NIIS

Nordic Institute for
Interoperability
Solutions

YEARBOOK
2019

Nordic Institute for Interoperability Solutions

Nordic Institute for Interoperability Solutions (NIIS) is a non-profit association with the mission to ensure the management of X-Road® and other cross-border components for e-government infrastructure.

NIIS is both a network and cooperation platform and executioner of IT developments in members' common interests. The institute focuses on practical collaboration, sharing of experience and promoting innovation. The operating model of the institute is something unique in the world.

2019 constituted another successful year for NIIS with activities centred around the technical development of X-Road, extensive international co-operation, and internal development of the organisation. I express my gratitude to the NIIS team for the continuous efforts in making X-Road the leading open-source data exchange solution in the world.

During the year 2019, we updated the NIIS multiannual strategy with our members. Our vision is that NIIS will be an agile innovator and a strong influencer in the field of e-governance, as well as being an attractive organisation of which to be a member. We continue cooperating actively in Europe with the aim of having new members in the near future.

The global X-Road Community – facilitated by NIIS – continued its growth also in 2019, and X-Road use-cases were reported from several countries. In May, the Faroe Islands became a partner of NIIS. The year 2019 was astonishing for NIIS and X-Road!

I want to thank X-Road Community members and X-Road Technology Partners for their contributions to X-Road. I also want to thank NIIS members, our partners Iceland and the Faroe Islands, our advisors and friends for their continuing support.

Ville Sirviö, CEO
Twittter: @sirvioville

Table of Contents

X-Road®

- Development Model
- Technology Overview
- Design Overview

X-Road®
Development Model

NIIS

Nordic Institute for Interoperability Solutions (NIIS) is a non-profit association with the mission to ensure the development and strategic management of X-Road®

- Management, development, verification and audit of the source code;
- Administration of documentation;
- Administration of business and technical requirements;
- Development and management of tools, platforms and practices;
- Management of licensing and distribution;
- Second-line support to NIIS members.

X-Road Community

Users of the open-source product around the world submit business feature requests, enhancement requests and source code contributions. Users participate in community activities, e.g., hackathons, X-Road Community Event.

Advisory Group

Approval of business feature requests and prioritization of the X-Road product roadmap.

Working Group

Approval of enhancement requests and prioritization of the X-Road product backlog.

New versions of X-Road

X-Road user organisations

NIIS member (countries)

- Operations and management of their own ecosystems:
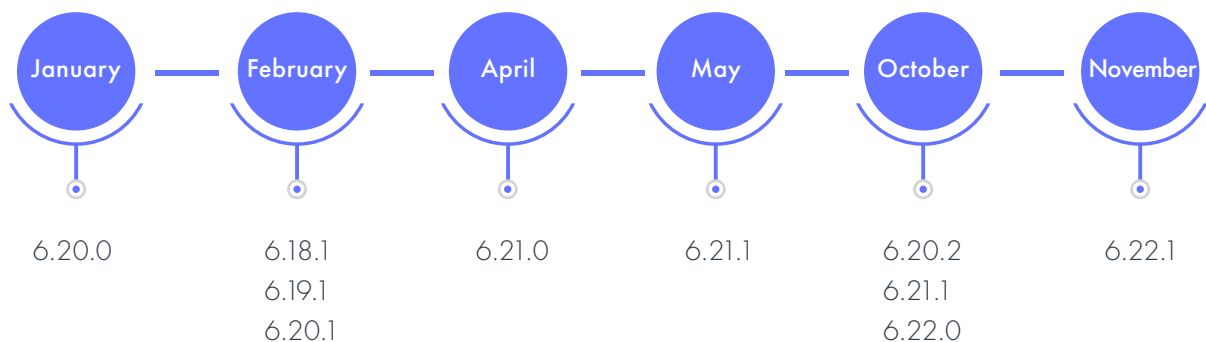- Provide feedback and input for development activities.

The full version of the X-Road development model is available at:
https://github.com/nordic-institute/X-Road-development/blob/master/DEVELOPMENT_MODEL.md

X-Road®
Technology Overview

Year 2019 was the first full year for NIIS as the X-Road core development organization. NIIS delivered 10 new X-Road core releases during the year. In addition to three planned minor releases, multiple patch versions were released as well:
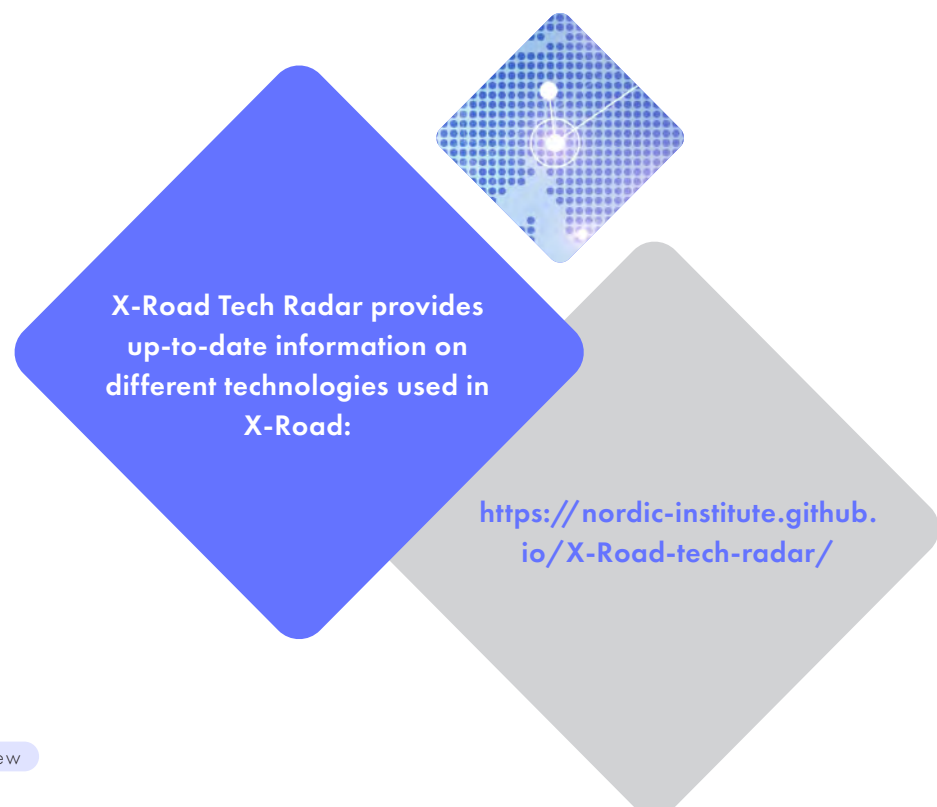
January	February	April	May	October	November
6.20.0	6.18.1	6.21.0	6.21.1	6.20.2	6.22.1
	6.19.1			6.21.1	
	6.20.1			6.22.0	

In 2019 the X-Road core saw the most significant change since the first release of X-Road version 6 in 2015 – the long-awaited REST support. In the context of X-Road, supporting REST means consuming and producing REST-style API's via X-Road. Security Server now provides support for consuming and producing both SOAP and REST services. The REST support implementation also includes support for publishing REST service descriptions via X-Road using OpenAPI 3 specification, and REST versions of meta services to query service descriptions and other meta data.

Other important X-Road improvements and bug fixes that were released in 2019 include:

- support for Ubuntu 18.04 LTS operating system;
- improvements on message time-stamping to guarantee that message log records are always verifiable regardless of the number of processed messages and Security Server's load;
- streamlined onboarding process by enabling automatic approval of registration requests of new member organizations and information systems;
- introduction of the standalone Security Server – a special version of Security Server that is ready for use in minutes without the normal Security Server installation, configuration and registration process;
- better support for running Security Server on cloud platforms;
- support for changing the Security Server owner member after the initial configuration of the Security Server is added;
- publishing of Central Server and Security Server Docker images for development and testing purposes;
- improvements on documentation, and updates on third-party dependencies.

The development of the core components of X-Road version 6 continues in 2020. The most significant changes will be a new user interface and an administrator REST API for Security Server. At the same time, NIIS is actively working with X-Road users and stakeholders on the user-centric design of X-Road 7 "Unicorn", the next generation data exchange layer solution.

X-Road Tech Radar provides up-to-date information on different technologies used in X-Road:

https://nordic-institute.github. io/X-Road-tech-radar/

X-Road®
Design Overview

Geroli Peedu, Chief Design Officer

X-ROAD® 7

The key highlight for 2019 has been the start of X-Road 7 design and planning. In spring, the X-Road 7 visual style approach was defined by introducing the version 7 unicorn logo. In autumn, X-Road 7 user-centred design was kicked off with a co-design workshop in an X-Road Community Event.

- **In 2019 the role of Chief Design Officer was established in NIIS.** In may, Geroli Peedu joined to provide design leadership and strategic direction across the organisation's activities, which includes service design, user experience and visual design.

- **The main principles for NIIS design were defined as:**
  - Design is based on the user-centred approach. Users are involved throughout the design process to solve their challenges.
  - NIIS is following the Double Diamond design process methodology. The service design methods used were qualitative interviews, questionnaires and co-creation workshops.
  - Agile design principles are used for UX/UI design in software development.

- **The design work is happening in two tracks** "Visual Design and Branding" and "Service Design and User Experience".

Visual Design and Branding:

- In spring 2019, the X-Road software version 7 visual style approach was introduced. The version is called Unicorn. Unicorns remain hidden from us, and this is the logic used in version 7 design as well. There are hints of unicorns, like colours and patterns, but the character itself is not visible in official communication.
- Current X-Road marketing materials have been reviewed, and improvements have been made to communicate the X-Road product values more clearly.
- X-Road CVI was updated and trademark symbol ® introduced to the X-Road logo to reduce the misuse of X-Road brand assets.
- Additional X-Road Technology Partner logo was added to the X-Road brand family.
- A unique X-Road Community Event-specific visual style was introduced.
- Preparations were started for the X-Road 7 User Interface (UI), with the style guide & type-pages design to be delivered in March 2020. The aim of the style guide project is to enhance the overall visual appearance and user experience of X-Road 7.

X-Road Community
Event 2019 visuals

Service Design and User Experience:

- X-Road 7 design and planning was kicked-off with a co-design workshop at the X-Road Community Event in Helsinki.
- In autumn, areas for improvement and innovation of X-Road were identified. The preparations for a thorough user research study among stakeholders and target users was initiated. The goal of the "X-Road 7 Feature Study" is to identify the users' needs to provide better services for the X-Road infrastructure.
- The results from the feature study will be used as an input for workshops to find innovative solutions to identify users' needs.

Procurement
Overview

Procurement Overview

A procurement plan sets out the public procurements of NIIS only if they exceed the statutory limit[1]. All the public procurements of NIIS are public and available without charge at the public procurement environment eRHR and the NIIS website.

Planning for NIIS public procurements for 2019 started the year before, and ended with the approval of the NIIS budget for the financial year. In 2019 there were six contracts, with a total value of 1,3M euros. 94% of those funds have been invested in X-Road core software development and 6% in testing. All these activities were undertaken with the reopening of the competition in ongoing framework agreements: 1) "X-Road core development"[2] and 2) "X-Road Core Development Related Testing"[3], and are respectively related to the X-Road core software development and testing.

Procurement Plan of 2019:

Procurement title	Type of the public contract	Type of the procedure	Estimated deadlines	Technical specification	Estimated cost in 2019 (overall contract period)	Contract duration
Core development team (X-Road core development)	Services	The reopening of the competition in the framework agreement	Contract: 01.2019-06.2019	Petteri Kivimäki	349 074 €	6 months
API based UI (X-Road core development)	Services	The reopening of the competition in the framework agreement	Contract: 10.2018-06.2019	Petteri Kivimäki	291 667 € (528 000 €)	7 months
API based UI (X-Road core development)	Services	The reopening of the competition in the framework agreement	Contract: 07.2019-12.2019	Petteri Kivimäki	199 360 €	6 months
Core development team (X-Road core development)	Services	The reopening of the competition in the framework agreement	Contract: 07.2019-12.2019	Petteri Kivimäki	342 592 €	6 months
Testing team (X-Road Core Development Related Testing)	Services	The reopening of the competition in the framework agreement	Contract 01.2019-06.2019	Petteri Kivimäki	67 500 €	6 months
Testing team (X-Road Core Development Related Testing)	Services	The reopening of the competition in the framework agreement	Contract 07.2019-12.2019	Petteri Kivimäki	90 833 €	6 months

After almost two years of experience, we can say that the approach NIIS has used in the resource procurement for X-Road core software development has provided NIIS with a competent and committed team, and there are no difficulties in fulfilling contracts. Also, this has given us the confidence to use a similar approach in future resource procurements.

For next year (2020), NIIS is aiming to move towards sustainable procurement and development models.

[1] Under the Public Procurement Act of Estonia.
[2] https://riigihanked.riik.ee/rhr-web/#/procurement/721591/general-info
[3] https://riigihanked.riik.ee/rhr-web/#/procurement/724779/general-info

Management
Report

Management Report
2019

2019 constituted another successful year for NIIS with activities centered around the technical development of the X-Road, extensive international co-operation, and internal development of the organisation.

The rapid development continued on X-Road in 2019:

- X-Road version 6.20.0 was released in January, which provided support for Ubuntu 18.04 LTS operating system and a number of functional improvements.
- This was followed in February by the release of X-Road version 6.20.1, which provided a fix for a critical security vulnerability – discovered by the NIIS development team – that had existed in the software since the release of X-Road version 6 (2015).
- At the end of April, X-Road version 6.21.0, which provided support for consuming and producing REST services and a number of smaller improvements was released.
- Another release was completed in May when NIIS released X-Road version 6.21.1, which provided a patch for a functional bug introduced in version 6.21.0.
- NIIS released X-Road version 6.22.0 in October, which provided improvements to REST support, better support for cloud platforms and other minor improvements.
- In November, NIIS released X-Road version 6.22.1, which provided a patch for functional bugs introduced in version 6.22.0.

In March NIIS completed a technical proof of concept of the X-Road–eDelivery Gateway – a solution that in the future shall enable data exchange between the X-Road ecosystem and the eDelivery policy domain.

During the spring, NIIS undertook the management and development of the X-Road® brand related to the trademark X-ROAD registered by the Information System Authority of Estonia (RIA) and used under a license by NIIS.

In December a cyber security company, F-Secure, conducted a security assessment of X-Road Security Server. The report stated that NIIS has clearly shown that it has invested in security and the overall security level of the X-Road Security Server is high.

Extensive international co-operation is exemplified by the numerous workshops, seminars, hackatons, and presentations with international colleagues.

The year began with a workshop on X-Road between NIIS and the Agency for Digital Government (DIGG), which is responsible for the governance of digital administration in Sweden. The workshop was also attended by several other Swedish public authorities. At the end of June, the CEO of NIIS participated in a panel discussion on data exchange during Almedalsveckan in Visby, Sweden.

International flagship event for X-Road enthusiasts, the X-Road Community Event, was organised in Helsinki on 6 September. The event brought together 165 participants from 20 countries, representing users, developers, operators of environments or servers, decision-makers and e-governance experts.

In December, the CEO and the CTO of NIIS participated in the Interoperability Academy Winter School in Leuven, Belgium, which was organised jointly by the European Commission and the University of Leuven.

Of the international meetings the following are worth emphasizing: In March, a meeting with the Danish Agency for Digitisation took place in Copenhagen; NIIS established contact with the agency and introduced the status of X-Road development. In June, a meeting took place between NIIS and the Agency for Public Management and eGovernment of Norway (Difi); NIIS established contact with the agency and introduced the status of X-Road development.

NIIS participated and organised hackathons. It participated in the Hack for Sweden event in Stockholm as a partner organisation in April. At the end of May, with the Information System Authority of Estonia (RIA) and the Digital and Population Data Services Agency of Finland (DVV: formerly the Population Registry Centre PRH), NIIS organised a hackathon under Ultrahack Sprint in Finland.

Numerous presentations were given and various exhibitions participated.
- In May the CTO of NIIS gave a presentation on NIIS and X-Road during Forum Pubblica Amministrazione in Rome, Italy. The CEO and the CTO of NIIS also met with a delegation of the French Government CTO.
- The CTO of NIIS gave a presentation on X-Road joint development during the Sharing & Reuse Conference 2019 in June, in Bucharest, Romania.
- NIIS also participated the Offentliga Rummet event in Västerås, Sweden, in June as an exhibitor.
- In September, NIIS participated as an exhibitor in the TechBBQ event in Copenhagen, Denmark. During the event, NIIS organised a workshop on X-Road in collaboration with the Estonian and Finnish embassies.
- In October, NIIS participated as an exhibitor in the eFörvaltningsdagarna (eGovernance Days) event in Stockholm, Sweden.
- At the end of October, members of the NIIS Advisory Group presented NIIS and X-Road to an international audience at the SEMIC 2019 conference in Helsinki, Finland.
- In November, the CEO of NIIS delivered a presentation on X-Road at Kvalitetsmässan (Quality Fair) in Gothenburg, Sweden.

The increased interest of various countries towards the X-Road is exemplified by the partnership agreement that was signed in May between the Faroe Islands and NIIS; both parties aim to deepen their cooperation in the future.

As part of the aim for compatibility of X-Road with the EC developed building blocks, NIIS has been participating in the Informal Cooperation Network for eDelivery meetings since April, with the goal of developing the X-Road–eDelivery Gateway solution.

In May, there was a meeting with IEEE regarding cooperation opportunities in the field of standardisation.

Also, cooperation continued on a national level, e.g. co-operation was initiated with the Tallinn University of Technology (TalTech) by introducing possible research areas to its students since February.

Throughout the year, NIIS participated in discussions regarding X-Road with representatives of several countries. In its international relations, NIIS worked foremost in cooperation with the Ministry of Economic Affairs and Communications of Estonia, the Ministry of Finance of Finland, the Ministry of Finance and Economic Affairs of Iceland, the Information System Authority of Estonia (RIA) and the Digital and Population Data Services Agency of Finland (DVV).

Rapid internal development of the organisation also took place. NIIS started with the recruitment interviews of the Chief Design Officer in February and the newly Geroli Peedu appointed Chief Design Officer started working in May.

At the end of November, the NIIS team underwent change management training with a particular focus on the Prosci® ADKAR framework. The aim is to systematically apply change management in the development and delivery of X-Road version 7 "Unicorn" and other NIIS activities.

Timeline 2019

◆ JANUARY:
- Workshop with Agency for Digital Government (DIGG, Sweden)
- Release of X-Road version 6.20.0

◆ FEBRUARY:
- Initiation of co-operation with Tallinn University of Technology (TalTech)
- Release of X-Road version 6.20.1

◆ MARCH:
- Workshop with the Danish Agency for Digitisation
- Completion of technical proof of concept of the X-Road–eDelivery Gateway

◆ APRIL:
- Participation at the Informal Cooperation Network for eDelivery
- Participatin in the Hack for Sweden hackathon event
- Release of X-Road version 6.21.0

◆ MAY:
- Chief Design Officer started
- Workshop Forum Pubblica Amministrazione, Italy
- Meeting with IEEE regarding standardisation
- Meeting with a French Government CTO delegation
- Signing partnership agreement with the Faroe Islands
- Released of X-Road version 6.21.1

◆ JUNE:
- Meeting with the Agency for Public Management and eGovernment, Norway (Difi)
- Presentation at Sharing & Reuse Conference 2019, Romania
- Participation at the Offentliga Rummet event, Sweden

◆ SEPTEMBER:
- X-Road Community Event, Finland
- Participation in the TechBBQ event, Denmark

◆ OCTOBER:
- Participation at the eFörvaltningsdagarna (eGovernance Days) expo, Sweden
- Release of X-Road version 6.22.0
- Participation at the SEMIC 2019 conference, Finland

◆ NOVEMBER:
- Participation at Kvalitetsmässan (Quality Fair), Sweden
- Released of X-Road version 6.22.1
- Corporate change management training

◆ DECEMBER:
- Participation in the Interoperability Academy Winter School, Belgium
- F-Secure conducting a security assessment of X-Road Security Server

October

v6.22.0

REST support v2

Improved support for cloud platforms (*Security Server*)

*API based UI

Change Security Server Owner

* postponed to 2020

Annual
Report 2019

Statement of financial position
(In Euros)

	31.12.2019	31.12.2018	Note
Assets			
Current assets			
Cash and cash equivalents	2 642 408	2 895 842	
Receivables and prepayments	21 353	53 549	2
Total current assets	**2 663 761**	**2 949 391**	
Non-current assets			
Property, plant and equipment	2 880	3 104	
Total non-current assets	**2 880**	**3 104**	
Total assets	**2 666 641**	**2 952 495**	
Liabilities and net assets			
Liabilities			
Current liabilities			
Payables and prepayments	153 688	267 369	4
Total current liabilities	**153 688**	**267 369**	
Total liabilities	**153 688**	**267 369**	
Net assets			
Accumulated surpluses (deficits) from previous periods	2 685 126	1 758 569	
Surplus (deficit) for the period	-172 173	926 557	
Total net assets	**2 512 953**	**2 685 126**	
Total liabilities and net assets	**2 666 641**	**2 952 495**	

Statement of revenues and expenses
(In Euros)

	2019	2018	Note
Revenue			
Fees received from members	1 877 820	1 859 410	5
Other income	73	138	
Total revenue	**1 877 893**	**1 859 548**	
Expenses			
Other operating expense	-1 701 645	-657 921	6
Employee expense	-346 476	-272 214	7
Depreciation and impairment loss (reversal)	-1 724	-1 724	
Other expenses	-543	-1 319	
Total expenses	**-2 050 388**	**-933 178**	
Surplus (deficit) from operating activities	**-172 495**	**926 370**	
Interest income	322	187	
Net surplus (deficit) for the period	**-172 173**	**926 557**	

Statement of cash flows
(In Euros)

	2019	2018	Note
Cash flows from operating activities			
Surplus (deficit) from operating activities	-172 495	926 370	
Adjustments			
Depreciation and impairment loss (reversal)	1 724	1 724	
Total adjustments	**1 724**	**1 724**	
Adjustments for operating receivables and prepayments	32 196	-51 620	2
Adjustments for operating liabilities and prepayments	-113 681	257 447	4
Interest received	322	187	
Total cash flows from operating activities	**-251 934**	**1 134 108**	
Cash flows from investing activities			
Purchase of property, plant and equipment and intangible assets	-1 500	-3 104	
Total cash flows from investing activities	**-1 500**	**-3 104**	
Total cash flows	**-253 434**	**1 131 004**	
Cash and cash equivalents at beginning of period	2 895 842	1 764 838	
Change in cash and cash equivalents	**-253 434**	**1 131 004**	
Cash and cash equivalents at end of period	2 642 408	2 895 842	

Statement of changes in net assets
(In Euros)

	Accumulated surpluses deficits from previous period	Total net assets
31.12.2017	1 758 569	1 758 569
Net surplus (deficit) for the period	926 557	926 557
31.12.2018	2 685 126	2 685 126
Net surplus (deficit) for the period	-172 173	-172 173
31.12.2019	2 512 953	2 512 953

Notes

Note 1 Receivables and prepayments
(In Euros)

	31.12.2019	Within 12 months	Note
Prepayments	21 353	21 353	
Deferred expenses	16 037	16 037	
Other paid prepayments	5 316	5 316	
Total receivables and prepayments	**21 353**	**21 353**	

	31.12.2018	Within 12 months	Note
Tax prepayments and receivables	26 351	26 351	3
Other receivables	18 410	18 410	
Prepayments	8 788	8 788	
Deferred expenses	8 788	8 788	
Total receivables and prepayments	**53 549**	**53 549**	

Note 2 Tax prepayments and liabilities
(In Euros)

	31.12.2019	31.12.2018	
	Tax liabilities	Tax prepayments	Tax liabilities
Value added tax	15 061	0	33 309
Personal income tax	7 111	0	6 296
Fringe benefit income tax	322	0	0
Social tax	2 800	26 351	912
Contributions to mandatory funded pension	4 377	0	0
Unemployment insurance tax	173	0	0
Other tax prepayments and liabilities	0	0	137
Total tax prepayments and liabilities	**29 844**	**26 351**	**40 654**

Note 3 Payables and prepayments
(In Euros)

	31.12.2019	Within 12 months	Note
Trade payables	98 696	98 696	
Employee payables	25 095	25 095	
Tax payables	29 844	29 844	3
Other payables	53	53	
Total payables and prepayments	**153 688**	**153 688**	

	31.12.2018	Within 12 months	Note
Trade payables	211 151	211 151	
Employee payables	6 481	6 481	
Tax payables	40 654	40 654	3
Other payables	9 083	9 083	
Total payables and prepayments	**267 369**	**267 369**	

Note 4 Fees received from members
(In Euros)

	2019	2018
Fees not intended for specific purposes		
Membership fees Estonia	920 500	920 500
Membership fees Finland	920 500	920 500
Partnership fees	36 820	18 410
Total fees received from members	**1 877 820**	**1 859 410**

Note 5 Miscellaneous operating expenses
(In Euros)

	2019	2018
Leases	40 728	28 418
Travel expense	44 123	19 858
Training expense	15 610	4 769
Purchased services	51 179	61 523
Expenses of the X-Road project develepment	1 272 719	462 067
Expenses of the X-Road project testing	83 324	911
Expenses of the X-Road project other	52 940	29 971
Marketing expenses	98 649	16 224
Other	42 373	34 180
Total miscellaneous operating expenses	**1 701 645**	**657 921**

Note 6 Labor expense
(In Euros)

	2019	2018
Wage and salary expense	279 823	213 815
Social security taxes	66 653	58 399
Total labor expense	**346 476**	**272 214**
Average number of employees in full time equivalent units	4	3

Note 7 Related parties
(In Euros)

Number of members by the end of economic year		
	31.12.2019	**31.12.2018**
Number of juridical person members	2	2

Remuneration and other significant benefits calculated for members of management and highest supervisory body		
	2019	**2018**
Remuneration	116 366	111 012

Corporate
Governance

Administrational Structure

General Meeting (GM)

The highest body of NIIS is the General Meeting of its members, where all members of the association may participate. For clarity, as a non-profit association NIIS doesn't have a supervisory board and the General Meeting consists of representatives of the NIIS members.

Advisory Group (AG)

The Advisory Group is formed for the purpose of supporting the Chief Executive Officer and relaying information and instruction between the operative level and the General Meeting. For clarity, the Advisory Group is not a formal organ of the Institute and has no decision-making power on its own.
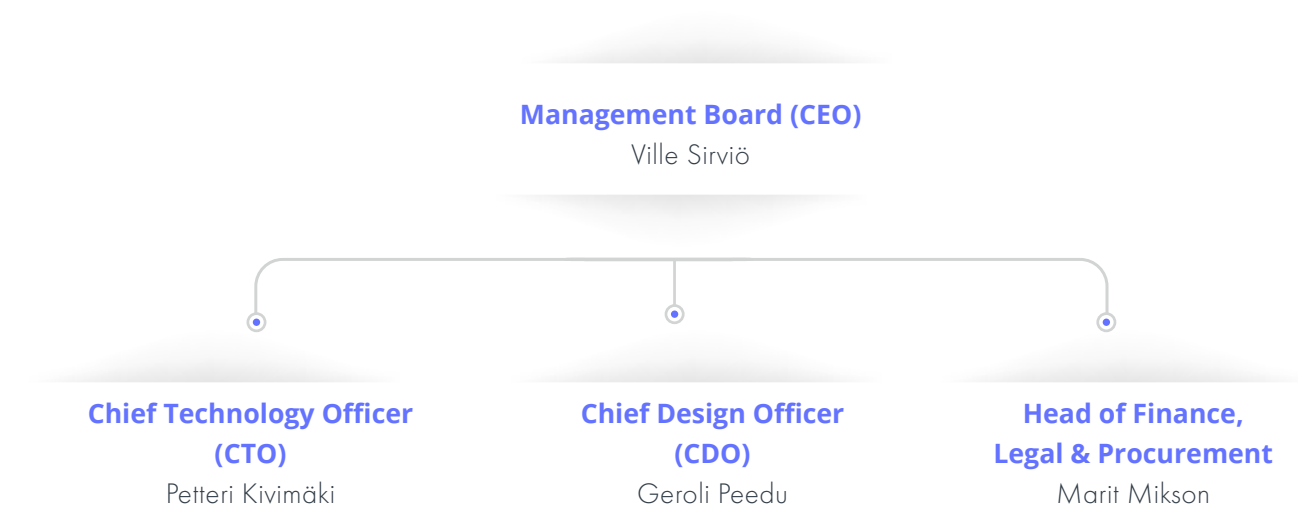
Management Board (CEO)

NIIS is managed and represented by the Management Board. The members have agreed that the Management Board shall comprise a single member who shall act as the Chief Executive Officer of the Institute.

Decision-making

General Meeting

Approve and monitor strategy, budget and action plan;
Approve transactions that are beyond the scope of everyday economic activities.

Advisory Group

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

Management Board (CEO)

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

X-Road Working Group

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

Representatives of the Members:

- Anna-Maija Karjalainen, Director General, Public Sector ICT, Ministry of Finance, Finland;
- Siim Sikkut, Deputy Secretary General for Communications and State Information Systems, Ministry of Economic Affairs and Communications, Estonia.

Management Board (CEO)
Ville Sirviö

Chief Technology Officer (CTO)	**Chief Design Officer (CDO)**	**Head of Finance, Legal & Procurement**
Petteri Kivimäki	Geroli Peedu	Marit Mikson

Representatives of the Members in 2019

- Advisory Group Members in 2018-2019;
- Andrus Kaarelson, Director of Information System, Information System Authority (RIA), Estonia (26.10.2017–31.12.2019);
- deputy member Joonas Heiter, Head of Department, Information System Authority (RIA), Estonia (20.09.2018–);
- Miia Mänd, Head of Department of IT Policy, Ministry of Economic Affairs and Communications (MKM), Estonia (26.10.2017–22.11.2019);
- Atte Pirttilä, Development Manager, Population Register Centre (VRK), Finland (18.9.2018–);
- Katja Väänänen, Senior Specialist, Ministry of Finance, Public Sector ICT, Digitalization, Finland (30.4.2018–);
- Kristo Vaher - Chief Technology Officer, Ministry of Economic Affairs and Communications of Estonia (MKM), Estonia (22.11.2019 -).

MTÜ Nordic Institute for Interoperability Solutions
Beginning of financial year: 01.01.2019
End of the financial year: 31.12.2019
Business name: MTÜ Nordic Institute for Interoperability Solutions
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