



Asia Pacific Network Information Centre 2016 Report from Focus Groups and Individual Interviews

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May 2016

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INTRODUCTION

As a membership-based organisation, the APNIC secretariat conducts biennial member and stakeholder research to gather feedback on its performance and seek ideas to inform its strategic planning efforts.

The research program is in its tenth iteration. It is comprehensive and thorough. It comprises face to face focus groups and individual interviews with members and key stakeholders from around the region. This is followed by a quantitative on-line survey of all members and interested stakeholders.

As with previous surveys, the APNIC Executive Council (EC) commissioned the 2016 APNIC Member and Stakeholder Survey. In a departure from previous programs, APNIC engaged Survey Matters, an independent research agency. Survey Matters assisted with the conduct of the research and provided recommendations to ensure that processes remained in line with current best practice in research.

As a result of the program review, some changes were introduced to the qualitative process:

- The discussion guide topics were reduced from nine topics in 2014 to four main subjects to allow full examination of the topics within the allocated time.
- Random selection of participants by an independent third party was used to ensure representation of members. This removes any bias when the selection is made by the organisation commissioning the research.
- Where permission was provided, the focus group discussions were recorded and an independent note-taker was present to ensure greater accuracy of transcription and subsequent analysis.
- An online focus group was trialled in one location. The purpose was to test the efficacy of conducting qualitative research online compared to the face to face method.
- Separation of technical and managerial members was trialled in one location. The rationale was to test if there were different perceptions and opinions across different roles and whether participants of similar positions and status felt more at ease in sharing their opinions within a like cohort.

To ensure anonymity of participants and confidentiality of the discussions, independent facilitators were used. The focus groups were facilitated by Anne Lord. Survey Matters facilitated the online focus group. Anne Lord and Dr John Earls conducted the individual interviews.

This report is a consolidated view of all the topics discussed in the focus groups and individual interviews. It includes direct quotes from participants to provide depth and richness to the findings. To protect participant anonymity, no names, organisations or locations are identified in the report findings.

A note of thanks

Thank you to all those who participated in the 2016 APNIC Member Survey focus groups and individual interviews. The feedback provided by the participants is appreciated and valued. In writing this report, every effort has been made to be faithful to the comments received.

Thanks also to Dr John Earls for his wisdom, feedback and continuous support.

METHODOLOGY

Selection of locations

Face to face focus groups were conducted in eleven (11) economies, with a total of fifteen (15) sessions conducted. One (1) online focus group was also held, giving a total of sixteen (16) focus groups in the thirteen (13) locations below.

- Bangkok, Thailand
- Delhi, India
- Mumbai, India
- Singapore
- Tokyo, Japan
- Seoul, South Korea
- New Zealand (online)
- Beijing, People's Republic of China
- Hong Kong, SAR
- Phnom Penh, Cambodia
- Yangon, Myanmar
- Colombo, Sri Lanka
- Brisbane, Australia

The APNIC secretariat, Survey Matters, Anne Lord and Dr John Earls selected the locations for the face to face focus groups, with final approval by the APNIC EC.

The choice of location was based on three principal factors: 1) the percentage of quantitative online survey responses in 2014 by economy type (i.e. Developed, Developing and Least Developed), 2) locations visited in 2014 and 3) the location of the NIRs within the region. Government advice regarding travel to some countries and size of member base in different locations were also taken into consideration.

Table 1 below outlines how selection for the focus groups was calculated.

Region	Classification						
	Developed	# of Focus Groups	Developing	# of Focus Groups	Least Developed	# of Focus Groups	Total
Eastern Asia	Japan	1	People's Republic of China	2: 1 NIR, 1 APNIC			
			South Korea	2: 1 NIR, 1 APNIC			
			Hong Kong	1			
Oceania	Australia	1					
	New Zealand	1					
South Eastern Asia			Singapore	1	Cambodia	1	
			Thailand	2	Myanmar	1	
Southern Asia			India	2: 1 NIR, 1 APNIC			
			Sri Lanka	1			
Total # Focus Groups		3		11		2	16
Total # Visited by Region	3		7		2		12
% of Focus Groups	25%		58%		17%		
% of Responses in 2014	25%		58%		17%		

Table 1

Individual Interviews

Individual interviews were also conducted with key stakeholders across the region, in the same location as the focus groups, or via Skype for stakeholders in other locations. In total twelve (12) individual interviews were conducted with fifteen (15) people. The process was managed by the APNIC secretariat, Anne Lord and Dr John Earls.

Discussion Guide

In 2014 there were nine (9) potential subjects for discussion. In 2016 this was reduced to four (4) main topics:

1. Issues and challenges related to providing Internet services;
2. APNIC secretariat performance (APNIC members only);
3. The Internet today – security, resilience and stability; and
4. Technical trends being experienced within the region.

The full discussion guide can be found in Appendix A on page 25.

Participant Selection and Recruitment

Participants for the focus groups were chosen at random by Survey Matters from a full list of member organisations provided by APNIC. The selection process took into account the number of member organisations within each location and the size of the member as defined by the APNIC member classification of Very Large, Large, Medium, Small and Very Small.

Survey Matters randomly selected approximately 40 potential candidates from each location (where member numbers in that location were large enough). The names of the organisations were then passed back to APNIC. From this point onwards, the recruitment of participants was handled as per previous surveys, with APNIC managing the invitation process.

Survey Matters were not involved in recruitment of participants for the NIR focus groups; this was handled by APNIC directly with the assistance of the NIRs themselves. APNIC and NIR staff were available to assist with translating the invitations for locations where English was not the predominant language spoken.

The APNIC secretariat and the facilitators, Anne Lord and Dr John Earls, managed recruitment of the stakeholders for individual interviews.

Format of this report

This report comprises findings from APNIC members who participated in focus groups and individual interviews conducted during April-May 2016. Additional input was received from non-members who participated in interviews. Throughout the report, where appropriate, a distinction is made between the feedback and suggestions from APNIC members and non-members.

This is the first time that the qualitative information from the focus group participants and the individual stakeholders has been presented together into the one report. The purpose is to provide the reader with information that is more integrated and therefore easier to digest.

EXECUTIVE SUMMARY

Following the conclusion of the focus groups and individual interviews, all of the discussions were analysed and the principal themes identified.

The majority of the feedback regarding APNIC performance was positive. Collaboration, co-operation and partnerships rather than expansion were seen as key to delivering more with less.

The following summarises the feedback for each of the four main topics. Security was a dominant theme, raised in each of the topic areas.

Challenges

The three major challenges experienced were the lack of IPv4 addresses, the slow and decreasing uptake IPv6 and the prevalence of network security threats.

The ready availability of IPv6 does not reduce the demand for IPv4 addresses. Obtaining more IPv4 addresses is the number one concern, both technically and commercially. Techniques to deal with the shortages include purchasing additional addresses, either from legitimate or black market sources, deploying Network Address Translation (NAT), internal renumbering and less frequently, deploying IPv6.

Awareness of the IPv4 address market is acute. Prices and risk were perceived as high and trust in sellers was low. While some were resigned to the market led new world order, others cited the principles of resource management: fairness and equal access in calling for APNIC to take a more active role in resource reclamation and recovery efforts.

IPv6 deployment in the region has slowed. Deploying IPv6 in the network core is not difficult, whereas deploying IPv6 in customer networks continues to be problematic. Reasons include the lack of IPv6 applications, the economic burden of migration, the lack of customer willingness to change, risk averse management and embedded IPv4 addresses in legacy equipment. Psychological and knowledge barriers were also inhibiting change.

Suggestions for APNIC help included increased focus on IPv6 deployment, increase the level and availability of IPv6 training, give prominence to successful case studies, expand outreach to universities and end users and to facilitate a more productive dialogue with regulators and key industry players.

Security threats have escalated with many members reporting DDoS attacks, Botnets and other security breaches as their biggest challenge after IPv4 and IPv6. Emphasis was placed on more training, greater information sharing and dialogue between members. Leadership from APNIC to increase collaboration, partnerships and to help formulate a joint approach to tackle security were perceived as the best ways in which it could assist. The accuracy of the Whois Database information was also seen as an essential component of resolving security attacks.

APNIC Performance

Members were largely happy with APNIC performance, although many mentioned that their contact was largely a transactional one. In particular, the helpdesk staff and training services were praised.

APNIC is largely regarded as a well-respected organisation that it is important to belong to. In the context of a diminishing registry function, some felt that APNIC needed to do more work in reviewing its activities and adjusting the organisational structure accordingly.

Demand for training services was strong with requests for new subjects such as Quality of Service (QoS), detailed training on prevention of Distributed Denial of Service attacks (DDoS), more advanced courses in IPv6 and routing, more face to face training and accreditation.

Changes to the APNIC website have been well received, though navigation could be improved. The blog was not widely read. Social media was useful but lacks Internet community participation. Simplifying the language and providing translation for the more interactive areas of the website used by members were suggestions for improvement.

Opportunities exist for APNIC to raise its profile in the economies of the region by participating in local industry events and conducting more outreach to tertiary institutions.

Developing tools, promoting RIPE's (and others) tools, improving the speed and usability of MyAPNIC and the Whois Database, together with broader collection and dissemination of statistical information would add value for members.

Secure, Resilient and Stable Internet

Concerns for a secure Internet were paramount and consistently generated more discussion than a reliable and stable Internet.

APNIC is perceived as a key regional body with shared responsibilities for a secure, resilient and stable Internet. As such it is well placed to expand the dialogue on security. As stressed in the section above on 'Challenges', the need for collaborative security initiatives, co-operation and partnerships is re-iterated. Reaching out to I* organisations, governments and related agencies is seen as key to tackling security threats.

APNIC's continued support for capacity building and development activities, such as assistance to Internet Exchange Points (IXPs) and Network Operator Groups (NOGs) was seen as important to aid Internet development in the region.

Technical Trends

Security was again raised as a concern, especially in the context of identified technical trends like Internet of Things (IoT). Attacks are increasingly sophisticated, making prevention difficult.

Despite hype and speculation, there is no clarity or common understanding over what an IoT future will bring other than the utility of connected devices and an increased demand for IP addresses. More negatively, IoT presents a range of security vulnerabilities for exploitation. Fragmentation of the Internet into many private Internets was also considered a risk.

Cloud computing is on the increase. Trust is not perceived to be an issue, however the requirement for public IPv4 addresses is. Increased network latency and congestion could negatively impact cloud applications requiring fast and large-scale data processing.

Software-defined Networking (SDN) is perceived as a buzzword. Grasping its potential is difficult due to a lack of consistency in vendor implementations.

When speaking about technical trends, APNIC's role as a trusted, neutral and independent organisation comes to the fore, offering a unique opportunity to gather and disseminate impartial and reliable information in the region regarding new technologies and industry trends, enabling the provision of related services.

FINDINGS

Topic A – Challenges

By far the single biggest challenge facing members was the lack of IPv4 addresses. This was often coupled with problems related to the deployment and uptake of IPv6. Operational responses and policies for managing attacks to network infrastructure and cyber security threats were also very high on the list of challenges for both members and non-members alike.

Members in some focus groups emphatically placed capacity building at the top of their list, as did a number of non-members, for whom capacity building was a key policy challenge.

Other challenges raised by members include an uncertain and changing regulatory environment, geo-location inaccuracies, congestion and fragmentation of the Internet.

In the following pages each challenge is explored in detail, along with related suggestions as to how APNIC could help mitigate the challenges.

"There is a critical shortage of IPv4 addresses"

In the context of growing demand for services, many members acutely felt the shortage of IPv4 addresses. Obtaining more IPv4 addresses is the number one business and technical concern.

- *"Lack of IPv4 addresses is the number one problem."*
- *"There is a business impact because IPv4 addresses are getting more and more expensive."*

According to members, management appears to be well aware of the shortage of IPv4 addresses. Strategies predominantly used to deal with the shortage included purchasing additional IPv4 addresses from the legitimate and/or black market or deploying NAT. Without exception, members were making increasing use of NAT.

In contrast to the survey results from 2014, members' knowledge of IPv4 broker services was high. While many had explored the market, far fewer members had actually completed transactions with brokers. High prices were a barrier. Uncertainty and a lack of trust predominate.

- *"We have no idea for the "proper" price of IPv4 addresses, it is like oil."*
- *"We get quotes from the open market and we cannot tell if they are genuine sellers or not."*
- *"Are they [brokers] reliable? I asked APNIC, but they say they are not responsible. It seems to me very risky."*
- *"We did not admit their business officially. Brokerage business does not have a good image in [economy]."*

Other techniques to deal with the shortages included internal renumbering to make more efficient use of IPv4 addresses and less frequently, deploying IPv6. Taking out additional APNIC memberships to obtain small amounts of IPv4 address space was also another strategy used.

- *"The way to get IPv4 addresses is to create a lot of companies and to use the companies to get membership of APNIC."*

Customer demand for IPv4 addresses has also increased, intensifying the pressure for IPv4 resources. The reseller market is very active. A few members spoke of being approached by their customers to lease out their allocation of IPv4 addresses.

- *"Some customers requesting larger than a /24, but we are not sure if they will resell our IP addresses. They ask for 4-5 /24 blocks. We are unable to verify if they will resell."*

- *"Customers say they have more hosts, but in fact it is a commercial decision rather than a technical decision. Everybody is greedy, they try to get more."*

How can APNIC assist?

Several suggestions were made for APNIC to make more IPv4 addresses available.

It was felt by some that IP addresses should not be bought and sold, citing the importance of the principles of Internet resource management policies: fairness and equal access.

- *"IP addresses should not be bought and sold, they are "public property" and should not be used for commercial gain."*
- *"This is wrong business practice for the Internet community. They are the property of society, not owned."*

Suggestions were also made for APNIC to assist by playing a role in IPv4 address recovery and reclamation efforts.

- *"APNIC should start a campaign to return addresses for the greater good."*
- *"Remove the high prices of addresses and ensure fair access to the addresses."*
- *"APNIC and the other RIRs should be far more pro-active in recovering unused address space. Stanford returned addresses but MIT are still sitting on unused addresses which they do not need."*

Other suggestions included price setting, setting up new allocation policy guidelines for special cases, checking BGP announcements and pursuing illegal activity. There was also a suggestion to buy IPv4 addresses from other RIR regions. Akin to the year 2000 problems, some felt a declared end of life for IPv4 would be helpful to aid planning.

Non-members did not express strong views on IPv4 address shortages.

"The thrust for IPv6 is seriously faltering"

Transitioning to IPv6 was always part of the conversation when discussing the challenges with IPv4 address supply. Despite the critical situation, several members stated that there were no plans in their company to deploy IPv6 yet. Many felt they would co-exist with IPv4 and NAT for 10 or more years.

The slow uptake of IPv6 was a key concern for both members and non-members alike. Even in the more advanced Internet economies, the situation was similar in that they felt they were a long way off their planned targets for uptake of IPv6 and the rate of IPv6 deployment had slowed. Planning scenarios were totally different from reality, with widespread deployment of NAT.

- *"People have accepted Carrier grade NATs are here to stay and tweaks will do."*
- *"Despite some of the larger organisations announcing that their infrastructure will support IPv6 services, like Apple, Google and Facebook, for the most part, IPv6 deployment for the rest of the infrastructure does not go well. In the emerging countries it is especially difficult. Cellular phone services do not work well."*

Unchanged from the 2014 focus group report, the deterrents to customer migration to IPv6 still focused on the cost of transitioning, the lack of backwards compatibility for both hardware and software and the lack of IPv6 applications.

Additionally, the potential for disruption to the customer base caused management to be risk averse and to focus on obtaining more IPv4 addresses combined with NAT. In exceptional cases, ISPs had paid for the upgrade of the customer's CPE equipment to IPv6 capable devices.

- *"Top management of the company does not understand IPv6 well as they are not technical. So they do not want to take any risks with the change."*

- *"Customer solutions get very tied to the technology - whether it's appropriate or not. And once in production those solutions have very long life cycles."*
- *"Our major challenge is how to promote the wide range of applications to be IPv6 enabled. As an ISP we do not have many tools to push forward the development in this area and this is a problem."*

More than half of the members reported that IPv6 had been implemented in their core networks. They were dual-stacked and IPv6 ready, but they had few or no customers, and were unable to convince them to change. Despite their best efforts, they still needed more IPv4 addresses. A few had IPv4 only in their networks and did not have an IPv6 allocation.

- *"IPv6 will take time and many ISP's still need a large block of IPv4 addresses in the meantime, but we are trying our best internally and with our partners to promote IPv6."*
- *"The backbone is ready, access side is difficult and needs significant budget due to scale."*
- *"We are IPv6 ready but we have zero customers."*

The lack of upstream providers who could provide IPv6 connectivity was mentioned. Whilst not a 'usual' situation, it has a major impact for a particular economy, so is highlighted here.

- *"I have to create tunnelling and it is not very reliable. None of the three international providers who provide connectivity outside [country] can provide IPv6 peering services. If they are not providing IPv6 services it is very difficult for us to start IPv6 services."*

Other reasons to explain the slow adoption of IPv6 included a lack of IPv6 content, a lack of confidence about how to plan and deploy IPv6 and the difficulty of working with hexadecimal addresses. This was all compounded by a lack of provisioning tools and education systems that do not produce engineers who are IPv6 literate.

Non-members were also aware of the issues with IPv6 deployment. Some are trying to lead industry by example. Others had initiated high-level conversations between mobile phone carriers and the government to work together to promote deployment.

- *"Government tries to showcase best practices so in the case of IPv6 the Government has deployed IPv6, trying to lead industry."*
- *"Right now we are engaged in private, very technical meetings with 3 major cellular phone companies, in collaboration with the government - they are going to have a mobile IPv6 launch next year. We have been focussing on cellular IPv6 delivery because major content providers are based on wireless cell-phone access and they will be forced to adapt. This is their strategy to shift deployment."*

Among some members, factors perceived to tangibly drive IPv6 uptake were lowering costs and a clear technical and/or business advantage.

- *"If you can show that IPv4 is more expensive than IPv6 that's a thing to move people over long term."*
- *"There is a need for an explicit advantage to be well defined to move to IPv6 or a tax exemption."*

How can APNIC assist?

Managing a limited supply of IPv4 addresses was the biggest challenge facing members but IPv6 was the area they felt that APNIC could help most.

Suggestions for the types of help were wide ranging and included targeting end users and management, increasing availability of training, sharing real case studies illustrating successful transition strategies and best practices. More dialogue with large players and vendors was also seen as important as well as reaching out to tertiary education providers. Both members and non-members felt more co-operation and dialogue with regulators would be helpful.

- *"IPv6 is not difficult, but it is difficult and getting customers to understand when they should go to IPv6 is hard. Helping our end users understand why this is important going forward is important."*
- *"Examples of successful transition strategies would be helpful."*
- *"APNIC could help by talking to the regulator to help promote IPv6 deployment."*
- *"Providing material that we can use on IPv6 would be a very big help. For promoting IPv6 to [country], we plan to do the networking to the universities, then we train the teachers how to use it, then they can push it to the students."*

Some of the non-member interviewees were interested in opportunities to help guide them with concrete advice and activities to support IPv6 deployment in their economy.

- *"We are interested in opportunities for consultancy projects to assist the countries in need with, for example, policies and activities to support and promote IPv6 deployment and the development of Broadband Master Plans for individual members. I would like to encourage APNIC to have some small narrowed down and targeted projects."*

"DDoS really hinders our ability to deliver a robust Internet"

Security has become a much bigger challenge than was reported in 2014. At almost all of the focus groups, dealing with issues of network security was cited as the next biggest challenge they faced after IPv4 and IPv6. Similarly for non-members, for whom cyber-security was at the top, or near to the top of their challenges.

For members, specific reference was always made to the difficulty in managing DDoS attacks, Botnets and other security breaches. DDoS attacks were singled out as being more frequent and more sophisticated than ever, creating significant management overhead. Using DDoS mitigation providers is very expensive.

Route hijacking occasionally came up in the context of security. Knowledge of Routing Public Key Infrastructure (RPKI) appears to have increased from the levels in the 2014 focus groups, however deployment was not widespread. In one group it was noted that deploying RPKI would mean that a DDoS mitigation provider would not be able to their announce routes, negating the mitigation service. The vulnerability of the routing system as a whole was also a concern.

- *"Taking action to protect against this is a very embarrassing and costly issue."*
- *"Use of DDoS mitigation providers is very expensive. If you use RPKI it is difficult to use a DDoS provider."*
- *"Trust anchor is another important issue. Many of the small ISPs do not really understand these issues, routing, trust – which makes the whole system vulnerable."*

Non-members tended to have a more policy-oriented perspective, with cyber-security a major concern.

- *"We are currently planning the next generation of public services over the Internet, but we are held up by the various security, cyber-security threats."*

How can APNIC assist?

In terms of areas where APNIC could assist with security issues, suggestions from members and non-members included extending the training, information and outreach activities. Collaboration with the other RIRs, national agencies and I* organisations to assist with cyber-crime was also suggested.

- *"Some of the training courses are very good for the community. It would be useful if APNIC could reach out to universities and to the ICT agency in terms of policies relating to cyber-crime and security."*
- *"As APNIC have access to different organisations, they could also be more of an information provider in matters relating to security."*

- *The Internet organisations should have a joint hand to do something. We are just general users."*
- *"Route hijacking is a major problem and a big issue. RPKI is not widely deployed. APNIC should target tier 1 providers."*
- *"APNIC should be shaping the conversation and do more user facing guidance."*

Both members and non-members saw maintaining the accuracy of the Whois Database as an important aid to tracking.

- *"APNIC is the service provider of the IP addresses, behind that the whois registry is really important: the accuracy, the usability of that directory helps the security professionals do their job."*
- *"Whatever APNIC delivers in terms of the whois registry we have to accept. When we look for some assistance from APNIC, if they are not well prepared, that's it. Of course I expect them to do more."*

"Geo-location providers are not here to help us"

Across the focus group locations, members nearly always spoke of customer complaints associated with geo-location servers not resolving to correct locations. Particular problems were experienced with APNIC's recent IPv4 allocations or addresses acquired through the market. Resolving these satisfactorily was a challenge.

How can APNIC assist?

Despite being a widespread problem, there were few suggestions how APNIC could concretely help. Those received include APNIC acting as a geo-location provider, taking measures to further disseminate information about new IPv4 blocks received, and providing a 'track changes' history of the whois APNIC database.

- *"APNIC could help resolve cases of inaccurate reporting with geo-location services, in co-operation with IANA."*
- *"Can APNIC be a geo-location provider or point them to the Whois Database?"*

"Bandwidth is a big topic"

Keeping up with an ever-growing demand for bandwidth from customers and degrading network quality were challenges generally experienced by members across the region. It was a much bigger issue in some economies where everyone spoke of the same pressing challenge.

- *"But cheap does not equal resilient and fast. It's that whole pick 2 of 3 - but we are being asked to supply all 3."*
- *"This has become a major business challenge, customers are especially worried about their download speeds."*

The need for an IXP was raised in the context of bandwidth management. Non-members confirmed the industry concern for saturated bandwidth and explained how they had addressed the problem by supporting a second IX.

- *"ISP's are worried that their bandwidth is saturated. So they made a proposal to government to be able to double their capacity via a second IX. To boost e-commerce and video services the government assisted in supporting a second data centre."*

How can APNIC assist?

APNIC was encouraged to continue support for establishing IXP's as one way to ease in country traffic congestion. It was also suggested that APNIC could help by providing some hands on workshops on traffic optimisation and advanced BGP.

- *"Bandwidth congestion should not be in a healthy Internet. APNIC can help facilitate the development of an IX."*
- *"APNIC is seriously focussed on the BGP fundamentals, not on how we can improve throughput, delay and jitter."*

"There is regulation, but the regulator does not regulate"

The lack of regulation and/or the changing regulatory environment was a challenge for some members. While this was not at the top of the list, it was a factor creating uncertainty.

- *"You have to educate the people in the ministries, look at it from their perspective and then help them come up with regulations that are not crazy. We need to keep the barriers to entry low."*
- *"Can APNIC talk more to regulators and policy makers - to help create an enabling environment."*

How can APNIC assist?

Non-members in economies with an emerging Internet industry also spoke of regulatory challenges, but in terms of creating a regulatory environment.

- *"If APNIC can design a course only for the regulators, this would be good. For example, how to do the start up of ISP's. What are the steps, how to operate as an ISP, so that when we come up with problems, we know what to do."*

"We simply do not have enough qualified people"

Regions with an emerging Internet industry placed capacity building at the top of their list of key challenges. Similarly the majority of the non-members stressed capacity building as a key challenge, which often related directly to their role, responsibilities and wider policy purview.

One of the challenges was the lack of qualified staff, training and retaining them. In some locations, the education systems do not have budget or the resources to be able to provide the necessary skills. Where this was the case, it critically impacted the ability of members to conduct their business.

- *"We are a developing country and it will rapidly move on to the next stages, but the challenges are people related, turnover is high."*
- *"If you need someone to learn networking, you have to train them yourself, and then the competitors try to steal your talent."*
- *"When they graduate from the university in IT, they do not meet the market demand."*

Non-members had a host of capacity building challenges, which included a lack of skilled labour, digital literacy inequality, disparity between urban and rural Internet access and infrastructure and promoting local content.

- *"High-density areas have multiple choices to access Internet but low-density areas have no options at all in some cases. Lessening that disparity is a challenge."*
- *"Advanced countries have high bandwidth networks such as LTE and wireless and tend to be hyper-connected societies. Emerging countries struggle to get their backbone in place to support the industry."*
- *"How to increase the domestic contents in this country is a very big topic. I think there is a potential big market."*

How can APNIC assist?

Building in-country capacity to provide effective training, lowering training costs, providing more advanced training, expanding in country outreach, having a local 'go to' person and improving awareness of APNIC training services were suggestions where APNIC could help.

- *"Helping to support the national colleges and universities would be a very big help, but if someone from outside the country talks to them it really does help."*
- *"If APNIC can send an engineer for 3 months, to help train all the lecturers in universities."*

For non-members, increased co-ordination, collaboration and partnerships was the overwhelming response to how APNIC could assist with their capacity building challenges. In a number of cases, while acknowledging that APNIC did good work already, there was a strong desire to see more in-country and regional collaboration, an expansion of key partnerships and more information sharing.

- *"APNIC is a good partner, especially in training programmes and public policy development. It has some role to assist in some of the challenges."*
- *"Partnerships are essential to be able to deliver workshops, despite APNIC being "embedded" in these organisations."*
- *"No. 1 priority is capacity building: security topics, IPv6 adoption and transition. This can be done through the hands on workshops, not only for regulator but also for the operators to help build capacity."*

Topic B – APNIC Secretariat Performance (APNIC members only)

"Professional organisation, they are amazing"

Many members spoke of their 'limited' engagement with APNIC, stating that their contact was essentially 'transactional' in that they logged in once a year and paid their invoice or occasionally used the helpdesk services. Notwithstanding the limited contact, the organisation was praised for its performance. APNIC is recognised as a respected organisation that conveyed status and that was important to belong to. There were very high levels of appreciation for local language support where it was available and, conversely, disappointment where this support was not available.

- *"Performance of APNIC versus other RIRs is number one."*
- *"In this market if you are not a member of APNIC, then you're nobody."*
- *"Chat is very good, better than it used to be and fast."*

How can APNIC assist members further?

Suggestions were made to expand the operational time zone of APNIC, open the helpdesk on the weekend and offer increased local language support.

Long processing times and tighter restrictions on foreign transactions made it difficult for members in several economies to pay their APNIC membership fees. A longer notification period for renewals would help, along with opening a local bank account so that fees could be paid in cash.

Given the end of the IPv4 distribution function, a few members felt that APNIC needed to do more work in reviewing its priorities, consulting with its members and adjusting the structure of the organisation accordingly.

- *"Since the APNIC allocation role is dropping substantially, then staffing levels/cost should also decline."*
- *"While current services are generally satisfactory, APNIC needs to review and decide on the role it should play. By APNIC, I mean members. It is a member's organisation. It should still have addresses as its primary focus; have a core membership charge; and then additional service packages which could be tailored to need, size and perhaps ability to pay."*
- *"APNIC seems to be diversifying what it does without member discussion and agreement. Foundation is a good example. That was a top down decision to a fairly passive membership. Is the need social or Internet/structural?"*

"Training is good but ..."

Training services were praised although with caveats. Again lower fees were stressed as important in some economies, trainers with real operational experience are needed and training conducted in local languages would help members.

- *"To a developed country the fees do not look big but it is often approaching a monthly salary here. It does not make sense to employers."*
- *"Local language is better."*
- *"APNIC could hire or sub-contract with someone who has real expertise that can deliver... for example, security. APNIC staff are good as teachers, but they are not experts."*

How can APNIC assist?

Enhancements to the training services included suggestions for more face-to-face training, accredited training courses, delivery in local language, advanced and new courses in IPv6, DDoS mitigation, QoS, bandwidth optimisation and routing. There were a number of suggestions to develop alumni of training participants.

- *"Can APNIC follow up with people who have been to trainings, and ask for feedback and get some inputs on what they are going to do after their training, so that they can form some sort of community in the country to help."*
- *"We attended the course on DNSsec - it was a great course, very hands on. At the end of it, it would be really nice to know, how can we get more support going forward."*
- *"Can APNIC help provide some small grant funding to help build up the community?"*

Some felt that APNIC should develop a stronger local presence. This entailed suggestions for building brand awareness by participating in bigger industry events and reaching out to university engineering students through exhibitions and special event days.

"The website is better but still a bit complicated to use"

The APNIC website, although noticeably improved, was still too complex for a number of people. Members were often not aware of information available on the website, suggesting that they rarely went deeper than satisfying their immediate requirements. The blog did not appear to be widely read. Knowledge of APNIC's Facebook page and other social media was low. Facebook users noted the lack of community interaction.

- *"Slower than old website."*
- *"Too much content in English."*
- *"APNIC's Facebook page is silent - only APNIC posts."*

How can APNIC assist?

The feedback suggests that simplifying language and increased translation are key areas to target for further improvements to the website which would help members.

- *"Make sure the interactive parts of APNIC services are in local languages, etc. MyAPNIC, resource delegations and policy documents."*
- *"Content needs to be simplified."*

"MyAPNIC functionality has improved a lot recently and is faster"

Recent improvements to the speed and functionality of MyAPNIC were appreciated. However it was felt that it was still difficult to use, with some areas not functioning correctly. Similarly, the APNIC Whois Database interface was not regarded as very user friendly, with many members preferring faster, more user-friendly alternatives.

- *"MyAPNIC embedded links do not work."*
- *"Too complex, too many steps, display issues."*
- *"RADB is very user friendly, APNIC is not. RADB guides you."*
- *"Comparing with the update speed and the access speed, RADB is quicker. With APNIC it takes too much time."*

How can APNIC assist?

MyAPNIC and changes to the Whois interface were two areas where feedback indicates that further consultation with the community may be needed to address some of the issues above.

"APNIC is taking care of its members"

As part of the conversation about the APNIC Secretariat performance, members were asked whether they felt their organisation was important or valued by APNIC. For the most part, participants cited that they were just basic users of services so had very

little to add or did not need to feel valued. Therefore, with the caveat that there were fewer responses to this question, comments suggest that APNIC is highly regarded and is looking after its members well.

- *"It feels nice to be part of APNIC."*
- *"Yes. APNIC seem to treat members well. Whether small or medium in our experience."*

How can APNIC provide more value?

In terms of adding value to their APNIC membership, members were evenly divided. Some said that they could not suggest anything to add value to their membership. A small number said they were happy as long as APNIC did its job well.

- *"APNIC best 'job' is ensuring that resources are correctly managed. As long as that happens I don't really have a need to feel valued."*

Others provided a number of suggestions. These are outlined under the headings below.

Develop tools

Particular emphasis was made of the usefulness of the RIPE and other tools. The expectation was not that APNIC would replicate tools, but they could develop additional tools while promoting the RIPE (and other tools).

- *"RIPE has taken some good initiatives. They are developing very good tools and we are using them e.g 'BGP delay', 'RIPE Atlas' which helps measure latency from everywhere."*
- *"Tools like 'MXToolbox' which is free software used to check blacklists."*
- *"Develop active training tools e.g. an IPv6 'simulation' DNS tool (like Hurricane Electric)."*
- *"An API would be good so we could pull and push details using a REST API."*

Information sharing

Members often looked to APNIC as a neutral, vendor independent source of information with a regional, and globally connected perspective. It was suggested that value could be added to their membership with efforts by APNIC to facilitate and promote greater information sharing.

- *"I have been the contact point for 12 months, and I have seen emails about elections etc - that's not the level I want to be engaged. I would like to know what forums there are, what's happening in the industry."*
- *"It would be really good if there was a forum on DDoS (not mailing lists)."*
- *"As a member I would like to know what the organisation is doing."*
- *"Help to build directory services - to know who is doing what."*

Provide local support

Whether temporary or permanent, having a local support person would add great value for some.

- *"The way APNIC works and how things work in [economy] is completely alien."*
- *"[Economy] is at a completely different level of economic development. You just need a bridge. Having a local speaker on staff would not really help - it is someone on the ground that is important. It is a different mind set and there is a different order to doing things."*

Topic C – A secure, resilient and stable Internet

Prior to a discussion about APNIC's role in a secure, resilient and stable Internet, APNIC's broader activities beyond resource management and training often had to be elaborated to provide context for the members and to a lesser degree with the non-members. This indicates a general lack of awareness of APNIC's activities in this area.

Where comments were forthcoming, it was similar from both members and non-members alike, in that concerns for a secure Internet were paramount. Members often made more specific suggestions, but both groups stressed the need for greater co-ordination, collaboration and outreach.

Continuing support for Internet development and capacity building were perceived as important ways in which APNIC could continue to contribute to resiliency and stability. This included support for IXPs and NOGs, as well as support for community led initiatives.

"If APNIC wants to join hands with the other Internet organisations to maintain a stable, healthy Internet environment, they should do something and explore how they can help"

As noted earlier in this report, security is a key issue for members and non-members alike. Effective progress to tackle security was linked to the need for broader collaborative security related initiatives to be undertaken by APNIC and the community. Suggestions also included promoting tools and information, providing education and awareness on how to prevent DDoS attacks and increasing work with CERTS.

- *"APNIC can provide more information and tools on how to deal with security."*
- *"APNIC could collaborate to produce a guidebook or workbook on the issues around cyber-security. It could be made by APNIC (and/or ISOC) and be distributed through the NIC's or ccTLD's to be put into local language. Making this kind of information stream to the people in the region would be really wonderful."*
- *"Be an information and support bridge - for example, for DNS hijacking ... between ISC and the operators?"*
- *"Can APNIC take leadership on establishing a regional Security Operations centre, where operators can share their ideas and information regarding DDoS and other security attacks?"*

"A C-level forum would be good, like a roundtable/informational session sponsored/organised by APNIC"

Some felt that APNIC should provide more opportunities for CEOs to understand APNIC's work. This would provide them with a deeper understanding of how a secure, resilient and stable Internet related to their business objectives.

- *"A C-level forum would be good, like a roundtable/informational session sponsored/organised by APNIC, would be very helpful...once every 6 months, with invites from Paul Wilson."*
- *"The Internet is so core to so many businesses these days and even in the supposedly technical space a lot of the decision makers don't understand the issues (IPv6 especially)."*
- *"APNIC should do more in the non-technical C-level advocacy."*

Non-members felt that increasing outreach to government and regulatory bodies were important activities that could help with contributing to a secure, resilient and stable Internet. Some non-members felt that they were equally responsible for critical infrastructure.

- *"Increase co-operation with NIC's, ISOC, governments and other areas. This is how APNIC can help with these issues."*
- *"As Government we are not so aware of what APNIC is doing. I do not think there is harm in going around to Governments and doing the introductory pitch so that there is more awareness of these technical organisations that are primarily industry and in regards to the Internet that it is really multi-stakeholder."*

- *"They are not strangers on the international circuit, but they are seen as technical people and therefore you may not intuitively go to them as Governments. APNIC needs to initiate the outreach. Face to face is key, usually at international meetings."*

Continuing the policy and collaboration theme, the non-members appreciate APNIC's involvement with the IANA transition.

- *"This activity [IANA transition] was very important and is a concrete example of APNIC's contribution to a secure and stable Internet. This is very valuable from our perspective."*

Non-members raised the role of the US government in ICANN in the context of security and stability.

- *"The IP address registry (IANA) is left to do its job under the US government but are they influencing the policy making process?"*
- *"The role of the US government is upsetting many Asian countries. Politics is a challenge which did not really exist 10-15 years go."*

"It [the multi-stakeholder model] is not really inclusive... It is a discussion that takes place between insiders"

Some felt that to effectively safeguard the future of the multi-stakeholder model much more effort was needed to encourage participation from different stakeholder groups.

- *"We need an awareness campaign to the users of the Internet to educate them about the importance of the 'multi-stakeholder' model. This kind of outreach is now needed to the next generation to safeguard their and our future Internet."*
- *"There is a huge impact to APNIC in terms of the different and new stakeholders emerging in the Internet landscape. We should invite them into our circle; if we leave them out they will make their own world. We want to share all the resources as much as possible. APNIC should invite 'Ali Baba' data centre designers to APNIC. This could be very interesting. Or 'Tencents' in China, we could discuss about security in the banking systems for example."*

Members also felt that the increased focus on security was at the risk of freedom, which is an important attribute of creating and managing today's Internet with its characteristics of openness, inclusiveness and bottom up, multi-stakeholderism.

Increasing the dialogue with policy makers about the balance between security and freedom was felt to be important.

- *"There is an increased concern for security, which may decrease freedom."*
- *"We should be able to self-regulate rather than over-regulate and we need be active to ensure the balance is correct."*
- *"APNIC can work more closely with the Government. They will listen more to APNIC. Maybe they have different concerns that we do not know about. Maybe APNIC can talk to them and mitigate their concerns by talking to them."*

"APNIC plays an important role in [economy] in supporting NOGs"

Members in economies with a less mature Internet industry were aware of APNIC's work in the region to enhance Internet resiliency through activities such as helping to establish IXPs, NOGs and the development of 'community'. There is a strong desire to see APNIC continue support for these activities. There was also a suggestion for APNIC to provide seed funding to mobilise local activity.

- *"This is one of the major things we have to address. If APNIC can support us to form a NOG. All the operators operate as individuals, but we should be interlinked to get things solved."*
- *"Can APNIC help provide some small grant funding to help build up the community?"*
- *"Provide micro funding to support community initiatives. The amount of money does not have to be large."*

While support for NOGs was felt for the most part to be extremely valuable, members noted that different cultural norms play an important factor in determining their success. These should be carefully researched prior to efforts to support a NOG activity. This was echoed by several members in economies where NOG's did not exist.

Topic D – Technical Trends

Both members and non-members observed similar trends in technology. IoT was perceived as a buzzword with no real impact to any of the participants although it was believed that it would be prominent in the future. Software Defined Networking (SDN) was perceived as another buzzword, with the diversity in vendor implementations making evaluation difficult.

Security related issues were raised again in the context of technical trends, with an increase in sophistication and organisation of attacks cited.

Cloud computing was seen as a growing trend, with an increase in private clouds.

In some economies, members felt congestion and instability were growing trends. Block chain technology was noted for its potentially disruptive impact as well as generating opportunities. Additional mention was made of virtual machines and artificial intelligence work.

Changing technology was impacting the established business models for some. While providing opportunities, there were also concerns. One of the key concerns raised was fragmentation of the Internet. For non-members, such changes were felt in some cases to challenge existing policy frameworks. As a consequence, they look to APNIC for assistance and guidance.

"IoT is a playground just now - it's not commercially viable"

Few members were actively engaged in IoT. Non-members, predominantly from a public policy perspective were more actively exploring opportunities for IoT applications. Overall, concern was expressed about the lack of direction in IoT, its need for a large number of public IP addresses and security vulnerabilities.

- *"Security in IoT is a big issue."*
- *"Many members are concerned with this and want to invest in IoT. They know that IoT needs number resources. We need fully-fledged IPv6 to accomplish their goals."*
- *"I" for the IoT is not for the Internet but is more about closed networks, for example, sensor networks. The increase in IoT devices does not mean increase of activity on the Internet."*

In terms of support that could be provided by APNIC, non-members commented that APNIC needed to highlight this topic more.

- *"IoT is a can of worms. There is much waffle and people claiming they understand it all. The problems will wander off and snowball. In this area what the ITU is doing is nonsense. APNIC needs to flag more of these issues at conferences."*

"SDN is another buzzword"

Members looked to APNIC as a neutral, impartial and trusted organisation, rather than vendors to make sense of SDN. While very few were using it, everyone had heard of it.

- *"The term is not well understood especially as different vendors have different terminology and implementations."*
- *"SDN is another buzzword to which each person you ask a) gives you a different definition and b) when you ask them questions they do not really understand it anyway."*

"Patterns of traffic are changing. Outbound traffic is twice as much as inbound"

Cloud computing is on the increase. Despite heightened security awareness, trust in the cloud was high; specifically trust in for example, Microsoft and Google. The cloud trend was causing an increase in the demand for public IPv4 addresses. Some noted that the trend for cloud computing was a move in the wrong direction.

- *"The trends for big data, cloud computing, IoT etc are currently based on large computing number crunching in data centres. With IoT many m2m applications will require very low latency e.g. for auto-operation etc. In this case people are now realising that the data centre is too far away from the local network operation. Computation resources should be in the customer networks, where they can easily be controlled. Few people realise this."*

- *"No trust issues, good thing, but huge demand for IPv4 addresses."*
- *"Decrease in the size of server space, decreasing costs of rack usage."*

"Customers just want more stability, less congestion"

Several members felt that the services that they provide are not stable and suffer from congestion. When selecting ISPs customers used this as a point of differentiation.

- *"Right now it has become a real concern, customers are benchmarking operators based on the throughput."*
- *"Jitter and lack of bandwidth affecting cloud services mostly located offshore."*

"The increase in 'ransom-ware' is a hot topic"

Malware, botnets, ransom-ware are evolving rapidly in sophistication and becoming increasingly difficult to prevent.

- *"Local/individual entities do not understand – yet it is critical to their business e.g take a small florist everything is Internet based orders, purchases accounting. They do not realise that 91% of Malware is Ransome ware; they have 2 vulnerable laptops and no knowledge about what to do."*
- *"The increased incidence of spam, malware and ransom-ware are evolving in their sophistication and consequently pose increasing threats to daily life."*

"We are still catching up"

An element of the membership in less mature markets felt that they needed special consideration as they were playing 'catch up' to technology.

- *"Things that are old hat in other markets, a lot of people here are learning about them and struggling with them."*

"Fragmentation is a huge issue"

A small number of members focused on the impact of trends. These included the risk of fragmentation of the Internet, the need for heavy computing processing power at the edges of the network, the decrease in popularity for proprietary hardware, the criticality of security and alternatives to IPv6.

- *"Large providers e.g. Facebook or Google want specialised hardware available only to them. This is causing a change in the structure of the big IT industry suppliers. We do not need DEC or HP anymore."*
- *"There is a risk of fragmentation with IoT networks. Despite using TCP/IP, designers want to create their own backbone, which is private and which they control. This is especially true with new participants into the industry."*
- *"Some parts of the industry are looking to explore new areas of technology where they do not need IP addresses, for example non licensed frequencies. They think that this might be another way for some companies to avoid the adoption of IPv6 and be ahead of the industry."*

Some of the non-members responsible for policy felt that the impact of new technologies and technical trends challenged the existing framework for policymakers.

- *"We are solving problems like whether the mobile Internet needs may need new governance and control measures from a personal data security perspective but also want to make use of big data to be able to provide the best user experience."*
- *"New technologies contribute to the digital divide rather than bridging the gap. Spam, malware, ransom-ware, etc. are a continuous problem to all citizens. Digital privacy and cyber-security are the top priorities of the member countries."*

- *"Many retailers have online shops, but the selling is all offline. There is only advertising online at the moment. But we have no regulations and policy, consumer protection etc for how this should work."*

How can APNIC help?

There were few ideas regarding how APNIC could assist. Some suggested that APNIC was already doing enough and that moving outside its current remit was not helpful.

The suggestions received are elaborated under the headings below.

"Add services evaluating new technology, research and awareness"

APNIC's role as a neutral and trusted organisation, independent from vendors was highly valued. Suggestions were made for APNIC to enhance or add services providing impartial, reliable information regarding new technologies, industry trends and to provide related information services for the community.

- *"Add services evaluating new technology research and awareness."*
- *"APNIC is agnostic - new technology information comes from tradeshows and vendors, but you do not know whom to trust. APNIC is a trusted organisation; it is non-commercial and is in a unique position."*
- *"They need to educate people on SDN. While it is a powerful paradigm, members do not really understand it. It is a hype bubble at present. They don't know the difference between control plane and data plane."*
- *"A YELP for Internet services amongst members, so that we have an awareness of what different services are out there would be good."*

While supportive, a few expressed caveats in APNIC providing statistical information and services, stressing the need for accuracy and timeliness.

- *"Data needs to be available quickly as industry is changing very quickly."*
- *"Interested, but we are concerned over whether we would be allowed to provide the information."*

"For APNIC, my point is that it is all about collaboration - it is key!"

Replies from non-members were different. First and foremost, regulators, governments and regional organisations all wanted more collaboration with APNIC and for APNIC to expand its collaboration activities.

- *"Co-operation with APNIC is good, but we would like to co-operate more with APNIC."*
- *"In order to successfully deploy 5G and IoT, devices need IPv6. APNIC needs to help with this, by reaching out to our members and to regulators in each country and also the equipment vendors."*
- *"We have studied cyber-security 15 strategies from other countries, but if we can get some consultant to advise on these strategies it would be really useful. We have already asked to the ITU, who have given a positive response."*
- *"APNIC has good relationships with country governments in the Asia Pacific area. At APRICOT we could have some kind of workshop, or there could be in country conferences. Every single country is interested in IoT and big data. We can share with the government people what the real issues are for IoT."*

Last but not least:

- *"Please send our regards to APNIC staff and management. We want to build on the co-operation."*

APPENDIX A

NOTE

NIR members and individual non-member interviewees used the same questionnaire as the one below, omitting topic B - Secretariat Performance.

Discussion Guide APNIC Members

Welcome & Introduction

Thank you for attending the APNIC discussion.

This document provides you with information about how the Focus Group discussion will be conducted and the topics that we will discuss. We hope this helps you to prepare for the session.

How the session works

The session works as follows:

- An independent facilitator, Ms Anne Lord, will conduct the session. No APNIC staff will be present
- The session will be recorded. The recording will be destroyed after the survey
- The information you provide is completely confidential and anonymous
- Everyone will be given time to contribute their ideas and opinions on the different topics. Please respect the group members and give each other time to provide feedback
- There are no right or wrong answers. We want to understand your opinions but not to find consensus or agreement. Please feel free to share your feedback even if it's different from what others have said
- Please respect each other's privacy and confidentiality. Do not share any information discussed with other people when you leave

During the session

- Please turn off mobile phones, tablets or computers.

Topic A – Challenges

1. What are the biggest issues or problems that you face in providing your Internet services today?
2. Could APNIC assist you with any of your issues? What can they do that is not being done now, or where could they improve?

Topic B – APNIC Secretariat Performance

As a member-based organisation, APNIC aims for a culture of excellence across all the activities they perform.

APNIC also tries to make changes in response to feedback to improve its services and service delivery. From the 2014 survey they made a number of changes based on your feedback, such as:

- Reduced fees
- Introduced Paypal as payment method
- Increased transparency and reporting against activities
- Introduced "instant feedback" which can be given on services
- Made improvements to MyAPNIC
- Increased support for RPKI deployment
- Established a member outreach programme
- Started work on accreditation (exam based) for APNIC training

You can also go to the APNIC website to view all of the initiatives:

<https://www.apnic.net/survey-response-activity>

1. What do you think about APNIC Secretariat overall performance in the past twelve months?

For example,

- Can you think of examples where APNIC performed very well?
- Can you think of examples where APNIC performance did not perform very well?

2. Can you tell us about your membership of APNIC – do you feel supported and important?

- Think about your involvement in APNIC activities, how you provide feedback to them, and how you communicate with APNIC.
- Can you think of an example when APNIC provided a good support ? could they do better?

3. What could the APNIC Secretariat do to add more value to your membership?

For example

- New services, training and education, communication with APNIC, or meetings or forums that would provide you with value.

Topic C – The Internet

APNIC's core focus is technical. Core activities are providing Internet registry services to the highest possible standards of trust, neutrality, and accuracy. APNIC also supports the development of regional infrastructure, provides technical education and training, shares information and provides leadership and advocacy for the region.

These activities contribute towards a more secure, resilient and stable Internet. This benefits everyone.

1. How can APNIC help to contribute to a secure, resilient and stable Internet?

For example,

- Could they provide more technical services and tools, more training and education with different audiences, increase engagement and support for policy and governance, more liaison with CERT's and other security agencies?

2. Are there things they are not doing that they could be doing to help?

Topic D – Technical Trends

We are interested in the technical trends that are developing within your economy and how they impact you in conducting your business.

1. What changes in technology and / or technical developments do you see in your economy? How are these impacting the way you do business?

For example,

- Cloud computing, Software Defined Networking, IP connectivity demands for household devices (the Internet of things), trends in ASN and IP address usage, security services

2. Is there anything that APNIC could do that would help you with these trends, that you feel are within the scope of their activities.

For example,

- Gathering data to provide a picture of networking trends; reporting of information services; tools that you could use; delivering localised training in emerging technical trends etc.

End of Session

If you have additional information that you did not get to say, please talk to us after the session.

If you have any other questions about the discussion, please also ask us.