Policy-based Authentication and Authorization based on the Layered Privacy Language

LPL

→ Machine-readable representation of Legal Privacy Policies
→ Purpose-based Access Control
→ Representation of Privacy-Preserving Methods
→ Concept: Sticky Policies with Raw Data

Request

Entity Authentication

→ Authenticate requesting Entity
→ Agnostic of Authentication Method

Purpose Authorization

→ Authorize requested Purposes against each Purpose of the LPL Policy for each Data Source

Entity Authorization

→ Authorize requesting Entity against each Data Recipient of each relevant Purpose

Data Authorization

→ Authorize requested Data against each Data element of each authorized Purpose for each Data Source

→ POLICY-BASED AUTHENTICATION AND AUTHORIZATION

1 Requesting Entity Uni Passau authenticates .......... 2 Purpose research is valid ........
3 Requesting Entity Uni Passau authorized against Data Recipients .......... 4 Data age and postal-code authorize ........ 5 Data salary is invalid for ‘Alice’

LPL POLICY LPL1

→ Purpose: research
→ Data: age, postal-code
→ Data Recipient: Uni Passau, TH Deggendorf

POLICY / DATA SOURCE / AGE / POSTAL-CODE / SALARY

- lpl1 - Alice - 25 - 94032 - 36.000
- lpl2 - Bob - 23 - 94469 - 35.500
- lpl3 - Charlie - 24 - 18055 - 35.700

REQUEST

→ Entity: Uni Passau
→ Purpose: research
→ Data: age, postal-code, salary
→ Data Source: Alice, Bob

POLICY-BASED AUTHENTICATION AND AUTHORIZATION

AGE / POSTAL-CODE / SALARY

- 25 - 94032 - –
- 23 - 94469 - 35.500

RESULT

Each of the benchmark parameters has maximal a linear effect on the execution time of the modules.

→ Put all requested and inherited Purposes to the key-set ... < 1 ms
→ Put the Data Sources to the relevant Purposes .................... 11 ms
→ Getting all not relevant Purposes of the key-set .......... < 1 ms
→ Remove all not relevant Purposes from the result map .... < 1 ms
→ Total execution time (cleaned) ........................................... ~ 11 ms

EXPERIMENT SETUP

Configuration

Dataset

Request

Policy-based Authentication and Authorization

Modul Execution Times