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Real Integrat-

ion Tests with

TESTCONTAINERS



Infrastructure | Developer 🥑

Integration Tests

UNIT TEST?



IT COMPILED: PASS

UNIT TEST

WORK

Please do not turn off
the light switch.

It also operates the
elevator.

Thank You

**But the unit tests
passed, so...**

**[https://twitter.com/Aaronius/status/
933497253347463168](https://twitter.com/Aaronius/status/933497253347463168)**





via reddit.com/r/programmerhumor






Mocking

**Mockito, EasyMock,
JMock,...**



A close-up photograph of a woman with vibrant red hair styled in two braids. She is holding a small, fluffy dog with a yellow and grey patterned head. The image has a dark, semi-transparent overlay, and the text is centered in a bold, white font.

**Ich mock mir die Welt
widdewidde wie sie mir
gefällt**

 **Unit tests, systems not
under your control**

 **Test real datastore**

In-Memory

**H2, HSQLDB, Apache
Derby,...**



same

Embedded Elasticsearch unsupported in 5.0+

<https://www.elastic.co/blog/elasticsearch-the-server>



Often good enough



**Test real datastore,
supported systems**

Actual Datastore

Local installation
Docker container
Cloud

Demo



"Good old approach"



**External dependency,
parallelization**

In-Process

de.flapdoodle. embed.process

[https://github.com/flapdoodle-oss/
de.flapdoodle.embed.process](https://github.com/flapdoodle-oss/de.flapdoodle.embed.process)

...will provide a platform neutral way for running processes in unittests.

- MongoDB [de.flapdoodle.embed.mongo](#)
- Redis [de.flapdoodle.de.embed.redis](#)
- Memcached [de.flapdoodle.embed.memcached](#)
- PostgreSQL [ru.yandex.qatools.embed](#)
 - MySQL [com.wix.mysql](#)
- Consul [com.github.golovnin.embedded.consul](#)
- Vault [com.github.golovnin.embedded.vault](#)
- InfluxDB [io.apisense.embed.influx](#)

Build Tool

docker-maven-plugin

<http://dmp.fabric8.io>

Build image: `docker:build`

Run container:

`docker:start & docker:stop`

Dockerfile or Docker assembly

```
<build>
  <from>java:8</from>
  <assembly>
    <descriptor>docker-assembly.xml</descriptor>
  </assembly>
  <cmd>
    <shell>java -jar /maven/service.jar</shell>
  </cmd>
</build>
```

Demo

maven-failsafe-plugin

<https://maven.apache.org/surefire/maven-failsafe-plugin/>

 **Plain or custom Docker
image**

 **One instance for all
tests**

Testcontainers

Testcontainers is a Java library that supports JUnit tests, providing lightweight, throwaway instances of common databases [...] that can run in a Docker container.

Dependency

```
@ClassRule
public static GenericContainer redis =
    new GenericContainer("redis:3.0.2")
        .withExposedPorts(6379);
```

GroupId	ArtifactId	Latest Version	Updated	Download
org.testcontainers	vault	1.8.0 all (8)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	mockserver	1.8.0 all (2)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	testcontainers	1.8.0 all (36)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	influxdb	1.8.0 all (2)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	nginx	1.8.0 all (36)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	dynalite	1.8.0 all (9)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	database-commons	1.8.0 all (5)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	selenium	1.8.0 all (36)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	spock	1.8.0 all (5)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	pulsar	1.8.0	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	couchbase	1.8.0	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	postgresql	1.8.0 all (36)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	testcontainers-bom	1.8.0 all (5)	14-Jun-2018	pom
org.testcontainers	mssqlserver	1.8.0 all (8)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	mysql	1.8.0 all (36)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	oracle-xe	1.8.0 all (28)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	mariadb	1.8.0 all (15)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	localstack	1.8.0 all (8)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	kafka	1.8.0 all (6)	14-Jun-2018	pom jar javadoc.jar sources.jar
org.testcontainers	jdbc-test	1.8.0 all (13)	14-Jun-2018	pom jar javadoc.jar sources.jar

testcontainers-java- module-elasticsearch

[https://github.com/dadoonet/testcontainers-java-module-
elasticsearch](https://github.com/dadoonet/testcontainers-java-module-elasticsearch)

Demo

Todo

Set (randomized) port



Container per test

Or reuse in `static` block



Custom integration

Conclusion

Why Integration Tests

**Why not
Mocking
In-Memory
Actual Datastore**

How
In-Process
Build Tool
Testcontainers

Code

<https://github.com/xeraa/integration-test-demo>

Questions?

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