

Annual Report

2008





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APNIC

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Addressing the challenge of responsible Internet resource
distribution in the Asia Pacific region

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▲ Paul Wilson is APNIC's Director General.

Marking 10 years

APNIC relocated to Brisbane in 1998.
Since then...

Staff numbers grew from 6 to 59

Office increased from 218 sq m to 1138 sqm

Membership grew from 191 to 1855

The number of IPv4 /8s allocated per year grew from 0.29 to 5.26

The number of RIRs grew from 3 to 5

The number of rootservers in the region grew from 1 to 36, with APNIC supporting 22

A Message from the Director General

This Annual Report marks the tenth anniversary since APNIC relocated its operations from Tokyo to Australia. It is also 10 years since I joined the organization as Director General in 1998. In the decade since, APNIC has grown consistently, both in size and in the scope of our activities.

Many things have changed at APNIC in that time, but our primary mission "Addressing the Challenge" has not.

We document the many changes at APNIC in our Annual Reports. In this latest report, we again focus on the achievements and developments of the past year. Again, these are considerable.

During 2008, we paid unprecedented attention to the twin challenges of IPv4 consumption and IPv6 adoption, analysing the emerging trends in detail and planning for future scenarios. These topics are now of keen interest to a wide population of stakeholders, as we saw when participating in forums such as OECD, ICANN, ITU, and the IGF.

APNIC continues to play a strong and active role in this sphere, working closely with all the Regional Internet Registries (RIRs) through the Number Resource Organization (NRO) and with others in the Internet community.

Meanwhile, demand for APNIC's core activities continues to accelerate. APNIC remains the most active of the RIRs in terms of IPv4 allocations, and we have never been busier than we were in 2008.

We continued to develop our core service platforms, training services, community liaison efforts, communications programs, and research activities.

In 2008 we also became the first RIR to implement Resource Certification to enhance the security of inter-domain routing

and, in response to community demand, initiated a new program for the support of IPv6 deployment.

Internally, we have continued to improve efficiency through better management systems, improvements to infrastructure redundancy and reliability, and a formal Business Continuity Plan, which nears completion.

APNIC is a member service organization and in the year ahead we will continue to serve our members, listen to them, and respond to their needs. At the end of 2008 we launched the latest formal APNIC survey and we will announce the results at the APNIC Member Meeting in February 2009.

Those survey results will guide APNIC, so that we continue to provide a broad range of services relevant to the needs of our members and the community.

Over these past 10 years, the Internet has seen phenomenal growth, exceeding expectations and becoming a tool that is now taken for granted in all walks of life. It is thanks to the efforts of APNIC staff and the ongoing support we receive from APNIC Members and the broader community that we have been so successful.

Personally, and for APNIC as a whole, it was a very exciting decade. I thank you all for your support and very much look forward to serving you in the future.

Paul Wilson

About APNIC

What is APNIC

As the Asia Pacific Regional Internet Registry (RIR), APNIC's role is to promote the fair distribution and responsible management of IP addresses and Autonomous System numbers. These resources are required for the operation of the global Internet.

APNIC does this according to policies developed in an open, transparent, bottom-up policy development process.

The organization also represents the regional Internet community's interests in global forums and is actively involved in the development of Internet infrastructure throughout the region. We provide training and education services, support technical activities such as root server deployments, and collaborate with other regional and international organizations.

APNIC also acts as a registry of resource holdings, maintaining the public APNIC Whois Database and managing reverse Domain Name System zone delegations.

APNIC is a not-for-profit organization. Membership is open to any stakeholder interested in Internet number resources.

2008 was our fifteenth year of operations. The APNIC Secretariat relocated from Tokyo to Brisbane in 1998.

APNIC structure

Growing membership

APNIC has an active membership base of 1855 (as of 31 December 2008). Members contribute their financial support and participate in a wide range of APNIC sponsored activities.

APNIC Secretariat

The APNIC Secretariat is the administrative organization responsible for providing member services, maintaining the registry functions, facilitating policy development, enforcing APNIC policies, and conducting a range of other executive duties.

In the global arena, the Secretariat had additional responsibilities to the Number Resource Organization (NRO), with APNIC Director General Paul Wilson serving as Chair of the NRO Executive Council.

During 2008, the Secretariat reorganized into four divisions. These are Business, Communications, Services, and Technical.

Executive Council (EC)

The eight-member Executive Council oversees the APNIC Secretariat operations, including the review of budgets and financial reports. APNIC Members directly elect seven EC Members for a two-year term of office. The Director-General of APNIC serves as the one *ex officio* member.

EC Members meet monthly, generally by teleconference. The council also meets face-to-face twice a year during APNIC Meetings. They are not paid for their services.

Bringing the community together

APNIC provides its Members and other stakeholders with channels to share knowledge, build networks, participate in policy development, and learn valuable skills. Stakeholders include industry participants, government representatives, regulators, educators, the media, the technical community, civil society, and other not-for-profit organizations.

The Executive Council of 2008 was as follows:



MAEMURA Akinori (Chair)

General Manager, IP Department, Japan Network Information Center (JPNIC). Serving until March 2010.



Che-Hoo Cheng (Secretary)

Associate Director (Infrastructure), Information Technology Services Centre, The Chinese University of Hong Kong. Serving until March 2010.



Kuo-Wei Wu (Treasurer)

CEO, National Information Infrastructure Enterprise Promotion Association. Serving until March 2009.



Ming-Cheng Liang

Associate Professor, National University of KaoHsiung. Serving until March 2009.



Kusumba Sridhar

President and Managing Director, Vebtel Obconic Internet Protocol Pvt. Ltd. Serving until March 2009.



Wei Mao

Director, China Internet Network Information Center (CNNIC). Serving until March 2009.



Ma Yan

Executive Committee Member, China Education and Research Network (CERNET). Serving until March 2010.



Paul Wilson (*ex officio*)

Director General, APNIC.



▲ Sanjaya is APNIC's Services Area Manager.

2008 Service requests by numbers

APNIC helpdesk statistics

Helpdesk chat requests:	2091
Helpdesk tickets resolved:	8811
Admin tickets resolved:	2581

Applications processed

New Member accounts:	443
New Non-Member accounts	57
Resource requests:	3876

MyAPNIC use

Number unique visitors:	10,299
Number of visits:	23,666

Commitment to Service

Demand for resources and APNIC services continued to accelerate through 2008, making us busier than ever before. Internally, we worked hard to improve service levels and efficiency by upgrading systems and processes to better address the needs of both APNIC Members and the Asia Pacific networking community.

Among the changes made, we worked to streamline the resource request and allocation process, reducing complexity, while also providing greater scrutiny over unusually large requests.

Significant software development work culminated in a major upgrade to the MyAPNIC self-service website, which introduced new features and simplified access for users.

MyAPNIC is a key service-delivery platform, which APNIC continues to enhance as part of our strategic continuous improvement program. In response to member feedback, the secured member service website was updated to enable secure access with a username and password.

The simplified login process expands on the digital certificate access previously required to access the site. Enhanced contact and user management features were added to provide greater control over user access and privileges.

The existing digital certificate security system remains in place for higher privilege changes to protect critical data.

The MyAPNIC upgrade also included new functionality in the form of the Resource Certification hosted signing service discussed on page seven.

At the end of 2008, work began to improve the overall user experience within MyAPNIC, incorporating feedback from member surveys and APNIC meetings. A major redesign of the MyAPNIC user interface, which makes the task of managing Internet number resources easier for members, is now complete and will launch in 2009.

Membership breakdown at end of 2008

Membership tier	Number of members
Extra Large	12
Very Large	30
Large	92
Medium	251
Small	813
Very Small	345
Associate	312
Total Membership	1,855
<hr/>	
Non-members accounts	711
Total	2,566

Process improvement

Increased merger and acquisition activities in the region prompted APNIC to revise the membership and resource transfer guidelines. These changes maintain high levels of accuracy in the number registry, while providing improved flexibility in response to industry demands.

The Asia Pacific region is experiencing rapid and accelerating Internet growth largely due to increased adoption as a result of higher capacity technologies of 3G, xDSL, cable, and WiMax. In response, since March 2008, a large-request escalation process means IPv4 allocations greater than /15 now automatically attract senior APNIC management review to ensure adequate safeguards are in place for correct stewardship of the number resources.

In addition, APNIC also upgraded its internal resource management tools to handle 32-bit Autonomous System (AS) numbers and to maximize IPv6 aggregation using sparse allocation.

Member and stakeholder survey

To better guide our goals and direction, APNIC regularly seeks the advice and input of our members using regional surveys. The 2009 Member and Stakeholder Survey launched in December 2008 and concluded in January 2009.

For the first time, the survey also included specific questions designed to assess the level of IPv6 readiness in the Asia Pacific.

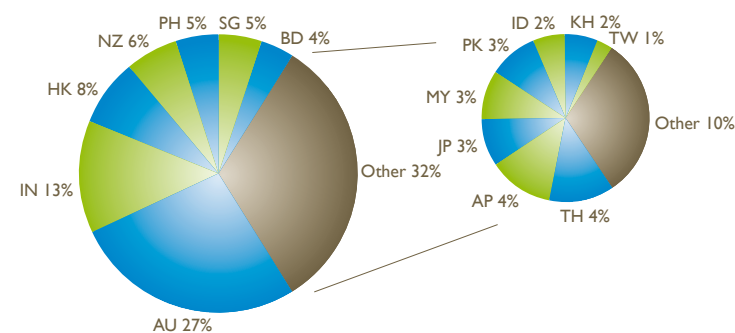
Conducted independently by management consultants, KPMG, the survey sought the opinions of a wider community of stakeholders across the region to include not just APNIC Members but other groups such as educators, the media, regulators, and government representatives.

The survey consisted of an assessment of the following three areas

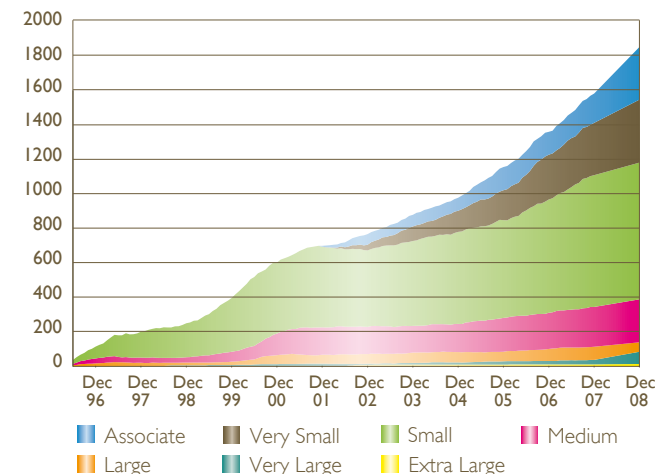
- APNIC's performance
- Future investment for member revenue
- IPv6 readiness in the Asia Pacific region

At the close of the survey, KPMG had received more than 422 completed surveys, an increase of 33 per cent from previous years. Outcomes of this survey, to be released in early 2009, will guide our activities and decisions well into the future.

Geographic distribution of members



APNIC Membership growth





▲ Geoff Huston is APNIC's Chief Scientist.

Key areas of Research and Development

- IPv4 exhaustion

- IPv6 deployment

- Resource certification

- BGP and routing behaviors

- Standards Activities

- Network Measurement and Reporting

- Address Policies & Address use practices

Research and Technical Development

Responding to our last Member Survey, we have positioned technical research and development activities as a high priority and endeavoured to provide more outcomes from research and analysis to the Internet community. This year, we also completed the first phase of the APNIC Resource Certification project.

It is our priority for APNIC to be a source of objective, quality information for the region's stakeholders, network operators and policy makers.

APNIC continues to undertake in-depth analysis of various forms of address distribution to develop potential scenarios that may eventuate over the coming years. Because of the broadening dependence on IP addressing, we have widened our research to include scenarios for address transfers and after-markets.

We are committed to an open framework for collaboration, where researchers, networking professionals and others, are able to contribute to valuable research on the latest Internet issues.

For example, APNIC Chief Scientist, Geoff Huston, worked with Swinburne University of Technology in Australia and Cisco Systems on an investigation of path exploration dampening algorithms in BGP (Boundary Gateway Protocol). This project is intended to inform Internet resource management policy by investigating the scaling properties of inter-domain routing, and quantifying the effects of dis-aggregation on routing stability.

Informing the community

Huston is internationally renowned for his research on IPv4 depletion and IPv6 transition mechanisms and

is referenced globally by mainstream media, technical publications, and bodies such as ICANN, the ITU, and the OECD, including the *Internet Address Space: Economic Considerations in the Management of IPv4 and in the Deployment of IPv6* report published in 2008.

He and other APNIC specialists made several presentations regarding their findings, addressing several stakeholder events within the Asia Pacific region, Europe, and the United States. Much of the data is also available via our website for public use and further research activities.

APNIC research findings inform policy development and assist stakeholders to evaluate the real-world experience of IPv6 deployment and other factors affecting Internet performance. Our ongoing DNS (Domain Name System) measurements related to APNIC's reverse DNS function and the collection of statistics regarding BGP views of number resources, has provided valuable information about the state of the Internet.

The APNIC research team participates in collaborative research projects across the globe and contributes to the technical Internet community through involvement in Internet Engineering Task Force Working Groups (IETF WG). Standardization work continued during 2008, with nine documents progressing in the IETF WG with substantive APNIC authorship.

Geoff Huston was co-chair of the Secure Inter-Domain Routing (SIDR) working Group and the Site-Multihoming in IPv6 (SHIM6) Working Groups. APNIC continues to support Internet standards process development including those activities by the IETF.

In late March 2008, APNIC captured the DNS packetflows to its DNS servers in Brisbane, Hong Kong, and Tokyo for the DITL (Day in the Life of the Internet) project. APNIC contributed 320 GB of data to the project.

Addressing network security

Efforts to secure the components of the Internet's infrastructure have been underway many years. While parts of the Domain Name System are now being secured with the introduction of DNSSEC, securing the use of addresses, particularly in the context of network routing, remains a current topic of study. The APNIC Resource Certification program is a major step in securing IP address resources as part of this broader effort to further secure the global Internet Infrastructure of addresses and routing.

Resource Certification is a new initiative, which aims to improve the security of inter-domain routing. APNIC has worked in conjunction with other RIRs over an extended period and is at the forefront of efforts to secure this part of the Internet infrastructure.

The project proved incredibly complex, requiring the expertise of specialists in IP addressing, networking, and security from across the world to establish a solution that takes into account the dynamic evolution of the Internet.

The first phase of the APNIC Resource Certification project came to fruition in 2008 with the launch of the upgraded MyAPNIC website that includes GUI-based access to the facility. This work forms an important foundation in routing security, which is seen as becoming

increasingly important as more, and more transactions occur over the Internet.

Resource Certificates extend the public key certification model in a way that allows resource holders to affirm their 'right-of-use' and enables them to encrypt or sign routing instructions in such a way that other operators have a high degree of confidence that a routing request is legitimate.

This confidence is achieved with a combination of certification of resource holdings via Resource Certificates, and a validation structure for such certification in the formation of a Resource Public Key Infrastructure (RPKI).

A new operations platform, including hardware-backed key security modules and equipment, significantly enhanced the certification framework. In 2009, this platform will be used to create a high-trust certificate over APNIC resources. Our certificate authority framework investments benefit both resource certification and user identity certificates, which are already mandated for high trust activity with APNIC web services.

APNIC will develop the digital certificate system further in 2009 to include client-verification tools.

In addition to Geoff Huston's contributions as co-chair of the Secure Inter-Domain Routing (SIDR) working Group and the Site-Multihoming in IPv6 (SHIM6) Working Groups, APNIC contributed to the Internet standards process with the following RFCs.

RFCs published in 2008, APNIC staff authors

- RFC 5398 Autonomous System (AS) Number Reservation for Documentation Use (Huston)
- RFC 5396 Textual Representation of Autonomous System (AS) Numbers (Huston & Michaelson)
- RFC 5158 6to4 Reverse DNS Delegation Specification (Huston)

"The cost of migrating the Internet infrastructure to IPv6 is significant considering the global scope of the task, but the cost of not making this investment will be far higher."

"Part of the problem with working on security-related activities is that it's simultaneously everyone's problem and no one's problem."

Geoff Huston, Chief Scientist, APNIC



▲ Byron Ellacott is APNIC's Technical Area Manager.

Technical Area milestones in 2008

- MyAPNIC username login
- Meeting registration system upgrade
- Sparse algorithm for IPv6 allocations
- Resource Certification signed route announcements
- AS-plain/4-byte ASN request support
- Reverse DNS web service for NIRs

Technical Innovation

Continuous improvement

In 2008, the technical area at APNIC underwent some reorganization with the appointment of a Technical Area Manager to the Executive Team. Previously, this function was under the control of the Services Area Manager.

With this reorganization, all publicly visible and internal systems were brought under the same area as software development and separated from specific member facing services functions, such as Hostmasters and Helpdesk support.

During the year, the technical area undertook significant reviews of the systems and operating procedures to verify that best practices are observed across all levels of the APNIC computing systems area.

In accordance with our continuous improvement objectives, significant reviews of our internal monitoring systems, network architecture, and business-critical infrastructures will lead to increasing availability through 2009.

IPv6 network enhancements

In 2008, APNIC established several native IPv6 peering agreements and added a new IPv6 tunnel to the United States. Several improvements were made to IPv6 routing configuration, particularly with regard to IPv6 tunnel stability. APNIC is reachable via IPv6 for web, email, and DNS services, as well as for the Joint Whois service. Additional services will become IPv6-enabled during 2009.

Network reliability

APNIC is using a co-location facility to ensure greater robustness of services. By the end of 2008, this facility housed most of our externally-visible services and their dependencies. Ongoing work at both the network and applications levels, through the last quarter of 2008 and into 2009, continues to increase the availability of our services.

TTM and NTP services

In early 2009, APNIC will participate in the European Internet registry, RIPE NCC's, Test Traffic Measurements (TTM) service by delivering the service for use in the Asia Pacific region. This will offer greater visibility and measurement of network conditions in our region.

Additionally, APNIC will begin providing Network Time Protocol (NTP) Stratum One time servers through the region, providing high accuracy clock services to APNIC Members.

Root server collaboration

APNIC continued its root server collaboration assisting Netnod/Autonomica AB to establish an I-root nameserver in Colombo. The mirror is the first root server deployed in Sri Lanka and will bring significant improvements in speed and reliability to Internet users in Sri Lanka and the surrounding region.

Proactive Communications

Each year, APNIC's role as a key Asia Pacific region information source evolves and our communications strategy must evolve with it. We can no longer focus solely on our traditional members; we must include other stakeholders, such as government and civil society organizations.

During 2008, the units comprising the Communications Area aligned in a coordinated effort to deliver common and institutional messages to our new and existing stakeholders. We adjusted training content, facilitated policy discussions, and prepared messaging to accord with these new sector and stakeholder groups.

Critical period

The Internet is reaching a crucial point in its short life; the transition from IPv4 to IPv6 addressing has become more imperative, with predictions reporting the imminent exhaustion of IANA's pool of available IPv4 addresses. Soon, IPv6 addresses will be the only resource at hand, and in preparation, organizations must be strongly encouraged to initiate plans for IPv6-based networks.

Through 2008, APNIC's online and print publications focused on highlighting transition issues and informing stakeholders how the current situation could affect them. A detailed marketing and public relations strategy is in place to provide this information and to assist them in making decisions about how and when to transition to IPv6.

Our latest APNIC Member and Stakeholder Survey sought information from a broader range of stakeholders and included information on IPv6 readiness. The results of the survey, coupled with our current activities, will allow

us to refine our strategies to reflect the interest and concern of all interested parties in the region.

Awareness program

APNIC's efforts to raise awareness included activities in different forums, such as regional and national Network Operators' Group (NOG) meetings, IPv6 Summits, and non-traditional stakeholder forums, such as the ITU Telecom Asia conference in Bangkok, Thailand; the OECD Ministerial Meeting in Seoul, South Korea; and at The Internet Governance Forum in Hyderabad, India. APNIC also arranged for a number of world-class Internet specialists to speak at these events.

Policy response

APNIC's policy facilitation efforts resulted in new policies, which aim to address the depletion of the IPv4 address pool, make it possible for small organizations to receive their own IPv4 address space, and to assist organizations in qualifying for IPv6 addresses. Internally, a new unit will develop and execute an IPv6 education program to assist the Asia Pacific transition.

We are increasing stakeholder communication by expanding our efforts to encompass a greater range of media outlets with a goal to inform stakeholders about the key issues affecting Internet number resourcing.



▲ German Valdez is APNIC's Communications Area Manager.

APNIC in the global community

NRO

- Paul Wilson as NRO Chair

International forums

- OECD: Geoff Huston quoted in OECD report, spoke at forum
- ITU: Booth for the Asia Pacific Internet Community, Paul Wilson spoke on Internet issues in developing economies including IPv4 exhaustion and IPv6 depletion
- IGF: Booth with NRO, organized "Challenges facing Internet operators in developing countries workshop", Paul Wilson a panelist at several workshops, German Valdez addressed closing session.
- ICANN: APNIC executives attended/presented at the three ICANN meetings in 2008.



▲ Miwa Fujii is APNIC's IPv6 Program Manager.

APNIC IPv6 Program

A new position launched in August 2008 to answer the needs raised by the APNIC community

Representing APNIC's IPv6 stance

- Global IPv6 Summit in China
- Global IPv6 Summit in Korea
- Global IPv6 Summit in Taiwan
- Philippine IPv6 Summit
- Australian IPv6 Summit
- Thailand IPv6 Summit

Collaborating with the community

- MoU with Taskforce on IPv4 Address Exhaustion in Japan
- Participate in the Asia Pacific IPv6 Task Force

IPv6 Program: Supporting Transition

APNIC introduced a new initiative, the IPv6 Program, in August 2008 as part of our response to the community's requests for assistance in transitioning smoothly to IPv6.

APNIC acknowledges the adoption of IPv6 as the optimal future outcome for the Internet. We recommend network operators and service providers begin planning for this transition as soon as practically possible so they are able to provide IPv6 support and IPv6 services by 2010.

APNIC is uniquely placed to facilitate information sharing and education across the Asia Pacific.

The objectives of the IPv6 Program are to:

- **Gather** empirical data about IPv4 unallocated address space exhaustion and IPv6 transition.
- **Monitor** technical developments in relation to methods to cope with IPv4 unallocated address space exhaustion and IPv6 transition.
- **Research** the best practices with regard to IPv6 transition mechanisms and technologies.
- **Distribute** reports that address the information requirements of each stakeholder within the Asia Pacific Internet community.
- **Collaborate** with national and regional organizations through strategic alliances that can help bring our messages to the community.

The IPv6 Program supports the community through various outreach activities and the distribution of practical information customized for a variety of stakeholders, such as ISPs, content providers, enterprises, vendors, end users, and governments and regulators.

APNIC also provides an IPv6 Program wiki, where community members are able to share information,

monitor technical developments, take part in deployment surveys, or see the results of quantitative and qualitative analyses of IPv6 deployment progress.

The wiki also provides a forum where the community can exchange their IPv6 implementation experiences, ask questions, or discuss issues and collaborate to find solutions to technical or other challenges.

Alliances with other IPv6 related organizations provide an opportunity for APNIC to present its views on IPv6 transition and to support each other's activities through effective information exchange. The program also initiates small-scale regional meetings to deliver customized information to different stakeholders by collaborating with local leaders.

Number of IPv6 routes announced to the global Internet



▲ This table indicates accelerating growth in the number of IPv6 routes announced in the global routing table since mid-2007. Active BGP entries reached 1600 for the first time in December 2008. (Source: www.potaroo.net)

APNIC Community Events

APNIC meetings represent a significant opportunity for regional stakeholders to learn, discuss, and make decisions about important operational issues facing the Asia Pacific Internet community.

Meeting highlights

In 2008, we held two meetings:

APNIC 25

APNIC 25 was held in conjunction with the APRICOT (Asia Pacific Regional Internet Conference on Technologies) 2008 in Taipei, Taiwan and was hosted by the Taiwan Network Information Centre (TWNIC).

At this meeting, APNIC hosted our inaugural Internet governance meeting, titled *Partnership toward IGF in Asia*, which included a dynamic program that provided a forum for the discussion of current governance issues and generated significant positive feedback. This forum was co-sponsored by ISOC and this event will be a regular feature of future APNIC meetings.

APNIC 26

InternetNZ hosted APNIC 26 in Christchurch, New Zealand. The first APNIC meeting convened in New Zealand and the event broke participation records for a stand alone meeting with more than 230 people in attendance. We introduced the *IPv6 Hour* to the meeting program, which provided an opportunity for delegates to get firsthand experience running IPv6 on the conference network.

These APNIC meetings saw the achievement of new milestones in terms of participation, both on site and remotely.

Remote participation

A key objective determined by the member survey was to expand avenues for participation at APNIC meetings.

Online participation

A new web-based remote participation space, which allowed multiple participation tools to be available on the one screen, registered nearly 2000 page views the week of the APNIC meeting in Christchurch.

Online access tools for APNIC meetings:

- Live video
- Live audio
- Live transcription
- Online chat

Remote participation events

In addition, APNIC conducted two remote participation events during the policy day at APNIC 26. Vietnam Network Information Centre (VNNIC) hosted one event in Hanoi, Vietnam, while the Advanced Science and Technology Institute (ASTI) hosted the other in Manila, Philippines. Delegates were able to participate in and interact with the Christchurch meeting using videoconferencing facilities. APNIC's regional liaisons attended the remote participation events to provide personal, onsite assistance.

APNIC Fellowship Program

The APNIC Fellowship Program offers financial assistance to enable people in selected economies to attend APNIC meetings. There were 12 fellows selected for APNIC 26 from Bhutan, the Cook Islands, the Federated States of Micronesia, Fiji, Samoa, Singapore, Kiribati, Mongolia, and Papua New Guinea.



▲ Vivian Yang is APNIC's Events Manager.

APNIC 25

Overall participants (including APRICOT) 395

APNIC Member Meeting 132

APNIC 26

Overall participants 237

Remote event participants 45

Remote online page views 1887

2009 meeting schedule

Manila, Philippines on 23-27 February (hosted by ASTI)



Beijing, China on 24-28 August 2009 (hosted by CNNIC)





▲ Samantha Dickinson is APNIC's Policy Development Manager.

In 2008, the APNIC community:

Considered 17 policy proposals

Reached consensus on 8 policy proposals

Implemented 3 new policies

Approved 3 more for 2009 implementation

Participated in 2 global policies

Held over 4 proposals for further discussion

Prominent Year for Policy Development

Policies are developed by the APNIC Membership and the broader Asia Pacific Internet community. APNIC develops policies according to a formal policy development process (PDP) at face-to-face meetings and in mailing list discussions.

Face-to-face policy development forums take place twice each year. APNIC stages these meetings at various locations throughout the Asia Pacific and provides remote participation facilities to make the policy development process more accessible for all stakeholders.

APNIC documents all policy discussions and decisions to provide complete transparency of the policy development process.

2008 policy environment

2008 was a very busy year for policy discussions, with 17 policy proposals being discussed during the year.

Predictions the unallocated IPv4 pool will reach exhaustion within the next five years meant that in 2008, APNIC policy discussion was dominated by proposals aiming to

make the management of the remaining IPv4 addresses more equitable and effective. Some of the proposals were intended solely for use in the APNIC region, while other proposals were designed to become policies that would be coordinated amongst other RIRs as well.

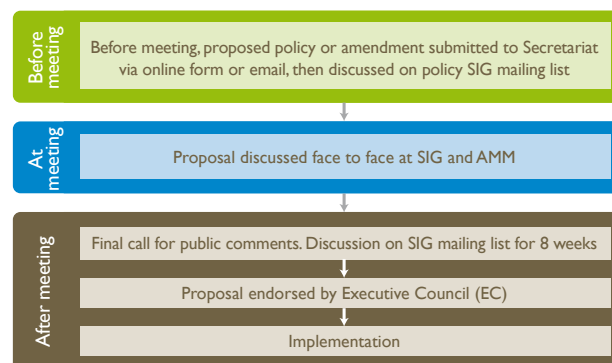
The APNIC community's role in developing policy at regional and global levels

As the Internet addressing communities in the different regions examine different ways to best address the depletion of the IPv4 pool, it is useful to understand how policies can be coordinated or differ across regions.

Often, the policies developed through the APNIC PDP are specific to the APNIC region. Such regional policies are completely independent from, but may be similar to, policies in other RIR regions.

Sometimes, the addressing community may prefer that a certain policy issue be dealt with on a wider scale. In such cases, the communities of two or more RIRs work within each RIR's PDP to coordinate policy development across regions.

Occasionally, there are policies that cannot be independently implemented by an RIR, for example, a policy governing addressing activities of IANA or ICANN. Such global policies are first adopted by each RIR using their regional PDP. When every RIR community has adopted the policy, the policy enters the formal global policy development process defined by the Address Supporting Organization (ASO). After the ASO has endorsed the proposal, and the ICANN Board of Directors has ratified the policy, it becomes an active global policy.



APNIC implemented the following policies in 2008:

- **prop-053: Changing the minimum IPv4 allocation size to /22**
The minimum IPv4 allocation size was reduced from /21 to /22.
- **prop-054: NIR operational policy document revision**
The document now includes a reference to ip6.arpa and updated reverse DNS processes.
- **prop-057: Proposal to change IPv6 initial allocation criteria**
Current LIRs with an existing IPv4 allocation from APNIC or an NIR can now justify an IPv6 initial allocation without documenting a plan for making 200 assignments.

The APNIC EC endorsed following policy proposals for implementation in early 2009:

- **prop-062: Use of final /8**
Each APNIC account holder will be eligible to request and receive a single allocation from the last remaining /8 worth of space in the unallocated pool. In addition, APNIC will reserve a /16 from the final /8 worth of space for future uses, which are as yet unforeseen.
- **prop-064: Change to assignment policy for AS numbers**
From 1 July 2009, requests for a two-byte AS numbers from APNIC will need to document why a four-byte AS number is unsuitable.
- **prop-066: Ensuring efficient use of historical IPv4 resources**
All historical address allocations will be included when assessing a network's eligibility for more IPv4 addresses.

Two proposals reaching consensus during 2008 moved to IETF RFC status:

- **prop-061: Autonomous System Numbers (ASNs) for documentation purposes**
RFC 5398 records the reservation of AS numbers 64496–64511 and 65536–65551 for documentation purposes.
- **prop-065: Format for the delegation and recording of 4-byte AS numbers**
RFC 5396 documents the standard form for representing four-byte AS numbers: Asplain.

APNIC's participation in the global policy development process

In 2008, there were two APNIC policy proposals associated with the global policy process:

- **prop-049: IANA policy for the allocation of ASN blocks to Regional Internet Registries (RIRs)**
The global policy process concluded in 2008 and the policy has been implemented by IANA.
- **prop-055: Global policy for the allocation of the remaining IPv4 address space**
The proposal has been endorsed by the APNIC EC and is awaiting completion of the global policy process.

Policy proposals still under discussion

Three of the four proposals under discussion at the end of the year were responses to the depletion of the remaining unallocated IPv4 pool.

- **prop-050: IPv4 address transfers**
This proposes removing policy restrictions on how IPv4 registration records can be transferred between APNIC account holders.
- **prop-060: Change in the criteria for the recognition of NIRs in the APNIC region**
This is a proposal to update the criteria for recognizing new National Internet Registries (NIRs) in the APNIC region.
- **prop-063: Reducing timeframe of IPv4 allocations from twelve to six months**
This proposes changing the timeframe APNIC uses to make IPv4 allocations to meet LIRs' needs from twelve months to six months.
- **prop-067: A simple transfer proposal**
This proposal is similar to prop-050 above, with the significant difference being that prop-067 requires organizations receiving transfers to justify their need for the space according to current APNIC allocation and assignment criteria.



▲ Cecil Goldstein is APNIC's Training Unit Manager.

2008 APNIC Training team stats:

Training attendees	1480
Training courses run	63
Training locations	27
Number of economies	21
Number of training topics	10

Training Developments

In 2008, APNIC continued to deliver training courses throughout the Asia Pacific, conducting sixty-three courses in 21 economies. The schedule included our first training programs in Brunei and Guam as well as the first training and update session held in Japan, which ran in collaboration with JPNIC (the Japan Network Information Center).

Interactive eLearning

In 2008, we expanded our eLearning interactive capabilities and held our first online web-classes, an IPv6 module, for our members in Mongolia. Further classes will be scheduled on a regional, sub-regional, and economy basis.

In 2009, we will be adding upgraded self-paced training functionality to the eLearning program.

Course development

In response to industry and member needs, we continued to develop and enhance our courses, particularly the Security and Forensics courses, in collaboration with Team Cymru. In 2008, we commenced development of an advanced IPv6 Course, *IPv6 Deployment from Edge to Edge*, and this year are planning a new course 'Internet Operations for Corporates and Enterprises'.

Training lab

Our remote training lab at APNIC's headquarters was enhanced by the inclusion of further functionality, including remote power management and VPN, and we are currently in the process of adding server devices to the topography. These advances will allow the lab to support two parallel training sessions to further improve our training capacity.

We invite our members to access the lab for testing, experimenting, and training, and there has been interest from a range of organizations. In 2008, the lab was used outside the region to host training in Kenya by 6Deploy.

Increased collaboration

We continued to build our already strong association with Team Cymru in 2008 and are developing a Memorandum of Understanding (MoU) to formalize the relationship. We commenced new collaborative initiatives with 6Deploy in the European Union and NAV6 in Malaysia. MoUs are pending with both organizations.

Other collaborative efforts include work with the Pacific Islands Telecommunications Association (PITA) for the delivery of sub-regional training events in the Pacific, and we began discussing the implementation of a pilot *Train the Trainer* program in India with the National Indian Internet Exchange (NIXI).

During 2008, APNIC also assisted the AIT (IntERLab) mobile network deployment following the cyclone disaster in Myanmar as part of Project DUMBO.

Regional APNIC activities in 2008



▲ MoU signing with NZNOG in Christchurch

▼ APNIC Senior Training Specialist, Champika Wijayatunga, in Colombo





▲ Srinivas Chendi is APNIC's External Relations Manager.

APNIC in the Asia Pacific community

Network Operators' Group (NOG) forums

- AusNOG
- CNNOG
- JANOG
- NSP
- NZNOG
- PHNOG
- PaciNET
- PacNOG
- SANOG
- TWNOG

National Internet Registry events and Open Policy Meetings

- APJII OPM
- JPOPM
- TWNIC OPM
- VNNIC

Community events

- PITA

Networking the Community

As part of APNIC's communications strategy, we conduct a yearly program of external relations with stakeholders across the region.

APNIC has four Regional Liaison Officers (South Asia, South-East Asia, Central-East Asia, and the Pacific) and two Liaison Officers (Japan and Taiwan) who are available to provide local cultural and language support to APNIC activities and to collect feedback from local community groups.

In 2008, APNIC contributed to the Asia Pacific Internet community directly through funding, by participating in collaborative activities, and by representing the community at a number of events.

Collaborative activities

In 2008, APNIC signed Memorandums of Understanding (MoUs) with AusNOG, NZNOG, and the Taskforce on IPv4 Address Exhaustion.

We also collaborated with the Pacific Islands Telecommunications Association (PITA) in presenting *Internet Service Fundamentals* and *Network Security & Forensics* stakeholder seminars in Suva, Fiji.

This was the first in a series of similar programs we will conduct around major centres of the Pacific, including Papua New Guinea, Samoa, Tahiti, and Micronesia.

APNIC also hosted CEO lunches in Christchurch, New Zealand and Bangkok, Thailand, to foster relationships with industry decision makers and understand their specific circumstances and needs so we can work together to develop the Internet in the Asia Pacific region.

Finally, participation in several regional forums, summits, and meetings gave APNIC the opportunity to learn more about local conditions and take part in discussions about Internet development.

2008 funding

We provided financial assistance to

- NZNOG
- SANOG
- PHNOG
- PacNOG
- AusNOG
- APAN
- AINTEC
- InternetWeek

Fellowship Program

For the first time this year, we extended the APNIC Fellowship Program to the Internet Governance Forum (IGF) in Hyderabad, India, to enable six APNIC Members to participate in discussions about Internet governance issues that affect multiple stakeholder groups.

Mr Bani Lara

*Advanced Science and Technology Institute (ASTI)
Philippines*

"Thank you for the opportunity that APNIC has given me in attending the IGF 2008 meeting in India. This is really a big help to emerging countries like the Philippines, where travel funds are usually lacking. Rest assured, the knowledge gained in this meeting will be put to good use in terms of the local network problems of our country."

The Information Society Innovation Fund (ISIF)

The Information Society Innovation Fund (ISIF) is a small grants program aimed at stimulating creative solutions to ICT development needs in the Asia Pacific region and is part of APNIC's continuing support for developing economies. It was established with the assistance of the Canadian International Development Research Centre (IDRC), the Internet Society (ISOC), and it is supported by the dotAsia domain registry.

The fund's first round of funding took place during the second half of 2008 with projects receiving up to USD 30,000 each.

In 2009, these grants will advance local and regional projects aimed at introducing, improving, and applying Internet and other digital communications technologies for the benefit of Asia-Pacific users and communities.

The program received 148 submissions from applicants in 22 economies. The majority of the submissions came from South Asia, with Bhutan, Mongolia, Myanmar, Nepal, Papua New Guinea, and Tonga also participating.

The fund is administered from APNIC's head offices and the Grants Evaluation Committee met there on 6-8 October 2008, where it shortlisted 11 proposals.

Those who submitted shortlisted projects attended a workshop in Hyderabad, India on 1-2 December, where they modified the proposals based on feedback received from the ISIF partners and other participants at the workshop. They also explored simple networking strategies to help them establish effective collaboration among the projects.

After the workshop, the group participated at the Internet Governance Forum (IGF) in Hyderabad on 3-6 December 2008.

The 2009 selection of projects to be funded are:

- Development of emergency network training and tools kit - **Internet Education and Research Laboratory (intERLab), Asian Institute of Technology, Thailand.**
- Capacity building of lady health workers in rural areas through the use of ICT and mobile based Tele-Healthcare - **School of Electrical Engineering and Computer Science, National University of Science and Technology, Pakistan.**
- A low-cost digital forensic investigation infrastructure for a third world country - **University of Colombo School of Computing, Sri Lanka.**
- Innovative broadband Internet access for rural areas of Vietnam using WiMAX technology via television broadcasting infrastructure - **Bac Ha International University, Vietnam.**
- VoIP as a model applicable to developing countries - **One Destination Center, Indonesia.**
- Web-based transliteration and translation system between Urdu and Hindi Languages - **Punjabi University, India.**
- High speed backbone for the Nepal Research and Education Network - **Nepal Research and Education Network, Nepal.**
- Efficient e-mail for telecentres and schools - **Department of Computer Science & Engineering, University of Moratuwa, Sri Lanka.**
- Health emergency and disaster information system using mobile and virtual earth technology - **SynapseHealth, The Philippines.**
- Meshing Up Mahavilachchiya - **Horizon Lanka Foundation, Sri Lanka.**
- AirJaldi Bandwidth Maximizer (BwM) – proving concepts, demonstrating potential and viability - **AirJaldi Networks, India.**



▲ Sylvia Cadena is ISIF Program Officer.

Project Endorsements

"Innovative projects, such as the ones funded by ISIF, are a significant driver to Internet and technology growth in our region"

Paul Wilson, Director General, APNIC.

"ISIF helps ensure that local knowledge and experience is directed at tapping the potential of ICTs to address real-world problems with creative, innovative solutions"

Lynn St. Amour, President and CEO, ISOC.

"We hope the ISIF research fund can help illuminate and address the new 'digital divergence' in our region"

Richard Fuchs, Regional Director, IDRC.

ISIF partners and sponsors have confirmed their support for a new round of funding, that will select up to 12 projects during 2009 to be executed during 2010/2011. All the details for the new call for applications will be available at the ISIF website.



▲ Guangliang Pan is APNIC's Resource Services Unit Manager.

IPv4 Demand continued to grow in 2008

Year	IPv4 Allocated
2006	3.09 /8s
2007	4.18 /8s
2008	5.26 /8s

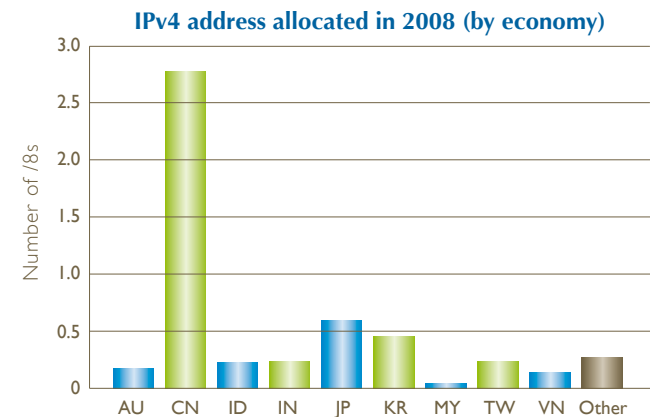
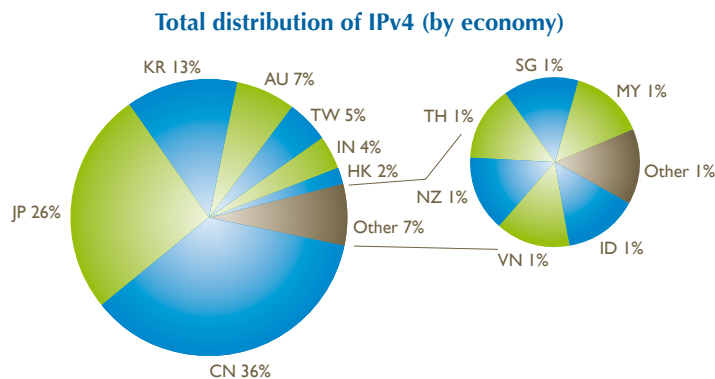
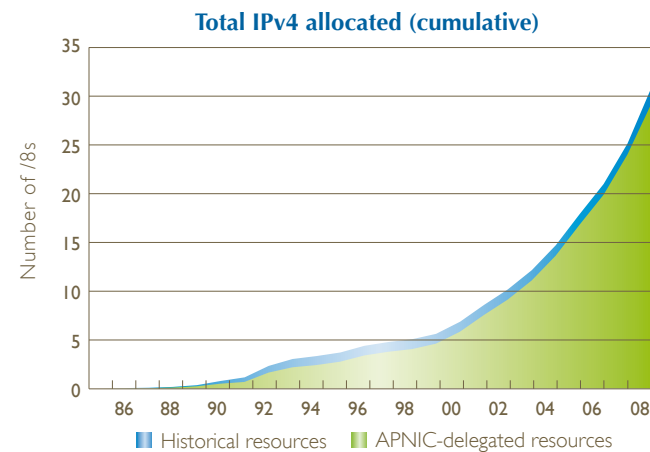
2008 Resource Statistics

IPv4 address update

Japan and China continued to dominate with a combined total of 62% of the address space in the Asia Pacific now concentrated in these two economies. This is the same as in 2007. However, the ratio has shifted towards China. In our last report, China accounted for 32% of the region's address space and Japan 30%. This year those figures are 36% and 26%, respectively.

This is the result of sustained growth in China, which consumed even more address space in 2008 than the year before. This year, APNIC allocated 2.77 /8s to organizations in China, bringing the total allocated space in the region to just over 30 /8s.

Overall, demand continued to accelerate with 3.09 /8s allocated in 2006, 4.18 /8s allocated in 2007 and a total of 5.26 /8s allocated in 2008.



IPv6 address update

After experiencing rapid growth in address allocations through 2003 to 2007, consumption of IPv6 address space slowed in 2008. While 24,172.5 /32s were allocated by the end of 2007, this number had grown only marginally by the end of 2008, 24,317.50 /32s consumed in the year. This decreased consumption does not necessarily indicate a lack of interest. Rather, APNIC policy changes encouraging smaller allocations led to more efficient use of the resource in 2008.

The number of delegations in 2008 compared to 2007 reflects this change. Australia, New Zealand, and Japan were the leading IPv6 economies in 2007, with a combined total of 23 delegations. By 2008, these three economies accounted for a total of 71 of the 153 delegations registered. This is more than the total IPv6 delegations for the entire region in 2007.

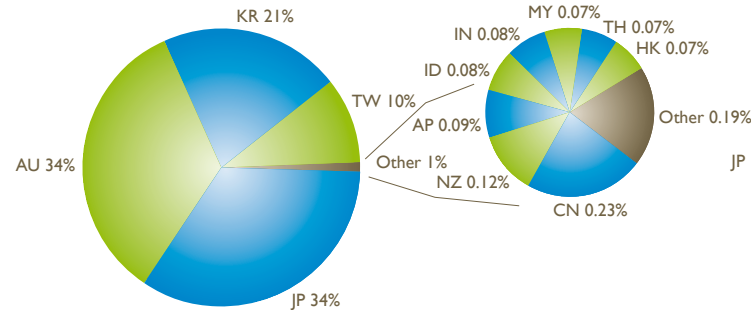
AS numbers

Increased network maturity in the region is leading to a steady increase in the number of Autonomous System numbers in use. AS number allocations reached more than 5000, with over 700 allocated in 2008 alone. Australia, China, and India accounted for nearly 40% of these.

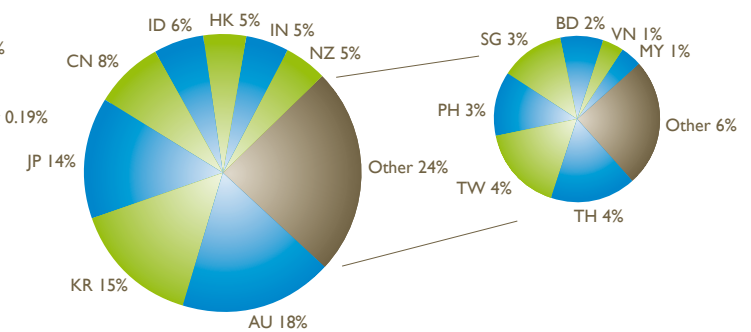
While Korean organizations led the way in 2007, Australian organizations were the most active, with 119 new AS numbers assigned to them in 2008.

In January this year, APNIC began issuing four-byte AS numbers by default. In July 2009, APNIC will assign two-byte AS numbers only if the applicant is able to demonstrate that a four-byte only AS number is unsuitable.

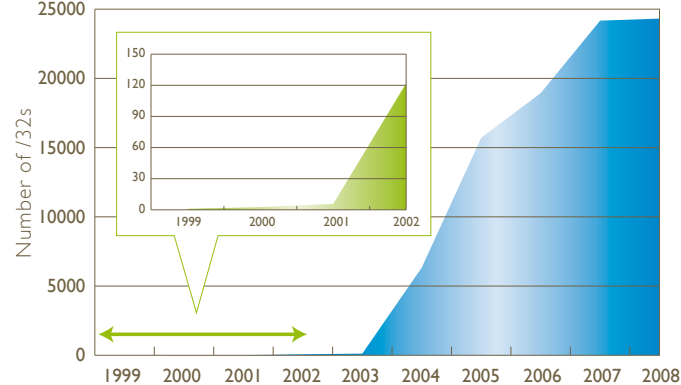
Total distribution of IPv6 (by economy)



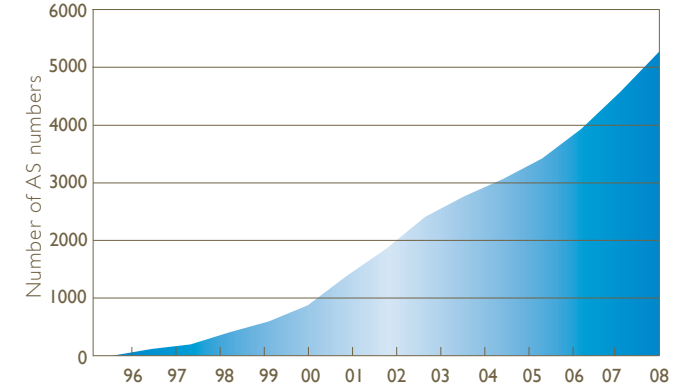
Total distribution of AS numbers (by economy)



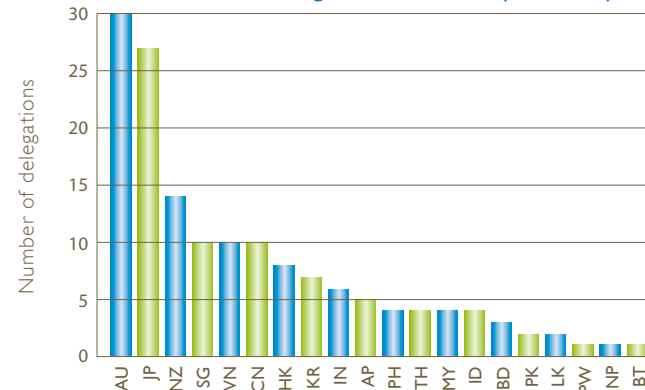
Total IPv6 allocated (cumulative)



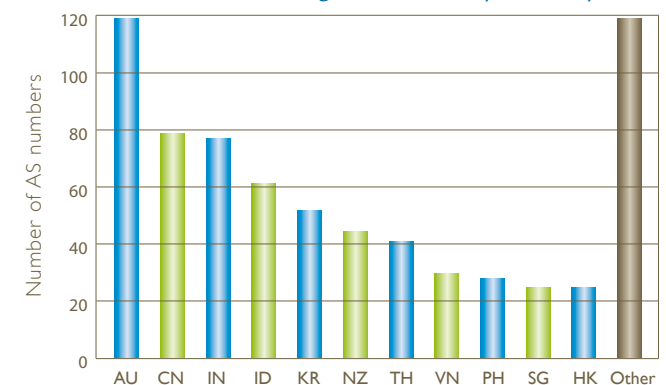
Total AS numbers allocated (cumulative)



IPv6 address delegations in 2008 (by economy)



AS numbers assigned in 2008 (by economy)





▲ Richard Brown is APNIC's Business Area Manager.

The APNIC staff as at 31 December 2008

Secretariat staff	59
Nationalities represented	23
Languages spoken	26

Business Planning and Reporting

Business Continuity Planning

As an integral part of our overall risk management planning, APNIC is developing a formal Business Continuity Plan (BCP). The framework and methodology is based on that used successfully at RIPE NCC. Initial scoping, risk assessment, and project planning were undertaken during 2008. The project team involves staff from across APNIC and is working to finalize a BCP, that will be ready for audit in the middle of 2009.

Managing resources effectively

In 2008 APNIC's staff count was 59, representing 23 nationalities and speaking 26 languages. To ensure APNIC attracts and retains the best staff, we maintain policies and procedures to ensure we not only comply with legislative requirements and manage costs effectively, but provide staff with a positive working experience and work/life balance. During 2008, we have concentrated on reducing the complexity in the policies and procedures in relation to staff recruitment, migration, leave, benefits and allowances, and travel.

Reporting and analysis

APNIC's activity plan provides the basis for the development of APNIC's budget development process. We developed the budget submission for 2009 using a consultative, bottom-up process, according to a zero-based approach. The APNIC EC approved the budget in December 2008. The introduction of new budget reporting tools in 2008 has given APNIC managers the ability to effectively manage their resources and track expenditure effectively.

Financial reporting

Since 1 January 2008, APNIC member fees have been invoiced in Australian dollars. This fee structure change ensures membership fees are now received in the same currency as the majority of APNIC's expenses, greatly reducing APNIC's exposure to exchange rate fluctuations.

The changes in global economic conditions towards the end of the 2008 resulted in significant reduction in the value of equity markets around the world. With the majority of reserves being held in short and long-term cash investments, APNIC's exposure to these factors is limited to its small investments in managed funds. Returns on these cash investments were strong in 2008 as a result of a competitive interest rate market for the majority of the year.

During 2008, there was a continued focus on risk management and the development of processes for more effective monitoring and management of operational expenditure. Overall, the operational expenses for the 2008 year tracked in line with the budget. The write down of APNIC's managed fund investments in 2008 was an extraordinary item that affected the financial performance, which was otherwise in line with budget predictions.

The financial reports presented here summarize APNIC's finances for the 2008 calendar year. These reports are presented in Australian dollars and have been audited by PricewaterhouseCoopers.

Balance sheet

	2008 (AU\$)	2007 (AU\$)	% change from 2007
Current assets			
Cash	6,844,414	6,626,341	3%
Term deposit investment	2,300,000	2,300,000	0%
Receivables	1,753,941	948,481	85%
Other	301,328	111,734	170%
Total current assets	11,199,683	9,986,556	12%
Non-current assets			
Other financial assets	883,201	1,222,666	-28%
Property, plant and equipment	1,708,216	1,667,091	2%
Long term deposit investment	1,700,000	1,700,000	0%
Total non-current assets	4,291,417	4,589,757	-7%
Total assets	15,491,100	14,576,313	6%
Liabilities			
Payables	629,650	1,139,160	-45%
Provisions	985,888	884,794	11%
Unearned revenue	5,383,679	3,817,898	41%
Total liabilities	6,999,217	5,841,852	20%
Equity			
Share capital	1.00	1.00	0%
Reserves	0	90,827	-100%
Retained earnings	8,491,882	8,643,633	-2%
Total equity	8,491,883	8,734,461	-3%
Total liabilities & equity	15,491,100	14,576,313	6%

Notes:

The balance sheet, income statement, and cash flow statement are the consolidation of APNIC Pty Ltd accounts being recorded in AU\$.

For a better understanding of APNIC Pty Ltd's financial position and performance, as represented by the results of its operations and its cashflows for the financial year ended 31 December 2008, the balance sheet, income statement, and cash flow statement should be read in conjunction with the annual statutory financial report and the audit report contained therein.

Income statement

	2008	2007	% change
	(AU\$)	(AU\$)	from 2007
Revenue			
Interest income	771,499	601,512	28%
IP resource application fees	1,053,679	764,637	38%
ISIF grant administration received	154,911	0	0%
Membership fees	6,678,051	6,102,907	9%
Non-member fees	127,336	142,765	-11%
Per allocation fees	1,633,389	1,251,102	31%
Reactivation fees	10,144	11,854	-14%
Sundry income	268,443	212,215	26%
Sub-total	10,697,452	9,086,992	18%
Exchange rate gain/(loss)	71,832	(327,823)	-122%
Total revenue	10,769,284	8,759,169	23%
Expenditure			
Communication expenses	171,713	208,217	-18%
Depreciation expense	638,668	565,075	13%
Donation/sponsorship	128,885	109,099	18%
ICANN contract fees	236,503	243,468	-3%
Impairment investment value	334,821	0	0%
ISIF grant administration expense	154,911	0	0%
Meeting and training expenses	169,293	143,318	18%
Membership fees	58,282	52,706	11%
Other operating expenses	2,101,558	1,657,390	27%
Professional fees	552,659	391,459	41%
Rent and outgoings	614,054	446,076	38%
Salaries	4,252,510	3,882,350	10%
Travel expenses	1,359,756	1,186,740	15%
Total expenditure	10,773,613	8,885,898	21%
Operating loss before income tax expense	(4,329)	(126,729)	-97%
Income tax expense	147,422	109,382	35%
Operating loss after income tax expense	(151,751)	(236,111)	-36%

Cash flow statement

For the year ended 31 December 2008

	2008	2007	% change
	(AU\$)	(AU\$)	from 2007
Cash flows from operating activities:			
Receipts from members and customers	10,892,196	8,790,087	24%
Payments to suppliers and employees	(10,609,776)	(8,602,780)	23%
	282,420	187,307	51%
Interest received	693,066	569,711	22%
Income tax paid	(178,506)	(71,167)	151%
Net cash inflow from operating activities	796,980	685,851	16%
Cash flows from investing activities:			
Payments for property, plant and equipment	(696,935)	(747,640)	-7%
Proceeds from sale of property, plant and equipment	7,269	5,591	30%
Proceeds from sale of available-for-sale financial assets	0	1,314,062	-100%
Net cash inflow/(outflow) from investing activities	(689,666)	572,013	-221%
Net increase in cash held:	107,314	1,257,864	-91%
Cash at the beginning of the financial year	6,626,342	5,696,301	16%
Effects of exchange rate changes on cash	110,758	(327,823)	-134%
Cash reserve at the end of the financial year	6,844,414	6,626,342	3%

APNIC Supporters

APNIC expresses its sincere thanks to the following organizations that have supported our operations, meetings, and training activities in 2008.

Meeting sponsors

- Advanced Science and Technology Institute (ASTI)
- Afilias
- .au Domain Administration Ltd (auDA)
- Canterbury Development Council (cdc)
- Catalyst IT
- China Network Information Center (CNNIC)
- Christchurch City Networks Ltd (CCNL)
- Cisco
- CityLink
- DotAsia
- FX Networks
- Google Inc.
- Hurricane Electric
- International Training Institute
- Internet Corporation for Assigned Names and Numbers (ICANN)
- Internet Society (ISOC)
- InternetNZ
- IPv6Now
- Japan Network Information Center (JPNIC)
- National Internet Development Agency (NIDA)
- Nominum
- .nz Registry
- Pacific Internet Partners (PIP)
- Research and Education Advanced Network New Zealand (REANNZ)

- Taiwan Network Information Center (TWNIC)
- Telstra
- Vietnam Network Information Center (VNNIC)
- VOCUS Group

Operations

- HKIX – for hosting Hong Kong collocation facility
- Nominum – for subsidized software
- Reach – for providing transit for Hong Kong collocation facility
- Telstra – for transit
- WIDE Project – for hosting and transit for the Japan co-location facility

Root server projects

I-root server, Colombo, Sri Lanka

- Autonomica (I-root) – for equipment and technical consultation
- Sri Lankan Telecom – for financial and logistical assistance

Ongoing support

- ISC – maintaining F-root servers
- RIPE-NCC – maintaining K-root servers

ISIF supporters

- The International Development Research Centre (IDRC)
- Internet Society (ISOC)
- DotAsia

Training supporters

- AIT (Asian Institute of Technology) - IntERLab
- AnAnA Computer
- ASTI (Advanced Science and Technology Institute)
- Chittagong Online Limited
- DST Multimedia Sdn Bhd
- Eingtellego
- GTA Telecom
- ISPAI (Internet Service Providers Association of India)
- ITI (International Training Institute)
- KiderNet
- MeekongNet
- Nextgen
- NIXI (National Internet Exchange of India)
- NSA (Noel De Silva Associates)
- NUOL (National University of Laos)
- PITA (Pacific Island Telecommunications Association)
- Reliance Communications
- Republic Polytechnic
- Telecomm Fiji
- TOT Public Company Limited
- University of Dhaka

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