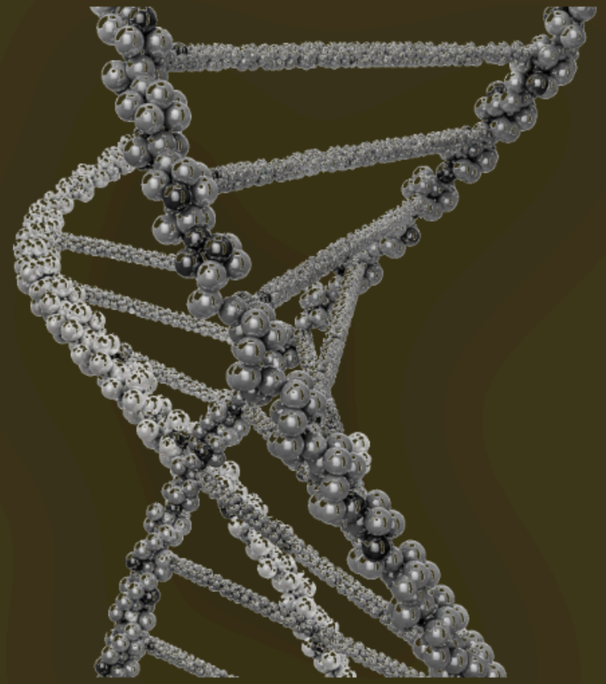
Tinkoff Agile Conference · October 22, 2021

Evolutionary architecture in practice

What it is made of and when to start



The company grows faster than the architecture settles

Why we need evolutionary architecture

- 16M+ customers, growing about 35% a year
- A multi-product company with its own IT verticals
- The products are merging into an ecosystem
- Monolithic teams split into stream-aligned ones

Tech debt can be repaid evolutionarily instead of via a 2.0

Your context | Why you need it

Why you need evolutionary architecture

- Tech debt accumulates as the system grows
- Left unpaid, it can lead to bankruptcy
- That turns into revolutionary 2.0 and 3.0 systems
- But the process can be approached evolutionarily

Part 1

01

What is architecture?

The two definitions the talk builds on

A decision's importance is the cost of changing it

Definitions Booch and Kruchten

What architecture is

- The set of important design decisions shaping a system
- Importance is defined by the cost of change
- And a shared understanding of trajectory and boundaries
- Where the project is going and its mental model

Part 2

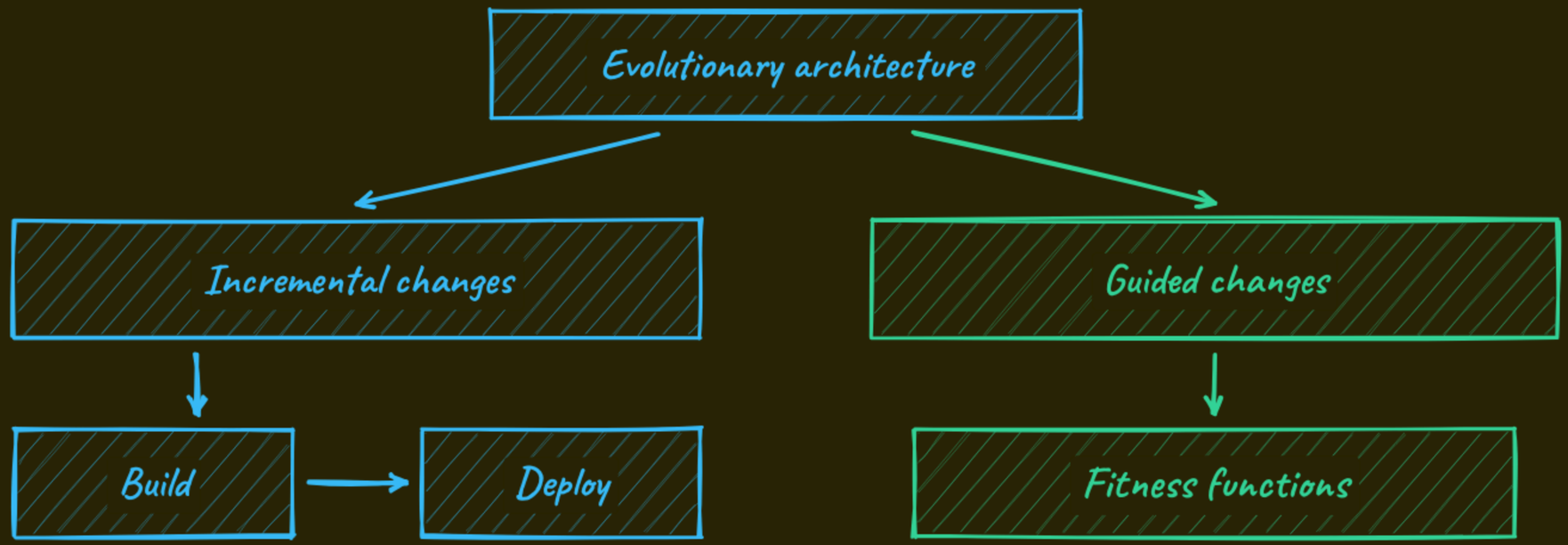
02

What is evolutionary architecture?

Incremental and guided change

Small changes must stay on course

Definition Three parts



Modularity · low coupling

Check the intended architecture

Part 3

03

Incremental change

A closed loop from idea to deploy

An increment is a closed loop, not a single step

Idea → requirements → development → deploy

- Idea
- Requirements
- Development
- Deploy — and the loop repeats

Loop Increment

Part 4

04

Fitness functions

How architectural conformance gets measured

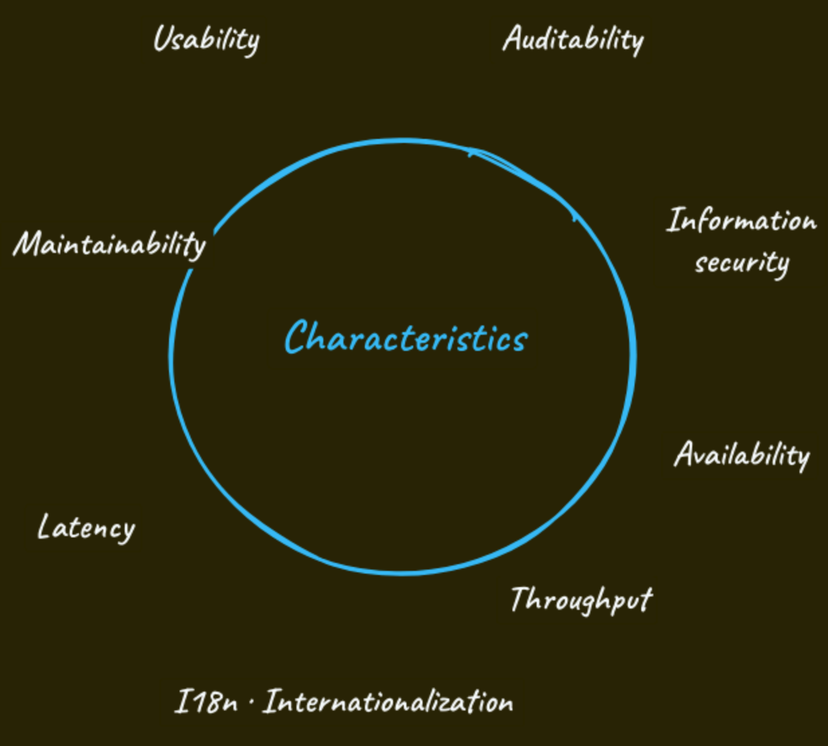
A fitness function is both a guide and a constraint

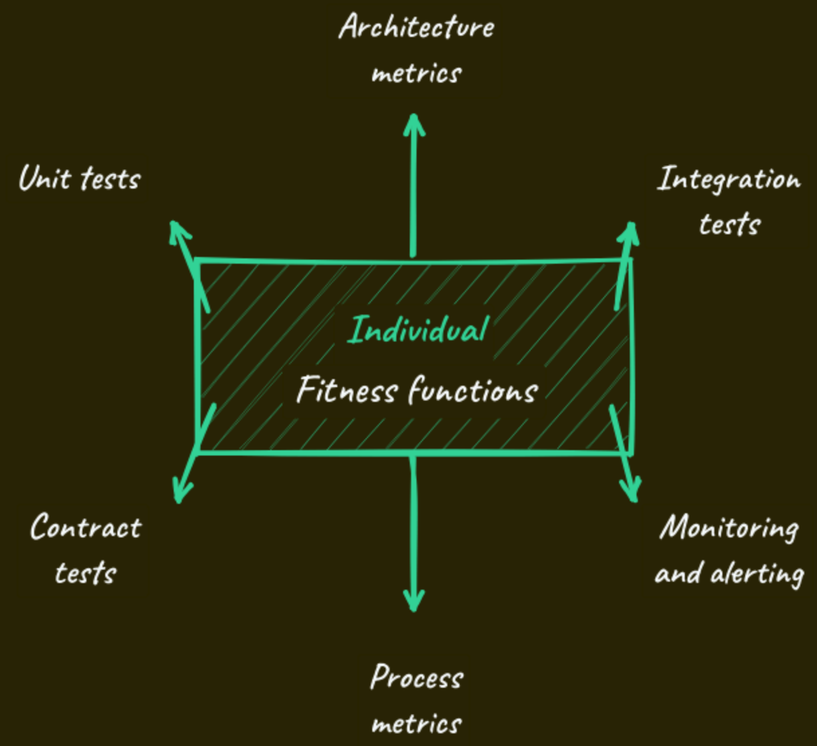
Definition **Fitness function**

The definition from the «Evolutionary Architecture» book

- A measure of how the solution fits its context
- And that context keeps changing
- It acts as a guide for how architecture evolves
- And as the constraint that evolution runs inside

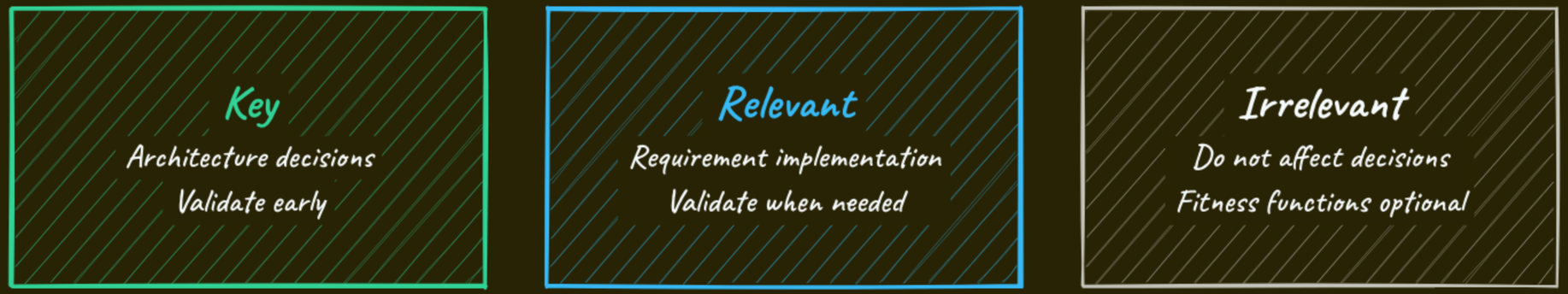
Tests and metrics validate architecture





Dimensions differ in their architectural importance

Categories Priority



There are tools to check fitness functions with

Tooling for automating fitness function checks

Tooling Automation

- Static code analysis and testing frameworks
- Penetration testing and load testing
- Monitoring and logging
- Architecture checks: ArchUnit, Danger, fitv

Part 5

05

Appropriate coupling

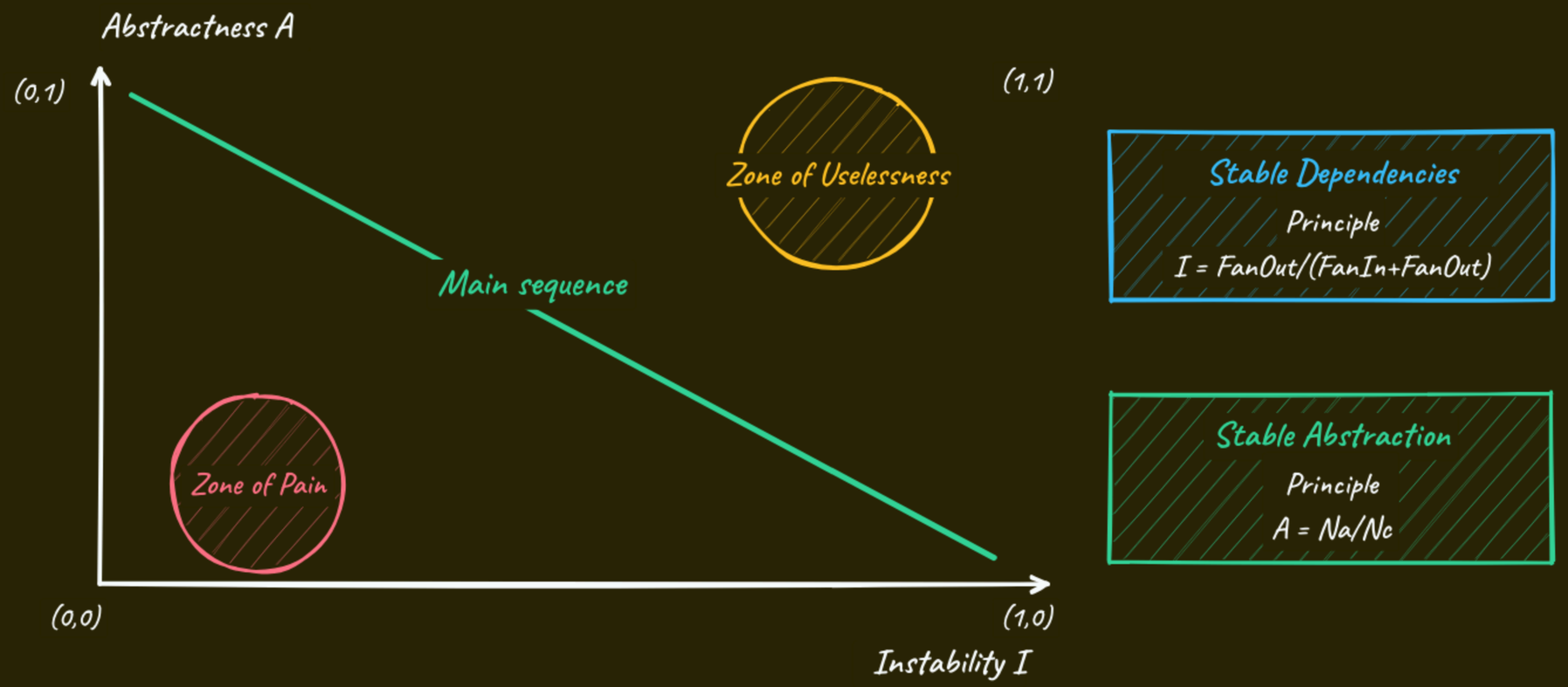
Modularity and organizing components

Cohesion looks inside a module, coupling looks out

Modularity, cohesion, coupling

- Modularity — a logical grouping of related code
- Cohesion — how much the parts belong in one module
- Coupling — the interdependence between modules
- One is about links inside, the other about links between

Stable components need abstractions



Part 6

06

How do you know it is time to evolve?

Team evolution triggers and their link to architecture

Change the teams and you must change the system

Conway

Conway's law

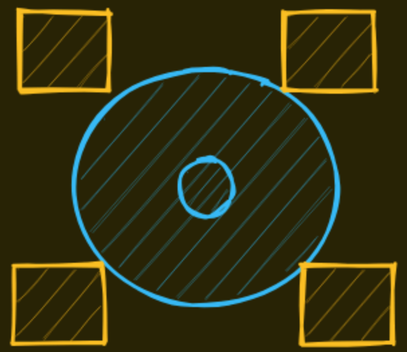
Conway’s law, and brownfield rather than greenfield

- Organizations design systems that copy their communication
- The desired team structure changes
- So the system has to be redesigned
- The business cannot pause — so we redesign evolutionarily

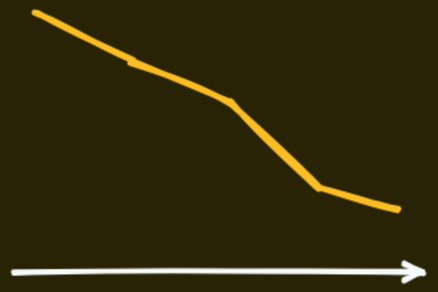
Three signals that teams need to evolve

Triggers | Team Topologies

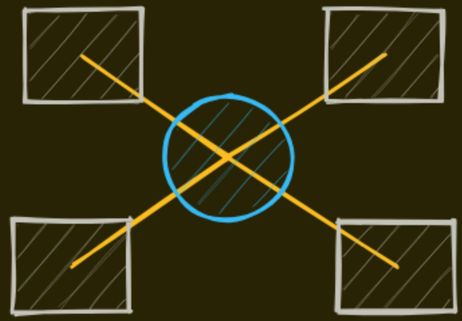
Size
Software outgrows the team



Delivery
Sustained slowdown



Dependencies
Fragmented services



The questions we covered

Wrap-up Summing up

What evolutionary architecture is and when you need it

- What evolutionary architecture is
- Why it is needed
- What it consists of: incremental change
- …fitness functions and appropriate coupling
- When it is time to evolve the teams and the systems

Links for further study

The sources from the talk’s closing slide

- «Evolutionary Architecture» and «Fundamentals of Software Architecture»
- «Clean Architecture» with two reviews
- «Team Topologies» and its three-part summary
- Articles on the double loop and Essential Architecture

polomodov.tech

Thank you!

All slides and links are in the Telegram channel

Alexander Polomodov

Technical Director & Fellow,
T-Technologies



@book_cube