

# Testing Kafka with Testcontainers

There and Back Again



Kafka Summit, London, 2022

@gamussa | #kafkasummit | @thekonginc



# How many times you've heard

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

How many have 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**

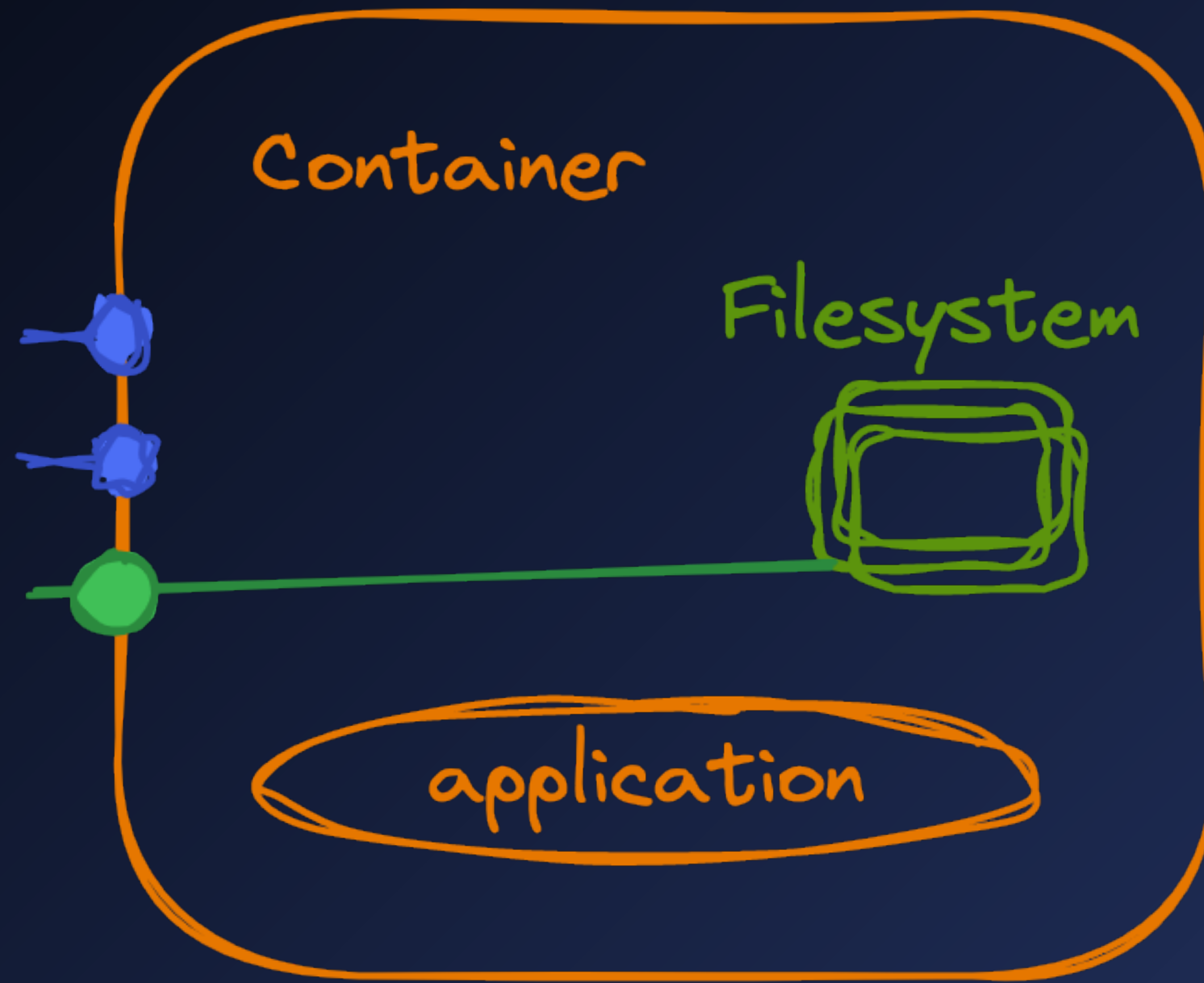


**Running  
them  
in Docker**



```
docker pull confluentinc/cp-kafka:7.0.1
```

```
docker run -p 9092:9092 cp-kafka:7.0.1
```





---

**version:** '2'

**services:**

**zookeeper:**

**image:** confluentinc/cp-zookeeper:7.0.1

**ports:**

- "32181:32181"

**environment:**

**ZOOKEEPER\_CLIENT\_PORT:** 32181

**ZOOKEEPER\_TICK\_TIME:** 2000

**kafka:**

**image:** confluentinc/cp-kafka:7.0.1

**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:7.0.1

**ports:**

- "32181:32181"

**environment:**

**ZOOKEEPER\_CLIENT\_PORT:**

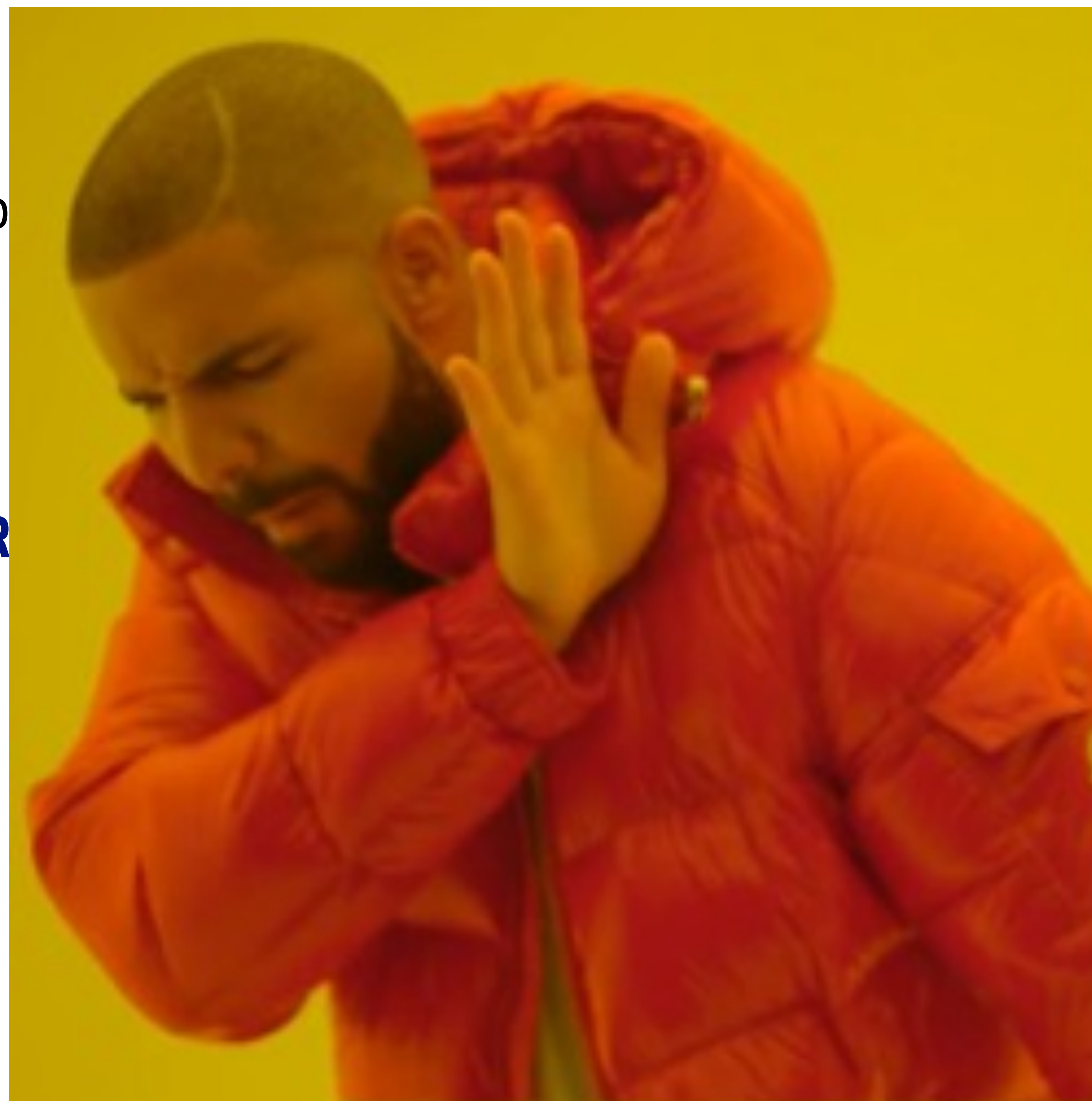
**ZOOKEEPER\_TICK\_TIME:**

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

Principal Developer Advocate  
@ **Kong**



@gamussa | #kafkasummit | @thekonginc



The background is a dark blue gradient. It features a series of thin, wavy, horizontal lines that create a sense of depth and movement. On the right side, there is a large, translucent, golden-yellow cone that tapers towards the top right corner. The cone's surface is composed of many fine, parallel lines that follow its curvature. The overall effect is a modern, digital, and abstract aesthetic.

@gamussa | #kafkasummit | @thekonginc



# KAFKA IN ACTION IS OUT!

Use code

**KAFKAA35**

## Kafka IN ACTION

Dylan Scott  
Viktor Gamov  
Dave Klein  
Foreword by Jun Rao

 MANNING







@gamussa | #kafkasummit | @thekonginc



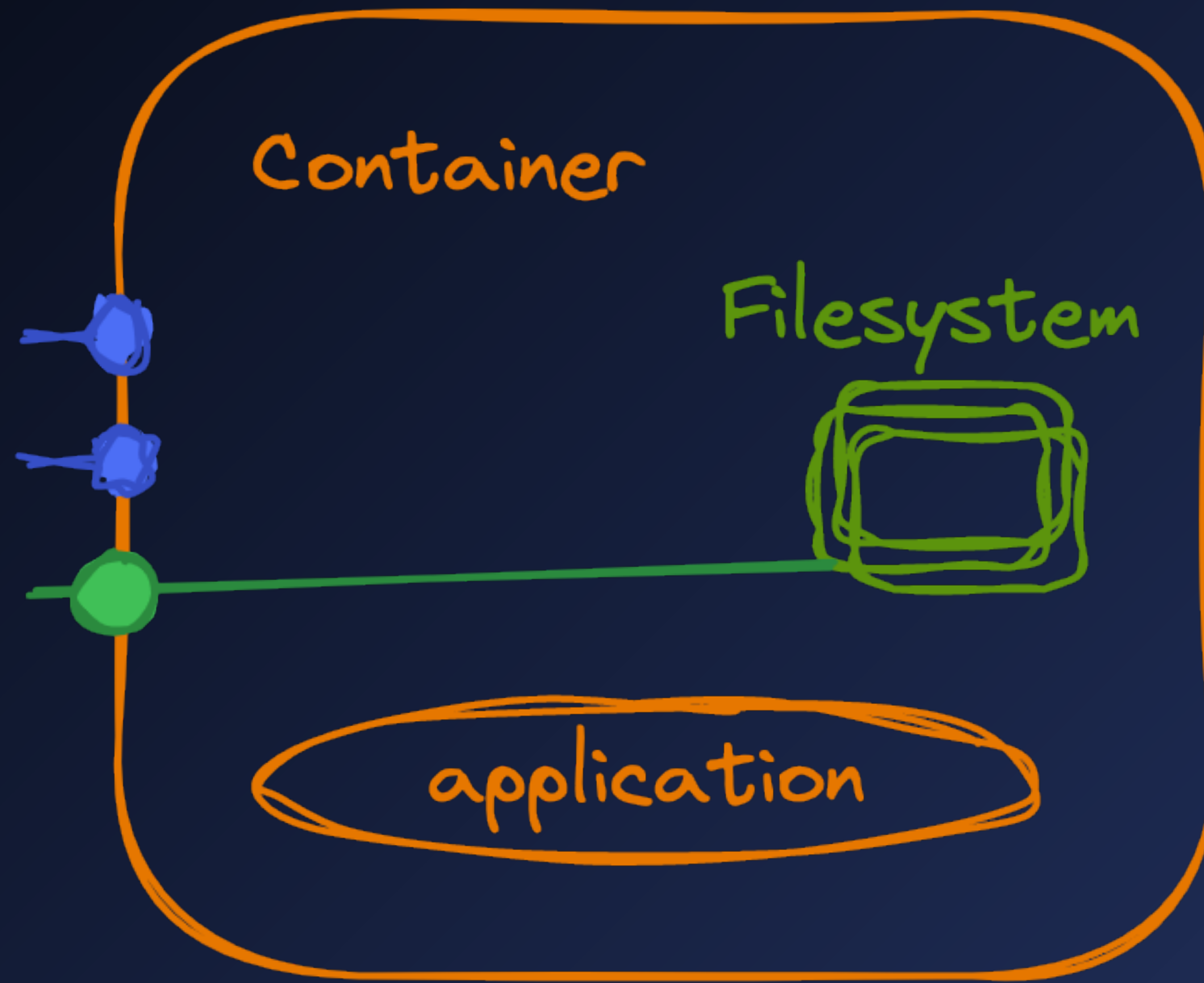


docker®



```
docker pull confluentinc/cp-kafka:7.0.1
```

```
docker run -p 9092:9092 cp-kafka:7.0.1
```



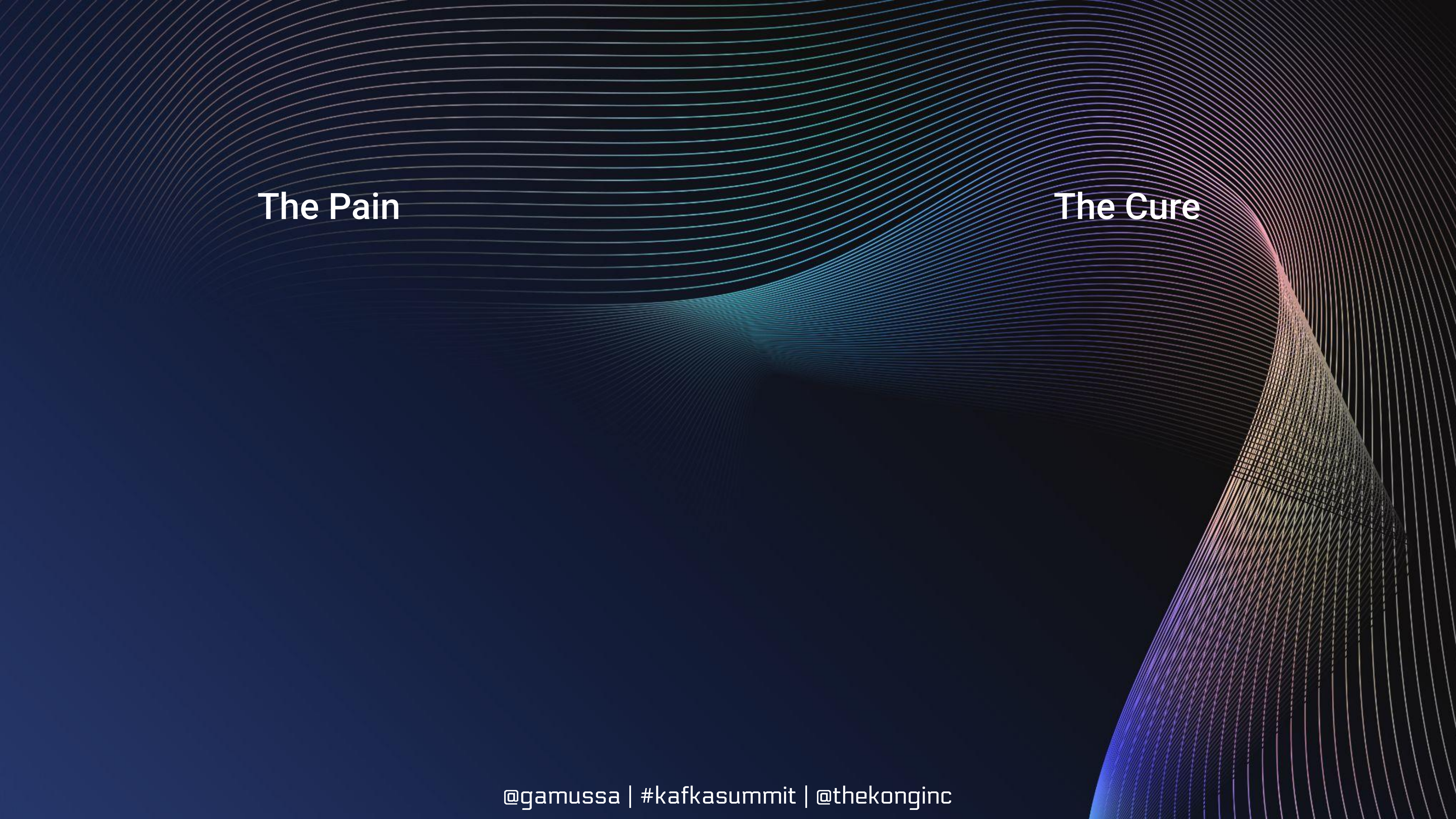




The Pain

The Cure



The background features a dark blue gradient with a series of fine, wavy lines that create a sense of depth and movement. On the right side, a bright, multi-colored cone of light (with hues of yellow, orange, and red) points towards the center, illuminating the wavy lines. The text 'The Pain' is positioned on the left side of the image.

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

Hard-coded  
scenarios

Slow test



## The Cure

Port  
randomization

Data-driven tests

Parallelization





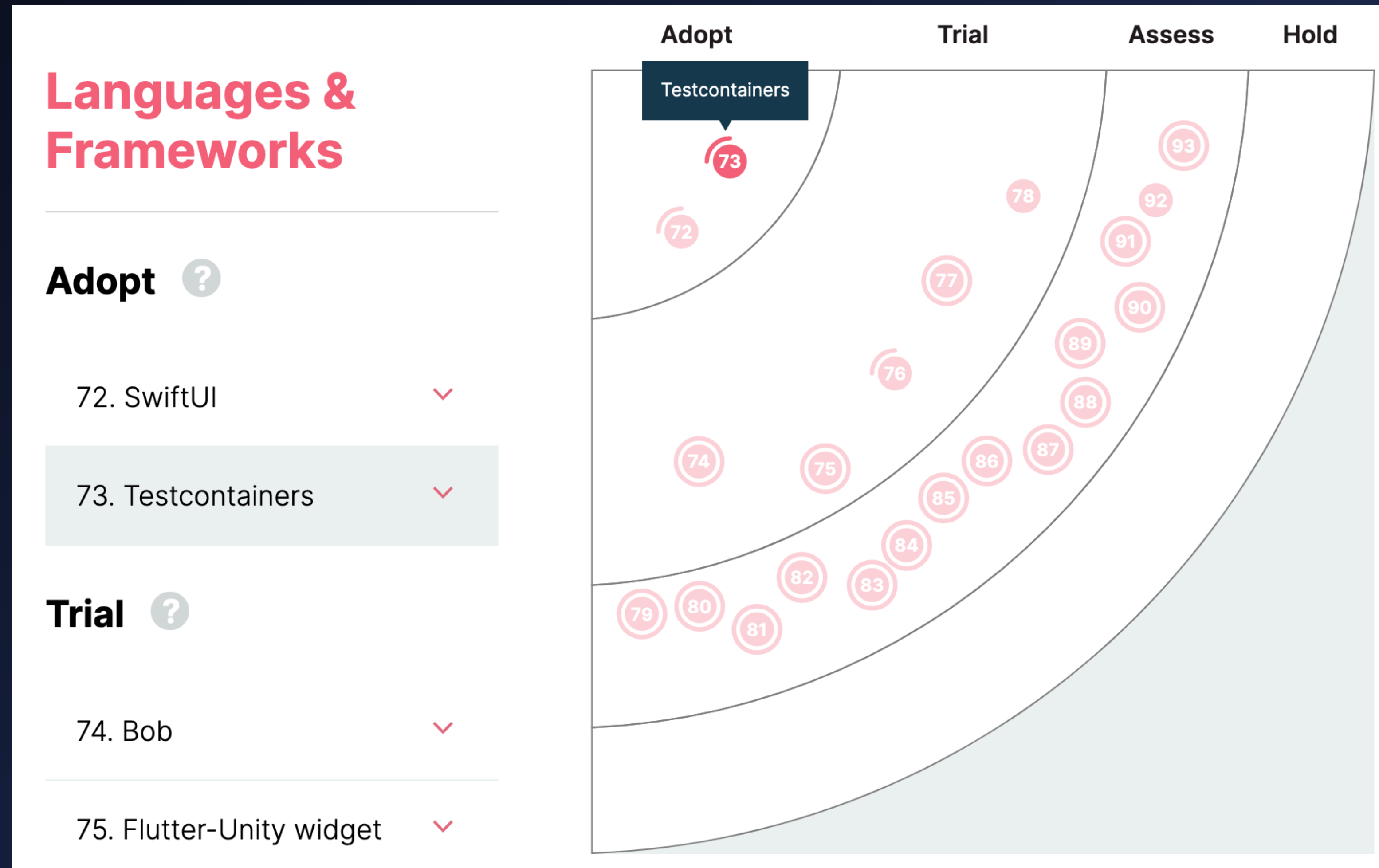
# Testcontainers



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**.



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

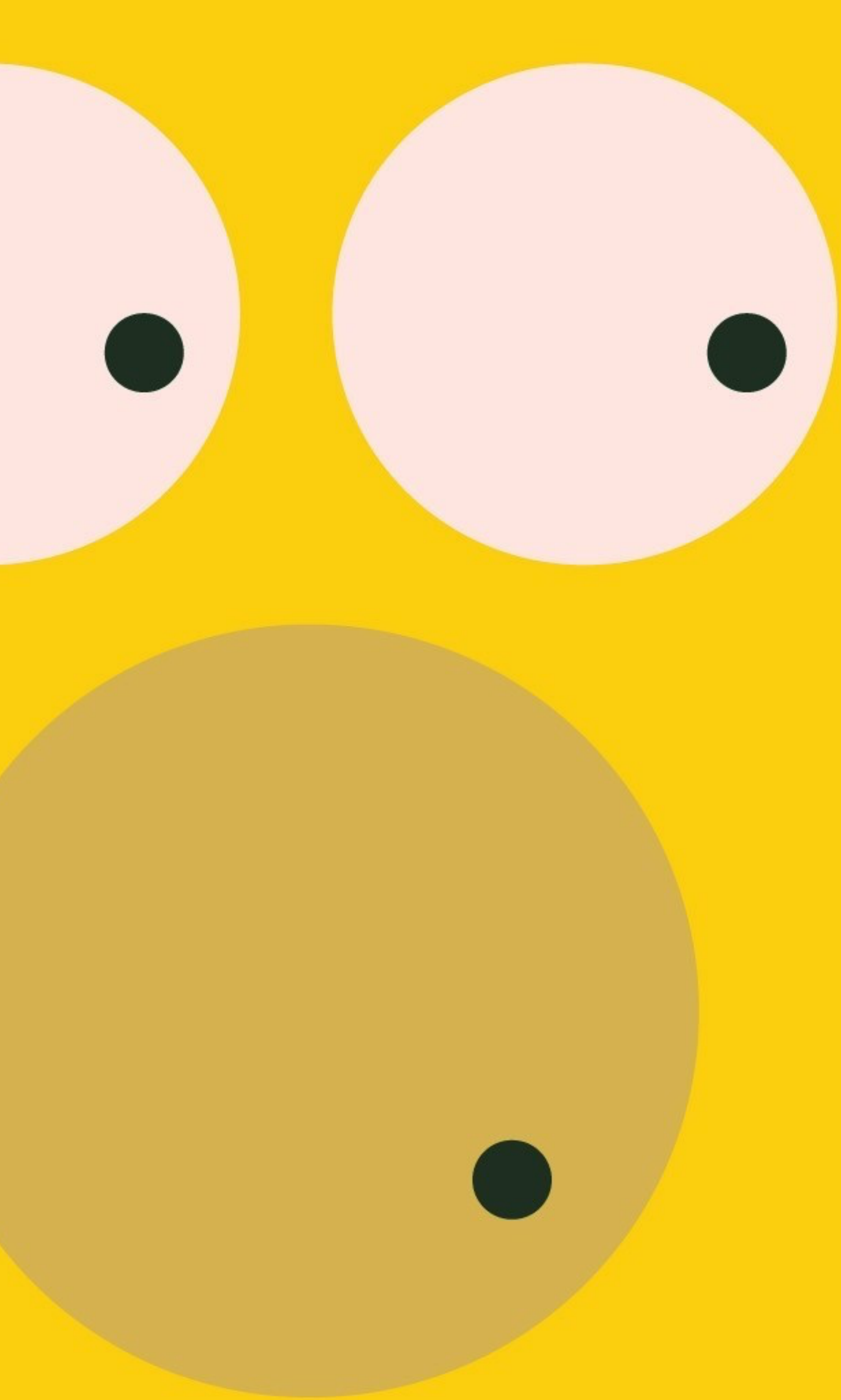
@gamussa | #kafkasummit | @thekonginc





# 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<br>(more is better)    | ✓✓✓            | ✓✓             | ✓✓✓      | ?      |
| Effort<br>(less is better)           | 📦              | 📦              | 📦📦       | 📦📦📦    |
| Performance<br>(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



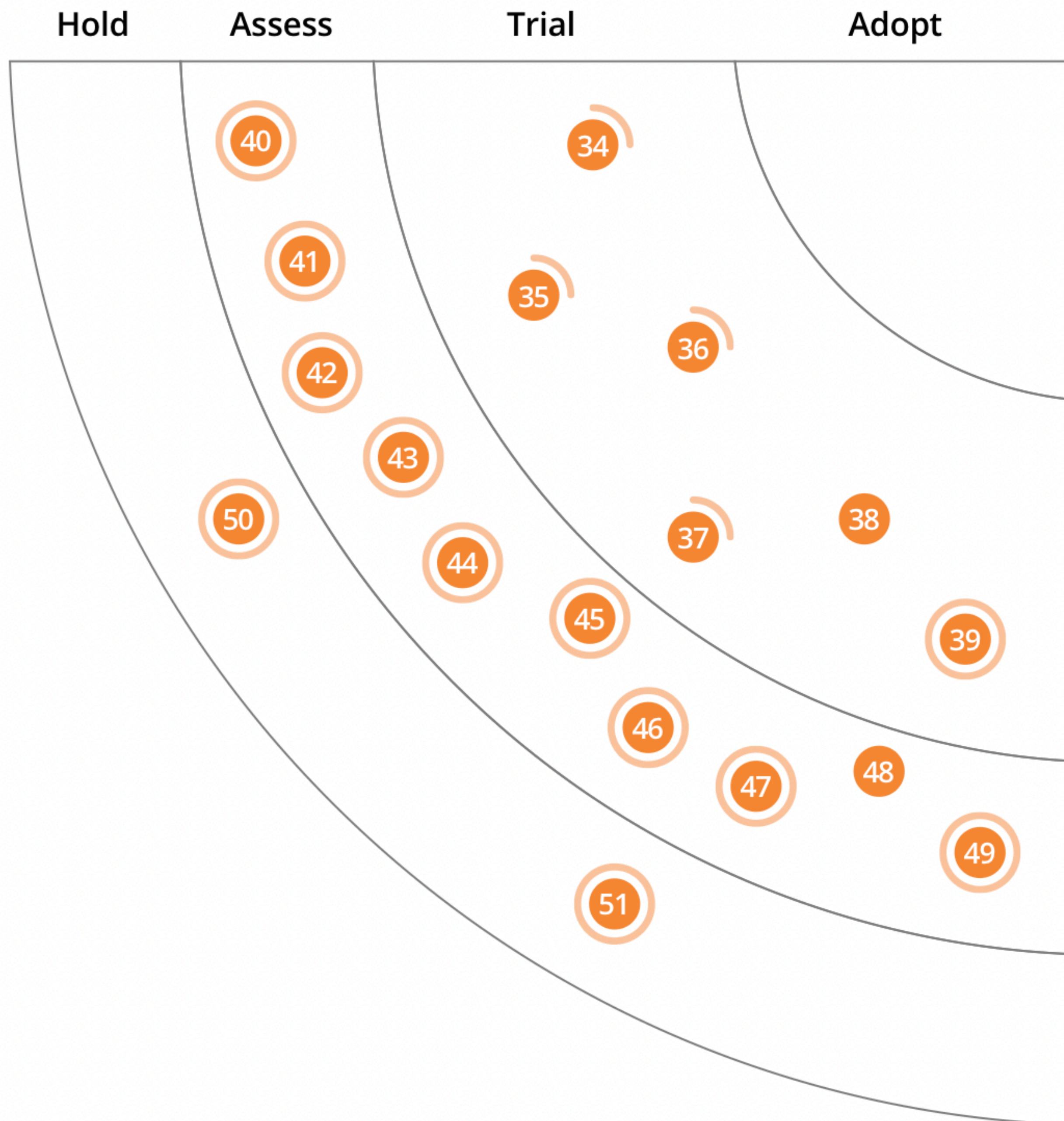


The background features a dark blue gradient with a series of fine, wavy lines that create a sense of depth and movement. On the right side, a large, translucent cone shape is visible, composed of many thin, parallel lines that converge towards a point at the top right. The overall aesthetic is modern and tech-oriented.

# ONE MORE THING...

@gamussa | #kafkasummit | @thekonginc





## 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

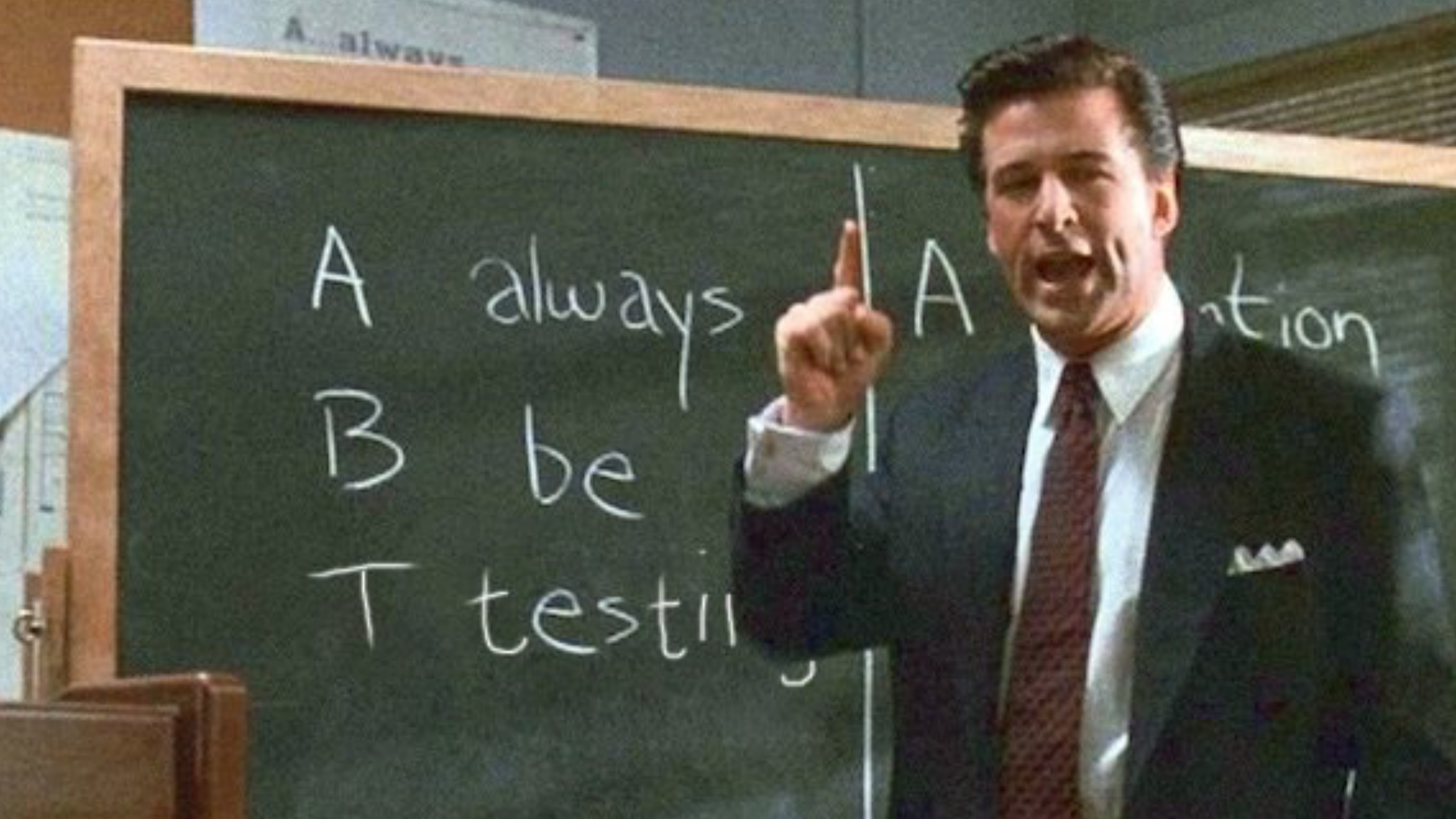
A always

B be

T testi

A

ntion





AS ALWAYS,  
HAVE A NICE DAY...

Viktor Gamov @ [gAmUssA](#)

