Docker Recipes for Java Developers

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What is Docker?

• Open source project and company

• Used to create containers for software applications

• Package Once Deploy Anywhere (PODA)
Docker Contributors by employers/hackers

<table>
<thead>
<tr>
<th>Rank</th>
<th>Employer</th>
<th>Changeset Count</th>
<th>Percentage</th>
</tr>
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<td>47.9%</td>
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<td>&quot;IBM&quot;</td>
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<tr>
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<td>&quot;Google&quot;</td>
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<tr>
<td>6</td>
<td>&quot;Cisco&quot;</td>
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<td>7</td>
<td>&quot;Amadeus&quot;</td>
<td>4</td>
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<td>&quot;VMWare&quot;</td>
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<td>9</td>
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</tr>
</tbody>
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https://gist.github.com/arun-gupta/7d5a373099ff831d7213
Build

Develop an app using Docker containers with any language and any toolchain.

Run

Scale to 1000s of nodes, move between data centers and clouds, update with zero downtime and more.

Ship

Ship the “Dockerized” app and dependencies anywhere - to QA, teammates, or the cloud - without breaking anything.
Virtual Machines
Each virtualized application includes not only the application - which may be only 10s of MB - and the necessary binaries and libraries, but also an entire guest operating system - which may weigh 10s of GB.

Docker
The Docker Engine container comprises just the application and its dependencies. It runs as an isolated process in userspace on the host operating system, sharing the kernel with other containers. Thus, it enjoys the resource isolation and allocation benefits of VMs but is much more portable and efficient.
Docker Workflow

docker run <image>
docker …
Docker Machine

• Create Docker Host on computer or cloud provider

  
docker-machine create --driver=virtualbox myhost

• Configure Docker client to talk to host

• Create and pull images

• Start, stop, restart containers

• Upgrade Docker

• Not recommended for production yet
Docker Compose

- Defining and running multi-container applications
- Configuration defined in a single file
- Great for dev, staging, and CI
- Not recommended for production yet
```yaml
mysqldb:
  image: mysql
  environment:
    MYSQL_DATABASE: sample
    MYSQL_USER: mysql
    MYSQL_PASSWORD: mysql
    MYSQL_ROOT_PASSWORD: supersecret

mywildfly:
  image: arungupta/wildfly-mysql-javaee7
  links:
    - mysql:
docker-compose.yml
Docker Swarm

- Native clustering for Docker
- Provides a unified interface to a pool of Docker hosts
- Fully integrated with Machine
- Serves the standard Docker API
- Partially integrated with Compose
- Not recommended for production yet
Advantages of Containers

• Immutability
• Reproducibility
• Isolation
• Faster deployments
• Portability - “it works on my machine”
• Snapshotting
• Security sandbox
• Limit resource usage
• Simplified dependency
• Sharing
Kubernetes

- Open source orchestration system for Docker containers
- Provide declarative primitives for the “desired state”
  - Self-healing
  - Auto-restarting
  - Schedule across hosts
  - Replicating
Concepts

- **Pods**: collocated group of Docker containers that share an IP and storage volume

- **Service**: Single, stable name for a set of pods, also acts as LB

- **Replication Controller**: manages the lifecycle of pods and ensures specified number are running

- **Label**: used to organize and select group of objects
Collect statistics about who wrote Kubernetes

gitdm (git data mine) is a tool written by Jonathan Corbet at LWN which he uses to do his 'who wrote the kernel' articles. I spent a couple of minutes to run it against kube. Some interesting results...

Developers with the most changesets
Brendan Burns 643 (10.3%)
Daniel Smith 485 (7.8%)
Clayton Coleman 453 (7.3%)
Tim Hockin 312 (5.0%)
derekwaynecarr 209 (3.4%)

Developers with the most changed lines
Brendan Burns 455888 (18.0%)
Nan Monnand Deng 379610 (15.0%)
Yifan Gu 219191 (8.7%)
Patrick 169265 (6.7%)
nikhiljindal 124915 (4.9%)

Top changeset contributors by employer
"Google" 3562 (56.8%)
"Red Hat" 1252 (20.5%)
(Umknown) 899 (14.7%)
"CoreOS" 144 (2.4%)
"FathomDB" 142 (2.3%)