

# IPv6 Allocation Policy and Procedure

Global IPv6 Summit in China 2007

April 13, 2007

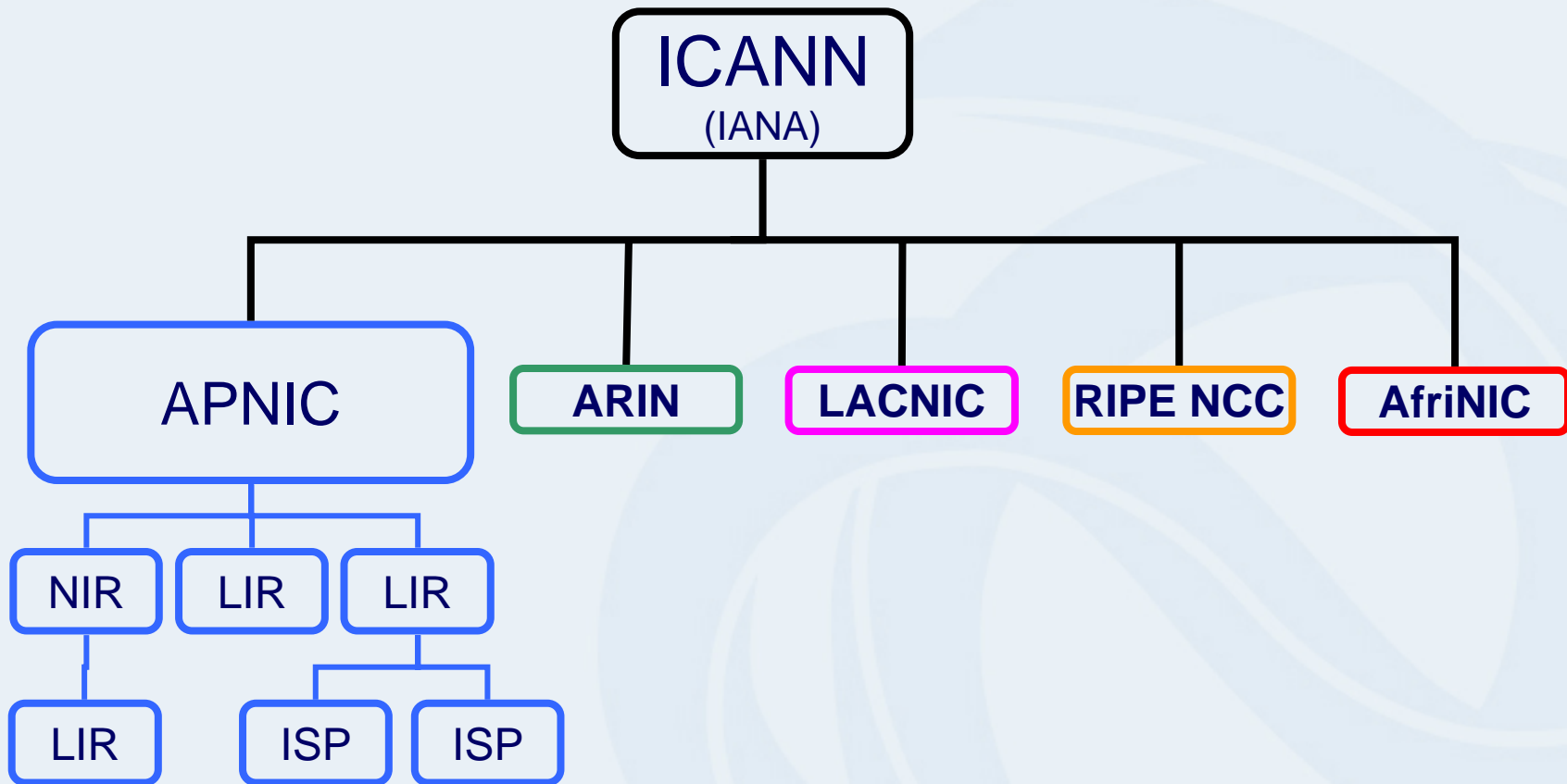
Gerard Ross and Guangliang Pan

# Overview

- Introduction to APNIC
- Policy development process
- IPv6 policy and procedures
- Obtaining IPv6 addresses
- IPv6 statistics

# Introduction to APNIC

# Internet Registry Structure



# Internet address management structure

- Agreed on policy and procedures determine a common management system
  - Defined and implemented through agreement and consensus by the community of Internet network operators and users.
  - Implementation facilitated by an infrastructure comprising essentially the RIRs, NRO, ASO, IANA (ICANN)
  - RIRs only regional component of the Internet infrastructure that has a neutral, permanent operational presence (secretariat)

# What is APNIC?

- Regional Internet Registry (RIR) for the Asia Pacific Region

- Regional authority for Internet Resource distribution
- IP addresses (IPv4 and IPv6), AS numbers, in-addr.arpa delegation

- Membership-based organisation

- Established 1993
- Non-profit, neutral and impartial

Not operations forum

Not standards development



# The RIR structure

- Five RIRs today
  - Open
  - Transparent
  - Neutral and impartial
- Addresses distributed fairly
  - Based on need
  - No discrimination
- Not for profit membership organisation
  - Membership open to all interested parties
  - Bottom up, industry self-regulatory structure
- Policies developed by industry at large
  - Through open policy processes



# Policy development process



# Why a policy?

- Long term interests of the Internet requires prudent management of address space
- While address management is not a pure “technical” issue, mismanaged management can severely impact Internet operation.
  - routing tables
  - filtering and accessibility
  - Imbalance of distribution

# Policy development

- Industry self-regulatory process
  - Policy is developed by the AP Internet community to suit needs of region
  - Facilitated by RIR staff
- Policy implementation
  - APNIC shares with its members and their customers a collective responsibility
    - RIR process
    - ISPs and other affected parties

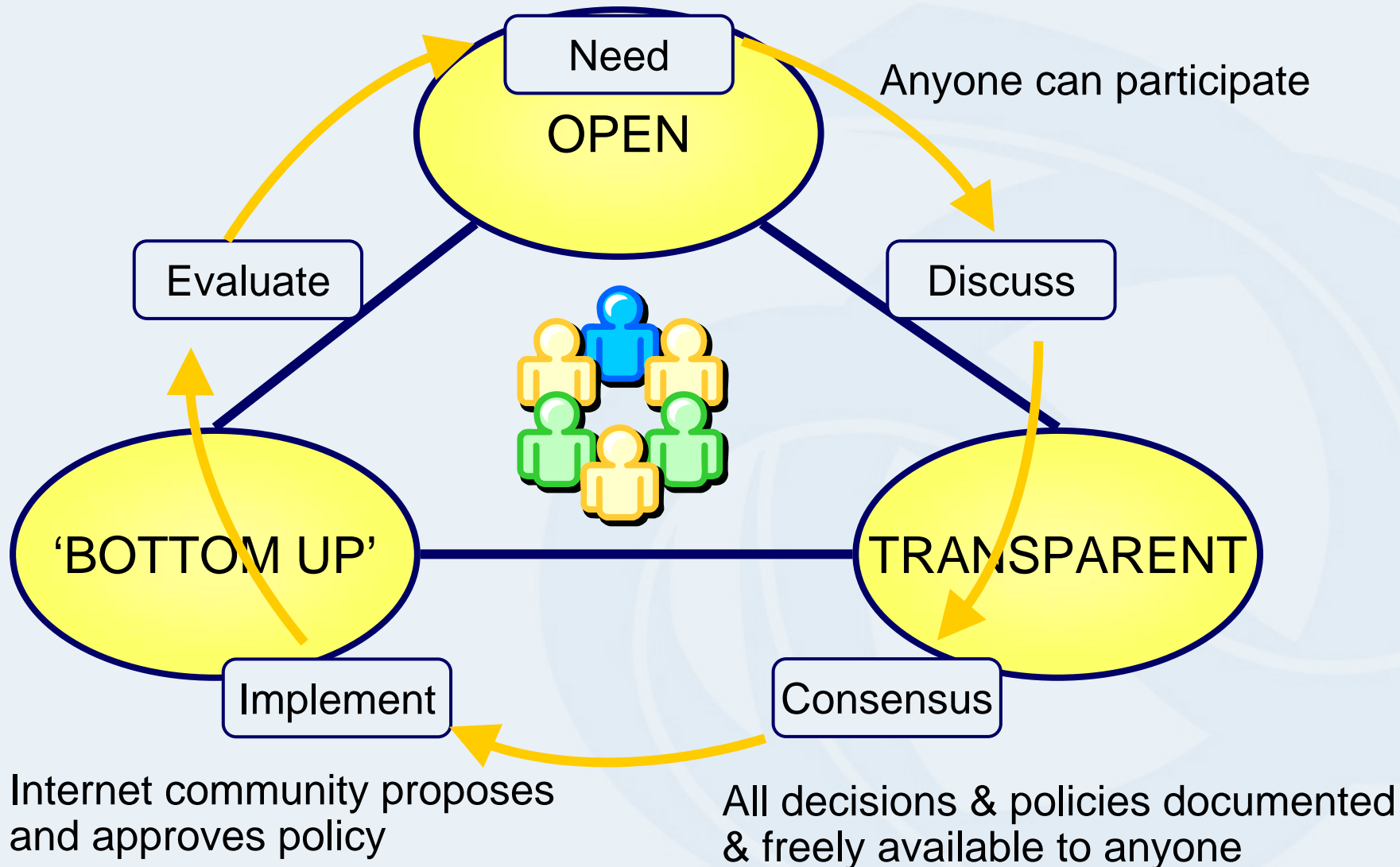
# IPv6 Policy Principles (Similar to IPv4)

- Address space not freehold property
  - Understanding that globally unique address space is licensed for use – not owned
- Routability not guaranteed
- Minimum allocation is defined
- Current state of IPv4 structure (infrastructure and customers) can be used to justify larger initial allocation

# Participation in policy development

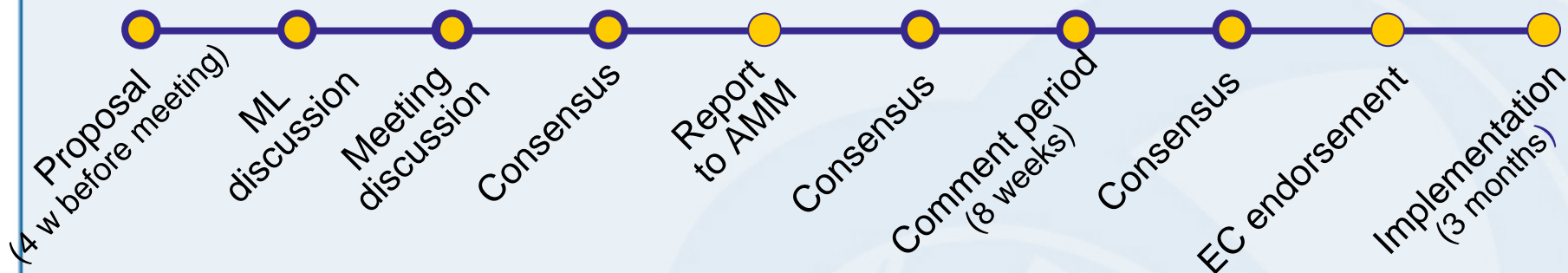
- Why should I bother?
  - Responsibility as an APNIC member
    - To be aware of the current policies for managing address space allocated to you
  - Business reasons
    - Policies affect your business operating environment and are constantly changing
    - Ensure your 'needs' are met
  - Educational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

# Policy Development Process



# The policy development process

Need Discuss Consensus Implement



You can participate!

More information about policy development can be found at:

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

# IPv6 policy and procedures

# IPv6 Address Policy

- IPv6 Address Allocation and Assignment Policy
  - <http://www.apnic.net/docs/policy/ipv6-address-policy.html>
- APNIC guidelines for IPv6 allocation and assignment requests
  - <http://www.apnic.net/docs/policy/ipv6-guidelines.html>



# Some definitions

- RIR – Regional Internet Registry
- NIR – National Internet Registry
- LIR – Local Internet Registry (Top level ISP)
- End Site defined as an end user of an ISP where the ISP:
  - Assigns address space to the end user
  - Provides Internet transit service to the end user
  - Advertises an aggregate prefix route that contains the end user's assignment
- POP – Point of Presence

# Allocation and assignment

## Allocation

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

- Not yet used to address any networks

## Assignment

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

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

# IPv6 initial allocation

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

32 bits	48 bits	128 bits
---------	---------	----------

  - Larger initial allocations can be made if justified according to:
    - IPv6 network infrastructure plan
    - Existing IPv4 infrastructure and customer base
- License model of allocation
  - Allocations are not considered permanent, but always subject to review and reclamation

# IPv6 customer assignments

- Assignment /48 - /64 for all end sites (POP also defined as end site)
  - Defined in revised policy – effective 19 March 2007
  - Provides for up to 16 bits of space for subnets



- Other assignment sizes
  - /64 only one subnet
  - /128 only one device connecting
- Larger assignments (to ISP)- Multiple /48s
  - Should be reviewed by RIR/NIR
    - Follow second opinion procedure

# IPv6 IXP assignment

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

# IPv6 Critical Infrastructure Assignment

- Organisations seeking assignment for critical infrastructure must be an actual operator of the network infrastructure performing the following functions:
  - root domain name system (DNS) server
  - global top level domain (gTLD) DNS server
  - country code TLD (ccTLDs) DNS server
  - Regional Internet Registry (RIRs)
  - National Internet Registry (NIRs)
- \* Minimum assignment size is /48

# IPv6 Multihoming Assignment (New)

- An organisation is eligible to receive a portable assignment from APNIC if it:
  - is currently multihomed with provider-based addresses, or demonstrates a plan to multihome within three months and,
  - agrees to renumber out of previously assigned address space.
- \* Minimum assignment size is /48

# Obtaining IPv6 addresses



# Where to request IPv6 addresses?

- 1. From your upstream ISP
  - Receive an assignment or sub-allocation
  - Address space is non-portable
- 2. From CNNIC
  - CNNIC member
  - Address space is portable
- 3. From APNIC
  - APNIC member
  - Address space is portable

**Note: 6bone address is no longer available**

# Request IPv6 addresses from APNIC

- Become APNIC member
  - <http://www.apnic.net/member/index.html>
- IPv6 Allocation Request Form
  - <http://ftp.apnic.net/apnic/docs/ipv6-alloc-request>
- IPv6 Portable Assignment Request Form
  - <http://www.apnic.net/services/portable-assign/index.html>

# How do I apply for IPv6 addresses?

Check your eligibility for IPv6 addresses



Read IPv6 policies

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

Read IPv6 guideline

<http://www.apnic.net/docs/policy/ipv6-guidelines.html>



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>



# IPv6 address request form

http://ftp.apnic.net/apnic/docs/ipv6-alloc-request.txt - Microsoft Internet Explorer provided by OptusNet

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Refresh Mail Print Address Bar Links

Address <http://ftp.apnic.net/apnic/docs/ipv6-alloc-request.txt> Go Links

-----  
APNIC Document identity  
Title: APNIC IPv6 Allocation Request Form  
Short title:  
Document ref:  
Version:  
Date of original publication:  
Date of this version:  
Review scheduled:  
Obsoletes:  
Status: Active  
Comments: n/a  
-----

APNIC IPv6 Allocation Request Form

What is this form used for?  
-----

This form is for use by organisations requesting IPv6 allocations that they will use for addressing their own infrastructure and making assignments to customers.

It may be used by APNIC account holders only.

Other IP address request forms  
-----

If you are an APNIC member seeking an IPv4 allocation, then use the "IPv4 ISP Request Form", at:

<http://www.apnic.net/services/ipv4/index.html> (web)  
<ftp://ftp.apnic.net/apnic/docs/isp-address-request> (text)

If you are seeking a portable address assignment under APNIC's multihoming, IXP or critical infrastructure policies, then use the "APNIC Portable Assignment Request Form", at:

<ftp://ftp.apnic.net/apnic/docs/portable-assign-request>

Eligibility for IPv6 allocation  
-----

Done Internet

start cfp Microsoft PowerPoint ... http://ftp.apnic.net/... EN 3:32 PM

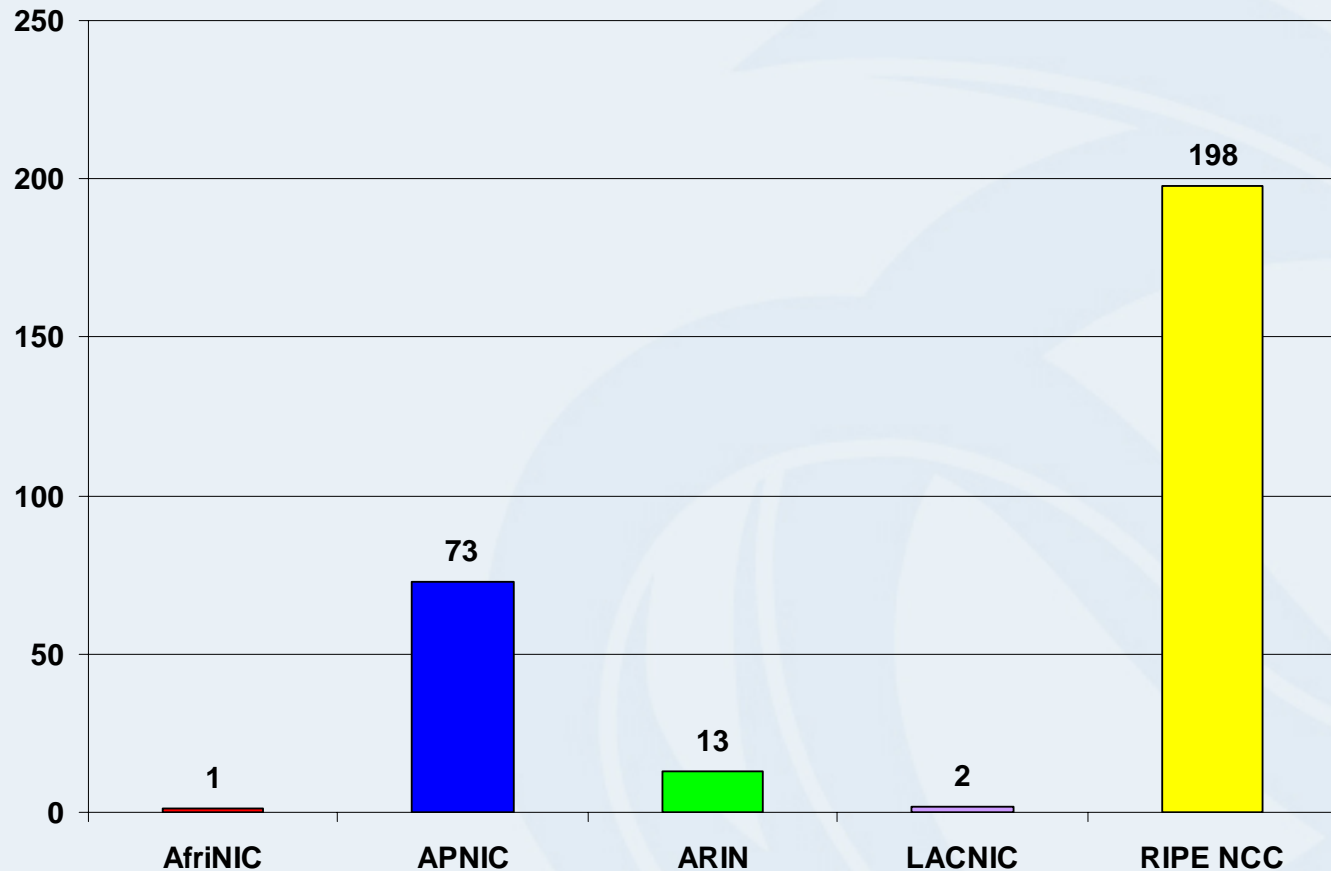
# IPv6 address request form

- Requester template
  - Name, email, acct-name, org-relationship:
- Network template
  - Netname, descr, country, admin-c, tech-c, remarks, changed, mnt-lower
- IPv6 usage template
  - Services, cust-types, cust-network, infrastructure, network-plan
- Additional information

# IPv6 statistics

# IANA IPv6 Allocations to RIRs

issued as /23s prior to Oct 2006



# IANA IPv6 Allocations to RIRs

issued in Oct 2006

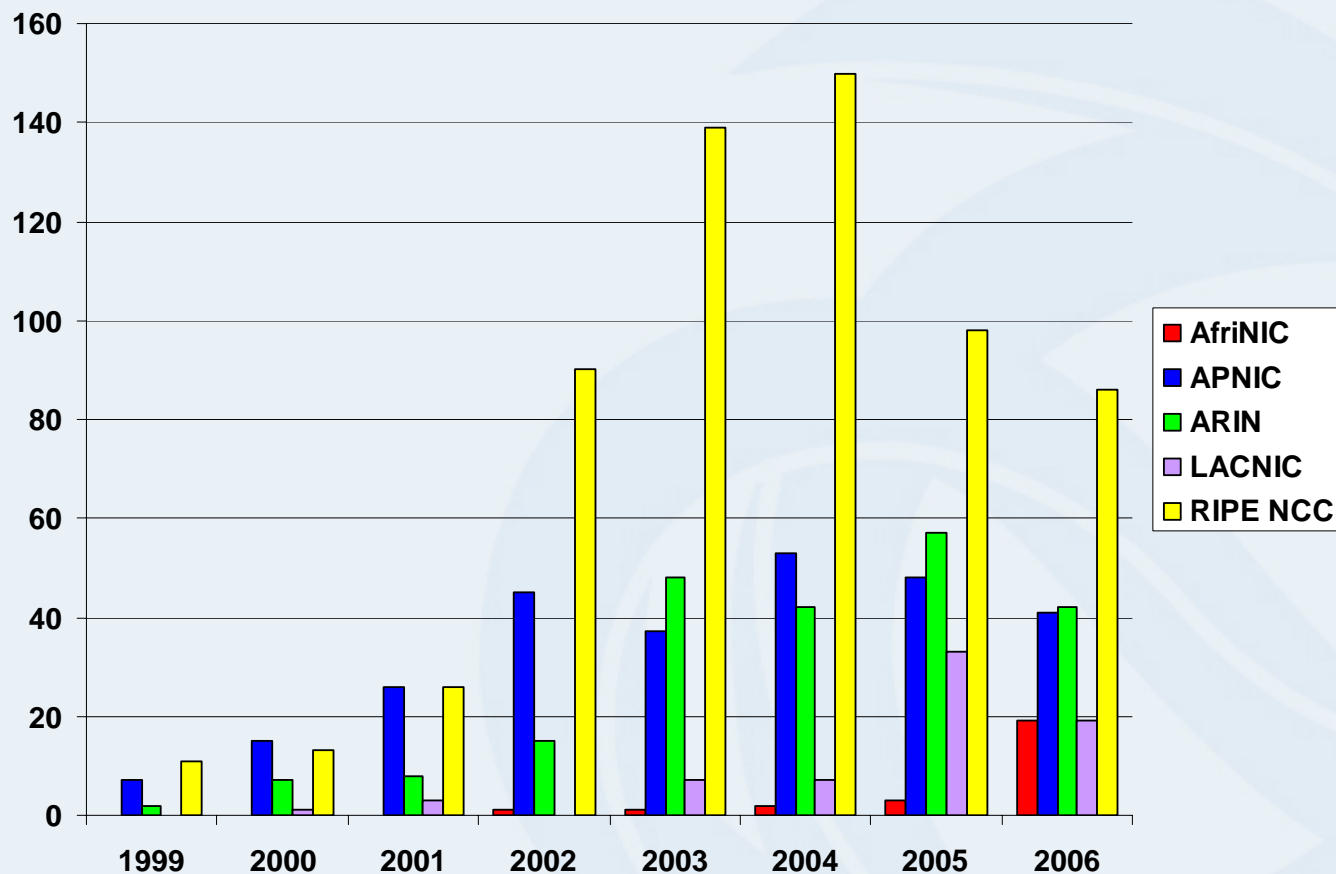
<b>RIR</b>	<b>IPv6 Address</b>
<b>AfriNIC</b>	<b>2C00:0000::/12</b>
<b>APNIC</b>	<b>2400:0000::/12</b>
<b>ARIN</b>	<b>2600:0000::/12</b>
<b>LACNIC</b>	<b>2800:0000::/12</b>
<b>RIPE NCC</b>	<b>2A00:0000::/12</b>

Some /23s from the previous slide are incorporated in these /12s



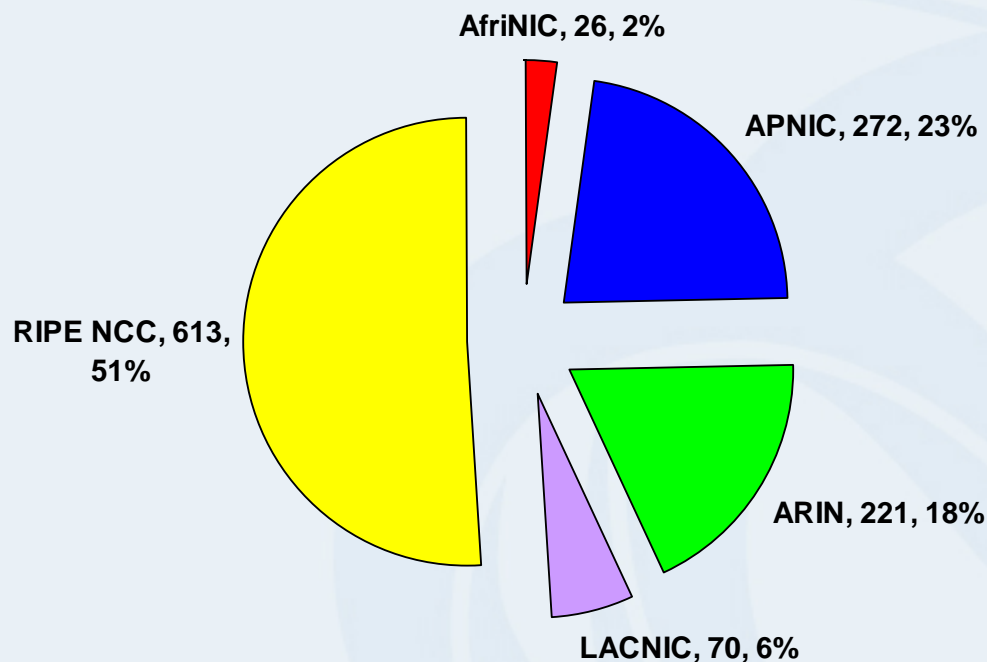
# IPv6 Allocations RIRs to LIRs/ISPs

## Yearly Comparison

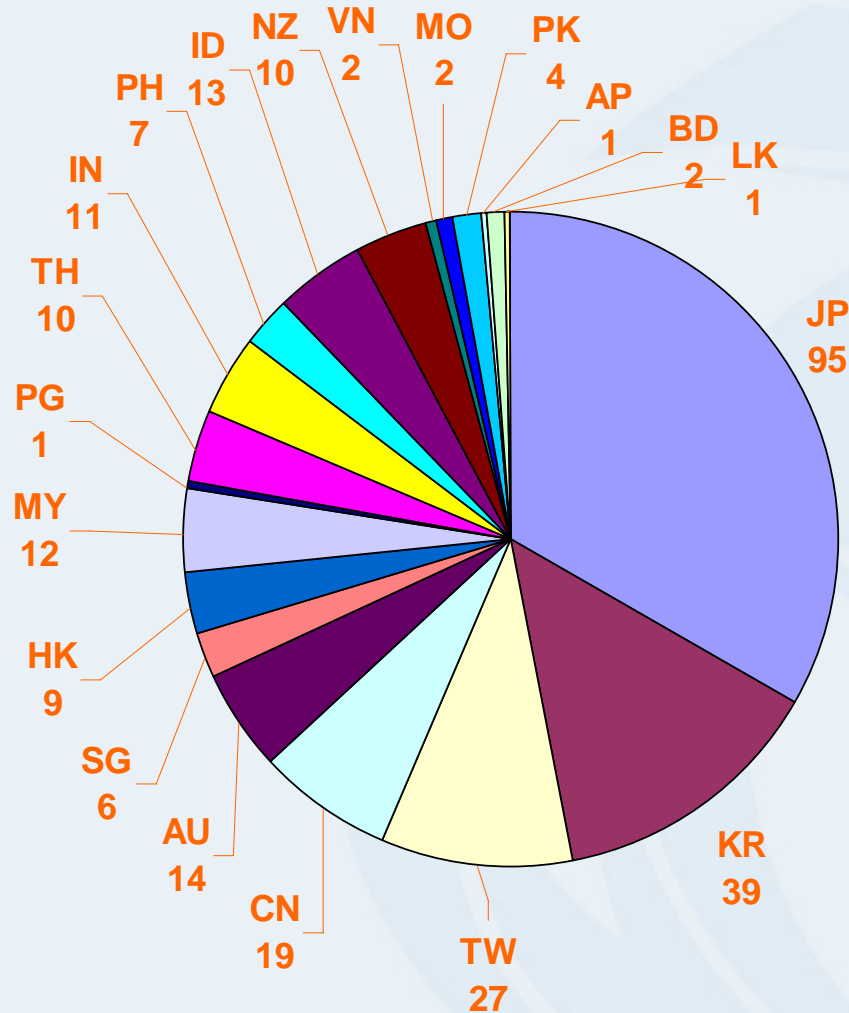


# IPv6 Allocations RIRs to LIRs/ISPs

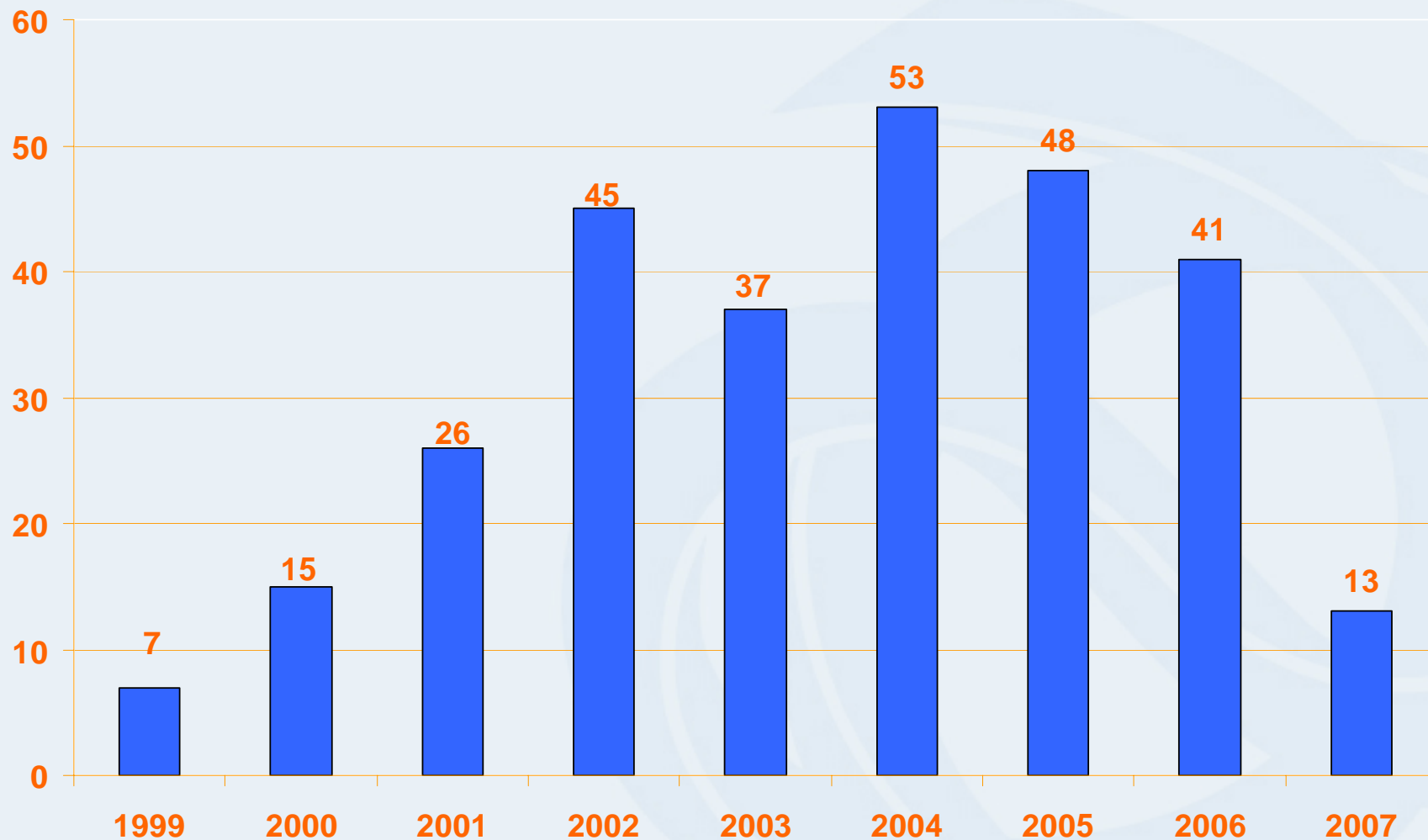
Cumulative Total (Jan 1999 – Dec 2006)



# APNIC allocations by economies



# APNIC annual allocations

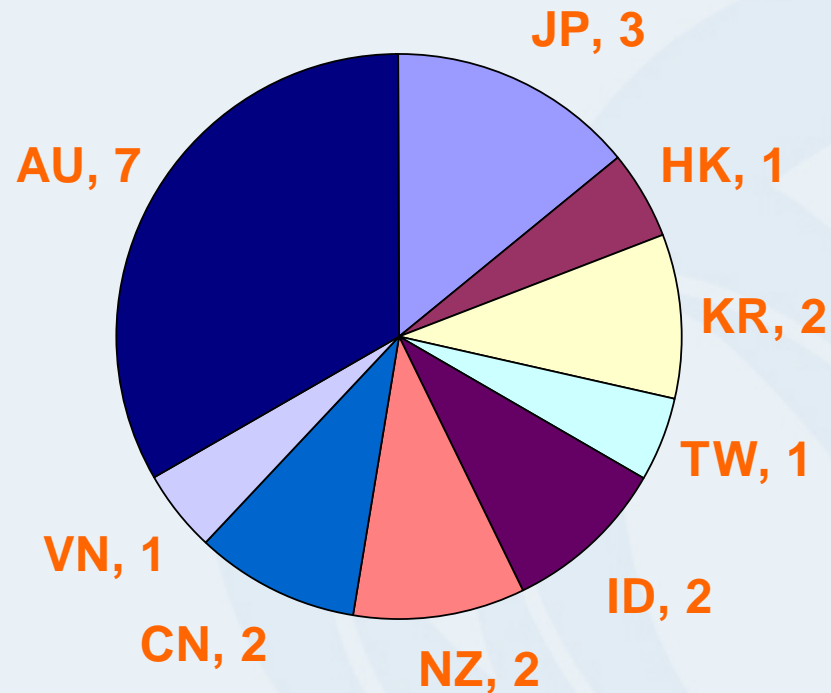


# APNIC allocations by sizes

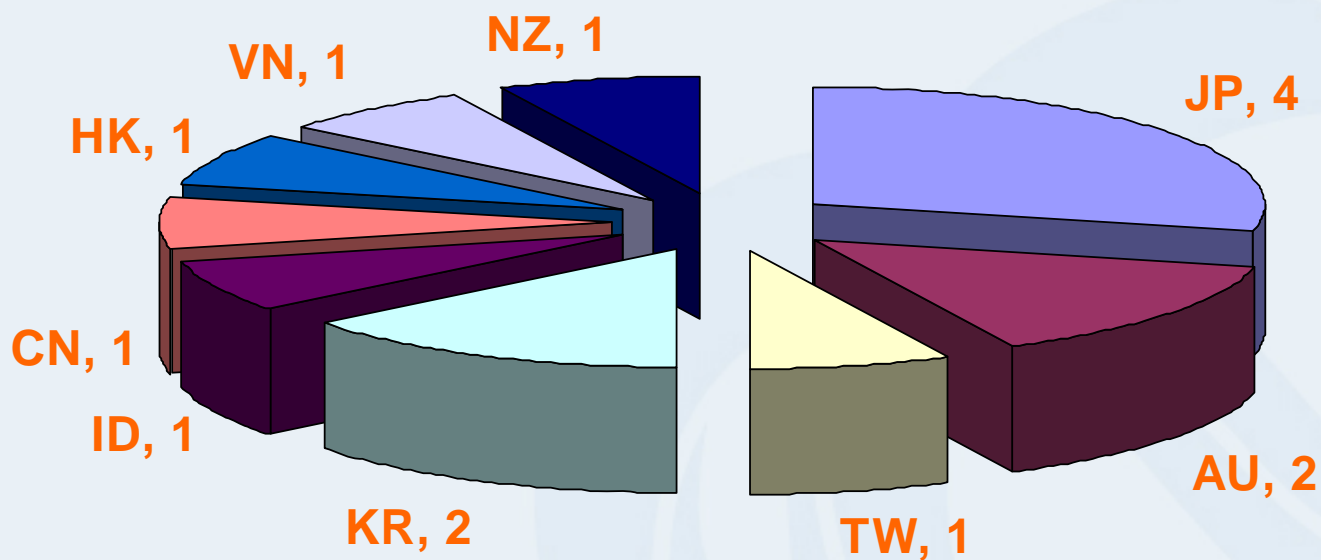


# APNIC IXP assignments

All /48s except 4 are /64s

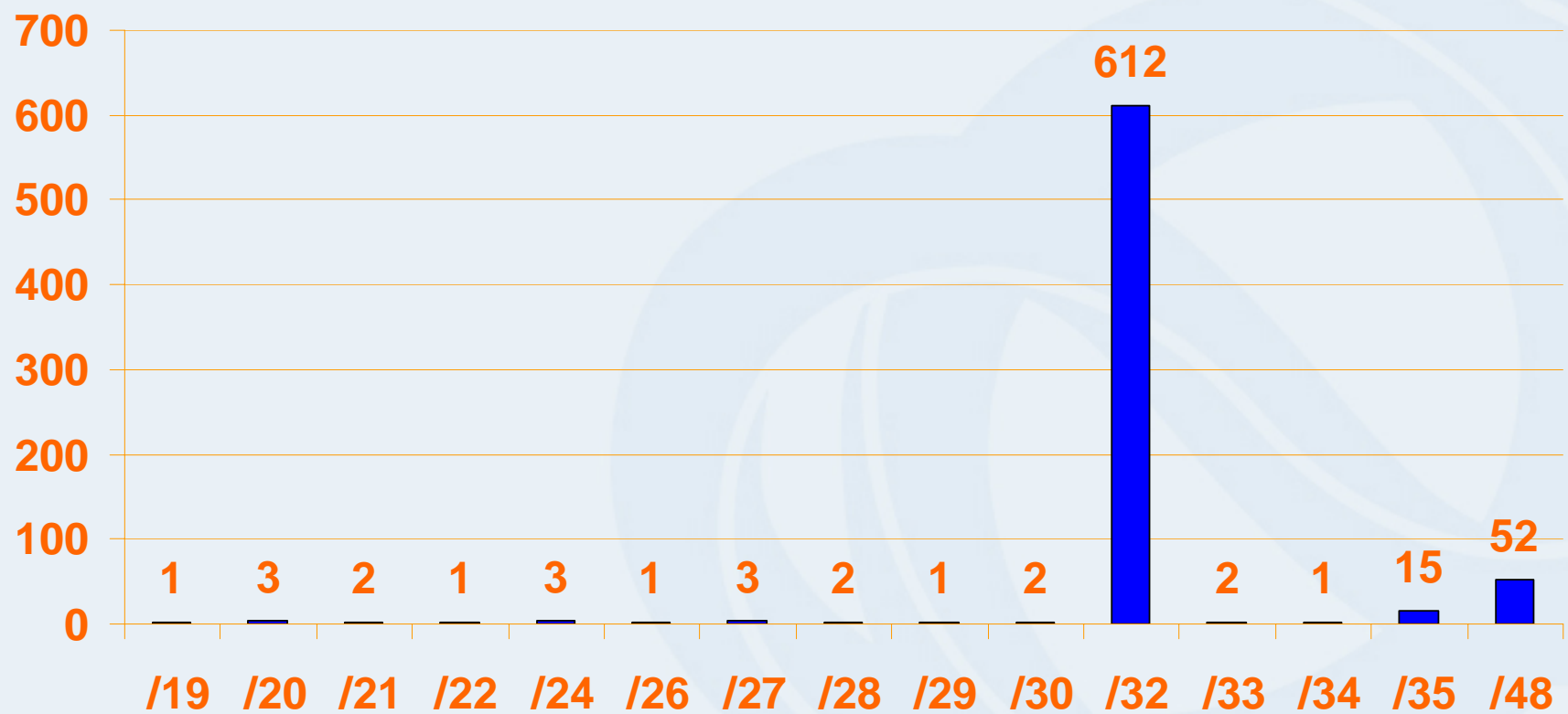


# APNIC critical infrastructure assignments (/32s)



# Global IPv6 root routing table

Data as 1 April 2007 from  
<http://bgp.potaroo.net/v6/as1221/index.html>





# Questions?

# »Thanks!