Fitness Functions for Your Architecture

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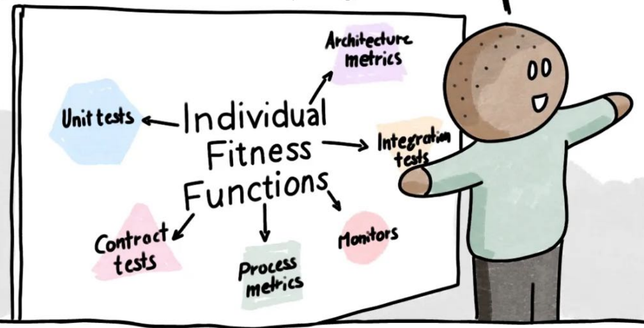
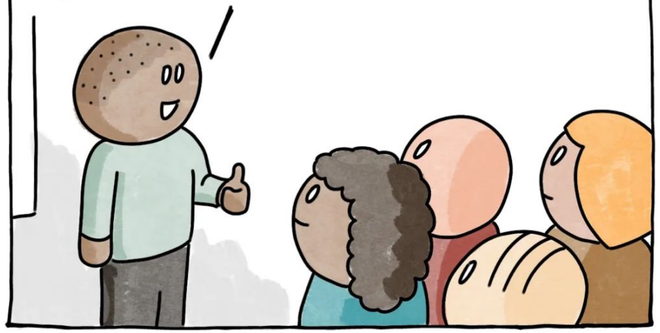
6 February 2025, München

Comic Agilé

Fitness Functions provide an objective integrity assessment of the desired characteristics of our architecture, such as how well we meet our NFRs, our level of Cyclomatic Complexity or our degree of Modular Coupling.



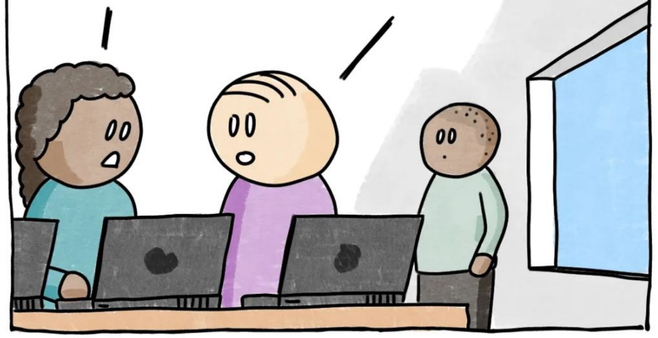
So, they're manual or automatic checks that verify how evolutionary our architecture is through tests or metrics. Each Fitness Function represents each requirement for our architecture.



Later

The Performance Fitness Function shows that our response time is too high!

But the Security Fitness Function is too low-we need better encryption!



And our Cyclomatic Complexity is through the roof!

Which one should we address? Alan?

www.comicagile.net

Created by Luxshan Ratnaravi & Mikkel Noe-Nygaard

https://www.comicagile.net/comic/fitness-functions/

Today

https://www.comicagile.net/comic/fitness-functions/

Comic Agilé

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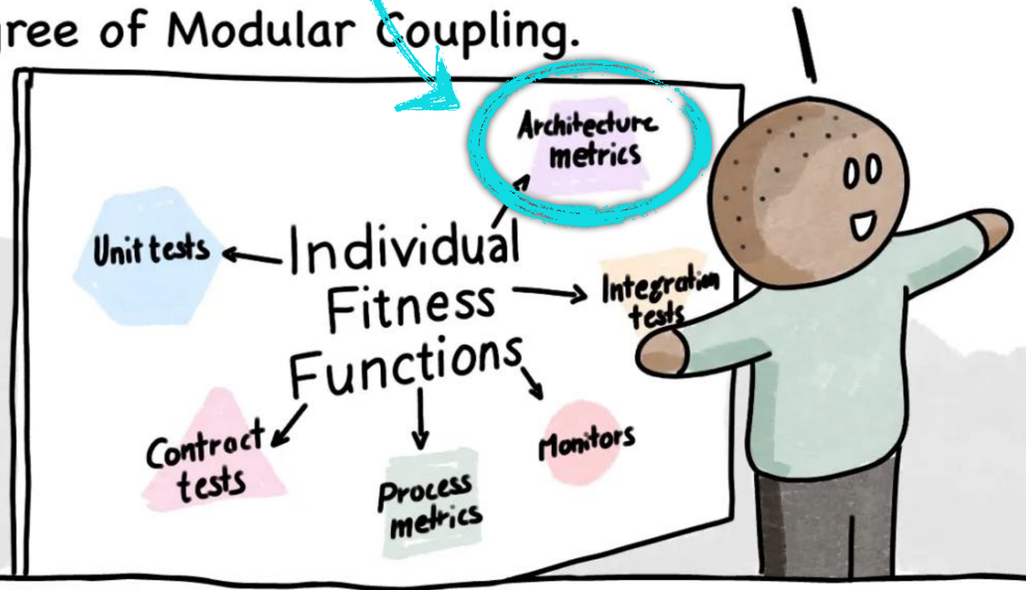

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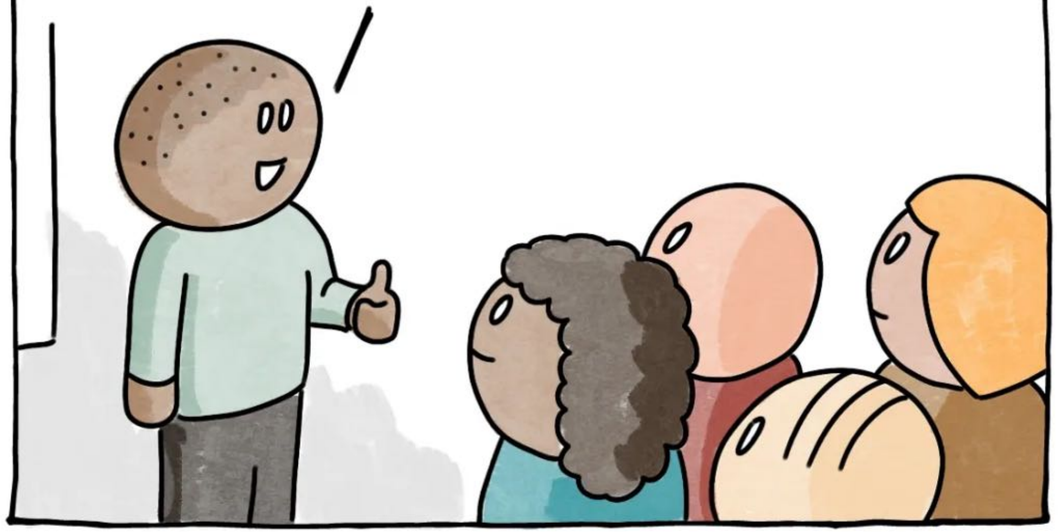


Later

The Performance

But the Security

And our Cyclomatic Complexity is

Agility
+
Continuous *

Technical
Agile
Coach

Die Techniker

www.tk.de/IT

Architecture

Health

Fitness

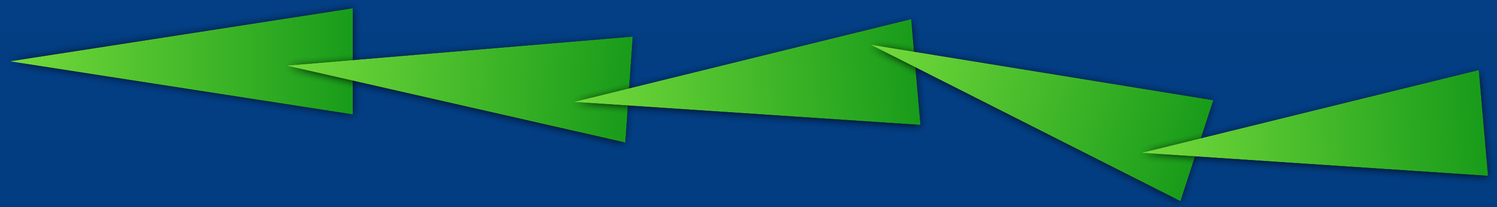
Coding + Testing

@thmuch

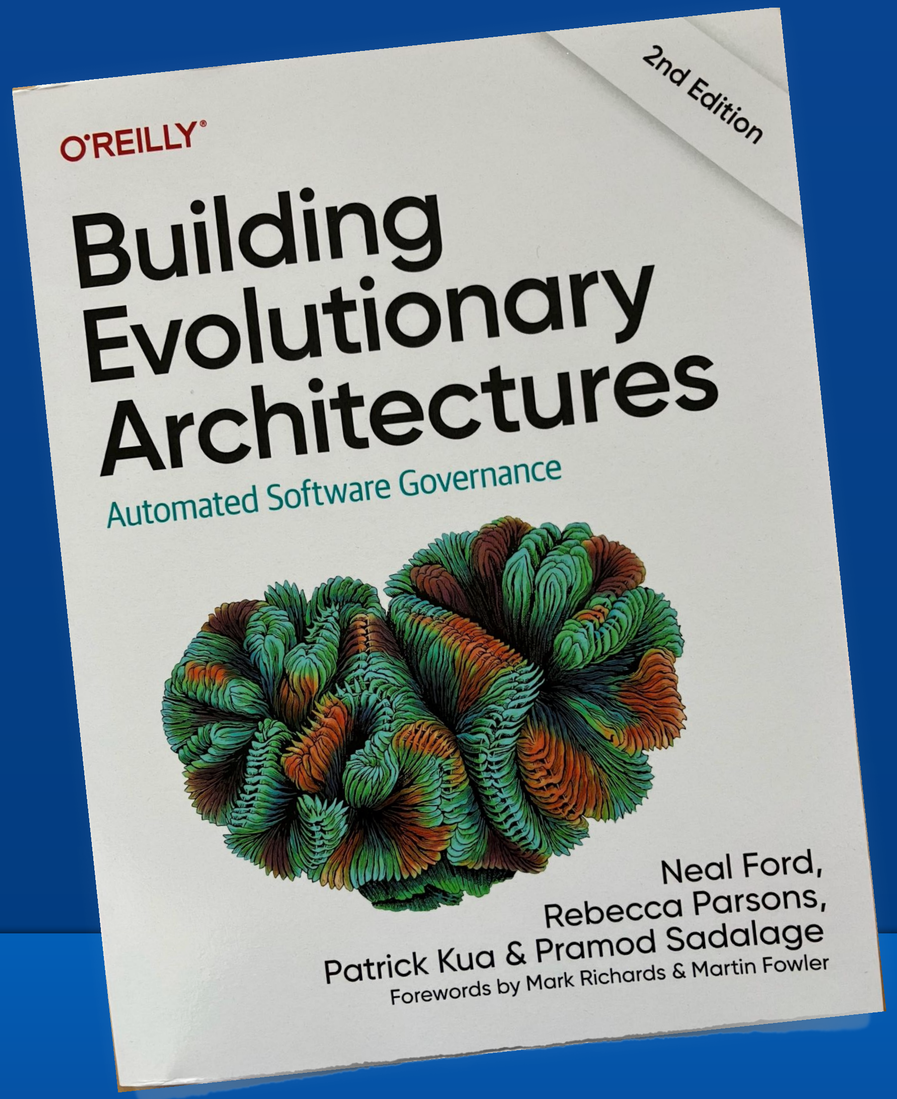
Fitness Functions – Why?

Accidental change?

Guided change!



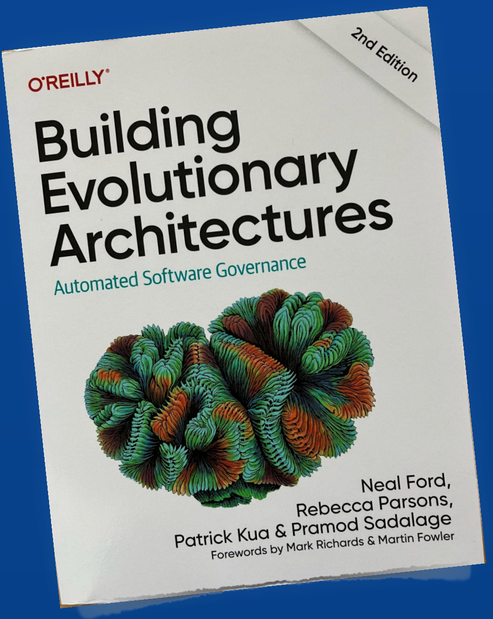
Changes 😳


O'REILLY
2nd Edition
Building Evolutionary Architectures
Automated Software Governance
Neal Ford,
Rebecca Parsons,
Patrick Kua & Pramod Sadalage
Forewords by Mark Richards & Martin Fowler

Incremental change

Guided change

Multiple **dimensions**



…

Structure & coupling

Runtime cost (€$£)

Code metrics

Performance

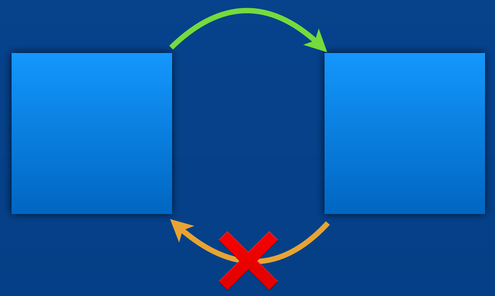
Security

Changes 😊

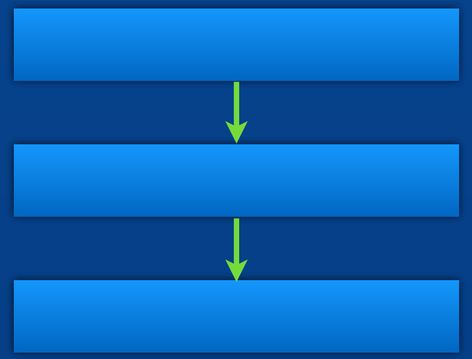
One Dimension Today:
Structure

https://pixabay.com/photos/brick-brickwork-ruin-broken-decay-2205882/

Structures & **Dependencies**

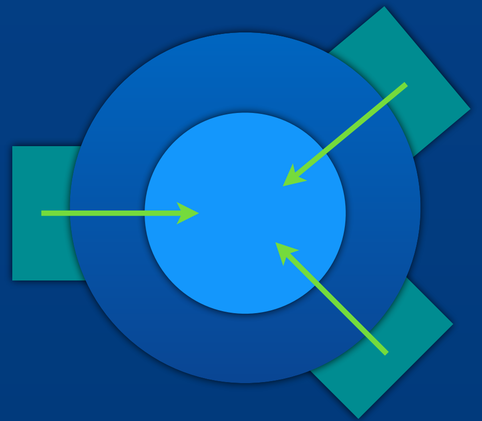


Modules / Components

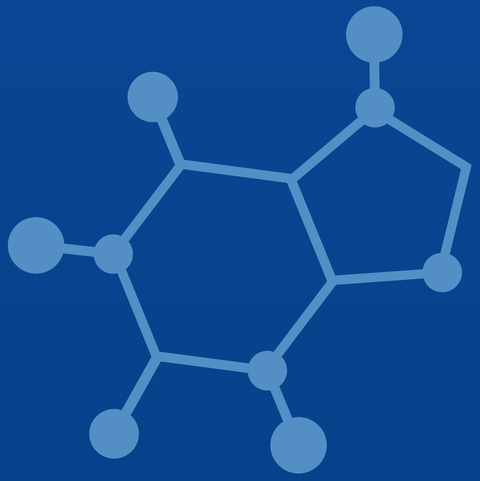


Layers

Verticals / Slices



Inside & Outside



Two Tools **in Practice**: ArchUnit & jMolecules

https://www.archunit.org/

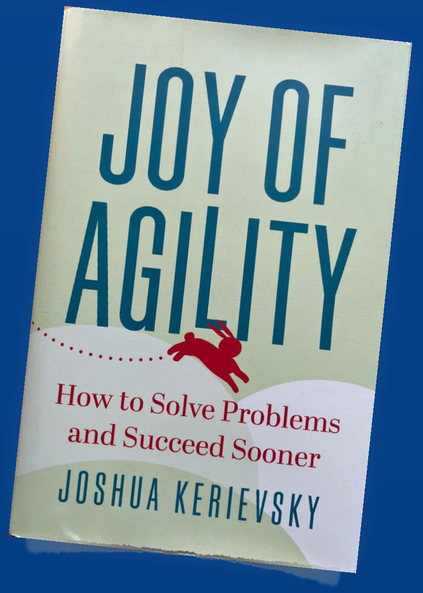
https://xmolecules.org/

Live Demo

Why is this about **Agility?**

„Moving **Quick** with Ease and Grace“

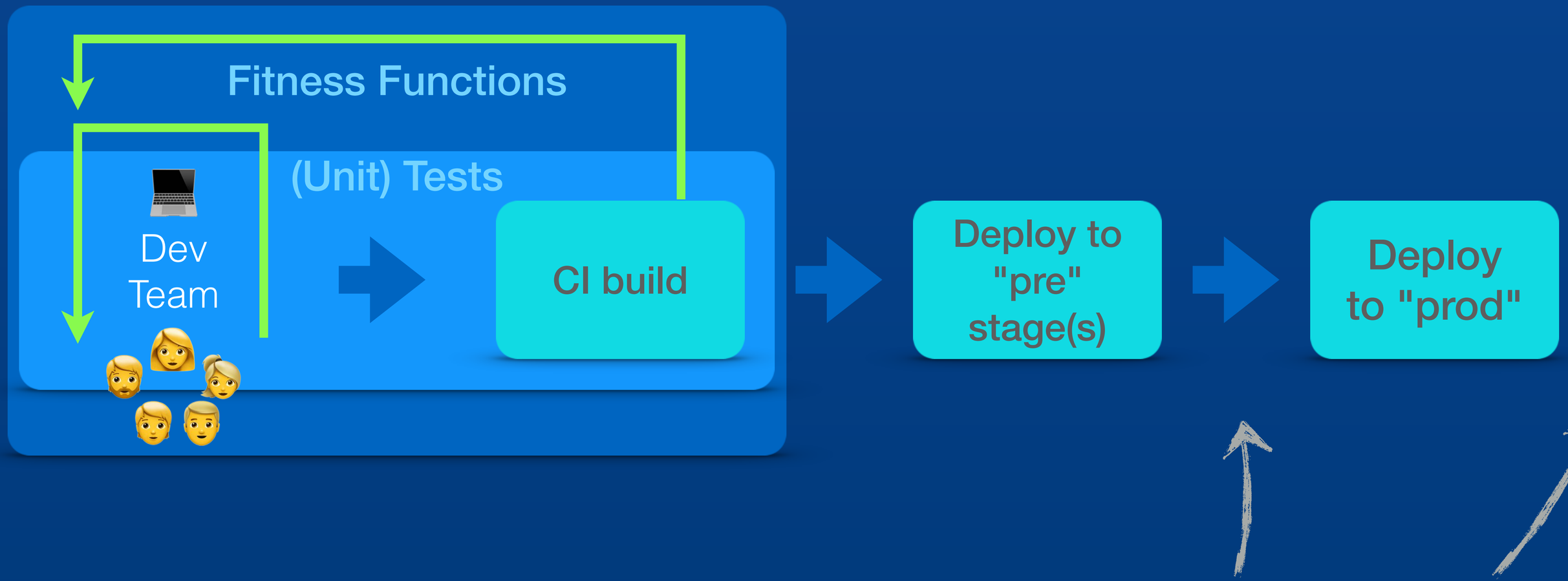
„Speed Under **Control**“



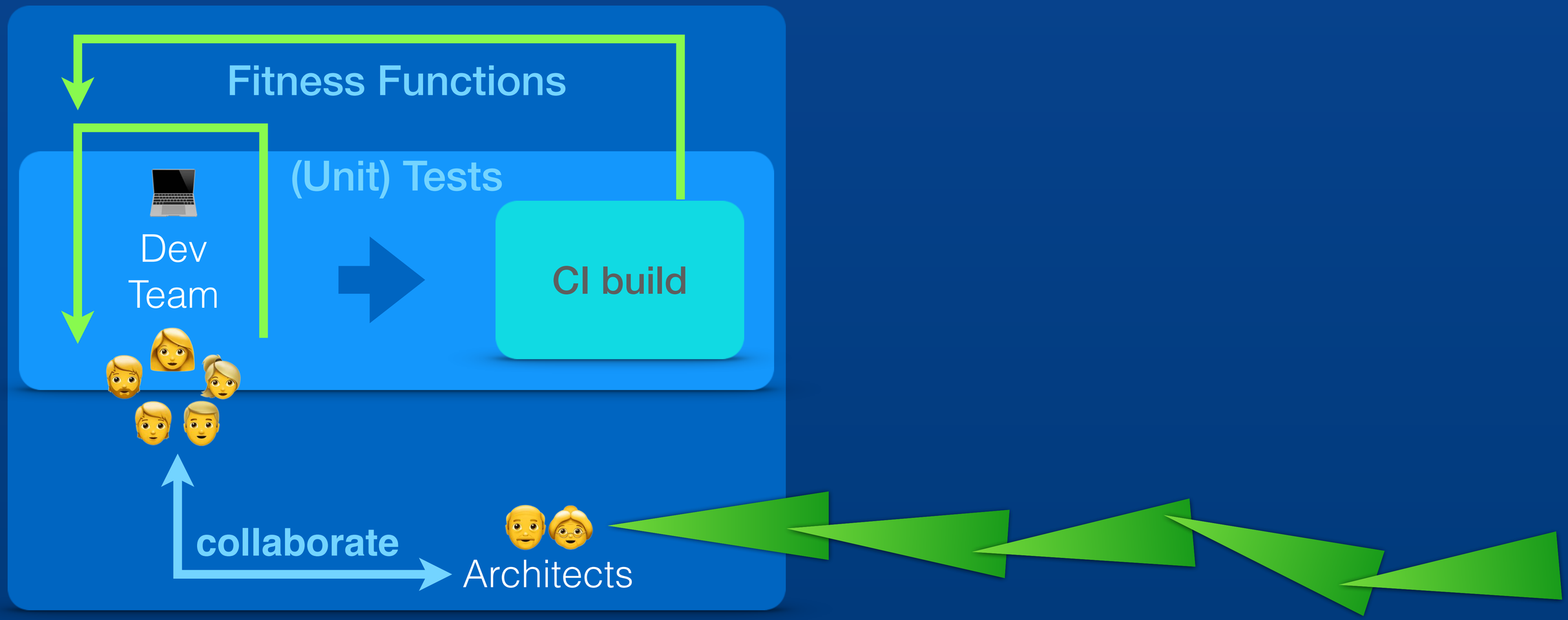
Fitness Functions:

Guidance for your Architecture – with **fast feedback loops**

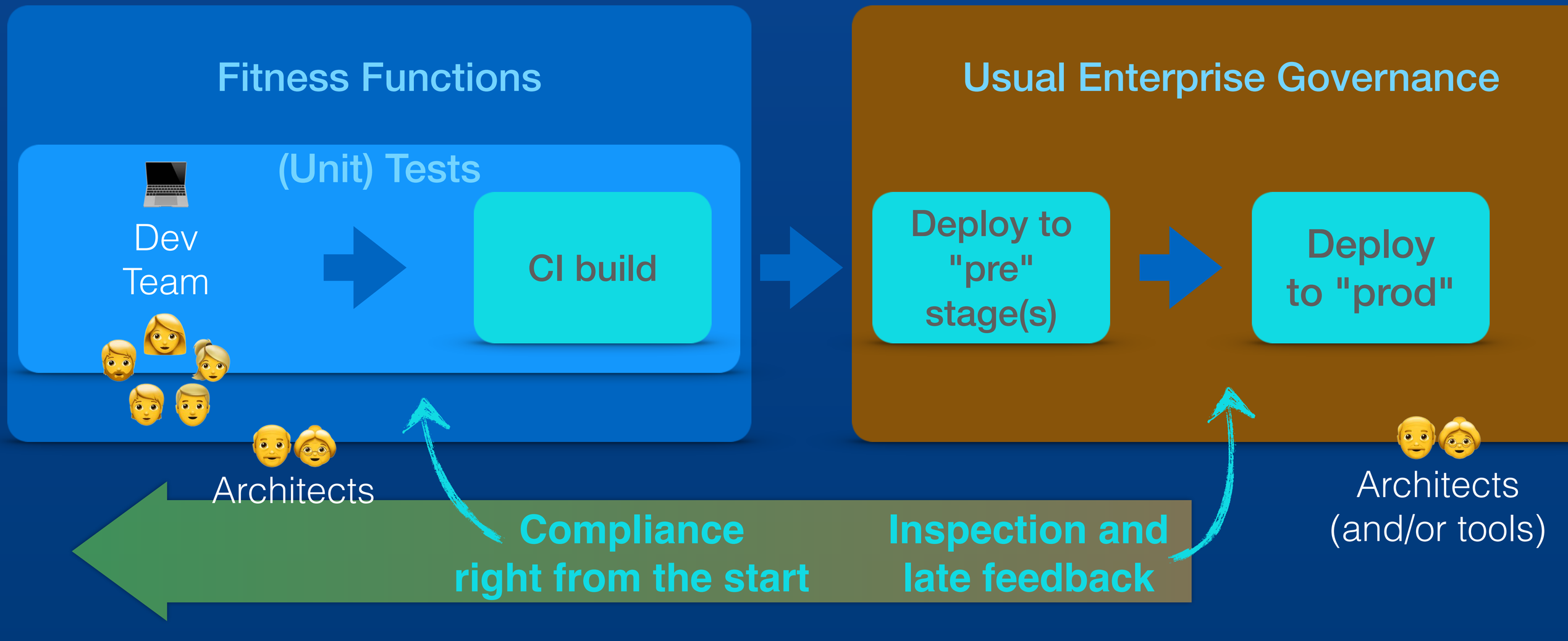
Fast **Continuous** Feedback Loops



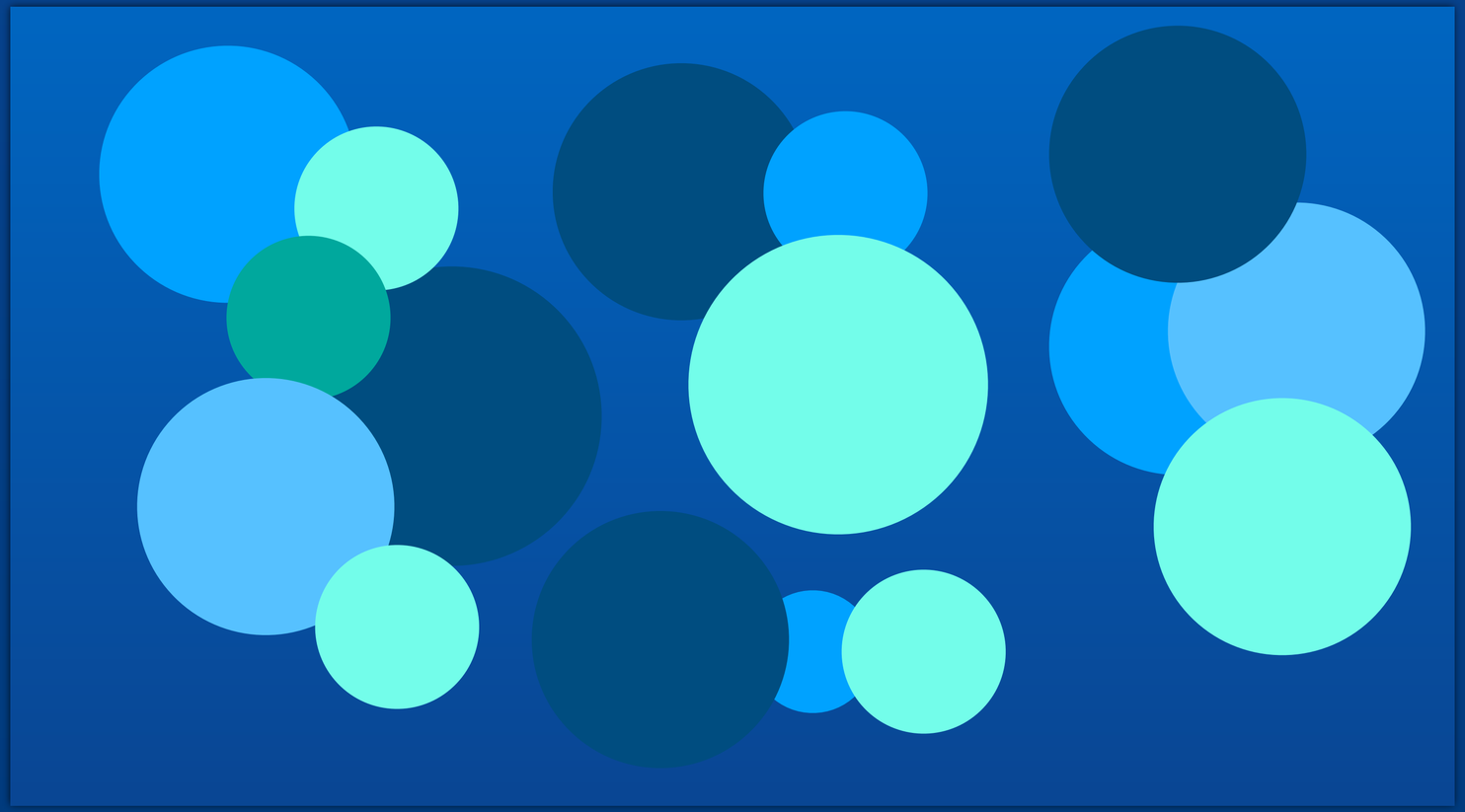
Who Writes Fitness Functions?



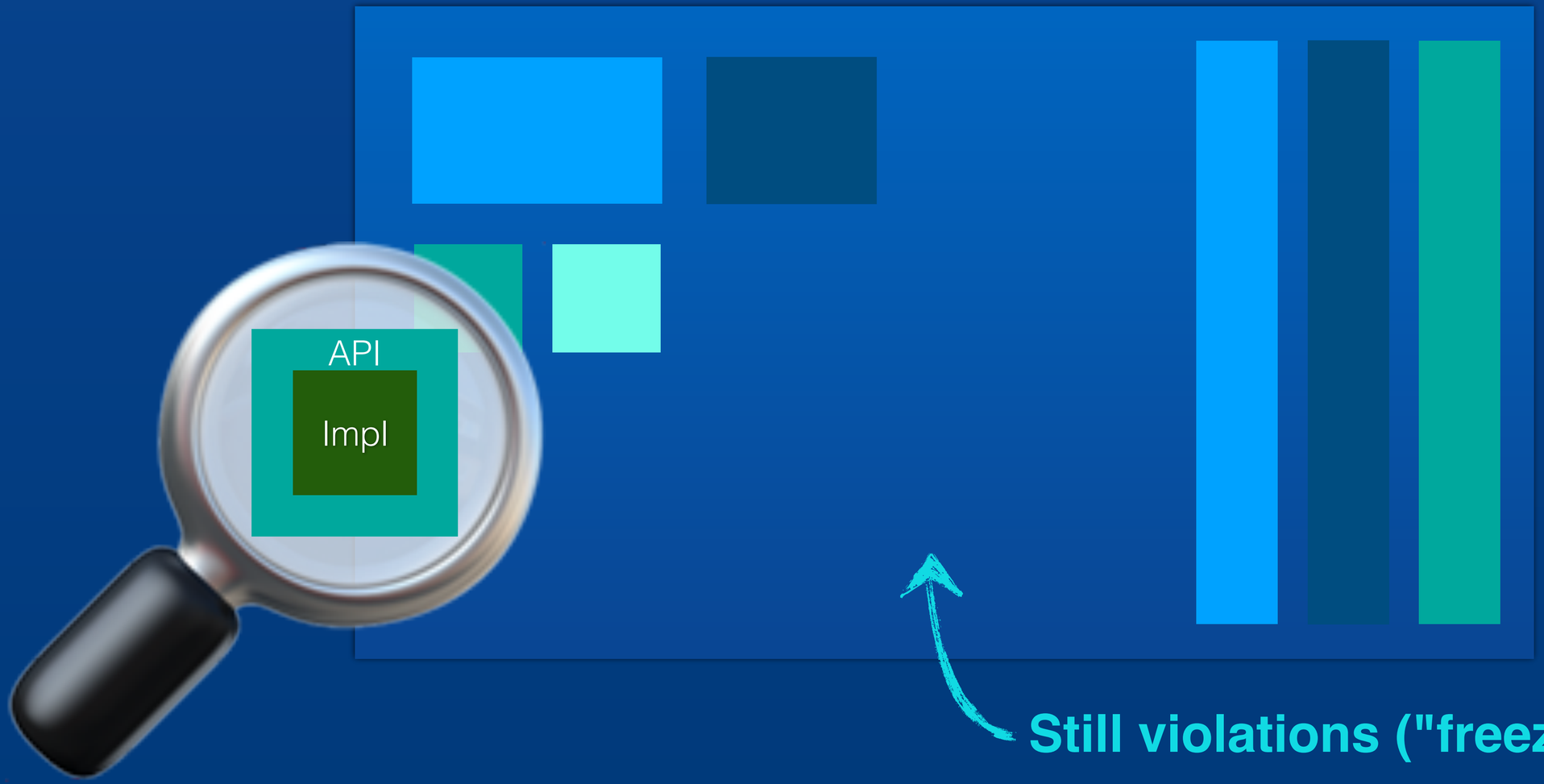
"Shift Left" **Governance**



Dependencies in **Legacy** Code



Improvements in **Legacy** Code



Wrap-Up

Many

Tools

More important:

Why

… and which actions to take

Fitness Functions

… keep **architecture evolvable**

… offer **guidance** (direction)

… offer **protection** against accidental changes

… foster architecture as a **continuous team sport**

… enable **step-by-step improvements** in existing systems

You cannot inspect (architectural) fitness into a frail system.

Build fitness in
right from the start!

“Quality can not be inspected into a product or service; it must be built into it.” (W. Edwards Deming quoting Harold F. Dodge)

*https://github.com/**thmuch**/**architecture-fitness-functions***

oop
software meets business

Thank You 😊

Die Techniker

www.tk.de/IT

@thmuch

Books

https://evolutionaryarchitecture.com/
https://joyofagility.com/

Libraries, Frameworks & Tools

https://www.archunit.org/
https://xmolecules.org/
https://spring.io/projects/spring-modulith
https://jqassistant.org/
https://www.hello2morrow.com/products/sonargraph
… and many more

Further Reading

https://www.thoughtworks.com/en-de/insights/articles/fitness-function-driven-development
https://martinfowler.com/articles/fitness-functions-data-products.html
https://mikaelvesavuori.se/blog/2023-08-20_The-Up-and-Running-Guide-to-Architectural-Fitness-Function

Smiles

https://www.comicagile.net/