redhat.

CHOOSING THE RIGHT CONTAINER BASE IMAGE

For your applications

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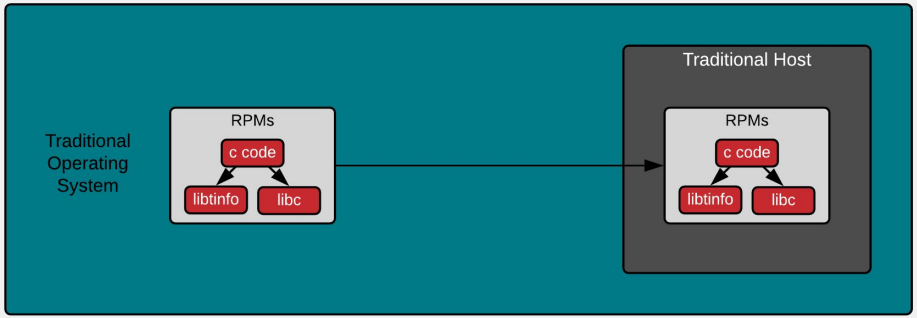
Principal Product Manager
05/07/2019

Red Hat Summit 2019

WHAT IS A BASE IMAGE?

WHAT IS A CONTAINER IMAGE?

Let’s start with a traditional operating system

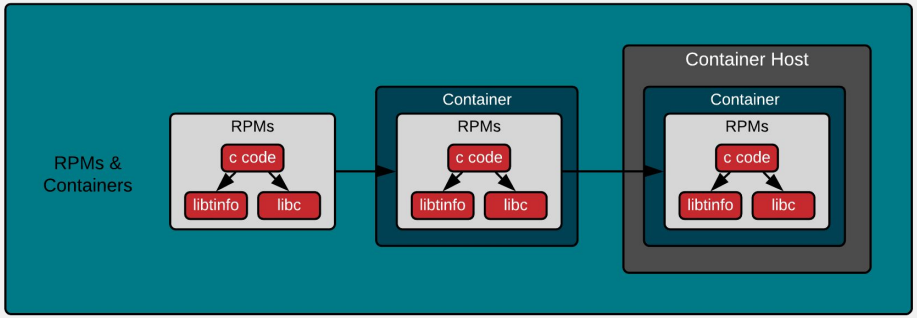


Dependencies

- **Libraries** - Compile once, update once, everyone gets benefits
- **Binaries** - Leverages libraries because requires SME knowledge I don’t have to
- **Packages** - Put this logic in packages so that I don’t have to know it

WHAT IS A CONTAINER IMAGE?

We started containers by putting these same components in container images



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- **OCI Container Images** - Tar files full of packages and JSON metadata

WHAT IS A CONTAINER IMAGE?

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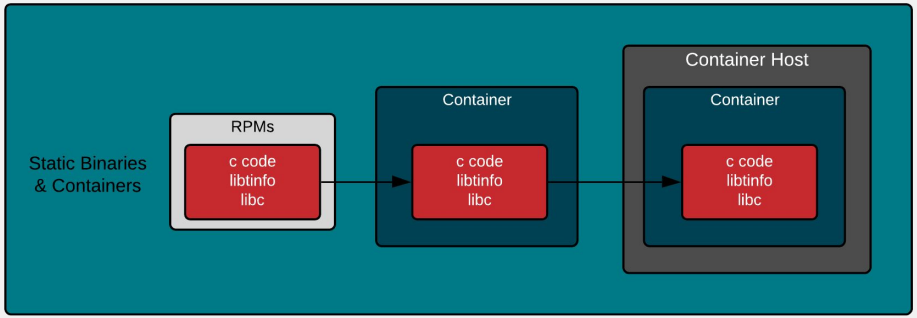

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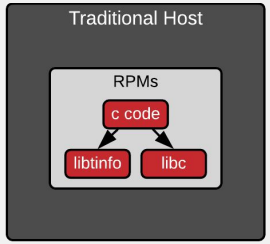
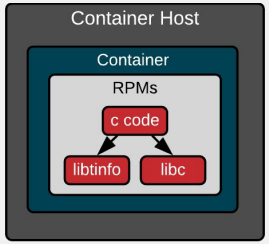
WHAT IS A CONTAINER IMAGE?

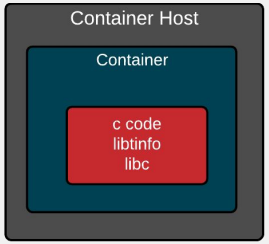
Side by side comparison



OS Packages
Installed



OS Packages
In Container



Static Binaries
In Container

Benefits/Drawbacks

- **Libraries** - every binary inherits changes
- **Binaries** - dynamically inherit changes
- **Packages** - SME knowledge offloaded to specialist
- **OCI Container Images** - Easy to deploy with single command

DO LINUX DISTRIBUTIONS STILL MATTER?

With containers?

Short Answer

- Yes

Longer Answer

- **Container Image**: You are still using in binaries that are compiled - even JVMs, Python, Ruby, Node.js, etc
- **Interaction with Container Host**: Performance, security and testing - regressions, extra resources used, unknown CVEs (yes, this can happen)

See Also

- https://opensource.com/article/19/2/linux-distributions-still-matter-containers

KEY QUESTIONS IN SELECTING A BASE IMAGE

QUESTION #1

Do I even need a base image?

Some Options

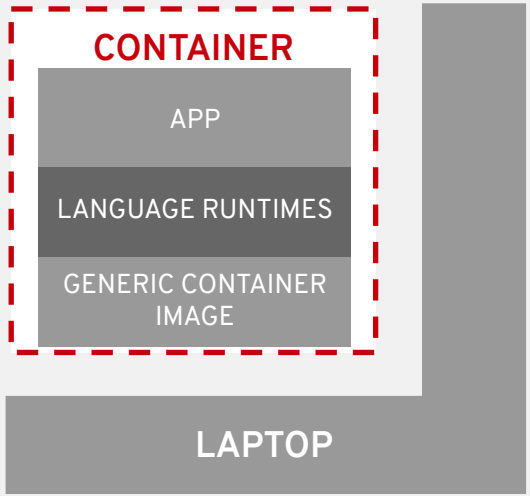
- YUM - just pull the packages you need in a multi-stage build
- Distroless - some programming languages compiled
- Scratch - literally nothing, just a scratch image

Reality

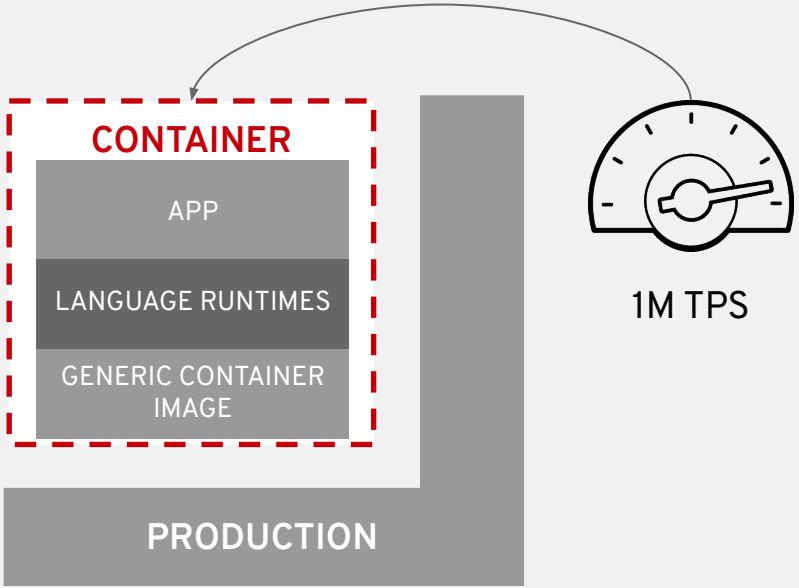
- You are likely pulling in pre-built packages
- You are compiling everything yourself
- When things break, it’s a developer action, not an operations action

QUESTION #2

How do I guarantee performance in production?



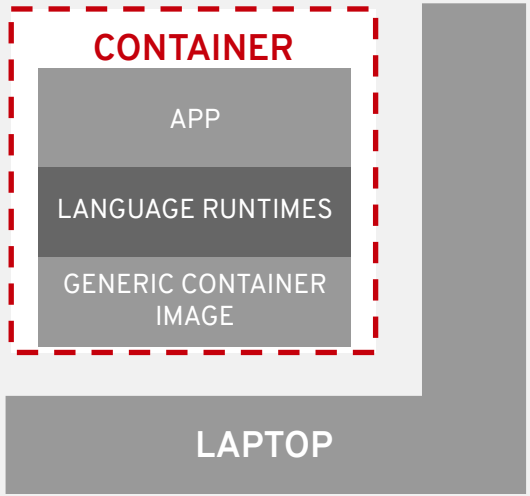
Works on my laptop



But, what about at 1M transactions per second

QUESTION #3

How do I guarantee security in production?



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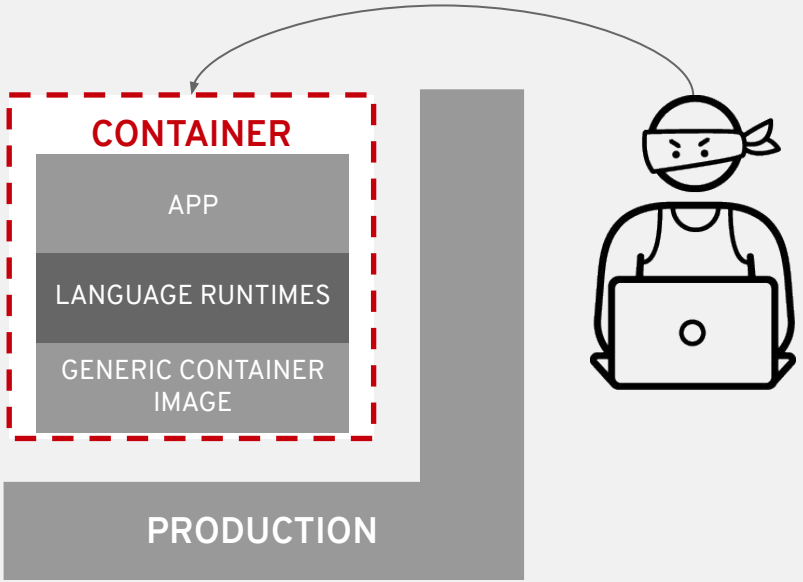
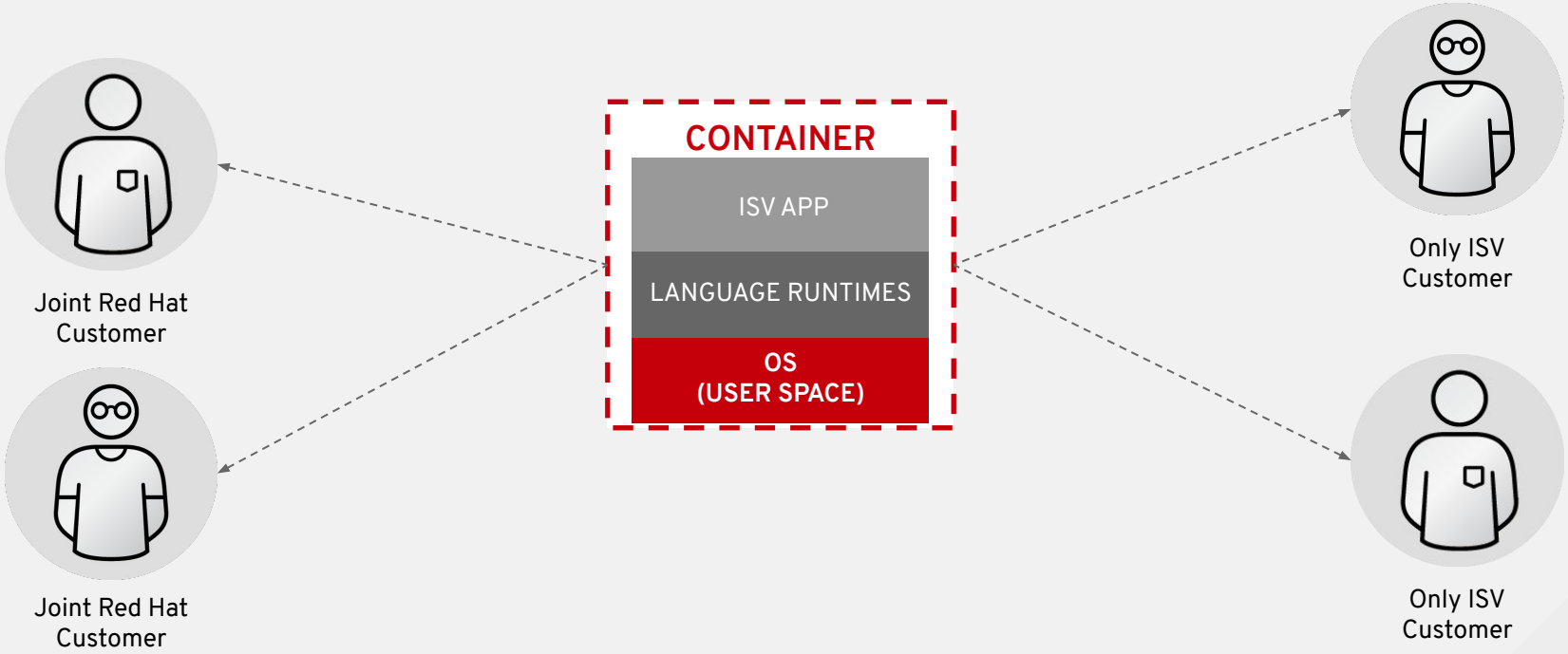


What about hackers?

QUESTION #3

Can I redistribute my application how I want?



QUESTION #5

What else am I not thinking about?

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

INTRODUCING THE RED HAT UNIVERSAL BASE IMAGE

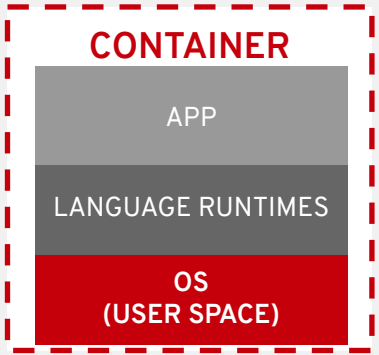
THE RED HAT UNIVERSAL BASE IMAGE

The purpose is...

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

THE BASE IMAGE FOR ALL OF YOUR NEEDS

Enterprise architecture, security and performance



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

Development

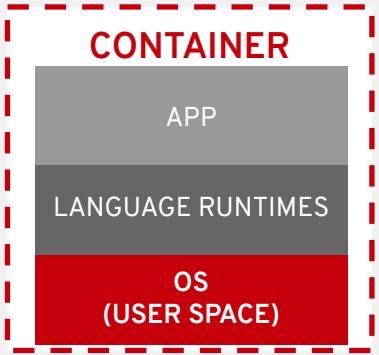
- Minimal footprint (~90 to ~200MB)
- Programming languages (Modularity & AppStreams)
- Enables a single CI/CD chain

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, security and performance

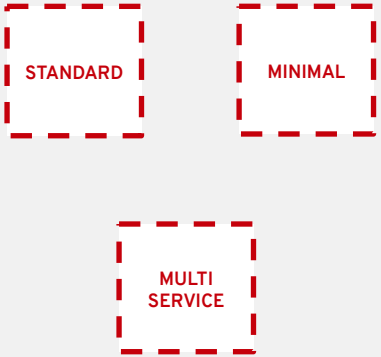


Trusted:

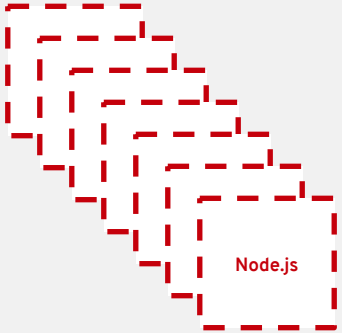
- Libraries
- Packaging format
- Core Utilities
- Security Response
- Patching
- Performance Response
- Technical Support
- More

WHAT IS THE RED HAT UNIVERSAL BASE IMAGE?

Three base images, language runtime images, and software packages



Base Images

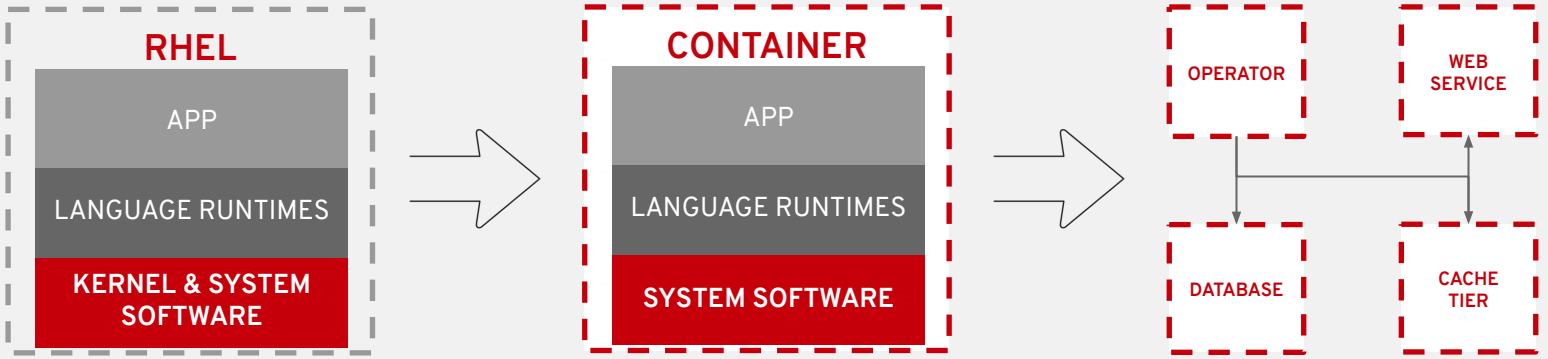


Pre-Built Language Images

Package Subset

THE BASE IMAGE FOR ALL OF YOUR NEEDS

Bringing the value of RHEL to cloud native applications



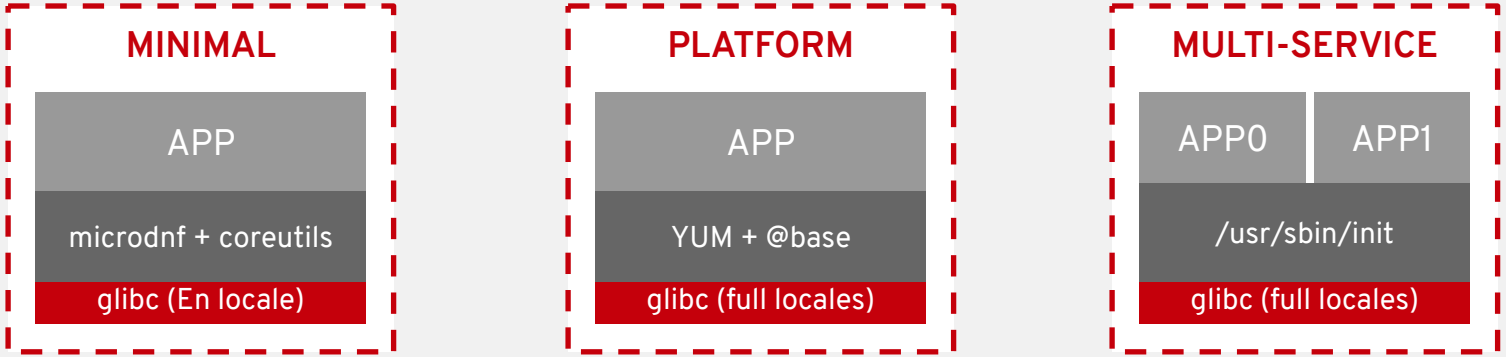
Traditional Applications

Containerized Applications

Cloud Native Applications

WHAT IS THE RED HAT UNIVERSAL BASE IMAGE?

Providing the right level of content for application stability via the RHEL API/ABI



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)

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)

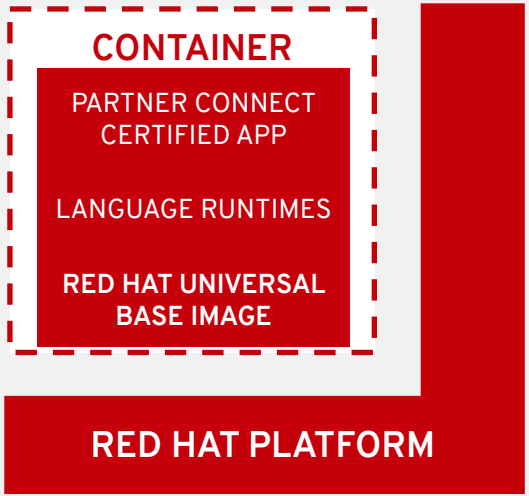
ubi8/ubi-init

Eases running multiple services in a single container

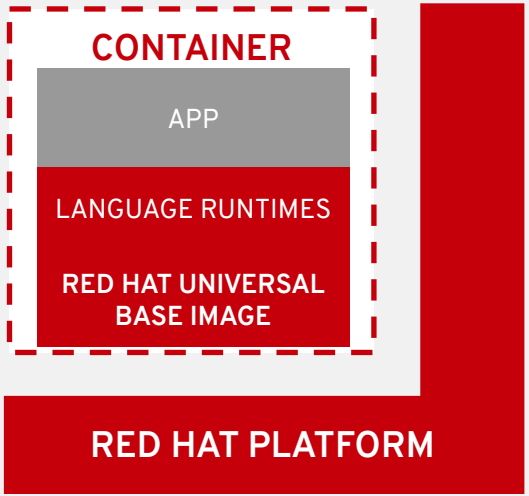
- Configured to run systemd on start
- Simply enable the services at build time

CAN BE BUILT & DEPLOYED ANYWHERE

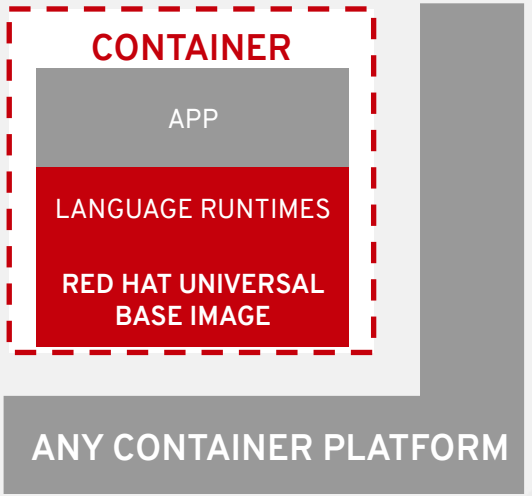
Building on UBI is the first step



Certification provides the highest level of support



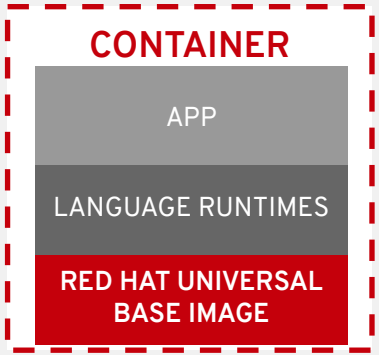
Enterprise support when run on Red Hat platforms



Trusted base for any environment

TWO WAYS TO GET UPDATES

Red Hat provides updated base images & RPM updates so you can rebuild any time you want

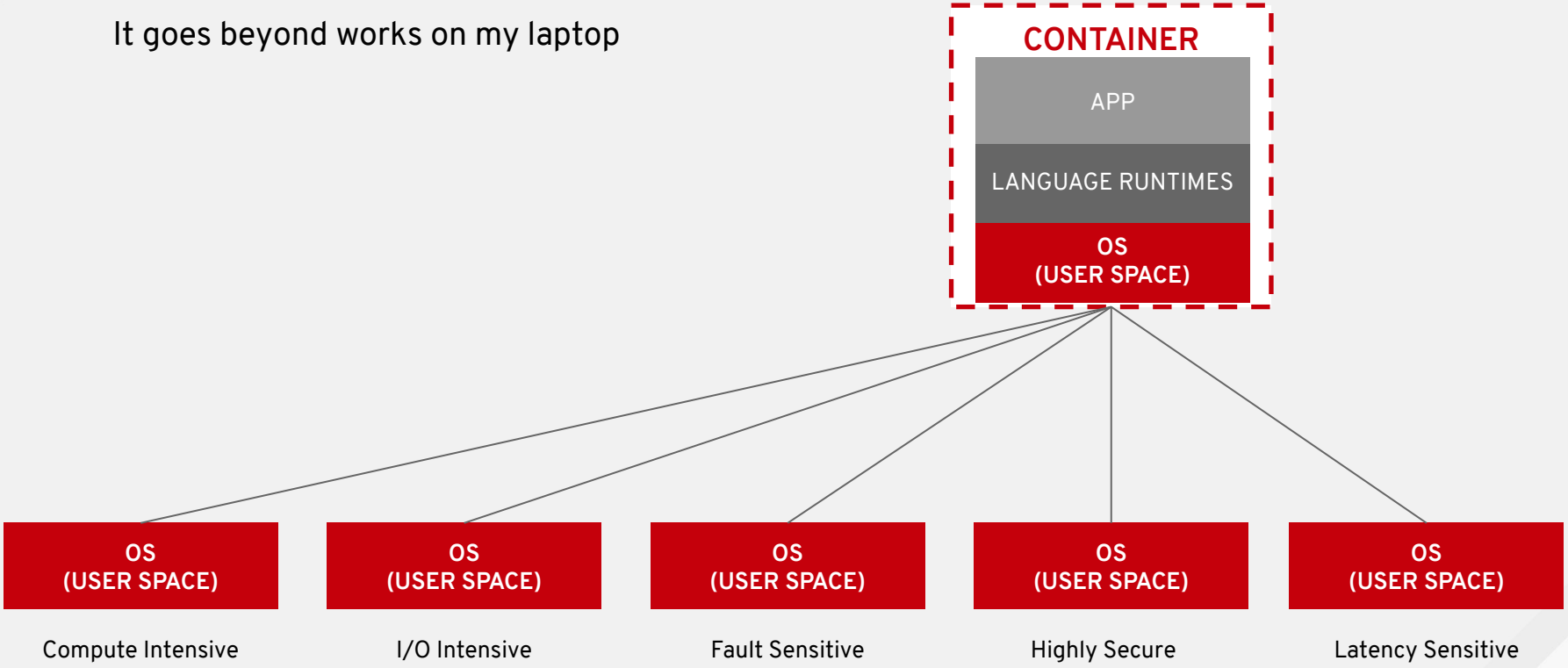


Base Image Updates

Associated RPM Updates

SAME BITS USED IN MISSION CRITICAL WORKLOADS

It goes beyond works on my laptop

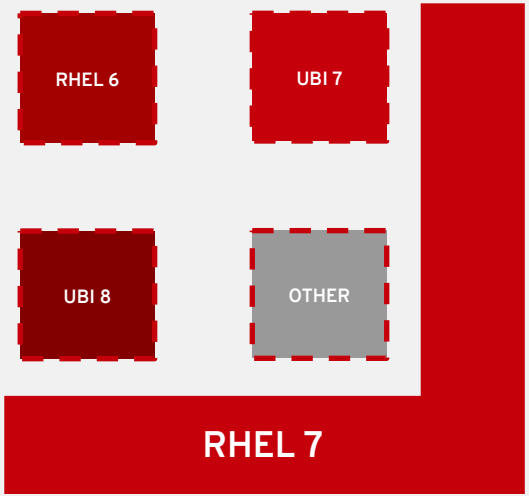


LEVELS OF SUPPORTABILITY

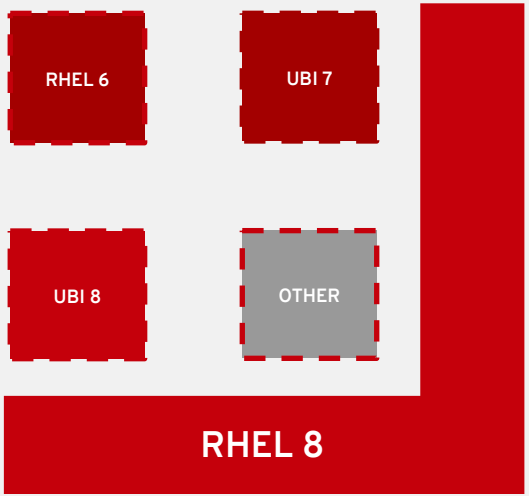
	ANYWHERE	+RED HAT PLATFORM	+CERTIFICATION	+OPERATOR CERTIFICATION
Trusted Roadmap	Yes	Yes	Yes	Yes
Proven Images	Yes	Yes	Yes	Yes
Minimal Images	Yes	Yes	Yes	Yes
Package/Image Updates	Only UBI Content	All RHEL Content	All RHEL Content	All RHEL Content
Cloud Native Language Runtimes	Yes	Yes	Yes	Yes
Distribution/Redistribution	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

SUPPORTABILITY MATRIX

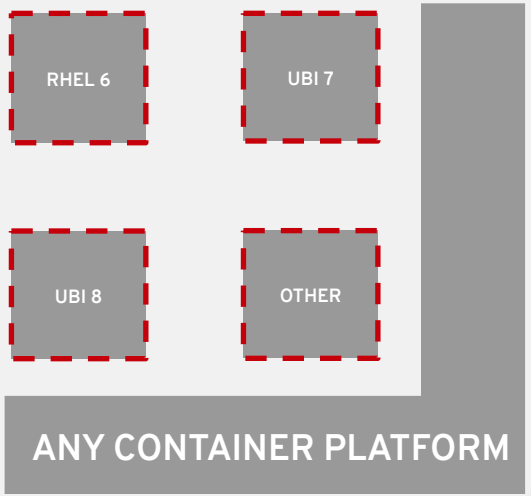
Tiered support model



Red Hat Enterprise Linux 7



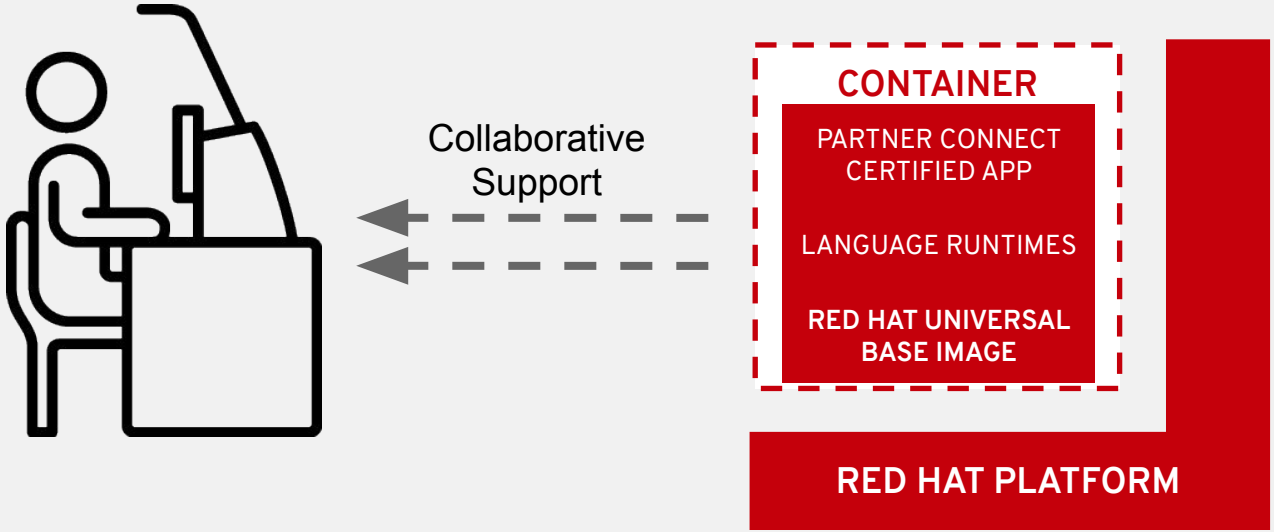
Red Hat Enterprise Linux 8



Like any upstream project

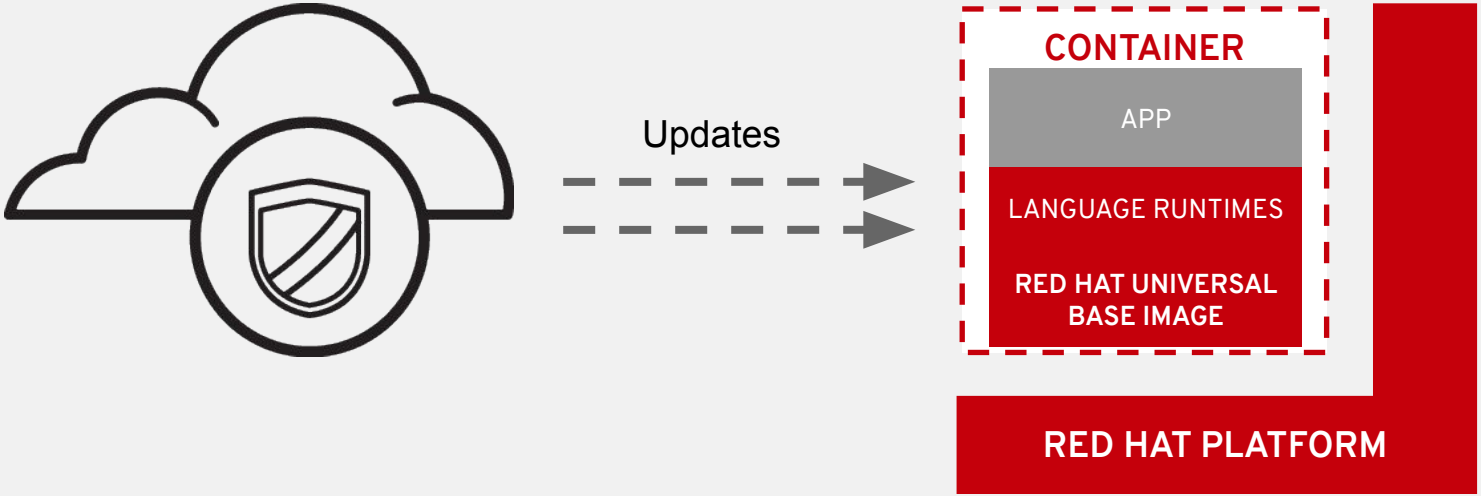
WITH A CERTIFIED APPLICATION CONTAINER

Collaborative support with Red Hat and ISV to resolve any issue, request patches, etc



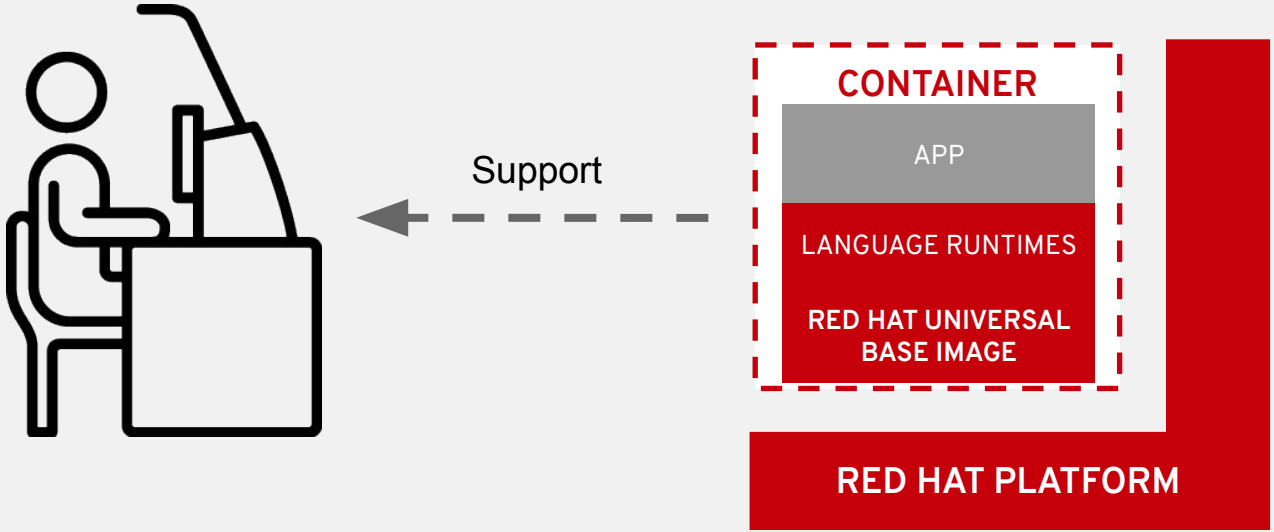
WHEN DEPLOYED ON RED HAT PLATFORM

Red Hat Universal Base & RHEL packages when registered



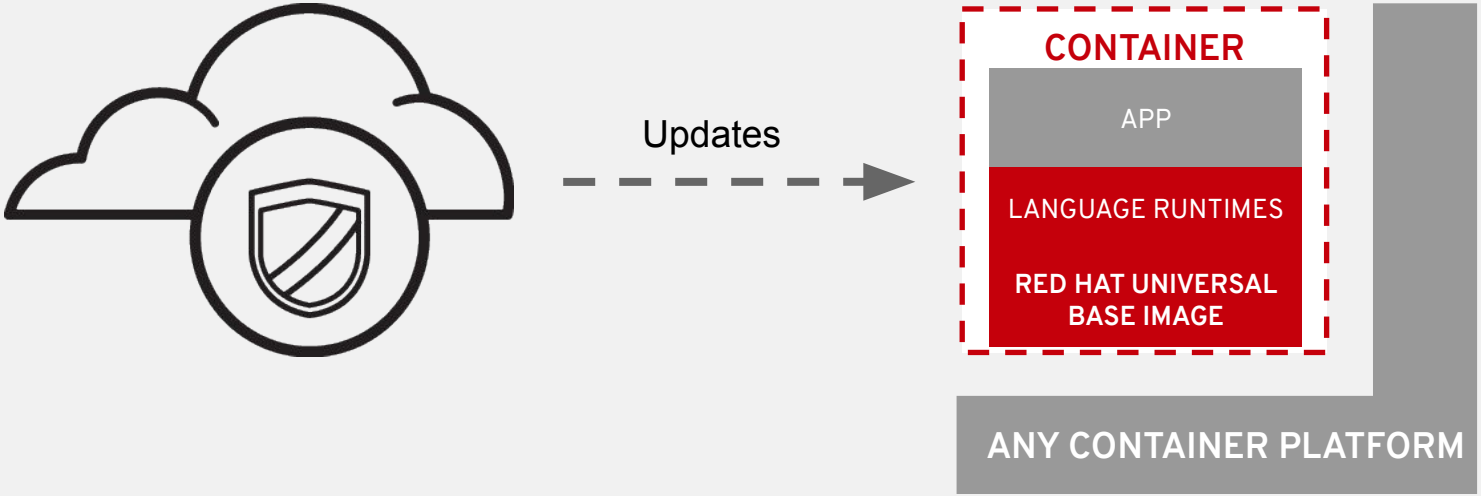
WHEN DEPLOYED ON RED HAT PLATFORM

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



WHEN DEPLOYED ON ANY CONTAINER PLATFORM

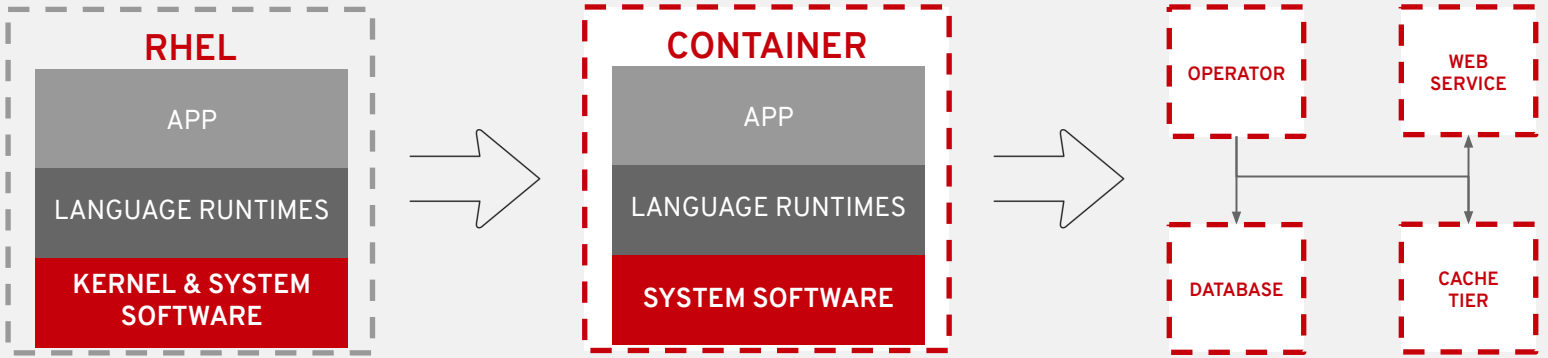
Red Hat Universal Base Image package updates from anywhere



CERTIFICATION & OPERATORS

THE BASE IMAGE FOR ALL OF YOUR NEEDS

Bringing the value of RHEL to cloud native applications



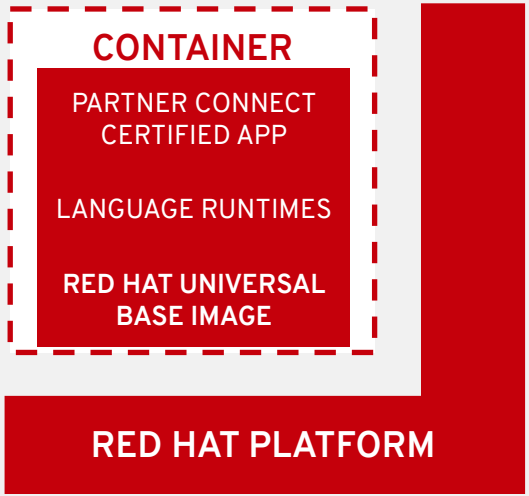
Certified Traditional Application

Certified Containerized Applications

Certified Cloud Native Applications

BEHIND THE SCENES

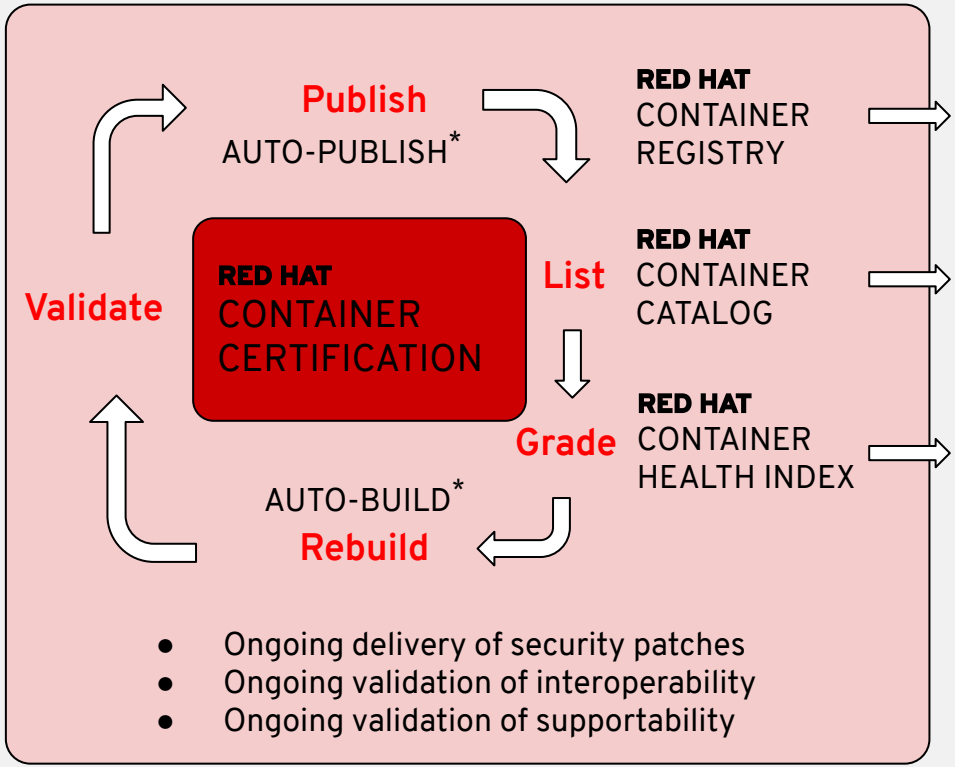
There is a lot more than might be suspected



Process:

- Build
- Validate
- Publish
- List
- Grade
- Rebuild

BEHIND THE SCENES



Build With

Red Hat Universal Base Image

New Product

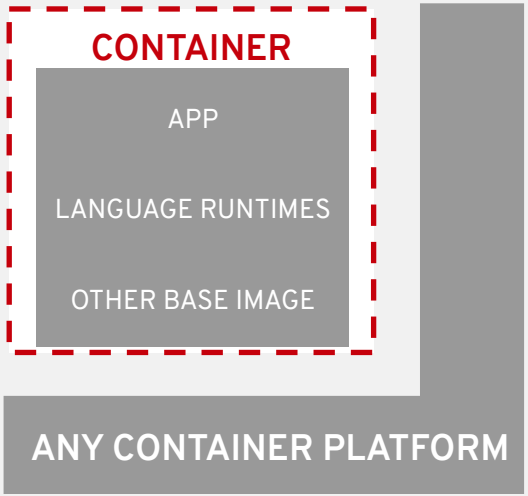
RED HAT **CONNECT** for technology partners

* Red Hat's automated build and publishing services are optional, but recommended

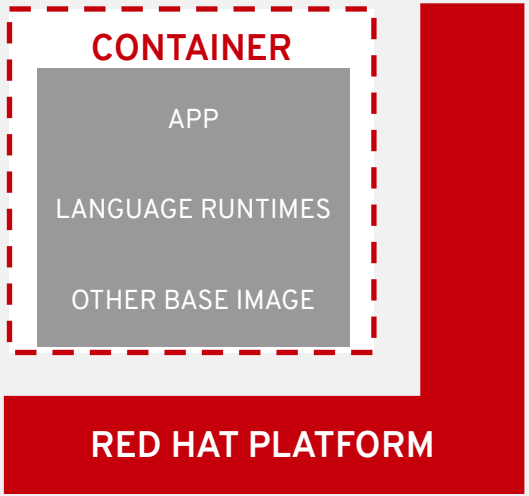
redhat.

COMMON CHOICES & PROBLEMS

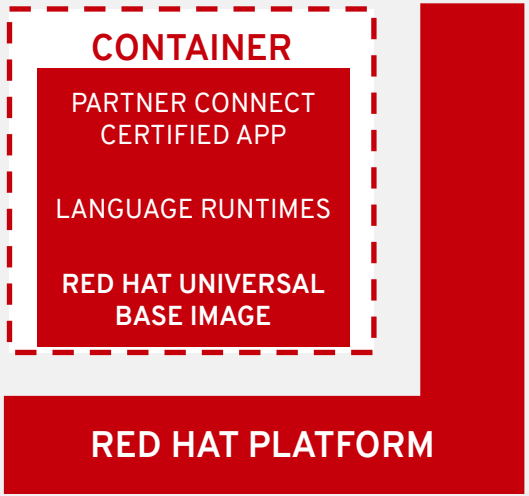
Supportability is a major concern



Third Party OS & Platform



Third Party OS



Ideal Supportable Solution

UBI IS AVAILABLE TODAY

Use it with your favorite container engine

```
podman pull registry.access.redhat.com/ubi8/ubi
podman pull
registry.access.redhat.com/ubi8/ubi-minimal
podman pull registry.access.redhat.com/ubi8/ubi-init
podman pull registry.access.redhat.com/ubi7/ubi
podman pull
registry.access.redhat.com/ubi7/ubi-minimal
podman pull registry.access.redhat.com/ubi7/ubi-init
```

redhat.

THANK YOU

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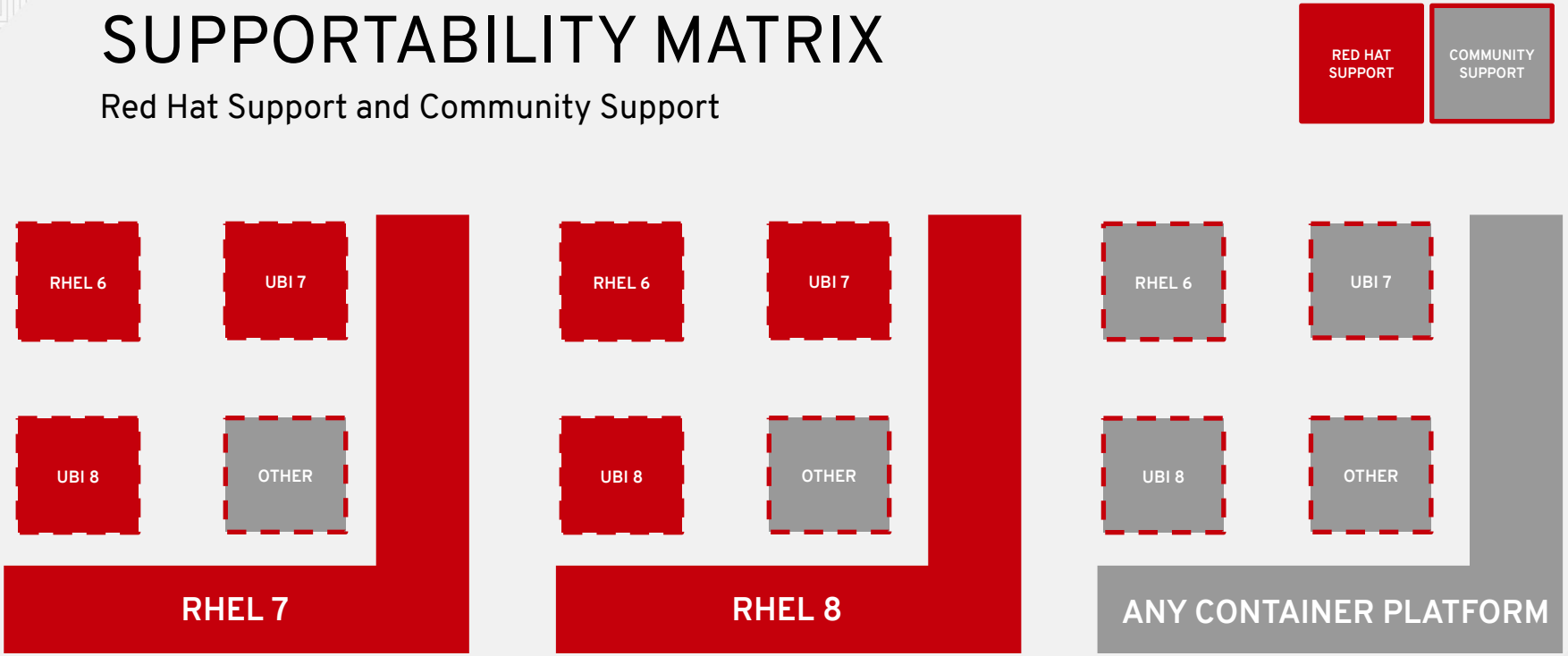
twitter.com/RedHat

youtube.com/user/RedHatVideos

SUPPORTABILITY MATRIX

Red Hat Support and Community Support



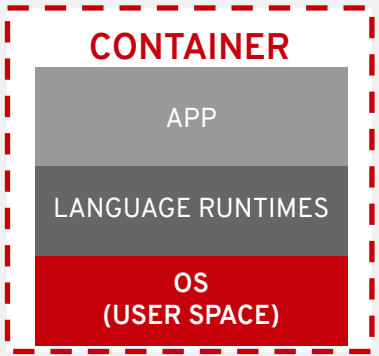
Red Hat Enterprise Linux 7

Red Hat Enterprise Linux 8

Like any upstream project

WHAT IS THE RED HAT UNIVERSAL BASE IMAGE?

The UBI is a subset of content from RHEL...



1. A set of three base images (ubi, ubi-minimal, ubi-init)
2. A set of language runtime images (nodejs, ruby, python, php, perl, etc)
3. A set of associated YUM repositories with common application dependency components

CAN BE BUILT & DEPLOYED ANYWHERE

On OpenShift and RHEL, or any container platform of your choice