X-ROAD® – SECURE DATA EXCHANGE FOR DIGITAL GOVERNMENT

Ville Sirviö, CEO
Nordic Institute for Interoperability Solutions (NIIS)
Future Data Summit 2022

DIGITAL SOCIETY SOLUTIONS AND CROSS-BORDER COOPERATION

Nordic Institute for Interoperability Solutions

Non-profit association to ensure the development and strategic management of X-Road® and other cross-border solutions for digital government infrastructure.

niis.org

X-ROAD®

Open-source software and ecosystem solution that provides unified and secure data exchange between organisations.

x-road.global

Harmony eDelivery Access

A free and actively maintained open-source component for joining one or more eDelivery policy domains.

edelivery.digital

Nordic Institute for Interoperability Solutions

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

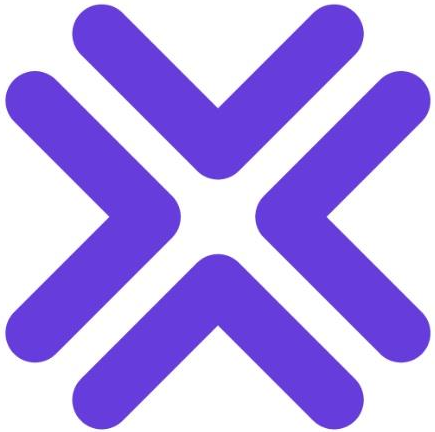
Approve and monitor strategy, budget and action plan;

Approve transactions that are beyond the scope of everyday economic activities.

Relaying information and instruction between the operative level and the General Meeting.

In charge of the day-to-day management of NIIS

Day-to-day coordination of the joint development of X-Road



X-ROAD®

X-Road® is open-source software and ecosystem solution that provides unified and secure data exchange between organisations.

WHY CHOOSE X-ROAD?

- ## Digital Public Good (DPG)

  X-Road is a digital public good verified by the Digital Public Goods Alliance. X-Road is free of charge and can be implemented by any organisation. X-Road helps attain the Sustainable Development Goals.

- ## Open-source software

  The X-Road core is published under the MIT open source licence. The source code and all protocol specifications are publicly available on GitHub. Support is available through X-Road Community and X-Road Technology Partners.

- ## A versatile security solution

  X-Road through its security architecture provides managed authentication, multilevel authorization, a high-level log processing system, digitally signed and time-stamped data traffic.

- ## Once-Only Principle

  X-Road reduces administrative burdens by enabling the Once-Only Principle (TOOP) implementation. Data is managed by its owner and exchanged securely via X-Road.

- ## Scalable ecosystem

  Start small or go big – X-Road always comes in the right shape and size. X-Road's distributed architecture adapts to changing needs.

- ## Flexible implementation

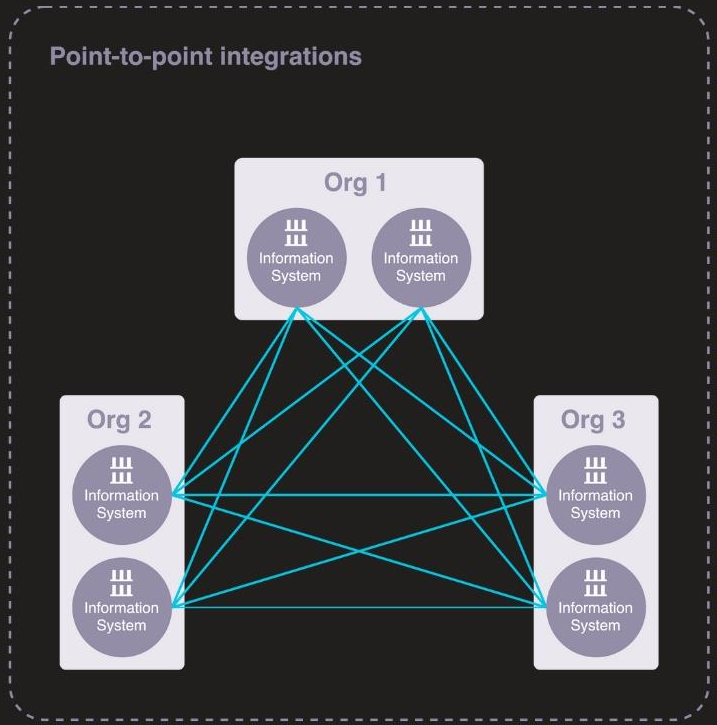
  X-Road supports various implementation models. Whether implementing a national, regional or domain-specific data exchange solution, X-Road adapts to your needs.

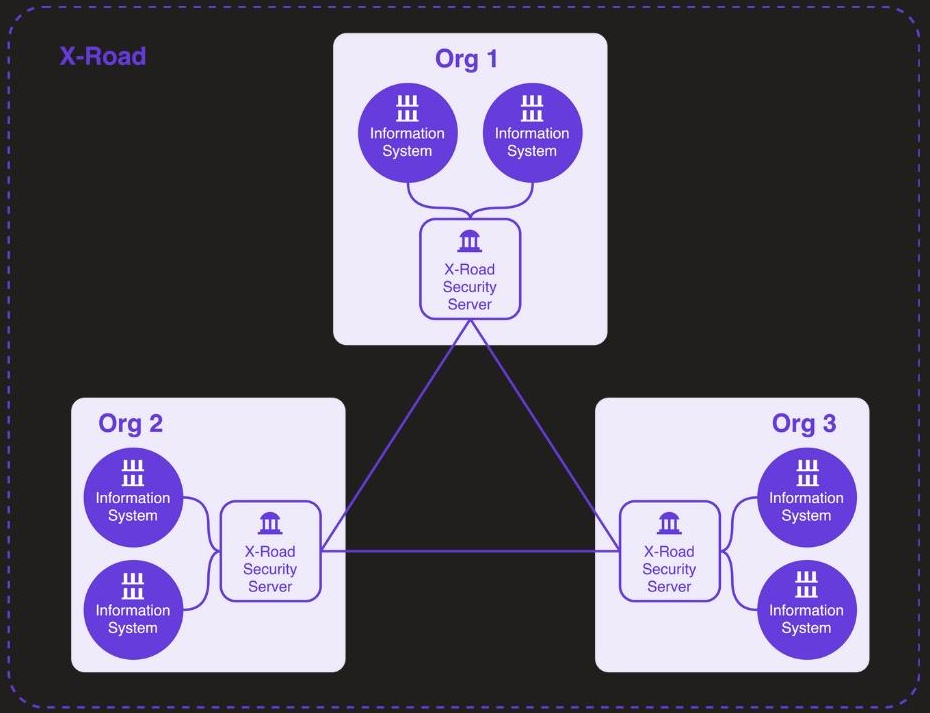
X-ROAD FEATURES

X-Road implements a set of standard features to support and facilitate data exchange and ensures confidentiality, integrity, and interoperability between data exchange parties:

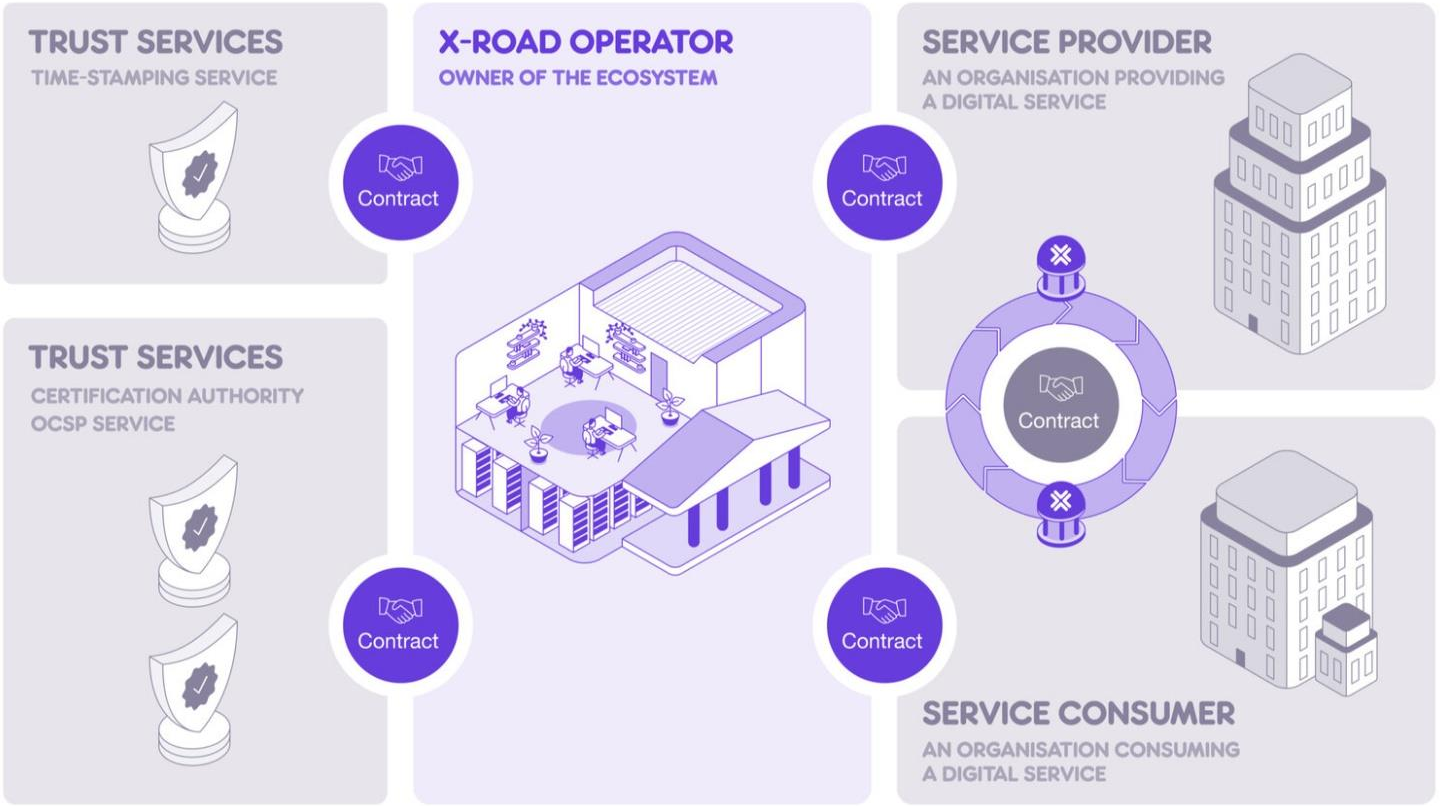
- address management
- message routing
- access rights management
- organization-level authentication
- machine-level authentication
- transport-level encryption
- time-stamping
- digital signature of messages
- logging
- error handling

X-ROAD VS POINT-TO-POINT

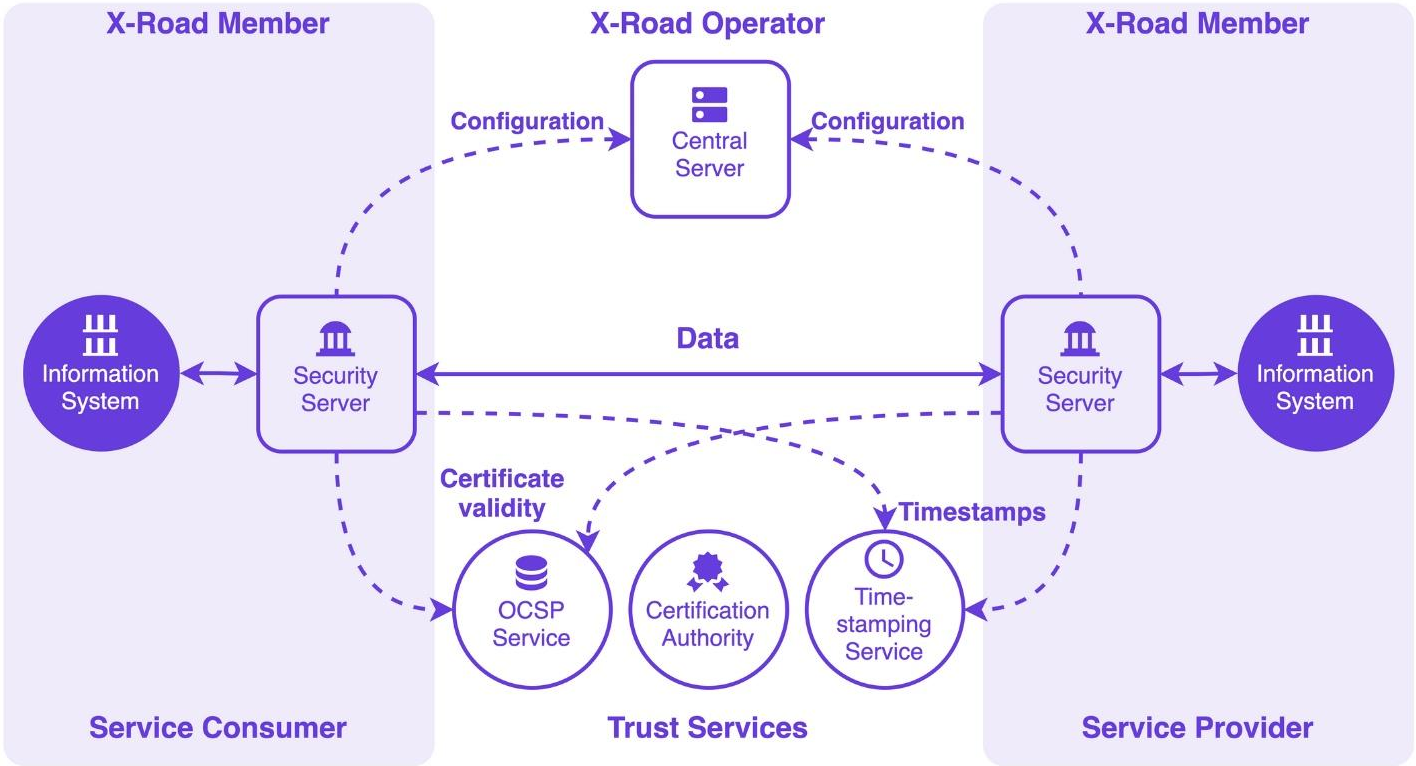




X-ROAD ECOSYSTEM

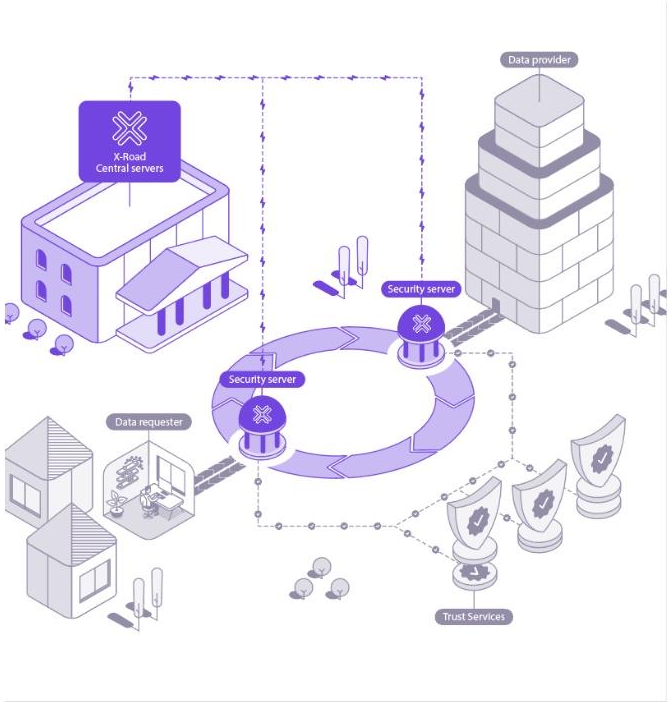


X-ROAD DATA EXCHANGE



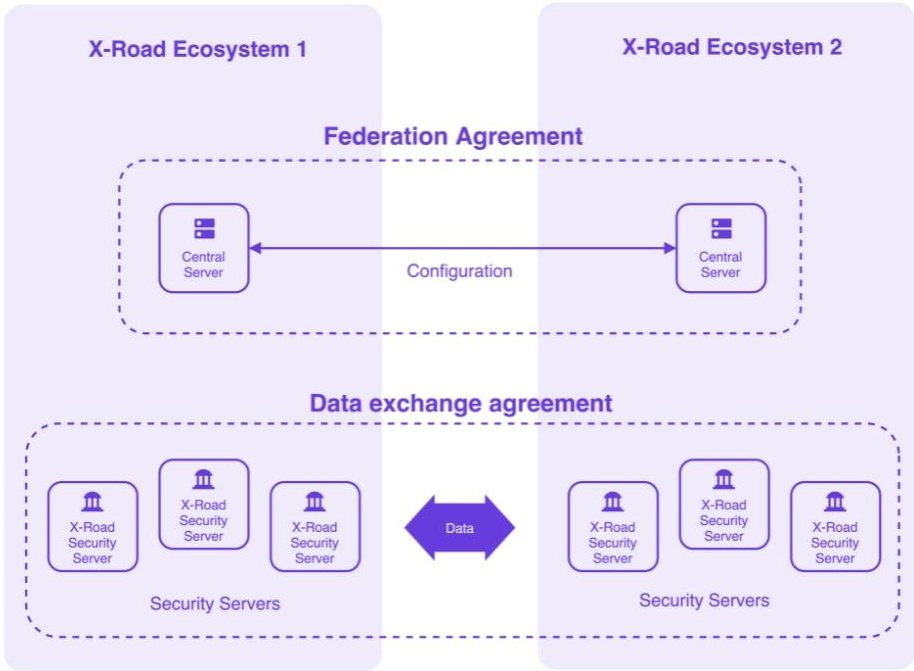
X-ROAD ECOSYSTEMS

- X-Road ecosystems (instances) worldwide are operated by governments, companies or other organisations.
- Since 2014 (version 6.x), X-Road has a feature called Trust Federation for joining together two X-Road ecosystems.



TRUST FEDERATION

- 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.
- Federation is not only about technology – administrative and/or legal agreements are also needed between:
  - X-Road operators of the federated ecosystems.
  - Member organisations that exchange data (data exchange parties).



X-ROAD SECURITY

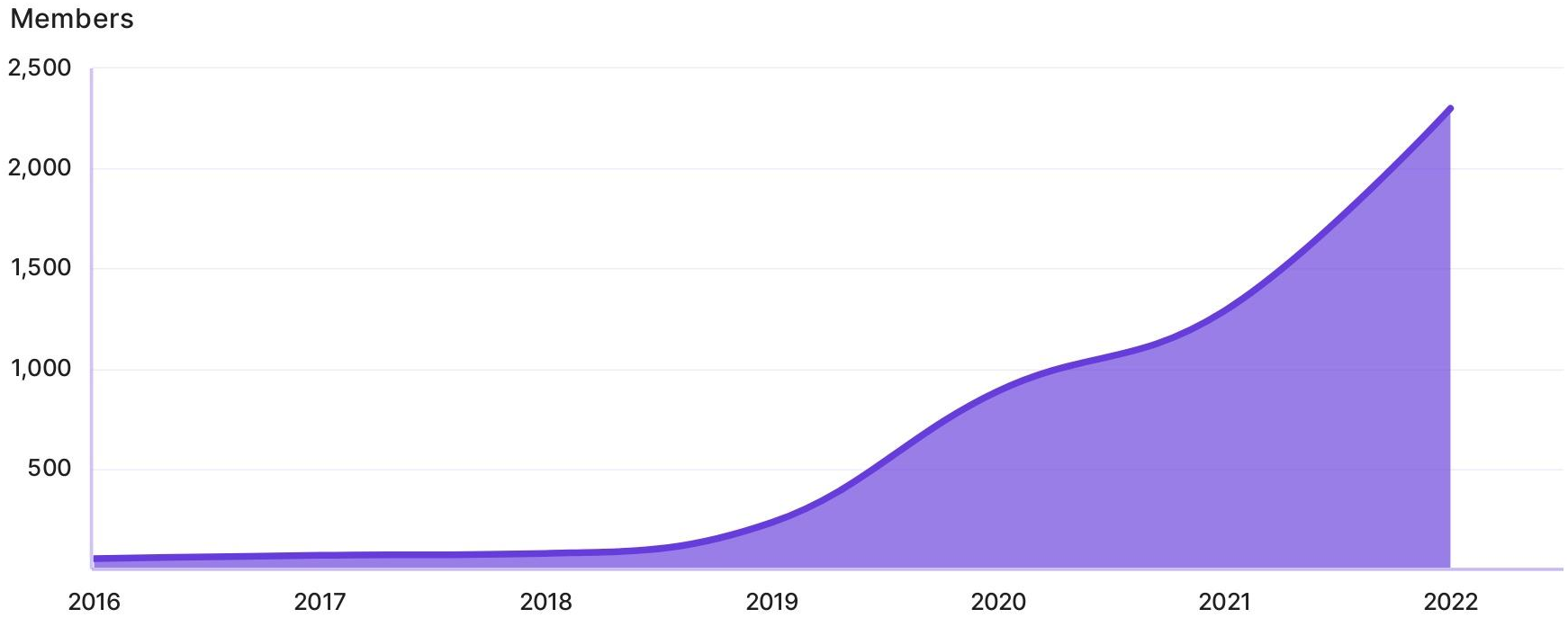
X-Road security is designed with a critical information infrastructure equivalence resilience in mind.

- X-Road software
  - confidentiality
  - integrity
  - availability
  - authentication
  - access control
  - logging
  - time-stamping
- X-Road development
  - public bug bounty program
  - regular security assessments by a third-party
  - source code reviews
  - threat modeling
  - static source code analysis
  - automated dependency checks

X-ROAD COMMUNITY


2015, Estonia

X-ROAD COMMUNITY KEEPS GROWING




2019 Finland
X-ROAD
x-road.global/event
6th September
Helsinki, Finland
X-ROAD
6th September
Helsinki, Finland

20

ECOSYSTEMS

DEPLOYED BY GOVERNMENTS OR OTHER ORGANISATIONS

115

COUNTRIES

REPRESENTED IN THE X-ROAD COMMUNITY

2300

MEMBERS

PARTICIPATING IN THE X-ROAD COMMUNITY

207M

END USERS

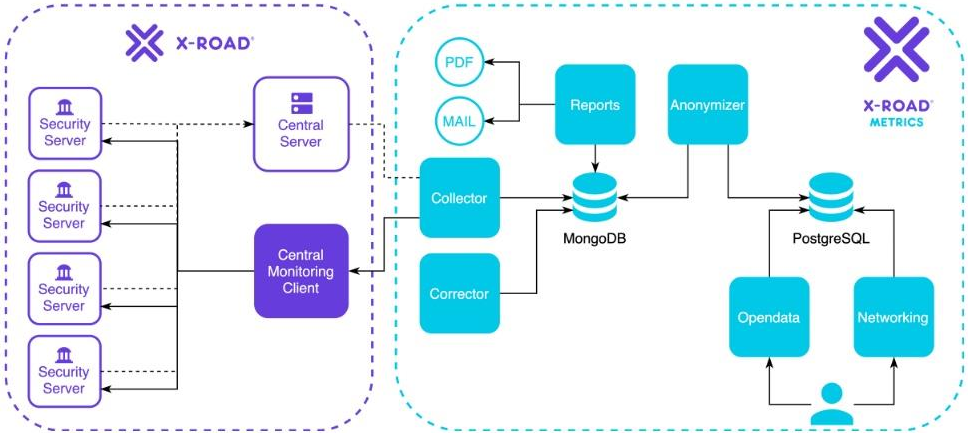
WORLDWIDE


Sweden
Russia
Belarus
Poland
Ukraine
Romania
Italy
Greece
Turkey
Mongolia
Uzbekistan
China
Afghanistan
Iran
Pakistan
Nepal
Bangladesh
Laos
Oman
Sri Lanka
Maldives
Malaysia
Indonesia
Papua New Guinea
Morocco
Tunisia
Algeria
Libya
Mauritania
Mali
Niger
Chad
Sudan
Senegal
Nigeria
South Sudan
Somalia
Cameroon
Kenya
Tanzania
Angola
Zambia
Mozambique
Namibia
Peru
Bolivia
Paraguay
Chile
North Atlantic Ocean
South Atlantic Ocean
Indian Ocean
United States

FROM A “TECHNICAL MAGIC BULLET” TO A SOURCE OF INNOVATION?

DATA COLLECTION MODEL BASED ON THE METRICS COMPONENT

- X-Road Metrics – collecting, storing and analysing reporting data and metrics from an X-Road ecosystem
- Service usage statistics, response times, request sizes, service health data, etc.
- The operational data of an X-Road ecosystem is not shared with others by default.



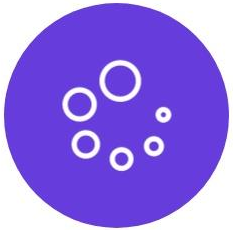
CHARACTERISTICS OF THE DATA COLLECTION MODEL

Parallel data sharing separated from the secure data exchange

Collection of

- service and usage data
- configuration data
- performance data
- sustainability data

Incentive for data sharing – share data and get data



Innovative and data-enabled product development

BENEFITS OF THE DATA COLLECTION MODEL

Create insights and optimal decisions.

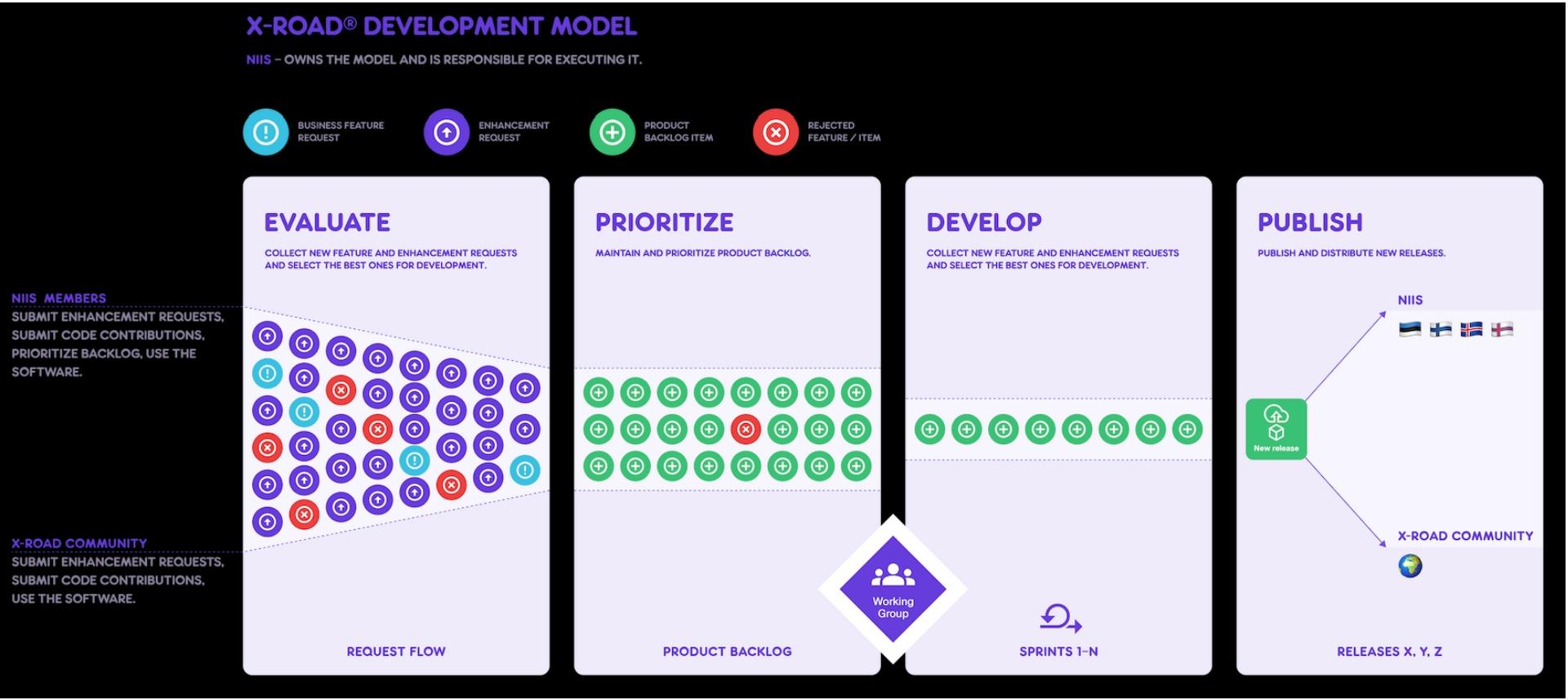
Enhance processes and the product.

Compare with other ecosystems to enhance the performance.

STEPS TOWARD DATA-ENABLED X-ROAD

X-ROAD DEVELOPMENT

DEVELOPMENT MODEL

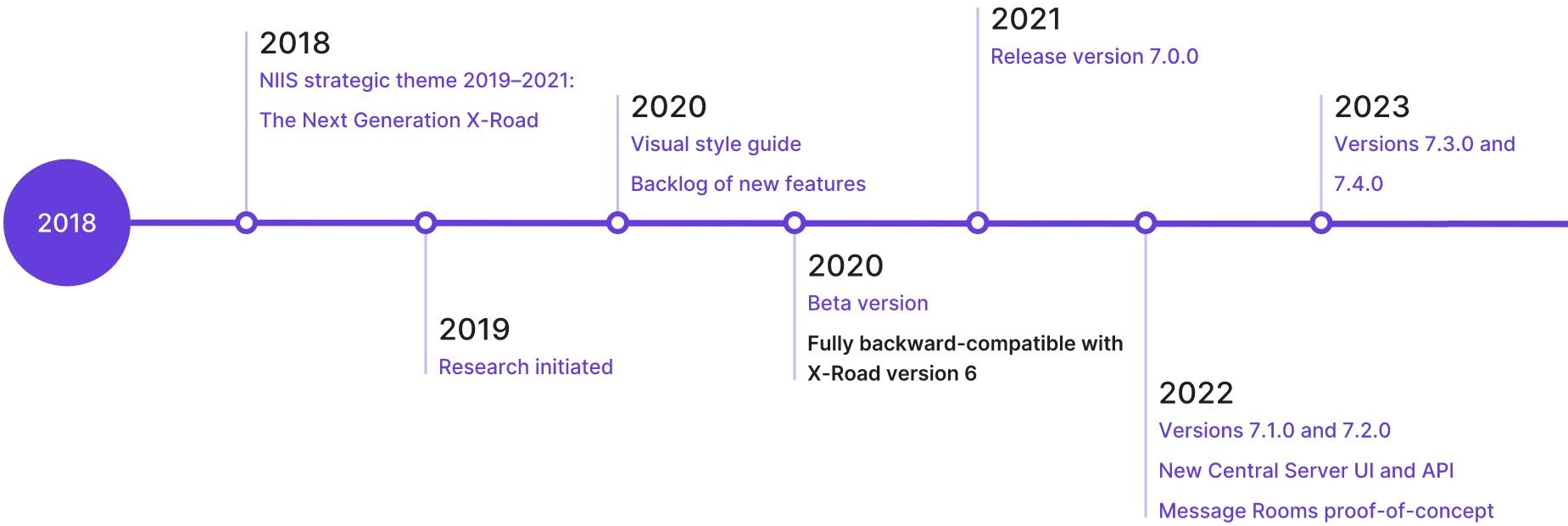


X-ROAD PRODUCT VISION 2023

X-Road is a modular, easy-to-use, cloud-native, secure and sustainable data exchange solution.

X-Road is thriving as a core digital infrastructure component in the Nordic and EU countries and is a worldwide known technology solution.

X-ROAD 7 “UNICORN”



X-ROAD TECHNOLOGY PARTNERS

X-ROAD TECHNOLOGY PARTNERS

THANK YOU!

Twitter: @sirvioville

ville.sirvio@niis.org