# 2020 APNIC Member Survey Individual Interview Report

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## INTRODUCTION

The APNIC Survey has two parts. This report is the first part, which is qualitative. It consolidates up to date, indepth feedback and opinions directly from APNIC Members, including the seven NIRs and other non-Member stakeholders who participated in individual interviews held during April 2020. The findings from this report inform the design of the second part of the project, an online quantitative survey that will be conducted in July 2020.

As an open Membership-driven organisation APNIC operates on continuous feedback and implementation cycles. This year is the eleventh iteration of the APNIC Survey. Commissioned by the APNIC Executive Council (EC) and conducted every two (2) years, the APNIC Survey is a significant and comprehensive feedback tool, used to improve APNIC performance, target activities and inform APNIC's strategic planning.

The APNIC Executive Council (EC) oversees the appointment of external organisations to conduct the APNIC Survey. As in 2018, independent consultants Anne Lord and Survey Matters were appointed to complete the interviews.

## **Report Format**

Readers of this report can be guided by the following distinct sections. 'Key Highlights' summarises very highlevel issues, 'Executive Summary' is a succinct and consolidated overview of all themes, 'Key Findings' consists of in-depth findings illustrated and supported by participant quotes and 'Potential Survey Topics Arising' concludes the report listing suggestions to help inform the quantitative survey design.

Throughout the report a distinction is made where appropriate, between the feedback and suggestions of APNIC Members versus the NIRs. To protect participant anonymity, no names, organisations or locations are identified in the report findings. The report includes direct quotes from participants to add authenticity and insight to the findings.

#### Note of thanks

Thank you to everyone who participated in the 2020 individual interviews. The feedback is highly valued by APNIC. In writing this report, every effort has been made to be faithful to the comments received.

Thank you to the NIRs and APNIC staff for their excellent co-operation, coordination and support in arranging interviews with the participants.





# **METHODOLOGY**

## **Survey Process**

After each APNIC survey, a review is conducted to identify process improvements to be considered for future surveys. In 2020 a full analysis of the success of both face to face and online focus groups was conducted, and identified four elements that limited the outcomes of these:

- 1. Attendance
- 2. Resource requirements
- 3. Language barriers
- 4. Costs associated with travel

To mitigate these issues, but still allow formal independent discussions with the NIRs, APNIC Members and other Stakeholders, a recommendation was made to the APNIC EC to conduct individual interviews using video conference or telephone, which was subsequently approved.

As with any modification to research format that is used to track and monitor changes across time, the outcomes can differ. For the APNIC Survey, there were two main consequences:

- More economies could be consulted than previously, providing a greater spread of opinion. Therefore a wider range of issues and views were raised
- Fewer Members from the same economy were asked to provide their opinions, and therefore the individual views expressed were not able to be tested across a wider audience for validation.

In addition, whilst the decision to change the qualitative discussions to individual telephone/video conferences was approved prior to the full effects of the Covid-19 pandemic becoming apparent, it proved pertinent as inperson meetings would not have been possible.

The Covid-19 pandemic did disrupt a very small number of scheduled interviews, however a further consequence was that the effects on organisations interviewed were often 'top of mind', and therefore mentioned more frequently. It will be interesting to understand any lasting influence in subsequent surveys.

Despite the change to the format of the discussions, the process remained largely the same as previously:

- Analysis of feedback from the previous survey, as input to the discussion guide
- Some minor changes to the discussion guide to reflect the current environment
- Recommendation by Survey Matters for the economies to be interviewed
- In collaboration with the APNIC secretariat, selection and recruitment of suitable candidates from each economy
- Interviews conducted via Skype, Zoom or WhatsApp, depending on the participants preference. All interviews recorded (with permission) and transcribed
- Confidentiality of the discussions was ensured by independence of facilitators, and de-identification of all information reported





## **Effects of Change of Interview Format**

As a result of the change to the format of the qualitative consultations (to an exclusively individual online format, rather than face-face focus-group sessions), there were some impacts to the outcomes.

Firstly, it allowed an expansion of the numbers of economies consulted. Positively, the number of economies interviewed totalled twenty seven (27), far exceeding the number of economies visited in prior surveys. In 2018, twelve economies were consulted.

Secondly, for the first time, all 7 NIRs were consulted. This served to give every NIR the opportunity to contribute, where previously around half were consulted in each survey wave.

Thirdly, whilst many more economies were consulted, in many of these only one interview was conducted. To some extent, this reduced the 'spread' of opinion across an economy, because in focus groups there is usually some diversity of both Member and organisation type contributing to the discussion. Therefore, in consulting just one organisation in an economy, care needs to be taken when comparing the outcomes to previous qualitative results.

The extent to which this influenced the overall findings cannot be fully understood until this format is repeated in future APNIC surveys. However, as the qualitative outputs from the survey project is tested through the quantitative process, the ability to check the ideas and perspectives that arose from the interviews will be able to be corroborated.

What became apparent from the expansion of the economies consulted was that, although the 'usual suspects' of network security, IPv4 scarcity and difficulties in fully deploying IPv6 were often mentioned when asked about challenges, other more specific and nuanced issues emerged across different economies.

This highlights the APNIC Membership diversity and the challenges APNIC faces in serving the needs of a Member-base that spans multiple cultures and vastly different economic and political situations. And, whilst APNIC may not be able to specifically address all of the concerns of the Asia Pacific Internet community, it does provide greater context when making strategic decisions about how to best serve Members.





## **Selection of Locations**

Survey Matters, the APNIC Secretariat and Anne Lord provided input on locations for interviews with final approval by the APNIC EC.

The choice of locations for the interviews was based on the two factors: quantitative online survey responses in 2018 by economy type (i.e. Developed, Developing and Least Developed) and locations visited in 2014, 2016 and 2018.

It was also decided to consult all seven (7) NIRs because the effort and costs to do so were significantly lower than scheduling face to face visits.

In summary, the number of interviews conducted totalled 41, spanning 27 economies:

- 28 APNIC Members
- 7 NIRs
- 6 APNIC Stakeholders

The table below shows the locations chosen, the recommended interviews for each location, and the actual number of interviews completed.

Differences between the planned and actual number of interviews largely reflect different circumstances, however the primary impacts were the Covid-19 pandemic across the region and language barriers, particularly in two economies.

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Recommended		Recommended #	Completed	
Economies	Region	Interviews	Interviews	
Afghanistan	South Asia	1	0	
AP		2	0	
Australia	Oceania	1	1	
Bangladesh	South Asia	1	1	
Bhutan	South Asia	1	1	
Brunei	SE Asia	1	1	
Cambodia	SE Asia	2	1	
China	East Asia	1	2	
Hong Kong	East Asia	1	1	
India	South Asia	2	2	
Indonesia	SE Asia	1	1	
Japan	East Asia	2	0	
Laos	SE Asia	1	0	
Macao	East Asia	1	0	
Malaysia	SE Asia	2	3	
Mongolia	East Asia	1	1	
Myanmar	SE Asia	1	1	
Nepal	South Asia	1	0	
New Caledonia	Oceania	1	3	
Pakistan	South Asia	1	1	
Papua New Guinea	Oceania	1	1	
Philippines	SE Asia	1	1	
Singapore	SE Asia	1	0	
Solomon Islands	Oceania	1	1	
Taiwan	East Asia	1	1	
Thailand	SE Asia	2	2	
Timor Leste	Oceania	1	1	
Vanuatu	Oceania	1	1	
Interview Sub-total		34	28	

Others

Others .					
NIRs	Region	Recommended	Completed		
CNNIC	East Asia	1	1		
IDNIC	SE Asia	1	1		
IRINN	South Asia	1	1		
JPNIC	East Asia	1	1		
KRNIC	East Asia	1	1		
TWNIC	East Asia	1	1		
VNNIC	SE Asia	1	1		
	Sub-total	7	7		
Stakeholders	Region	Recommended	Completed		
Australia	Oceania	N/A	2		
India	South Asia	N/A	1		
Korea	East Asia	N/A	1		
Sri Lanka	South Asia	N/A	1		
Vanuatu	Oceania	N/A	1		
	Sub-total		6		
Т	otal Interviews	41	41		

Members by Region	Non LDC	LDC	Total
East Asia	5	n/a	5
Oceania	5	3	8
SE Asia	8	2	10
South Asia	3	2	5
Total	21	7	28

Table 1: Recommended and actual interviews by economy, Members, Stakeholders and region.





## **Participant Selection and Recruitment**

Once the locations were established and agreed, the APNIC secretariat, assisted by Anne Lord, identified three or four potential participants per location to approach for an interview, depending on the number of interviews required in each location.

In the selection process, consideration was given to the Member organisation type and size, the frequency of contact with, and knowledge of APNIC. This helped to ensure that the interviews would be productive, as the participant would have enough awareness of the topics to be able to contribute meaningful perspectives and opinions.

Potential interview participants were approached simultaneously, as time was of the essence to achieve in excess of forty (40) interviews within the project timeframe. As a result, in some economies more than the required number of participants agreed to take part in an interview. When this occurred it was decided it was appropriate to conduct interviews with all who had accepted the invitation.

Therefore, in some economies as many as three interviews were conducted, however equal weight has been given to the feedback in this report to ensure the correct balance.

#### **Discussion Guide**

Four (4) topics were developed for the 2020 discussion guide (Appendix A):

- 1. Issues and challenges providing Internet services as they relate to APNIC;
- 2. APNIC Services including APNIC Training (APNIC Members);
- 3. APNIC's Support for Internet Development; and
- 4. How is APNIC regarded?





## **KEY HIGHLIGHTS**

- Wider variety of issues and challenges amongst participants, probably as a result of more economies interviewed.
- IPv4 scarcity and difficulty deploying IPv6 beyond their own enterprises were the most frequently mentioned challenges, consistent with the 2018 survey. More dialogue and 'aggressive' promotion to vendors about IPv6 required.
- As in 2018, security remains an issue.
- Awareness and uptake of RPKI and RoA much greater than 2018, continued training and awareness needed.
- Questions about APNIC 'future strategy' arose quite frequently. As IPv6 matures, some believe APNIC's role needs to evolve beyond addresses and numbering.
- Concern about a 'fragmentation' of the Internet, with increased 'chatter' about a new Internet protocol being developed.
- Capacity, load, traffic management and Internet reliability is of concern, particularly during the Covid-19 pandemic
- Call for a greater focus from APNIC on new technologies 5G and the Internet, IoT and AI frequently mentioned
- APNIC's continued support for Internet development is valued, particularly in RPKI deployment, IXPs, CERTs and NOGs
- Greater awareness and use of the Academy is apparent. The Academy is seen as a valuable training tool.
- Calls for some new services for APNIC to consider. These were the development of an APNIC 'app', the introduction of an e-newsletter and for statistics to be gathered and published in two main areas 5G and Internet usage, and Internet traffic and capacity (the latter due to Covid-19)





## **EXECUTIVE SUMMARY**

The decision to conduct the qualitative aspect of the 2020 APNIC Survey using individual interviews by video or telephone conference was made prior to the full effects of the Covid-19 pandemic were felt, including the subsequent travel restrictions. In hindsight, this proved very prudent as it would have been impossible to conduct these using the face to face format of previous surveys.

The table below provides a comparison of economies and numbers of people consulted between 2018 and 2020.

2020 Economies	#	Organisations	2018 Economies	#	Organisations	
Consulted	Interviews	Represented	Consulted	Attended	Represented	
Australia	3	3	Afghanistan	3	2	
Bangladesh	1	1	Australia	2	2	
Bhutan	1	1	Bangladesh	8	5	
Brunei	1	1	India	2	2	
Cambodia	1	1	Indonesia	2	1	
China	2	2	Japan	2	2	
Hong Kong	1	1	Malaysia	3	3	
India	3	3	Nepal	2	2	
Indonesia	1	1	New Zealand	5	5	
Korea	1	1	Pakistan	3	2	
Malaysia	3	3	Philippines	5	4	
Mongolia	1	1	Taiwan	1	1	
Myanmar	1	1	Total	38	31	
New Caledonia	3	3				
Pakistan	1	1	NIRs			
Papua New Guinea	1	1	2020 # Attended 2018 # Atte		ended	
Philippines	1	1	CNNIC	3	CNNIC	13
Solomon Islands	1	1	IDNIC	1	IDNIC	7
Sri Lanka	1	1	IRINN	2	IRINN	8
Taiwan	1	1	JPNIC	3	TWNIC	8
Thailand	2	2	KRNIC	1		
Timor Leste	1	1	TWNIC	3		
Vanuatu	2	2	VNNIC	3		
Total	34	34	Total	16		36

Table 2: Comparison to 2018 Qualitative Research

As can be seen in Table 2, whilst the number of Members and / or stakeholders consulted remained relatively consistent with 2018, the number of economies almost doubled.

To some extent, this reduced the 'spread' of opinion across an economy, because in previous APNIC focus groups there was usually some diversity of both Member and organisation type contributing to the discussion. Therefore, in consulting just one organisation in an economy, care needs to be taken when comparing the outcomes to previous qualitative results.

However, the expansion of economies served to showcase the APNIC Membership diversity and the difficulties APNIC faces in serving the needs of a Member-base that spans multiple cultures and vastly different economic and political situations. Whilst APNIC may not be able to specifically address all of the concerns of the Asia Pacific Internet community, it does provide greater context when making strategic decisions about how to best serve Members.

A summary of the full findings is outlined in order of topic discussed below.





#### **Challenges**

One of the most interesting findings from the interviews was the diversity of challenges across different economies, which was largely discovered as a result of consulting many more economies than previously. Adding to this diversity of opinions was the decision not to 'prompt' interviewees about the issues that were apparent in 2018 and 2016. This is usual in qualitative discussions because it serves to gather unbiased, 'top of mind' responses.

The combination of these two factors meant that while the 'usual suspects' of IPv4 scarcity, difficulties in fully deploying IPv6 and Internet security were the top challenges cited, they did not dominate the array of issues participants cited and many more nuanced issues arose.

This year IPv4 scarcity, coupled with challenges fully deploying IPv6, was top of mind for 12 of the 41 interviews. Security was the biggest challenge for eight of the participants. This is not to say that these issues did not come up at all in other interviews, they frequently did, however when asked unprompted what the single biggest challenge their organisation faced within the realms of the Internet and APNICs remit, these were first mentioned 12 and eight times, respectively.

Three other issues also arose from the discussions that were not apparent previously.

Firstly, there was concern from some about APNIC's future direction in the context of a greater take up of IPv6 and subsequent reduction in administration and support required, alongside a more 'mature' Internet where 'names and numbers are no longer dominant (but are) almost just like infrastructure in the background'. Some participants questioned APNIC's future role, and how it was planning to address this. Concerns about 'fragmentation' of the Internet and greater interference by government and regulators were also cited.

Secondly, management of Internet traffic, load balancing, capacity and bandwidth were also frequently mentioned as a result of organisations having to deploy work from home models for their employees due to COVID-19. Latency and congestion issues were also cited, again as a result of more people accessing the Internet from home.

Thirdly, new technologies like 5G, the Internet of Things (IoT) and Artificial Intelligence (AI) were often included amongst the challenges discussed. This was largely in the context of a 'broader Internet picture' and the need for Members to both gain a better understanding of their impacts on existing technology and infrastructure, and a desire to be able to 'meet the needs of the modern community'.

In response to what APNIC can do to alleviate these issues, responses ranged from specific 'relax the application requirements for IPv4 for my organisation' to an almost esoteric '[APNIC] can assist developing the whole ecosystem because that will help the Members'!

In respect to IPv4 and IPv6 issues, many were resigned to the situation that they could not get more IPv4 addresses and suggestions were more targeted towards APNIC being more 'aggressive' in the promotion of IPv6. A large number of interviewees already have IPv6 deployed in their backbone and lamented the lack of willingness of vendors to prioritise IPv6 support over IPv4.

There were many more mentions of using RPKI and RoA to combat some of the security issues, and awareness of these was much higher than in 2018. Suggestions for help with security issues mostly included continued training and workshops, however one participant suggested that APNIC link Membership renewal and fees with RoA deployment, providing incentives for those who have implemented it.

A more 'structured, formal training program' incorporating not only technical areas but also 'policy, operation and promotion' were mentioned as one direction that APNIC could contemplate in the future. Additional training programs including topics around new technologies like 5G and the Internet, IoT and AI were also mentioned. Most felt that continued dialogue with governments, regulators and other prominent entities like Google, Apple, Huawei and social media conglomerates was required to continue to combat issues of fragmentation of the Internet and growing government interference.

There were calls for tools to better track network availability, traffic and load and help with understanding how to improve access to the Internet and network performance outside metropolitan areas.

The NIRs called for greater collaboration between each other, facilitated by APNIC to 'share information and ideas' on how to incorporate new technologies into their suite of services to their Members. They also want 'general governance or guidelines' to follow that incorporate these technologies.





#### **APNIC Services and Products**

APNICs products and services are well known, and there is widespread appreciation of APNIC's capabilities and service offerings. As in other consultations, although satisfaction is high, specific usage is mixed. Many interviews were conducted with quite senior Members, who do not have a need to access specific services. There was some speculation that there was lower awareness across their organisation and that APNIC could increase its promotion of what was available more broadly.

Feedback was largely positive about all of the products and services offered, while specific mention was made of the helpful improvements to MyAPNIC, the expertise of the helpdesk and the usefulness of the blogs which provide 'a lot of information about what's new and upcoming',

Suggestions for improvement included three ideas; the development of an APNIC App, the introduction of a periodic e-newsletter and new statistical information and reporting. An App was appealing because 'an app with MyAPNIC resources is easier, I don't have to remember passwords and all the resources are there.' There were suggestions for a newsletter that 'doesn't have to be too frequent' but could have 'a push for Members to do things ... like an "APNIC recommends" series.' There were also calls for statistical information in 'IP address management and traffic', 'infrastructure which links to current technology' and RPKI and RoA uptake so 'we can compare how countries are doing'.

Many participants had undertaken training in the past two years and were very appreciative of both in-person and online training. Mention was made of APRICOT this year where Members could 'systematically do things hands-on'. Awareness of the Academy has also improved from previous surveys.

As in 2018, suggestions for further improvements included having more intermediate and advanced training courses available and better notice of when courses were being held so 'we can schedule the right people to attend'. They would also like new topics included, particularly around 'technology trends, IoT and 5G etc.'

#### **Support for Internet Development**

APNIC's support for IXPs, CERTs and NOGs is widely acknowledged and valued. Many spoke of their reliance on APNIC support for these activities because 'we depend on it! Financially, human resources, content - APNIC is our biggest supporter.'

Similarly, the continued dialogue with governments and regulators in the region is welcomed, although it is acknowledged that it is 'very difficult to do this across the political divides in the region.'

While there were no new improvements that Members felt APNIC could implement, many encouraged APNIC to continue to use its position of neutrality to 'help build the bridges' with organisations and government to allow greater collaboration on 'the technical issues we are facing.'

There were few comments about the APNIC fellowships and the APNIC Foundation, however many indicated that they had applied for fellowships but they were rejected and there was 'no reason given why'. They called for better communication about why their application was rejected to help them improve their chances of acceptance in future.

The NIRs provided a different perspective on the subject of support for Internet development. They were all appreciative of APNICs involvement and support to establish IXPs, CERTs and NOGs, and of efforts to promote better security through RPKI and RoA technologies. They encouraged APNIC to 'continue to work collaboratively on these important initiatives.'

They are also welcoming of the appointment of George Kuo as NIR Liaison and called for more meetings of all NIRs outside the standard conferences to create a 'forum for us to share ideas and what's happening to have a better community'.

They, too, wanted more exposure to new technologies like 5G, IoT and AI, and called on APNIC to work with them to establish wider norms and guidelines that include these alongside the existing Internet governance. There were calls for APNIC to 'adopt a '21st century approach' to this and encourage the development of the Internet community to include 'new aspects that will impact on us soon.'





#### **How is APNIC Regarded?**

APNIC is held in high esteem amongst participants. They value the support and contribution provided by APNIC who is regarded as a trusted, neutral authority in the region.

However, throughout the interviews, many expressed the feeling that APNIC is still not well enough known 'outside of existing Members' and that more promotion and outreach was required because 'the addresses, the names, don't matter ... it's a much bigger picture now'.

Mirroring the feedback from the discussions about challenges, some questioned APNIC's ongoing role and its strategy in 'meeting the demands of the  $21^{st}$  century and all the new technologies'. Others felt that APNIC 'comes from a historical position of power but needs to evolve more and embrace new thinking'.

There were suggestions that APNIC could work with universities to educate engineering students about the work it does. Others wanted APNIC to collaborate with organisations who were involved with 5G, IoT and AI to both expand awareness of APNIC and enable it to move into new training areas.

One participant called for APNIC to provide 'one staff for [economy], dedicated and on the ground with the job of building the network community.'





## **FULL FINDINGS**

## **Topic A – Challenges**

As with previous survey consultations, the first topic for discussion was the issues and challenges faced both within organisations and the broader economy as they relate to the Internet and APNIC's remit in the region.

In a departure from previous discussion guides, the decision was taken to not 'prompt' interviewees about the issues that were apparent in previous consultations, in order to get unbiased 'top of mind' responses from participants.

This, together with the expansion of the number of economies consulted in 2020, uncovered a vast array of topics, spanning issues of Internet literacy and knowledge, government and authorities, capacity and cost of provision as well as the known common challenges of security, IPV4 scarcity and IPv6 deployment.

## Unlike previous surveys, there is no single dominant challenge

In 2016, scarcity of IPv4 addresses was the main challenge identified in focus groups. In 2018, this had shifted to security, in all its forms, relating to the Internet.

In the 2020 interviews, attention has shifted back to IPv4 address shortages, which inevitably involves challenges with IPv6 deployment. These were the two most frequently mentioned challenges.

In relation to security, most were accepting that disruptions, DDoS attacks, route hijacks and other forms of intrusion are now an accepted fact of Internet life and that, although problematic and resource-intensive when dealing with breaches, are not going to be eliminated. Interestingly, there was more mention this year of mitigation through use of RPKI and/or RoA technologies. Many participants mentioned APNIC's work in promoting these.

When looked at in their entirety, these three issues did not dominate the discussions to the extent they have previously. As discussed, this is possibly the result of conducting interviews across many more economies.

In summary and in order of the number of mentions, the challenges in 2020 are:

- 1. IPv4 scarcity and deployment of IPv6
- 2. Internet security, access and reliability
- 3. APNIC's on-going role, Internet 'fragmentation' in the region
- 4. Management of capacity, load, bandwidth and Internet traffic
- 5. New technologies such as 5G, IoT and AI

Other issues mentioned included lack of expertise, knowledge and general 'literacy' about the Internet and the need for greater support for establishment of IXPs.





#### **IPv4 Address Shortages and Deployment of IPv6**

The issue of IPv4 address shortages was mentioned by two thirds of Members and the majority of the NIRs. For a few, IPv6 deployment is a long way off, and their dependency on IPv4, coupled with the inability to get more IPv4 addresses relatively cheaply, is hampering their business growth.

Many others, however, have deployed IPv6 themselves and want to roll it out to end-users (thus freeing up IPv4 resources). A combination of lack of vendor support, not enough IPv6 expertise in-house, competing priorities and no demand from customers, has prevented their progression to full deployment.

- "The network is expanding, rapidly expanding. We are implementing IPv6 and v4 but the number of IPv4 we have is not enough"
- "IPv4 resources is still biggest problem. This is not good news we can't expand the business. Deployment of IPv6 can make situation better, but time is an issue and the technology is not mature"
- "We have IPv6 on our own network and last year we rolled out IPv6 on our mobile network as well. The problem is on mobile network is we have to depend upon the vendors ... not all vendors have a default IPv6 accepted capability"
- "Biggest challenge for us is ... I think you hearing many times ... is the shortages of IPv4. We have deployed IPv6 ourselves, so our concern is the slow adoptions of the IPv6 and the lack of understanding on IPv6 in the [economy] Internet community"
- "We tried [to buy IPv4] last year ... US\$13 per address, but to spend that we needed approval from the chairman, and by time he approve price had gone up to US\$19"

#### What can APNIC do to assist?

In 2018, many Members wanted APNIC to intervene in the IPv4 transfer market, some calling for APNIC to 'force' companies with unused addresses to hand them back or incentivising them to return address space.

This year there were fewer calls for these tactics. Instead there were more calls for APNIC to continue promotion of IPv6, to enter into dialogue with vendors, regulatory authorities and governments to educate and inform them of the benefits. Many interviewees lamented the lack of support for IPv6 among equipment vendors, citing a preference to invest in IPv4 support at the expense of IPv6. This prompted calls for APNIC to be more 'aggressive' in their promotion of IPv6 amongst vendors.

- "Big vendors don't care about us, we are just small. We try to reach out to a lot of people ... but it is really difficult to get on board with them, please APNIC do it for us"
- "Get vendors to have default IPv6 capability"
- "Really pushing the operators and the regulator and the government with high level interventions. Big stick approach"
- "APNIC can also create a safe dialogue in encouraging vendors to put more resources into the IPv6 feature development"

"A good initiative would be to have some kind of logo to encourage more vendors to migrate to start promoting IPv6. A sort of certification program ... IPv6 ready or hardened, making sure that we set some kind of benchmark - 80% of your IPv4 features are also supporting IPv6 ... that would be very helpful"

A few do not believe that APNIC can do any more than it is already doing, believing that the community needed to 'accept that IPv6 [deployment] is far away'.





#### **Internet Security**

Although still prevalent, unlike 2018, security challenges were not the dominant theme of the 2020 discussions. While still cited as a 'major issue' for smaller and least developed economies, many others tended to discuss security challenges in terms of an ongoing issue that needed to be dealt with constantly.

Limited expert knowledge amongst employees and those working in the Internet community about security was also mentioned, again, largely by those in smaller, remote and least developed economies.

- "Security is still the big issue same as before"
- "So earlier it was only big corporates who are providing Internet, now as Internet has penetrated the region and rural large houses started outsourcing to smaller organisations. These organisations have not been trained enough to ensure that Internet works as securely as it can be"
- "[Economy] has so many Internet providers and so many Internet exchange because everybody can create their own ISP. They're not very good at routing. Because it happened every day about the routing security, the problems with the hijack ..."
- "Very limited skills and knowledge, especially in the cybersecurity front. And the fact that we still don't have the experts that we need"
- "... but the main ones are simply hijacks of a prefix, and I guess that's one thing that's progressed especially with RPKI. We've signed all our addresses"

In relation to Covid-19, some talked about the challenge of ensuring Internet connections to homes were 'as secure as they can be' but acknowledged that it was not easy to provide both access and security quickly.

"So, it was like what do you want first, access first? Or do you want security along with access? I think in our
cases we said we want access first and we will look after the security as we move along. So, this has created
challenges"

In one economy, the major issue was the blacklisting of IP addresses that have been bought through third parties, and the difficulty in getting these unblocked.

• "And basically there are some of the pools which we took from the third parties, and they seem to be on the blacklist ... and it has become very difficult and challenging task to unblock them"

#### What can APNIC do to help with network security issues?

Interestingly, many more participants are aware and supportive of using RPKI and RoA to combat security issues than in 2018, and all want more training and assistance in its application and roll out. Some want local campaigns in their economy to push for RPKI deployment across all ISPs, and better education of the benefits.

As in 2018, many believe that the best form of assistance from APNIC, apart from more training and awareness, would be to continue to champion deployment of RPKI and to collaborate with all relevant parties to ensure its uptake. One Member suggested that APNIC link membership renewal and fees with RoA deployment, providing incentives for those who have implemented it.

- "I've seen the effort that everyone is putting in to try to encourage people to adopt RPKI. I think that APNIC is championing that and it's definitely one of the very hot topics in the industry right now"
- "We plan to address some of the BGP safety issues as well. Things like RPKI, I am actually contacting the ISPs and major players to propose an APNIC workshop as soon as possible"
- "Deployment needs to be broadened, but it is not happening. RoA not much use if only implemented by one
  company. Could APNIC help with broadening RoA deployment by somehow associating it with Membership
  renewals and incentives given to deploy it?"
- I promote [RPKI] already, I want more work hand-in-hand with APNIC. Reach the [economy] community by running RPKI campaign locally"





The vast majority of NIRs called for greater collaboration and cooperation on RPKI and RoA management and deployment between them and called on APNIC to facilitate this.

One NIR wants the discussion about security broadened to include all aspects of cyber-security and are already initiating discussions around 'cyber-norm guidelines' with mutually agreed norms for Internet intermediaries.

- "More training tutorials or workshops in the routing security technologies. More information and experience sharing in cyber-norm discussions. This could be done with APNIC community that we know less about – how can we know about it and work together?"
- "RPKI and RoA management needs cooperation with all NIRs and APNIC needs to collaborate on that with us"
- "In the recent Melbourne conference there was a stress to implement RPKI in [NIR], so I would like to have the technical sharing session from APNIC on how to deploy RPKI in NIR and Internet exchange"

## **Access and Reliability**

The expansion of economies included in the qualitative survey process meant that more participants from Least Developed Economies (LDEs) were able to be interviewed. As noted earlier, this resulted in challenges other than those commonly held in the region being highlighted.

One of these is the reliability and stability of the Internet in some economies including dependence on one source of infrastructure to deliver the Internet. Economies who rely on satellite or submarine cable as their only means of connecting to Internet networks are concerned both about the effect if something should happen to the satellite or cable, and about the costs.

- "If there is a problem with this cable [economy] will be isolated, so that's very critical and that dangerous for the country I think"
- "We have been running into these difficulties for almost 10 years ... and we still have same international Internet gateway"
- "Stable, redundant Internet in [economy] is still the biggest issue facing the country. Growth is hampered by this. Fibre infrastructure and redundancy is not sufficient. And power reliability is an on-going challenge"
- "Because we rely on capacity through satellite at the moment from outside ... we have a high price... so we have big cost for each megabyte that we get from the provider and of course we are not deliver good price to the customer also"

#### What can APNIC do to help with access and reliability?

While there was acknowledgement that there was little APNIC can do about reliance on satellite or submarine cables from a practical standpoint, interviewees want APNIC to continue to educate and encourage regulatory bodies and governments about these issues.

- "I think APNIC has done a good job since last two years to encourage our regulatory"
- "No, APNIC cannot change right now. We're still talking about it, but they [Government] haven't decided yet for the second submarine cable"
- "Help with technical support and training in these"
- "APNIC could help assist Government with developing an agenda for these as priority"





#### APNIC's On-going Role. The Evolution of the Internet and 'Fragmentation' in the Region

Perhaps as a result of the larger numbers of economies interviewed, the topic of APNIC's ongoing role in the Internet community was mentioned in around a quarter of the discussions. There were also many instances where participants expressed concern about the 'fragmentation' of the Internet community in the region, both politically and technically.

Because these topics were often combined when they were discussed, this report deals with these as one holistic topic.

#### The evolution of the Internet

Participants talked about the need for a more 'modern, 21<sup>st</sup> Century' approach to Internet development and support, moving past just numbering and addresses. Some felt that as IPv6 is maturing and becoming more commonly deployed, the role of APNIC in its current format may become irrelevant.

Concern was raised about APNIC strategy and planning for the future, saying it could not remain as it is currently, and needed to embrace new technologies like 5G, IoT and AI because 'the world is very different right now'.

- "So one question I ask myself Do they [APNIC] have a full vision? What are they going to be in five years, 10 years, 15 years from now? Has it evolved beyond someone who hands out IP addresses and does a bit of training?"
- "The Internet where APNIC was created is different from the Internet we have today. I'm kind of arguing Internet is sort of becoming infrastructure. Where is APNIC going with this?"
- "The Internet is just in the background by now. You don't see the IPv4 or the domain name in the newspaper. You see a bunch of things about AI, social networking, IoT ... implying it's not just the Internet and Internet governance ... we should talk more expanded to digital governance and digital technology ..."
- "APNIC doing well, has been doing very well, but these new topics, people concerned. APNIC should sort of expand. Now we're in the 21<sup>st</sup> century and our role is somehow very different"

#### Fragmentation and regulation in the region

Alongside this topic was the notion of a 'fragmented' Internet, where some economies and governments want to regulate the Internet, control exchange of information and ideas and censor content. There were also mentions of a 'new IP thing' being proposed, a new version of protocol being developed.

- 'And so what [economy] is proposing with the new IP or whatever they're proposing so we need to look at all of that, as Internet professionals need to look at it and make sure that it moves in the correct direction and not in a incorrect direction"
- "Currently, due to the current situation, the biggest worry for us is the fragmentation of the Internet ... One side is national policy and on the other side it is blocked exchange [of information] which is not good. We believe the one Internet is the most important thing in the world."
- "... it's been around for a while but sort of caught people's attention a few days ago is this new IP thing which [economy] is proposing ... it's getting a bit of traction these days. So we need to figure out how the Internet might change, especially what governments do because they also want to make sure it is controlled"





#### How can APNIC meet the future needs of the Internet community?

As is often the case when discussing less tangible subjects, participants were often long on challenges and short on solutions! It was acknowledged that, while APNIC could do more outreach and discussion with governments and regulators, advocacy to different governments about their policies or policy change in respect to regulation was difficult for an entity like APNIC. However, there were some ideas that were shared.

#### Training remains important

A more structured, formal training program incorporating not only technical areas but also policy, operation and promotion were mentioned, as was the need for more advanced training and inclusion of topics around new technologies like 5G and the Internet, IoT and AI. One mentioned that APNIC could further expand its training operations to become a 'training organisation that administers IP addresses'.

- "I think this is probably an opportunity for APNIC as well to review how it trains people and what it actually does in the training, maybe it's time to tweak some of those things"
- "A structural review ... to build the community trainers ... what does it take to become a community trainer?
   Just because you went to a NOG ... that shouldn't be the criteria. There has to be some sort of certification that a person has to run through ..."
- "Build the [training] capacity beyond that small group of people. Need wider capability and ongoing refreshers so that the person is up to date ..."

#### Bring in the next generation

Some spoke about trying to attract new 'talent' into the supporting Internet communities like the NOGs, CERTS, and other organisations like ICANN and ISOC, as well as the RIRs including APNIC. There was mention that IPv4 and IPv6 address space and domain names were not interesting to a new generation who do not view the Internet as anything other than a 'piece of infrastructure in the background'.

"Over time the oldies sort of retire or die or whatever they do, and the new generation takes over. I think the
new generation has new ideas and all that. Try to get the new generation into leadership positions so that
change can be affected that way"

"We try to attract young people to come to the meeting in [economy]. The topic is domain name ... It's not a hot topic anymore and there are so many more important issues today. ... We have such good infrastructure with APNIC and we are not using to address those hot topics – it's not that difficult for APNIC to sort of outreach to those topics"

#### Facilitate collaboration; APNIC is the trusted advisor

In respect to the issues of fragmentation and greater government regulation, APNIC's trusted position of neutrality was mentioned as a good leverage for opening dialogue with governments and regulators. Continuing to work with other RIRs, the IETF and others about the importance of Internet security was also discussed, in particular one economy where 'some organisations think RPKI model is Western controlled, even if it's distributed in regional registries.'

- "If APNIC can look at Internet development in a very broad sense, and say 'yeah, this has nothing to do with IP addresses' but how do we develop this entire Internet ecosystem? I think there's a role of APNIC in developing the whole ecosystem because that will help the Members"
- "...if APNIC collaborate with other RIRs and the IETF and others would be better and ease the worry of some organisations who worry about western controlled RPKI and not the global RPKI. The issue is a little bit political right, but we have to face it ... maybe APNIC can make big contributions in this area."
- "So maybe for APNIC to keep channel open with [government ministry] and exchange ideas and give advice to these leaders at this stage is more feasible"





#### **Internet Capacity, Load, Bandwidth and Internet Reliability**

Issues of Internet capacity, load, bandwidth and traffic were not mentioned amongst challenges in 2018. However, and it appears as a direct result of COVID-19, these issues were mentioned frequently by participants, particularly Members in emerging Internet economies.

With the requirement for people to work from home during the pandemic, many economies are struggling to provide adequate Internet connections to individuals now working at home. While large portions of the population worked in larger cities, the problem was not so acute. Many Members felt ill-prepared for the sudden shift of traffic to mobile networks, home broadband and connections away from the large corporates. However, the general feeling is that this shift was not going to revert after the pandemic has passed, because 'working from home for more will be new norm'.

For other LDEs, the issue of reliability, capacity and congestion is simply a fact of life. It remains a key concern and one that they would like assistance with.

- "Main one that my organisation is facing at the moment is management of Internet access and unnecessary traffic and we don't have a device to tell us OK you have this much traffic to allow us to control the traffic"
- "You just see this huge increase in Internet usage. Instead of have say 10,000 people having broadband connections at home you need to meet that to a hundred thousand people ..."
- "So how do you make sure that you are in this small village so many kilometres from the nearest Metro, how do you make sure you have good Internet?"
- "We know there's a lot of traffic that should be placed or located locally, but there's no conditions to do that, so we go out to the international, and then we come back again. Local traffic go outside [economy] and back"
- "Most of the content companies not sitting locally and too much content that we are pulling from the cable
  is causing latency and congestion. Because of the Covid-19 most of the people sitting at home, the children
  sitting at home and playing their gaming and video conferencing and everything, and we are getting a lot of
  latency ..."

#### How can APNIC help with capacity and reliability?

For most interviewees, APNIC's role was largely seen as one of an 'influencer' to talk to governments, regulators and content providers about these issues. As a trusted, non-partisan entity, participants believe that APNIC has the ability to convene forums to explain the benefits of having more local IXP's or 'points of presence' in-country that would assist with Internet traffic, congestion and latency. It was also suggested that this would also reduce the costs to ISPs, which could then be passed on to end-users.

- "APNIC has the chance to talk with our government, our regulatory, to speed up the implementation [of the IX] because I'm not sure the regulatory of our government understand it very well ... just let them know there will be no conflict of interest, and we will all feel more about the useful of its implementation here locally"
- "So not only the access ... the other part would be to work with the CDNs and the Google and Zoom and so on to make sure they have their end points, whatever they call it, the Points of Presence maybe in each country"
- "More technical support more training to establish more redundant links to support the infrastructure"





#### **New Technologies**

Another topic that was mentioned more frequently than in 2018 was new technologies, specifically 5G, IoT and AI. In particular, the NIRs are concerned about the role they play in assisting Members and their Internet communities with these new technologies

The NIRs are interested in understanding global trends around IP address usage and increases to cope with demand. In addition, they want to understand what (if any) standards and guidelines are being looked at and how they prepare for this because 'the more preparation the more ready we are, the better it is'.

- "5G and the IoT this is the thing requiring a lot of the IP, and that's what we're here for. So the trend as we go from 4G to 5G was a significant increase, so the next step when promoting the 5G applications is to know the world trend in increases as well as from the AP region"
- "We need to know more on the digital transformations, the new ways with 5G and IoT, what is our role in those? How do we assist our community with those?"

One economy was concerned about the increase in the number of Radio Base Stations (RBS) required as a result of the deployment of 5G, and their technical capacity to implement and configure these.

"And another challenge coming is the fifth-generation network on mobiles as well, we will have to increase
the number of base stations, will be multiplied by three or four I think. And this will change the way we
approach a new technology since the deployment will be much more complicated"

#### What is APNIC's role in assisting with new technologies?

The NIRs called for greater collaboration between each other, facilitated by APNIC to share information and ideas on how to deal with these issues. They also want 'general governance or guidelines' to follow, and a better sense of where they can best assist their Members and their wider Internet communities to continue to ensure a stable, reliable and secure Internet.

APNIC Members want technical assistance, and for APNIC to use its non-partisan neutral position to talk to regulators and governments about the impacts of these new technologies and the need for greater digital governance.

- "We need more discussion, the awareness and experience sharing. This can be done with the APNIC community that we in [NIR] know less about. We need to establish the cyber-norms to sustain the Internet as well as the new technologies"
- "We are keen to contribute and to learn. Can we help with APNIC to establish protocols for IoT and 5G?"
- "For example, when you have APNIC meeting or APRICOT how about additional day for topic on AI, IoT?
  Tutorials and discussion forums. And invite the people who attend the AI governance conference from
  around the world."
- "The outreach on these topics is very important, it's an important issue facing the digital technology or digital governance which includes the Internet"
- "APNIC needs to reach the ministry here, have meetings with the ministry, they need to know and understand. And the government will follow the guidelines from the ministry"





## **Topic B – APNICs Products and Services (APNIC Members)**

APNIC's products and services are largely well known. While the interviews included stakeholders and senior organisation representatives who do not always directly experience APNIC's delivery of services, there is widespread appreciation of the specific products and services offered.

Feedback about MyAPNIC, the helpdesk, WHOIS, the website and training are positive. And, although many would like additional features and have plenty of suggestions around training, they are very satisfied with APNIC saying 'overall I would rate them nine out of ten'. Particular mention was made about the APNIC Blog as being "... great, very informative, it has improved over the years.'

- "I think every time I've spoken to them [helpdesk] or dealt with them it's been really authoritative, they're really clear on the policies and it's a good organisation to deal with"
- "MyAPNIC is now very convenient, very powerful"
- "So they brought in the RDAP and I tried that and its much faster. So I don't have any reason to think how to make it faster because its fast enough now"
- "I look at the blogs. Always interesting. I get a lot of information about what's new and upcoming"
- "I love the blogs!"

"I have been very impressed by all the APNICs products over the many years. I can see a lot of effort has been put into developing user-focussed features that help us in our business on a day to day basis"

As in 2018, a lack of time and / or resources stops participants using services more regularly. However, some mentioned a lack of awareness about APNIC and its products and services prevents use of these more widely in their organisation. There were some suggestions to 'create more awareness on the availability of these' because 'not very many people are aware'.

- "I wish we had more time to go to APNIC events and trainings. I used to, but no time now"
- "One thing that limits my availability to use the services is my availability, and we are short resources this year"
- "APNIC is important for the Internet community for sure. The point is that, apart from the very specific ecosystem, except Internet players, a lot don't even know APNIC, don't know what APNIC is and what mission it has"

#### Suggestions for improvement and new ideas

The vast majority of the suggestions to improve services revolve around training, and this is dealt with separately below. Other suggestions are included below, and provide ideas about improvements to billing, Reverse DNS and the APNIC newsletter. Suggestion was also made that an APNIC App would be useful, as would statistics around traffic, usage of new technologies and uptake of RPKI and RoA.

#### Billing

- "Cannot easily pay our bills because of banking limits, despite improvements from APNIC. Only solution is APNIC open a bank account in [economy]
- "Recent fees increase we unhappy with. And the exchange rate is not good, so makes it worse"

#### **Reverse DNS**

• "I do have a problem now because my AS number has 1,149 peers. So updating that under myAPNIC is not possible, because you could not copy and paste 1,100 AS numbers peering to you ... I'm working on that, how to get over that"





#### **APNIC App**

- "I would like APNIC to focus on developing an app. I mostly work on the mobile I have a laptop but I don't
  open the laptop. So an app with MyAPNIC resources is easier, don't have to remember passwords and all the
  resources are there"
- "Maybe APNIC can build tools with latency monitoring, route manipulation etc. so the engineer can gets hands on quickly what is happening and this also in the app."

#### **APNIC E-newsletter**

- "We hardly get any emails from APNIC except for billing. I'd like a newsletter with a push for Members to do things like IPv6 deployment, RPKI ... an 'APNIC Recommends' series"
- "Does APNIC send out a newsletter? Doesn't have to be too frequent ... could be every quarter, for example like say 'hey have you heard about APNIC Academy?' you know ... something short but with links"

#### **Statistics**

There were also some mentions of APNIC either collaborating with others or publishing its own meaningful statistics around three key areas. Firstly, in the midst of Covid-19 'traffic analysis data is required'. Secondly data around Internet usage and new technologies was suggested. And thirdly security related data, particularly the uptake of RPKI and RoA by economy.

- "With this Covid-19 situation, what's floating to the top right now is that need for having a traffic analysis data, and knowing exactly where the bottlenecks are ... so, it's not just a number of ASN allocations or IP address allocations, it's got to go deeper than that"
- Is APNIC producing statistical information about IP address or management assistance, or those statistical
  information focussing on infrastructure which links it to current events such as AI or IoT uptake or usage ..."
- We're interested in detailed statistics with trends on RPKI or RoA uptake ... maybe for example by country"
- "It would probably serve APNIC to collaborate with others and provide data sets and help build things up from that, rather than doing it themselves"

#### **Training and the APNIC Academy**

Although not always used personally, 80% of interviewees said their organisation had undertaken some form of APNIC training in the last two years. This is in stark contrast to the online survey results of 2018. Again, this may be due to the wider number of economies included but could equally be the expansion of training delivery mechanisms and the greater use of community trainers.

Most are very appreciative of APNIC training, both in-person at events and online. Mention was made of the recent APRICOT event where 'their feedback to me is very good' because 'quite systematically doing things hands-on is very important, our staff very enjoy these kinds of hands on'.

#### **Online Training**

Online training was also praised 'from what I see they have been participating through the online, and so far I have not seen any problems and the results very encouraging' and 'after they have attended the online training I have always seen the results being manifested in new rollout, new product in our networks'.

- "I think the online is a great channel for us, and very encouraging"
- "I find especially in [economy] the APNIC training has been very useful"





#### **APNIC Academy**

Awareness of the Academy also appears to have improved, with 55% of participants having heard about it. Of those, around a quarter had used the Academy and were happy with the format and content.

- "Yes actually we are very familiar with APNIC academy and the quality is very good so far"
- "Yes, I've heard of the academy but haven't used it. I always thought it was to help the nations that are probably more in need. I think [organisation] is big enough to look after itself and leave those resources to people who need it"

#### Suggestions for improvement to training

Unsurprisingly, although satisfied with the current offerings, participants had many suggestions to improve the training provided. These included suggestions for new content and more local 'hands on' training. Requests for community trainers were also frequent, including a suggestion that trainers should be fully trained in the subjects and have 'some sort of certification' with 'refresher courses' regularly. The need for paid community trainers to be sourced from outside the local economy was stressed in one interview, as it was deemed to be detrimental to the volunteer training completed by others inside the economy.

More advanced training was also frequently mentioned, alongside including more 'modern topics' such as IoT, AI and 5G. Greater structure and planning was again mentioned, specifically in terms of 'basic, intermediate and advanced programs that we cycle through' and 'less ad-hoc training, structure a calendar to follow'.

One participant called for a high level structural review of the whole training program, from strategic objectives that 'can be adequately measured' through to 'examination of the trainers – are they effective? Why are we relying on same bunch of people from NOG meetings to do training?'. This may be pertinent given the issues raised around APNIC's future strategy.

#### Structure, Planning and Training Strategy

- "I think there needs to be a strategic review of that, in the training department, to build the capacity to ensure continuity, because it seems to be problematic just now"
- "Currently I believe it is fine, however I like to see if APNIC is more innovative [with training]. Now especially with Covid-19 what strategy for training now? If in next 5 years is still just the same well ... current form is OK for current thing but look forward? What? Maybe APNIC can lead in this direction ..."
- "If we could know before the sessions, way, way before the sessions if you could announce it first so we could schedule the right person to attend"

#### New Content and More Advanced Training

- "We need more new topics, not just same old ones. Technology trends, IoT, 5G etc."
- "Like we said in last survey, APNIC training now too basic. We need more intermediate and advanced topics"
- "I'd like more training for IPv6 on other vendors, because have Cisco, Juniper devices, but no one does for Huawei devices. And Huawei very big, plenty of big companies use Huawei now, and the functions very powerful ..."
- "Well, the work APNIC does is very good actually, but it's not actually reaching anyone it should because, as I said, new generation has different mindset. So if you say to a new gen "No, we are going to do same training done 5 years ago" they have no interest. Need new ways, new topics"
- "Security training at the APNIC are too basic. Too simple. Because some topics are old. For example, I followed this training about security, and most of this training was about old security rules. That's crazy!"
- "New training on new services OTT, 5G, AI for example"





#### Case Studies, Best Practice

- "I'd like more actual practical case studies, workshops on migrating mobile data network from IPv4 to IPv6"
- "Please more knowledge sharing, IPv6 cases, RoA examples, SDN, help us to do this"
- "Where there are successes, where are the stories? Show the stories so we can replicate"

#### Collaboration with Universities

- "Need to figure how to get APNIC content as part of the curriculum. Reach out to the Institute to explore a partnership to extend the reach of the Academy"
- "Need trainings for final year engineering students with up to date materials"

#### Awareness of the Academy

- "The Academy courses are very good, but not very many people are aware of that, that those are provided by APNIC"
- "The best thing to do is create more awareness on the availability [of the Academy], and get people to engage more so they can start to learn at their own pace"

## **Topic C – Support for Internet Development - Members & Stakeholders**

As the NIRs had quite different feedback, it is written in two parts – APNIC Members and Stakeholders, and NIR feedback. In addition, in discussing this topic the feedback is often intwined with suggestions for how APNIC can provide further assistance. Therefore, this section is written up by topics mentioned.

#### **IXPs and CERTs**

The support provided by APNIC in the development and implementation of IXPs and CERTS was often mentioned, and many are deeply appreciative of APNICs efforts. Where these had already been established most were satisfied with the outcomes.

- "The [economy] Internet Exchange was set up almost more than a year back, we had a huge helping hand from APNIC"
- "We make it a point that this is an open Internet exchange. So we want to encourage more people to come in and peer and by doing so, improve the connectivity's in [economy]. And we are very fortunate that we are getting help from APNIC ..."

Others spoke of political tensions that are affecting their establishment and want APNIC to act as a 'neutral body' to help cut through these issues.

- "IXP and CERT here is even worse. Those big companies just do own thing, very secret, and it's politicised, the government interest is high. Hard for APNIC to help, maybe some PR or joint event inviting major companies and the government. They may be happy to come to a discussion ..."
- "No, we don't have any IXP, no response team. Some people want to develop it but because we are between ISP and monopolistic position of the telco, each time it has failed"
- "And first of all, before APNIC can assist us [with an IXP] we need to agree altogether to be OK with that. We don't want to include APNIC on something which is not great to work on from the beginning"
- "The APNIC support was good for two IXPs, but [city] is not progressing well. APNIC could really help with a big push to help broaden the message and get community on board"
- "The ministry responsible are currently looking at the legislative review with the cyber security policy, as part
  of that to look at the CERT ... I will be recommend to APNIC to be more engaged in the IXP and CERT
  initiatives that we are trying to implement"





#### **Support for NOGs**

Again, all interviewees who had experience of NOGs and the concept were very satisfied with APNICs support for these.

- "In terms of NOG, [APNIC] very helpful. Very, very helpful in human resources, financially and everything"
- "APNIC extremely good in its support. Has very big role in helping to develop the NOG with funding resources and training support'
- "We depend on it! Financially, organisations, content, APNIC our biggest sponsor"

Some had issues because 'our bosses on senior management have difficulties to allow us to go to [NOG meeting] because they don't want any business secret to leak out', so competitive interests come into play with convening meetings. Others spoke about political problems with attending because 'we need permission from the Director General before we can attend a meeting'.

APNIC's help was requested again as the 'neutral advisor' to senior management and officials about the benefits of network engineers sharing technical information.

- "Management worried about information that could then be useful to our competitors and things like that. But if somebody that could play the middleman ... could help, somebody like APNIC"
- "Needs more community building from APNIC for this, contact managers to encourage more Members to go"
- "We all agreed to have a NOG in [economy]. But we don't have the same definitions and the same missions for the NOG. APNIC could help try to bring these definitions together"
- "I don't really have a solution for this. But we have to reactivate, resuscitate this NOG in [economy]. Initially
  it was OK, but then came North American NOG and APRICOT, and we start to lose momentum. The reason
  we have to have a NOG is of course we can say we have a national NOG. Just go to NANOG and APRICOT if
  necessary, somehow that doesn't work"

Some were concerned about how to facilitate NOG meetings in the Covid-19 pandemic and wanted to know if APNIC could 'help to get these virtual'.

• "With all this happening globally a pandemic, travel restraints so will the APNIC help have the events virtually? Because we're not going to recover in a month or two, right? Maybe NOG meeting can be virtual?"

#### **Government and Regulators**

As in 2018, Members and stakeholders are supportive of APNIC's regular dialogue with governments and regulators across the region, noting that it is 'very difficult to do this across the political divides in the region'. APNIC's neutrality was also noted and encouraged. It was also acknowledged that maintaining dialogue with governments was 'very hard, because you just educate one minister and then there's an election and a new minister comes in with zero [knowledge], and so it goes on'.

One interviewee commented that with this type of outreach 'you need to have a team that does government engagement because its multi-faceted'.

Continuous collaboration was the dominant theme in this topic.

- "So again, work collaboratively to support the model of Internet development that works best, which is open and secure Internet. There's a mandate and there's great interest in that"
- "I don't quite know what APNIC is doing in that realm. I don't quite know how they've been doing. I know they're piggy-backing on some things quite a bit ... but then things were rearranged and all that I just don't who is engaging with governments and keeping that running"
- "Yeah, you'll never have a point where you have a government that understands the Internet and all that goes with it"





- "I think currently APNIC are doing excellent work, the governments and regulators all know about them, the services they have."
- "I think they should engage more with the government. Government participation is important for the development of the Internet and they should participate more while there is a lot of eagerness from the government going into the digital age"
- "Continually interaction will help improve interest in the Internet in a better way"

#### **APNIC Fellowships and Foundation**

There were few comments about the APNIC Fellowships and the APNIC Foundation, however when it was discussed participants mentioned the application process and selection criteria. There was also frequent mention that if they were rejected for a fellowship attendance to a meeting there 'was no reason given why'.

- "I think the foundation and the fellowships awareness is sufficient. We do get lots of applications for the fellowships, which is good. And people are actually aware of the benefits of attending or being part of the programs that APNIC puts out"
- "I was encouraged for many to apply for fellowship by the foundation, and a lot of us are applying but none of us approved. I don't know why"
- "Fellowship, yes, I have come across that. We still have a lot of challenge in terms of having the budgets especially when we talk about going to conferences and that"
- "Most people know about the fellowships. I been rejected twice and I don't know why, but I keep trying."
- "... and the process to apply was quite lengthy, all the things we needed to input, but I got rejected. So I'm not sure if my justification wasn't right, or that we just don't qualify. I don't know why we were rejected like that"

## **Topic C - Support for Internet Development - NIR Feedback**

The discussions with the NIRs around support for Internet development in the region consisted of two parts – technical support and APNIC's assistance to the NIRs, and outreach activities including government liaison, meetings and events and other collaborative efforts.

As a result, this section has been written with these two subjects reported separately.

#### **Technical Assistance and Training**

The NIRs were all appreciative of APNIC's involvement and assistance in helping to establish IXPs, CERTs, better security through RPKI and RoA technologies and of its support to the NOGs in their economies (where they exist).

- "APNIC sponsored and attended the [NOG] which was very fruitful event. Many of our largest ISPs attended and they report they are very happy"
- "I think that since the first day that [NIR] was founded we work very closely with APNIC. The working relationship has been going very well. They support the NOG, help with training and support our training to make these events successful"
- "APNIC is doing fairly great work in helping us, the main thing they help us to set up our IXP, let's say thanks APNIC, especially to the technical team"
- "APNIC is a good partner in technical assistance from the regional perspective"
- "The support is very good and have prompt and quick response. We will be needing more help from APNIC in route server deployment in a new exchange point"





Many called for more localised training assistance, particularly through community trainers and training in the local language.

- "Yes, we get enough training, actually not many ISPs attend. Maybe it's a good question to ask what others in South East Asia experience with trainings. How get people attend?"
- "Training is very important and community trainers are a very good product which improve the technical skills. We need more community trainers in local language we have people who wanted to sign up for the trainings, but we couldn't meet all the demands"
- "In person training to the local economy to bring the new ideas and technology"
- "I think we are in the Internet society we are one globe, but the cultural differences are very different. So the technical solutions where one workshop is duplicated for multiple economies doesn't work. Need to collaborate and listen more to adapt these to local"

Some, like in the Member and Stakeholder interviews, wanted APNIC to embrace newer technologies like 5G, IoT and AI, and encouraged APNIC to 'find new topics that will interest Members aside from the traditional ones, like IPv6 for IoT'.

- "I wanted to mention that APNIC is focusing on developing new services such as RoA. We tried to promote these for the local ISPs but I think it take some time. Because its good and strengthen security and make things more safe, but the businesses needs to make money. It would be good if APNIC can explain this benefit using the numbers, the money"
- "So IoT and 5G maybe we can have more awareness training on this technology and cloud computing? This would be excellent thing for us and help increase our skills"

#### **Outreach Activities**

Although the NIRs had many suggestions for increased activity by APNIC, they were also satisfied with the work that APNIC does in outreach already. NIRs were also positive about the initiative to have George Kuo as the NIR liaison – 'George has really good understanding of us and we appreciate', and many mentioned the NIR sessions at the APRICOT meeting in Melbourne. There were calls for continued dialogue between all NIRs outside standard meetings and the creation of 'a forum for us to share ideas and what's happening to have a better community'.

- "I think APNIC needs to continue that process [NIR meetings/forums] because the discussions between the NIRs and APNIC very good and we shared lot of information and ideas. And I got help with data inconsistency"
- "I am going to talk with other NIRs more now how to have this community better and I want to talk more policy issues and APNIC can help us in that"
- "I talk to most of the NIRs there, and they say that it's a good process and to continue that, so that's good OK?

There were also calls for more engagement with the wider Internet community, including businesses and non-members particularly now that 'digital transformation is here, 5G, AI etc.'. Members feel the wider community needs 'better governance and understanding of all these new things.'

- "We try locally to have the information and experience sharing and contributions from local ISPs and content providers and telecom carriers and pilot mutually agreed norms and so far we see good feedback ... and we thought this could be done with APNIC community that we know less about that sharing, so we can know about it and work together?"
- "APNIC could help us to engage more Internet organisations like say in Internet security ... so those
  organisations could be more engaged with other Internet or international organisations so we can
  collaborate more deeply"





Continued dialogue with governments and regulators was also encouraged, especially 'in collaboration with us, have us help'.

• "APNIC needs to outreach more to the government, think about a good event that we could invite them and they can see where they can help to follow the guidelines. They need to know and understand"

## **Topic D – How is APNIC Regarded**

Across the board, APNIC is very well regarded amongst participants. Although there were improvement ideas and suggestions, APNIC is held in high esteem.

Despite this, over a third mentioned that they also feel that APNIC is 'not well enough known', particularly 'outside the small realm of addresses and the Members'. Some felt that this 'restricts the messages about a stable, reliable Internet and what has to go on to keep it that way'.

- "When I think about APNIC, I think technical leadership, great depth of technical knowledge and leadership, as well as a broader agenda of doing good, not focussed on what's in it for APNIC"
- "We value the relationship, and have relied on their expertise a number of times"
- "I think APNIC not known enough. Not known outside Members"
- "For people who know APNIC it's good, but many not knowing them"
- "Yeah, its quite famous in [economy], and trustable"
- "Very powerful, is what people think APNIC is. As powerful as government! Some people I think they see
  APNIC as the United Nations in a way, they think APNIC can enforce policy and topple governments. So
  regarded too highly in some cases"
- "We think highly of APNIC. But we wish they could give us more addresses"
- "I think their continuous engagement with us helps us to feel that we are actually part of APNIC, actually part of Internet development in the region. They go the extra mile"
- "Excellent and Bravo! Thanks for supporting and collaborating"

#### Improvements and new initiatives or services

As discussed above, some participants feel that APNIC is not well enough known across the wider Internet community, and that more outreach is required 'because now, the addresses, the names don't matter to the new generation, it's a much bigger picture now'.

Again, some questioned APNIC's ongoing role and its strategy in 'meeting the demands of the 21<sup>st</sup> century and all the new technologies'. Others felt that APNIC 'comes from a historical position of power but needs to evolve more and embrace new thinking'.

There were again many calls for updated training and training in newer technologies, as well as simply more training in general.

- "APNIC is not really known outside of existing Members. Perhaps they could make universities or students in engineering more aware of APNIC"
- "We should think more progressively. Invite people who know the new topics, AI etc., to come to the meetings. Its not difficult to invite them"
- "The outreach to new organisations is very important otherwise we may become irrelevant. Digital technology or digital governance, which includes the Internet, is important issue."





- "Most of the people don't know the APNIC, even the ISPs. Only maybe half of them know. And that's the way to help us develop the Internet I think, get the government and the industry to be more aware"
- "Please reflect my concerns to APNIC to prepare for the fragmentation of the Internet, so please APNIC do as much as possible to keep a single Internet. Is very important to people"
- "They should go to other Internet organisations, smaller ones and offer the DDoS mitigation platform and train on the Internet visibility. And also the IP hijacking that happens, the BGP monitoring that's one area I think APNIC can help customers"
- "We need them to be better known. And need new trainings and training on Huawei devices"
- "We need one staff for [economy], dedicated on the ground with the job of building the network community.
   Maybe it's time to experiment because current model the way it is is not changing things."

"Traditionally, APNIC has been well known among the providers. But is it time for APNIC to move beyond that and go to a much broader audience? Do we need to go out and educate about APNIC and how APNIC can help everybody?"

#### **Other Items**

In the discussions there were some additional topics that arose. Two that were more frequently mentioned were Covid-19, which, understandably, came up in the majority of the interviews. Specific concerns about this are noted throughout this report.

The announcement of the 43/8 address block and the Asia Pacific Internet Development Trust (APIDT) was also mentioned.

These are discussed in this report because they were frequently mentioned, although it is noted that APNIC may not be able to address these specifically within its remit.

#### **The Covid-19 Pandemic**

Many participants spoke about the effects of Covid-19, not only on their ability to deliver their usual services but also in how they thought the future post-pandemic might be different.

Mention has already been made in this report about the impacts on traffic, capacity and delivering stable and secure Internet connections to a vastly greater audience as a result of the restrictions imposed by a majority of economies. In terms of the future, participants spoke about working from home as becoming the 'new norm', and that organisations, including APNIC, will need to 'prepare and be ready for this'.

Aside from the technical challenges this inflicts on Members, many spoke of the need to be prepared for much greater demand on good Internet governance and policy.

- "Well, you know, this teleworking, working from home since the Covid thing, the need to have government employees so they can carry on their work, and be spy system secure. That's hard to do ... and how do we get total security with everyone working from home using different Internet providers?
- "We won't go back to the old way, not totally, because bosses now think work from home saves them money. But how do we train them to know home working is not always secure as office working?"
- "... and coronavirus this shows up the weaknesses in systems and things. So bigger picture is required, whole
  of Internet, not the pieces"





#### Announcement of 43/8 Address Space and the Asia Pacific Internet Development Trust

The announcement regarding the availability of unused IPv4 address blocks within 43/8 and the establishment of the Asia Pacific Internet Development Trust (APIDT) was made immediately prior to the interviews commencing.

As it was such a new announcement, it was decided not to include it in the interview guide because the details on how the address block would be treated had not been decided. Although not specifically included, there was some awareness amongst a few participants.

When prompted, there were mixed views about the announcement. Some observed that it was good to have additional address space available and thought that is would be beneficial for the Internet community in the region. Others had some questions either relating to the criteria for eligibility for its assignment or to the broader issue of APNIC's 'involvement ... being an RIR'.

- "In a way I feel it's a good initiative because they're going to use it for a good cause. At the same time, it's a huge block of IP, that probably would have gone to the recovered pool and a bigger consideration would have been shown to those ISPs like us in need"
- "When it says that the block will be placed on the IPv4 address market ... So will the transferences be coordinated by APNIC? Or through the brokers and all that?"
- "I heard that he returned a 43/8, that's a big chunk. It's very big. We are wondering how APNIC is using that address? Is it decided already or is it on the table for discussion at the next meeting?"
- "... with particular concern is who will be the primary benefactor of the IP addresses themselves, and the largest buyer of IP addresses from what I've heard is Amazon. And there may be nothing wrong at all in terms of this, but there's some governance issues I suppose that start to arise from the EC perspective, which APNIC need to deal with."
- "So if not going to the recover pool, the question is what happens when the money is in the bank? ... what is the business approach ... if it's just going to the foundation then I fear it's a waste of money."

## SUGGESTED SURVEY TOPICS

As a result of these interviews and the feedback provided, the following suggestions are offered as areas for further examination in the online survey. This will help to determine the extent to which this feedback is shared across the wider APNIC Membership.

- Explore what could be done to improve IPv6 support / deployment particularly among vendors
- · Test uptake of RoA and RPKI deployment and how Members rate this in terms of competing priorities
- Examine appetite for expansion of focus into new technologies, including the development of new technology governance protocols and guidelines
- Check the extent to which capacity, Internet traffic and bandwidth issues are apparent because of Covid-19
- Examine concerns around Internet 'fragmentation' and awareness of the development of new Internet protocols
- Review perceptions of APNIC's ongoing role in the Internet community and strategic direction
- Test recent training improvements and suggestions for new improvements
- Investigate support for an APNIC app, E-newsletter and statistics





# **APPENDIX A - INTERVIEW GUIDE**

#### Invitation - Have your say!

As part of the APNIC Survey for 2020 you've been invited to take part in an individual interview.

This document covers the APNIC Survey, the purpose of Interview, topics to be discussed and what to expect. Your interviewer will be independent from APNIC and you are assured of complete anonymity and confidentiality. Your name and identifying details are <u>not</u> shared with APNIC or included in the report, so you are encouraged to speak freely!

#### **About APNIC Surveys**

APNIC Surveys are held every two years to gather views and opinions of APNIC Members and stakeholders, as a critical input to APNIC's planning processes. You can read about past APNIC surveys and their results on the <u>APNIC Survey</u> web pages.

#### What is an Individual Interview?

An Individual Interview is a one-on-one, confidential online meeting with an independent interviewer.

Information gathered is in-depth, detailed and honest. There are no right or wrong answers. It is your opinions that are important.

#### Why are Individual Interviews held?

Individual Interviews are held in preparation for the Online Survey, to identify the most pressing current issues and opinions, and any changes since the last survey.

#### How does the Interview work?

An independent facilitator conducts the Individual Interview. No APNIC staff will be present.

For accuracy, we may ask your permission to make an audio recording of the Interview. The recording is destroyed after the Survey.

Privacy & confidentiality are extremely important. We do not share personal information or the content of interview discussions.

## Topic A - Challenges

I would like start by understanding the challenges you face, as they relate to the Internet and APNIC's work in the region. What is the biggest issue right now for you and / or your organisation?

How is this affecting you? What has changed in the last year? How do you see the future?

What could APNIC do to help the situation?

Are there other challenges or issues that concern you?

## Topic B - APNIC's Products and Services

Now I'd like to talk about APNIC's products and services. What APNIC services do you use?

What is your experience in using these services?

#### Example

- Are they easy to access and use?
- What stops you using more services?

What could APNIC do to improve their services? Are there any new services or products APNIC could offer that would provide you with more value?





#### **APNIC Training**

Have you or anyone in your organisation undertaken any APNIC training in the last 2 years? What was your experience of the training?

#### Example:

- Usefulness and relevance of the topic, the content and the format?
- Quality of training and training materials

Have you heard about (or used) the APNIC Academy? What was your experience of the APNIC Academy?

Is there anything that stops you from using APNIC's training services?

Can you make any suggestions for improvements to the training?

Are there other topics that you would like included in the training programs?

## Topic C - Support for Internet development

APNIC works to support the development of a robust, stable and secure Internet, through projects and partnerships with other organisations.

Do you have any feedback about APNIC's support for Internet development in your economy?

#### Example:

- Internet Exchange Points (IXPs) and Computer Emergency Response Teams (CERTs)
- Network Operator Groups (NOGs)
  - Have you been to a NOG meeting? Are they useful? Why/Why Not
- Meetings and events
  - How could APNIC make their events more accessible to you?
- Engagement with government and regulators
- Fellowships and the APNIC Foundation
- Technical Assistance

What else could APNIC do to support the development of the Internet in your economy?

## Topic D - How is APNIC regarded?

Thinking about the work of APNIC in your economy, what is their reputation like amongst organisations like yourselves?

What do they do well?

What could be improved?

Are there any new or different activities they could offer that would provide more value to you?

#### **End of Session**

Before we end the interview, is there anything else you would like to say, or do you have any questions?

If you have additional information or questions you did not raise in the interview, please contact me.





# **ABOUT SURVEY MATTERS**

Survey Matters specialise in providing services to the Member-based organisations and the 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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