RIPE NCC
Survey 2019 Report

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Survey Matters
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RIPE NCC
RIPE NETWORK COORDINATION CENTRE

survey matters.

Contents

Introduction & Methodology

The RIPE NCC is an independent, not-for-profit membership organisation that supports the infrastructure of the Internet through technical coordination in its service region. The RIPE NCC Survey is conducted every three years and is in its eighth iteration.

The RIPE NCC Survey 2019 was conducted from 24th May to 30 June 2019 to obtain feedback from RIPE NCC members and other stakeholders about RIPE NCC services, the challenges they face and where the RIPE NCC can assist. The survey helps the RIPE NCC to understand the needs and wishes of the community and guides decisions on future priorities and services. The RIPE NCC places a high degree of importance on this survey as a source of guidance for strategy and planning.

The 2019 Survey was conducted by Survey Matters, a research agency specialising in research for member-based organisations. The RIPE NCC commissioned Survey Matters to ensure the anonymity of respondents and the impartial analysis of results.

Individual responses are not identified throughout this report; results are provided at an aggregate level only. To further protect participant anonymity, no organisations or individuals are noted against verbatim feedback provided in this report. No identifying data has been provided to the RIPE NCC.

This report provides the full feedback from the online survey. Where appropriate, it also references results from the RIPE NCC Survey 2016. While Survey Matters was not involved, outcomes from consultations with members conducted by independent consultant Dr. Rob Allen on behalf of the RIPE NCC to inform the survey in late 2018 are also attached as an Appendix to this report.

Response Rates and Sample

Following a comprehensive communication and survey distribution program, a total of 5,645 responses were received. Of these, 4,297 were fully completed. After data cleansing, 4,161 responses remained. This represents a 36% increase from the 3,056 fully completed responses in 2016.

Consistent with 2016, of the responses received 88% were received from RIPE NCC members. Most responses (95%) were received from respondents in regions served by the RIPE NCC. A further 4% were from members in countries outside Europe and the Middle East.

Over half (52%) of the responses were received from respondents in Western Europe, while 17% were from the ENOG region and 12% from the Middle East. A further 7% of responses were from each of Eastern Europe and South East Europe.

Please note that some segments contain small samples and so do not aim to be representative of the different segments. They do, however, provide directional feedback about the opinions of these respondents.

Survey Design

The quantitative survey was designed by Survey Matters, in consultation with the RIPE NCC, following consultations with members and other parties in the service region in late 2018.

The 2019 survey questionnaire was designed primarily as a quantitative instrument, but respondents were also given the opportunity to provide feedback in their own words (and in their own language if desired). The addition of these are used throughout the report and add depth to the statistical results.

A variety of question types were used in the survey. Where questions required a degree of agreement, satisfaction or priority, a seven point scale has been used. This allows results to be compared (where applicable) between this survey and that conducted in 2016.

Questionnaire

The main topics canvassed by the survey included:

- Satisfaction with the RIPE NCC
- Awareness and engagement with the RIPE NCC Services
- Challenges
- Network Security
- IPv4 Issues and IPv6 Deployment
- The RIPE Database
- Training and Information Services
- Internet Governance
- Billing and Administration

Translation

As part of a trial to see if language translations would assist survey completion across the region, the survey questionnaire was translated into eight languages in 2019. The languages selected for translation were Arabic, French, Italian, Farsi, Polish, Russian, Spanish and Turkish. These languages were chosen by the RIPE NCC based on several factors, including membership size and level of perceived English proficiency.

A total of 1,822 responses were completed in languages other than English. A breakdown of non-English language survey completions by economy is provided on page 14.

Communication & Distribution

The survey was designed as an anonymous online instrument, hosted by Survey Matters. Promotion of the survey was done by the RIPE NCC.

Several prizes were offered throughout the communication period to encourage responses at different stages of the fieldwork. Survey Matters randomly drew prize winners and provided the RIPE NCC with contact details so that the prize could be forwarded to winners.

Survey Analysis

When analysing the survey data, results have been cross-tabulated by the RIPE NCC region within which the respondent resides. These include Eastern Europe, ENOG, Middle East, South East Europe, Western Europe and 'Other'. Regional differences in the opinions and behaviours of respondents are highlighted and discussed throughout the report.

The results of the survey are presented as the proportion of respondents who selected a particular option. Where possible and appropriate, full frequency distributions are provided. Comparisons to the 2016 survey are also made where possible.

Where 'top 2' ratings are provided, these indicate the proportion of respondents who have provided a score of 6 or 7. Top 2 ratings are always calculated after the removal of any 'don't know' responses, so that proportions are based only on those able to answer the question. This tends to increase top 2 ratings where the proportion of 'don't know' is high.

While all individual comments have been anonymised, we have also drawn heavily on the qualitative comments. Verbatim feedback to most of the open-end questions has been coded, in order to identify common themes. In many instances, the qualitative findings provide further insight into the quantitative survey results. Respondents' qualitative feedback has been referenced throughout the report.

Executive Summary

The results of the RIPE NCC Survey 2019 are positive and satisfaction with RIPE NCC service delivery remains high.

Overall, an overwhelming majority of respondents perceive the quality of RIPE NCC service delivery highly, with 92% rating it as good or excellent. This is consistent across all regions served by the RIPE NCC and has improved since 2016.

While slightly lower, 76% are also satisfied with the value provided for the service fees paid. Perceptions of value are lower in Eastern Europe (69%) and the Middle East (65%).

Over three quarters of respondents are satisfied with leadership and corporate governance, and 79% with the RIPE NCC's engagement with members. Fewer members in Eastern Europe and the Middle East are satisfied with membership engagement in their region.

Similar proportions indicted satisfaction with RIPE NCC billing services, although there were several calls for the return of more frequent payment options and some respondents indicated difficulty with international transfers.

Positively, 76% of respondents speak highly of the RIPE NCC – 23% speak highly of the RIPE NCC without being asked, and 53% tend to provide positive feedback when asked.

RIPE Tools and Services

Respondents' ratings of the core RIPE NCC services are also positive. Ratings of the quality of the RIPE NCC's resource registration services have improved from 2016 to 87% in 2019.

Perceptions of the RIPE NCC customer service is also positive, with over eight in ten respondents satisfied with the quality and speed of their interactions with RIPE NCC customer service.

Respondents are generally satisfied with the usefulness (80%) of the information provided through the RIPE Database. Satisfaction with data accuracy (77%) and ease of use (70%) of the RIPE Database is marginally lower, with verbatim feedback suggesting that the RIPE NCC could implement "periodic checks of the information" and "require members and resource holders to maintain up to date information in the database". Calls for upgrades to the user interface and search functionality were also common.

Of the additional tools and services provided by the RIPE NCC, RIPEstat and the Routing Information Service (RIS) are the most widely used, with 34% and 30% of respondents indicating they use the services respectively. Long-term members, respondents in South East Europe, IXPs and telecommunications and mobile operators are most likely to use these services.

While over a quarter (27%) use RIPE Atlas, lack of awareness seems to be preventing more widespread use of many other RIPE NCC tools and services, particularly RPKI, RIPE Labs and DNSMON.

While only 15% of respondents use RIPE NCC online training, 71% are aware of its availability. Calls for training were also a strong theme across all free text comments. Many respondents suggested that more training, and training in local areas and in local languages, would be highly valued. Use of RIPE NCC online training is highest among respondents from the Middle East and South East Europe.

Over half (52%) of respondents indicated that taking an exam to earn RIPE NCC professional accreditation would be of value to either their own professional career or their organisation. Interest in accreditation is highest among respondents from the Middle East, and those in technical roles.

Network Security

Network security is overwhelmingly the biggest challenge facing the Internet community in 2019. Fifty-one percent (51%) include network security among the top three challenges facing their organisation.

Regarding specific security challenges, DDoS attacks (57%), phishing, spam, malware and ransomware (47%) and blacklisting of IP addresses (26%) are all of concern. Respondents in Eastern Europe and the Middle East were more likely than those in other regions to identify DDoS attacks and blacklisting of IP addresses as issues for their organisation.

Training and sharing information on best practice are the main ways respondents believe the RIPE NCC can help the community with security challenges.

Scarcity of IPv4

Scarcity of IPv4 addresses also remains a concern for the community, with 33% of respondents rating it among the main challenges facing their organisation.

Reflecting concerns about dependency on IPv4 and the challenges associated with IPv6 deployment, over half (53%) of respondents indicated that they will need more IPv4 addresses in the next 2-3 years. The need for more IPv4 address space appears to be highest in the ENOG and Middle East regions, and among hosting companies and telecommunications and mobile operators.

Most respondents who indicated they would need more IPv4 address space suggested they would buy more on the transfer market (61%) or would use NAT (41%).

To assist with the challenges associated with the scarcity of IPv4 address space, there were many calls for more active management of IPv4 resources by the RIPE NCC. Many respondents believe that the RIPE NCC should reclaim unused address space, with suggestions that the RIPE NCC could assist by "revoking unused IPv4 addresses from big corporations".

Others thought the RIPE NCC could take a more active role in the transfer market and provide a "managed IPv4 broker service" or assist by 're-selling IPv4 addresses at a lower cost than brokers".

IPv6 Deployment

Overall, it appears there has been little change in the state of IPv6 deployment since the RIPE NCC Survey was conducted in 2016.

Out of all respondents, only 22% indicted that IPv6 is fully deployed – consistent with 21% in 2016. Just over half have commenced the process, while nearly a quarter (23%) indicated that their organisation has no plans for deployment. Respondents in the Middle East (38%) are significantly more likely to have no plans for deployment.

Lack of business need is the main challenge facing organisation's deployment of IPv6. Many respondents thought that the RIPE NCC could help by promoting the benefits of IPv6 "so that customers start asking for it", while others suggested that the RIPE NCC could drive demand by "forcing major service providers to adopt IPv6".

A lack of internal organisational knowledge and expertise is also making IPv6 deployment challenging. Consequently, calls for IPv6 training and support were common among verbatim comments. Respondents suggested the RIPE NCC should “run more courses on IPv6” and provided “dedicated IPv6 support specialists to help guide deployment”.

Lack of time for implementation is also a challenge for many, particularly in Western Europe. Respondents from the Middle East were also likely to indicate that their ISP and communications providers do not support IPv6.

Regulatory Risks and Challenges

The impact of changes to government regulation was also of interest to the survey and, overall, 27% of respondents believe that changes in government regulation will directly affect their organisation or the operations of the RIPE NCC over the next few years.

Concern about the impact of regulatory change is significantly higher in the ENOG region. Specifically, 57% of respondents in the Russian Federation believe that changes to government regulation are likely to affect their operations. Conversely, concern is lower in the Middle East, South East Europe and Western Europe.

Fears about censorship was the predominant theme in respondent feedback. Many mentions were made of the potential impact of the Sovereign Internet Act in the Russian Federation, and more broadly about potentially greater surveillance and restrictions on content by governments. Respondents spoke of “governments obtaining the ability to demand blocks on certain content” as well as the “possible restriction of access to foreign resources”. Other respondents were concerned that a “move to more national autonomy will have implications on how we deploy services”

Organisations also expressed concern that regulatory changes will impose additional compliance and cost burdens on their organisation. Respondents suggested that changes will likely “increase reporting requirements” and that “legal requirements will increase non-operational costs”.

The implications of GDPR and heightened privacy and data retention restrictions were also mentioned as impacting both organisations and the operations of the RIPE NCC.

Conclusion

The RIPE NCC Survey 2019 achieved very high participation. Over 4,100 completed responses were received, an increase of 36% when compared to 2016, indicating a high degree of engagement with the RIPE NCC.

Respondents also shared useful information about the challenges they face and the ways in which the RIPE NCC can best help the Internet community. Training and information sharing are prominent themes about the ways the RIPE NCC can assist with the main challenges of network security, IPv4 scarcity and the transition to IPv6.

Demand for local opportunities to participate and multi-lingual experiences and information was also apparent. Completion of the survey by 45% of respondents in a language other than English reinforces feedback suggesting there is significant demand for RIPE NCC information and services to be provided in local languages and is a significant step in improving accessibility to the RIPE NCC.

Finally, while there are differences in the challenges, needs and satisfaction of respondents in different regions, feedback was generally very positive, and a majority of respondents expressed a high degree of satisfaction with the RIPE NCC and the functions it performs.

Summary of Results

Service Satisfaction

- Overall, a majority of respondents perceive the quality of RIPE NCC service delivery highly, with 92% rating it as good or excellent.
- Although reasonably positive, fewer respondents are satisfied with the value provided by the RIPE NCC, with 76% rating the value for money provided for the service fees paid as good or excellent.
- Ratings of the quality of the RIPE NCC's resource registration services have improved from 2016, to 87% in 2019.
- Respondents are generally satisfied with the usefulness (80%) of the information provided through the RIPE Database. Satisfaction with data accuracy (77%) and ease of use (70%) of the RIPE Database is marginally lower.
- Over three quarters (77%) of respondents believe that the efficacy of checks and verifications of membership applications and resource requests is about right.
- While overall satisfaction with the RIPE NCC's billing services is reasonably positive, significant differences exist at a regional level.
- Seventy-nine percent (79%) of respondents are satisfied with the RIPE NCC's engagement with membership.
- Satisfaction with corporate governance is also reasonably strong, and has improved since 2016. Overall, 77% of respondents are satisfied with the RIPE NCC Executive Board's Leadership

RIPE NCC Tools and Services - Awareness and Usage

- RIPEstat is the most used of the RIPE NCC tools and services, with over a third (34%) of respondents indicating that they often use, or rely on, the tool.
- The Routing Information System (RIS) and RIPE Atlas are also relatively well used, with 30% and 27% of respondents using the services, respectively.
- Lack of awareness seems to be preventing more widespread use of many other RIPE NCC tools and services, such as RIPE Labs, RPKI and DNSMON.
- While only 15% of respondents indicate that they have used RIPE NCC online training services, 71% are aware of the service.

Challenges

- Overall, network security was most often included among the main operational challenges facing organisations in the Internet community.
- Deployment of IPv6 and scarcity of IPv4 were the next most frequently cited challenges.
- Training was overwhelmingly the main way respondents believe the RIPE NCC can assist with the challenges they face in delivering Internet services. Respondents also suggested that the RIPE NCC could assist by re-distribution or reclamation of unused IPv4 address space. Encouraging and providing assistance with IPv6 deployment is another important way in which the RIPE NCC can help the community.

Network Security

- DDoS attacks are the main security challenges identified by respondents, with 57% of respondents including it within the top three network security issues.
- Forty-seven percent (47%) of respondents indicated that phishing, spam, malware and ransomware are a problem for their organisation.
- Blacklisting of their IP address was the next most often identified network security issue, selected by 26% of respondents
- There was no consensus about the best way the RIPE NCC can support organisations with the challenge of network security. Approximately a third of respondents support each of security-specific training, collaboration between the RIPE NCC and technical security organisations, and sharing of insights and best practice on RIPE Labs and the RIPE NCC website.

Scarcity of IPv4

- Dependency on IPv4 was identified as the main challenge facing organisations arising from the scarcity of IPv4 address space. Deploying IPv6 is also a challenge for organisations arising from the lack of IPv4 addresses.
- Over half of respondents indicated that they will need more IPv4 address space in the short term.
- Of the organisations who will not need more IPv4 addresses, 65% indicate that they have enough IPv4 space. A further 44% of respondents who indicate they will not need more IPv4 stated that their organisation has/will have deployed IPv6.
- Of respondents who indicated that their organisation will need more IPv4 address space in the coming 2-3 years, 61% suggested they would buy address space on the transfer market. A further 41% will deal with the lack of IPv4 address space by using network address translation (NAT).

IPv6 Deployment

- Overall, it appears that there has been little change in the state of IPv6 deployment since the RIPE NCC Survey conducted in 2016.
- While many technologies are being used, dual stack with public IPv4 is the overwhelmingly the most common, used by 62% of respondents.
- Lack of business need was the most often selected reason organisations are not deploying IPv6. Time challenges and a lack of organisational knowledge or expertise were also hindering deployment for approximately a third of organisations.

Regulatory Risks

- Overall, just over a quarter (27%) of respondents believe that regulatory change will impact their organisation in the short term.
- When asked to indicate the ways in which regulatory changes might impact their organisation, or the RIPE NCC, censorship was the main theme of free text comments provided by respondents. Many mentions were made of the potential impact of the Sovereign Internet Act in the Russian Federation, and more broadly about potentially greater surveillance and restrictions on content by government.
- Organisations also expressed concern that regulatory changes will impose additional compliance and cost burdens on their organisation.
- The implications of GDPR and heightened privacy and data retention restrictions were also mentioned as impacting both organisation and the operations of the RIPE NCC.

Training and Information Services

- Over half (52%) of respondents indicated that taking an exam to earn RIPE NCC professional certification on IP-related topics would add value to either their own professional career or to their organisation.
- Verbatim feedback confirmed satisfaction with and support for RIPE NCC training.
- Email communication is overwhelmingly the most common way that respondents keep up to date with news about the RIPE NCC.
- Although significant differences exist by country, online forums are the most common way respondents connect with others, obtain more information and research best practices. Commercial vendor events, National NOGs and IXP meetings are other common ways in which respondents keep up with information and best practice.

Sample

With over 4,100 responses, participation in the 2019 RIPE NCC Survey increased by 36% compared to 2016.

Following a comprehensive communication and survey distribution program, a total of 5,645 responses were received. Of these, 4,297 were fully completed. After data cleansing, 4,161 responses remained. This represents a 36% increase from the 3,056 fully completed responses in 2016.

Responses were collected from over 100 countries, with most (95%) received from respondents in the RIPE NCC service region. A further 4% were from members in countries outside Europe and the Middle East. Over half (52%) of the responses were from respondents in Western Europe, while 17% were from the ENOG region and 12% from the Middle East. A further 7% of responses were from both Eastern Europe and South East Europe.

With 444 responses, the largest proportion of respondents were from the Russian Federation (11%). This is consistent with 2016 - although the number of responses has increased significantly from 295. The next most common locations from which respondents were drawn are Germany (410), Italy (295), United Kingdom (244), France (220), the Netherlands (203) and Spain (190). An overwhelming majority of respondents from Russia, Italy, France and Spain chose to take the survey in their native language.

The industry profile of the sample is also broadly consistent with 2016. Just over a third (34%) of respondents were telecommunications or mobile operators, while 22% represent IT services or consultancies and 12% are from hosting companies.

Consistent with 2016, 88% of responses were received from RIPE NCC members. Over half (59%) were received from members who have belonged to the RIPE NCC for five years or more. This is consistent with 2016, when 56% of responses were from long-term members. Of interest, 31% of respondents have been involved with the RIPE NCC for over ten years.

Among non-member contributors, participation was strongest among those who have been interacting with the RIPE NCC for less than five years. Twenty-three percent (23%) of non-member respondents have only been involved with the RIPE NCC for the last two years.

Completion of the survey by 44% of respondents in a language other than English reinforces feedback suggesting there is significant demand for RIPE NCC information and services to be provided in various languages and is a significant step in improving accessibility to the RIPE NCC.

Economy	Count	%
Eastern Europe		
Czech Republic	82	2%
Hungary	33	1%
Poland	135	3%
Slovakia	23	1%
Sub-Total	**273**	**7%**
ENOG Region		
Armenia	17	0%
Azerbaijan	10	0%
Belarus	15	0%
Estonia	13	0%
Georgia	22	1%
Kazakhstan	34	1%
Kyrgyzstan	7	0%
Latvia	17	0%
Lithuania	20	0%
Republic Of Moldova	15	0%
Russian Federation	444	11%
Tajikistan	14	0%
Turkmenistan	2	0%
Ukraine	79	2%
Uzbekistan	14	0%
Sub-Total	**723**	**17%**
Middle East		
Bahrain	11	0%
Islamic Republic Of Iran	141	3%
Iraq	13	0%
Israel	25	1%
Jordan	8	0%
Kuwait	11	0%
Lebanon	39	1%
Oman	9	0%
Palestine	14	0%
Qatar	4	0%
Saudi Arabia	29	1%
Syrian Arab Republic	8	0%
Turkey	175	4%
United Arab Emirates	15	0%
Yemen	3	0%
Sub-Total	**505**	**12%**
South East Europe		
Albania	29	1%
Bosnia And Herzegovina	16	0%
Bulgaria	53	1%
Croatia	19	0%
Greece	36	1%
Republic Of North Macedonia	10	0%
Montenegro	3	0%
Romania	56	1%
Serbia	56	1%
Slovenia	26	1%
Sub-Total	**304**	**7%**

Economy	Count	Response %
Western Europe		
Andorra	2	0%
Austria	62	1%
Belgium	52	1%
Cyprus	24	1%
Denmark	49	1%
Faroe Islands	1	0%
Finland	47	1%
France	220	5%
Germany	410	10%
Holy See (Vatican City State)	2	0%
Iceland	12	0%
Ireland	42	1%
Isle Of Man	3	0%
Italy	295	7%
Jersey	1	0%
Liechtenstein	1	0%
Luxembourg	28	1%
Malta	2	0%
Netherlands	203	5%
Norway	63	2%
Portugal	33	1%
San Marino	2	0%
Spain	190	5%
Sweden	78	2%
Switzerland	106	3%
United Kingdom	244	6%
Sub-Total	**2172**	**52%**
Other		
Argentina	3	0%
Australia	9	0%
Bangladesh	3	0%
Brazil	2	0%
Canada	11	0%
Chile	3	0%
China	5	0%
Egypt	2	0%
Hong Kong	8	0%
India	14	0%
Japan	4	0%
Kenya	1	0%
Mauritius	2	0%
Morocco	2	0%
New Zealand	2	0%
Pakistan	3	0%
Reunion	1	0%
South Africa	2	0%
Republic Of China (Taiwan)	3	0%
Tunisia	2	0%
United States	82	2%
Sub-Total	**164**	**4%**
Total Member Economies	**4141**	
Non-Member Economy	**20**	
TOTAL RESPONSES	**4161**	**100%**

Non-English Language Completions

Language	Count	Response %
Arabic	42	1%
Farsi	140	3%
French	246	6%
Italian	282	7%
Polish	129	3%
Russian	634	15%
Spanish	176	4%
Turkish	176	4%
Total	**1825**	**44%**

Industry & Role

The industry profile of the sample is broadly consistent with 2016. Just over a third (34%) of respondents were telecommunications or mobile operators, while 22% represent IT services or consultancies and 12% are from hosting companies. Ten percent (10%) are from academia, research organisations or government.

Like in 2016, a majority of respondents come from technical roles. Nearly a third (31%) work in technical operations, while 25% are IT / ICT managers or equivalent. Company owners and executives comprise 17% and 15% of the sample, respectively.

Industry	Count	%
Telecommunications/Mobile Operator	34%	1417
IT Services/IT Consultancy	22%	896
Hosting Company	12%	505
Academic/Research	6%	242
Government/Regulator/Municipality	4%	167
Other	4%	153
Banking/Financial	3%	121
Enterprise/Manufacturing/Retail	2%	104
Non-Profit/NGO/Internet Community	2%	95
Software Vendor	2%	94
Media/Entertainment	2%	89
Internet Exchange Point (IXP)	2%	74
DNS/ccTLD/gTLD	2%	69
Industrial (Construction, Mining, Oil)	1%	43
Infrastructure (Transport, Hospital)	1%	38
NREN	1%	32
Hardware Vendor	1%	22
Total	**100%**	**4161**

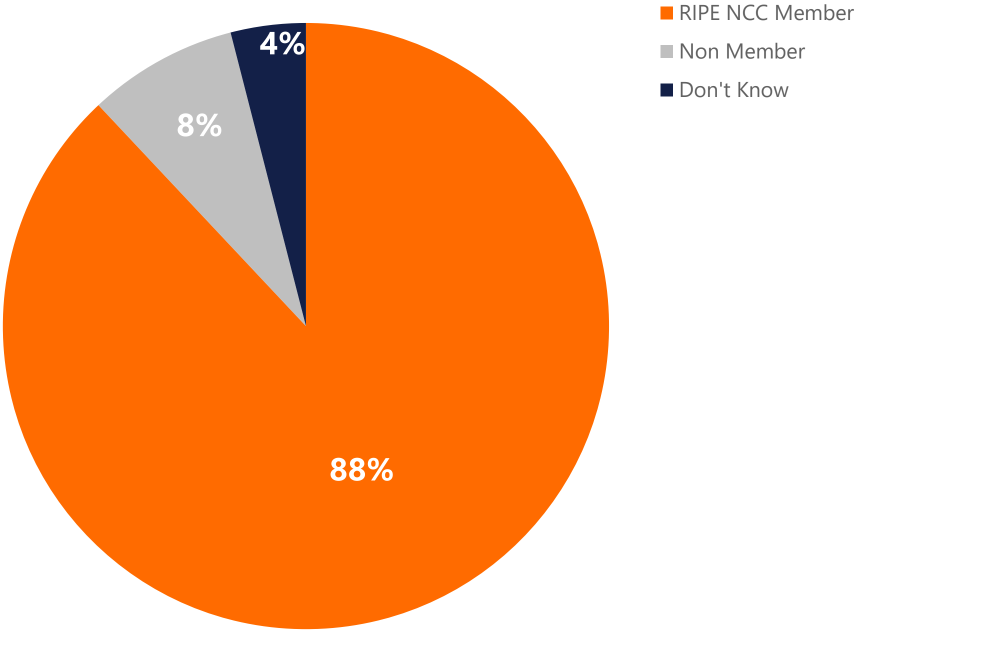
Role	Count	%
Technical operations	31%	1303
IT/ICT Manager or equivalent	24%	1000
Company owner	17%	725
Executive Director, Managing Director, CEO/CFO/CTO or equivalent	15%	629
Other	5%	209
Administration	3%	138
Software development	2%	65
Business development	1%	54
Commercial operations	1%	38
Total	**100%**	**4161**

Membership & Interaction

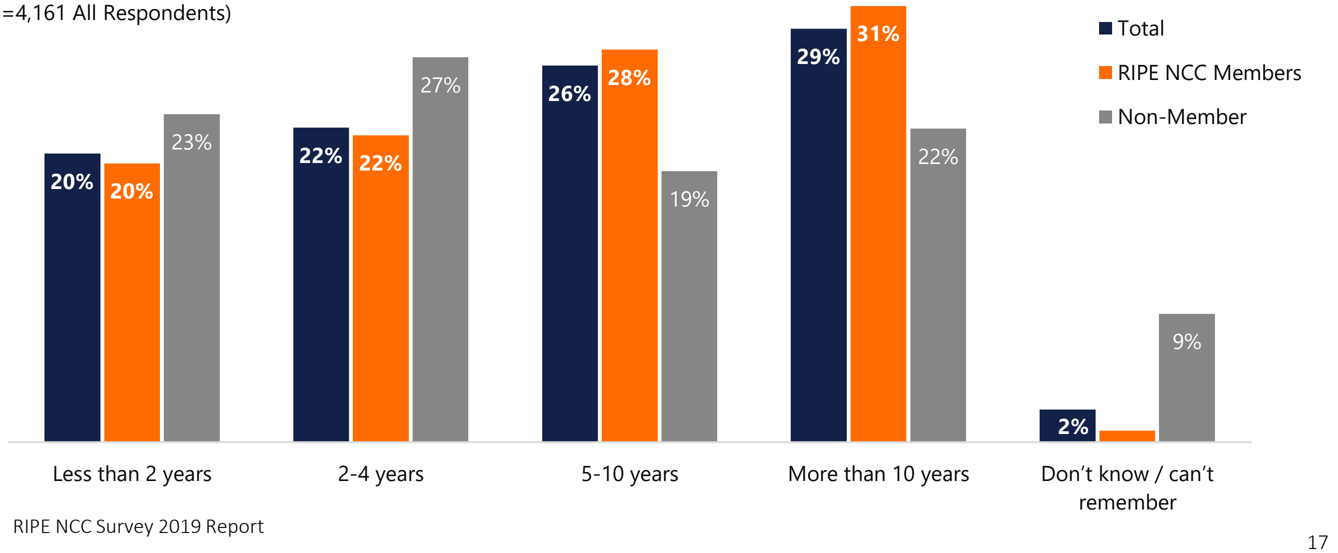
Consistent with 2016, of the responses received 88% were received from RIPE NCC members. Over half (59%) were received from members who have belonged to the RIPE NCC for five years or more. This is consistent with 2016, when 56% of responses were from long-term members. Of interest, 31% of respondents have been involved with the RIPE NCC for over ten years.

Among non-member contributors, participation was strongest among those who have been interacting with the RIPE NCC for less than five years. Twenty-three percent (23%) of non-member respondents have only been involved with the RIPE NCC for the last two years.

Q3. Is your organisation a RIPE NCC member?
(n=4,161 All Respondents)



Q5. How long have you been interacting with the RIPE NCC?
(n=4,161 All Respondents)



DETAILED RESULTS

Service Satisfaction

As a Regional Internet Registry (RIR), the main function of the RIPE NCC is to allocate and register blocks of Internet number resources and provide related services to Internet service providers and other organisations in the RIPE NCC service region. The first section of the survey sought to understand satisfaction with the way in which the RIPE NCC delivers on these services. Questions tested respondents' overall satisfaction and perceptions of value for money, as well as satisfaction with customer service and core resource allocation and database services. Opinions about leadership and corporate governance of the RIPE NCC were also canvassed.

In summary, the survey found that:

- Overall, a majority of respondents perceive the quality of RIPE NCC service delivery highly, with 92% rating it as good or excellent.

- Fewer respondents, however, are satisfied with the value provided by the RIPE NCC, with 76% rating the value for money provided for the service fees paid as good or excellent.

- Ratings of the quality of the RIPE NCC's resource registration services have improved from 2016, to 87% in 2019.

- Respondents are generally satisfied with the usefulness of the information provided through the RIPE Database. While reasonable, satisfaction with data accuracy and ease of use is slightly lower.

- While overall satisfaction with the RIPE NCC's billing services is reasonably positive, significant differences exist at a regional level.

- 79% of respondents are satisfied with the RIPE NCC's engagement with membership.

- Satisfaction with corporate governance is also reasonably strong, and has improved since 2016.

Service Delivery and Value for Money

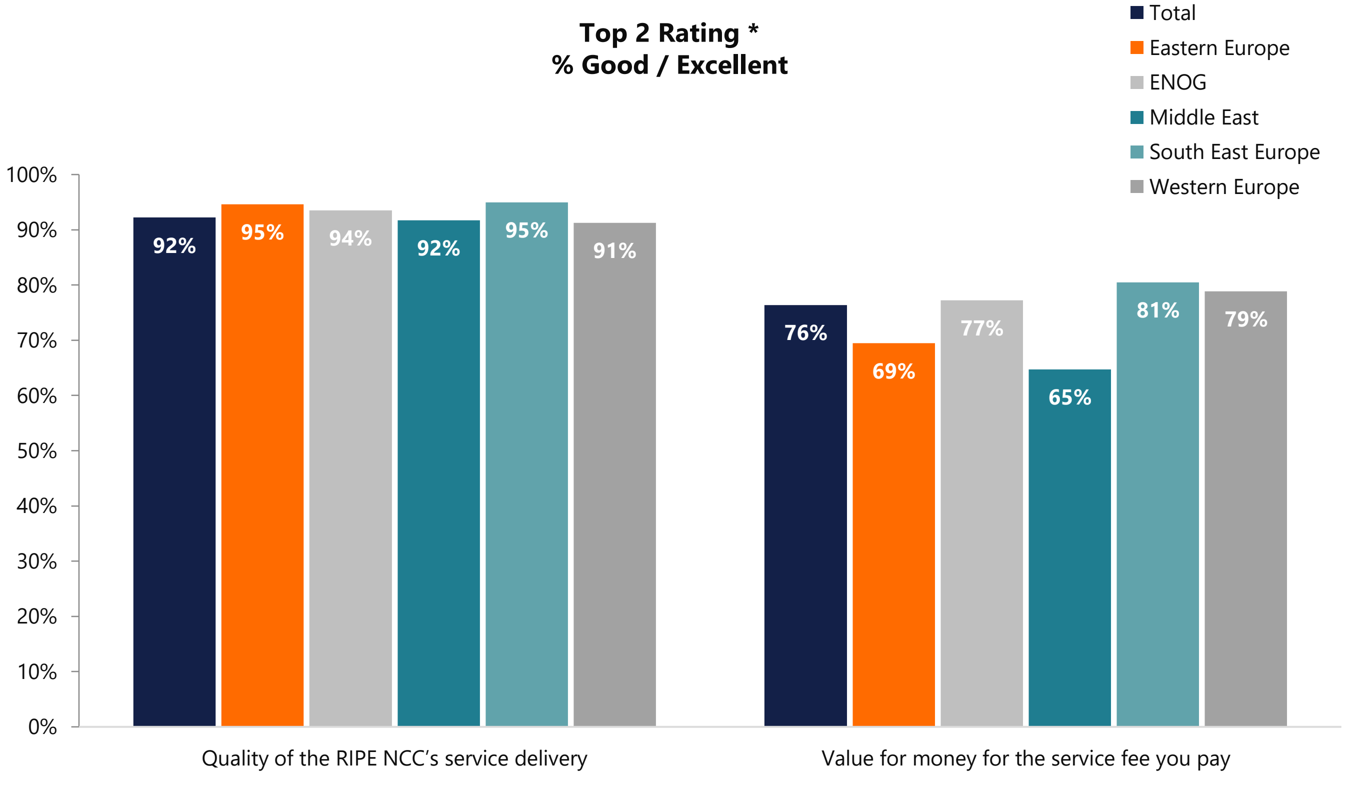
Overall, a majority of respondents believe the quality of RIPE NCC service delivery is high, with 92% rating it as good or excellent.

Very few rated the service quality as average or below, with those who did referring predominantly to the high cost of membership. Positively, at least nine in ten respondents across all RIPE NCC service regions rate RIPE NCC service delivery highly.

Fewer respondents, however, are satisfied with the value provided by the RIPE NCC, with 76% rating the value for money provided for the service fees paid as good or excellent. A further 9% rated the value provided as above average, 11% average, while 4% indicated it was below average, poor or very poor.

Perceptions of value are particularly low in Eastern Europe and the Middle East, with only 69% and 65% of respondents respectively from these regions rating the value for money provided as good or excellent – significantly lower than other regions. Comments from respondents in Iran referred to the declining value due to currency devaluations in their country, while other respondents mentioned lack of equity in the value obtained by small and large organisations. Respondents from South East Europe were the most likely to perceive value for money (81%), while those from Western Europe were also significantly more satisfied with the value equation than the average respondent.

Q6. Thinking about the RIPE NCC overall, how would you rate the following?
N=4,161 All Respondents



* Top 2 % calculated after exclusion of 'Don't Know' responses

You indicated aspects of these services were below average. Can you please tell us what you are not satisfied with and why?

While respondents provided various feedback, the most common issues raised and indicative comments are outlined below.

1. Too expensive

“Member fees are very high - especially for smaller businesses there is not enough value for the huge amount of money” Germany

“The basic membership fee required to hold resources is pretty high for my country, especially for smaller entities like ourselves” Croatia

“Costs are quite high and seemingly increasing.” UK

“Charges should be made according to the number of IP addresses, all small members pay the same money too much” Turkey

“Cost must be appropriate to size.” Russian Federation

2. Poor / slow customer service

“Bad customer service. Lots of delays” Netherlands

“The response from managers is often to late. Also, new billing scheme is difficult for me.” Ukraine

“Ticket responses are slow” UK

N=103 comments.
Please note, only presented to respondents rating the RIPE NCC’s service delivery or members value for money at Q6 as below average or lower.

Resource Registration & Customer Service

Ratings of the quality of the RIPE NCC's resource registration services have improved from 2016. Up from 80% in the last survey, 87% of respondents are satisfied or extremely satisfied with the quality of the service.

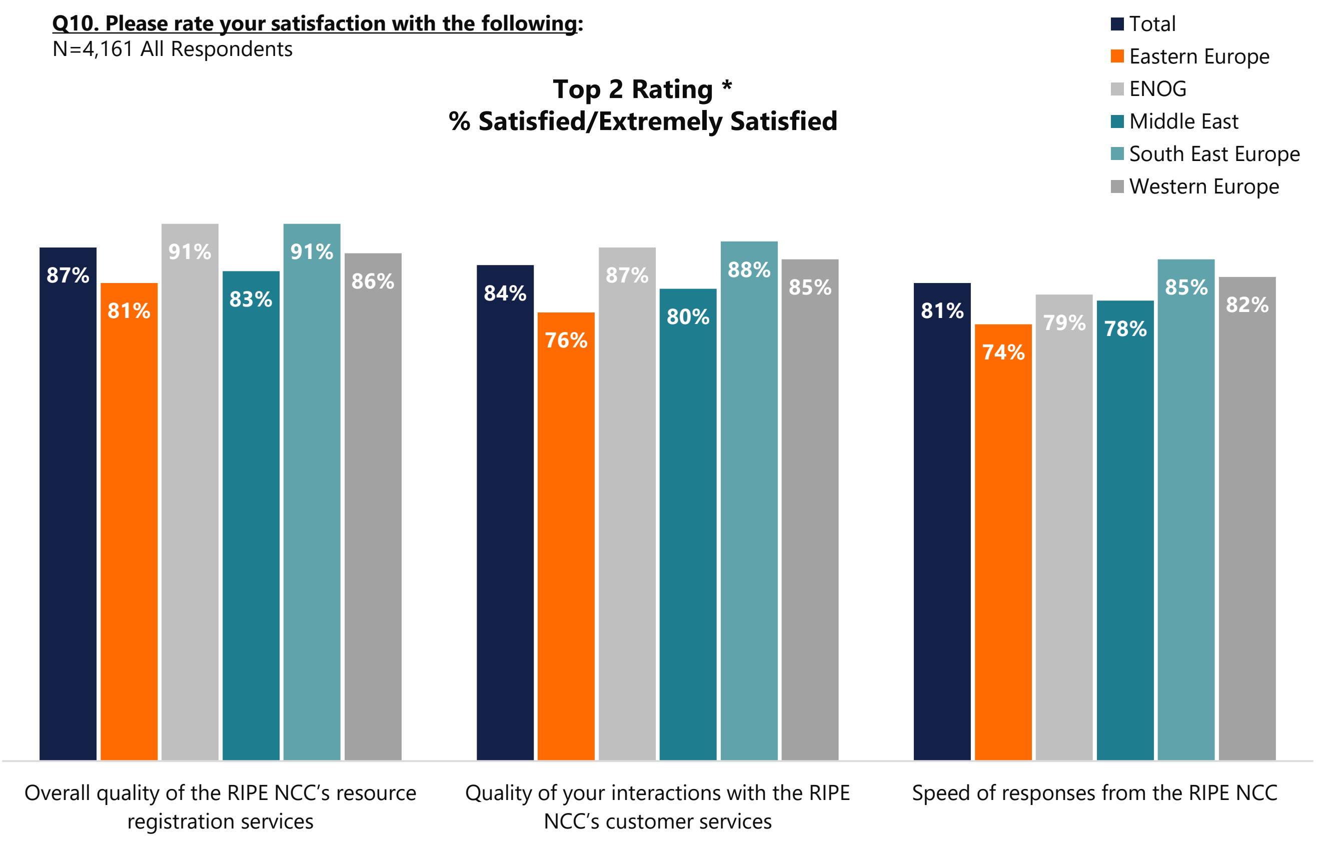
Perceptions of RIPE NCC customer service are also positive. Excluding respondents providing a 'don't know' response, over eight in ten respondents are satisfied or extremely satisfied with the quality of their interactions (84%) and the speed of responses (81%) from the RIPE NCC customer service. While few respondents rated registration processes and customer service as below average, most of those who did indicated that service was too slow and that response times could be improved.

When analysed by region, respondents from Eastern Europe and the Middle East again provide lower satisfaction ratings than those from other regions. In particular, ratings of the quality of their customer service interactions (76%) and the speed of responses (74%) from the RIPE NCC were rated significantly lower than average by those in Eastern Europe.

Hosting companies are also significantly less satisfied with the speed of responses from the RIPE NCC than respondents from other industries (75%, compared to 81% overall). There was little difference in satisfaction with resource registration and customer service based on respondents' length of membership.

Q10. Please rate your satisfaction with the following:
N=4,161 All Respondents

Top 2 Rating *
% Satisfied/Extremely Satisfied



* Top 2 % calculated after exclusion of 'Don't Know' responses

You indicated aspects of these services were below average. Can you please tell us what you are not satisfied with and why?

While respondents provided various feedback, the most common issues raised and indicative comments are outlined below.

1. Increase speed of customer service

"You get at most one response a day from support, so communication that needs 4-5 back and forths can take a week or two." Greece

"Very slow, complicated and repeating the same questions to me over and over again. Its very poor service" Germany

"The response times are a bit slow, in particular if you just want to add a little information to a ticket." Germany

"Takes a long time to get a response" UK

"An open ticket, a response to a ticket, the processing time of a response from RIPE NCC is around 20 hours." Ukraine

2. Inefficient systems / processes / ticketing system

"The processes to transfer resources between RIPE members took too long and there are a lot of back and forth that could be simplified." Israel

"1 reply per day rule is just stupid." Germany

"A very long wait - 1 ticket per day is a very low speed" Russian Federation

"Sometimes tickets are processed for a very long time. For some questions, you are waiting for an answer for several weeks. There is never an answer more often than one per day." Kazakhstan

N=117 comments
Please note, only presented to respondents rating the RIPE NCC's resource registration and customer service at Q10 as below average or lower.

RIPE Database

While respondents are generally satisfied with the usefulness of the information provided through the RIPE Database, satisfaction with data accuracy and ease of use is slightly lower.

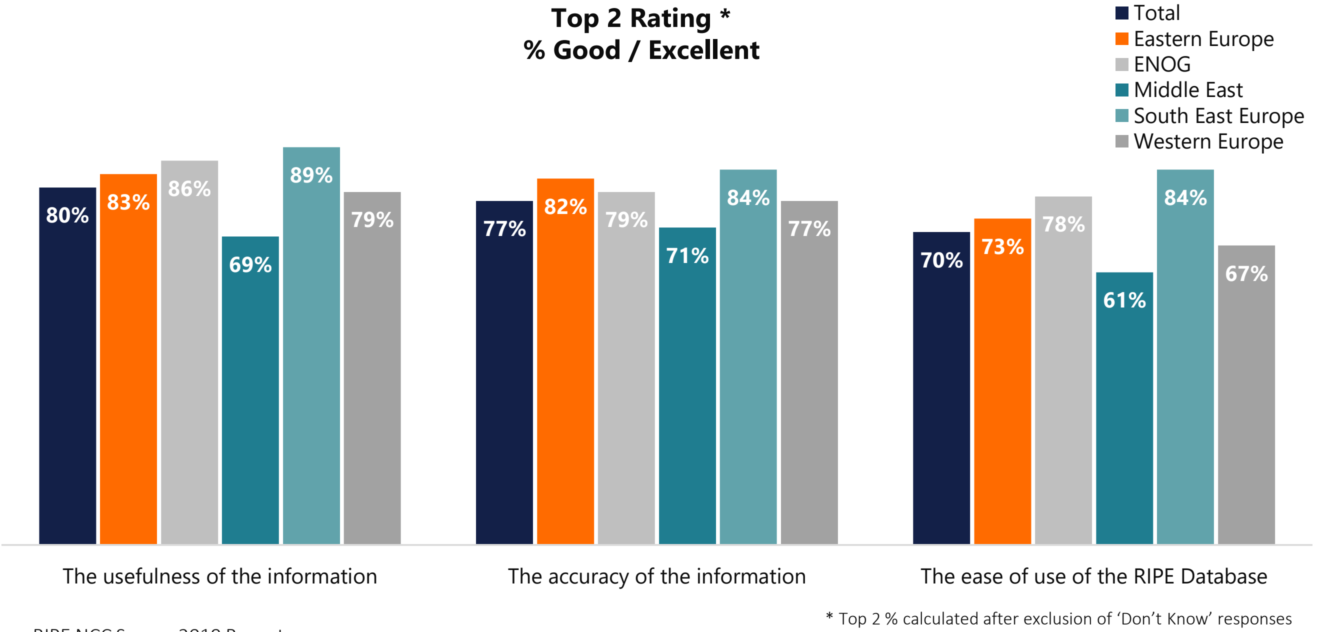
Overall, respondents are most satisfied with the usefulness of the information provided through the RIPE Database. Excluding respondents unable to answer the question, eight in ten respondents rated the usefulness of the information as good or excellent. This was consistent across all regions, except for the Middle East, where only 69% of respondents provided a top two rating for usefulness. At 86% and 89%, respondents from the ENOG and South Eastern Europe regions, respectively, are significantly more satisfied with the usefulness of information.

Respondents are also broadly satisfied with the accuracy of the information in the RIPE Database. Seventy-seven percent (77%) of respondents indicated that the data accuracy is good or excellent. While this rises to 84% of respondents from South East Europe, those from the Middle East are again significantly less satisfied with data accuracy.

Suggestions for how the RIPE NCC could improve the accuracy of the information in the RIPE Database were varied. Many respondents indicated that the RIPE NCC should do more to encourage users to keep their database information up to date, with suggestions including that the RIPE NCC conduct "periodic checks of the information" and "require members and resource holders to maintain up-to-date information in the database".

At 70% fewer respondents indicate that the RIPE Database is easy to use. Satisfaction with ease of use is significantly lower in the Middle East (61%) and Western Europe (67%). Many respondents also suggested technical updates to the database, such as APIs or structural changes. Requests that the user interface could be improved were also common, and there were also many comments suggesting improvements to search functionality. Many users also indicated that training or instructional guides would also be useful.

Q27. When you have used the RIPE Database, how would you rate the following:
N-4,161 All Respondents



* Top 2 % calculated after exclusion of 'Don't Know' responses

Are there ways the RIPE NCC could improve the accuracy, usefulness and ease of use of the RIPE Database?

While respondents provided various feedback, the most common issues raised and indicative comments are outlined below.

1. Improve data accuracy / enforce data checks and validation

“Check the validity of objects from time to time and distribute alerts to owners. And after some time, delete invalid objects.” Russia

“Visibly increase pressure on LIRs to keep their records up-to-date in the RIPE database as mandated by RIPE IP address policy!” Netherlands

“Stricter policy on the database update frequency” France

“Encourage organisations to keep the database up to date” Ireland

2. Training, user instruction information, best practice guides

“I would be great to have some quick 'how to' docs available for the top task items” US

“Increase 'ease of use': Online courses (self learning) for beginners.” Italy

“Share information about the monthly RIPE Database and share short-term demo videos on specific topics.” Turkey

“We need to make a short description - best practices. In small organizations, there is often no time to get acquainted with all the capabilities and tools.” Russia

“More instruction videos.” Poland

“Training for users and users with examples of possible operations” Italy

3. Technical changes, user interface upgrades

“The interface can be somewhat confusing at times. “ Sweden

“More user-friendly interface, UX” Ukraine

“Please extend the API for more query types” Germany

“Include digital signatures of the data.” Bahrain

“Better search options.” Germany

N=770 comments
Please note, only presented to respondents rating the RIPE Database at Q10 as below average or lower.

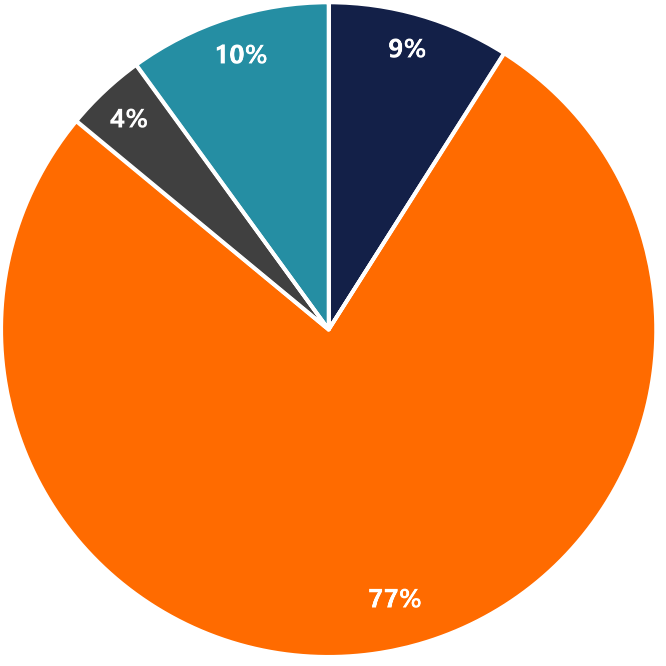
Checks and Verification

The survey also canvassed opinions about the efficacy of checks and verifications conducted by the RIPE NCC. These checks are necessary to process membership applications, resource requests, transfers, and mergers and acquisitions.

Overall, more than three quarters (77%) of respondents indicated that the level of checks and verifications carried out by the RIPE NCC are about right. While 9% think they are too strict, 4% believe they are not strict enough.

Respondents from Western Europe (79%) are the most likely to believe the level of checking is about right, while those from the Middle East are less likely to be satisfied with the efficacy of checks (69%) with more respondents than average from the Middle East (15%) indicating they are too strict.

Similarly, company owners (12%) are more likely than those in management and technical roles (6%) to believe that the verification processes are too strict.



Q12. The RIPE NCC carries out checks and verifications on documents and information whenever it needs to process membership applications, resource requests, transfers, and mergers and acquisitions. What do you think about the checks and verifications carried out by the RIPE NCC?
N=3.547, Members Only

	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**3647**	**246**	**653**	**450**	**241**	**1956**	**97**
Too strict	9%	10%	11%	15%	8%	6%	15%
About right	77%	75%	78%	69%	83%	79%	71%
Not strict enough	4%	4%	4%	3%	4%	4%	1%
Don't Know	10%	11%	7%	13%	5%	11%	12%

Significantly higher / lower than total

“Encourage organisations to keep the database up to date”

Ireland

Billing Services

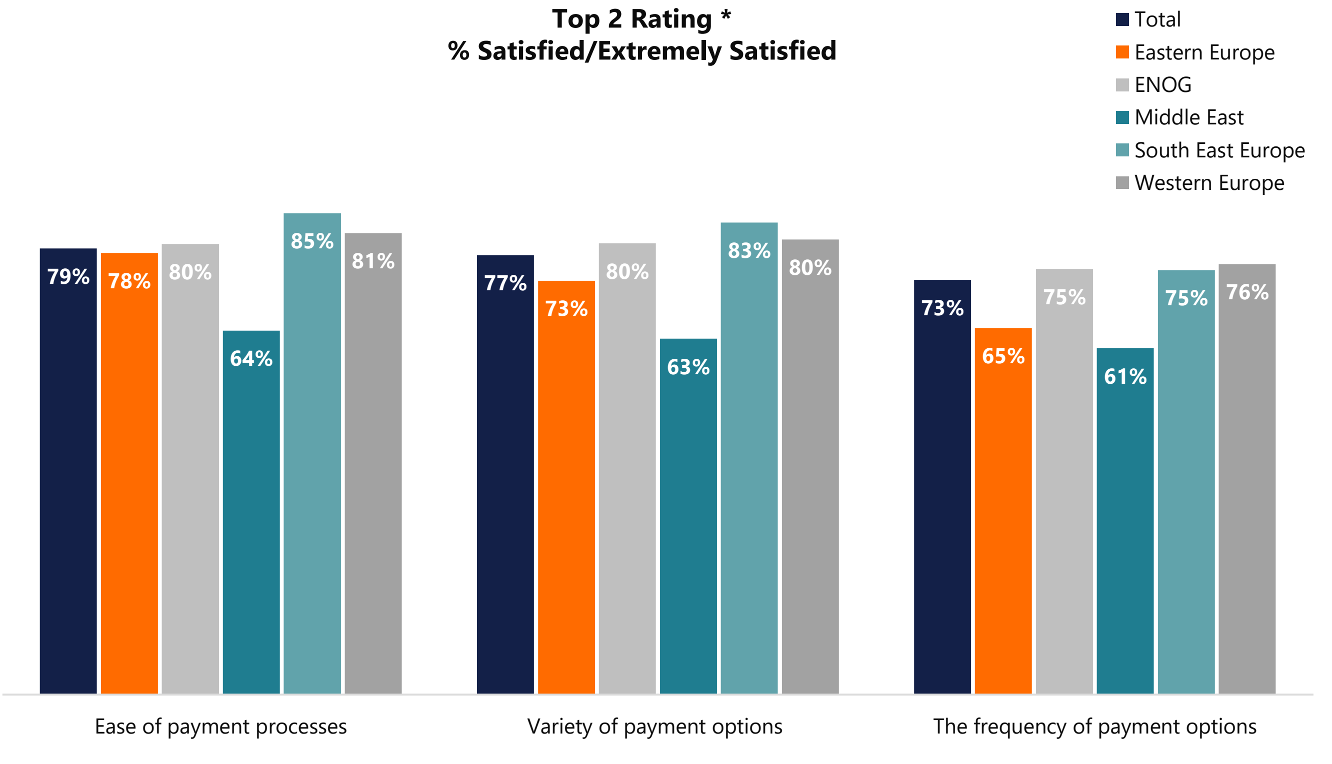
While overall satisfaction with the RIPE NCC's billing services is reasonably positive, significant differences exist at a regional level. among those with experience of the billing function of the RIPE NCC, 79% are satisfied or extremely satisfied with the east of payments, 77% with the variety of payment options and 73% with the frequency of payment options.

It should be noted that 14%, 17% and 16% of respondents felt unable to answer and selected 'don't know' to questions about the ease of billing processes, variety and frequency of payment options. These respondents have been excluded from the calculation of satisfaction ratings.

Satisfaction with billing services is highest in South East and Western Europe, while those in the Middle East are significantly less satisfied. Only 64% of respondents from the Middle East are satisfied with the east of payment processes, 63% with the variety of payment options and 61% with the frequency of payment options.

Dissatisfaction with billing processes is significantly higher in the Middle East, where 11% of respondents are dissatisfied with all aspects of the billing function. Based on verbatim comments, lack of satisfaction with billing services is predominantly driven by payment frequency. Nearly half of the 206 comments provided expressed dissatisfaction at the removal of the quarterly payment option, with many respondents indicating a preference for a more regular, monthly payment option. Others referred to issues with international payment processes, particularly those from Iran and the Russian Federation.

Q36. How satisfied are you with these aspects of the RIPE NCC's billing services?
N-4,161 All Respondents



* Top 2 % calculated after exclusion of 'Don't Know' responses

Can you please tell us why you are not satisfied with aspects of the RIPE NCC's billing services?

Please note, only presented to respondents rating the RIPE Billing Services at Q36 as below average or lower.

1. Payment Frequency

"Would like to have quarterly billing back." Norway

"Single payment per year is difficult for our company" Lithuania

"Quarterly payments should be re-established" Germany

"More granular payment options would work better for us, up to even monthly payments. Larger yearly payments are somewhat harder to budget effectively." Romania

"I would prefer more frequent payment options via direct debit facilities" UK

"Quarterly payment was easier for our organization's budget than one large payment once a year" Russian Federation

2. More Payment Options / International Payment Issues

"There is little time to pay the bill when it comes to a large organization in which processing a transfer abroad is complex." Spain

"Delays and payment problems due to sanctions" Iran

"Difficult to verify payment received unless we provide very specific reference which is not possible from our account." UK

"I would prefer an automatic-debit like system" Netherlands

"There are no closing accounting documents when paying by card." Russian Federation

"E-mails that have not been paid despite payment." Turkey

N=206 comments
Please note, only presented to respondents rating the RIPE Billing Services at Q36 as below average or lower

Leadership and Corporate Governance

Overall, respondents are generally satisfied with the leadership and corporate governance of the RIPE NCC.

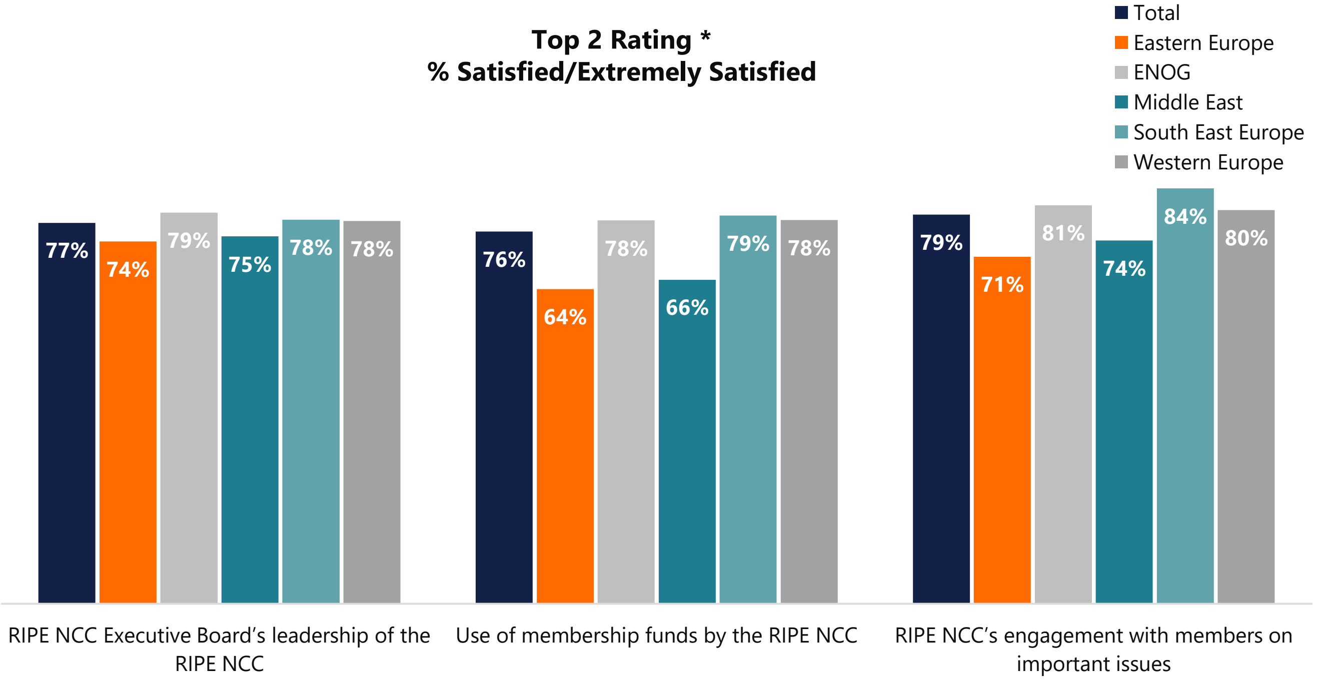
Respondents were most satisfied with the RIPE NCC's engagement with membership. After excluding respondents who provided a 'don't know' response, 79% are satisfied or extremely satisfied with membership engagement. This compares to 73% in 2016.

Satisfaction with corporate governance is also moderately positive. Overall, 77% are satisfied with the Executive Board's leadership of the RIPE NCC, while 76% are satisfied with the use of membership funds by the RIPE NCC. This is up from 70% and 67% in 2016, respectively.

Despite these improvements, it should be noted that:

- While the proportion of respondents providing a rating of 7 (extremely satisfied) has fallen across all areas of leadership and governance, fewer members provided a more neutral rating of 5 (somewhat satisfied) opting instead for a rating of 6 (satisfied)
- Many respondents provided a 'don't know' response, an option that was not offered in the 2016 survey. This suggests lack of awareness of leadership and governance of the RIPE NCC. Don't know responses accounted for 23%, 17% and 10% of respondents in relation to executive leadership, use of member funds and engagement with membership, respectively. A further 12%, 11% and 8% provided neutral ratings for each of the questions, respectively.
- Satisfaction ratings are calculated after excluding 'don't know' responses so as to understand the levels of satisfaction among those members who felt knowledgeable enough to provide a response.

Q8. Please rate your satisfaction with the following:
N= 4,161 All Respondents



* Top 2 % calculated after exclusion of 'Don't Know' responses

While satisfaction with the Executive Board's leadership of the RIPE NCC is consistent across all regions, satisfaction with the use of membership funds and engagement with members varies. In general, members in Eastern Europe and the Middle East are significantly less satisfied than respondents in other RIPE NCC service regions.

Notably, only 71% and 74% of respondents in Eastern Europe and the Middle East are satisfied with the RIPE NCC's engagement with members on important issues. This compares to at least eight in ten of their counterparts in other regions. Among respondents who provided lower satisfaction ratings, comments suggested that members would like more events in specific countries, engagement in native languages, less technical communications and greater openness and transparency in RIPE NCC activities.

Similarly, only 64% and 66% of respondents from Eastern Europe and the Middle East respectively are satisfied with the use of member funds. Again, this compares to nearly eight in ten respondents in all other RIPE NCC service regions. Feedback from less satisfied respondents indicates that some members are dissatisfied with member funds being spent on projects unrelated to the core registry activities.

*** Top 2 Rating: % Satisfied/Extremely Satisfied**	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**4161**	**273**	**722**	**505**	**304**	**2172**	**164**
RIPE NCC Executive Boards Leadership	**77%**	74%	79%	75%	78%	78%	78%
Use of Member Funds by RIPE NCC	**76%**	64%	78%	66%	79%	78%	81%
RIPE NCCs Engagement with Members	**79%**	71%	81%	74%	84%	80%	80%

* Top 2 % calculated after exclusion of 'Don't Know' responses

Significantly higher / lower than total

You indicated that aspects of the RIPE Leadership, the use of member funds or the RIPE NCC's engagement with members is below average. Can you tell us what you are not satisfied with and why?

While respondents provided various feedback, the most common issues raised and indicative comments are outlined below.

1. Inefficient Use of Funds

"Since the establishment of the Dubai office, there has been increased activity in the region, but the region needs more capacity building and policy participation" Palestine

"Expense budget too large, especially for travel and meetings" Russian Federation

"I don't see enough commitment to security issues, and regarding funds the amount of FTE is probably too high and there are high amounts of investment in some projects. Investment in training activities should be increased." Portugal

"Funds should be used only to manage IP and other resources. Now funds are being used for non-essential matters. Any surplus should be returned. " Finland

"It seems that has money has been pouring in the last few years, a lot has been spent on different 'projects' rather than the core business, which is member services." Sweden

2. Lack of Member Consultation / Poor Communication

"Communication should be made simpler from a technical-linguistic point of view, to help less structured companies to follow the dynamics of RIPE" Italy

"Lack of openness in contentious issues." Russian Federation

"The level of involvement of RIPE NCC in the Israeli Internet community is very low. It's been years since RIPE conducted any on site event in Israel. Not to mention a full RIPE meeting" Israel

"Risk management especially and general governance as oversight of the NCC by the board needs to be improved. The oversight processes and frequency needs to be published and reported back to the membership." UK

3. Other Comments

"The interaction takes place in English." Russian Federation

"Unfortunately, the RIPE does not offer a website in German or other support in German." Germany

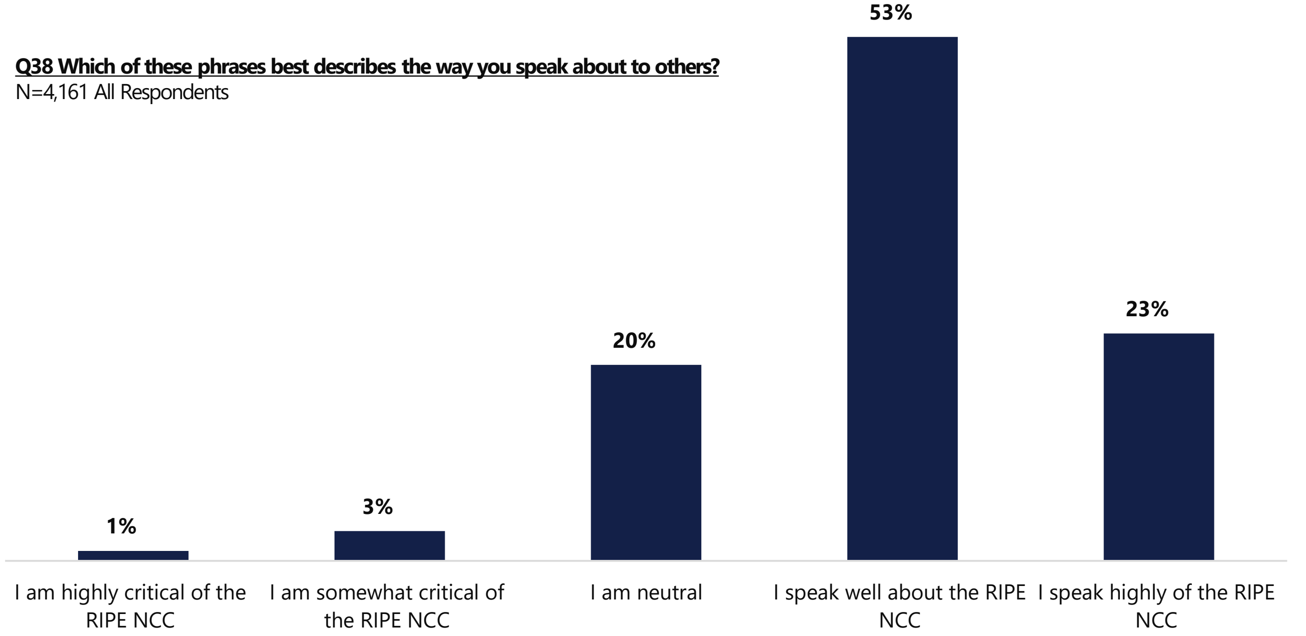
"Far too bureaucratic, not commit to getting things done efficiently." Switzerland

"All processes and potential involvements of member LIRs in them are extremely complex, and system is designed in a way that benefits very large companies and doesn't pay any attention to small members." Sweden

Please note, only presented to respondents rating their satisfaction with the RIPE Leadership at Q8 as below average or lower

Endorsement

Q38 Which of these phrases best describes the way you speak about to others?
N=4,161 All Respondents



	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other	Non Member
Sample size	**4161**	**273**	**722**	**505**	**304**	**2172**	**164**	**20**
I am highly critical of the RIPE NCC	1%	1%	2%	2%	1%	1%	2%	0%
I am somewhat critical of the RIPE NCC	3%	3%	3%	7%	2%	2%	4%	5%
I am neutral	20%	25%	13%	22%	18%	20%	32%	45%
I speak well about the RIPE NCC	53%	55%	56%	50%	48%	55%	40%	40%
I speak highly of the RIPE NCC	23%	16%	27%	20%	30%	23%	21%	10%

Significantly higher / lower than total

As well as understanding satisfaction with the RIPE NCC services and membership, the survey asked respondents to indicate how they speak about the RIPE NCC to others.

Overall, 76% of respondents speak highly of the RIPE NCC - 23% speak highly of the RIPE NCC without being asked and 53% tend to speak highly if they are asked.

Fewer respondents (20%) indicate that are neutral about the RIPE NCC, and very few (4%) speak negatively of the organisation.

At 83%, members from the ENOG region are more likely to provide favourable endorsement of the RIPE NCC than members from other regions.

Over three quarters (78%) of members from South East and Western Europe also speak favourably of the RIPE NCC – with those from South East Europe more likely to provide favourable endorsement of the organisation without being asked.

Non-members are the least likely to speak positively of the RIPE NCC, with 45% neutral in their commentary of the organisation.

RIPE NCC Tools & Services

To test usage and satisfaction with individual tools and services provided by the RIPE NCC, respondents were next asked to indicate if they used RIPEstat, RIS, RIPE Atlas, RPKI, RIPE Labs, DNSMON and Online Training.

In summary, the survey found that:

- RIPEstat is the most used of the RIPE NCC tools and services, with over a third (34%) of respondents indicating that they often use, or rely on, the tool.
- The Routing Information System (RIS) and RIPE Atlas are also relatively well used, with 30% and 27% of respondents using the services, respectively.
- Lack of awareness seems to be preventing more widespread use of many other RIPE NCC tools and services.
- While only 15% of respondents indicate that they have used RIPE NCC online training services, over eight in ten are aware of the service.

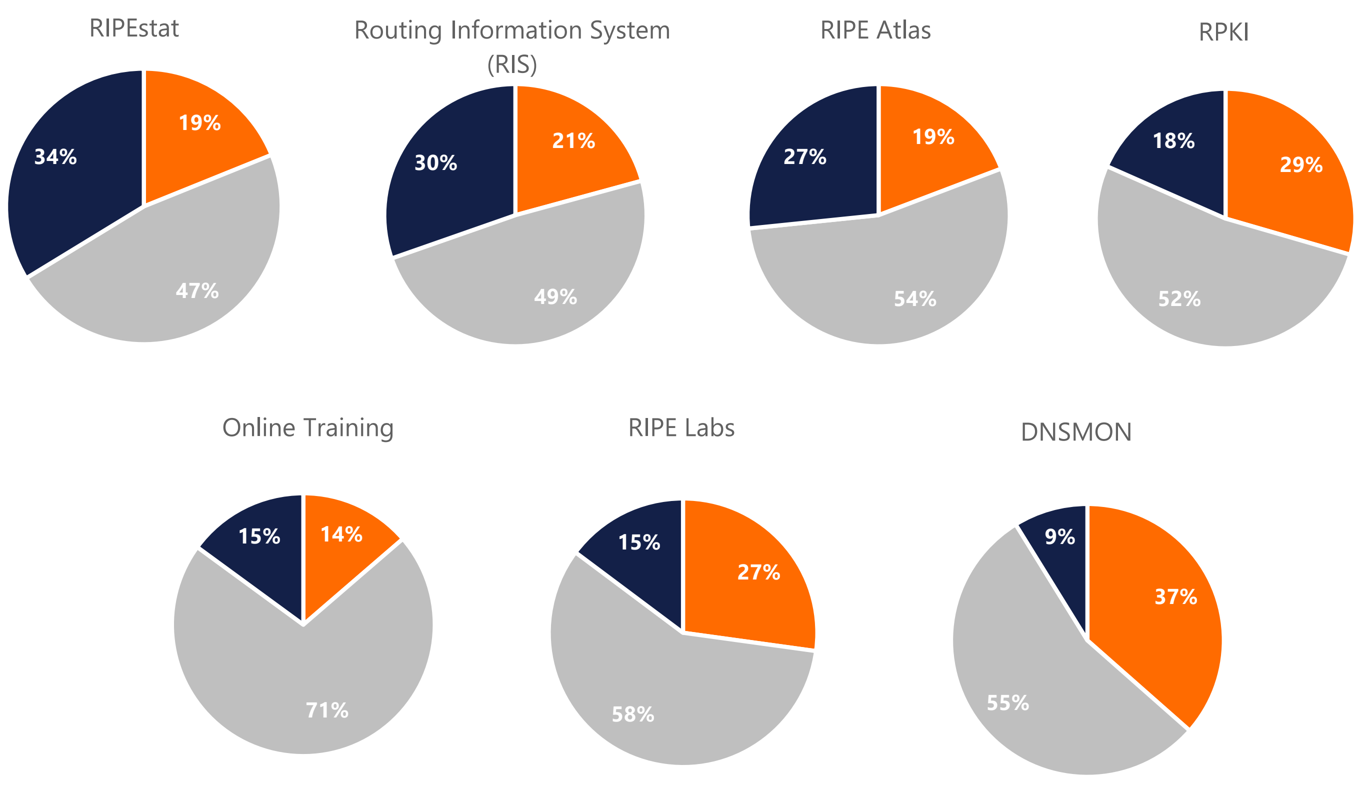
Participation and Awareness

RIPEstat is the most used of the RIPE NCC tools and services, with over a third (34%) of respondents indicating that they often use, or rely on, the tool.

Overall, 26% of respondents often use RIPEstat, while 8% rely on it as an essential work tool. Use is highest in South East Europe, where 45% of respondents indicate using the service. Longer term members also seem more inclined to use RIPEstat, with 42% of those who have been dealing with the RIPE NCC for over 10 years indicating they use the tool. RIPEstat is also more widely used by IXPs (45%) and telecommunications and mobile operators (37%). Despite reasonably wide use, however, 19% of respondents indicated that they were unaware of RIPEstat, while 47% were aware of the tool but never or rarely use it.

The Routing Information System (RIS) is also relatively well used, with 30% of respondents using the service, 8% of whom claim it is essential for their work. Reflecting the trend across most RIPE NCC tools, long-term members (41%), respondents in South East Europe (41%), IXPs (41%) and telecommunications and mobile operators (34%) are more likely to use the tool. Respondents in the Middle East (25%) are the least likely to use RIS. Just over one in five respondents are unaware of the RIS, while nearly half (49%) are aware of the tool but never or rarely use it.

Q.13 Please indicate the extent to which you are aware of, and use, the following RIPE NCC tools and services:
N=4,161 All Respondents



Over a quarter (27%) of respondents also use RIPE Atlas, increasing to 29% of those in Western Europe. RIPE Atlas is more widely used by respondents from government, education and not-for-profit organisations (32%). Few industry representatives (17%) indicated that they use RIPE Atlas.

Lack of awareness seems to be preventing more widespread use of many other RIPE NCC tools and services. Thirty-seven percent (37%) of respondents are not aware of DNSMON, while 29% and 27% lack awareness of RPKI and RIPE Labs, respectively. Awareness of all RIPE NCC tools and services is significantly lower in the Middle East region, among newer members and those working in industry.

In contrast, lack of awareness does not appear to be the reason behind lower usage of RIPE NCC online training. While only 14% of respondents indicate that they often use RIPE NCC online training services, 71% are aware of the service. Of these, 39% have never used the online training, while 32% rarely use it.

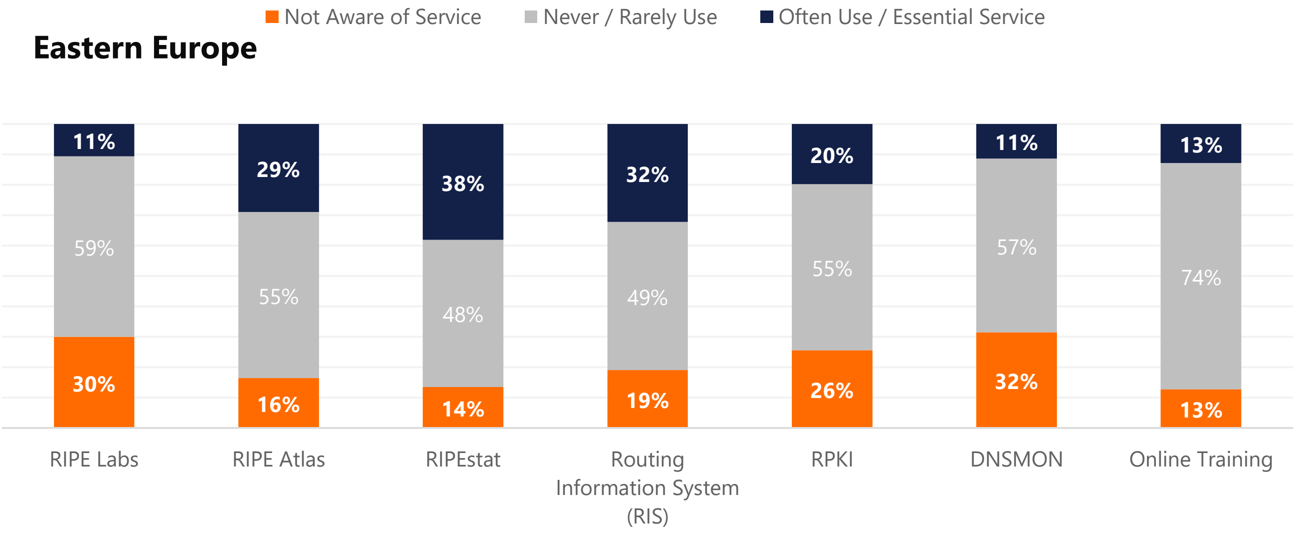
Respondents in the ENOG region (76%) and Western Europe (73%) are significantly more likely to be aware of, but never or rarely use, RIPE NCC online training courses and webinars. Similarly, long-term members are also more likely to indicate awareness, but lack of use, of RIPE NCC online training.

Use of RIPE NCC online training and webinars is highest among respondents from the Middle East (21%) and South East Europe (22%) government, educational and not-for-profit organisations (20%). Conversely, use of RIPE NCC training is significantly lower than average among respondents from the ENOG region (12%) and hosting companies (11%). No difference was noted when use of RIPE NCC training was analysed by length of involvement with the RIPE NCC.

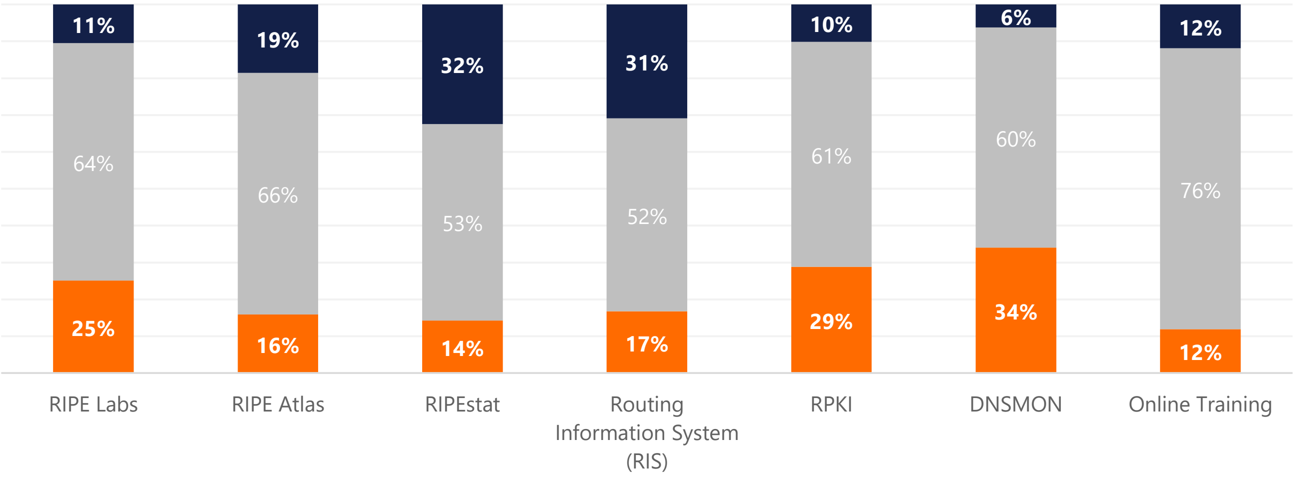
	RIPEstat	(RIS)	RIPE Atlas	RPKI	RIPE Labs	Online training	DNSMON
Sample size	**4161**	**4161**	**4161**	**4161**	**4161**	**4161**	**4161**
I am not aware of this service	19%	21%	19%	29%	27%	14%	37%
I am aware of this service but never use it	18%	21%	24%	32%	30%	39%	34%
I rarely use this service	29%	28%	30%	20%	28%	32%	21%
I often use this service	26%	22%	22%	12%	13%	13%	7%
This service is essential for my work	8%	8%	5%	6%	2%	2%	2%

Q Please indicate the extent to which you are aware of, and use, the following RIPE NCC tools and services:

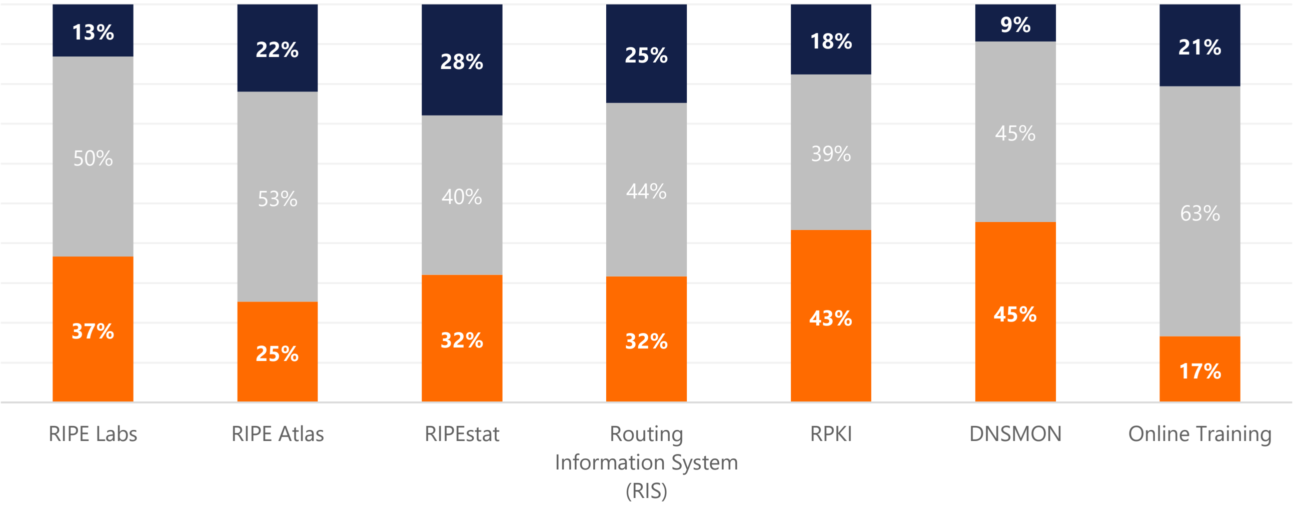
Eastern Europe

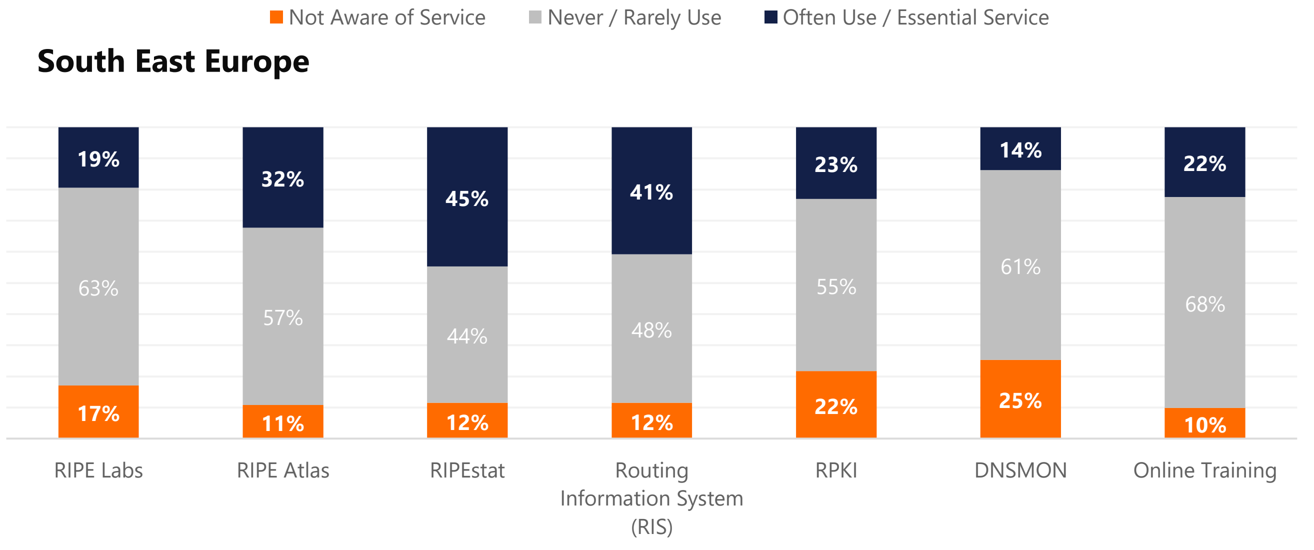


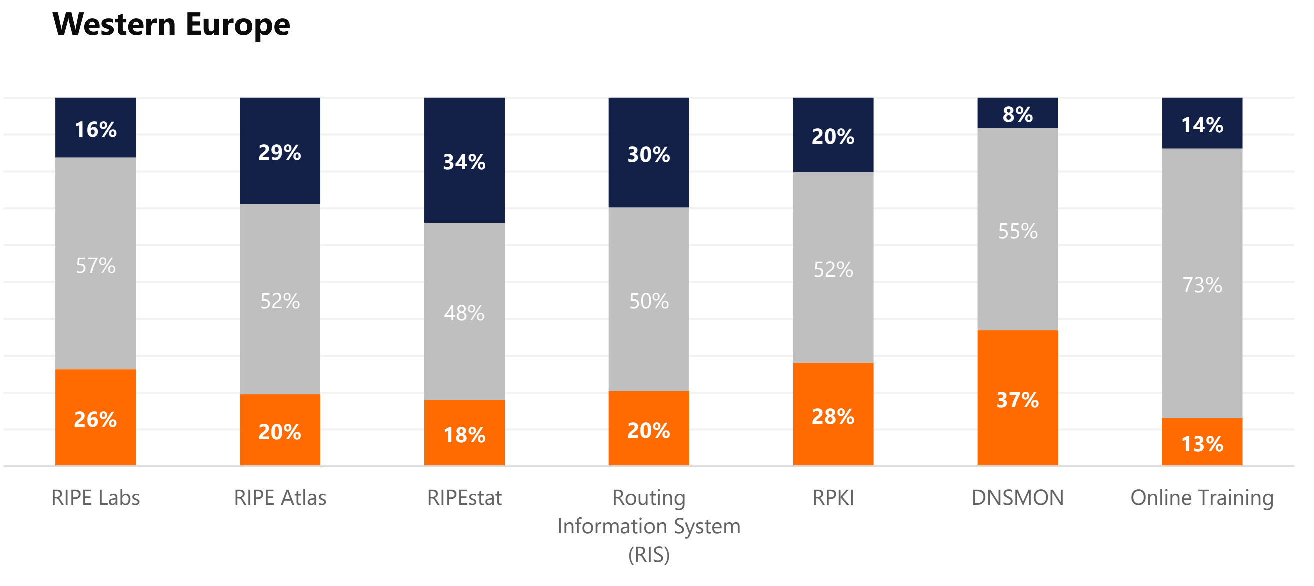
ENOG



Middle East







% Often Use / Rely on Service	**Eastern Europe**	**ENOG**	**Middle East**	**South East Europe**	**Western Europe**	**Other**	**Non Member**
Sample size	**273**	**722**	**505**	**304**	**2172**	**164**	**21**
RIPE Labs	11%	11%	13%	19%	16%	20%	0%
RIPE Atlas	29%	19%	22%	32%	29%	33%	33%
RIPEstat	38%	32%	28%	45%	34%	29%	14%
Routing Information Service (RIS)	32%	31%	25%	41%	30%	32%	24%
RPKI	20%	10%	18%	23%	20%	22%	24%
DNSMON	11%	6%	9%	14%	8%	12%	14%
Online Training	13%	12%	21%	22%	14%	15%	24%

Significantly higher / lower than total

Challenges

A key focus of the 2019 RIPE NCC Survey was to understand the challenges facing the Internet community, and to seek ideas for ways in which the RIPE NCC can assist.

In summary, the survey results found that:

- Overall, network security was most often included among the main operational challenges facing organisations in the Internet community.
- Deployment of IPv6 and scarcity of IPv4 were the next most frequently cited challenges.
- Training was overwhelmingly the main way respondents believe the RIPE NCC can assist with the challenges they face in delivering Internet services.
- Respondents also suggested that the RIPE NCC could assist by re-distribution or reclamation of unused IPv4 address space.
- Encouraging and providing assistance with IPv6 deployment is another important way in which the RIPE NCC can help the community.

Internet-related Challenges

To understand how the RIPE NCC can best support the Internet community, a section was included in the survey about the operational challenges organisations face in providing Internet-related services. The question asked respondents to identify the challenges facing their organisation, and to select a maximum of three challenges from a list of ten options.

Overall, network security was most often included among the main operational challenges facing organisations, with 51% of respondents including it in their selection. Network security was significantly more likely to be identified as a challenge by respondents in Eastern Europe and South East Europe (both 59%). Respondents in the ENOG region were significantly less likely to rate network security among their biggest challenges (38%).

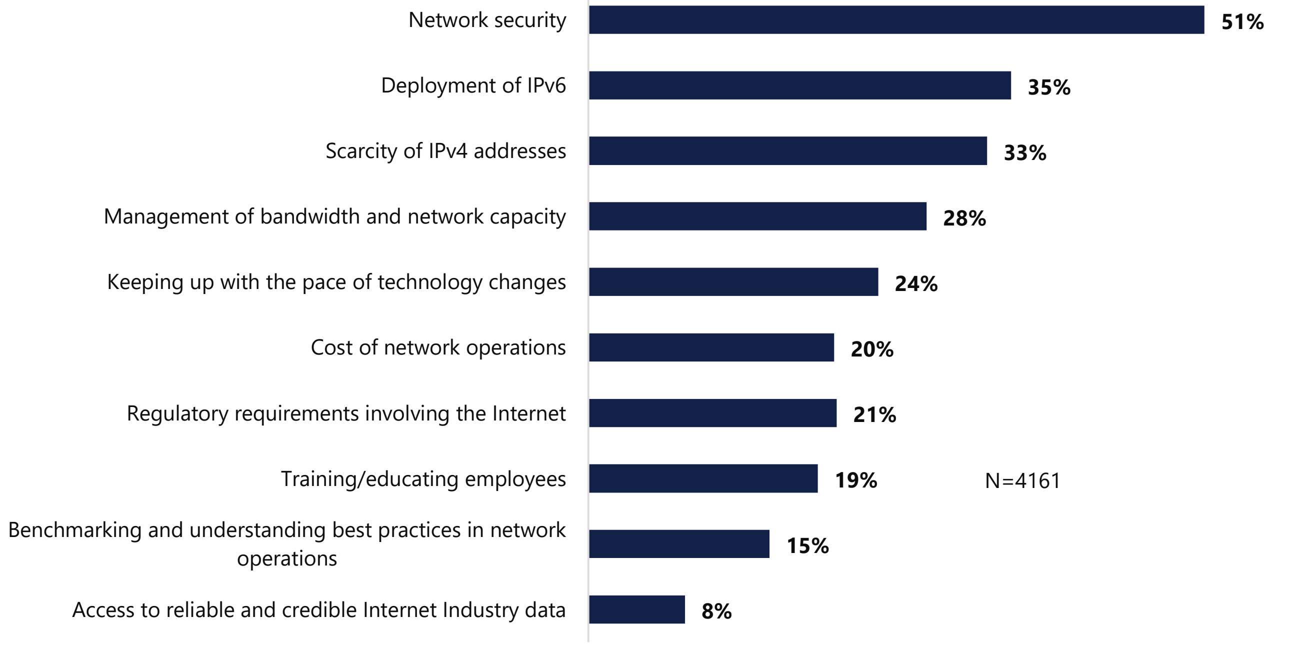
Deployment of IPv6 and scarcity of IPv4 were the next most often identified challenges facing organisations in the Internet community. Thirty-five percent (35%) of respondents included deployment of IPv6 and 33% scarcity of IPv4 among their top three selections.

While there was little difference in the proportion of respondents indicating that deployment of IPv6 is a challenge for their organisation based on their location, respondents in ENOG countries and the Middle East were more likely to indicate that they are challenged by the scarcity of IPv4 addresses. Forty-three percent (43%) of respondents in the ENOG region and 37% in the Middle East rated scarcity of IPv4 address space among the top three challenges facing their organisation in providing Internet related services.

Of interest, ratings of the relative importance of issues facing their organisation varies by role. While those in technical roles (most particularly ICT Managers) are most likely to rate network security as one of the main challenges for their organisation, executives and company owners are more likely to be concerned by the scarcity of IPv4 address space.

Executives are also more concerned with the impact of cost and regulatory requirements on their organisation than those in technical roles.

Q14. Thinking about your Internet-related services, products or activities, what are the MAIN operational challenges facing your organisation? N=4,161 All Respondents



Training was overwhelmingly the main way respondents believe the RIPE NCC can assist with the challenges facing the Internet community.

Over half of the verbatim comments provided by respondents about ways in which the RIPE NCC could help them with their Internet related challenges mentioned training. Across all service regions, respondents suggested that the RIPE NCC could “expand training activities”. Many suggestions specifically mentioned a need for network security training, as well as training in IPv6 deployment.

To assist with the challenges associated with the scarcity of IPv4 address space, there were many calls for more active management of IPv4 resources by the RIPE NCC. Respondents suggested that the RIPE NCC could help by “freeing up IPv4 resources that are not active” and “re-selling IPv4 addresses at a lower cost than brokers”.

Assistance with IPv6 deployment was also a major theme in the assistance that the RIPE NCC can provide the community. Some feedback indicated a desire for the RIPE NCC to take a more active role in driving deployment, with some respondents suggesting that the RIPE NCC should “strongly encourage the deployment of IPv6”. Other suggestions were that the RIPE NCC expand the training and support provided for organisations to deploy IPv6, with requests that the RIPE NCC “produce even more IPv6 training materials” and that “more training materials regarding RIPE tools and also on IPv6 migration strategies would be a good help”.

“Continued development of your training courses to bring together 'best practices' around areas of security, new technology etc”

UK

Q14. Thinking about your Internet-related services, products or activities, what are the MAIN operational challenges facing your organisation?

	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**4161**	**273**	**722**	**505**	**304**	**2172**	**164**
Network security	51%	59%	38%	47%	59%	53%	47%
Deployment of IPv6	35%	38%	36%	39%	35%	34%	23%
Scarcity of IPv4 addresses	33%	33%	43%	37%	27%	29%	28%
Management of bandwidth & network capacity	28%	33%	26%	26%	24%	29%	29%
Keeping up with the pace of technology changes	24%	29%	21%	20%	26%	26%	20%
Cost of network operations	20%	27%	11%	21%	23%	22%	26%
Regulatory requirements involving the Internet	21%	22%	35%	22%	17%	17%	13%
Training/educating employees	19%	14%	28%	21%	23%	16%	19%
Benchmarking and understanding best practices in network operations	15%	12%	9%	12%	18%	18%	18%
Access to reliable and credible Internet Industry data	8%	4%	8%	8%	9%	7%	15%

Significantly higher / lower than total

	Total	Company owner	Executive Leadership	IT/ICT Manager	Software development	Technical operations	Admin & Commercial
Sample size	**4161**	**725**	**629**	**1000**	**65**	**1303**	**439**
Network security	51%	44%	46%	56%	55%	53%	48%
Deployment of IPv6	35%	36%	36%	34%	25%	37%	25%
Scarcity of IPv4 addresses	33%	45%	41%	31%	12%	29%	19%
Management of bandwidth & network capacity	28%	23%	25%	30%	28%	31%	27%
Keeping up with the pace of technology changes	24%	22%	24%	23%	28%	25%	26%
Cost of network operations	20%	23%	24%	20%	11%	19%	16%
Regulatory requirements involving the Internet	21%	21%	26%	22%	14%	17%	21%
Training/educating employees	19%	13%	20%	21%	18%	20%	22%
Benchmarking and understanding best practices in network operations	15%	13%	13%	14%	17%	18%	14%
Access to reliable and credible Internet Industry data	8%	6%	7%	8%	22%	6%	17%

Significantly higher / lower than total

Are there ways the RIPE NCC could help you with your Internet related challenges?

While respondents provided various feedback, the most common issues raised and indicative comments are outlined below.

1. Training

“Expand training activities” Spain

“Increasing the educational aspects of RIPE NCC will be helpful in this regard.” Iran

“Educational programs for audiences of various levels of training.” Russian Federation

“Conduct more training in network security.” Russian Federation

“Continued development of your training courses to bring together 'best practices' around areas of security, new technology etc” UK

“I think more training materials regarding RIPE tools and also on IPv6 migration strategies would be a good help” Turkey

“More onsite training.” Latvia

2. Make Available / Re-distribute / Reclaim IPv4

“By reselling ipv4 addresses at a lower cost than brokers …” France

“Freeing IPv4 resources that are not active” Italy

“RIPE NCC could organize a service for the sale / purchase of blocks of IP addresses, so that all these issues could be solved through the RIPE NCC, and not through third-party brokers.” Russian Federation

“Help in providing IPv4 address addition / 24 blocks” Turkey

“I wish there was a better management of unused IPv4 space, there are people who are in an extremely need of IPv4 addresses while those who own /22's don't even use a half.” UK

3. Encourage / Provide Assistance with IPv6 deployment

“Speed up ipv6 network development” Iran

“To strongly encourage the deployment of IPv6.” France

“forcing major service providers to adopt ipv6” Italy

“Encourage the major operators of countries to further expand IPv6” Turkey

“Produce even more IPv6 training material.” UK

N=952 comments - Presented to all respondents

"I think more training materials regarding RIPE tools and also on IPv6 migration strategies would be a good help"

Turkey

Network Security

To provide a deeper understanding of the network security issues facing the community, the survey next asked respondents to select the main network security issues facing their organisation.

In summary, the survey results found that:

- DDoS attacks are the main security challenges identified by respondents, with 57% of respondents including it within the top three network security issues.
- Forty-seven percent (47%) of respondents indicated that phishing, spam, malware and ransomware are a problem for their organisation.
- Blacklisting of their IP addresses was the next most often identified network security issue, selected by 26% of respondents
- There was no consensus about the best way the RIPE NCC can support organisations with the challenge of network security. Approximately a third of respondents support each of security-specific training, collaboration between the RIPE NCC and technical security organisations, and sharing of insights and best practice on RIPE Labs and the RIPE NCC website.

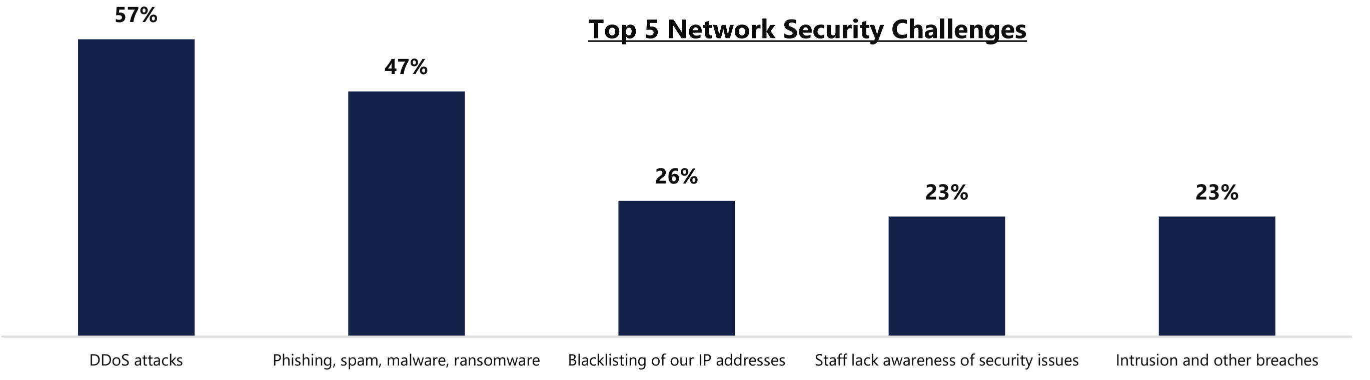
Network Security

To provide a deeper understanding of the network security issues facing the community, the survey next asked respondents to select the main network secrurity issues facing their organisation. Respondents were able to select up to three challenges.

DDoS attacks are the main security challenges identified by respondents, with 57% of respondents including it within the top three network security issues. Prevalence appears higher in Eastern Europe (70%) where respondents were significantly more likely to identify DDoS attacks as an issue for their organisation. Nearly two thirds (64%) of respondents in the Middle East also identified DDoS attacks among their main challenges. Fewer respondents in Western Europe selected DDoS attacks among their main challenges.

Forty-seven percent (47%) of respondents indicated that phishing, spam, malware and ransomware are a problem for their organisation. Blacklisting of their IP addresses was the next most often identified network security issue, selected by 26% of respondents. Respondents in Eastern Europe, the ENOG region and the Middle East are more likely to experience the challenges associated with blacklisting of IP addresses.

Q. Thinking about network security, what are the MAIN challenges facing your organisation?



	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**4161**	**273**	**722**	**505**	**304**	**2172**	**164**
DDoS attacks	57%	70%	59%	64%	58%	54%	42%
Phishing, spam, malware, ransomware	47%	49%	49%	43%	52%	46%	43%
Blacklisting of our IP addresses	26%	33%	34%	36%	28%	20%	13%
Staff lack awareness of security issues	23%	25%	26%	28%	24%	20%	24%
Intrusion and other breaches	23%	16%	17%	15%	23%	28%	26%
Routing security	22%	29%	16%	15%	18%	24%	30%
Lack of application security	15%	10%	14%	13%	11%	17%	11%
Inadequate security policies	10%	9%	7%	12%	10%	10%	13%
Lack of security for IoT applications	10%	9%	7%	7%	10%	11%	11%
No cyber security focus from government(s)	8%	4%	6%	17%	13%	7%	8%
Password problems caused by third-party data breaches	8%	8%	8%	8%	9%	9%	5%

Significantly higher / lower than total

Training and sharing information and best practice are the main ways the RIPE NCC can help the community with security challenges.

36%

Security Training

Thirty-six percent of respondents think security-specific training programs are the best way the RIPE NCC can assist the community with network security issues. Security-specific training is the preferred form of assistance by 47% of respondents in the Middle East.

35%

Collaboration

Thirty-five percent of respondents believe that the RIPE NCC should collaborate with other technical security organisations to share information and best practice. Collaboration is less likely to be seen as an effective method of assistance by respondents in the Middle East.

32%

Sharing Insights

Sharing of security insights with the community on RIPE Labs and the RIPE NCC website is suggested as the best way the RIPE NCC can assist the community by 32% of respondents.

25%

Data for Incident Responders

A quarter of respondents would like to see the RIPE NCC provide more data for incident responders through tools such as RIPEstat. Respondents in the ENOG region are the most likely to believe that the RIPE NCC can best assist in this way.

Q17. How could the RIPE NCC best assist you or others with network security challenges?

	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe
Sample size	**4161**	**273**	**722**	**505**	**304**	**2172**
Security-specific training courses	36%	33%	35%	47%	43%	34%
Collaborate with other technical security organisations to share information and best practice	35%	36%	36%	26%	36%	36%
Sharing of security insights with the community on RIPE Labs and the RIPE NCC website	32%	36%	32%	31%	24%	33%
Provide more data for incident responders through tools such as RIPEstat	25%	27%	33%	23%	23%	24%
Encourage CERT development and information sharing between CERTs and the RIPE community	17%	20%	11%	15%	22%	19%
Engagement with Governments in the region about the issues of cyber security	16%	12%	13%	23%	17%	16%
Include more security content in RIPE NCC-organised meetings	10%	7%	15%	14%	12%	8%
None of these	6%	6%	5%	4%	6%	7%

Significantly higher / lower than total

Routing Security and RPKI Origin Validation

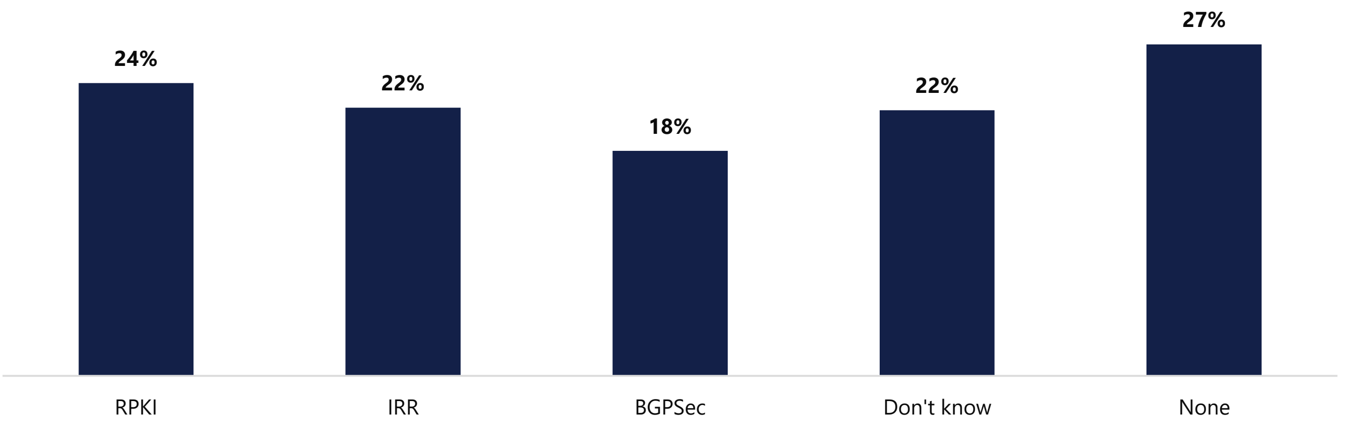
To understand how respondents are dealing with the various threats to their network security, they were next asked to identify the methods they use to secure their routing and whether they are running RPKI Origin Validation.

Overall, there is a relatively even spread of methods being used by respondents to secure their routing. RPKI is the most widely used, with 24% of respondents indicating this is the method they use to secure their routing. This has increased from 2016, when only 15% of respondents confirmed that their address space was certified using RPKI. With lack of information the main barrier to use in 2016, this suggests there is greater awareness of RPKI in 2019.

A further 22% of respondents indicated that they use IRR to secure their routing, while 18% have adopted BGPSec. IRR is significantly more likely to be used in Western Europe, while respondents in the Middle East were more likely to indicate that they use BGPSec.

Surprisingly, 27% do not use any methods to secure their routing, with respondents in the ENOG region (40%) the most likely to indicate they do not secure their routing.

Q20 Which methods do you use to secure your routing?
N=4,161 All Respondents



	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**4161**	**273**	**722**	**505**	**304**	**2172**	**164**
RPKI	24%	26%	18%	21%	27%	25%	33%
IRR	22%	20%	21%	11%	20%	24%	36%
BGPSec	18%	13%	17%	33%	18%	16%	21%
Don't know	22%	20%	13%	20%	23%	25%	18%
None	27%	33%	40%	24%	24%	24%	15%

Significantly higher / lower than total

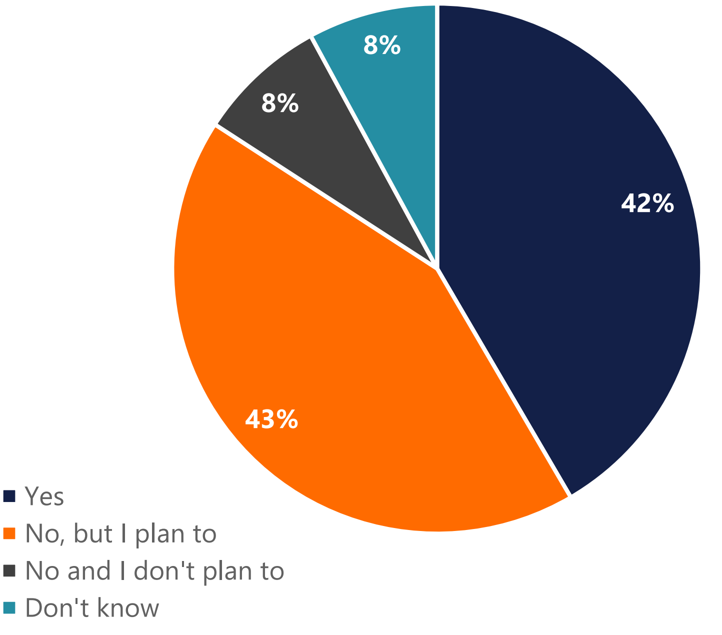
Of the respondents who have adopted RPKI, 42% are using RPKI Origin Validation. A further 43% are not currently, but plan to, implement the tool. Eight percent (8%) indicated that they have no plans to implement RPKI Origin Validation.

Usage of RPKI Origin Validation is highest in Turkey, where 65% of respondents are using the technology. Over half are also using RPKI in Iran (55%), Italy (52%), Spain (52%) and Switzerland (52%).

While it is less widely used in the UK (27%), Russian Federation (32%) Poland (33%), Czech Republic (33%), Sweden (33%) and Germany (35%), over half of respondents in these countries indicated they plan to implement to the tool.

Respondents in the Russian Federation (19%) were the most likely to indicate that they have no plans to implement RPKI Origin Validation.

Q Are you running RPKI Origin Validation?



	Yes	No, but I plan to	No and I don't plan to	Don't know	Sample *
Germany	35%	50%	9%	6%	112
Russian Federation	32%	45%	19%	4%	75
Netherlands	48%	40%	5%	8%	63
France	47%	39%	9%	5%	57
United Kingdom	27%	56%	6%	10%	48
Italy	52%	38%	2%	8%	48
Turkey	65%	18%	0%	18%	40
Iran (Islamic Republic Of)	55%	32%	6%	6%	31
Poland	33%	50%	10%	7%	30
Spain	52%	40%	0%	8%	25
Czech Republic	33%	50%	8%	8%	24
Sweden	33%	57%	10%	0%	21
Switzerland	52%	33%	5%	10%	21

* Countries with less than 20 responses have been excluded

Significantly higher / lower than total

IPv4 Scarcity

The next section of the survey was concerned with the challenges organisations are facing as a result of the scarcity of IPv4 address space, as well as whether they think this will continue to be a challenge. Ways in which organisations are dealing with the lack of IPv4 addresses was also canvassed by the survey.

In summary, the survey found that:

- Dependency on IPv4 was identified as the main challenge facing organisations arising from the scarcity of IPv4 address space.
- Deploying IPv6 is also a challenge for organisations arising from the lack of IPv4 addresses.
- Over half of respondents indicated that they will need more IPv4 address space in the short term.
- Of the organisations who will not need more IPv4 addresses, 65% indicate that they have enough IPv4 space.
- A further 44% of respondents who indicate they will not need more IPv4 stated that their organisation has/will have deployed IPv6.
- Of respondents who indicated that their organisation will need more IPv4 address space in the coming 2-3 years, 61% suggested they would buy address space on the transfer market. A further 41% will deal with the lack of IPv4 address space by using network address translation (NAT).

IPv4 Address Scarcity

More detailed information about the challenges organisations face arising from the lack of IPv4 addresses was canvassed by the survey. From a list of seven potential challenges, respondents were asked to indicate up to two main challenges facing their organisation as a result of IPv4 scarcity.

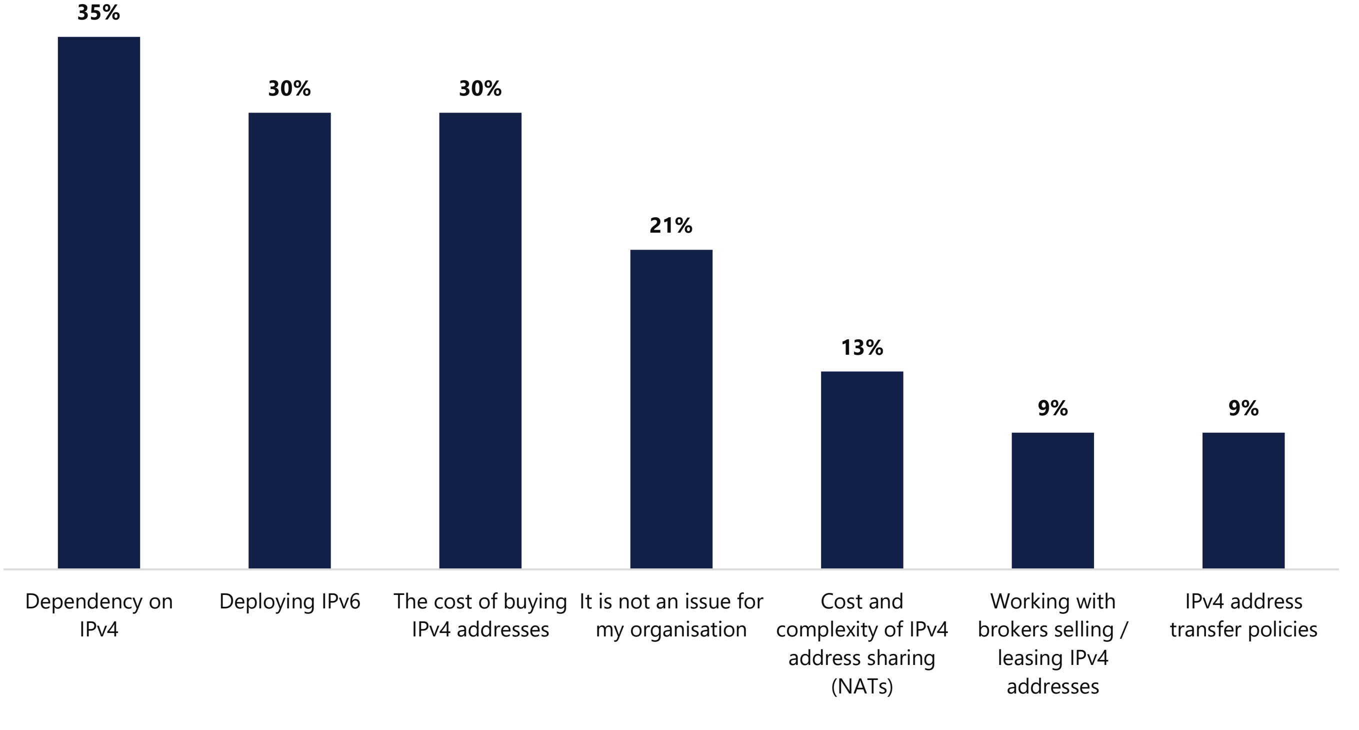
Dependency on IPv4 was most often identified as the main challenge facing organisations arising from the scarcity of IPv4 address space. Thirty-five percent (35%) of respondents included dependency on IPv4 among their biggest challenges. While the difference was not significant, respondents in Eastern Europe and ENOG were more likely to indicate that dependency on IPv4 is an issue for their organisation.

Deploying IPv6 was also identified as a challenge for organisations arising from the lack of IPv4 addresses. Thirty percent (30%) of respondents indicated that deployment of IPv6 is a challenge for them. This is consistent across all of the RIPE NCC regions.

The cost of buying IPv4 addresses was cited a challenge by 30% of respondents. Cost concerns were most frequently cited by respondents in the ENOG and Middle East regions, while those in more affluent Western Europe countries were less likely to identify cost as an issue.

Respondents in Western Europe (24%) were significantly more likely than those in other regions to suggest that the scarcity of IPv4 is not an issue for their organisation.

Q22. Thinking about the scarcity of IPv4 addresses, what are the main challenges facing your organisation?
N=3,647, Members Only



	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**3647**	**246**	**653**	**450**	**241**	**1956**	**97**
Dependency on IPv4	35%	42%	39%	30%	29%	35%	30%
Deploying IPv6	30%	31%	30%	29%	33%	31%	22%
The cost of buying IPv4 addresses	30%	32%	39%	35%	32%	24%	35%
It is not an issue for my organisation	21%	18%	16%	16%	21%	25%	16%
Cost and complexity of IPv4 address sharing (NATs)	13%	17%	11%	14%	13%	13%	5%
Working with brokers selling / leasing IPv4 addresses	9%	6%	9%	16%	8%	8%	14%
IPv4 address transfer policies	9%	11%	8%	13%	11%	8%	21%
Clean status of IPv4 addresses being transferred	8%	4%	6%	7%	11%	8%	8%

Significantly higher / lower than total

To assist with the challenges associated with the scarcity of IPv4 address space, there were many calls for more active management of IPv4 resources by the RIPE NCC.

Many respondents believe that the RIPE NCC should reclaim unused address space, with suggestions that the RIPE NCC could assist by “revoking unused IPV4 addresses from big corporations” and by “forcing major and big telecoms to release currently unused IPv4 addresses and to allocate them to small operators.”

Others thought the RIPE NCC could take a more active role in the transfer market and provide a “managed IPv4 broker service” or assist by “re-selling IPv4 addresses at a lower cost than brokers”. Another respondent suggested that the “RIPE NCC could organize a service for the sale / purchase of blocks of IP addresses, so that all these issues could be solved through the RIPE NCC, and not through third-party brokers.”

“The most important problem with the RIPE is IPV4 depletion. There are many organizations with huge address spaces which they never used. Unused address spaces should be taken from the members.” Turkey

Reflecting concerns about dependency on IPv4, over 53% of respondents indicated that they will need more IPv4 address space in the short term.

53% Yes

35% No

12% Don't Know

Q23. Do you think you / your organisation will need more IPv4 address space in the next 2 – 3 years?
N=3,647 Members Only

The need for more IPv4 addresses in the short term appears to be highest in the ENOG and Middle East regions, where 60% and 64% of respondents respectively indicated their organisation would need more address space, particularly those in Iran (73%) and Turkey (67%). Organisations in Western Europe (47%) are the least likely to indicate they will not have a need for more IPv4, with respondents from Germany (43%), Netherlands (39%) and Switzerland (38%) significantly less likely to have an upcoming need. Long term members of the RIPE NCC (over ten years) are also less likely to suggest they will need more IPv4 address space in the next few years.

Hosting companies and telecommunications and mobile operators (both 66%) were also significantly more likely to indicate they would have a need for more IPv4 in the short term. Respondents representing educational/government or not for profit organisations (26%), industry (27%) and hardware/software vendors (33%) were the least likely to indicate that their organisation will have a need for more IPv4 addresses over the coming few years.

Reasons Organisations Will Not Need IPv4

Having enough IPv4 space is cited as the reason organisations will not need more IPv4 addresses in the coming few years. Sixty-five percent (65%) of respondents indicate they have enough address space. This is consistent across all regions and industry types, with the exception of respondents from Eastern Europe who were more likely to indicate that their deployment of IPv6 would be the reason they would not require any IPv4 address space.

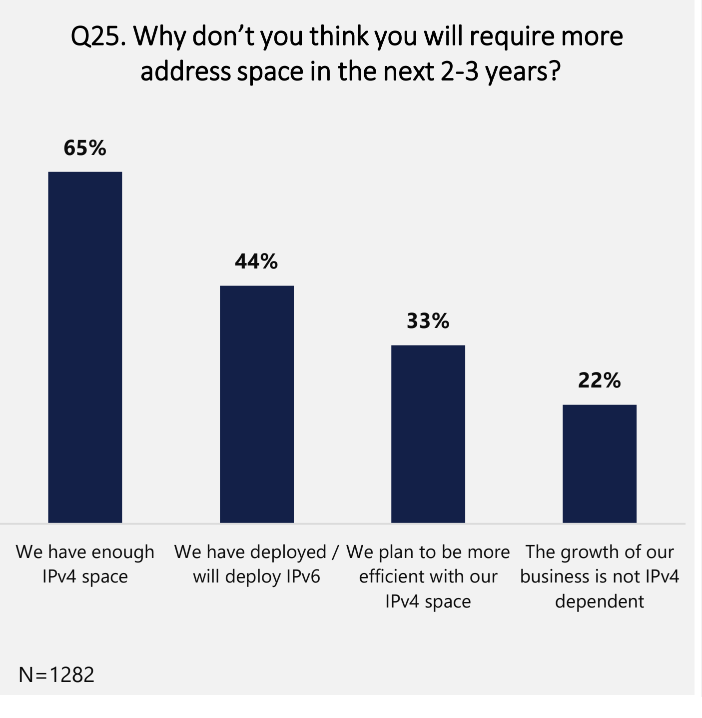
Deployment of IPv6 was the next most common reason for organisations suggesting they will not need more IPv4 address space. Overall, 44% of respondents indicated that their organisation have/will have deployed IPv6. Respondents in Eastern Europe (60%) and Western Europe (48%) are the most likely to suggest their organisation will have deployed IPv6. Hosting companies (58%) and telecommunications and mobile operators (53%) are also more likely to be advanced in their deployment of IPv6.

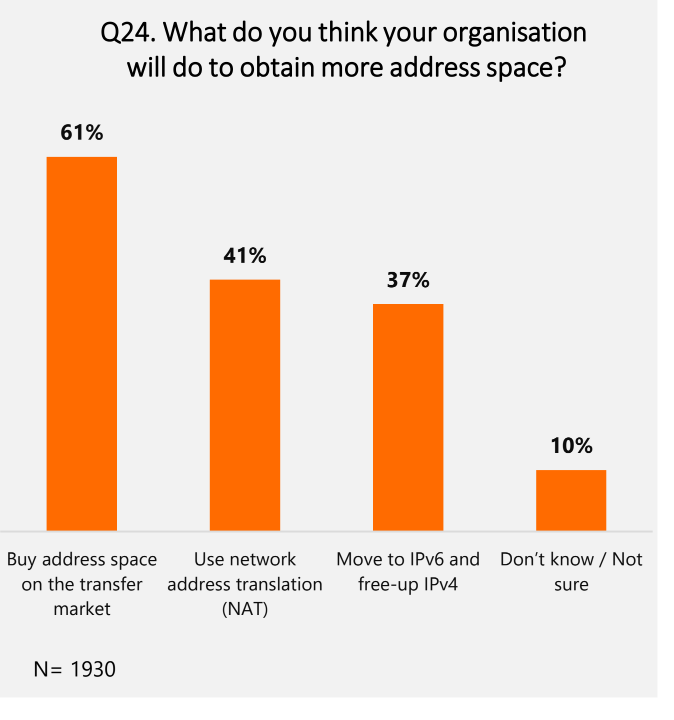
How Organisations will Manage the Need for More IPv4 Address Space

Of respondents who indicated that their organisation will need more address space in the coming 2-3 years, 61% suggested they would buy address space on the transfer market. Use of the transfer market appears lower in the Middle East (54%) region. Hosting companies (73%) were significantly more likely to indicate they will meet their need for more IPv4 by purchasing address space on the transfer market. Educational, government and not-for profit organisations (37%) are less likely to turn to the transfer market.

The next most common way respondents plan to deal with the lack of IPv4 address space is by the use of network address translation (NAT). Overall, 41% of respondents think their organisation with use NAT to obtain more address space, with planned use of NAT highest in the ENOG region (55%). Use of NAT is much less likely in Western Europe (35%). Telecommunications and mobile operators (54%) are also significantly more likely to plan on using NAT than respondents in other industries. Few hosting companies plan on using NAT (19%).

Thirty-seven percent (37%) of respondents indicated that their organisation is likely to move to IPv6 to free up IPv4 address space. Plans to deploy IPv6 to overcome lack of IPv4 address space are highest in the Middle East (44%) and among educational, government and not for profit organisations (52%).





Regional Data

	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**4161**	**273**	**722**	**505**	**304**	**2172**	**164**
Will your organisation need more IPv4 address space in the next 2-3 years?							
Yes	53%	57%	60%	64%	57%	47%	61%
No	35%	26%	29%	29%	30%	41%	27%
Don't know	12%	16%	11%	7%	13%	13%	12%
What do you think you / your organisation will do to obtain more address space?							
Buy address space on the transfer market	61%	53%	65%	54%	60%	62%	68%
Use network address translation (NAT)	41%	47%	52%	44%	40%	35%	27%
Move to IPv6 and free-up IPv4	37%	33%	29%	44%	39%	38%	25%
Don’t know / Not sure	10%	9%	5%	7%	12%	12%	12%
Other	3%	3%	5%	4%	1%	3%	7%
Why don’t you think you will require more address space in the next 2-3 years?							
We have enough IPv4 space	65%	51%	60%	72%	60%	66%	65%
We have deployed / will deploy IPv6	44%	60%	41%	22%	40%	48%	27%
We plan to be more efficient with our IPv4 space	33%	43%	48%	24%	30%	31%	15%
The growth of our business is not IPv4 dependent	22%	17%	12%	17%	19%	25%	31%
Other	1%	3%	1%	4%	1%	1%	4%

Significantly higher / lower than total

Industry Data

	Total	Education /Govt / NFP	Industry	Hardware-Software Vendor	Hosting Company	IT Services/IT Consultancy	IXP	Teleco / Mobile Operator
Sample size	**3647**	**333**	**346**	**91**	**490**	**778**	**69**	**1353**
Will your organisation need more IPv4 address space in the next 2-3 years?								
Yes	53%	26%	27%	33%	66%	50%	65%	66%
No	35%	65%	64%	48%	22%	37%	14%	23%
Don't know	12%	10%	10%	19%	12%	14%	20%	12%
What do you think you / your organisation will do to obtain more address space?								
Buy address space on the transfer market	61%	37%	57%	73%	73%	60%	49%	59%
Use network address translation (NAT)	41%	43%	40%	30%	19%	34%	27%	54%
Move to IPv6 and free-up IPv4	37%	52%	38%	30%	31%	36%	44%	37%
Don't know / Not sure	10%	14%	13%	10%	11%	12%	4%	8%
Other	3%	2%	2%	3%	5%	3%	9%	3%
Why don't you think you will require more address space in the next 2-3 years?								
We have enough IPv4 space	65%	67%	71%	73%	62%	65%	80%	54%
We have deployed / will deploy IPv6	44%	49%	25%	45%	58%	42%	50%	53%
We plan to be more efficient with our IPv4 space	33%	27%	30%	30%	37%	28%	30%	46%
The growth of our business is not IPv4 dependent	22%	24%	21%	25%	23%	27%	40%	13%
Other	1%	1%	1%	2%	1%	1%	10%	2%

Significantly higher / lower than total

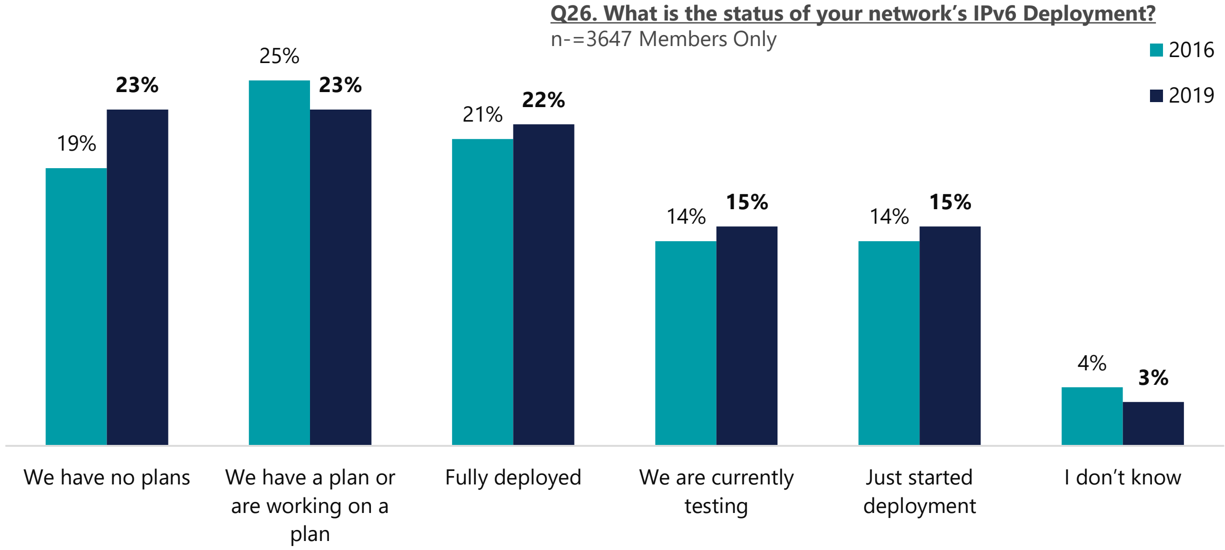
IPv6 Deployment

Understanding the state of IPv6 deployment across the region, as well as the technologies being used by deployment activities, was another important focus of the RIPE NCC Survey 2019. Reasons or challenges preventing deployment were also canvassed.

In summary, the survey found that:

- Overall, it appears that there has been little change in the state of IPv6 deployment since the RIPE NCC Survey conducted in 2016.
- While many technologies are being used, dual stack with public IPv4 is overwhelmingly the most common, used by 62% of respondents.
- Lack of business need was the most often selected reason organisations are not deploying IPv6.
- Time challenges and a lack of organisational knowledge or expertise were also hindering deployment for approximately a third of organisations.

IPv6 Deployment Status



Overall, it appears that there has been little change in the state of IPv6 deployment since the RIPE NCC Survey conducted in 2016.

- Out of all respondents, only 22% indicated that IPv6 is fully deployed – consistent with 21% in 2016. Full deployment is highest among respondents in Eastern Europe (30%) and Western Europe (27%).
- Just over half have commenced the process, with 15% having just started deployment, 15% currently in testing, while 23% have or are working on a deployment plan. Again these figures are consistent with 2016 (14%, 14% and 25%, respectively). Those in the ENOG region are the most likely to be currently working on deployment.
- Nearly a quarter (23%) of respondents indicated that their organisation has no plans for deployment of IPv6, up from 19% in 2016. Respondents in the Middle East (38%) are significantly more likely to have no plans for deployment.

	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**3647**	**246**	**653**	**450**	**241**	**1956**	**97**
We have no plans	23%	14%	21%	38%	23%	21%	19%
We have a plan or are working on a plan	23%	22%	26%	25%	23%	22%	20%
Fully deployed	22%	30%	13%	6%	20%	27%	35%
We are currently testing	15%	17%	19%	17%	18%	14%	10%
Just started deployment	15%	14%	19%	11%	11%	15%	14%
I don't know	3%	3%	2%	3%	4%	2%	2%

Significantly higher / lower than total

IPv6 Technology

To further understand the status of IPv6 deployment in the region, the survey asked respondents to indicate the technology they are using for their IPv6 implementation.

Overall, while many technologies are being used, dual stack with public IPv4 is overwhelmingly the most common, and is used by 62% of respondents. Dual stack with public IPv4 is most common in Western Europe, where it is used by 67% of respondents. This compares to only 55% in the ENOG region and 41% in the Middle East.

Dual stack with private IPv4 (via CGN) is being used by a further 18% of respondents, increasing to 25% among ENOG region respondents. NAT64 is the next most common technology, used by 11% of respondents. Use of NAT64 is significantly higher in the Middle East, where 21% of respondents are using the technology for their IPv6 implementation.

Other technologies used by a small proportion of respondents included DS-Lite, 6rd, 464XLAT and MAP-T.

Q27. What technology are you using for your IPv6 implementation?
N=2,731

62% Dual-stack Public IPv4

22% Don't Know

18% Dual-stack private IpV4

	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	2731	205	500	267	175	1506	77
Dual-stack with public IPv4	62%	65%	55%	41%	62%	67%	69%
Don't know	22%	19%	23%	31%	23%	20%	17%
Dual-stack with private IPv4 (via CGN)	18%	23%	25%	21%	16%	16%	10%
NAT64	11%	11%	12%	21%	5%	10%	10%
DS-Lite	2%	1%	2%	5%	3%	2%	3%
Other	2%	0%	2%	2%	2%	2%	3%
6rd	2%	2%	1%	2%	1%	2%	3%
464XLAT	2%	0%	1%	4%	2%	2%	1%
MAP-T	1%	0%	0%	1%	1%	1%	1%
lw4o6	0%	0%	1%	1%	0%	0%	3%
MAP-E	0%	0%	0%	1%	0%	0%	0%

Significantly higher / lower than total

Main Reasons Not to Deploy IPv6

1 | Lack of Business Need

Lack of business need was the most often selected reason organisations are not deploying IPv6. Nearly half (48%) of respondents suggested that there is no business requirement for IPv6. This is consistent with 2016, when lack of demand for IPv6 was the most common factor stopping respondents from deploying IPv6.

Many respondents suggested that the RIPE NCC could help organisations by promoting the benefits of IPv6. Comments included that “we need more IPv6 awareness at the smaller content hosts” and that the RIPE NCC should “promote IPv6 only implementations in the market so that customers start asking for it”. Others suggested that the RIPE NCC should be driving business demand by “forcing major service providers to adopt ipv6”.

2 | Lack of Time

Time pressures are another factor constraining IPv6 deployment efforts. Thirty-five percent (35%) of respondents indicated that they simply have not had time for IPv6 deployment yet.

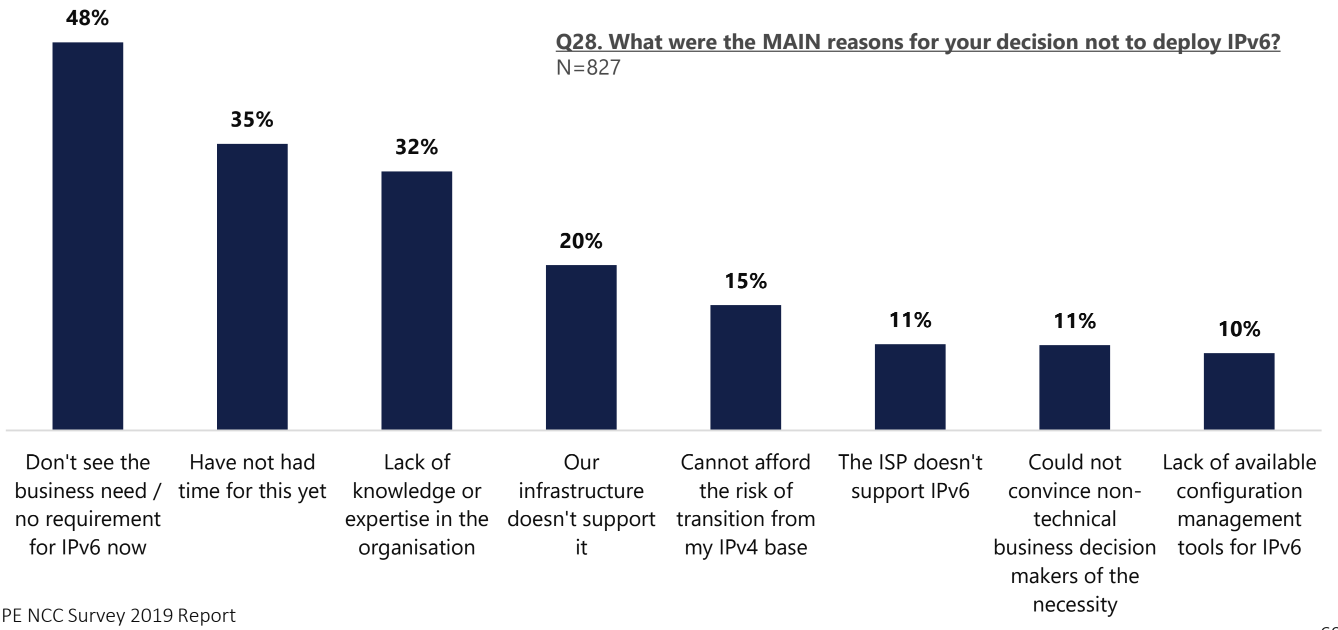
Respondents in Western Europe (44%) were more likely to cite time constraints as the reason they had not deployed IPv6. Technical operations professionals (44%) were also more likely to suggest lack of time is one of the main obstacles to IPv6 deployment,

3 | Lack of Expertise

A lack of organisational skills and expertise was the next most cited challenge affecting IPv6 deployment.

Nearly a third (32%) of respondents indicated that skills deficiencies are on the top three challenges affecting their organisations’ ability to deploy IPv6. This rises to 36% in Western Europe

Calls for IPv6 training were common among verbatim comments about ways in which the RIPE NCC could assist organisations with the challenges they are facing. Respondents suggested that the RIPE NCC should “run more courses on IPv6” and provide“dedicated IPv6 support specialists to help guide deployment”.



Q28 What were the MAIN reasons for your decision not to deploy IPv6?

	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**827**	**34***	**139**	**172**	**56**	**406**	**18 ***
Don't see the business need / no requirement for IPv6 now	48%	62%	55%	38%	43%	50%	50%
Have not had time for this yet	35%	35%	29%	19%	36%	44%	33%
Lack of knowledge or expertise in the organisation	32%	29%	29%	24%	32%	36%	28%
Our infrastructure doesn't support it	20%	26%	29%	27%	16%	15%	11%
Cannot afford the risk of transition from my IPv4 base	15%	18%	20%	16%	13%	14%	11%
The ISP doesn't support IPv6	11%	0%	12%	26%	7%	5%	17%
Could not convince non-technical business decision makers of the necessity	11%	12%	6%	8%	20%	12%	11%
Lack of available configuration management tools for IPv6	10%	18%	11%	13%	11%	7%	0%
Communications service provider doesn't support IPv6	8%	6%	4%	20%	9%	4%	11%
Cannot afford the expense	8%	6%	16%	3%	7%	8%	6%
Legal or regulatory constraints	3%	0%	5%	6%	4%	1%	0%

* Please note small sample

Significantly higher / lower than total

- Lack of business need is the main reason organisations are not deploying IPv6. Nearly half (48%) of respondents suggested that there is no business need or requirement for IPv6
- Respondents in Western Europe (44%) were more likely than average (35%) to cite time constraints as the reason they had not deployed IPv6.
- Lack of organisational expertise or technical knowledge was another common barrier to IPv6 deployment, selected by 32% of respondents. This increases to 36% in Western Europe.
- Lack of support for IPv6 appears to be more of an issue in the Middle East than other regions, with 26% of respondents from the Middle East deciding not to deploy IPv6 as their ISP doesn't support it and a further 20% because their communications providers doesn't support IPv6. This compares to only 11% and 8% overall, respectively.
- Significantly higher than other regions, 16% of respondents from ENOG regions indicated they could not afford the expense of IPv6 deployment.

Regulatory Risk

The impacts of changes to government regulation was also a topic of interest to the survey. Respondents were asked to indicate whether they believe that changes to government regulations will affect their organisation, and the operations of the RIPE NCC, over the coming 2-3 years, and in what way they will be affected.

In summary, the survey found that:

- Overall, just over a quarter (27%) of respondents believe that regulatory change will impact their organisation in the short term.
- Censorship fears was the main theme of free text comments provided by respondents. Many mentions were made of the potential impact of the Sovereign Internet Act in the Russian Federation, and more broadly about potentially greater surveillance and restrictions on content by government.
- Organisations also expressed concern that regulatory changes will impose additional compliance and cost burdens on their organisation.
- The implications of GDPR and heightened privacy and data retention restrictions were also mentioned as impacting both organisations, and the operations of the RIPE NCC.

Changes to Regulations

Overall, 27% of respondents believe that changes in government regulations will directly affect their organisation or the operations of the RIPE NCC over the next 2-3 years. A further 41% are unsure of the impact that changes to regulations might have.

Differences are evident when analysed by region. Respondents in the ENOG region (43%) are significantly more likely than those in other regions to believe that changes to government regulations will impact their organisation, or the operations of the RIPE NCC. Conversely, concern is lower in the Middle East, South East Europe and Western Europe, where 37%, 39% and 35% of respondents respectively indicated that changes to government regulations will not impact their organisation. Greater uncertainty exists in Eastern Europe, where nearly half (49%) were unsure about any potential impact of regulatory change.

Q 34 Do you expect that changes in government regulations will directly affect your operations or the operations of the RIPE NCC over the next 2 – 3 years?

	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	4161	273	722	505	304	2172	164
Yes	27%	26%	43%	29%	22%	22%	34%
No	32%	26%	20%	37%	39%	35%	31%
Don't know	41%	49%	37%	34%	38%	43%	35%

Significantly higher / lower than total

When asked to indicate the ways in which regulatory changes might impact their organisation, or the RIPE NCC, censorship was the main theme of free text comments provided by respondents. Many mentions were made of the potential impact of the Sovereign Internet Act in the Russian Federation, and more broadly about potentially greater surveillance and restrictions on content by government. Respondents spoke of "governments obtaining the ability to demand blocks on certain content." as well as the "possible restriction of access to foreign resources". Other respondents were concerned that increased censorship "may force us to route or mirror traffic to a government agency for supervision" and indicated that the "move to more national autonomy will have implications on how we deploy services".

Organisations also expressed concern that regulatory changes will impose additional compliance burdens on their organisation. Respondents suggested that changes will likely "increase reporting requirements" and impacts would be felt due to the need to ensure "compliance with multiple data protection frameworks". Increasing costs was also a concern of respondents, with suggestions that "tightening control over traffic will entail huge costs" and that "legal requirements will increase non-operational costs".

The implications of GDPR and heightened privacy and data retention restrictions were also mentioned as impacting both organisations and the operations of the RIPE NCC. Comments recognised that "as privacy is a big concern, we expect more regulations related to this and this will affect operations of every company", while others indicated that "the GDPR places further obstacles to a complete use of Internet-related services". One respondent suggested that the "usefulness of RIPE DB will decrease because of GDPR".

Concern about the impact of regulatory change is significantly higher in the Russian Federation than any other country, where 57% of respondents believe the changes to government regulation are likely to impact activities. Many comments from Russian respondents mentioned the Sovereign Internet Act and consequent restrictions to Internet access.

Over a third of respondents in the United States (40%), Poland (36%), Greece (36%), Iran (35%) and Ireland (33%) also expect changes in government regulations to impact their operations, or those of the RIPE NCC.

Q Do you expect that changes in government regulations will directly affect your operations or the operations of the RIPE NCC over the next 2 – 3 years?

	Sample	Yes	No	I don't know
Total	**4161 ***	**27%**	**32%**	**41%**
Russian Federation	443	57%	14%	29%
Germany	410	29%	34%	37%
Italy	295	20%	28%	52%
United Kingdom	244	24%	33%	43%
France	220	19%	34%	47%
Netherlands	203	21%	39%	40%
Spain	190	15%	34%	52%
Turkey	175	27%	39%	33%
Iran (Islamic Republic Of)	141	35%	32%	33%
Poland	135	36%	16%	48%
Switzerland	106	23%	42%	36%
Czech Republic	82	17%	35%	48%
United States	82	40%	30%	29%
Ukraine	79	24%	23%	53%
Sweden	78	17%	44%	40%
Norway	63	17%	44%	38%
Austria	62	23%	40%	37%
Romania	56	21%	41%	38%
Serbia	56	21%	34%	45%
Bulgaria	53	19%	47%	34%
Belgium	52	27%	46%	27%
Denmark	49	12%	53%	35%
Finland	47	15%	40%	45%
Ireland	42	33%	24%	43%
Lebanon	39	28%	31%	41%
Greece	36	36%	22%	42%
Kazakhstan	34	29%	12%	59%
Hungary	33	9%	33%	58%
Portugal	33	21%	52%	27%
Albania	29	21%	41%	38%
Saudi Arabia	29	21%	28%	52%
Luxembourg	28	14%	21%	64%
Slovenia	26	15%	54%	31%
Israel	25	8%	36%	56%
Cyprus	24	25%	25%	50%
Slovakia	23	22%	35%	43%
Georgia	22	14%	41%	45%
Lithuania	20	10%	40%	50%

* Economies with less than 20 responses have been excluded

Significantly higher / lower than total

Can you please tell us how you think any changes will affect your organisation or the operations of the RIPE NCC?

While respondents provided various feedback, the most common issues raised and indicative comments, are outlined below.

1. Censorship and Government Control

“Adoption of a law on the sovereign Internet will necessarily affect its availability.” Russian Federation

“Any law may force us to route or mirror traffic to a government agency for supervision.” Russian Federation

“Possible restriction of access to foreign resources..” Russian Federation

“Implementation of content control measures incompatible with our vision of the Internet” France

“Internet censorship would require strict knowledge about IP owner and user.” Netherlands

“Move to more national autonomy will have implications on how we deploy services.” Norway

“Governments will try to expand mass surveillance.” Germany

“Increasing the list of web resources that need to be blocked/made inaccessible” Romania

“The implementation of content regulation in the UK will impact the operations of Internet in the UK” UK

2. Increase Compliance and Cost of Providing Services

“Legal requirements will increase non-operational costs” Poland

“A significant increase in the company's expenses is possible due to the adoption of laws related to the control and storage of user traffic.” Russian Federation

“Industry regulation by the state may increase costs” Russian Federation

“Tightening control over traffic will entail huge costs.” Estonia

“Compliance with multiple data protection frameworks.” UK

“The regulator can influence the management costs (see costs for freed times or obligation to implement security policies).” Italy

3. Increasing Compliance with Privacy and GDPR

“Clarifying the interpretation of regulations related to the GDP (RODO) will significantly affect the ease of work in my company.” Poland

“Purpose of GDPR in conflict with Whois databases” France

“As privacy is a big concern, we expect more regulations related to this and this will affect any operations of every company.” Germany

“Draconian UK laws that seek to erode privacy are technologically expensive.” UK

“Privacy is becoming an increasing concern. Some information may not be shared online anymore. ” Netherlands

“Usefulness of RIPE DB will decrease because of GDPR” Netherlands

“More data colleting and traffic blocking, more request to identify clients or to delete data” Czech Republic

4. Other

“Challenges by government forcing data retention…” Germany

“Requirement of long time retention of customer address assignments could be mandatory, running public Wi-Fi networks could get more restricted, VPNs could get banned.” Germany

“New laws and regulations will force us to install some specific devices on the network.” Russian Federation

“Legal regulations may require the use of certain standards.” Turkey

“Regulation forcing major change to management and collection of data and/or operation of the network.” UK

“I'd expect IPv6 to be mandated within that time” UK

“IPv6 implementation at the legislative level” Russian Federation

N=555 comments.
Please note only presented to respondents who indicated changes in government regulations will affect their operations, or those of the RIPE NCC.

Accreditation & Information Services

The survey also sought to understand demand for training, testing respondent reactions to accreditation being provided by the RIPE NCC. Information about the channels used by the community to keep up to date with industry information and RIPE NCC activities, as well as to learn about best practices and maintain connections, was also questioned.

In summary, the survey found that:

- Over half (52%) of respondents indicated that taking an exam to earn RIPE NCC professional certification on IP-related topics would add value to either their own professional career or to their organisation.

- Verbatim feedback confirmed satisfaction with and support for RIPE NCC training.

- Email communication is overwhelmingly the most common way that respondents keep up to date with news about the RIPE NCC.

- Although significant differences exist by country, online forums are the most common way respondents connect with others, obtain more information and research best practices.

- Commercial vendor events, national NOGs and IXP meetings are other common ways in which respondents keep up with information and best practice.

Professional Accreditation

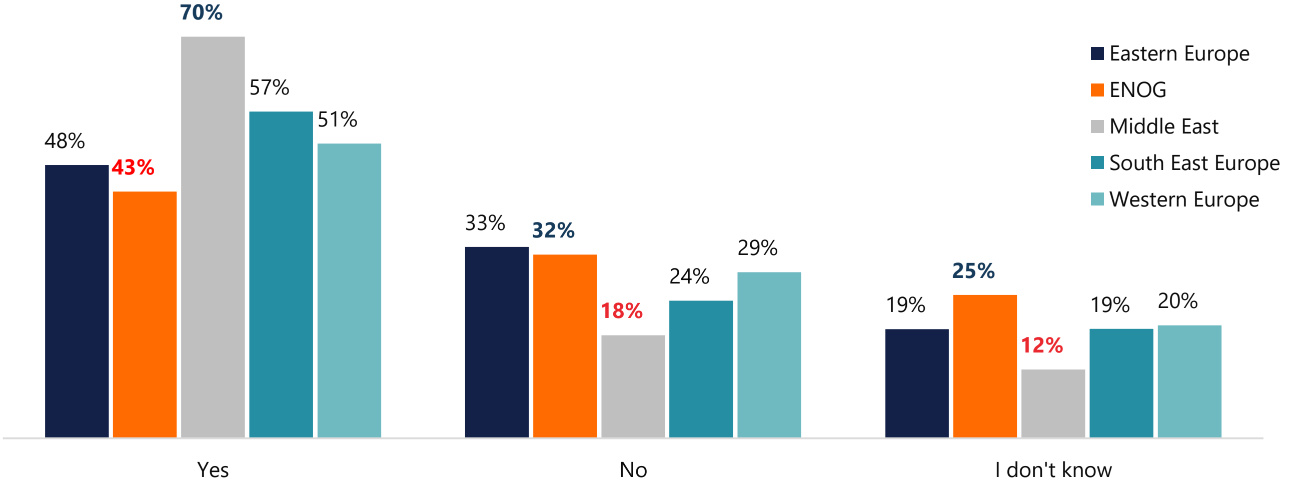
Training was a strong theme through much of the feedback and there is interest in RIPE NCC professional accreditation.

Over half (52%) of respondents indicated that taking an exam to earn RIPE NCC professional certification on IP-related topics would add value to either their own professional career or to their organisation. While 28% indicated they had no interest, a further 22% were undecided.

Interest in RIPE NCC accreditation is strongest in the Middle East, with 70% of respondents in the region indicating that RIPE NCC accreditation would add value to their career or their organisation. Support was particularly evident in Tajikistan (93%), Moldova (93%), Iran (72%), Turkey (64%) and Italy (62%). There is less interest in the Russian Federation (36%).

The proportion of respondents interested in undertaking exams to obtain RIPE NCC accreditation was also significantly higher among those in technical operations based roles (56%).

Q 31- Would taking an exam to earn a RIPE NCC professional certification on IP-related topics (e.g. RIPE Database, IPv6, routing security) add value to either your professional career or to your organisation as an employer?
N=4,161 All Respondents



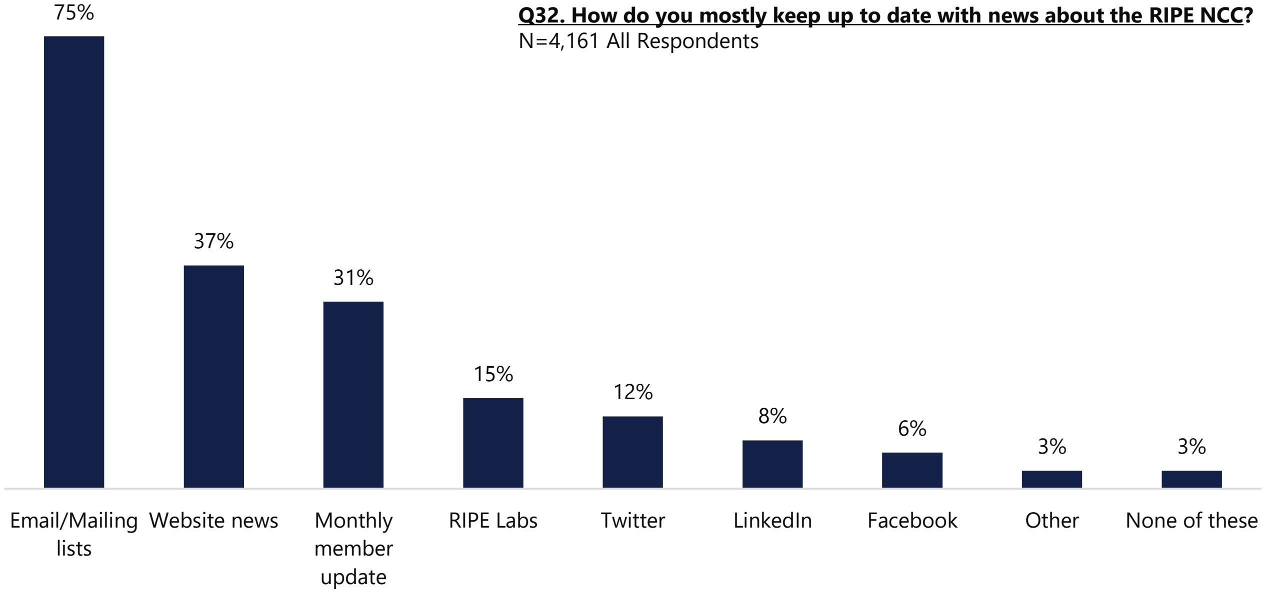
	Total	Company owner	Executive	IT/ICT Manager	Software development	Technical operation	Admin / Commercial
Sample size	**4161**	**725**	**629**	**1000**	**65**	**1303**	**439**
Yes	52%	48%	51%	53%	43%	56%	49%
No	28%	33%	30%	29%	34%	23%	27%
Don't know	20%	19%	18%	18%	23%	20%	24%

Significantly higher / lower than total

Keeping Up to Date & Connecting with Others

Email communication is overwhelmingly the most common way that respondents keep up to date with news about the RIPE NCC.

- Three quarters (75%) of respondents use email to keep up to date with the RIPE NCC. Respondents from the ENOG region are the most likely to rely on email communications to keep up with news about the RIPE NCC (82%, compared to 75% overall).
- Website news updates are used to keep up to date with the RIPE NCC by 37% of respondents. The website news updates are relied upon more heavily by respondents from Eastern Europe, (51%) than those from other regions,
- Nearly a third (31%) rely on the monthly member update to keep up with news about the RIPE NCC, with the monthly member update appearing to have more traction in Western Europe (35%). It is also more heavily relied upon by company owners (37%) and executives (39%) than those in more technical roles.
- RIPE Labs is used by more respondents in Western Europe (17%) and those in administrative or commercial roles (20%).
- Software developers are more likely to rely on social media, particularly Twitter (31%) and LinkedIn (18%) than respondents in other roles. Facebook is less widely used, although 12% of respondents in Eastern Europe, and 10% in administrative and commercial roles, obtain information about the RIPE NCC via Facebook.



Q32. How do you mostly keep up to date with news about the RIPE NCC?
N=4,161 All Respondents

	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**4161**	**273**	**722**	**505**	**304**	**2172**	**164**
Email/Mailing lists	75%	70%	82%	78%	76%	74%	60%
Website news	37%	51%	37%	33%	42%	35%	32%
Monthly member update	31%	33%	25%	29%	30%	35%	26%
RIPE Labs	15%	14%	10%	10%	16%	17%	20%
Twitter	12%	9%	3%	10%	8%	15%	15%
LinkedIn	8%	4%	4%	12%	11%	8%	12%
Facebook	6%	12%	9%	7%	6%	4%	10%

Significantly higher / lower than total

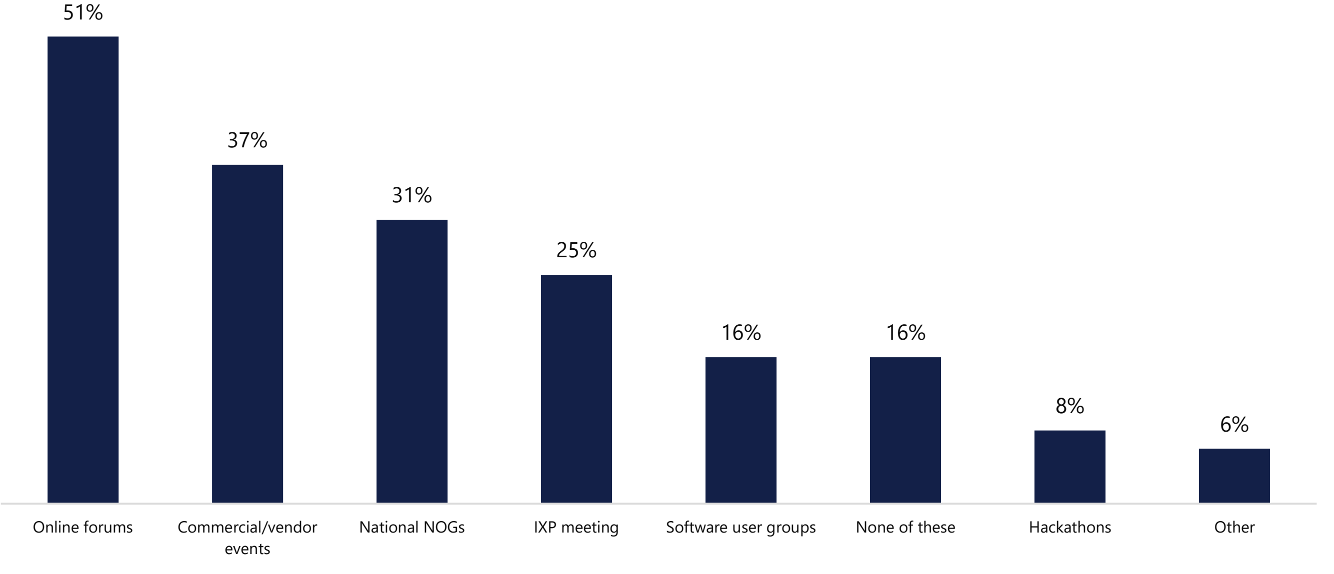
	Total	Company owner	Executive	IT/ICT Manager	Software development	Technical operation	Admin / Commercia l
Sample size							
Email/Mailing lists	75%	78%	78%	78%	57%	73%	66%
Website news	37%	34%	37%	37%	28%	39%	34%
Monthly member update	31%	37%	39%	31%	11%	30%	20%
RIPE Labs	15%	14%	14%	13%	20%	15%	20%
Twitter	12%	11%	13%	8%	31%	12%	15%
LinkedIn	8%	4%	9%	6%	18%	8%	14%
Facebook	6%	6%	8%	5%	5%	5%	10%

Significantly higher / lower than total

The survey also canvassed ways in which respondents connect with others, and keep up with industry information and best practice. Apart from RIPE NCC-organised events, respondents were asked to select as many as applicable from a list of six common methods.

Overwhelmingly, online forums are the main way respondents connect with others, obtain more information and research best practices. Over half (51%) of respondents connect with others online, with respondents in Eastern Europe (60%) more likely than others to connect and keep up to date through online forums. Respondents from Poland (70%) and the Russian Federation (65%) are the most likely to use online forums.

Q33. Apart from RIPE and RIPE NCC-organised events, where do you connect with other groups or individuals to understand best current practices or gain more information?
N=4,161 All Respondents



	Total	Eastern Europe	ENOG	Middle East	South East Europe	Western Europe	Other
Sample size	**4161**	**273**	**722**	**505**	**304**	**2172**	**164**
Online forums	51%	60%	62%	49%	55%	45%	62%
Commercial/vendor events	37%	38%	40%	24%	41%	38%	33%
National NOGs	31%	45%	26%	22%	38%	32%	30%
IXP meeting	25%	30%	33%	16%	22%	26%	13%
Software user groups	16%	18%	11%	16%	15%	16%	21%
None of these	16%	11%	10%	25%	11%	18%	9%
Hackathons	8%	6%	7%	7%	10%	8%	14%
Other	6%	3%	7%	3%	3%	6%	9%

Significantly higher / lower than total

Commercial vendor events are another common way in which respondents keep up with information and best practice. Over a third (37%) of respondents attend vendor events. In particular, they are widely attended by respondents from industry (45%) and telecommunications and mobile operators (39%). Vendor events are less common in the Middle East, with few respondents in Iran (9%) and Turkey (24%) attending vendor events.

National NOGs (Network Operator Groups) and IXP meetings are also reasonably common ways for respondents to connect and keep up to date. Thirty-one percent (31%) of respondents connect at national NOGs, while 25% attend IXP meetings.

National NOGs are more common in Eastern Europe (45%) and South East Europe (38%), but less frequently used by respondents in the ENOG region (26%) and the Middle East (22%). Respondents in Slovenia (65%), Serbia (61%) Poland (56%), Czech Republic (48%), Spain (44%) and Denmark (53%) are the most likely to belong to national NOGs. They are also particularly popular among respondents from IXPs (51%) and government, academic or not-for-profit organisations (38%).

IXP meetings are more frequently used as a means to keep up to date by respondents from the ENOG region (33%), and those working at IXPs (64%) and telecommunications and mobile operators (32%). Few respondents from the Middle East attend IXP meetings (16%). Over half of the Irish (55%) respondents indicate they attend IXP meetings in an effort to connect and keep up with information and best practice in the industry.

Q33. Apart from RIPE and RIPE NCC-organised events, where do you connect with other groups or individuals to understand best current practices or gain more information?
N=4,161 All Respondents

	Total	Education /Govt / NFP	Industry	Hardware-Software Vendor	Hosting Company	IT Services/IT Consultancy	IXP	Teleco / Mobile Operator
Sample size	**4161**	**536**	**395**	**116**	**505**	**896**	**74**	**1417**
Online forums	51%	50%	49%	60%	50%	54%	42%	51%
Commercial/vendor events	37%	35%	45%	35%	34%	32%	39%	39%
National NOGs	31%	38%	17%	23%	33%	28%	51%	32%
IXP meeting	25%	22%	12%	19%	25%	20%	64%	32%
Software user groups	16%	17%	15%	28%	16%	20%	9%	11%
None of these	16%	12%	19%	16%	17%	18%	15%	15%
Hackathons	8%	12%	7%	10%	7%	9%	8%	6%
Other	6%	12%	4%	7%	6%	4%	0%	4%

Significantly higher / lower than total

Q33. Apart from RIPE and RIPE NCC-organised events, where do you connect with other groups or individuals to understand best current practices or gain more information?
N=4,161 All Respondents

	Sample	Online forums	Vendor events	National NOGs	IXP meeting	Software user groups	Hackath ons	None of these
Russian Federation	443	65%	39%	25%	39%	10%	5%	10%
Germany	410	49%	37%	33%	24%	19%	12%	17%
Italy	295	39%	29%	26%	32%	21%	4%	24%
United Kingdom	244	50%	35%	27%	27%	14%	7%	18%
France	220	38%	33%	35%	25%	17%	5%	20%
Netherlands	203	45%	42%	34%	23%	16%	13%	15%
Spain	190	43%	44%	44%	22%	13%	4%	18%
Turkey	175	54%	24%	10%	9%	21%	8%	32%
Iran (Islamic Republic Of)	141	53%	9%	49%	17%	17%	5%	18%
Poland	135	70%	39%	56%	34%	19%	3%	7%
Switzerland	106	47%	43%	32%	19%	20%	7%	15%
Czech Republic	82	50%	39%	48%	32%	16%	10%	10%
United States	82	63%	35%	32%	9%	17%	11%	9%
Ukraine	79	58%	47%	44%	39%	14%	6%	3%
Sweden	78	47%	38%	17%	27%	15%	6%	17%
Norway	63	52%	41%	33%	22%	10%	11%	16%
Austria	62	52%	44%	31%	29%	6%	8%	16%
Romania	56	61%	41%	34%	25%	14%	7%	13%
Serbia	56	54%	46%	61%	16%	21%	7%	4%
Bulgaria	53	58%	43%	25%	23%	11%	21%	13%
Belgium	52	40%	50%	13%	19%	10%	4%	21%
Denmark	49	49%	53%	53%	20%	14%	18%	12%
Finland	47	55%	51%	32%	21%	11%	4%	11%
Ireland	42	43%	26%	43%	55%	12%	14%	10%
Lebanon	39	31%	46%	15%	44%	10%	8%	15%
Greece	36	44%	28%	53%	33%	14%	8%	8%
Kazakhstan	34	59%	53%	9%	29%	6%	6%	15%
Hungary	33	52%	45%	21%	24%	21%	0%	15%
Portugal	33	52%	48%	48%	36%	18%	9%	9%
Albania	29	48%	31%	31%	34%	7%	14%	17%
Saudi Arabia	29	52%	24%	21%	7%	10%	7%	24%
Luxembourg	28	39%	50%	50%	36%	11%	14%	7%
Slovenia	26	50%	42%	65%	23%	23%	0%	12%
Israel	25	52%	20%	4%	8%	16%	8%	28%
Cyprus	24	46%	38%	13%	17%	8%	4%	33%
Slovakia	23	52%	22%	13%	13%	17%	17%	30%
Georgia	22	55%	41%	36%	27%	9%	23%	9%
Lithuania	20	40%	20%	5%	0%	20%	5%	35%

Significantly higher / lower than total

While many comments suggested that members are satisfied with the RIPE NCC’s overall service, there were also suggestions and ideas for improvement put forward for consideration.

Increase training and events

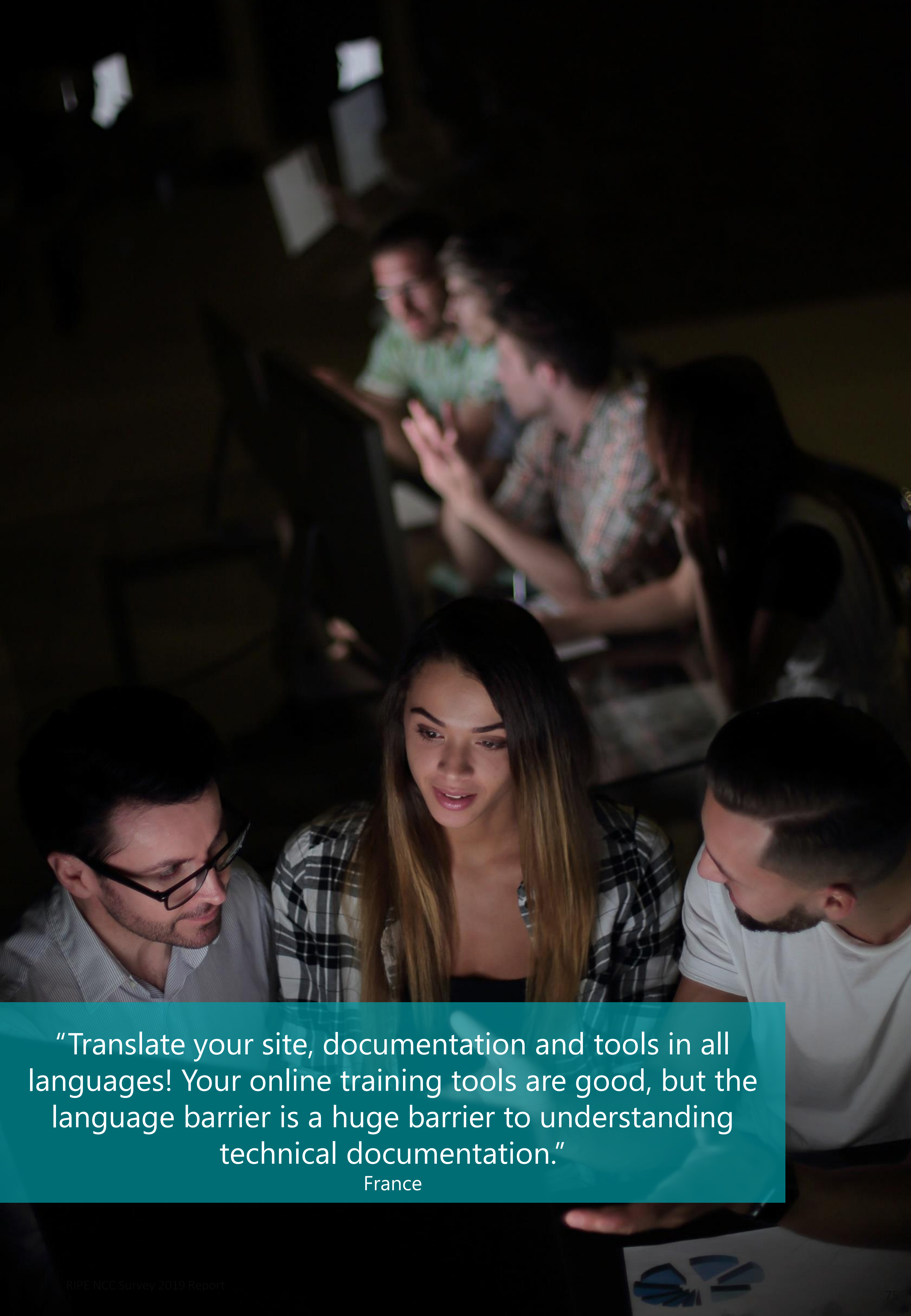
- “Organize more events with national tech organizations in countries to spread awareness of RIPE NCC's role in industry.” Serbia
- “Your webinars and offline courses are great, if possible do them more often! Especially locally, where you can meet RIPE NCC employees and talk to them. Gives the member a whole new, personal, connection to the RIPE NCC” Germany
- “Training is the basis of everything. Greater local training would facilitate knowing and using the platform and its services better” Spain
- “Diversify and increase the frequency of classroom training.” France
- “It would be worth to strengthen cooperation with ISP by preparing a large number of trainings / meetings with both technical and budget-related persons.” Poland
- “More training should be done. Excursions to the Ripe NCC headquarters can be organized to increase interest and explain their activities more.” Turkey

Create local opportunities and provide information in multiple languages

- “Expand the scope of activities in other languages, not English. It would be great if the information appears in Russian”. Russian Federation
- “Carry out training courses in Italy” Italy
- “Farsi content encourages and enhances the productivity of millions of Persian speakers.” Iran
- “Translate your site, documentation and tools in all languages! Your online training tools are good, but the language barrier is a huge barrier to understanding technical documentation.” France
- “Implement training courses in Spanish.” Spain

Assist with shortage of IPv4 and provide support to transition to IPv6

- “More IPV4 addresses should be allocated.” Turkey
- “I would suggest harsher policies against companies that have many IPv4 allocations . Maybe create monetary penalties to incentivize companies to use as little IPv4 addresses as possible and give back the rest.” Italy
- “It is not fair that large LIRs, with a large number of IPv4 addresses assigned (either by having many IPv4 blocks or by having large IPv4 blocks) pay proportionally much less than small LIRs.” Spain
- It is necessary to introduce a fee for using IPv4 resources by type of tax in states for more efficient use of resources and a faster transition to IPv6.” Russian Federation



"Translate your site, documentation and tools in all languages! Your online training tools are good, but the language barrier is a huge barrier to understanding technical documentation."
France

Appendix

Appendix A:

RIPE NCC Definitions of Regions

Eastern Europe
Czech Republic
Hungary
Poland
Slovakia

ENOG
Armenia
Azerbaijan
Belarus
Estonia
Georgia
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Republic of Moldova
Russian Federation
Tajikistan
Turkmenistan
Ukraine
Uzbekistan

Middle East
Bahrain
Iran
Iraq
Israel
Jordan
Kuwait
Lebanon
Oman
Palestine
Qatar
Saudi Arabia
Turkey
UAE
Yemen

South East Europe
Albania
Bosnia & Herzegovina
Bulgaria
Croatia
Greece
Macedonia
Montenegro
Romania
Serbia
Slovenia

Western Europe
Aland Islands
Andorra
Belgium
Cyprus
Denmark
Faroe Islands
Finland
France
Germany
Gibraltar
Greenland
Guernsey
Holy See
Iceland
Ireland
Isle of Man
Italy
Jersey
Liechtenstein
Luxembourg
Malta
Monaco
Netherlands
Norway
Portugal
San Marino
Spain
Svalbard & Jan Mayen
Sweden
Switzerland
United Kingdom

Appendix B:

RIPE NCC Consultation Report 2018

Introduction
With the next RIPE NCC survey scheduled for 2019, the RIPE NCC decided to conduct consultations with members and other parties in its service region. The purpose of these consultations was to check on the progress made since the last large-scale survey in 2016 and to identify areas where improvements can be made.

This report contains the executive summary of the consultations conducted between October-December 2018 followed by more details about the key findings. In total there were 69 participants in these consultations from 18 countries in the RIPE NCC service region (see Appendix for more details).

Independent consultant, Dr. Rob Allen, conducted the consultations on behalf of the RIPE NCC to ensure objective reporting as well as anonymity for respondents. Dr. Allen prepared this report based on analysis of the feedback from participants in the consultations.

The RIPE NCC's Senior Management and Executive Board were presented with this report in February 2019.

Section 1: Executive summary
Overall, the respondents were happy with the RIPE NCC. There was a general feeling that the RIPE NCC provided members with good value for money and a useful set of tools and services. Respondents felt that the RIPE NCC had an important role to play beyond the run-out of IPv4. The registry function, RIPE Database, training and routing security were all noted as activities of critical importance.

There was positive feedback about the RIPE Database and the LIR Portal. The major issues were related to data accuracy and the steep learning curve for new members. RIPE NCC Training Courses were almost universally praised with suggestions for more advanced courses, especially BGP, and for courses on RPKI. The proposed system of credentialing received good feedback.

There was positive feedback on the RIPE NCC's work in building communities across the service region. The language barrier and the high threshold for entry for the Policy Development Process (PDP) were noted as issues.

Respondents indicated that the RIPE NCC had an important role to play in routing security. However, when it came to RPKI many respondents were unclear on the current benefits, methods of deployment and consequences of implementation.

With regard to measurement tools, RIPEstat is widely used and received positive feedback. RIPE Atlas is a very well regarded, but a common theme was that people didn't know how to get started with making Atlas measurements. For those that did use RIPE Atlas, the credit system was seen as an issue for both researchers and operators.

Specific feature requests and service improvements have been noted by the consultant, Dr. Rob Allen, and passed to the RIPE NCC for consideration.

Section 2: Consultation topics
The issues that the RIPE NCC identified as areas for discussion during the consultations were as follows:
The future of the RIPE NCC in light of IPv4 run-out
Service delivery in light of expanded member base
Membership analysis and ensuring specific sector wishes are catered for
The importance of security and the RIPE NCC's role
The RIPE NCC as a unique source of neutral data
Trust, transparency, inclusiveness and engagement

1. The future of the RIPE NCC in light of IPv4 run-out
There was consistent feedback that the RIPE NCC's role extends beyond the allocation of IPv4 addresses, with respondents pointing to the importance of data accuracy work as well as tools to help secure routing and to support network monitoring and troubleshooting. The RIPE NCC is seen to be doing good work in these areas, as well as in organising high-quality training courses, local meetings and RIPE Meetings.

1.1 Data accuracy
Respondents were in favour of continued efforts to help improve data accuracy, with Assisted Registry Checks (ARCs) receiving very positive feedback. Data accuracy is seen as essential with several respondents noting that more could be done from a RIPE policy point of view and on a global scale, with the coordinated improvement of all registry data.

1.2 Transfers
In the light of IPv4 run-out, and with the transfer of address space, a reliable registry function is seen to be as important as ever. Respondents noted that the RIPE NCC is providing a good process in this regard, with most respondents who had participated in transfers commenting that the process worked well and that the RIPE NCC was exercising the right level of due diligence.

1.3 Training courses
RIPE NCC training was almost universally praised, with positive feedback for all modes of training offered. Some respondents preferred face-to-face training and requested this take place in the local language. The most popular training courses requested were: IPv6, RPKI, DNSSEC, BGP and advanced BGP.

There were some suggestions that the RIPE NCC should make efforts to work more closely with universities and IT schools, as in many countries there is a lack of information on network engineering, IPv6, peering and routing security in current academic courses.

The proposed system of credentialing received very positive feedback both from a technical and management perspective. There were different opinions on what the correct charging model should be, though most respondents agreed there should be some cost. Various suggestions included that the first level of each credential course should be free, that members should receive all credential courses of free, or that new members should be obliged to take a mandatory credential courses in the RIPE Database to help improve data accuracy.

1.4 IPv6

Respondents mostly wanted the RIPE NCC to provide IPv6 training (particularly IPv6 and BGP routing, and IPv6 and security). There were frequent comments about how IPv6 deployment is stalling due to lack of customer demand and that operators, cloud providers, regulators and governments could benefit from the RIPE NCC's expertise in IPv6 deployment, security and capacity building. There was also feedback that the RIPE NCC should encourage IPv6 usage by actively encouraging governments, vendors and large ISPs to proceed with deployment.

4. Service delivery in light of expanded member base

4.1 RIPE Database/LIR Portal

The RIPE Database and LIR Portal received positive feedback with many respondents noting that both had improved. Some respondents noted that for new users the learning curve for these tools is initially quite steep. There were suggestions for step-by-step guides for the most important tasks (with diagrams, screenshots or videos) as well as some suggestions for improvements to functionality.

4.2 New members

There were some comments that it can be hard for new members to get an overview of the services that the RIPE NCC provides and what they have to do as a new member. Several respondents suggested that the RIPE NCC could try different ways to engage with new members, to break down what can be an overwhelming amount of information and to make the distinction between the RIPE NCC and RIPE much easier to understand.

5. Membership analysis and ensuring specific sector wishes are catered for

There was a lot of positive feedback on the RIPE NCC's work in building communities and becoming more inclusive (local meetings, member lunches, supporting NOGs, capacity building and diversity work). The RIPE NCC's support for NOGs received excellent feedback, with some suggestions for the RIPE NCC to support new NOGs in specific areas, to provide a general Best Current Practice document and to help with speaker development and IT infrastructure.

Regional offices in Moscow and Dubai were much appreciated. There was some feedback that key RIPE NCC/RIPE policy documents should be translated into local languages spoken by a large proportion of the membership and that smaller operators should be supported.

Law Enforcement Agencies (LEAs) were positive about the RIPE NCC's outreach efforts and asked for more basic and advanced training modules focused on their needs. They were positive about their involvement in the RIPE community and in the Policy Development Process (PDP).

Respondents from the financial sector suggested that the RIPE NCC should aim tools at Enterprises that might need more guidance than technically-literate ISPs.

It was noted that the RIPE NCC could reach out to the gaming industry as they share many similar issues to the RIPE community but are not currently involved.

Respondents also noted that lack of high-quality university courses related network engineering and suggested that the RIPE NCC make stronger connections with academia and bring RIPE NCC training modules into university courses.

6. The importance of security and the RIPE NCC's role
Respondents agreed that the RIPE NCC should be involved in ensuring the security of IP addresses and routing. There are some encouraging signs of RPKI deployment with RPKI already implemented or on the roadmap of hardware and software router vendors and the RIPE NCC having the most Route Origin Authorisations (ROAs) of any region. However, it is clear that the RIPE NCC needs to do more in terms of RPKI communication and training. Many respondents were aware of RPKI but unclear of the current benefits of deployment and the possible consequences for their networks. There were repeated comments that the RPKI documentation needed to be clearer with a short summary of benefits of deployment, step-by-step instructions and troubleshooting support. There were also repeated requests for RPKI and BGP security training as well as suggestions that the RIPE NCC should work together with hardware and software vendors to promote RPKI, and should follow up on operators' experience of RPKI deployment.

7. The RIPE NCC as a unique source of neutral data
RIPEstat and RIPE Atlas are both widely used and appreciated, but most respondents were not aware that the RIPE NCC provides APIs for these tools.

7.1 RIPEstat
RIPEstat was mostly very well regarded and only received minor comments regarding BGPlay being hard to find, slow and sometimes crashing.

RIPE Atlas
There was lots of interest in RIPE Atlas with many respondents hosting RIPE Atlas probes and providing enthusiastic feedback about the platform. However, there was consistent feedback that users did not know how to start making measurements and that the documentation should be simplified to provide a quick start guide for targeted groups (e.g. operators, researchers and Enterprises). There were also repeated requests for a review of the credit system so that credits could be made available for research or purchase by organisations that wanted to use Atlas for operational monitoring. Many respondents indicated they would use RIPE Atlas significantly more if the credit system was changed. It was also noted that if you want to make a series of measurements (especially when working in research) it is difficult to predict how many credits the measurements will cost. Some respondents asked for improvements to the front-end interface and suggested some form of dashboard and improved presentation of measurement results. The introduction of virtual anchors was seen as a good development. Some respondents noted that certain probes had hardware problems.

8. Trust, transparency, inclusiveness and engagement
Respondents from all sectors were generally positive about the RIPE NCC and thought that they received good value of money for the membership fee. The RIPE NCC is generally seen as being transparent and encouraging inclusiveness and engagement.

8.1 RIPE Meetings
RIPE Meetings received positive feedback especially the quality of the presentations and overall programme. There were some comments about the need to encourage greater diversity of participation through, for example, fellowship schemes, mentoring and restructuring the programme to make it more accessible to newcomers.

8.2 RIPE Policy Development Process (PDP)

Some respondents noted that the threshold for entry into the PDP is too high with an overwhelming amount of emails and a complex process. There were comments that this meant many people didn't participate in the PDP who might otherwise engage. There were requests for more efficient mechanisms for following policy discussions and for initiating policy proposals.

8.3 Inclusiveness

There was a lot of positive feedback on RIPE NCC's work in building communities and becoming more inclusive (local meetings, member lunches, and diversity work across industry sectors, regions and gender).

Several respondents suggested that the RIPE NCC should promote inclusiveness by providing more translations in local languages (key policies, PDP text and voting details for Executive Board elections).

8.4 Website/Communication

Some respondents found the website hard to navigate with no clear overview of RIPE NCC services, an overwhelming amount of information on the homepage and no clear distinction between the activities of the RIPE NCC and the RIPE community. There were also comments that members received too many emails and that, because of this, sometimes important information such as service updates or billing requests can get missed.

8.5 External relations

Respondents were largely positive about the RIPE NCC's External Relations activities. There were repeated comments that an important part of the RIPE NCC's role was performing outreach activities to governments and helping them to make informed public policy decisions. In several regions, there were comments that the RIPE NCC had a role to play in supporting IPv6 deployment by working together with governments.

Appendix: Participants by country

The consultations were conducted during the RIPE 77 Meeting, RIPE NCC Member lunches and via remote participation. In total there were 69 participants in these consultations from the following countries in the RIPE NCC service region:

Armenia
Belgium
Bosnia
Denmark
France
Germany
Greece
Ireland
Montenegro
Netherlands
Oman
Poland
Portugal
Russia
Spain
Ukraine
United Kingdom
Yemen

About Survey Matters

Survey Matters specialise in providing services to the Member-based and not for profit sector.

Survey Matters have helped a wide range of organisations understand their value proposition - what is important to their members, how the organisation can help and how satisfied they are with their performance.

We also work with the sector to generate and build industry data and knowledge to support advocacy, promotion, industry development and marketing activities.

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ACKNOWLEDGEMENTS

In conclusion, we would like to take the opportunity to thank all respondents for participating in the 2019 Survey. Your input is extremely valuable.

The robust sample size of 4,161 provides the RIPE NCC with clear direction on the preferences and opinions of the Internet community.

We trust this information forms a solid basis upon which the RIPE NCC can craft their strategic plans and service delivery for the coming three years.

If there are any questions about this report, please do not hesitate to contact Survey Matters.