Annual Report 2007

NLnet Labs

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22 August 2008

Colophon

This document was prepared with the OpenOffice and NeoOffice software using the OASIS open document type. The various artwork was created with the aid of Blender 2.45.

Typeface: Helvetica Neue and Gill Sans.

Lectori Salutem

We are happy to present NLnet Labs Annual report 2007. It is intended to present an overview of Labs' various activities to those who support NLnet Labs financially, through grants or support contracts, and for those who have shown a general interest in our activities.

The first half of this document presents an overview of our activities, while the second half presents details about the organizational and financial aspects of the foundation.

NLnet Labs

The Internet's strength is that it allows people to connect and communicate with all others on the Internet without, in theory, the need for special provisions elsewhere than at the end-nodes. This allows people to publish, provide services, to purchase, read, and consume in a global and truly free manner.

The success of the Internet and the success of open source and open standards development are closely related. Open source implementations of the TCP/IP stack, web browsers, scripting languages, popular databases, core infrastructure, popular operating systems, etcetera, have all been at the foundation of the net's success and the net has been a driver for the proliferation of all these tools.

NLnet Labs, founded in 1999 by Stichting NLnet, is a non-profit research and development organization that focuses on developments in Internet technology where bridges between theory and practical deployment need to be built; areas where development, engineering, and standardization takes place. The budget of NLnet Labs is mainly based on a subsidy from Stichting NLnet. Stichting NLnet has provided a long-term commitment in the form of a subsidy contract such that NLnet Labs can guarantee support for the software it produces.

It is our goal to play an active and relevant role in the aforementioned areas through the development of open source software, through the participation in development of open standards, and through the dissemination of knowledge. Within that context NLnet Labs has become a recognized center of expertise in the area of DNS and DNSSEC. Our DNS software has found its way to important components of the Internet infrastructure and we actively contribute in multiple facets of the standards development process. Dissemination of knowledge is done through education and collaboration. In 2007 we started an effort to broaden our expertise to other areas of the core Internet infrastructure by initiating a project on inter-domain routing.

The NLnet Labs offices are located in the Amsterdam Science Park (ASP).

Details of NLnet Labs Activities

In 2007 we initiated a new DNS related project and started to establish a new area of expertise, namely routing and addressing. The following sections provide further detail about the individual activities, which are categorized in four areas of interest. Additionally, we point out how we plan to continue in 2008 and beyond.

Area of Interest: DNS and DNSSEC

DNSSEC Evangineering

NLnet Labs believes that deployment of DNSSEC, being a security extension to one of the protocols that is key to the operation of the Internet, is the most important area where NLnet Labs can make a significant difference. We contribute to global deployment by providing tools and software such as NSD, Unbound, LDNS, and Net::DNS. But we also do so by providing technical information, teaching courses, and

popularizing the technology. The combination of solid engineering combined with spreading the word on the necessity of the technology is what we have come to call 'evangineering'.

Unbound

Unbound is a validating caching resolver implementation with full DNSSEC support. Work started in January 2007, and continued throughout the year to December. The plan incorporated milestones every month (and two two-month milestones: recursive functionality and validation functionality). All the milestones were met on time. This means that by December a fully functional validating caching recursive name server was available; complete with code documentation, manual pages and test suite. The Unbound server has been running as the NLnet Labs workgroup DNS server for months uninterrupted.

The Unbound implementation in C is based on the Unbound Java implementation from Verisign, Nominet (David Blacka wrote the Java code). Basically, the modular, clean design was used and some parts of the state machine were used as well. The validator state machine was changed considerably for CNAME processing without recursion. The recursion state machine was first copied, then changed to accommodate corner cases.

The C implementation adds proper resource handling of file descriptors and memory; memory usage can be strictly controlled by the operator. Also, the C code was written with performance in mind. This means the same lean and mean attitude from NSD, but since this is a resolver, many more features are necessary. The Java code only works single threaded, but the C code works threaded and can also fork (like NSD does) to use multiple CPUs. The C code, like Java, supports NSEC3 while some validation corner cases were addressed during the development of the C code.

Unbound uses the LDNS library for parsing text to resource records. It also uses the LDNS library for decoding DNSKEY RRs into openssl structures. This is a very limited use of the functionality that LDNS provides, however, parsing DNS Resource Record syntax is thousands of lines of code. Unbound does not use other functionality from LDNS because of performance reasons. This is a design choice, LDNS was written for general purpose tools, and thus mallocs and frees internally to support that goal, where Unbound is written for performance. LDNS is used extensively in the Unbound test code, for example for comparing decoded and encoded DNS packets.

The Unbound test suite has a unique setup called testbound, apart from unit tests and tests using tpkg like NSD and LDNS have. Testbound is a unique feature in that it allows a simulation of network interactions to Unbound. It is implemented with linker replacements for the Unbound network callback code. In testbound, queries from users and replies from authoritative servers can be scripted and checked, without starting actual servers and clients. By starting work on Unbound with this design goal in mind, the interface and linking could be kept clean enough to create testbound. Testbound greatly helped to quickly test the recursion, cache, and validation features.

Throughout the work on Unbound there was interaction with the project members from Nominet, Verisign, and Kirei. Through mailinglists and teleconferences the partners were kept abreast of the developments and participated in architectural discussion.

Unbound was presented at the Internetdagarna in Sweden, 6 November 2007, as work in progress in a talk about name server alternatives during the DNS security session.

Unbound is available at the dedicated website http://unbound.net, hosted and maintained by NLnet Labs.

NSD

The NLnet Labs Name Server Daemon (NSD) is an authoritative RFC compliant DNS name server. It was first conceived to allow for more genetic diversity for DNS server implementations used by the root-server system and it has been developed for operations in environments where speed, reliability, stability, and security are of high importance. NSD is currently used on some root servers such as the *L* and *K* root-servers and is also in use by several top-level domain registries such as .DE, .BR, and .UK.

We believe that having DNSSEC-enabled software available for embedding in products will help in the on-take of DNSSEC deployment. Therefore we have released NSD under a BSD-style open source license. NSD has been selected as the engine for the Secure 64™ DNS appliance[1].

In 2007 NSD saw one patch release in the 2.3 branch, and 4 patch releases in the 3.0 branch. Most of the changes were bug fixes. We also implemented the NSEC3 protocol elements in experimental NSD code and tracked the developments in the draft NSEC3 specification as they occurred. NSD was ready to be released with the NSEC3 protocol specifications enabled as soon as those specifications were stable.

On popular request we also created a tool to estimate NSD's memory usage. This tool is publicly available from the NSD project page on the NLnet Labs website.

NLnet Labs commits to long term support of NSD. Not only will it announce the termination of support two years in advance, it also offers support contracts in 3 varieties.

LDNS

LDNS is a C library aimed to simplify DNS programming. It allows developers to easily create software conforming to current RFCs and Internet Drafts.

LDNS saw one minor release in 2007 (1.2). After this release, work was started on some big changes, mainly in the DNSSEC code, to provide for the needs of our users. The API is more flexible and support for Hardware Security Modules has been added. The results of these activities will be incorporated in the next set of releases. As mentioned above LDNS is now a necessary prerequisite for compiling Unbound.

LDNS has been used by Nominet during the development of DNSSEC signing tools.

LDNS is released under a BSD-style license.

Net:DNS and Net::DNS::SEC

The maintenance responsibility for the Perl libraries Net::DNS and Net::DNS::SEC is a task that NLnet Labs started in 2005. In 2007 Net::DNS saw three and Net::DNS::SEC saw no maintenance releases. Net::DNS and Net::DNS::SEC are published through CPAN and via the www.net-dns.org website.

DNSSEC Courses

In collaboration with Alain Anain, and on invitation by MYNIC Berhad, the Malaysian TLD registry, Kolkman taught a 3 days course in Kuala Lumpur.

DNSSEC Howto

The DNSSEC Howto document is maintained at NLnet Labs. In 2007 the DNSSEC Howto saw minor updates and was used extensively in the DNSSEC courses mentioned above. The howto can be downloaded from the NLnet Labs website at http://www.nlnetlabs.nl/dnssec_howto/

DNS Threat Analysis

NLnet Labs performed a study that resulted in an inventory of the threats surrounding key Domain Name System infrastructure such as top level domains. The study suggests system requirements for preventing these threats and present a few tools that can assist in prevention. The approach taken for this project was a desk study with a focus on architecture. NLnet Labs does not operate a large scale DNS service itself, therefore there is less focus on operational aspects. While the study was commissioned by .SE, the Swedish top level domain registry, its conclusions are relevant for all parties involved in operating DNS infrastructure. The study was commissioned in 2006 and finalized and published via our website [2] in 2007.

OARC

As of January 2007, NLnet Labs is a member of OARC, the DNS Operations, Analysis, and Research Center.

Area of Interest: Routing and Addressing

Inter-domain Routing

The inter-domain routing project started in June 2007. During the IAB Workshop on Routing and Addressing in October 2006, a number of problems were identified. Most prominently, the scalability of the routing system and the overloading of IP address semantics are mentioned as serious contenders inhibiting the future growth of the Internet, in size and in amount of traffic.

The first activities were directed both towards getting on par with the current state-of-the-art in the inter-domain routing area (currently the Border Gateway Protocol), and obtaining an overview of current important directions in the Routing Research Group (RRG). In the following months, after visiting the IETF-69 and the relevant working groups, more specific interests in inter-domain routing were defined.

The challenges that deal with the current inter-domain infrastructure, are the improvement of the Border Gateway Protocol (BGP) to increase route convergence and system stability. The relative simple operational rules of the BGP protocol have been observed to expose unexpected and complex dynamic behavior. To understand this complex behavior of the BGP protocol, the basic mechanisms driving the protocol must be studied. To this end, available collected BGP data from RouteViews and RIPE NCC Routing Information System (RIS) have been analyzed, and an initiative to collaborate with RIPE NCC Research Group has been undertaken. Other collaboration on analysis of BGP data is with Lixia Zhang (UCLA) and their work on inferring the origin of routing changes using link weights.

Next to the BGP analysis, NLnet Labs started with modeling and simulation inter-domain routing on full-scale Internet topologies. Current state-of-the-art models and simulations are either very detailed but limited to an order of ten BGP speaker (or daemons) (e.g., BGP++), or do not model the dynamics of the BGP protocol and are limited in the number of prefixes (e.g., C-BGP). Our aim is to model and simulate the BGP protocol on a higher-level of abstraction, allowing for scaling the simulation model to tens of thousands autonomous systems (ASes) and hundreds of thousands of prefixes.

Together with the Vrije Universiteit Amsterdam (Maarten van Steen and Guillaume Pierre), NLnet Labs supports a MSc. project and a student to collaborate on this topic. Researchers/engineers from the IETF community have shown interest in this project.

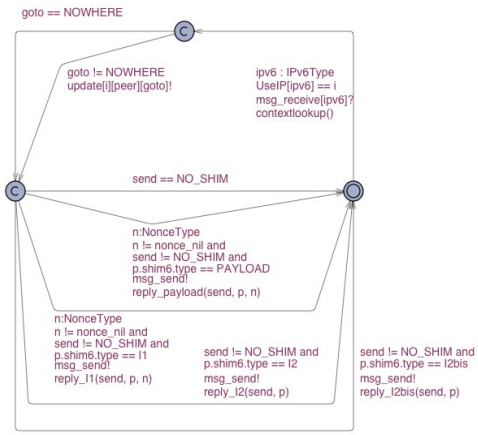
For developments incurring future changes in the inter-domain routing, the Routing Research Group (RRG) is closely monitored. During the last two IETF meetings (IETF-69 and IETF-70), we have attended the RRG sessions and made contact with other participants working on solutions dealing with the overloading of IP address semantics, also known as locator-identifier split. The most prominent proposals in the RRG, as of the end of 2007, are LISP (from Cisco) and Six/One (from Ericsson). We are in contact with both groups for early deployment and usability tests, which will take place in 2008.

Shim6

The Shim6 protocol specifies a layer 3 shim approach and protocol for providing locator agility below the transport protocols, so that multihoming can be provided for IPv6 with fail-over and load spreading properties, without assuming that a multihomed site will have a provider independent IPv6 address prefix which is announced in the global IPv6 routing table. The hosts in a site which has multiple provider allocated IPv6 address prefixes, will use the Shim6 protocol specified in this document to setup state with peer hosts, so that the state can later be used to fail-over to a different locator pair, should the original one stop working[3].

Under the mentorship of Wijngaards, Mekking started to work on formal analysis of the Shim6 protocol, including the REAP protocol[4], using the UPPAAL verification tool[5]. The UPPAAL syntax is sufficiently expressive for the description of network protocol specifications, and has been used in many other case studies. Furthermore, a patch to parse Shim6 packets was implemented for Wireshark[6] and a Shim6 beta implementation[7] was tested for draft compliance.

State diagram from Mekking's Thesis



The results are presented in a thesis (see publications), which revealed several errors that were not spotted before, and that were difficult to derive from the draft specification.

Area of Interest: IPv6

IPv6 Evangineering

NLnet Labs position is that the deployment of IPv6 is key to the preservation of an Internet that remains open for innovation, new consumers, and new market parties. Since its establishment in 1999 NLnet Labs

has a strong interest in IPv6 and has delivered all of its software, and services with IPv6 supported/enabled. The work on addressing and routing has a strong relation to this area of interest.

While IPv6 has been deeply integrated in our operations, development, and thinking, we have contributed practically to IPv6 deployment by participating in tests to add IPv6 glue to the root-zone (see below) and other operational aspects[8][9], by presenting on "*the completion of the IANA IPv4 registry*", and the need for IPv6 deployment and by participation in the Dutch IPv6 task-force[10].

IPv6 Root experiment

To help ICANN/IANA to determine the effects of adding IPv6 addresses to the root zones, NLnet Labs participated in an experiment to provided a server for an alternative "hints file". The full description of the experiment can be found on the ICANN site[11].

Area of Interest: Standards Development, Internet Governance and technical advisories.

NLnet Labs staff is actively involved in the Internet Standards Development through involvement in the IETF.

Kolkman was appointed chair of the Internet Architecture Board in March 2007 and was active as co-chair of IETF's DNS extensions (DNSEXT) working group until the same month. Furthermore, NLnet Labs staff has actively participated or tracking the work in the DNSOP, ENUM, SHIM6, and GROW working groups, and the Routing Research Group both in email discussions and during meetings. NLnet Labs staff is also participating in the RIPE meetings.

During 2007, Akkerhuis contributed as a paid consultant to ICANN, for 5 days per month. As part of this role he is a member of the ISO 3166 Maintenance Agency " ISO's focal point for country codes.

Akkerhuis and Kolkman continued to participate in the DNSSEC deployment group that is 'hosted' by Shinkuro and funded by the US Department of Homeland Security. That group strives to coordinate global DNSSEC deployment efforts.

Kolkman participated in the public consultation for ENUM deployment in the Netherlands.

Both Kolkman and Akkerhuis are active in the area between technology and policy development: Both participated in the round table meetings organized by RIPE NCC and Kolkman participated in a forum organized by RAND Europe for the Dutch Ministry of Economic affairs that served as the basis of a discussion paper [14] for the preparation of the OECD ministerial meeting in 2008.

Akkerhuis is a member of ICANN's security and stability advisory committee SSAC[12]. Until August 2007, he was also a member of the ENISA Permanent Stakeholders' Group (PSG)[13].

Near and medium term future

NLnet Labs will continue with a focus on DNS related activities. There is a commitment with respect to the support of NSD and Unbound; we commit to announcing end of support at least two years in advance. This allows for users of our software to have some confidence in business continuity, and thus contributes to the acceptance and dissemination of the technology

In addition to our DNS work we try to diversify our research and development interest as mentioned above. We have made a start with the extension of our operations by entering into the Routing and Addressing area in the past year. We expect it will take a while before we have gained sufficient expertise and experience before we can contribute in a way that is widely recognized as useful. While we are expanding in this area, we initially focus on comparison of various proposals for identifier-locator splits and on realistic modeling of BGP inter-domain routing.

The long term strategy for NLnet Labs is to continue finding pragmatic approaches to bridge between theory and practical deployment in the area of Internet protocols.

The specialism and expertise of the persons in our team are a large factor in identifying new areas of work. Occasionally we allow (pilot) projects to drift outside of the current areas of interest. An example of such a pilot project is called “Oceanos”. This project aims to provide scalable high performance real-time services using modest server capacity by having a loose tree of peers that share real-time and static data. This can enable small businesses to provide virtual world services using a small server to a large audience. Or enable home users to run a massive user-base service from home.

NLnet Labs organization and finance

Board

Stichting NLnet Labs was founded on December 28, 1999 by Stichting NLnet. Its Board consists of three to five members with staggered terms. In 2007, the board had the following members: Frances Brazier (secretary), Wytze van der Raay (treasurer), and Leo Willems (chair and member as of January 31, 2007).

5 Board meetings took place in the year 2007: February 1, April 5, June 26, September 4, and October 31. All meetings took place in Amsterdam.

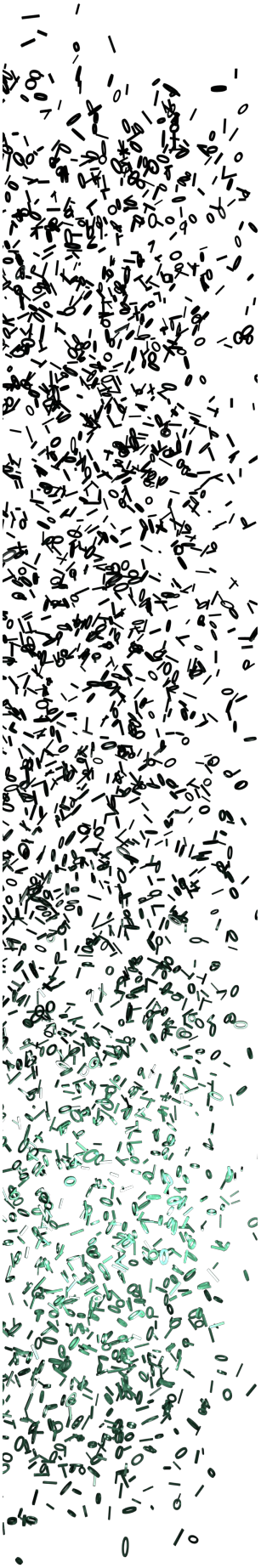
Olaf Kolkman and Ted Lindgreen participated in the board meetings in their roles of Director of NLnet Labs and advisor to NLnet respectively.

An active search for expansion and refreshment of the board was started in the second half of 2007. This has resulted in appointing Simon Hania (Technical Director XS4ALL Internet BV) and Ted Lindgreen (former director Stichting NLnet Labs) as new board members in January 2008. The board's composition and rotation schedule is shown in the table.

name	**end of term**
Frances Brazier	December 28, 2008
Ted Lindgreen	January 31, 2009
Leo Willems	February 1, 2010
Wytze van der Raay	December 28, 2010
Simon Hania	January 31, 2011

Relation to NLnet

During 2006 a reorganization of the NLnet Foundation was started after a recommendation by its advisory board. In order to achieve a more transparent relation between the NLnet foundation and NLnet Labs, it was decided that NLnet board members or employees and people dependent on NLnet funding should not serve anymore in the board of NLnet Labs.



The preparatory work related to this restructuring took place in 2006 and was completed in 2007 through the following two actions:

The formal dependencies in the bylaws of NLnet Labs, such as control of NLnet over changes to the bylaws, were removed. These new bylaws have been effectuated on March 22, 2007. To formalize the long term commitment of NLnet towards NLnet labs, the financial relation has been codified in a subsidy contract with a 5 year notice period. This allows NLnet Labs to commit to long term efforts and support. The contract was finalized and signed in April 2007.

Staff

NLnet Labs employed seven people in 2007: Jelte Jansen, Jaap Akkerhuis, Olaf Kolkman (director), Wouter Wijngaards, Benno Overeinder (as of April 1, 2007) Mark Santcroos (until 31 November 2007). Matthijs Mekking who started his internship on Shim6 in 2006 and finished acquired his masters degree (with honors) based on his work in the summer of 2007 started to work for NLnet Labs 1 November 2007.

The director of Stichting NLnet Labs is responsible for the daily management of all activities of the Open Source network software development laboratory, including development of strategies and plans for new activities.

Finances

Stichting NLnet Labs primarily finances its projects and activities from grants obtained from its parent organization Stichting NLnet. The long term financial commitment of NLnet towards NLnet labs has been codified in a subsidy contract with a five year notice period. This allows NLnet Labs to commit to long term efforts and support.

In addition, income may be obtained by providing Open Source Internet based consultancy and/or programming services to third parties.

Consultancy contracts with .SE, the Swedish top-level domain registry, and ICANN, the Internet Corporation For Assigned Names and Numbers, and a number of NSD support contracts were sources of additional income in 2007 in the latter category.

Fiscal Status

After modification of the bylaws in March 2007, NLnet Labs requested to reconfirm its classification by the Dutch tax authorities as an entity with general benefit objectives within the meaning of the "*Successiewet 1956*" (article 24 sub 4). This reconfirmation was received 1 May 2007.

On 20 September 2007, NLnet Labs has been recognized as a institution with general benefit objectives, "*Algemeen Nut Beogende Instelling (ANBI)".* This status becomes relevant under new regulations that are effective as of January 1, 2008.

Belastingdienst

Wat zijn de fiscale voordelen voor een ANBI?

Een ANBI hoeft geen successierecht of schenkingsrecht te betalen over erfenissen en schenkingen die de ANBI ontvangt in het kader van het algemeen belang.

Uitkeringen die een ANBI doet in het algemene belang zijn vrijgesteld voor het recht van schenking.

Als een instelling door de Belastingdienst is aangewezen als een ANBI, kan een donateur giften van de inkomsten- of vennootschapsbelasting aftrekken (uiteraard binnen de daarvoor geldende regel

(bron: website belastingdienst)

Thanks to its status as a an institution with general benefit objectives. Stichting NLnet Labs can receive grants from Stichting NLnet (and others) without considerable tax consequences.

Because Stichting NLnet Labs may provide consultancy and/or development services based on its Open Source and Internet expertise, to commercial third parties, it is also registered as a Value Added Tax-liable entity, since March 15, 2000.

Based on its non-profit status, Stichting NLnet Labs does not expect to become subject to company tax (“*vennootschapsbelasting”)*.

Since Stichting NLnet Labs employs staff, it has been registered for Social Security insurances with UWV, in the sector commercial services II (BV 25).

Administration

The books of Stichting NLnet Labs are kept by Patricia Otter of NLnet. We are grateful for this contribution in kind from NLnet.

The salary administration has been contracted out to the Financial Management Solutions group of PricewaterhouseCoopers in Rotterdam. This group also prepares the salary tax form submissions.

PricewaterhouseCoopers Accountants has been charged with compiling and auditing Stichting NLnet Labs' Annual Accounts 2007.

The accountancy report is a separate document with this Annual Report.

Income in 2007

At the end of 2006, a budget was drawn up for the expected staffing level and activities of NLnet Labs during the year 2007, with a total of **€**536.748

Based on this budget and the expected consultancy income, a grant was requested from Stichting NLnet for **€**441.000 during 2007. Stichting NLnet allocated these funds for 2007, to be received by NLnet Labs on a quarterly basis, **€**110.250 per quarter. Due to vacancies, the subsidy requested for the fourth quarter was reduced by **€**47.750.

2007 Income

	2006 actual	2007 actual
Donations General	345.000	393.250
Consultancy Income	52.200	57.000
NSD Support	7.292	56.771
Interest Income	3.538	3.295
Total	408.030	510.316

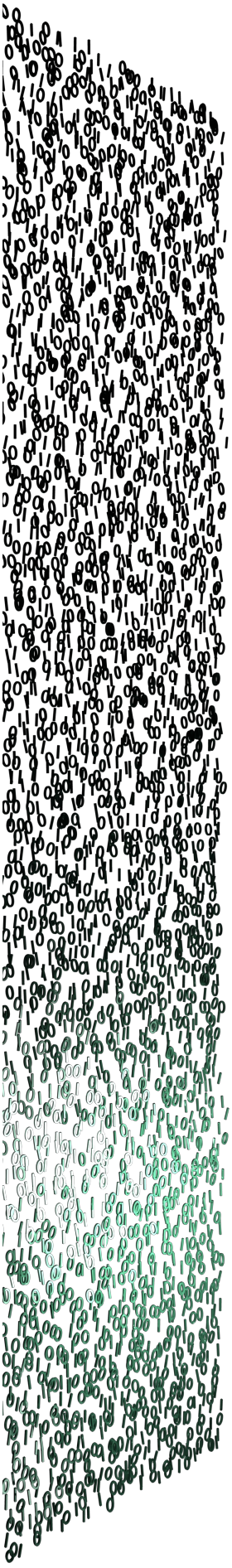
The net result of that is that Stichting NLnet Labs received a total of **€**393.250 from Stichting NLnet during 2007.

The consultancy contract with ICANN from April 2005 was continued in 2007. In addition to that contract NLnet Labs provided advisories to .SE the Swedish top level domain registry. Besides, NLnet Labs offers support contracts for NSD. The total income from consultancy and NSD support in 2007 came to **€**113.771

The only other significant source of income during 2007 was interest derived from a savings account used to deposit funds temporarily. This amounted to **€**3.300

Expenditure in 2007

The major expenditure categories of NLnet Labs in 2007 are staff, travel, and housing. Over 2007 NLnet Labs had a positive result of **€**462



As a result, the financial reserve at the start of 2008 is €65.077

Budget for 2008

The 2008 budget is higher than the realization for 2007, primary because NLnet Labs will be fully staffed for 2008.

In addition to interest, NLnet Labs expects to receive about €48.000 from consulting activities, and €60.000 from NSD support contracts. Therefore the projected deficit for 2008 comes down to €435.000. A request for four quarterly grants of €108.750, thus for a total of €435.000 in 2008, has been submitted to Stichting NLnet.

Stichting NLnet has approved these grants on 9 February 2008.

2007 Expenditure

	2006 actual	2007 actual
Staff	289.518	389.968
Housing	25.582	35.606
Travel	45.017	51.002
Depreciation	4.371	5.601
Other costs	17.464	18.387
Correction VAT	32.865	9.291
Total	414.816	509.855

2008 Budget

	2007 actual	2008 budget
Staff	389.968	416.280
Housing	35.606	36.420
Travel	51.002	49.200
Depreciation	5.601	7.200
Other costs	27.678	36.900
Total	509.855	546.000

Publications, Presentations, and Reports

Publications

B.J. Overeinder , M.A. Oey, R.J. Timmer, R. van Schouwen, E. Rozendaal, and F.M.T. Brazier: ***Design of a Secure and Decentralized Location Service for Agent Platforms***, in Proceedings of the 6th International Workshop on Agents and Peer-to-Peer Computing, May 2007,http://www.nlnetlabs.nl/downloads/ap2pc07.pdf.

Matthijs Mekking: ***Formalization and Verification of the Shim6 Protocol*****,** Master Thesis Radboud University Nijmegen, May 2007, http://www.nlnetlabs.nl/downloads/fvShim6thesis.pdf

Olaf Kolkman, ***NLnet Labs Annual report 2006***, May 2007, http://www.nlnetlabs.nl/annualreports/annualreport2006.pdf.

Mark Santcroos and Olaf Kolkman: ***DNS Threat Analysis****,* May 2007, NLnet Labs technical Report, http://www.nlnetlabs.nl/downloads/se-consult.pdf.

Matthijs Mekking, Wouter Wijngaards, Frits Vaandrager, and Theo Schouten: ***Formalizing Shim6,*** poster at Verifocation and Validation of Software Systems, March 23, 2007. Eindhoven, http://www.nlnetlabs.nl/downloads/fvShim6poster.pdf.

Presentations and meetings participation

31 January - 1 February, Akkerhuis participated in the 7th ENISA PSG meeting, München DE;

12 February, Akkerhuis participated in the RIPE Roundtable Meeting in Schiphol NL;

15 March, Kolkman presented “DNSSEC and Enum”, a presentation at the ISOC.NL SIP event;

18-23 March, Akkerhuis and Kolkman participated in the IETF 68 meeting in Prague, Czech Republic;

4 April, Akkerhuis participated in a Workshop of SAFE-NL at the Vrije Universiteit, Amsterdam NL;

26 April, Akkerhuis participated in the 8th ENISA PSG meeting, Heraklion GR;

7-11 May, Akkerhuis, Jansen, Kolkman, and Santcroos participated in the RIPE 54 meeting in Tallinn, Estonia;

23 May, Akkerhuis at ICT Delta, Utrecht NL;

1 June, Akkerhuis participated in a consultation of OPTA about Internet Security, The Hague NL;

18 June, Akkerhuis participated in a EC meeting on critical infrastructure, Brussels BE;

22-27 July, Akkerhuis, Overeinder, and Kolkman, participated in IETF 69 in Chicago, IL, USA;

9-15 September, Akkerhuis participated at the Russian network conference in Moscow RU, representing ICANN and presented a talk about ENUM and DNSSEC;

14 September, Kolkman presented “09-June-2010, about the availability of IPv4 addresses and the deployment of IPv6” at the IP management day in Utrecht.

17 September, Akkerhuis en Kolkman participated in the RIPE Roundtable Meeting in Schiphol NL;

23-29 September, Akkerhuis planned to teach on a course for TLD Management In Kazakhstan organized by ISOC which was cancelled at the last moment;

4-6 October, Kolkman participated in the ISOC retreat on “Trust and the Inter*net*” in Toronto, Canada;

17-18 October, Kolkman participated in seminars organized by RAND Europe to prepare a discussion paper[14] in preparation for the OECD Future conference in Seoul 2008;

22-26 October, Akkerhuis, Jansen, Kolkman, Overeinder, and Wijngaards participated in the RIPE 55 meeting in Amsterdam;

19 November, Kolkman presented a keynote on “The IETF Standards Process and DNSSEC” at MENOG 2 in Doha, Qatar [15];

2-7 December, Akkerhuis, Kolkman, and Overeinder, participated in IETF 70 in Vancouver, Canada;

Bibliography

1: , Secure 64 DNS Datasheet, http://secure64.com/docs/Secure64_DNS_datasheet_rel_2_3.pdf
2: Mark Santcroos and Olaf Kolkman, DNS Threat Analysis, http://www.nlnetlabs.nl/downloads/se-consult.pdf
3: E. Nordmark, M. Bagnulo, {Level 3 multihoming shim protocol, http://tools.ietf.org/html/draft-ietf-shim6-proto-07
4: J. Arkko, I. van Beijnum, Failure Detection and Locator Pair Exploration Protocol for IPv6 Multihoming, http://tools.ietf.org/html/draft-ietf-shim6-failure-detection-07
5: Department of Information Technology at Uppsala University, Department of Computer Science at Aalborg University , UPPAAL home, http://www.uppaal.com/
6: Wireshark: The World's Most Popular Network Protocol Analyzer,http://www.wireshark.org
7: LinShim6,http://inl.info.ucl.ac.be/LinShim6/
8: SSAC, Testing Recursive Name Servers for IPv6 and EDNS0 Support , 2007
9: SSAC, Survey of IPv6 Support Among Commercial Firewalls, 2007
10: Peter van Eijk, IPv6: inventarisatie praktische implementaties en testcases bij bedrijven, http://www.ipv6-taskforce.nl/IPv6%20implementaties.htm
11: SSAC, Accommodating IP Version 6 Address Resource Records for the Root of the Domain Name System, 2007
12: ICANN, Security and Stability Advisory Committee (SSAC), http://www.icann.org/committees/security/
13: EU, European Network and Infromation Security Agency, http://www.enisa.europa.eu/
14: Constantein van Oranje, Joachim Krapels, Maarten Botterman, and Jonathan Cave, The Future of the Internet Economy; a Discussion Paper on Critical Issues, 2007
15: Kolkman, The IETF Standards Process and DNSSEC, 19 November 2007

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