Real World CI with Red Hat Cloud Suite

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Who we are

- DevOps Engineers - experts in software engineering and sys admin
- QE Ops - we build customer-like environments for testing products
- Central CI - we manage all the CI requirements for the testing env

Sim Zacks
Principal Quality Engineer

Oded Ramraz
Manager QE Ops
Enterprise solution for multiple teams

RHCS

CloudForms

CI Message Bus

RHEVM

JM1

JM2

JM3

Logstash

Code Review

Code Quality

QE

ENG

IT

Satellite

Capsules per location
RHCS Components - Harmonious Conjunction

Robust, Stable, Flexible

VM? Instance? Container?

Jenkins, Logstash, Sonar, Gerrit

Build your own CI Workflow!!
Agenda

● The What and How of CI
● RHCS Components Role
  ○ Added value of each component
  ○ Satellite Configuration Management
  ○ RHEV VM vs OpenStack Instance vs OpenShift Container
  ○ Integration with Jenkins, Gerrit, Logstash, …
  ○ High level management and reporting with CloudForms
● Summary
What is CI?

- Multi-user
- Continuous
- Integrated
- Automated
Why do we need CI?

- Prevent broken builds
- Early detection of bugs
- Continuous quality monitoring
- Increase SW development process
CI Workflow

Regression

Build System

Tier 1

Tier 2

CI Message Bus

Gerrit

Tier 0

Doc Gen

Web Server
CI Infrastructure

Legend
- Run on OpenShift
- Run on RHEV-M
- Run on RHOS

CloudForms by Red Hat Cloud

Job
- configuration
- node
- test bed
- results analysis

Nodepool

DocGen
ShipShift
SonarQube

CI provisioner
- Red Hat Openstack
- OpenShift
- Beaker
- AWS

Red Hat Satellite

Jenkins Job Builder
CI Goals

● Continuous quality analysis
● Automatic provisioning
● Configuration management
● Centralized reporting
Continuous Quality Analysis

Summary:
- Debt: 1,499
- Issues: 28,082

Documentation:
- Public API: 33,657
- Public Unloc. API: 29,304
- Comment Lines: 41,321

Coverage:
- Total Coverage: 48.9%
- Line Coverage: 53.3%
- Condition Coverage: 38.8%

Projects:
- Lines of Code: 550,542
- Files: 6,963
- Functions: 51,120

Complexity:
- Total Complexity: 102,601

Duplications:
- Lines: 17,187
- Blocks: 1,108
- Files: 491

#redhat #rhsummit
Automatic Provisioning

● Reduces provision time and human errors
● Reduces non test related errors
● Allows investing more time on development
Centralized Logging

- Detection of anomalous activity
- Simplify log analysis and correlation tasks
- Display trends, graphs and data tables
- Fast deployment
- Jenkins integration
- Containerized
- Scalable
How we do it -
RHCS Components
- Centralized virtual infrastructure management (e.g. hosts, VMs, networking, storage, templates)
- Providing mechanism for VMs high availability
- Delivering leading performance and scalability for virtual machines on a stable and secure platform
- Running crucial CI services such as Jenkins, ELK, CFME, etc
RHEVM - Permanent services (Jenkins, Satellite, Gerrit, ELK stack, SonarQube, …)
RHEVM - Static platform/properties

- High availability
- Live migration
- Storage live migration
- Live snapshots
- Load balancing
- Power saving
- Hot plug disk and network
- Storage on local disk, FC, iSCSI, NFS, Red Hat Storage Server, IBM GPFS, Posix or Direct LUN
- Self service portal with quotas
RHEVM - Reporting
Satellite

- New modern design, cutting-edge open source software
- Designed for software life cycle (SLC) management
- Bare metal, virtual machine (VM), and cloud deployment
Satellite 6 Architecture
Satellite - Application Lifecycle Management
Jenkins

- Pluginable
- Supports various source control management tools
- Supports various script languages and common tools
- Allows triggered builds

![Jenkins Interface with Build Logs and Execution Commands](image-url)
Jenkins - Workflow - Triggers

- Gerrit
- Code-Review +2 Jaime Flynn
  - +1 Boaz Shuster, Vasyl Kaigorodov
- Verified +1 Alexander Braverman, Masis, CI OPs, Jenkins

Build other projects
Projects to build
- sonar-report-ypaliron
  - Trigger only if build is stable
  - Trigger even if the build is unstable
  - Trigger even if the build fails
Jenkins - Workflow - CI Message Bus

- Expands trigger capabilities
- Allows passing additional information for smart triggering
- Allows customizing Jenkins triggers
Jenkins - Workflow - Plugins

• Jenkins functionality extended via plugins
• For example, CI message bus is a Jenkins plugin
• New plugins could be added according to requirements
Jenkins - Workflow - Jenkins nodes (slaves)

- Jenkins nodes are used for Jenkins builds
- VM, bare metal and containers could be used as Jenkins nodes
- Jenkins nodes connected to Jenkins master
- Accessible by Jenkins plugins and Jenkins master
Jenkins - Workflow - Tools

● Jenkins Job Builder:
  ○ Allows us to maintain Jenkins Jobs in YAML format
  ○ Fast deployment of jobs
● Nodepool:
  ○ Key part of Openstack CI infra.
  ○ Allows Jenkins nodes lifecycle management
● CI provisioner:
  ○ Test bed provision/teardown
  ○ Allows provision of complex topologies that contain bare metal, vm from various providers, containers
Cloud Implementation
Openstack/OpenShift
OpenStack
OpenStack - Tenant per team

Limit Summary

Usage Summary

Select a period of time to query its usage:

From: 2016-05-01  To: 2016-05-10

Active Instances: 5  Active RAM: 416GB  This Period's VCPU-Hours: 4021.56  This Period's GB-Hours: 118556.99  This Period's RAM-Hours: 2258156.99

Usage

<table>
<thead>
<tr>
<th>Instance Name</th>
<th>VCPUs</th>
<th>Disk</th>
<th>RAM</th>
<th>Time since created</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows2012</td>
<td>4</td>
<td>100GB</td>
<td>8GB</td>
<td>1 month, 1 week</td>
</tr>
<tr>
<td>Windows2012</td>
<td>4</td>
<td>100GB</td>
<td>8GB</td>
<td>6 days, 11 hours</td>
</tr>
<tr>
<td>Windows2012</td>
<td>4</td>
<td>100GB</td>
<td>8GB</td>
<td>6 days, 11 hours</td>
</tr>
<tr>
<td>Windows2012</td>
<td>4</td>
<td>100GB</td>
<td>8GB</td>
<td>6 days, 11 hours</td>
</tr>
<tr>
<td>Mike-Deploy-test</td>
<td>4</td>
<td>100GB</td>
<td>8GB</td>
<td>2 days, 2 hours</td>
</tr>
</tbody>
</table>

Download CSV Summary
OpenStack - Zones
OpenStack - Jenkins slaves

Image Labels
OpenStack - Virtualized Test Resources
OpenStack - Image Management
OpenShift

IT'S THE OPENSHEET SOLUTION

DEVOPS

MICROSERVICES

CONTAINERS

CLOUD

Public

Private

Virtualized

Bare Metal
OpenShift - Containers
OpenShift - Lightweight disposable tasks
OpenShift - Lightweight disposable tasks - Doc Gen
OpenShift - Lightweight disposable tasks - Unit Testing

Okay let me put this code live

Wait a minute, where are your unit tests?

No need for that, I have something much better

Hey what the...

Guys, the app is broken, what the hell did you do?!

So there is a bug!

Taken from CommitStrip (strip)
ShipShift / Logstash
Cloud Management
CloudForms
CloudForms - Automation

- ManageIQ (Locked)
- Cloud
  - Orchestration
  - VM
    - Lifecycle
    - Operations
    - Provisioning
      - Email
      - Naming
    - Placement
      - default
      - best_fit_amazon
      - best_fit_openstack
- Namespace
- Class
  - default
  - best_fit_amazon
  - best_fit_openstack
- Instance
- Method

- Devices
- PXE
- Requests
- Configuration Management
- Lifecycle
  - Provision VMs
  - Clone selected item
  - Publish selected VM to a Template
  - Migrate selected items
  - Set Retirement Dates
  - Retire selected items
- Policy
- Monitoring
  - Clone this VM
  - Set Retirement Date
  - Retire this VM

#redhat #rhsummit
Summary
<table>
<thead>
<tr>
<th>Name</th>
<th>Comment</th>
<th>Host</th>
<th>IP Address</th>
<th>FQDN</th>
<th>Cluster</th>
<th>Data Center</th>
<th>Memory</th>
<th>CPU</th>
<th>Network</th>
<th>Graphics</th>
<th>Status</th>
<th>Uptime</th>
</tr>
</thead>
<tbody>
<tr>
<td>adehdrt@jenkins</td>
<td></td>
<td></td>
<td>10.8.63.05</td>
<td>adehdrt@jenkins</td>
<td>RHEV-CI</td>
<td>RHEV-CI</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>SPICE</td>
<td>Up</td>
<td>148 days</td>
</tr>
<tr>
<td>aes-devel@jenkins</td>
<td>clone fr...</td>
<td>hv09</td>
<td>10.8.63.05</td>
<td>aes-devel@jenkins</td>
<td>RHEV-CI</td>
<td>RHEV-CI</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>SPICE</td>
<td>Up</td>
<td>283 days</td>
</tr>
<tr>
<td>aes-ostree</td>
<td>Owned b...</td>
<td>hv08</td>
<td>10.8.63.104</td>
<td>aes-ostree@rhe...</td>
<td>RHEV-CI</td>
<td>RHEV-CI</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>SPICE</td>
<td>Up</td>
<td>194 days</td>
</tr>
<tr>
<td>apl-qa-jenkins</td>
<td></td>
<td>hv08</td>
<td>10.8.63.72</td>
<td>apl-qa-jenkins.rhe...</td>
<td>RHEV-CI</td>
<td>RHEV-CI</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>SPICE</td>
<td>Up</td>
<td>275 days</td>
</tr>
<tr>
<td>artfactory</td>
<td></td>
<td>hv08</td>
<td>10.8.63.24</td>
<td>artfactory.rhe...</td>
<td>RHEV-CI</td>
<td>RHEV-CI</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>SPICE</td>
<td>Up</td>
<td>525 days</td>
</tr>
</tbody>
</table>

**Note:** The table contains information about hosts and their respective properties such as IP addresses, clusters, data centers, memory, CPU, network, graphics, status, and uptime.
<table>
<thead>
<tr>
<th>Name</th>
<th>Comment</th>
<th>Host</th>
<th>IP Address</th>
<th>FQDN</th>
<th>Cluster</th>
<th>Data Center</th>
<th>Memory</th>
<th>CPU</th>
<th>Network</th>
<th>Graphics</th>
<th>Status</th>
<th>Uptime</th>
</tr>
</thead>
<tbody>
<tr>
<td>jenkins</td>
<td></td>
<td></td>
<td>10.0.0.1</td>
<td></td>
<td></td>
<td>RHEV-CI</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dev-jenkins</td>
<td></td>
<td></td>
<td>10.0.0.2</td>
<td></td>
<td></td>
<td>RHEV-CI</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>release-jenkins</td>
<td></td>
<td></td>
<td>10.0.0.3</td>
<td></td>
<td></td>
<td>RHEV-CI</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>master</td>
<td></td>
<td></td>
<td>10.0.0.4</td>
<td></td>
<td></td>
<td>RHEV-CI</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Compliance Reports**

<table>
<thead>
<tr>
<th>Host</th>
<th>Date</th>
<th>Failed</th>
<th>Critical</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Other</th>
<th>View Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>host1.example.com</td>
<td>5 days ago</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>host2.example.com</td>
<td>5 days ago</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>host3.example.com</td>
<td>5 days ago</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>host4.example.com</td>
<td>5 days ago</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#redhat #rhsummit
Workload by Provider
- VMware vCenter
- Microsoft System Center
- Amazon EC2
- Red Hat Enterprise
- OpenStack
- Azure

Vendor and Guest OS Chart
- Unknowns
- Debian GNU/Linux 4
- other Linux
- RHEL 6
- Red Hat Enterprise
- Other

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LEARN. NETWORK.
EXPERIENCE OPEN SOURCE.