STAR WEST
A TECHWELL EVENT

T20

Test Automation

Thursday, October 4th, 2018 3:00 PM

An Innovative Test Automation Approach without Making Test Cases

Presented by:

Mehmet Duran and Hatim Chahim

ProRail

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TECHWELL™

Mehmet Duran

Mehmet Duran is a Project Leader in Automation. He offers experienced-based QA and tooling service which improves the software quality within organizations. At a company in the railway sector he has implemented automation within a complex IT landscape. As a Project Leader Automation, he is focused on implementing innovative solutions around the QA. Mehmet also offers training, and consulting services helping clients evolve their business processes and make it more efficient.

Hatim Chahim

Hatim Chahim is an experienced program (test) manager, agile project manager and senior advisor test tooling with more than thirteen years' experience in IT industry and is currently working at ProRail. He has worked at the largest IT companies such as Capgemini and Accenture. Within ProRail, Hatim is responsible for managing large test teams at program level. At the program level, Hatim has developed test policies for test automation. Hatim has worked diligently to improve the test approach within the rail sector, making it both more accessible and functional. He is a leader in software and systems testing. He also gives training and consulting services about test automation tools.

An innovative test automation approach without making test cases

Hatim Chahim & Mehmet Duran

4 October 2018, STARWEST

How to keep 1.2 Million customers happy (each day)

Passengers per year

- 68 Million - Schiphol Airport
- 80 Million - Los Angeles Airport
- 88 Million - Railway Central Station Utrecht

Average per day

1.2 Million train passengers in The Netherlands

Innovative test automation approach

Agenda

1. ProRail

2. Why is Testing so Important to ProRail?

3. Mission critical systems at ProRail

4. Current situation ProRail: challenges in testing

5. Test Automation

6. The operation of the Test Automation Tool

7. Framework developed for comparison

8. Results of the comparison and lessons learned

Connexxion

Arriva

NS
(Dutch Railways)

DB Schenker

ProRail

ProRail is a major ICT Player in The Netherlands

-3 central datacenters
-13 local centers for Traffic Control

-Private GSM-R network
-500 software applications

-1 ProRail Test Center
-1 Backup Center

-Planning and control software among the top 10 largest and most complex software applications in The Netherlands
-No own SW development External SW suppliers

- 600 IT employees
- 200 mln Euro spending/year
- 1-0 IT projects/year

Demonstration ProRail

Why is testing so important? When IT system fails….

Headlines

NS roept ProRail op matje om storingen

(Novum) - De maat is vol voor de **Nederlandse Spoorwegen**. Een computerstoring bij spoorbeheerder ProRail die het treinverkeer rond **Amsterdam** donderdag urenlang platlegde, is
directie van NS bij ProRail al aan op verbeteringen, maar de NS roept ProRail nu nog een keer op het matje.

de Volkskrant

NS heeft genoeg van falende computers van Prorail

Rover na nieuwe storing: 'Stuur top ProRail naar huis'

21 mei 2008 - Bron: ANP

'ProRail moet sneller storing voorkomen'

Gepubliceerd: 4 april 2007 00:00 | Gewijzigd: 22 augustus 2008 18:07

PRORAIL ONDER DRUK

Politieke partijen en Rover roepen om snellere aanpak van spoorproblemen

woensdag 4 april 2007

DEN HAAG -- Spoorbeheerder ProRail moet er snel voor zorgen dat het aantal ernstige verstoringen van treinverkeer afneemt. Dat vinden politieke partijen en maatschappelijke organisaties na een incident waardoor gistermorgen het treinverkeer van en naar Tilburg helemaal stil kwam te liggen.

Rover: ProRail liegt over storingen

'Nog zeker jaar storing op spoor',

Geplaatst: 07 maart 2007 11:45, laatste wijziging: 07 maart 2007 11:45

Minister wil onderzoek storingen treinverkeer

dinsdag 11 september 2007 | 07:17

ProRail held accountable for IT failures

Dutch Railways (NS) is done with failing ProRail computers!

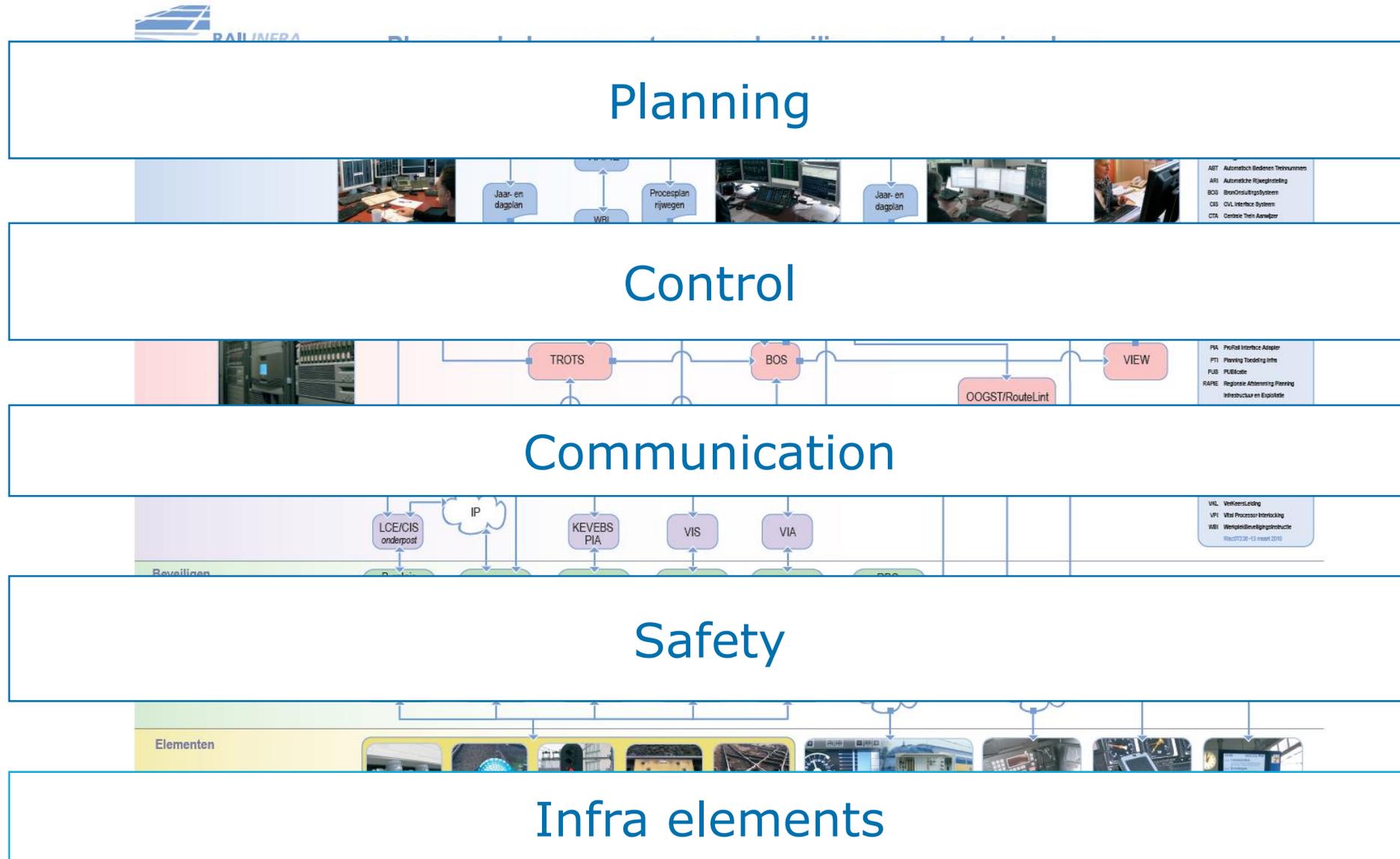*Send ProRail Management Board home!!*

ProRail under pressure to solve IT problems quickly!

Minister wants investigation train traffic malfunctions!!

# Logistics and traffic control systems

ICT architecture control systems

Planning

Control

Communication

Safety

Infra elements

Situation ProRail: challenges in testing

- No overall test approach and integration environment is missing

- Testing is vital for operation
  - 1ste time right
  - Customers demand a shorter time to market

- Agile way of working is growing
  - Test Automation is becoming more important

- Many Test Automation tools failed in implementation
  - Human factors
  - Maintenance problems with test scripts

Vision for the challenges
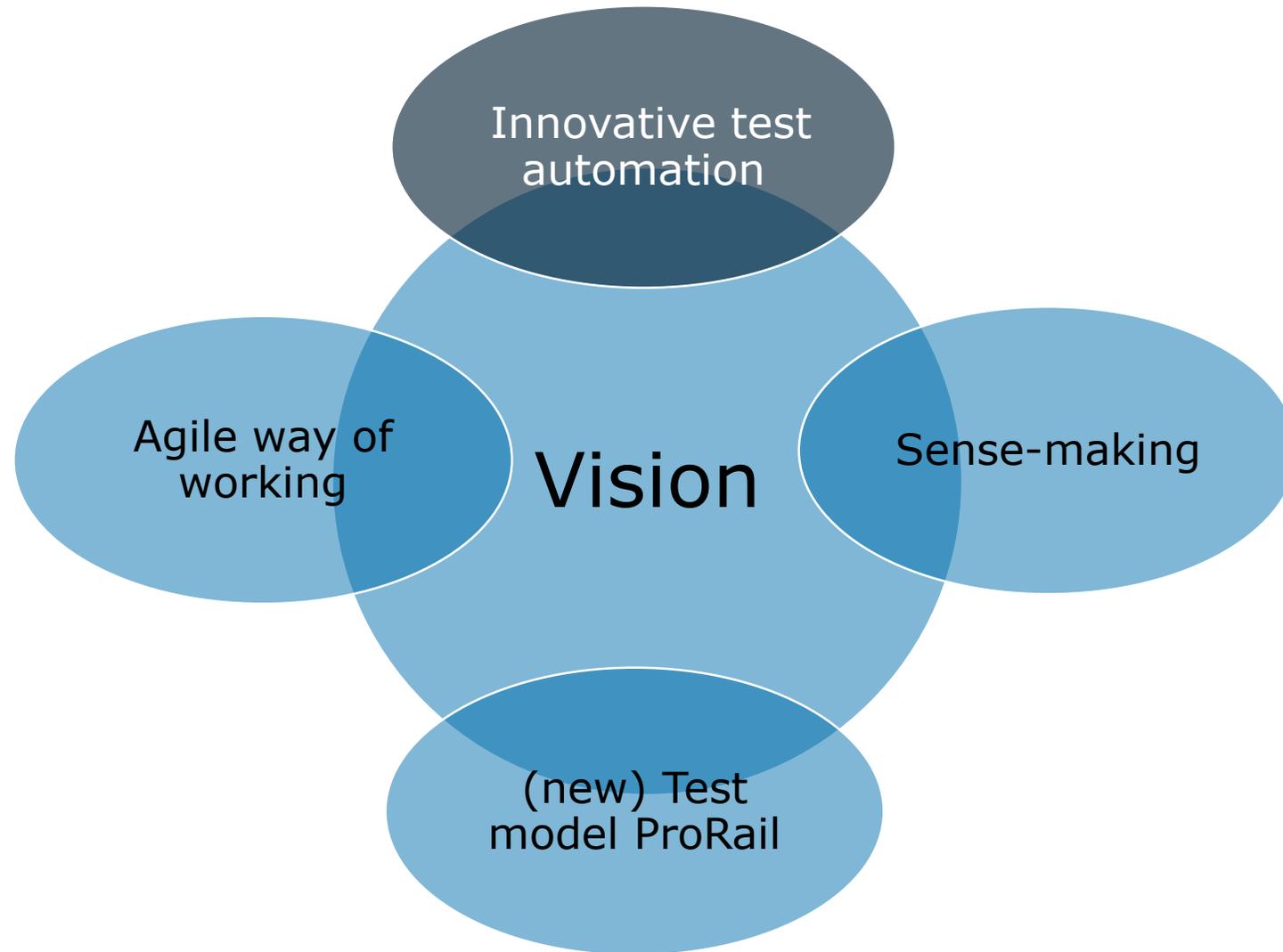
Experience with Test Automation?
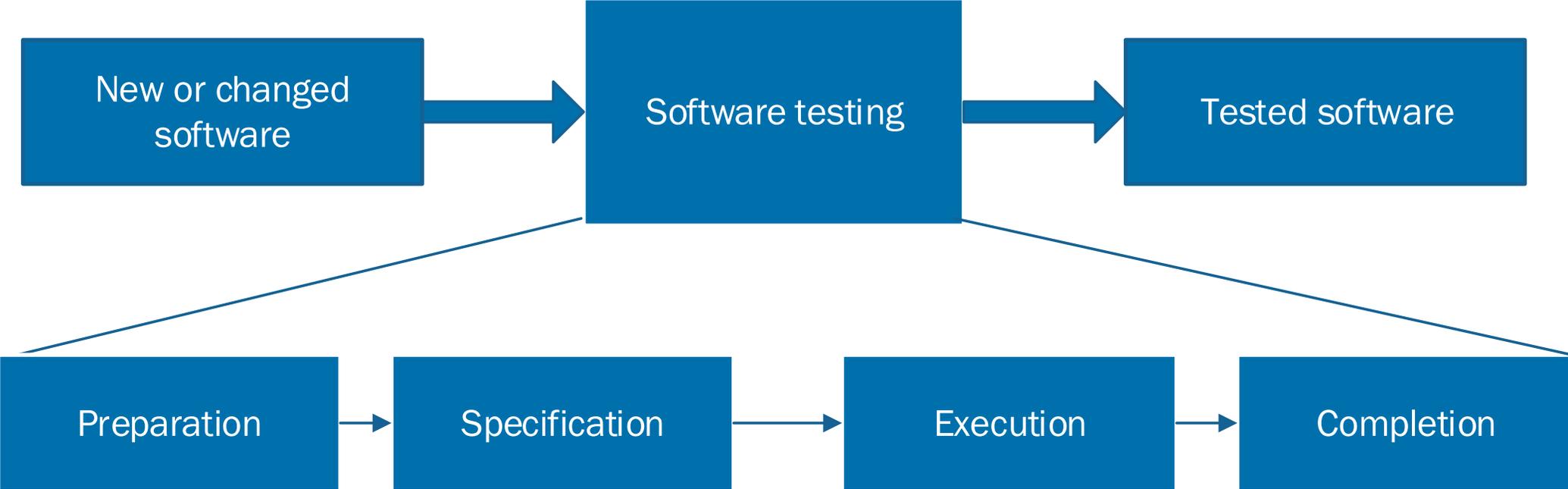
Who is doing test automation?

Are you using test scripts?

"Once you abandon the maintenance of the automation, it is likely to die. For a better chance of success, choose a test automation approach that will require the least maintenance"

(source: Dorothy Graham & Mark Fewster)

Context – Manual test approach at ProRail

UI Test Automation – Capture and replay

Capture and replay

Automates execution

User Interface (UI) test automation

UI Test Automation – Capture and replay

Capture and replay

Automates execution

Scripting based

Automates execution

User Interface (UI) test automation

UI Test Automation – Capture and replay

Capture and replay

Automates execution

Scripting based

Automates execution

Visual based

Automates execution

User Interface (UI) test automation

UI Test Automation – Capture and replay

Capture and replay

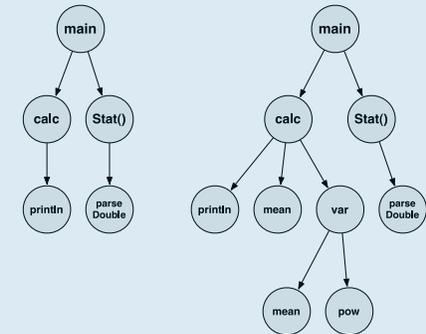Automates execution

Scripting based

Automates execution

Visual based

Automates execution

Traversal based

Automates specification and execution -TESTAR

User Interface (UI) test automation

TESTAR

Widget tree

(disabled)

Search

Form

Main Menu

```
settings().get(SuspiciousTitles);

for(Widget w : state){
        String title = w.get(Title, "");
        if(title.matches(titleRegEx)){
```
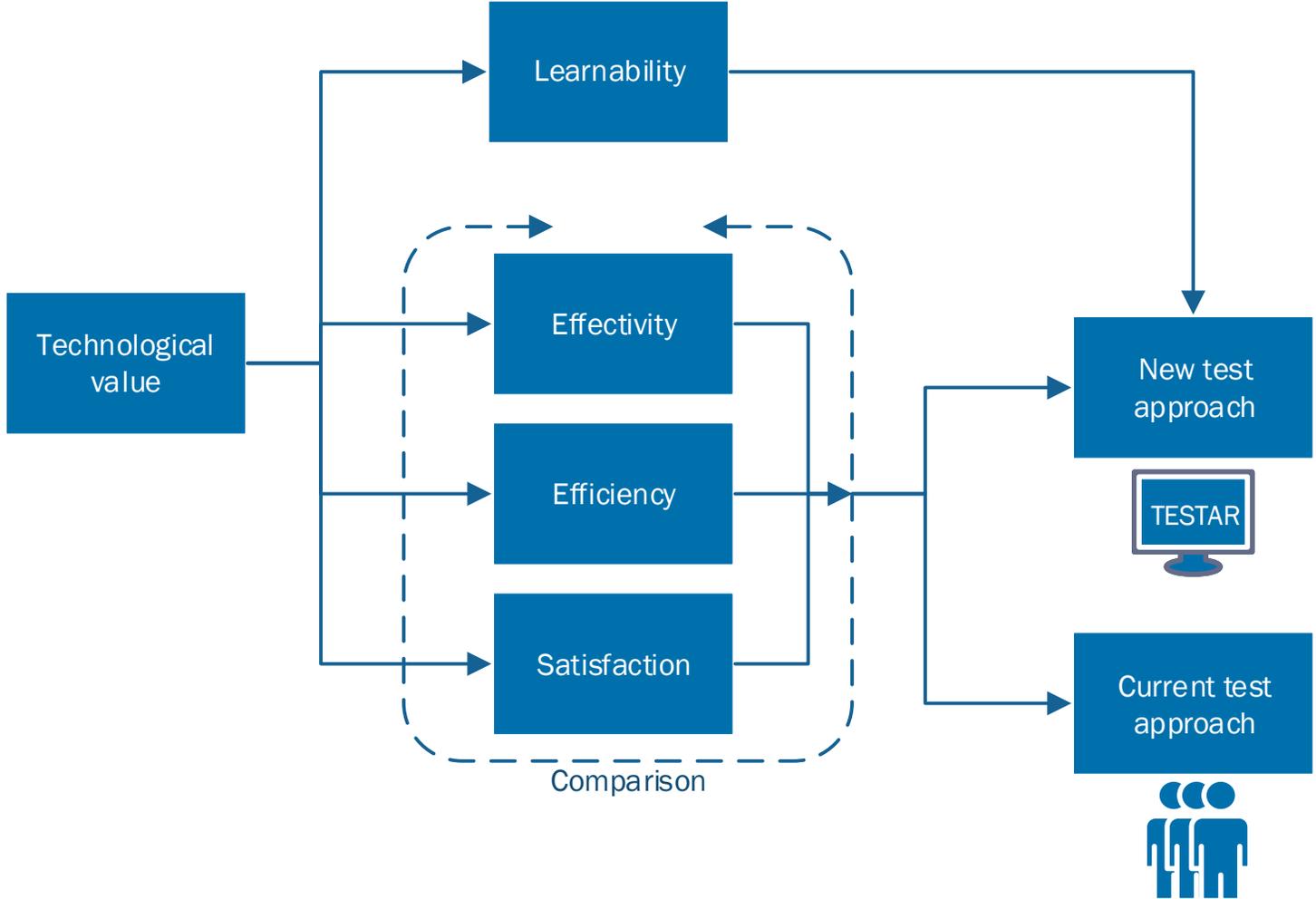
Demo - TESTAR
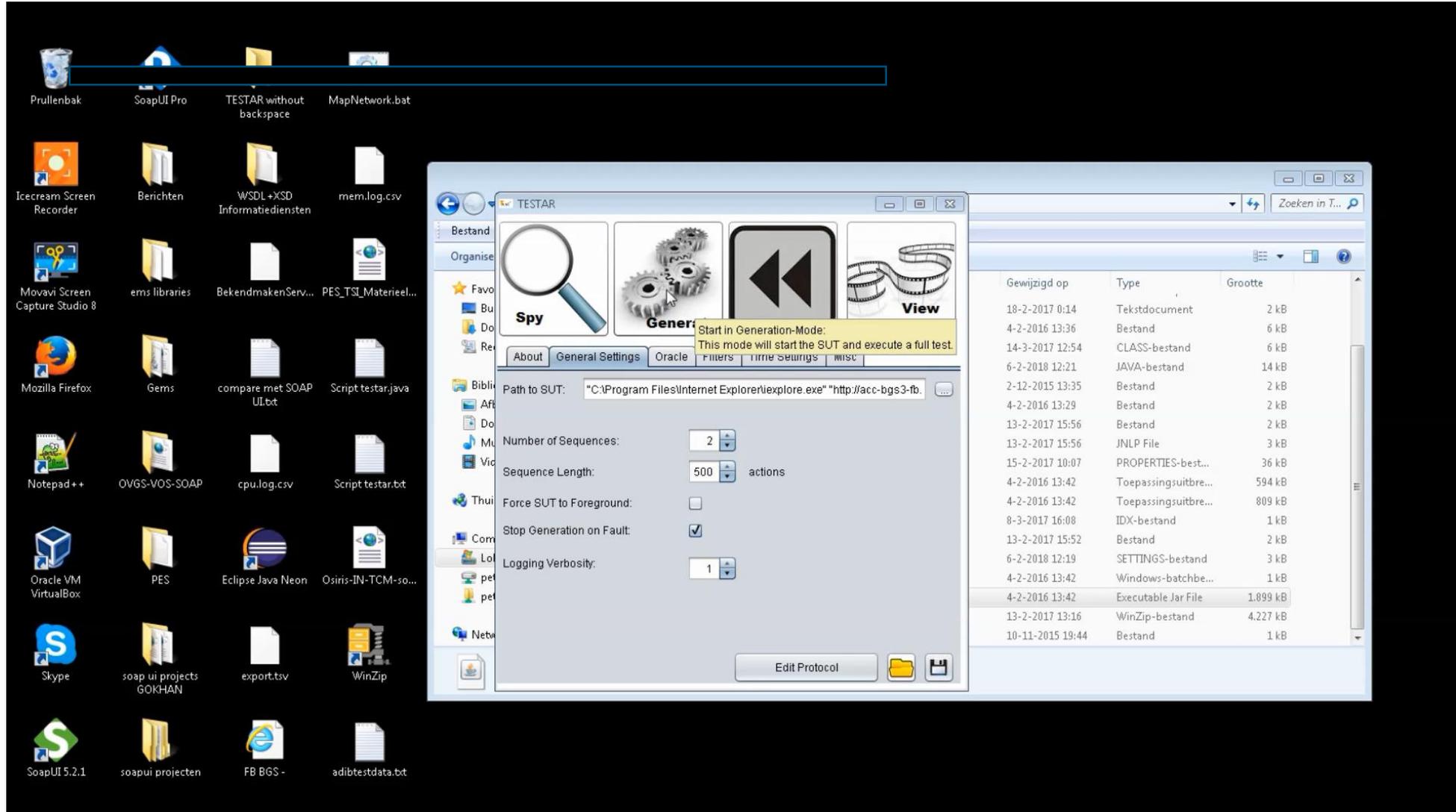
Framework for comparison (1)

Framework for comparison (2)

Learnability

- Time-tracked learning process
- Knowledge level
- Observation hands on learning process

Effectivity

- Number of faults
- Functional test coverage
- Interviews

Efficiency

- Time-tracked of:
  - Preparation
  - Execution
  - Evalution

Satisfaction

- Interviews
- Reaction cards

Results - Learnability

TESTAR

Learnability

- Time needed 10h
- Level of knowledge sufficient
- Knowledge has grown positively

Results - Effectivity

TESTAR

Learnability

- Time needed 10h
- Level of knowledge sufficient
- Knowledge has grown positively

Effectivity

- Four faults
- Impact seriously
- 80% coverage
- Offers variety
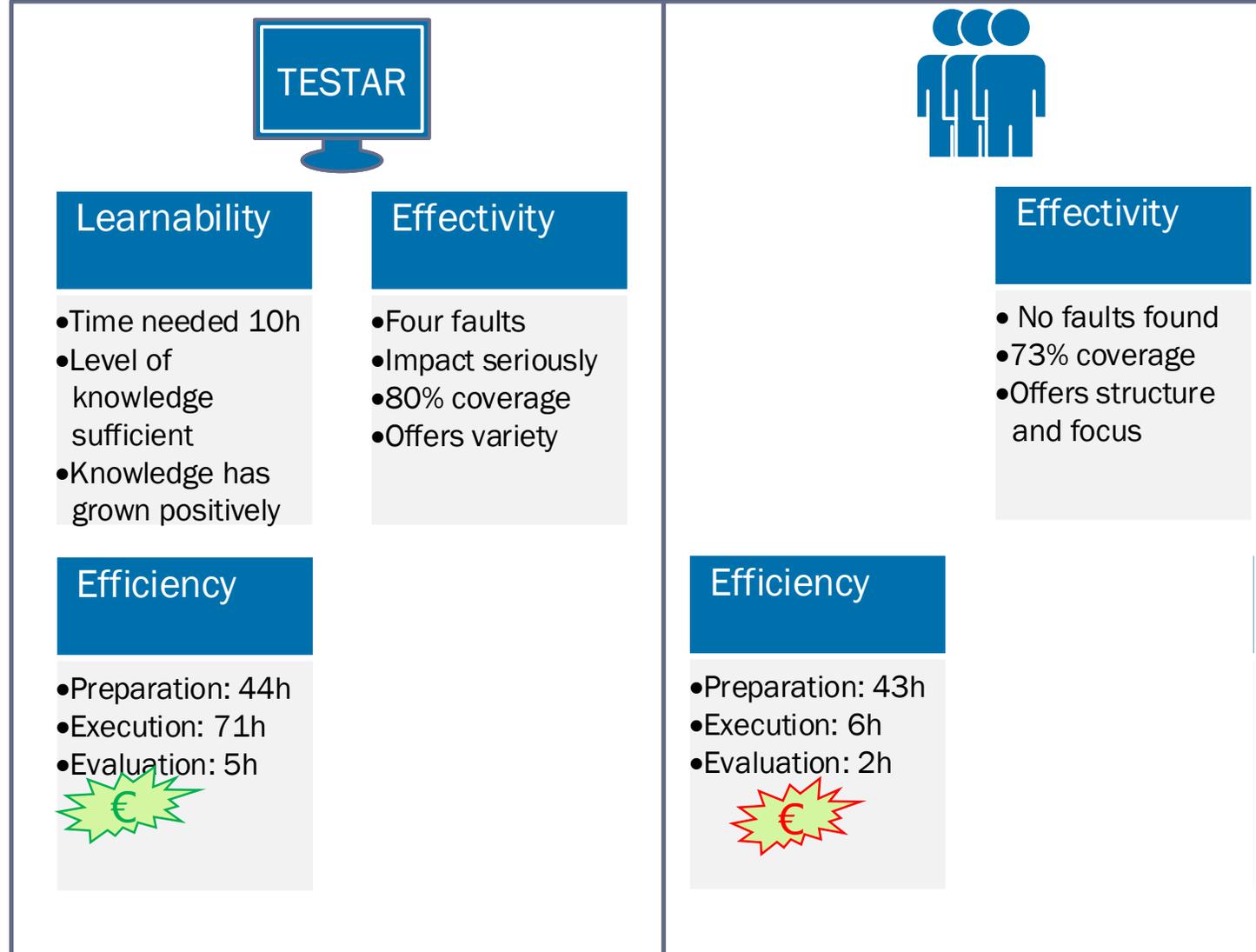
Effectivity

- No faults found
- 73% coverage
- Offers structure and focus

Results - Efficiency

TESTAR

Learnability

- Time needed 10h
- Level of knowledge sufficient
- Knowledge has grown positively

Effectivity

- Four faults
- Impact seriously
- 80% coverage
- Offers variety

Efficiency

- Preparation: 44h
- Execution: 71h
- Evaluation: 5h

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Effectivity

- No faults found
- 73% coverage
- Offers structure and focus

Efficiency

- Preparation: 43h
- Execution: 6h
- Evaluation: 2h

€

Results – Satisfaction

TESTAR

Learnability
- Time needed 10h
- Level of knowledge sufficient
- Knowledge has grown positively

Effectivity
- Four faults
- Impact seriously
- 80% coverage
- Offers variety

Efficiency
- Preparation: 44h
- Execution: 71h
- Evaluation: 5h

€

Satisfaction
- Impression grown
- User-friendliness prone to improvement
- Satisfaction rate 7

(People)

Effectivity
- No faults found
- 73% coverage
- Offers structure and focus

Efficiency
- Preparation: 43h
- Execution: 6h
- Evaluation: 2h

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Satisfaction
- Personal and familiar
- Time-consuming to use
- Satisfaction rate 7

Lessons learned

Lessons learned

- Complementary
- Framework in the railway sector
- GAP between theory and practice

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ACCEPTED

Challening TESTAR in an industrial setting

Thank you for listening!

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