RED HAT DEVELOPERS

The Microservices Journey: Part I

- Skinny on Fat, Thin, Hollow, and Uber -

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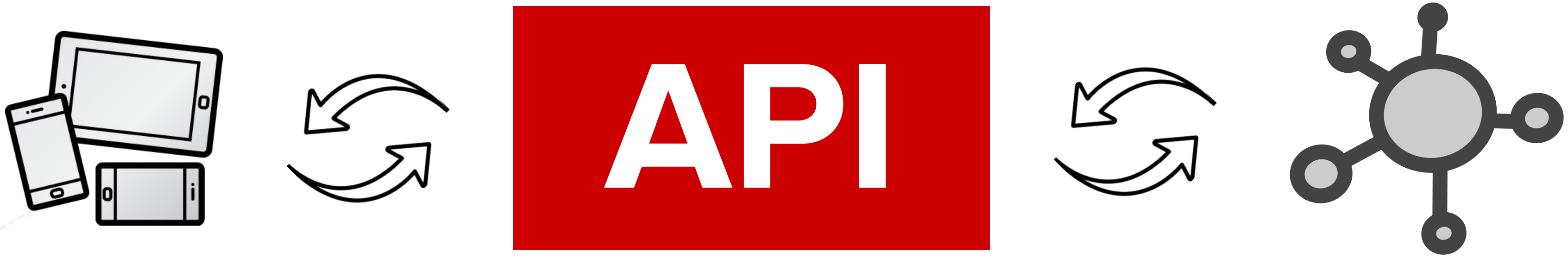
THE NEW DIGITAL ARCHITECTURE



event-driven

asynchronous

antifragile

reactive

serverless

polyglot

scalable

velocity

agile

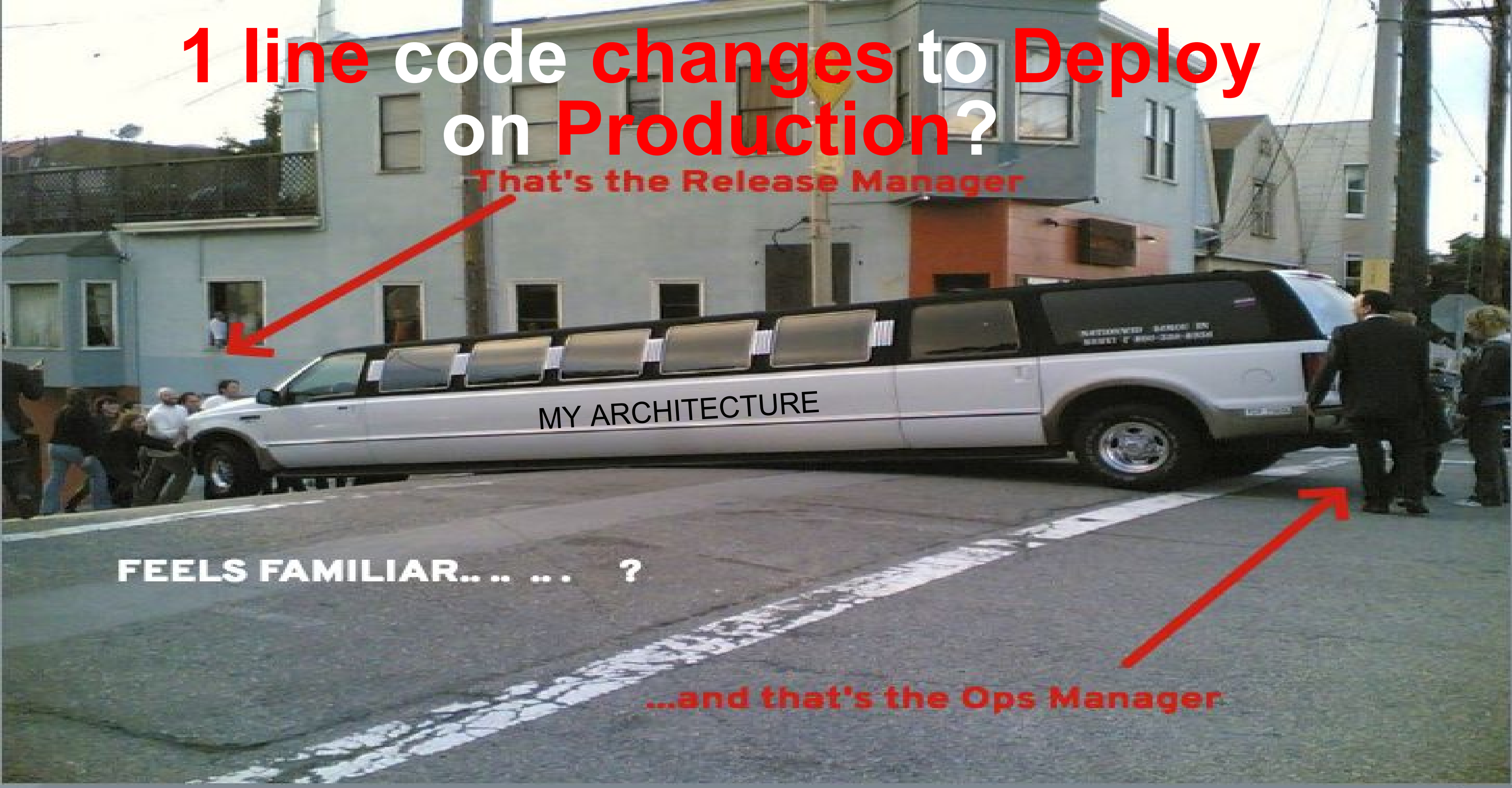
micro-services

Let’s talk about your Reality on Enterprise

Pet vs Cattle

Snowflake vs Phoenix

1 line code changes to Deploy on Production?


That's the Release Manager
MY ARCHITECTURE
FEELS FAMILIAR.. .. ... ?
...and that's the Ops Manager

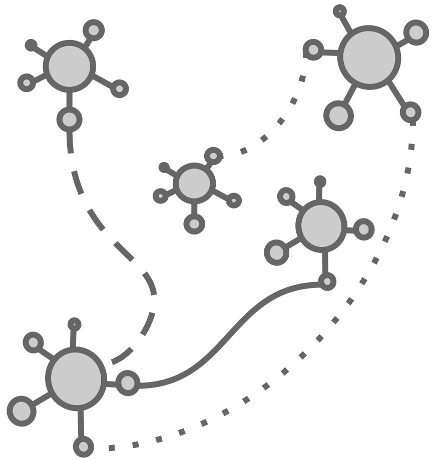
What’s Solution?

Trends : Microservices

“... is an approach to developing a single application as a suite of small services, each running in its **own process** and **communicating with lightweight** mechanisms, often an HTTP resource API. These services are built around business capabilities and **independently deployable** by **fully automated** deployment machinery. There is a bare minimum of **centralized management** of these services, which may be written in **different programming languages** and use different data storage technologies.”

- *Martin Fowler*

  http://martinfowler.com/articles/microservices.html



Why are organization adopting microservices?

Faster deployments

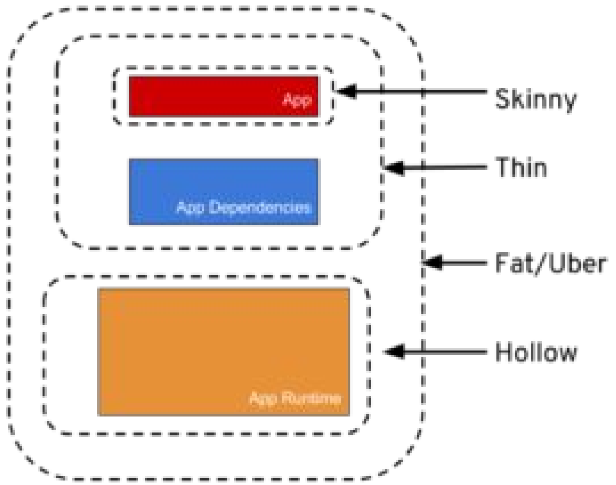
Less complex code

Quicker development

Easier to scale

How to deploy faster?

- Skinny
- Thin
- Hollow
- Fat/Uber



Fat/Uber JAR

- Maven and Spring Boot popularized approach to packaging
- Standard Java Runtime environment
- The amount of extra runtime stuff with framework and runtime features

Thin WAR

- For over a decade with Java EE developers
- Java EE web application with only web content, business logic, and 3rd-party dependencies
- Not anything provided by the Java EE runtime, hence it’s “thin”
- Can’t run “on its own”
- Must be deployed to a Java EE app server or Servlet container

Thin JAR

- Same as a Thin WAR, except using the JAR packaging format
- Typically used by specialized applications/plugin architectures
- The .kjar format from Drools

Skinny WAR

- Thinner than a Thin WAR
- Not include any of the 3rd-party libraries
- ONLY contains the (byte) code
- **Pros on layered container images for DevOps sanity**

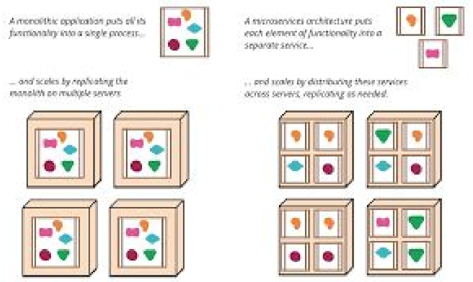
Skinny JAR

- Same as a Skinny WAR, except using JAR packaging and frameworks such as WildFly Swarm
- CI/CD sanity (and your AWS bill) – just ask Hubspot
- Take a Thin WAR and remove all the 3rd-party dependencies
- The smallest atomic unit of app
- Must be deployed to a runtime, the other needed bits(e.g. Hollow JAR)

Hollow JAR

- Java application runtime like “just enough” app server
- Not contain any applications itself
- WildFly Swarm allow you to customize how much is “just enough”
- Eclipse MicroProfile(e.g. Paraya Micro, TomEE) provide pre-built distributions of popular combinations of runtime components

Why bother?


A monolithic application puts all its functionality into a single process...
... and scales by replicating the monolith on multiple servers
A microservices architecture puts each element of functionality into a separate service...
... and scales by distributing these services across servers, replicating as needed.

- Deploying to Dev, Test, and Prod lots of times a day **even** [**2 billion times a week**]
- Minimizing the app sizing for overall devops efficiency, operational sanity
- Don't have to minimize the lines of code
- Must reduce the number of times your app, dependencies across network, disk, etc.
- Finally, breaking your app into different packaged parts with properly separated, treated even versioned like **Container Image Layers**

Just tell me which one to use!

DEMO

- WildFly Swarm -

WildFly Swarm

"… is a mechanism for packaging Java applications that contain **just enough** functionality to run the app. It has an abstraction called a **Fraction**, each of which embodies some functionality that apps need. You can select which Fractions you need, and **package only those fractions** along with your app to produce a **minimized and specialized runnable image** for your app. WildFly Swarm has the ability to create many of the above types of packaged apps."

Grab the code

```
$ git clone
https://github.com/jamesfalkner/wfswarm-packaging-demo
```

Fat/Uber JARs

```
$ cd fat-thin; mvn clean package
$ du -hs target/*.jar
45M target/weight-1.0-swarm.jar

$ curl http://localhost:8080/api/hello
```

Thin WARs

```
$ du -hs target/*.war
512K target/weight-1.0.war
```

Skinny WARs

```
% unzip -l target/*.war
Archive: target/weight-1.0.war
Length Date Time Name
-------- ---- ---- ----
0 08-26-17 01:14 META-INF/
132 08-26-17 01:14 META-INF/MANIFEST.MF
0 08-26-17 01:14 WEB-INF/
0 08-26-17 01:14 WEB-INF/classes/
0 08-26-17 01:14 WEB-INF/classes/com/
0 08-26-17 01:14 WEB-INF/classes/com/test/
0 08-26-17 01:14 WEB-INF/classes/com/test/rest/
0 08-26-17 01:14 WEB-INF/lib/
746 08-26-17 01:14 WEB-INF/classes/com/test/rest/HelloEndpoint.class
402 08-26-17 01:14 WEB-INF/classes/com/test/rest/RestApplication.class
634048 08-26-17 01:14 WEB-INF/lib/joda-time-2.9.9.jar   <------ This one
0 08-26-17 01:14 META-INF/maven/
0 08-26-17 01:14 META-INF/maven/com.test/
0 08-26-17 01:14 META-INF/maven/com.test/weight/
2829 08-26-17 01:14 META-INF/maven/com.test/weight/pom.xml
97 08-26-17 01:14 META-INF/maven/com.test/weight/pom.properties
-------- -------
638381 16 files
```

Skinny WAR: Removing direct dependencies

```
$ cd joda-fraction; mvn clean package install

[INFO] --- maven-install-plugin:2.4:install (default-install) @ joda ---
[INFO] Installing /Users/daniel/ws/fat/joda-fraction/target/joda-1.2.jar to
/Users/daniel/.m2/repository/com/jhf/joda/1.2/joda-1.2.jar
[INFO] Installing /Users/daniel/ws/fat/joda-fraction/pom.xml to
/Users/daniel/.m2/repository/com/jhf/joda/1.2/joda-1.2.pom
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
```

Skinny WAR: Removing direct dependencies

```
$ cd ../skinny; mvn clean package
$ ls -l target/*.war
-rw-r--r-- 1 daniel daniel  2240 Aug 3 01:45 target/weight-1.0.war

$ unzip -l target/*.war
Archive: target/weight-1.0.war
Length Date Time Name
-------- ---- ---- ----
99 08-26-17 01:45 META-INF/MANIFEST.MF
0 08-26-17 01:45 META-INF/
0 08-26-17 01:45 WEB-INF/
0 08-26-17 01:45 WEB-INF/classes/
0 08-26-17 01:45 WEB-INF/classes/com/
0 08-26-17 01:45 WEB-INF/classes/com/test/
0 08-26-17 01:45 WEB-INF/classes/com/test/rest/
0 08-26-17 01:45 WEB-INF/lib/
402 08-26-17 01:45 WEB-INF/classes/com/test/rest/RestApplication.class
746 08-26-17 01:45 WEB-INF/classes/com/test/rest/HelloEndpoint.class
-------- -------
1247 10 files
```

Hollow JARs

```
$ mvn clean package -Dswarm.hollow=true
$ du -hs target/*.jar target/*.war
44M target/weight-1.0-hollow-swarm.jar
4.0K target/weight-1.0.war ⇒ Block size 4K

#Run Skinny app on Hollow server
$ java -jar target/weight-1.0-hollow-swarm.jar
target/weight-1.0.war

$ curl http://localhost:8080/api/hello
hello, the date is 2017-08-26
```

What about Spring Boot?

```
$ cd spring-boot-fat; mvn clean package
$ du -hs target/*.jar
14M target/greeting-spring-boot.jar
```

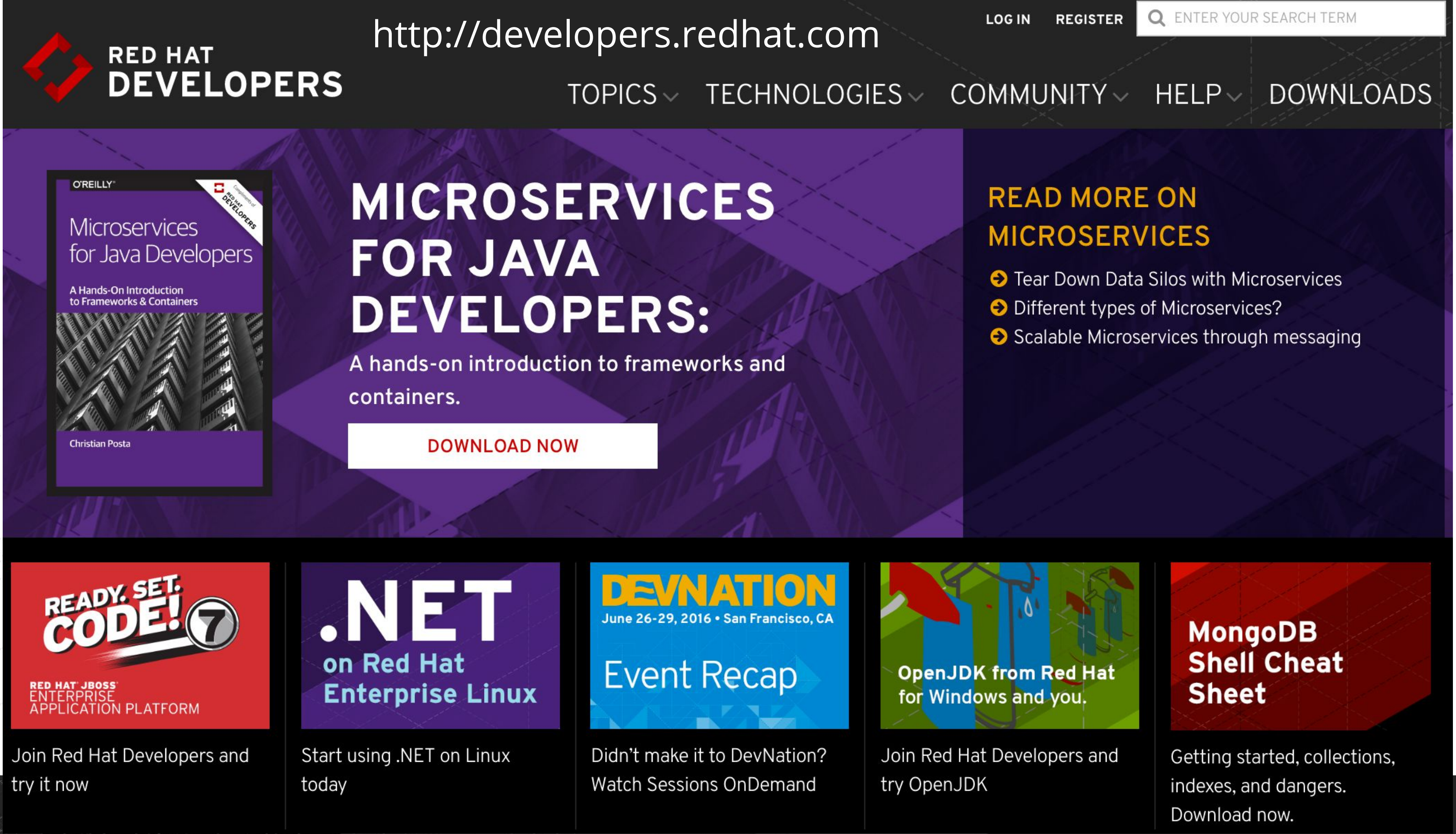
What if Spring code changes to WildFly Swarm's hollow JAR / skinny WAR duo?

https://en.wikipedia.org/wiki/Fourth_wall

SUMMARY

- Shrank app from 45M ➔ 512K ➔ 2243 bytes via WildFly Swarm
- Separated app from runtime dependencies,
- And put them in separate Linux container image layers
- Make your CI/CD pipelines faster
- Make your developers faster at edit, build, and test
- Provide assurance that you are testing with the same bits that will land in production.

http://developers.redhat.com



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