Master

Modellbasierte Analyse der Datensicherheit und Datensouveränität von Datenökosystemen und Marktplätzen

Model-Based Data Security and Sovereignty Analysis of Data Marketplaces

Motivation

The era of profitable data accumulation has come to an end. The new paradigm emphasizes companies' capacity to effectively monetize their data. In response to the evolving landscape, a multitude of digital marketplaces have emerged to facilitate the trading and monetization of industrial data. Such systems, similar to traditional information systems, need to implement technical and organizational measures to safeguard data security and uphold data sovereignty. However, ensuring data security and privacy in data marketplaces poses greater challenges than in traditional information systems. Data marketplaces involve the sharing and exchange of data among multiple parties, creating a complex network that heightens the risks of data exposure, and unauthorized access. Additionally, the complex control of data monetization presents difficulties for data providers in effectively monitoring and ensuring compliance with data sovereignty policies.

Aligned with the principles of security by design, which advocate for security analysis to be integrated into the earliest phases of system development, the goal of this thesis is to apply and extend an existing model-based analysis approach to report on the data security and sovereignty of data marketplaces at the modeling phase of the system development life cycle. This thesis is developed in the context DATAMITE project[1], which aims at delivering a modular framework to improve data trading and monetization.

Tasks/Goals

In this master thesis you will:

- Model the architectural and behavior aspects of a marketplace platform using UML.

- Analyse the models with respect to security by using an automated tool, called CARiSMA[2].

- Enhance CARiSMA by developing additional security checks to enable reasoning on data sovereignty.

Requirements

Knowledge required to carry out the work: Java, UML, basics in IT security and good experience in Eclipse Modeling Framework (EMF).

Remarks

The opportunity to cooperate in writing research paper after the successful submission of the thesis will be provided.

Organizational

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[1] https://www.egi.eu/project/datamite/
[2] https://rgse.uni-koblenz.de/carisma/