Contributing to an open information society

Stichting NLnet   Annual Report 2016

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Content

Introduction

L.S.,

Since the mid-ninetees, the NLnet foundation has been donating funds to hundreds of projects 'for the good of the Internet'. However, although the initial fund was significant, no fund is inexhaustible.

Therefor, since 2014, NLnet is more actively raising funds from third-parties with a similar mission as NLnet ('to promote and sustain the exchange of electronic information'), and with these extra funds increasing and extending the funding capabilities of NLnet.

In these last three years, this resulted in several significant theme-donations from amongst others the Dutch Ministry of Security and Justice, the Dutch Ministry of Economic Affairs, Logius, the Internet Society, the Open Doc Society, the Vietsch Foundation, Nordunet, and various individuals.

This has enabled NLnet to contribute with extra funding to more projects than would have been possible with just our own fund, and for a longer period in time. All projects we support continue to be in the area of promoting and sustaining electronic information exchange, however spread over several themes that put a dedicated focus on area's of concern with respect to the future of the internet.

Prime on this list of concerns is the growing threat of cybercrime, cyberwarfare and privacy breach, which we are trying to help solving with our former 'DNSsec Fund' and our current 'Internet Hardening Fund'.

The latter fund is a new fund that assigns means as donated by the Dutch Ministery of Economic Affairs to encryption-related projects over the next three years. End 2016 the first 8 projects have been selected in this programme.

Moreover, NLnet has started a collaboration with the Vietsch Foundation to assign new means to promote research and development of advanced Internet technology, services, processes for scientific research and higher education, whereby the first two projects started end 2016.

Other area's in our aim to keep the Internet open, free and save are currently covered by our support on open source and standardisation developments as with e.g. 'the ODF Fund' , our 'Arpa2' projects, and with our in-kind support to institutes like Forum Standaardisatie (resulting in 'Internet.nl'), Platform Internetstandaarden, and several AntiDDoS workinggroups.

Additionaly we continued to support the improvement of cybersecurity by our partnerships with non-profit cybersecurity startups (as with 'Radically Open Security'), and by organising cybersecurity events (as with 'Holland Strikes Back').

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Aside from being very active in the various themes and our focus area's, NLnet also continued its cooperation with various other institutes and foundations, to strengthen common goals, and to reduce individual costs on similar efforts.

Amongst others NLnet continued its membership of Digital Infrastructuur NL (DINL) (and sub-project 'Digital Gateway To Europe'), our seat in the dutch 'Onderwijsraad', and our participation in the 'Raad van Advies' at the SIDN Fund.

A special new cooperation has started with the 'Commons Conservancy' project, in which several institutes work together to collectively obtain funding an have NLnet manage the project allocation.

All described activities and all these beautiful funds tend to the conclusion that 2016 was a very successful year in the history of NLnet. Hardly ever before did we both donate to such number of projects while simultaneously raising so many third party funds to help seeding this.

Therefor, even more than before, we are grateful to all individuals, organizations and public institutions that contributed to NLnet with their funds and charity, which is very motivating to continue and expand our efforts on a save, open and free Internet for many coming years.

On behalf of the board,

<center>Marc Gauw,

Chair Governing Board Stichting NLnet</center>

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1.NLnet organisation

History   NLnet's history started in April 1982 with the announcement of a major initiative to develop and provide network services in Europe. The Netherlands Local Unix User Group (NLUUG) played a major role in raising the so-called pan-European "UNIX" Network, EUnet; to support these activities the NLUUG members founded NLnet. NLnet was formally established by the NLUUG as a "stichting" (Dutch for foundation) on February 27, 1989.

Funding source   In November 1994, NLnet Holding BV was formed by the foundation in order to create a commercial base for its internet activities. NLnet Holding BV was the very first commercial Internet access provider in the Netherlands. The sale of NLnet's Internet Service Provider (ISP) activities to UUnet (now part of Verizon) in 1997 provided Stichting NLnet with the means to actively stimulate the development of network technology and to make this freely available to the community in its broadest sense.

More and more funding for NLnet activities comes from external sources. Other commercial and non-for-profit organisations donate to NLnet when they see that the technology being fostered by NLnet is in line with their mission and market development expectations. Stichting NLnet is a recognized charity ('ANBI' Algemeen Nut Beogende Instelling) according to Netherlands legislation[1].

Domicile   NLnet Foundation, together with NLnet Labs, holds offices at Science Park Amsterdam, a technology hotspot with a long history of pioneering in network technology R&D in The Netherlands.

Supervisory Board   In 2016, the Supervisory Board (Raad van Toezicht) of Stichting NLnet consists of:

- Maarten Botterman
- Frank van Rijn
- Hanneke Slager

These positions are non-remunerated positions in accordance with the NLnet Statutes, except for a financial compensation for time spent ('vacatiegeld'). In 2016 the Supervisory Board in its entirety has received a total compensation of € 7650,- .

Governing Board   The Governing Board of Stichting NLnet in 2016 consists of:

- Marc Gauw, chair
- Harm Rietmeijer, treasurer
- Bert Wijnen, secretary (until June 1)
- Simon Hania, secretary (as of June 1)

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1   More information at http://www.anbi.nl

These positions are non-remunerated positions in accordance with the NLnet Statutes, except for financial compensation for time spent ('vacatiegeld'). In 2016, the Governing Board, with the exception of Marc Gauw, received a total compensation of € 10.000,- .

Operations For daily operations the NLnet Bureau was staffed in 2016 with the following people, totaling the staff to 2,6 fte (Full Time Employee), all are remunerate positions:

- Patricia Otter, administrator for Nlnet, NLnet Labs and OpenNetLabs, (0,6 FTE);
- Michiel Leenaars, strategy director (1,0 FTE);
- Marc Gauw, general director (1,0 FTE)

Total actual fte-costs in 2016 for 2,6 fte: € 291.207,-   *)

Total budgeted fte-costs in 2016 for 2,6 fte: € 277.333,-

) = including pension-correction

Operations support For external (financial and legal) advice and consultancy, Stichting NLnet is supported by:

- Koningsbos Accountants (accountancy).
- Milestone-Advocaten (legal advice),

The NLnet website **http://nlnet.nl** is maintained by Mark Overmeer (MARKOV Solutions).

2. Overview

NLnet financially supports open development of information society technologies. NLnet strives to facilitate shock waves of innovation.

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Statutory goal and Mission

The articles of association for the NLnet foundation state: "to promote the exchange of electronic information and all that is related or beneficial to that purpose".

This is done through stimulating new internet and broader network technology research and development, improving existing technology, encourage new applications of existing technology and dissemination of the relevant knowledge.

The last decade an increasing focus is applied on improving cybersecurity on the Internet.

NLnet actively stimulates the development of open network-related technology and makes this technology freely available to the community in its broadest sense. The technology should support and contribute to a better exchange of information.

Free Software, Open Source, Open Content, Open Hardware

With respect to this, a wide range of Internet and technology related projects are permanently being funded for which Open Source licensing conditions (like GNU GPL, BSD license, Open Hardware License, Creative Commons and such) hold. The conditions under which projects happen, matter – NLnet wants projects to reach as far and wide as possible, and to have a broad future that is open to continued development beyond its originators.

Not-for-profit

NLnet does not derive any financial benefits from the undertaken projects or their results.

Any future possible benefits will be used to meet the statutory goals of NLnet.

Co-operation

NLnet maintains a warm relationship with other institutes and foundations:

- Internet Society (ISOC/ISOC.nl)
- SIDN Fund
- Vietsch Foundation
- Digital Infrastructure NL

  (Surfnet, SIDN, DHPA, ISPConnect, NL-ICT, DDA, VVR, AMS-IX, NLnet)
- Digital Gateway To Europe (project-org of DINL)
- The Commons Conservancy
- The Hague Security Delta
- W3C
- Platform Internetstandaarden
- Forum Standaardisatie
- OpenDoc Society
- Open Invention Network (OIN)

Their regular activities, technical conferences, programs and occasional actions are being seen by NLnet as major forums to make its plans public, to encourage cooperation between information technology professionals and to obtain feedback from them.

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Finance In 2016 NLnet sponsored projects, programs and other activities to the sum of € 496.835,- , compared to € 550.000 in budget 2016, excluding loans.

The total expenditure was € 866.790,- , compared to € 945.160,- in budget 2016, excluding loans.

The total loss equals - € 366.790,- , compared to - € 620.160,- in budget 2016, excluding loans.

For 2017 NLnet has allocated € 500.000,- (excluding loans) for financing of projects, programs and other sponsoring.

The total budgeted expenditure in 2017 is forecasted to be € 882.942,- excluding loans.

The total budgeted decrease in capital in 2017 is forecasted to be - € 395.942,- excluding loans.

3. Strategy and working methods

Strategic Themes

NLnet maintained and expanded focus in 2016 on the following areas of attention:

- Standards in real-time communication;
- Open Source and Open Document Format;
- Internet Hardening, DNSsec and Cybersecurity;
- Internet Measurement and System Stability Fund

See for more information: **http://nlnet.nl/themes**

Third parties willing to donate to NLnet may choose to dedicate their donations to one of these themes, or to a new theme, or to NLnet in general.

Donations and Loans

Three types of sponsoring and financing support model underpins the NLnet policy:

1. Project donations - projects in general requiring not more than € 30.000 per project with duration, in general, not exceeding one year. If successful, and require more funding, NLnet may consider consequent finding(s), thus making it NLnet's focus project.

2. One-off donations - sponsoring of conferences, work-shops, hackathons, seminars, contests and financial compensation of travel costs for participants of these events.

3. Loans (temporary) – for projects with a reasonable likelihood that spent funds can be returned to NLnet.

Projects specific

The project proposals, i.e. those with requested budget not exceeding € 30.000 per project and duration not exceeding one year, seemed to be a very powerful instrument intended for new technology reconnaissance, which can potentially lead to break-throughs in some fields.

For more details on projects sponsored in 2016 see Annex 1.

Standalone donations

NLnet may choose to provide standalone donations to organisations and individuals in order to stimulate their activities which are in line with the NLnet mission and philosophy.

With standalone donations NLnet also supports community building in the form of workshops, hackathons, conferences, new foundations, and other events.

More details on these and other activities sponsored by NLnet in 2016 are provided in Annex 1.

Loans

Occasionally applicants maybe in a good position to pay the awarded funds back to NLnet over time. This has the advantage that the funding can be re-used again later for other relevant projects within our mission. NLnet strives to have more projects in this category to avoid our main fund to run out of steam.

Distinctive investment

NLnet derives its yearly budgets from the available capital, the interest gained from banking of (a part of) this capital, from donations, and some revolving activities. The practice has shown, however, that such policy in the long run does not necessarily guarantee sufficient funding strength to continue its donations.

Therefore NLnet decided to experiment with investing a part of our assets in technologies we understand, in people we trust and in concepts we believe will change the world to the better. And to gain money with this which can be used to accomplish the mission of NLnet.

For this purpose since 2012 a few investments were done:

- Appcache Ltd ('5apps') in 2012 (currently 37,5 % equity)

- Rockstart in 2014-2016 (currently convertible loans in GAYR4 BV, GAYR5 BV, and GAYR6 BV)

4. Finances

Stichting NLnet finances its projects and activities from the annual return and interest as received on its invested capital and bank-capital. NLnet also solicits donations from third parties to finance project activities, and co-sponsors projects with other organisations, this under the condition that independence of NLnet in choosing and financing projects is assured, and mission is respected.

Fiscal Status Stichting NLnet does not derive any financial benefits from the supported projects or their results.

Since 1999, Stichting NLnet has had a non-profit tax status (so-called Article 24 status, "Algemeen Nut Beogende Instelling")[2].

In accordance with ever changing legislation NLnet in 2007 obtained and in 2009 confirmed its non-profit tax status (ANBI-regeling) with the Dutch Tax Authority.

Administration Salary administration was contracted to Cent Lonen in Haarlem.

Koningsbos Accountants in Amsterdam has been charged with compiling and auditing Stichting NLnet's Annual Accounts 2016 and have given an unqualified opinion. The accountancy report is a separate document. The figures are incorporated in this annual report.

Cost of activities in 2015 The Actual costs and Revenues of activities in 2016 is summarized below, and compared with Budget 2016, and compared with Actual 2015 and Budget 2017 (excluding loans):

	Budget 2017	Actual 2016	Budget 2016	Actual 2015
Cost of programs and projects	586.352	496.835	550.000	566.867
Cost of staff	270.133	291.207	277.333	278.016
Cost Rental Office	12.485	12.497	12..485	12.383
Office costs	3.640	4.016	3.641	3.909
Advisory costs	25.500	4.637	25.500	10.969
Remuneration Mgt & Supervisory Board	17.650	17.650	17.650	17.650
Miscellaneous costs	29.244	39.827	58.395	16.487
Depreciation of inventory, equipment	156	121	156	121
Total (excl loans)	945.160	866.790	945.160	906.402

Revenue of activities

	Budget 2017	Actual 2016	Budget 2016	Actual 2015
Income and returns (excl loans)	325.000	516.091	325.000	247.775

2   More information on **http://www.anbi.nl/**

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	2016		2015	
	debit	credit	debit	credit
Assets				
Total inventory	221		342	
Participations	104.814		120.905	
Investment funds	541.438		389.424	
Total Investments	**646.473**		**510.671**	
Current assets	40.334		33.390	
Liquid assets	3.108.848		3.619.403	
Total Assets	**3.795.655**		**4.163.464**	
Liabilities				
Capital and Reserves		4.114.446		4.792.019
Result bookyear		-350.699		-675.168
Delta participation		-16.091		-2.405
Total Reserves		**3.747.656**		**4.114.446**
Current liabilities		47.999		49.018
Total Liabilities		**3.795.655**		**4.163.464**
Total Balance	**3.795.655**	**3.795.655**	**4.163.464**	**4.163.464**

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Spread of liquidity

	2016	2015
Bank 1	955.255	1.106.276
Bank 2	2.008.071	2.000.000
Bank 3	133.229	445.657
Bank 4	7.519	67.393
Bank 5	196	77
Bank 6	4.578	-
Total	**3.108.848**	3.619.403

Budget for 2017   The budget for 2017 (excluding loans) as approved by the board, is as follows:

	Budget 2017
Cost of programs and projects	500.000
Cost of organisation including staff	382.942
Depreciation of inventory & equipment	158
Total	883.100

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5. Annex 1: Programs, projects and activities in 2016

Programs in 2016

NLnet Labs NLnet Labs is the Research, Development, and Expertise center for those technologies that turn a network of networks into one Internet. Established by the NLnet Foundation in 1999, NLnet Labs contributes innovative ideas to open source software and open standards. NLnet Labs is an independent not-for-profit (ANBI, Algemeen Nut Beogende Instelling). NLnet Labs activities have lead to these accomplishments: it is recognized for the seminal role in the deployment of DNSSEC through creation of high-quality DNS software and tools, training, 'engineering'. It collaborates with other organisations such as Verisign Labs, ICANN, SIDN and USC/ISI. NLnet Labs is led by Dr. Benno Overeinder . For more information see **www.nlnetlabs.nl**

NLnet Foundation still supports NLnet Labs unsalaried with its administration, and with funding of some projects as being selected via our Open Call procedure.

The Commons Conservancy In 2016 NLnet helped founding [The Commons Conservancy]. This is an initiative to provide a lightweight organisational structure for open project. Its mission is to strive towards a stable democratic and open global information society in which individuals can collectively scrutinise, reconfigure and improve upon any technology they depend on - unleashing and empowering human innovation at the widest possible scale, with the express intention to empower any individual to participate in all facets of social, cultural, economic and private life under conditions of his or her own choosing and with secure and reliable technology they can have full control over themselves. More info on this programme at **http://commonsconservancy.org/**

Incoming project proposals in 2016

Received proposals In 2016 NLnet has received in total 115 project proposals (compared to 54 in 2015), whereof 22 requests were (partially) granted (against 16 in 2015).

Projects supported in 2016

Anansi Anansi is a new open source honeypot framework with advanced analysis and replay capabilities, written from scratch in Go. Stichting [The Common Conservancy] has established a Anansi Programme and all code written during this project will be donated in this Programme. See the progress at the project website (not available yet)

ARPA2 ARPA2 is the ambitious effort by **InternetWide.org** to develop tools to repopulate a decentralised global internet that offers **security** and **privacy** by design. It aims to make the internet live up to its full potential. With **TLS Pool** (part of the SecureHub project) it aims to increase control over TLS security, shielding nomadic users and unpredictable services against even the most common external attacks. With **TLS-KDH** the project is trying to standardise the use of Kerberos combined with Diffie-Hellman, for use over TLS. **SteamWorks** is aimed at providing live configuration across unreliable networks. Earlier the project is co-funded together with the programme "veilig door innovatie" from **NCTV** , currently also by the **Internet Hardening Fund**. See all Arpa2 projects at **project website**.

Implement Cake in CeroWRT

Cake is a mechanism to better queue networking traffic inside networked devices, and offers a built in shaper. The project implements Cake into CeroWrt, the experimental firmware aiming to push forward the state of the art of edge networks and routers. Without advanced queue management, traffic handling can get unpredictable. Cake is the intended successor of the Fq_codel module currently in the Linux mainline kernel. The project is led by Dave Taht and Johathan Morton from Bufferbloat.net, and should help make Cake reach feature-complete status and stabilise its API & ABI. See progress at **project website**.

Deep Firmware Inspection Tool

The Binary Analysis Tool (BAT) makes it easier and cheaper to look inside binary code using a database with information extracted from source code as well as other sources. The Deep Firmware Inspection Tool project extends the capabilities of the Binary Analysis Tool, adding security analysis for firmware to the existing compliance oriented features. There is much overlap between compliance and security issues, and after DFIT the modular Binary Analysis framework will allow to reduce uncertainty about included components for both. BAT is available for free under the Apache license so that everyone can use, study, share and improve it. The project is cofunded with the programme "veilig door innovatie" from **NCTV**. See also the **project website** . The project successfully ended in 2016.

Dowse

Dowse is a smart digital network appliance for home based local area networks (LAN), but also small and medium business offices, that makes it possible to connect objects and people in a friendly, conscious and responsible manner. Dowse provides a central point of soft control for all local traffic: from ARP traffic (layer 2) to TCP/IP (layers 3 and 4) as well as application space, by chaining a firewall setup to a transparent proxy setup. A core feature for Dowse is that of hiding all the complexity of such a setup. Its motto is: "to perceive and affect all devices in the local sphere". See progress at the **project website** .

DIME

DIME is a serious attempt to provide end-to-end encrypted email. Starting from a very strict threat model, it brings some novel ideas on how to improve the concept of email and bring it into the 'age of distrust'. See progress at the **project website** .

GetDNS

Because of the technical complexity of DNSSEC, DANE support has so far been quite complex for developers to work with. The getdns library is a modern asynchronous DNS library for application developers, with an API vetted by application developers. getdns has especially good stub-resolving capabilities, and has been developed alongside and in close co-operation with recent standards for stub resolving; such as DNS over TLS (RFC7858), and acquiring DNSSEC at stub resolving level. One of the key features of getdns is the ability to deliver DNSSEC as a building block in harsh environments. In this project a number of essential components is implemented to this library, and work on mechanisms to make it easy to integrate the library also at a system level. See progress at the **project website** .

Interactive XML / Relax NG

CodeMirror is a very popular code editor for the web. The rnost valuable tool that is missing is the ability to know if the current XML document is valid and show inline error messages. There is no JavaScript implementation of XML Schema validation and only an incornplete one for Relax NG. There is a widely-used library libxml, that can perform validation with XML Schema and Relax NG. See also the project website ????. The project successfully ended in 2016.

luh Support in OpenBSC

The open source OpenBSC project is both used for research purposes as well as in empowering rural communities to set up their own communication networks. The project will add 3G support to OpenBSC to be used with off-the-shelf 3G components, creating the first open 3G stack that would allow anyone to set up their own experimental network. See progress at the **project website**.

Leap-Torbirdy Integration

The project will integrate LEAP usage into the well-regarded plug-in TorBirdy to allow easy to use email integration. The integration with LEAP into TorBirdy will allow a "one-click" install for Thunderbird to provide better anonymity and a working email client for the LEAP project. This will result in the highest-level of anonymity, privacy, and security possible today with e-mail. See progress at **project website**.

Namecoin

Namecoin is a blockchain project that provides a decentralized naming system and trust anchor. The flagship use-case is a decentralized top-level domain (TLD) which is the cornerstone of a domain name system that is resistant to hijacking and censorship. Among other things, this provides a decentralized trust anchor for Public Key Infrastructure that does not require third party trust. See progress at the **project website**

NetAidKit

The NetAidKit is a pocket size, USB powered router that connects everything to everything, designed specifically for non-technical users. The easy to use web interface will allow you to connect the NetAidKit to a wireless or wired network and share that connection with your other devices, such as a phone, laptop or tablet.

Once the NetAidKit is connected to a wireless or wired network, you can make it connect to a Virtual Private Network or the anonymising Tor network at the click of a button. Any devices connected to the NetAidKit will use these extra security features automatically, without needing to configure each of the devices separately. See progress at the **project website**.

NixCloud

The project is integrating the most hygienic TLS architecture available, TLS Pool, into the forward-looking NixOS operating system, in order to make its capabilities available to easily set up secure web services. This project great value for money, and when adopted by the hosting industry could potentially give a huge boost to the usage of modern TLS on the internet - by not just simplifying the whole setup of infrastructure but by also automating it. The project combines the strong points of one of the most innovative OS-es (declarative, reproducible, robust) with the unique security capabilities of TLS Pool from the ARPA2 project. See also the **project website**.

NOMA

The Network Operator Measurement Activity — NOMA — is exploring the possibility of developing operator-driven network health measurements. NOMA aims to establish a platform for collaboration on the initial definition, collection and dissemination of operator network measurements (self-instrumentation), with a goal of ensuring a better, shared understanding of what "good" Internet looks like. This will allow new networks brought online to determine that they are well aligned with that target, and will give operators a better sense of when their networks are healthy or underperforming. See also **project website**. The project successfully ended in 2016.

ODF Testing and ODF Server Additions

ODF Testing and ODF Server Additions are part of an effort to improve the overall coverage of the ODF standard, earlier supported by NLnet in the ODF AutoTesting programme. An extensive test effort is being set up, by development of an open source test server. See also **project website** and **project website**. The projects successfully ended in 2016.

OOCRAN

The project is focused on developing a platform to facilitate sharing wireless physical infrastructure resources (including spectrum) by creating, coordinating and managing the (several) virtual wireless infrastructures of different tenants (service providers) under a "spectrum and infrastructure on demand" policy. The base of the work is the development of a catalog of modular VNFs that can be used to create complete wireless infrastructure, including, base stations, terminals and core network. Furthermore, the project proposes to establish a simple and clear as well as efficient methodology to create new VNFs and build new services (linked VMs) with them. See the progress at **project website**.

Open Source Anti-DDoS Solution

The NaWas initiative (short for "Nationale Wasstraat"), is a collective effort to handle large scale internet attacks on targets in the Netherlands. NaWas is a initiative of ISP organisation NBIP aimed at hosting providers, midsize ISPs and users, providing a collective solution against so called DDoS attacks. NaWas is used to filter out large amounts of fake internet traffic as used by attackers to bring down internet services. The project is aimed at developing additional anti-DDos tools for NaWas. Besides NBIP, the project will help more organisations to adequately shield themselves against DDoS attacks as the software will be made available under a GNU General Public License. See progress at **project website**.

Pitchfork

The PITCHFORK project deals with a simple Cortex-M3 based device for compartmentalizing key material and cryptographic operations in a small and durable USB device in the CPUs flash. It can do post-quantum cryptographic key-exchanges over an embedded radio interface with other PITCHFORKs. And over USB it can send and receive messages using various modern low-level crypto protocols providing different aspects of overall security. See also the **project website** .

Qubes Qubes OS is a security-oriented operating system (OS). Qubes takes an approach called security by compartmentalization, which allows you to compartmentalize the various parts of your digital life into securely isolated compartments called qubes. This approach allows you to keep the different things you do on your computer securely separated from each other in isolated qubes so that one qube getting compromised won't affect the others. See also the **project website**. The project successfully ended in 2016.

RPKI-RTRlib The RTRlib is a real-time capable, open-source (MIT licensed) C library that implements the RPKI router part. Basically, it fetches data from an RPKI cache server and allows for prefix origin validation as well as initial steps of BGP path validation (draft 6810bis). The RTRlib can serve as the backend for BGP daemons and monitoring tools in real-world operations, as well as user guidance. See progress at **project website**.

Searsia Searsia is an open source engine and a protocol, created by academic researchers. Using Searsia you can i) manage and share large collections of independent sources; ii) select for each query the most relevant sources; iii) combine sources in an aggregated search interface. Searsia learns over time what kind of information each source provides. To see it in action check this search engine of the University of Twente that combines the results of about 30 sources, including results from Google's web crawl, from Courses, from News, the Telephone directory, the Timetables, as well as results from social media, such as Facebook, Twitter, Pinterest, and Flickr.

Searsia is co-funded by the **Vietsch Foundation.** See the progress at the **project website**.

SecureShare The **SecureShare** project implements a social messaging service based on the GNUnet peer-to-peer framework offering scalability, extensibility, and end-to-end encrypted communication. The scalability property is achieved through multicast message delivery, while extensibility is made possible by using PSYC (Protocol for SYnchronous Communication), which provides an extensible RPC (Remote Procedure Call) syntax that can evolve over time without having to upgrade the software on all nodes in the network. Another key feature provided by the PSYC layer are stateful multicast channels, which are used to store e.g. user profiles. End-to-end encrypted communication is provided by the mesh service of GNUnet, upon which the multicast channels are built. Pseudonymous users and social places in the system have cryptographical identities identified by their public key, these are mapped to human memorable names using GNS (GNU Name System), where each pseudonym has a zone pointing to its places. See also **project website**. The project successfully ended in 2016.

SERVAL iOS

Serval Project's goal is making mobile phones useful, even when there is no cellular network or internet available. The Serval Project is intended to be useful in disaster and emergency situations anywhere in the world, as well as for people in rural, remote and developing world settings where traditional cellular service may not be available or may be too expensive. The Serval Project's technologies also have obvious application to enabling freedom of speech and communications for people under oppressive regimes.

Serval used to use ad-hoc WiFi on mobile phones to form the mesh network. Traditional focus was on the Android platform, due to the closed nature of other large ecosystems. One such ecosystem (iOS) recently gained an API to allow applications for adhoc communications between devices running iOS. The project tailors the Serval Mesh software to these devices, allowing peer-to-peer mobile telecommunications and internet and bringing mobile mesh communications to the main-stream. See progress at **project website**.

Shadow Internet (Tribler)

Shadow Internet is an alternative communication infrastructure developed by researchers at Technical University Delft that enables people to distribute videos by copying them from phone to phone wirelessly. So even without an Internet connection you can share content. Specifically crafted to be resilient. The project is specifically targeted for recording and spreading of protest videos. The Shadow Internet ensures people no longer are reliant on commercial websites to view and share content with friends. See progress at **project website**.

SnabbWall

SnabbWall is designed as a modular, application-level (Layer-7) firewall suite built on the foundations of the popular open source SDN **Snabb Switch**, allowing it to be used with cheap commodity hardware. It will include a complete firewall program out of the box, and components that can be reused in other software defined networking components. As an application-level firewall, it will be able to inspect network traffic and detect flows of related data, and pinpoint which application has produced a certain data flow. It can subsequently be used to filter (drop, reject, or accept) packets using criteria specified in a set of rules. See progress at **project website**.

Stratosphere IPS

The Stratosphere Project is sophisticated free software Intrusion Prevention System that was researched and partially developed in the CTU University in Czech Republic. It detects and protects users or organizations from the most advanced government-sponsored and botnet-related attacks. The Stratosphere IPS analyzes the behavior of network connections and detects the known malicious patterns. Instead of using anomaly detection techniques or static rules, our technique consists in generating Markov Chain-based models of verified malicious activities that can be later detected in the network. Stratosphere offers a high-level semantic interface to block the traffic. The publication of the Stratosphere software will lower the cost of protection of Internet users against cybercrime and cyberespionage attacks. See progress at the **project website**.

Stubby   DNSSEC as a technology adds cryptographic signatures to DNS traffic, but does not handle the other axis of security: privacy. Any (passive) observer in the network can see the requests going to the DNS server, leaving a trail that can endanger the user. DNS over TLS is a new approach supported by the DNS software vendor communty which gives it a fair chance of succeeding. The approach allows to encrypt the traffic between a trusted (DNSSEC aware) DNS server and the user in the same way. Stubby allows to use this technology when ones provider does not provide it. See progress at the **project website** .

Presentations, contributions and initiatives in 2016

Various Contributions   NLnet and its employees actively participate in various fora and projects regarding the open and free internet, cybersecurity, and the implementation of open standards and open source. A selection of the most prominent contributions:

Participation in various brainstorms and workshops:

- 'Herrijking Vitaal' (Min EZ)
- 'ICANN NL' (Min EZ)
- 'Expertmeeting DANE/StartTLS' (nominated by Nlnet) (Forum Standaardisatie/Min BZK)
- 'High Level Expert group DG Net Futures' (EU)
- 'Global Governance & cyber security', (Uv Leiden/Min Buza)
- 'NFIA/EZ-training Digitale Infrastructuur NL' (Min EZ)
- 'Security in times of surveillance ' (TU/Eindhoven)
- "Internet Futures" (ISOC.nl)
- 'Onderwijsdialoog Eerste Kamer' (Onderwijsraad)
- 'CIO Summit' (IDG)
- CBS-report "De interneteconomie gemeten" (CBS)
- 'InterCommunity Node' Bruxelles
- 'Launch of The Commons Conservancy'
- Brainstorm with respect to Universal Periodic Review (UPR) of UN (Min BZK)
- Session on 'Informatie Beveiligings Dienst'
- Expert meeting Cyber Norms (BuZa)
- Session on Internet Futures ISOC.nl with a.o. Kees Verhoeven
- Final session Gridforum.nl
- Sessions on Encryption project (Min EZ)
- Session with board VNG
- Sessions on DDoS riscs at UT-Twente, and Workshop DDoS Defense Surfnet
- Sessions on 'Secure Exchange / Netport' (MRDH South Holland)
- Sessions on 'Digital Gateway to Europe' (DINL)
- Sessions on 'Platform Internetstandaarden' (various organisations)
- Sessions on 'TNI-DCB' (HSD/NCSC)
- Sessions on 'Global Accelerator 2016' (Rockstart)
- Sessions on 'Radically Open Security'
- Sessions on third edition of Deloitte report on Dutch Digital Infrastructure

Contributing to an open information society

Talks, booths and conferences

Talks :

- Presentation UNESCO PERSIST
- Keynote Electronic Warfare 2016
- Presentation European Legal Conference, Barcelona
- Presentation FSFE Summit Berlin
- Presentation Holland Strikes Back
- Presentation HoneyNed @NCSC

Booths:

- 'Holland Paviljoen' and 'Launchpad' at Hostingcon Europe, Amsterdam

Conferences, organised by NLnet:

- New Year Event 2016
- Holland Strikes Back 2016
- ARPA2 All Hands

Participation in various other conferences and seminars:

- WHD Rust
- NCSC One Conference
- TNC Prague
- EC-conference 'Economic Affairs' (Dutch period chair EC)
- IETF Berlijn
- Endconference Gridforum.nl
- 'Holland Paviljoen' and 'Launchpad' at Hostingcon Europe, Amsterdam
- "Above the Net" (Global NREN CEO Forum)
- Werk maken van Talent
- 12e ODF plugfest in Paris (host: French Government)
- ECP year-event
- Bits Of Freedom 'Big Brother Award'
- UNESCO IPDC/IFAP
- Conference Accessibility
- Congres Min V&J: Binnenstebuiten
- Het grote onderwijsdebat (De Balie)
- DCipher 2016

Other Various trade missions:

- Londen Digital Mission, 13-15 april

Various management board, advisory-board, and workinggroup contributions:

- DINL (Digitale Infrastructuur NL), ISOC-NL, SIDN-Fonds, Onderwijsraad, Accessibility, W3C, Unesco, Platform Internet Standaarden, Digital Gateway To Europe.

Radically Open Security 'Radically Open Security' (ROS) is a company around ethical hacking and security founded in 2014 by dr. Melanie Rieback. ROS will donate at least 90% of its proceeds to NLnet foundation for at least the first five years. In 2016 the company continued to build its portfolio of projects and clients, hauling in big names from telecoms, banking, academia and critical infrastructures. The company takes a principled approach which puts transparency, open source, responsible disclosure and ethics first – which together with its idealistic and non-hierarchical model has attracted a talent pool of ethical hackers. Sofar NLnet provided them with two loans to help them grow more rapidly.

DINL In 2016 NLnet continued its membership of Digital Infrastructure Netherlands. DINL is a group of seven institutes, associations and foundations (SIDN, DHPA, DDA, AMS-IX, ISPConnect, Surfnet, Nederland-ICT, VVR and NLnet) that collectively works on important topics in the dutch Digital Infrastructure: promotion, education, cybersecurity, and laws & policy.

Open Invention Network Since 2014 NLnet has been supporting the Open Invention Network with the recruitment of members. Companies, by being an OIN-member, benefit from the collective legal support to defend themselves against patent offenses. Open Invention Network has made several donations to NLnet in recognition of its contribution to this initiative.

Stichting Accessibility During 2016 NLnet continued to support Stichting Accessibility. The mission of the Accessibility Foundation is to improve the accessibility of internet and other digital media for all people, including the elderly and people with disabilities. The Foundation was established in 2001 and has about 20 people working in their office in Utrecht. Accessibility has always been funded by its founding father: the Bartiméus Institute for the blind in the Netherlands. Since early 2016 Accessibility operates more independent, whereby NLnet provided them a loan to help them with this.

Event sponsoring

Holland Strikes Back On Tuesday October 4nd 2016 NLnet foundation organised the third edition of the conference "Holland Strikes Back", together with its partners of DINL. The event presented the key Netherlands initiatives against cyber attacks with prominent speakers such as Patricia Zorko (NCTV), Brenno De Winter and various experts from the sector