

FP 7 Euro-NF SJRP GOVPIMIT

Privacy and Governance Considerations for the Internet of Things

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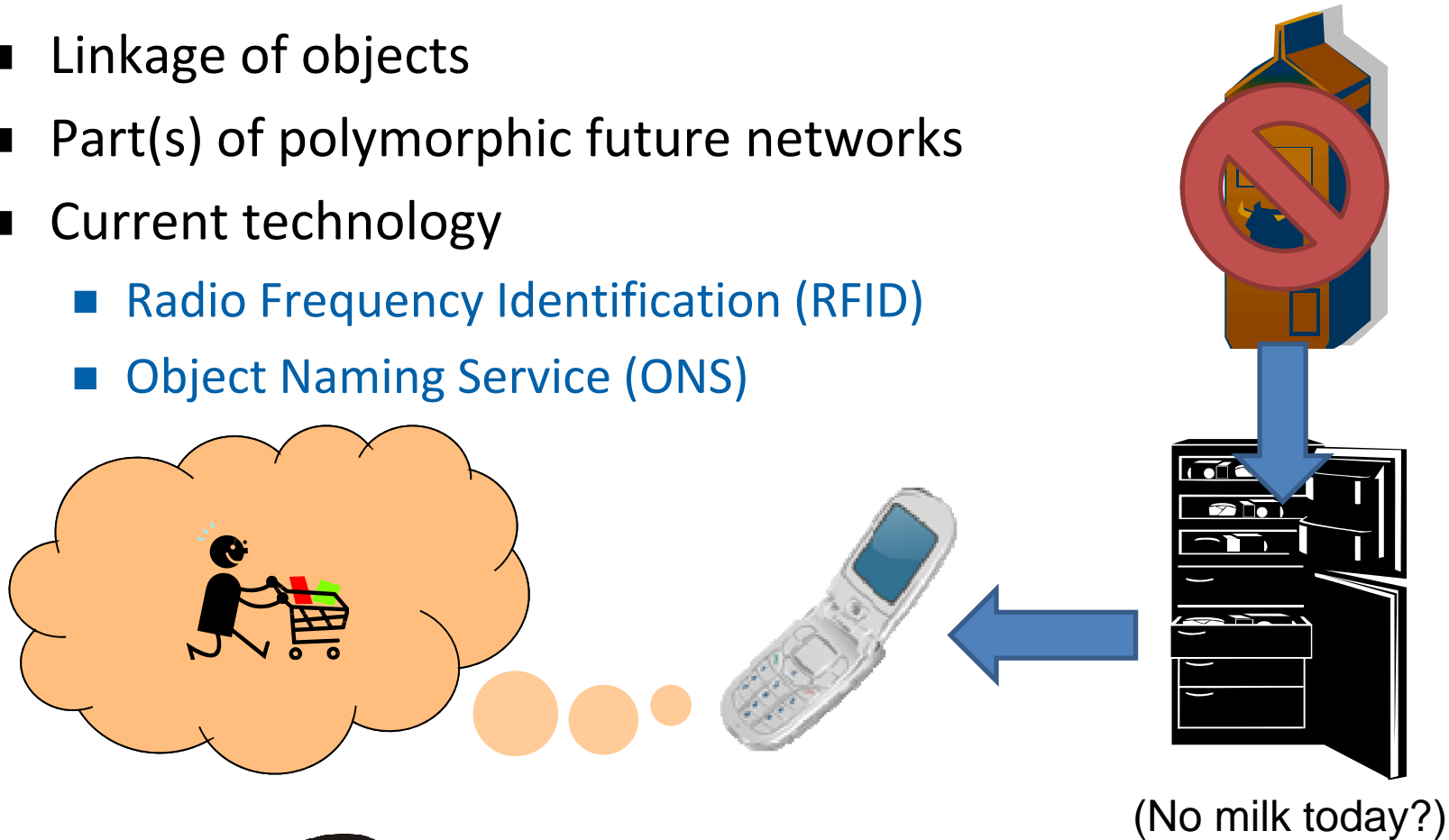
Outline

- Internet of Things
- GOVPIMIT
- Privacy Considerations
- Governance Challenges
- And the Future?



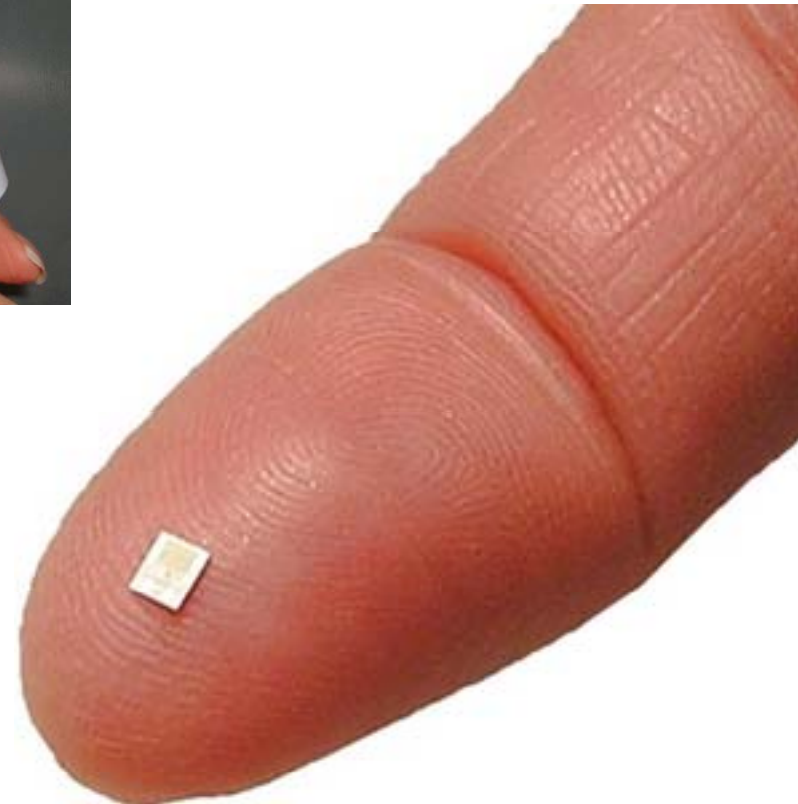
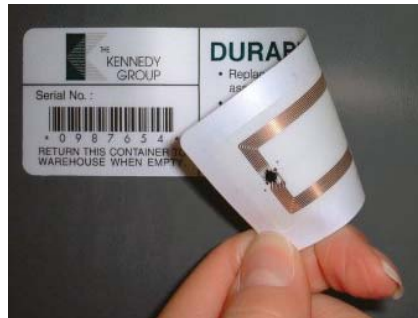
Internet of Things (IoT)

- Linkage of objects
- Part(s) of polymorphic future networks
- Current technology
 - Radio Frequency Identification (RFID)
 - Object Naming Service (ONS)



IoT with RFID

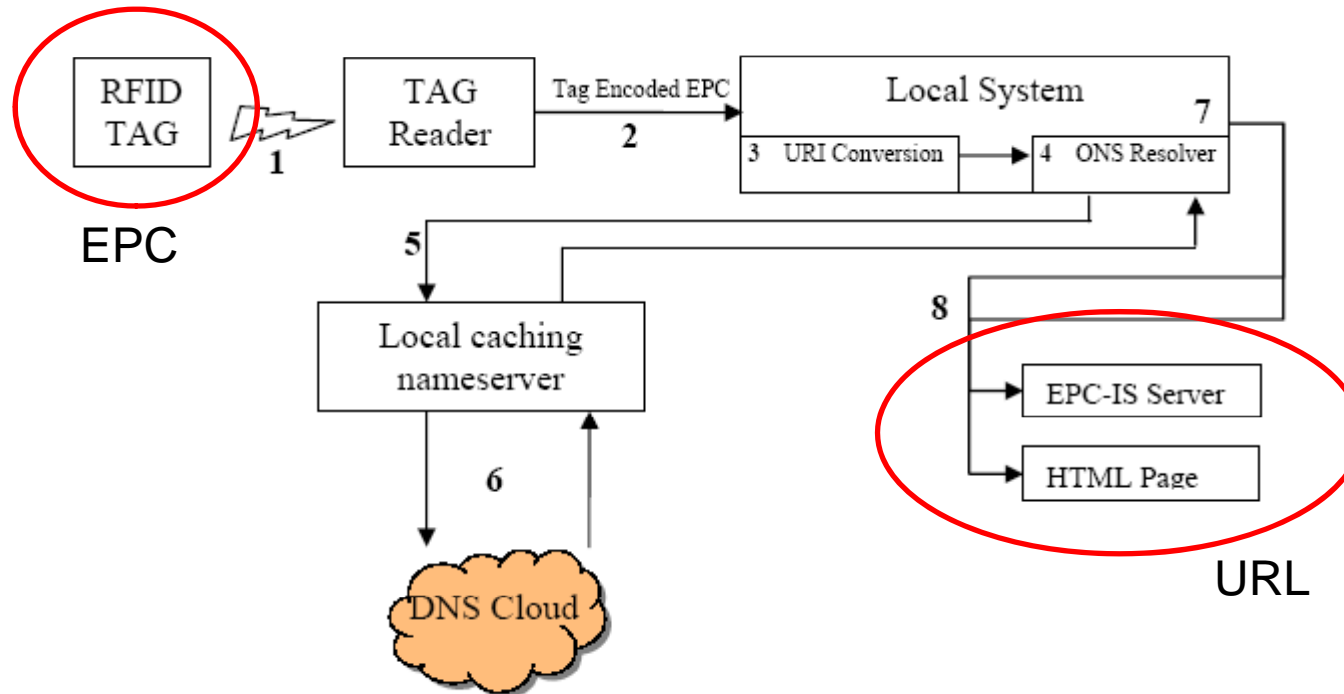
- Wireless identifier
- Batteryless
- Easy to deploy
- Getting smaller
- Optional: computational power and sensors
- Getting cheaper
- Jan 2010: < 1 USD (4" by 1")
(RFID weblog: http://www.rfid-weblog.com/50226711/rfid_tag_breaks_on_e_dollar_price_barrier.php)



PHASE IV ENGINEERING, INC
(<http://www.phaseivengr.com/>)



IoT with ONS



Source: EPCglobal Object Name Service (ONS) 1.0.1

ONS - Example



Marques de Murrieta Ygay Reserva 2005
Bodega Marques de Murrieta, D.O.C. Rioja
15,90 EUR

[\[follow for further information\]](#)

Chateau Cos d'Estournel,
2e Grand Cru Classé, Saint Estèphe
Bordeaux 2007

87,90 EUR

[\[follow for further information\]](#)

Internet of Things (IoT)

- Great market potential
- Wide-ranging political, legal, and socio-economic implications
- Particular concern: privacy issues
 - Large-scale, global data recording
 - Tagged with time and location information
 - Hidden to humans
 - Right to silence the tag?



GOVPIMIT objectives

- **Integration scenarios** of IoT with the Network of the Future and **use case scenarios** of links between IoT and the Network of the Future
- **Analysis and evaluation** of privacy, secure authentication, and identity management
- **Impact** of policies and governance to ONS architecture
- **Recommendations** on policies and governance for the ONS

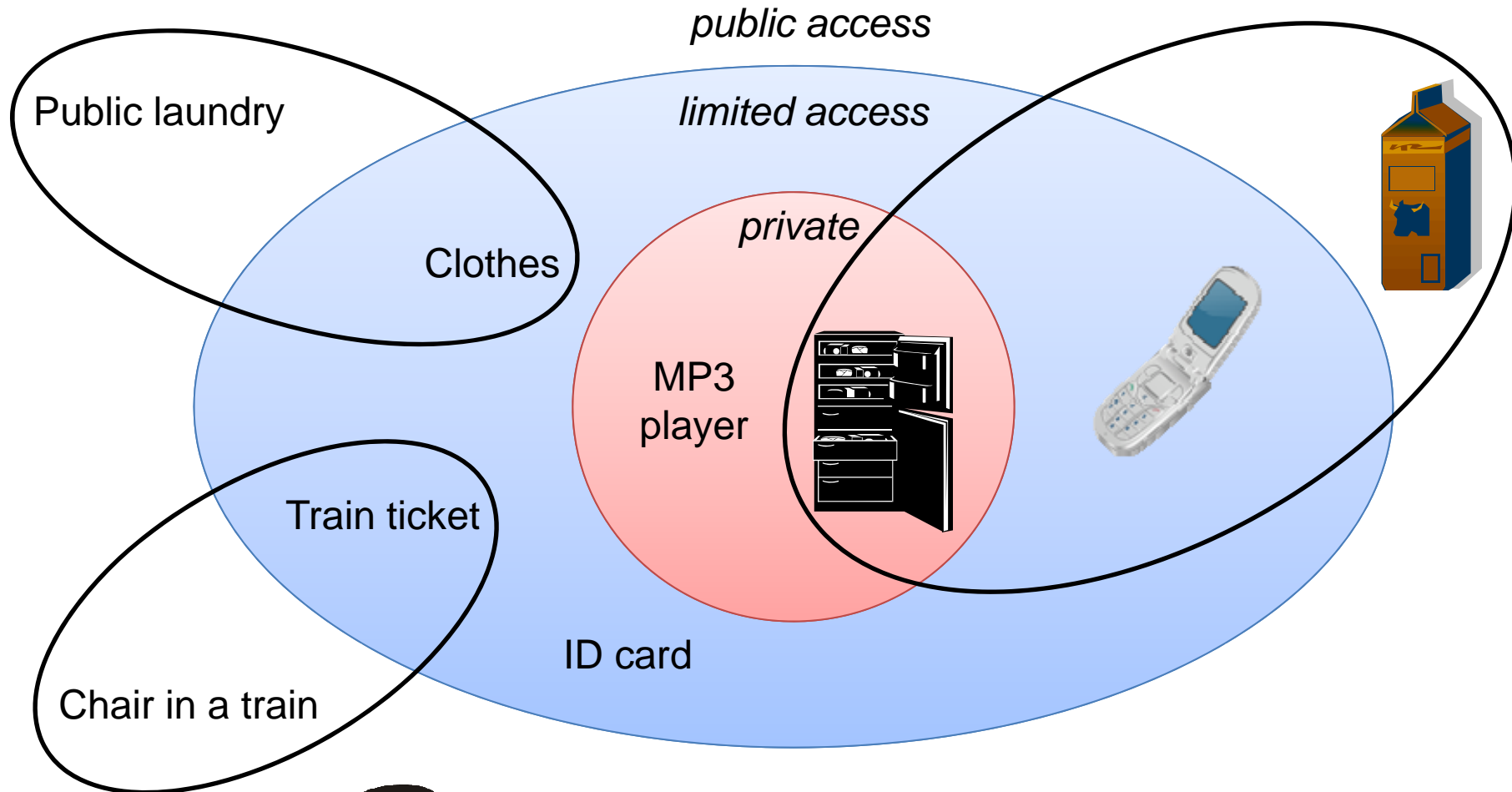


GOVPIMIT studies

- Governance, privacy and security issues in the ONS
- Authentication via dynamic naming
- Flexible identity management for ONS
- Dynamic creation of intranets
- Governance authority



Privacy Considerations (1)



Privacy Considerations (2)

Information privacy in the IoT?

- **Information is linked** to persons, actions, activities, places, time, ...
- In the future: enriched with “live” **sensor data**
 - like GPS, motion/inertia, blood pressure, ...

→ Defining **scopes of information**

- Private scope
- Confidential scope
- Public scope

→ **Information accountability**



Privacy Considerations (3)

Location privacy in the IoT?

- Objects are **uniquely named** (by EPC) and can be **probed wirelessly**
 - RFID tags have a “radio fingerprint”
 - Combinations of objects are (almost) **uniquely identifying**
 - Enables **tracking and tracing** of persons
- ➔ Silencing the tag?
- Usability issues
 - Maybe on demand? (private mode)
 - Self-hiding tags? (tag-centric authentication)

Governance Challenges

Who should govern the IoT?

- IoT uses the Internet naming and addressing scheme
 - Governed by ICANN
 - But: do we want to replicate the ICANN model/debate?
- Industry has shown interest (e.g. EPCGlobal)
- European Commission
 - policymakers should participate
 - shared and decentralized governance



And the Future? (Conclusion)

- IoT presumably becomes reality
 - RFID is cheap and potential
 - ONS already exists
- Big opportunities and big challenges
 - Keeping the power in the user's hands, but to what extent?
 - We need governance, but by whom?
- What comes next?
 - Smart Objects
 - Smart Living
 - ...

