Linux Containers Roadmap
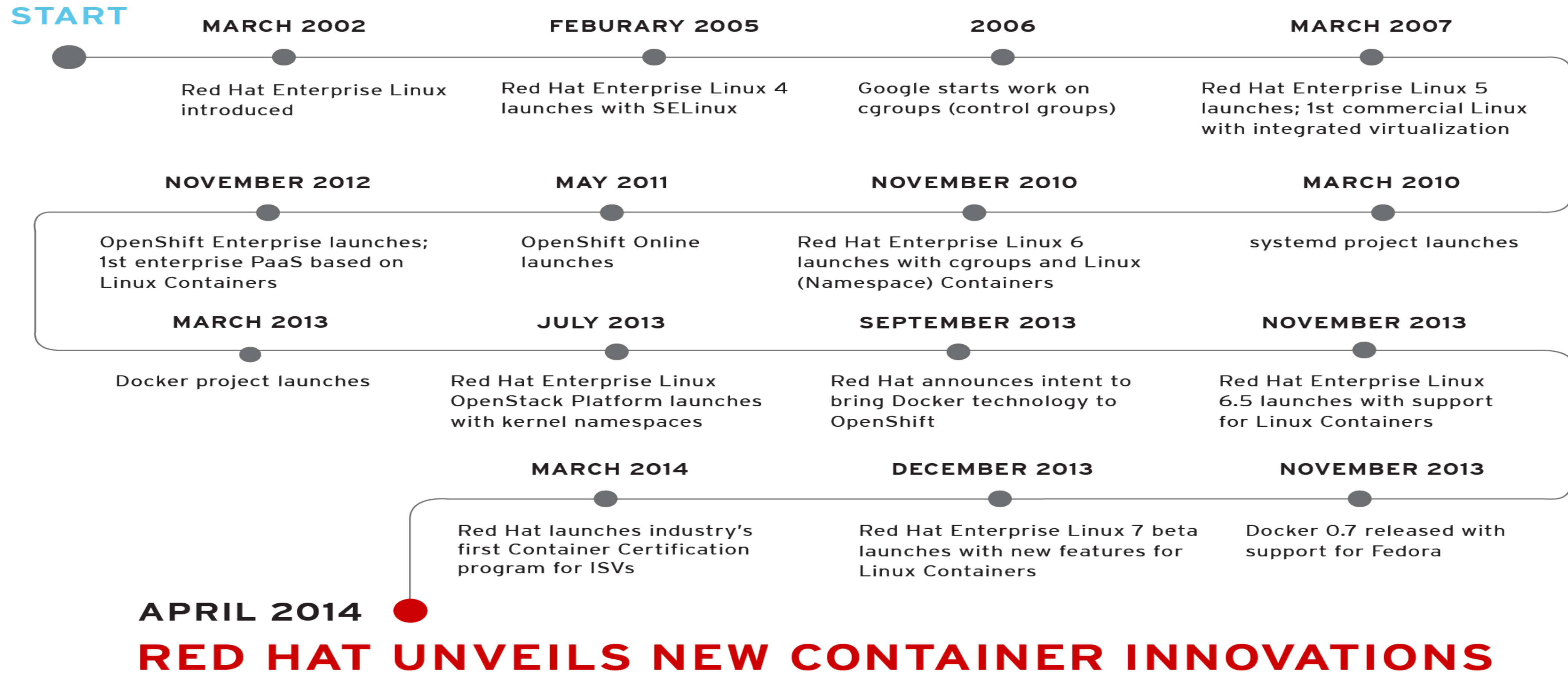# Red Hat Enterprise Linux 7
Docker Meetup - Wellington

Steven Ellis
Solution Architect
Red Hat NZ

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Red Hat's Been Investing in Linux Containers Technology for a While

START

MARCH 2002
Red Hat Enterprise Linux introduced

FEBURARY 2005
Red Hat Enterprise Linux 4 launches with SELinux

2006
Google starts work on cgroups (control groups)

MARCH 2007
Red Hat Enterprise Linux 5 launches; 1st commercial Linux with integrated virtualization

NOVEMBER 2012
OpenShift Enterprise launches; 1st enterprise PaaS based on Linux Containers

MAY 2011
OpenShift Online launches

NOVEMBER 2010
Red Hat Enterprise Linux 6 launches with cgroups and Linux (Namespace) Containers

MARCH 2010
systemd project launches

MARCH 2013
Docker project launches

JULY 2013
Red Hat Enterprise Linux OpenStack Platform launches with kernel namespaces

SEPTEMBER 2013
Red Hat announces intent to bring Docker technology to OpenShift

NOVEMBER 2013
Red Hat Enterprise Linux 6.5 launches with support for Linux Containers

MARCH 2014
Red Hat launches industry's first Container Certification program for ISVs

DECEMBER 2013
Red Hat Enterprise Linux 7 beta launches with new features for Linux Containers

NOVEMBER 2013
Docker 0.7 released with support for Fedora

APRIL 2014

RED HAT UNVEILS NEW CONTAINER INNOVATIONS

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How about Red Hat Linux Containers?

Value Proposition

Application isolation mechanism for Light-weight multi-tenancy

400,000 users

Server 1: 100 containers

Server 2: 100 containers

Server 40: 100 containers
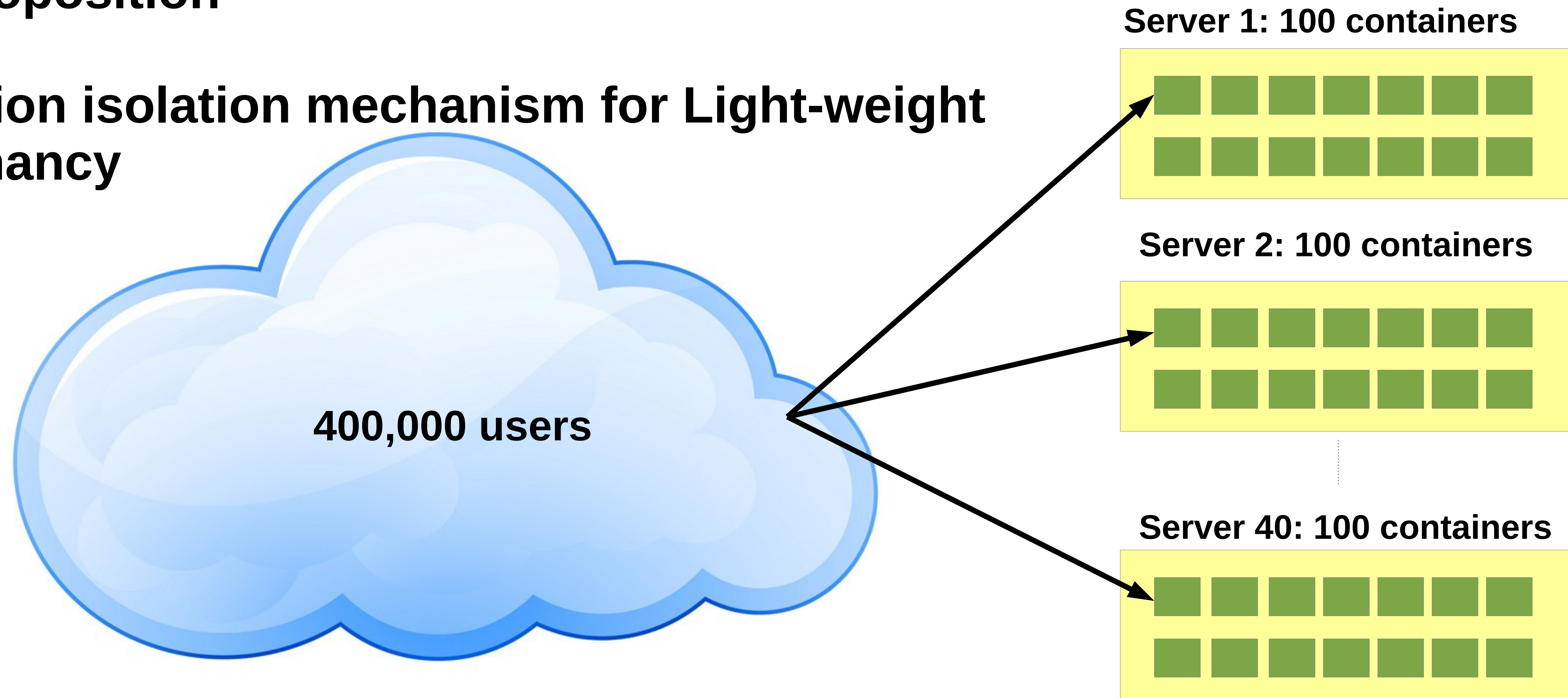
RHEL 7 Linux Containers Use Case 1
Host Containers

Identical Containers

Host RHEL
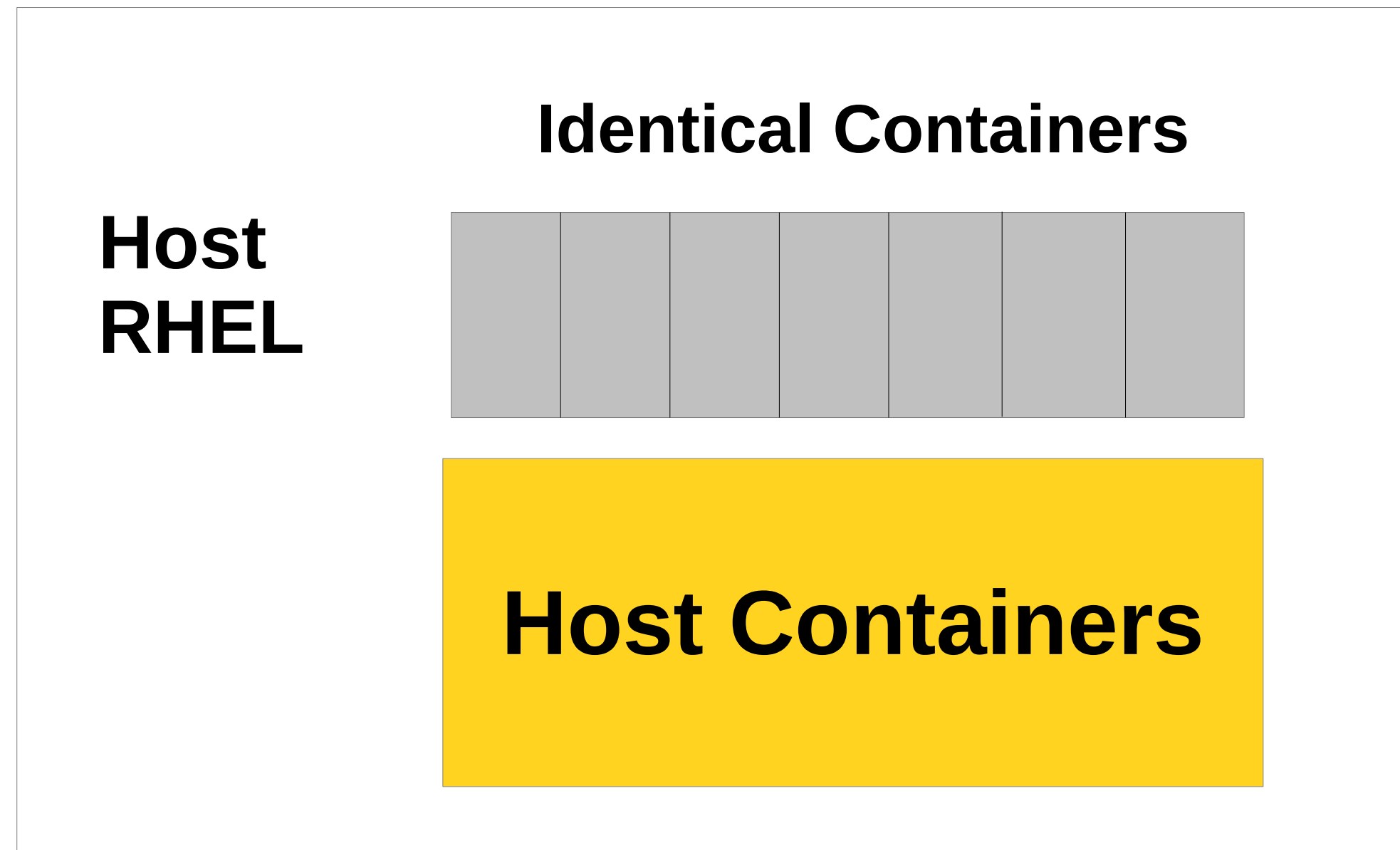
Host Containers

- **RHEL 7 host carved into secure containers**
- **Each container running RHEL 7 userspace**
- **Pro : Security erratas can be applied easily with "yum update"**
- **Con : Limited to RHEL 7 runtimes**

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RHEL 7 Linux Containers Use Case 2 Image-based Containers

Docker format

Non-identical Containers

RHEL 6
RHEL 7
RHSCL
Fedora

Image-based Containers
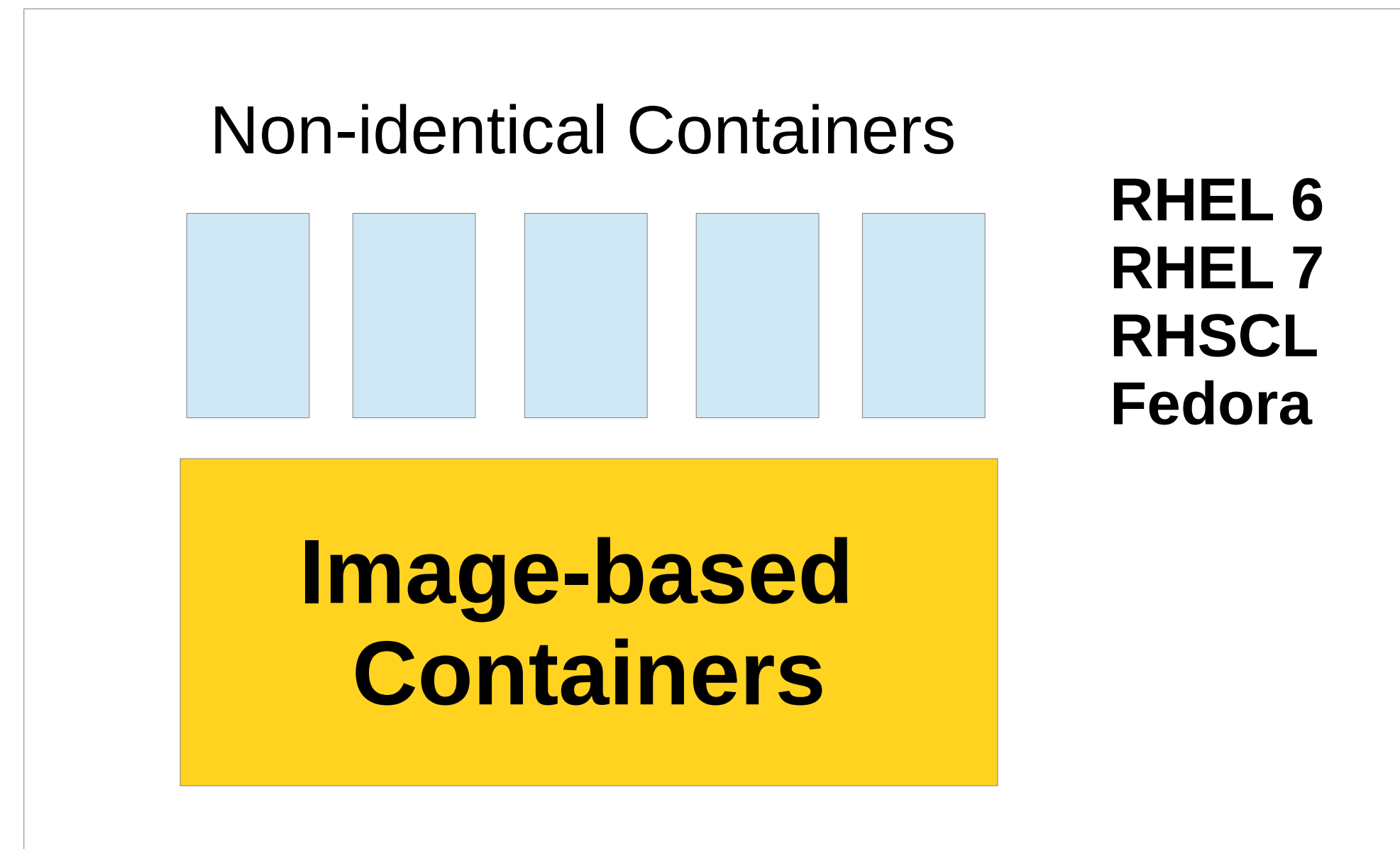
- **Docker builds on Linux Containers and provides format for content distribution**

- **Docker includes the userspace runtime of an application**

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Image-based Containers with Docker technology

App Layer

Base Image

Layered Image 2

Layered Image 1

Base Image

App A
SCL 1
RHEL 7
Runtime

App B
SCL 2
RHEL 6.5
Runtime

App C
SCL3
RHEL6.6
Runtime

RHEL 7 Container Host
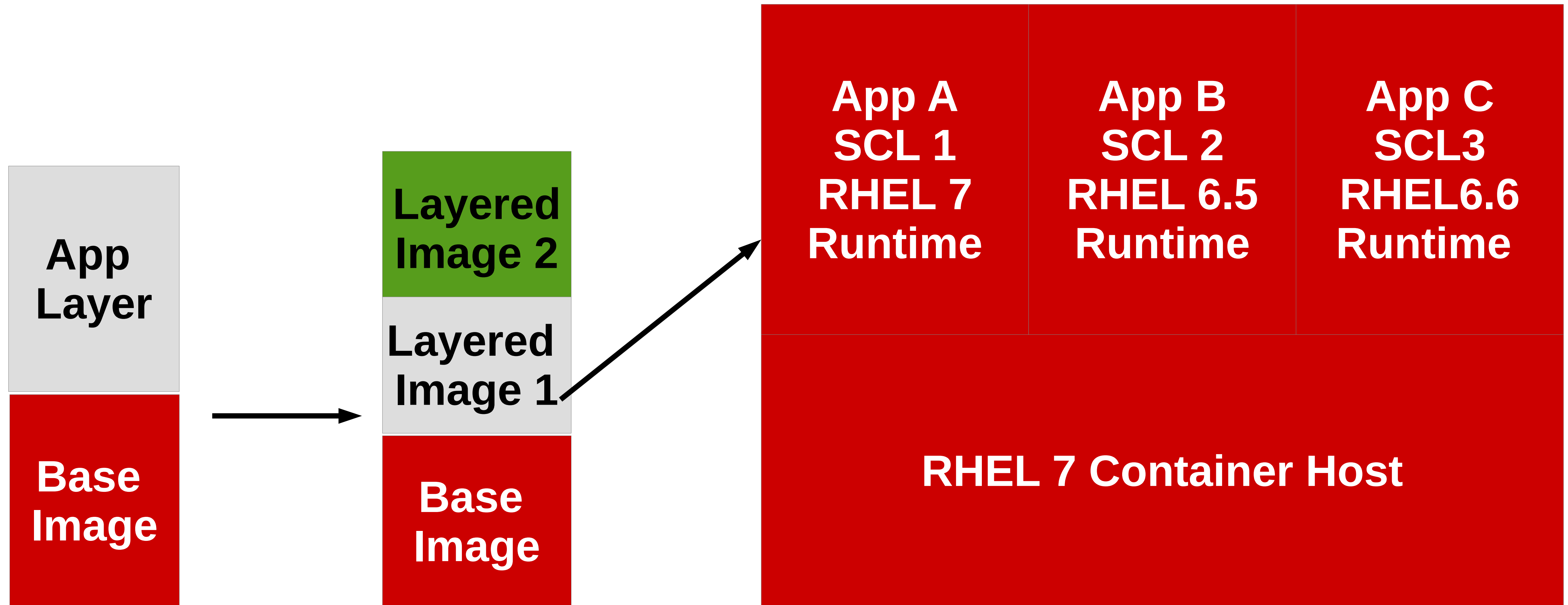
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Linux Containers in Red Hat Enterprise Linux 7

Host RHEL

Identical Containers

Host Containers

Non-identical Containers

Image-based Containers

RHEL 6
RHEL 7
RHSCL
Fedora

Red Hat Enterprise Linux 7

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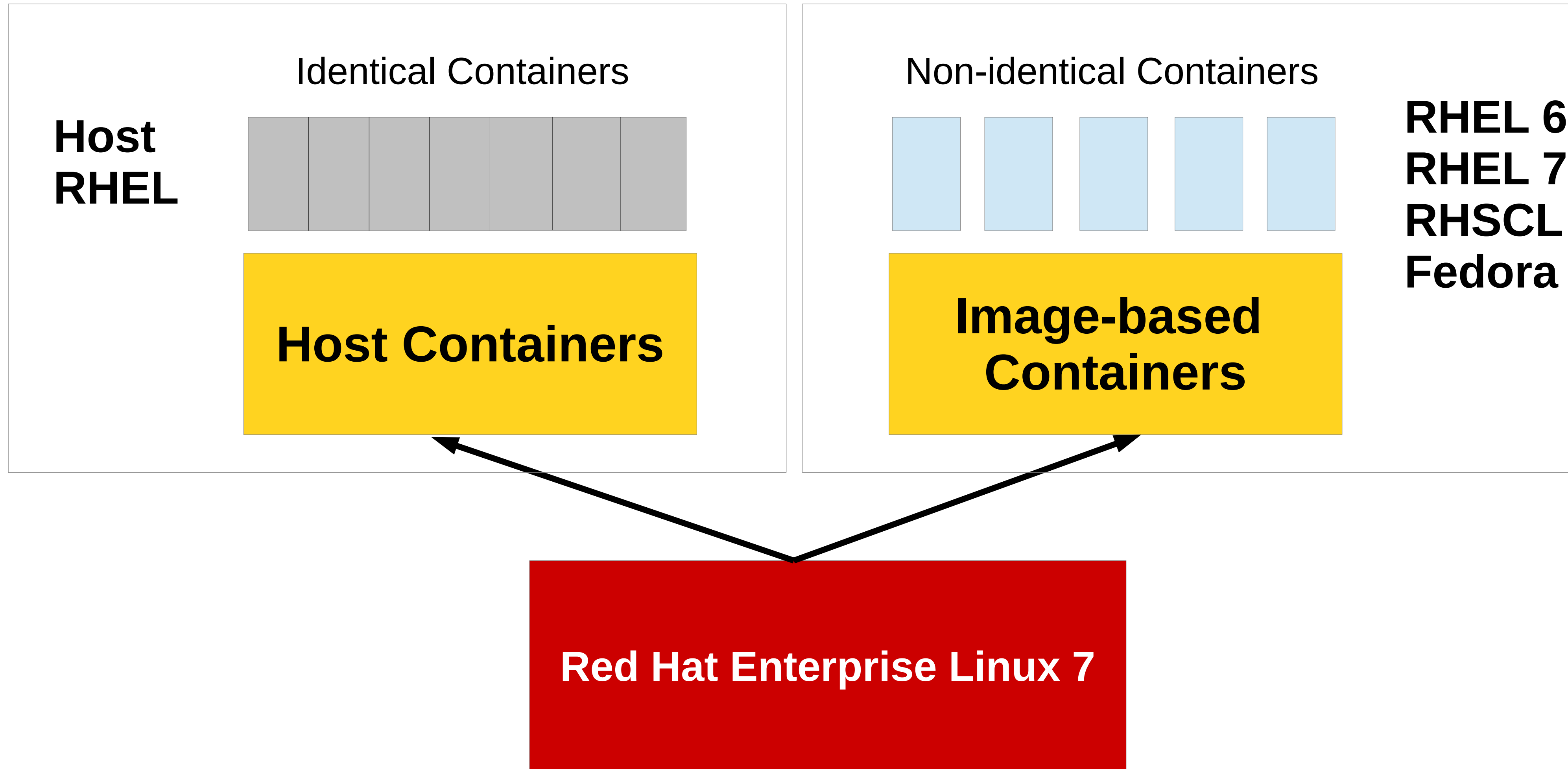
RHEL 7 Deployment Models

- Containers can be deployed in baremetal or virtual
- RHEL 7 supports both Virtualization with KVM and Linux Containers

App A	App B	App C
Runtime A	Runtime B	Runtime C
Service Containers		Mgmt Containers
Container Host OS & Central Shared Services		
Kernel & HW Drivers		

Hardware

App A	App B	App C
Runtime A	Runtime B	Runtime C
Service Containers		Mgmt Containers
Container Host OS & Central Shared Services		
Kernel & Virt Drivers		

Hypervisor
Host OS
Kernel & HW Drivers

Hardware
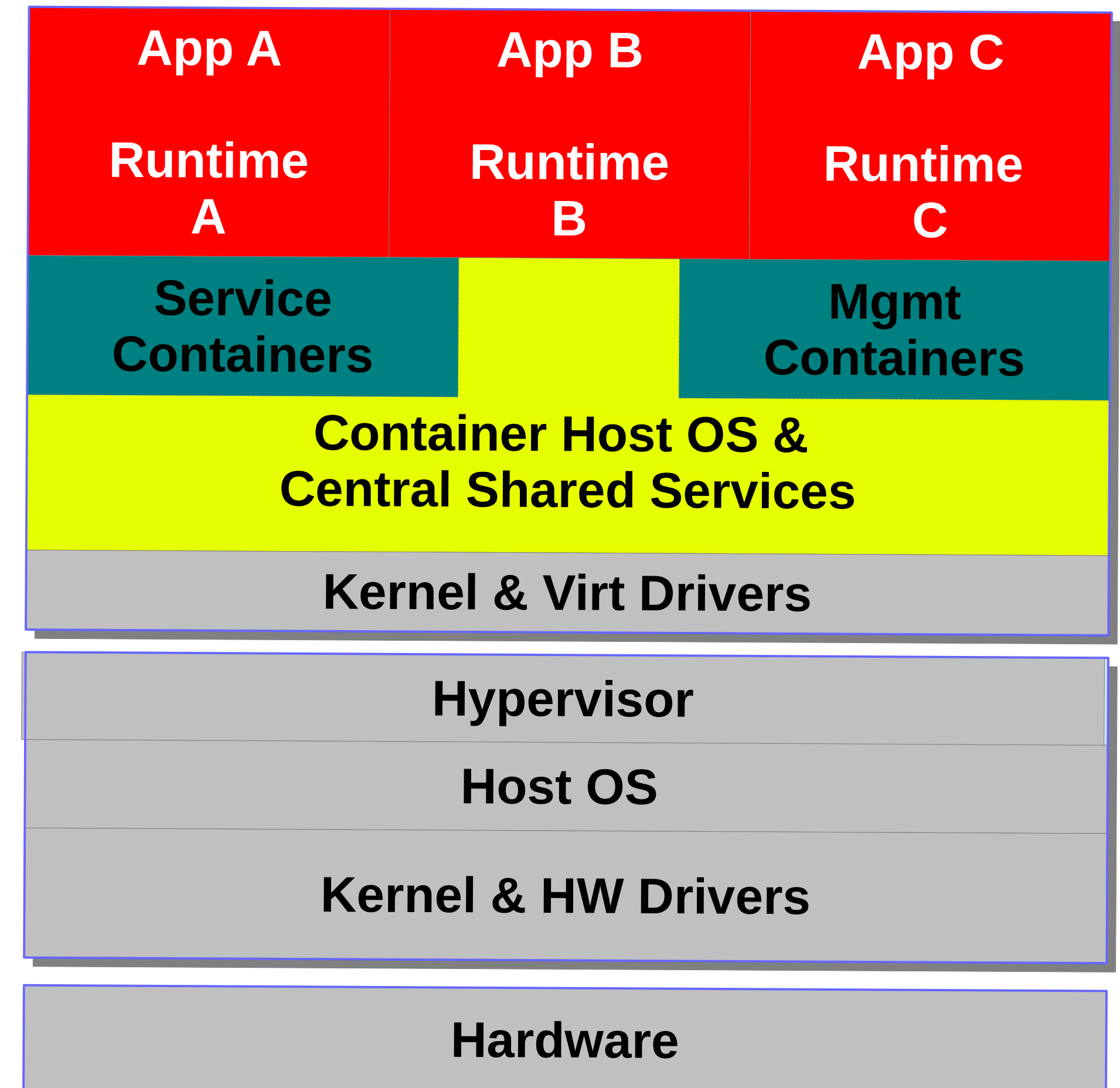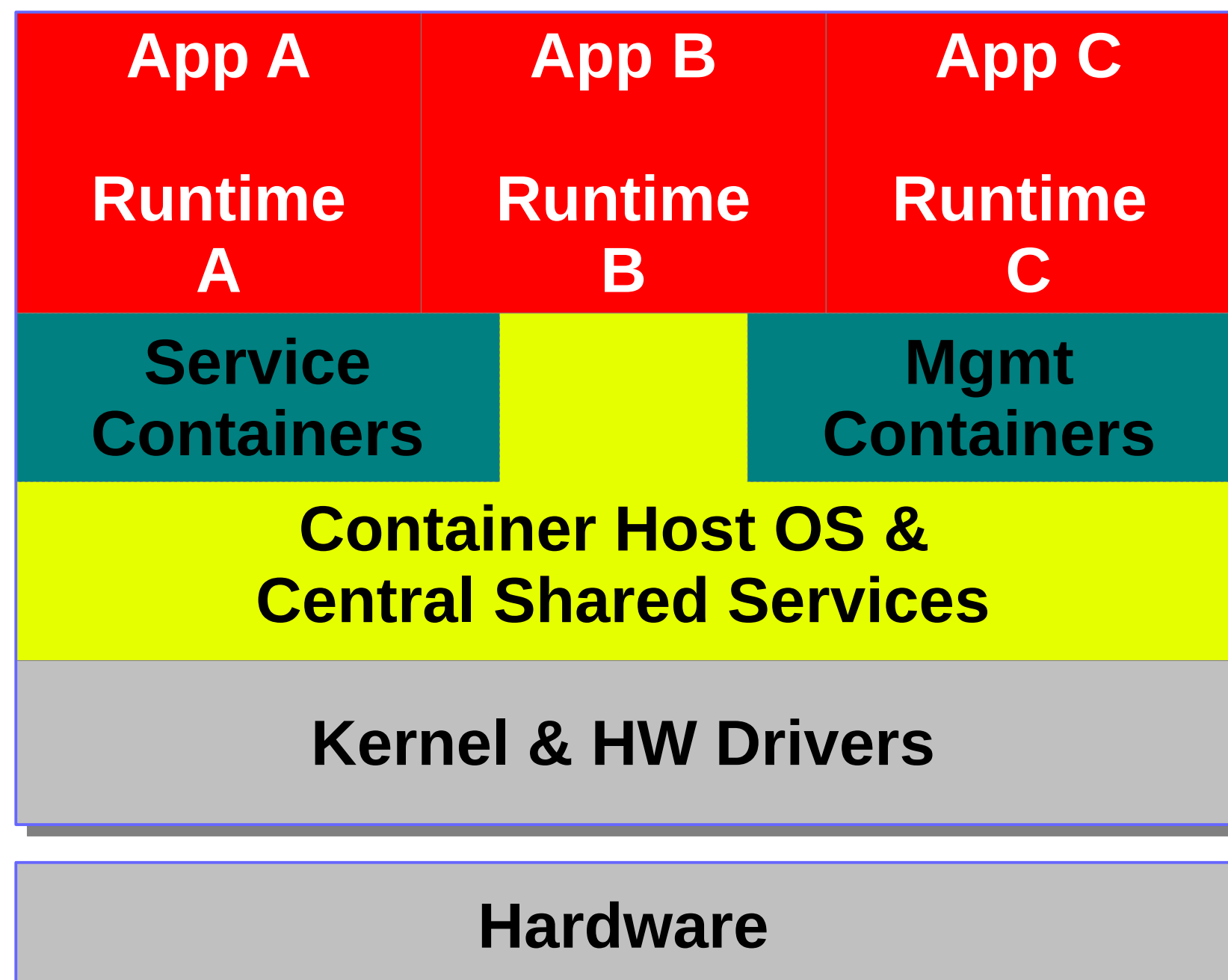
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RHEL 7 Container Host
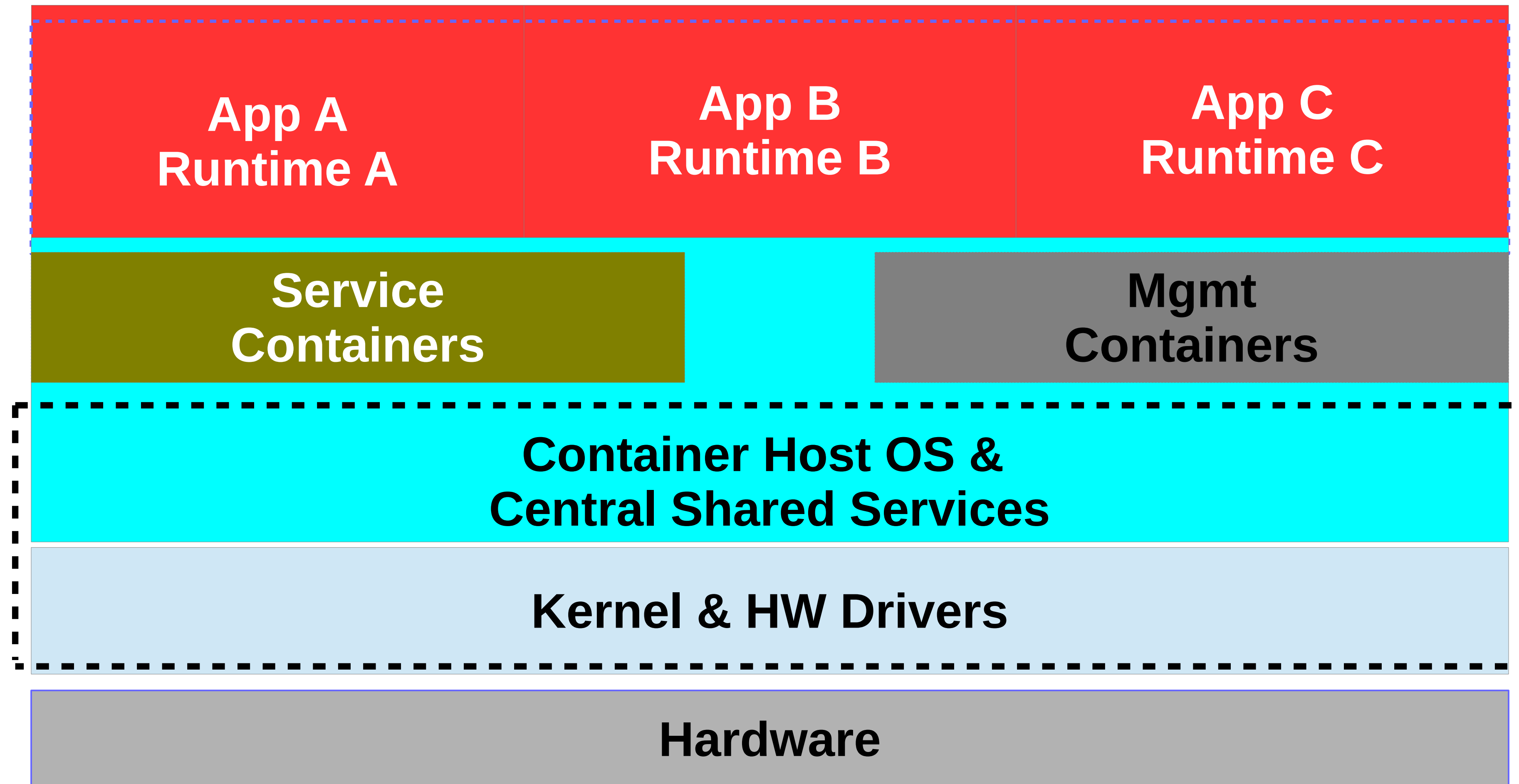
Docker CLI

Docker format

- Tool to package an application and its runtime dependencies for deployment into a Linux Container

- Docker 0.9 includes libContainer, native LXC implementation

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Red Hat Enterprise Linux 7 Containers Architecture with Docker CLI
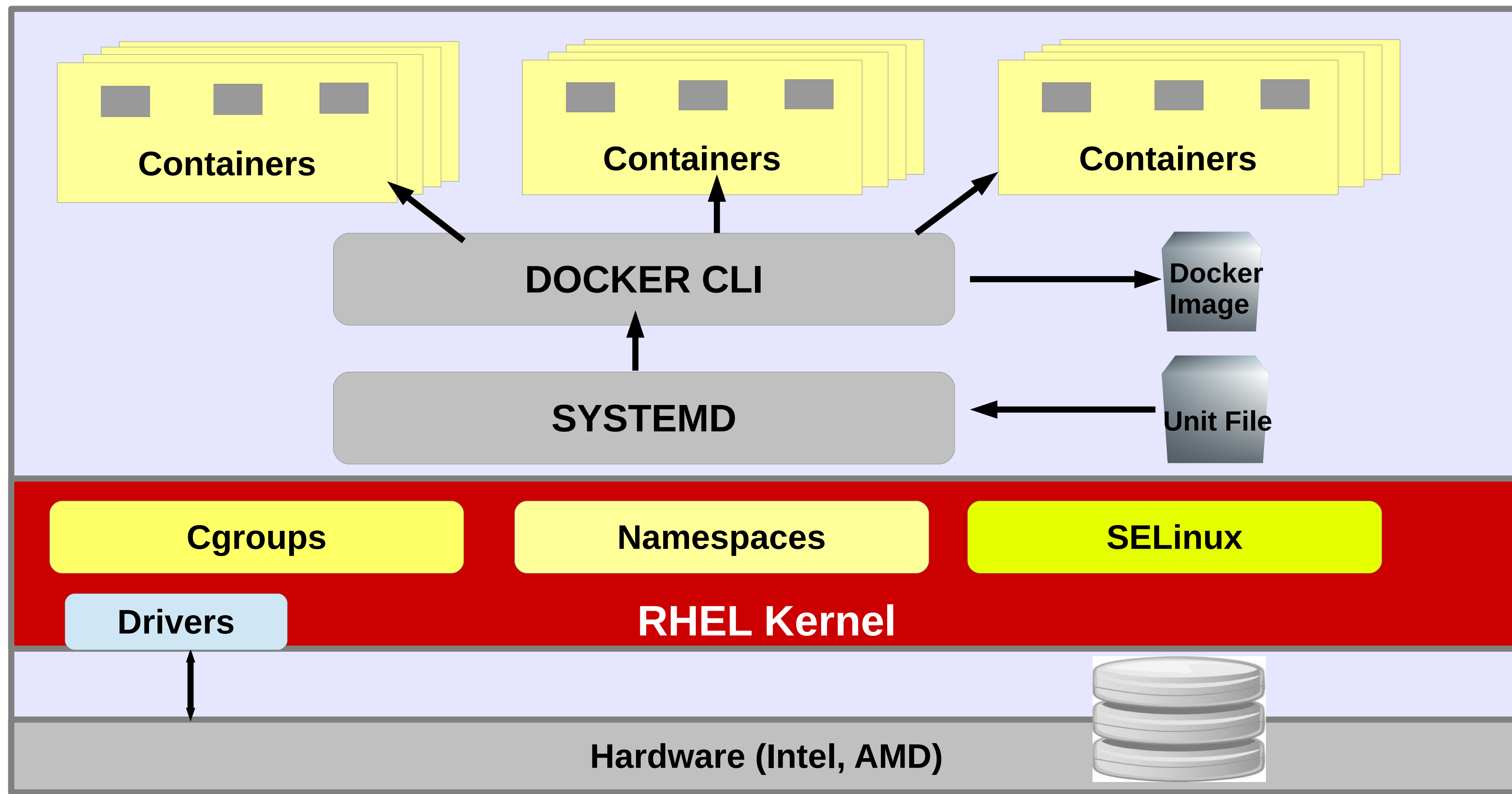
Red Hat Certification for Containerized Apps
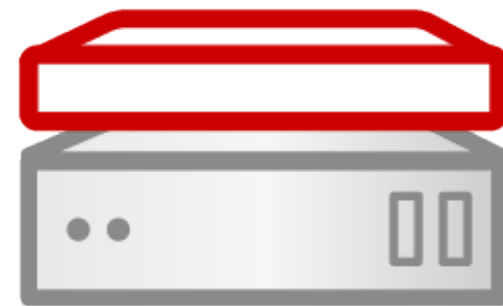
Docker, Project Atomic & GearD

Project Atomic Brings It All Together On A New Lightweight RHEL Container Host
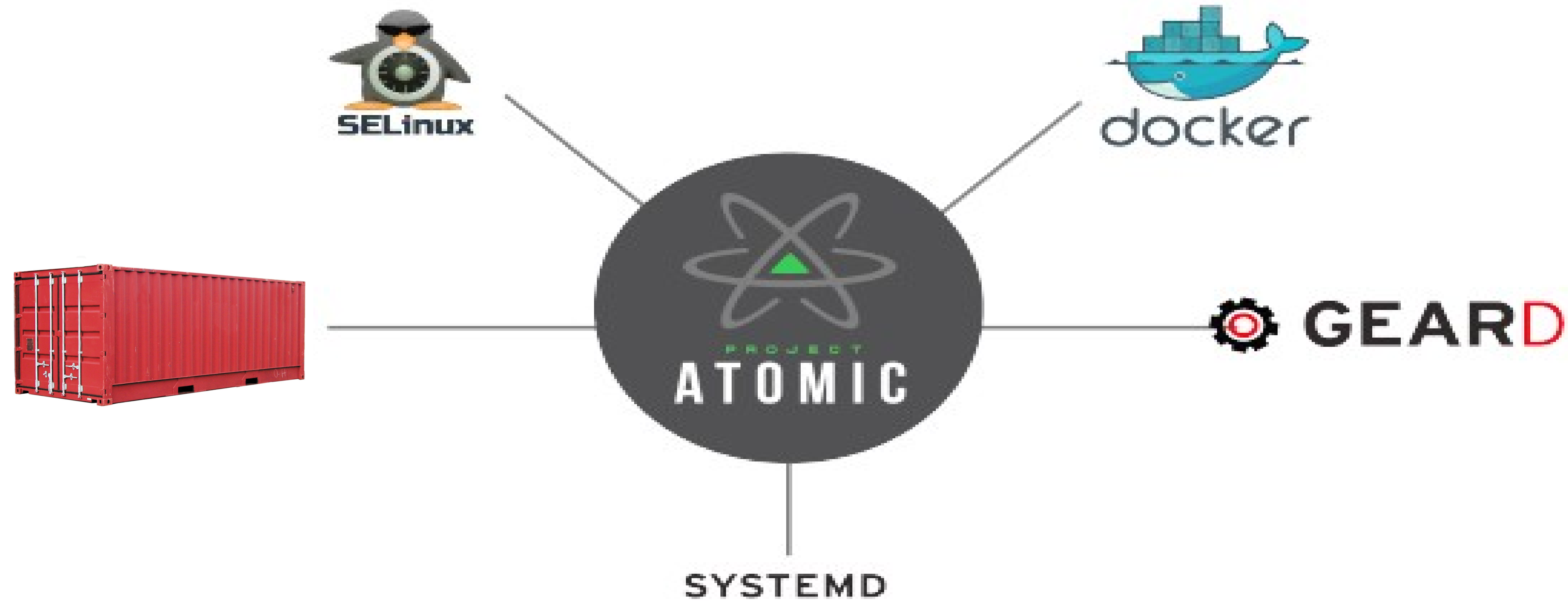
Red Hat Enterprise Linux Atomic Host
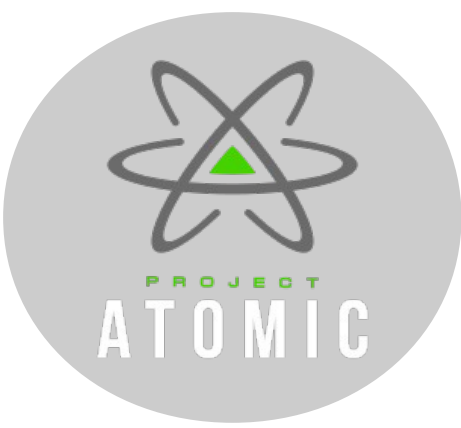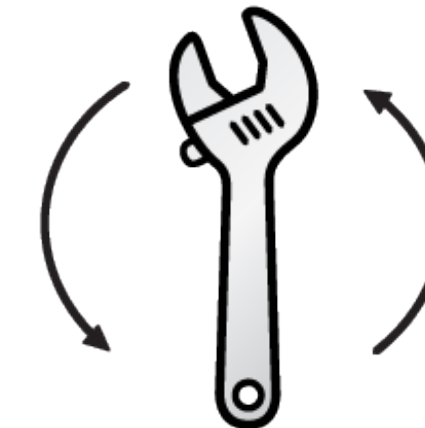
IT IS RED HAT ENTERPRISE LINUX

Inherits the complete hardware ecosystem, military-grade security, stability and reliability Red Hat Enterprise Linux is known for.

OPTIMIZED FOR CONTAINERS
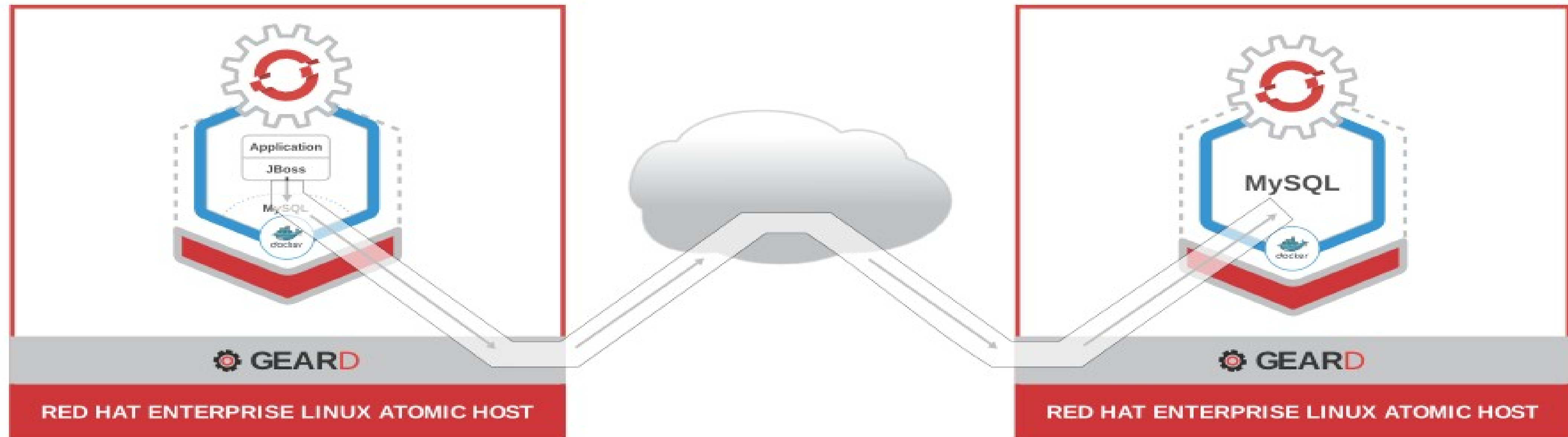
MINIMAL FOOTPRINT

Minimal environment, tuned for running Linux Containers while maintaining compatibility with Red Hat Enterprise Linux.

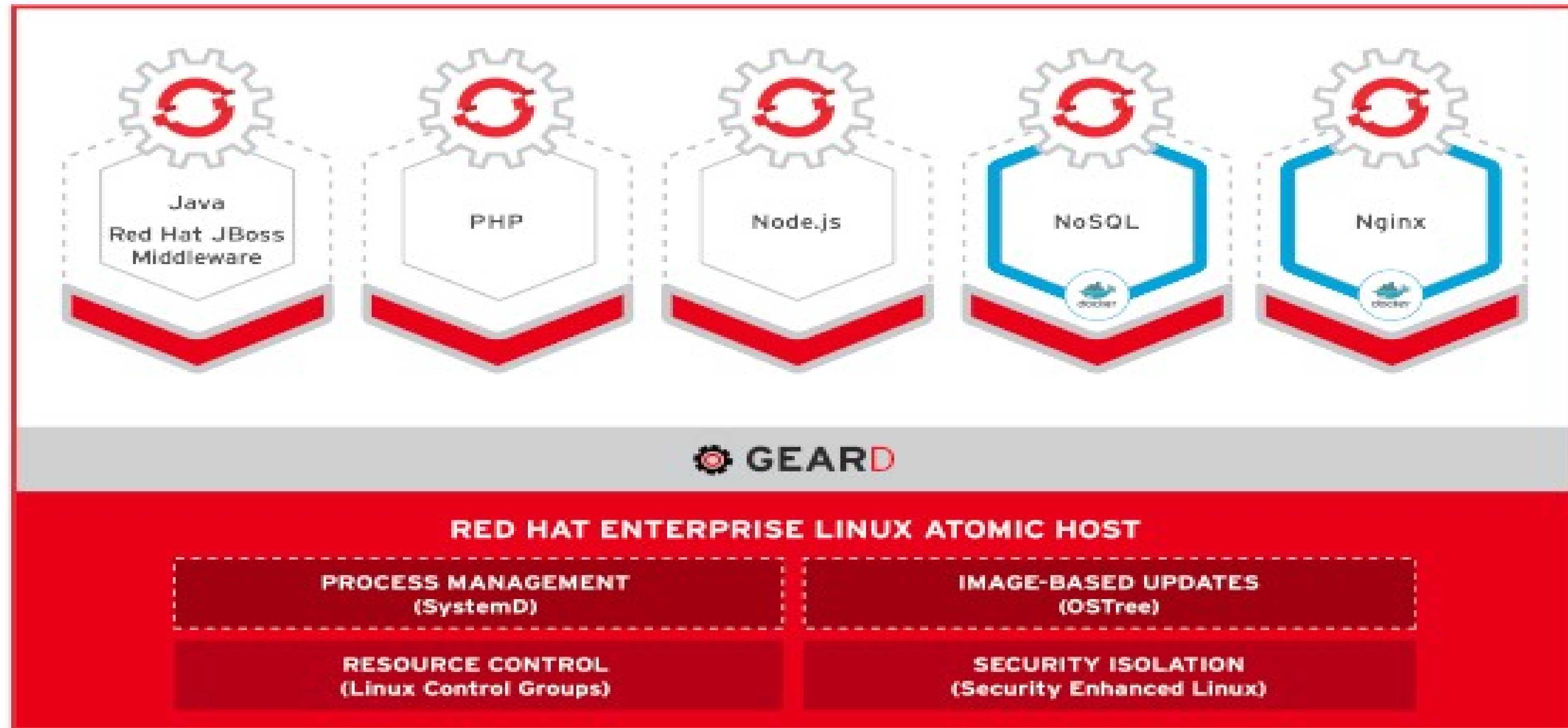### SIMPLIFIED MAINTENANCE

Easy to deploy, update, and rollback using image-based technology.
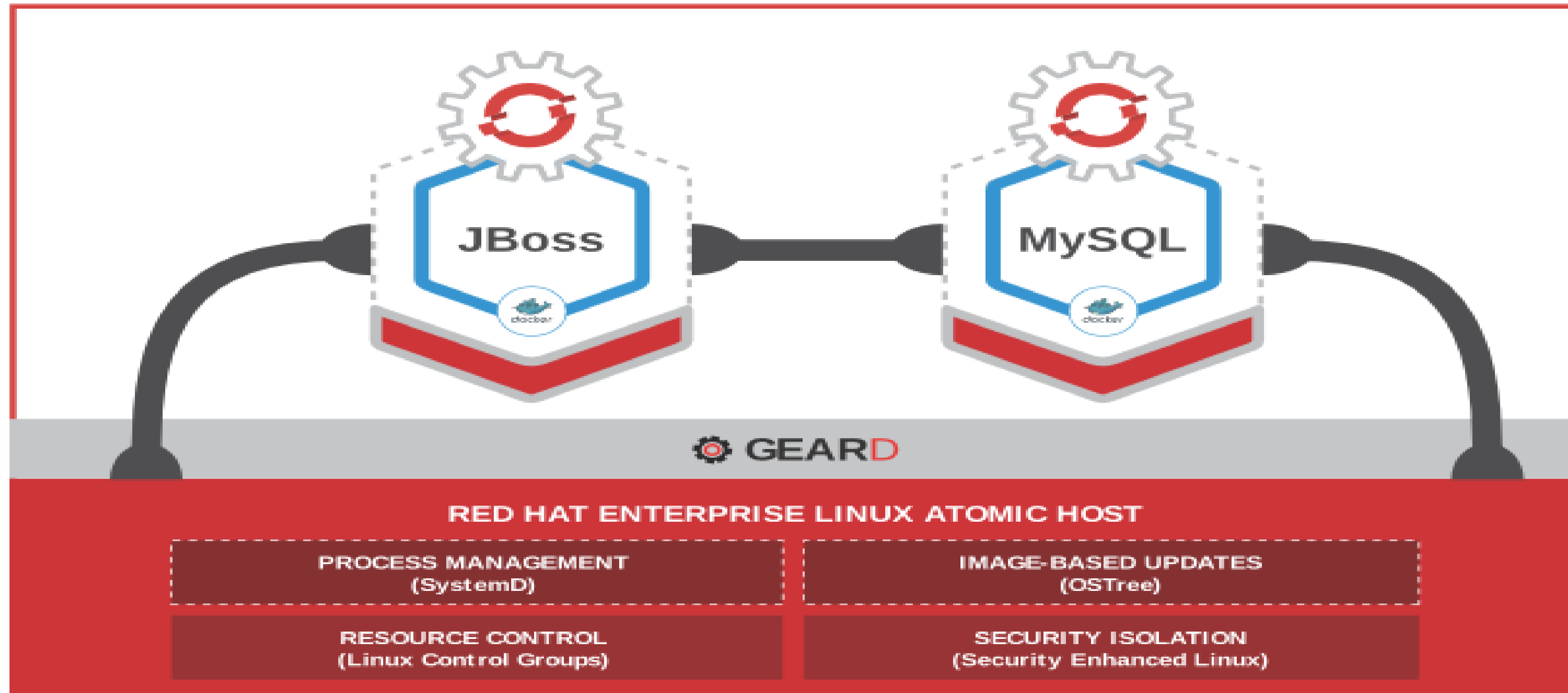
GearD - Elastic Container Wiring

Integrate multiple containers, spanning multiple hosts to build complex, composite applications, using an IP-based container linking framework.

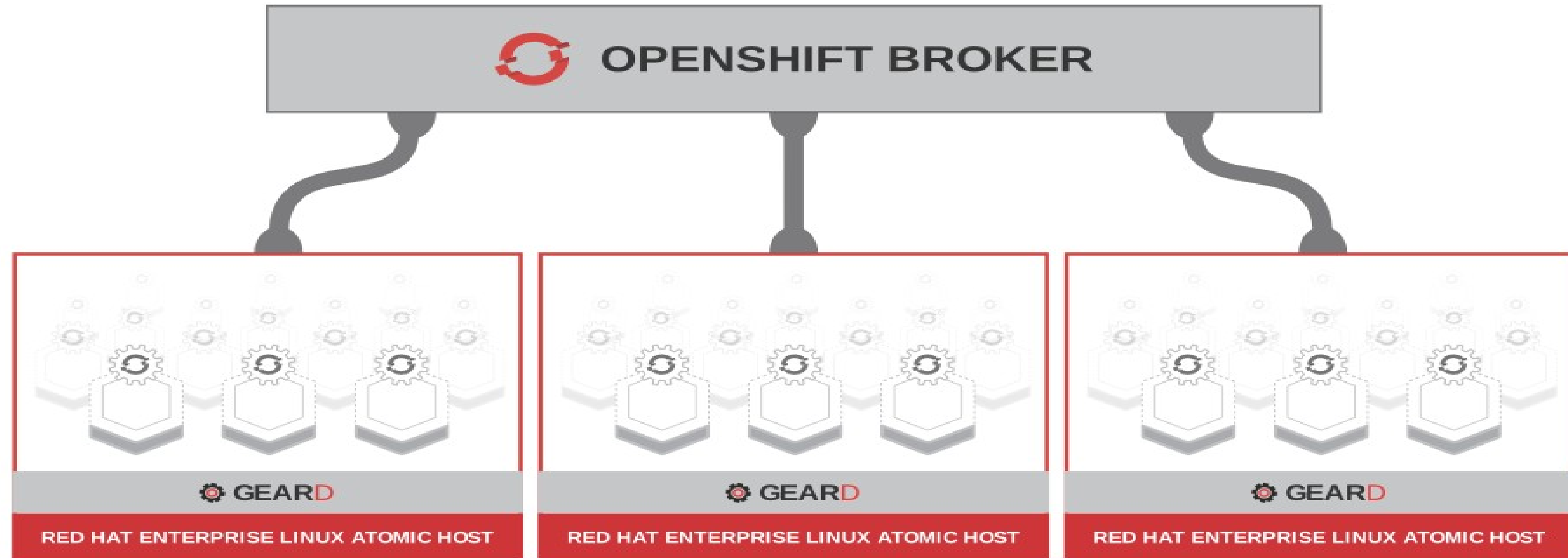# OpenShift Origin "GearD" Project Integrates That Core With Docker

IT Ops / Sysadmin Friendly

Tightly integrates with both Docker (Docker daemon & API) and RHEL OS technology such as systemd (create unit files, logging via journalctl).

OpenShift Integration

Integrate OpenShift GearD and RHEL Atomic Host Nodes with Broker as part of OpenShift Enterprise 3.0 to leverage full OpenShift capabilities.

Red Hat Enterprise Linux Atomic Host
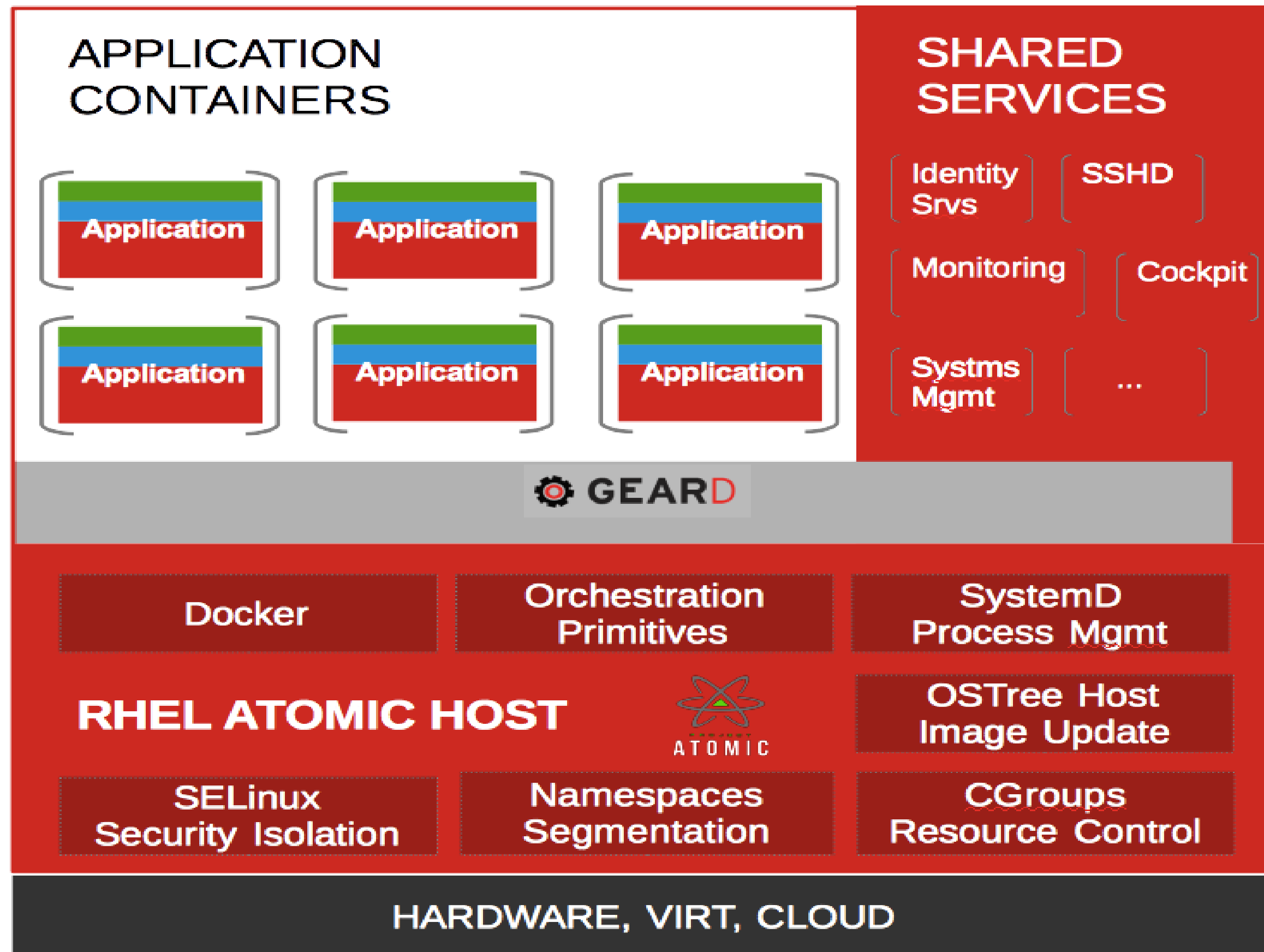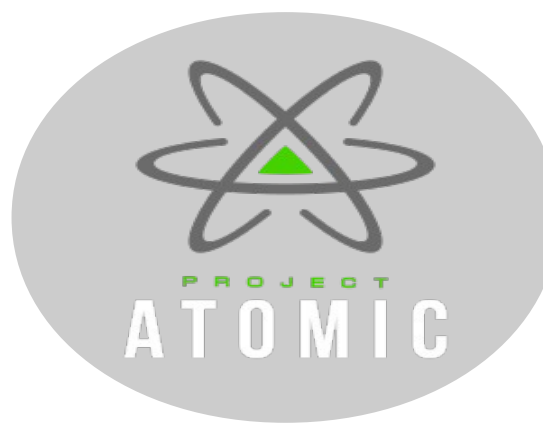
- Minimal optimized container host with atomic updates.

- Systemd for process management.

- Generic container orchestration primitives.

- Integrated with OpenShift Geard for cross-node PaaS orchestration.

- Shared services and management agents deployed as privileged containers

Demo

Linux Containers in RHEL 7 - Key Takeways

- Application isolation mechanism for Light-weight multi-tenancy

- Application centric packaging w/ Docker image-based containers

- Linux Containers Productization

  - Key kernel enablers – full support in RHEL 7 GA

  - Docker 1.0 – shipped after RHEL 7 GA

- Linux Container Certification

- Red Hat and Docker partnership to build enterprise grade Docker containers

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Questions?