RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE NCC
Activity Plan
and Budget 2018

RIPE NCC Activity Plan and Budget 2018

The RIPE NCC Activity Plan and Budget 2018 documents the activities that the RIPE NCC proposes to undertake in 2018 along with their associated costs, provided in terms of Full Time Employees (FTEs), Operational Costs (OPEX) and Capital Expenditure (CAPEX). The document also highlights areas of strategic focus for the organisation.
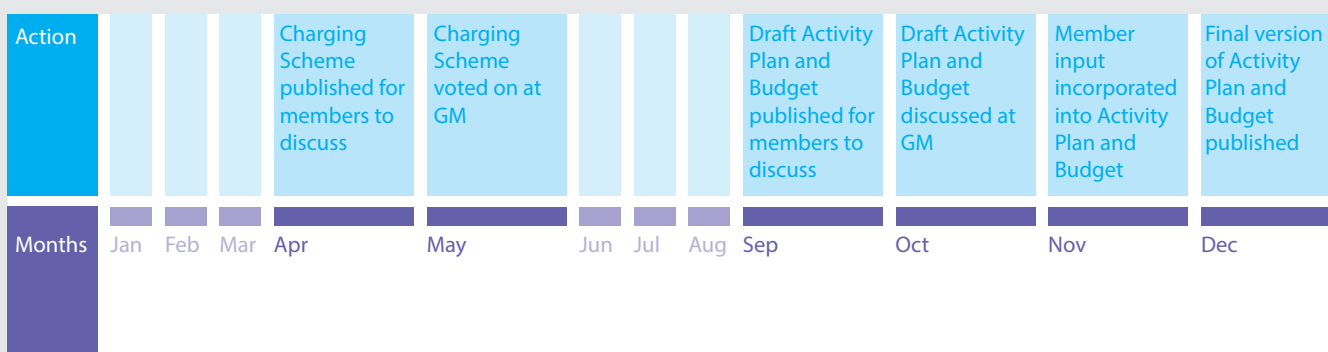
This document is the clearest way that RIPE NCC members can learn about, comment on and ultimately shape the direction the RIPE NCC will take in the coming year. The RIPE NCC views this as an integral part of maintaining the trust of its members, by ensuring high standards of transparency and accountability.

The RIPE NCC collects feedback from mailing lists, membership and community meetings, and responses to the RIPE NCC Survey 2016. The RIPE NCC also carries out member lunches across its service region to get specific feedback on its activities. This feedback is presented to the RIPE NCC Executive Board which provides comments on the draft document before an updated version is published online and announced to the RIPE NCC membership in September.

It is important that members are aware of how to provide feedback on the Activity Plan and Budget. The RIPE NCC publishes this draft version of the document before discussions take place in the RIPE NCC Services Working Group and the RIPE NCC General Meeting (GM) in October. Members are also encouraged to ask questions and discuss the document on the RIPE NCC Membership Discussion mailing list (members-discuss@ripe.net).

The feedback received over this period will be incorporated into a final Activity Plan and Budget that will be published in December, after the document is approved by the RIPE NCC Executive Board.

Shaping the RIPE NCC's Activities and Budget

Action				Charging Scheme published for members to discuss	Charging Scheme voted on at GM				Draft Activity Plan and Budget published for members to discuss	Draft Activity Plan and Budget discussed at GM	Member input incorporated into Activity Plan and Budget	Final version of Activity Plan and Budget published
Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Overview of the Strategic Focus Points in 2018

The strategic vision of the RIPE NCC is to deliver world-class services while engaging to connect people to maintain the resiliency and stability of the Internet. To achieve this vision, the RIPE NCC Executive Board has decided on four strategic focus points:

> Service Delivery and the Registry/RIPE Database – Rethink service delivery, incorporating a professional trust model, and ensure the accuracy of the Registry/RIPE Database.
> Engagement – Carry out effective outreach to all stakeholders to stay connected so we can meet the goals of the RIPE NCC.
> RIR System – Strengthen the global RIR system and ensure its accountability, transparency and resilience, and allow it to adapt to the changing environment.
> Member Base – Understand the member base to meet its needs and add value for members.

Ensuring the accuracy of the data in the RIPE Registry is of critical importance to RIPE NCC members and the wider Internet community. This will remain a key focus point in the coming years, as will rethinking the delivery of related services so that members are more than satisfied from their interactions with the RIPE NCC. Rethinking the RIPE NCC's service delivery will involve incorporating a professional trust model that strikes the right balance between carrying out appropriate due diligence for the security of members' resources and achieving high levels of customer service.

For the RIPE NCC to achieve its goals, effective engagement with its members, the RIPE community and other stakeholders is crucial. This is particularly important because the membership continues to expand, not only in terms of numbers, but also in terms of the different sectors and industries that are joining the RIPE NCC. Understanding exactly who these new members are and what they expect in terms of service and adding value to their operations will remain a focus area in the coming years. The RIPE NCC will work to ensure that the time members spend accessing its services is appropriate, while maintaining an effective and close business relationship with them.

As one of five Regional Internet Registries (RIRs), the RIPE NCC must play its part in ensuring the overall RIR system is robust and able to face whatever challenges may come from a changing Internet environment. With each passing year, the Internet becomes more integral to all aspects of society and it is reasonable to expect that outside attention on the RIR system will increase. The RIPE NCC will work to proactively strengthen the RIR system by increasing its accountability, transparency and resilience.

Executive Summary

In 2018, the RIPE NCC's Budget will increase by 5%. The largest part of this increase is due to Registry Maintenance, Training, IT and Information Security, DNS and K-Root Operations, and Finance and Administration. The RIPE NCC plans to increase its FTE count by 4% in 2018 (from 148 FTE to 154). The RIPE NCC membership fee will remain at EUR 1,400 per LIR and there is an anticipated surplus of EUR 6.24 million. The cost per LIR is expected to be EUR 1,436.

The previously separate activities of Member Outreach and External Relations have been merged into one Outreach and Engagement activity.

There are two new activities within the Training Services section: RIPE NCC Educa is a series of one day webinars given by RIPE NCC trainers and experts from the community. The RIPE NCC Academic Partnership Programme will place RIPE NCC training material within the curricula of universities in the RIPE NCC's service region.

There are several activities that have the status "Expanding", which means the costs for these activities have increased by at least 10% over the 2017 Budget. In line with the strategic goals set out above, the main increases come in the areas relating to registry accuracy, effective engagement, rethinking service delivery and strengthening the RIR system. The expansion of several areas is also linked to the addition of FTEs to handle the still-increasing membership (there were over 16,200 LIRs at 30 June 2017 and this is expected to grow to 19,400 by the end of 2018).

From the areas that are decreasing by more than 10%, most are due to higher costs from 2017 reducing naturally. For RPKI, the activity decreases as the consultancy fees paid here are moved to other software development areas. The RIPE NCC moved office at the end of 2016, so the reduction in the Facilities area is due to the decreased efforts now that this has been completed.

Activities that are increasing or decreasing by 10% compared to the 2017 Budget.

⊕ Expanding	⊖ Decreasing	💡 New Activities
› Registry Maintenance	› Establishing Contractual Relationships with Legacy Internet Resource Holders	› RIPE NCC Educa
› Assisted Registry Check (ARC)		› RIPE NCC Academic Partnership Programme
› Internet Number Resource Investigations, and Dispute and Hijacking Handling	› Resource Certification (RPKI)	
› LIR Portal	› RIPE Atlas Anchors	
› Training	› IPv6 support	
› Training Courses and Workshops	› RIPE Policy and Community Support	
› RIPE NCC Academy	› Facilities – Rent and Utilities	
› Webinars	› Legal	
› RIPEstat	› Organisational Activities: Executive Board, Arbitration Panel and General Meetings	
› DNS and K-root Operations		
› Data analysis and Scientific support		
› RIPE Labs		
› ICANN/IANA/IETF/ISOC/RIRs		
› RIPE Fellowship		
› IT and Information Security		
› Finance and Administration		

Note: activities are deemed to be expanding or decreasing in financial terms only. This does not reflect a greater or lesser degree of importance being placed on certain activities.

Overview of RIPE NCC Costs per Activity 2018

On the following page is an overview of the Full-Time Equivalents (FTEs), Operational Expenses (OPEX) and Capital Expenses (CAPEX) per activity. All amounts are in kEUR. The overview is presented on two levels. It is possible to click on any Level 1 or Level 2 activity for more detailed information.

For a detailed description of FTE, OPEX and CAPEX, please see Appendix 3.

Overview of RIPE NCC Budgeted Costs for 2018

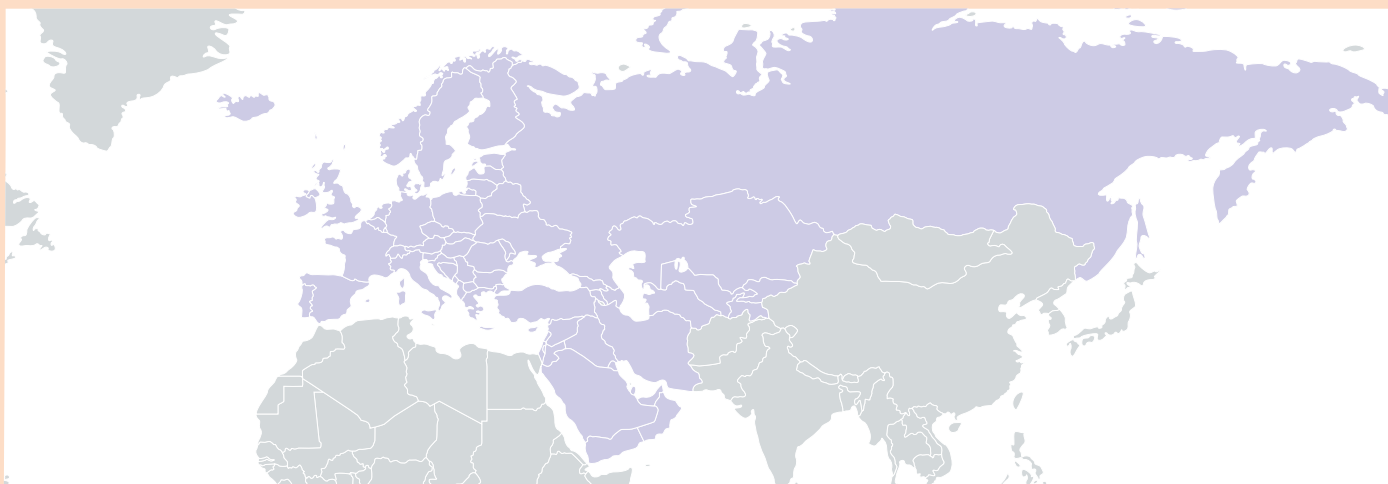|	FTEs	OPEX kEUR	CAPEX kEUR	Change from 2017 in %
1. Regional Internet Registry	**49.6**	**5,628**	**-**	**8%**
1.1 Registry Maintenance*	37.1	3,829	-	19%
1.2 RIPE Database	7.0	906	-	1%
1.3 Resource Certification (RPKI)	1.6	208	-	(64%)
1.4 LIR Portal	3.9	685	-	32%
2. Services	**30.0**	**3,862**	**395**	**12%**
2.1 Training	10.6	1,442	-	27%
2.2 RIPEstat	5.9	743	148	10%
2.3 RIPE Atlas and RIS	10.5	1,237	247	5%
2.4 Other Services	3.0	440	-	(3%)
3. Coordination Activities	**42.7**	**9,268**	**152**	**4%**
3.1 DNS and K-root Operations	4.2	797	140	14%
3.2 Data Analysis and Scientific Support	3.2	417	12	17%
3.3 RIPE Labs	2.1	348	-	45%
3.4 Outreach and Engagement*	18.4	3,811	-	2%
3.5 IPv6 Support	1.6	148	-	(11%)
3.6 RIPE Meetings	5.9	1,780	-	(2%)
3.7 RIPE Policy and Community Support	1.6	184	-	(20%)
3.8 ICANN/IANA/IETF/ISOC/RIRs	4.7	1,258	-	15%
3.9 Good of the Internet	1.0	525	-	(5%)
4. Internal	**32.2**	**7,699**	**628**	**2%**
4.1 IT and Information Security	12.6	2,836	528	15%
4.2 Facilities - Rent and Utilities	0.6	1,007	100	(19%)
4.3 Management and HR	8.5	2,355	-	(1%)
4.4 Finance and Administration	7.9	1,017	-	20%
4.5 Legal	0.5	166	-	(13%)
4.6 Organisational Activities: Executive Board, Arbitration Panel and General Meetings	2.1	318	-	(30%)
Total	**154.5**	**26,457**	**1,175**	**5%**

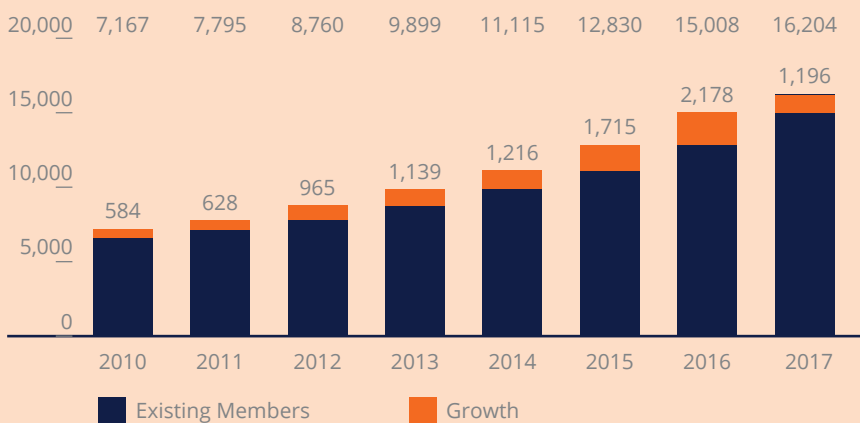** RIPE NCC strategic focus point for 2018*

RIPE NCC Activities 2018

1) Regional Internet Registry

RIPE NCC Service Region

Annual Membership Growth

Values above chart: 7,167   7,795   8,760   9,899   11,115   12,830   15,008   16,204

Growth values: 584   628   965   1,139   1,216   1,715   2,178   1,196
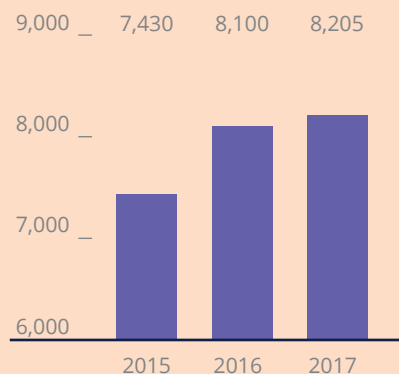
Years: 2010   2011   2012   2013   2014   2015   2016   2017

■ Existing Members   ■ Growth

Internet number resource records the RIPE NCC is responsible for

93,000   101,000   110,000

Years: 2015   2016   2017
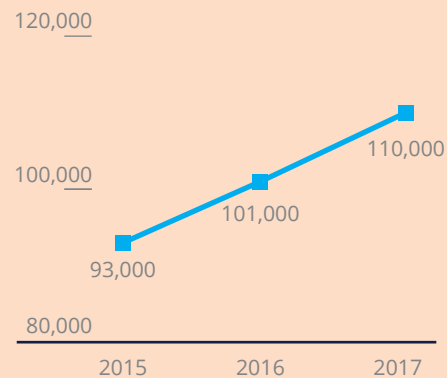
Annual IPv4/IPv6/ASN Allocations and Assignments
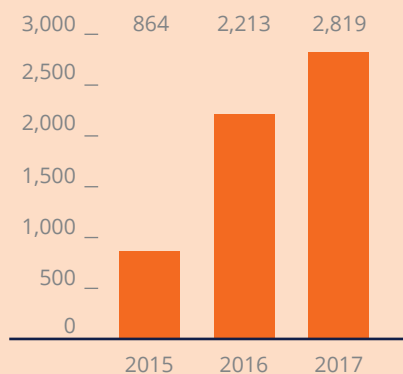
7,430   8,100   8,205

Years: 2015   2016   2017

Assisted Registry Checks

864   2,213   2,819

Years: 2015   2016   2017

Resource Certificates Created

2,932   3,736   4,713

Years: 2015   2016   2017
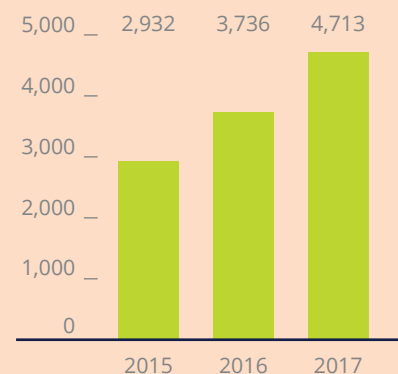
1.1 Registry Maintenance

Registry Maintenance	Status: **Expanding**				

Description

The RIPE NCC is responsible for assigning and allocating Internet number resources (IPv4, IPv6 and AS Numbers) within its service region. A key responsibility is to maintain the accuracy and quality of the RIPE Registry, which contains information about the current holders of these resources. This includes public information available in the RIPE Database as well as other non-public registration information held by the RIPE NCC.

Benefits

> Improves the overall accuracy of the data in the RIPE Registry
> Improves the accuracy of legacy address space registration records
> Supports members and the RIPE community with their operations and business needs
> Inter-RIR transfers allow members to access unused address space from organisations in other RIR regions
> Meets the strategic goals of improving registry accuracy and engaging with members to better understand their needs

FTEs	Cost	CAPEX
37.1	3,829	-

Internet number resource records the RIPE NCC is responsible for

2015:	2016:	2017:
93,000	101,000 (+8.6%)	109,914 (+8.8%)

The exhaustion of the unallocated "free pool" of IPv4 address space means the RIPE NCC has adapted its registry function to maintain its careful stewardship of resource registrations. There is a continuing focus on legacy address space, with the goal of bringing registration records up to the same standards of accuracy as address space that was distributed by the RIPE NCC. Additionally, the RIPE NCC works to ensure that the RIPE Registry can accurately deal with a high level of IPv4 transfers and a heightened potential for conflicts over address space, both resulting from the growing scarcity of IPv4. The RIPE NCC will continue to respond to any community-driven initiatives to increase the accuracy of registry data.

As part of this stewardship role, the RIPE NCC gives special attention to protecting resource holders against hijacking of their Internet number resources. While this involves more strict verification requirements when evaluating requests, the RIPE NCC is mindful of the balance between ensuring due diligence on the one hand while not being overly bureaucratic or inflexible on the other. The RIPE NCC is continuously reviewing its service delivery to maintain a balance between trust, due diligence, accuracy of registry data and offering the best possible service to members.

Services such as the Assisted Registry Check will continue to provide an incentive for resource holders to maintain accurate registration information. The focus will be on increasing the value of services that the RIPE NCC can provide to its members to improve their day-to-day operations, while at the same time maintaining the accuracy of registry and RIPE Database data. We will also continue to monitor technological developments like RPKI and Blockchain to assess the effect that new technologies will have on the stability and the accuracy of the registry.

The RIPE NCC will continue its work in partnership with the other RIRs to improve data quality and to make this data readily available to the Internet community. The ongoing processing of inter-RIR transfers means that close ties will need to be maintained among the participating RIRs.

1.1.1 Distribution of IPv4/IPv6 Address Space and Autonomous System (AS) Numbers
Status: Ongoing
Measurable usage: Approximately 8,205 allocations and assignments from 1 July 2016 to 30 June 2017.

The RIPE NCC provides fair, impartial and stable distribution of Internet number resources according to policies developed by the RIPE community. In addition to the allocation and assignment of IPv4 and IPv6 address space, the RIPE NCC also assigns AS Numbers and registers these along with the initial associated routing policy. This ensures the uniqueness of AS Numbers and collects data for the RIPE Routing Registry. Since 2007, the RIPE NCC has assigned AS Numbers from both the 16-bit and 32-bit pools.

Benefits for RIPE NCC members / RIPE community:
> Provides fair and impartial distribution of Internet number resources guided by policies developed by the RIPE community
> Promotes the efficient use of IP address space and AS Numbers
> Facilitates the optimal aggregation of routing information
> Supports members with the relevant processes and procedures

1.1.2 Management of Internet Number Resources
Status: Ongoing
Measurable usage: The RIPE NCC is administratively authoritative for approximately 109,914 Internet number resource records.

The RIPE NCC manages the complete lifecycle of Internet number resources within its service region, supporting updates of the registration data and deregistering resources that have been returned. In order to facilitate the transfer of IPv4 address space between members, the RIPE NCC provides the IPv4 Transfer Listing Service. From 1 July 2016 to 30 June 2017, the RIPE NCC transferred 2,176 original IPv4 blocks, 419 ASNs and 213 IPv6 blocks within its service region. The RIPE NCC also processes inter-RIR IPv4 transfers – transferring 23 IPv4 blocks out of the region, and receiving 114 IPv4 blocks from other regions over this same period. The RIPE NCC expects that the work involved with transfers will continue to increase in 2018.

Benefits for RIPE NCC members / RIPE community:
> Ensures the uniqueness of IP addresses, aggregation of routing information and conservation of IP address space
> Implements the necessary procedures to enable the processes defined by RIPE Policies
> Enables the accurate registration of network management and contact information
> The inter-RIR transfer policy means that RIPE NCC members can access the resources of organisations in other RIR regions

1.1.3 Assisted Registry Check (ARC)

Status: Expanding

Measurable usage: 2,819 Assisted Registry Checks from 1 July 2016 to 30 June 2017.

The Assisted Registry Check (ARC) gives LIRs an opportunity to receive personalised support from the RIPE NCC. This includes help creating database objects to improve contact data, removing inconsistent resource records and providing clarification on RIPE Policies. The aim is to strengthen registry data while supporting the daily technical operations of the membership.

The ARC review covers four broad subject areas:
- › Registry consistency
- › Resource consistency
- › Route/rDNS consistency
- › Resource Certification (RPKI) usage/consistency

In the past year, the RIPE NCC used ARCs to target LIR accounts that did not have an LIR Portal admin account. In general, these are members that have not been in contact with the RIPE NCC for a long period of time. It was found that despite having outdated information, these members were reluctant to cooperate. It took more time and effort to make contact and explain the risks of outdated information and the benefits of ensuring their data was correct. This shows the importance of a direct relationship with the RIPE NCC member base and gaining a greater understanding of its needs and motivations. Maintaining a closer and more regular business relationship will be essential to ensure a strong registry. The goal for 2018 is to carry out ARC reviews for 25-30% of the membership and this additional effort accounts for the expansion of this activity.

Benefits for RIPE NCC members / RIPE community:
- › Helps RIPE NCC members to maintain accurate registry data
- › Provides RIPE NCC members with an overview of how their networks are perceived by an independent entity
- › Provides personalised support to members
- › Provides an incentive and an easy way for LIRs to keep their RIPE Database objects up to date
- › Allows the RIPE NCC to stay in more frequent contact with its members and better understand their needs

1.1.4 Maintenance of Contractual Information on End Users and Sponsoring LIRs

Status: Ongoing

Measurable usage: Contracts for approximately 53,150 End User Internet number resource records are overseen by the RIPE NCC.

Subject to the RIPE Policy on contractual requirements for holders of independent resources (ripe-637), the RIPE NCC ensures that changes to contractual arrangements between sponsoring LIRs and End Users are followed up on and the appropriate administrative action taken.

In 2015, the RIPE NCC finalised the process of implementing the RIPE Policy related to establishing an indirect or direct contractual link between the End Users of independent Internet number resources and the RIPE NCC (ripe-637). All independent resources are now covered by a contractual relationship that the RIPE NCC will follow up on.

Benefits for RIPE NCC members / RIPE community:
- › Ensures that Internet number resources are registered to the legitimate End Users or legacy resource holders
- › Ensures that all resources are covered by a contractual relationship
- › Maintains the accuracy of the RIPE Registry

1.1.5 Establishing Contractual Relationships with Legacy Internet Number Resource Holders

Status: Decreasing

Measurable usage: The total number of legacy Internet resources within the RIPE Registry is approximately 4,200 parent IP blocks and 35,000 more specific blocks. There are also 740 legacy AS Numbers. By 30 June 2017, approximately 55% of legacy address space in the RIPE NCC service region was registered either directly or via a sponsoring LIR. In the 12 months prior to 30 June 2017, there were 104 requests to update the RIPE Registry following legacy resource transfers.

Historically, legacy resources have been held without any formal relationship existing between their holders and the RIPE NCC. In order to improve the accuracy and trustworthiness of registry data, the RIPE community created the policy, "RIPE NCC Services to Legacy Internet Resource Holders" to allow for a formal relationship to be established between legacy resource holders and the RIPE NCC.

In 2015, the RIPE NCC finished contacting all legacy holders to offer them the option of establishing an indirect or direct contractual link with the RIPE NCC. With all legacy holders having been contacted, this activity is decreasing, though maintaining these contractual relationships will continue to exist as an ongoing activity.

Benefits for RIPE NCC members / RIPE community:
> Ensures that legacy resources are registered to the legitimate resource holders
> Safeguards resources from hijacking
> Creates a formal relationship between legacy holders and the RIPE NCC
> Maintains the accuracy of the RIPE Registry

1.1.6 Internet Number Resource Investigations, and Dispute and Hijacking Handling

Status: Expanding

Measurable usage: The RIPE NCC has investigated over 400 potential hijacks since 2012. From 1 July 2016 to 30 June 2017 the RIPE NCC handled 70 investigations. The RIPE NCC received and investigated 594 abuse reports from 1 July 2016 to 30 June 2017.

Since September 2012, the RIPE NCC has seen a significant increase in the number of attempted IP address hijackings taking place within its service region. Due to the increasing scarcity of IPv4 address space, the RIPE NCC expects this to continue for the foreseeable future, with not only legacy and Provider Independent resources being targeted, but also Provider Aggregatable address blocks. The past 12 months have seen a number of incidents where hijackers attempted to impersonate resource holders, either to gain control of their resources in the RIPE Database or to sell them to third parties who were unaware that they were not from the legitimate holder.

Hijackers are using sophisticated methods to gain access to resources, such as test announcements to verify usage, falsified documents, re-registering domains and making copies of websites. Although the rate of new cases has shown a relative decline, the complexity of each investigation and the time spent on support activities, involving several divisions across the RIPE NCC, is increasing. This is particularly the case regarding disputed claims on address space being transferred between RIPE NCC members. Legacy space remains particularly susceptible to hijacking attempts because the RIPE NCC did not issue the resources and therefore has no authoritative documentation on the original distribution and changes in holdership over time.

The RIPE NCC also checks for unauthorised changes to the RIPE Database objects for which it is administratively responsible (mainly independent Internet number resources).

Benefits for RIPE NCC members / RIPE community:
> Safeguarding the resources of legitimate resource holders
> Maintaining the accuracy of the RIPE Registry
> Executing the policies decided on by the RIPE community

1.2 RIPE Database

RIPE Database	Status: **Ongoing**

Description

The RIPE Database contains information about the IP addresses and AS Numbers used by networks within the RIPE NCC service region. For these resources, the database carries information about their current holders along with contact details and related attributes. Resource holders are responsible for maintaining the information in the database, while the role of the RIPE NCC is as data controller.

Benefits

> Enables a range of users to find the information they need for network troubleshooting or determining abuse contacts
> Ensures the stability of global Internet routing
> Makes sure the RIPE Database is robust and secure
> Provides greater integration with the LIR Portal

FTEs	Cost	CAPEX
7.0	906	-

RIPE Database queries per minute

2015:	2016:	2017:
18,000	20,000 (+11.11%)	22,000 (+10%)

The RIPE Database provides information that is crucial for network troubleshooting and determining abuse contacts. The database has a wide range of users, including network engineers, system administrators and researchers. The service is available for anyone that needs information about networks and Internet number resources.

The RIPE Database also includes the RIPE Routing Registry, which is part of the global Internet Routing Registry (IRR). The IRR ensures the stability and consistency of global Internet routing by sharing information between network operators. The IRR consists of several databases, including the RIPE Routing Registry, in which network operators can publish their routing policies and routing announcements.

The RIPE NCC works to ensure that the RIPE Database remains a high-quality service with close to 100% uptime. The RIPE NCC has staff on 24/7 support to ensure that any incidents are addressed quickly. However, almost all of the effort in this regard is spent pro-actively: by managing hardware, operating systems and software life cycles, carefully testing any new releases in the Release Candidate environment, and monitoring the service and planning for resilience and scalability.

The RIPE NCC works to understand and implement the wishes of the RIPE community with regards to the database. This involves working on features and changes requested by the RIPE Database Working Group, supporting RIPE policies emerging from other working groups, and keeping up with technical standards discussed in the IETF and among the RIRs.

The RIPE NCC uses any remaining time for other improvements and feature implementations. These may be focused on improving the internal processes of the RIPE NCC, but a lot of effort is also spent on improving the usability of the RIPE Database to create efficiencies for those who rely on the database for their operations. Priority setting for these improvements is done on the basis of measurements of time spent on processes, as well as questions and requests we receive from users of the database, and feedback from individual users – for example at training courses and in discussions at various meetings.

1.2.1 Outreach and Support

Status: Ongoing

The RIPE NCC is committed to supporting users of the RIPE Database. Training courses on how to use the RIPE Database are provided to RIPE NCC members. Furthermore, the RIPE NCC responds to user requests through customer support channels and through the feedback received from the bug reporting tool on the website. Requests range from users who have lost access to a maintainer object to users with problems setting up reverse DNS, to more general questions about the RIPE Database.

The development of the RIPE Database is done in close collaboration with all stakeholders. New features of the core database services are suggested, discussed and approved by the RIPE Database Working Group before they are implemented. New services that integrate with or extend the database software can also be initiated and defined in other forums such as the IETF or with feedback from training courses and direct customer contact.

In 2018, the RIPE NCC will continue to reach out to database users. The only way to create and provide an excellent service is by knowing the users and by involving them in the entire process.

The RIPE NCC is committed to providing transparency by having the software available as open source. This also enables third-party developers to contribute to the development of the database.

Benefits for RIPE NCC members / RIPE community:
> Provides transparency and awareness of changes to the RIPE Database
> Ensures that the RIPE NCC's priorities for the database match the RIPE community's
> Provides users with training and support on how to use the RIPE Database

1.2.2 New Feature Development

Status: Ongoing
Measurable achievements: five releases from 1 July 2016 to 30 June 2017.

Improvements to the RIPE Database are made on a continuous basis. The RIPE NCC works closely with the RIPE community to implement new features and priorities are established in cooperation with the appropriate RIPE Working Groups. The RIPE NCC closely monitors new policies and assesses any impact they might have on the database software and suggests implementation plans.

In 2017, we made significant improvement in the usability of the RIPE Database web-based user interface. We made it much easier to set up domain objects for reverse DNS, reducing the error rate by 65%. Another major body of work has gone into showing users of the RIPE Database an easy overview of all the resource objects that they manage. In 2018, we will continue to build on this to make it easier for users to manage various aspects of their resources, such as contact or abuse information, authorisations, managing reverse DNS lameness or route(6) objects.

Benefits for RIPE NCC members / RIPE community:

> Simplifies use of the database
> Creates more efficient ways to use the RIPE Database
> Supports improving the data quality of the RIPE Database
> Provides an overview of member resources in one location

1.3 Resource Certification (RPKI)

Resource Certification (RPKI)	Status: **Decreasing**	⊖	＝	⊕	💡

Description

RPKI is a community-driven system that allows resource holders to request a digital certificate listing the Internet number resources they hold. A resource certificate offers proof of holdership of a resource's allocation or assignment by an RIR. It allows the holder of the certificate to make statements with regards to the resources listed on the certificate. The practical application offered today is the ability to use the certificates to help secure Internet routing, particularly BGP Origin Validation.

Benefits

› Offers network operators a reliable system for performing BGP Origin Validation based on the RPKI data set

› The option to run a self-hosted open source package for running a local certificate authority

› A robust, open source validation package for using RPKI data, optionally in conjunction with supported router hardware

› A stepping stone towards full BGP security, including path validation, as developed by the SIDR working group in the IETF

FTEs	Cost	CAPEX
1.6	208	-

Resource certificates created

2015:	2016:	2017:
2,932	3,736 (+27.4%)	4,713 (+26.2%)

RIPE NCC announced IPv4 space covered by ROAs

2016:	2017:
11.6% of prefixes, 22.8% of addresses	13.5% of prefixes (+16.4%), 28.1% of addresses (+23.2%)

The Resource Certification (RPKI) system uses open standards that were developed by the Secure Inter-Domain Routing (SIDR) Working Group in the IETF. All Regional Internet Registries are committed to operating a resource certification system, making this a global effort.

RPKI has been fully developed into a mature system. The RIPE NCC does not see the need for significant development of new functionality on the RPKI back-end next year. However, the RIPE NCC is planning to implement the use of new RPKI Hardware Signing Modules (HSM) purchased in 2017, as the current modules are five years old and due for replacement.

The RIPE NCC may also pursue further development of the RPKI Validator, depending on the community's feedback after the RPKI Validator 3.0 is released in late 2017.

1.4 LIR Portal

LIR Portal	Status: **Expanding**	⊖	=	⊕	💡

Description

The LIR Portal is the main member interface with the RIPE NCC, which allows members to manage their Internet number resources and related registration information. It also contains tools such as the IP Analyser and IPv6 Analyser, which are being integrated with the RIPE Database functionality into My Resources.

Benefits

› A single place to manage Internet number resources
› Clean user interface, easy to use wizards and tight integration with the RIPE Database
› Strong security with two-factor authentication
› User-friendly Live Chat service that allows users to easily talk with an expert
› Meets strategic goals of improving registry accuracy and better understanding the member base and its needs

FTEs	Cost	CAPEX
3.9	685	-

Page views per month (logged in)

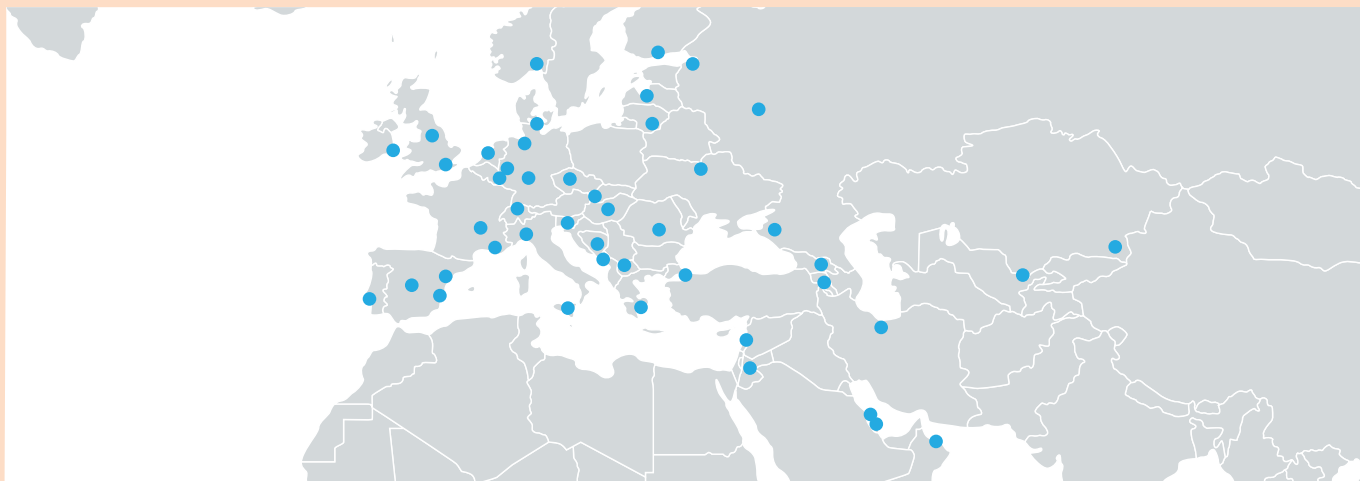| 2015:	2016:	2017:
~140,000	~150,000 (+7.1%)	~108,000 (-28%)

In 2017, we started integrating the LIR Portal and RIPE Database user interface in order to provide LIRs with a seamless experience when managing their resources. Significant effort has also been spent on introducing a new ticketing system and integrating this with request workflows.

In 2018, we will continue the goal of making it easier for members to manage their operations effectively and easily. This will become apparent in the blending of LIR Portal and RIPE Database functionality, which will bring more efficiency gains and easier management for resource holders.

2) Services

Training Course Locations in 2017

RIPE Atlas at a Glance

Results collected
5,200/second

RIPE Atlas visitors
34,655

Originating ASNs covered

IPv4	IPv6
3,452 **(5.92%)**	1,308 **(9.46%)**

Active probes
10,112

Countries covered
180 **(91.327%)**

RIPE Atlas Anchors
250
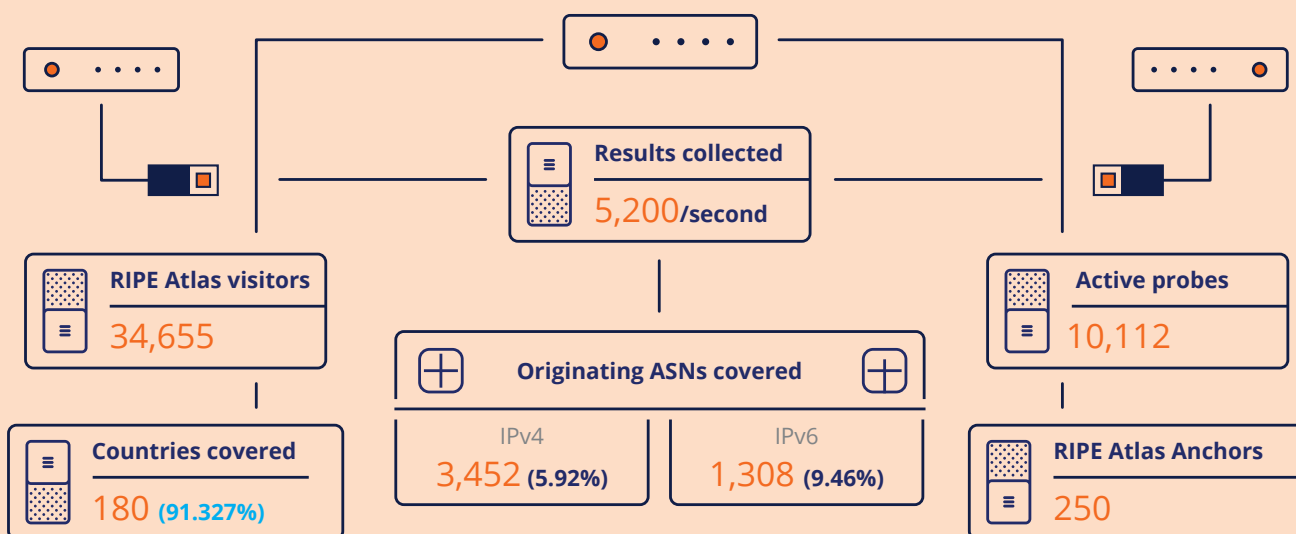
RIPEstat Queries per Day

2.1 Training

Training		Status: **Expanding**			

Description

The RIPE NCC provides regular face-to-face training courses within its service region on daily operations and specialised areas, such as IPv6 and routing security. The goal of this training is to increase efficiency, raise members' awareness of their role as part of the RIPE community and improve understanding of the RIPE NCC's procedures and tools. In addition to the face-to-face courses, the RIPE NCC provides training courses and learning resources online, including certified training through the RIPE NCC Academy. This activity is expanding due to the addition of two new programmes.

Benefits

> ❯ Helps members to understand the RIPE NCC's processes and how to request Internet number resources
> ❯ Builds knowledge of upcoming technologies, best practices, protocols and RIPE Policies
> ❯ Increases awareness of the tools and services provided by the RIPE NCC
> ❯ Members and non-members can conveniently access learning materials online
> ❯ Members have the opportunity to gain certificates demonstrating their knowledge
> ❯ Meets strategic goals of improving registry quality, improving engagement with members and getting a better understanding of the member base

FTEs	Cost	CAPEX
10.6	1,442	-

Training Courses and Workshops

2015:	2016:	2017:
104	90 (-13.5%)	96 (+6.7%)

Webinars

2015:	2016:	2017:
53	42 (-20.8%)	55 (+31%)

For 2018, the RIPE NCC Executive Board has asked the RIPE NCC to further develop its online learning options, enabling members and the RIPE community to easily follow training courses and share best current practices online while allowing the RIPE NCC to reach members outside regular destinations.

The focus in 2018 on Outreach and Engagement (section 3.4) is also assisted by Training Services, which provides resources for activities such as IPv6 Roadshows, presentations at industry events and hands-on workshops at meetings. Face-to-face training and interaction with members will remain an important part of the RIPE NCC's efforts to engage with members and find out how their needs can be met.

The RIPE NCC is also coordinating with technical experts and trainers in several regions on a "Train the Trainer" program. This initiative prepares teams of local trainers to spread the technical knowledge required to build and operate IPv6 networks far beyond what might be achieved by the RIPE NCC alone. In 2018, local trainers were trained in both the MENOG and ENOG regions.

Two new activities will be included in 2018 – RIPE NCC Educa, which is a series of one-day online events, and the RIPE NCC Academic Partnership Programme, which will see RIPE NCC training material incorporated into the curricula of university engineering departments. More information on these activities is included below.

2.1.1 Training Courses and Workshops

Status: Expanding

Measurable usage: From 1 July 2016 to 30 June 2017, the following courses were given:

› LIR and RIPE Database Training Course: 9
› LIR Training Course: 9
› Basic IPv6 Training Course: 27
› Advanced IPv6 Training Course: 17
› BGP Operations and Security Training Course: 12
› DNSSEC Training Course: 10
› RIPE Database Training Course: 9
› Measurements and Tools Training Course: 1
› IPv6 Workshop for ISPs: 2

The RIPE NCC offers the following training courses to its members:

› The one-day Local Internet Registry (LIR) and RIPE Database Training Course introduces members to the administrative procedures and policies related to obtaining and distributing Internet number resources and operating an LIR. The course includes an overview of the RIPE Database and how to use it.
› The Basic IPv6 Training Course is a one-day session for members who are planning to deploy IPv6.
› "Advanced IPv6" is a two-day IPv6 course. Topics include IGP, BGP, security and configuration.
› The BGP Operation and Security Training Course is a two-day course working through advanced topics, offering an in-depth look into BGP.
› The RIPE Database Training Course is a practical introduction for members on usage of the RIPE Database that includes hands-on exercises
› The DNSSEC Training Course covers basic DNS theory, public key encryption basics and guides members in securing their domain name servers and zones
› In October 2017, the RIPE NCC will introduce a new course: IPv6 Security
› The Measurements and Tools Training Course was launched at the beginning of 2017. This is an introductory hands-on course covering RIPEstat and RIPE Atlas.

Apart from these, the RIPE NCC provides tutorials and workshops covering best current practices and popular topics such as IPv6, DNSSEC, Routing and Security to law enforcement agencies, governments and others on request. Workshops and presentations will also be given at RIPE Meetings and other industry events, which supports the RIPE NCC's Outreach and Engagement activity.

Benefits for RIPE NCC members / RIPE community:

› Helps members to understand the RIPE NCC's processes and how to request Internet number resources
› Assists with the IPv6 deployment process
› Builds knowledge of upcoming technologies, best practices, protocols and RIPE Policies
› Increases awareness of the tools and services provided by the RIPE NCC

2.1.2 Online Training

The RIPE NCC provides a wide range of training courses and learning resources online, including certified training through the RIPE NCC Academy. In 2018, the RIPE NCC will further develop its online learning options, allowing members and the RIPE community to easily follow training courses and share best current practices online while allowing the RIPE NCC to reach members outside regular destinations. There will also be the addition of two new activities – RIPE NCC Educa and RIPE NCC Academic Partnership Programme (see below).

2.1.2.1 RIPE NCC Academy

Status: Expanding

Measurable usage: RIPE Database Expert Course (launched October 2014): 1,820 participants; Introduction to IPv6 Course (launched June 2015): 1,570 participants; LIR course (launched October 2016): 720 participants

The RIPE NCC has been offering learning resources online for several years. These resources included instructional videos, documentation and live webinars, allowing participants to interact with RIPE NCC trainers remotely.

Following feedback showing that members wanted the RIPE NCC to provide more online learning options, the RIPE NCC Academy was launched at the end of 2014. The RIPE NCC Academy allows the RIPE NCC to offer learning modules and training courses through an interactive portal. Members are able to test and certify their knowledge and interact with the RIPE NCC and each other, sharing best current practices and experiences. In 2018, the RIPE NCC will continue to develop content for the RIPE NCC Academy.

Benefits for RIPE NCC members / RIPE community:
 › Members and non-members can conveniently access learning materials online
 › Members have the opportunity to gain certificates demonstrating their knowledge
 › Members and non-members can share best current practices and experiences
 › Members can interact with RIPE NCC trainers without having to travel

2.1.2.2 Webinars

Status: Expanding

Measurable usage: 47 webinars were given from 1 July 2016 to 30 June 2017

The RIPE NCC organises weekly one-hour interactive webinars, offering members the opportunity to learn from RIPE NCC trainers, watch live demonstrations and have their questions answered online. The number of participants is limited to 25 so that the trainers have enough time to address individual questions. Topics covered are:
 › Introduction to the RIPE Database
 › RIPE Database Advanced Topics
 › IPv6 in the RIPE Database
 › IPv6 Addressing Plan Webinar
 › Webinar for New LIRs
 › Resource Certification (RPKI)
 › Advanced RIPE Atlas Usage

In 2016, the RIPE NCC launched a webinar on RIPE Atlas, which had been frequently requested by members. The RIPE NCC Executive Board has requested development of this activity in 2017 to support more members who are unable to attend face-to-face training courses.

In 2017, the RIPE NCC delivered a series of webinars for Europol on RIPE Database usage, and an Internet Governance webinar in conjunction with EuroDIG and the IGF. The RIPE NCC plans to introduce webinars with guest speakers on current topics in 2018.

Benefits for RIPE NCC members / RIPE community:
> Enables interaction with RIPE NCC trainers on a variety of topics without having to travel

2.1.2.3 RIPE NCC Educa
Status: New Activity

In October 2017, the RIPE NCC will launch RIPE NCC Educa, a series of full-day online events with webinars that focus on a single topic. The first such event will cover RIPE Atlas and will feature not only RIPE NCC trainers but also experts from the RIPE community who can give their own insight on the services and tools provided by the RIPE NCC.

The RIPE NCC Executive Board has requested development of this activity in 2018 to support members who are unable to attend face-to-face training courses.

2.1.2.4 RIPE NCC Academic Partnership Programme
Status: New Activity

In 2018, the RIPE NCC will work to incorporate its online training material into the curricula of Computer Science and Engineering departments in universities across its service region. In the Middle East, a pilot programme saw the RIPE NCC visit six universities to explain the basic technical fundamentals that allow the Internet to function, such as standardisation, numbering and naming. The students and faculty in attendance learned about the organisations that coordinate these efforts, their operating models and how to get involved.

By taking a more formal approach to these efforts, and by including the RIPE NCC's training material into the curricula of universities, engineers and computer scientists will get a better grasp of the realities of network engineering and the Internet environment. RIPE NCC members and others in the community should also benefit from having the ability to hire graduates that are already familiar with Internet operations as they are carried out in the industry.

This work also helps the RIPE NCC to promote such programmes as RACI and the RIPE Fellowship, further strengthening links with the academic community and the network engineers of the future.

2.2 RIPEstat

RIPEstat	Status: **Expanding**	⊖	⊜	⊕	💡

Description

RIPEstat is a web-based interface that provides information about IP address space, ASNs and related information for hostnames and countries in one place. It presents registration and routing data, DNS data, geographical information, abuse contacts and more from the RIPE NCC's internal data sets as well as from external sources.

Benefits

› Provides current and historical information about Internet number resources, including those the user is responsible for
› Will provide members with routing-specific functions, such as alarms
› Additional targeted analysis options provided specifically for members
› Provides a single, consolidated interface for accessing all RIPE NCC public data

FTEs	Cost	CAPEX
5.9	743	148

Queries per day

2015:	2016:	2017:
4 million	6 million (+50%)	30 million (+400%)

The country-based reports have been expanded in 2016 and 2017 by creating an interface that focuses on comparisons and country-specific reports as well as visualisations that serve interested parties beyond the network operations community. We plan to continue this work in 2018.

Usage of RIPEstat has increased significantly mid-2016: the number of queries against the API increased five-fold within a year. Even though the scale of growth was bigger than anticipated, the serving infrastructure kept up with the increased load and there seems to be no inherent bottleneck limiting growth to meet future demand.

Using feedback from RIPEstat users, the RIPE NCC will continue to evaluate other tools and features that can be incorporated to make the service more useful to members and the RIPE community.

2.3 RIPE Atlas and RIS

RIPE Atlas and RIS	Status: **Ongoing**		

Description

RIPE Atlas is a leading Internet active measurement network that collects unique data, providing valuable live and historical information about the reliability of networks and the Internet's reachability and connectivity. The RIPE NCC operates globally distributed measurement networks for the purpose of collecting data on Internet infrastructure, usage and development.

Benefits

> Provides timely, hard data on topical issues such as country-wide Internet outages
> Offers topical measurements and data analysis for RIPE NCC members
> Interfaces with network monitoring tools to add global-monitoring capabilities
> Provides datasets that can be used to analyse the operation and growth of the Internet
> RIS provides data that can be used in tools such as RIPEstat and RIPE Atlas

FTEs	Cost	CAPEX
10.5	1,237	247

Measurement results per day

2015:	2016:	2017:
~250 million	~350 million (+40%)	~420 million (+20%)

Connected RIPE Atlas probes

2015:	2016:	2017:
8,302	9,232 (+11.2%)	9,860 (+6.8%)

RIPE Atlas anchors

2015:	2016:	2017:
125	200	250

RIPE Atlas has proven to be a very useful measurement infrastructure used by operators and scientists to observe the Internet, track changes in networks and diagnose networking issues, among other things. The RIPE NCC has received very positive feedback on the value of RIPE Atlas from different groups, including RIPE NCC members, Internet service providers around the globe, press agencies, and researchers and scientists.

RIPE Atlas currently allows users to run their own measurements that test reachability and round-trip times, traceroutes, DNS, NTP measurements and more – from thousands of vantage points around the globe. All measurements are aggregated and provide a big-picture view of the Internet available in several formats, including "traffic maps".

The RIPE NCC started to purchase probes using only external funding from 2014 and this approach will continue in 2018. With the number of active probes passing 10,000 in 2017, the RIPE NCC is focusing its distribution strategy to target as many ASNs as possible. The experience gained by the RIPE NCC and the move to external funding of the service means that further efficiencies can be introduced while maintaining value for users.

In 2017, the RIPE NCC continued to add features and extensions: traceroute visualisations (TraceMON), further development of the APIs, more support tools, faster response times for the main site, significantly improved probe stability, easier access of bulk data, extended support for OpenIPMap, and more.

In 2018, development will continue with improvements:
> OpenIPMap will be further developed and integrated with RIPE Atlas
> Efforts will continue to make it easier to work with measurements, sources and targets
> The back-end systems that process and store RIPE Atlas data will be scaled to accommodate the expected volume in measurement data

The RIPE NCC maintains a public roadmap for RIPE Atlas and will hold continued dialogue with the RIPE community, especially the RIPE MAT Working Group, on future developments and functionality.

Benefits for RIPE NCC members / RIPE community:
> Provides timely, hard data on topical issues such as country-wide Internet outages
> Offers topical measurements and data analysis for RIPE NCC members
> Interfaces with network monitoring tools and adds global-monitoring capabilities to such tools
> Provides datasets that can be used to analyse the operation and growth of the Internet

2.3.1 RIPE Atlas Anchors
Status: Decreasing
Measurable usage: About 250 RIPE Atlas anchors deployed by 30 June 2017

RIPE Atlas anchors are essentially enhanced probes with far greater measurement capacity than regular RIPE Atlas probes. They basically provide two functions: they perform far more measurements than regular probes and act as stable, cooperating regional targets for measurements originating from probes throughout the RIPE Atlas network. This allows users to examine measurement traffic at both the source and the destination. RIPE Atlas anchors are hosted by interested organisations (mostly data centres and IXPs), who receive additional benefits for their contribution. RIPE Atlas anchors are also used as vantage points for DNS Monitoring.

The RIPE NCC continues to deploy RIPE Atlas anchors in various partnering networks to provide a wider distribution of measurement targets. We also have a successful partnership with some of the other RIRs, who are sponsoring the deployment of anchors in their regions.

Hosting and the hardware for RIPE Atlas anchors is funded by interested parties, except for strategic locations where the RIPE NCC has a direct interest in monitoring network connectivity, such as where we host essential equipment like resiliency servers or global K-root nodes. During 2018, the RIPE NCC will also support further deployment of RIPE Atlas anchors by sponsoring a fixed number of anchor hosts. This allows us to add anchors to interesting locations that bring measurement benefits to the project, specifically in those locations where no local host can be found who is able to fund the necessary hardware purchases. This activity is expected to continue in 2018.

2.3.2 Routing Information Services (RIS)
Status: Ongoing

The RIPE NCC operates globally distributed measurement networks for the purpose of collecting data on Internet infrastructure, usage and development.

The RIPE NCC works with a range of stakeholders to unify, optimise and develop new interfaces for this data, while performing life-cycle maintenance on the collector hardware. Data collectors and back-end systems have been

replaced by a new hardware and software platform that is easier to deploy and maintain. This new architecture enables us to provide near real-time route updates to the RIPE NCC's back-end infrastructure. The RIS data is and will be accessible via RIPEstat as outlined in the sections above, and it is also available in the form of MRT dump files for those parties that prefer to create their own visualisations or reporting based on the RIS data.

In 2018, the emphasis for RIS will be on improving the scalability of the back-end infrastructure and making the near-real time data more widely available.

The RIS collector network will be expanded modestly with a maximum of five nodes per year in network areas not currently covered by the RIS project. We adapted to this model following feedback from the Routing Working Group at RIPE 71. Independently, the RIPE NCC is open to consider adding new RIS collectors in locations that bring significant additional routing visibility to the RIS project, and where a local host is able to sponsor the required collector hardware according to our specifications.

Benefits for RIPE NCC members / RIPE community:
> Provides datasets that can be used to analyse the operation and growth of the Internet
> Provides data that can be used in tools such as RIPEstat and RIPE Atlas

2.4 Other Services

Other Services		Status: **Ongoing**			

Description

The RIPE NCC manages the complete lifecycle of RIPE NCC memberships and of those wishing to take advantage of RIPE NCC services (e.g. legacy resource holders). This includes queries from potential members, applications, administrative and contractual changes, billing enquiries and account closures. The RIPE NCC also runs the RIPE Database Proxy Service, the Near Real Time Mirroring (NRTM) service and the LISP EID Registry for the benefit of the RIPE community.

Benefits

› New customers are guided through the application process
› Support is given when administrative or financial questions arise
› Members are kept aware of services, tools and features
› Members can receive personal support via Live Chat and in other languages where possible

FTEs	Cost	CAPEX
3.0	440	-

RIPE NCC Members

2015:	2016:	2017:
12,000	13,700 (+14.2%)	16,200 (+18.2%)

2.4.1 Membership Lifecycle Management

Status: Ongoing

Measurable usage: 16,204 Local Internet Registries (LIRs); 3,301 membership applications; 2,925 accounts activated; 36,156 member enquiries

The RIPE NCC manages the complete lifecycle of RIPE NCC memberships and of those wishing to take advantage of RIPE NCC services (e.g. legacy resource holders). Support and advice is given throughout the contractual relationship, including queries from potential members, applications, administrative and contractual changes, billing enquiries and account closures.

In 2018, the RIPE NCC expects to see a further substantial increase in the number of members (around 14%), leading to a greater number of applications and requests for support. The growing IPv4 transfer market is expected to continue generating high numbers of requests to update the registry as members get their administration in order. Furthermore, the RIPE NCC will continue to perform increased due diligence on membership applications and registry update requests to secure the quality of registry data.

In 2018, the RIPE NCC will review its processes to better understand and improve the customer experience, in addition to gaining efficiencies and saving time for both members and the RIPE NCC. Customer feedback will be sought, tracked and shared internally to remain aware of the expectations and opinions of our customers.

Benefits for RIPE NCC members / RIPE community:
> New customers are guided through the application process
> Support is given when administrative or financial questions arise
> Members are kept aware of services, tools and features
> Members can receive personal support via Live Chat and in other languages where possible

2.4.2 RIPE Database Proxy Service

Status: Ongoing
Measurable usage: six contracts have been signed; four actual users of the service

The RIPE Database Proxy Service is for third parties who send queries to the RIPE Database on behalf of their clients. It ensures that the daily access limits for users of the RIPE Database are correctly applied. For example, if a third party provides their clients with a web-based gateway to the RIPE Database, the proxy service ensures that daily limits are calculated based on the clients' queries and avoids the possibility of the third party's server being denied access to the RIPE Database because of too many queries from its clients.

At the 87th Executive Board Meeting, held on 26 March 2013, the RIPE NCC Executive Board decided that the RIPE Database Proxy Service should be continued free of charge, for both members and non-members, under a formal contract with the users of the service.

Benefits for RIPE NCC members / RIPE community
> Provides third parties with a mechanism for ensuring that their clients' RIPE Database queries are not added to their daily access limit
> Helps to ensure the accessibility of query gateways to the RIPE Database that third parties provide to their clients

2.4.3 Near Real Time Mirroring (NRTM)

Status: Ongoing
Measurable usage: 23 users of the NRTM service

The Near Real Time Mirroring (NRTM) service provides RIPE NCC members with a local copy of the RIPE Database. This local copy is kept up to date with modifications from the RIPE Database in near real time. The NRTM feeds do not contain any personal or private data.

Benefits for RIPE NCC members / RIPE community
> Provides members with a local copy of the RIPE Database
> Enables members to use RIPE Database data (e.g. routing data) in near real time to manage their networks without the need to continuously query the RIPE Database for changes

2.4.4 LISP EID Registry

Status: Ongoing

At the IETF, an Internet Draft for the allocation of LISP EID (Locator/Identifier Separation Protocol Endpoint ID) address prefixes was submitted. LISP EID is a "map-and-encapsulate" protocol.

The basic idea behind the separation is that the Internet architecture combines two functions: routing locators (where a client is attached to the network) and identifiers (who the client is) in one number space, the IP address. The IETF LISP Working Group has requested a trial period of three years for this protocol extension. During these three years, interested parties can request IPv6 address space from a specific designated experimental block. The LISP EID Registry was implemented in November 2016, and the RIPE NCC is now responsible for the management and registration of this temporary experimental address space.

3) Coordination Activities

K-root Locations
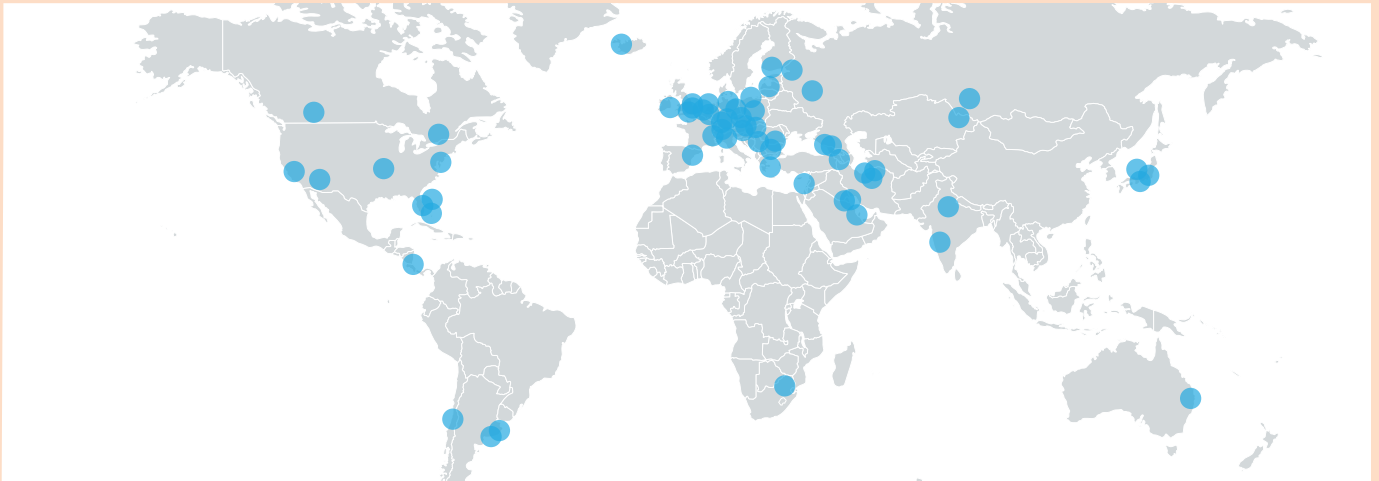
RIPE Labs Statistics

155 articles	**220,000** page views	**100,000** unique visitors	Popular content **IPv6, DNS, Routing**	Staff **106 (68%)** External **49 (32%)** total **155**

RIPE 73 Meeting

Total Attendees 631

62 Staff

445 Returning Attendee

186 Newcomer

83	73	69	53	34
DE	US	ES	NL	GB

Top 5 Countries
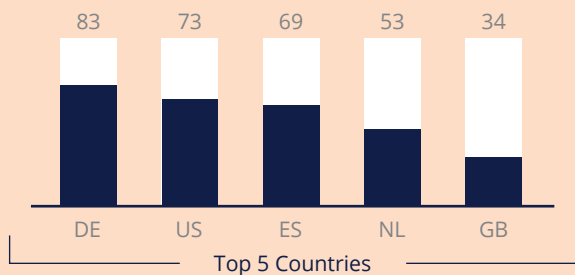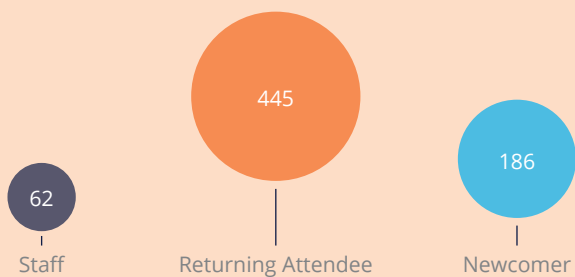
RIPE 74 Meeting

Total Attendees 629

67 Staff

414 Returning Attendee

148 Newcomer

99	98	58	54	25
US	DE	NL	GB	RO

Top 5 Countries
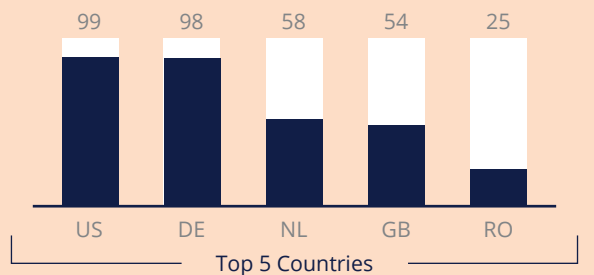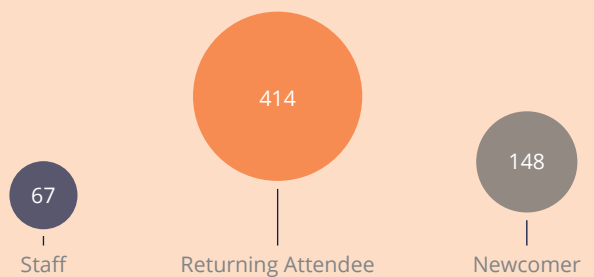
3.1 DNS and K-root Operations

DNS and K-root Operations	Status: **Expanding**

Description

The RIPE NCC provides DNS coordination and support activities as well as reverse DNS services for the IPv4 and IPv6 address space that it manages. For reverse DNS (rDNS) associated with the address space managed by other RIRs, the RIPE NCC provides secondary DNS services to support the reliability of reverse lookups.

Benefits

› Provides reverse DNS services for RIPE NCC members with registered IP addresses
› Ensures the stability and diversity of the DNS root name server system
› Guarantees the neutral, impartial and professional provision of key high-level DNS services
› Provides a secondary service for ccTLD operators

FTEs	Cost	CAPEX
4.2	797	140

K-root instances

2015:	2016:	2017:
20	42 (+110%)	53 (+26.2%)

The scalability of the DNS infrastructure for primary, secondary and reverse DNS services is improved based on the requirements specific to each of these services.

Primary and secondary DNS services by the RIPE NCC have traditionally been served from three locations, in Amsterdam, London and Stockholm, to provide resilience and geographical coverage. In 2016, the RIPE NCC decided to look for a third party to provide secondary DNS services for www.ripe.net and some other RIPE NCC domains. An external service provider was selected after following an open Request for Proposal (RfP) procedure. In addition to the three existing locations, service of these main RIPE NCC domains has, since 2016, also been provided from several tens of additional locations worldwide, via the partnering service provider.

During 2017 and 2018, the RIPE NCC will be running an experiment to test applicability of the "hosted server" model also to the DNS services provided from our authoritative DNS services platform, which supports reverse DNS operations as well as ripe.net and ccTLD services. The intention is to work with local sponsoring hosts, similar to how we already work with sponsoring local hosts for K-root anycast services.

K-root and other DNS service nodes will continue to be well maintained and supported. As a consequence, necessary lifecycle upgrades and replacements are planned for 2017.

Security-related aspects, as well as global measurement and reporting on the RIPE NCC's DNS services (for example by providing RSSAC002 data to the public) are becoming increasingly important and will continue to be areas of focus in 2017.

This activity is expanding due to the reasons explained in the more detailed sections below.

3.1.1. Reverse DNS and Reverse DNS Support

Status: Expanding
Measurable usage: three reverse provisioning instances; approximately six billion reverse DNS queries daily

The RIPE NCC delegates reverse DNS zones for the address ranges that it manages. To support this service, it provides reliable, authoritative name servers.

The RIPE NCC considers DNSSEC support a given for any DNS service provider and signs all of its zones and provides. We also provide tools for users to secure delegations received from the RIPE NCC and are continuing to improve these. In addition, we share experience by publishing operational white papers, documentation and software toolkits.

Benefits for RIPE NCC members / RIPE community:
> Supports the proper address-to-name mapping for addresses allocated to the RIPE NCC
> Provides reliable and secure reverse DNS services
> Supports the operation and maintenance of DNSSEC

3.1.2 Secondary DNS Service

Status: Ongoing
Measurable usage: 41 TLDs hosted as secondary for ccTLD operators

The RIPE NCC offers a free secondary name service to the other RIRs, and additionally to 41 country code top-level domain (ccTLD) operators who are in the start-up phase of their operations. The RIPE NCC no longer provides this service to well-established ccTLDs.

The community has provided guidelines on the eligibility of ccTLDs to receive this service, as documented in ripe-663. In 2016, the RIPE NCC started to apply the given criteria to new requests for service and to re-evaluate the eligibility of ccTLDs currently receiving the secondary service. This review process concludes during 2017. By July 2017, the number of ccTLDs receiving this service was reduced to 41. In 2018, we will again revisit the eligibility of the ccTLD operators we provide these services to. We will investigate further options to improve on the process for verifying eligibility to avoid a heavy administrative burden.

A slight increase of ccTLD operators using the secondary name service is expected, due to the increased visibility of this service and the number of potentially eligible operators.

Benefits for RIPE NCC members / RIPE community:
> Supports the stability of the global DNS by offering a professional service to the other RIRs and to developing ccTLD operators that require it

3.1.3 DNS Service in the e164.arpa Domain (ENUM)

Status: Ongoing
Measurable usage: 51 delegations in the ENUM (e164.arpa) zone

The Internet Architecture Board has an agreement with the RIPE NCC under which the RIPE NCC provides technical operation of the e164.arpa domain. This domain implements support in the DNS for the ENUM protocol, which allows the mapping of telephone numbers to domain names to facilitate services such as Voice over IP.

Benefits for RIPE NCC members / RIPE community:
> Supports the operations of one of the systems required for the deployment of the ENUM protocol, promoting increased integration between the Internet and services provided through the traditional telephony infrastructure
> Supports security of the e.164.arpa domain by deploying and maintaining DNSSEC and allowing secure delegations from ENUM operators

3.1.4 K-root Operations

Status: Expanding

Measurable usage: 53 K-root instances at 30 June 2016; approximately five billion queries daily

Root name servers are a crucial part of the Internet DNS infrastructure. The RIPE NCC operates the K-root service through a set of globally distributed anycast clusters. The RIPE NCC has operated the K-root server since 1997, when the first server was installed at the London Internet Exchange (LINX). The RIPE NCC has since deployed five global nodes of the K-root name server and, with help of the community, added several tens of K-root hosted nodes. Since 2003, the RIPE NCC has been using anycast to provide the K-root name service.

Since 2016, the RIPE NCC has been implementing an expansion plan for K-root that was proposed to the community in 2015. Following this approach, we have been able to substantially expand and improve the global coverage and reachability of K-root, supported and sponsored by organisations that opted to have a K-root hosted node in their own network. The cost of these nodes is covered by the hosts rather than the RIPE NCC.

By 30 June 2017, we had a total of 53 K-root nodes spread over a wide range of locations. This expansion plan will continue in 2018 and we expect to see around ten more hosted nodes added to the K-root anycast service. The RIPE NCC has been revising the agreements it has with some external parties that house K-root global nodes. In some cases, this has led to increased costs to formalise these support arrangements with the local hosts and has meant that new colocation facility costs have been incurred. This ongoing work has contributed to an increased operational cost for K-root in 2018.

The RIPE NCC continues to adapt the architecture of the K-root global nodes to make them more future-proof, while also increasing K-root capacity to maintain headroom against growing query and attack volumes. We have a diverse strategy to increase overall K-root capacity: we're investing in additional hardware and network capacity at our core nodes, we work with sponsoring organisations that choose to host a K-root node, and we investigate options to work with large-scale network operators to support us with an even more fine-grained K-root presence globally. The RIPE NCC is also working closely with other RIRs to identify locations that would benefit from a local K-root node and to find possible hosts for the service. These expansions and activities have resulted in a slight increase in the DNS and K-root operational costs for 2018.

Benefits for RIPE NCC members / RIPE community:
> Provides a resilient, efficient, secure and high-quality service
> Can help with the isolation of an "external" Denial of Service (DoS) attack and localises the impact of a "local" DoS attack
> Efficiently maintains the network of K-root anycast instances by monitoring network and instance problems, performing trend analysis and determining if, and where, other anycast nodes should be deployed.

3.2 Data Analysis and Scientific Support

Data Analysis and Scientific Support	Status: **Expanding**	⊖	⊜	⊕	💡

	FTEs	**Cost**	**CAPEX**
	3.2	417	12

Description

The RIPE NCC has a long-standing tradition of providing the operator community with data analysis about the state of the Internet and providing new and innovative tools that help the community understand various aspects of routing, DNS, reachability and other topics.

Benefits

› Regular reporting and analysis of various RIPE NCC-related statistics such as Internet number resource usage

› Accurate and methodological analysis of Internet events, with a particular emphasis on using data collected by the RIPE NCC's measurement systems

› Publication of interesting findings about the working of the Internet, relevant to network operators

› Prototypes of new and innovative tools that have the potential to become future RIPE NCC services

In 2018, the RIPE NCC will carry on producing high-quality research and analysis to support network operations, outage analysis, policy development (via policy impact analyses) and Internet research. Research cooperation activities with external researchers (such as university students and research centres) will be continued to provide relevant data and expertise in order to increase the usefulness of such research to network operators.

We'll also continue to develop prototype tools that, if they show enough operational value to the RIPE NCC membership and the community at large, can be evolved into future RIPE NCC services. The RIPE NCC will also aim to work with well-known publishing outfits to keep the technical community up to date with developments and changes in the global Internet infrastructure, such as the effects of natural disasters. Improving our intelligence-gathering mechanisms will also allow the RIPE NCC to gain a better understanding of the global Internet and adapt quickly to changes and new conditions.

Beginning in 2017, a dedicated budget was established to attract interns and researchers from around the world to spend time at the RIPE NCC. This provides a structured approach to developing our collaborative research program with external parties where they work closely with staff researchers. Applications are open, and the research results of these collaborations are made publicly available. This activity is expected to continue in 2018.

Based on many successful collaborations in this area, the RIPE NCC will also continue to participate at well-recognised measurement conferences in 2018.

3.3 RIPE Labs

RIPE Labs	Status: Expanding	⊖	⊜	⊕	💡

Description

RIPE Labs is a platform for network operators, developers and industry experts to expose, test and discuss innovative Internet-related tools, ideas, analysis and statistics that can benefit members and the RIPE community. These ideas are being developed both within the RIPE NCC and the community at large. RIPE Labs also provides the location for reporting on RIPE NCC Hackathons and the resource centre to support network operating groups in the service region.

FTEs	Cost	CAPEX
2.1	348	-

Articles published

2015:	2016:	2017:
80	97 (+21.3%)	155 (+59.8%)

Benefits

› Informs the community about new ideas and prototypes the RIPE NCC is working on
› Provides a platform for community members to present and discuss their research
› Provides a channel for community feedback
› Provides a statistics dashboard showing a large range of operational statistics

The Statistics Dashboard has been one of the most popular pages on RIPE Labs, together with articles on topics related to IPv6, routing and security. All the RIPE NCC's outreach efforts are also documented and published on RIPE Labs by staff who go to events in the Internet community to learn about industry developments and engage with attendees.

In 2018, the RIPE NCC will continue to reach out to the wider community and to attract content from external sources such as researchers, network operators and experts in other fields who can give insight to the RIPE community. In the year to 30 June 2017, over 100,000 unique visitors came to RIPE Labs.

RIPE Labs also serves a valuable function in promoting and publishing the work and research that emerges from RIPE NCC Hackathons. These hackathons focus on specific topics, such as RIPE Atlas or IXP measurements, and they bring people together from various backgrounds to collaborate on projects. The work of the hackathons is published on RIPE Labs, as is the code produced on the projects. The hackathons have proven to be very successful in fostering engagement with talented people who produce innovations that the whole community can benefit from. The sixth RIPE NCC Hackathon in late 2017 will focus on IPv6 and will be well documented on RIPE Labs.

In 2017, RIPE Labs also published a resource centre for network operator groups (NOGs) in the RIPE NCC service

region. The RIPE NCC attaches great importance to the development of local networking communities and is happy that it can support new and established NOGs by providing sponsorship, expertise and a platform on RIPE Labs to share information and learn from each other's experiences. In 2018, work will continue to further develop this area of RIPE Labs, helping to meet the strategic goals of increasing engagement with our members and getting to better know them and their needs.

3.4 Outreach and Engagement

Outreach and Engagement	Status: Ongoing

	FTEs	Cost	CAPEX
	18.4	3,811	-

Description

The RIPE NCC engages with a wide range of external parties, including our members, the technical community, governments, law enforcement and other communities to achieve our strategic goals.

Benefits

› Ensures the RIPE NCC can better understand and respond to the needs of all stakeholders
› Contributes to the strength and legitimacy of the bottom-up community driven policy-making, as practiced in the RIPE community
› Promotes openness and transparency in the development of public policy relating to the Internet, as well as raising any specific concerns for the RIPE NCC membership or the RIPE community

Outreach and engagement have been identified as a strategic focus point for 2018, and activities in this area are fundamental to two of the other strategic focus points, specifically the need to better understand the RIPE NCC member base and the need to defend and support the global Internet registry system and its bottom-up policymaking processes.

3.4.1 Member Outreach

Engaging our membership is critical to ensuring that the RIPE NCC can better understand the organisations that make up our member base, communicate effectively with them, collect feedback and input, and develop our services and activities in response to that input. The geographic size and diversity of the RIPE NCC service region, which covers 76 countries, and strong continued growth in the number of members, pose ongoing challenges to this engagement and inform many of our member outreach strategies.

Outreach to our membership on a local level was a key focus point in 2017, in which we organised Member Lunches in 25 cities across the service region, and we will maintain this focus in 2018. These events can be targeted at members in a certain city or country, or at members from a specific industry sector, such as banking and finance. They allow RIPE NCC staff to engage with members who may not be able to attend a RIPE Meeting or RIPE NCC Regional Meeting and to learn more about local issues shaping the Internet landscape, and can often be arranged adjacent to existing events.

At the same time, these member engagement activities are enriched by data and analysis developed by the RIPE NCC in relation to specific communities and published on RIPE Labs. The regular publication of studies looking at technical data, levels of participation in RIPE and RIPE NCC activities, and local or regional comparisons provide the membership with timely and relevant information, while building the RIPE NCC's reputation as a trusted source of data.

At the end of 2018, the RIPE NCC will start consultations with its membership and the RIPE community in preparation for the RIPE NCC Survey 2019. The 2016 survey received over 4,000 responses that were a key component in gaining a better understanding of member and stakeholder needs and which helped form the RIPE NCC's strategy for the three-year period 2017-2019.

3.4.2 Stakeholder Engagement

Beyond the membership, the RIPE NCC has a diverse range of stakeholders with whom we engage. All of these engagements are driven by a combination of two concerns:
- The interests of the RIPE NCC as an organisation with specific responsibilities under the law and to its membership
- The RIPE community's interest in safeguarding the health and sustainability of the Internet itself

The technological, business and regulatory landscape in which all Internet stakeholders operate will continue to evolve in 2018. The RIPE NCC's engagement activities will reflect this, with a focus on:
- Internet technical community groups (including Network Operator Groups (NOGs) and Internet Exchange Point (IXP) communities)
- Internet industry and professional groups (including groups focused on specific industry segments, such as the Internet of Things)
- Academia and the research community
- Public sector (including governments, regulators, law enforcement agencies (LEAs) and international organisations)
- Partner organisations (ICANN, IANA, IETF, ISOC, RIRs); see section 3.9

Engaging with technical and other communities

The RIPE NCC is committed to supporting the development and activities of the technical community across its service region, particularly at the local and regional level. Effective community structures and participation at this level are vital in developing the local industries, but are also crucial to the bottom-up model of policy development, providing all stakeholders with the means to contribute and have their voices heard.

The RIPE NCC's support for and engagement with the technical community includes:
- Support (through financial contributions and active participation) for Network Operator Groups (NOGs), Internet Exchange Points (IXPs) and local technical community events
- Working with local communities to organise RIPE NCC Regional Meetings, including sessions attached to MENOG and ENOG, the SEE Meeting, and events in Central Asia and the Middle East
- Contribution to regional Internet governance events (including EuroDIG, the Central Asian Internet Governance Forum and national Internet governance forum events)
- Educational initiatives, including regionally targeted events (training events for IPv6 and other topics) and online webinars and educational content

Engaging with industry

Outreach to industry partners is vital to ensuring that the RIPE NCC is aware of new technologies, new business models or other developments that could impact the RIPE NCC's operations or those of our members. Issues on which the RIPE NCC is engaging industry partners include the Internet of Things (IoT) and the growth of mobile

Internet use, with related outreach activities including:

› Organisation of issue-focused meetings and events, bringing together the RIPE NCC membership, RIPE community and other stakeholders to consider the relevance to the RIPE NCC and RIPE

› Participation in industry groups such as the Alliance for IoT Innovation (AIOTI), and coordination with industry bodies such as the European ISP Association, the Arab ISP Association, GSMA (the global mobile industry association), the SAMENA Telecommunications Council, and other relevant groups

Engaging with the academic community

The RIPE Academic Cooperation Initiative (RACI) will continue as a significant activity, providing opportunities for greater academic involvement in RIPE community events, including RIPE, MENOG, ENOG and SEE Meetings. The program has proven to be popular and useful for both the RIPE community and for Internet researchers, and contributes to the long-term development of RIPE by bringing interesting and relevant research into the community's conversations.

In addition, the RIPE NCC is engaging with universities across the service region to raise awareness of the Internet registry system, bottom-up policymaking practices and the fundamentals of Internet networking technology with students from technical, business and legal fields.

Engaging with the public sector

The RIPE NCC engages with government, regulators and law enforcement to ensure that we understand the impact of legislation and regulation on the RIPE NCC, that public policy makers are well informed on issues relating to the registry system and the RIPE community, and that the RIPE NCC can inform our membership and community of relevant developments in regulation or public policy. Activities include:

› RIPE NCC Roundtable Meetings for Governments and Regulators across the service region. In 2017, the first of these meetings were held outside of Western Europe (one in the Middle East and one in the CIS region). We will continue to organise annual events targeting the governments in each of these regions going forward.

› Engagement with law enforcement representatives via direct capacity-building efforts with specific agencies (including webinars and in-person training events) and targeted participation in relevant forums and events (in 2017, we developed a series of webinars for LEAs on how to use the RIPE Database and other services, and will continue to expand on these efforts in 2018).

› Direct engagement with government agencies on issues relevant to the RIPE NCC, its membership and the RIPE community, including formal coordination agreements with specific governmental entities.

› Participation in international discussions of Internet-related public policy development in forums including:

• The International Telecommunication Union (ITU) and its regional coordination groups (CEPT Com-ITU in Europe, RCC in the CIS region, and the Arab Group in the Middle East)

• The Internet Governance Forum (IGF)

• Regional and national Internet governance events

• The Organisation for Economic Cooperation and Development (OECD)

• The United Nations World Summit on the Information Society (WSIS)

› Cooperative educational and capacity building initiatives with public sector organisations and industry partners (including IPv6 Roadshow and Train the Trainer education initiatives).

Key events in this space will include the International Telecommunications Union Plenipotentiary Conference, which takes place every four years and will occur in November 2018. However, the RIPE NCC's focus will predominantly be on more targeted public sector engagements at the national level and with regional entities such as the European Union institutions. To this end, we began working with a third party in 2017 to remain informed on regulatory and legislative developments across the service region and will continue to use this

service in order to inform our members and RIPE community about developments with the potential to impact their operations.

The RIPE NCC will also continue to seek opportunities to formalise its existing relationships with external parties, which was a key focus point in 2017, including public sector bodies, and develop strategic partnerships for the benefit of RIPE NCC members and the RIPE community in a transparent, broadly communicated way. The RIPE NCC lists the agreements it has with external parties on www.ripe.net and announces these as they are signed.

3.5 IPv6 Support

IPv6 Support		Status: **Decreasing**				

Description

The RIPE NCC focuses a great deal of its outreach efforts on IPv6 awareness-raising across the full range of RIPE NCC stakeholder groups.

FTEs	Cost	CAPEX
1.6	148	-

Benefits

> Builds awareness among all Internet stakeholders of the need to deploy IPv6
> Ensures that the interests of the RIPE NCC membership and the technical community are represented in all relevant forums
> Promotes capacity building, particularly in developing areas, and facilitates knowledge sharing with global experts

IPv6 support includes work to inform and educate governments, regulators and LEAs about IPv6 deployment, engagement with national forums and task forces, and meetings with LEAs around the world. The RIPE NCC will also continue to work closely with the OECD on IPv6-related activities conducted under the remit of that organisation.

While there will remain a strong focus on the technical and operational aspects of deploying IPv6, RIPE NCC management has decided that efforts will continue to be made to raise awareness of IPv6 among decision-makers. This will be supported by the IPv6 Program Manager, who will dedicate efforts to IPv6 awareness-raising activities. In 2018, this awareness-raising and engagement will be further supported by a National IPv6 Week. This is a four-day event, where the RIPE NCC will bring together all stakeholders to raise awareness about IPv6.

The first day of the National IPv6 Week is intended for regulators and decision makers and focusses on the current level of IPv6 deployment in a country, the obstacles and the successes. Added to this, we bring experts from all over the world to share their stories on IPv6 deployment. The following days are reserved for our Basic and Advanced IPv6 Training Courses. This way, we draw a lot of attention to the subject and offer direct help for operators to deploy IPv6.

3.5.1 Training and Education
3.5.1.1 RIPE NCC/MENOG IPv6 Roadshows
Status: Ongoing

The IPv6 Roadshow events are a joint initiative from the Middle East Network Operators Group (MENOG) and the

RIPE NCC. They consist of three-day events that provide hands-on training for network engineers involved in the operation of private and public sector networks.

In 2018, there will be around seven IPv6 Roadshow events throughout the Middle East region. The RIPE NCC continues to work with local partners, including governments, to develop the Train-the-Trainer programme to broaden the pool of Arabic-speaking trainers and increase the amount of capacity building resources in the region. The goal is to create a broad pool of Arabic-speaking trainers who can assist in delivering roadshows and also carry out their own IPv6 events with RIPE NCC support.

Benefits for RIPE NCC members / RIPE community:
> Provides education and capacity building in a context that recognises the Middle East region's specific needs
> Builds relationships with public sector bodies and actors in the Middle East
> Enables local trainers to acquire the knowledge and skills to educate their communities

3.5.1.2 IPv6 Roadshows in the ENOG region
Status: Ongoing

The ENOG IPv6 Roadshows will be further rolled out in 2017. In 2017, we worked with additional candidates through the Train-the-Trainer programme, and in 2018 the number of IPv6 courses will be increased.

Benefits for RIPE NCC members / RIPE community:
> Provides education and capacity building in a context that recognises the specific needs of stakeholders in Russia, Ukraine and surrounding countries
> Builds relationships with public sector bodies and actors in the region
> Enables local trainers to acquire the knowledge and skills to educate their communities

3.5.2 Online IPv6 Resources, Measurements and Analysis
Status: Ongoing

The RIPE NCC supports IPv6 adoption by providing resources, measurements and analysis to its membership and the wider RIPE community. This activity includes maintenance of the IPv6ActNow section of the website, the provision of IPv6-related statistics and the IPv6 RIPEness rating system, which measures and ranks the IPv6 preparedness of individual RIPE NCC members based on a number of specific indicators.

Recognising the advances being made in the deployment of IPv6 in several markets in the RIPE NCC service region, the RIPE NCC will continue working on including case studies and background information about successful IPv6 deployments on the IPv6ActNow section of the website and RIPE Labs. In collaboration with local and regional communities, the RIPE NCC will encourage and facilitate community members to share their operational experience with IPv6.

Monitoring and measuring the level of IPv6 deployment among members and Internet end users in general remains an important focal point. These measurements will provide an important basis to monitor progress as well as help the community to measure the quality of IPv6-based communications. With significant advances in the deployment of IPv6 in several networks and markets, RIPE NCC management has decided to put additional focus on providing statistics that can help the public sector to evaluate and identify successful programmes to incentivise IPv6 deployment.

In 2018, we will work on integrating per-LIR measurements in the LIR Portal so that RIPE NCC members can check on their own IPv6 RIPEness status.

Benefits for RIPE NCC members / RIPE community

> Provides comprehensive, impartial information to assist in deploying IPv6
> Provides analysis on the rate of IPv6 deployment
> Encourages RIPE NCC members to become IPv6-ready and rewards them for doing so
> Provides a unique indicator of IPv6 readiness across the RIPE NCC service region (and at more specific levels, including by country, sector, LIR size)

3.6 RIPE Meetings

RIPE Meetings		Status: **Ongoing**			

Description

The RIPE NCC organises two five-day RIPE Meetings each year at various locations throughout its service region, trying to vary these geographically. RIPE Meetings bring together Internet service providers (ISPs), network operators and other interested parties from all over the world. The RIPE NCC provides all administrative, logistical and technical support.

FTEs	Cost	CAPEX
5.9	1,780	-

Attendees per meeting

2015:	**2016:**	**2017:**
650+	650+	650+

Benefits

> Supports the open, bottom-up, industry self-regulatory structure
> Stimulates participation of the RIPE community in the IP policy-making process and the technical coordination of IP networking
> Facilitates networking opportunities with key players in the Internet industry
> Contributes to the stable operation of the RIPE NCC by allowing for guidance and advice from the RIPE Working Groups
> Contributes to meeting all four strategic goals set by the RIPE NCC Executive Board

The RIPE NCC sends staff to RIPE Meetings who are available for face-to-face consultation on a range of topics, including RIPE NCC services. It is also crucially important for the RIPE NCC in meeting its objectives that is able to have staff engage face-to-face with members at RIPE Meetings so that we can better understand their needs and form productive relationships with people from across the community.

The RIPE NCC expects that both RIPE Meetings in 2018 will receive attendance in excess of 600 people. For those that are unable to physically attend RIPE Meetings, state of the art webcasting services and live transcription will be made publicly available.

In 2018, increased attendance is expected due to a steady rise in membership (resulting in more free tickets to new LIRs). The RIPE Fellowship Programme, which launched in 2017 and provides financial support in the form of subsidised travel and accommodation to allow worthy recipients to attend RIPE Meetings, will be further developed and we will look to increase the number of fellows who can attend RIPE Meetings.

The RIPE NCC launched a network meeting app in 2017 that saw strong uptake from attendees looking to meet and engage with each other and with RIPE NCC staff. Work to improve this tool will continue in 2018 in order to make it easier for people to connect with each other and do business at RIPE Meetings and other RIPE NCC-organised events.

2017 also saw the launch of the RIPE Diversity Task Force, and the RIPE NCC will work to ensure that RIPE Meetings are an attractive and appealing environment for everyone to attend. To further meet the goal of inclusion at RIPE Meetings, in 2018 we will also look to improve and promote the remote participation options that are available at RIPE Meetings. The costs of RIPE Meetings are partially offset by sponsorship received from third parties.

3.7 RIPE Policy and Community Support

RIPE Policy and Community Support	Status: **Decreasing**

Description

The RIPE NCC provides support to any and all stakeholders who wish to participate in formulating RIPE Policy or who wish to be part of the RIPE community. It supports the RIPE Policy Development Process (PDP) and offers assistance to the RIPE Working Groups and Working Group Chairs as required so that they are able to develop policy in a consensus-based, bottom-up manner.

Benefits

› Encourages participation in the RIPE Policy Development Process
› Helps to anticipate problems related to the PDP or policy proposals by analysing their potential impact for the community
› Provides transparency and consistency of the procedures
› Translates RIPE Policy into RIPE NCC procedures
› Documents and maintains a clear overview of new and changed procedures

FTEs	Cost	CAPEX
1.6	184	-

New policy proposals by year

2015:	2016:	2017:
12	5 (-58.3%)	5 (+0%)

The RIPE NCC provides information and statistics to various working group mailing lists and creates impact analyses that highlight the expected outcome of RIPE Policy proposals to facilitate community discussion. The RIPE NCC also implements procedures as part of the RIPE Policy Development Process.

In recent years, important stakeholders within the Internet community, both technical and non-technical, have shown greater interest in the RIR system. The RIPE NCC plays an active role in promoting the bottom-up policy development process to support:

› The engagement of community members with the PDP
› The engagement of all stakeholders in the Internet community that look to RIPE as a model of effective policy-making
› Understanding of the RIPE NCC's role in the coordination of Internet policy
› The existing collaborations with other important Internet institutions such as ICANN, the ASO AC and the NRO

The RIPE NCC maintains a number of high-volume external mailing lists. Traffic is closely monitored and efforts are made to support subscribers with problems and to control spam so the mailing lists can be easily and efficiently moderated without losing any End User functionality.

Starting in 2014, the RIPE NCC has placed greater emphasis on growing community engagement with the PDP by facilitating accessibility, communication and greater information dissemination within the RIPE community. This has included sending monthly PDP updates to the ENOG and MENOG communities in Russian and Arabic. As a result of the greater emphasis, more people than ever have participated in policy-related mailing list discussions in 2016 and 2017.

In 2016, the RIPE Forum was rolled out, which is a web-based interface to RIPE community mailing lists. The RIPE Forum is completely optional – the existing mailing list setup will continue to be supported. In 2018, the RIPE NCC will continue to encourage further engagement with the PDP. Apart from promotion of the RIPE Forum, this also includes greater regional outreach activities to increase awareness and improvements to the website to make it easier for people to participate in the PDP.

3.8 ICANN/IANA/IETF/ISOC/RIRs

ICANN/IANA/IETF/ISOC/RIRs	Status: **Expanding**	⊖ ⊜ ⊕ 💡

	FTEs	Cost	CAPEX
	4.7	1,258	-

Description

The RIPE NCC is strongly committed to maintaining close relationships with its industry partners, including the four other Regional Internet Registries (RIRs), ICANN, the Internet Engineering Task Force (IETF) and the Internet Society (ISOC).

Benefits

› Ensures the RIPE NCC is widely recognised as accountable and legitimate in its role as a Regional Internet Registry
› Promotes the open, bottom-up, industry self-regulatory structure common to the RIR communities and other Internet technical coordination bodies
› Facilitates coordinated implementation of global policies developed by the Policy Development Processes (PDPs) of the five RIRs, and contributes to the global legitimacy of bottom-up, community-driven policy-making processes
› Facilitates the general technical and outreach coordination necessary to support the stable operation and governance of the Internet

There is a focus in recent years from all Internet stakeholders on the accountability and legitimacy of those organisations with an administrative role in the global governance of the Internet. This includes the RIRs, as part of the global Internet registry system, and the RIPE NCC will continue to work closely with all participants in this discussion in venues including the ICANN Cross-Community Working Group on Enhancing ICANN Accountability (CCWG-Accountability) and the ICANN Governmental Advisory Committee (GAC) Public Safety Working Group (PSWG). The work the RIPE NCC carries out in this arena is an extremely important part of meeting the strategic goal of ensuring the resilience and stablility of the RIR system.

The RIPE NCC has also confirmed its strong support for the IETF and its role in the development and implementation of technical standards and coordination among those who support the global operation of the Internet. In 2016, the RIPE NCC committed to annual contributions to support the long-term sustainability of the IETF for the coming ten years.

The RIPE NCC will continue to work with Internet industry organisations to ensure strong, coordinated

communication on issues where there is a common technical community position, such as the promotion of IPv6, NOGs, IXPs, and supporting the bottom-up policymaking process. With technical community partners, we will look to build on our cooperative engagement efforts, particularly those directed towards local and regional communities and non-technical stakeholders.

3.9 Good of the Internet

| Good of the Internet | Status: **Ongoing** | | | |

	FTEs	Cost	CAPEX
	1.0	525	-

Description

In July 2016, the RIPE NCC Executive Board approved the addition of a Good of the Internet activity to the RIPE NCC Activity Plan and Budget, with a budget of EUR 553,000. This activity is intended to provide a means for the RIPE NCC and its members to support worthwhile causes that contribute to the overall development and stability of the Internet.

Benefits

> Contributes to the good of the Internet in the RIPE NCC service region
> Supports worthwhile initiatives that help with the development and stability of the Internet
> Recognises people who have contributed to the advancement of the Internet locally, regionally or globally
> Gives financial support to industry partners who are instrumental to the global Internet infrastructure

3.9.1 RIPE NCC Community Projects Fund
Status: Ongoing

The RIPE Community Projects Fund supports specific projects of value to the operation and resilience of the Internet, with a focus on tools and services that benefit the technical community in our service region. Applications are evaluated by a committee of RIPE community and Executive Board members, along with one RIPE NCC staff observer.

The first round of funding from the RIPE NCC Community Projects Fund will be distributed in 2018.

3.9.2 Rob Blokzijl Foundation
Status: Ongoing

The Rob Blokzijl Foundation was officially incorporated in February 2017 in honour of the RIPE Chair Emeritus, who passed away in 2015. The foundation recognises people from our service region who have made a lasting contribution to the development of the Internet. This award will be given every two years, with the first award expected in 2018.

A nomination committee was chosen by the RIPE community to select the award recipients. The foundation is completely independent from the RIPE NCC, although the RIPE NCC has provided initial support to the foundation.

3.9.3 SEED Alliance
Status: Planned Ending

In the 2017 Activity Plan and Budget, it was noted that the RIPE NCC intended to join the SEED Alliance, which is an organisation consisting of several RIRs and partner organisations that collect and distribute funds aimed at developing the Internet in marginalised areas or communities.

While the RIPE NCC still supports the mission of the SEED Alliance, further investigation revealed that the staff resources that would be needed were greater than initially thought. For this reason, in 2017 the RIPE NCC Executive Board directed the RIPE NCC to focus on developing its other Good of the Internet initiatives and remain separate from the SEED Alliance for now.

3.9.4 Supporting IETF Sustainability
Status: Ongoing

In 2018, the RIPE NCC will continue its annual contribution of EUR 100,000 towards the sustainability of the IETF, a cause that was endorsed by RIPE NCC members following presentations from the IETF at RIPE 71 and RIPE 72 and subsequent discussion on the RIPE NCC Members Discuss mailing list. This financial contribution supports the IETF in its role in the development and implementation of technical standards and coordination for the global operation of the Internet.
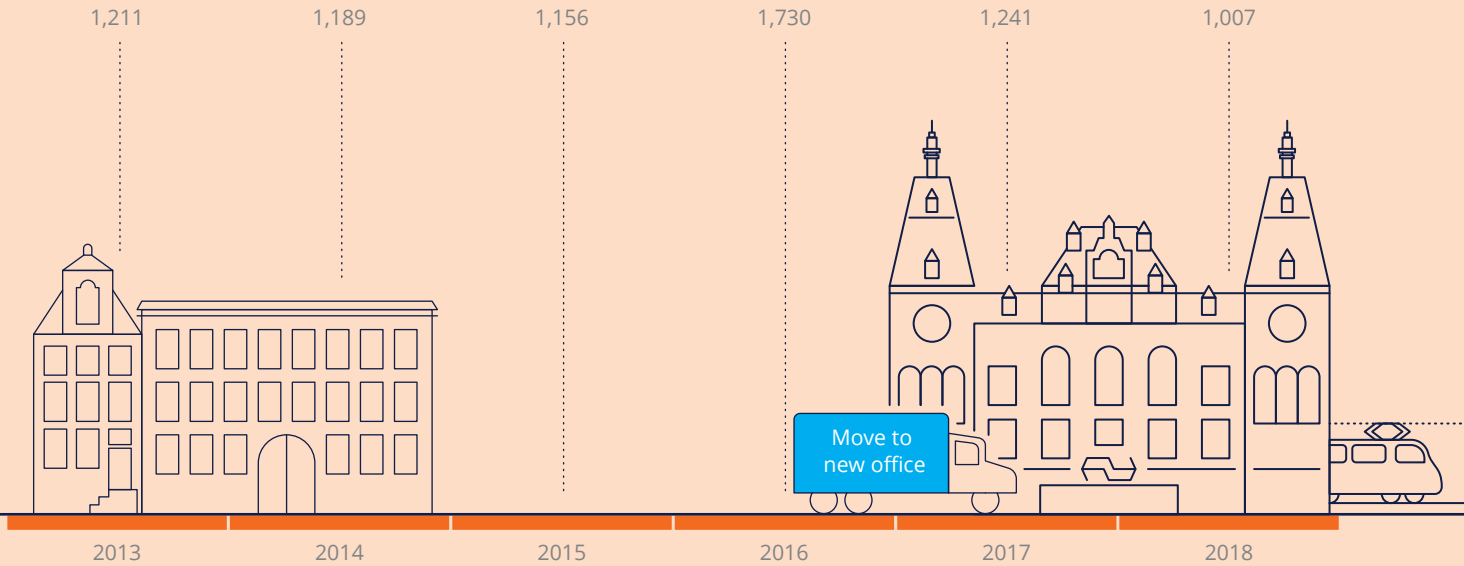
3.9.5 RIPE Fellowship
Status: Ongoing

The RIPE Fellowship will be expanded in 2018. Launched in 2017, this program provides assistance for interested individuals from across the service region to attend RIPE Meetings, participate in policy discussions, and network with industry peers and others. Funds are used to cover travel, accommodation and meeting registration costs, with successful applicants identified by the RIPE NCC Executive Board.
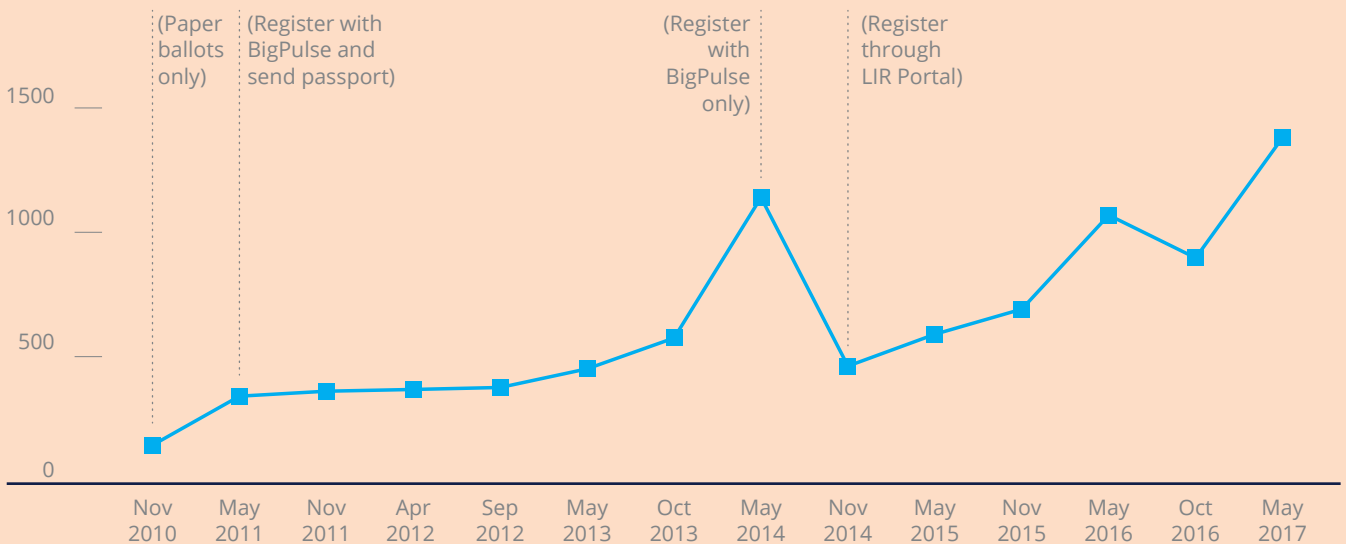
4) Internal

Budgeted Costs for Facilities - Rent and Utilities

1,211   1,189   1,156   1,730   1,241   1,007

Move to new office

2013   2014   2015   2016   2017   2018

General Meeting Vote Registrations 2010-2017

(Paper ballots only)

(Register with BigPulse and send passport)

(Register with BigPulse only)

(Register through LIR Portal)

1500

1000

500

0

Nov 2010 | May 2011 | Nov 2011 | Apr 2012 | Sep 2012 | May 2013 | Oct 2013 | May 2014 | Nov 2014 | May 2015 | Nov 2015 | May 2016 | Oct 2016 | May 2017

4.1 IT and Information Security

IT and Information Security	Status: Expanding

	FTEs	Cost	CAPEX
	12.6	2,836	528

Description

The IT activity at the RIPE NCC provides the back end, infrastructure and network support for all the internal and external services and activities provided by the RIPE NCC.

Benefits

› Provides the state-of-the-art, redundant IT platform for services to operate under
› Provides 24/7 support for services
› Ensures efficient IT support for staff to facilitate delivery of RIPE NCC services
› Enables members and RIPE community to flag technical emergencies outside of the RIPE NCC's regular office hours

This activity includes the operation of the internal infrastructure and system administration and engineering support for all related infrastructure (such as co-location facilities, network, archiving and storage and email delivery), user support for staff, and IT support and enhancement for all external services provided by the RIPE NCC. 24/7 IT support is provided for all the RIPE NCC's critical services.

The IT infrastructure at the RIPE NCC currently includes two main co-locations, in addition to one external "warm node" in Stockholm, Sweden to operate all RIPE NCC services. This warm node operates completely independent from the RIPE NCC infrastructure in the Netherlands. The RIPE NCC also maintains the technical operations of the Number Resource Organization (NRO) and the Address Supporting Organization (ASO).

IT also includes the technical set-up for the twice-yearly RIPE Meetings at locations throughout the service region, as well as support during RIPE NCC Regional Meetings.

For 2018, the RIPE NCC plans to change the current set up of co-locations to maximise its redundancy. Furthermore, in 2018, key areas will be maintaining a high availability network, server and virtual server environment and a focus on efficiency and simplicity to facilitate service improvements.

The RIPE NCC monitors its critical services 24/7. This monitoring includes RIPE NCC websites, the RIPE Database, K-Root, DNS and reverse DNS, the LIR Portal and Resource Certification (RPKI). A technical emergency hotline is in place to ensure issues relating to RIPE NCC's critical services can be dealt with appropriately.

4.1.1 Information Security

Status: Expanding

In 2018, the RIPE NCC will continue to strengthen its information security capabilities to keep up with the current threat and legal landscape.

The RIPE NCC will conclude a major data classification project to ensure that the RIPE NCC processes sensitive data in a sufficiently secure manner, in compliance with new European legislation. It will also support our efforts to mature our risk management process.

Other activities will focus on gathering cyber threat intelligence and improving our capabilities to identify, correlate and prevent potential information security incidents.

The RIPE NCC will continue outreach efforts with the security community, such as TF-CSIRT (of which the RIPE NCC is a member) and M3AAWG. Further engagement and involvement with the security community will help us to get a better understanding of what the RIPE NCC can do to help members and stakeholders in this area.

Benefits for RIPE NCC members / RIPE community:
- Ensures the availability, confidentiality and integrity of the RIPE NCC's services and data
- Minimises the impact of security incidents on the RIPE NCC's services and subsequently minimises the possible impact on our members
- Co-ordination provision between parts of the security community and RIPE NCC members and the RIPE community

4.2 Facilities – Rent and Utilities

Facilities – Rent and Utilities		Status: Decreasing	⊖	⊜	⊕	💡

Description		
Facilities include all of the rent, utilities, security, repair and maintenance costs for the RIPE NCC's building and equipment.		

FTEs	**Cost**	**CAPEX**
0.6	1,007	100

Benefits

> Creates a secure, healthy and productive environment for employees
> Provides up-to-date and well-maintained working facilities

The RIPE NCC is continuously improving its facilities in order to provide a work environment that maximises the productivity of its employees. The current set up of offices will be continued in 2018; the RIPE NCC head office location in Amsterdam, a subsidiary office in Dubai and small office space in Moscow. Furthermore, there will be an external storage space in Amsterdam. This activity is decreasing in 2018 now that the RIPE NCC has completed the move to its new office.

4.3 Management and HR

Management and HR	Status: **Ongoing**				

	FTEs	Cost	CAPEX
	8.5	2,355	-

Description

The Management and HR activity at the RIPE NCC encompasses the Senior Management functions, including the Managing Director and the Chief Scientist. The Senior Management Team works closely with the RIPE NCC Executive Board to develop the strategy and vision of the organisation. HR is responsible for the recruitment and effective integration of well-qualified employees from throughout the RIPE NCC's service region.

Benefits

› Maximises the efficiency of the RIPE NCC's internal structure
› Provides strategy and vision for the RIPE NCC
› Maintains a well-trained workforce

The Senior Management Team guides staff and actively steers the RIPE NCC in order to provide excellent services and coordination activities for the RIPE NCC membership and the wider Internet community. The team is supported by the Management Assistants at the RIPE NCC.

The RIPE NCC continuously reviews its organisational structure to ensure it remains as efficient as possible. Management support is also provided to facilitate decision making through engagement with relevant third parties. A priority is placed on maintaining an effective, healthy, and skilled RIPE NCC staff.

In 2018, the RIPE NCC will work to further the development of all managers within the company, to review the existing organisation structure and most importantly to continue to motivate and stimulate the RIPE NCC staff, a key asset.

4.4 Finance and Administration

Finance and Administration	Status: **Expanding**

FTEs	Cost	CAPEX
7.9	1,017	-

Description

The RIPE NCC maintains high-quality administrative processes and is constantly looking to increase efficiency. The RIPE NCC's accounting, administration and reporting adheres to the General Dutch Accounting Standards and aims to provide a true and fair view of the RIPE NCC's financial situation, even though it is not required to do so by law. Furthermore, following from this enhanced reporting, the RIPE NCC continues to improve its processes to ensure effective cost control and to be able to provide useful management information.

Benefits

› Increases efficiency in payment and administration for members and the RIPE NCC
› Ensures a professionally managed organisation with efficient administrative processes and cost-effective processes
› Meets the financial needs of organisations in different parts of the RIPE NCC service region
› Meets the audit standards set by the Dutch fiscal system

In 2018, under the helm of a new CFO, the RIPE NCC will further the billing process, the RIPE NCC administration and other financial services. Focus will also be given to simplifying internal processes wherever possible to increase efficiency.

The RIPE NCC stays in close contact with local tax authorities, auditors and local authorities to comply with legislation, corporate governance code and best current practices. The RIPE NCC will continue with the execution of the Treasury Statute to achieve a minimised-risk treasury management.

4.5 Legal

Legal	Status: **Decreasing**	⊖	=	⊕	💡

	FTEs	Cost	CAPEX
	0.5	166	-

Description

The RIPE NCC's Legal activity encompasses its work to help legislators and law enforcement agencies understand the RIR system and how they can participate. The RIPE NCC also updates its internal activities according to new national and international legislation and maintains an extensive legal governance framework, which consists of a range of corporate governance documents that sets out the standards and procedures for our internal and external operations and ensures the RIPE NCC's accountability.

Benefits

› Ensures that the RIPE NCC is run within an up-to-date legal framework and with a full set of corporate governance documents

› Improves legislators and LEAs' understanding of the Internet governance model and the role of RIRs to gain their support for the current model

› Ensures that legislators receive the technical community's perspective

In 2018, the RIPE NCC will continue to follow legislative developments and coordinate externally for the support of the self-governance model. Additionally, the RIPE NCC will keep enhancing its accountability by reviewing its governance model and the procedures in place. A goal for 2018 is compliance with the General Data Protection Regulation and continuing the engagement with national authorities to gain better understanding of regulation and legislation throughout the service region and how it affects RIPE NCC members. Finally, the scarcity of IPv4 addresses increases the complexity of legal requests the RIPE NCC receives because there is an increasing number of mergers and transfers as well as an increasing number of disputes and abuse complaints.

4.6 Organisational Activities: Executive Board, Arbitration Panel and General Meetings

Organisational Activities: Executive Board, Arbitration Panel and General Meetings	Status: **Decreasing**			

	FTEs	Cost	CAPEX
	2.1	318	-

Description

The RIPE NCC supports twice-yearly RIPE NCC General Meetings (GMs). At these GMs, members vote annually on the RIPE NCC Financial Report and on the Charging Scheme for the following year. Members can also exercise their rights to vote in Executive Board elections and on resolutions, such as amendments to the RIPE NCC Articles of Association. The RIPE NCC also supports a neutral and objective arbitration panel that exists to resolve any disputes relating to its services and evaluate any resource requests made by the RIPE NCC for its own infrastructure or services.

Benefits

› Allows RIPE NCC members' interests to be represented by Executive Board
› Gives members the opportunity to give feedback directly to the Executive Board on the RIPE NCC's Activity Plan and Budget
› Allows members to approve the RIPE NCC Charging Scheme and Financial Report
› Gives a level of transparency on the management and the strategies of the RIPE NCC that gives members and other interested parties sufficient information to give feedback on any of activity/decision/change

In order to help ensure an informed membership at the General Meeting, the RIPE NCC prepares various sets of documents including a draft Activity Plan and Budget, a Charging Scheme, an Annual Report and a Financial Report. The RIPE NCC provides remote participation facilities and electronic voting capabilities for those members who are unable to attend the GM in person but who wish to follow proceedings and vote in elections and on resolutions. Members attending the GM in person can also choose to vote electronically.

As set out in the Articles of Association, the arbiters on the RIPE NCC Arbitration Panel are appointed by the RIPE NCC's Executive Board and approved by the RIPE NCC membership. The RIPE NCC has an arbitration panel to rule on disputes between the RIPE NCC and members, and between members. Once a year, the Arbitration panel meets to discuss procedures, cases and the panel itself.

The RIPE NCC Executive Board conducts multiple meetings every year. These meetings deal with strategic and financial issues pertinent to the organisation as well as the RIPE NCC's relationship with industry partners. At these meetings, the RIPE NCC Executive Board incorporates feedback from the membership and the RIPE NCC Management into their discussion and final decision on the RIPE NCC's Activity Plan and Budget for the following year. The Executive Board also plays a crucial role in the RIPE NCC's outreach and member liaison activities. After every Executive Board meeting, the minutes of the meeting are published for the membership along with key outcomes.

The Executive Board and the RIPE NCC Management are actively looking to engage with the membership regarding its activities and strive for the utmost transparency with regards to the management, services and strategies of the RIPE NCC.

5) Unforeseen Activities

There may be activities that are entirely unforeseen at the time of writing the RIPE NCC Activity Plan and Budget 2018 or have started recently and are not at the stage where they can be estimated to have a material financial impact. A quick, well-focused reaction to the changing environment and new requirements of the RIPE NCC members and other stakeholders is always a goal of the RIPE NCC. In line with good corporate governance, any unforeseen activities that that arise are developed in close consultation with the RIPE NCC Executive Board, and when there is any material financial impact the Executive Board must approve the resulting action to be taken.

Appendix 1: Membership Services

> Distribution and Management of Internet Number Resources
> Assisted Registry Check (ARC)
> Resource Certification (RPKI)
> IPv4 Transfer Listing Service
> Resource Transfers
> Reputation Service
> LIR Portal
> Training Courses: LIR; IPv6; Routing Registry and Resource Certification (RPKI); RIPE Database
> Near Real Time Mirroring (NRTM)

Appendix 2: Notes on Measurable Usage and Activity Plan Features

Measurable Usage

To allow members to easily track the development of the RIPE NCC's activities year on year, a measurable usage figure for 30 June is given each year where applicable. This allows members to easily compare each year's figures against the previous year. The Activity Plan and Budget also has information boxes that give an easy-to-read overview of activities, providing a description, benefits to the membership, significant changes to the activity, FTEs, costs and whether the activity is ongoing, decreasing or a new activity.

Features in This Activity Plan and Budget

To maintain good transparency for RIPE NCC members, this Activity Plan and Budget includes several features. An activity status is included for each of the activities listed. There are five different activity statuses given throughout this document:

> "Ongoing": Any recurring activity that requires around the same amount of resources as in the Activity Plan and Budget 2017 (OPEX) (with less than a 10% deviation from the Activity Plan and Budget 2017)
> "New Activity": Any activity that is making its first appearance in the Activity Plan and Budget
> "Expanding": Any activity where expenses will increase by more than 10% over the Activity Plan and Budget 2017 (OPEX)
> "Decreasing": Any activity where expenses will decrease by more than 10% from the Activity Plan and Budget 2017 (OPEX)
> "Planned Ending": Any activity that will come to a complete end during the coming year

Secondly, where the status of an activity is anything other than "Ongoing", this document will contain information about when and why the decision was made, and who was responsible for making the decision.

Finally, usage statistics have been included wherever possible for each activity. These are intended to show the general scale of a service. There are some cases where activities cannot be quantified or the inclusion of statistics is of little relevance so they are not provided.

Individual activities that cost less than 5 kEUR per annum are considered to have negligible costs and therefore their cost details are not included in the Activity Plan and Budget.

Appendix 3: Notes on Overview of RIPE NCC Activities

Full-Time Equivalents

Full-Time Equivalents (FTEs) indicates the average amount of personnel assigned to each activity as well as supporting staff over the course of the full year.

OPEX (Operational Expenses)

Operational expenses are all direct costs that relate to the activity or project, and a portion of overhead that is related to absence (vacation, illness, education) that has been allocated to the project. The overhead allocation is calculated by dividing the percentage of FTEs involved in the activity by the overall number of FTEs. Operational expenses exclude depreciation and bad debt expenses.

Sponsorship is reported as Income in the Budget and it offsets the costs of RIPE Meetings, Regional Meetings and RIPE Atlas probes.

CAPEX (Capital Expenditure)

Capital Expenses are all items that are taken as an asset. These items include hardware and software, infrastructure, and office furniture.

Appendix 4: Budget Figures 2018

RIPE NCC Budgeted Statement of Income & Expenditure 2018 in kEUR

	Budget 2018	LE 2017*	Budget 2017	Difference B18/17	B18/B17
Income					
Fees Existing Members	24,150	21,011	20,860	3,139	3,290
Independent Resource Fees	1,100	1,082	1,082	18	18
Service Fees New Member	2,382	2,553	2,149	(171)	233
Re-opening Fees	200	300	200	(100)	-
Members Fees	**27,832**	**24,946**	**24,291**	**2,886**	**3,541**
New Member Sign-up Fees	5,500	6,000	5,000	(500)	500
RIPE Meetings	235	225	275	10	(40)
Sponsorship Income	280	285	340	(5)	(60)
Other Income	50	50	50	-	-
Total Income	**33,897**	**31,506**	**29,956**	**2,391**	**3,941**
Expenditure					
Salary Wage Components	10,661	9,700	10,059	961	602
Secondary Benefits	2,578	2,400	2,485	178	93
Miscellaneous Personnel	2,536	2,475	2,251	61	285
Subtotal Personnel	**15,775**	**14,575**	**14,795**	**1,200**	**980**
Housing	803	800	922	3	(119)
Office Costs	2,494	2,152	2,152	342	342
Marketing/External Relations	701	640	725	61	(24)
Contributions	928	950	1,070	(22)	(142)
IT Infrastructure	2,042	1,715	1,673	327	369
Travel	1,435	1,730	1,336	(295)	99
Consultancy	2,025	2,030	2,212	(5)	(187)
Bank Charges	254	240	220	14	34
Bad Debts	250	200	200	50	50
Depreciation	1,300	1,009	1,141	291	159
Total Expenses	**28,007**	**26,041**	**26,446**	**1,966**	**1,561**
Financial Result	**350**	**300**	**350**	**50**	**-**
Surplus before Redistribution	**6,240**	**5,765**	**3,860**	**475**	**2,380**
Capital Expenditure	**1,175**	**1,325**	**1,478**	**(150)**	**(303)**
Number of FTEs	**155**	**147**	**149**	**8**	**6**

* LE 2017 based on the estimated figures per 30 June 2017.

Note on the Budget 2018 figures:

All figures are drawn up in compliance with the general accounting standards in the Netherlands (Dutch GAAP).

Development of the RIPE NCC Reserves

The table below shows the RIPE NCC's capital development. The RIPE NCC Capital consists of the Clearing House and any addition to the Clearing House, either from capital gains or from an accumulation of the surplus. Each year the RIPE NCC General Meeting will decide whether excess contribution paid for a given year should be redistributed to members.

Development of RIPE NCC Reserves with a redistribution in 2018 (in kEUR)

Year	Surplus	Addition to the Capital	Capital at 31 December	Expenses Per Year	% of Expenses
2013	1,732	-	21,912	19,330	113%
2014	3,414	-	25,326	21,224	119%
2015	(262)	-	25,064	21,978	114%
2016	325	-	25,389	23,528	108%
LE 2017	-	-	25,389	26,041	97%
B 2018*	-	-	25,389	28,007	91%

Development of RIPE NCC Reserves without a redistribution in 2018 (in kEUR)

Year	Surplus	Addition to the Capital	Capital at 31 December	Expenses Per Year	% of Expenses
2013	1,732	-	21,912	19,330	113%
2014	3,414	-	25,326	21,224	119%
2015	(262)	-	25,064	21,978	114%
2016	325	-	25,389	23,528	108%
LE 2017	5,765	4,334	29,723	26,041	114%
B 2018*	6,240	4,690	34,413	28,007	123%

* This figure may be adjusted between the publication of the Draft Activity Plan and Budget and the final version to reflect the current situation.

Appendix 5: Changes to the Draft Activity Plan and Budget 2018

This section will include a summary of changes between the Draft Activity Plan and Budget that is published in September and the final version of the document.