REPUBLIC OF ESTONIA
INFORMATION SYSTEM AUTHORITY

European Union
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Development Fund

Investing
in your future

Document Exchange Protocol DHX

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May 2, 2016

Document exchange protocol DHX

Developed by Estonian Information System Authority in 2015-2016

Purpose
standardised and simple method to exchange documents

Target group
all Estonian public sector organisations (mandatory)
companies who have a lot of business with public sector (optional)

Motivation

Document Exchange Centre (DEC)
https://www.ria.ee/en/dec.html

- operated 10+ years
- over 600 agencies
- uses X-Road as transport layer
- centralised, “main post office“ type solution

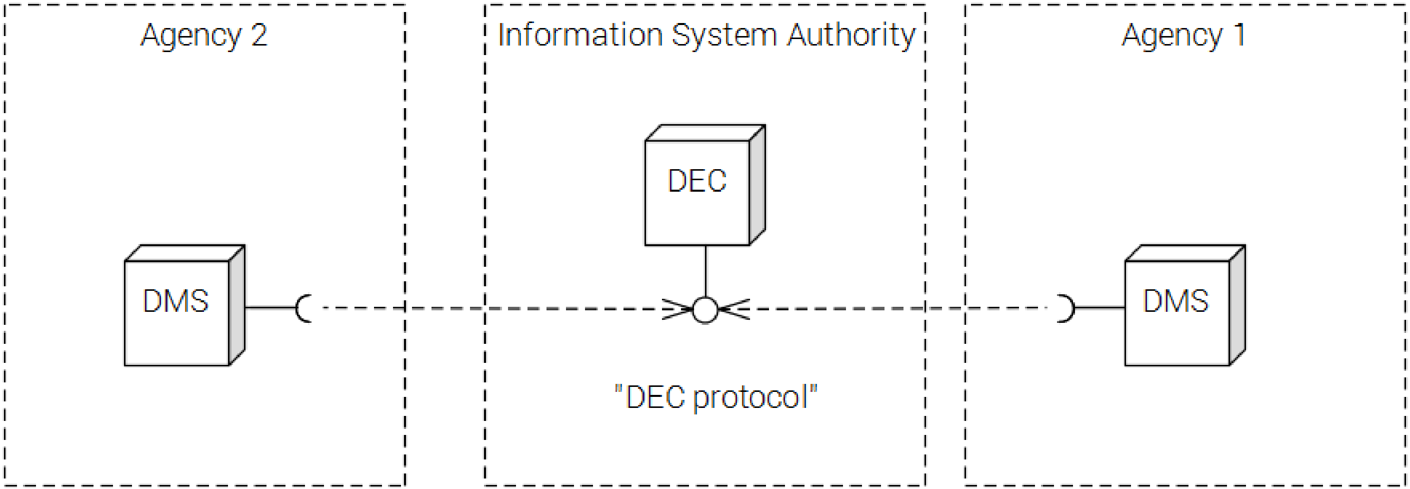
Need:

- faster and simpler document ecxhange
- lower operating costs
- no single point of failure

Architecture

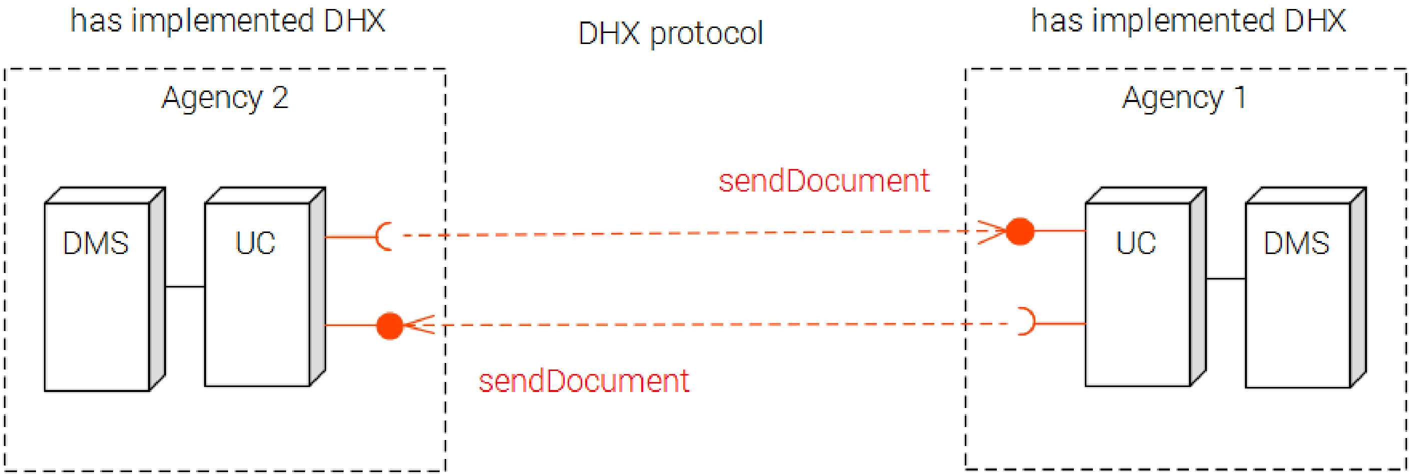
- symmetric interaction with no central node
- a thin layer on top of X-Road
- a thin layer under Document Metadata Standard („the Capsule“)
- made to fully use the new capabilities of X-Road v6
- reliable delivery
- strong e-identity
- encryption
- low implementation costs
- low operation costs
- structured as protocol + reference implementation + standardised adapter
- developed by following the best practice of protocol design and specification

As is



DMS - Document Management System; DEC - Document Exchange Centre

To be



UC - Universal Component

X-ROAD

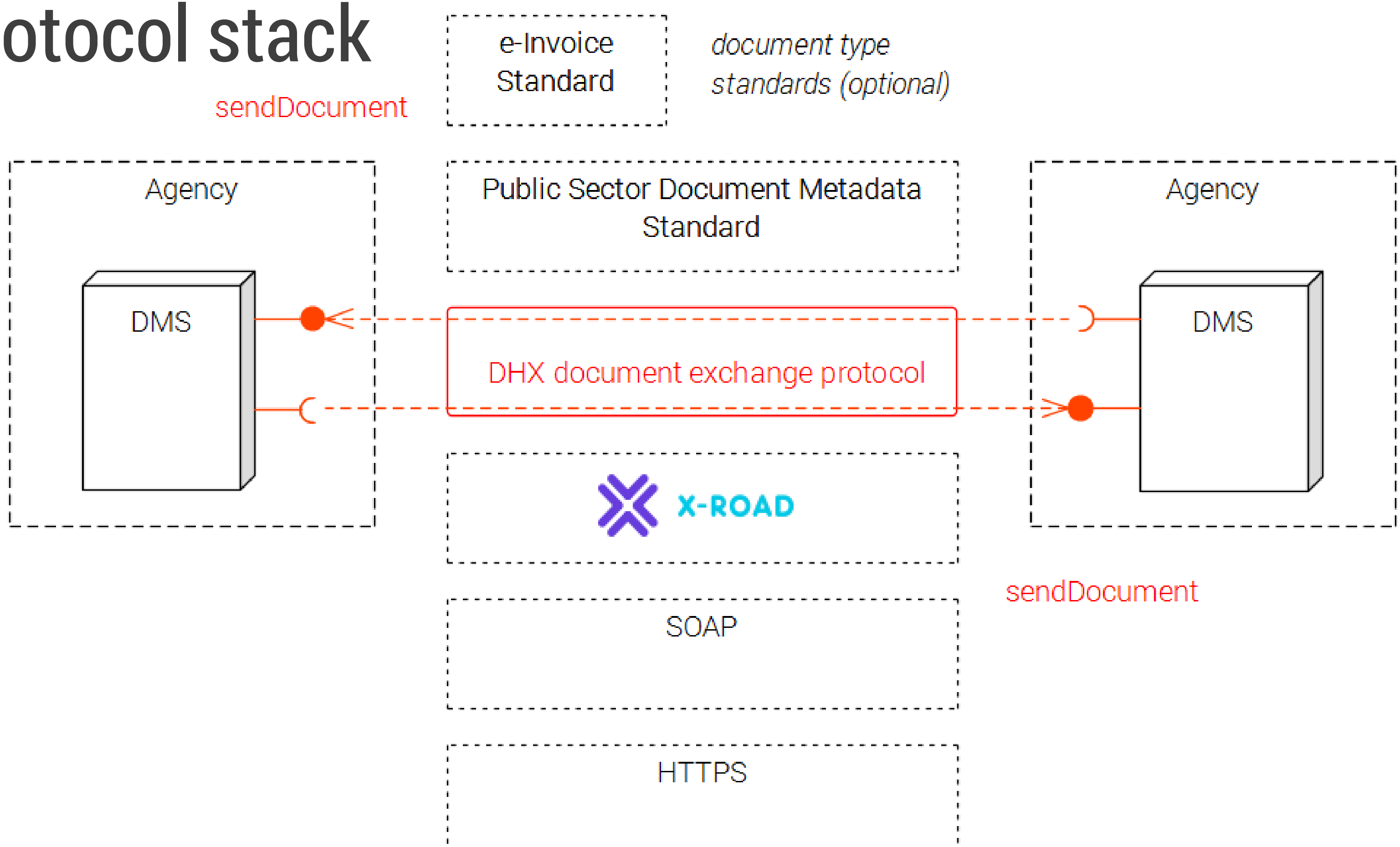
Builds on unique capabilities of X-Road

X-Road, the Estonian national public sector data exchange layer

- addressability
- service discovery
- strong identity
- security
- legally binding
- non-repudiation

X-ROAD

Protocol stack



sendDocument

e-Invoice Standard

document type standards (optional)

Agency

Public Sector Document Metadata Standard

Agency

DMS

DHX document exchange protocol

DMS

X-ROAD

sendDocument

SOAP

HTTPS

Elements of DHX

- DHX standardised web service
- name rule
- message format: Estonian Document Metadata Standard ("the Capsule")
- processing rules
- provisions for the transition period

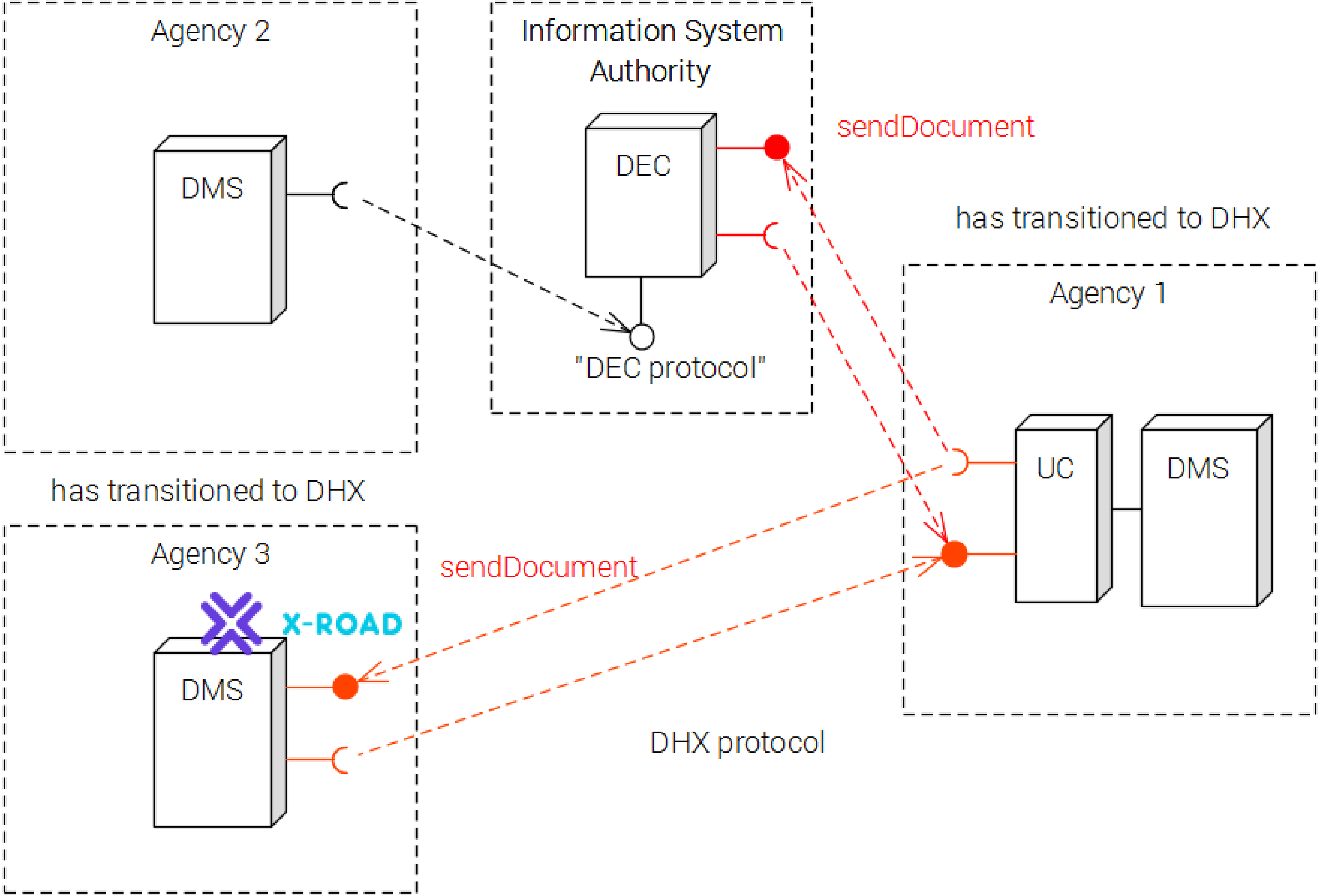
Implementer support

- reference implementation
- standardised adapter component (optional)

Schedule

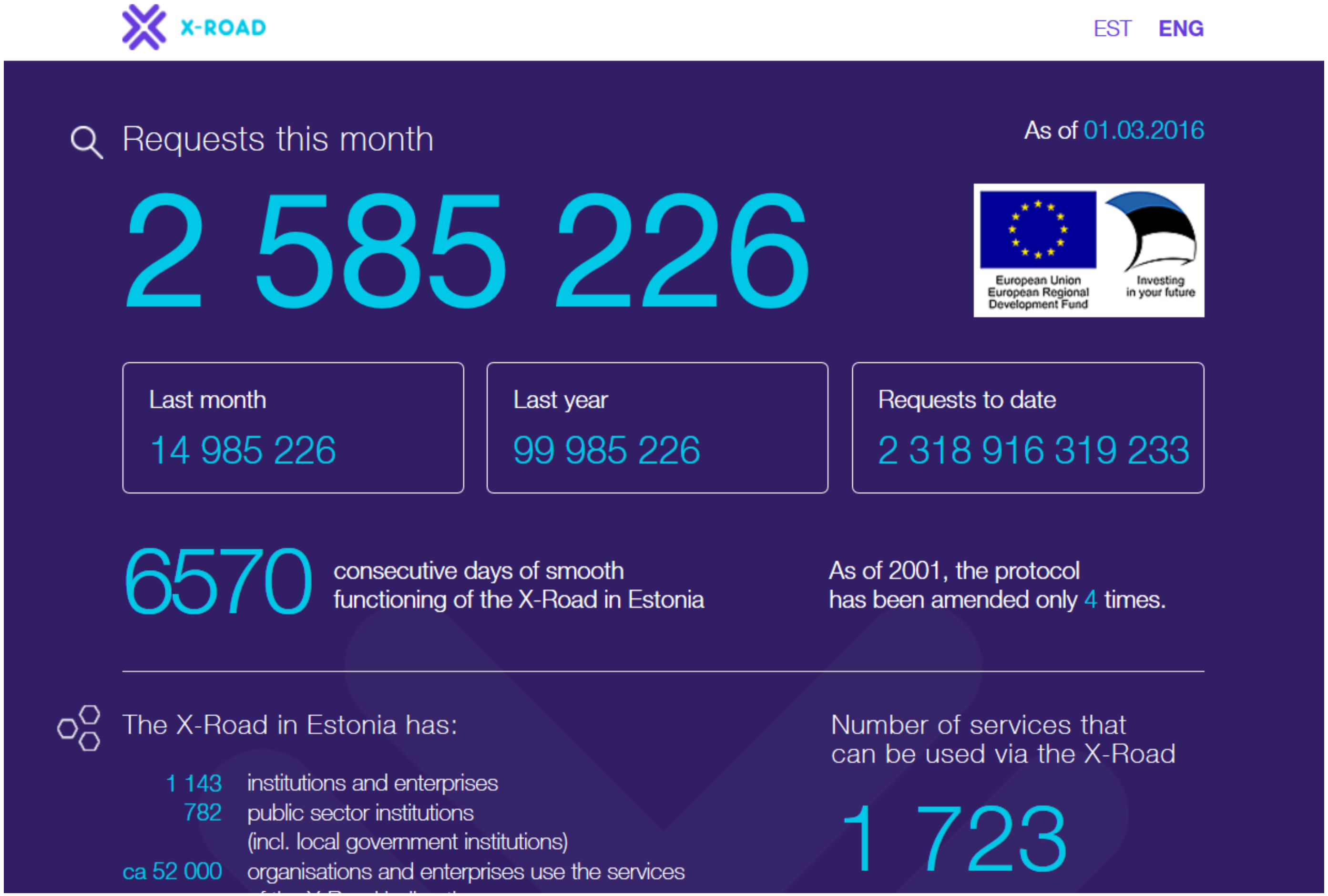
2015	Draft version of the protocol
	https://github.com/e-gov/DHX
2016	Reference implementation
	Verification
	Development of universal adapter component
	Migration planning
2017-2018	Migration to DHX

Transition


Agency 2
DMS
Information System Authority
DEC
sendDocument
"DEC protocol"
has transitioned to DHX
Agency 1
UC
DMS
has transitioned to DHX
Agency 3
sendDocument
X-ROAD
DMS
DHX protocol

Brief overview of X-Road

X-ROAD



Requests this month

As of 01.03.2016

2 585 226

Last month	Last year	Requests to date
14 985 226	99 985 226	2 318 916 319 233

6570 consecutive days of smooth functioning of the X-Road in Estonia

As of 2001, the protocol has been amended only 4 times.

The X-Road in Estonia has:

1 143	institutions and enterprises
782	public sector institutions (incl. local government institutions)
ca 52 000	organisations and enterprises use the services

Number of services that can be used via the X-Road

1 723

The X-Road in Estonia has:

1 143	institutions and enterprises
782	public sector institutions (incl. local government institutions)
ca 52 000	organisations and enterprises use the services of the X-Road indirectly
1 169	interfaced information systems
220	security servers installed by members

Number of services that can be used via the X-Road

1 723

Every party who provides services offers 8 services on average

Designed to be secure

Traditional attacking vectors cannot be used with the X-Road due to its structure and architecture

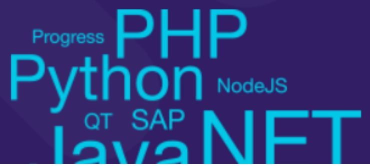
X-Road implements the following security technologies

XAdES, ASiC, VPN, RSA, TSL, RFC3161, OCSP, PKI

5 most popular service providers

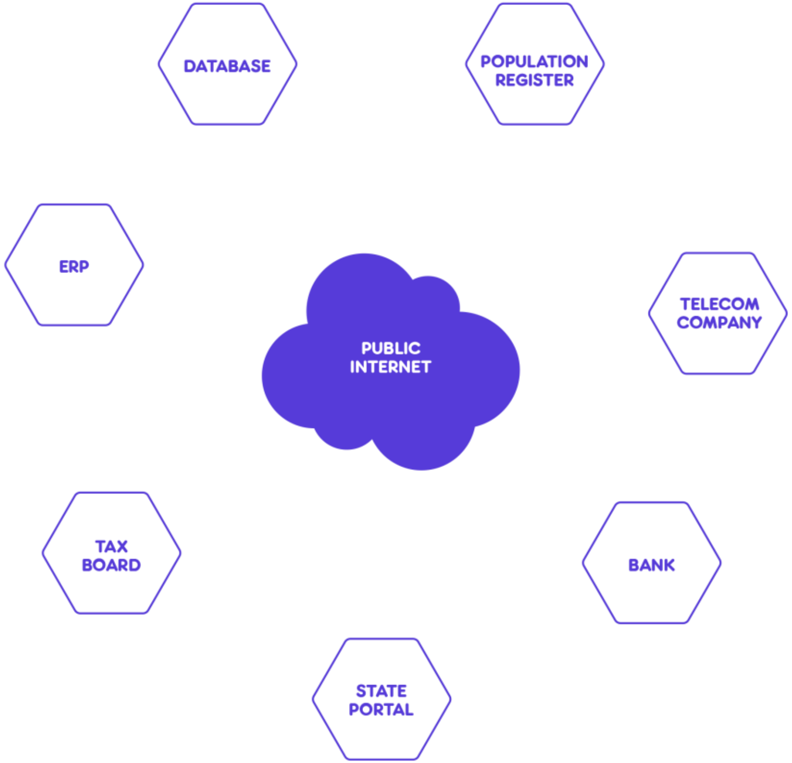
139 253 983	Estonian Tax and Customs Board
65 935 244	Population Register
50 298 345	Prescription Centre
38 240 423	Official Announcements
33 071 481	e-File

Most popular platforms of information systems that have been interfaced with the X-Road



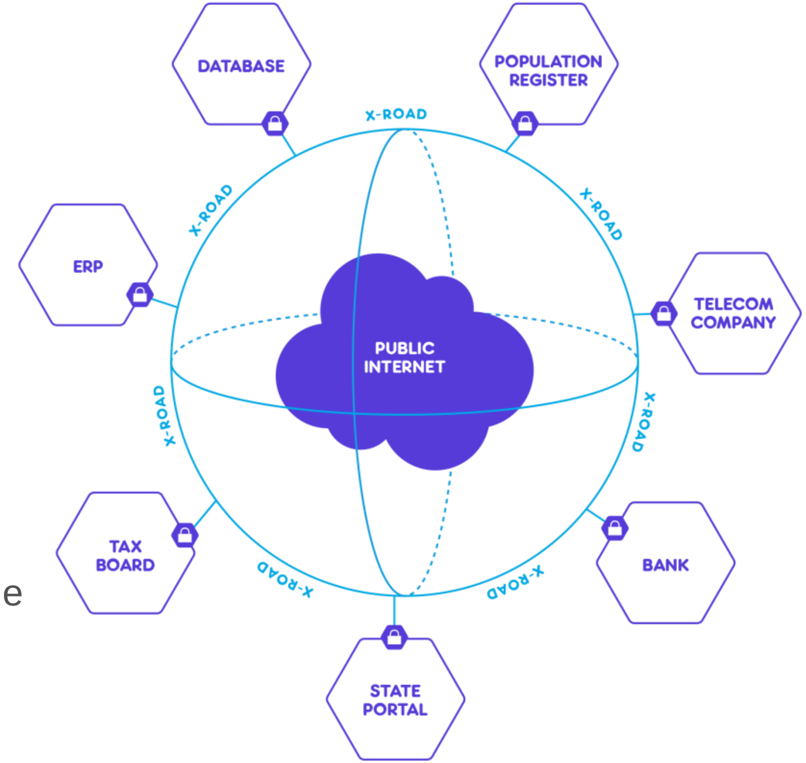
Starting point

- Everyone is aware of their internal processes
- Everyone is in the network
- Security of data exchange



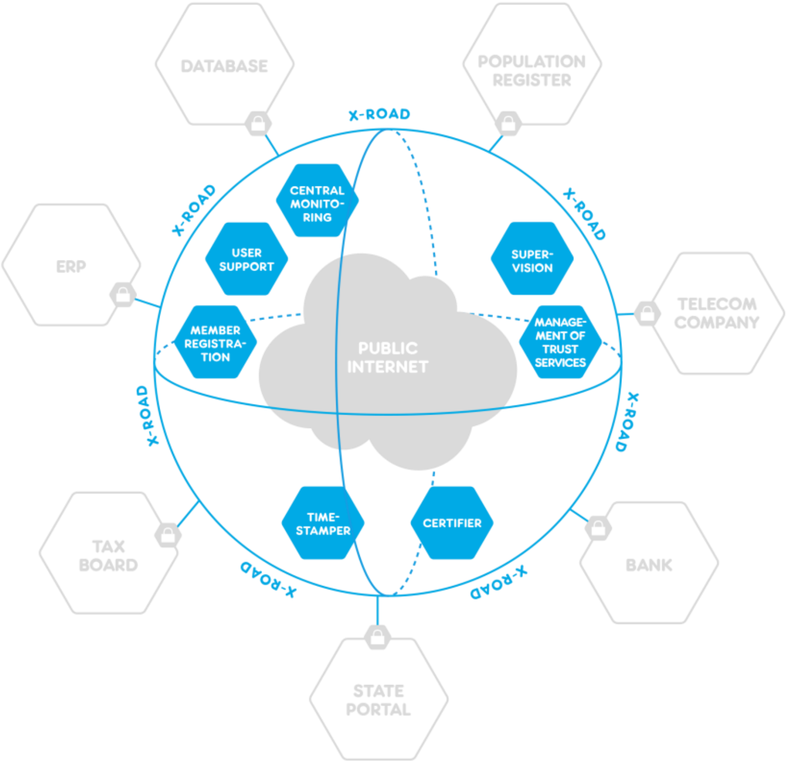
X-Road: organisation method
# of a distributed state information system

- Uses the internet
- Maintains freedom for its members
- Ensures the authenticity of members
- Provides means for secure information exchange



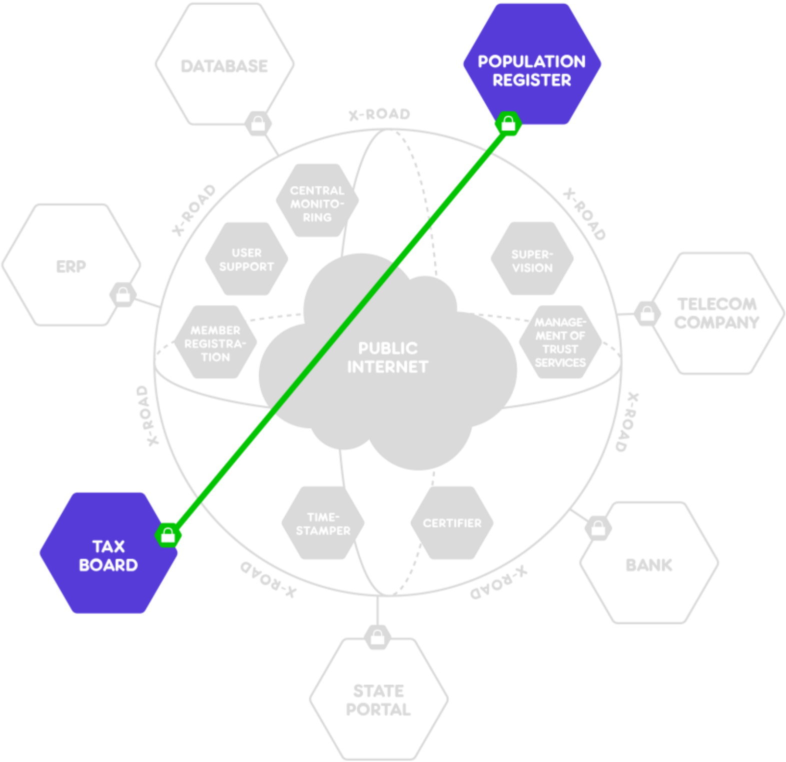
X-Road Centre

- Registration of members
- User support
- Central monitoring
- Supervision
- Management of trust services
- Timestamp and certification service



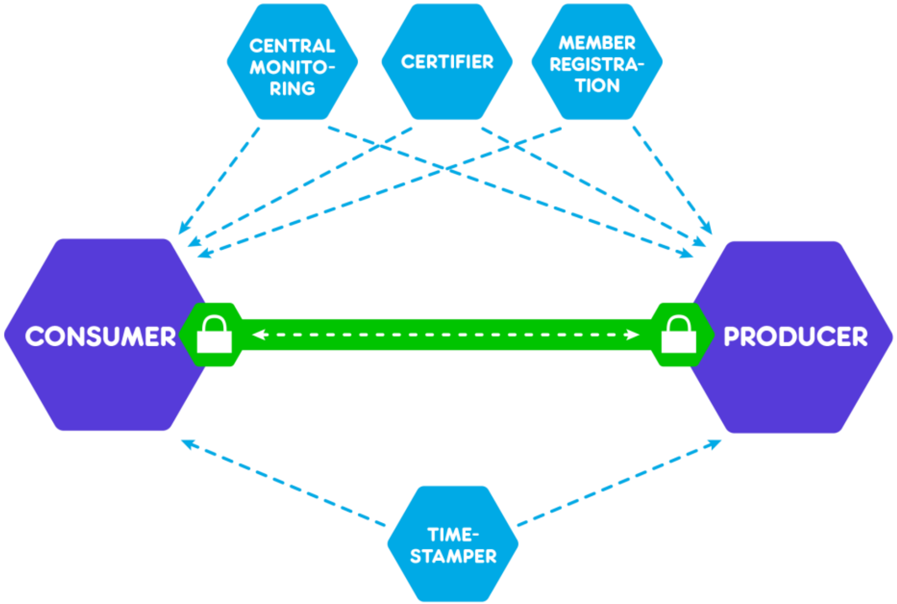
Data does not pass through X-Road Centre

- Universal membership
- Freedom of choice
- Direct communication



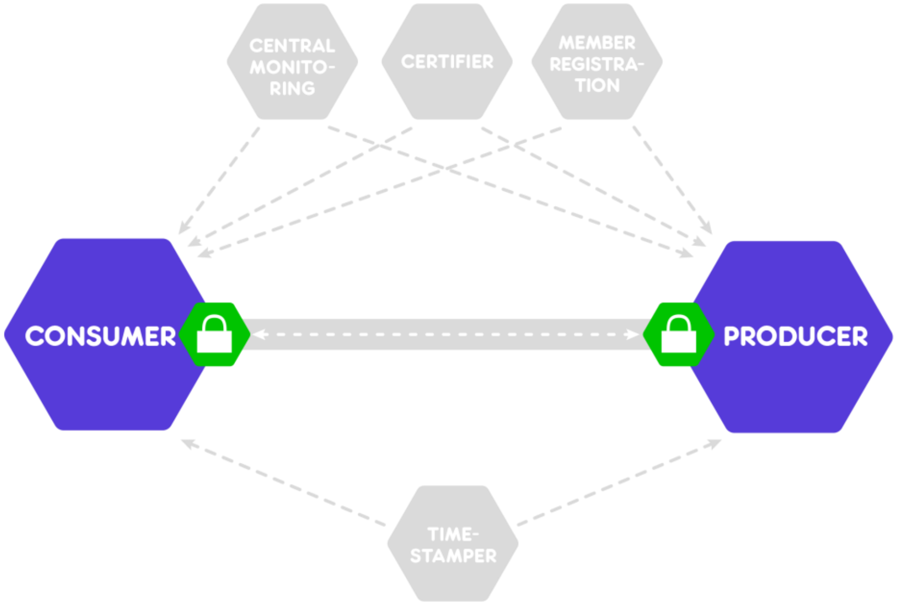
Overview of communication/ data exhange

- Availability
- Integrity
- Confidentiality



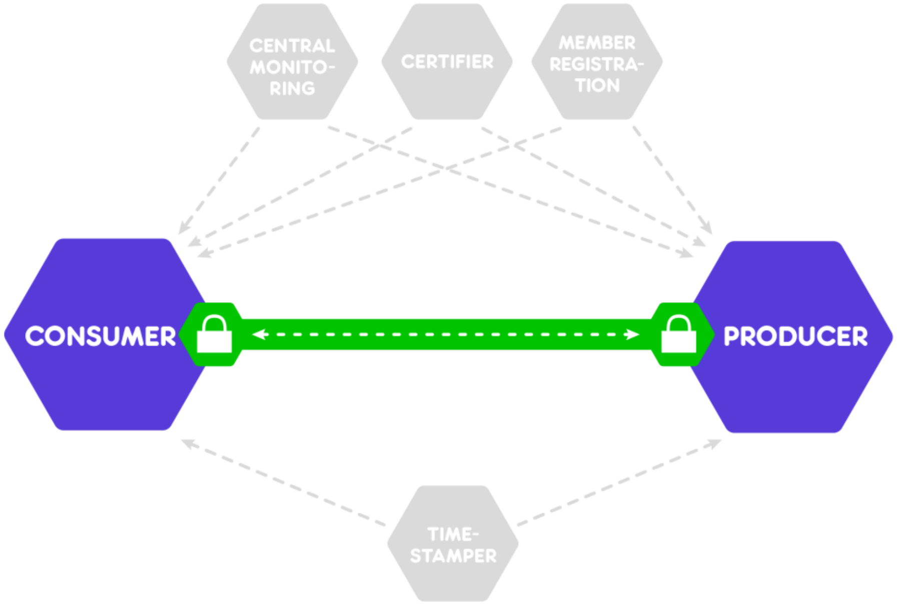
Services and access rights

- Describing the service
- Providing access rights



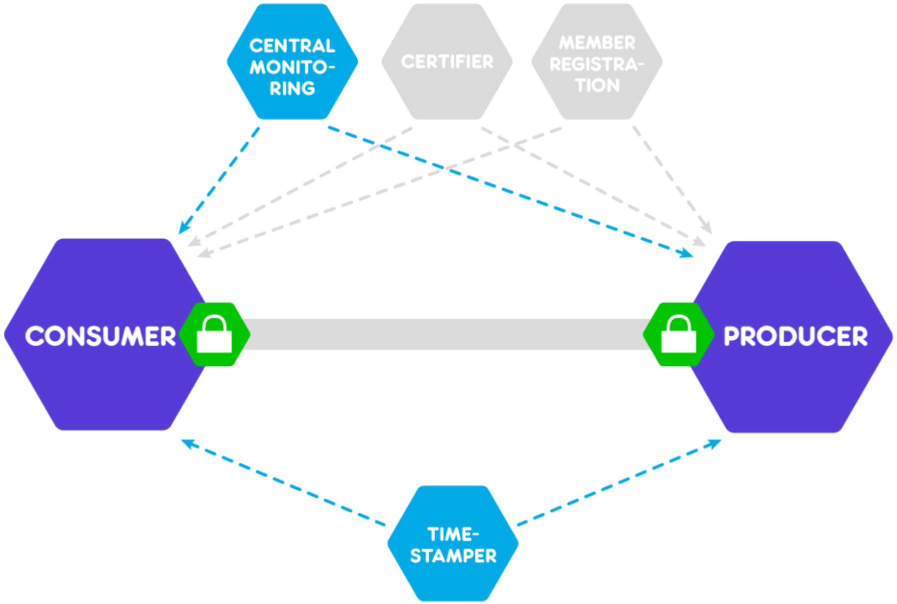
During a transaction

- Signing/stamping a request
- Creating an encrypted channel
- Verifying a signature/stamp
- Signing/stamping a response
- Sending a response
- Verifying a response signature



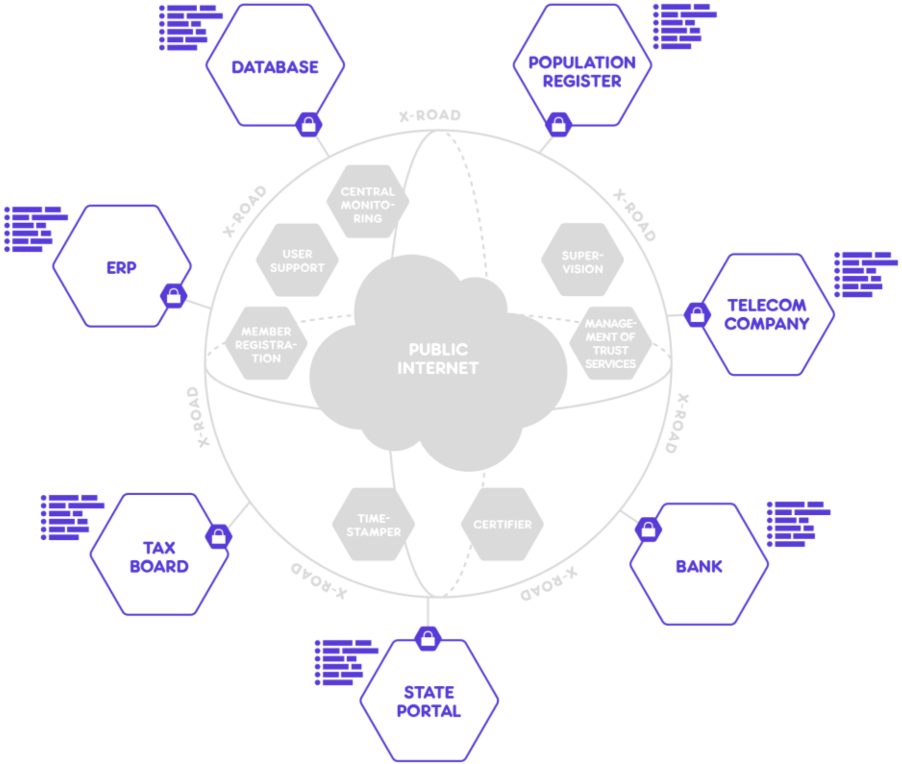
Long-term confirmation of transaction

- Timestamping messages
- Central monitoring input



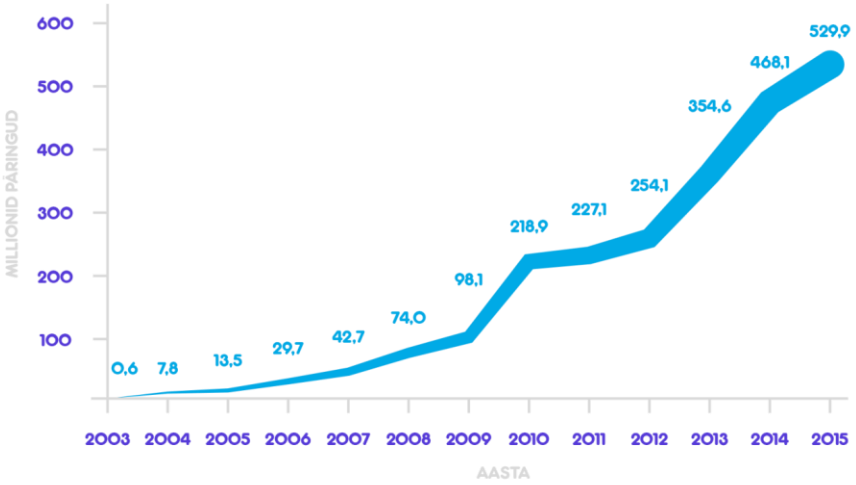
Authenticity and autonomy

- Responsibility is preserved
- Information is reliable
- Autonomy is maintained



Robust and high-quality

- 15 years of continuous operations
- Stability
- There are no back doors
- The European Framework of Interoperability
- eIDAS requirements for trust services
- Security frameworks (ISKE, ISO27001 etc)

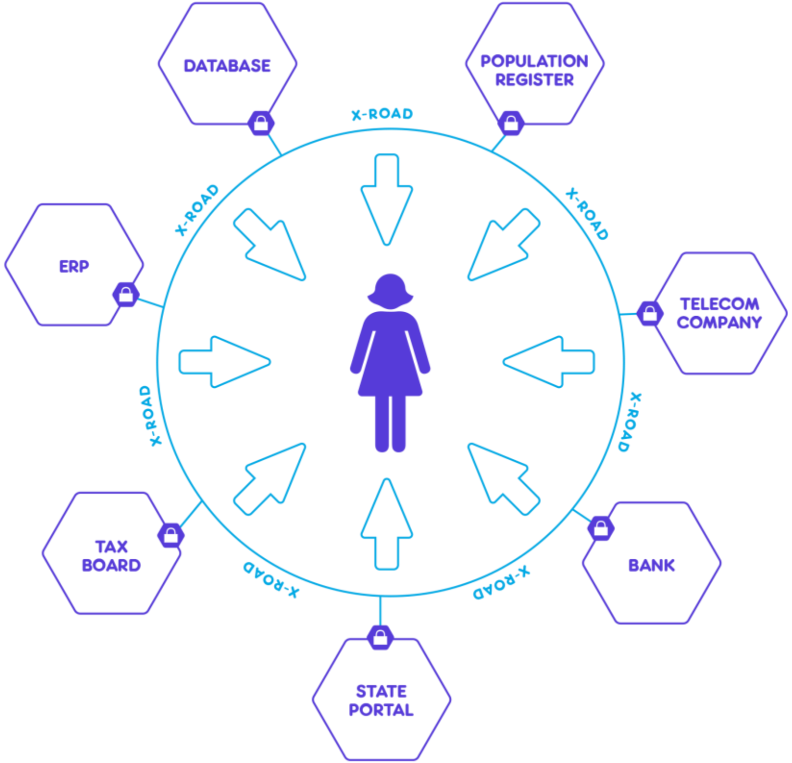


X-Road values

- Governability
- Authenticity and autonomy of members
- Security
- Flexibility
- Savings
- Robustness and quality

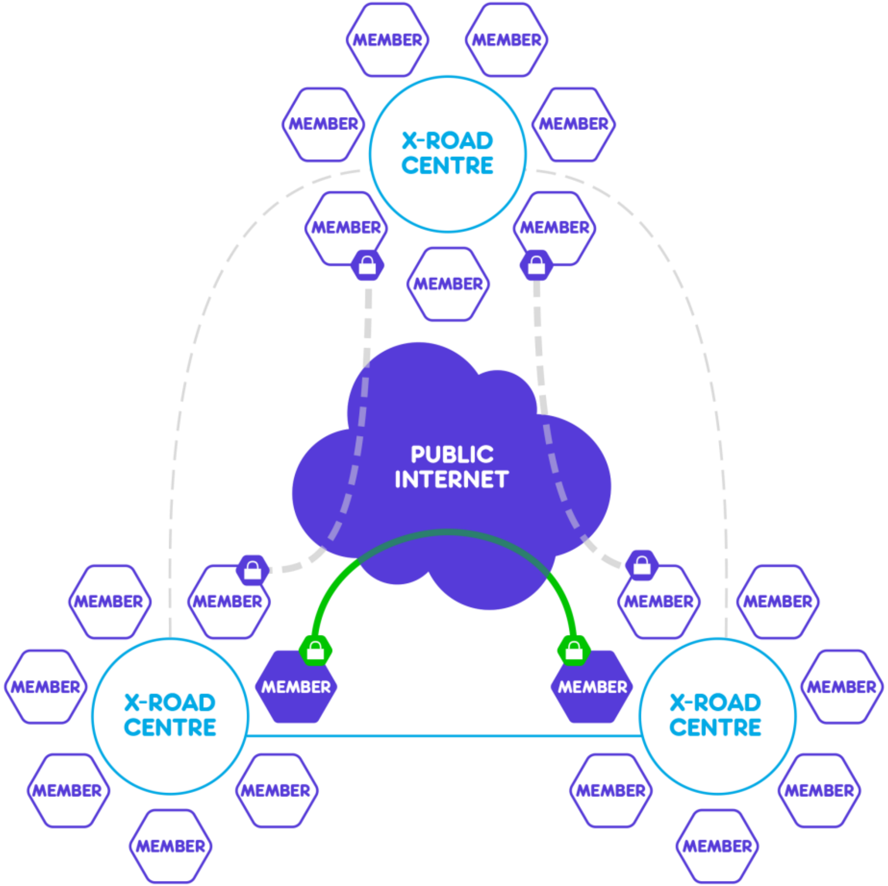
“Once-only”

Citizen must enter information only once.



Trust Federation

- Can be expanded everywhere
- Centres communicate with centres, members with other members
- Creation of cross-border services



Thank You!

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