



# OPENSHIFT ENTERPRISE

TRAINING

PRESENTED  
BY



GRANT  
SHIPLEY



MICIAH  
MASTERS

# AGENDA



Introductions



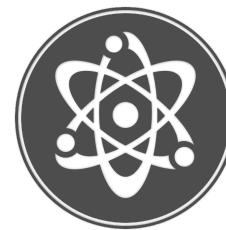
Overview



Installation



Usage



## WHO AM I?

- Senior Manager, Product Marketing
  - Really, I am a Developer Evangelist
- Red Hat (7 Years), Novell (2 years), Caldera / SCO (5 years)
- Java / PHP / Node.js / Mobile /MongoDB / MySQL/ PostgreSQL
- Open source projects

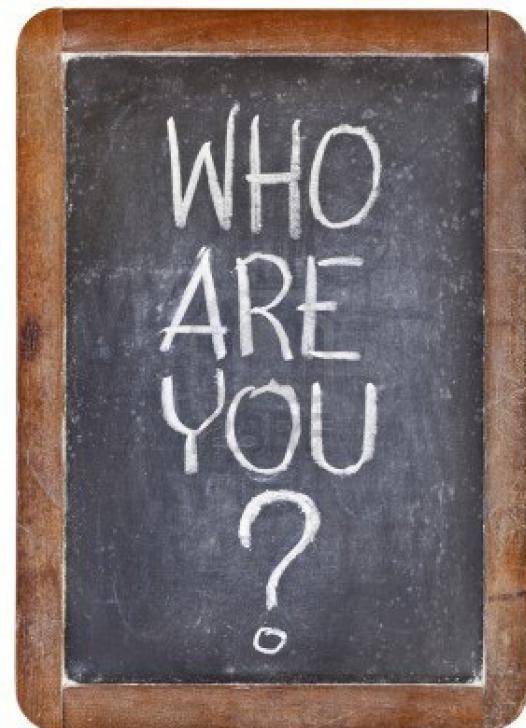


## WHO IS MICIAH?

- Miciah Masters
- Software Engineer, OpenShift Enterprise
- Started at Red Hat in July 2012
- C / shell / GNU/Linux system administration
- Open source project



WHO ARE YOU?





## WHAT WILL YOU LEARN?

- How to install OpenShift Enterprise
- How to configure and administer OpenShift Enterprise
- How to add cartridges
- How to use OpenShift Enterprise for deployment
- How to use OpenShift Enterprise for development



## ASSUMPTIONS

- You want to learn how to use OpenShift Enterprise
- You can write some form of code
- You have your own laptop
- You will ask questions
- You know how to use Red Hat Enterprise Linux
- You have an SSH client installed on your laptop



## TRAINING SCHEDULE

- Some lecture
- Mostly labs
- Let's set our break schedule
- Lunch (the most important thing)



BORING.....

# DEMO



## HOUSEKEEPING

# CLASS MATERIAL



### OpenStack

- Two virtual machines
  - Broker Host
  - Node Host
- RHEL Pre-installed



### Lab Manual

- 32 Labs (less talking - more doing)
- Printed copy



### Online Material

- [training.runcloudrun.com](http://training.runcloudrun.com)
- HTML and PDF manual
- Source code and scripts



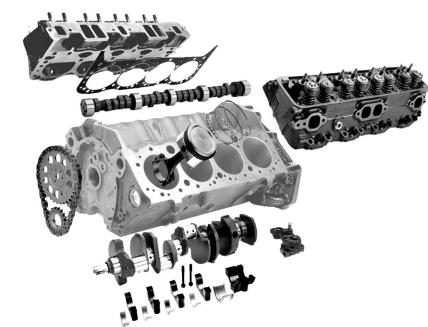
### SWAG

- T-Shirts
- USB Bottle openers
- Reference cards



# LAB MANUAL

- Divided into three parts
  - Installation and Configuration
  - Administration
  - Usage



OpenShift

# HISTORY



# CLOUD OVERVIEW

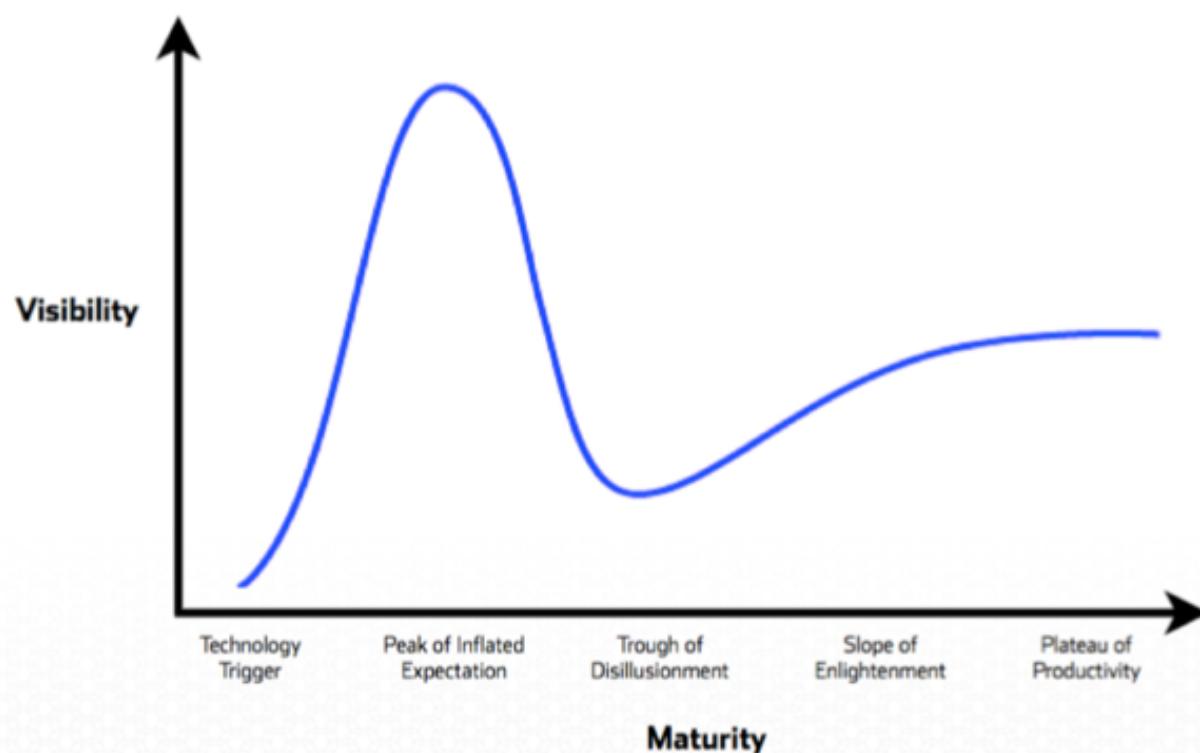


## LEVEL SET

- Cloud computing will
  - Feed all the children
  - Shelter all the homeless
  - Create world peace
  - Save us from the zombie apocalypse
  - Automagically correct your terrible photos



## HYPE CYCLE



Source: Gartner, The hype cycle

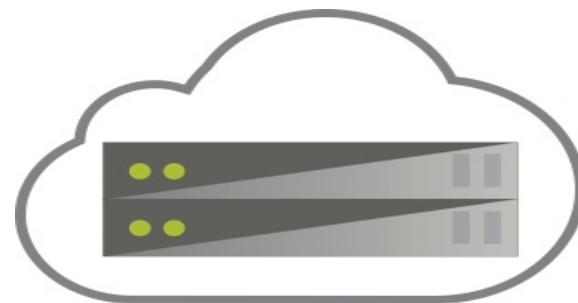
THE H.Y.P.E



# IaaS

## Servers in the Cloud

You must build and manage everything  
(OS, App Servers, DB, App, etc.)



# SaaS

Someone else's app in the Cloud (CRM, etc.)

You are restricted to the features of the 3rd Party application



*"I'm not sure this does  
what I need."*



# PaaS

- Quickly build the Application that YOU need for
  - Your Group, your Enterprise, your next great idea!
  - Big data, mobile, social
- You code the application, We run it for you
- Leverage the **ease**, **scale** and **power** of the Cloud



## EVERYONE GETS ALONG

- Operations care about stability and performance
- Developers just want environments without waiting

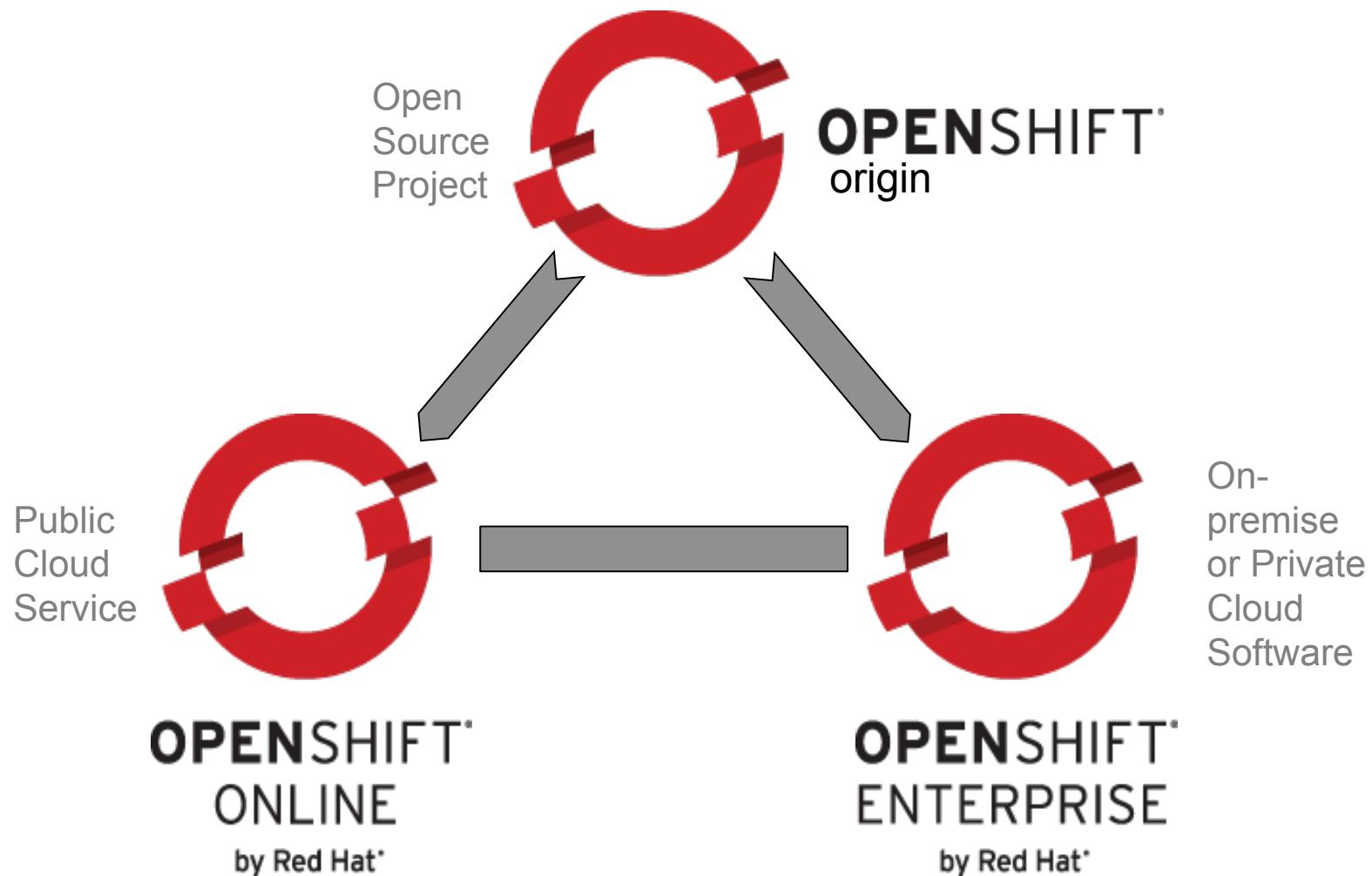
OpenShift Enterprise creates a peaceful environment for both parties



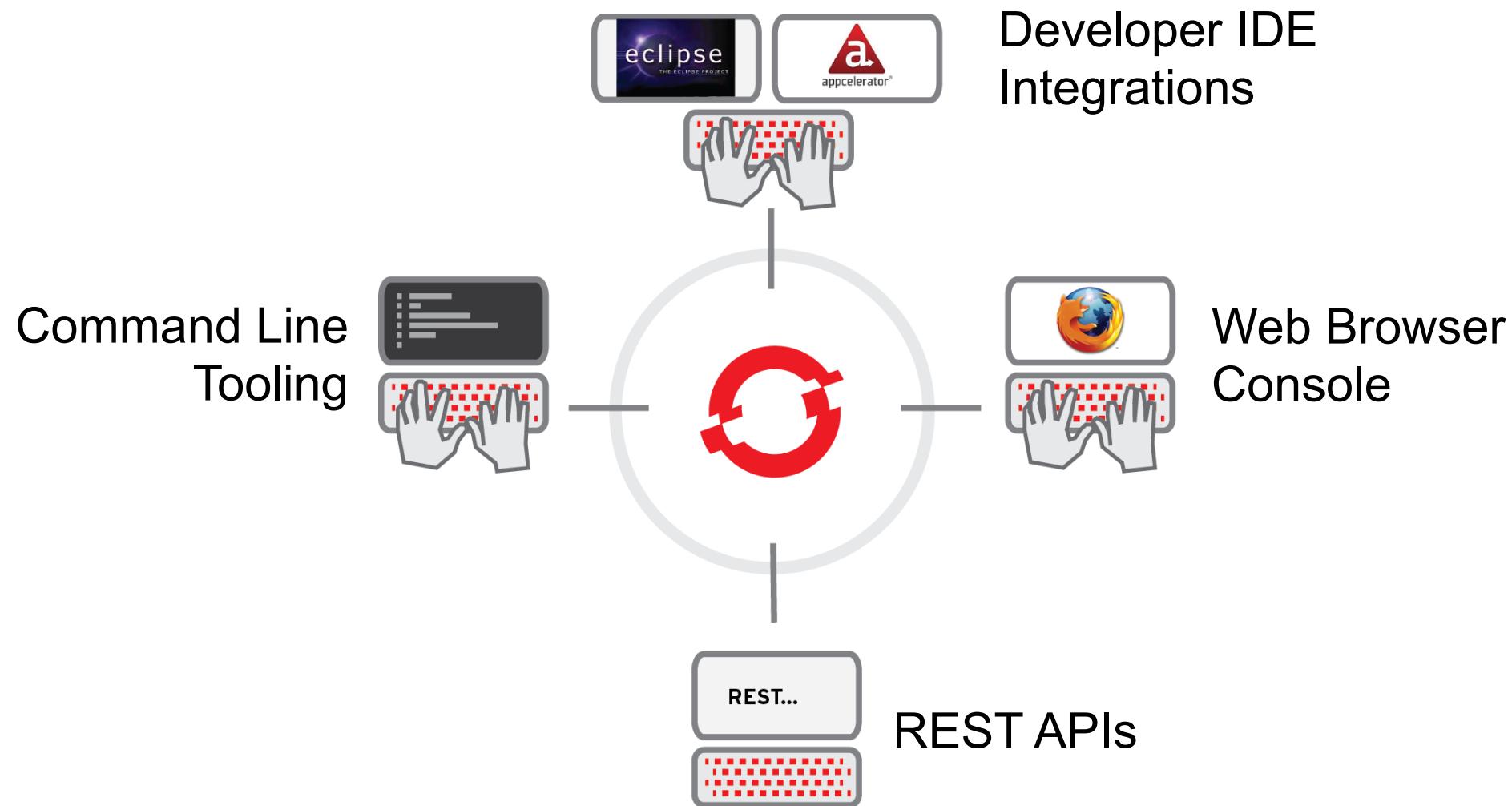
# OPENSIFT OVERVIEW



## FLAVORS OF OPENSHIFT



## INTERACTIONS



RUNS ON IaaS



**OpenShift Enterprise is a PaaS that runs on top of..... Infrastructure**

Amazon EC2

Rackspace

Bare Metal

OpenStack

RHEV

VMWare

# FOUNDATION



The foundation of OpenShift Enterprise is Red Hat Enterprise Linux

RHEL

RHEL

RHEL

RHEL

RHEL

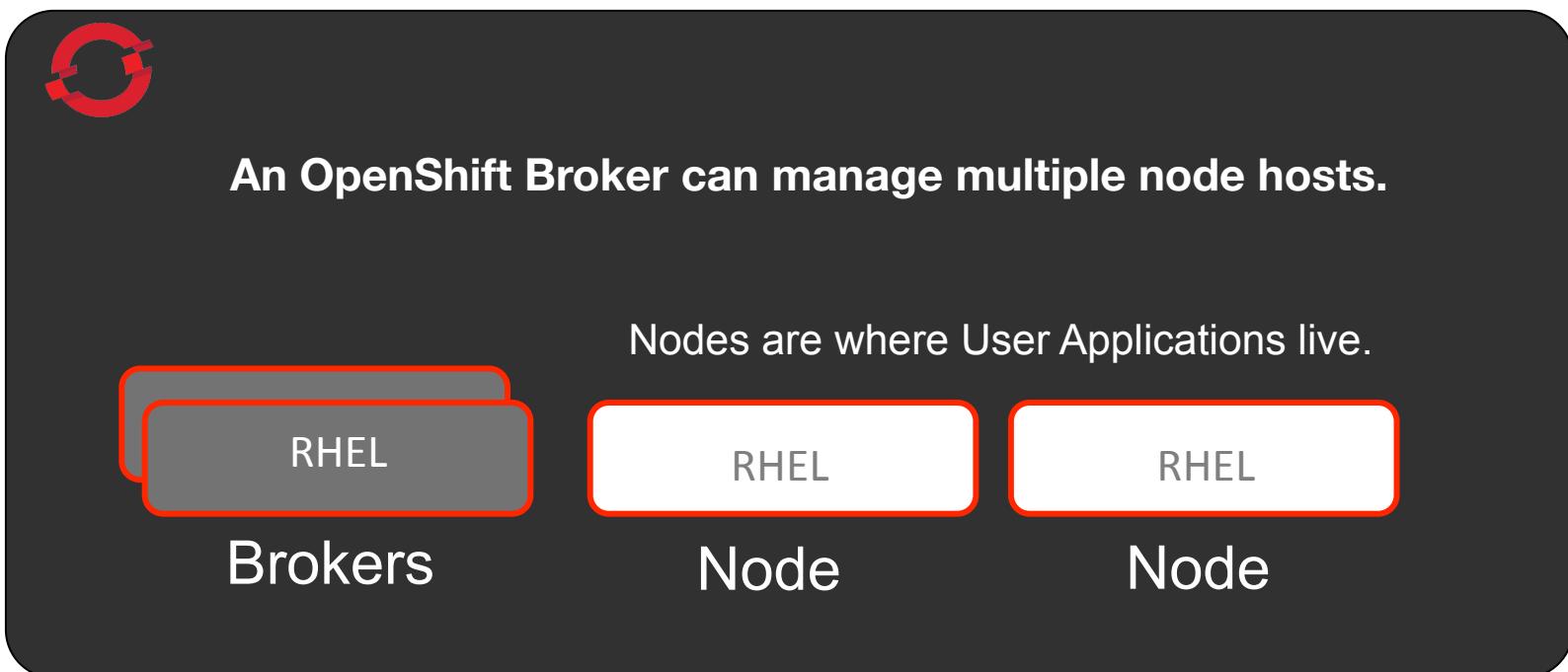
RHEL

## SERVER TYPES

- Each OpenShift Enterprise server will be one of the following types:
  - Broker Host
  - Node Host

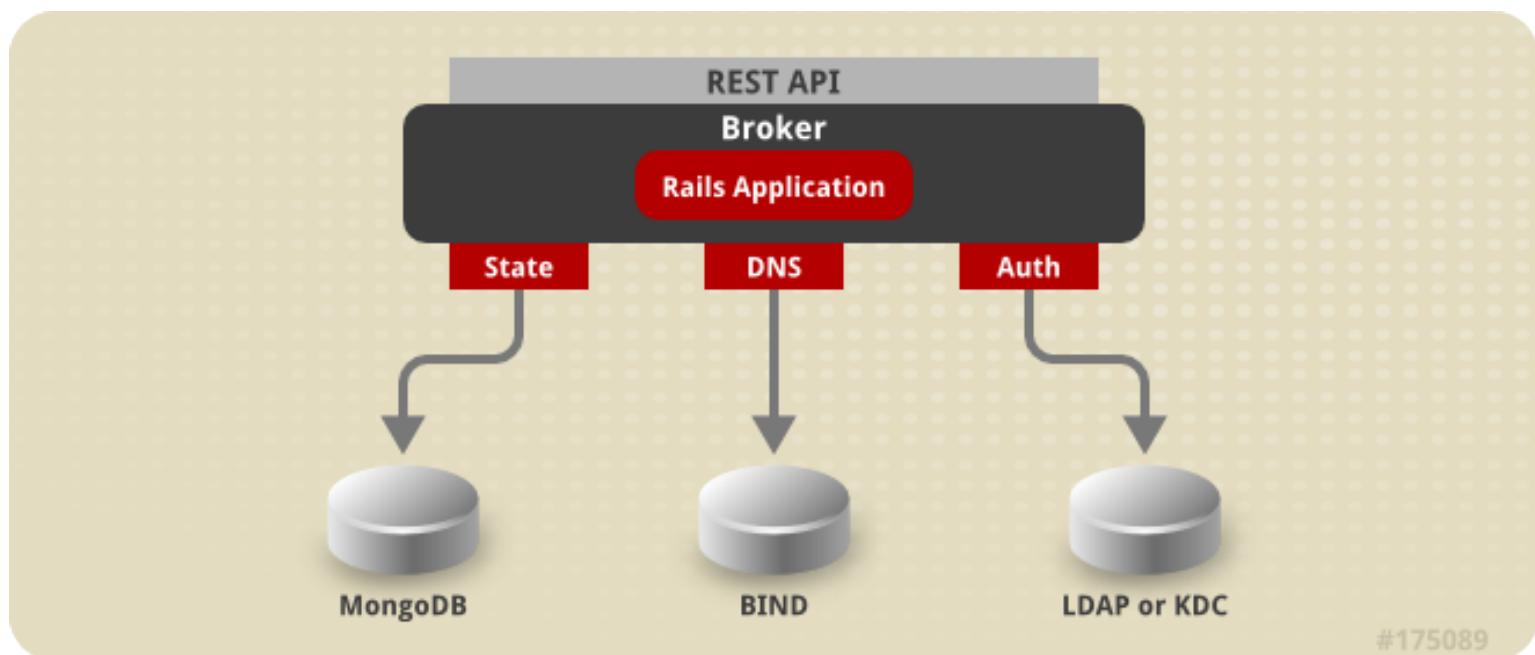


# BROKER



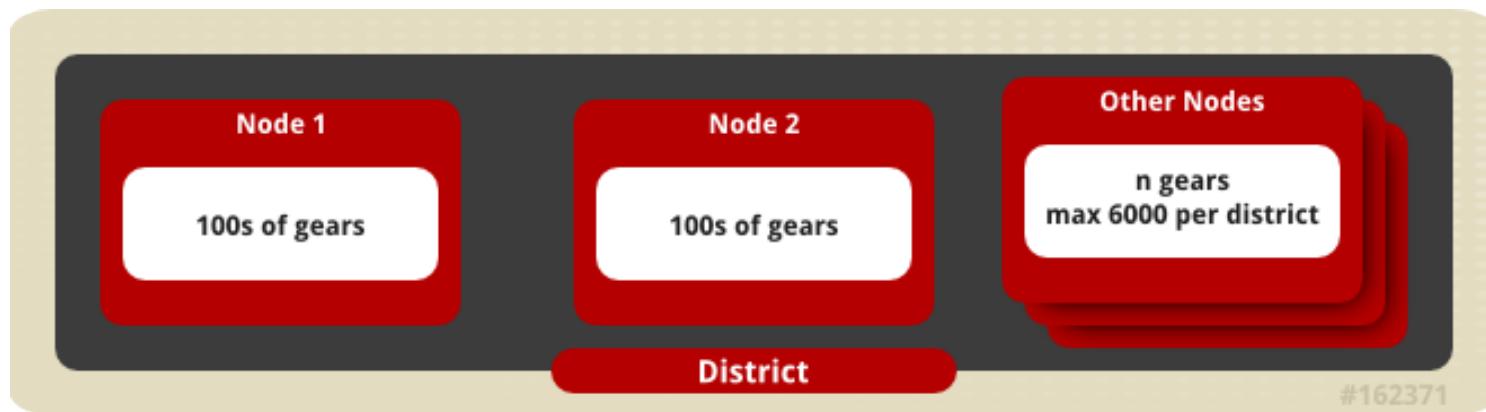
# BROKER

The Broker is responsible for state, DNS, and authentication.

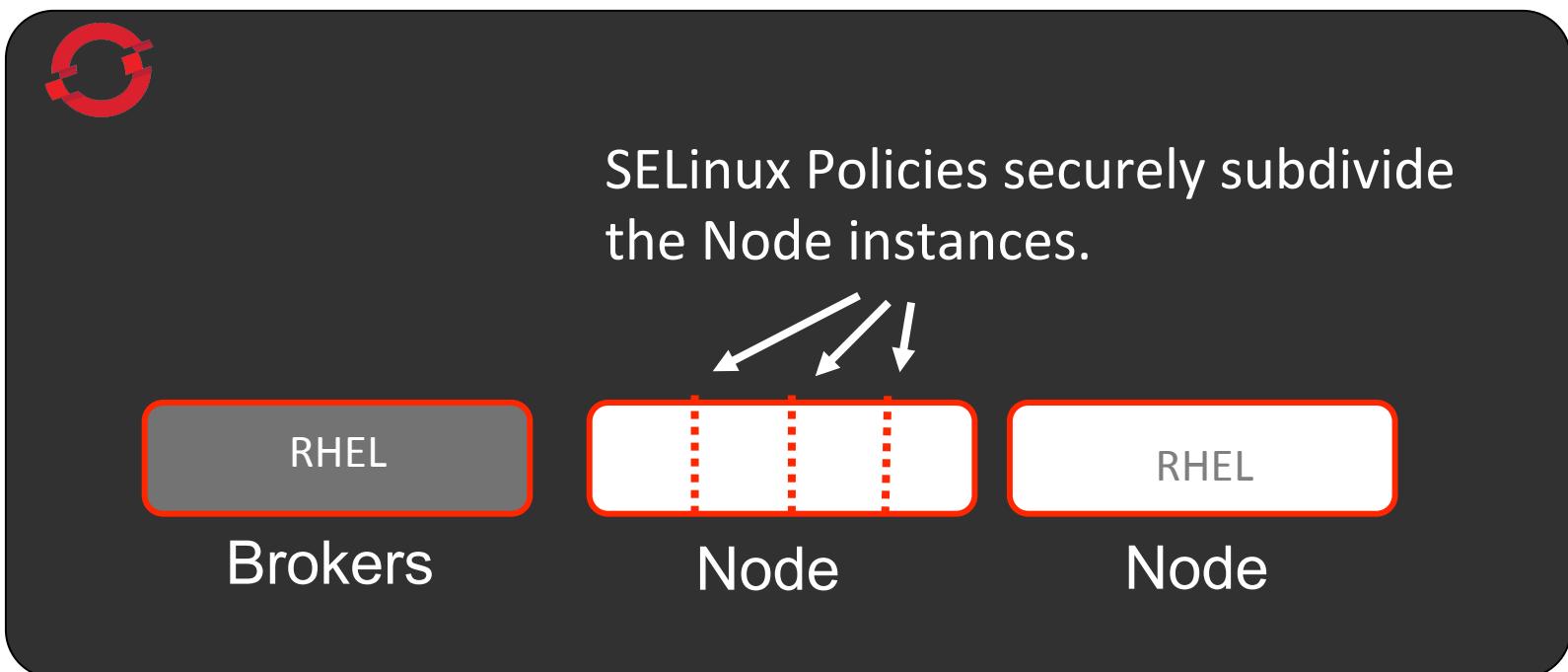




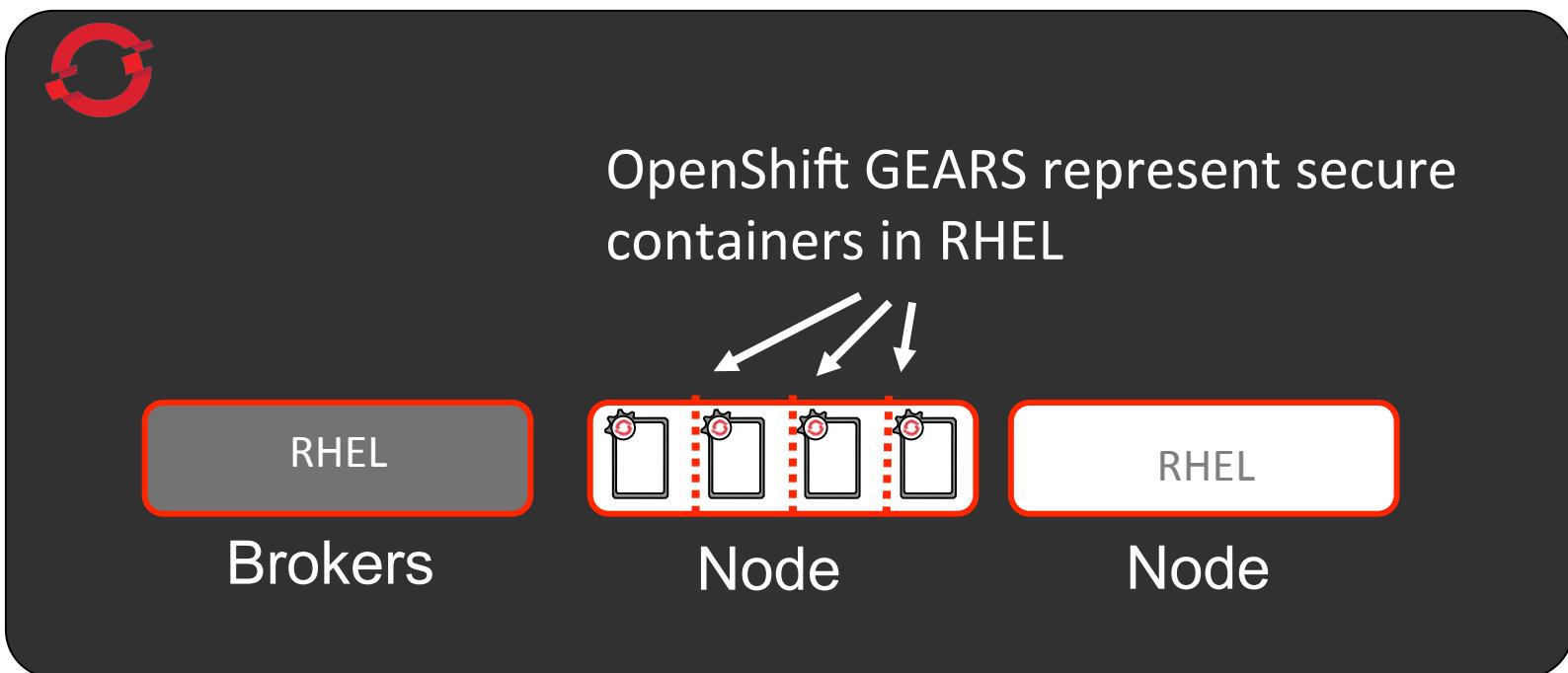
The node hosts are responsible for holding application gears.

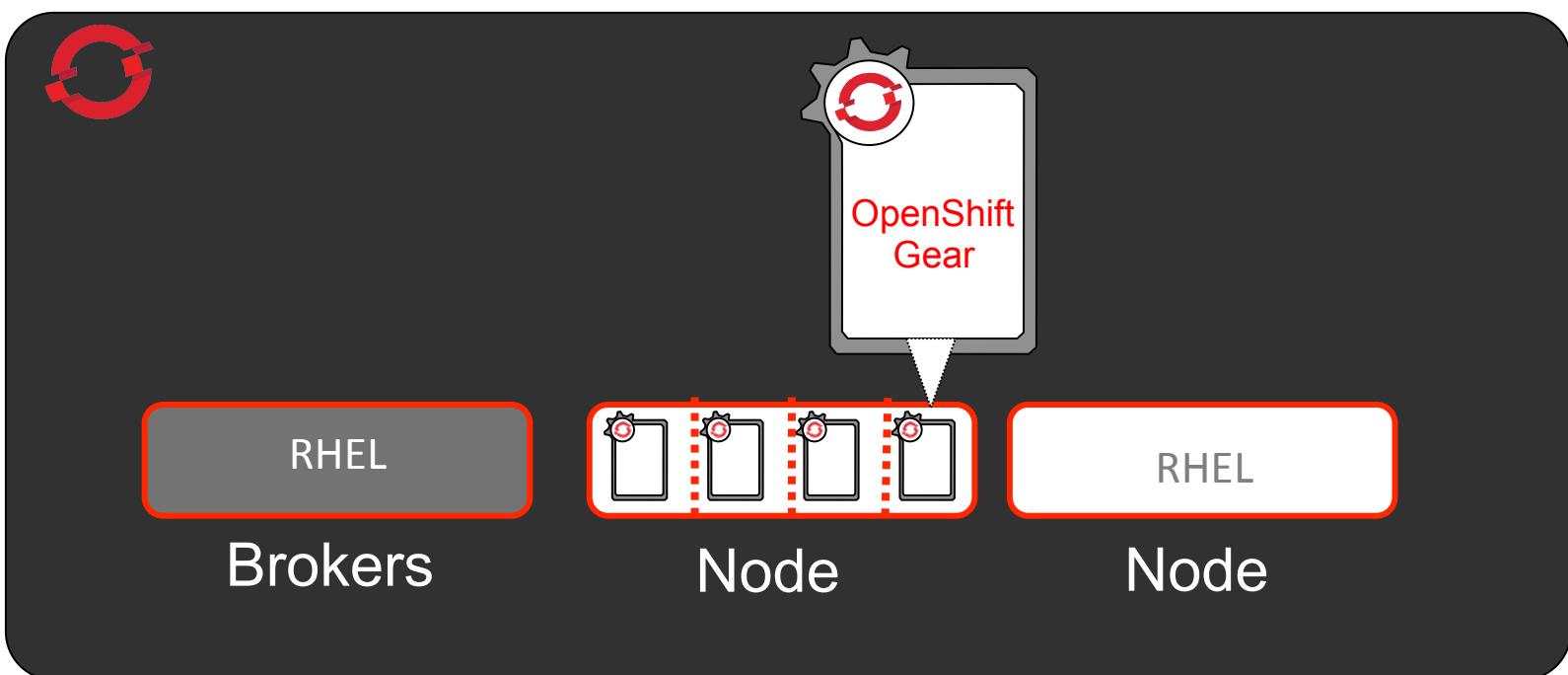


# SELINUX



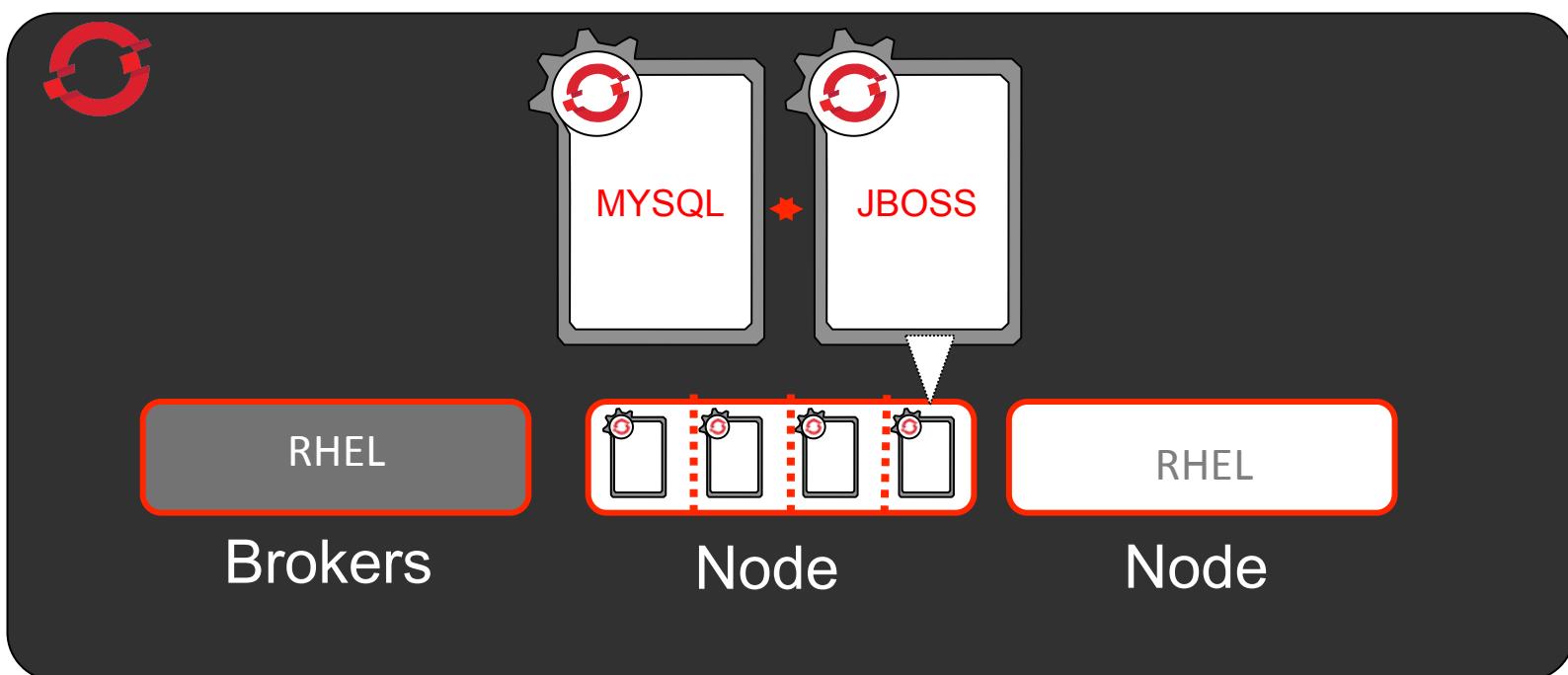
# GEARS



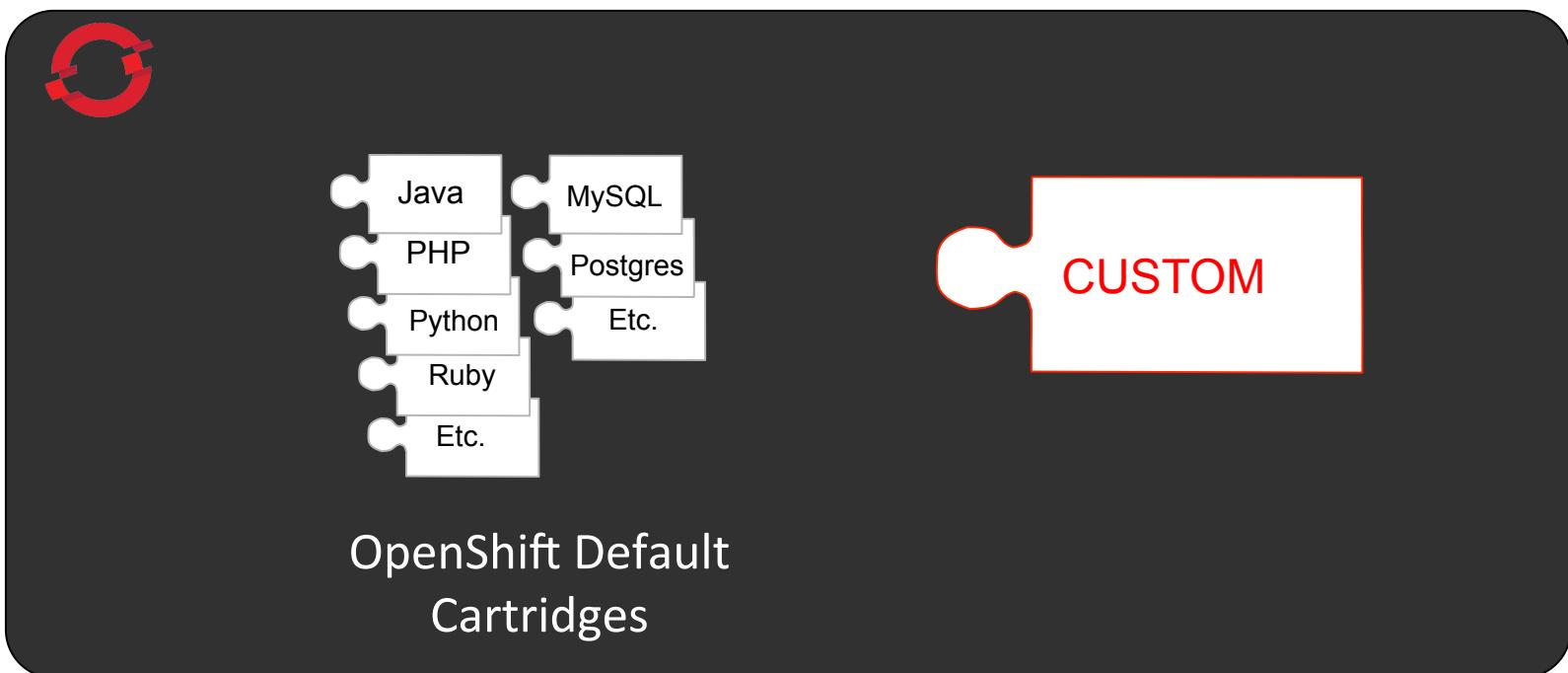


## CARTRIDGES

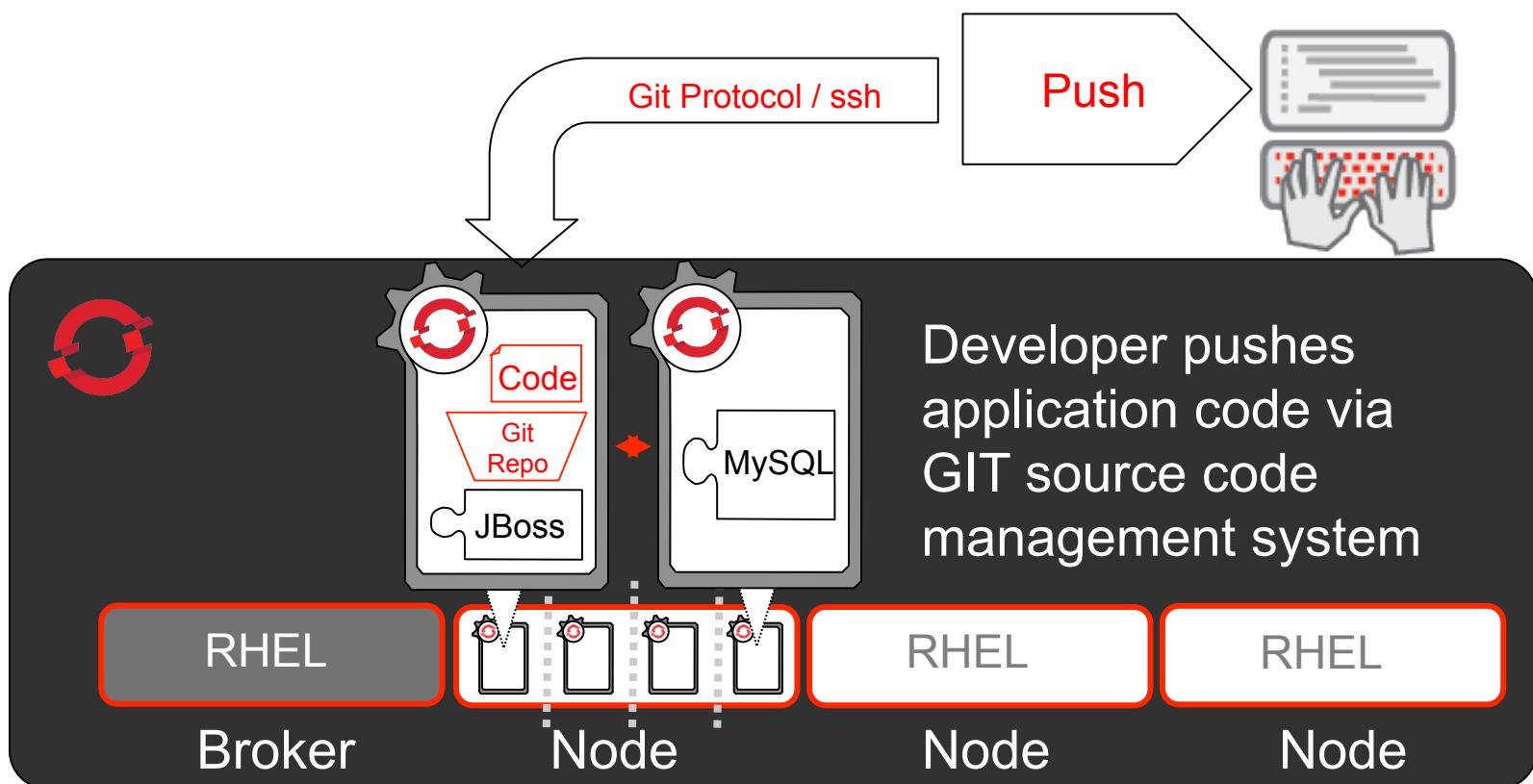
Web Console  
Eclipse IDE  
Cmd Line



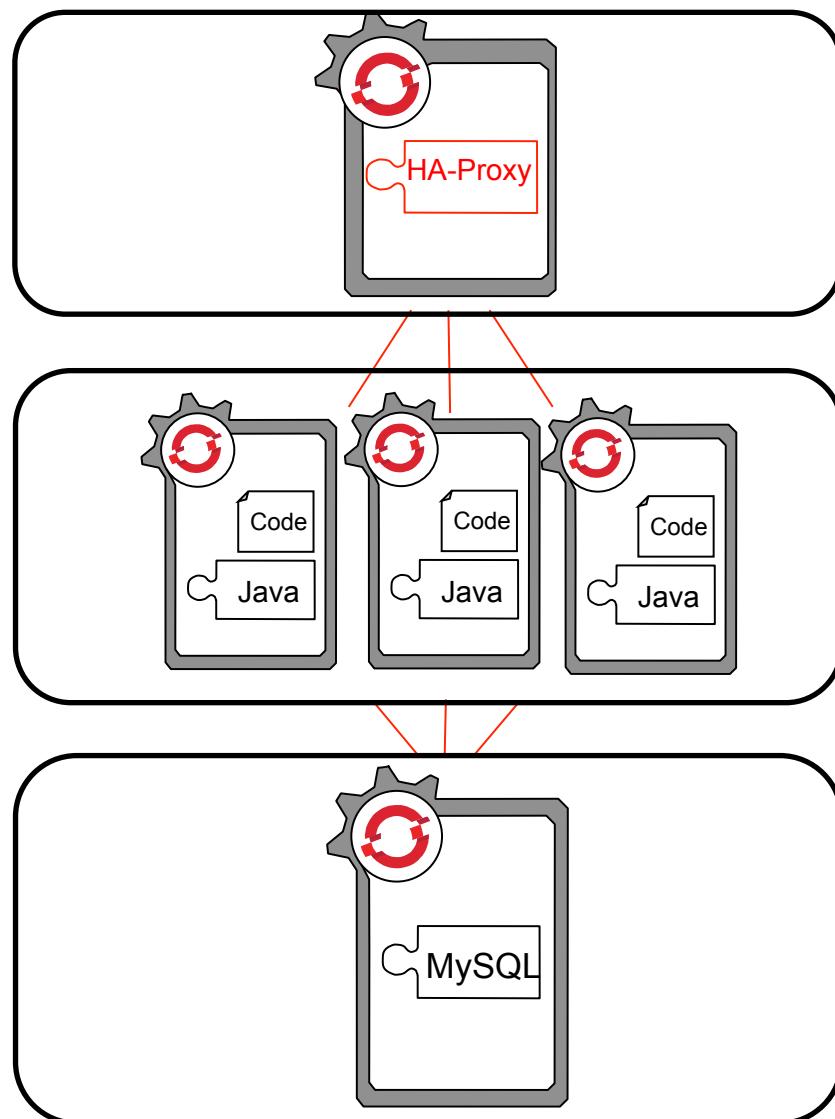
# CARTRIDGES



# WORKFLOW



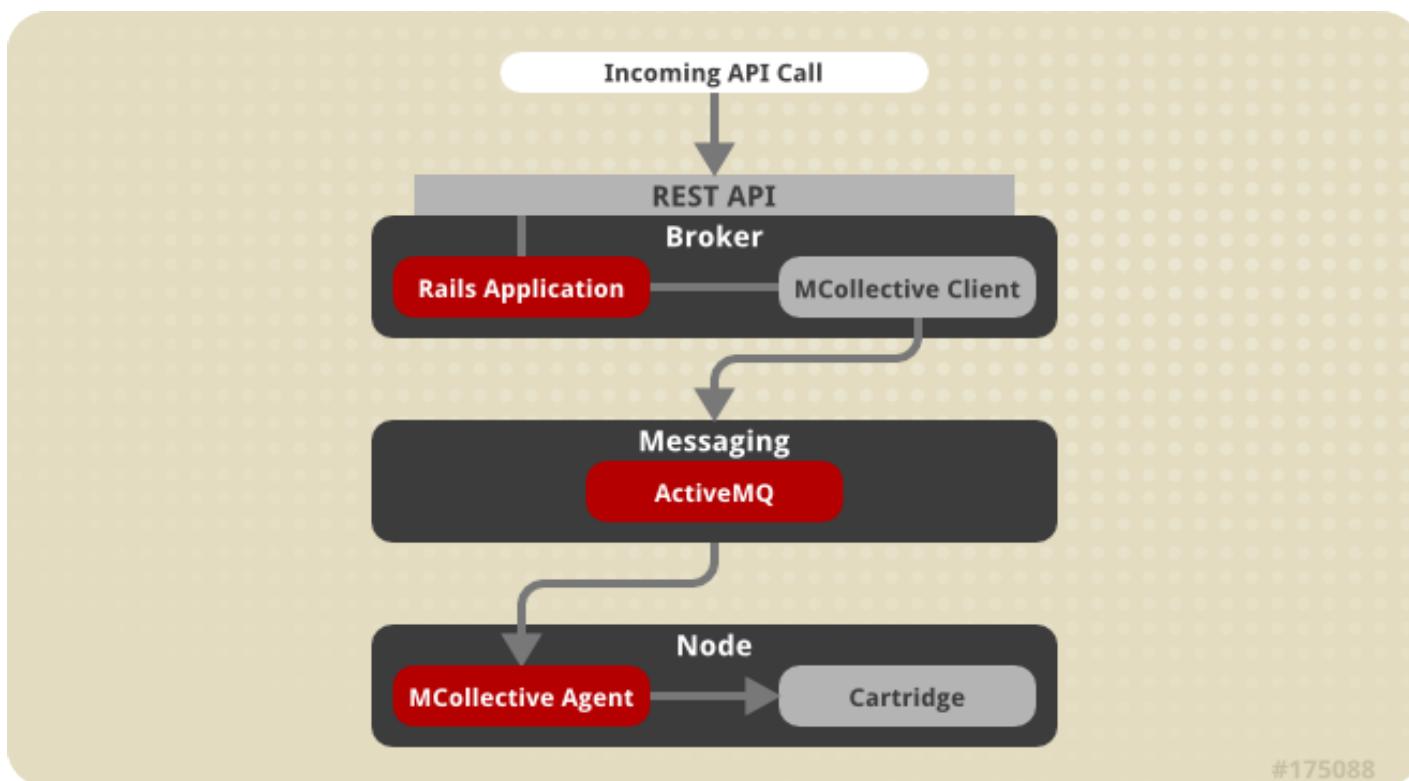
# SCALING



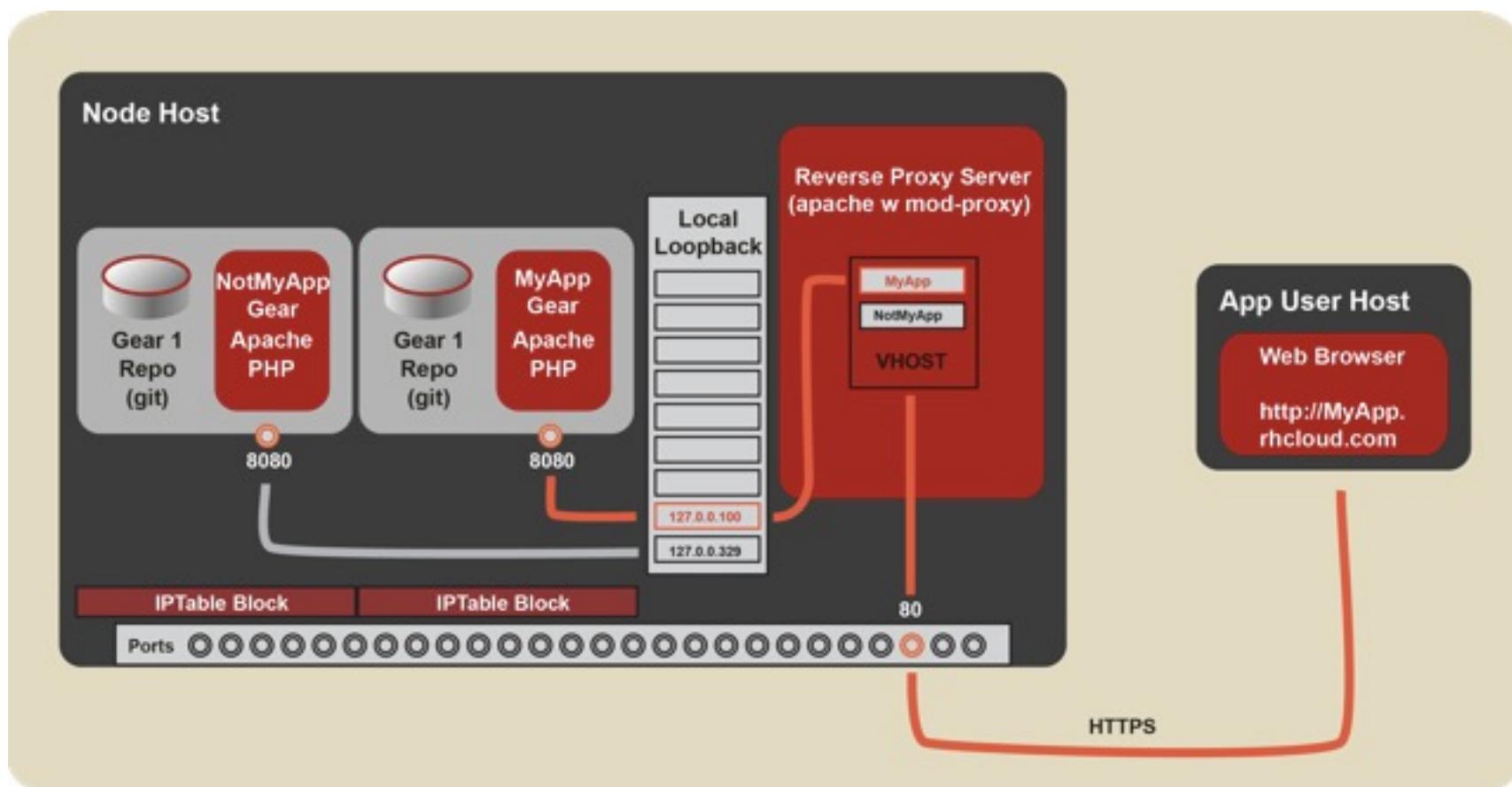
## COMMUNICATION

Communication from external clients occurs through the REST API

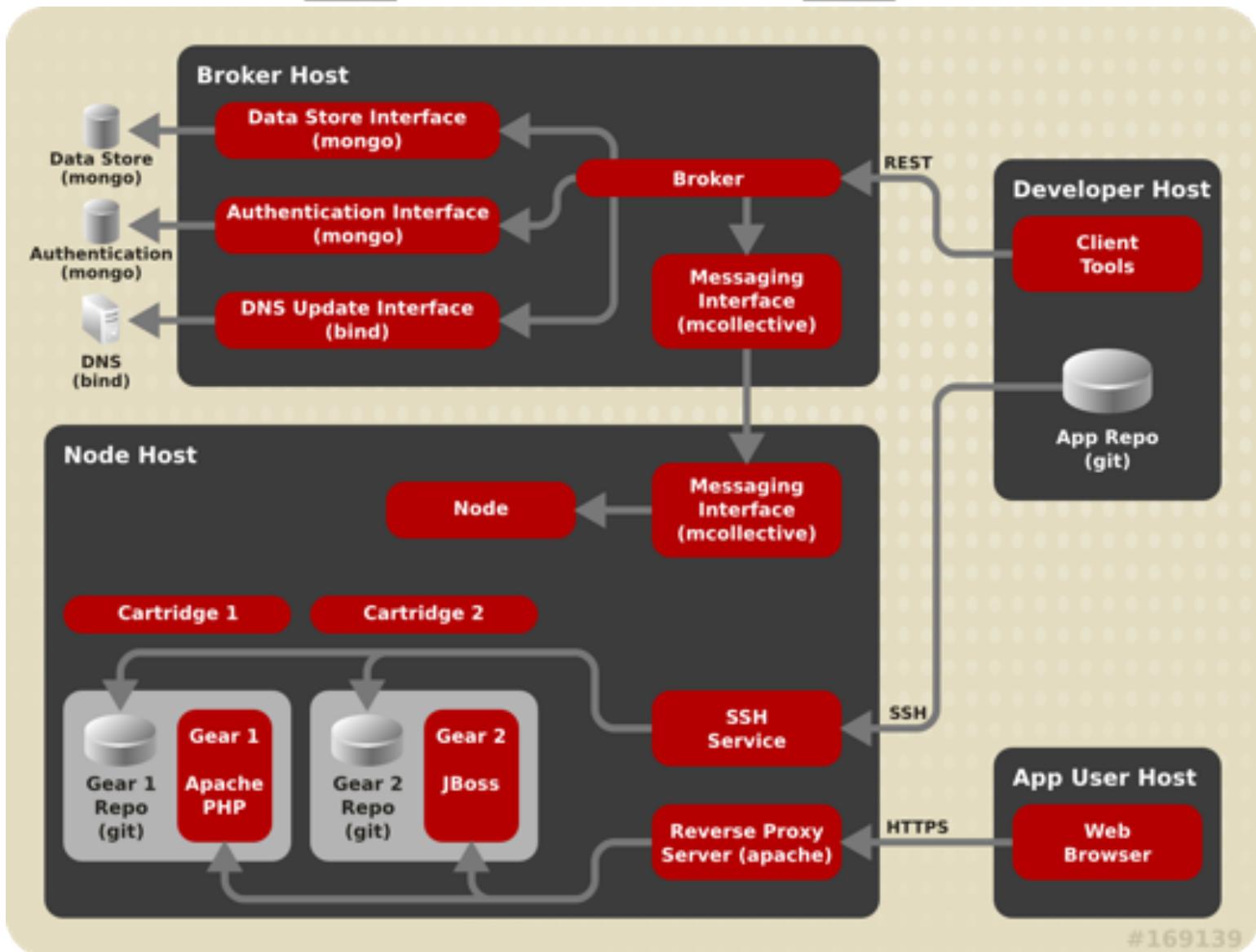
The Broker then communicates through the messaging service to nodes



## HTTP FLOW



# COMPLETE PICTURE



## LAB 1

- Read the overview chapter
- Register the system and add subscriptions
- Update the operating system
- Configure the system clock



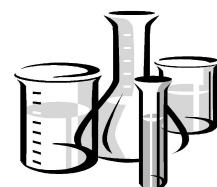
## LAB 1



# 15 MINUTES



## LAB 1



# QUESTIONS?



## LAB 2

- BIND
- Environment variables
- Create a database for your example.com domain
- Use the new nameserver
- Gotchas



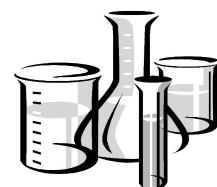
## LAB 2



# 20 MINUTES



## LAB 2



# QUESTIONS?



## LAB 3

- Configure dhclient
- Configure hostname



## LAB 3



# 5 MINUTES



## LAB 3



# QUESTIONS?



## LAB 4

- Install MongoDB
- Configure MongoDB
- Verify MongoDB is working

AVOID ACCIDENTS

We have gone

1



days since last  
'drop database `production`'

## LAB 4



# 10 MINUTES



## LAB 4



# QUESTIONS?



## LAB 5

- Install ActiveMQ
- Configure ActiveMQ
- Update firewall
- Verify it works



## LAB 5



# 10 MINUTES



## LAB 5



# QUESTIONS?

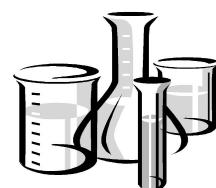


## LAB 6

- Install MCollective Client
- Configure MCollective Client



## LAB 6



# 10 MINUTES



## LAB 6



# QUESTIONS?

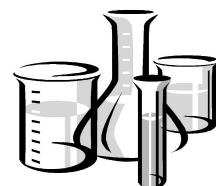


## LAB 7

- Install Broker application
- Generate access keys
- Configure SELinux and Boolean variables
- Changing Broker configuration



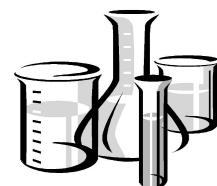
## LAB 7



# 15 MINUTES



## LAB 7



# QUESTIONS?



## LAB 8

- Configure Broker plugins
  - DNS plugin
  - Authentication plugin
- Create MongoDB account
- Configure SELinux and Boolean variables
- Changing Broker configuration



## LAB 8



# 15 MINUTES



## LAB 8



# QUESTIONS?

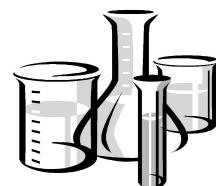


## LAB 9

- Install web console
- Configure authentication for web console



## LAB 9



# 10 MINUTES



## LAB 9



# QUESTIONS?



LAB 10

- Configure node host
- Set system clock
- Register node with DNS entry
- Configure SSH authentication

I KNOW! I KNOW!  
LICENSE & REGISTRATION

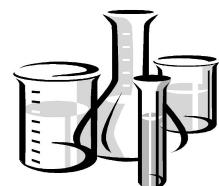
## LAB 10



# 20 MINUTES



## LAB 10



# QUESTIONS?



## LAB 11

- Install MCollective on node host
- Configure MCollective on node host
- Using STOMP (Simple Text Orientated Messaging Protocol)



LAB 11



# 10 MINUTES



## LAB 11



# QUESTIONS?

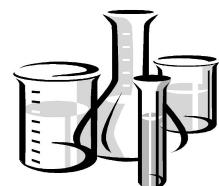


## LAB 12

- Install core node packages
- Install cartridges / runtimes node host will support



## LAB 12



# 10 MINUTES



## LAB 12



# QUESTIONS?



## LAB 13

- Configure PAM namespace module
- Configure Linux Control Groups (cgroups)
- Configure disk quotas



## LAB 13



# 10 MINUTES



LAB 13

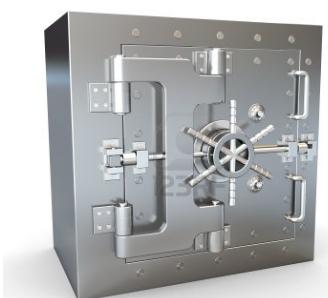


# QUESTIONS?

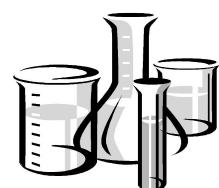


## LAB 14

- Configure SELinux (even more)
- Configure System Control Setting



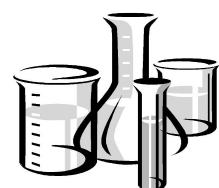
## LAB 14



# 5 MINUTES



## LAB 14



# QUESTIONS?



## LAB 15

- Configure SSH to pass GIT\_SSH variable
- Configure port proxy
- Reboot the node
- Finally, we get to test the setup!



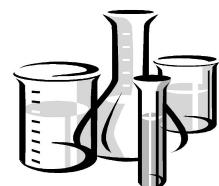
## LAB 15



# 20 MINUTES



## LAB 15



# QUESTIONS?

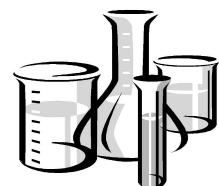


## LAB 16

Configure local machine (your laptop), for DNS resolution



## LAB 16



# 10 MINUTES



## LAB 16



# QUESTIONS?

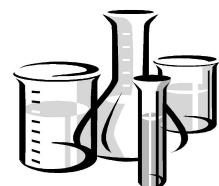


## LAB 17

- List available cartridges
- Install JBoss cartridges
- Clearing broker application cache
- Install PostgreSQL cartridge
- Install DIY cartridge



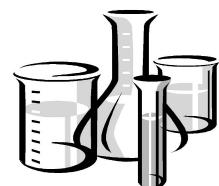
LAB 17



# 10 MINUTES



LAB 17



# QUESTIONS?



## LAB 18

- Managing resources
- Default gear quota and size
- Number of allowed gears
- Configuring gear types for a user



## LAB 18



# 10 MINUTES



## LAB 18

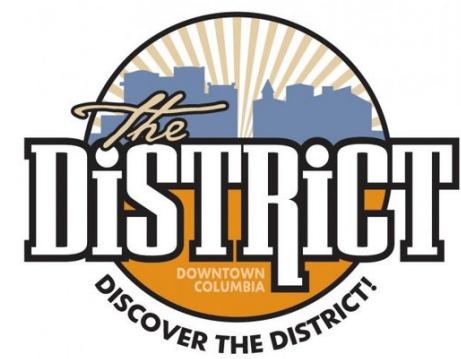


# QUESTIONS?

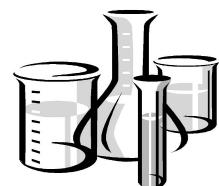


## LAB 19

- Introduction to districts
- Enable districts
- Populate district with node host
- Configure district capacity



## LAB 19



# 10 MINUTES



## LAB 19



# QUESTIONS?



## LAB 20

- Install RHC client tools
  - Windows
  - OS X
  - Linux
  - Any OS with Ruby



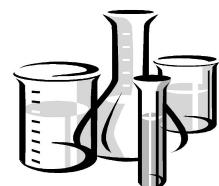
LAB 20



# 15 MINUTES



## LAB 20



# QUESTIONS?

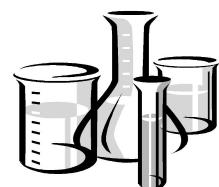


## LAB 21

- Configure RHC tools (broker.example.com)
- Run rhc setup



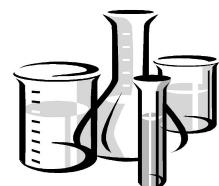
## LAB 21



# 10 MINUTES



LAB 21



# QUESTIONS?



## LAB 22

- Creating our first application (wait, really? – Yes, finally.)
- Understanding directory structure
- Edit the source code
- Deploy changes to your gear
- Enable hot deployment



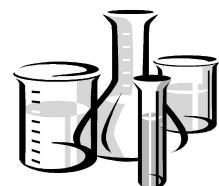
## LAB 22



# 30 MINUTES



## LAB 22

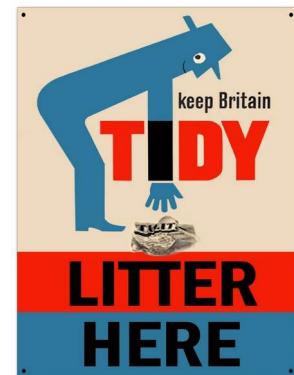


# QUESTIONS?

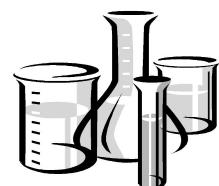


## LAB 23

- Managing Applications
- Cleaning up applications
- Start / Stop / Restart applications
- Viewing application details
- SSH to application gear
- Viewing log files
- Adding custom domain names
- Deleting an application



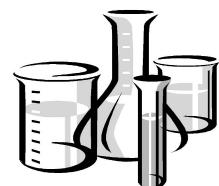
## LAB 23



# 30 MINUTES



## LAB 23



# QUESTIONS?

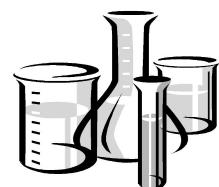


## LAB 24

- Using cartridges
- Adding MySQL to an application
- Modify PHP code to use MySQL
- Managing cartridges
- Using port forwarding



## LAB 24



# 30 MINUTES



## LAB 24



# QUESTIONS?



## LAB 25

- Using the web console



## LAB 25



# 10 MINUTES



## LAB 25



# QUESTIONS?



## LAB 26

- How scaling works
- Create a scaled application
- Automatic scaling
- Manual scaling



LAB 26



# 15 MINUTES



## LAB 26



# QUESTIONS?



## LAB 27

- Create a DIY application
- Start and Stop scripts



## LAB 27



# 10 MINUTES



LAB 27



# QUESTIONS?



## LAB 28

- Create a JBoss EAP application
- Adding marker files
- Building a TODO application
- Enable CDI
- Creating RESTful web service
- Deploying Java applications



LAB 28



# 30 MINUTES



## LAB 28



# QUESTIONS?



## LAB 29

- Using Jenkins for CI
- Adding a Jenkins server
- Configuring Jenkins builder
- Adding Jenkins to your Java application



LAB 29



# 30 MINUTES



## LAB 29



# QUESTIONS?



## LAB 30

- Using JBoss Tools
- Downloading Eclipse
- Installing JBoss Tools
- Configure JBoss Tools
- Creating applications
- Viewing logs
- Port forwarding
- Setting up database in Eclipse



## LAB 30



# 30 MINUTES



## LAB 30



# QUESTIONS?



## LAB 31

- Using quick starts



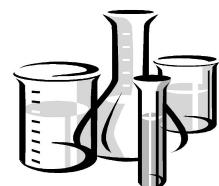
## LAB 31



# 10 MINUTES



LAB 31



# QUESTIONS?



## LAB 32

- Creating your own quick start



## LAB 32



# 30 MINUTES



## LAB 32



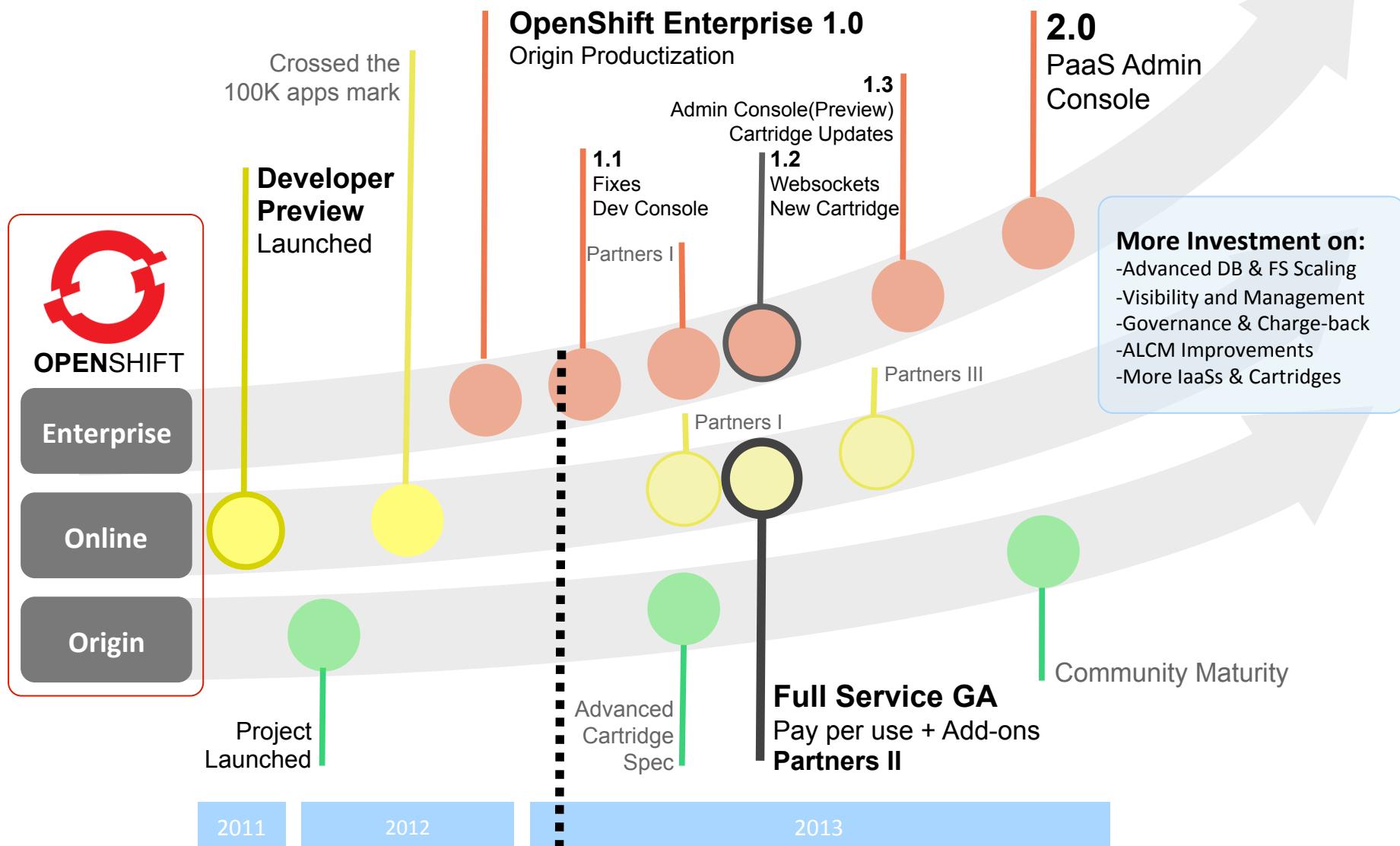
# QUESTIONS?



DONE!



# OpenShift 2011-2013 Roadmap



# Upcoming Releases

- OpenShift Enterprise 1.1 (Jan 31)
  - Developer Console fully supported, bug fixes & doc updates
- OpenShift Enterprise 1.2 (~May)
  - Integrate new cartridge format, Web sockets, SSL, other upstream
  - Rebase
- OpenShift Enterprise 1.3 (~Aug)
  - RHEL cartridge updates, Admin Console (Tech Preview), HA fixes, bugs
- OpenShift Enterprise 2.0 (~Nov)
  - Admin Console, additional JBoss cartridges (TBD)
  - Rebase

# Product Feedback

- Top Features & Enhancements Identified by OSE Prospects
  - Cartridge Enhancements
    - New Carts (MongoDB, Node.js, more JBoss products)
    - Updates Carts (update RHEL runtimes)
    - Custom Cartridges (easier to create; documented)
  - Administration
    - Usage Metering
    - Admin Console
    - App/Infrastructure Monitoring Integration
  - High Availability
    - HA Proxy
    - Active-Active, Active-Passive

# Product Feedback (cont.)

- Other Feature Requests
  - Larger Node Sizes for Bare Metal Deployments
  - Multi-level Authorization (Groups/Roles) & Enabling Team Development
  - Network Isolation & Access for Gears
  - IaaS/Virt Integration for Automated Provisioning of Nodes/Brokers
  - Chargeback Integration
  - Database Tier Autoscaling
  - CDN Integration
  - Localization

For more details and to provide feedback see:

<http://etherpad.corp.redhat.com/OpenShiftEnterprise-ReleasePlanning>

# OpenShift Enterprise Pricing

## Based on OpenShift Nodes for correlation to PaaS Capacity

SKU	Product and Price Description	USD	EUR	GBP
		1 Yr	1 Yr	1 Yr
<b>OpenShift Enterprise</b>				
MCT2736	OpenShift Enterprise Standard, 2 Core, 8 GB	\$5,500	€ 4,400	£3,793
MCT2735	OpenShift Enterprise Premium, 2 Core, 8 GB	\$8,000	€ 6,400	£5,517
MCT2738	OpenShift Enterprise Standard, 4 Core, 32 GB	\$13,500	€ 10,800	£9,310
MCT2737	OpenShift Enterprise Premium, 4 Core, 32 GB	\$20,000	€ 16,000	£13,793
MCT2748	JBoss Enterprise Application Platform for OpenShift Enterprise Standard, 2 Core, 8 GB	\$825	€ 660	£569
MCT2739	JBoss Enterprise Application Platform for OpenShift Enterprise Premium, 2 Core, 8 GB	\$1,200	€ 960	£828
MCT2749	JBoss Enterprise Application Platform for OpenShift Enterprise Standard, 4 Core, 32 GB	\$1,650	€ 1,320	£1,138
MCT2740	JBoss Enterprise Application Platform for OpenShift Enterprise Premium, 4 Core, 32 GB	\$2,400	€ 1,920	£1,655
MCT2741	OpenShift Enterprise Broker Infrastructure	\$0	€ 0	£0
SER0419	30 Day Unsupported OpenShift Enterprise, 2 Core, 8 GB Evaluation	\$0	€ 0	£0
SER0420	30 Day Unsupported JBoss Enterprise Application Platform for OpenShift Enterprise, 2 Core, 8 GB Evaluation	\$0	€ 0	£0
SER0421	OpenShift Employee Subscription	\$0	€ 0	£0

\*Euro = .8 USD

\*GBP = .68966 USD

# How Many OpenShift Brokers Do I Need?

- Brokers are RHEL instances that act as a central controller for a set of Nodes
  - Typical deployment will have a set of Nodes connected to a Broker
  - All customers need at least 1 OpenShift Broker, so be sure to add it to your quote!
  - We don't charge customers for Brokers (\$0 SKU) and you can add up to 20 max per customer
  - Customer's may need more than 1 Broker if they:
    - Want to make the Broker tier redundant for HA reasons;

# How Many OpenShift Nodes Do I Need?

- Nodes are RHEL instances where user applications run
  - Nodes are multi-tenant, meaning multiple apps run on each
  - Nodes are split up into individual containers or “Gears”, that are where application runtimes are deployed
  - Nodes have finite capacity, meaning there are limits to how many total Gears a single node can run

# How Many OpenShift Nodes Do I Need?

- Nodes are sold in specific instance sizes (two sizes to start)
  - 2 Core, 8 GB (“Small” Node) and 4 Core, 32 GB (“Medium” Node)
- Nodes can be split up into Gears of different sizes
  - Small Gear (512 MB), Medium Gear (1 GB), Large Gear (2GB), etc.
  - Customer can define gear size & name associated to it
- Number of Gears a Node can run can be estimated per the table below
  - Note the maximum number Gears per Node is not guaranteed and can vary based on application

Node Size	Small Gears (512 MB)	Medium Gears (1 GB)	Large Gears (2 GB)
2 Core, 8 GB	25	12	6
4 Core, 32 GB	100	50	25

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- To determine how many Nodes a customer will need, ask:
  - How much capacity (i.e. total # of applications) do you want to be able to support in your PaaS?
    - One application consumes at least 1 Gear
    - One application may consume 3 or more Gears if auto-scaling is enabled and/or if the DB (i.e. MySQL, Postgresql) runs in OpenShift
  - What types of applications do you want to run?
    - LAMP app runtimes can use Small Gears (512 MB)
    - JBoss EAP typically requires Medium or Large Gears (1 GB or 2 GB)
  - Do you want PaaS environments for Development, Testing, Staging, Production, etc. or all of the above?