Red Hat
Enterprise Linux

Red Hat Enterprise Linux

Container Engines, Runtime & Images Roadmap

Scott McCarty   Jenee Davis
Product Manager   Product Marketing Manager

Red Hat

Agenda

▸ RHEL 8 Container Needs & Capabilities

▸ Technology Architecture

▸ RHEL as a Container Host

▸ Red Hat Universal Base Image

▸ Red Hat Enterprise Linux Container Tools

▸ Roadmap

▸ Public Reference Information

▸ Previous Roadmaps

Needs and Capabilities

RHEL 8 delivers key new capabilities with containers

Red Hat

> **"** We have chosen Red Hat Enterprise Linux as our container base, giving customers a common foundation to operate, manage and safeguard their infrastructure as well as a common development environment. This allows them to consistently develop, run and maintain container apps on premises, in the cloud, as well as across multiple clouds

—
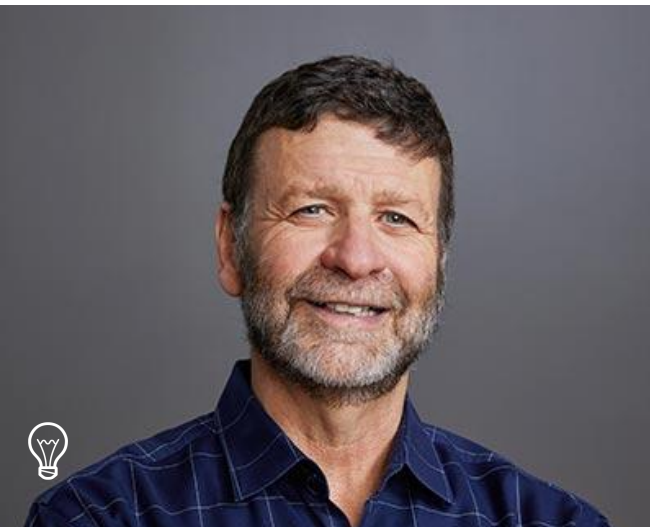
Paul Cormier
CEO, Red Hat

How to talk about RHEL and containers

RHEL powers the adoption of new technologies like containers by helping development and operations teams work together.

New tech means new approaches and processes

New tech like Kubernetes

RHEL is built to fit seamlessly into how you work – even as you package your applications differently and the way you work evolves.

Innovation starts with Linux and RHEL is the first step on your journey to Kubernetes and beyond.

Changing the way you package will help you on the path to k8s

The power of OPEN

Sales Kickoff | 2021

Red Hat

Customer Needs

Mapping needs to capabilities

Use Case	Capability	Technology	Product
Unorchestrated	Few Containers	Linux and Podman	Red Hat Enterprise Linux Server
Orchestrated	Many Containers	Linux and Kubernetes	OpenShift Container Platform

Red Hat

New container use cases are being invented every day

Red Hat solutions can meet you wherever you are on the container continuum

Infrastructure complexity at 10, on scale from 1 to 10, 1 being on prem and 10 being **multi-cloud**

Microservices in production, microservices architecture goals, plans, initiatives

Organization has availability, interdependence, and/or deployment needs that require **orchestration**

Interested in containerizing but brand new to Red Hat, new to Linux or **no standardized Linux**

One container, lots of locations (**retail** stores, **franchises**, **Edge** computing)

Red Hat OpenShift

Greater than 5 **workloads** per host

Red Hat Enterprise Linux

Currently using **Docker,** looking for alternatives

One big app that smaller apps are dependent on (ie **SAP HANA**)

Red Hat Enterprise Linux

Less than 5 **workloads** per host

Red Hat

Technology Architecture

There are new

technology primitives

with containers

Red Hat

Four primitives for Containerizing Applications

#1 Container Image

Universal Base Image

Red Hat
Enterprise Linux

#2 Container Host

Red Hat Enterprise Linux

Red Hat
Enterprise Linux

#3 Container Registry

Red Hat Quay

Red Hat
Quay

#4 Container Orchestration

Red Hat OpenShift

Red Hat
OpenShift

Red Hat

The Same Components

Are the foundation for RHEL and OpenShift

Red Hat
Enterprise Linux

Red Hat
OpenShift
Container Platform

Container Host

▸ Rock solid Linux kernel with great performance, security and modular architecture

▸ Battle tested systemd

▸ Container tools included with the Operating System

Container Images

▸ Uses same RPMs and binaries from RHEL

▸ Includes layered images for cloud native language development

▸ Released under new EULA to be redistributable for customers, partners and community

Red Hat

Container Hosts

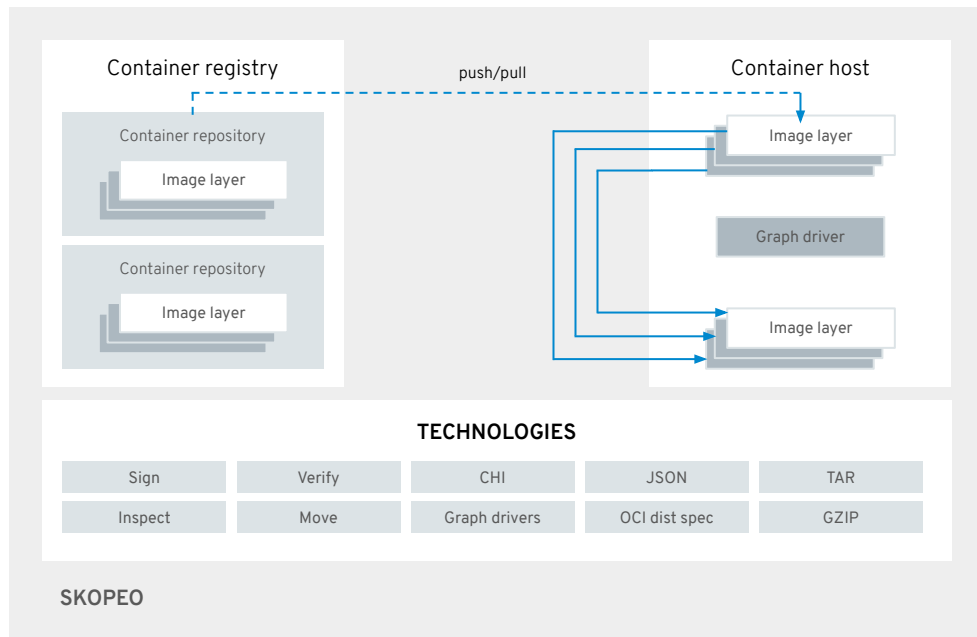## Kernel, container engines, and systemd from Red Hat Enterprise Linux
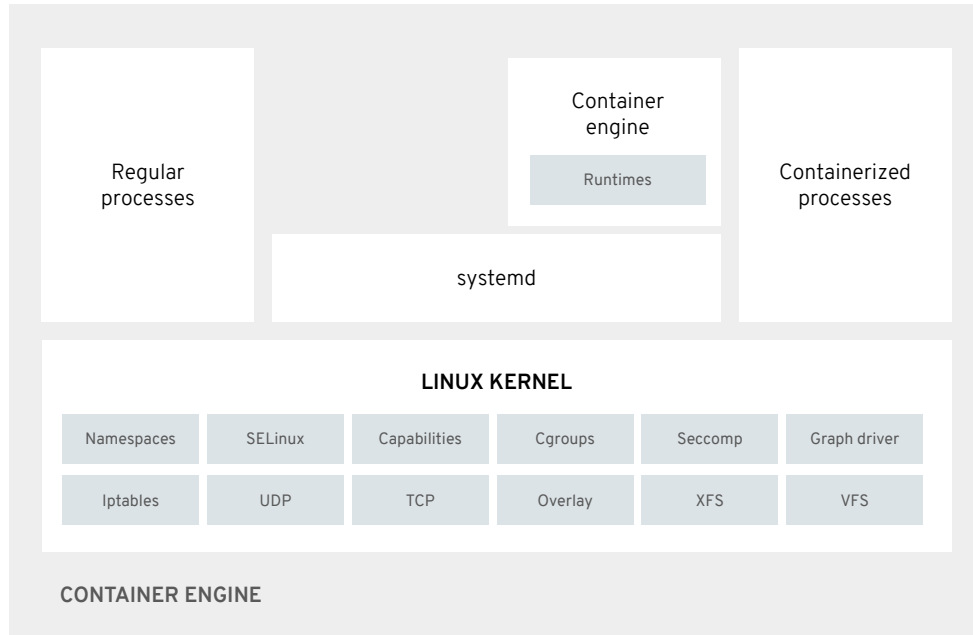
Tightly coupled communication through the kernel—all-or-nothing feature support:

❯ Operating system (kernel)

❯ Container runtime (runC)

❯ Container engine (Podman, CRI-O)

❯ The whole stack is responsible for containers—the container host

Container Images

Linux binaries and libraries built from Red Hat Enterprise Linux

Container registry   push/pull   Container host

Container repository

Image layer

Container repository

Image layer

Image layer

Graph driver

Image layer

TECHNOLOGIES

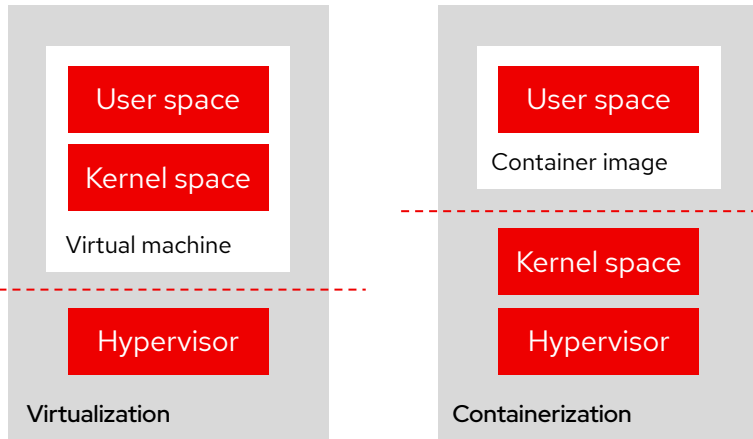| Sign	Verify	CHI	JSON	TAR
Inspect	Move	Graph drivers	OCI dist spec	GZIP

SKOPEO

Container engines and runtimes rely on the kernel for storage:

> Cached container images map to layered file system

> Running containers often use an extra copy on write layer

Red Hat

Virtual Machines & Containers

Portability, compatibility, and supportability

User space		
Kernel space		
Virtual machine		
Hypervisor		
Virtualization		

User space		
Container image		
Kernel space		
Hypervisor		
Containerization		

Move the kernel around or move the user space around:

▶ Fancy processes

▶ Breaking the OS into 2 pieces

▶ All containers share a kernel

▶ Root-only exploits can be bad

13

Red Hat

Red Hat Enterprise Linux as a Container Host

Same familiar operating system, configurable like any host

Red Hat

One Operating System

Two deployment options

	RED HAT® ENTERPRISE LINUX® **Customizable OS**	**RED HAT® ENTERPRISE LINUX CoreOS** **Immutable container host**
BENEFITS	• Industry standard security • 10+ year enterprise lifecycle • High performance on any infrastructure • Customizable and compatible with wide ecosystem of partner solutions	• Increased container host security • Self-managing, over-the-air updates • Optimized performance on popular infrastructure • Immutable and tightly integrated with OpenShift
WHEN TO USE	When customization and integration with additional solutions is required	When cloud-native, rolling updates are top priority

Red Hat

Red Hat Enterprise Linux 8

Modern foundation for the datacenter, powering current and next-gen workloads

▷ **Core Components Snapshot**
4.18.x kernel
gcc 8.2, llvm 6.0
systemd 239
YUM 4 (DNF base)

▷ **Improved Namespaces & Cgroups**
userns capabilities
cgroup ns
cgroup v2 enablement*

▷ **High Performance Networking**
OVS-dpdk improvement
NFV enablement - multus
eBPF*
IPVLAN

▷ **Enhanced security**
System-wide crypto policies
NBDE

Red Hat

Portability Starts with Red Hat Enterprise Linux

TBD: Multi-Arch

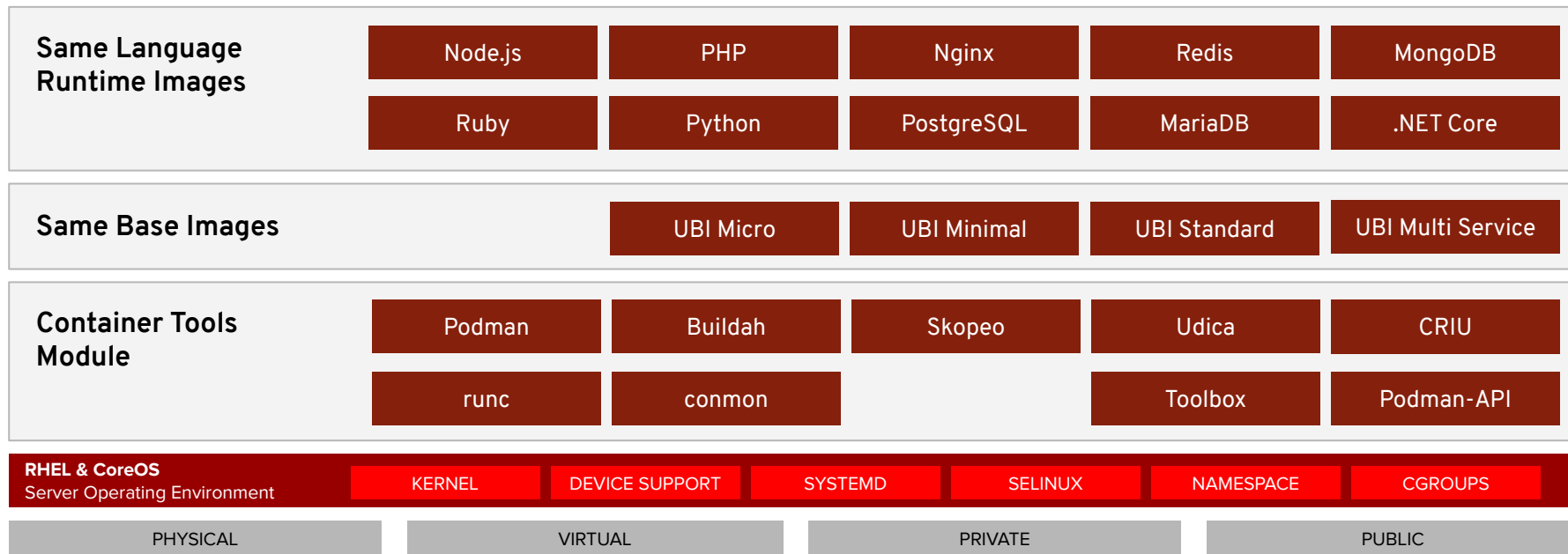TBD: Highlight multi-arch support for container-tools

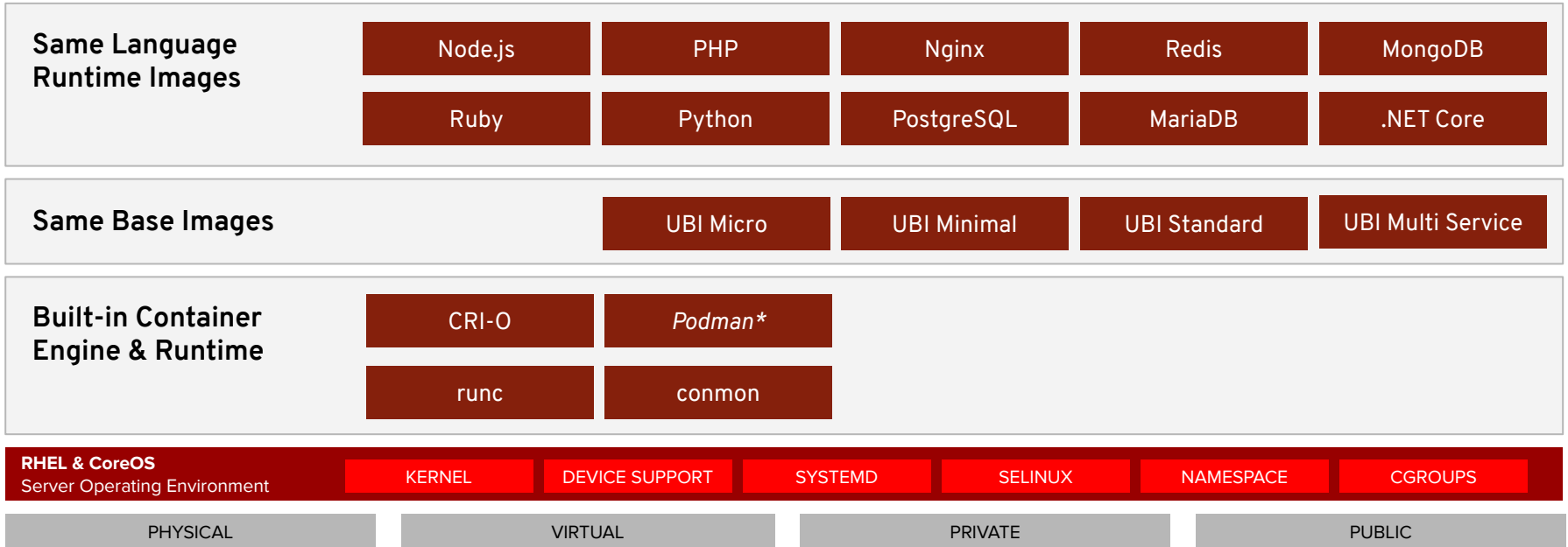| Red Hat Enterprise LInux Bits	KERNEL	DEVICE SUPPORT	SYSTEMD	SELINUX	NAMESPACE	CGROUPS
PHYSICAL	VIRTUAL		PRIVATE		PUBLIC	
X86						
POWER						
Z						
ARM						
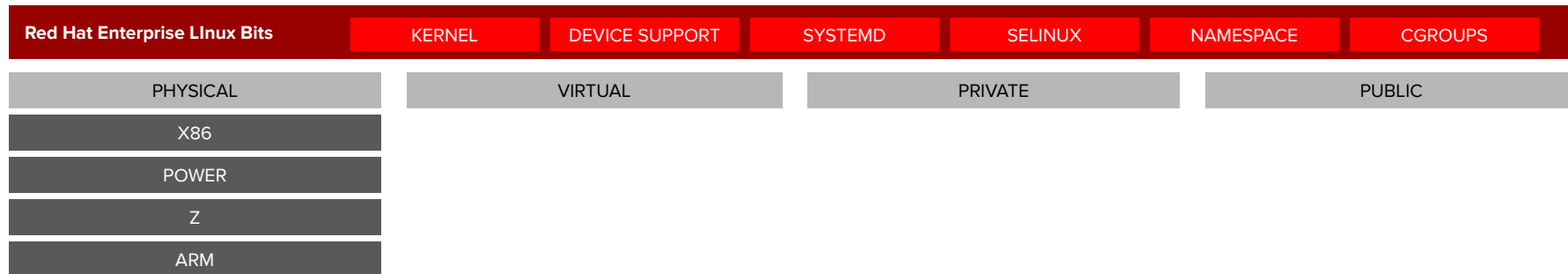
Red Hat Enterprise Linux & OpenShift Container Hosts

Same foundational technology, two products

Same Base Images		UBI Micro	UBI Minimal	UBI Standard	UBI Multi Service

Red Hat Enterprise Linux

Podman

Red Hat OpenShift Container Platform

Kubernetes

CRI-O

Red Hat Enterprise LInux Bits	KERNEL	DEVICE SUPPORT	SYSTEMD	SELINUX	NAMESPACE	CGROUPS

PHYSICAL	VIRTUAL	PRIVATE	PUBLIC

Red Hat Enterprise Linux Server

Same Language Runtime Images	Node.js	PHP	Nginx	Redis	MongoDB
	Ruby	Python	PostgreSQL	MariaDB	.NET Core

Same Base Images		UBI Micro	UBI Minimal	UBI Standard	UBI Multi Service

Container Tools Module	Podman	Buildah	Skopeo	Udica	CRIU
	runc	conmon		Toolbox	Podman-API

RHEL & CoreOS Server Operating Environment	KERNEL	DEVICE SUPPORT	SYSTEMD	SELINUX	NAMESPACE	CGROUPS

PHYSICAL	VIRTUAL	PRIVATE	PUBLIC

Red Hat

Red Hat CoreOS (in OpenShift)

Same Language Runtime Images	Node.js	PHP	Nginx	Redis	MongoDB
	Ruby	Python	PostgreSQL	MariaDB	.NET Core

Same Base Images		UBI Micro	UBI Minimal	UBI Standard	UBI Multi Service

Built-in Container Engine & Runtime	CRI-O	*Podman*
	runc	conmon

RHEL & CoreOS Server Operating Environment	KERNEL	DEVICE SUPPORT	SYSTEMD	SELINUX	NAMESPACE	CGROUPS

PHYSICAL	VIRTUAL	PRIVATE	PUBLIC

Red Hat

Red Hat Enterprise Linux & OpenShift

Same foundation, different release cadence

RHEL Server 8.0
Podman 1.0
UBI 8.0
Released 05-07-2019

RHEL Server 8.1
Podman 1.4.2
UBI 8.1
Released 11-05-2019

RHEL Server 8.2
Podman 1.6.4
UBI 8.2
Released 04-28-2020

OpenShift 4.0 Beta
CoreOS 4.0
CRI-O 1.13
Released 05-07-2019

OpenShift 4.1
CoreOS 4.1
CRI-O 1.13
Released 06-04-2019

OpenShift 4.2
CoreOS 4.2
CRI-O 1.14
Released 10-16-2019

OpenShift 4.3
CoreOS 4.3
CRI-O 1.16
Released 01-23-2020

OpenShift 4.4
CoreOS 4.4
CRI-O 1.17
Released 04-16-2020

OpenShift 4.5
CoreOS 4.5
CRI-O 1.18+
Released TBD

Red Hat

Red Hat Universal Base Image

The purpose is to be To be the highest quality and most flexible base container image available

Red Hat

Challenges in Selecting The Right Container Base Image

Red Hat

Too Many Options

Figuring out which container base image to use can be difficult

Traditional Options

- Red Hat Enterprise Linux
- Fedora
- CentOS
- Debian
- Ubuntu
- Windows

Minimal Options

- Distroless
- Scratch
- UBI Minimal
- UBI Micro
- Alpine

Red Hat

Developers Will Make a Choice

Which creates image sprawl

No Standard Operating Environment

Container Image	Container Image	Container Image
Application	Application	Application
Fedora 34	Ubuntu 20.04	Alpine 3.12.3

Container Image	Container Image	Container Image	Container Image
Application	Application	Application	Application
Fedora 33	Ubuntu 18.04	Alpine 3.11.3	UBI 8

Container Image	Container Image	Container Image	Container Image
Application	Application	Application	Application
Fedora 32	Ubuntu 16.04	Alpine 3.9.6	UBI 7

- 8 different versions of glibc
- 3 different versions of muslc
- 11 different versions of openssl

Standardized on Universal Base Image 8

Container Image
Application
UBI 8

- 1 version of glibc
- 1 version of openssl

It Works on My Laptop, But...

What about performance?
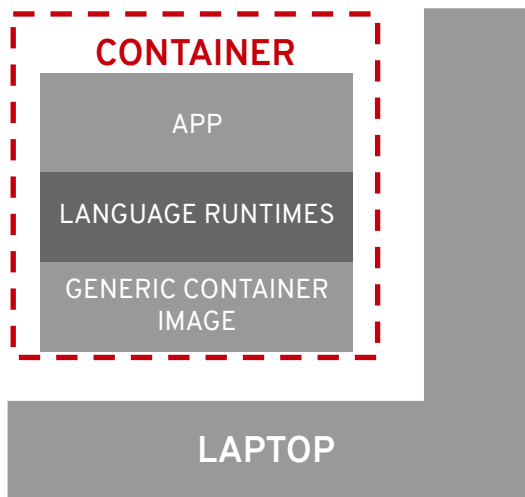
Works on my laptop
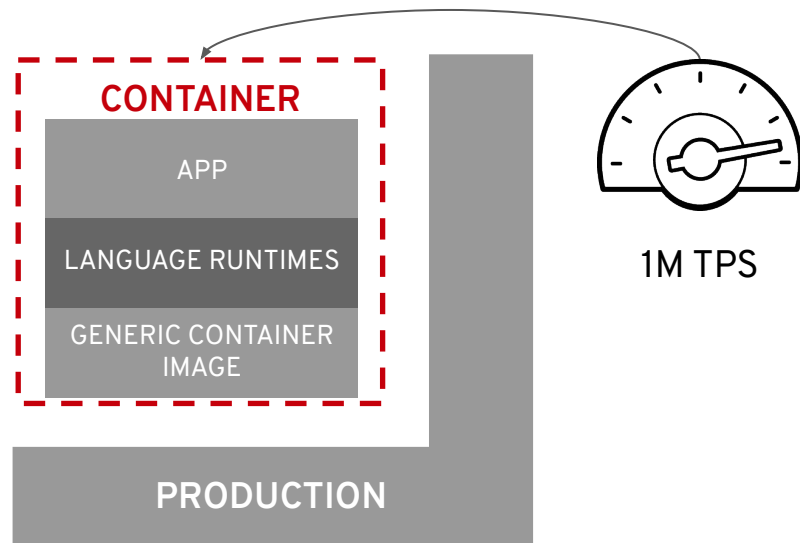
But, what about at 1M
transactions per second

It Works on My Laptop, But...

What about security?
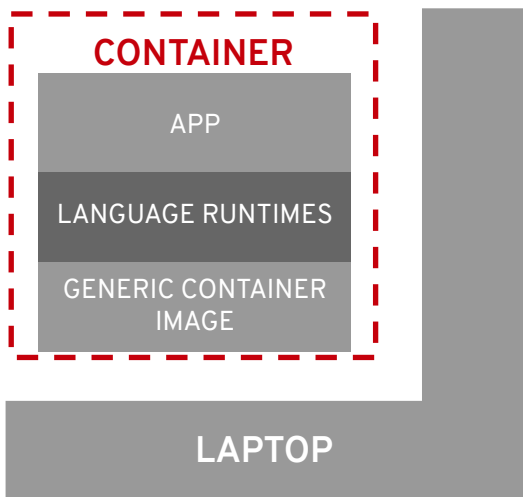
Works on my laptop
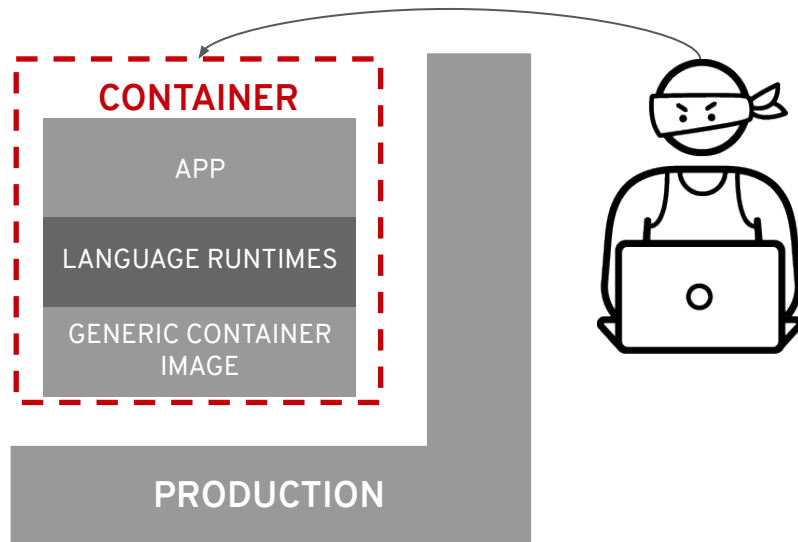
What about hackers?

ISVs Need to Distribute Anywhere

Meet your customers where they are, Joint Red Hat customers or not

Joint Red Hat Customer

Joint Red Hat Customer

CONTAINER

ISV APP

LANGUAGE RUNTIMES

OS (USER SPACE)

Only ISV Customer

Only ISV Customer

Red Hat
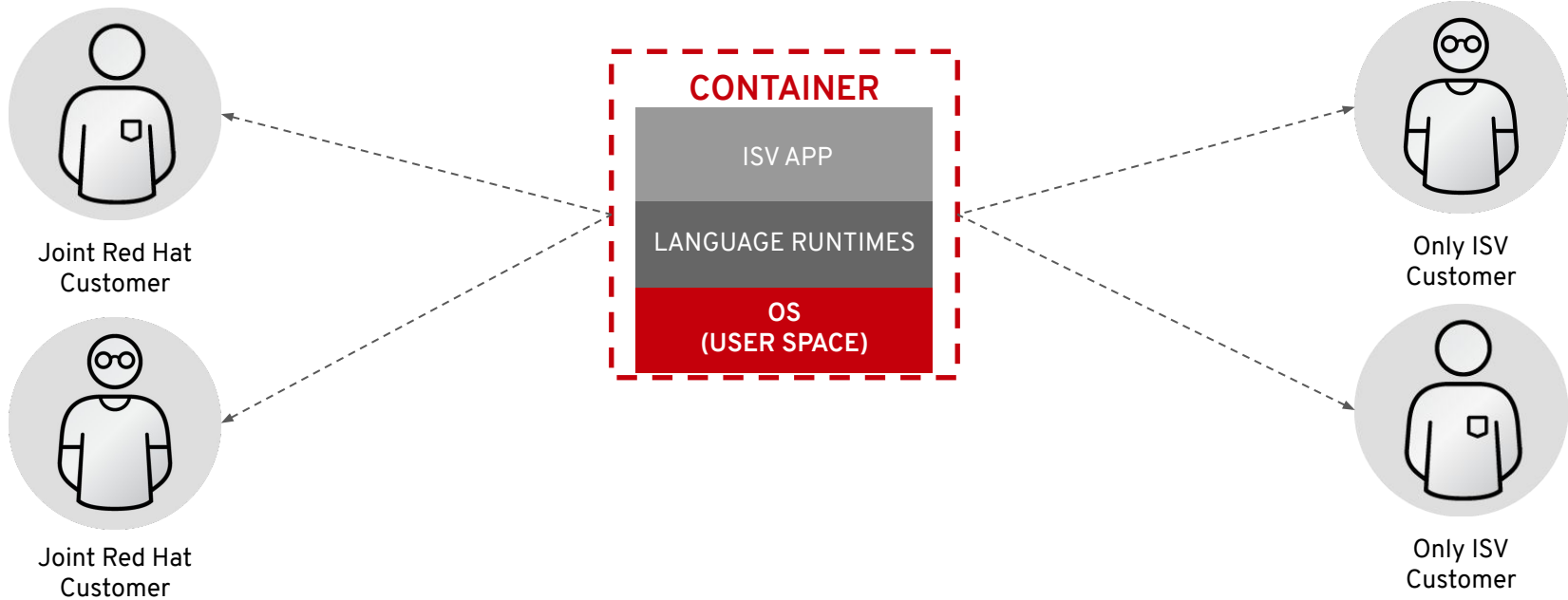
How to Select The Right Image

There is standard criteria which can help

Architecture

- C Library
- Core Utilities
- Size
- Life Cycle
- Compatibility
- Troubleshooting
- Technical Support
- ISV Support
- Distributability

Security

- Updates
- Tracking
- Security Response Team

Performance

- Automated
- Performance Engineering

Red Hat

Introducing Red Hat Universal Base Image

Red Hat

One Operating System

One Container Image

RED HAT® ENTERPRISE LINUX®

Red Hat Universal Base Image

BENEFITS	• Industry standard security • Excellent workload performance tuning • 10+ year enterprise lifecycle • Best image for RHEL and RHEL CoreOS • Customizable and compatible with wide ecosystem of partner solutions
WHEN TO USE	Run anywhere you like, supported on RHEL & OpenShift

Red Hat

Red Hat Universal Base Image

The purpose is…

"To be the highest quality and most flexible base container image available"

Red Hat

The Base Image for All of Your Needs

Enterprise architectures, security and performance

CONTAINER

APP

LANGUAGE RUNTIMES

OS
(USER SPACE)
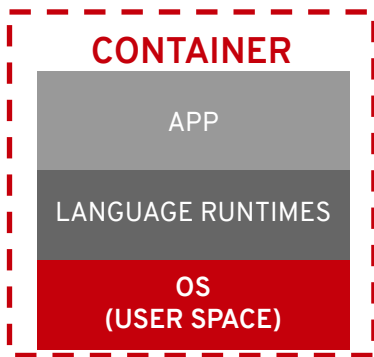
The Red Hat Universal Base Image is based on RHEL and made available at no charge by a new end user license agreement.

Development
- Minimal footprint (~15 to ~200MB)
- Programming languages (Modularity & AppStreams)
- Enables a single CI/CD chain

Production
- Supported as RHEL when running on RHEL
- Same Performance, Security & Life cycle as RHEL
- Can attach RHEL support subscriptions as RHEL

The Base Image for All of Your Needs

Engineered by Red Hat with an Enterprise Roadmap

CONTAINER

APP

LANGUAGE RUNTIMES

OS
(USER SPACE)
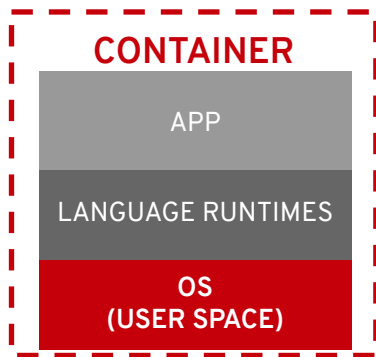
Trusted:
- Libraries
- Packaging format
- Core Utilities
- Security Response
- Patching
- Performance Response
- Technical Support
- More

Red Hat

What is Red Hat Universal Base Image?

Four base image, language runtimes, and software packages

MICRO

MINIMAL

STANDARD

MULTI SERVICE

Node.js

ALL RED HAT ENTERPRISE LINUX PACKAGES

UNIVERSAL BASE IMAGE PACKAGES
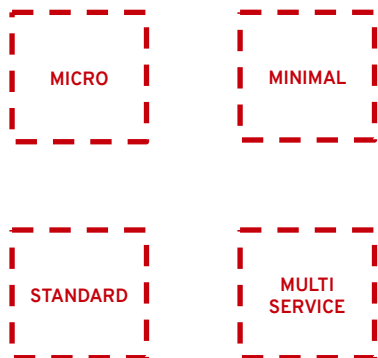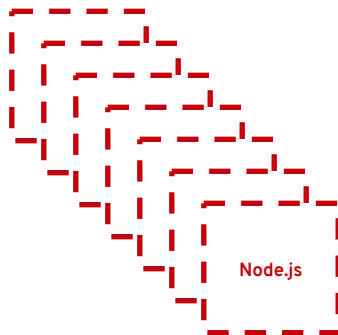
Base
Images

Pre-Built
Language
Images

Package
Subset

Red Hat

What is Red Hat Universal Base Image?

Bring the value of RHEL to cloud native applications

RHEL
- APP
- LANGUAGE RUNTIMES
- KERNEL & SYSTEM SOFTWARE

CONTAINER
- APP
- LANGUAGE RUNTIMES
- SYSTEM SOFTWARE

- OPERATOR
- WEB SERVICE
- DATABASE
- CACHE TIER

Traditional Applications

Containerized Applications

Cloud Native Applications
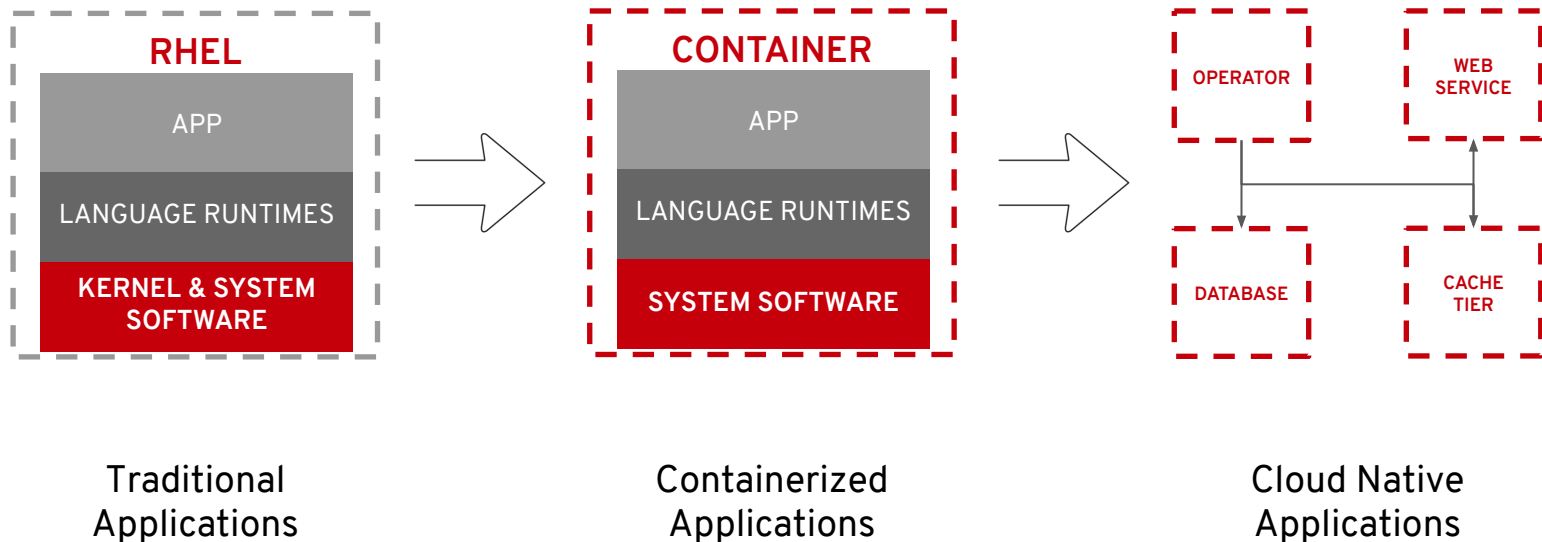
What is Red Hat Universal Base Image?

Four images to choose from

MICRO

app

coreutils

glibc (En locale)
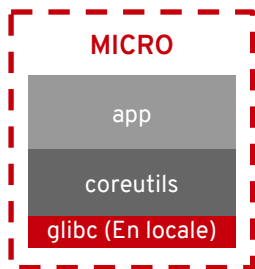
ubi8/ubi-micro

Designed for applications that contain all dependencies (Golang, dotnet, etc)

- Tiny (<15MB)
- No package manager
- Built using Buildah

MINIMAL

app

microdnf + coreutils

glibc (En locale)
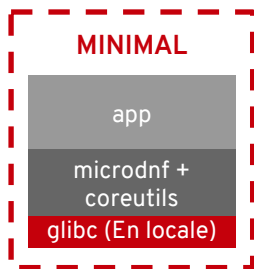
ubi8/ubi-minimal

Designed for applications that contain all dependencies (Golang, dotnet, etc)

- Minimized content set
- No suid binaries
- Minimal package manager (install, update, remove)

PLATFORM

app

yum/dnf + @base

glibc (full locales)
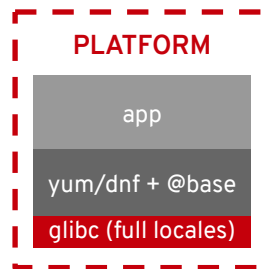
ubi8/ubi

For any application that runs on RHEL

- Unified, openssl crypto stack
- Full YUM stack
- Includes useful basic OS tools (tar, gzip, vi, etc)

MULTI-SERVICE

app #1   app #2

/usr/sbin/init

glibc (full locales)
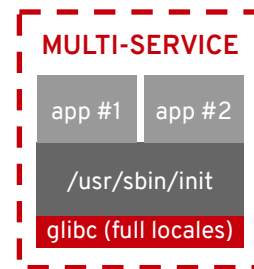
ubi8/ubi-init

Eases running multiple services in a single container

- Configured to run systemd on start
- Simply enable the services at build time

Can Be Built and Deployed Anywhere

On RHEL and OCP or any platform of your choice

CONTAINER

APP

LANGUAGE RUNTIMES

RED HAT UNIVERSAL BASE IMAGE

RED HAT PLATFORM

CONTAINER

APP

LANGUAGE RUNTIMES

RED HAT UNIVERSAL BASE IMAGE

ANY CONTAINER PLATFORM
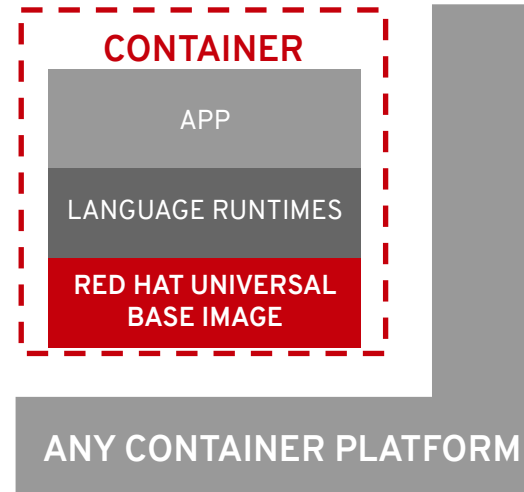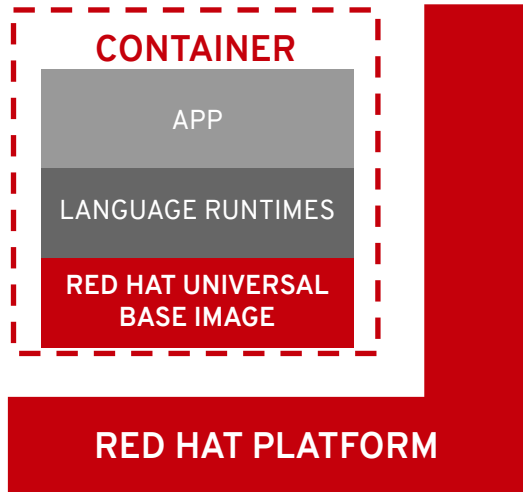
Red Hat

Can Be Built and Deployed Anywhere

Building on UBI is the first step

CONTAINER

| PARTNER CONNECT CERTIFIED APP |
| LANGUAGE RUNTIMES |
| RED HAT UNIVERSAL BASE IMAGE |

RED HAT PLATFORM

CONTAINER

| APP |
| LANGUAGE RUNTIMES |
| RED HAT UNIVERSAL BASE IMAGE |

RED HAT PLATFORM

CONTAINER

| APP |
| LANGUAGE RUNTIMES |
| RED HAT UNIVERSAL BASE IMAGE |

ANY CONTAINER PLATFORM
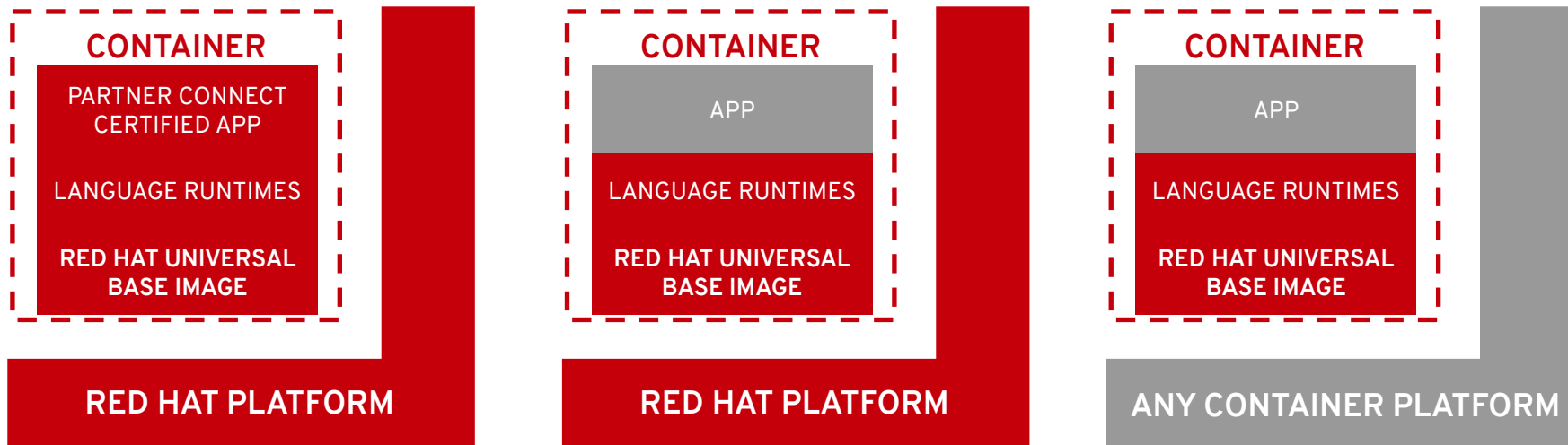
Certification provides the highest level of support

Enterprise support when run on Red Hat platforms

Trusted base for any environment

Two Ways to Get Updates

Red Hat provides updated base images & RPMs

CONTAINER

APP

LANGUAGE RUNTIMES

RED HAT UNIVERSAL BASE IMAGE
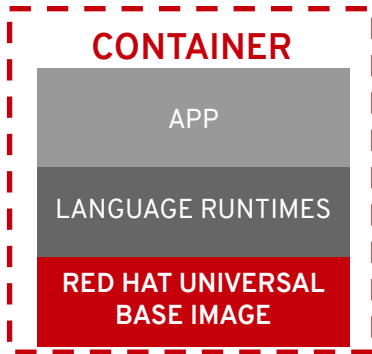
Base Image Updates

Associated RPM Updates

Red Hat

The Same RHEL Bits

Goes beyond "works on my laptop"

CONTAINER

LANGUAGE RUNTIMES

**OS
(USER SPACE)**

OS (USER SPACE)	OS (USER SPACE)	OS (USER SPACE)	OS (USER SPACE)	OS (USER SPACE)
Compute Intensive	I/O Intensive	Fault Sensitive	Highly Secure	Latency Sensitive
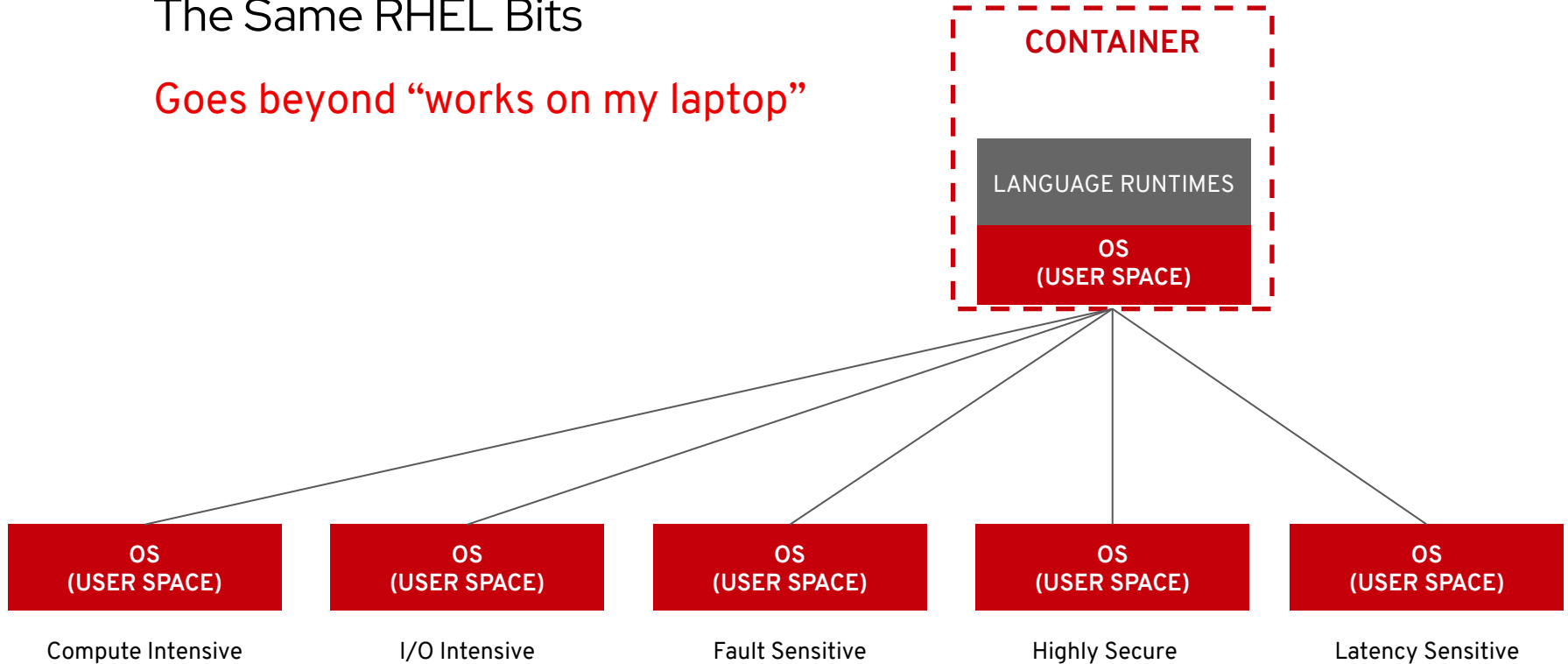
Red Hat

Levels of Supportability

	ANYWHERE	+RED HAT PLATFORM	+CERTIFICATION	+OPERATOR CERTIFICATION
Trusted Roadmap	Yes	Yes	Yes	Yes
Proven Images	Yes	Yes	Yes	Yes
Minimal Images	Yes	Yes	Yes	Yes
Package/Image Updates	Only UBI Content	All RHEL Content	All RHEL Content	All RHEL Content
Cloud Native Language Runtimes	Yes	Yes	Yes	Yes
Distribution/Redistribution	Yes	Yes	Yes	Yes
Platform Testing	None	Yes	Yes	Yes
Customer Support	None	Red Hat Components	Joint (All Components)	Joint (All Componentes)
Joint Promotion	None	None	Yes	Yes
ISV Build Support	None	None	Yes	Yes
Automated Deployment Support	None	None	None	Yes
Automated Operations Support	None	None	None	Yes
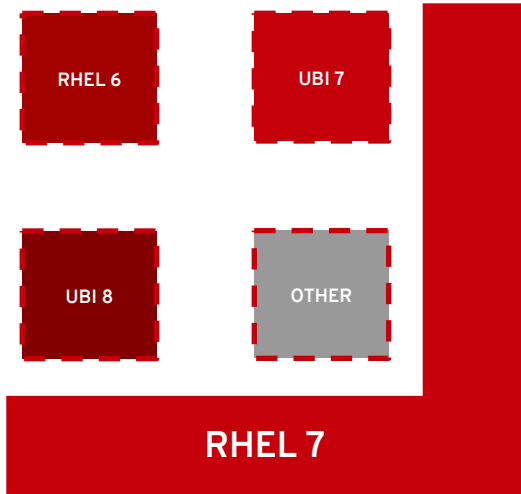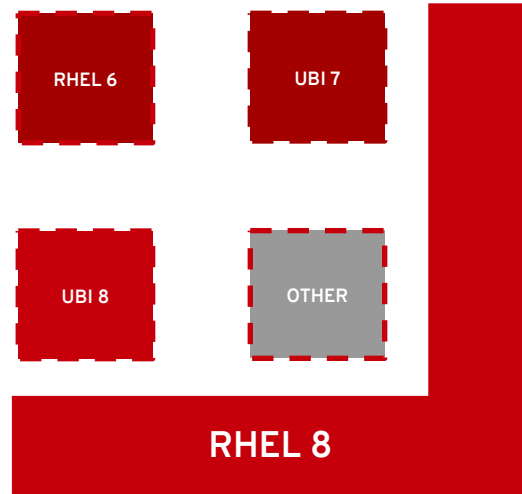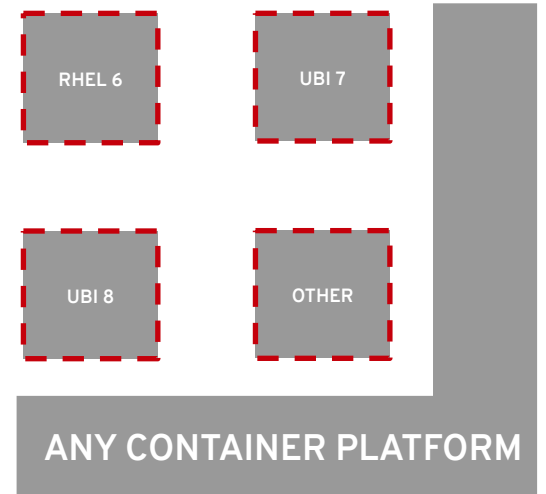
Certified Applications

Collaborative support with Red Hat and ISVs

Collaborative
Support

CONTAINER

PARTNER CONNECT
CERTIFIED APP

LANGUAGE RUNTIMES

**RED HAT UNIVERSAL
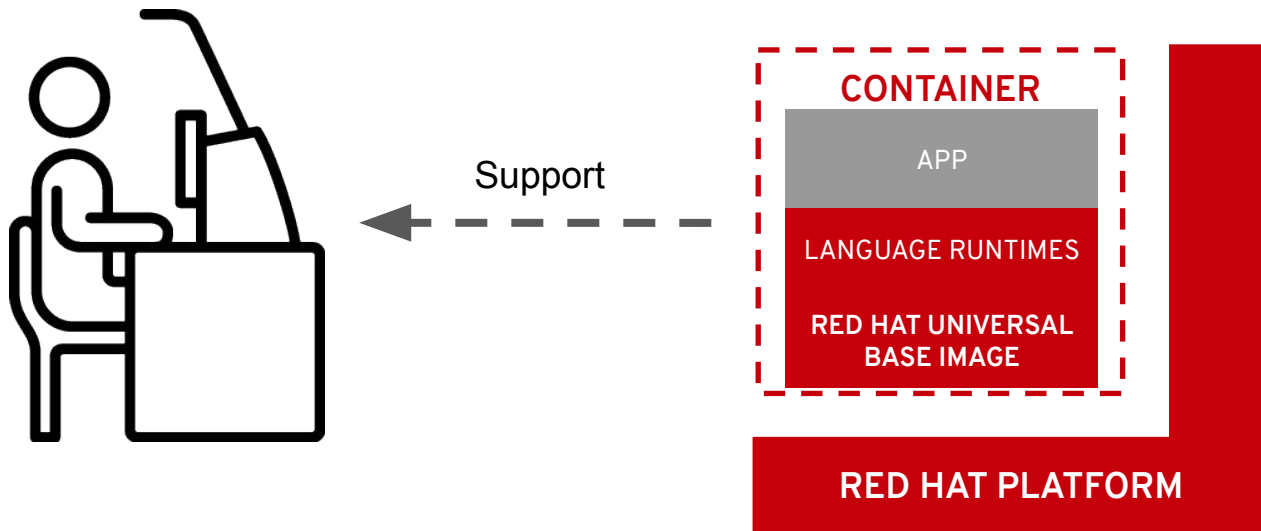BASE IMAGE**
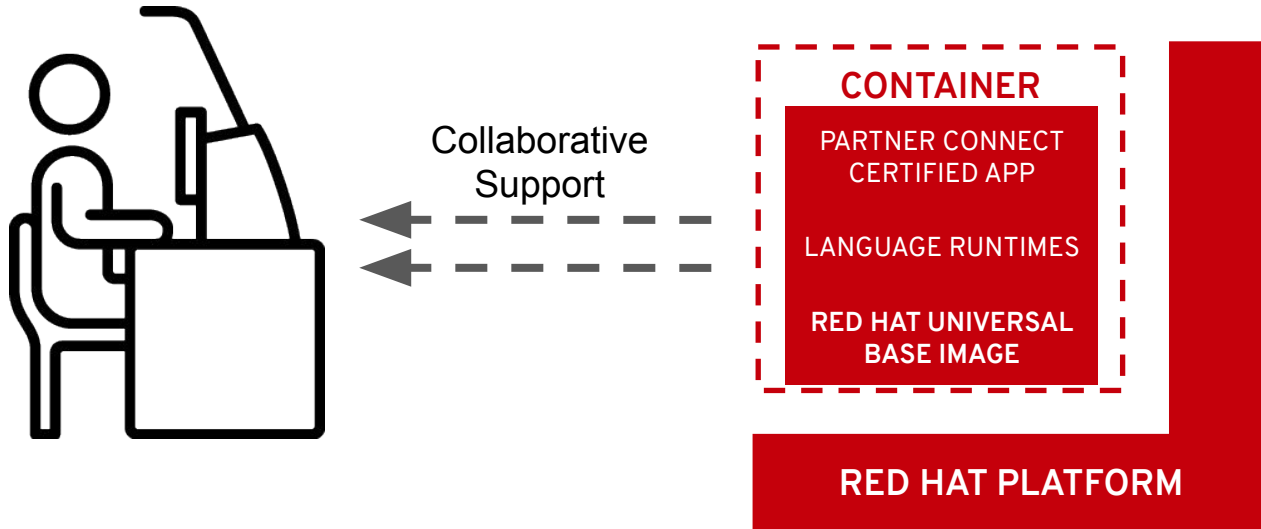
RED HAT PLATFORM

Deployed on A Red Hat Platform

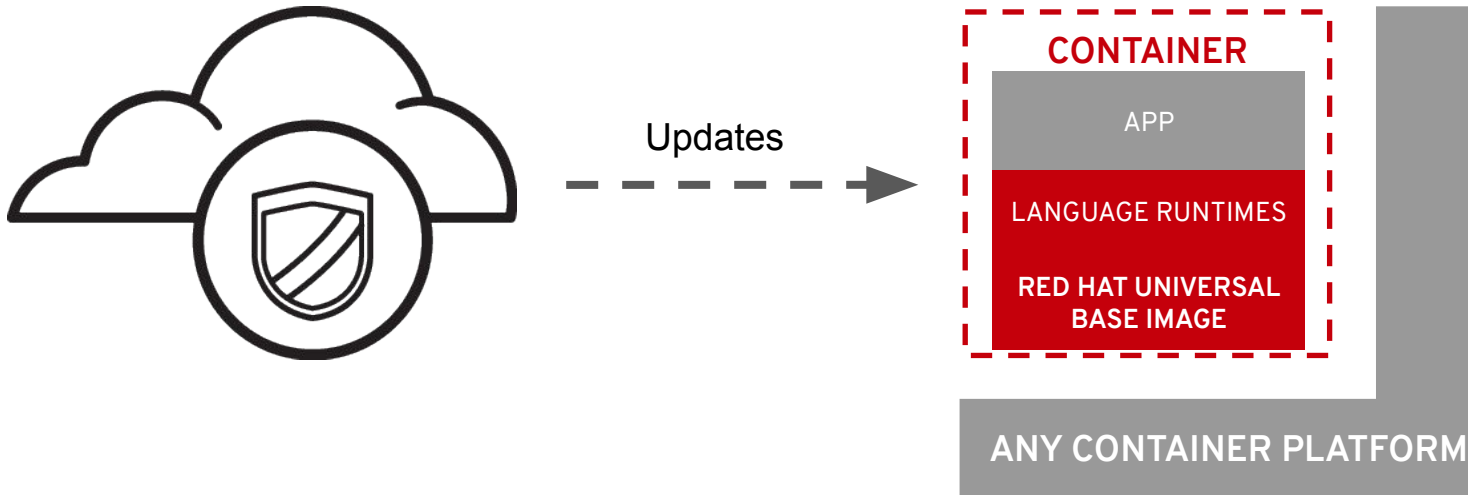## Red Hat Universal Base & RHEL packages when registered
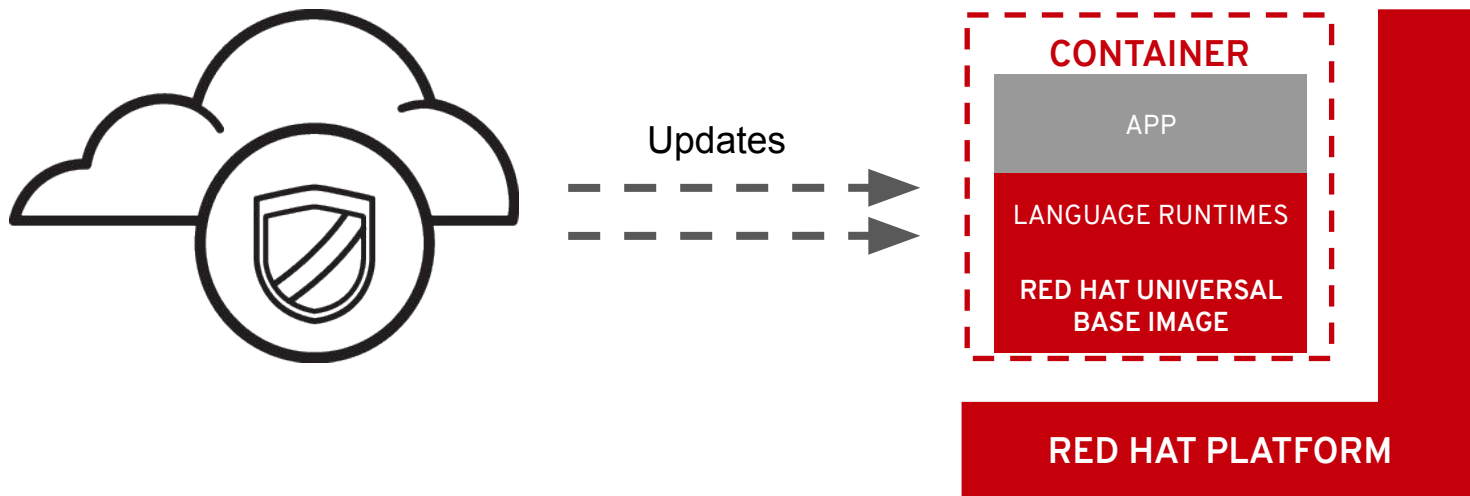
Deployed on A Red Hat Platform

Call Red Hat Support to resolve any issue, request patches, etc

Deployed on Other Platforms

Updates like any other Linux distribution, but no Red Hat support

Updates →

CONTAINER

APP

LANGUAGE RUNTIMES

RED HAT UNIVERSAL BASE IMAGE

ANY CONTAINER PLATFORM

Red Hat

Container Tools

RHEL 8 delivers a new set of container tools including Podman, Buildah, Skopeo packaged in a way that is easy to consume
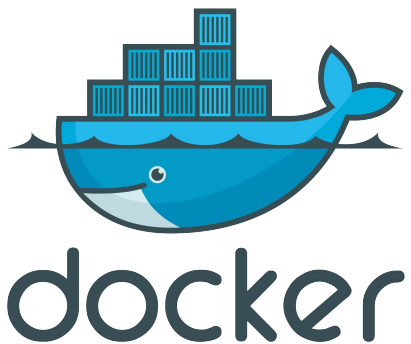
Container Standards Are Open

OPEN CONTAINER INITIATIVE
AN OPEN GOVERNANCE STRUCTURE FOR THE EXPRESS PURPOSE
OF CREATING OPEN INDUSTRY STANDARDS AROUND CONTAINER
FORMATS AND RUNTIME

Established in June 2015 by Docker and other leaders in the container industry, the OCI currently contains three specifications which govern, building, running, and moving containers.

Red Hat

Container Standards Are Open

- Governed by The Linux Foundation
- Ecosystem includes:
  - Vendors
  - Cloud Providers
  - Open Source Projects
- Does not govern of Linux binaries and libraries in container images

Container Standards Are Open: Red Hat Enterprise Linux Server

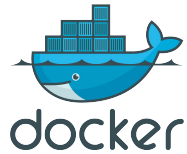# OCI Project & Technology Evolution

Mapping technologies to offerings

Experience

- Provides a familiar command line experience compatible with the docker cli
- Great for running, building, and sharing containers outside of OpenShift
- Can be wired into existing infrastructure where the docker daemon/cli are used today
- Simple command line interface, no client-server architecture, so more agile in many use cases

Roadmap:

- GA in RHEL 7.6 & RHEL 8
- Run containers as non-root (enhanced user namespaces)
- Docker compatible health checks
- Atomic run label support

Experience

- Will be embedded in OpenShift build strategies, mostly transparent (except custom build strategy)
- OCI Container images compatible with Docker format
- Multi-stage builds supported with and without dockerfiles
- Customizable image layer caching
- Shares the underlying image and storage components with CRI-O

Roadmap :

- GA support with RHEL 7.5
- User namespace enablement
- Working towards unprivileged, non-root container builds
- Future integrations with Ansible (new work on Ansible Builder), and OSBS

Experience:

- A lightweight, OCI-compliant container runtime designed for Kubernetes
- Runs any OCI compliant, Docker compatible container images
- Focus on stability and life cycles *with* the Red Hat CoreOS in OpenShift Container Platform
- Improve container security & performance at scale

Roadmap

- Now running in production under OpenShift Online clusters
- Permanent Kubernetes project
- Continues to track and release with upstream Kubernetes
- On track to become the default container engine for nodes
- Converting node troubleshooting documentation to use crictl for human interface to CRI-O
- Adding user namespace support
- Integrating libpod for better CLI integration with Podman

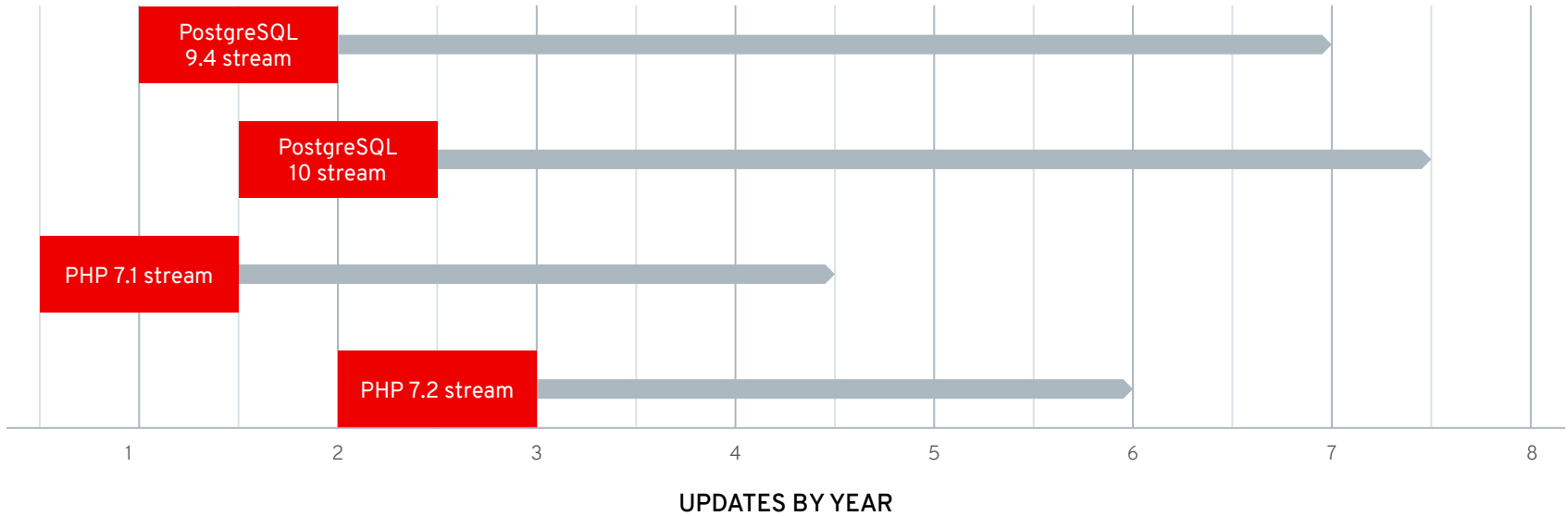# Container Standards Are Open: CoreOS/OpenShift
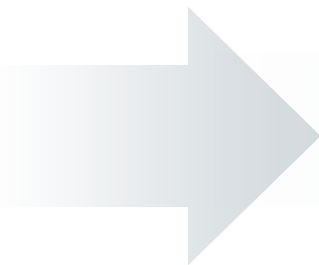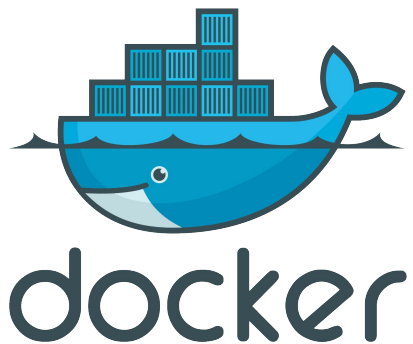
Application Streams Use Modules

Each module defines its own life cycle, which is closer to the natural life
of the application rather than the Red Hat Enterprise Linux life cycle.

PostgreSQL
9.4 stream

PostgreSQL
10 stream

PHP 7.1 stream

PHP 7.2 stream

1   2   3   4   5   6   7   8

UPDATES BY YEAR

The Container Tools Module

One module delivered with multiple application streams based on different use cases:

- The Red Hat Enterprise Linux 8 stream delivers new versions for developers
- The versioned, stable streams provide stability for operations

UPDATES BY YEAR
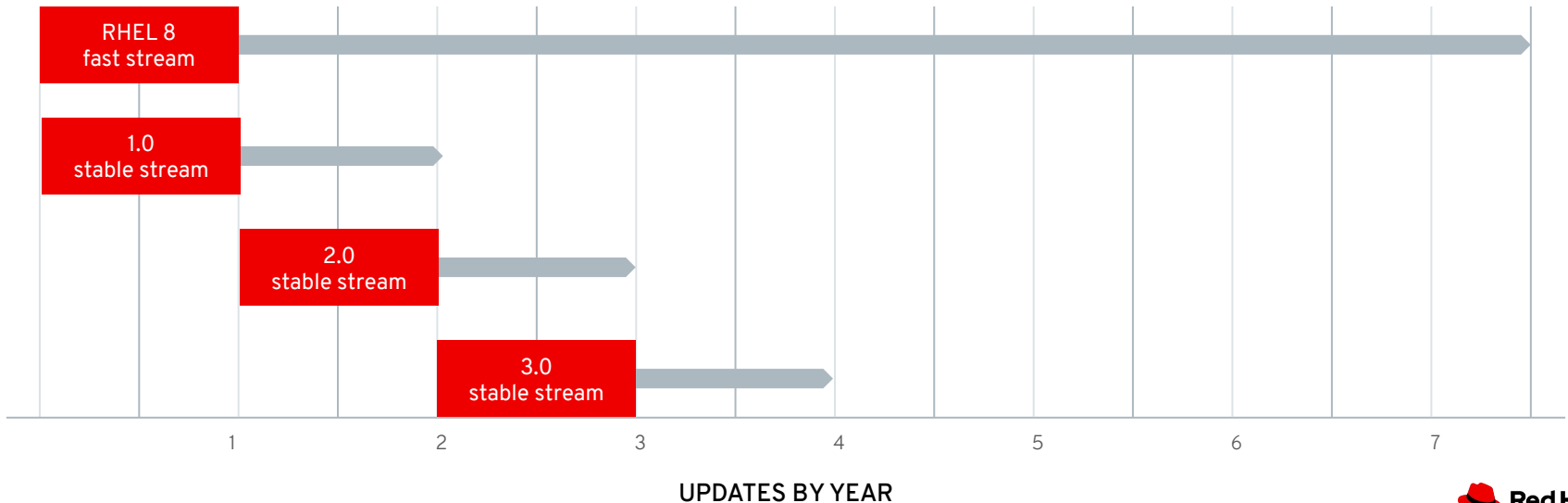
Deployment Options

Product	Red Hat Enterprise Linux		OpenShift Container Platform 4		
Deployment	**RHEL 7 Server**	**RHEL 8 Server**	**CoreOS* Worker**	**RHEL 8 Worker**	**RHEL 7 Worker**
Run Containers	Podman or Docker	Podman	CRI-O	CRI-O	CRI-O
Build Containers	Podman, Buildah or Docker	Podman or Buildah	Buildah in Container	Buildah in Container	Buildah in Container

Red Hat

Containers Roadmap

Tody, this roadmap covers Red Hat Enterprise Linux 6, 7, and 8

Red Hat

Containers Roadmap 8.4

8.3

Podman API V2
Provide Docker compatible REST API through systemd socket activation.

Container Images for Buildah, Skopeo & Podman
Tech preview version of Podman, and GA versions of Buildah and Skopeo in containers. Useful for CI/CD systems, and on Workstations.

Podman Manifest Support
Create OCI compliant manifests, inspect them, and push them to Registry Servers.

8.4

UBI Micro
Tiny distroless container base image weighing in at 13MB compressed and 38MB uncompressed

Container Images for Buildah, Skopeo & Podman
GA versions of Podman, Buildah and Skopeo in containers. Useful for CI/CD systems, and on Workstations for testing new versions easily.

Secure Short Names
Safely search multiple registry servers for container images, while preventing spoofing attacks.

Automatic Image Updates
Podman can automatically monitor and update an application when a new image is published to a registry server.

Podman Volume Plugins
All partners to bring existing Docker plugins to RHEL 8 with Podman

Future

Containerized Podman Generally Available
Use newer (or older) versions of podman anywhere by deploying it in a container.

Centralized Management of Rootless Users
Using IdM, administrators can manage subuids/subguids

Expand UBI Micro
Expand to include container images for httpd, nginx, and openssl

Containerized Virtual Environments
Toolbox will provide developers, admins, and architects with a simple VM-like experience with containers

Cgroups V2 Support with crun
Better resource management in containers.

Containers Roadmap 7.9+

7.7

Container Tools
Podman 1.4.2 with tech preview rootless support

Container Images
Go toolset released as part of UBI. Users can now access and redistribute Golang build containers.

RHEL Workstation
Receives podman, buildah and skope to be used as a development platform for UBI containers (no subscription content available)

Rootless Tech Preview
PUsers can try out rootless container with Podman on RHEL Server and Workstation using the VFS driver

7.8

Container Tools
Last update to podman. Podman version 1.6.4 with full rootless support.

Container Images
Rebuilds of all container images.

Rootless GA
Users are now supported to use rootless on RHEL Server and Workstation using OverlayFS for fast starting containers.

Future (no new features)

Container Tools
No new features or versions. RHEL 7.9 will have podman 1.6.4 until end of maintenance in 2024. RHEL 7 is in Maintenance Phase II, so only limited security errata and bug fixes will be provided

Container Images
Images will continue to be rebuilt during Maintenance Phase II until Extended Life Phase. Then, users will need to update to a later release or a subscription to ELS in order to update their own images

Containers Roadmap 6.10+

6.10

Future (no new features)

Container Tools
No container tools have ever been
provided on RHEL 6 hosts

Container Images
Supported on RHEL 7 and RHEL 8
container hosts

Container Tools
No container tools have ever been
provided on RHEL 6 hosts

Container Images
Images will cease being rebuilt with
the Extended Life Phase. Users will
need an ELS subscription - they will
need to use 6.11 images as a base and
run their own updates using ELS
channels

Red Hat

Kernel Separated Containers

- Lots of interest from customers in this area

- All of these solutions have limitations, compatibility issues, and are not mature enough to support

- Customers seem to get less excited as they learn about the gaps

- Not mature enough to be on our product roadmaps

- Kata seems to be the most promising solution and community

  - We are engaged upstream and currently bringing kata into Fedora

katacontainers

gVisor

Reference Information

All of this information is

publicly available

Red Hat

RHEL 8 Blogs

- 8.4: [What's new in RHEL Container Tools?](#)
- 8.3: [Updates to Container Tools in Red Hat Enterprise Linux 8.3](#)
- 8.2: [New container capabilities in Red Hat Enterprise Linux 8.2](#)
- 8.1: [A minor release with major new container capabilities](#)
- 8.0: [Using the rootless containers Tech Preview in RHEL 8.0](#)
- 8.0: [RHEL 8 enables containers with the tools of software craftsmanship](#)
- 8.0: [Introducing the Red Hat Universal Base Image](#)
- 8.0: [Why Red Hat is investing in CRI-O and Podman](#)

RHEL 8 Documentation

How To

- [Building, running, and managing containers](#)
  - [Getting started with Podman](#) (Docker to Podman)
  - [Getting started with UBI](#)
- [Red Hat Universal Base Image FAQ](#)
- [RHEL 8 Katacoda Tutorials](#)
  - [Podman Katacoda](#)
  - [Buildah Katacoda](#)

Policies

- [Container Support Policy](#)
- [Container Compatibility Matrix](#)
- [UBI Content Availability](#)
- [Container Tools Appstream Content Availability](#)

RHEL 7 Blogs

- 7.8: TBD
- 7.7: [Three New Container Capabilities in Red Hat Enterprise Linux 7.7](#)
- 7.6: [Intro to Podman (Red Hat Enterprise Linux 7.6 Beta)](#)
- 7.5: [Container-related Changes in Red Hat Enterprise Linux 7.5](#)
- 7.4: [What's New in Red Hat Enterprise Linux Atomic Host 7.4?](#)

RHEL 7 Documentation

How To

- [Getting started with containers](#)
  - [Getting started with Podman](#) (Docker to Podman)
  - [Getting started with UBI](#)
- [Managing containers](#)
- [Red Hat Universal Base Image FAQ](#)

Policies

- [Container Support Policy](#)
- [Container Compatibility Matrix](#)
- [UBI Content Availability](#)
- [Container Tools Appstream Content Availability](#)