Nordic Institute for
Interoperability
Solutions

NIIS

X-Road as an Interoperability Component in European eDelivery

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NIIS as the X-Road core development organization

Mission

To ensure the development and strategic management of the X-Road and other cross-border components for eGovernment infrastructure.
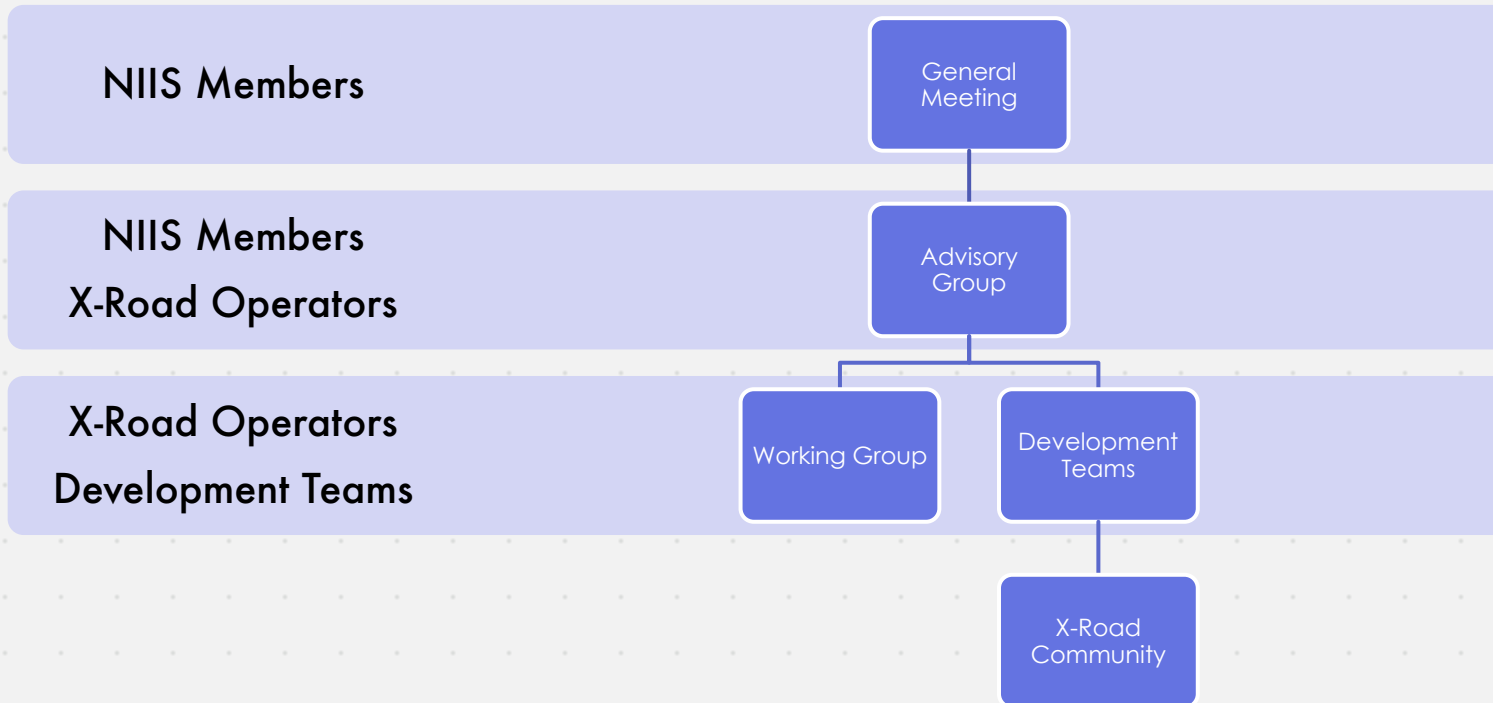
NIIS Responsibilities

▶ Management, development, verification, and audit of the source code

▶ Administration of documentation

▶ Administration of business and technical requirements

▶ Conducting development

▶ Developing and implementing principles of licensing and distribution

▶ Providing second-line support for members

▶ International cooperation.

NIIS governance model

NIIS Members

General Meeting

NIIS Members
X-Road Operators

Advisory Group

X-Road Operators
Development Teams

Working Group

Development Teams

X-Road Community

NIIS Members

- Ministry of Economic Affairs and Communications (Estonia)
- Ministry of Finance (Finland)

X-Road Operators

- Information Systems Authority (Estonia)
- Population Register Centre (Finland)

Partners

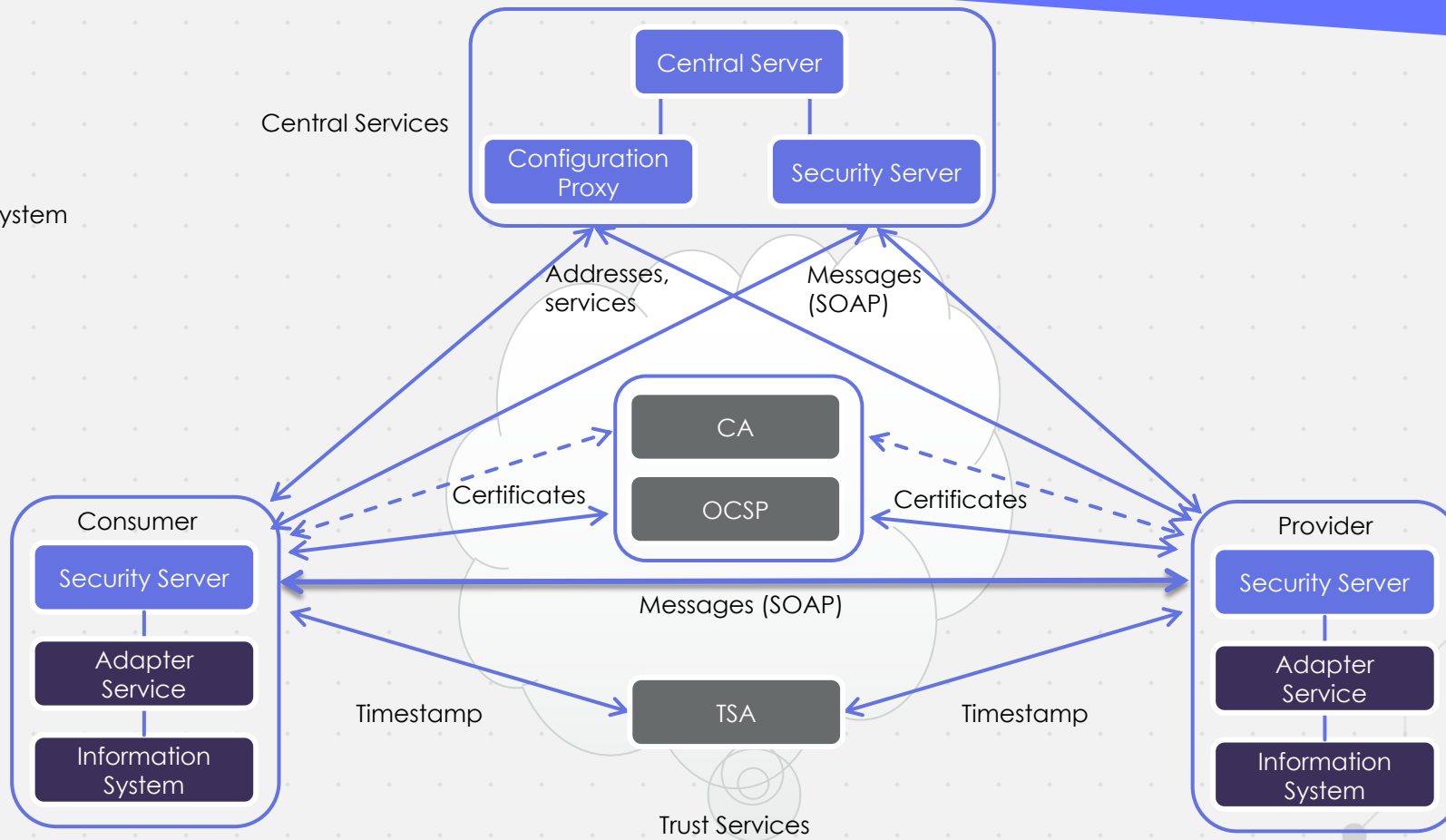- Iceland

What is X-Road

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X-ROAD

X-Road Provides

- ▶ Organization level authentication
- ▶ Machine to machine authentication
- ▶ Standardized messaging model
- ▶ Non-repudiation of messages
- ▶ Logging of messages
- ▶ Access rights management
- ▶ Address management and message routing
- ▶ Transportation level encryption.

X-Road Architecture


X-Road Core

Trust Services

Information System

Central Services

Central Server

Configuration Proxy

Security Server

Addresses, services

Messages (SOAP)

CA

OCSP

Certificates

Certificates

Consumer

Security Server

Adapter Service

Information System

Provider

Security Server

Adapter Service

Information System

Messages (SOAP)

Timestamp

TSA

Timestamp

Trust Services

What Is X-Road

Trust Services

- Certification Authority
- OCSP Service
- Time-Stamping Service

Trust Services - certification and time-stamping services - are provided by **Trust Service Providers**. They may be commercial third parties, or the services can be provided and maintained by the X-Road Governing Authority as well. Trust Services are not part of the X-Road core.

X-Road Governing Authority
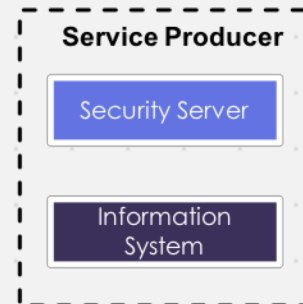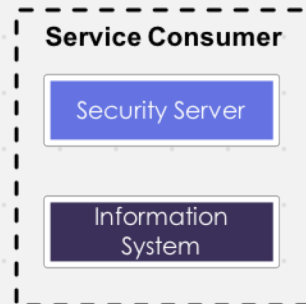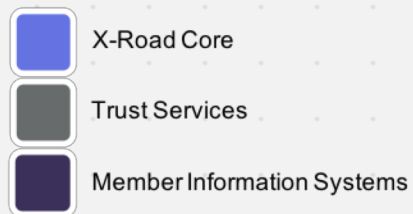
- Central Server
- Security Server
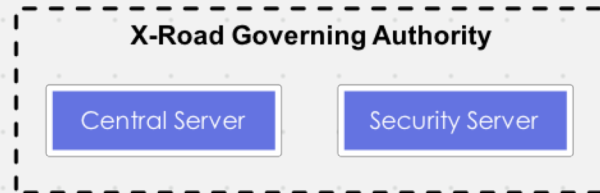
X-Road Governing Authority is responsible for all the aspects of the operations of an X-Road ecosystem including defining regulations and practices, accepting new Members, providing support for Members and operating the central components of the X-Road software.

Service Consumer

- Security Server
- Information System

Service Producer

- Security Server
- Information System

Service Consumers and **Service Producers** are **X-Road Members** - organizations that have joined the ecosystem and produce and/or consume services with other Members. A Member organization can be service provider, service consumer or both.

Legend

- X-Road Core
- Trust Services
- Member Information Systems

X-Road Core

- **Central Server** - Registry of X-Road member organizations and their Security Servers.
- **Security Server** - Entry point to X-Road - required for both producing and consuming services via X-Road. Mediates service calls and service responses between Information Systems.
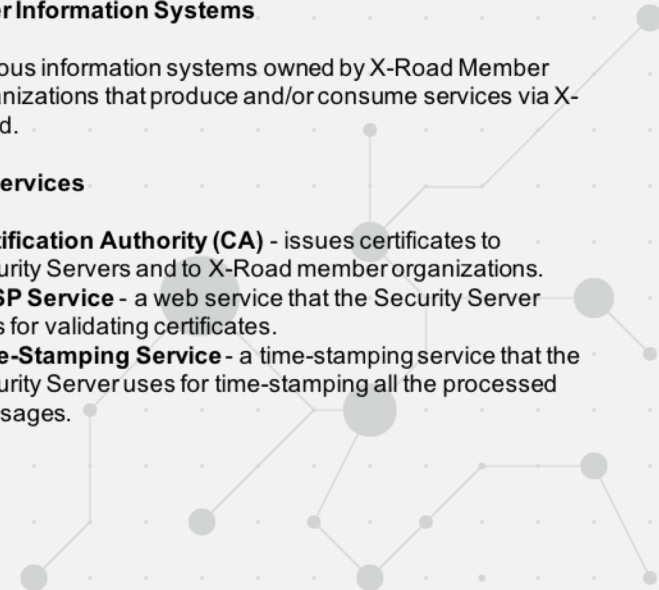
Member Information Systems

- Various information systems owned by X-Road Member organizations that produce and/or consume services via X-Road.

Trust Services

- **Certification Authority (CA)** - issues certificates to Security Servers and to X-Road member organizations.
- **OCSP Service** - a web service that the Security Server uses for validating certificates.
- **Time-Stamping Service** - a time-stamping service that the Security Server uses for time-stamping all the processed messages.

What Is X-Road

▶ A centrally managed distributed data exchange layer for information systems – an open source platform enabling a secure Internet-based data exchange between information systems.

▶ All kind of organizations - public and private sector enterprises and institutions - can connect their information systems to X-Road.

▶ X-Road employs a versatile security solution: authentication, multilevel authorization, a high-level log processing system, digitally signed and time-stamped data traffic.

▶ Distributed architecture and standardized messaging model make data exchange between all the members of the X-Road ecosystem significantly more efficient.

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X-Road as enabler for cross-border data exchange

X-Road Federation

▶ Two X-Road ecosystems can be joined together, federated. Federation is a one to one relationship between two ecosystems.

▶ Members of the federated ecosystems can publish and consume services with each other as if they were members of the same ecosystem.

▶ It is possible to create federation connections with multiple ecosystems, but transitive federation relationships are not supported.

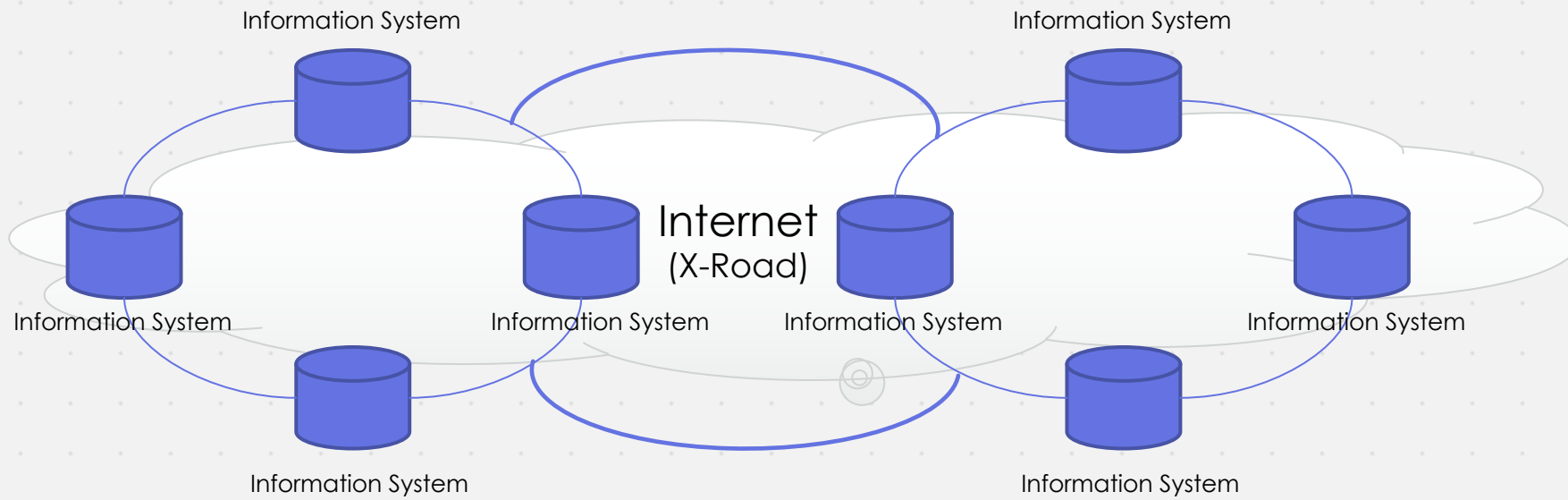▶ Ecosystem does not have a federation relationship with another ecosystem that it's not directly federated with.

X-Road Federation

X-Road Ecosystem 1

X-Road Ecosystem 2

Information System

Information System

Information System

Internet
(X-Road)

Information System

Information System

Information System

Information System

Information System
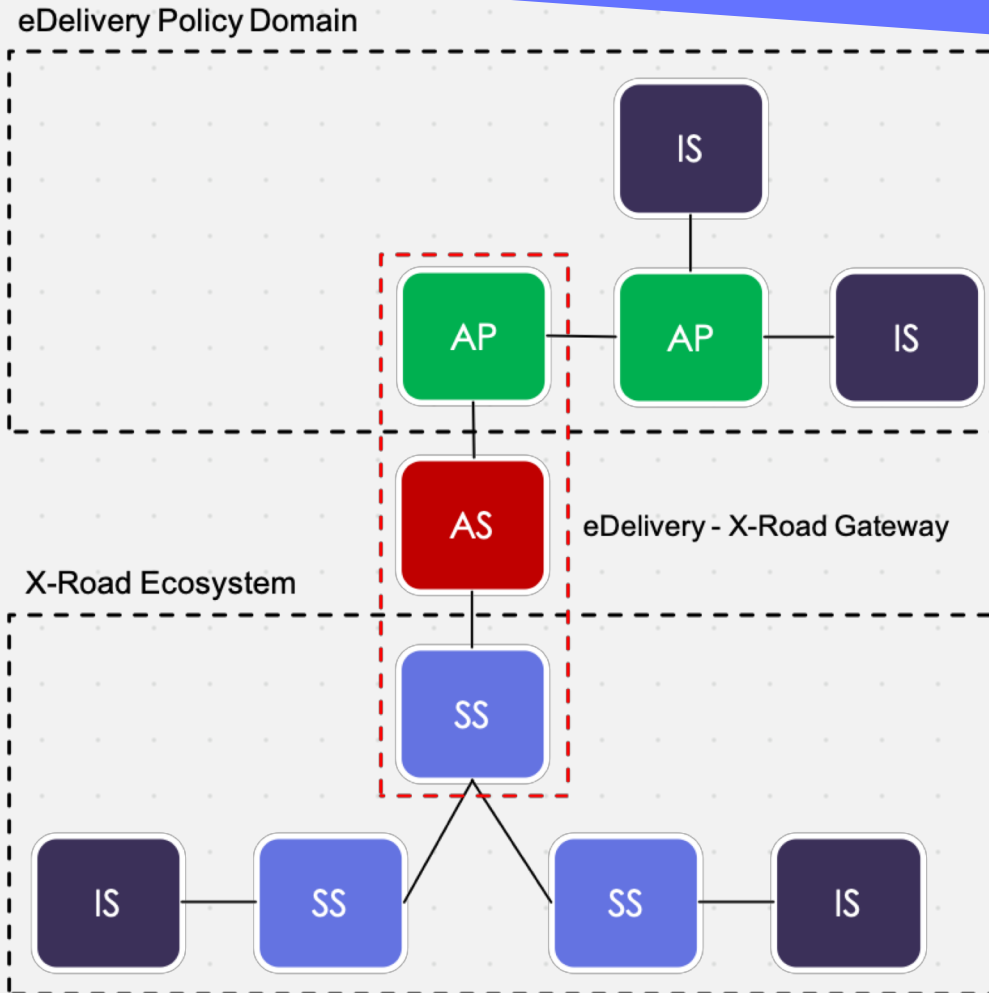
Information System

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X-Road and eDelivery

X-Road and eDelivery

- X-Road is used nationwide in Estonia and Finland.
  - Cross-border and cross-sector data exchange.
- eDelivery is used in multiple member states.
  - Data exchange within a policy domain (e.g. finance, healthcare etc.).
- Is it possible to publish a service via one platform, and access it from both platforms?
  - TOOP in the context of publishing APIs/interfaces/services.

eDelivery – X-Road Gateway

eDelivery Policy Domain

IS

AP — AP — IS

AS

eDelivery - X-Road Gateway

X-Road Ecosystem

SS

IS — SS — SS — IS

Legend:
- X-Road Security Server (SS)
- eDelivery Access Point (AP)
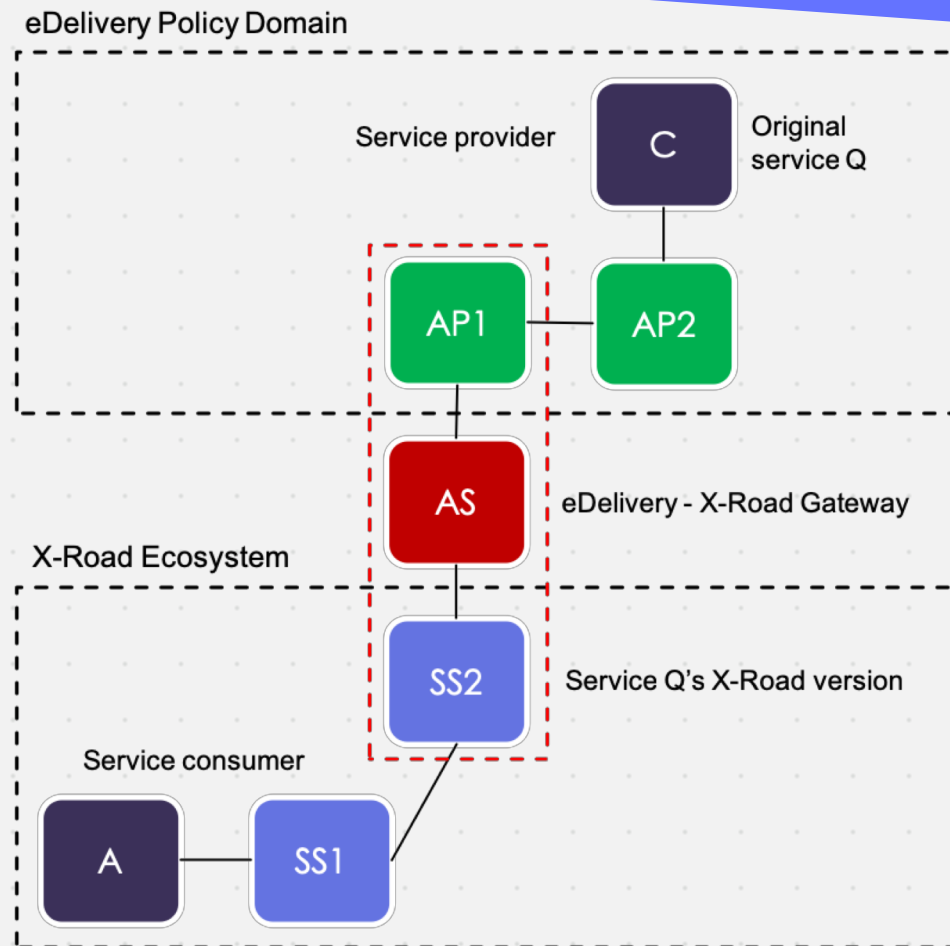- Adapter Service (AS)
- Information System (IS)

eDelivery – X-Road Gateway

▶ Component that automatically converts messages from AS4 to X-Road SOAP (and vice versa).

  ▶ Hides AS4 messages from X-Road, and X-Road SOAP from eDelivery AP.

▶ Enables consuming eDelivery services using X-Road Security Server, and X-Road services using eDelivery Access Point (AP).

▶ Maps eDelivery organization and service identifiers to X-Road organisation and service identifiers (and vice versa).

Sample Message Flow

eDelivery Policy Domain

Service provider — C — Original service Q

AP1 — AP2

AS — eDelivery - X-Road Gateway

X-Road Ecosystem

SS2 — Service Q's X-Road version

Service consumer

A — SS1

- X-Road Security Server (SS)
- eDelivery Access Point (AP)
- Adapter Service (AS)
- Information System (IS)

Open Questions

▶ The Gateway is maintained by an operator which identity is used for:

  ▶ Publishing eDelivery services in X-Road (and vice versa)

  ▶ Consuming eDelivery services from X-Road (and vice versa)

▶ Message receiver sees the operator as a sender – message is signed by the operator, not by the original sender.

▶ **Access rights management and legal issues?**

Open Questions

▶ eDelivery and X-Road use different identifiers for organizations and services – mapping should be automated.