

Testing Kafka with Testcontainers

There and Back Again



Current, Austing TX, 2022

@gamussa | #current22 | @thekonginc

How many times you've heard

How many times you've heard
«IT WORKS ON MY MACHINE 🤪»

How many



we heard

1.



IT WORKS ON MY MACHINE



THEN WE'LL SHIP YOUR MACHINE



AND THAT IS HOW DOCKER WAS BORN



IT WORKS ON MY MACHINE



THEN WE'LL SHIP YOUR MACHINE



AND THAT IS HOW DOCKER WAS BORN



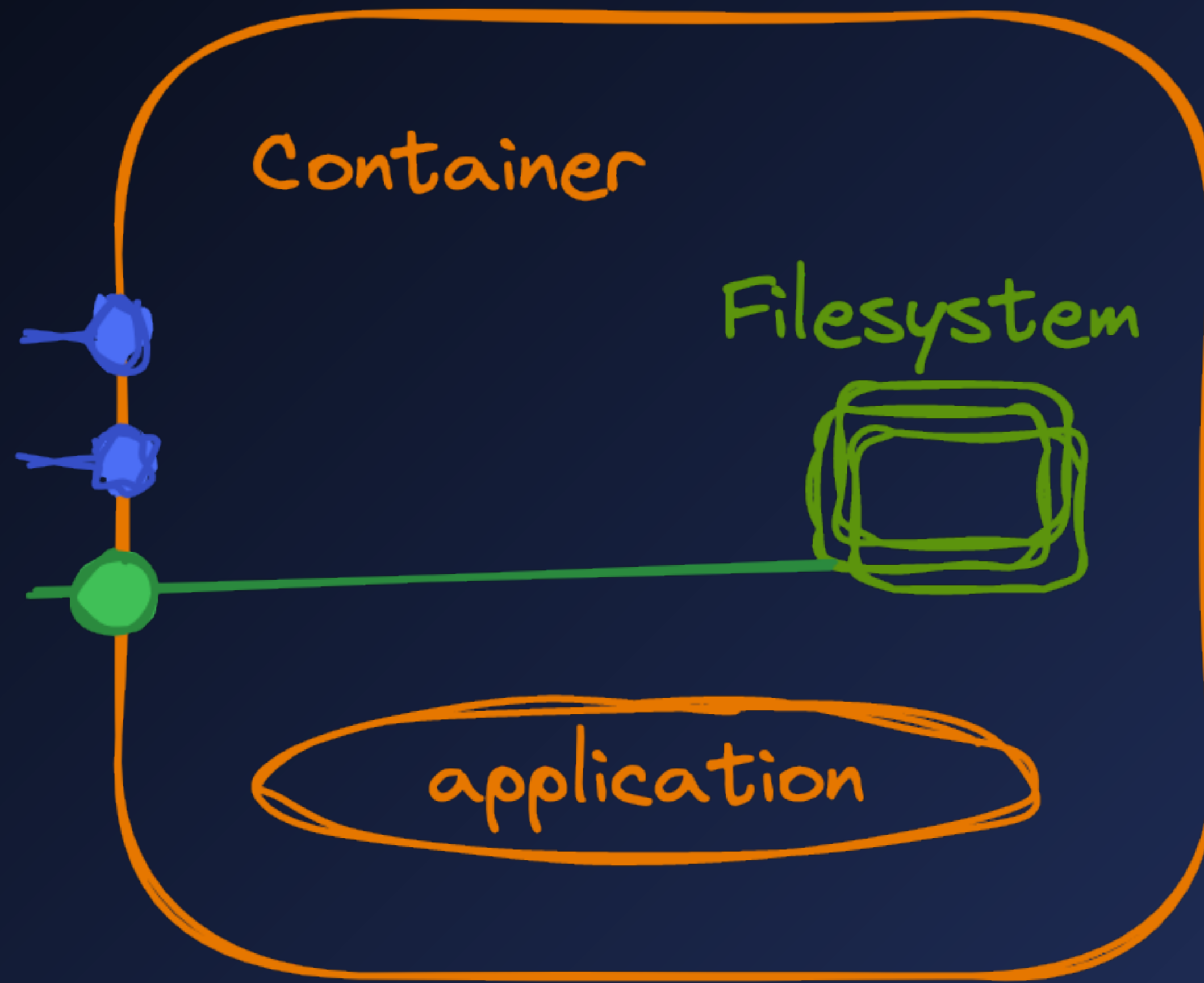
**Installing
apps**



**Running
them
in Docker**


```
docker pull confluentinc/cp-kafka:7.2.2
```

```
docker run -p 9092:9092 cp-kafka:7.2.2
```



version: '2'

services:

zookeeper:

image: confluentinc/cp-zookeeper:7.2.2

ports:

- "32181:32181"

environment:

ZOOKEEPER_CLIENT_PORT: 32181

ZOOKEEPER_TICK_TIME: 2000

kafka:

image: confluentinc/cp-kafka:7.2.2

ports:

- "29092:29092"

depends_on:

- zookeeper

environment:

KAFKA_BROKER_ID: 1

KAFKA_ZOOKEEPER_CONNECT: zookeeper:32181

KAFKA_ADVERTISED_LISTENERS: PLAINTEXT://

localhost:29092

KAFKA_OFFSETS_TOPIC_REPLICATION_FACTOR: 1

version: '2'

services:

zookeeper:

image: confluentinc/cp

/cp-kafka:7.2.2

ports:

- "32181:32181"

environment:

ZOOKEEPER_CLIENT_PORT:

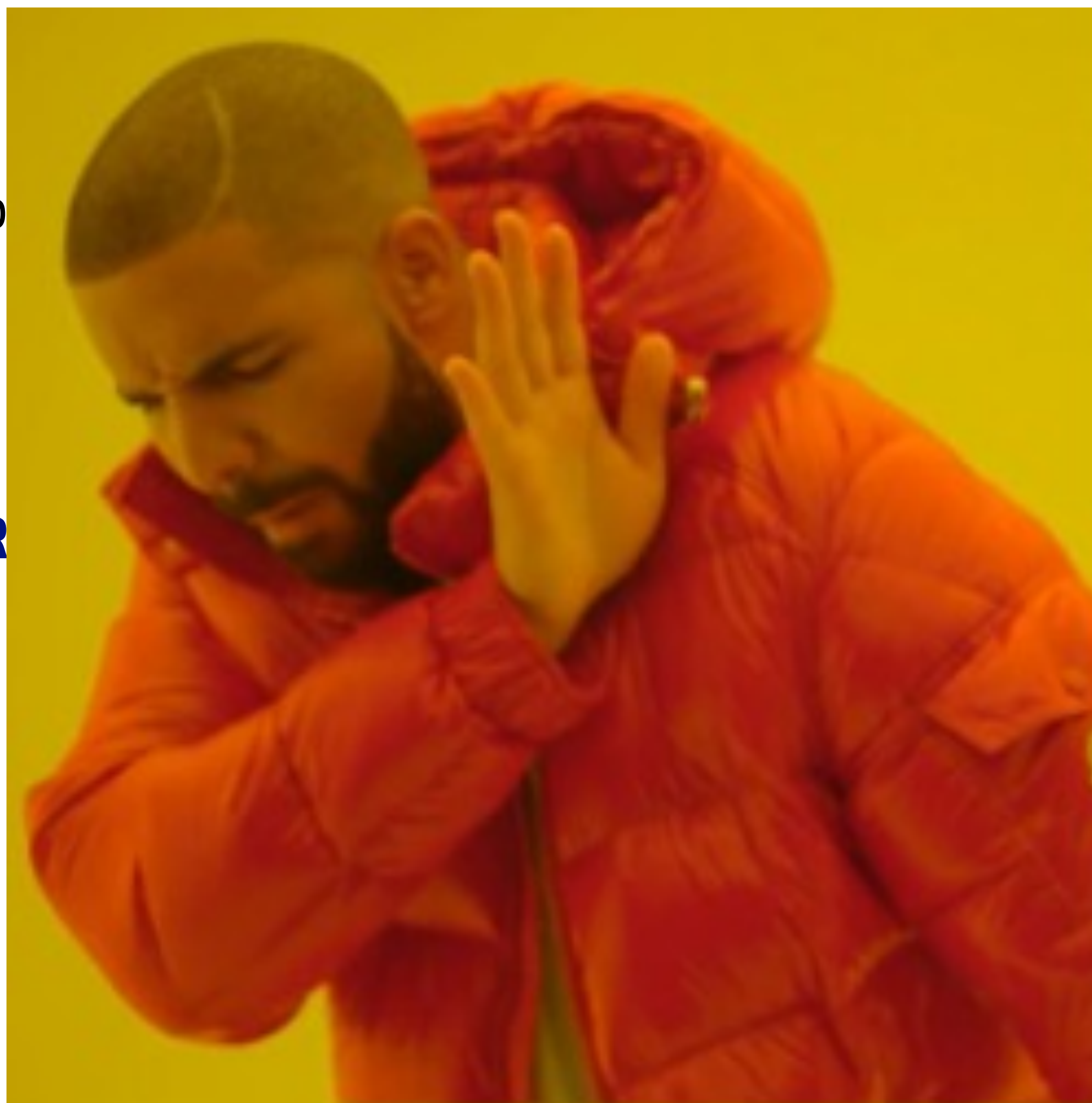
ZOOKEEPER_TICK_TIME:

1

CONNECT: zookeeper:32181

LISTENERS: PLAINTEXT://

LOG_REPLICATION_FACTOR: 1




```
public KafkaContainer createKafka() {  
    return new KafkaContainer(imageName("cp-kafka"));  
}
```



```
public KafkaContainer createKafka() {  
    return new KafkaContainer(imageName("cp-kafka"));  
}
```



VIKTOR GAMOV



@gamussa | #current22 | @thekonginc

VIKTOR GAMOV

- Principal Developer Advocate @ **Kong**



VIKTOR GAMOV

- Principal Developer Advocate @ Kong
- **Confluent** Community Catalyst



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- Java Champion



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VIKTOR GAMOV

- Principal Developer Advocate @ **Kong**
- **Confluent** Community Catalyst
- Java Champion
- Author @ **Manning**



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**A genius billionaire
playboy philanthropist.**



**A genius billionaire
playboy philanthropist.**





KAFKA IN ACTION IS OUT!

Use code

KAFKAA35

Kafka IN ACTION

Dylan Scott
Viktor Gamov
Dave Klein
Foreword by Jun Rao

 MANNING





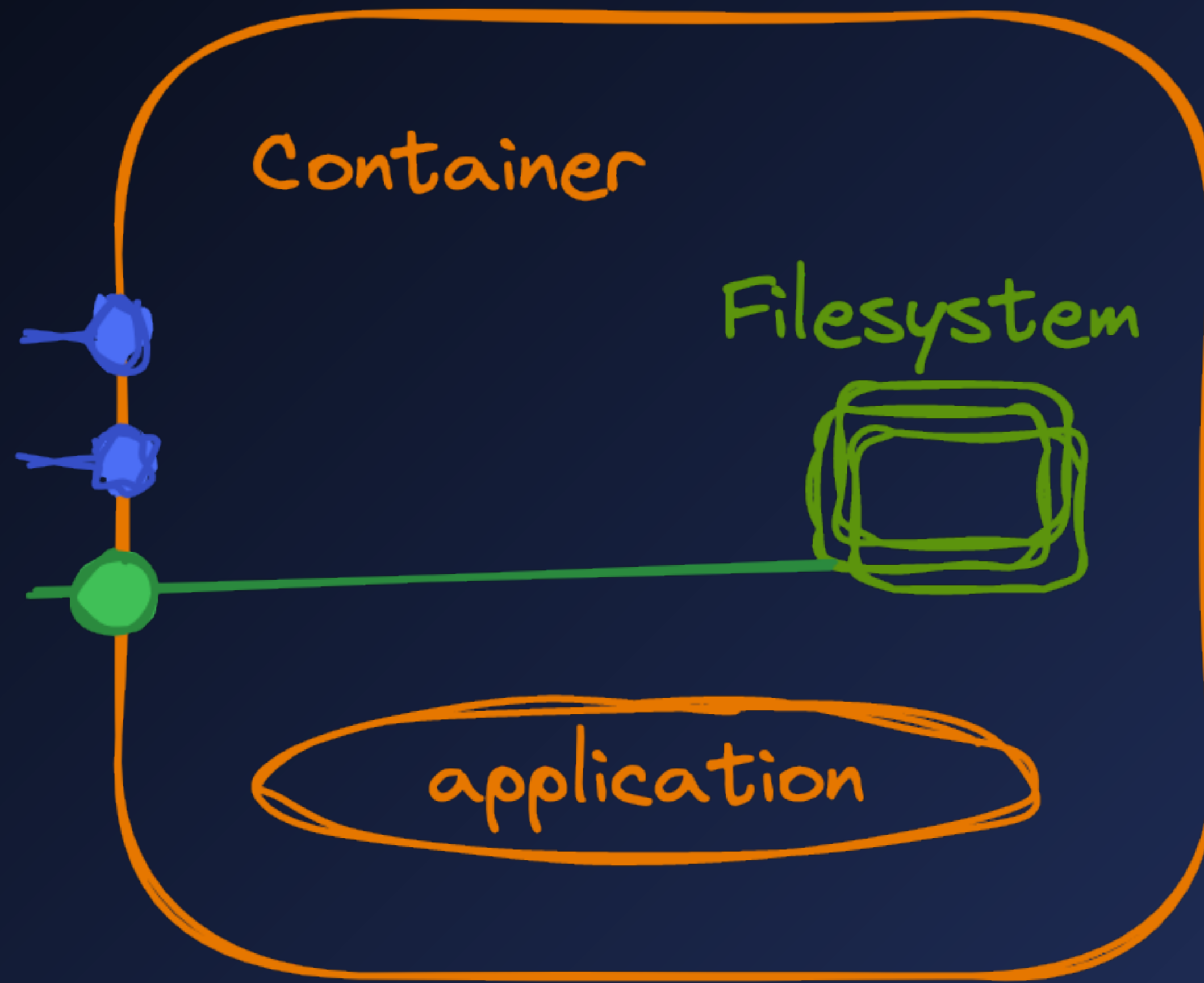
@gamussa | #current22 | @thekonginc



docker®


```
docker pull confluentinc/cp-kafka:7.2.2
```

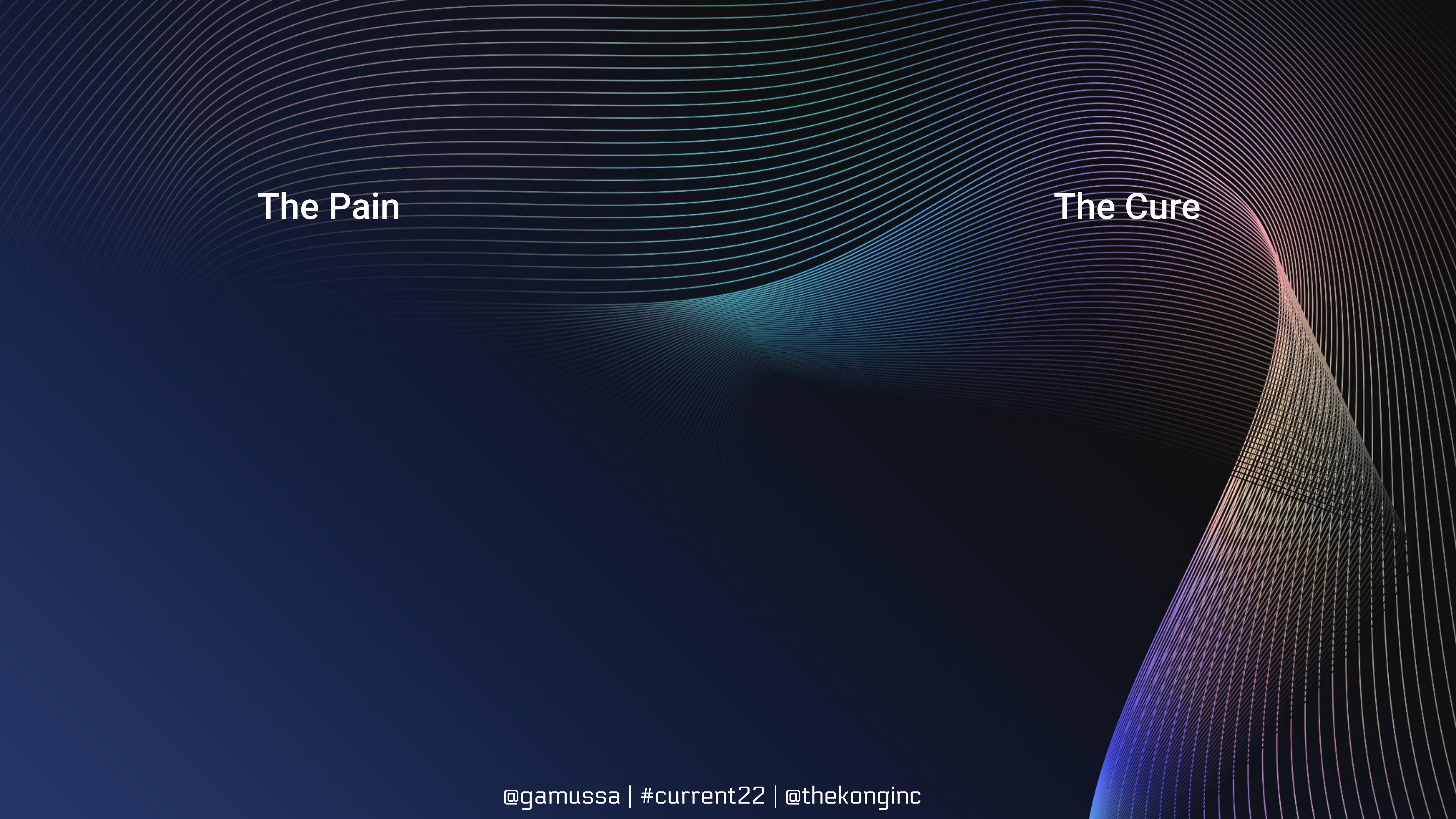
```
docker run -p 9092:9092 cp-kafka:7.2.2
```





The Pain

The Cure

The background features a series of concentric, wavy lines that create a sense of depth and movement. These lines are colored in a gradient from dark blue to light blue. On the right side, a funnel-like shape is formed by these lines, narrowing towards the top right corner. The overall effect is a dynamic, abstract composition.

The Pain

The Cure

The Pain

The Cure

Port conflicts

The Pain

Port conflicts



The Cure

Port
randomization

The Pain

Port conflicts

Hard-coded
scenarios



The Cure

Port
randomization

The Pain

Port conflicts

Hard-coded
scenarios



The Cure

Port
randomization

Data-driven tests

The Pain

Port conflicts

Hard-coded
scenarios

Slow test



The Cure

Port
randomization

Data-driven tests

The Pain

Port conflicts

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scenarios

Slow test



The Cure

Port
randomization

Data-driven tests

Parallelization



Testcontainers

We think it's a useful **default option** for creating a **reliable environment** for running tests.

...

Our teams have consistently found this library of **programmable, lightweight** and **disposable** containers to make functional tests more **reliable**.

Languages & Frameworks

Adopt ?

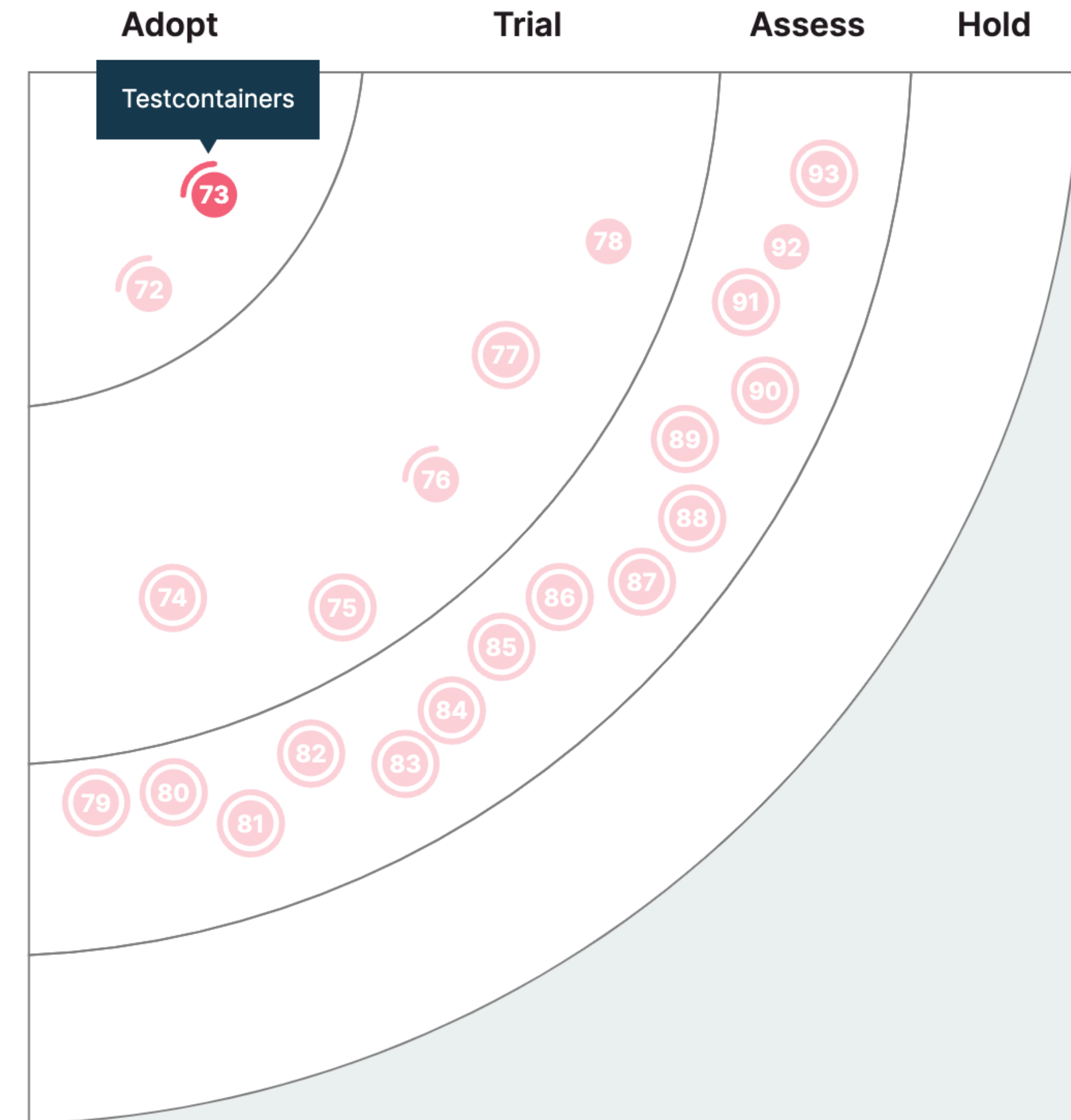
72. SwiftUI ▼

73. Testcontainers ▼

Trial ?

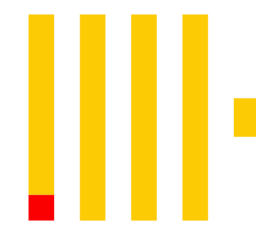
74. Bob ▼

75. Flutter-Unity widget ▼

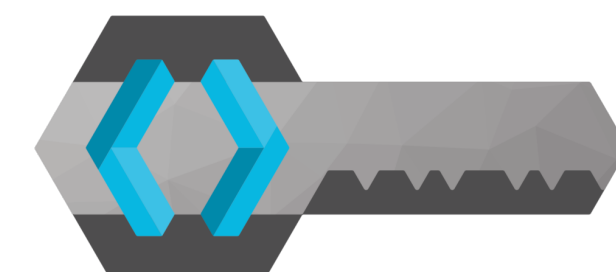


<https://www.thoughtworks.com/en-us/radar/languages-and-frameworks/testcontainers>

@gamussa | #current22 | @thekonginc

 ClickHouse

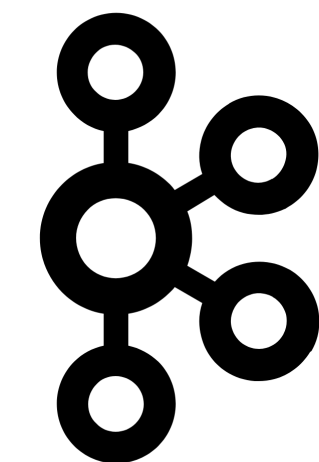
 **NGINX**
Part of F5


KEYCLOAK

 Selenium

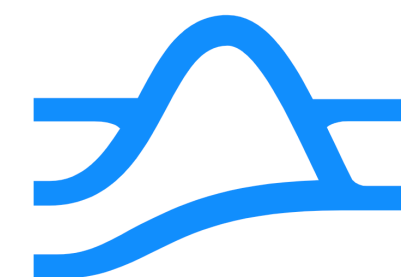

MySQL®

 MongoDB®

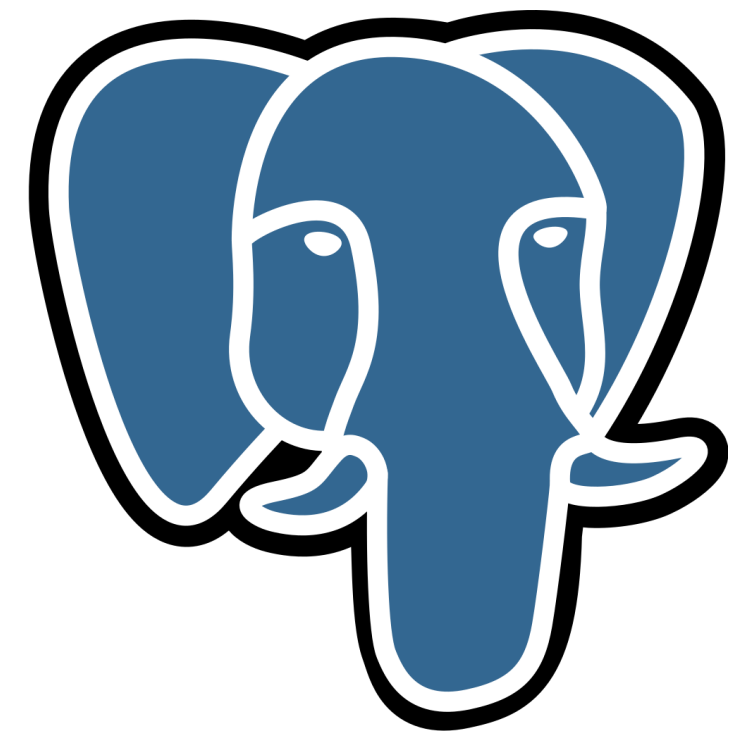
 kafka

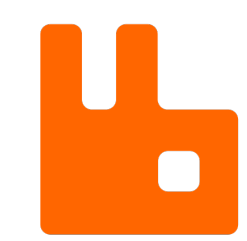
 neo4j

 Apache
CASSANDRA™

 PULSAR


ORACLE



 RabbitMQ

 CockroachDB

 HIVEMQ

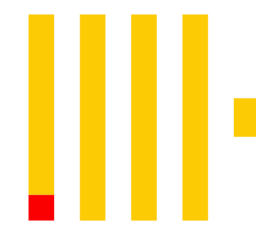
 Redpanda



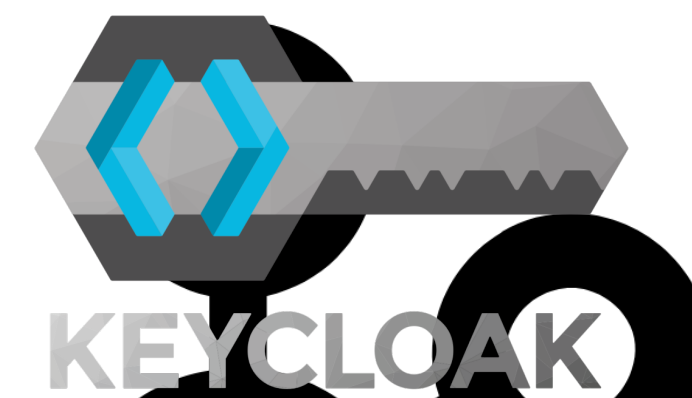
LocalStack

 elasticsearch

 kubernetes

 ClickHouse

 **NGINX**
Part of F5

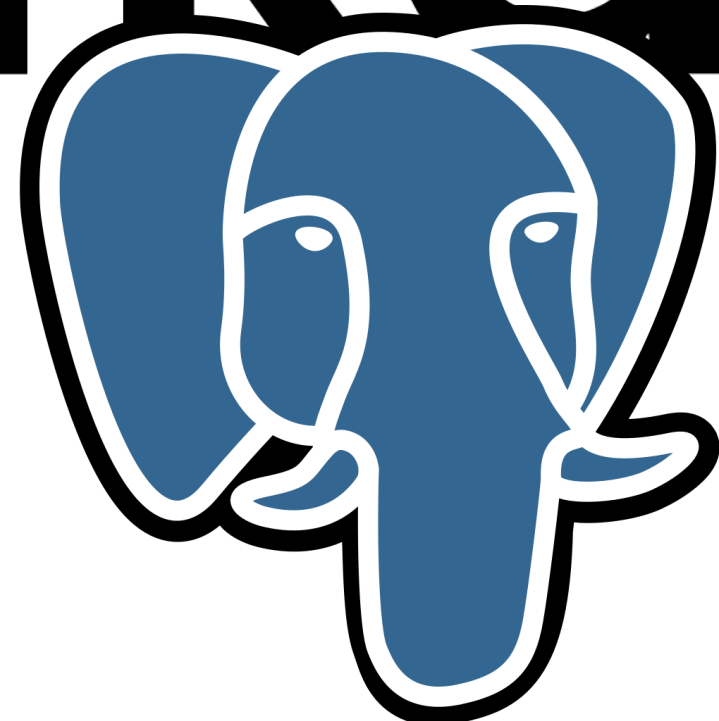
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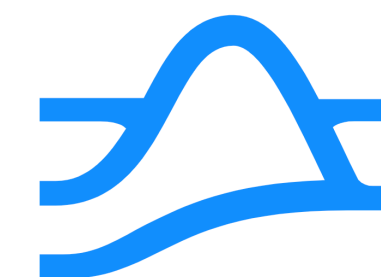
 MySQL

 MongoDB

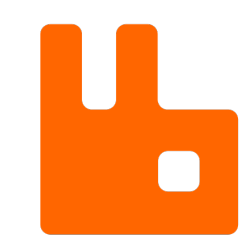
 Apache CASSANDRA

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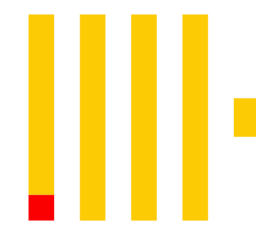
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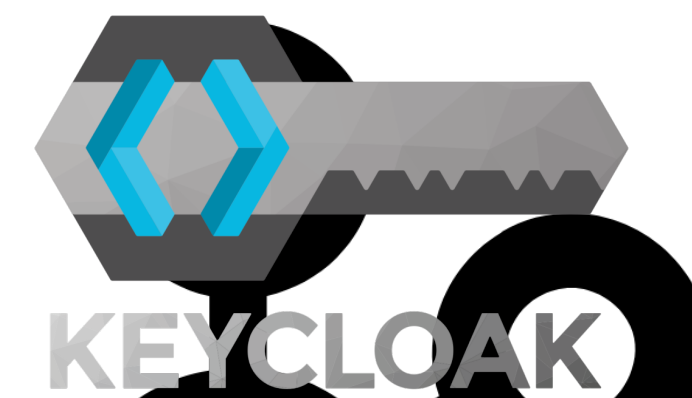
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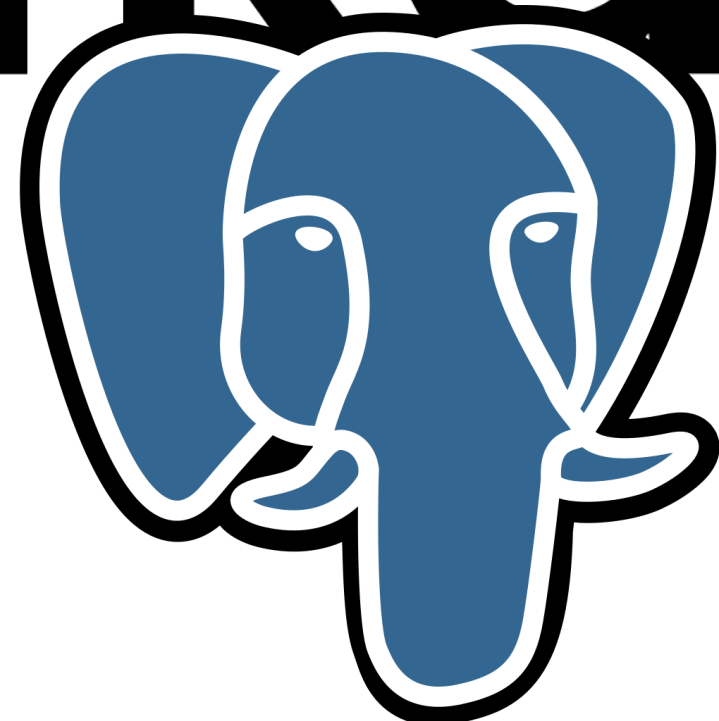
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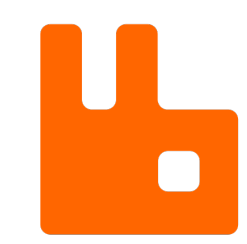
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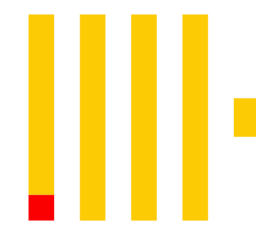


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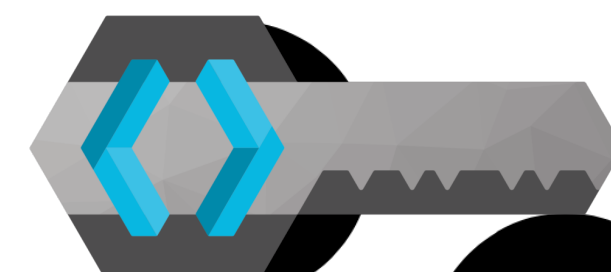
 elasticsearch



kubernetes

 ClickHouse

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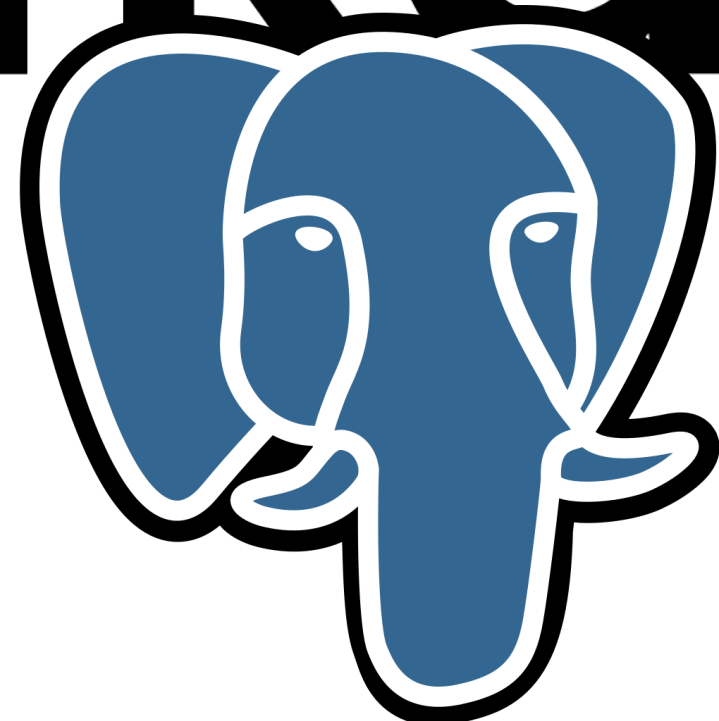

KEYCLOAK

 Selenium


MySQL®

 MongoDB


Apache CASSANDRA™

kafka



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 HIVE **Redpanda**



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 elasticsearch



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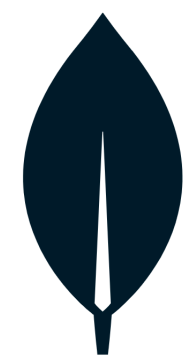


KEYCLOAK



Selenium

MySQL



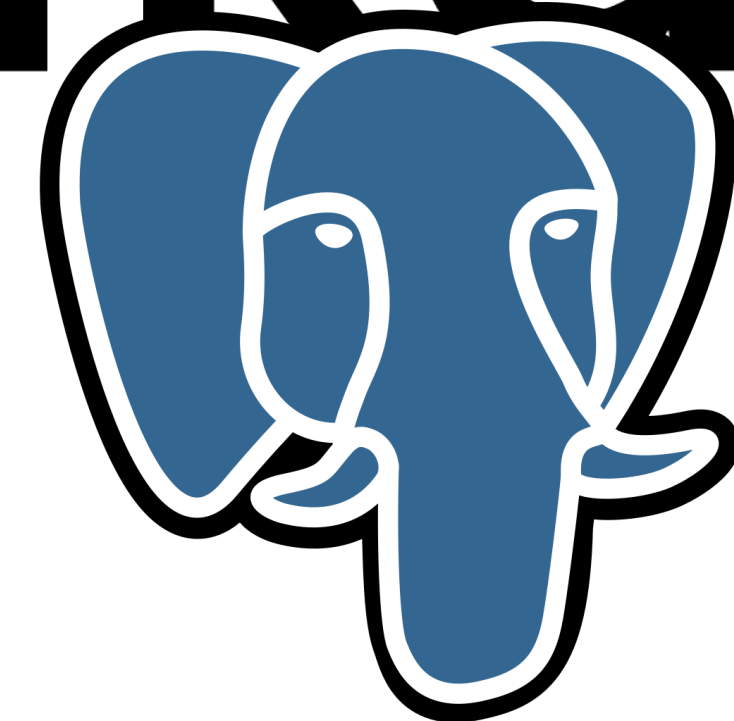
MongoDB

kafka



Apache
CASSANDRA

PULSAR



RabbitMQ

CockroachDB



HIVE

Redpanda



LocalStack



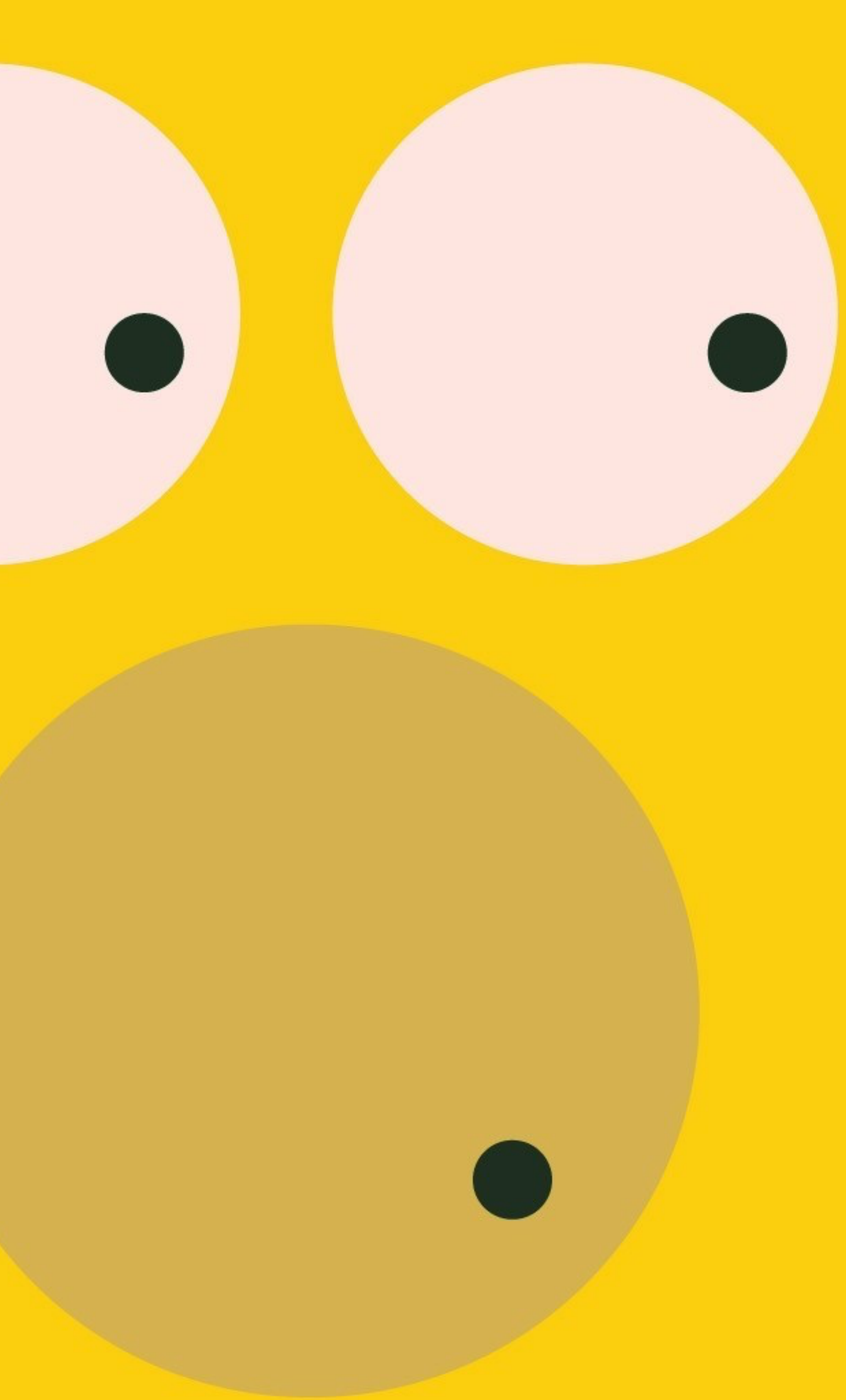
elasticsearch



kubernetes



LET'S SEE SOME CODE!

Three stylized eyes are positioned on the left side of the image. Two are light pink and one is tan, all with black pupils. They are set against a solid yellow background.

**What to do if
you have
no Docker?**

<https://www.atomicjar.com/2021/10/docker-on-windows-and-macos>

	Docker Desktop	Docker Machine	Minikube	Podman
Compatibility (more is better)	✓✓✓	✓✓	✓✓✓	?
Effort (less is better)	📦	📦	📦📦	📦📦📦
Performance (1 Kafka, in seconds)	3.81	3.69	3.91	-
Risks & comments		Deprecated		

 **ATOMICJAR**



Andy Wilkinson
@ankinson



I had the good fortune of being asked to beta test Testcontainers Cloud. It's the real deal. Drop-in replacement for Docker Desktop and containers now start more quickly, both in Spring Boot's own build and tests of various Boot-based apps that I maintain. Impressive start.



Michael Simons
@rotnroll666



I have to say, @QuarkusIO dev-services combined with @testcontainers in the cloud via @AtomicJarInc is brilliant.

No load for the containers on the local machine and config-free setup.



Sébastien Blanc
@sebi2706



Red Hat

Replying to @rotnroll666 @QuarkusIO and 2 others

Is this a real thing or just a (great) idea for now ?



Asaf Mesika
@asafmesika



This a game changer for integration and e2e testing ! Awesome idea !



Gerrit Meier
@meistermeier



Friends of Docker wormholes in CI, I have bad news for you: I just threw @AtomicJarInc @testcontainers cloud support into the build config and things(tm) are just working.



Max Rydahl Andersen
@maxandersen



Red Hat

This should be interesting! Ever since @quarkusio introduced devservices that uses @testcontainers I've wondered how we could make it available for users without the machine power or even access to docker. Testcontainer cloud solves that problem.



Marouane Trabelsi
@tmarwen

One big step ahead in the Integration Testing space, one that haven't seen much innovation in a long time.

Kudos @testcontainers and @AtomicJarInc



James Ward
@_JamesWard



Holy amazing wowzers! The best improvement to developer productivity since docker has landed. I got hands on with Testcontainers Cloud yesterday and it blew me away. Local dev, test, and CI will never be the same. Forever better. Thank you @AtomicJarInc!



peter royal
@osi



Replying to @NayShins and @testcontainers

you may be interested in what @AtomicJarInc is up to!



Julien Dubois
@juliendubois



Microsoft

Congrats to the team!! That's a great idea.



ATOMICJAR



LET'S SEE SOME CODE!

How it's started



gAmUssA/testcontainers-java-module-confluent-platform



How it's going



testcontainers-all-things-kafka/cp-testcontainers



How it's going



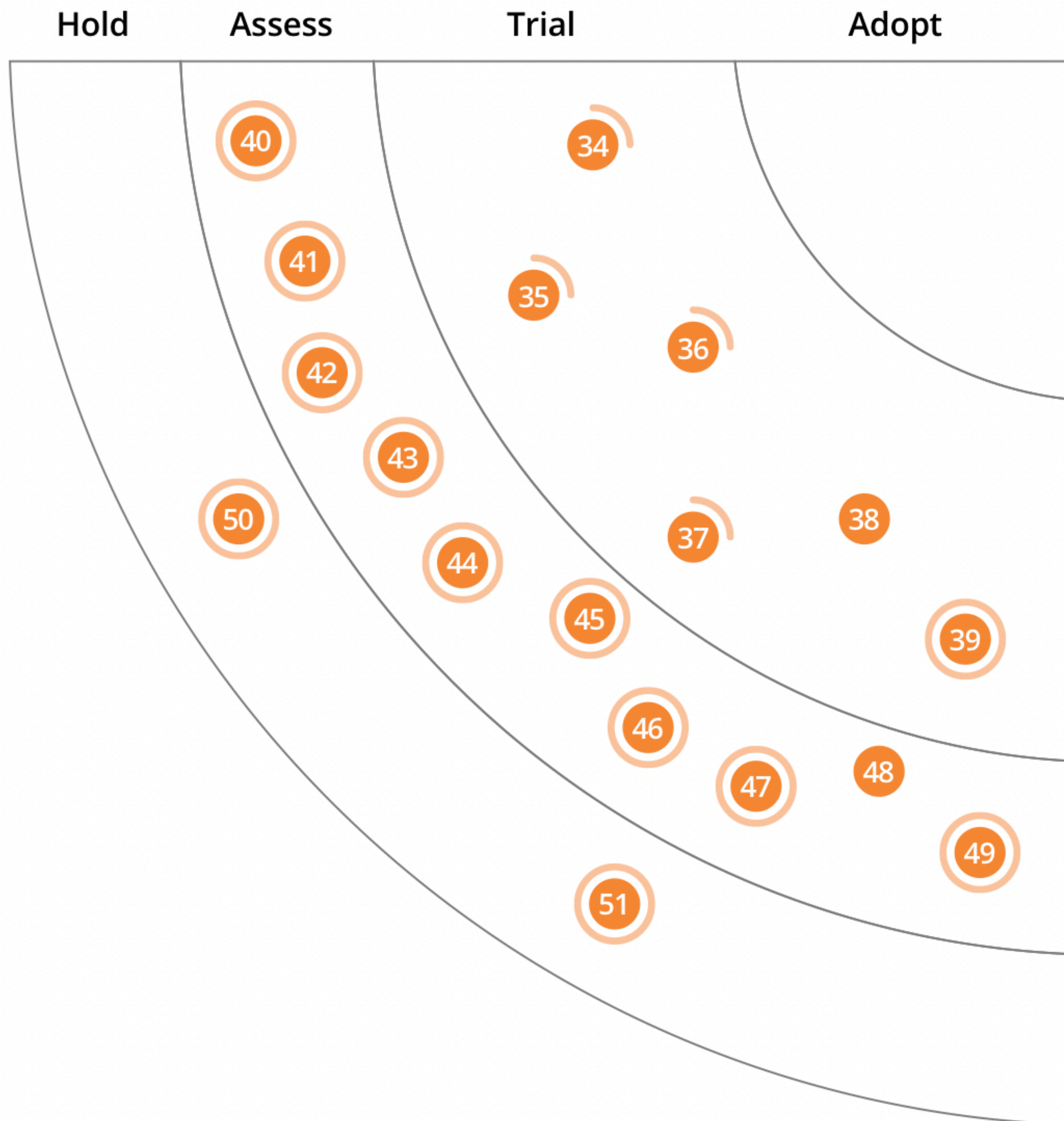
testcontainers-all-things-kafka/cp-testcontainers-examples





ONE MORE THING...

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Adopt

Trial

- 34. AWS Cloud Development Kit
- 35. Backstage
- 36. Delta Lake
- 37. Materialize
- 38. Snowflake
- 39. Variable fonts

Assess

- 40. Apache Pinot
- 41. Bit.dev
- 42. DataHub
- 43. Feature Store
- 44. JuiceFS
- 45. Kafka API without Kafka
- 46. NATS
- 47. Opstrace
- 48. Pulumi
- 49. Redpanda

Hold

- 50. Azure Machine Learning
- 51. Homemade infrastructure-as-code (IaC) products



**DEVELOPMENT AND
DEPLOYMENT
WITH
BORING SCRIPTS**



**EXPLORE
THE
WORLD OF CONTAINERS**

**DEVELOPMENT AND
DEPLOYMENT
WITH
BORING SCRIPTS**



A. always

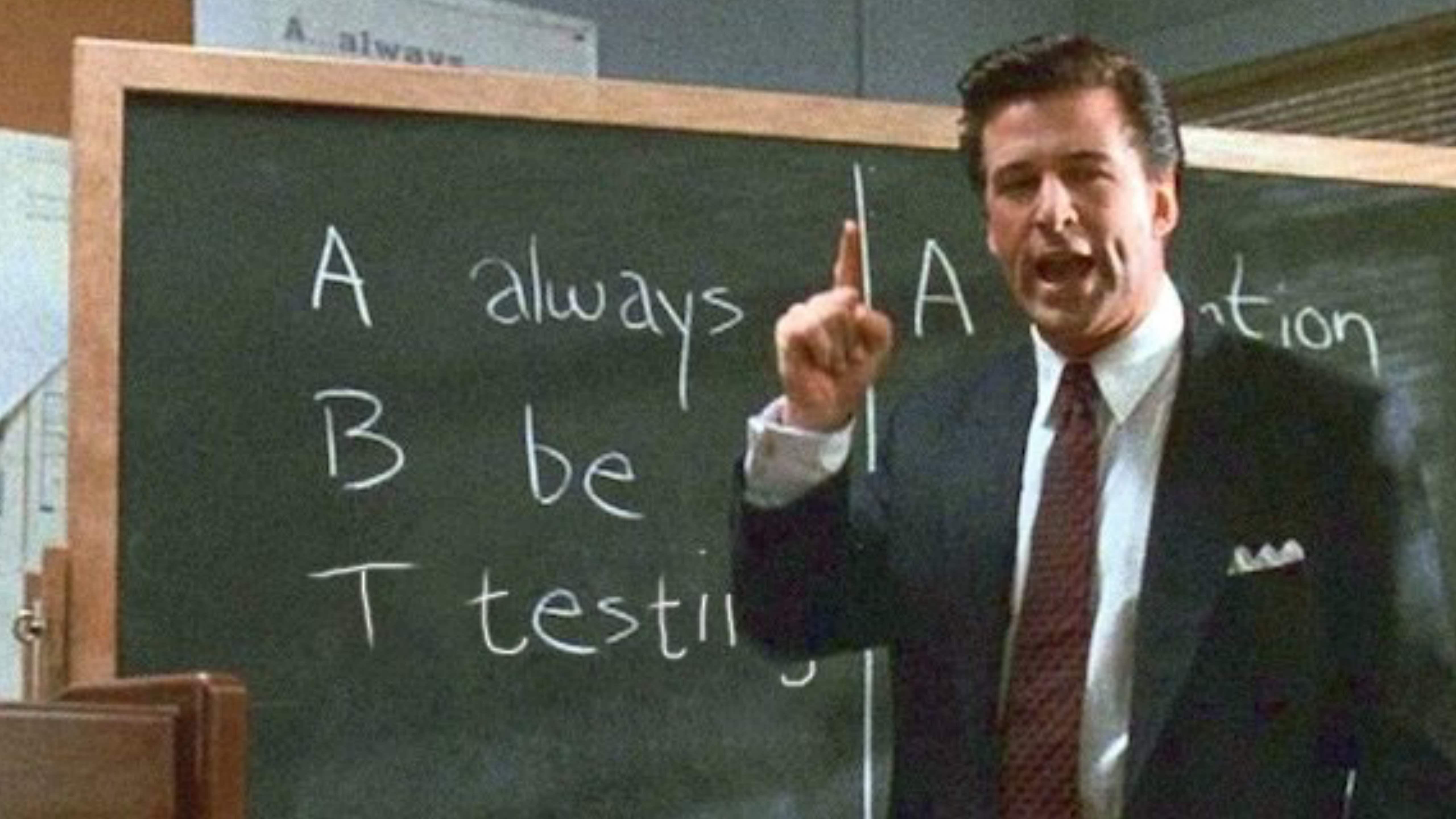
A always

B be

T testi

A

ntion



The background features a dark blue gradient with intricate, wavy, concentric lines that create a sense of depth and movement. On the right side, a large, translucent cone shape is visible, composed of many fine, parallel lines that converge towards a point, adding a geometric element to the organic wave patterns.

ONE MORE THING...

@gamussa | #current22 | @thekonginc

LOCAL DEVELOPMENT



Dev Services

<https://quarkus.io/guides/dev-services>



Test Resources

<https://micronaut-projects.github.io/micronaut-test-resources/latest/guide/>



Autoservices

<https://github.com/spring-projects/spring-boot/issues/29461>

AS ALWAYS,
HAVE A NICE DAY...

Viktor Gamov @ [gAmUssA](#)

