

# Digital Product Innovation and Development

Kickoff

23.04.2025

# Agenda

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## introduction.

Learning Goals

Involved Stakeholders



## challenges.

Creatum

Itestra

BTH

Netlight x Digital School Story

Siemens



## organization.

Course Schedule

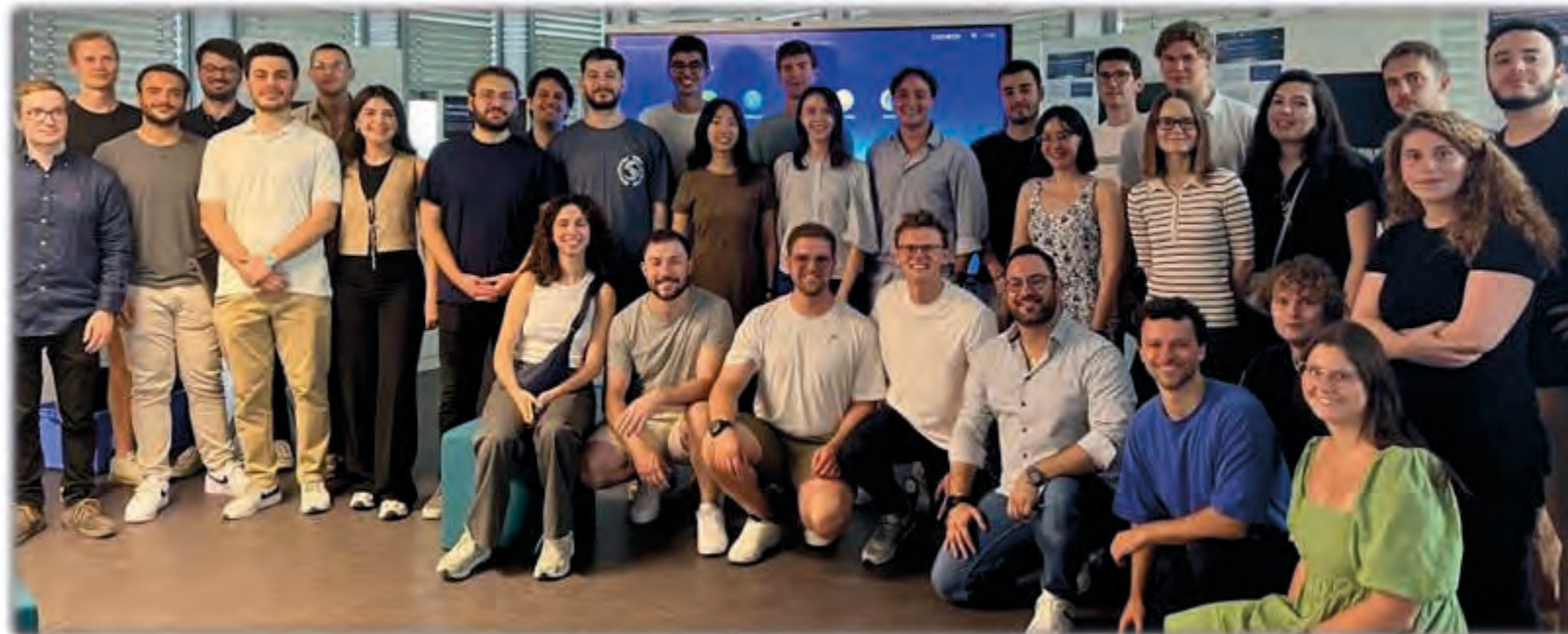
Workshops

Next Steps

# Introduction.

Learning Goals  
Involved Stakeholders

# Introduction



# Introduction

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## Learning Goals

### Problem Solving

Learn to tackle complex industrial challenges using innovative digital solutions.

### Entrepreneurial Thinking

Cultivate entrepreneurial skills by formulating a product plan and navigating customer collaboration.

### Technical Proficiency

Gain hands-on experience in creating technically excellent digital products.

### Collaboration and Communication

Enhance teamwork and communication skills through group-based projects.

# Introduction

## Involved Stakeholders



**Prof. Andrea Stocco**

Professor (TUM, fortiss)



**Florian Angermeir - Siemens**

PhD Student (fortiss, BTH)



**Parisa Elahidoost - Itestra**

PhD Student (fortiss, BTH)



**Dr. Jannik Fischbach - Netlight**

Consultant (Netlight, fortiss)



**Lukas Thode - Creatum**

PhD Student (BTH)



**Andreas Bauer - BTH**

PhD Student (BTH)

# Challenges.

Creatum

Itestra

BTH

Netlight x Digital School Story

Siemens

**Creatum.**



## Patrik Jonsson

- Improved software and business development for 35+ years:
- Software engineering and agile methods
- Advanced tools
- Artificial intelligence in the last 9 years
- Co-author: Software Reuse: Architecture, Process and Organization for Business Success

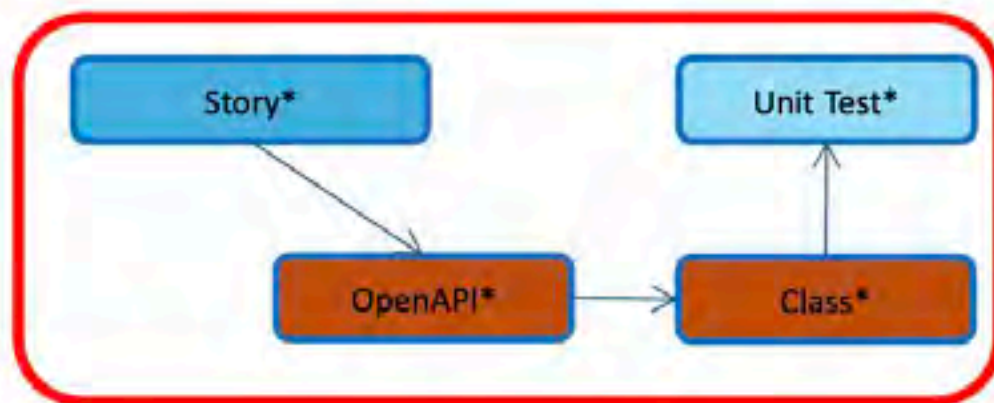


**Teamplayer fundamentally changes the way you develop and manage your systems**



- 100% increased productivity
- Increased quality
- Dramatically reduced TTM
- "Human in the loop"
- ... Just the beginning

# The context





## Challenges

1. Predictable code generation
2. High precision code generation
3. In various languages
4. From mix of sources
5. With high repeatability
6. Using different frameworks
7. Following various patterns: Clean Architecture, etc.
8. With a plug-and-play approach
9. Including generation of Unit tests
10. Delta code generation
11. Traceability management
12. Traceability based updates on change
13. Agent based stuff....
14. **Security by Design**

## Clean Architecture

### Clean Architecture

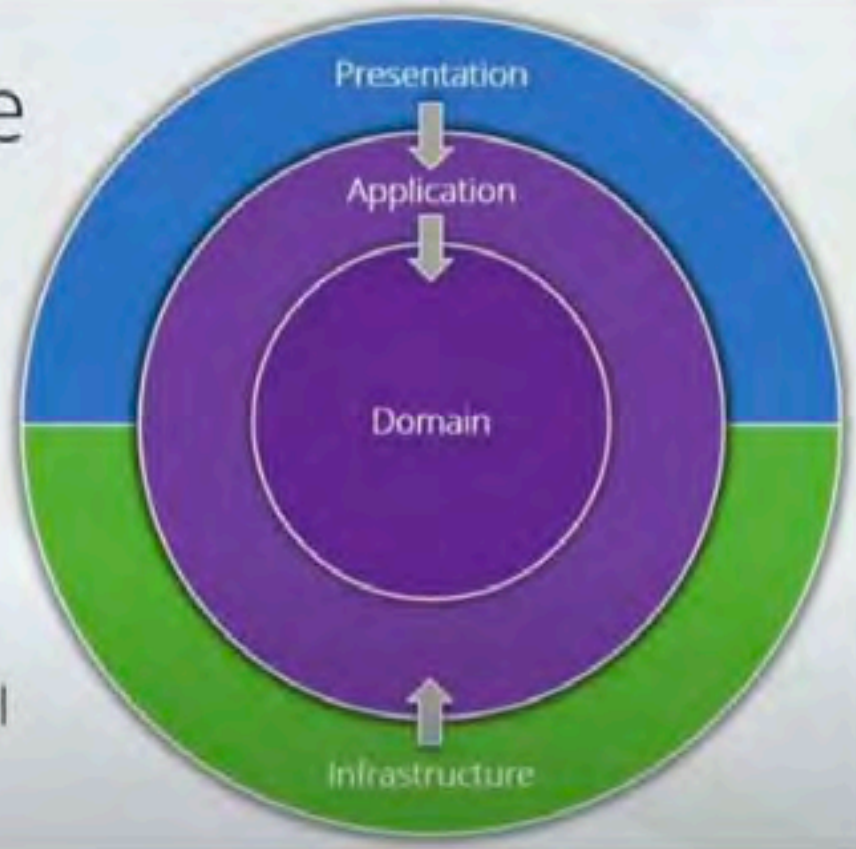
Independent of frameworks

Testable

Independent of UI

Independent of database

Independent anything external





## A potential solution

Now please generate the required {programming\_language} files and classes inside the {component\_name} component. While trying to align with the already existing classes as much as possible, use the following structural\_pattern: {design\_pattern}

Now, adhere to the following pattern to each class {design pattern}

The classes that provides REST endpoints should call their corresponding operations. The entity managing class should manage their entity, including acquiring DB connections. For each class, make sure to adhere to the programming\_language format for naming. Also, try to align as much as possible with the existing classes and their imports.

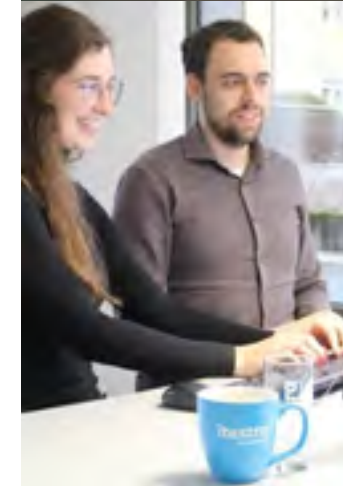
```
"customer.py": {
    "type": "Entity",
    "filepath": "/app/models",
    "file_extension": ".py",
    "definition": "from app.extensions import db # Always needed\n\nclass Customer(db.Model):\n    __tablename__ =\n"},
"customer_service.py": {
    "type": "Service",
    "filepath": "/app/services",
    "file_extension": ".py",
    "definition": "from datetime import datetime, date\n\nfrom app.extensions import db\n\nfrom app.models.customer\n"},
"customer_controller.py": {
    "type": "Controller",
    "filepath": "/app/controllers",
    "file_extension": ".py",
    "definition": "from flask import Blueprint, request, jsonify, abort, render_template\n\nfrom app.models.customer\n"},
"customer_detail.html": {
    "type": "Jinja Template",
    "filepath": "/app/templates",
    "file_extension": ".html",
    "definition": "{% extends 'layout.html' %}\n\n{% block content %}\n<div>{{ customer.name or 'New Customer' }}</div>\n{% endblock %}\n"},
"customer_list.html": {
    "type": "Jinja Template",
    "filepath": "/app/templates",
    "file_extension": ".html",
    "definition": "{% extends 'layout.html' %}\n\n{% block content %}\n<div class='container mt-4'>\n\n</div>\n{% endblock %}\n"}
}
```



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Itestra.

- ▶ **2004** founded
- ▶ **160+** employees (+ **30** working students) across Europe
- ▶ **90+** customers (automotive, insurance, banking, ...)
  - ▶ **Solution Engineering**  
IT solutions for core business processes
  - ▶ **Governance & Renovation**  
Optimization and migration
- ▶ Applying a large **variety of technologies**
  - ▶ From legacy (e.g. COBOL) ...
  - ▶ ... to cutting edge (e.g. applying GenAI)
- ▶ **100 % Computer Science and technology focus**





# itestra Event Exchange

## Employee Matching at Company Events



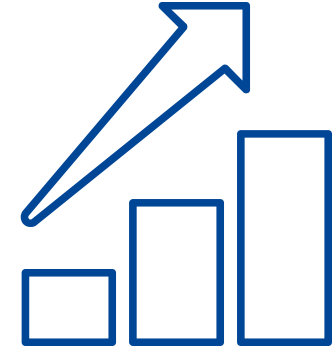
# itestra events

- ▶ **Multiple events per year** (Winter- and Summer-Event, Year-End-Party, ...)
- ▶ Last Summer in **Stockholm**
  - ▶ **150 employees**
  - ▶ Additionally: **40+ partners**
- ▶ All should have the opportunity to get to **know each other**



# Matching at Company Events

- ▶ We want to improve the connections within our **staff**
  - ▶ Find employees who **do not connect often**
  - ▶ Enable **exchange between different roles, locations etc.**
- ▶ Different activities
  - ▶ **Seating plan** for lunch/dinner of Events
  - ▶ **Speed Networking** at Year End Party
  - ▶ **Restaurants** distribution at Exchange Days
- ▶ Multiple requirements depending on Event/Activity
  - ▶ Different event locations and seating areas
  - ▶ Multiple parameters for best match



# Possible Solution – Web Application

- ▶ **User Interface** to assist at:
  - ▶ **Import/create** data for employees, seatings, room etc.
  - ▶ **Defining constraints** for matching
- ▶ **Algorithm** to create matches
  - ▶ Probably **SAT Solver** (Backend)
  - ▶ Other approaches are also welcome
- ▶ **Criteria** to be met
  - ▶ **Importing** employee data (with extendable parameters)
  - ▶ **Creating/managing** tables, rooms etc. (possibly using plan of room)
  - ▶ Keeping track of **last matches**
  - ▶ Adding **different constraints** for matching
  - ▶ And more criteria to be **analysed** through requirements engineering



# Deliverables

- ▶ What will we provide?
  - ▶ Requirements
  - ▶ Testdata
- ▶ What will you provide?
  - ▶ Repository containing the application
  - ▶ Documentation of the installation and usage
  - ▶ Nice-to-have:
    - ▶ Containerization of the application
- ▶ Contact of itestra: Stefan Haas (haas@itestra.de)

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**BTH.**



- ▶ **Software Engineering Research Lab (SERL) at BTH in Sweden**
- ▶ BTH conducts research focused on digitalisation and sustainability and is usually conducted in collaboration with industry and society.
- ▶ **Stakeholder:**
  - ▶ **Andreas Bauer** (researcher with a focus on GUI-based testing and collaborative practices)

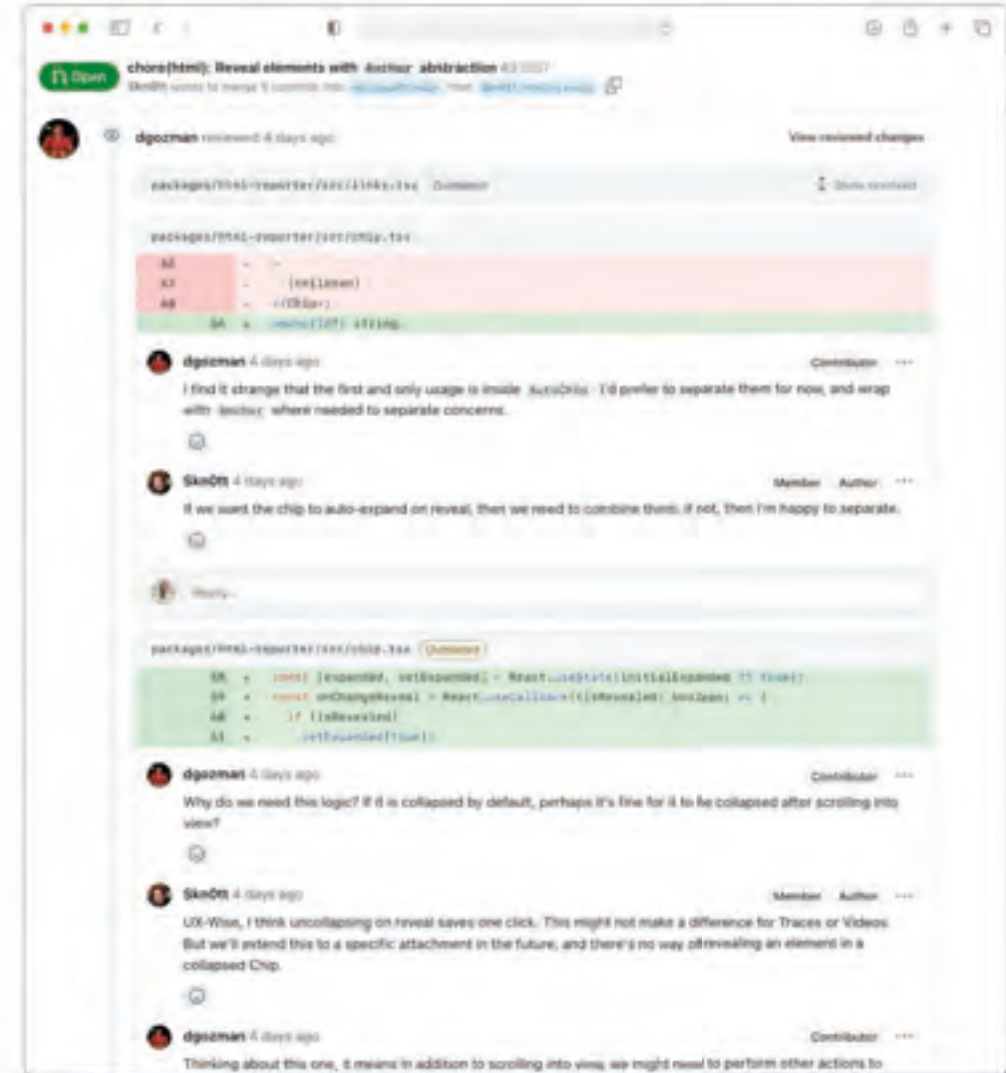


Blekinge Institute  
of Technology



# Background – Code Reviews

- Is the **discussions around changes** among developers and testers
- It is a **core practice** for collaborative software engineering
- Improves **software quality** and facilitates **knowledge sharing**





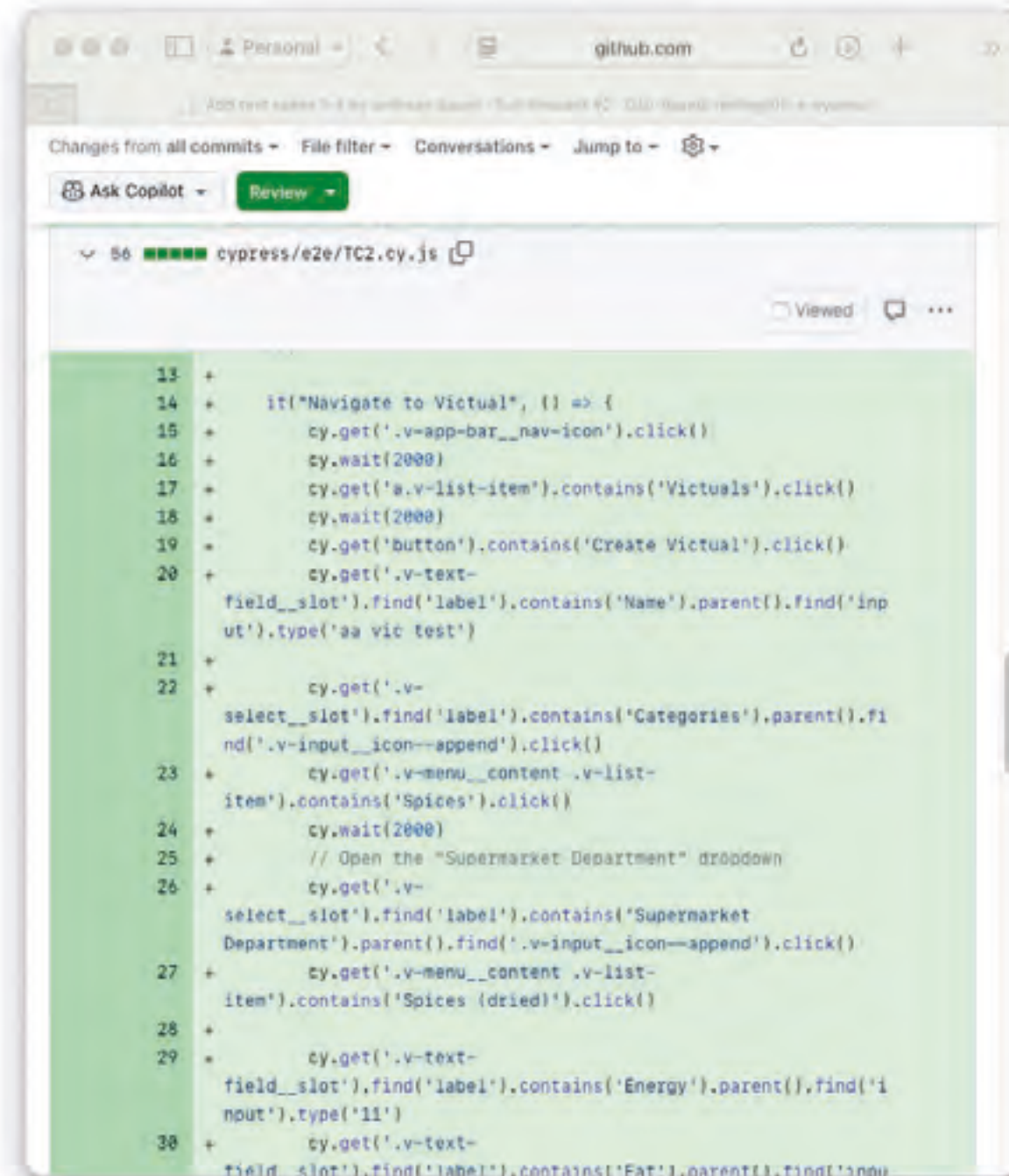
# Background – GUI-based Testing

- ▶ Testing the **whole system** through its **GUI**
- ▶ Through **interactions with widgets** of the system, similarly as a user would do
- ▶ Allows to detect **defects in the GUI**, as well as the **underlying functions**
- ▶ Common testing tools are
  - ▶ Playwright, Cypress, and Selenium



# Problem Statement

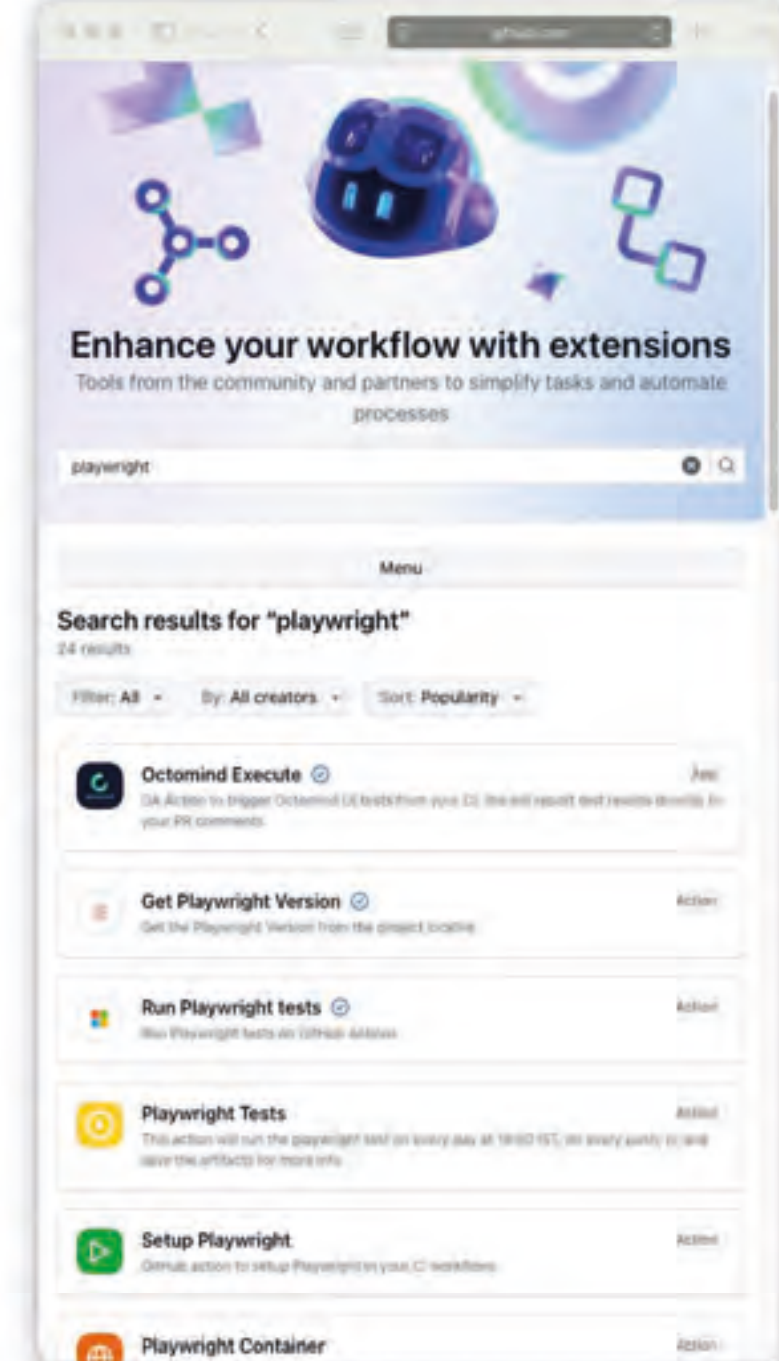
- ▶ Code review tools lack support for testing relevant information
- ▶ Context (GUI under test) is missing during review
- ▶ Testers are interested in other information than developers
- ▶ Guidelines for conducting code reviews focus only on production/source code
- ▶ This results in ad-hoc review processes and the need for testers to inspect tests on their local machine



# Potential Solution

**Goal:** Support the code review process for GUI-based testing files to improve the quality of tests and allow knowledge-sharing.

- ▶ Potential tool solutions to improve the code review process
  - ▶ Automation of code review guidelines
    - ▶ As automated checks, like code linters
    - ▶ Provide missing test-relevant information
  - ▶ Visualization of changes
    - ▶ Visualize the missing context of the GUI
    - ▶ Visualize the impact on the code base
- ▶ Integrated into GitHub
  - ▶ As part of a Pull Request (PR)
  - ▶ As an extension publicly available in GitHub's marketplace



# Netlight. x Digital School Story.



## Automation of feedback for students' video.

TUM - April 23, 2025

We prepare people for a self-determined life.



# DigitalSchoolStory gGmbH.

We're passionate about transforming the potential of social media for education and social participation. Instead of excluding young people from the digital space, we support them in shaping it confidently and responsibly. By tapping into their enthusiasm for social media, we're nurturing key skills for the future and empowering students to take charge of shaping our digital society.



Nina Mülhens

Geschäftsführerin und Co-Founderin



Siegfried Baldauf

Geschäftsführer und Co-Founder

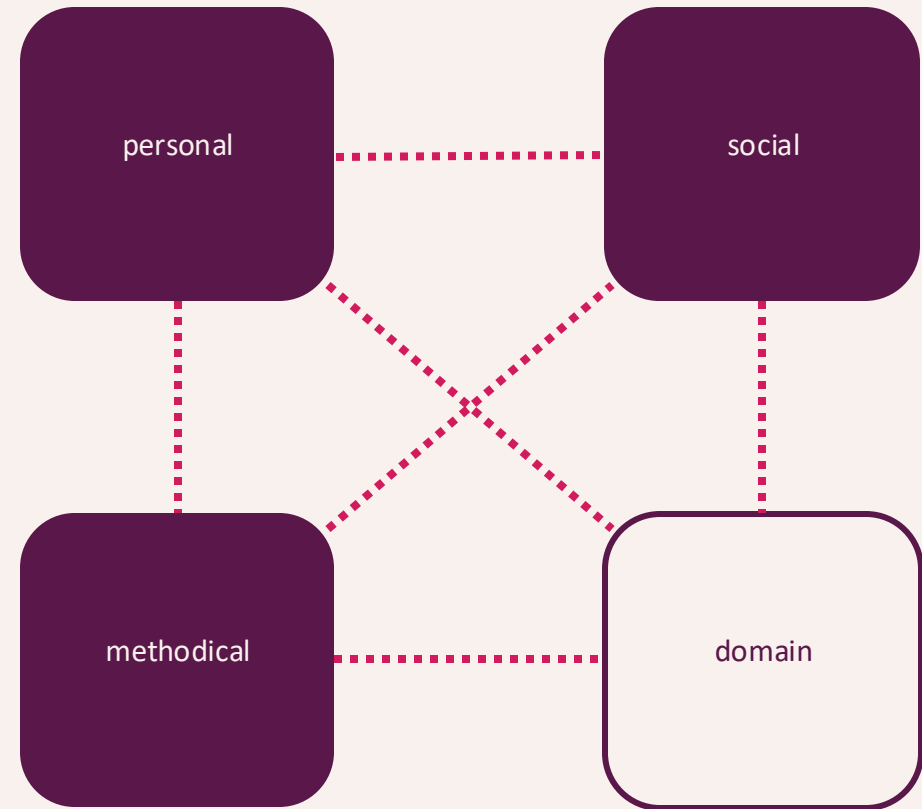
# 4K+

Communication  
Collaboration  
Critical Thinking  
Creativity  
Media Literacy

~~Consuming.~~

## Doing & create impact.

At DigitalSchoolStory, we absolutely love turning tables and transforming our classrooms! We transform them into vibrant, innovative spaces where students design independently in dynamic small teams. We are proud to share that over 11,000 students have already experienced the incredible learning journey with DSS!



## PHASE 1 - CONNECT & CONDENSATE



1. Project intro, topic distribution, agile way of working



2. Research, factsheet



3. Storytelling: storyline and red threaden



4. Storytelling: Storyboard

RETROSPECTIVE



## PHASE 2 - COLLABORATE & CO-CREATE



9. Q&A with Creator



8. Second shooting & editing



7. Revise storyline & storyboard



6. Blueprint video, speed dating



5. First shooting & editing

RETROSPECTIVE

## PHASE 3 - CONSOLIDATE & COMMUNICATE



10. Third shooting & editing



11. Video presentation



12. Feedback & Certificate

# Our Process.

47%

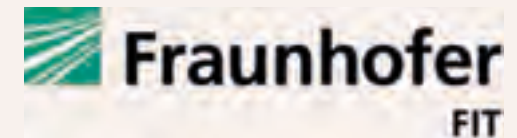
of teachers confirm that the learning method leads to a **deeper understanding** of the subject content.

78%

of students would like to **repeat DigitalSchoolStory in another subject.**

88%

of teachers **recommend the project to others.**



Wiss. geprüfte Lernmethode.



## Current Bottleneck.



### Need:

- Individual feedback of videos.

### Challenge:

- Feedback must be automated to enable growth plan

### Solution:

- AI-Creator

# High level approach

## AI Creator

### User

via Browser

- Students
- Teachers
- Administrators



Interface between Users and AI

- Calling API, providing results
- Enable prompt changes for administrators
- privacy-first approach
- No persistancy for videos

Project scope!

### AI Model

Standard (public) model  
or local implementation

- Privacy Requirements
- Costs



# Your challenge...

To be considered during design:

- Solution will be used in educational context and will be run by start-up that has no own IT department
- Use standard language & frameworks (maintenance) that fits best for you

API to AI.

Rail guards to prevent misuse.

School friendly user management.

UI for administrator to optimize prompt.

Concept for operations, maintenance and extensibility.

Evaluation on data protection aspects, costs. (NTH)

Alternative AI. (NTH)

### Skill development

Full stack development: API integration, UI/UX design, and working with AI models.

Experience in real world development challenges.

Consider full software lifecycle:

Development, operations, maintenance, extension, costs, data privacy.

### Impact-Driven Approach

With your work you will support a non-profit organisation and its goal in the educational sector

Thousands of students will benefit from the application.

## What's in for me...

Young people who make conscious usage of social media and can differentiate identify fake news are needed more than ever.

# Your contacts for the challenge



**Andreas Weber**

Volunteer Supporter, IT contact  
(30 years of experience in software industry)  
[andreas.w@digitalschoolstory.de](mailto:andreas.w@digitalschoolstory.de)



**Siegfried Baldauf**

CEO and Co-Founder  
[siegfried@digitalschoolstory.de](mailto:siegfried@digitalschoolstory.de)



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**Siemens.**

# About Me

## **Fabiola Moyón**

- Senior Key Expert Secure Agile & DevOps @Siemens
- Former CISO and IT Audit Lead
- 20+ years of experience
  
- Cybersecurity Researcher
- 7+ years of experience

# Background

- Almost all big companies have research and development division
- Business Value (e.g. 2900 patent applications in 2023)
- Reputation (e.g. innovation driver in healthcare imaging tech/clinical diagnostics)
- Public Value (e.g. >50.000 peer-reviewed publications)
- ~50.000 Employees work in R&D @Siemens
- Siemens invested 6.2 billion in R&D in 2023



# Problem Statement

- High investment (6.2 bn €), but...
- How well do we perform?
  - Number of patents?
  - Innovationleader?
  - Collaborations?
  - Impact?
- Where can we improve?
  - Which fields need more attention?
  - Who would be interesting collaboration partners?

# Potential Solution

## Goal

- Ad-hoc visibility into research position analysis
  - For specific research area (e.g. security compliance in devops)
  - For research teams
- Support common KPIs for informed decision making
- Results insightful for different stakeholders (e.g. researcher, manager)

# Organization.

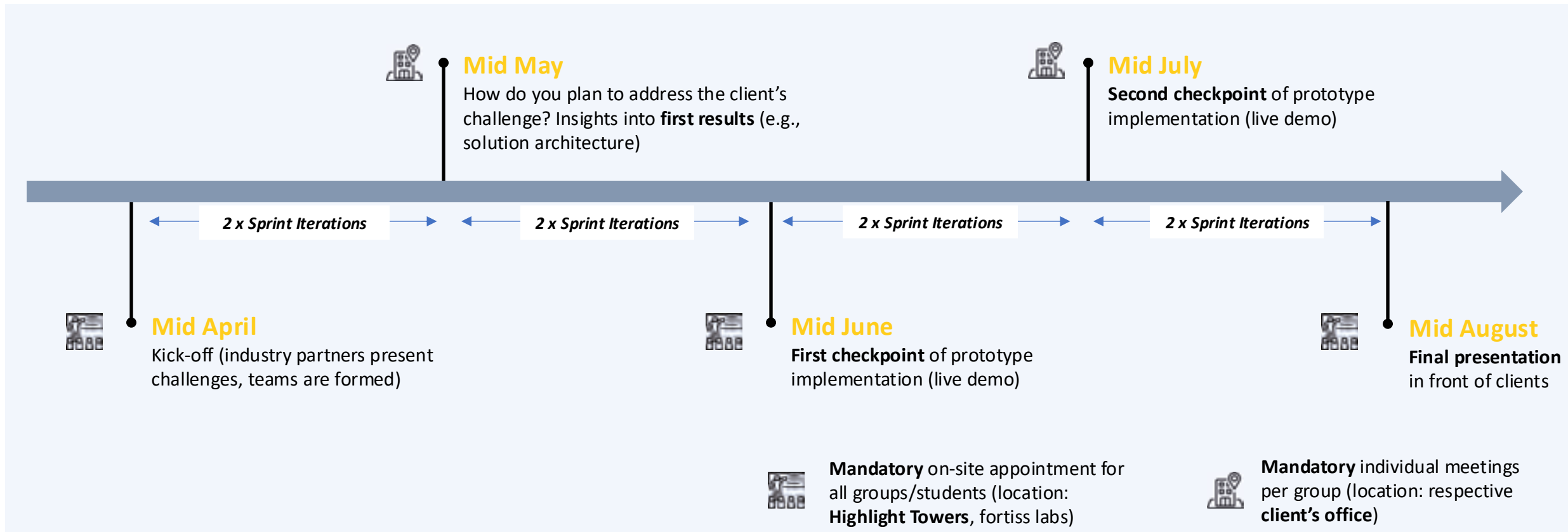
Course Schedule

Workshops

Next Steps

# Organization

## Course Schedule



# Organization

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## Course Schedule

### Mid May

How do you plan to address the client's challenge? Insights into **first results** (e.g., solution architecture)

### Activities

- Meet your client
- Understand the problem & analyse requirements
- Review requirements with client
- Draft solution architecture

### Deliverables

- Requirements document with epics and tasks
- Requirements integrated into product backlog
- System architecture diagram
- Envisioned Tech-Stack

# Organization

## Workshops

Requirements Engineering	Architecture	CI/CD
<p><b>Date</b> 2025-04-30 15:30-17:30</p> <p><b>Where</b> Online (To be shared)</p> <p><b>Prerequisites</b> None</p> <p><b>What</b></p> <ul style="list-style-type: none"><li>- Introduction to requirements engineering</li><li>- Hands-on guidance through process</li></ul>	<p><b>Date</b> 2025-05-08 16:00-18:00</p> <p><b>Where</b> Online (To be shared)</p> <p><b>Prerequisites</b> Requirements Engineering</p> <p><b>What</b></p> <ul style="list-style-type: none"><li>- Built on top of requirements engineering</li><li>- Engineer the architecture (from problem to solution space)</li><li>- Hands-on guidance through the engineering process</li></ul>	<p><b>Date</b> To be decided</p> <p><b>Where</b> Online (To be shared)</p> <p><b>Prerequisites</b> None</p> <p><b>What</b></p> <ul style="list-style-type: none"><li>- Hands-on introduction to continuous integration</li><li>- Hands-on introduction to continuous delivery</li></ul>

# Organization

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## Next Steps

Submit your challenge preferences



<https://tinylink.info/10Bxz>

Join the discord server



<https://discord.gg/gf5yurFA>

# Organization

## Summary

### Challenges

#### **Creatum**

Predictable Secure Code Generation in Teamplayer

#### **Itestra**

Event Exchange Platform

#### **BTH**

GUI Testing for Code Reviews

#### **Netlight x Digital School Story**

Automated Evaluation of Student Videos

#### **Siemens**

R&D Research Position Analysis Platform

### Next Steps

#### **Give your Challenge Preferences**

<https://tinylink.info/10Bxz>

#### **Join the Discord Server**

<https://discord.gg/gf5yurFA>



# Vielen Dank!



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