The State Of Docker and Vagrant Tooling in Eclipse

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What is Docker?

- Open-source project
- Light-weight virtualization sharing Linux kernel
- Deploy applications in a “Container”
- Container has all that is needed to run app
  - Filesystem, runtime, system tools, libraries
- Container is created from an “Image”
  - An image is a template for creating Containers
Docker Tooling

• Set of plug-ins from the Linux Tools Project
• Initially provided in Eclipse Mars release
• Provide management of Containers/Images
• UI interface to “docker” command functionality
  - attach, build, commit, create, exec, images, info, inspect, kill, pause, ps, pull, push, restart, rm, rmi, run, search, start, stop, tag, unpause
• Uses spotify/docker-client for communicating with the Docker daemon
Docker Perspective
Docker Perspective Views

• New views
  – Docker Explorer View
    • Tree view of Docker connections, images, containers
  – Docker Images View
    • Table view of Docker Images (can be filtered)
  – Docker Containers View
    • Table view of Docker Containers (can be filtered)

• Console and Properties view
Docker Explorer
Docker Explorer Cont.

- Manages Connections
- Current connection used by Docker Containers and Docker Images views
- At first start-up, no connections exist and one must click to get the New Connection Wizard
- Connections can be specified either as:
  - Unix socket (default for Linux)
  - TCP connection (authentication can be enabled)
# Docker Images View

![Docker Images View](image)

## Table

<table>
<thead>
<tr>
<th>Id</th>
<th>Repo Tags</th>
<th>Created</th>
<th>Virtual Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>94628036c2f2</td>
<td>myrepo/blah7:latest</td>
<td>2016-01-12</td>
<td>374.1 MB</td>
</tr>
<tr>
<td>6093980bd989</td>
<td>fedora:rawhide</td>
<td>2014-04-04</td>
<td>227.9 MB</td>
</tr>
<tr>
<td>0721f2b3cb16</td>
<td>fedora:23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>85f4e2af80d3</td>
<td>fedora:22</td>
<td>2015-10-13</td>
<td>194.6 MB</td>
</tr>
<tr>
<td>a4f22ccab9b1</td>
<td>my:blah</td>
<td>2015-05-29</td>
<td>451.7 MB</td>
</tr>
<tr>
<td></td>
<td>myrepo/blah:latest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e26efd418c48</td>
<td>fedora:21</td>
<td>2015-05-15</td>
<td>250.2 MB</td>
</tr>
<tr>
<td></td>
<td>fedora:latest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7dc48690bc64</td>
<td>fedora:21-gdbserver</td>
<td>2015-05-01</td>
<td>585.4 MB</td>
</tr>
<tr>
<td>d7f0e75cf11f</td>
<td>fedora:20</td>
<td>2015-04-22</td>
<td>374.1 MB</td>
</tr>
<tr>
<td>517a02c276ea</td>
<td>ubuntu:sox</td>
<td>2015-03-14</td>
<td>270.8 MB</td>
</tr>
</tbody>
</table>

## Tools

- Add Tag
- Remove Tag
Docker Images View Actions

- Pull image with optional Dockerhub search
- Push image tag
- Run image (create a Container)
  - Saves launch configuration
- Build image from Dockerfile
  - Can right-click and run as Image Build
  - Also saves launch configuration
Docker Images View Actions Cont.

- Tag image
  - Use this to specify an external registry or an alternate repository to push to
- Delete image
- Refresh images
- Show all images
  - By default intermediate and dangling images are filtered
Docker Containers View

<table>
<thead>
<tr>
<th>Name</th>
<th>Image</th>
<th>Created</th>
<th>Command</th>
<th>Ports</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>elegant_pare</td>
<td>fedora:21</td>
<td>2015-03-11</td>
<td>/bin/bash</td>
<td></td>
<td>Up About a minute</td>
</tr>
<tr>
<td>sharp Ritchie</td>
<td>fedora:21</td>
<td>2015-03-11</td>
<td>/home/jjoh</td>
<td></td>
<td>Exited (0) 11 months ago</td>
</tr>
<tr>
<td>stoic sammet</td>
<td>tmp:example</td>
<td>2015-03-11</td>
<td>/bin/sh -c '</td>
<td></td>
<td>Exited (0) 11 months ago</td>
</tr>
<tr>
<td>determined franklin</td>
<td>fedora:21</td>
<td>2015-03-11</td>
<td>/home/jjoh</td>
<td></td>
<td>Exited (0) 11 months ago</td>
</tr>
<tr>
<td>sad Brattain</td>
<td>tmp:example</td>
<td>2015-03-11</td>
<td>/bin/sh -c '</td>
<td></td>
<td>Exited (0) 10 months ago</td>
</tr>
<tr>
<td>evil bell</td>
<td>ubuntu:13.04</td>
<td>2015-03-14</td>
<td>/bin/bash</td>
<td></td>
<td>Exited (-1) 10 months ago</td>
</tr>
<tr>
<td>Hungry Darwin</td>
<td>ubuntu:13.04</td>
<td>2015-03-14</td>
<td>/bin/bash</td>
<td></td>
<td>Exited (-1) 10 months ago</td>
</tr>
<tr>
<td>Nostalgic Newton</td>
<td>ubuntu:latest</td>
<td>2015-03-14</td>
<td>/bin/bash</td>
<td></td>
<td>Exited (0) 10 months ago</td>
</tr>
<tr>
<td>Trusting Colden</td>
<td>ubuntu:13.10</td>
<td>2015-03-14</td>
<td>/bin/bash</td>
<td></td>
<td>Exited (-1) 8 months ago</td>
</tr>
<tr>
<td>Elegant Davinci</td>
<td>fedora:21-gdbserver</td>
<td>2015-05-01</td>
<td>/home/jjoh</td>
<td></td>
<td>Exited (0) 10 months ago</td>
</tr>
</tbody>
</table>
Docker Containers View Actions

- Equivalent to docker ps command
- Start container
- Pause container
- Unpause container
- Stop container
- Kill container
Docker Containers View Actions
Cont.

- Delete container
- Refresh containers (manual)
  - Auto-refresh occurs by default every 15 seconds
  - Can tune this using preferences
- Commit container (create an image)
- Display log
  - By default starting a container shows log
- Remove log
  - Remove the console log for this container
Container Logs

- Logs of a Container are shown by default after starting
- If tty option is used then a Terminal is opened
  - Input is allowed if stdin is specified
- If tty option is not used then a Console is open
  - Console name contains Container name
  - Timestamp is defaulted but can be disabled via preferences
- Can display logs for a stopped container
What is Vagrant

- Hypervisor: The software that manages virtual machines
- Vagrant is a layer of abstraction above the hypervisor providing a uniform way to manage virtual environments

```
sh-1$ vagrant up
```
Eclipse Vagrant Tooling Capabilities

- Boxes: Package format for Vagrant environment
- Vagrantfile: specification file for VM(s), reads like a config file
- VM: Create, Start, Stop, Destroy, SSH, Package
Eclipse Vagrant Tooling
Vagrant + Docker

- Useful on systems like MacOS and Windows where Docker can't be run natively
- Similar to boot2docker/docker-machine
Vagrant + Docker

sh-$ vagrant plugin install vagrant-service-manager
# Download Vagrantfile with projectatomic/adb Box
sh-$ vagrant service-manager env docker
Future Features to Vagrant Tooling

- Support some basic resource allocation commands (memory, cpus)
- Handle sync issues between vagrant and provider backend
- Support 'provisioners' for 'shell' and 'file'
- Support for vagrant service-manager for ADB
- Use TM Terminal for output of certain commands
New in Eclipse Docker Tooling

- Many bug fixes that improved user experience
  - AERI has helped with this
- TM Terminal for interactive shells in containers
- Container auto-removal on exit
- Launch configurations for running containers and building images
Future Features In Eclipse Docker Tooling

• Add support for storing authentication credentials
• 'docker exec -it $ID /bin/sh' for interacting with container that has foreground process
• Better support for private registries
• Implement Run/Debug Java application
Issues

- Docker Remote API evolves quickly
  - In the time between Eclipse service releases, multiple newer versions of the API could be out that have breaking changes

- 'docker-client' while active, also has some issues
  - No release cadence or versioning policy
Issues Cont.

• Using output from 'vagrant' CLI
  – 'machine-readable' flag exists but not supported for all commands
  – There's much more data to display, just no guarantee the format will remain

• Some implementation details become visible across different providers
Issues Cont.

- Eclipse CQ Process (3rd party libraries, Works-With CQ, Pre-requisite CQ)
  - [https://rgrunber.fedorapeople.org/docker-client-deps.svg](https://rgrunber.fedorapeople.org/docker-client-deps.svg)
  - Overall, this wasn't that bad
  - Works-With/Pre-requisite CQ process was pretty smooth (docker-machine, vagrant)
$ for m in containers vagrant ; do echo $m; git shortlog -s $m | sort -n ; done;

containers
   1 Rob Stryker
   3 Kaloyan Raev
  18 Alexander Kurtakov
  37 Jeff Johnston
  40 Roland Grunberg
  78 Xavier Coulon
vagrant
   1 Jeff Johnston
   2 Rob Stryker
   7 Alexander Kurtakov
  34 Roland Grunberg

Not enough contributors

Shipping as part of Linux Tools (share releng)

Cannot define our own project release policy
Resources

- https://marketplace.eclipse.org/content/eclipse-docker-tooling
- https://marketplace.eclipse.org/content/eclipse-vagrant-tooling
- github.com/fedoradesign/coloringbook-containers/raw/master/Print-Ready/Web.pdf
- github.com/projectatomic/vagrant-service-manager
- wiki.eclipse.org/Linux_Tools_Project/Docker_Tooling/User_Guide
- wiki.eclipse.org/Linux_Tools_Project/Vagrant_Tooling/User_Guide