



REPUBLIC OF ESTONIA  
INFORMATION SYSTEM AUTHORITY

# The State ICT Infrastructure in Estonia

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# Agenda

- e-State unique aspects, risks and challenges
- Estonian State ICT infrastructure
- X-road's importance for a well-functioning e-State

Welcome to e-Estonia. Let's zoom in...



Let's zoom in a little more...

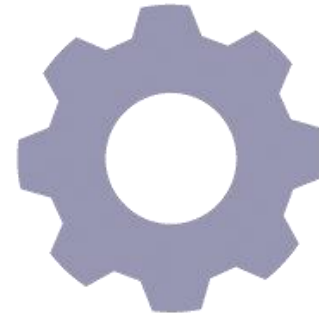


Everything starts with people



# My background

- Education: management of IT, MBA
- 9+ years in RIA
- Positions held:
  - service manager
  - domain manager
  - head of development
  - head of interoperability solutions
  - advisor
  - domain manager (current)



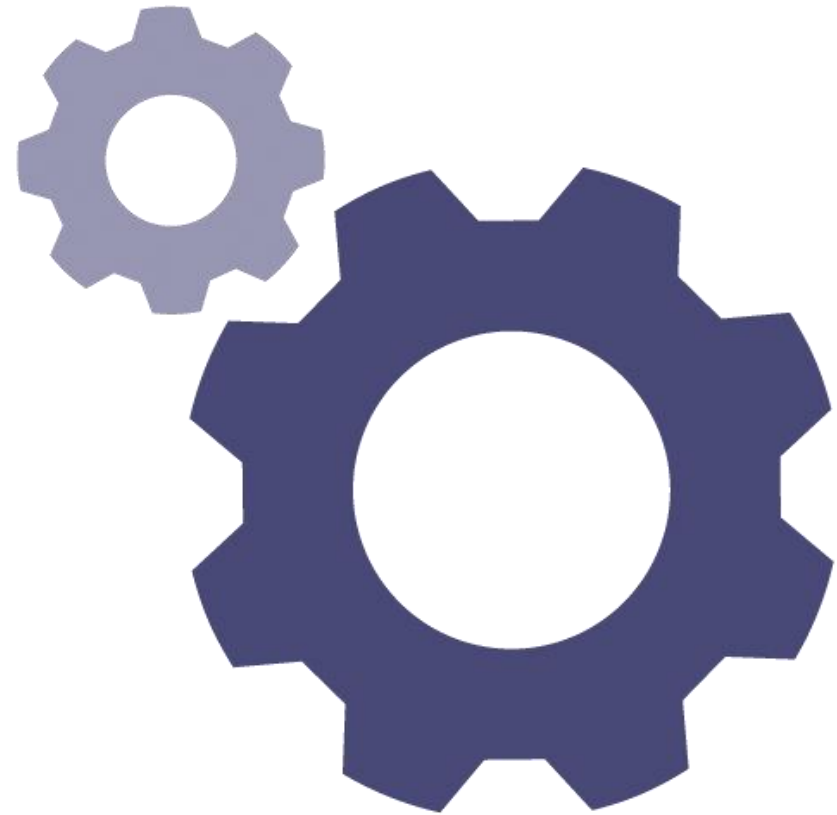
# State data governance domain

## Vision:

- We enable government data reuse

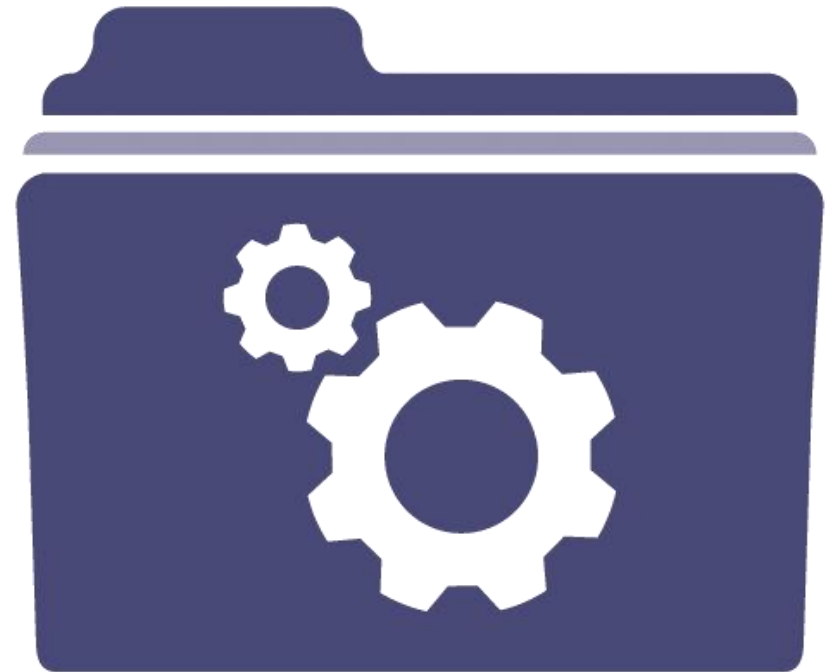
## Services:

- catalogue of information systems and data
- data and document exchange platform
- data governance requirements evaluation



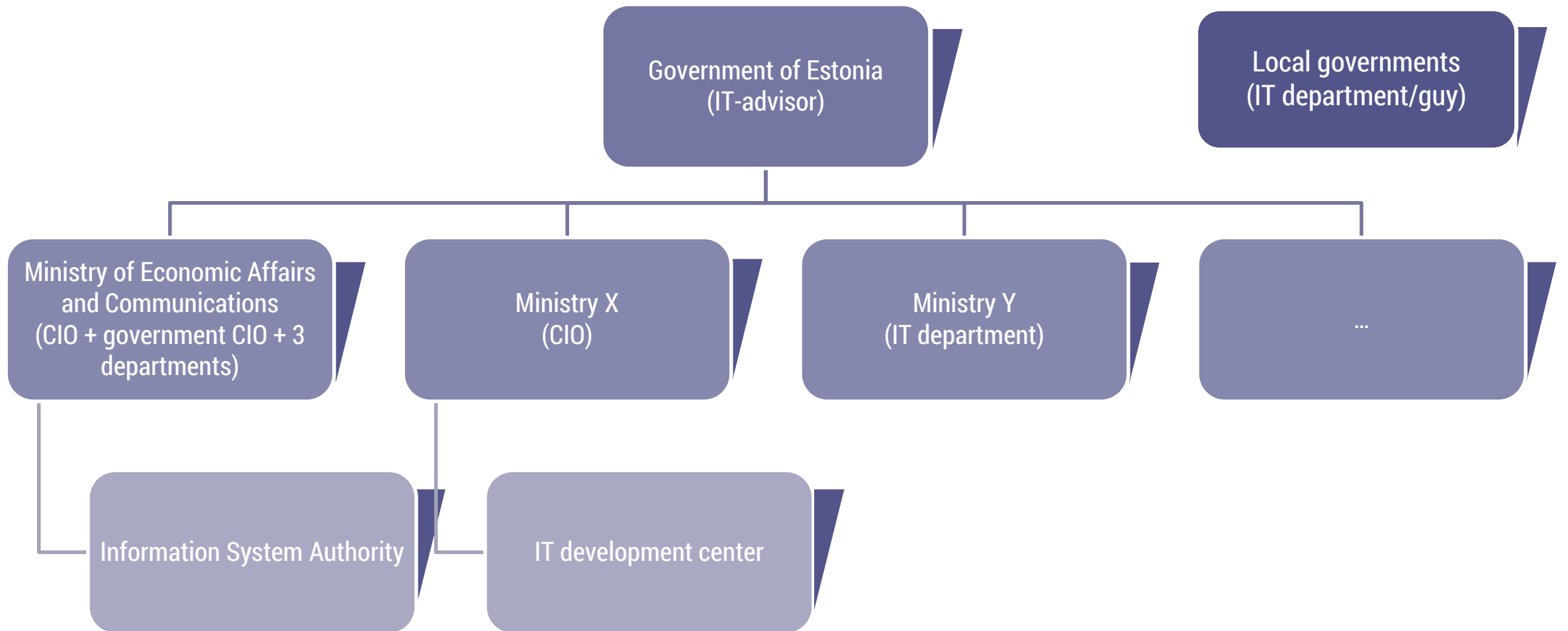
# Information System Authority (RIA)

- Develop and manage **central e-government components**
- Coordinate national **cyber security**
- Distribute EU structural **funds for IT development**



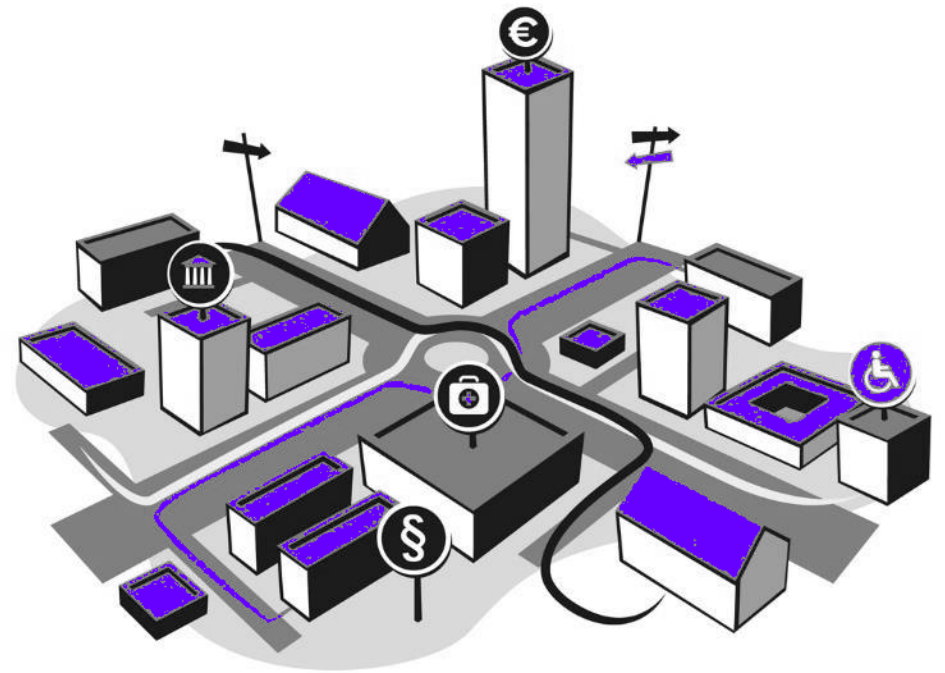


# Organisation chart of e-gouvernement



# Estonian way of life

- 500 million digital signatures given
- 700 million electronic log ins
- 95% of taxes are declared online
- 98% medical prescriptions digital
- 1/3 of votes cast online
- Estimated 2-6% of GDP saved



# How to get to the e-State?



# e-State

vs

# conventional state

- Who is behind the computer?
- Who signed the document?
- How to securely exchange electronic data?
- Who owns data X?
- How to best serve citizens in whole-of-governement view?

- Who is behind the counter?
- No problem: the citizen is in your office
- How to transport/manage paperfolders in-house and between institutions?
- No worries: ask the citizen
- How to serve my customer?

# Risks and challenges

- No fallback (going back to analogue)
- Possibility to develop too complex systems:
  - maintenance costs rising
  - dependence of central components
  - vendor lock-in
  - low freedom in technology decisions
- Cyber incidents:
  - interruptions to real life/services
  - loss of trust of IT systems and/or users



# Estonian digital enablers

- Trust & cooperation between stakeholders
- Systematic capacity building: Tiger Leap & Look@World projects
- Relatively high level of awareness
- Critical competences



# The Foundation

- Authentication of people in digital environment + digital signature



electronic  
identity



digital  
signature

- Secure/standardized identification and data exchange of information systems



data exchange  
platform X-Road

# Plastic + electronic identity (ID-card)

- Compulsory for all residents
- One person = one identity

## Use cases:

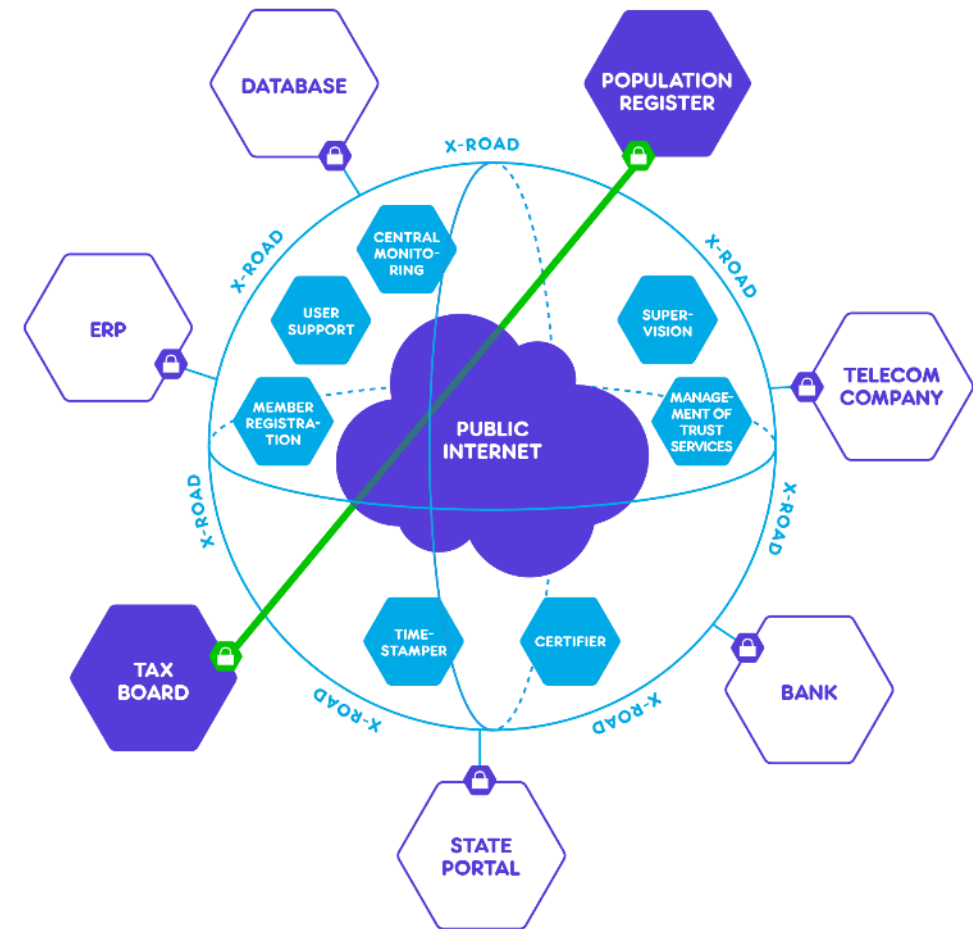
- Authentication
- Legally binding signature
- File encryption/decryption for secure delivery





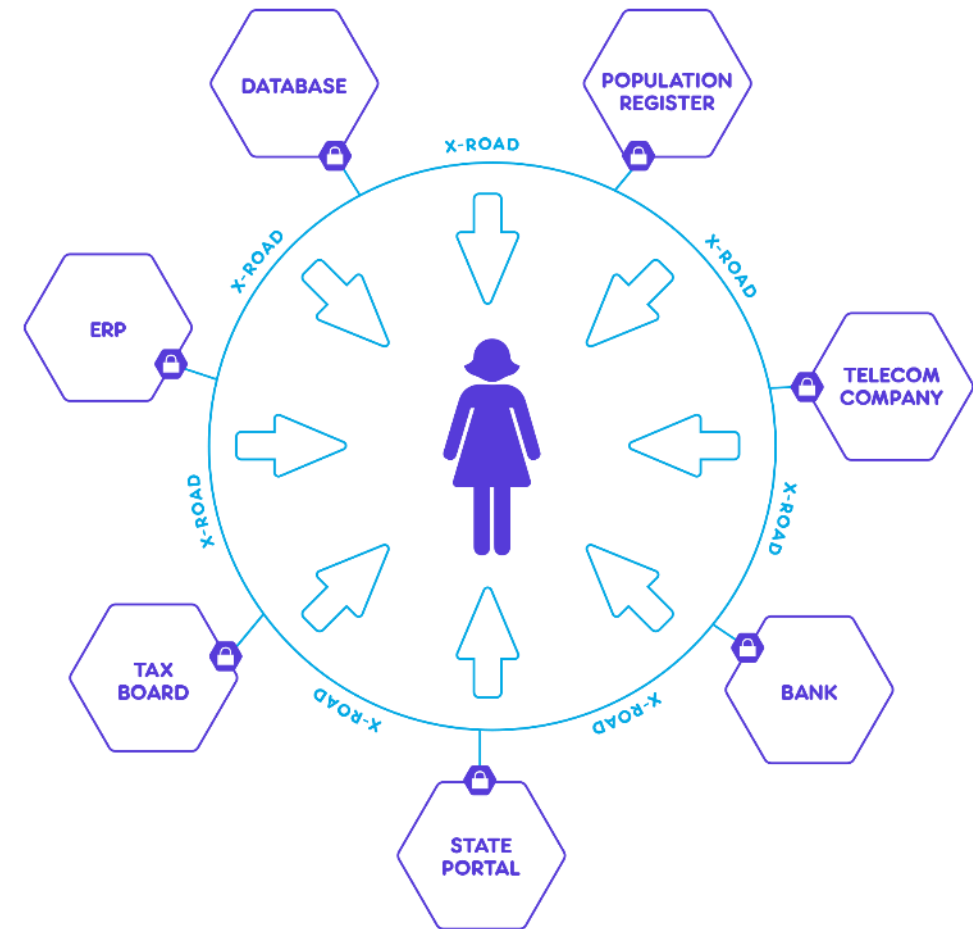
# Data exchange platform (X-Road)

- Distributed environment of interoperability for information systems with central identity management
- 15 years of continuous operations
- Overview of the entire ecosystem, incl activity between parties
- Interoperable, resource efficient and flexible



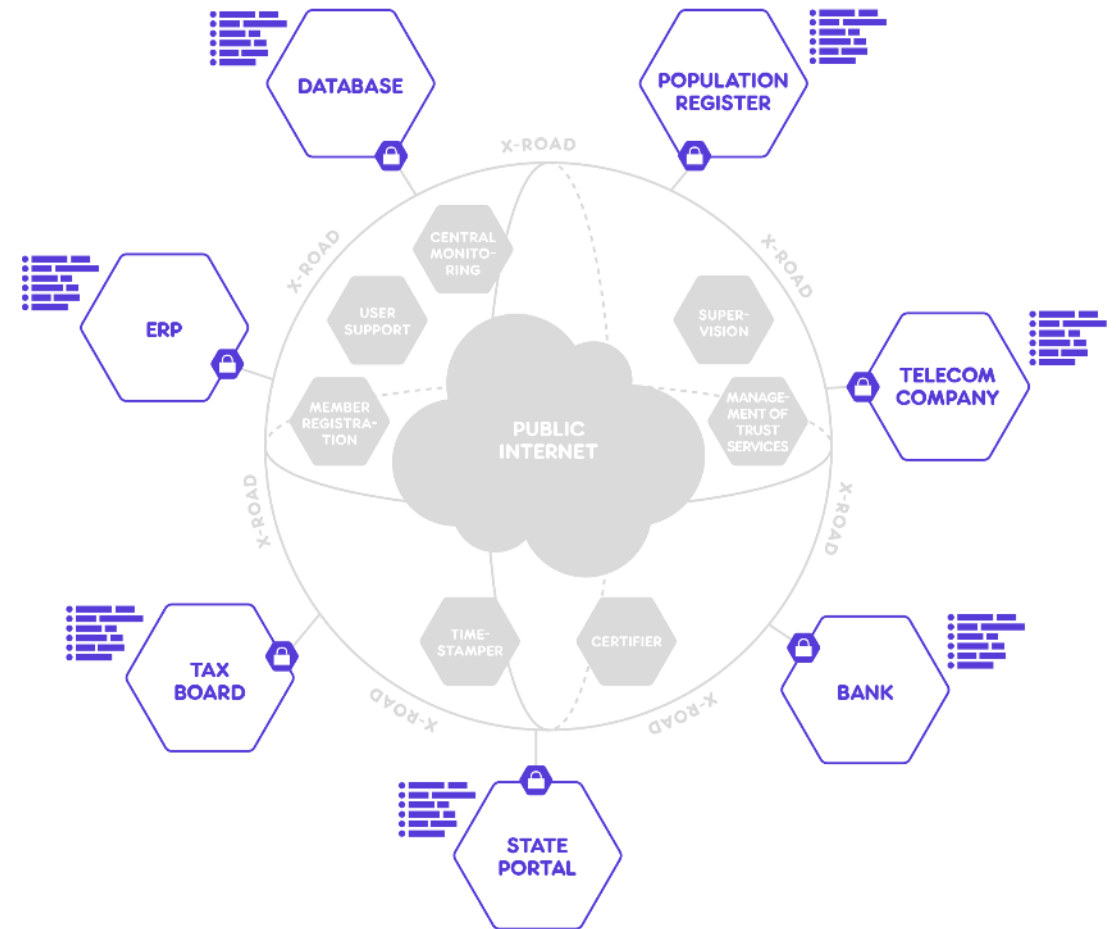
# Once only principle (OOP)

- Citizen must enter information only once
- Information collected to the state information system must be reusable and reused



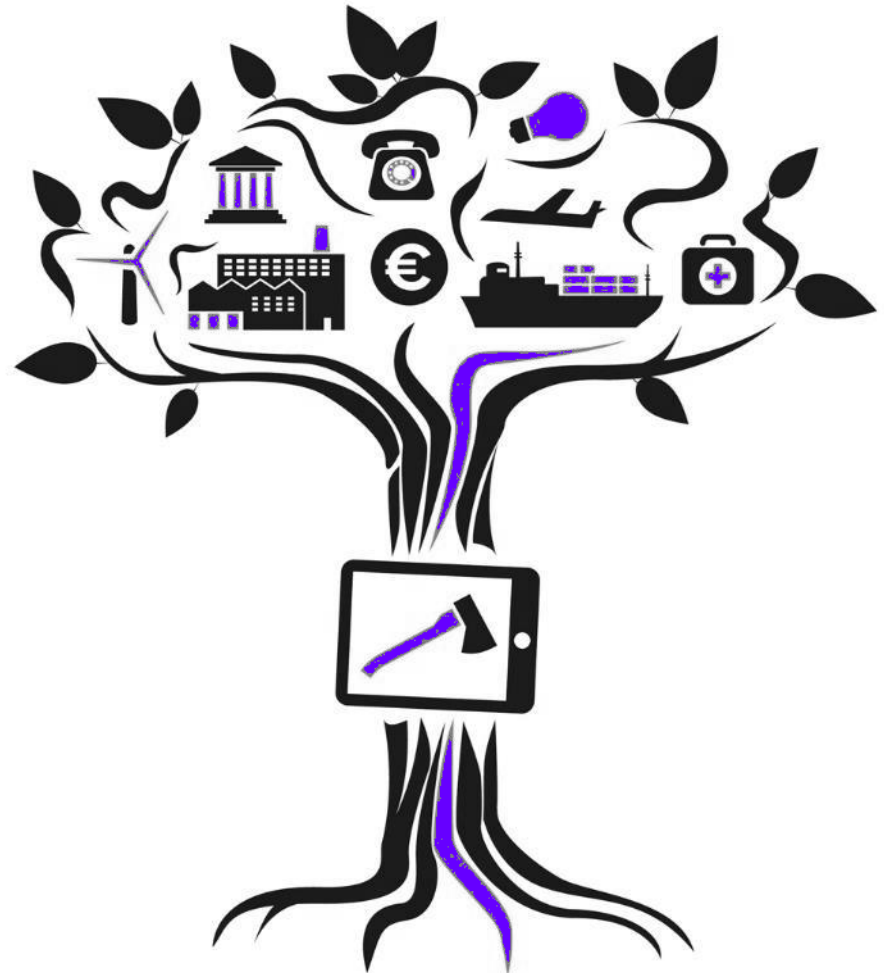
# Catalogue of systems (RIHA)

- Complete picture of members and services
- Avoids double solutions and data collection
- Control over compliance with the law



# Reference security framework (ISKE)

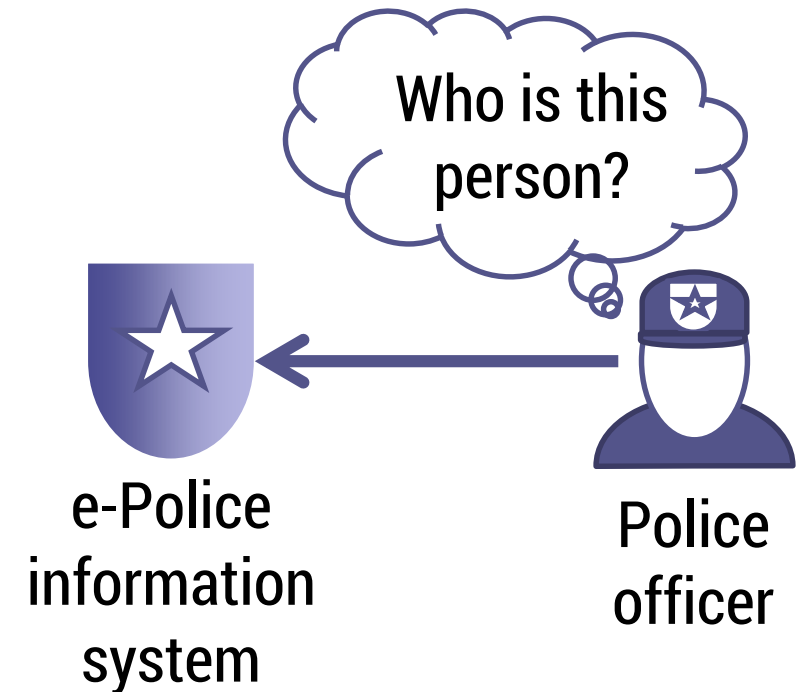
- A set of organisational, infrastructural/physical and technical security measures
- Based on German *IT-Grundschutz*
- 3 aspects of security: availability, confidentiality and integrity of data
- 3 levels of security requirements
- Auditing every 2...4 years



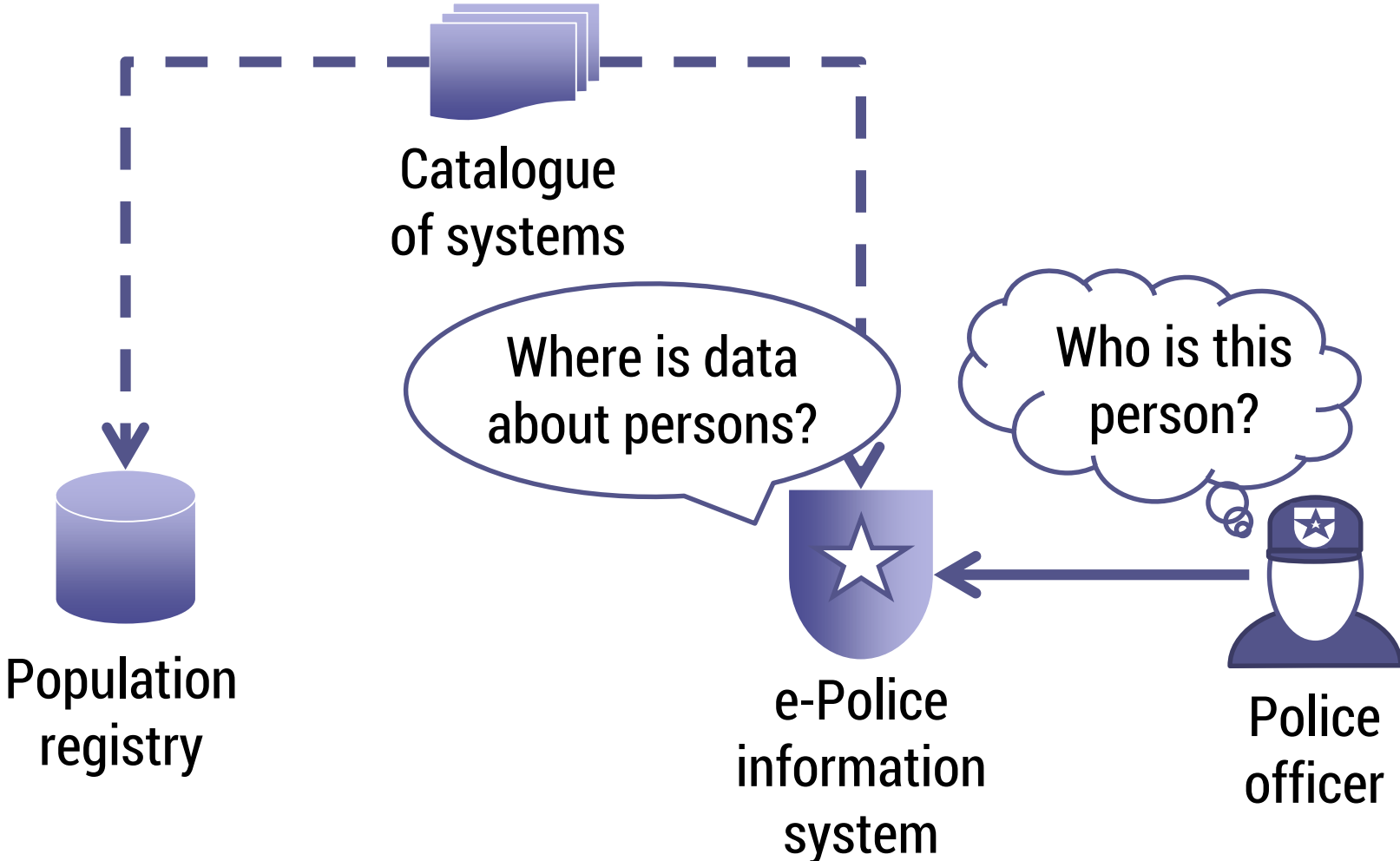
This looks nice! How does it work exactly?



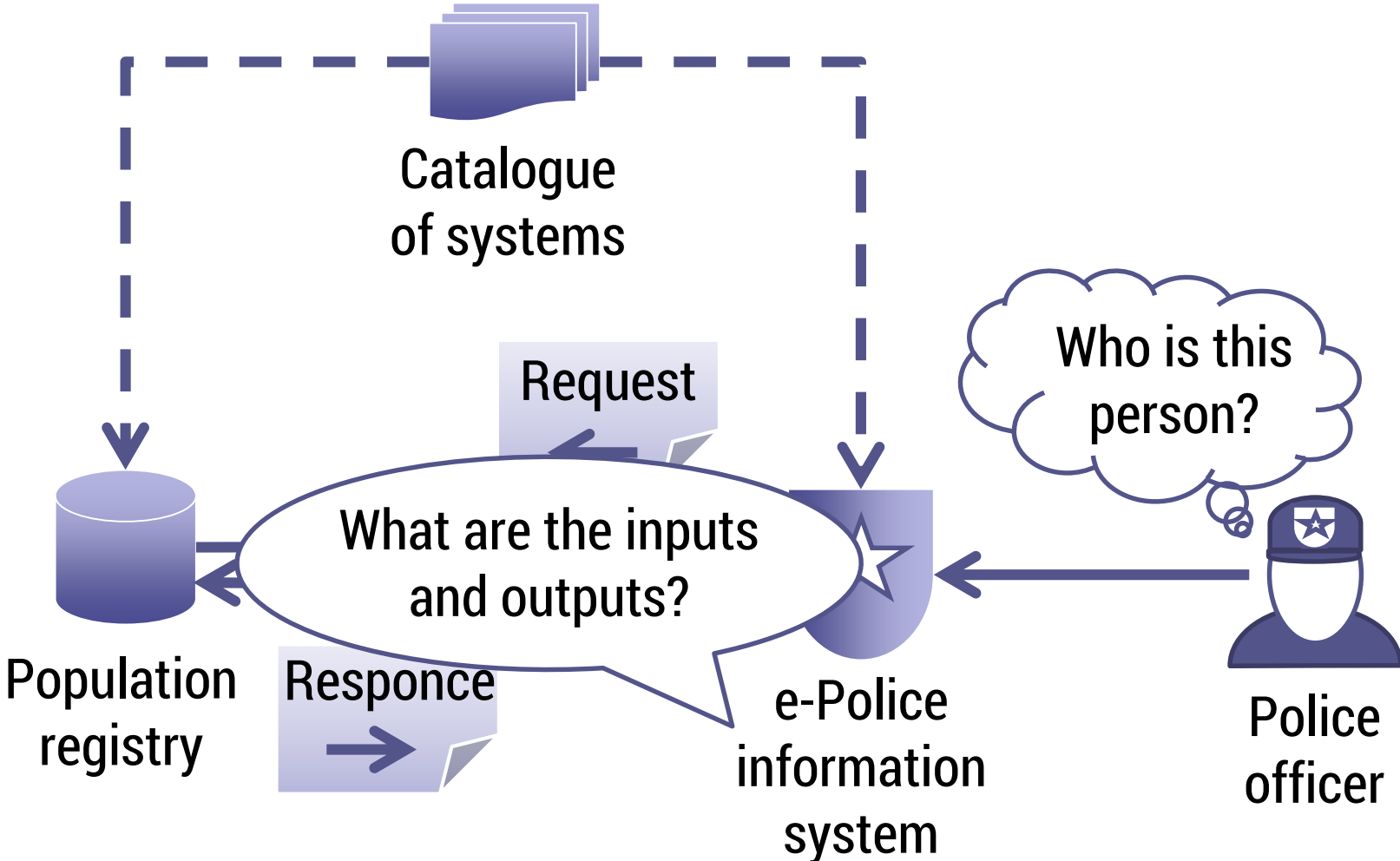
# Estonia IT-architecture example (functional view)



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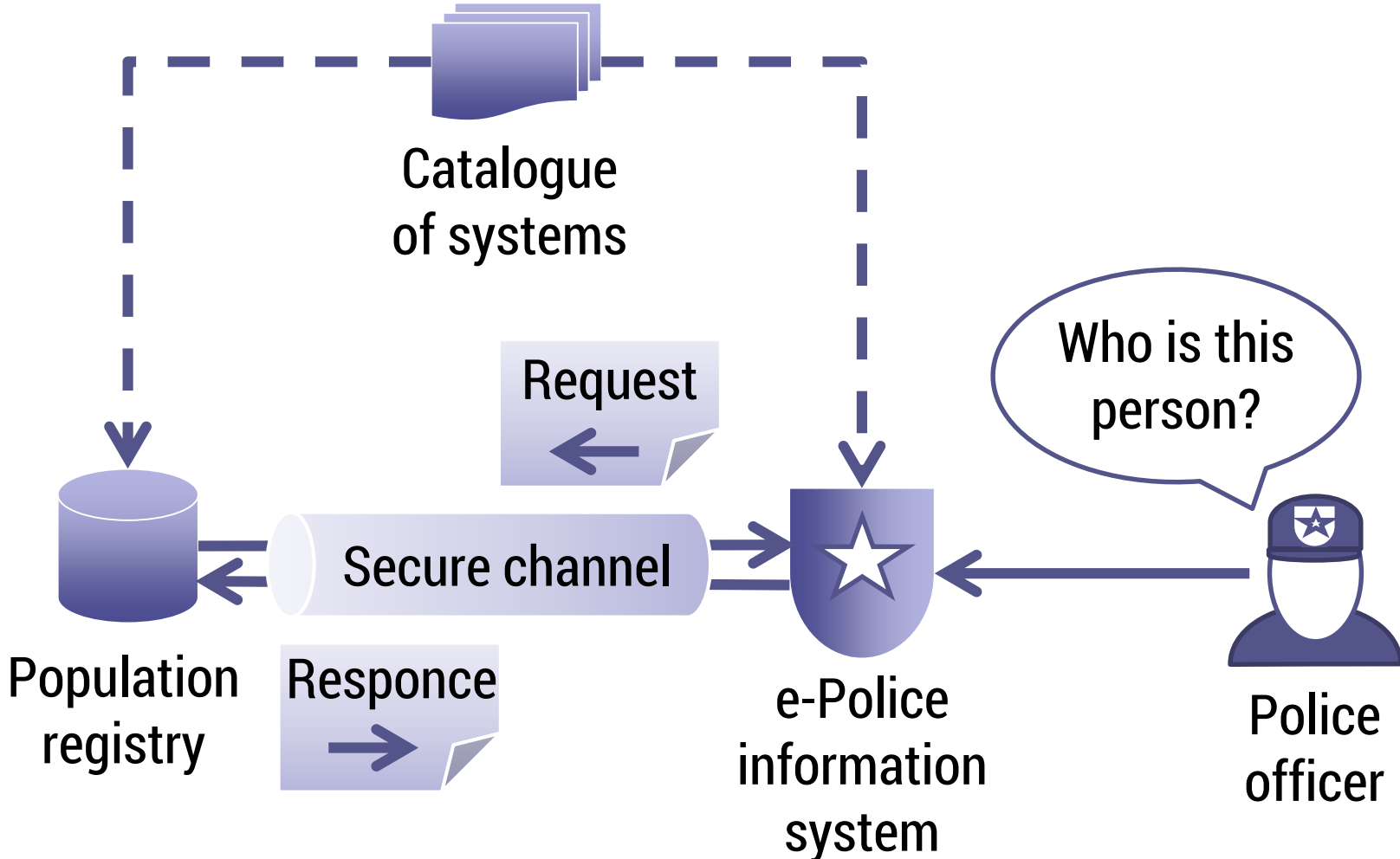


# Estonia IT-architecture example (functional view)

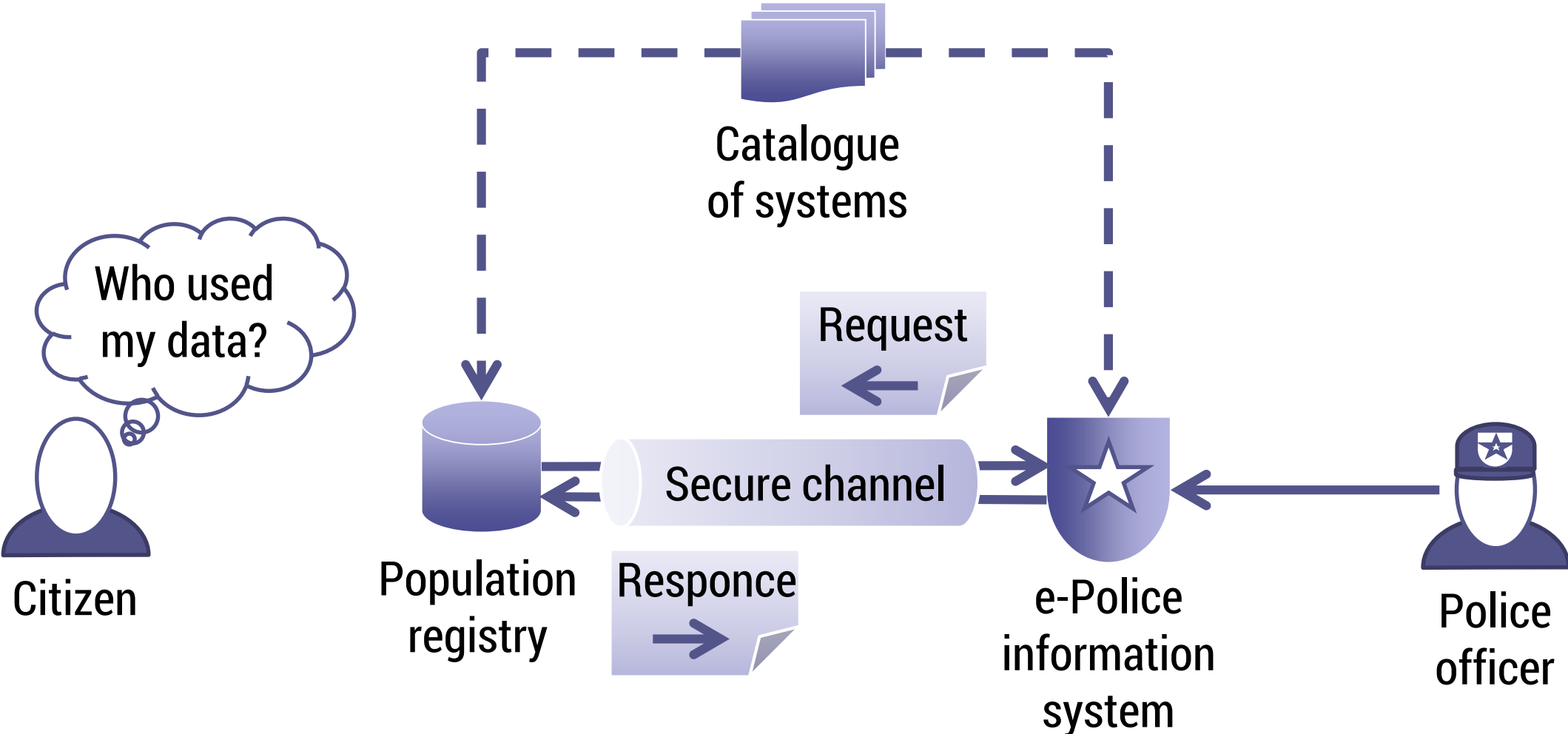




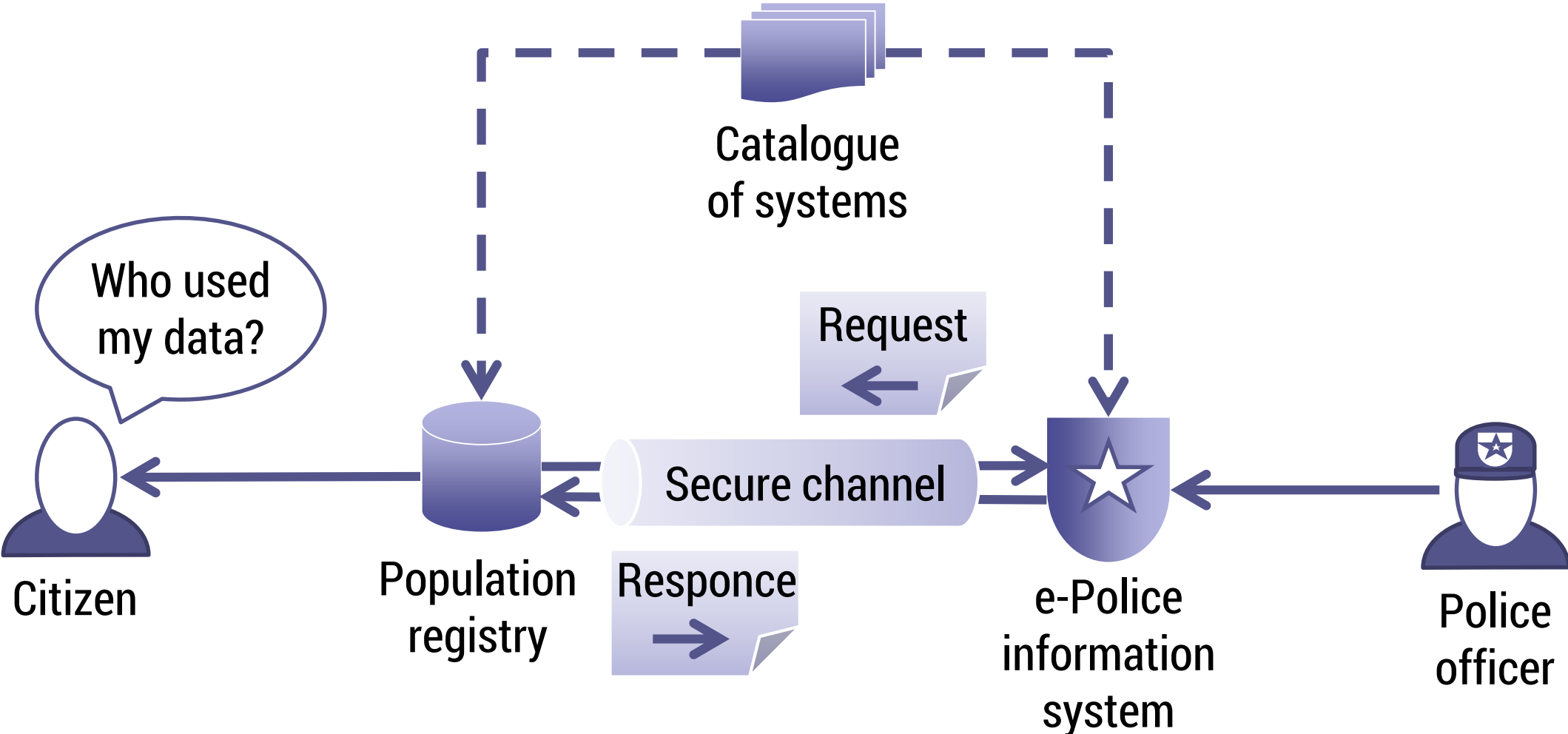
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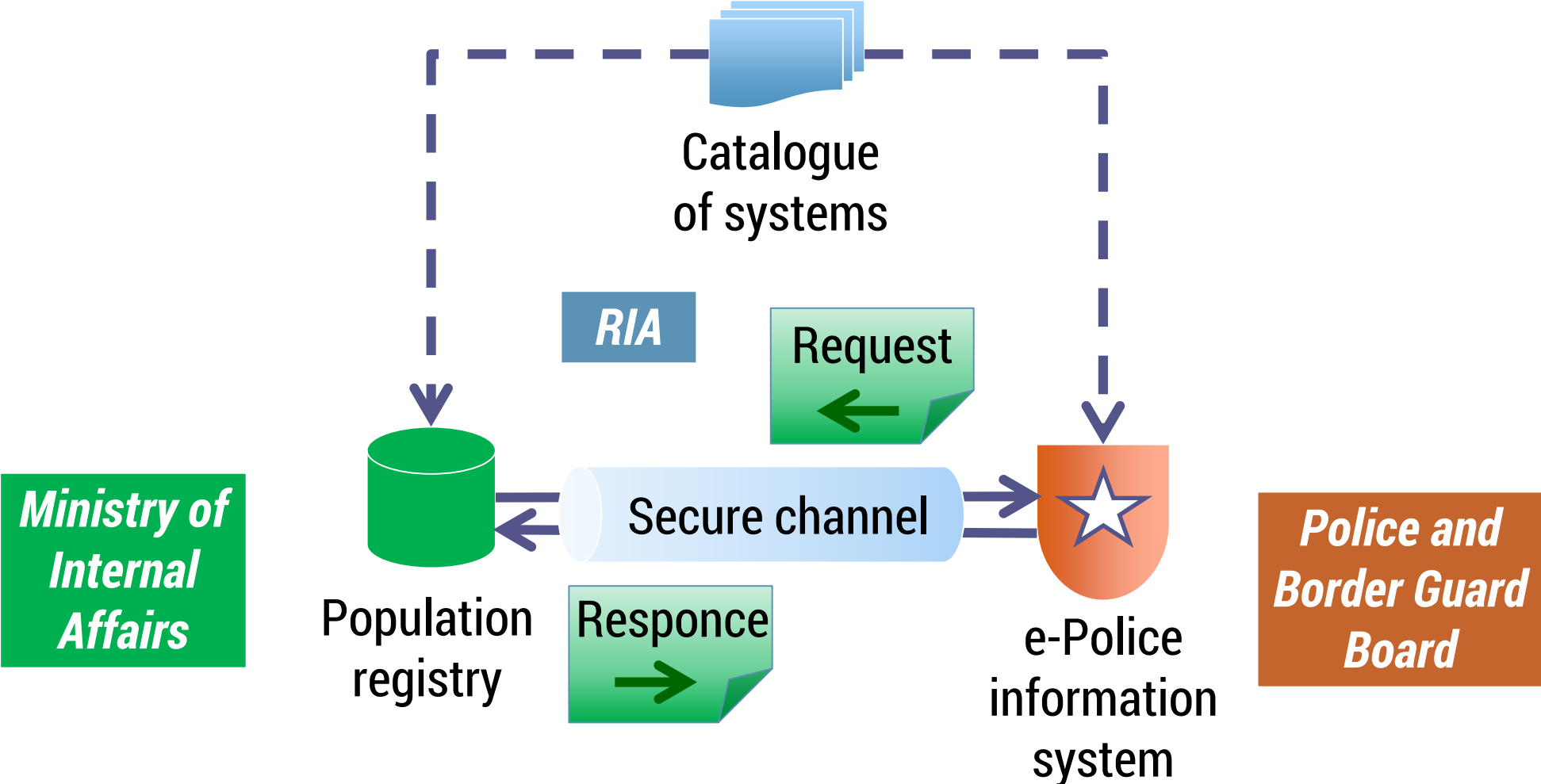
# Estonia IT-architecture example (functional view)



# Estonia IT-architecture example (functional view)



# Estonia IT-architecture example (governance view)



Everything's perfect in Estonia?



# Estonian ID-card case

## Problem:

- Global flaw in RSA crypto library, affecting 1 billion smartchips (including Austrian, Slovakian and Spanish cards)
- Theoretical vulnerability in 750 000 Estonian ID-cards (60% of those in circulation)

## Solution:

- Open communication
- Private keys suspended in November, revoked in April
- Bypass the problem with remote updating/generation of new keys during 6 months
- Result: 95% electronically used cards renewed online

Souvenirs?



# Lessons to be learned

Do:	Don't:
1. Copy best ideas and solutions	1. Don't reinvent the wheel
2. Maintain parties' technology freedom/autonomy	2. Don't build central systems
3. Access others' data from only baseregistries	3. Don't keep your baseregistries closed
4. Create resilient electronic identities and enable digital signatures	4. Don't rely on insecure authentication of users, institutions and companies



Earn the trust of citizens and  
execution is a magnitude easier





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Thank You for listening!  
Any questions?

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