SCIENCESPRINGDAY

FCT FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

DEPARTAMENTO DE INFORMÁTICA

Security in Data-Centric Systems

SOFTWARE SYSTEMS / PLASTIC Team

CENTER FOR INFORMATICS AND INFORMATION TECHNOLOGIES

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Research focus on Language-based Security

Objectives

We aim at developing static analysis techniques to deal with **information security** in the context of **data-centric software**.

There are still many open challenges on how to ensure **data privacy** in the presence of the degree of **data sharing** and **multi-tenancy** arising in such scenarios. Frequently, security compartments are dynamic and **depend on runtime data values**, as required to ensure so-called "row-level" security.

We strongly believe there is a need for a new approach to enforce and statically verify information security properties on data-centric applications.

Methodology

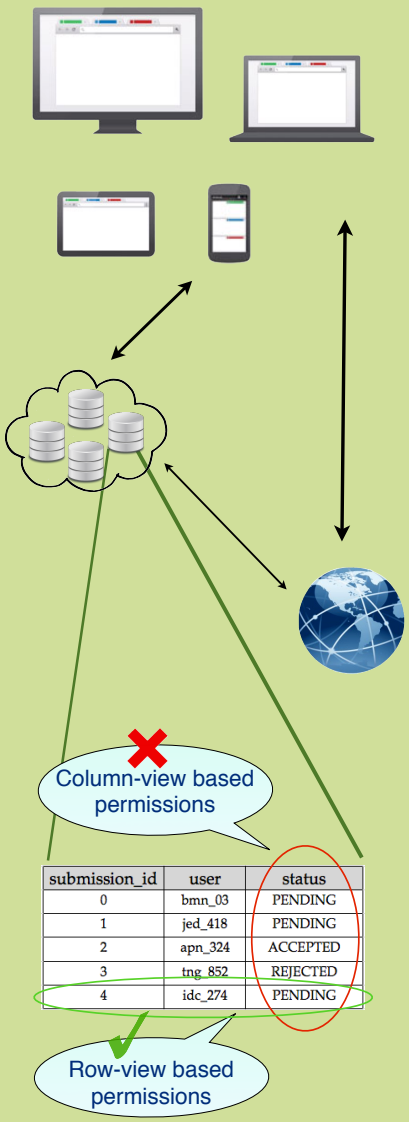
We design a programming language to express **data-centric processes** by augmenting a lambda-calculus with typical Data Manipulation Language primitives.

We then propose a **novel type system** to enforce security properties via **information flow analysis** where security labels may be **dependent** on the values manipulated by the computations they classify, and a **role-based access control** mechanism that complements our information flow analysis:

- Roles represent the class of individuals that can access the system
- Security labels represent security compartments indexed by runtime values that classify those individuals' data

Expected Results

- A core programming language for data-centric information systems
- A type system to enforce “row-level” access control of data as well as to ensure “row-level” secure information flows
- Security properties such as Non-Interference in the context of data-centric applications
- Correctness results for the type system and security properties, and their validation



Funding:

FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA EDUCAÇÃO E CIÊNCIA

PEst-OE/EEI/UI0527/2011

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