



CONTAINERIZED APP DEVELOPMENT WITH THE CDK

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BRIEF INTRO: MAXIM BURGERHOUT

- Solution Architect @ Red Hat
- Platform, Cloud
- Speaker
- Open Sourcer
- Cooking
- Running
- Whiskey



CONTAINERIZED APP DEVELOPMENT WITH THE CDK

WHAT ARE WE GOING TO DO TODAY?

“Wat gaan we doen vandaag?”

- Talk about containers
- Talk about containerizing applications
- Talk about OpenShift
- Introducing the container development kit a.k.a. *Minishift*
- Do a little dance^H^Hdemo

CONTAINERS

(yes, we really need to talk about those first)

WHAT ARE CONTAINERS?

It Depends Who You Ask

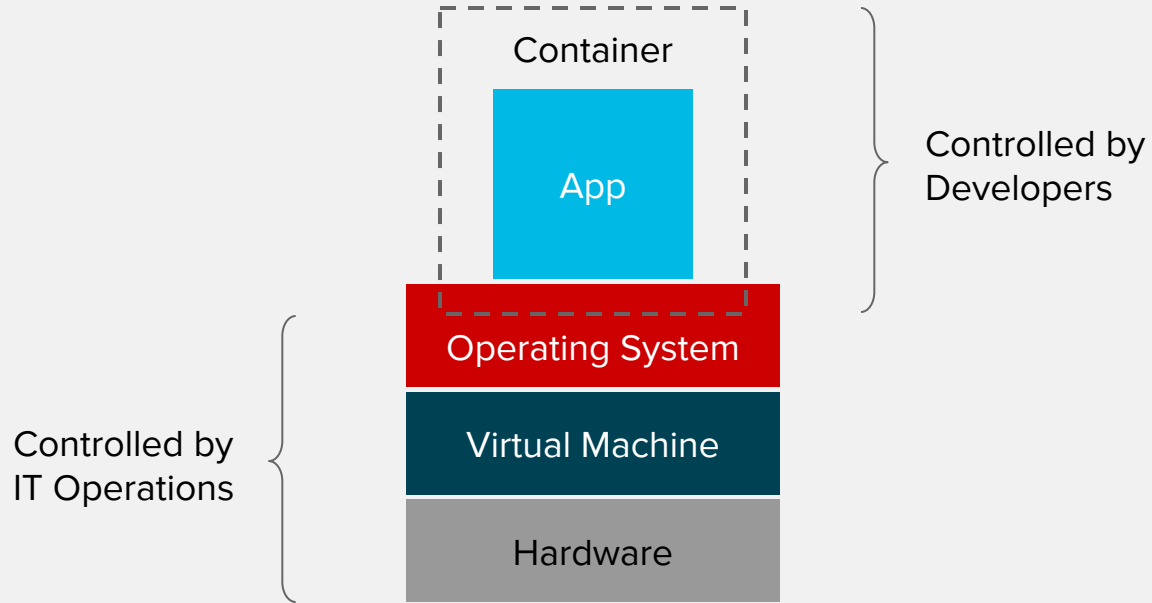
INFRASTRUCTURE

- Sandboxed application processes on a shared Linux OS kernel
- Simpler, lighter, and denser than virtual machines
- Portable across different environments

APPLICATIONS

- Package my application and all of its dependencies
- Deploy to any environment in seconds and enable CI/CD
- Easily access and share containerized components

FRICTIONLESS IT



APPS IN CONTAINERS

APPS IN CONTAINERS

Boil 'em, Mash 'em, stick 'em in a stew!

- As said, containers hold the promise of making a developer's life easier
- But: I need to somehow wrap my application in a container
- There are many ways to take an application and stick it into a container
- Some examples
 - Using a Dockerfile
 - Using ansible-container
 - Create an image by running docker shell
- All of these work, but really, as a developer, I really just want to write code...

SOME MORE REQUIREMENTS FROM DEVS

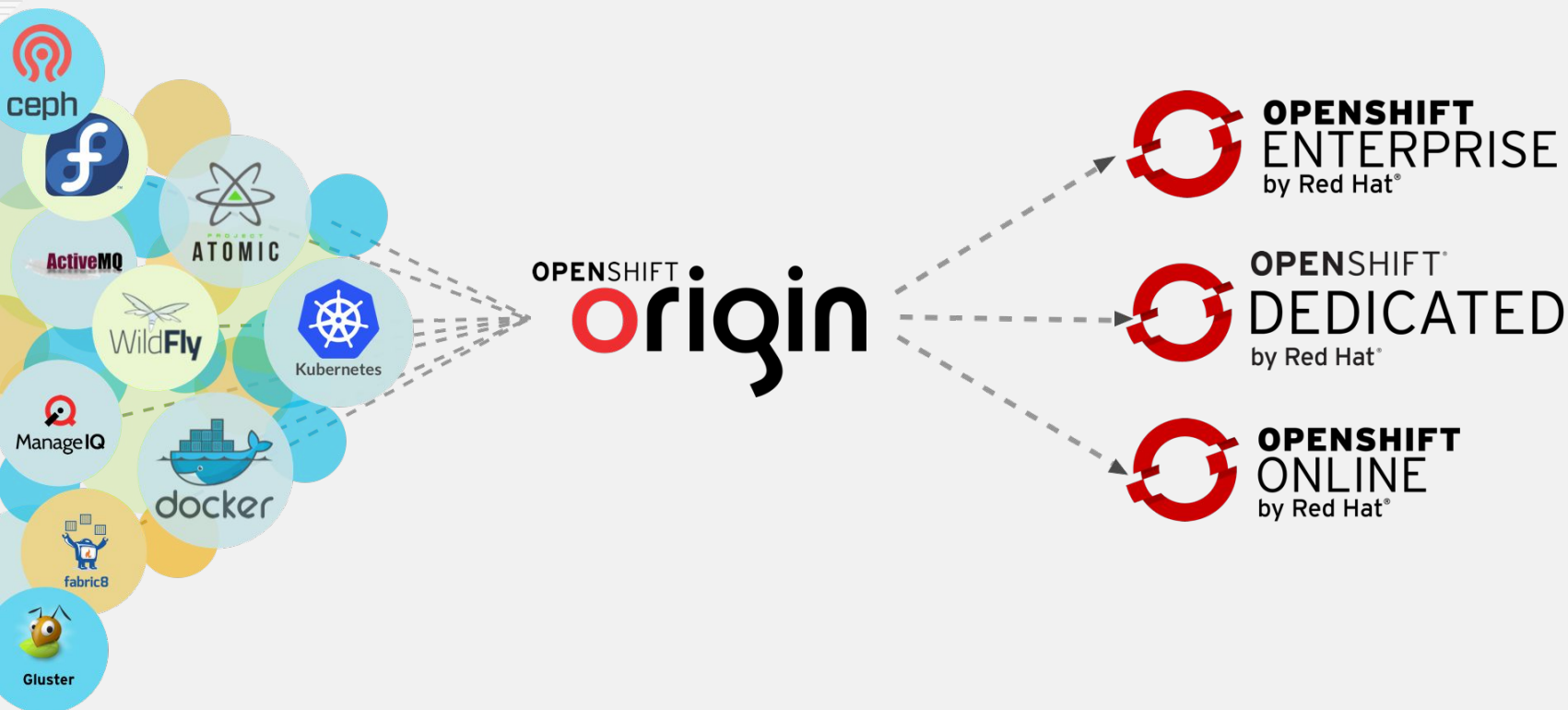
- As a developer, I want to write code on my local workstation
- As a developer, I want to be able to functionally test my code on my local workstation before pushing to master
- As a developer, I want to run integration tests on my code on my local workstation before pushing to master
- As a developer, I want my development environment to resemble production as much as reasonably possible
- ... and still take it home with me

SOME MORE REQUIREMENTS

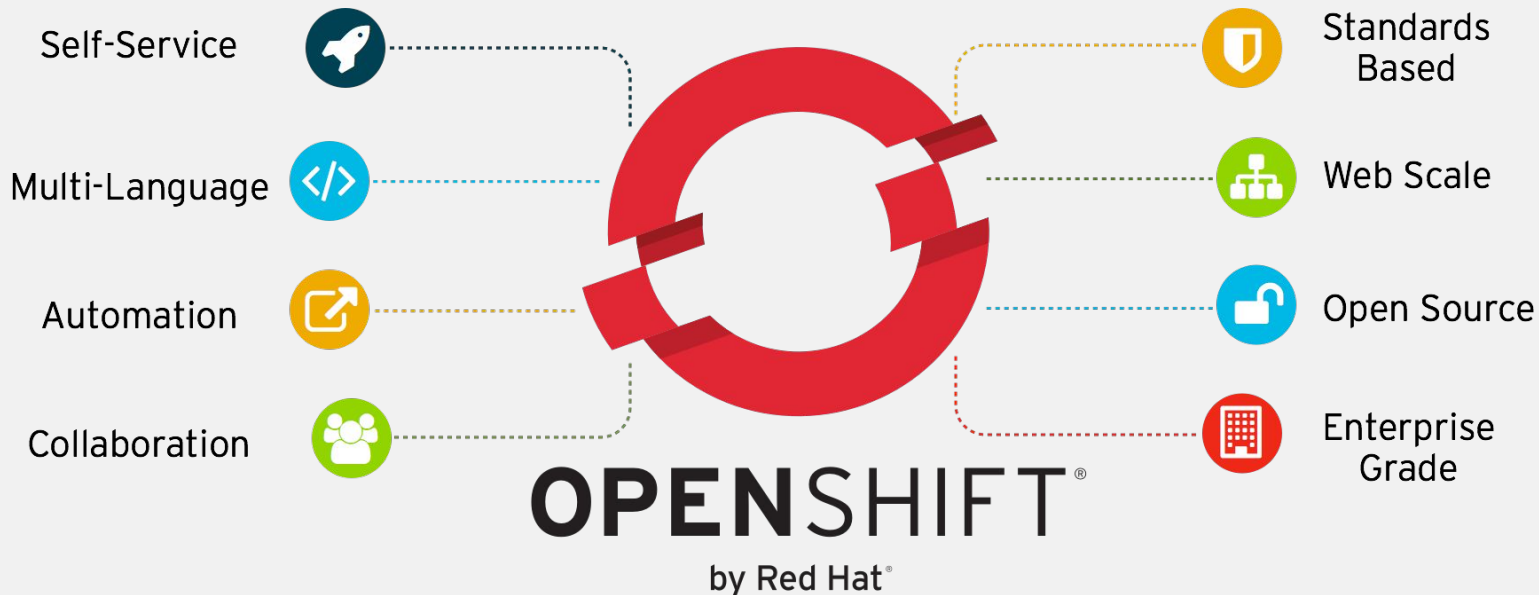
- As a freelance developer, I write my code on a Mac, or on Linux
- As a corporate developer, I need to write my code on a Windows machine
- As a developer,
 - to sometimes use a UI for management of my development environment, and sometimes a CLI
 - I want to write my code from Eclipse, like I'm used to doing
 - I want to write my code in a uniform way, whatever language I'm using
 - I want to benefit from containers, and not have them get in my way

OPENSIFT

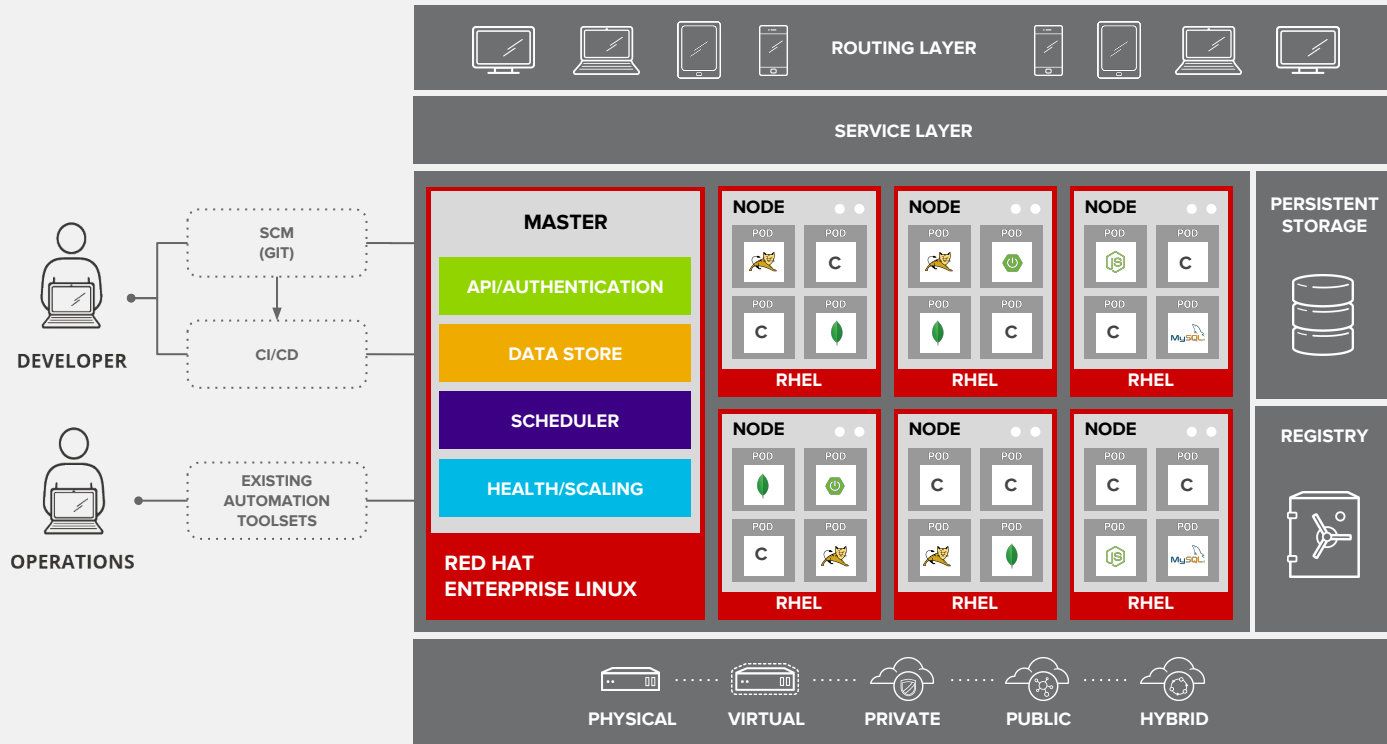
COMMUNITY POWERED INNOVATION



CRITICAL FEATURES FOR BOTH DEV AND OPS



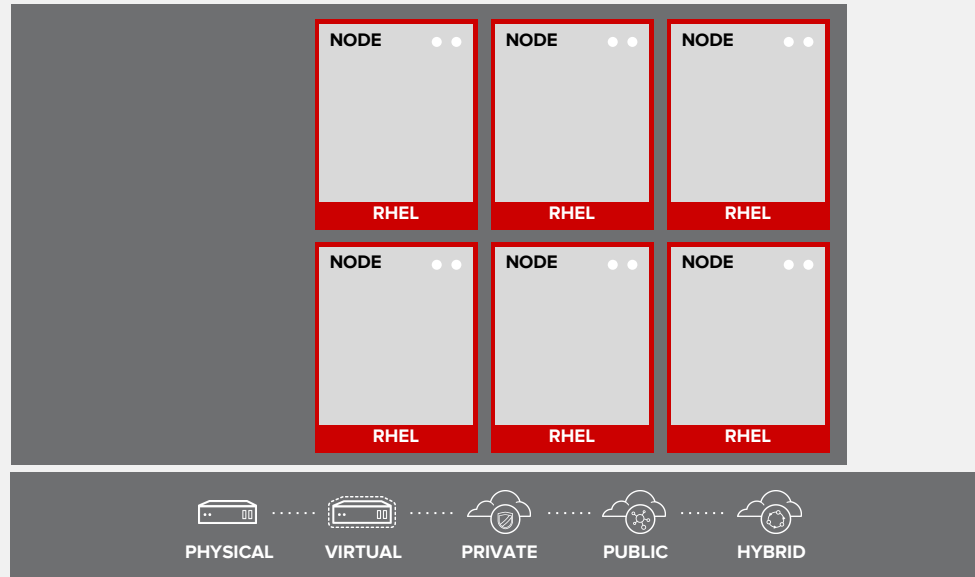
OPENSIFT ARCHITECTURE



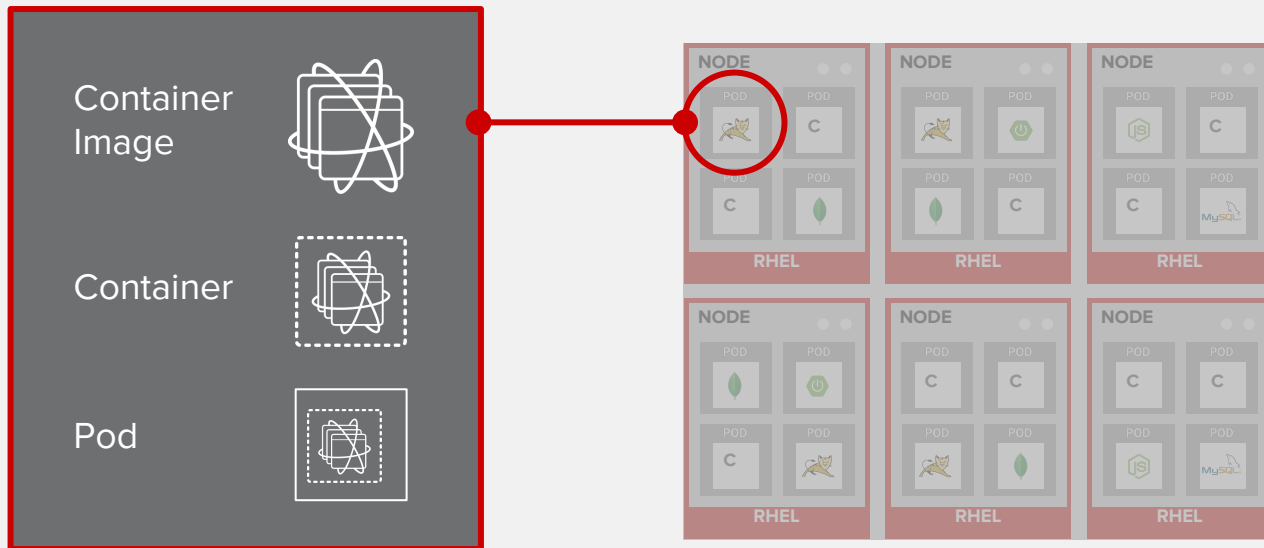
YOUR CHOICE OF INFRASTRUCTURE



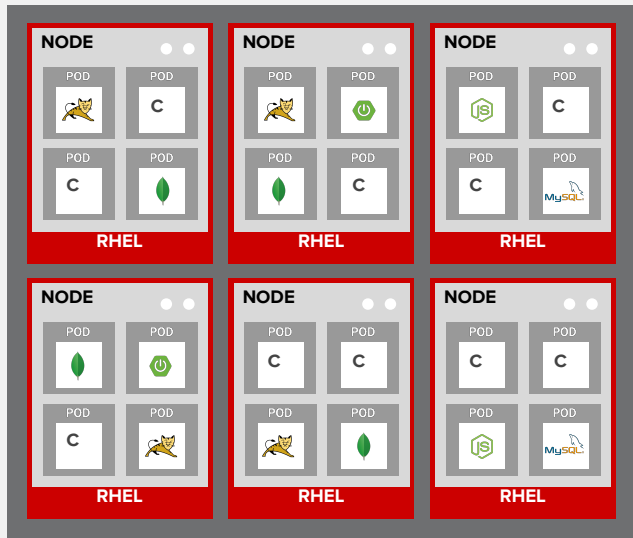
NODES: RHEL INSTANCES WHERE APPS RUN



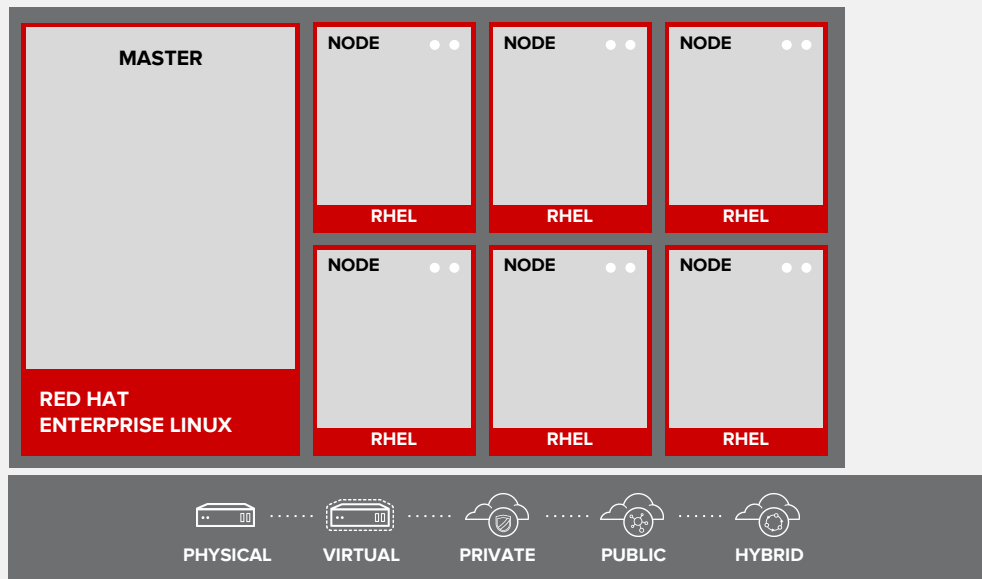
APPS RUN IN CONTAINERS



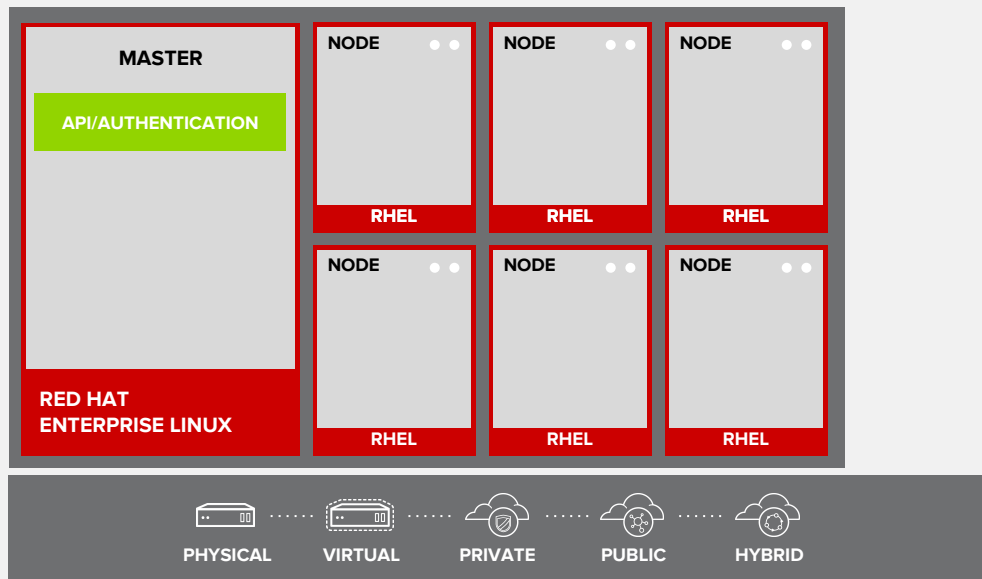
PODS ARE THE UNIT OF ORCHESTRATION



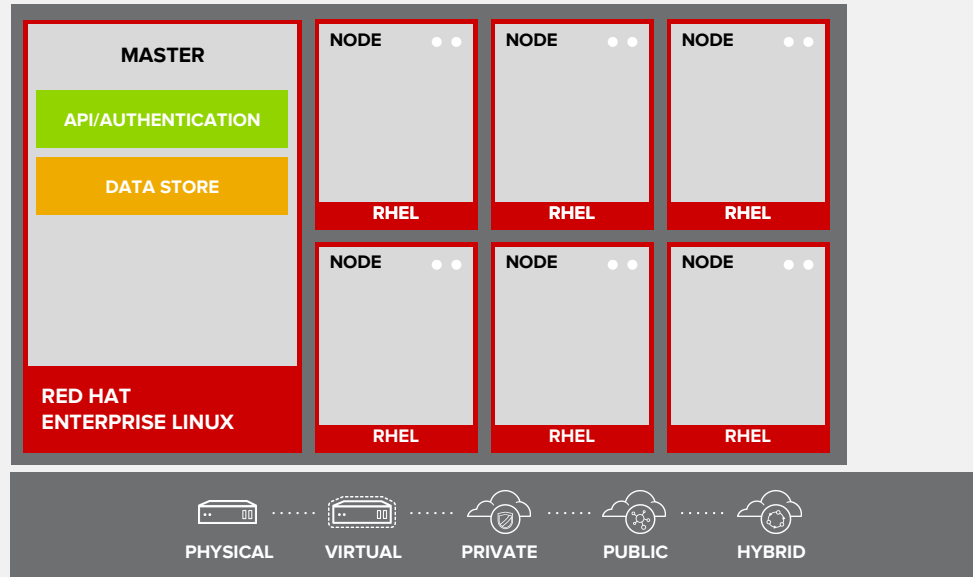
MASTERS ARE THE CONTROL PLANE



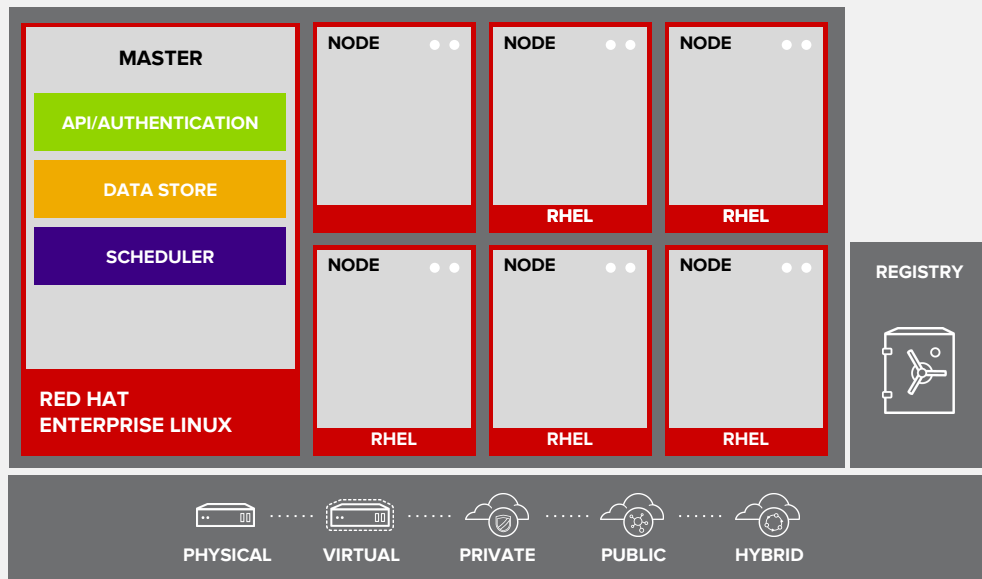
API AND AUTHENTICATION



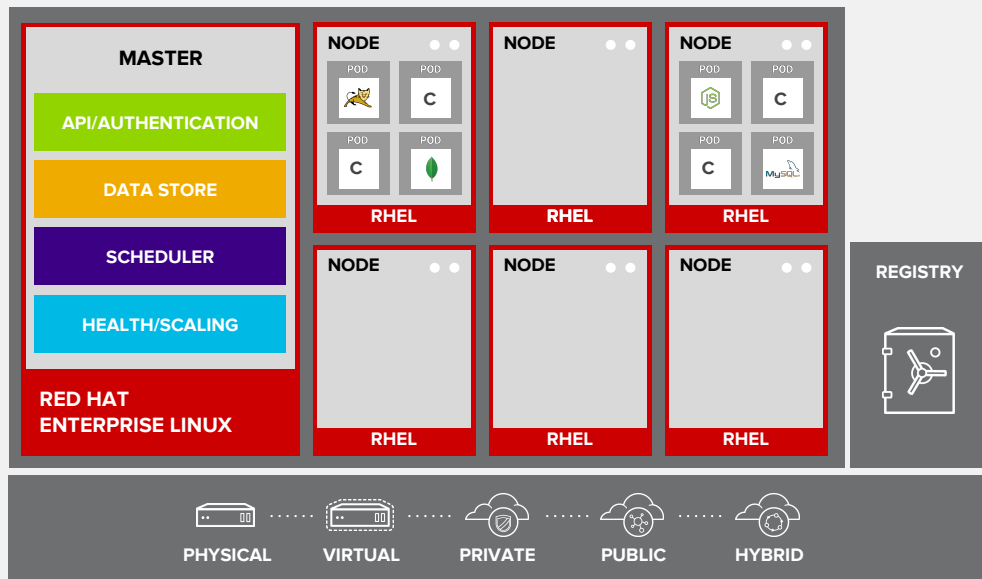
DESIRED AND CURRENT STATE



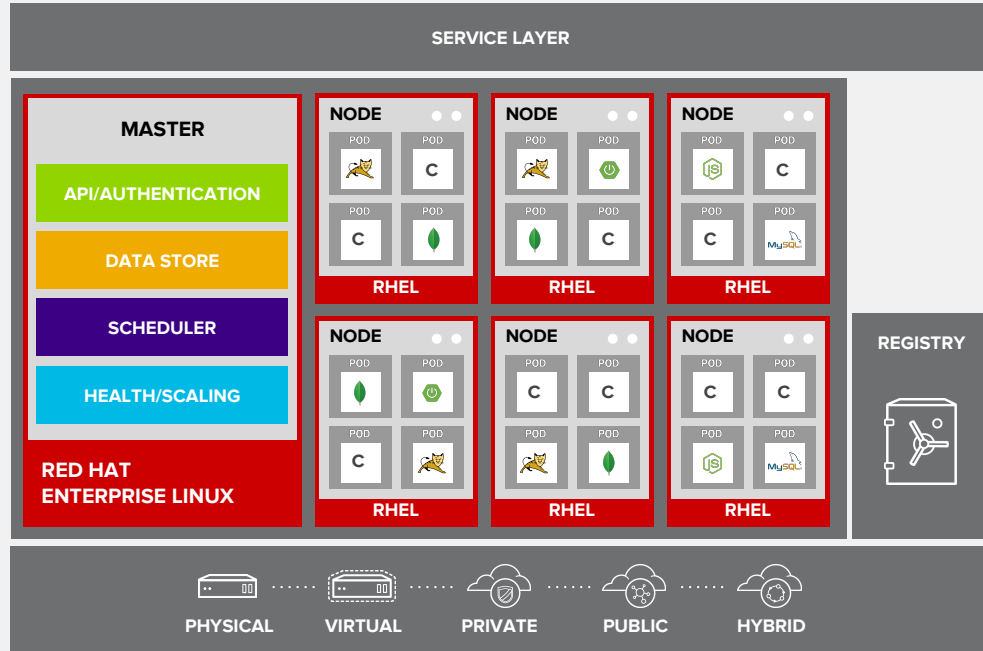
SCHEDULER PULLS FROM THE REGISTRY



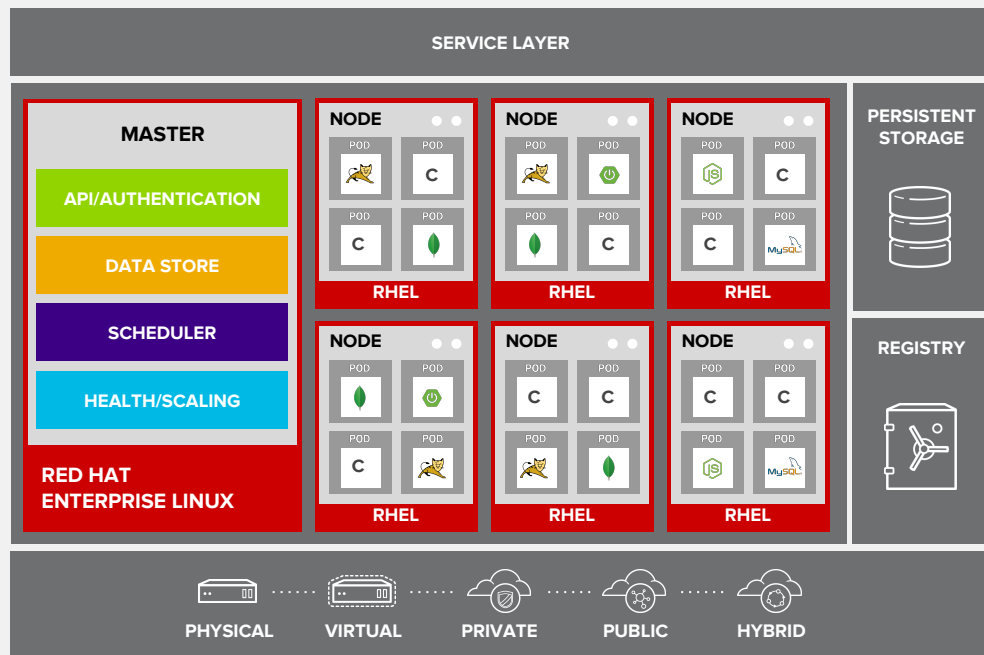
HEALTH AND SCALING



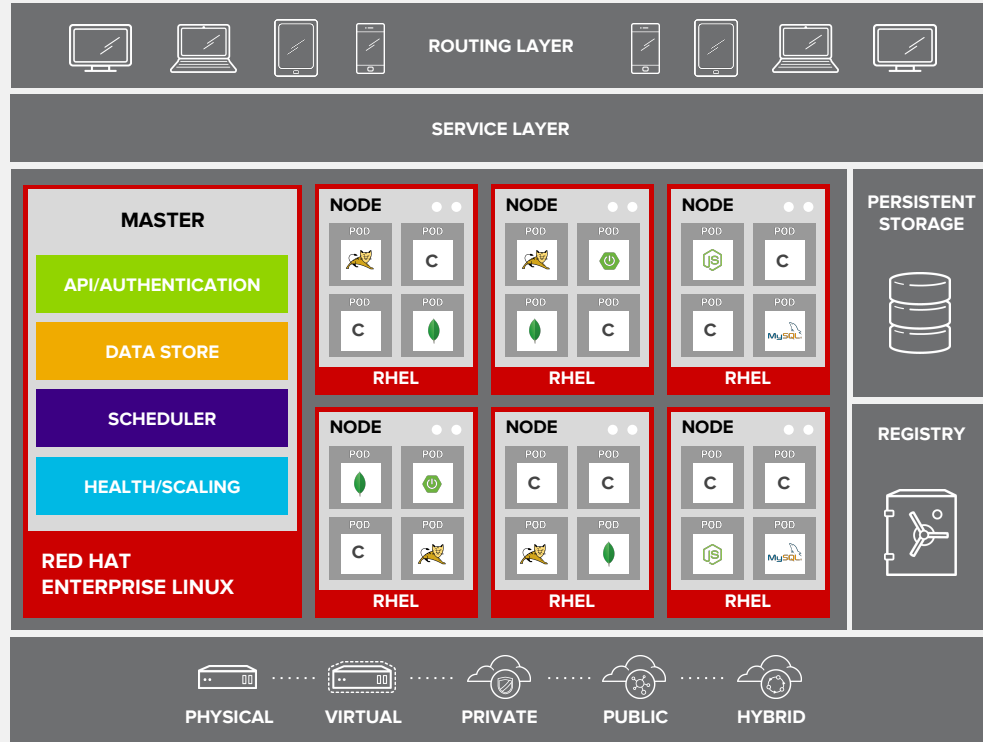
SERVICE DISCOVERY



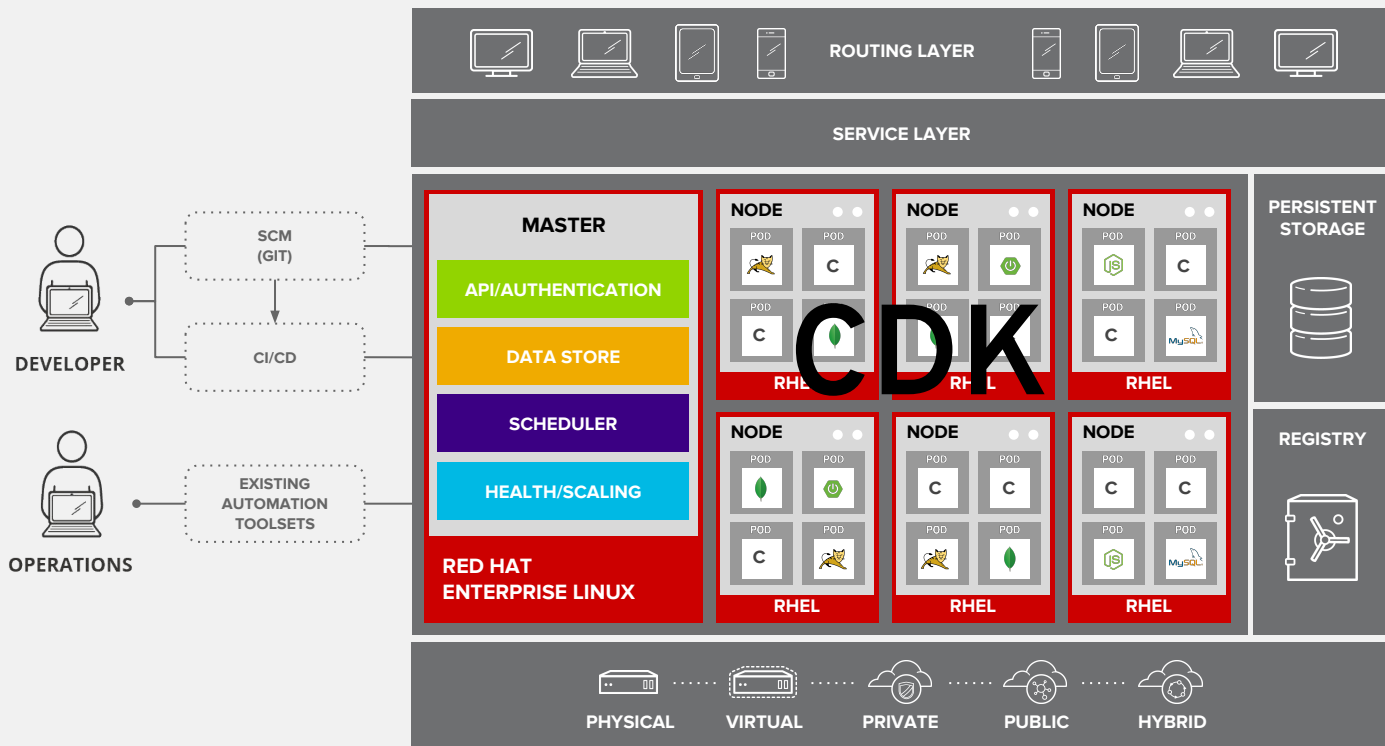
WHAT ABOUT DATA?



ROUTING AND LOAD-BALANCING



ACCESS VIA WEB, CLI, IDE AND API



THE CONTAINER DEVELOPMENT KIT

Enter the Container Development Kit

- The CDK sets up an OpenShift cluster on your local machine, that allows you to build, test and run your application
- It offers all the features the OpenShift Container Platform brings
 - source-to-image
 - pipelines
 - service discovery
 - performance monitoring
 - application templates
 - scaling and upgrade tests
 - aggregation
- Polyglot, integrated in Eclipse, includes a UI and CLI, and runs on *any platform!*

WHAT IS SOURCE-TO-IMAGE?

Code



git



DEV

Build

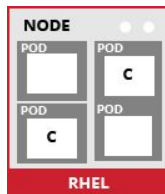
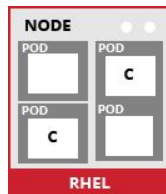
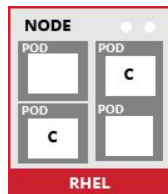


Container
Image



Registry

Deploy



OPS

The tiniest OpenShift you ever did see!

- All of OpenShift in a single, small footprint VM
- All runs from a single binary that is available for Mac, Windows and Linux
- Supports KVM, VirtualBox, Hyper-V and xhyve as hypervisors
- During install, an ISO is downloaded, and a containerized version of OpenShift runs on top of that
- nip.io is used to expose containers to the end-user
- Official CDK based on minishift will be released soon!

LET'S TRY SOME STUFF!

Demos

1. Install minishift
2. Start minishift
3. Setup the 'oc' command (command line interface to OpenShift / minishift)
4. Create a project to work on (through the UI)
5. Create an application in the project (through the CLI)
6. Wait until the app builds, then open it (nip.io)
7. Change the code of the app in-place (i.e. without rebuild)

SOME MORE STUFF

openshift.io

- At Red Hat Summit two weeks ago, we announced openshift.io
- It's an IDE in the cloud, tailored for working with OpenShift
 - Open source: based on fabric8 and Eclipse Che
 - Currently in developer preview mode

The screenshot displays an IDE interface with the following components:

- Project Explorer:** Shows the project structure for 'trader-insights-service', including 'src/main/java' and 'resources'.
- Code Editor:** Displays the 'pom.xml' file. The dependency on 'ch.qos.logback:logback-core:1.1.10' is highlighted with a red 'x' and a warning message: 'Package ch.qos.logback:logback-core-1.1.10 is vulnerable: CVE-2017-5929. Recommendation: use version 1.2.1'.
- Terminal:** Shows the output of the application redeploying. The log includes information about the Vert.x application, the SLF4J logger implementation, and the successful deployment of the verticle.

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <groupId>org.slf4j</groupId>
  <artifactId>slf4j-api</artifactId>
  <version>1.7.22</version>
</dependency>
<dependency>
  <groupId>ch.qos.logback</groupId>
  <artifactId>logback-core</artifactId>
  <version>1.1.10</version>
</dependency>
</dependencies>

<build>
  <plugins>
    <plugin>
      <groupId>io.fabric8</groupId>
      <artifactId>vertx-maven-plugin</artifactId>
      <version>${vertx-maven-plugin.version}</version>
    </plugin>
  </plugins>
</build>
</project>
```

Terminal Output:

```
[INFO] Vert.x application redeploy enabled
[INFO] Observing path:/projects/trader-insights-service/src/main
[INFO] May 02, 2017 9:13:13 PM io.vertx.core.impl.launcher.commands.Watcher
[INFO] INFO: Watched paths: [/projects/trader-insights-service/target/classes]
[INFO] May 02, 2017 9:13:13 PM io.vertx.core.impl.launcher.commands.Watcher
[INFO] INFO: Starting the vert.x application in redeploy mode
[INFO] Starting vert.x application...
[INFO] 9407d15b-f9a0-41d0-a29e-7b3660687f67-redeploy
[INFO] SLF4J: Failed to load class "org.slf4j.impl.StaticLoggerBinder".
[INFO] SLF4J: Defaulting to no-operation (NOP) logger implementation
[INFO] SLF4J: See http://www.slf4j.org/codes.html#StaticLoggerBinder for further details.
[INFO] May 02, 2017 9:13:14 PM io.netty.util.internal.MacAddressUtil defaultMachineId
[INFO] WARNING: Failed to find a usable hardware address from the network interfaces; using random bytes: e4:f5:c7:f1:13:0a:16:2d
[INFO] Server starter on port 8080
[INFO] May 02, 2017 9:13:14 PM io.vertx.core.impl.launcher.commands.VertxIsolatedDeployer
[INFO] INFO: Succeeded in deploying verticle
```

log [Board](#)

log **11**

Current Iteration

t 4

Insights/Sprint 4

0 of 7 completed

uture Iterations

est Iterations

Select

Currently showing:

new 5

-
- 577 Write script for validating the deployment
- 573 Evaluate unit test coverage
- 570 Run reports of OpenShift usage
- 569 Design notifications for any market alerts
- 563 Performance Tests

open 2

- 582 Notification history needed
- 567 Integrate with zabbix

in progress 3

- 576 Test service scaling for HA
- 575 Design trade window alert area
- 566 Add tradeWindowEnd

resolved

- 579 Add Quinn to sprint retrospective
- 565 Add functional tests stage environment

Trader Insights

Codebases Pipelines

Application Filter by Application...

trader-insights-service created 10 days ago

Source Repository: <https://github.com/qkartal/trader-insights-service.git>

Recent Runs

Build #44
36 minutes ago
[View Log](#)

Build Release 1m 7s
[Stack Reports](#)

Integration Testing 4s

Rollout to Stage 8s

Approve
Input Required

View Pipeline Runs

Input is required on pipeline trader-insights-service-44

Would you like to promote version 2.0.33 to the next environment?

[View application on Stage](#)

[See additional details in jenkins](#)

Close Abort Promote

OpenShift Console

Quinn Kartal

- Recommended - Update io.vertx:vertx-web : 3.4.1** Vert.x HTTP with Logback has a different version of dependency [Create Work Item](#)
- Recommended - Update ch.qos.logback:logback-core : 1.2.3** Vert.x HTTP with Logback has a different version of dependency [Create Work Item](#)
- Recommended - Update org.slf4j:slf4j-api : 1.7.24** Vert.x HTTP with Logback has a different version of dependency [Create Work Item](#)

Stack Overview

Security

CVE-2017-5929 ▲

7.5 CVSS score

7.5 of 10 Total



Dependencies



4

Dependencies
(direct declared)

Code Metrics



147942

lines of code



1.79

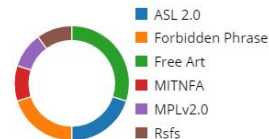
Avg.
cyclomatic
complexity



1026

total files

Total Licenses Used



Dependencies

Name

Name	Current Version	Latest Version	CVE ID	CVSS	License	Lines Of Code	Average Cyclomatic Complexity	Total Files
org.slf4j:slf4j-api	1.7.22	1.7.24	NA	NA		-1	NA	-1
io.vertx:vertx-web	3.4.0	3.4.1	NA	NA	ASL 2.0,Free Art,Rsfs	37850	NA	241
ch.qos.logback:logback-core	1.1.10	1.2.1	CVE-2017-5929	▲ 7.5	Forbidden Phrase,Free Art,MPLv2.0	29507	2.24	345
io.vertx:vertx-core	3.4.1	3.4.1	NA	NA	ASL 2.0,Forbidden Phrase,Free Art,MITNFA	80586	1.34	441

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 - Open source: based on fabric8 and Eclipse Che
 - Currently in developer preview mode
- Sign up at <https://openshift.io>

OpenShift Online

- OpenShift Online has been an ongoing thing since 2011
- Originally built upon OpenShift v2
 - Containers, but not quite like the ones we use today
- Complete rewrite done: it's now based on OpenShift v3
- Free tier is now available
- Sign up at <https://openshift.com>

Go get it!

- Go to <https://developers.redhat.com>
- Get a free developer subscription, that gives you access to a lot of Red Hat products
- Download the CDK and get going!*

* The current version of the CDK out there is 2.4. The first minishift-based release will be 3.0, which will be released soon!

developers.redhat.com

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