code analysis."



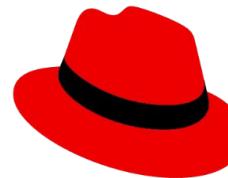
Karl Abbott

Senior Product Manager
RHEL Performance Experience

Performance Tool Updates

- Systemtap 4.4
- Dyninst 10.2
- Perf supports Common Trace Format (CTF)
- Improved integration between Performance Co-Pilot and Grafana
- MS SQL Server Dashboard in Grafana
- Perf can generate flame graphs showing CPU stack data

Red Hat Insights is expanding



Red Hat Insights



**Red Hat
Insights**

for Red Hat Enterprise Linux



**Red Hat
Insights**

for Red Hat OpenShift



**Red Hat
Insights**

for Red Hat Ansible Automation
Platform

Filter results ▾

4 Systems registered with Insights

⚠ 0 stale systems
❗ 0 systems to be removed

⚠ Latest critical notifications on your systems

Newly released security rule 24 Mar 2021
Linux-firmware: Denial of Service or Privilege Escalation in Bluetooth range

Collapse all ▾

Important Expand ▾

Vulnerability

Red Hat recommends addressing these CVEs with high priority due to heightened risk associated with these security issues

20 CVEs with security rules impacting 1 or more systems

View CVEs

3 CVEs with known exploits impacting 1 or more systems

View known exploits

Advisory recommendations

⚠ 2 incidents detected

Problematic conditions that cause an issue have been actively detected on your systems

View incidents

Recommendations by total risk ⓘ

0 Critical 4 Important 3 Moderate 0 Low

CVEs by CVSS score

| CVSS score | CVE totals | Known exploits |
|------------|------------|----------------|
| 8.0 - 10 | 78 | 1 |
| 4.0 - 7.9 | 503 | 2 |
| 0.0 - 3.9 | 100 | 0 |

Recommendations by category

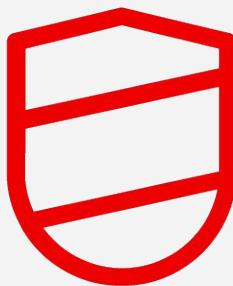


| Category | Count |
|--------------|-------|
| Availability | 3 |
| Stability | 1 |
| Performance | 1 |
| Security | 2 |

*Image represents current state of UI, subject to change

Protect

More confidently mitigate risk, enforce security configurations and policies, and implement identity management



Red Hat Insights Vulnerability Service

Reduces risk by pinpointing RHEL hosts with known CVEs and corresponding publicly-known exploits, so highest risk systems can be prioritized

System Roles for Crypto Policies

Streamlines policy changes and ensures compliance across RHEL environments by automating modifications to crypto policies

Red Hat Insights Compliance Service

Improves compliance of RHEL deployments using OpenSCAP by ensuring RHEL systems and SCAP Security Guide (SSG) versions are aligned

Want to learn more ??



The Red Hat logo, featuring a red fedora hat icon next to the word "Red Hat".

Explore Red Hat Enterprise Linux 8

These interactive learning scenarios provide you with a pre-configured Red Hat® Enterprise Linux® instance to experiment, learn, and see how Red Hat can help you solve real-world problems.

<https://lab.redhat.com/>

LEARNING SCENARIOS

Configuring Terminal Session Recording

Keep track of what is happening on your systems by using Terminal Session Recording to record and review terminal sessions of users and administrators.

START SCENARIO

Managing software from an application stream

Learn how to choose versions of popular and supported open source languages and offer them to users through an application stream.

START SCENARIO

Configuring Network Interfaces [Admin 101]

Learn how to apply network settings to interfaces and manage connections using Network Manager and the nmcli command.

START SCENARIO

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