

# Relevant Human Factors for Research Software Engineering

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<http://www.dlr.de/sc>



Knowledge for Tomorrow



# Research Software Development at DLR

- **Some background**

- More than 10,000 employees working in > 50 institutes at 30 different locations
- ~20% of DLR employees involved in software development
- Variety of fields, maturity, and technologies:  
<https://doi.org/10.1145/3387940.3392244>

- **DLR 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



# Typical “Software Engineers” at DLR

- **Researchers**

- Basic programming skills
- Contribute to existing software or develop small tools
- Main focus: Good research

- **Students**

- Basic programming skills
- Contribute to existing software or develop prototypes
- Main focus: Get job / thesis done

- **Research Software Engineers**

- Advanced level of software development skills
- Leading software projects or contribute as consultant
- Main focus: Good software and research



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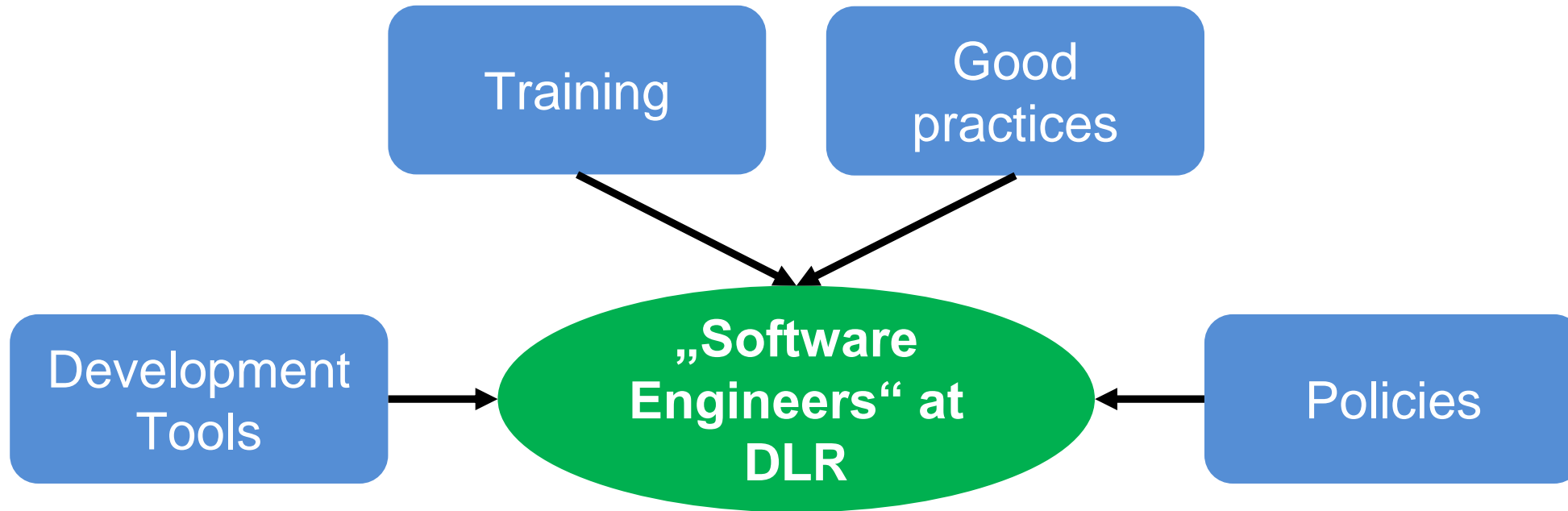
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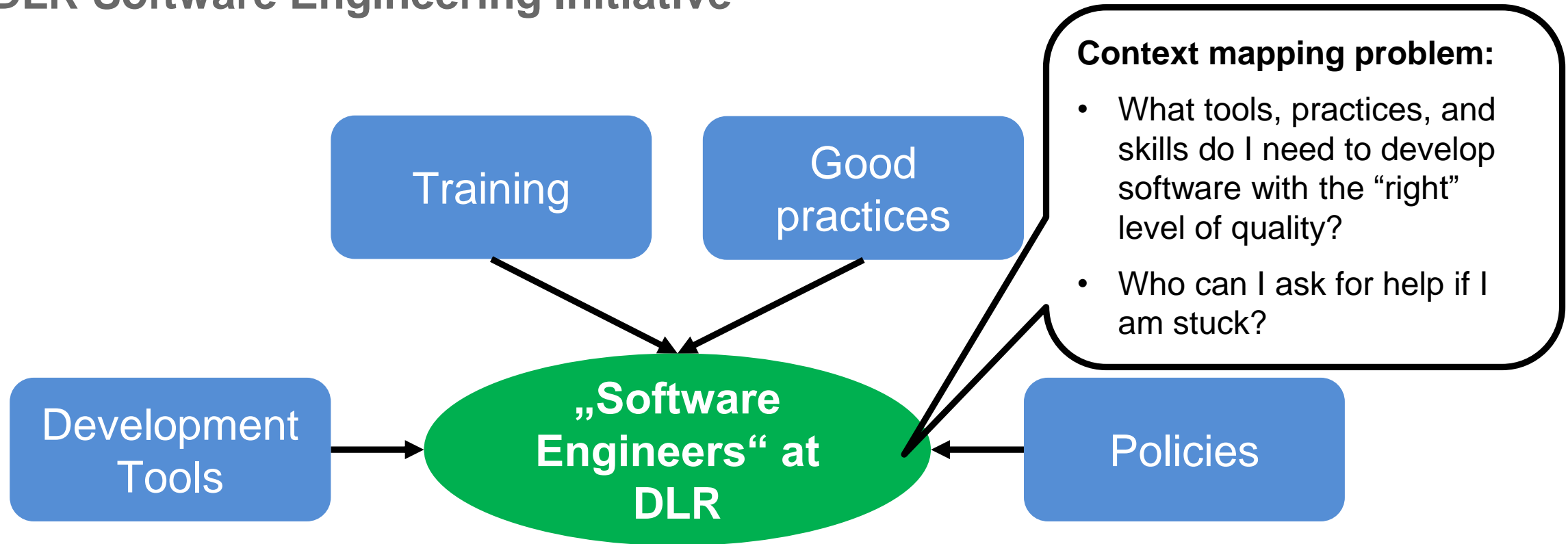
How to support such a heterogenous group to achieve the “right” level of software quality?



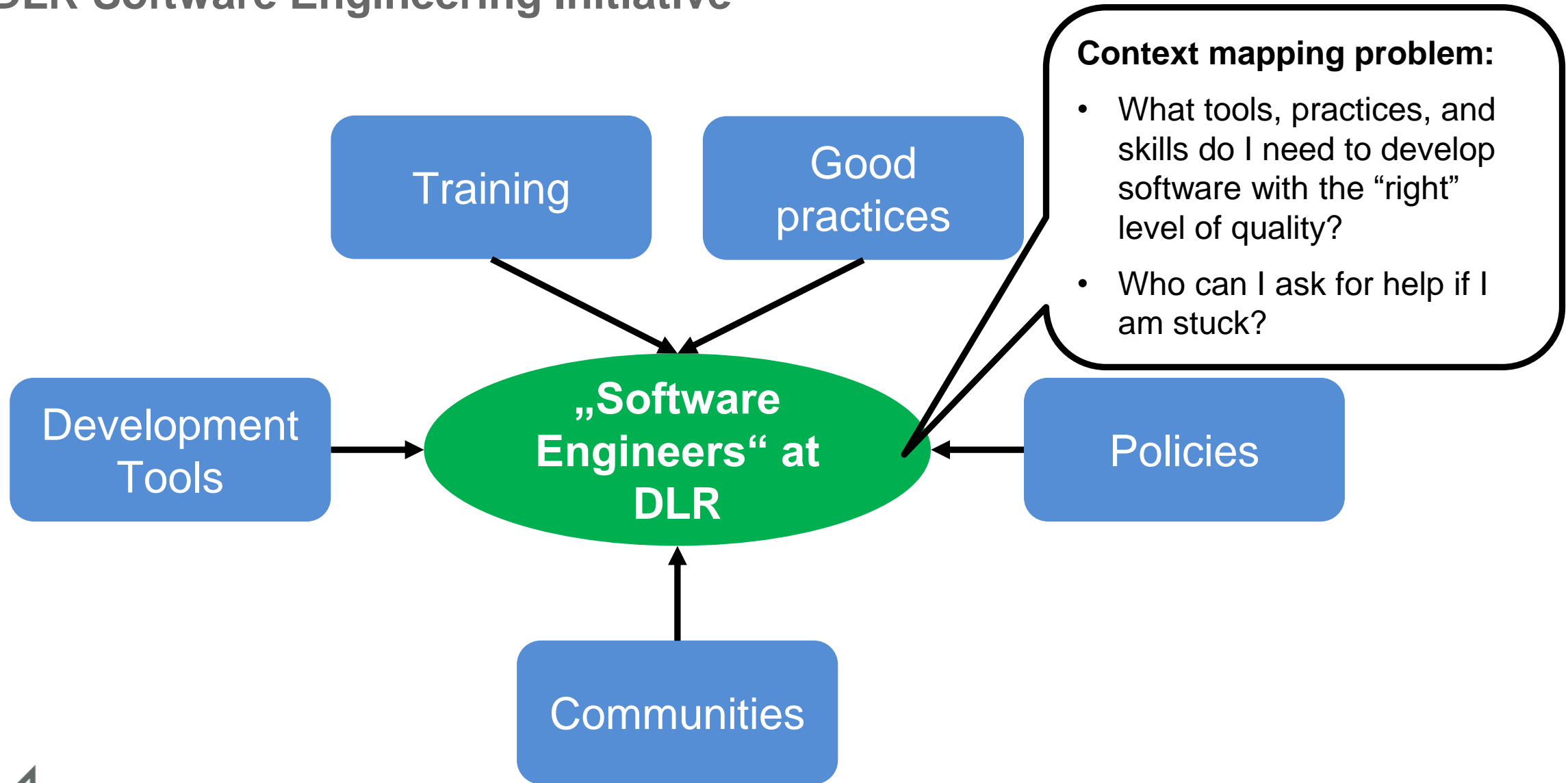
# DLR Software Engineering Initiative



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# How to foster the Establishment of Communities across DLR?

- **Communities help to address the context mapping problem:**

- Concretize DLR recommendations and standardize practices on the right level of granularity
- Establish a trusted network of contact persons

- **Challenges**

- Varying motivations and backgrounds
- High fluctuation of persons
- Culture of “working on your own”





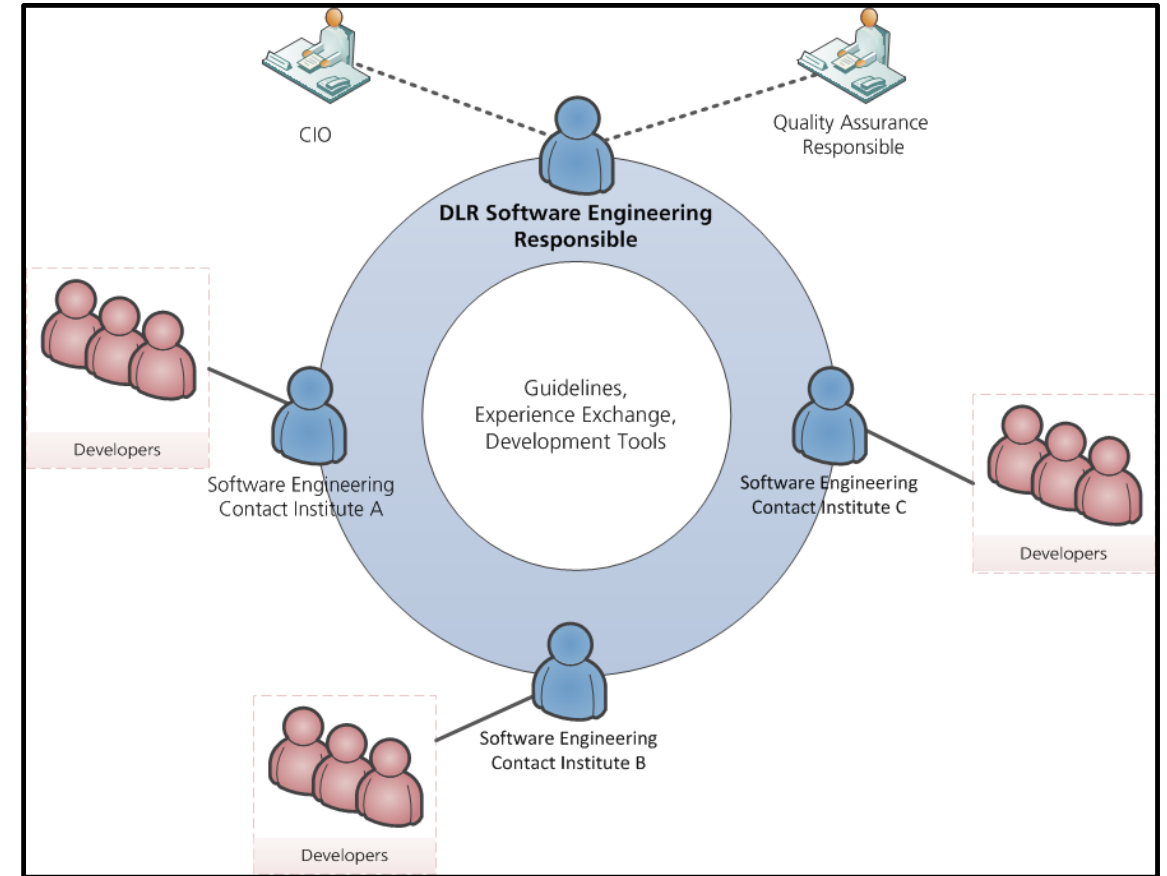
# How to foster the Establishment of Communities across DLR?

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- **Challenges**
  - Varying motivations and backgrounds
  - High fluctuation of persons
  - Culture of “working on your own”
- **Current approach at DLR**
  - Establish a stable DLR-wide community on institute-level
  - Establish low-threshold opportunities for experience exchange



# DLR Software Engineering Network

- **Idea:** Establish a stable community across DLR institutes which provides the basis for institute-specific communities!
- **Concept:**
  - Software engineering contacts coordinate institute-wide strategy and foster the creation of institute-specific communities
  - Members of the network work together on specific topics to improve conditions for software development at DLR
  - Official committee established via DLR`s quality policy to increase management visibility

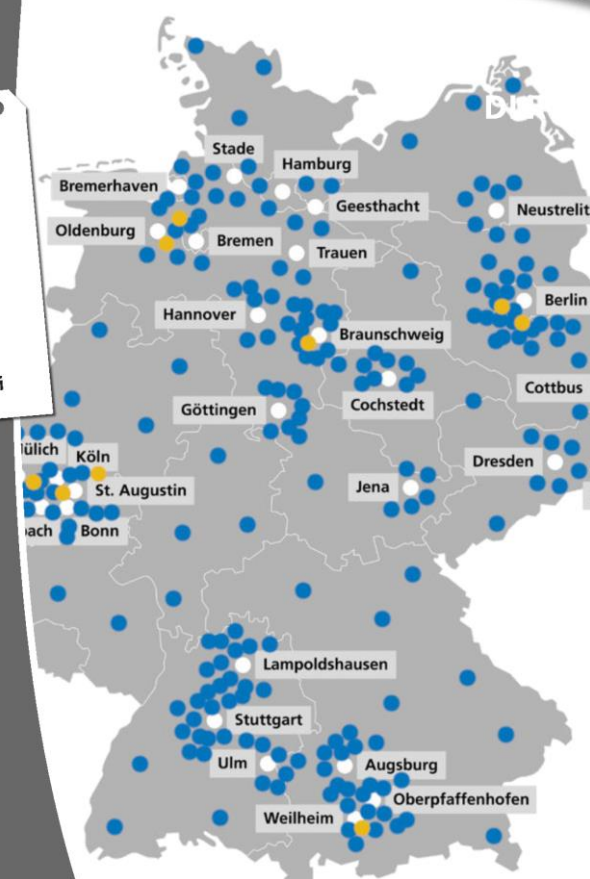


# Knowledge Exchange Workshops

- **Idea:** Organize a yearly software engineering event to actively involve DLR researchers and to foster exchange!
- **Concept:**
  - Intensive 2 days 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**

## WissensAustauschWorkshop

Software Engineering VIII  
16. - 17. September 2021, Virtuell



**Software-entwicklung in verteilten Teams**  
Mehr unter [s.dlr.de/seviii](https://s.dlr.de/seviii)

Kontakt:  
Tobias Schlauch  
[tobias.schlauch@dlr.de](mailto:tobias.schlauch@dlr.de)

Anmeldung über das Bildungsprogramm im Intranet

Mehr Details unter:  
[s.dlr.de/seviii](https://s.dlr.de/seviii) (DLR 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

## Software Engineering

### Welcome to the *SoftwareEngineering.Wiki*!

The *SoftwareEngineering.Wiki* is the place to create, share and discuss software engineering content with colleagues on a working-level! We aim for an open and constructive exchange of ideas. Therefore, feel free to share your knowledge and encourage others to do so as well!

- **Before you start:** Please visit the [Get Involved!](#) section and [subscribe to our Blog!](#)
- **Any Software Engineering related question?** You can ask it directly in the [Ask a Question](#) section!
- **You require more information how you can approach the topic software development in general?** [The guidelines section](#) provides an overview about general recommendations. In addition, your [Software Engineering Contact](#) is able to support you!

This Wiki space is moderated by [Simulation and Software Technology](#). In addition, this work is supported and funded by [DLR's central IT department](#).

### Blog Posts

Free and Open Source Software Conference (FROSCON) - Call for Papers / Call for Projects created by [redacted] 09. May 2022 Software Engineering


StudienteilnehmerInnen gesucht! created by [redacted] 22. April 2022 Software Engineering

DLR GitLab - Update from 14.5 => 14.6 created by Schlauch, Tobias 14. January 2022 Software Engineering

### Latest Questions

- WSL2 / Windows Subsystem for Linux 2 DNS issues question [software-engineering](#)
- Sicherheitskritische Software question [software-engineering](#)
- Remindertool question [software-engineering](#)

### Latest Changes

 **Schlauch, Tobias**  
DLR-GitLab commented about 3 hours ago

### Get Involved!



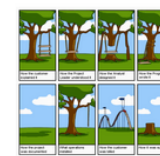
Get Involved!

### Ask a Question



Ask a Question

### Topics



Learn about specific SE Topics!

### Literature



Find out about useful SE readings!

### Tools



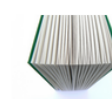
Learn about specific SE Tools!

### Best Practices



Programming recommendations, how-tos and more!

### Software Engineering Guidelines



Learn how to organize your software development!

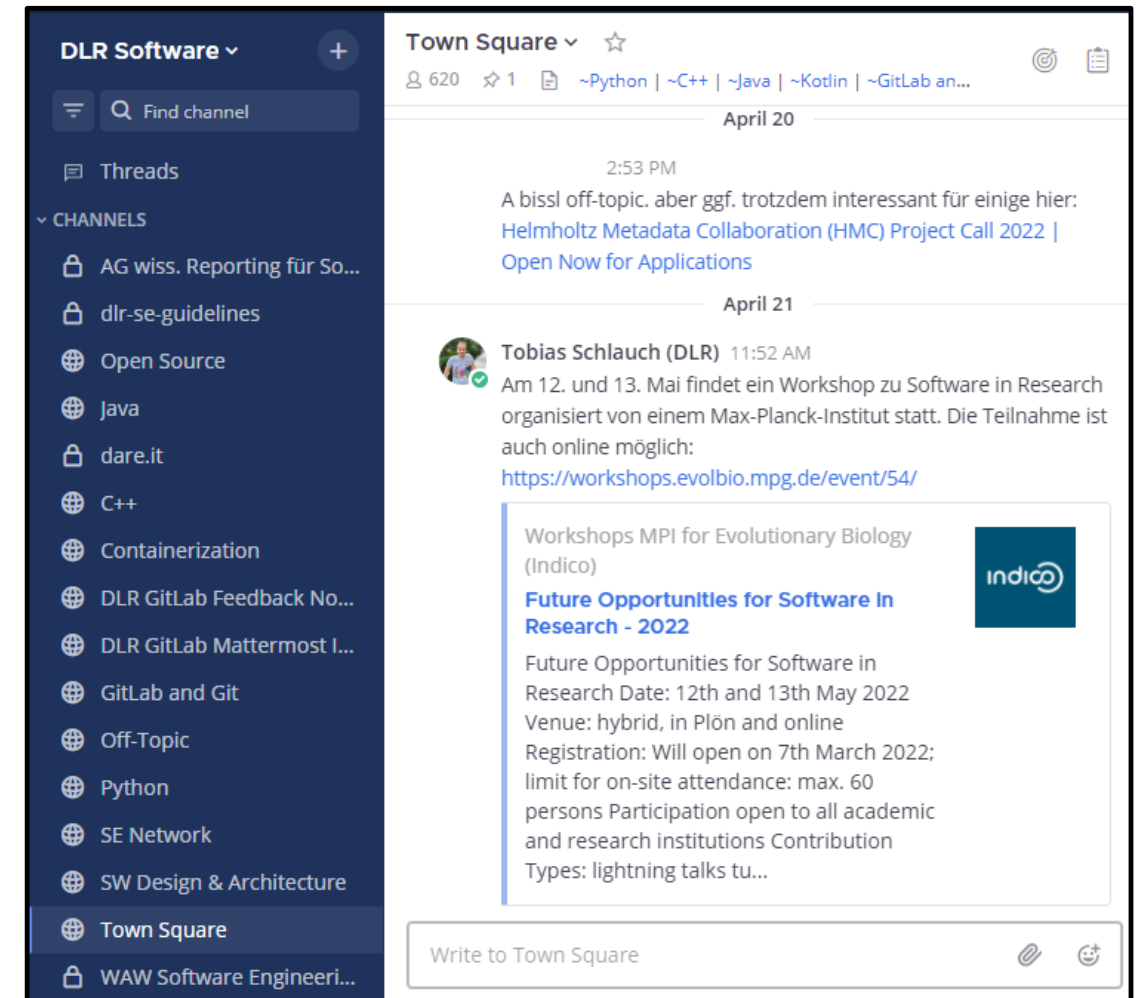
### Events



Find out about upcoming workshops, presentations, or trainings!

# 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
  - 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



# Future Plans

- **Work towards a culture of “Inner Source” to establish communities around important tool across DLR:**
  - Inner Source: Apply open source development practices to software development inside an organization
  - DLR GitLab instance provides technical basis but the cultural development is the actual challenge!
- **Collect more information about individuals and communities inside DLR**
  - Apply methods from the social sciences to collect facts about software development at DLR
  - Important to identify actual problems and to find out about the current status



# Summary

- **DLR`s software engineering initiative provides the overall environment for software engineers at DLR. But what is required in the concrete case?**
- **Communities help to address the context mapping problem:**
  - Concretize DLR recommendations and standardize practices on the right level of granularity
  - Establish a trusted network of contact persons
- **DLR follows a combined top-down and bottom-up approach with regard to community building:**
  - Establish a stable DLR-wide community to foster creation of institute-specific communities
  - Establish low-threshold opportunities for experience exchange to foster creation of more focused DLR-wide communities
- **Future plans**
  - Work towards a culture of “Inner Source” to establish communities around important tool across DLR
  - Collect more information about individuals and communities inside DLR to identify actual problems and to find out about the current status





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# Thank you!

What are your Questions?

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