2020 APNIC Survey Report

September 2020

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Introduction and Methodology

APNIC values the feedback and views of Members and Stakeholders, with results of the biennial Survey integral to its future planning and continuous improvement processes.

The APNIC survey process comprises a series of consultations across the region, which this year were done as individual interviews via video conference with interested respondents. This was followed by an online survey promoted throughout the region. The survey is open for any interested Member or Stakeholder to complete. The APNIC Survey is run every two years and is in its eleventh iteration.

The APNIC 2020 Survey was conducted between the 13 and the 31 July 2020 to gain feedback from APNIC Members and other Stakeholders (Members of a National Internet Registry (NIR), or others involved in the Internet community) about APNIC services, the challenges they face and where APNIC can assist. The Survey forms an integral part of the strategic planning process and helps the APNIC Executive Council (EC) and Secretariat to understand the needs and wishes of the community. The results are used to guide decisions on future priorities and developments, and inform APNIC strategic planning.

The 2020 Survey was again conducted by Survey Matters, a research agency specialising in research for Member-based organisations. As with previous surveys, the APNIC EC commissioned and approved the survey, and engaged Survey Matters to ensure the anonymity of responses.

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

This report provides the full feedback from the online survey. Where appropriate, it also draws on feedback from interviews conducted by Survey Matters during March and April 2020.

Response Rates and Sample

Following a comprehensive communication and survey distribution program, 1,659 responses were received and, after data cleansing, 1,624 responses remained. The sample size provides 95% confidence that results are within +/- 3% of presented figures.

Of the responses received, 73% were received from APNIC Members or Account Holders. The remaining 27% were from Members of NIRs within the APNIC region or other Stakeholders, namely consumers of APNIC services who are not formally APNIC Members.

Most responses (96%) were from the Asia Pacific economies served by APNIC. Consistent with 2018, only 4% were from outside the Asia Pacific region.

Sub-region sample composition has changed in 2020, with responses from East Asia falling from 27% in 2018 to 16% this year. This fall is largely driven by fewer responses from China.

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.

Interviews

The survey instrument (online survey form) that forms the basis of this 2020 APNIC Survey Report was developed following a series of interviews conducted in March and April 2020.

Conducting qualitative research prior to undertaking an online survey is best practice in research of this kind, as it gathers perspectives directly from randomly selected Members that can be tested across the wider Member and Stakeholder base through the online survey instrument.

While in prior years the qualitative component of the research took the form of focus groups held across the region, in 2020 discussions were conducted as individual interviews, either online via video conference or telephone. This allowed the project to canvass opinions from respondents from a larger number of economies than in previous years. Up from ten in 2018, participants from 24 economies participated in the interview process in 2020.

Interviews were conducted with Members and stakeholders in 24 economies. A total of 41 interviews were conducted with participants in the locations below:

Australia	Mongolia
Bangladesh	Myanmar
Bhutan	New Caledonia
Brunei	Pakistan
Cambodia	Papua New Guinea
China	Philippines
Hong Kong	Solomon Islands
India	Taiwan
Indonesia	Thailand
Japan	Timor Leste
Korea	Vanuatu
Malaysia	Viet Nam

The full Interview Report is available at https://www.apnic.net/community/participate/member-feedback. Where relevant, quotes and themes from the interviews are referenced in this report, as they provide depth of understanding to the quantitative results.

Online Survey

The quantitative survey was designed by Survey Matters. It was based on output from the interviews but also included consultation with the APNIC EC and Secretariat.

As in 2018, the survey instrument comprised two separate surveys; one designed for Members and Account Holders of APNIC, the other for Members of an NIR or other interested Stakeholders.

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 those conducted in 2014, 2016 and 2018.

The 2020 survey questionnaire was designed primarily as a quantitative instrument, but respondents were also given opportunities to provide feedback in their own words (and in their own language if desired). The addition of these are used throughout this report to add depth to the statistical results.

Translation

The survey questionnaire was translated into 14 languages in 2020, up from eight in 2018. The languages selected for translation were Bengali (Bangladesh), Chinese (Simplified and Traditional), Indonesian, Hindi (India), Japanese, Korean, Mongolian, Burmese (Myanmar), Nepali, Tagalog (Philippines) Thai, Urdu (Pakistan) and Vietnamese. These languages were chosen by the APNIC Secretariat based on several factors, including level of perceived English proficiency, membership size, and level of engagement (or lack of, in some cases) with previous surveys.

A total of 568 surveys were completed in a language other than English, up from 389 in 2018. Reflecting the inclusion of seven additional languages, this represents 35% of all surveys completed and is up from 31% in 2018. Non-English verbatim feedback was translated back to English using Google translate, with a verification of translations undertaken by language specialists within APNIC.

A breakdown of non-English language survey completions by economy is provided on page 14.

Communication and Distribution

The survey was designed as an anonymous online instrument (hosted by Survey Matters), and promotion of the survey was done by the APNIC Secretariat. Several prizes were offered throughout the communication schedule to encourage responses at different stages of the survey period.

Data Cleansing

At the conclusion of the online survey, Survey Matters undertook data cleansing as per the standard protocols for market research. A total of 1,659 responses were reviewed and after interrogation 35 were removed as they were either generally unreliable or found to be multiple responses from the same respondent.

The method used to clean the data was as follows:

- Removal of records where respondents answered too quickly or selected the same rating or score regardless of the question being asked throughout the survey.

- Removal of multiple responses where the information regarding the prize draw was the same.

Survey Analysis

When analysing the survey data, results have been cross tabulated by respondents' relationship with APNIC (Member or Stakeholder), APNIC sub-region (East Asia, Oceania, South East Asia and South Asia) and Classification of Economies (Developed, Developing and Least Developed Economies (LDEs) based on the UN classifications referenced in the Appendix.

Differences in the opinions and behaviours of respondents based on their APNIC relationship, sub-region and economy classification are presented throughout the report and highlighted where the findings are significant.

The results to survey questions are displayed as either a mean score (always out of a maximum score of seven) or as a percentage of respondents who selected a positive option. Where possible and appropriate, a full frequency distribution is shown. Comparisons to the 2016 and 2018 Surveys are made where possible.

Where percentage ratings for agreement, satisfaction or importance are referred to throughout the body of the report, these have been classified as follows:

- Scores of 5, 6 or 7 out of 7 are positive (blue)
- Score of 4 out of 7 is neutral (grey)
- Scores of 1, 2 and 3 out of 7 are negative (red)

We have also drawn on the qualitative comments and have referenced the feedback provided in the interviews conducted when reaching many of our conclusions. In many instances, the quantitative findings are used to validate the issues raised in the interviews. In others, the free text or interview feedback provides further insight into the quantitative findings.

Executive summary

Overall satisfaction with the quality and value of APNIC services and Membership remains high, with a vast majority providing positive ratings.

Consistent with 2018 and 2016, respondents in South Asia are most satisfied with the overall quality and value of APNIC services and Membership. Those from the least developed economies (LDEs) also report higher satisfaction than their more developed counterparts. While remaining high, respondents from Oceania provided significantly lower ratings across quality and value dimensions.

APNIC Service Usage

Engagement with APNIC was also higher. Up from 67% in 2018, 71% of respondents had at least one interaction with APNIC over the past two years.

A third of respondents had over five interactions with APNIC. While survey respondents reported usage of new membership accounts, the website and APNIC Blog was lower than recorded in 2018, more respondents have used MyAPNIC, RPKI, IP address transfer services and attended APNIC training.

Satisfaction with individual APNIC services also remains high. Ratings for nearly all services improved in 2020. As in previous Survey waves, respondents are most satisfied with their personal interactions with APNIC, such as meetings with an APNIC representative and the support provided by the APNIC Helpdesk.

Satisfaction with APNIC training also rose. Up 3% from 2018, 97% of respondents were satisfied with their experience of APNIC training. While use and interaction with the APNIC Foundation is relatively low among respondents, satisfaction is also very high at 96%.

Satisfaction with APNIC's core services of IP address applications, allocations and transfers, the whois database, reverse DNS and Technical Assistance were also consistent or slightly higher than in 2018. In particular, positive ratings for IPv4 address transfers increased 6% to 92%.

Endorsement

Members and Stakeholders continue to hold APNIC in high esteem.

Respondents also speak well of APNIC, with two thirds (66%) speaking highly about the organisation. Those who speak highly about APNIC without being asked has risen from 10% in 2016, when the question was first included in the Survey, to 12% in 2018 and 20% this year.

Also pleasing, fewer respondents indicate they are neutral about APNIC, with many who were previously ambivalent now reporting they speak about APNIC positively.

Strategic challenges

The Internet community faces a variety of strategic challenges with cost control, regulatory compliance, security risk and finding skilled employees the biggest issues for those in executive positions.

This year a section on the strategic challenges facing organisations was included in the Survey, to better understand the issues facing those in executive or managerial positions.

From a strategic perspective, four main challenges faced by executives emerged. Cost control of hardware, software and network investment is ranked as the main issue by 17% of respondents.

Regulatory compliance (16%), security risks affecting business and hiring and retaining skilled employees (both 15%) round out the four biggest issues.

While the free text comments provided about how APNIC can best assist with challenges largely focussed on operational aspects like training, there were also suggestions that APNIC could facilitate "education activities for governments and those who make policies and regulations". Others mentioned that helping organisations make buying decisions "not based on vendor propaganda … have reliable trusted sources to check beforehand …" would aid in cost control.

Operational challenges

Despite a wide variety of issues emerging from the individual interviews conducted prior to the Survey, network security is still the main challenge.

Nearly a quarter (23%) of respondents rank network security as the biggest issue faced by their organisation. Handling security threats is a challenge for organisations across the region, with at least one in five respondents in all APNIC sub-regions ranking it as the number one issue they face.

Interestingly, while 15% of Executives chose security risks as their main challenge, it was not ranked as highly as their operational counterparts indicate. Cost and compliance ranked higher than security for Executives, and it appears there may be a disconnect between employers and employees regarding network security threats.

Reflecting the strategic focus on cost control, cost management of systems, networks and security is the main challenge for 18% of respondents. In particular, respondents from Oceania are concerned about the costs related to systems, networks and security, with 26% ranking it their number one challenge.

Overwhelmingly, respondents believe that the best form of assistance APNIC can offer to help with the challenges they face is education and training. While acknowledging that APNIC already offers training in many forms and across many topics, respondents want more, with comments such as "more training & workshops", "more training content" and "more local or online training for basic and advanced users" prevalent in the free text comments.

Network Security

DDoS attacks, phishing, spam, ransomware and malware remain the biggest network security issues faced.

Forty-one percent (41%) of respondents indicated that DDoS attacks are one of the main network security threats their organisation faces.

Two in five (40%) respondents indicated that phishing, spam, ransomware and malware are problematic for their organisation, with those from Oceania (49%) more likely than other regions to identify these as issues for them.

Consistent with feedback provided in interviews conducted with Members prior to the Survey, lack of awareness of security issues amongst employees is also a concern, with three in 10 (30%) indicating this is an issue for them when managing network security.

As is common across the Survey, training, collaboration and sharing of knowledge is the best way respondents believe APNIC can assist the Internet community deal with ongoing security issues.

IPv4 Scarcity

A lack of available IPv4 addresses continues to be a challenge for organisations.

With 13% ranking it as their biggest challenge, coping with IPv4 shortages remains an issue – although fewer respondents rank it amongst their top three challenges and feedback from the interviews suggests it is becoming less important. In particular, at only 8%, those in Oceania are less concerned about IPv4 shortages than respondents in other sub-regions.

As in 2018, deploying IPv6 (34%) and the cost of buying IPv4 addresses (27%) are the biggest issues arising from the shortage of IPv4. Over a quarter (26%) also report challenges in finding available IPv4 addresses, particularly in East Asia, South East Asia and South Asia.

Of the actions that APNIC could take to assist with IPv4 shortages, two in five respondents (40%) favour APNIC reclaiming unused addresses which have no existing holder. A further 39% want APNIC to analyse and identify unused IPv4 addresses, presumably to enable reclamation of these.

Deploying IPv6

Reported full deployment of IPv6 has grown from 15% in 2018 to 20% this year, with Members in East Asia (36%) significantly more likely to have fully deployed IPv6 than those in other sub-regions.

Nearly a quarter (23%) have deployed IPv6 in their core networks and 32% have a deployment plan. Pleasingly, the proportion who report that they have no deployment plan in place has dropped from 35% in 2016 to 25% this year.

A lack of demand from customers remains the biggest barrier to IPv6 deployment outside core networks. Over half of respondents (53%) cite that lack of customer demand prevents deployment; this rises to over three in five Members in South East Asia and Oceania.

Lack of skills and knowledge (31%) and customer equipment (CPE) that does not support IPv6 (26%) are also barriers to full IPv6 deployment.

Training

Training emerged as one of the main themes of the Survey. Confirming that training is a highly valued service, attendance at APNIC training was significantly higher in 2020.

Over two in five (41%) respondents attended some form of APNIC training in the past two years, up from 27% in 2018.

Almost a quarter (23%) of respondents attended face-to-face training or online, self-paced training on APNIC Academy, while 20% have undertaken on-line live training on APNIC Academy or other platforms.

Respondents in South Asia and in LDEs are significantly more likely to report they have used the online, self-paced training on APNIC Academy than other sub-regions or economies (both 29%).

Those in South East Asia and Oceania are most likely to have participated in APNIC training activities. At 55%, respondents in East Asia are more likely to have not attended any form of training in the past two years.

Online training activities offer the most value, with online Virtual Labs and on-line self-paced training preferred by 54% and 45% of respondents respectively. A further 42% value full training certification.

Over a quarter would value training and training materials delivered in their local language, with those in East Asia significantly more likely to call for local language formats (40% and 46% respectively).

The most frequently mentioned topics for potential APNIC training were IPv6 deployment and network and cyber security. There were also frequent requests for training in BGP, RPKI, ROA and ROV, as well as SDN and SD-WAN.

RPKI, ROA and ROV Awareness and Deployment

Awareness and use of RPKI as a means to improve routing security has increased substantially, up from 10% in 2018 to 27% in 2020.

Over a third (38%) of respondents have either deployed RPKI or have plans to implement it. Satisfaction with APNIC RPKI has also surged, up from 85% in 2016, to 89% in 2018 and 94% in 2020.

Use of ROA is also relatively high, with over a quarter (26%) having already deployed ROA and another 13% reporting plans to implement the technology.

Awareness of ROV is lower, with 50% citing no awareness of the technology. Nine percent (9%) have implemented ROV in their networks, and 15% have plans to deploy.

To encourage implementation of RPKI, ROA and ROV, respondents indicated that online training (67%) and Technical Assistance (37%) are the best forms of support APNIC can provide. Case studies of successful implementation and face-to-face training (27% and 20% respectively) would also be helpful.

Dealing with Diversity

The Survey continues to highlight the differences in the needs and preferences of stakeholders in different regions and economies.

As was apparent in 2018, respondents in LDEs appear to rely more heavily on APNIC, with those in LDEs more frequent users of APNIC services such as MyAPNIC, the APNIC Helpdesk, training, conferences and events. They are also more likely to rate their APNIC Membership and the services they engage with favourably. As expected, however, cost is a bigger barrier to participation in community activities amongst this group.

Regional differences are also evident. Satisfaction with the quality and value of APNIC services and Membership is significantly higher amongst respondents from South East Asia. They also rate IP address application and allocation processes, and individual services such as MyAPNIC, the APNIC website and whois database, more favourably than those in other regions. Broadly speaking, respondents from East Asia and Oceania indicate slightly lower satisfaction.

Barriers to participation also vary across regional lines. Cost is the factor most likely to prevent engagement with APNIC activities amongst respondents from South East Asia. Conversely, respondents in East Asia are less likely to cite cost as a barrier to participation in APNIC activities, with language barriers more likely to prevent them engaging. Lack of time is the biggest issue for respondents from Oceania.

Reflecting this diversity, demand for local opportunities and language support was apparent. When asked how APNIC could encourage greater participation in community activities, over a third (36%) suggested greater language support. Approximately a quarter also suggested that training and materials delivered in their local language would be of value to their organisation. Many free text comments also expressed a desire for training, information and materials in local languages.

To meet this demand, in 2018 APNIC offered respondents the opportunity to complete the Survey in multiple languages, and in 2020 the number of languages was increased. Up from eight in 2018, the 2020 Survey was translated into 15 languages and 35% of responses were provided in a language other than English.

Conclusion

Interview feedback suggests that APNIC is very well regarded, and although there are always suggestions for improvement, APNIC is widely respected.

Survey feedback confirms this, with over nine in 10 (92%) respondents agreeing that APNIC enjoys the respect of the community. Notably, 43% of all respondents strongly agreed that APNIC is respected in the community. A majority of respondents (89%) are also satisfied that APNIC is sufficiently open and transparent in its activities.

APNIC's position as a neutral community participant, combined with the regard in which it is widely held, puts APNIC in a unique position to provide value to the Internet community. Reflecting this, the Survey continues to elicit demand from Survey participants for APNIC to support Members and other Stakeholders through training, knowledge building, collaboration and sharing of information, case studies and experiences.

Key findings

Favourable endorsement of APNIC continues to rise

Two thirds (66%) of respondents speak highly of APNIC, up from 56% in 2018 and 41% in 2016.

Further, those who previously indicated ambivalence, now speak positively about APNIC. Very few speak negatively about the organisation.

More respondents have attended APNIC training

Attendance at all forms of APNIC training has risen from 27% of Survey respondents in 2018 to 41% this year. Satisfaction with training, which was already high, has risen to 97%.

Online training activities offer the most value, with online Virtual Labs (54%) and online, self-paced training (45%) preferred by respondents.

Awareness and adoption of RPKI has improved

Respondents' use of RPKI services has increased from 10% in 2018 to 27% in 2020. Seven in 10 respondents were aware of RPKI, and 22% have already deployed it.

Satisfaction with RPKI services is up 5%, with 94% providing a positive satisfaction rating.

Key findings

IPv6 Uptake

Reported full deployment of IPv6, although still low, has risen to one in five (20%) respondent organisations. This is up from 15% in 2016 and 2018.

At 36%, organisations in East Asia are significantly more likely to report they have IPv6 fully deployed than organisations in other sub-regions.

Encouraging participation

Over a third (36%) of respondents believe that additional focus on language support would encourage greater participation in APNIC activities.

Other suggestions to boost participation included promotion of activities to build awareness, enhanced remote access capabilities, and financial support.

Assistance with Internet development

Emphasising the diversity of the APNIC community, opinions were divided about where APNIC should focus its efforts in Internet development.

While APNIC Members, LDEs and those in South Asia want a focus on supporting IXPs, NOGs and CDN caches, other Stakeholders, developed and developing economies and those in Oceania would prefer a focus on CERTs.

Sample

Gender

- Male
- Female
- Other
- Prefer not to say

What is your age?

18-24	8%
25-34	36%
35-44	36%
45-54	15%
Over 54	4%
Prefer not to say	2%

Do you have a Disability?

- Yes
- No
- Prefer not to say
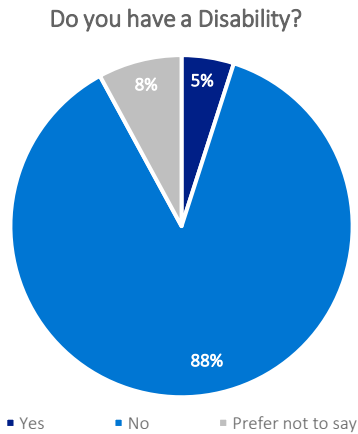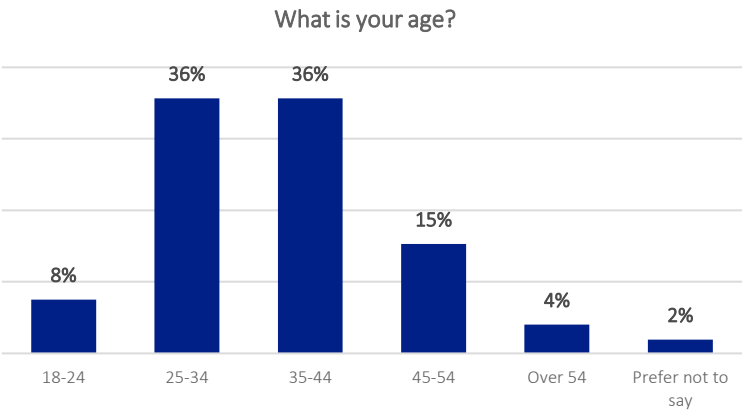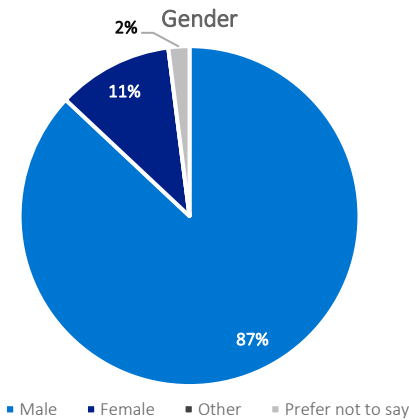
English Proficiency	Count	%
I am fluent in English	683	42%
I can understand most English and have English conversations comfortably	511	31%
I can understand some English and have basic English conversations	351	22%
I understand little English and need assistance	79	5%

Membership Status

- APNIC Member
- Member of NIR in APNIC Region
- Other Stakeholder
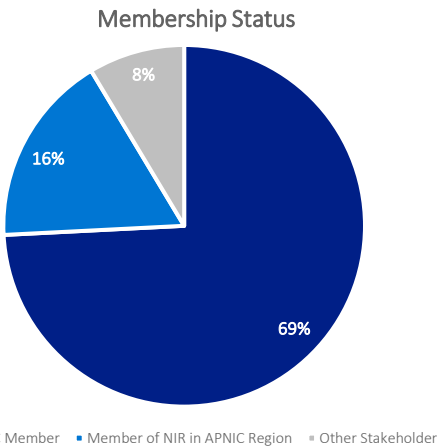
Region	Count	%
East Asia	255	16%
Oceania	296	18%
South East Asia	439	27%
South Asia	562	35%
Non APNIC Region	72	4%

Development Status	Count	%
Least Developed Economy (LDEs)	476	29%
Other (Developed or Developing)	1,148	71%

Code	Name	Economic Classification	2016		2018		2020	
			Count	%	Count	%	Count	%
East Asia								
CN	China	Developing	170	13%	107	9%	68	4%
HK	Hong Kong Special Administrative Region of China	Developing	39	3%	53	4%	25	2%
JP	Japan	Developed	24	2%	63	5%	50	3%
KR	Republic of Korea	Developing	2	0%	11	1%	10	1%
MN	Mongolia	Developing	9	1%	71	6%	50	3%
MO	Macao Special Administrative Region of China	Developing	-	-	2	0%	6	0%
TW	Taiwan	Developing	24	2%	30	2%	46	3%
Sub-total			**268**	**23%**	**337**	**27%**	**255**	**16%**
Oceania								
AS	American Samoa	Developing	1	0%	1	0%	0	0%
AU	Australia	Developed	202	15%	132	11%	136	8%
CK	Cook Islands	Developing	2	0%	1	0%	2	0%
FJ	Fiji	Developing	4	0%	10	1%	23	1%
FM	Micronesia	Developing	1	0%	-	-	0	0%
GU	Guam	Developing	1	0%	1	0%	6	0%
KI	Kiribati	LDE	-	-	1	0%	2	0%
MH	Marshall Islands	Developing	-	-	1	0%	2	0%
MP	Northern Mariana Islands	Developing	1	0%	-	-	0	0%
NC	New Caledonia	Developing	2	0%	6	0%	4	0%
NF	Norfolk Island	Developing	-	-	2	0%	0	0%
NR	Nauru	Developing	1	0%	2	0%	1	0%
NU	Niue	Developing	1	0%	1	0%	0	0%
NZ	New Zealand	Developed	47	4%	42	3%	58	4%
PG	Papua New Guinea	Developing	10	1%	10	1%	30	2%
PW	Palau	Developing	2	0%	1	0%	0	0%
SB	Solomon Islands	LDE	1	0%	22	2%	6	0%
TK	Tokelau	Developing	1	0%	1	0%	0	0%
TO	Tonga	Developing	2	0%	7	1%	7	0%
TV	Tuvalu	LDE	1	0%	1	0%	1	0%
VU	Vanuatu	LDE	2	0%	4	0%	5	0%
WF	Wallis & Fortuna Islands	Developing	-	-	1	0%	0	0%
WS	Samoa	Developing	1	0%	4	0%	13	1%
Sub-total			**283**	**24%**	**251**	**20%**	**296**	**17%**
SE Asia								
BN	Brunei Darussalam	Developing	1	0%	3	0%	5	0%
ID	Indonesia	Developing	49	4%	51	4%	74	5%
KH	Cambodia	LDE	15	1%	18	1%	18	1%
LA	Lao People's Democratic Republic	LDE	4	0%	4	0%	4	0%
MM	Myanmar	LDE	11	1%	24	2%	111	7%
MY	Malaysia	Developing	39	3%	36	3%	35	2%
PH	Philippines	Developing	43	3%	48	4%	114	7%
SG	Singapore	Developing	27	2%	27	2%	20	1%
TH	Thailand	Developing	18	1%	41	3%	39	2%
TL	Timor-Leste	LDE	2	0%	2	0%	4	0%
VN	Viet Nam	Developing	48	4%	5	0%	15	1%
Sub-total			**257**	**22%**	**259**	**21%**	**439**	**27%**

Code	Name	Economic Classification	2016		2018		2020	
			Count	%	Count	%	Count	%
South Asia								
AF	Afghanistan	LDE	5	0%	8	1%	9	1%
BD	Bangladesh	LDE	94	7%	138	11%	298	18%
BT	Bhutan	LDE	7	1%	7	1%	19	1%
IN	India	Developing	142	11%	82	7%	109	7%
IO	British Indian Ocean Territory	Developing	-	-	-	-	0	0%
LK	Sri Lanka	Developing	10	1%	16	1%	28	2%
MV	Maldives	Developing	1	0%	4	0%	3	0%
NP	Nepal	LDE	26	2%	65	5%	60	4%
PK	Pakistan	Developing	36	3%	36	3%	36	2%
Sub-total			**321**	**27%**	**356**	**29%**	**562**	**35%**
Non APNIC Region								
	Algeria				1	0%	1	0%
	Asia Pacific Regional						1	0%
	Benin						2	0%
	Canada						3	0%
	Croatia						1	0%
	Democratic Republic of Congo						2	0%
	Denmark						2	0%
	Egypt						1	0%
	Ethiopia						1	0%
	France						1	0%
	Germany		1	0%	1	0%	6	0%
	Haiti						1	0%
	Ireland		-	-			1	0%
	Israel		2	0%	2	0%	1	0%
	Italy		-	-	1	0%	1	0%
	Mexico						3	0%
	Netherlands		6	0%	2	0%	3	0%
	Nicaragua						1	0%
	Niger						1	0%
	Nigeria		1	0%	1	0%	1	0%
	Oman						1	0%
	Panama						1	0%
	Poland						1	0%
	Saudi Arabia						2	0%
	Slovenia		-	-	1	0%	1	0%
	Sweden						1	0%
	United Arab Emirates						1	0%
	United Kingdom						3	0%
	United States of America		16	1%	22	2%	26	2%
	Zambia						1	0%
Subtotal			***46**	**4%**	***38**	***3%**	**72**	**4%**
Total			**1,175**	**100%**	**1,241**	**100%**	**1,624**	**100%**

* 2016 and 2018 Response subtotal for Non-APNIC Region includes responses from economies not listed as no responses were received in 2020

Translated Surveys Completed		2018	2020
Code	**Language**		
BD	Bangladesh (Bengali)	41	157
CN	Chinese Simplified	101	75
CN	Chinese Traditional	56	59
ID	Indonesian	43	62
IN	Indian (Hindi)		3
JP	Japanese	60	45
KR	Korean	9	8
MN	Mongolian	49	39
MY	Malaysian		4
MM	Myanmar (Burmese)		52
NP	Nepali		10
PH	Philippines (Tagalog)		7
TH	Thai	30	29
PK	Urdu		4
VN	Vietnamese		14
Total		**389**	**568**

Organisation Type	2016	2018	2020
Sample Size	**1,169**	**1,241**	**1,624**
Internet Service Provider (ISP)	32%	34%	34%
Academic/Educational/Research	9%	11%	15%
Telecommunications / Mobile Operator	11%	13%	11%
Other	7%	7%	7%
Government/Regulator/Municipality	5%	6%	6%
Hosting / Data Centre	11%	7%	5%
Banking/Financial	6%	5%	4%
Enterprise/Manufacturing/Retail	3%	3%	4%
Non-profit/NGO/Internet community	4%	4%	3%
Software Vendor	3%	3%	3%
Media / Entertainment	2%	2%	2%
Domain Name Registry / Registrar	2%	1%	1%
NREN/Research network	1%	1%	1%
Infrastructure (transport/hospital)	1%	1%	1%
Internet Exchange Point (IXP)	1%	1%	1%
Hardware Vendor	1%	1%	1%
Industrial (construction, mining, oil)	1%	1%	1%

Position	2020
Sample Size	**1,624**
Network/Systems Operations Engineer/Manager	39%
Network/Systems Planning Engineer/Manager	26%
IT Support	16%
Manager	13%
Academic/Research	11%
CEO/COO/CFO	9%
CTO/CIO	8%
Product/Peering/Interconnect Engineer/Manager	6%
Project Manager	5%
Student	5%
Trainer	4%
Software Engineer	3%
Sales / Marketing	2%
Applications Developer	2%
Other	4%

Detailed Results

Service Usage & Satisfaction

In order to measure service usage and satisfaction, the first section of the Survey asked respondents to indicate how often they had interacted with APNIC over the last two years, which services they had used and how satisfied they were with each of the APNIC products, services and activities they had experienced.

After rating their experience using individual APNIC services, respondents were also asked to rate the overall quality and value of APNIC services and Membership.

Respondents were also asked to indicate if they face any barriers to participation in APNIC activities, and what they believe APNIC can do to encourage greater participation and involvement in community activities.

APNIC contact frequency

Overall, 71% of respondents have used APNIC services or interacted with APNIC over the last two years. This compares to 67% in 2018 and 77% in 2016.
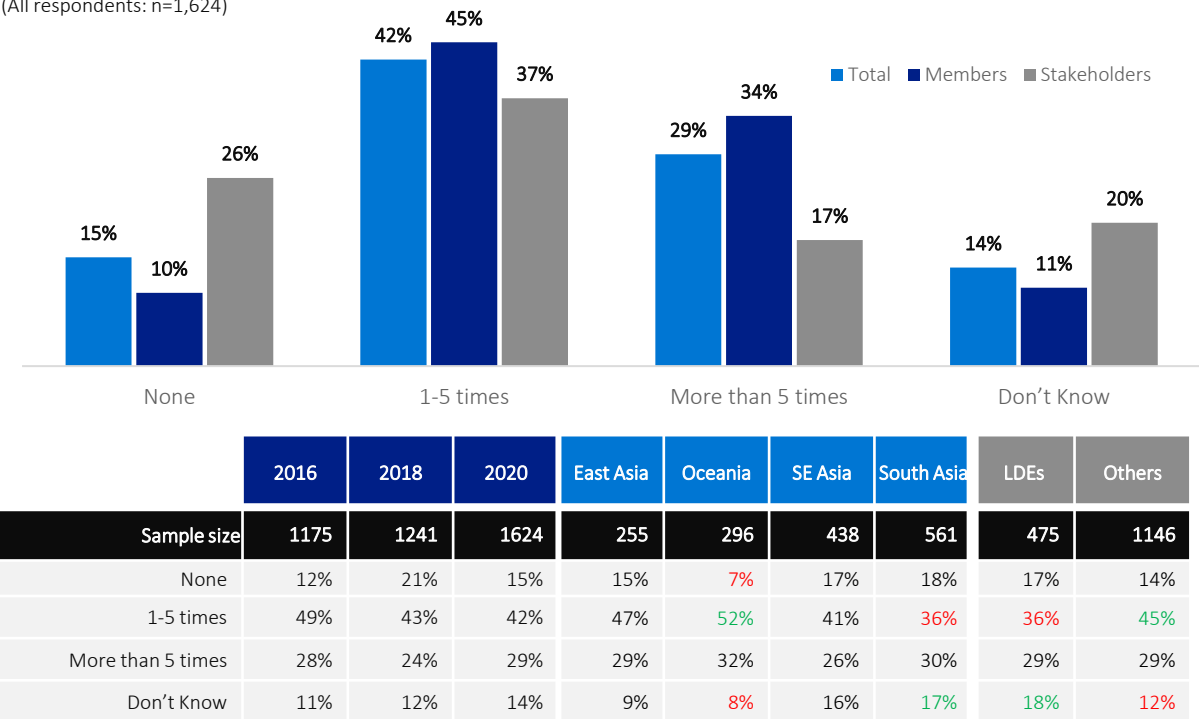
As expected, APNIC Members were significantly more likely to have used APNIC services or contacted APNIC for support than other respondents. Consistent with 2018, nearly eight in 10 (79%) APNIC Members had used an APNIC service or interacted with APNIC in some way at least once over the last two years. This compares to 54% of Members of NIRs or other Stakeholders (up from 41% in 2018).

Suggesting greater engagement with APNIC, 45% of Members and Account Holders had interacted with APNIC between one and five times and 34% had interacted with APNIC more than five times over the last two years (compared to 49% and 28% in 2018 respectively). Only 10% of Members and 26% of Members of NIRs or other Stakeholders had no contact with APNIC over the last two years, down from 13% and 43% respectively in 2018.

Respondents from Oceania were again the most likely to have interacted with APNIC, with 84% indicating they had contact with APNIC at least once (up from 81% in 2018). Survey respondents from South East Asia (67%) and South Asia (66%) were less likely than counterparts from other regions to have engaged with APNIC over the past two years.

Respondents from least developed economies were less likely to have interacted with APNIC, with 65% indicating they have had at least one interaction over the last two years. This compares to 74% of respondents from developed or developing economies.

How many times have you used an APNIC service, contacted or interacted with APNIC in the last 2 years?
(All respondents: n=1,624)

	2016	2018	2020	East Asia	Oceania	SE Asia	South Asia	LDEs	Others
Sample size	1175	1241	1624	255	296	438	561	475	1146
None	12%	21%	15%	15%	7%	17%	18%	17%	14%
1-5 times	49%	43%	42%	47%	52%	41%	36%	36%	45%
More than 5 times	28%	24%	29%	29%	32%	26%	30%	29%	29%
Don't Know	11%	12%	14%	9%	8%	16%	17%	18%	12%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

APNIC service usage

APNIC Services used by respondents over the last 2 years .
(Have used, interacted or contacted APNIC in the last 2 years: Base n=1,378; Total mentions: 4,721)

	2018			2020			Change 2018-2020
	Total	Members	Stakeholders	Total	Members	Stakeholders	
Sample Size	1,241	905	336	1,624	1,120	504	
* MyAPNIC	62%	62%	--	69%	69%	-	7%
APNIC website	76%	77%	70%	60%	56%	70%	-16%
APNIC Whois Database	56%	56%	54%	52%	55%	44%	-4%
* IP address or AS number resource application	41%	41%	-	42%	42%	-	1%
APNIC training (face-to-face or online)	27%	26%	32%	41%	39%	45%	14%
* APNIC helpdesk	38%	38%	-	37%	37%	-	-1%
APNIC Blog	44%	43%	48%	33%	31%	37%	-11%
* Resource Certification (RPKI)	10%	10%	-	27%	27%	-	17%
APNIC Conference, APRICOT or another event	25%	24%	30%	27%	24%	34%	2%
* New membership account	45%	45%	-	25%	25%	-	-20%
Met with APNIC representative	21%	21%	23%	22%	19%	28%	1%
APNIC EC Election	NA	NA	NA	20%	20%	-	-
* APNIC Reverse DNS	20%	20%	-	18%	18%	-	-2%
* IPv4 address transfer (as source or recipient)	13%	13%	-	16%	16%	-	3%
Presentation by APNIC representative	18%	16%	23%	16%	12%	25%	-2%
** Contacted APNIC with a query	16%	-	16%	13%	-	13%	-3%
APNIC Internet Directory	NA	NA	NA	11%	9%	18%	-
APNIC Annual Report	NA	NA	NA	10%	10%		-
Special Interest Group (SIGs)	9%	7%	14%	8%	6%	13%	-1%
APNIC Foundation activities	NA	NA	NA	7%	5%	11%	-
APNIC Policy Development Process	6%	5%	9%	6%	5%	9%	-
APNIC RDAP service	NA	NA	NA	4%	4%	-	-
APNIC NetOX	NA	NA	NA	2%	2%	2%	-
None of these	3%	1%	7%	2%	1%	5%	-1%

* Option not offered to Stakeholder respondents
** Option not offered to Member respondents

Significantly higher / lower than total

MyAPNIC is the most used of APNIC's services. Up 7% from 2018, 69% of respondents have used MyAPNIC. A majority of respondents have also used the whois database over the last two years, with usage broadly consistent with prior surveys at 52%. The proportion of respondents contacting the APNIC Helpdesk was also consistent with 2018, at 37%.

While a majority of respondents report visiting the APNIC website over the last two years, at 60%, this is down from 76% in 2018. Survey respondents readership of the APNIC Blog is also lower, down 11% to 33% of respondents in 2020. It should be noted that this is reported usage by survey respondents, and may not reflect the wider APNIC communities' use of these services.

Positively, engagement with APNIC training increased significantly. Up from just over a quarter of respondents in 2018, over four in 10 (41%) respondents in 2020 had attended training over the last two years. This increased to 45% amongst Members of NIRs and other Stakeholders.

While a similar proportion of respondents applied for IP addresses, at 42%, fewer received (31%) addresses allocations than two years ago (45%). At 16%, IP address transfers were completed by a broadly consistent proportion of respondents. Usage of RPKI increased significantly, from 10% of respondents in 2018 to 27% in 2020. This reflects the feedback in the interviews that were conducted, where many participants spoke of the use of RPKI for routing security.

Conference attendance (24%), meetings with APNIC representatives (19%), participation in SIGs (6%) and policy development activities (5%) were broadly consistent with the levels reported in 2016 and 2018.
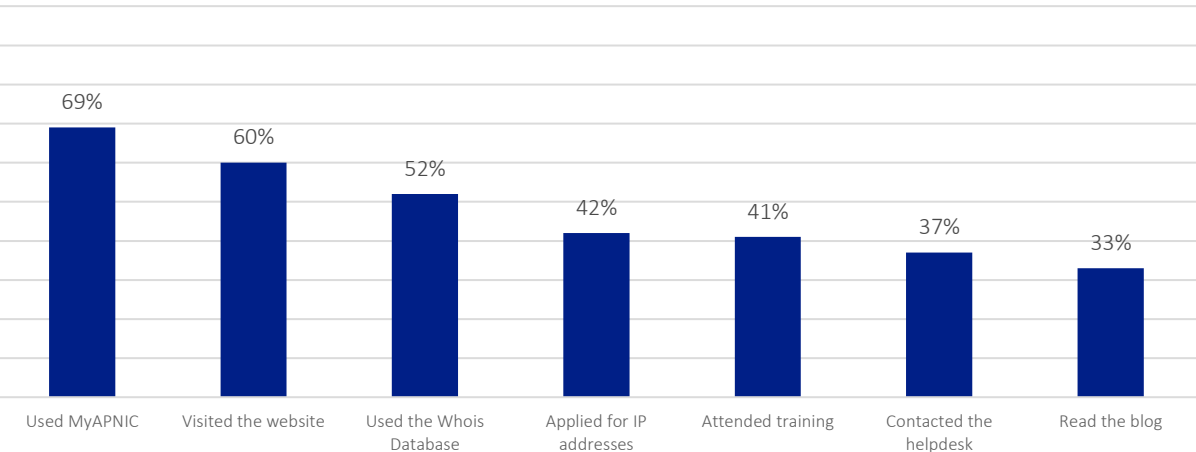
From a sub-regional perspective, APNIC training services are more likely to be attended by respondents in South East Asia and Oceania (48% and 42% respectively). Respondents from South Asia were more likely than those from other regions to have contacted the Helpdesk (46%), used RPKI (32%) or received an IP address allocation (31%), while respondents in East Asia were more likely to have attended Special Interest Group (SIG) meetings and events, and to have read the APNIC Annual Report. MyAPNIC is more widely used in Oceania than other sub-regions.

At 46%, the APNIC Helpdesk is significantly more likely to be used by respondents from LDEs than those from developed or developing economies. Respondents from LDEs were also more likely to have used MyAPNIC (76%), RPKI (36%) and to have participated in the APNIC EC Election (39%) and SIG meetings and events (10%).

Most Used APNIC Services

Over the last two years, which of the following APNIC products, services or initiatives have you used, participated in or accessed:
(Base n=1,624; Total mentions: 4,721)

Used MyAPNIC	Visited the website	Used the Whois Database	Applied for IP addresses	Attended training	Contacted the helpdesk	Read the blog
69%	60%	52%	42%	41%	37%	33%

APNIC services used by respondents over the last 2 years by classification and region for 2020.

(% have used, interacted or contacted APNIC in the last 2 years: Base N=1,378; Total mentions: 4,721)
(See previous page for breakdown by relationship with APNIC)

	Total	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1624	255	296	439	562	476	1148
* MyAPNIC	69%	61%	80%	57%	74%	76%	66%
APNIC website	60%	56%	63%	54%	65%	60%	59%
APNIC Whois database	52%	85%	56%	48%	52%	51%	53%
* IP address or AS number resource application	42%	38%	41%	40%	45%	44%	40%
APNIC training (face-to-face or online)	41%	31%	42%	48%	40%	44%	39%
* APNIC Helpdesk	37%	31%	36%	30%	46%	46%	34%
APNIC Blog	33%	30%	32%	32%	36%	37%	31%
* Resource certification (RPKI)	27%	27%	21%	23%	32%	36%	22%
APNIC Conference, APRICOT or another APNIC event	27%	28%	24%	26%	28%	30%	25%
* New membership account	25%	21%	23%	20%	31%	30%	23%
Met with an APNIC representative	22%	21%	24%	19%	24%	15%	21%
* APNIC's EC election	20%	15%	8%	13%	36%	39%	12%
* APNIC reverse DNS service (as an address holder)	18%	19%	16%	15%	19%	19%	18%
* IPv4 address transfer (as source or recipient)	16%	18%	15%	13%	17%	18%	15%
Presentation by APNIC representative	16%	13%	18%	15%	15%	15%	16%
**Contacted APNIC with a query	13%	8%	23%	11%	13%	10%	14%
APNIC Internet Directory	11%	14%	9%	9%	13%	11%	11%
* APNIC Annual Report	10%	16%	10%	5%	10%	10%	10%
Special Interest Groups (SIGs)	8%	9%	7%	4%	11%	10%	7%
APNIC Foundation activities (of any kind)	7%	5%	8%	7%	7%	6%	7%
APNIC Policy Development Process	6%	27%	5%	4%	8%	8%	5%
* APNIC RDAP service	4%	4%	2%	3%	5%	4%	3%
APNIC NetOX	2%	3%	1%	2%	3%	2%	2%
None of these	2%	1%	1%	4%	2%	3%	2%

* Option not offered to Stakeholder respondents
** Option not offered to Member respondents

Significantly higher / lower than total

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Assessment of APNIC services

Having identified the APNIC services used, the next question asked respondents to rate their satisfaction with those services, on a seven point scale from Very Poor (1) to Excellent (7). Results are presented to show both the top three ratings (percentage rating a 5, 6 or 7) as well as the mean, or average, score. On the following pages, comparisons between different economy type and sub-regions and to ratings from the 2018 Survey (where comparable) are provided.

Overall, satisfaction with individual services is high and for most services, has improved since 2018. Consistent with surveys conducted in 2016 and 2018, respondents are most satisfied with the personal services and support provided by APNIC. Of those respondents who had met personally with an APNIC representative, 97% rated the experience positively, with 63% rating their experience as excellent. A similar proportion (96%) rated APNIC presentations they had attended highly. Ninety-five percent (95%) of respondents are satisfied with the support they received from the APNIC Helpdesk, with half providing an excellent rating.

Positively, APNIC training was the second highest rated service, with 97% rating it as positive – up 3% from 2018. Of respondents providing a positive score, 52% rated APNIC training as excellent. The average rating for training improved from 6.18 to 6.38.

While fewer respondents have experience of APNIC Foundation activities, those who have rate their involvement with the Foundation highly. Ninety-six percent (96%) provided a positive rating of Foundation activities.
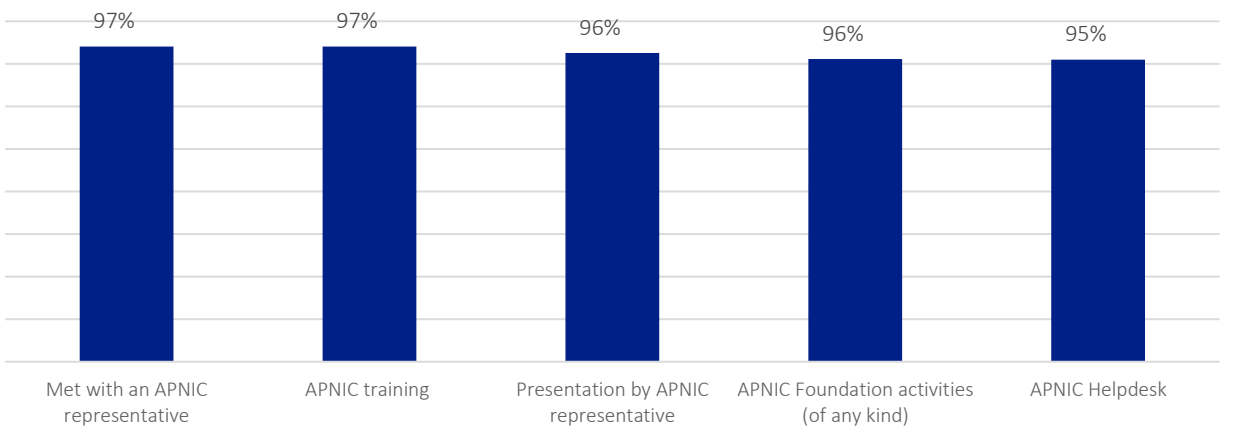
Respondents' rating of their experience of the core APNIC services of IP address applications and allocations remained consistent, while satisfaction with the whois database, MyAPNIC, reverse DNS and Helpdesk assistance improved since 2018. A majority of respondents rated their experience of IP address and AS resource application processes (89%) favourably, and 90% were satisfied with the IP allocation process. Satisfaction with MyAPNIC (93%) and the whois database (93%) remained high, while satisfaction with RPKI improved significantly (up from 89% in 2018 to 94% in 2020).

Satisfaction with the APNIC website and APNIC Blog has improved. Up from 90% in 2018, both services attracted a positive rating of five or above from 93% of respondents in 2020.

Top Rated APNIC Services

Thinking about the APNIC services and activities you have used or undertaken, how would you rate your experience?

(Have Used APNIC Service. Top 3 Box Score Base n=1,379, n=various)

Met with an APNIC representative	APNIC training	Presentation by APNIC representative	APNIC Foundation activities (of any kind)	APNIC Helpdesk
97%	97%	96%	96%	95%

APNIC

Thinking about the APNIC services and activities you have used or undertaken, how would you rate your experience?

(Have Used APNIC Service. Top 3 Box Score (% Above Average, Good, Excellent) (Base n= 1,379, n=various)

	Top 3 Box Satisfaction Scores				Mean Scores			
	2016	2018	2020	Change 2018-2020	2016	2018	2020	Change 2018-2020
Sample	1175	1241	1624		1175	1241	1624	
Met with an APNIC representative	92%	97%	97%	-	6.27	6.43	6.51	+0.08
APNIC training (face-to-face or online)	91%	94%	97%	+3%	6.00	6.18	6.38	+0.20
Presentation by APNIC representative	90%	97%	96%	-1%	5.96	6.31	6.37	+0.06
APNIC Foundation activities (of any kind)	N/A	N/A	96%	-	N/A	N/A	6.24	-
APNIC Helpdesk	91%	93%	95%	+2%	6.19	6.16	6.33	+0.17
Special Interest Groups (SIGs)	84%	97%	94%	-3%	5.67	6.06	6.05	-0.01
APNIC Conference, APRICOT or another APNIC event	92%	98%	94%	-4%	6.05	6.35	6.33	-0.02
Contact with APNIC	80%	90%	94%	+4%	5.83	6.26	6.31	+0.05
Resource certification (RPKI)	85%	89%	94%	+5%	5.85	5.94	6.26	+0.32
APNIC reverse DNS service (as an address holder)	92%	91%	93%	+2%	6.05	6.03	6.13	+0.10
APNIC website	86%	90%	93%	+3%	5.78	5.92	6.16	+0.24
APNIC Whois database	92%	91%	93%	+2%	6.03	6.06	6.16	+0.10
MyAPNIC	90%	92%	93%	+1%	5.9	6.06	6.14	+0.08
APNIC NetOX	N/A	N/A	93%	-	N/A	N/A	6.21	-
APNIC Blog	81%	90%	93%	+3%	5.66	5.98	6.16	+0.18
IPv4 address transfer (as source or recipient)	83%	86%	92%	+6%	5.73	5.78	6.04	+0.26
APNIC Policy Development Process	85%	95%	92%	-3%	5.71	6.13	5.98	-0.15
IP address allocation	92%	89%	90%	+1%	6.11	6.06	6.08	+0.02
IP address or AS number resource application	93%	90%	89%	-1%	6.09	6.05	6.12	+0.07
APNIC Internet Directory	N/A	N/A	89%	-	N/A	N/A	6.06	-
APNIC's EC election	N/A	N/A	89%	-	N/A	N/A	6.03	-
APNIC Annual Report	N/A	N/A	87%	-	N/A	N/A	6.04	-
APNIC RDAP service	N/A	N/A	86%	-	N/A	N/A	6.08	-

Significantly higher / lower than total

In some cases, satisfaction with APNIC services varies between economies based on development status or sub-region.

Respondents from South Asia are significantly more satisfied than counterparts in other regions with the APNIC website (97%), the whois database (98%) and MyAPNIC (98%). Conversely, respondents from East Asia (87%) were the least satisfied with the whois database.

At 96%, the IP address application and allocation processes are more highly rated by respondents from South Asia. Conversely only 79% of Oceanic respondents were satisfied with the IP address application and allocation process, significantly lower than respondents in other regions.

Respondents in LDE's were significantly more likely to rate IP address applications and allocations (97%), the whois database (98%) and MyAPNIC (97%) as positive than respondents in developing or developed economies.

There were few suggestions about how APNIC could improve Member experiences with the services used. However, there were suggestions that "the website needs to improve in a lot of ways" and that "there are lots of good documentation for few things, however, it would be really great to see more improved documentation i.e. RPKI, rDNS etc."

Thinking about the APNIC services and activities you have used or undertaken, how would you rate your experience?

(Have Used APNIC Service. Top 3 Box Score (% Above Average, Good, Excellent) (Base n= 1,379, n=various)

	Total	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Met with an APNIC representative	97%	93%	94%	99%	99%	100%	96%
APNIC training (face-to-face or online	97%	98%	97%	97%	97%	98%	96%
Presentation by APNIC representative	96%	100%	94%	93%	100%	100%	95%
APNIC Foundation activities (of any kind)	96%	WH	91%	96%	100%	100%	94%
APNIC Helpdesk	95%	91%	92%	98%	98%	99%	94%
Special Interest Groups (SIGs)	94%	89%	94%	100%	94%	93%	95%
APNIC Conference, APRICOT or another APNIC event	94%	90%	90%	96%	98%	94%	94%
Contact with APNIC	94%	WH	88%	100%	93%	100%	93%
Resource certification (RPKI)	94%	85%	93%	97%	97%	97%	91%
APNIC reverse DNS service (as an address holder)	93%	90%	91%	100%	96%	97%	92%
APNIC website	93%	89%	94%	92%	97%	97%	92%
APNIC Whois database	93%	87%	89%	95%	98%	98%	91%
MyAPNIC	93%	87%	93%	91%	98%	97%	91%
APNIC NetOX	93%	WH	WH	WH	100%	100%	91%
APNIC Blog	93%	89%	94%	91%	94%	93%	92%
IPv4 address transfer (as source or recipient)	92%	93%	94%	85%	95%	98%	88%
APNIC Policy Development Process	92%	95%	85%	100%	91%	93%	91%
New membership account	90%	87%	81%	90%	96%	96%	87%
IP address or AS number resource application	89%	86%	79%	91%	96%	97%	86%
APNIC Internet Directory	89%	90%	81%	82%	97%	98%	86%
APNIC's EC election	89%	78%	88%	88%	94%	91%	85%
APNIC Annual Report	87%	88%	90%	85%	86%	83%	88%
APNIC RDAP service	86%	WH	WH	WH	100%	100%	78%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total
WH = Withheld, sample less than 10l

Barriers to participation

To inform activities that may encourage greater access to services and activities, the Survey asked respondents about the main barriers to participation in APNIC community activities.

Unsurprisingly, cost and time top the list of barriers to participation. Nearly four in 10 (39%) respondents indicated that cost presents a barrier to participating in APNIC community activities. A similar proportion (34%) suggested a lack of time is a barrier to participation. Geographical constraints hinder greater participation amongst nearly three in 10 (29%) respondents.

Respondents in East Asia are the least likely to suggest that cost is a barrier to participation in APNIC activities, instead being more likely to cite language barriers. At 36%, the proportion indicating that language is a barrier to participation is significantly higher amongst respondents from East Asia than all other APNIC regions.

Conversely, respondents from South Asia and LDEs are the most likely to indicate that cost is a barrier to participation, at 44% and 47% respectively. Lack of time to participate is most commonly cited by Oceanic respondents, at 56%.

Positively, over one in five (21%) respondents do not believe there are any significant barriers to participation in APNIC community activities.

What do you think are the main barriers to participation in APNIC community activities?
(Select up to three (3) responses. Base n= 1,624, n=various)
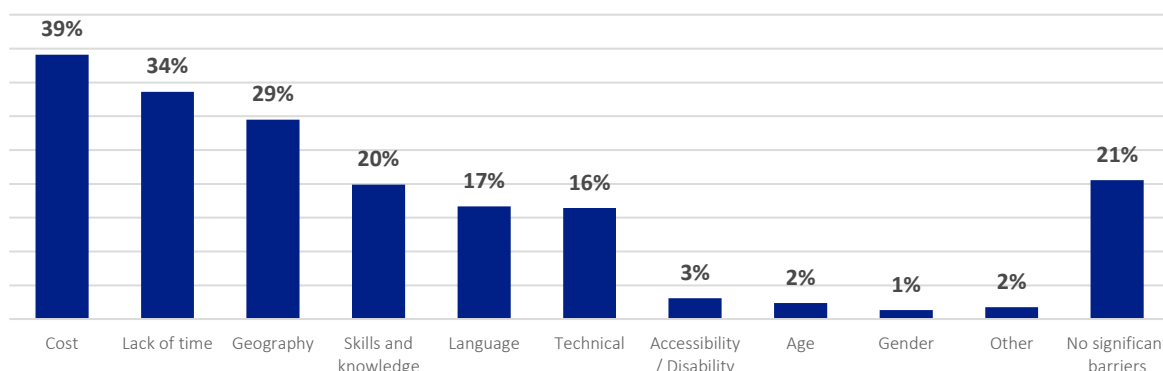
	Total	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample Size	1624	255	296	439	562	476	1148
Cost	39%	31%	39%	40%	44%	47%	36%
Lack of time to participate	34%	25%	56%	31%	27%	24%	38%
Geographical factors	29%	33%	28%	30%	28%	29%	30%
Skills and knowledge-related factors	20%	18%	19%	24%	20%	23%	19%
Language	17%	36%	4%	20%	13%	19%	16%
Technical challenges with remote participation	16%	12%	16%	20%	17%	18%	16%
Accessibility / Disability-related factors	3%	2%	1%	3%	5%	6%	2%
Age	2%	1%	1%	4%	3%	3%	2%
Gender	1%	1%	2%	2%	1%	1%	2%
Other	2%	2%	4%	1%	1%	1%	2%
No significant barriers to participation	21%	20%	18%	18%	23%	19%	21%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

When asked to elaborate on any barriers to participation in APNIC community activities, respondents provided a variety of feedback. Most commonly respondents indicated that cost, language, time and geographic barriers prevented them from participating in APNIC activities. Several mentions were also made of the difficulties young professionals face in attending APNIC events.

- "The cost of participating should be further reduced" South Asia*

- "Not easy for budget approval from our company" East Asia*

- "APNIC technical should support language every country." South East Asia*

- "Conference held at different countries, unable to participate because of location and only selected individuals are always attending training." Oceania

- "Cost of travel specially to far places is a barrier for young people who do not get organization support." South Asia

- "If APNIC could give more chances to youths, more youth will be involved, and they would get a chance to explore and learn more." South Asia

- "Whilst remote participation is possible, it is not as beneficial as attending events in person. For in-person attendance, there are some cost-related factors, which relates to geographical-related factors." Oceania
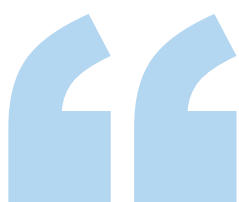
"The timing is not suitable for our region, if recording is shared with those participant who registered for that training, it will be a great service and more beneficial for community members"

South Asia

*Translated
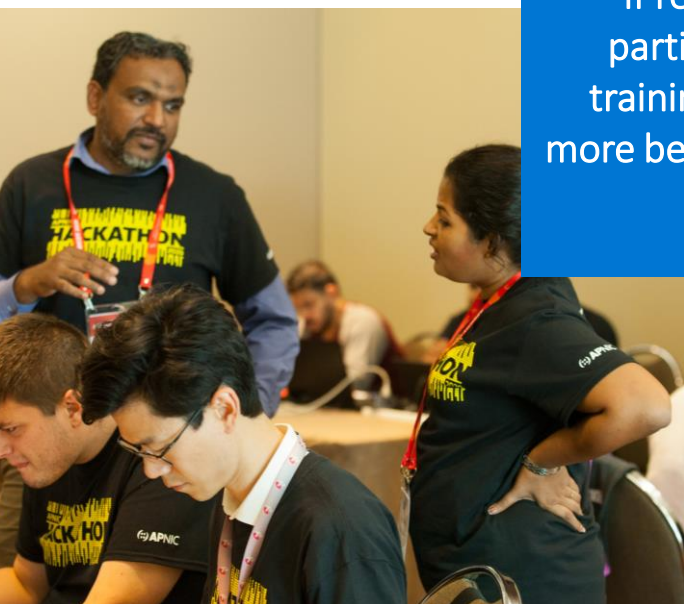
Encouraging greater participation

When asked what APNIC could do to encourage greater diversity of participation in community activities, language support was the most common response. Over a third (36%) of respondents believe that APNIC could place additional focus on language support.

More than a quarter of respondents (26%) believe that APNIC could support greater cultural diversity, while 20% would like to see APNIC foster more involvement amongst young community members. While few respondents (9%) believe APNIC needs to place additional focus on activities that encourage gender diversity, it should be noted that 87% of respondents to the Survey were male.

As with the main barriers to participation, respondents from East Asia and South East Asia are more likely to indicate that language support is required from APNIC (55% and 43% respectively) than the other sub-regions.

Other suggestions to encourage participation were varied, with calls for increased promotion of activities to build awareness, enhanced remote access capabilities, financial support and increased geographical reach to improve access in different regions.

Nearly three in 10 respondents do not believe that APNIC should do anything to support greater diversity of participation in community activities.

Where should APNIC place additional focus to encourage greater diversity of participation in community activities?
(N= 1,624, n=various)
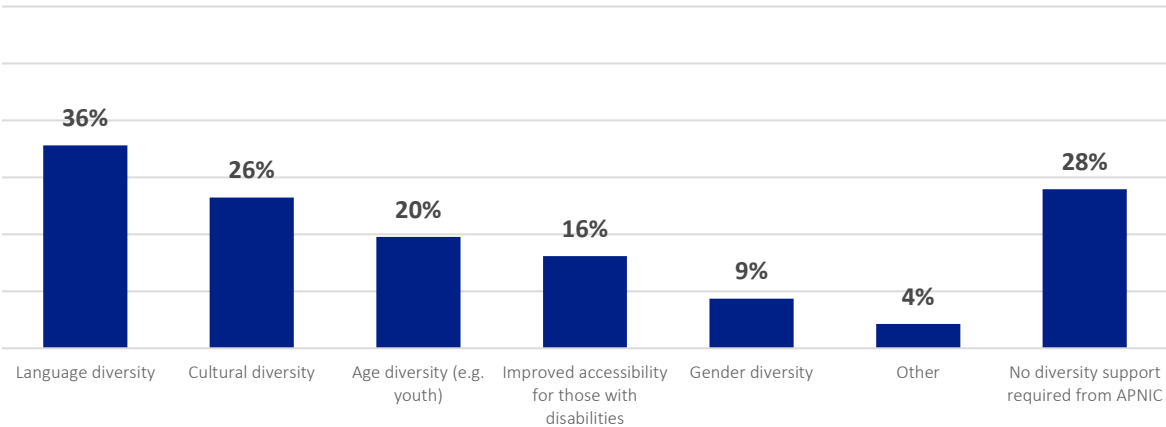
	Total	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample Size	1624	255	296	439	562	476	1148
Language diversity	36%	55%	12%	43%	36%	42%	33%
Cultural diversity	26%	36%	23%	22%	29%	28%	26%
Age diversity	20%	18%	21%	21%	18%	18%	20%
Improved access for those with disabilities	16%	5%	12%	18%	23%	26%	12%
Gender diversity	9%	6%	15%	6%	8%	8%	9%
Other	4%	2%	7%	3%	5%	4%	5%
No diversity support required from APNIC	28%	21%	43%	26%	22%	18%	32%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

Overall satisfaction

After rating their experience using individual APNIC services, APNIC Members or Account Holders were asked to rate the overall quality and value of APNIC services and Membership on a seven point scale from Very Poor (1) to Excellent (7).

A majority of respondents rated the quality of service delivery positively, with 92% rating the quality of services at a five or higher. Ninety-one percent (91%) also provided a rating higher than neutral for the value of APNIC services. Slightly fewer (89%) rated the overall value of APNIC Membership as above average or better.

While overall positive ratings were broadly consistent with previous years across all three satisfaction dimensions, the proportion of respondents rating the quality of APNIC services as 'excellent' increased to 39%, up from 35% in 2018. Excellent ratings for service value were also up slightly, to 40% of Members.

Thinking about APNIC overall, how would you rate:
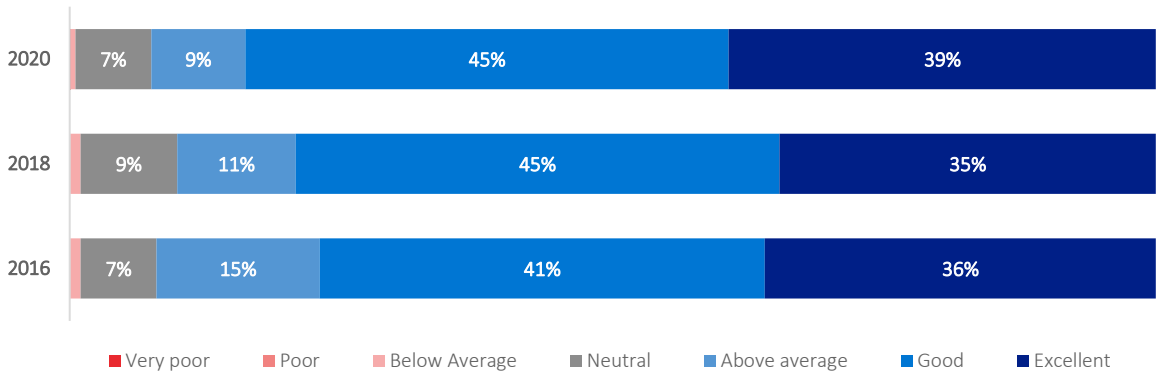(Members only: n=1,119)
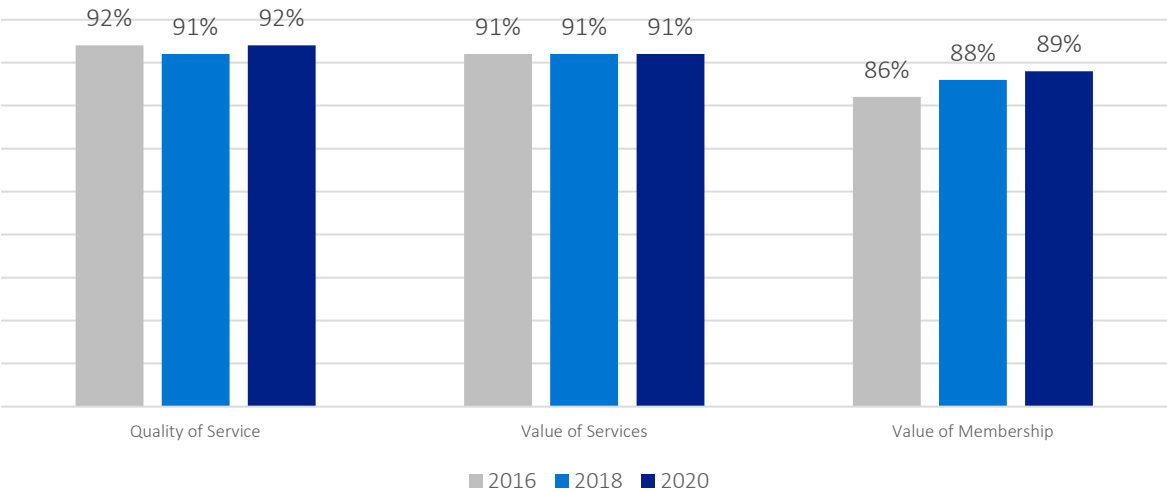
	Total	East Asia	Oceania	SE Asia	South Asia	LDE	Others
Sample Size	1119	165	217	296	397	353	766
Quality of Service	92%	88%	89%	93%	97%	97%	90%
Value of Services	91%	90%	84%	93%	96%	97%	89%
Value of Membership	89%	92%	79%	89%	96%	95%	86%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
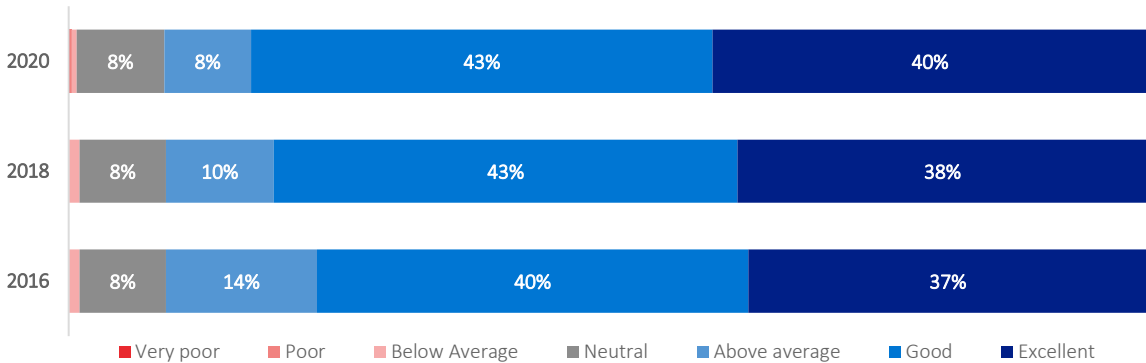'Other' segment includes developed and developing economies

Significantly higher / lower than total

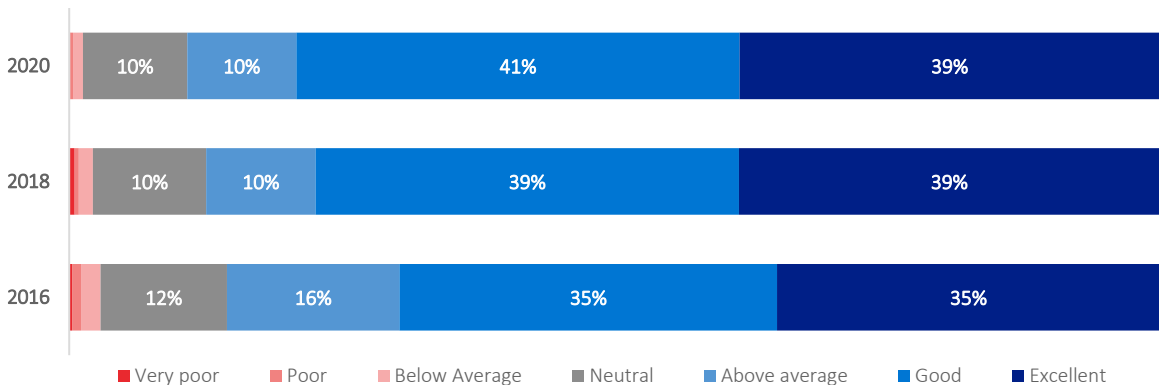Thinking about APNIC overall, how would you rate:
(Members only: n=1,119)

Quality of Services

Year	Neutral	Above average	Good	Excellent
2020	7%	9%	45%	39%
2018	9%	11%	45%	35%
2016	7%	15%	41%	36%

■ Very poor ■ Poor ■ Below Average ■ Neutral ■ Above average ■ Good ■ Excellent

Value of Services

Year	Neutral	Above average	Good	Excellent
2020	8%	8%	43%	40%
2018	8%	10%	43%	38%
2016	8%	14%	40%	37%

■ Very poor ■ Poor ■ Below Average ■ Neutral ■ Above average ■ Good ■ Excellent

Value of Membership

Year	Neutral	Above average	Good	Excellent
2020	10%	10%	41%	39%
2018	10%	10%	39%	39%
2016	12%	16%	35%	35%

■ Very poor ■ Poor ■ Below Average ■ Neutral ■ Above average ■ Good ■ Excellent

From a regional perspective, respondents in South Asia are the most satisfied, with 97% rating service quality positively, and 96% rating the value provided by APNIC services and membership highly. Of particular note, service quality and value were rated as excellent by over half of the respondents from South Asia (52% and 53% respectively). This is significantly higher than all other regions.

South East Asia respondents were also more likely to be satisfied with APNIC services than respondents from the other sub-regions. Ninety-three percent (93%) of respondents from South East Asia rated the quality and value of APNIC services positively.

Conversely, respondents from Oceania provided significantly lower ratings across all dimensions than respondents in other regions. In particular, only 79% of Oceanic Members rated APNIC membership value above average or better, significantly lower than respondents in South Asia (96%), East Asia (92%) and South East Asia (89%).

Respondents from East Asia were less likely to provide a score of five or higher for APNIC service quality, with the quality of APNIC service delivery rated positively by 88% of respondents.

APNIC service quality and value is rated significantly higher by Members in LDEs than those from developed and developing economies. Satisfaction with the value provided by APNIC membership is also significantly higher amongst this group of Members.
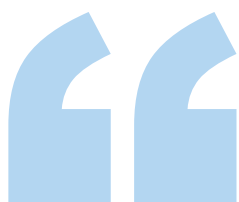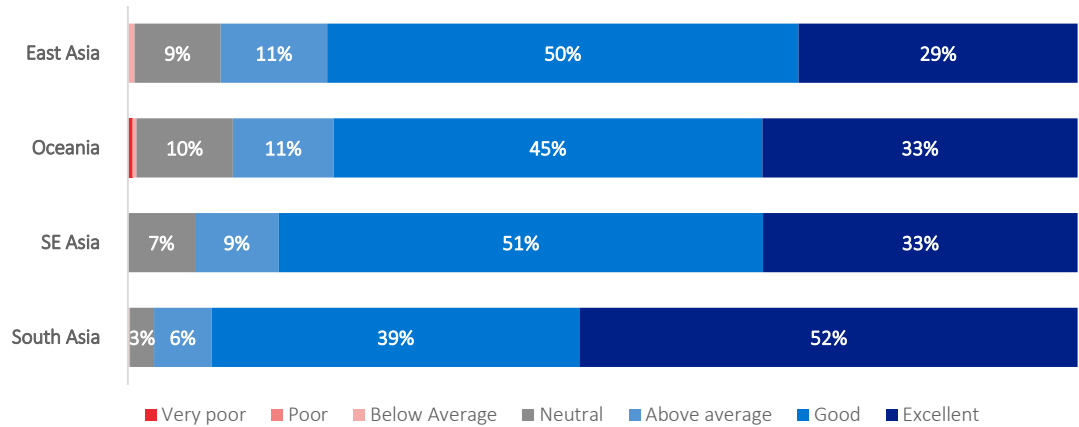
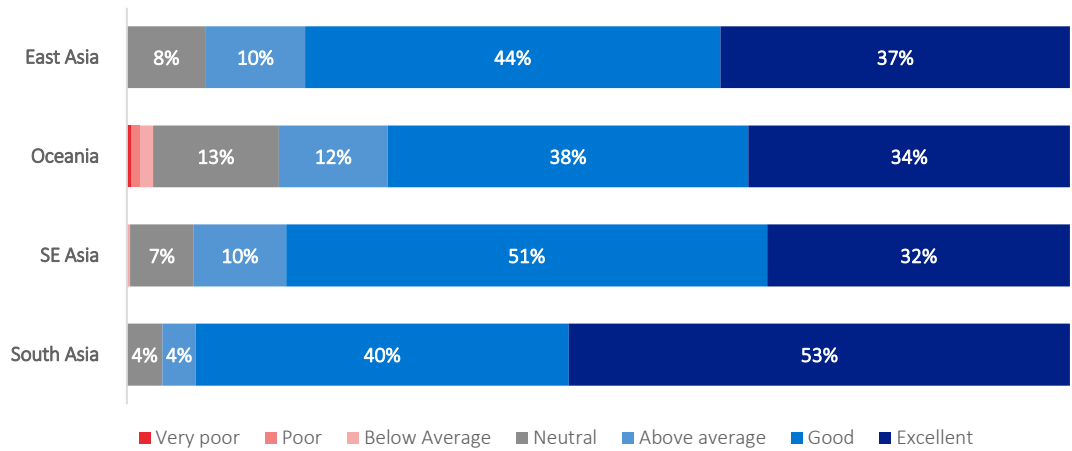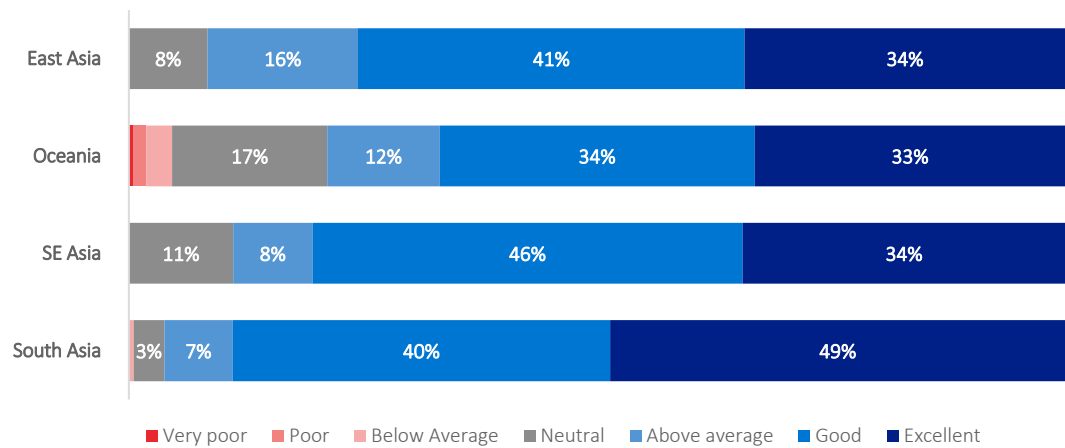"APNIC is doing very good job by organizing workshops and trainings"

South East Asia

Quality of Service Delivery

Region	Neutral	Above average	Good	Excellent
East Asia	9%	11%	50%	29%
Oceania	10%	11%	45%	33%
SE Asia	7%	9%	51%	33%
South Asia	3%	6%	39%	52%

■ Very poor ■ Poor ■ Below Average ■ Neutral ■ Above average ■ Good ■ Excellent

Value of Services

Region	Neutral	Above average	Good	Excellent
East Asia	8%	10%	44%	37%
Oceania	13%	12%	38%	34%
SE Asia	7%	10%	51%	32%
South Asia	4%	4%	40%	53%

■ Very poor ■ Poor ■ Below Average ■ Neutral ■ Above average ■ Good ■ Excellent

Value of Membership

Region	Neutral	Above average	Good	Excellent
East Asia	8%	16%	41%	34%
Oceania	17%	12%	34%	33%
SE Asia	11%	8%	46%	34%
South Asia	3%	7%	40%	49%

■ Very poor ■ Poor ■ Below Average ■ Neutral ■ Above average ■ Good ■ Excellent

Respondents ratings of the quality and value of APNIC services and membership, by Region 2020.
(Members who have used APNIC services only: n=1,119)

Service Quality

Overall, the mean rating of the quality of APNIC service delivery improved in 2020, from 6.07 in 2018 to 6.15 in 2020.

Satisfaction with the quality of service delivery improved across all APNIC sub-regions. In particular, the mean rating for APNIC service delivery increased from 5.78 to 5.98 in East Asia and was up from 6.30 to 6.41 in South Asia.
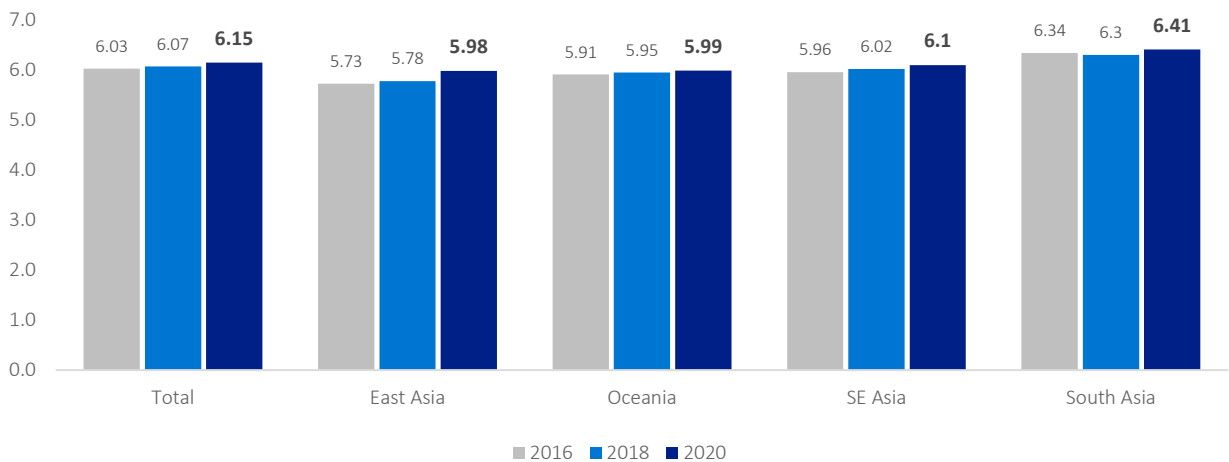
Service Value

Satisfaction with the value of APNIC services has also improved. At an overall level, the mean rating for APNIC service value increased from 6.07 in 2018 to 6.13 in 2020. While small improvements were noted in all APNIC sub-regions the largest increase was evident in East Asia, with the mean rating rising from 5.85 to 6.10.

Like in 2016 and 2018, the number of interactions respondents had with APNIC had a positive impact on satisfaction ratings, with more frequent users rating service quality and value more highly.
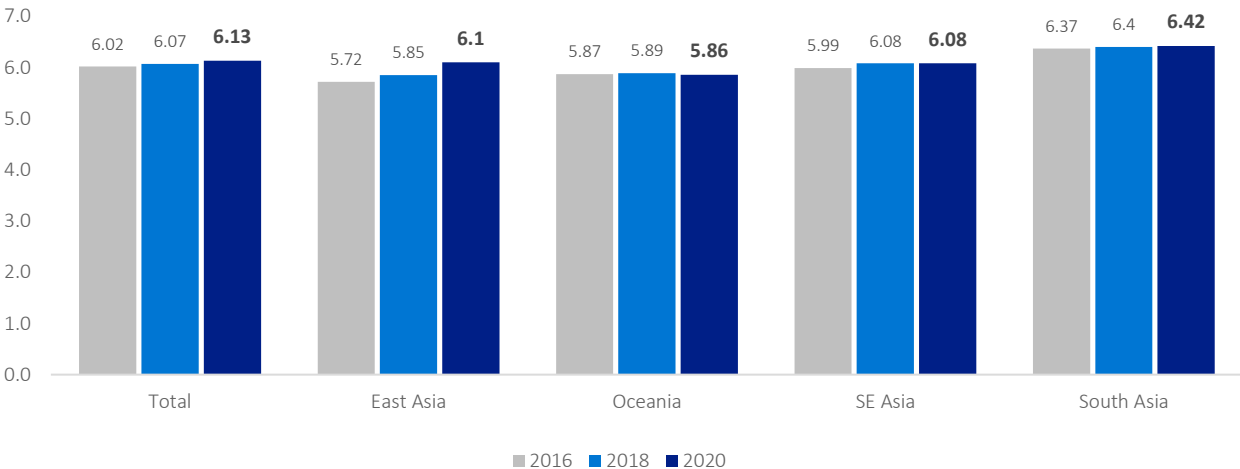
Respondents ratings of the quality and value of APNIC services, 2016-2020.
(Mean scores of Members who have used APNIC services only: 2016: n=733, 2018: n=788, 2020: n=1,119)

Stakeholder satisfaction

Members of NIRs or other Stakeholders were also asked to rate their experience dealing with APNIC. Ratings were provided on a seven point scale, from Very Poor (1) to Excellent (7).
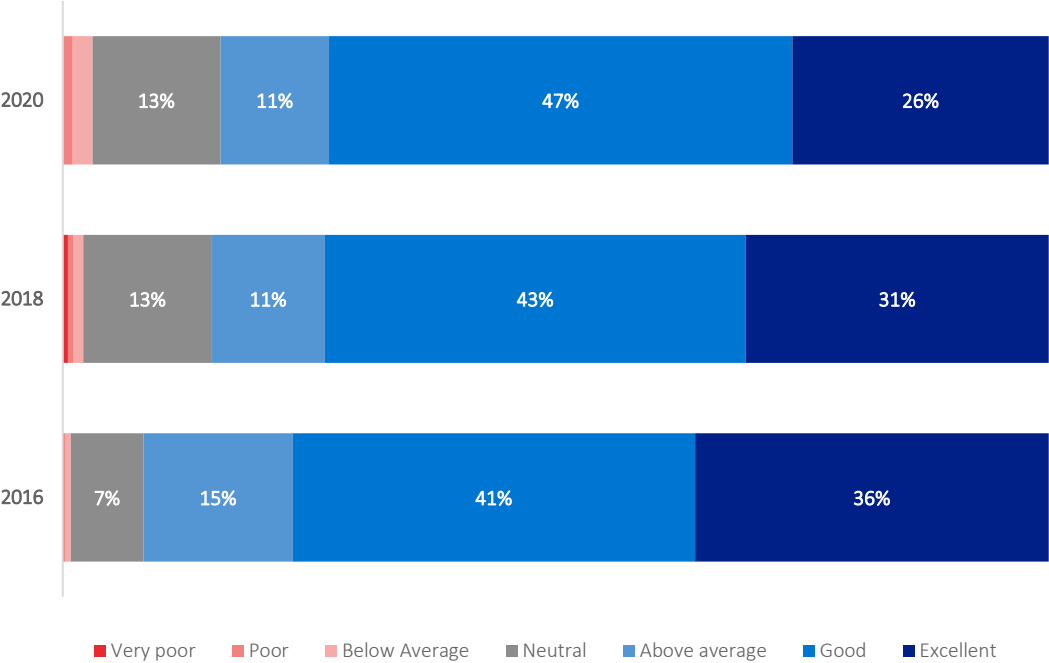
Broadly consistent with 2018, 84% of Members of NIRs or other Stakeholders rated their experience dealing with APNIC as positive, with 13% providing a neutral rating.

Respondents from Oceania provided the most positive feedback. Ninety percent (90%) of respondents from Oceania provided positive ratings, consistent with 2018. Most notably, 43% of Oceanic stakeholders rated their experience dealing with APNIC as 'excellent'. This is significantly higher than respondents from all other sub-regions.

Down significantly from 94% 2018, 83% of stakeholders in South East Asia rated their experience dealing with APNIC as above average, good or excellent. Positive ratings were provided by 85% of respondents from South Asia. The lowest ratings were provided by respondents from East Asia, with 77% providing a positive rating.

Stakeholders from developed economies were more likely to rate their experience favourably, with 85% providing a positive rating. This compares to 80% of respondents in LDEs, which is down from 85% in 2018.

Overall, how would you rate your experience dealing with APNIC?
(Stakeholders who have used APNIC services only: 2016 n=292; 2018 n=192, 2020 n=502)

Year	Neutral	Above average	Good	Excellent
2020	13%	11%	47%	26%
2018	13%	11%	43%	31%
2016	7%	15%	41%	36%

■ Very poor   ■ Poor   ■ Below Average   ■ Neutral   ■ Above average   ■ Good   ■ Excellent

Governance

As in prior years, the Survey also asked respondents to assess APNIC governance processes. Respondents were asked to indicate whether they believe APNIC is sufficiently open and transparent and whether it is respected in the Internet community.

Transparency

Transparency is one of APNIC's declared values, and since 2014 the APNIC Survey has tested respondents' satisfaction that APNIC is sufficiently open and transparent in its activities.

As in past years, there was majority agreement that APNIC is sufficiently open and transparent in its activities. Consistent with 2018, 89% of respondents are satisfied (ratings of above average, good or excellent) with APNIC's openness and transparency.

Like in 2018, respondents in South Asia (94%) were the most likely to agree that APNIC is sufficiently open and transparent. Respondents in Oceania (85%) were the least likely to report satisfaction with APNIC's transparency. Agreement levels were 87% in East Asia and 90% in South East Asia.

Respondents from LDEs (94%) were significantly more likely to agree that APNIC is sufficiently open and transparent than those in developed or developing (88%) economies.

	Total	East Asia	Oceania	SE Asia	South Asia	LDE	Others
Sample Size	1119	165	217	296	397	353	766
Top 3 Satisfaction	89%	87%	85%	90%	94%	94%	88%

Significantly higher / lower than total

Respect

Interview feedback suggests that APNIC is very well regarded in the Internet community, and although there are always suggestions for improvement, APNIC is held in high esteem.

Survey feedback confirms this, with over nine in 10 (92%) respondents agreeing that APNIC enjoys the respect of the community. Notably, 43% of all respondents strongly agreed that APNIC is respected in the community. This is consistent with 2018, when the corresponding proportions were 93% and 41%.

Respondents in South Asia (95%) were the most likely to agree that APNIC is respected in the Internet community. While this is significantly higher than respondents in other regions, over nine in 10 respondents agree that APNIC is respected in East Asia (90%), Oceania (91%) and South East Asia (93%).
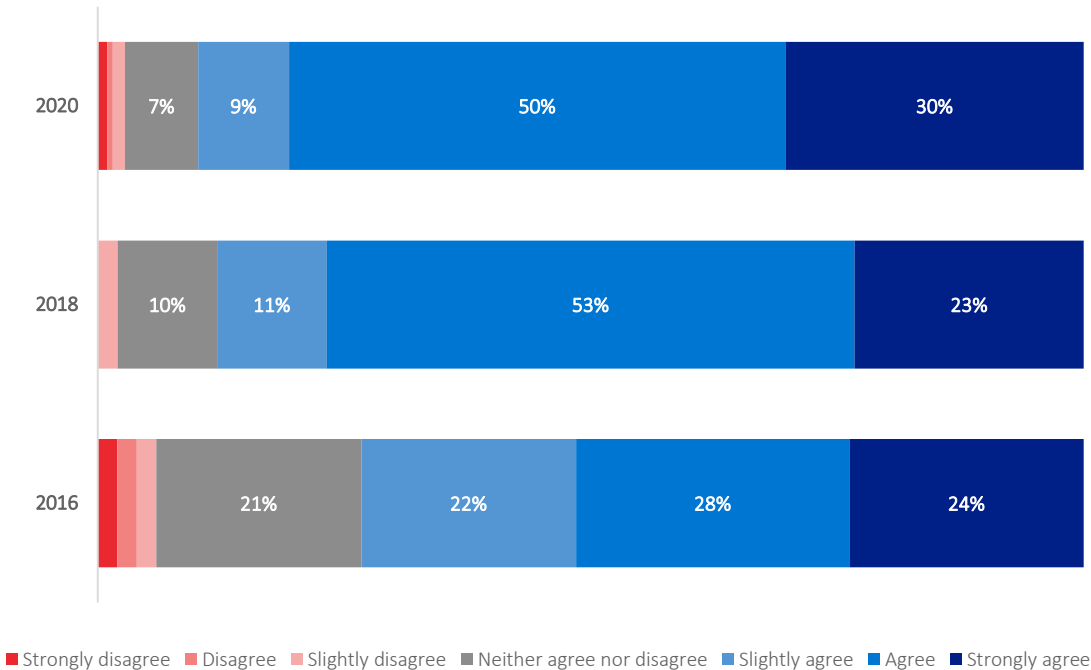
Respondents in developed economies (92%) were less likely to agree that APNIC is respected than respondents in LDEs (95%).

	Total	East Asia	Oceania	SE Asia	South Asia	LDE	Others
Sample Size	1119	165	217	296	397	353	766
Top 3 Satisfaction	92%	90%	91%	93%	95%	95%	92%

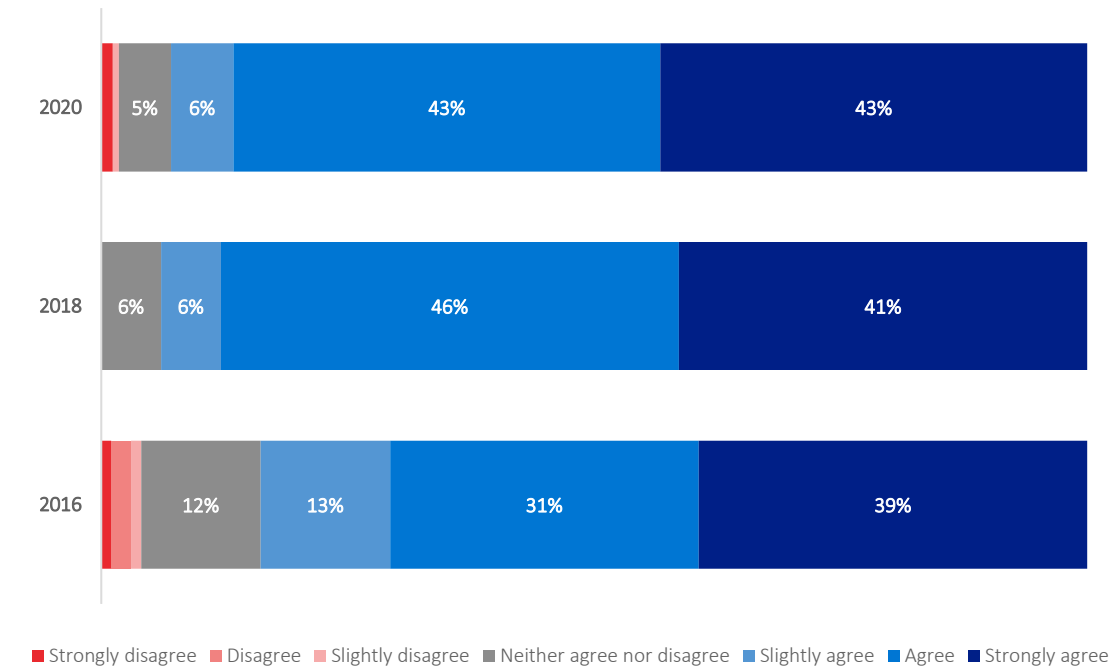Significantly higher / lower than total

Thinking about your membership of APNIC, how much do you AGREE that APNIC is sufficiently transparent in its activities?
(Members only. 2016 n=733; 2018 n=903, 2020 n=1,118)

Year						
2020		7%	9%	50%		30%
2018		10%	11%	53%		23%
2016		21%	22%	28%		24%

■ Strongly disagree ■ Disagree ■ Slightly disagree ■ Neither agree nor disagree ■ Slightly agree ■ Agree ■ Strongly agree

Thinking about your membership of APNIC, how much do you AGREE that APNIC is respected in the Internet community?
(Members only. 2016 n=733; 2018 n=903, 2020 n = 1,118)

Year						
2020		5%	6%	43%		43%
2018		6%	6%	46%		41%
2016		12%	13%	31%		39%

■ Strongly disagree ■ Disagree ■ Slightly disagree ■ Neither agree nor disagree ■ Slightly agree ■ Agree ■ Strongly agree

Endorsement

As well as understanding satisfaction with APNIC services and Membership, the Survey asked respondents to indicate how they speak about APNIC to others.

Reflecting interview feedback, APNIC is held in high esteem amongst participants. Positively, two thirds (66%) of respondents speak highly of APNIC, 20% speak highly of APNIC without being asked and 46% tend to speak highly if they are asked. This is up significantly from 12% and 44% respectively in 2018. Fewer respondents (29% compared to 39%) indicate that are neutral about APNIC, with many respondents who were previously ambivalent now indicating that they speak positively about APNIC. Very few speak negatively of the organisation.

APNIC Members are more likely to provide favourable endorsement of APNIC than Members of NIRs or other Stakeholders, with 68% and 60% speaking highly of APNIC respectively. Positive endorsement by Members has increased from 60% in 2018.

As in 2018, respondents from Oceania and South Asia are the most likely to provide positive word of mouth, with 69% indicating they speak highly of APNIC – approximately a quarter without being asked. Six in 10 (60%) respondents from East and South East Asia also speak highly of APNIC, with respondents from these regions more likely to be neutral in their communications about APNIC.

Which of these phrases best describes the way you speak about APNIC to others?
(All respondents: 2016: n=1,167; 2018: n=1,241; 2020=1,624)
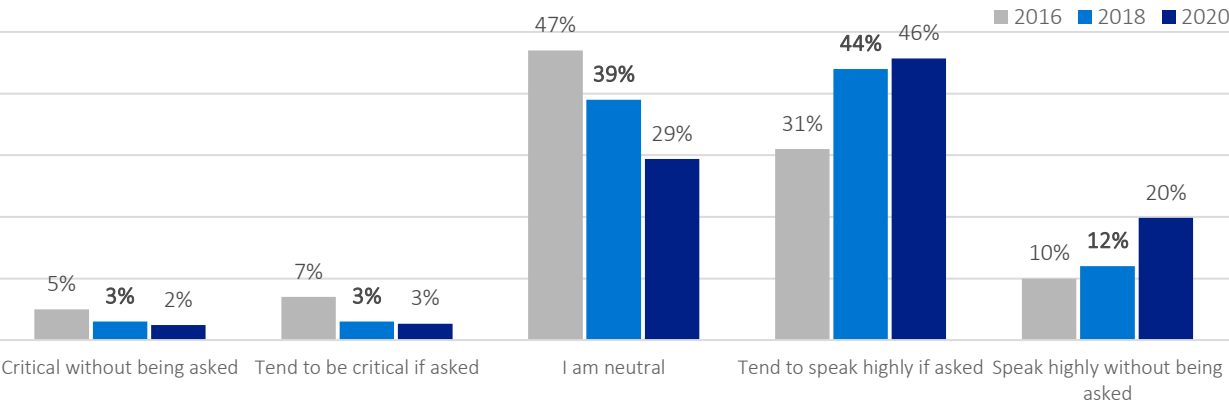
	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample Size	1122	502	255	296	439	562	476	1148
Critical without being asked	3%	2%	2%	1%	3%	3%	3%	2%
Tend to be critical if asked	3%	3%	2%	1%	4%	2%	3%	3%
I am neutral	27%	35%	35%	28%	33%	25%	25%	31%
Tend to speak highly if asked	49%	39%	45%	45%	46%	46%	47%	45%
Speak highly without being asked	19%	21%	16%	24%	14%	23%	22%	19%
Mean Score	3.8	3.7	3.7	3.9	3.6	3.8	3.8	3.8
Standard Deviation	0.9	0.9	0.8	0.8	0.9	0.9	0.9	0.9

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Segment mean significantly higher / lower than total mean score

Challenges

To test feedback from interviews and understand how APNIC can best support the Internet community, the Survey included a section about the strategic and operational challenges respondents face in providing Internet related products and services.

More detailed information about the challenges organisations face in relation to managing network security and scarcity of IPv4 addresses, as well as how respondents believe APNIC can help in these areas, was also canvassed by the Survey.

APNIC

"

What is the main challenge for you / your organisation in providing Internet-related products, services & activities?

To provide an understanding of the issues faced by Members and other Stakeholders in the Internet community, the Survey first asked respondents to identify, in their own words, the main challenge for them or their organisation in providing Internet-related products, services and activities. Feedback was elicited in verbatim form, without prompting, to provide a sense of the "top of mind' issues facing the community.

Many issues were raised by respondents, with challenges cited including the cost of managing and providing Internet services, network and cyber security threats, ageing or underdeveloped infrastructure, poor bandwidth and unreliable Internet connectivity and a lack of access to resources with the necessary technical skills and knowledge to deliver services. As in previous years, many respondents also identified the challenge arising from the shortage of IPv4 address space and the associated issues surrounding implementation and transition to IPv6.

"The internet cost in the Pacific Island countries is still very high and this is a major challenge in the Pacific." (Oceania)

"Increasing human resources who are ready to keep up with updates on IT technology developments, especially related to updated regulations, policies and the latest IT knowledge." (South East Asia)

"Main challenge is as a developing country Sri Lanka does not have sufficient telecommunications infrastructure specially in rural areas." (South Asia)

"Security is major challenge, nowadays. APNIC should focus on this aspect for their members in terms of training, knowledge sharing & best practices." (South Asia)

What are the main challenges for your organisation in providing internet related products, services & activities?

Financial, budget, cost of managing network operations

"Costing is main challenge when it come to internet related products." South Asia

"High cost of internet connectivity and high cost of cyber security appliances." South Asia

"Limitations of cost, skills and knowledge." South East Asia*

"The internet cost in the Pacific Island countries is still very high and this is a major challenge in the Pacific." Oceania

"Source of funds." South East Asia*

Infrastructure, access and capacity

"Very expensive and slow sometime unreliable and unstable connection." Oceania

"The main challenge is the internet infrastructure here in Samoa. The internet is not reliable and fast at times despite the costs but for me, we need a stable and secure internet for our online products and services. " Oceania

"Slow internet connection of the ISP." South East Asia

"Poor connectivity." South Asia

"Aging infrastructure, poor connectivity issues, slow and unreliable internet access." Oceania

Security

"Network security from cyber crime that is currently growing rapidly." East Asia*

"Cybersecurity, Denial of any Service." South East Asia

"Information security issues are becoming more serious, simple, unimplemented systems are vulnerable to hacker attacks." South East Asia*

"Our main challenge is to prevent the data of our organization from internal or external (Internet) attacking." South East Asia

"Security issues is the main challenge." South East Asia

Lack of technical knowledge and skills

"Technical skills and understanding of the different technologies available." Oceania

"Limited staff with administrative skills for Internet-related management." Oceania

"Lack of knowledge regarding IT infrastructure." South Asia

"Challenges in technology, our engineers' access to technology are still inadequate, so we have not kept up with continuous innovation in the world." South East Asia*

Availability of IPv4

"IPV4 address allocation." South Asia

"IPv4 exhaustion has become a great challenge. Customer reluctant to go for IPv6." South Asia

"Lack of IPv4 addresses, despite some organizations have plenty unused addresses." Oceania

"IPv4 Resources and migration from IPv4 to IPv6 are current challenges for us." South Asia

"Insufficient IPv4 address resources, and insufficient application support during the transition to IPv6." East Asia *

*Translated

Strategic challenges

To understand how APNIC can best support the Internet community, a section was included in the Survey about the challenges organisations face in providing Internet-related services. Expanding on the results of prior Surveys, the question was changed to separately test the strategic and operational challenges that community members face. The first question asked respondents holding executive positions to identify the strategic challenges facing their organisation, and to rank at least three in order of priority, from a list of nine items.

From a strategic perspective, four main issues rank as the top challenges for two thirds of organisations. Cost control of hardware, software and network investment, compliance with regulatory requirements, hiring and keeping skilled staff and security risks were identified as the main challenge by approximately one in six respondents each.

Cost Control

At 17%, cost control of hardware, software and network investments is the main challenge for the largest proportion of organisations. Further, nearly half (48%) of respondents ranked cost control within the top three challenges for their organisation. It was also the most often mentioned challenge identified in free text feedback, with respondents citing "high cost of internet connectivity and high cost of cyber security appliances", as well as "lack of funding for new equipment". Respondents from East Asia were the least likely to identify cost control within their top three challenges, at 10% and 34% for the top rated and either first, second or third ranked issue, respectively.

Regulatory Compliance

Compliance with regulatory requirements is the main strategic challenges facing 16% of organisations in the Internet community. A third (34%) indicate that compliance is one of the top three issues for their organisation.

Few respondents in East Asia rank regulatory compliance as an issue for their organisation, at 3% (number one issue) and 17% (top three challenges). While compliance is also less likely to be the main challenge for those in Oceania (9%), it is the main issue for nearly one in five respondents in South Asia (22%) and South East Asia (20%).

Security Risks

Security risks were the next most selected challenge, identified as the main strategic challenge for their organisation by 15% of respondents. Top three rankings indicate that security risks (48%) are a challenge for half of organisations who participated in the Survey, with many also mentioning security as their main challenge in free text comments.

Security appears to be of particular concern to respondents in Oceania. A quarter (25%) of executive respondents in Oceania rank it as the top challenge facing their organisation, while 63% include it amongst the top three strategic issues their business confronts. No organisations in East Asia report that security is the main issue facing their organisation – although 45% include it as either the second or third biggest challenge.
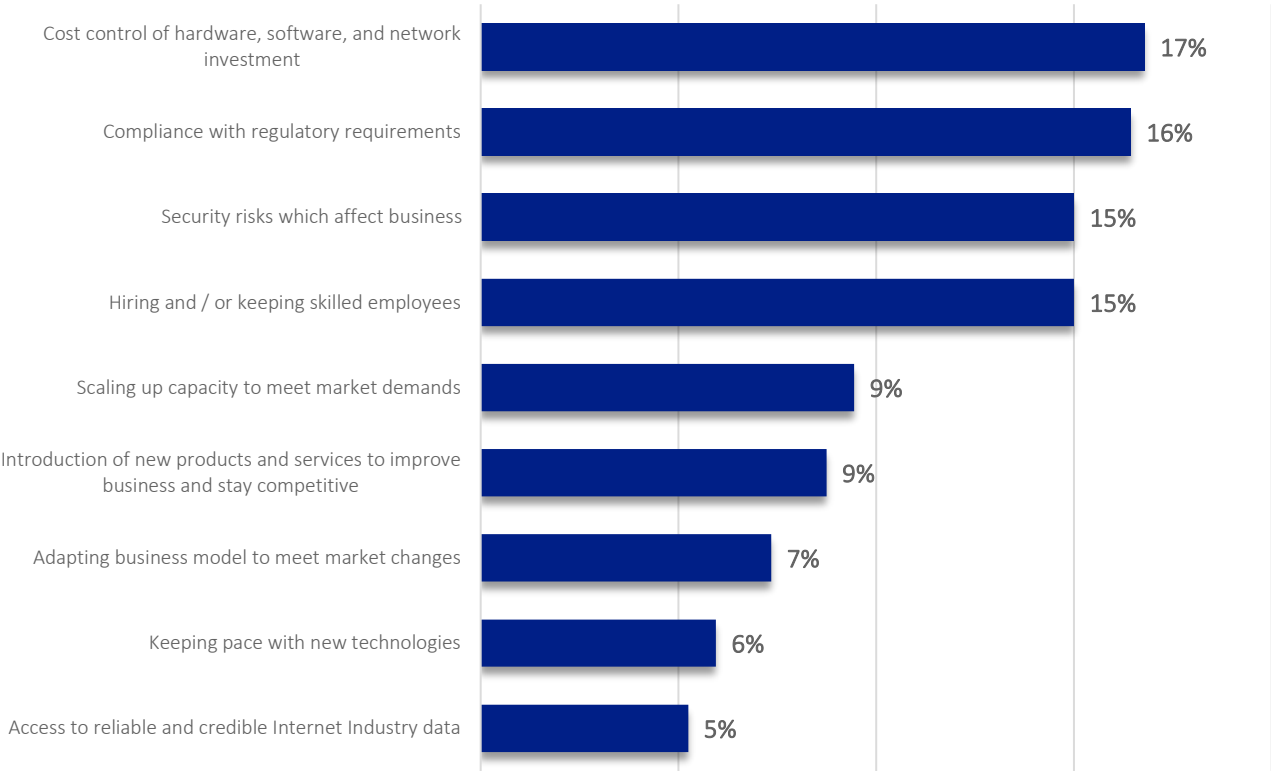
Workforce

Maintaining an adequately skilled workforce is also a concern for 15% of respondents across the region, particularly in East Asia where 24% of respondents suggest it is the main challenge for their organisation. Hiring and keeping skilled staff is the main strategic issue for 18% of organisations in Oceania, 13% in South East Asia and 11% in South Asia.

Staffing challenges were also commonly mentioned amongst free text feedback, with many comments referencing difficulties with "finding adequately trained staff in our region", "technical resource availability" and "lack of knowledge and skills".

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significance tests not performed on ranking questions

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

(Ranking Question. Respondents holding executive roles asked to rank at least top 3 items, n=286) (% Ranked 1)

Challenge	%
Cost control of hardware, software, and network investment	17%
Compliance with regulatory requirements	16%
Security risks which affect business	15%
Hiring and / or keeping skilled employees	15%
Scaling up capacity to meet market demands	9%
Introduction of new products and services to improve business and stay competitive	9%
Adapting business model to meet market changes	7%
Keeping pace with new technologies	6%
Access to reliable and credible Internet Industry data	5%

	Member	Stakeholder	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	230	56	29	68	64	118	85	201
Cost control of hardware, software, and network investment	18%	13%	10%	19%	19%	17%	19%	16%
Compliance with regulatory requirements	15%	23%	3%	9%	20%	22%	19%	15%
Hiring and / or keeping skilled employees	16%	13%	24%	18%	13%	11%	11%	17%
Security risks which affect business	14%	16%	0%	25%	6%	17%	16%	14%
Scaling up capacity to meet market demands	10%	5%	14%	9%	11%	8%	7%	10%
Introduction of new products and services to improve business and stay competitive	10%	5%	14%	9%	14%	5%	7%	9%
Adapting business model to meet market changes	7%	11%	21%	9%	5%	4%	4%	9%
Keeping pace with new technologies	6%	5%	7%	1%	5%	9%	11%	4%
Access to reliable and credible Internet Industry data	4%	9%	7%	1%	8%	6%	7%	4%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significance tests not performed on ranking questions

Operational challenges

The next question was designed to test the operational challenges organisations face in providing Internet-related services. The question asked respondents to identify the challenges facing their organisation, and to rank at least three in order of priority, from a list of ten items.

Overall, the top three operational challenges facing organisations providing internet related services remain the same as in prior years. Network security (23%), the cost of operations (18%) and scarcity of IPv4 (13%) received broadly consistent rankings as in 2018. While regional differences were apparent in the challenges identified by respondents, there were few differences based on economic development or membership status.

Network Security

Despite less prominence in interview discussions than in prior years, network security remains the issue identified as the main operational challenge by the highest proportion of respondents in the 2020 Survey. Nearly a quarter (23%) of respondents indicated that handling security incidents is the main operational challenge facing their organisation, while 47% of respondents rated it as one of their top three operational challenges. Many free text comments indicated that "security issues (are) the main challenge", with suggestions that "cyber crime is currently growing rapidly" and that "information security issues are becoming more serious". Others mentioned that "cyber security (is) growing in size and sophistication" and there is a need for "mitigations against abuses".

Handling security threats is a challenge for organisations in all regions, with at least one in five respondents in East Asia (26%), South Asia (25%) South East Asia (21%) and Oceania (20%) ranking it the number one operational issue they face. This is at odds with the strategic challenges cited by Executives, where only 15% selected security risks affecting their business at their number one challenge.

Cost Management

Reflecting strategic priorities, managing the cost of systems, network operations and security is the main operational challenge for 18% of respondents. When those who ranked it either one, two or three is considered, 42% of respondents indicated that systems and network operation costs are a challenge for their organisation. Managing costs is a specific concern for respondents in Oceania, with 26% ranking it their number one operational challenge.

IPv4 Shortage

While interviews suggest that the relative importance of IPv4 scarcity is falling, scarcity of IPv4 addresses remains a challenge for respondents. Reflecting prior surveys, 13% of respondents indicated it was the number one operational challenge facing their organisation. Coping with IPv4 shortages is less of a concern amongst respondents in Oceania, only 8% of whom reported it was the number one operational issue facing their organisation. This compares to 19% in East Asia, 14% in South Asia and 12% in South East Asia.

In signs that other issues are taking precedence, however, only 25% of respondents rated the scarcity of IPv4 amongst their top three challenges – lower than all but one of the other listed issues. It was also identified as the main challenge by only 8% of respondents providing free text feedback about the main challenge facing their organisation.
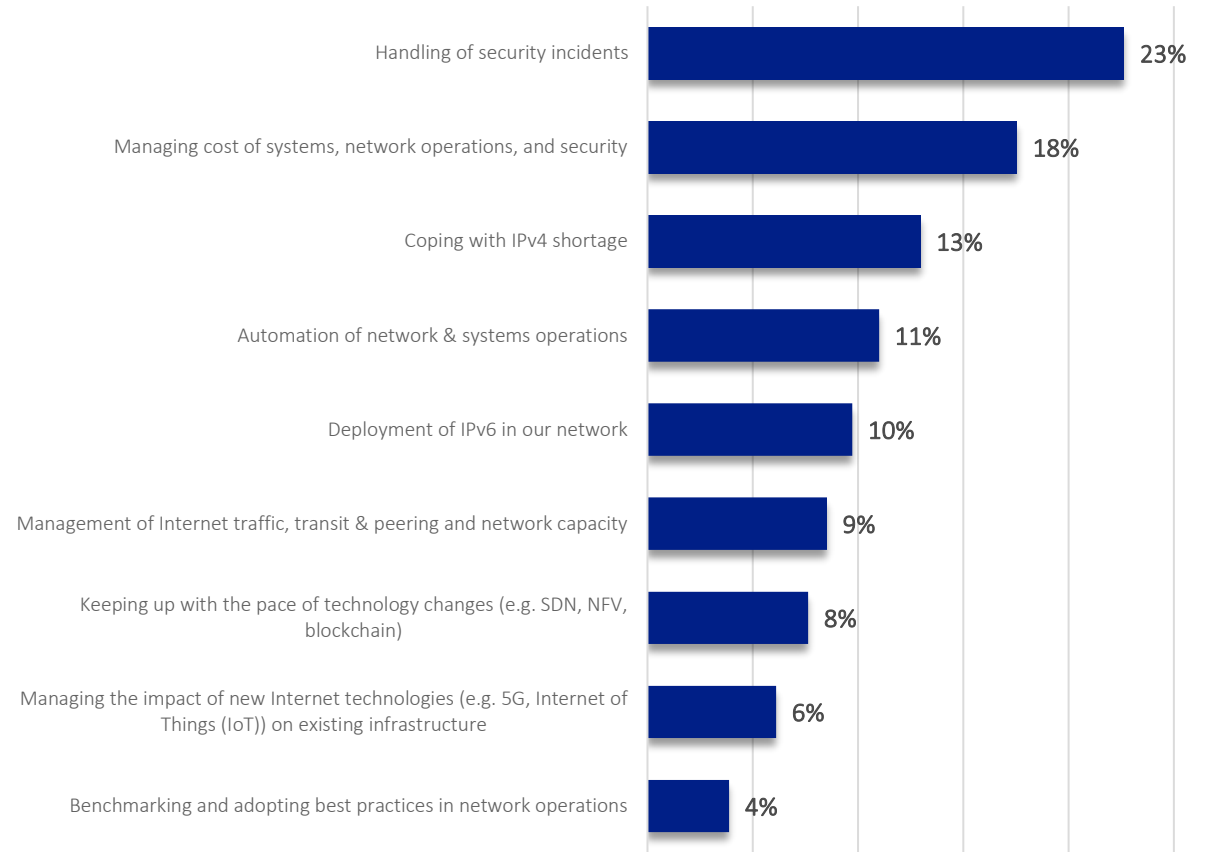
Automation of Network Systems & Operations

A new challenge added to the list in 2020, automation of network systems and operations, was identified as the main operational challenge facing their organisation by 11% of respondents. It was also included amongst the top three challenges of 42% of respondents.

Respondents in Oceania were particularly likely to identify automation as a challenge for their organisation, with 49% including it within their main three operational challenges. This compares to only 37% in South East Asia and 39% in East Asia.

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

(Ranking Question. All Respondents asked to rank at least top 3 items, n=1,624)

Challenge	Percentage
Handling of security incidents	23%
Managing cost of systems, network operations, and security	18%
Coping with IPv4 shortage	13%
Automation of network & systems operations	11%
Deployment of IPv6 in our network	10%
Management of Internet traffic, transit & peering and network capacity	9%
Keeping up with the pace of technology changes (e.g. SDN, NFV, blockchain)	8%
Managing the impact of new Internet technologies (e.g. 5G, Internet of Things (IoT)) on existing infrastructure	6%
Benchmarking and adopting best practices in network operations	4%

	Member	Stakeholder	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1087	486	252	295	425	531	444	1129
Handling of security incidents	21%	25%	26%	20%	21%	25%	27%	21%
Managing cost of systems, network operations, and security	17%	19%	15%	26%	20%	13%	14%	19%
Coping with IPv4 shortage	16%	7%	19%	8%	12%	14%	12%	13%
Automation of network & systems operations	11%	10%	6%	12%	11%	11%	11%	11%
Deployment of IPv6 in our network	9%	10%	8%	6%	10%	12%	12%	9%
Management of Internet traffic, transit & peering and network capacity	9%	7%	8%	9%	8%	9%	9%	8%
Keeping up with the pace of technology changes (e.g. SDN, NFV, blockchain)	7%	10%	11%	6%	8%	7%	7%	8%
Managing the impact of new Internet technologies (e.g. 5G, Internet of Things (IoT)) on existing infrastructure	5%	8%	7%	5%	6%	6%	5%	6%
Benchmarking and adopting best practices in network operations	4%	4%	2%	7%	5%	2%	2%	4%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significance tests not performed on ranking questions

> "APNIC is doing fantastic job by organizing technical trainings and workshops on latest technologies and they should organize more so people can more benefit."
>
> South Asia

How might APNIC best assist you or others with these challenges?

Overwhelmingly, respondents believe APNIC can best support the Internet community to overcome the challenges it faces through the provision of education and training.

There were many calls for APNIC to provide more training, both online and in person. Respondents suggested training on many different topics, such as network security, IPv6 implementation, network automation, global trends and new technologies.

Also suggested was that APNIC arrange training provided by experts, local training, practical hand-on training and workshops, more in-depth training and training focussed on the needs of small organisations and less developed economies.

Demand for case studies and best practice information sharing was also common.

"Providing capacity building and other assistive training at a very low cost or no cost for the organizations that struggle to adapt in rapidly changing environments of technologies". (East Asia)

"Provide more face-to-face training opportunities for the Pacific Island Countries" (Oceania)

"Provide more training and inform best practices in the implementation of new technologies." (South East Asia)

"Provide more resources for network operators and smaller organization who need to respond to security incidents" (East Asia)

How might APNIC best assist you or others with these challenges?

Education and Training

"More number of training sessions on new technologies will be great help." South Asia

"More local or online training, for basic and advanced users." Oceania

"If APNIC can give more training sections to developing countries." South East Asia

"Everything that has been deployed by APNIC, from workshops to APNIC Academy is a great help in everyday work, maybe more advanced topics, to go deeper in the subject." Oceania

"Conducting online/in-person workshops with experts. " South Asia

"By providing technical training online in key areas of Internet technologies." South Asia

"Webinars and online workshops." South Asia

"Regular training is given, especially combining practical training and organizing members to exchange experience." East Asia (Translated)

"Workshop, Conference, Community meetup." East Asia*

"Provide more training and inform best practices in the implementation of new technologies." South East Asia*

"More workshops or conferences." South East Asia

Information and Resources

"Providing guidance, whitepapers and courses." Oceania

"Provide more comprehensive documentation of standards and suggestions." South East Asia

"By providing relevant information and best practical way to maintain the sustainability and the security of the network." Oceania

"APNIC may provide updates about the technological developments, security risks etc. through newsletters and social media channels." South Asia

"Providing access to more open resources and knowledge forum." South East Asia*

"Provide the latest industry trends and organize platform exchanges." East Asia*

"Disseminate information about Internet security to a wide range of users and end users." East Asia*

Case Studies and Collaboration

"Sharing best practices and some new industry trends will be beneficial for all." Oceania

"Provide best practices and solution sharing among members." South East Asia

"Collaboration for enhancing the knowledge base among the budding and experienced Engineers further." South Asia

"Establish a forum to exchange discussions regularly." South East Asia*

Regional and Local Language Support

"We need more Pacific focused events through the support of APNIC." Oceania

"More training in different languages, especially in Chinese." East Asia*

"APNIC should support multiple languages, providing more in-depth training in these areas." South East Asia*

*Translated

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 challenges facing their organisation, from a list of 13. Respondents were able to select up to three challenges.

While results are not directly comparable due to slight changes to the question structure and options, as in 2018, DDoS attacks, phishing, spam, malware, ransomware are the top two security threats identified by respondents.

DDoS attacks were included as one of the main network security issues for 41% of respondents. This rises to 51% of respondents in East Asia and 46% in South Asia, significantly higher than respondents in Oceania (24%). DDoS attacks appear to be a bigger issue amongst organisations in LDEs (48%).
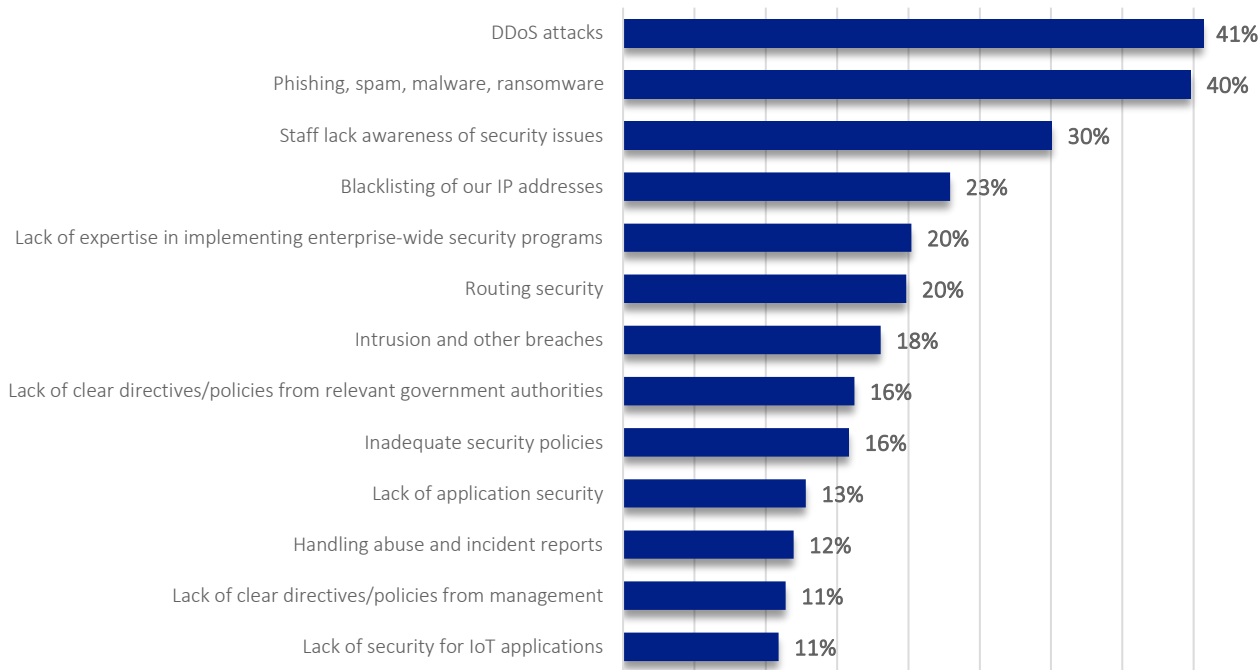
Two in five (40%) respondents indicated that phishing, spam, malware and ransomware are problematic for their organisation. Respondents in Oceania (49%) were more likely than those in other regions to identify these as issues for their organisation.

Reflecting feedback provided by some interview participants, lack of awareness of security issues amongst staff is also a challenge for organisations in trying to manage network security. Three in ten (30%) suggested that limited knowledge amongst employees and those working in the Internet community is one of the main challenges facing their organisation in relation to network security. Mentioned largely by those in smaller and least developed economies in interview discussions, lack of staff expertise was significantly more likely to be identified as an issue by respondents in Oceania (40%) than other regions.

Also mentioned in interviews, blacklisting of IP addresses was identified as a challenge. This was confirmed by the Survey with 23% of respondents, particularly those in LDE's with 28% rating it amongst their main challenges. Those in South Asia were the most likely (31%) to rate it as a challenge.

Thinking about network security, what are the MAIN challenges facing your organisation?
(All Respondents. Select up to 3. Base n=1,624, total mentions = 4,420)

Challenge	%
DDoS attacks	41%
Phishing, spam, malware, ransomware	40%
Staff lack awareness of security issues	30%
Blacklisting of our IP addresses	23%
Lack of expertise in implementing enterprise-wide security programs	20%
Routing security	20%
Intrusion and other breaches	18%
Lack of clear directives/policies from relevant government authorities	16%
Inadequate security policies	16%
Lack of application security	13%
Handling abuse and incident reports	12%
Lack of clear directives/policies from management	11%
Lack of security for IoT applications	11%

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

(All Respondents. Select up to 3. Base n=1,624, total mentions = 4,420)

	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1120	503	255	296	439	562	476	1147
DDoS attacks	44%	32%	51%	24%	40%	46%	48%	38%
Phishing, spam, malware, ransomware	41%	36%	37%	49%	35%	40%	38%	40%
Staff lack awareness of security issues	27%	36%	27%	40%	29%	28%	29%	31%
Blacklisting of our IP addresses	26%	15%	16%	16%	22%	31%	28%	21%
Lack of expertise in implementing enterprise-wide security programs	19%	24%	16%	21%	25%	19%	19%	21%
Routing security	21%	18%	20%	16%	21%	20%	23%	19%
Intrusion and other breaches	19%	16%	31%	22%	16%	11%	11%	21%
Lack of clear directives/policies from government	14%	21%	11%	12%	18%	20%	21%	14%
Inadequate security policies	14%	19%	20%	18%	15%	14%	18%	15%
Lack of application security	13%	13%	8%	15%	14%	12%	12%	13%
Handling abuse and incident reports	11%	14%	12%	12%	14%	11%	11%	13%
Lack of clear directives/policies from management	11%	13%	11%	11%	13%	11%	12%	11%
Lack of security for IoT applications	11%	11%	7%	11%	10%	12%	11%	11%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

Consistent with 2018, training is the most common way both Members and other Stakeholders believe APNIC can assist the community with the challenges posed by network security threats. Overall, 49% of respondents believe APNIC can best help the community by running specific security training courses, on topics such as DDoS prevention and security policy development. Many respondents suggested that APNIC should "provide more trainings and webinars" and could assist "through trainings/workshops, technical exchange and advice".

Calls for APNIC training is highest in South Asia and South East Asia, at 55% and 50% of respondents, respectively. Respondents in LDEs (58%) were also significantly more likely to indicate APNIC could best help them with network security challenges by offering security focused training.

Over a third (37%) of respondents believe that APNIC can also help them with security related challenges by collaborating with other technical security organisations to share information and best practice. This was reflected in free text feedback, with respondents suggesting that APNIC is "in a position ease this burden through trainings and collaboration to bring providers in the region to share best practices in the area of technology adoption".

Approximately a quarter (26%) of respondents also believe that APNIC should raise awareness and share security insights with the community on the APNIC Blog and website. Respondents in South East Asia (30%) were most likely to support this proposal. Comments provided by respondents suggested that the "APNIC blog publish in-depth articles on the matter (including) deep technical articles with advanced features deployment guides". Others simply asked for APNIC to "keep doing what you are doing with training, conferences and the blog".

A similar proportion (24%), particularly those in South Asia (30%) and LDEs (31%), indicated that engagement with government would also help, with verbatim survey comments suggesting that APNIC could "coordinate with key-government stake-holders in the country to run more workshops and awareness" and that it would be beneficial to run "education activities for governments and those who make policies and regulations".

How might APNIC best assist you or others with network security challenges?
(All Respondents. Select up to 2. Base n=1,624: Total mentions: 2,915)
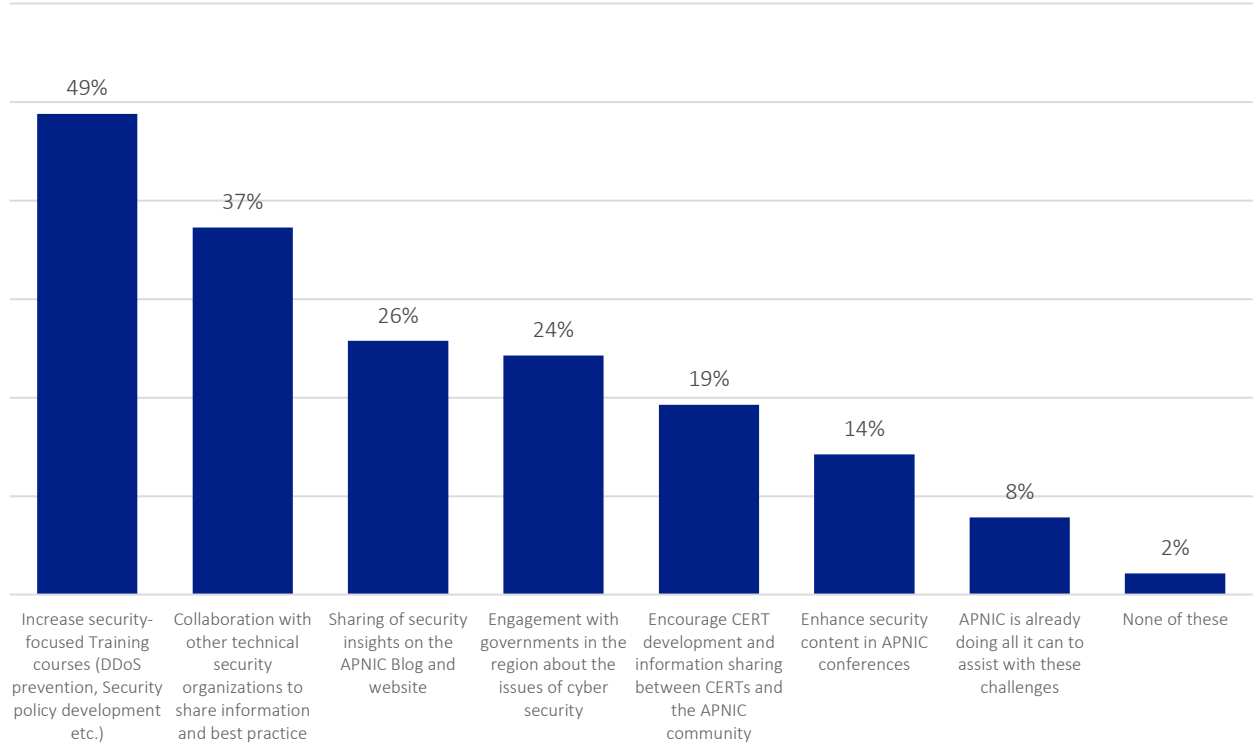
APNIC

> "APNIC should add in-depth courses on information security as well as related documents, future information security trends."
>
> South East Asia*

How might APNIC best assist you or others with network security challenges?
(All Respondents. Select up to 2. Base n=1,624: Total mentions: 2,915)

	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1120	503	255	296	439	562	476	1147
Increase security-focused Training courses (DDoS prevention, Security policy development etc.)	51%	44%	48%	40%	50%	55%	58%	45%
Collaboration with other technical security organizations to share information and best practice	39%	34%	42%	40%	37%	34%	36%	38%
Sharing of security insights on the APNIC Blog and website	27%	24%	23%	26%	30%	24%	21%	28%
Engagement with governments in the region about the issues of cyber security	22%	29%	25%	19%	21%	30%	31%	21%
Encourage CERT development and information sharing between CERTs and the APNIC community	17%	24%	23%	22%	20%	18%	17%	20%
Enhance security content in APNIC conferences	13%	16%	15%	11%	15%	14%	14%	14%
APNIC is already doing all it can to assist with these challenges	8%	7%	4%	11%	6%	7%	6%	9%
None of these	2%	2%	2%	4%	1%	1%	1%	3%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies
*Translated

Significantly higher / lower than total

Do you have any other ideas about how APNIC can help the region deal with network security challenges?

"APNIC is already doing more. Increasing APNIC membership in the Region will surely see more Security related information being disseminated to the members via different platforms already in use." (Oceania)

"By fostering and supporting security talks and meetups in the APNIC region." (Oceania)

"Focus on Government and Regulatory body engagement on this developments.. Their engagement is really important. " (South Asia)

"Guide network operators newest technology to safeguard networks." (South East Asia)

"Sharing industry best practices and provide training." (South Asia, Translated)

"APNIC can arrange free short session with members regarding security issues occurring regularly and to give proper guidelines for preventing this." (South Asia)

"APNIC can organize the community base training." (South Asia)

"Training on security fundamental and practical case studies from leading service providers and what do they seen often in production deployment." (South East Asia)

Do you have any other ideas about how APNIC can help with network security issues in the region?

Training

"Provide training and conferences on network security." South East Asia*

"APNIC sharing their knowledge how to maintain security in a workshop". South Asia

"By arranging tech talks and webinars by the network security professionals." South Asia

"Partner with local CERT to lead on national development of guidelines and technical internal policies. Partner with local organisation to run hands on practical training." Oceania

"I think best is for APNIC to provide more updates network security training as well as hand on labs." Oceania

"Provide more training with certificates on the latest security threats and how users can handle them." South Asia

Information sharing, case studies,

"Dissemination of the latest security-related information." South Asia*

"APNIC can assist us with network security challenges is a blog post". South Asia

"Enhance sharing of security insights on the APNIC Blog and website." South Asia

"create best practices guides and open source tools." South East Asia

"Providing lessons on how to overcome network security problems that are often encountered, both through the APNIC website blog and through the Seminar program held by the APNIC team." South East Asia*

Collaboration, working with government and business

"Strengthen the network security activities with government departments in the jurisdiction, so as to promote enterprises to improve the level of security management." East Asia*

"Support the understanding of the importance of security technology to policy makers and business owners in each local community." East Asia*

"APNIC can develop more effective tools for mitigating security challenges for NIRs of Asia Pacific region and showcase or train NIRs with their existing security tools." South Asia

"Close cooperation with related organizations and information transmission." East Asia*

"Provide better collaboration among members." South East Asia

Encourage RPKI, BGP and other tools

"Encourage uptake of RPKI for BGP or other technologies to similarly secure routing paths." Oceania

"Developing RPKI within our region; coordinating with all NIRs to promote RPKI, coordinating with big ISPs/IXPs in the world to deploy RPKI within their networks." South East Asia*

"Push harder to have members adopt BCP routing security practices, too many networks are behaving poorly and causing other network providers to bridge the gap and protect against bad traffic." Oceania

Already doing a great job!

"APNIC is on the way of helping organization from the network security incidents. But still need to apply the action." South East Asia

"APNIC is already doing the best assistance." South East Asia

*Translated

IPv4 scarcity

As in 2018, the Survey canvassed information about the challenges arising from the continued scarcity of IPv4 addresses. From a list of seven potential challenges, respondents were asked to indicate up to two challenges facing their organisation.

Similar to 2018, and reflecting the findings from the qualitative interviews, the two biggest issues facing respondents are deployment of IPv6 (34%) and the cost of IPv4 addresses (27%). Although not significant, deployment of IPv6 (28%) and the cost of buying IPv4 addresses (20%) is less of an issue for Members in Oceania than other regions.
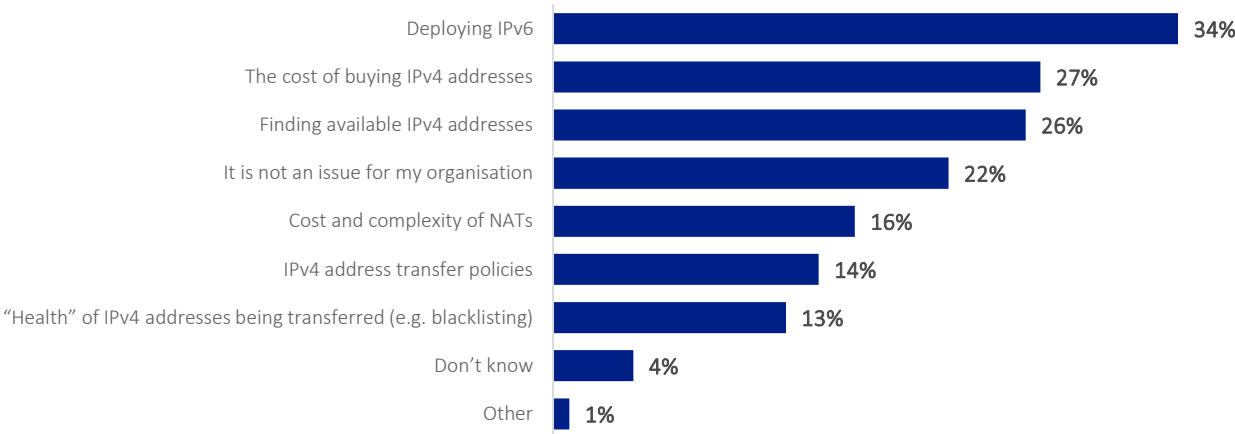
Finding available IPv4 addresses is also an issue for just over a quarter (26%) of respondents. Again, Members in Oceania (15%) are significantly less likely to indicate that finding IPv4 addresses poses a challenge for them.

Whilst cost and complexity of NATs was the third biggest challenge for Members in 2018, this year it is not as prominent. This also reflects the feedback in the qualitative interviews, where challenges with using NATs was rarely mentioned.

Similar to 2018, 22% of Members indicate that scarcity of IPv4 is not an issue for their organisation. Members from Oceania (37%) were significantly more likely to report that this is not an issue for them than those in other regions.

Thinking about the scarcity of IPv4 addresses, what are the MAIN challenges facing your organisation?
(Members only:. Select up to 2. Base n=1,119 Total mentions: 1,754)

	Deploying IPv6	34%
	The cost of buying IPv4 addresses	27%
	Finding available IPv4 addresses	26%
	It is not an issue for my organisation	22%
	Cost and complexity of NATs	16%
	IPv4 address transfer policies	14%
	"Health" of IPv4 addresses being transferred (e.g. blacklisting)	13%
	Don't know	4%
	Other	1%

	East Asia	Oceania	SE Asia	South Asia	LDEs	Others
Sample size	165	217	296	397	353	766
Deploying IPv6	36%	28%	38%	36%	34%	34%
The cost of buying IPv4 addresses	24%	20%	30%	30%	29%	25%
Finding available IPv4 addresses	28%	15%	26%	30%	26%	25%
It is not an issue for my organisation	16%	37%	19%	17%	18%	23%
Cost and complexity of NATs	16%	16%	17%	17%	18%	16%
IPv4 address transfer policies	21%	9%	14%	14%	16%	14%
"Health" of IPv4 addresses being transferred	12%	10%	11%	15%	14%	12%
Don't know	2%	5%	4%	5%	5%	4%
Other	2%	0%	1%	1%	0%	1%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

Thinking about the scarcity of IPv4 addresses, which, if any, of the following IPv4 activities do you think APNIC should undertake?
(Members only. Select up to 2. Base n=879,Total mentions: 1,548)
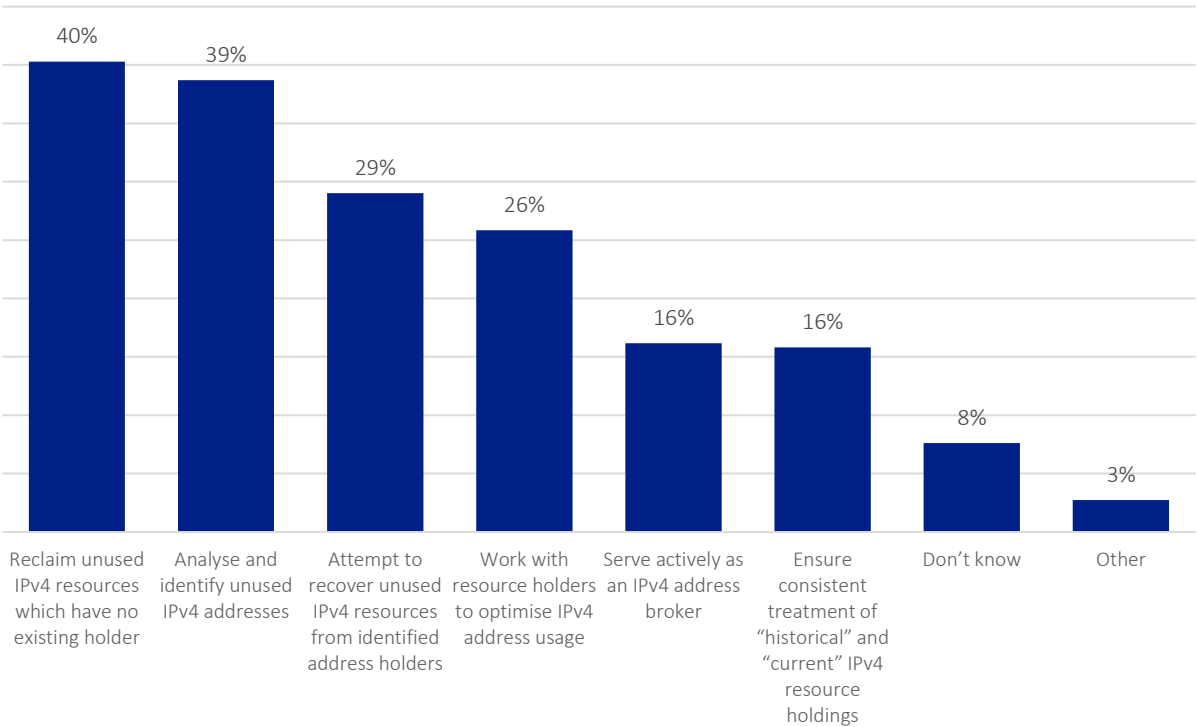
Respondents were next asked to indicate what activities APNIC should undertake to assist with the scarcity of IPv4 addresses.

Reclaiming unused IPv4 resources which have no existing holder was supported by 40% of respondents. Nearly two in five (39%) also want APNIC to analyse and identify unused IPv4 addresses, presumably to enable the reclamation of these.

Twenty-nine percent (29%) want APNIC to attempt to recover unused address space from identified address holders, and over a quarter (26%) believe that working with address holders to optimise IPv4 address usage would assist to combat the scarcity of IPv4.

There was less support for APNIC to serve actively as an IPv4 broker or to ensure the consistent treatment of historical and current resource holdings (both 16%).

In the individual interviews conducted prior to this Survey, Members were more likely to indicate they wanted APNIC to continue the encouragement and promotion of deployment of IPv6 in response to IPv4 scarcity. There were calls for APNIC to enter into dialogue with vendors, government and regulatory authorities to educate and inform them of the benefits of IPv6. This was supported by the majority of the 'Other' suggestions, with comments that APNIC could "socialize the use of IPv6' and 'promote IPv6 with greater emphasis on the benefits".

Thinking about the scarcity of IPv4 addresses, which, if any, of the following IPv4 activities do you think APNIC should undertake?
(Members only. Select up to 2. Base N=879,Total mentions: 1,548)

	Total	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	879	139	136	239	330	288	591
Reclaim unused IPv4 resources which have no existing (or contactable) holder	40%	40%	46%	37%	39%	36%	42%
Analyse and identify unused IPv4 addresses	39%	30%	26%	46%	43%	40%	38%
Attempt to recover unused IPv4 resources from identified address holders	29%	26%	25%	26%	35%	36%	26%
Work with resource holders to optimise IPv4 address usage	26%	28%	23%	25%	28%	29%	24%
Serve actively as an IPv4 address broker	16%	25%	21%	14%	13%	11%	18%
Ensure consistent treatment of "historical" and "current" IPv4 resource holdings	16%	17%	17%	18%	14%	16%	16%
Don't know	8%	6%	10%	5%	9%	9%	7%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

Reclaiming unused IPv4 resources that have no existing holder was supported relatively evenly across all regions and economies. While support to analyse and identify unused addresses was also consistent across economies at different stages of development, from a regional perspective respondents in Oceania (26%) are significantly less likely to indicate they want APNIC to do this.

Three in ten (29%) respondents support APNIC attempting to recover unused IPv4 resources from identified address holders, with those in South Asia (35%) and LDEs (36%) more likely to indicate APNIC should undertake this activity. Respondents in developed or developing economies are significantly less likely to support this initiative.

Members in East Asia are more likely to want APNIC to serve actively as a broker for IPv4 resources, with a quarter (25%) indicating support for this approach.

Technology Adoption

More detailed information about the challenges organisations face in implementing and transitioning to IPv6, as well as how respondents believe APNIC can help with this, was canvassed in the Survey.

This year, the Survey also tested awareness and adoption of Resource Public Key Infrastructure (RPKI), Route Origin Authorisation (ROA) and Route Origin Validation (ROA) amongst Members, and what more APNIC can do to assist with implementation of these technologies for routing security.

APNIC

IPv6 deployment

Reported full deployment of IPv6 in the region has grown from 15% in 2018 to 20% in 2020. Consistent with 2018, 23% indicate that IPv6 is deployed in their core networks, and 32% have a deployment plan in place. Pleasingly, those who report they have no deployment plan in place has fallen from 35% in 2016 to 25% this year.

Members in East Asia (36%) are more likely to indicate they have fully deployed IPv6, up from only 17% in 2018. In contrast, only 15% of respondents in South Asia report full deployment of IPv6, although this is higher than reported in 2018 when only 8% had fully deployed the technology.
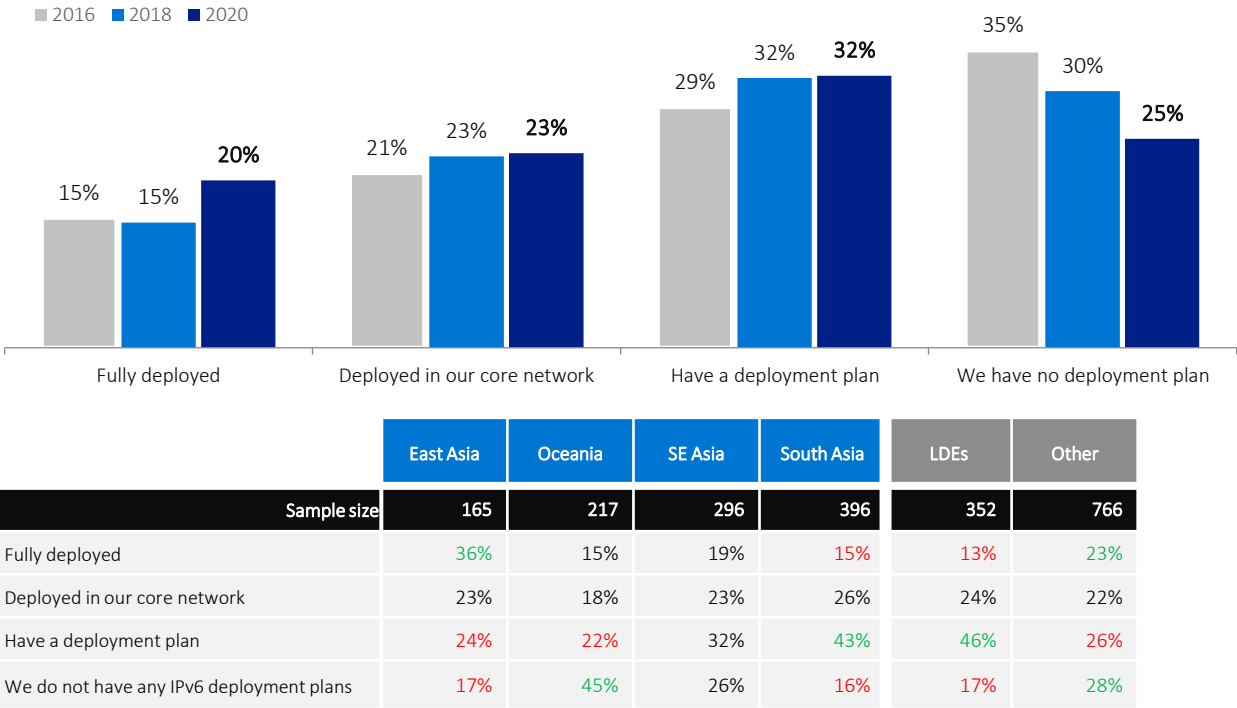
Those in least developed economies also report higher deployment than in 2018, with 13% having fully deployed IPv6 in 2020, compared to only 7% in 2018.

Deployment of IPv6 in core networks is relatively consistent across regions and economies. While many Members interviewed prior to the Survey indicated that whilst deployment in their own networks was complete, slow adoption and a lack of understanding of the benefits of IPv6 amongst others in the Internet community was hampering full deployment.

More respondents in South Asia (43%) and least developed economies (46%) indicate they have an IPv6 deployment plan than other regions and economies.

Members in Oceania (45%) and those from other economies (28%) are the most likely to indicate they have no IPv6 deployment plans in place.

Has your organisation already deployed or are you ready for deployment of IPv6?
(Members only: n= 1,119)

■ 2016 ■ 2018 ■ 2020

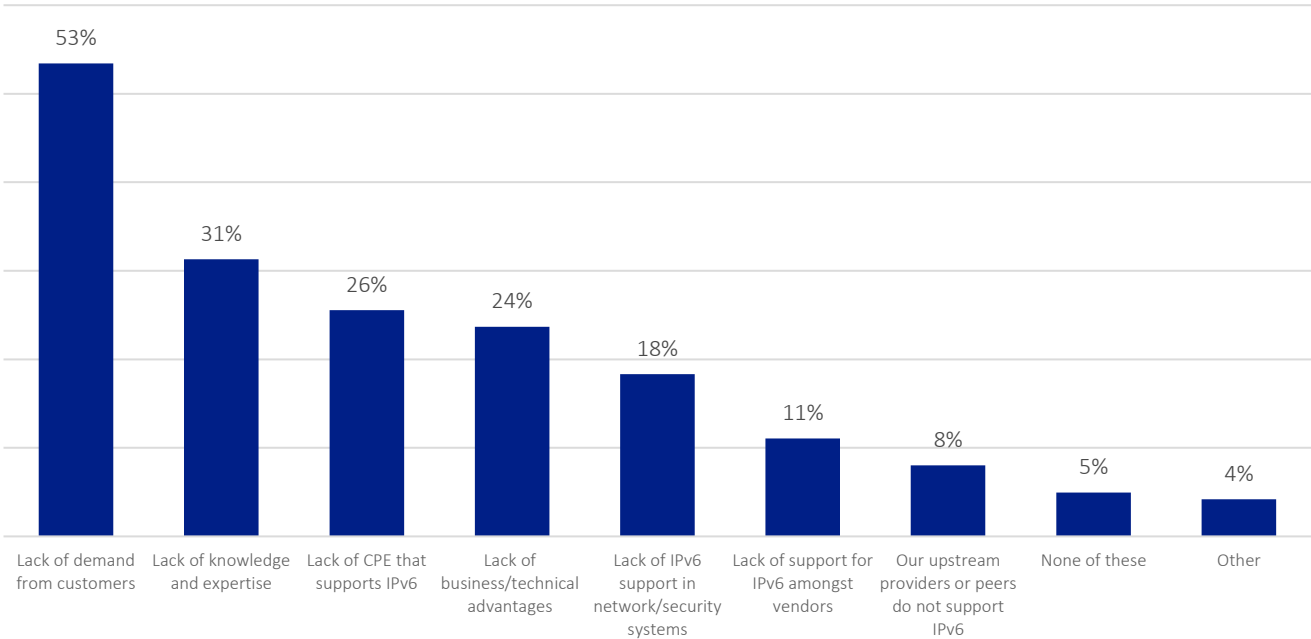|	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	165	217	296	396	352	766
Fully deployed	36%	15%	19%	15%	13%	23%
Deployed in our core network	23%	18%	23%	26%	24%	22%
Have a deployment plan	24%	22%	32%	43%	46%	26%
We do not have any IPv6 deployment plans	17%	45%	26%	16%	17%	28%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

What is preventing IPv6 deployment in access or other networks?

(Members only. Select up to 2. n=262)

Bar chart values:
- Lack of demand from customers: 53%
- Lack of knowledge and expertise: 31%
- Lack of CPE that supports IPv6: 26%
- Lack of business/technical advantages: 24%
- Lack of IPv6 support in network/security systems: 18%
- Lack of support for IPv6 amongst vendors: 11%
- Our upstream providers or peers do not support IPv6: 8%
- None of these: 5%
- Other: 4%

	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	39	40	69	105	88	174
Lack of demand for IPv6 from customers	51%	60%	61%	49%	52%	54%
Lack of knowledge and expertise on IPv6	28%	30%	28%	37%	39%	28%
Lack of CPE (customer equipment) that supports IPv6	21%	20%	26%	30%	34%	21%
Lack of business/technical advantages or reasons to adopt IPv6	31%	38%	25%	14%	15%	28%
Lack of IPv6 support in network management / security systems	23%	15%	7%	24%	25%	15%
Lack of support for IPv6 amongst vendors	10%	18%	6%	12%	11%	11%
Our upstream providers or peers do not support IPv6	5%	5%	12%	8%	5%	10%
None of these	5%	5%	7%	4%	2%	6%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

The Survey next asked those without an IPv6 deployment plan for feedback about the main barriers to IPv6 deployment. Over half (53%) of APNIC Members report that a lack of customer demand is the biggest issue with deployment of the technology.

And while a lack of skills (31%) and customer equipment (26%) round out the top three reasons preventing deployment, nearly a quarter (24%) indicate that there are not enough business or technical advantages to adopt IPv6. Free text comments also support this, with suggestions that "the problem with IPv6, is that cost-to-benefit analysis doesn't add up. It does the same thing as IPv4, but requires significant engineering time to accomplish …"

Interestingly, there are no significant differences across economies and sub-regions regarding the barriers faced in fully implementing IPv6.

1 | Lack of demand from customers

A perceived lack of customer demand is preventing a majority of Members from deploying IPv6 outside their core networks. More than half (53%) of all respondents indicate this is the main issue for them. This rises to 61% of Members in South East Asia and 60% in Oceania.

Unlike in 2018 when ISPs, software vendors and telecommunication / mobile operators were significantly more likely to report customer readiness and demand was the primary barrier to implementation of IPv6, this year there are no significant differences across organisation types.

Feedback from the interviews also indicated that, although a majority of those interviewed had deployed IPv6 in their core networks, one of the reasons they had not progressed to full deployment was because of lack of customer demand.

2 | Lack of knowledge and expertise

A lack of knowledge and expertise in IPv6 deployment within organisations (31%) was the next most cited challenge affecting the transition to IPv6.

Thirty-one percent (31%) of Survey respondents indicated that skill deficiencies are one of the top three challenges affecting their organisations ability to deploy IPv6. This rises to 39% of respondents in LDEs and 37% in South Asia.

### 3 | Lack of customer premise equipment (CPE) that supports IPv6

Reflecting feedback provided in interviews conducted before the Survey, a combination of a lack of CPE that supports IPv6 (26%) and lack of support amongst vendors (11%) and upstream providers (8%) also hampers full deployment of IPv6.

At 36%, ISPs were significantly more likely than other respondent groups to indicate that lack of CPE presented challenges to their IPv6 deployment. A higher proportion of software vendors (67%) also indicated that they had not fully deployed IPv6 because their upstream providers or peers do not support it.

Interviews with Members suggested that equipment vendors favoured investment in IPv4 support at the expense of IPv6, and that APNIC needed to increase its work in the promotion of IPv6 amongst vendors and content providers.

Which of the following APNIC activities do you believe are the most important to encouraging IPv6 adoption in the APNIC region?
(Members only: Select up to 2. Base n= 1,119; Total mentions: 2,091)
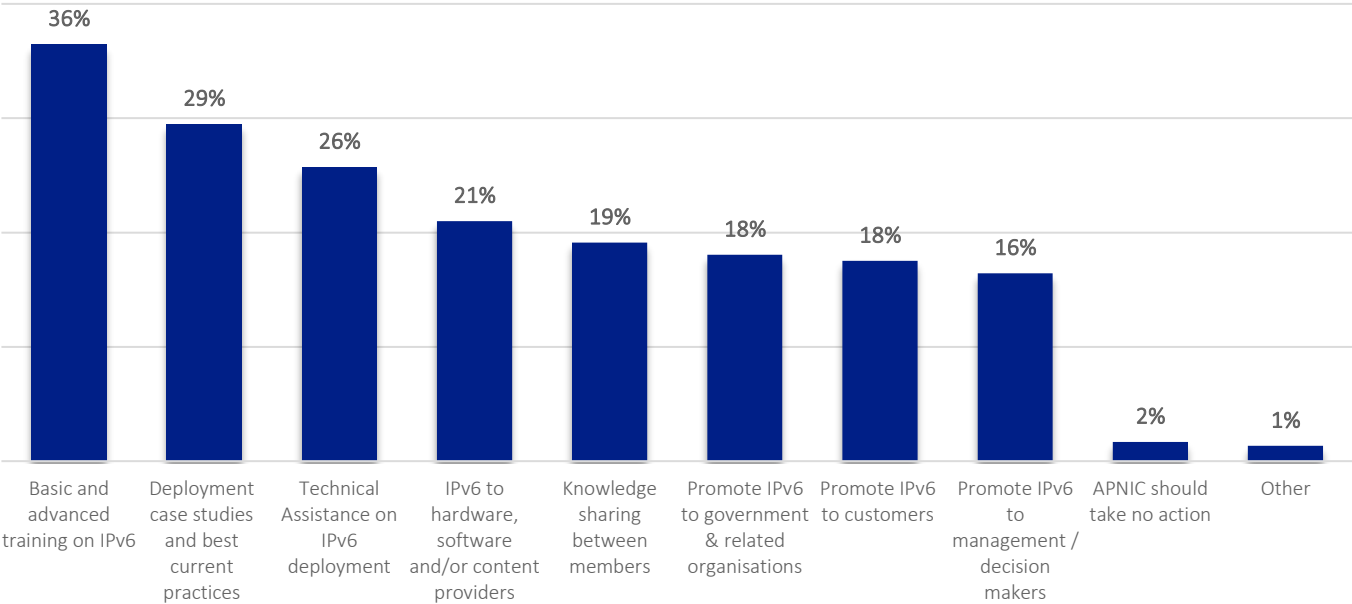
1 | Training, Information Sharing & Technical Assistance

Of the eight potential activities suggested to encourage IPv6 deployment, 36% of respondents indicated that providing basic and advanced training is the most important way APNIC can encourage IPv6 adoption in the region.

Demand for IPv6 training is relatively consistent across all regions and economies this year, although slightly higher in LDEs (42%) and in South Asia (40%)

At 29%, sharing deployment case studies and best practices about IPv6 is also supported by Members, with those in East Asia (35%) and Oceania (32%) most likely to favour these activities.

Continuing the technical training and assistance theme, just over a quarter (26%) of respondents believe that providing technical assistance on IPv6 deployment is important to encourage IPv6 adoption in the region.

2 | Promotion of IPv6

Consistent with feedback provided in individual interviews, many respondents also believe that APNIC can aid the transition to IPv6 by promoting it to various stakeholders, particularly hardware, software and content providers.

Just over one in five (21%) respondents want APNIC to promote IPv6 to hardware, software and content providers, and 18% favour similar promotion to governments and related organisations, and to business and retail customers.

Much of the verbatim feedback about adoption of IPv6 also focused on the need for promotion. Respondents called for APNIC to "get vendors to have default IPv6 capability" and to "create a safe dialogue in encouraging vendors to put more resources into the IPv6 feature development".

Other comments included that there was little benefit for IPv6 because "IPv6 has no business benefit. It is too technically complex to implement and support, not widely supported and the ROI fails."

Which of the following APNIC activities do you believe are the most important to encouraging IPv6 adoption in the APNIC region?

(Members only. Select up to 2. Base n= 1,119; Total mentions: 2,091)

	Total	East Asia	Oceania	SE Asia	South Asia	LDEs	Others
Sample size	1119	165	217	296	397	353	766
Providing basic and advanced training on IPv6	36%	30%	34%	36%	40%	42%	34%
Sharing deployment case studies and best current practices about IPv6	29%	35%	32%	29%	27%	27%	31%
Providing Technical Assistance on IPv6 deployment	26%	15%	20%	28%	33%	31%	23%
Promoting IPv6 to hardware, software and/or content providers	21%	26%	24%	17%	21%	18%	23%
Facilitating knowledge sharing between member organisations on IPv6 deployment experiences	19%	19%	19%	16%	22%	24%	17%
Promoting IPv6 to government and related organisations	18%	24%	14%	21%	18%	17%	19%
Promoting IPv6 to customers (business and retail)	18%	22%	16%	19%	14%	15%	19%
Promoting IPv6 to management and/or decision makers	16%	19%	16%	19%	14%	14%	18%
APNIC should take no action to promote or assist with the deployment of IPv6	2%	1%	3%	2%	1%	1%	2%
Other	1%	2%	3%	1%	0%	0%	2%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

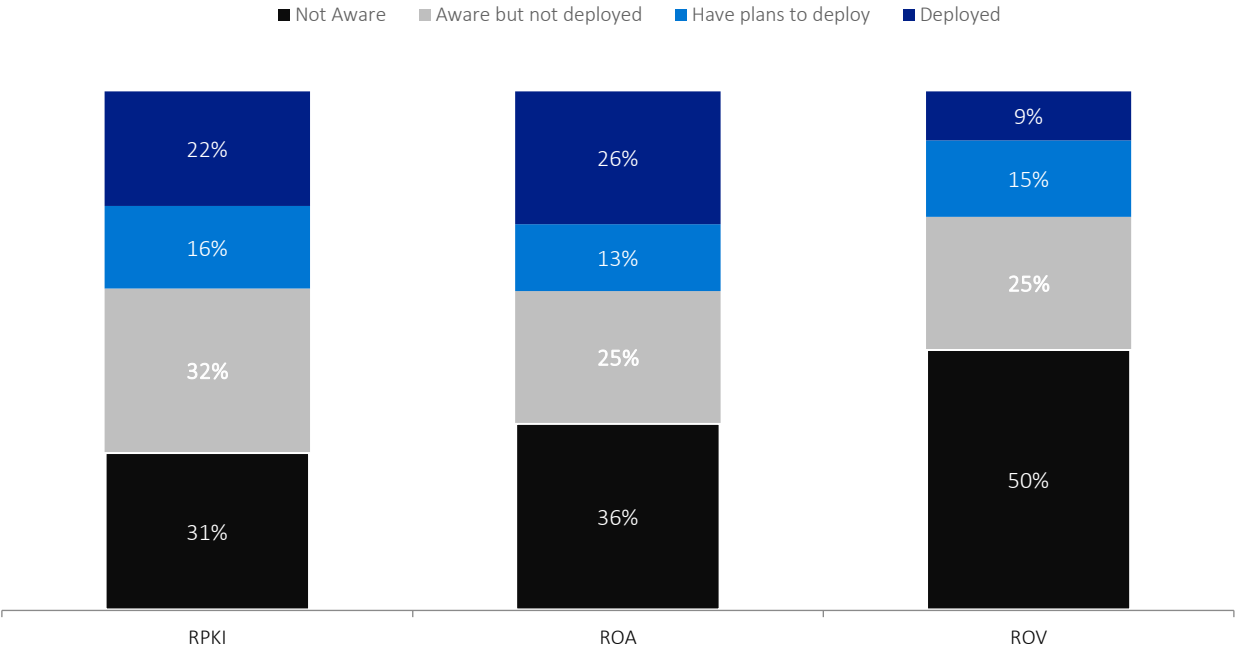Significantly higher / lower than total

RPKI / ROA / ROV

This year, the Survey was extended to canvass awareness and usage of Resource Public Key Infrastructure (RPKI), Route Origin Authorisation (ROA) and Route Origin Validation (ROV) technologies as a means to improve network security. As was evident in the feedback provided in individual interviews, use of RKPI has increased substantially since 2018. Twenty-two percent (22%) on Members have deployed RPKI, and a further 16% have plans to deploy it. Deployment of RPKI is highest in South Asia (26%) and LDEs (31%).

Notwithstanding higher usage, nearly two thirds of Members are either not aware of RPKI (31%) or are aware of it but have not deployed it (32%).

Deployment of ROA is slightly higher than RPKI at 26%, with a further 13% indicating they have plans to deploy. Again, deployment is highest in LDEs (36%) and South Asia (31%). In contrast, 42% of Members in Oceania and 39% in developed or developing economies (39%) have no awareness of ROA.

Only 9% of respondents have deployed ROV in their networks. Half report no awareness at all of the technology, and another quarter are aware of it, but have not deployed it. Among the regions, South Asia Members are most likely to indicate they have deployed ROV (12%), while only 5% of respondents from Oceania have ROV in their networks.

Please indicate the extent to which you are aware of, and have deployed, the following?
(All respondents. Base n= 1,624)

	Not Aware	Aware but not deployed	Have plans to deploy	Deployed
RPKI	31%	32%	16%	22%
ROA	36%	25%	13%	26%
ROV	50%	25%	15%	9%

RPKI

Twenty-two percent (22%) of respondents have deployed RPKI, with those in LDEs (31%) and South Asia (26%) more likely than other economies or regions to have RPKI in their networks.

	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1119	503	255	296	439	561	475	1147
I am not aware of this	27%	38%	27%	33%	31%	31%	30%	31%
I am aware of this, but have not deployed it	28%	39%	38%	36%	30%	27%	25%	34%
We have plans to deploy	17%	13%	11%	17%	17%	16%	15%	16%
This is deployed in our network	27%	10%	23%	14%	23%	26%	31%	19%

ROA

Almost a third (32%) of Members have registered ROAs in their networks. Again, more Members in LDEs (36%) and South Asia (31%) report ROA registration than other regions and economies.

	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1119	503	255	296	439	561	475	1147
I am not aware of this	32%	45%	37%	42%	38%	32%	29%	39%
I am aware of this, but have not deployed it	22%	33%	28%	29%	25%	23%	21%	27%
We have plans to deploy	13%	12%	10%	10%	14%	14%	14%	13%
This is deployed in our network	32%	11%	25%	19%	23%	31%	36%	21%

ROV

Only 12% of Members have deployed ROV. Most respondents are not aware of it.

	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1119	503	255	296	439	561	475	1147
I am not aware of this	48%	55%	50%	53%	50%	51%	51%	50%
I am aware of this, but have not deployed it	23%	30%	29%	30%	26%	21%	19%	28%
We have plans to deploy	17%	10%	12%	11%	15%	16%	17%	14%
This is deployed in our network	12%	4%	9%	5%	9%	12%	13%	8%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

How could APNIC support your organisation to learn more about, or deploy RPKI / ROA / ROV?

(All respondents. Select up to 2. Base n= 1,493; Total mentions: 2,706)
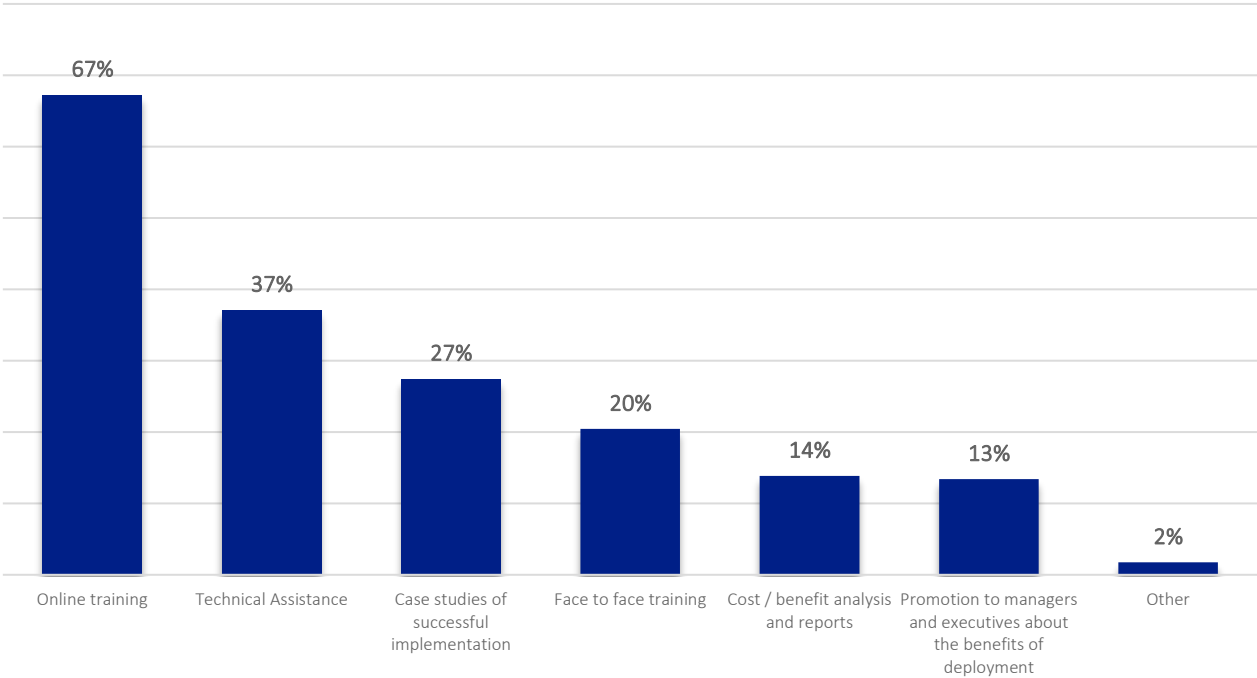
1 | Online training & Technical Assistance

Of the six potential activities suggested to support respondents to learn more about, or deploy RPKI, ROA or ROV, online training was favoured by over two thirds (67%) of respondents. Technical Assistance from APNIC was favoured by 37% of respondents.

Seven in 10 (70%) respondents from South East Asia and South Asia believe that online training would help their organisation to either learn more or deploy RPKI, ROA or ROV. Members from East Asia are less likely to favour this approach, with only 57% selecting this as a preferred option. There are no differences in preferences across economy types, with 67% indicating online training would be the best support for their organisation.

Technical Assistance from APNIC is evenly supported across all regions and economies.

2 | Case studies & Face-to-Face Training

Just over a quarter (27%) of respondents believe that case studies demonstrating successful implementation of the technology would be the best form of support APNIC can provide to learn more about, and deploy, RPKI, ROA and ROV.

Case studies are most preferred by respondents in East Asia, with 47% indicating examples of successful implementation would be useful to them.

While one in five (20%) indicate face-to-face training would be the best support for their organisation, rising to 26% of respondents from least developed economies.

What can APNIC do to support deployment of RPKI, ROA and/or ROV?

Much of the feedback in the interviews conducted with Members and NIRs about the assistance APNIC could provide with network security centred around RPKI and ROA. As in this Survey, many interview participants were aware and supportive of using RPKI and ROA for routing security.

Similarly, according to interviewees and Survey feedback, the best support APNIC can provide to support deployment of RPKI, ROA and ROV is training in application and rollout of these technologies. There is also support for APNIC to promote and champion RPKI and ROA within the region.

"In general, training on RPKI, ROA & ROV by APNIC will be effective" (South East Asia)

"Push network equipment manufacturers to support RPKI already which is long overdue." (South East Asia)

"I think that APNIC is championing [RPKI] and it's definitely one of the hot topics right now" (South Asia)

"Presentations or workshops at NOG meetings." (Oceania)

"Deployment needs to be broadened. ROA is not much use if only implemented by one company. Could APNIC help with broadening ROA deployment by associating it with Membership renewals?" (South East Asia)

Training, Information & Internet Development

Training and educational opportunities to help improve the technical knowledge and skills of the Internet community, as well as provision of Internet trend and benchmarking data are key components of APNIC's service provision.

To understand preferences around training services, and gauge interest in the type of benchmarking data that would be of value, the Survey asked about:

- Attendance at training events in the past two years

- What prevents respondents from attending training

- The training activities and formats that provide the most value

- Suggested topics for inclusion into APNIC training

- Internet trends and benchmarking data that would provide the most value

Two new questions were also added to the Survey this year canvassing opinion about where APNIC should focus its efforts if additional resources were available to support Internet development.

Training attendance

With over two in five (40%) respondents indicating they attended training in the past two years, up from 27% in 2018, the Survey asked respondents to identify the type of training they had used, if they attended.

Nearly a quarter of respondents (23%) had attended face-to-face training or online, self-paced training on the APNIC Academy. A further one in five (20%) had completed online live training on APNIC Academy or other platforms.

Respondents from South Asia (19%) were the least likely to have attended face-to-face training, instead being more likely to indicate they had undertaken online, self-paced training on the APNIC Academy (29). Unsurprisingly, respondents from LDEs are more likely to report they have attended some form of APNIC training than their developed or developing economy counterparts.

Forty-five percent (45%) of Survey respondents indicated they had not attended any training in the past two years. Those from East Asia (55%) were significantly more likely to have not taken part in training than other regions.

Have you completed any APNIC training in the past two years?
(All respondents: n=1,624)
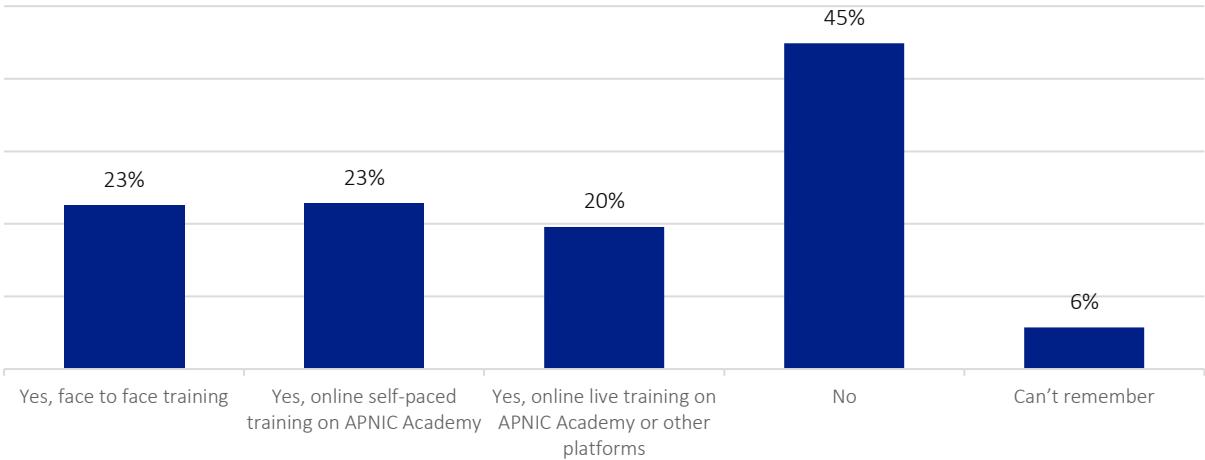
	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1119	503	255	296	439	562	476	1147
Yes, face-to-face training	23%	23%	25%	27%	26%	19%	26%	21%
Yes, online self-paced training on APNIC Academy	22%	25%	12%	19%	23%	29%	29%	20%
Yes, online live training on APNIC Academy or other platforms	20%	19%	13%	17%	23%	22%	22%	19%
No	46%	43%	55%	48%	37%	43%	39%	48%
Can't remember	5%	8%	6%	3%	9%	5%	5%	6%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

APNIC

Why have you not attended training over the past two years?
(All respondents who have not attended training: n=731)

|	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	515	216	141	143	161	242	186	545
I didn't know about the training opportunities	36%	51%	40%	35%	39%	46%	45%	39%
I don't have time	22%	19%	30%	30%	20%	8%	6%	26%
It's too expensive	18%	14%	9%	10%	22%	25%	27%	14%
The location(s) are not suitable	16%	12%	18%	13%	19%	12%	9%	17%
The courses are not suited to my role / job	9%	14%	9%	15%	9%	11%	8%	12%
I couldn't get management approval	11%	9%	9%	9%	15%	8%	11%	10%
Training is not offered in my local language	9%	6%	14%	1%	6%	12%	16%	5%
Other	7%	4%	6%	9%	7%	4%	5%	7%
The topics are too basic	4%	1%	2%	5%	4%	2%	2%	3%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

Perhaps surprisingly, two in five (40%) respondents had not attended training because they were not aware of the opportunities that were available.

For others, time (21%), cost (17%) and location (15%) are the main barriers to participation in training activities. Time pressures are more prevalent in East Asia (30%), Oceania (30%) and developed and developing economies (26%), while cost is the biggest barrier in South Asia (25%) and LDEs (27%).

Training not offered in the local language prevents attendance for 16% of respondents in LDEs and 14% in East Asia.
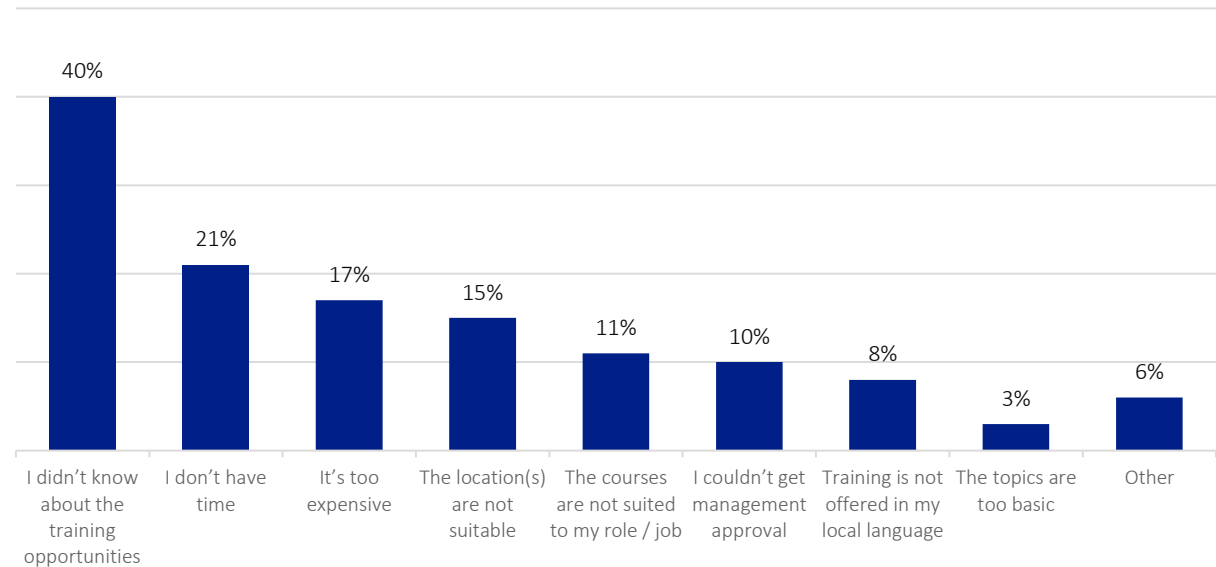
Training preferences

To understand training preferences, the Survey asked the types of activities that would provide most value. From a list of 11, respondents could choose up to five activities.
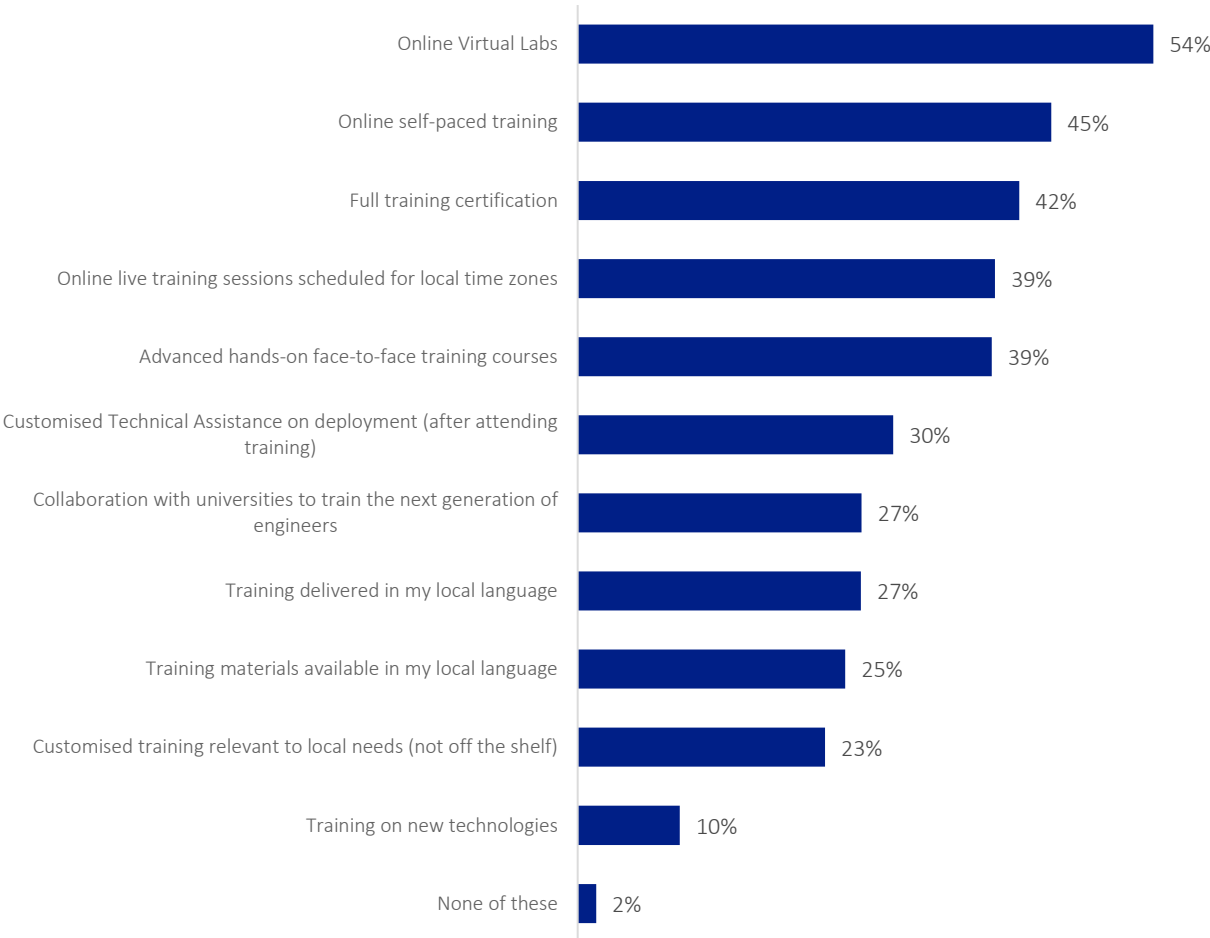
Online activities offer the most value, with online Virtual Labs and self-paced training preferred by approximately half of respondents, at 54% and 45% respectively.

Full training certification would be of value to 42% of respondents. Online live training sessions scheduled for local time zones and advanced hands-on face-to-face training would be of value to a similar proportion of respondents (both 39%). Around a quarter of responses indicate that having training delivered (27%) and training materials available in local language (25%) would provide the most value.

Although frequently mentioned in the individual interviews with Members and NIRs, training on new technologies was selected by only 10% of respondents. When asked to specify which new technologies, Software Defined Networking (SDN), the Internet of Things (IoT), IPv6, and cyber security were most often mentioned.

Which of the following training activities would be of MOST value to your organisation?
(All respondents Select up to 5. Base n=1,624; Total mentions: 5,872)

Training activity	Percentage
Online Virtual Labs	54%
Online self-paced training	45%
Full training certification	42%
Online live training sessions scheduled for local time zones	39%
Advanced hands-on face-to-face training courses	39%
Customised Technical Assistance on deployment (after attending training)	30%
Collaboration with universities to train the next generation of engineers	27%
Training delivered in my local language	27%
Training materials available in my local language	25%
Customised training relevant to local needs (not off the shelf)	23%
Training on new technologies	10%
None of these	2%

Emphasising the diversity among APNIC Members, there are differences in the types of training activities that would provide the most value to respondents in different regions.

Those in Oceania (58%) and developed and developing economies (48%) favour online self-paced training over other activities. LDEs and respondents from South Asia are more likely to indicate that advanced hands-on training, customised Technical Assistance on deployment, and collaboration with universities to train the next generation are valuable than other regions and economies (48% and 53% respectively)

Respondents from East Asia are more likely to indicate that training (40%) and training materials (46%) delivered in the local language would be of most value to their organisation.

Which of the following training activities would be of MOST value to your organisation?
(All respondents Select up to 5. Base n=1,624; Total mentions: 5,872)

	Member	Stakeholder	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1120	503	255	296	439	562	476	1147
Online Virtual Labs	55%	52%	46%	56%	53%	57%	57%	53%
Online self-paced training	44%	45%	36%	58%	45%	40%	36%	48%
Full training certification	40%	46%	24%	42%	46%	46%	44%	41%
Online live training sessions scheduled for local time zones	39%	40%	28%	44%	40%	43%	36%	41%
Advanced hands-on face-to-face training courses	38%	42%	31%	36%	37%	48%	53%	33%
Customised Technical Assistance on deployment	29%	30%	23%	28%	31%	35%	37%	27%
Collaboration with universities to train the next generation	24%	33%	22%	21%	29%	31%	32%	25%
Training delivered in my local language	27%	26%	40%	9%	31%	28%	30%	25%
Training materials available in my local language	24%	27%	46%	6%	29%	25%	30%	23%
Customised training relevant to local needs	22%	25%	20%	19%	25%	27%	29%	21%
Training on new technologies	9%	12%	4%	8%	10%	13%	11%	9%
None of these	2%	1%	1%	3%	2%	1%	1%	2%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

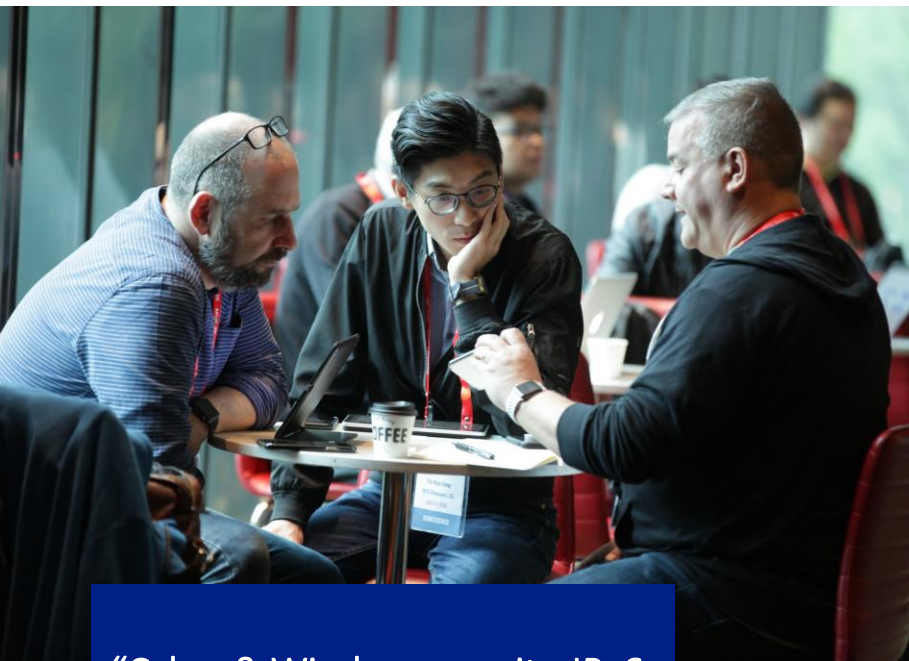Significantly higher / lower than total

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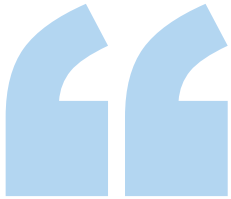
Are there any training topics you would like APNIC to provide?

Respondents were next asked to indicate in their own words the training topics that they would like APNIC to provide.

Similar to the 2018 Survey, the most frequently mentioned topics for potential APNIC training were IPv6 deployment and network and cyber security training. In respect of security training, there were many mentions of training on BGP, RPKI, ROA and ROV. Training on Software Defined Networking (SDN) and SD-WAN were also prevalent.

Although less frequently mentioned, training on newer technologies such as the Internet of Things (IoT), 5G and Artificial Intelligence (AI) are of interest to some Members.

"RPKI, Security aspects, BGP hijacking & best practices." (South Asia)

"IPv6 deployment and Network Security." (South Asia)

"Internet technology trending training for CEO/CTOs to encourage to deploy new technology." (East Asia)

"Cyber Security and IoT security related training programs will be very much helpful." (South Asia)

"Network automation and security." (South East Asia)

"Cyber & Wireless security, IPv6 deployment, network security and automation, emerging network technologies"

Oceania

> ## Are there any training topics you would like APNIC to provide?

Trend and benchmarking data

Respondents were next asked the types of Internet trend and benchmarking data would be of most use to their organisation. A list of nine suggested topics were offered and respondents could choose up to three that would be of most use.

In line with the 2018 results, data about network threats and security, such as routing anomalies, intrusion detection and security alerts, was selected as the most useful information by a majority of respondents (54%). Those in Oceania (68%) were significantly more likely to indicate this information was the most useful for their organisation.
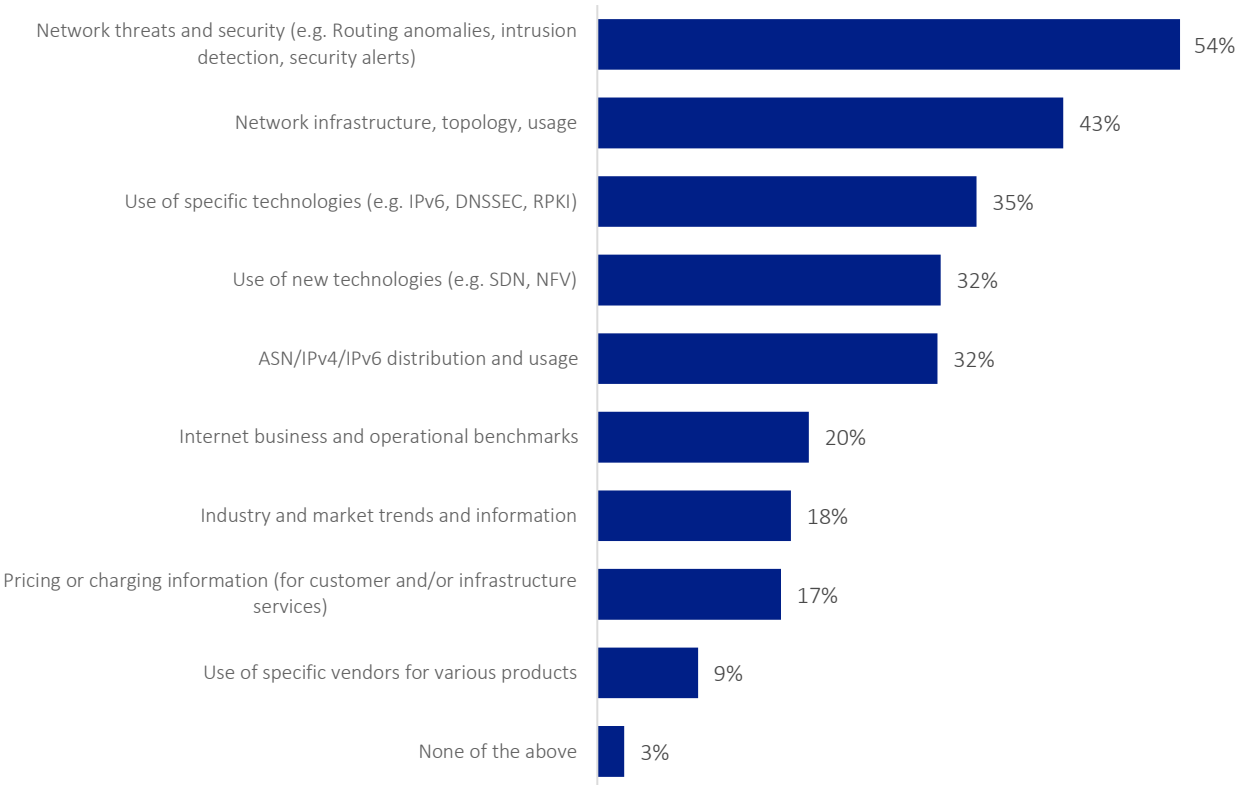
Information about network infrastructure, topology and usage was selected by 43% of respondents. This was also mentioned in the individual interviews, particularly in relation to COVID-19, as organisations were experiencing increases in Internet traffic and usage as more people were forced to work and study from home.
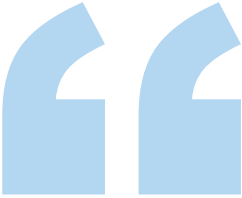
Use of specific technologies like IPv6, DNSSEC and RPKI (35%), and use of new technologies such as SDN, NFV and IoT (32%) would be of use to around a third of respondents. These topics were also frequently mentioned in response to the free text question regarding other Internet trend and benchmark information that would provide value.

Respondents from South East Asia and those in LDEs are significantly less likely to be interested in the use of specific technologies like IPv6, DNSSEC and RPKI than other regions or economies.

What types of Internet trend and benchmarking data services would be of MOST use to your organisation?
(All respondents. Select up to 3. Base n=1,624; Total mentions: 4,271)

Category	Percentage
Network threats and security (e.g. Routing anomalies, intrusion detection, security alerts)	54%
Network infrastructure, topology, usage	43%
Use of specific technologies (e.g. IPv6, DNSSEC, RPKI)	35%
Use of new technologies (e.g. SDN, NFV)	32%
ASN/IPv4/IPv6 distribution and usage	32%
Internet business and operational benchmarks	20%
Industry and market trends and information	18%
Pricing or charging information (for customer and/or infrastructure services)	17%
Use of specific vendors for various products	9%
None of the above	3%

Is there any other Internet trend and benchmark information that would be of value to your organisation?

When asked if there is any other Internet trend and benchmark information that would be of value, information about network and cyber security, RPKI, ROA and DNSSEC were frequently mentioned by respondents in free text. Respondents called for 'trends on cyber crime activities' and 'security breach information', as well as how to 'optimize routing security and use ROA and RPKI'.

Trends around usage, bandwidth, Internet capacity and traffic were also cited by respondents as being useful. Information on how to "measure network performances and benchmarking" and "more information about topology management and traffic management" would provide many with value. Others wanted data about "regional traffic usage and where more networks peer in the region."

More information about new technologies, cloud computing and IoT were also mentioned. Respondents mentioned that "introduction to new technologies and training" would be of value, as well as trends and information on "digital transformation, IPv6 and domain for IoT, 5G."

What types of Internet trend and benchmarking data services would be of MOST use to your organisation?
(All respondents Select up to 3. Base n=1,624; Total mentions: 4,271)

	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1120	504	255	296	439	562	476	1148
Network threats and security (e.g. Routing anomalies, intrusion detection, security alerts)	54%	54%	56%	68%	49%	51%	54%	54%
Network infrastructure, topology, usage	43%	44%	39%	46%	42%	46%	48%	41%
Use of specific technologies (e.g. IPv6, DNSSEC, RPKI)	36%	35%	40%	40%	33%	31%	29%	38%
Use of new technologies (e.g. SDN, NFV)	33%	31%	37%	28%	33%	31%	30%	33%
ASN/IPv4/IPv6 distribution and usage	32%	30%	29%	17%	32%	40%	36%	30%
Internet business and operational benchmarks	19%	21%	15%	14%	23%	23%	25%	17%
Industry and market trends and information	18%	18%	26%	17%	18%	15%	12%	21%
Pricing or charging information (for customer and/or infrastructure services)	16%	18%	16%	16%	20%	17%	20%	16%
Use of specific vendors for various products	9%	10%	5%	10%	10%	11%	11%	9%
None of the above	3%	2%	1%	4%	3%	2%	1%	3%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total
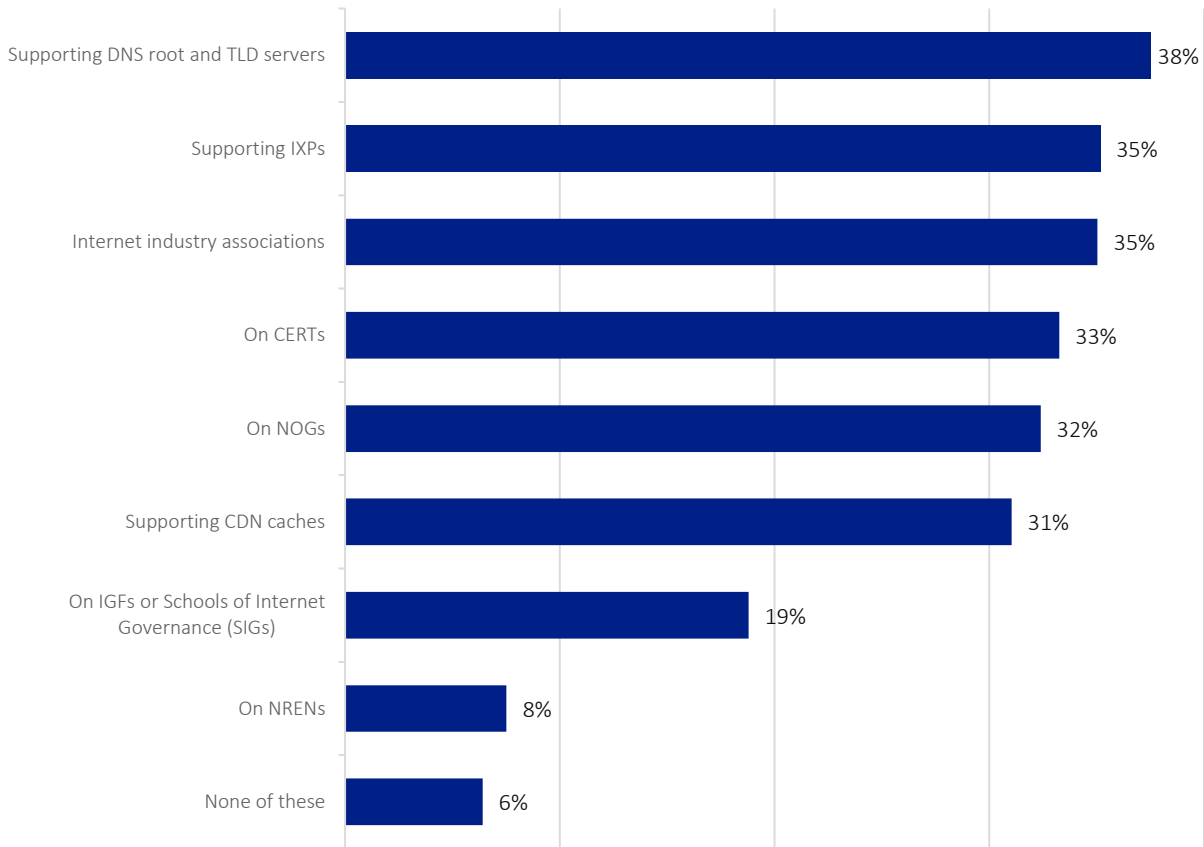
Internet development

The 2020 Survey included two new questions, canvassing opinions about where APNIC should focus its efforts if additional resources were available for Internet development. The first question sought to understand where APNIC could assist with community development or supporting shared infrastructure, and respondents could choose up to three areas from a list of eight.

Responses were relatively evenly distributed across six of the focus areas. Thirty-eight percent (38%) of respondents want a focus on supporting DNS root and TLD servers, with 35% selecting IXPs or Internet industry associations. There was no differences in support for DNS root and TLD servers or Internet industry associations across regions. Respondents from South East Asia (46%) and developed and developing economies (37%) are more likely to prefer a focus on supporting IXPs than their sub-regional or LDE counterparts.

Around a third of respondents also want APNIC to focus on NOGs (32%), CERTs (33%) and supporting CDN caches (31%). Respondents from LDEs (42%) are significantly more likely to prefer a focus on NOGs than other economies, who indicate that CERTs (36%) are more important to them as a focus for APNIC.

If additional resources were available for Internet development, through assistance for community organisations or supporting shared infrastructure, where do you want APNIC to focus its efforts?
(All respondents. Select up to 3. Base n=1,624; Total mentions: 3,850)

Supporting DNS root and TLD servers	38%
Supporting IXPs	35%
Internet industry associations	35%
On CERTs	33%
On NOGs	32%
Supporting CDN caches	31%
On IGFs or Schools of Internet Governance (SIGs)	19%
On NRENs	8%
None of these	6%

If additional resources were available for Internet development, through assistance for community organisations or supporting shared infrastructure, where do you want APNIC to focus its efforts?

(All respondents Select up to 3. Base n=1,624; Total mentions: 3,850)

	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1120	504	255	296	439	562	476	1148
Supporting DNS root and TLD servers	38%	36%	32%	37%	38%	40%	37%	38%
Supporting IXPs	37%	31%	34%	36%	46%	27%	30%	37%
Internet industry associations	34%	38%	33%	33%	36%	36%	37%	34%
On CERTs	31%	39%	36%	44%	32%	28%	25%	36%
On NOGs	34%	28%	34%	32%	30%	34%	42%	28%
Supporting CDN caches	33%	26%	29%	20%	32%	41%	40%	27%
On IGFs or Schools of Internet Governance (SIGs)	16%	26%	18%	13%	19%	23%	22%	17%
On NRENs	6%	10%	6%	2%	8%	11%	11%	6%
None of these	7%	5%	3%	10%	6%	6%	5%	7%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

Emphasising the diversity of the APNIC community, differences across APNIC Members, Stakeholders, regions and economies are apparent for many of the focus areas.

APNIC Members are significantly more likely to want APNIC to focus on supporting IXPs, NOGs and CDN caches in the region than other Stakeholders, who would prefer a focus on CERTs.

Respondents from Oceania (44%) prefer a greater focus on CERTs, while LDEs and those in South Asia are more likely to indicate that supporting CDN caches would be the best area for APNIC to concentrate on.

The second question asked respondents what type of information services would provide their organisation with the most benefit. From a list of six topics, respondents could choose up to two.

Reflecting the operational challenges organisations face managing network security, a majority of respondents (52%) are interested in new information about security incidents and threats. Those in Oceania (61%) are more likely to believe this information would provide them with the most benefit than respondents in other regions.

Information on Internet performance (32%) and industry metrics and trends (30%) would also provide value, although LDEs and those in South Asia are less likely to believe that Internet industry metrics and trends would provide them a benefit.

If additional resources were available for Internet development in information services, what would provide your organisation with the most benefit?
(All respondents. Select up to 2. Base n=1,624; Total mentions: 3,043)
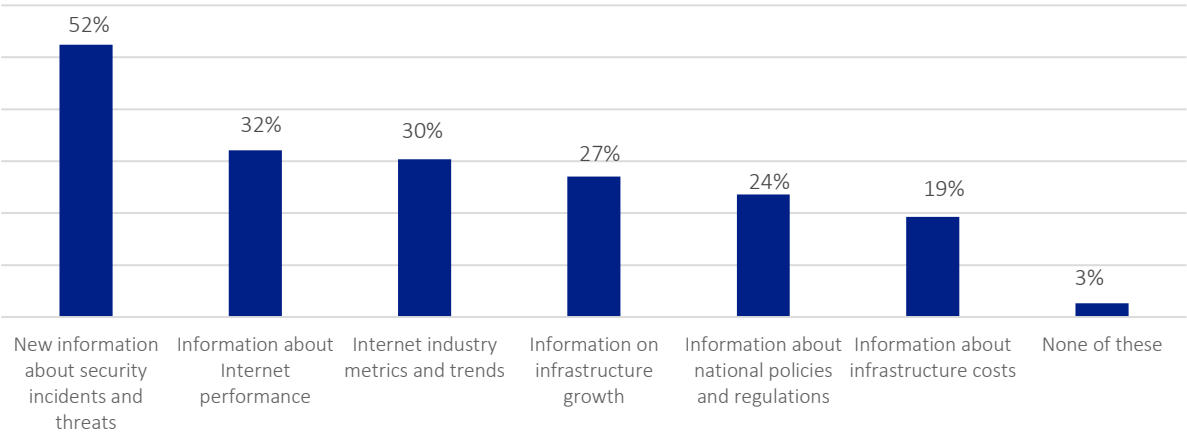
	Members	Stakeholders	East Asia	Oceania	SE Asia	South Asia	LDEs	Other
Sample size	1120	504	255	296	439	562	476	1148
New information about security incidents and threats	52%	54%	49%	61%	52%	51%	53%	52%
Information about Internet performance	33%	29%	26%	28%	37%	34%	33%	32%
Internet industry metrics and trends	32%	27%	43%	28%	35%	23%	23%	33%
Information on infrastructure growth	28%	25%	21%	18%	27%	35%	34%	24%
Information about national policies and regulations	21%	29%	25%	28%	20%	22%	21%	24%
Information about infrastructure costs	18%	21%	22%	15%	17%	22%	22%	18%
None of these	3%	3%	2%	5%	2%	2%	2%	3%

Note: Segments exclude respondents from non-APNIC regions included in the 'Total'
'Other' segment includes developed and developing economies

Significantly higher / lower than total

Appendix

APNIC Definitions of Sub-regions

East Asia	
CN	China
KP	Democratic People's Republic of Korea
HK	Hong Kong Special Administrative Region of China
JP	Japan
KR	Republic of Korea
MN	Mongolia
MO	Macao Special Administrative Region of China
TW	Taiwan

South Asia	
AF	Afghanistan
BD	Bangladesh
BT	Bhutan
IN	India
IO	British Indian Ocean Territory
LK	Sri Lanka
MV	Maldives
NP	Nepal
PK	Pakistan

South-East Asia	
BN	Brunei Darussalam
CX	Christmas Island
ID	Indonesia
KH	Cambodia
LA	Lao People's Democratic Republic
MM	Myanmar
MY	Malaysia
PH	Philippines
SG	Singapore
TH	Thailand
TL	Timor-Leste
VN	Viet Nam

Oceania	
AS	American Samoa
AU	Australia
CK	Cook Islands
FJ	Fiji
PF	French Polynesia
FM	Federated States of Micronesia
GU	Guam
KI	Kiribati
MH	Marshall Islands
MP	Northern Mariana Islands
NC	New Caledonia
NF	Norfolk Island
NR	Nauru
NU	Niue
NZ	New Zealand
PF	French Polynesia
PG	Papua New Guinea
PW	Palau
SB	Solomon Islands
TK	Tokelau
TO	Tonga
TV	Tuvalu
VU	Vanuatu
WF	Wallis & Fortuna Islands
WS	Samoa

Definitions of Economies*

Developed/Developing Economies	
AS	American Samoa
AU	Australia
IO	British Indian Ocean Territory
BN	Brunei Darussalam
CN	China
CX	Christmas Island
CC	Cocos and Keeling Islands
CK	Cook Islands
KP	Democratic People's Republic of Korea
FJ	Fiji
PF	French Polynesia
TF	French Southern Territories
GU	Guam
HK	Hong Kong Special Administrative Region of China
IN	India
ID	Indonesia
JP	Japan
MO	Macao Special Administrative Region of China
MY	Malaysia
MV	Maldives
MH	Marshall Islands
FM	Federated States of Micronesia
MN	Mongolia
NR	Nauru
NC	New Caledonia
NZ	New Zealand
NU	Niue
NF	Norfolk Island
MP	Northern Mariana Islands
PK	Pakistan
PW	Palau
PG	Papua New Guinea
PH	Philippines
PN	Pitcairn
KR	Republic of Korea
WS	Samoa
SG	Singapore
LK	Sri Lanka
TW	Taiwan
TH	Thailand
TK	Tokelau
TO	Tonga
VN	Viet Nam
WF	Wallis and Fortuna Islands

Least Developed Economies	
AF	Afghanistan
BD	Bangladesh
BT	Bhutan
KH	Cambodia
KI	Kiribati
LA	Lao People's Democratic Republic
MM	Myanmar
NP	Nepal
SB	Solomon Islands
TL	Timor-Leste
TV	Tuvalu
VU	Vanuatu

*United Nations Classifications of Economies can be found at
http://unstats.un.org/unsd/methods/m49/m49regin.htm

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 respondents, 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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