Contract Testing

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Outline

Let's start

It all started with Bob...

...and it continues with Bob

It all started with Bob…

They do work on my local machine though 😢

Bob

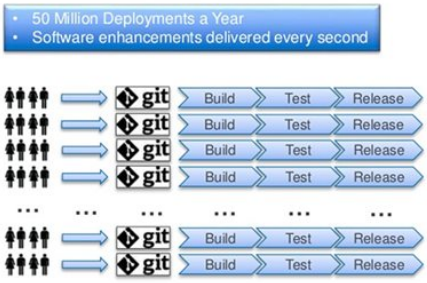
BOB ! the changes you made do not work on the live system 😡

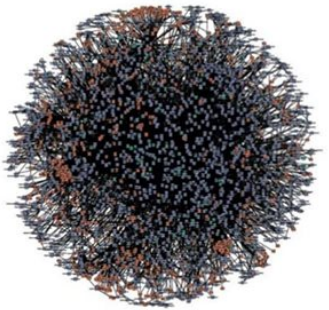
Angry chef

Bob has learnt the lesson...


MICROSERVICES
MICROSERVICES EVERYWHERE

Extreme examples...





Gigantic Web of Micro-services at Amazon

amazon web services

Everybody loves microservices

- Big promise: Independent deployability

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- Fast feedback loops

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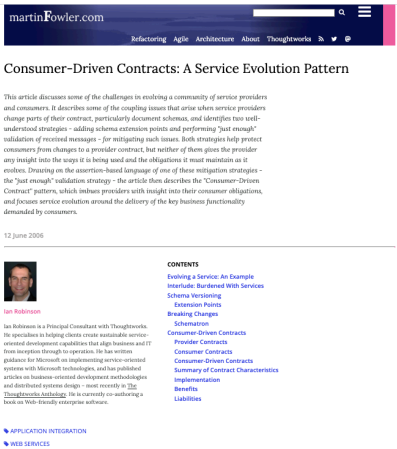
- Scalability out of the box
- Improved Security (no SPOF, no SPOC)
- Optimized Time to Market

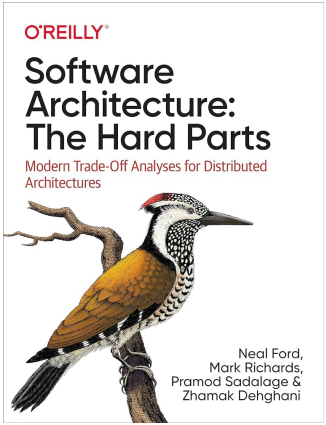
Everybody loves microservices

> *Chief among the benefits of service-enabling an enterprise's application landscape are* ***increased organizational agility*** *and* ***reduced overall cost*** *of implementing change.*
>
> *A SOA increases organizational agility by placing high-value business functions in* ***discrete, reusable services****, and then connecting and orchestrating these services to satisfy core business processes.*
>
> *It reduces the cost of change by* ***reducing the dependencies*** *between services, allowing them* ***to be rapidly recomposed and tuned*** *in response to change or unplanned events.*



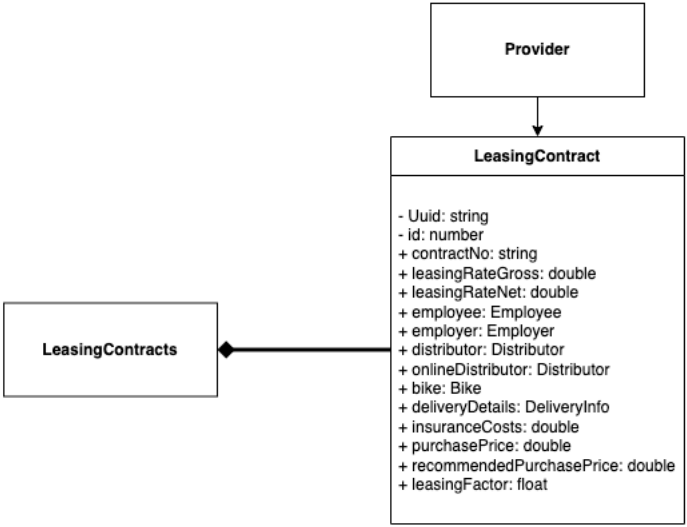
Is always a tradeoff

> *There is only one hard rule in software development:* ***Everything is a tradeoff****.*
>
> *– Neal Ford*

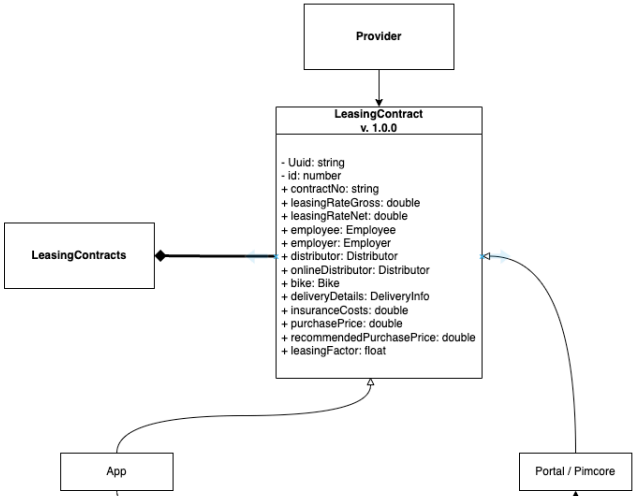


Bob's company is being very successfull...

A company growth... so its architecture



A company growth... so its architecture



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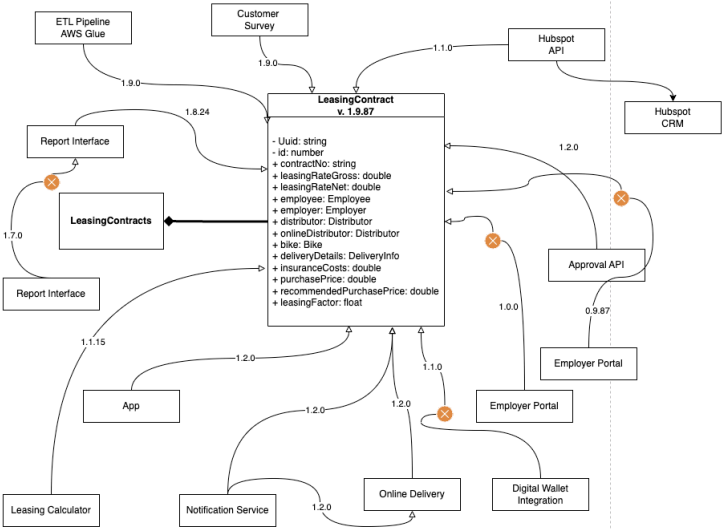
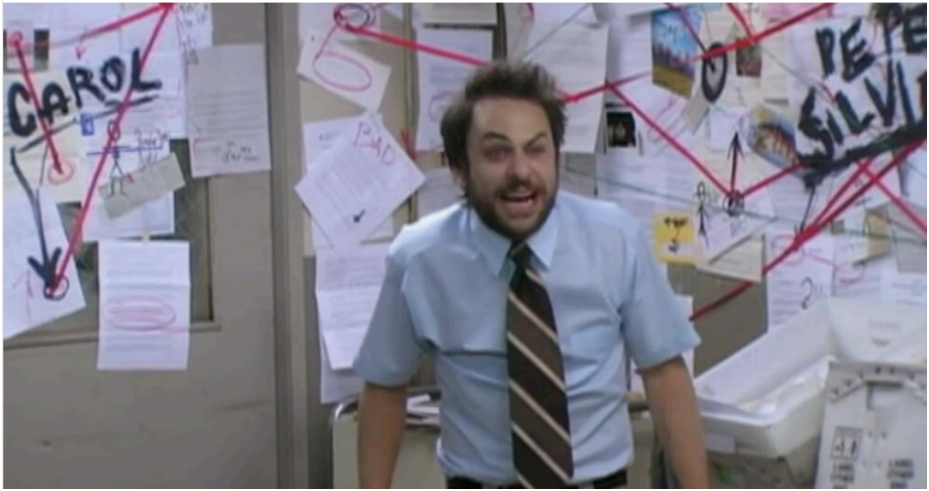


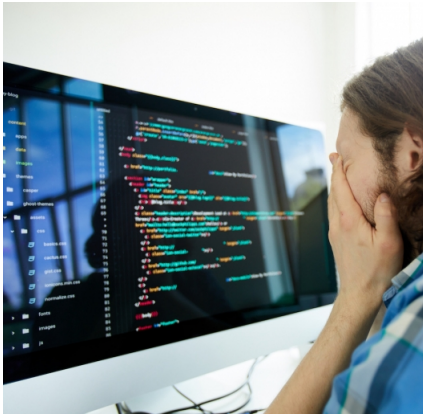
Bob is happy...



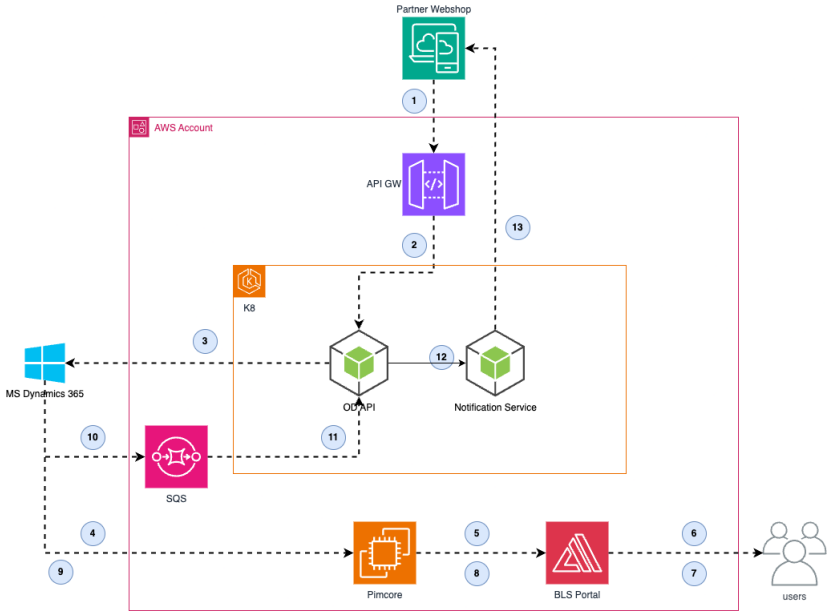
The Problem...

> *Every time we touch one service, all the others break :(*

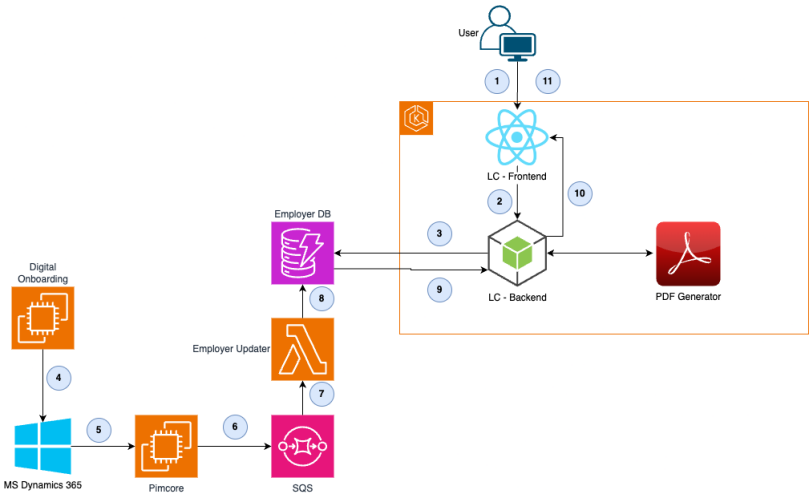
- Dependency hell
- Devs don't have confidence in deploying changes
  - Consequences of changes are hard to track
  - Distributed architectures are hard to test



Architecture example: Online Delivery



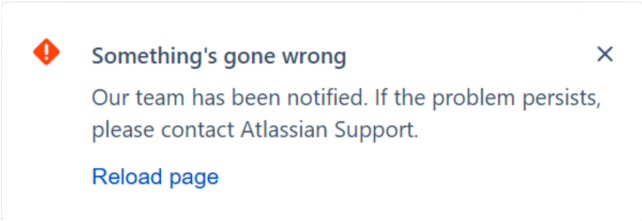
Architecture example: Leasing Calculator



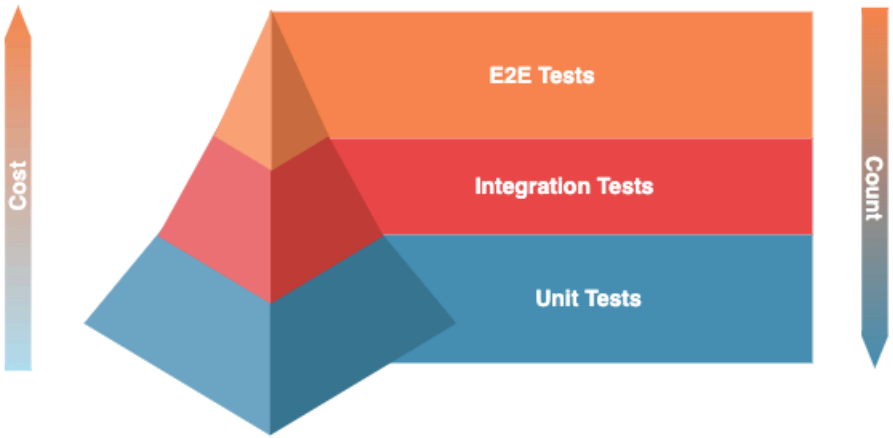
Updating a microservice: the sad Atlassian case

```
{
  "users": "Mike",
  "address": "Something"
}
```

```
{
  "user": "Mike",
  "address": "Something"
}
```



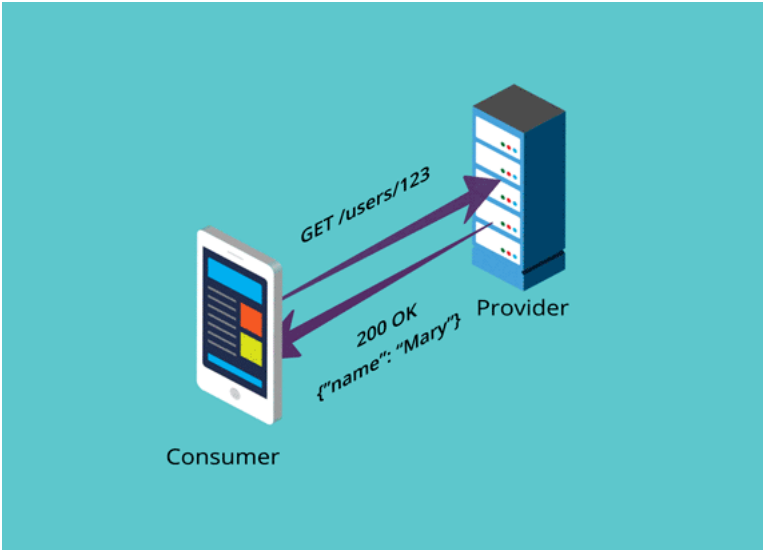
Test Typology



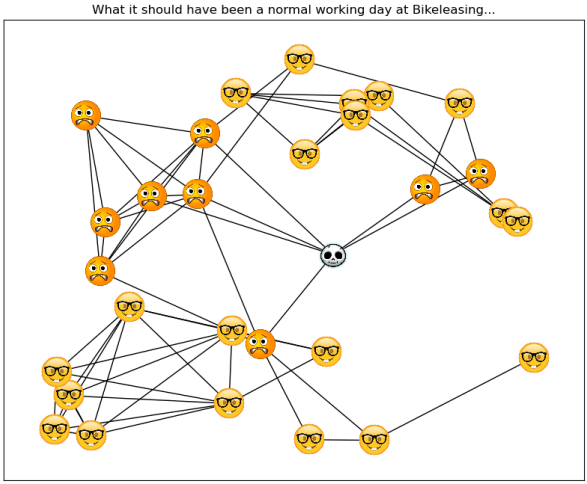
The problem with Unit Tests alone

- Local changes, even if tested, do not assure that the system as whole is working
- Mocks are not guaranteed to really represent the other part of the system

The bad side of mocks



Embedded Animation

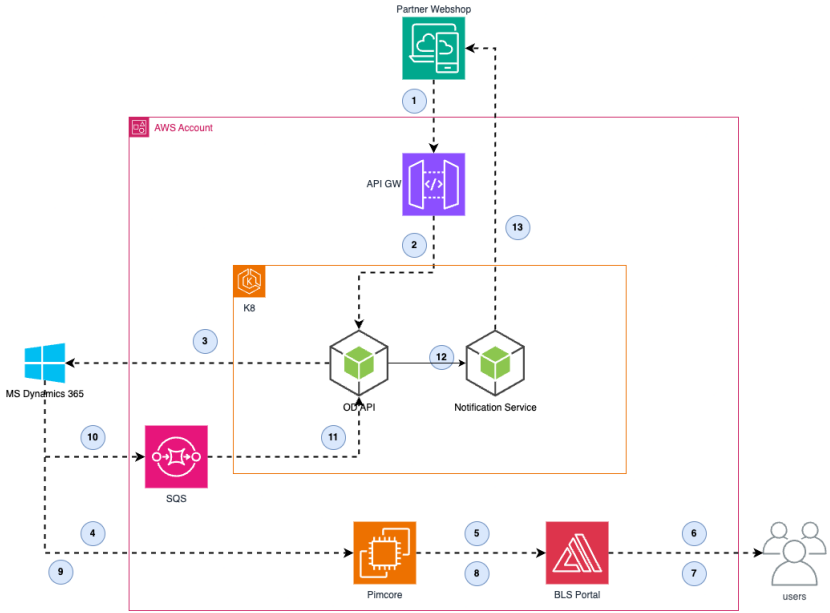


Problem with E2E Tests

They're very important (*qua* realistic), **but**...

- they tend to be not reproduceable locally
- they're hard or impossible to test some scenarios (e.g. system not available)
- they're expensive (time and money)
  - The longer we need to find out what's wrong, the more expensive it is
- Not few companies report *excessive test setup*
- they're prone to flakiness

Architecture example



Distributed $\neq$ Decoupled

Is this one or three pipelines?

What do we need?

We need a way to **test and ensure correct data exchange** between services, with the following characteristics:

- **Fast feedback** on changes
- **Confidence** in our changes
- **Reproducibility** of tests
- **Realistic** tests
- **Cheap** tests
- **Easy** to write and maintain

What do we need?

Seen so far:

- **Option A**: Mocks
- **Option B**: E2E / System Tests with real infrastructure

Is there an option C?

Contracts

Contracts

A formal agreement between parties or individual. Synonyms: pact, agreement, protocol, deal
— Oxford English Dictionary

A pact between who?

- **Consumer**: the service that consumes the information (typically closer to the user)
- **Provider**: the service that provides the information (typically closer to the data)

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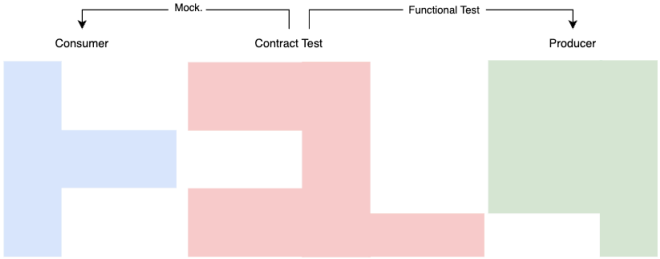
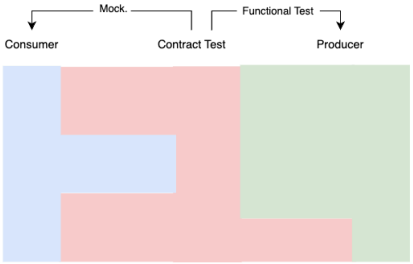
Where do we find this architecture?

- REST, GraphQL, gRPC, SOAP ...APIs
- Microservices communication
- SOA
- Other kinds of distributed systems (IoT, ...)
- Client-Server
- Messaging systems (Kafka, RabbitMQ, SQS ...)
- Notifying systems (Webhooks, SNS, ...)

Contract Test Role

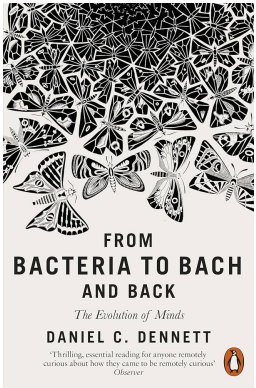


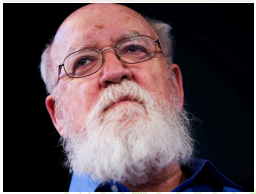


Pact - Consumer Driven Contracts

"'*A strange inversion of reasoning...*"'

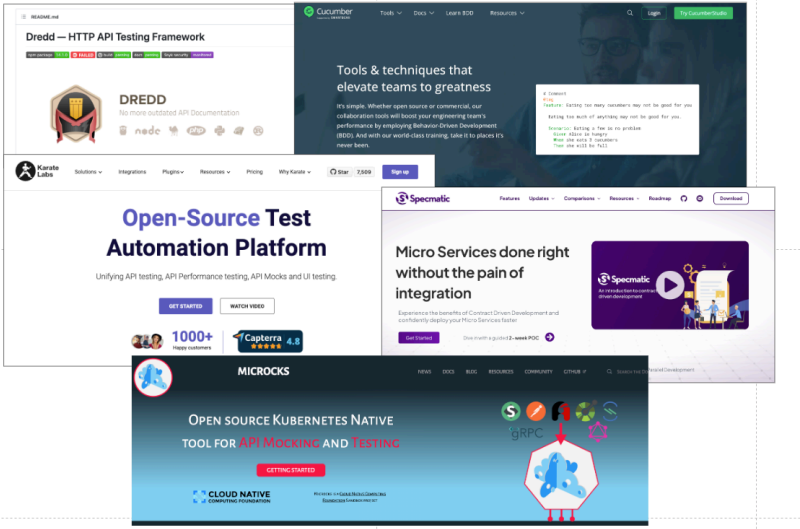
- Consumer Driven Contracts
- Pact is a contract testing tool
- Pact is a specification for consumer driven contracts
- Pact is a set of frameworks that support consumer driven contracts





Hintergrund

Other tools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Conclusions

- ja, something

Contract testing and Interface Segregation Principle

- Contract testing ensure that services can communicate with each other effectively

Contract testing and Interface Segregation Principle

- Contract testing ensure that services can communicate with each other effectively
- Interfaces are what services use to communicate with each other


THANK
YOU