Asia Pacific Network Information Centre

APNIC

Welcome to "Maximising your IP address potential"

APNIC 21

Perth, Australia

February 27, 2006

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Finding out about each other..

- Tell us about yourself..
  - Name, organisation?
  - What kind of work do you do?
  - Why did you attend this tutorial?
  - What do you hope to get out of the session today?
- About the APNIC secretariat
  - 46 staff from 21 nationalities
  - 20 languages

Cantonese, Mandarin, Filipino (Tagalog), Korean, Japanese, Lao, Thai, Persian (Farsi), Telugu, Punjabi, Hindi, Tamil, Sinhalese, Fijian, Bahasa Indonesian, Malay, Hokkien, French, Swedish, English

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About APNIC

- Regional Internet Registry (RIR)
  - For the Asia Pacific region
  - Core activity is to allocate & assign Internet number resources (IPv4, IPv6 & ASNs)
  - Manages reverse DNS domains
- Organisational structure
  - Membership based, non-profit
  - Self-regulatory body governed by members and broader Internet community
    - Bottom up policy and decision making processes

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Today's schedule

9 am - 10.30 am	Technical infrastructure, education, policy and APNIC
11 am - 12.30 pm	Creating policies that work for you
2 pm - 3.30 pm	Efficient address space management tools
4 pm - 5.30 pm	Managing your "old" address space

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Maximise address space potential by …

- Gaining understanding of APNIC in a global Internet context
- Learning how to formulate and participate in policy making
- Understanding how to manage your resources more effectively
- Explaining issues to us so we can learn from you!

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What questions do you have?

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Internet development

Technical internet infrastructure, education, policy and APNIC

Presenters

- Nurani Nimpuno
  - Outreach Co-ordinator
- Anne Lord
  - Communications Director
- Geoff Huston
  - Internet Research Scientist

Maximise address space potential by

- Gaining an understanding of the role and responsibilities of APNIC and where it fits with "Internet development" agencies
- Having an appreciation that APNIC supports internet development with specific technical and human resource focused activities
- Learning how you can benefit from these activities and contribute in the wider context
- Gaining a perspective on changes in the ISP industry with a view to understanding the future

Defining Internet development

- What do we mean by 'Internet development' in this context?
  - Initiatives aimed at developing technical infrastructure
  - Education and learning programmes
  - Policy support and evolution
- UN Declaration of principles (WSIS 2003)
  - "Governments, as well as private sector, civil society and the United Nations and other international organizations have an important role and responsibility in the development of the Information Society and, as appropriate, in decision-making processes."
- As an international organisation, APNIC has an important role to play

Overview

- Technical Internet infrastructure
- Education and support
- Policy
- The future of the Internet

Internet Development

Technical Internet Infrastructure

Technical infrastructure development

Technical infrastructure development

- physical network → Access and last mile technologies, Wireless, Physical equipment
- operations → Creating an operational environment that fosters a secure and reliable network platform
- protocols & standards → Specifying standards and protocols which define the technology
- technical admin → IANA, RIRs, cc & TLD operators, Root server advisory committee

Technical infrastructure - global organisations

- Operations
  - Security - FIRST
    - Brings together CERTS from gov't, commercial, & educational org's across globe
    - Cooperation & coordination, info sharing, rapid responses
    - http://www.first.org
- Protocols & Standards
  - IETF purpose is to support a set of open standards that allow interoperability
    - Open processes, technical competence
    - Volunteer code, *"rough consensus & running code"*
    - Protocol ownership
    - http://www.ietf.org

IETF

RFC 3935

Technical infrastructure - global organisations

Technical administration

IANA → IP address delegation (to RIRs); Protocol number assignment; ccTLD & gTLD delegation

Number resources

RIRs (NRO: Afri-NIC, APNIC, ARIN, LAC NIC, RIPE NCC) → Internet Resource allocation

DNS operations

RootOps, ccTLDs, gTLDs, Registrars → DNS Name management

Technical Internet infrastructure - regional groups

APTLD	Collaboration of TLD operators in region	http://www.aptld.org
APNG	Fostering the advancement of network infrastructure	http://www.apng.org
APAN	Asia Pacific Advanced Network	http://www.apan.net
APIA	Asia Pacific Internet Association (Supports APRICOT)	http://www.apia.org
AP*	Collaborative effort between AP orgs	http://www.apstar.org

Technical Internet infrastructure - APNIC activities

- Collaboration
  - ICANN root server system advisory committee
  - CAIDA workshops and research
    - Participate in workshops
    - Provide statistics & measurement points
- DNS infrastructure
  - Improving resiliency
    - Secondary DNS services for ranges delegated by APNIC and some ccTLD's
  - Improving quality
    - "Cleaning up the reverse DNS" requested by community
    - Operational report at DNS SIG at APNIC21
      - http://www.apnic.net/services/rev-del/lame-del/lame-del-response.html

Rootservers supported by APNIC

More information at http://www.apnic.net/services/rootserver/

Technical Internet infrastructure - APNIC activities

- Certification Authority (CA)
  - Issuing X.509 certs to access "MyAPNIC"
    - Secure resource management
      - (Also online voting, training & billing records etc)
      - Optimised for faster response
  - Routing certificates trial
    - Issuing X.509 certs with IP & AS extensions
    - Implementing rfc3779
- "Debogon" project (currently in trial)
  - Problem with new APNIC allocations & assignments being blocked by "bogon" filters
  - Test prefixes from new IANA blocks for one month prior to making allocations from it and produce report

RFC 3779

APNIC activities - IETF support

- Staff as WG chairs
  - CRISP (cross registry information service protocol)
    - Co-chair: George Michaelson
    - Common framework with registries, structured data (XML)
      - Long term "whois" replacement
      - http://www.ietf.org/html.charters/crisp-charter.html

  - GROW (Global routing operations)
    - Chair: Geoff Huston
    - Examines operational problems of IPv4 and IPv6
      - http://www.ietf.org/html.charters/grow-charter.html

  - Shim6 (Site multihoming by IPv6 Intermediation)
    - Co-chair: Geoff Huston
    - Specifications for IPv6-based site multihoming
      - http://www.ietf.org/html.charters/shim6-charter.html

APNIC activities - IETF support

- PKIX
  - X.509 Extensions for IP Addresses and AS numbers
  - APNIC deployment of resource certificates (rfc3779)
    - http://www.ietf.org/html.charters/pkix-charter.html
- DNSop (DNS operations)
  - Guidelines for DNS operations
    - http://www.ietf.org/html.charters/dnsop-charter.html
- V6ops (IPv6 operations)
  - Guidelines for the operation of shared v4/v6 Internet
  - Operation guidelines on how to deploy IPv6 into existing IPv4-only networks
    - http://www.ietf.org/html.charters/v6ops-charter.html
- IDR (Inter-Domain Routing)
  - Standardize and promote BGP-4 to support IPv4 & IPv6
  - Improving scalability of BGP
    - http://www.ietf.org/html.charters/idr-charter.html

APNIC activities - funding

- Pan-Asia grants
  - Funding partner to ICT R&D grants programme
    - Practical technical research solutions to problems in developing world
    - http://www.idrc.ca/panasia/
    - Staff support on project committee
  - Projects
    - Vclass: SIP-based mobile classroom
    - IPv6 Tunnel Broker: a key for using next generation Internet in developing countries
- Other regional funding support
  - Infrastructure: APstar, APng, APIA, AP*
  - Operations: SANOG, PACNOG, NZNOG..

Internet infrastructure - what about you?

- Use available sources of information
  - RFCs
  - Drafts & BCPs
  - APNIC research & technical articles (Geoff)
- Follow agreed Best Current Practices
  - Spam fighting
  - Security
  - DNS
  - Routing aggregation etc
- Stay abreast of developments

Internet Development

Education and Support

Education & support - global

- ISOC
  - Facilitates training programmes
    - CCTLD workshops
    - Participation in regional workshops
  - On-line workshop resource centre (with NSRC)
    - http://ws.edu.isoc.org/
- NSRC
  - Provides technical and engineering assistance to international networking initiatives building access to the public Internet
    - Active in Africa, South America, Asia
- ITU
  - Mostly telecom workshops, training in IPv6

Education & support - regional

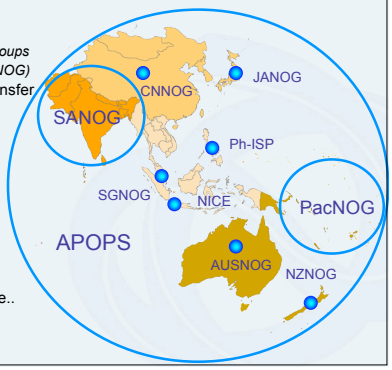
NOGs

(Network Operator Groups - Fashioned after NANOG)

- Technology transfer & education
- Workshops, training, conferences

Also…

- ISOC chapters
- IPv6 forums
- And much more..



Education & support - APNIC

- Collaboration with global & regional organisations
  - Supporting NOGs & educational forums
    - APRICOT, NOGs, PITA, ISOC-AU, RIR meetings
    - IPv6 forums, NIR Open Policy meetings..
  - Collaboration with training partners
    - AIT, Cisco routing workshops, APTLD
    - ISOC and NSRC workshops
  - MoU's: mutual support & collaboration
    - ISP Associations of South Asia
    - Root server operators (F, K, I)
    - ISOC-AU and others..

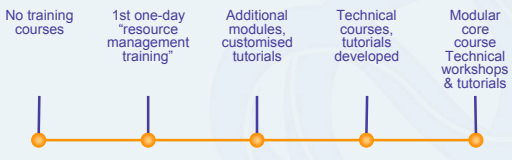
Education & support - APNIC training

- Training needs established
  - Through member surveys (1999, 2001, 2004)
  - Feedback from HM's, training, outreach, billing
  - "EOI" forms to request training
    - http://www.apnic.net/training/more-info/eoi/eoi-spon-form.html
- Training schedule & locations
  - http://www.apnic.net/training/schedule/
- Sponsorship
  - Ensures cost-recovery
  - Training courses subsidised for APNIC members

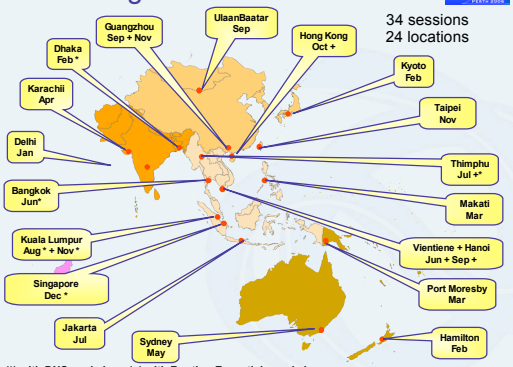
Education & support - APNIC training

- Evolutionary approach

Originally… *Development over time…* *Today*



Training in 2005



(*) with DNS workshop (+) with Routing Essentials workshop

APNIC training courses

- Core courses
  - Internet Resource Management training
    - IRM I, IRM II
    - IRM Essentials
- Technical workshops
  - DNS
  - Advanced DNS
  - Routing essentials
- Tutorials
  - Security
  - IRR
  - Spam
- Courses under development
  - IPv6 services workshop

- Material, information and schedules on website
  http://www.apnic.net/training

APNIC training and eLearning

- Taking it further…
  - Hired an eLearning officer
    - Sall'ee Ryman
  - Bringing APNIC training to your desktop
    - On demand training, self paced learning
- eLearners
  - Adult learners
    - Clear instruction and outline of objectives
  - English as a second language (ESL)
    - Visual clues, more time, reading vs listening
- Pilot available 2nd quarter 2006
  - 3 modules ready 3rd quarter

APNIC eLearning

- eLearning objectives
  - Provide a number of pathways for learning
    - Fast paced or slower
  - Deliver outcomes that have immediate application in the real world
    - Request forms easier to complete
  - Invite content experts to contribute
    - Hostmasters, external experts
  - Generate a sense of "belonging"
    - Immediate support from group for problems

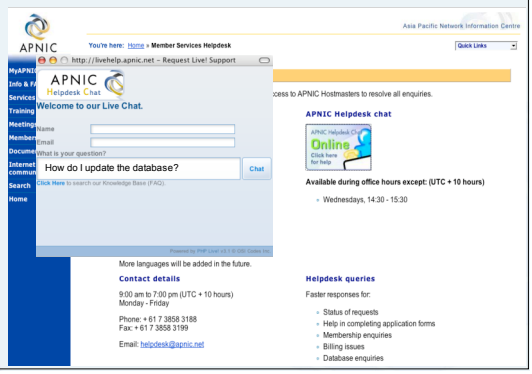
APNIC support services

- Getting answers to your queries
  - Problems with your request? Database update failed? Not sure of the policies?

Member Services Helpdesk
-One point of contact for all member enquiries!
helpdesk@apnic.net
Helpdesk hours
9:00 am – 7:00 pm (AU EST, UTC + 10 hrs)
Helpdesk ph: +61 7 3858 3188 fax: 61 7 3858 3199

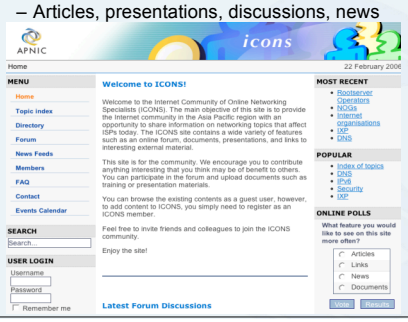
- VOIP service trial
  - Save on international call rates to helpdesk!
    - helpdesk@voip.apnic.net

Helpdesk "chat" service



icons.apnic.net

- Online Community of Networking Specialists
  - Articles, presentations, discussions, news



Education & support - what about you?

- Get involved with your regional / local NOG!
  - Share your knowledge and experience
  - Learn from others
- Participate on ICONs
  - Share material, discuss in the forums, exchange ideas and knowledge
- *Knowledgeable peers benefit you and the rest of the Internet community!*

Internet Development

Policy

IGov & WSIS - global discussions

- World Summit on the Information Society
- Intergovernmental summit hosted by UN
  - Phase I: Geneva 2003, Phase II: Tunis 2005
- WSIS scope covers all aspects of ICTs
  - Content, crime, digital divide, ecommerce, capacity building, financing, linguistic diversity
  - IGov: names & numbers, inter-connection, security…
- WSIS I outcomes: "Declaration" and Action"
  - Guidance to UN and Governments

http://www.wsis.org

Internet Governance

- WSIS II outcomes - 'Tunis Agenda'
  - "Recognises existing arrangements for Internet Governance have worked effectively..", "..enhanced co-operation model.."
  - "..guarantee national interest and rights of countries.."
  - Recommended forming Internet Governance Forum
- What does the IGF mean for the RIRs?
  - More work ahead!
  - Governments to limit involvement
- What will the IGF do?
  - Remit is as advisory body
  - 1st meeting October 24-26th, Athens, Greece

http://www.intgovforum.org

IGov & WSIS - regional concerns

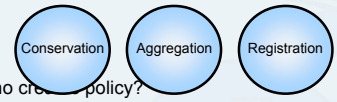
- UNDP-APDIP regional survey
  - 1200+ respondents from 30+ economies
  - Reports from its regional dialogue (ORDIG) for CN, IN, ID, PK and TH
    - Concerns about cybercrime, spam
    - Internet infrastructure and access, local language and content
    - Current allocation system for IP resources (China)
- AP concerns voiced during WSIS
  - Outcomes of the system of Internet governance not fair
  - Dissatisfaction over US gov oversight of ICANN
  - Concerns about access to resources

RIRs, APNIC & WSIS

- RIRs position
  - Promote need for continued stability
  - Dispel misconceptions and misunderstanding
  - Promote a position of "do no harm",
  - Be mindful of cross-impacts when proposing changes to infrastructure administrative functions
- APNIC participation in WSIS
  - Internet "pavilion" as part of Summit 'ICT for all' exhibition
    - Collaboration between NRO, ISOC, IETF, ICANN and CENTR
    - Promoting bottom-up structure
    - Engaging in discussions with stakeholders

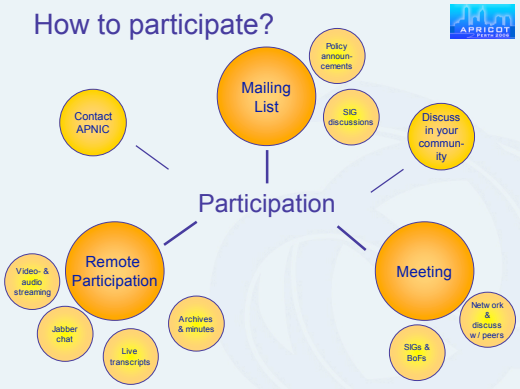
Policy in the APNIC region

- Policy goals
  - Lessons learnt from past



- Who cr[illegible] policy?
  - *You* as part of the Internet community
  - Policy development open to all
    - Open processes, public discussion, consensus decisions, full archives and documentation
  - Policy changes driven by changes in industry

How to participate?



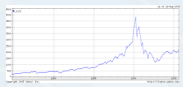
Internet policy - what about you?

- Have an awareness of current discussions
  - Operational
    - NOGs, IETF, RIR meetings etc
  - Policy
    - Internet resource management
- Participate in APNIC meetings
  - Get involved in discussions
    - Create policies that work for you

The future of the Internet

Looking forward

There are many ways of predicting the future….



The tough bit is getting it right!

"One day man will travel faster than a horse can run"

Rene Descarte

This approach

- Informal look at some aspects of the ISP industry today that might help us in looking forward across the next few years

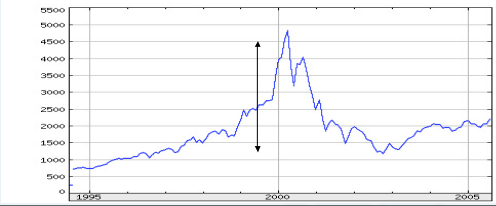
Boom and bust.. is nothing new

- 1637 Tulip mania
  - Takes hold in Holland and the price of tulip bulbs escalates to fantastic levels
  - The subsequent recovery from the crash took decades to overcome and restore Dutch fortunes

- 1719 Banque Royale
  - John Law introduces the French king to the magical mysteries of bank credit and paper money. The word "millionaire" entered our vocabulary
  - By 1720 French economy collapsed utterly and France was brought to the brink of revolution

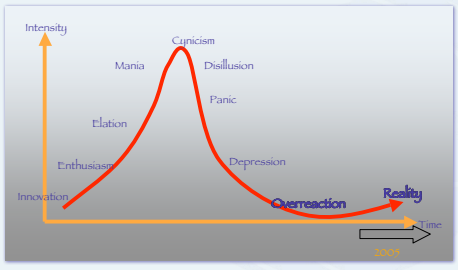
It's a post-dot-boom-and-bust world

- The Internet boom has been pretty mild by comparison with past booms in gold, oil, rail, shipping, ice and, of course, tulips
  - The peak of the Internet boom saw stock indices peak at just 3 times their longer-term value



It's a post-dot-boom-and-bust world

- But the lessons from the boom cycle are no different…



Today..

- ISPs no longer operate a rapid expansion-based business model
  - Internet service business models tending to use a common theme of service consolidation
- Industry attention at the ISP level is now concentrating on *product marketing aspects* of the Internet service model
  - Dependability and integrity
  - Utility and flexibility
  - Value-add service models
  - Quality and performance
- Applications and services that meet business case criteria

From optimism to conservatism

- We've learned that optimism alone is no substitute for knowledge & capability in the industry
- A conservative period of consolidation rather than explosive growth
  - Investment programs need to show assured & competitively attractive financial returns across the life cycle of the program
  - Reduced investment risk implies reduced levels of innovation & experimentation in service models
  - Attempts to combine communications with additional services to create value-added service bundles
  - Accompanied by greater emphasis on service robustness and reliability

Security questions

- It's a very hostile world out there among the packets..
- We have learnt that we need to understand more about what stakeholders want from the Internet in terms of security

Security questions

- The list of outstanding issues include
  - How can users identify each other?
  - How can users identify network-based services & validate the integrity of such services before entrusting them with data?
  - How can the network protect itself from abuse & attack?
  - How can users protect themselves do likewise?
  - What are a user's obligations & responsibilities?
  - How can abusers be identified? And whose role is it?
  - What is the role of the ISP?
    - Neutral common carrier? Trusted intermediary? Enforcement point?

Security focus

- We've learned that we cannot operate global networks based on random trust models
  - A highly visible security focus for the next few years
    - Increased end-user awareness of vulnerabilities & weaknesses & a desire for more secure & trustable services
    - Increased public sector agency awareness of the vulnerabilities of the Internet communications environment & its consequences
    - A response based on increased technology effort in dismantling aspects of the Internet's distributed trust model & attempting to replace it with negotiated conditional trust
  - There is now a considerable industry based on insecurity
  - But little actual work based on robust security

Multiple networks

- We've learned that 'IP' is not the panacea of communications protocols
  - "Convergence" remains a deluded fantasy
- Recognise TCP/IP's strengths & weaknesses
  - TCP/IP allows adaptable traffic sessions to operate extremely efficiently over wired networks
  - TCP/IP is probably not the optimal approach to support
    - Mobile wireless traffic, resource management requirements
  - TCP/IP is not strong in supporting
    - Real time traffic under localized congestion events
    - Various forms of traffic engineering applications
    - (Unless you are willing and able to overprovision everywhere!)

Multiple networks

- "Everything over IP"
  - Still not a viable carrier strategy
  - Continued use of multiple networks to provide specialised service environments for various communications application sectors is likely for some time yet

Bandwidth abundance lessons

- DWD Multiplexing has lifted per-strand optical capacity over a thousand-fold
  - From 2.5Gbps to 6.4Tbps (640 wavelengths, each of 10Gbps per lambda) per optical strand
- Major long haul comms routes worldwide are more than amply provisioned with IP bandwidth
  - The shift from demand-pull to massive supply-overhang has destroyed business stability of the long haul communications supply market
- We've learned that when you eliminate one choke point in a system you expose others - doh!
- Network 'choke' points are shifting to access domain, not the long haul elements
  - Continued pressure for high speed last mile services

Broadband last mile

- What form of broadband access?
  - Wireless probably not a logical contender for ubiquitous last mile, but it has its areas of application - if you are sufficiently desperate!
  - Hybrid Fibre Coax systems are capital intensive & often rely on a strong pay-TV market to provide some capital leverage – no longer relevant for many markets!
  - Fibre is great but also capital intensive – good for CBD and dense MTA deployments but less capital efficient for low density deployments – too expensive!
  - DSL is a reasonable compromise for lower density deployment environments over existing copper plant
    - BitTorrent and similar P-2-P is pushing demand for higher speed symmetrical DSL services

Technology – IPv4

- We're learning that we might be stuck with making IPv4 work for longer than we thought we could or should
- IPv4 remains the overwhelmingly dominant protocol choice for the service industry
- Its now a NAT world - but NAT has its problems
  - Peer-to-peer networks, service fragility, VOIP, complexity and cost
- Even with NATS we are running through the IPv4 address pool
  - IP service networks will need to commence some considered investment in IPv6 sooner rather than later

Technology – IPv6

- "IP with larger addresses"
  - Address space requirements are no longer being easily met by IPv4
- This is an issue for high volume deployments including
  - GPRS mobile, pocket IP devices, consumer devices
- IPv6 appears to offer reasonable technology solutions
  - Preserving IP integrity, reducing middleware dependencies & allowing full end-to-end IP functionality for a device-rich world
- BUT no-one wants to pay for widespread IPv6 deployment yet!

IPv6 - From iPOD to iPOT

- IPv4 cannot sustain a device-dense world
- If we are seriously looking towards a world of billions of chattering devices then we need to look at an evolved communications service industry that understands the full implications of the words "commodity" and "utility"



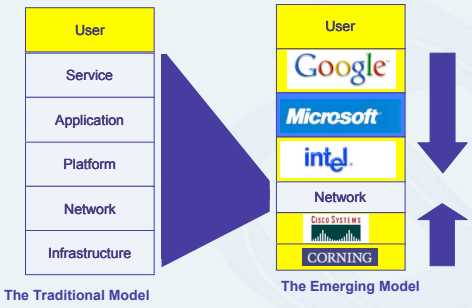
Voice over IP

- We're learning that voice has more dimensions than just emulating simple carriage of a voice signal
- The technology is getting better…
  - Load-sensitive codecs that adjust their signal rate to the current delay / loss characteristics
  - Abundant trunk bandwidth circumvents need for detailed QoS in network core
  - Solutions available to map between the phone address domain & the Internet address domain (ENUM)
  - Intertwining hand-held devices into phone + PDA
- But its more than Skype
  - There are many practical technology, regulatory and business issues remain on the VOIP path….

Services and Middleware

- Can you completely separate various service platforms from the network?
  - Middleware technologies continue to spread with the addition of a more generic approach to include aspects of
    - Interception technologies
    - Active security-based response systems
    - Open pluggable edge service technologies
  - Directory technologies & mapping of disparate protocol and services domains into the IP world
- But its not the only push
  - The alternative is packaging the entire service delivery model into XML – which also has its own unstoppable momentum

Today's carrier squeeze play



The ISP and the carrier

- The carrier ISP business is being pushed into the role of
  - Commodity IP transit provider
  - Consumer market IP access
  - SME IP access
- The enterprise ISP market is being pushed into the role of
  - SME service integrator

Optimism vs reality

- Convergence to IP as a multi-media broadcast medium are not well grounded
- Triple Play Time is over – BitTorrent wins

Optimism vs reality

- Value Added Service Networks are causing value address service network providers to overstress their business model
- Leave overlays to the edge

Optimism vs reality

- The Internet's major point of leverage was ultimately cheaper services, not better quality
- QoS in the core has lost
- The Internet is a lousy time switch
- High quality real time data needs high quality real time switching

Optimism vs reality

- VoIP is a regulatory mess
- And its going to get a lot messier yet!
- Carrier platform convergence with the mantra of ‘everything in ATM IP” is still a myth
- Get over it!

Optimism vs reality

- IP is the not the foundation of high value add networks
- From value to volume - IP Transit is heading into a volume-based low-value commodity activity

Optimism vs reality

- Stop looking for another “killer app” – now ‘everything over http’ appears to have won the users’ play space!
- Think XML, RSS, Wikis, Blogs, Torrents, Podcasts,…

Some guiding principles for the IP utility industry

- Stick to the basics - keep the network offering simple, stable, fast and cheap
- Avoid feature-stuffing the network – leave that to the edge
- Avoid integrated middleware
  - Use modular plug-ins rather than basing the network design on middleware
  - Use modular service architectures

What have we learned?

- The Internet is not infinitely elastic & some things just cannot fly no matter how much thrust is put under it
- Vertical service providers are fading away- building communications infrastructure is one thing, using it to best effect is another - both aspects require care and attention from dedicated players
- That the Internet may not be the best entertainment medium today – but it’s a remarkable exchange medium. And the emerging entertainment models appear to be a peer-to-peer edge-to-edge overlay
- That this is an immature technology-intensive activity with much that we still have to learn

So what can we expect?

- My personal list of expectations for the next few years
  - No repeat of boom and bust
  - Networks are a commodity utility business with commodity returns (the shift from value to volume) – this is plumbing
  - More surprises from Google et al in terms of compelling user service models
  - The regulatory pendulum is swinging back - renewed levels of regulatory interest to ensure that public objectives are being achieved
  - More restructuring - industry sector members with longer term objectives phrased more modestly than may have been the case in the past five years

Meet the new economy.

Same as the old economy.

Summary

- APNIC is part of a global context
  - In addition to its core responsibilities, it is involved with many aspects of Internet infrastructure development in the region
- Increased awareness of industry developments
  - Who benefits?
    - You gain competitive edge
    - Industry-wide knowledge improves health of the Internet
- Meet the new economy
  … Same as the old

Thank you for listening

Questions?

Today's schedule - next session

9 am - 10.30 am	Technical infrastructure, education, policy and APNIC
11 am - 12.30 pm	Creating policies that work for you
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4 pm - 5.30 pm	Managing your "old" address space

Creating policies that work for you

APNIC 21
Perth, Australia
February 27, 2006

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Presenters

- Save Vocea
  - Policy Development Manager
- Amante Alvaran
  - Training Officer

Maximise address space potential by …

- Understanding why a knowledge of Internet resource policy is important to your business
- Learning how to participate to ensure your needs are met
- Understanding how easy it is to participate in policy creation

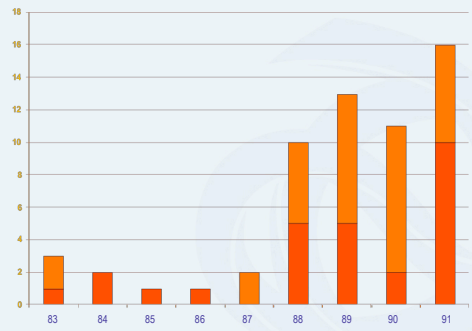
What do we mean by "policy"?

- A set of agreed principles which define Internet Resource management
- Scope
  - Anything related to management of Internet resources
    - eg. reverse-DNS, Whois Database, IPv4 & IPv6 addresses, AS numbers
- Out of scope
  - Mandating certain technical behaviour or 'policing' ISP business practices

Early years: 1981 – 1992

"The assignment of numbers is also handled by Jon. If you are developing a protocol or application that will require the use of a link, socket, port, protocol, or network number **please contact Jon to receive a number assignment.**" (RFC 790)

Addresses and Routing: '83 – '91



Addresses and Routing: ’83 – ’91

Why do we need policies?

- Manage and stabilise addressing and routing growth

Conservation	Aggregation	Registration
• Efficient use of resources • Based on demonstrated need	• Limit routing table growth • Support provider-based routing	• Ensure uniqueness • Facilitate trouble shooting

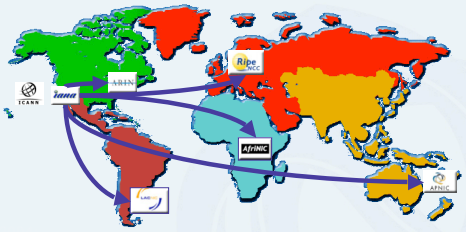
- Answering industry needs
  - ISP industry needs access to resources on an equal basis
  - Uniqueness, fairness and consistency

Enter the RIRs: 1992

next one to three years.” (RFC1366)

“…it is [now] desirable to consider delegating the registration function to an organization in each of those geographic areas.” (RFC 1338)

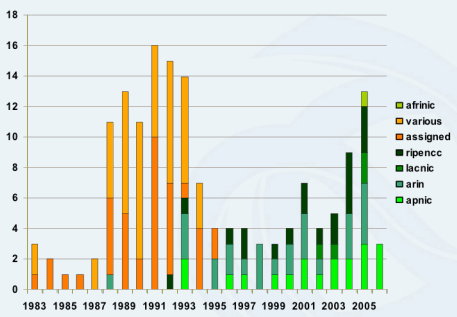
Today: 2002 – 2006



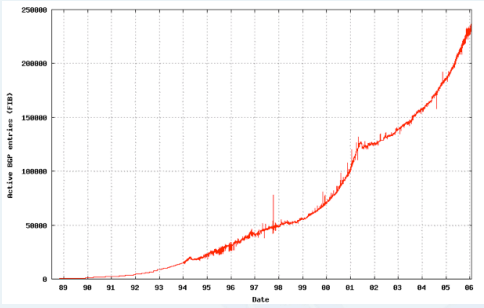
Number Resource Organisation

NRO

Address distribution to 2006 - /8

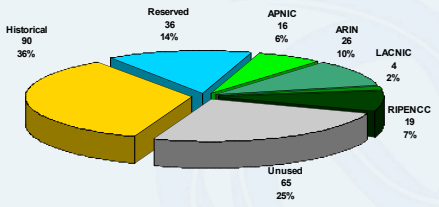


Routing table to 2006



More data in http://bgp.potaroo.net/

IPv4 – IANA distribution



Why have an interest in policy?

- Business reasons
  - Policy affect your business operating environment and are constantly changing
  - Ensure your 'needs' are met
- Responsibility as APNIC member
  - Be aware of the current policies for managing address space allocated to you

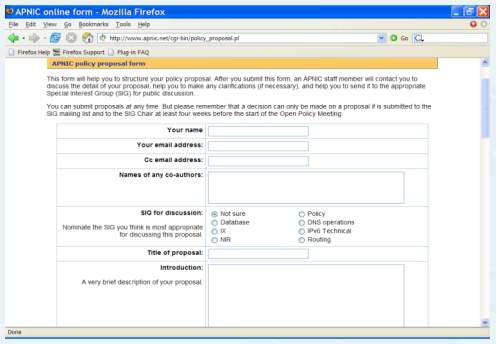
Discussion

- Who has submitted a policy proposal?
- If not, why not?
  - Time poor, not interested, didn't know you could, not your responsibility to do so?
- Recognise that there are problems
  - APNIC is trying to make things easy with an evolutionary approach
    - eg. RSS mailing lists, and new for this meeting podcasts & audio only stream
    - eLearning for training

Demonstration

- Process of submitting proposal form
  - http://www.apnic.net/cgi-bin/policy_proposal.pl
- Recognise you are at this meeting but may not attend future meetings
  - Ways to stay "informed with minimal effort"
  - Catering to on-demand need
    - RSS mailing list announcements
    - Archives of webcasts, podcasts of sessions

Policy proposal web-form

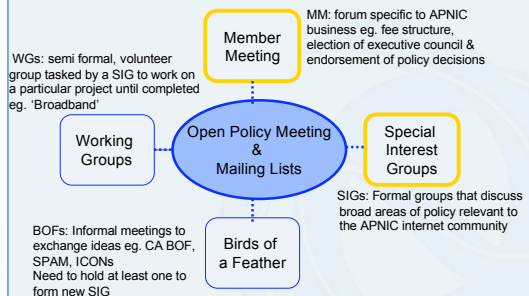


Ways to participate

The policy development process

Need Discuss Consensus Implement

Elements of the process



Facilitating the process

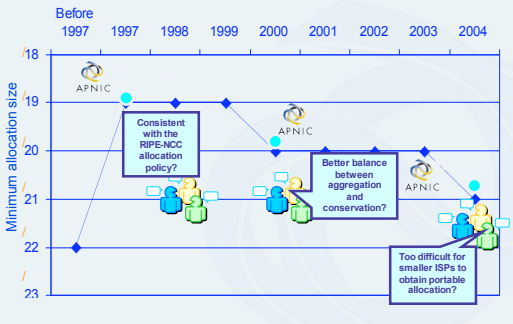
- Policy development facilitation
  - APNIC secretariat is first contact
  - SIG chairs check suitability
  - Discussion in appropriate mailing list
  - Discussion in upcoming SIG and AMM
    - Decision by consensus
- Want a policy change?
  - Discuss with peers
  - Submit a proposal using the form
    - Don't need to be a member to participate
    - Secretariat happy to assist if needed

Case studies

Overview

- IPv4 minimum allocation size
- Privacy of address assignments
- Prevent routing of 'dark' address space
- Portable IPv6 address space assignment

Case 1 – IPv4 allocation size



Case 2

- prop-007-v001: Privacy of customer assignment records
  - Discussed in APNIC 16
- Objective
  - Protect ISP customer assignment information
  - Defines private & public information
- Motivation
  - Privacy and legal responsibility
  - Database registration accuracy
- Adopted
  - Provision of hidden attributes within APNIC database for use with inetnum, inet6num and autnum

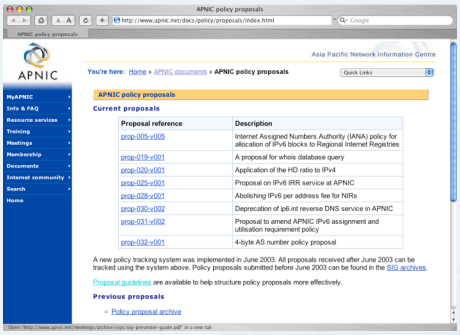
Case 3

- prop-023-v001: A proposal to prevent the routing of 'dark' address space ('unallocated')
  - Discussed in APNIC 18
- Objective:
  - APNIC to revoke allocated IP address space to offenders routing un-allocated address space used for illegal or unsavory practices, eg. Spam
- Motivation
  - Curb spammers
- Did not get support

Case 4

- 2006-4: IPv6 direct portable assignments for end sites
  - New proposal in ARIN for upcoming ARIN XVII (April 2006)
- Objective
  - Orgs multihoming in IPv4 to qualify for portable assignment in IPv6
- Motivation
  - Orgs need to multihome in IPv6
  - No real solution yet

Current policy proposals



http://www.apnic.net/docs/policy/proposals/

What's next?

- This week
  - Attend APNIC 21
  - Discussions are held in SIG sessions and AMM
  - Attend various tutorials
  - Meet and discuss with APNIC staff and hostmaster
- Subscribe to ML if you haven't done so
  - Follow the discussions
  - Contribute to the community, post your thoughts

Summary

- Policies evolve and change continually to reflect changing environment
- Policies are important as they define the way that you use, manage and obtain resources and can impact your business
- We recognise that you have competing priorities
  - We're trying to make it easier for you
- If you have a problem, it's easier to become involved and be heard

Thank you for listening

Questions?

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Efficient address space management tools

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27 February 2006
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Presenters

- Sanjaya
  - Technical Services Manager
- Sall'ee Ryman
  - Training Officer

Maximise address space potential by …

- Introducing you to the internet resource management system
- Understanding how to use the Whois database
- Understanding the functions of MyAPNIC

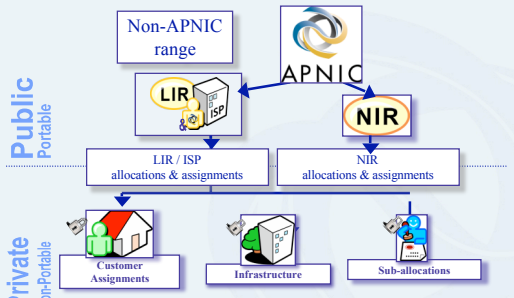
Overview

- IP address space management architecture
  - Public data
  - Private data
- Tools available
  - Whois/auto-dbm
  - MyAPNIC
- Whois case study demo
- MyAPNIC case study demo

Your turn

- Who has used the Whois database?
- Who uses the GUI on the webpage?
- Who uses MyAPNIC?
- Are there any issues you want addressed?

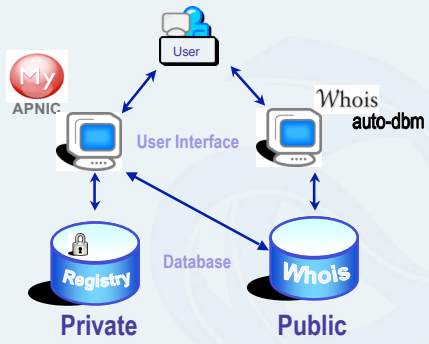
Address space management

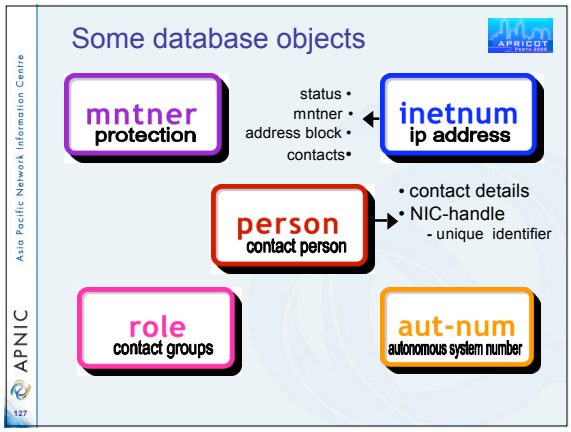


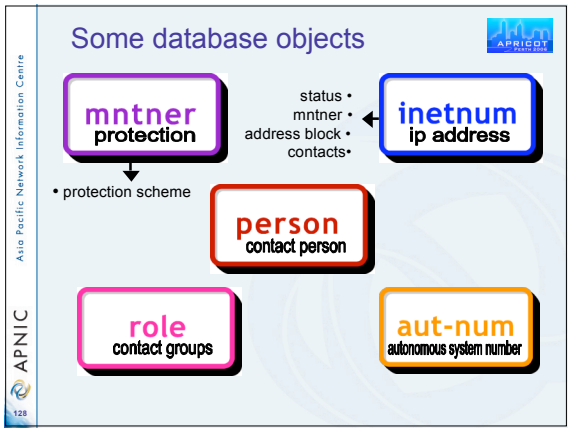
Allocation and assignment

- Allocation
  - A block of address space not yet used to address any networks
  - Held by an IR (or downstream ISP)
  - Public
- Assignment
  - A block of address space used to address an operational network
  - May be used by
    - LIR customers
    - LIR infrastructure
  - Private by default

Database tools




Some database objects
mntner
protection
status •
mntner •
address block •
contacts•
inetnum
ip address
person
contact person
• contact details
• NIC-handle
- unique identifier
role
contact groups
aut-num
autonomous system number
APNIC
Asia Pacific Network Information Centre


Some database objects
mntner
protection
• protection scheme
status •
mntner •
address block •
contacts•
inetnum
ip address
person
contact person
role
contact groups
aut-num
autonomous system number
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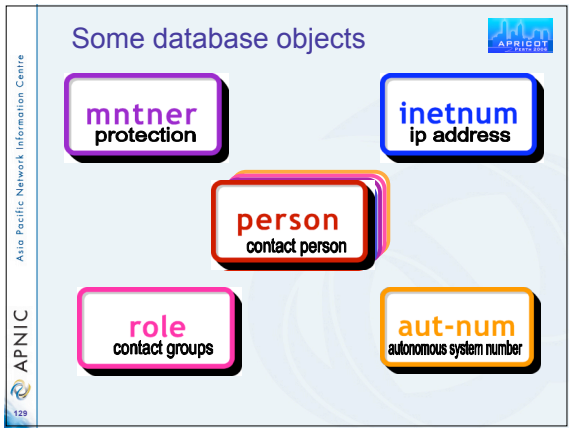
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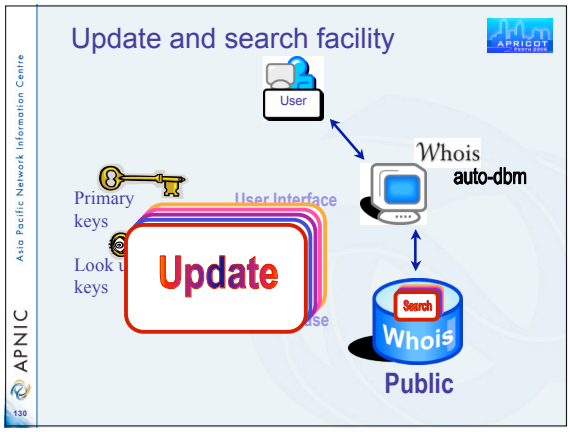
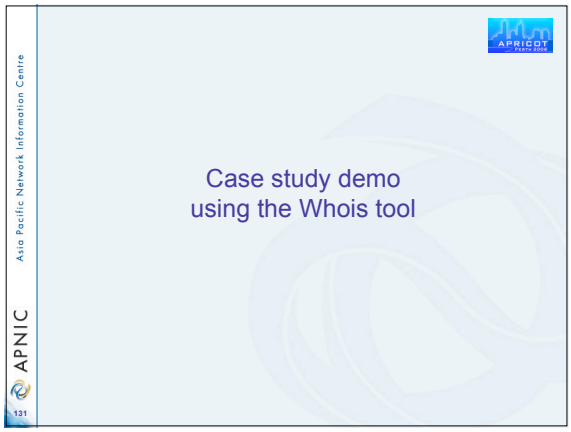
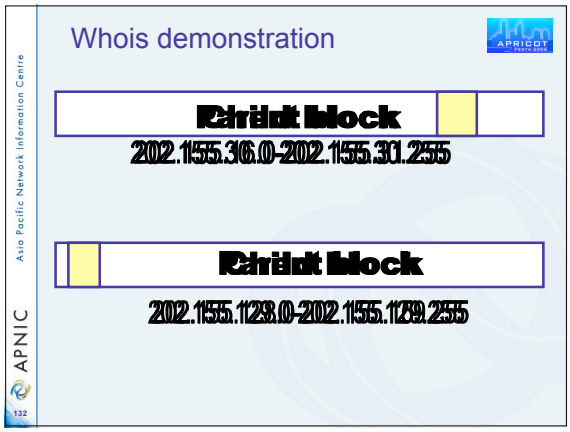
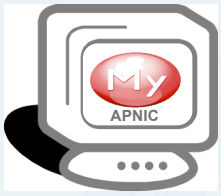

Update and search facility
User
Whois
auto-dbm
Primary
keys
Update
Search
Whois
Public
APNIC
Asia Pacific Network Information Centre


Case study demo
using the Whois tool
APNIC
Asia Pacific Network Information Centre


Whois demonstration
inetnum block
202.155.16.0-202.155.31.255
inetnum block
202.155.128.0-202.155.159.255
APNIC
Asia Pacific Network Information Centre

MyAPNIC



A day-to-day tool to manage your APNIC account and resources

What is MyAPNIC

- A secure member service web interface, allowing each member to access account and resource information, and to invoke specific APNIC services

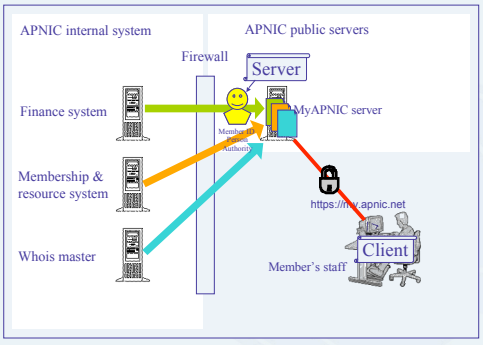
MyAPNIC advantage

- Designed for day-to-day management of resources
- Account self-management
- Easy to use
- Reliable (compared to mail-based update)
- Very secure

MyAPNIC security

- SSL/TLS protection
  - Encrypted transmission data
- Server certificate authentication
- Client certificate authentication
  - APNIC operates as a CA
- Role-based authorisation
  - Functions available to corporate contacts only:
    - Update address
    - Update contact persons

How it works



MyAPNIC menus

- Resource information
  - IPv4, IPv6, ASN
- Administration
  - Membership detail
  - Contact persons
  - Billing history
- Training
  - Training history
- Technical
  - Looking glass
- Tools

Case study demo
using the MyAPNIC tool

Getting access to MyAPNIC

- Apply online for a digital certificate
  1. https://www.apnic.net/ca
  2. Fax/email your photo ID
  3. Download the completed certificate (approx 2 business days after APNIC receives the photo ID)
- Go to https://my.apnic.net

Common issues

- Issues in getting a certificate
  - Forgetting to send the photo ID
  - Downloading the certificate to the wrong computer
- Accessing MyAPNIC
  - Using a computer without a digital certificate
  - Expired certificate
    - It's easy to renew! Just send a new request via https://www.apnic.net/ca (renewals do not require photo ID)

Summary

Maximising address space potential by…

- Knowing how to update and search the public database
- Knowing how to access the information in the public database using Whois
- Knowing how to access my private information using MyAPNIC

Thank you for listening

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Presenters

- Elly Tawhai
  - Internet Resource Analyst

Maximise address space potential by

- Defining what historical addresses are
- Where they come from
- Understanding recent changes and their impact on historical address space

Overview

- Definition of historical (old) space
- Background
- Issues
- Secure data maintenance
- Motivation behind policy
- Policy developments
- Case studies

Definition of historical (old) space

- Pre-RIR allocations/assignments
  - Resources distributed without formal agreement
  - Former AUNIC blocks
    - 203.0.0.0/10
  - Resource distributed by InterNIC
  - Part of address from
    - 202/8 and 203/8
  - Former NZNIC
    - 202.27/16, 202.37/16, 202.36/16, 202.49/16, 202.50/16

Background - Pre-APNIC

- IPv4 addresses allocated by InterNIC (US)
  - APNIC took over this role in 1998
- No formal agreement between registry and organisation
- No policies
- No proper registration
- No fees
  - (cost born by University of California)

Issues & problems (1)

- Registrations inaccurate, outdated, unprotected
  - DB transfer, example: AUNIC to APNIC
  - Difficult to establish custodianship
  - Unauthorised usage of address space
    - Hijacking by spammers and hackers
    - "Stealing" unprotected records
- Address fragmentation
  - Allocations made on classful boundaries
    - Not possible to aggregate announcements

Issues & problems (2)

- "Old addresses" outside the RIR policy framework
  - Low utilisation
  - Lack of registration and reverse delegations
- Cost and fairness
  - Expectation on APNIC of maintenance and service
    - In-addr.arpa
    - Whois
  - Cost carried by APNIC members

Policy developments - overview

Policy	Issues	Motivation
Deprecation of mail-from auth	Mail-from un-secure auth method	Improve security and data accuracy in whois
Removal of lame delegations	Inaccurate DNS data	Improve quality of DNS
Historical prefix exchange policy	Many discontiguous prefixes announced	Reduce routing table size
Protecting historical records	Expectation of maintence & service Hijacking of address space	Prevent unauthorised use Secure maintenance Establishing custodianship
Transfer of historical resources	Old contact information Unused address space	Resource transferred to correct custodian "Old" space brought into policy framework
Recovery of unused historical space	Unused address space Potential use for spamming and hacking	Recover unused address space

Policy developments - data maintenance

- Secure data maintenance
  - MyAPNIC and Certificates
    - Highly secure maintenance tool
  - Customer privacy
    - Removal of incorrect customer data
  - Better Whois database security
    - Depreciation of mail-from
    - Removal of maint-null

Policy developments - routing table

- Historical prefix exchange policy
  - Reduce routing table size
  - Swap 3 or more discontiguous prefixes for single prefix, no charge
    - http://www.apnic.net/docs/policy/historical-resource-policies.html#7
  - Form for returning addresses
    - http://ftp.apnic.net/apnic/docs/address-return-request

Policy developments - whois

- Protecting historical resource records in the APNIC Whois Database
  - Protect historical resource objects in APNIC Whois Database
    - Prevent unauthorised use of resources
      - mnt-by: APNIC-HM
    - http://www.apnic.net/docs/policy/historical-resource-policies.html#4
  - Existing custodians wish to update records establish formal agreement with APNIC and pay service fee
    - US$100 per account

Policy developments - DNS

- Removing lame delegations
  - Repair or remove persistently lame DNS delegations
  - DNS delegations are lame if:
    - Some or all of the registered DNS nameservers are unreachable or badly configured
    - http://www.apnic.net/services/rev-del/lame-del/index.html

Policy developments - Internet resources

- Transfer of historical Internet resources
  - Bring historical resource registrations into the current policy framework
    - http://www.apnic.net/docs/policy/historical-resource-policies.html#6
    - Allows transfers from 'historical' to 'current' status
    - Allow transfers of historical resources to APNIC members
      - the recipient of the transfer must be an APNIC members
      - no technical review or approval
      - custodianship must be verified
      - resources will then be considered "current"
  - Address space subject to current policy framework

Policy developments - Internet resources

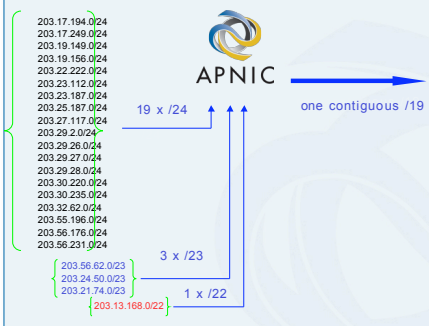
- Recovery of unused historical address space
  - Recover unused historical IPv4 addresses in the AP region
    - http://www.apnic.net/docs/policy/historical-recovery-guide.html
    - Unused and un-contactable
    - Potential target for hijacking
      - Maybe used for hacking, spamming, etc.
  - Administrative steps proposed
    - Notification and updating registry information

Case studies

Case 1 - HAPPY-AU

- Historical prefix exchange
  - An APNIC member has acquired many smaller companies with historical IPv4 address space and wish to exchange for contiguous block

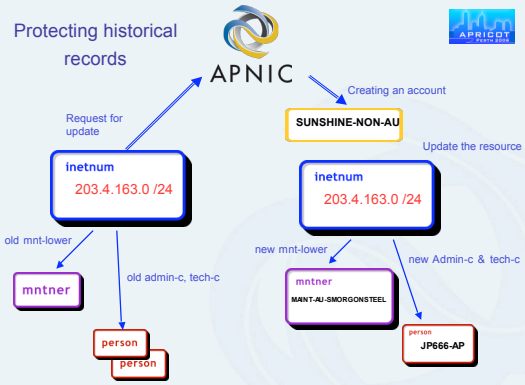
Historical prefix exchange



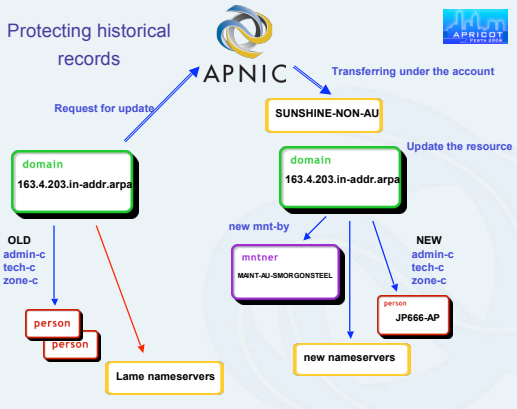
Case 2 - SUNSHINE-NON-AU

- Protecting historical records
  - A company has historical address space registered with invalid contact and out of date information. They would like to update registration details in whois db.

Protecting historical records



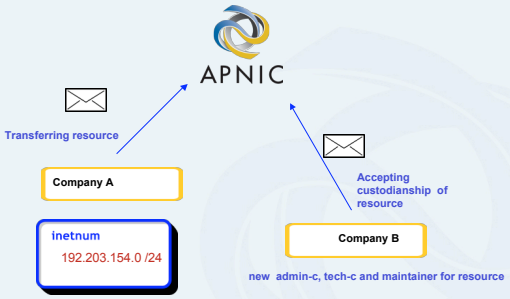
Protecting historical records



Case 3 - FUNNY-AU

- Transfer of historical internet resources
  - Company A acquired by company B. Company B wish to update records to their organisation.

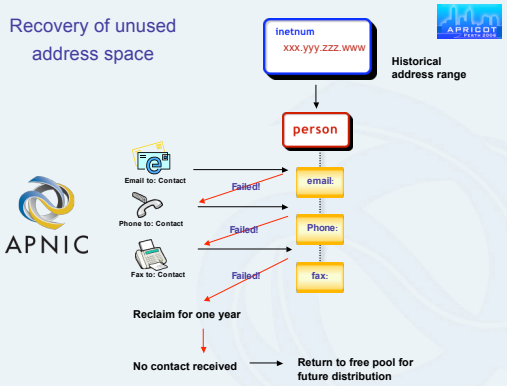
Historical transfer



Case 4

- Recovery of unused address space
  - A /22 has not been globally routed since 1 January 1998 based on data from Oregon University. Therefore the following process takes place to contact with registered admin-c and tech-c.

Recovery of unused address space



Other cases not covered?

- What is your experience?
  - Do you have issues or questions not covered in this session?

Summary

Maximising address space potential by…

- By understanding what is historical (old) address space
- Policies involved, motivation and effects they have

Thank you for listening

Questions?

What we've talked about today

9 am - 10.30 am	Technical infrastructure, education, policy and APNIC
11 am - 12.30 pm	Creating policies that work for you
2 pm - 3.30 pm	Efficient address space management tools
4 pm - 5.30 pm	Managing your "old" address space

Did we meet the objectives?

- Gaining understanding of APNIC in a global Internet context
- Learning how to formulate and participate in policy making
- Understanding how to manage your resources more effectively
- Explaining issues to us so we can learn from you!

Questions / discussion

- Questions from this morning & lunch answered?
  - Additional questions?
- Talk to us here
  - We'll be here all week
- Specific issues / cases?
  - Make an appointment with the HMC
    - Discuss your particular situation with the APNIC hostmasters
- Policy issues?
  - Come to the Policy-SIG on Thursday
    - Speak your mind! :-)
  - Put forward a proposal

Thank you for listening