

Software Development as a Process

Prof. Dr. Robert Mertens

The Software-Engineering Perspective

... or: „Why don't we just start programming?“

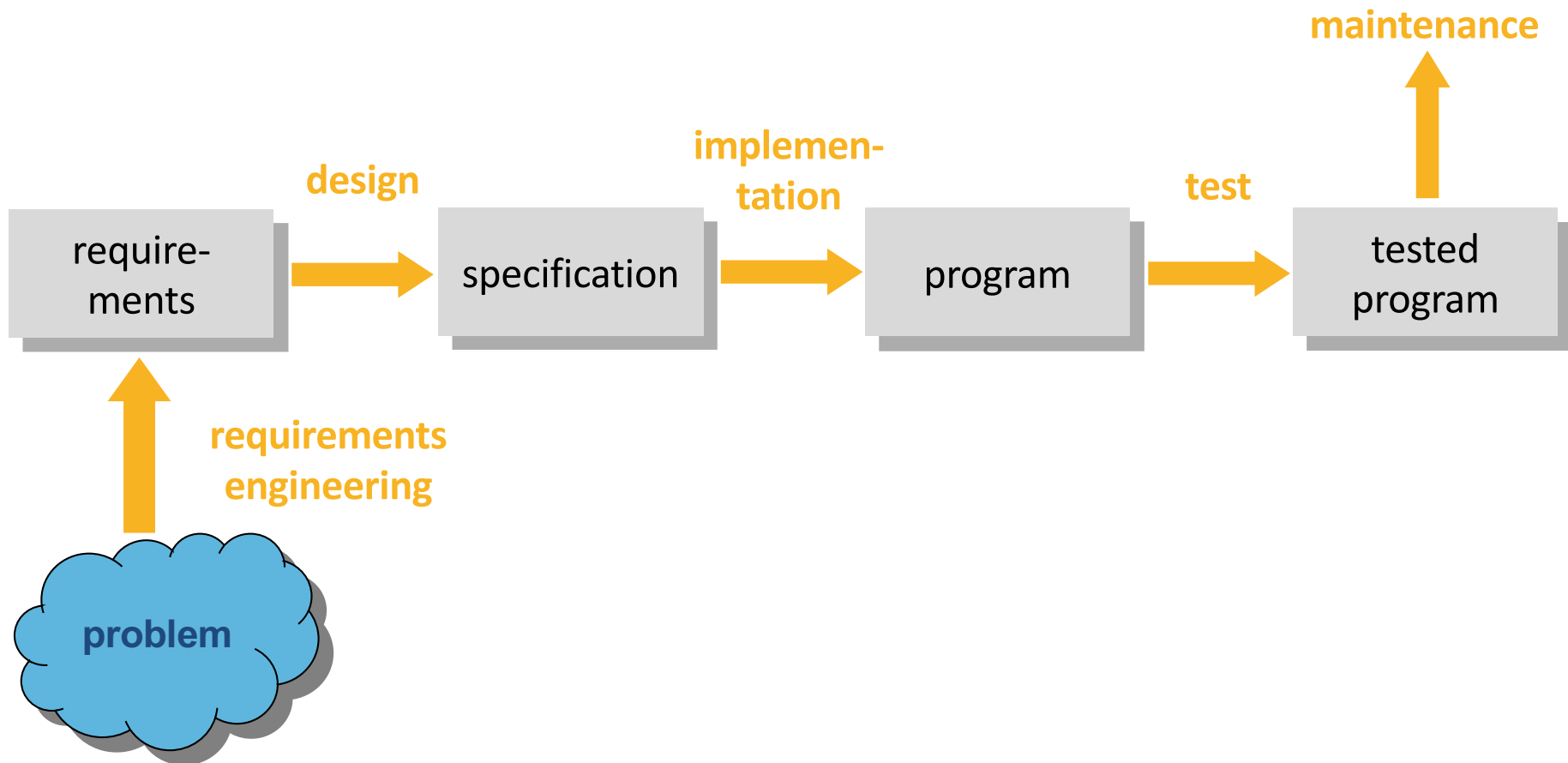
- Software is „pure thought stuff“
- Reducing complexity
 - Patterns and Frameworks
 - Components and Modules
- Structuring
 - Development phases
 - Tasks and teams



„The larger a program the more complex it becomes.“

Steps in the Software Development Process

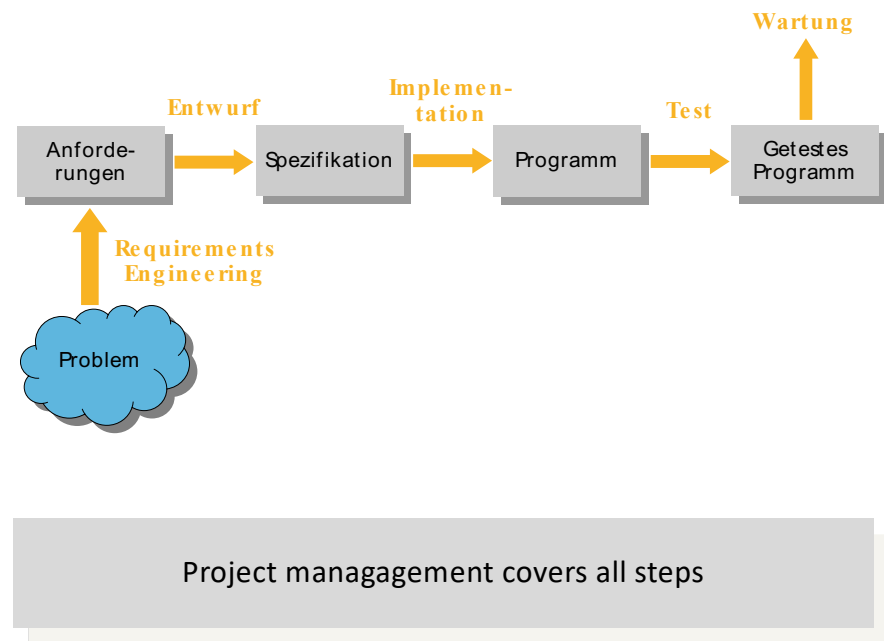
... or: „How can we structure the process?“



Process Overview

... or: „All steps are connected!“

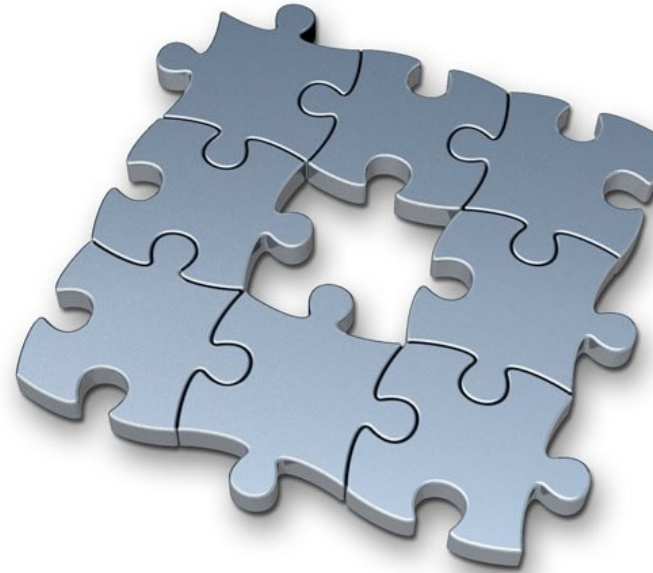
- Connections between steps
 - Overlaps
 - Backtracing (design errors, missing requirements, ...)
- Projekt management
 - Covering all steps
 - Coordination of all project members



Step I: Requirements Engineering

... or: „What do we want?“

- Understanding the problem
 - With domain experts
 - Communication is a key problem
- Non functional requirements
 - Performance, security, ...
- Feasability
- Functions
 - First version
 - Future versions

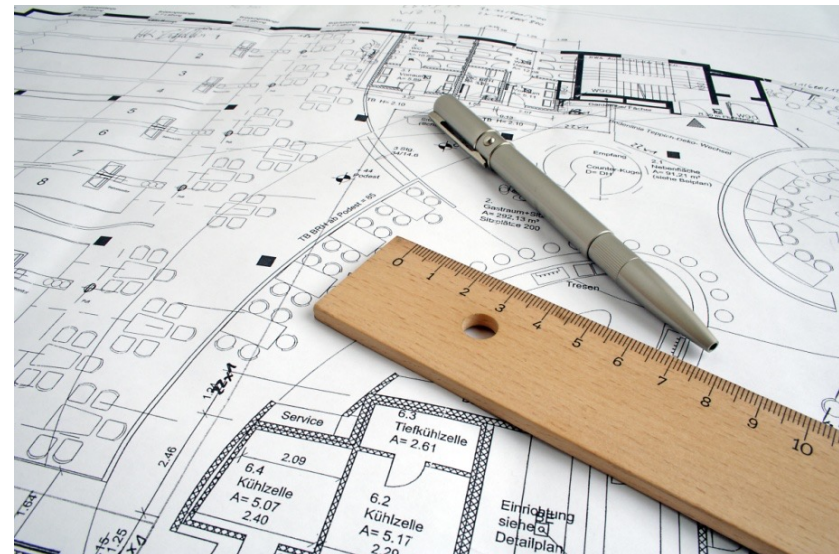


„At the end of the first step the team should have a good description of the problem that allows them to understand all its facets. “

Step II: Design

... or: „How will the code be structured?“

- Decomposition of the problem
 - Components
 - Interfaces between components
 - Interaction of components
- Definition of the architecture
- Not: Implementation deadlines

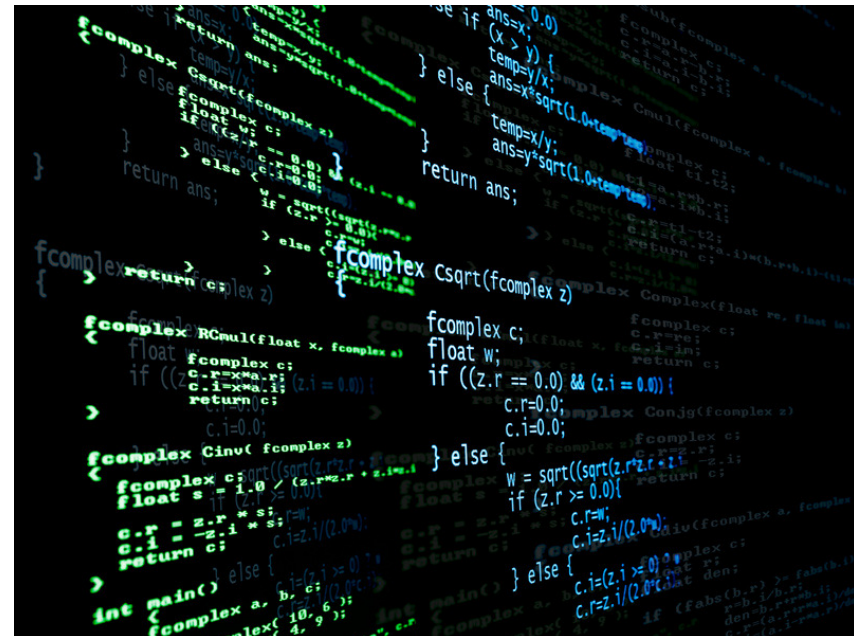


„At the end of this step stands a specification detailing the inside structure of the software.“

Step III: Implementation

... or: „Writing the code!“

- Implementation of components
 - Starting from the component specification
 - In some cases an intermediary design step for components is necessary
- Implementation within architecture constraints
- Important factors when coding
 - Readability, documentation
 - Flexibility, correctness
 - Reliability

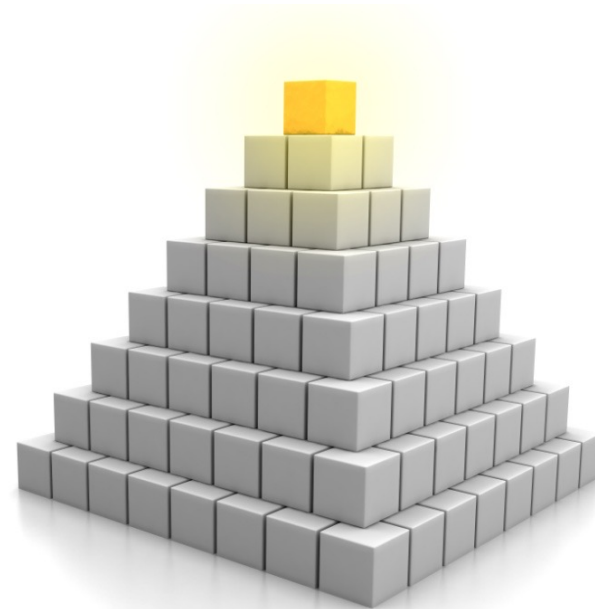


„This is where programming takes place. The result of this step is runnable software!“

Step IV: Test

... or: „And, does it work?“

- Test is not
„The step after implementation“
- Testing takes place at every step
- Testing between the steps
 - Verification: Everything runs according to the specification
 - Validation: Keeping an eye on the requirements

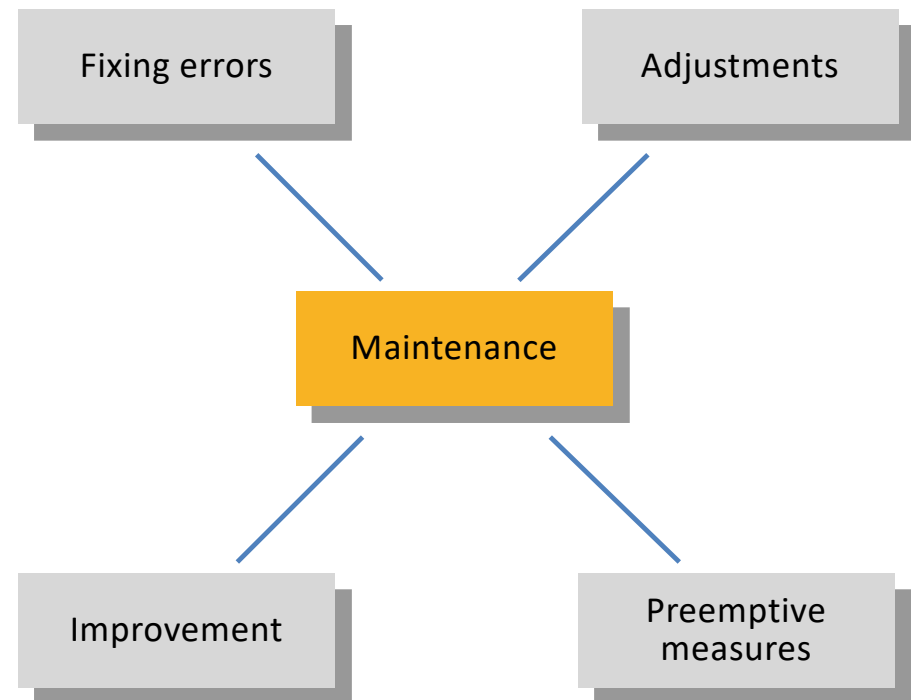


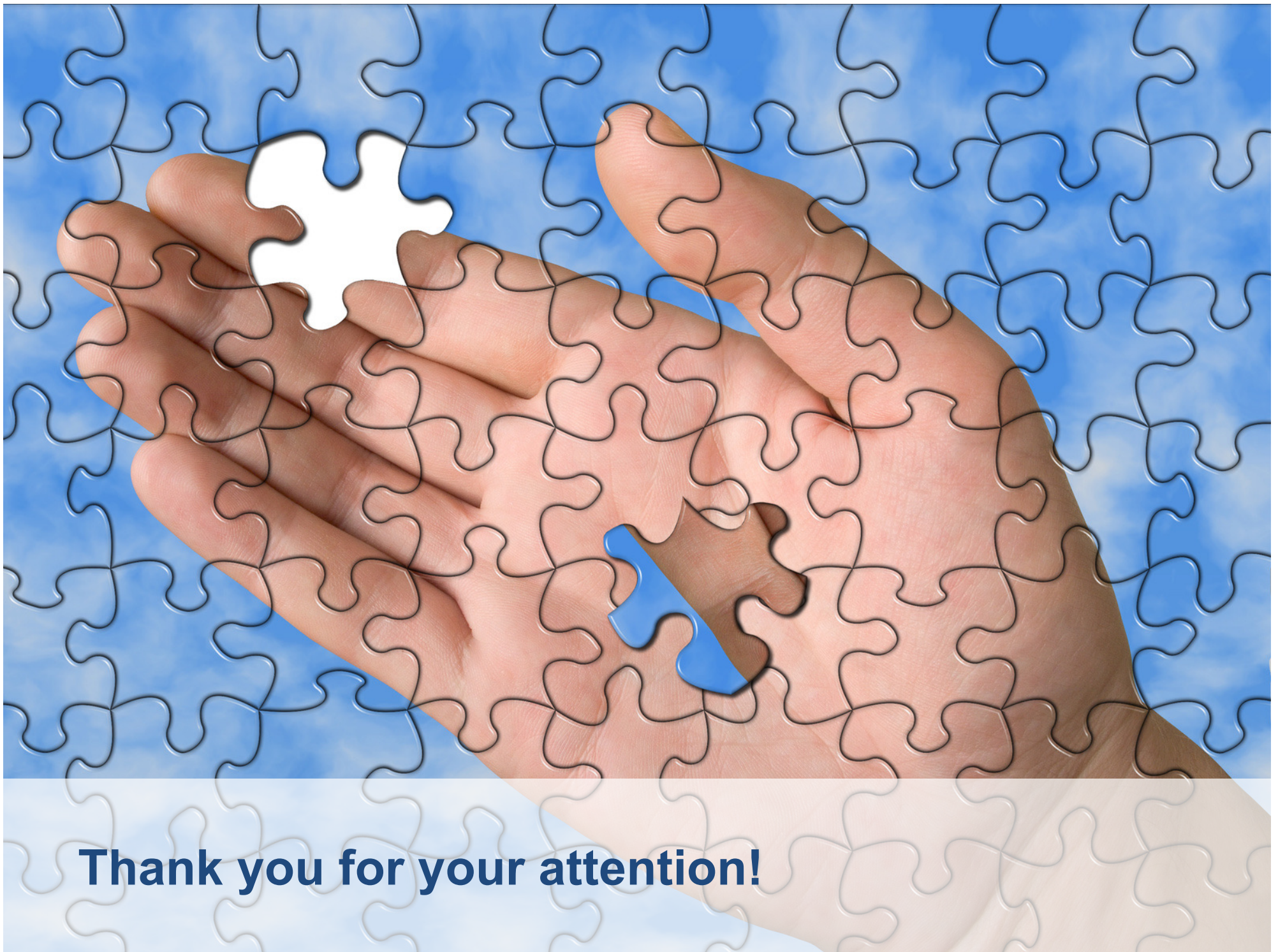
„Tests should be conducted at every step, starting with desk checking and ending with integration tests.“

Last step: Maintenance

... or: „The real job starts once product is shipped!“

- Maintenance costs are higher than development costs
- Adjusting to external changes
 - New hardware, new database, ...
- Improvements
 - New functions, performance, ...
- Preemptive measures (Maintenance)
 - Documentation, refactoring, ...





Thank you for your attention!