Policy Design and Optimization in Information Sharing

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Kick off meeting for the DL4LD
Operational Mobility Center case

Systems and Networking Laboratory

27 February, 2020

TKI DINALOG Dutch Institute for Advanced Logistics
NWO Netherlands Organisation for Scientific Research
Commit 2 Data connecting business and science
THALES BiZZdesign ciena evofenedex Gemeente Amsterdam
AIRFRANCE KLM TRANSFIDES ORACLE
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Content

- My role in the DL4LD project
- Policy design and optimization
- Methodology

My role in the DL4LD project

Policy

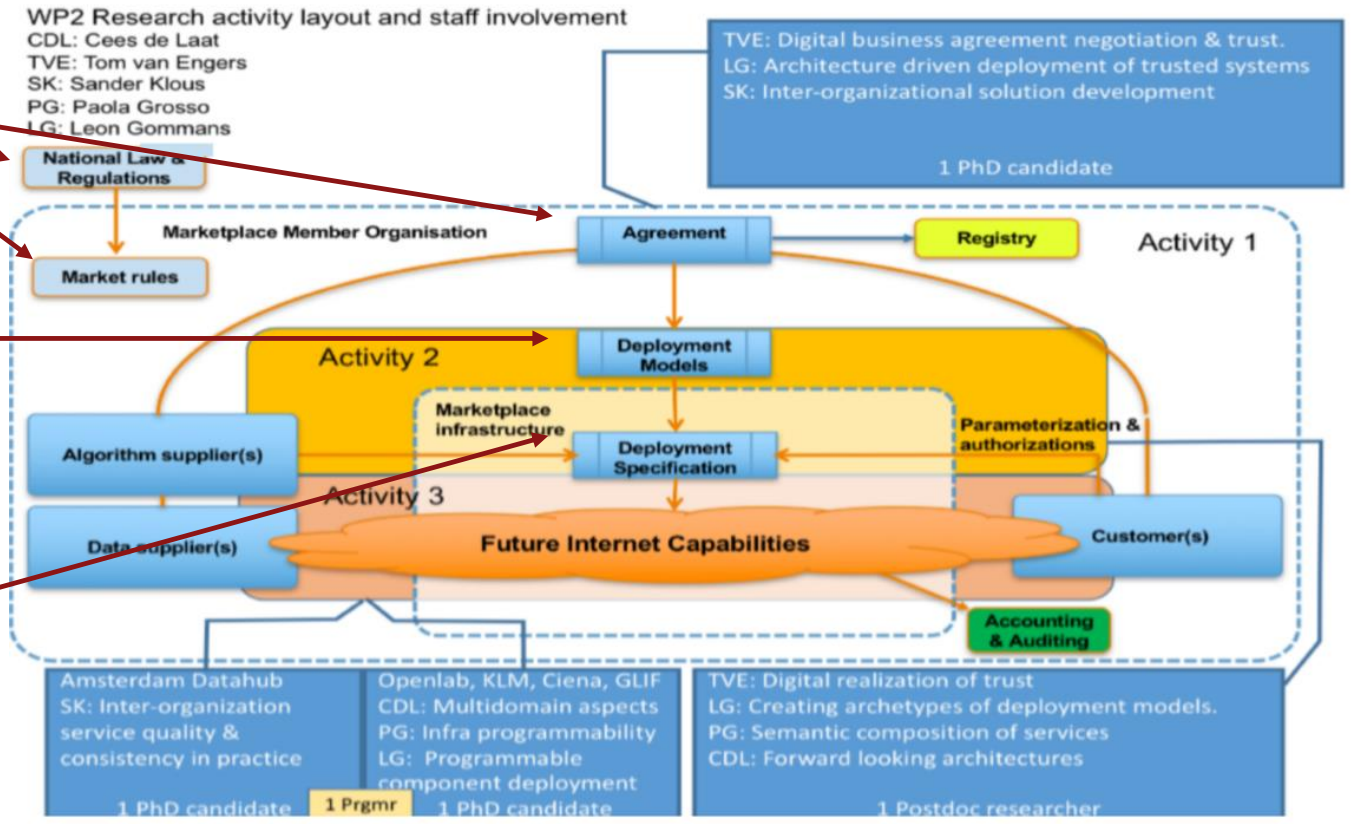
Strategic level

Planning

Tactical level

Operations

Operational level



Policy design and optimization

- What is policy?
  - Specified as **Event-Condition-Action** (ECA) rules that determine the **actions** to be **performed** under certain **situations**
- In ArenA case: Access control policy
  - **Access control policies**: rules that determine permissions on **who** can **perform what on which entities** under **what situations**
  - **Aim: lower down the risks of authorization**

[1] A Policy-based Management Framework for Pervasive Systems using Axiomatized Rule-Actions
[2] An ECA-P Policy-based Framework for Managing Ubiquitous Computing Environments

Policy design and optimization

Risk on:

- **System security**
- **Data security**
- **…**

Risk on:

- **Individual safety**
- **Public security**
- **…**

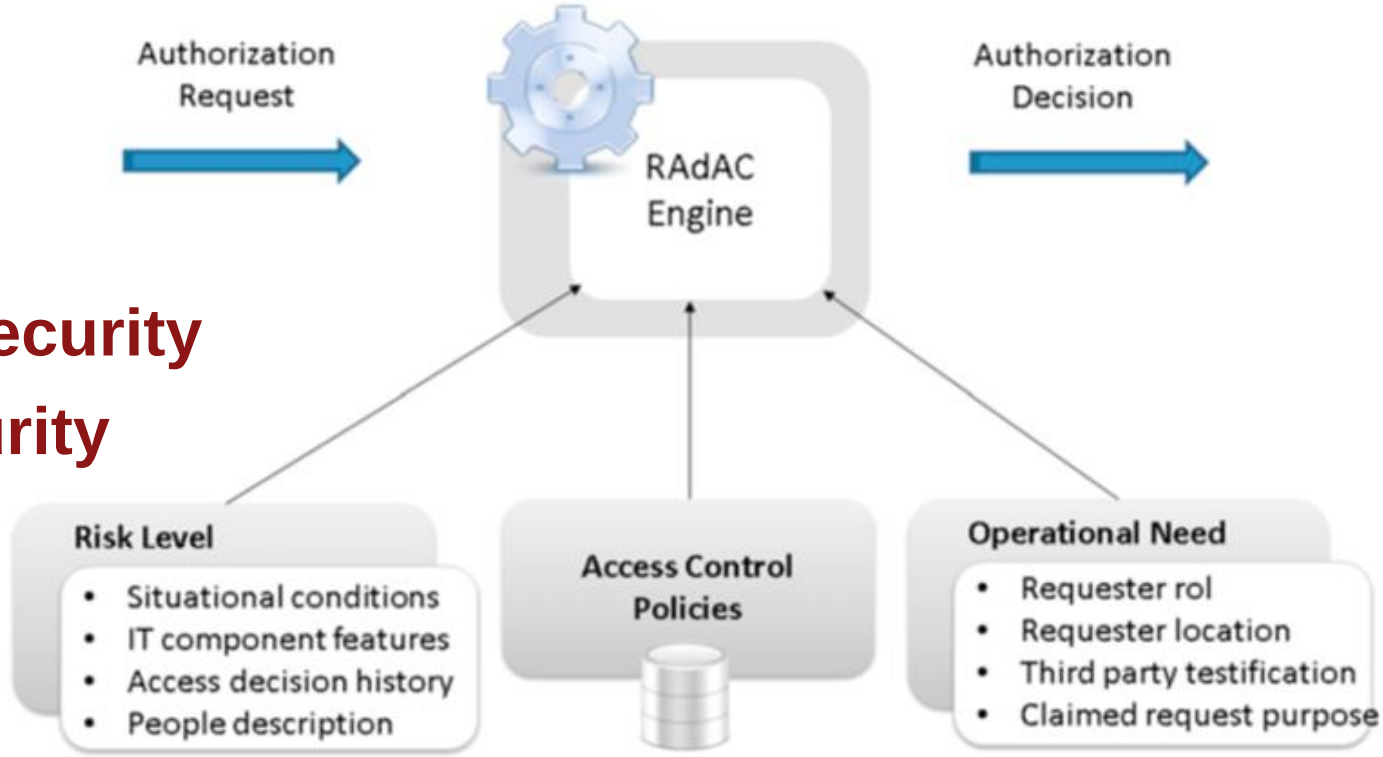


Fig. 1. RAdAC process model.

[3] Dynamic counter-measures for risk-based access control systems: An evolutionary approach

Policy design and optimization

- The calculation about risk
  - The risk of giving authorization R_A
  - The risk of NOT giving authorization R_NA

Parties	Operations	Datasets	
Ope Mobi Cen	Add	Seats	R_A + R_NA
Police	Delete	Age/gender	
Fire department	Change	Cameras	R_A + R_NA
Hospital	View	Sensors	

Policy design and optimization

- Test and evaluate different policies
- Generate the optimized policy in trade-off
- **Core problem:**

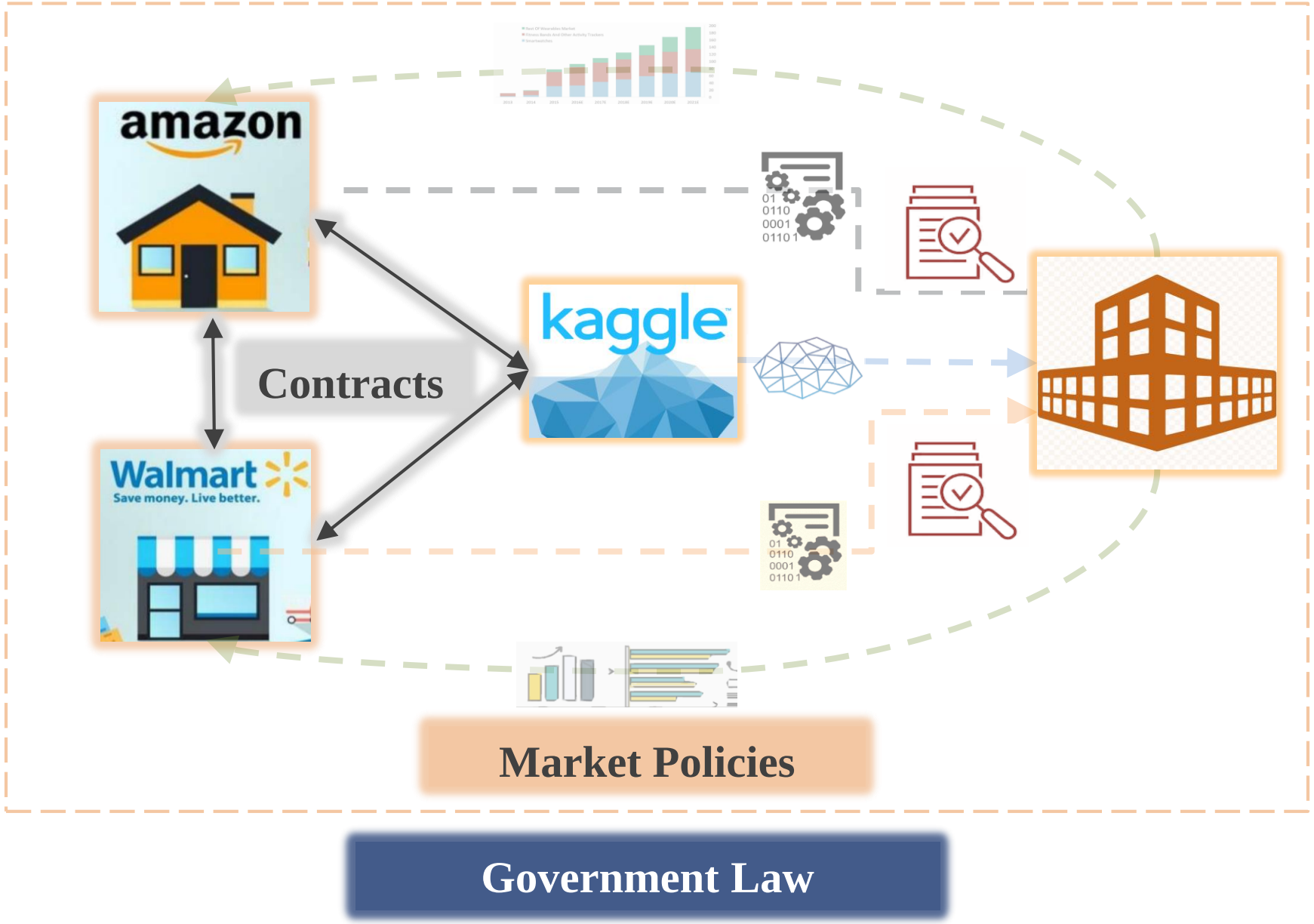
Risk evaluation

$$RL(T_1) = P(T_1|A) \cdot I(T_1)$$

$$RL(T_2) = P(T_2|NA) \cdot I(T_2)$$

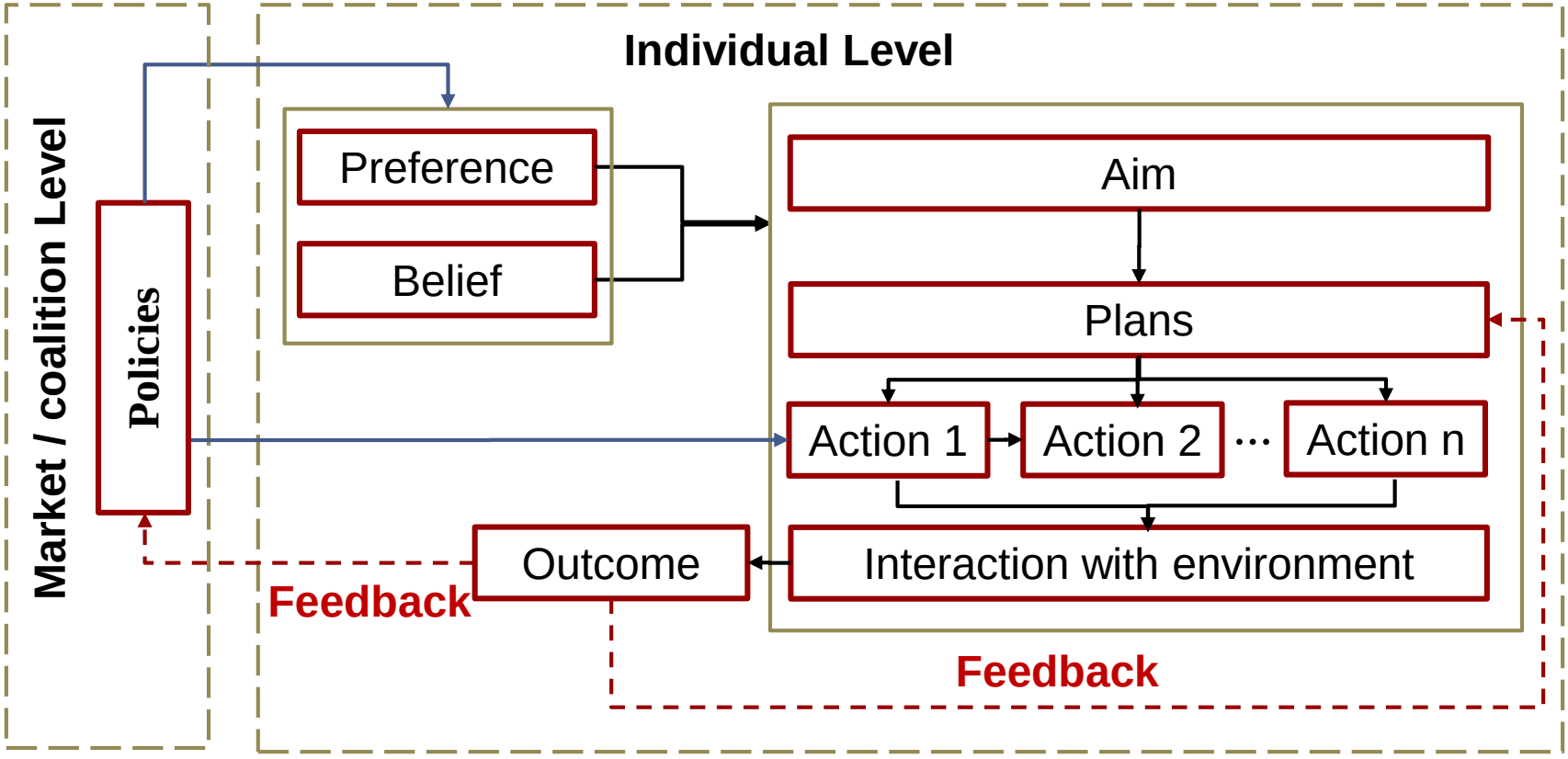
quantitative and qualitative (cardinal and ordinal)

Policy design and optimization



Methodology

- Analytical investigation
- Agent-based modeling
- Simulation experiments



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