(Research-)Softwareentwicklung für Non-IT'ler
Die Software Engineering Initiative des DLR

Carina Haupt (@caha42)

Deutsches Zentrum für Luft- und Raumfahrt (DLR)
Institut für Softwaretechnologie

OOP 2022
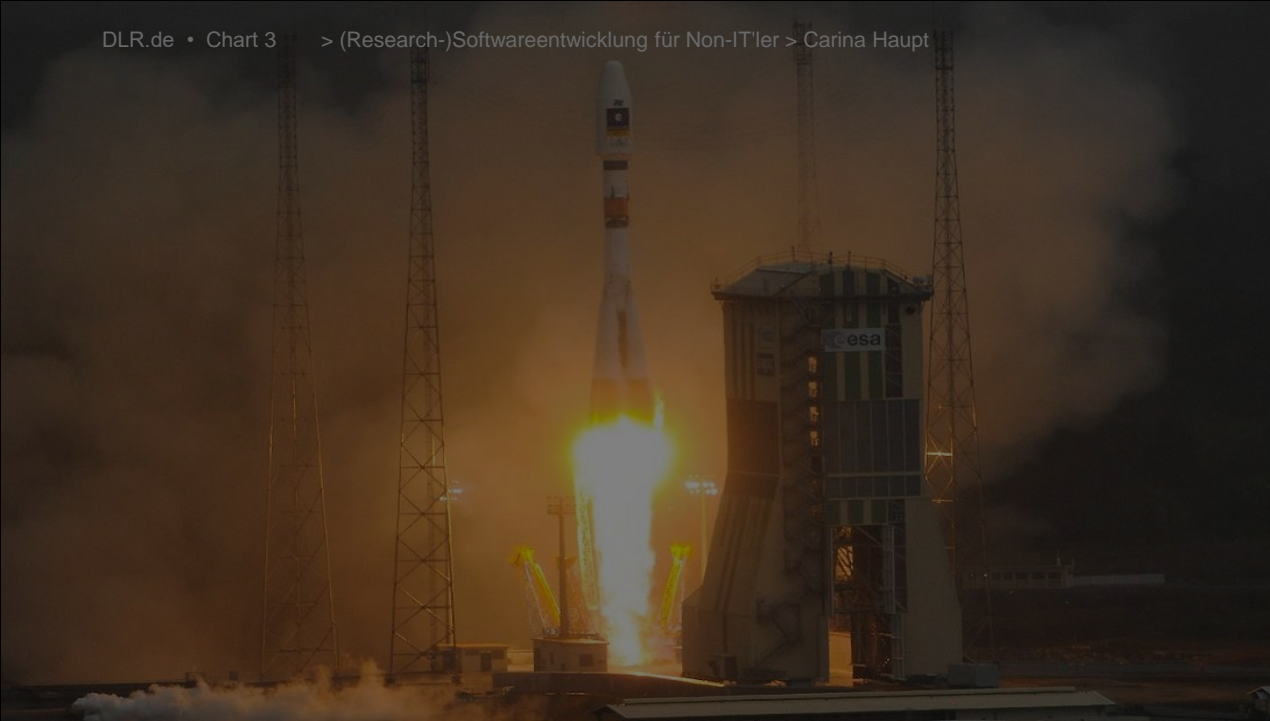
Knowledge for Tomorrow

German Aerospace Center (DLR)

Numbers

- About 10.000 employees
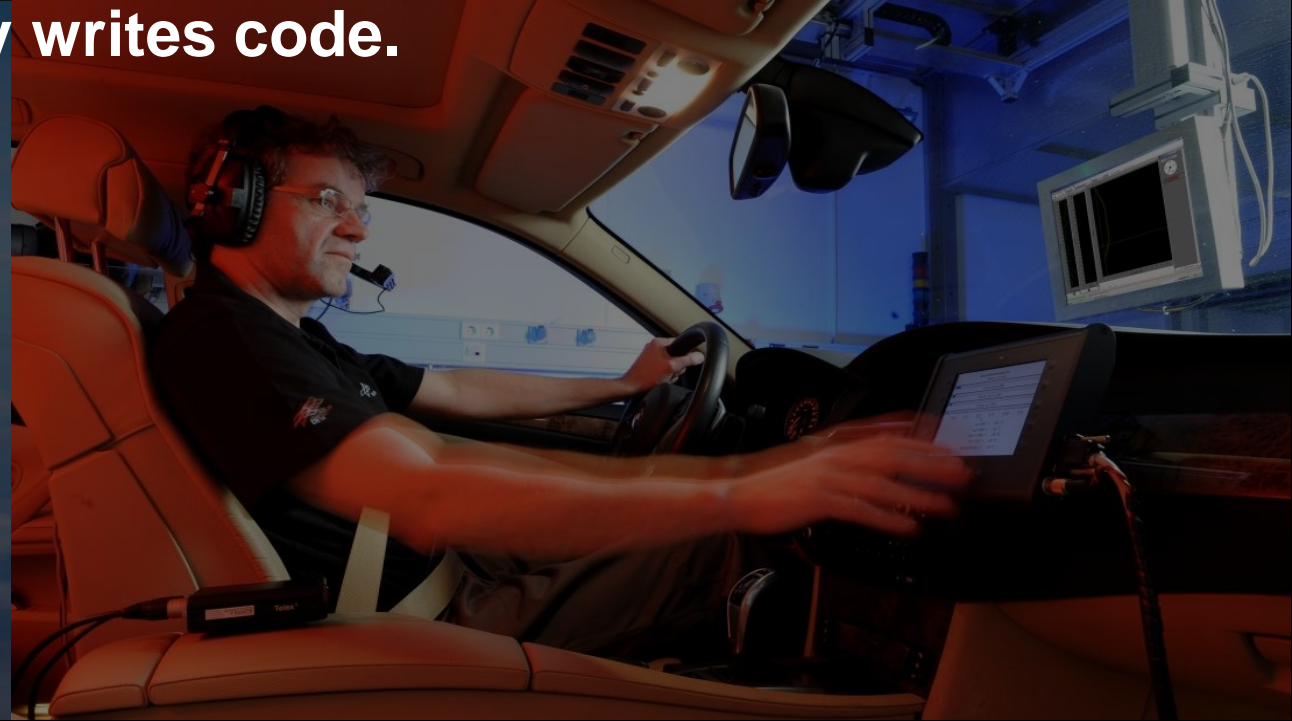
- 30 locations

- 54 institutes and facilities

Fields
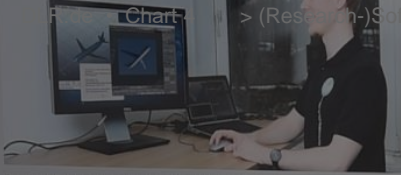
- Space

- Avionics

- Transportation

- Energy

- Safety

Everybody writes code.

Huge amount of software projects & variety of used software technologies

Technology
What programming language do you use at work?
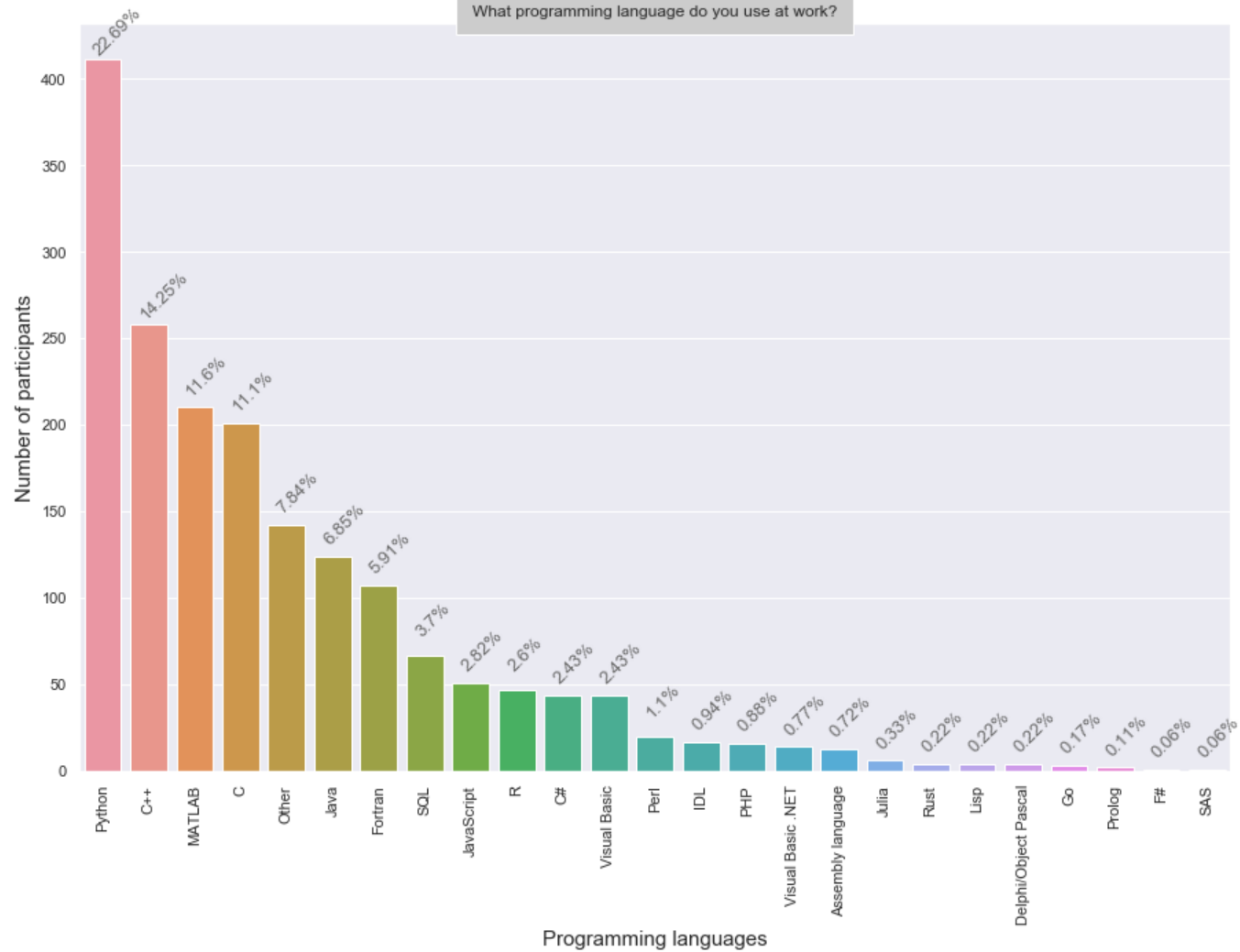
Most developers have no training in software development

Development
Version Control System
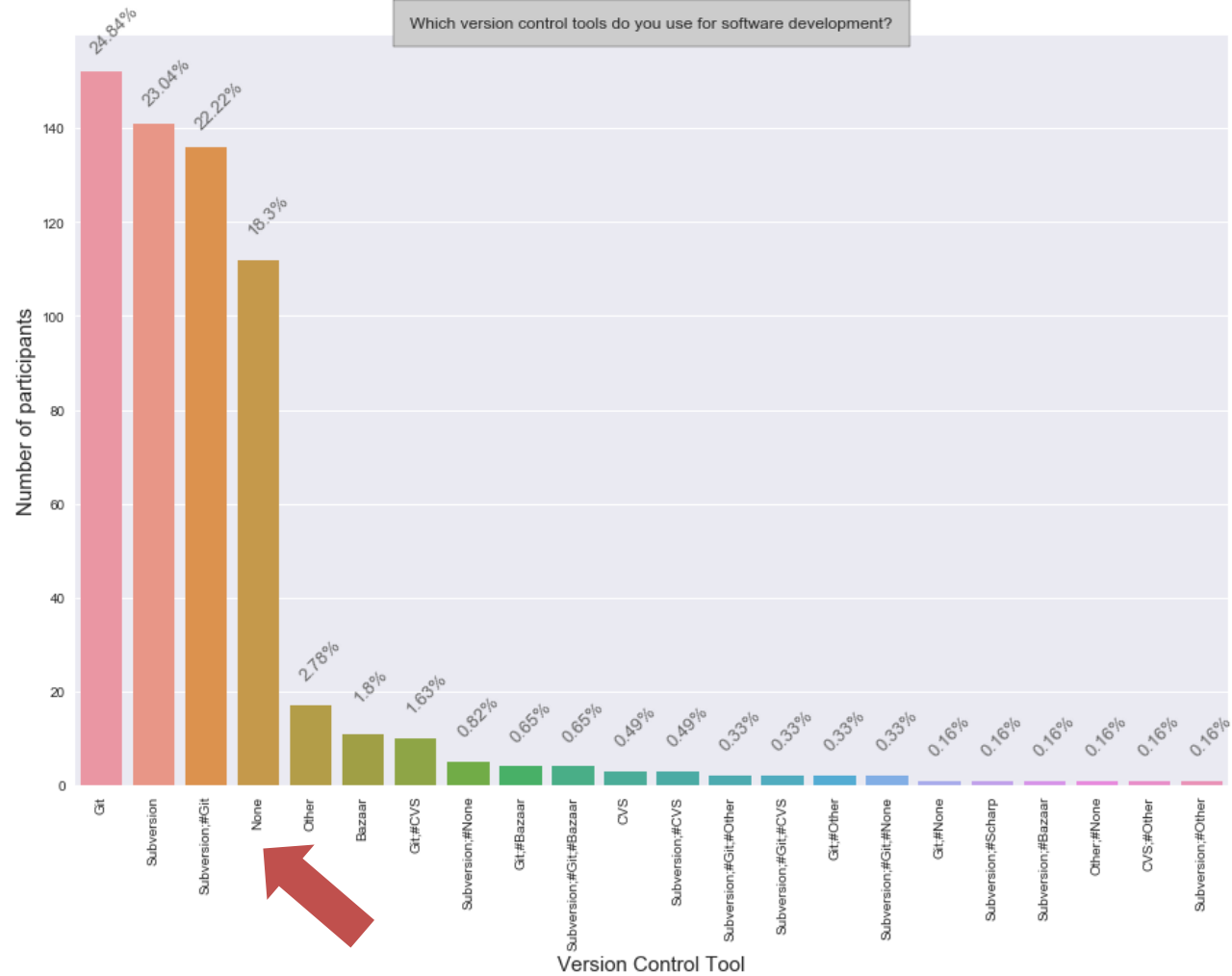
Development
Documentation
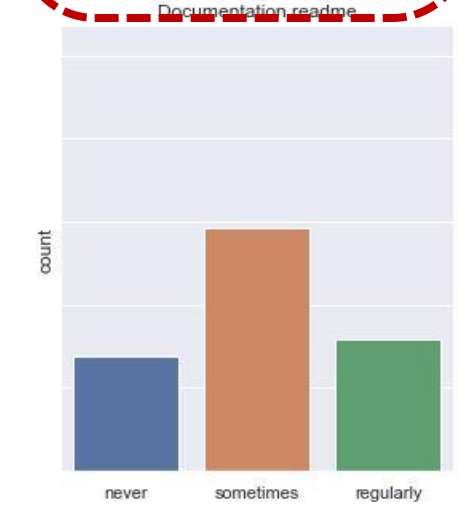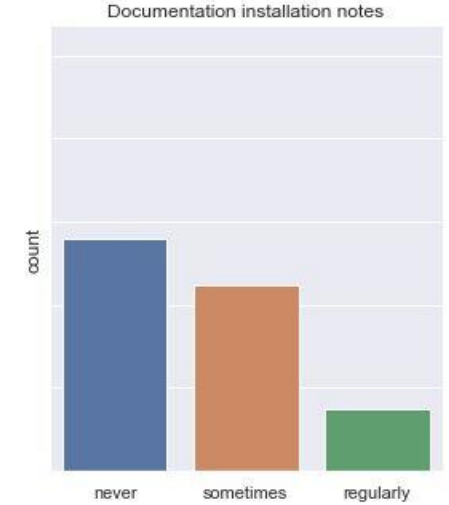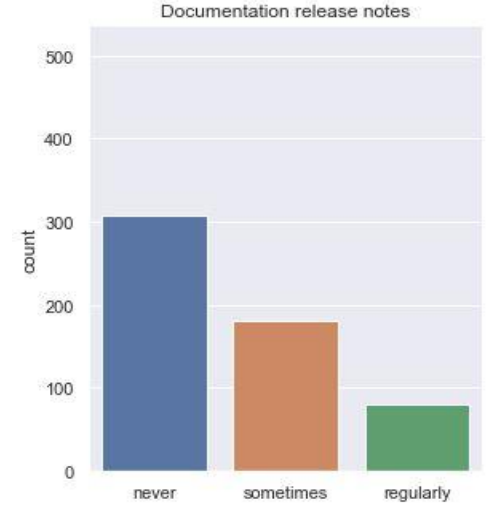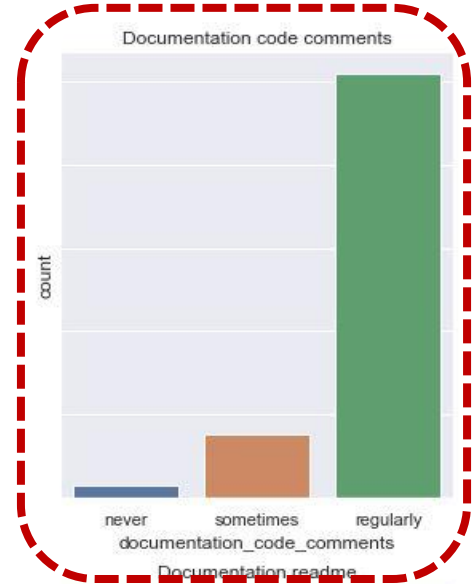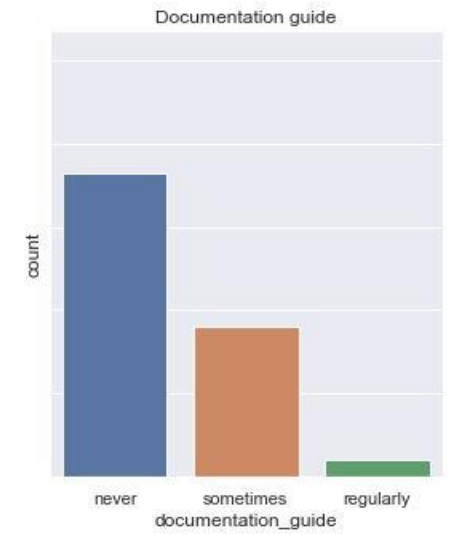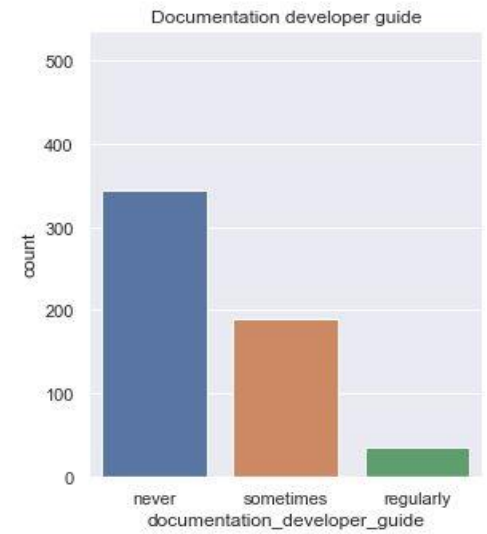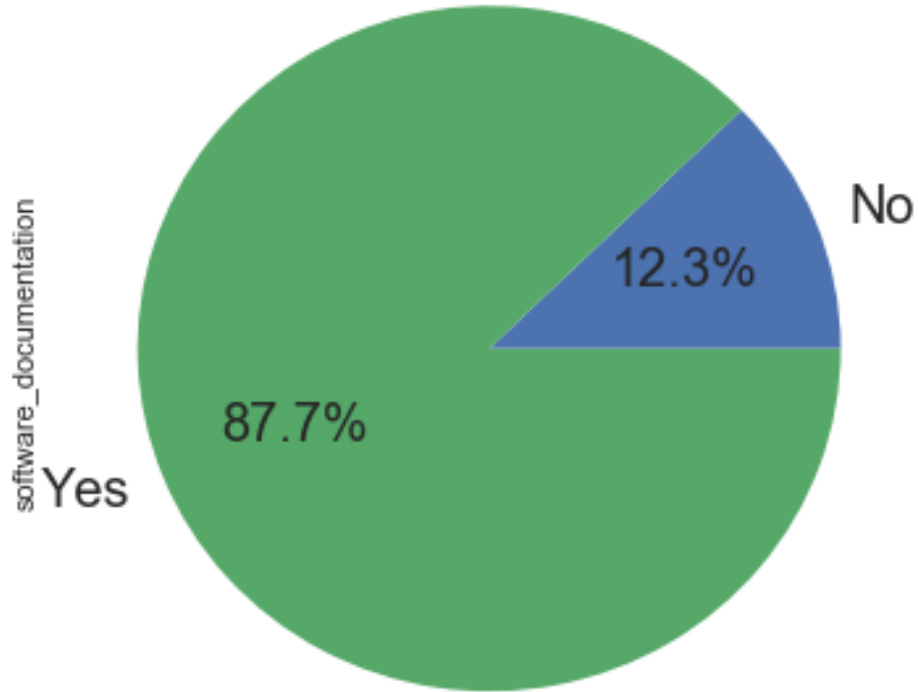
Development
Testing
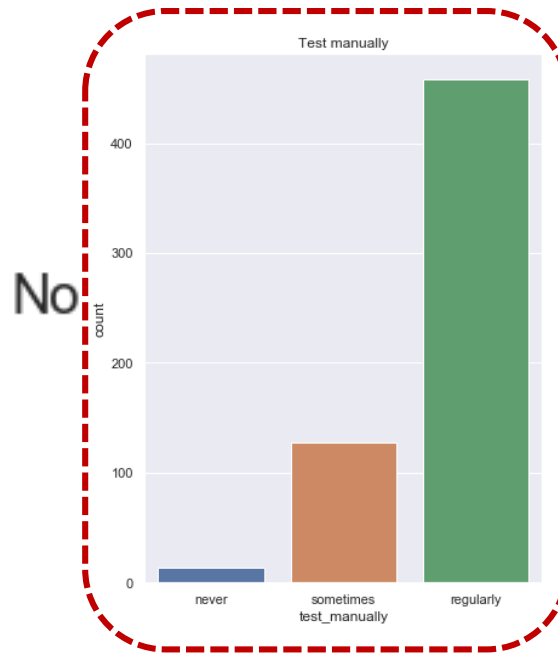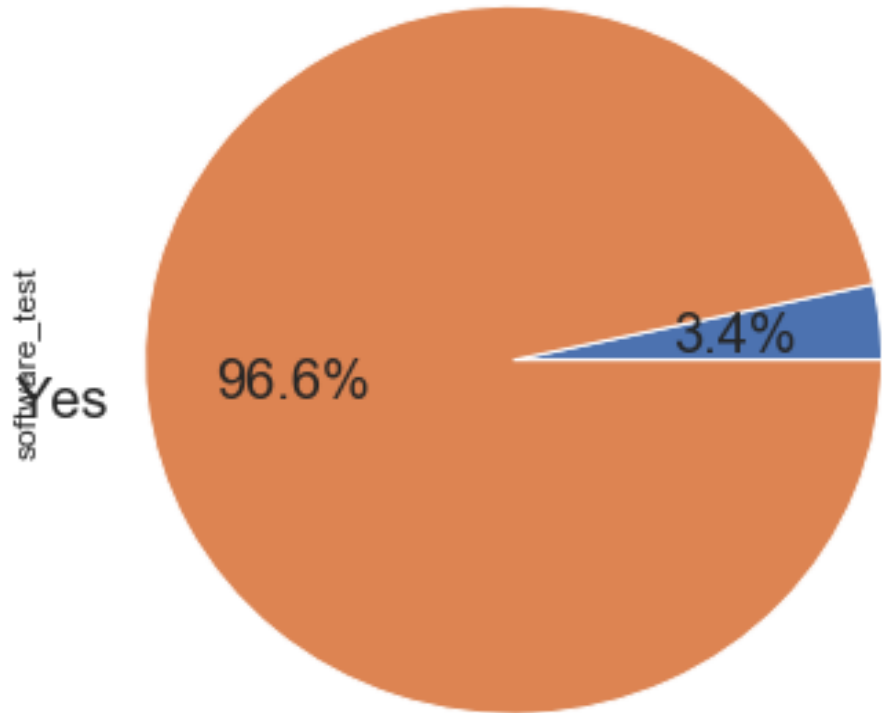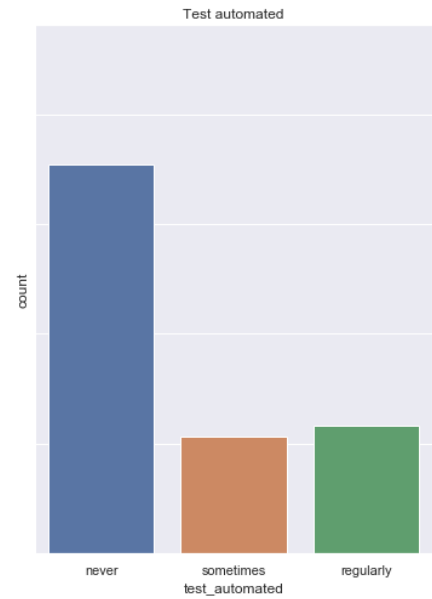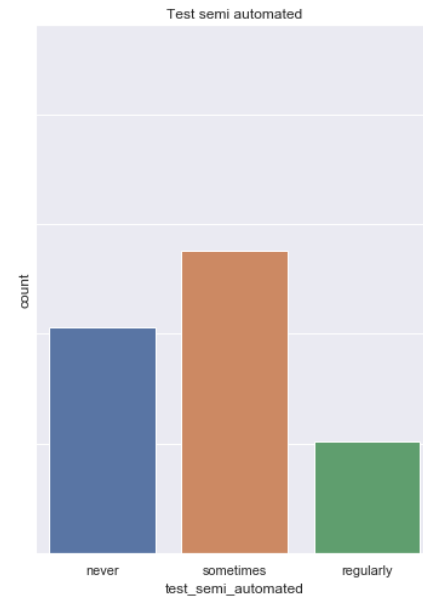
Obviously, they need help

Knowledge for Tomorrow

Not so fast!
The Obstacles

Lack of Resources

- Project-based funding

- Hard accessible long-term funding

- Missing infrastructure

Lack of Motivation

- Unmotivated scientist

- Unmotivated management

- Missing incentives

Lack of Knowledge

- Missing knowledge

- Missing strategy

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Current status of our approach for DLR

Goal: Improve sustainability and quality of software products

Software Engineering Initiative of DLR

| Guidelines | Trainings | Knowledge Provision | Collaboration | Experience Exchange |

Software Engineering Network
The Backbone
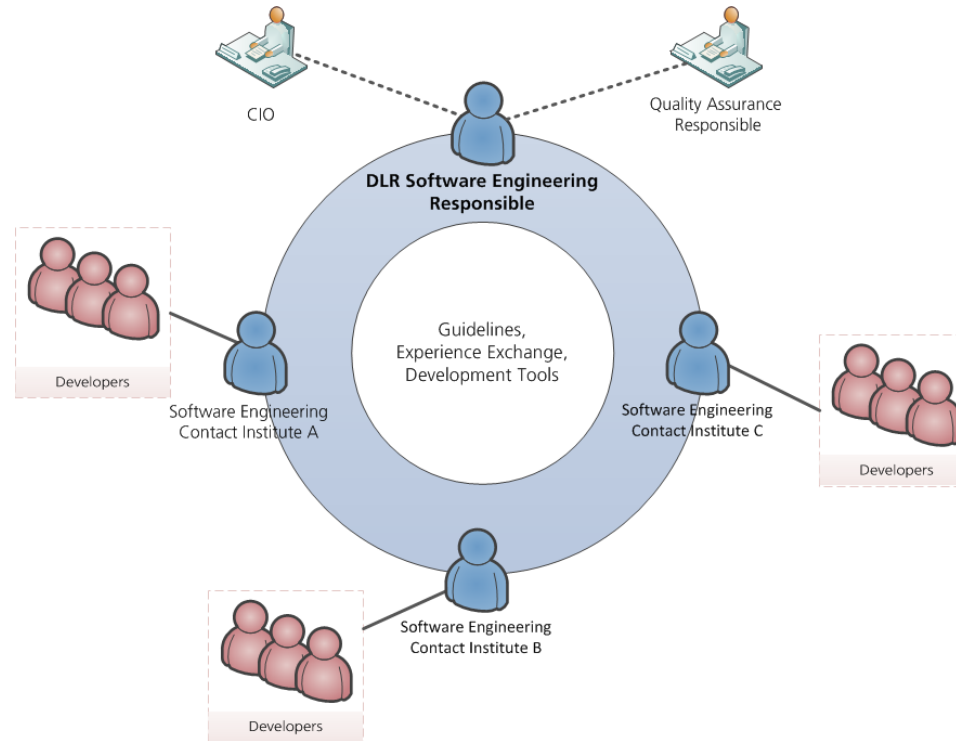
- Network consists of **representatives from all DLR institutes** concerned with software development.

- Representatives further organize software engineering activities in **their institutes**.

Software Engineering Guidelines

Guidelines support developers to self-assess their software concerning good development practices.

- Joint development with focus on **good practices, tools,** and **essential documentation**

- **Three maturity level** available as checklists in **different formats** to ease practical usage

Checklists for different maturity levels

Change Management

| Recommendation	Comment	Status
EÄM.2: The most important information describing how to contribute to development are stored in a central location. *(from application class 1)*	Build steps are missing	todo
EÄM.5: Known bugs, important unresolved tasks and ideas are at least noted in bullet point form and stored centrally. *(from application class 1)*		
EÄM.7: A repository is set up in a version control system. The repository is adequately structured and ideally contains all artifacts for building a usable software version and for testing it. *(from application class 1)*		ok
EÄM.8: Every change of the repository ideally serves a specific purpose, contains an understandable description and leaves the software in a consistent, working state. *(from application class 1)*		ok

Reasoning and further advice

The repository is the central entry point for development. [M]ain artifacts are stored in a safe way and are available [a]t a single location. Each change is comprehensible and can be traced back to the originator. In addition, the version control system ensures the consistency of all changes.

The repository directory structure should be aligned with established conventions. References are usually the version control system, the build tool (see the Automation and Dependency Management section) or the community of the used programming language or framework. Two examples:

Tailoring Checklists
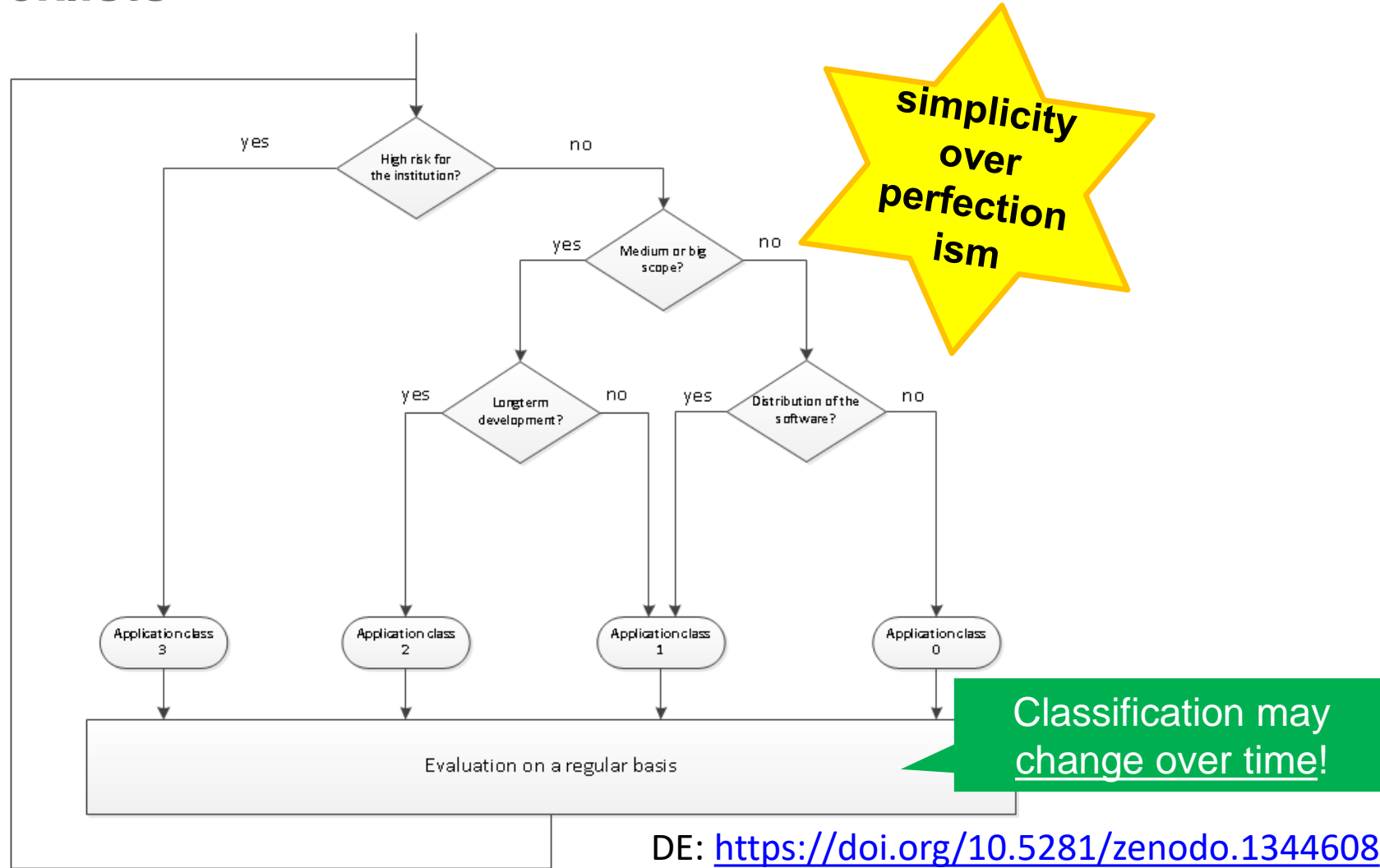
DE: https://doi.org/10.5281/zenodo.1344608
EN: https://doi.org/10.5281/zenodo.1344612

Trainings

Regular trainings are offered to provide hands-on experience in applying the guidelines and the DLR development tools.

Concept

- Intensive two-day course

- Small groups with up to 15 participants

- Hands-on experience on the basis of a complete example project

- Trainings are offered on a yearly basis at different DLR locations across Germany
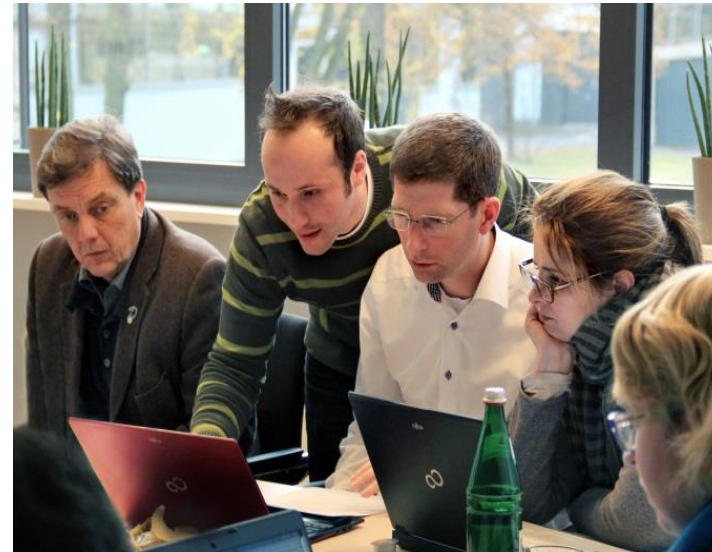
Knowledge Provision and Collaboration
SoftwareEngineering.Wiki

Internal Wiki space to share software engineering knowledge and experiences.

- Open to contributions of all DLR employees

- Moderation by a small central group

Main content categories

- News

- Information about topics like architecture, testing, etc.

- Official programming guides

- Experiences concerning dev. tools

- Questions & Answers

Experience Exchange
Workshops
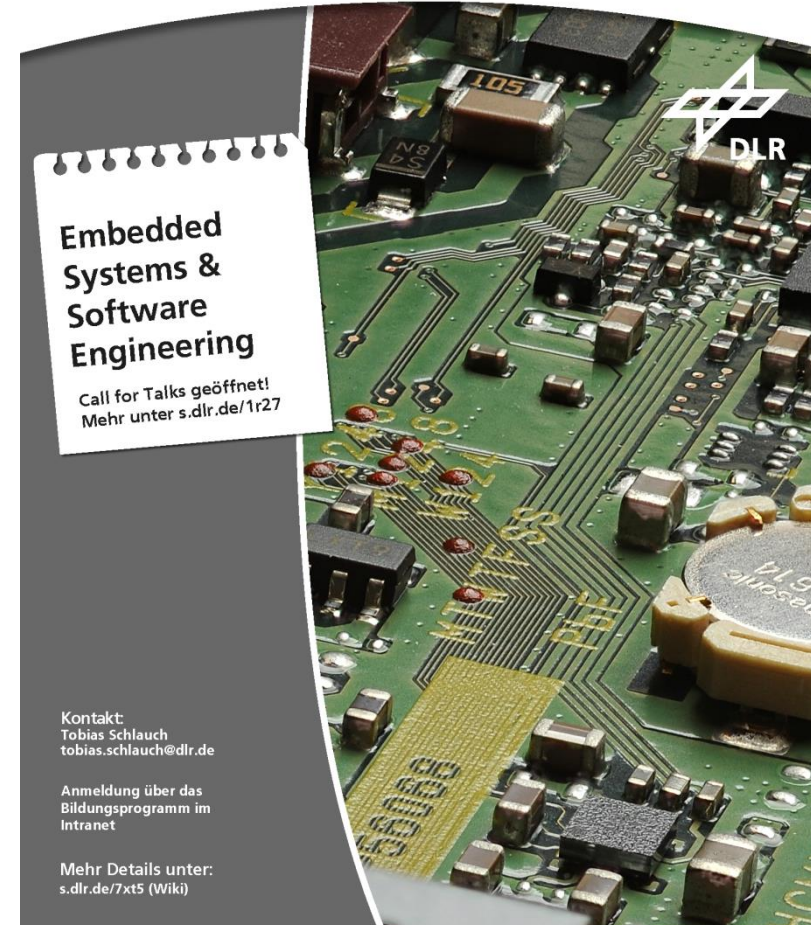
Regular knowledge exchange workshops are held to actively involve DLR scientists and to foster exchange.

Concept

- Intensive 1.5-day workshop

- Knowledge, experience exchange and networking opportunities

- Active involvement of the participants

- Results are shared via the SoftwareEngineering.Wiki

- 50 participants

- 2018 → EAW SE V

ErfahrungsAustauschWorkshop
Fallstricke bei der Software-Entwicklung V
15. - 16. Mai 2018 in Bremen

Embedded Systems & Software Engineering

Call for Talks geöffnet!
Mehr unter s.dlr.de/1r27

Kontakt:
Tobias Schlauch
tobias.schlauch@dlr.de

Anmeldung über das
Bildungsprogramm im
Intranet

Mehr Details unter:
s.dlr.de/7xt5 (Wiki)

Consulting

Concept

- Experienced software engineer

- Analyzing situation in institute / project

- Actions

  - SE-Guideline

  - Tooling

  - Trainings

  - Individual process

  - Individual support

  - (Feature development)

Software Visualisation

Visualisation of Software Architecture

- Modules, components and dependencies

- Interactive visualisation

  - Web-/VR-/AR-based

  - Chat and speech interfaces

(•) Rocket.Chat

rocket.cloud.conts.de/channel/general

Stefan

Administration

Info
Import
Rooms
Users
Permissions
Custom Sounds
Custom Emoji
Integrations
Mailer
OAuth Apps
View Logs

SETTINGS

Search

Accounts
Assets
Atlassian Crowd
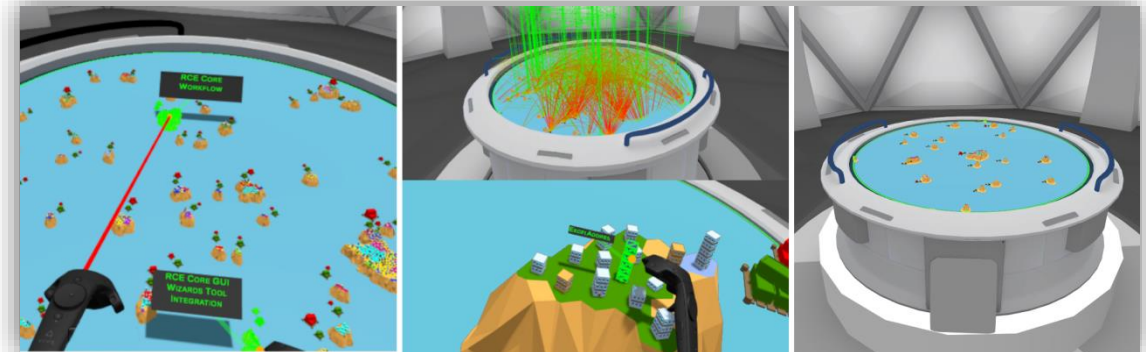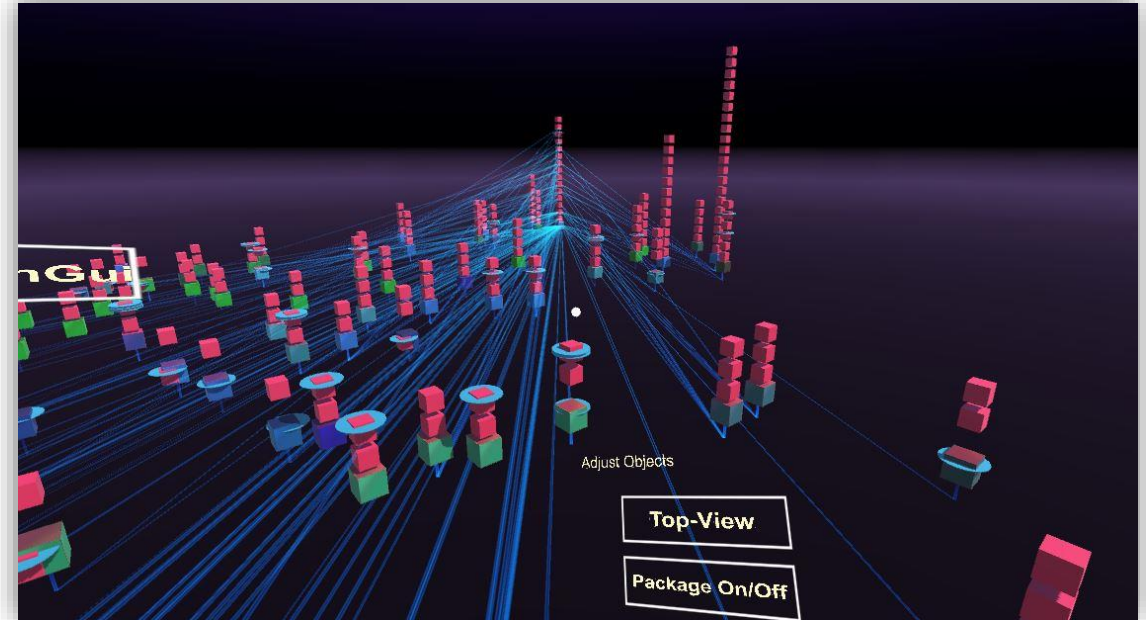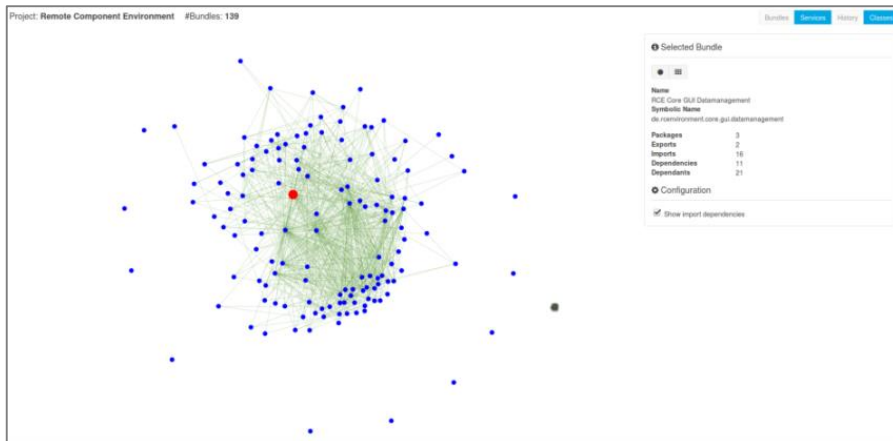Bots
CAS
Chatops
Custom Sounds Filesystem
Email
Custom Emoji Filesystem
File Upload
General
IRC

general

Project: Revision: Model Timestamp: ⤓

Bundles   Services   History   Classes

Start of conversation

February 15, 2017

stefan `Admin` 7:00 PM
Has joined the channel.

February 17, 2017

SO Sofia 8:15 PM
Has joined the channel.

June 21, 2017

BO Bob 10:06 AM
Has joined the channel.

stefan `Admin` 10:07 AM
I've got a bug (see ticket) that relates to the login function. Did anybody know where I should start to locking for a potential solution?

BO Bob 10:08 AM
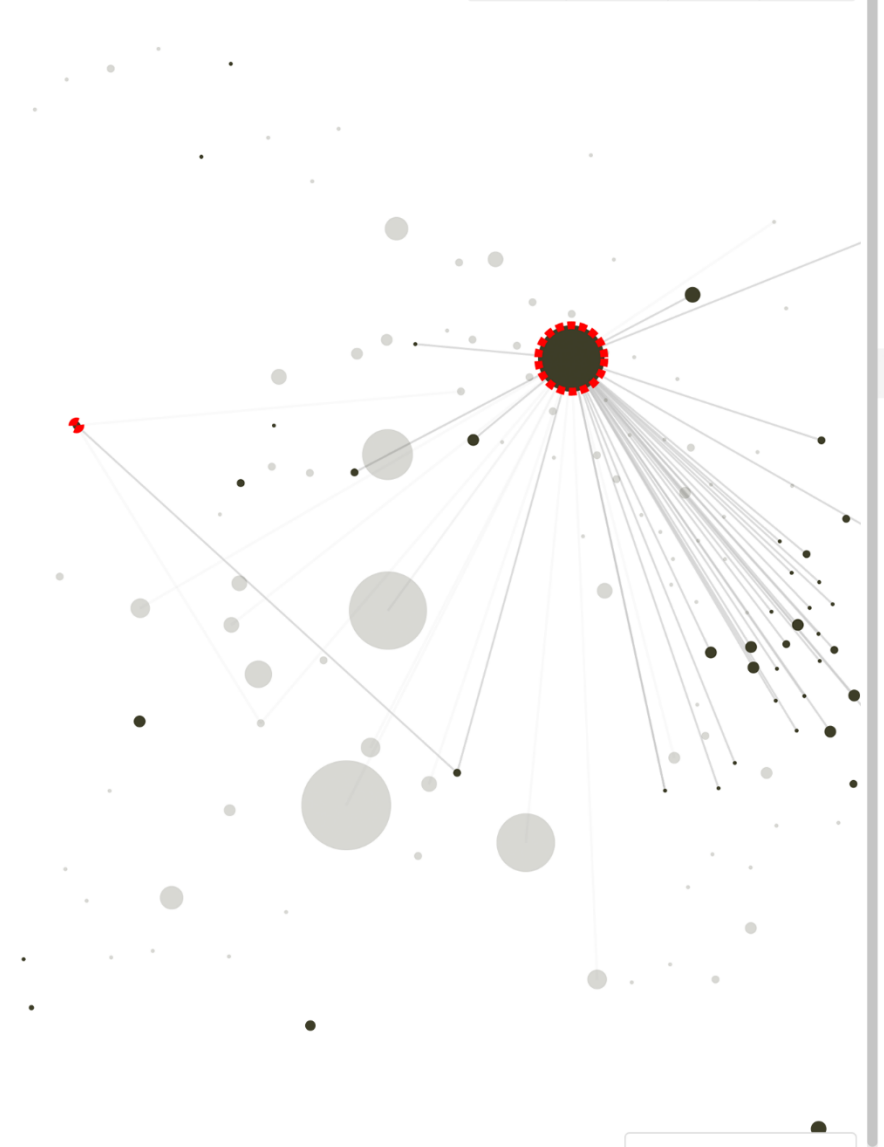Oh year you should look into the login bundle and maybe also into the gui bundle

stefan `Admin` 10:09 AM
Okay thanks, I will look into the code 🙂

Message

bold _italics_ ~strike~ `inline_code` ``` ⏎multi⏎line⏎ ``` \[KaTeX\] >quote

Summary and Outlook

First steps have been taken to build a self-reliant RSE community at DLR. Low-Code tools are being developed to support scientists.

BUT (research specific)

- Incentives for sustainable software must be provided
- Funding structures need to be adapted
- RSE needs to be an official job title and career in research

ALSO (in general)

- It needs people with an appropriate background to support and enable scientists
- The target audience of software development tools and processes is not professional developers anymore
  → It needs software development tools and processes with low entry barriers
- More Low-Code approaches

Questions?

carina.haupt@dlr.de

@caha42

#WIRROCKENSOFTWARE