

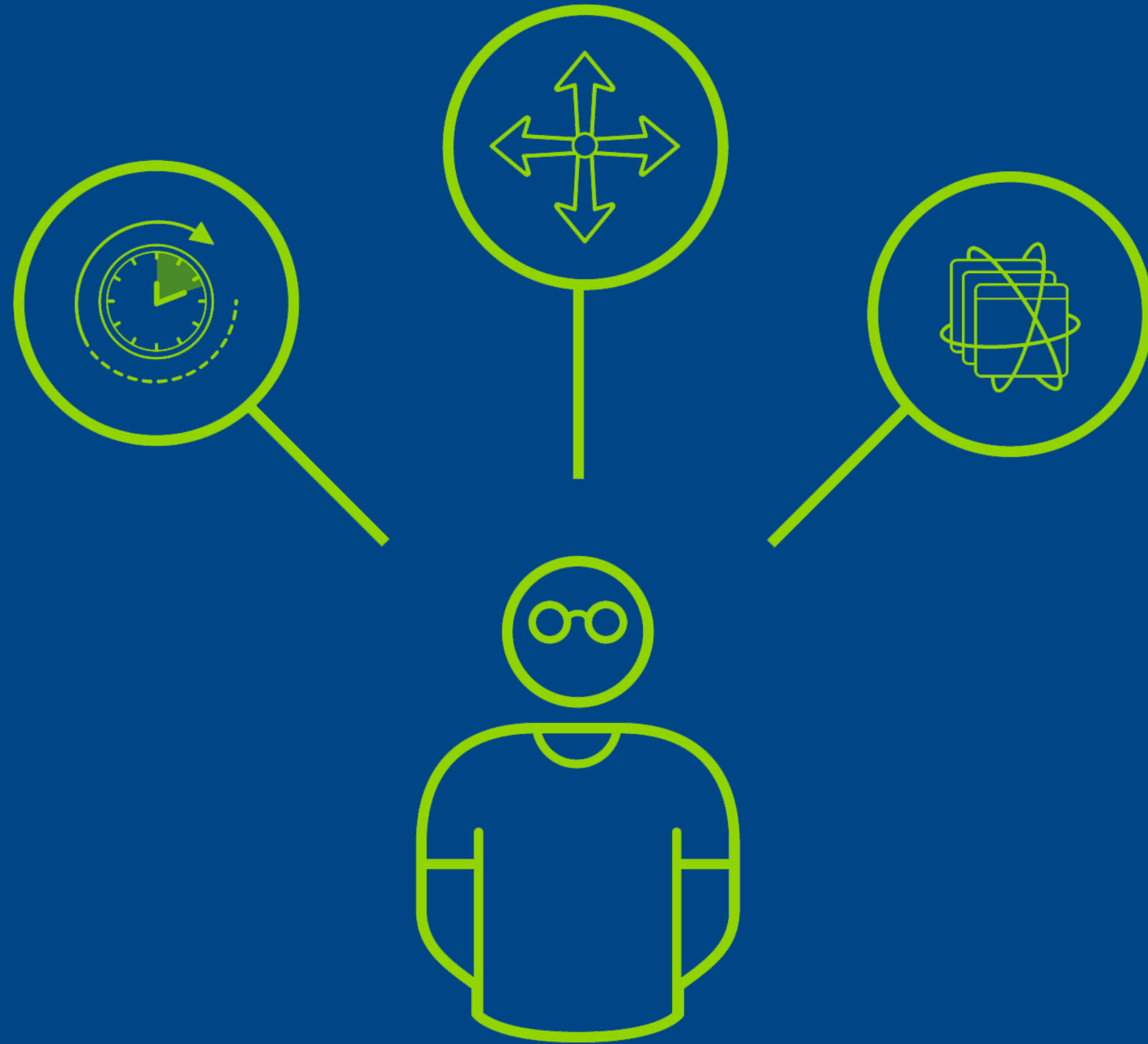
**RED HAT  
SUMMIT**

**BOSTON, MA  
JUNE 23-26, 2015**

# RED HAT'S CONTAINER STRATEGY

Lars Herrmann  
General Manager, RHEL, RHEV and Containers  
June 24, 2015

# DEVELOPMENT VS I.T. OPERATIONS



DEVELOPER



IT OPERATIONS

# DEVELOPERS WANT TO GO FAST

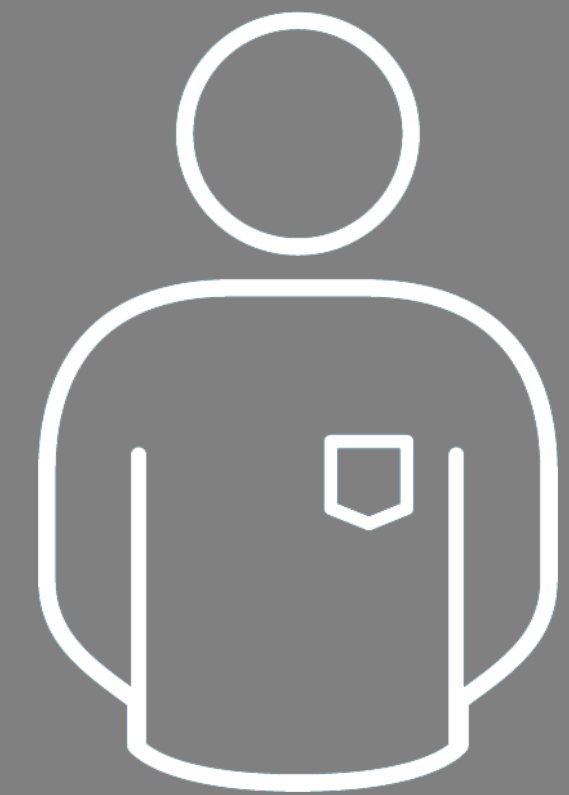


DEVELOPER





# HOW TO MEET DEMAND?



I.T. OPERATIONS

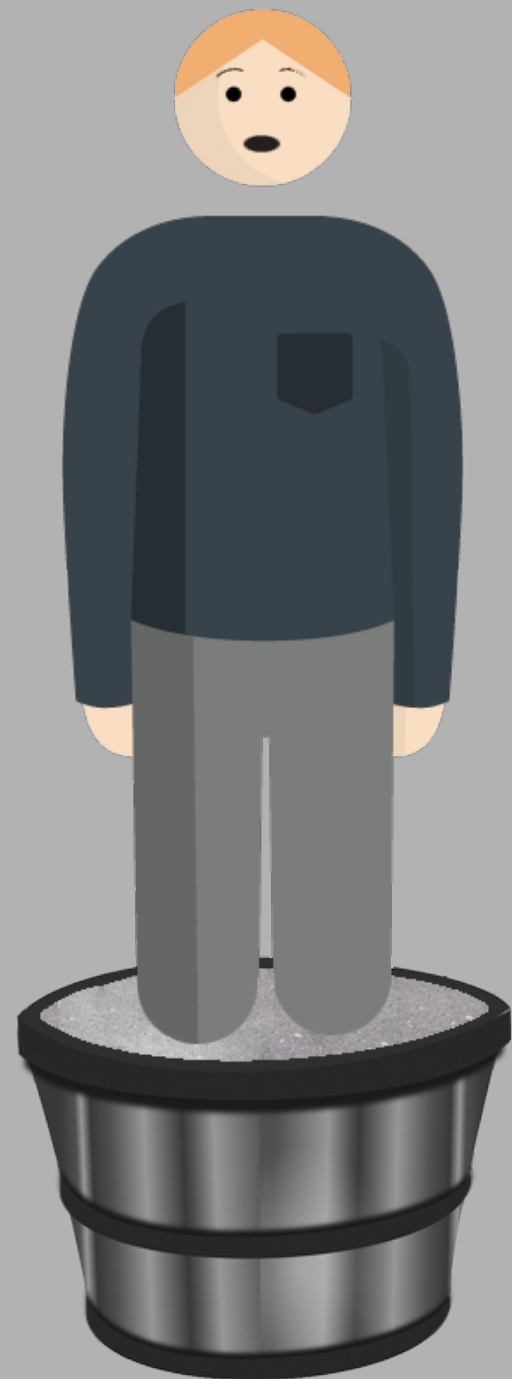


# I.T. OPERATIONS UNDER PRESSURE

## CONCRETE SHOES OF LEGACY AND RIGID PROCESSES

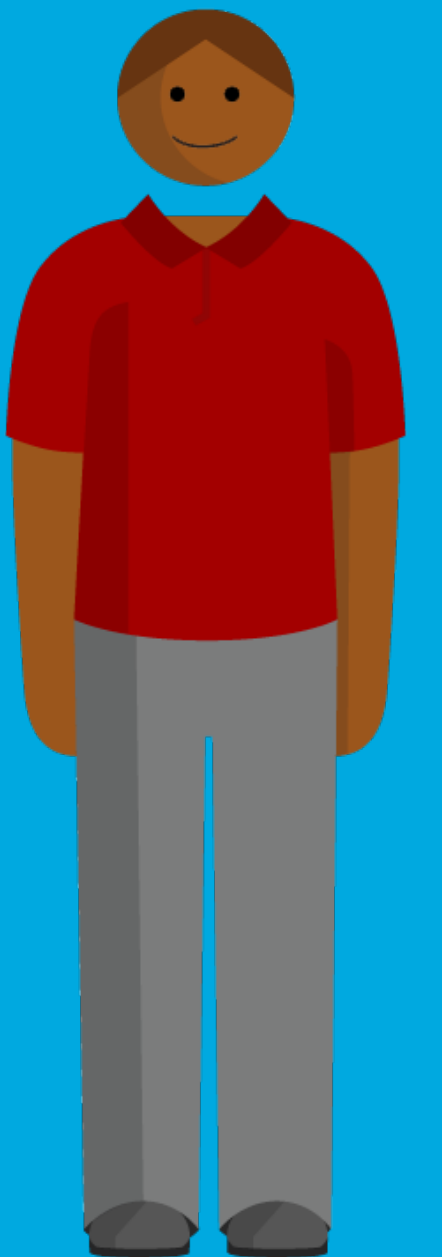
### CURRENT STATE

Manual processes  
Inconsistent environments  
Dependency hell  
Legacy inheritance  
Skills fragmentation



### DESIRED STATE

Automation of processes  
Environmental independence  
Application autonomy  
Modernization and expansion  
Skill abstraction





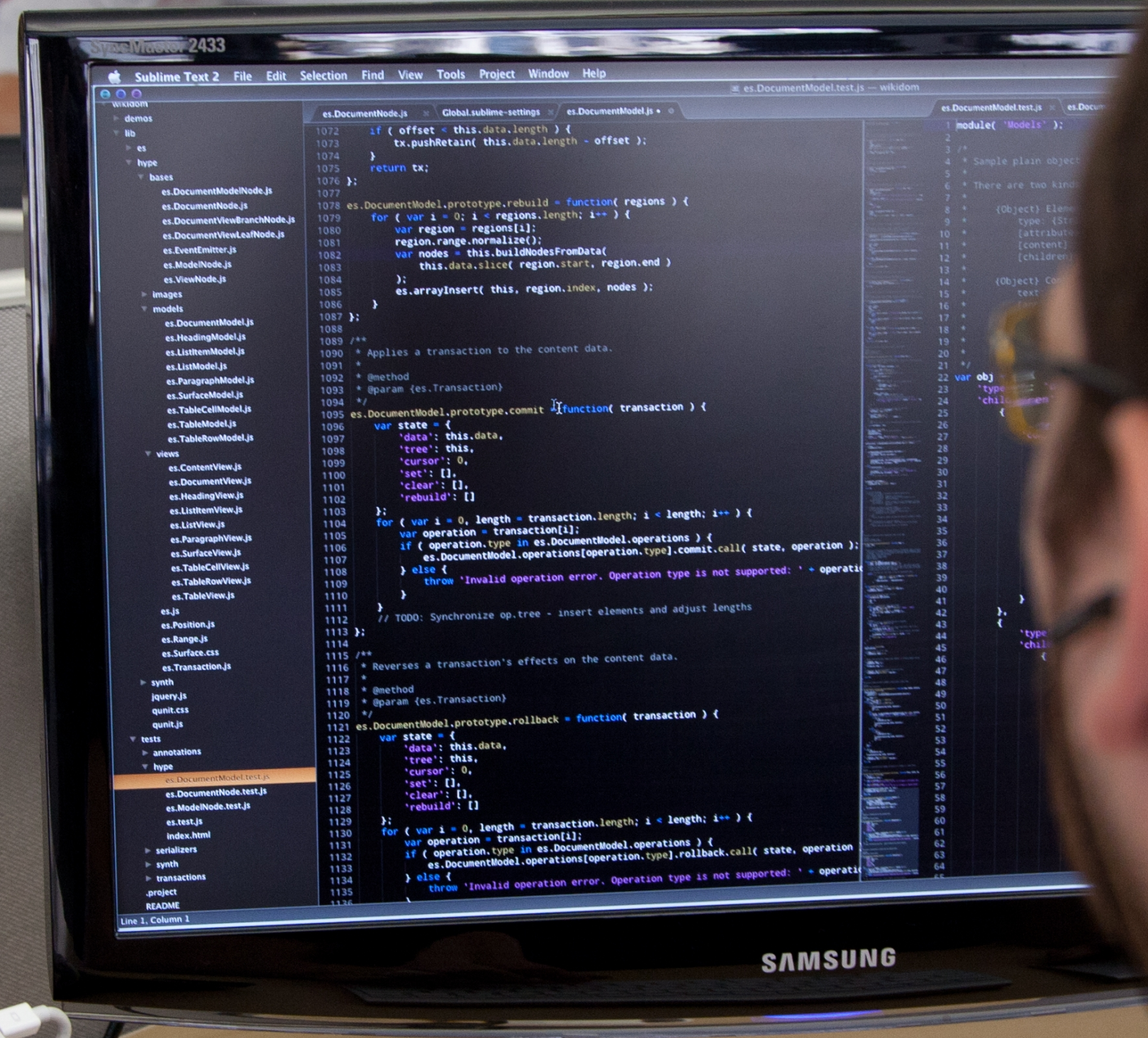
“What... is your quest?”  
“To seek the Holy Grail of application delivery”





# STEP 1 – LAPTOP

> docker run dockerfile/nodejs





**SUCCESS!**



**CONSISTENCY, PORTABILITY, CHOICE!**

**STEP 2**  
**> containerize entire datacenter**

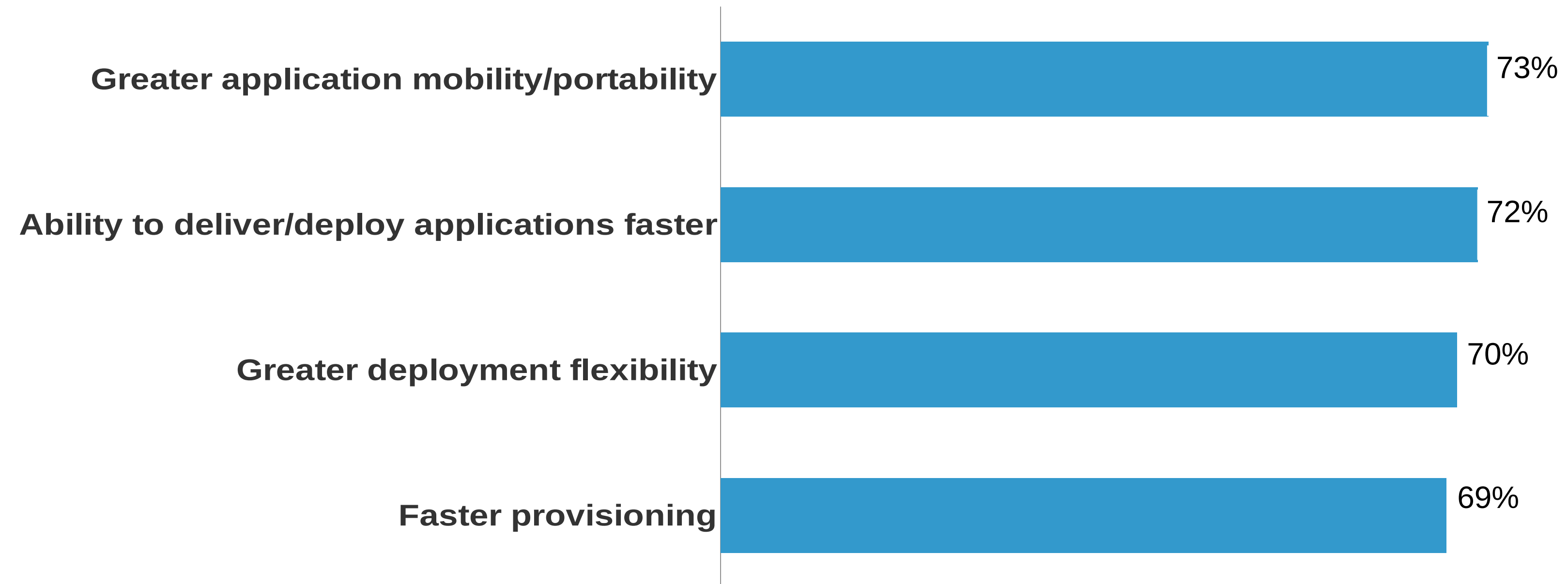




# CONTAINERS DELIVER MANY BENEFITS

How important are the following benefits of containers to your organization?

■ Critically or Very Important



Base: 171 IT and Developer/programmer decision-makers at companies with 500+ employees in APAC, EMEA, and NA  
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat, January, 2015

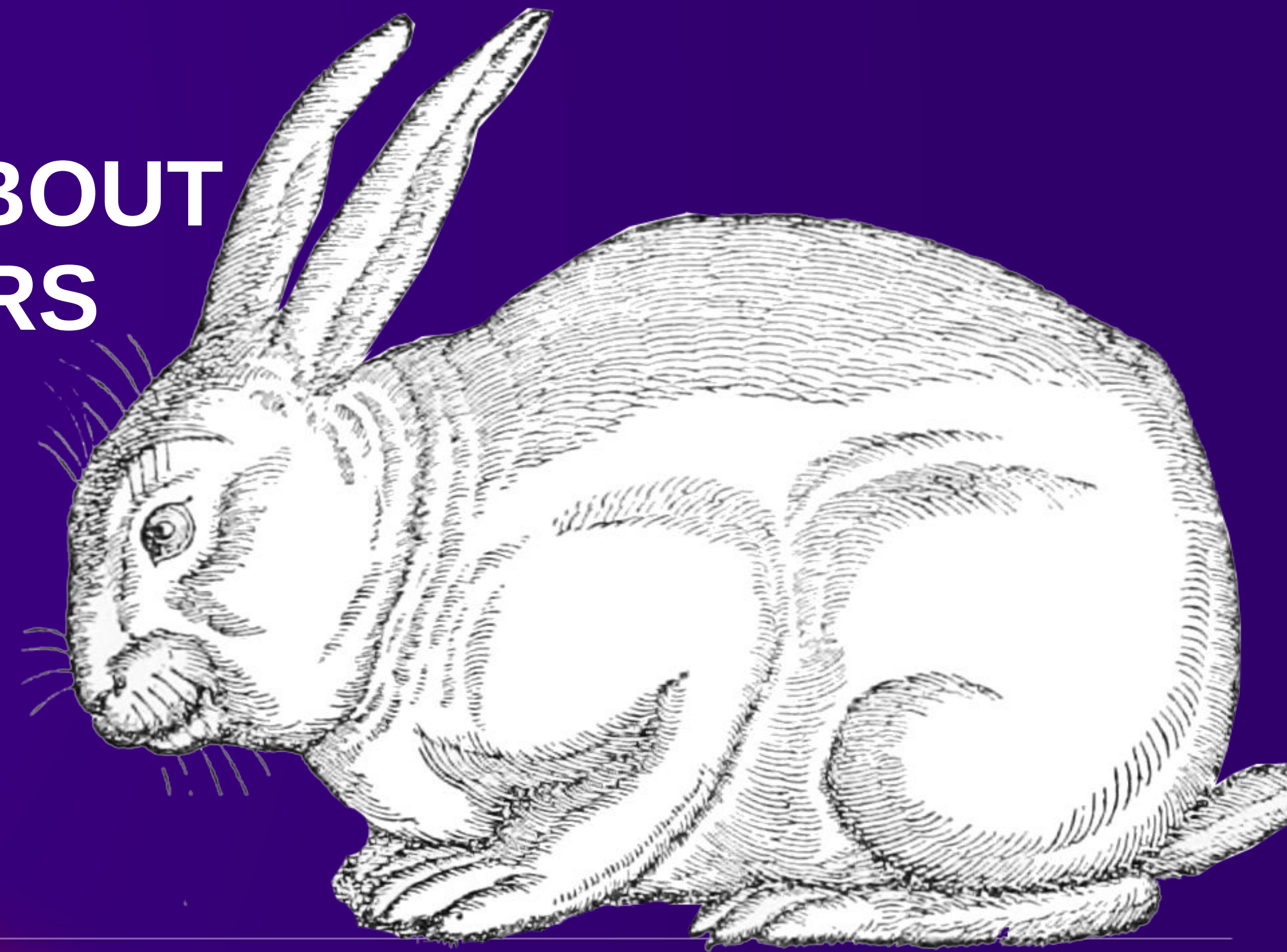




**...STEP 1.1?**



# THE TRUTH ABOUT CONTAINERS



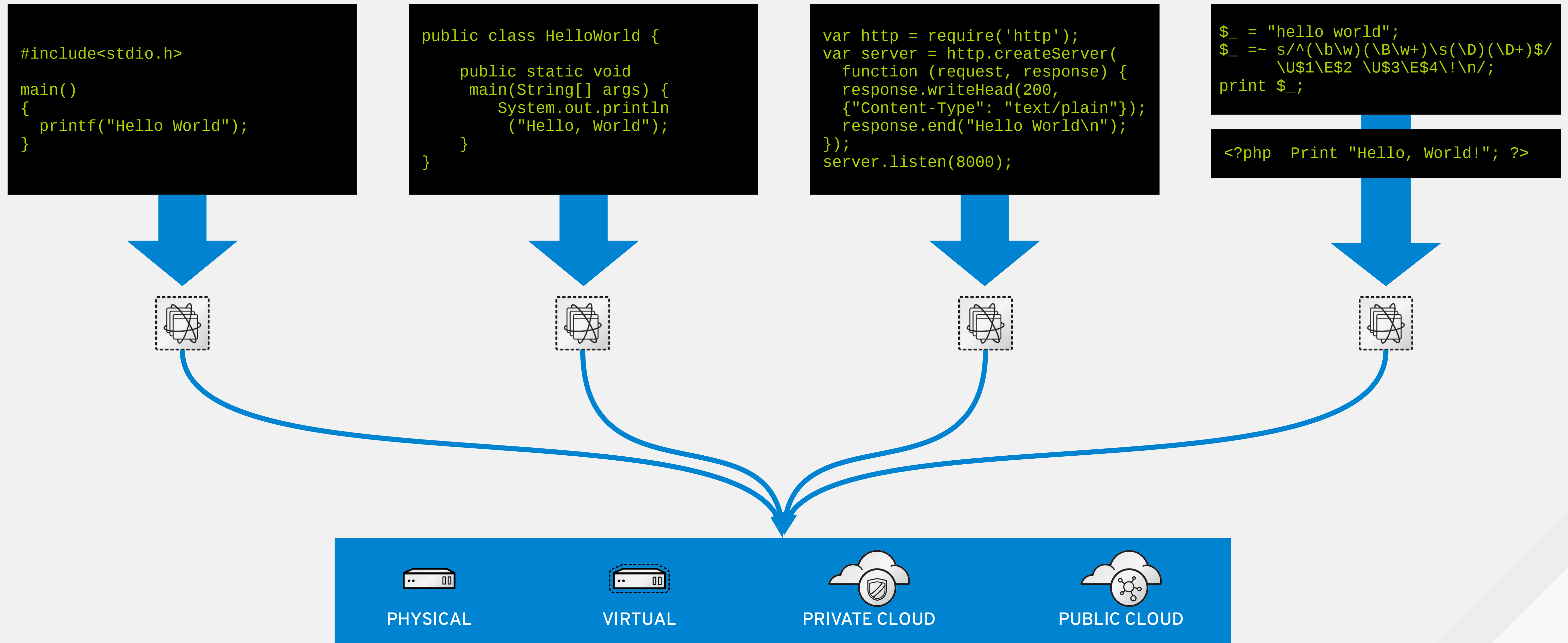


**LET'S LOOK AT...**

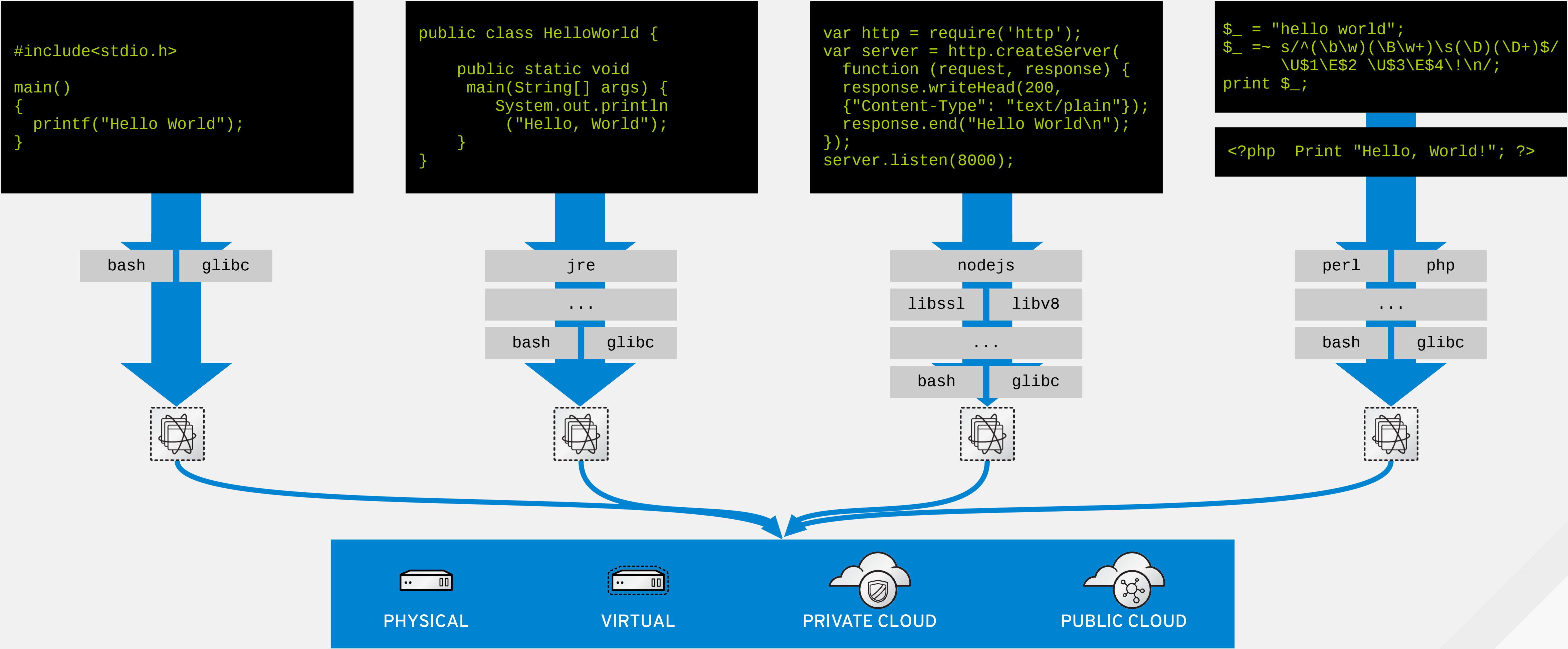
**THE MOST INTERESTING APPLICATION IN THE WORLD**



# THE PROMISE: CONSISTENT DELIVERY FOR ANY LANGUAGE



# LANGUAGE RUNTIMES

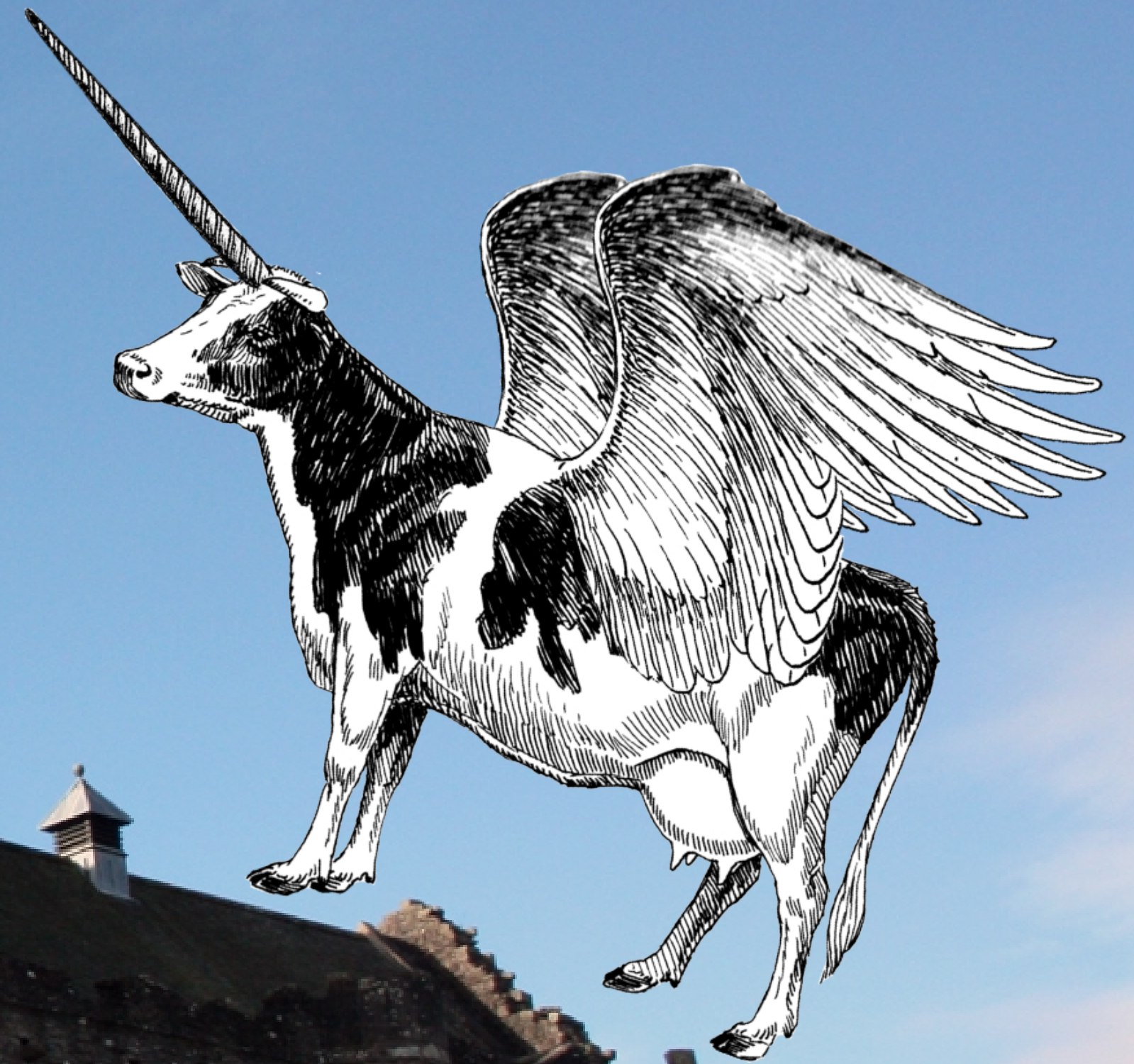
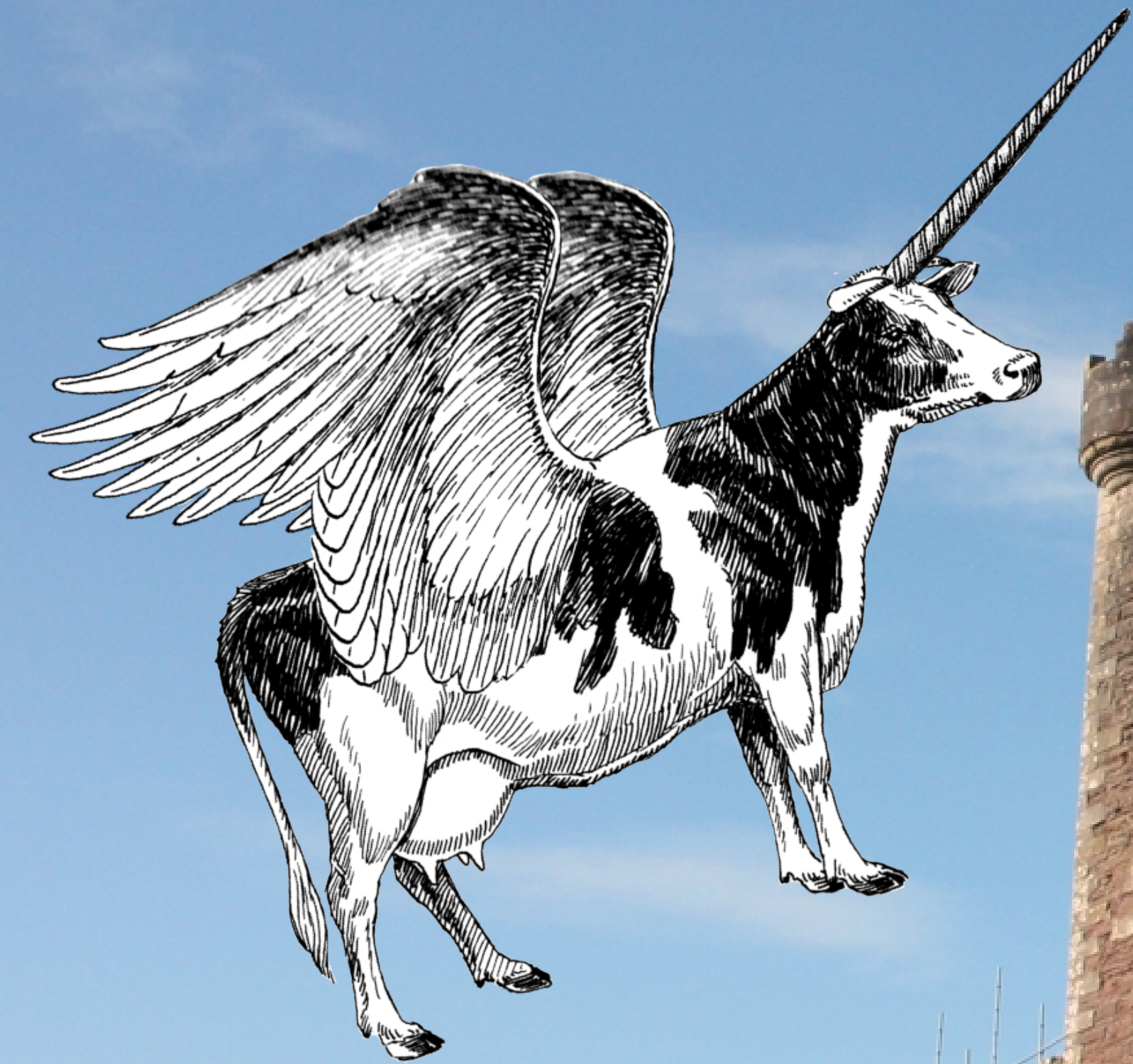




# WHERE DO THESE RUNTIMES COME FROM?

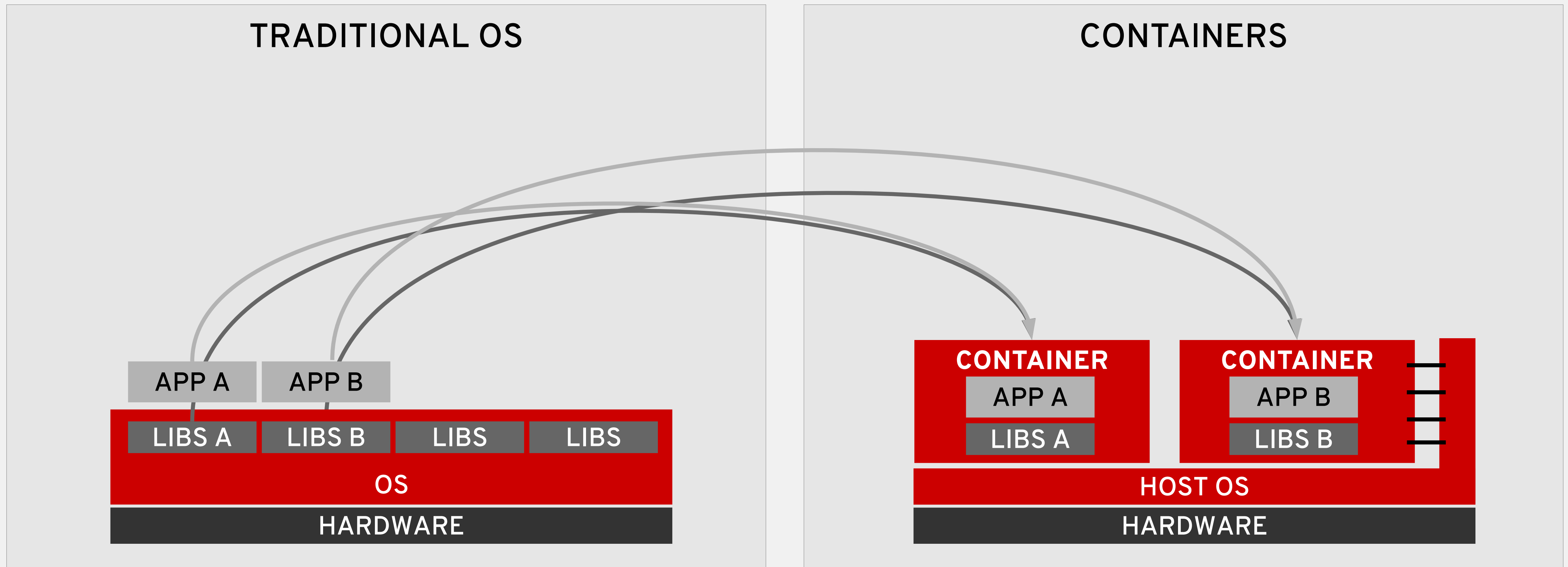


IT'S MAGIC!



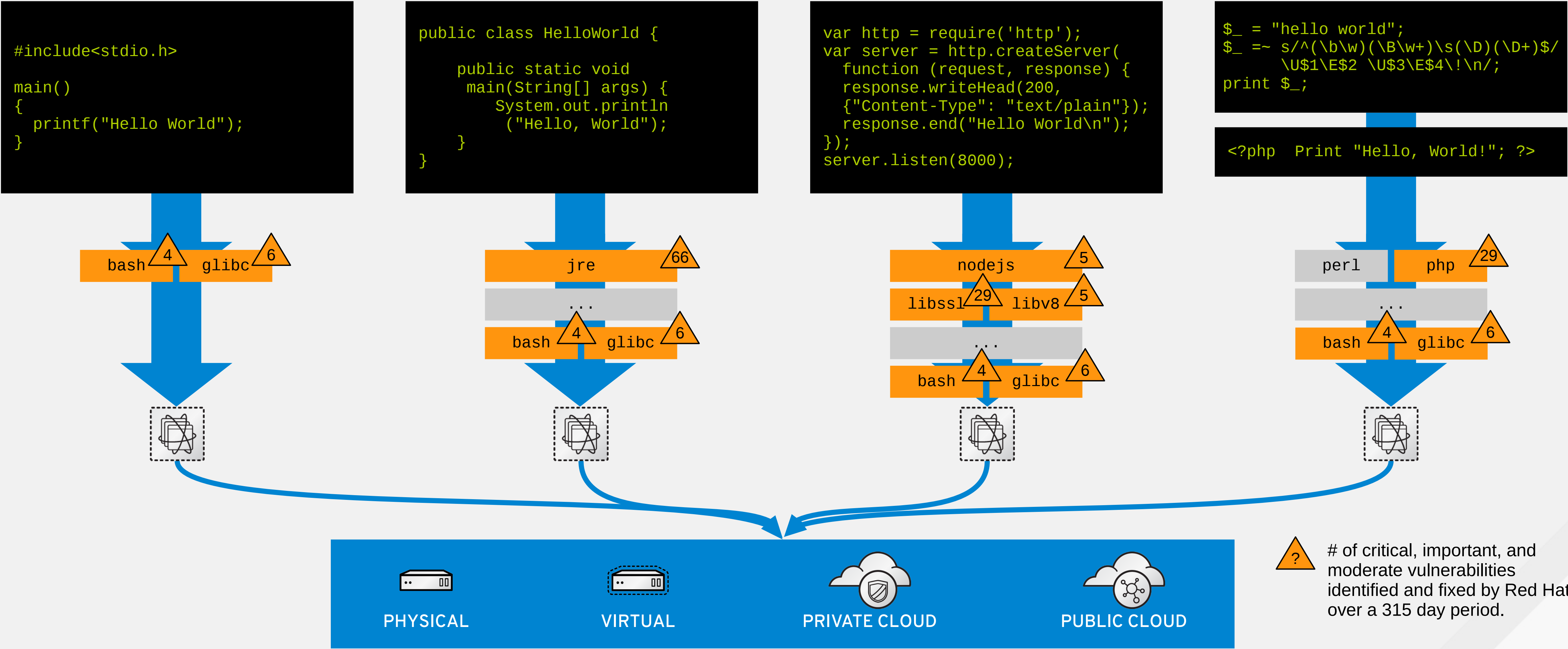


# CONTAINERS ARE AN OS TECHNOLOGY





# SECURITY IMPLICATIONS





AND THAT'S WHY THE OPS GUY IS FREAKING OUT

Run away!

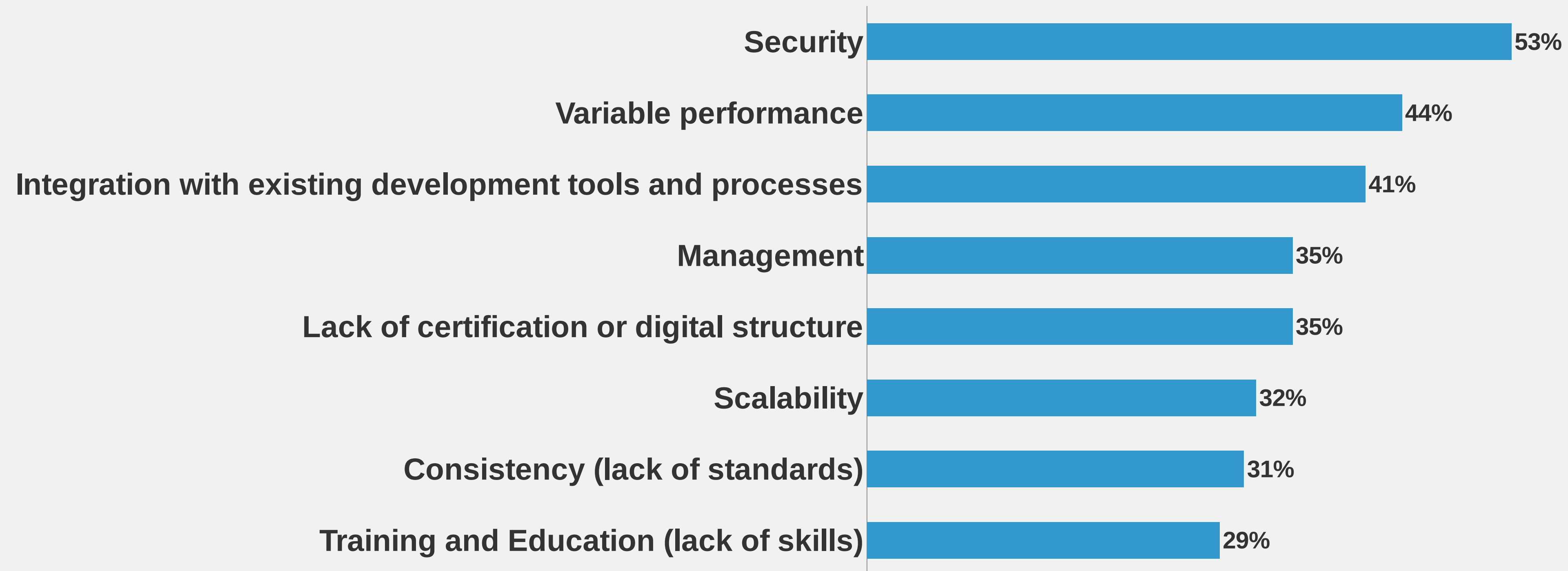




# TOP CURRENT CONTAINER CHALLENGES

What are the top three challenges your organization has experienced so far in its use of containers?

■ Total mentions (sum of responses of '1', '2', and '3')



Base: 171 IT and Developer/programmer decision-makers at companies with 500+ employees in APAC, EMEA, and NA  
Source: A commissioned study conducted by Forrester Consulting on behalf of Red Hat, January, 2015

# RED HAT'S CONTAINER STRATEGY

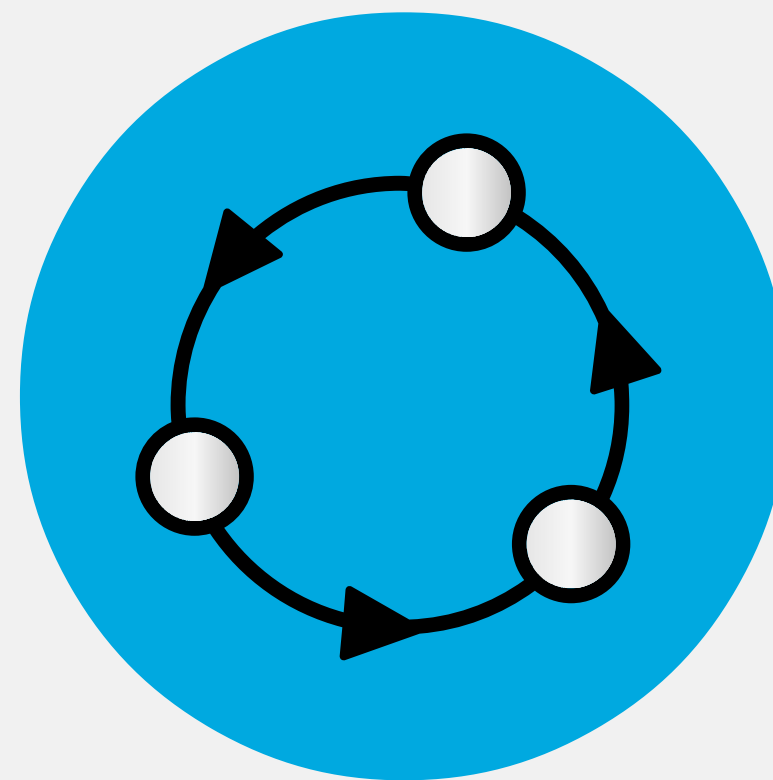
## GUIDING PRINCIPLES

- 1) Bring containers to the enterprise
- 2) Address adoption challenges

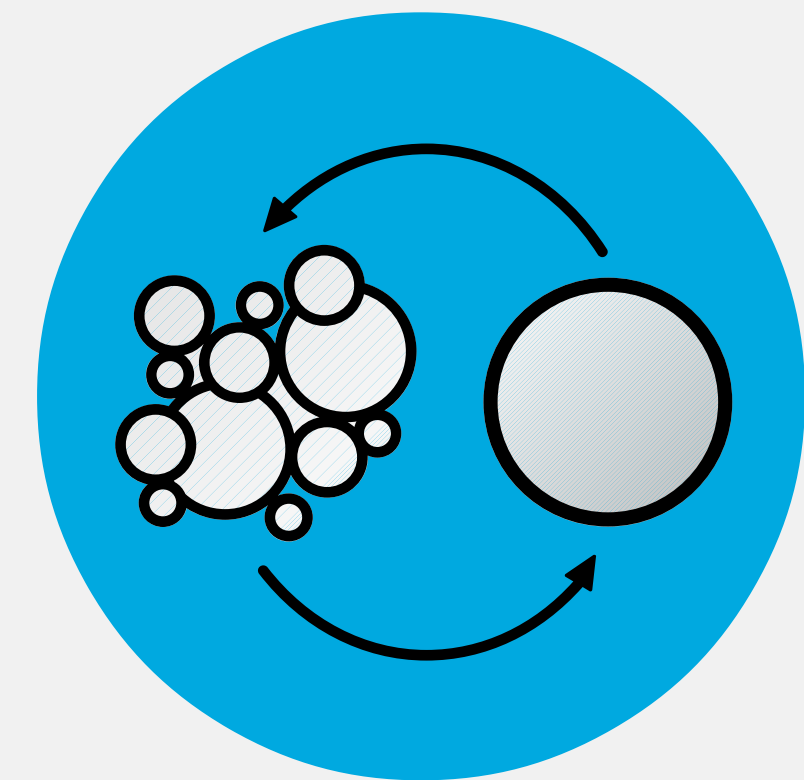
- 3) Make it all about the application
- 4) Enable choice



**TRUST**



**PORTABILITY**

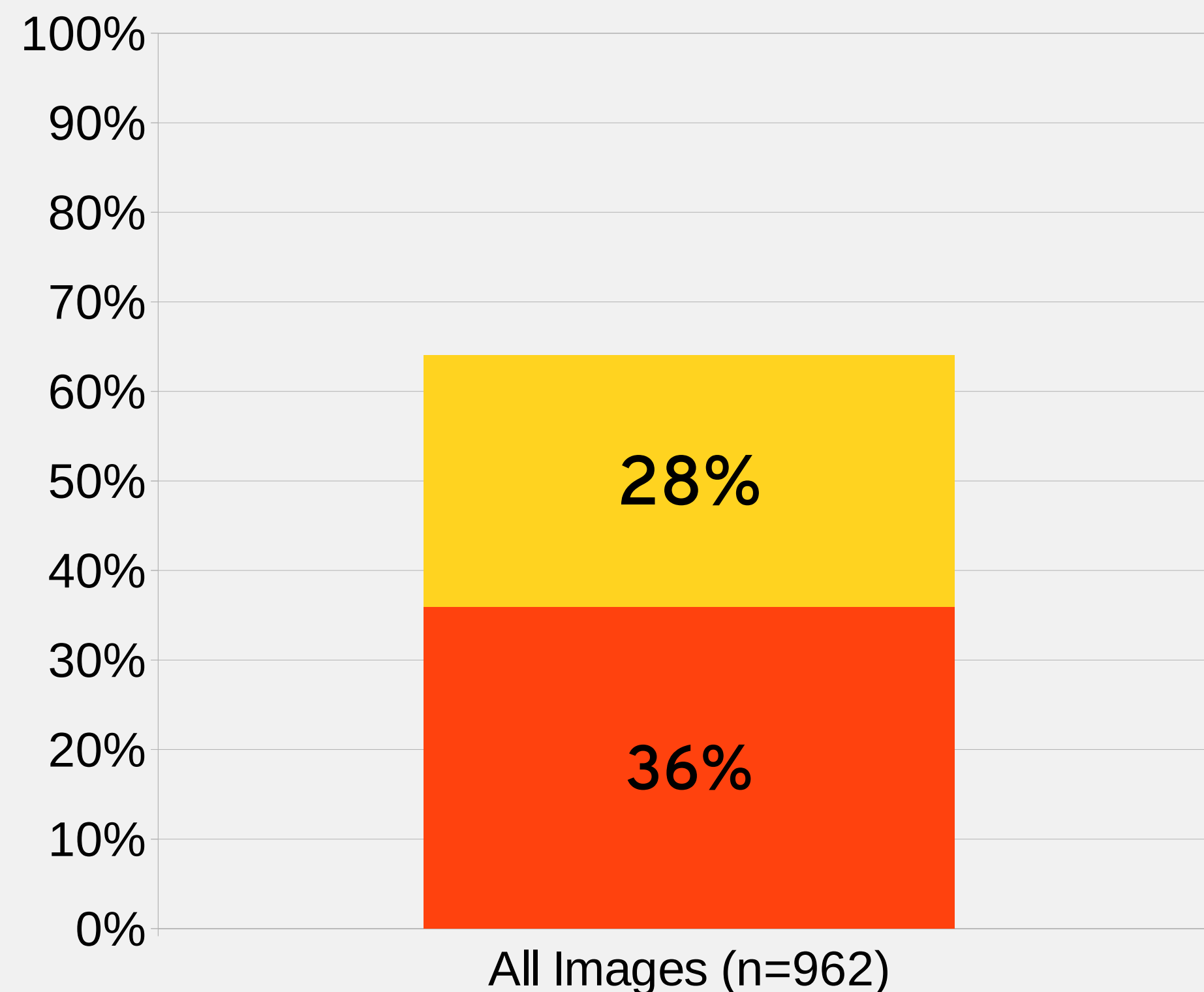


**INTEGRATED**



# SECURITY IS DEFINED INSIDE THE CONTAINER

**36%** of official images available for download contain high priority security vulnerabilities



- High vulnerabilities: ShellShock (bash), Heartbleed (OpenSSL), etc.
- Medium vulnerabilities: Poodle (OpenSSL), etc.
- Low vulnerabilities: gcc: array memory allocations could cause integer overflow

■ Medium priority  
■ High priority

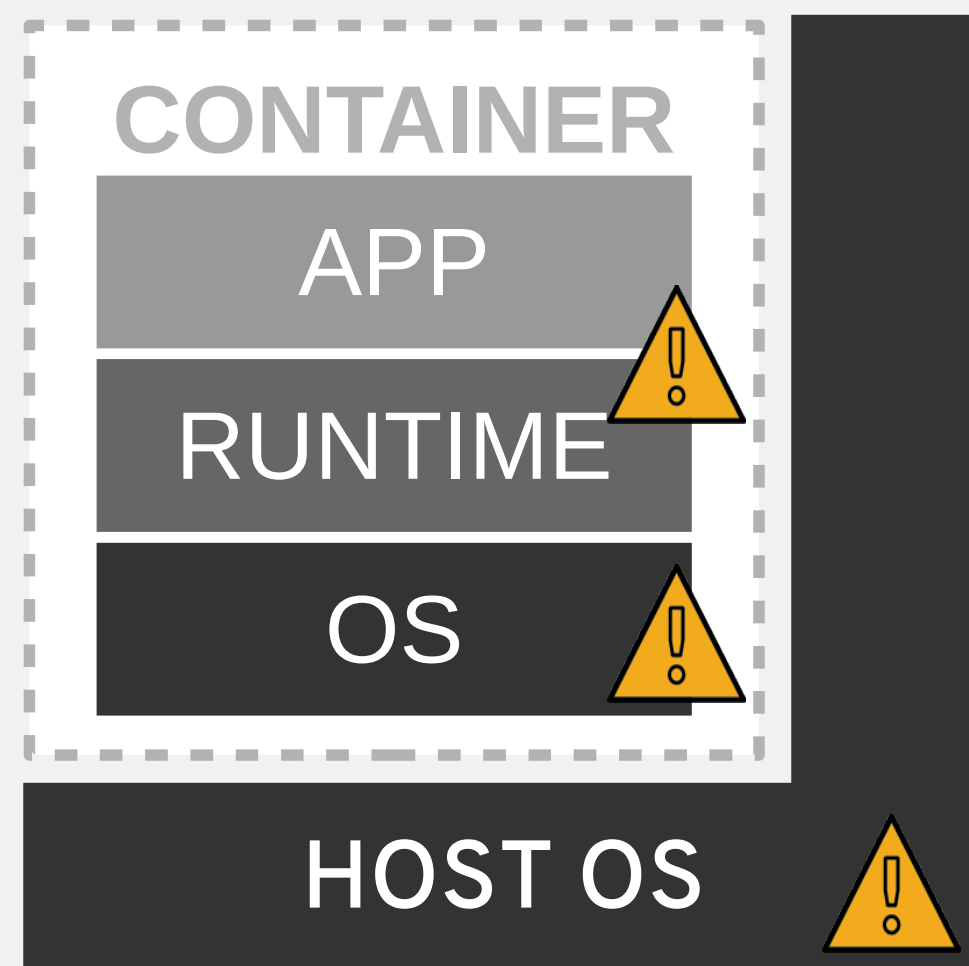
Source: *Over 30% of Official Images in Docker Hub Contain High Priority Security Vulnerabilities*, Jayanth Gummaraju, Tarun Desikan, and Yoshio Turner, BanyanOps, May 2015 (<http://www.banyanops.com/pdf/BanyanOps-AnalyzingDockerHub-WhitePaper.pdf>)



# RED HAT CONTAINER CERTIFICATION

## UNTRUSTED

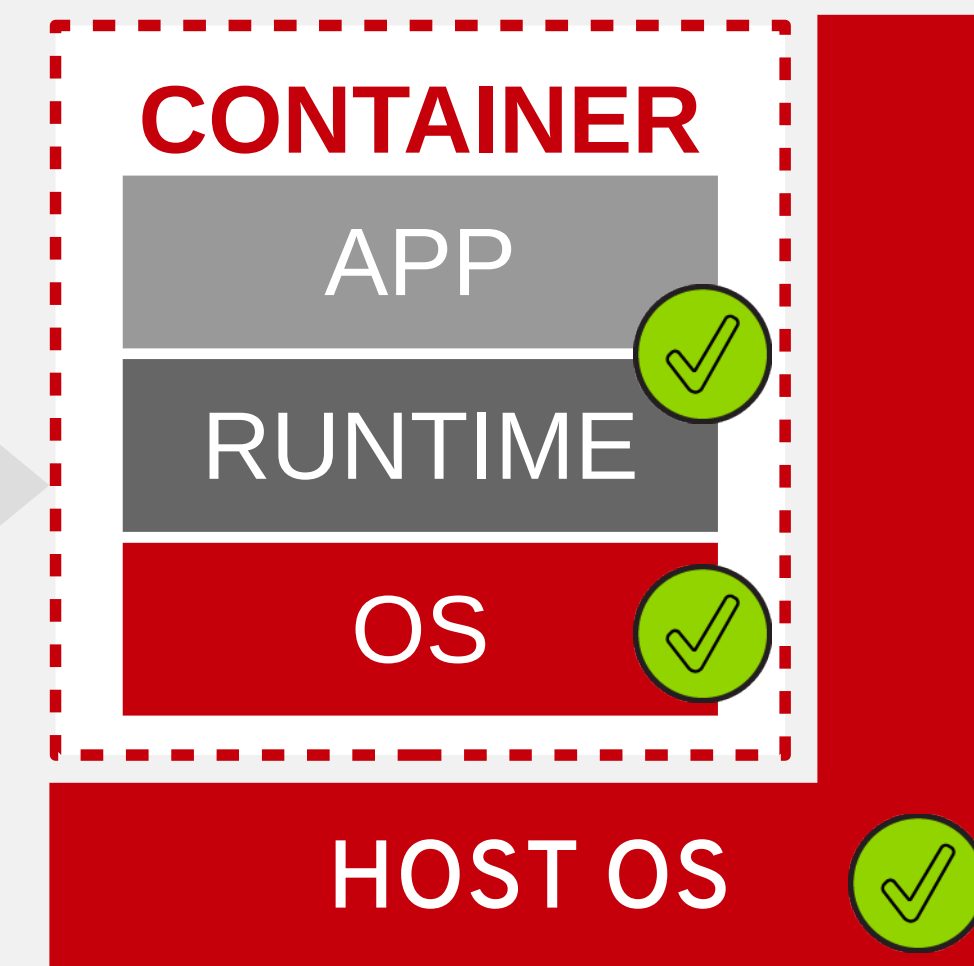
- Will what's inside the containers compromise your infrastructure?
- How and when will apps and libraries be updated?
- Will it work from host to host?



- Container Development Kit
- Certification as a service
- Certification catalog
- Red Hat Container Registry

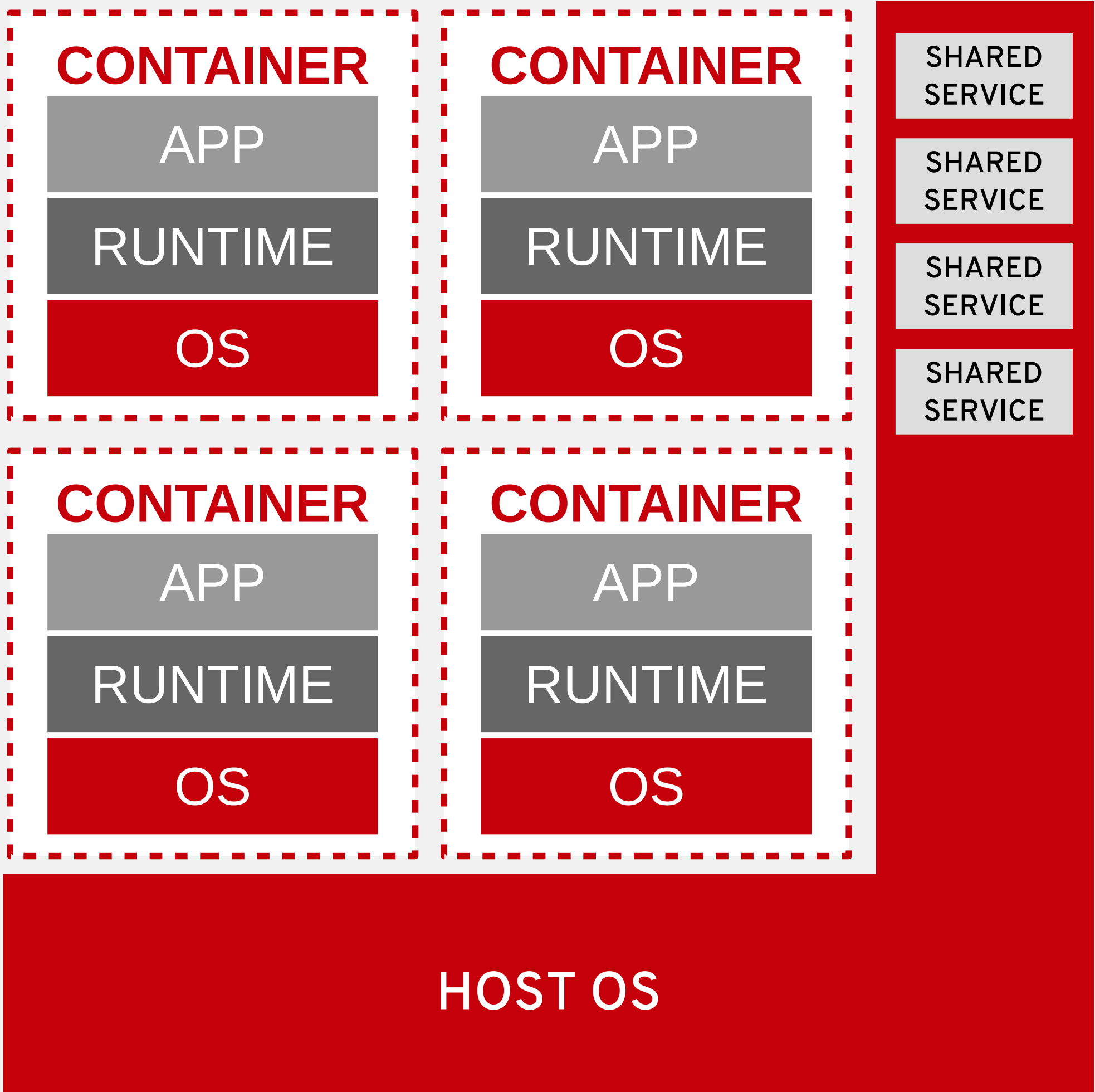
## RED HAT CERTIFIED

- Trusted source for the host and the containers
- Trusted content inside the container with security fixes available as part of an enterprise lifecycle
- Portability across hosts



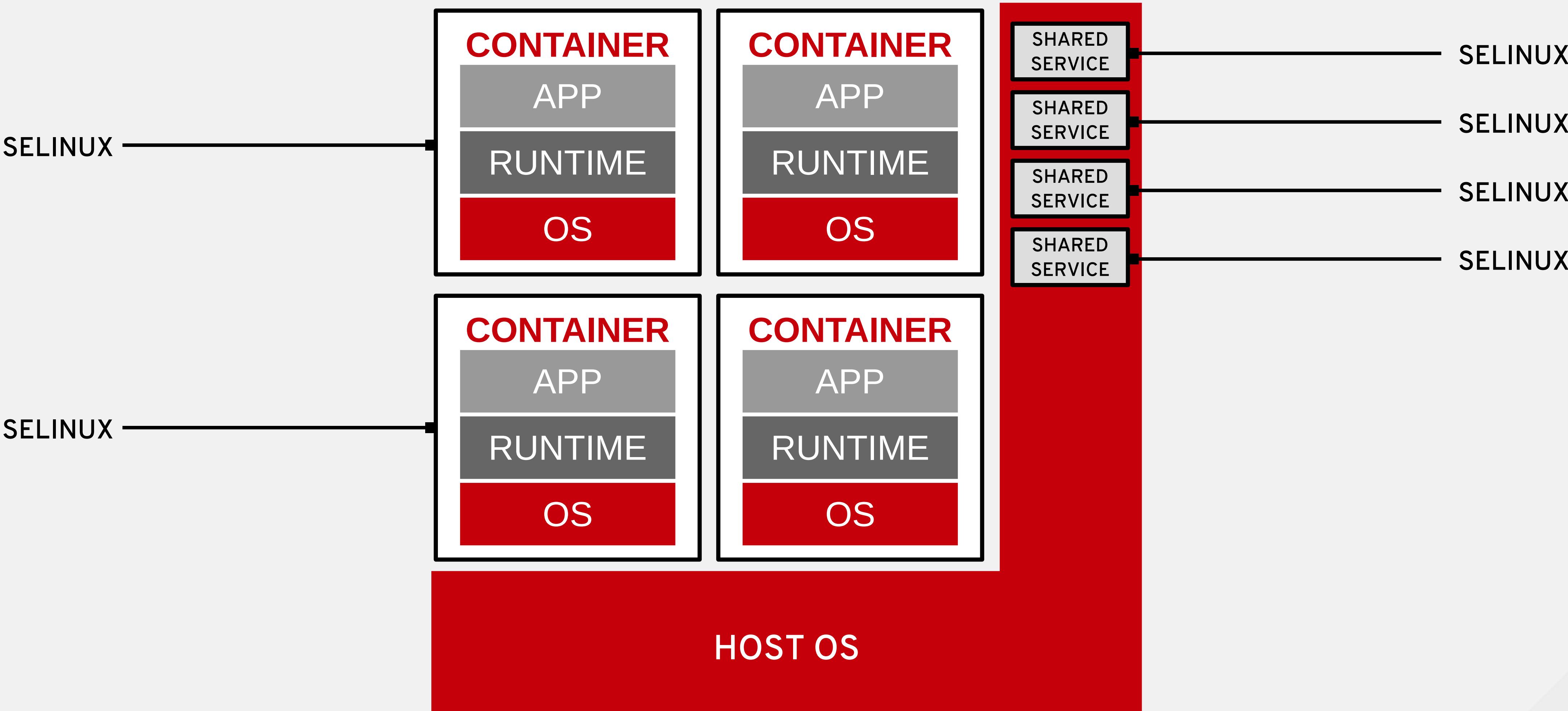


# CONTAINER ISOLATION



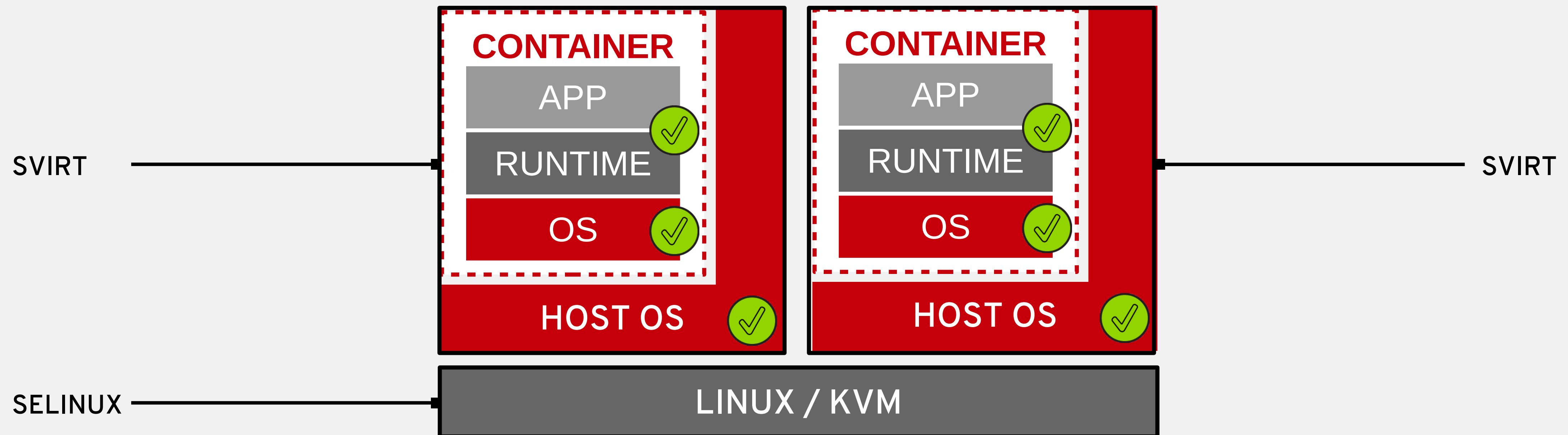


# CONTAINER ISOLATION WITH SELINUX





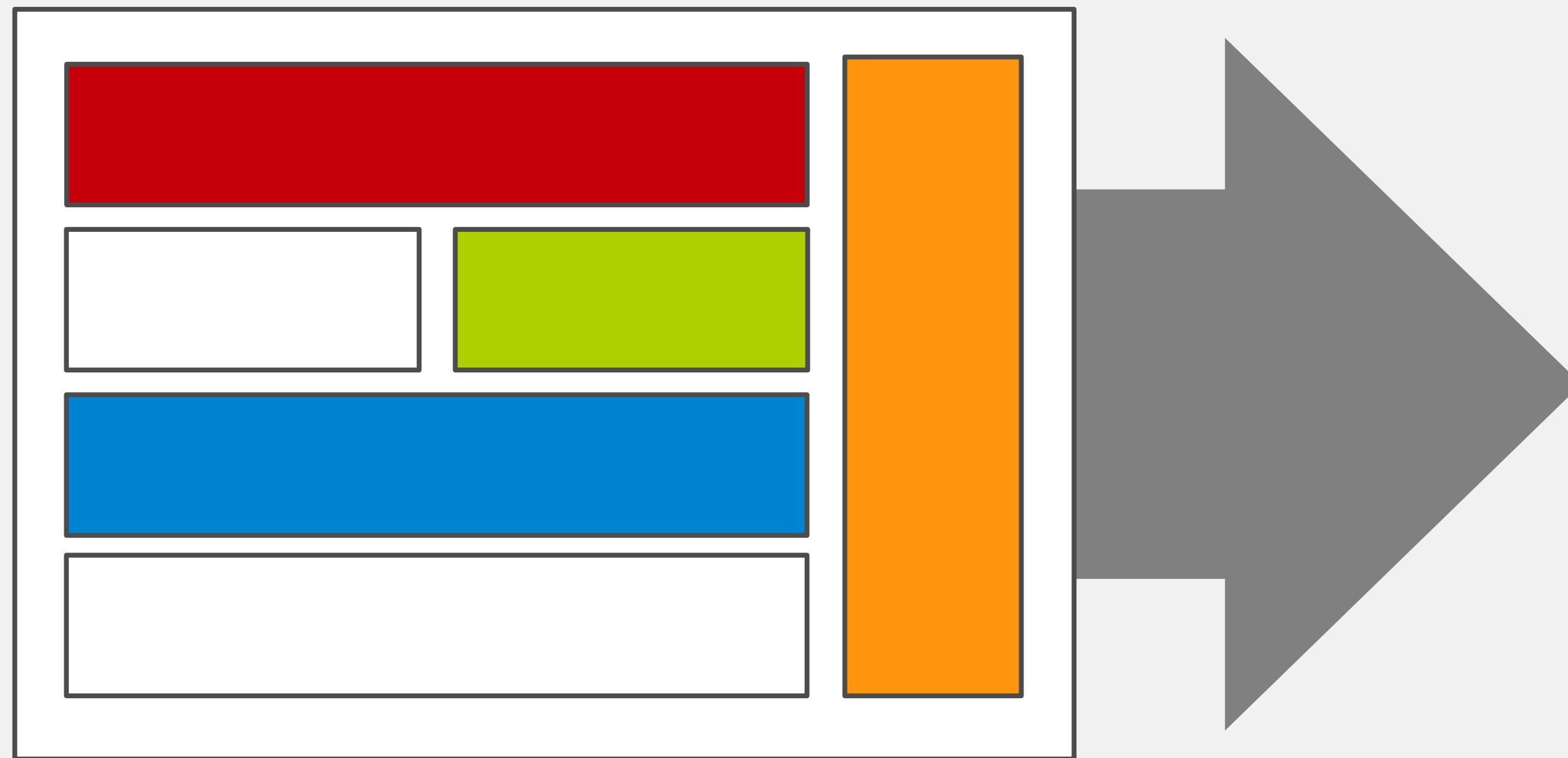
# VM ISOLATION WITH SELINUX



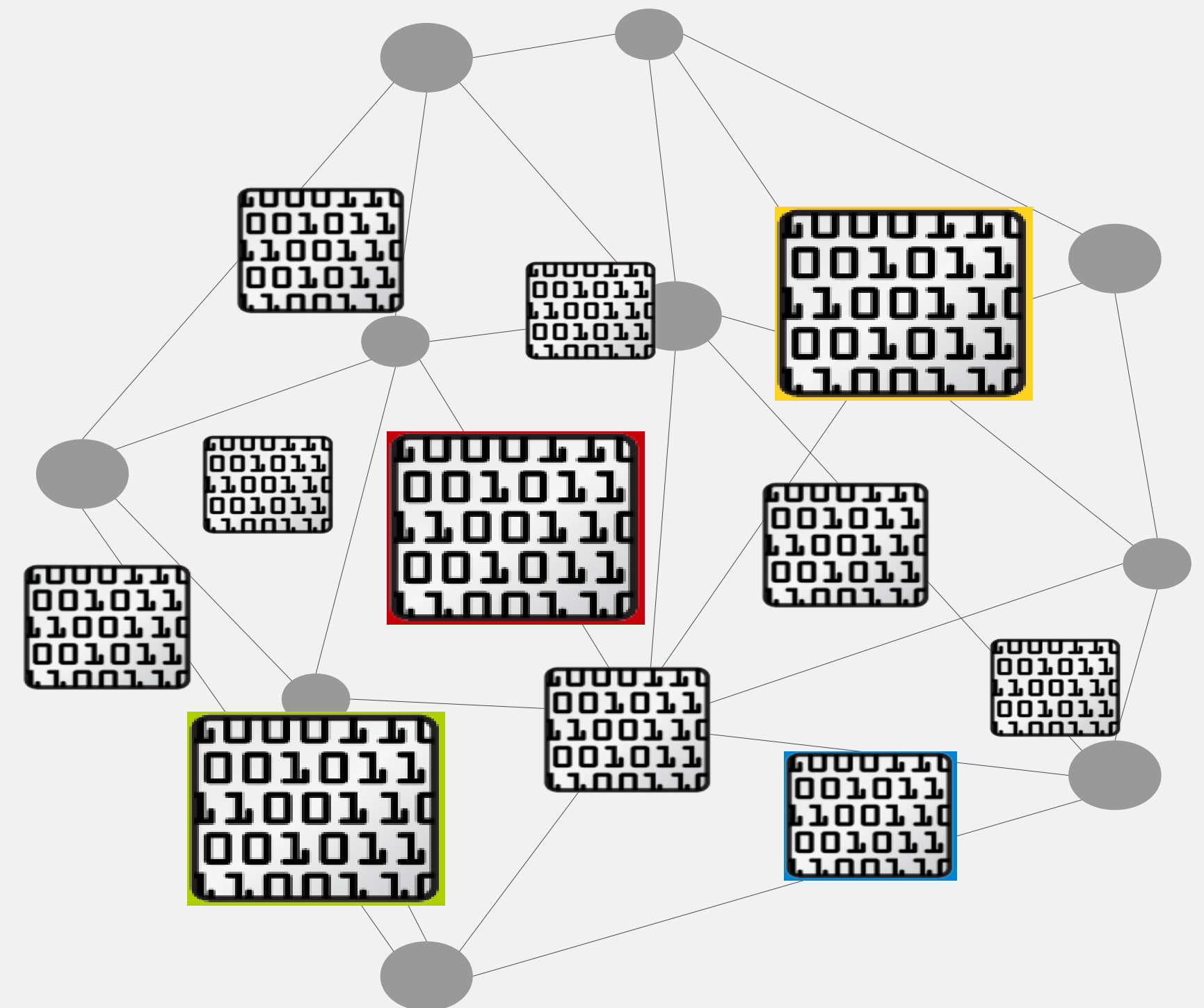


# NOT ALL APPLICATIONS ARE SIMPLE

Multi-container applications are the norm, not the exception



MONOLITHIC/LAYERED



MICROSERVICES



# COMPLEXITY OF CONTAINERS AT SCALE

## CONTAINERIZING THE DATACENTER REQUIRES PLANNING

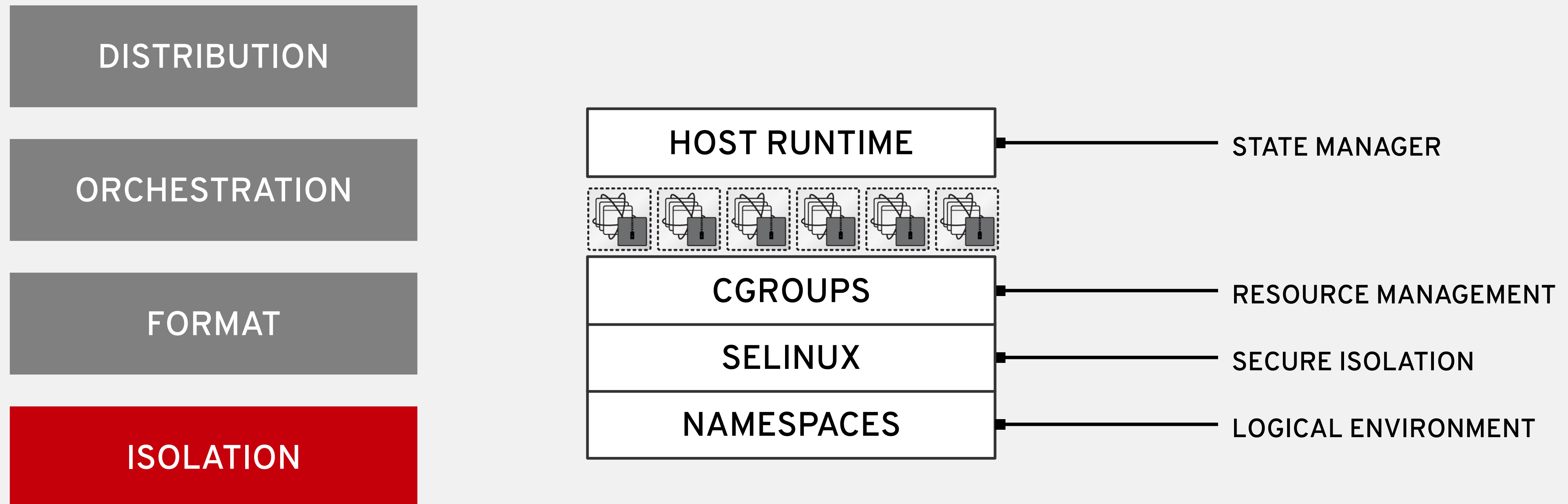


Organizations need a secure and reliable foundation on which they can run and orchestrate multi-container based applications at scale



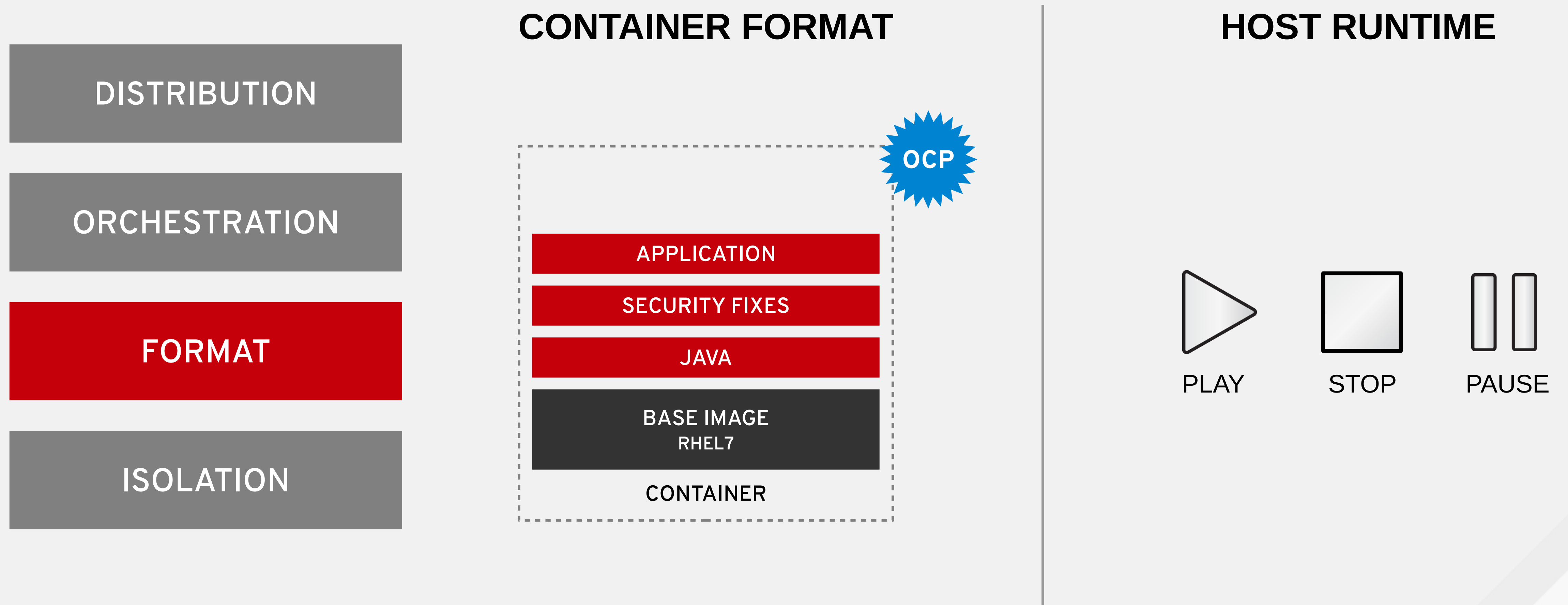
# INTEROPERABILITY THROUGH OPEN STANDARDS

Driving standards for containerization in four key areas





# INTEROPERABILITY THROUGH OPEN STANDARDS





# INTEROPERABILITY THROUGH OPEN STANDARDS

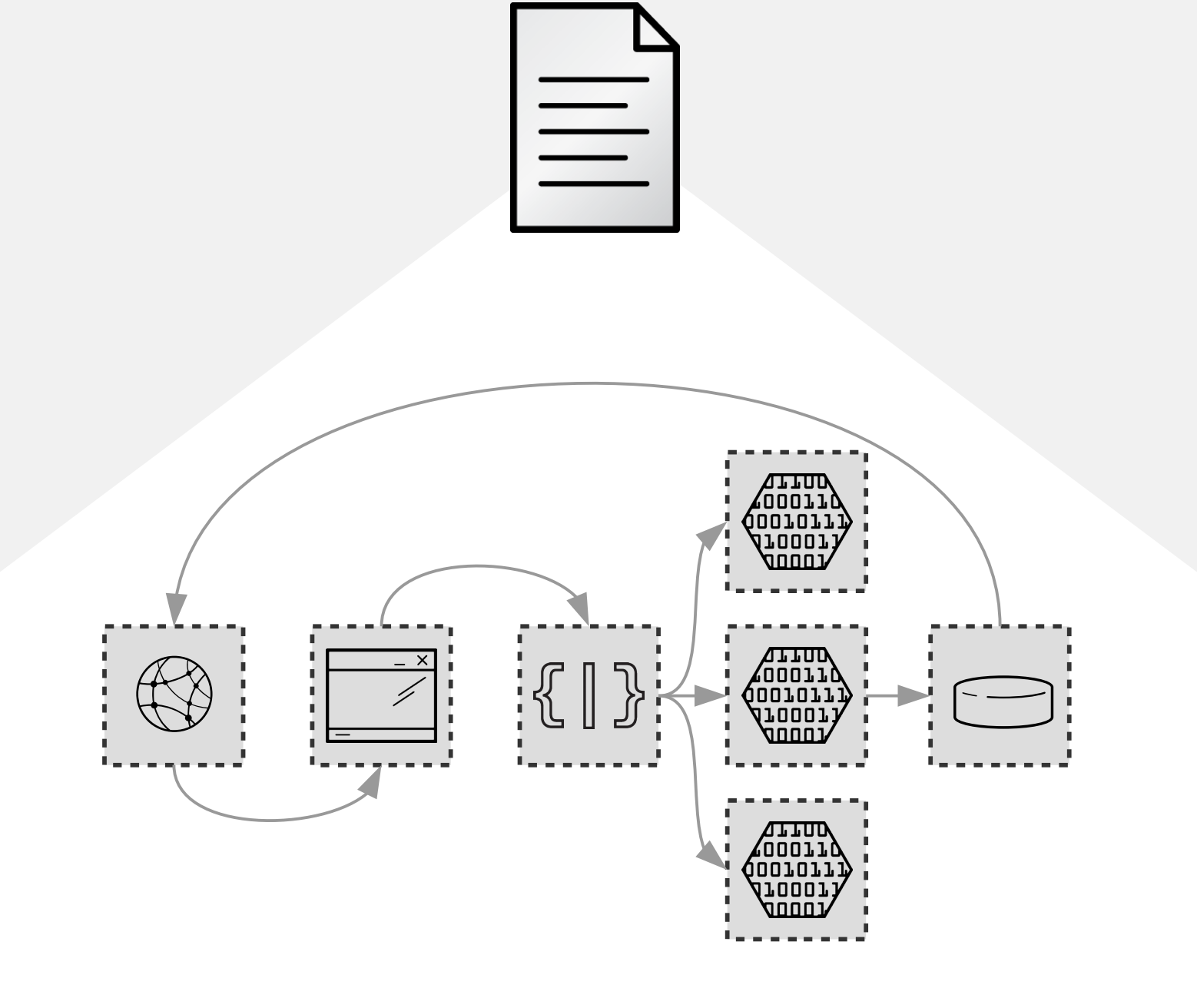
DISTRIBUTION

ORCHESTRATION

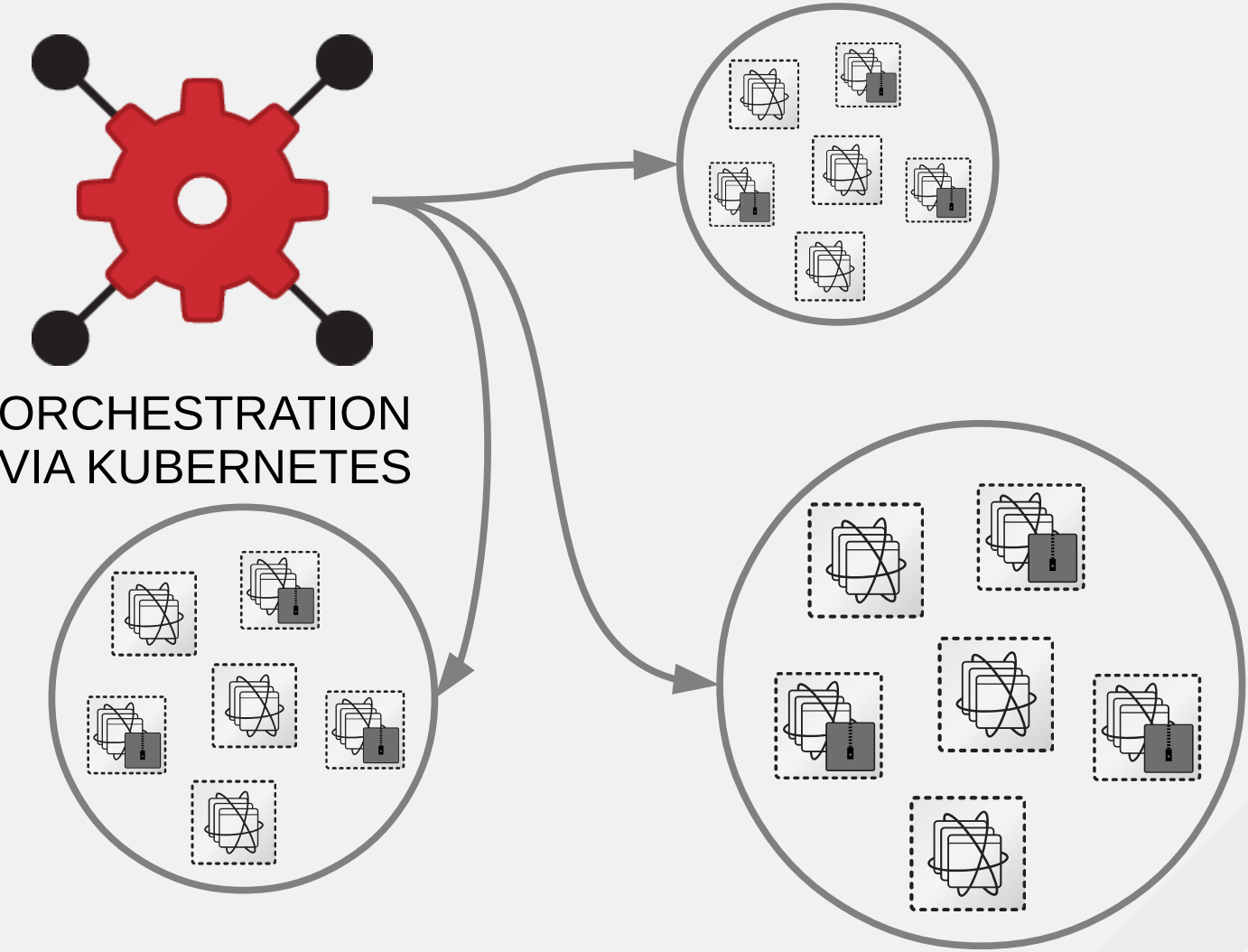
FORMAT

ISOLATION

## DESCRIBE MULTI-CONTAINER APPLICATIONS



## TRANSPARENT ORCHESTRATION ACROSS CONTAINER HOSTS





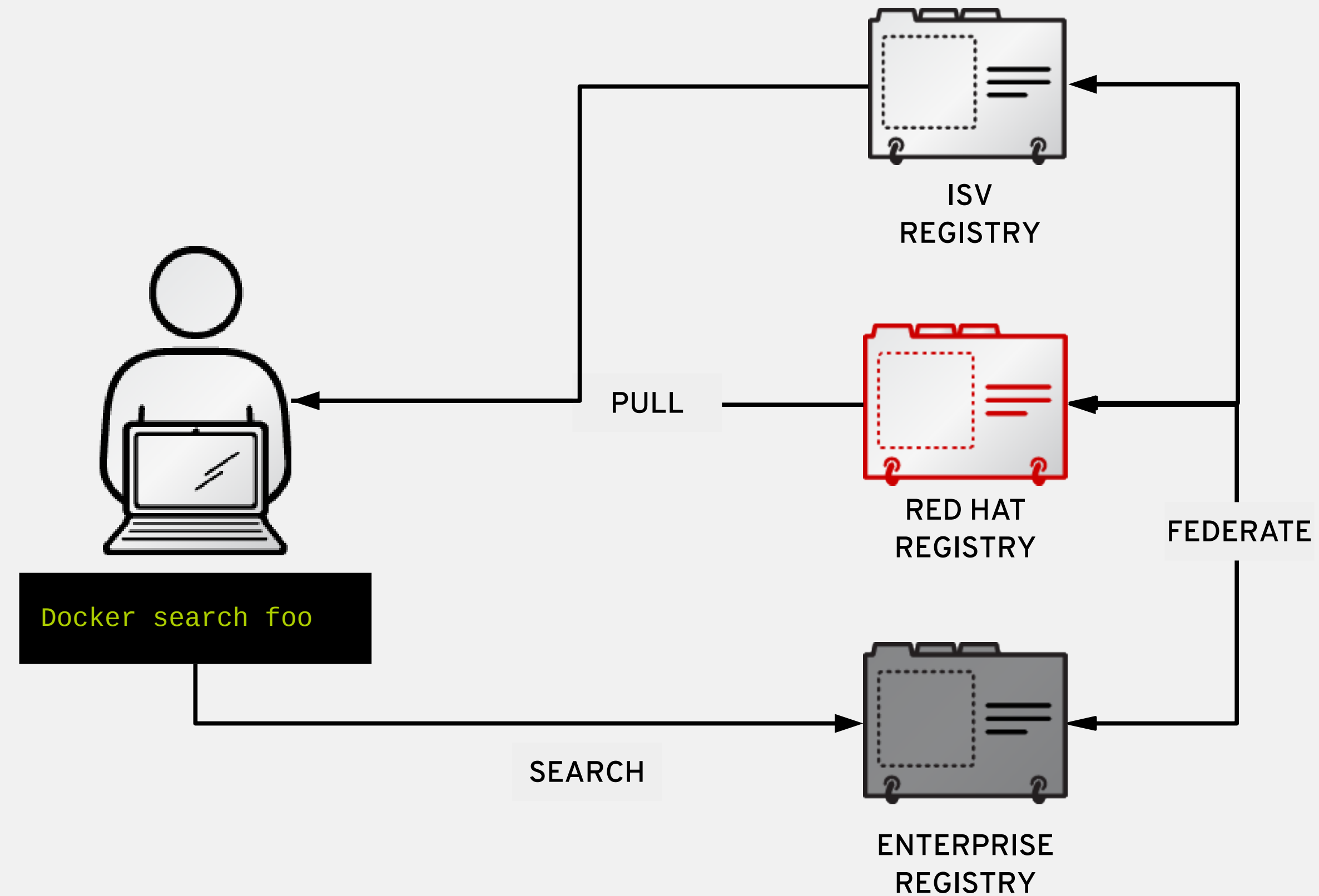
# INTEROPERABILITY THROUGH OPEN STANDARDS

DISTRIBUTION

ORCHESTRATION

FORMAT

ISOLATION





# INTEGRATED APPLICATION DELIVERY





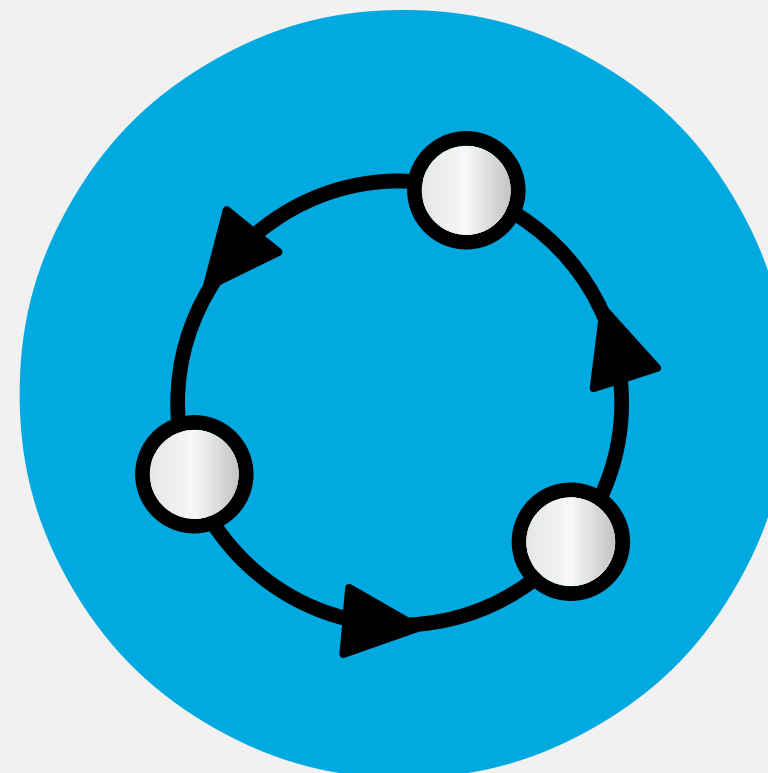
# ATOMIC APPLICATION ARCHITECTURE

**ATOMIC**  
**Immutable**  
Separation of Concerns  
**Annotated**  
**LIGHTWEIGHT**  
**Not Configured**

**ELASTIC**  
**Distributed**  
Cluster is the Computer  
**SERVICE AGGREGATION** **Dynamic**  
**Location Awareness**



INTROSPECTION



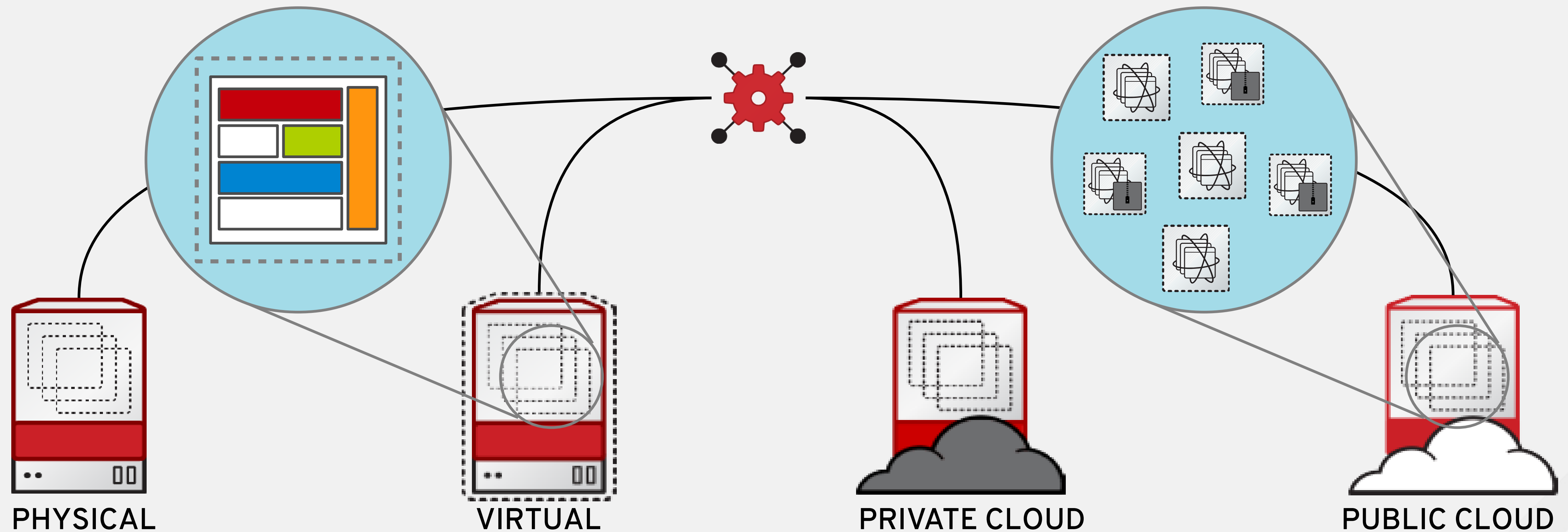
LIFECYCLE  
MANAGEMENT



RESILIENCY



# CONSISTENT ACROSS TRADITIONAL AND CLOUD-READY APPLICATIONS



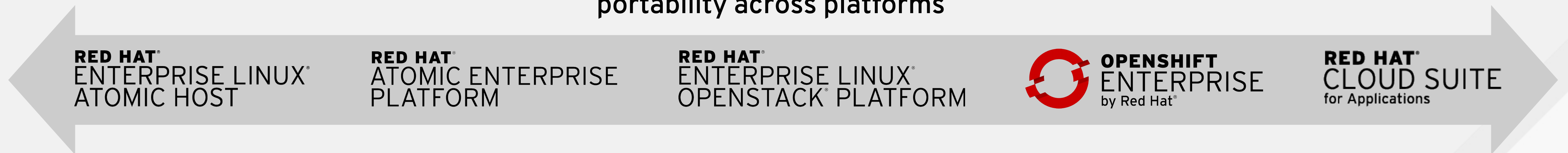


# PROVEN APPLICATION PORTABILITY

portability across environments



portability across platforms

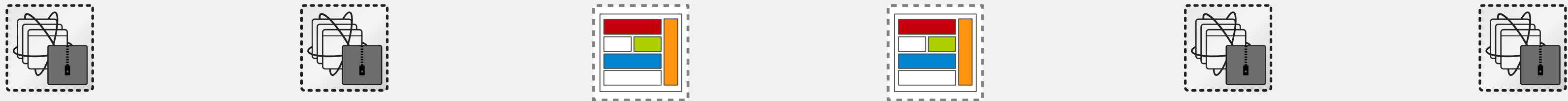




# ATOMIC APPLICATION ARCHITECTURE



CHOICE OF CONTENT



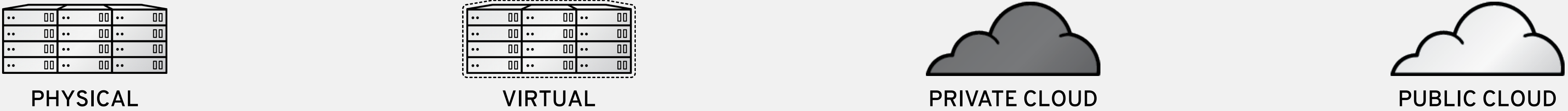
FLEXIBILITY AND SCALE



CHOICE OF HOST PLATFORMS

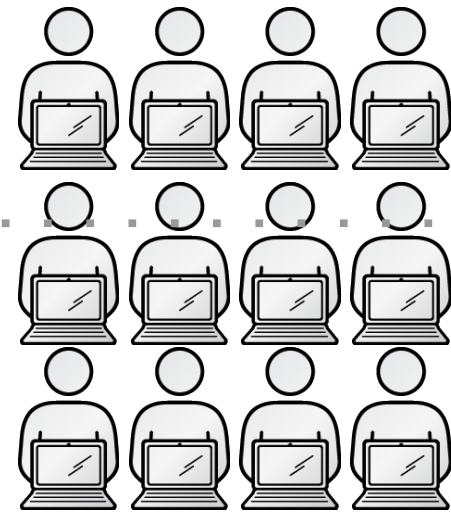


CHOICE OF INFRASTRUCTURE

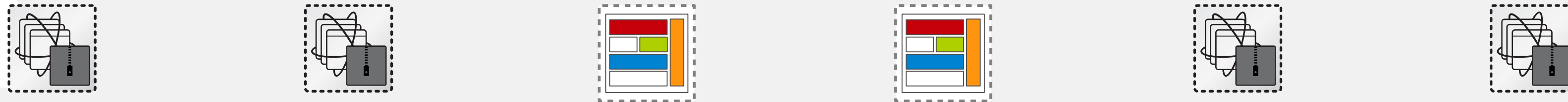




# ATOMIC APPLICATION ARCHITECTURE



## CHOICE OF CONTENT



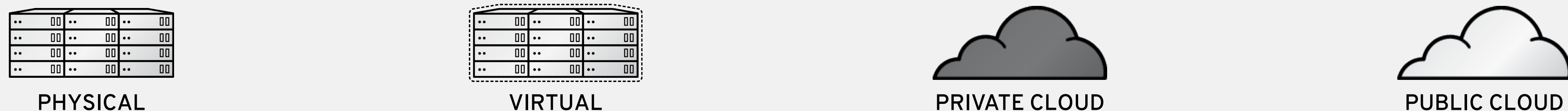
## FLEXIBILITY AND SCALE



## CHOICE OF HOST PLATFORMS



## CHOICE OF INFRASTRUCTURE

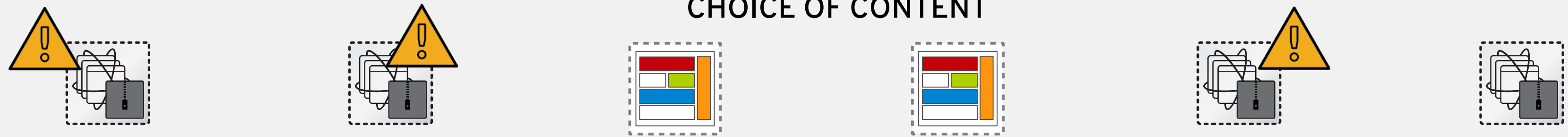




# ATOMIC APPLICATION ARCHITECTURE



## CHOICE OF CONTENT



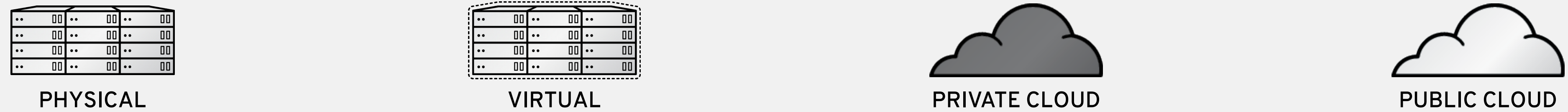
## FLEXIBILITY AND SCALE



## CHOICE OF HOST PLATFORMS



## CHOICE OF INFRASTRUCTURE



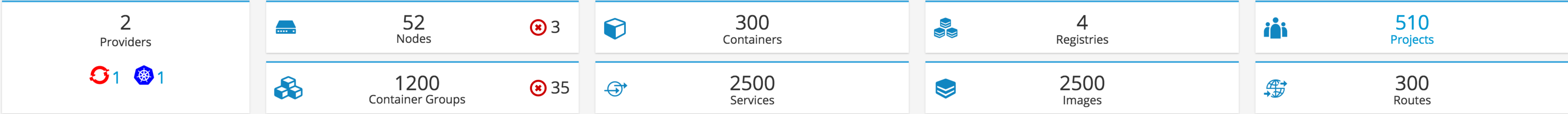
# ADMINISTRATION & CONTAINER MANAGEMENT

RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Brian Johnson

Cloud Intelligence Services Clouds Infrastructure Containers Control Automate Optimize Configure

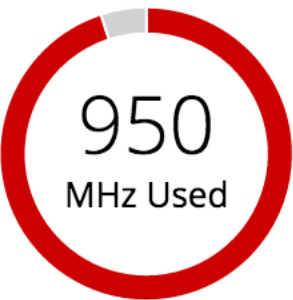
Dashboard Container Providers Projects Nodes Container Groups Routes Replicators Images Image Registries Services Containers Topology



## Utilization

### CPU

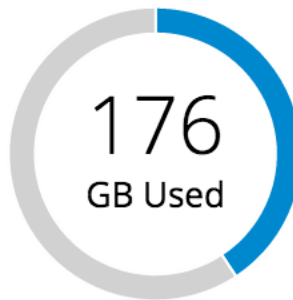
50 Available of 1000 MHz



Last 30 Days

### Memory

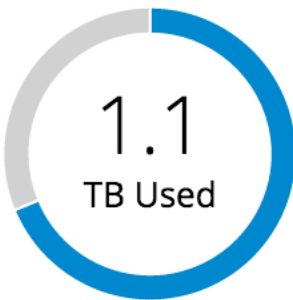
256 Available of 432 GB



Last 30 Days

### Storage

0.5 Available of 1.6 TB



Last 30 Days

### Network

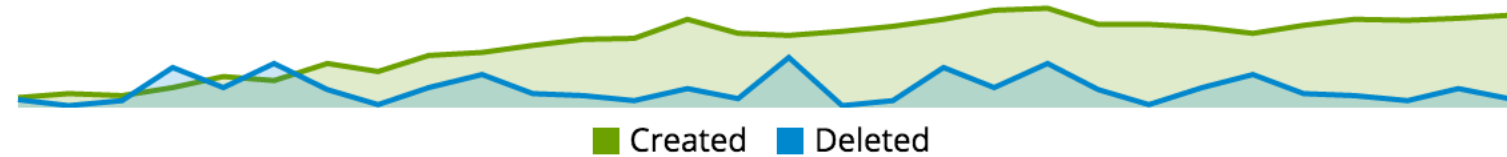
200 Available of 1300 Gbps



Last 30 Days

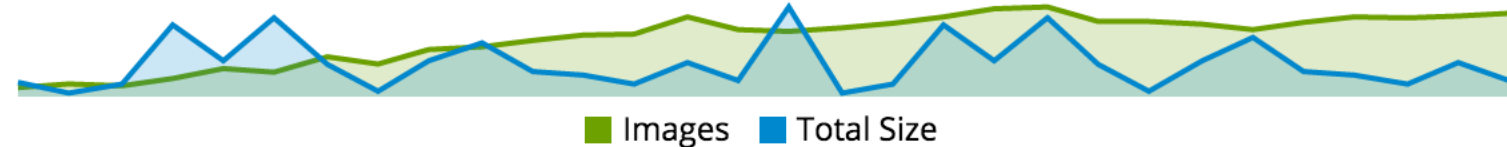
## Container Group Trends

Last 30 Days



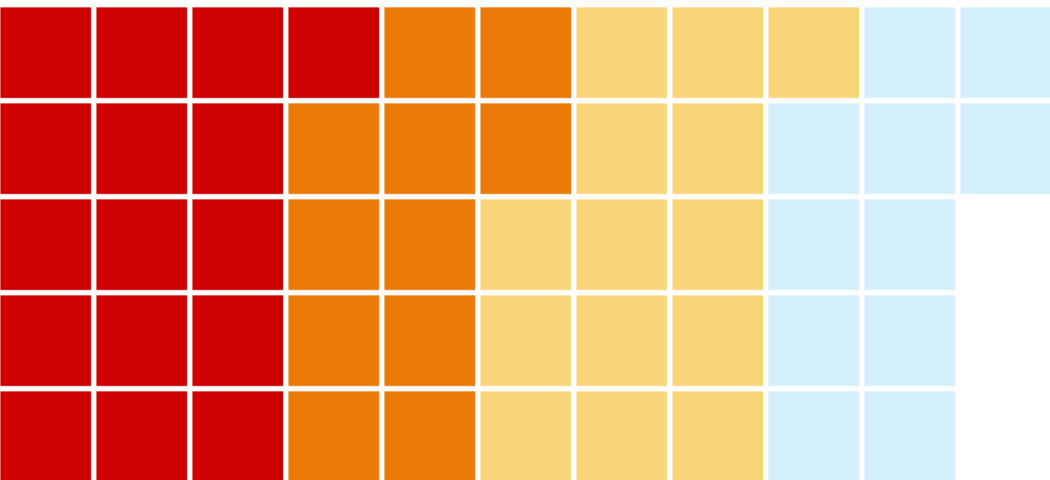
## Image Creation Trends

Last 30 Days



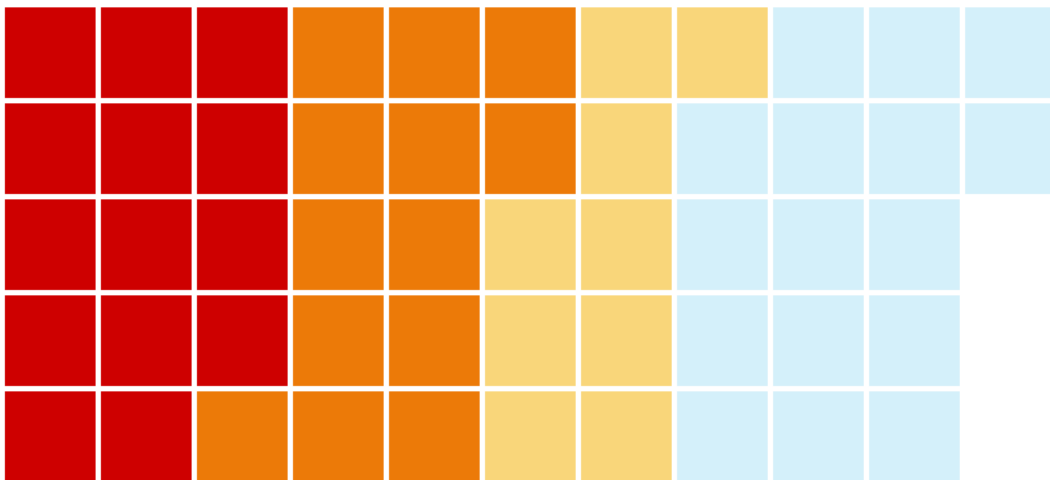
## Utilization By Nodes

### CPU

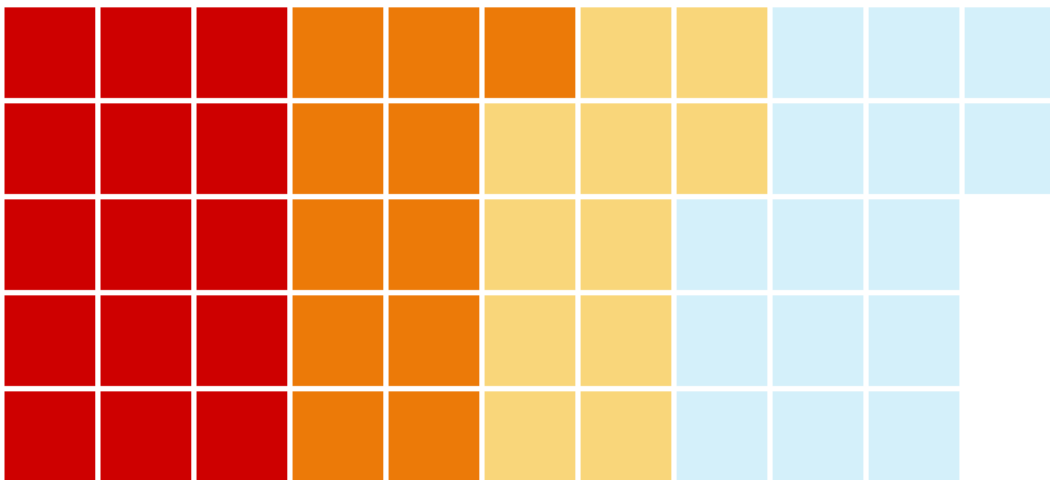


> 90% 80-90% 70-80% < 70%

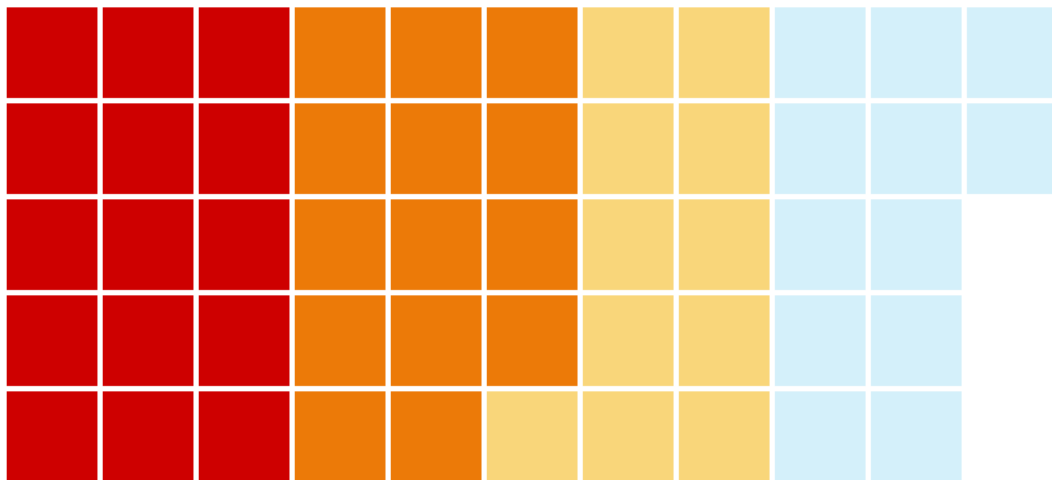
### Memory



### Storage



### Network



Very Low Low High Very High





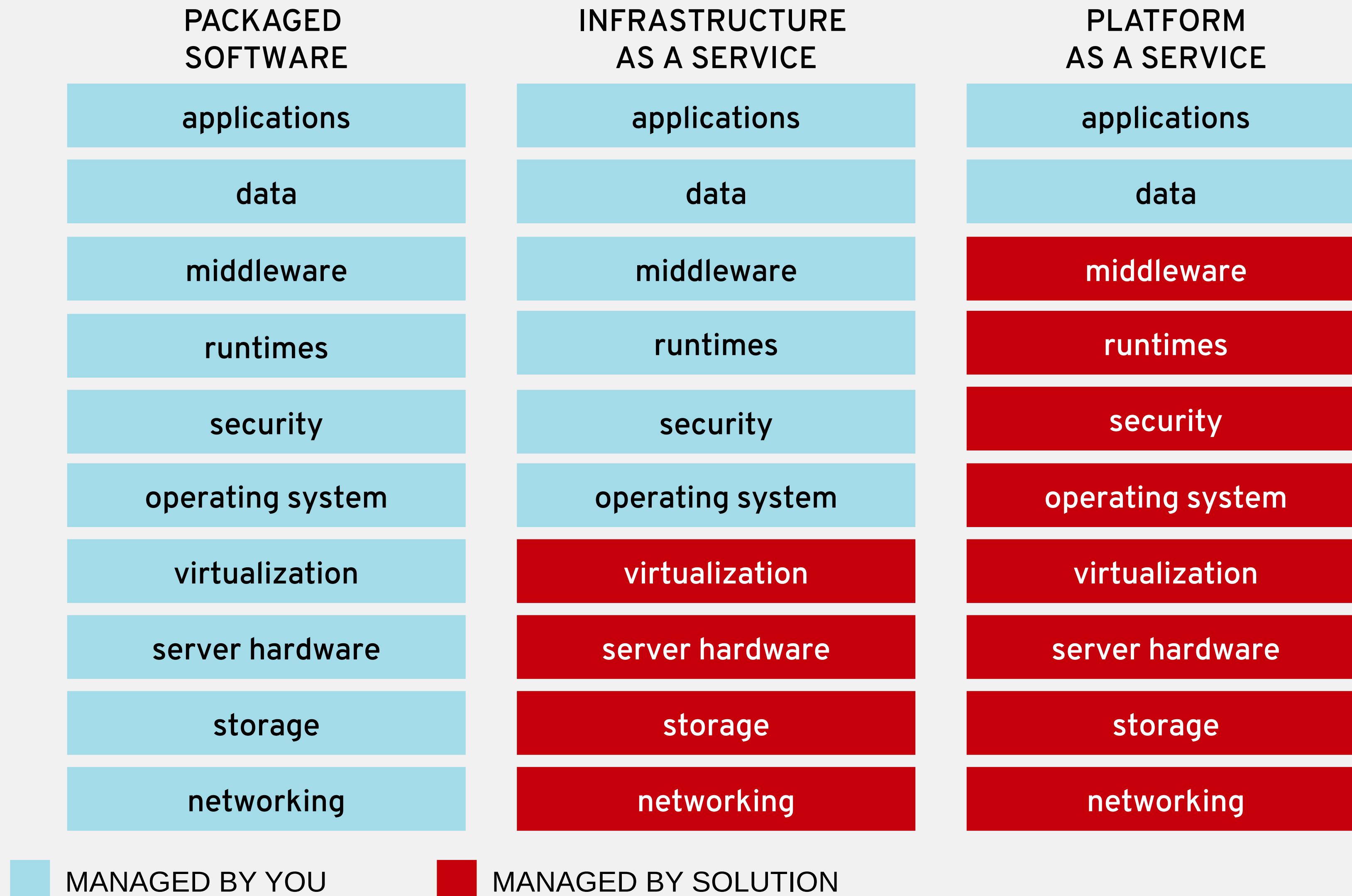
**AUTOMATION  
+ AUTONOMY**

---

**= AGILITY**

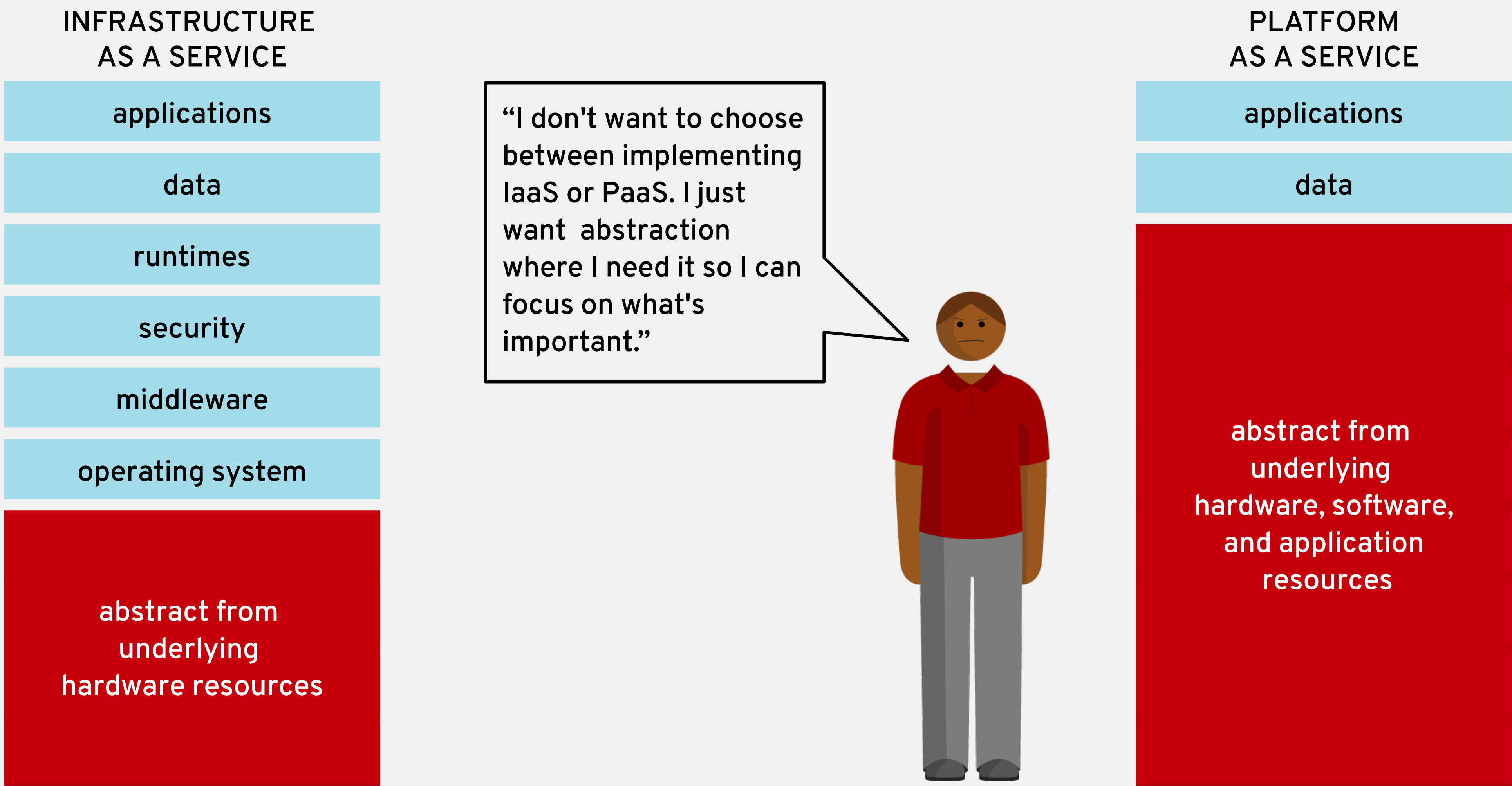


# LEVELS OF ABSTRACTION

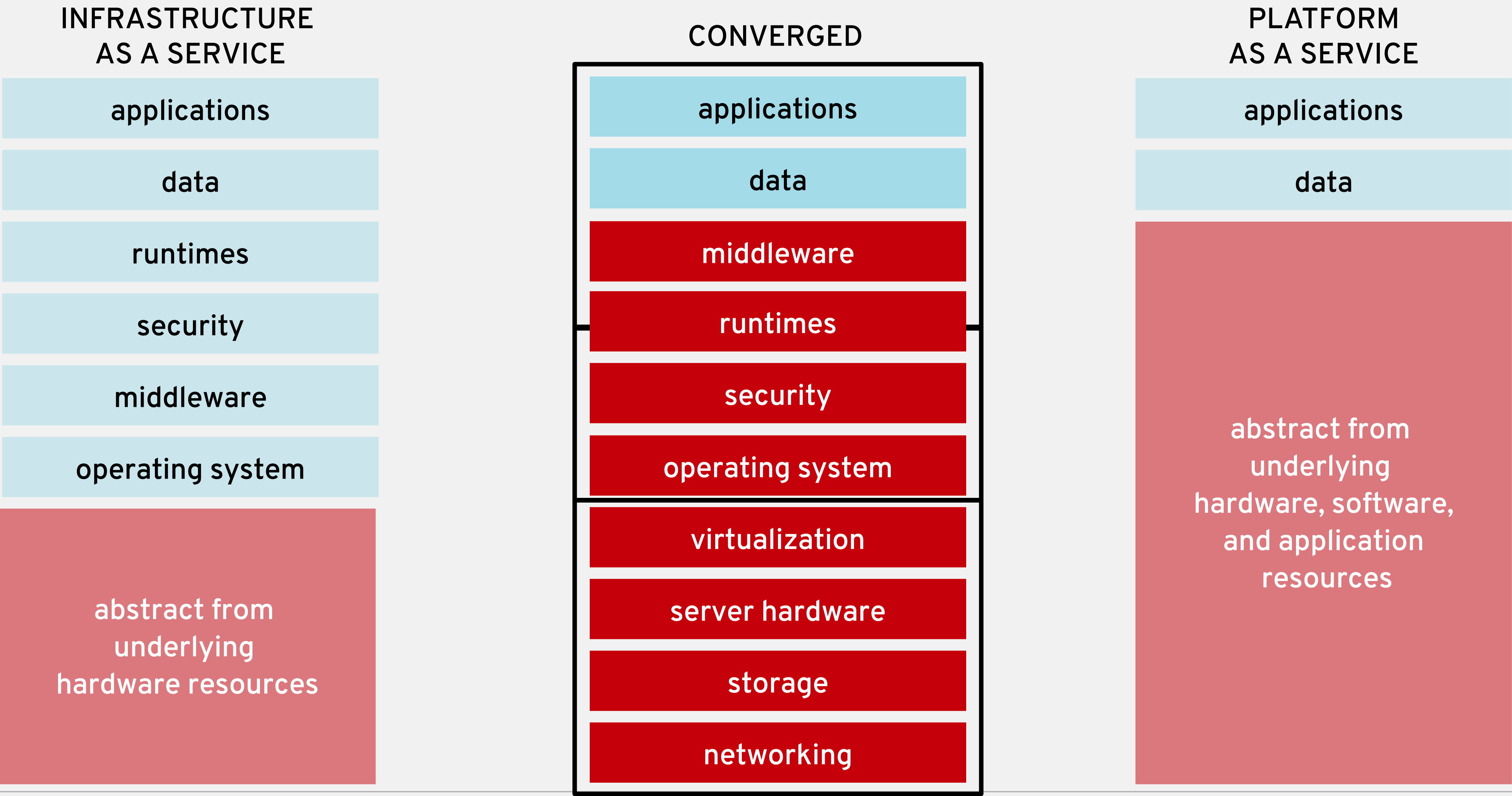




# CONVERGENCE OF IAAS AND PAAS

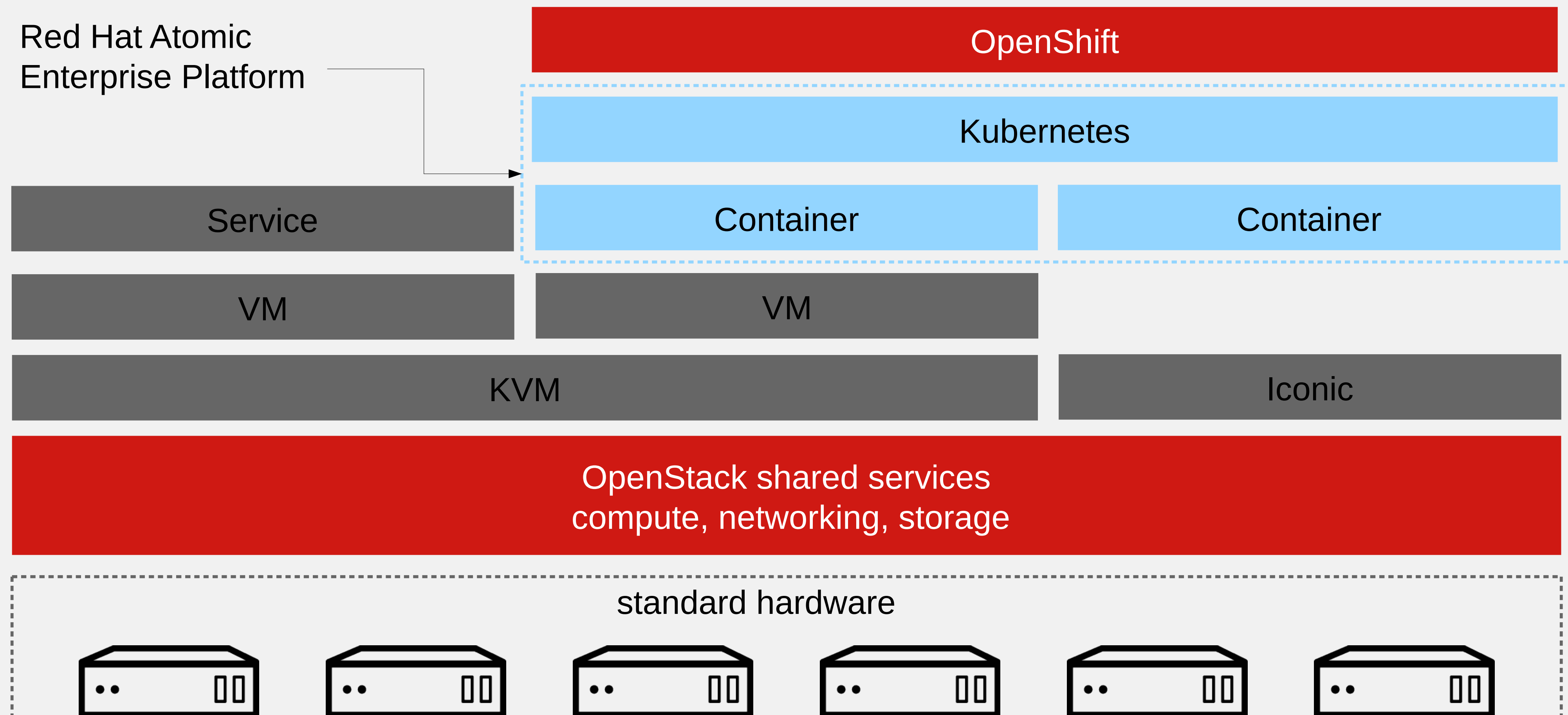


# REDEFINE AUTONOMY



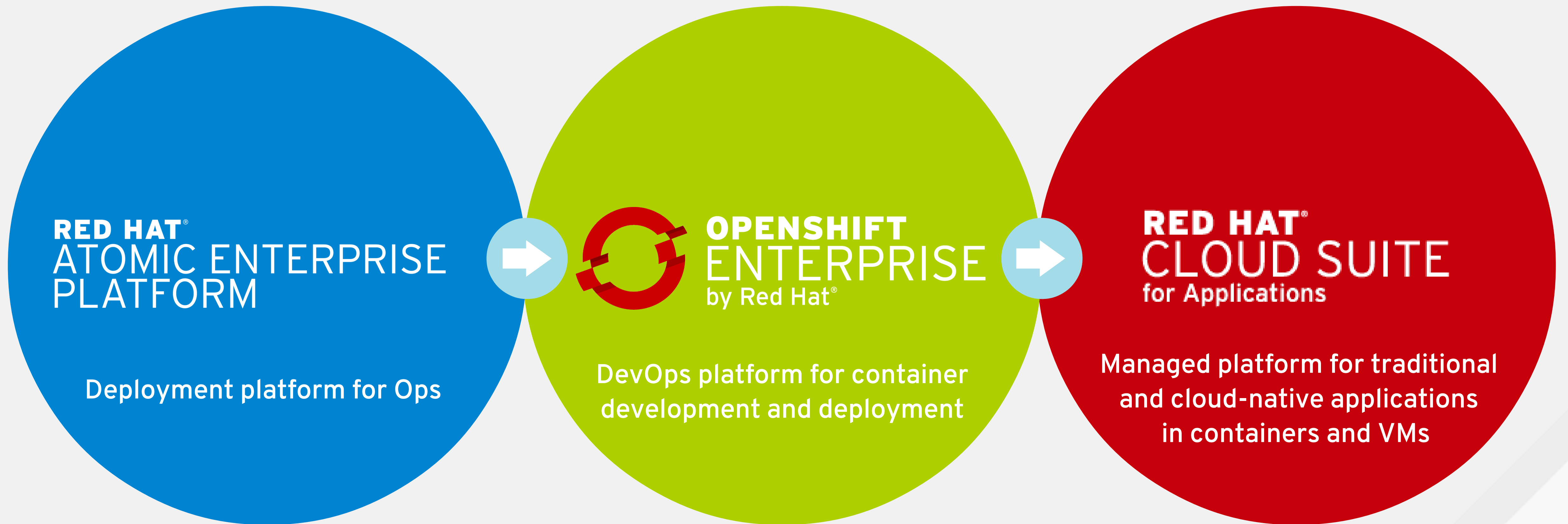


# CONVERGENCE OF IAAS AND PAAS PHYSICAL AND APPLICATION ABSTRACTION



# CONTAINER-BASED APPLICATION DELIVERY SOLUTIONS

A continuum of solutions to develop, run, and manage container-based applications

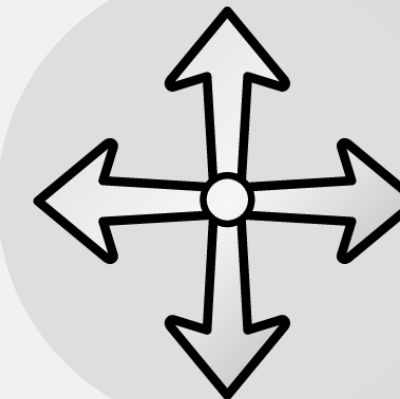
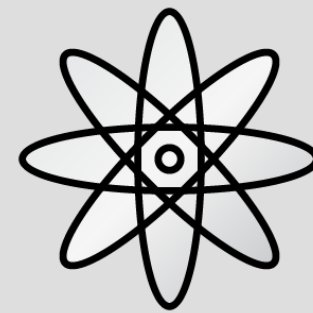




# RED HAT CONTAINER SOLUTIONS

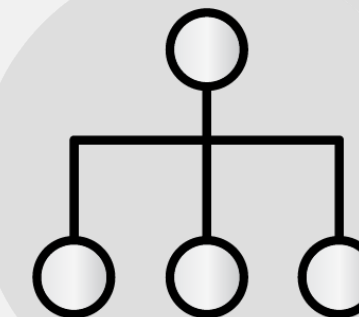
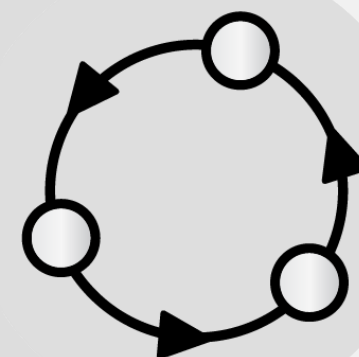
Develop, run, and manage container-based applications at scale

**MODERNIZE APP DELIVERY**  
STANDARDS AND AUTOMATION



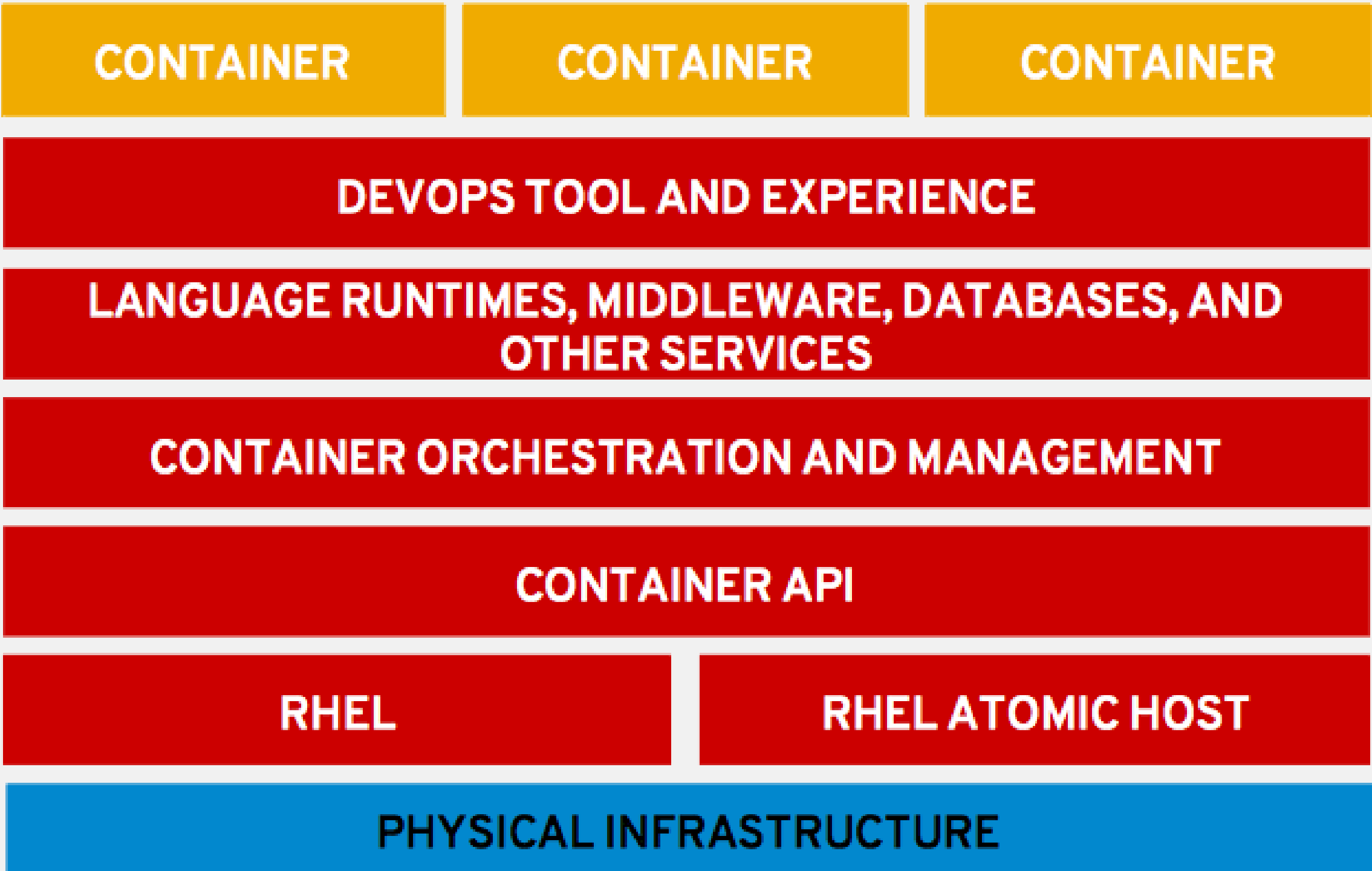
**GAIN AGILITY**  
FLEXIBILITY AND OWNERSHIP

**CONSISTENCY**  
DEV, TEST, AND PRODUCTION



**DEPLOY ANYWHERE**  
ACROSS OPEN HYBRID CLOUD

# RED HAT ATOMIC ENTERPRISE PLATFORM AND OPENSIFT 3



**RED HAT**  
ATOMIC ENTERPRISE  
PLATFORM

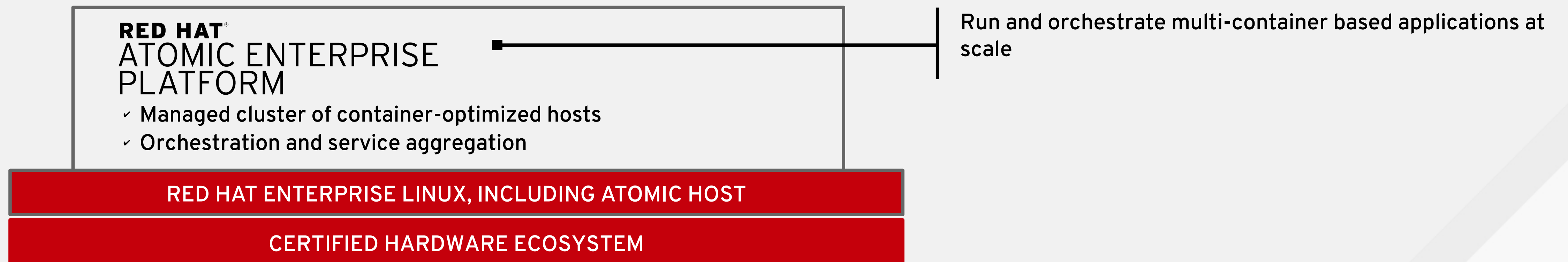


# CONTAINER-BASED APPLICATION DELIVERY SOLUTIONS

RED HAT ENTERPRISE LINUX, INCLUDING ATOMIC HOST

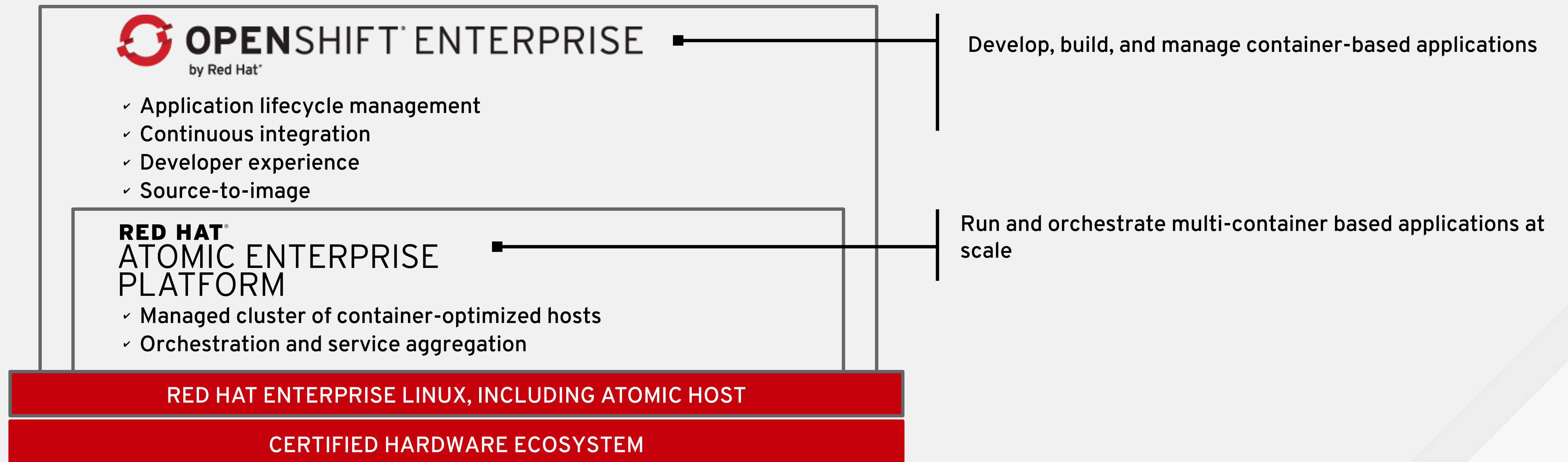
CERTIFIED HARDWARE ECOSYSTEM

# CONTAINER-BASED APPLICATION DELIVERY SOLUTIONS

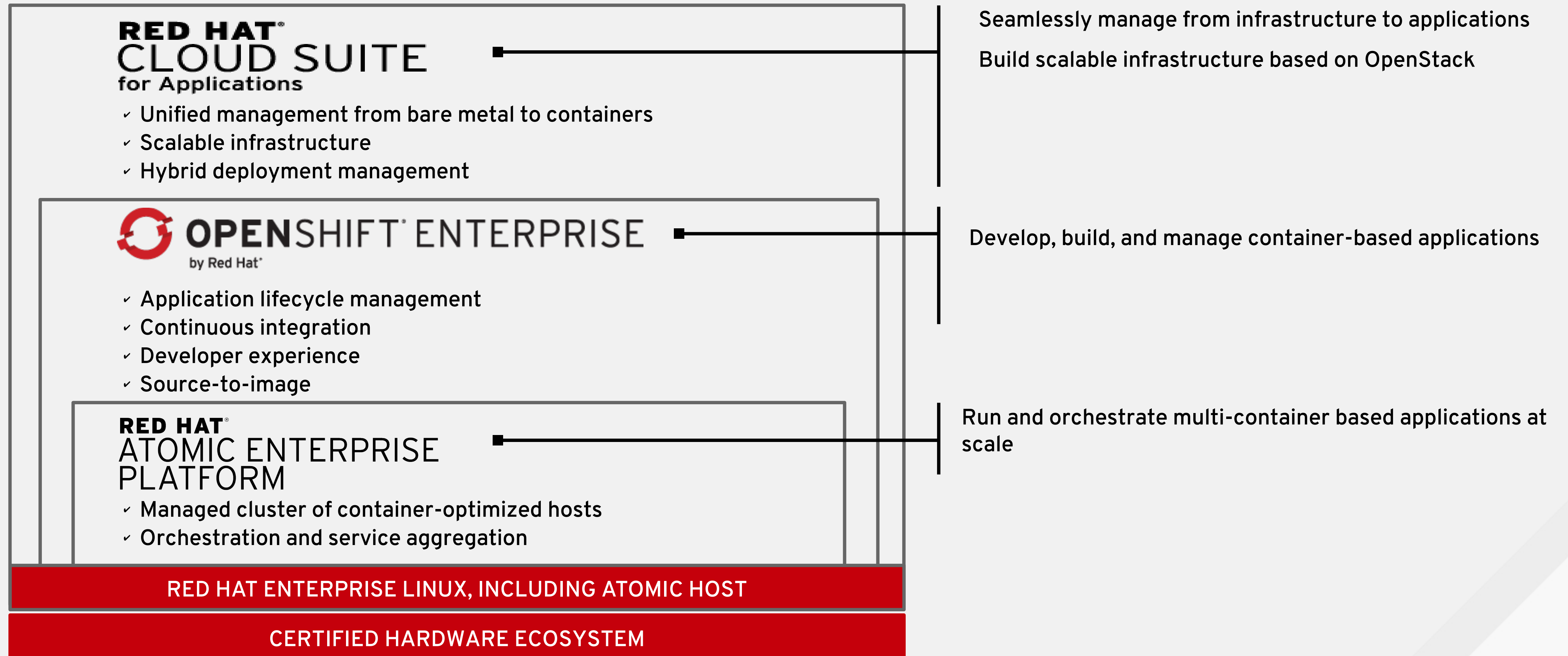




# CONTAINER-BASED APPLICATION DELIVERY SOLUTIONS

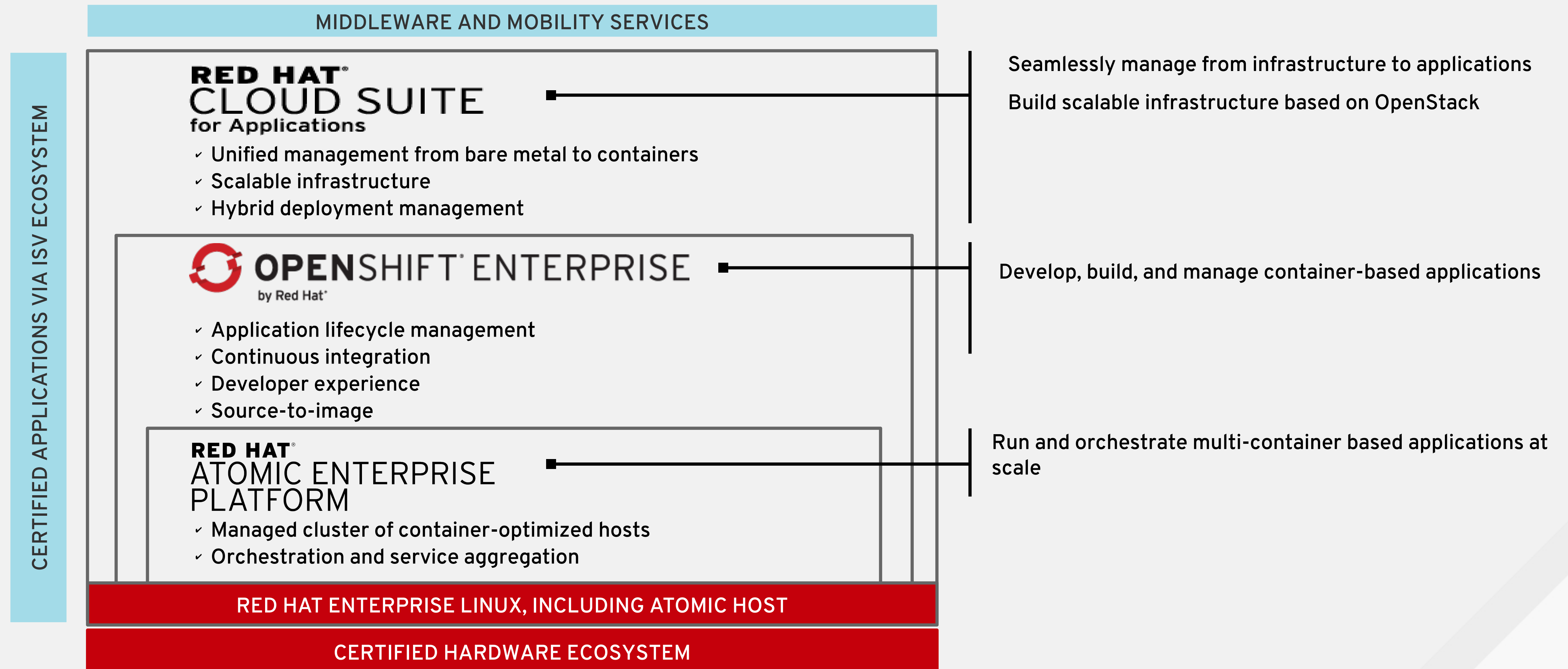


# CONTAINER-BASED APPLICATION DELIVERY SOLUTIONS

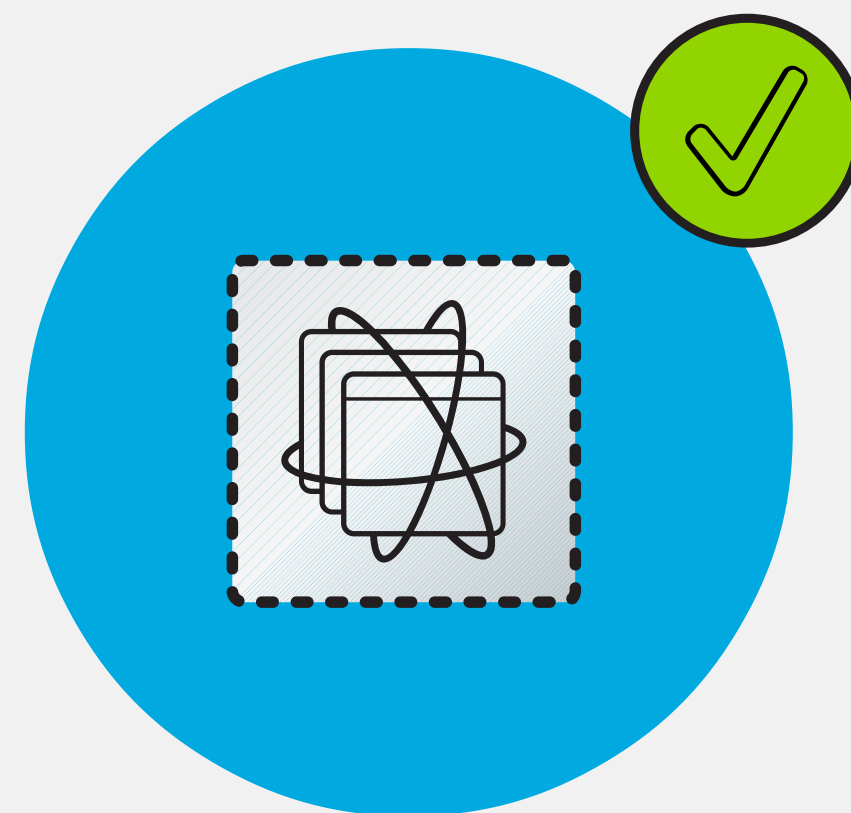




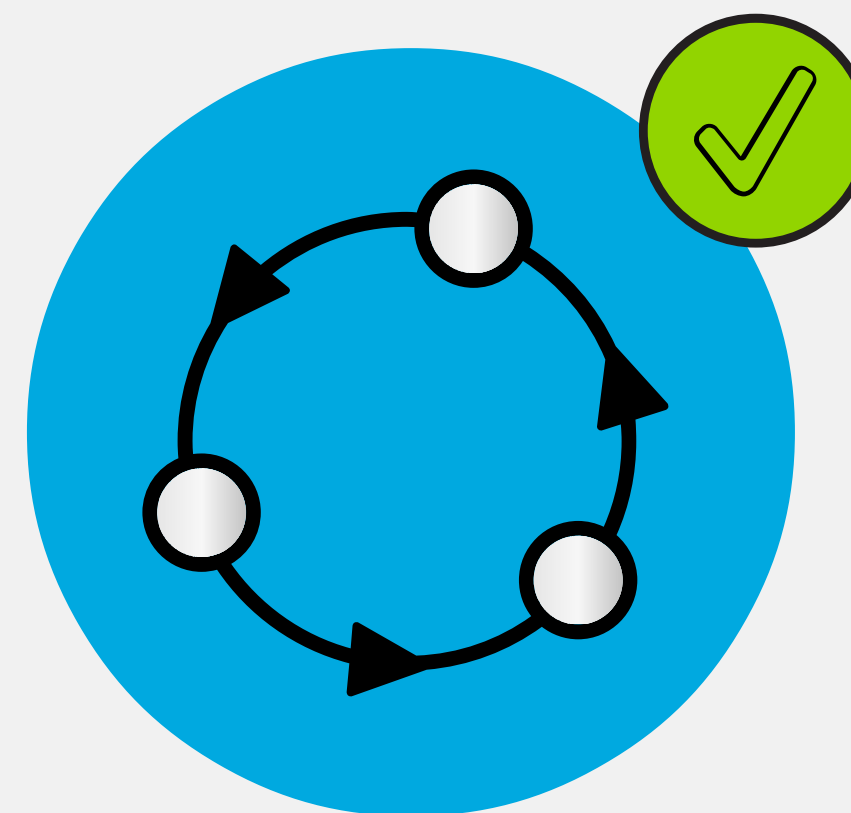
# CONTAINER-BASED APPLICATION DELIVERY SOLUTIONS



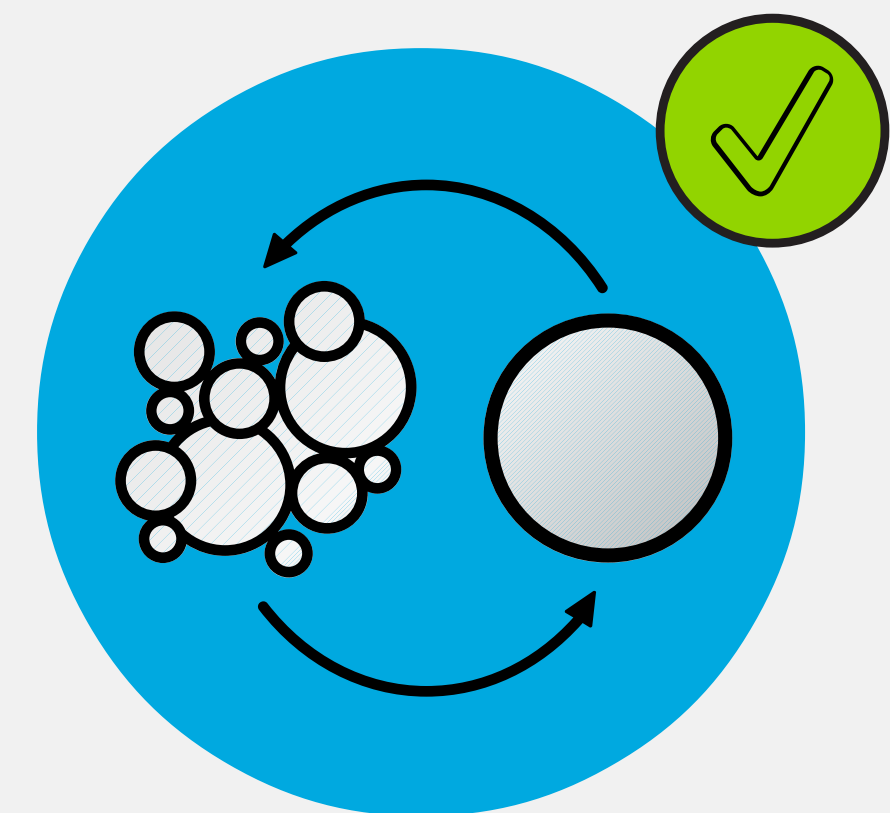
# RED HAT'S CONTAINER STRATEGY



**TRUST**



**PORTABILITY**



**INTEGRATED**



**“IT'S JUST A FLESH WOUND!”**





# LEARN MORE ABOUT CONTAINERS

- Related sessions:
  - Thursday, 10:40 am - 11:40 am: Container management at Red Hat
  - Thursday, 1:20 pm - 2:20 pm: Red Hat Enterprise Linux 7 Atomic Host special interest group panel
  - Thursday, 1:20 pm - 2:20 pm: Atomic architectures & containerized, application-centric IT
  - Thursday, 2:30 pm - 3:30 pm: Operating and managing an Atomic container-based infrastructure
  - Thursday, 3:40 pm - 4:40 pm: Container security: Do containers actually contain? Should you care?
  - Thursday, 4:50 pm - 5:50 pm: Red Hat's container roadmap
- Hands-on labs:
  - Thursday, 10:30 am - 12:30 pm : Hands-on Red Hat Enterprise Linux Atomic Host
  - Friday, 9:00 am - 11:00 am: Containerizing applications, existing and new
- Demonstrations:
  - Booth #306 in the Partner Pavilion



# RED HAT **SUMMIT**

**LEARN. NETWORK.  
EXPERIENCE OPEN SOURCE.**