APNIC Internet Resource Management (IRM)

Karachi, SANOG XX – 15 July, 2012

In conjunction with:

APNIC

Presenters

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Agenda

- Introduction to APNIC
- Policy Development Process
- Internet Registry Policies
- Requesting IP Addresses and ASN
- Whois Database and MyAPNIC

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- **Introduction to APNIC**
- Policy Development Process
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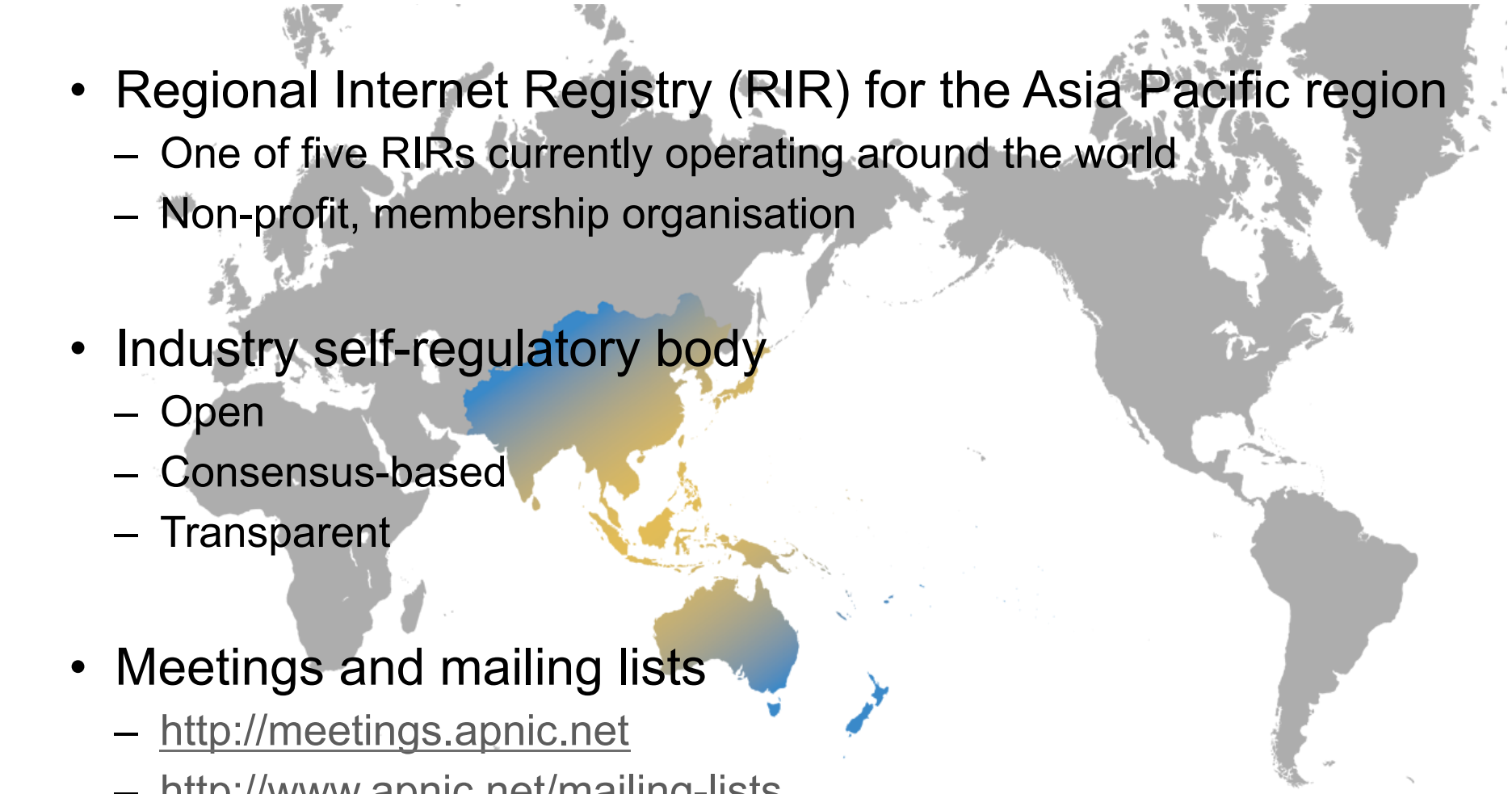
What is APNIC?



- 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
  - Open
  - Consensus-based
  - Transparent
- Meetings and mailing lists
  - http://meetings.apnic.net
  - http://www.apnic.net/mailing-lists

What does APNIC do?

Resource service	Policy development

• IPv4, IPv6, ASNs
• Reverse DNS delegation
• Resource registration
  • Authoritative registration server
  • Whois
  • IRR
	• Facilitating the policy development process
	• Implementing policy changes

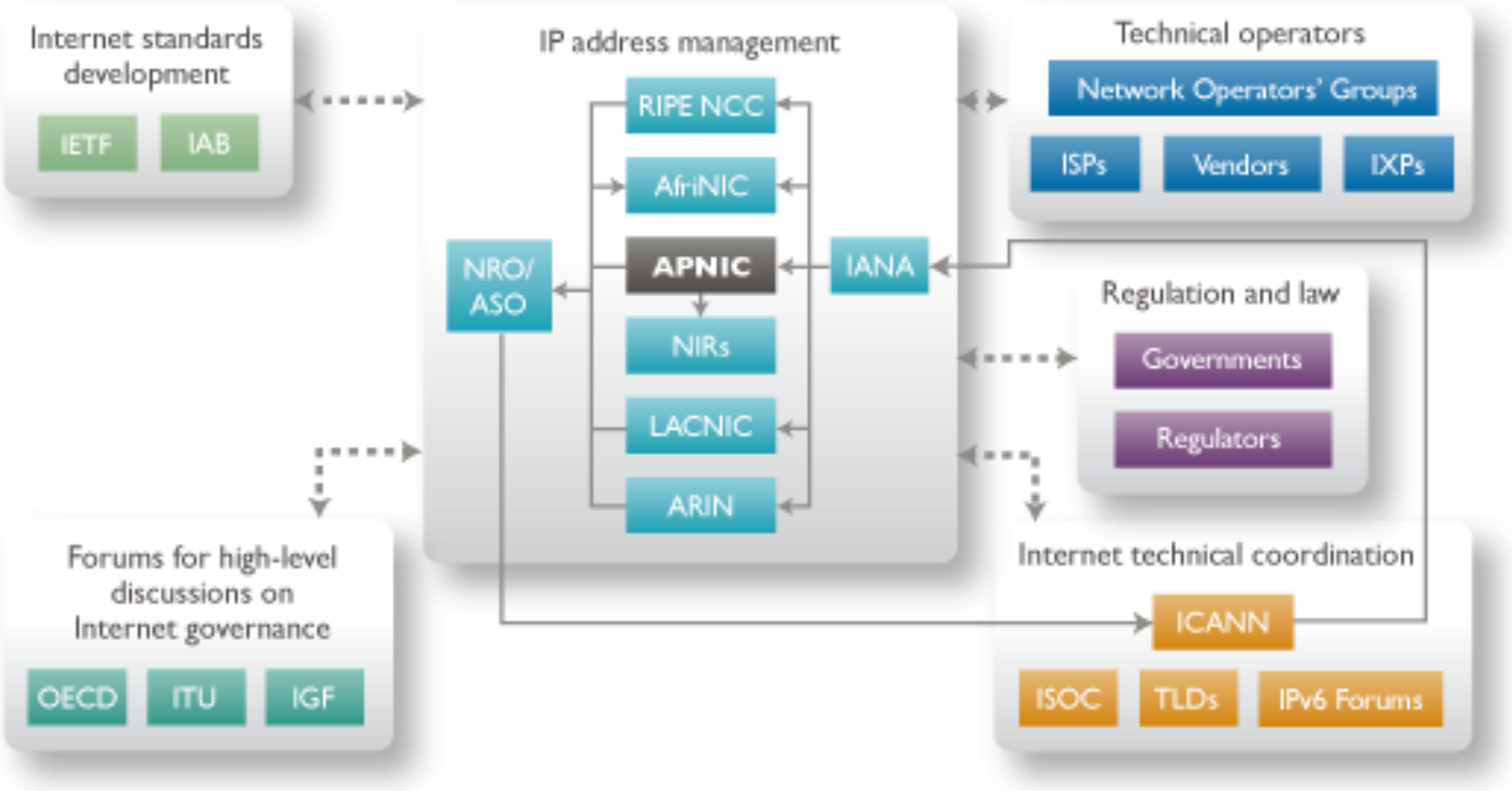
Information dissemination	**Training**
• APNIC meetings • Web and ftp site • Publications, mailing lists • Outreach seminars http://www.apnic.net/community/participate/join-discussions/sigs	• Face to Face • Via eLearning - Subsidised for members Schedule: http://www.apnic.net/training

Where is the APNIC Region?

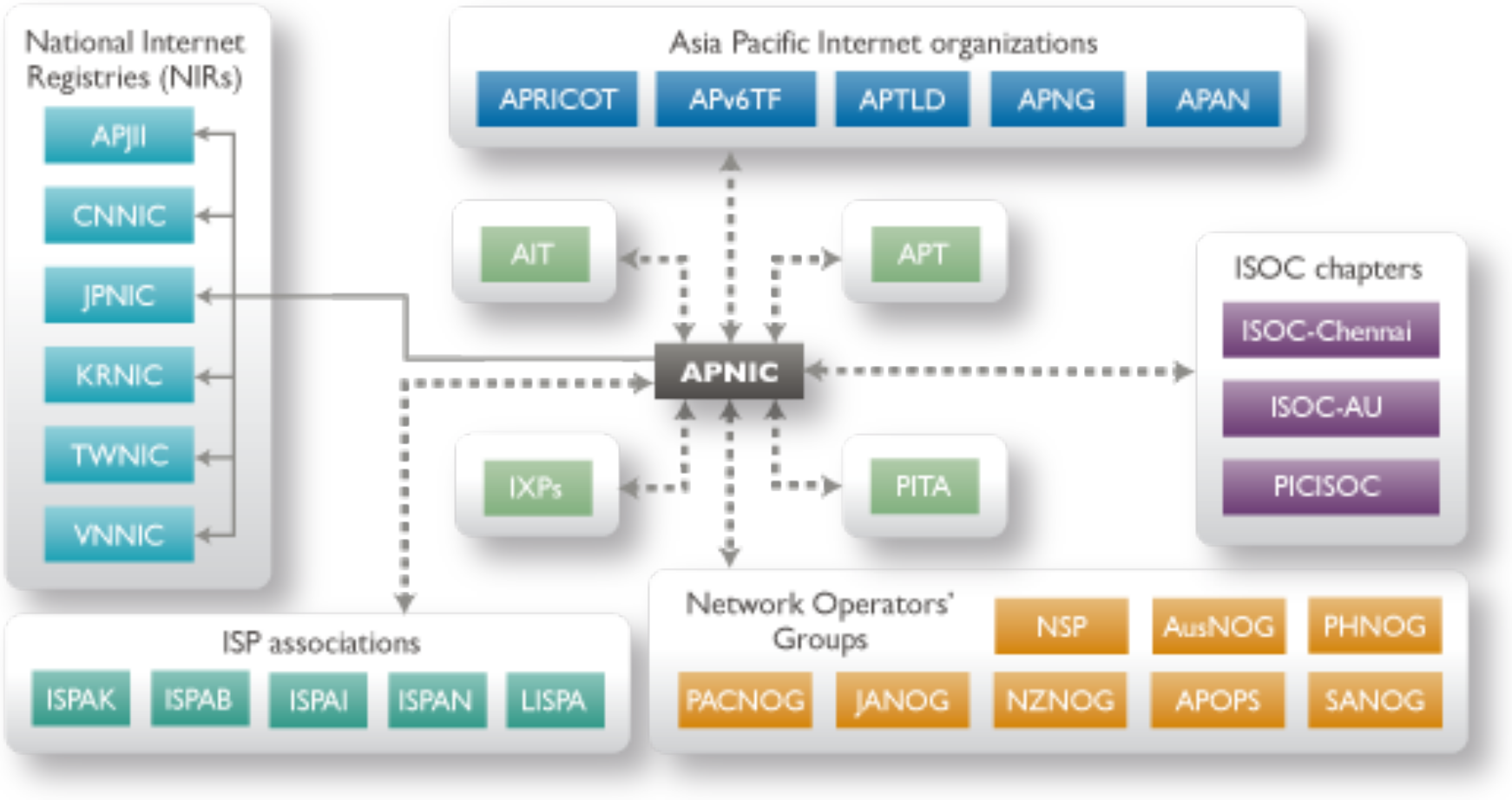
APNIC is NOT

- 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

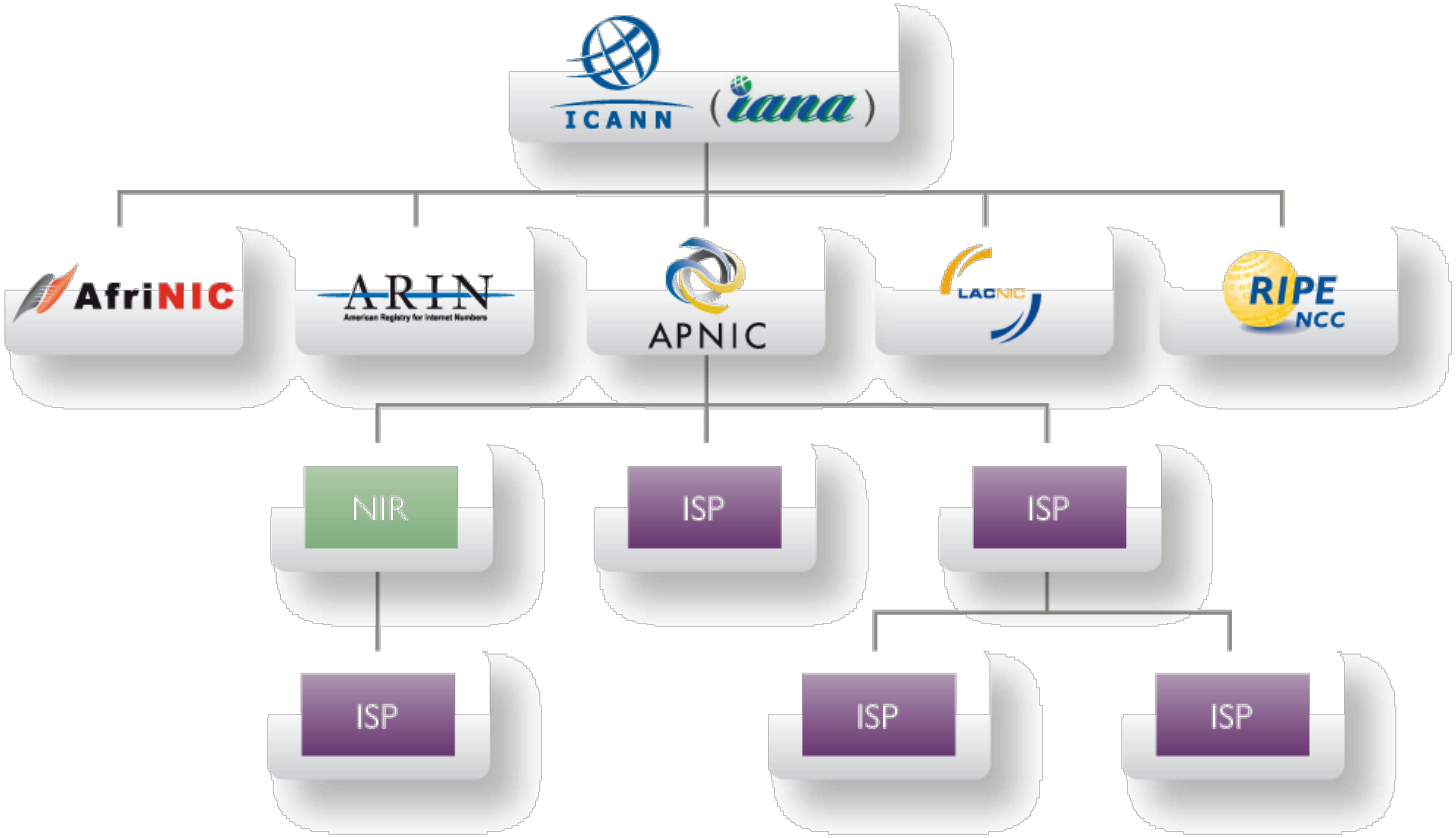
APNIC from a Global Perspective



APNIC in the Asia Pacific



Internet Registry Structure



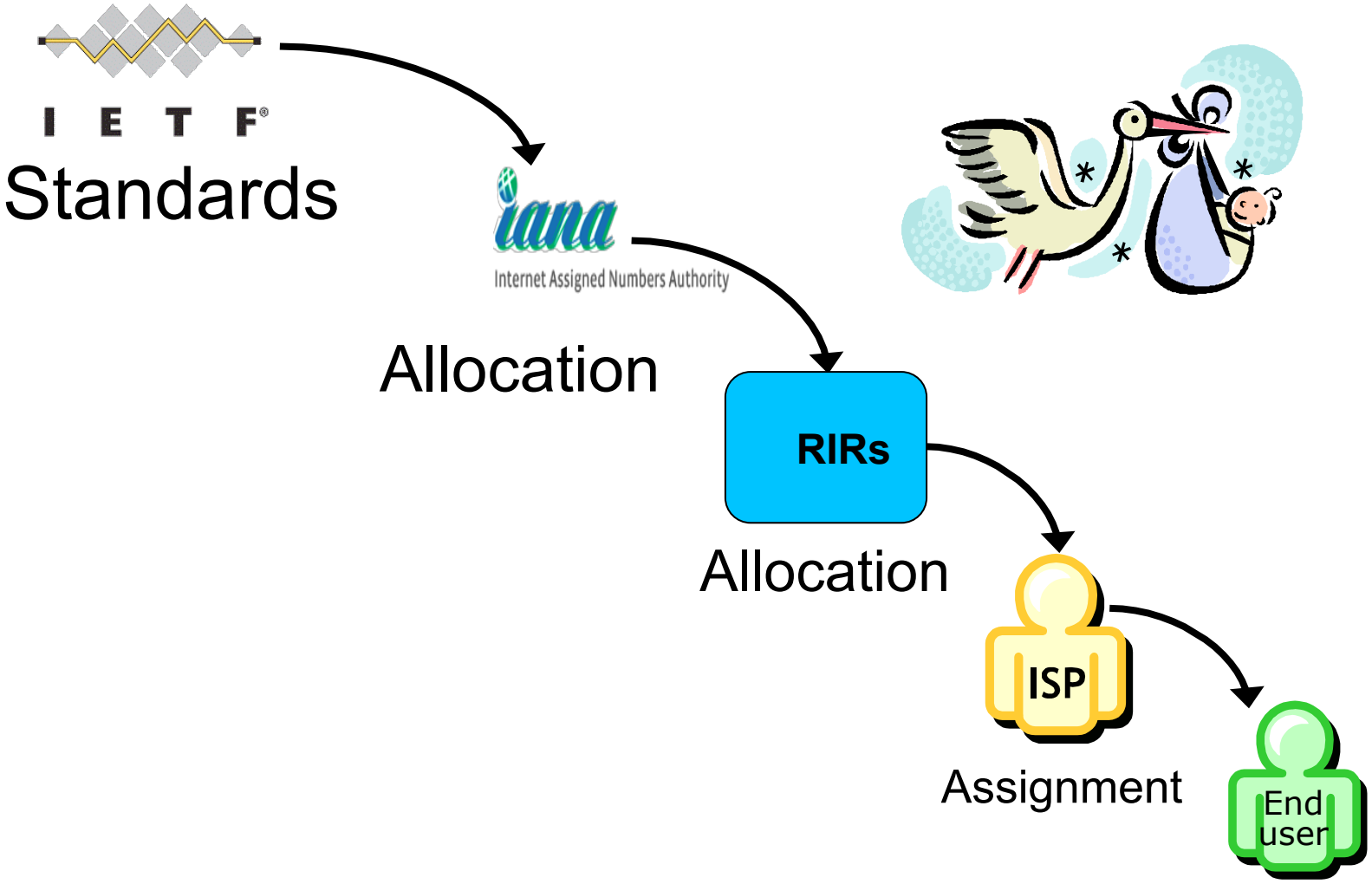
Global Policy Coordination

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

Where do IP Addresses come from?



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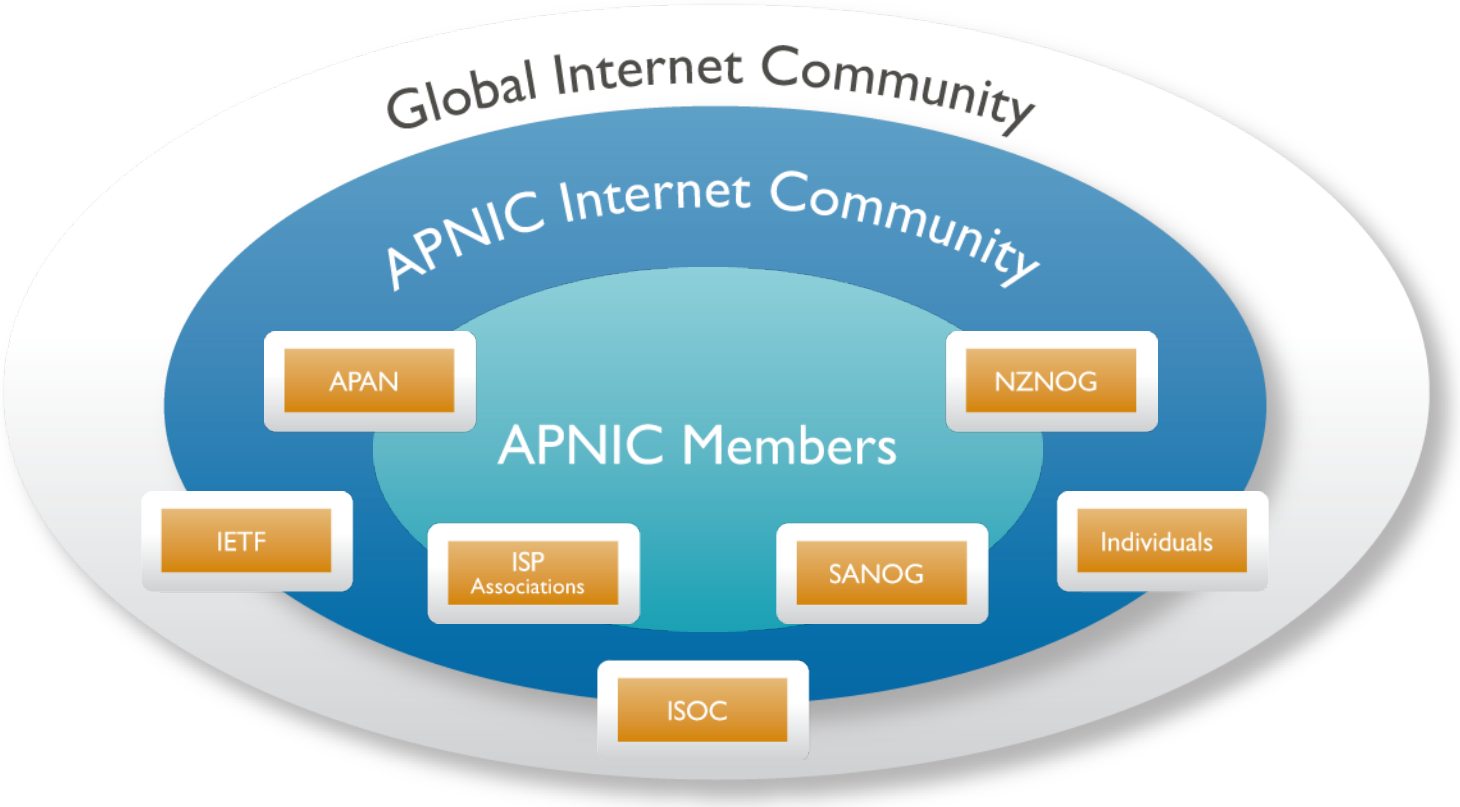
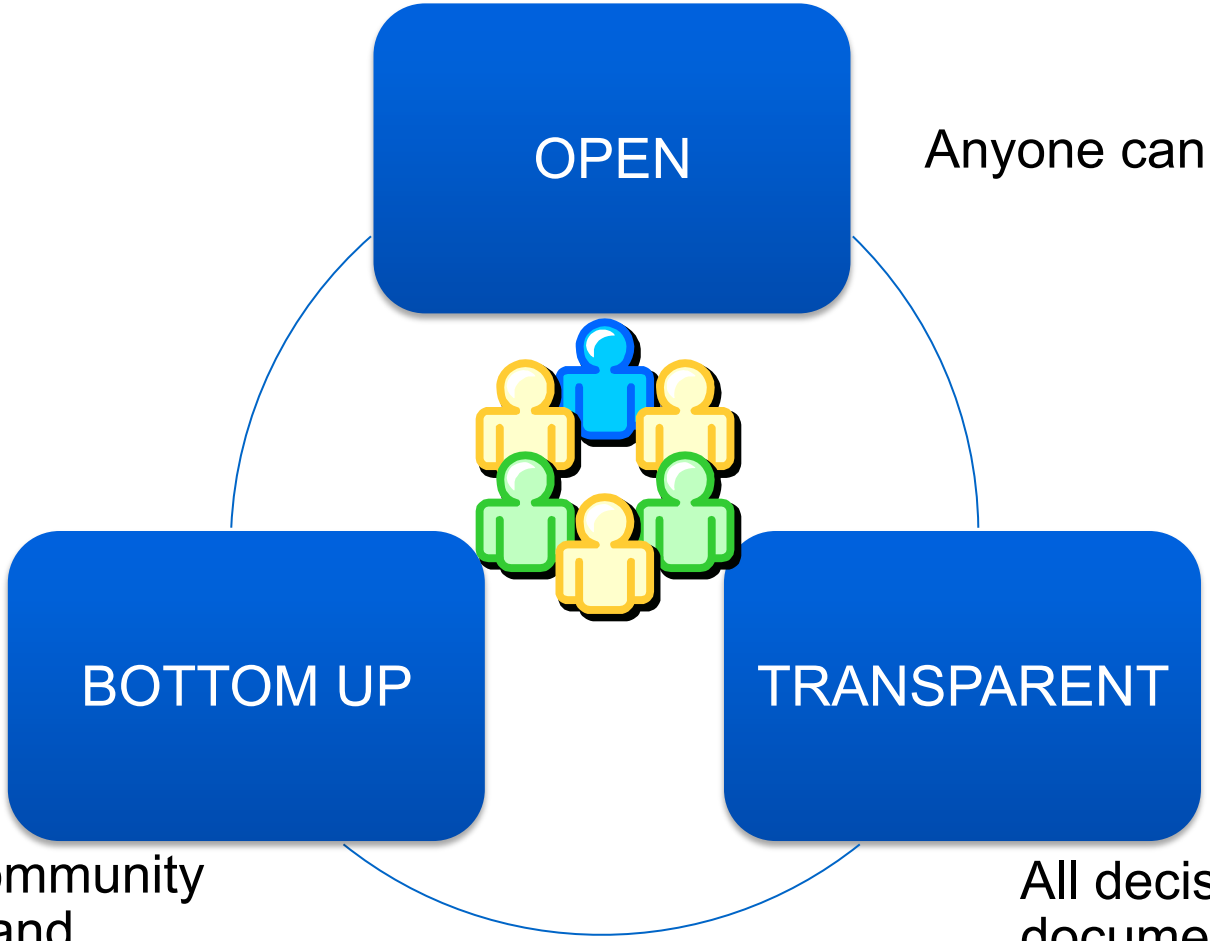
You are Part of the APNIC Community!

Open forum in the Asia Pacific



A voice in regional Internet operations through participation in APNIC

Policy Development Process

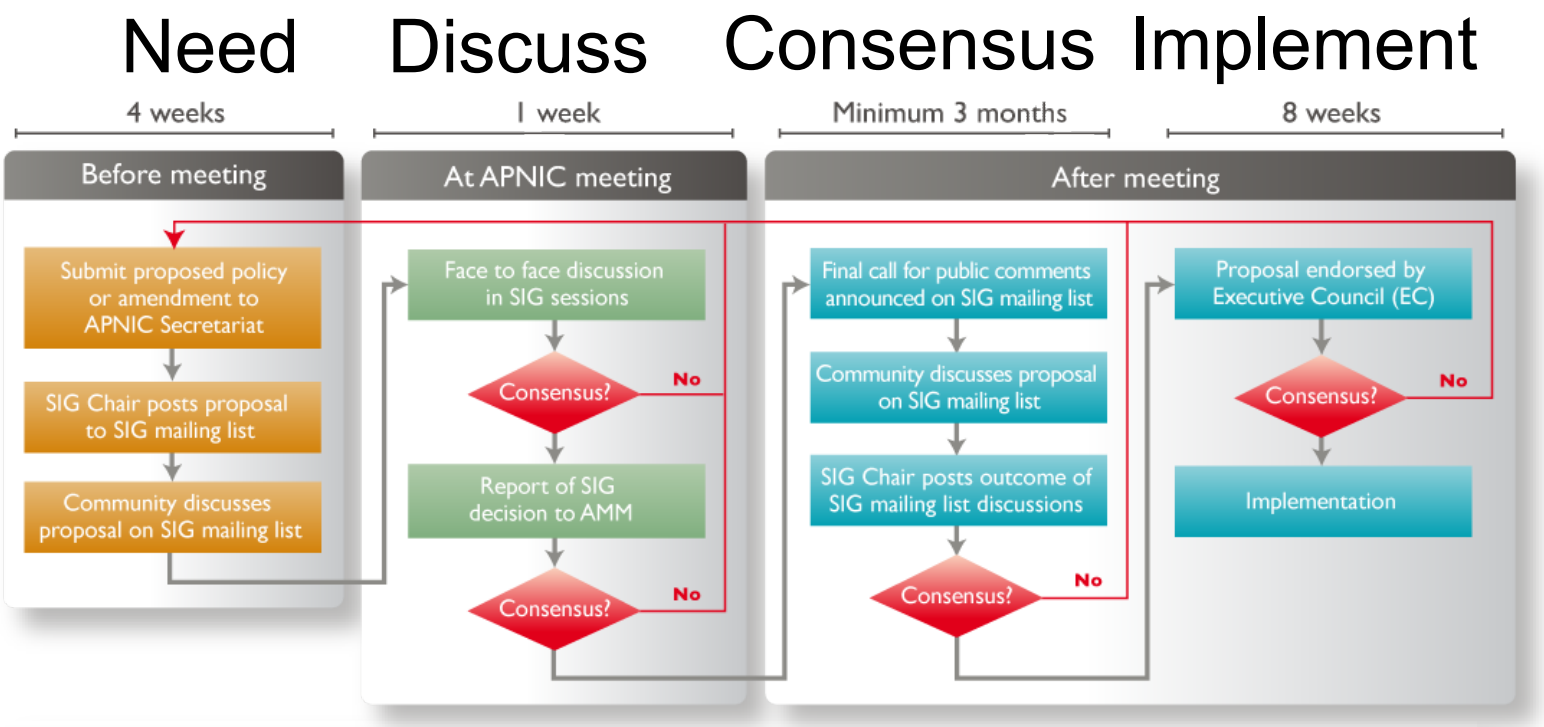


Anyone can participate

Internet community proposes and approves policy

All decisions & policies documented & freely available to anyone

Policy Development Process



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/mailing-lists
  - Attend APNIC conferences
  - Or send a representative
  - Watch webcast (video streaming) from the conference 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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- Requesting IP Addresses
- Whois Database and MyAPNIC
- Autonomous System Numbers
- Reverse DNS

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

APNIC
Allocates
to APNIC Member

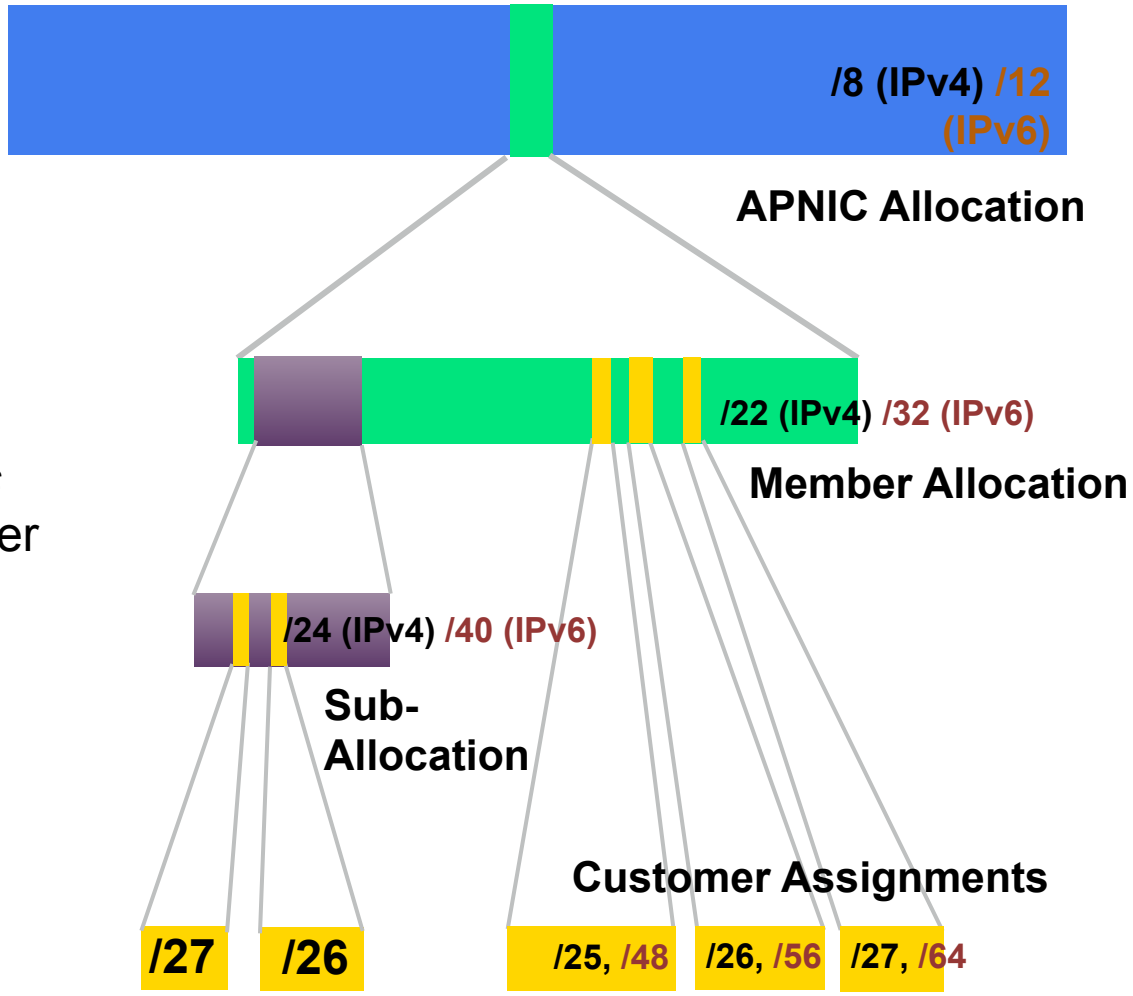
APNIC Member

Allocates
to downstream

Downstream
Assigns
to end-user

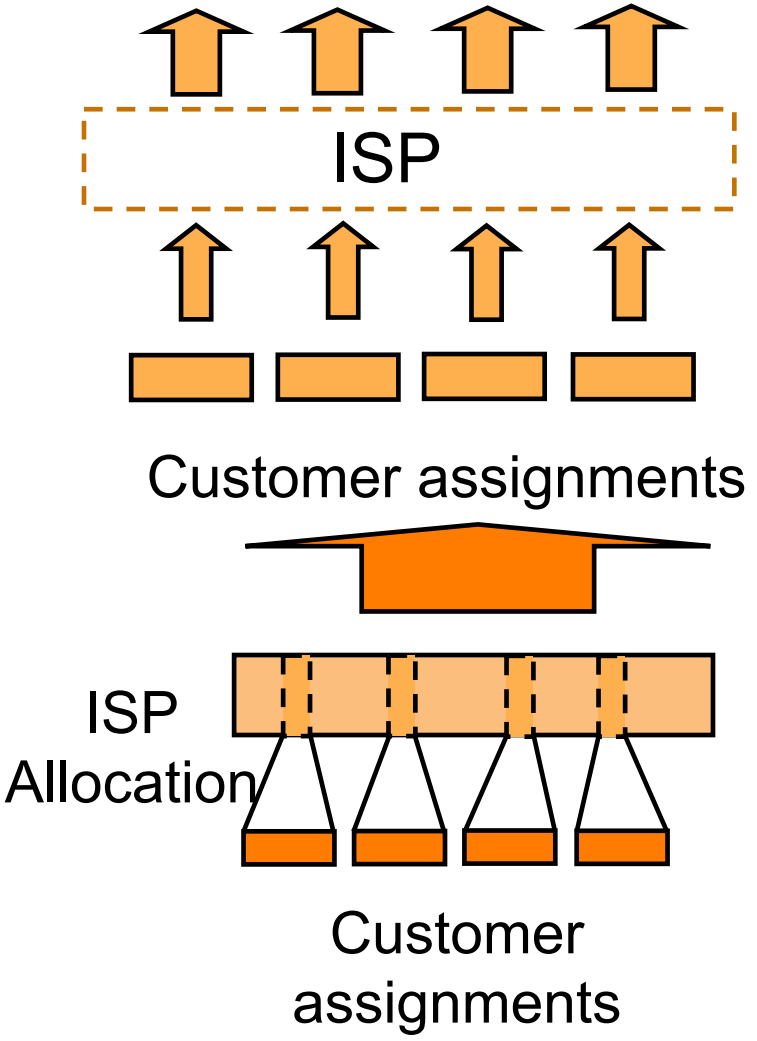
Assigns
to end-user

Customer / End User



Portable and 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



Internet Resource Management Objectives

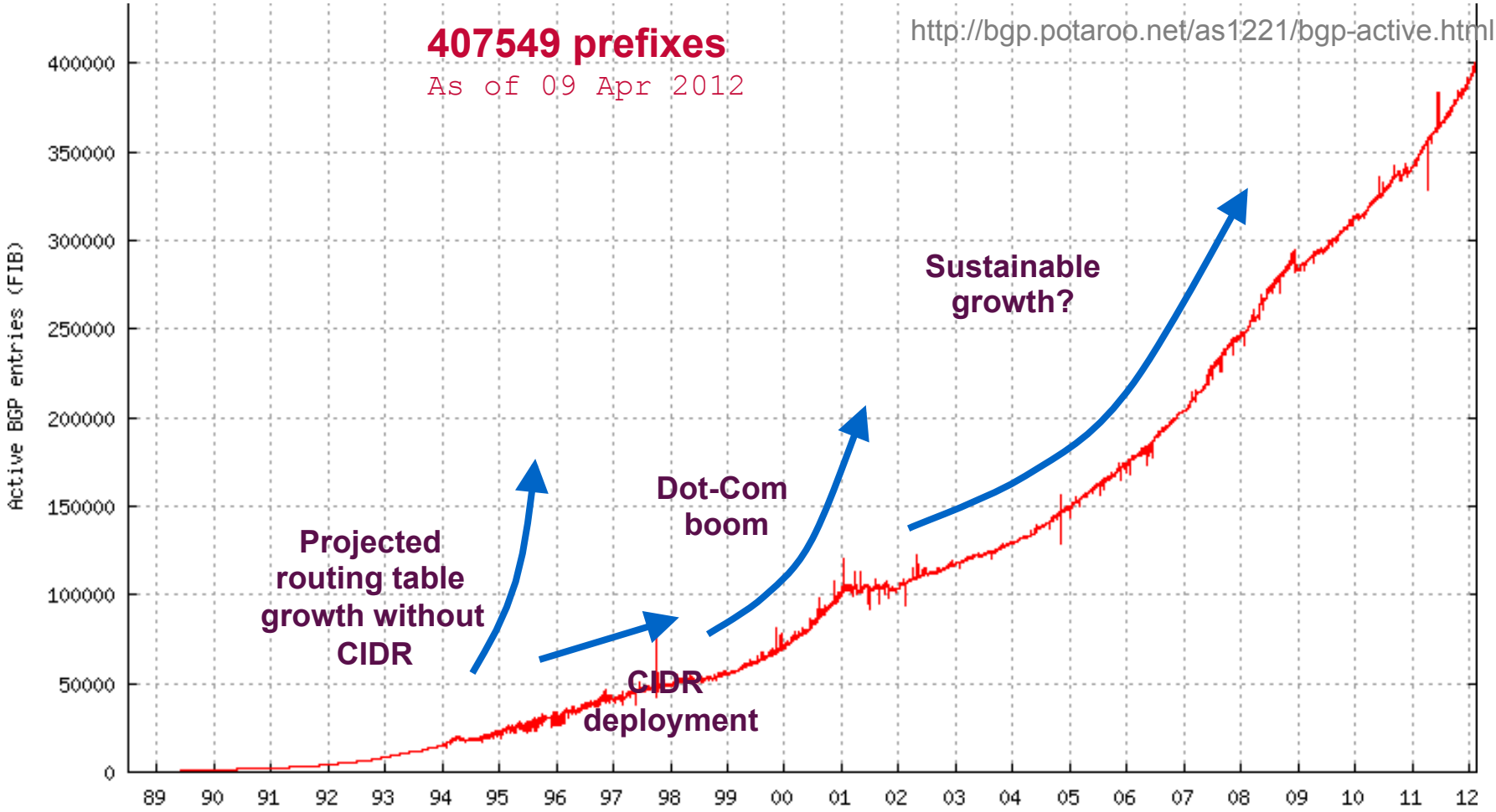
Conservation
- Efficient use of resources
- Based on demonstrated need

Aggregation
- Limit routing table growth
- Support provider-based routing

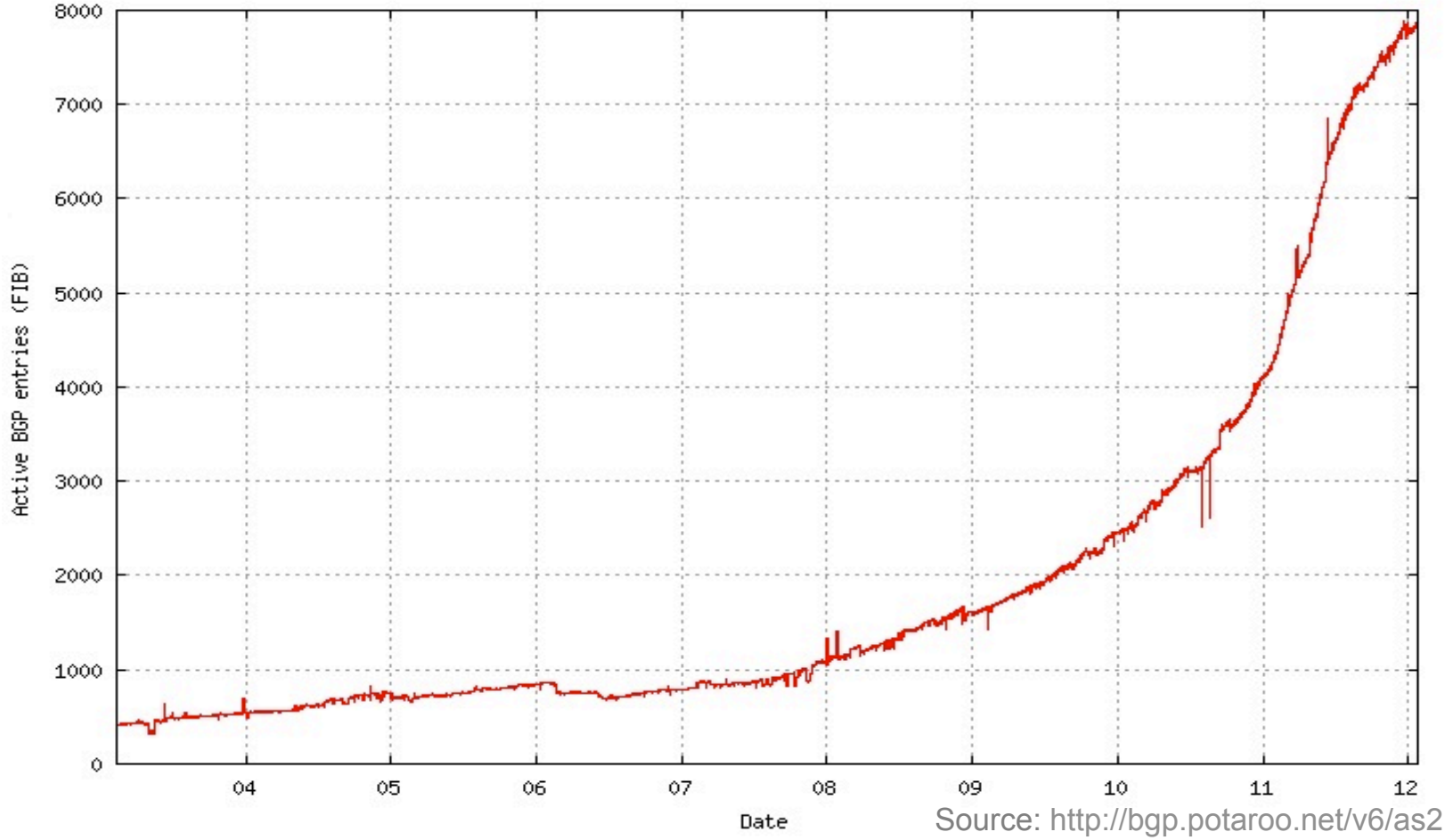
Registration
- Ensure uniqueness
- Facilitate trouble shooting

Uniqueness, fairness and consistency

Growth of the Global Routing Table



Growth of the Global Routing Table – IPv6



Source: http://bgp.potaroo.net/v6/as2.0/

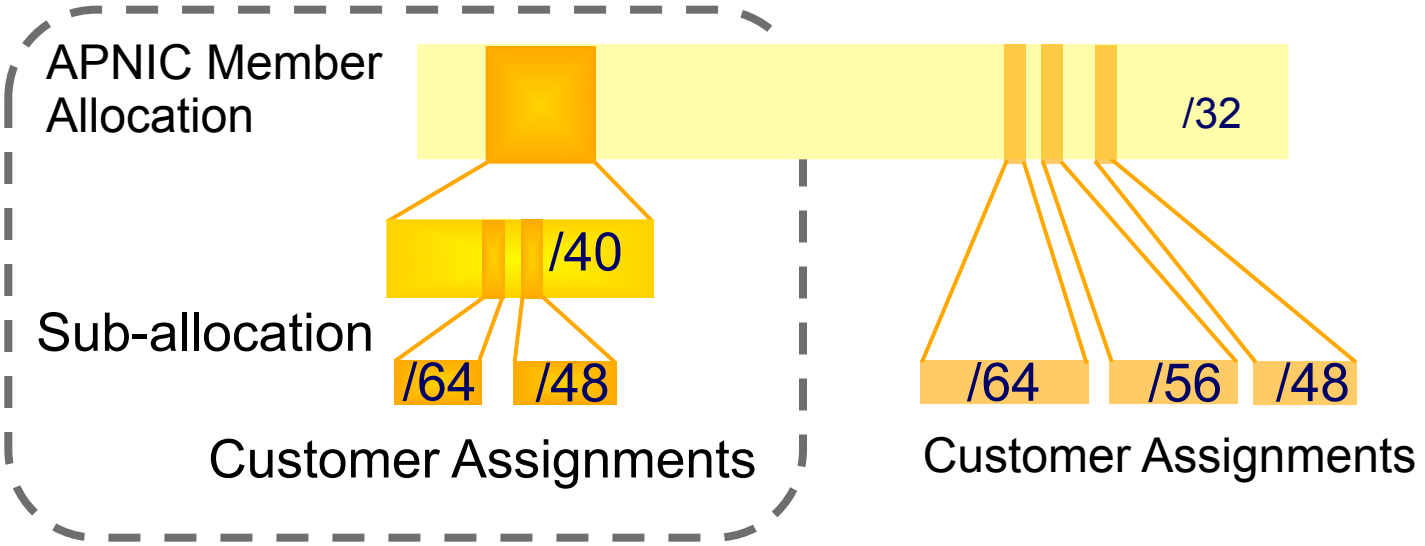
IPv4 Allocation Policies

- Allocations based on demonstrated need
  - Detailed documentation required
- APNIC IPv4 allocation size per account holder
  - Minimum /24
  - Maximum /22
- Aggregation of allocation
  - Provider responsible for aggregation
  - Customer assignments /sub-allocations must be non-portable

IPv6 Allocation Policies

- Initial allocation criteria
  - Minimum of /32 IPv6 block
  - larger than /32 may be justified
- For APNIC members with existing IPv4 space
  - One-click Policy (through MyAPNIC)
- Without existing IPv4 space
  - Must meet initial allocation criteria
- Subsequent allocation
  - Based on HD ratio (0.94)
  - Doubles the allocated address space

IPv6 Sub-allocations



- No specific policy for LIRs to allocate space to subordinate ISPs
- All /48 assignments to end sites must be registered
- Second opinion
  - LIRs do not need to submit second opinion request before making sub-allocations to downstream ISPs
  - Must submit a second opinion request for assignments more than /48

IPv6 Assignment Policy

- Assignment address space size
  - Minimum of /64 (only 1 subnet), Normal maximum of /48, Larger end-site assignment can be justified
- In typical deployments today
  - Several ISPs gives small customers a /56 or a /60 and Single LAN end sites a /64, e.g.,
    - /64 if end-site will ever only be a LAN
    - /60 for small end-sites (e.g. consumer)
    - /56 for medium end-sites (e.g. small business)
    - /48 for large end-sites
- Assignment of multiple /48s to a single end site
  - Documentation must be provided
  - Will be reviewed at the RIR/NIR level
- Assignment to operator's infrastructure
  - /48 per PoP as the service infrastructure of an IPv6 service operator

IPv4 Transfer Policies

- Between APNIC members
  - Minimum transfer size of /24
  - source entity must be the currently registered holder of the IPv4 resources
  - recipient entity will be subject to current APNIC policies
- Inter-RIR IPv4 Transfers
  - Minimum transfer size of /24
  - Conditions on the source and recipient RIR will apply

Mergers, Acquisitions, and Takeovers

- LIR should advise APNIC of any changes in ownership (due to merger, sale or takeover)
- APNIC membership is not transferable
- APNIC will review the status of any allocations held by the new entity.
- Full disclosure of all address space held by all of the entities in question is required

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How Do I Get IP Addresses?

- Decide what kind of number resources you need
  - IPv4, IPv6
- Check your eligibility
  - On the website www.apnic.net
  - Contact the helpdesk helpdesk@apnic.net
- Become familiar with the policies
  - www.apnic.net/policy
- Apply for membership and resources

  - www.apnic.net/member

Requesting an ASN

- Complete the request form
  - Check with peers if they can handle 4 byte ASN
  - Existing members send the request from MyAPNIC
  - New Members can send AS request along with membership application

- Criteria to receive ASN

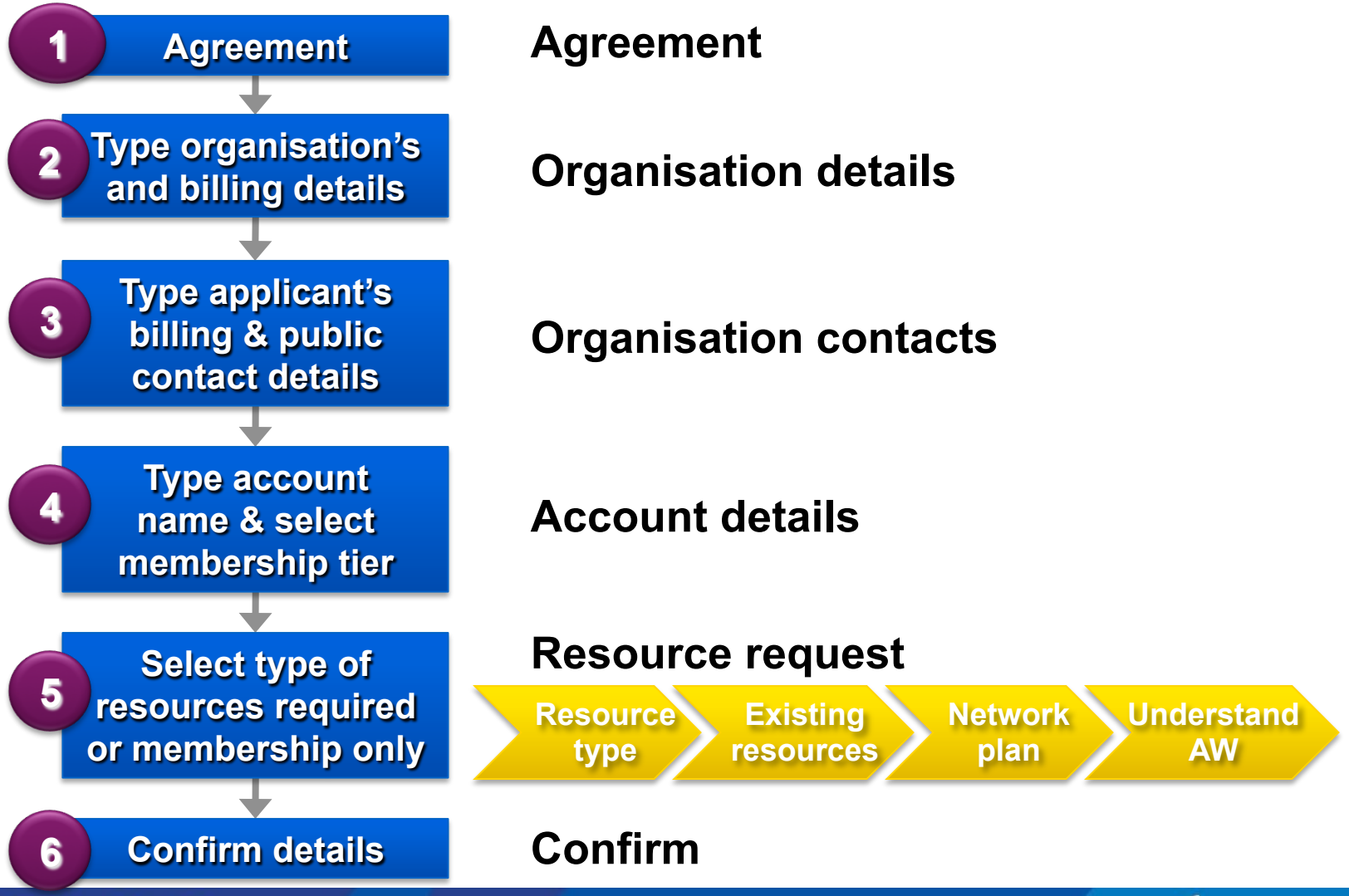
  - Demonstrate your network is multihomed

  - or plan to multihome in the near future

Requesting an ASN contd.

- If a member requests an ASN from APNIC for own network infrastructure
  - AS number is “portable”
- If a member requests an ASN from APNIC for its downstream customer network
  - ASN is “non-portable”
  - ASN is returned if the customer changes provider

Complete the Client First Form



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What is the APNIC Database?

- Public network management database
  - Operated by Internet Registries
    - Public data only (For private data, please see “Privacy of customer assignment” module)
- Tracks network resources
  - IP addresses, ASNs, Reverse Domains, Routing policies
- Records administrative information
  - Contact information (persons/roles)
  - Authorization

Object Types

OBJECT	PURPOSE
person	contact persons
role	contact groups/roles
inetnum	IPv4 addresses
Inet6num	IPv6 addresses
aut-num	Autonomous System number
domain	reverse domains
route	prefixes being announced
mntner	(maintainer) data protection
mnt-irt	Incident Response Team

http://www.apnic.net/db/

Person Object

- Represents a contact person for an organization
  - Every Member must have at least one contact person registered
  - Large organizations often have several contacts for different purposes
- Is referenced in other objects
- Has a nic-hdl
  - Eg. EC17-AP

Person Object

```
whois -h whois.apnic.net Vivek Nigam
% [whois.apnic.net node-1]
% Whois data copyright terms    http://www.apnic.net/db/dbcopyright.html

person:       Vivek Nigam
nic-hdl:      VN61-AP
e-mail:       vivek@apnic.net
address:      6 Cordelia Street
address:      South Brisbane 4101
phone:        +61 7 3858 3180
fax-no:       +61 7 3858 3199
country:      AU
changed:      vivek@apnic.net 20080219
changed:      vivek@apnic.net 20090317
changed:      vivek@apnic.net 20111219
mnt-by:       MAINT-AU-VIVEK
source:       APNIC
```

Maintainers

- WHAT: protects other objects in the APNIC Whois Database
- WHY: Maintainers are used to prevent unauthorized persons from changing the details in whois
- Multiple levels of maintainers exist in a hierarchical manner
  - Maint-by
  - Maint-lower
- Applied to any object created directly below that maintainer object

Database Protection - Maintainer Object

```
mntner:         MAINT-AU-APNICTRAINING
descr:          APNIC Training
country:        AU
admin-c:        AA196-AP
tech-c:         AA196-AP
auth:           MD5-PW $1$FUrnj.4g$sIyzbkZj2XJoDanL/ndXN0
mnt-by:         MAINT-AU-APNICTRAINING
upd-to:         amante@apnic.net
referral-by:    APNIC-HM
changed:        hm-changed@apnic.net 20080424
changed:        hm-changed@apnic.net 20090325
changed:        hm-changed@apnic.net 20090403
changed:        hm-changed@apnic.net 20090702
changed:        hm-changed@apnic.net 20091111
changed:        hm-changed@apnic.net 20091217
changed:        hm-changed@apnic.net 20100528
source:         APNIC
```

Inetnum / Inet6num Objects

- Contains IP allocation and assignment information
- APNIC creates an inetnum (or inet6num) object for each allocation or assignment they make to the Member
- All members must create inetnum (or inet6num) objects for each sub-allocation or assignment they make to customers

Whois – Inet6num Example

```
inet6num:       2001:0DF0:000A::/48
netname:        APNICTRAININGIPv6-20080424
descr:          APNIC Training IPv6 Address
country:        AU
admin-c:        AA196-AP
tech-c:         AA196-AP
status:         ASSIGNED PORTABLE
mnt-by:         MAINT-AU-APNICTRAINING
mnt-routes:     MAINT-AU-APNICTRAINING
remarks:        -+-+-+-+-+-+-+-+-+-+-+-+-++-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
remarks:        This object can only be updated by APNIC hostmasters.
remarks:        To update this object, please contact APNIC
remarks:        hostmasters and include your organisation's account
remarks:        name in the subject line.
remarks:        -+-+-+-+-+-+-+-+-+-+-+-+-++-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
changed:        hm-changed@apnic.net 20080424
source:         APNIC
```

What is MyAPNIC?

- A secure services website that enables Members to manage Internet resources and account interactions with APNIC online
- Uses 128-bit SSL
- https://myapnic.net

Member Services Helpdesk

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

Helpdesk hours

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

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

- More personalised service
  - Range of languages:
    Bahasa Indonesia, Bengali, Cantonese, English, Hindi, Mandarin, Thai, 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

Thank you!

APNIC