APNIC Update

19 June 2006, Apia, Samoa

In conjunction with PacNOG2

Overview

- About APNIC
  - Policy development
  - Services
  - Pacific allocation trends
- Address management
- IPv6 update
- Reverse DNS delegations
- Q&A

Presenters

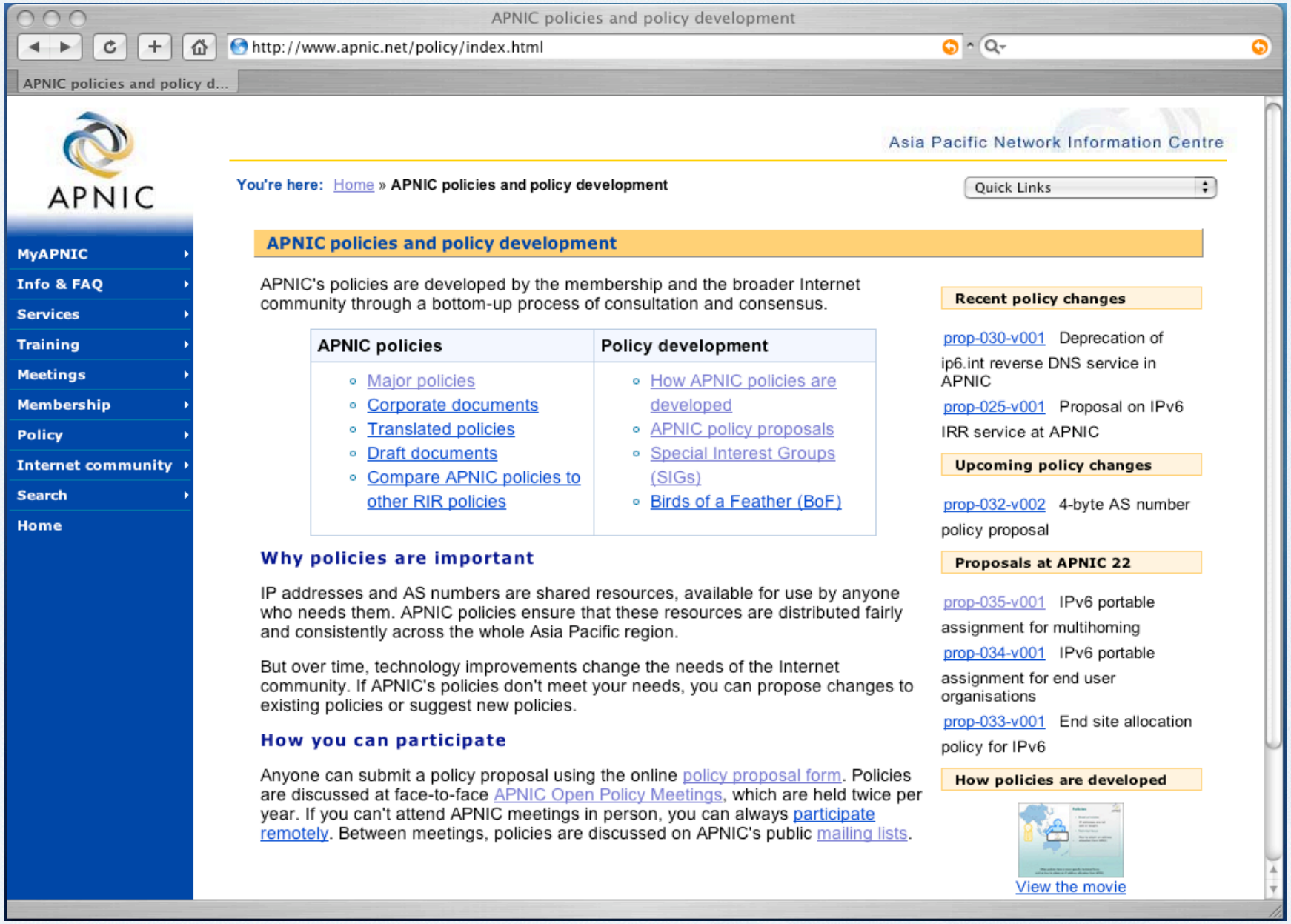
- Savenaca Vocea
  - Policy Development Manager
- Champika Wijayatunga
  - Senior Training Specialist

About APNIC (recap)

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

Policy development

Policy page


APNIC policies and policy development
http://www.apnic.net/policy/index.html
APNIC policies and policy d...
APNIC
Asia Pacific Network Information Centre
You're here: Home » APNIC policies and policy development
Quick Links
MyAPNIC
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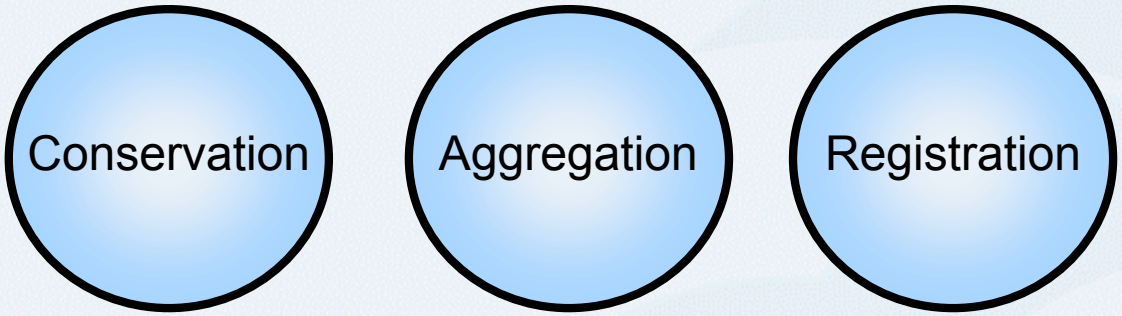
APNIC policies and policy development
APNIC's policies are developed by the membership and the broader Internet community through a bottom-up process of consultation and consensus.
APNIC policies
Major policies
Corporate documents
Translated policies
Draft documents
Compare APNIC policies to other RIR policies
Policy development
How APNIC policies are developed
APNIC policy proposals
Special Interest Groups (SIGs)
Birds of a Feather (BoF)
Why policies are important
IP addresses and AS numbers are shared resources, available for use by anyone who needs them. APNIC policies ensure that these resources are distributed fairly and consistently across the whole Asia Pacific region.
But over time, technology improvements change the needs of the Internet community. If APNIC's policies don't meet your needs, you can propose changes to existing policies or suggest new policies.
How you can participate
Anyone can submit a policy proposal using the online policy proposal form. Policies are discussed at face-to-face APNIC Open Policy Meetings, which are held twice per year. If you can't attend APNIC meetings in person, you can always participate remotely. Between meetings, policies are discussed on APNIC's public mailing lists.
Recent policy changes
prop-030-v001 Deprecation of ip6.int reverse DNS service in APNIC
prop-025-v001 Proposal on IPv6 IRR service at APNIC
Upcoming policy changes
prop-032-v002 4-byte AS number policy proposal
Proposals at APNIC 22
prop-035-v001 IPv6 portable assignment for multihoming
prop-034-v001 IPv6 portable assignment for end user organisations
prop-033-v001 End site allocation policy for IPv6
How policies are developed
View the movie

Policy in the APNIC region

- Policy goals
  - Lessons learnt from past



- Who creates 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?

Status in IPv4 policy discussions

Proposal discussion	RIR	Status
Apply HD ratio for IPv4 allocations	APNIC, LACNIC RIPE	No consensus No consensus Withdrawn
Resource recovery	LACNIC	Consensus
Global addresses for private network inter-connectivity	ARIN	Adopted
Address space for anycast services	RIPE ARIN	In review period Abandoned

Status in IPv6 policy discussions

Proposal discussion	RIR	Status
HD ratio to 0.94	APNIC ARIN RIPE LACNIC	Endorsed Adopted Under discussion Under final discussion
Amend IPv6 assignment and utilisation requirements	APNIC ARIN RIPE	Under discussion by these RIRs
IPv6 blocks from IANA to RIRs (global policy)	ALL	Endorsed in all regions
Address space for anycast services	RIPE	Under discussion
IPv6 portable assignment (multihoming solution)	ALL	Under discussion

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

Next meetings

- APNIC 22
  - Kaohsiung, Taiwan
  - 4 to 8 September 2006

- APRICOT 2007, APNIC 23
  - Bali, Indonesia
  - 27 February to 2 March 2007

All invited !!!

http://www.apnic.net/meetings

APNIC secretariat services

Education & support

- 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, PITA, PICISOC
    - Root server operators (F, K, I)
    - ISOC-AU and others..

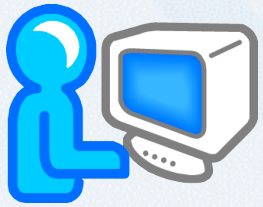
Root servers support

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

Available training courses

- Core courses
  - Internet Resource Management
- Tutorials
  - Security, Internet Routing Registry, Spam
- Technical workshops
  - DNS, Routing essentials
- Courses under development
  - IPv6 services workshop

- Plan to offer above through eLearning
  - Pilot module to be tested soon
  - Interested in testing?
    - Ask us or email training@apnic.net



- Material, information, schedules, sponsorship

http://www.apnic.net/training

It's easy to use

Simply log on & Follows the symbols

View:
A demonstration

Help:
a range of options

Explore:
Objects of a lesson

Forum: best way to seek help & discuss issues

Practice:
A process

Home: Main menu

Launching in September 2006

Interacting with Secretariat

- 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

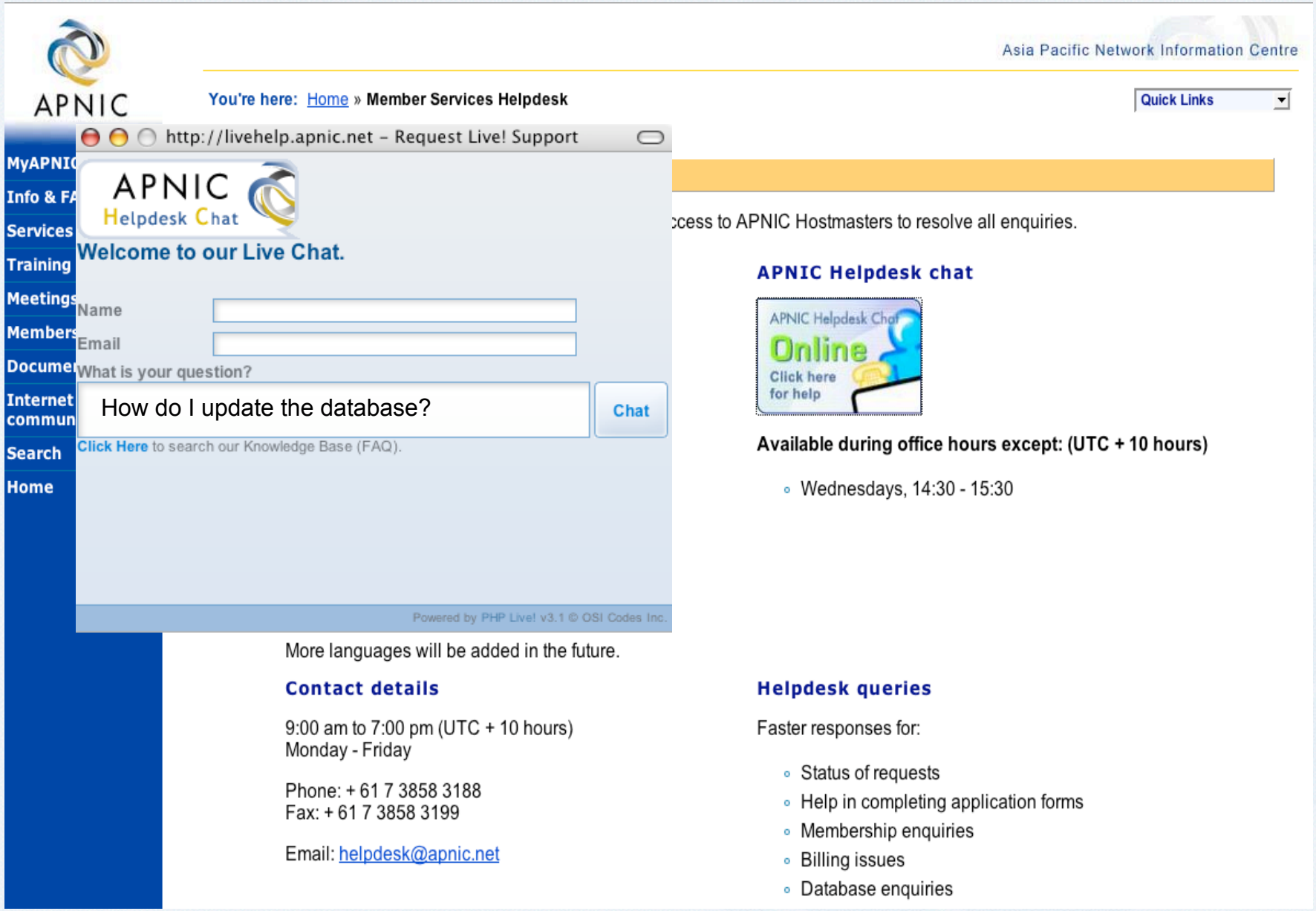
Helpdesk hours

9:00 am – 7:00 pm (AU EST, UTC + 10 hrs)

ph: +61 7 3858 3188 fax: 61 7 3858 3199

- VOIP service trial
  - low international call rates to helpdesk!
    - SIP: helpdesk@voip.apnic.net

Helpdesk “chat” service



icons.apnic.net

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

RnD

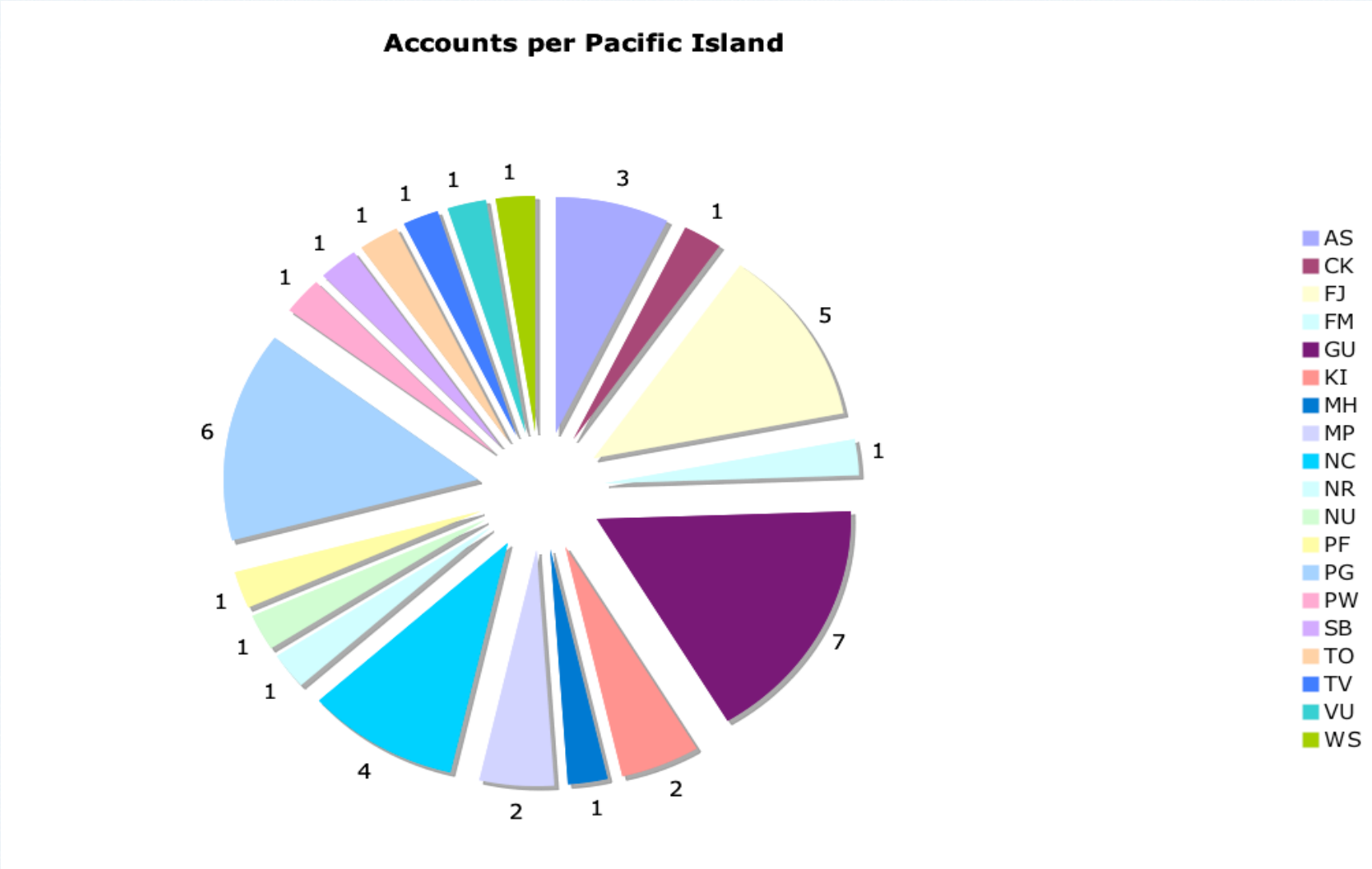
- Resource certification
  - Trial began in 2005
  - Full service trial in 2006
- Prefix history analysis
  - 8-year history of 650,000 prefixes (20 Gb)
  - Query prefix advert history, ASN details etc
  - Supporting debogon and reclamation projects
- ASNs
  - Consumption estimates
  - 32-bit ASN study and proposals
- Internet resource reports and projections
  - http://www.potaroo.net

Other activities

- Communications
  - Internal multimedia productions
  - More translation and publication activity
- Internet “governance”
  - WSIS Tunis – Internet Pavilion
  - ORDIG - Open Regional Dialog on Internet Governance (UNDP)
  - ICANN, WSIS, WGIG, IGF … … …
- Pan Asia ICT R&D grants programme
  - APNIC, IDRC, UNDP, ISOC
  - Practical technical research solutions to ICT challenges in developing world

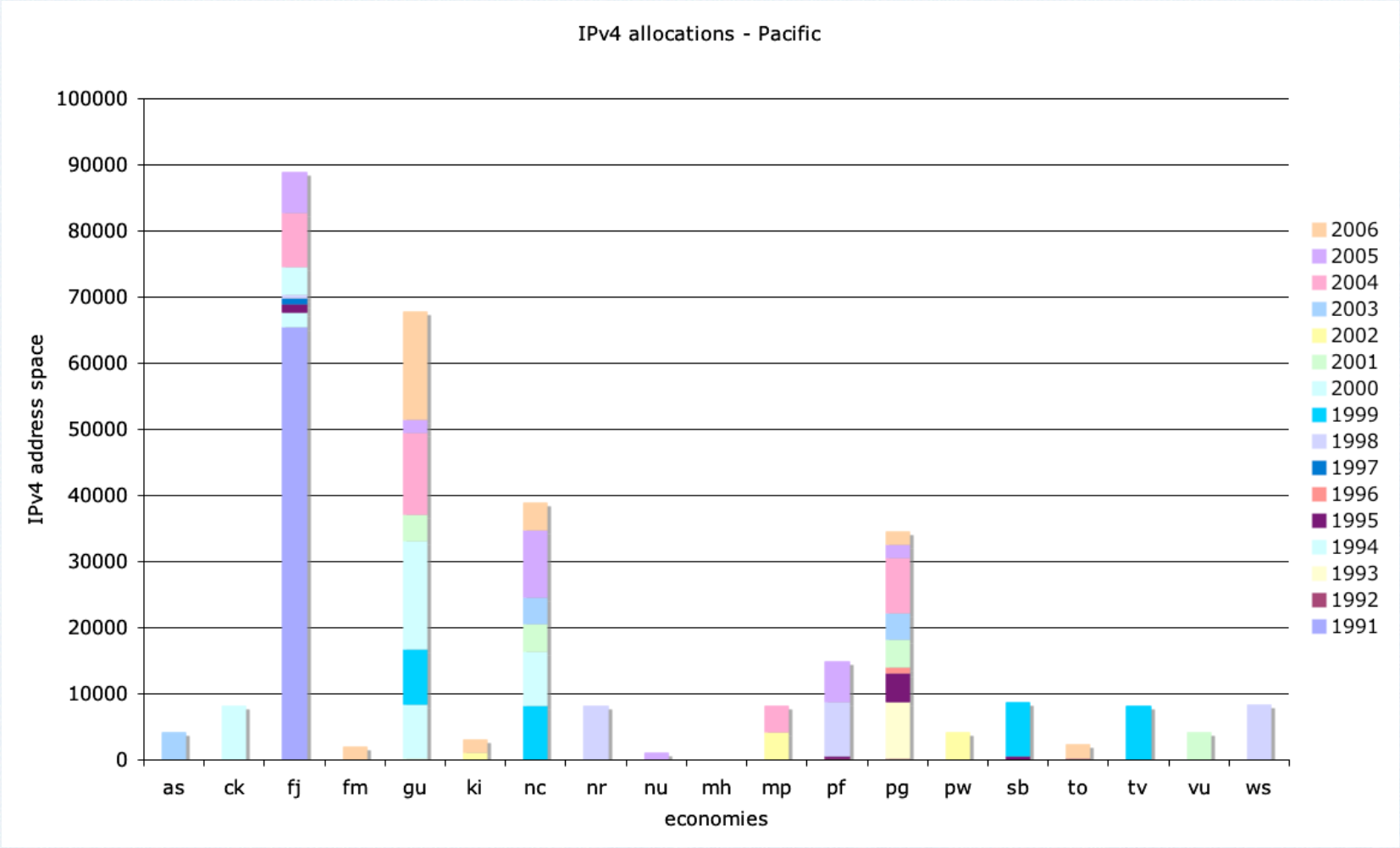
Pacific Islands allocation trends

Current accounts in the Pacific

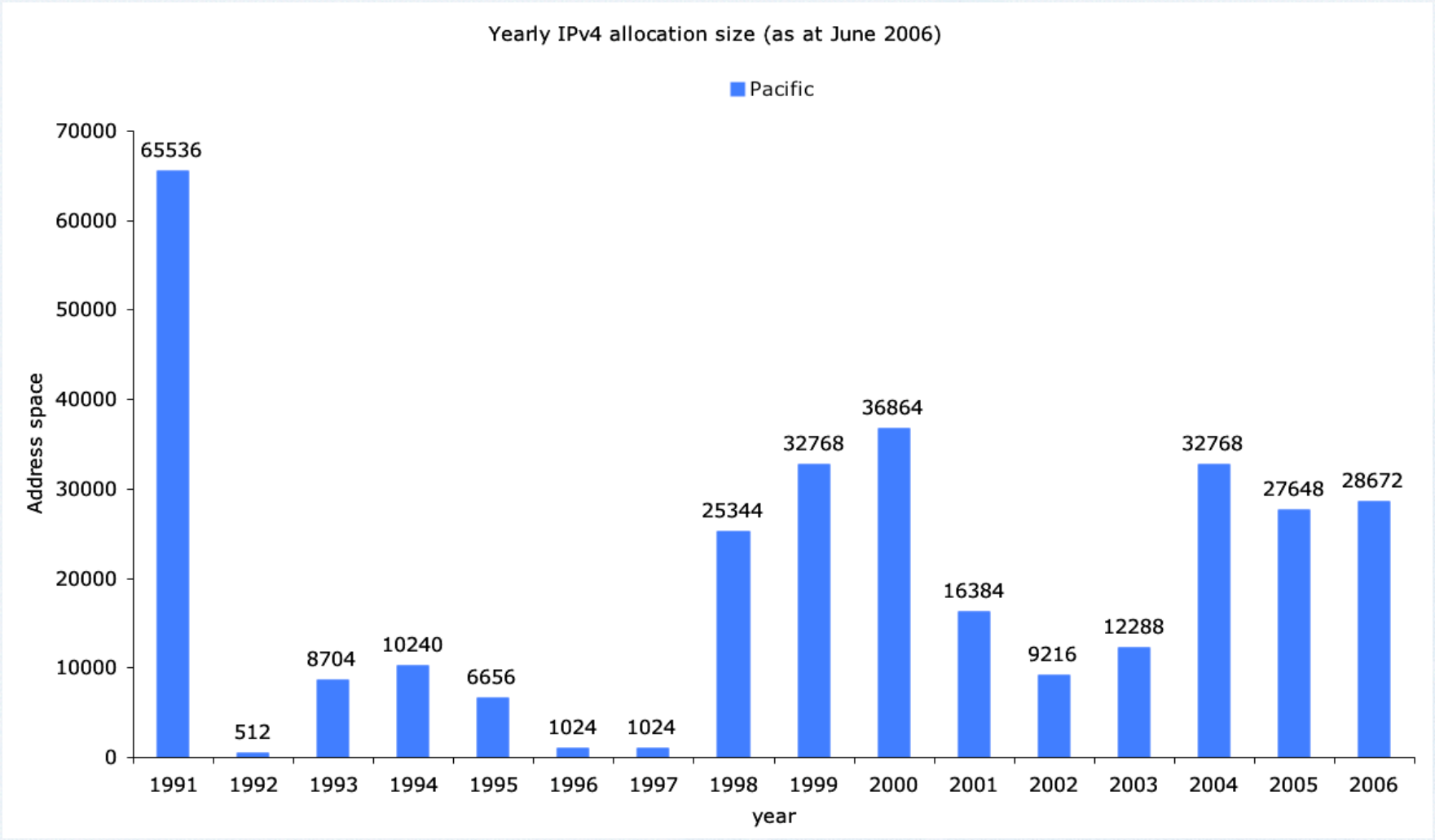


http://www.apnic.net/member/current-members.html

IPv4 address allocation by economy

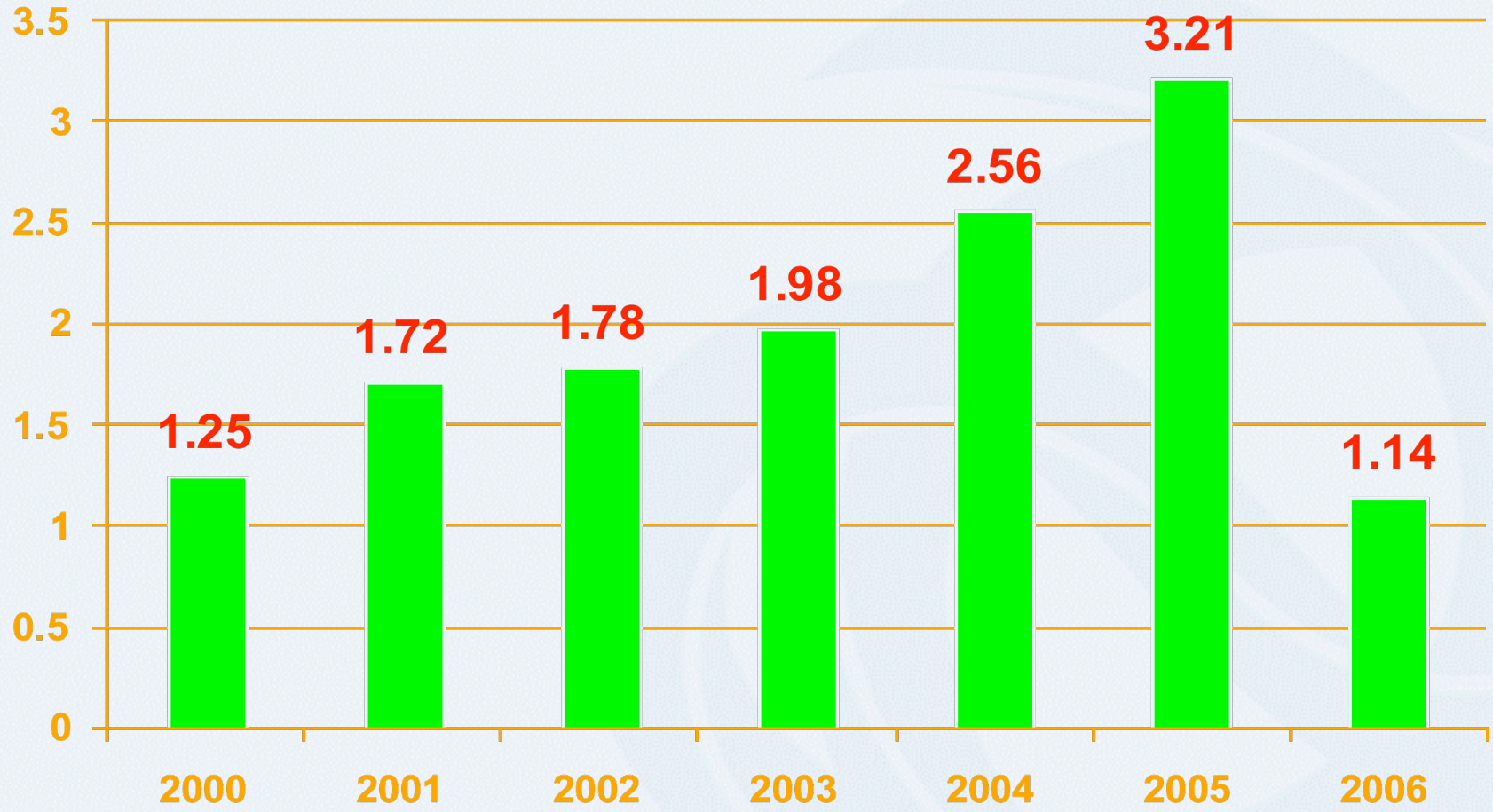


IPv4 allocation by year to the Pacific

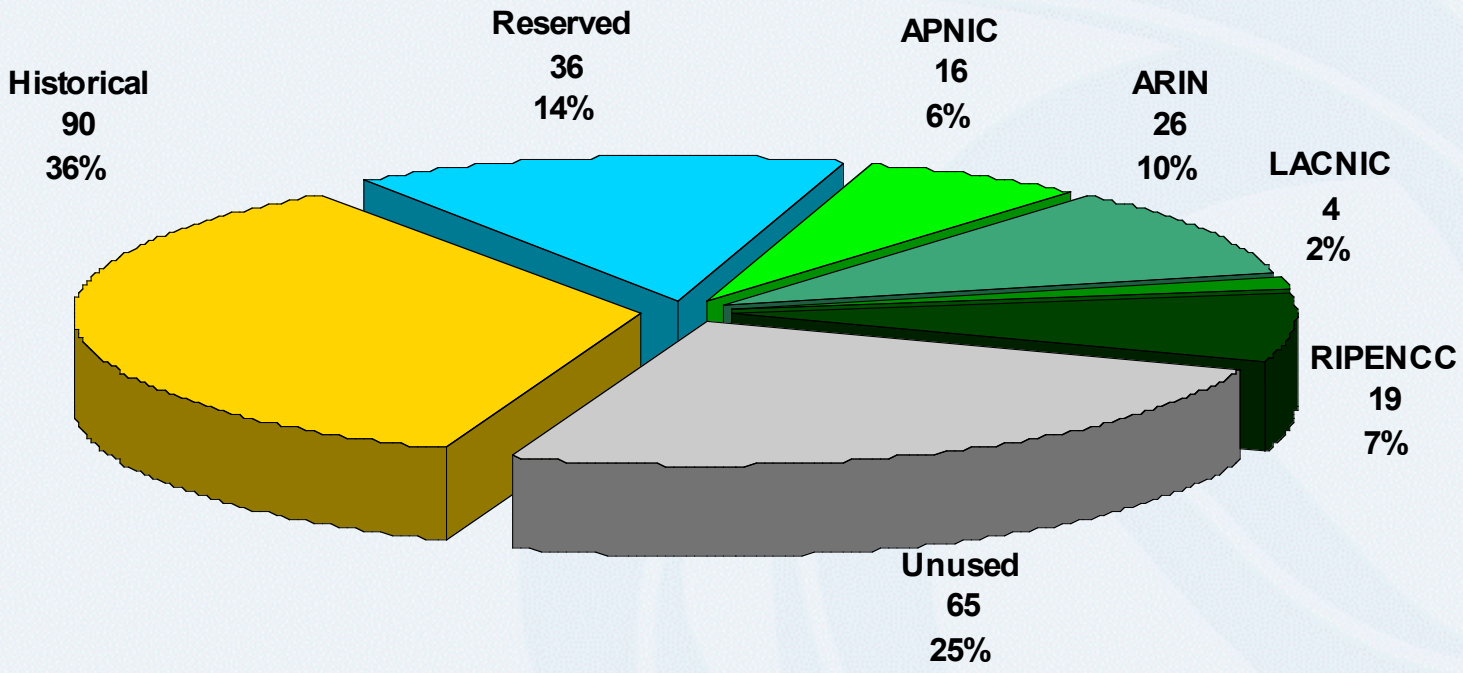


APNIC and global statistics

APNIC IPv4 allocations (/8s) by year



IPv4 - IANA distribution



Last update: Mar 2006

IP resource utilisation

- Various Pacific country reports mention plans to deploy:
  - ADSL, Broadband, Wireless and NGN
  - Have you sufficient IP addresses for these services?
- Verify utilisation
  - APNIC Whois database records up to date?
  - 80% utilisation rule for subsequent allocation
  - Use MyAPNIC

Essential RIR terminology

Allocation and assignment

Allocation

"A block of address space held by an IR (or downstream ISP) for subsequent allocation or assignment"

- Not yet used to address any networks

Assignment

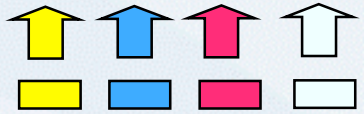
"A block of address space used to address an operational network"

- May be provided to LIR customers, or used for an LIR's infrastructure ('self-assignment')

Portable & non-portable

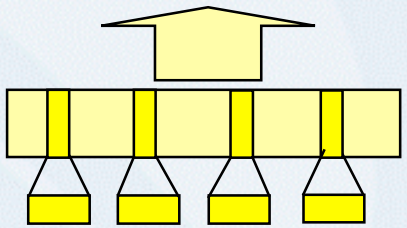
Portable Assignments

- Customer addresses independent from ISP
  - Keeps addresses when changing ISP
- Bad for size of routing tables
- Bad for QoS: routes may be filtered, flap-dampened



Non-portable Assignments

- Customer uses ISP's address space
  - Must renumber if changing ISP
- Only way to effectively scale the Internet



Portable allocations

- Allocations made by APNIC/NIRs"

Objectives of IP address management

Address management objectives

Conservation

- Efficient use of resources
- Based on demonstrated need

Aggregation

- Limit routing table growth
- Support provider-based routing

Registration

- Ensure uniqueness
- Facilitate trouble shooting

Uniqueness, fairness and consistency

Registration & management of address space

APNIC:

- Selects range to allocate to member

- Registers allocation in DB

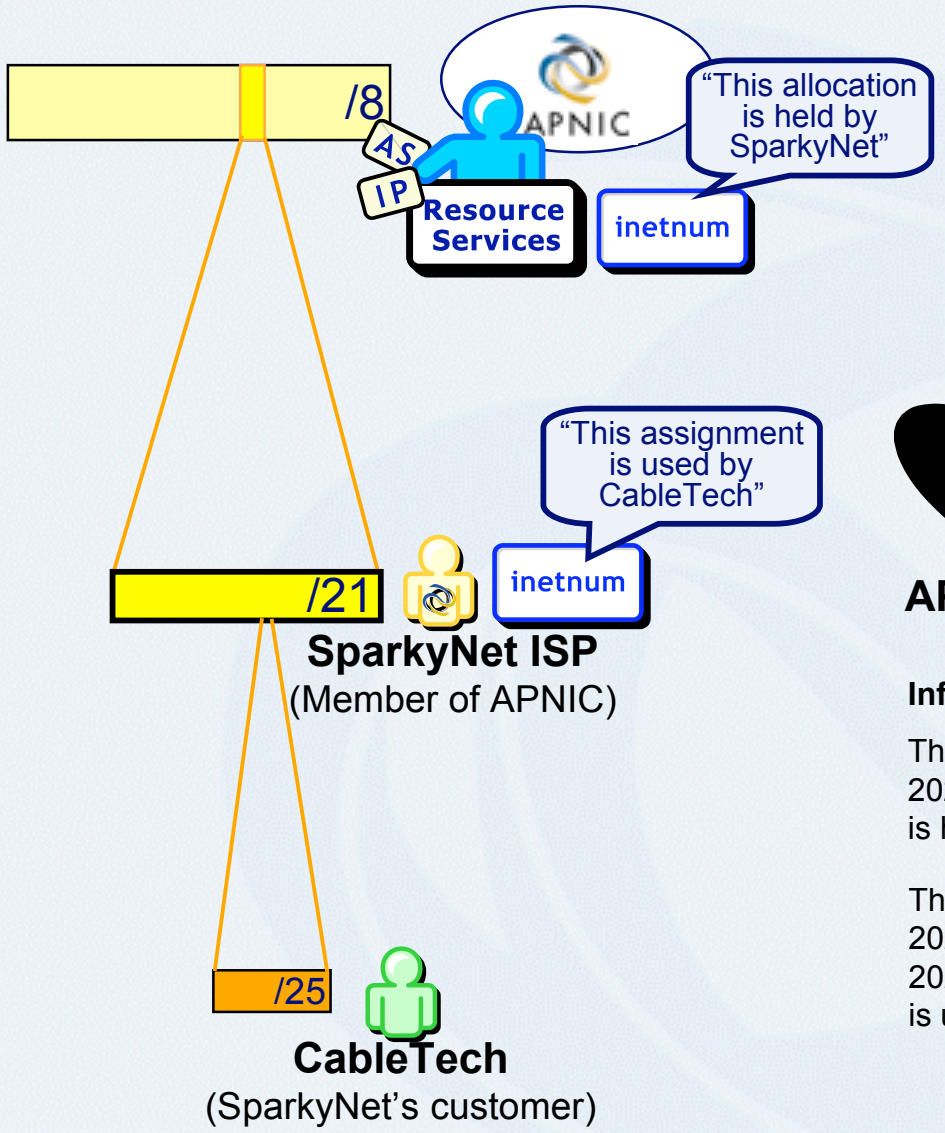
- Allocates the addresses to member

Member:

- Selects range to assign to customer

- Registers assignment in DB

- Assigns the addresses to customer

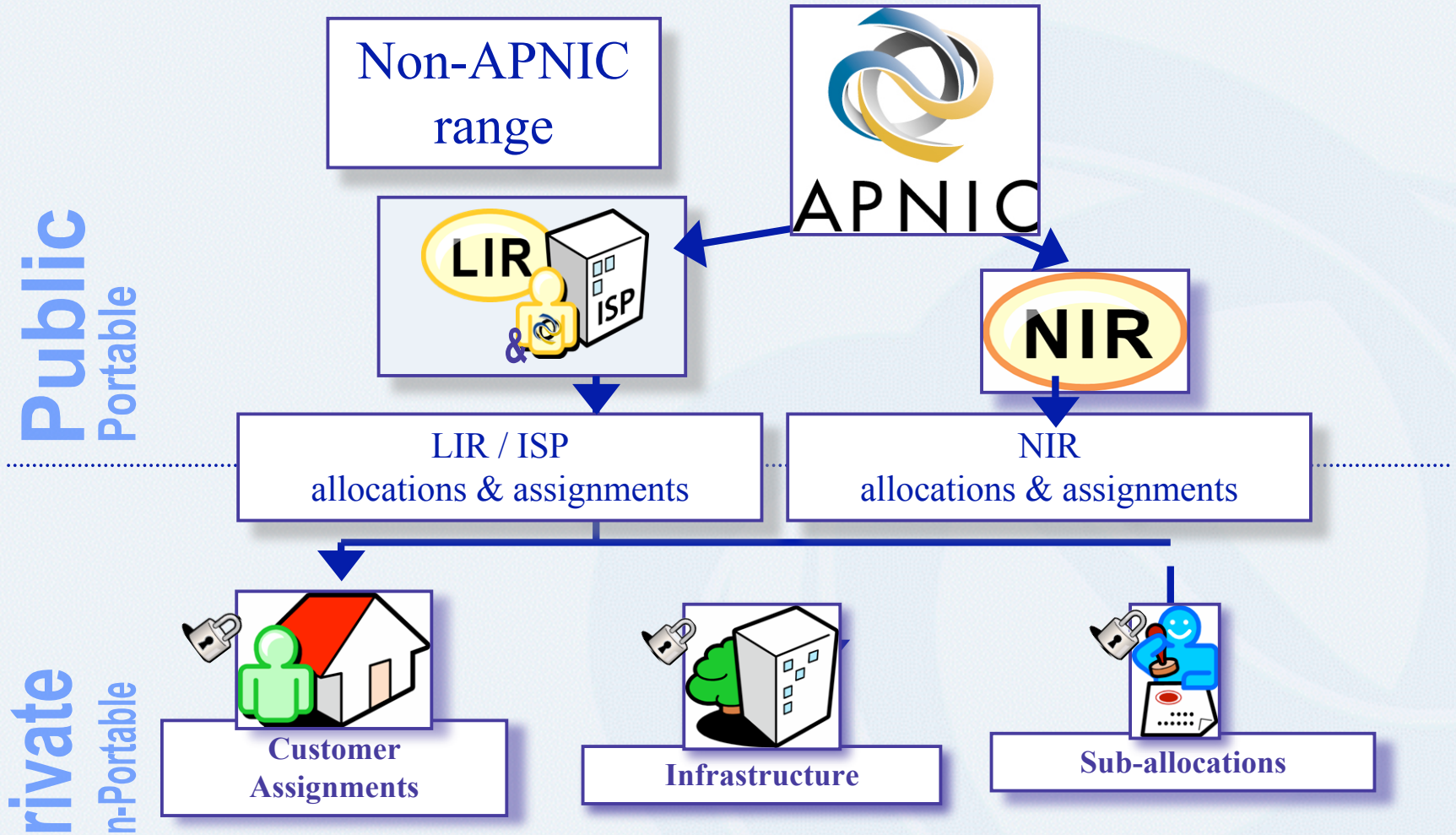


Information in Database:

The allocation
202.12.0.0– 202.12.7.255
is held by SparkyNet

The assignment
202.12.1.0 –
202.12.1.127
is used by CableTech

Registration & management of address space



When can I come back for more addresses?

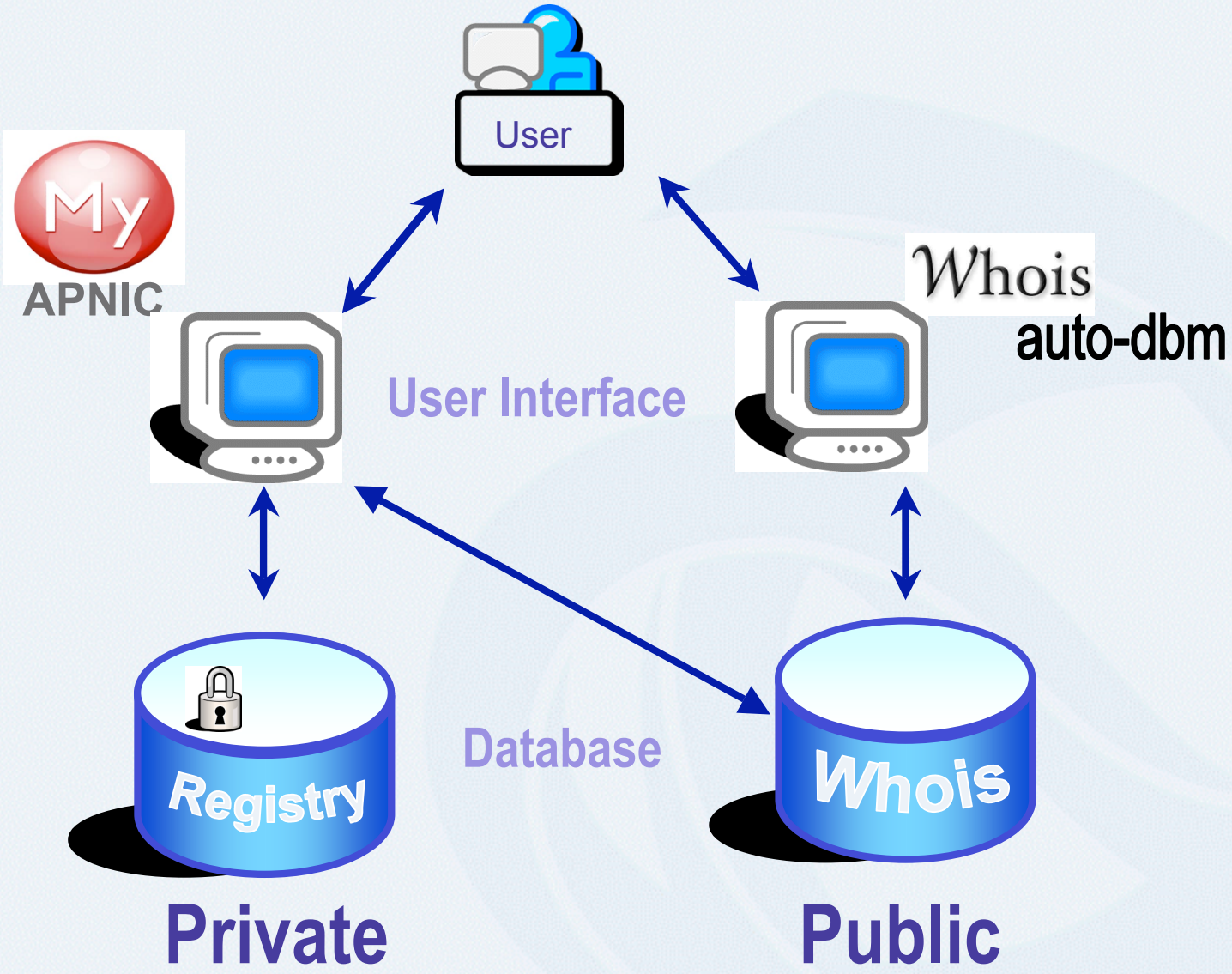
- Under IPv4, address space utilisation measured as simple percentage:

$$\text{utilisation} = \frac{\text{Assigned address space}}{\text{Available address space}}$$

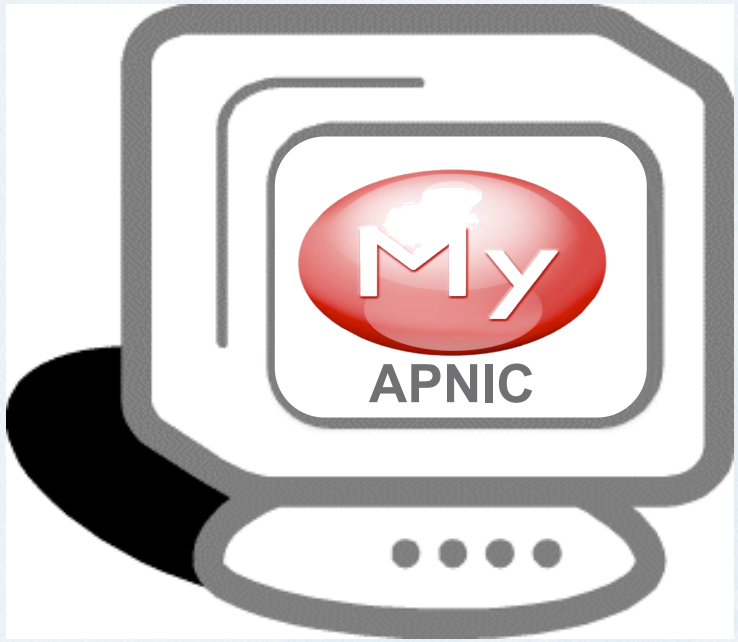
- IPv4 utilisation requirement is 80%
  - When 80% of address space has been assigned or allocated, LIR may receive more
    - E.g. ISP has assigned 55000 addresses of /16

$$\frac{\text{Assigned address space}}{\text{Available address space}} = \frac{55{,}000}{65{,}536} = 84\%$$

Database tools



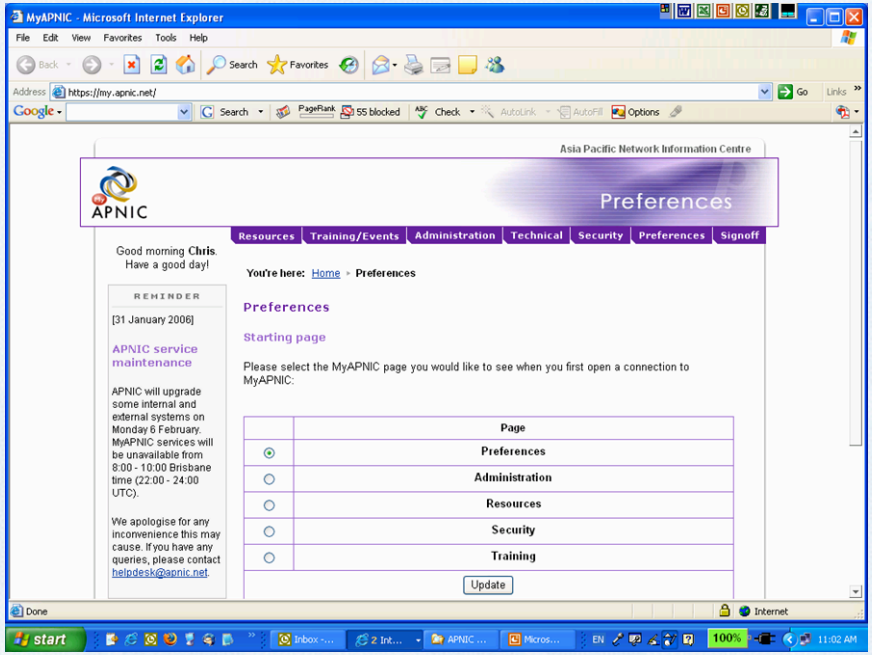
MyAPNIC



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

What is MyAPNIC

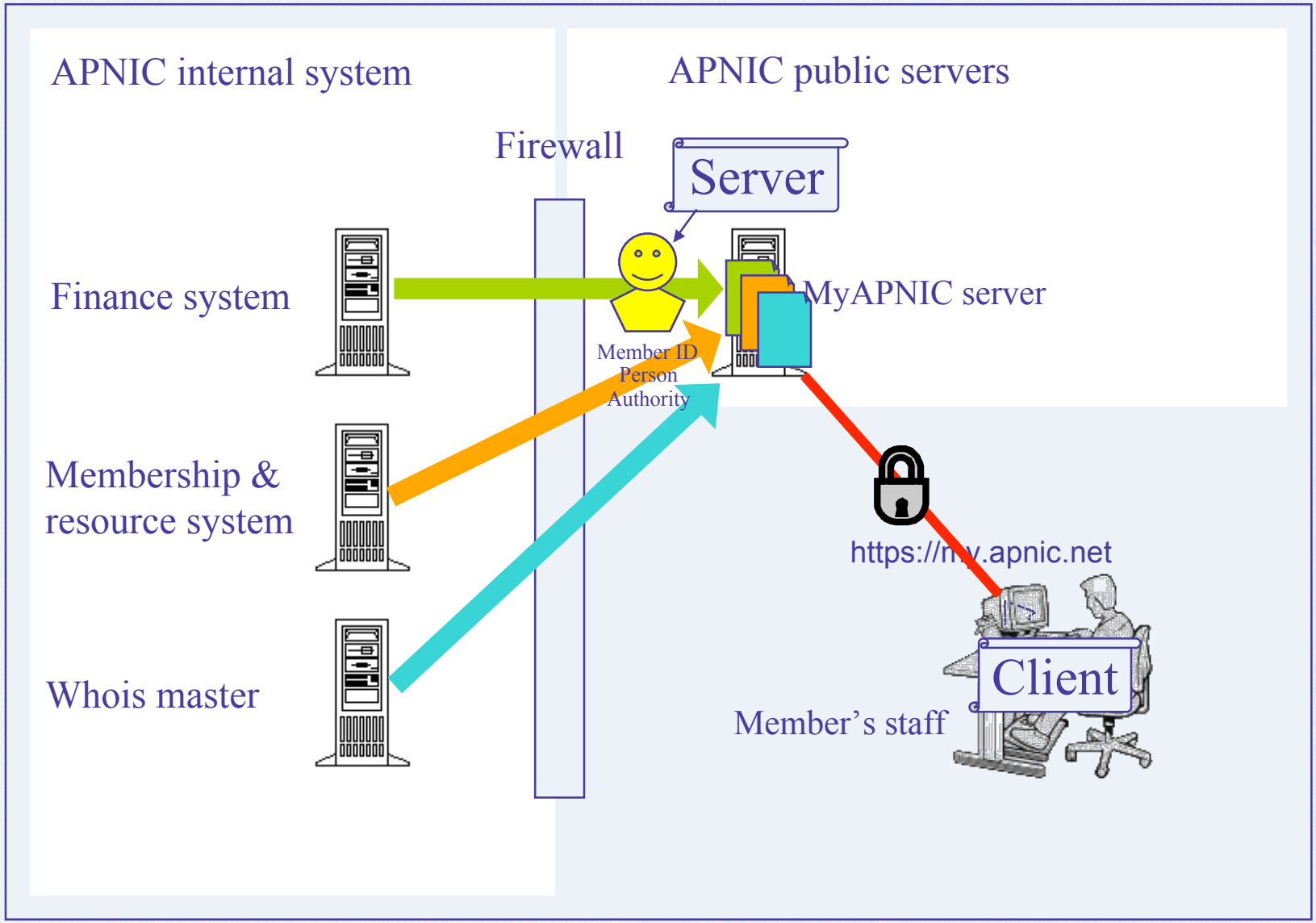
- A secure member service web interface, allowing each member to access account and resource information, and to invoke specific APNIC services



MyAPNIC advantage

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

How it works


APNIC internal system
APNIC public servers
Firewall
Server
Finance system
MyAPNIC server
Member ID
Person
Authority
Membership &
resource system
https://my.apnic.net
Client
Member's staff
Whois master

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

Questions?

IPv6 Policy framework

IPv6 addressing

- 128 bits of address space
- Hexadecimal values of eight 16 bit fields
  - X:X:X:X:X:X:X:X (X=16 bit number, ex: A2FE)
  - 16 bit number is converted to a 4 digit hexadecimal number
- Example:
  - FE38:DCE3:124C:C1A2:BA03:6735:EF1C:683D
  - Abbreviated form of address
    - 4EED:0023:0000:0000:0000:036E:1250:2B00

    →4EED:23:0:0:0:36E:1250:2B00

    →4EED:23::36E:1250:2B00

    (Null value can be used only once)

IPv6 address policy goals

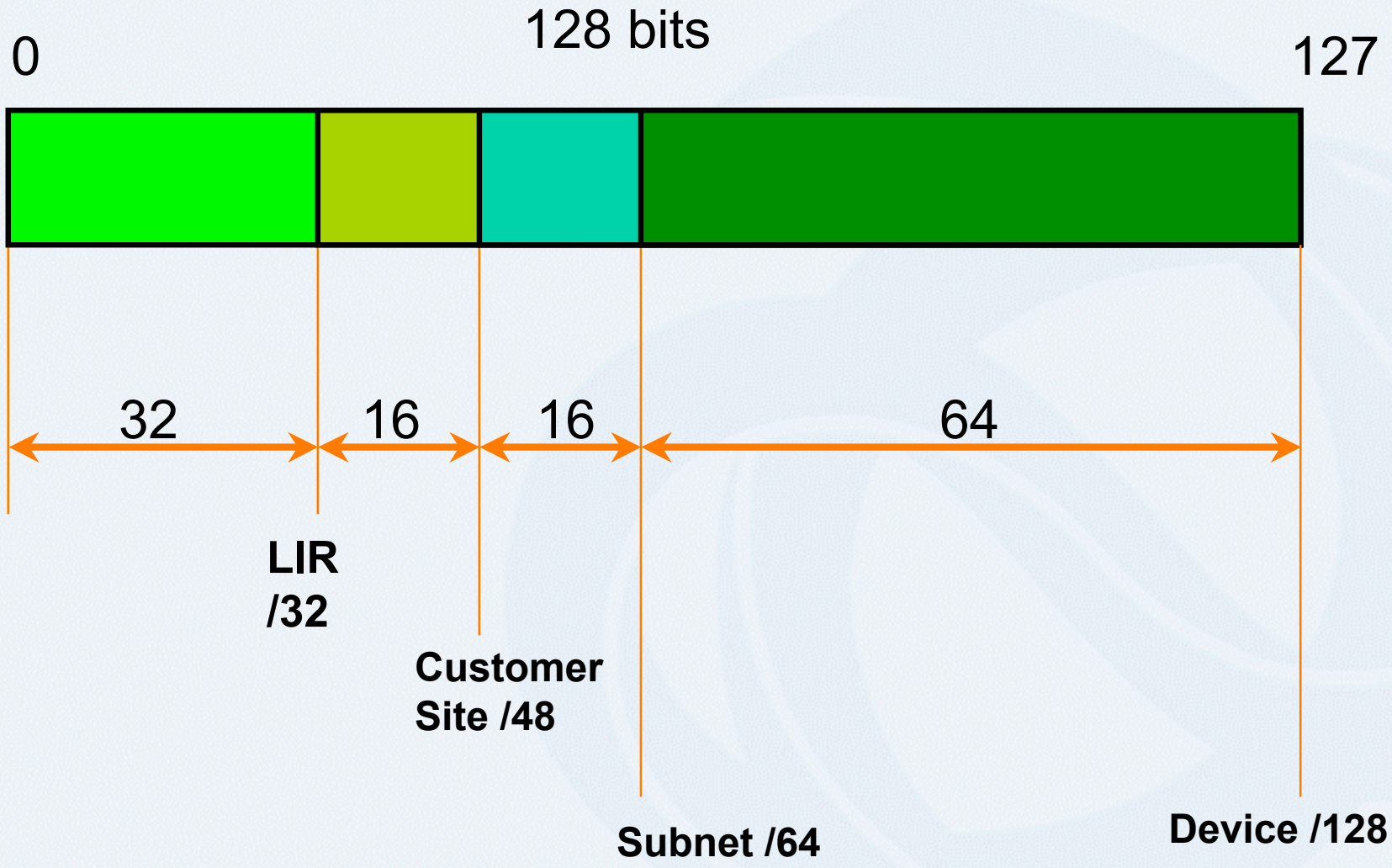
- Efficient address usage
  - Avoid wasteful practices
- Aggregation
  - Hierarchical distribution
  - Aggregation of routing information
  - Limiting number of routing entries advertised
- Registration, Uniqueness, Fairness & consistency

Same as IPv4

- Minimise overhead
  - Associated with obtaining address space

- Like IPv4, policy framework is changing

IPv6 addressing structure



IPv6 initial allocation

- Initial allocation criteria
  - Plan to connect 200 end sites within 2 years
    - Default allocation (“slow start”)
- Initial allocation size is /32
  - Provides 16 bits of site address space

  - Larger initial allocations can be made if justified according to:
    - IPv6 network infrastructure plan
    - Existing IPv4 infrastructure and customer base

IPv6 utilisation

- Utilisation determined from end site assignments
  - LIR responsible for registration of all /48 assignments
  - Intermediate allocation hierarchy not considered
- Utilisation of IPv6 address space is measured differently from IPv4

IPv6 utilisation requirement

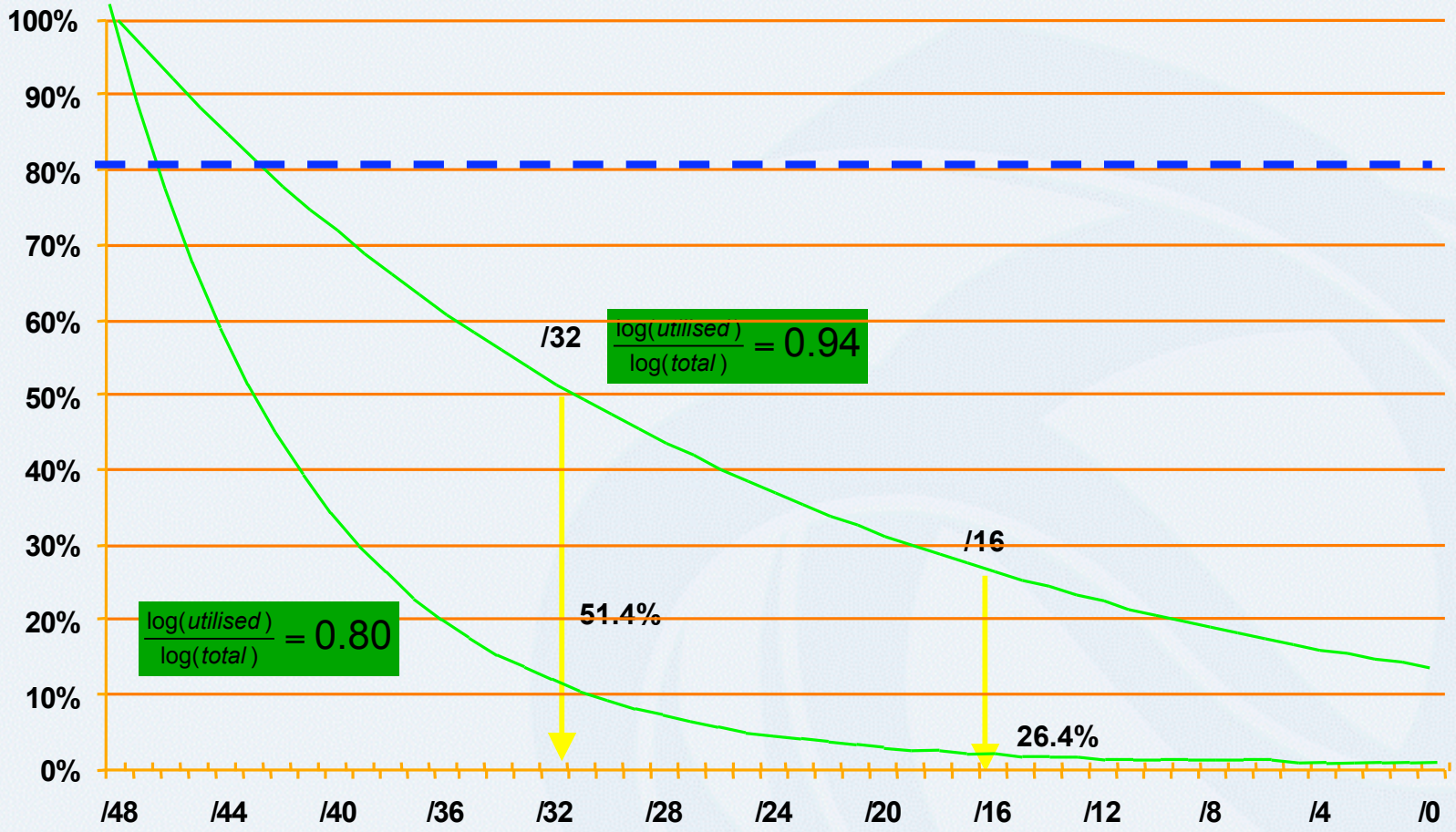
- IPv6 utilisation measured according to HD-Ratio (RFC 3194):

$$\text{Utilisation}_{HD} = \frac{\log(\text{Assigned address space})}{\log(\text{Available address space})}$$

- IPv6 utilisation requirement is HD=0.80
  - Measured according to assignments only
    - E.g. ISP has assigned 10000 (/48s) addresses of /32

$$\frac{\log(\text{Assigned address space})}{\log(\text{Available address space})} = \frac{\log(10{,}000)}{\log(65{,}536)} = 0.83$$

IPv6 utilisation (HD = 0.94)



RFC3194 “The Host-Density Ratio for Address Assignment Efficiency”

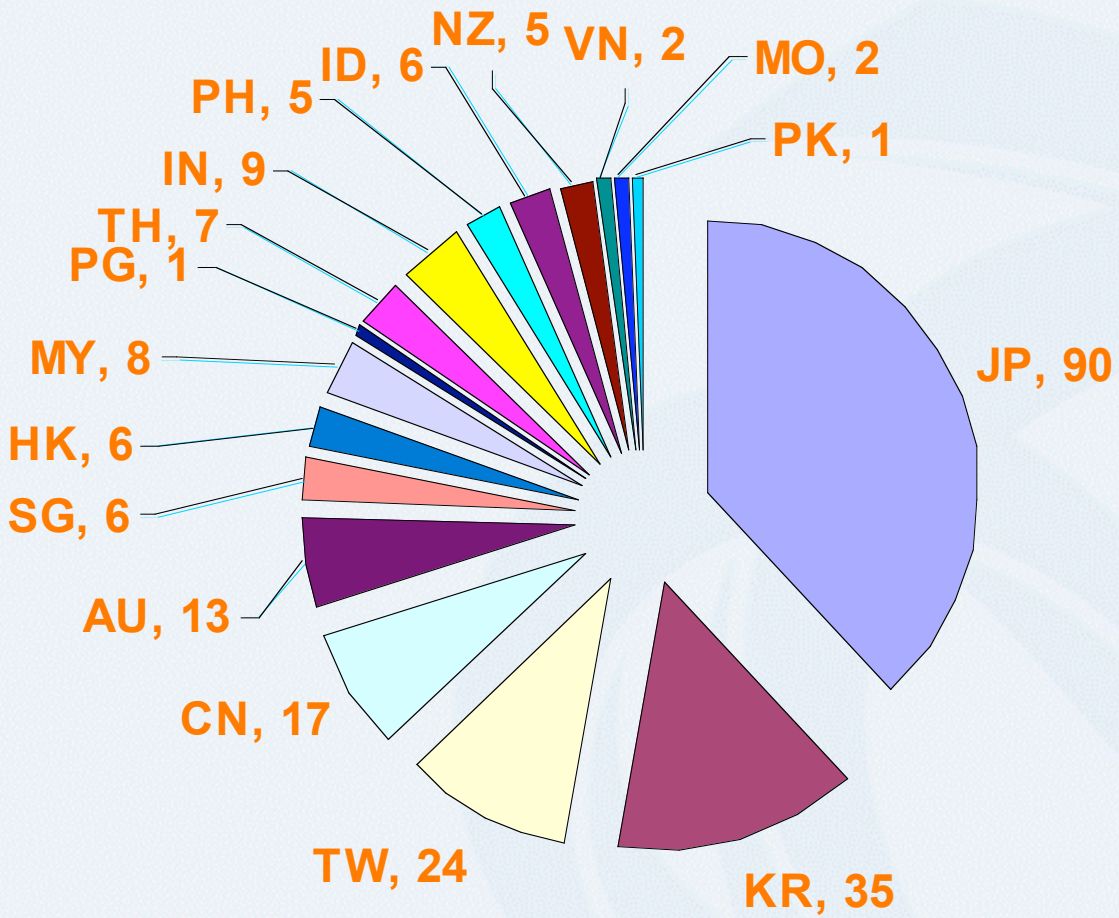
Subsequent allocation

- Must meet HD = 0.8 utilisation requirement of previous allocation
    - (7132 /48s assignments in a /32)
- Other criteria to be met
  - Correct registrations (all /48s registered)
  - Correct assignment practices etc
- Subsequent allocation results in a doubling of the address space allocated to it
  - Resulting in total IPv6 prefix is 1 bit shorter
  - Or sufficient for 2 years requirement

Current IPv6 policy

Use case scenario	Policy criteria	Address size
ISP or LIR	-plan for making at least 200 /48 assignments to other organizations within two years -use of IPv4 infrastructure + customer base to transition to IPv6	/32 allocation possible > /32 allocation, dependent on evaluation
IXP	-must be an IXP and demonstrate need	/48 assignment (portable)
Critical infrastructure (eg. ccTLD)	-must be CI and demonstrate need	/32 assignment
Experiment	-public disclosure of experiment -non-commercial	/32 allocation or dependent on evaluation (to be returned after use)

APNIC allocations by economies



As of Mar 2006

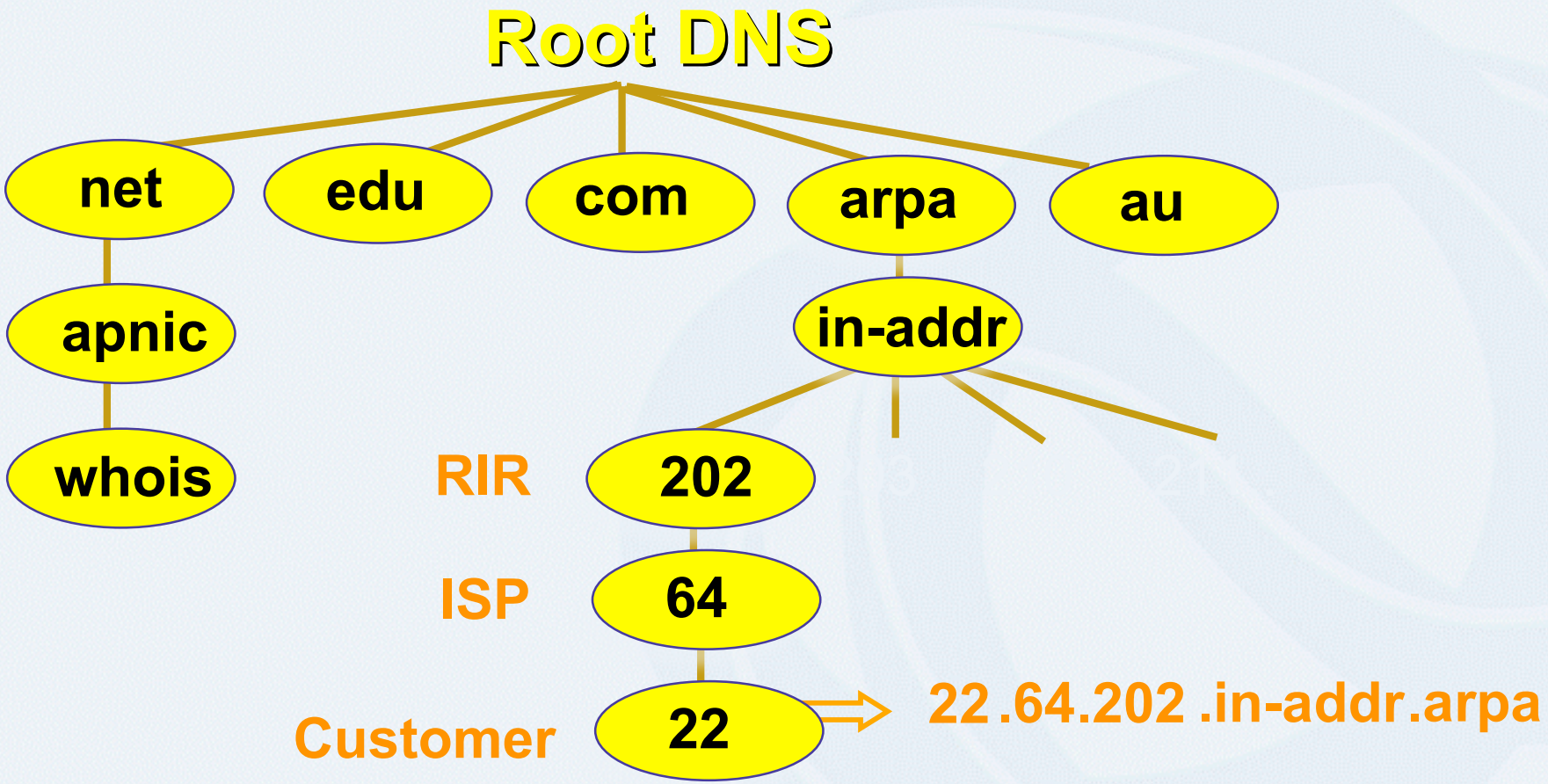
Reverse DNS Delegation

Registry Procedures

What is ‘Reverse DNS’?

- ‘Forward DNS’ maps names to numbers
  - svc00.apnic.net -> 202.12.28.131
- ‘Reverse DNS’ maps numbers to names
  - 202.12.28.131 -> svc00.apnic.net

Principles – DNS tree



Reverse DNS - why bother?

- Service denial
  - That only allow access when fully reverse delegated eg. anonymous ftp
- Diagnostics
  - Assisting in trace routes etc
- Spam identification
- Registration
  - Responsibility as a member and Local IR

Reverse delegation requirements

- /24 Delegations
  - Address blocks should be assigned/allocated
  - At least two name servers
  - Can ask APNIC to be the secondary zone
- /16 Delegations
  - Same as /24 delegations
  - APNIC delegates entire zone to member
  - Recommend APNIC secondary zone
- < /24 Delegations
  - Read “classless in-addr.arpa delegation”

Delegation procedures

- Upon allocation, member is asked if they want /24 place holder domain objects with member maintainer
  - Gives member direct control
- Standard APNIC database object,
  - can be updated through online form or via email.
- Nameserver/domain set up verified before being submitted to the database.
- Protection by maintainer object
  - (auths: CRYPT-PW, PGP).
- Zone file updated 2-hourly

Example ‘domain’ object

domain:	**124.54.202.in-addr.arpa**
descr:	**co-located server at mumbai**
country:	**IN**
admin-c:	**VT43-AP**
tech-c:	**IA15-AP**
zone-c:	**IA15-AP**
nserver:	**dns.vsnl.net.in**
nserver:	**giasbm01.vsnl.net.in**
mnt-by:	**MAINT-IN-VSNL**
changed:	**gpsingh@vsnl.net.in 20010612**
source:	**APNIC**

Delegation procedures – request form

- Complete the documentation
  - http://www.apnic.net/db/domain.html
- On-line form interface
  - Real time feedback
  - Gives errors, warnings in zone configuration
    - serial number of zone consistent across nameservers
    - nameservers listed in zone consistent

Evaluation

- Parser checks for
  - ‘whois’ database
    - IP address range is assigned or allocated
    - Must be in APNIC database
  - Maintainer object
    - Mandatory field of domain object
  - Nic-handles
    - zone-c, tech-c, admin-c

Creation of domain objects

- APNIC highly recommend you to use MyAPNIC when creating domain objects
  - MyAPNIC parser will check the maintainer of ‘inetnum’ object
  - If the password matches no errors will be returned
- Can use MyAPNIC to create multiple domain objects at once
  - ex: If you are allocated a /19, you can provide the full IP range and 32 domain objects can be created in one go

Removing lame delegations

- Objective
  - To 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
- APNIC commenced formal implementation of the lame DNS reverse delegation procedures

Thank you for listening

Questions?

Talk to APNIC staff