



# TECHNICAL FACTSHEET

## WHAT IS X-ROAD?

X-road is a platform independent data exchange layer that enables secure Internet based data exchange. The system ensures sufficient security for the treatment of queries made to databases and responses received. The X-road infrastructure consists of software, hardware, and organizational methods for standardized usage of national databases.

## GENERAL ARCHITECTURE OF X-ROAD

- Distributed architecture (no SPOF)
- Properties – data integrity, authenticity and authentication, encryption, reliable, verifiable, scalability and availability
- Neutral – using X-road must not change systems FURPS settings level
- Two-level authorization model
- Loosely coupled services – transparent to data models, database/system management technologies and usage patterns
- XML-based

## X-ROAD VERSIONS

- Version 1.0 – 2001. XML-RPC
- Version 2.0 – 2002. SOAP RPC/encoded
- Version 3.0 – 2004. Asynchronous services
- Version 4.0 – 2006. Security update
- Version 5.0 – 2010. SOAP document/literal wrapped
- Version 6.0 – 2014 Federation, External trust service providers

## OPENNESS

- **A common protocol and the independence of development platforms** – Information systems developed on any development platform can be interfaces with the X-road secure servers.
- X-road is developed from **freeware components**.
- **Data exchange on the public Internet** – X-road does not require a separate network or a VPN. All data exchange is conducted over the public internet and is encrypted with SSL.

## SECURITY

X-road uses a versatile security that employs authentication, multilevel authorisation, a high-level log processing system, encrypted and time-stamped data traffic.

- **Authentication and authorisation of parties** – secure servers authenticate parties on the basis of certificates that are located in the central server. The certificates are created by the certification centre, which guarantees that the certificate owner is who it claims to be. Once the parties have been authenticated on the basis of information available from the central server, authorisation is carried out in the secure server. Data owners maintain control over who can access their data: each organisation can determine the services that are open to another party. The administrative interface of the security server allows a complete freedom in specifying different access for different parties. When a query is made to the secure server, the availability of the service described in the query for the organisation is checked.

TECHNOLOGY	LAYER	COMPONENTS
WSDL UDDI	Services	Parental benefit My vehicles My penalties
SOAP (XML RPC) LDAP ...	Data traffic X-road	Security server Central server MISP Citizen portal
Java .NET PHP Python SAP	Information systems	Traffic register Population register Passports register



- **Data protection** – In the X-road environment, encrypted data are transferred directly through secure servers from one information system to another. Data does not pass through the X-road centre and cannot be viewed there.
- **Monitoring** – Secure servers log the data traffic between themselves and only send a log hash to the central server, so that later it is possible to compare the logs of both secure servers and the central server's hash in order to prove the usage of data.
- **Distributed architecture** – As a result of X-road distributed architecture, individual data transactions do not rely on a central server, presenting no single point of failure.
- If a member of X-road wants to interface X-road with an existing information system, they have to develop a **software adapter server** on a development platform of their choice.
- The **service provider** creates services in their adapter server that it will start offering to others over X-road. Opening the services for other members of X-road is done in the service provider's secure server.
- The **service user** creates a solution in their adapter server that connects the service provider's open web services to their own information system.
- **Mini Information System Portal (MISP) software** can be adopted for using the service. This is a simple user interface that has mechanisms for user authentication and authorisation, MISP software is meant for the usage of services available on X-road.

## WHAT DO I NEED TO CONNECT TO X-ROAD?

X-road is simple, easy-to-install. Only a few components are needed to connect data system to X-road:

- A virtual physical **secure server** has to be installed for using X-road and exchanging data. The secure server's software also includes a **local monitoring system**.

## PARENTIAL BENEFIT EXAMPLE

