Traceability during Development of Systems with Safety and Security Implications – Importance, Tools, and Challenges

Aim of the survey

Investigate the purpose and uses of traceability during system development projects, identify the state of practice, and understand the challenges when implementing traceability during development projects.

Participants

The survey is mainly intended for the REFSQ 2014 participants who have experiences in projects on development of systems with a focus on the systems which could have safety and other quality implications (for e.g. loss of life or mission or equipment, economic implications).

The survey is both for practitioners and researchers who have experiences in creating and/or using traceability information during activities (e.g. RE tasks, system designing, testing, V&V, quality assessment, qualification, project management) of a development project.

Even if participants do not have experiences in development of systems with safety and other quality consequences, participants input to the survey is valuable as traceability concerns are also important and applicable to systems with other consequences (e.g. economic, customer/user satisfaction).

Timings and incentives

It is aimed that you will participate and complete this survey while you are attending REFSQ. However, if you have any time constraints, you can participate in the survey after REFSQ. The only difference is that only the participants who completed the survey during REFSQ (i.e. before April 10th, 12:30 PM) are eligible for incentives. Incentive, a small appreciation for participation, will be given to four selected (lottery) participants, who will receive an Amazon gift card worth 50 euros. After completing the survey, each of you will be given a number. Please remember this number as these numbers would be used for the lottery.

The survey will stay open for one week after REFSQ'14 (i.e. April 17th) conference.

You will be able to complete the survey within 15 minutes.

Consent of participation and confidentiality

By filling in the questionnaire you consent to your voluntary participation in this survey.

The data collected through the survey will be kept confidential and will be stored securely in our company's internal server, and will be deleted after completion of the survey related activities. The result of the survey will be anonymised.

There are 24 questions in this survey

Your work experience

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For which type of organisations have you worked, and the number of years in each of those organisations?

Select more than one options, if necessary. Enter numbers of years of experience in the right text field.

Please choose all that apply and provide a comment:

☐ Academia

☐ Industry

☐ Research institute

Other:

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For which domain you have worked for?

Select more than one options, if necessary.

Please choose **all** that apply:

☐ Energy (petroleum, nuclear, solar, etc.)

☐ Transport

☐ Information Technology

☐ Other (please specify):

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In which roles you have experience?

Select more than one option, if necessary.

Please choose **all** that apply:

- ☐ Requirements engineer
- ☐ Designer (architecture and detailed design)
- ☐ Coder/programmer
- ☐ Tester
- ☐ Safety analyst/expert (internal to the company)
- ☐ Security analyst/expert (internal to the company)
- ☐ Independent assessor (consultant or external to the company)
- ☐ Project leader or manager
- ☐ Customer of a system
- ☐ Researcher
- ☐ Teacher (Professor, lecturer etc.)
- ☐ Other (please specify): _____

Purpose and use of traceability

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Is traceability implemented (created, used, and maintained) in the typical projects you are involved in?

Please choose **only one** of the following:

○ Yes

○ No

[]If No, what is the rationale behind not implementing traceability? Please state below

Only answer this question if the following conditions are met:
Answer was 'No' at question '4 [4]' (Is traceability implemented (created, used, and maintained) in the typical projects you are involved in?)

Please write your answer here:

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What is the main reason for implementing traceability in the project?

Select more than one option, if necessary.

Please choose **all** that apply:

☐ Traceability is mandated or required by the regulations and standards the project

☐ Traceability is mandated or required by the organisational policies or procedures or plans (quality plans, safety plans, etc.)

☐ Traceability is valued by the project or the organisation (understand and know the benefits of traceability)

☐ Traceability is required by the customers of the project

☐ Other (please specify):

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For which activities do you create and/or use traces?

Select more than one option, if necessary.

Please choose **all** that apply:

☐ Impact analysis

☐ Change management

☐ Configuration management

☐ Verification and validation

☐ Safety assurance, demonstration, certification

☐ Security assurance, demonstration, certification

☐ Compliance to requirements from standards

☐ Other (please specify):

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How important is the implementation of traceability in projects?

Please choose **only one** of the following:

○ Very important

○ Somewhat important

○ Neither important nor unimportant

○ Somewhat unimportant

○ Very unimportant

Implementing traceability

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How often traces are implemented (created, used, and maintained) in the project?

Please choose **only one** of the following:

○ Very often
○ Often
○ Sometimes
○ Rarely
○ Never

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How is traceability implemented (created, used, and maintained) during the development process?

Please choose **only one** of the following:

○ Traceability is implemented in all the phases of the lifecycle
○ Traceability is implemented only in some phases of the lifecycle, select the relevant phases

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Please select the relevant phases?

Select more than one option, if necessary.

Only answer this question if the following conditions are met:
Answer was 'Traceability is implemented only in some phases of the lifecycle, select the relevant phases' at question '10 [9]' (How is traceability implemented (created, used, and maintained) during the development process?)

Please choose **all** that apply:

☐ System concept
☐ Requirements analysis
☐ Architecture or High-level design
☐ Detailed design
☐ Implementation
☐ Integration and Test
☐ Operation and maintenance
☐ Other (please specify): [_____]

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Is there guidance such as a procedure or policy or process in your project or organisation describing that helps the stakeholders on how to implement traceability? For example a document describing *what* artefacts should be traced, *when* (phases) the artefacts should be traced, *how* to trace artefacts, and *who* should create or use traces?

Please choose **only one** of the following:

○ Yes
○ No

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If Yes, please describe in short (maximum 2 to 3 sentences) about the procedure or policy or process the project or organisation has?

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '12 [10]' (Is there guidance such as a procedure or policy or process in your project or organisation describing that helps the stakeholders on how to implement traceability? For example a document describing what artefacts should be traced, when (phases) the artefacts should be traced, how to trace artefacts, and who should create or use traces?)

Please write your answer here:

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Do you agree that the projects need better guidance on implementing traceability?

Please choose **only one** of the following:

○ Strongly agree

○ Agree

○ Neither agree nor disagree

○ Disagree

○ Strongly disagree

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Which tools are used in the project for implementing traceability?

Select more than one option, if necessary.

Please choose **all** that apply:

☐ Traceability matrices

☐ Office tools (excel, word, etc.)

☐ Commercial traceability tools

☐ Implicitly (semi-automatic or automatic) handled by the development environment)

☐ Other (please specify):

[]Please list the name of the tools

Only answer this question if the following conditions are met:
Answer was at question '15 [12]' (Which tools are used in the project for implementing traceability?   Select more than one option, if necessary.)

Please write your answer here:

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How often are these tools used in the project for implementing traceability?

Please choose **only one** of the following:

○ Always

○ Almost always

○ Sometimes

○ Almost never

○ Never

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To what extent the tools help you to perform your activities or tasks in the project?

Please choose **only one** of the following:

○ To a large extent

○ To a moderate extent

○ To some extent

○ To a little extent

○ Not at all

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How easy is it to use the tools?

Please choose **only one** of the following:

○ Very hard

○ Somewhat hard

○ Neither hard nor easy

○ Somewhat easy

○ Very easy

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Do you recommend a specific technique or a tool?

Please write your answer here:

Challenges

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What are the challenges of implementing (creating, using and maintaining) traceability in the projects?

Select more than one option, if necessary.

Please choose the appropriate response for each item:

	To a large extent	To a moderate extent	To some extent	To a little extent	Not at all
lack of understanding of the use of implementing traceability	○	○	○	○	○
lack of tools	○	○	○	○	○
lack of guidance (procedures or policies or process) on how to implement the traceability	○	○	○	○	○
costs of implementing the traceability over weigh the benefits	○	○	○	○	○
complexity of the product (number of people involved, number of requirements, etc.)	○	○	○	○	○

[]If there are challenges other than the ones mentioned in the above question, please list them below

Please write your answer here:

[]If you have further comments, please state below

Please write your answer here:

Contact details

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Please provide your email id below. We will use your email ONLY twice:

1. As an unique indentifier for the incentive lottery.

2. To send you the report with the results of the survey by the end of May 2014.

Note that your email will not be used for OTHER purposes.

Please write your answer here:

Thank you for participation.

For any questions please contact vikash.katta@hrp.no

05-01-2014 – 00:00

Submit your survey.
Thank you for completing this survey.