Supporting the Research Software Development Community at DLR

HiRSE Seminar, 10.06.2022, Online

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Research Software Development at DLR

- **Some background**
  - More than 9000 employees, ~20% of DLR employees involved in software development
  - Variety of fields, maturity, and technologies: https://doi.org/10.1145/3387940.3392244

- **Brief history of DLR`s Software Engineering Initiative**
  - Activities started in 2005 as part of DLR`s quality assurance program
  - Since 2017 focus moved more and more on research software development aspects
  - Work is driven by the DLR institute for Software Technology and funded by DLR IT

Software Engineering Initiative for DLR

Software Engineering Initiative for DLR

- Policy Development
- Guidelines and Tools
- Training and Consulting
- Community Building and Experience Exchange

Software Engineering Initiative for DLR (cont.)

DLR SE Guidelines
https://rse.dlr.de/

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)*		
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)*		

Git

Issue Tracker

Continuous Integration

Collaboration

...

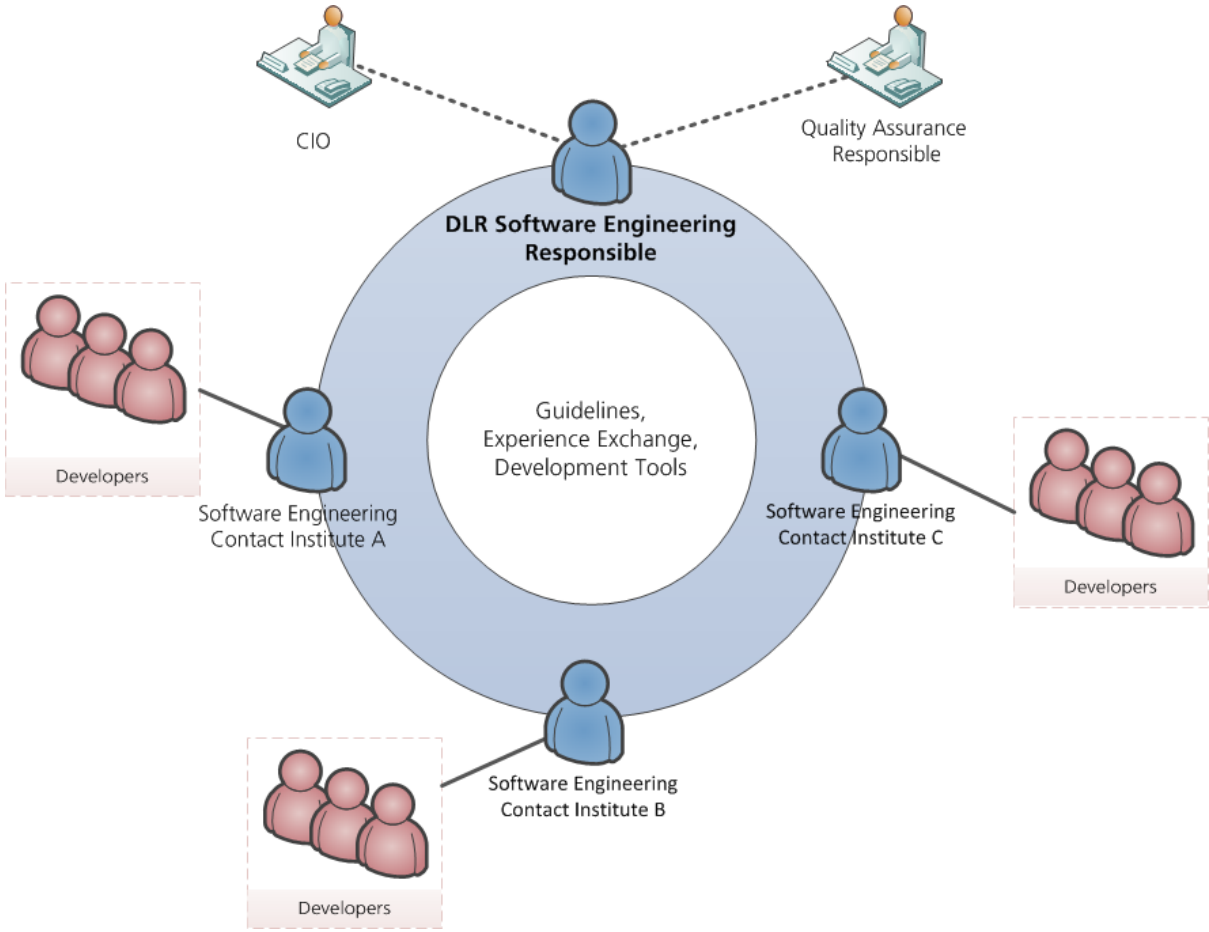
DLR GitLab Instance

Community Building and Experience Exchange

- **Goals**
  - Improve collaboration across domains and hierarchies
  - Enable the establishment of DLR-wide and local communities
- **Challenges**
  - Distributed across different institutes, domains and locations
  - High fluctuation of personnel
  - Culture of “working on your own”
- **Current Approach**
  - Establish an official DLR-wide collaboration network
  - Establish low-threshold opportunities for knowledge and experience exchange

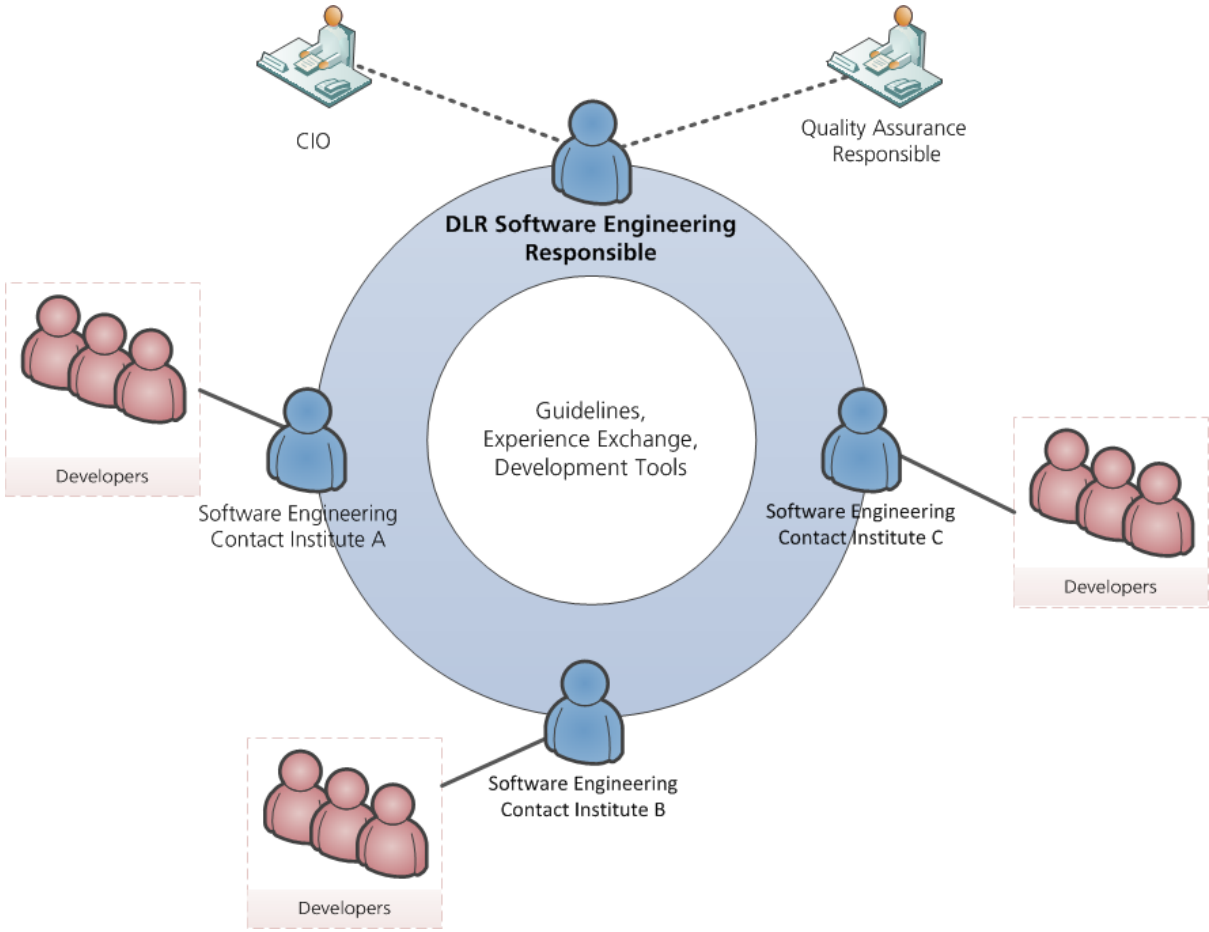
DLR Software Engineering Network

- Consists of the **Software Engineering Contacts** and further interested persons of each institute
- Software Engineering Network and related roles are officially established via DLR`s quality policy
- **Role of the Software Engineering Network**
  - Exchange experiences and needs across the different institutes
  - Discuss and work on central topics related to software engineering
  - Joint decision making



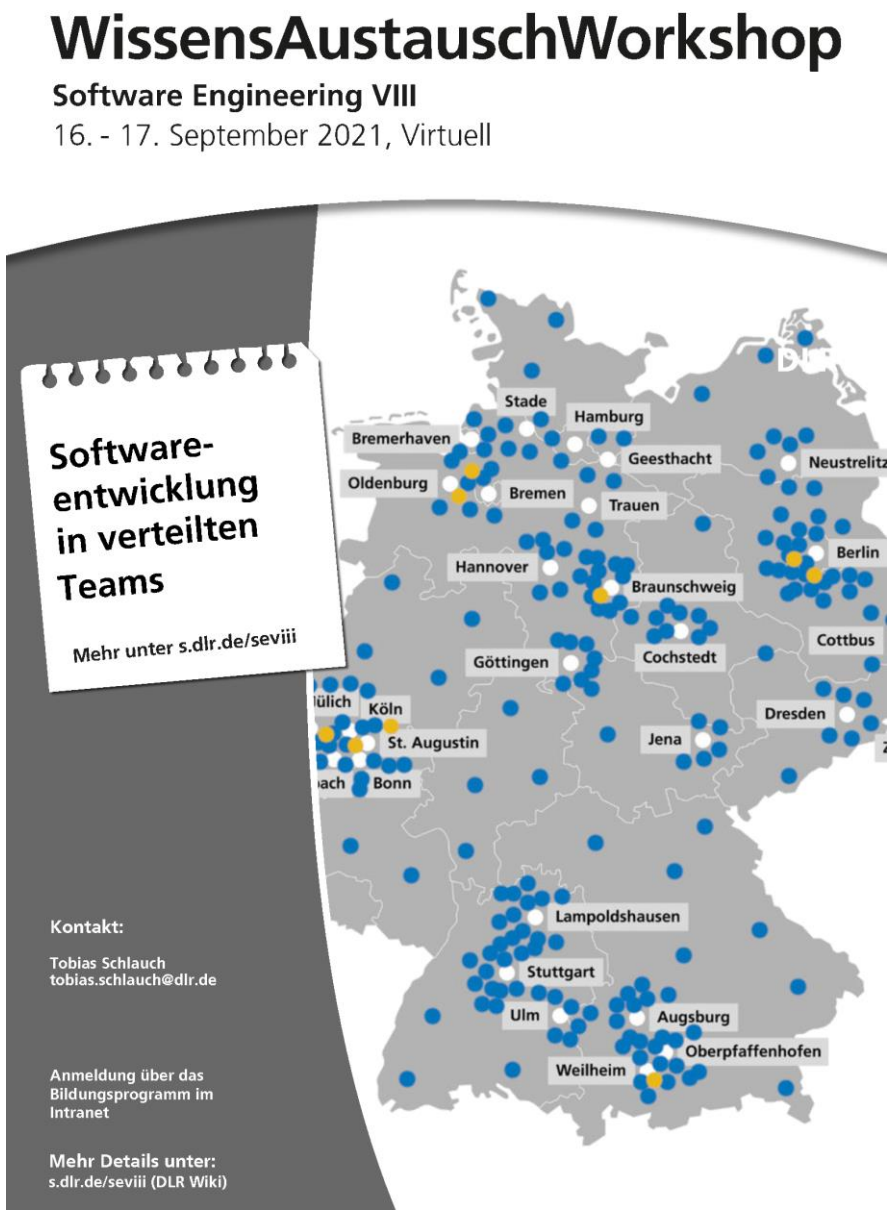
DLR Software Engineering Network

- **Role of the Software Engineering Contact**
  - Coordinate institute-wide software engineering strategy and their practical implementation
  - Organize the institute-specific knowledge exchange
- **How do we collaborate?**
  - Yearly joint meeting, if possible in person
  - Small working groups work on current topics asynchronously
  - Information exchange via a shared Wiki space, GitLab group, persistent chat, and mailing list



Software Engineering Knowledge Exchange Workshops

- **Idea:** Organize a yearly software engineering event to actively involve DLR researchers and to foster exchange!
- **Concept:**
  - Intensive 1.5 day workshop with focus on a main topic
  - Active involvement of the participants through interactive formats such as posters sessions, software architecture speed dating, group work, etc.
  - Social event
  - Talk program consisting of DLR-internal contributions
  - Invited external speakers
  - Results are shared via the **DLR SoftwareEngineering.Wiki**



Knowledge Exchange Workshops (cont.)

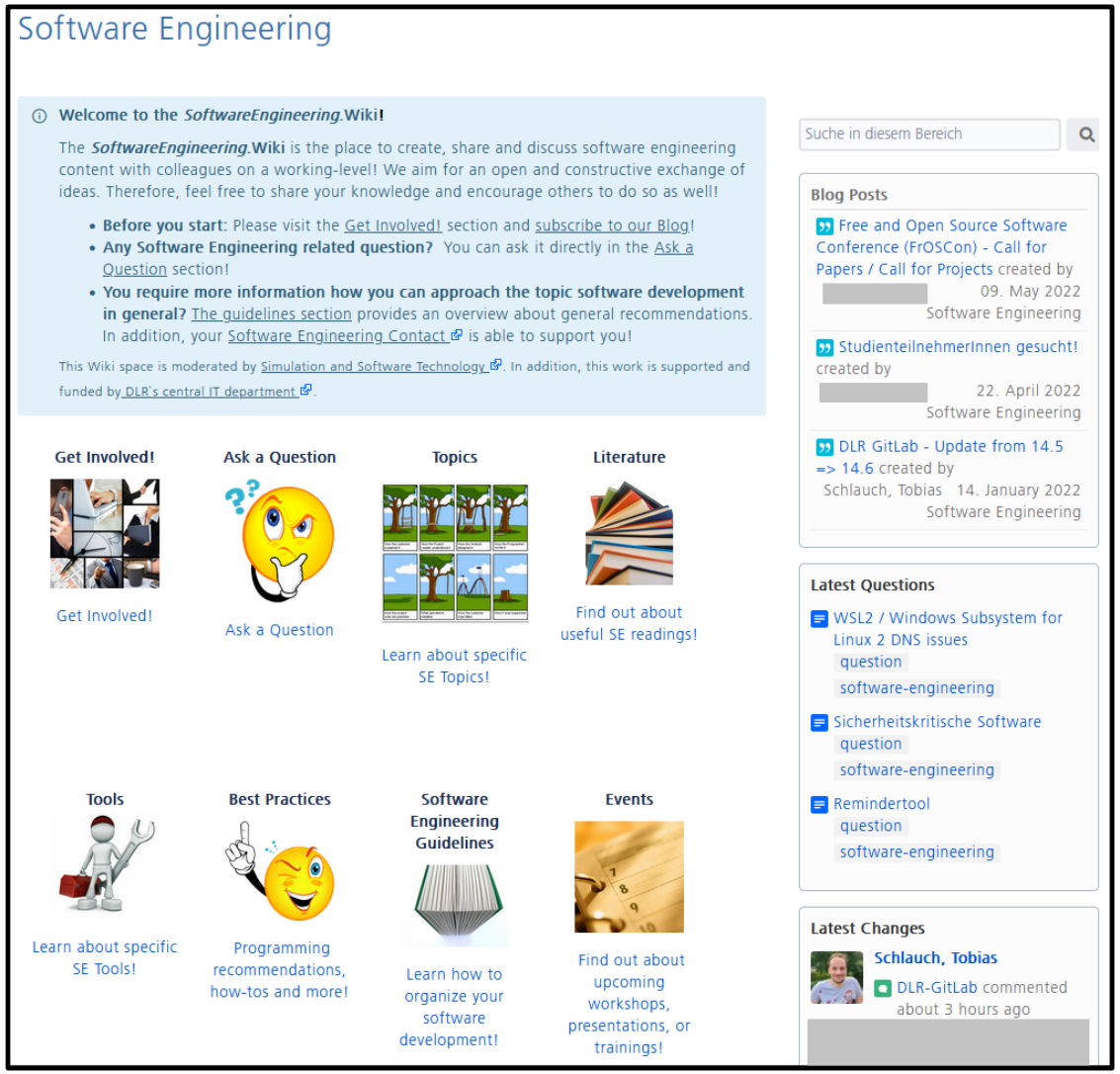
Overall:

- 461 participants
- 58 participants per workshop in average

#	Topic	# Participants	Date	Location
1	Kick-Off	57	November 2014	Braunschweig
2	Tools and Processes	56	April 2015	Köln
3	Open and Inner Source	53	April 2016	Oberpfaffenhofen
4	Software Architecture	52	April 2017	Berlin
5	Embedded Systems	47	May 2018	Bremen
6	Software Engineering for Data Science	55	May 2019	Jena
7	Software Development Process and Software Architecture	70	September 2020	Online
8	Software Development in distributed Teams	71	September 2021	Online
9	Inner Source and Legacy Code	??	September 2022	Berlin?

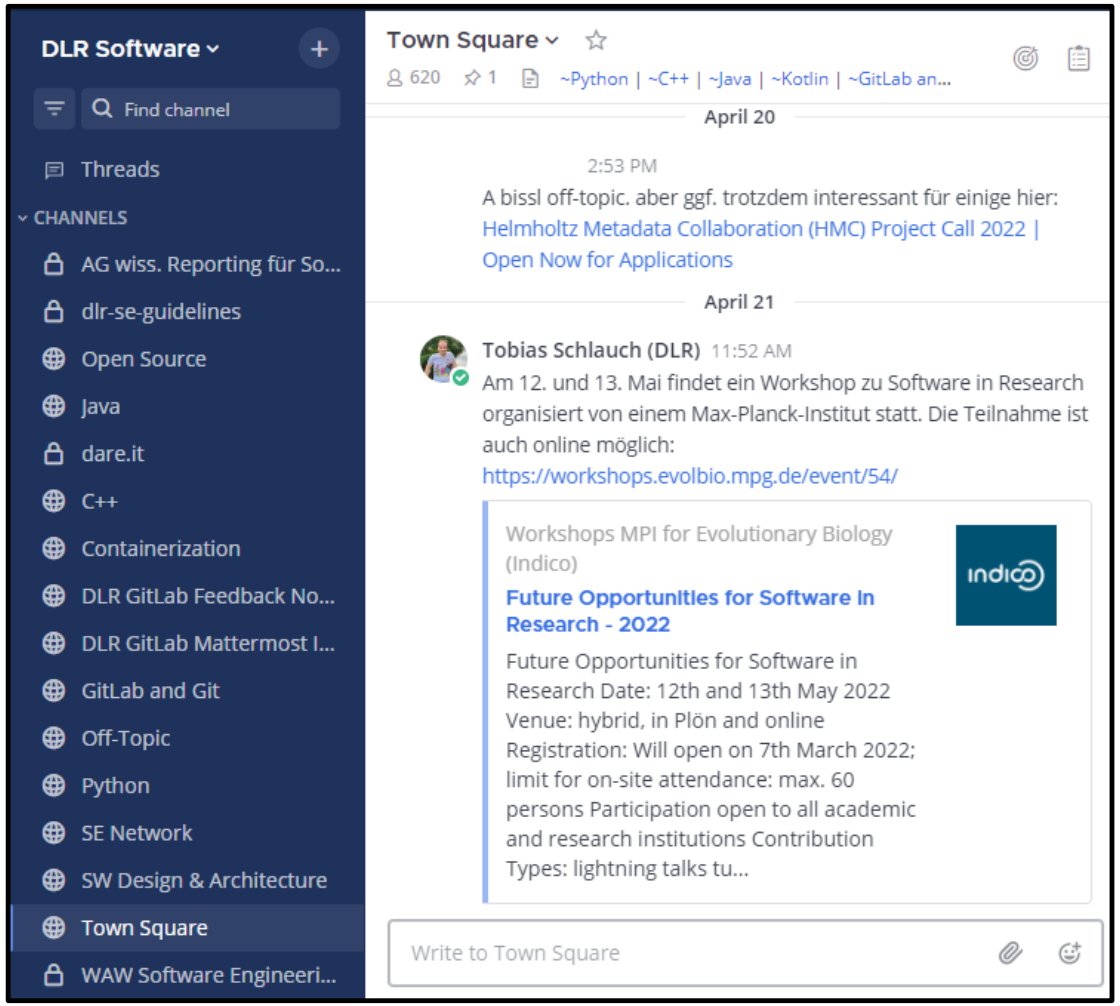
DLR SoftwareEngineering.Wiki

- **Idea:** Provide a central place to exchange software engineering content and find contacts at DLR!
- **Concept:**
  - Actively moderated
  - Everyone can read, contribute, and comment on content
  - Pre-structured Wiki space
  - Blog for announcing news
  - Established in April 2013, > 500 Wiki pages, > 250 blog posts



DLR Software Mattermost Team

- **Idea:** Make it easier to discuss software engineering related topics and ask questions!
- **Concept:**
  - Establish the DLR Software Team using the Mattermost service provided by HIFIS
  - Actively moderated
  - Everyone can join into channels and create public/private channels for their own purposes
  - Topic channels link back to Wiki topic pages
  - Established in early 2021, > 600 participants, 25 public channels, > 8000 messages



Summary

- **Combined top-down and bottom-up approach** with regard to community building and experience exchange from the overall DLR point of view
- **Software Engineering Network:**
  - Joint working and decisions making across the different DLR institutes
  - Software Engineering Contacts organize institute-internal collaboration
- **Low-threshold opportunities for knowledge and experience exchange:**
  - Software Engineering Knowledge Exchange Workshops
  - DLR SoftwareEngineering.Wiki
  - DLR Software Mattermost Team
- **Future Idea:** Better utilization of the DLR GitLab instance by establishing a culture of “Inner Source” to foster internal collaboration on concrete software projects

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Thank you!

What are your Questions?

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