Connect

Unleashing The Power of Image Mode for RHEL

Managing RHEL one container image at a time

Eric Lavarde
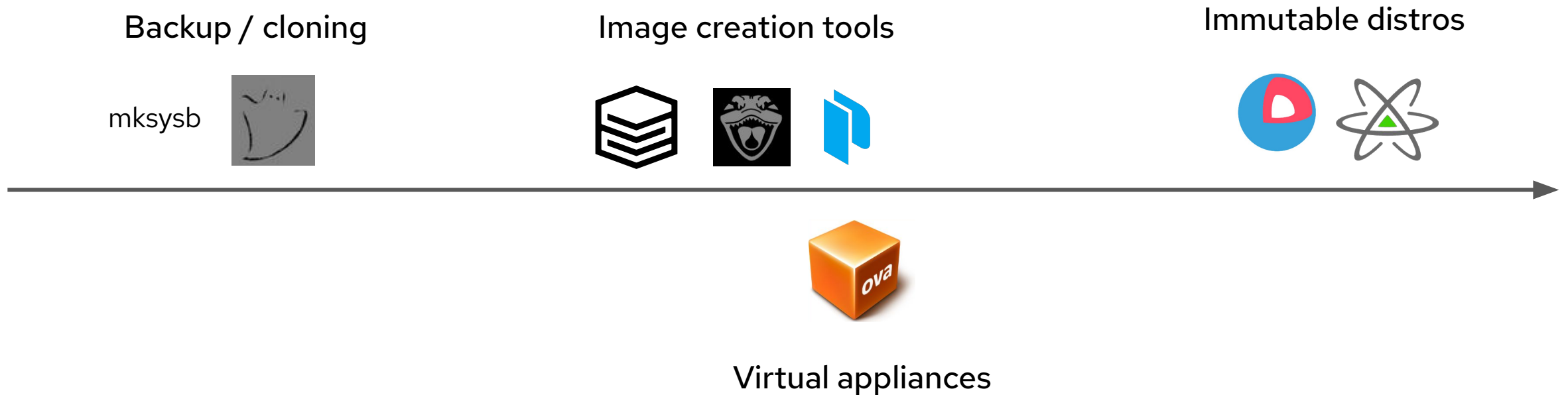
Senior Principal Architect

Red Hat EMEA Services

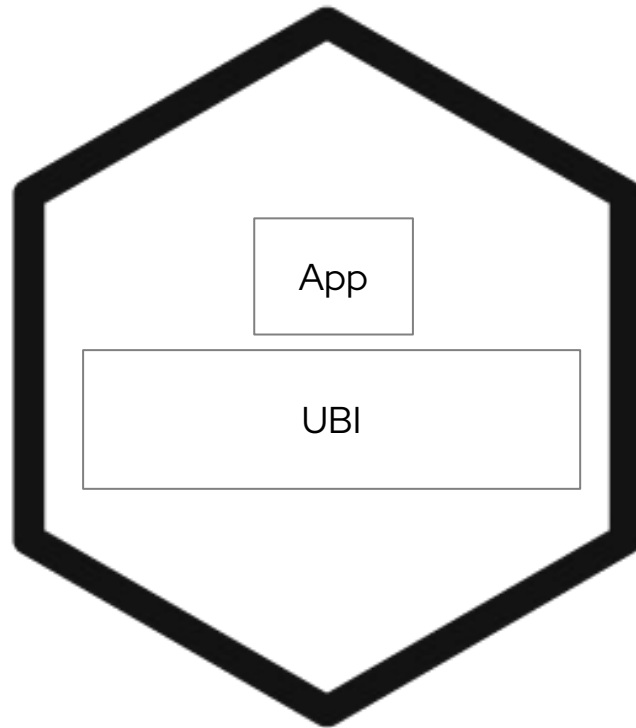**Ingo Börnig**

Principal Chief Architect

Red Hat Field CTO

We've learned from past initiatives

Backup / cloning

mksysb

Image creation tools

Immutable distros

Virtual appliances

Key takeaway: Everybody wants the OS to be completely **customizable**…
until the point that they want it to be **immutable!**

Containers revolutionized application deployment

App

UBI

- Standardized packaging via OCI image format

- Standardized delivery via OCI registry

- Clarity and transparency with the container file

- Deployment portability & predictability

- Rich ecosystem of security, automation, & orchestration tooling

- Rapid adoption and pervasive

...and they will also become the language of modern IT

Red Hat

Introducing image mode for Red Hat Enterprise Linux
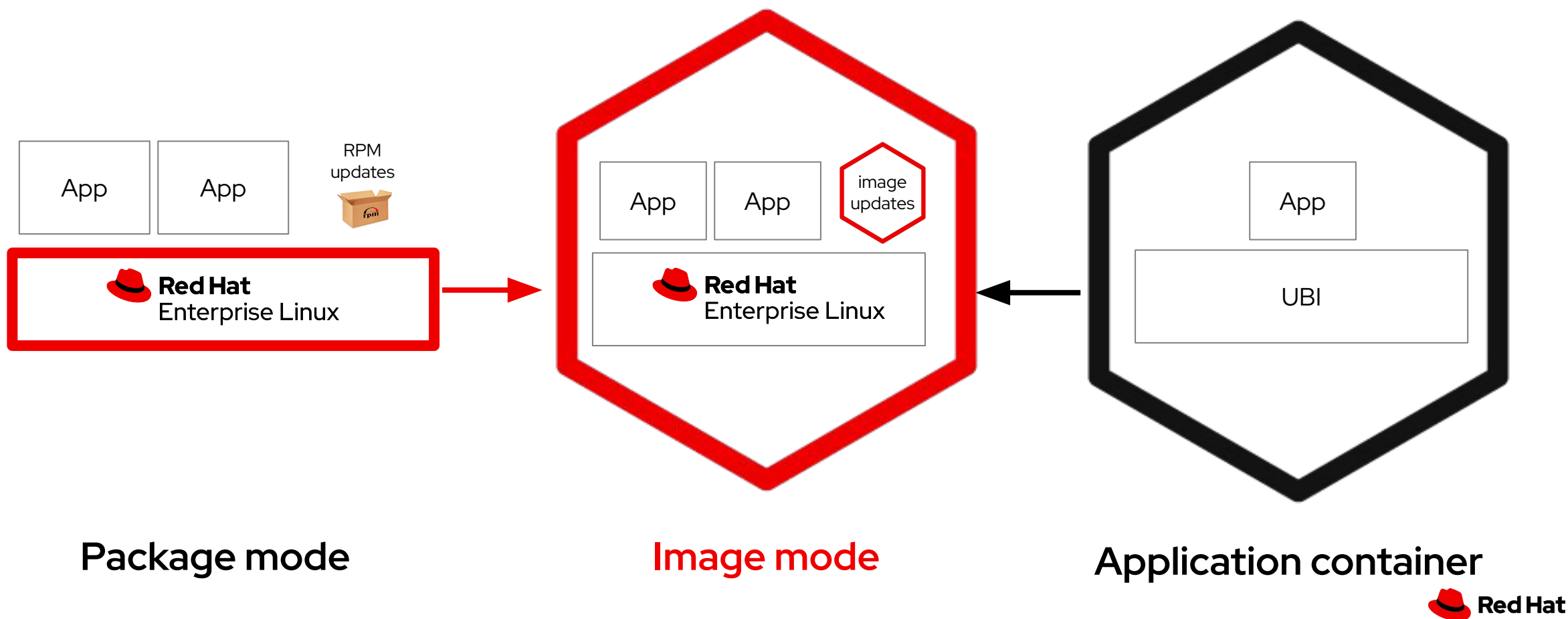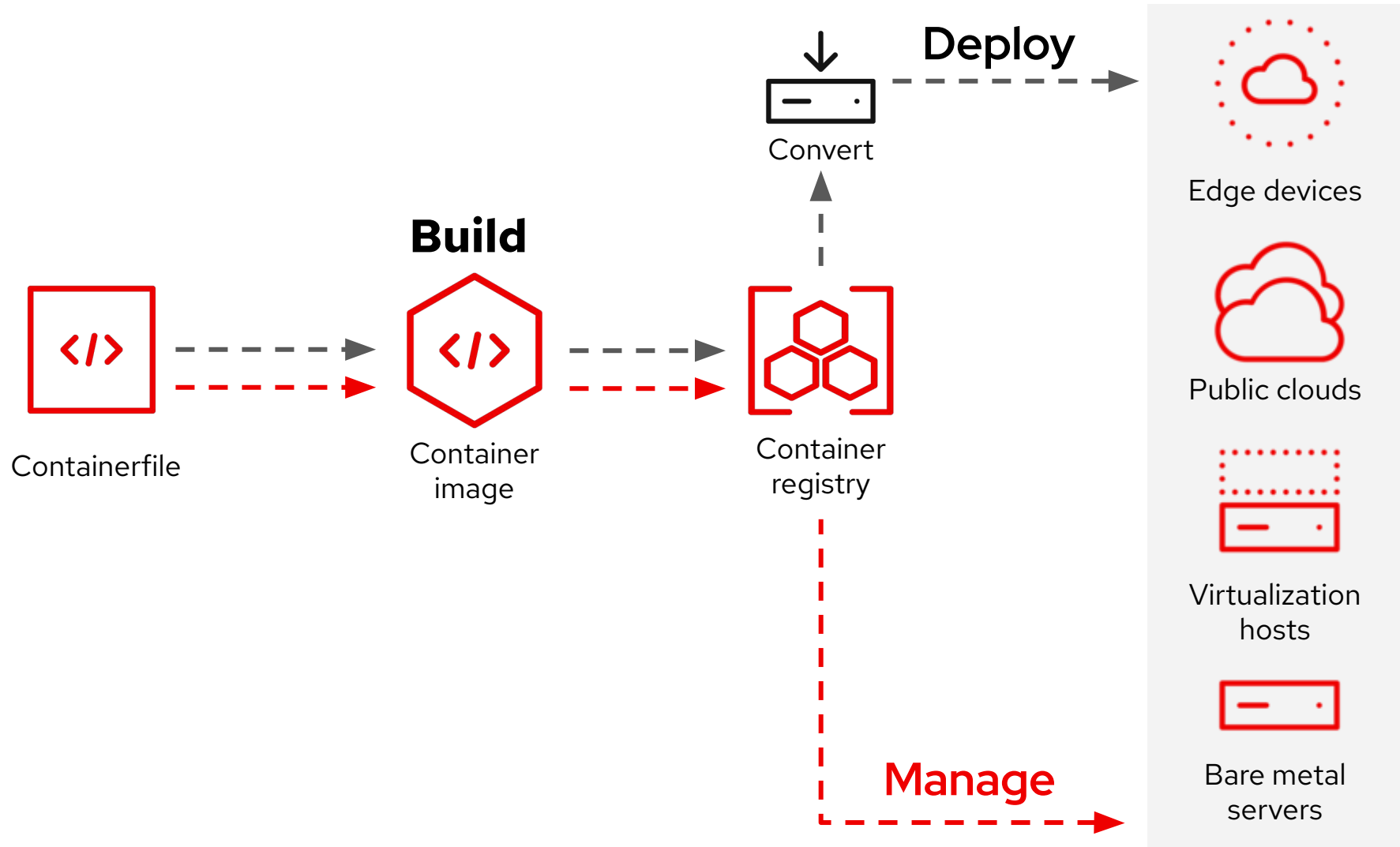
Combining the power of RHEL with the benefits of containers

Package mode

Image mode

Application container

Image mode for Red Hat Enterprise Linux
Simple. Consistent. Anywhere.

Deploy

Convert

Build

Containerfile → Container image → Container registry

Edge devices

Public clouds

Virtualization hosts

Bare metal servers

Manage

Red Hat

One RHEL, two modes

	Package mode	Image mode
Smallest Unit	RPM package	OCI image
Updates	Package update (`dnf update`)	Image update (`bootc upgrade`)
Package installation	`dnf install`	Build OCI image with new package installed; then update (`bootc upgrade`)
System installation	Anaconda with `%packages`	Anaconda with ostreecontainer --url
Build raw, qcow2, AMI, GCP, VMware, Azure image	Image Builder	Bootc Image Builder

Red Hat

registry.redhat.io/rhel9/rhel-bootc:9.5

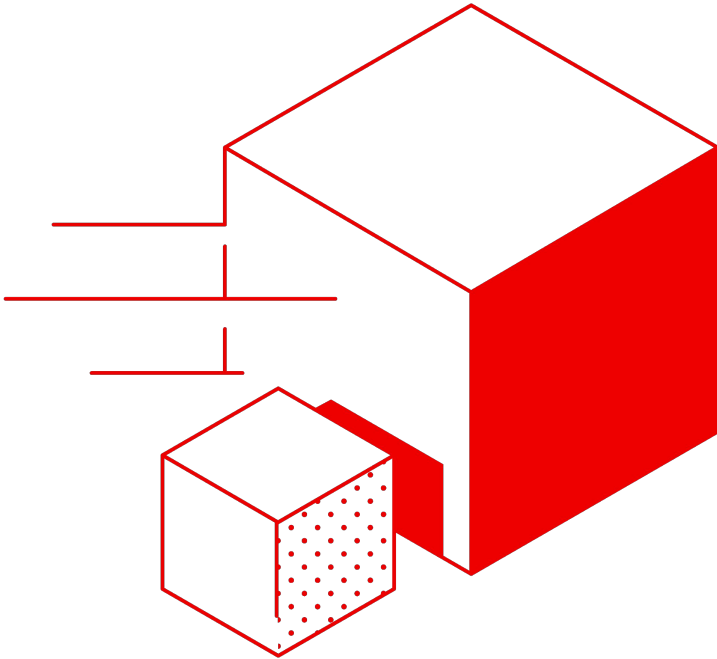The RHEL bootc image is available here!

Image Specs:
- 439 rpms
- ~785M compressed
- ~2.2G on disk

Primary contents:
- systemd, kernel, bootc
- rpm-ostree[1]
- linux-firmware
- NetworkManager
- podman
- python
- Misc CLI tools: jq, sos

No cloud-init or virt agents

7

Documentation

bootc

A/B booting of container images

bootc upgrade
Download and stage an updated container image.
- ○ Automatic updates on by default. Configurable using bootc-fetch-apply-updates.timer

bootc rollback
Rollback to the previous state. Staged updates are discarded

bootc switch
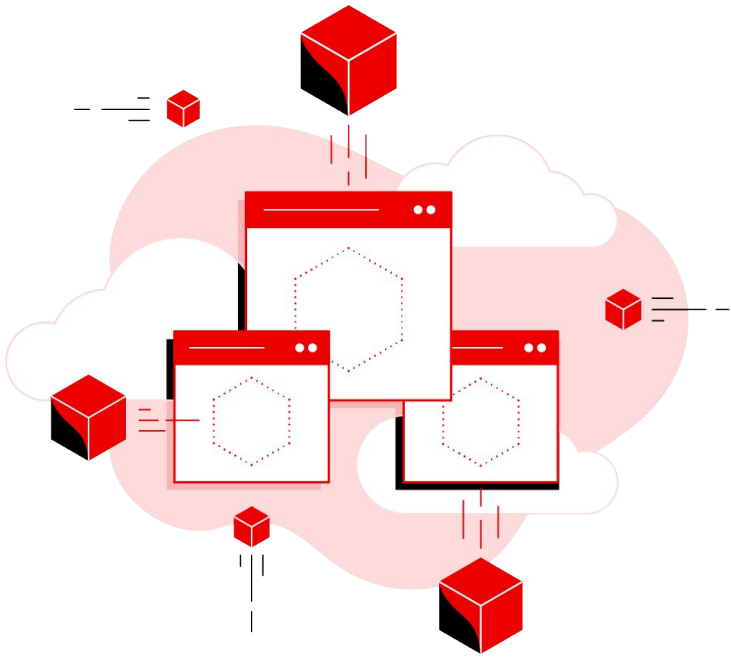Change to a different reference image

bootc install
Install container image **to-disk** or **to-filesystem**

- Man page
- https://github.com/containers/bootc
- https://github.com/containers/podman-desktop-extension-bootc

# Image mode creates opportunities to think differently

- **All RHEL users** will benefit from standardization, simplicity and portability across all of their environments that span the hybrid clouds

- **DevOps teams** can easily plug RHEL into their CI/CD & GitOps workflows, easing the friction that exists between the platform and the application.

- **Security teams** can apply container security tools, from scanning and validation to cryptography and attestation to the base elements of the operating system, making their jobs far less complex.

- **Solution providers** will love how easy it is to build and distribute their offerings on the trusted RHEL platform

Red Hat

Recommended use cases

AI/ML stacks

Perfectly version app dependencies from kernel, GPU & accelerator drivers, frameworks, runtimes, etc
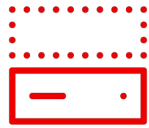
1:1 App/Host

Manage the OS <u>and</u> app as a single unit

Edge appliances

Registries and auto-updates make managing a fleet of identical systems a snap

Container hosts

Simplify and manage the OS in the same way as your applications

Apply container techniques and tools to full fledged operating systems

LET'S GO!

Open the following website to access your lab environment: red.ht/unleash-rhel-2025 resp. https://catalog.demo.redhat.com/workshop/535v3r

ToC

Terminal settings

LB1054 - Unleashing The Power of Image Mode for RHEL

Red Hat
Demo Platform

Terminal

```
[lab-user@bastion ~]$
```

Undo
Redo

Cut
Copy
Paste
Delete
Select All

Ask an AI Chatbot
This Frame

Check Spelling

Inspect Accessibility Properties
Inspect (Q)

uBlock Origin

**Context menu
(mouse right-click)**

webserver running on the Red Hat Universal Base Image.

```
FROM registry.access.redhat.com/ubi9/ubi

RUN dnf install -y httpd
RUN echo "Hello Red Hat" > /var/www/html/index.html

ENTRYPOINT /usr/sbin/httpd -DFOREGROUND
```

A brief explanation of the key directives in the Containerfile above:

- `FROM` → the base container image
- `RUN` → commands to be executed during build
- `ENTRYPOINT` → the command that will be executed by the container engine at run time

To create this basic webserver as an image mode system instead of an application container, create a Containerfile that contains the directives below.

```
nano Containerfile
```

```
FROM registry.redhat.io/rhel9/rhel-bootc:9.5

RUN dnf install -y httpd
RUN echo "Hello Red Hat" > /var/www/html/index.html

RUN systemctl enable httpd.service
```

Copy icon

Let's talk about the effects of these changes from the application container definition:

- The `FROM` field is now pointing to the Red Hat Enterprise Linux 9.5 bootc image instead of the UBI base image.

  This new bootc image is a complete version of RHEL 9.5, much like the KVM image available on the Customer Portal and includes all of the OS compo

Depending on OS and browser, copy & paste can be fiddly.

Try...
For copying:
- **Copy icon**
- **[Shift+]Ctrl+C,**
- **Simply select**
- **Context menu**

For pasting:
- **[Shift+]Ctrl+V**
- **Middle mouse click**
- **Context menu**

read

work

Red Hat Summit: Connect Darmstadt

Jetzt Session bewerten!

Einfach QR-Code scannen, Session aus der Liste wählen und bewerten. **Vielen Dank!**

red.ht/rhsc-darmstadt-feedback

Guide: https://github.com/rhpds/showroom-lb1054-rhel-image-mode

Red Hat Summit

Connect

Thank you

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