RIPE NCC
RIPE NETWORK COORDINATION CENTRE

Annual Report
2021

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WELCOME TO THE 2021 RIPE NCC ANNUAL REPORT

This past year, we have continued to face challenges arising from the COVID-19 pandemic while providing quality services and support to our members and the RIPE community. Renewed health concerns and restrictions meant we had to alter our event planning. We also had to adapt the way we work, ensuring we could function remotely while planning an eventual return to the office. Focus on our core Registry function remained front and centre, as a substantial increase in the number of requests, together with the implementation of an improved sanctions screening process, impacted our workload significantly. Alongside this, we continued to develop our information services and our community outreach, learning and engagement programmes.

While working online has not always been easy, our staff have made a fantastic effort in terms of ensuring we met our commitments as an organisation while helping to maintain connections with members and our community. We further improved the resilience of our services and engaged with the RIPE community on our plans to use third-party cloud infrastructures where appropriate. This included development of a framework to assess the criticality of our services. And while we phased out our own RPKI validator, we found better solutions for our members and continued to drive home the importance of routing security.

Meanwhile, our Registry Services staff faced a surge of requests as network operators continue to deal with the impacts of IPv4 runout. Transfer requests were at an all-time high, and we had to hire new staff to handle the increased workload. Despite this, we maintained our work to reinforce the quality of our Registry data, which included enhanced due diligence efforts to counter fraud and ensure our full compliance with EU sanctions. We also augmented many of our information services, rolling out new UIs, updated hosted DNS and an expanded RIPE Atlas.

We are also proud of our Learning & Development team's successes in the past year. There is the new RIPE NCC Certified Professionals exam on IPv6 security, together with a new IPv6 Security Expert course. Over a thousand certifications were earned in 2021, and we were delighted to see the enthusiasm of community members in sharing their badges with their professional networks online. Members can also now learn at their own pace through the newly launched Microlearnings in the RIPE NCC Academy. Beyond these courses, we delivered many trainings last year, including a new internal training programme to develop the knowledge of our staff.

As an organisation, we are undergoing our own internal transition. Over the past few years, we have redesigned our staff structure and our work processes as we moved to a system called Holacracy. We continued this evolution in the past year and will make even more changes in the next, as we have decided to leave behind Holacracy and develop our own blended system that carries over some of these advantages while allowing for more flexibility. We are excited by the chance to develop a new and more efficient way for our staff to work with each other, even as this raises some interesting considerations for us to handle in the months ahead. And we have a clear plan for the next several years, as we have now published our Five-Year Strategy covering our objectives from 2022-2026.

Despite all the challenges of 2021, the tireless efforts of our staff have made me proud to stand at the helm of the RIPE NCC as we continue to work with you to shape the Internet. We're all still learning how to work best while handling the uncertainty of these times. But with our dedicated employees and the effective processes we have developed, I am confident that we will continue to accomplish great things and will have many successes to look forward to in the year ahead.

HANS PETTER HOLEN
MANAGING DIRECTOR

VIEW FROM THE RIPE NCC EXECUTIVE BOARD

Over the past year, the RIPE NCC has worked on expanding its ability to meet the needs of members, exploring ways to better serve you even from afar. For those of us on the Board, we've been busy with online meetings, virtual events and new forms of remote engagement. We've also been supporting the RIPE NCC as its staff reinvent their working processes. Through these efforts, this year has been a very productive one for the RIPE NCC.

One of the highlights for 2021 has been the RIPE NCC's efforts to improve its Registry. Ever-changing sanctions have made it necessary to be vigilant about compliance and transparency. To this end, the RIPE NCC has ramped up its due diligence efforts and published regular reports with sanction updates. It has also automated some of these processes to ensure that the Registry is as accurate and up to date as possible.

The RIPE NCC also faced banking challenges, as it had to determine whether its bank could accept payments from members in Iran and Syria, two countries faced with sanctions. To continue providing services to affected members while it solved this issue, the RIPE NCC held off on sending their invoices until it had clarified that their payments would be accepted. Despite sanctions and banking issues, we are committed to ensuring uninterrupted service for members and are seeking a long-term solution to this problem.

To address Internet governance issues at a high level, the RIPE NCC continued its outreach to governments and regulatory authorities. It held three Roundtables to connect with regulators in Europe, in the Middle East, and in Eastern Europe, the Caucasus and Central Asia. And at the more local level, the RIPE NCC also continued with its remote Open Houses, where staff met with network operators and stakeholders in different parts of its service region. The RIPE NCC also held governance-specific Open Houses to hear members' thoughts on these issues and discuss its approach.

And we reached out to the membership over other important matters this year. We convened with members virtually at two General Meetings this year, at which we welcomed two new members to the Board. The RIPE NCC surveyed members for their feedback on updating its Charging Scheme and discussed their thoughts at the November General Meeting. The RIPE NCC listened to members' input on its consideration of cloud providers. And it implemented the new Code of Conduct for Executive Board candidates. We'd like to continue to have these conversations with members about what the RIPE NCC is doing and how you feel about it. On our side, we'll maintain transparency in sharing our plans, but we need you to let us know your thoughts so we can address your needs and adapt accordingly.

In addition to supporting members, we've also been supporting the RIPE NCC as it reinvents its staff and management structure. While the RIPE NCC adopted a system called Holacracy in recent years, it is now moving away into a unique blended system that is no longer fully Holacratic. We'll be there assisting RIPE NCC management as they develop this further and figure out what works best for employees and for handling their work processes.

This year, we're also pleased to have finalised our plan for the RIPE NCC's future steps as it continues to improve its services to better support its members. The new RIPE NCC Strategy 2022-2026 offers a look at the organisation's values and major objectives for the coming years, with supporting goals that will help us achieve those objectives. In the changing Internet landscape, it can be hard to predict what new geopolitical and technological developments may arise. But we feel prepared to handle the challenges of the next several years with the RIPE NCC's solid foundation of principles and a strong relationship with its membership. With this future in mind, let's go over the past year and all that the RIPE NCC accomplished.
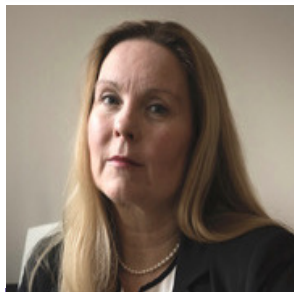
ONDŘEJ FILIP
TREASURER

REMCO VAN MOOK

JOB SNIJDERS

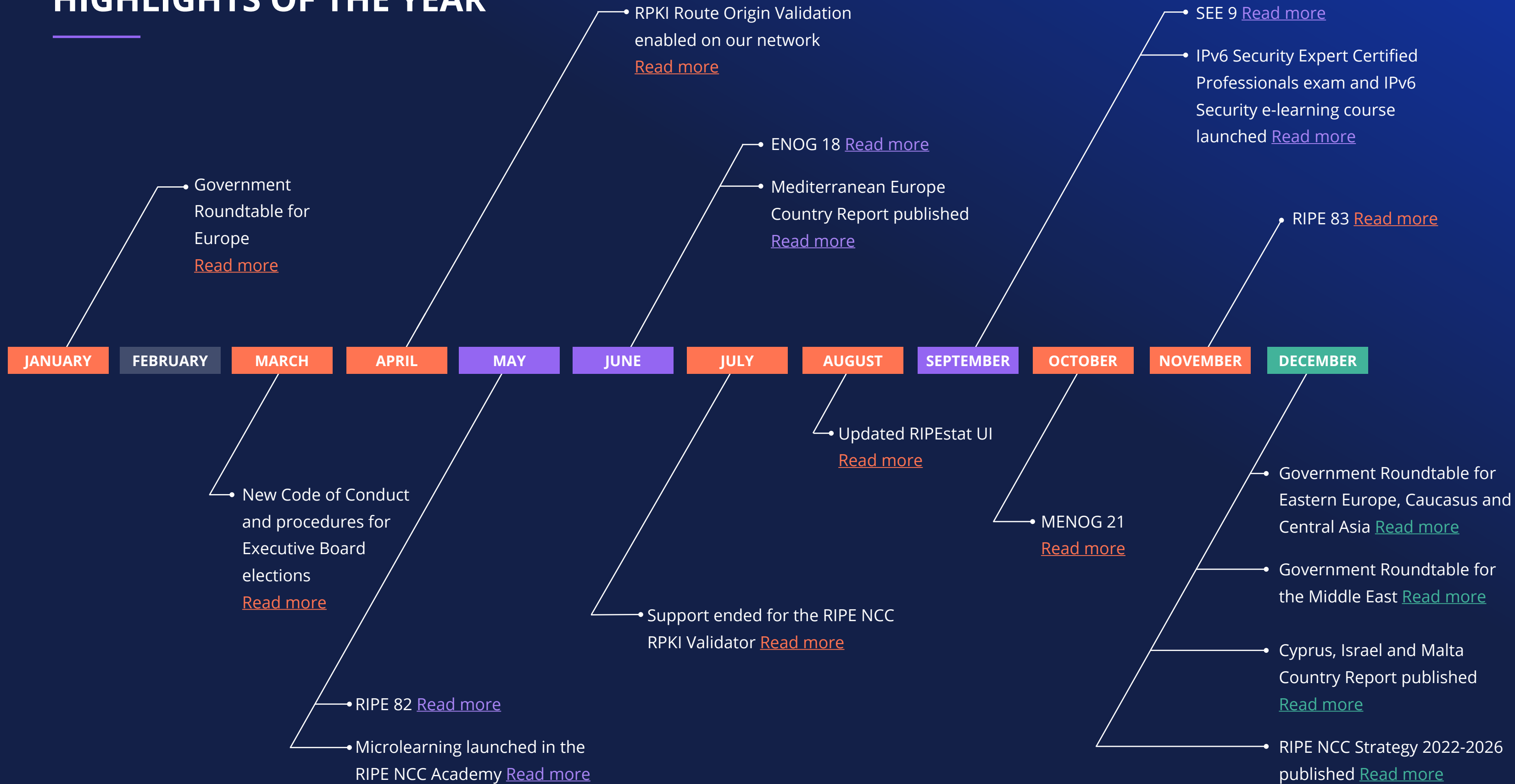**CHRISTIAN KAUFMANN**
CHAIR

PIOTR STRZYŻEWSKI
SECRETARY

MARIA HÄLL

RAYMOND JETTEN

HIGHLIGHTS OF THE YEAR

JANUARY · **FEBRUARY** · **MARCH** · **APRIL** · **MAY** · **JUNE** · **JULY** · **AUGUST** · **SEPTEMBER** · **OCTOBER** · **NOVEMBER** · **DECEMBER**

Government Roundtable for Europe
Read more

New Code of Conduct and procedures for Executive Board elections
Read more

RIPE 82 Read more

Microlearning launched in the RIPE NCC Academy Read more

RPKI Route Origin Validation enabled on our network
Read more

Support ended for the RIPE NCC RPKI Validator Read more

ENOG 18 Read more

Mediterranean Europe Country Report published
Read more

Updated RIPEstat UI
Read more

SEE 9 Read more

IPv6 Security Expert Certified Professionals exam and IPv6 Security e-learning course launched Read more

RIPE 83 Read more

MENOG 21
Read more

Government Roundtable for Eastern Europe, Caucasus and Central Asia Read more

Government Roundtable for the Middle East Read more

Cyprus, Israel and Malta Country Report published
Read more

RIPE NCC Strategy 2022-2026 published Read more

MEMBERSHIP OVERVIEW

All numbers are as of 31 December 2021. Please note that one member can hold more than one LIR.

23,209	**3,582**	**116**	**20,015**	**14,908**
Total number of active LIRs	New LIRs	Member countries	Total number of active members	Members with an IPv6 allocation

TOP 10

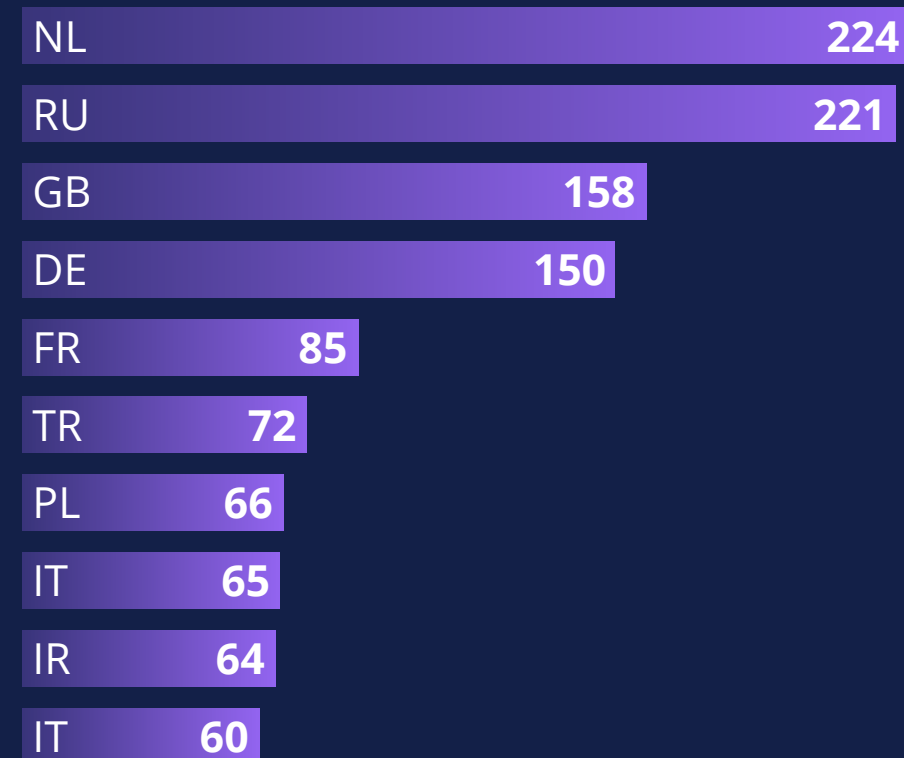### MEMBERS BY COUNTRY

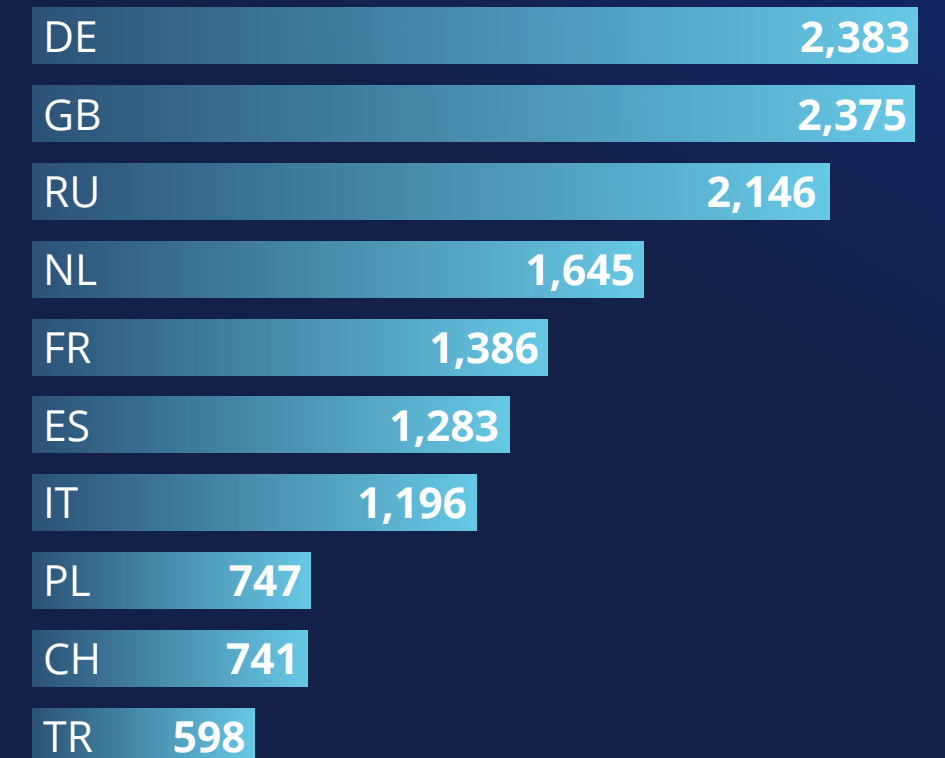|	
DE	2,180
GB	2,064
RU	1,560
FR	1,276
NL	1,182
ES	1,168
IT	1,150
CH	697
PL	696
TR	513
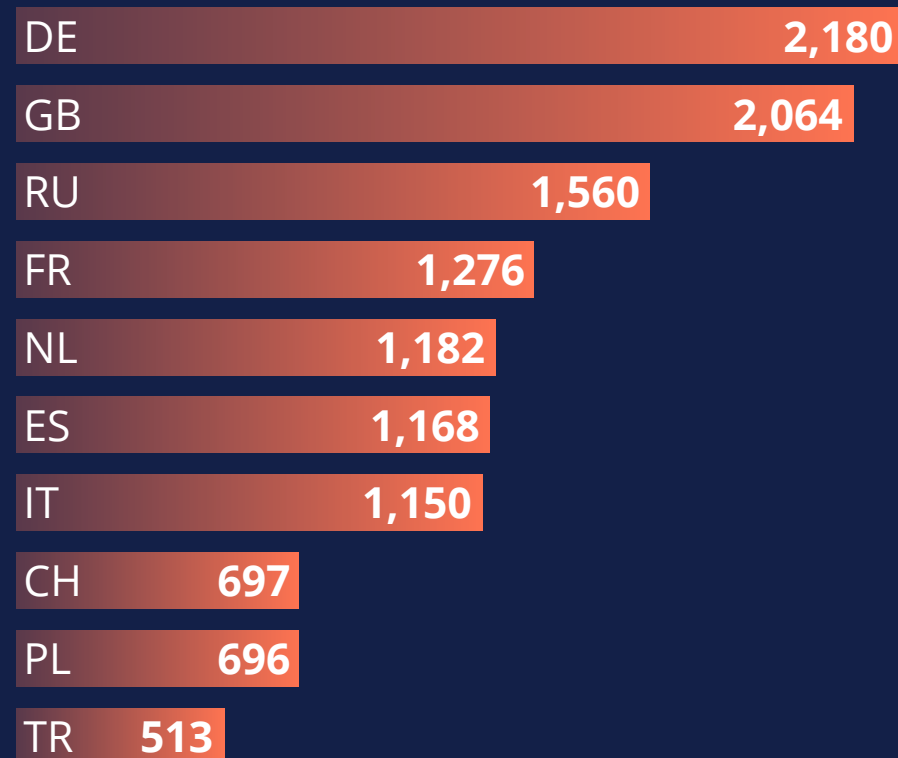
TOP 10

NEW MEMBERS BY COUNTRY

NL	224
RU	221
GB	158
DE	150
FR	85
TR	72
PL	66
IT	65
IR	64
IT	60

TOP 10

LIRS BY COUNTRY

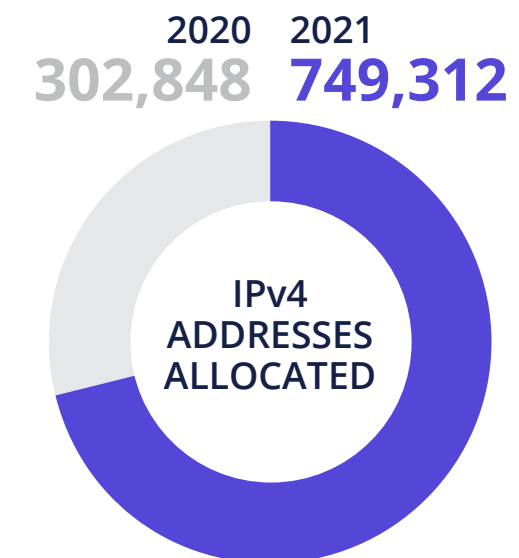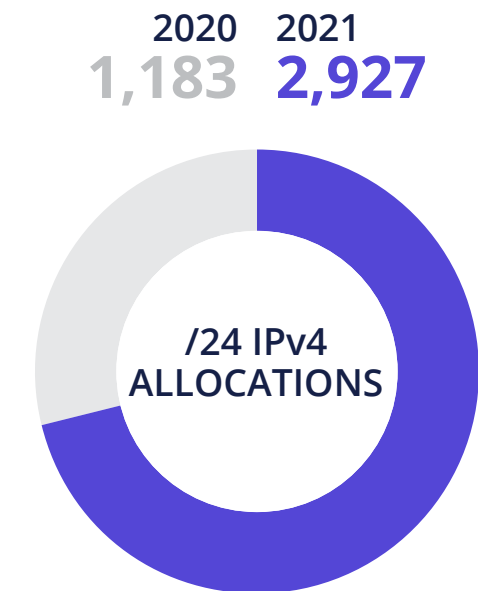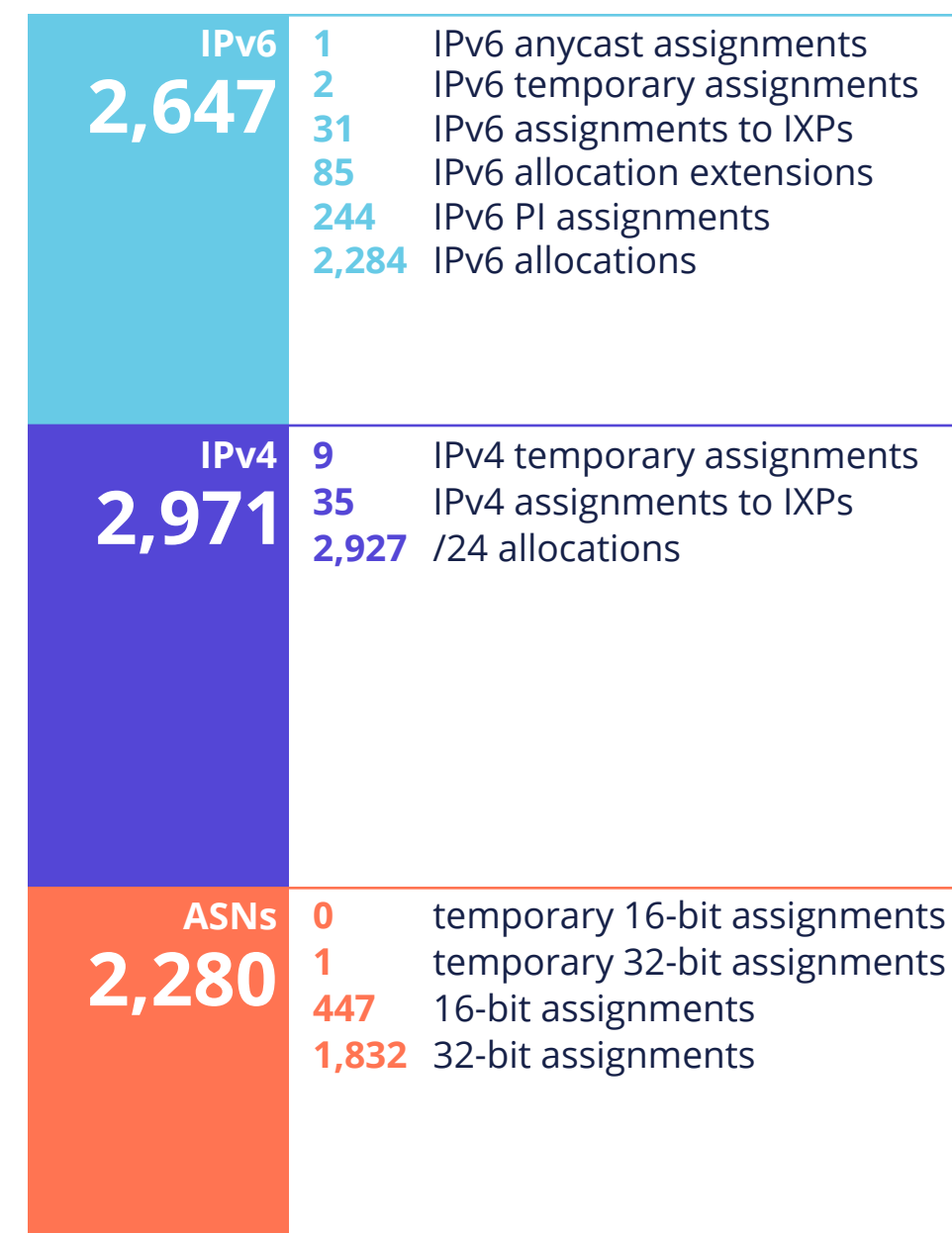|	
DE	2,383
GB	2,375
RU	2,146
NL	1,645
FR	1,386
ES	1,283
IT	1,196
PL	747
CH	741
TR	598

The Registry

INTERNET NUMBER RESOURCES OVERVIEW

All numbers are as of 31 December 2021. Please note that one member can hold more than one LIR.

IPV4 /24 ALLOCATIONS BY COUNTRY

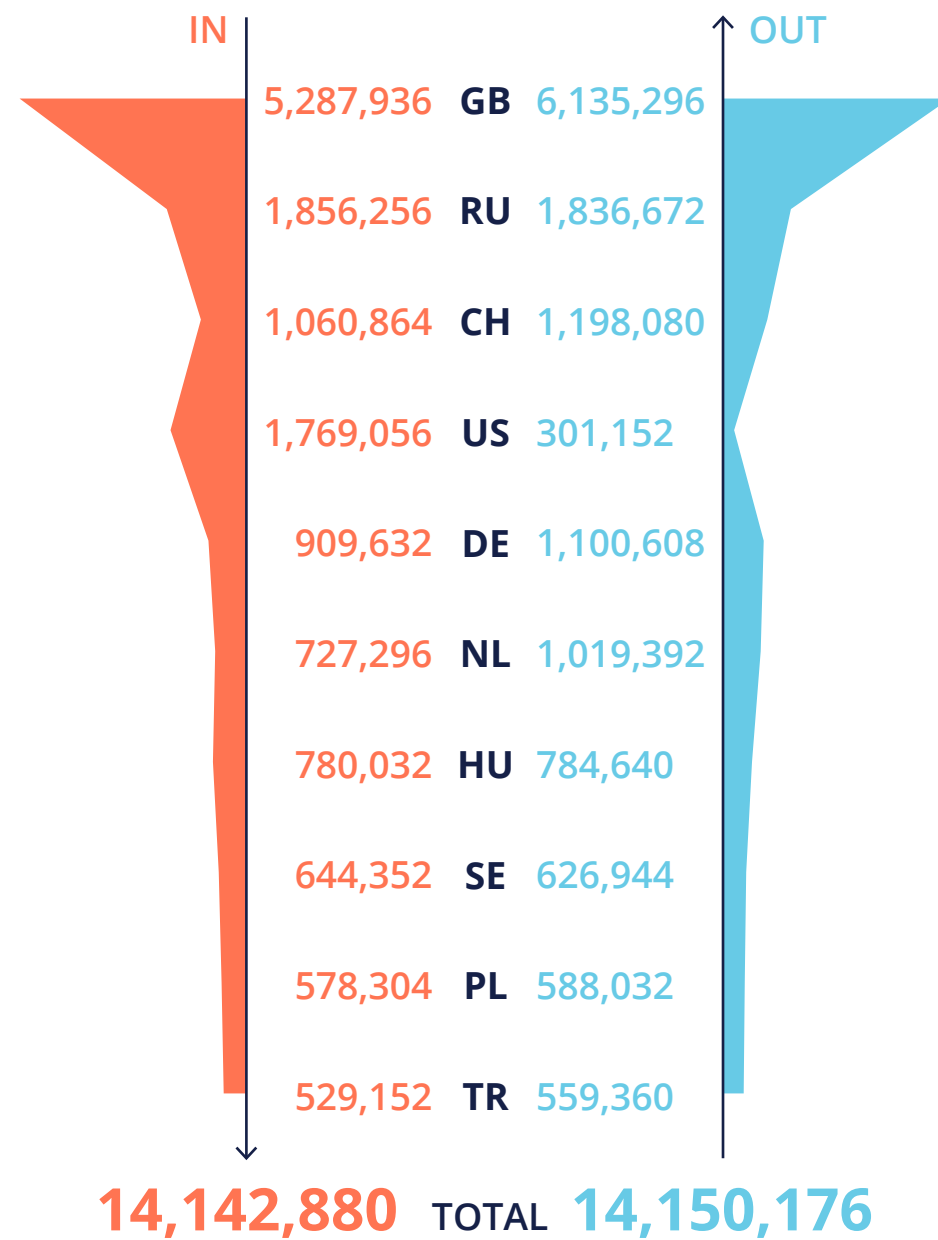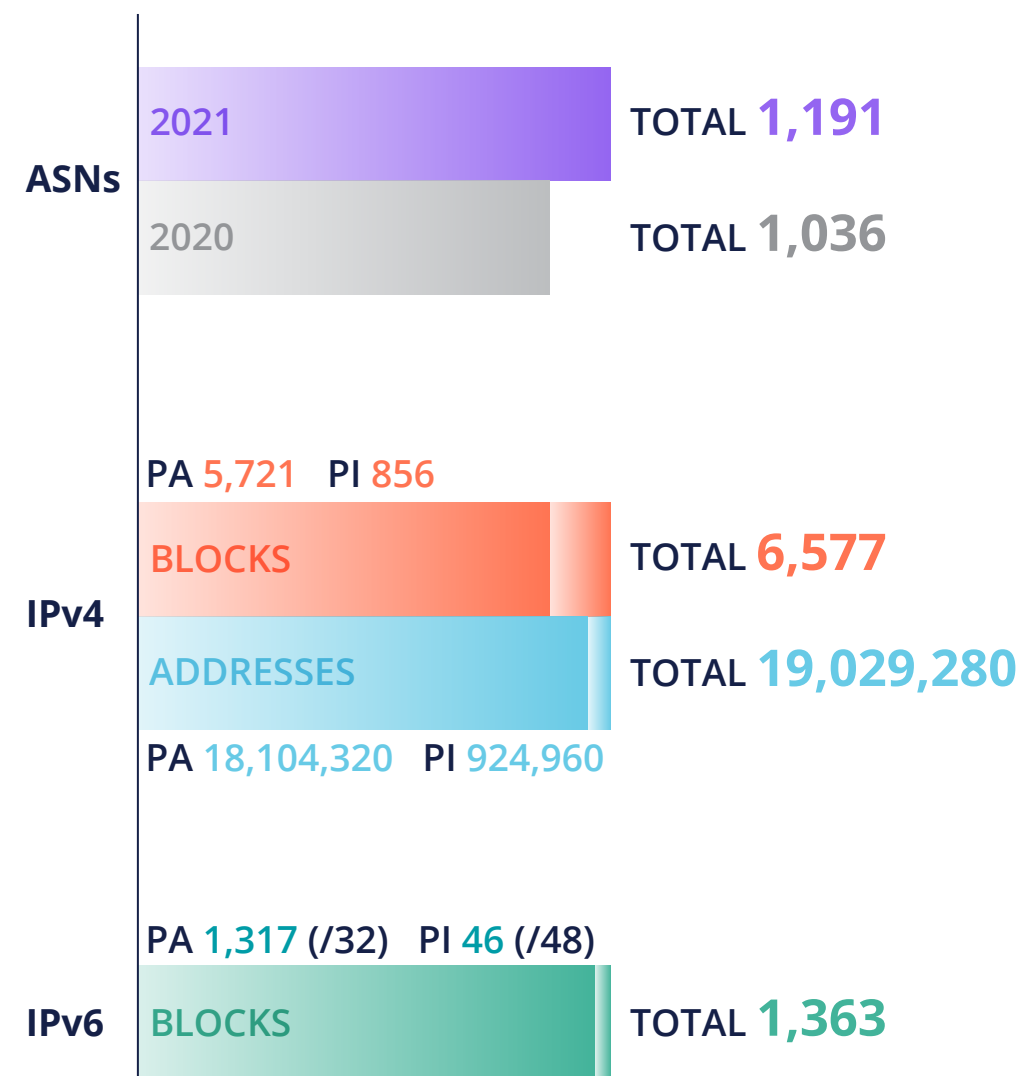| TOTAL 1,002		
472	RU	
459	NL	
314	GB	
190	DE	
114	LT	
101	FR	
97	ES	
92	TR	
86	UA	
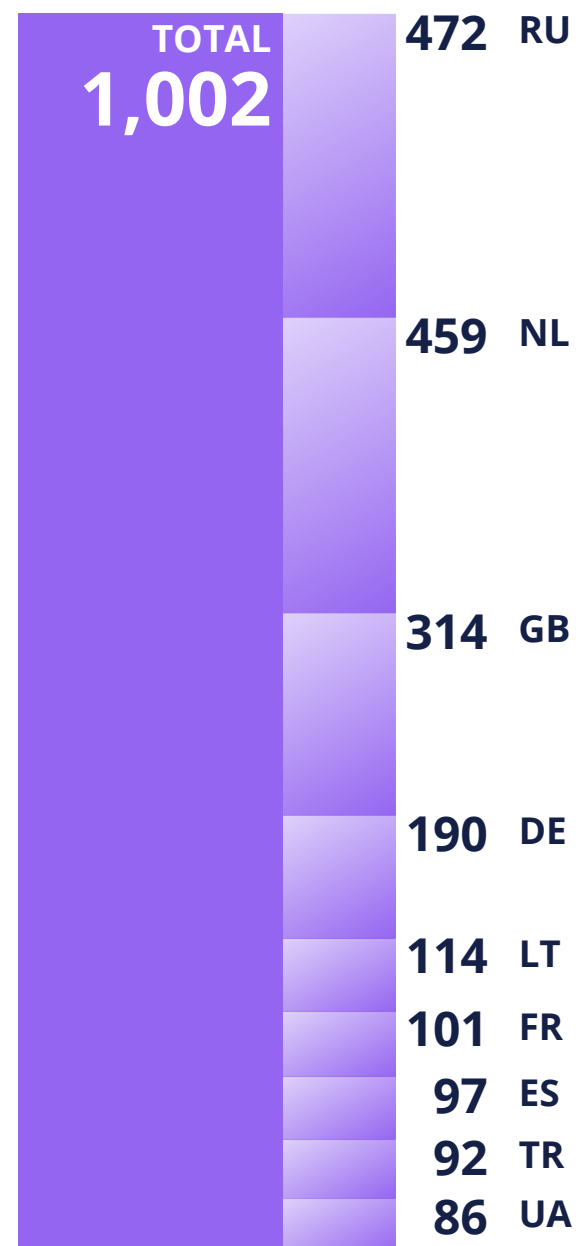
ALLOCATIONS AND ASSIGNMENT

IPv6 2,647
1	IPv6 anycast assignments
2	IPv6 temporary assignments
31	IPv6 assignments to IXPs
85	IPv6 allocation extensions
244	IPv6 PI assignments
2,284	IPv6 allocations

IPv4 2,971
9	IPv4 temporary assignments
35	IPv4 assignments to IXPs
2,927	/24 allocations

ASNs 2,280
0	temporary 16-bit assignments
1	temporary 32-bit assignments
447	16-bit assignments
1,832	32-bit assignments

/24 IPv4 ALLOCATIONS

2020	2021
1,183	2,927

IPv4 ADDRESSES ALLOCATED

2020	2021
302,848	749,312

TRANSFERS OVERVIEW

Here is an overview of resource transfers between the RIPE NCC and other RIRs, and within the RIPE NCC service region. The figures below include policy transfers and other transfers resulting from a change in business structure (e.g. mergers and acquisitions).
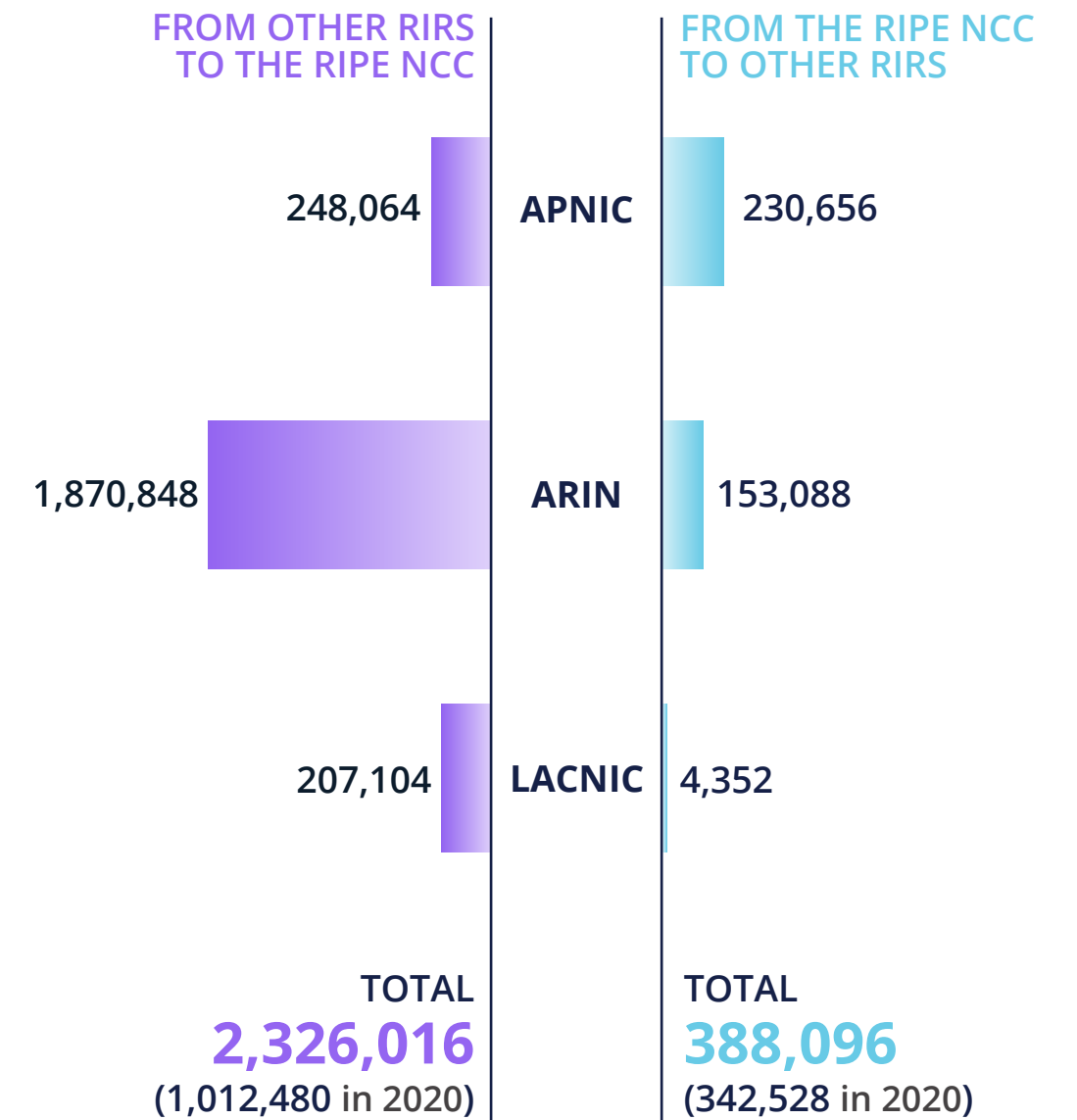
INTRA-RIR TRANSFERS BY COUNTRY - TOP 10 (IPv4 addresses)

IN		OUT
5,287,936	**GB**	6,135,296
1,856,256	**RU**	1,836,672
1,060,864	**CH**	1,198,080
1,769,056	**US**	301,152
909,632	**DE**	1,100,608
727,296	**NL**	1,019,392
780,032	**HU**	784,640
644,352	**SE**	626,944
578,304	**PL**	588,032
529,152	**TR**	559,360

14,142,880 TOTAL **14,150,176**

TRANSFERS WITHIN THE RIPE NCC'S SERVICE REGION

ASNs
- 2021 — TOTAL **1,191**
- 2020 — TOTAL **1,036**

IPv4
- PA 5,721   PI 856
- BLOCKS — TOTAL **6,577**
- ADDRESSES — TOTAL **19,029,280**
- PA 18,104,320   PI 924,960

IPv6
- PA 1,317 (/32)   PI 46 (/48)
- BLOCKS — TOTAL **1,363**

INTER-RIR TRANSFERS (IPv4 addresses)

FROM OTHER RIRS TO THE RIPE NCC | | **FROM THE RIPE NCC TO OTHER RIRS**

From other RIRs	RIR	To other RIRs
248,064	**APNIC**	230,656
1,870,848	**ARIN**	153,088
207,104	**LACNIC**	4,352

TOTAL
2,326,016
(1,012,480 in 2020)

TOTAL
388,096
(342,528 in 2020)

RIPE REGISTRY ACCOUNTABILITY

ASSISTED REGISTRY CHECKS (ARCs)

An Assisted Registry Check is how we help members ensure their data is accurate and up to date. We provide personalised support over a call or in person at events to help members correct any inconsistencies. Our goal is to constantly strengthen the quality of data in the registry. During an ARC, among other things, we check an LIR's legal name, address and contacts, IPv4 and IPv6 resources registered, and whether their BGP announcements are consistent with the Routing Registry.

READ MORE

ABUSE-C: VALIDATION

In 2021, we continued to implement the Abuse Contact (abuse-c) management policy and validated over 83,751 email addresses. 2% of those required manual intervention.

READ MORE

MEMBER FEEDBACK ON ARCs:

"Please continue with the ARCs - it gives us a friendly reminder to keep our records up to date."

"The help given by Stefania was incredible. Many thanks for everything."

"Thanks to Kjell for the help provided - well done!"

IN 2021

1,754 ARCs completed

84,761
abuse-c ROLE objects created and/or updated

83,227
validated email addresses

81,596
validated using automated process

1,631
email addresses required manual intervention

REPORTS AND INVESTIGATIONS

REPORTS RECEIVED VIA THE ABUSE FORM

TOTAL
673

NUMBER OF INVESTIGATIONS (EXCLUDING ABUSE-C)

TOTAL
535

5	Bankruptcy
7	Policy violation
7	Violation of RIPE Policies
12	Untruthful information
52	Resource(s)
54	LIR account
96	Sanctions
302	Contact information
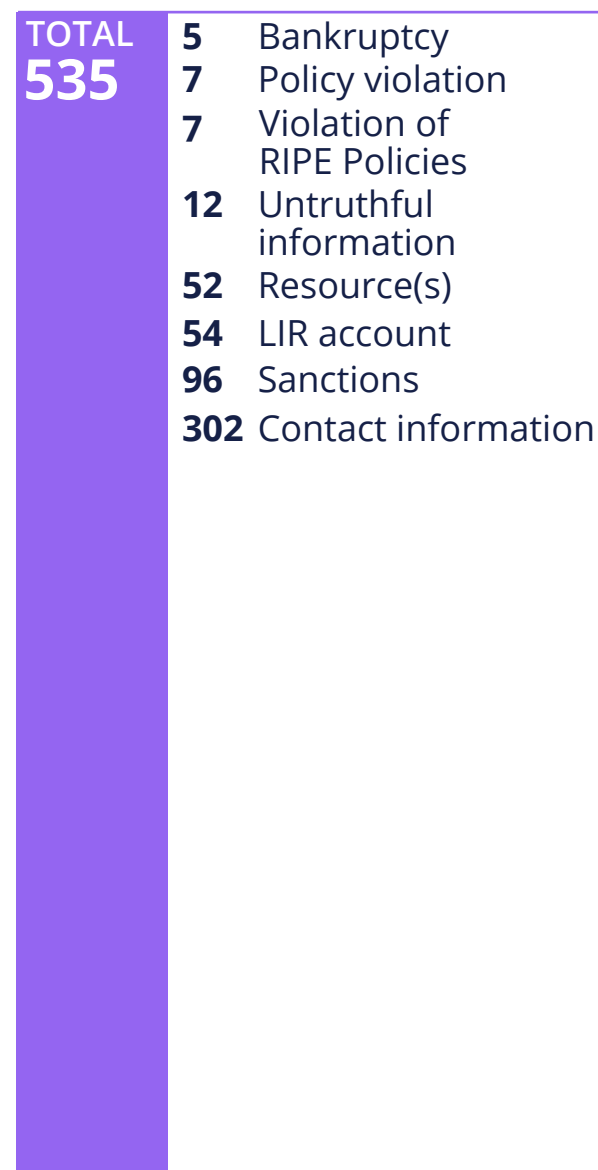
ABUSE-C VALIDATION INVESTIGATIONS

TOTAL
3,336

852 LIR resources

1,487 LIR

997 End user
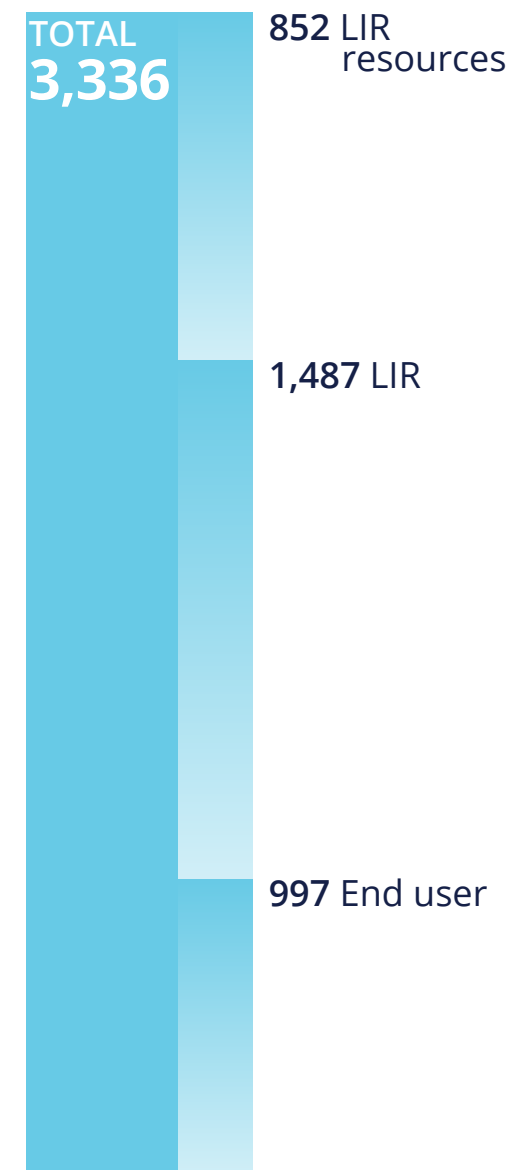
SECURITY INCIDENTS

Security incidents are detected on the basis of audits performed, alerts from our network intrusion detection system and external reports.

IN 2021

10 Low-impact security incidents

6 Medium-impact security incidents

0 High-impact security incidents

HIJACK INVESTIGATIONS
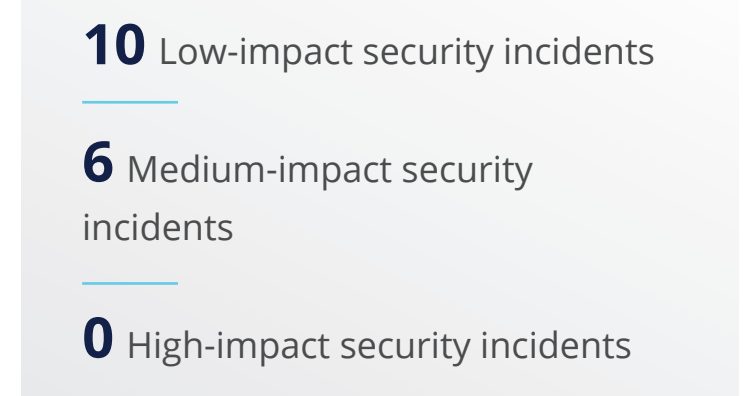
IN 2021

1,144 Hijack investigations
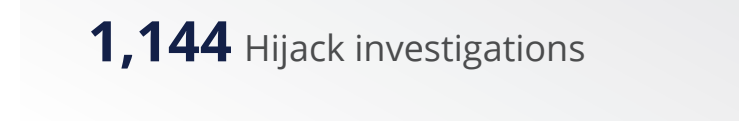
SECURITY REPORTS

We encourage the reporting of vulnerabilities in line with our Responsible Disclosure Policy. Read more

IN 2021

592 Security-related reports received

63 Reports were relevant
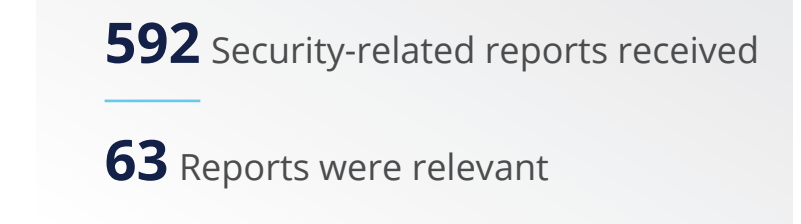
RIPE DATABASE UPDATES

Here are some of the updates we made to the RIPE Database in 2021:

IMPLEMENTED

Implemented the "geofeed:" attribute on inet(6)num resources (RFC 9092).

CLEANUP

Cleanup of route(6) objects using unregistered space in the NONAUTH database.

Converted all "status:" attribute values to uppercase.

Cleanup of "address:" attributes in some LIR organisations.

IMPROVED

Improved the search interface of the RIPE Database web application.

Applied improvements from the cloud migration project to the internal environment.

RPKI

In 2021, our focus for RPKI was on maintaining a safe, stable and resilient Trust Anchor.

Initially, we phased out our support and maintenance for the RIPE NCC's RPKI Validator, as we believe there are enough mature alternatives on the market, which helped shift our efforts towards resiliency and security.

READ MORE

RPKI CERTIFICATES

13,657
16,280

2020 | 2021

ROAs

20,880
26,608

2020 | 2021
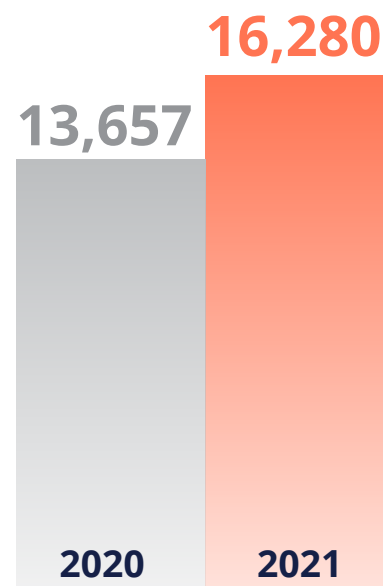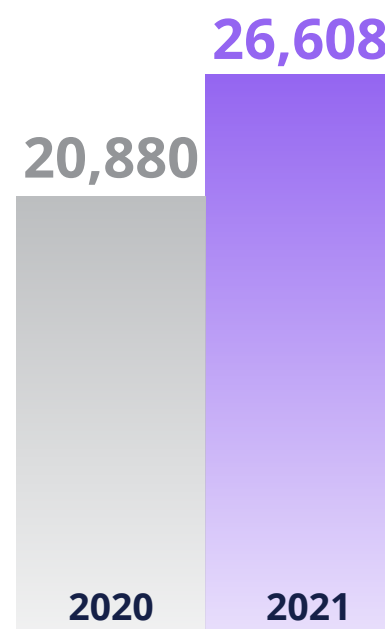
We improved the architecture for the rsync repository and the behaviour of our RRDP repository.

———

We asked a third party to perform a source code review and a penetration test.

———

We enabled Route Origin Validation on our own network, AS3333.

———

We updated the RPKI Certification Practice Statement and our terms and conditions to include PI and Legacy holders.

———

We started publishing our quarterly plans for RPKI on our website and asked the community to contribute to those plans.

———

We hosted two RPKI Open Houses, one on the future of RPKI and the other on Hosted vs Delegated RPKI.

Information Services

RIPE ATLAS

RIPE Atlas is a leading Internet active measurement network that collects unique data, providing both live and historical information about networks' reliability, reachability and connectivity.

In 2021, we continued to grow the number of software probes, reaching a population of almost 2,000 by the end of the year. This was in part made possible by translations of the installation documentation to multiple languages by the generous contributions from volunteering community members. We have also been working with partners on introducing the next version of hardware probes, which are expected to become available in early 2022.

During the year, we also introduced a new sponsorship model with clearly defined benefits to the sponsors. We continued to support data availability in Google BigQuery, which also supported the analysis of Internet outages and other events.

READ MORE

RIPE ATLAS PROBES AND ANCHORS

	Probes connected	Probes shipped	Anchors connected	Results collected per second	RIPE Atlas total users	RIPE Atlas active users	ASNs covered (IPv4)	ASNs covered (IPv6)	Countries covered
2021	11,832	55	718	13,177	58,200	15,055	3,572	1,628	165
2020	11,475	1,569	677	11,403	53,500	25,000	3,672	1,461	176
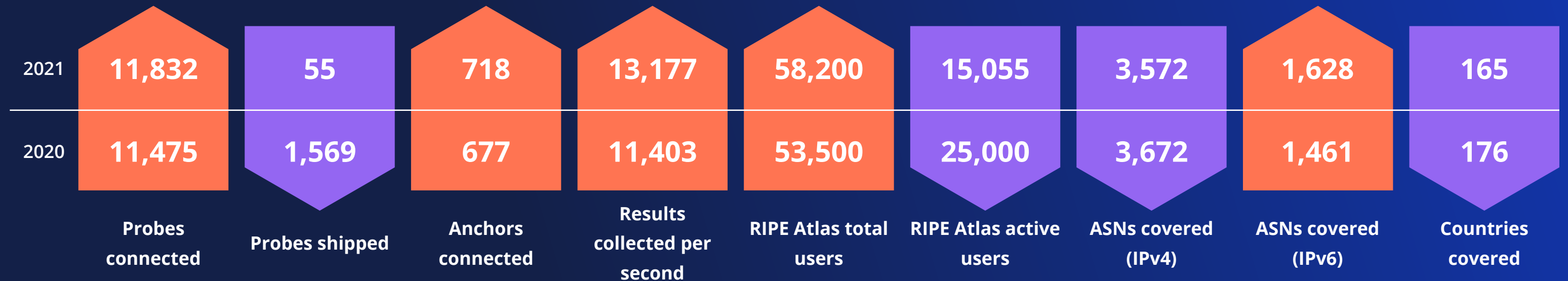
DNS AND K-ROOT

The RIPE NCC runs two independent and equally important DNS services. The first is K-root, one of the 13 Internet root name servers. The K-root service is provided by a set of distributed nodes using IPv4 and IPv6 anycast. The second is a DNS service for RIPE NCC zones, reverse DNS and secondary DNS, which we refer to as AuthDNS.

We continue to improve the resiliency and availability of both services by adding hosted nodes. This has been made possible by an improved Hosted DNS app that allows us to accept applications for hosting both K-root and AuthDNS. Additionally, we are accepting applications to run this service on virtual servers, which makes it easier to deploy them in some places.

In 2021, we brought up three new AuthDNS nodes, bringing the total number of nodes to nine, up from six in 2020. These nodes serve zones for reverse delegations of RIPE NCC member allocations, country code Top-Level Domain (ccTLD) secondary services and RIPE NCC authoritative zones. The K-root cluster grew by nine new instances, bringing the total to 91 nodes.

LEGEND

▲ AuthDNS   ● Existing

● K-Root   ● New

RIPEstat

RIPEstat provides users with essential information on IP address space and Autonomous System Numbers (ASNs) along with related statistics on specific hostnames and countries.

READ MORE

We released a new user interface (UI)
The new user interface evolved from an alternative to the default UI for RIPEstat.

———

We released a new landing page and our documentation
We revamped the RIPEstat landing page and documentation to fit the new company-wide UI styling.

———

Celebration of 10 years of RIPEstat
At RIPE 82, we celebrated the 10-Year anniversary of the service with a presentation looking back at the stages that RIPEstat went through in the past 10 years.

———

New data sets
Additional RPKI data and a new broadband measurements data source were made available to provide more insights into the status of the Internet.

———

We made preparations to benefit from cloud services
Moving a large information service onto a new platform requires much consideration and thinking as we prepare for a cloud debut for RIPEstat.

IN 2021

Total number of requests to the Data API
21,538,505,303

———

Visits from unique IP addresses
5,431,633

RIS

The Routing Information Service (RIS) collects routing data from several key locations. We run this globally distributed system to collect data on the Internet routing system. This is used both in RIPEstat and in many external systems to debug and monitor Internet routing.

RIS LIVE

RIS Live lets users stream BGP data in real-time, allowing them to monitor and detect routing events anywhere in the world as those events occur. With several filters available, users can quickly drill down to the information they need.

We added a route collector at UAE-IX in Dubai to capture more data in the Middle East and a second multi-hop route collector in Amsterdam that captures data from networks worldwide.

READ MORE

BGP SESSIONS FEEDING RIS

IPv4

2020	2021
744	758

IPv6

2020	2021
595	627

DATA VOLUME

ROUTING TABLE SNAPSHOTS

2020	2021
28.12TB	31.23TB

BGP UPDATES

2020	2021
16.71TB	21.20TB
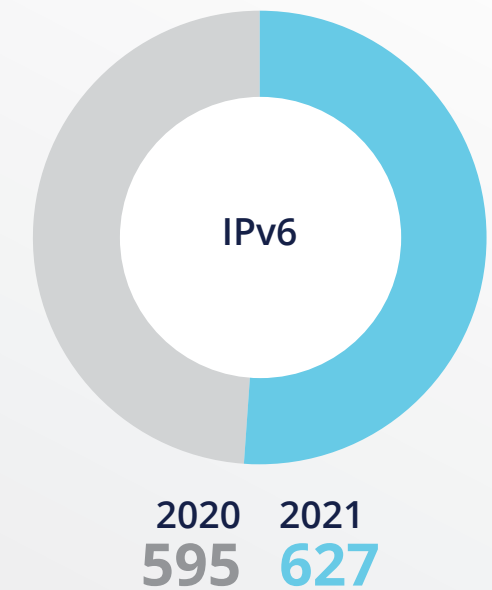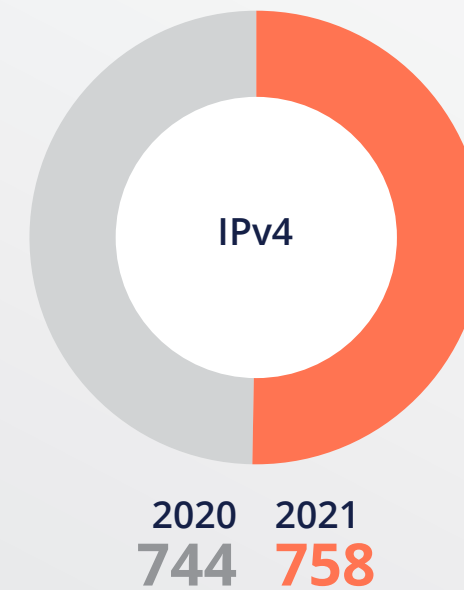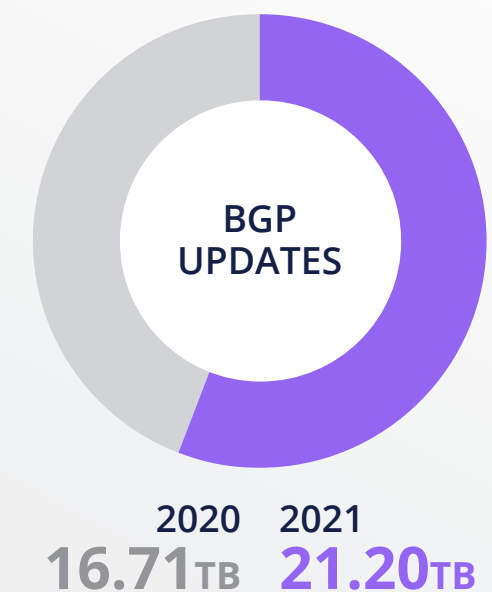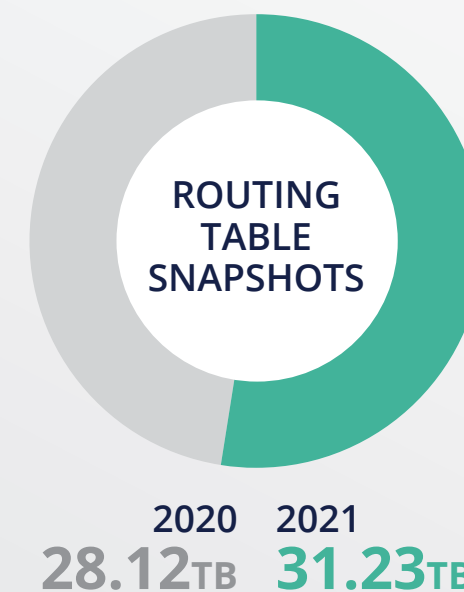
Community and Engagement

TRAINING AND E-LEARNING SERVICES

In 2021, we continued to provide our members with webinars that have been translated from face-to-face courses and even managed to launch some new webinar topics, such as IP Blocklisting Basics and RIPEstat API.

This is in addition to our ever-growing portfolio, which consists of RIPE Database, Basic and Advanced IPv6, IPv6 Security, Measurements and Tools, BGP and Internet Registry webinars. This year, we also tried to focus on the larger community and provide Open House sessions that are open to non-members of the RIPE NCC. These sessions included topics such as IPv6-only Networks, Becoming a Certified Professional in IPv6 Security and Building Your Own Test Labs.

We also launched the Internal Training Programme for RIPE NCC staff in 2021.

READ MORE

HIGHLIGHTS

Popular months where we saw the highest number of webinar (incl. open house) participants are March: 322 participants, February: 292 participants and September: 235 participants.

———

BGP was the most-attended webinar topic in 2021. We had over 900 participants.

IN 2021

New webinars
- IP Blocklisting Basics
- RIPEstat API

———

Updated webinars
- Policy Development Process

Activity
- Webinars: **84**
- Open House: **3**
- Internal Training Programme sessions: **14**
- Others: **1**

Participants
- Webinars: **1,791**
- Open House: **246**
- Internal Training Programme: **261**

RIPE NCC ACADEMY

The RIPE NCC Academy offers free online courses on a number of important networking topics. Our Academy courses are also paired with corresponding RIPE NCC Certified Professionals exams, preparing learners to get certified in a particular skill.

This year, the RIPE NCC Academy launched the IPv6 Security e-learning course. We also redesigned our IPv6 Fundamentals course to give it an updated look and fresh material. And for more bite-sized lessons, we introduced Microlearnings, which are short and smaller learning units in the Academy. Our new Microlearning topics include Packet Switching, Ping, Traceroute and RIPE Database.

READ MORE

IN 2021

TOTAL
5,482
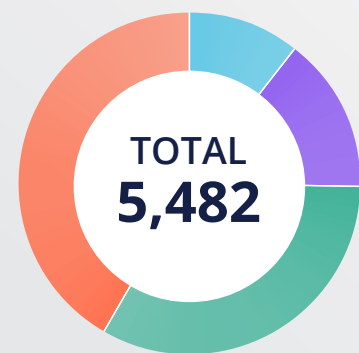
592 learners enrolled in **IPv6 Security** course
807 learners enrolled in **Microlearning** courses
1,805 learners enrolled in **RIPE Database** course
2,278 learners enrolled in **IPv6 Fundamentals** course

RIPE NCC CERTIFIED PROFESSIONALS

A RIPE NCC certification validates expertise in the fields of IP address management, IPv6 technologies and network security.

Our certifications show the ability to use best practices in line with RFCs, as recommended by industry experts. RIPE NCC Certified Professionals earn a digital badge that can easily be verified by any third party, like your employer or customers.

We currently offer three certifications:
- RIPE Database Associate
- IPv6 Fundamentals - Analyst
- IPv6 Security Expert
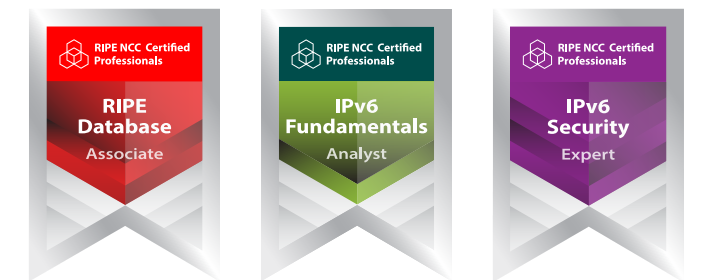
In September 2021, we released the IPv6 Security Expert exam, which certifies the ability to design a high-level IPv6 security strategy to protect an IPv6 network against new attack vectors. The new exam was also accompanied by the IPv6 Security e-learning course, which was launched in the RIPE NCC Academy. Additionally, we started a pilot with the Dutch government, offering training and certification together to support their IPv6 rollout efforts. By the end of 2021, we were proud to see over 1,000 professionals succeed in getting certified by us.

1,117 badges were issued as of 31 December 2021.

READ MORE

POLICY DEVELOPMENT

Policies implemented by the RIPE NCC emerge from an open, transparent, community-led development process. Here is an overview of the policies discussed in 2021. The data shown reflects the status of that policy and participation as of 31 December 2021.

Although no new RIPE policy proposals were submitted in 2021, the following topics were discussed by community members:

- An update to the Policy Development Process (PDP) document, suggested by the RIPE Chair Team, to clarify its authorship, to encourage feedback on policy ideas before submitting a new proposal and to provide more details about the appeal procedure.

- Implementation of the new RIPE Code of Conduct.

- Publication of the final RIPE Database Requirements Task Force report.

- A review of RIPE IPv6 policy goals.

- A report from the Registry Services team on IPv6 stockpiling.

READ MORE

IN 2021

0 Policy proposals submitted for discussion

57+ People who participated in discussions

23 From how many countries

PUBLIC AUTHORITY ENGAGEMENT

The RIPE NCC actively engages with a wide range of stakeholders, including governments, regulators and law enforcement agencies, to promote a multistakeholder approach to Internet governance and ensure the future growth and continued stability of the Internet.

Our Roundtable Meetings offer governments and regulators the opportunity to discuss governance issues relevant to the RIPE community and gain a deeper understanding of complex technical topics. Over the past year, we held three Roundtable Meetings: one for stakeholders in Europe, another for stakeholders in Eastern Europe, the Caucasus and Central Asia and a third for stakeholders in the Middle East.

Representatives attending these events discussed a variety of issues including IPv6 developments, routing security and public policies to stimulate technological development. They highlighted the importance of digital cooperation.

In 2021, we sponsored several Internet governance events, such as the IGF, EuroDIG and SEEDIG, as well as several national IGFs (in Russia, Greece, Ukraine and Moldova).

PUBLIC POLICY CONSULTATIONS

We contribute to various consultations led by different governmental and inter-governmental organisations involved in Internet governance and public policymaking that have the potential to impact our operations or those of our membership and the RIPE community. Such organisations have included various individual governments throughout our service region, the European Commission, the International Telecommunication Union (ITU), the Internet Governance Forum (IGF), the Organisation for Economic Co-operation and Development (OECD) and the Body of European Regulators for Electronic Communications (BEREC).

In 2021, we contributed to consultations led by the IGF, the European Commission and the ITU, and sent a response to a draft report by the European Parliament. Topics ranged from the Digital Services Act, to the NIS 2 proposal, to the UN Secretary-General's Roadmap for Digital Cooperation.

In our responses, we shared our opinion on larger Internet governance developments, such as efforts to improve the IGF. We provided detail on how different legislative proposals would affect our own operations and how they could impact the technical layers of the Internet. For example, the European Commission's NIS 2 proposal sought to bring root name servers under EU regulation, and the RIPE NCC's response pointed out three main arguments against doing so, focusing on the proposal's unintended consequences and overreach, its potential to undermine the resiliency of the DNS, and the fact that it subjected DNS operations to government oversight, which is in direct opposition to agreements made by the multistakeholder community as part of the IANA stewardship transition.

Regardless of the particular issue, our standpoint always champions a multistakeholder approach to Internet governance and is focused on protecting the Internet's core technical functions, the role of the global RIR system, and the technical community's role in operating the technical layers of the Internet.

READ MORE

COMMUNITY DEVELOPMENT

RESEARCH PROJECTS FUNDING

We did not have Fellowships for any meetings in 2021, as they all took place online and attendance was free of charge.

The budget allocated for RACI, the initiative which provides funding for academics to present their research at RIPE NCC events, was instead used to support research projects relevant to work carried out by the RIPE NCC.

The call for applications attracted 22 submissions from 14 countries, out of which we selected two projects. They are expected to finalise their research in 2022.

READ MORE

RIPE MEETING MENTORING PROGRAMME 2021

The RIPE Meeting Mentoring programme brings together experienced community volunteers to mentor newcomers at RIPE Meetings.

- RIPE 82 had 20 pairs of mentors and mentees
- RIPE 83 had six pairs of mentors and mentees

With the meeting being online and people being in different timezones people have found it hard to find the time to meet up. This saw a significant drop in people signing up for the mentoring programme on both sides - mentors and mentees.

OPEN HOUSE EVENTS

RIPE NCC Open House events are 60- to 90-minute-long online sessions bringing together experts from the RIPE NCC and our wider network for a focused discussion on topics of interest to our stakeholders.

An Open House event consists of a mixture of short presentations, panel discussions, Q&As with experts and open mic sessions with participants. As the name suggests, these events are free and open to all. By creating a series of focused events, we offer our stakeholders insights into issues at hand such as in our session on the new charging scheme and our Meet the EB Candidates session. These events also let the community offer their feedback, as in the session on our RPKI service.

All of these sessions are recorded and available online.

READ MORE

TOP 10 OPEN HOUSE SESSIONS OF 2021

The Future of RPKI

IPv6-Only Networks

Internet in France

Internet in Turkey

Become a Certified Professional in IPv6 Security

Building Your Own Test Labs

Internet in Bulgaria

Internet in Italy

Hosted vs. Delegated RPKI

Organising Network Operator Groups

NOGS AND REGIONAL EVENTS

Four NOG meetings sponsored: UKNOF, NLNOG Day, LUNOG and RSNOG.

SEE 9

The SEE 9/RIPE NCC Regional Meeting took place online on 28 September 2021. The meeting was a 90-minute session hosted by the RIPE NCC, with 84 people joining the meeting on Meetecho.
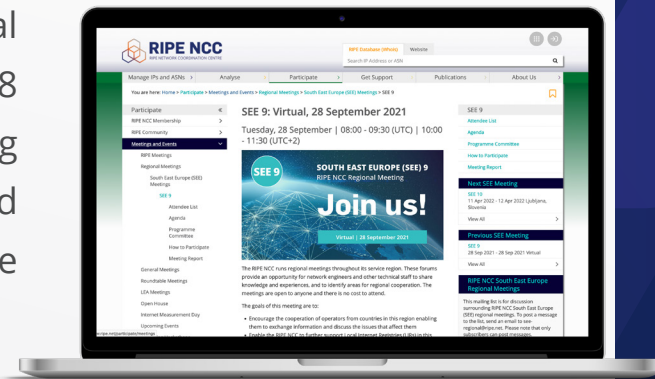
The meeting focused on the community during and after a pandemic, with a presentation from the RIPE NCC (Vesna Manojlovic) about Technical Communities' Resilience During the Pandemic followed by IXPs in the SEE Region presenting on Adapting to the Traffic Increase after COVID.

Further presentations included:
- A Reverse DNS Survey.
- An Overview of the Electronic Communications Market in Montenegro.
- The Cybersecurity Excellence Centre and the First B&H Academic CSIRT.
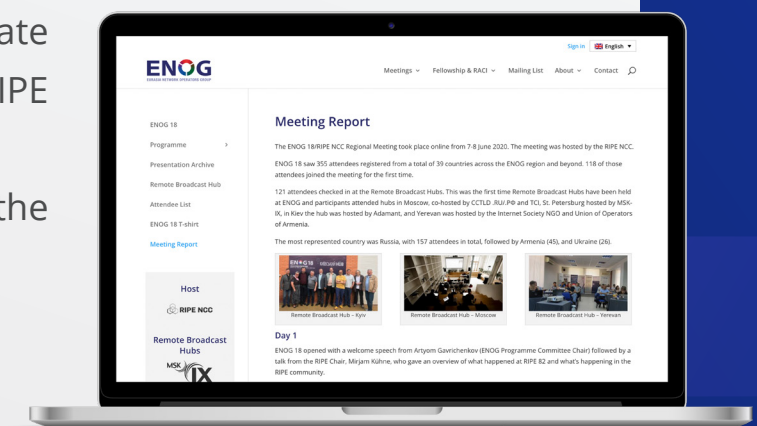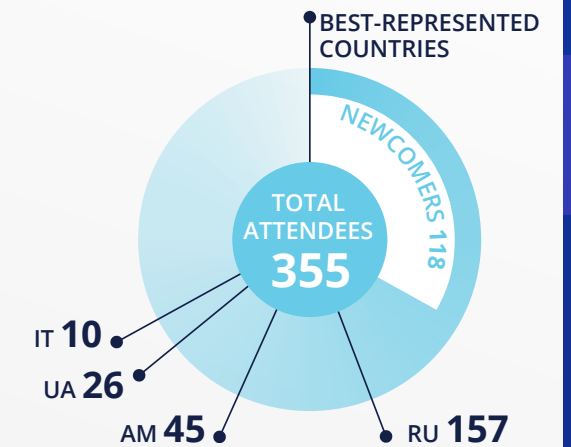
READ MORE

ENOG 18

The ENOG 18/RIPE NCC Regional Meeting took place online from 7-8 June 2021. The meeting was hosted by the RIPE NCC. ENOG 18 saw 355 attendees registered from a total of 39 countries across the ENOG region and beyond.

121 attendees checked in at the Remote Broadcast Hubs. This was the first time Remote Broadcast Hubs have been held at ENOG, and participants attended hubs in Moscow, co-hosted by CCTLD .RU/.РФ and TCI, and in St. Petersburg, hosted by MSK-IX. In Kyiv, the hub was hosted by Adamant, and in Yerevan, it was hosted by the Internet Society NGO and Union of Operators of Armenia.

The meeting agenda included presentations on Routing Loops, BGP instrumentation and Virtual Peering Series.
- Day 1 focused on RPKI and closed with an RPKI Update followed by an Introduction to RPKI tutorial by the RIPE NCC.
- Day 2 saw some lively discussion during a BoF about the ENOG Charter.

READ MORE

BEST-REPRESENTED COUNTRIES

NEWCOMERS 118

TOTAL ATTENDEES
355

IT **10**
UA **26**
AM **45**
RU **157**

MENOG 21 MEETING AND PEERING FORUM

MENOG 21 took place online on Tuesday, 26 October 2021 and featured a 90-minute programme and a new schedule. The event was held in English with Arabic translation available. 117 stakeholders joined this edition from 27 countries.

- The meeting centred discussions on the region's development of Internet operations and its shift to peering-based networks for better connectivity.

- Key regional Internet players shared experiences, offered technical updates and identified areas for potential collaboration.

The meeting agenda included recent deployments in measurement infrastructure at UAE-IX, traffic flows in the Middle East, Central Asia and Caucasus-interconnected regions, revamping networks for the FIFA World Cup Qatar 2022, Internet resilience during Lebanon's economic crises, a routing security update and experiences with deploying RPKI.
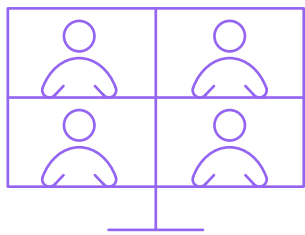
[READ MORE]
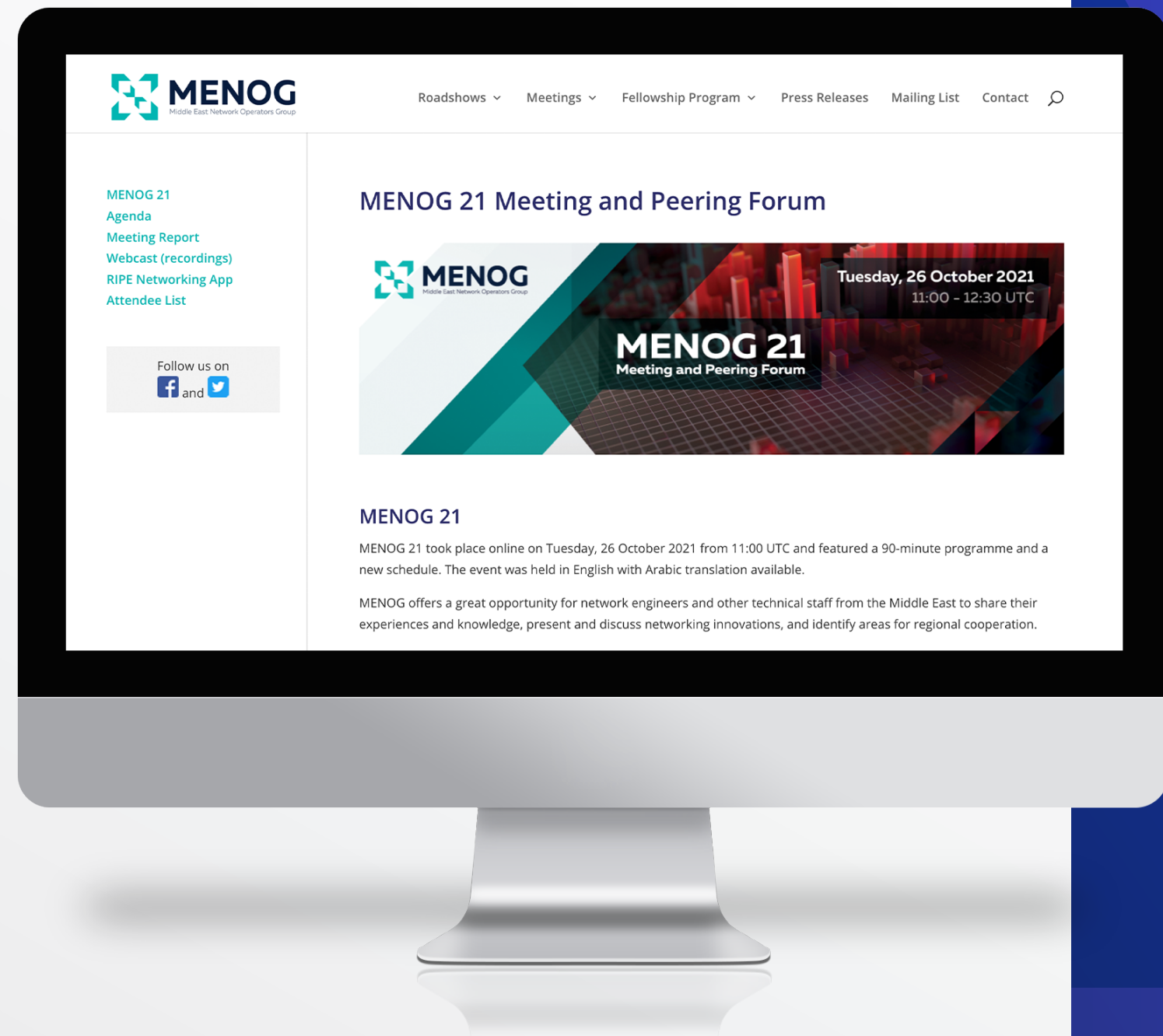
RIPE 82

RIPE 82 took place in a virtual format from 12-17 May 2021.

Our third virtual meeting welcomed 1,190 attendees from 95 countries. There were 274 newcomers and an average of 450 viewers a day.
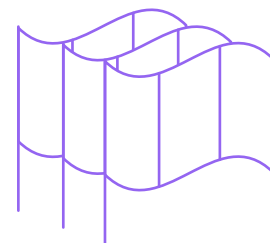
READ MORE

VIRTUAL EVENT
12-17 MAY 2021

ATTENDEES
1,190

COUNTRIES
95

View meeting statistics
VIEW

Erik Bais presented the results of a survey conducted to assess the wellbeing and mental health of community members in the context of the pandemic. His presentation was very well received by the community.

———

Patrik Fältström gave a presentation on encryption and pointed out that even though it is taken for granted by many, it complicates the work of other actors, such as law enforcement.

———

Marco Hogewoning gave an update on the impact that the new Network Information and Security Directive (NIS2) could have on network operators and in particular on DNS providers.

———

Geoff Huston discussed the state of the DNS and current development drivers.

———

Participants were able to test their hacking skills in the RIPE 82 Cybersecurity Challenge.
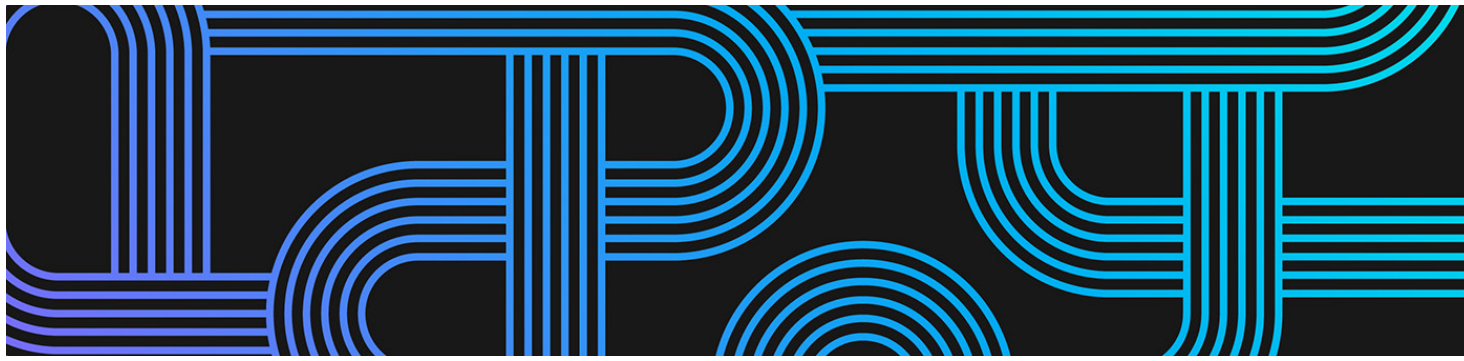
RIPE 83

RIPE 83 took place in a virtual format from 22-26 November 2021.

1,012 people from 87 countries registered to attend RIPE 83. There were 389 newcomers and an average of 450 viewers a day.
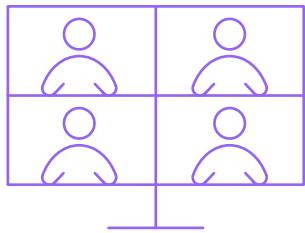
READ MORE

VIRTUAL EVENT
22-26 NOVEMBER 2021

ATTENDEES
1,224
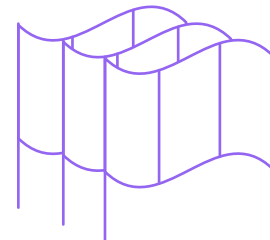
COUNTRIES
87

View meeting statistics   **VIEW**

Corinne Cath presented her PhD research in which she looked at the community culture within the IETF. Her findings were also applicable to the RIPE community.

Alexander Isavnin informed the community about the Russian government's attempts to create a "sovereign Internet" and the impact this could have on number resources.

There were some interesting lightning talks, for example Michael Oghia's on a sustainable digital economy and Sheik Md Seum's on increasing affordable internet access in Bangladesh.

The RIPE Database Requirements Working Group presented its final report.

The new RIPE Code of Conduct was introduced.

THE COMMUNITY PROJECTS FUND

Through the RIPE NCC Community Projects fund, we support projects of value to the operation, resilience and sustainability of the Internet, with a focus on tools and services benefitting the technical community in our service region. There's no shortage of creative solutions in the Internet technical community, and this fund gives innovators the chance to develop their projects for 'the Good of the Internet'.

The RIPE NCC Community Projects Fund opened its call for applications in June 2021. We received 20 applications from 16 different countries.

READ MORE

PROJECTS FUNDED IN 2021		
Addition of CAcert's Distributed Web of Trust to OpenID Connect *CACert*	**Cryptofuzz** *Guido Vranken*	**Virtual School of Internet Governance** *Glenn C McKnight*
Open Source TCP-AO (RFC 5925) Implementation *Melchior Aelmans*	**Closed Resolved Project** *KorLabs*	**Door Step Digital Skills and IT Freedom in Gboko** *Jacob Ayoki Driving School Ltd ICT Unit*
A Carbon-Aware Internet *Greenweb Foundation*	**Open and Scalable DNSThought Platform** *NLnet Labs*	**Open Source Automatic Incident Report Handling and Response Tool for RIPE Members** *Aaron Kaplan*

RIPE LABS

RIPE Labs is an online publication where network operators, researchers, developers and others share case studies, best practices, deployment experiences, prototypes, research and more.

We also use RIPE Labs to share ideas and ask for feedback from the community, as well as trial prototypes for our tools.

The new RIPE Labs launched in April 2021, bringing a whole new look to the platform and a range of useful new features.
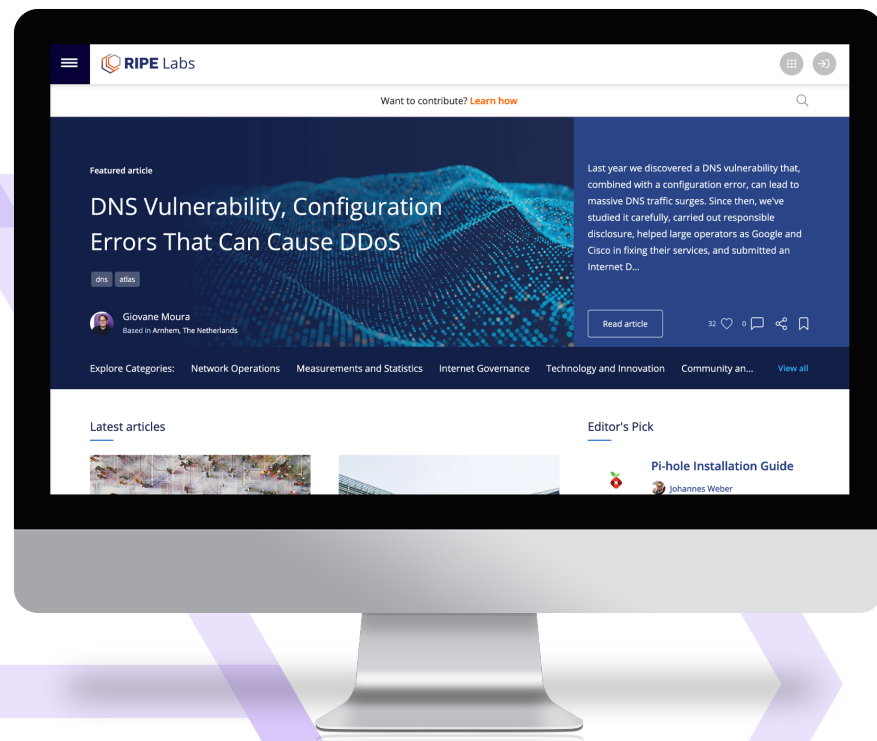
THREE MOST-READ RIPE LABS ARTICLES IN 2021

1
SCION -
A Novel Internet
Architecture

👁 **5,913** VIEWS

READ MORE

2
Build your own
Anycast Network
in Nine Steps

👁 **5,339** VIEWS

READ MORE

3
Micro BGP Suite:
The Swiss
Army Knife of
Routing Analysis

👁 **4,991** VIEWS

READ MORE

252,333 Visitors
127 Articles
70 Articles (by staff)

2021

228,525 Visitors
131 Articles
70 Articles (by staff)

2020
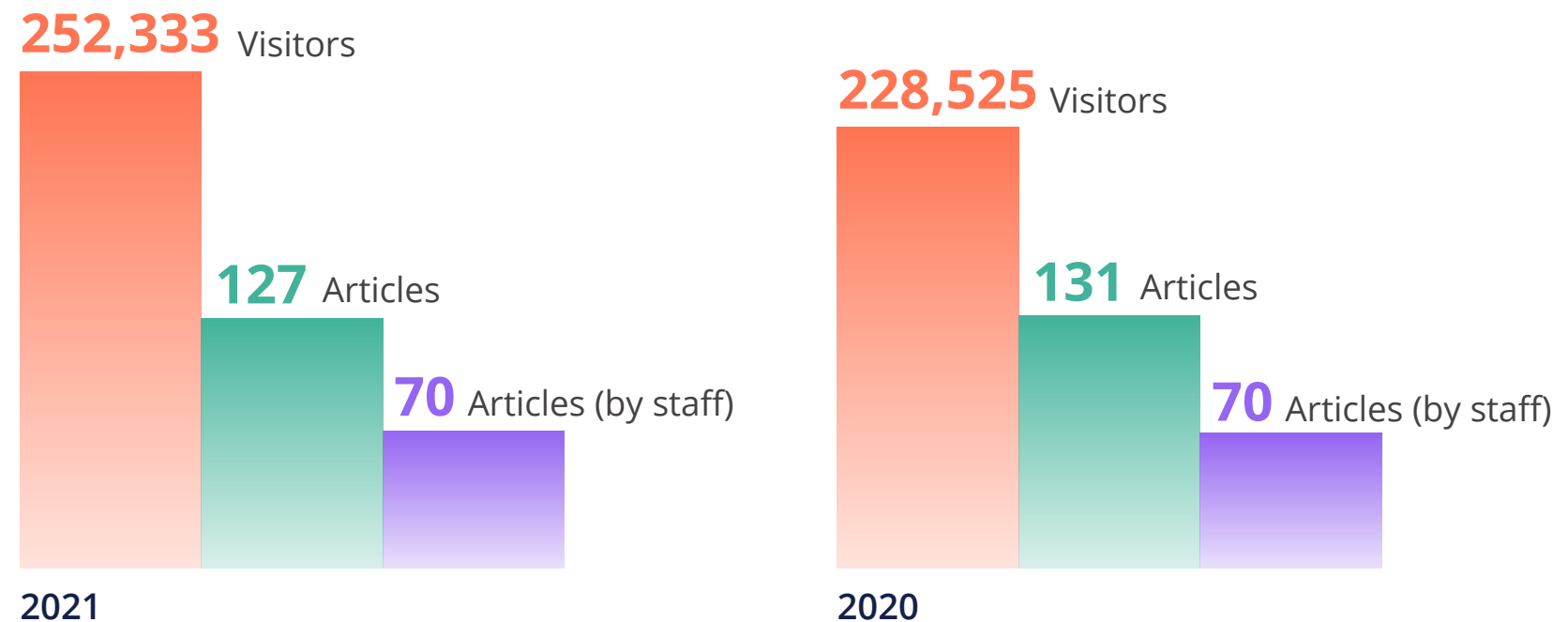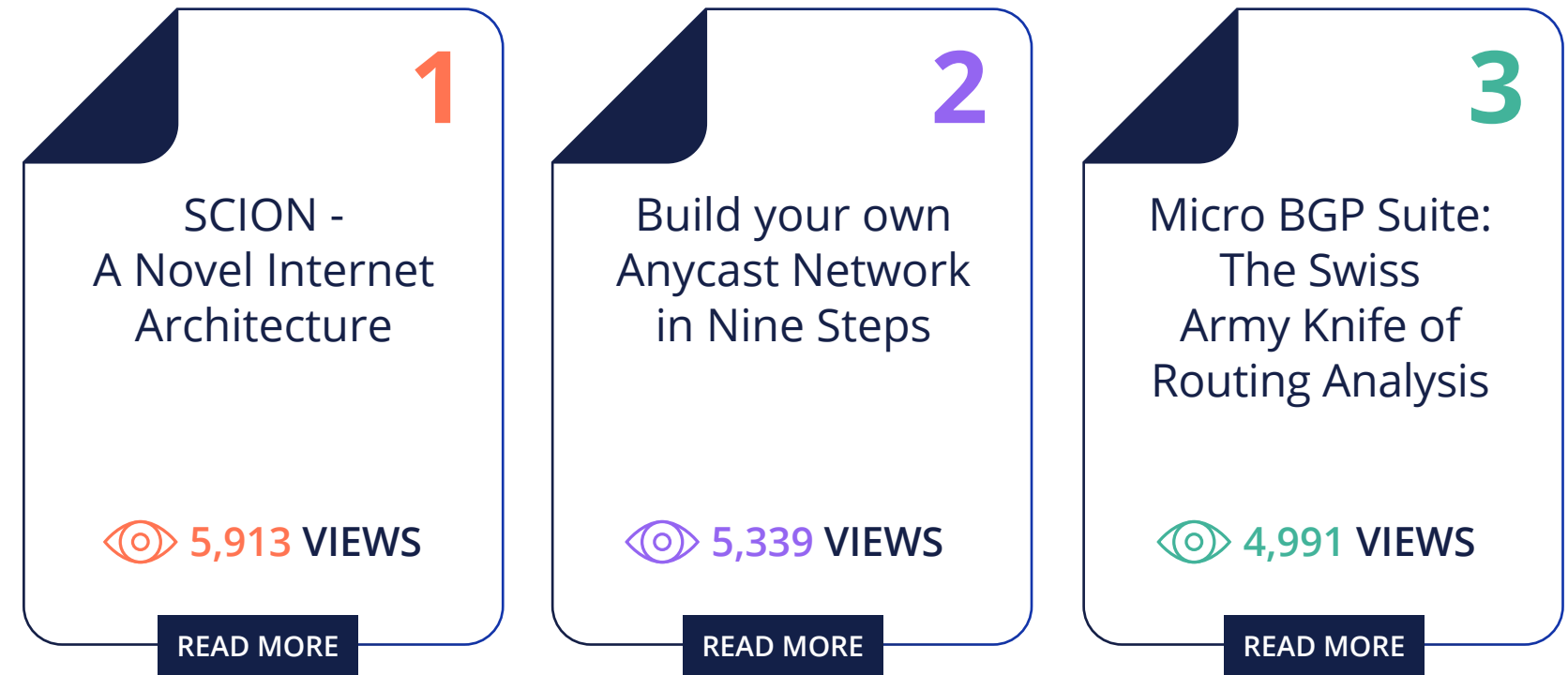
Inside the RIPE NCC

AT THE HEART OF THE RIPE NCC

In 2021, we had 161.9 FTEs on our team based in Amsterdam and Dubai. Our staff come from 41 different nationalities and speak over 30 languages. Currently, most of our staff are working from home, but our office is open with a limited capacity for employees who choose to come in.

READ MORE

FTES **161.9**

FEMALE
37.65%

MALE
62.35%

NATIONALITIES
41

LANGUAGE SPOKEN
30+

TURNOVER
9.91%
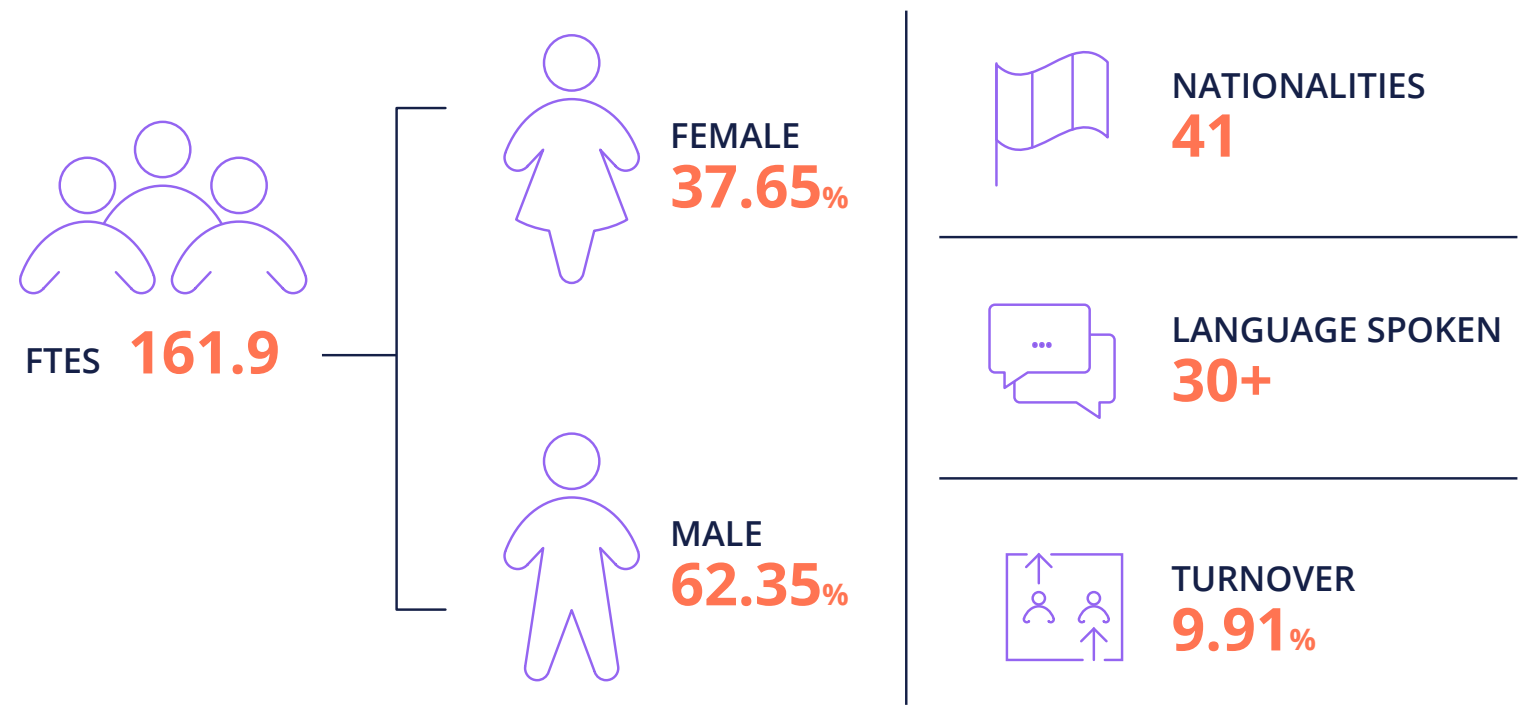
COMPLIANCE AND TRANSPARENCY

We aim to implement corporate governance best practices where possible. We operate under transparent organisational, management and Executive Board structures.

ARBITRATION CASES

In 2021, one arbitration ruling was issued on a case initiated by a member against the RIPE NCC about our decision to not process a transfer request due to inadequate legal documentation supporting this request. All arbitration rulings are available on our website.

READ MORE

CORPORATE GOVERNANCE

In 2021, we amended the following RIPE NCC legal and procedural documents:
- Transfer of Internet Number Resources and Change of a Member's Official Legal Name
- Independent Internet Number Resources - Contractual Relationship Changes Between Sponsoring LIR and End Users
- Due Diligence for the Quality of the RIPE NCC Registration Data
- Closure of Members, Deregistration of Internet Resources and Legacy Internet Resources
- RIPE NCC Certification Terms and Conditions

All of these documents and their previous versions are available on our website.

READ MORE

LEA TRANSPARENCY REPORT

The RIPE NCC receives information requests from Law Enforcement Agencies (LEAs) and tries to facilitate the provision of any required publicly available information. We do not provide confidential or private information to LEAs without a court order or other legally enforceable order or request under Dutch law.

READ MORE

GDPR COMPLIANCE

In 2021, we received ten requests from individuals to delete their personal data under the EU General Data Protection Regulation (GDPR). Six of these requests were approved and processed.

In two cases, we took no action or partial action, as there were legitimate reasons to retain personal data. This consisted of contact information of existing members and association with a maintainer object in the RIPE Database. It is crucial that we retain this type of information to preserve the integrity of the RIPE Registry and demonstrate the chain of custody over Internet number resource registration. Partial action related to the deletion of personal data that would not affect the integrity of the RIPE Registry.

In two other cases, the requests were not finalised because the requestors did not respond to our authentication requests.

SANCTIONS

In 2021, sanction regulations caused complications with our bank. As Iran and Syria were subject to sanctions, this resulted in uncertainty over whether our banks would accept payments from members in these countries - despite the fact that these members themselves were not subject to EU sanctions.

To address this, we delayed invoicing affected members until we were sure that their payments would be accepted, and we remain in talks with our banks to find a long-term solution. At no point did these billing difficulties prevent these members from accessing our services.

This issue emphasised how important it is for us to be prepared for sanctions so that we can continue to offer uninterrupted service to our members. In the case a member is subject to EU sanctions, we freeze their resources in the RIPE Database, but we do not have to deregister these resources or terminate these memberships. To stay aware of which members are subject to sanctions, we have automated our sanctions screening process using third parties to help with our due diligence checks. We also contracted an independent reviewer, EY, to assess the effectiveness of this procedure. EY's report found that the RIPE NCC has a sound sanctions process in place and provided a few recommendations on how we could further improve our process.

READ MORE

QUARTERLY SANCTIONS TRANSPARENCY REPORTS

To keep members informed as well, we now publish quarterly sanctions transparency reports that show how many RIPE NCC members and other resource holders are affected by sanctions and where they are based. As of now, we have published two reports:

ripe-768 Q4 2021

Quarterly sanctions transparency report

READ MORE

ripe-776 Q1 2022

Quarterly sanctions transparency report

READ MORE

ACTIVITY PLAN COMMITMENTS

In the table below, we list the commitments we made in our Activity Plan and Budget 2021 and how we lived up to those commitments. We do not include those commitments that are business as usual or that can be considered as continuing to carry out a high level of service in a certain area.

#	Commitment from 2021 Activity Plan	Section	Status
1.	Work with other RIRs to improve registry data quality and make this readily available	Registry Accuracy and Investigations	In progress, started in 2021
2.	Develop a more proactive approach to monitoring the accuracy of registry data and contacting members about outdated information	Registry Accuracy and Investigations	In progress, started in 2021
3.	Apply our improved due diligence approach to more processes, reducing the procedural burden for our members	Registry Accuracy and Investigations	Completed
4.	Create an updated process to closely monitor membership information against the EU sanctions list	Registry Accuracy and Investigations	Completed
5.	Develop internal software to support active monitoring of registry accuracy	LIR Portal	In progress, work started in 2021
6.	Implement recommendations from external security audits	LIR Portal	Completed
7.	Improve automation of GDPR-related requests and validation of ID documents	LIR Portal	Completed
8.	Improve the visibility of user tickets and uploaded documents	LIR Portal	In progress, started in 2021

#	Commitment from 2021 Activity Plan	Section	Status
9.	Define a complete audit framework for RPKI, have a third-party audit performed and implement changes to our internal processes and documented procedures on the basis of this audit	RPKI	In progress In 2021: Audit Framework (ISAE3000) completed, gap analysis performed Q3 2022: Audit scheduled
10.	Improve our infrastructure to allow high availability and resiliency for our RPKI repositories, ensuring a stable and resilient RPKI Trust Anchor and Certificate Authority	RPKI	In progress In 2021: New CDNs purchased Q1 2022: Implementation scheduled
11.	Phase out the RPKI Validator and focus on improvements to the RPKI Trust Anchor	RPKI	Completed
12.	Introduce new hosted sites for our reverse DNS infrastructure	DNS and K-root	Completed
13.	Upgrade to better algorithms for DNSSEC-signing all the zones we maintain	DNS and K-root	Completed
14.	Improve the systems that manage the data collected by RIPE Atlas	RIPE Atlas	In progress, started in 2021
15.	Make cloud storage solutions more accessible to our users, giving them better tools to analyse the collected results	RIPE Atlas	In progress, started in 2021

#	Commitment from 2021 Activity Plan	Section	Status
16.	Expand on the RIPE Atlas software probe concept we introduced in 2020	RIPE Atlas	Completed
17.	Create more user-friendly dashboards and APIs for RIPE Atlas	RIPE Atlas	In progress, started in 2022
18.	Migrate parts of RIPEstat to the cloud	RIPEstat	In progress, started in 2021
19.	Establish more automatic service monitoring with new features and performance improvements	RIPEstat	In progress, started in 2021
20.	Improve the RIPEstat Data API with new documentation and a more consolidated API schema	RIPEstat	In progress, started in 2021
21.	Release a redesigned user interface	RIPEstat	Completed
22.	Assess our Information Security Management practises, as well as our Critical Security Controls (CSC-20), which will now include all of our operational, technical and business processes	IT Security	Implementation of CSC-20 is completed and is following Plan/Do/Check/Act cycle
23.	Define our operations within the ISO/IEC 27000 framework and ensure that we are at the level of ISO 27001 certification, with the Plan/Do/Check/Act cycle fully in place	IT Security	In progress, started in 2022
24.	Provide country or region-focused reports	Research	Completed
25.	Migrate our automation system to Salt	IT Support	In progress, started in 2020
26.	Improve our email infrastructure, especially authentication, mailing list administration and mail flow	IT Support	In progress, started in 2021

#	Commitment from 2021 Activity Plan	Section	Status
27.	Review our internal policies and procedures to accommodate remote working	IT Support	Completed
28.	Improve our remote engagement, such as through our Open Houses	Membership Engagement	Completed
29.	Hold larger physical events, including RIPE NCC Regional Meetings, RIPE NCC Days and Member Lunches	Membership Engagement	On hold until 2022 due to pandemic restrictions
30.	Carry out translations in six languages (Russian, Arabic, Turkish, Farsi, Spanish, Italian) to be published on our website	Membership Engagement	In progress, started in 2021
31.	Conduct two meetings: either physically, in Berlin, 17-21 May (RIPE 82) and in Milan, 22-26 November (RIPE 83), or virtually if necessary	Community Development	Completed
32.	Hire an external supplier for webcasting	Community Development	Completed
33.	Work with relevant stakeholders to conduct regional events for the ENOG, MENOG and SEE communities	Community Development	Completed
34.	Deliver targeted engagement events, including Roundtable Meetings for Governments and Regulators	Public Authority Engagement	Completed
35.	Continue to formalise our relationships with key public sector agencies for transparency and stability	Public Authority Engagement	On hold due to re-evaluating the return and value proposition of existing arrangements and addressing other priorities
36.	Invest in additional external expertise to increase our awareness of regulatory developments and our ability to engage relevant public authorities	Public Authority Engagement	Completed

#	Commitment from 2021 Activity Plan	Section	Status
37.	Assume the Chair of the Number Resource Organization (NRO) and chair the various NRO Coordination Groups	Internet Governance	Completed
38.	Develop new e-learning content for the RIPE NCC Academy focusing on IPv6, Measurements and Tools, and BGP	Training and E-Learning Services	IPv6 course launch completed Others in progress, started in 2021
39.	Rewrite some of our face-to-face training courses to ensure more support for self-paced study and micro-learning	Training and E-Learning Services	Completed
40.	Roll out additional exams to cover our remaining IPv6, Measurements and Tools, and BGP training content	Certified Professionals	IPv6 exam launch completed Others in progress, started in 2021
41.	Launch a fifth round of funding, while engaging with past funding recipients to enhance the benefits of their work for the RIPE community	Good of the Internet	Completed
42.	Update our job profiles, rewarding and performance management to ensure alignment with the new self-managed structure	HR	In progress, started in 2021
43.	Work with the Dutch authorities and other relevant parties to seek a permanent solution for sanctions compliance that minimises the potential impact on our members	Sanctions	In progress, started in 2020
44.	Investigate how we can enhance our member administration setup and related fee structure	Finance	In progress, started in 2021

#	Commitment from 2021 Activity Plan	Section	Status
45.	Implement our updated AFAS Online to make our process more efficient and improve our financial reporting (Financial Governance)	Finance	Completed
46.	Implement "paperless payroll"	Finance	Completed
47.	Ensure effective risk management planning and a solid "Plan/Do/Check/Act" cycle covering our operations	Information Security and Compliance	On hold, as it will be part of the ISO 27001 project and driven by the new Risk & Compliance manager (who is not yet hired)
48.	Reduce response times and decrease the number of steps members have to go through in order to interact with us	Organisational Sustainability	In progress, started in 2021

OVERVIEW OF COSTS PER ACTIVITY IN 2021 (in kEUR)

These figures are not part of the Financial Report and as such have not been audited by an external third party. These figures serve only as indications of the costs relating to these activities.

	Budget Operational Expenses 2021	Actual Operational Expenses 2021	Variance 2021	Actual Operational Expenses 2020
The Registry	**8,452**	**8,508**	**(56)**	**6,711**
Registration of IP Addresses and ASNs	522	457	65	352
Processing Registry Updates	1,885	1,839	46	1,637
Membership Administration	925	920	5	850
Registry Accuracy and Investigations	1,661	1,380	281	1,332
LIR Portal	1,838	2,150	(312)	1,387
RPKI	963	1,173	(210)	690
RIPE Database	658	589	69	463
Information Services	**7,013**	**6.502**	**511**	**5,913**
DNS and K-Root	869	738	131	864
RIPE Atlas	834	502	332	856
RIPEstat	735	403	332	680
RIS Live	807	765	42	789
Research	868	483	385	638
IT Support	2,900	3,611	(711)	2,086
Community and Engagement	**8,500**	**5,523**	**2,977**	**6,098**
Community Building & Engagement	4,610	2,042	2,568	2,576
Community Learning & Development	2,429	1,890	539	2,117
Community Coordination & Collaboration	1,461	1,591	(130)	1,405
Organisational Sustainability	**8,015**	**7,856**	**342**	**8,938**
Facilities	2,401	1,691	710	1,775
HR	693	1,065	(372)	1,186
Legal	767	744	23	781
Finance	1,466	1,443	23	1,497
Information Security and Compliance	1,191	915	276	573
Office of the Managing Director	1,497	1,815	(318)	3,126
RIPE Chair	-	183	(183)	-
RIPE NCC	**31,980**	**28,389**	**3,774**	**27,660**
Bad Debts	350	152	197	277
Depreciation	1,227	1,071	155	1,156
RIPE NCC TOTAL	**33,557**	**29,612**	**4,125**	**29,093**