Asia Pacific Network Information Centre

APNIC

APNIC Training

Internet Resource Management

July 21, 2010 – Paro, Bhutan

16 South Asian Network Operators Group (SANOG) Conference

In conjunction with Bhutan Telecom Ltd.

Introduction

- Presenters
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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.

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Overview

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

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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://meetings.apnic.net/30
  - http://www.apnic.net/community/participate/join-discussions/sigs

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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

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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

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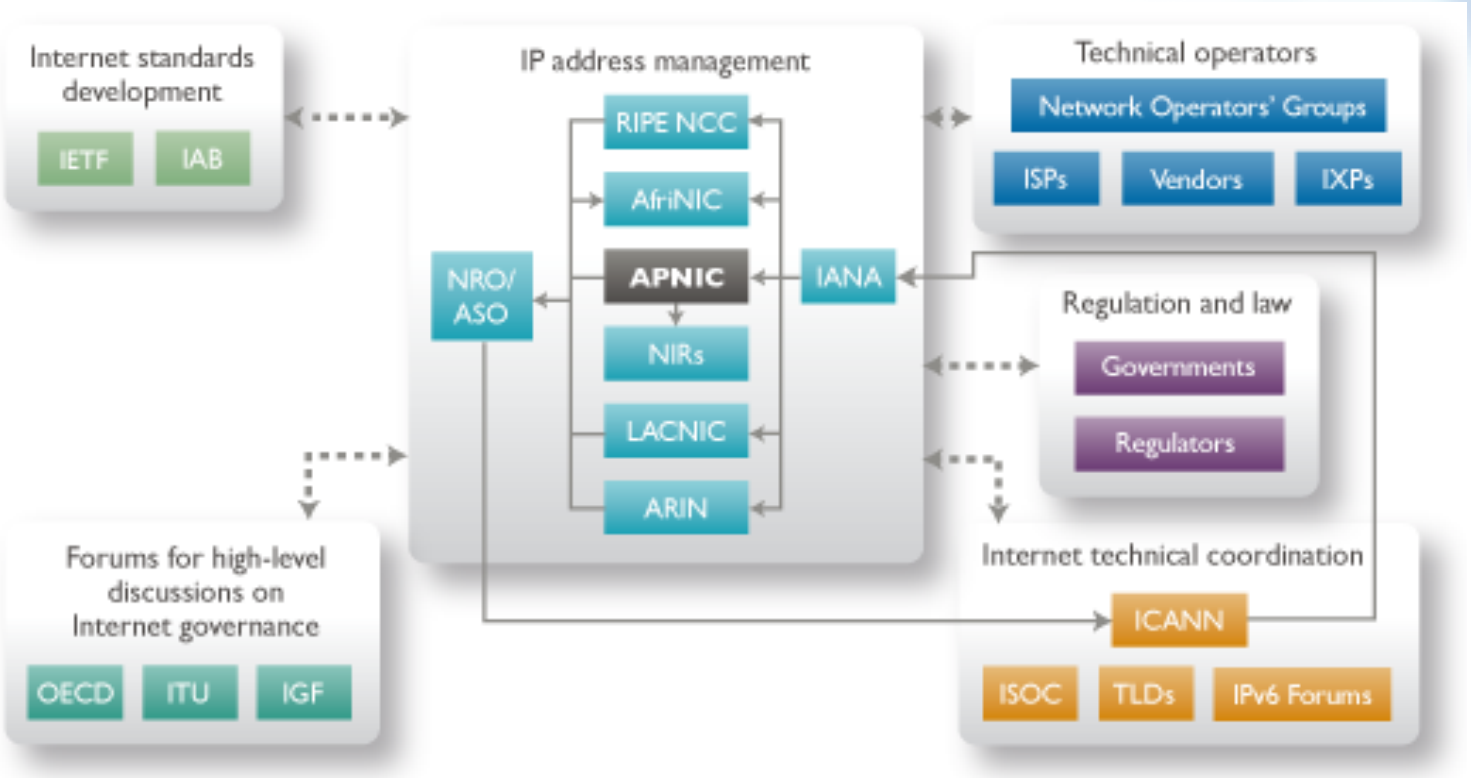
APNIC from a Global Perspective



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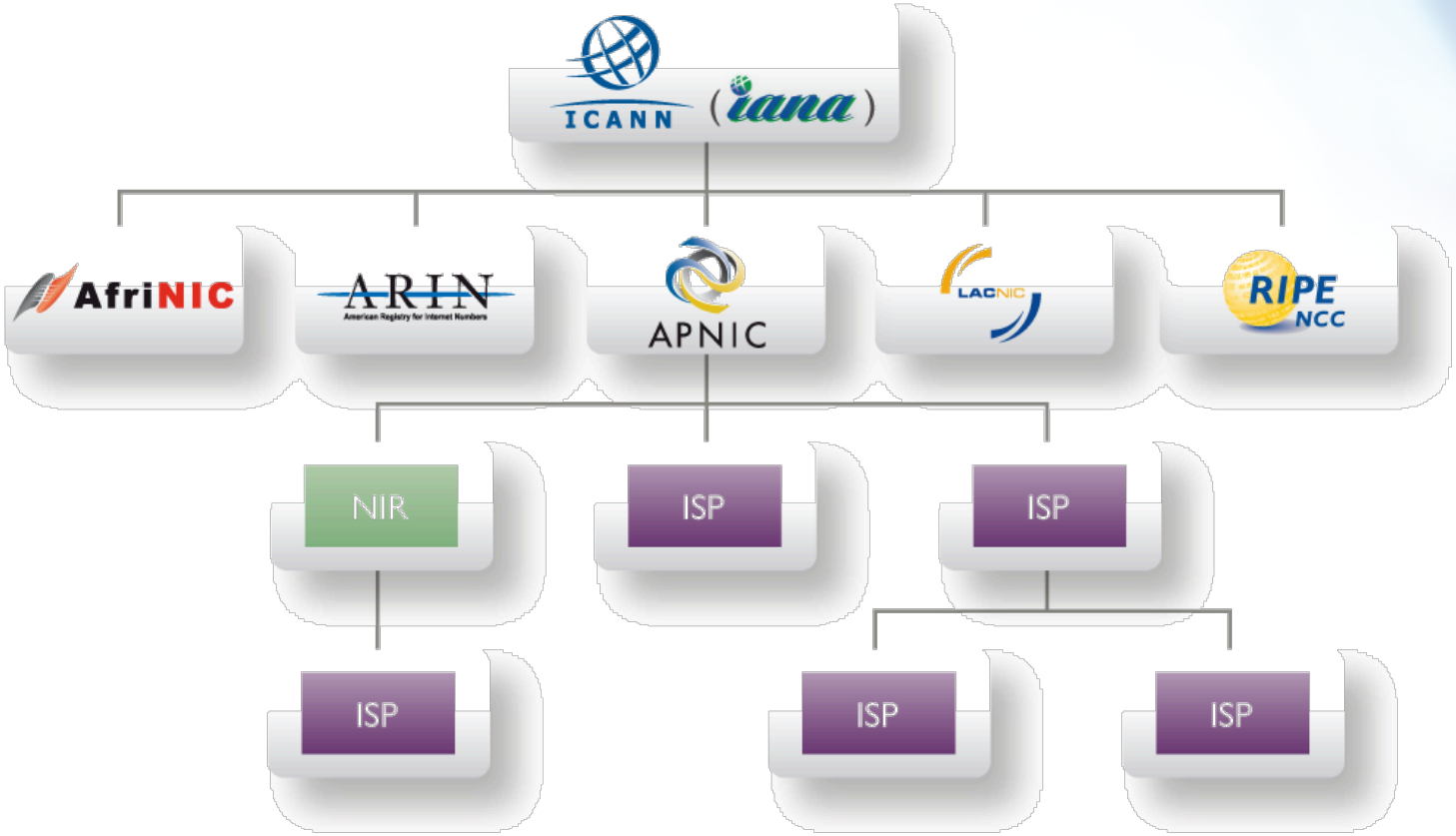
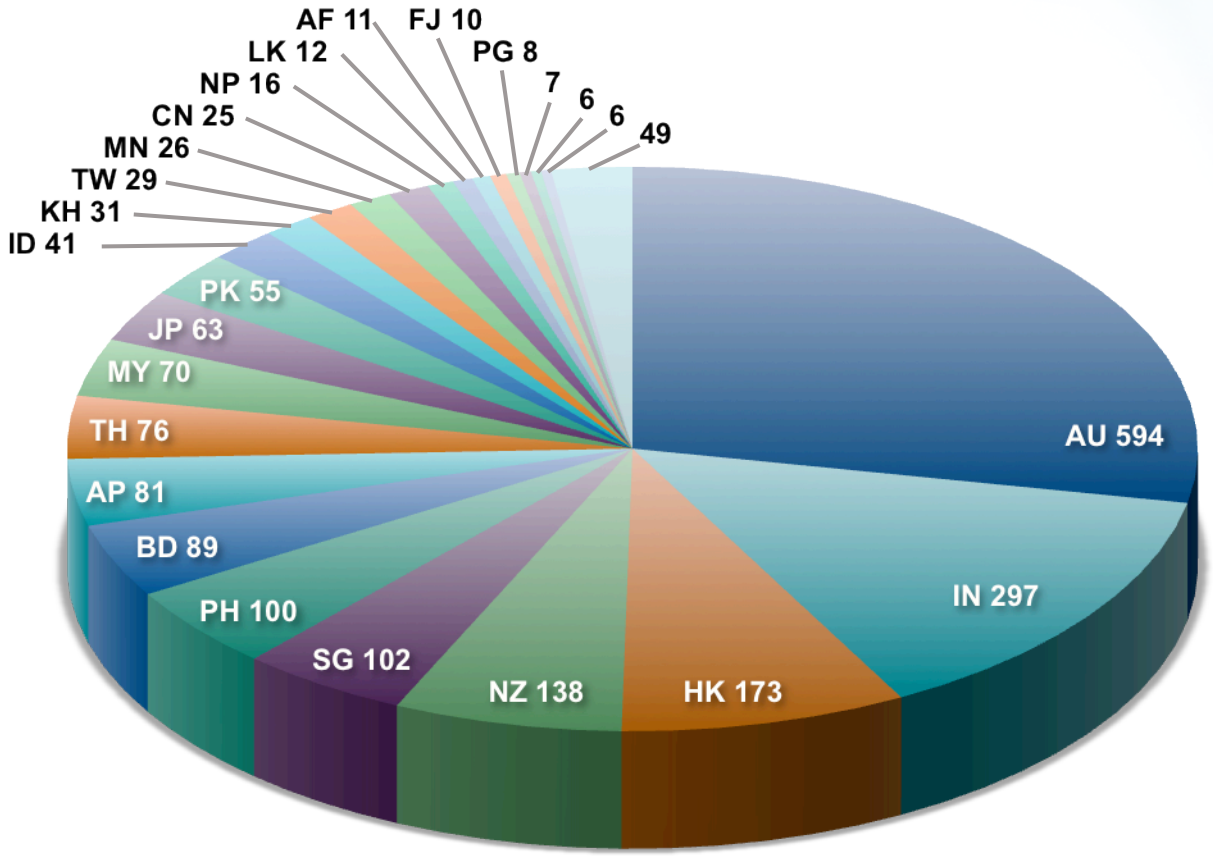
Internet Registry Structure

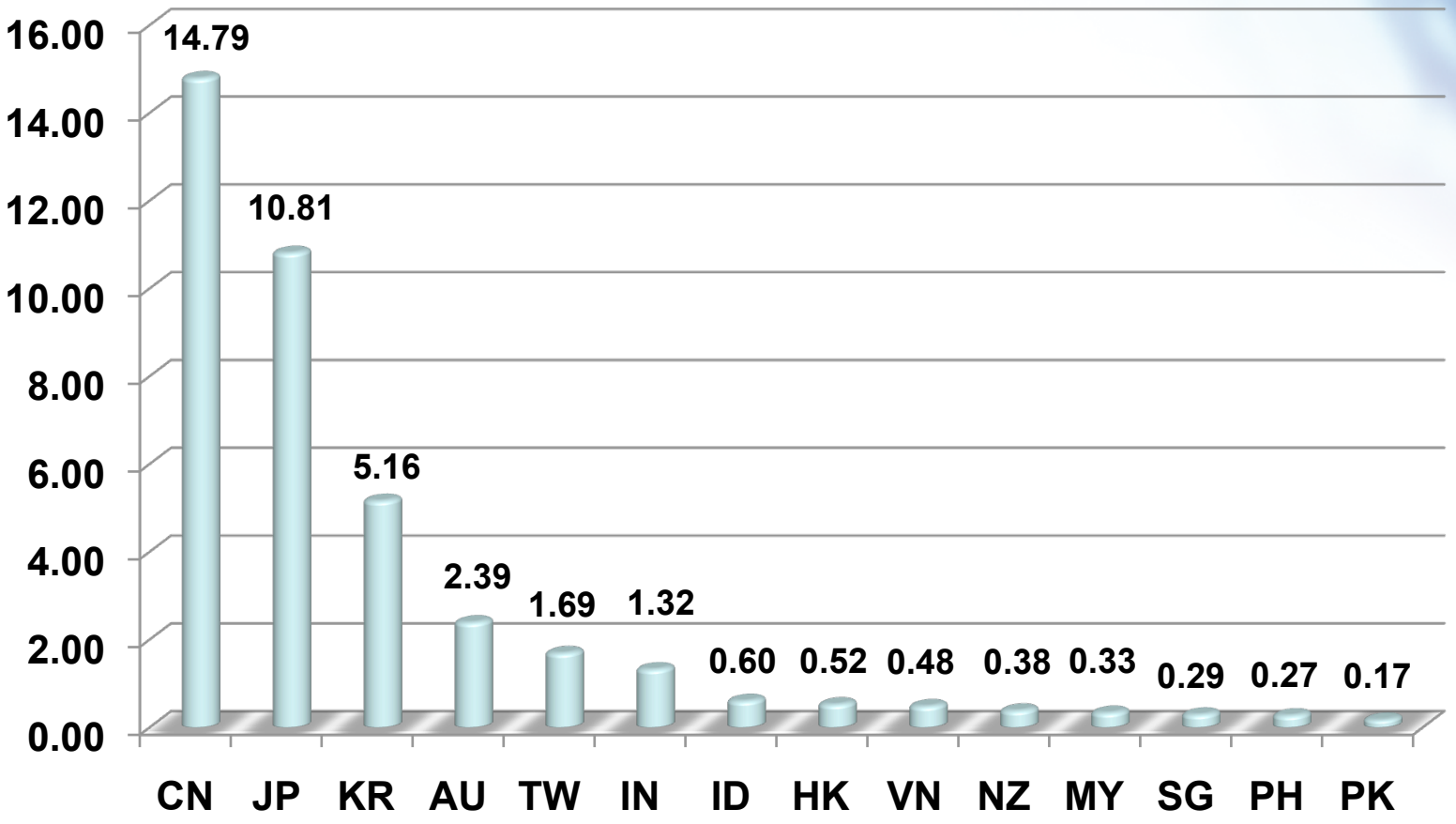


APNIC membership

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

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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

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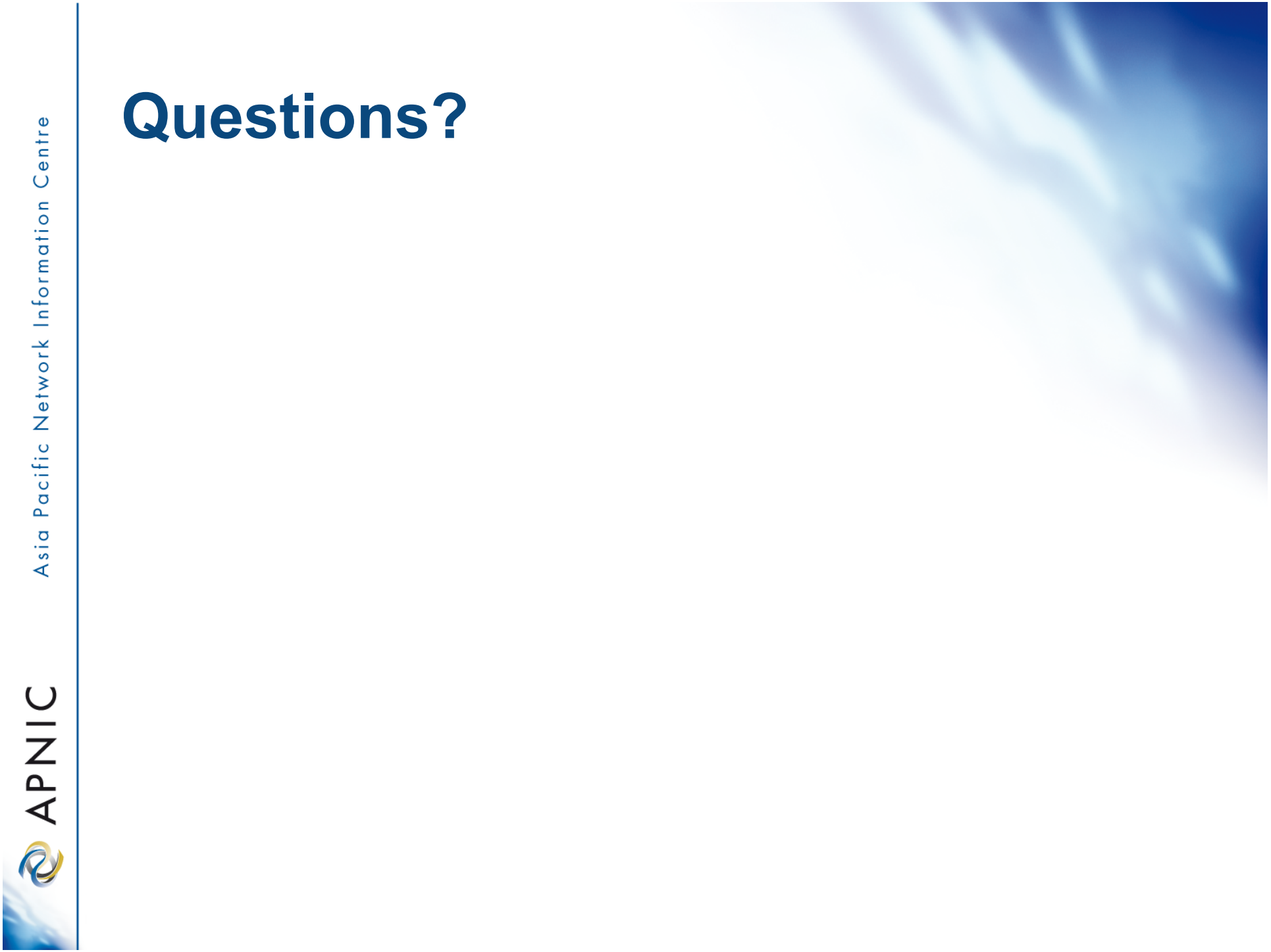
Questions?



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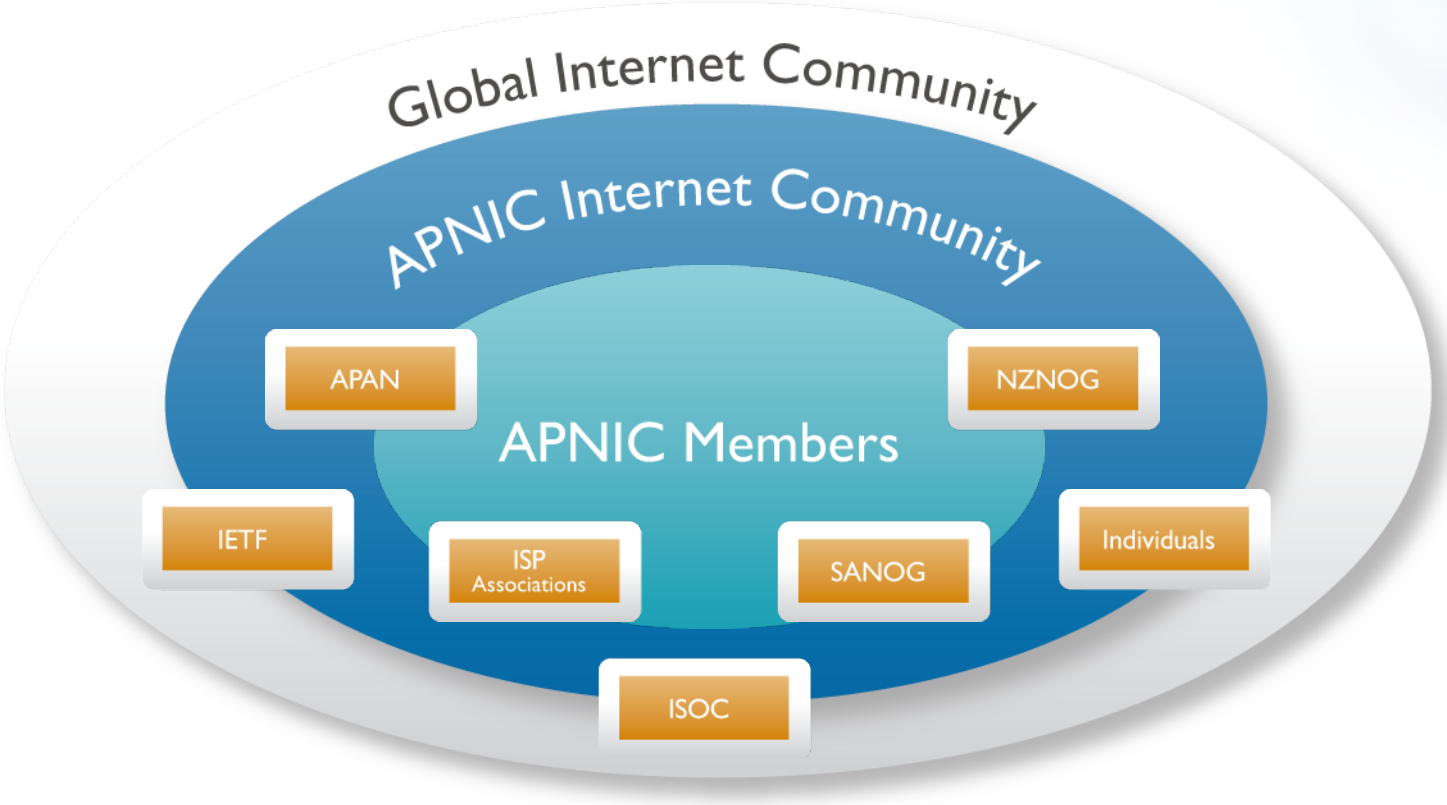
You are part of the APNIC Community!

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



– A voice in regional Internet operations through participation in APNIC

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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

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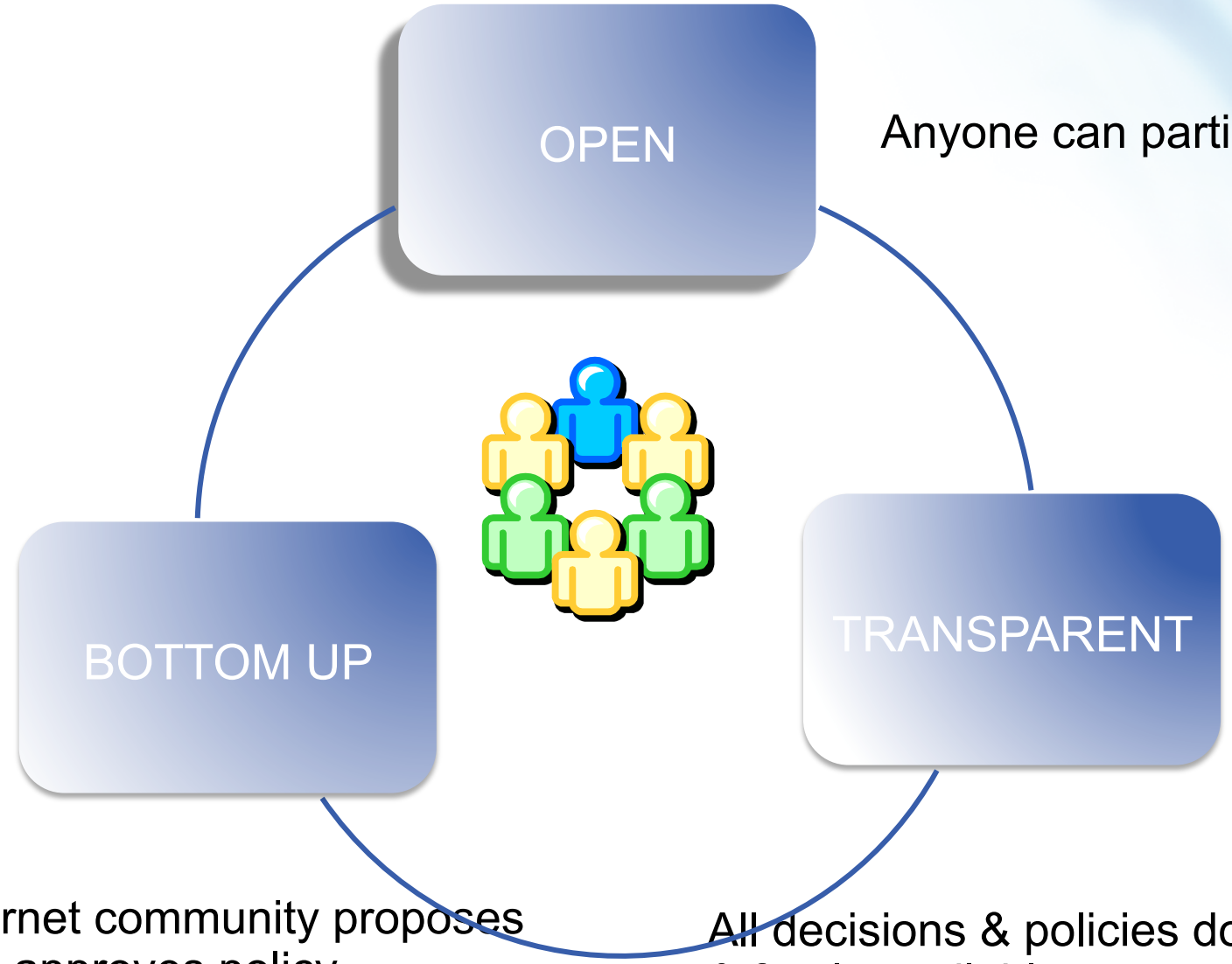
Policy Development Process



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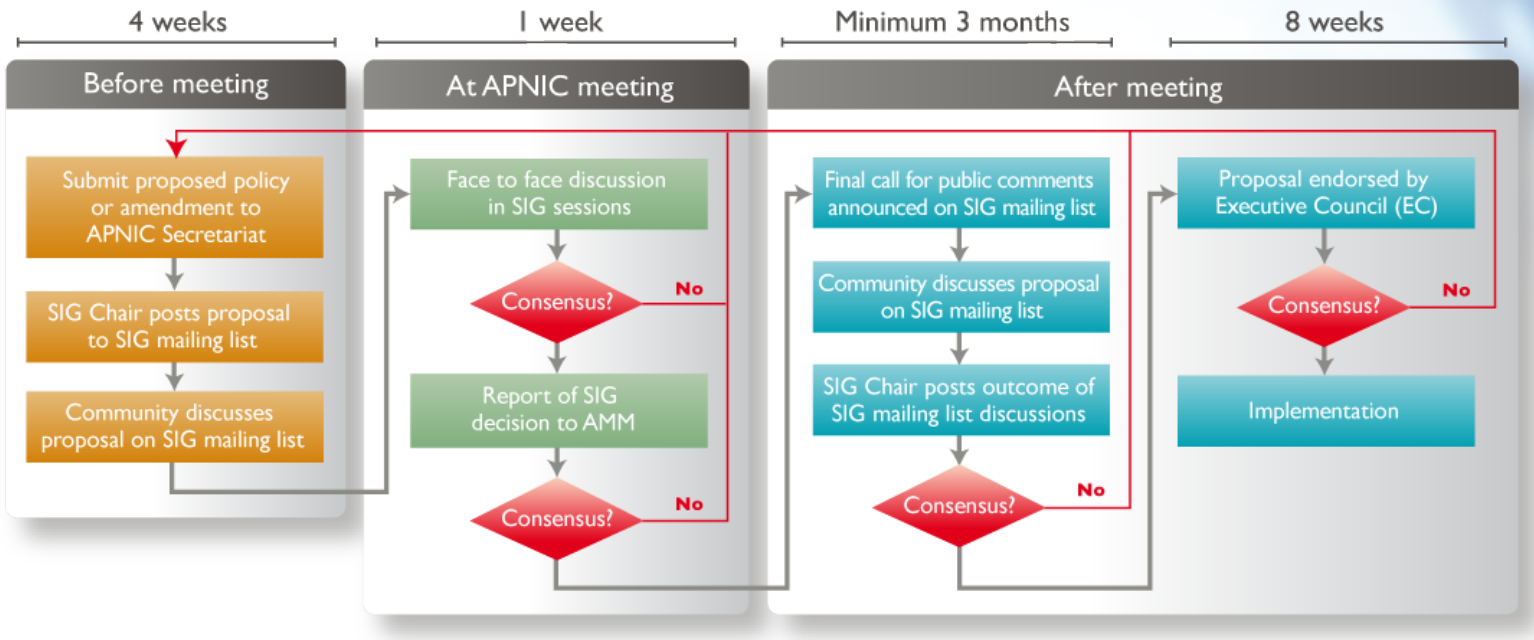
The Policy Development Process

Need Discuss Consensus Implement



You can participate!

More information about policy development can be found at:

http://www.apnic.net/community/policy

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How to Make Your Voice Heard

- Contribute on the public mailing lists
  - http://www.apnic.net/community/participate/join-discussions/sigs
  - 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

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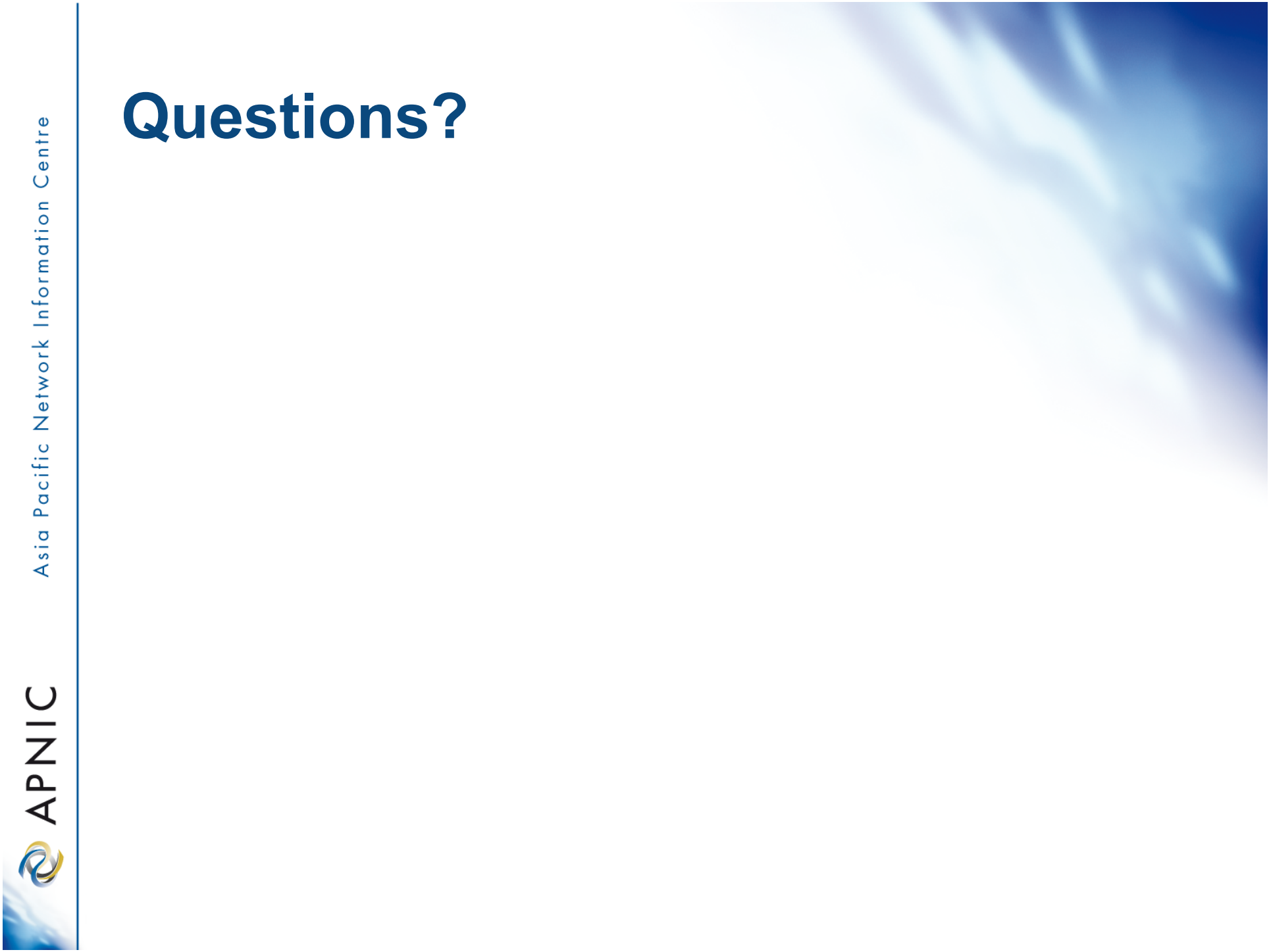
Questions?



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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')

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Allocation and Assignment

APNIC
Allocates
to APNIC Member

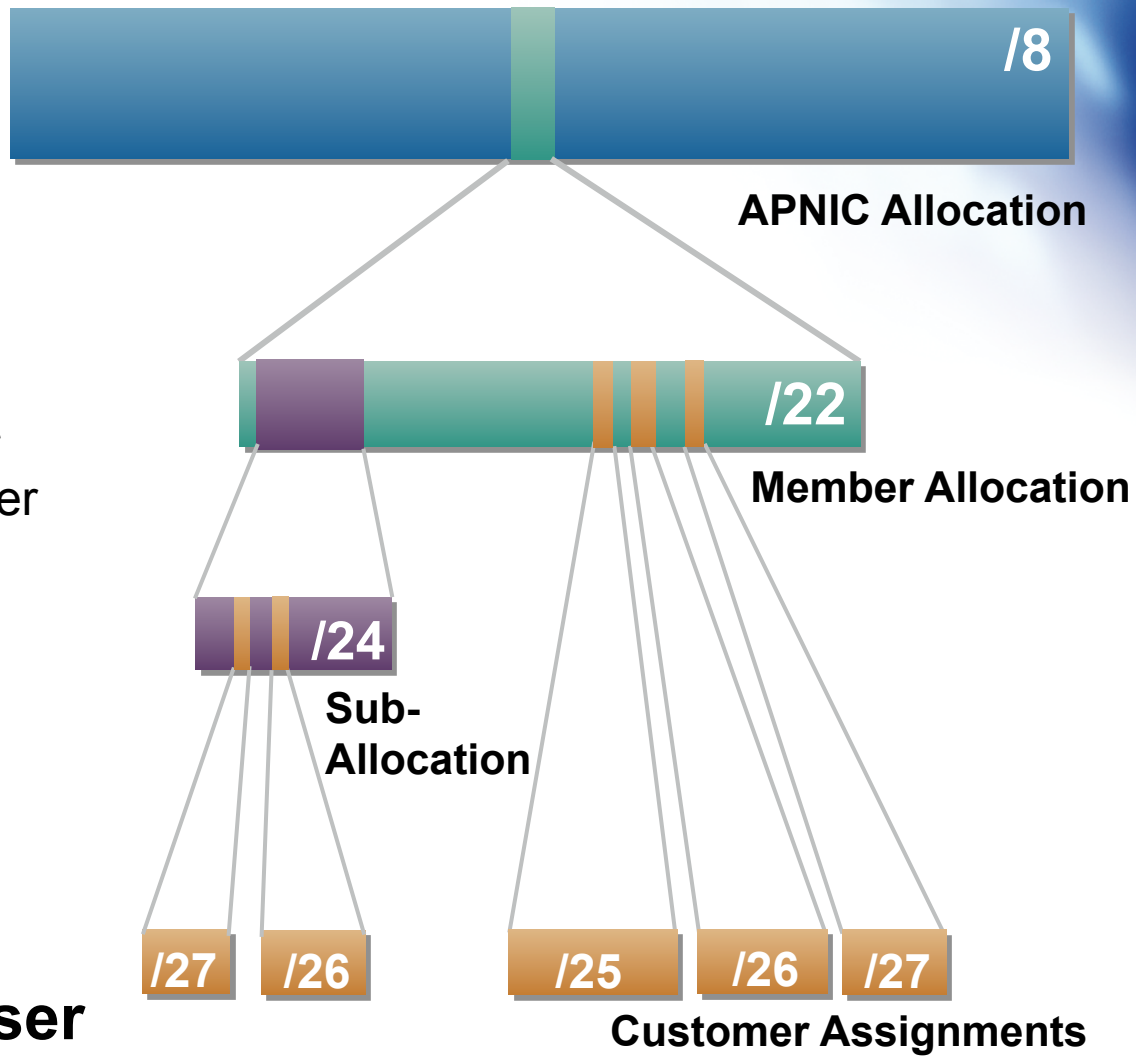
APNIC Member

Allocates
to downstream

Assigns
to end-user

Downstream
Assigns
to end-user

Customer / End User



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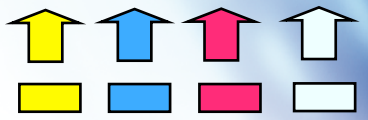
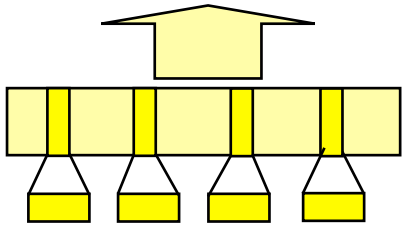
Portable & non-portable

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

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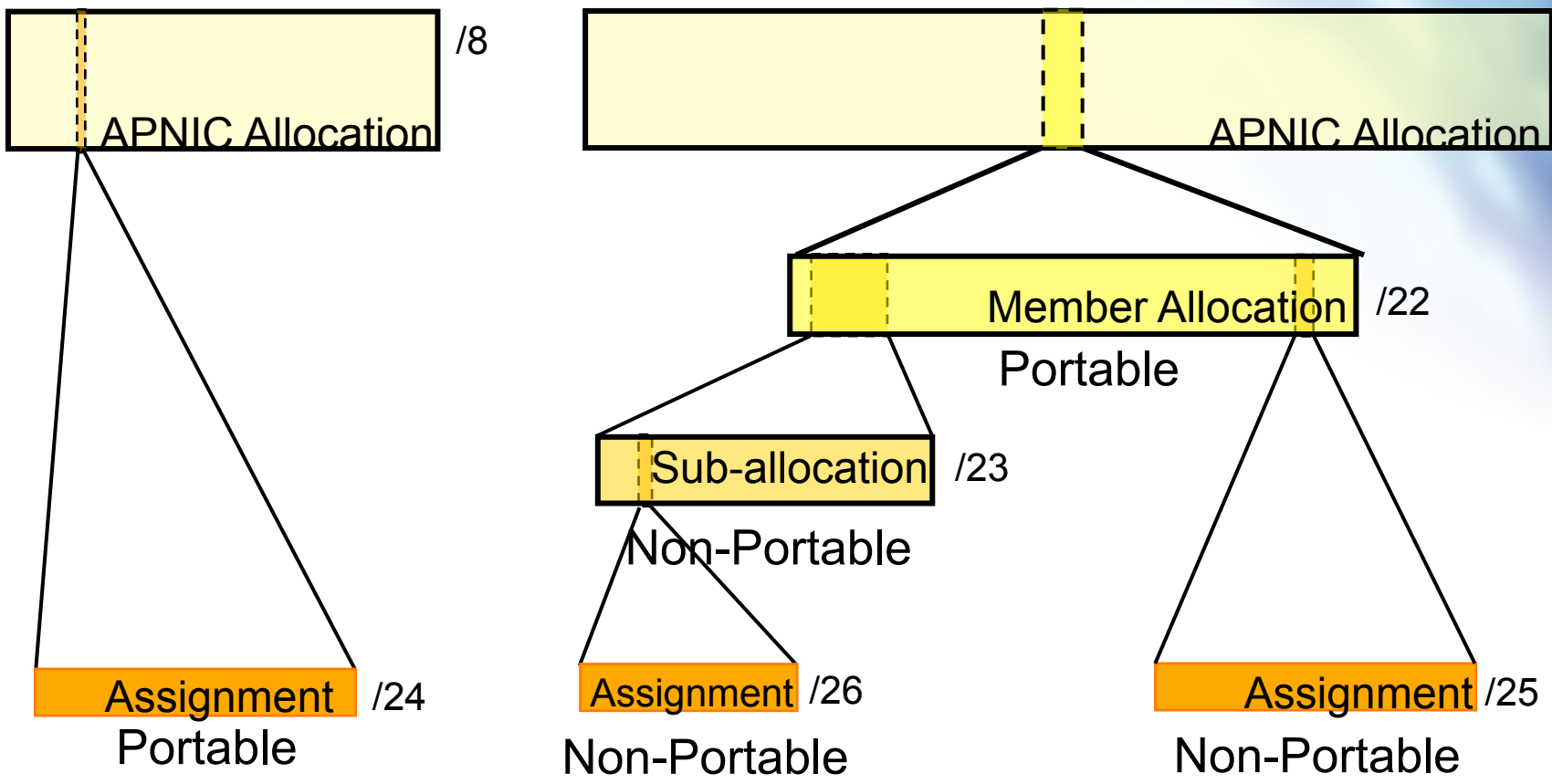
Address Management Hierarchy



- Describes “portability” of the address space

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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

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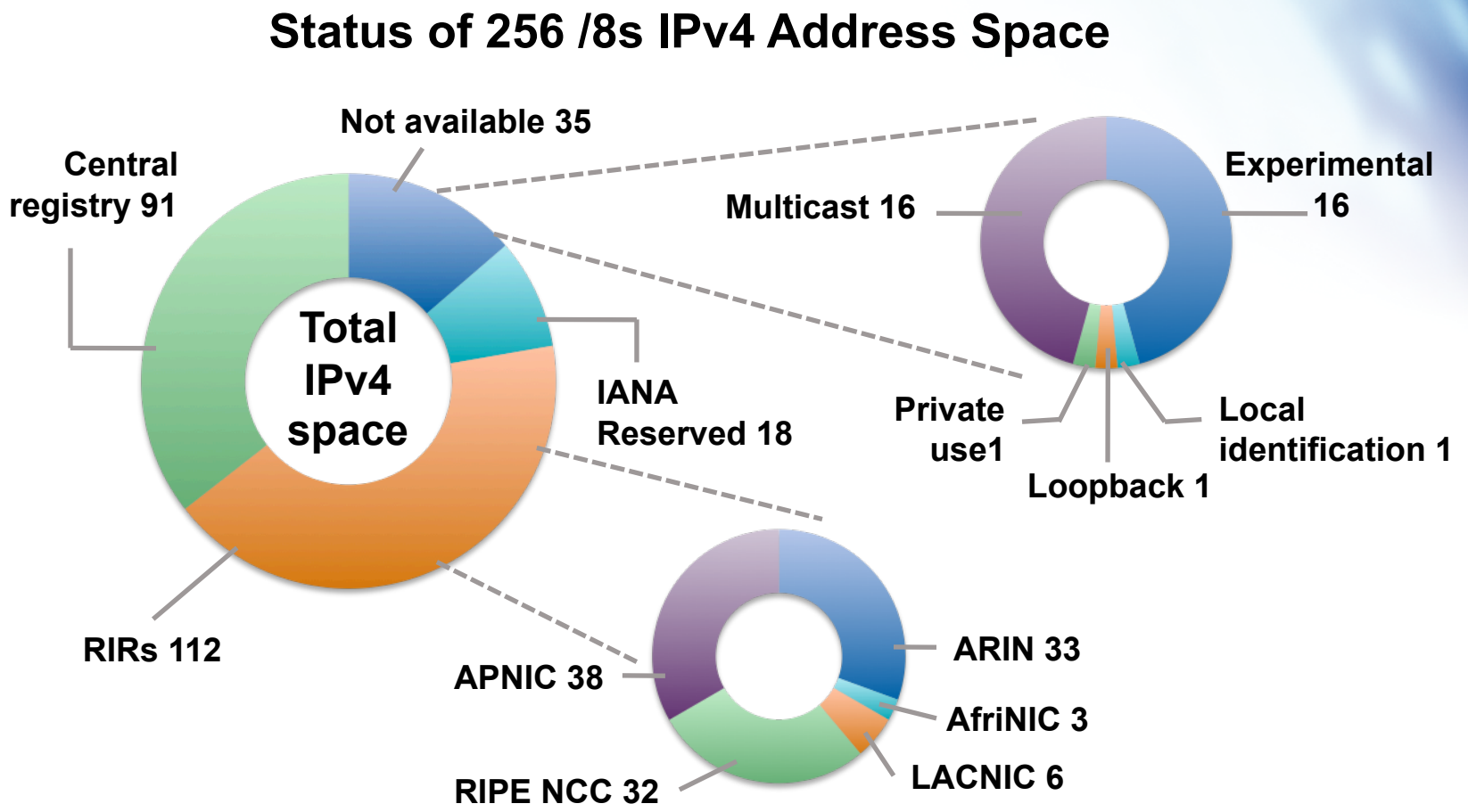
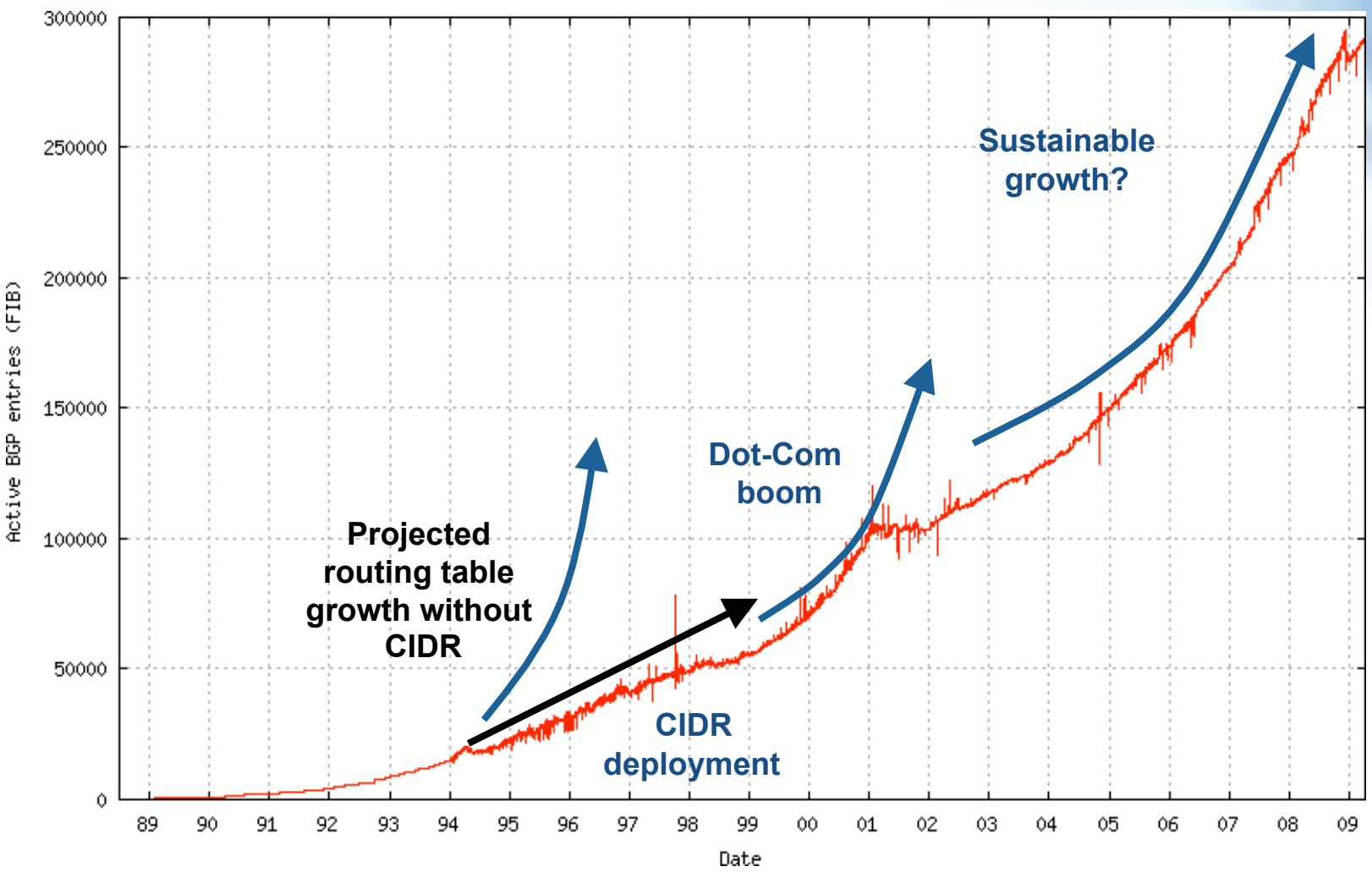
Why do we Need Policies?
- Global IPv4 Delegations (in /8)



Source : Number Resource Organization (NRO)

Growth of the Global Routing Table



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

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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

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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
  - Address space to be obtained from one source
    - routing considerations may apply
  - Stockpiling not permitted

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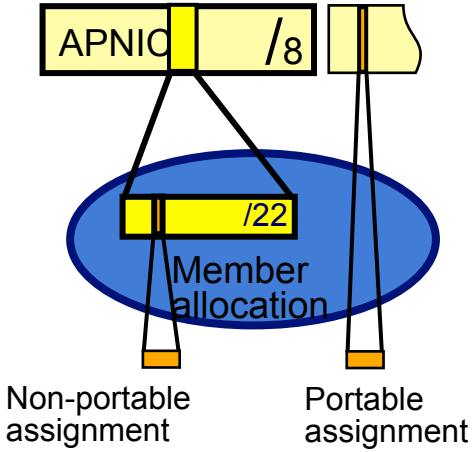
Initial IPv4 Allocation

- APNIC minimum IPv4 allocation size /22
  - Two of the criteria for an initial allocation have been updated to show:
    - An ISP must have used a /24 from their upstream provider or demonstrate an immediate need for a /24
    - An ISP must demonstrate a detailed plan for use of a /23 within a year



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APNIC Allocation Policies

- Transfer of address space
  - Not automatically recognised
    - Return unused address space to appropriate IR
- Effects of mergers, acquisitions & take-overs
  - Will require contact with IR (APNIC)
    - contact details may change
    - new agreement may be required
  - May require re-examination of allocations
    - requirement depends on new network structure

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Address Assignment Policies

- Assignments based on requirements
  - Demonstrated through detailed documentation
  - Assignment should maximise utilisation
    - minimise wastage
- Classless assignments
  - showing use of VLSM
- Size of allocation
  - Sufficient for up to 12 months requirement

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Portable assignments

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

Criteria

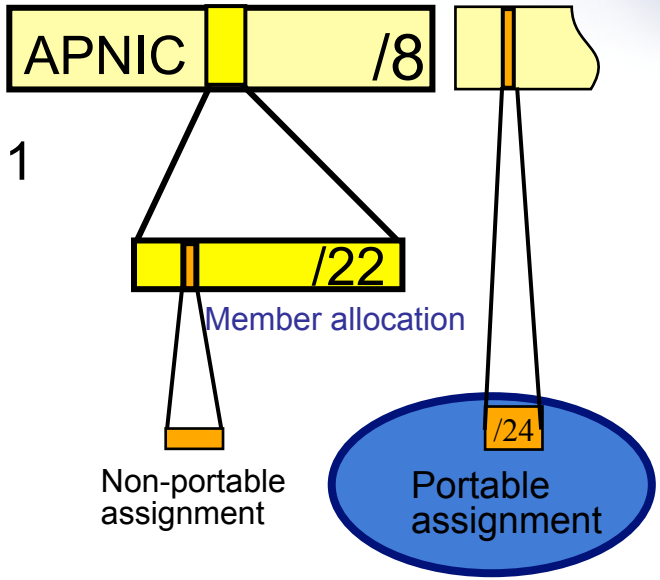
1a. Applicants currently multihomed

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



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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

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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

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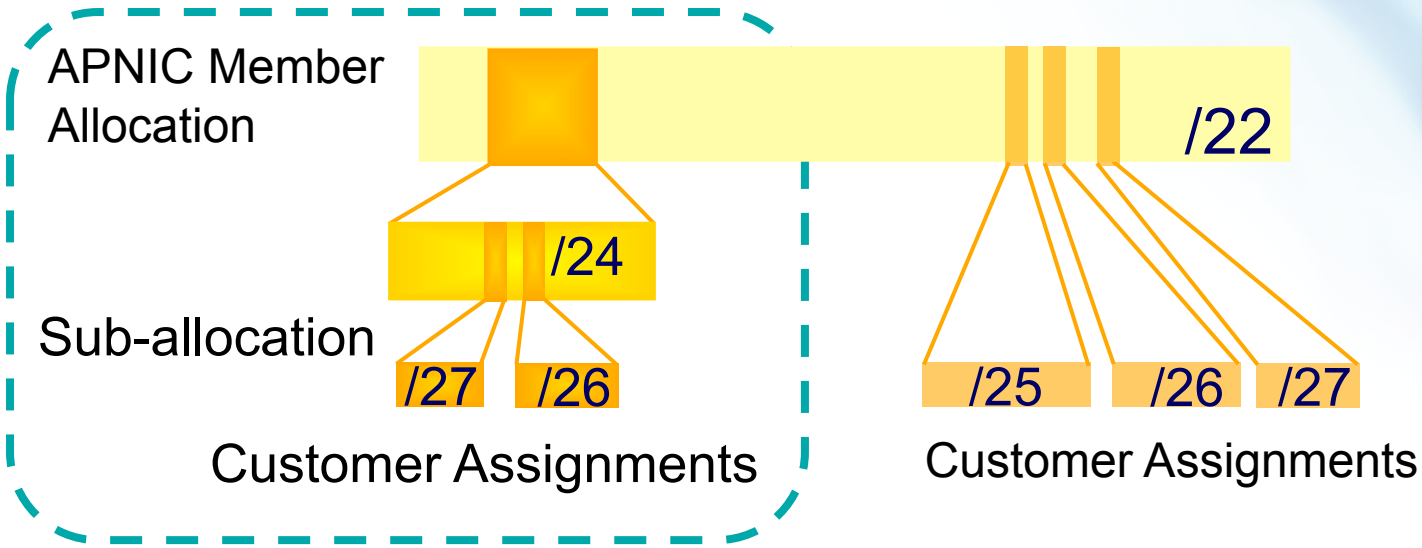
Sub-allocations



- 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

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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

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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

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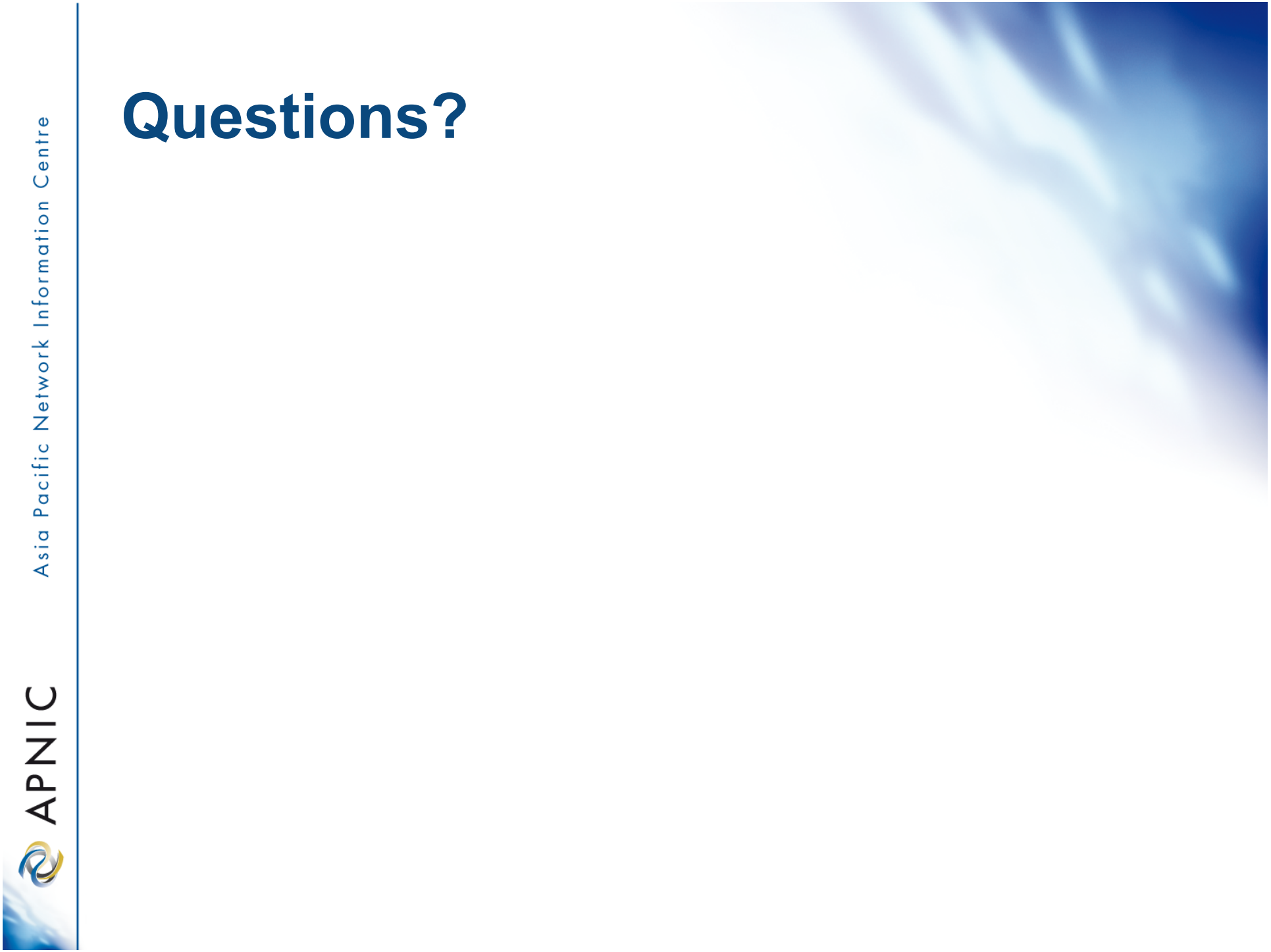

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Evaluation by APNIC

- 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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First Allocation

- Must meet criteria
  - (discussed in policy section)
- Requires clear detailed and accurate request
- Implementation of ‘Best Current Practice’
- Efficient assignments planned
- Always a /22 ‘slow start’
  - Exceptions made for very large networks but not common

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Subsequent Allocations

- 80% overall utilisation
  - Unless large assignment pending
- Demonstrated conservative assignments
- Correct customer registrations in db
  - Need to fix inconsistencies before next allocation
- Allocation size to cover 1 year need
  - Based on previous utilisation rate
- Contiguous allocation not guaranteed
  - But every effort made

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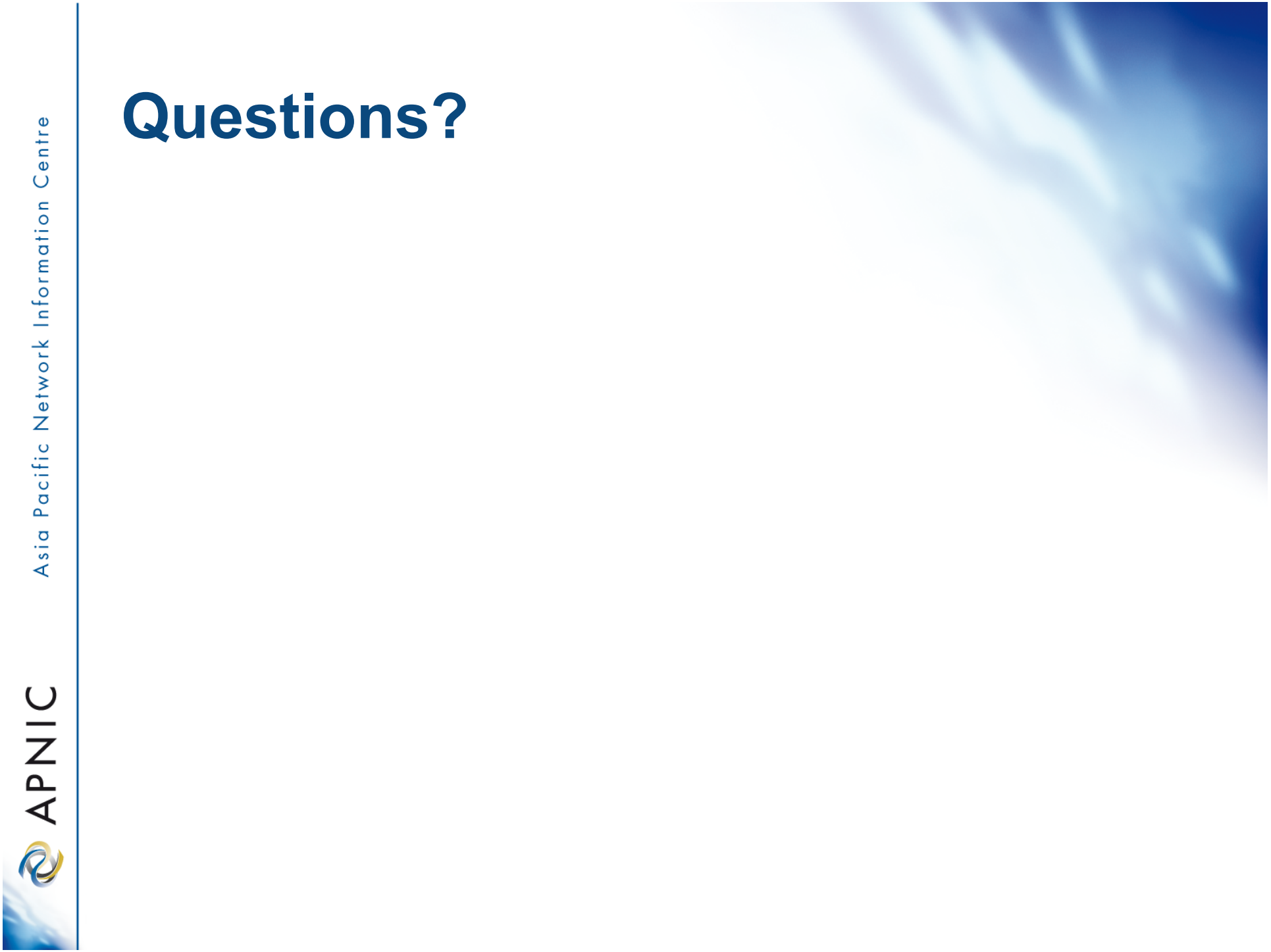

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What is an Assignment Window?

"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

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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

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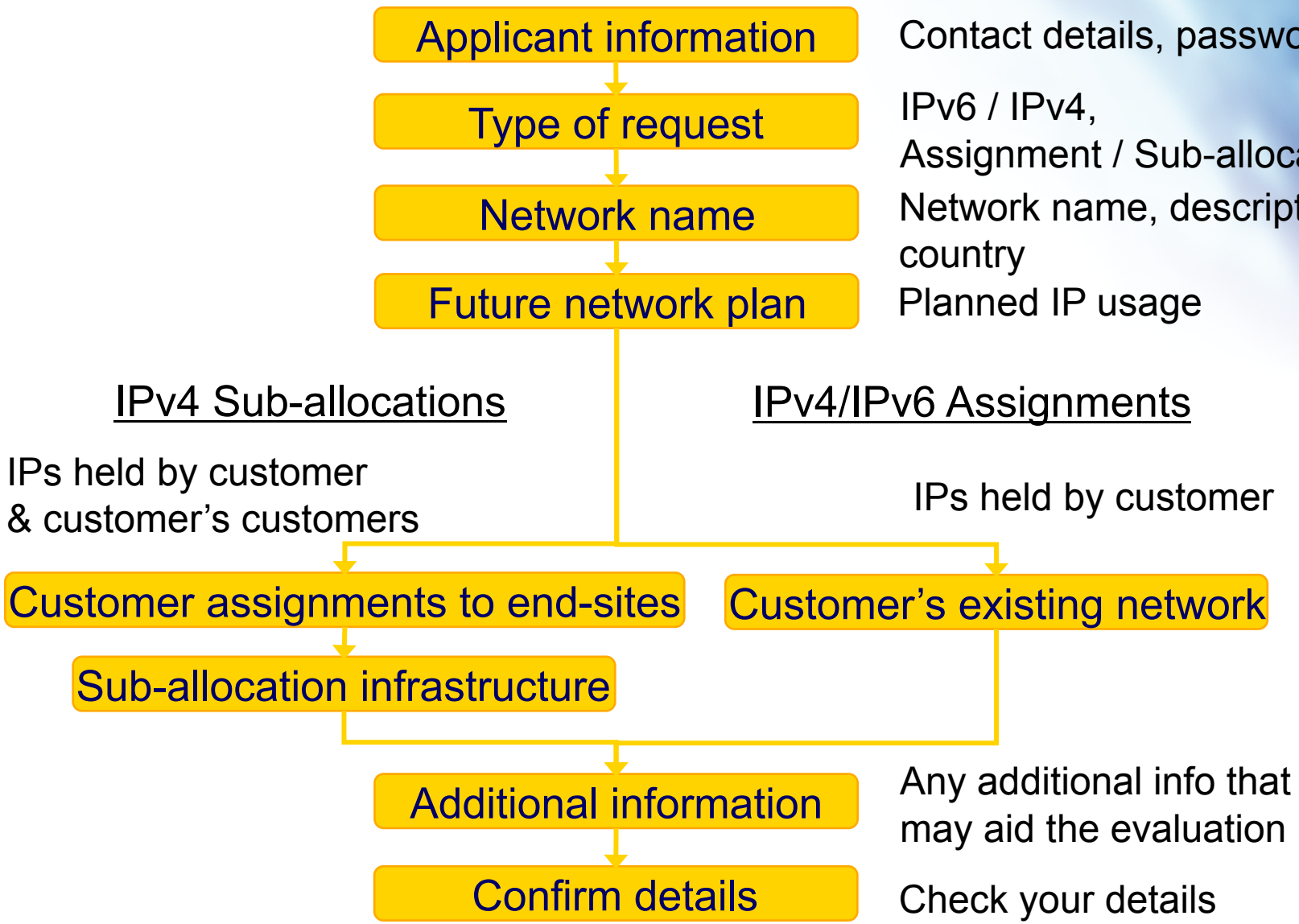
Overview of 2nd Opinion Form



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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?

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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

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2nd Opinion Request Approval

Dear XXXXXXX,

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"

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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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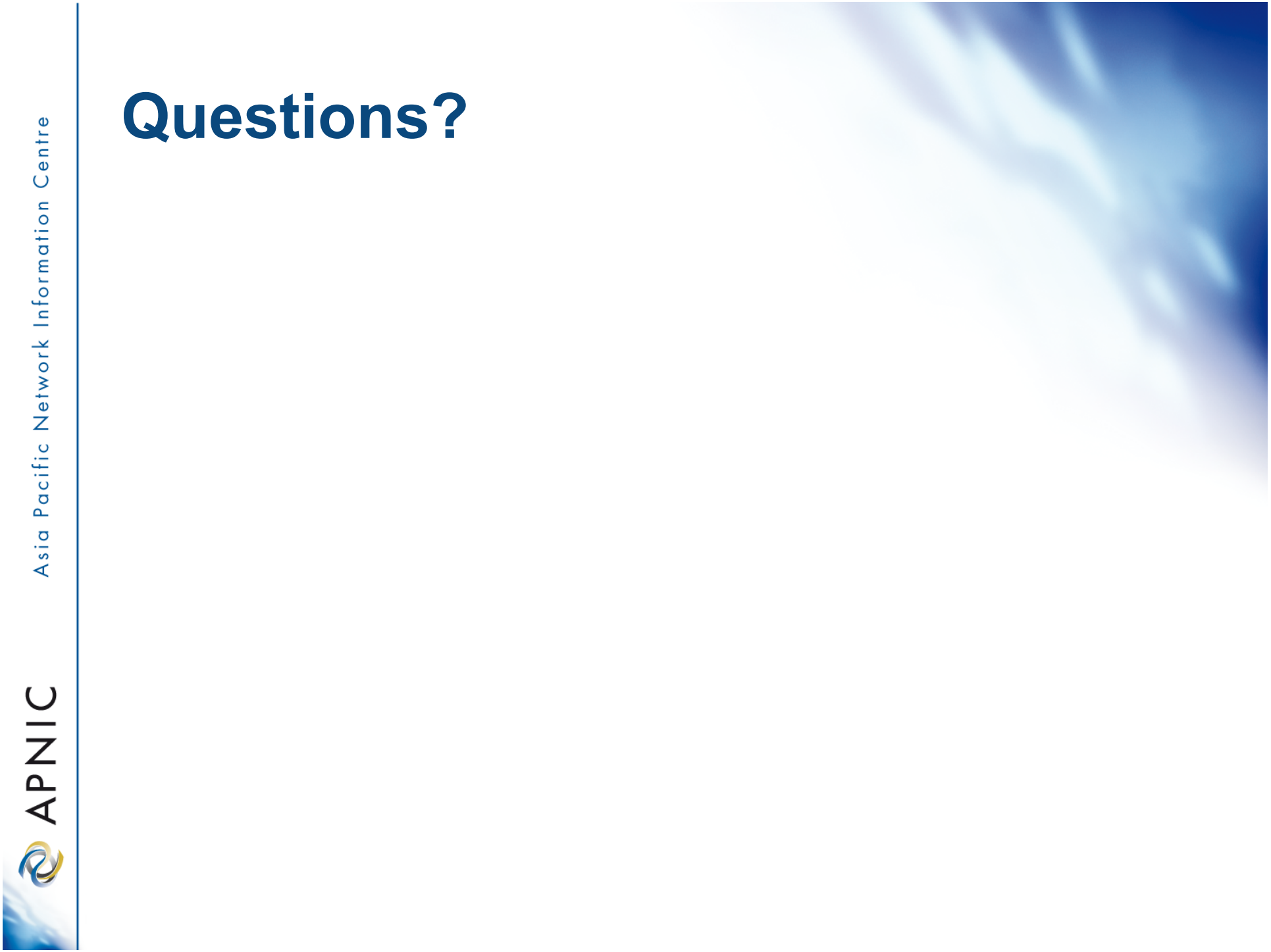

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Overview

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

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Accessing MyAPNIC

MyAPNIC

- Corporate contacts can long 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.

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APNIC Digital Certificate

MyAPNIC

- 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

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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

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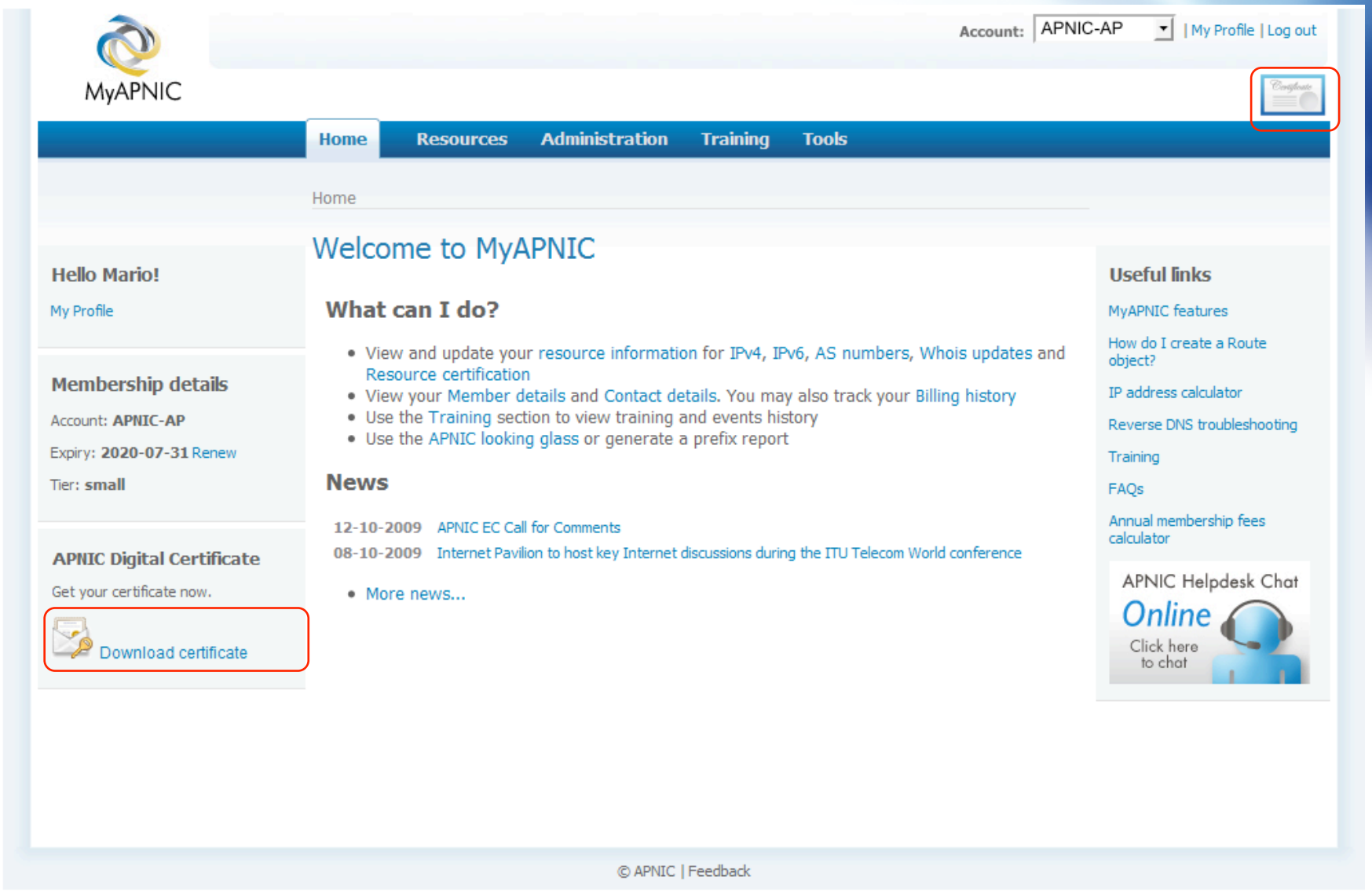
Access without certificate



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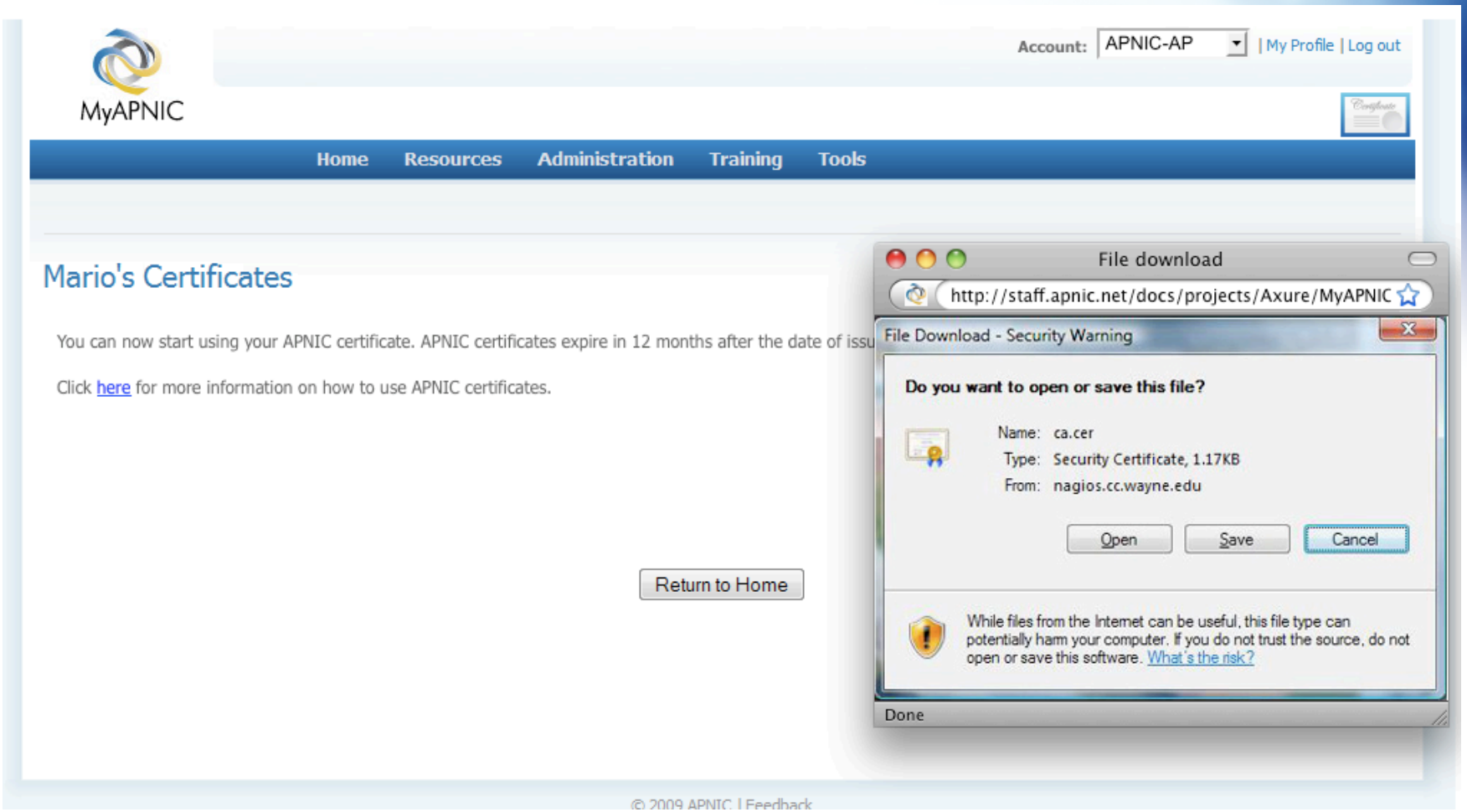
Downloading Certificates



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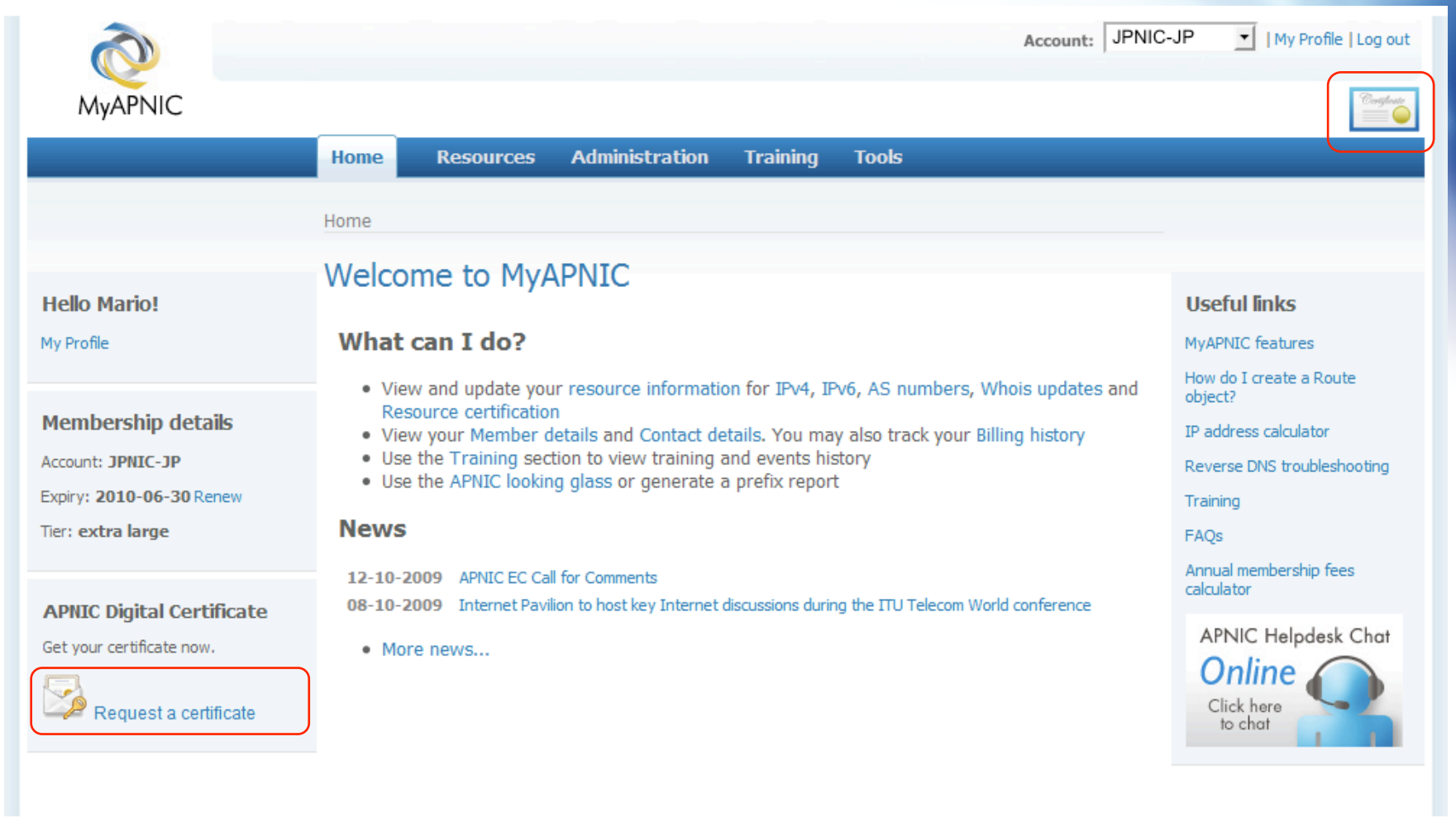
Access with Certificate



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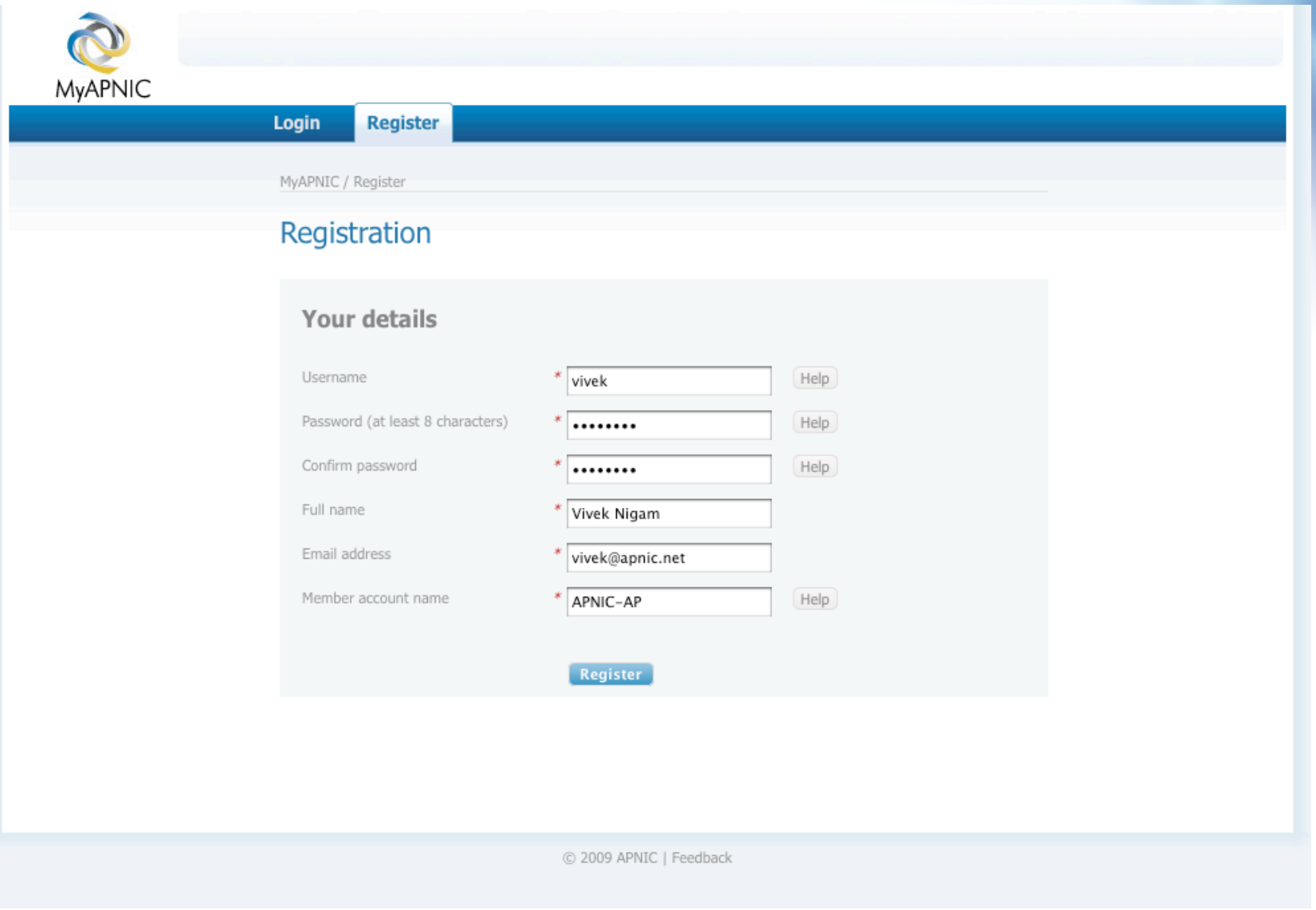
MyAPNIC Registration



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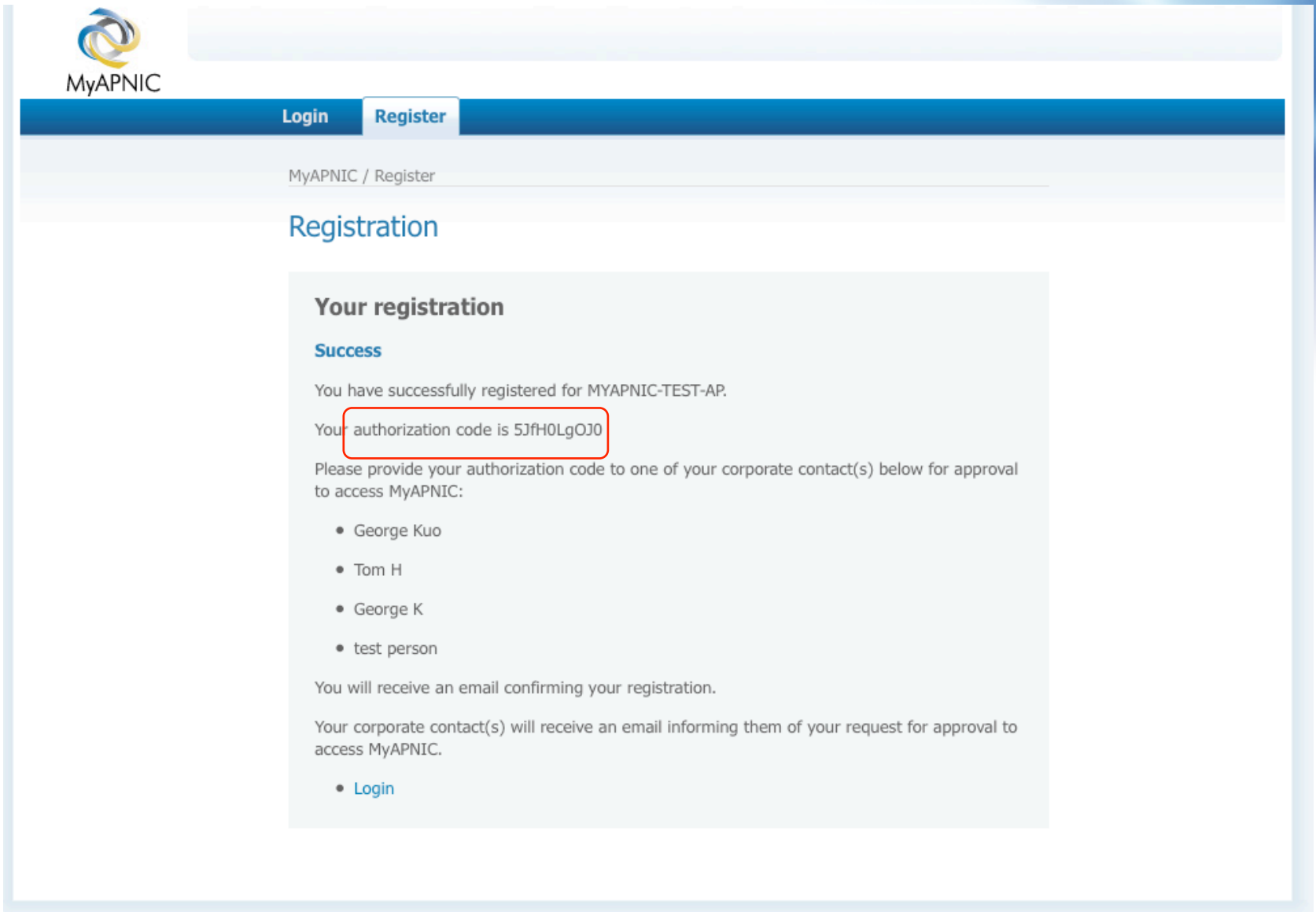

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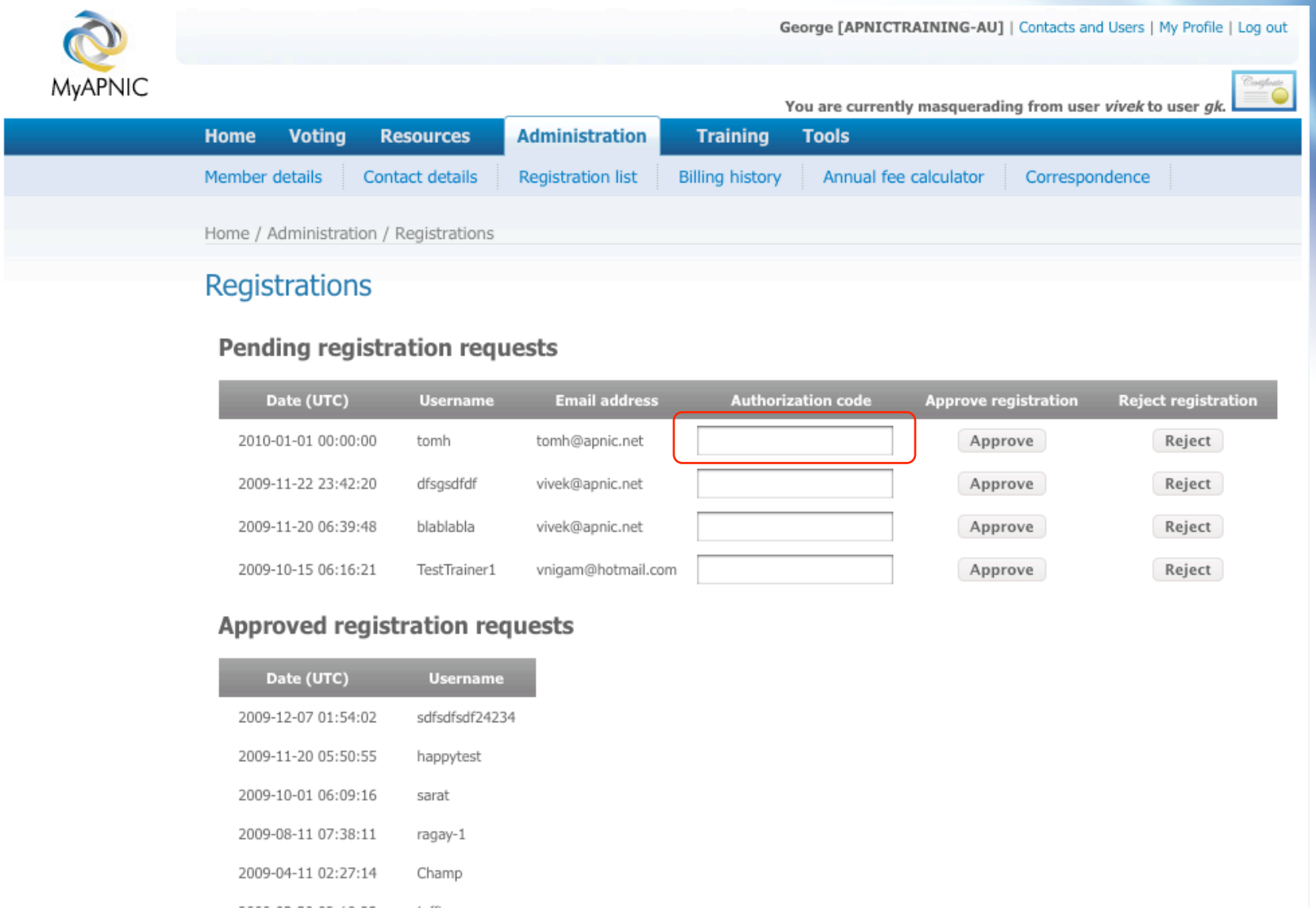

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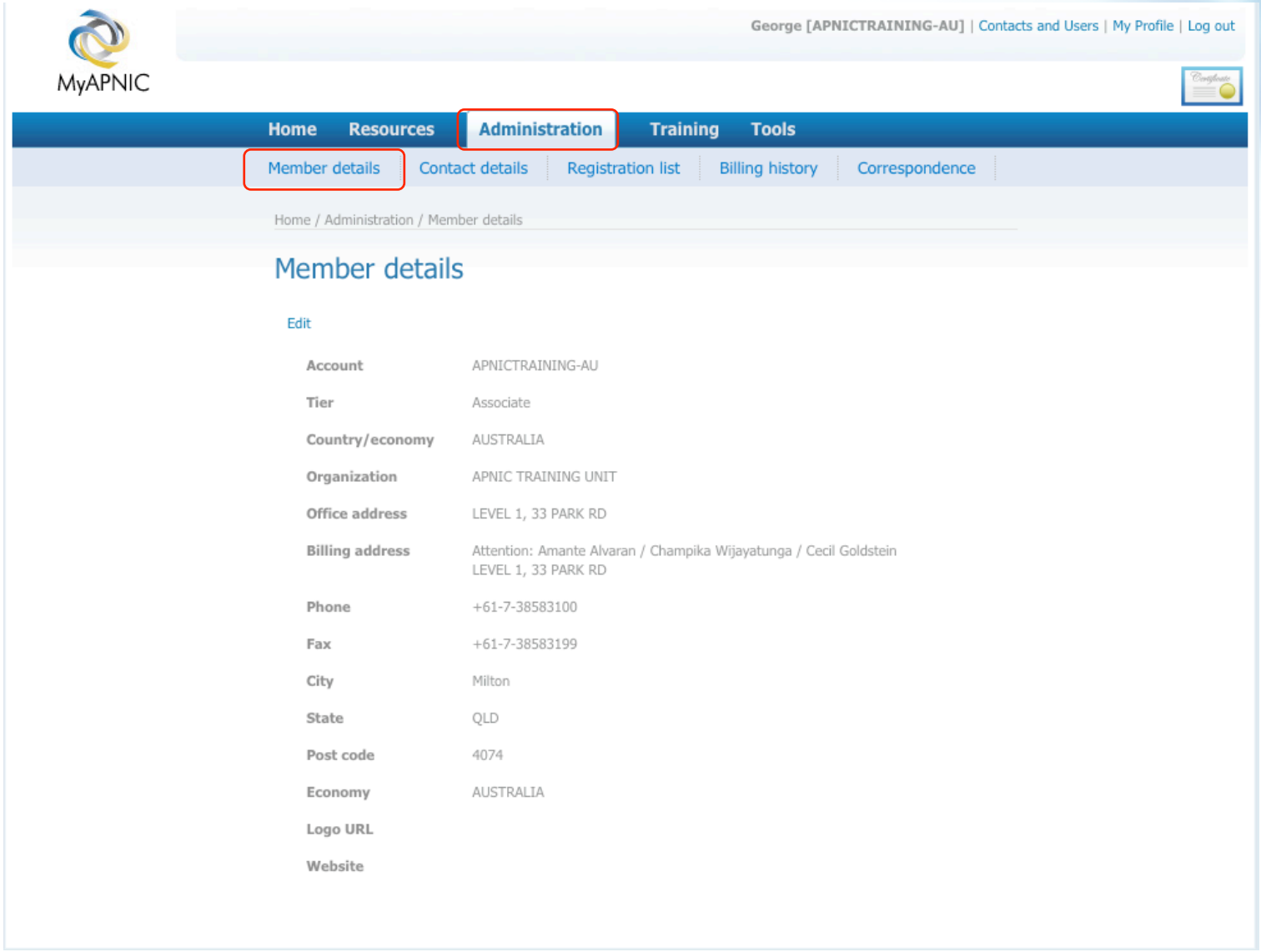
Manage your membership



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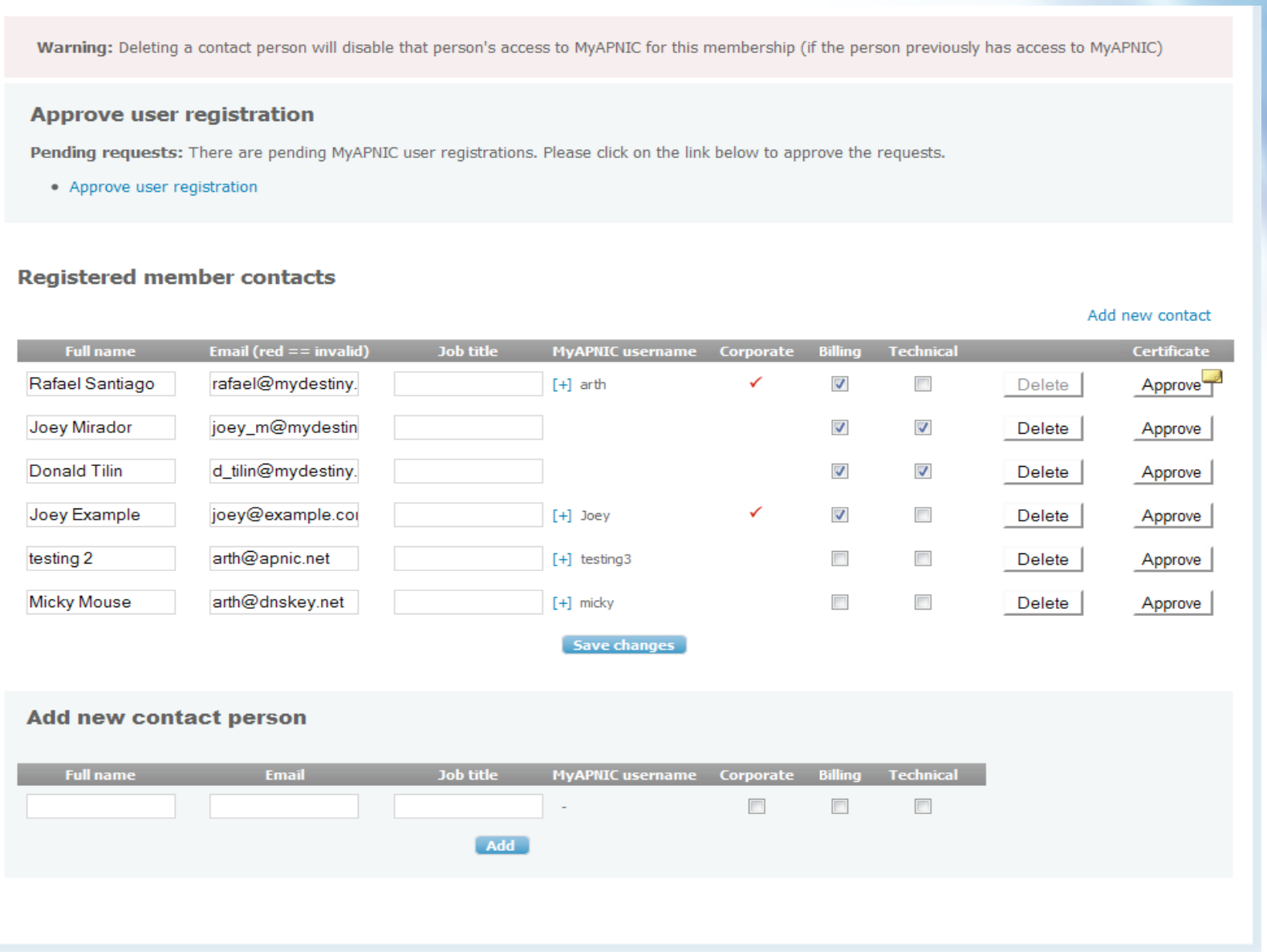
Contact Management



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	✓	☑	☐	Delete	Approve
Joey Mirador	joey_m@mydestin				☑	☑	Delete	Approve
Donald Tilin	d_tilin@mydestiny.				☑	☑	Delete	Approve
Joey Example	joey@example.co		[+] Joey	✓	☑	☐	Delete	Approve
testing 2	arth@apnic.net		[+] testing3		☐	☐	Delete	Approve
Micky Mouse	arth@dnskey.net		[+] micky		☐	☐	Delete	Approve

Save changes

Add new contact person

Full name	Email	Job title	MyAPNIC username	Corporate	Billing	Technical
			-	☐	☐	☐

Add

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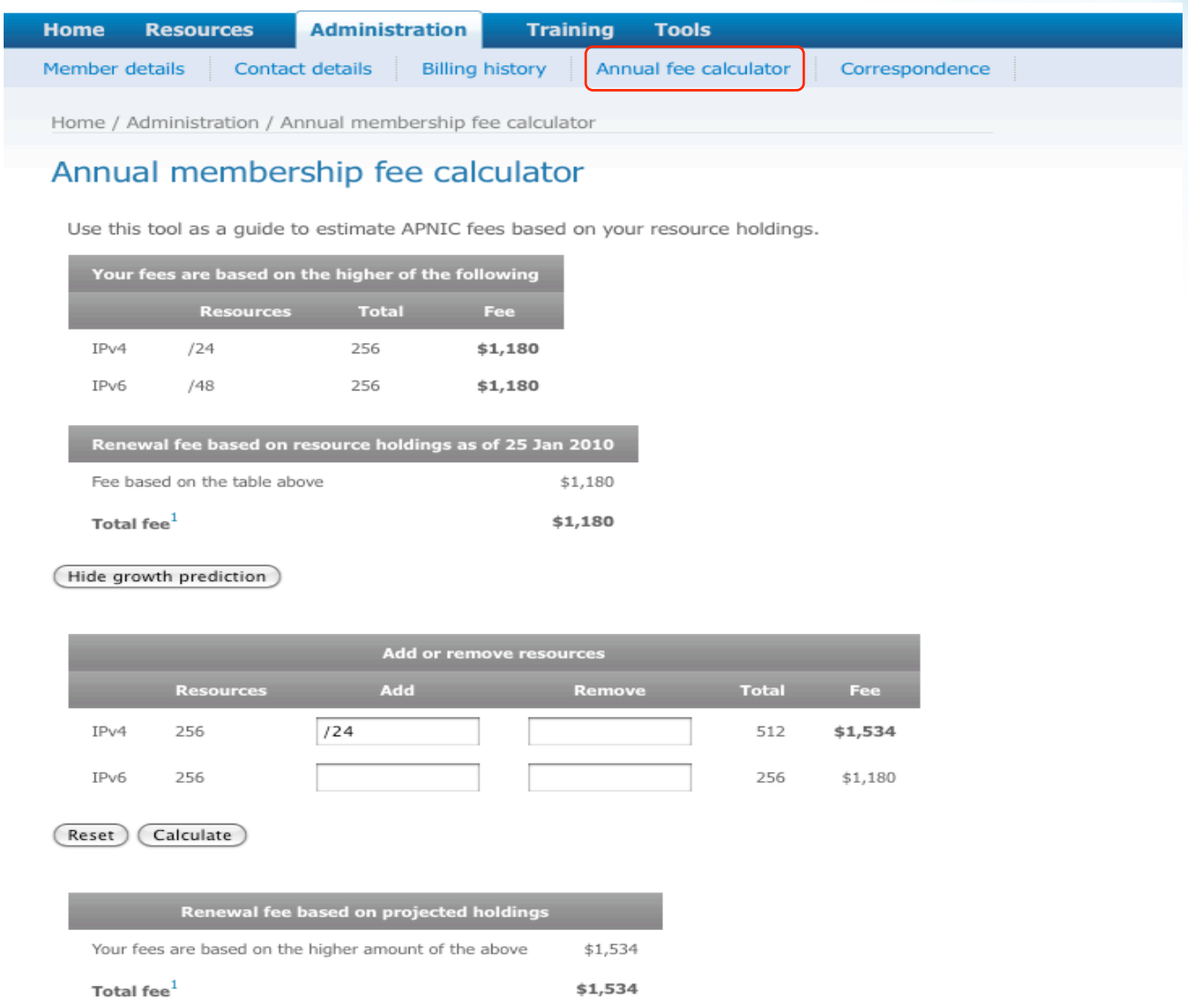
Annual fee calculator



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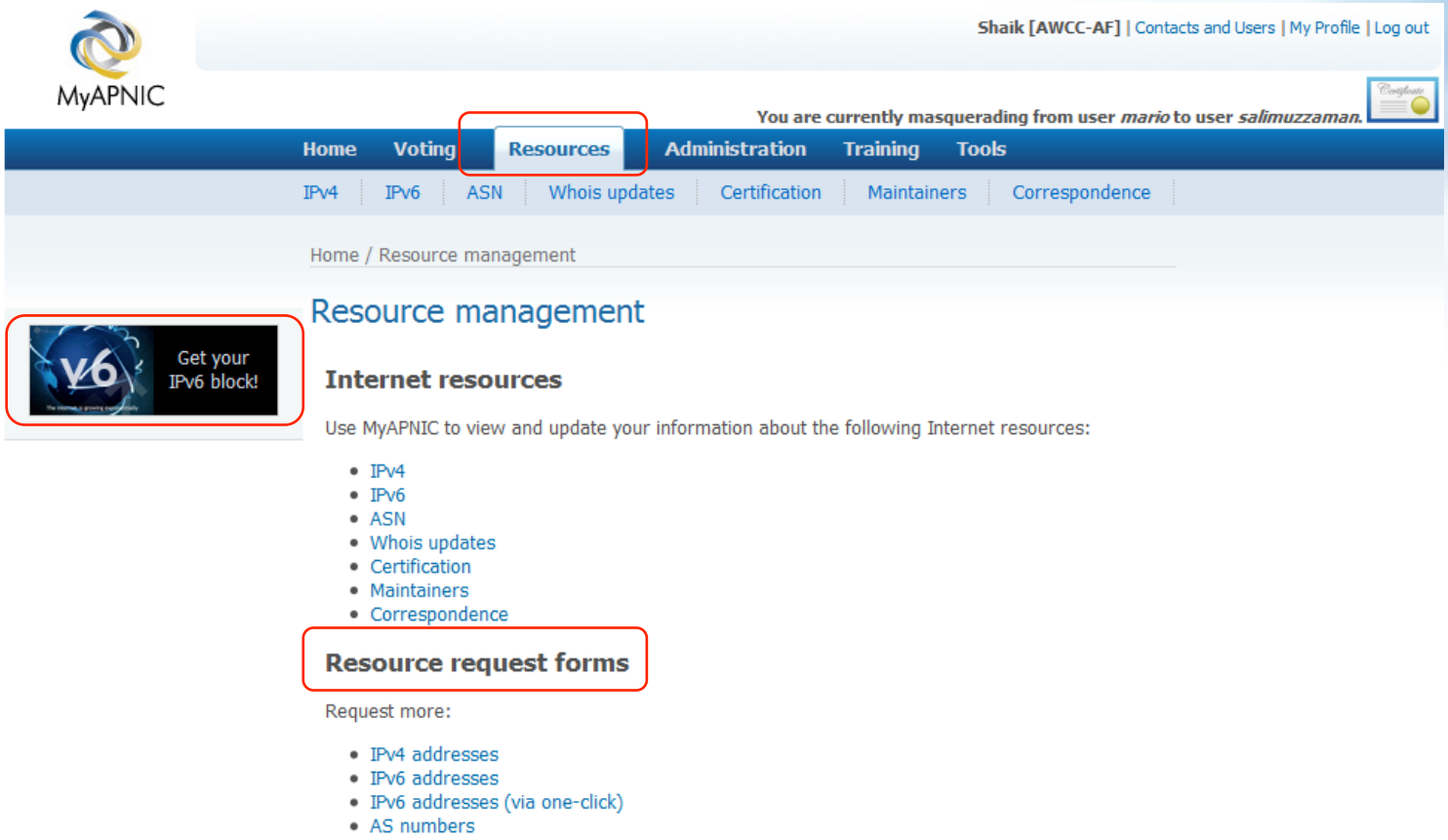
Manage your resource



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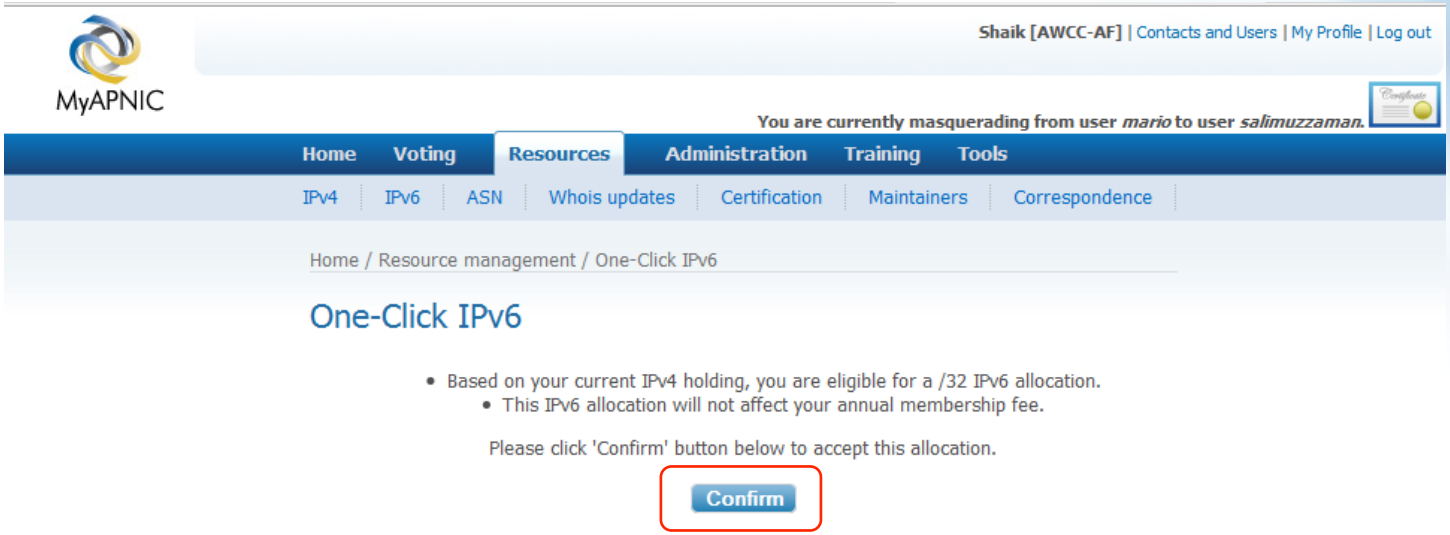
Just one click…



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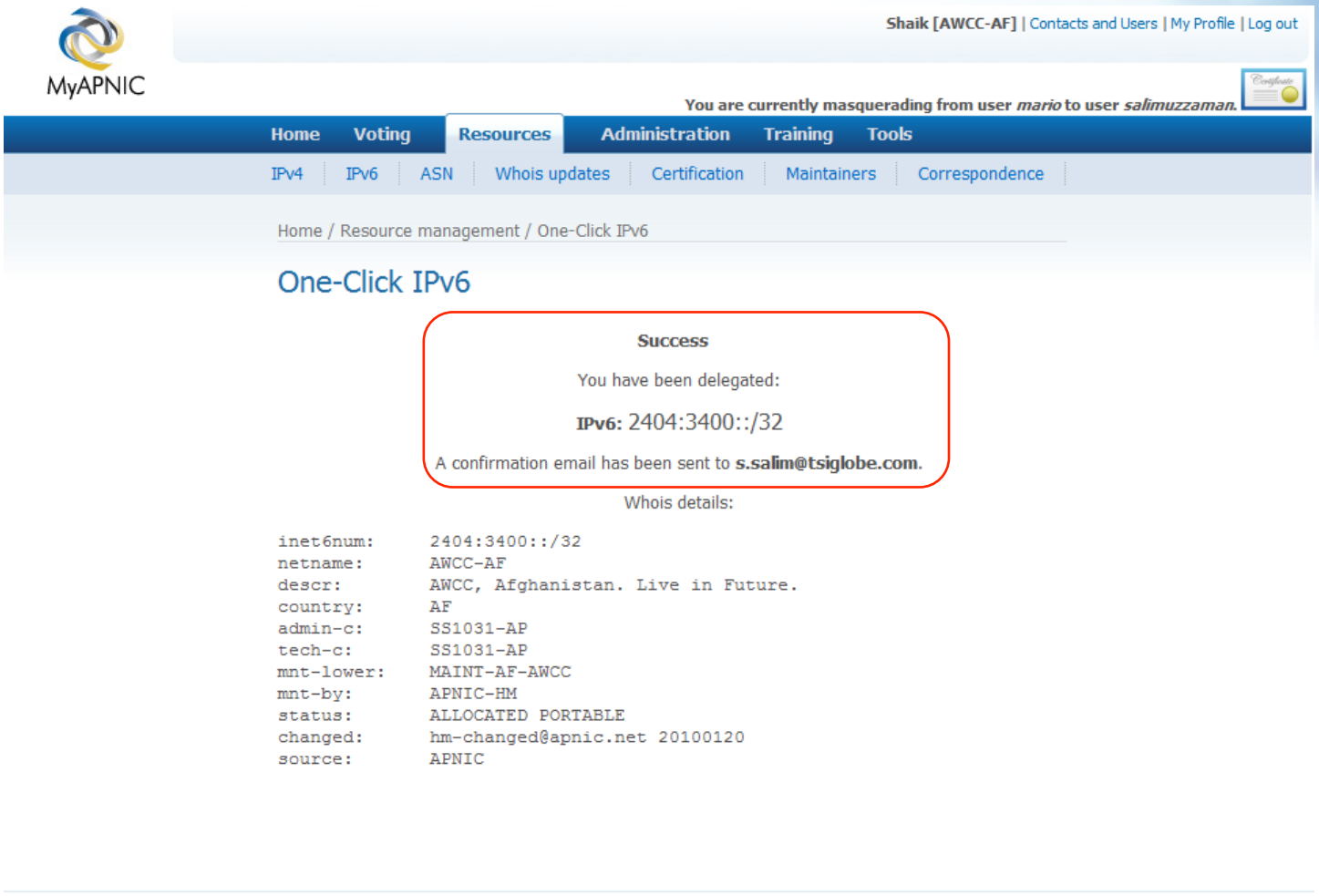
And you have your IPv6!



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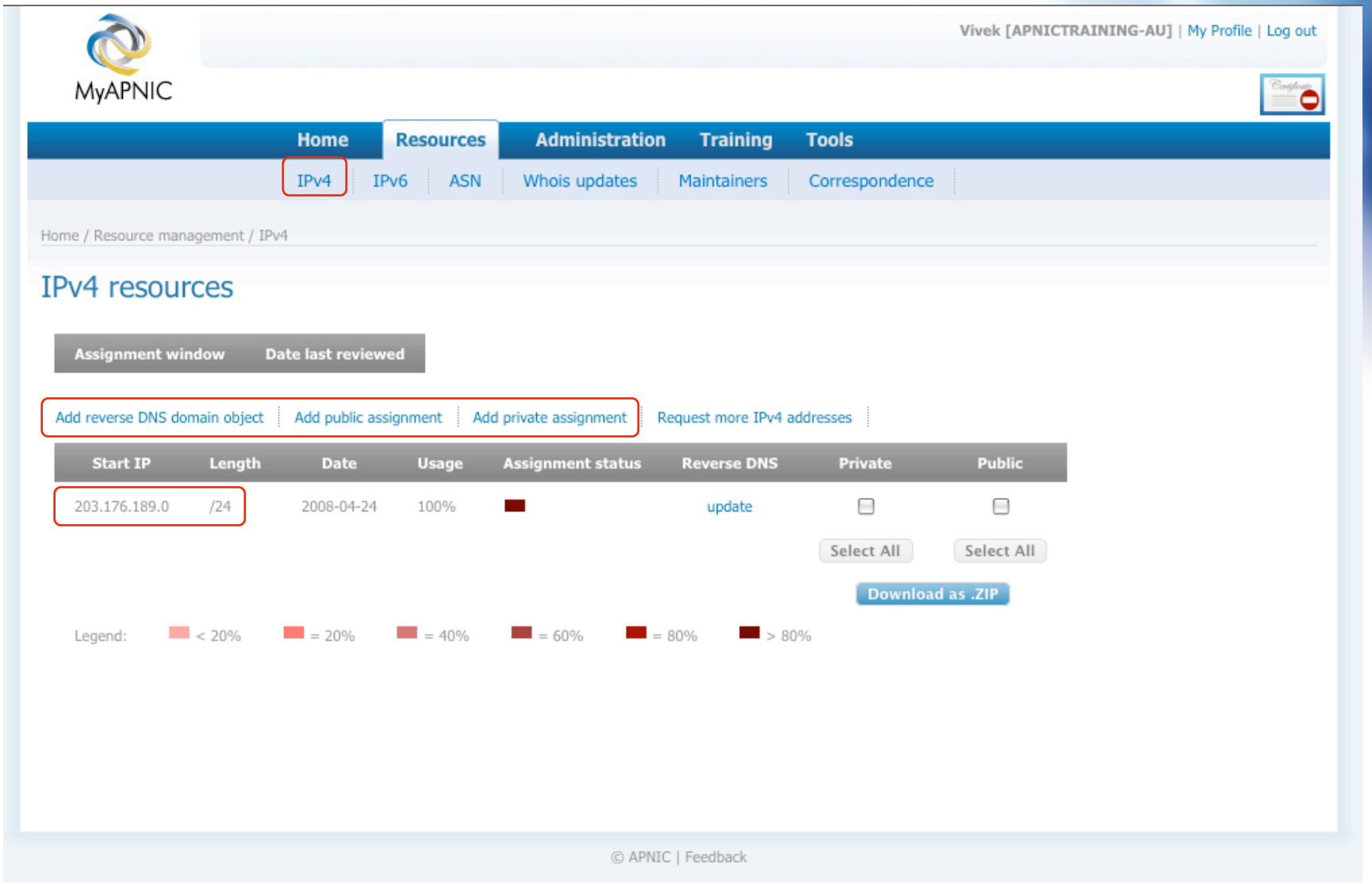
IPv4 Resources



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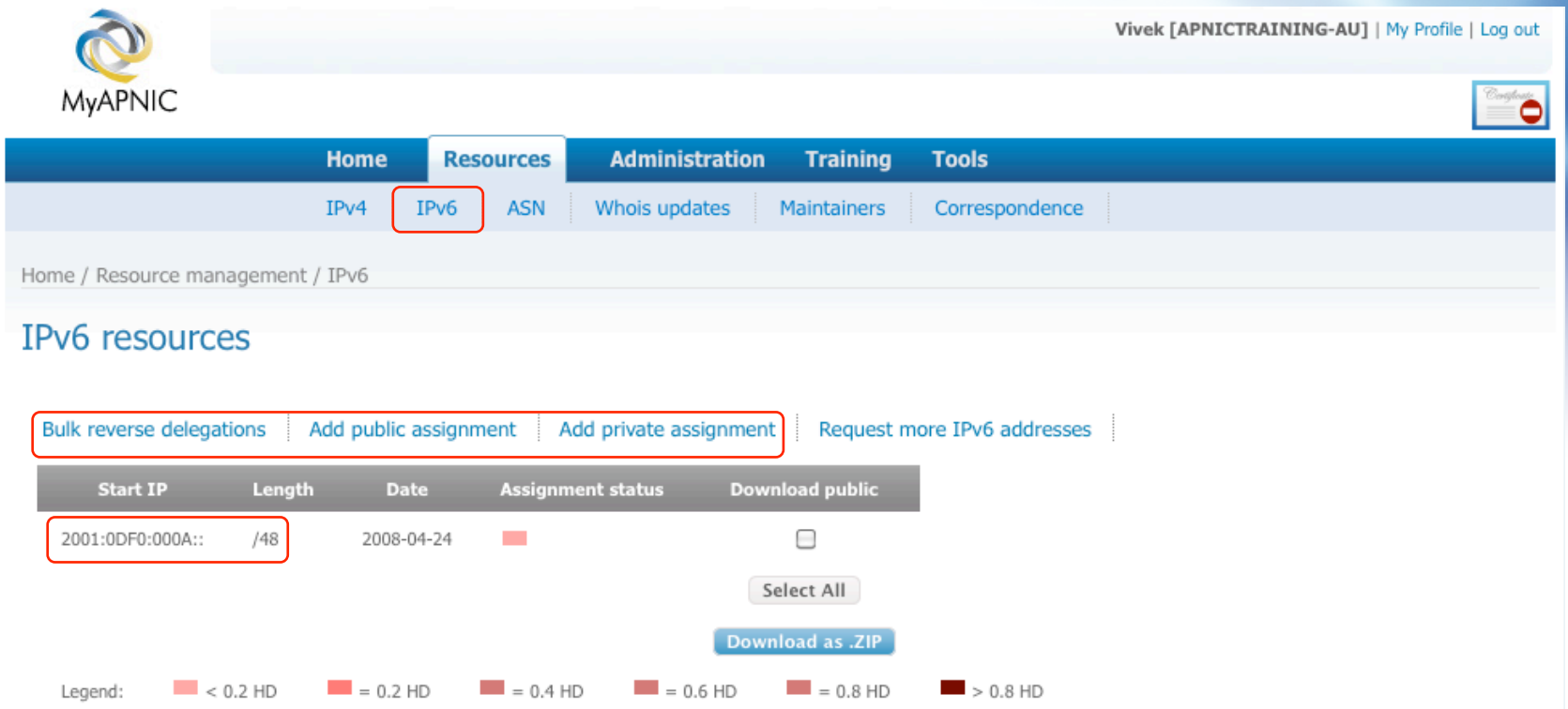
IPv6 Resources



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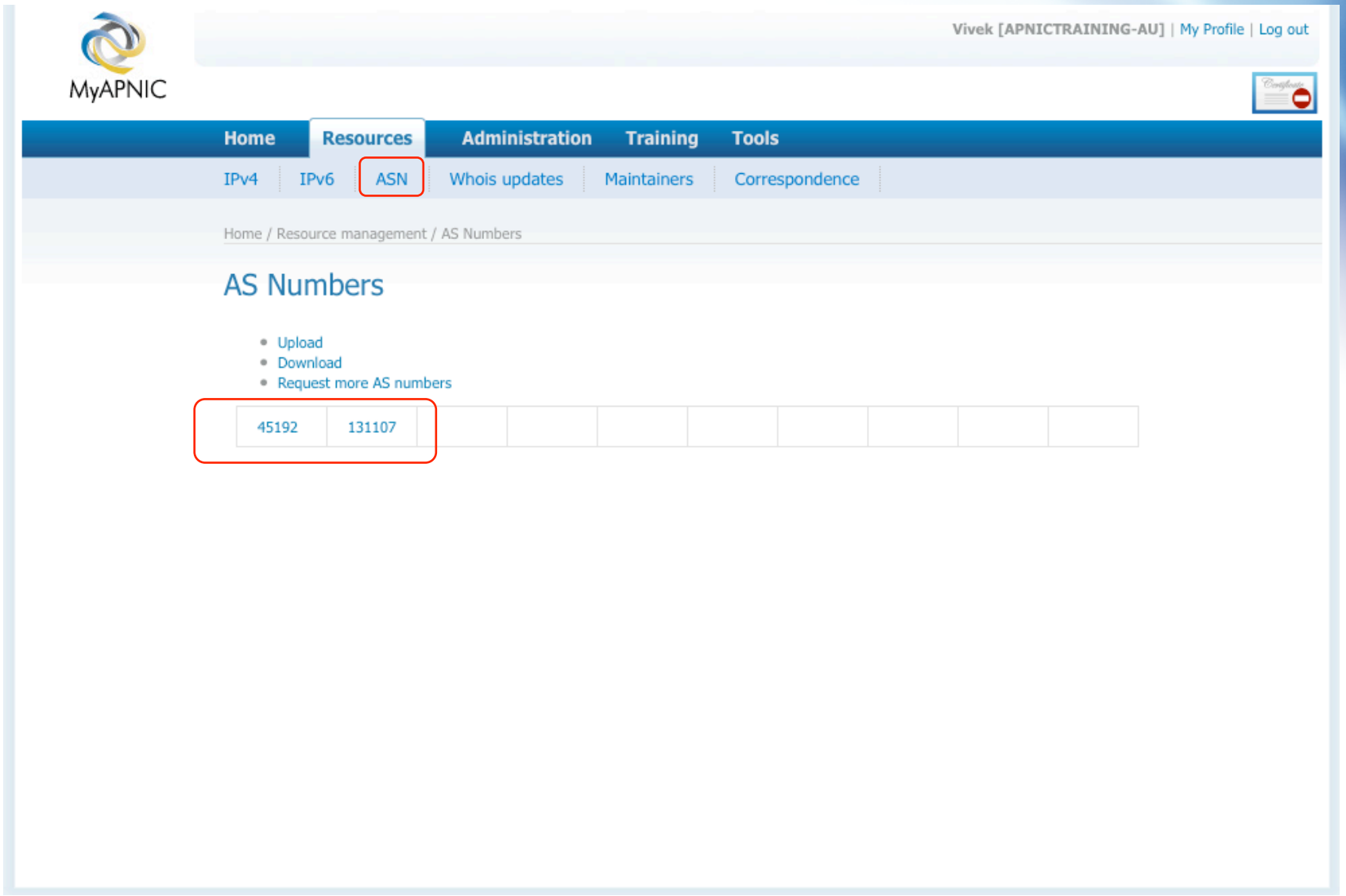
AS number Resources



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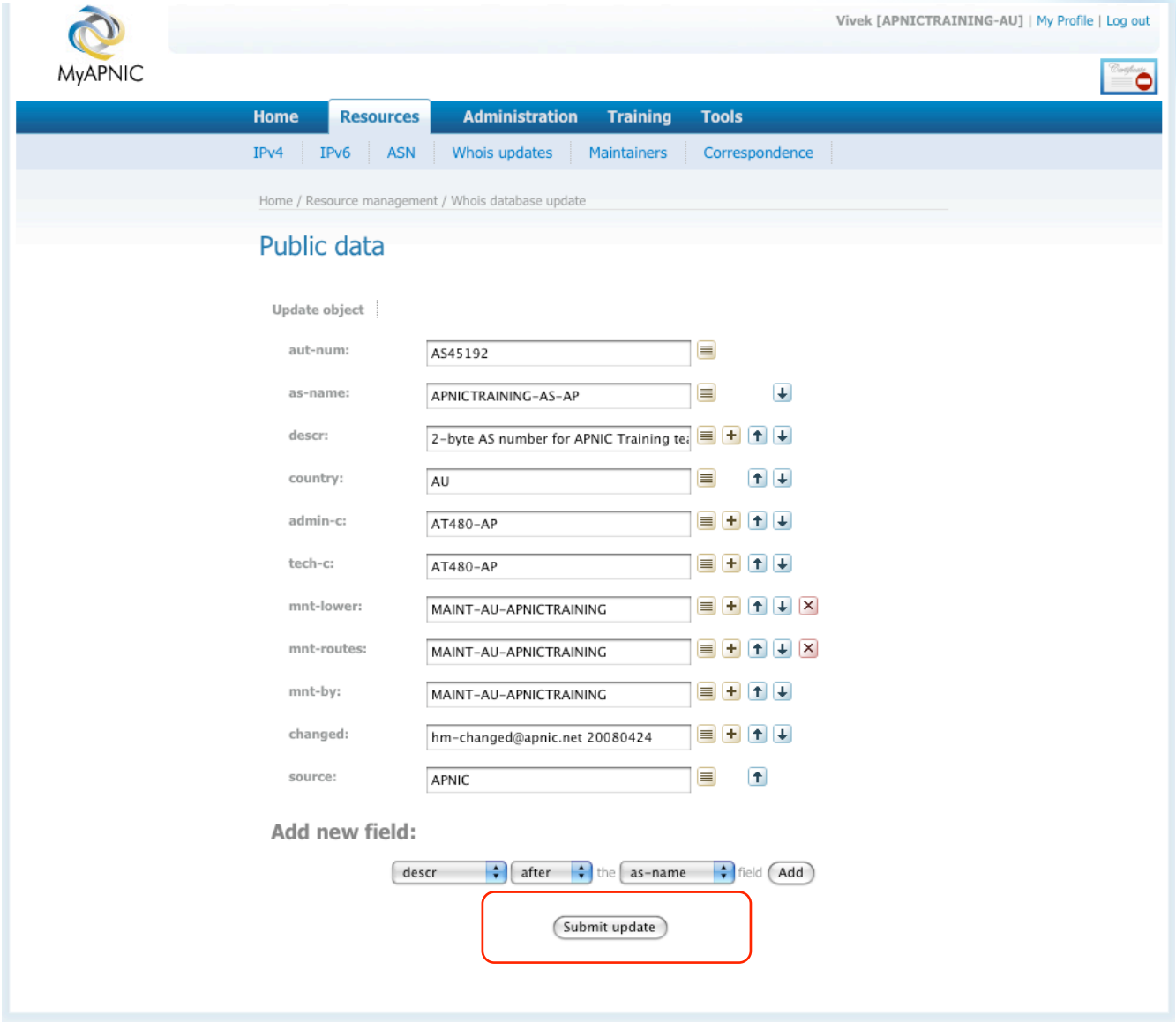
AS number Resources



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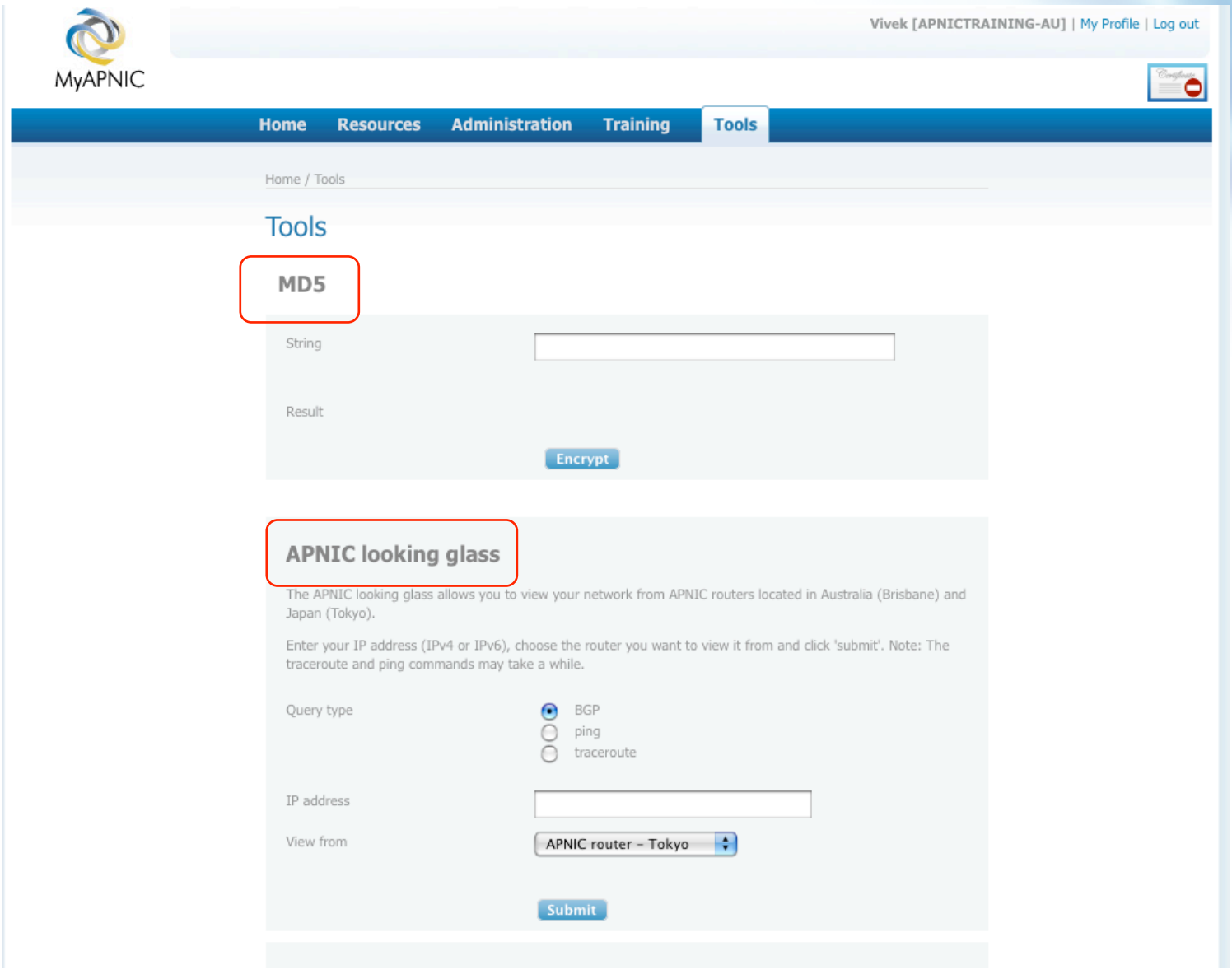
Useful tools



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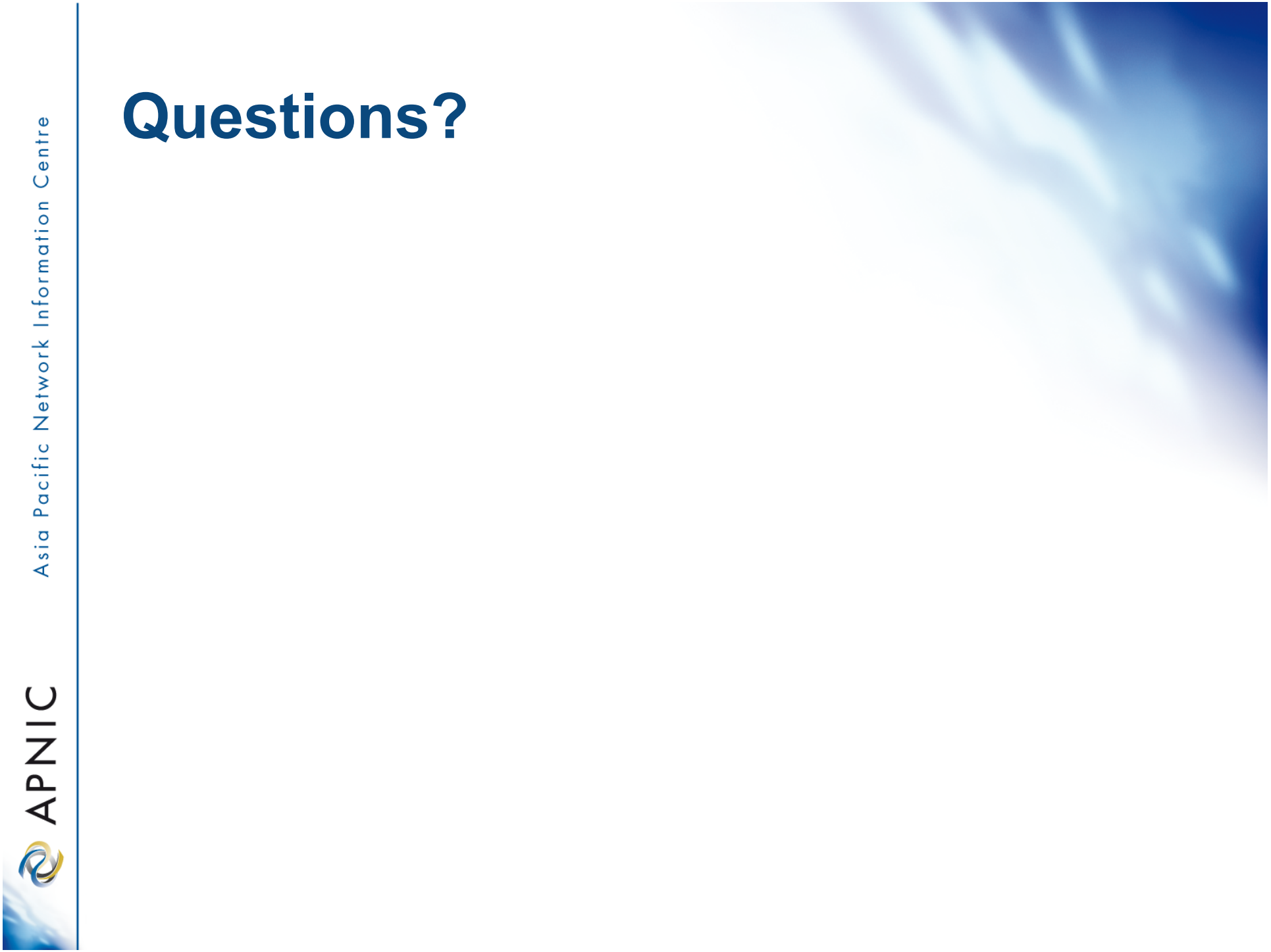
Questions?



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  - IPv6 Policy and Procedure
  - Reverse DNS
  - APNIC Helpdesk

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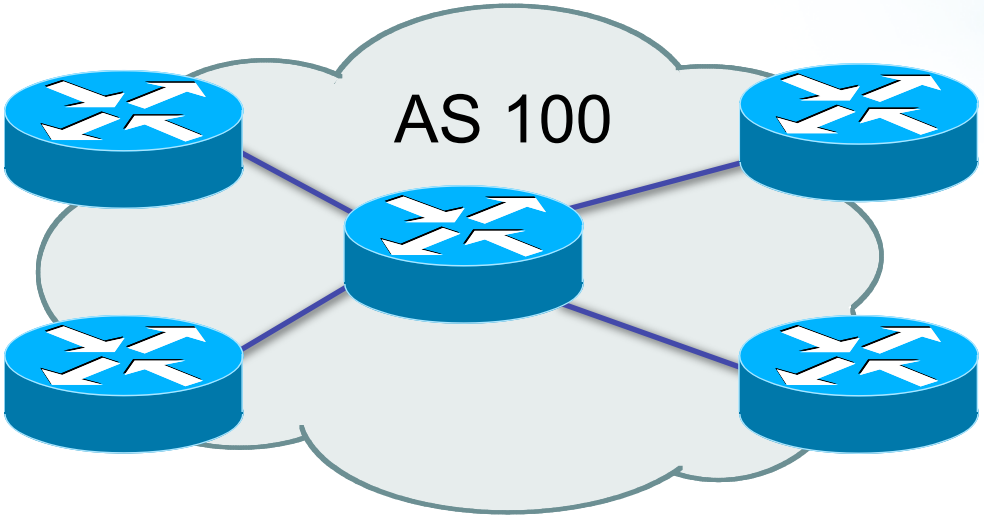
What is an Autonomous System?



- Collection of networks with same routing policy
- Usually under single ownership, trust or administrative control

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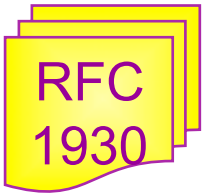
When do I Need an ASN?

- When do I need an AS?
  - Multi-homed network to different providers and
  - Routing policy different to external peers

RFC1930: Guidelines for creation, selection and registration of an Autonomous System



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When Don't I Need an ASN?

Factors that don't count:

- Transition and 'future proofing'
- Multi-homing to the same upstream
  - RFC2270: A dedicated AS for sites homed to a single provider
- Service differentiation
  - RFC1997: BGP Communities attribute

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Requesting an AS Number

1. Requested from APNIC for own network infrastructure
   - AS number is “portable”
2. Requested from APNIC for member customer network
   - ASN is “non-portable”
   - ASN returned if customer changes provider

- Transfers of ASNs
  - Need legal documentation (mergers etc)
  - Should be returned if no longer required

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Requesting an ASN

- Complete the request form
  - Existing member:

    Will send request from MyAPNIC
  - New Member:

    Can send AS request along with membership application

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4 byte AS Numbers

Background

- Previously 2 byte ASN (16 bits)
  - Possibly run into exhaustion by 2010
  - 4 byte ASN was developed by IETF
- Currently 4 byte ASN distribution policy (32 bits)

- Timeline
  - July 1 2009: Default 4 byte ASN, 2 byte ASN on request with documented justification
  - Jan 2010: 4 byte ASN only

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4 Byte AS number

- 2-byte only AS number range 0 – 65535
  (decimal range 0- 65,535)

- 4-byte only AS number range 1.0 - 65535.65535
  (decimal range 65,536 - 4,294,967,295)

- AS number representation
  - AS DOT
  - AS PLAIN

4 Byte AS number

- AS number representation
  - **AS DOT**
  - Based upon 2-Byte AS representation
  - <Higher2bytes in decimal> . <Lower2bytes in decimal>
  - For example: AS 65546 is represented as 1.10
  - Easy to read, however hard for regular expressions
  - There is a meta character “.” in regular expression
  - i.e For example, a.c matches "*abc*", etc., but [a.c] matches only "*a*", "*.*", or "*c*".

4 Byte AS number

- AS number representation
  - **AS PLAIN**
  - ASPLAIN IETF preferred notation
  - Continuation on how a 2-Byte AS number has been represented historically
  - Notation: The 32 bit binary AS number is translated into a Single decimal value Example: AS 65546
  - Total AS Plain range (0 – 65535 - 65,536 - 4,294,967,295)

4 Byte AS number

APNIC resource range:

- In AS DOT: 2.0 ~ 2.1023
- In AS PLAIN: 131072 ~ 132095

AS number converter

http://submit.apnic.net/cgi-bin/convert-asn.pl

Aut-num object example

aut-num:	AS4777
as-name:	APNIC-NSPIXP2-AS
descr:	Asia Pacific Network Information Centre
descr:	AS for NSPIXP2, remote facilities site
import:	from AS2500 action pref=100; accept ANY
import:	from AS2524 action pref=110; accept ANY
import:	from AS2514 action pref=120; accept ANY
export:	to AS2500 announce AS4777
export:	to AS2524 announce AS4777
export:	to AS2514 announce AS4777
default:	to AS2500 action pref=100; networks ANY
admin-c:	PW35-AP
tech-c:	NO4-AP
remarks:	Filtering prefixes longer than /24
mnt-by:	MAINT-APNIC-AP
changed:	paulg@apnic.net 19981028
source:	APNIC

POLICY RPSL

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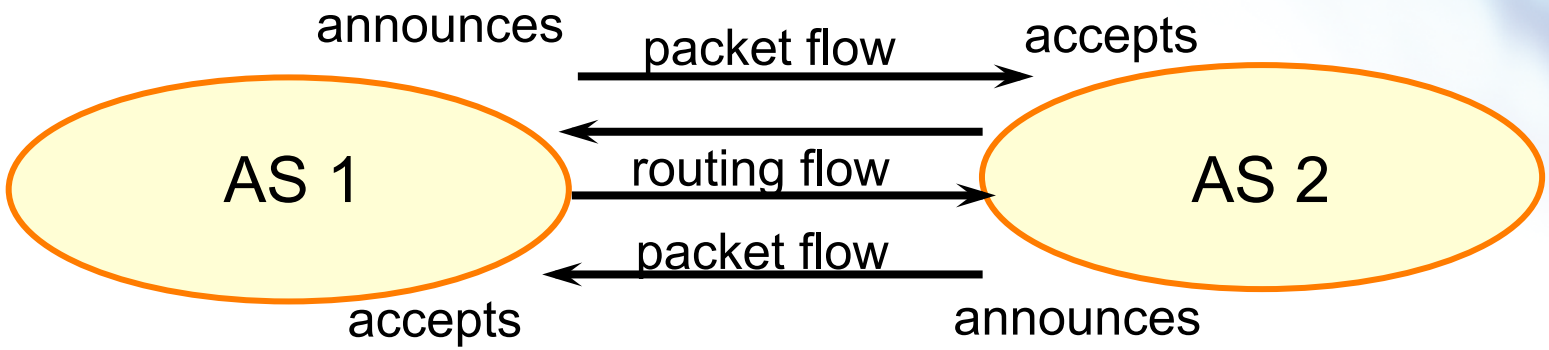
Representation of routing policy

- Routing and packet flows



For AS1 and AS2 networks to communicate

- AS1 must announce to AS2
- AS2 must accept from AS1
- AS2 must announce to AS1
- AS1 must accept from AS2

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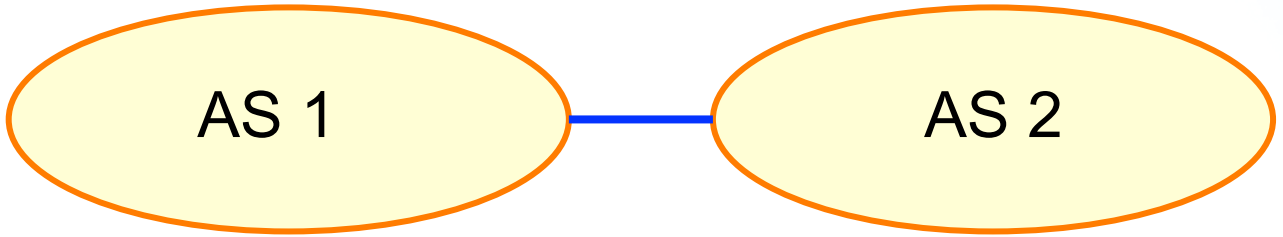
Representation of routing policy

Basic concept



"action pref" - the lower the value, the preferred the route

```
aut-num: AS1
…
import:   from AS2
          action pref=100;
          accept AS2
export:   to AS2 announce AS1
```

```
aut-num: AS2
…
import:   from AS1
          action pref=100;
          accept AS1
export:   to AS1 announce AS2
```

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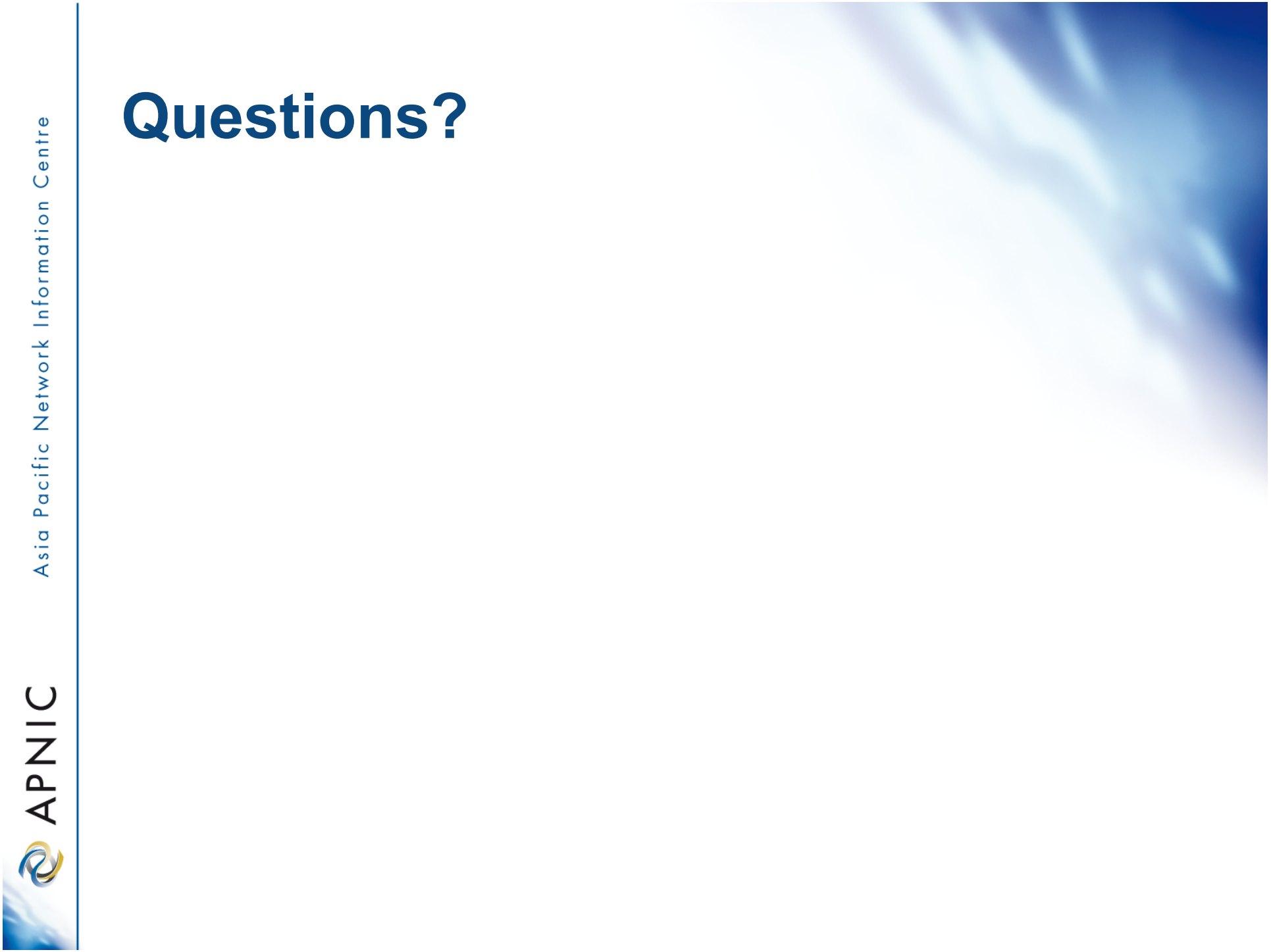
Questions?



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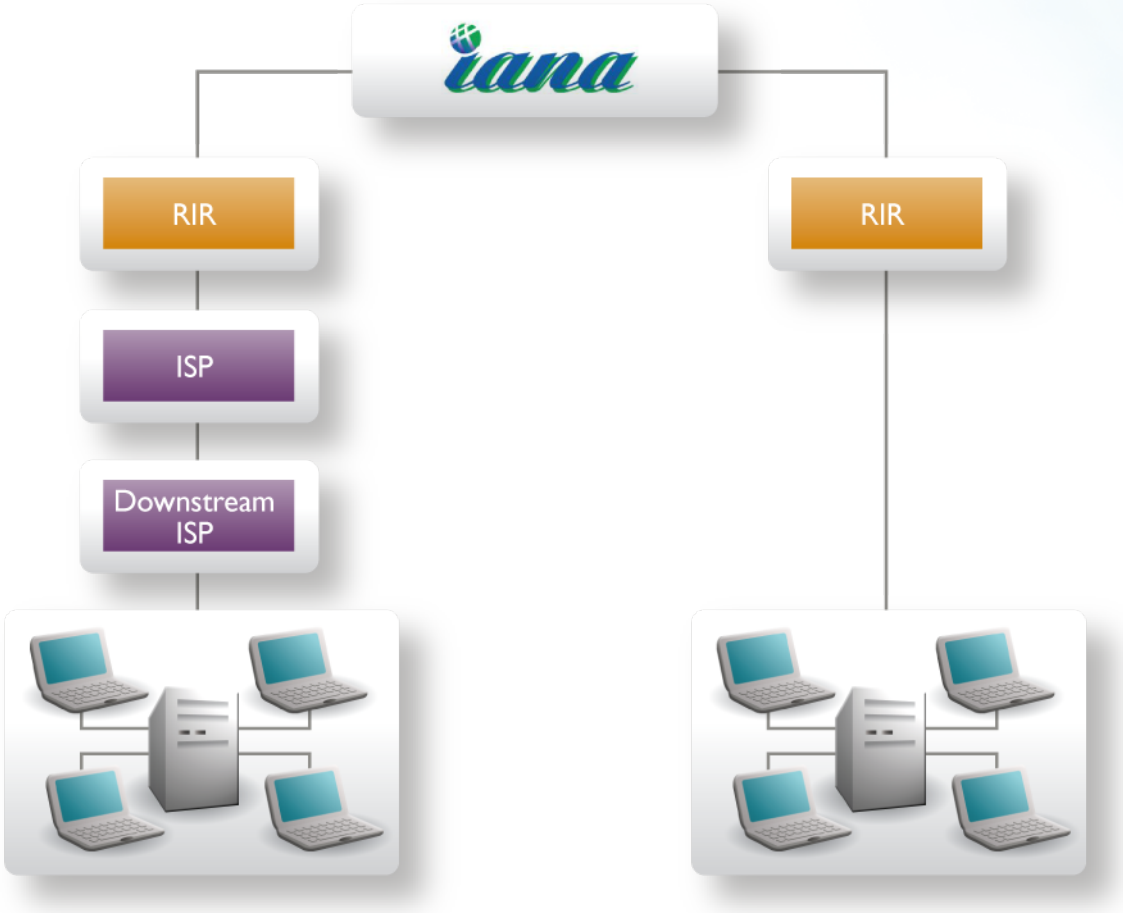
IPv6 Address Management Hierarchy



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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

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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

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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”)

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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.

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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

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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

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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

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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 units assigned) / log (16,777,216)
  - 0.94 = 6,183,533 x /56 units
- Calculation of the HD ratio
  - Convert the assignment size into equivalent /56 units
    - Each /48 end site = 256 x /56 units
    - Each /52 end site = 16 x /56 units
    - Each /56 end site = 1 x /56 units
    - Each /60 end site = 1/16 x /56 units
    - Each /64 end site = 1/256 x /56 units

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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."

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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

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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

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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

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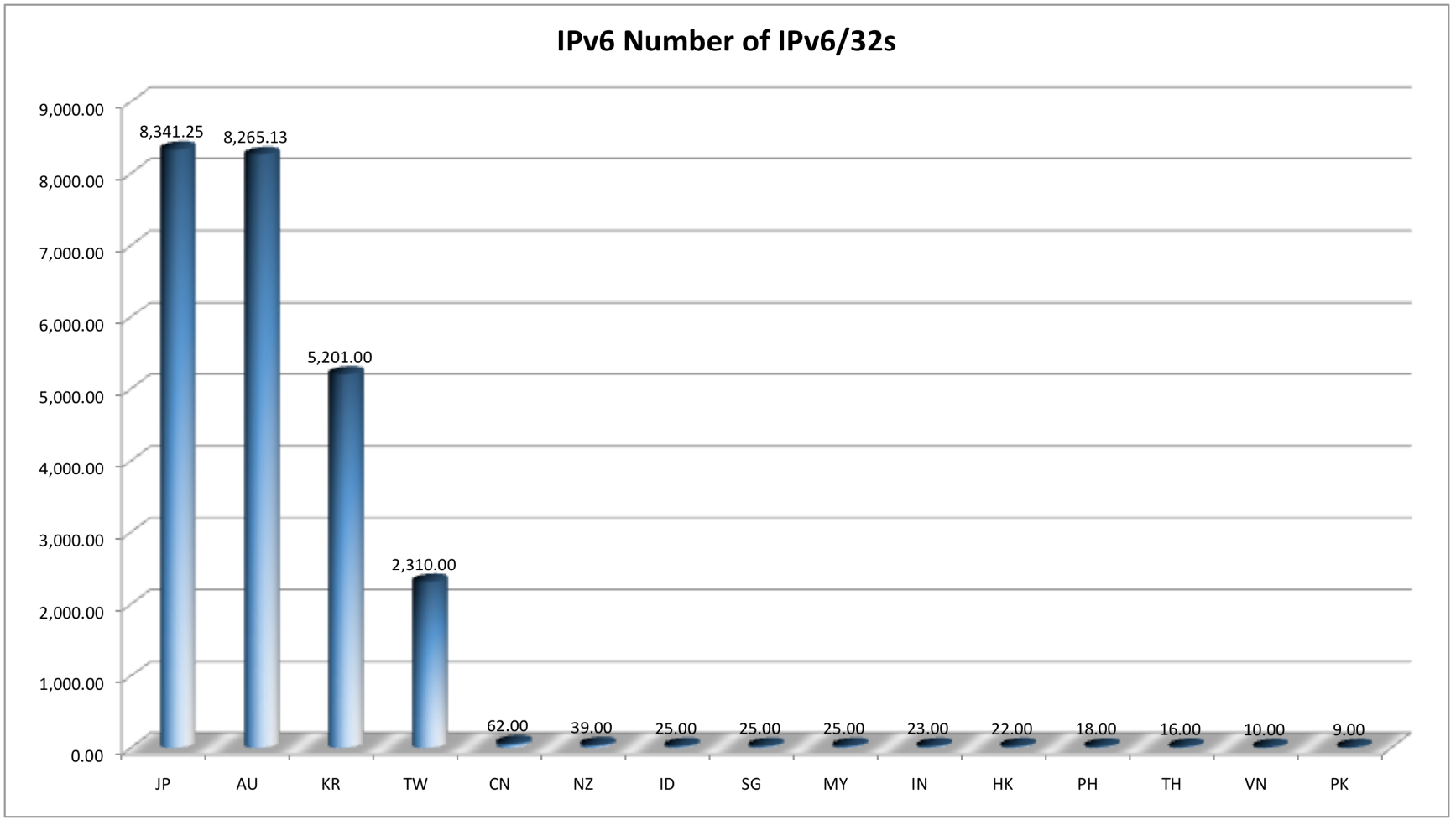
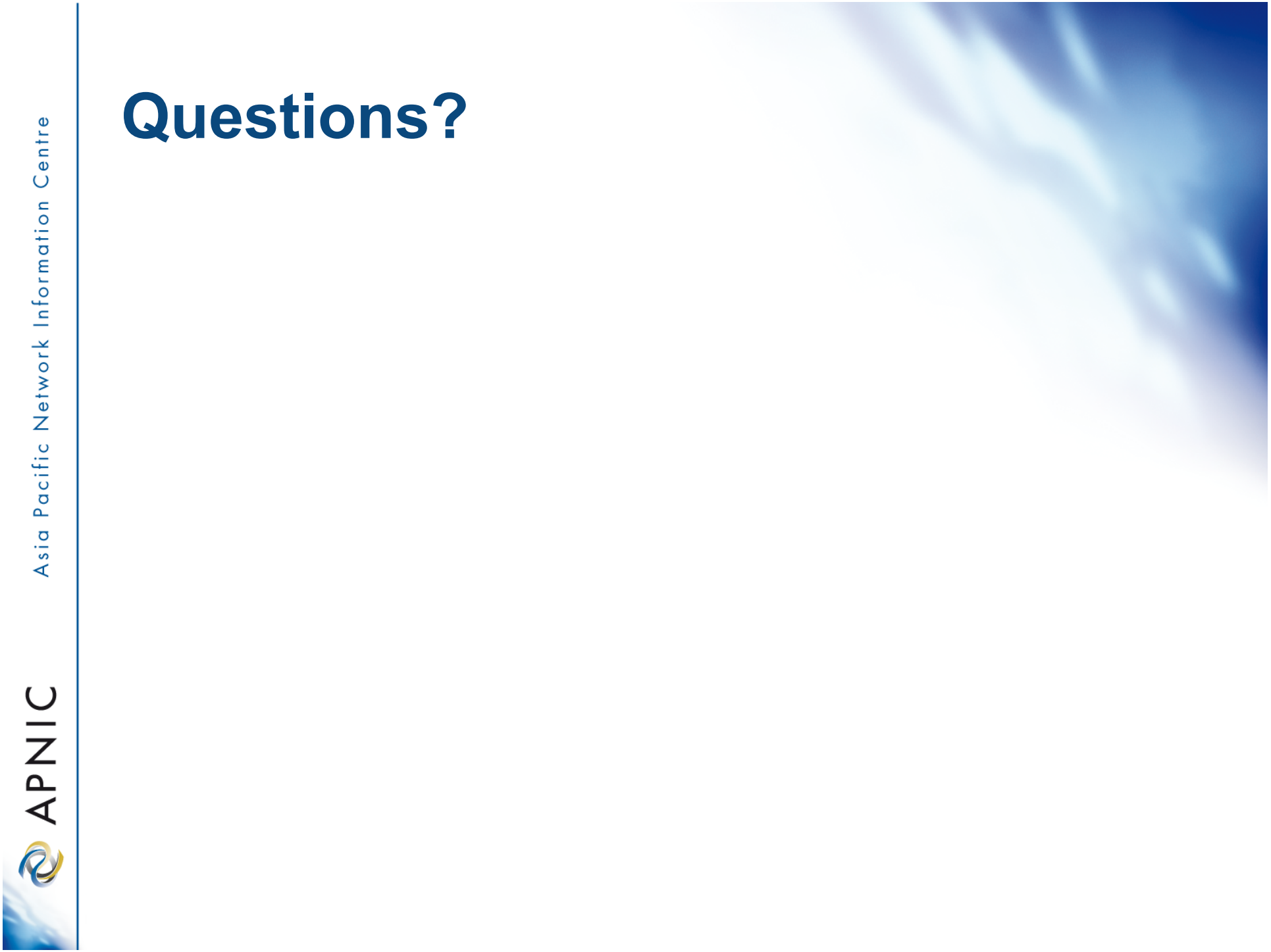
APNIC IPv6 Delegation by Economy



No of delegations (/35, /32)

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

Questions?



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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

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APNIC & Member responsibilities

- APNIC
  - Manage reverse delegations of address block distributed by APNIC
  - Process members requests for reverse delegations of network allocations
- Members
  - Be familiar with APNIC procedures
  - Ensure that addresses are reverse-mapped
  - Maintain nameservers for allocations
    - Minimise pollution of DNS

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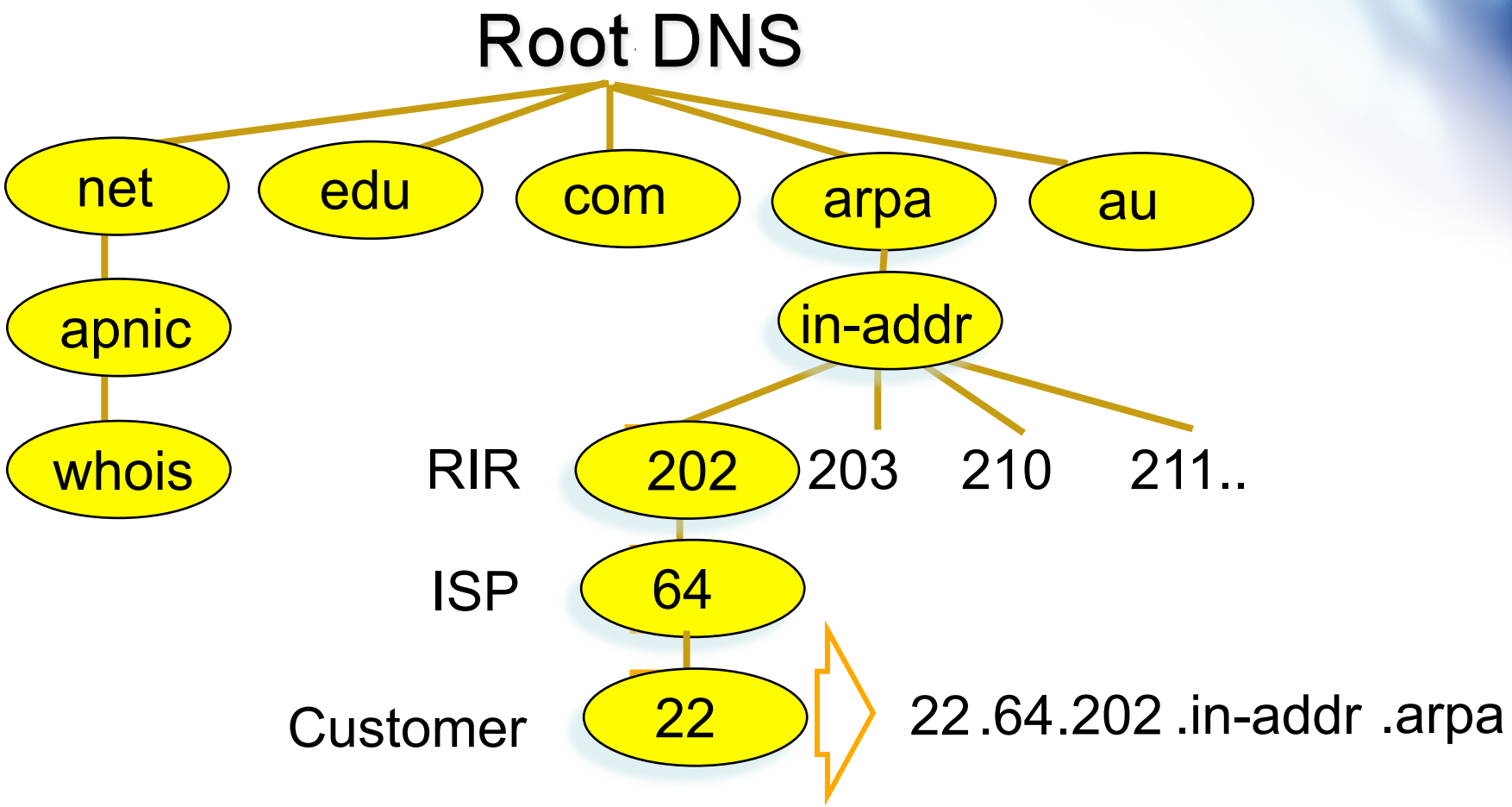
Principles – DNS tree

- Mapping numbers to names - 'reverse DNS'



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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”

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A reverse zone example

```
$ORIGIN 1.168.192.in-addr.arpa.
@       3600   IN SOA test.company.org. (
                      sys\.admin.company.org.
                      2002021301    ; serial
                      1h            ; refresh
                      30M           ; retry
                      1W            ; expiry
                      3600 )        ; neg. answ. ttl

        NS      ns.company.org.
        NS      ns2.company.org.

1       PTR     gw.company.org.
                router.company.org.

2       PTR     ns.company.org.
;auto generate:  65 PTR host65.company.org
$GENERATE 65-127 $ PTR host$.company.org.
```

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Example ‘domain’ object

domain:	124.54.202.in-addr.arpa
descr:	co-located server at mumbai
country:	PK
admin-c:	VT43-AP
tech-c:	IA15-AP
zone-c:	IA15-AP
nserver:	dns.isp.net.pk
nserver:	giasbm01.isp.net.pk
mnt-by:	MAINT-PK-isp
changed:	gps@isp.net.pk 20010612
source:	APNIC

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Adding Domain Object to WHOIS

- Using My APNIC (Instant)
- Sending Domain object template to APNIC Helpdesk (1 working day)
- Name servers must be configured before submitting request

Delegation procedures – request form

- Complete the documentation
  - ftp://ftp.apnic.net/apnic/docs/reverse-dns
- 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
  - Uses database ‘domain’ object
    - examples of form to follow..

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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

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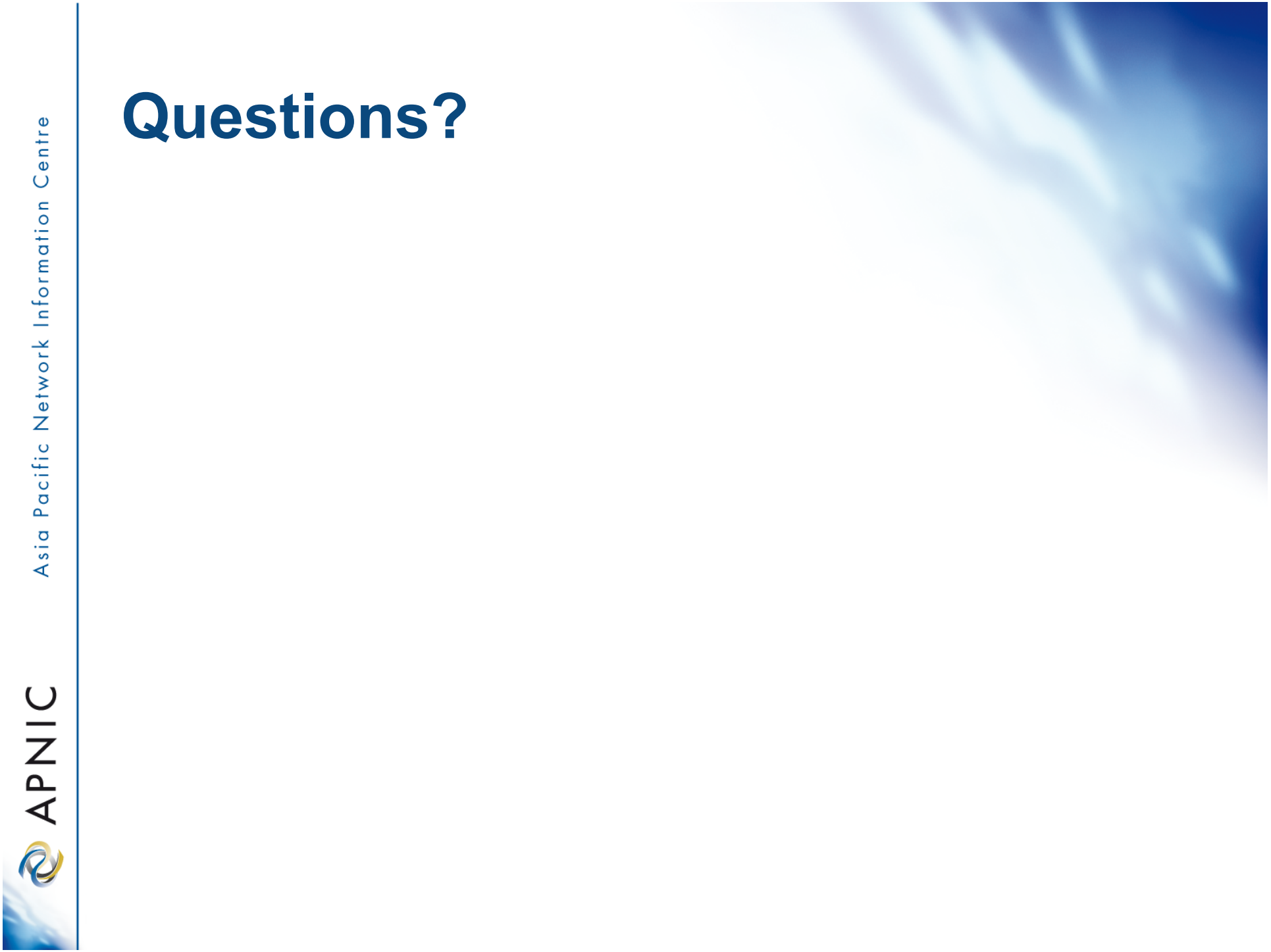
Questions?



Overview

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

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APNIC

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

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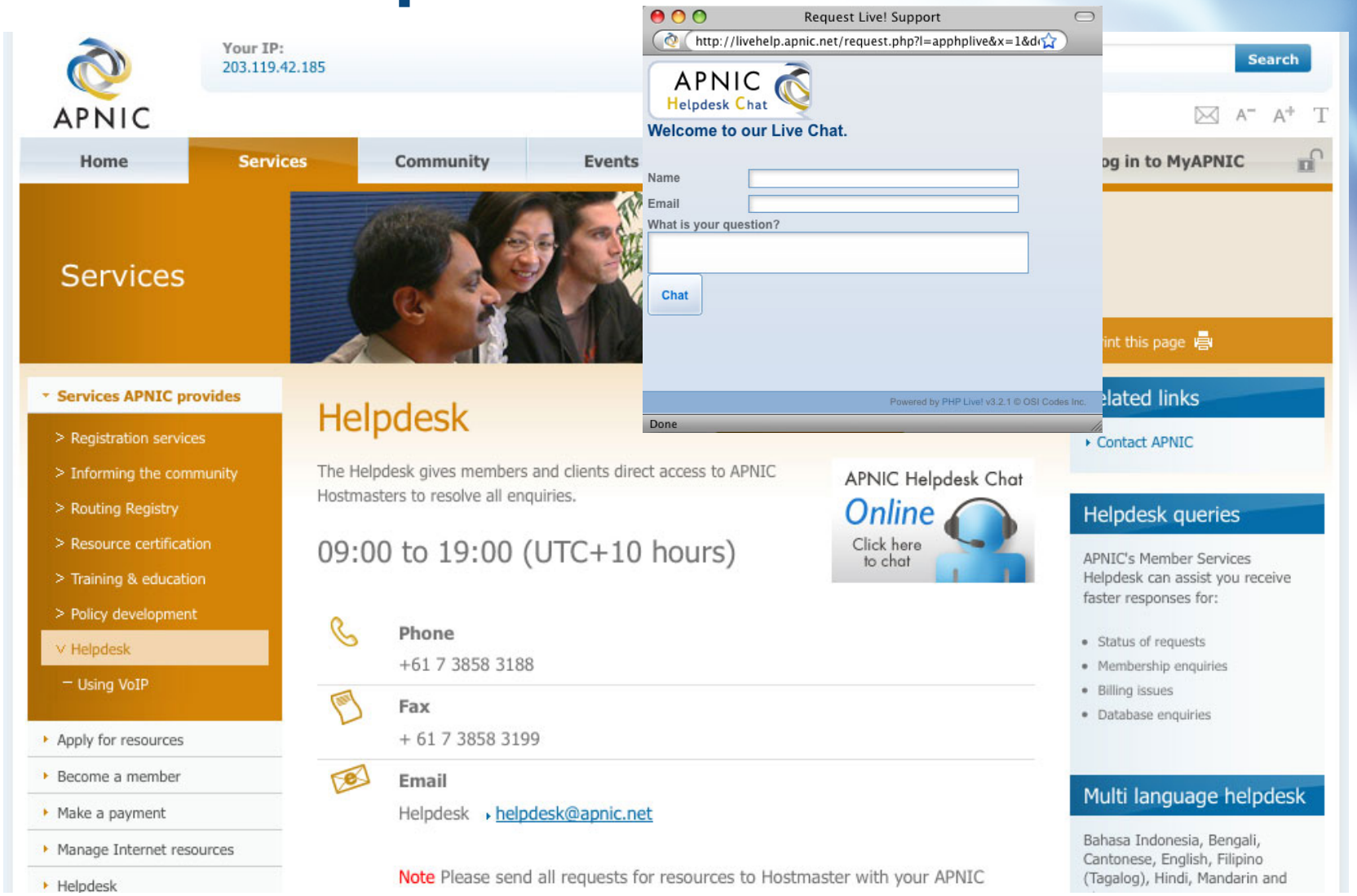
APNIC Helpdesk Chat



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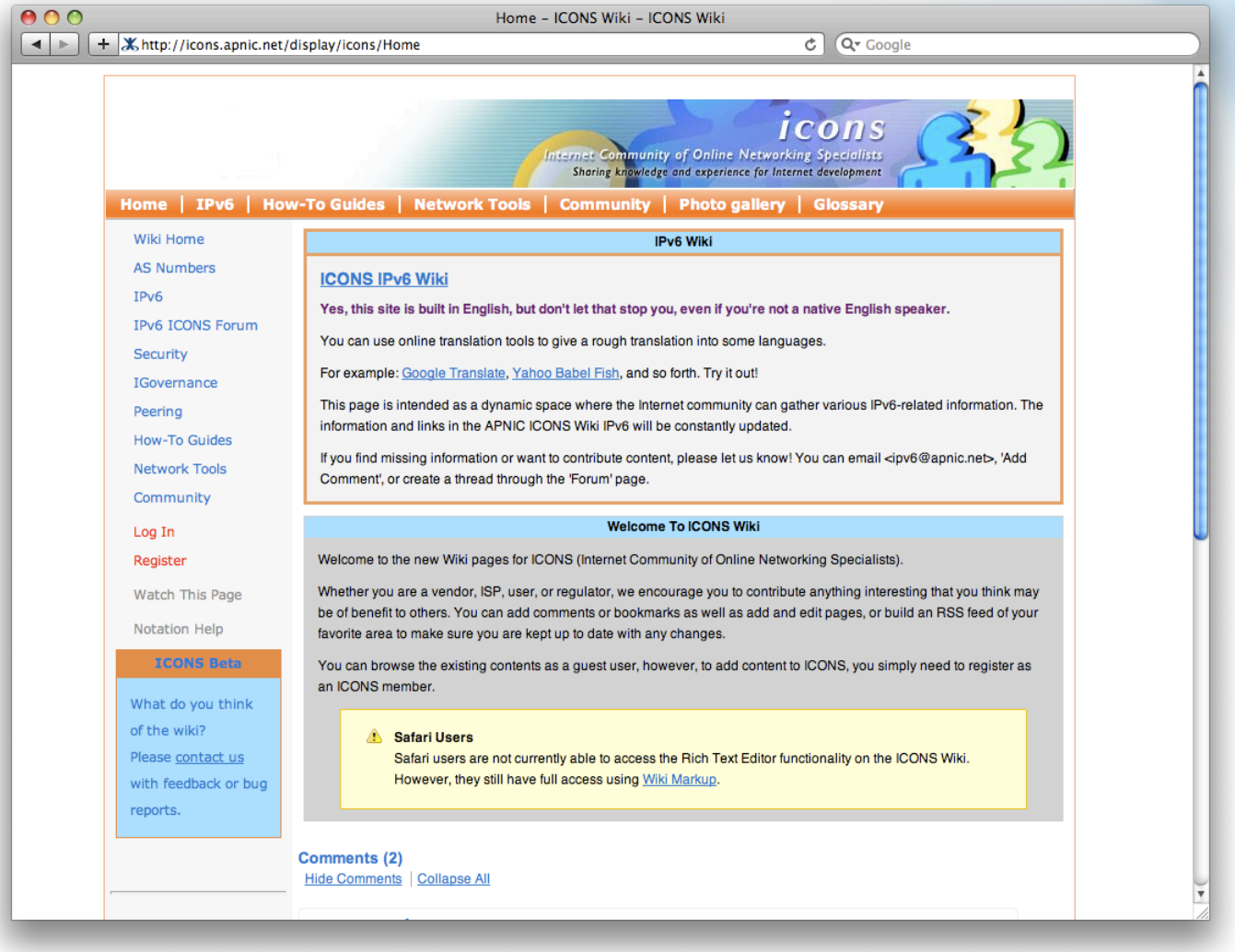
ICONS



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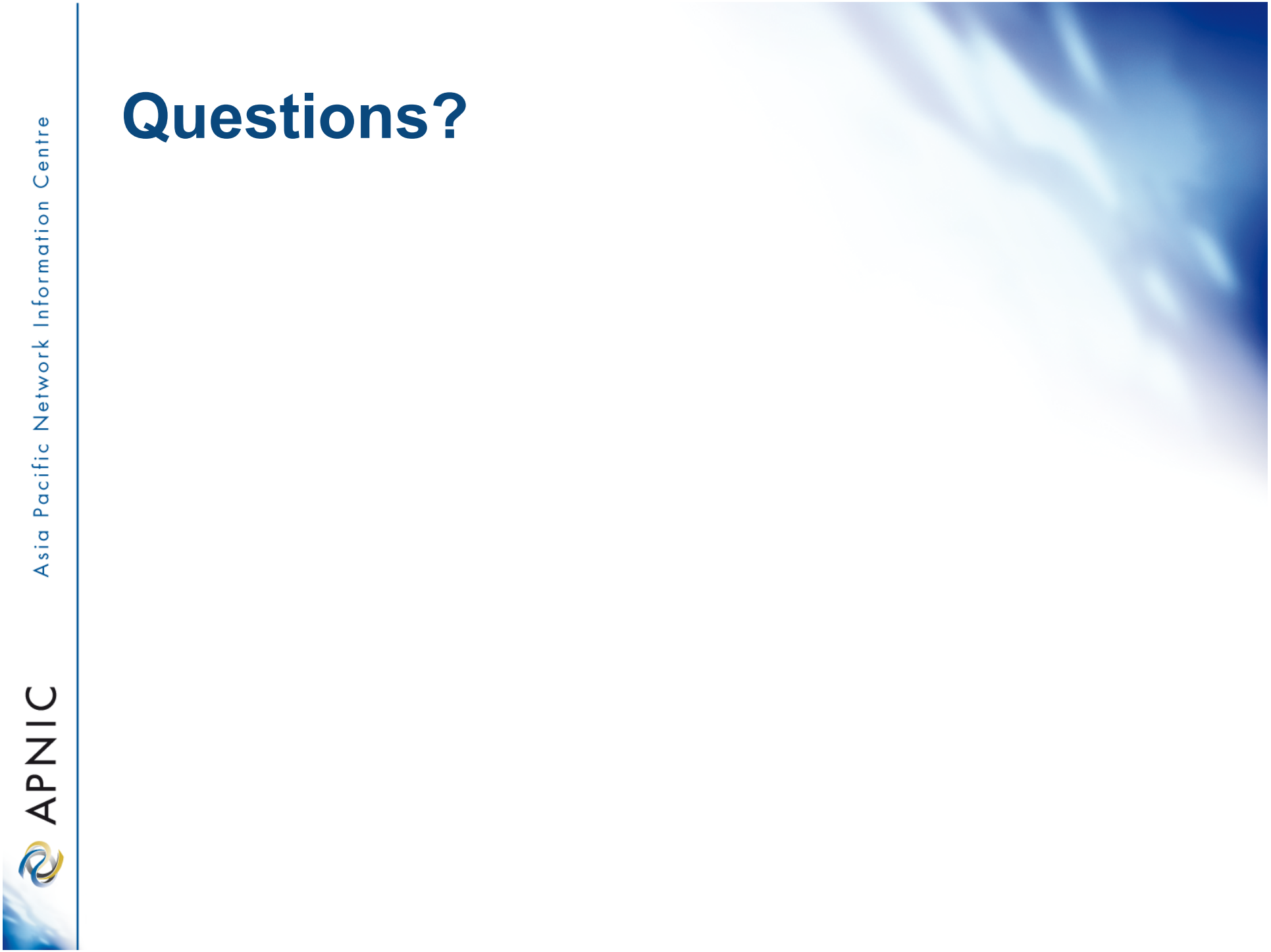
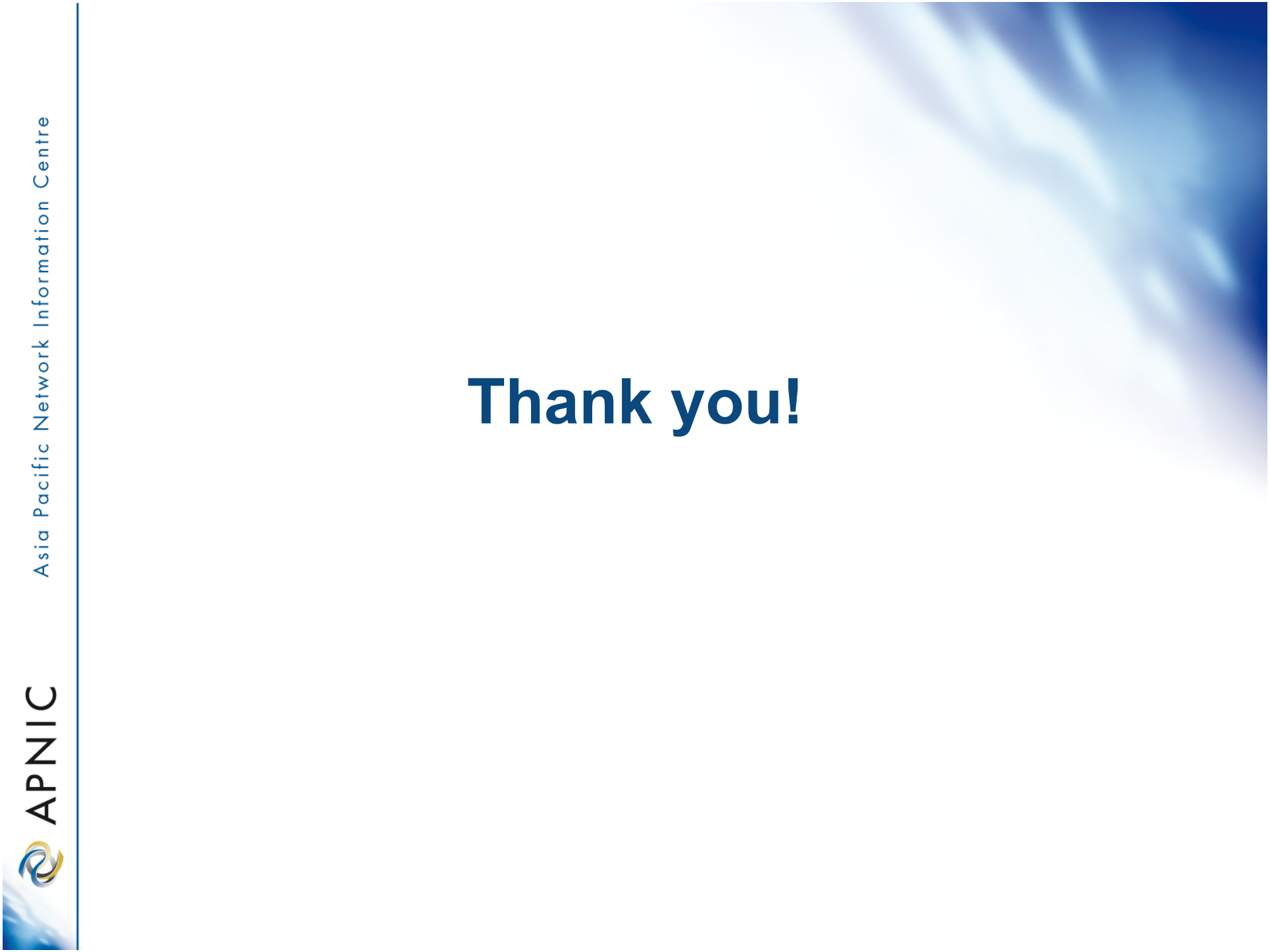
Questions?



Training Survey

- http://www.surveymonkey.com/s/KLGSVPD



Thank you!