

# Internet Resource Management

**Kuala Lumpur, 1<sup>st</sup> March 2010**

In conjunction with  
APRICOT 2010 / APNIC 29

# Introduction

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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.

# Overview

- IRMe
  - **Introduction to APNIC**
  - APNIC policy development process
  - Internet registry policies
  - Requesting IP resources
  - Second opinion request
  - IPv6 Overview
  - APNIC whois database
  - MyAPNIC (Demo)
  - Autonomous System Numbers
  - Reverse DNS
  - APNIC Helpdesk

# 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/29>
  - <http://www.apnic.net/community/participate/join-discussions/sigs>

# 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/lists/>

## Training

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

Schedule:

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

# 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

# Where is the APNIC region?



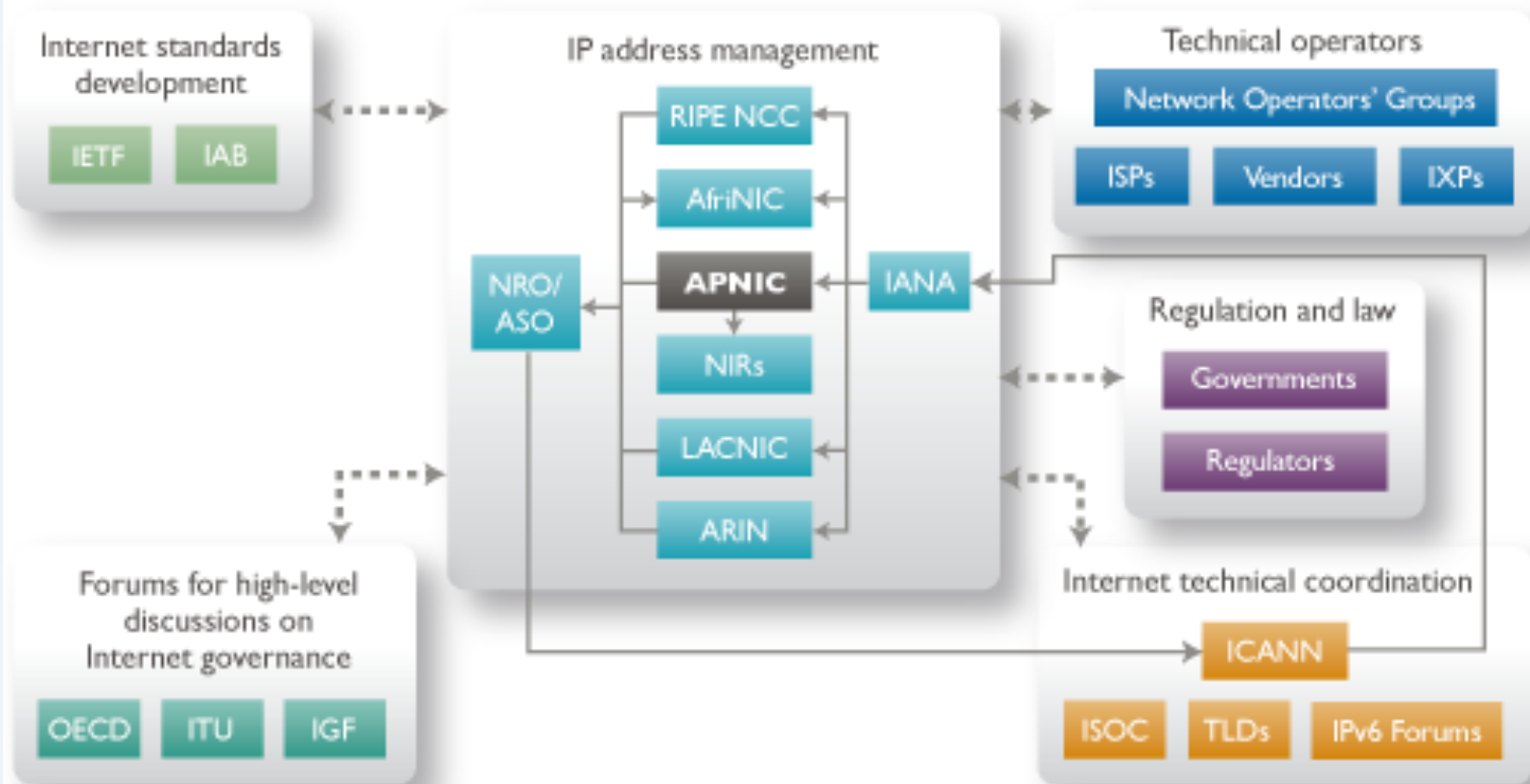


# What Economies are in the APNIC Region?

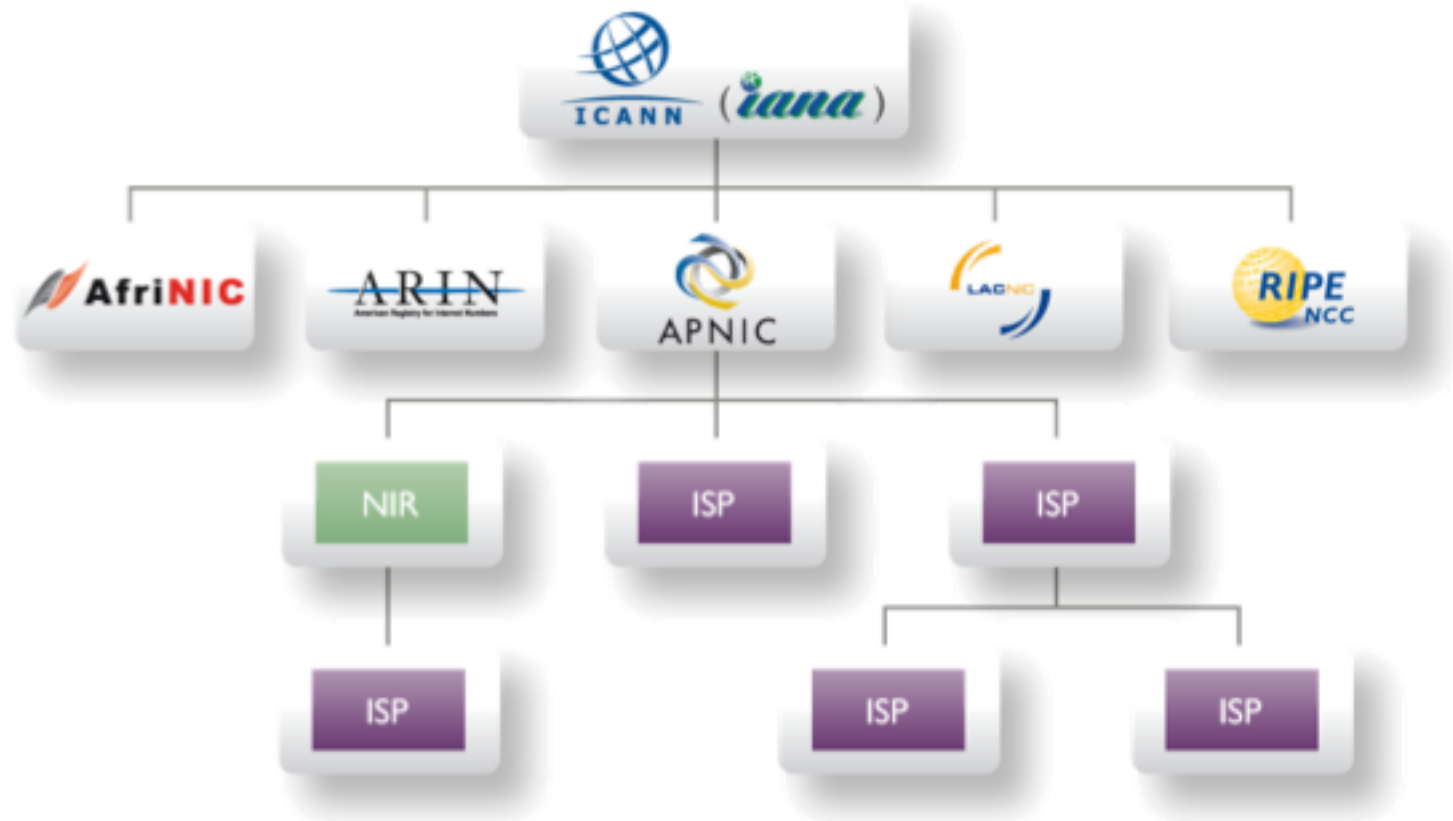


# APNIC from a Global Perspective

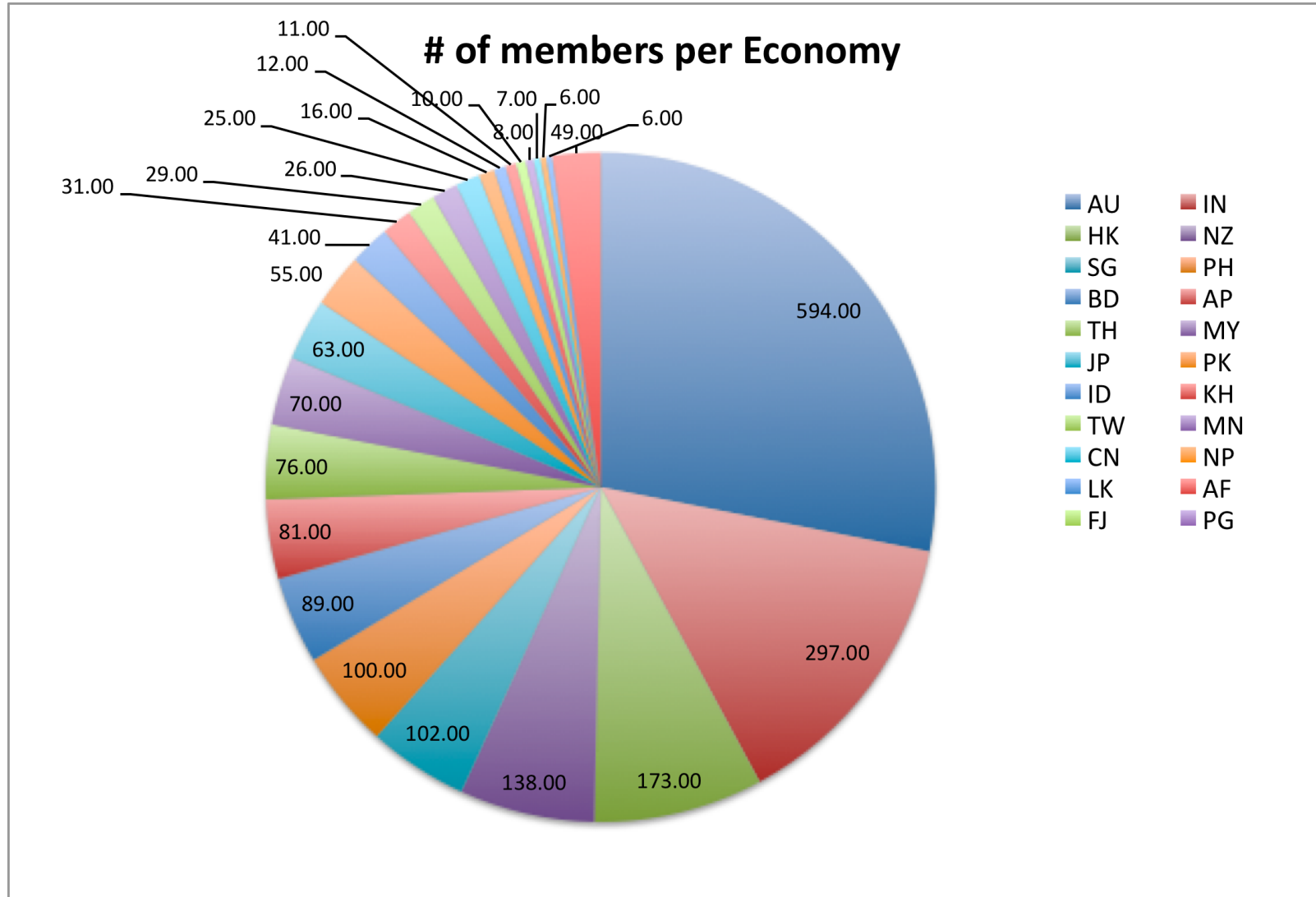
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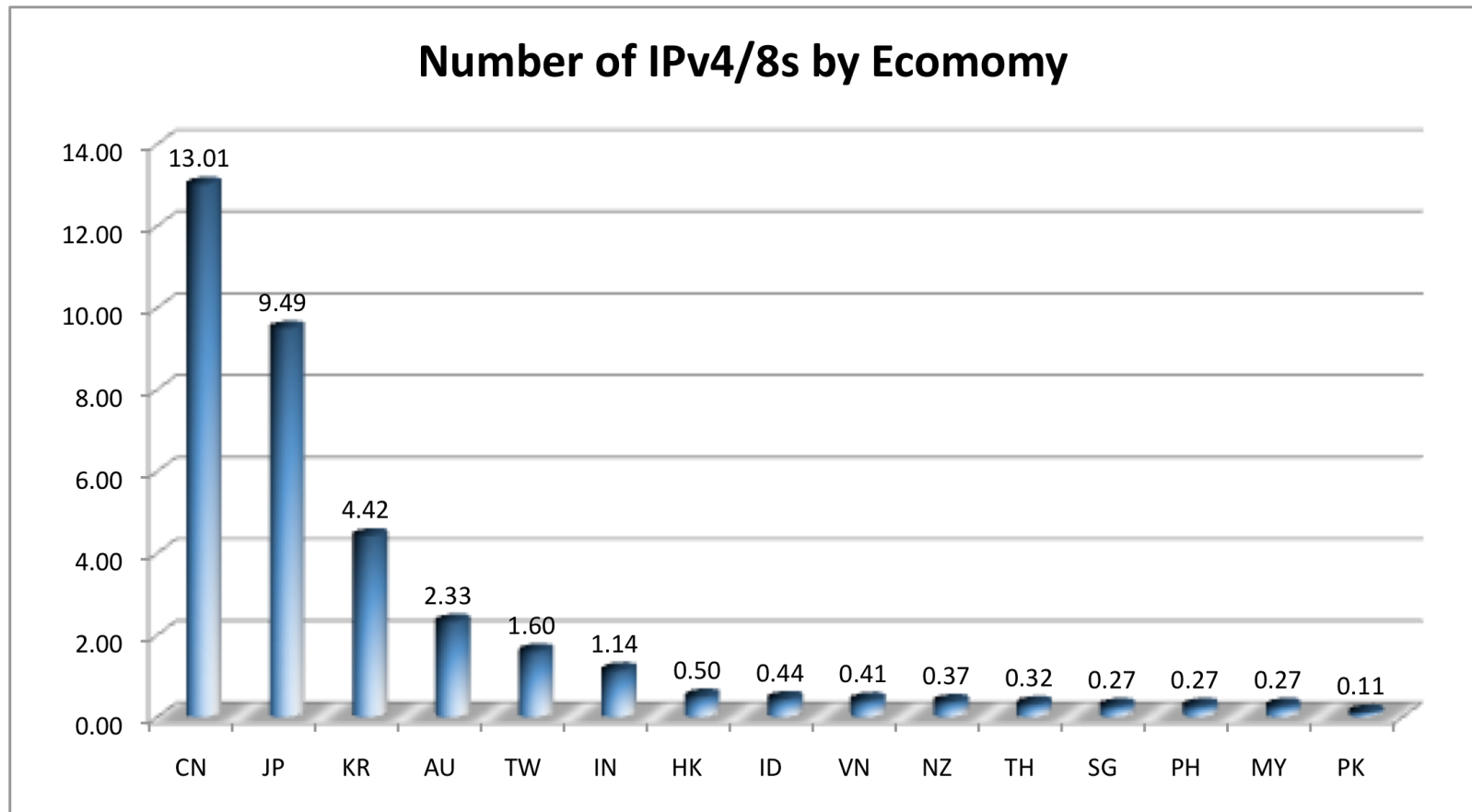
# Internet Registry Structure



# APNIC Membership



# APNIC IPv4 allocations by economy



# 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

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# Questions?



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# What are Internet Number Resources?

- IPv4
- IPv6
- ASN

# Internet Resource Management Objectives

## Conservation

- Efficient use of resources
- Based on demonstrated need

## Aggregation

- Limit routing table growth
- Support provider-based routing

## Registration

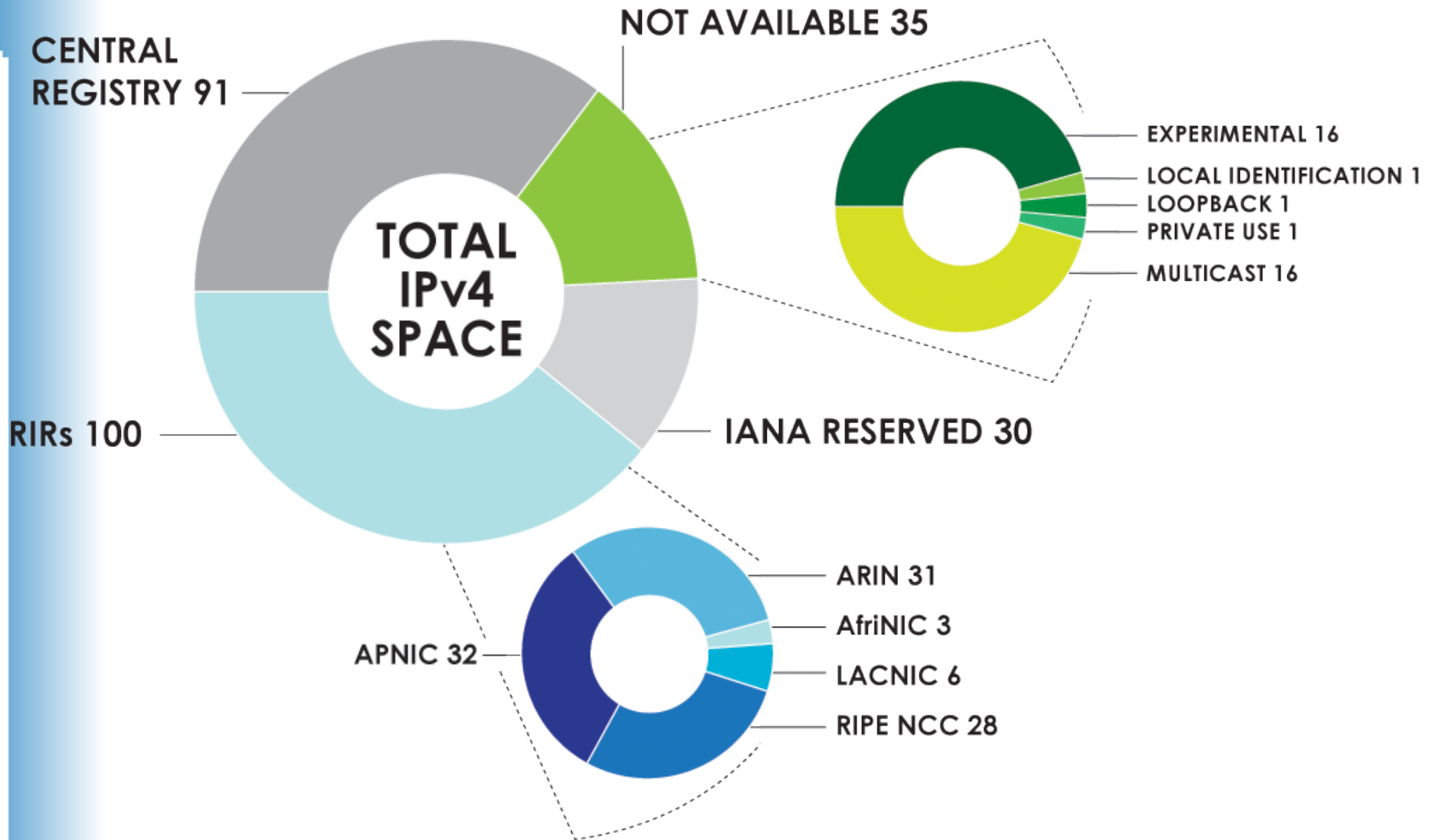
- Ensure uniqueness
- Facilitate trouble shooting

Uniqueness, fairness and consistency

# Why do we Need Policies?

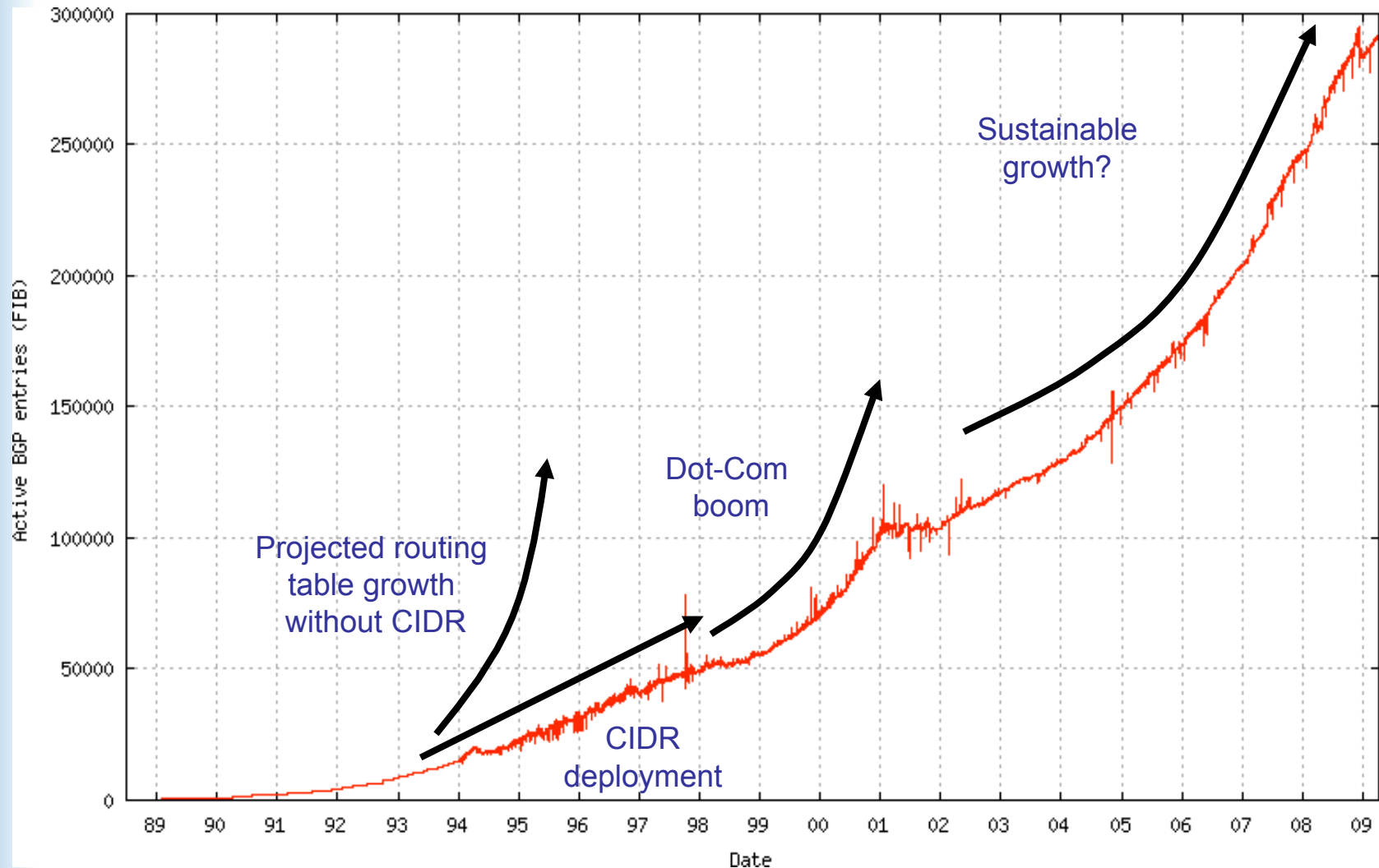
## - Global IPv4 Delegations (in /8)

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Source : Internet Number Resource Report -  
Number Resource Organization (NRO)

# Growth of the Global Routing Table



# Participation in policy development

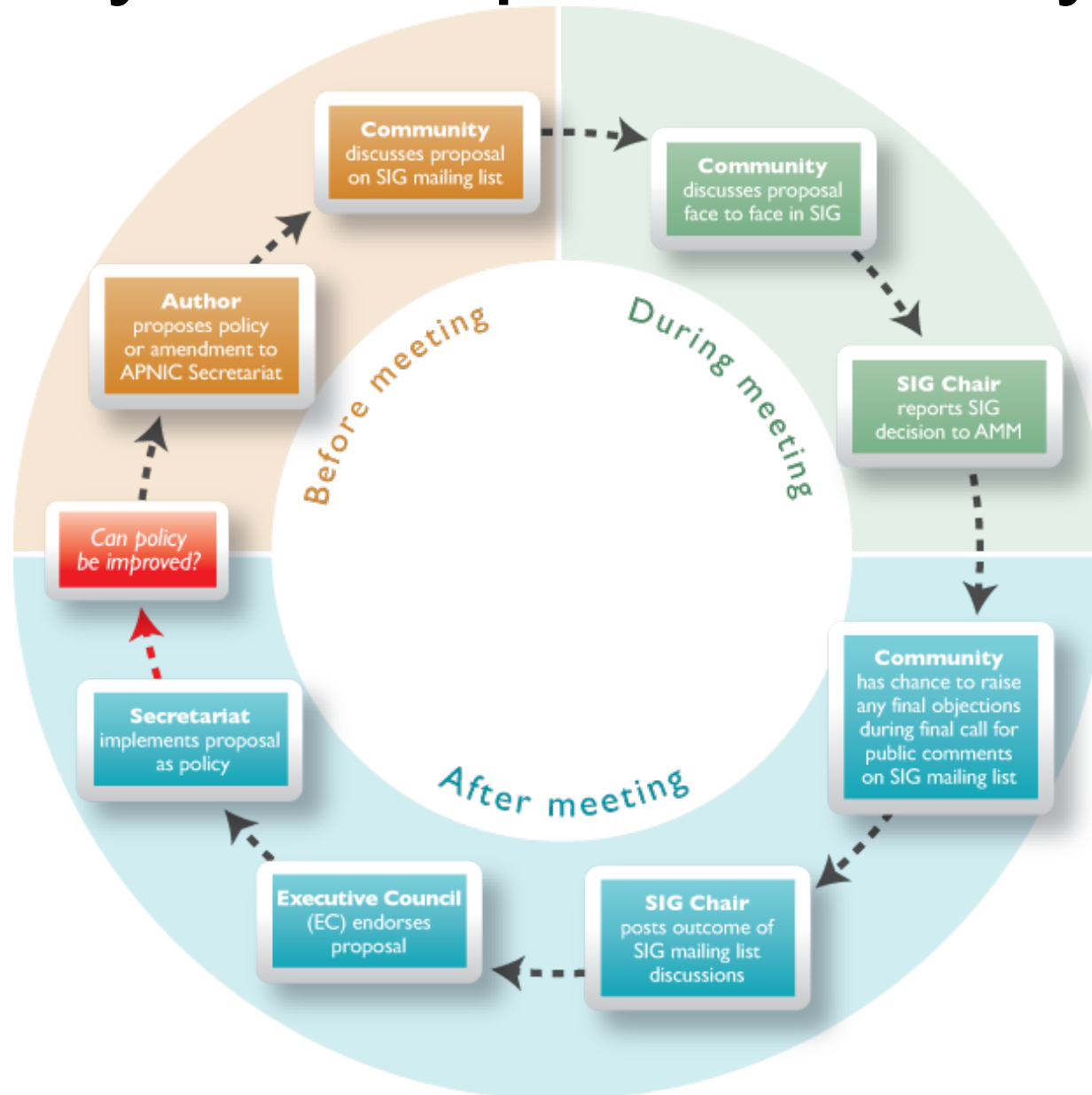
- Why?
  - Responsibility as an APNIC member
    - To be aware of the current policies for managing address space allocated to you
  - Business reasons
    - Policies affect your business operating environment and are constantly changing
    - Ensure your 'needs' are met
  - Educational
    - Learn and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

# Policy Development Process

- Open
  - Anyone can propose policies
  - Everyone can discuss policy proposals
- Transparent
  - APNIC publicly documents all policy discussions and decisions
- Bottom-up
  - The community drives policy development



# Policy development is a cycle





# 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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# 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

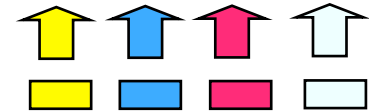
*“A block of address space used to address an operational network”*

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

# Portable & Non-portable

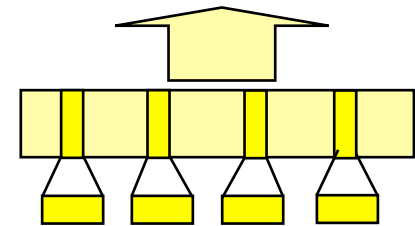
## Portable

- 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

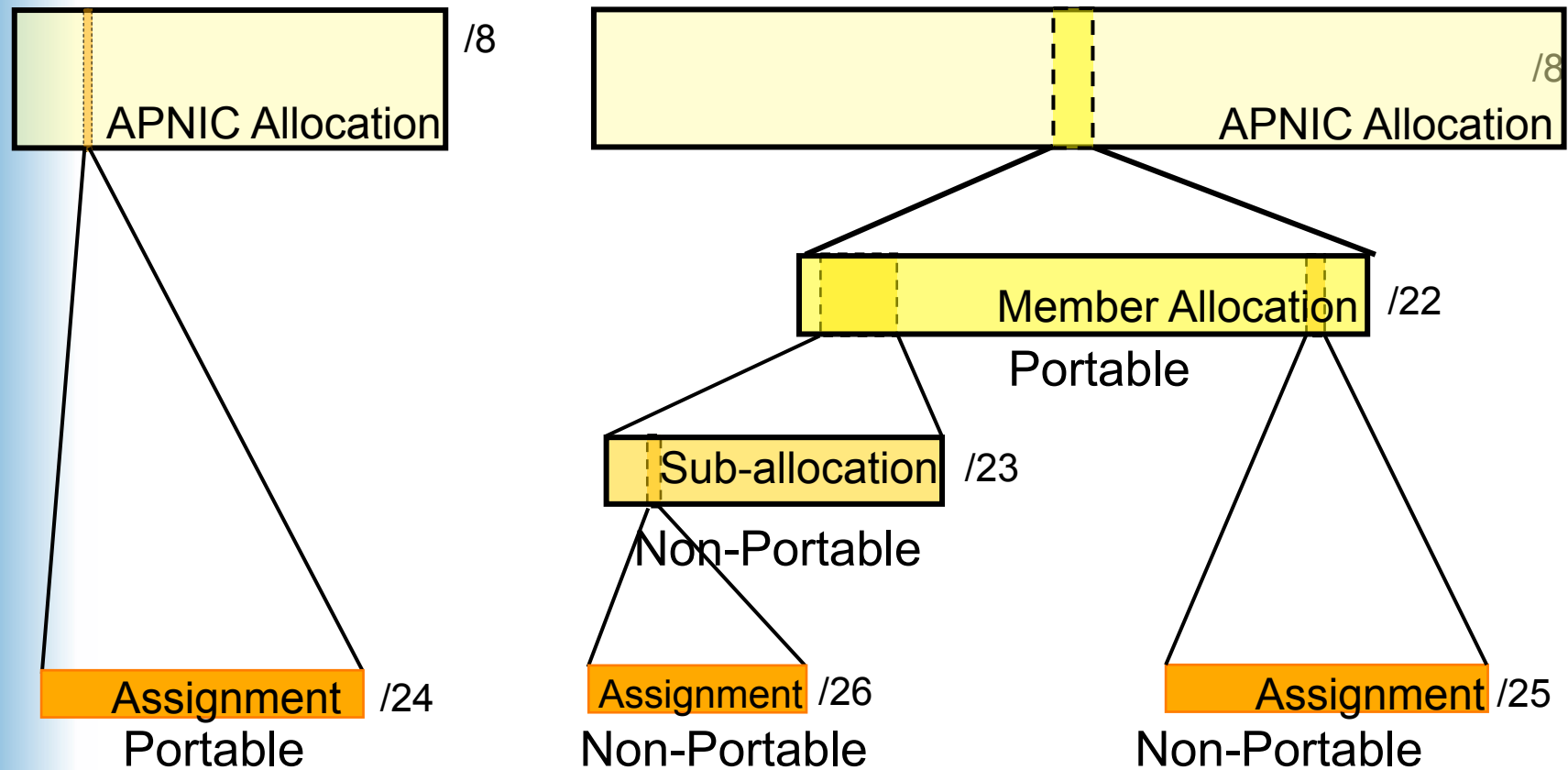


## Non-portable

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



# Address Management Hierarchy



- Describes “portability” of the address space

# Allocation and Assignment

**APNIC**  
*Allocates*  
to APNIC Member



**APNIC Allocation**

**APNIC Member**

*Allocates*  
to downstream

*Assigns*  
to end-user



**Member Allocation**

**Downstream**  
*Assigns*  
to end-user



**Sub-  
Allocation**

**Customer / End User**



**Customer Assignments**

# APNIC Policy Environment

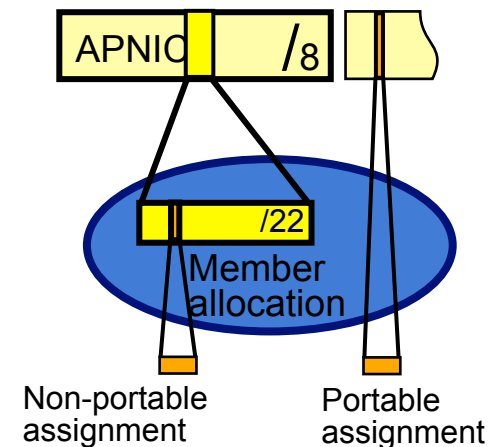
*“Internet number resources are public resources”*

- Assignments & allocations on an annual lease basis
- Distribution of Internet resources are 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



# 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



# 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

# 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

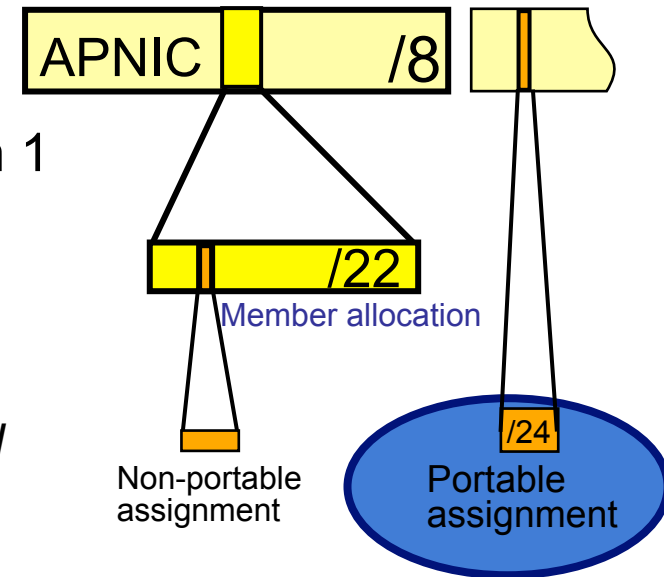
# Portable assignments

- 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: /48 (max of /32)

# 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



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# Requesting IP Resources

# IP Address Request

- You are required to be an APNIC member in order to initiate your IP Address Request.
- However you can apply for membership and an initial address allocation at the same time.
- <http://www.apnic.net/services/become-a-member>

# Resource application requirements

- How do I become a member?
- How many IP addresses do I need?
- Do I need an ASN?

# Applying for Resources

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The screenshot shows the APNIC website interface. At the top, there is a navigation bar with links for Home, Services, Community, Events, Publications, and About APNIC. A search bar is located on the right. Below the navigation bar, there is a banner image showing three people looking at a computer screen displaying a pie chart. The main content area is titled 'Services' and features a section for 'Apply for resources'. This section includes a description of APNIC's role as the Regional Internet Registry for the Asia Pacific region, responsible for distributing and registering numeric Internet address resources. It also provides links for 'Already a member account holder?' and 'Not an account holder?'. A sidebar on the left lists various services provided by APNIC, including 'Apply for resources', 'Check your eligibility', 'Check your ISO 3166 code', 'Become a member', 'Make a payment', 'Manage Internet resources', and 'Helpdesk'. A 'Related links' section on the right includes 'Become a member', 'Corporate Contacts', and 'Obtaining resources - FAQs'. A 'Fees apply' section explains that in addition to the annual membership fee, first-time IP resource applications require a one-off, non-refundable application fee. A note at the bottom right states that certain services are exempt from the initial IP resource application fee, including critical infrastructure assignments, experimental allocations, IXP assignments, and AS numbers.

Your IP: 2001:dc0:a000:4:223:32ff:feca:9668

connect

Contact us | Jobs | Site map

Search

APNIC

Home Services Community Events Publications About APNIC Log in to MyAPNIC

## Services

Print this page

- Services APNIC provides
- Apply for resources
  - Check your eligibility
  - Check your ISO 3166 code
- Become a member
- Make a payment
- Manage Internet resources
- Helpdesk

### Apply for resources

APNIC is the Regional Internet Registry for the Asia Pacific region responsible for distributing and registering numeric Internet address resources; namely, IPv4 and IPv6, AS numbers, and reverse DNS delegations.

#### Already a member account holder?

MyAPNIC is a secure services website that allows you to manage your ongoing Internet resource requests with APNIC online, anytime.

[MyAPNIC](#) | [Manage Internet Resources](#)

#### Not an account holder?

In the process of applying for resources, you will be required to set up an APNIC membership account to become an account holder.

[Apply for resources](#) | [Check your criteria](#)

After you submit your application for resources, you will receive an email with a **tracking number** to confirm your application along with a copy of your application.

#### Need to request resources on behalf of multiple APNIC members?

If you are requesting resources on behalf

### Related links

- Become a member
- Corporate Contacts
- Obtaining resources - FAQs

### Fees apply

In addition to the annual membership fee, first time IP resource applications require a one-off, non-refundable application fee. This fee will only be invoiced to you once your resource request is approved.

**Note:** The following services are exempt from the initial IP resource application fee: *critical infrastructure assignments, experimental allocations, IXP assignments and AS numbers*

# Client First - Agreement

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APNIC membership / Internet number resource application

Agreement

Organisation details

Organisation contacts

Account details

Resource request

Confirm

\* fields are required

## Agreement

Print

[APNIC-079] Standard APNIC Membership Agreement

### Recitals

- 
- A. APNIC Pty Ltd ("the Company") is a non-profit proprietary limited company incorporated under Australian law.
- B. The Company is committed to acting in accordance with the interests and wishes of its membership in pursuing the following objectives:

\* To support APNIC members in fulfilling their

- \*  I agree to the terms and conditions of the Standard APNIC Membership Agreement. I confirm that I am authorised to act on behalf of the organisation entering into this binding agreement.

I agree, that by acting on behalf of the organisation entering into this membership agreement, I also agree to become the Corporate Contact, with the following key duties and responsibilities:

- To represent the Member organisation in all matters related to APNIC;
- To receive APNIC communication material;
- To identify and verify additional contact persons to liaise with APNIC in specific areas.

For further duties and responsibilities, see <http://www.apnic.net/services/manage-resources/corporate-contacts>.

Save

# Organisation Details

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APNIC membership / Internet number resource application

- Agreement
- Organisation details
- Organisation contacts
- Account details
- Resource request
- Confirm

\* fields are required

## Organisation details

Please note that APNIC membership is only available to legal entities or individuals.

Organisation name \*

Organisation address \*

City \*

State / Province / District \*

Postcode

Economy \*

Organisation ABN

URL

## Billing details

Same as above

Postal address for billing \*

City \*

State / Province / District \*

Postcode

Economy \*

Save



# Contact Details

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APNIC membership / Internet number resource application

Agreement

Organisation details

Organisation contacts

Account details

Resource request

Confirm

\* fields are required

## Applicant contact details

First name *	<input type="text"/>	<b>Format:</b> + Country code - Area code - Number  <b>Examples:</b> +61-7-3367 0490 (landline) +61-415 654 321 (mobile)
Last name *	<input type="text"/>	
Email *	<input type="text"/>	
Confirm email *	<input type="text"/>	
Preferred contact number *	<input type="text"/> ?	
Fax	<input type="text"/> ?	

## Billing contact details

	<input type="button" value="Same as above"/>
First name *	<input type="text"/>
Last name *	<input type="text"/>
Email *	<input type="text"/>
Confirm email *	<input type="text"/>
Preferred contact number *	<input type="text"/> ?
Fax	<input type="text"/> ?

## Public contact details

This information will be used to register your resource allocation in the public [APNIC Whois Database](#).

Contact name *	<input type="text" value="APNIC TRAINING TEAM - network administrator"/>
Address *	<input type="text"/>
	<input type="text"/>

# Account Details



Agreement

Organisation details

Organisation contacts

Account details

APNIC membership / Internet number resource application

You should include this name in email subject lines and in all other future correspondence with APNIC.

Please use alphanumeric characters and single dashes (-) only. Account name must not start with a number or end with a dash. Please do not use spaces.

\* fields are required

## Account details

Preferred APNIC account name\*  -AS ?

Examples:

- ✓ SparkNet3
- ✓ Spark-3-Net
- ✗ 3Spark-Net
- ✗ Spark-Net
- ✗ SparkNet-
- ✗ Spark Net

Membership tier\*

- Associate ?
- Very small
- Small
- Medium
- Large
- Very large
- Extra large

### Membership renewal

Your organization must renew its APNIC membership every 12 months. At each renewal APNIC will assess your [membership tier and fee](#) based on the IP address space held under your account. If your holdings exceed the limits of your current tier, you will be upgraded to a higher tier.

Save

# Resources Required

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APNIC

APNIC membership / Internet number resource application

Agreement Organisation details Organisation contacts Account details Resource request Confirm

Resource type Existing resources Network plan (Assignment) Network plan (Allocation) Assignment window AS number

\* fields are required

### Resources required


Select the type of resources you require:

- IP allocation for service providers ?
  - Autonomous System Number (ASN) - select if you also require an AS number ?
- IP assignment for own network use ?
  - Multihoming network (connected to multiple upstreams) ?
  - Internet exchange point (IX/IXP) ?
  - Critical infrastructure ?
  - Autonomous System Number (ASN) - select if you also require an AS number ?
- Autonomous System Number (ASN) only ?

I want to apply for membership only ?

Save

# Existing Resources



APNIC membership / Internet number resource application

Agreement Organisation details Organisation contacts Account details Resource request Confirm

Resource type Existing resources Network plan (Assignment)

\* fields are required

### Existing resources

Note: You are only required to complete this page if you currently have ASN or IP resources.

Please enter all ASNs you currently use.

Please enter any IP address ranges you currently use

Format: 2-byte or 4-byte, separated by commas.

IP address range	Source	Utilisation (0-100%)	Intend to return?
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

What services do you provide with these resources?

Save

# Network Plan

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APNIC membership / Internet number resource application

Agreement Organisation details Organisation contacts Account details Resource request Confirm

Resource type Existing resources Network plan (Assignment)

\* fields are required

### Network plan

Multihoming

Type of IP resource required\*  IPv4  IPv6

Implementation date (DD/MM/YYYY)\*

List of current or future peering contacts\*

ASN	Contact name	Email	Phone
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

By default IPv4 requestors will receive a /24 and IPv6 requestors will receive a /48. If you require more address space please enter supporting information here.

If you want to provide supporting documentation upload it here. Multiple attachments may be uploaded.

Supporting documentation

Supporting documentation N/A

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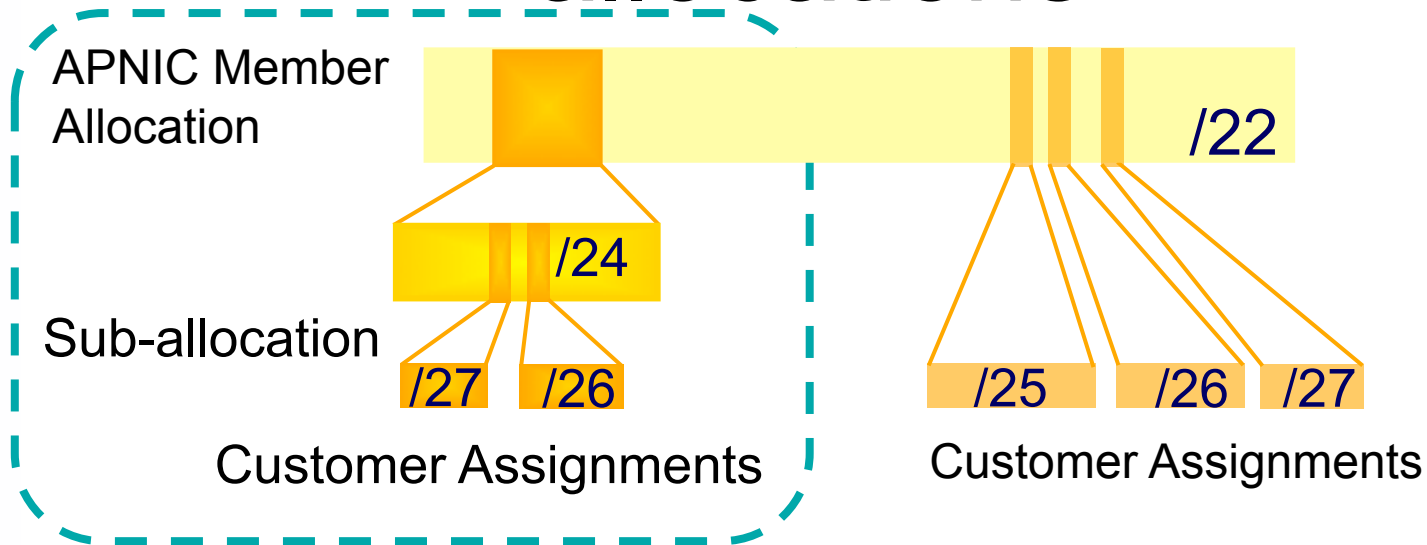
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# Assignments and sub-allocations



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



# What is an Assignment Window?

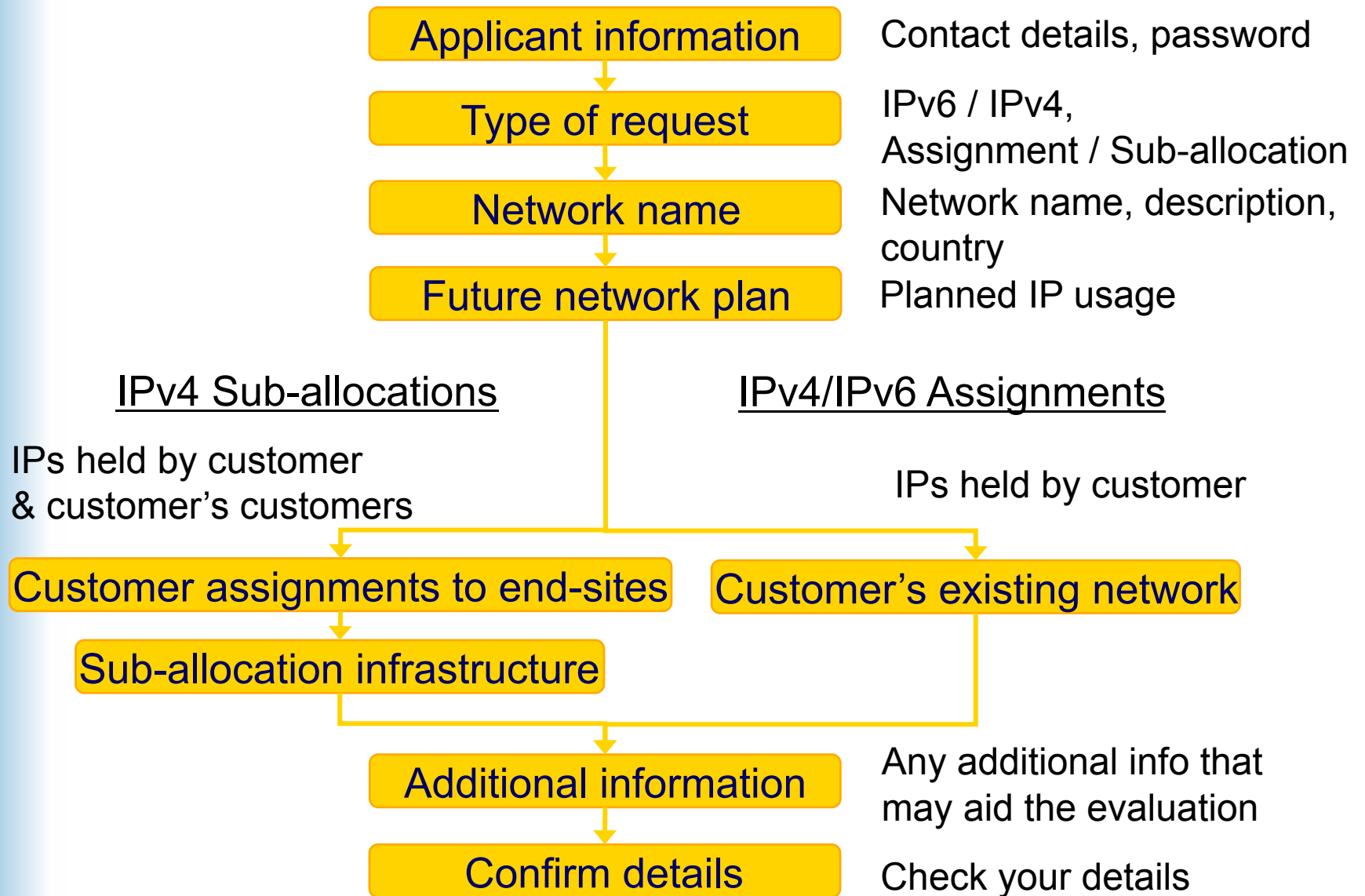
*“The amount of address space a member may assign without a ‘second opinion’”*

- 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 2<sup>nd</sup> Opinion Form



## 2<sup>nd</sup> 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?

# 2<sup>nd</sup> 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

# Questions?



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# Rationale

- Address depletion concerns
  - Squeeze on available addresses space
    - Probably will never run out, but will be harder to obtain
  - End to end connectivity no longer visible
    - Widespread use of NAT
- ➔ IPv6 provides much larger IP address space than IPv4


# Main IPv6 Benefits

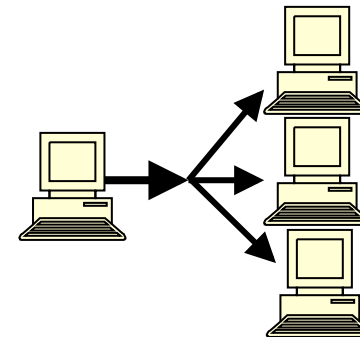
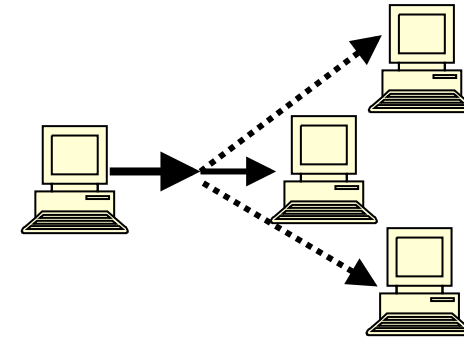
- Expanded addressing capabilities
- Server-less autoconfiguration (“plug-n-play”) and reconfiguration
- More efficient and robust mobility mechanisms
- Built-in, strong IP-layer encryption and authentication
- Streamlined header format and flow identification
- Improved support for options / extensions

# IPv6 Addressing

- 128 bits of address space
- Hexadecimal values of eight 16 bit fields
  - X:X:X:X:X:X:X:X (X=16 bit number, ex: A2FE)
  - 16 bit number is converted to a 4 digit hexadecimal number
- **Example:**
  - FE38:DCE3:124C:C1A2:BA03:6735:EF1C:683D
  - Abbreviated form of address
    - 4EED:0023:0000:0000:0000:036E:1250:2B00
    - 4EED:23:0:0:0:36E:1250:2B00
    - 4EED:23::36E:1250:2B00
    - (Null value can be used only once)

# IPv6 Addressing Model

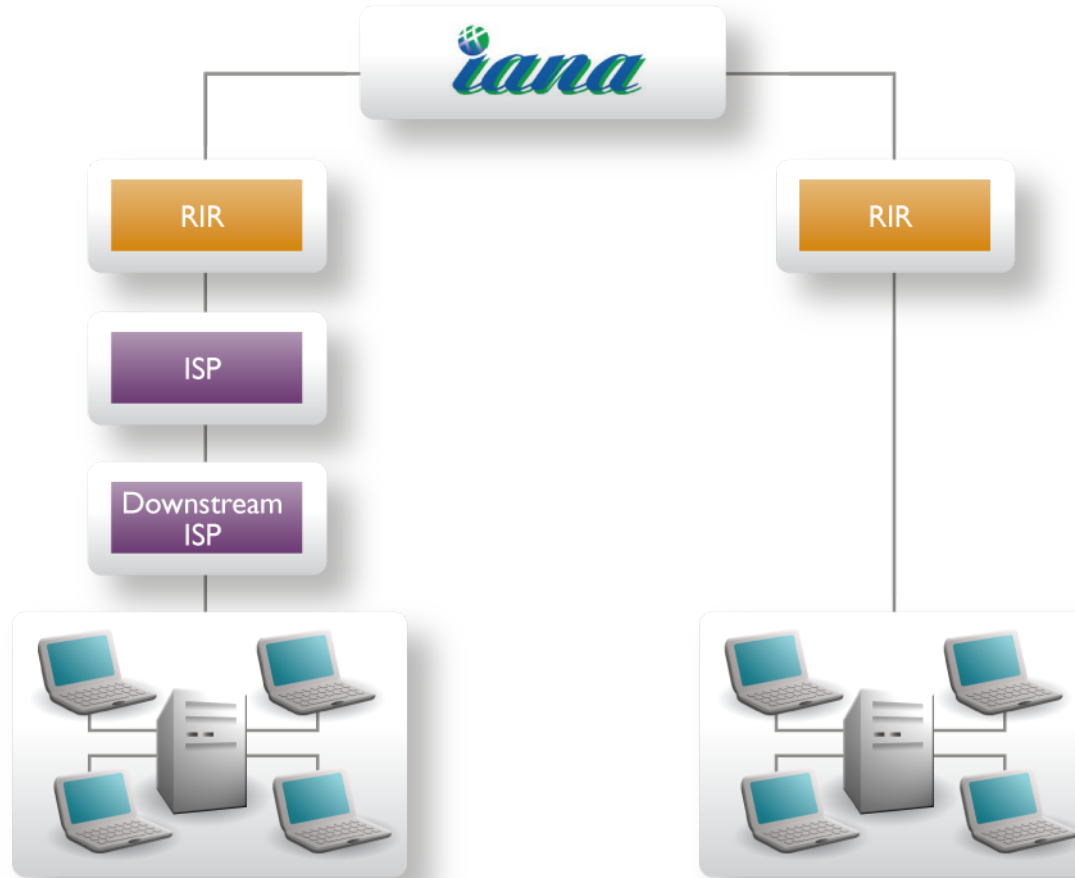
- **IPv6 Address type** 
  - Unicast
    - An identifier for a single interface
  - Anycast
    - An identifier for a set of interfaces
  - Multicast
    - An identifier for a group of nodes





# IPv6 Policies and Procedures

# 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



# Allocation and Assignment Policies for IPv6

- Initial allocation size is /32
  - Default allocation (“slow start”)
- 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](mailto:hostmaster@apnic.net)



Questions:

email: [helpdesk@apnic.net](mailto:helpdesk@apnic.net)

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



# Questions?

# Overview

- IRMe
  - Introduction to APNIC
  - APNIC policy development process
  - Internet registry policies
  - Requesting IP resources
  - Second opinion request
  - IPv6 Overview
  - **APNIC whois database**
  - MyAPNIC (Demo)
  - Autonomous System Numbers
  - Reverse DNS
  - APNIC Helpdesk

# What is the APNIC Database?

- Public network management database
  - Operated by IRs
    - 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)
  - Authorisation

# Whois Database Query - Clients

- Standard whois client
  - Included with many Unix distributions
  - RIPE extended whois client
    - <http://ftp.apnic.net/apnic/dbase/tools/ripe-dbase-client.tar.gz>
- Query via the APNIC website
  - <http://www.apnic.net/apnic-bin/whois2.pl>
- Query clients - MS-Windows etc
  - Many available

# Object Types

## OBJECT

person

role

inetnum

inet6num

aut-num

domain

route

mntner

## PURPOSE

contact persons

contact groups/roles

IPv4 addresses

IPv6 addresses

Autonomous System number

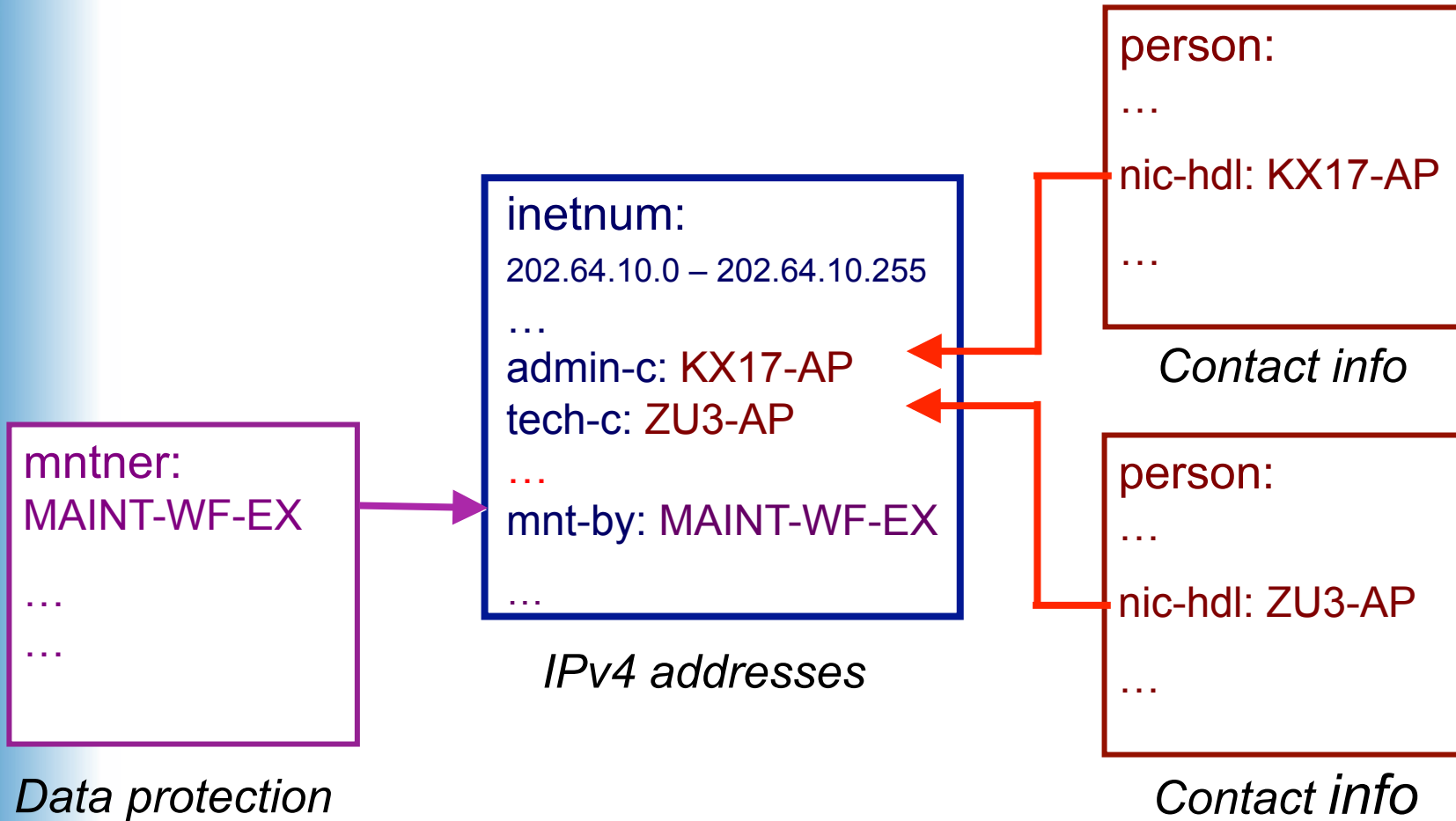
reverse domains

prefixes being announced

(maintainer) data protection

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

# Inter-related Objects



# Database Query – Look-up

## Keys

### OBJECT TYPE

person  
role  
mntner  
inetnum  
domain  
aut-num  
as-macro  
route  
inet6num

### ATTRIBUTES – LOOK-UP KEYS

name, nic-hdl, e-mail  
name, nic-hdl, e-mail  
maintainer name  
network number, name  
domain name  
as number  
as-macro name  
route value  
network number, name

\* Whois supports queries on any of these objects/keys

# Object Templates

To obtain template structure\*, use :

**whois -t <object type>**

```
% whois -h whois.apnic.net -t person
```

```
person: [mandatory] [single] [primary/look-up key]
address: [mandatory] [multiple] [ ]
country: [mandatory] [single] [ ]
phone: [mandatory] [multiple] [ ]
fax-no: [optional] [multiple] [ ]
e-mail: [mandatory] [multiple] [look-up key]
nic-hdl: [mandatory] [single] [primary/look-up key]
remarks: [optional] [multiple] [ ]
notify: [optional] [multiple] [inverse key]
mnt-by: [mandatory] [multiple] [inverse key]
changed: [mandatory] [multiple] [ ]
source: [mandatory] [single] [ ]
```

\*Recognised by the RIPE whois client/server



# Person Object Example

- Person objects contain contact information

Attributes

Values

person:	Ky Xander
address:	ExampleNet Service Provider
address:	2 Pandora St Boxville
address:	Wallis and Futuna Islands
country:	WF
phone:	+680-368-0844
fax-no:	+680-367-1797
e-mail:	kxander@example.com
nic-hdl:	KX17-AP
mnt-by:	MAINT-WF-EX
changed:	kxander@example.com 20020731
source:	APNIC

# What is a nic-hdl?

- Unique identifier for a person
- Represents a person object
  - Referenced in objects for contact details
    - (inetnum, aut-num, domain...)
  - format: <XXXX-AP>
    - Eg: KX17-AP



```
person: Ky Xander
address: ExampleNet Service Provider
address: 2 Pandora St Boxville
address: Wallis and Futuna Islands
country: WF
phone: +680-368-0844
fax-no: +680-367-1797
e-mail: kxander@example.com
nic-hdl: KX17-AP
mnt-by: MAINT-WF-EX
changed: kxander@example.com 20020731
source: APNIC
```

# Creating a Person Object

## Creating objects in Whois:

[http://www.apnic.net/apnic-info/whois\\_search2/using-whois/creating-objects](http://www.apnic.net/apnic-info/whois_search2/using-whois/creating-objects)

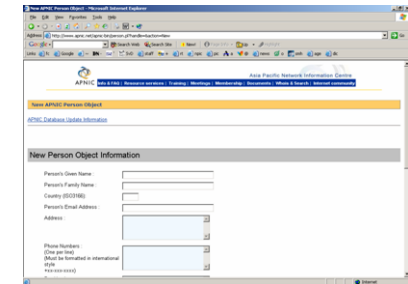
### 1. Fill out person object form on web

- Name, e-mail, phone, address etc
- Tick 'MNT-NEW' for temporary protection

### 2. Completed template is sent to you

### 3. Forward template to **<auto-dbm@apnic.net>**

### 4. Person object created and nic-hdl is generated



The screenshot shows a web browser window displaying the APNIC website. The page title is 'New APNIC Person Object'. Below the title, there is a section for 'APNIC Database Update Information'. The main form is titled 'New Person Object Information' and contains several input fields: 'Person's Given Name', 'Person's Family Name', 'Country (ISO3166)', 'Person's Email Address', 'Address', 'Phone Number', and 'MNT-NEW' (a checkbox). There are also dropdown menus for 'Country' and 'Phone Number'.

# Inetnum Object Example

- Contain IP address allocations / assignments

Attributes

Values

inetnum:	202.51.64.0 - 202.51.95.255
netname:	CCNEP-NP-AP
descr:	Communication & Communicate Nepal Ltd
descr:	VSAT Service Provider, Kathmandu
country:	NP
admin-c:	AS75-AP
tech-c:	AS75-AP
mnt-by:	APNIC-HM
mnt-lower:	MAINT-NP-ARUN
changed:	hostmaster@apnic.net 20010205
status:	ALLOCATED PORTABLE
source:	APNIC

# Whois Database Query - UNIX

```
% whois zulrich@example.com
```

```
% whois zu3-ap
```

```
% whois "zane ulrich"
```

```
person:          Zane Ulrich
address:         ExampleNet Service Provider
address:         2 Pandora St Boxville
address:         Wallis and Futuna Islands
country:         WF
phone:           +680-368-0844
fax-no:          +680-367-1797
e-mail:          zulrich@example.com
nic-hdl:         ZU3-AP
mnt-by:          MAINT-WF-EX
changed:         zulrich@example.com 20020731
source:         APNIC
```

# APNIC Whois Web Query

APNIC 29 Kuala Lumpur 1 - 5 March 2010

The screenshot shows the APNIC website homepage in a Safari browser window. The browser's address bar displays 'http://www.apnic.net/'. The page features a navigation menu with links for Home, Services, Community, Events, Publications, and About APNIC. A 'Log in to MyAPNIC' button is also visible. The main content area includes a banner for 'MyAPNIC' with the text 'Addressing the challenge of responsible internet resource distribution in the Asia Pacific region'. Below the banner are three columns: 'Internet resources' (with links like 'Apply for resources', 'Check your eligibility', 'How much does it cost?', 'Make a payment'), 'Participate' (with links like 'NRO NC Nominations', 'Propose a policy', 'Attend meetings', 'Join discussions', 'Policy development', 'Contribute news'), and 'Get help' (with links like 'IPv6 Program', 'Helpdesk', 'Training & education', 'Network abuse', 'Reverse DNS'). A 'Whois search' box is located on the right side of the page. The footer contains logos for 'ember Member', 'isif asia', 'NRO', 'icons', and 'Relief.Asia', along with copyright information and a 'Powered by MySource Matrix' note.

# APNIC Whois web query

APNIC - Query the APNIC Whois Database

To assist you with debugging problems, this whois query was received from IP Address [203.119.42.131]  
Your web client may be behind a web proxy.

Search for  Search

**IP address lookups**

- I 1st level less specific
- L All less specific
- m 1st level more specific
- M All more specific
- x Exact match only
- d Associated reverse domain

**Miscellaneous queries**


- i Inverse attributes
- T Object types   
as-block  
as-set

**Query hints**

- Include "AS" in front of an AS number.  
Example: AS4808
- Include "-t" (template only) or "-v" (template and description) in front of an object name to view the template  
Example: -t inetnum

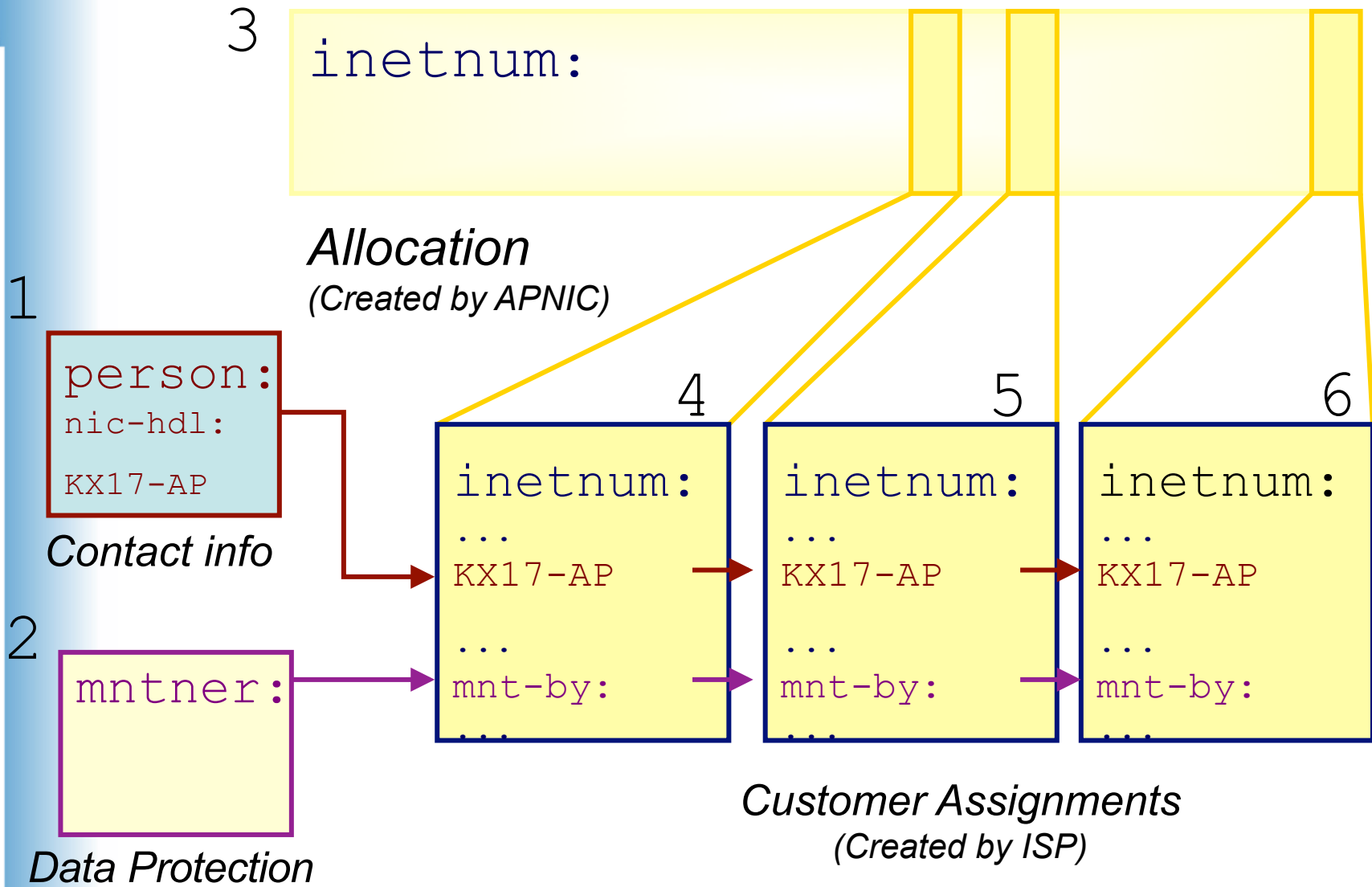
For more information see:

# ISP Registration Responsibilities

1. Create person objects for contacts
  - To provide contact info in other objects
2. Create mntner object
  - To provide protection of objects   
(To be discussed later)
3. Create inetnum objects for all customer address assignments as private data
  - But you may change these to be public data if you wish
  - Allocation object created by APNIC



# Using the db – Step by Step



# Role Object - Example

- Contains contact info for several contacts

Attributes	Values
role:	Xnet IP ADMINISTRATORS
address:	2000 Miller Road North Sydney
country:	AU
phone:	+61-2-93420000
phone:	+61-2-93420000
fax-no:	+61-2-9342-0900
fax-no:	+61-2-9342-6100
e-mail:	<a href="mailto:noc@xnet.net.au">noc@xnet.net.au</a>
admin-c:	XNC2-AP
tech-c:	XNC2-AP
tech-c:	XNB120-AP
nic-hdl:	XND1-AP
mnt-by:	MAINT-XNET-AP
source:	APNIC

# Role Object

- Represents a *group* of contact persons for an organisation
    - Eases administration
    - Can be referenced in other objects instead of the person objects for individuals
  - Also has a nic-hdl
    - Eg. HM20-AP
- <http://www.apnic.net/db/role.html>

# Replacing Contacts in the db

- using person objects

*K. Xander is leaving my organisation. Z. Ulrich is replacing him.*

1. Create a person object for new contact (Z. Ulrich).
2. Find all objects containing old contact (K. Xander).
3. Update all objects, replacing old contact (KX17-AP) with new contact (ZU3-AP).
4. Delete old contact's (KX17-AP) person object.

~~person:  
...  
KX17-AP~~

person:  
...  
ZU3-AP

inetnum:  
202.0.10.0  
...  
ZU3-AP

inetnum:  
202.0.12.127  
...  
ZU3-AP

inetnum:  
202.0.15.192  
...  
ZU3-AP

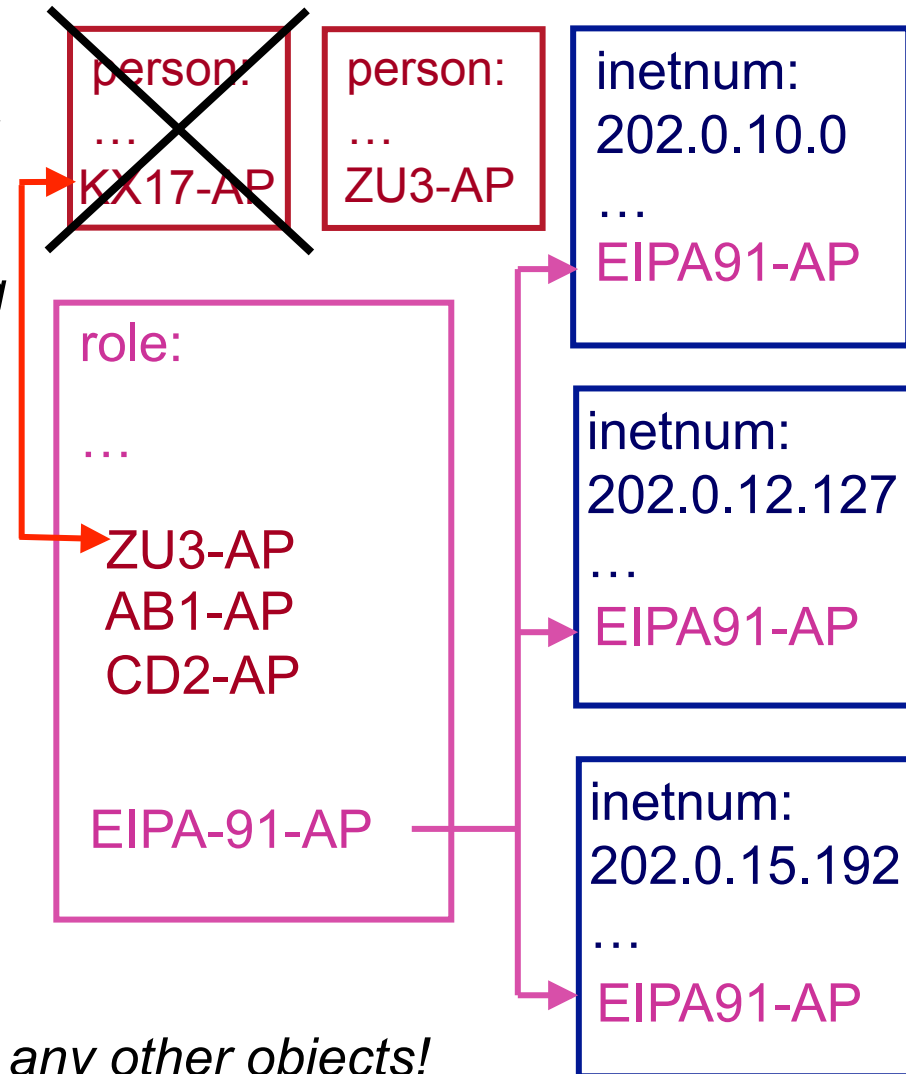
# Replacing Contacts in the db

## – using a role object

*K. Xander is leaving my organisation. Z. Ulrich is replacing him.*

*I am using a role object containing all contact persons, which is referenced in all my objects.*

1. Create a person object for new contact (Z. Ulrich).
2. Replace old contact (KX17-AP) with new contact (ZU3-AP) in role object
3. Delete old contact's person object.



*No need to update any other objects!*

# Database Protection

## - Maintainer Object



```
mntner: MAINT-WF-EX
descr:      Maintainer for ExampleNet Service Provider
country:    WF
admin-c:    ZU3-AP
tech-c:     KX17-AP
upd-to:     kxander@example.com
mnt-nfy:    kxander@example.com
auth:       CRYPT-PW apHJ9zF3o
mnt-by:     MAINT-WF-EX
referral-by: MAINT-APNIC-AP
changed:    kxander@example.com 20020731
source:     APNIC
```

- protects other objects in the APNIC database

# Creating a Maintainer Object



1. Fill out webform
  - Provide:
    - Admin-c & tech-c
    - password
    - email address etc
2. Completed form will be sent to you
3. Forward request to [maint-request@apnic.net](mailto:maint-request@apnic.net)
4. Maintainer will be created *manually*
  - Manual verification by APNIC Hostmasters
5. Update your person object with mntner

[http://www.apnic.net/services/whois\\_guide.html](http://www.apnic.net/services/whois_guide.html)

# Database Protection



- Authorisation
  - “mnt-by” references a mntner object
    - Can be found in all database objects
    - “mnt-by” should be used with every object!
- Authentication
  - Updates to an object must pass the authentication rule specified by its maintainer object



# Authorisation Mechanism

```
inetnum:      202.137.181.0 – 202.137.185.255
netname:      EXAMPLENET-WF
descr:        ExampleNet Service Provider
.....
mnt-by:       MAINT-WF-EX
```

```
mntner: MAINT-WF-EX
descr:        Maintainer for ExampleNet Service Provider
country:      WF
admin-c:      ZU3-AP
tech-c:       KX17-AP
upd-to:       kxander@example.com
mnt-nfy:      kxander@example.com
auth:         CRYPT-PW apHJ9zF3o
mnt-by:       MAINT-WF-EX
changed:      kxander@example.com 20020731
source:       APNIC
```

# Authentication Methods



- 'auth' attribute
  - Crypt-PW
    - Crypt (Unix) password encryption
    - Use web page to create your maintainer
  - PGP – GNUPG
    - Strong authentication
    - Requires PGP keys
  - MD5
    - Available

# Mnt-by & Mnt-lower

- 'mnt-by' attribute
  - Can be used to protect any object
  - Changes to protected object must satisfy authentication rules of 'mntner' object.
- 'mnt-lower' attribute
  - Also references mntner object
  - Hierarchical authorisation for inetnum & domain objects
  - The creation of child objects must satisfy this mntner
  - Protects against unauthorised updates to an allocated range - highly recommended!

# Authentication / Authorisation

## – APNIC allocation to member


- Created and maintained by APNIC

```
Inetnum:      203.146.96.0 - 203.146.127.255
netname:      LOXINFO-TH
descr:        Loxley Information Company Ltd.
Descr:        304 Suapah Rd, Promprab, Bangkok
country:      TH
admin-c:      KS32-AP
tech-c:       CT2-AP
mnt-by:       APNIC-HM
mnt-lower:    LOXINFO-IS
changed:      hostmaster@apnic.net 19990714
source:       APNIC
```

1. Only APNIC can change this object
2. Only LOXINFO-TH can create assignments within this allocation

# Authentication / Authorisation

- Member assignment to customer
  - Created and maintained by APNIC member



```
Inetnum:      203.146.113.64 - 203.146.113.127
netname:     SCC-TH
descr:       Sukhothai Commercial College
Country:     TH
admin-c:     SI10-AP
tech-c:      VP5-AP
mnt-by:      LOXINFO-IS
changed:     voraluck@loxinfo.co.th 19990930
source:      APNIC
```

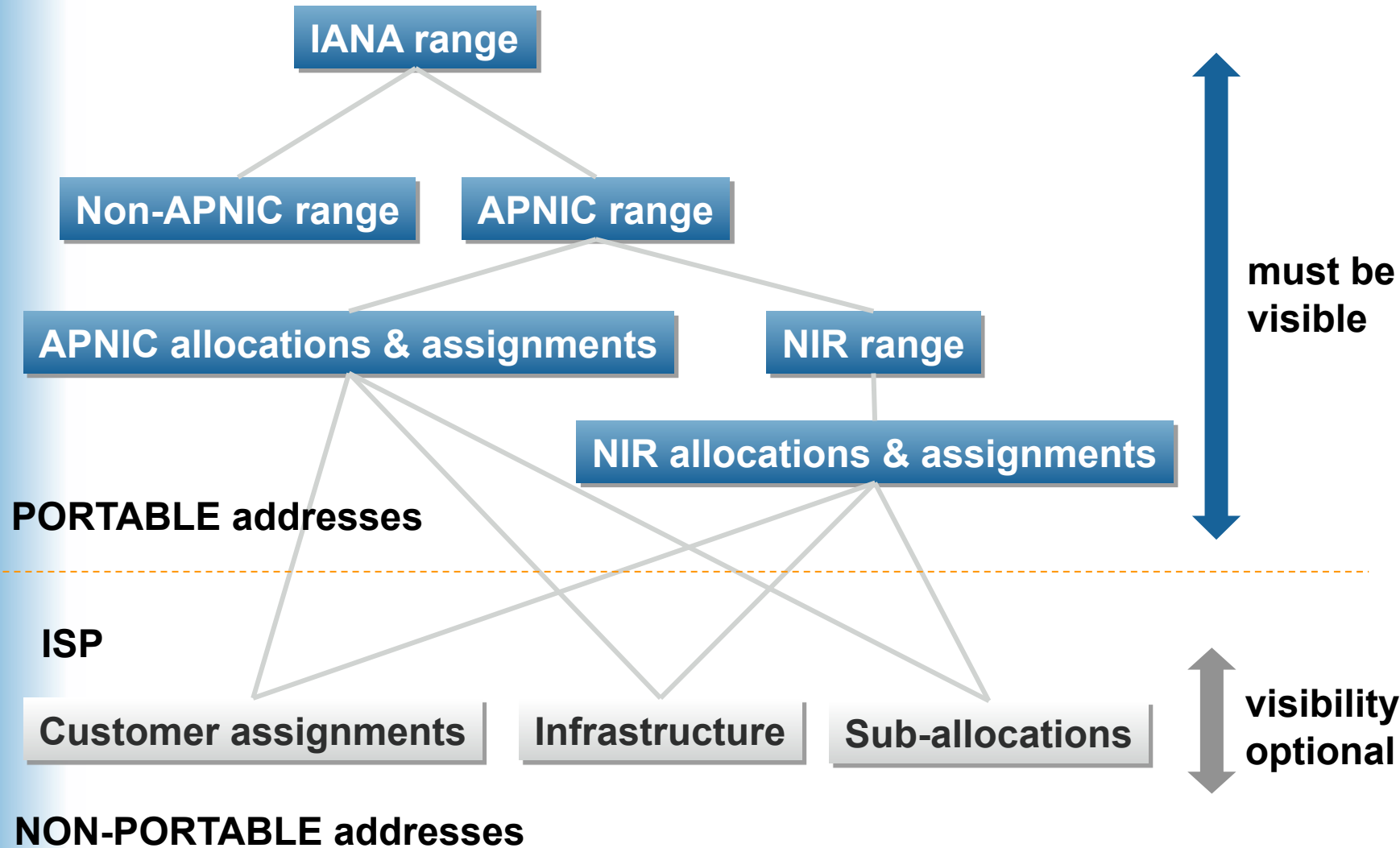
Only LOXINFO-IS can change this object

# Privacy of Customer Assignments

# Customer Privacy

- Privacy issues
  - Concerns about publication of customer information
  - Increasing government concern
- APNIC legal risk
  - Legal responsibility for accuracy and advice
  - Damages incurred by maintaining inaccurate personal data
- Customer data is hard to maintain
  - APNIC has no direct control over accuracy of data
- Customer assignment registration is still mandatory

# What Needs to be Visible?





# Questions?

# Overview

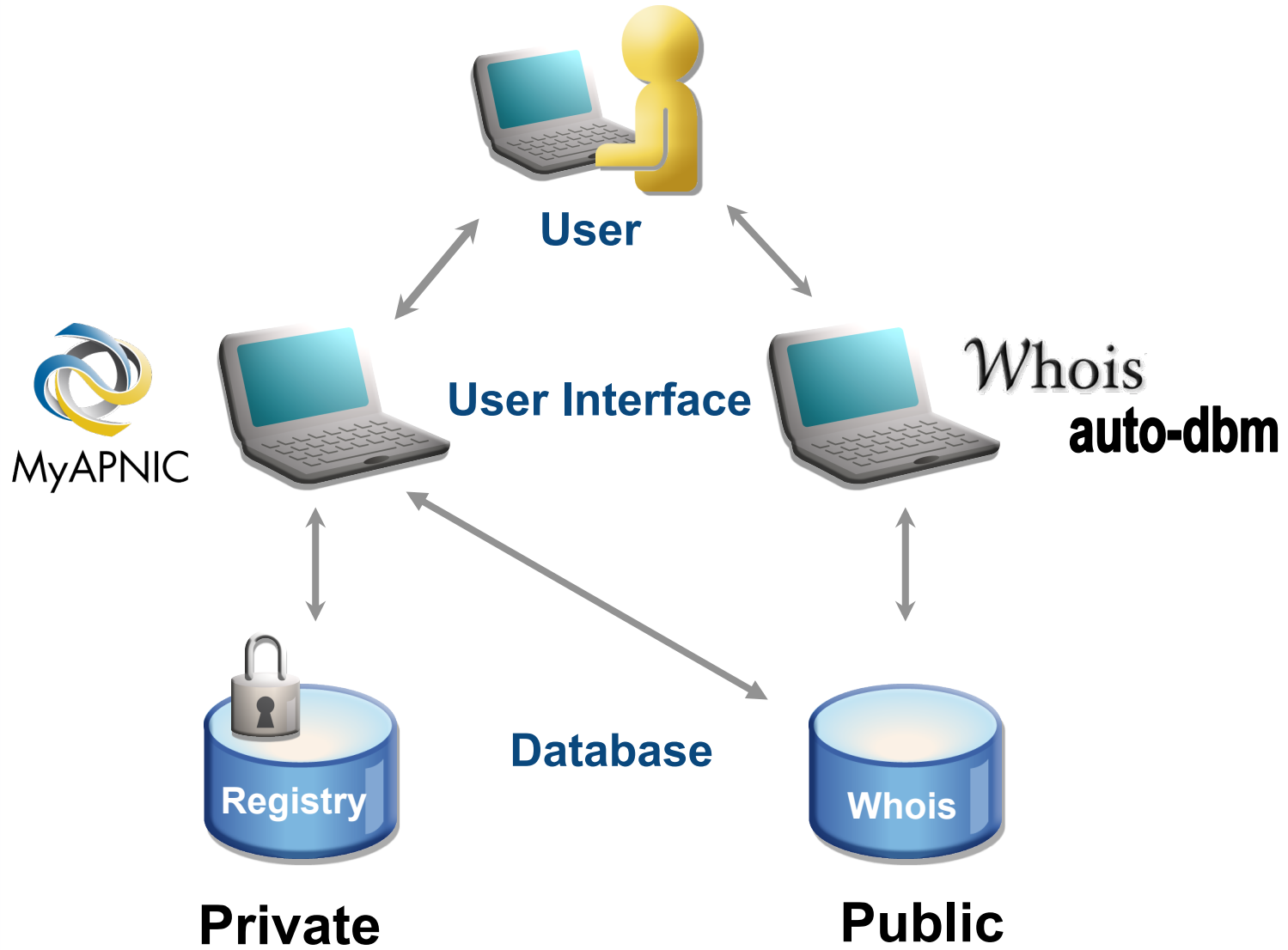
- IRMe
  - Introduction to APNIC
  - APNIC policy development process
  - Internet registry policies
  - Requesting IP resources
  - Second opinion request
  - IPv6 Overview
  - APNIC whois database
  - **MyAPNIC (Demo)**
  - Autonomous System Numbers
  - Reverse DNS
  - APNIC Helpdesk

# MyAPNIC

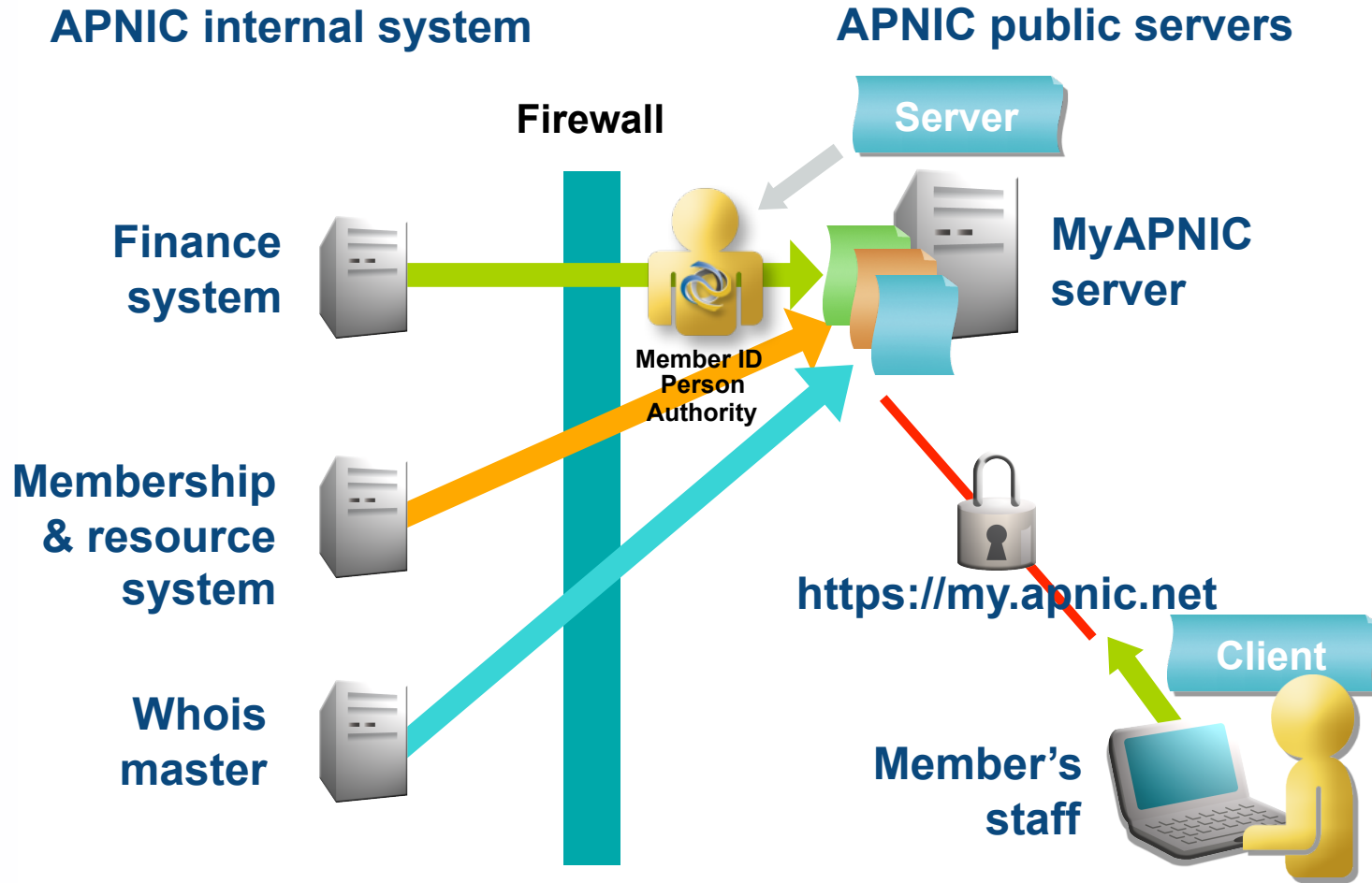


A day-to-day tool to manage your  
APNIC account and resources

# Database Tools



# How it Works



# Accessing My APNIC

- Two options
  - Digital Certificate (Corporate Contact)
  - Username & Password (limited access to My APNIC)

# MyAPNIC Functions

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

# MyAPNIC registration



Login Register

MyAPNIC / Register

## Registration

### Your details

Username	* <input type="text" value="vivek"/>	<a href="#">Help</a>
Password (at least 8 characters)	* <input type="password" value="....."/>	<a href="#">Help</a>
Confirm password	* <input type="password" value="....."/>	<a href="#">Help</a>
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"/>	<a href="#">Help</a>

Register



# MyAPNIC Registration



[Login](#)

[Register](#)

[MyAPNIC / Register](#)

## Registration

### Your registration

#### Success

You have successfully registered for MYAPNIC-TEST-AP.

Your token number is WeVOQjLLH1

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

- Tom H
- George K

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 [MYAPNIC-TEST-AP] | [Contacts and Users](#) | [My Profile](#) | [Log out](#)



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

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

Home / Administration / Registrations

## Registrations

### Pending registration requests

Date (UTC)	Username	Email address	Token	Approve registration	Reject registration
2009-07-17 06:10:31	test001	vivek@apnic.net	<input type="text"/>	<input type="button" value="Approve"/>	<input type="button" value="Reject"/>
2009-07-03 07:32:26	witatestagain	witalaksono@yahoo.com	<input type="text"/>	<input type="button" value="Approve"/>	<input type="button" value="Reject"/>
2009-06-17 04:54:15	dummy123	vivek@apnic.net	<input type="text"/>	<input type="button" value="Approve"/>	<input type="button" value="Reject"/>
2009-06-09 01:45:58	testinguser	hdtest01@gmail.com	<input type="text"/>	<input type="button" value="Approve"/>	<input type="button" value="Reject"/>
2009-05-21 07:54:21	vivek12345678	vnigam@hotmail.com	<input type="text"/>	<input type="button" value="Approve"/>	<input type="button" value="Reject"/>
2009-05-21 07:53:48	Vivtesting	vnigam@hotmail.com	<input type="text"/>	<input type="button" value="Approve"/>	<input type="button" value="Reject"/>



# Digital certificates

- Privileges of Digital Certificate
- Approve new users
- Add or remove contacts
- Update organization details
- Online voting

# 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](#)

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

# 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 / Edit member details

## Edit member details

**Edit**

Account: APNICTRAINING-AU

Organization: APNIC TRAINING UNIT

**Office address**

Address: LEVEL 1, 33 PARK RD

City: Milton

State/province: QLD

Country/economy: AUSTRALIA

Post code: 4074

Telephone: +61-7-38583100

Fax: +61-7-38583199

**Billing address**

Attention: Amante Alvaran / Champika Wijayatunga / Cec

Address: [Same details as above](#) LEVEL 1, 33 PARK RD

# Update contact details

The screenshot shows the MyAPNIC Administration interface. At the top, the user is identified as George [MYAPNIC-TEST-AP] with links for Contacts and Users, My Profile, and Log out. A notification states: "You are currently masquerading from user vivek to user georgetest." The navigation menu includes Home, Resources, Administration (highlighted), Training, and Tools. Under Administration, there are links for Member details, Contact details (highlighted with a red box), Registration list, Billing history, and Correspondence. The breadcrumb trail is Home / Administration / Contact and user management. The main heading is "Contact and MyAPNIC user management" with a sub-heading "Registered member contacts". A table lists registered member contacts with columns for Full name, Email (red == invalid), Job title, MyAPNIC username, Corporate, Hostmaster, Billing, Technical, Training, and a Delete button. Below the table is a form to "Add new contact person" with input fields for name, email, and job title, and a set of checkboxes for contact types (Corporate, Hostmaster, Billing, Technical, Training) and an "Add" button. Two red callout boxes with arrows point to the "Add" button and the checkboxes, containing the text "Add new contacts for your APNIC account" and "Select contact type" respectively.

George [MYAPNIC-TEST-AP] | [Contacts and Users](#) | [My Profile](#) | [Log out](#)

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

**Home** Resources Administration Training Tools

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

Home / Administration / Contact and user management

## Contact and MyAPNIC user management

### Registered member contacts

[Add new contact](#)

Full name	Email (red == invalid)	Job title	MyAPNIC username	Corporate	Hostmaster	Billing	Technical	Training	
George Kuo	george@apnic.net			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Delete
Wita test	wiaksono@gmail.com			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Delete
Tom H	tomh@apnic.net		[+] tomtest	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Delete
George K	hdtest01@gmail.com		[+] georgetest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Delete
vivek nigam	vivek@apnic.net			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Delete
Vivek Nigam	vnigam@hotmail.com			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Delete

[Add new contact person](#)

Add

**Add new contacts for your APNIC account**

**Select contact type**

# Manage Internet Resources

APNIC 29 Kuala Lumpur 1 - 5 March 2010



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



Home **Resources** Administration Training Tools  
IPv4 IPv6 ASN Whois updates Maintainers Correspondence

Home / Resource management

## Resource management

### Internet resources

Use MyAPNIC to view and update your information about the following Internet resources:

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

### Resource request forms

Request more:

- [IPv4 addresses](#)
- [IPv6 addresses](#)
- [AS numbers](#)

# 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%	■	update	<input type="checkbox"/>	<input type="checkbox"/>

Select All Select All

Download as .ZIP

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

© APNIC | Feedback



# IPv6 Resources

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

MyAPNIC

Home Resources Administration Training Tools

IPv4 IPv6 ASN Whois updates Maintainers Correspondence

Home / Resource management / IPv6

## IPv6 resources

[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	<span style="color: red;">■</span>	<input type="checkbox"/>

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

The screenshot shows the MyAPNIC website interface. At the top left is the MyAPNIC logo. At the top right, the user is logged in as 'Vivek [APNICTRAINING-AU]' with links for 'My Profile' and 'Log out'. A navigation menu includes 'Home', 'Resources', 'Administration', 'Training', and 'Tools'. Under 'Resources', there are sub-links for 'IPv4', 'IPv6', 'ASN', 'Whois updates', 'Maintainers', and 'Correspondence'. The breadcrumb trail is 'Home / Resource management / AS Numbers'. The main heading is 'AS Numbers', followed by a list of actions: 'Upload', 'Download', and 'Request more AS numbers'. Below this is a table with one row containing the AS numbers '45192' and '131107', which are highlighted with a red box. The rest of the table cells are empty.

45192	131107								
-------	--------	--	--	--	--	--	--	--	--

# AS number Resources

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

MyAPNIC

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



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



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

Home / Tools

## Tools

### MD5

String

Result

Encrypt

### APNIC looking glass

The APNIC looking glass allows you to view your network from APNIC routers located in Australia (Brisbane) and Japan (Tokyo).

Enter your IP address (IPv4 or IPv6), choose the router you want to view it from and click 'submit'. Note: The traceroute and ping commands may take a while.

Query type

- BGP
- ping
- traceroute

IP address

View from

APNIC router - Tokyo

Submit

# Digital Certificates

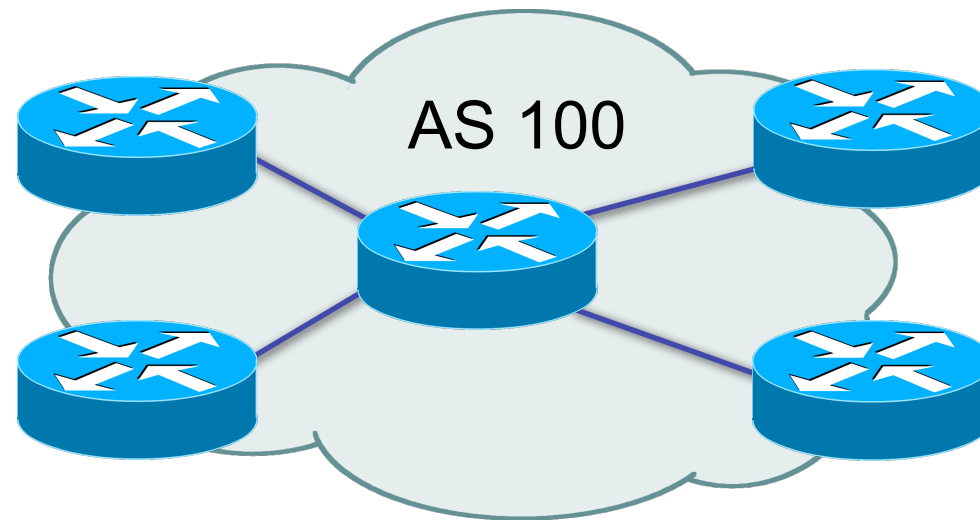
- Are used:
  - to manage staff contacts. Only registered Corporate Contacts have the authority to change or approve users in MyAPNIC.
  - for online voting in the APNIC elections
  - to secure email exchange with APNIC

# Questions?

# Overview

- IRMe
  - Introduction to APNIC
  - APNIC policy development process
  - Internet registry policies
  - Requesting IP resources
  - Second opinion request
  - APNIC whois database
  - MyAPNIC (Demo)
  - **Autonomous System Number (ASN)**
  - Reverse DNS
  - APNIC Helpdesk

# What is an Autonomous System?



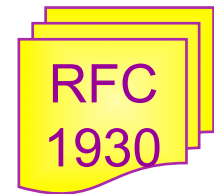
- Collection of networks with same routing policy
- Usually under single ownership, trust or administrative control



# 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



# 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



# 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

# Requesting an ASN

- Complete the request form
  - Existing member:  
Will send request from MyAPNIC
  - New Member:  
Can send AS request along with membership application



## 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

# 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 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=100; accept ANY
import: from AS2514 action pref=100; 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

# Questions?

# Overview

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  - IPv6 Overview
  - APNIC whois database
  - MyAPNIC (Demo)
  - Autonomous System Number (ASN)
  - **Reverse DNS**
  - APNIC helpdesk

# Reverse DNS - why bother?

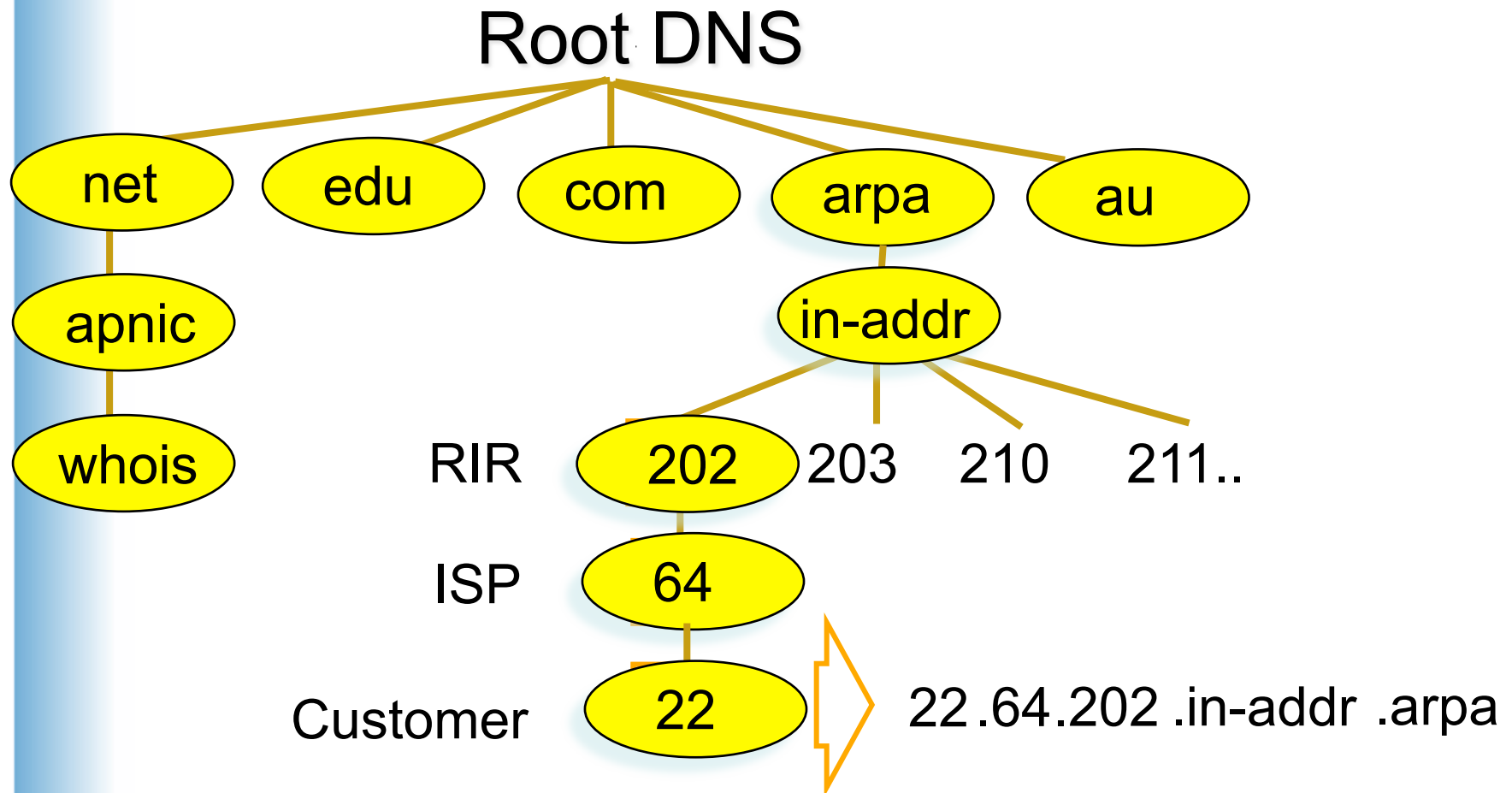
- Service denial
  - That only allow access when fully reverse delegated eg. anonymous ftp
- Diagnostics
  - Assisting in trace routes etc
- Spam identification
- Registration
  - Responsibility as a member and Local IR

# 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

# Principles – DNS tree

- Mapping numbers to names - 'reverse DNS'



# Reverse delegation requirements

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





# 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.
```

# Example 'domain' object

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

# 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..

# 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

APNIC 29

Kuala Lumpur 1 - 5 March 2010

# Questions?

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  - APNIC whois database
  - MyAPNIC (Demo)
  - Autonomous System Number (ASN)
  - Reverse DNS
  - **APNIC helpdesk**

## 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

APNIC 29 Kuala Lumpur 1 - 5 March 2010

**APNIC**

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
- ▼ 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](mailto:helpdesk@apnic.net)

**Note** Please send all requests for resources to Hostmaster with your APNIC

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?

Chat

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

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

# ICONS

The screenshot shows a web browser window displaying the ICONS Wiki website. The browser's address bar shows the URL <http://icons.apnic.net/display/icons/Home>. The page features a navigation menu with links for Home, IPv6, How-To Guides, Network Tools, Community, Photo gallery, and Glossary. A sidebar on the left contains links for Wiki Home, AS Numbers, IPv6, IPv6 ICONS Forum, Security, IGovernance, Peering, How-To Guides, Network Tools, Community, Log In, Register, Watch This Page, and Notation Help. The main content area is titled "IPv6 Wiki" and includes a section for "ICONS IPv6 Wiki" with the following text:

**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.

Below this is a "Welcome To ICONS Wiki" section with the following text:

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.

A yellow warning box for "Safari Users" states: "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](#)."

At the bottom, there is a "Comments (2)" section with links for "Hide Comments" and "Collapse All".

# Questions?

APNIC 29

Kuala Lumpur

1 - 5 March 2010



Thank you!