annualreport2002

RIPE NETWORK COORDINATION CENTRE

Ripe
NCC

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The RIPE NCC Annual Report 2002 can also be found at:
http://www.ripe.net/annual-report

1. Foreword

Kees Neggers
Executive Board Chair

2002 marks the tenth anniversary of the RIPE NCC and the fifth year of its existence as a legal entity. This presents an excellent moment for reflection.

Let us begin by reminding ourselves that the RIPE NCC was assembled from scratch and has grown over the years through the dedication and professionalism of its staff and the support and guidance from its members. The Internet community at large owes a big thanks to all those involved.

It is also good to note that after having suffered some growing pains in previous years, the quality of the RIPE NCC service provision showed measurable improvement over 2002 and is back on track again.

However, 2002 did not just bring good news. The downturn of the telecommunications industry did not pass by unnoticed. The RIPE NCC suffered an operational loss of more than two million euros. Due to the healthy financial position built in the past years, this will not immediately endanger the financial stability of the RIPE NCC. It does, however, give us a warning that the RIPE NCC operates in a dynamic environment where constant evolution is necessary to stay alive.

To collect some concrete input to this evolutionary process the RIPE NCC commissioned KPMG Consulting to conduct an independent member and stakeholder survey during the second half of 2002. Based on the results of this survey and in close interaction with the members and stakeholders, the RIPE NCC Executive Board and management will work in 2003 on concrete proposals to further improve the operational quality and organisational structure of the RIPE NCC.

I would like to use this opportunity to welcome LACNIC as an officially recognised Regional Internet Registry (RIR) for the Latin American and Caribbean region. Another notable event was the ICANN evaluation and reform process started by ICANN early in 2002. The RIRs have worked closely together to participate in this process. This has resulted in a much better understanding of each other's positions at the end of the year. Hopefully the negotiations between ICANN and the RIRs can finally be concluded in 2003 to the satisfaction of all parties.

Kees Neggers
Executive Board Chair

2. Summary 2002

The year 2002 has focused around continued improvement to the core services of the RIPE NCC, the realisation of the changes in the global market, and intense dialogue with external partners in the Internet industry.

The Internet Corporation for Assigned Names and Numbers (ICANN) reform issue was centre stage at the beginning of the year. In February, ICANN's CEO, Stuart Lynn, introduced a reform proposal with the statement that ICANN was not functioning as it should. He suggested a number of possible changes that were seen as highly controversial to the RIPE community. As a result, several contributions and counter proposals were collectively brought forward by the RIRs.

In addition, the RIPE NCC co-ordinated with the other Regional Internet Registries (RIRs) in contributing to the discussion at various forums. The process of ICANN reform has not yet come to a close, and it remains to be seen if and how the RIRs' suggestions will be incorporated by ICANN.

Axel Pawlik
Managing Director

The second prominent issue of 2002 was unique for the RIPE NCC: In the course of the year it became clear that the income of the RIPE NCC Association would be considerably less than originally envisaged. This was caused mainly by the pronounced slowdown of the Internet economy and, as a result, a significantly decelerated registration of new members.

By design, the RIPE NCC has sufficient reserves to cushion such financial effects. While all available measures were taken to ensure delivery of service at the lowest operational cost, it became clear that the services and activities expected from the association put limits on the flexibility of possible reactions.

On the positive side, the ensuing discussions coupled with the results of the commissioned RIPE NCC 2002 Member and Stakeholder Survey have produced a number of valuable suggestions. We were pleased to report that service level issues raised in the survey had been addressed by the RIPE NCC, as outlined in the RIPE NCC 2002 Activity Plan. During 2002, there was a significant improvement in service levels, especially in response times within Registration Services. The measures taken earlier, as well as keen support efforts for the core services, have taken root and have shown strong results.

In particular, interfaces with the RIPE NCC services, be it in the registration or database areas, have received significant attention. Towards the end of the year, this culminated in the public beta testing of the LIR Portal. This service gives LIRs the ability to access their own registry data and make queries and updates on the RIPE NCC web pages. We expect this effort to increase users' access to reliable and secure self-service and decrease the number of requests sent to the RIPE NCC Hostmasters.

As the year 2002 comes to a close, I feel strongly that the RIPE NCC, thanks to its dedicated staff and supportive membership, has made good progress. The RIPE NCC has shown its adaptability to the changing needs of the Internet even in challenging times by providing a steady and responsive service to its membership.

Outlook 2003

The coming year will be a year of transformation for the RIPE NCC. The results of the RIPE NCC 2002 Member and Stakeholder Survey have delivered a great deal of input from the membership and stakeholders. The results will be reviewed and analysed in order to yield the necessary changes and improvements to service delivery. During the RIPE 44 Meeting, we will give a first presentation of results. This will be followed by additional analysis and planning sessions to address key issues. Pivotal importance will be given to community dialogue before deciding possible actions to take, in order to ensure a result that fully reflects the membership's expectations.

Further, in March 2003, a new CEO will head ICANN. Personnel changes at this level always come with opportunities and apprehensions. It will be interesting to see how the ICANN Executive Search Committee's choice will influence the relationship between the RIRs and ICANN. In this arena, we will continue to rely strongly on our members and the Internet community at large to show their support of the long-standing bottom-up, industry self-regulatory process. This is essential given governments' increased concern for security and reliability on the Internet.

This year has clearly shown us that the current set-ups of RIPE and the RIPE NCC have their strengths by design but also exhibit weaknesses. Foremost in our goals is service to our membership and to the RIPE community. We expect that during the coming months we will, together with the Executive Board, enter into a discussion with the membership of the RIPE NCC Association on how to structurally improve in order to remain stable and reliable to suit the current environment.

The RIPE NCC turned ten this year. It has grown to become an integral part of the Internet structure with broad industry recognition. It has faced, and competently addressed, changes of varying magnitude during its ten years. The RIPE NCC staff, Executive Board, members and community must remain focused and resilient to take on future industry fluctuations and challenges.

Axel Pawlik
Managing Director

3. What is the RIPE NCC?

The RIPE NCC is one of four Regional Internet Registries existing today. It provides services to members in 91 countries out of a total of 109 countries in its service region. This region incorporates Europe, the Middle East, Central Asia and African countries located north of the equator. A detailed map of the RIPE NCC service region can be found at:

http://www.ripe.net/region-maps/

The mission of the RIPE NCC is to perform activities for the benefit of the membership, primarily activities that the members need to organise as a group, although they may be competing with each other in other areas. While an activity may result in services being provided to an individual member, performing the activity as a whole must benefit the RIPE NCC membership as a group. Membership is open to anyone using the RIPE NCC services. The activities and services of the RIPE NCC are defined, performed, discussed and evaluated in an open manner. In all of its activities, the RIPE NCC observes strict neutrality and impartiality in regard to individual members.

Role

The core activity of the RIPE NCC is to act as the RIR in its service region, providing global Internet resources and related services (IPv4, IPv6 and ASN). The RIPE NCC also provides services for the benefit of the Internet community at large, including the development and maintenance of the RIPE Whois Database. Other activities include administrative support for the RIPE community and the development of innovative services and outreach activities with governments and other industry-related organisations. All activities and projects are described in the annual RIPE NCC Activity Plan and budget that is approved by the membership. The "RIPE NCC Activities and Expenditures 2002" can be found at:

http://www.ripe.net/ripe/docs/ap2002.html

Structure

The organisational structure of the RIPE NCC consists of:

- Members who vote on issues during the annual General Meeting and who provide general input through participation in RIPE.

- The Executive Board as appointed by the RIPE NCC membership.

- The RIPE NCC staff.

New Countries Served in the RIPE NCC Service Region in 2002 *	
ISO Code	Country
BJ	Benin
CI	Ivory Coast

* Countries are shown as listed in the ISO 3166 country code list.

### Other Regional Internet Registries

- APNIC: www.apnic.net
- ARIN: www.arin.net
- LACNIC: www.lacnic.net

The RIPE NCC Executive Board
From left to right: Kees Neggers, Frode Greisen, Manfredo
Miserocchi, János Zsakó, and Daniele Bovio.

The RIPE NCC Executive Board includes individuals with expertise in the Internet community and represents the membership and the RIPE NCC service region as a whole. The Executive Board members in 2002 were Daniele Bovio (Secretary - since November 2002); Frode Greisen (ICANN Liaison); Kees Neggers (Chair); Nigel Titley (Secretary - until November 2002); and János Zsakó (Treasurer). The terms of both Kees Neggers and Nigel Titley expired in 2002. The members at the annual General Meeting of 29 Ocotober 2002 elected Kees Neggers and Manfredo Miserocchi (member) to the RIPE NCC Executive Board.

Regional Internet Registries
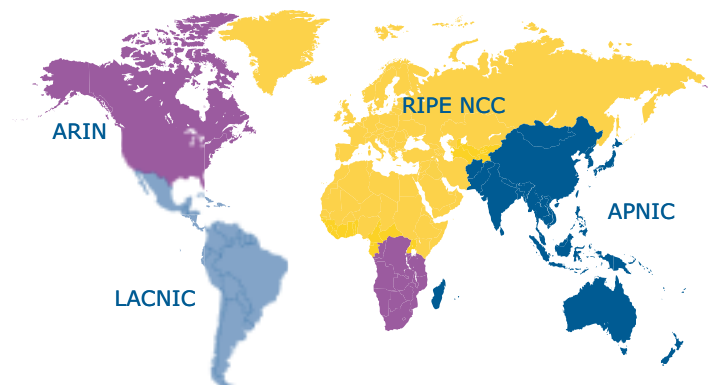
4. Membership Report

In 2002, 530 members applied for membership of the RIPE NCC as compared to 555 applications in 2001. Due to the increasing number of mergers, closures and the non-payment of new applicants, the net growth has only reached 147 members. This is a considerable decline from previous years.

Actual and Projected Membership				
	Actual			Projected *
	2000	2001	2002	2003
Small	1,978	2,536	2,503	2,470
Medium	459	441	614	650
Large	130	145	152	130
Total	2,567	3,122	3,269	3,250
* Projection made for the RIPE NCC Activity Plan 2003.				

In parallel, the RIPE NCC has seen a shift in the category size of the membership. The total number of medium and large members has increased, now comprising a total of almost 25% of all members. The first few months of 2002 witnessed a slow growth and, in some months, even a decline in the membership. But in Q3 and Q4 the number of new members significantly increased. In the final quarter of 2002, there was a growth rate of one to two members per day.

For 2003 the budget shows a zero membership growth. We anticipate the number of new members will equal the number of members that discontinue their membership.

The table (right) reflects the origin of the new members. This table clearly reflects the economic downturn in Western European countries while Eastern Europe and especially Russia have seen a growth rate similar to 2001.

New LIRs Per Country		
Country	2001	2002
RU	84	85
UK	79	68
DE	90	65
NL	45	32
IT	54	26
ES	26	20
FR	37	20
SE	29	18
NO	13	16
CZ	9	14

Actual and Projected Membership

5. Services and Projects

5.1 Registration Services

As a Regional Internet Registry, one of the RIPE NCC's core activities is to provide registration services to its members. The overall goal is to provide the fair distribution of Internet resources required for the stable and reliable operation of the Internet globally.

The most prominent services supplied by the RIPE NCC are the allocation and assignment of Internet Protocol (IP) address space, Autonomous System Numbers (ASNs) and the management of reverse domain name space. These areas of activity also include auditing and quality control, training of Local Internet Registries (LIRs) and the production of documentation to support registration services activities.

In 2002, the RIPE NCC processed a total of 27,607 requests for resources and related assistance (as compared with a total of 22,127 requests in 2001). In 2002, the RIPE NCC allocated 1.27 /8s (as compared to the 1.51 /8s allocated in 2001). The initial response time for resource requests and membership applications was quite high at the start of the year. However, it was reduced to under a week by the summer and stayed below two days in August. From August to the end of the year, the response time for a request remained stable at one to two working days.

IPv4

The RIPE NCC continued to allocate address space from the 80/7 IPv4 block received from the Internet Assigned Numbers Authority (IANA) in April 2001. It allocated more than twenty million IPv4 addresses. This is equivalent to about one /8 in ten months. The RIPE NCC also received a new IPv4 address range, 82/8, from the IANA in November 2002.
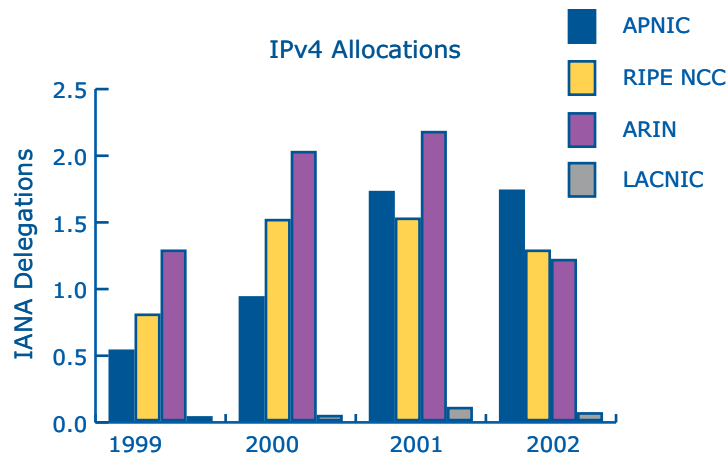
IPv4 Allocations

Number of RIPE NCC
IPv6 Allocations
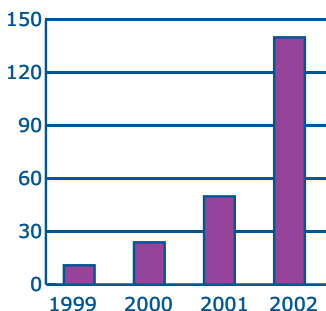
IPv6

The RIPE NCC received its second /23 IPv6 allocation from the IANA in May 2002. A new IPv6 policy was co-ordinated by the RIRs in their respective regions. As an outcome of the extensive collaboration between the RIRs and their communities there is now one common IPv6 policy in place.

http://www.ripe.net/ripe/docs/ipv6policy.html

In July 2002, the first allocation under this new policy was made. There was a rapid growth in the number of IPv6 allocations made after the new policy was implemented. In November 2002, the RIPE NCC received a third /23 IPv6 allocation. The ranges allocated to the RIPE NCC at the end of 2002 were:

- 2001:0600::/23
- 2001:0800::/23
- 2001:0A00::/23

In 2002, 70 /32 allocations were made to RIPE NCC members. In total, 140 IPv6 allocations have been made by the RIPE NCC since it started allocating IPv6 address space in 1999. From the 63 /35 allocations made under the provisional IPv6 policy agreed in 1999 42 had been expanded to /32, the new minimum allocation size, by the end of 2002. Fifteen /48s have been assigned for Internet Exchange Points since the interim policy was decided in 2001.

http://www.ripe.net/ripe/docs/ipv6-policy-ixp.html

No root nameserver operators have requested IPv6 address space. The RIPE community has a policy allowing root nameservers to receive a block of the minimum allocation size (currently a /32).

http://www.ripe.net/ripe/docs/ipv6-rootservers.html

At the beginning of 2002, the RIPE NCC carried out a survey of members holding IPv6 allocations in order to observe the progress of IPv6 deployment within the RIPE NCC service region. Positive support from its members was received for conducting the survey. The results provided valuable information to those considering the implementation and deployment of IPv6.

The results of this survey can be found at:

http://www.ripe.net/ipv6/ipv6-survey-summary.html

Reverse Delegation

In addition to the automated handling of reverse delegation requests, human handling is required for about 10% of requests received. These individuals also deal with user questions concerning reverse delegation. In 2002, the RIPE NCC delegated 229 /16 domains and 20,541 /24 domains.

During 2002, the RIPE NCC continued to make IPv6 reverse delegations available within both ip6.int and ip6.arpa. At the end of 2002, 50 /32 delegations had been made within ip6.arpa. The RIPE NCC made "ns-v6.ripe.net" available as a secondary nameserver for these domains. Delegation of /36 domains for LIRs whose /35 IPv6 allocations have not been expanded to /32 remained available. For more information on reverse delegation, see section 5.3 of this report.

Autonomous System Numbers

In the past year, the RIPE NCC has assigned 1139 AS Numbers to LIRs. On average, 95 AS Numbers were assigned per month. The RIPE NCC received a new block of 1024 AS Numbers from the IANA in November 2001. Assignment from this range, however, began in January 2002. An additional block of AS Numbers was received from the IANA in November 2002.
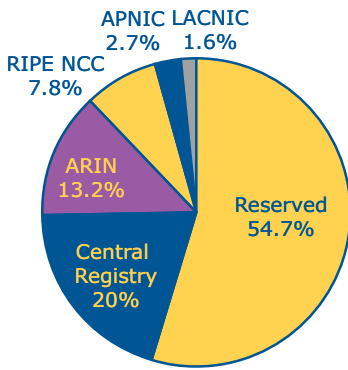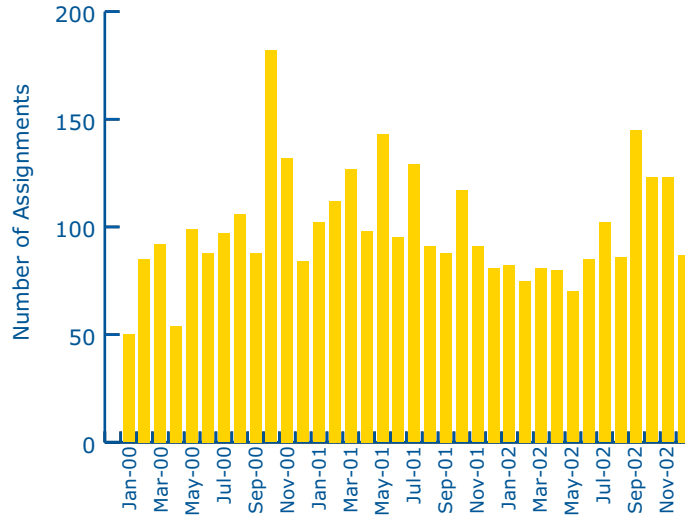
RIPE NCC IPv6 Allocations 1999-2002
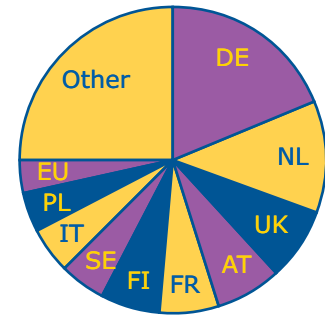
Total IPv6 Allocations 1999-2002
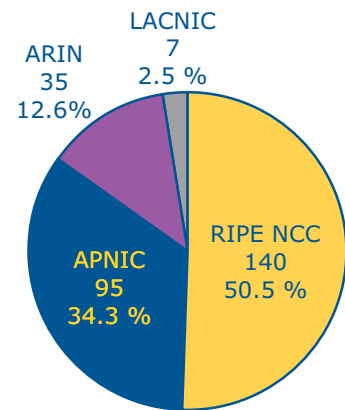
Global ASN Assignments

- APNIC 2.7%
- LACNIC 1.6%
- RIPE NCC 7.8%
- ARIN 13.2%
- Central Registry 20%
- Reserved 54.7%

ASN Assignments 2000-2002

Training

An important service delivered to the RIPE NCC membership is the LIR Training Courses. During 2002, the RIPE NCC provided 61 training courses in 28 countries in the RIPE NCC service region. About 1400 LIR members were trained in 2002.

The LIR Training Course material is updated monthly to ensure that attendees are aware of any recent policy changes decided by the RIPE community.

The RIPE NCC introduced a new course in 2002. The DNS Security (DNSSec) Training Course, aimed at experienced DNS operators, explains how to implement DNSSec in an operational environment. This course is preparing the way for the RIPE NCC to provide DNSSec as part of the reverse delegation service during 2003.

Additionally, two IP request tutorials were given at RIPE Meetings in Amsterdam, the Netherlands and Rhodes, Greece. These tutorials contained basic material selected from the current course material and were open to all RIPE Meeting participants.

Further information about the RIPE NCC LIR Training Courses can be found at:

http://www.ripe.net/training/

Countries where LIR Training Courses were held in 2002

Countries where LIR courses were offered during 2002
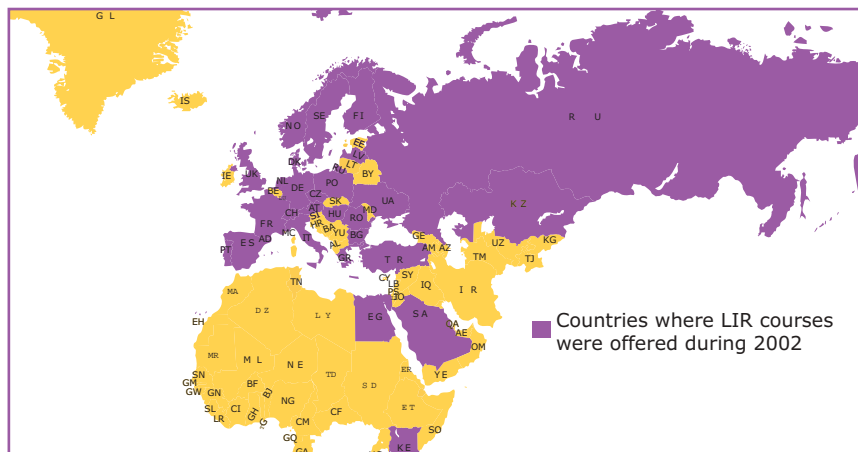
Tools and Support for LIR Operations

LIR Portal

The RIPE NCC LIR Portal service allows members to manage their own registry data and to make queries and updates instantly. This new interface to RIPE NCC services was made available as a technical beta test during the RIPE 43 meeting in Rhodes, in September 2002. All information exchanged is encrypted to ensure security. Features include:

- viewing and editing LIR contact and address information
- viewing billing information
- viewing IP and AS resources
- viewing status of open tickets
- news and events board

The LIR Portal will move from a beta service to a full release service in January 2003. More details can be found at:

https://lirportal.ripe.net/

More information about publicly available member tools can be found at:

http://www.ripe.net/ripencc/mem-services/tools/

RIPE Community Policy Developments in 2002

The RIPE NCC adheres to Internet address distribution policies developed by community consensus in the RIPE LIR Working Group (see section 7.0). Through open discussions at RIPE Meetings and on public mailing lists, consensus for the following policy changes was reached:

- During 2002, the RIPE community finalised the revision of the IPv4 policy documentation. This resulted in a simpler and more concise document for IPv4 policy.

  http://www.ripe.int/ripe/docs/ipv4-policies.html

- In a co-ordinated effort among the RIRs, the RIPE community reached consensus during the RIPE 42 meeting in Amsterdam on a new policy for the allocation and assignment of IPv6 address space. The new policy's minimum allocation is eight times larger and the qualifying criteria are more relaxed. The IPv6 Address Allocation and Assignment Policy is available at:

  http://www.ripe.net/ripe/docs/ipv6policy.html

- A proposal for a sub-allocation policy was initially raised during RIPE 40 in Prague in October 2001. The proposal continued to be evaluated during 2002. At RIPE 43 in Rhodes in September 2002, the proposal was accepted by the community and proposed as a draft document for community review.

- The RIPE NCC has had a procedure for making temporary assignments to trade shows, fairs and other temporary networks. During 2002, a proposal for a formal policy for temporary assignments for Internet experiments was put forward in the APNIC, RIPE and ARIN regions. The proposal was accepted by the RIPE community at RIPE 43 in Rhodes in September 2002. The proposal was published as a draft document in November 2002. Following its acceptance the policy was incorporated into the existing IPv4, IPv6 and ASN policy documents.

- The RIPE NCC renewed all the resource and registration-related policy documentation during 2002. Revised policy documents were published for all resources (IPv4, IPv6 and ASN). A new document structure was introduced that makes it easier to keep the documents up-to-date with future policy changes.

The RIPE NCC will continue its efforts to keep policy documentation clear and concise. Policy changes will be reported in an efficient and easily accessible format.

5.2 Database Services

One of the main public services provided by the RIPE NCC is the operation and maintenance of the RIPE Whois Database and the implementation of new database functionality requested by the RIPE community.

The RIPE Database provides information about address space and autonomous system number allocations; DNS reverse delegation domains; routing policies; and contact information. The RIPE Whois Database can be queried at:

whois -h whois.ripe.net   or   http://www.ripe.net/perl/whois
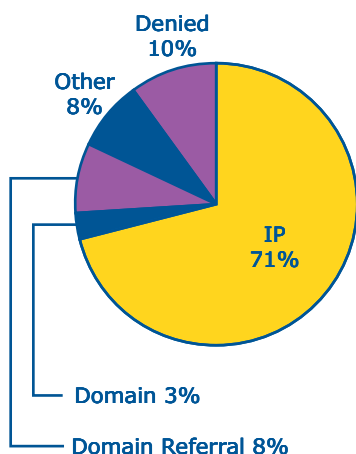
In 2002, the RIPE Database gradually grew from 1.4 to 1.7 million objects. The main contributors to this growth remain objects representing IPv4 address allocations and assignments, contact information and DNS reverse delegation.

There was an increase in query rate that reached 25 queries/second on a weekly average basis. These queries return on average almost five million objects per day, more than twice the content of the whole database. The majority of these queries (70%) are requests for address space assignment information.

Query by Type in 2002

Denied 10%
Other 8%
IP 71%
Domain 3%
Domain Referral 8%

Further Development of the RIPE Database Software

Following requests by the RIPE community, new functionality has been implemented in the RIPE Database software.

Substantial developments have been made to further improve security in the RIPE Database. A new authentication scheme based on the MD5 hashing algorithm was introduced in May 2002. This scheme is more resistant to password-breaking attacks. More than 40% of all maintainers have already implemented the new scheme. Another security improvement was phasing out a weak authentication scheme based on the e-mail address of the user. Since 15 August 2002 the "MAIL-FROM" authentication scheme is no longer allowed in the RIPE Database.

At the request of the RIPE community and European CSIRT (Computer Security Incident Response Team) in particular, an object representing CSIRT (i.e the IRT object) was introduced to the database. It is now possible to reference such objects from an address range (e.g. inetnum object) thus providing information regarding the responsible CSIRT. The RIPE NCC worked closely together with the community to develop a set of procedures and related documentation available at:

http://www.ripe.net/ripe/docs/irt-object.html

Another important feature that was introduced to the RIPE version 3 (RIPEv3) Database code was an RPSL object library that can also be used in user's tools. Using the latest version of the library guarantees that the client is 100% compliant with object format and definitions currently in use in the RIPE Database. This feature also allows those who run their registries using the RIPE Database software to easily introduce modifications to the existing definitions, or even new object types and new attributes.

To reflect new policy development in IPv6, new values of the "status" attribute for inet6num objects were implemented. Following requests from the community, new status values for IPv4 address ranges, "LIR-PARTITIONED", were introduced to facilitate address management tasks. The new "LIR-PARTITIONED" policy document is available at:

http://www.ripe.net/ripe/docs/lir-partitioned.html

Improved User Access to the Whois Database

The RIPE NCC continued to improve user support by deploying intuitive web-based graphical interfaces to access the Whois Database.

An advanced Whois query interface has been developed and deployed by the RIPE NCC. The web-based interface helps the user create queries and provides online help, making even complex queries a simple task.

http://www.ripe.net/perl/whois

A web-based graphical user interface (GUI) for updating the RIPE Whois Database has been made available to users. It provides a more intuitive way of creating, editing, updating, or deleting objects in the database.

http://www.ripe.net/ripencc/pub-services/db/webupdates.html

An interface supporting "synchronous updates" has been developed and deployed. The term synchronous updates, or "syncupdates", comes from the fact that results of the operation are returned by the database in the same TCP session. This feature facilitates automation of database updates by the users. The syncupdate facility is also a basis for the web-based GUI mentioned above.

http://www.ripe.net/ripencc/pub-services/db/syncupdates/

Database Related Projects

The RIPE NCC continued to develop several projects related to the RIPE Database. The RIPE Database Consistency and Statistics project has been re-implemented and put into production in January 2002. In the new version of the software, inconsistency reports can be requested by e-mail using existing maintainer authentication schemes. These reports aim to help users keep their information in the database consistent and up-to-date. A new version of the project also provides extended statistics regarding content and usage of the database. This information is helpful in understanding trends and patterns in database usage in order to plan accordingly.

The Routing Registry Consistency Check (RRCC) project has been put into production. The next steps are to ensure that the software is more portable to allow its usage as a stand-alone toolset.

During 2002, the RIPE NCC continued to maintain the IRRToolSet software providing bug fixes and implementing new features as requested by the community.

More information about database related projects is available at:

http://www.ripe.net/ripencc/pub-services/db/index.html#projects

User Support

Throughout 2002 the RIPE NCC continued with its efforts to provide high-quality user support and to seek improved ways to serve our members.
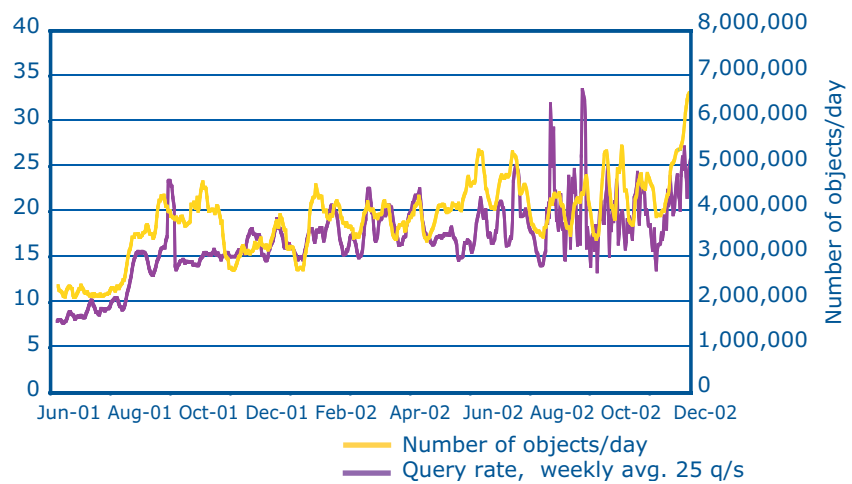
An important part of this activity is the database helpdesk, RIPE DBM. To provide better tracking of user requests a ticketing system was deployed in May 2002. To increase efficiency, an anti-spam filter was put in place allowing only messages addressed to <ripe-dbm@ripe.net> to be processed.

Another key part of user support is documentation and training. Database training comprises a significant part of the LIR Training Course. In the documentation area the "RIPE Database User Manual - Getting Started" document was published with support from APNIC. This document is the first part of the User's Manual presenting essential concepts and information for novice users. Additional content will be added to the User's Manual in 2003. The RIPE Database Frequently Asked Questions (FAQ) is constantly updated to reflect the most commonly encountered problems.

More information about RIPE Database Services can be found at:

http://www.ripe.net/ripencc/pub-services/db/

Query rate and objects returned

Number of objects/day
Query rate, weekly avg. 25 q/s

5.3 DNS Services

Reverse Delegation

As part of member services, the RIPE NCC provides reverse domain delegations for the allocated IPv4 and IPv6 address space. This remains the primary DNS activity carried out by the RIPE NCC.

As well as setting up the reverse DNS zones, the RIPE NCC also monitors the quality of the reverse nameservers that it delegates and also publishes statistical reports.

More information about reverse delegation is available at:

http://www.ripe.net/reverse/

Secondary DNS

The secondary DNS server is an important component of the system to ensure its robustness and stability. At the end of 2002, the RIPE NCC was providing a stable secondary DNS name service to around 200 country code top-level and related zones and several other second-level zones, according to the policy of providing this service to any ccTLD organisation that requested it.

Starting from Q4 2002, native IPv6 access was added to the DNS services by the RIPE NCC.

The RIPE NCC is also responsible for the operation of the crucial part of the DNS infrastructure - one of the thirteen root servers - k.root-servers.net. Every effort is made to ensure that this service meets the high performance and security standards required. The recent upgrade of this server was completed in Q4 2002. The server is located at the London Internet Exchange (LINX).

Hostcount

Every month since the beginning of 1992 the RIPE Region Hostcount is performed to indicate the growth in the service region. At the end of 2002, the amount of hosts registered in the RIPE NCC service region was almost 16,680,000. This represents an increase of approximately 1,030,000 (6.5%) in 2002.
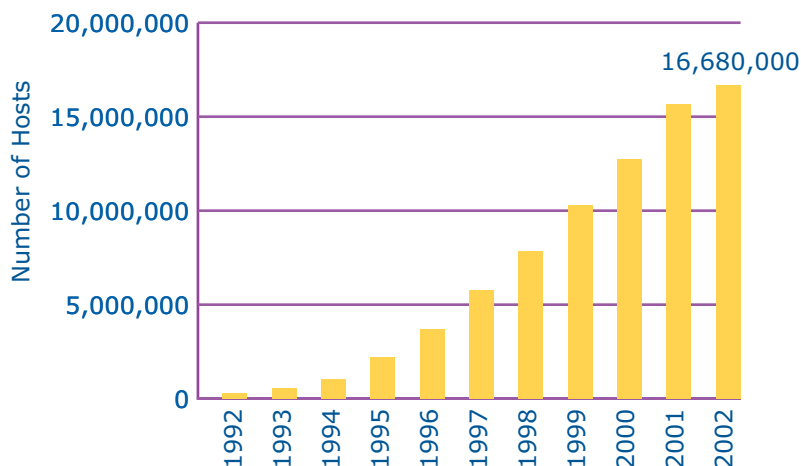
IPv4 and IPv6 Delegations in 2002

IPv4 Delegations:

- /16 : 207
- /24 : 17,297

IPv6 Delegations:

For ip6.arpa:

- /32 : 44
- /36 : 15
  (of which 7 comprise a /35) *
- /48 : 3

For ip6.int:
- /32 : 27
- /36 : 18
  (of which 9 comprise a /35) *
- /48 : 3

* A /35 network is reverse delegated as 2 /36 domains.

DNS Hostcount 1992-2002

16,680,000

More information about the RIPE Region Hostcount is available at:

ccTLDs

In 2002, the RIPE NCC continued to provide a stable secondary DNS to around 200 country code Top-Level Domains (ccTLDs) and several second level domains. This service is offered free of charge and upon request to any country code Top-Level Domain organisation.

Furthermore, in the wake of KPNQwest's bankruptcy, the RIPE NCC agreed to host "ns.eu.net" on a temporary basis, as this particular machine provided secondary DNS to 42 ccTLDs at this point in time. It had therefore to be regarded as important for European, if not global, Internet infrastructure. In the meantime, some of these ccTLDs moved to another secondary DNS host - of which 15 found a new home with the RIPE NCC. The remaining 25 on "ns.eu.net" will hopefully be phased out during 2003, so that this machine can eventually be retired.

5.4 Test Traffic Measurements

The Test Traffic Measurement Service (TTM) is a membership service of the RIPE NCC. It is designed to reliably and impartially measure end-to-end performance characteristics of the inter-provider Internet. This is achieved by installing test-boxes at participating sites. These test-boxes send measurement traffic to each other. From this traffic, packet-losses, delays and other parameters are determined according to the metrics developed by the IETF IP Performance Working Group (IPPM-WG). As the RIPE NCC has an established track record of neutrality and impartiality, it is an ideal organisation to perform such measurements in a trusted way.

Under the TTM service, any site interested in these measurements can purchase a test-box with a service contract from the RIPE NCC and install this box near the border routers. The service contract entitles the test-box operator to an analysis of the data by the RIPE NCC, software upgrades, user support and new products based on the data.

It was projected in the RIPE NCC Activity Plan 2002 that the number of test-boxes would grow by about 50 in 2002. This estimate proved to be overly optimistic due to changes in the worldwide economic climate late

Number of Test-Boxes Sold

Sold, not yet installed

Installed
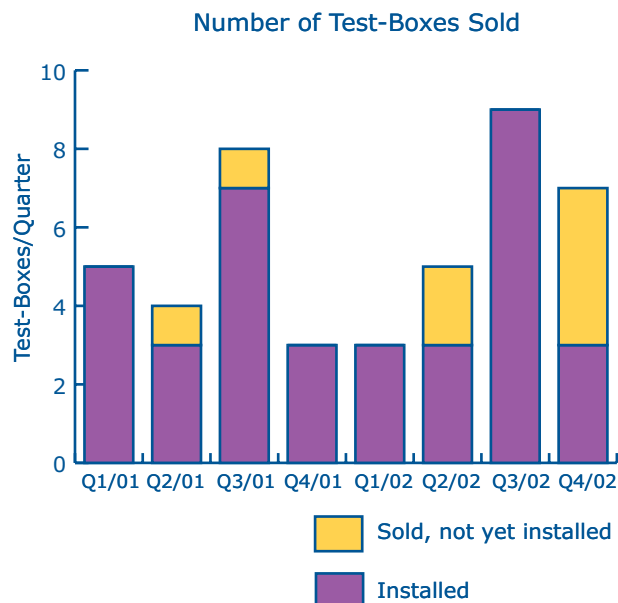
in 2001 as well as some delay in the development of products that translate the high-quality output into data immediately useful to network operators.

During 2002, a total of 24 test-boxes were sold. The RIPE NCC is currently discussing the installation of approximately fifteen boxes at three major network operators in early 2003. It is expected that the number of test-boxes will see significant growth in 2003.

There has been a continuous improvement of the TTM service. The most important developments in this area were:

- Installation of a GPS clock often proved to be a problem for ISPs. However, no alternative was available. This changed in 2002 for the North American market when clocks using CDMA cell phone signals became available. These clocks work wherever a CDMA based mobile phone works, without the need for expensive antenna installations.

- Native IPv6 networks were deployed during 2002. Several such networks are interested in using TTM for performance measurements and asked for an IPv6 version of TTM. The TTM code was therefore ported to IPv6 and installed on three test-boxes in December 2002.

- An interface allowing the user to adjust packet rates and sizes was added. With this interface, the user can increase traffic in directions that he considers important while reducing traffic in other directions.

- Web pages showing the paths with exceptionally good or bad performance were added. Autonomous System level data has also been added to the output, allowing test-box hosts to easily distinguish between inter-provider and internal route changes.

- The jitter analysis was completed and resulted in a product that is offered to the test-box hosts on a regular basis.

Promotion of the TTM service continued in 2002. A TTM introductory talk was developed and given at various meetings, including the RIPE 42 plenary, TERENA Conference, GGF5, NANOG-26/ARIN-X, as well as at smaller meetings and for interested Internet Service Providers (ISPs). A TTM customer questionnaire was conducted to obtain feedback for improvement.

Analysis of the TTM data continued, both inside and outside the RIPE NCC. One of the results was a joint paper with the University of Delft titled "Analysis of End-to-End Delay Measurements in the Internet", presented at the PAM2002 conference. A second paper is currently being written and is expected to be published in 2003. Relevant papers and reports will be available from the RIPE NCC web site. More information about the RIPE NCC Test Traffic Measurements membership service can be found at:

http://www.ripe.net/test-traffic

5.5 Routing Information Service

The Routing Information Service (RIS) has been established to collect inter-provider routing information at various points in the Internet infrastructure in near real-time. The information is time-stamped and stored in a database.

In 2002, the development of the RIS focused on increasing the number of data collection points, development of additional products based on the data and user feedback, turning the RIS from an experimental project into a regular and reliable service and, finally, research for future expansion of the RIS.

Remote Route Collectors (RRCs) are being used to collect data for the RIS. In 2002, two more collectors were installed, at Netnod-IX (Stockholm, SE), and MAE-West (San Jose, USA), bringing the total of RRCs to nine. The collector at MAE-West is our first presence in North America and provides a view of the routing table from a North American point of view. The number of peering sessions increased from approximately 170 in December 2001, to 214 in December 2002.

In March 2002, a failure in our newly installed RAID array exposed several weaknesses in the RIS system, which has led to several steps being taken to make the architecture more scalable and resilient. One major change was the addition of a faster server that primarily provides RIS services to our users, while the old RIS server now devotes its resources to the collection of raw data and its insertion into the RIS Database. Both servers mirror each other to provide failover in case one of the two breaks down. We have found that the new set-up has noticeably improved RIS query response times. Another change is to move some of the CPU intensive tasks from the servers to the RRC's.

Several new services were introduced throughout 2002 based on user feedback. New RIS report plots were added prior to the RIPE 43 Meeting in September 2002. New tables for Martians (IPv4 addresses that have been assigned for special use by IANA but that are nevertheless announced) and BGP Traffic Hotspots were also made available on the RIS web site to assist the community in quickly identifying unnecessary route leakage and BGP routes with high routing churn.

The RIS has also actively supported the RIPE NCC Training Team in the development of the new advanced course for LIRs, "Welcome to the Routing Registry for LIRs" in an effort to promote RIS usage.

After feedback at RIPE 43 in Rhodes, it became evident that there was a strong desire in the community for the collection of IPv6 BGP routing information. This possibility has since been added. IPv6 peering trials commenced at AMS-IX in November 2002. We hope to add this additional service to the remaining collectors by the end of 2003.

At SIGCOMM 2002 and RIPE 43, the need for "BGP Routing Beacons" (a BGP speaker that announces and withdraws a particular prefix at pre-determined times) became apparent for studies on route flapping and dampening. Subsequently, RIS project offered to assist these studies by adding the "Routing Beacon" functionality to our Remote Route Collectors (RRCs), which were considered to be ideal for this purpose due to their geographically dispersed distribution. The Routing Beacons became operational by the end of September, shortly after RIPE 43. For more information see:

http://www.ris.ripe.net/beacons

During 2002, several university and research groups used the RIS data for research purposes. Two projects were carried out in collaboration with the RIPE NCC:

- With Agilent Laboratories. The objective of this project is to visualise and characterise Border Gateway Protocol (BGP4) behaviour.

- With the "Politehnica" University Timisoara (Romania). A study on "black holes" or address space seen by an individual peer in

comparison to the RIS as a whole. This resulted in a master's thesis "Tracking Routing Black Holes with the RIS", available at:

http://www.ripe.net/ris/analysis.html

Other research projects were carried out independently of the RIPE NCC using the raw BGP data collected by the RIS. An overview of published papers can be found at:

http://www.ripe.net/ris/analysis.html

Even though the RIS was not intended to provide raw BGP data for the research community, it has become clear that making the raw BGP data available is a useful service for research purposes and for the ISP community in the long run. This service cannot be easily provided by other organisations.

More information about the RIS can be found at:

http://www.ripe.net/ris

5.6 Deployment of Internet Security Infrastructure (DISI)

The Deployment of Internet Security Infrastructure project (DISI) continued to focus on the security of the Domain Name System and deployment of DNSSec. A joint project with NLnet Labs was the development and implementation of "nsd", an authoritative only nameserver. The RIPE NCC's contribution to this project is a DNS server performance and regression test suite called "DISTEL".

Within the context of deploying DNSSec, the RIPE NCC focused on operational issues concerning the rollout. This resulted in two Internet drafts for the DNSEXT IETF Working Group:

- One draft proposes an optimisation in the denial of existence of wild-cards, see:
http://www.ietf.org/internet-drafts/draft-olaf-dnsext-dnssec-wildcard-optimization-02.txt

- The draft proposes a flag to distinguish between key-signing keys and zone-signing keys, see:
http://www.ietf.org/internet-drafts/draft-ietf-dnsext-keyrr-key-signing-flag-06.txt

A workshop, hosted in February to test secure dynamic updates of secure zones, resulted in a "HOW-TO" for this procedure. See:

http://ops.ietf.org/dns/dynupd/secure-ddns-howto.html

The RIPE NCC continued to work on tools to ease DNSSec operations. The Net::DNS::SEC Perl library is available from the Comprehensive Perl Archive Network (CPAN). Various other tools and procedures are currently being tested internally. The "DNSSec signing appliance" is a pragmatic approach to enable zone signing in a networked environment while making direct access to the key material impossible.

The DNSSec courses have matured and were given at Apricot 2002 (March), at RIPE 43 (September), and in Paris (November) and Amsterdam (December). This training has now become a part of the regular curriculum and is being taught by the RIPE NCC Training Team.

More information about DISI can be found at:

http://www.ripe.net/disi/

5.7 ENUM

The RIPE NCC, chosen by the Internet Architecture Board (IAB) to act on its behalf as the Tier 0 registry for ENUM, provides delegation to domains under the e164.arpa domain.

ENUM is a proposed Internet Engineering Task Force (IETF) standard as described in RFC 2916 to map telephone numbers according to the International Telecommunication Union (ITU) standard E.164 into the DNS. The purpose is to foster the convergence between the Internet and the telephony world by enabling each system to address the other one.

The RFC 2916 document and the E.164 standard can be found at:

ftp://ftp.rfc-editor.org/in-notes/rfc2916.txt

http://www.itu.int/rec/recommendation.asp?type=folders&lang= e&parent=T-REC-E.164

The RIPE NCC's duties, according to the IAB instruction, are to run the primary name server and to organise the set of secondary name servers for the e164.arpa domain in a root server class-like manner. IAB instructions can be found at:

http://www.ripe.net/enum/instructions.html

The RIPE NCC also delegates E.164 country codes to requesting entities (i.e. the Tier 1 registries) after approval by ITU Telecommunication Standardization Sector - Telecommunication Standardization Bureau (ITU-T TSB). The e164.arpa domain is the "root" of ENUM in the global DNS. ITU-T TSB handles delegation request following the ITU-T – Study Group 2 (ITU-T SG2) Interim Procedures. More information can be found at:
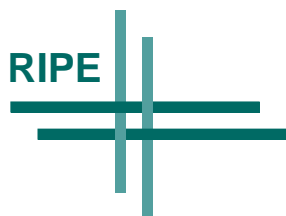
http://www.itu.int/ITU-T/inr/enum/procedures.html

The first domain under the e164.arpa domain was delegated on 14 February 2002. In 2002, the RIPE NCC processed 15 requests for delegation of an E.164 code: thirteen country codes and two non-geographical codes.

More details can be found at:

http://www.ripe.net/enum/

6. RIPE

RIPE (Réseaux IP Européens) is a collaborative forum open to all parties interested in wide area IP networks. The objective of RIPE is to ensure the administrative and technical co-ordination necessary to enable the operation of the Internet. There are no membership requirements for participation in RIPE; activities are performed on a voluntary basis and decisions are formed by consensus.

The work of the RIPE community is carried out within a variety of Working Groups. Each of these RIPE Working Groups has one or more mailing lists where relevant topics are discussed. The RIPE community is the most important source of public input for the RIPE NCC and also plays a significant role in the development of the RIPE NCC annual Activity Plan.

http://www.ripe.net/ripe/wg/

http://www.ripe.net/ripe/about/maillists.html

RIPE Meeting Support

Although two distinct entities, RIPE and the RIPE NCC are highly interdependent in their operations.

The RIPE NCC is committed to supporting the bottom-up, industry self-regulatory structure developed by the RIPE community. As an integral part of this structure the RIPE NCC provides administrative support for RIPE and facilitates the organisation of RIPE Meetings.

RIPE Meetings

RIPE Meetings take place three times a year. The RIPE Working Groups gather to openly discuss the current challenges and to develop solutions at each of these meetings. The main purpose of these open meetings is to discuss technical and policy issues affecting Internet administration and operations specific to IP networking. Network operators also meet at RIPE Meetings to discuss technical co-ordination matters.

Policies regarding IP networking are created within RIPE, in particular the Local Internet Registries Working Group (LIR-WG). The RIPE NCC does not set policies but ensures the consistent application of policies within its service region.

2002 RIPE Meeting Attendees per Organisational Category

RIPE Meetings during 2002		
RIPE 41	14-18 January	Krasnapolsky Hotel, Amsterdam, NL
RIPE 42	29 April - 3 May	Krasnapolsky Hotel, Amsterdam, NL
RIPE 43	9-13 September	Rhodes Palace, Rhodes, GR

During 2002, RIPE Meetings have seen a slight decrease in attendees representing telecommunications companies and an increase in attendees representing governments and associations. All attendees of RIPE 43 were asked to participate in the RIPE NCC Members and Stakeholders Survey and to attend an open forum discussion to help the RIPE NCC pinpoint areas where improvement is needed.

More information about RIPE Meetings can be found at:

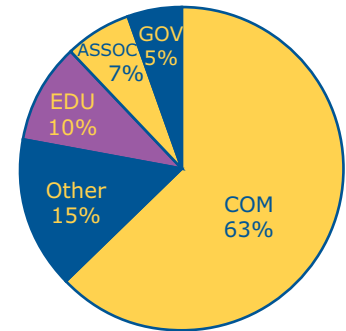*http://www.ripe.net/ripe/meetings/*

7. RIPE NCC in the Internet Industry

In 2002, the RIPE NCC continued to support and represent the interests of its membership and the RIPE community to Internet industry groups and government. The main goal of its outreach activities remains the promotion of the open, bottom-up, industry self-regulatory structure common to all RIR communities in managing Internet address resources.

Each year, the RIPE NCC actively participates in a number of technical forums and policy development meetings. At related industry and government meetings particular attention is focused on increasing awareness of the distinct roles of RIPE and the RIPE NCC in Internet administration. A list of presentations delivered at meetings in 2002 can be found at:

http://www.ripe.net/ripencc/about/presentations/

Industry focus in 2002 was centred primarily around ICANN with the sudden announcement of the ICANN Evolution and Reform process. Prior to this issue, negotiations were underway to finalise a contract between ICANN and the RIRs on matters of roles, responsibilities and procedures relating to Internet address management and global address management policies.

The purpose of the ICANN evaluation and reform process was to redefine ICANN and its operational relationship with its supporting organisations. The ICANN Evolution and Reform Committee published a succession of reports and a "Blueprint for Reform". In response, the RIR boards collectively produced a number of documents with the intention of aiding the ICANN development process. In October, the RIR boards jointly published the "RIR Blueprint for Evolution and Reform of Internet Address Management". This report brought forward a summary of discussions, stressed support for the bottom-up policy making process, and proposed a mutual view on a significantly streamlined resource management process with the establishment of a "Number Resource Registry" organisation.

As the year ended, the overall outcome remained open. The RIPE NCC is confident that future dialogue will establish an agreement governing the ASO and a relationship agreement between ICANN and the RIRs.

The RIPE NCC remained committed to its workings with the ASO Address Council as outlined in the Memorandum of Understanding. Address Council elections were held at the RIPE 43 Meeting in Rhodes, Greece with Wilfried Wöber re-elected as an Address Council member. The three Address Council members from the RIPE NCC service region in 2002 were:

- Sabine Jaume-Rajaonia (RENATER, France)
- Hans Petter Holen (Tiscali AS, Norway)
- Wilfried Wöber (Vienna University, Austria)

More information and announcements on ICANN and ASO developments can be found at:

http://www.ripe.net/ripencc/about/regional/icann.html

In October 2002, the Latin American and Caribbean Network information Centre (LACNIC) received full recognition from ICANN as an RIR. The RIPE NCC is pleased to welcome LACNIC as the fourth RIR. LACNIC operates from facilities in Montevideo, Uruguay and an operational centre located in São Paulo, Brazil. More information about LACNIC can be found at:

http://www.lacnic.org

The existing RIRs continue to offer their support for the development of the emerging RIR, AfriNIC (African Network Information Centre). The RIRs participated in the AfriNIC open meeting held in Nairobi, Kenya in August 2002. A significant development announced at the meeting was the selection of two candidates from the African region to undergo Hostmaster training at the RIPE NCC offices in 2003. More information about AfriNIC can be found at:

http://www.afrinic.org/

8. Financial Report

Statement of Income and Expenditure 2002

in kEuro	Actual Year 2002	Actual Year 2001	Difference FY02 vs FY01	
Income				
Fee	7,693	8,746	-1,053	-12%
RIPE Meeting	221	322	-101	-31%
Other income	159	35	124	354%
Total Income	**8,073**	**9,103**	**-1,030**	**-11%**
Expenditures				
Personnel	5,530	4,519	1,011	22%
Operational expenses	2,382	1,854	528	28%
RIPE Meetings and LIR courses	775	750	25	3%
Depreciation	1,057	674	383	57%
Total expenses	**9,744**	**7,797**	**1,947**	**25%**
Surplus before misc. costs and financial exp.	-1,671	1,306	-2,977	
Miscellaneous costs				
Bad debts	403	321	82	25%
Personnel fund	483	-165	648	-393%
Total miscellaneous costs	886	156	730	
Financial expenses	-188	-232	44	-19%
Surplus / Deficit	**-2,369**	**1,382**	**-3,751**	

Balance Sheet as at 31 December 2002

ASSETS

in kEuro	31 DECEMBER 2002		31 DECEMBER 2001	
Fixed assets				
Computers	602		847	
Infrastructure	537		481	
Office equipment	186		61	
Total fixed assets		1,325		1,389
Current assets				
Accounts receivable	5,174		5,299	
VAT	-18		17	
Miscellaneous receivables	723		433	
Total current assets		5,879		5,749
Cash on hand		7,585		6,028
Total ASSETS		14,789		13,166

LIABILITIES

|	31 DECEMBER 2002		31 DECEMBER 2001	
Capital				
Reserves	477		477	
Clearing house	6,102		4,720	
Deficit	-2,369		1,382	
Total capital		4,210		6,579
Current liabilities				
Creditors	36		241	
Wage taxes and soc. securities	89		146	
Unearned revenues	9,197		5,610	
Personnel fund	483		-165	
Miscellaneous payables	774		755	
Total current liabilities		10,579		6,587
Total LIABILITIES		14,789		13,166

General

All amounts are expressed in kEuro. Foreign currencies are converted at the daily exchange rate at the date of transaction or valuation. Historic costs have been used throughout unless otherwise stated.

Notes to the RIPE NCC Statement of Income and Expenditure 2002

The year 2002 resulted in a deficit of 2,369 kEuro. This deficit was a result of the decrease in income in 2002. This is the first deficit in the history of the RIPE NCC and, although it decreases our reserves substantially, the historically built-up surpluses guarantee the financial stability and the continuity of RIPE NCC operations.

Revenues
The total income of the RIPE NCC decreased by 11% due to less than expected LIR membership income in 2002. This decrease was due to the less than expected net growth number of new LIRs, 147 in 2002 vs 555 in 2001, and the decrease of 16% on average in the membership fees. See graph.
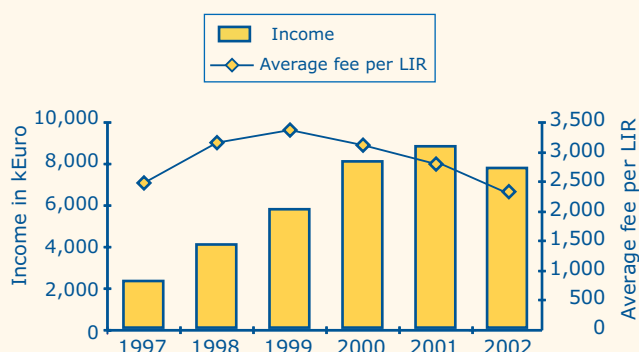
RIPE Meeting contributions decreased by 100 kEuro due to less conference attendees, approximately 300 per meeting in 2002 versus 400 in 2001. Miscellaneous income was up as more TTM test-boxes were placed in 2002 and written off debts of 2001 that were paid in 2002. The interest result on our reserves is 167 kEuro and is reflected in the financial expenses.

Expenditures
The growth in expenditure in 2002 was up 25% from 2001. The growth in personnel expenditure was the main cause. In 2002, the RIPE NCC had on average a workforce of 99.0 FTEs (Full Time Equivalents) versus 75.9 in 2001. During 2002 we saw a stabilisation of the membership. However, the existing members put in more requests than in 2001. An increase in personnel was necessary to cope with this increased workload and to support an increase to our service levels.

RIPE Meeting expenses were down by 20 kEuro in comparison to 2001 due to fewer meeting attendees. LIR Training Course expenses increased by 45 kEuro in comparison to 2001 as a result of more courses given in 2002, i.e. 61 in 2002 versus 55 in 2001, and an active approach to cover the RIPE NCC region efficiently.

Depreciation expenses increased by 383 kEuro as a result of the computer purchases made in 2001. In the year at issue the total purchases were almost 45% lower than in the financial year 2001, i.e. 503 kEuro in 2002 versus 914 kEuro in 2001. The computer depreciation expenses are approximately 75% of total depreciation expenses.

An increase in the workforce has led to a liability to the Personnel Fund of 483 kEuro in 2002. The Personnel Fund expense is calculated using the number of people with employment contracts of indefinite time working at the RIPE NCC as at 31 December 2002.

All outstanding LIR membership invoices for the financial year at issue are expensed. For 2002 the bad debts expense was 403 kEuro.

Notes to the RIPE NCC Balance Sheet as per 31 December 2002

Fixed Assets	Computer	Infrastructure	Office Furniture
Value 1/1/2002	847	481	61
Purchase costs	503	323	167
Depreciation	748	267	42
Bookvalue 31/12/2002	602	537	186

Assets are valued at historical costs and are depreciated on a straight-line basis, starting in the month after acquisition. Computers including activated software are written off in two years, infrastructure is written off in three years and office furniture and equipment in five years. All items under EUR 1,000 are expensed.

| Current Assets	31/12/2002	31/12/2001
Accounts Receivable		
Receivables	5,174	5,442
Bad Debts	-	143
Total accounts receivable	5,174	5,299

Accounts receivable have decreased in comparison with 31 December 2001 due to the fact that the LIR membership fee invoices were sent out in November 2002 while in 2001 this was done in December. This difference in timing has led to a decrease in the accounts receivable balance even though the total invoiced amount was up by more than 60%.

Miscellaneous Receivables	31/12/2002	31/12/2001
Prepaid	484	321
Miscellaneous Receivables	239	112
Total miscellaneous receivables	723	433

Prepayments include rent, equipment, pension, health and deposits for RIPE Meeting venues. Other receivables consist of interest receivable, fees to be received, payments in transit and long-term receivables.

Capital
Up to 1998, surpluses have been accumulated in the RIPE NCC reserves. In 1998, the RIPE NCC agreed with the Dutch tax authorities on a tax ruling that allows surpluses to be put into a Clearing House. All yearly surpluses since 1998 have been allocated to the Clearing House.

Capital Development 1997-2002
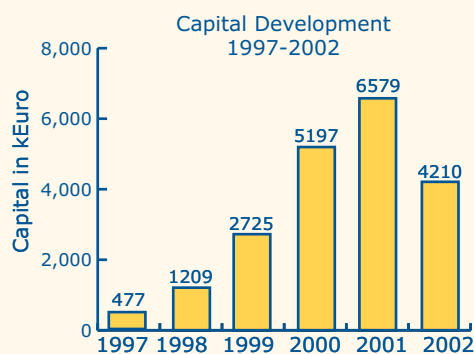
Current liabilities

Unearned revenues
The unearned revenues consist of invoices sent in the financial reporting year but pertaining to the following accounting year. The increase in LIR membership fees for the year 2003 has resulted in a vast increase of the unearned revenue balance.

Wage Taxes and Social Securities	31/12/2002	31/12/2001
Wage taxes	59	87
Social securities	30	59
Total wage taxes and social securities	89	146

In comparison with the financial report 2001 the holiday allowance reservation and the accrued taxation for this is not accounted for in this category but is accounted for under miscellaneous payable.

Miscellaneous Payable	31/12/2002	31/12/2001
Accrued expenses	573	610
Accrued holiday payment	170	142
Other payables	31	3
Total miscellaneous payable	774	755

In the course of 2002 part of the ICANN fee was paid. Therefore the total accrued expenses decreased at 31 December 2002. The accrued holiday allowance increased as a result of the increase in number of staff.

Items not shown in Balance Sheet
The RIPE NCC rents office space in two buildings and has four separate rental agreements for these. Four bank guarantees have been issued for an amount of 135 kEuro to cover the rent of the office space in Amsterdam.

HORLINGS, BROUWER & HORLINGS
Accountants, Belastingadviseurs & Consultants

NEXIA
INTERNATIONAL

Auditor's Report

To the General meeting and
Executive Board of the
RIPE NCC Association
Singel 258
1016 AB Amsterdam

Introduction
We have audited the financial statements of Réseaux IP Européens
Network Coordination Centre (RIPE NCC), Amsterdam, for the year 2002.
These financial statements are the responsibility of the management of
the association. Our responsibility is to express an opinion on these
financial statements based on our audit.

Scope
We conducted our audit in accordance with auditing standards generally
accepted in the Netherlands. Those standards require that we plan and
perform the audit to obtain reasonable assurance about whether the
financial statements are free of material misstatement. An audit includes
examining, on a test basis, evidence supporting the amounts and
disclosures in the financial statements. An audit also includes assessing
the accounting principles used and significant estimates made by
management, as well as evaluating the overall financial statements
presentation of the financial statements. We believe that our audit
provides a reasonable basis for our opinion.

Opinion
In our opinion, the financial statements give a true and fair view of the
financial position of the association as at 31 December 2002 and of the
result for the year ended in accordance with accounting principles
accepted in the Netherlands.

Amsterdam, 13 May 2003

M.H.P. van Winsen
Registeraccountant