How to Become A Great Software Architect

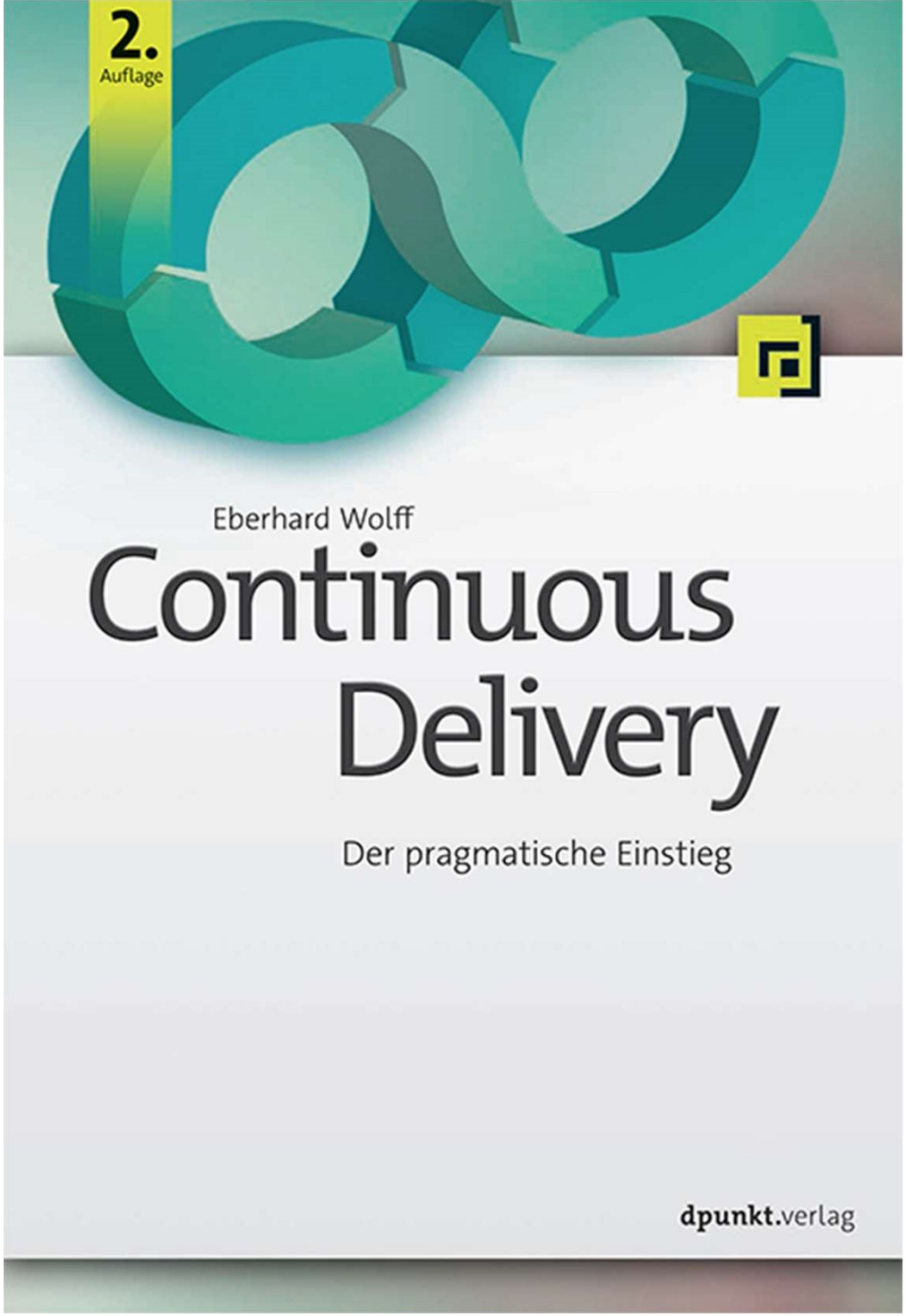
Eberhard Wolff

Fellow

INNOQ

@ewolff

http://ewolff.com



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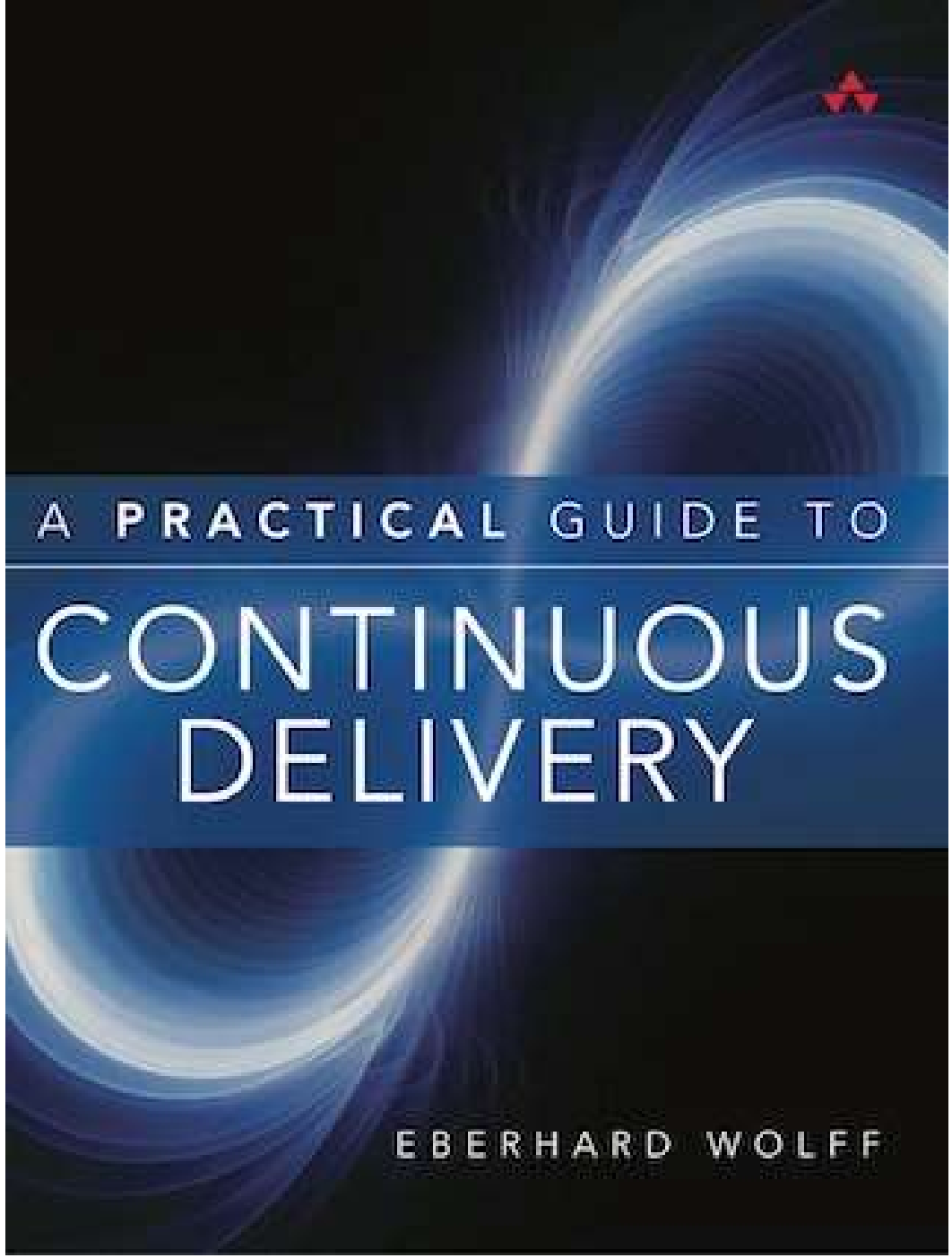

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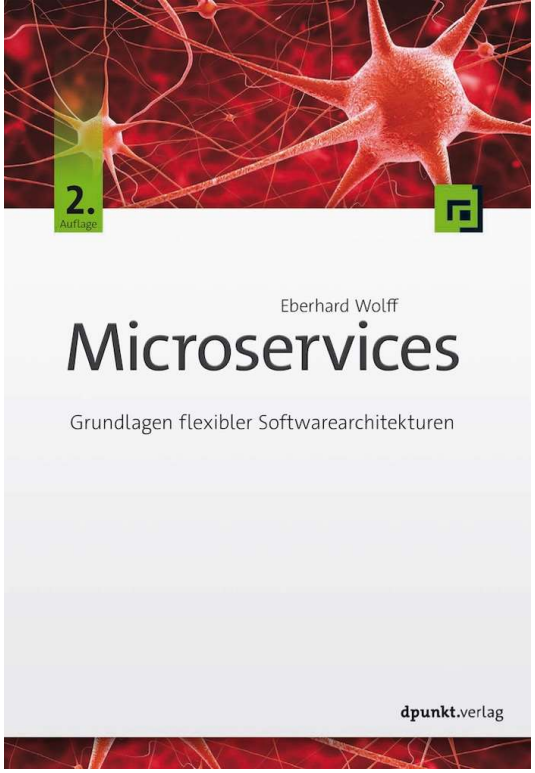

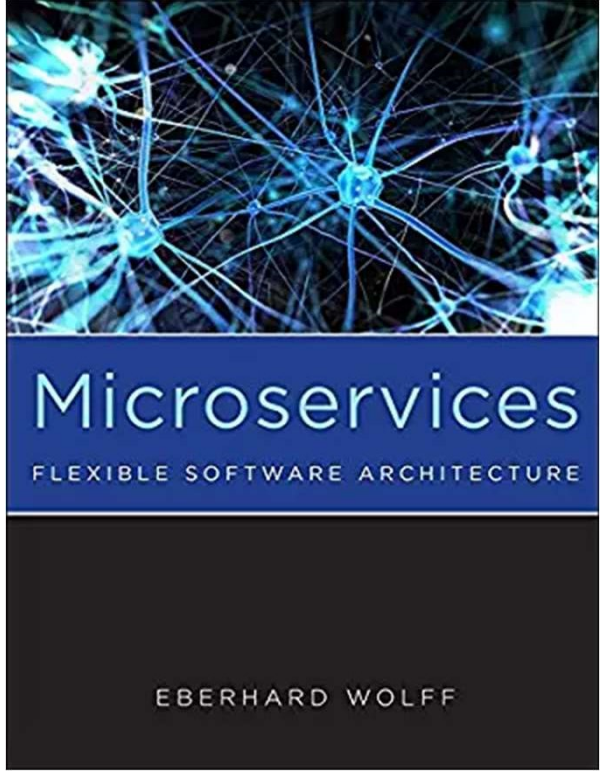

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Eberhard Wolff

Microservices

Ein Überblick

Eberhard Wolff

Microservices Primer

A Short Overview

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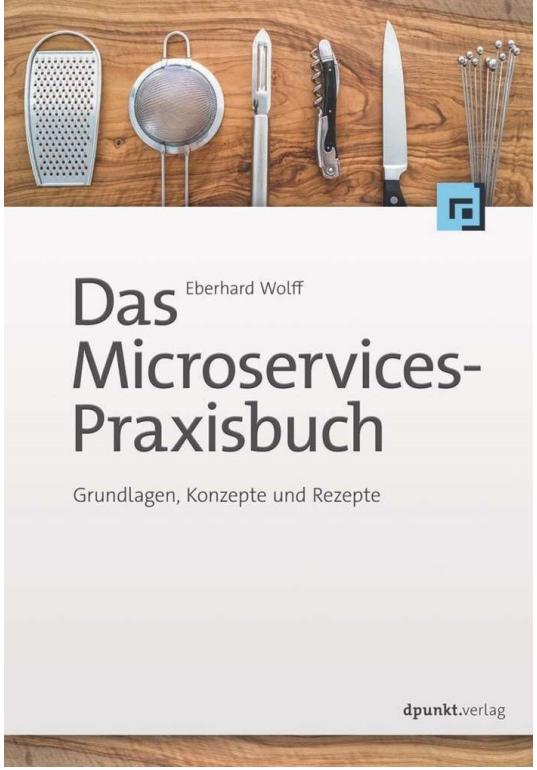

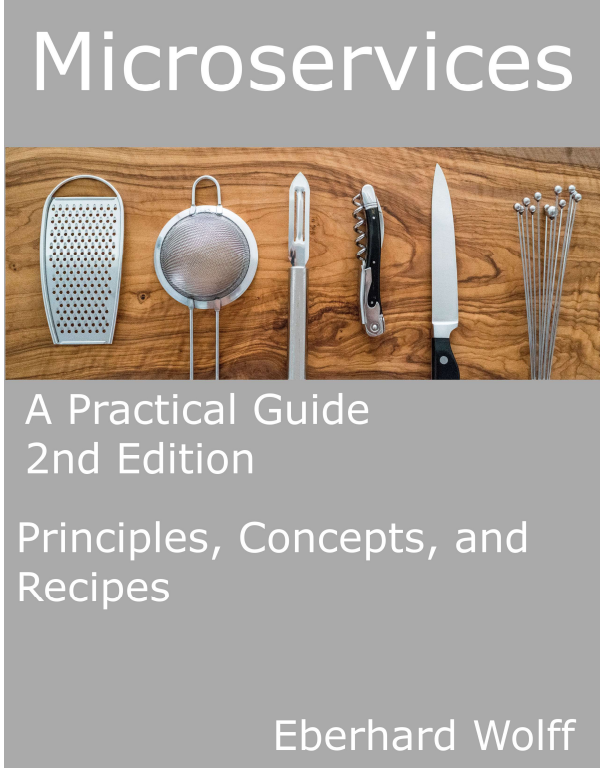

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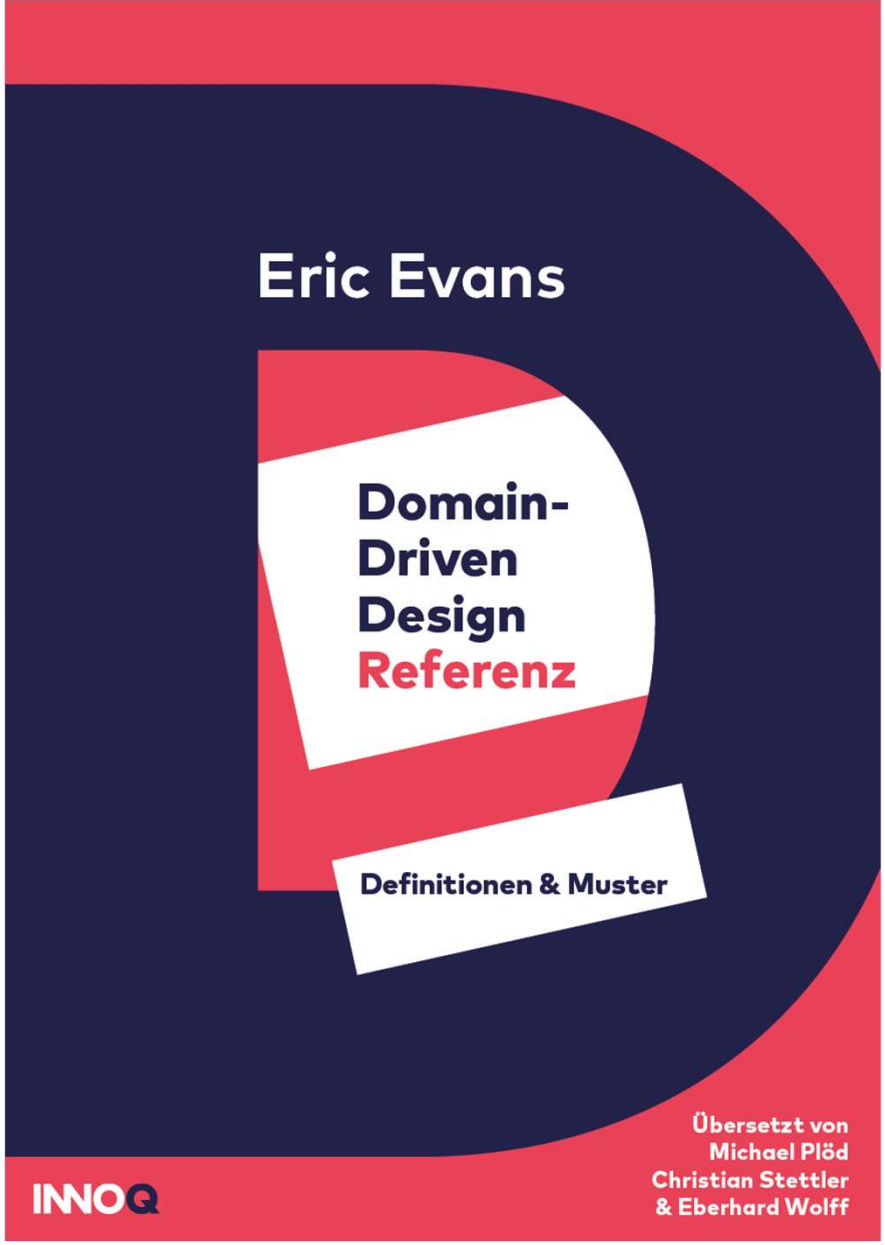

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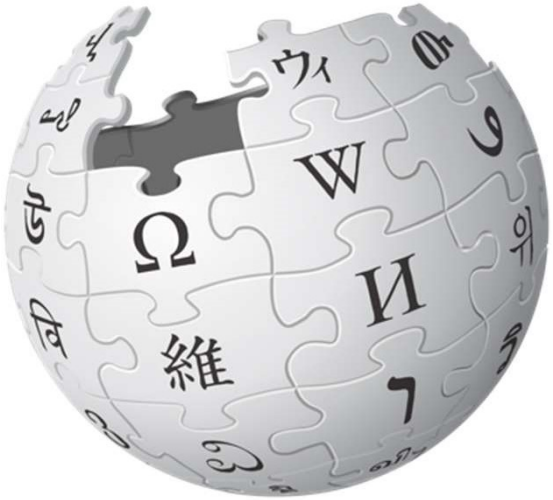
International Software Architecture
Qualification Board

https://www.isaqb.org/

What is Software Architecture?

Wikipedia



- Software architecture =

  high level structures

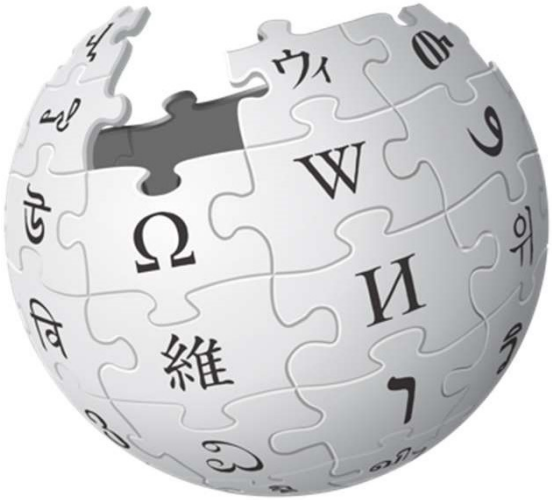
- Structure =

  Software elements +

  Relations among them +

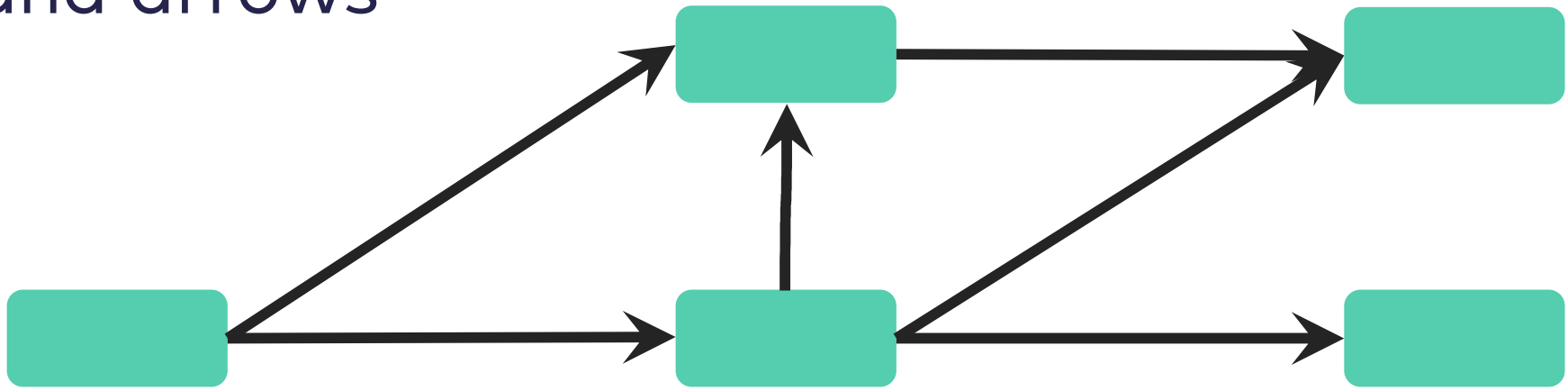
  Properties of elements and relations

Wikipedia



- Software architecture = structures
- Boxes

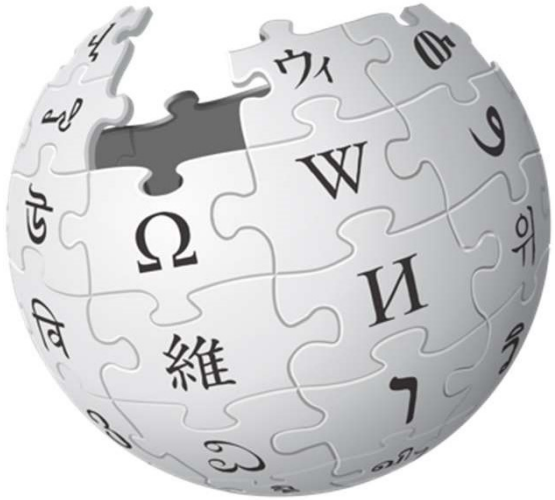
... and arrows



Wikipedia

- Common definition of architecture

...but does it catch all?



Architecture Fail?

- Software doesn't go into production

  Security problem

  Compliance problem

- Fail caused by structure?
- Successful architecture?

Martin Fowler

- Software architecture =

Important

and hard to change decisions

- How to know in advance?

Photo: Webysther Nunes

Software Architecture

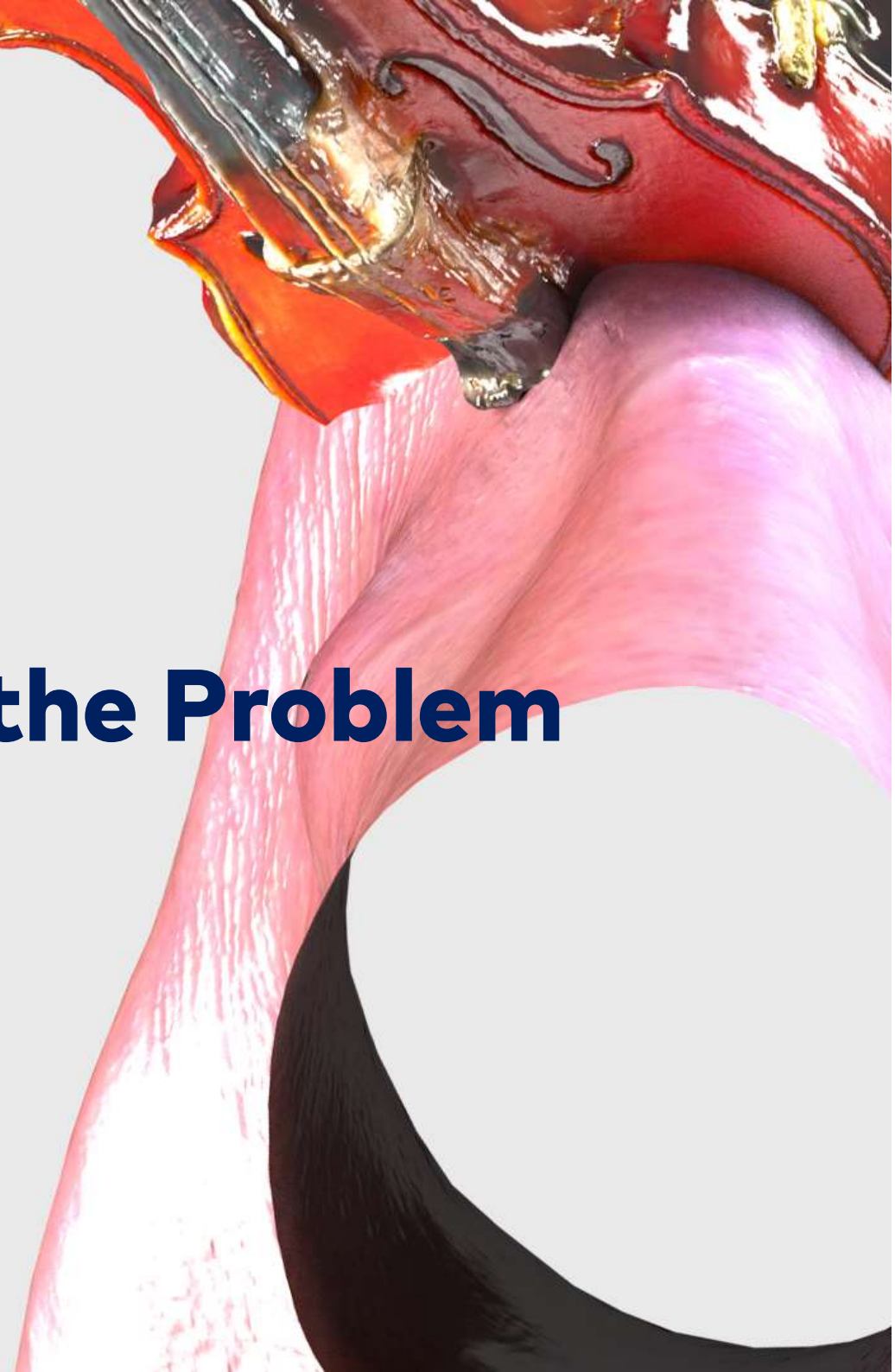
- Find technical solutions

...to the problem at hand.

- Home-grown definition
- Broad definition

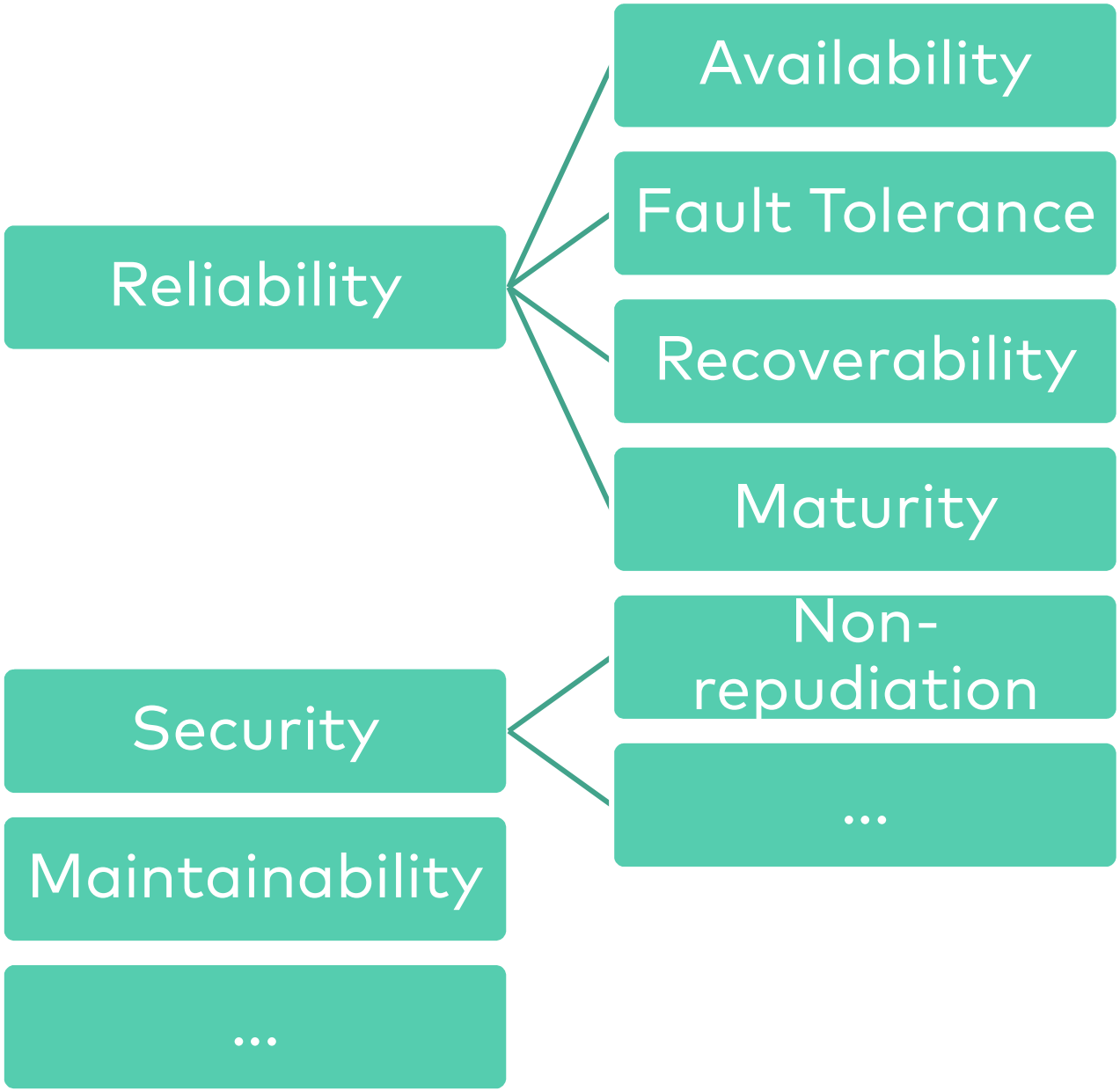
- Need to understand the problem!

Understand the Problem



Quality Attributes / Tree

ISO 25010



Structure only helps with maintainability

Quality Attributes

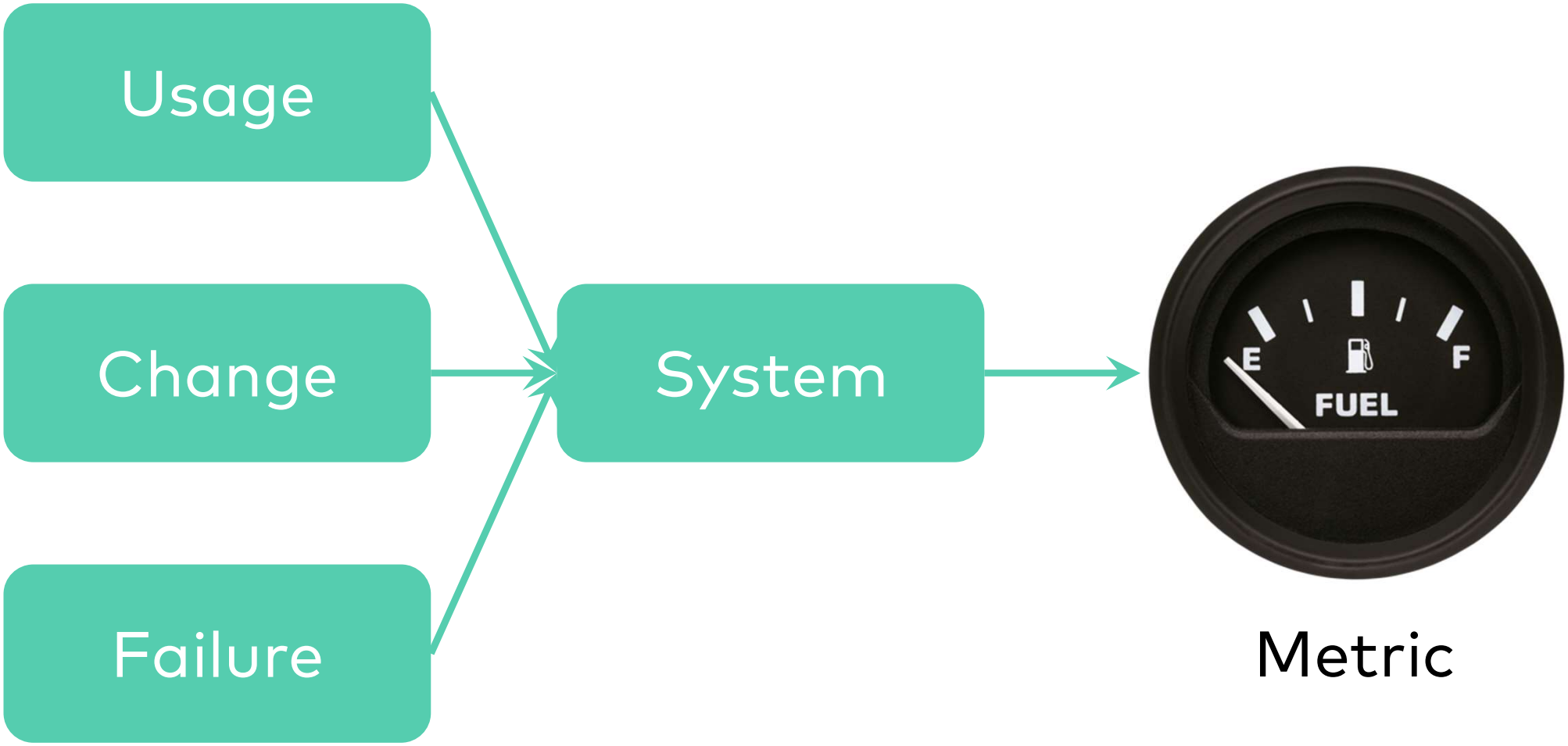
- Holistic view on quality
- Identify important attributes

- But

high-level

hard to verify

Quality Scenario



Event / Stimulus

Metric

Quality Scenario

- Concrete

- Easy to verify - metric

Usage Scenario

- Stimulus

  A new users registers

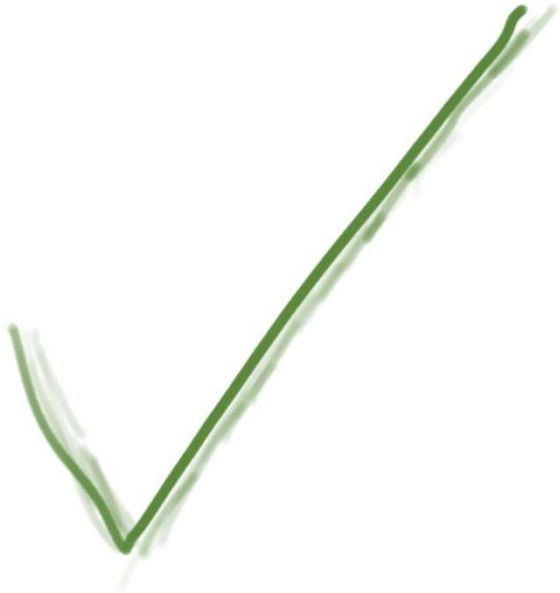
- Metric

  Only one in 1.000 users calls the hotline.

  Usability – Ease of Use

Usage: Solution

- Hire UX experts
- Usability tests



- No "classic" architecture work

Change Scenario

- Stimulus

  A new language / locale should be support

- Metric

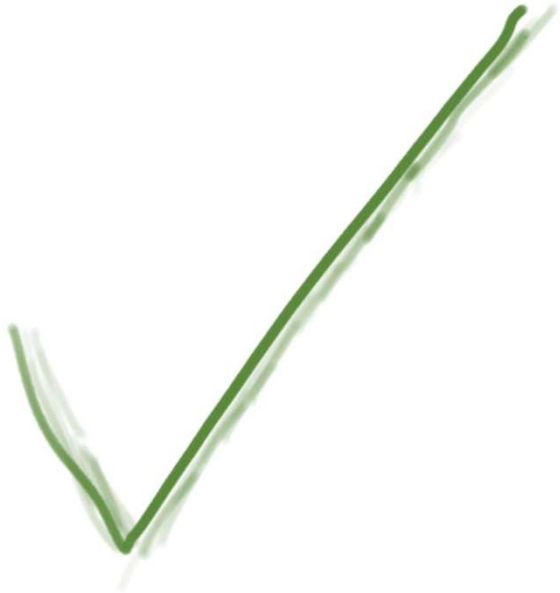
  No code modification needed.

  Takes two days

  Maintainability - Modifiability

Change Solution

- Configuration files for language



- Code quality irrelevant

Failure Scenario

- Stimulus

  A server crashes

- Metric

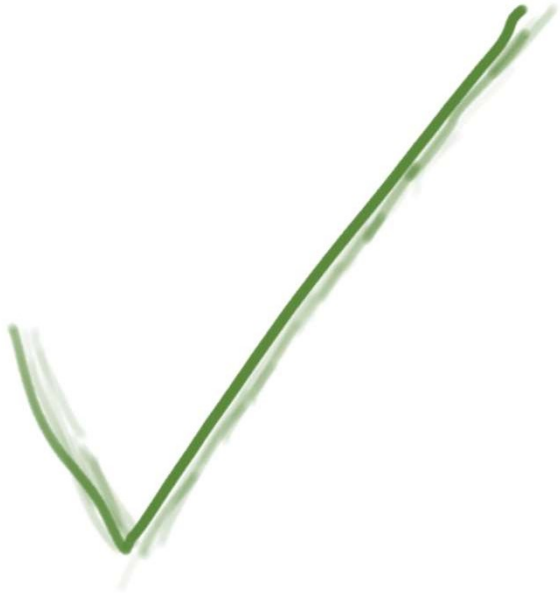
  System might be unavailable for two hours.

  No data might be lost.

  Reliability – fault tolerance

Failure Solution

- RAID
- Backup
- Data center in different locations



- No need for a cluster of servers

Solutions

- Solutions must solve problems.
- Traditional measures like

  high code quality,

  clean architecture,

  scalability,

  your favorite framework or language

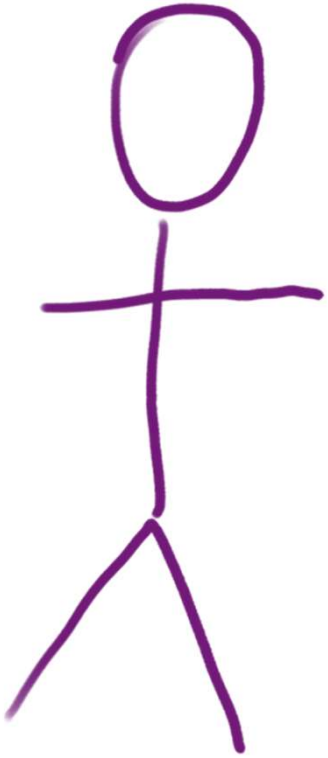
...solves none of the scenarios

Traditional Architect
vs.
Modern Architect

Traditional Architect

- A title

Modern Architect



- Architect does architecture
- A role

- Might be different persons
- Might change over time

- Might or might not have title “software architect”

Traditional Architect

- Most experienced technical person

Most Experienced Person

- For every detail?
- For every technology?
- Unrealistic

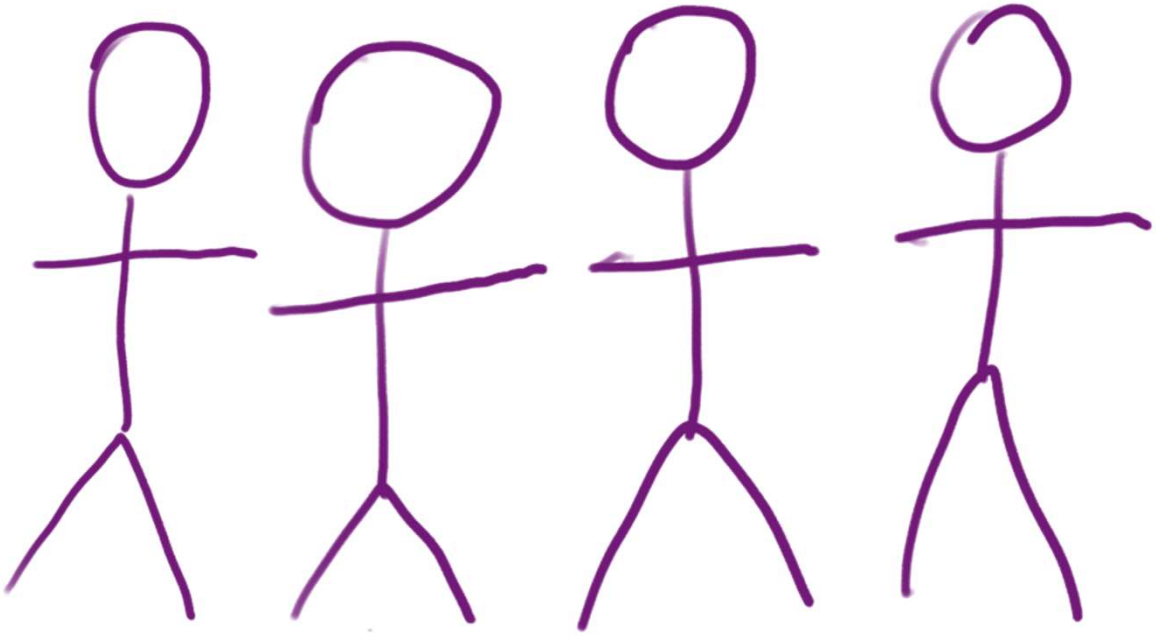
- Making all important decisions
- Puts enormous pressure on the architect.

- Why do you want to play such role?

Most Experienced Person

- Quite sad

- Use the technical expertise of the team
- ...and grow the team

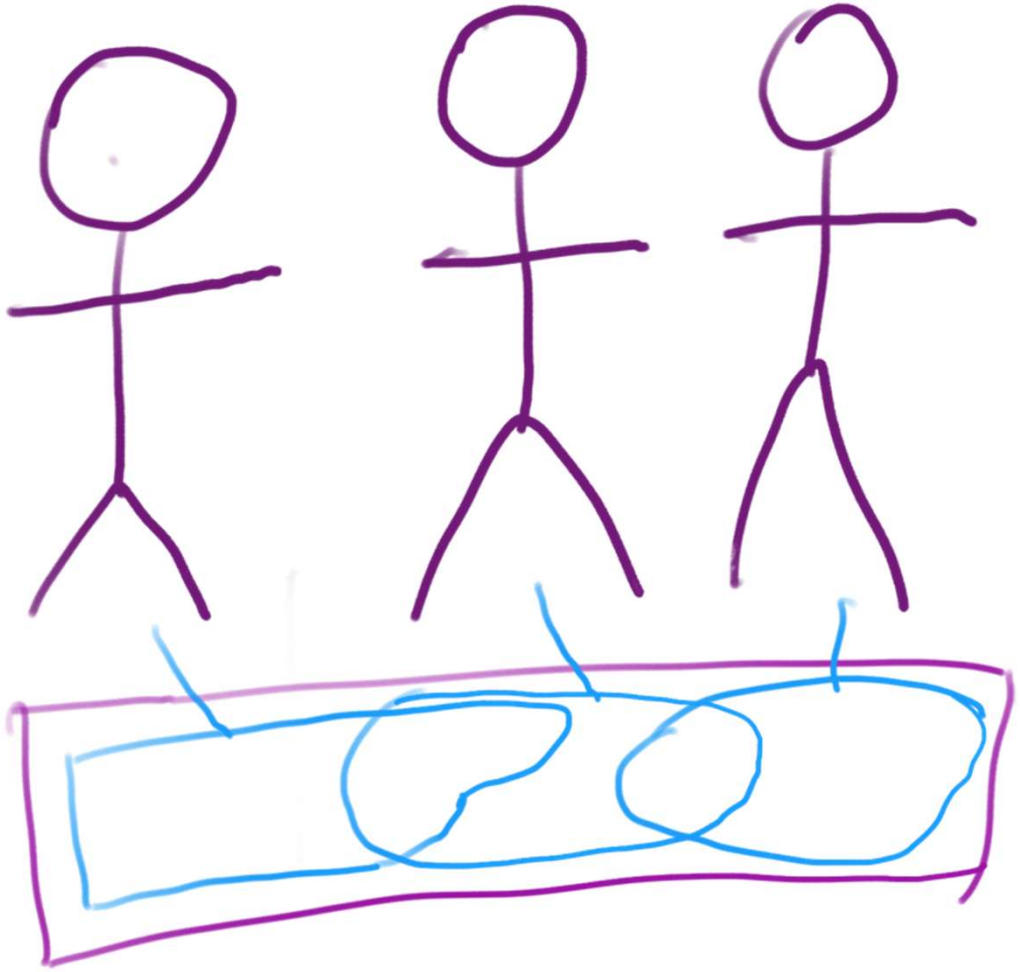


Traditional Architect

- Understand & guard whole system

Understanding the System

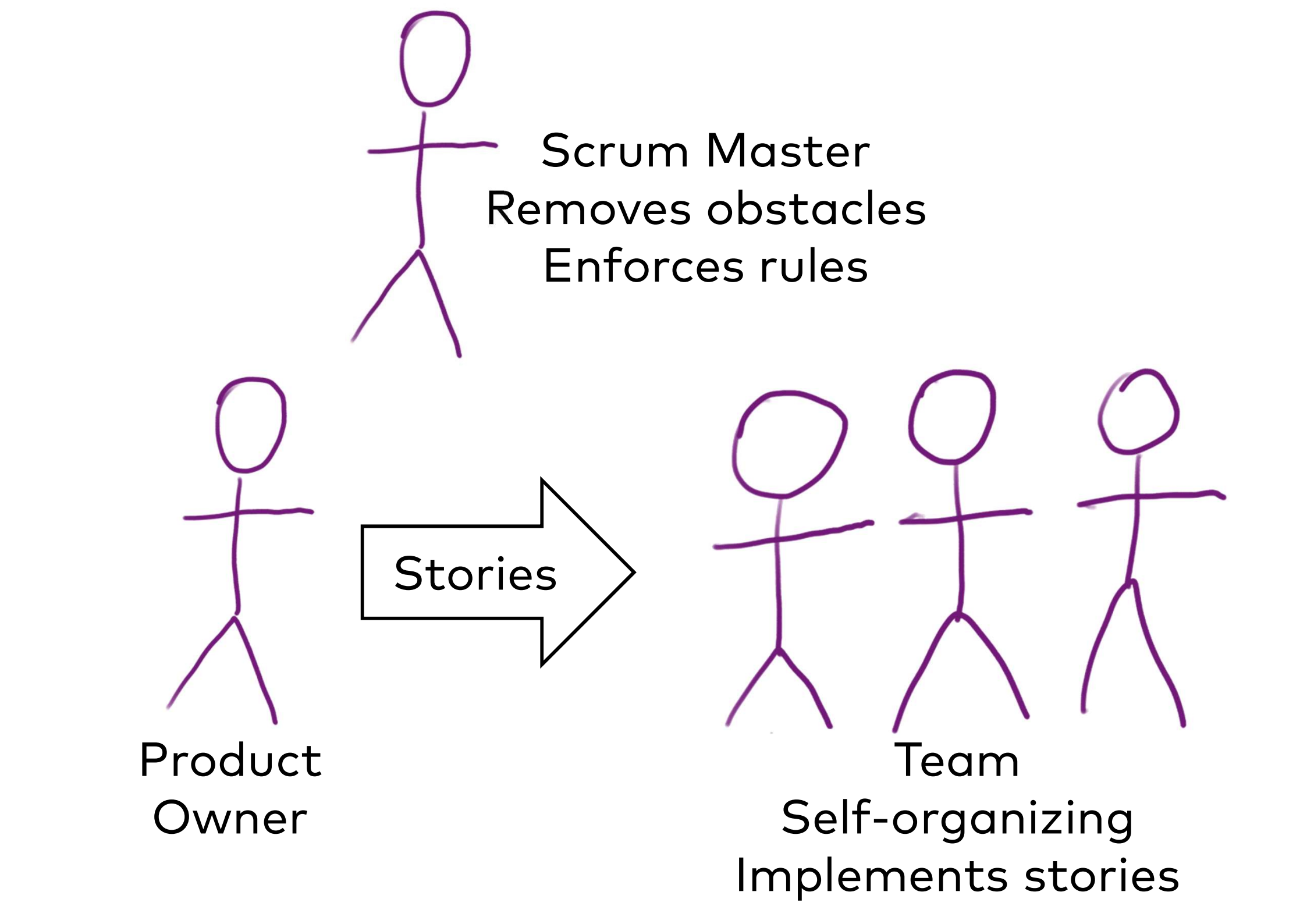
- Architects need to understand the system.
- Systems too large for one person.
- So use the expertise of the team.



Traditional Architect

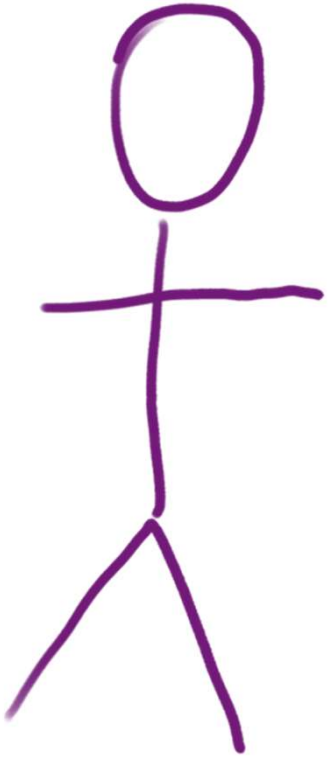
- Define the architecture
- i.e. make all relevant decisions

- Enforce the architecture


Scrum Master
Removes obstacles
Enforces rules
Stories
Product
Owner
Team
Self-organizing
Implements stories

Self-organizing Team

- Architect is “just” a team member
- No way to “enforce” architecture
- Actually, the team decides how to work.



- How can the architect define the architecture?

Traditional Architect

- Enforces the architecture

...but probably doesn't know whether it is truly implemented.

...because he / she can't understand the whole system.

- How do you architect if you can't understand the system?
- What is being "enforced"????

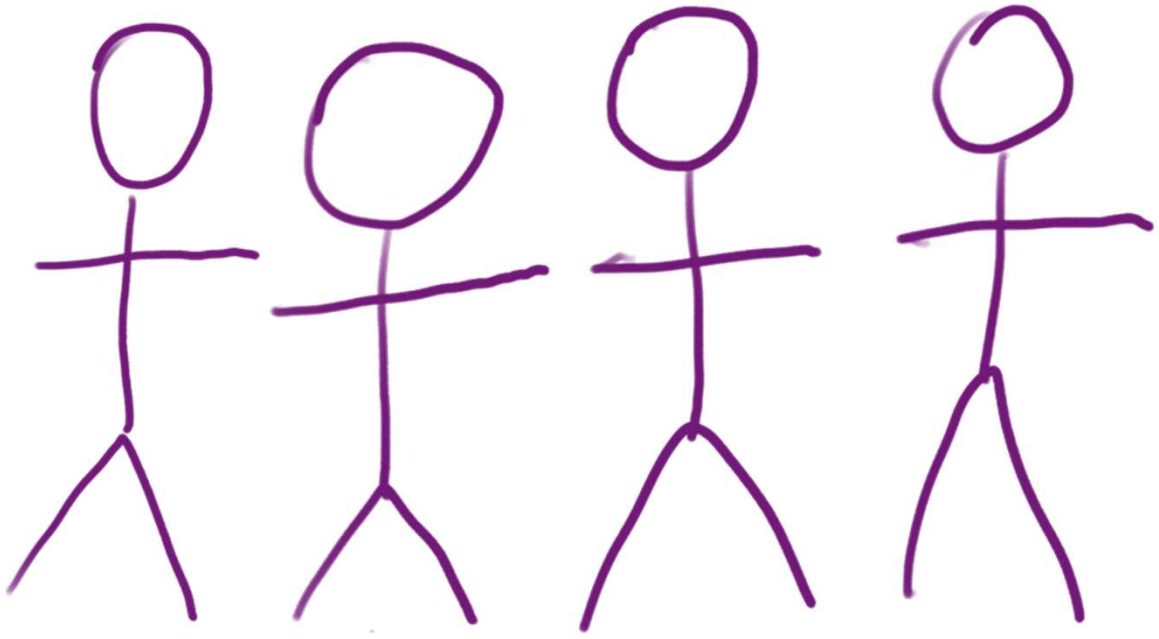
Ivory Tower

- Just because architects think they do architecture doesn't mean it has any impact.

- Information about issues might be wrong.
- Enforcement might be an illusion.

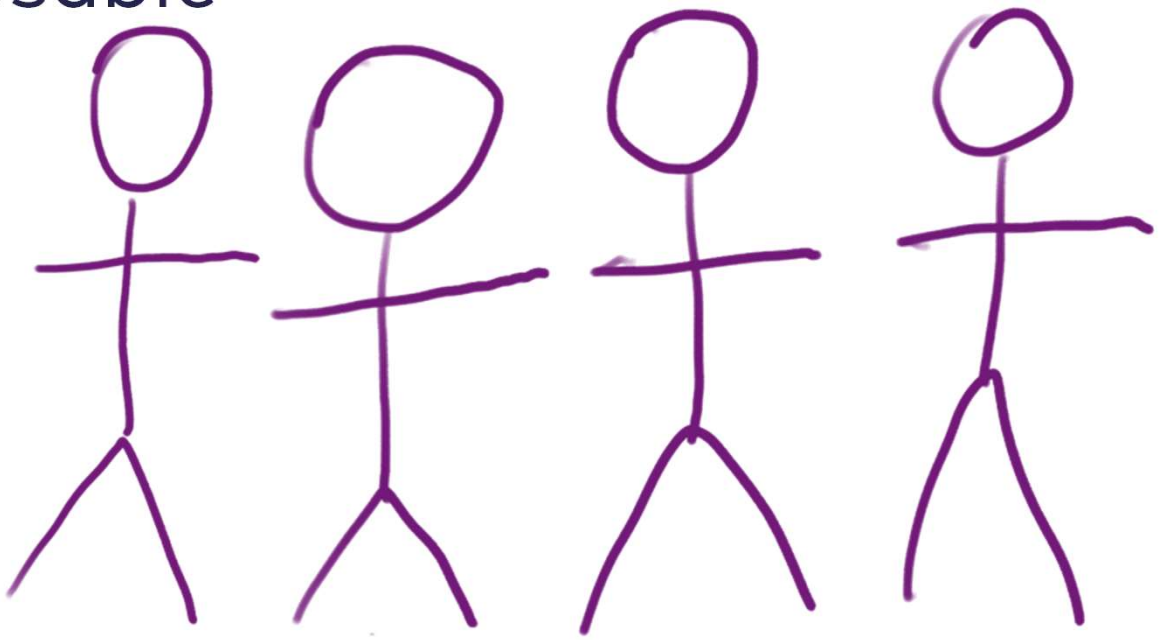
Technical Decisions

- Understand the team's problems
- Seek feedback about possible decision
- Communicate decisions



Technical Decisions

- Moderate, don't enforce
- Make your expertise usable
- General rule for managing self-organization



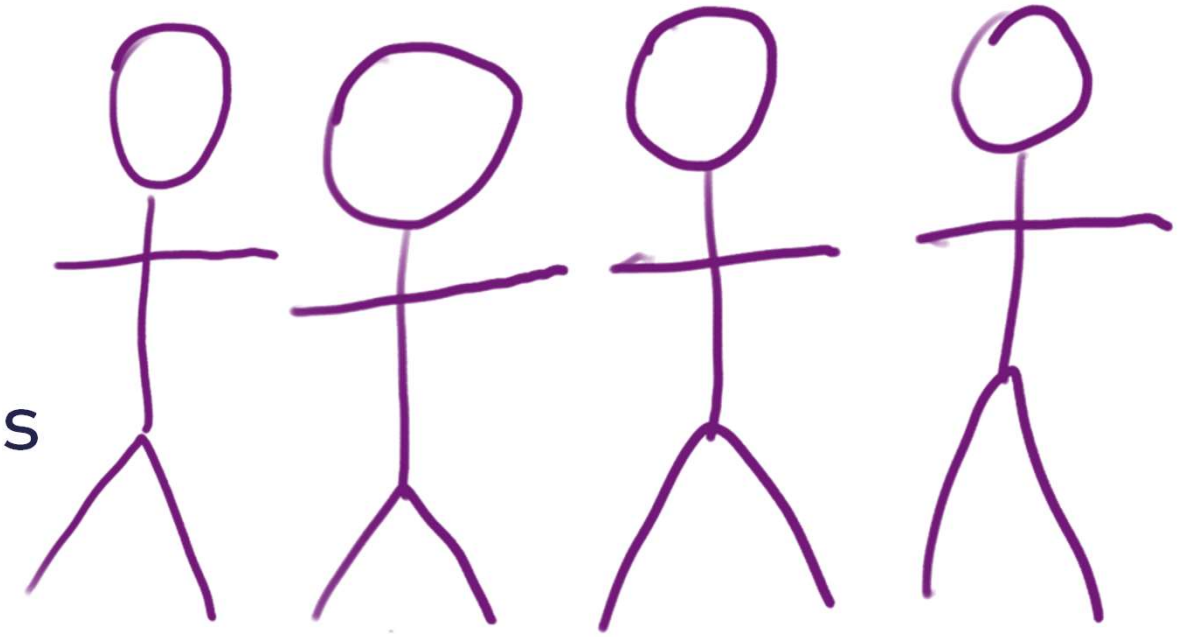
Moderate Technical Decisions

- Use expertise of the full team

- Results:

Better decisions

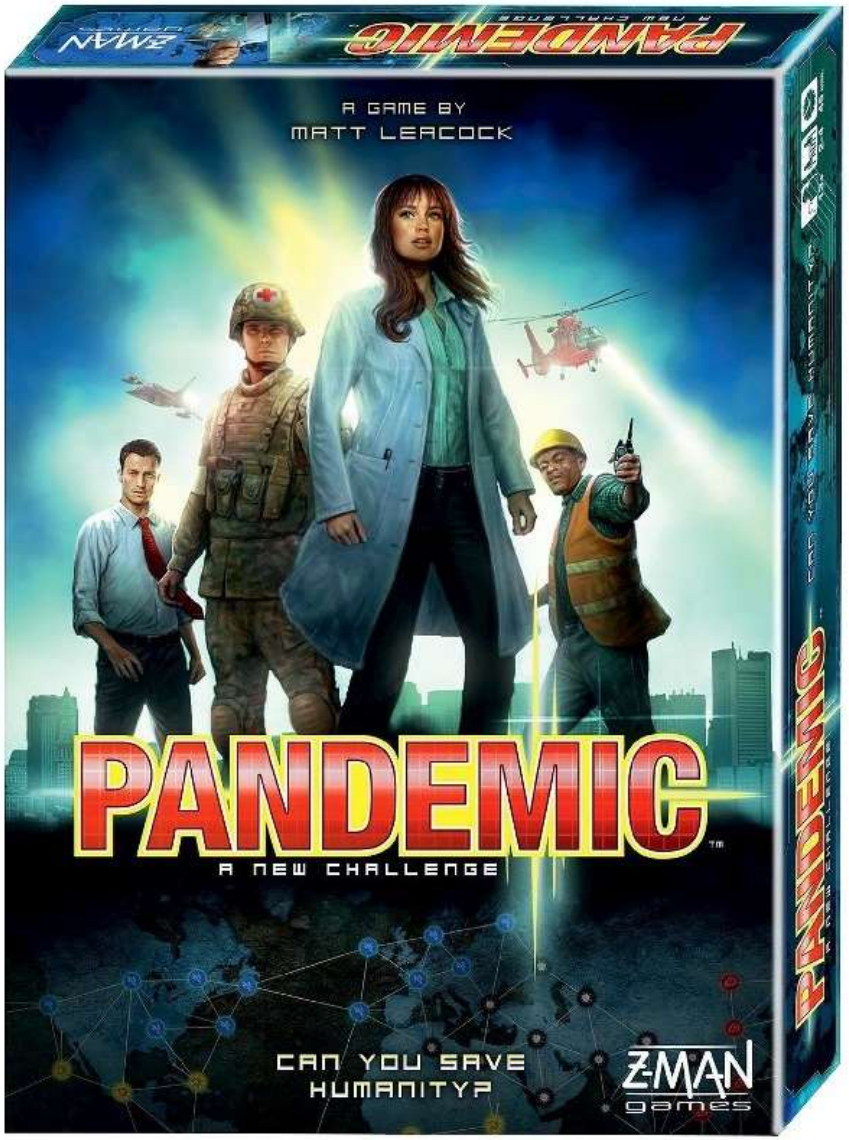
Team actually executes decisions



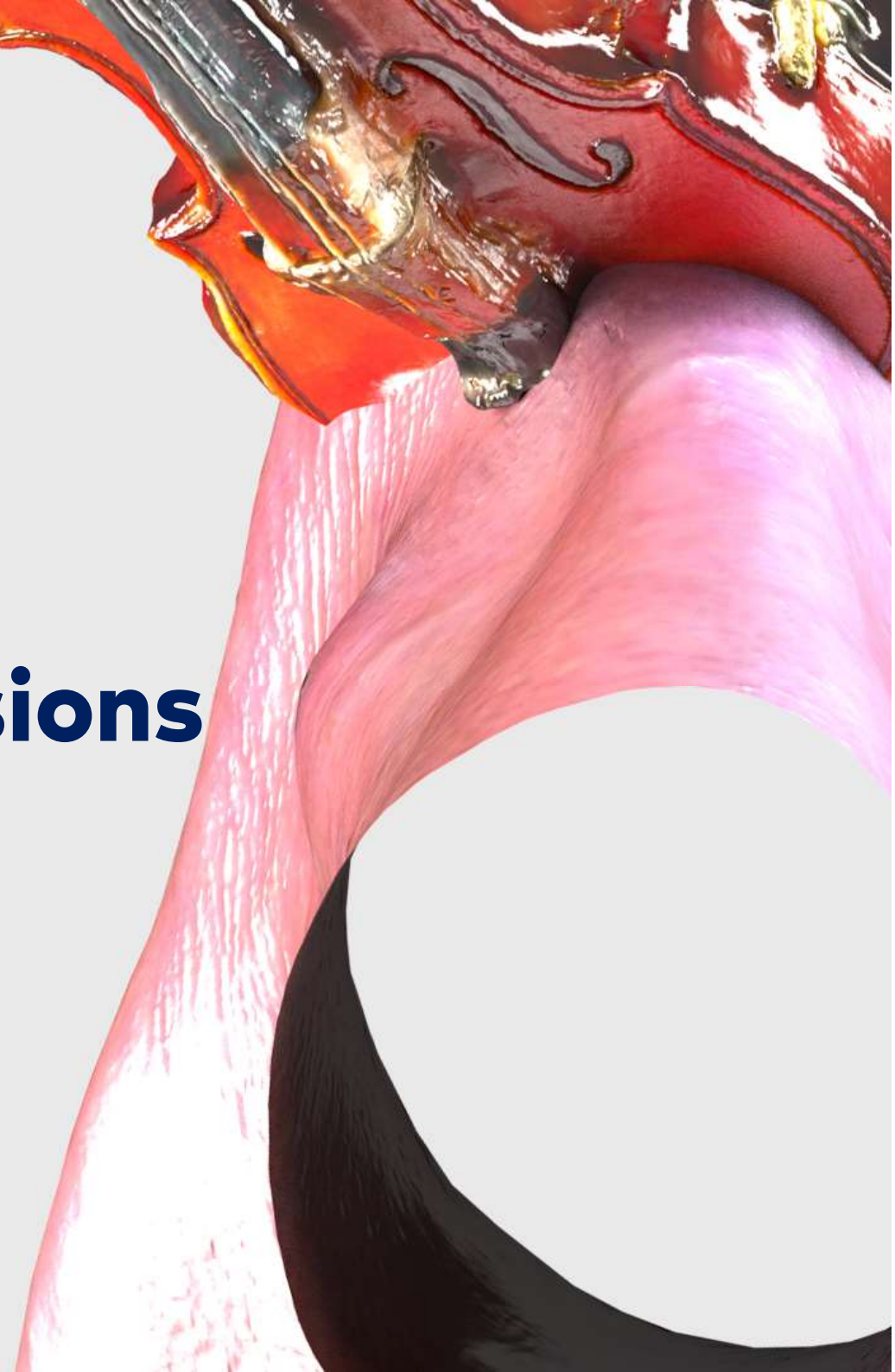
- No ivory tower

Software Architecture = Collaborative Game

- All lose or win together
- Everyone has a specific role
- Communication is essential



Decisions



Understanding the System

- Information about the system is incomplete

...so are requirements

- More information might be hard to get.

...or too late

...or too expensive

- You will still need to make decisions.
- Be courageous.

Software architecture
= making decisions
...constantly
...without enough
information

Decisions

- Often decisions are made too early

- Work on unimportant stuff
- Too little information

Decisions

- When do you need to make the decision?

- Example: Issue invoices as soon as there is revenue

...and also payment, book keeping etc

- No need for a detailed architecture, yet.

Decisions

- What if you do nothing?
- What if you make the decision too late?

- No revenue

...only bad if there are customers

- Manual invoicing

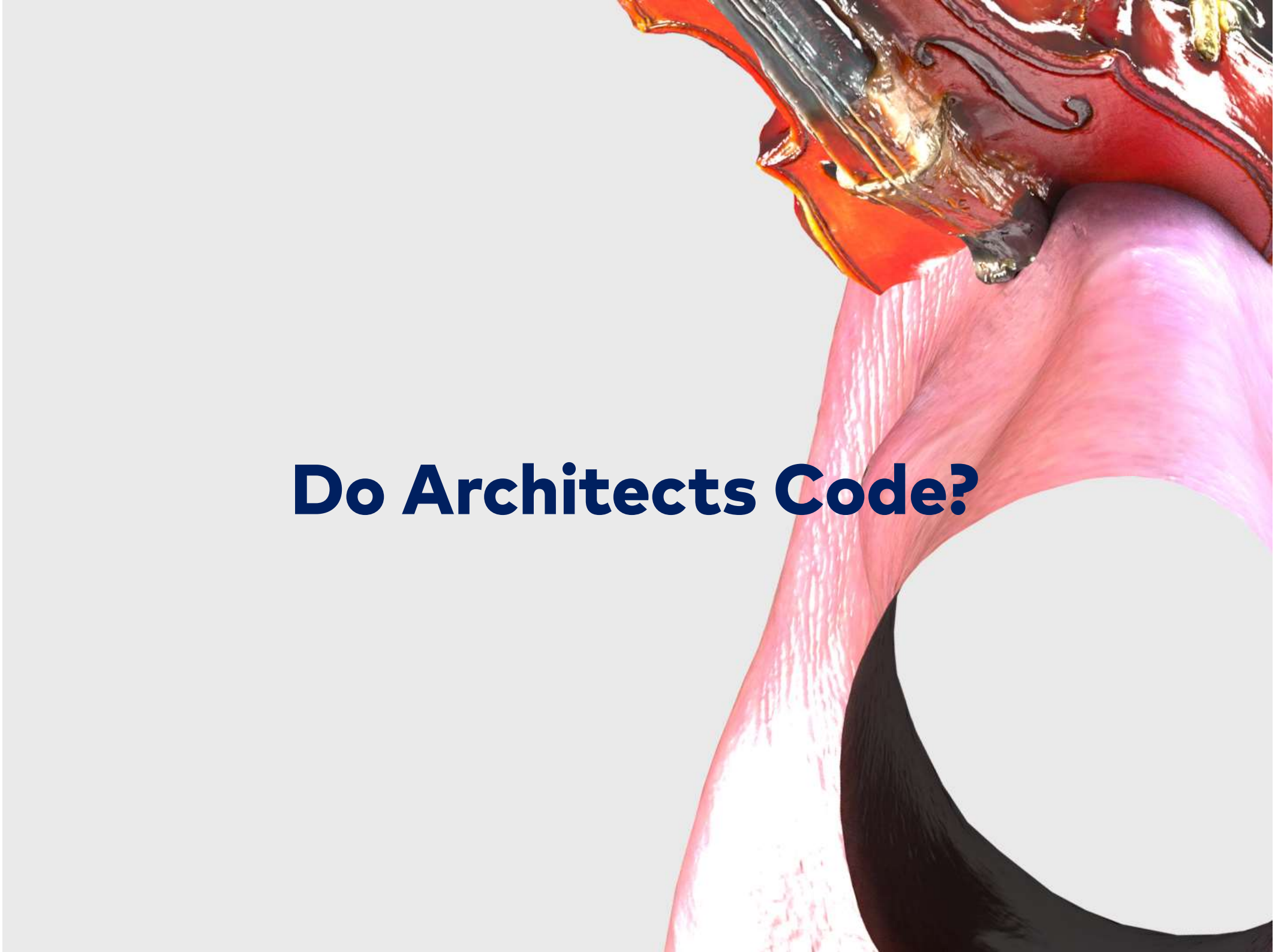
...might be fine

...unless you are truly successful

The best decisions
are the ones not made
yet.

Be prepared
to revise decisions

Do Architects Code?



Traditional Architect

- Doesn't code

...because architects do architecture

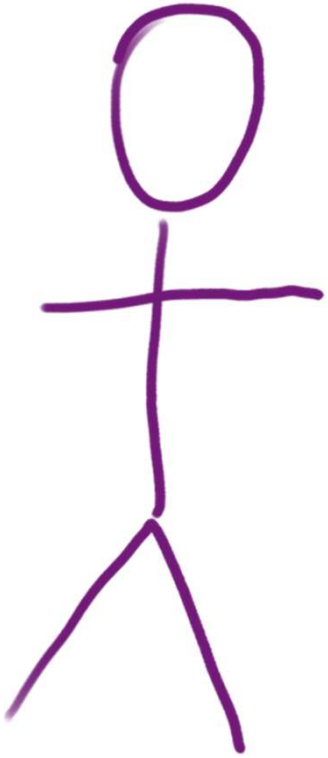
- Problem: Ivory tower

...but that is solved

- Problem: Detached from reality

...can be solved by communication

Modern Architect



- What if architecture is a full-time job?
- No time to code

- Architect is a role.
- Anyhow collaborative
- Either have several coding architects

...and communication overhead between them.

- Or a full time architect

Soccer Coach

- Knows how to play soccer

...but doesn't do it any more.

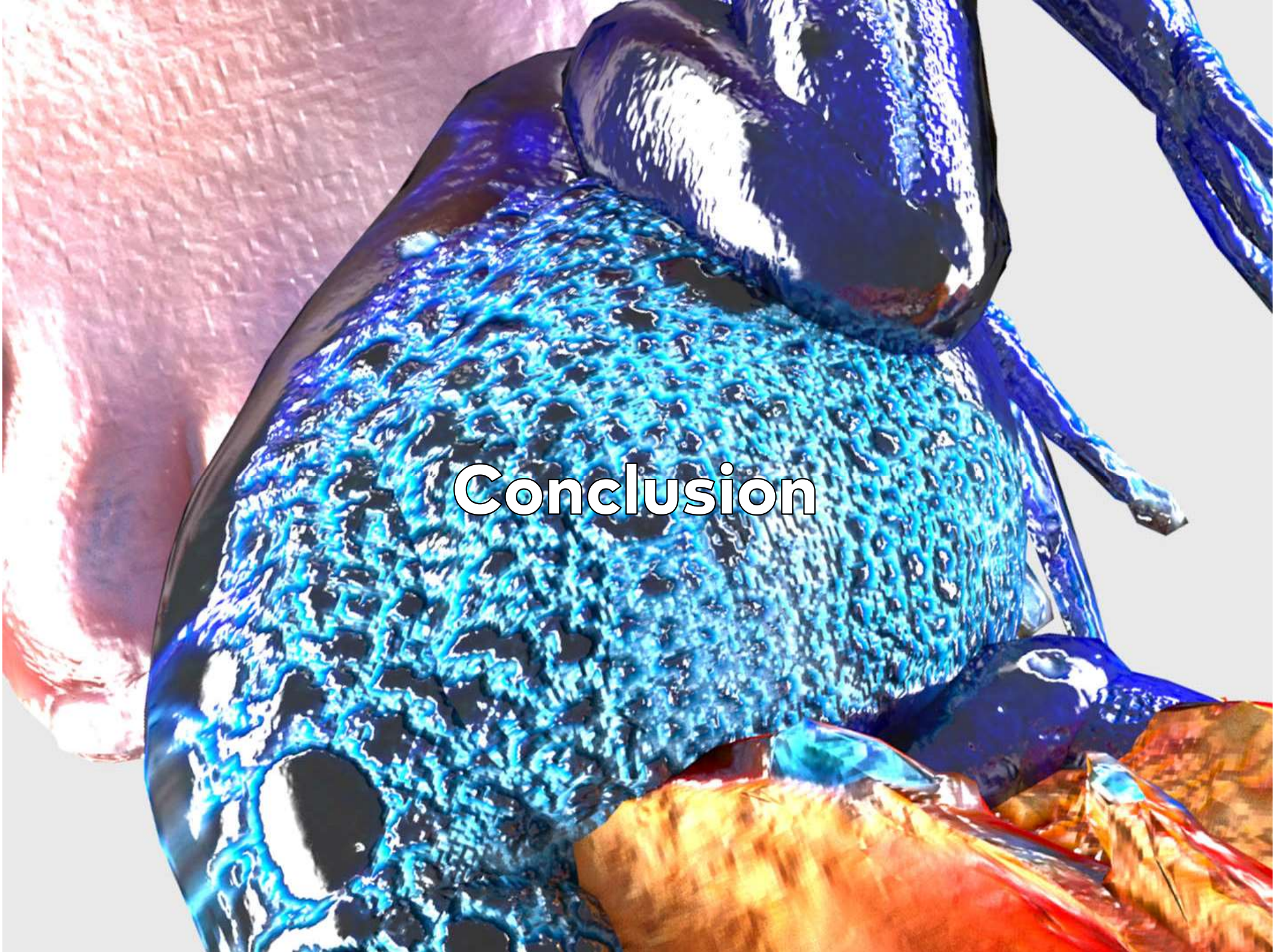
- In particular won't try to score a goal.

- A role model for software architects?
- Knows how to code

...but doesn't do it.

- In particular not for complex code.

Architects May or May Not Code.


Conclusion

Conclusion

- Software architecture = solve technical problems
- Quality attributes / tree / scenarios to understand problem
- Often solution is not traditional architecture
- Software architecture is a collaborative game
- Don't be afraid to make decision later
- Don't be afraid to make decisions with unclear information

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