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The privacy requirements dilemma - now the end-user can specify privacy requirements - But does (s)he really want to?

Jörg Dörr
(presenting work of
Manuel Rudolph)

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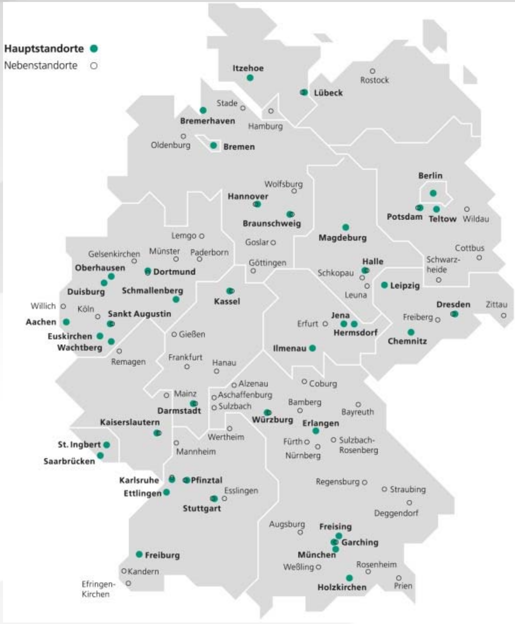
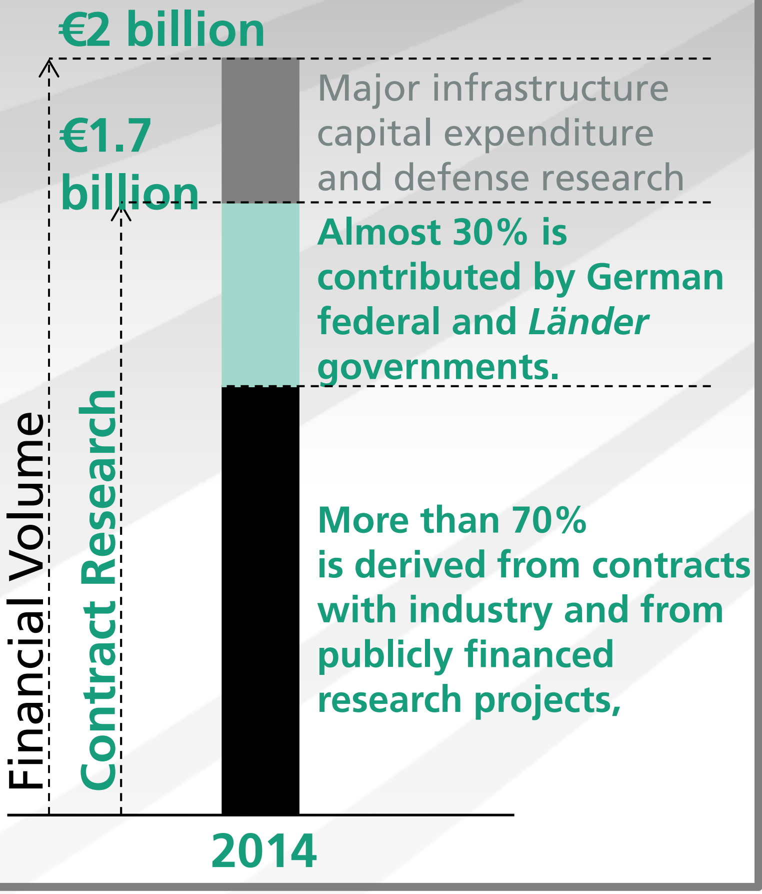
IND²UCE
SECURITY

THE FRAUNHOFER-GESELLSCHAFT AT A GLANCE

The Fraunhofer-Gesellschaft undertakes applied research of direct utility to private and public enterprise and of wide benefit to society.

Nearly **24,000** staff





Major infrastructure capital expenditure and defense research

Almost 30% is contributed by German federal and *Länder* governments.

More than 70% is derived from contracts with industry and from publicly financed research projects,

66 institutes and research units

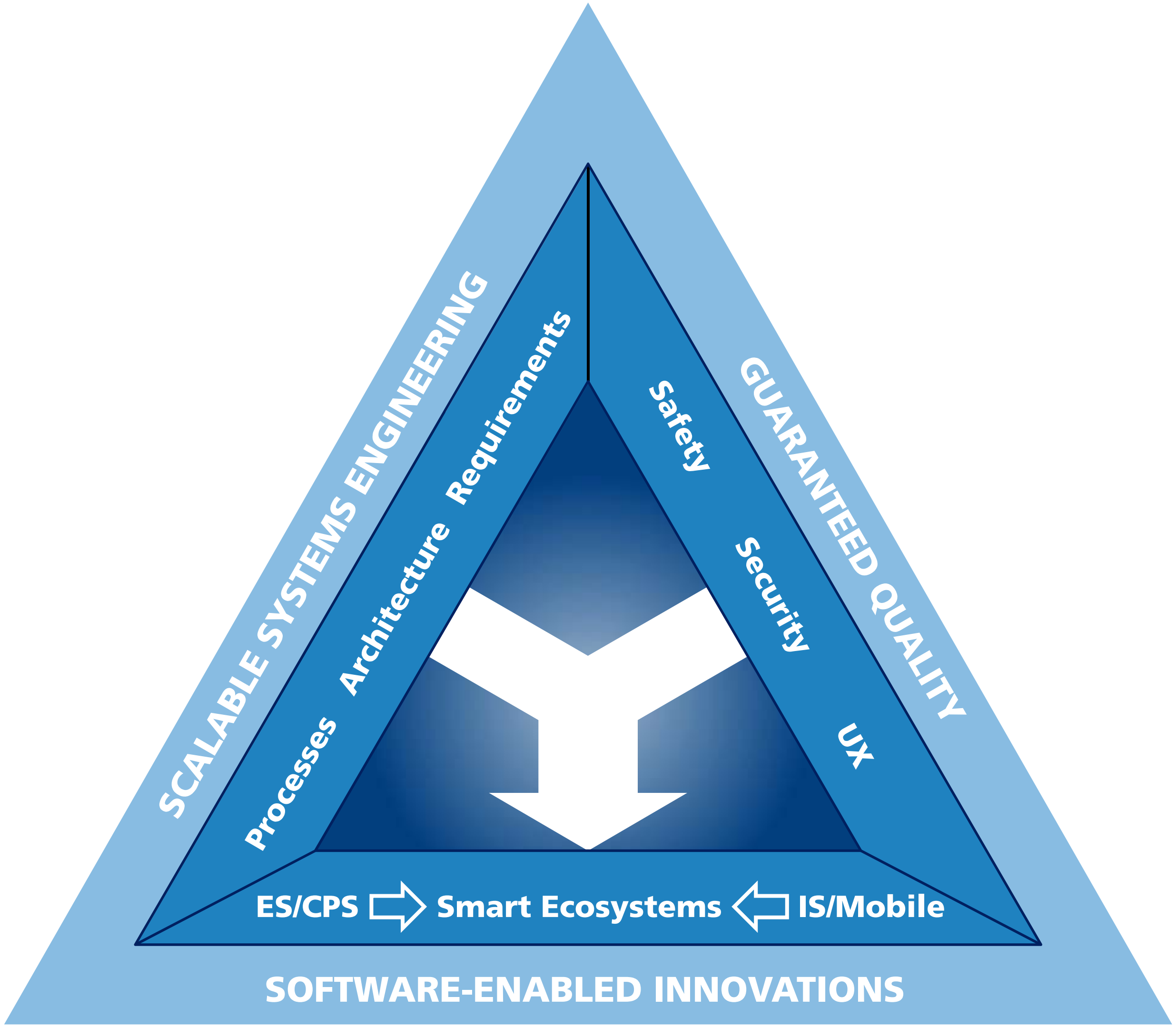
Fraunhofer IESE

The research institution for software and systems engineering methods

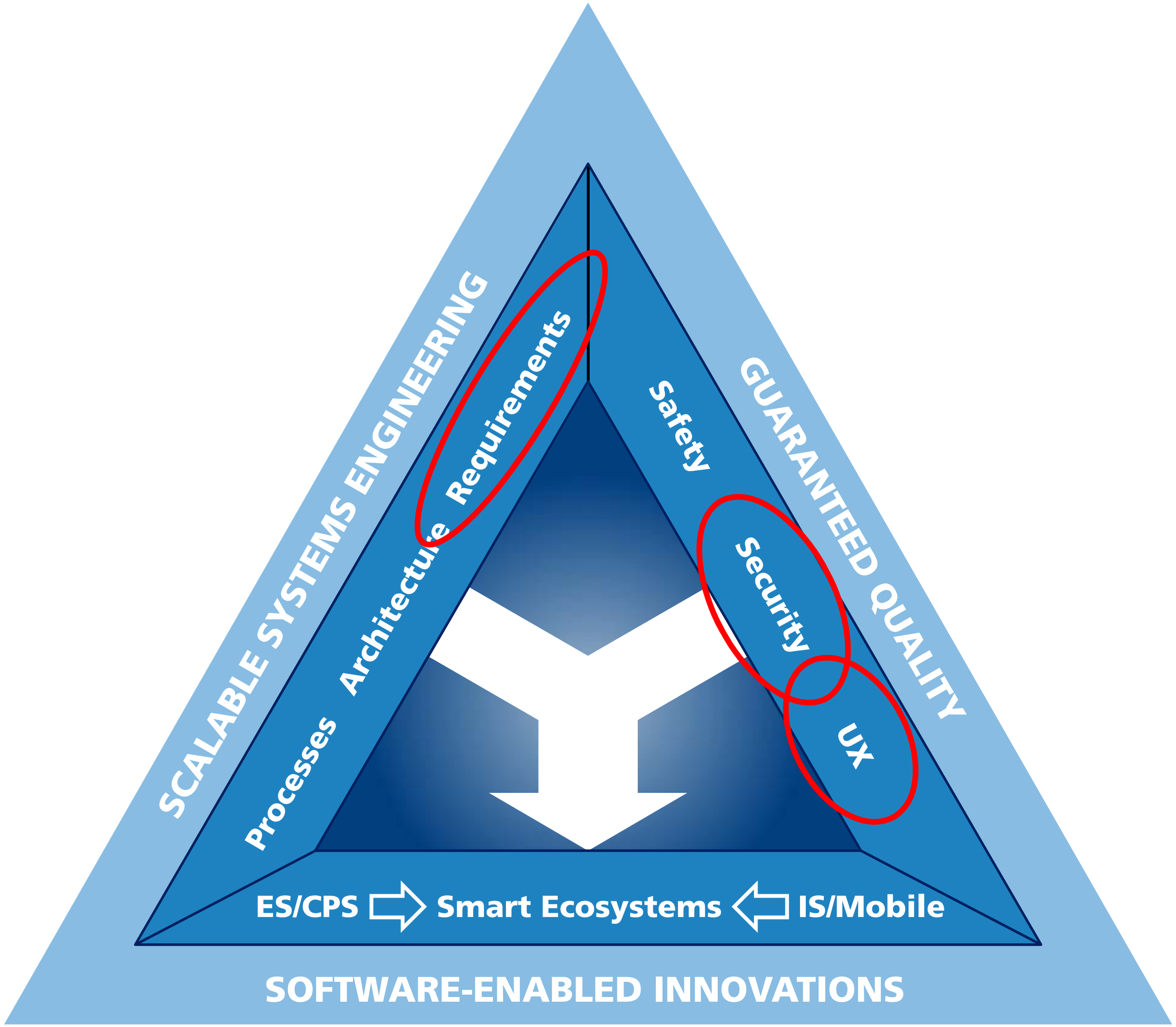
- Founded in 1996, headquartered in Kaiserslautern
- approx. 240 employees
- Our solutions can be scaled flexibly and are suitable for companies of any size

- Our most important business areas:
  - Automotive and Transportation Systems
  - Automation and Plant Engineering
  - Health Care
  - Information Systems
  - Energy Management
  - E-Government

Our Competencies / Research Areas



Research Areas of Today’s Talk



BUSINESS TODAY IS ALL ABOUT DATA

SENSITIVE DATA – FROM PRIVATE PERSON AND THE COMPANIES

Business data
Process data
Product data

Intellectual property

Private data
Employee data
Contractor data
Personal data

USAGE CONTROL

DATA LEAKAGE AND MISUSE

Legal Consequences

Reputation damage

Financial Losses

What happens after data is released?

CONSEQUENCES: *GO BIG OR GO HOME!*

- Option 1: Companies respond with strong data protection mechanisms
  - infrastructure protection,
  - data leakage prevention,
  - organizational regulations (no USB sticks, no cloud storage)

➔ „Fort Knox" Solution (black thinking)

- Option 2: Companies share their data and believe: shared data = lost data
  - nearly no data protection,
  - open data exchange,
  - careless data use

➔ „Open Data" Solution (white thinking)

WHY NOT GOING A MIDDLE WAY?

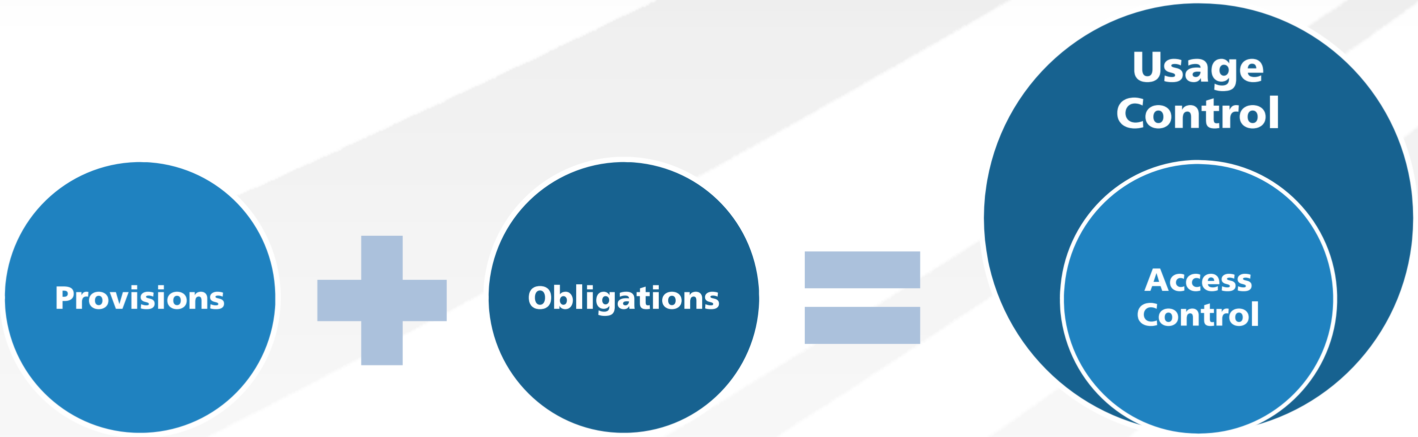
- If companies want to use data as production factor, they have to …
  - control data usage,
  - protect data value, and
  - prevent data misuse.
- Sharing of data does not exclude the protection of the data value
- Conceptual Solution (supported by technology): **Data Usage Control**

Share data, but keep control!

USAGE CONTROL

ACCESS CONTROL VS. USAGE CONTROL

- **Access control is not enough!**
- **Usage control** – a generalization of access control
  - Fine-grained policies specify how data is handled **after access has been granted**
  - Allows the user to **keep control over his/her data**



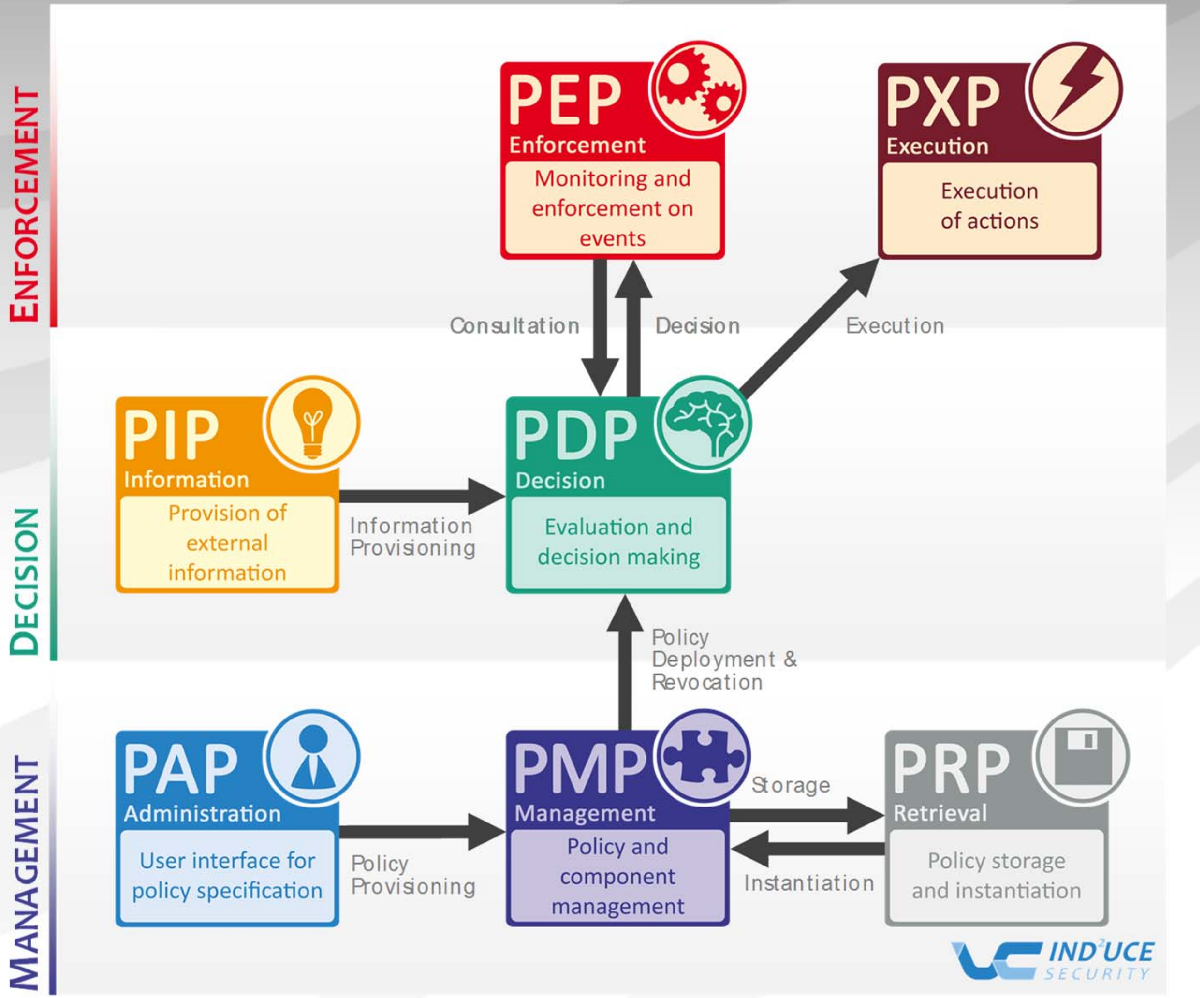
IND²UCE FRAMEWORK

INTEGRATED DISTRIBUTED DATA USAGE CONTROL ENFORCEMENT

- IND²UCE provides **theoretical concepts and technological components** for implementing data usage control
- EARTO innovation prize winner 2014

EARTO IMPACT DELIVERED

2014 Innovation Prize Winner



IND²UCE SECURITY

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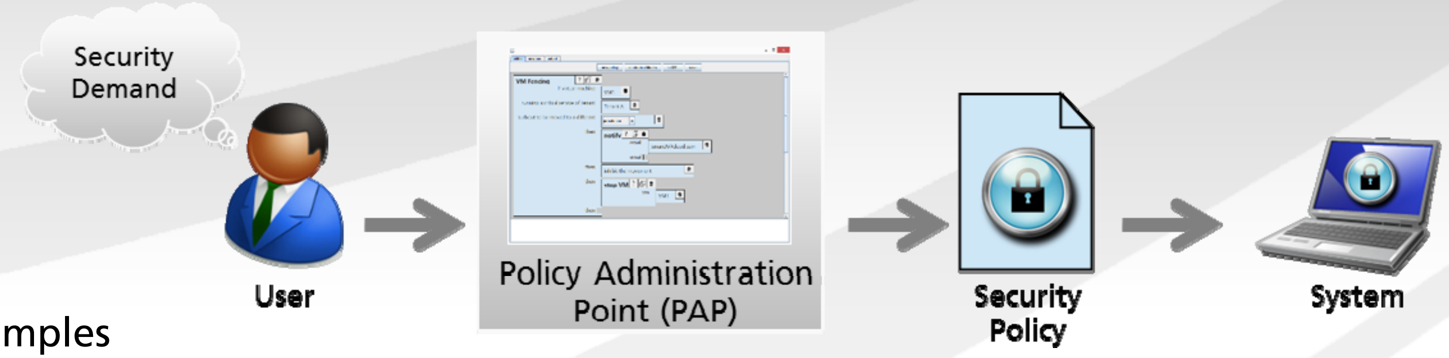
POLICY SPECIFICATION

- **Security policies** …
  - describe **security behavior** of a software system demanded by a stakeholder
  - can be specified flexibly changed during operation of system or software
  - are specified by various stakeholders depending on the scenario

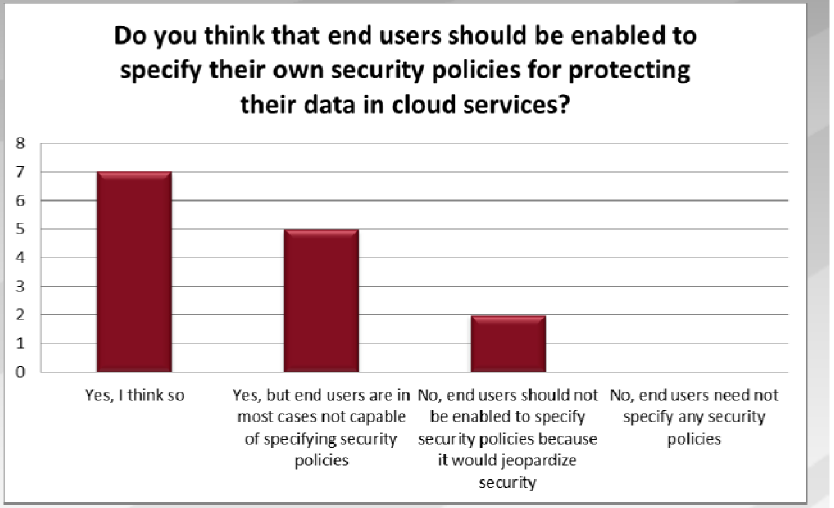


- Examples
  - Privacy – Facebook Privacy Settings: “Only friends may see my profile”
  - Data Usage Control – Business to Customer: “When business documents are sent to customers, they must be deleted after opening them 3 times or latest after 14 days”
- Policy Administration Points (**PAP**s) are specification tools for security policies

DEMAND FOR END USER SPECIFICATION

- Companies want their end users to specify their own security demands
- EU-GDPR demands that users give consent to data usage (data sovereignty)
- But companies don't know how to enable non-experts to specify own security polies
  - User does not understand policies
  - Policies become to complex to be handled by the end user
  - Effects of policies on the target system are not transparent to the end user

(Customer statements from e.g., Bosch, Finanz Informatik, camLine, TMF e.V.)



from SECCRIT User and Advisory Board survey

→ Users need appropriate security policy specification interfaces (PAP)

POLICY AUTHOR TYPES → SPECIFICATION PARADIGMS

- **Assumption**: Different specification paradigms are suitable for different policy author types

- Policy author types differ in their level of security and domain knowledge

- Assumption:
  - Suitable specification paradigm

  → Higher **acceptance** and higher **correctness** rate of specified policies

- **Research question: How can policy author types be characterized?**

Predefined Security Policies: No specification

Predefined Security Policies: On-off Button

Selection from List of Predefined Policies

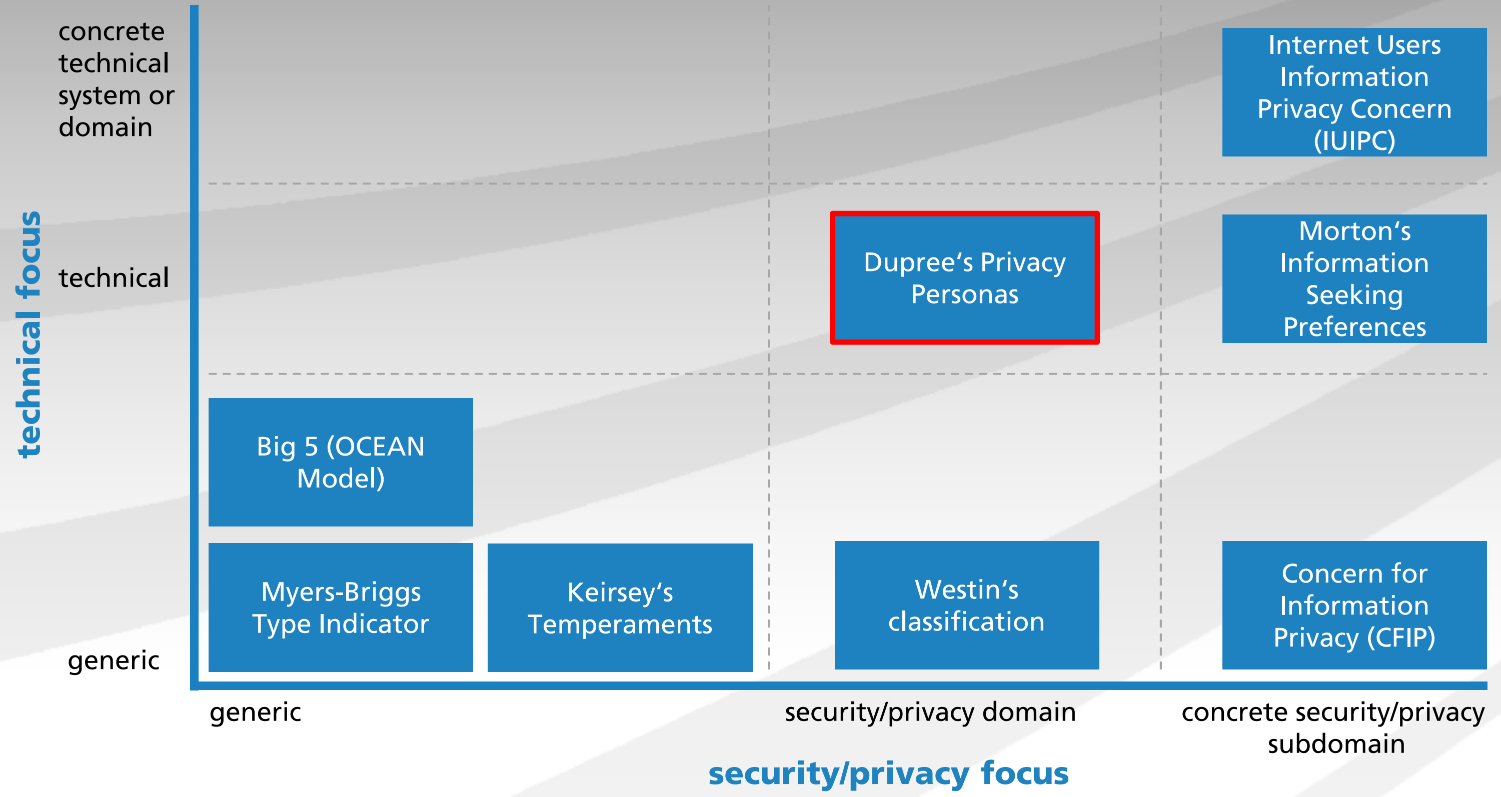
Specification Wizard

Security Policy Templates

IND^{2}UCE Policy Editor

Goal: Acceptance by policy author and correctness of specified policies

PERSONALITY TYPE MODELS – EARLY WORK



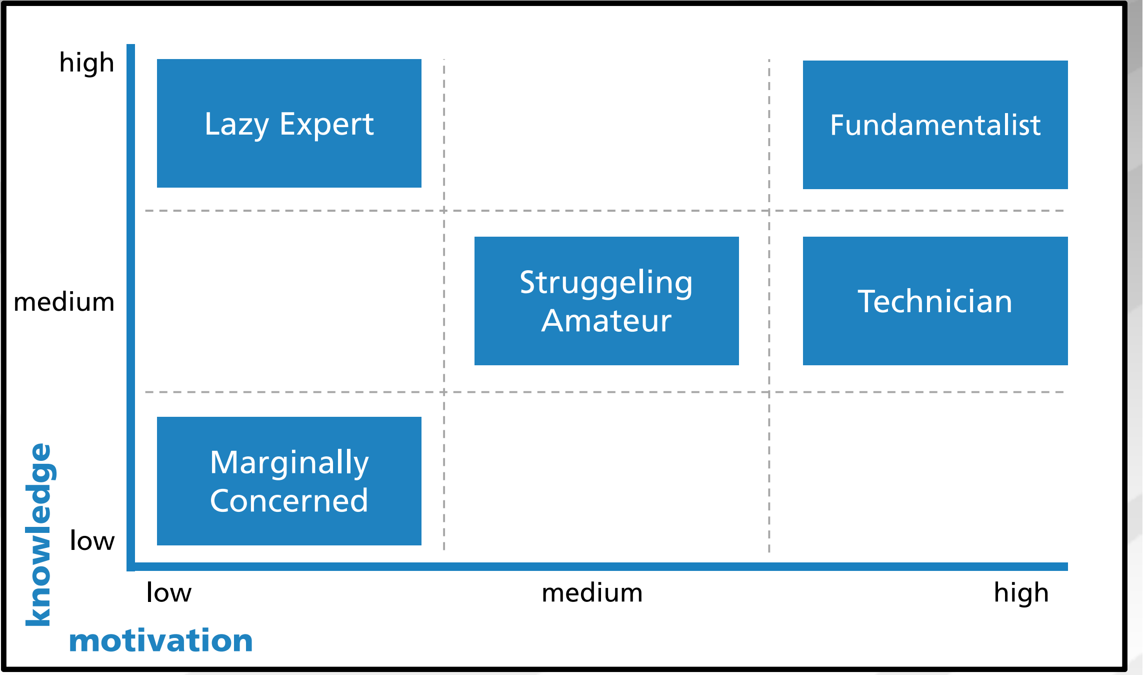
technical focus \ security/privacy focus	generic	security/privacy domain	concrete security/privacy subdomain
concrete technical system or domain			Internet Users Information Privacy Concern (IUIPC)
technical		Dupree's Privacy Personas	Morton's Information Seeking Preferences
generic	Big 5 (OCEAN Model) Myers-Briggs Type Indicator Keirsey's Temperaments	Westin's classification	Concern for Information Privacy (CFIP)

- Security policies are technical and affect various elements in the security and privacy domain

➔ Current Focus on Dupree's Privacy Personas (seem to match best)

DUPREE‘S PRIVACY PERSONAS

- Dupree identified five personas that behave differently when it comes to security practices
- Key distinction factors
  - Knowledge of privacy and security
  - Motivation



- Each persona has between 9 and 13 characteristic traits
  - e.g., Lazy Expert: „Chooses convenience over security“, „Chooses being social over privacy“ and „Write down passwords securely“
- Policy author to persona matching using persona descriptions with traits

SUMMARY

- Now **end-users are able (in principle) to specify** their security and privacy policies (requirements) at runtime
- An open question is **how to provide the best interface** (policy authoring point) to the different types of end-users
- We are open to a controversial discussion and hearing your opinion: **what are the key influencing factors** from your point of view?
  - Domain Knowledge
  - Security/Privacy Knowledge
  - Bad Experience
  - Personality
  - Business / Private Setting
  - …