APNIC

Apster

Apster is the quarterly newsletter for APNIC members and the Internet community.

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

www.apnic.net

APNIC and NIDA sign MoU

On 23 March, 2006, APNIC signed a Memorandum of Understanding with the National Internet Development Agency of Korea (NIDA). The agreement was signed in the Brisbane offices of APNIC by Paul Wilson, Director General of APNIC, and Dr. Hyun-Joon Kwon (Manager of International Affairs) and Mr. Jai-Min Shim (Vice President) of NIDA.

The MoU marks an important development in the relationship between APNIC and NIDA, and will result in more opportunities for the two organisations to work together, allowing each organisation to benefit from the knowledge, experience, and complimentary skills of the other. The agreement is non-binding and does not impose any legal obligations on either organisation. It will, however, promote cooperation in areas such as infrastructure development, exchange of information and materials, and joint activities, including seminars, conferences, and training programs.

NIDA began operating in July 2004, taking over the responsibilities of the Korea Network Information Centre, or KRNIC, a founding member of APNIC (though KRNIC remains a department within NIDA, managing the .kr domain and local IP addressing). NIDA acts as a hub organisation for the Internet in Korea, promoting local initiatives in areas such as IPv6, RFID, and third- and fourth-generation mobile telephony. This role makes it an ideal partner for APNIC in connecting with the Internet industry in Korea.

▲ Hyun-Joon Kwon and Jai-Min Shim of NIDA, and Paul Wilson and Connie Chan of APNIC (left to right) at the signing of the MoU in Brisbane, Australia.

For more information on the APNIC/NIDA MoU, and other APNIC partnerships, see:

www.apnic.net/community/partnership.html

For information on NIDA, visit:

www.nida.or.kr

APNIC has established similar agreements with industry bodies throughout the Asia Pacific, including ISP associations in India, Pakistan, Nepal, and Bangladesh, and bodies such as ISOC (including ISOC-AU and PICISOC), PITA, and SANOG.

IPv6 Day marks new chapter in IPv6 development

Developers and promoters of IPv6 celebrated “IPv6 Day” on the well-chosen 6 June 2006. This day coincided with the end of the IPv6 experimental network, the 6bone, and followed soon after withdrawal of ip6.int services in favour of ip6.arpa (both subjects are detailed in this issue of *Apster*).

IPv6 Day also draws attention to the fact that the IETF IPv6 Working Group has now started to advance the core IPv6 specifications to the last step in the IETF standardisation process. The IPv6 Day web site, which celebrates these achievements and links to many other IPv6 resources is available at:

www.ipv6day.org

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22nd APNIC Open Policy Meeting

4 - 8 September 2006 Kaohsiung - TAIWAN

APNIC invites anyone with an interest in Internet address policy to attend the 22nd APNIC Open Policy Meeting (APNIC 22), to be held from 4-8 September, 2006 at the Grand Hi-Lai Hotel in Kaohsiung, Taiwan.

New program format at APNIC 22

APNIC 22 has an innovative program showcasing presentations on operational Internet issues. Two new types of sessions will be added to the APNIC 22 program on Wednesday 6 September:

APOPS (Asia Pacific OperatorS Forum)

Previously a BoF, APOPS will now showcase Internet operational content of wide interest to the community. Most of Wednesday's program will consist of APOPS sessions.

Lightning talks

Lightning talks are a chance for the community to discuss Internet issues and trends that emerge in the weeks before APNIC 22.

Policy proposals will be discussed in the appropriate SIG sessions on Thursday 7 September. Tutorials, Birds of a Feather sessions (BOFs), hostmaster consultations, the APNIC Member Meeting (AMM), and social events will continue to be a part of the APNIC meeting program.

For the latest program information, see:

www.apnic.net/meetings/22/program

Remote participation

As with previous meetings, APNIC will provide a range of remote participation facilities for those unable to attend the meeting in person. Those with an interest will be able to follow events at APNIC 22 in real time via video and audio streaming, online transcripts, and live chat rooms. These features will give users the chance to participate in APNIC 22 sessions in near real time.

For more information on APNIC's remote participation facilities, and how they can enhance your meeting experience, see:

www.apnic.net/meetings/remote

Become an APNIC 22 sponsor

Organisations throughout the region can play an important role in the APNIC meeting by becoming a sponsor. Sponsors will be presented with valuable opportunities to expose their organisation, products, and services to an international audience of Internet leaders, with approximately 150-200 delegates from the region and around the world expected to attend APNIC 22.

By becoming a sponsor, you help to:

- Reduce the financial burden on members attending the Open Policy Meeting;
- Foster stronger, more supportive mutual relationships among member and non-member organisations, and create opportunities for effective communication and sharing of experience;
- Provide opportunities for fellows to network with their peers, gain valuable experience, and meet key people in the Asia Pacific Internet community.

For more information on becoming a sponsor, see:

www.apnic.net/meetings/22/sponsors

More information

Regular meeting updates will be sent to the apnic-announce mailing list over the coming months.

Please send any meeting related enquiries to

meetings@apnic.net

Apster

Have you got an article for *Apster*?

APNIC is on the look-out for new *Apster* articles. If you have an article of your own or an idea for an article, then we'd like to hear about it. Your topic should be of interest to the Internet addressing community and can be about technical developments, practices, or research; address policy; or Internet governance.

A typical *Apster* article could be between 500 and 2,000 words. If necessary, APNIC can help you to edit your article or translate it into English. Depending on the content, APNIC may also be able to help with illustrations, diagrams, or photographs.

Articles and ideas submitted to APNIC will be evaluated on the basis of quality of content, relevance to Asia Pacific addressing community, timeliness, and availability of space.

APNIC is not able to pay for articles, but authors of complete articles will retain full copyright in their work. Although it is not a strict condition for publication, APNIC may also seek the author's permission to publish the article on the ICONS web site.

If you have an article, an idea for an article, or any other question about *Apster*, please contact APNIC at apster@apnic.net.

◀ Kaohsiung, in the south of Taiwan, is the venue for the APNIC 22 OPM in September 2006.

NRO Number Council election

A seat for an Asia Pacific representative on the NRO Number Council will become vacant as of 31 December, 2006, and an election will be held during the APNIC Member Meeting at APNIC 22 for an individual from the Asia Pacific region to fill the position for the next three years.

The NRO Number Council

The Number Council, established in October 2004 under a MoU negotiated between the Number Resource Organization (NRO) and ICANN, is made up of three representatives from each of the five RIRs. Of these three positions, one is filled by the RIR's Board; the person chosen for this position acts as a representative for the RIR, reporting regularly to their Board.

The remaining two positions from each region are selected by the regional policy forum. These members of the Number Council do not represent any RIR, nor do they act as representatives of any other body. They are appointed in their individual capacity, and their membership cannot be proxied by any other individual or organisation.

Under the terms of the MoU, the Number Council performs the role of the Address Supporting Organization Address Council (ASO AC), which includes providing advice to the Board of ICANN on number resource allocation policy, defining procedures for selection of individuals to serve on other ICANN bodies, and undertaking a role in the global policy development.

For a complete description of roles of the Number Council and the ASO Address Council, see NRO web site:

www.nro.net

Nominations

Nominations for this position are due by close of business Tuesday 8 August, 2006. Any individual may be nominated, with the exception of any staff member of any RIR, and self-nominations are permitted.

Nominations should be made using the online nomination form available at:

www.apnic.net/meetings/22/nc

Election process

The election will be held during the APNIC Member Meeting in Kaohsiung, Taiwan, on Friday 8 September, 2006.

There will also be an online voting facility available to APNIC members through MyAPNIC. This will open on Tuesday 29 August and close at 14:00 UTC+8, Friday 8 September. Please note that there will be no proxy voting in this Number Council election.

All APNIC members are entitled to one vote in the NC election, which may be cast in person at the APNIC 22 Member Meeting, or via the online voting facility in MyAPNIC.

Individuals who have been a registered attendee at any APNIC Open Policy Meeting since APNIC 10 (Brisbane, 2000), including APNIC 22, are entitled to one vote onsite in the paper ballot. APNIC staff will verify entitlement using official registration records for these meetings. Individuals who are not registered to attend APNIC 22, but who wish to vote onsite, will need to show photo identification to receive a ballot paper.

*i*ndex

Deprecation of ip6.int

On 1 June, 2006, APNIC ceased all ip6.int reverse delegation services, completing the process of deprecating ip6.int, and replacing it with ip6.arpa. This marked the final stage in a process that was set in motion more than six years ago, and has involved all of the RIRs working closely with their respective communities and each other. This article examines the background to this transition, and the consequences for the Internet community.

Background

Reverse DNS delegations allow applications to map to a domain name from an IP address. This ability is vital to a range of network functions, and is made possible by use of the pseudo-domain names in-addr.arpa (IPv4) and ip6.arpa (IPv6).

In the early days of IPv6 development, however, it was decided that reverse delegations for IPv6 addresses would be maintained under the ip6.int domain. ".int" already existed as a top level domain (TLD), defined in RFC 1591 as being reserved for organisations "established by international treaties, or international databases", and including bodies such as the UN and the ITU.

In 2000, the Internet Architecture Board (IAB) issued a statement calling for all reverse delegations to be brought under the .arpa domain, now considered an acronym for "Address and Routing Parameters Area", rather than its original ARPANET connotation. IPv4 reverse delegations were already mainained under in-addr.arpa, and the IAB argued that it was:

> in the interest of general Internet stability, adequate attention to placement of secondary DNS servers, and administrative cleanliness, to [locate] new infrastructure subdomains in a single domain and migrat[e] existing ones to it as appropriate.
> (IAB Statement on Infrastructure Domain and Subdomains, 2000)

This challenge was taken up by the global Internet community, and in RFC 3152, Randy Bush discussed the need for ip6.arpa, and outlined plans for the technical operation of the new zone. In August 2001, IPv6 reverse delegations began to be placed in ip6.arpa, and ip6.int was deprecated, meaning that no new reverse delegations were placed within it. However, the RIRs continued to provide legacy support for ip6.int delegations.

RFC 4159, published in August 2005, took the further step of recommending that the RIRs no longer maintain the delegation of entries in ip6.int. After consideration at RIR meetings around the world, the RIR communities agreed to end their support of ip6.int on 1 June, 2006.

Deprecating ip6.int

In deciding to discontinue support for ip6.int, it was necessary to ensure that anyone still relying on reverse delegations held in this zone was given ample notice to make the change to ip6.arpa. In the proposal presented at the APNIC 20 Open Policy Meeting in 2005, the following steps were recommended to ensure an orderly cutoff and minimum operational impact:

- Notify the parties who have been sending ip6.int queries to APNIC servers
- Monitor the DNS traffic for ip6.int queries
- Send final reminder to the parties still sending ip6.int queries
- Send public announcements through newsletter, website, MyAPNIC, and mailing lists
- Notify root ip6.int to remove APNIC delegation on the cutoff date (8 days prior to the closure date)
- Remove ip6.int entries in APNIC domain name servers and restart the service
- Report completion of the project in APNIC 22 meeting (September 2006)

In the lead-up to the discontinuation of ip6.int services, the APNIC Secretariat created equivalent ip6.arpa reverse domain objects for all ip6.int reverse domain objects listed in the APNIC Whois Database. These new ip6.arpa reverse domain objects are maintained by the same maintainer as the original ip6.int reverse domain object, however, they do not become visible on global nameservers until the organisation responsible for the delegation has created the appropriate zone files and modified the reverse domain object accordingly.

APNIC ceased all ip6.int reverse delegation services on 1 June, 2006, with the only disruption at the time being a temporary loss of ip6.arpa delegations in Japan. APNIC staff were able to fix the problem with the assistance of JPNIC staff and restored service within two hours.

Possible effects

The discontinuation of ip6.int service means that if your computer performs reverse address look-up, it is vital that it is configured to use ip6.arpa, and not ip6.int. All modern operating systems which support IPv6 now use ip6.arpa, so you should have no difficulty upgrading to a version which supports this domain for reverse DNS resolution.

If any of your systems perform reverse address look-up using ip6.int, then when you receive IPv6 traffic, or need to do reverse DNS look-up on IPv6 for any other reason, your look-up will fail. This can have two consequences:

1. Everything runs slower at connect time: it usually takes up to 30 seconds for the failing request to be logged as having 'timed out' – during this time, your connections are not being processed.

   For example, if you run a web server that attempts to perform a reverse address look-up on every IPv6 request, there will be a 30 second delay for any IPv6 request before the server can continue. This may be a problem for you, or it may be a problem for clients accessing your web server.
2. Because reverse DNS fails, your services may refuse to continue.

   Some higher security services regard reverse DNS failure as an indication of a security or other problem, and will not continue. This may apply to any services, including web, mail, or remote access.

Unfortunately, even if your own IPv6 resources are correctly delegated under ip6.arpa, you may still be affected by this problem if servers you connect to continue to look up addresses under ip6.int. In such cases you should contact the operators of these services and advise them to investigate the problem and, if necessary, upgrade their service to use ip6.arpa for reverse DNS resolution.

If you have any queries regarding the deprecation of ip6.int or reverse delegation in general, please see the resources listed below, or contact <helpdesk@apnic.net>.

Relevant resources

RFC 3152, 'Delegation of IP6.ARPA', August 2001

www.ietf.org/rfc/rfc3152.txt

RFC 4159, 'Deprecation of "ip6.int"', August 2005

www.ietf.org/rfc/rfc4159.txt

Deprecation of ip6.int reverse DNS service FAQ page

www.apnic.net/info/faq/ip6int-faq.html

Guide to reverse zones

www.apnic.net/db/revdel.html

Farewell to the 6bone

The 6bone network played an important role in the development of IPv6. The recent winding up of this testbed closes a chapter in Internet history and gives cause to look to the future.

In 1996, three years before the RIRs first began allocating IPv6 address space, engineers from the IETF's IPng project held a meeting to form the 6bone. This testbed for standards and implementations of the new addressing protocol became officially active later that year, with subsequent oversight from the NGtrans (IPv6 Tranisition) Working Group.

The 6bone's mission was to foster development, testing, and deployment of IPv6. In the beginning, it operated as a virtual network, using tunneling techniques to allow IPv6 transport over the IPv4-based network. In time, though, native IPv6 links were added and the network grew to connect more than a thousand sites around the world.

APNIC itself became a participant in the 6bone in 1998, deploying a test network that connected to the 6bone via Cisco.

RFC 3701 records that the 6bone was first addressed from 5F00::/8, using the original provider based unicast format. That format was replaced in July 1998 with the 'aggregatable global unicast address format', which is now standard, so the 6bone network was renumbered from 3FEE::/16. This new allocation was made on a temporary basis, under RFC 2471, which defined an experimental protocol for IPv6 testing purposes.

In July 1999, the RIRs received their first allocations of public IPv6 address space from IANA. Prior to receiving their allocations, the RIR communities all adopted a common IPv6 policy, a document that had greatly benefitted from the experience of 6bone participants.

As the IPv6 protocol began to mature, the work of the 6bone evolved. Rather than working solely on testing standards and implementations, 6bone participants began to focus more on testing transition practices and operational procedures.

Nevertheless, as more networks around the world received 'real' IPv6 allocations, the need for a separate testbed diminished. In RFC 3701, published in March 2004, Bob Fink and Bob Hinden outlined a plan to phase out the 6bone by (the not so arbitrary date) 6 June 2006 and to return the 6bone address allocations to IANA. In detailing the phaseout plan, Fink and Hinden noted that:

> During its lifetime the 6bone has provided:
>
> - a place for early standard developers and implementers to test out the IPv6 protocols and their implementations;
> - a place for early experimentation with routing and operational procedures;
> - a place to evolve practices useful for production IPv6 prefix allocation;
> - a place to provide bootstrap qualification for production IPv6 address prefix allocation;
> - a place to develop IPv6 applications;
> - a place for early users to try using IPv6 in their hosts and networks.
>
> (RFC 3701, 2004)

The original 6bone web site remains in place as an archive of useful information for IPv6 network operators and researchers. Among the collected resources are links to IPv6 statistics; a range of looking glass, trace route, and other tools; documentation on 6to4 tunnelling practices; BGP data; mailing list archives; and operating system information.

As Bob Fink told the IPv6 Day web site, "after more than ten years of planning, development and experience with IPv6, with efforts from all around the world, it is gratifying for me to see the 6Bone phase-out on the 6th of June 2006, having served its purpose to stimulate IPv6 deployment and experience, leaving IPv6 a healthy ongoing component of the future of the Internet".

But what is the status of the IPv6 network, post 6bone? Although the original take-up of IPv6 was relatively slow outside of certain parts of Asia and Europe, IPv6 is now deployed in 100 countries around the world. Several governments have committed their support to the protocol: the IPv6 Promotion Council of Japan is one well-known example; and the announcement of the US Department of Defense to require all of its services to be IPv6 compliant by 2008 is widely considered as a powerful driver for vendors to increase IPv6 readiness across product ranges.

While some technical challenges remain for the protocol (most notably an effective solution for multihoming), IPv6 is available and used in the real world. All major operating systems and an increasing number of applications are IPv6-enabled by default.

However, as Geoff Huston notes in his article 'IPv6 – Extinction, Evolution or Revolution?' (2006), what is still missing for IPv6 is a genuine demand from customers. While much has been written about the potential technical benefits of IPv6, by far the most significant advantage IPv6 has over IPv4 is the size of the address pool. Until providers begin to see a strong customer demand for IPv6, many may find it hard to make a commercial case for widespread IPv6 deployment.

This is an important point when using the word 'transition' in the IPv6 context. In recent years, the experience of the 6bone participants and other early adopters has made it increasingly clear that transition will not mean turning off IPv4 at any time in the foreseeable future. Rather, the dual-stacking of IPv4 and IPv6 networks is likely to be an enduring feature of the Internet. While noting that "IPv6's basic potential is that of extraordinary volume", Huston argues that it is "likely that IPv6 will need to compete for market share with IPv4, and the basic terms of the competition for the consumer will be price-based competition rather than feature or service-based".

Nevertheless, as Brian Carpenter, author of several IPv6 RFCs told the IPv6 Day web site, "it's very encouraging to see IPv6 moving forward both technically and commercially, with its address assignments now routinely managed by the same registries that look after the rapidly diminishing IPv4 address pool. I look forward to the day the Internet reaches ten billion active nodes with public addresses, which will only be possible with IPv6".

The future of IPv6 is yet to be seen, but the role of the 6bone in helping the protocol get to where it is today is a matter of record.

Sources

6bone web site www.6bone.net

IPv6 Day web site www.ipv6day.org

RFC 3701, '6bone (IPv6 Testing Address Allocation) Phaseout', March 2004
www.ietf.org/rfc/rfc3701.txt

Geoff Huston, 'IPv6 – Extinction, Evolution or Revolution?', The ISP Column, January 2006
www.potaroo.net/ispcol/2006-01/ipv6revolution.html

Open standards and processes on the Internet

Bangkok was host in May 2006 to the "Regional Conference on Open Standards: The Key to an Open ICT Ecosystem". The aim of the conference was to bring together "key players, experts, executives, and policy makers from government, business and academia to discuss and share ideas and experiences on how to adopt and implement open ICT ecosystems effectively". APNIC Director General, **Paul Wilson** gave a presentation entitled "Open Standards and Processes on the Internet", which forms the basis of this article.

A discussion of open standards on the Internet begins with a definition of the Internet itself. In the words of Wikipedia the Internet "is the publicly accessible worldwide system of interconnected computer networks that transmit data by packet switching using a standardized Internet Protocol (IP) and many other protocols."

Rather than being a single, defined entity, the Internet is a multi-cellular, multi-layered system – a complex organism, comprised of many networks and many types of infrastructure, hardware, and applications, all operating independently yet held together by common protocols that allow effective communication from end to end.

The US District Court recognised this arrangement clearly, saying "No single entity ... administers the Internet. It exists and functions as a result of the fact that hundreds of thousands of separate operators of computers and computer networks independently decided to use common data transfer protocols" (1996).

Those common data transfer protocols are standards. They have been agreed upon by the Internet community to form the rules or guidelines which allow interoperability for mutual benefit. Most of the standards that allow the Internet to exist are developed by the Internet Engineering Task Force (IETF) through the Request for Comment (RFC) process which is discussed later in this article. However, other relevant standards come from bodies such as the Institute of Electrical and Electronics Engineers (IEEE), the World Wide Web Consortium (W3C), the International Organization for Standardization (ISO), and the International Telecommunications Union (ITU).

Crucially, the most important standards which allow the Internet to exist are 'open', meaning that they are freely accessible, implementable, and usable without barriers. The degree of openness is not absolute and different standards have different qualities and attributes which contribute to their openness. In many cases there is debate about where openness begins and ends; for instance, some will insist that any open standard must be free of fees while others will admit the possibility of fair and reasonable license fees

The use of open standards means that any vendor or developer can create hardware and software that communicates seamlessly with all the other standard-compliant hardware and software on the Internet. A home user can plug in a new laptop and easily access data or services from networks all over the world, without any knowledge of the details of those networks other than a URL. Networking was not always this easy.

Competing protocols and early standards

Before the Internet, there was a variety of networking protocols available. Many large vendors, such as Digital, HP, IBM, NCR, Novell, Microsoft, Apple, Xerox, and others have all, at some time, developed their own closed, proprietary protocols for networking. While each may offer its own set of advantages or specific features, they cannot of themselves interoperate with the other protocols.

Furthermore, even if other vendors are able to access the protocols – generally by paying substantial license fees – evolution (or potentially extinction) of the protocol is still solely controlled by the original developer and subject to its own internal demands and constraints. So, without a common protocol, there is no Internet, but rather archipelagos of vendor-specific network islands.

An early attempt to standardise networking was the Open Systems Interconnection (OSI) project, started in 1982 by the ISO and the ITU's Telecommunication Standardization Sector (ITU-T). The OSI's abstract seven-layer network model had a profound effect on all Internet development to follow, but the eventual failure of the OSI protocol stack is generally acknowledged to be due to its complexity and the difficulty of implementing it.

In time, the OSI was superseded by Transmission Control Protocol (TCP) and Internet Protocol (IP), together known as TCP/IP, which which was already entrenched as the Internet's defining protocol suite.

TCP, operating at layer four of the OSI model (the transport layer) allows data channels to be reliably established across packet-switched networks (RFC 793). IP, which operates at layer three (the network layer) allows for globally unique addressing of networked devices and the best-effort delivery of packets between those devices (RFC 791).

RFCs, the IETF, and open standard protocols

The history of the TCP/IP protocol suite can be traced back to 1973, when researchers at the Defense Advanced Research Projects Agency (DARPA) in the United States began working on ways to communicate across networks. The very nature of this research required an open cooperative approach and was done within a highly collaborative community environment.

Historically, the time was ripe for this type of cooperation. A core of idealistic young engineers understood the potential benefits of shared knowledge and experience. They openly documented the development of the protocols which would become core Internet standards in Requests for Comments (RFCs), a series of "technical notes" that started in 1969 as part of the Advanced Research Projects Agency Network (ARPANET).

```
traceroute to www.ietf.org (132.151.6.75), 30 hops max, 38 byte packets
 1  fxp1-basil (202.12.29.254)  0.242 ms  0.164 ms  0.146 ms
 2  fe0-0.gw1.apnic.net (202.12.29.114)  0.335 ms  0.287 ms  0.275 ms
 3  fe1-1.gw2.apnic.net (202.12.29.125)  0.556 ms  0.410 ms  0.433 ms
 4  FastEthernet3-30.cha23.Brisbane.telstra.net (139.130.97.61)  0.856 ms  0.846 ms  0.866 ms
 5  GigabitEthernet1-2.woo-core1.Brisbane.telstra.net (203.50.50.129)  1.045 ms 0.956 ms  1.006 ms
 6  Pos5-0.ken-core4.Sydney.telstra.net (203.50.6.221)  12.020 ms  12.279 ms  11.923 ms
 7  10GigabitEthernet3-0.pad-core4.Sydney.telstra.net (203.50.6.86)  12.176 ms13.834 ms  12.073 ms
 8  GigabitEthernet0-0.syd-core01.Sydney.net.reach.com (203.50.13.242)  13.631 ms  13.503 ms  13.592
 9  i-12-1.wil-core02.net.reach.com (202.84.144.65)  163.275 ms  163.446 ms  163.384 ms
10  i-2-0.dal-core01.net.reach.com (202.84.143.66)  196.954 ms  196.791 ms  196.939 ms
11  POS1-3.GW1.DFW13.ALTER.NET (65.208.15.89)  197.036 ms  197.198 ms  197.424 ms
12  0.so-0-0-0.CL1.DFW13.ALTER.NET (152.63.103.86)  196.717 ms  196.558 ms  196.715 ms
13  0.so-0-0-0.TL1.DFW9.ALTER.NET (152.63.0.193)  196.251 ms  196.193 ms  196.067 ms
14  0.so-4-2-0.TL1.DCA6.ALTER.NET (152.63.38.145)  240.699 ms  241.416 ms  240.802 ms
15  189.at-5-0-0.XR1.TCO1.ALTER.NET (152.63.39.226)  243.266 ms  243.411 ms  243.204 ms
16  193.ATM7-0.GW5.TCO1.ALTER.NET (152.63.39.85)  242.898 ms  241.967 ms  242.296 ms
17  cnrl-gw.customer.alter.net (157.130.44.142)  245.964 ms  246.573 ms  246.391 ms

www.ietf.org (132.151.6.75)  251.321 ms !<10>  250.003 ms !<10>  244.306 ms!<10>
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◀ Here is an example of a traceroute from apnic.net to ietf.org. Traffic between the two end points is shown to make many hops. Each of those hops could potentially be composed of different carrier networks, hardware vendors, and underlying protocols. Each hop can be quite ignorant of the composition of the others, but it works, thanks to standards.

In the RFC process, researchers and practitioners publish Internet Drafts, working documents relating to Internet protocols and technical specifications. Published drafts are discussed in open forums, leading to them being either revised, withdrawn, or adopted as final RFCs. While an RFC may be published with a historical, experimental, or informational status, those of most significance are the ones that are published as Internet standards or best current practices.

In 1986, the Internet Engineering Task Force (IETF) was formed, assuming the role of 'RFC Editor' and providing the official forum for discussing and developing RFCs. The IETF is now the most important body for creating the open standards that are the foundation of the modern, evolving Internet.

On its web site, the IETF describes itself as a "large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet". Its stated goal is simply "to make the Internet work better" (RFC 3395).

A critical factor setting the IETF apart from many other standards bodies is that it is fully committed to openness. In the IETF, open process means that "any interested person can participate in the work, know what is being decided, and make his or her voice heard on the issue. Part of this principle is our commitment to making our documents, our WG mailing lists, our attendance lists, and our meeting minutes publicly available on the Internet" (RFC 3395).

The IETF's philosophy on decision making is also fundamental to its identity. In an address to the IETF plenary in 1992, Dave Clark famously proclaimed "We reject kings, presidents, and voting. We believe in rough consensus and running code". This statement was aimed at more restrictive, cumbersome, and – some would say – compromised decision-making processes based on committee membership, representation, and formal voting. Perhaps more important is the IETF's emphasis on "rough consensus and running code", which is further explained as follows: "We make standards based on the combined engineering judgement of our participants and our real-world experience in implementing and deploying our specifications" (RFC 3395).

The scope of the IETF's mandate is not sharply defined but is sometimes colloquially described as "above the wire and below the application", a reference to layers 2 to 6 in the OSI model. Apart from TCP/IP, other IETF standards used in the Internet include SMTP, BGP, IPsec, HTTP, FTP, SSH, LDAP, SIP, PPP, RADIUS, KERBEROS, and many others.

For an organisation with no formal corporate identity, the IETF has a relatively complex, yet clearly defined structure. Funded by the Internet Society (ISOC), this structure features:

- the Internet Engineering Steering Group (IESG), which is responsible for technical management of IETF activities and the Internet standards process;
- the Areas, which as a group represented by the Area Directors, comprise the IESG (there are 13 Area Directors managing seven Areas);
- Working Groups, which perform the bulk of the IETF's work, developing specific topics within the Areas, comprised of interested volunteers, generally communicating on the WG mailing lists and at WG sessions in IETF meetings;
- the Internet Architecture Board (IAB), which provides overall architectural advice and external liaison;
- the IETF Chair, who, like the Area Directors and IAB members is selected by a nominating committee to serve a defined term; and
- The IETF Secretariat, which comprises a small staff, primarily to organise meetings and administer mailing lists.

Apart from the RFC Editor role, the two most important aspects of the IETF's work are the mailing lists and the IETF meetings, which are both vital parts of the open process. As noted above, the mailing lists and meetings are the forums for the Working Groups and are open to any interested party.

IETF meetings attract up to 2,000 participants, are held three times per year, and consist of five full days, with plenary sessions and multiple Working Group tracks held in parallel.

Other sources of Internet standards

As noted above, the IETF is not the only body developing standards used on the Internet. Some of the other notable bodies (and their standards) include:

- W3C – eg: HTML and XML
- IEEE – eg: 802 committee standards for Ethernet and WiFi
- ITU-T – eg: xDSL and H.323/H.248
- ISO and International Electrotechnical Committee (IEC) – eg: OSI model and MPEG
- European Telecommunications Standards Institute (ETSI) – eg: GSM and WAP
- American National Standards Institute (ANSI) – eg: ASCII

◀ The IETF is an unusual mix of structured working practices within an informal environment. IETF t-shirts like this one are essential geek-chic. Newcomers can learn a lot about the methods and unique culture of the IETF by reading the "The Tao of IETF" at www.ietf.org/tao.html.

From open standards to open policy development

The IETF is responsible for the technical developments of Internet standards. Its main standard, IP, defines an addressing system in which uniqueness of addresses is paramount, therefore raising the need for an administrative function: a registry system.

At the centre of the registry system is the Internet Assigned Numbers Authority (IANA) which, among other responsibilities, holds the unused pool of IP addresses (and related resources). But the task of distributing the addresses to those who actually use them is handled regionally by the five Regional Internet Registries (RIRs): AfriNIC, APNIC, ARIN, LACNIC, and RIPE NCC.

Although the RIRs are separate organisations, they all share common features that flow from the environment that created them. In keeping with the Internet tradition, each of the RIRs operates in open, transparent, consensus-based ways. RIRs distribute and register IP addresses according to policies which are developed through processes mirroring the standards development processes.

The RIRs were established, and are sustained, by the consensus of the ISP communities in their respective regions. They are neutral, non-profit, and independent, allowing true industry self-regulation.

As is the case for the standards development process, anyone can participate in the address policy development process. Discussions are held in public – at meetings and on mailing lists – and the consensus-based decisions are documented and freely available to anyone.

Openness for an evolving future

The Internet has been one of the most successful technical developments in human history. The speed with which it has transformed from an obscure research project into an indispensable global phenomenon is astonishing and unparalleled. The people who have been part of this revolution agree that the success and strength of the Internet is due to commitment to open standards and processes. This commitment was shared by the Internet pioneers and remains true of the developers and practitioners at work today. But the Internet is still young. If its future is to be one of continuous evolution, the commitment to open standards and processes must endure.

So what is an open standard?

Paul Wilson's presentation on open standards was delivered in the session "Common Understanding: Open Dialogue on Open Standards", chaired by Shahid Akhtar (Programme Coordinator, UNDP-APDIP) and Thaweesak Koanantakool (Director, National Electronics and Computer Technology Development Agency of Thailand).

The session was designed to "explore policy issues affecting open standards and openly discuss and share practices, to come to some common understanding and possible future collaboration". It was attended by representatives of government, academia, the private sector, and civil society from 13 economies of the region.

How to define an open standard was one of the central questions of discussion, leading to agreement on a set of essential attributes, namely, that an open standard is:

- openly developed
- openly maintained
- openly modified
- openly accessible
- openly implemented

The role of patent royalties and licensing remains a topic of debate, with participants recognising that the degree of openess can be seen along a spectrum. The Wikipedia entry for "open standard" explains that licenses and patent rights may apply to open standards and cites by example the standards of the ITU, ISO, and IEC, which are "ordinarily considered open, but may require patent licensing fees for implementation".

The Berkman Center for Internet and Society at Harvard Law School published the Roadmap for Open ICT Ecosystems, which formed part of the inspiration (and title) for the Bangkok conference. That document argues that a standard can be considered open when it meets all of the following criteria:

- it cannot be controlled by any single person or entity with any vested interests;
- it is evolved and managed in a transparent process that is open to all interested parties;
- it is platform independent, vendor neutral, and usable for multiple implementations;
- it is openly published (including availability of specifications and supporting material);
- it is available royalty free or at minimal cost, with other restrictions (such as field of use and defensive suspension) offered on reasonable and non-discriminatory terms; and
- it is approved through due process by rough consensus among participants.

(Berkman, p.4)

The Roadmap also offered "guiding principles of Open ICT Ecosystems", which it describes as:

> Interoperable – allowing, through open standards, the exchange, reuse, interchangeability and interpretation of data across diverse architectures.
>
> User-Centric – prioritizing services fulfilling user requirements over perceived hardware or software constraints.
>
> Collaborative – permitting governments, industry, and other stakeholders to create, grow and reform communities of interested parties that can leverage strengths, solve common problems, innovate and build upon existing efforts.
>
> Sustainable – maintaining balance and resiliency while addressing organizational, technical, financial and legal issues in a manner that allows an ecosystem to thrive and evolve.
>
> Flexible – adapting seamlessly and quickly to new information, technologies, protocols and relationships while integrating them as warranted into market-making and government processes.

(Berkman, p.6)

The "Common Understandings" session concluded with several proposals, one of which was to form a group modelled on the Berkman Roadmap group to investigate more about the role of open standards in the Asia Pacific context. *Apster* will monitor the progress in this area and report any significant future developments.

Sources and more information

Regional Conference on Open Standards

http://open.giti.nectec.or.th

Paul Wilson's original presentation "Open Standards and Processes on the Internet"

www.apnic.net/community/presentations/other.html

List of official IETF Internet protocol standards

www.rfc-editor.org/rfcxx00.html

RFC archives www.ietf.org/rfc

Berkman Center for Internet and Society at Harvard Law School (2005), Roadmap for Open ICT Ecosystems

http://cyber.law.harvard.edu/epolicy

Selected Wikipedia references (June 2006)

http://en.wikipedia.org/wiki/Internet
http://en.wikipedia.org/wiki/Open_standards
http://en.wikipedia.org/wiki/Open_Systems_Interconnection
http://en.wikipedia.org/wiki/Tcp/ip

US District Court explanation of Internet administration from "American Civil Liberties Union et al, v. Janet Reno, Attorney General of the United States, American Library Association, Inc., et al, v. United States Department of Justice et al", US District Court, E.D. Pennsylvania, June 1996.

APNIC staffer to chair secure routing working group

The IETF announced in April that it had formed a new working group in the Routing Area. The Secure Inter-Domain Routing Working Group (SIDR) is now active and is chaired by APNIC Internet Research Scientist Geoff Huston and Sandra Murphy.

SIDR Working Group

The following is the official description of the SIDR WG:

One of the areas of vulnerability for large scale Internet environments lies in the area of inter-domain routing. The basic security questions that can be posed regarding routing information are whether the originating Autonomous System is authorised to advertise an address prefix by the holder of that prefix, whether the originating AS is accurately identified by the originating Autonomous System Number in the advertisement, and the validity of both the address prefix and the Autonomous System Number. A related question concerns the level of trust that can be ascribed to attributes of a route object in terms of their authenticity, including consideration of the AS Path attribute.

The Routing Protocol Security Group (RPSEC) has been chartered to document the security requirements for routing systems and, in particular, to produce a document on BGP security requirements.

The scope of work in the SIDR working group is to formulate an extensible architecture for an interdomain routing security framework. This framework must be capable of supporting incremental additions of functional components. The SIDR working group will develop security mechanisms which fulfill those requirements which have been agreed on by the RPSEC working group. In developing these mechanisms, the SIDR working group will take practical deployability into consideration.

The scope of work will include describing the use of certification objects for supporting the distribution of authorisation and authentication information. Both hierarchic and distributed non-hierarchic trust systems are intended to be supported within this framework. The intended support of both forms of trust models is to allow for the use of this framework for routing security in diverse routing environments that have different underlying trust characteristics.

The scope of work is limited to inter-domain router-to-router protocols only, for both unicast and multicast systems.

The SIDR working group is charged with the following tasks:

- Document an extensible interdomain routing security architecture
- Document the use of certification objects within this secure routing architecture
- Document specific routing functionality modules within this architecture that are designed to address specific secure routing requirements as they are determined by the RPSEC Working Group

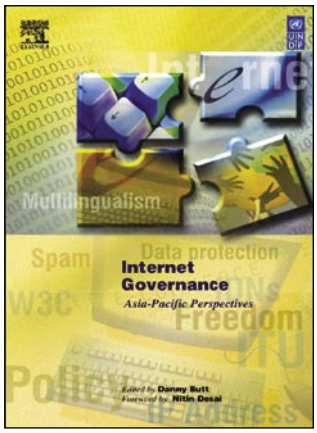
More information

SIDR mailing list address sidr@ietf.org

SIDR mailing list archive

www.ietf.org/mail-archive/web/sidr

Study published on regional iGov perspectives



▲ *Internet Governance: Asia Pacific Perspectives* is available as a free PDF download from:

http://www.apdip.net/news/igovperspectives

As previously reported in *Apster*, in 2005, APNIC provided support to the UNDP-APDIP project called the Open Regional Dialogue on Internet Governance (ORDIG). ORDIG's goal was to promote discussion of Internet governance issues and to create channels for the Asia Pacific community to develop awareness of Internet governance and form views on what aspects are most important in this region.

ORDIG projects included a portal, a comprehensive survey, online discussions, and a variety of other activities all designed to involve as many different types of stakeholders as possible. This work is seen as a valuable source of potential information relevant to the WSIS/IGF processes.

One of the most significant resources produced as an outcome of ORDIG is the book Internet Governance: Asia Pacific Perspectives, edited by Danny Butt with a foreward by Nitin Desai.

This book presents the work of ORDIG, summarising the key debates in Internet governance from those involved in international policy-making, with specific inputs coming from:

- a survey on 22 key governance issues conducted in 12 major regional languages, which received over 1,200 responses from 37 countries and from all major stakeholders;
- an online discussion forum on Internet governance, which included 180 participants from 27 countries in the region; and
- one regional conference (Bangkok) and four sub-regional conferences (Bishkek, Suva, Bali, and Kathmandu) organised in collaboration with the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), involving several hundred participants, from 50 countries and 35 regional and international organisations.

It contains detailed analysis of issues seen as critical to the region, such as spam, wireless technologies, security, multilingualism, and cultural diversity in the Asia-Pacific. Also included are detailed chapters describing the Internet policy priorities in China, Indonesia, India, Pakistan, and Thailand.

Internet Evolution and IPv6: webcast

APNIC Internet Research Scientist Geoff Huston is known around the Asia Pacific and beyond as one of the pioneers of Internet technology in the region. He is a regular speaker, not only at APNIC meetings, but at technical fora around the world, discussing issues such as IPv4 address exhaustion, Internet governance, and new developments in the Internet.

In conjunction with the SANOG 8 meeting, being held in Karachi, Pakistan, from 27 July to 4 August, Geoff will be presenting on "Internet Evolution and IPv6", via webcast. This means that not only will this presentation be available to a wider, more geographically diverse audience than ever before, but by archiving the presentation on APNIC servers, people from around the world will be able to watch and listen to this presentation anytime, anywhere.

For those attending the SANOG meeting in person, details of when the presentation will be shown will be available in the conference program. For those not attending, the video will be available following the SANOG meeting at:

http://streaming.apnic.net/presentations/huston-evolution.mov

▲ Geoff Huston delivering his presentation, "Internet Evolution and IPv6". The video will be shown as part of SANOG 8, and will then be available on the APNIC website.

APNIC training webcast

On Monday 29 May, the APNIC training department conducted the first public webcast of its Internet Resource Management Essentials (IRM E) training course. The webcast, which included audio and video footage of the trainers in APNIC's Brisbane office, as well as course content slides, was transmitted live onto the Internet, and is available as an archive on the APNIC website.

By making this training event available as a free webcast, the APNIC training department hopes to make it easier for APNIC members and the broader community to benefit from APNIC training. On the day of the event, 145 unique users from around the world logged in to part or all of the live webcast, with viewers from Australia, Pakistan, the Philippines, India, Hong Kong, and 15 other economies.

The IRM E course is designed for Internet professionals, and is aimed particularly at those responsible for administering and managing Internet resources, including IP managers, senior hostmasters and network engineers. If you feel that this course would be valuable to you, you can view the webcast at the following URLs.

Note you will need Quicktime installed on your computer to view the webcast files.

Session 1 http://streaming.apnic.net/multimedia/irme-part1-20060529.mov

- Introduction to APNIC
- APNIC community and policy development
- APNIC Policies

Session 2 http://streaming.apnic.net/multimedia/irme-part2-20060529.mov

- IP address request and evaluation
- Second opinion request

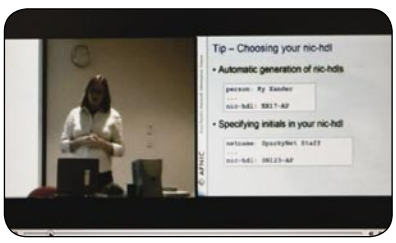
Session 3 http://streaming.apnic.net/multimedia/irme-part3-20060529.mov

- APNIC Whois Database
- MyAPNIC
- Autonomous System Numbers procedures

Session 4 http://streaming.apnic.net/multimedia/irme-part4-20060529.mov

- Reverse DNS procedures
- IPv6 overview & policies
- Summary

The training department is currently investigating further possibilities for webcasting APNIC training events, as well as the APNIC eLearning project, which will be launched at APNIC 22 in Kaohsiung, Taiwan. For more information, please see: www.apnic.net/training



▲ APNIC training officer Sall'ee Ryman delivers the Internet Resource Management Essentials course via webcast.

▲ Attendees at a training session in APNIC's Brisbane office.

New staff

Administration Department

May del Rosario, Accounts Officer

May del Rosario joined APNIC in early May as an Accounts Officer with the Finance team. Originally from the Philippines, May completed a degree in accounting in Manila and has worked in various companies, including Del Monte Phils., Inc and New Zealand Milk Phils. She is fluent in both Tagalog and English. Her responsibilities at APNIC include general accounts keeping, billing related queries, and other administrative tasks within the Finance Department.

Training Department

Cecil Goldstein, Training Manager

Cecil Goldstein joined APNIC this month as Training Manager. Prior to this, Cecil was a lecturer at the Queensland University of Technology with a particular focus on internetworking subjects. He has been involved in Internet training and support from the initial AARNET days and was co-author of the first AARNET guide, "Getting the Most out of AARNET". He holds a Masters Degree in Computer Science. Cecil is responsible for the training group and development of the training program.

Documentation Department

Tina Bramley, Technical Editor

Tina Bramley joined the Documentation team at the end of June as Technical Editor, filling the position vacated by Samantha Dickinson, who is now working as Policy Officer. Tina's past work experiences have included data communications project management for AAP Communications Services, and work with Alcan Engineering, the University of Queensland, and the Queensland University of Technology Student Guild. She also has a degree in journalism. Her responsibilities at APNIC will centre around writing and editing APNIC documentation.

Resource Services Department

Vikas Jayaram, Internet Resource Analyst

Vikas Jayaram joined APNIC as an Internet Resource Analyst, or Hostmaster, at the end of June. Vikas has worked in the past for companies such as Gotalk Australia, for whom he was an Internet Product Specialist involved in the development of new Internet and VoIP products. He has also worked as a freelance developer, and has a Bachelors degree in Commerce from Osmania University, Hyderabad, India, and a Masters in Information Technology from Bond University, Australia. He is fluent in English, Telugu, and Tamil. Vikas' responsibilities at APNIC will include processing requests for IP address space and AS number allocations within the Asia Pacific region.

Training schedule

2006

June

- 8 Surabaya, Indonesia
- 13 - 16 Bangkok, Thailand

July

- 27 - 4 Aug Karachi, Pakistan
  (In conjunction with SANOG 8)

August

- 8 Delhi, India
- 9 - 12 Hyderabad, India
- 21 - 26 Samoa
  (In conjunction with PICISOC)

September

- 4 - 8 Kaohsiung, Taiwan
  (In conjunction with APNIC 22)
- 27 - 29 Ulaan Baatar, Mongolia

October

- 9 -13 Bangkok, Thailand
- 16 - 20 Colombo, Sri Lanka
- 30 - 1 Nov Hong Kong

November

- TBA CNNIC OPM
- TBA Taipei, Taiwan
  (In conjunction with TWNIC OPM)
- 27 - 30 Kuala Lumpur, Malaysia

December

- 4 - 7 Singapore
- TBA Brunei Darussalam

The APNIC training schedule is provisional and subject to change. Please check the web site for regular updates at:

www.apnic.net/training

If your organisation is interested in sponsoring APNIC training sessions, please contact us at:

training@apnic.net

APNIC by numbers: IPv6

3.4×10^{38} Total number of IPv6 addresses	73 x /23s Total amount of IPv6 allocated to APNIC by IANA	23% Proportion of global IPv6 allocations made by APNIC	100 Number of economies globally with IPv6 allocations
17 Number of AP economies obtaining IPv6 address allocations	65,536 Number of /48 end-site assignments that can be made in a /32 allocation	1999 Year the first IPv6 allocations were made	2373 RFC 2373 is the IETF document defining the IPv6 standard

Calendar

PacNOG 2
18-24 June 2006
Apia, Samoa
www.pacnog.org/

ICANN meeting
26-30 June 2006
Marrakesh, Morocco
www.icann.org/meetings/

66th IETF
9-14 July 2006
Montreal, Canada
www.ietf.org/meetings/meetings.html

22nd APAN meeting
17-21 July 2006
Singapore
www.apan.net/meetings/future.htm

SANOG 8
27 July - 4 August 2006
Karachi, Pakistan
www.sanog.org/

PacINET 2006
21-26 August 2006
Apia, Samoa
www.picisoc.org/tiki-index.php?page=PacINET+2006

APNIC 22
4-8 September 2006
Kaohsiung, Taiwan
www.apnic.net/meetings/22/

RIPE 53
2-6 October 2006
Amsterdam, Netherlands
www.ripe.net/ripe/meetings/current.html

ARIN XVIII/NANOG 38
8-13 October 2006
St. Louis, USA
www.arin.net/meetings/

First Internet Governance Forum meeting
30 October - 2 November 2006
Athens, Greece
www.igfgreece2006.gr

67th IETF
5-10 November 2006
San Diego, USA
www.ietf.org/meetings/meetings.html

AfriNIC 5
31 November - 1 December 2006
Port Louis, Mauritius
www.afrinic.net/meeting/index.htm

ICANN meeting
2-8 December 2006
Sao Paulo, Brazil
www.icann.org/meetings/

ITU Telecom World 2006
4-8 December 2006
Hong Kong
www.itu.int/WORLD2006/

How to contact APNIC

Street address	Level 1, 33 Park Road, Milton, Brisbane, QLD 4064, Australia
Postal address	PO Box 2131, Milton QLD 4064, Australia
Phone	+61-7-3858-3100
SIP	helpdesk@voip.apnic.net
Fax	+61-7-3858-3199
Web site	www.apnic.net
General enquiries	info@apnic.net
Hostmaster (filtered)	hostmaster@apnic.net
Helpdesk	helpdesk@apnic.net
Training	training@apnic.net
Webmaster	webmaster@apnic.net
Apster	apster@apnic.net

Member Services Helpdesk

The Member Services Helpdesk provides APNIC members and clients with direct access to APNIC Hostmasters.

www.apnic.net/helpdesk

helpdesk@voip.apnic.net

helpdesk@apnic.net

+61 7 3858 3188

Helpdesk Hours: 9:00 am to 7:00 pm (UTC + 10 hours) Monday - Friday

Communicate with APNIC via MyAPNIC

APNIC members can use MyAPNIC to:

- view APNIC resources held by their organisation
- monitor the amount of address space assigned to customers
- view current and past membership payments
- view current tickets open in the APNIC email ticketing system
- view staff attendance at APNIC training and meetings
- vote online

For more information on MyAPNIC's features, see:

www.apnic.net/services/myapnic