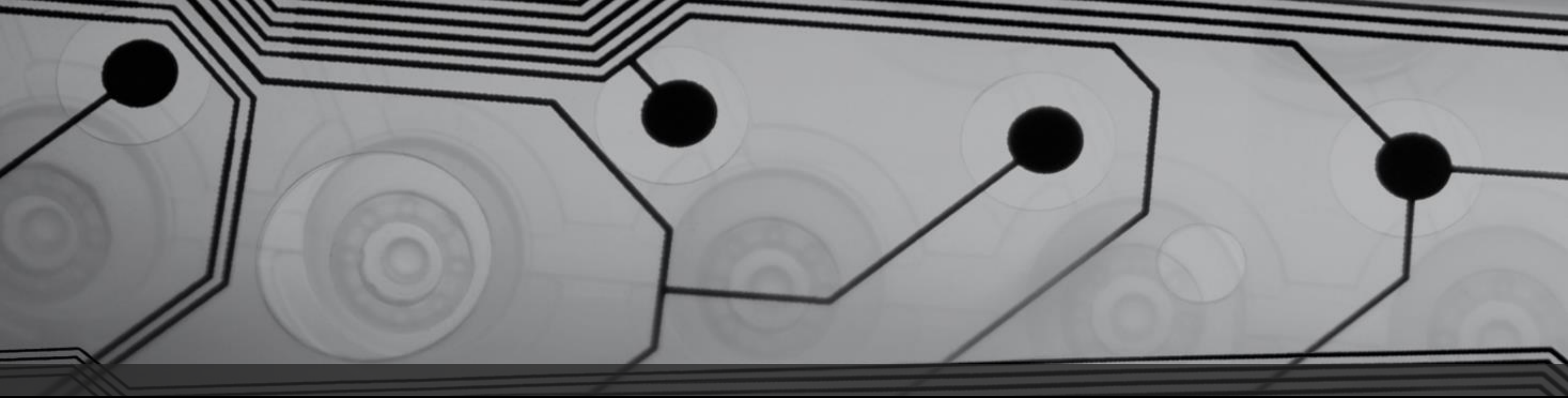

From Privacy Impact Assessment to Social Impact Assessment

Preserving trust in the Internet of Things

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The problem space : trust in the IoT

- Consumer trust in the Internet of Things is at vulnerable place
  - e.g. Samsung smart TV "listening" to conversations
  - Hackable baby alarms (Houston "wake up you little slut!"); 9 models tested in 2015 still had major flaws)
  - Search engine for IoT devices, inc. private webcam streams (shodan.io)
- Hypothesis: SMEs creating IoT chips and systems are not privacy aware
- Why?
  - Not traditionally customer facing;
  - Privacy a bug not a feature;
  - Little awareness of legal DP regulation;
  - May be regarded as responsibility of retail chain;
  - Engineers don't see themselves as responsible for ethical values
- Baseline questionnaire going out, via Digital Catapult , via IoTUK
- Also fits into general miasma of consumer distrust post-Snowden

The problem space: law

- IoT involving processing personal data (PD) is challenging for European DP law (DPD/GDPR)
- Is the law enough to reassure consumers?
- Consent (free, informed, signified, unambiguous) is problematic given "pervasive" environment ambition of ubicomp; esp for public systems eg smart transport, roads
  - In private systems , consent can be given by contract – but quality of consent?
- DP allows other grounds for collecting/processingPD eg "legitimate interests" of data controller if not harming fundamental rts of data subject
- BUT ePrivacy Directive ONLY accepts prior, informed consent (opt in) where location or traffic data collected (much confusion, and reform underway)
- Also increasingly hard to argue IoT systems only processing "anonymous" data (i.e. non-PD
  - NB under GDPR "pseudonymous" data expressly considered to be PD

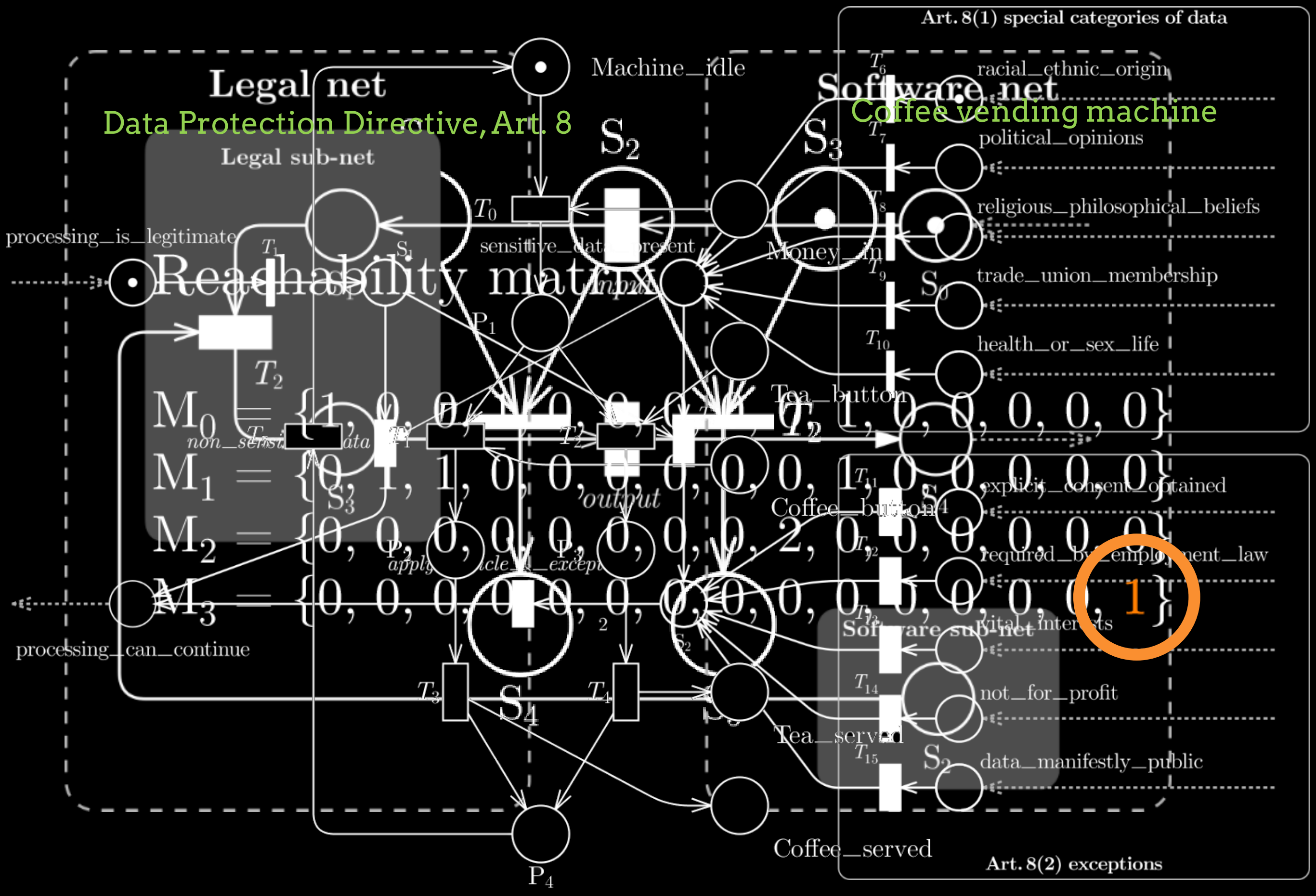
From *post factum* legal compliance to *a priori* privacy by design

- GDPR mandates "privacy by design" by 2018
- Also requires Data Protection Impact Assessments (DPIAs) where "high risk" processing
- DP by design to be embedded "from the very early stage", "within entire life cycle of technology"
- How c/should DPIAs be used in IoT? By SMEs? To be useful for entire design process, and consumer trust - not box ticking exercise too late on?
  - e.g. a system to detect bus seat occupancy using anonymous sensors not CCTV
- One key idea: a wider Social Impact Assessment to cover impacts of data processing which are not confined to classic privacy intrusions (Responsible Innovation)
  - e.g. discrimination from profiling systems (Sweeney)
  - Other values we might want to embed from start – data minimisation, interoperability, sustainability, transparency of algorithmic processing
  - Ethical impact assessment prior work exists (SATORI, PULSE, PRIPARE, EDPS) – but not so far aimed at private sector, IoT, and SMEs

SIA: bridging the law–technology gap

- GDPR
- SMEs – awareness, fears, resources
- Opening the “black box”
- Different legal regimes

- **Petri Net visual model**
- Easily understood & technically robust
- Both technical and legal processes
- Formally provable
- Portable models; IDE integration
- Evidential basis for SIA?


Art. 8(1) special categories of data
Legal net
Data Protection Directive, Art. 8
Machine_idle
Software net
Coffee vending machine
racial_ethnic_origin
political_opinions
religious_philosophical_beliefs
trade_union_membership
health_or_sex_life
Legal sub-net
processing_is_legitimate
sensitive_data_present
Money_in
Reachability matrix
Tea_button
Coffee_button
explicit_consent_obtained
required_by_employment_law
vital_interests
Software sub-net
not_for_profit
data_manifestly_public
Tea_served
Coffee_served
processing_can_continue
Art. 8(2) exceptions
M_0
M_1
M_2
M_3
1
S_2
S_3
S_4
P_1
P_4
T_0
T_1
T_2
T_3
T_4