



addressing the Internet in the Asia Pacific

# 2021

## Annual Report

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## EXECUTIVE COUNCIL



**Gaurab Raj Upadhaya, Chair**  
Head of Global Video Delivery, Prime Video  
Amazon



**Yoshinobu Matsuzaki**  
Senior Engineer,  
Internet Initiative Japan Inc



**Vincent "Achie" Atienza, Secretary**  
Peering, Interconnection & Strategy,  
Globe Telecom



**Kam Sze Yeung**  
Principal Network Architect,  
Akamai Technologies



**Kenny Huang, PhD, Treasurer**  
Managing Director and CEO,  
TWNIC



**Feng Leng**  
Director of Operation Management Department,  
China Internet Network Information Center



**Sumon Ahmed Sabir**  
Chief Technology Officer,  
Fibre@Home Limited



**Paul Wilson, Ex-officio**  
Director General,  
APNIC



## WELCOME FROM THE DIRECTOR GENERAL

For all of us in the Asia Pacific, the COVID pandemic continued to disrupt life in 2021. “Work from home” has been the new normal for millions around the region, proving again the importance of the Internet and of the work of the APNIC community.

At the APNIC Secretariat we continued to adapt and improve our ability to work alongside the pandemic, for as long as necessary. We’re looking forward to the day when we can again meet and work face-to-face as a Secretariat, as we used to. Even more, we look forward to resuming face-to-face conferences and community events, which have now been held online for two years.

Until we can meet face-to-face again, APNIC will continue to service and support Members online, just as we have in 2021. This Annual Report details APNIC’s activities for this past year, but here’s a snapshot of highlights, which I hope will show what a productive year we’ve had.

### **Encouraging the next generation of Internet leaders.**

After fellowships were cancelled in 2020, APNIC was determined to continue the fellowship program, in an online mode. A new, five-month program was designed, with expert presentations, Academy training, and time with community mentors before the APNIC 52 conference. With forty-six fellows participating (52% female), and a Net Promoter Score (NPS) of 92, it was a great success and becomes the new model for 2022 and beyond.

### **Returning IPv4 addresses to availability.**

Our work to reclaim unrouted and unused IPv4 space resulted in the return of 488,704 addresses (almost a /13) to APNIC. With many custodians of unused space either unresponsive or uncontactable – after exhaustive efforts – it is likely that at least another 1 million IPv4 addresses will be reclaimed in future, for the benefit of Members.

### **Operators taking routing security seriously.**

RPKI adoption continued to grow. More than 36% of IPv4 address holders now have ROAs, up from 24% a year ago; the proportion of IPv6 address holders with ROAs reached 22% compared with 17% at the

end of 2020. Eleven economies exceeded 90% ROA coverage – an outstanding achievement!

### **Demand for training remains strong.**

With travel still restricted, all but one of APNIC’s instructor-led training courses were delivered online. Ninety-six tutorials and workshops were delivered to 2,382 participants, and an additional 20 webinars reached another 1,202. At the same time, 5,428 users signed up for self-paced training on the Academy platform, and 1,735 completion certificates were awarded. Online technical assistance was also launched.

### **An active year in the labs.**

Less time on the road equals more time in the labs to conduct experiments. In addition to releasing a new ROA measurement tool, the Labs team analysed BGP, IPv4 and IPv6 address pools, QUIC, and other DNS topics such as DOH and DNS query patterns. This work translated into a record 43 research articles, 41 presentations at industry events, and support for a new podcast, PING, which published five episodes.



## WELCOME FROM THE DIRECTOR GENERAL - CONTINUED

### **Staying connected.**

During another year of almost no travel for most of the community, online participation continued to be critical. Webcasting and technical support was provided to 16 technical community events – such as NOGs, peering forums and more – to help them reach online audiences and maintain community engagement. Event support was provided to 17 NOGs and 28 technical events overall, and 1,558 participated in APNIC's two online conferences. In addition, APNIC's pilot of an online community platform with 110 users was completed, as preparations continued for a 2022 full launch.

### **Improving security.**

Security remained a top priority for Members and APNIC itself. The security team supported 43 security events, with 20 security training sessions delivered across nine economies and development support and advice provided to six CERTs. Three new organizations from Tonga, Bangladesh and the Philippines joined the Community Honeynet project taking the total

number of partners to 15. Internally, progress was made towards ISO27001 certification readiness. A great deal was also learned from a security incident APNIC experienced in June; you'll be hearing a lot more on security investments in 2022.

You'll find more information on these and other activities in the report that follows.

Thank you to all Members, and members of the APNIC community, for your continued support and cooperation, especially during such a challenging year for all of us. It is very much appreciated.

**Paul Wilson**

Director General





## WELCOME FROM THE EXECUTIVE COUNCIL CHAIR

On behalf of the Executive Council (EC), welcome to APNIC's 2021 Annual Report.

I'm glad to say that year two of the global COVID-19 pandemic is behind us. It was another challenging year for all industries, APNIC Members, and our community.

Throughout, the demand for Internet Number resources and related information services, training and development assistance continued unabated. As you will see in the following report, it was a busy year for APNIC. It was also an eventful year for the Internet numbering community globally.

As I look back on 2021, there are a couple of notable developments I'd like to highlight.

### **Welcoming all resources to routing security.**

At the EC's February/March meeting, the EC resolved that RPKI services would be made available to all historical resources held by APNIC Members and Non-Members. Improving routing security is critical to the health and stability of the Internet globally and APNIC is committed to supporting RPKI adoption in the region.

As part of these changes, the EC resolved that historical resource holders in the APNIC region would need to become Members or Non-Members by 1 January 2023 to receive registration services. While regular annual fees will be payable, historical resources will NOT be considered in the calculation of those fees.

These decisions by the EC aimed to provide holders of historical address space with access to RPKI services – a known previous source of frustration – while minimizing their ongoing costs.

In 2022, historical resource holders will need to begin the transition to APNIC membership. If your organization falls into this category, you'll hear more from the Secretariat as the year progresses.

### **Maintaining the integrity of the global registry system.**

A dispute between AFRINIC, the RIR for Africa, and one of its Members gained global attention in 2021. The dispute is ongoing, so I will not get into the specifics of the issue.

However, the case gained international attention after an order granted by the Mauritian courts froze AFRINIC's bank accounts, restricting its access to funds. It was an unusual action – that was soon lifted – but at the time it caused some concern among the community, with questions raised about the sustainability of AFRINIC and the RIR system.

These concerns were unfounded. AFRINIC continues to be sustainable and able to do its job. Secondly, the NRO Stability Fund commitments, established in 2018, set aside funding that APNIC and the other RIRs stood ready to provide should it have been required.

On this occasion the Stability Fund did not need to be called upon. The smooth operation of the Internet numbers system has continued while this legal process progresses towards a conclusion.

It is important to understand that while Internet number resources are managed by regional bodies, the RIR system is global, and cooperation between RIRs and cooperation in our global community make it resilient. APNIC and the NRO continue to stand ready as needed to help, for as long as needed.



## WELCOME FROM THE EXECUTIVE COUNCIL CHAIR - CONTINUED

I think I speak for many in the community in hoping this legal action comes to a swift conclusion in 2022.

### **Delivering on the plan.**

This was the first year where APNIC publicly tracked progress against its annual plan commitments on its website (replacing the 24-month survey action tracking).

As you'll see in this document, the Secretariat delivered well – despite changing circumstances – and I would like to thank all APNIC staff for their achievements in 2021.

However, there is always room for improvement on setting meaningful commitments; the EC worked closely with the Secretariat on the new measures in place for 2022. We hope these reports, plus the online tracker, provide the membership with an easy and transparent way to assess performance now and into the future.

### **We need your views.**

Looking ahead, 2022 is an APNIC Survey year. While you can always contact the EC, the APNIC Survey offers a wider opportunity for you to provide feedback on APNIC's activities and the issues that matter to your organization. When the Survey is released mid-year, please take the time to share your views – it is much appreciated and helps APNIC serve you better.

Thank you again to all Members and the community for your continued support of APNIC. However long this pandemic takes to end, let's stay in touch and stay connected as a community.

**Gaurab Raj Upadhaya**





# Vision and Mission

APNIC's Four Year Strategic Plan (2020-2023) introduced an updated Vision and Mission, and a new structure for activities under five strategic pillars (detailed on the following page).

## VISION

A global, open, stable, and secure Internet.

## MISSION

To provide essential services as a Regional Internet Registry, and to support Internet development in the Asia Pacific region.

### PURPOSE

To serve our community.

### IDENTITY

A not-for-profit trusted authority on Internet infrastructure.

### VALUES

Passion  
Trust  
Curiosity  
Accountability  
Inclusion

### CREDO

We are APNIC.  
One team dedicated to making a positive impact.  
Our ambition will be achieved by working together.  
Trust and respect for each other are not negotiable.  
Inclusion and diversity really matter to us.  
We take pride and excel in everything we do.  
We are curious. We are accountable.  
We are APNIC.



# Strategic Pillars



## 1. MEMBERSHIP

Develop and deliver world-class products and services required by APNIC Members.

Engage with Members in building a global, open, stable and secure Internet.

Ensure accountable governance of APNIC as a membership organization.



## 2. REGISTRY

Develop and deliver world class registry products and services required by the community.

Ensure responsible stewardship of Internet number resources and deliver accurate registry services.



## 3. DEVELOPMENT

Invest in sustainable development of the regional Internet community, industry and infrastructure.

Build capacity for best-practice Internet operations across the Internet technical community.



## 4. INFORMATION

Support Internet development with needed network information services, and research outcomes which are of demonstrated value to the community.



## 5. CAPABILITY

Provide stable and secure technical infrastructure to support APNIC operations and services.

Develop a strong service culture driven by people committed to APNIC's vision and values.

Sustain a healthy and resilient organization.



# APNIC Workstreams

The Four Year Strategic Direction (2020-2023) defines 18 workstreams, across the five pillars, as follows. Each workstream includes a number of activities that are described in this plan.



## 1. MEMBERSHIP

### 1A. MEMBER SERVICES

*Deliver excellence in service and value to Members through active and quality engagement.*

### 1B. MEMBERSHIP PRODUCTS

*Apply best practice in development of membership products that meet Members' needs and exceed their expectations.*

### 1C. MEMBERSHIP REPORTING

*Ensure that APNIC remains fully accountable to its Members, by providing timely and accurate information about APNIC operations.*



## 2. REGISTRY

### 2A. REGISTRATION SERVICES

*Provide delegation and registration services for Internet numbers (ASNs, IPv4, IPv6) according to community developed policies.*

### 2B. REGISTRY PRODUCTS

*Maintain an accurate number registry and reliable registry services.*

### 2C. POLICY DEVELOPMENT

*Facilitate the open Policy Development Process to ensure resource policies in the APNIC region are developed and implemented in a neutral manner consistent with agreed rules and community expectations.*



## 3. DEVELOPMENT

### 3A. APNIC CONFERENCES

*Deliver engaging and relevant APNIC conferences for learning, sharing ideas and experience, professional networking, and Internet policy development.*

### 3B. FOUNDATION SUPPORT

*Provide financial and operational support to ensure the success of the APNIC Foundation.*

### 3C. COMMUNITY ENGAGEMENT

*Build and maintain close and meaningful relationships between APNIC and its various communities.*

### 3D. COMMUNITY PARTICIPATION

*Encourage awareness, diversity, participation, and leadership in APNIC processes, events, and activities.*

### 3E. APNIC ACADEMY

*Scale up training and technical assistance infrastructure with high-quality training content and curriculum.*

### 3F. INTERNET INFRASTRUCTURE SUPPORT

*Promote and support the deployment of critical Internet infrastructure and deploy tools for operational infrastructure monitoring.*



## 4. INFORMATION

### 4A. INFORMATION PRODUCTS

*Provide meaningful information services to the communities APNIC serves.*

### 4B. RESEARCH AND ANALYSIS

*Analyse the pressures shaping the evolution and future demands of Internet names and numbers infrastructure, and their impacts.*



## 5. CAPABILITY

### 3C. INTERNAL TECHNICAL INFRASTRUCTURE

*Provide stable and secure technical infrastructure to support APNIC operations and services.*

### 3D. FINANCE AND BUSINESS SERVICES

*Provide efficient and robust finance and business services and facilities to effectively support APNIC's operations.*

### 5E. EMPLOYEE EXPERIENCE

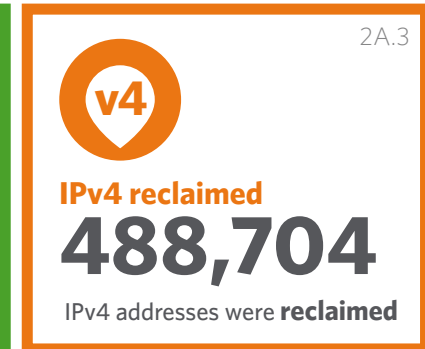
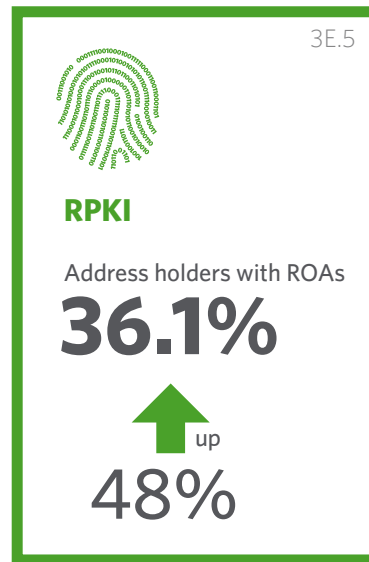
*Attract, develop and retain talented, service-oriented people to deliver APNIC's mission and exceed organization and community expectations.*

### 5F. GOVERNANCE

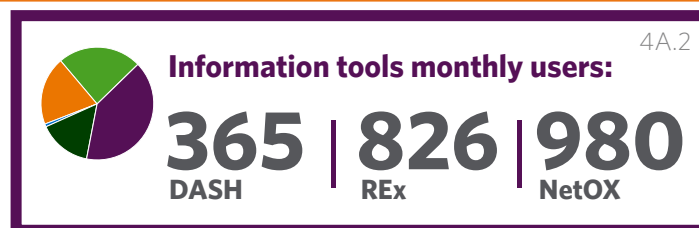
*Provide the legal, economic and governance framework and professional services to support APNIC's operations to minimize risk and ensure compliance and continuity.*



## 2021 at a Glance



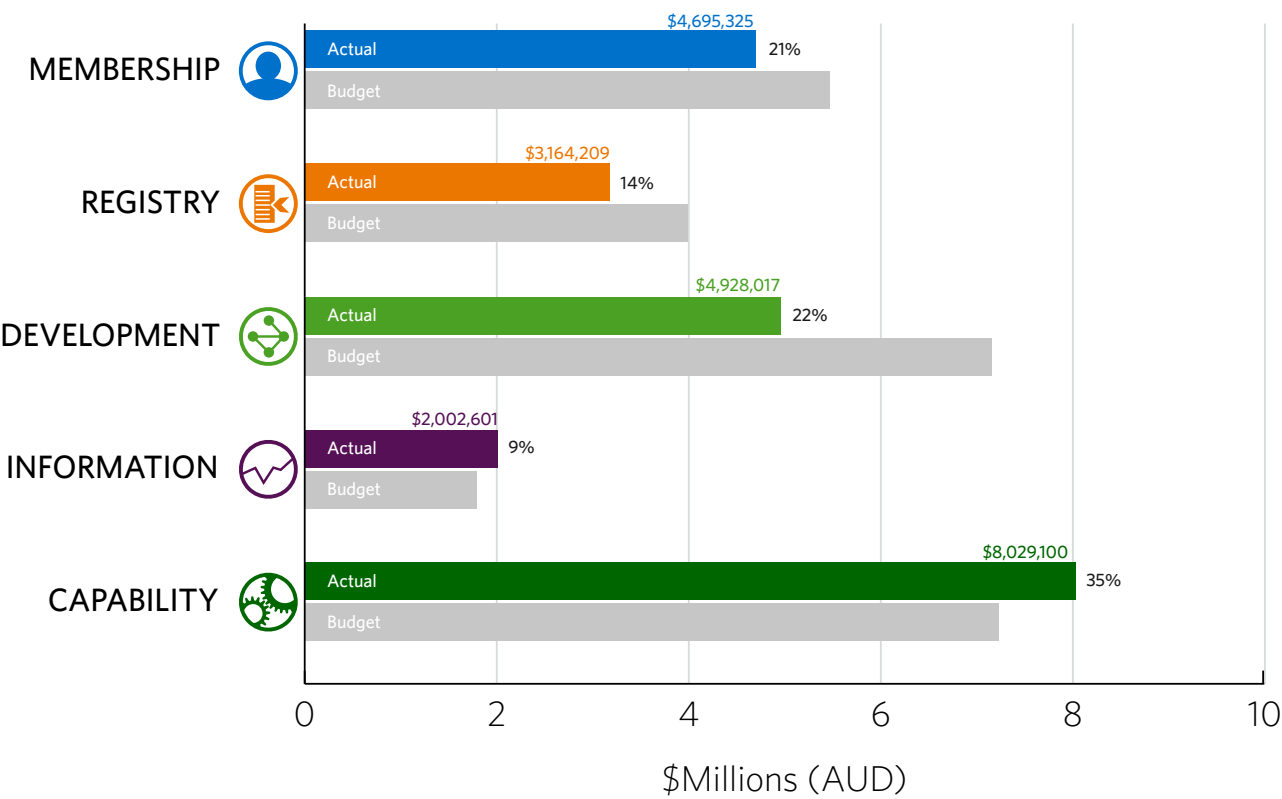
# 2021





# Financial Performance Summary

## OPERATING EXPENSES BY OUTCOME AREA



Note: Some numbers presented in this chart may not add up precisely due to rounding.

In addition to standard financial reporting, APNIC also reports activities and expenses under the five pillars and 18 workstreams detailed on page 10.

The chart on this page illustrates 2021's actual operating expenses compared to the budget in the 2021 Activity Plan. The percentage for each area indicates the proportion of the total budget it represents.

For more details on APNIC's 2021 finances, please refer to pages 91-94 to view:

- Financial Report by Activity
- Statement of Financial Position
- Statement of Income
- Cash Flow Statement



# Notes on the Activities

APNIC’s activities are reported in this document under the 18 workstreams and five pillars described in the previous section:



Membership



Registry



Development



Information



Capability

## THE ACTIVITIES

The Activities are described as either ‘Operations’ or ‘Investments’.



‘Operations’ includes all ongoing activities required for continued provision of APNIC services.



‘Investments’ are discrete project activities that result in new products, services, or improvements to APNIC services. Where these investments are funded by the APNIC Foundation (not Member funds), it is clearly noted.

## SUCCESS MEASURES

The status of Success Measures in the document’s following pages is denoted by a coloured circle for at-a-glance reference on progress.



Completed



At least 90% complete



Less than 90% complete

A table summarizes the resources (financial and human) needed to successfully complete the operations and investments in each workstream.

**All monetary figures quoted are in Australian Dollars (AUD).**

|            | Budget    | Actual    |
|------------|-----------|-----------|
| 1 FTE      | 22.42     | 19.88     |
| 2 Expenses | 5,441,868 | 4,685,680 |
| 3 CAPEX    | -         | 7,935     |

**1 FTE:** The number of Full-Time Equivalent employees required for the activity. In all cases FTE figures comprise contributions from multiple employees. For example – an FTE of 1.6 may be made up of four employees who each contribute 40% of their time (0.4 FTE), for a period of one year. The detailed account of these allocations is provided in section 4.2, FTE Distribution.

**2 Expenses:** Refers to all operational costs directly incurred by the activity.

**3 CAPEX:** Provides the provision for capital expenditure required by the activity.



# 1. MEMBERSHIP



## OBJECTIVES

Deliver world-class products and services required by APNIC Members.  
Engage with Members in building a global, open, stable and secure Internet.  
Ensure accountable governance of APNIC as a membership organization.

## WORKSTREAMS

- 1A. Member Services
- 1B. Membership Products
- 1C. Membership Reporting

## MEMBERSHIP - SUMMARY

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 22.42     | 19.88     |
| Expenses | 5,441,868 | 4,695,325 |
| CAPEX    | -         | 7,935     |



## OPERATIONS



# 1A. Member Services - continued

## 1A.3. Membership development

New Member outreach was conducted at the PCTA e-Tech Show, PITA Business Forum & Expo 2021, CommunicAsia 2021 and at various NOGs, plus the APNIC conferences.

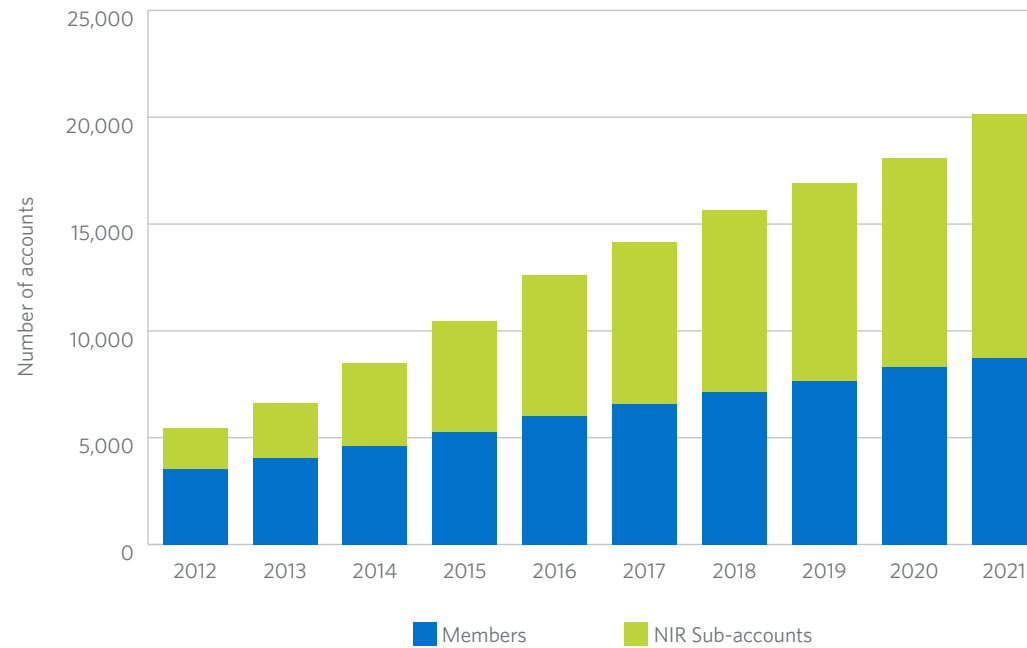
Two new Service Partners – Lao National Internet Center (LA) and Information Beam Company Limited (MM) – were engaged.

The majority of the 783 new Members joining APNIC in 2021 did so directly, with seven joining via Service Partners and 11 from Member referrals.



## 1A. Member Services - continued

MEMBERSHIP GROWTH



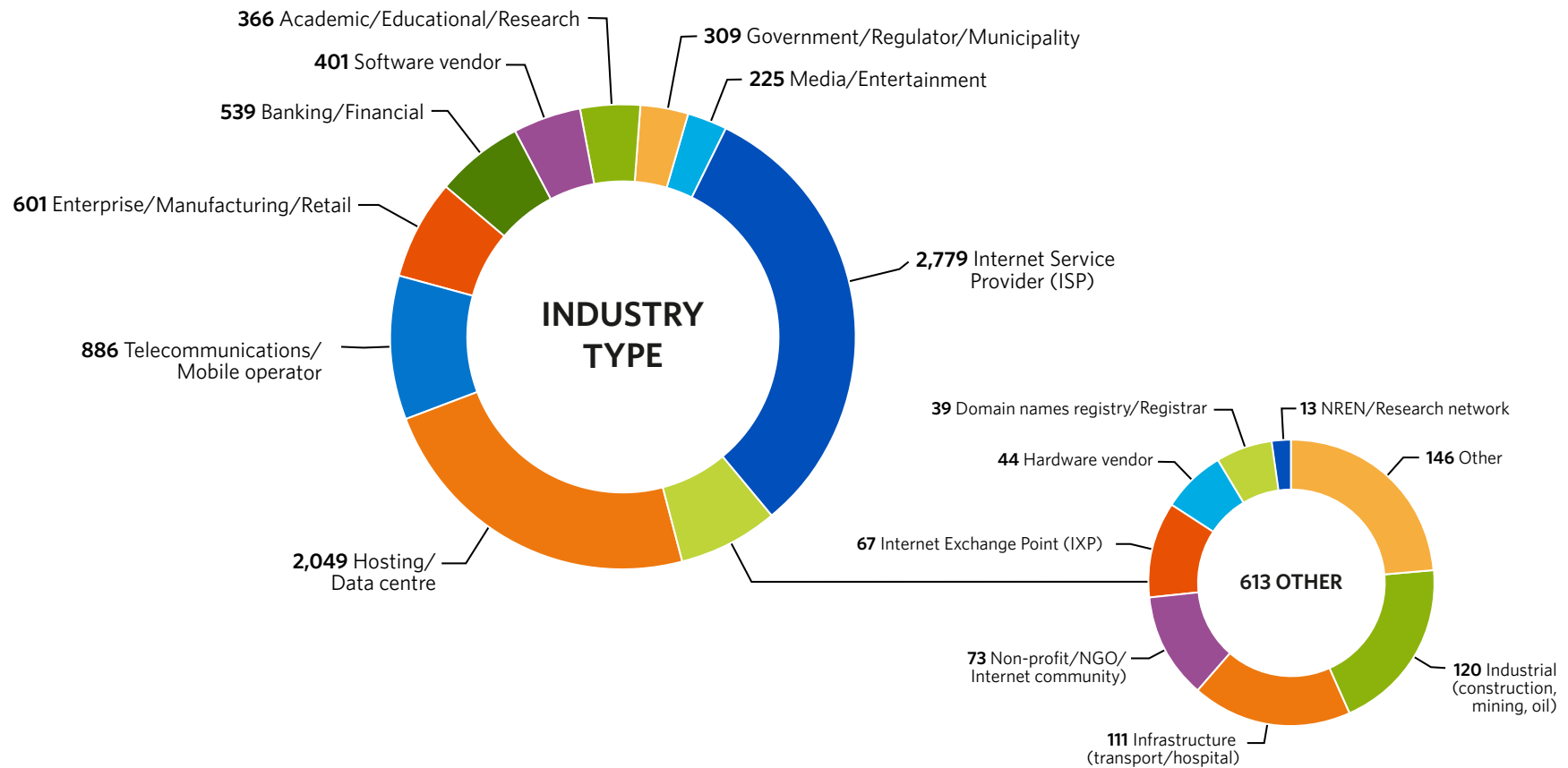
At the end of 2021, APNIC direct membership stood at 8,768, an increase of 5.1% on 2020. In addition, there were 12,089 NIR sub accounts, after rapid growth of 21.2% in 2021.

Total combined membership was 20,857.



## 1A. Member Services - continued

MEMBERSHIP INDUSTRY TYPE



## 1A. Member Services - continued

### SUCCESS MEASURES - 1A

| Targets                                                                                                                        | Results            | Status |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------|--------|
| Maintain helpdesk SLA of 48-hour business day response to enquiries                                                            | 100%               | ●      |
| Maintain service satisfaction ratings of at least 93% "excellent and above average" feedback                                   | 93%                | ●      |
| All "poor and below average" feedback is followed up and actioned                                                              | 100% resolved      | ●      |
| Proactive Member service engagement in a minimum of 47 economies                                                               | 47 out of 47       | ●      |
| All improvement suggestions received from all feedback channels are followed up and actioned                                   | 100%               | ●      |
| All critical and high accessibility issues are resolved                                                                        | 81 issues resolved | ●      |
| Grow product and service user feedback group from 300 to 500 members                                                           | 526                | ●      |
| One-on-one UX feedback session with at least 50 Members                                                                        | 56                 | ●      |
| At least eight membership development activities, in economies with low membership relative to their Internet growth potential | 7 out of 8         | ●      |
| Total number of Members to match or exceed the 2021 budget assumption of 8,940                                                 | 8,768              | ●      |



## 1B. Membership Products

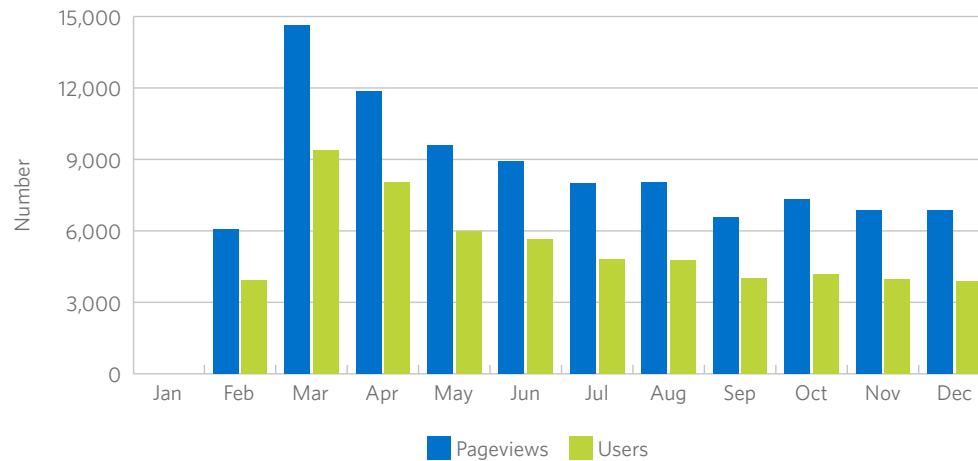
### OPERATIONS

#### 1B.1. Membership product management

A new Help Centre, containing FAQ articles and 'how to' information, was deployed in February. Fifty articles across seven categories were published, with an average 'helpful' rating of 74% from users (from 641 ratings received).

[help.apnic.net](https://help.apnic.net)

#### HELP CENTRE VISITORS

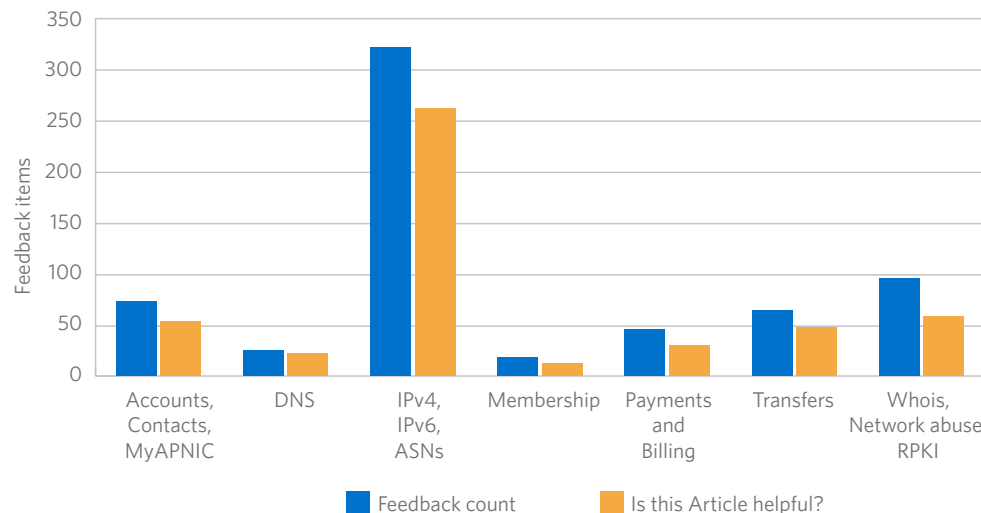


### RESOURCING

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 12.28     | 9.25      |
| Expenses | 2,473,335 | 1,856,909 |
| CAPEX    | -         | -         |

## 1B. Membership Products – continued

HELP CENTRE FEEDBACK



Updates to MyAPNIC included:

- Complete architecture conversion from WordPress to Java.
- Improvements to the billing section including new advance invoice management and downloadable receipts.
- Removal of billing surcharges for Members paying annual fees by instalment.
- An improved EC election dashboard to reduce support requirements.
- Web style updates to the MyAPNIC Resource Manager.
- Voting system updates to accommodate the addition of SIG and IANA RC elections (held at APNIC 52).
- Migration of the billing, elections and portal features to a microservice architecture.

Member application referrals were added to the Member application form to allow Members to refer their customers to APNIC for an easier application process.

## 1B. Membership Products – continued

### SUCCESS MEASURES – 1B

| Targets                                                                            | Results           | Status |
|------------------------------------------------------------------------------------|-------------------|--------|
| Member Help Centre deployed                                                        | Completed         | ●      |
| Migrate 100% of APNIC Logins to a new identity management system                   | Deferred to 2022* | ●      |
| Establish comprehensive testing infrastructure for membership product applications | Completed         | ●      |
| Deliver problem-free EC, NRO, IANA and SIG elections via BigPulse                  | Completed         | ●      |

\*See 5A.6.



## 1B. Membership Products – continued

### INVESTMENTS

#### 1B.2. Online community platform →

‘Tribe’ was selected to pilot as a community discussion platform over five months, with a total of 110 users, and several test groups.

The trial findings included the requirement for the integration of mailing lists and a community manager to coordinate to overall operation of the platform. These findings and other lessons of the trial period are being assessed to determine next steps, with deployment of an operational product scheduled in 2022.

| 2021 Investment           | Member Benefit                                                   |
|---------------------------|------------------------------------------------------------------|
| Online community platform | Network operators can better learn from each other's experience. |
|                           | Replace or augment aging mailing list facilities.                |
|                           | Promotes online engagement between the APNIC community.          |
| Status: Ongoing           |                                                                  |

# 1C. Membership Reporting

## OPERATIONS

### 1C.1. Planning and reporting

The 2021 Activity Plan and Budget, and 2020 Annual Report were presented at the 2021 Annual General Meeting in March. The 2022 Activity Plan and Budget was approved by the EC in December.

A public webpage tracking progress against the 2021 activities was published to replace the previous 'Survey Tracker' webpage.

[apnic.net/annualreport](https://apnic.net/annualreport)

## RESOURCING

|          | Budget  | Actual  |
|----------|---------|---------|
| FTE      | 1.56    | 1.12    |
| Expenses | 715,263 | 619,054 |
| CAPEX    | -       | -       |

## 1C. Membership Reporting – continued

### SUCCESS MEASURES – 1C

| Targets                                                                       | Results                | Status |
|-------------------------------------------------------------------------------|------------------------|--------|
| On-time publishing of required reports at the APNIC AGM and at APNIC 50       | Completed              | ●      |
| Publishing of EC Minutes within two months of each EC meeting                 | 100% achieved          | ●      |
| Event Wraps published for 100% of reportable events within one month of event | 67 out of 67 published | ●      |



# 2. REGISTRY



## OBJECTIVES

- Develop and deliver world class registry products and services required by the community.
- Ensure responsible stewardship of Internet number resources and deliver accurate registry services.

## WORKSTREAMS

- 2A. Registration Services
- 2B. Registry Products
- 2C. Policy Development

## REGISTRY - SUMMARY

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 14.21     | 11.71     |
| Expenses | 3,968,674 | 3,164,209 |
| CAPEX    | -         | -         |

## 2A. Registration Services

### OPERATIONS

#### 2A.1. IPv4, IPv6 and ASN delegation and registration services

APNIC processed 1,398 IPv6 delegations, 2,532 IPv4 delegations, 6,808 ASN assignments, 709 IPv4 market transfers (496 within the Asia Pacific region and 213 between APNIC and other RIR regions), and 118 Merger and Acquisition IPv4 transfers. These are illustrated on the following pages.

The proportion of APNIC Members that hold IPv6 resources is 68.43%, up from 66.32% in 2020.

APNIC received eight blocks of ASNs from IANA (8,192 ASNs) to meet large requests from networks in China and India. No additional IPv4 or IPv6 allocations were received from IANA in 2021.

At the end of 2021, APNIC had allocated 99.40% of its total IPv4 number resource pool (leaving 0.60% available), 9.22% of its IPv6 pool (leaving 90.78%) and 89.03% of its ASN pool (leaving 10.97%). The size of the available IPv4 pool increased in 2021 following APNIC's IPv4 reclamation work ([see 2A.3](#)).

The status of APNIC's Internet number resource pools at the end of 2021 is below.

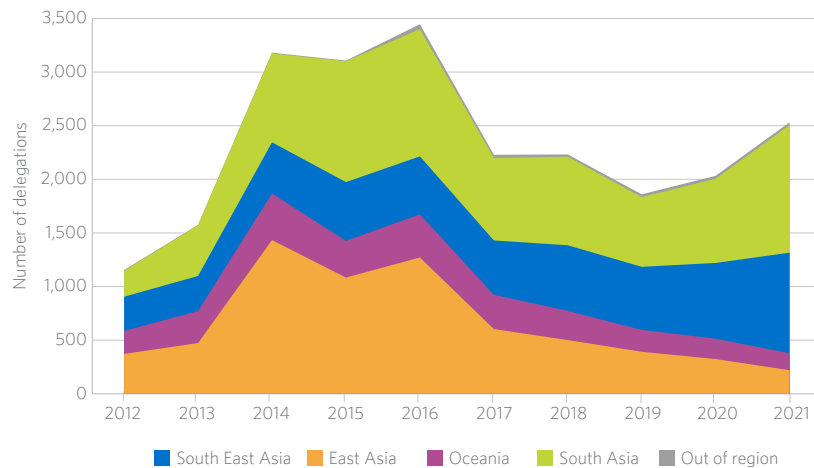
|                    | Total at 1 Jan 2021 | From IANA | Transfers in | Transfers out | Total at 31 Dec 2021 | Total delegated | Total reserved | Total available |
|--------------------|---------------------|-----------|--------------|---------------|----------------------|-----------------|----------------|-----------------|
| <b>IPv4 (/24s)</b> | 3,482,617           | 0         | 2,410        | 1,095         | 3,483,932            | 3,463,031       | 6,986          | 13,915          |
| <b>IPv6 (/32s)</b> | 1,067,008           | 0         | 0            | 0             | 1,067,008            | 98,392          | 113,746        | 854,870         |
| <b>ASNs</b>        | 21,143              | 8,192     | 5            | 4             | 29,336               | 26,118          | 0              | 3,218           |

### RESOURCING

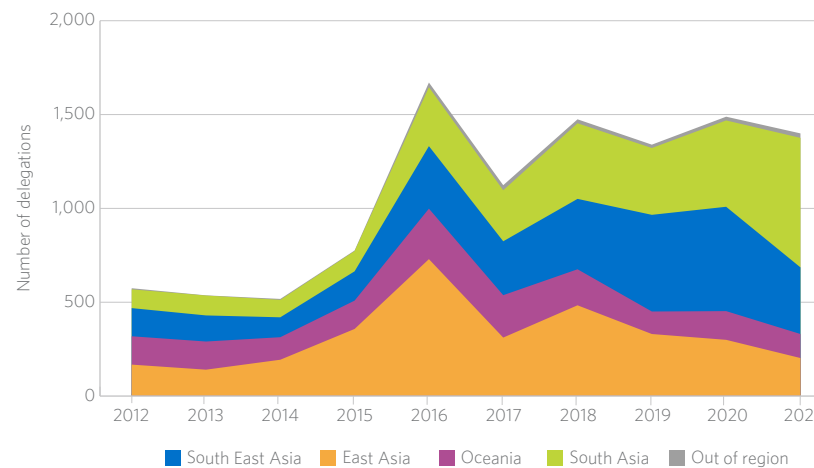
|          | Budget  | Actual  |
|----------|---------|---------|
| FTE      | 4.53    | 4.89    |
| Expenses | 842,899 | 890,233 |
| CAPEX    | -       | -       |

## 2A. Registration Services – continued

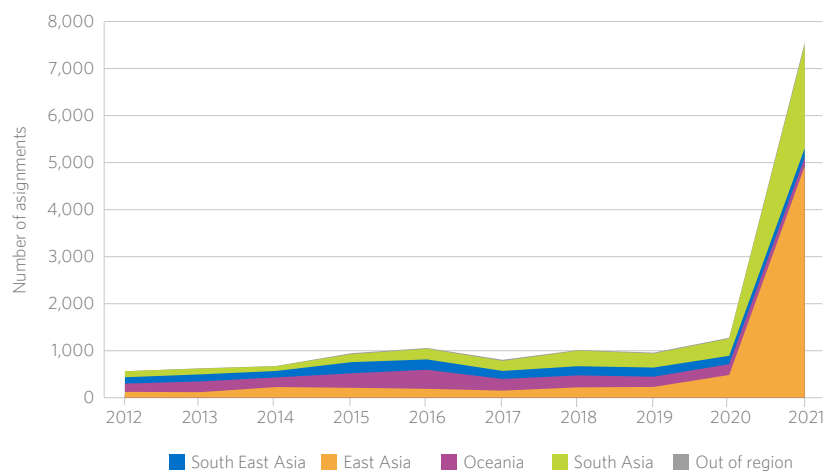
IPv4 DELEGATIONS



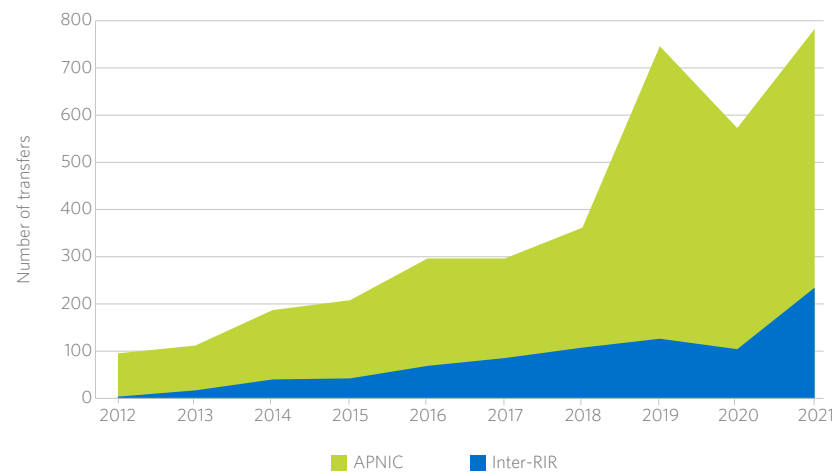
IPv6 DELEGATIONS



ASN ASSIGNMENTS



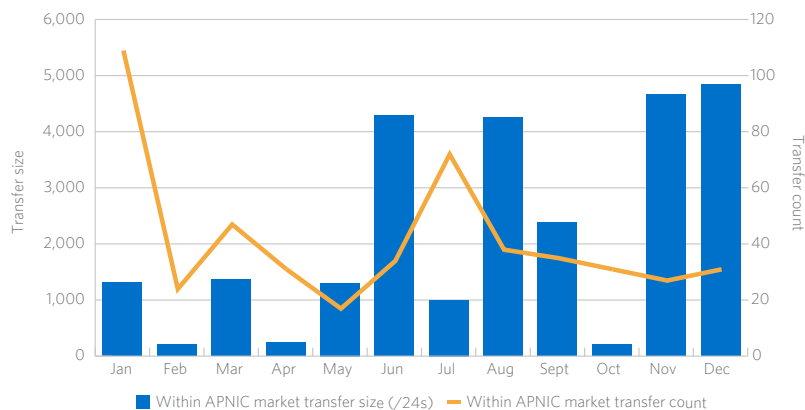
IPv4 MARKET TRANSFERS



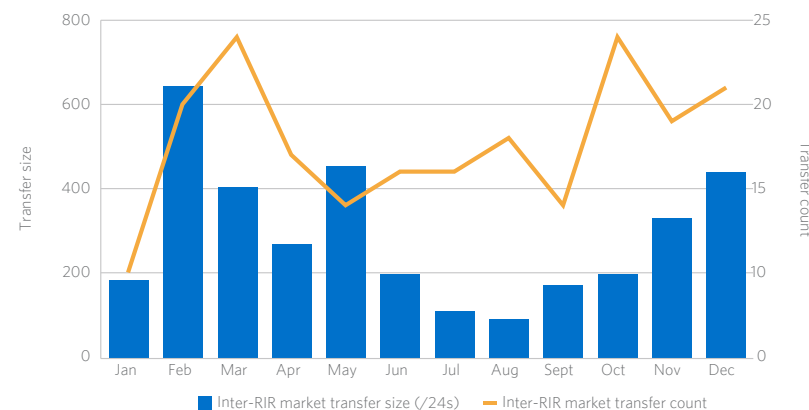
Note: Large requests from networks in China and India account for the significant rise in ASN assignments.

## 2A. Registration Services – continued

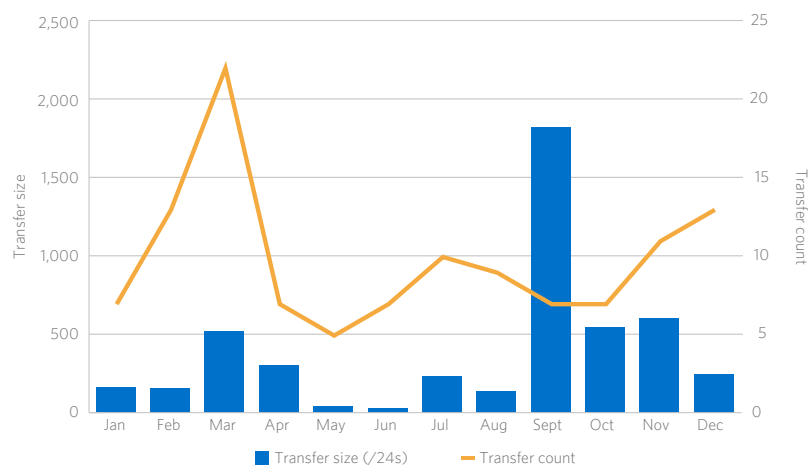
MARKET TRANSFERS



INTER-RIR TRANSFERS



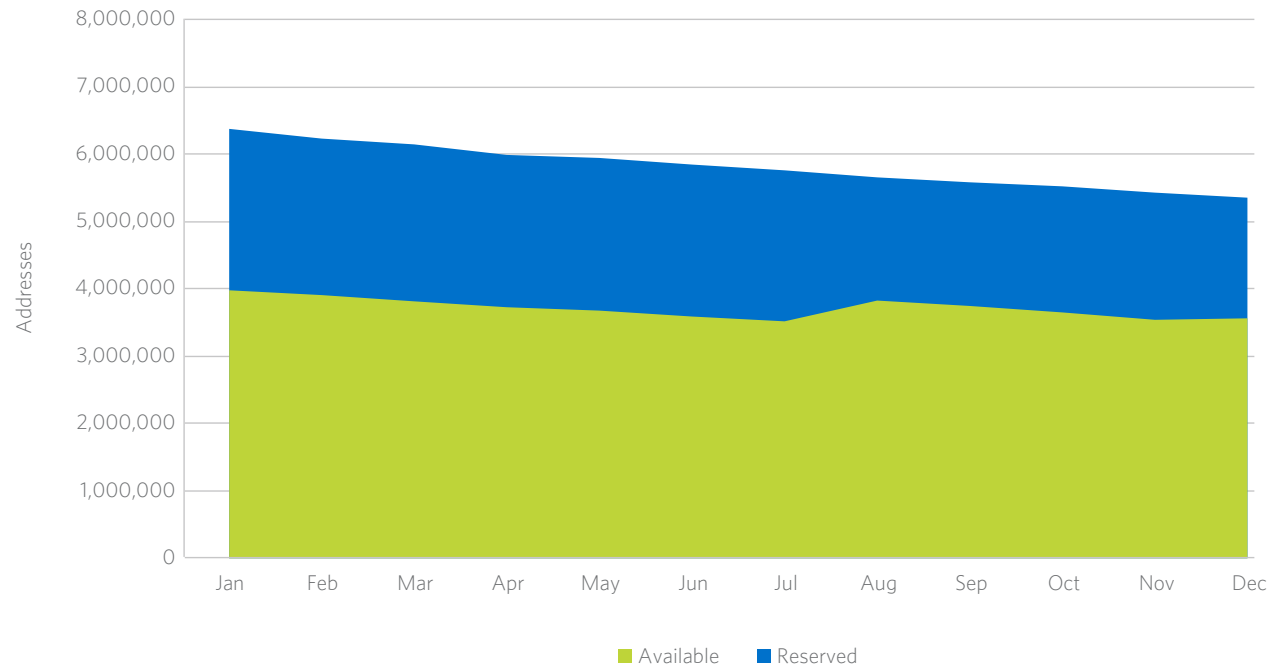
M&A AND HISTORICAL TRANSFERS



- Large IPv4 transfers from the Asia Pacific Internet Development Trust (APIDT) to various Members occurred in June, August, November, and December.
- A large transfer occurred within TWNIC in September.
- Inter-RIR market transfer activity slightly increased in 2021, albeit on small address volumes.

## 2A. Registration Services – continued

AVAILABLE IPv4 ADDRESS SPACE



488,704 historical IPv4 addresses were voluntarily returned to the available pool in 2021 as a result of APNIC's IPv4 reclamation efforts.

## 2A. Registration Services – continued

### OPERATIONS

#### 2A.2. Maintain correct and current registry data

Improvements were made to IRT validation under prop-125, including simplification of email and notification templates, and better IRT management functionality in MyAPNIC to help Members update IRT details and handle validation emails.

13,826 email validation requests were issued with 10,277 validation requests confirmed, equalling a confirmation rate of 74.3%.

In response to ICANN's Identifier Technical Health Indicators (ITHI) initiative, the NRO defined the 'accuracy' of Internet number resources data under three dimensions: 'Comprehensive, Correct, and Current'. APNIC deployed measurements for two of the three dimensions, with measurement for 'Current' to be completed in 2022.

## 2A. Registration Services – continued

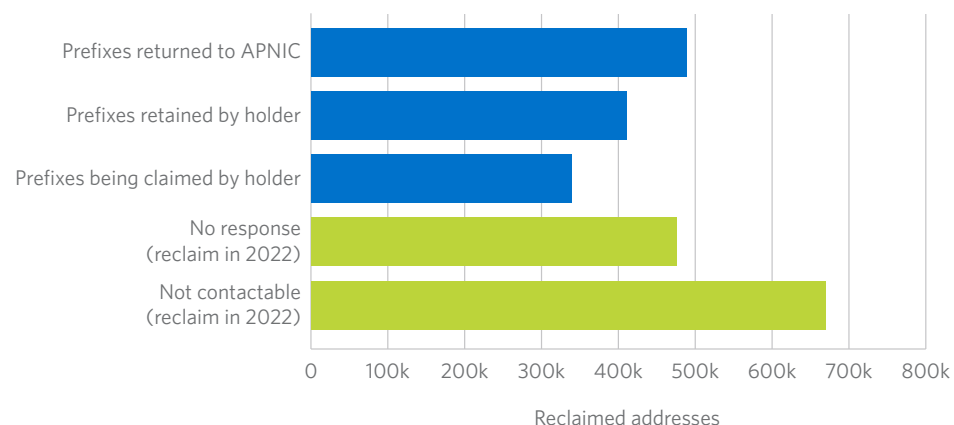
### 2A.3. Reclaiming unused IPv4 address space ↻

Around 2.3 million unrouted historical IPv4 addresses were identified under prop-017 and 78% of the address custodians were contacted following an exhaustive contacts search using public information such as business registries and web research.

Contacted address custodians retained, or were in the process of claiming, 750,592 addresses while 488,704 addresses were returned to APNIC (equivalent to around 1,909 /24s).

The remaining address space (around 1.1 million addresses) for uncontactable custodians, or custodians that did not respond, will be reclaimed by APNIC in 2022.

#### STATUS OF RECLAIMED ADDRESS SPACE



## 2A. Registration Services – continued

### SUCCESS MEASURES – 2A

| Targets                                                                                                                   | Results    | Status                                                                              |
|---------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------|
| Maintain Registration Services SLA of two business day response to enquiries (>99.90%)                                    | 100%       |  |
| Increase percentage of Members holding IPv6 address space to 70%                                                          | 68.43%     |  |
| Comply with NRO-defined Identifier Technology Health Indicators (ITHI) reporting                                          | 2 out of 3 |  |
| Increase rate of validation by Members of registration records                                                            | 74.3%      |  |
| All unrouted historical resource prefixes identified under policy prop-017 are claimed, transferred, or returned to APNIC | Completed  |  |

## 2B. Registry Products

### OPERATIONS

#### 2B.1. Internet number resource management

Significant performance improvements were made to the core registry service to make the registry management system more usable (now 5-10 times faster for typical requests).

An API to assist NIR resource administration and registry accuracy was developed, with an external test environment established. Deployment is planned for early 2022.

A requirements specification to rearchitect the registry was completed as part of the multi-year 'Next-generation Registry' project.

#### 2B.2. Registry product management

Updates to RPKI included improvements to route management functions in MyAPNIC, and to the Certification Practice Statement (CPS). The repository publication was made entirely atomic to avoid repository inconsistency/invalidity problems.

The finalized NRO RDAP profile was published in the IANA RDAP registry. APNIC will achieve full compliance with the profile in early 2022.

A public specification of a general Member registry API was developed, with the aim to share a prototype at APRICOT 2022.

MyAPNIC users can also now manage 'BYO IP' requirements for their resources by directly updating whois object attributes.

### RESOURCING

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 9.04      | 6.18      |
| Expenses | 2,580,512 | 1,831,592 |
| CAPEX    | -         | -         |



## 2B. Registry Products – continued

### SUCCESS MEASURES – 2B

| Targets                                                                                       | Results                                   | Status |
|-----------------------------------------------------------------------------------------------|-------------------------------------------|--------|
| Implement the NIR API and operate in conjunction with the NIRs                                | Completed for 2022 deployment             | ●      |
| Create initial design documentation for the 'Next-generation Registry' by the end of Q4       | Completed                                 | ●      |
| Implement a bulk update method to improve usability of the MyAPNIC Routing Management feature | General Member API implementation in 2022 | ●      |
| Improved support for 'BYO IP' services in MyAPNIC                                             | Completed                                 | ●      |
| Create a public specification of a general Member registry API                                | Completed                                 | ●      |
| Implement the NIR KPI monitor for RPKI                                                        | Completed                                 | ●      |

## 2C. Policy Development

### OPERATIONS

#### 2C.1. Policy development

The APNIC Policy SIG considered the following proposals in 2021.

| Proposal                                                                                                  | Result                                                                        |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <b>prop-130: Modification of transfer policies</b>                                                        | Presented at APNIC 51. Did not reach consensus and abandoned.                 |
| <b>prop-133: Clarification on Sub-Assignments</b>                                                         | Presented at APNIC 51. Reached consensus and endorsed by the EC for adoption. |
| <b>prop-135: Documentation</b>                                                                            | Reached consensus and endorsed by the EC for adoption.                        |
| <b>prop-136: Registration Requirements</b>                                                                | Reached consensus and endorsed by the EC for adoption.                        |
| <b>prop-137: IPv6 assignment for Associate Members</b>                                                    | Reached consensus but returned to author for clarification.                   |
| <b>prop-138: Restricting AS-ID in ROA</b>                                                                 | Accepted as a guideline only.                                                 |
| <b>prop-139: SOR not required</b>                                                                         | Reached consensus and endorsed by the EC for adoption.                        |
| <b>prop-140: Update End-Site Definition</b>                                                               | Reached consensus and endorsed by the EC for adoption.                        |
| <b>prop-141: Change maximum delegation size of IPv4 address from 512 (/23) to 768 (/23+/24) addresses</b> | Did not reach consensus and returned to mailing list.                         |

### RESOURCING

|          | Budget  | Actual  |
|----------|---------|---------|
| FTE      | 0.64    | 0.64    |
| Expenses | 545,263 | 442,384 |
| CAPEX    | -       | -       |



## 2C. Policy Development – continued

### 2C.2. Policy implementation

Policy text changes resulting from prop-133, -135, -136, -139, and -140 were implemented and published. Policy prop-138 was published as a guideline.

### 2C.3. Policy analysis

An update on the Policy Document Review was presented at APNIC 51, with an additional community consultation meeting held online in March, with 40 attendees.

A community Working Group (WG) was formed to review the Policy Document Review report and develop proposals for discussion at APNIC 52. The WG submitted nine proposals to the Policy SIG Chairs for APNIC 52; four were accepted for discussion at the Open Policy Meeting and all four reached consensus.

Impact assessments for the nine policy proposals discussed at APNIC 51 and 52 were conducted and shared with the Policy SIG. The APNIC 52 policy assessment was not presented due to time constraints.

[www.apnic.net/policy](http://www.apnic.net/policy)

## 2C. Policy Development – continued

### SUCCESS MEASURES – 2C

| Targets                                                                                                     | Results         | Status |
|-------------------------------------------------------------------------------------------------------------|-----------------|--------|
| Achieve minimum overall satisfaction rating of 6/7 from Policy Chairs in annual review of SIG Chair support | 6.7 out of 7    | ●      |
| Met 100% of implementation timelines                                                                        | 100%            | ●      |
| Deliver two policy analysis presentations at SIG meetings                                                   | 1 out of 2 done | ●      |
| Publish a policy proposals analysis before each Policy SIG meeting                                          | 2 out of 2 done | ●      |



# 3. DEVELOPMENT



## OBJECTIVES

Invest in sustainable development of the regional Internet community, industry and infrastructure.  
Build capacity for best-practice Internet operations across the Internet technical community.

## WORKSTREAMS

- 3A. APNIC Conferences
- 3B. Foundation Support
- 3C. Community Engagement
- 3D. Community Participation
- 3E. APNIC Academy
- 3F. Infrastructure Support

## DEVELOPMENT - SUMMARY

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 26.08     | 20.92     |
| Expenses | 7,118,088 | 4,928,017 |
| CAPEX    | 118,150   | 21,878    |

## 3A. APNIC Conferences

### OPERATIONS

#### 3A.1. APNIC conferences

APRICOT 2021 (incorporating APNIC 51) was held online from 22 February to 4 March 2021. This was the first APRICOT conference to be held 100% online, due to the COVID-19 pandemic.

The event welcomed 852 remote attendees (via Zoom) in total, including 416 attendees that attended the tutorial week. There were an additional 3,855 views on YouTube.

An election for three available APNIC EC positions was held at APNIC 51 with Feng Leng (2,612 votes), Yoshinobu Matsuzaki (2,605 votes), and Gaurab Raj Upadhaya (2,567 votes) elected for two-year terms.

APNIC 52, held from 13 to 16 September 2021, was also held wholly online and welcomed 706 remote attendees in total (via Zoom). The tutorials on day one attracted 374 attendees. Technology additions for APNIC 52 included CometChat for delegate chat and networking, and Otter.ai for automatic transcription. Improvements to the conference login process were also made.

Several community meetings were held at the conferences from partner organizations including, DotAsia, APIX, APStar, and APNG.

[conference.apnic.net](https://conference.apnic.net)

### RESOURCING

|          | Budget    | Actual  |
|----------|-----------|---------|
| FTE      | 5.04      | 4.75    |
| Expenses | 1,466,163 | 930,345 |
| CAPEX    | 43,150    | 4,296   |



|                                            | APRICOT 2021 | APNIC 52 |
|--------------------------------------------|--------------|----------|
| Total number of remote participants (Zoom) | 852          | 706      |
| Economies represented                      | 61           | 48       |
| YouTube views                              | 3,855        | 3,438    |
| YouTube hours viewed                       | 832.04       | 745.88   |





## 3A. APNIC Conferences – continued

### SUCCESS MEASURES – 3A

| Targets                                                                                                      | Results         | Status |
|--------------------------------------------------------------------------------------------------------------|-----------------|--------|
| Achieve attendance of 1,000 delegates                                                                        | 1,558 attendees | ●      |
| Achieve 4,000 remote conference session views                                                                | 8,145 views     | ●      |
| Achieve a minimum average conference participant satisfaction survey rating of 90%                           | 93%             | ●      |
| Achieve average participant satisfaction of 85% for speakers                                                 | 96%             | ●      |
| Select and integrate online meeting technologies to provide a seamless online experience for APNIC 51 and 52 | Completed       | ●      |

## 3A. APNIC Conferences – continued

### INVESTMENTS

#### 3A.2. Fellowships →

A new online fellowships program was developed, comprising 11 technical, policy and Internet governance presentations over five months; pairing fellows with industry mentors; APNIC Academy training; and guidance during APNIC 52.

Forty-eight fellows were shortlisted from 293 applicants, with 46 accepting (24 female and 22 male; 34 professionals and 12 youth).

The Fellows' average overall attendance was 86%, with 136 APNIC Academy self-paced courses completed and participation in an additional 26 Academy webinars.

Twelve mentoring sessions were held in August to September between 27 fellows and 25 volunteer mentors from the APNIC community.

The program achieved a Net Promoter Score (NPS) of 92 from Fellows in the participant survey.

| 2021 Investment          | Member Benefit                                              |
|--------------------------|-------------------------------------------------------------|
| <b>Fellowships</b>       | Diversity of participation in APNIC conference.             |
|                          | Opportunities for more Members to attend APNIC conferences. |
| Status: <b>Completed</b> |                                                             |

## 3B. Foundation Support

### INVESTMENTS

#### 3B.1. Operational and administrative support →

A total of 6.6 APNIC staff (FTE) were assigned to the Foundation, with all direct costs recovered.

APNIC continued to provide hosting and technical support for administrative, project and financial platforms used by the Foundation.

A new Affirmation of Commitments (AoC) was developed to cover both APNIC support and Foundation funding for APNIC activities.

| 2021 Investment                               | Member Benefit                                                                                                |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Operational and administrative support</b> | A well-run Foundation delivering successful and valuable Internet development activities in the APNIC region. |
| Status: <b>Completed</b>                      |                                                                                                               |

[apnic.foundation](https://apnic.foundation)

### RESOURCING

|          | Budget  | Actual |
|----------|---------|--------|
| FTE      | 1.58    | 1.24   |
| Expenses | 571,518 | 76,428 |
| CAPEX    | -       | -      |

## 3C. Community Engagement

### OPERATIONS

#### 3C.1. Technical community support

APNIC participated in 15 Network Operator Group (NOG) events during 2021 and 13 technical community events, providing sponsorship, speakers, and training (see Appendix for full list of events and economies). Webcasting and technical support was provided to help 16 technical community events proceed online.

Sponsorship of software and services for the technical community, supported by funding from the APNIC Foundation, was provided to PeeringDB, IXP Manager and IXPDB. APNIC also sponsored the Internet Society's MANRS Fellowship Program.

#### 3C.2. Security community support

APNIC participated at 43 security community events, including presenting at eight events and providing training at seven events (see Appendix for full list of events and economies).

Sponsorship was provided to CrikeyCon VII and Threat Con 2021, with staff also participating in the program committees for AusCERT 2021 and the FIRST Annual Security Conference.

Sponsorship of services for the security community, supported by funding from the APNIC Foundation, was provided to Shawdowserver.

### RESOURCING

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 6.38      | 4.46      |
| Expenses | 1,826,724 | 1,410,868 |
| CAPEX    | -         | -         |



# 3C. Community Engagement – continued

## 3C.3. Internet organization cooperation

APNIC partnered with LACNIC to commission a study from Analysys Mason on the Internet's technical success factors, and supported them in conducting 15 community interviews. The final report was published and presented during the 2021 Internet Governance Forum (IGF) in December.

Collaboration with other RIRs included participation in 34 online meetings with NRO coordination groups, supporting proposed revisions to the NRO MoU, and the proposed review of the NRO Strategic Plan. Staff participated in all RIR, ICANN and IETF meetings.

Staff participated in the Internet Technical Advisory Committee (ITAC) to the OECD, Internet Technical Collaboration Group (ITCG), ICANN Root Service Governance Working Group, the Root Zone Evolution Working Group, and the Security and Stability Advisory Committee.

NIR engagement included meeting with IRINN, NIXI, and the KRNIC Policy team and participating at the TWNIC OPMs and ICANN TWNIC Engagement Forum. Staff also provided training to the IRINN Hostmaster and Helpdesk teams on IRM, IPv6, the PDP and routing.

## 3C.4. Internet governance participation

Internet governance-related activities included:

- Participating in the 2021 IGF and conducting sessions on Learning Resiliency, Supply Chain IoT, and the results of the Internet Study on Technical Success Factors. Staff also participated in 62 meetings related to the IGF throughout the year including Multistakeholder Advisory Group (MAG) meetings, topic work groups, and the IGF Support Association Executive Committee.



### 3C. Community Engagement – continued

- Conducting two sessions at the 2021 APriGF: Interoperable Internet infrastructure (with ISOC); and the Internet study on Technical Success Factors. Staff also participated in 60 APriGF preparatory meetings covering event direction, arrangements, program, and fellowships.
- Participating in, and supporting the organization of three economy-level IGFs plus the new sub-regional Southeast Asia IGF (SEA-IGF).
- Sponsoring, presenting and participating at nine Youth IGFs and Schools of Internet Governance (SIG). APNIC also participated in 10 planning meetings for the Asia Pacific Internet Governance Academy (APIGA).
- Participating in six other Internet governance meetings online (see Appendix for full list of events and economies).

#### 3C.5. Government engagement

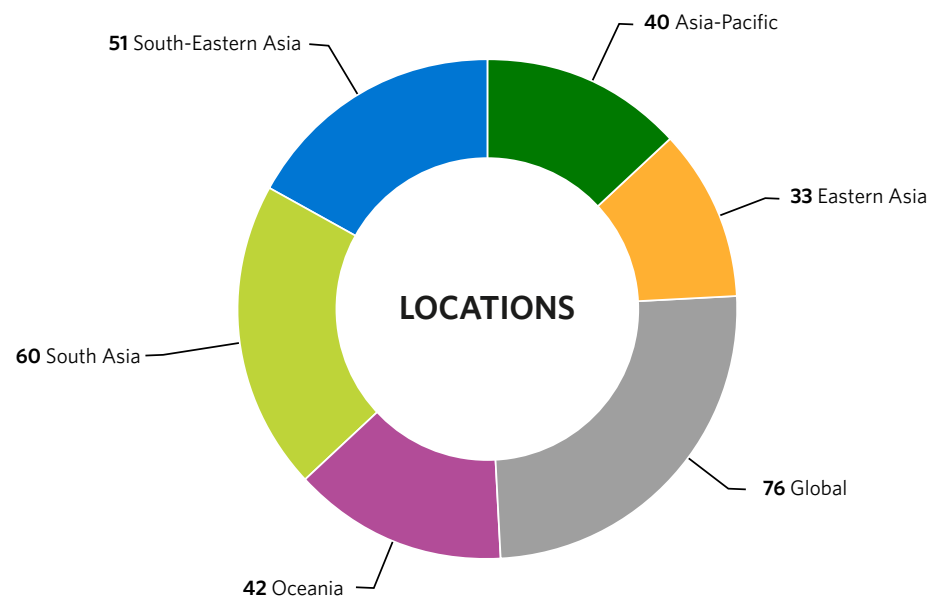
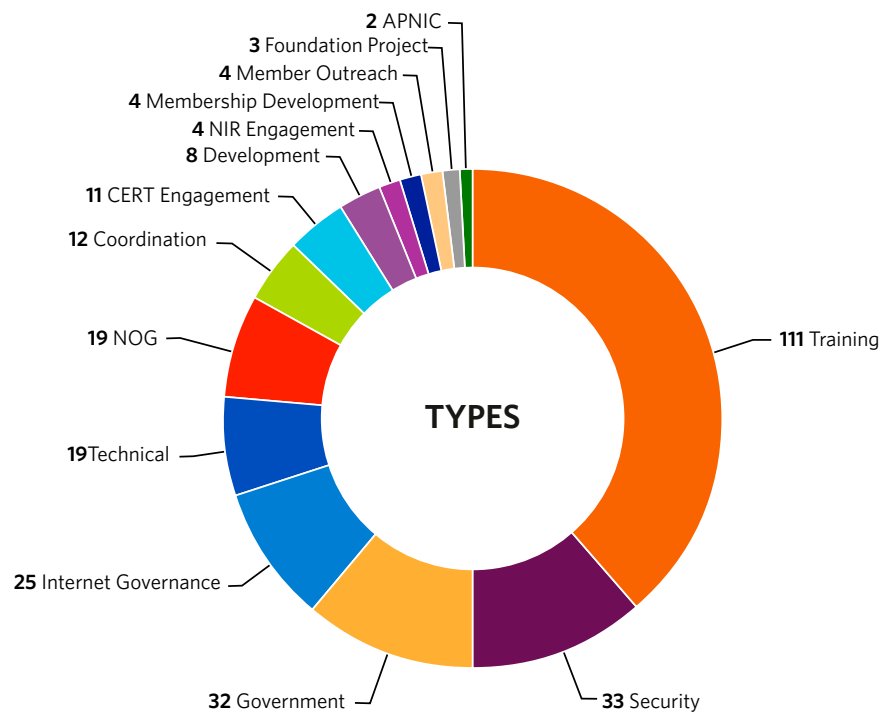
APNIC engages with governments and inter-governmental organizations as a member of the technical community. Participation in 2021 included:

- Joining 25 intergovernmental meetings and consultations, including 19 ITU meetings (see Appendix for full list of events and economies).
- Meeting with the APT Secretary General and Secretariat to coordinate regional initiatives.
- Providing training and technical assistance support to the Mongolian government's Digital Nation (e-Mongolia) initiative.
- Contributing to an OECD draft document on routing and DNS security, and monitored discussions at five OECD meetings.

APNIC also engaged directly with the Law Enforcement Agency (LEA) and Public Safety community, delivering training to LEAs in Oceania as part of Cyber Safety Pasifika, LEAs in Taiwan, and participating at the 6th INTERPOL Global Cyber Crime Expert Group meeting and INTERPOL Forum on Ransomware.

## 3C. Community Engagement – continued

### 3C.6. External relations coordination



Engagements are units of measurement for meaningful interactions by APNIC staff with the community through events. There are currently 15 types of engagements in APNIC, as shown on pages 49 and 50.

Due to COVID-19 and related travel restrictions, APNIC's participation at face-to-face events shifted to wholly online representation.

### 3C. Community Engagement – continued

- APNIC
- CERT engagement
- Coordination
- Development
- Foundation projects
- Government
- Internet governance
- Member outreach
- Membership development
- NOG
- Security
- Technical
- Technical assistance
- Training
- NIR engagement
- Product engagement
- Other

## SOUTH ASIA

|            |                                                                      |
|------------|----------------------------------------------------------------------|
| BD         | R R R R R R R                                                        |
| BT         | FR FR FR R R R                                                       |
| IN         | FR R FR FR FR R R R R R R                                            |
| LK         | FR R R                                                               |
| NP         | FR FR FR R R R                                                       |
| PK         | FR FR FR FR R R                                                      |
| Sub-region | FR FR FR FR FR FR FR FR FR FR FR FR<br>FR FR FR FR FR FR FR FR FR FR |

## SOUTH EAST ASIA

| Country    | FR | R | Other |
|------------|----|---|-------|
| ID         | 1  | 4 | 2     |
| KH         | 0  | 2 | 2     |
| MM         | 0  | 1 | 0     |
| MY         | 0  | 5 | 0     |
| PH         | 4  | 5 | 4     |
| SG         | 0  | 3 | 2     |
| TH         | 1  | 4 | 2     |
| TL         | 5  | 1 | 0     |
| VN         | 1  | 2 | 1     |
| Sub-region | 7  | 7 | 0     |

## ASIA-PACIFIC

AP

## EAST ASIA

|            | FR | FR | FR | FR | FR | R | R | R |
|------------|----|----|----|----|----|---|---|---|
| CN         |    |    |    |    |    |   |   |   |
| HK         |    |    |    |    |    |   |   |   |
| JP         |    |    |    |    |    |   |   |   |
| KR         |    |    |    |    |    |   |   |   |
| MN         |    |    |    |    |    |   |   |   |
| TW         |    |    |    |    |    |   |   |   |
| Sub-region |    |    |    |    |    |   |   |   |

## OCEANIA

[illegible]

## Global Collaboration

## 3C. Community Engagement – continued

### SUCCESS MEASURES – 3C

| Targets                                                                                                                       | Results          | Status |
|-------------------------------------------------------------------------------------------------------------------------------|------------------|--------|
| Sponsor/participate in 30 technical community events including NOGs, Peering Forums and Research & Education community events | 28 out of 30     | ●      |
| Support 20 NOGs to conduct online events if physical events are not possible                                                  | 14 out of 20     | ●      |
| Facilitate and support two new/revived NOGs in two sub-regions                                                                | One in progress  | ●      |
| Sponsor or participate in 10 security community events                                                                        | 43 events        | ●      |
| Support targeted development of four new/existing CERTs/CSIRTs                                                                | 6 CERTs/CSIRTs   | ●      |
| Deliver six presentations/training sessions on the Security Threat Sharing Platform                                           | 10 presentations | ●      |
| Participate in all NRO and I* coordination meetings                                                                           | 100%             | ●      |
| Participate in all NIR and RIR Open Policy Meetings                                                                           | 100%             | ●      |

## 3C. Community Engagement – continued

### SUCCESS MEASURES – 3C CONTINUED

| Targets                                                                                                        | Results                                                         | Status |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------|
| Sponsor and participate in APrIGF and IGF with workshop proposals, MSG/MAG participation, and speaking roles.  | 3 proposals to IGF<br>2 proposals to APrIGF<br>Sponsored APrIGF | ●      |
| Participate in at least three national Internet governance initiatives                                         | 3 out of 3                                                      | ●      |
| Sponsor and participate in at least two schools of Internet governance.                                        | 2 out of 2                                                      | ●      |
| Participate in at least 12 engagements with governments/intergovernmental organizations.                       | 25 engagements                                                  | ●      |
| Participate in at least three capacity building partnerships with governments/intergovernmental organizations. | 3 out of 3                                                      | ●      |
| Participate in six engagements with the Public Safety community.                                               | 6 out of 6                                                      | ●      |
| Facilitate one External Relations coordination retreat.                                                        | Completed                                                       | ●      |
| Facilitate 10 External Relations team coordination meetings.                                                   | 10 out of 10                                                    | ●      |

## 3D. Community Participation

### OPERATIONS

#### 3D.1. Community-led processes

Special Interest Group (SIG) meetings at APNIC conferences attracted 950 participants, with SIG mailing list subscribers increasing 5% from 1,268 to 1,333. Four 'intersessional' online SIG meetings (arranged by the Policy SIG and Routing Security SIG) were also held outside of APNIC conferences, attracting 139 participants.

The SIG Guidelines were updated in April following a joint SIGs meeting to discuss and agree proposed changes to SIG elections.

At the elections completed at APNIC 52:

- Joy Chan (TW) was re-elected Chair of the Cooperation SIG for a two-year term.
- Oanh Nguyen (VN) was elected Chair of the NIR SIG for a two-year term.
- Bertrand Cherrier (NC) was elected Chair of the Policy SIG and Shaila Sharmin (BD) was elected Co-Chair, both for two-year terms.
- Afifa Abbas (BD) was elected Co-Chair of the Routing Security SIG for a two-year term.
- Ching-Heng Ku (TW) was elected to the IANA RC for a two-year term.
- Di Ma (CN) was elected unopposed to the NRO NC for a two-year term starting 1 January 2022. Nicole Chen was reappointed by the EC to the second NRO NC seat for a one-year term beginning 1 January 2022.

Quarterly 'Community Elected Leaders' meetings were held by the APNIC EC and elected representatives of the SIGs, IANA RC, NRO NC, members of APIX and APNOG, and Secretariat staff. Discussions covered community feedback on APNIC conferences, the online conference format, election procedures, the use of confer at OPMs and the online community platform trial.

[apnic.net/sigs](https://apnic.net/sigs)

### RESOURCING

|          | Budget  | Actual  |
|----------|---------|---------|
| FTE      | 1.52    | 1.37    |
| Expenses | 310,076 | 244,552 |
| CAPEX    | -       | -       |

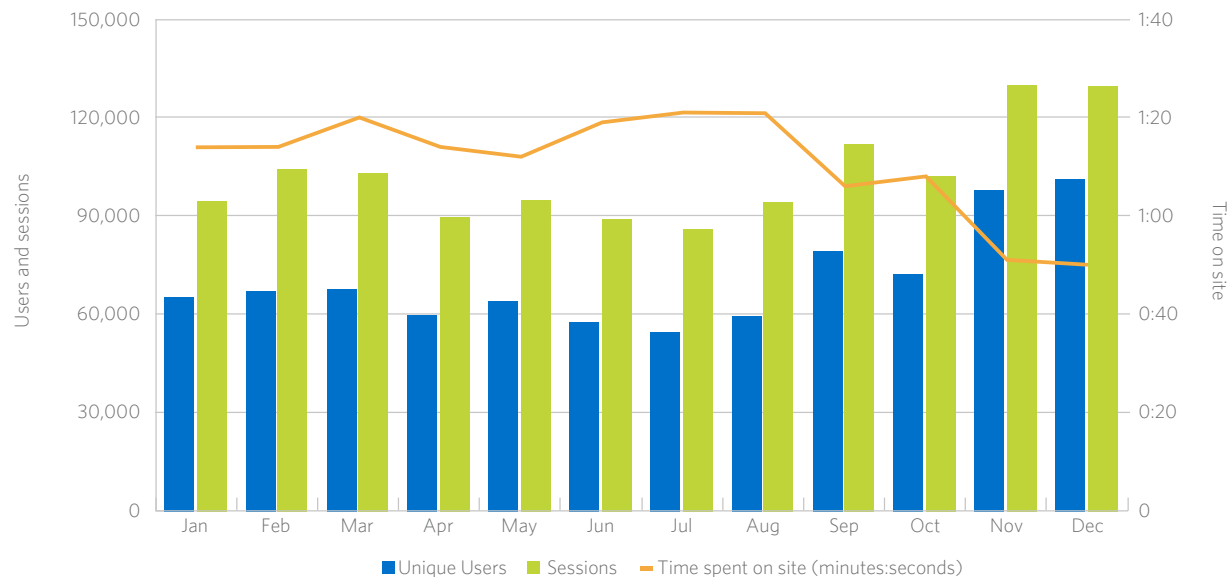
## 3D. Community Participation – continued

### 3D.2. Online participation

Visitor numbers to apnic.net peaked in September, with time on site at its highest point in July and August. The top five visitor economies were the United States, Hong Kong, India, China, and Australia.

Users consumed 4,013 hours of video content via APNIC's YouTube channel. Experimentation with paid information sharing campaigns on Facebook and Twitter helped increase Facebook reach by 13% (from 3 million to 3.4 million), and APNIC tweet engagement by 285% (from 63,749 to 245,337).

#### APNIC.NET WEBSITE VISITS





# 3D. Community Participation – continued

## 3D.3. Encouraging newcomers and diversity

APNIC presented and participated in the Diversity in Tech Panel session at APRICOT 2021/APNIC 51 and the Women in ICT session at APNIC 52. A NextGen Careers BoF was also held at APNIC 52. Thirty-seven percent of APNIC conference attendees were newcomers.

Following the elections at APNIC 52, two of the four SIG Chair positions and two of the six Co-Chair positions were held by females (previously, only one SIG leadership role was held by a female).

APNIC attracted 235 new Blog subscribers, 1,548 new Twitter followers, and 1,414 new LinkedIn followers.

An independent community survey on language understanding and translation was commissioned in August. The survey was provided in 11 languages and received 489 completed responses. Services identified by respondents as having the highest value – if available in local language – were training, conferences, and policy information.

## 3D. Community Participation – continued

### SUCCESS MEASURES – 3D

| Targets                                                                 | Results                           | Status |
|-------------------------------------------------------------------------|-----------------------------------|--------|
| Achieve 800 online SIG participants across two conferences              | 950 participants                  | ●      |
| Grow SIG mailing lists subscribers from 1,268 to 1,325                  | 1,333 subscribers                 | ●      |
| Achieve 6,000 remote conference session views                           | 8,145 views                       | ●      |
| Achieve attendance of 1,000 conference delegates across two conferences | 1,558 attendees                   | ●      |
| Grow all-time Blog views from 2.6 million to 3.4 million                | 3.46 million                      | ●      |
| Increase 12-month tweet engagement from 60,000 to 62,000                | 234,929                           | ●      |
| Increase annual Facebook posts reach from 3 million to 3.2 million      | 3.4 million                       | ●      |
| Attract 400 newcomers to APNIC conferences                              | 578 newcomers                     | ●      |
| Attract 125 new Blog email subscribers                                  | 235 new subscribers (total 1,235) | ●      |
| Grow Twitter followers from 12,100 to 13,250                            | 13,763                            | ●      |

## 3E. APNIC Academy

### OPERATIONS

#### 3E.1. Product management

The integration of Salesforce event management and training registration systems was completed. Training content on apnic.net was also migrated to the APNIC Academy website.

Note that additional investments in the training platform are covered in 3E.7 below.

#### 3E.2. Instructor-led training

APNIC remained unable to deliver full face-to-face training due to COVID-19 restrictions (all but one instructor-led training session was remote). The training delivery team conducted 96 courses for 2,382 participants in a mix of online and 'hybrid' sessions. Twenty webinars were also delivered to 1,120 participants.

Two new courses on Network Management and Monitoring (NMM) and Network Automation were completed. Updates were also made to existing courses on Internet routing, IPv6 deployment, network security, and the RPKI/ROV lab guides.

### RESOURCING

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 10.80     | 8.07      |
| Expenses | 2,392,222 | 1,886,157 |
| CAPEX    | 15,000    | 16,351    |



# 3E. APNIC Academy – continued

## 3E.3. Self-paced training

The APNIC Academy added 5,428 new accounts, with 1,735 course completions (3,340 contact hours), and 6,070 labs launched.

A self-paced Routing Fundamentals course, containing 39 new topics and five hours of new learning material, was published to replace the existing Routing Basics course.

New virtual labs were added including Hashing (File Integrity), SSH (Secure Shell), DHCPv6-PD, Linux Basics, PGP (File and Email Security) and Using Suricata to Analyse Packet Captures. The RPKI Lab was updated.

[academy.apnic.net/en](https://academy.apnic.net/en)

## 3E.4. Technical assistance

Technical assistance was provided to 34 Members across 14 economies, including:

- DNSSEC troubleshooting with a Member in Samoa to solve email delivery issues.
- Proactive outreach and support to 18 network operators in the region to reduce invalid RPKI routes.
- IPv6 deployment support with network operators in India, Pakistan, Sri Lanka and Australia.
- Network design development and discussions with Members in Tonga and Kiribati, plus network consolidation discussions with a Member in Brunei.
- IXP training, setup and configuration for PKIX Lahore.

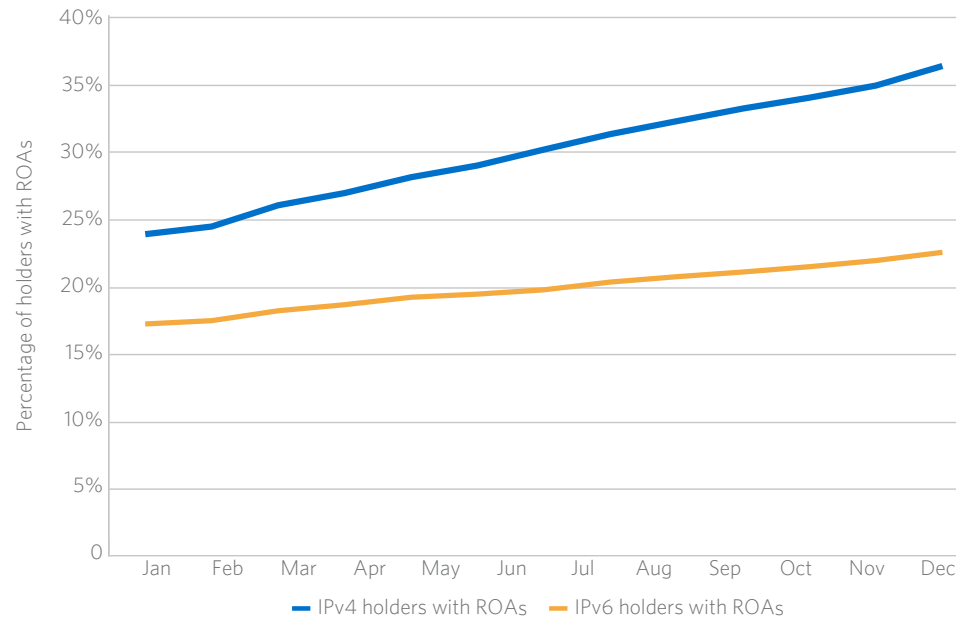
[academy.apnic.net/en/technical-assistance](https://academy.apnic.net/en/technical-assistance)

## 3E. APNIC Academy – continued

### 3E.5. RPKI awareness and deployment support

RPKI adoption in the APNIC region increased in 2021. The percentage of IPv4 address holders with ROAs grew from 24.4% to 36.1% in 12 months, while IPv6 address holders with ROAs increased from 17.3% to 22.3%.

#### ADDRESS HOLDERS WITH ROAS



The amount of IPv4 addresses covered by ROAs grew from 21.4% to 28.8%, with IPv6 address space covered by ROAs increasing from 24.0% to 31.7%.

Eleven economies reached 90%+ IPv4 ROA coverage by the end of 2021: VU (92%), TO (96%), LK (94%), MN (99%), BT (96%), MV (99%), TO (95%), NP (94%), NU (100%), NR (92%), MH (90%).

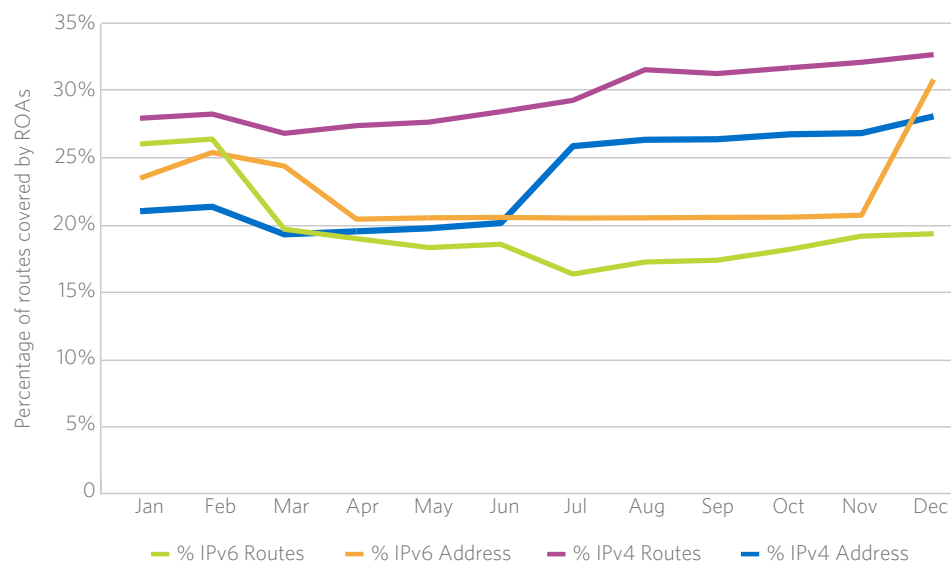
## 3E. APNIC Academy – continued

In addition to technical assistance provided (see 3E.4), 18 RPKI training events were delivered. Five RPKI deployment case studies and 36 RPKI-tagged posts were published on the APNIC Blog, including six in support of the Internet Society's 'RPKI Week' promotion.

APNIC Labs released a ROA measurement tool (alongside the existing ROV measurement tool) to help monitor the progressive deployment of RPKI across the Internet.

[www.apnic.net/rpki](http://www.apnic.net/rpki)  
[stats.labs.apnic.net/roa](http://stats.labs.apnic.net/roa)  
[stats.labs.apnic.net/rpki](http://stats.labs.apnic.net/rpki)

### ADDRESSES AND ROUTES COVERED BY ROAs





# 3E. APNIC Academy – continued

## 3E.6. IPv6 awareness and deployment support

IPv6 capability for the Asia Pacific region ended the year at 37.65%, as measured by APNIC Labs.

Seventeen IPv6 deployment focused training events were delivered, with three IPv6 deployment success stories and 23 IPv6 blog posts published.

[www.apnic.net/ipv6](http://www.apnic.net/ipv6)



## 3E. APNIC Academy – continued

### SUCCESS MEASURES – 3E

| Targets                                                                                  | Results                                                         | Status |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------|
| Migrate legacy training site information to APNIC Academy and decommission previous site | Completed                                                       | ●      |
| Develop a comprehensive curriculum of blended learning for future certification          | Commencing in 2022                                              | ●      |
| Develop two new/updated courses for instructor-led tutorials/workshops                   | 2 new courses completed<br>3 courses updated with 7 new modules | ●      |
| Conduct 70 instructor-led tutorials/workshops across four sub-regions                    | 96 tutorials/workshops delivered                                | ●      |
| Conduct 18 live webinars                                                                 | 20 webinars delivered                                           | ●      |
| Publish four new/revised self-paced online courses                                       | 2 new courses completed<br>2 courses revised                    | ●      |
| Publish five new self-paced virtual labs (associated with multiple courses)              | 6 new labs delivered                                            | ●      |



## 3E. APNIC Academy – continued

### SUCCESS MEASURES – 3E CONTINUED

| Targets                                                                                                    | Results      | Status |
|------------------------------------------------------------------------------------------------------------|--------------|--------|
| Begin conducting technical assistance via the APNIC Academy online platform                                | Completed    | ●      |
| Conduct eight RPKI/ROV focused instructor-led tutorials/workshops spread equally across sub-regions        | 18 completed | ●      |
| Achieve 90% ROA coverage for four additional economies                                                     | Completed    | ●      |
| Publish four RPKI/ROA/ROV deployment case studies                                                          | 5 published  | ●      |
| Conduct eight IPv6 deployment focused instructor-led tutorials/workshops spread equally across sub-regions | 17 done      | ●      |
| Publish three IPv6 deployment case studies                                                                 | 3 published  | ●      |

## 3E. APNIC Academy – continued

### INVESTMENTS

#### 3E.7. Platform and curriculum development →|

APNIC Academy development included extended translation support to online video-based courses, and the launch of the online Technical Assistance platform.

#### 3E.8. Community Trainers network →|

The number of active Community Trainers (CTs) was increased to 30. Twenty-eight CTs from 14 economies were engaged for 68 instructor-led online training events.

A new Retained CT model was created to provide dedicated on-the-ground training support, with recruitment begun.

| 2021 Investment                  | Member Benefit                                        |
|----------------------------------|-------------------------------------------------------|
| <b>APNIC Academy development</b> | Improved access to training and technical assistance. |
|                                  | Improved technical capacity in the APNIC region.      |
| Status: <b>Ongoing</b>           |                                                       |

|                                   |                                                                                               |
|-----------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Community Trainers network</b> | Local support for APNIC training and technical assistance.                                    |
|                                   | Increased instructor led APNIC training in targeted economies.                                |
|                                   | Options for training in local language and improved translation support for training content. |
| Status: <b>Ongoing</b>            |                                                                                               |



# 3E. APNIC Academy – continued

## 3E.9. Curriculum for non-technical audiences →

A team of instructional designers was appointed in May to develop an online educational game to help young, non-technical, Internet governance enthusiasts to better understand how the Internet works and inspire their involvement and participation in the Internet ecosystem.

A procurement process was established to select a game developer through a tender process, and three workshops and four consultations with target audience groups were conducted. The game developers are expected to release a minimum viable product in the first half of 2022.

| 2021 Investment                               | Member Benefit                                                                                                                                                                                                                 |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Curriculum for non-technical audiences</b> | <p>More informed government decision-making on issues that impact Internet operations.</p> <p>Better prepared fellows for APNIC conference participation.</p> <p>More meaningful engagements with non-technical audiences.</p> |
| Status: <b>Ongoing</b>                        |                                                                                                                                                                                                                                |

## 3F. Internet Infrastructure Deployment

### OPERATIONS

#### 3F.1. Internet infrastructure deployment

Training and IXP setup/configuration support was completed for the new Pakistan IX in Lahore in September.

Operating principles and high-level design work was completed with MV IX in the Maldives, with deployment to continue in 2022 when equipment arrives. Support was also provided to the planned upgrade of Fiji IX, and assistance was given to Bhutan IX to implement ROV on their route server.

Challenges in sourcing hardware replacements for seven disconnected RIPE Atlas anchor hosts led to APNIC testing software anchors on mini servers as an alternative. It is hoped this will allow resolution in 2022.

Root server deployment focused on the M-root project ([see 3F.3](#)).

### RESOURCING

|          | Budget  | Actual  |
|----------|---------|---------|
| FTE      | 0.76    | 1.03    |
| Expenses | 551,384 | 379,668 |
| CAPEX    | 60,000  | 1,231   |



# 3F. Internet Infrastructure Deployment - continued

## 3F.2. Community Honeynet and Security Threat Sharing Platform

The Community Honeynet project was expanded with the addition of five new partners, including three from the APNIC region (Tonga, Bangladesh, and the Philippines).

Feeds from the honeynet dataset were created for consumption by instances of the MISP threat sharing platform, and shared with various national CERTs, the ShadowServer Foundation, and APNIC's DASH service.

Eight engagements were held with communities in Bhutan, Mongolia, Taiwan, Nepal, Timor Leste, Tonga and Fiji on honeynet and threat sharing, with two webinars on Practical Threat Hunting delivered via the APNIC Academy.

Content for the 'Introduction to Suricata Intrusion Detection System' training course was also developed based on the honeynet datasets.

## 3F. Internet Infrastructure Deployment - continued

### SUCCESS MEASURES – 3F

| Targets                                                                | Results                                    | Status |
|------------------------------------------------------------------------|--------------------------------------------|--------|
| Support deployment of at least two new or upgraded IXPs                | 1 deployed<br>1 in progress                | ●      |
| Support four additional IXPs to deploy RPKI/ROV on their route servers | 1 deployed<br>1 in progress                | ●      |
| Deploy or upgrade four RIPE Atlas anchors at various networks          | 0 deployed<br>7 in progress                | ●      |
| Deploy 12 new root server instances                                    | 1 deployed<br>11 in progress<br>(see 3F.3) | ●      |
| Increase Community Honeynet partners from 10 to 15                     | 15 partners                                | ●      |



# 3F. Internet Infrastructure Deployment - continued

## INVESTMENTS

### 3F.3. M-root anycast instance deployment →

Deployment of the M-root instance in Hanoi was completed in collaboration with the WIDE Project and JPRS.

Deployment of servers in 11 locations (Guam, Kaohsiung, Manila, Dhaka, Kuala Lumpur, Bangkok, Jakarta, Ulaanbaatar, Kathmandu, Mumbai, and Singapore) progressed, however equipment delivery delays prevented progress. Deployment in these locations will be completed in 2022 upon equipment delivery.

| 2021 Investment                           | Member Benefit                                                                                                                                 |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>M-root anycast instance deployment</b> | Faster and more reliable DNS service.<br><br>Faster and easier deployment of root DNS anycast instances at desirable or underserved locations. |
| Status: <b>Ongoing</b>                    |                                                                                                                                                |



# 4. INFORMATION



## OBJECTIVE

Support Internet development with needed network information services, and research outcomes which are of demonstrated value to the community.

## WORKSTREAMS

- 4A. Information Products
- 4B. Research and Analysis

## INFORMATION - SUMMARY

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 6.54      | 10.31     |
| Expenses | 1,784,352 | 2,002,601 |
| CAPEX    | 80,000    | 62,532    |

# 4A. Information Products

## OPERATIONS

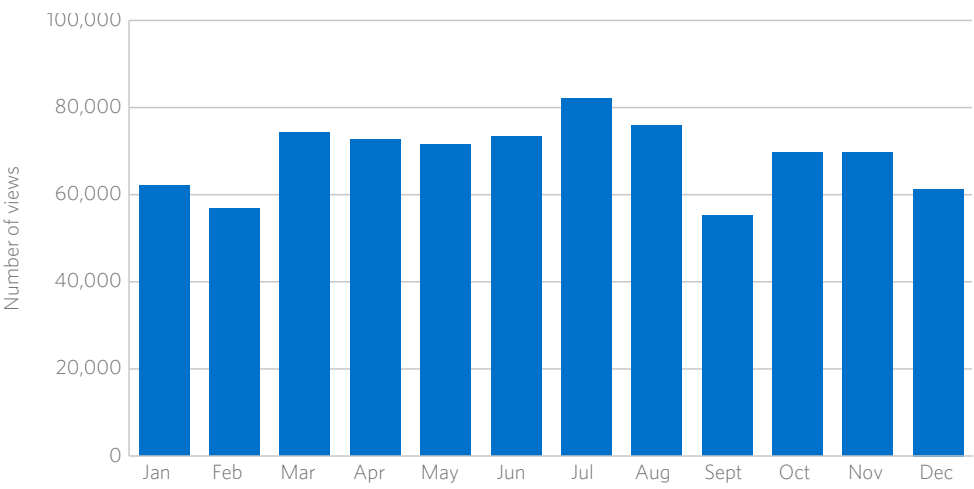
### 4A.1. APNIC Blog

The APNIC Blog averaged 68,721 unique views per month in 2021, a 6.1% increase on 2020's monthly average of 64,778. The Blog passed the milestone of 3 million views (all-time) in June.

There were 179 Guest Posts, representing 56% of total opinion posts (in line 2020). 'Related articles' functionality was added to the Blog in June.

A new APNIC podcast, 'PING', was launched in October, with the first five episodes attracting 648 downloads. PING will focus on Internet research and interview researchers and experts from around the world, with episodes to be published fortnightly.

#### BLOG VIEWS



[blog.apnic.net](https://blog.apnic.net)

## RESOURCING

|          | Budget  | Actual    |
|----------|---------|-----------|
| FTE      | 5.52    | 9.31      |
| Expenses | 985,151 | 1,254,806 |
| CAPEX    | -       | -         |





## 4A. Information Products – continued

### SUCCESS MEASURES – 4A

| Targets                                                                                      | Results                          | Status |
|----------------------------------------------------------------------------------------------|----------------------------------|--------|
| Grow all-time Blog views from 2.6 million to 3.4 million                                     | 3.46 million                     | ●      |
| Average 64,000 Blog views per month                                                          | 68,721 views/month               | ●      |
| Maintain Blog Guest Post ratio between 45-65%                                                | 56%                              | ●      |
| Reach an average of 400 users per month to NetOX and DASH, and of 700 users per month to REx | 980 NetOX<br>365 DASH<br>826 REx | ●      |
| Achieve a net promoter score (NPS) of 80+ for all products                                   | 68 NetOX<br>68 DASH<br>59 REx    | ●      |
| Achieve a usability score of at least 4.5/5 for all products                                 | 4.4 NetOX<br>4.5 DASH<br>4.4 REx | ●      |

## 4B. Research and Analysis

### OPERATIONS

#### 4B.1. Conducting research and measurements

APNIC Labs research activities included:

- New measurements on the use of IPv6 as a transport protocol for the DNS and IPv6 Extension Header handling, including fragmentation.
- Analysis of IPv4 and IPv6 advertised, unadvertised and reserved address pools over time.
- Reporting on the annual state of BGP, and further development of routing bogon and CIDR reports, as input to ISOC MANRS. Work continued on automated BGP anomaly detection.
- Development of an RPKI ROA monitor to help measure progressive deployment of RPKI.
- Research analysing the handling of large DNS responses, adoption of DOH, and DNS query patterns.
- Measurement of QUIC usage following the release of beta software that adds QUIC support to NGINX servers.
- Publishing 43 blog articles covering research findings, analysis of trust infrastructure, and commentary on new Internet technologies. Three podcasts were also recorded.

[labs.apnic.net](https://labs.apnic.net)

### RESOURCING

|          | Budget  | Actual  |
|----------|---------|---------|
| FTE      | 1.02    | 1.00    |
| Expenses | 799,201 | 747,795 |
| CAPEX    | 80,000  | 62,532  |



# 4B. Research and Analysis – continued

## 4B.2. Cooperative research

APNIC entered into a cooperative research program with ISOC in support of MANRS, providing a feed of routing data. As part of an agreement with ICANN, work continued on the measurement framework for ITHI.

Research collaboration also continued with Cloudflare.

## 4B.3. Sharing research outcomes

Forty-one presentations on research findings were shared at technical forums globally.

## 4B. Research and Analysis – continued

### SUCCESS MEASURES – 4B

| Targets                                                                                        | Results                           | Status |
|------------------------------------------------------------------------------------------------|-----------------------------------|--------|
| Twelve research articles and reports published                                                 | 43 articles                       | ●      |
| Conduct cooperative research with organizations such as CloudFlare, ICANN, RIPE NCC and others | 3 collaborative research projects | ●      |
| Ten research presentations delivered                                                           | 41 presentations                  | ●      |
| At least two research presentations at APNIC conferences                                       | 6 presentations                   | ●      |



# 5. CAPABILITY



## OBJECTIVES

- Sustain a healthy and resilient organization.
- Develop a strong service culture driven by people committed to APNIC’s vision and values.
- Provide stable and secure technical infrastructure to support APNIC operations and services.

## WORKSTREAMS

- 5A. Internal Technical Infrastructure
- 5B. Finance and Business Services
- 5C. Employee Experience
- 5D. Governance

## CAPABILITY - SUMMARY

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 23.75     | 33.88     |
| Expenses | 7,190,675 | 8,029,100 |
| CAPEX    | 2,543,200 | 400,222   |

## 5A. Internal Technical Infrastructure

### OPERATIONS

#### 5A.1. Architecture and technical coordination

OpenAPI was adopted to describe internal APIs, with dependencies between products and components managed using APIs and architectural documentation.

Dependency management tooling (Dependabot) was deployed to ensure systems remain current, and its use will expand as part of the regular system maintenance cycle.

Rust was adopted as a supported language for APNIC product development. The Information Product team used Rust to achieve lower memory footprint deployments than with Java or Python, with strong static safety checks.

#### 5A.2. Network and infrastructure operations

Connectivity from Brisbane to HKIX (via PCCW) was completed, with a shared Point of Presence (PoP) in the Singapore SG1 data centre established for critical APNIC services and an M-root global anycast node.

APNIC signed up to the NextDC carbon offset program to offset 100% of the carbon emissions generated by the Brisbane data centre.

A new [service status page](#) was also created to display the real-time operational status of APNIC's services.

### RESOURCING

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 6.20      | 14.78     |
| Expenses | 1,903,032 | 2,472,811 |
| CAPEX    | 353,200   | 390,978   |

## 5A. Internal Technical Infrastructure – continued

### 5A.3. System and platform operations

Initiatives to improve online service performance, stability and availability included:

- Completing the migration of the DNSSEC signer from Secure64 to Knot.
- Updating the APNIC Academy site to use Cloudflare.
- Deploying RDNS anycast nodes in Hong Kong, Mexico, Toronto, and London.
- Deploying a whois node in the KDDI data centre in Tokyo.
- Completing an upgrade of the secured centralized logging system to an open-source log collector for each host to send logs via secure TLS channels.
- Completing the upgrade of the on-premises Kubernetes test cluster, virtual machine environment hosts, and management server.
- Replacing aging network storage with two new high performance storage arrays to two separate data centres.
- Reconfiguring the new Hardware Security Module (HSM) to provide high availability service to RPKI, allowing data centre failover.
- Upgrading the community mailing list interface to Mailman 3 to support all external mailing list services.

| Core system uptime   |        | Average data centre bandwidth usage (Mbps) |      | Average query rates (per second) |        |
|----------------------|--------|--------------------------------------------|------|----------------------------------|--------|
| FTP                  | 100%   | AU edge inbound                            | 99.3 | Whois                            | 430    |
| MyAPNIC              | 99.99% | AU edge outbound                           | 280  | RDAP                             | 92     |
| RDNS                 | 100%   | JP edge inbound                            | 21.9 | RDNS                             | 18,600 |
| RDNS DNSSEC Validity | 100%   | JP edge outbound                           | 65   | RPKI (RSYNC and RRDP)            | 99.10  |
| Whois                | 99.99% |                                            |      | FTP                              | 2.47   |
| RPKI                 | 99.99% |                                            |      | MyAPNIC                          | 0.53   |
| RDAP                 | 99.99% |                                            |      |                                  |        |

## 5A. Internal Technical Infrastructure – continued

### 5A.4. Internal security operations

The Vulnerability Reporting Program generated 52 unique and verified vulnerability reports from external security researchers in 2021. Forty vulnerabilities were resolved, with seven still in progress within the 90-day period. Unresolved vulnerabilities outside of the 90 days are being addressed as part of larger upgrade projects.

HackerOne was selected to perform triage of newly reported vulnerabilities and continuous penetration testing to replace single annual tests commissioned in previous years.

Rapid7 was deployed on workstations, servers and network equipment for vulnerability scanning and Security Information and Event Management (SIEM).

The Acceptable Use and Bring Your Own Device policies were reviewed and updated. Online fraud training was completed with finance and services staff.

Policies and procedures that align with ISO 27001 were updated, and a gap analysis conducted in November indicated APNIC is ready to seek certification in 2022.

### 5A.5. Enterprise application management

New contract management software, device management systems, and CRM backup technology was implemented.

The APNIC office telephone system was migrated to Zoom phone and Zoom Room technology was deployed to meeting rooms.

## 5A. Internal Technical Infrastructure – continued

### SUCCESS MEASURES – 5A

| Targets                                                                                           | Results                                                           | Status |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------|
| Complete review of testing environment and practices                                              | Completed                                                         | ●      |
| Complete quarterly data centre failover tests                                                     | 4 out of 4 completed                                              | ●      |
| Maintain availability of 99.99% for critical APNIC services and 99.95% for less-critical services | 99.99% and 99.98%                                                 | ●      |
| Develop strategy for cloud and interconnection                                                    | Draft completed                                                   | ●      |
| Complete service migration to cloud for six services/websites                                     | Completed                                                         | ●      |
| Achieve readiness for ISO27001 certification                                                      | Gap analysis completed                                            | ●      |
| Track and resolve all vulnerability reports within 90 days                                        | 40 out of 52 reports resolved<br>(7 in progress, 5 missed target) | ●      |
| CRM roadmap established                                                                           | Completed                                                         | ●      |

## 5A. Internal Technical Infrastructure – continued

### INVESTMENTS

#### 5A.6. Product platform development →

A new Single Sign-On (SSO) architecture to cover all online services was developed during 2021. Deployment was deferred from December to March 2022 to avoid disruption to APRICOT registration.

| 2021 Investment                                                                                                                                      | Member Benefit                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Further development of infrastructure and services platforms common to APNIC products to streamline product development, integration and consistency | <p>Standardized user experience across products.</p> <p>Faster access to new products and services.</p> <p>Improved maintenance of online infrastructure to reduce operational risk.</p> |
| Status: <b>Ongoing</b>                                                                                                                               |                                                                                                                                                                                          |

## 5B. Finance and Business Services

### OPERATIONS

#### 5B.1. Knowledge management

A new staff intranet was launched in December.

#### 5B.2. Financial services

Monthly forecasting was initiated to track income and expenses to identify variations to budget caused by COVID-19 restrictions.

New accounting procedures were developed to manage APNIC Foundation-funded projects, with implementation support provided to the Foundation for its new ERP system.

The annual audit of the 2020 financial accounts was completed by Deloitte and presented to the EC at APNIC 51.

#### 5B.3. Business services

An external surveillance audit of APNIC's ISO9001:2016 quality management system was completed successfully in August.

A project to digitize legacy paper membership forms was completed at the end of March to improve access for services and finance teams.

### RESOURCING

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 10.14     | 11.45     |
| Expenses | 2,207,847 | 2,353,479 |
| CAPEX    | 30,000    | 9,244     |

## 5B. Finance and Business Services – continued

### 5B.4. Data governance and business intelligence

Reporting functions in APNIC's legacy business intelligence system (O3) were replicated into a new system based on Tableau. Additional software platforms were also implemented to improve the production of charts.

Development of an APNIC-wide data model and data dictionary is underway and scheduled for completion in 2022.

Data warehouse methodologies and tools were investigated and tested, with a priority on scaling and compatibility with industry standards. Basic membership and resource details were loaded into the data warehouse and transformed for Tableau visualizations.

## 5B. Finance and Business Services – continued

### SUCCESS MEASURES – 5B

| Targets                                                                                                          | Results      | Status |
|------------------------------------------------------------------------------------------------------------------|--------------|--------|
| Successful implementation of internal knowledge management tools with increased user satisfaction and experience | Completed    | ●      |
| Achieve a successful audit of APNIC's annual financial accounts                                                  | Completed    | ●      |
| Complete annual ISO Quality management compliance audit successfully                                             | Completed    | ●      |
| Undertake quarterly BCP scenario testing                                                                         | Completed    | ●      |
| Complete APNIC-wide data model and data dictionary                                                               | 70% complete | ●      |
| Generate all Secretariat report data/charts from BI system                                                       | 20% complete | ●      |

## 5C. Employee Experience

### OPERATIONS

#### 5C.1. Organizational development

The executive and leadership teams participated in a regular leadership webinar program provided by external coaches.

A new goal setting process was established to clearly link individual goals to organizational goals and improve goal progress monitoring.

A monthly agile leaders forum was created for continuous learning and development.

#### 5C.2. Work environment management

With COVID-19 restrictions changing regularly, a hybrid working environment of office access and work from home arrangements was maintained.

An updated travel health policy was developed to encompass COVID health risks and insurance implications.

### RESOURCING

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 4.65      | 5.69      |
| Expenses | 1,945,989 | 2,137,539 |
| CAPEX    | 2,160,000 | 0         |

## 5C. Employee Experience – continued

### 5C.3. Talent attraction and retention

Twenty permanent roles (including two new Directors for the Services and Finance areas) and five casual roles were filled. Nine contractors and six Community Trainers were also engaged.

Support was provided to recruit four operations staff for the APNIC Foundation.

### 5C.4. People operations management

Hybrid working principles were developed for staff to combine remote and office work and maximize engagement and effectiveness.

Emergency leave was introduced for staff to access when childcare was impacted by COVID restrictions, and for COVID testing and vaccinations.

## 5C. Employee Experience – continued

### SUCCESS MEASURES – 5C

| Targets                                                                                                       | Results                            | Status |
|---------------------------------------------------------------------------------------------------------------|------------------------------------|--------|
| Strategic goals clearly cascade to individual performance measures in performance management system in 2021   | Completed                          | ●      |
| Deploy agile work practices across the organization                                                           | 76% complete                       | ●      |
| No WHS incidents caused by APNIC's local or remote work environments — zero fault incident reports            | 3 incidents – none caused by APNIC | ●      |
| Maintain staff turnover rate within acceptable benchmarks of 5-15%                                            | 4.8 % turnover                     | ●      |
| Training budget is 100% allocated and distributed across the organization                                     | 50% spent                          | ●      |
| All HR policies, in particular, hybrid work, parental leave and travel safety policies, reflect best practice | Completed                          | ●      |

## 5C. Employee Experience – continued

### INVESTMENTS

#### 5C.5. Agile APNIC →|

Seventy-six percent of teams adopted appropriate Agile practices for the management of their work. The remaining teams will complete adoption by March 2022.

#### 5C.6. People management portal →|

Implementation of the Sage People human resources portal is in progress. The Core HR module was launched in September and Compensation Management was launched in December. Performance and Recruitment modules are undergoing UAT, for completion in January 2022.

#### 5C.7. APNIC workspace remodelling →|

An architectural and structural review of the current office building in South Brisbane indicated it could be extended to seat 140 staff, but at significant cost. It also concluded that significant capital improvement is not financially viable due to the limited future potential of the building itself.

APNIC staff reviewed several alternative office locations, for a potential relocation within two to three years.

A study of the current workspace use was completed to assist with short-term remodelling that may be undertaken, as well as longer term requirements for alternative office location in future.

| 2021 Investment                    | Member Benefit                                                                                                    |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Agile APNIC</b>                 | A focus on continuously improving operations and performance.                                                     |
| Status: <b>Ongoing</b>             |                                                                                                                   |
| <b>People management portal</b>    | Improved reporting on HR analytics.<br><br>Reduced HR administration to focus instead on improvement initiatives. |
| Status: <b>Ongoing</b>             |                                                                                                                   |
| <b>APNIC workspace remodelling</b> | Improved organizational flexibility and productivity.<br><br>Allows full benefits of a distributed workforce.     |
| Status: <b>Ongoing</b>             |                                                                                                                   |

## 5D. Governance

### OPERATIONS

#### 5D.1. Executive Council (EC) support

Feng Leng was elected to the APNIC EC for the first time at APNIC 51, with Gaurab Raj Upadhaya, Kenny Huang, and Yoshinobu Matsuzaki re-elected to the EC, for two-year terms.

Four EC meetings were held. The Annual EC satisfaction survey indicated a high level of satisfaction with the support provided by the APNIC Secretariat.

#### 5D.2. Corporate governance and legal

The Strategic Risk Register was maintained and presented to the EC quarterly for review.

### RESOURCING

|          | Budget    | Actual    |
|----------|-----------|-----------|
| FTE      | 2.76      | 1.96      |
| Expenses | 1,133,807 | 1,065,271 |
| CAPEX    | -         | -         |

## 5D. Governance – continued

### SUCCESS MEASURES – 5D

| Targets                                                          | Results   | Status |
|------------------------------------------------------------------|-----------|--------|
| Achieve a high level of satisfaction from a survey of EC members | Completed | ●      |
| Quarterly Strategic Risk Register updated and reviewed           | Completed | ●      |



## 2021 FINANCIAL REPORT BY ACTIVITY

| Activity                          | FTE          |              |              | CAPEX             |                   |                   | OPEX              |                   |                   |
|-----------------------------------|--------------|--------------|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                   | Actual 2021  | Budget 2021  | Variance     | Actual (AUD) 2021 | Budget (AUD) 2021 | Variance (AUD)    | Actual (AUD) 2021 | Budget (AUD) 2021 | Variance (AUD)    |
| Member Services                   | 9.51         | 8.58         | 0.93         | 7,935             | 0                 | 7,935             | 2,219,361         | 2,253,270         | -33,909           |
| Membership Products               | 9.25         | 12.28        | -3.03        | 0                 | 0                 | 0                 | 1,856,909         | 2,473,335         | -616,426          |
| Membership Reporting              | 1.12         | 1.56         | -0.44        | 0                 | 0                 | 0                 | 619,054           | 715,263           | -96,209           |
| <b>Membership - Total</b>         | <b>19.88</b> | <b>22.42</b> | <b>-2.54</b> | <b>7,935</b>      | <b>0</b>          | <b>7,935</b>      | <b>4,695,325</b>  | <b>5,441,868</b>  | <b>-746,543</b>   |
| Registration Services             | 4.89         | 4.53         | 0.36         | 0                 | 0                 | 0                 | 890,233           | 842,899           | 47,334            |
| Registry Products                 | 6.18         | 9.04         | -2.86        | 0                 | 0                 | 0                 | 1,831,592         | 2,580,512         | -748,920          |
| Policy Development                | 0.64         | 0.64         | 0.00         | 0                 | 0                 | 0                 | 442,384           | 545,263           | -102,879          |
| <b>Registry - Total</b>           | <b>11.71</b> | <b>14.21</b> | <b>-2.50</b> | <b>0</b>          | <b>0</b>          | <b>0</b>          | <b>3,164,209</b>  | <b>3,968,674</b>  | <b>-804,465</b>   |
| APNIC Conferences                 | 4.75         | 5.04         | -0.29        | 4,296             | 43,150            | -38,854           | 930,345           | 1,466,163         | -535,818          |
| Foundation Support                | 1.24         | 1.58         | -0.34        | 0                 | 0                 | 0                 | 76,428            | 571,518           | -495,090          |
| Community Engagement              | 4.46         | 6.38         | -1.92        | 0                 | 0                 | 0                 | 1,410,868         | 1,826,724         | -415,856          |
| Community Participation           | 1.37         | 1.52         | -0.15        | 0                 | 0                 | 0                 | 244,552           | 310,076           | -65,524           |
| APNIC Academy                     | 8.07         | 10.80        | -2.73        | 16,351            | 15,000            | 1,351             | 1,886,157         | 2,392,222         | -506,065          |
| Internet Infrastructure Support   | 1.03         | 0.76         | 0.27         | 1,231             | 60,000            | -58,769           | 379,668           | 551,384           | -171,717          |
| <b>Development - Total</b>        | <b>20.92</b> | <b>26.08</b> | <b>-5.16</b> | <b>21,878</b>     | <b>118,150</b>    | <b>-96,272</b>    | <b>4,928,017</b>  | <b>7,118,088</b>  | <b>-2,190,071</b> |
| Information Products              | 9.31         | 5.52         | 3.79         | 0                 | 0                 | 0                 | 1,254,806         | 985,151           | 269,655           |
| Research and Analysis             | 1.00         | 1.02         | -0.02        | 62,532            | 80,000            | -17,468           | 747,795           | 799,201           | -51,405           |
| <b>Information - Total</b>        | <b>10.31</b> | <b>6.54</b>  | <b>3.77</b>  | <b>62,532</b>     | <b>80,000</b>     | <b>-17,468</b>    | <b>2,002,601</b>  | <b>1,784,352</b>  | <b>218,249</b>    |
| Internal Technical Infrastructure | 14.78        | 6.20         | 8.58         | 390,978           | 353,200           | 37,778            | 2,472,811         | 1,903,032         | 569,779           |
| Finance and Business Services     | 11.45        | 10.14        | 1.31         | 9,244             | 30,000            | -20,756           | 2,353,479         | 2,207,847         | 145,632           |
| Employee Experience               | 5.69         | 4.65         | 1.04         | 0                 | 2,160,000         | -2,160,000        | 2,137,539         | 1,945,989         | 191,550           |
| Governance                        | 1.96         | 2.76         | -0.80        | 0                 | 0                 | 0                 | 1,065,271         | 1,133,807         | -68,536           |
| <b>Capability - Total</b>         | <b>33.88</b> | <b>23.75</b> | <b>10.13</b> | <b>400,222</b>    | <b>2,543,200</b>  | <b>-2,142,978</b> | <b>8,029,100</b>  | <b>7,190,675</b>  | <b>838,425</b>    |
| <b>Total</b>                      | <b>96.70</b> | <b>93.00</b> | <b>3.70</b>  | <b>492,566</b>    | <b>2,741,350</b>  | <b>-2,248,784</b> | <b>22,819,252</b> | <b>25,503,657</b> | <b>-2,684,404</b> |

Note: Some numbers presented in this chart may not add up precisely to the totals provided due to rounding.



## STATEMENT OF FINANCIAL POSITION

For a better understanding of APNIC Pty Ltd's financial position and performance, as represented by the results of its operations for the financial year ended 31 December 2020, the statement of financial position, and statement of income, should be read in conjunction with the annual statutory financial report and the audit report contained therein.

|                                 | 2021 (AUD)        | 2020 (AUD)        | % change   |
|---------------------------------|-------------------|-------------------|------------|
| <b>Assets</b>                   |                   |                   |            |
| <b>Current assets</b>           |                   |                   |            |
| Cash and cash equivalents       | 7,065,707         | 7,081,222         | 0%         |
| Trade and other receivables     | 5,340,114         | 5,356,419         | 0%         |
| Other current assets            | 973,041           | 780,654           | 25%        |
| <b>Total current assets</b>     | <b>13,378,862</b> | <b>13,218,295</b> | <b>1%</b>  |
| <b>Non-current assets</b>       |                   |                   |            |
| Financial assets                | 36,728,127        | 31,036,408        | 18%        |
| Property, plant and equipment   | 6,726,988         | 6,948,694         | -3%        |
| <b>Total non-current assets</b> | <b>43,455,115</b> | <b>37,985,102</b> | <b>14%</b> |
| <b>Total assets</b>             | <b>56,833,977</b> | <b>51,203,397</b> | <b>11%</b> |

## Liabilities

|                                      |                   |                   |            |
|--------------------------------------|-------------------|-------------------|------------|
| <b>Current liabilities</b>           |                   |                   |            |
| Trade and other payables             | 1,535,635         | 1,369,013         | 12%        |
| Employee benefit liabilities         | 2,700,030         | 2,233,396         | 21%        |
| Unearned revenue                     | 12,243,100        | 11,885,376        | 3%         |
| <b>Total current liabilities</b>     | <b>16,478,765</b> | <b>15,487,785</b> | <b>6%</b>  |
| <b>Non-current liabilities</b>       |                   |                   |            |
| Deferred tax liabilities             | 1,126,296         | 1,131,984         | -1%        |
| Employee benefit liabilities         | 383,353           | 406,744           | -6%        |
| <b>Total non-current liabilities</b> | <b>1,509,649</b>  | <b>1,538,728</b>  | <b>-2%</b> |
| <b>Total liabilities</b>             | <b>17,988,414</b> | <b>17,026,513</b> | <b>6%</b>  |
| <b>Net assets</b>                    | <b>38,845,563</b> | <b>34,176,884</b> | <b>14%</b> |

## Equity

|                     |                   |                   |            |
|---------------------|-------------------|-------------------|------------|
| Contributed equity  | 1                 | 1                 | 0%         |
| Retained earnings   | 38,845,562        | 34,176,883        | 14%        |
| <b>Total equity</b> | <b>38,845,563</b> | <b>34,176,884</b> | <b>14%</b> |



## STATEMENT OF INCOME

|                                                                          | 2021 (AUD)        | 2020 (AUD)        | % change   |
|--------------------------------------------------------------------------|-------------------|-------------------|------------|
| <b>Revenue</b>                                                           |                   |                   |            |
| Membership fees                                                          | 24,252,513        | 22,766,728        | 7%         |
| Non-member fees                                                          | 257,209           | 260,483           | -1%        |
| Reactivation fees                                                        | 22,400            | 18,400            | 22%        |
| Sign-Up fees                                                             | 302,750           | 347,250           | -13%       |
| Transfer fees                                                            | 244,156           | 216,016           | 13%        |
| Sundry income                                                            | 444,336           | 534,307           | -17%       |
| Foreign exchange gain/ (loss)                                            | 32,136            | -72,448           | -144%      |
| <b>Operating revenue</b>                                                 | <b>25,555,500</b> | <b>24,070,736</b> | <b>6%</b>  |
| Investment income                                                        | 865,457           | 924,590           | -6%        |
| <b>Total revenue</b>                                                     | <b>26,420,957</b> | <b>24,995,326</b> | <b>6%</b>  |
| <b>Expenses</b>                                                          |                   |                   |            |
| Communication expenses                                                   | 634,015           | 697,060           | -9%        |
| Computer expenses                                                        | 1,514,824         | 1,216,809         | 24%        |
| Contribution to APNIC Foundation                                         | 0                 | 760,890           | -100%      |
| Contribution to ICANN                                                    | 197,515           | 223,432           | -12%       |
| Depreciation expense                                                     | 652,409           | 707,658           | -8%        |
| Meeting and training expenses                                            | 88,786            | 135,335           | -34%       |
| Office operating expenses                                                | 367,000           | 290,543           | 26%        |
| Professional fees                                                        | 2,212,253         | 1,932,613         | 14%        |
| Salaries and personnel expenses                                          | 15,707,940        | 14,070,813        | 12%        |
| Sponsorship and publicity expenses                                       | 315,397           | 437,724           | -28%       |
| Travel expenses                                                          | 65,455            | 331,259           | -80%       |
| Other operating expenses                                                 | 1,063,656         | 978,134           | 9%         |
| <b>Total expenses</b>                                                    | <b>22,819,250</b> | <b>21,782,270</b> | <b>5%</b>  |
| <b>Operating surplus</b>                                                 |                   |                   |            |
| <b>Surplus before tax and fair value gain on financial assets</b>        | <b>3,601,707</b>  | <b>3,213,056</b>  | <b>12%</b> |
| Fair value gain on financial assets at fair value through profit or loss | 1,061,285         | 650,379           | 63%        |
| <b>Surplus before income tax</b>                                         | <b>4,662,992</b>  | <b>3,863,435</b>  | <b>21%</b> |
| Income tax expense                                                       | 5,687             | -411,255          | -101%      |
| <b>Surplus for the year</b>                                              | <b>4,668,679</b>  | <b>3,452,180</b>  | <b>35%</b> |



## CASH FLOW STATEMENT

|                                                           | 2021 (AUD)        | 2020 (AUD)        | % change     |
|-----------------------------------------------------------|-------------------|-------------------|--------------|
| <b>Cash flows from operating activities</b>               |                   |                   |              |
| Receipts from customers                                   | 25,549,754        | 24,574,280        | 4%           |
| Payments to suppliers and employees                       | -19,556,837       | -19,250,306       | 11%          |
| Interest received                                         | 46,080            | 70,754            | -35%         |
| <b>Net cash inflow from operating activities</b>          | <b>4,221,434</b>  | <b>5,394,728</b>  | <b>-22%</b>  |
| <b>Cash flows from investing activities</b>               |                   |                   |              |
| Investment distribution income                            | 828,161           | 853,836           | -3%          |
| Payments for property, plant and equipment                | -442,940          | -517,273          | -14%         |
| Proceeds from sale of property, plant and equipment       | 8,264             | 4,811             | 72%          |
| Purchase of available-for-sale financial assets           | -4,630,434        | -2,683,188        | 73%          |
| <b>Net cash /outflow from investing activities</b>        | <b>-4,236,949</b> | <b>-2,341,814</b> | <b>81%</b>   |
| <b>Net increase/decrease in cash and cash equivalents</b> | <b>-15,515</b>    | <b>3,052,914</b>  | <b>-101%</b> |
| Cash and cash equivalents at the beginning of the year    | 7,081,222         | 4,028,308         | 76%          |
| <b>Cash and cash equivalents at the end of year</b>       | <b>7,065,707</b>  | <b>7,081,222</b>  | <b>0%</b>    |



# Supporters

APNIC acknowledges and thanks the following organizations for their generous support for APNIC conferences and training events.

## SUPPORTERS

(In alphabetical order)

@Tokyo  
Akamai  
Aliter Networks  
AMSIX, Amsterdam Internet Exchange  
APJII, Asosiasi Penyelenggara Jasa Internet Indonesia  
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NSRC, Network Startup Resource Centre  
NYIIX  
Paraqum Technologies  
PHCOLO  
PLDT Enterprise  
Team Cymru  
TWNIC, Taiwan Network Information Centre  
VAS Experts  
Verisign



# Appendix: Events attended in 2021

The following is the list of events in which APNIC staff participated. A star (★) indicates events where APNIC provided sponsorship

| JANUARY                                                             | Economy         | Engagement type     |
|---------------------------------------------------------------------|-----------------|---------------------|
| Webinar: Practical Threat Information Sharing                       | AP              | Training            |
| Live eTutorial: Segment Routing                                     | TW              | Training            |
| MMNOG 4 (2021)                                                      | MM              | NOG                 |
| CWG-Internet Open Consultation                                      | CH              | Internet Governance |
| Live eTutorial: Network Security                                    | Oceania         | Training            |
| Live eTutorial: IPv6 Deployment                                     | South Asia      | Training            |
| Live eTutorial: Securing Internet Routing with RPKI                 | Oceania         | Training            |
| Live eTutorial: Network Security                                    | South Asia      | Training            |
| JANOG 47 ★                                                          | JP              | NOG                 |
| 3rd International Cyber Resilience Conference (CRC)                 | MY              | Security            |
| SANOG 36                                                            | NP              | NOG                 |
| 3rd Meeting of ITU TDAG WG on WTDC Resolutions                      | CH              | Government          |
| 2021 TPPE (Trans-Pacific RandE) Virtual Meeting                     | US              | Development         |
| SANOG: Securing Internet Routing tutorial (RPKI/ROV implementation) | NP              | Training            |
| Outreach/TA - TashiCell                                             | BT              | Training            |
| IBCAST 2021 Pakistan                                                | PK              | Security            |
| Live eTutorial: Securing Internet Routing with RPKI                 | East Asia       | Training            |
| Live eTutorial: IPv6 Deployment                                     | East Asia       | Training            |
| PTC '21                                                             | US              | Development         |
| FEBRUARY                                                            | Economy         | Engagement type     |
| APEC TEL 62 DSG Meeting                                             | NZ              | Government          |
| 1st IGF 2021 Open Consultations and MAG Meeting                     | CH              | Internet Governance |
| APRICOT 2021/APNIC 51                                               | AP              | APNIC, Training     |
| Live eTutorial: Cryptography Fundamentals                           | East Asia       | Training            |
| NDSS Symposium 2021                                                 | US              | Technical           |
| Live eTutorial: DNS Fundamentals                                    | South East Asia | Training            |
| Samoa Cyber Security Week                                           | WS              | Security            |
| Live eWorkshop: Securing Internet Routing with RPKI                 | PK              | Training            |

|                                                      |                 |                 |
|------------------------------------------------------|-----------------|-----------------|
| MANRS Tech Talk with Tashi Phuntsho                  | AU              | Technical       |
| Live eTutorial: IPv6 Transition Techniques           | PK              | Training        |
| Live eTutorial: Secure Internet Routing              | PK              | Training        |
| APAN 51                                              | PK              | Development     |
| NANOG 81                                             | US              | NOG             |
| Live eTutorial: Securing Internet Routing with RPKI  | IN              | Training        |
| Outreach/TA - u-blox Lahore Pvt Ltd                  | PK              | Training        |
| Outreach/TA - Bank Alfalah Limited                   | PK              | Training        |
| Outreach/TA - Pakistan Software Export Board         | PK              | Training        |
| Outreach/TA - Interwood Mobel Pvt Ltd                | PK              | Training        |
| Outreach/TA - National Telecommunication Corporation | PK              | Training        |
| Outreach/TA - i2c inc                                | PK              | Training        |
| Outreach/TA - CubeXS Pvt Ltd                         | PK              | Training        |
| Outreach/TA - IJ Internet Services (PVT.) Limited    | PK              | Training        |
| Outreach/TA - Pakistan Petroleum Limited             | PK              | Training        |
| Live eTutorial: DNS Fundamentals                     | Oceania         | Training        |
| Live eTutorial: IS-IS Operations                     | East Asia       | Training        |
| Live eTutorial: OSPF Operations                      | South Asia      | Training        |
| Live eTutorial: IPv6 Architecture & Address Planning | South Asia      | Training        |
| Live eTutorial: BGP Fundamentals                     | South Asia      | Training        |
| FIRST Regional Lightning Talk Session                | JP              | CERT engagement |
| Live eWorkshop: Introduction to SDN                  | IN              | Training        |
| DNS-OARC 34 Workshop                                 | US              | Technical       |
| Live eTutorial: OSPF Operations                      | South East Asia | Training        |
| Webinar: Single Sign On (SSO) for Remote Workforce   | AP              | Training        |
| Live eTutorial: Cryptography Fundamentals            | Oceania         | Training        |
| Live eTutorial: IS-IS Operations                     | Oceania         | Training        |



|                                                      |           |                 |
|------------------------------------------------------|-----------|-----------------|
| Live eTutorial: BGP Fundamentals                     | East Asia | Training        |
| APT WTDC21-2 Preparatory Meeting                     | TH        | Government      |
| Live eTutorial: IPv6 Architecture & Address Planning | East Asia | Training        |
| Webinar: Internet Resource Management                | AP        | Training        |
| Informal Experts Group on WTPF-21                    | CH        | Government      |
| APRICOT: Live eTutorial: ROA/RPKI                    | PH        | Training        |
| Root Server System (RSS) Information Sharing         | AP        | Development     |
| APNIC EC Meeting - 22 Feb 2021                       | AU        | Other           |
| bdNOG Policy Discussion for APNIC 51                 | BD        | Member Outreach |

### MARCH

### Economy Engagement type

|                                                                            |                 |                     |
|----------------------------------------------------------------------------|-----------------|---------------------|
| APEC TEL 62 SPSG Meeting                                                   | NZ              | Government          |
| Internet & Jurisdiction Policy Network Toolkit Lounge                      | FR              | Internet Governance |
| BrisSEC21                                                                  | AU              | Security            |
| Live eTutorial: Securing Internet Routing with RPKI                        | South Asia      | Training            |
| CrikeyCon VII ★                                                            | AU              | Security            |
| ICANN 70                                                                   | MX              | Coordination        |
| IETF 110                                                                   | CZ              | Technical           |
| IPv6 Deployment (Intensive) - Vanuatu - Pacific Technical Training Project | VU              | Training            |
| APEC TEL 62 Plenary                                                        | NZ              | Government          |
| ITU RPM-ASP WTDC-21                                                        | TH              | Government          |
| Live eTutorial: Securing Internet Routing with RPKI                        | IN              | Training            |
| Live eTutorial: MPLS Fundamentals                                          | South East Asia | Training            |
| Live eTutorial: 464XLAT                                                    | South East Asia | Training            |
| Live eTutorial: Packet Analysis                                            | South East Asia | Training            |
| ITU 1st Interregional Meeting for WTDC-21                                  | CH              | Government          |
| Live eTutorial: DNSSEC                                                     | AU              | Training            |
| Live eTutorial: Multihoming                                                | AU              | Training            |
| Outreach/TA - Optus                                                        | AU              | Training            |
| Webinar: Identifying Suspicious Traffic with DASH                          | AP              | Training            |
| ITU-T Study Group 13 Meeting 2021                                          | CH              | Government          |
| Live eTutorial: Securing Internet Routing with RPKI                        | CN              | Training            |
| ROA workshop with PH cable operators                                       | PH              | Member Outreach     |
| OECD - 3rd Session of the Working Party on Security in the Digital Economy | FR              | Government          |

### APRIL

### Economy Engagement type

|                                                                                 |            |                                  |
|---------------------------------------------------------------------------------|------------|----------------------------------|
| Live eTutorial: MPLS Fundamentals                                               | East Asia  | Training                         |
| Live eTutorial: BGP OpSec BCP                                                   | South Asia | Training                         |
| Live eTutorial: DNSSEC Fundamentals                                             | South Asia | Training                         |
| Live eTutorial: BGP TE Techniques                                               | Oceania    | Training                         |
| Live eTutorial: 464XLAT                                                         | South Asia | Training                         |
| Live eTutorial: Packet Analysis                                                 | Oceania    | Training                         |
| bdSIG 2021 ★                                                                    | BD         | Internet Governance              |
| Webinar: OTT - Challenges and Technical Evolution                               | AP         | Training                         |
| ARIN 47                                                                         | US         | Coordination                     |
| 5th Meeting of ITU TDAG WG on WTDC Resolutions                                  | CH         | Government                       |
| MPLS - Fiji - Pacific Technical Training Project                                | FJ         | Training                         |
| Outreach/TA - Globe Telecom                                                     | PH         | Training                         |
| HKIGF 2021 (Internet Censorship)                                                | HK         | Internet Governance              |
| SWITCHSEA Welcome Event                                                         | AP         | Foundation Projects              |
| PITA Exposition & Business Forum                                                | FJ         | Membership Development           |
| 35th TWNIC IP OPM                                                               | TW         | NIR Engagement                   |
| 2nd ICANN APAC-TWNIC Engagement Forum 2021                                      | TW         | NIR Engagement                   |
| PCTA e-Tech Show (Convention) 2021                                              | PH         | Membership Development, Training |
| Live eTutorial: Introduction to Suricata Intrusion Detection System             | South Asia | Training                         |
| Webinar: Demystifying ASO                                                       | AP         | Training                         |
| PNG 2021 ICT Summit and Expo                                                    | PG         | Technical                        |
| IPv6 Deployment live eTutorial                                                  | CN         | Training                         |
| Tabletop Exercises for FIRST Fellowship Teams                                   | Global     | CERT Engagement                  |
| Securing Internet Routing with Resource Key Public Infrastructure (RPKI) - PCTA | PH         | Training                         |
| Webinar: Datacentre Power Systems and solutions                                 | AP         | Training                         |
| Talk: Securing the Internet Routing                                             | PH         | Security                         |
| FIRST Cyber Threat Intelligence (CTI) Summit 2021                               | US         | CERT Engagement                  |
| Connectivity Capital Deep Dive: Hybrid Fiber/RF for Creative Deployments        | US         | Foundation Engagement            |
| Marshall Center APCSS 2021                                                      | DE         | Government                       |



## MAY

|                                                                                | Economy         | Engagement type     |
|--------------------------------------------------------------------------------|-----------------|---------------------|
| APNIC 52 Online Fellowships - IPv6 Fundamentals                                | AU              | APNIC, Training     |
| APNIC 52 Online Fellowships - Network Security Fundamentals                    | AU              | APNIC, Training     |
| Webinar: What to Expect in a Cyber Security Assessment                         | AP              | Training            |
| BKNIX Peering Forum 2021 ★                                                     | TH              | Development         |
| APT WTDC21-3 Preparatory Meeting                                               | AP              | Government          |
| WSIS Forum 2021                                                                | CH              | Internet Governance |
| WTPF 2021 (ITU World Telecommunication/ICT Policy Forum)                       | CH              | Government          |
| ThaiNOG 3 ★                                                                    | TH              | NOG, Training       |
| 28th Meeting of the ITU Telecommunication Development Advisory Group (TDAG-21) | CH              | Government          |
| LACNIC 35                                                                      | MX              | Coordination        |
| RIPE 82                                                                        | DE              | Coordination        |
| NZNOG 2021                                                                     | NZ              | NOG                 |
| ITU 2nd Interregional Meeting for WTDC-21                                      | CH              | Government          |
| Digital Transformation - Opportunities for The Downs & South West Region (ACS) | AU              | Member Outreach     |
| Live eTutorial: BGP TE Techniques (2 Parts)                                    | South Asia      | Training            |
| Live eTutorial: IPv6 Security                                                  | South Asia      | Training            |
| Live eTutorial: BGP OpSec BCP                                                  | Oceania         | Training            |
| Live eTutorial: TLS/SSL                                                        | South Asia      | Training            |
| DNS-OARC 35                                                                    | US              | Technical           |
| Telemars Engagement at APNIC                                                   | AU              | Foundation Projects |
| 5th Meeting of the Informal Experts Group for ITU WTPF-21 (IEG-WTPF-21)        | CH              | Government          |
| AusCERT 2021 Conference                                                        | AU              | Security            |
| Live eTutorial: Cyber Security                                                 | South East Asia | Training            |
| AIS'21                                                                         | MU              | Coordination        |
| Live eTutorial: OpenFlow                                                       | South Asia      | Training            |
| ThaiNOG eTutorial: IPv6 Protocol Architecture & Address Planning               | TH              | NOG, Training       |
| Live eTutorial: Cyber Security                                                 | South Asia      | Training            |
| NMM - Tonga - Pacific Technical Training Project                               | TO              | Training            |
| Live eTutorial: DNSSEC Fundamentals                                            | South Asia      | Training            |
| Conference talk: RPKI status in Thailand                                       | TH              | Security            |
| Webinar: Anycast service deployment                                            | AP              | Training            |

|                                                     |    |                 |
|-----------------------------------------------------|----|-----------------|
| Live eTutorial: Securing Internet Routing with RPKI | TW | Training        |
| BTCIRT Community Workshop 2021                      | BT | CERT Engagement |
| ICANN DNS Symposium 2021                            | US | Technical       |
| BTCIRT Community Workshop 2021                      | BT | CERT Engagement |
| ICANN DNS Symposium 2021                            | US | Technical       |

## JUNE

|                                                         | Economy         | Engagement type     |
|---------------------------------------------------------|-----------------|---------------------|
| CSP Threat Landscape 1                                  | Pacific Islands | Security            |
| CSP Threat Landscape 2                                  | Pacific Islands | Security            |
| UNITAR (MY) Security Talk                               | MY              | Security            |
| GFCE Pacific Consultation Meeting 2021                  | Oceania         | Government          |
| ROW #10                                                 | US              | Technical           |
| APNIC 52 Online Fellowships - Routing/RPKI Fundamentals | AU              | APNIC, Training     |
| Live eTutorial: Packet Analysis                         | NP              | Training            |
| Live eTutorial: Cryptography Fundamentals               | NP              | Training            |
| FIRST Annual Conference 2021                            | US              | CERT Engagement     |
| APNIC 52 Online Fellowships - Demystifying SDN          | AU              | APNIC, Training     |
| ICANN 71                                                | NL              | Coordination        |
| RightsCon 2021 ★                                        | US              | Internet Governance |
| APNG Webinar #1                                         | AP              | Technical           |
| ASEAN CyberSecurity Forum                               | MY              | Security            |
| PacNOG 28                                               | FJ              | NOG, Training       |
| bdNOG - NMM live eTutorial                              | BD              | NOG, Training       |
| Live eTutorial : OpenFlow                               | Oceania         | Training            |
| PacNOG: Routing Fundamentals eTutorial                  | FJ              | NOG, Training       |
| bdNOG 13 ★                                              | BD              | NOG                 |
| NIXI Webinar: Digital Economy - expanding footprints    | IN              | Technical           |
| Securing Internet Routing with RPKI live eTutorial      | Oceania         | Training            |
| Live eTutorial: IPv6 Security                           | Oceania         | Training            |
| Live eTutorial: TLS/SSL                                 | South Asia      | Training            |



## JUNE

|                                                                     | Economy         | Engagement type       |
|---------------------------------------------------------------------|-----------------|-----------------------|
| APNIC Routing Security SIG                                          | AP              | Technical             |
| APONet MoU signing ceremony                                         | AP              | Coordination          |
| Live eTutorial: Introduction to Suricata Intrusion Detection System | South East Asia | Training              |
| bdNOG - Segment Routing live eTutorial                              | BD              | NOG, Training         |
| GSMA Mobile World Congress 2021                                     | ES              | Government            |
| ITU 21st Global Symposium for Regulators (GSR-21)                   | CH              | Government            |
| NANOG 82                                                            | US              | NOG                   |
| Fluxxcon 2021                                                       | US              | Foundation Engagement |
| Live eTutorial: Securing Internet Routing with RPKI                 | IN              | Training              |
| Webinar: Hosted vs. Delegated RPKI                                  | AP              | Training              |
| Webinar: Automating and Securing Route Servers with IXP Manager     | AP              | Training              |

## JULY

|                                                                              | Economy    | Engagement type     |
|------------------------------------------------------------------------------|------------|---------------------|
| 6th INTERPOL Global Cybercrime Expert Group (IGCEG)                          | SG         | Security            |
| Live eTutorial - Information Security for System Administrators              | South Asia | Training            |
| Youth IGF Bangladesh 2021 ★                                                  | BD         | Internet Governance |
| Live eTutorial: NMM: Network Documentation with NetBox - SANOG 37            | LK         | Training            |
| TL Security Community Engagement                                             | TL         | CERT Engagement     |
| Consultation: RPKI Consultation and Technical Assistance for PH community    | PH         | Training            |
| INTERPOL Forum on Ransomware                                                 | FR         | Security            |
| Live eTutorial: NMM: Model Driven Programmability - SANOG 37                 | LK         | Training            |
| ITU Emerging Technology Week                                                 | CH         | Government          |
| Live eTutorial: IPv6 Protocol Architecture & Address Planning - SANOG 37     | LK         | Training, NOG       |
| LKNOG 5 (SANOG 37)                                                           | LK         | NOG                 |
| Live eTutorial: Introduction to Suricata Intrusion Detection System-SecTalks | AU         | Training            |
| Honeypots / Threat Sharing Handson - Tonga                                   | TO         | CERT Engagement     |
| SGNOG 8 ★                                                                    | SG         | NOG                 |

|                                                                 |           |                        |
|-----------------------------------------------------------------|-----------|------------------------|
| IETF 111                                                        | US        | Technical              |
| vPhNOG 2.0 ★                                                    | PH        | NOG                    |
| JANOG 48 ★                                                      | JP        | NOG                    |
| SANOG 37 ★                                                      | LK        | NOG                    |
| Live eTutorial: DNS Fundamentals                                | IN        | Training               |
| CommunicAsia 2021                                               | SG        | Membership Development |
| 1st Meeting of the APT Preparatory Group for PP-22 (APT PP22-1) | AP        | Government             |
| Live eTutorial: Securing Internet Routing with RPKI - phNOG     | PH        | Training               |
| Webinar: WiFi Security                                          | AP        | Training               |
| Webinar: APNIC Policy Framework and Development Process         | AP        | Training               |
| Live eTutorial: IPv6 Protocol Architecture & Address Planning   | East Asia | Training               |
| Outreach/TA - RACQ - IPv6 Deployment                            | AU        | Training               |

## AUGUST

|                                                                            | Economy | Engagement type       |
|----------------------------------------------------------------------------|---------|-----------------------|
| A13/SOI Asia Joint Meeting                                                 | JP      | Foundation Project    |
| Webinar: Internet Measurement Tool For the End Users                       | AP      | Training              |
| Webinar: Internet Transit, Peering and the Variants                        | AP      | Training              |
| ASEAN-JAPAN Cyber Security Seminar                                         | TH      | Security              |
| Live eTutorial: Introduction to Suricata Intrusion Detection System - APAN | ID      | Training              |
| Asia Peering Forum 2021                                                    | AP      | Technical             |
| Cambodia CERT Seminar                                                      | KH      | CERT Engagement       |
| Introduction to SDN - Fiji - Pacific Technical Training Project            | FJ      | Training              |
| APAN 52 ★                                                                  | ID      | Development, Training |
| APEC TEL 63                                                                | NZ      | Government            |
| Live eTutorial - IXP Planning & Deployment - PK                            | PK      | Training              |
| Hack In The Box (SIN) 2021                                                 | SG      | Security              |
| India IGF Pre-Event Webinar                                                | IN      | Internet Governance   |
| YouthxPolicyMakers Internet Governance Workshop                            | DE      | Internet Governance   |
| PANDI Meeting 12                                                           | ID      | Technical             |
| 2021 NCERT International Partnership Conference                            | CN      | CERT Engagement       |



## SEPTEMBER

|                                                               | Economy | Engagement type     |
|---------------------------------------------------------------|---------|---------------------|
| World Internet Conference 2021 (Wuzhen Summit)                | CN      | Government          |
| APrIGF 2021                                                   | NP      | Internet Governance |
| IDNIC Special Meeting/APJII National Meeting 2021 ★           | ID      | NIR Engagement      |
| VNIX-NOG 2021 ★                                               | VN      | NOG                 |
| ITU Global CyberDrill 2021                                    | CH      | Security            |
| ITU CWG-Internet Open Consultation                            | CH      | Government          |
| IGF 3rd Open Consultations & MAG Meeting                      | PL      | Internet Governance |
| AP* Retreat 2021                                              | AP      | Coordination        |
| IGF 2021 Townhall - Hybrid Format in Practice                 | CH      | Internet Governance |
| Pacific IGF (PacIGF) 2021 ★                                   | FJ      | Internet Governance |
| APNIC 52                                                      | SG      | APNIC, Training     |
| Live eTutorial: IPv6 Protocol Architecture & Address Planning | LK      | Training            |
| Threat Con 2021 ★                                             | NP      | Security            |
| HKNOG 10.0 ★                                                  | HK      | NOG                 |
| Webinar: Using RIPE Atlas for network diagnostics             | AP      | Training            |
| Webinar: Network Security for IoT & IIoT Environments         | AP      | Training            |
| SEA-IGF 2021                                                  | ID      | Internet Governance |
| Security Workshop National University of Samoa                | WS      | Security            |
| APCERT AGM 2021                                               | AP      | CERT Engagement     |
| 6th Meeting of ITU IEG-WTPF-21                                | CH      | Government          |
| Asia Pacific Youth IGF 2021                                   | AP      | Internet Governance |
| APNIC 52 - NMM live eTutorial                                 | SG      | APNIC, Training     |
| Live eTutorial: Network Security & Packet Analysis - APT CN   | CN      | Training            |
| Network Traffic Measurement and Analysis Conference 2021      | US      | Technical           |

## OCTOBER

|                                         | Economy | Engagement type     |
|-----------------------------------------|---------|---------------------|
| Global IPv6 Summit 2021                 | CN      | Technical           |
| 36th TWNIC OPM                          | TW      | NIR Engagement      |
| ISCR 2021                               | KR      | Security            |
| APIGA 2021                              | KR      | Internet Governance |
| KRCERT/CC APISC Training 2021 (Virtual) | KR      | Security            |

|                                                                                |                 |               |
|--------------------------------------------------------------------------------|-----------------|---------------|
| Cybersecurity Bootcamp for Senior Non-technical Experts                        | ES              | Security      |
| ARIN 48                                                                        | US              | Coordination  |
| ICANN 72 (23rd AGM)                                                            | US              | Coordination  |
| CSP Internet Fundamentals Oct 2021                                             | PW              | Security      |
| Securing Internet Routing with RPKI                                            | AU              | Training      |
| ITU Telecom World 2021 (Digital World)                                         | CH              | Government    |
| GFCE Southeast Asia Regional Meeting 2021 (SICW)                               | SG              | Government    |
| Broadband India Forum Session on IPv6                                          | IN              | Technical     |
| 3rd Interregional Meeting for Preparation of WTSA-20                           | CH              | Government    |
| VBLocalhost 2021                                                               | US              | Security      |
| Suricon2021                                                                    | US              | Security      |
| 8th Meeting of the ITU Telecommunication Standardization Advisory Group (TSAG) | CH              | Government    |
| GSMA Mobile 360 Asia Pacific Policy Leaders Forum                              | AP              | Technical     |
| MANRS Community Meeting                                                        | US              | Technical     |
| UMS Cybersecurity Awareness Seminar                                            | MY              | Security      |
| Live eTutorial: Openflow/SDN                                                   | TW              | Training      |
| LACNIC 36/LACNOG 2021                                                          | CO              | Coordination  |
| ISC2 Security Congress                                                         | US              | Security      |
| Security Sessions with FJ community                                            | FJ              | Security      |
| Cybersecurity Asia 2021 Conference                                             | AP              | Security      |
| IPv6 Protocol, Architecture, Address Planning & Deployment                     | CN              | Training      |
| Philippine International Cybersecurity Conference 2021                         | PH              | Security      |
| Live eTutorial - Introduction to SDN                                           | TV              | Training      |
| Live eTutorial - Information Security for System Administrators                | South East Asia | Training      |
| Y4IT 2021                                                                      | PH              | Technical     |
| btNOG 8 ★                                                                      | BT              | NOG           |
| btNOG: Network Security live eTutorial                                         | BT              | NOG, Training |
| MNNOG: SDN 4-day live eWorkshop                                                | MN              | NOG, Training |
| MNNOG 3 ★                                                                      | MN              | NOG           |
| btNOG: Network Management and Monitoring (NMM) live eTutorial                  | BT              | NOG, Training |
| OSDFCon                                                                        | US              | Security      |



## NOVEMBER

|                                                                           | Economy | Engagement type        |
|---------------------------------------------------------------------------|---------|------------------------|
| NANOG 83                                                                  | CA      | NOG                    |
| PacNOG 29                                                                 | FJ      | NOG                    |
| Marshall Center iPCSS 2021                                                | DE      | Government             |
| AFRINIC 34                                                                | MU      | Coordination           |
| RIPE 83                                                                   | NL      | Coordination           |
| GFCE Annual V-Meeting 2021                                                | NL      | Government             |
| IGF Preparatory Session on Trust, Security, Stability                     | PL      | Internet Governance    |
| Securing Internet Routing with RPKI - VNNIC                               | VN      | Training               |
| Vietnam Youth Internet Governance Forum 2021 ★                            | VN      | Internet Governance    |
| DNS-OARC 36                                                               | US      | Technical              |
| IETF 112                                                                  | US      | Technical              |
| DINR                                                                      | US      | Technical              |
| NetThing 2021                                                             | AU      | Internet Governance    |
| Securing Internet Routing with RPKI                                       | AU      | Training               |
| IIGF (India Internet Governance Forum)                                    | IN      | Internet Governance    |
| inSIG 2021                                                                | IN      | Internet Governance    |
| ID HoneyNet Project 10th Year Anniversary Webinar                         | ID      | Security               |
| Japan Internet Week 2021 ★                                                | JP      | Member Outreach        |
| 7th Meeting of the ITU IEG-WTPF-21                                        | CH      | Government             |
| ITU SG13 Plenary 2021                                                     | CH      | Government             |
| ITU TDAG-21/2 meeting                                                     | CH      | Government             |
| Telecoms World Asia 2021                                                  | TH      | Membership Development |
| Live eTutorial: Network Management & Monitoring                           | TL      | Training               |
| Live eTutorial: IPv6 Deployment                                           | TL      | Training               |
| Live eTutorial: Network Security                                          | TL      | Training               |
| Live eTutorial: Internet Routing                                          | TL      | Training               |
| Live eTutorial: DNS Fundamentals                                          | TL      | Training               |
| Peering Asia 2021v                                                        | AP      | Technical              |
| DNS/DNSSEC live eWorkshop                                                 | AP      | Training               |
| Imagining the Future of Internet Governance Workshop                      | AP      | Training               |
| Webinar: Lightning fast DDoS detection with FastNetMon Community          | AP      | Training               |
| Webinar: Lightning fast DDoS detection with FastNetMon Community (Part 2) | AP      | Training               |

## DECEMBER

|                                                          | Economy | Engagement type     |
|----------------------------------------------------------|---------|---------------------|
| Securing Internet Routing with RPKI - CNNIC              | CN      | Training            |
| Securing Internet Routing with RPKI                      | FJ      | Training            |
| PKSIG 2021 ★                                             | PK      | Internet Governance |
| Women in Networking Series                               | PH      | Technical           |
| Ph Peering Forum: Women in Tech session                  | PH      | Technical           |
| IGF 2021                                                 | PL      | Internet Governance |
| bdIGF 2021 ★                                             | BD      | Internet Governance |
| btCIRT: Network Security Live eTutorial                  | BT      | Training            |
| Bhutan CyberSecurity Week 2021 ★                         | BT      | Security            |
| KHNOG 3 ★                                                | KH      | NOG                 |
| Youth IGF India 2021                                     | IN      | Internet Governance |
| Meetings with APJII/IDNIC                                | ID      | NIR Engagement      |
| APSIG 2021 ★                                             | LK      | Internet Governance |
| FIRST & AfricaCERT Virtual Symposium 2021                | CH      | CERT Engagement     |
| ITU 2nd Interregional Meeting for WTDC-21                | CH      | Government          |
| WTPF 2021 (ITU World Telecommunication/ICT Policy Forum) | CH      | Government          |
| Taiwan LEA Training 2021                                 | TW      | Security            |
| AVAR 2021                                                | AP      | Security            |
| Webinar: RPKI: 2021 in review                            | AP      | Training            |



### Helpdesk

Monday-Friday 09:00-21:00 (UTC +10)

### Postal address

PO Box 3646  
South Brisbane, QLD 4101  
Australia

### Email

helpdesk@apnic.net

### Phone

+61 7 3858 3188

### SIP

helpdesk@voip.apnic.net

### Skype

apnic-helpdesk

**www.apnic.net**

ABN 42 081 528 010