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# PROTOCOL FOR INTERVIEWS

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This document contains supplementary material for the paper “*Why don’t we trace? A study on the barriers to software traceability in practice*”. The content of this document is presented below.

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## Informed consent Value of Traceability

Dear participant,

You have been asked to participate in an interview about the value of software traceability in practice. This interview is part of a research project that is performed by [RESEARCHERS] from [LOCATION]. The goal of the research project is to explore the value of software traceability based on the current practices and needs of practitioners, so that possible gaps between research and support for practitioners can be found and improved based on what is needed.

This interview is being recorded to help with the note-taking. The recording is only used by me and my colleagues and is not made publicly available. In addition:

- All the information/recordings are held confidential and will be anonymized.
- Your participation is voluntary and you can stop at any time.
- If you don't want to answer a question for any reason, you can always skip it.

I have read this form and agree,

.....

Date

.....

Signature participant

# Semi-structured interview Protocol

## *Semi structured interview [RESEARCHER]*

Note: All these items listed below are guidelines, which means that some of the questions can be asked differently depending on the interviewee's reaction and information he or she has already provided. In addition, the interviewees were already notified that this is an interview about the context and rationale behind their answers on the traceability questionnaire.

### BEFORE INTERVIEW:

- Ask for permission to record this interview.
  - This interview is being recorded to help with note-taking. The recording is only used by me and my colleagues of this project, and is not made publicly available. In addition we ask you to sign an informed consent which states:
    - All the information/recordings are held confidential and will be anonymized.
    - Your participation is voluntary and you can stop at any time
    - If you don't want to answer a question for any reason, you can always skip it.
  
- Date of interview:
  
- Time of interview:
  
- Participant name:

### START INTERVIEW:

- Introduction of interviewer (researcher) (~5 minutes)
  - Important to make clear that we would like to cover every important topic as indicated in the slide. In case the interviewee would like to discuss a certain topic in even more detail, that a follow up meeting can be arranged.

*Questions in bold are the overarching open questions, the sub questions are mainly used to 'steer' or keep the conversation on track. Not every subquestion will be asked, it depends on what has been described already by the interviewee and if it is applicable or not.*

## Initial background and project characteristics (10-15 minutes)

- **Can you tell me something about yourself?**
  - Can you briefly describe your work experience? In years and roles
  - Education background? Titles
- **Can you briefly tell me about your company?**
  - Can you briefly tell me about the sector/industry your company is in and which main types of services/products are offered by the company? (Mobile, software, etc.)
  - How long have you worked for this organization/project?
  - Can you briefly tell me about the company structure and culture? Flat, hierarchical
- **Were/are you familiar with the concept of software traceability?**
  - Which artifacts do you mainly think of when talking about traceability?
  - Which artifacts would you be responsible for in the typical projects you are involved with?
  - Which artifacts are the most important to establish traceability between for you and why?
- **In the survey you indicated that the typical software developed is safety-critical, or not safety critical, can you provide a brief example what the software is used for and in what way it is safety-critical or not safety-critical? (Could be critical for the life of users, or critical because of sensitive data, or high risks in other kinds of potential losses)**
- **In the survey you indicated that traceability is Always/sometimes/never performed,**
  - In case of Always/Sometimes, you indicated that it is performed for the Benefits/because of mandate/on request of customer, can you briefly describe a common scenario or which benefits are expected?
- **In the survey you mentioned that the typical software development paradigm used is Agile/Traditional/Mixed, could you describe which development method/process is followed (scrum, XP, kanban, waterfall, ....), and briefly describe the process from when a wish/requirement comes in till its deployment? (to get a general picture of the process and information flow between the teams)**
  - Iterations? Self organizing teams?
  - Local or geographically dispersed or outsourced teams?

## Management practices (~10 minutes)

**Can you tell me how the management statements in the survey relate to the current management practices in your projects and:**

1. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that traceability costs in money, time, and effort are the main inhibitor for adopting (more mature) traceability practices
  - a. Which costs between time, effort and money is most problematic?  
And why it is [not needed/nice to have/ should have/ must have] to reduce the costs?
  - b. Which costs have to be reduced?
2. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that there is insufficient guidance within the company to establish traceability  
And why it is [not needed/nice to have/ should have/ must have] to increase the guidance in the company?
3. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that traceability costs outweigh the expected benefits
  - a. Which benefits do you expect to be gained from traceability practices?  
And why it is [not needed/nice to have/ should have/ must have] to have a more clear overview of the costs and benefits regarding traceability?
4. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that it is difficult to access and obtain information sources to establish traceability
  - a.  
And why it is [not needed/nice to have/ should have/ must have] to have easier access to information sources to be able to establish and maintain traceability?
5. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that Traceability is mostly performed in an ad-hoc and non managed fashion,  
And why it is [not needed/nice to have/ should have/ must have] to perform traceability in a more managed fashion?

## Social collaboration practices (~10 minutes)

**Can you tell me how the social collaboration statements in the survey relate to the current collaboration practices in your projects and why:**

1. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that traceability is of high importance for the software development process,

And why it is [not needed/nice to have/ should have/ must have] to increase the awareness of the importance of traceability?

2. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that the allocation of time, staff and resources are often insufficient to be able to properly establish and maintain traceability,  
And why it is [not needed/nice to have/ should have/ must have] for more staff, time, and resources to properly establish and maintain traceability?
  - a. Which of the three, time, staff, and resources, are sufficient and insufficient?
3. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that there is a lack of collaboration between involved stakeholder teams in regards to establishing and maintaining traceability,  
And why it is [not needed/nice to have/ should have/ must have] for more collaboration between involved stakeholder teams?
4. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that it is unclear which roles are responsible for traceability  
And why it is [not needed/nice to have/ should have/ must have] to have more communication about who are responsible for traceability?

## Technology (~10 minutes)

**Can you tell me how the technology statements in the survey relate to the current technology practices and tools used in your projects and why:**

1. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that Traceability tools do not satisfy your needs,  
And why it is [not needed/nice to have/ should have/ must have] for better traceability tools?
  - a. Which tools are being used for traceability purposes?
2. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that it is difficult to establish traceability because development artifacts are stored in multiple locations/repositories,  
And why it is [not needed/nice to have/ should have/ must have] to have a more centralized development artifacts repository to establish traceability more easily?
3. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that the tools currently used for traceability are too complex to use effectively and to integrate with existing tools,
4. And why it is [not needed/nice to have/ should have/ must have] to make them less complex and easier to integrate with your existing tools?
5. Why you [strongly disagree/ somewhat disagree/ somewhat agree/ strongly agree] with that Traceability is mostly performed manually,

And why it is [not needed/nice to have/ should have/ must have] for more traceability automation?

## Prioritization (~10 minutes)

*For this section, I think it is good to not give them an elaborate assignment to rank their needs. I think a short question as written down below should be good enough!*

- In which software development stages would you say that traceability is the most important/critical? (Show slide with the SDLC phases, ask if there are any phases missing)
- Or between which of the phases?
- And why?

## Additional comments/improvements

- Do you have any additional comments?
- Thank interviewee and don't forget the token for appreciation.

# Interview protocol for extra interviews

## Software traceability

Tracing the value of software traceability in software development.

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Welcome to the interview about the value of software traceability in practice.

With this anonymous questionnaire, we aim to gather your view and needs regarding traceability in the software development process.

This interview is part of a research project that is being conducted at [LOCATION], with the main objective of exploring the value of software traceability based on the perspective of practitioners. With the results, we aim to find gaps between research and software traceability practices with the goal to increase traceability support for practitioners.

To this end, we kindly ask you to fill in this questionnaire and further elaborate on your reasoning behind each answer.

You are eligible to participate in this interview if you are involved in the software development process, be it as a Product Owner, Scrum Master, Developer, Architect, Project manager, Designer, Tester, Requirements Analyst, or any other role closely involved with the development process.

Thank you for your participation!

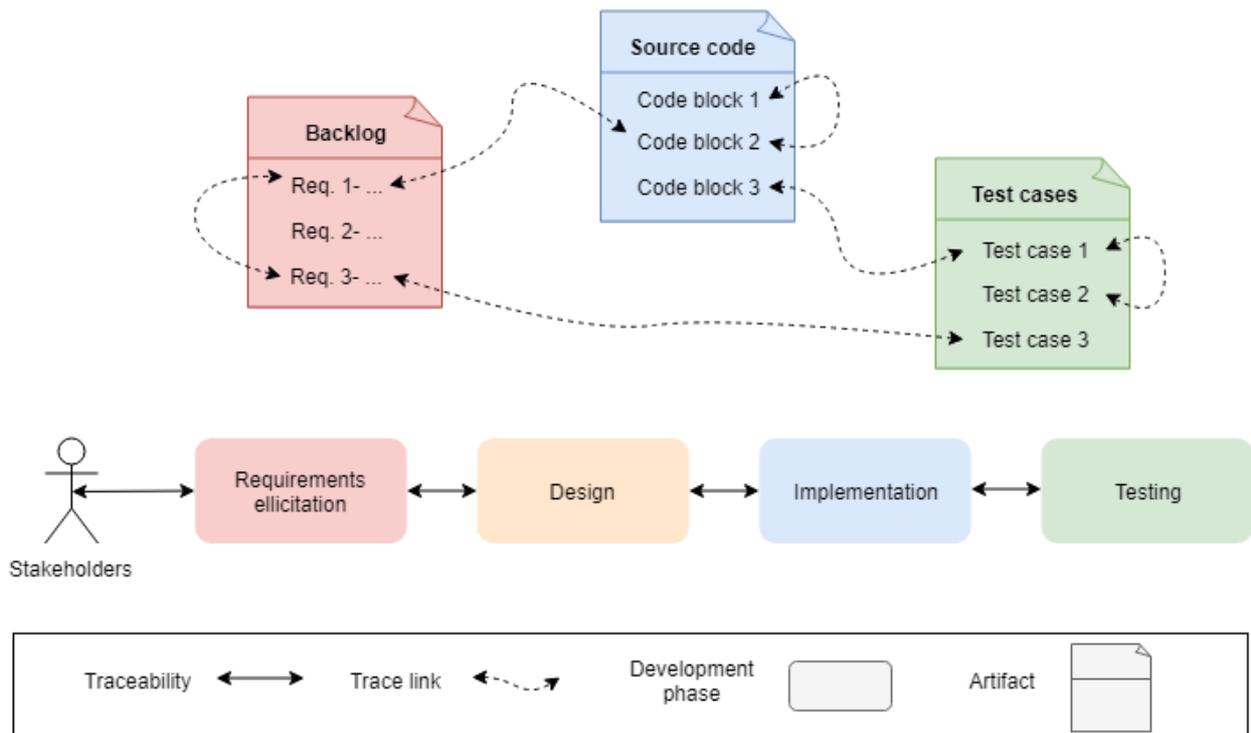
[CONTACTS REMOVED].

# What is software traceability?

In the context of this research, we see software traceability as the ability to **create, maintain, and use relations/links between diverse software development artifacts** such as requirements, source code, test cases, architecture, and any other development artifacts

These links, for example, enable determining (tracing) the origin of a requirement, or knowing which code fragments relate to which test cases or bug reports. Traceability links can be established and retrieved either manually, or with the use of automated software tools.

An illustration is provided below.



When answering questions in the survey, please provide responses based on the artifacts you are involved with.

## Demographic questions

**In which country do you currently reside?**

**What is the size of your company?**

For example:

Micro: 1-9 people; small: 10-49 people; Medium: 50-249 people; Large: 200+ people.

**Can you tell me something about yourself?**

- Can you briefly describe your work experience? In years and roles
- Education background? Titles

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**Can you briefly tell me about your company?**

- Can you briefly tell me about the sector/industry your company is in and which main types of services/products are offered by the company? (Mobile, software, etc.)
- How long have you worked for this organization/project?
- Can you briefly tell me about the company structure and culture? Flat, hierarchical

**Were/are you familiar with the concept of software traceability?**

- Which artifacts do you mainly think of when talking about traceability?
- Which artifacts would you be responsible for in the typical projects you are involved with?
- Which artifacts are the most important to establish traceability between for you and why?

The following questions are about the projects or products that you are generally involved in.

**Which role are you typically assigned to during software development projects?** For example: product owner, project manager, software developer, software tester, software architect, requirements analyst, other:

**On average, how many people are involved in the software development projects you participate in?**

Think of the people that interact with software development artifacts such as requirements, architecture, code, test cases, user feedback, user manuals.

In the remainder of the survey please provide answers based on your experience in projects of the size that you have selected.

**Which software development paradigm is normally used in the projects you are involved with?**

- Agile: Scrum, Kanban, XP, ...
- Traditional: Waterfall, Incremental Development, V-model, Spiral, ...
- Mixed
- Other

**Would you characterize the industry you work in to be highly regulated? (Examples: Healthcare, Automotive, Aerospace, Finance, ... )**

- Yes
- No

Would you characterize your software as safety-critical? (Examples: software for medical, automotive, railway, aviation, infrastructure, and nuclear systems, ... )

- Yes
  No

How often is software traceability performed in the projects that you are involved in?

- Always  
 Sometimes  
 Never

If you have answered 'Always' or 'Sometimes' in the previous question, please indicate your reason(s) for performing traceability (multiple answers possible).

- because of mandate (regulations/ISO)  
 on request of customer  
 for the expected benefits  
 other

## Current situation

Please indicate your level of agreement with the following statements based on your opinion and experiences of your current or most recent projects that you are typically involved in.

N/A if not applicable or if you do not want to answer.

### Traceability Management

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree	N/A
1. Traceability costs in money, time, and effort are the main inhibitor for adopting (more mature) traceability practices	<input type="radio"/>				
2. There is insufficient guidance within the company on how to establish traceability	<input type="radio"/>				
3. Traceability costs outweigh the expected benefits	<input type="radio"/>				
4. It is difficult to access and obtain information sources (people and artifacts) to be able to establish traceability	<input type="radio"/>				
5. Traceability is mostly performed in an ad-hoc and non managed fashion	<input type="radio"/>				

### Social collaboration practices

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree	N/A
6. Traceability is of high importance for the software development process	<input type="radio"/>				
7. The allocation of time, staff and resources are often insufficient to be able to properly establish and maintain traceability	<input type="radio"/>				
8. There is a lack of collaboration between involved stakeholder teams in regards to establishing and maintaining traceability	<input type="radio"/>				
9. It is unclear which roles are responsible for traceability	<input type="radio"/>				

### Technical aspects

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree	N/A
10. Traceability tools do not satisfy our traceability needs	<input type="radio"/>				
11. It is difficult to establish traceability because development artifacts are stored in multiple locations/repositories	<input type="radio"/>				
12. The tools used for traceability are too complex to use effectively and to integrate with our existing tools	<input type="radio"/>				
13. Traceability is mostly performed manually	<input type="radio"/>				

## Need of establishing traceability

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Please prioritize the following statements based on your needs of your current or most recent projects that you are typically involved in.

The possible prioritizations are:

Not needed -- not of importance

Nice to have -- desirable but not necessary

Should have -- important but not critical

Must have -- critical

### Management needs

	Not needed	Nice to have	Should have	Must have	N/A
1. There is a need to reduce the costs of traceability	<input type="radio"/>				
2. There is a need for more guidance in the company regarding traceability	<input type="radio"/>				
3. There is a need to have a more clear overview of the costs and benefits regarding traceability	<input type="radio"/>				
4. There is a need to have easier access to information sources to be able to establish and maintain traceability	<input type="radio"/>				
5. There is a need to perform traceability in a more managed fashion	<input type="radio"/>				

### Social collaboration needs

	Not needed	Nice to have	Should have	Must have	N/A
6. There is a need to increase the awareness of the importance of traceability	<input type="radio"/>				
7. There is a need for more staff, time, and resources to properly establish and maintain traceability	<input type="radio"/>				
8. There is a need for more collaboration between involved stakeholder teams regarding traceability	<input type="radio"/>				
9. There is a need for more communication about who are responsible for traceability	<input type="radio"/>				

### Technical needs

	Not needed	Nice to have	Should have	Must have	N/A
10. There is a need for better traceability tools	<input type="radio"/>				
11. There is a need for a more centralized development artifact repository to establish traceability more easily	<input type="radio"/>				
12. There is a need for less complex traceability tools and easier integration with our existing tools	<input type="radio"/>				
13. There is a need for more traceability automation	<input type="radio"/>				

# Comments and feedback

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**About software development**

**In which software development stages would you say that traceability is the most important/critical? (Show slide with the SDLC phases, ask if there are any phases missing)**

**Or between which of the phases?**

**And why?**

**Additional comments/improvements**

**If you are interested in the results of this research and would like to receive them, please provide an email address.**

The contact information will only be used for distributing the results. In case of interest for an interview, it will also be used as a reference to your answers to be able to conduct a more relevant interview. The results of the interview will be anonymized as well.