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Collaborative Legal Assessments and Confidentiality Analysis Under Uncertainty

RG and Labs: Mobility Lab

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Motivation and Research Questions

Modern mobility systems cross **technical domains**, operate within

various legal frameworks. Further, the high variability regarding their

internal structure and real-world environment leads to **uncertainty**.

How to enable collaborative data protection assessments based on software architecture?

How to analyze confidentiality at design time while considering the

impact of **uncertainty** on the software architecture?

Impact

- Improved communication between domains, enables efficient development of **legally compliant** mobility systems.
- **Foundation** for future research in the field of **uncertainty interactions** and self-adaptive systems
- Open-Source tooling ready to be used

in design time architecture analysis [1]

Research Activities and Results

Framework for collaborative and continuous data

- Approach for architecture-based and uncertainty-aware

protection legal assessments [3,5,7]



Publications

- **[1]** Boltz, Hahner, et al., "An Extensible Framework for Architecture-Based Data Flow Analysis for Information Security", ECSA, 2024.
- [2] Hahner, et al., "Architecture-Based Uncertainty Impact Analysis to Ensure Confidentiality", SEAMS, IEEE/ACM, 2023.
- **[3]** Boltz, Sterz, et al., "A Model-Based Framework for Simplified Collaboration of Legal and Software Experts in Data Protection Assessments", RuT Workshop, LNI, 2022.
- **[4]** Hahner, et al., "Model-based Confidentiality Analysis under Uncertainty", ICSA-C, IEEE, 2023.
- **[5]** Boltz, Sterz, et al., "Bridging Legal and Technical Realms: An Architecture-Model-Based Framework for Continuous Data Protection Legal Assessments", JSS, 2025 (submitted).
- **[6]** Hahner, et al., "ARC³N: A Collaborative Uncertainty Catalog to Address the Awareness Problem", MODELS-C, ACM/IEEE, 2024.
- **[7]** Boltz, Sterz, et al., "Towards Legal Knowledge Transfer Based on Software Architecture", ECSA, 2025 (submitted).





