

APNIC Training

Internet Resource Management (IRM)

September 14, 2011 – Pokhara, Nepal

SANOG

This training session is being held as part of SANOG XVIII

Introduction

- Presenters
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 - Technical Training Officer
 - nurul@apnic.net

Assumptions & Objectives

Assumptions

- Are current or prospective APNIC members
- Have not submitted many requests
- Are not familiar or up-to-date with address policies
- Are not familiar with procedures
- Are interested in address management

Objectives

- To provide an understanding of address management
- To provide a working knowledge of the procedures for requesting resources from APNIC and managing these
- To keep membership up-to-date with the latest policies
- Liaise with members.

Overview

- IRM
 - Introduction to APNIC
 - APNIC policy development process
 - Internet registry policies
 - IP address request (Demo)
 - Second opinion request
 - MyAPNIC (Demo)
 - IPv6 Policy and Procedure
 - APNIC Helpdesk

Overview

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 - **Introduction to APNIC**
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What is APNIC?

- Regional Internet Registry (RIR) for the Asia Pacific region
 - One of five RIRs currently operating around the world
 - Non-profit, membership organisation
- Industry self-regulatory body
 - Consensus-based
 - Open
 - Transparent decision-making and policy development
- Meetings and mailing lists
 - <http://www.apnic.net/meeting>
 - <http://www.apnic.net/ mailing-lists>
 -

What does APNIC do?

Resource service

- IPv4, IPv6, ASNs
- Reverse DNS delegation
- Resource registration
 - Authoritative registration server
 - whois
 - IRR

Policy development

- Facilitating the policy development process
- Implementing policy changes

Information dissemination

- APNIC meetings
- Web and ftp site
- Publications, mailing lists
- Outreach seminars

<http://www.apnic.net/community/participate/join-discussions/sigs>

Training

- Face to Face
- Via e-learning
- Subsidised for members

Schedule:

<http://www.apnic.net/training>

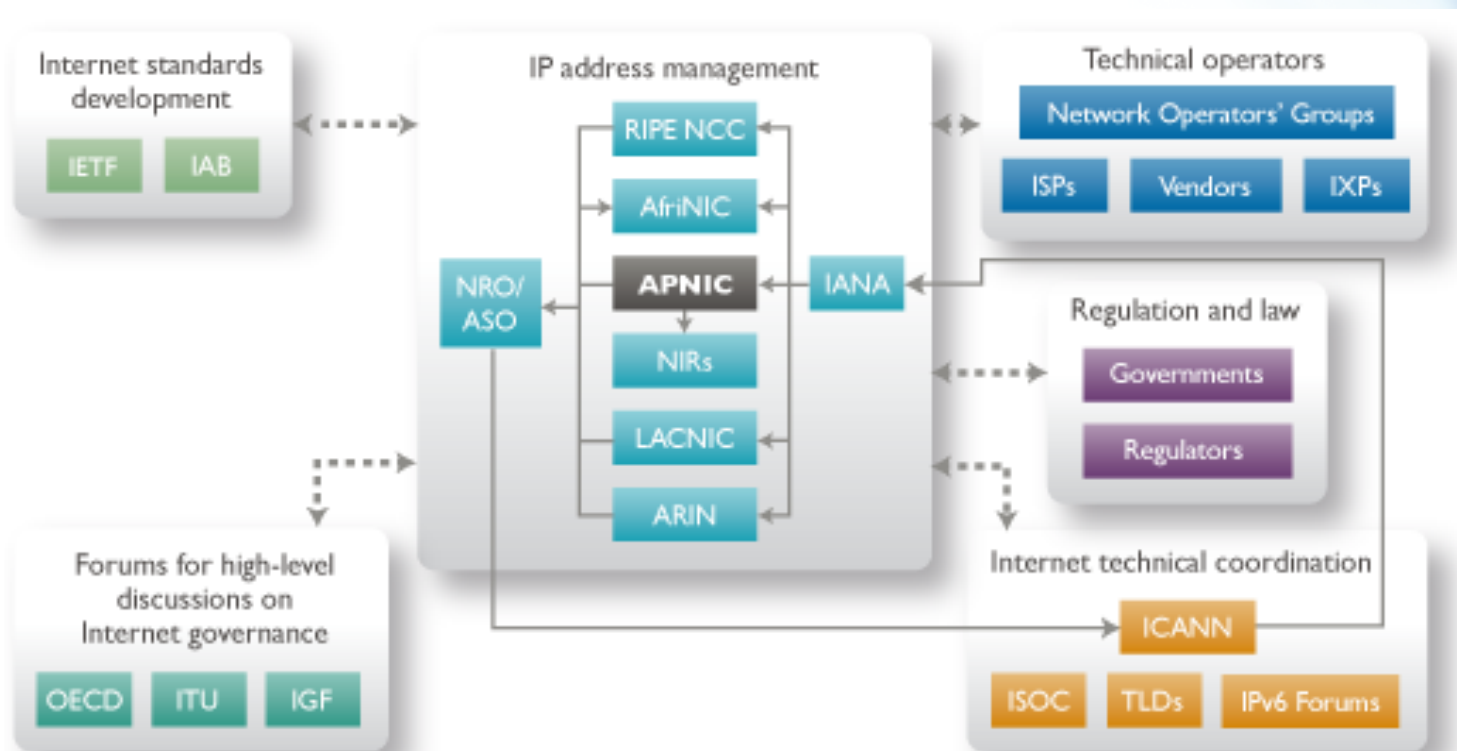
Where is the APNIC region?



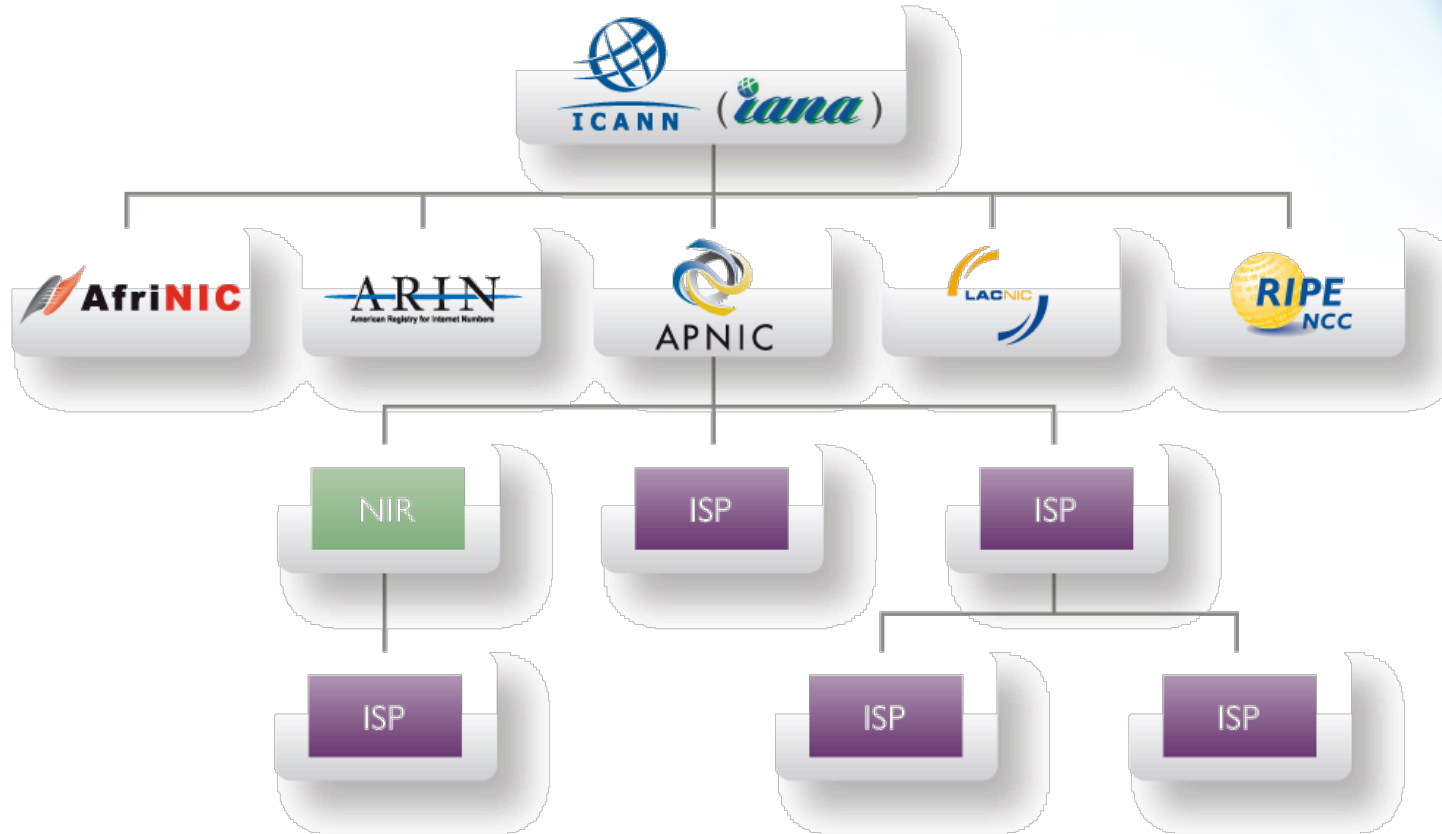
APNIC is NOT

- A network operator
 - Does not provide networking services
 - Works closely with APRICOT forum
- A standards body
 - Does not develop technical standards
 - Works within IETF in relevant areas (IPv6 etc)
- A domain name registry or registrar
 - Will refer queries to relevant parties

APNIC from a Global Perspective

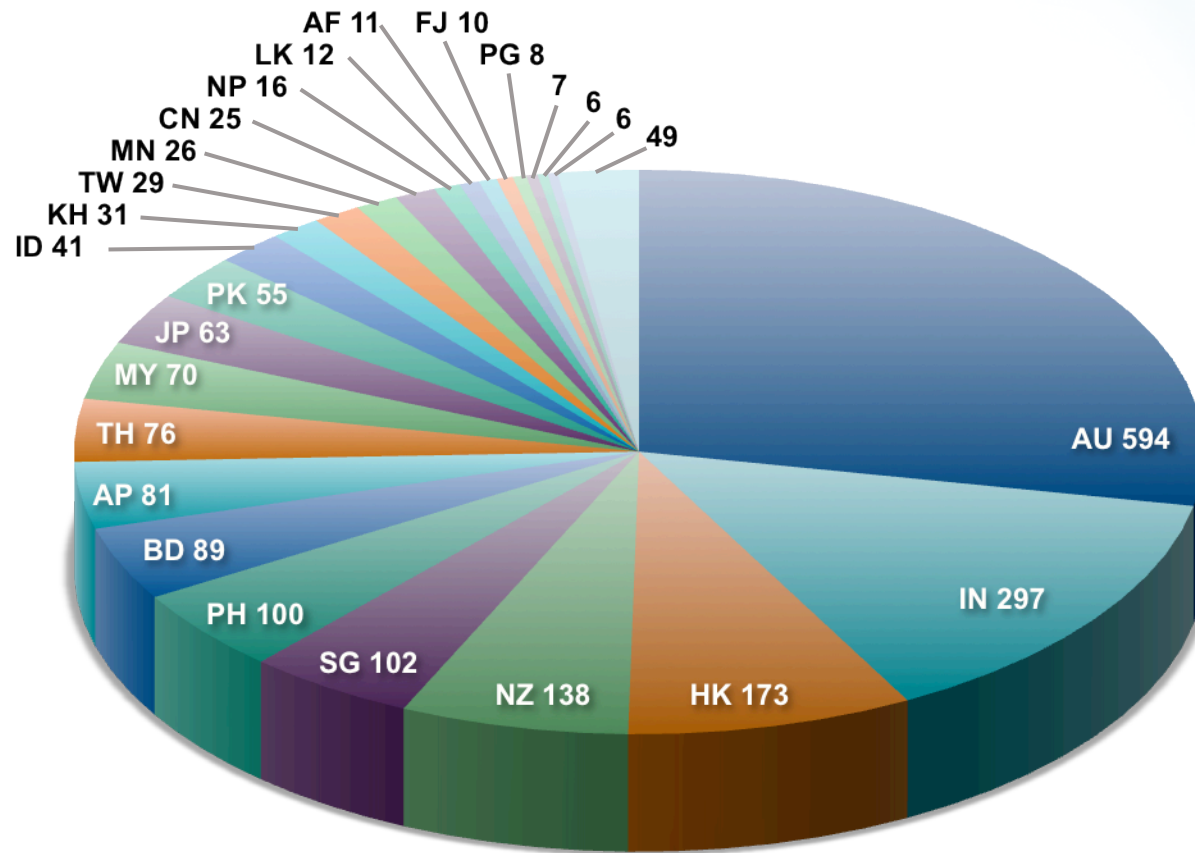


Internet Registry Structure

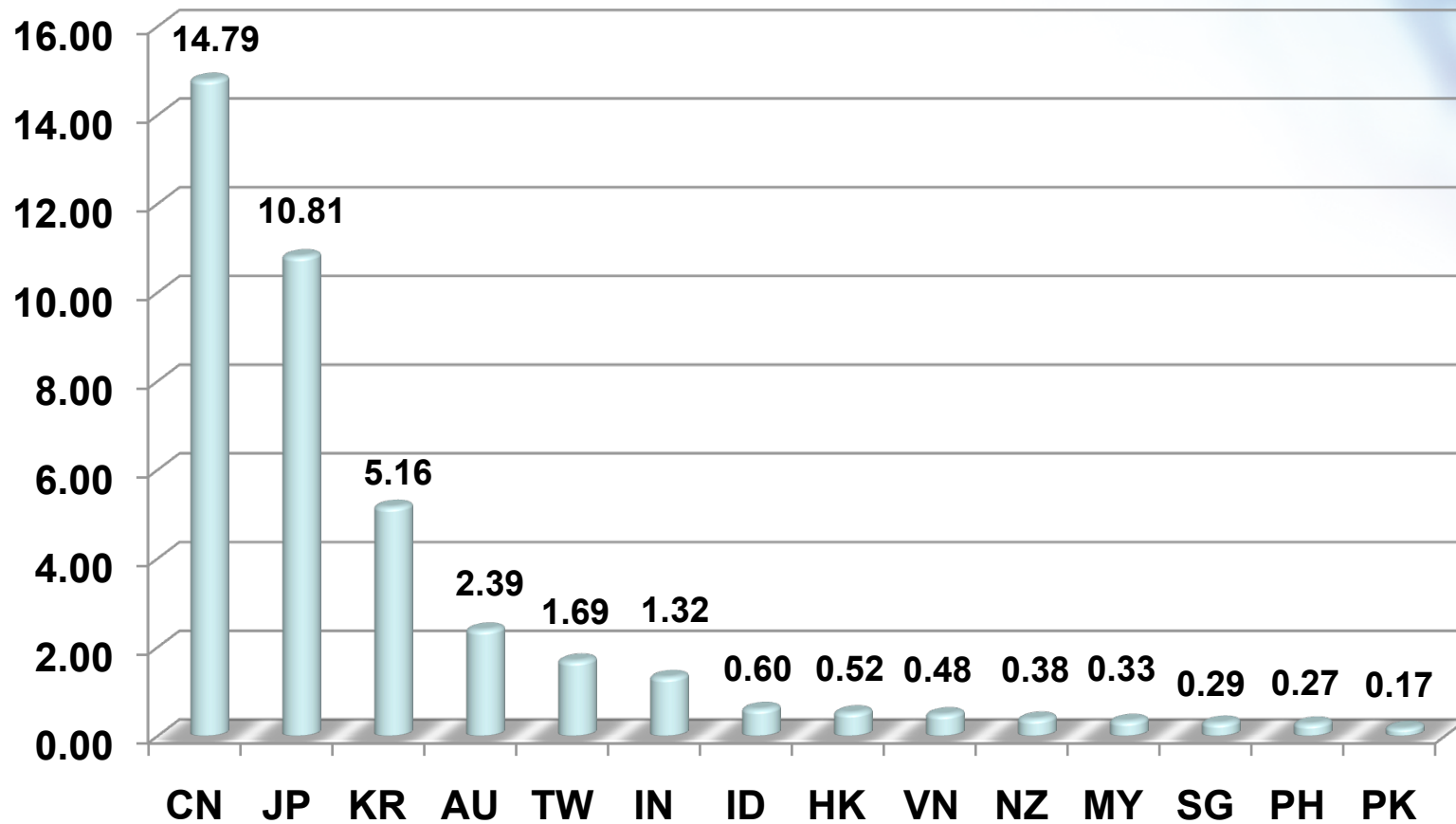


APNIC membership

Numbers of members per economy



APNIC IPv4 allocations by economy



<http://www.apnic.net/stats/o3/> as of 01/10/2009

Global policy Coordination



The main aims of the NRO:

- To protect the unallocated number resource pool
- To promote and protect the bottom-up policy development process
- To facilitate the joint coordination of activities e.g., engineering projects
- To act as a focal point for Internet community input into the RIR system

Global policy coordination



The main function of ASO:

- ASO receives global policies and policy process details from the NRO
- ASO forwards global policies and policy process details to ICANN board

Questions?

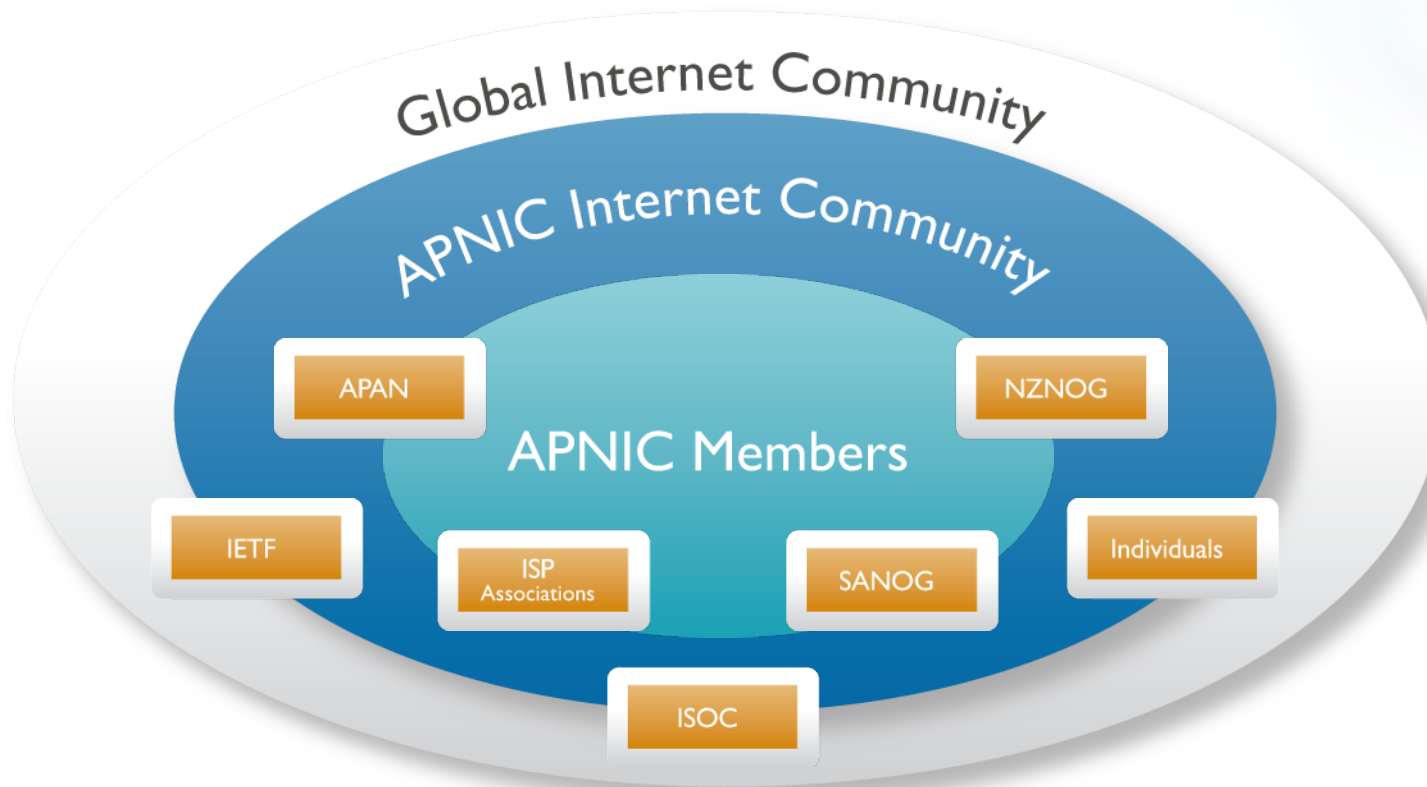


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You are part of the APNIC Community!

- **Open** forum in the Asia Pacific
 - Open to any interested parties

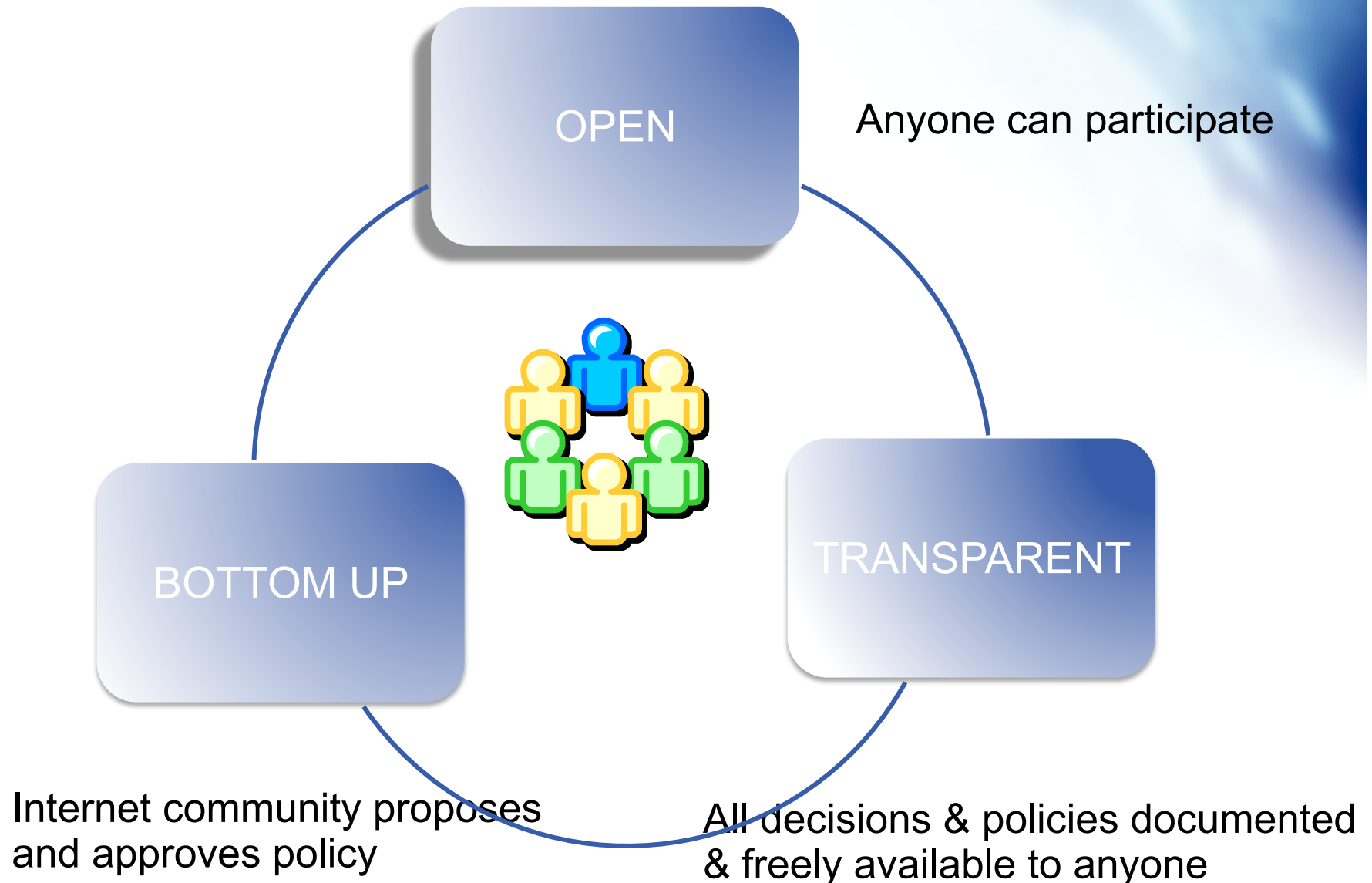


– A voice in regional Internet operations through participation in APNIC

Participation in policy development

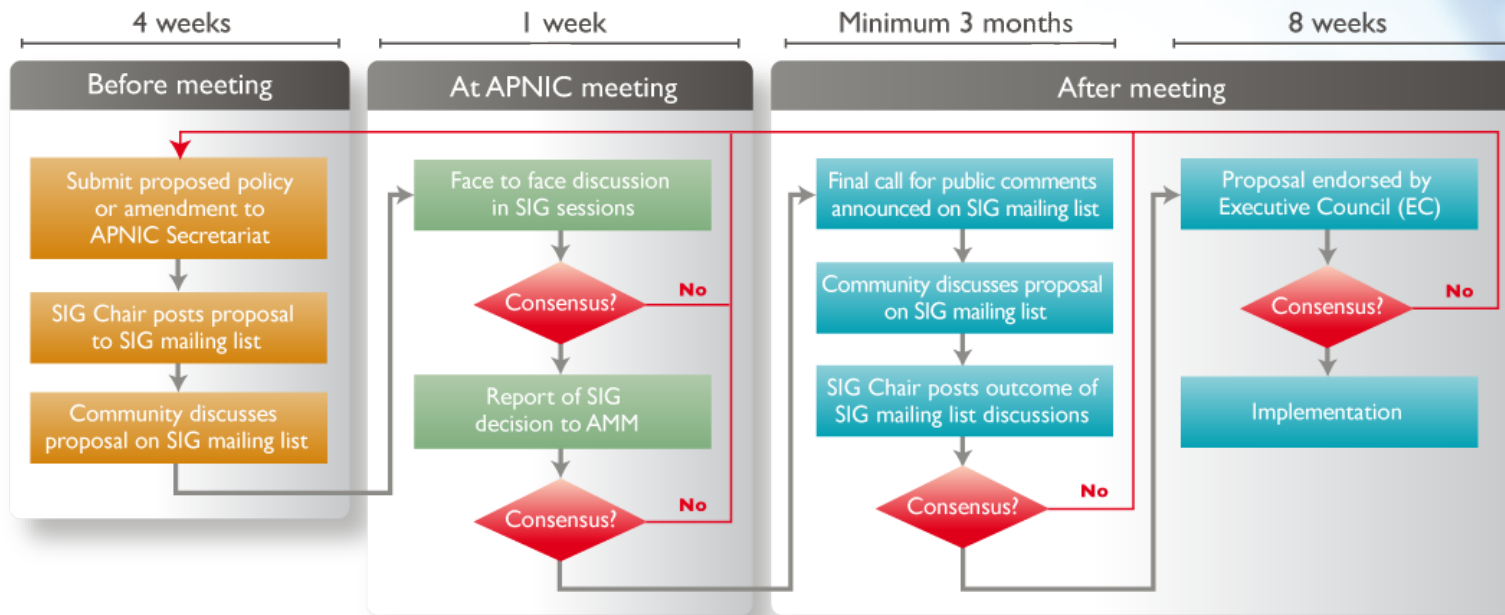
- Why should I bother?
 - Responsibility as an APNIC member
 - To be aware of the current policies for managing address space allocated to you
 - Business reasons
 - Policies affect your business operating environment and are constantly changing
 - Ensure your ‘needs’ are met
 - Educational
 - Learn and share experiences
 - Stay abreast with ‘best practices’ in the Internet

Policy Development Process



The Policy Development Process

Need Discuss Consensus Implement



You can participate!

More information about policy development can be found at:

<http://www.apnic.net/policy>

How to Make Your Voice Heard

- Contribute on the public mailing lists
 - <http://www.apnic.net/mailling-lists>
 - Attend meetings
 - Or send a representative
 - Watch webcast (video streaming) from the meeting web site
 - Read live transcripts from APNIC web site
 - And express your opinion via Jabber chat
- Give feedback
 - Training or seminar events

Questions?



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Allocation and Assignment

Allocation

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

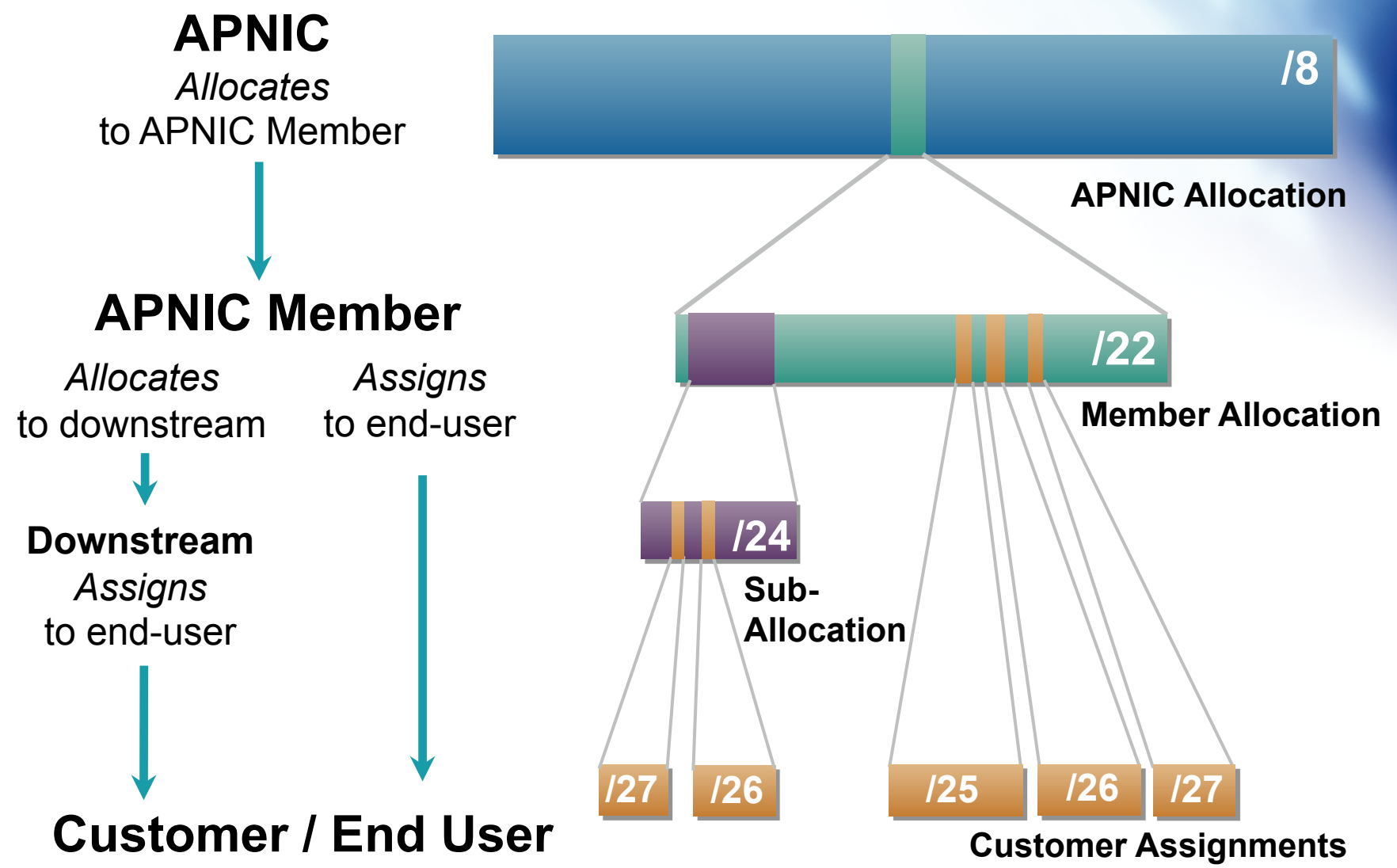
- Not yet used to address any networks

Assignment

“A block of address space used to address an operational network”

- May be provided to ISP customers, or used for an ISP’s infrastructure (‘self-assignment’)

Allocation and Assignment

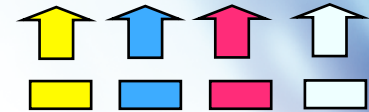




Portable & non-portable

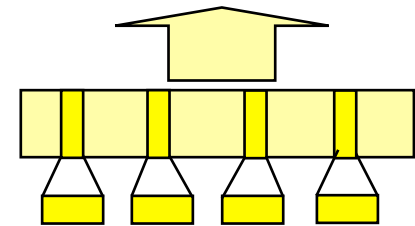
Portable Assignments

- 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

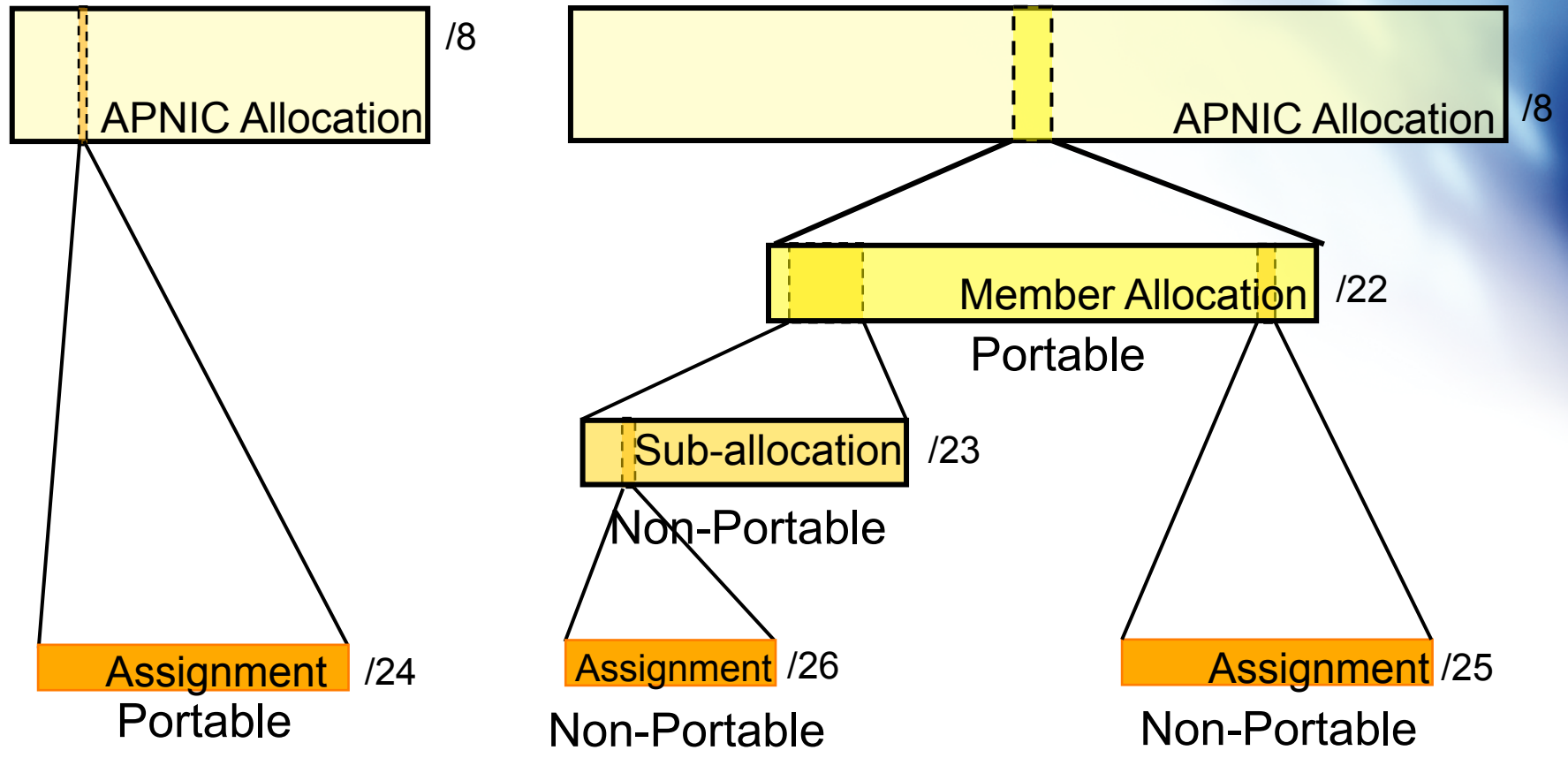
- Customer uses ISP's address space
 - Must renumber if changing ISP
- Only way to effectively scale the Internet



Portable allocations

- Allocations made by APNIC/NIRs

Address Management Hierarchy



•Describes “portability” of the address space

Internet Resource 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

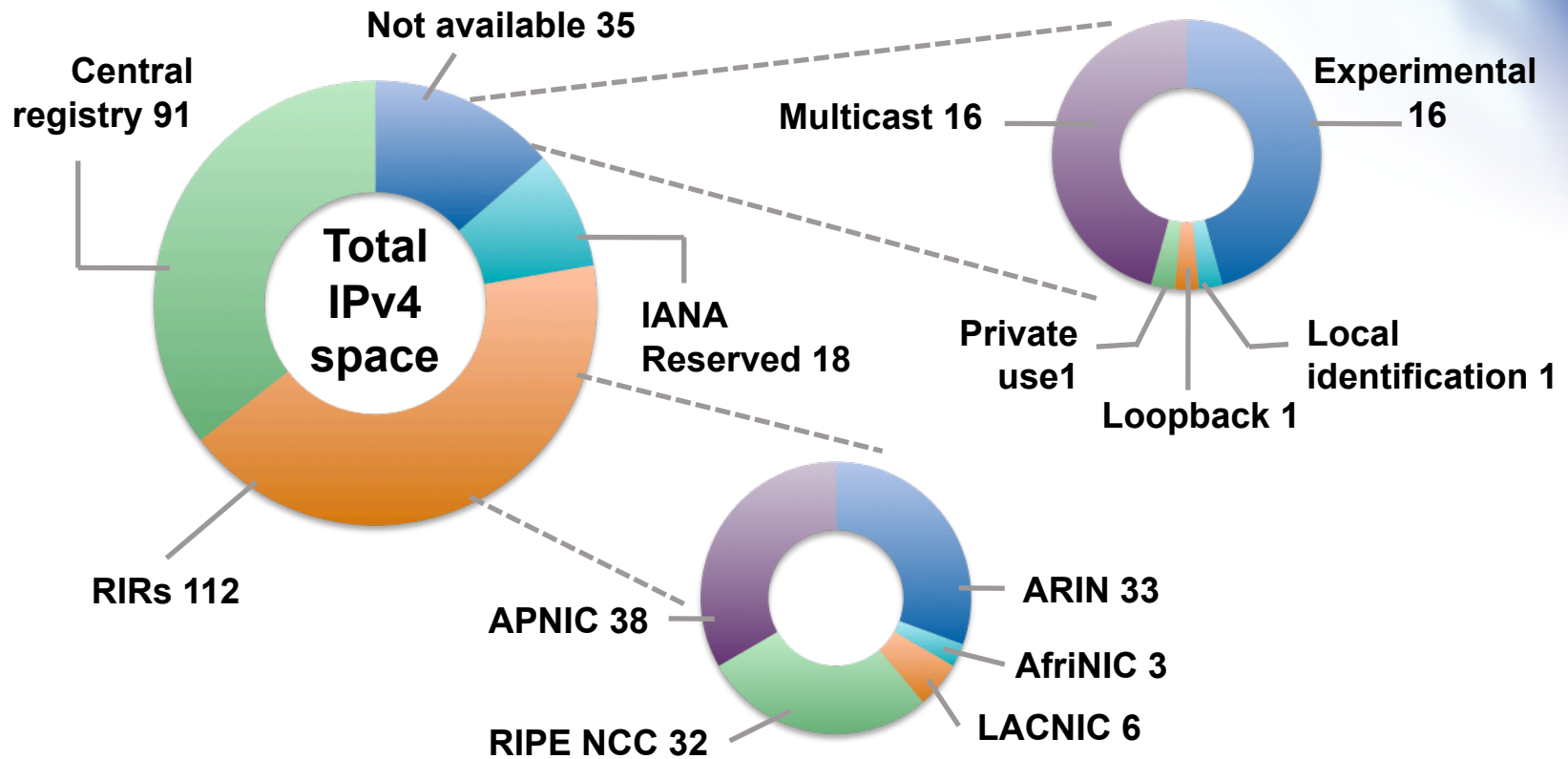
Uniqueness, fairness and consistency



Why do we Need Policies?

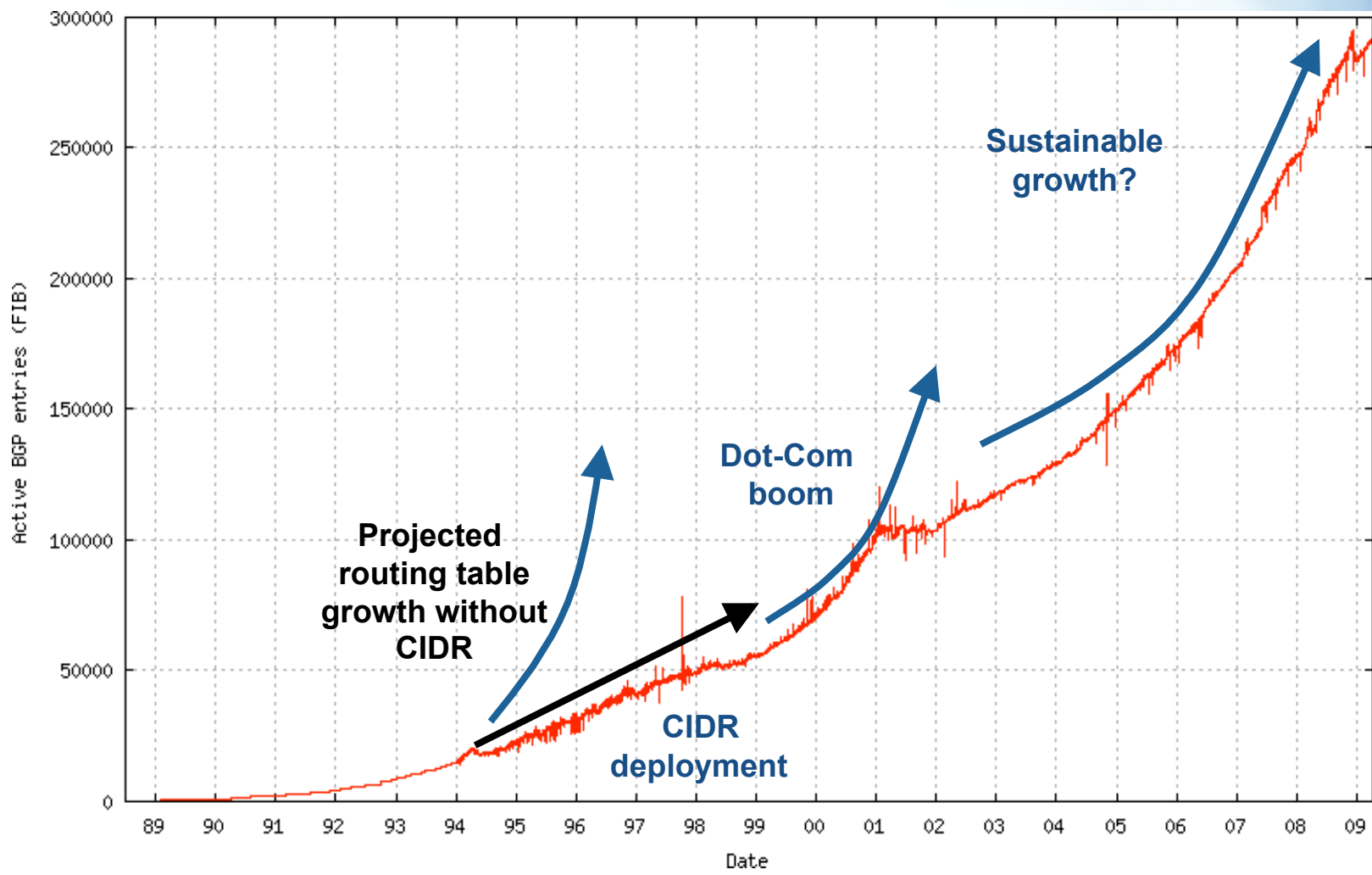
- Global IPv4 Delegations (in /8)

Status of 256 /8s IPv4 Address Space



Source : Number Resource Organization (NRO)

Growth of the Global Routing Table



<http://bgp.potaroo.net/as1221/bgp-active.html>

APNIC Policy Environment

“IP addresses not freehold property”

- Assignments & allocations on license basis
 - Addresses *cannot* be bought or sold
 - Internet resources are public resources
 - ‘Ownership’ is contrary to management goals

“Confidentiality & security”

- APNIC to observe and protect trust relationship
 - Non-disclosure agreement signed by staff

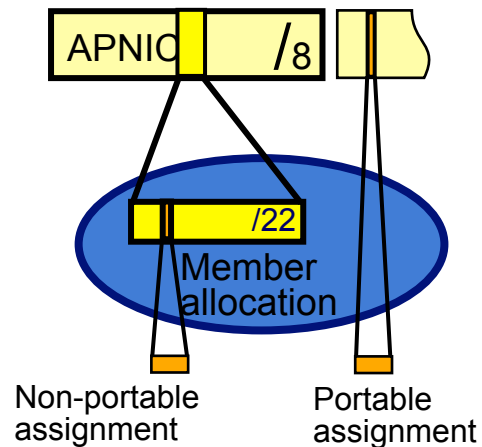


APNIC Allocation Policies

- Aggregation of allocation
 - Provider responsible for aggregation
 - Customer assignments /sub-allocations must be non-portable
- Allocations based on demonstrated need
 - Detailed documentation required
 - All address space held to be declared
 - Stockpiling not permitted

APNIC IPv4 Allocation

- APNIC IPv4 allocation size per account holder
 - Minimum /24
 - Maximum /22



APNIC Allocation Policies

- Transfer of address space
 - Need to properly register in APNIC registration DB
 - Return unused address space to APNIC
- Effects of mergers, acquisitions & take-overs
 - Will require contact with APNIC
 - contact details may change
 - new agreement may be required
 - May require re-examination of allocations
 - requirement depends on new network structure

APNIC Allocation Policies

- Minimum allocation is /24
- Maximum allocation is /22
- According to current last /8 policy each member account holder will get a maximum of /22 allocation from the final /8 block
- All allocation will be based on demonstrated need
 - Not based on any business competitive reason

Address Assignment Policies

- Assignments based on requirements
 - Demonstrated through detailed documentation
 - Assignment should maximise utilisation
 - minimise wastage
- Classless assignments
 - showing use of VLSM

Portable assignments

- Small multihoming assignment policy
 - *For (small) organisations who require a portable assignment for multi-homing purposes*

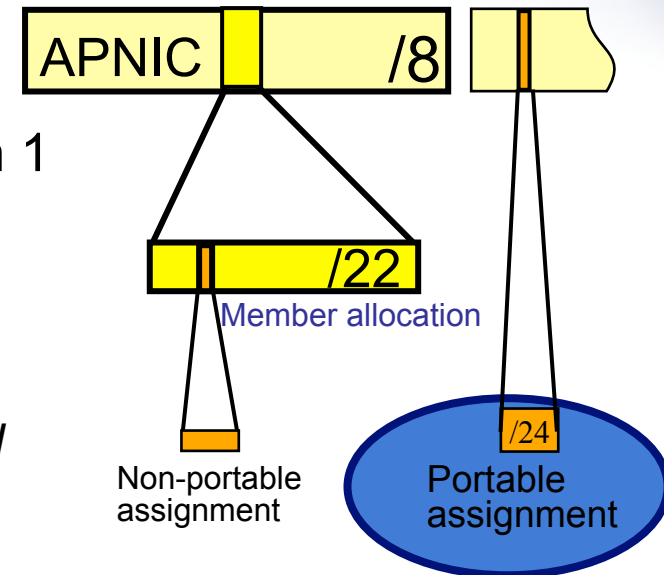
Criteria

1a. Applicants currently multihomed
OR

1b. Demonstrate a plan to multihome within 1 month

2. Agree to renumber out of previously assigned space

Demonstrate need to use 25% of requested space immediately and 50% within 1 year



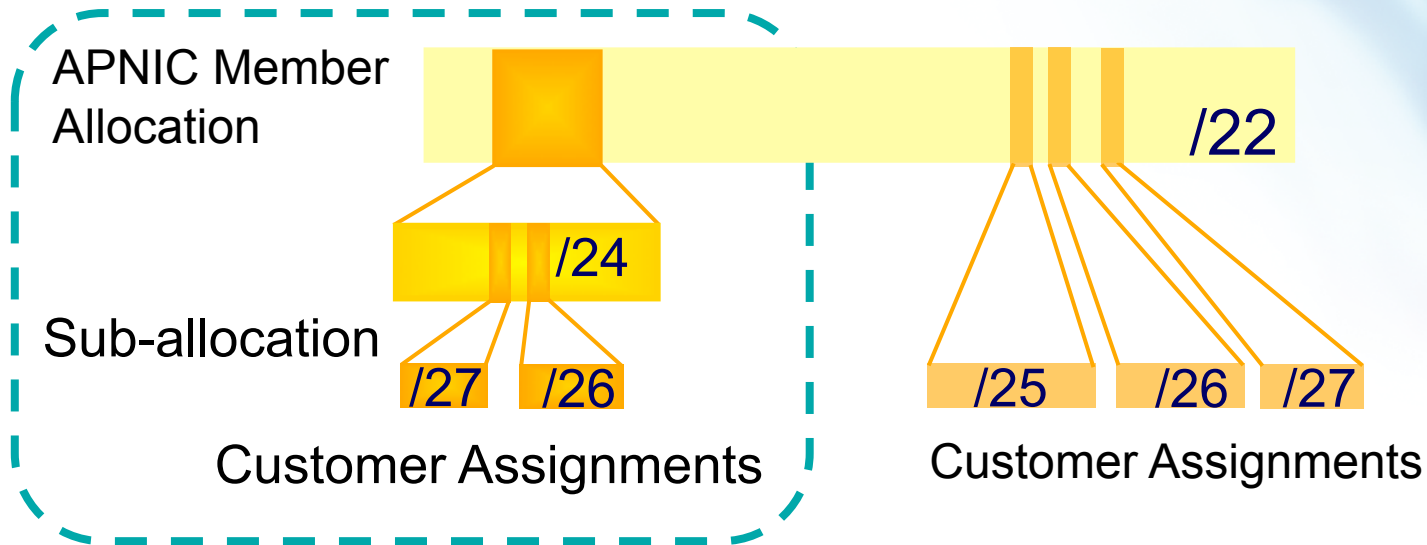
Policy for IXP Assignments

- Criteria
 - 3 or more peers
 - Demonstrate “open peering policy”
- APNIC has a reserved block of space from which to make IXP assignments

Portable Critical Infrastructure Assignments

- What is Critical Internet Infrastructure?
 - Domain registry infrastructure
 - Root DNS operators, gTLD operators, ccTLD operators
 - Address Registry Infrastructure
 - RIRs & NIRs
 - IANA
- Why a specific policy ?
 - Protect stability of core Internet function
- Assignment sizes:
 - IPv4: /24
 - IPv6: /32 (Maximum)

Sub-allocations



- No max or min size
 - Max 1 year requirement
- Assignment Window & 2nd Opinion applies
 - to both sub-allocation & assignments
 - Sub-allocation holders don't need to send in 2nd opinions

Sub-allocation Guidelines

- Sub-allocate cautiously
 - Seek APNIC advice if in doubt
 - If customer requirements meet min allocation criteria:
 - Customers should approach APNIC for portable allocation
- Efficient assignments
 - ISPs responsible for overall utilisation
 - Sub-allocation holders need to make efficient assignments
- Database registration (WHOIS Db)
 - Sub-allocations & assignments to be registered in the db

Supporting Historical Resource Transfer

- Bring historical resource registrations into the current policy framework
 - Allow transfers of historical resources to APNIC members
 - the recipient of the transfer must be an APNIC members
 - no technical review or approval
 - historical resource holder must be verified
 - resources will then be considered "current"
- Address space subject to current policy framework

Questions?



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Evaluation by APNIC

- All address space held should be documented
 - Check other RIR, NIR databases for historical allocations
- ‘No reservations’ policy
 - Reservations may never be claimed
 - Fragments address space
 - Customers may need more or less address space than is actually reserved

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What is an Assignment Window?

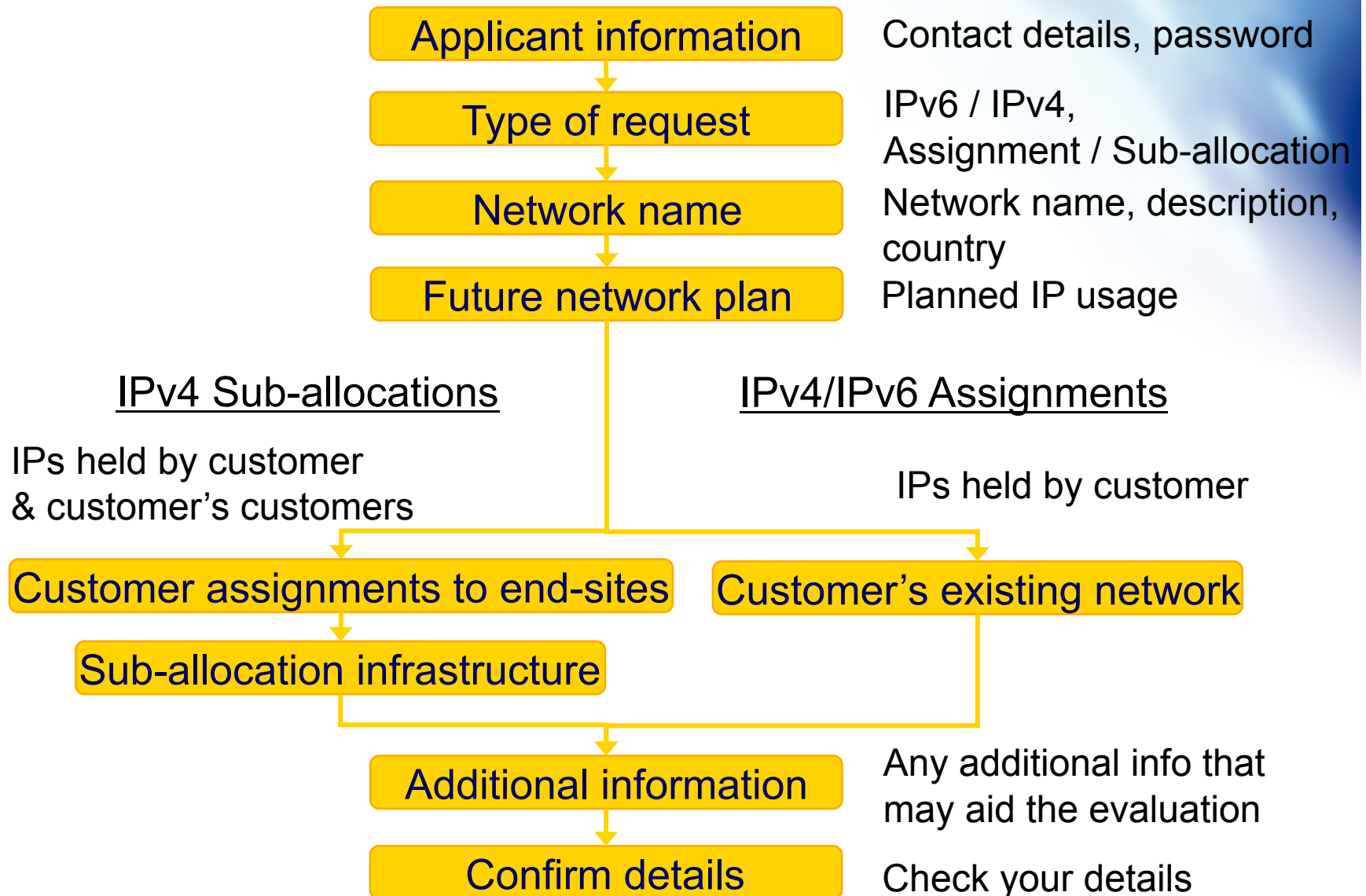
“The amount of address space a member may assign without a ‘second opinion’”

- All members have an AW
 - Starts at zero, increases as member gains experience in address management
- Second opinion process
 - Customer assignments require a ‘second-opinion’ when proposed assignment size is larger than members AW

Assignment Window

- Size of assignment window
 - Evaluated after about three 2nd-opinion requests
 - Increased as member gains experience and demonstrates understanding of policies
 - Assignment window may be reduced, in rare cases
- Why an assignment window?
 - Monitoring ongoing progress and adherence to policies
 - Mechanism for member education

Overview of 2nd Opinion Form



2nd Opinion Evaluation (policy)

- Efficiency
 - More than 50% used in any one subnet?
 - Can different subnet sizes be used?
 - More than 80% used for previous assignment?
- Stockpiling
 - Is all address space held declared on form?
 - Has organisation obtained address space from more than one member/ISP?
- Registration
 - Is previous assignment in APNIC database and are they correct and up to date?

2nd Opinion Evaluation

- APNIC & Member evaluation
 - Should be the same
 - If NO, APNIC will ask member to obtain more information
 - iterative process
 - If YES, APNIC approves 2nd opinion request

2nd Opinion Request Approval

Dear XXXXXXXX,

APNIC has approved your "second opinion" request to make the following assignment:

[netname]

[address/prefix]

* Please ensure that you update the APNIC whois database to register this assignment before informing your customer or requesting reverse DNS delegation. Do this using the form at:

<http://www.apnic.net/apnic-bin/inetnum.pl>

Important:

Unregistered assignments are considered as "unused"

Customer Assignment

- Member updates internal records
 - Select address range to be assigned
 - Archive original documents sent to APNIC
 - Update APNIC database
- Clarify status of address space
 - APNIC requirement is ‘Non portable’
 - ‘Portable’ assignments are made by APNIC only with the end-user request form
 - Organisation must have technical requirement

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Overview of MyAPNIC

- Access to MyAPNIC
- Digital certificate issue and renewal
- Manage your membership
- Manage your resource



Accessing MyAPNIC

- Corporate contacts can log in MyAPNIC immediately after confirming registration in an email sent by MyAPNIC
- Non corporate contacts to register for MyAPNIC access and approved by the corporate contacts.



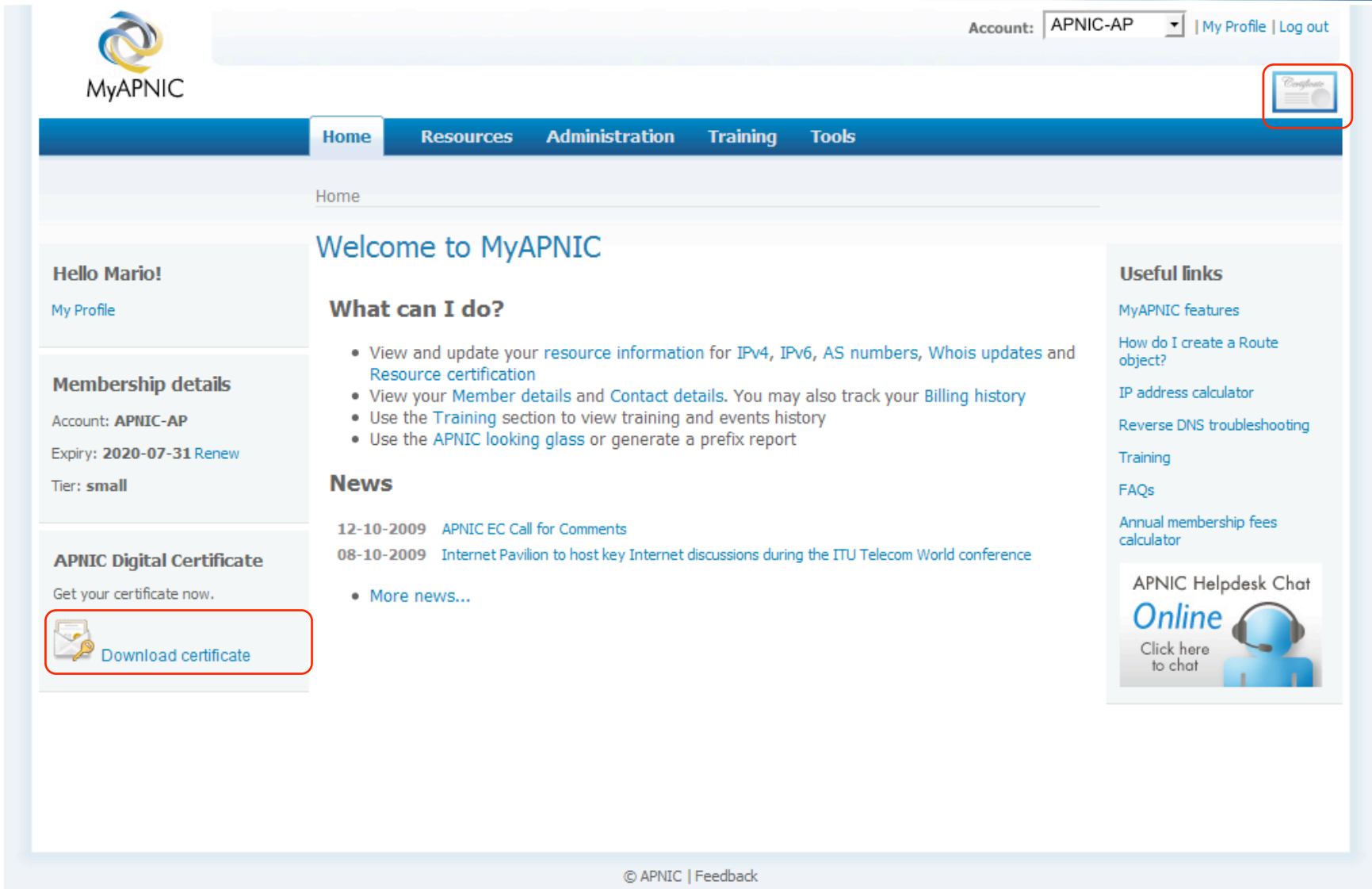
APNIC Digital Certificate

- Certificate issue and renewal are via MyAPNIC (ie request and download)
- Corporate contacts have certificate pre-approval
- Non-corporate contact certificate requests can be approved by the Corporate contact
 - the certificate is ready after login

Certificate Renew

- Automated, renewal request is not required
- New certificates are ready for download 30 days prior to expiry date
- Email notification sent to contacts

Access without certificate



The screenshot displays the MyAPNIC user interface. At the top right, the account is identified as "APNIC-AP" with links for "My Profile" and "Log out". A "Certificate" icon is highlighted with a red box. The main navigation bar includes "Home", "Resources", "Administration", "Training", and "Tools". The "Home" page features a welcome message, a "Hello Mario!" greeting with a "My Profile" link, and "Membership details" for account "APNIC-AP" with an expiry date of "2020-07-31" and a tier of "small". A "Download certificate" button is highlighted with a red box. The "What can I do?" section lists actions like viewing resource information, member details, training history, and using the APNIC looking glass. A "News" section shows recent updates from 2009. A "Useful links" sidebar provides quick access to features, calculators, and helpdesk chat.

Account: APNIC-AP | My Profile | Log out

MyAPNIC

Home Resources Administration Training Tools

Home

Welcome to MyAPNIC

Hello Mario!
My Profile

Membership details
Account: APNIC-AP
Expiry: 2020-07-31 Renew
Tier: small

APNIC Digital Certificate
Get your certificate now.
[Download certificate](#)

What can I do?

- View and update your resource information for IPv4, IPv6, AS numbers, Whois updates and Resource certification
- View your Member details and Contact details. You may also track your Billing history
- Use the Training section to view training and events history
- Use the APNIC looking glass or generate a prefix report

News

12-10-2009 APNIC EC Call for Comments
08-10-2009 Internet Pavilion to host key Internet discussions during the ITU Telecom World conference

- More news...

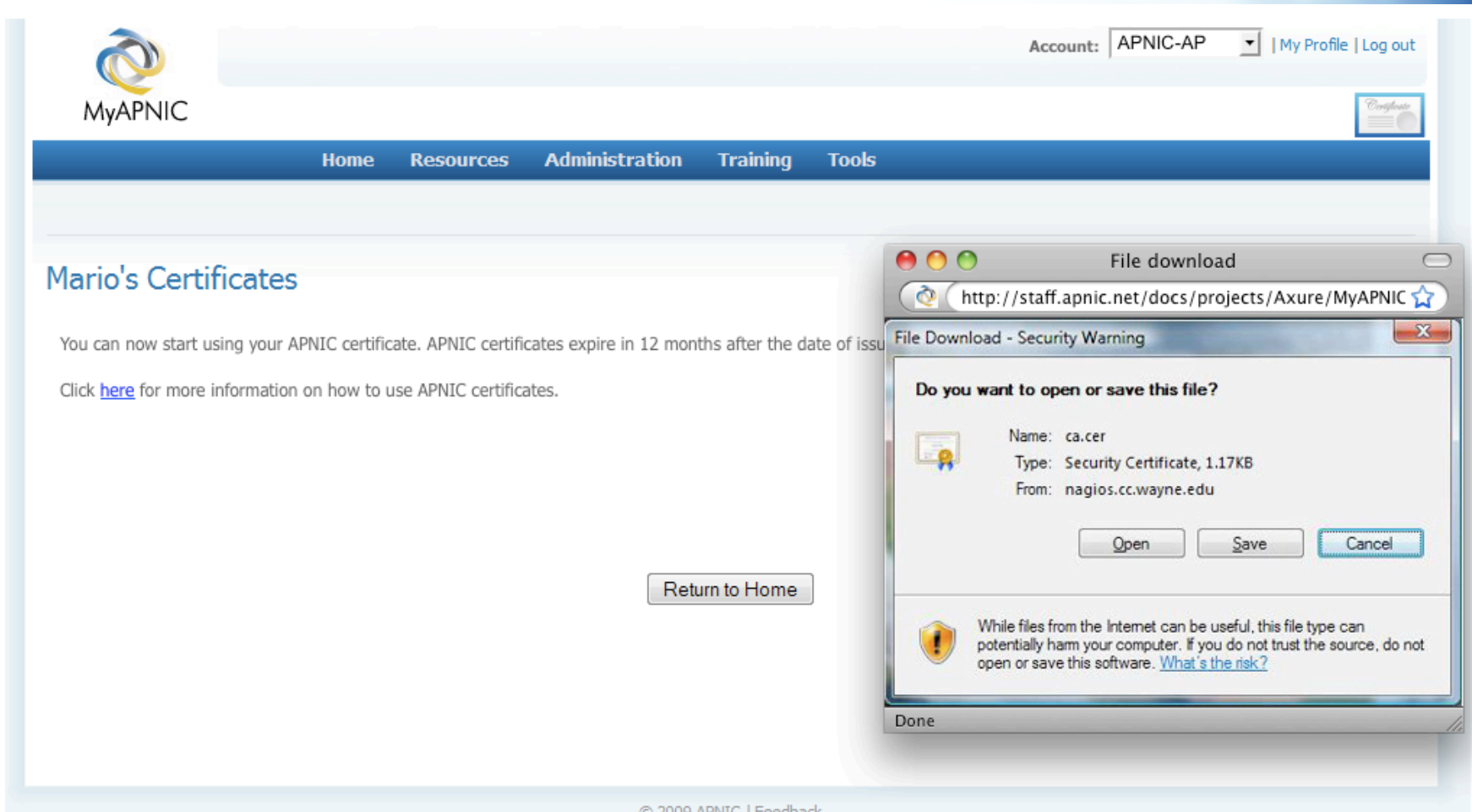
Useful links

- MyAPNIC features
- How do I create a Route object?
- IP address calculator
- Reverse DNS troubleshooting
- Training
- FAQs
- Annual membership fees calculator

APNIC Helpdesk Chat
Online
Click here to chat

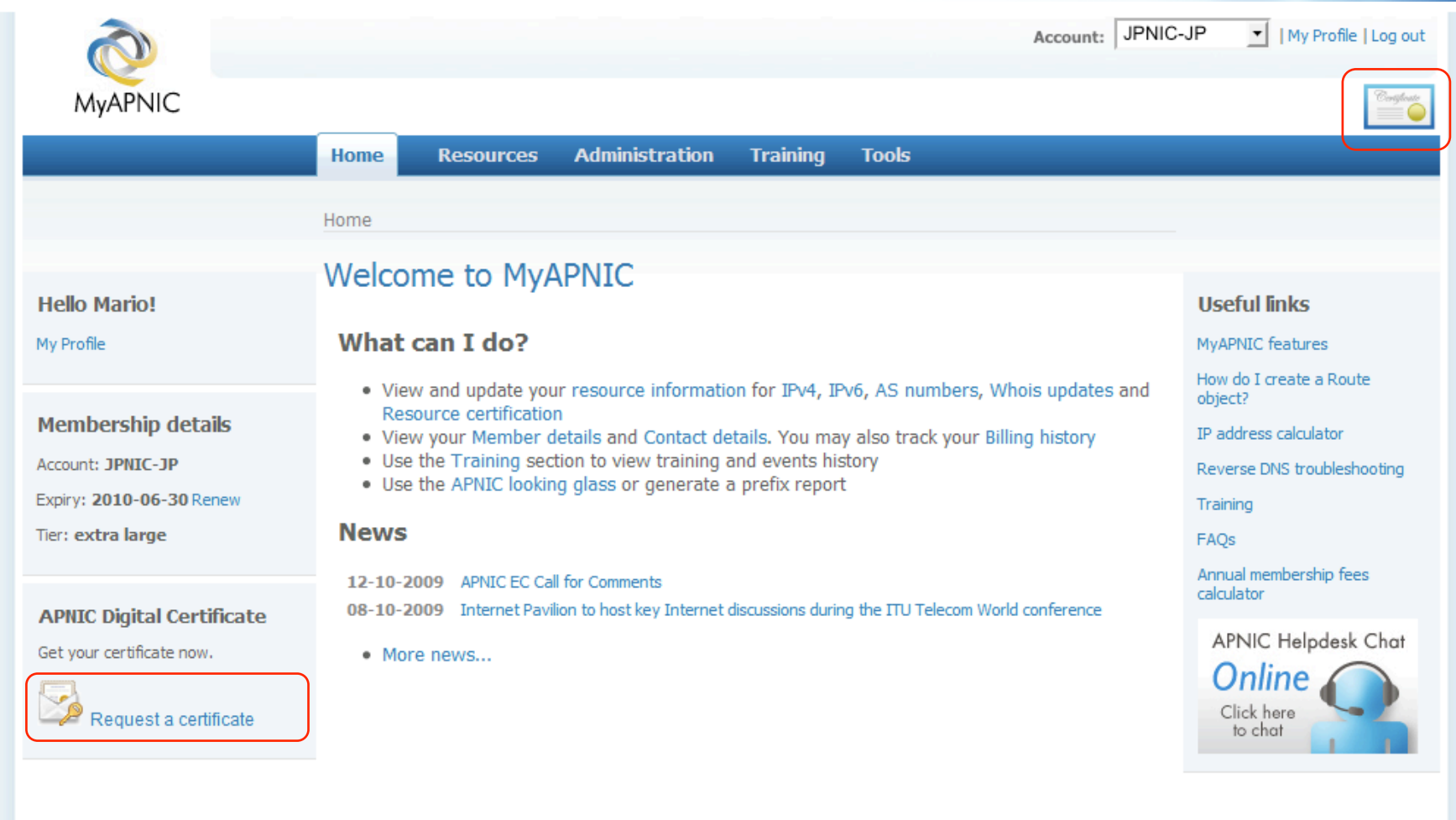
© APNIC | Feedback

Downloading Certificates



The screenshot shows the MyAPNIC user interface. At the top left is the MyAPNIC logo. On the right, the account is identified as 'APNIC-AP' with links for 'My Profile' and 'Log out'. A navigation menu includes 'Home', 'Resources', 'Administration', 'Training', and 'Tools'. The main content area is titled 'Mario's Certificates' and contains the text: 'You can now start using your APNIC certificate. APNIC certificates expire in 12 months after the date of issue.' Below this is a link: 'Click [here](#) for more information on how to use APNIC certificates.' A 'Return to Home' button is located at the bottom of the content area. A 'File download' dialog box is overlaid on the right side of the page. The dialog box title is 'File download' and the address bar shows 'http://staff.apnic.net/docs/projects/Axure/MyAPNIC'. The main window of the dialog is titled 'File Download - Security Warning' and asks 'Do you want to open or save this file?'. It displays the following information: Name: ca.cer, Type: Security Certificate, 1.17KB, From: nagios.cc.wayne.edu. There are 'Open', 'Save', and 'Cancel' buttons. At the bottom of the dialog, there is a warning icon and text: 'While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not open or save this software. [What's the risk?](#)' The dialog box has a 'Done' button at the bottom left.

Access with Certificate



The screenshot displays the MyAPNIC user interface. At the top right, the account is identified as 'JPNIC-JP' with links for 'My Profile' and 'Log out'. A red box highlights a 'Certificate' icon in the top right corner. The main navigation bar includes 'Home', 'Resources', 'Administration', 'Training', and 'Tools'. The 'Home' page features a welcome message, a 'Hello Mario!' greeting with a 'My Profile' link, and 'Membership details' showing an account for 'JPNIC-JP' with an expiry date of '2010-06-30' and a tier of 'extra large'. A 'Request a certificate' button is highlighted with a red box. The 'What can I do?' section lists actions like updating resource information and viewing member details. A 'News' section shows recent updates from 2009. A 'Useful links' sidebar contains various utility links, and an 'APNIC Helpdesk Chat Online' widget is visible at the bottom right.

MyAPNIC Registration



Login

Register

MyAPNIC / Register

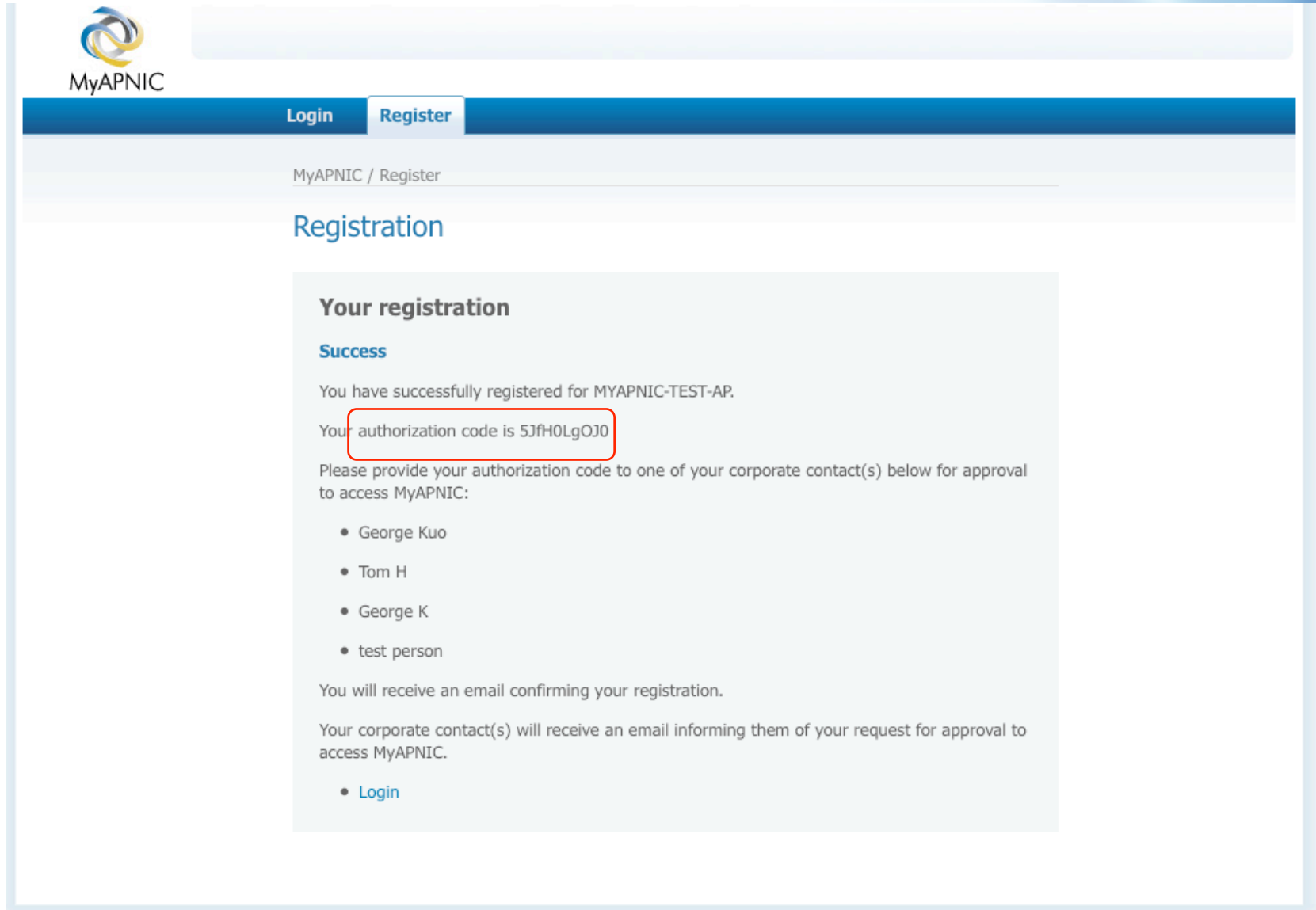
Registration

Your details

Username	* <input type="text" value="vivek"/>	Help
Password (at least 8 characters)	* <input type="password" value="....."/>	Help
Confirm password	* <input type="password" value="....."/>	Help
Full name	* <input type="text" value="Vivek Nigam"/>	
Email address	* <input type="text" value="vivek@apnic.net"/>	
Member account name	* <input type="text" value="APNIC-AP"/>	Help

Register

MyAPNIC Registration



The screenshot shows the MyAPNIC registration success page. At the top left is the MyAPNIC logo. Below it is a navigation bar with 'Login' and 'Register' tabs. The main content area is titled 'Registration' and contains a success message. A red box highlights the authorization code '5JfH0LgOJ0'.

MyAPNIC

[Login](#) [Register](#)

MyAPNIC / Register

Registration

Your registration

Success

You have successfully registered for MYAPNIC-TEST-AP.

Your authorization code is 5JfH0LgOJ0

Please provide your authorization code to one of your corporate contact(s) below for approval to access MyAPNIC:

- George Kuo
- Tom H
- George K
- test person

You will receive an email confirming your registration.

Your corporate contact(s) will receive an email informing them of your request for approval to access MyAPNIC.

- [Login](#)



MyAPNIC Registration

 George [APNICTRAINING-AU] | [Contacts and Users](#) | [My Profile](#) | [Log out](#)

 You are currently masquerading from user *vivek* to user *gk*.
 

[Home](#) | [Voting](#) | [Resources](#) | **Administration** | [Training](#) | [Tools](#)
[Member details](#) | [Contact details](#) | [Registration list](#) | [Billing history](#) | [Annual fee calculator](#) | [Correspondence](#)

[Home](#) / [Administration](#) / [Registrations](#)

Registrations

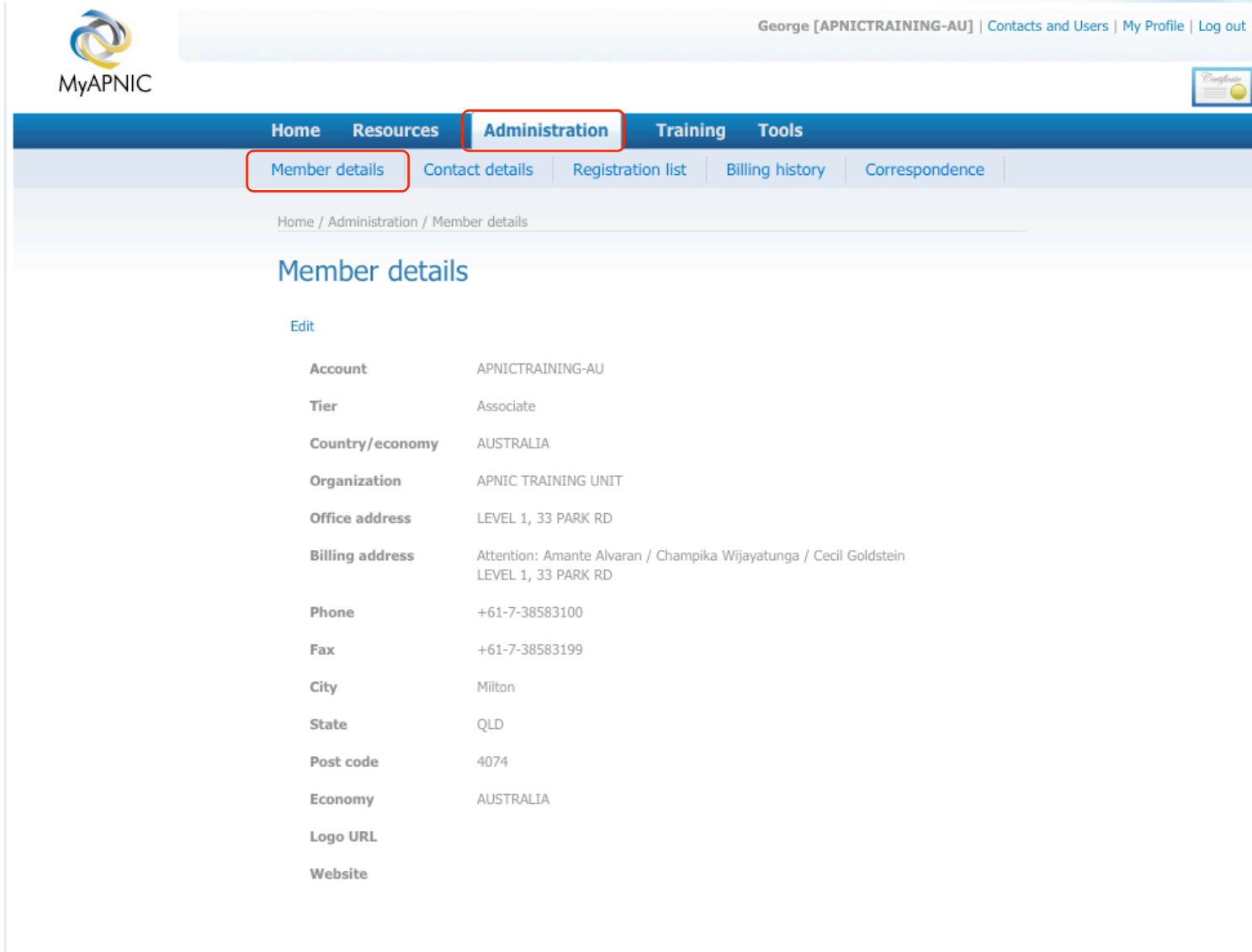
Pending registration requests

Date (UTC)	Username	Email address	Authorization code	Approve registration	Reject registration
2010-01-01 00:00:00	tomh	tomh@apnic.net	<input type="text"/>	Approve	Reject
2009-11-22 23:42:20	dfsgsdfdf	vivek@apnic.net	<input type="text"/>	Approve	Reject
2009-11-20 06:39:48	blablabla	vivek@apnic.net	<input type="text"/>	Approve	Reject
2009-10-15 06:16:21	TestTrainer1	vnigam@hotmail.com	<input type="text"/>	Approve	Reject


Approved registration requests

Date (UTC)	Username
2009-12-07 01:54:02	sdfsdfsf24234
2009-11-20 05:50:55	happytest
2009-10-01 06:09:16	sarat
2009-08-11 07:38:11	ragay-1
2009-04-11 02:27:14	Champ
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Manage your membership



George [APNICTRAINING-AU] | [Contacts and Users](#) | [My Profile](#) | [Log out](#)

MyAPNIC 

[Home](#) [Resources](#) **[Administration](#)** [Training](#) [Tools](#)

[Member details](#) [Contact details](#) [Registration list](#) [Billing history](#) [Correspondence](#)

[Home](#) / [Administration](#) / [Member details](#)

Member details

[Edit](#)

Account	APNICTRAINING-AU
Tier	Associate
Country/economy	AUSTRALIA
Organization	APNIC TRAINING UNIT
Office address	LEVEL 1, 33 PARK RD
Billing address	Attention: Amante Alvaran / Champika Wijayatunga / Cecil Goldstein LEVEL 1, 33 PARK RD
Phone	+61-7-38583100
Fax	+61-7-38583199
City	Milton
State	QLD
Post code	4074
Economy	AUSTRALIA
Logo URL	
Website	

Contact Management

Warning: Deleting a contact person will disable that person's access to MyAPNIC for this membership (if the person previously has access to MyAPNIC)

Approve user registration

Pending requests: There are pending MyAPNIC user registrations. Please click on the link below to approve the requests.

- [Approve user registration](#)

Registered member contacts

[Add new contact](#)

Full name	Email (red == invalid)	Job title	MyAPNIC username	Corporate	Billing	Technical	Certificate
Rafael Santiago	rafael@mydestiny.		[+] arth	✓	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Delete Approve
Joey Mirador	joey_m@mydestin				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Delete Approve
Donald Tilin	d_tilin@mydestiny.				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Delete Approve
Joey Example	joey@example.co		[+] Joey	✓	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Delete Approve
testing 2	arth@apnic.net		[+] testing3		<input type="checkbox"/>	<input type="checkbox"/>	Delete Approve
Micky Mouse	arth@dnskey.net		[+] micky		<input type="checkbox"/>	<input type="checkbox"/>	Delete Approve

[Save changes](#)

Add new contact person

Full name	Email	Job title	MyAPNIC username	Corporate	Billing	Technical
<input type="text"/>	<input type="text"/>	<input type="text"/>	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[Add](#)

Annual fee calculator

Home
Resources
Administration
Training
Tools

Member details
Contact details
Billing history
Annual fee calculator
Correspondence

Home / Administration / Annual membership fee calculator

Annual membership fee calculator

Use this tool as a guide to estimate APNIC fees based on your resource holdings.

Your fees are based on the higher of the following

	Resources	Total	Fee
IPv4	/24	256	\$1,180
IPv6	/48	256	\$1,180

Renewal fee based on resource holdings as of 25 Jan 2010

Fee based on the table above	\$1,180
Total fee¹	\$1,180

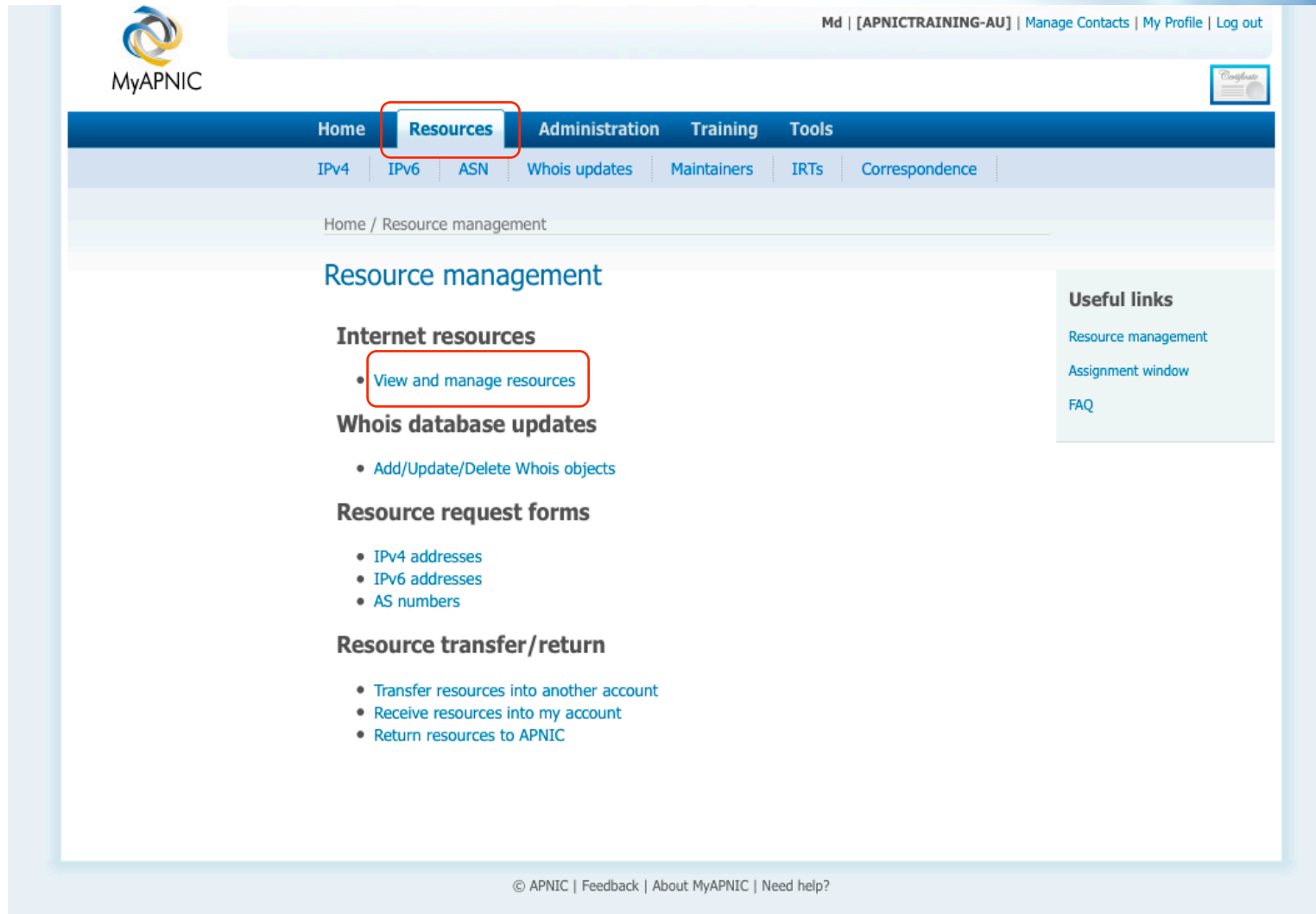
Add or remove resources

	Resources	Add	Remove	Total	Fee
IPv4	256	<input type="text" value="/24"/>	<input type="text"/>	512	\$1,534
IPv6	256	<input type="text"/>	<input type="text"/>	256	\$1,180

Renewal fee based on projected holdings

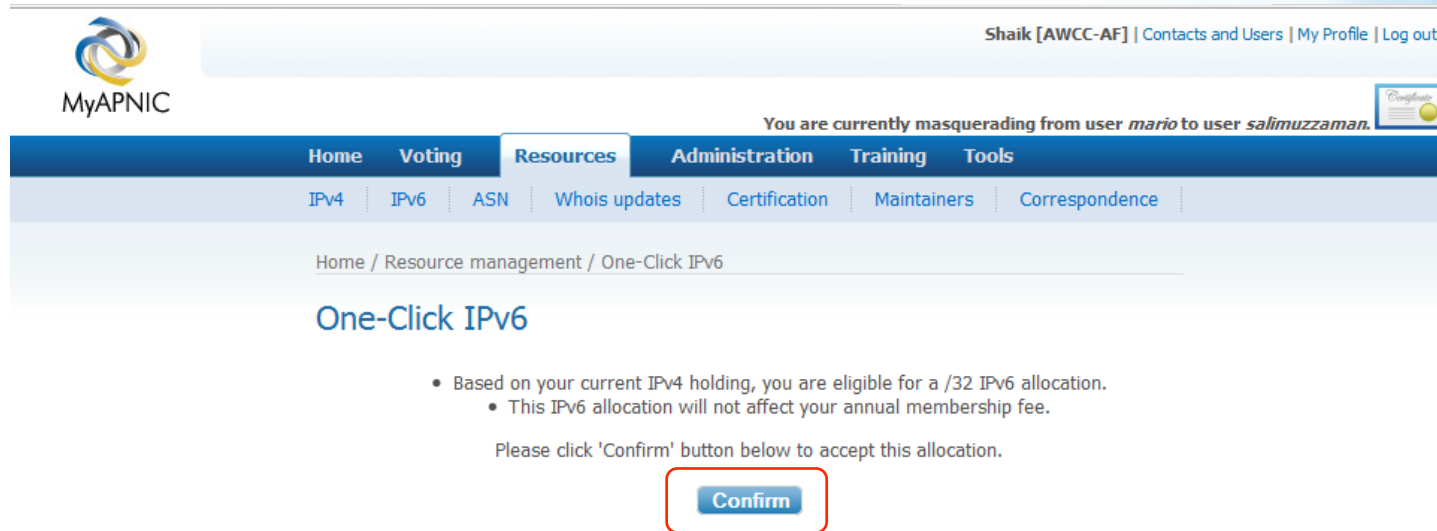
Your fees are based on the higher amount of the above	\$1,534
Total fee¹	\$1,534

Manage your resource



The screenshot shows the MyAPNIC website interface. At the top left is the MyAPNIC logo. The top right contains navigation links: Md | [APNICTRAINING-AU] | Manage Contacts | My Profile | Log out. A blue navigation bar features 'Home', 'Resources' (highlighted with a red box), 'Administration', 'Training', and 'Tools'. Below this bar are sub-links: IPv4, IPv6, ASN, Whois updates, Maintainers, IRTs, and Correspondence. The breadcrumb trail reads 'Home / Resource management'. The main content area is titled 'Resource management' and lists several categories: 'Internet resources' (with 'View and manage resources' highlighted in a red box), 'Whois database updates' (with 'Add/Update/Delete Whois objects'), 'Resource request forms' (with 'IPv4 addresses', 'IPv6 addresses', and 'AS numbers'), and 'Resource transfer/return' (with 'Transfer resources into another account', 'Receive resources into my account', and 'Return resources to APNIC'). A 'Useful links' sidebar on the right includes 'Resource management', 'Assignment window', and 'FAQ'. The footer contains the text: © APNIC | Feedback | About MyAPNIC | Need help?

Just one click...



The screenshot shows the MyAPNIC user interface. At the top left is the MyAPNIC logo. At the top right, the user is identified as Shaik [AWCC-AF] with links for Contacts and Users, My Profile, and Log out. Below this, a notification states: "You are currently masquerading from user *mario* to user *salimuzzaman*." A navigation menu includes Home, Voting, Resources (selected), Administration, Training, and Tools. A secondary menu lists IPv4, IPv6, ASN, Whois updates, Certification, Maintainers, and Correspondence. The breadcrumb trail reads: Home / Resource management / One-Click IPv6. The main heading is "One-Click IPv6".

- Based on your current IPv4 holding, you are eligible for a /32 IPv6 allocation.
- This IPv6 allocation will not affect your annual membership fee.

Please click 'Confirm' button below to accept this allocation.

[Confirm](#)



And you have your IPv6!

The screenshot shows the MyAPNIC website interface. At the top left is the MyAPNIC logo. On the right, there is a user profile for Shaik [AWCC-AF] with links for Contacts and Users, My Profile, and Log out. Below this is a notification: "You are currently masquerading from user *mario* to user *salimuzzaman*." The main navigation bar includes Home, Voting, Resources, Administration, Training, and Tools. A secondary navigation bar lists IPv4, IPv6, ASN, Whois updates, Certification, Maintainers, and Correspondence. The breadcrumb trail is Home / Resource management / One-Click IPv6. The main heading is "One-Click IPv6". A red-bordered box highlights a success message: "Success. You have been delegated: IPv6: 2404:3400::/32. A confirmation email has been sent to s.salim@tsiglobe.com." Below this, the "Whois details:" are listed.

MyAPNIC

Shaik [AWCC-AF] | [Contacts and Users](#) | [My Profile](#) | [Log out](#)

You are currently masquerading from user *mario* to user *salimuzzaman*.

Home Voting Resources Administration Training Tools

IPv4 IPv6 ASN Whois updates Certification Maintainers Correspondence

Home / Resource management / One-Click IPv6

One-Click IPv6

Success

You have been delegated:

IPv6: 2404:3400::/32


A confirmation email has been sent to **s.salim@tsiglobe.com**.

Whois details:

```
inet6num: 2404:3400::/32
netname: AWCC-AF
descr: AWCC, Afghanistan. Live in Future.
country: AF
admin-c: SS1031-AP
tech-c: SS1031-AP
mnt-lower: MAINT-AF-AWCC
mnt-by: APNIC-HM
status: ALLOCATED PORTABLE
changed: hm-changed@apnic.net 20100120
source: APNIC
```

IPv4 Resources

MyAPNIC Vivek [APNICTRAINING-AU] | My Profile | Log out



Home | **Resources** | Administration | Training | Tools

IPv4 | IPv6 | ASN | Whois updates | Maintainers | Correspondence

Home / Resource management / IPv4

IPv4 resources

Assignment window | Date last reviewed


[Add reverse DNS domain object](#) |
 [Add public assignment](#) |
 [Add private assignment](#) |
 [Request more IPv4 addresses](#)


Start IP	Length	Date	Usage	Assignment status	Reverse DNS	Private	Public
203.176.189.0	/24	2008-04-24	100%	<div style="width: 100%; height: 10px; background-color: #800000;"></div>	update	<input type="checkbox"/>	<input type="checkbox"/>

Legend: ■ < 20% ■ = 20% ■ = 40% ■ = 60% ■ = 80% ■ > 80%

© APNIC | Feedback

IPv6 Resources


Vivek [APNICTRAINING-AU] | [My Profile](#) | [Log out](#)




[Home](#) | [Resources](#) | [Administration](#) | [Training](#) | [Tools](#)

[IPv4](#) | [IPv6](#) | [ASN](#) | [Whois updates](#) | [Maintainers](#) | [Correspondence](#)

Home / Resource management / IPv6

IPv6 resources

[Bulk reverse delegations](#) | [Add public assignment](#) | [Add private assignment](#) | [Request more IPv6 addresses](#)


Start IP	Length	Date	Assignment status	Download public
2001:0DF0:000A::	/48	2008-04-24	■	

[Select All](#)


[Download as .ZIP](#)

Legend: ■ < 0.2 HD ■ = 0.2 HD ■ = 0.4 HD ■ = 0.6 HD ■ = 0.8 HD ■ > 0.8 HD

AS number Resources



Vivek [APNICTRAINING-AU] | [My Profile](#) | [Log out](#)



Home
Resources
Administration
Training
Tools

IPv4
IPv6
ASN
Whois updates
Maintainers
Correspondence

Home / Resource management / Whois database update

Public data

Update object :

aut-num:	<input type="text" value="AS45192"/>	☰	
as-name:	<input type="text" value="APNICTRAINING-AS-AP"/>	☰	↓
descr:	<input type="text" value="2-byte AS number for APNIC Training te"/>	☰ +	↑ ↓
country:	<input type="text" value="AU"/>	☰	↑ ↓
admin-c:	<input type="text" value="AT480-AP"/>	☰ +	↑ ↓
tech-c:	<input type="text" value="AT480-AP"/>	☰ +	↑ ↓
mnt-lower:	<input type="text" value="MAINT-AU-APNICTRAINING"/>	☰ +	↑ ↓ ✕
mnt-routes:	<input type="text" value="MAINT-AU-APNICTRAINING"/>	☰ +	↑ ↓ ✕
mnt-by:	<input type="text" value="MAINT-AU-APNICTRAINING"/>	☰ +	↑ ↓
changed:	<input type="text" value="hm-changed@apnic.net 20080424"/>	☰ +	↑ ↓
source:	<input type="text" value="APNIC"/>	☰	↑

Add new field:

descr

↓

after

↓

the

as-name

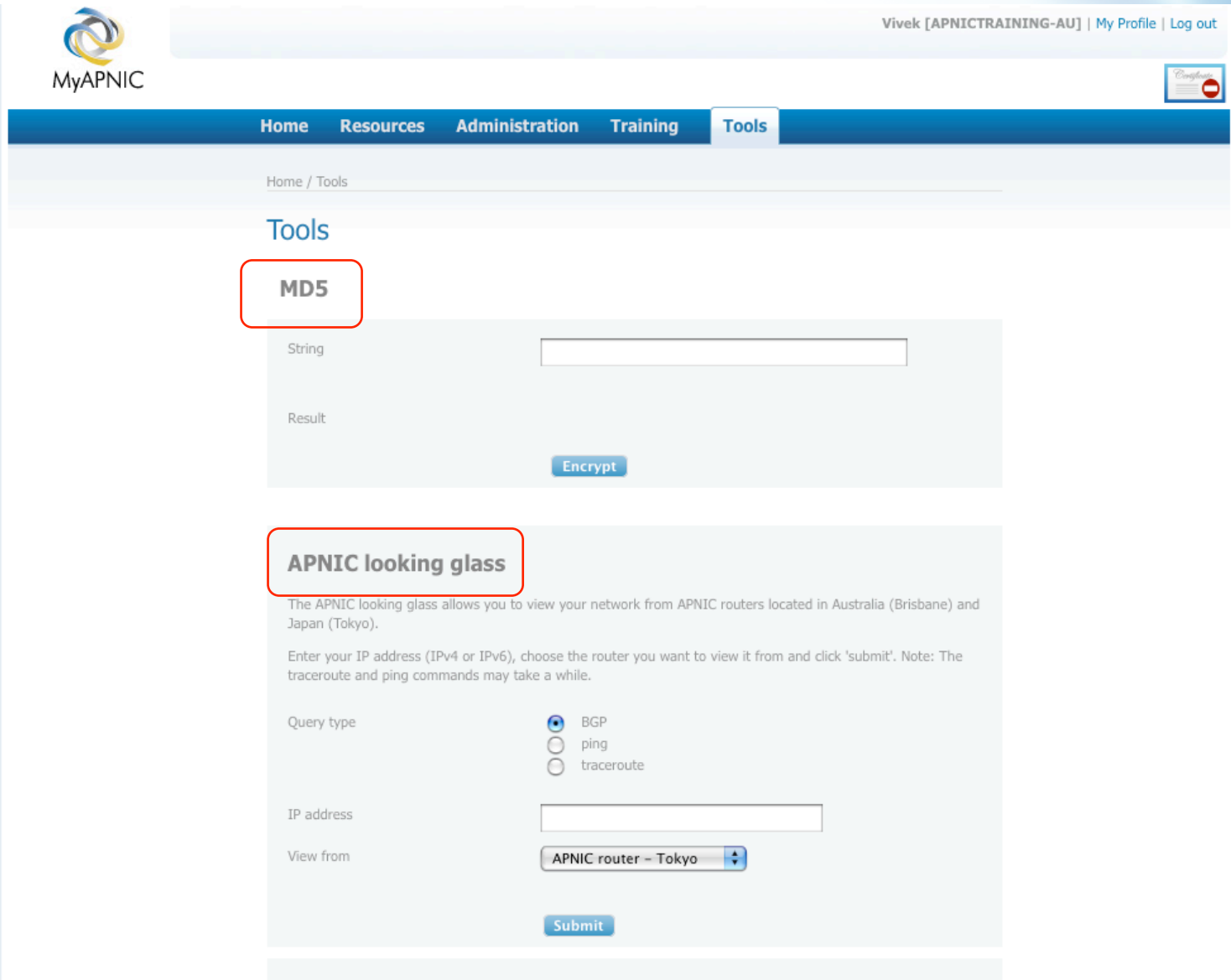
↓

field

Add

Submit update

Useful tools



The screenshot shows the MyAPNIC website interface. At the top left is the MyAPNIC logo. The top right shows the user name 'Vivek [APNICTRAINING-AU]' and links for 'My Profile' and 'Log out'. A navigation bar contains 'Home', 'Resources', 'Administration', 'Training', and 'Tools'. Below the navigation bar is a breadcrumb trail 'Home / Tools'. The main content area is titled 'Tools' and features two tool cards. The first card, 'MD5', is highlighted with a red box and contains a 'String' input field, a 'Result' label, and an 'Encrypt' button. The second card, 'APNIC looking glass', is also highlighted with a red box and contains a description, instructions, a 'Query type' section with radio buttons for 'BGP', 'ping', and 'traceroute', an 'IP address' input field, a 'View from' dropdown menu set to 'APNIC router - Tokyo', and a 'Submit' button.

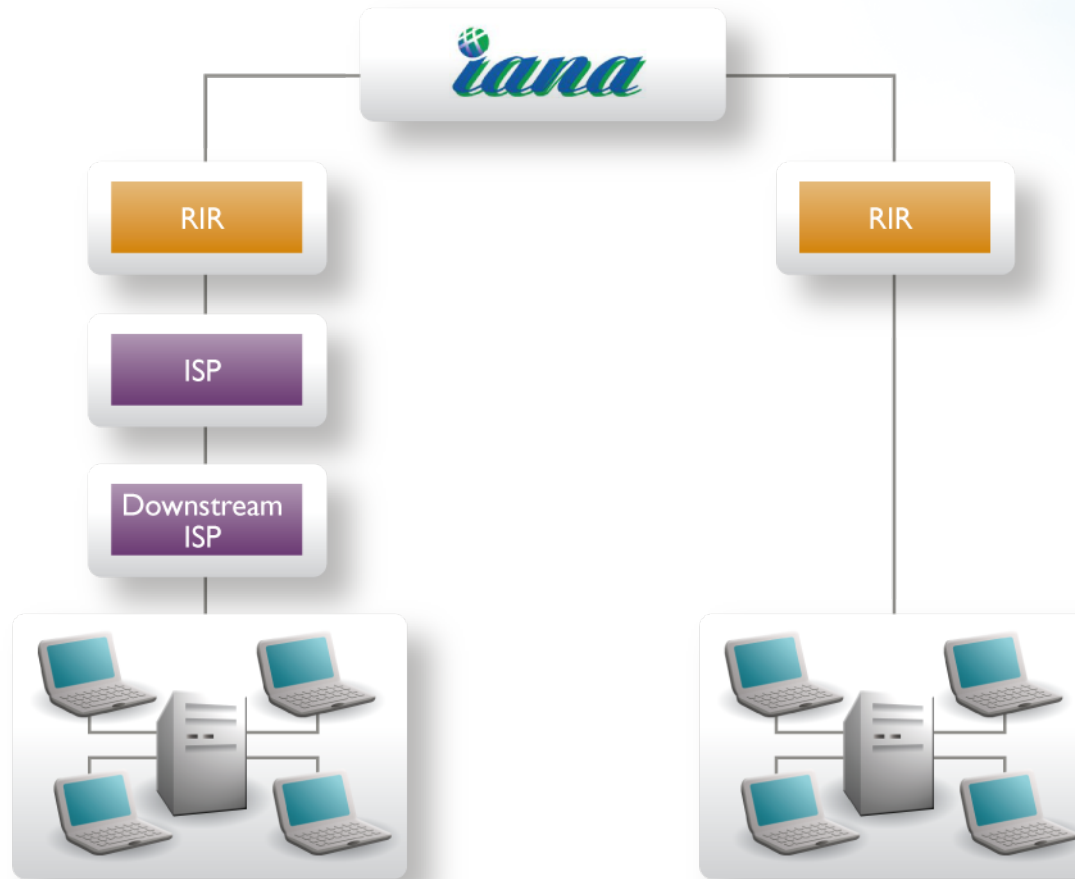
Questions?



Overview

- IRM
 - Introduction to APNIC
 - APNIC policy development process
 - Internet registry policies
 - IP address request (Demo)
 - Second opinion request
 - MyAPNIC (Demo)
 - **IPv6 Policy and Procedure**
 - APNIC Helpdesk

IPv6 Address Management Hierarchy





IPv6 Address Policy Goals

- Efficient address usage
 - Avoid wasteful practices
- Aggregation
 - Hierarchical distribution
 - Aggregation of routing information
 - Limiting number of routing entries advertised
- Minimise overhead
 - Associated with obtaining address space
- Registration, Uniqueness, Fairness & consistency

IPv6 Initial Allocation

- To qualify for an initial allocation of IPv6 address space, an organization must:
 - 1. Not be an end site (must provide downstream services)
 - 2. Plan to provide IPv6 connectivity to organizations to which it will make assignments, by advertising that connectivity through its single aggregated address allocation
 - 3. Meet one of the two following criteria:
 - Have a plan for making at least 200 assignments to other organizations within two years OR
 - Be an existing ISP with IPv4 allocations from an APNIC or an NIR, which will make IPv6 assignments or sub-allocations to other organizations and announce the allocation in the inter-domain routing system within two years

IPv6 Initial Allocation

- Private networks (those not connected to the public Internet) may also be eligible for an IPv6 address space allocation provided they meet equivalent criteria to those listed above.
- Initial allocation size is /32
 - Default allocation (“slow start”)

IPv6 Initial Allocation

- Initial allocations larger than /32 may be justified if:
 - 1. The organization provides comprehensive documentation of planned IPv6 infrastructure which would require a larger allocation; or
 - 2. The organization provides comprehensive documentation of all of the following:
 - its existing IPv4 infrastructure and customer base,
 - its intention to provide its existing IPv4 services via IPv6, and
 - its intention to move some of its existing IPv4 customers to IPv6 within two years.

End Site Assignment Policy for IPv6

- Any size longer than /48
 - Decision is up to ISPs or ISPs
 - Implication: any size between /64 - /48
 - Global coordination is required
 - Assuming the HD ratio changes to a larger value
 - HD ratio measurement unit: /48 => /56
 - Implication: Register all assignments shorter than /56?
 - HD ratio: 0.8 => 0.94

Subsequent Allocation

- Must meet $HD = 0.94$ utilisation requirement of previous allocation (subject to change)
- 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

IPv6 Utilisation

- Utilisation determined from end site assignments
 - ISP responsible for registration of all /48 assignments
 - Intermediate allocation hierarchy not considered
- Utilisation of IPv6 address space is measured differently from IPv4
 - Use HD ratio to measure
- Subsequent allocation may be requested when IPv6 utilisation requirement is met

IPv6 Assignment and Utilisation Requirement

- IPv6 assignment and utilisation requirement policy
 - HD ratio: 0.94
 - Measurement unit: /56
- The HD ratio threshold is
 - $HD = \log(/56 \text{ units assigned}) / \log(16,777,216)$
 - $0.94 = 6,183,533 \times /56 \text{ units}$
- Calculation of the HD ratio
 - Convert the assignment size into equivalent /56 units
 - Each /48 end site = $256 \times /56 \text{ units}$
 - Each /52 end site = $16 \times /56 \text{ units}$
 - Each /56 end site = $1 \times /56 \text{ units}$
 - Each /60 end site = $1/16 \times /56 \text{ units}$
 - Each /64 end site = $1/256 \times /56 \text{ units}$

IPv6 Utilisation (HD = 0.94)

- Percentage utilisation calculation

IPv6 Prefix	Site Address Bits	Total site address in /56s	Threshold (HD ratio 0.94)	Utilisation %
/42	14	16,384	9,153	55.9%
/36	20	1,048,576	456,419	43.5%
/35	21	2,097,152	875,653	41.8 %
/32	24	16,777,216	6,185,533	36.9%
/29	27	134,217,728	43,665,787	32.5 %
/24	32	4,294,967,296	1,134,964,479	26.4 %
/16	40	1,099,511,627,776	208,318,498,661	18.9 %

RFC 3194

“In a hierarchical address plan, as the size of the allocation increases, the density of assignments will decrease.”

IXP IPv6 Assignment Policy

- Criteria
 - Demonstrate ‘open peering policy’
 - 3 or more peers
- Portable assignment size: /48
 - All other needs should be met through normal processes
 - /64 holders can “upgrade” to /48
 - Through NIRs/ APNIC
 - Need to return /64

IPv6 Portable Assignment for Multi-homing

- The current policy allows for IPv6 portable assignment to end-sites
 - Size: /48, or a shorter prefix if the end site can justify it
 - To be multihomed within 3 months
 - Assignment from a specified block separately from portable allocations address space

How do I Apply for IPv6 Addresses?

Check your eligibility for IPv6 addresses



Read IPv6 policies

<http://www.apnic.net/policy/ipv6-address-policy>

Read IPv6 guideline

<http://www.apnic.net/publications/media-library/corporate-documents/resource-guidelines/ipv6-guidelines>



Do you have an APNIC account?

If not, become an APNIC member or open a non-member account



Complete an IPv6 address request form



Submit the form hostmaster@apnic.net



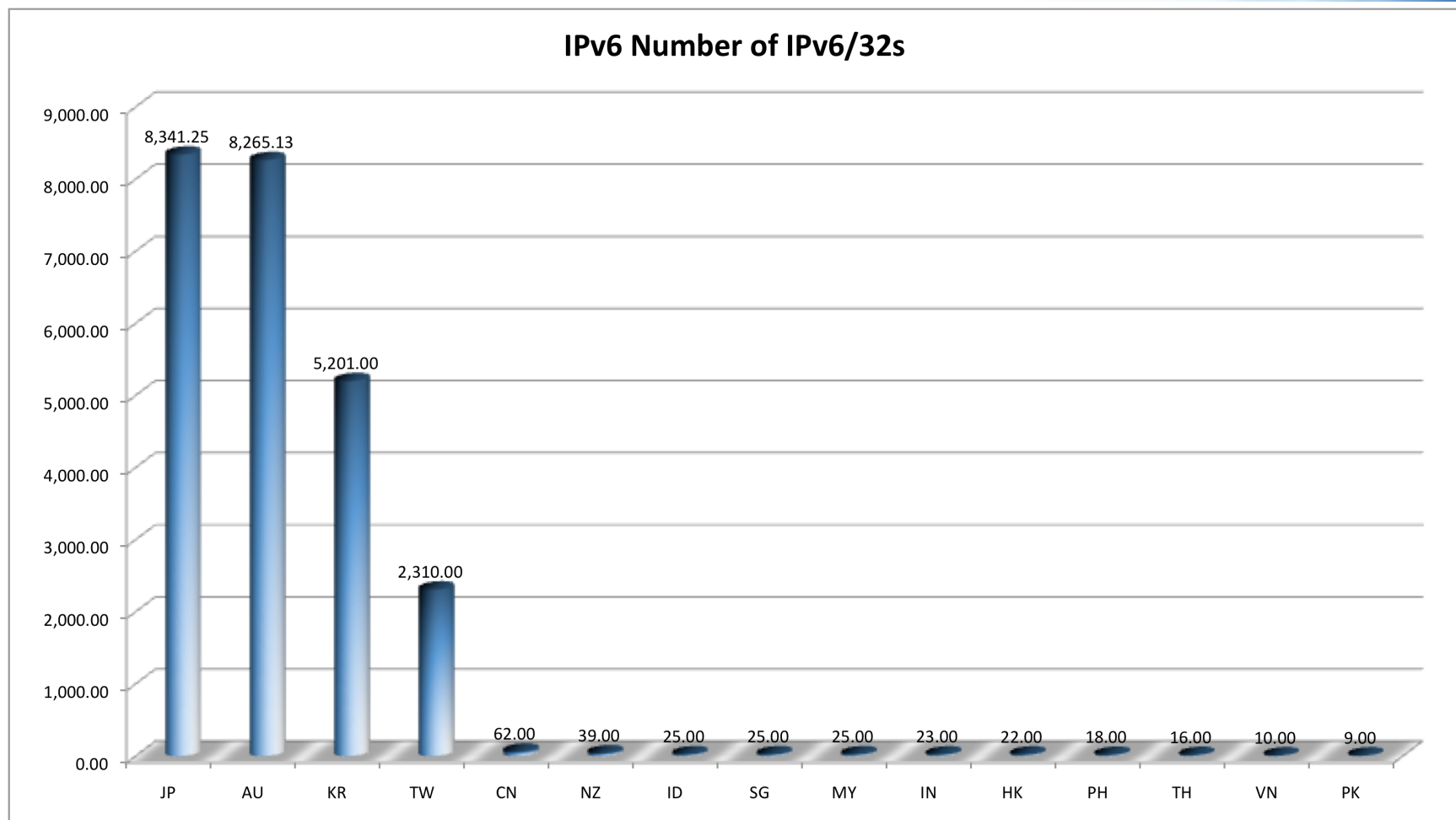
Questions:

email: helpdesk@apnic.net

Helpdesk chat: <http://www.apnic.net/helpdesk>



APNIC IPv6 Delegation by Economy



No of delegations (/35, /32)

<http://www.apnic.net/stats/o3/> as of 26/03/2009

Questions?



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Member Services Helpdesk

- One point of contact for all member enquiries
- Online chat services



Helpdesk hours

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

ph: +61 7 3858 3188

fax: 61 7 3858 3199

- ***More personalised service***
 - Range of languages:
Cantonese, Filipino, Mandarin, Thai, Vietnamese etc.
- ***Faster response and resolution of queries***
 - IP resource applications, status of requests, obtaining help in completing application forms, membership enquiries, billing issues & database enquiries

APNIC Helpdesk Chat



Your IP:
203.119.42.185

Home Services Community Events

Services

Services APNIC provides

- > Registration services
- > Informing the community
- > Routing Registry
- > Resource certification
- > Training & education
- > Policy development
- v Helpdesk
 - Using VoIP


- > Apply for resources
- > Become a member
- > Make a payment
- > Manage Internet resources
- > Helpdesk


Helpdesk

The Helpdesk gives members and clients direct access to APNIC Hostmasters to resolve all enquiries.

09:00 to 19:00 (UTC+10 hours)

 **Phone**
+61 7 3858 3188

 **Fax**
+ 61 7 3858 3199

 **Email**
Helpdesk > helpdesk@apnic.net

APNIC Helpdesk Chat
Online
Click here to chat 

Note

Please send all requests for resources to Hostmaster with your APNIC

Search

log in to MyAPNIC

Print this page

Related links

- > Contact APNIC

Helpdesk queries

APNIC's Member Services Helpdesk can assist you receive faster responses for:

- Status of requests
- Membership enquiries
- Billing issues
- Database enquiries

Multi language helpdesk

Bahasa Indonesia, Bengali, Cantonese, English, Filipino (Tagalog), Hindi, Mandarin and

Request Live! Support

http://livehelp.apnic.net/request.php?l=apphplive&x=1&d...

APNIC Helpdesk Chat

Welcome to our Live Chat.

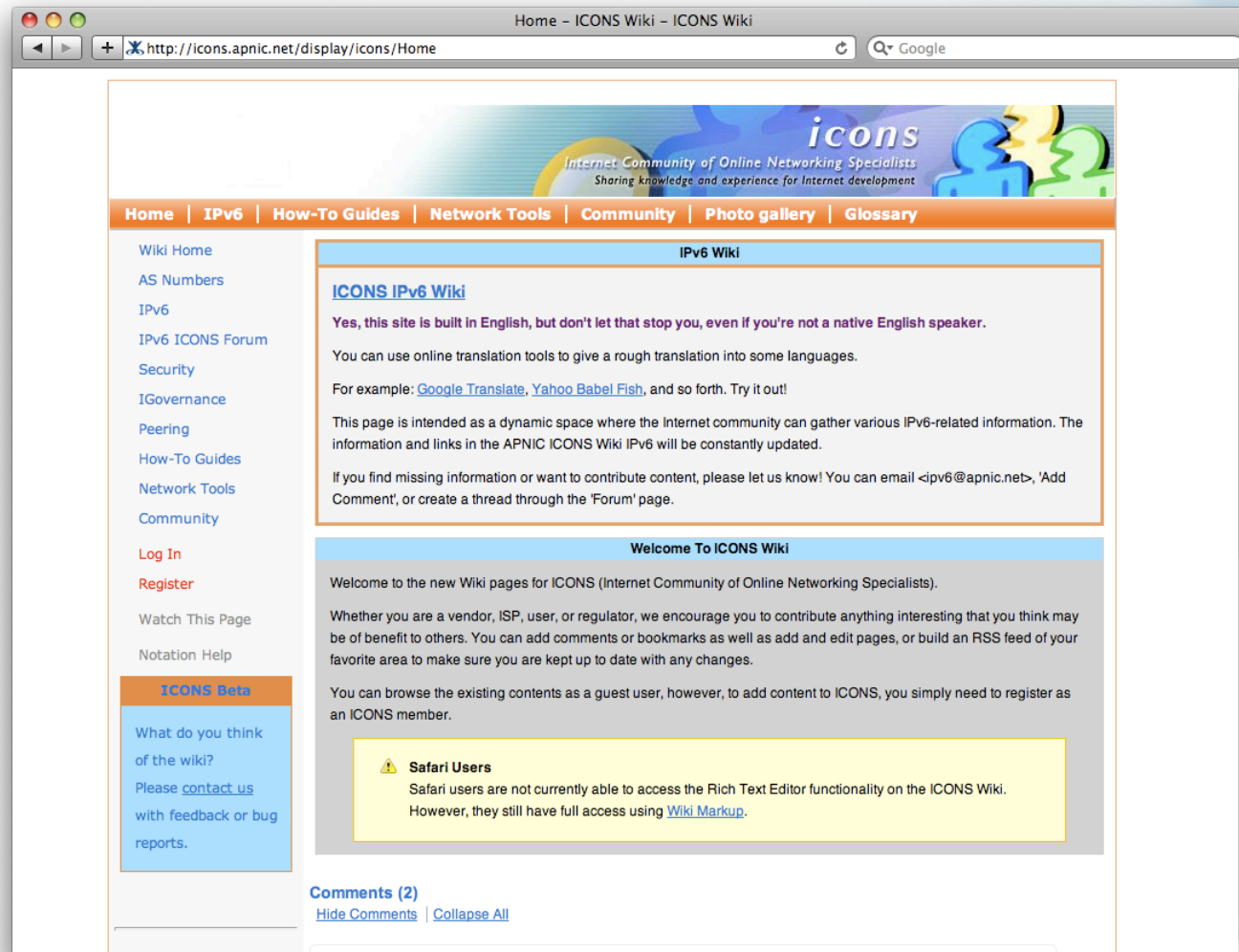
Name

Email

What is your question?

Powered by PHP Live! v3.2.1 © OSI Codes Inc.

ICONS



Home - ICONS Wiki - ICONS Wiki

http://icons.apnic.net/display/icons/Home

Google

icons
Internet Community of Online Networking Specialists
Sharing knowledge and experience for Internet development

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What do you think of the wiki?
Please [contact us](#) with feedback or bug reports.

IPv6 Wiki

ICONS IPv6 Wiki

Yes, this site is built in English, but don't let that stop you, even if you're not a native English speaker.

You can use online translation tools to give a rough translation into some languages.

For example: [Google Translate](#), [Yahoo Babel Fish](#), and so forth. Try it out!

This page is intended as a dynamic space where the Internet community can gather various IPv6-related information. The information and links in the APNIC ICONS Wiki IPv6 will be constantly updated.

If you find missing information or want to contribute content, please let us know! You can email <ipv6@apnic.net>, 'Add Comment', or create a thread through the 'Forum' page.

Welcome To ICONS Wiki

Welcome to the new Wiki pages for ICONS (Internet Community of Online Networking Specialists).

Whether you are a vendor, ISP, user, or regulator, we encourage you to contribute anything interesting that you think may be of benefit to others. You can add comments or bookmarks as well as add and edit pages, or build an RSS feed of your favorite area to make sure you are kept up to date with any changes.

You can browse the existing contents as a guest user, however, to add content to ICONS, you simply need to register as an ICONS member.

Safari Users

Safari users are not currently able to access the Rich Text Editor functionality on the ICONS Wiki. However, they still have full access using [Wiki Markup](#).

Comments (2)
[Hide Comments](#) | [Collapse All](#)

Questions?





Thank you!