FOSTERING AN EVOLVING ARCHITECTURE
IN THE AGILE WORLD

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jpoint

OPEN VALUE

Rotterdam JUG

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THE PORT OF ROTTERDAM


HARBOUR MASTER
MANAGEMENT
INFORMATION
SYSTEM
HaMIS
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SO WHAT IS HaMIS ?

Interactive map

Security

Admittance policies

Patrol vessels (RPA)

Vessel inspections

Dangerous cargo

Crisis control

Lock planning

Harbour communication

Cargo checklists

And more...

450+ USERS

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The history of HaMIS

- IVS, a console based application
- Hardware no longer available:
  - Craigslist and ebay
  - Thinking about a replacement

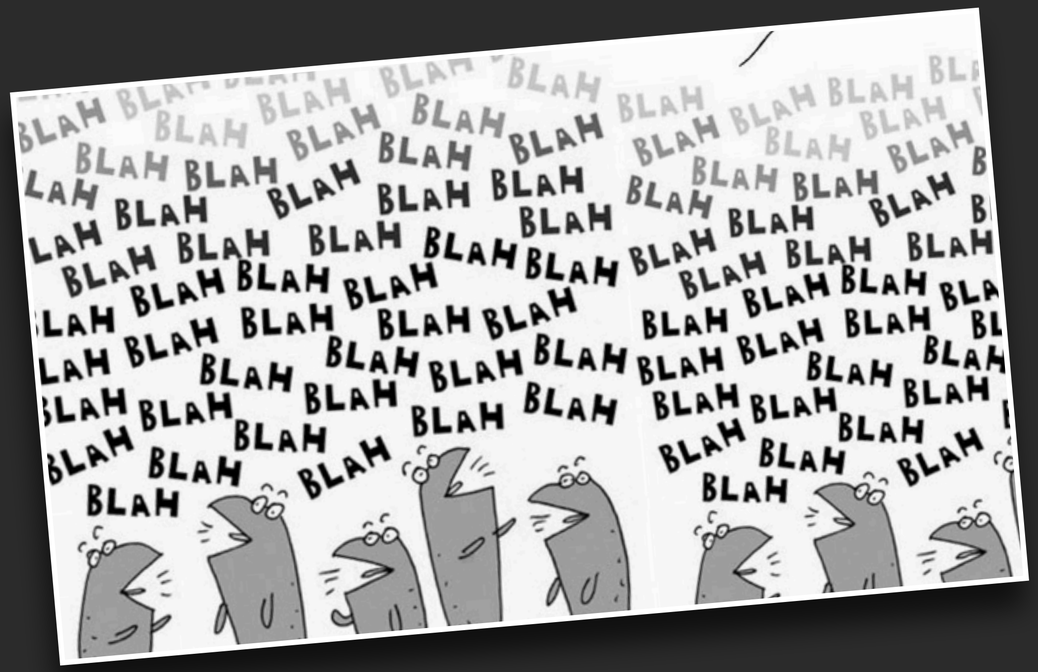
2004 2006 2008 2010 2012 2014 2016 PRESENT

The history of HaMIS

- Government procurement for 'HaMIS'

The history of HaMIS

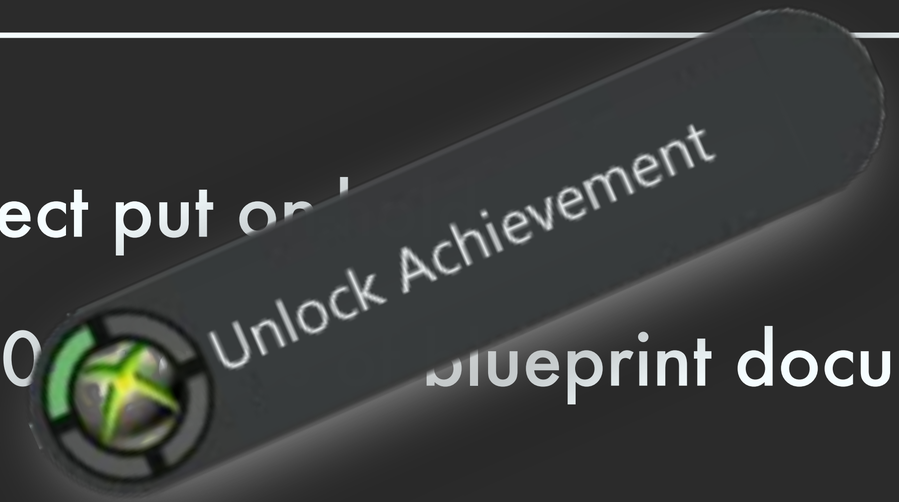
- 15+ architects
- 1 developer
- IBM WebSphere Partner Gateway



2004 2006 2008 2010 2012 2014 2016 PRESENT

The history of HaMIS

- Project put on h
  - 100 blueprint documents



2004 2006 2008 2010 2012 2014 2016 PRESENT

The history of HaMIS

- Ditch all the architects, hire developers
- A working application, live in production

The history of HaMIS

- I joined the team!

2004 2006 2008 2010 2012 2014 2016 PRESENT

⟷ Sprint 12

The history of HaMIS

2004 2006 2008 2010 2012 2014 2016 PRESENT

Sprint 70

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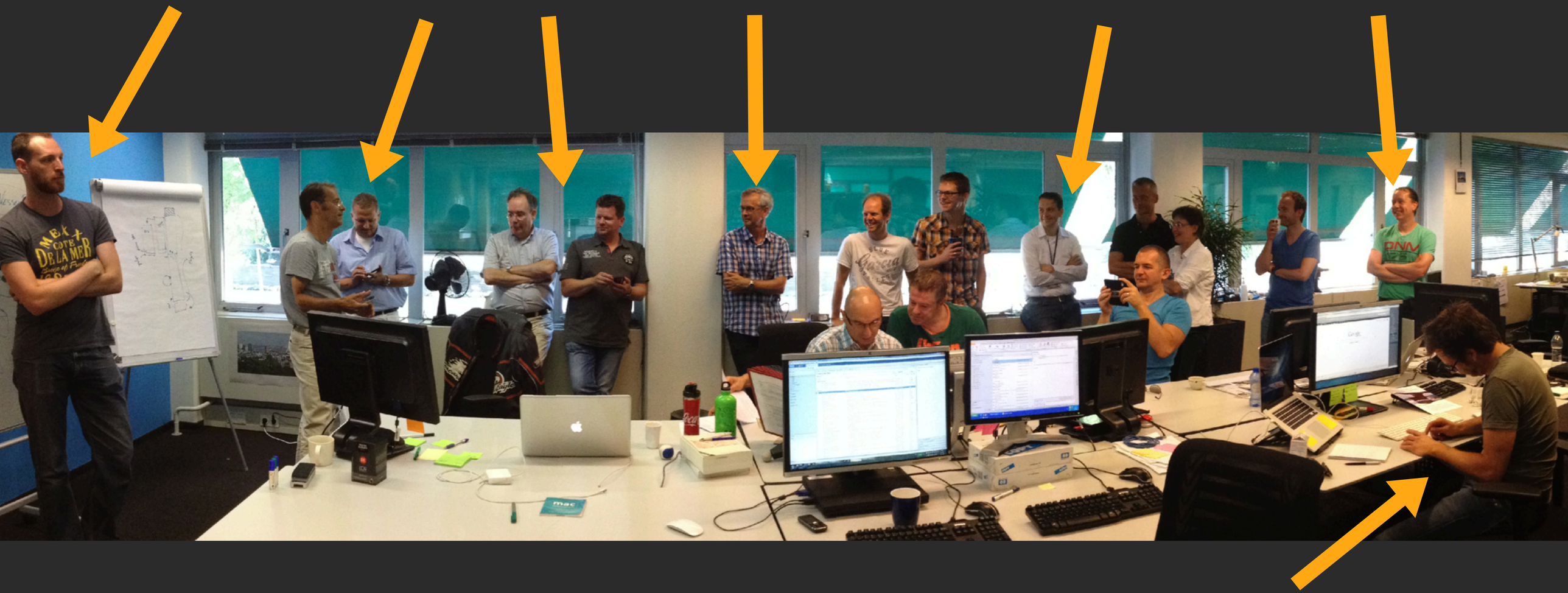
The history of HaMIS

The history of HaMIS

The history of HaMIS



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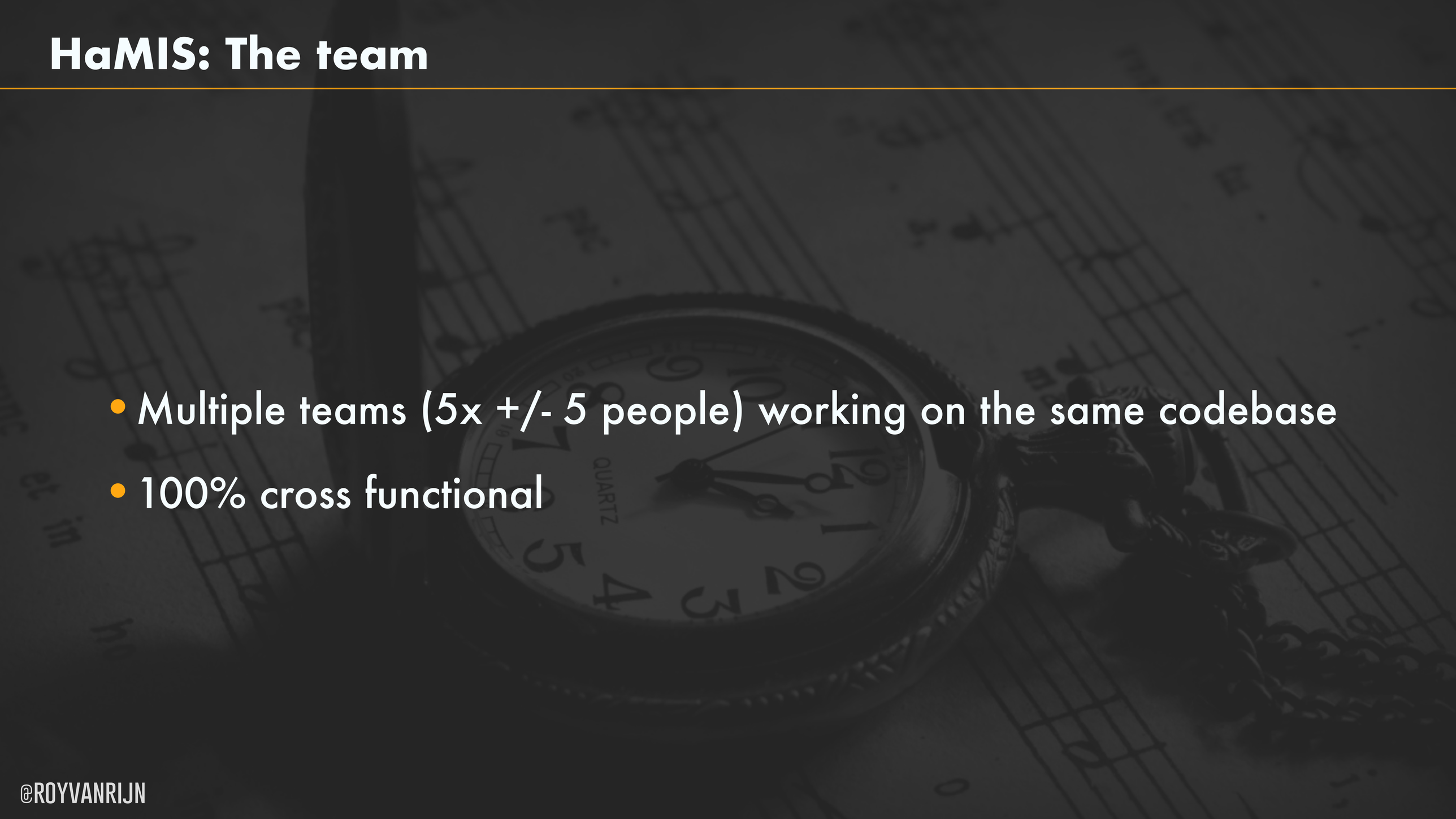
The history of HaMIS

- Another party: Sprint 100
- More and more users and epics
- Application grows and grows

The history of HaMIS

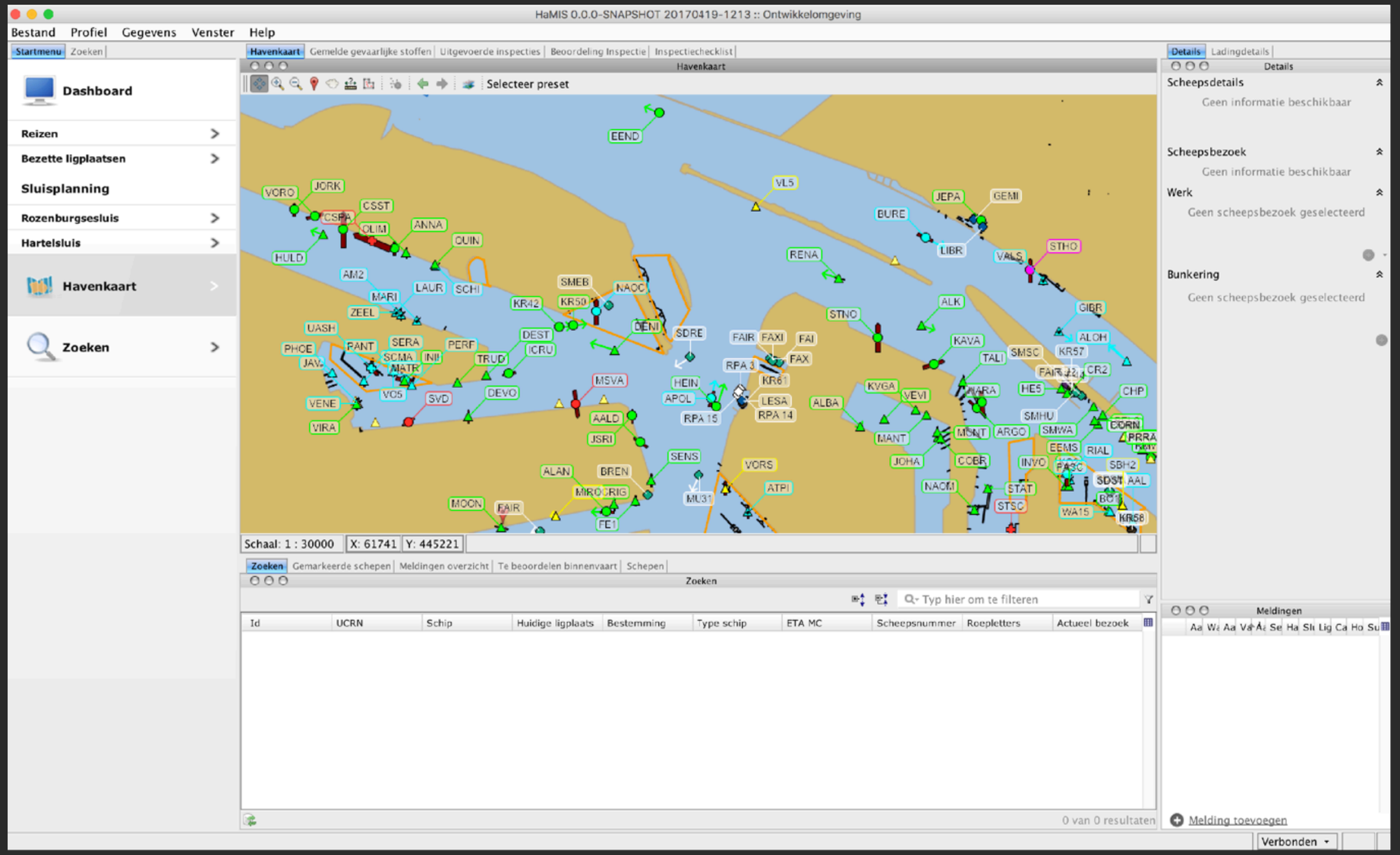
"We need microservices!"

HaMIS: The team



- Multiple teams (5x +/- 5 people) working on the same codebase
- 100% cross functional

Technical details: HaMIS



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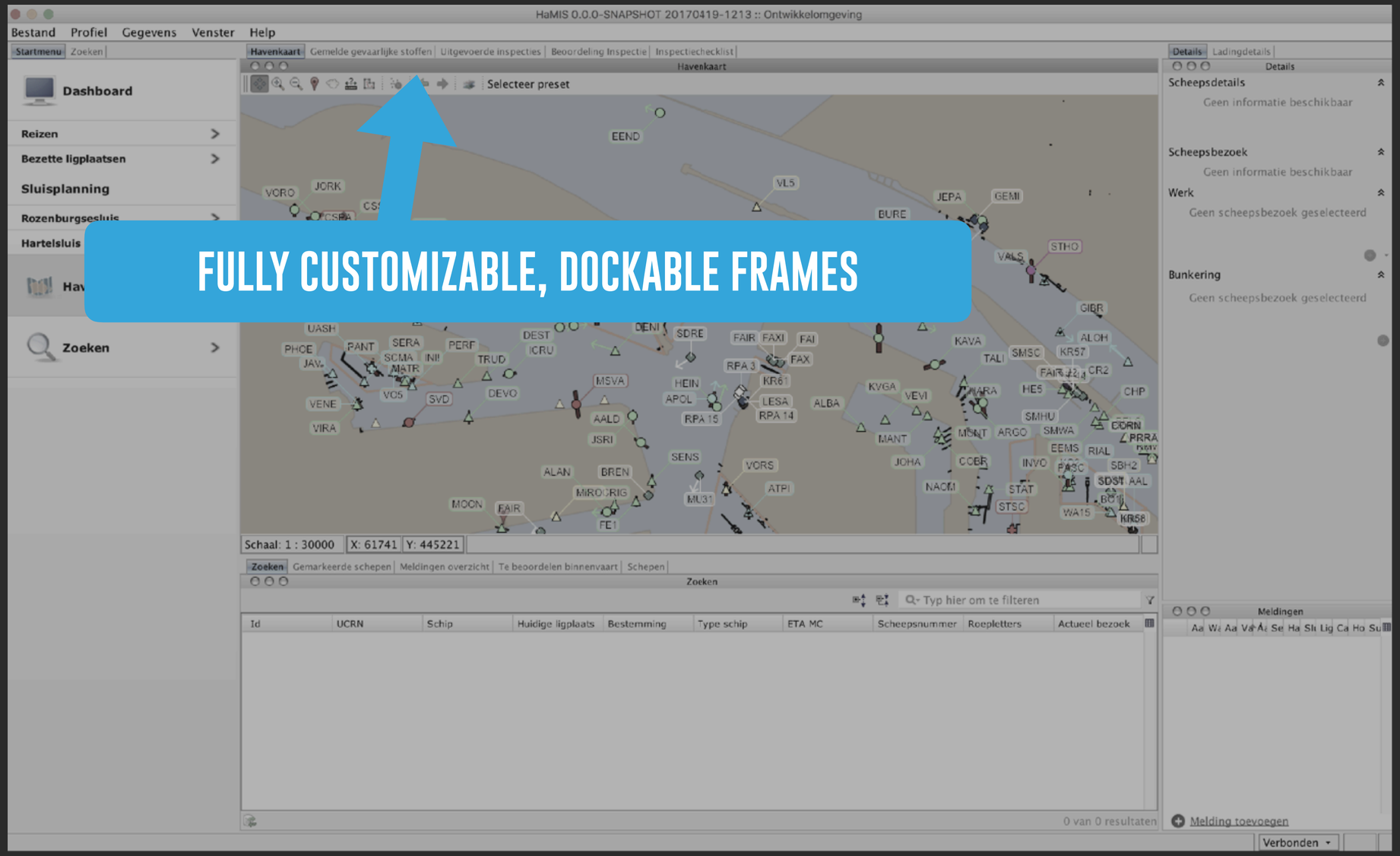

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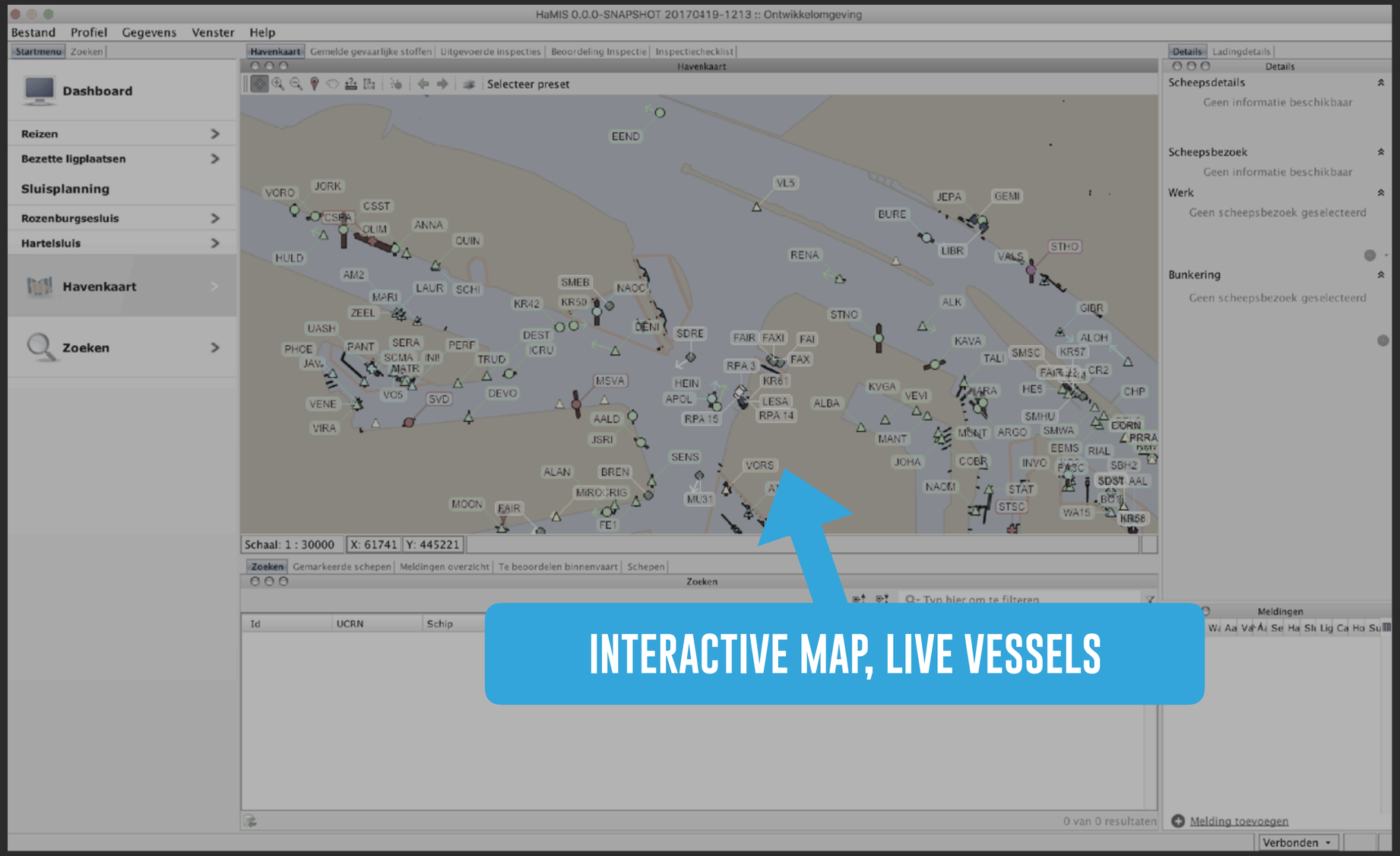

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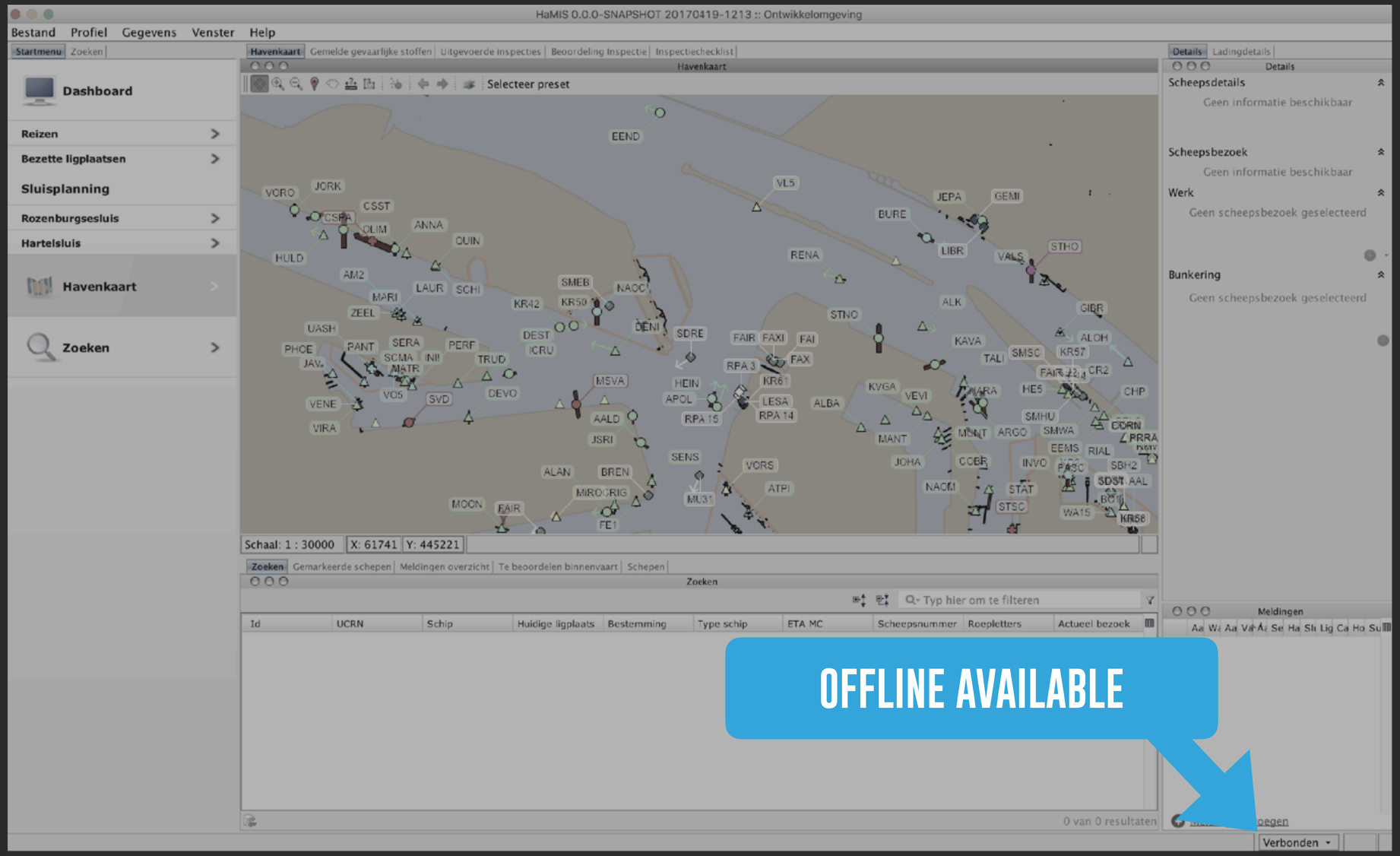

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Technical details: HaMIS

- Frontend:
  - Java WebStart, cached locally
  - JIDE ‘docking framework’, Swing panels
  - Communication to backend: Hessian

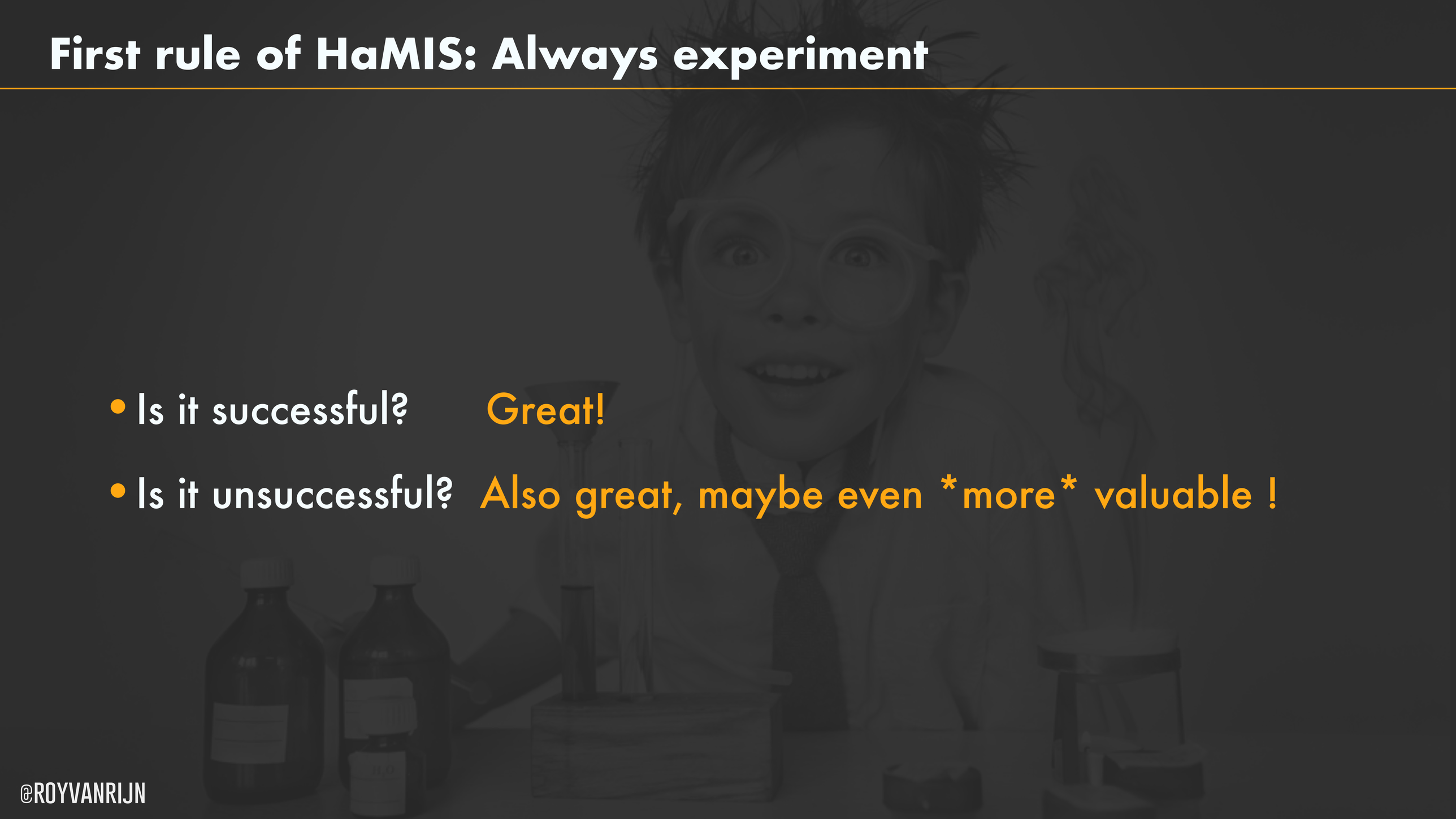
Technical details: HaMIS

- Backend:
  - Java EE, running on JBoss AS > WildFly 10
  - Two nodes, shared state: Hazelcast
  - Oracle database with Hibernate

Lessons learned

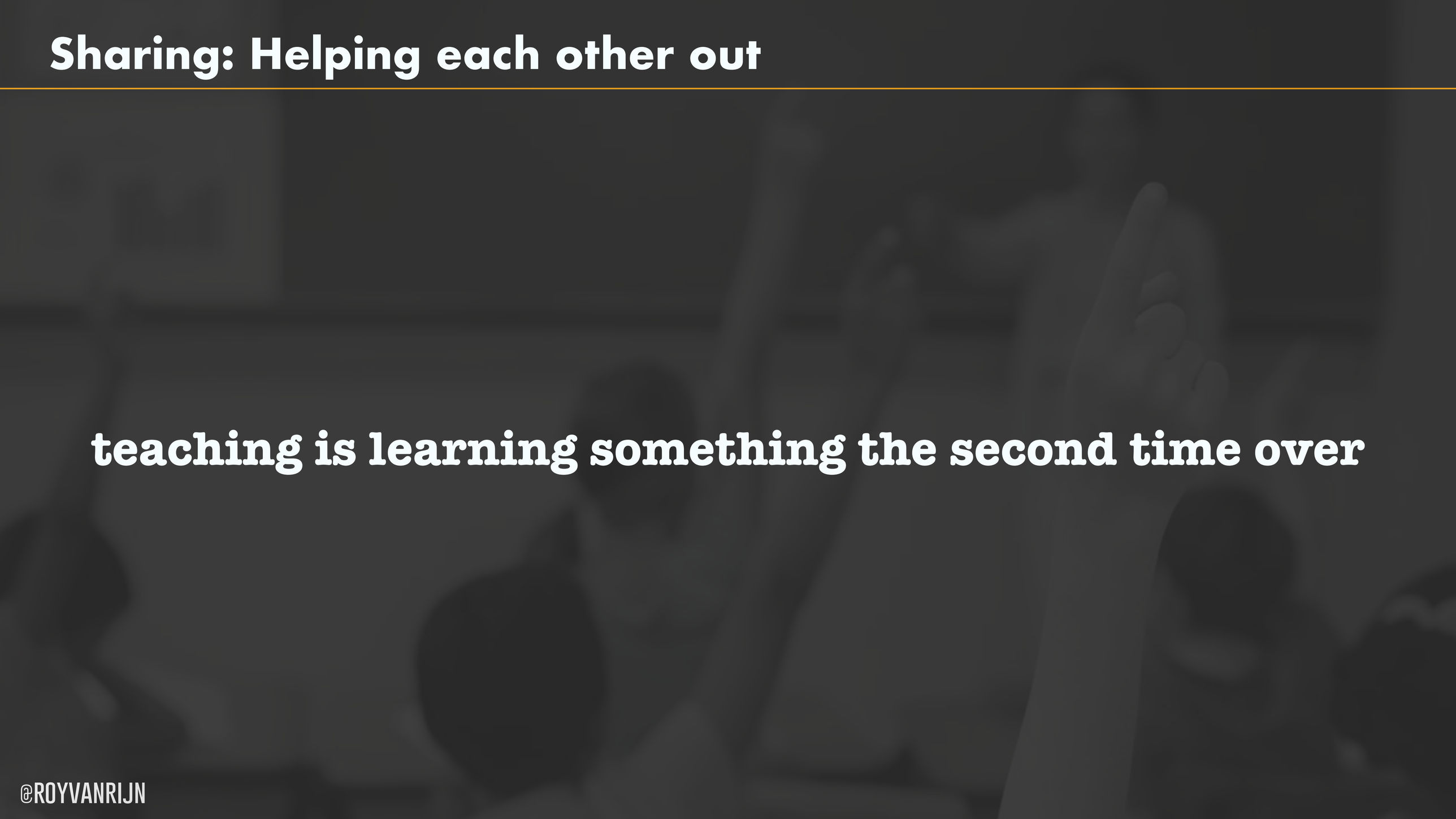
1. Teaching is learning
2. Bureaucracy
3. Being agile
4. Technical debt
5. Evolving architecture
6. Self-organising teams
7. Microservice transition
8. Team dynamics
9. Cargo cult
10. Survivorship bias

First rule of HaMIS: Always experiment



- Is it successful? Great!
- Is it unsuccessful? Also great, maybe even *more* valuable !

Sharing: Helping each other out



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Bureaucracy

Bureaucracy is compensating for incompetence and lack of discipline

– Jim Collins

Bureaucracy is about trust

Freedom needs trust

Trust gives freedom

Spiral of bureaucracy

- Project grows, more actors, more functionality
- Complexity creeps in
- Need to ‘manage' the complexity
- Rules, paperwork, standardised procedures
- Creativity decreases, responsibility decreases… bureaucracy.

– James C. Collins

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Agile vs agile

- Scrum is a set of best practices
- Don’t just follow the rules, apply where needed
- Ask yourself: Why are we doing X?

don’t do Agile, be agile

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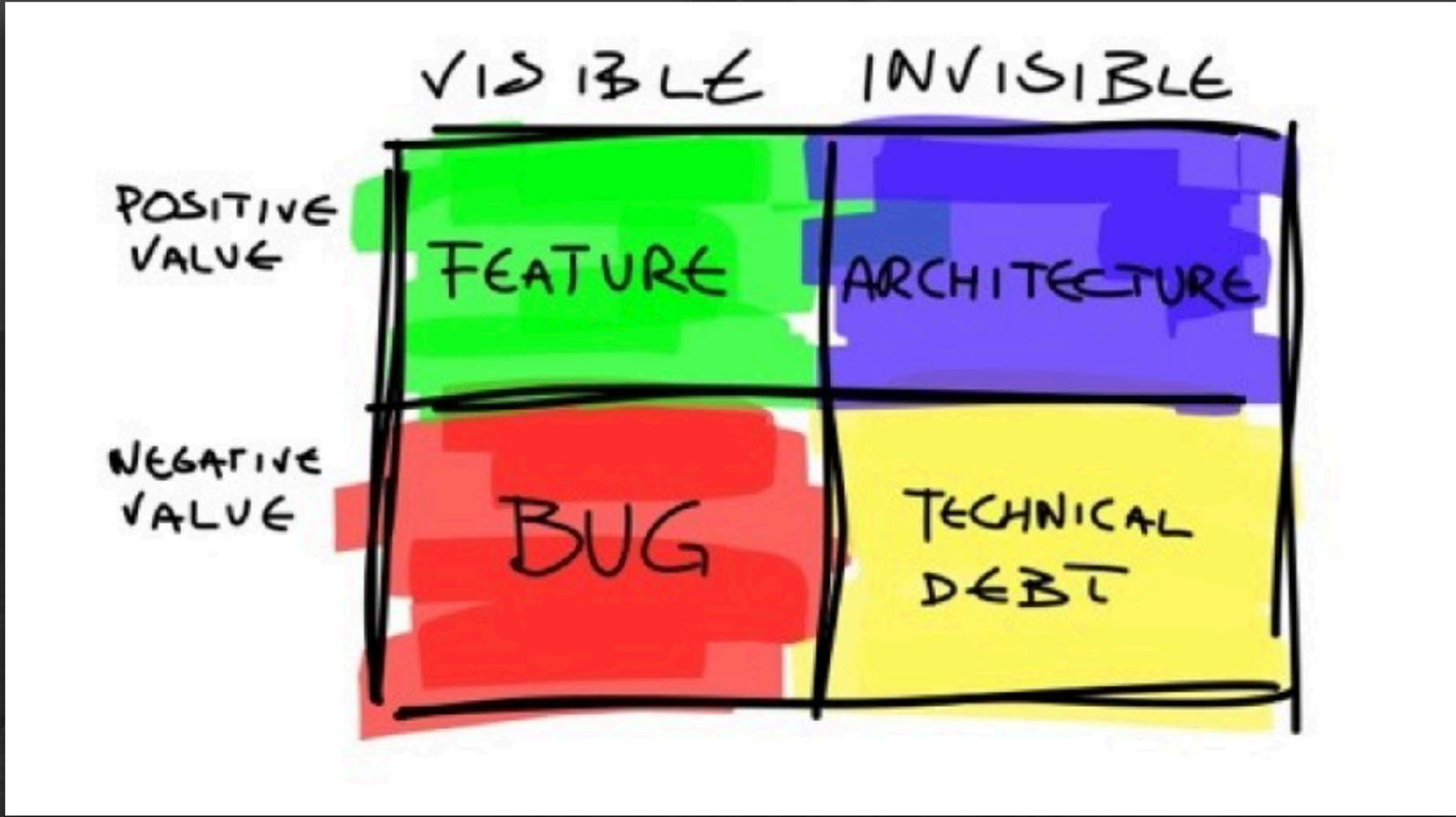
Technical debt



Spiral of Technical debt

- Velocity goes down
- Take shortcuts
- Focus on functionality instead of quality and architecture
- Velocity decreases even more
- Take more shortcuts (etc etc)

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Software architecture

- Software architecture is about making fundamental structural choices which are costly to change once implemented
- Better: Always try to design for change

- Wikipedia
- Viktor Grgic

Software architecture

- Just in time architecture, find the last responsible moment
- Decisions up front are often made with limited knowledge
- Do the simplest thing that could work

- Mary Poppendieck
- Barry Boehm

Software architecture

- Let every line of code you write be part of an evolving architecture
- Architecture is about code, not documents

Architecture, shared responsibility

- When firing the architects, we spared no-one
- Architecture became a shared responsibility

Architecture, joined effort

- Architecture tribe to brainstorm and create a vision
- Team members convinces the PO to prioritise ‘debt' and tech stories
- Code Camp sessions: spread the vision

We need someone...

- Who organises the tribe meetings and code camps?
- What if there is a stalemate?
- Who keeps spreading the vision?
- Who handles all the questions from outside the project #shitfilter

We do need someone for this... lets call him/her: the ARCHITECT

Modern/servant architect

- Acts as glue between teams
- Is free to think about issues unrelated to current affairs/epics
- Asynchronous buffer between:
  - The teams
  - Management and teams

#shitfilter

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Self-organising teams

- Self organising teams are *great*
- If you want something: make it happen, you have the freedom!
- BUT: Shared responsibility often means no responsibility

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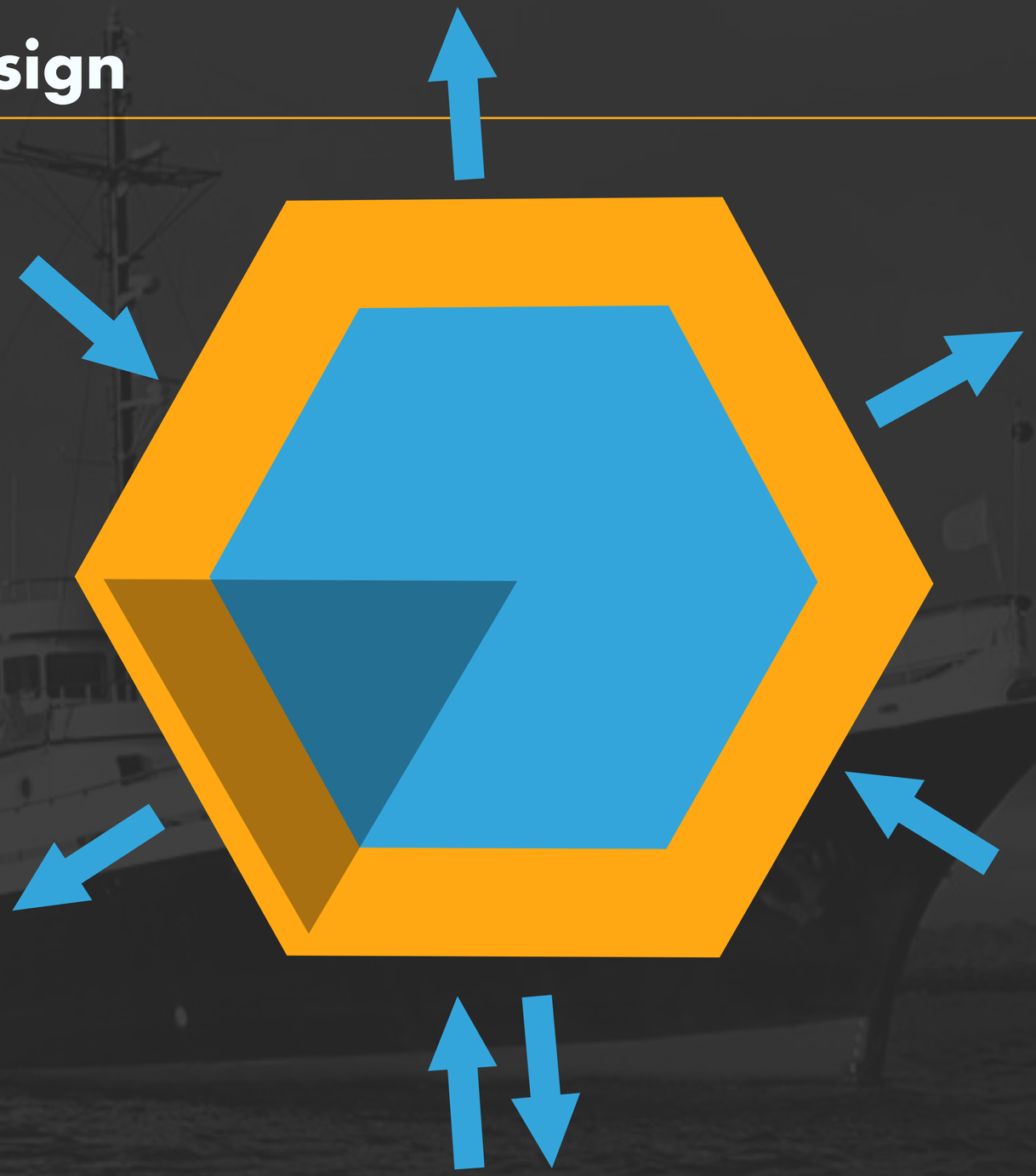
Microservices at HaMIS

- Problems:
  - Deployment cycle took way too long
  - Stuck with old technology, Swing and one big pile of EJBs
  - HaMIS is no longer sexy...

Design evolution

- Three-tier design
- Hexagonal design
- Microservices

Hexagonal design



Microservices at HaMIS

How do we make a smooth transition?

Microservices at HaMIS

- Frontend:
  - Replace JPanels with JXBrowser running Angular/HTML 5
- Backend:
  - Cut from monolith, place in microservice
  - Oracle database, migrate to separate schema

Microservices at HaMIS

- 30+ backend microservices (WildFly, Spring Boot)
- 14+ Angular projects (NGINX with Angular 2)
- 1 leftover frontend

Microservices at HaMIS : Hosting

- Everything is running on KPN AppFactory
- Which is: Kubernetes

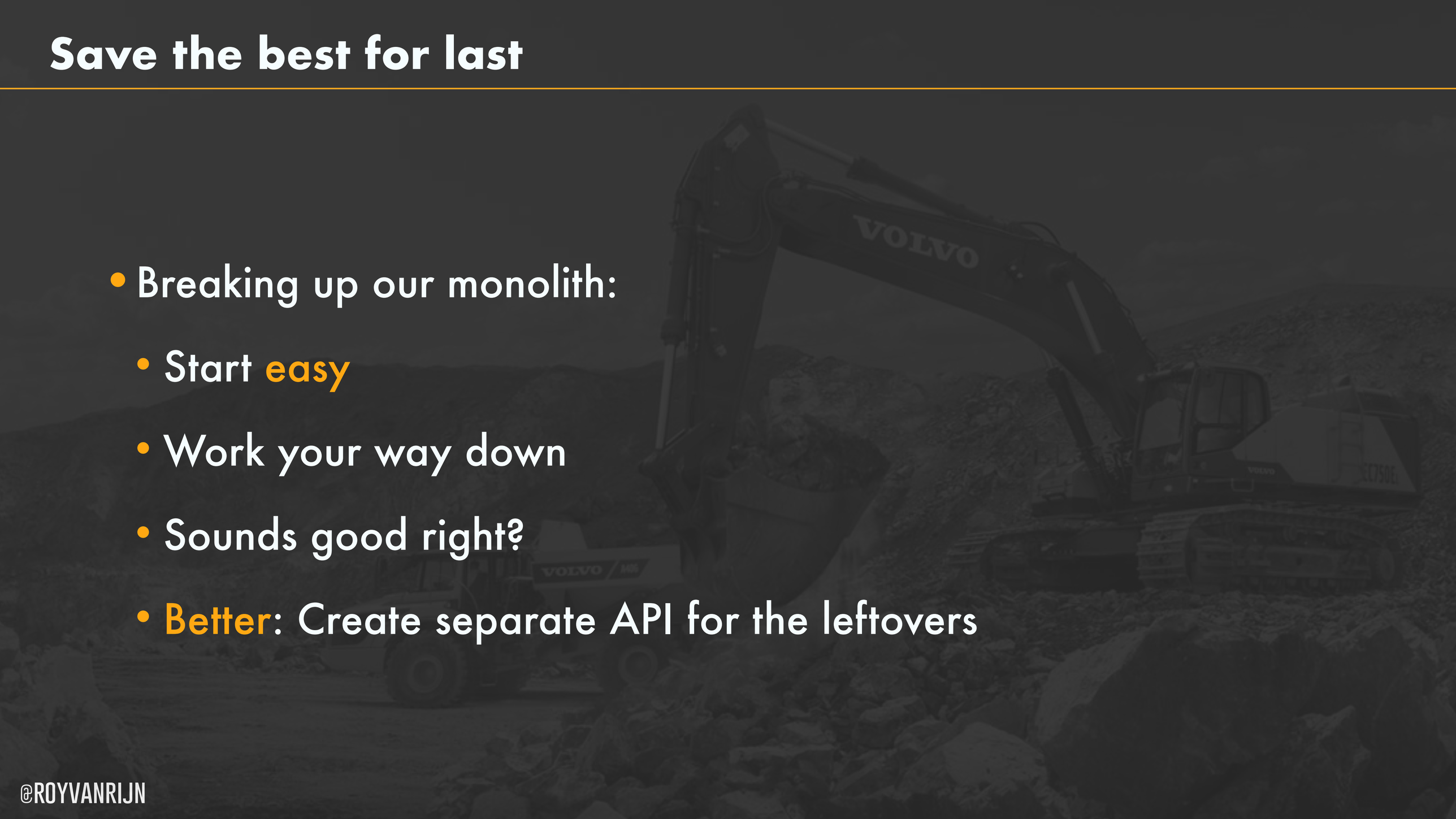
Freedom of technology

- Teams are picking their own technology
  - Good: Freedom, creativity and state of the art technology
  - Bad: Microservices deteriorate much faster…

Drawbacks in teams

- More drawbacks:
  - Code is being duplicated/copied
  - Monitoring microservices is (MUCH) harder
  - Coding styles are diverging

Save the best for last



- Breaking up our monolith:
  - Start easy
  - Work your way down
  - Sounds good right?
  - Better: Create separate API for the leftovers

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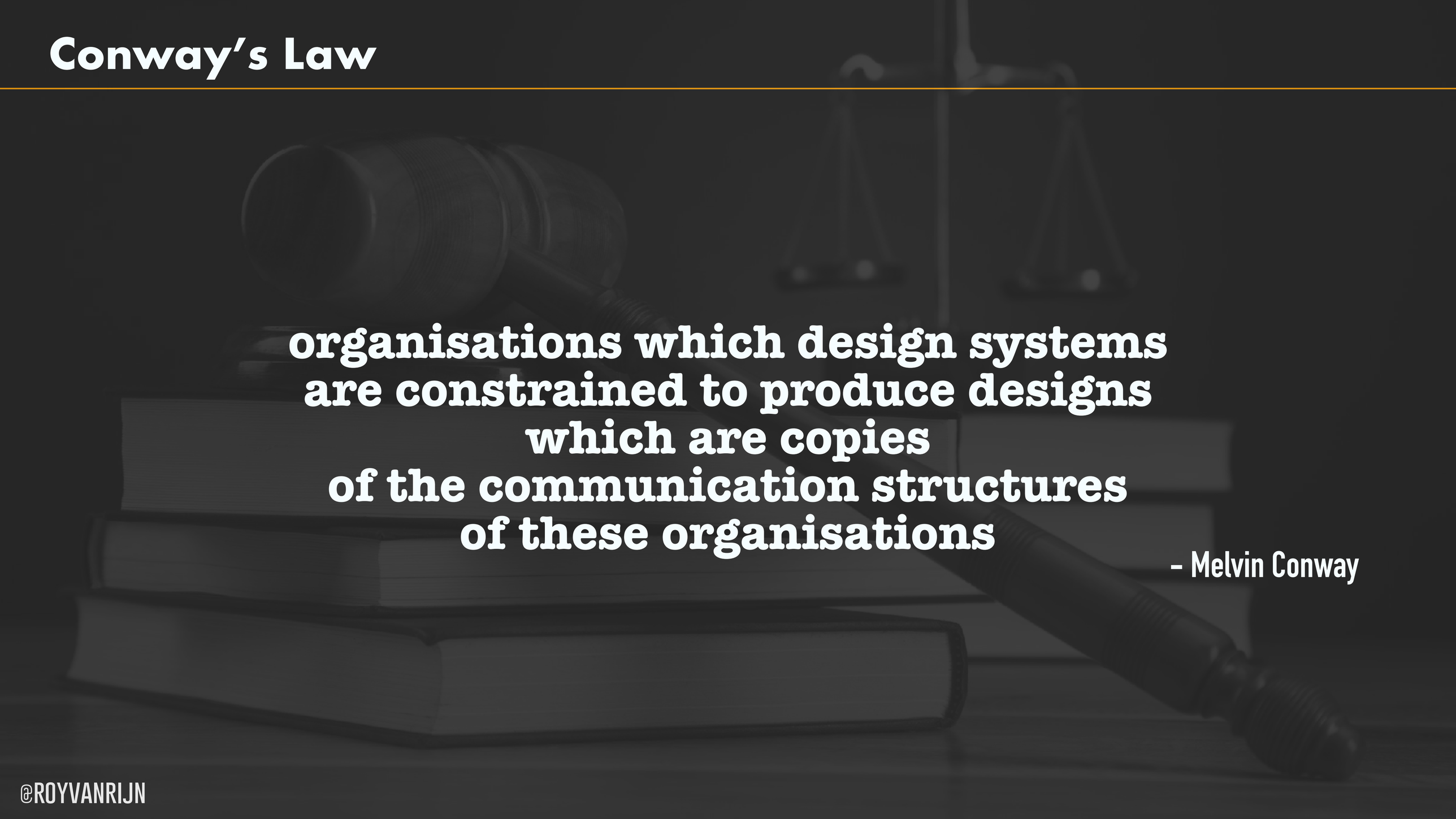
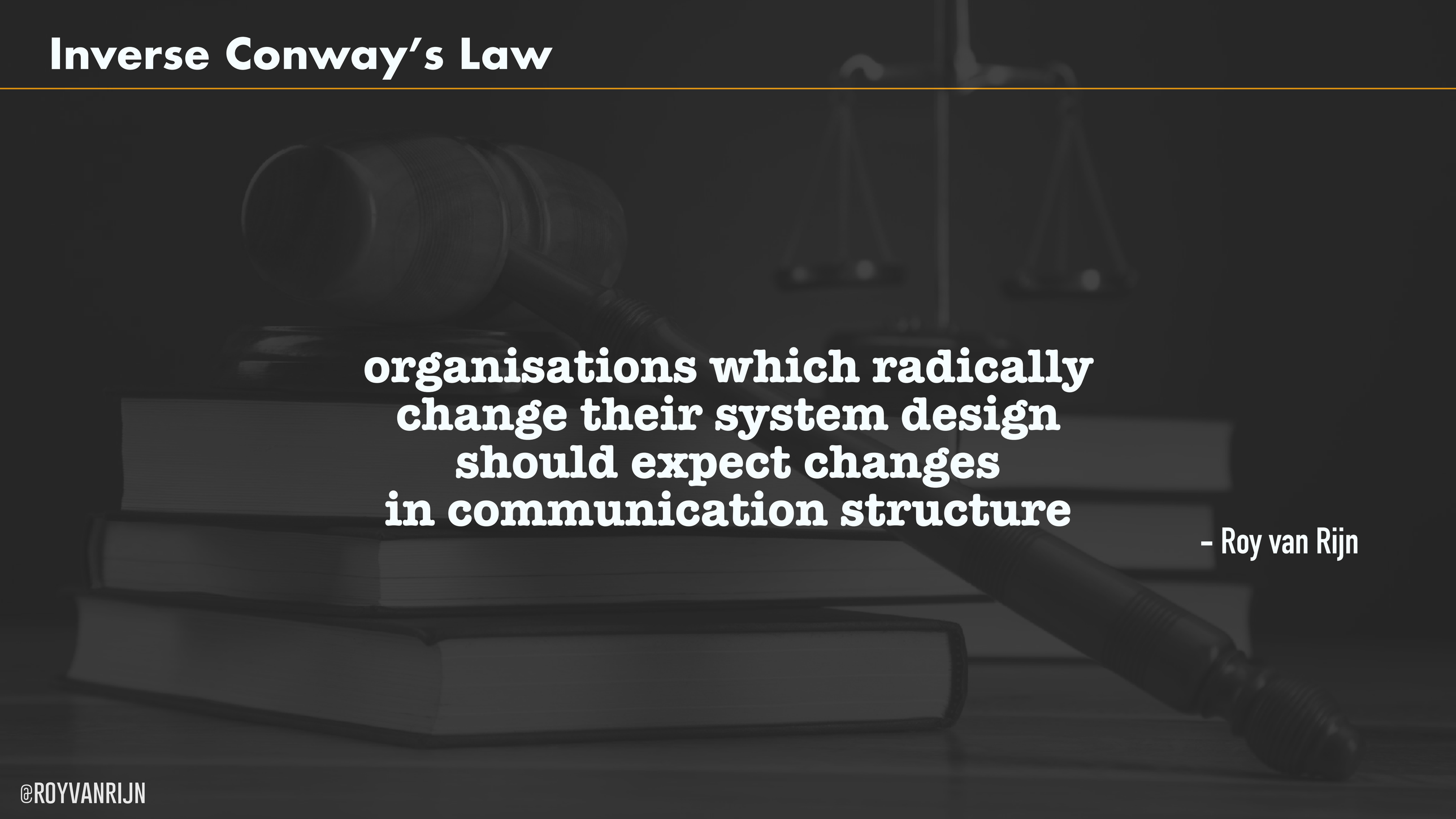
Conway's Law



**organisations which design systems
are constrained to produce designs
which are copies
of the communication structures
of these organisations**

– Melvin Conway

Inverse Conway's Law



organisations which radically change their system design should expect changes in communication structure

– Roy van Rijn

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Cargo cult, the origins

Cargo cult in IT


Spotify does X


Spotify is successful


We don’t do X


If we do X too, we’ll be successful!

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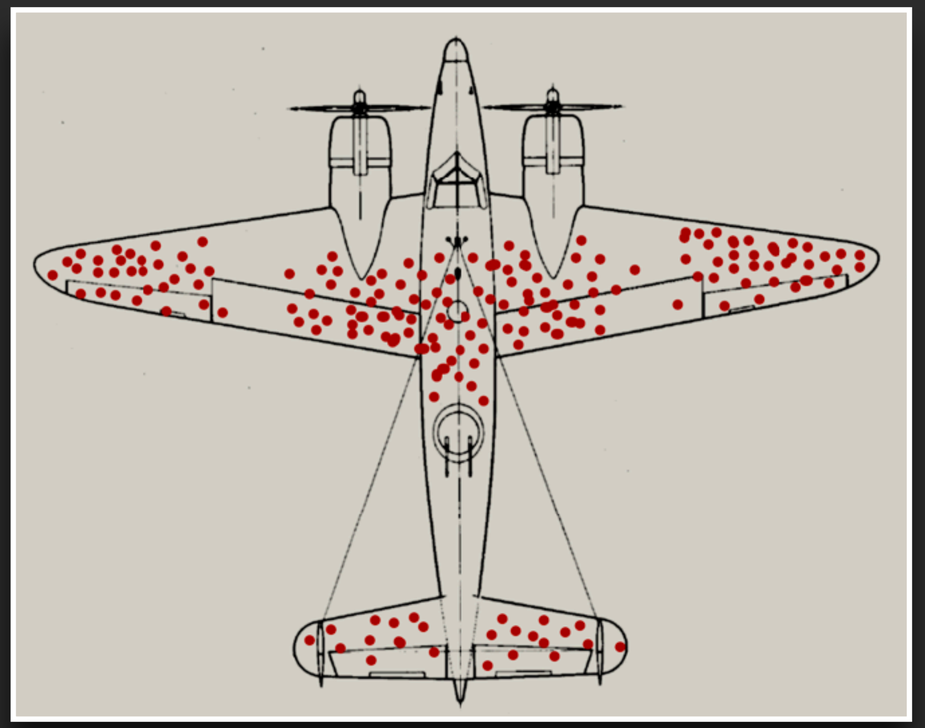
Survivorship bias, two examples



Survivorship bias in IT/conferences

I went to a conference and heard six talks about successful microservice projects

1. Nobody talks about failed projects using microservices…
2. There are more successful projects not doing microservices

HaMIS timeline

2004 2006 2008 2010 2012 2014 2016 2018 PRESENT

Sprint 231

99 problems...

- Big scary refactorings are left unfinished
- No clear vision about the frontend and the product(s)
- Scaled Agile Framework (SAFe) and LeSS are not friends

The future

- But we'll be okay…
- We'll keep evolving!

IF YOU HAVE

QUESTIONS OR ANSWERS

RAISE YOUR HAND