

End-to-End test environments

A dead End road

A black and white photograph of a full suit of medieval armor. The armor is highly reflective and metallic, showing intricate details like rivets and plates. A helmet with a tall plume is prominent in the center. The background is a solid, neutral gray.

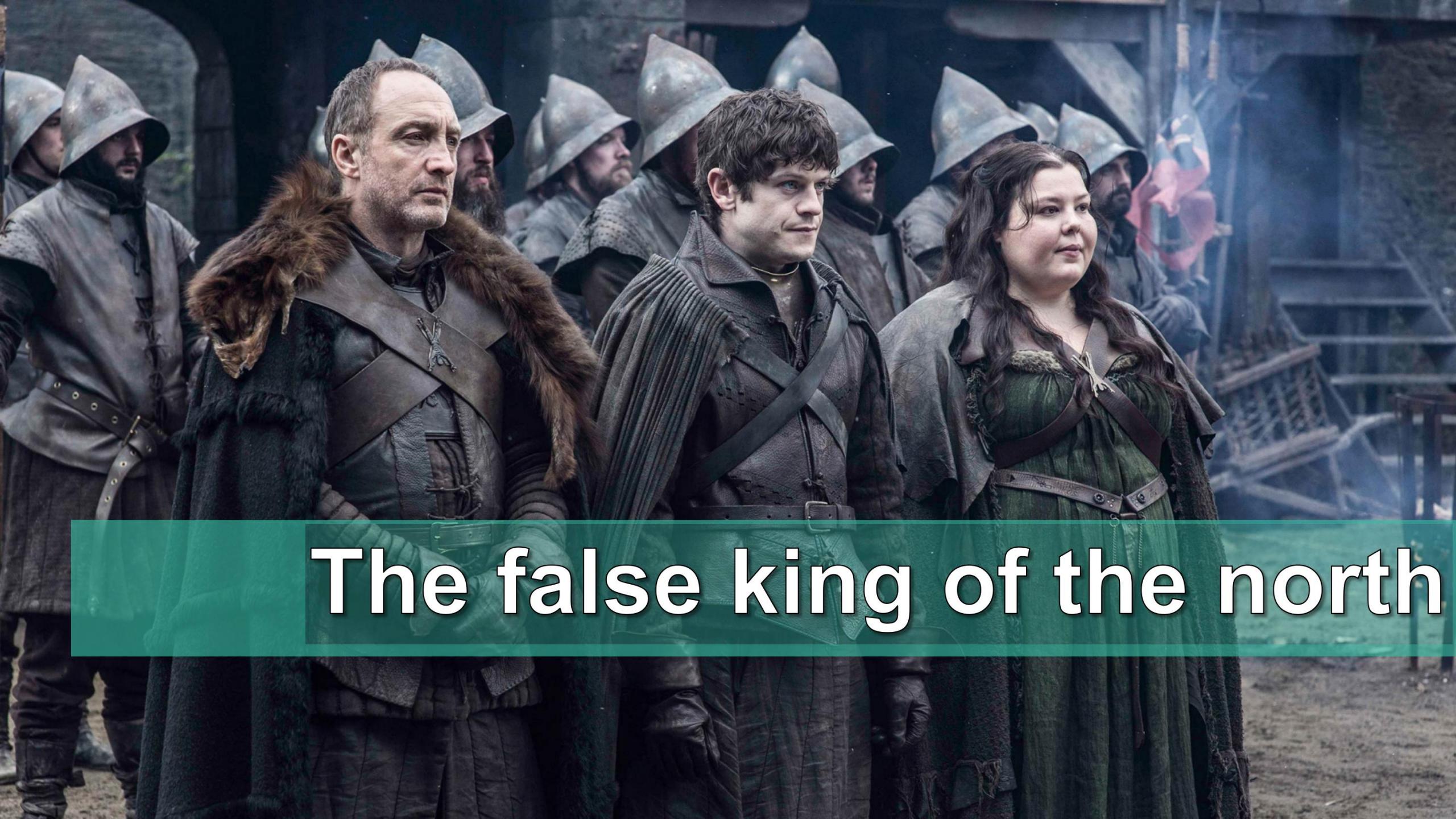
The slayer of automation



The Duke of false positives



The Prince of time consumption



The false king of the north



The opponent of CI/CD

A large pile of gold bars, some standing upright and others stacked horizontally, creating a sense of abundance and wealth. The gold has a shiny, reflective surface.

The gold digger of IT



The struggle of DevOps teams

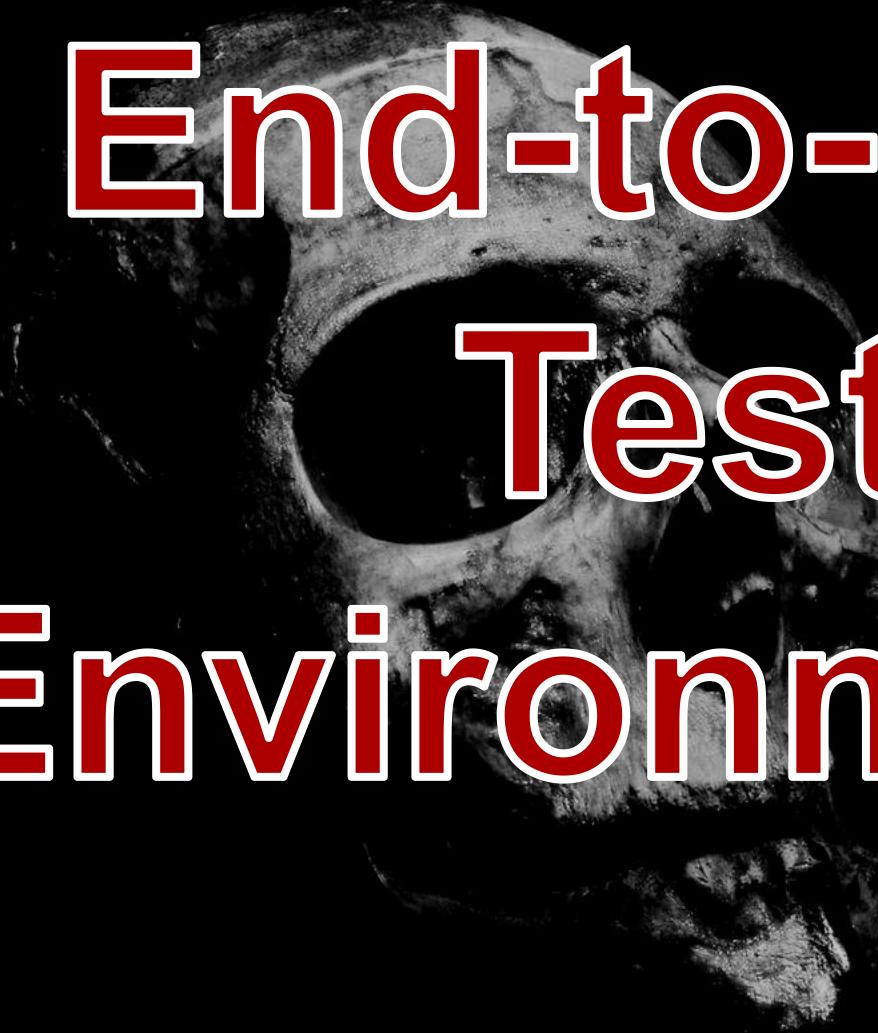


The challenger of patience



The master of frustration

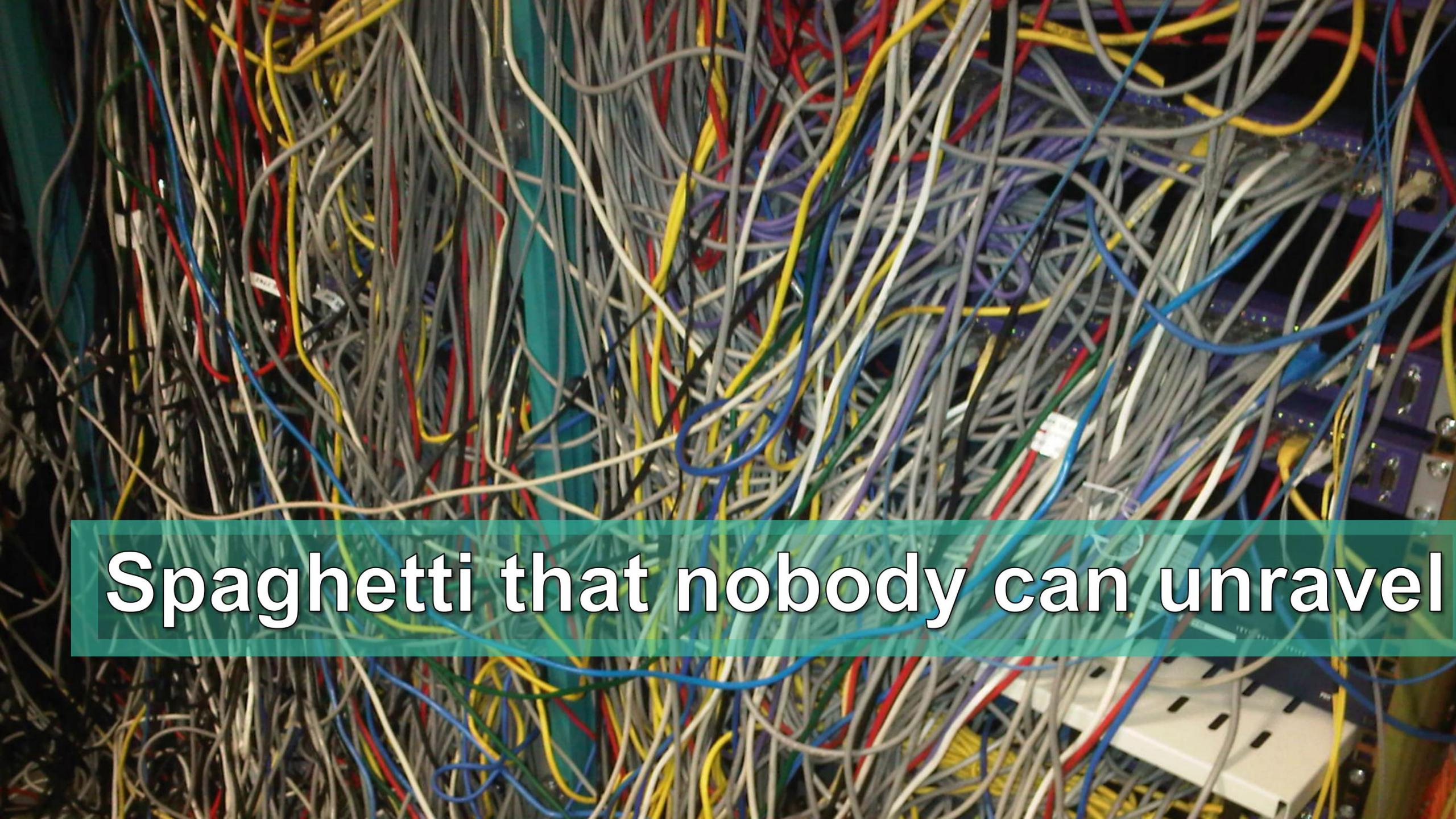
**End-to-End
Test
Environments**



**End-to-End
Test
Environments**

The background image shows the interior of a large, abandoned industrial building. The ceiling is collapsed, with twisted metal beams and debris hanging down. Large windows on the right side are shattered, letting in bright light. The floor is covered in a thick layer of dust and debris. In the distance, through the windows, other buildings are visible.

The place nobody wants to be



Spaghetti that nobody can unravel

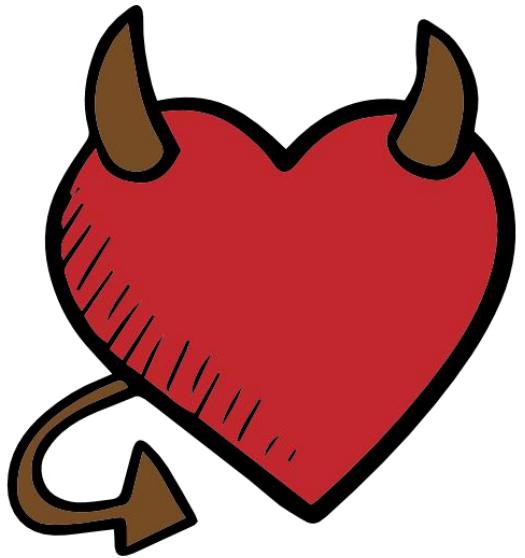
A photograph of a person standing on a mountain peak, viewed from behind. The person has their arms outstretched wide, embracing the vast landscape. The sky is a clear, pale blue, and the mountains in the background are dark and rugged. The overall atmosphere is one of freedom and achievement.

It currently looks like production....

...and then it isn't anymore.

A close-up photograph of a fish, likely a cichlid, swimming in dark water. The fish has a mottled pattern of brown and tan spots on its body. It is shown from the side, facing left. The background is dark, making the fish stand out.

Exaggerating?



End-to-End environments



jpoint



Agenda

- Definition
- Problem
- @ the Rabobank
- Why doing it
- Alternatives
- Questions

The End-to-End test environment

My definition

“A fully integrated environment with all systems that are part of some flow or functionality, with the single purpose of testing”

Aliases

- Chain Environment
- User Acceptance Environment
- Production Acceptance Environment
- Broad-stack Environment
- NGA Environment
- Acceptance Environment
- Pre Production Environment
- Enterprise-wide Integration Test Environment
- Full-stack Environment
- Production-like Environment

Full blown setup of multiple dependent systems that communicate to each other to achieve something

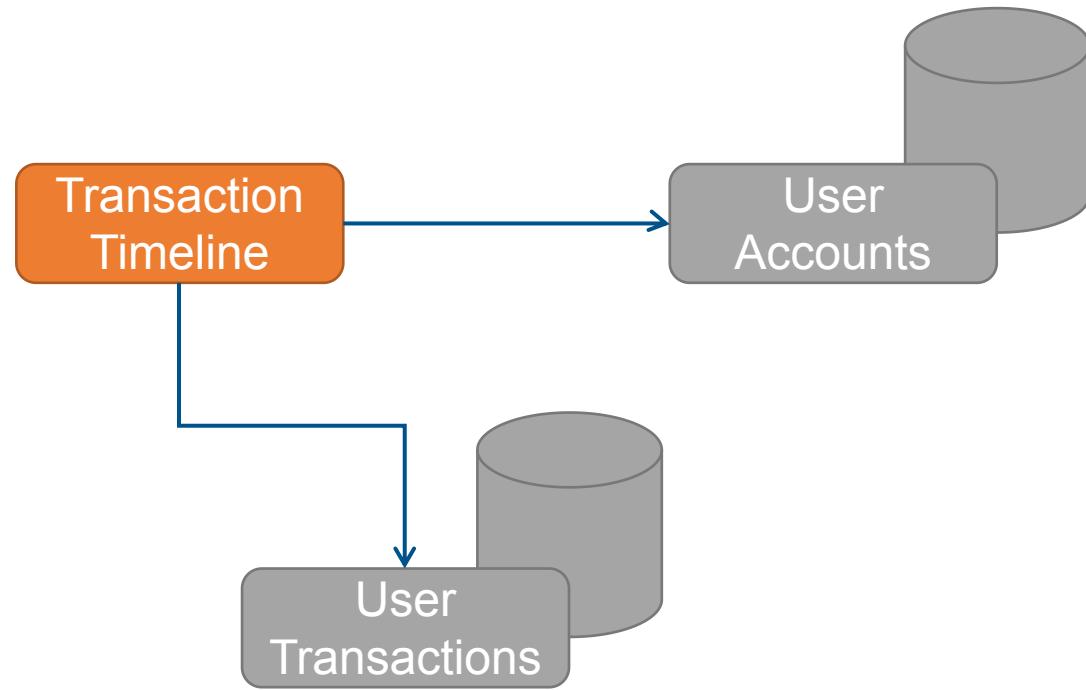
The dead end road

What is the problem?

Problems with E2E

- Test data hell

Test Data hell

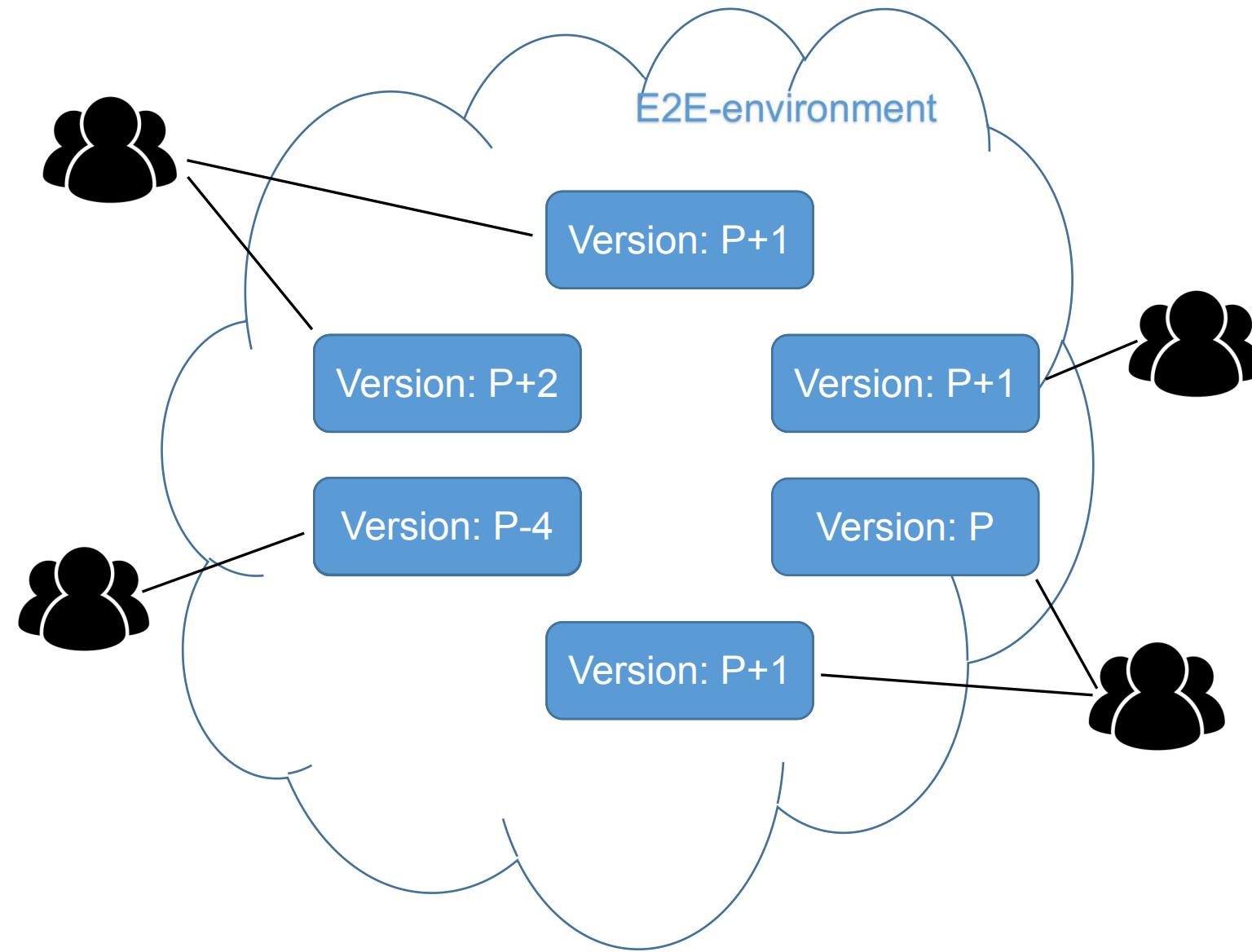


- Asking for test-data
- When consuming data, test-data needs to be prepared for every run
- Not 'your' test-data, others may change it
- Test-data needs to be correlated
- Bye-bye independent DevOps

Problems with E2E

- Test data hell
- Not so “production like”

Not so “production like”



- Simultaneously testing new version
- Multiple updates before deploying in production
- Not deploying in the End-to-End environment

Problems with E2E

- Test data hell
- Not so “production like”
- Test scope

Problems with E2E

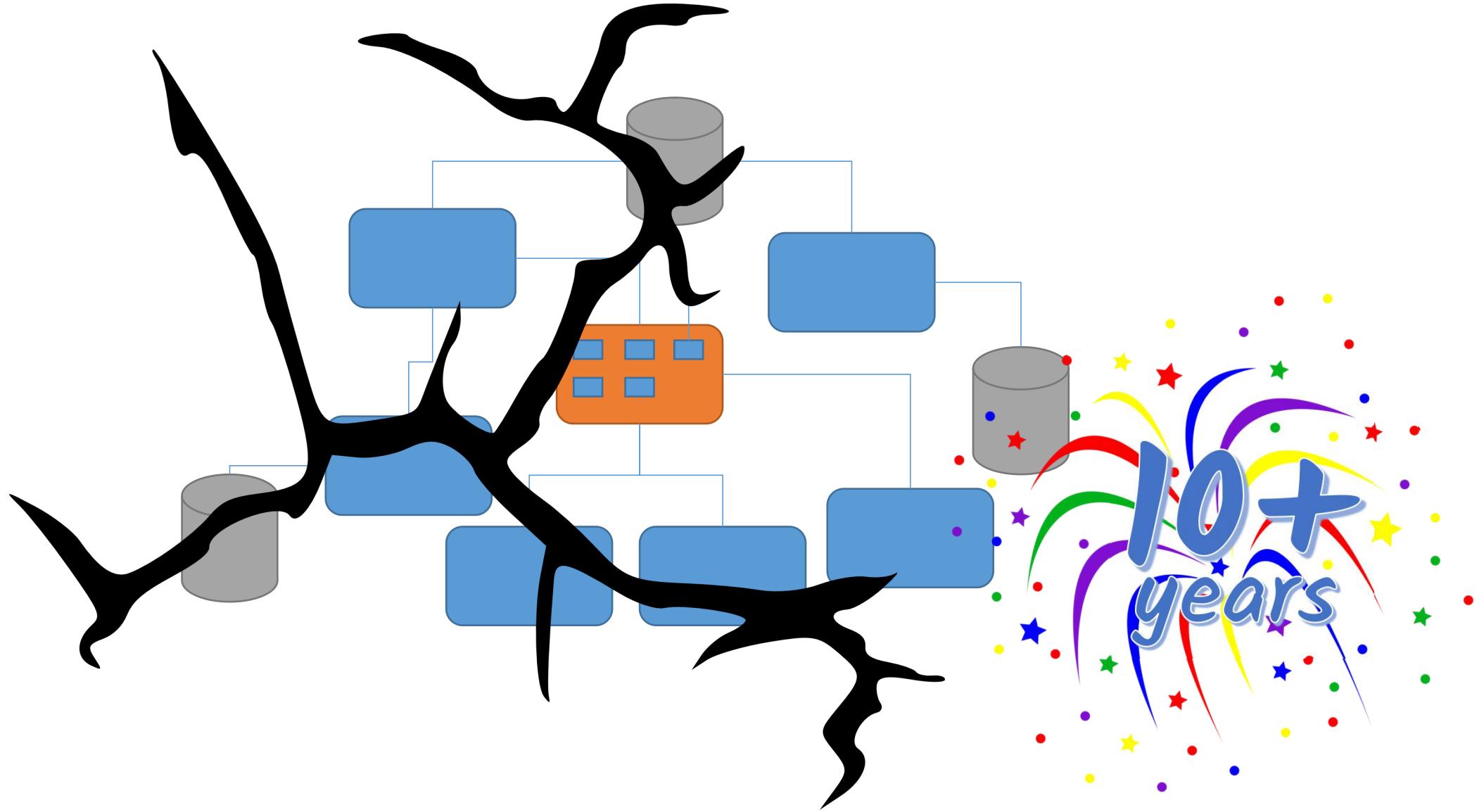
- Test data hell
- Not so “production like”
- Test scope
- False positives
- Slow Feedback time
- Reduce time-to-market
- Costs



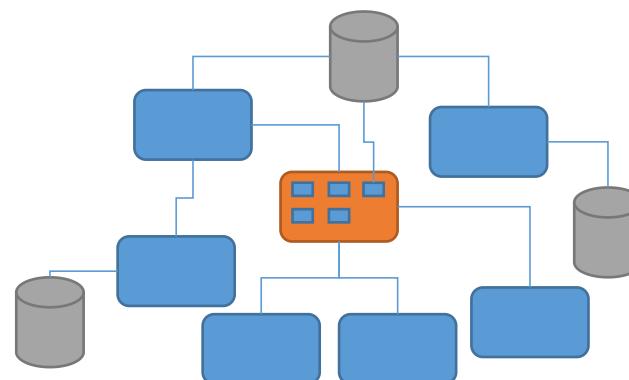
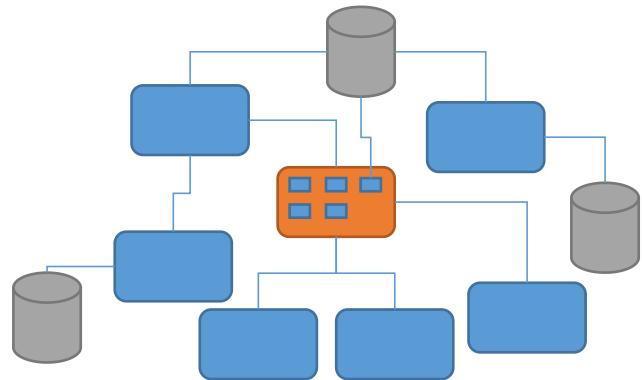
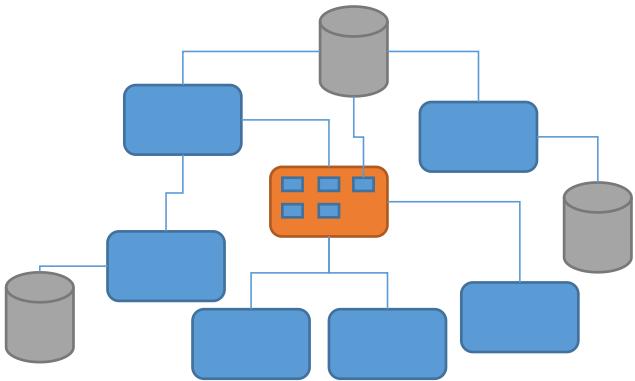
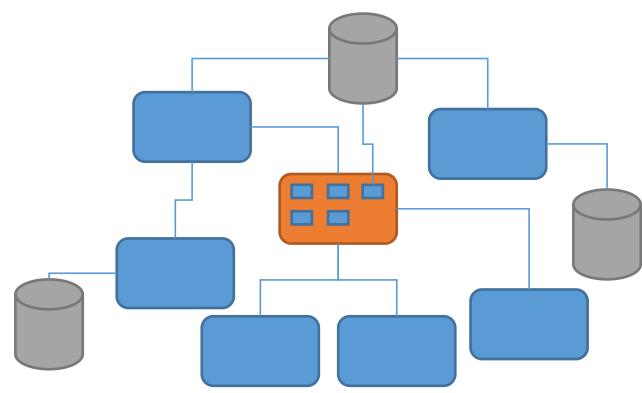
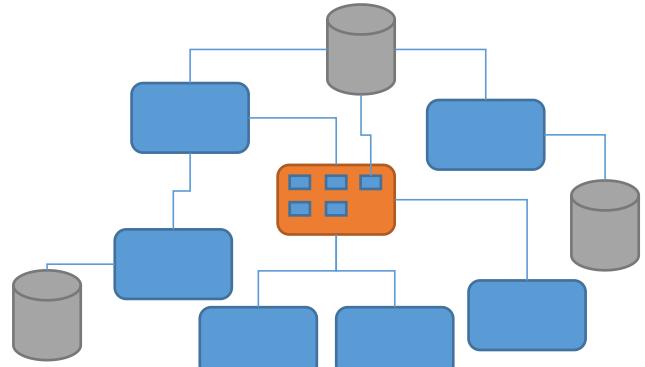
@ the Rabobank

We love End-2-End environments

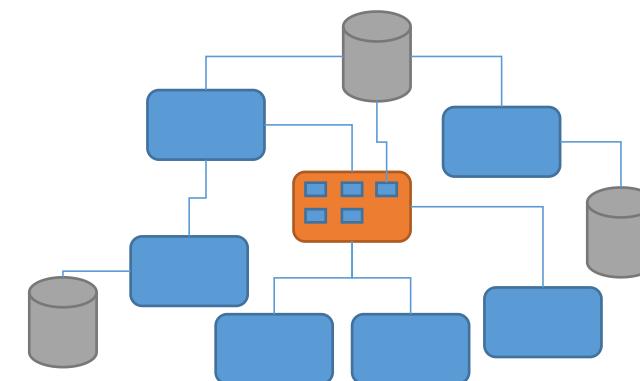
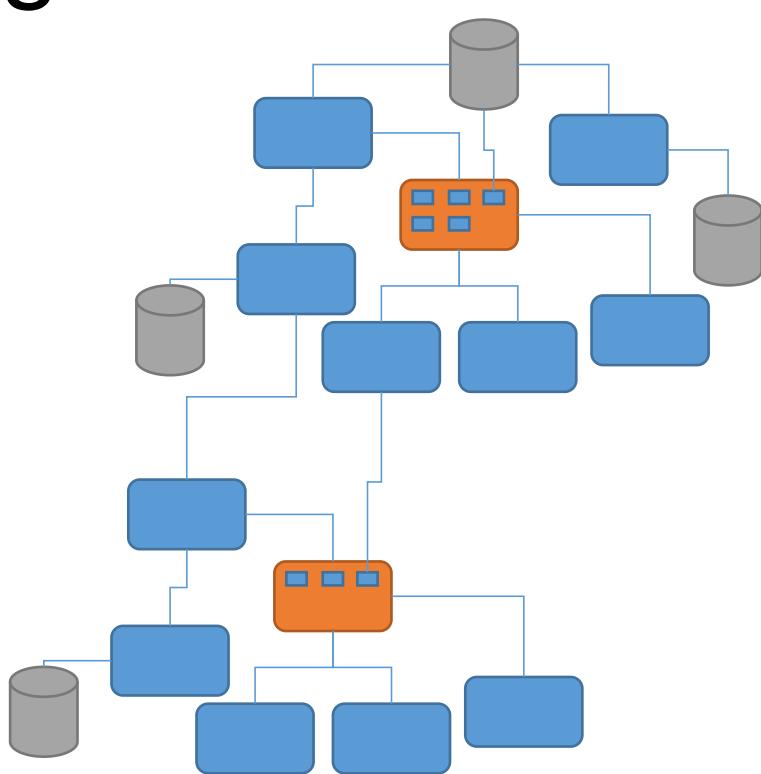
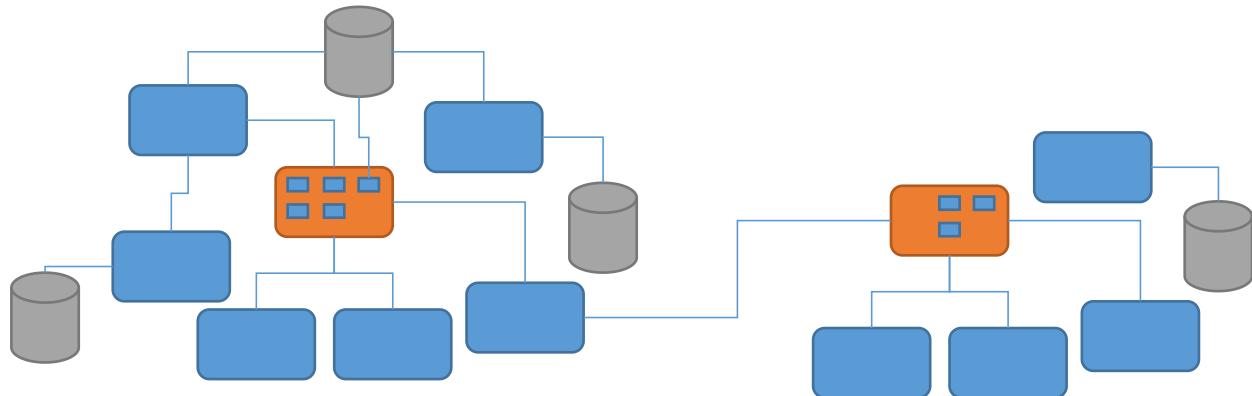
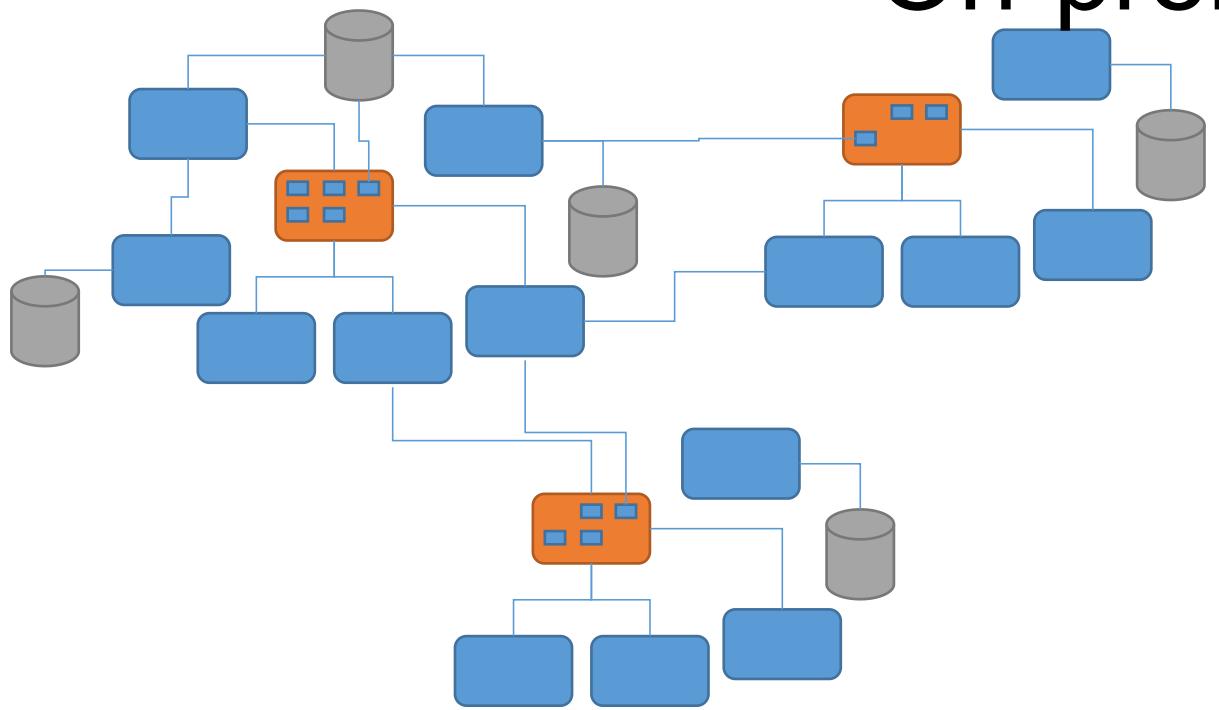
On-premises



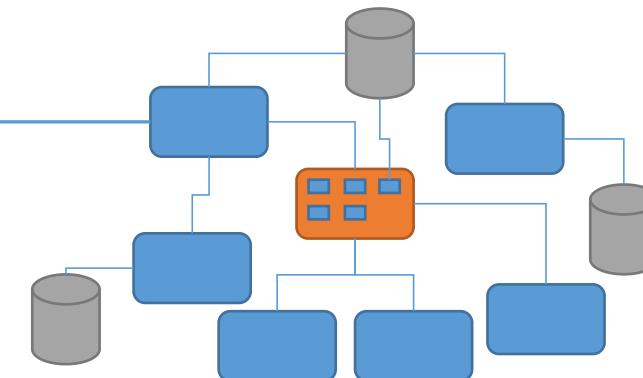
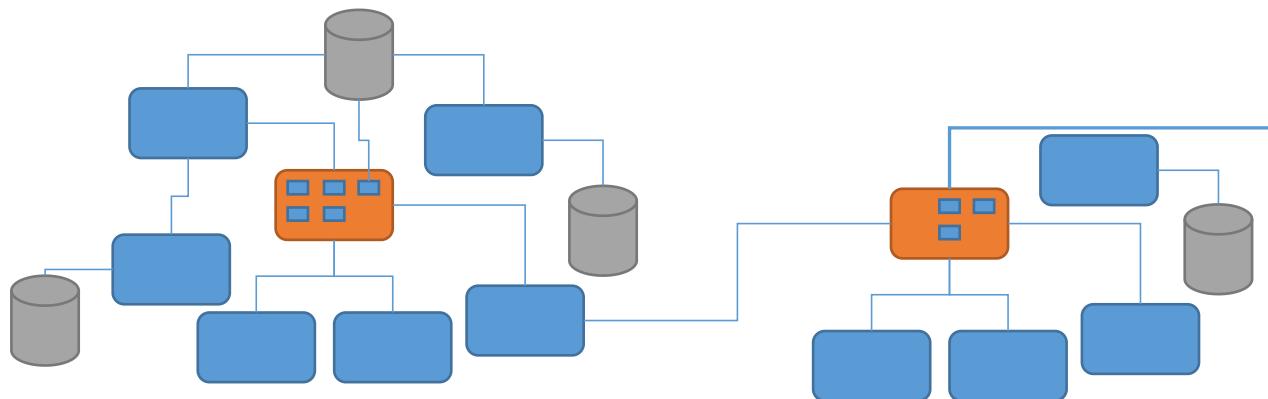
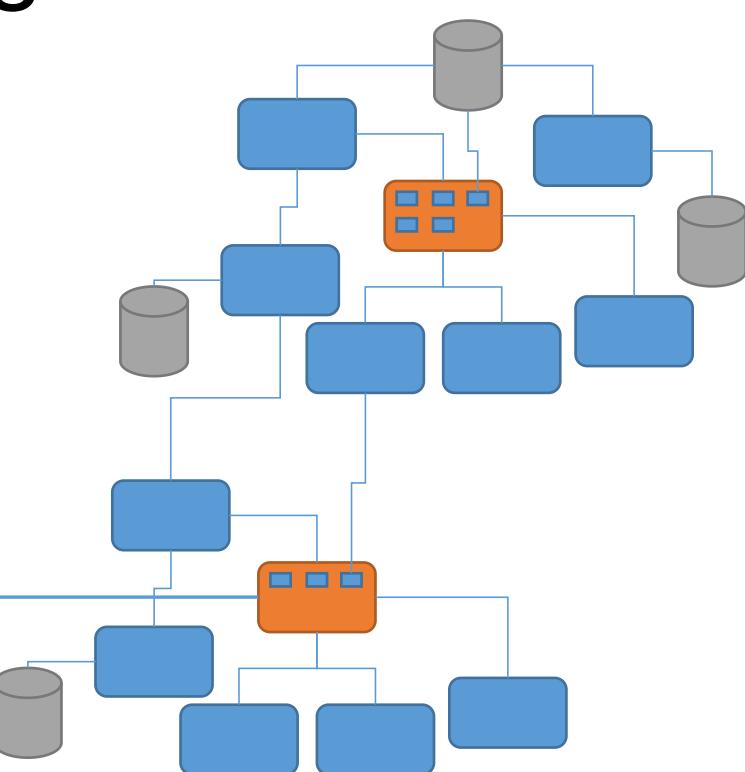
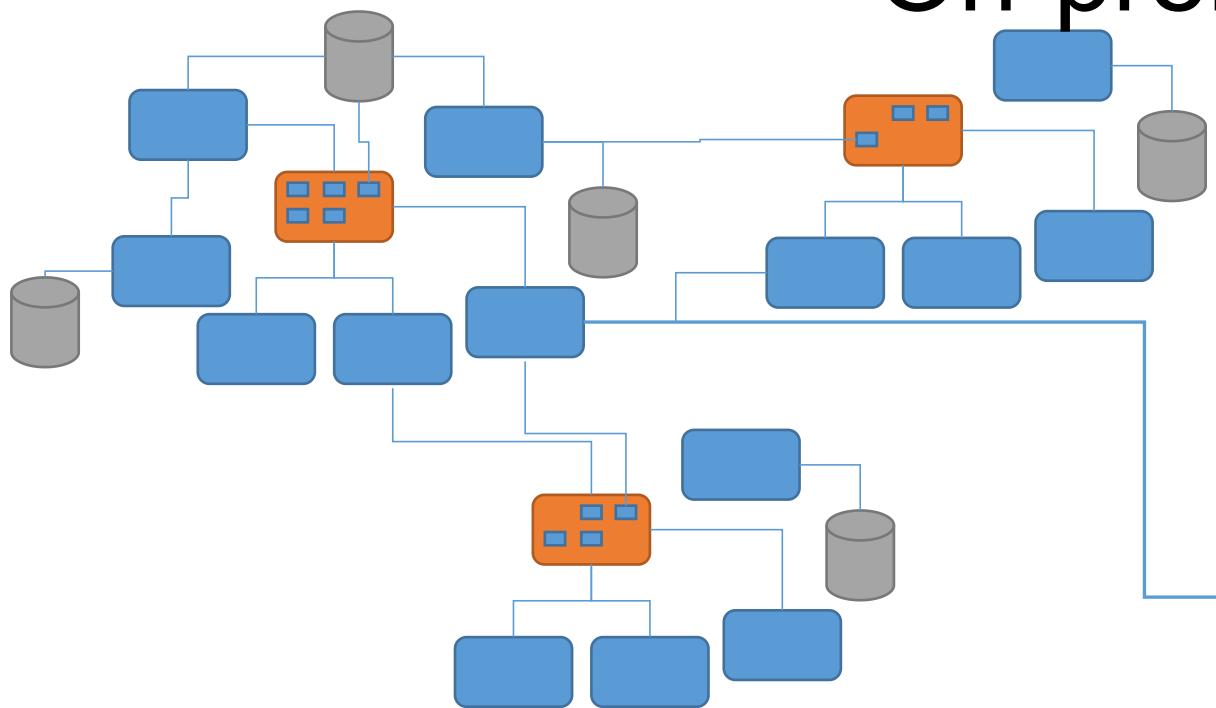
On-premises



On-premises



On-premises





Support conversation to a team

Dev: Hey, can you help me out. Flow x is not working on the environment 3, can you have a look if the platform is the cause

Me: Sure. I don't see any problem with the platform. Can you show me the broken flow on my device?

Dev: Yes.... Hey, now it's working. O, wait. You are looking at the chain environment 3.

Me: Yes, that is what you said, environment 3...

Dev: No, I meant acceptance environment 3

Me: But that's the same, it's environment 3.

Dev: No, it is an acceptance environment 3

Me: But that's the same platform environment

Dev: But not to us, in acceptance environment 3 we connect to services in environment 5

Me: What !!?!?





Migrating to the public Cloud



Pivotal
Cloud Foundry[®]



~~End-to-End
Environment~~

Why?

What are the reasons teams rely on End-to-End environments

Test data

*“Tests with semantic correct data
can only be run in a End-2-End test
environment.”*

Improve by

- Pull that data out of the e2e environment
- Tests in lower level of the Pyramid
- Build for failure

Trust



“I want to see it work before I go to production”

Improve by

- Move tests down the pyramid
- Proof no new issues are found
- For every incident, create an automated test case
- Invest in tests to gain trust
- Proof it will not break in production

Immaturity



“System X had a new release that broke our system, even though the contract is the same.”

Improve by

- Stricter and clearer contracts
- Consumer Driven Contract testing
- Automate an 1-on-1 integration system if needed
- Resilience

A large, textured tree trunk dominates the left side of the frame. A white-painted hand sculpture is wrapped around the trunk, with its fingers gripping the bark. The hand is positioned horizontally across the middle of the trunk. The background shows a park-like setting with other trees, a paved path, and a bench on the right.

Compensation

*“When they release a new version
we first want to test our system,
they often break things.”*

Improve by

- Put the responsibility where it belongs
- Resilience
- Run your automated expectations against their test environment

A close-up photograph of a man's torso and hand. He is wearing a dark suit jacket, a light-colored shirt, and a striped tie. His right hand is pointing directly at the viewer with his index finger. The background is blurred, showing warm, out-of-focus lights.

Requirement

“Our stakeholders demand that we first show it in an End-to-End environment, with that we guarantee our quality”

Improve by

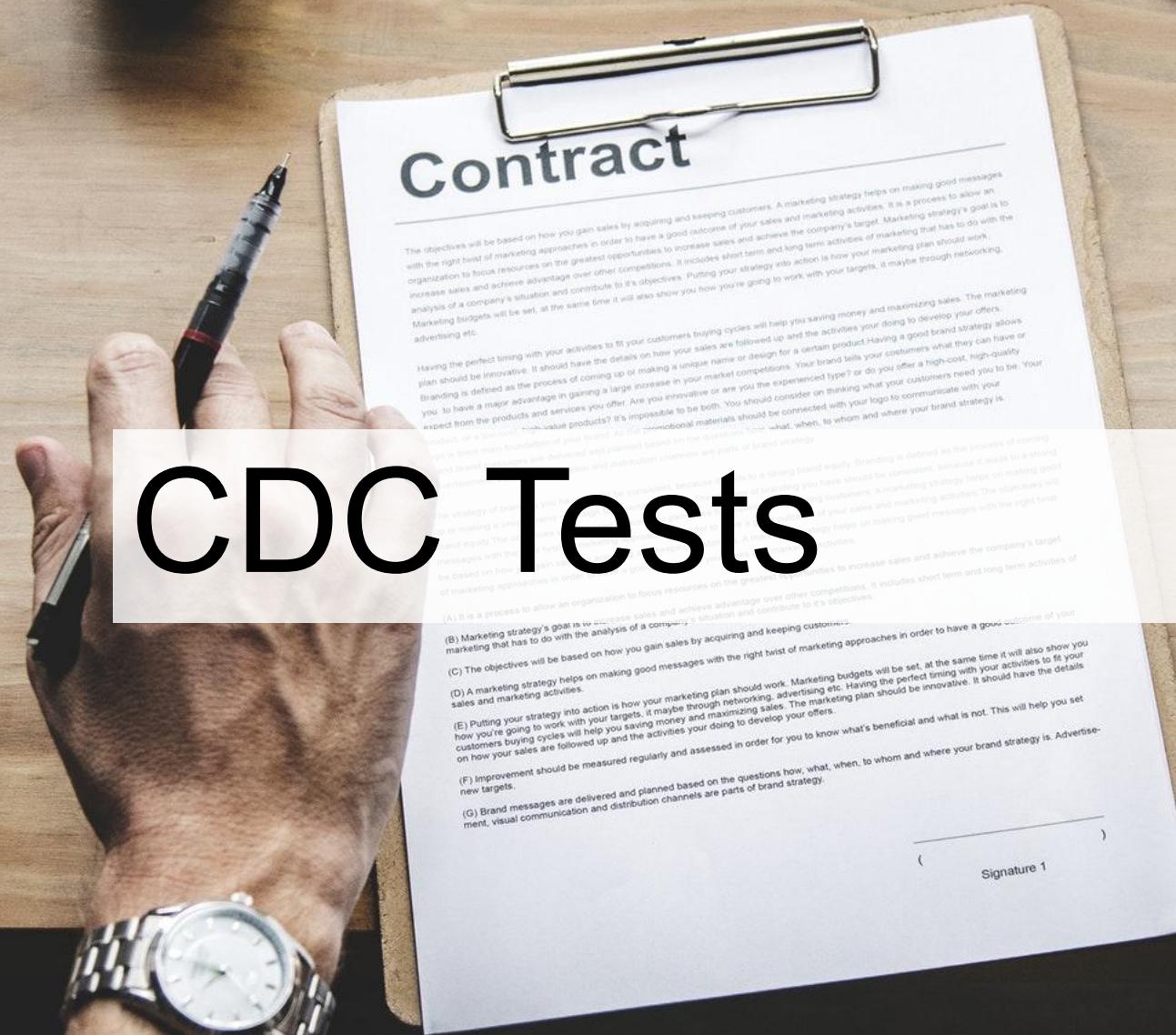
- Are stakeholders telling us how to guarantee quality?
- Gain their trust
- Always try to improve your process



Alternatives

Ways to minimize usage of E2E environments

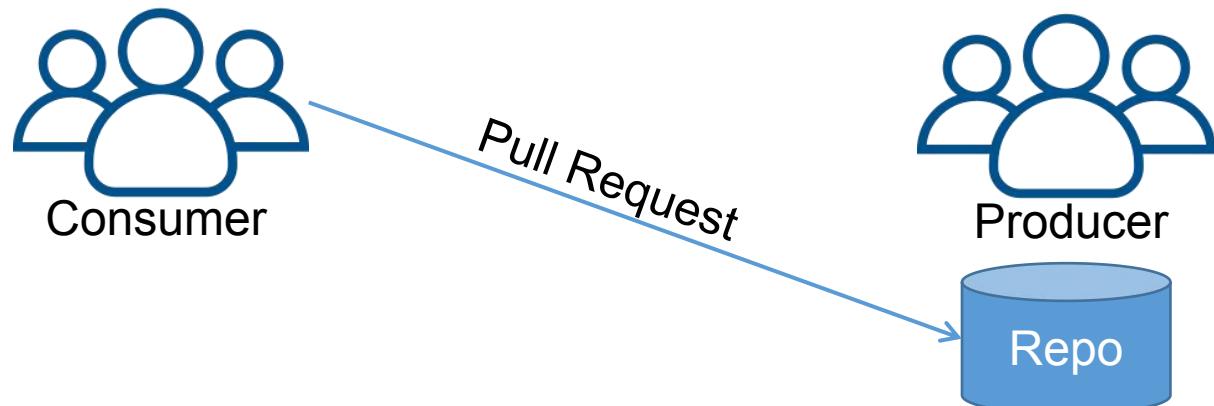
CDC Tests



CDC Tests

- Consumer Driven Contract Tests
- Testing pattern
- 2006 (by Martin Fowler??)
- Consumer offers expectations to producer

CDC Tests



- Expectations provided as tests by consumer
- Producer: Trust to not break consumers
- Consumer: Guarantee to not break contracts
- API design
- API usage

CDC tools

- Spring Cloud Contract (SCC)
- Pact
- Postman/Newman



PACT
FOUNDATION



	E2E Tests	Mock Tests	CDC Tests
Isolation	-	+	+
Complexity	-	+	+
Test Data Setup	-	+	+
Testing Data Semantics	+	-	-
Feedback time	-	+	+
Stability	-	+	+
Reveal Unused Interfaces	-	-	+
Well-Fittedness	-	-	+
Costs	-	+	+
Maintenance Effort	-	+	+

A photograph of a hiker standing on a rocky outcrop, looking out over a vast, misty mountain range under a bright blue sky with scattered white clouds. The hiker is wearing a red jacket, black pants, a black cap, and a brown backpack. A large white rectangular box is overlaid on the lower half of the image, containing the text.

Minimize Risks

- Separate deployment from release
- Canary releases
- Blue/Green deployments
- Feature toggle
- Test groups
- Monitor
- Focus on mean time to recover

**DEAD
END**

A long exposure photograph of a graffiti tunnel. The floor is dark and textured. The walls are covered in colorful, abstract graffiti. A large, illuminated letter 'P' is the central focus, glowing with red and white lights. The 'P' is outlined in red and filled with white, with bright highlights at the top left and bottom right. The background is dark, making the illuminated 'P' stand out.

Sources

- Practical test pyramid:
<https://martinfowler.com/articles/practical-test-pyramid.html>
- 7 reasons for CDC:
<https://refactoring.io/7-reasons-for-consumer-driven-contracts/>
- Thoughtworks tech radar
<https://www.thoughtworks.com/radar/techniques/enterprise-wide-integration-test-environments>