

Nordic Institute for
Interoperability
Solutions



X-Road Data Exchange Layer

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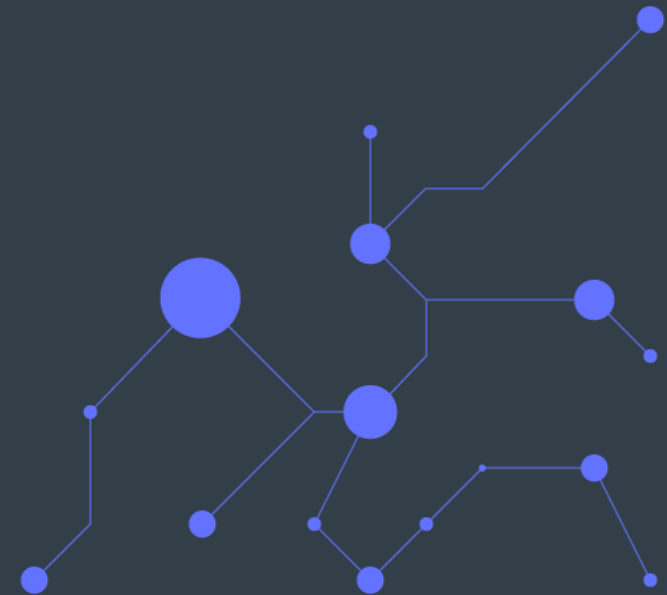
FORUM PA 2019, ROME, 16 MAY 2019





Topics

- ▶ What is X-Road
- ▶ X-Road as enabler for cross-border data exchange
- ▶ NIIIS as the X-Road core development organization
- ▶ X-Road Development Model





What is X-Road



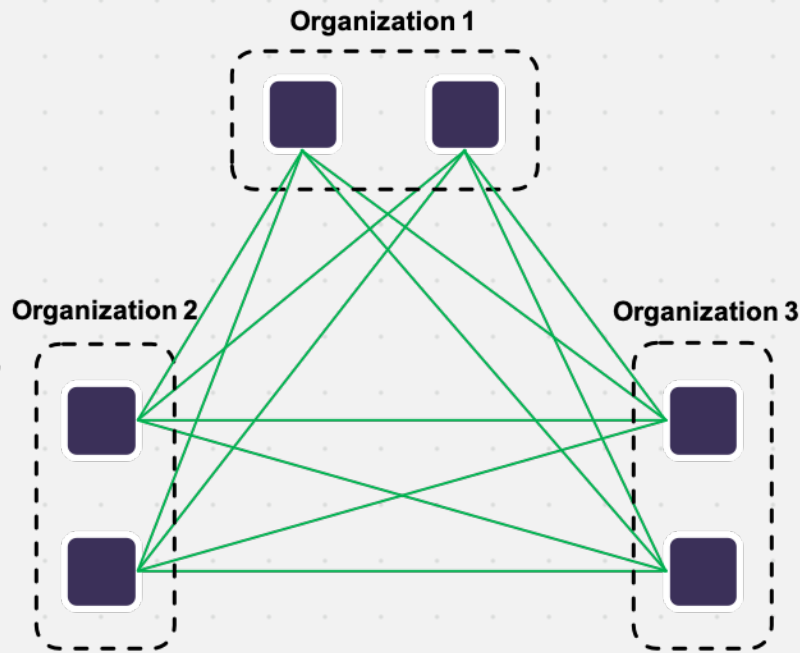
X-ROAD



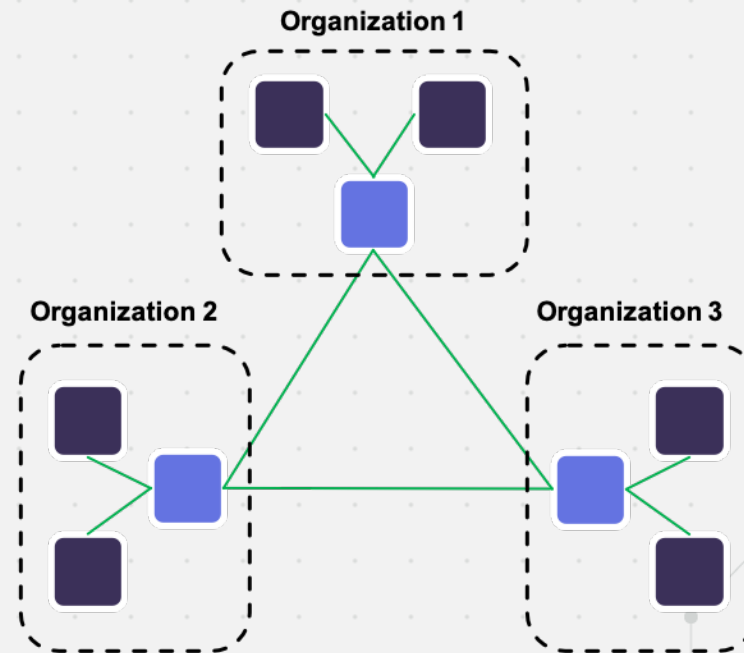


Point-to-Point Integrations vs X-Road

Point-to-point Integrations



X-Road



Information System



X-Road Security Server

- Each new connection must be configured separately (firewalls, certificates etc.)
- Configuration changes on service provider side affect all clients (e.g. new certificate or IP)
- Security requirements vary between information systems (e.g. allowed ciphers and TLS versions etc.)

- Once Security Server is installed and configured, it provides access to all available services through other Security Servers.
- X-Road automatically distributes and applies all configuration changes – no manual work required on the client side.
- X-Road guarantees standard security configuration between Security Servers.
- X-Road provides non-repudiation, legally binding digital signatures and eIDAS compliant eSeals.



X-Road Provides

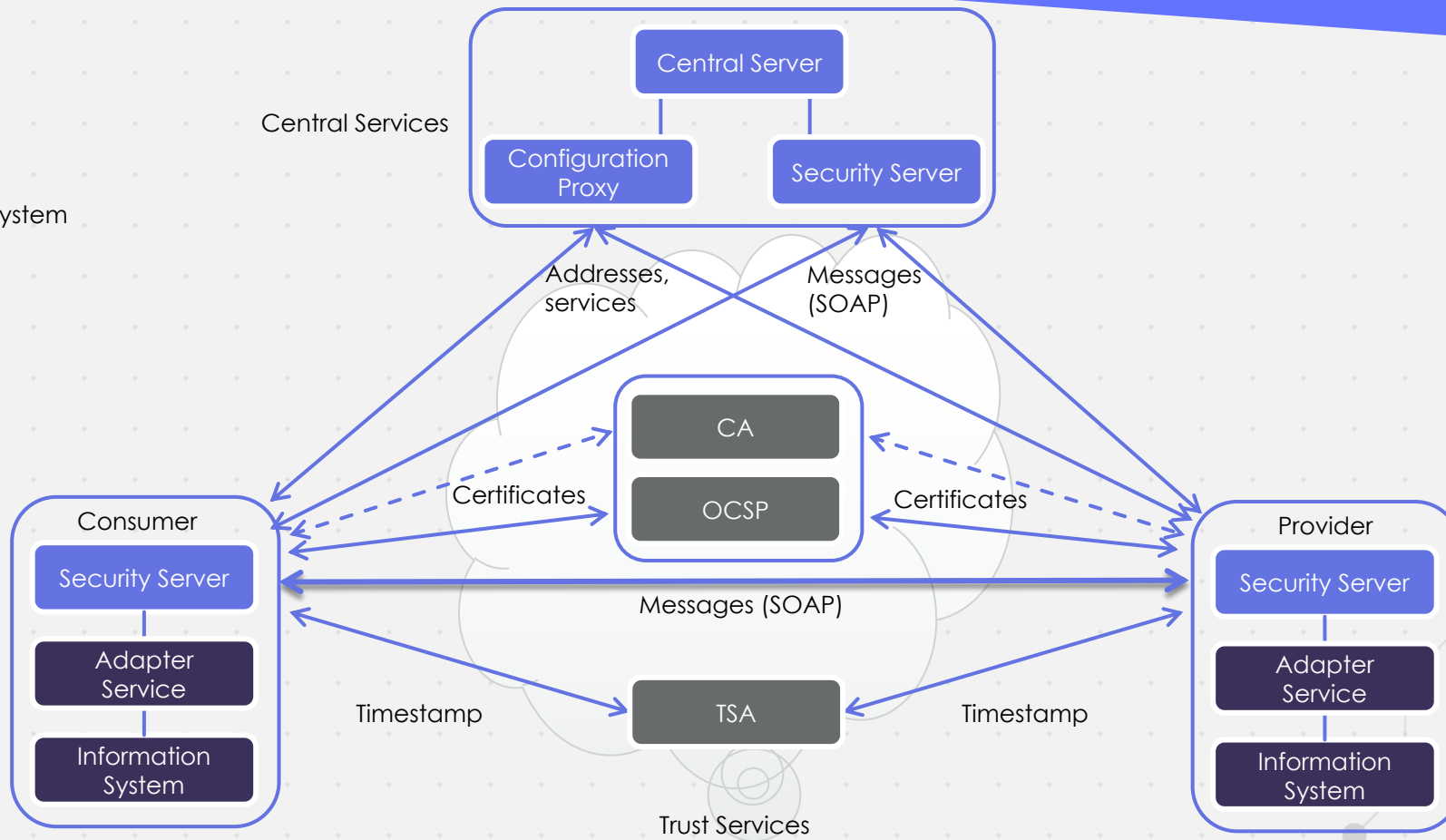
- ▶ Organization level authentication
- ▶ Machine to machine authentication
- ▶ Standardized messaging model
- ▶ Non-repudiation and logging of messages
 - ▶ *eIDAS compliant digital signatures with timestamps and eSeals*
- ▶ Access rights management
- ▶ Address management and message routing
- ▶ Transport level encryption.





X-Road Architecture

- X-Road Core
- Trust Services
- Information System





What Is X-Road



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.



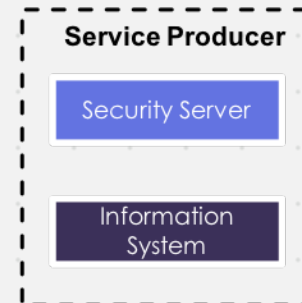
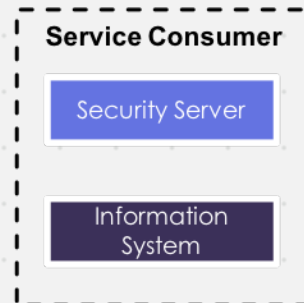
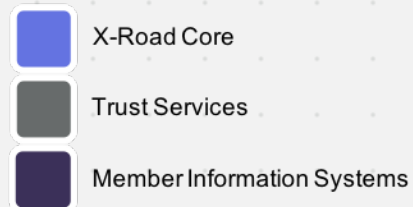
X-Road Governing Authority is responsible for all the aspects of the operations of an X-Road ecosystem including defining regulations and practices, accepting new Members, providing support for Members and operating the central components of the X-Road software.

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

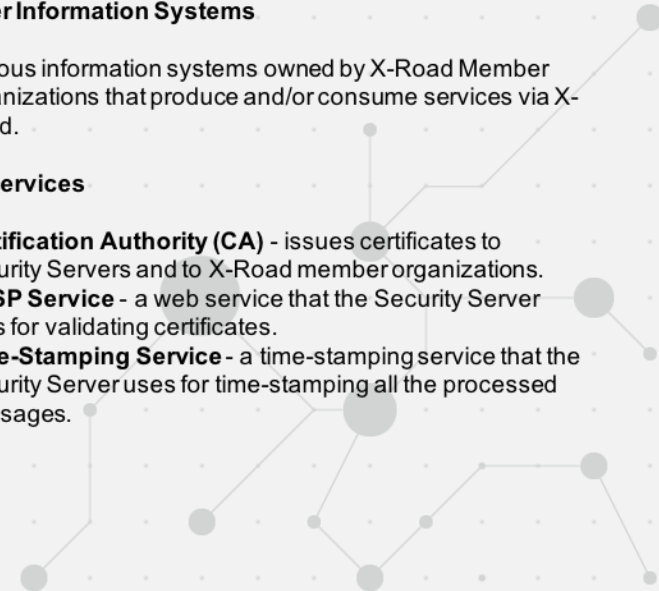
- Various information systems owned by X-Road Member organizations that produce and/or consume services via X-Road.



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.

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.





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.

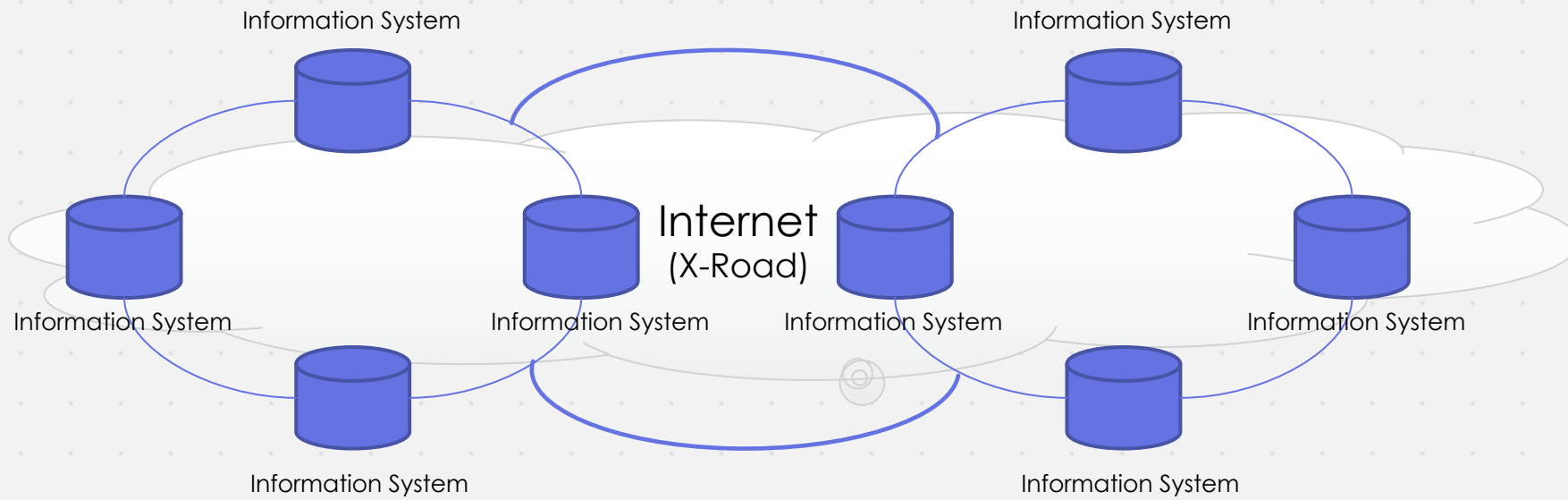




X-Road Federation

X-Road Ecosystem 1

X-Road Ecosystem 2





Federation Case Studies

- ▶ Business registers of Estonia and Finland
- ▶ Tax boards
- ▶ Implementation of X-Road in Iceland
- ▶ Improving environment services in the greater Helsinki area
- ▶ More information available at:
 - ▶ <https://x-road.global/case-studies>





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.





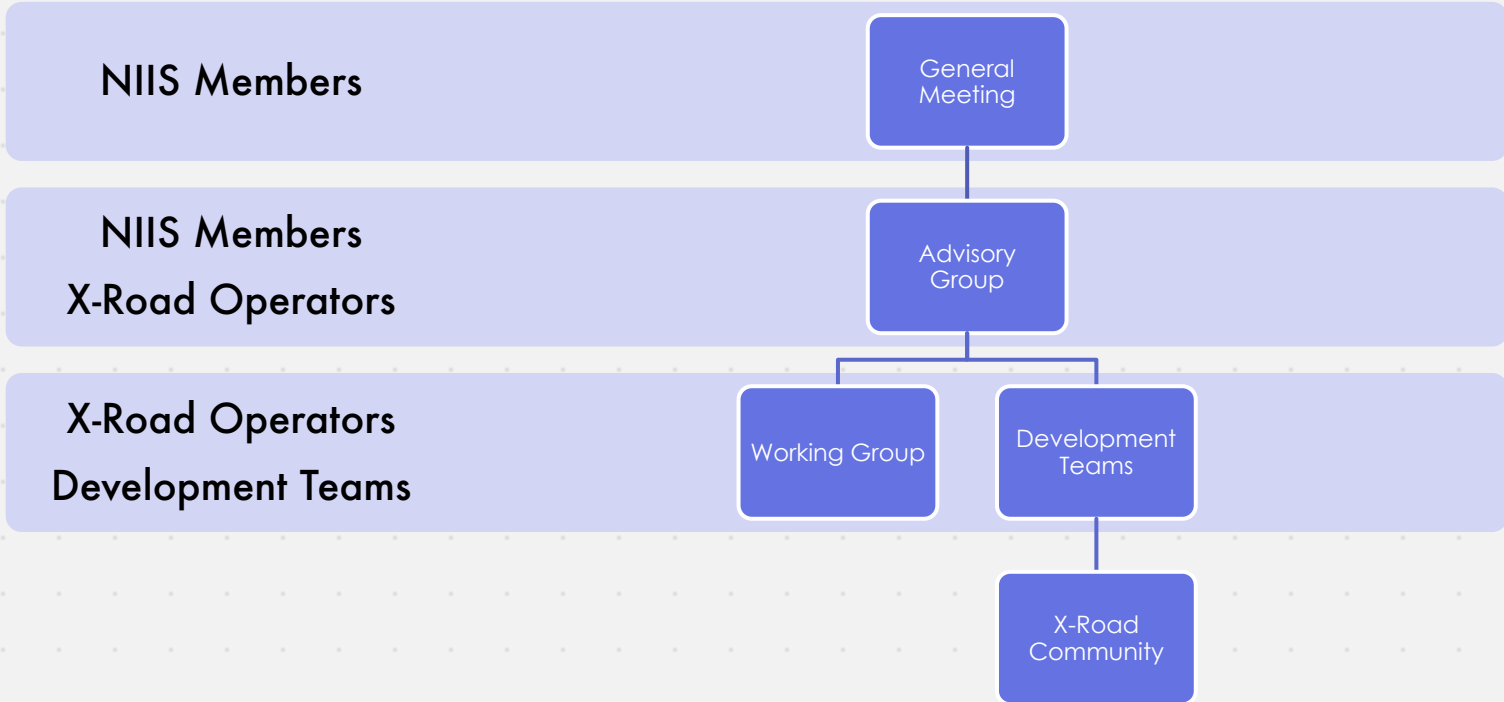
NIIS Responsibilities

- ▶ 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

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

X-Road Operators

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

Partners

- Iceland



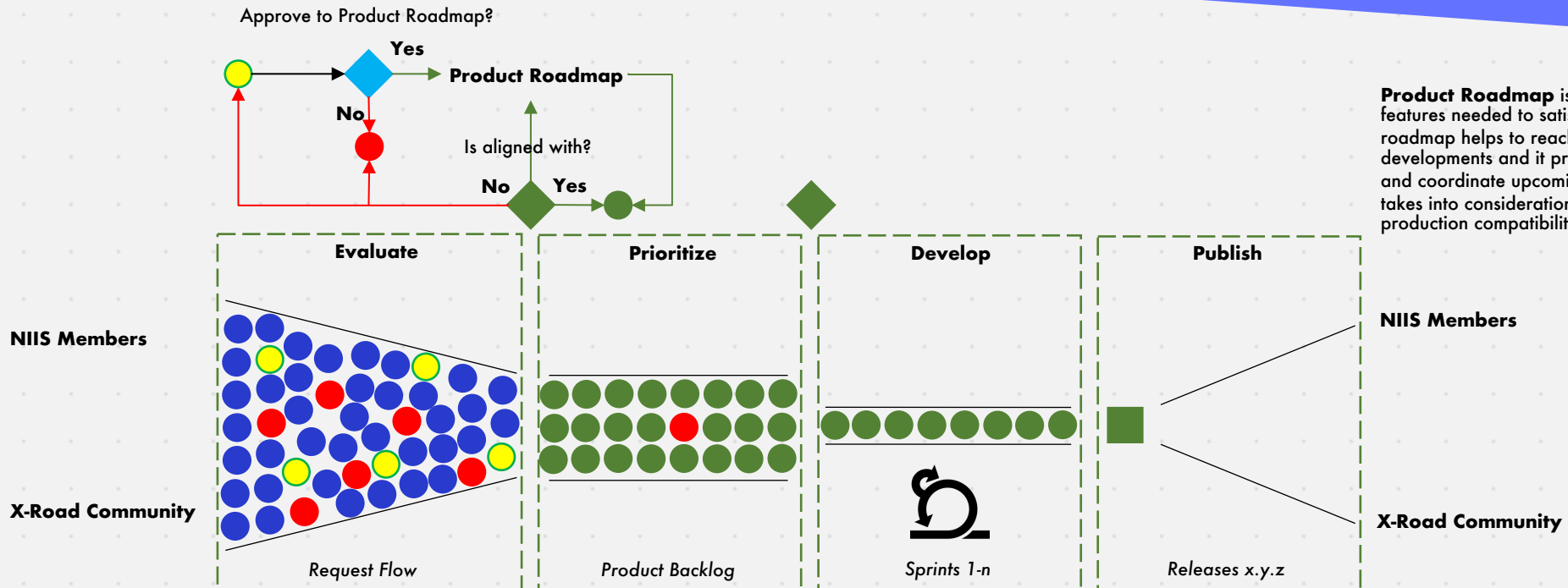


X-Road Development Model





Development Model



Product Roadmap is a plan that outlines the flow of new features needed to satisfy the needs of NIIS members. The roadmap helps to reach a consensus about future developments and it provides a framework to help plan and coordinate upcoming releases. The X-Road roadmap takes into consideration scoped functionality and X-Road production compatibility.

NIIS Members

X-Road Community

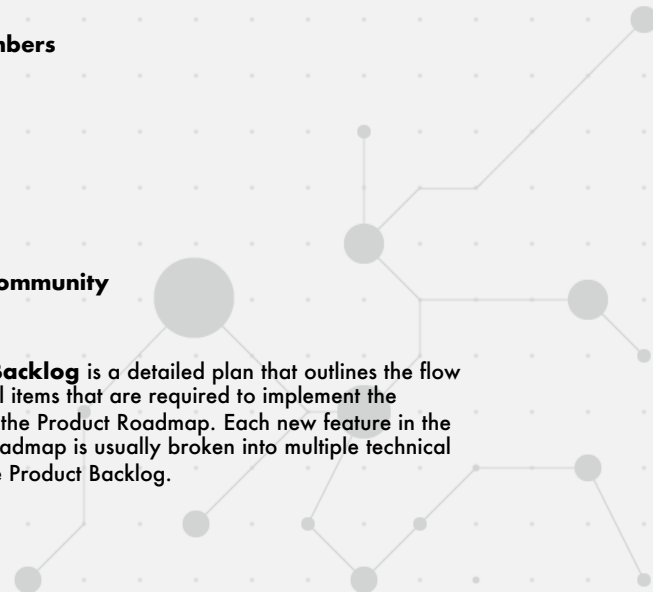
Product Backlog is a detailed plan that outlines the flow of technical items that are required to implement the features in the Product Roadmap. Each new feature in the Product Roadmap is usually broken into multiple technical items in the Product Backlog.

Enhancement request is about improving existing functionality.

Business feature request is about adding a new feature to X-Road core.

- Enhancement request
- Rejected request / item
- Business feature request
- ◆ Working Group
- ◆ Advisory Group
- Product Backlog Item

■ New release





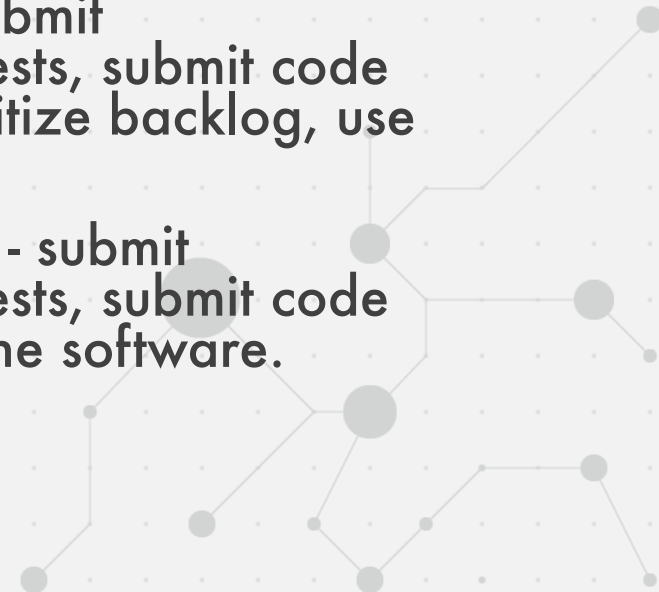
Development Model

Phases

- ▶ Evaluate – collect new feature and enhancement requests and select the best ones for development.
- ▶ Prioritize – maintain and prioritize product backlog.
- ▶ Develop – agile development of features requested by NIIS members.
- ▶ Publish – Publish and distribute new releases.

Interest Groups

- ▶ NIIS – owns the model and is responsible for executing it.
- ▶ NIIS Members – submit enhancement requests, submit code contributions, prioritize backlog, use the software.
- ▶ X-Road Community - submit enhancement requests, submit code contributions, use the software.





Roadmap 2019

2018 2019 2020

January

April

October

*v7 research and planning
kick off*

v6.20.0

- Ubuntu 18.04 LTS support
- ST IV support
- Enhanced time-stamping

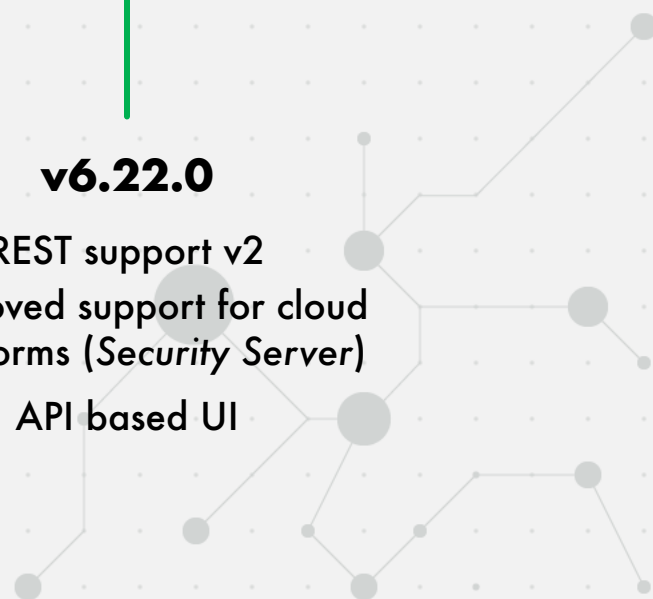
v6.21.0

- REST support v1
- Streamlined Onboarding Process
- Standalone Security Server

v6.22.0

- REST support v2
- Improved support for cloud platforms (*Security Server*)
- API based UI

+ minor improvements and bug fixes





High Level Roadmap 2019-2021

2019

2020

2021

- Upgrade and completion of X-Road version 6.
- Research and planning for X-Road version 7.

- Start of development of X-Road version 7.
- Beta pilot version of X-Road version 7.
- End of development of X-Road version 6.

- First release of X-Road version 7.
- Development of X-Road version 7.
- Maintenance of X-Road version 6.





WWW.NIIS.ORG

