Policy Workshop

SANOG V

Dhaka , Bangladesh

12 February, 2005

Overview

- Introduction
  - Intro to APNIC
- Policy development
  - Overview of the policy development process
- Address management
  - Background
  - IPv4 Lifetime
  - IPv6

Tea break

- Policy discussion
  - FAQ
  - Update on new policies
  - Discussion
- Next steps
  - How to voice your opinion and participate in Internet policy making

Who are we?

- Son Tran
  - Resource Services Manager

- Champika Wijayatunga
  - Senior Training Specialist

- Kapil Chawla
  - Research & Liaison Officer (S Asia)

- APNIC is the RIR for the Asia Pacific
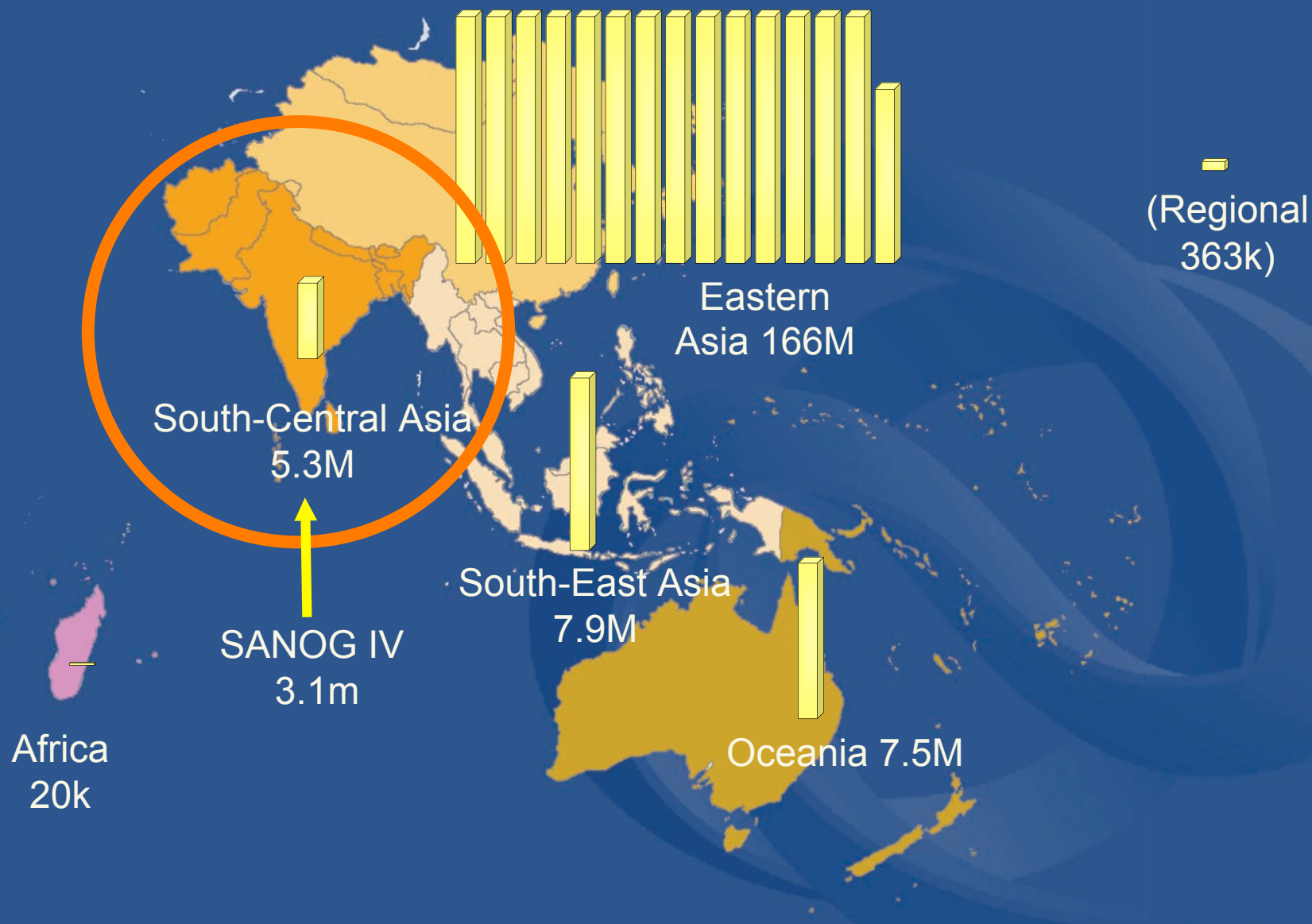 - Regional Internet Registry

Who are You?

- Who are you? ☺

- Why are you here at SANOG?
  - Have you ever attended an APNIC training?

What is APNIC?

- APNIC is the RIR for the Asia Pacific
  - Regional authority for Internet Resource distribution
    - IPv4 & IPv6 addresses, ASNs, reverse DNS delegation

- Industry self-regulatory body
  - Non-profit, neutral and independent
  - Policies developed by the community at-large

- Open membership-based structure
  - ~ 1000 members in 47 economies
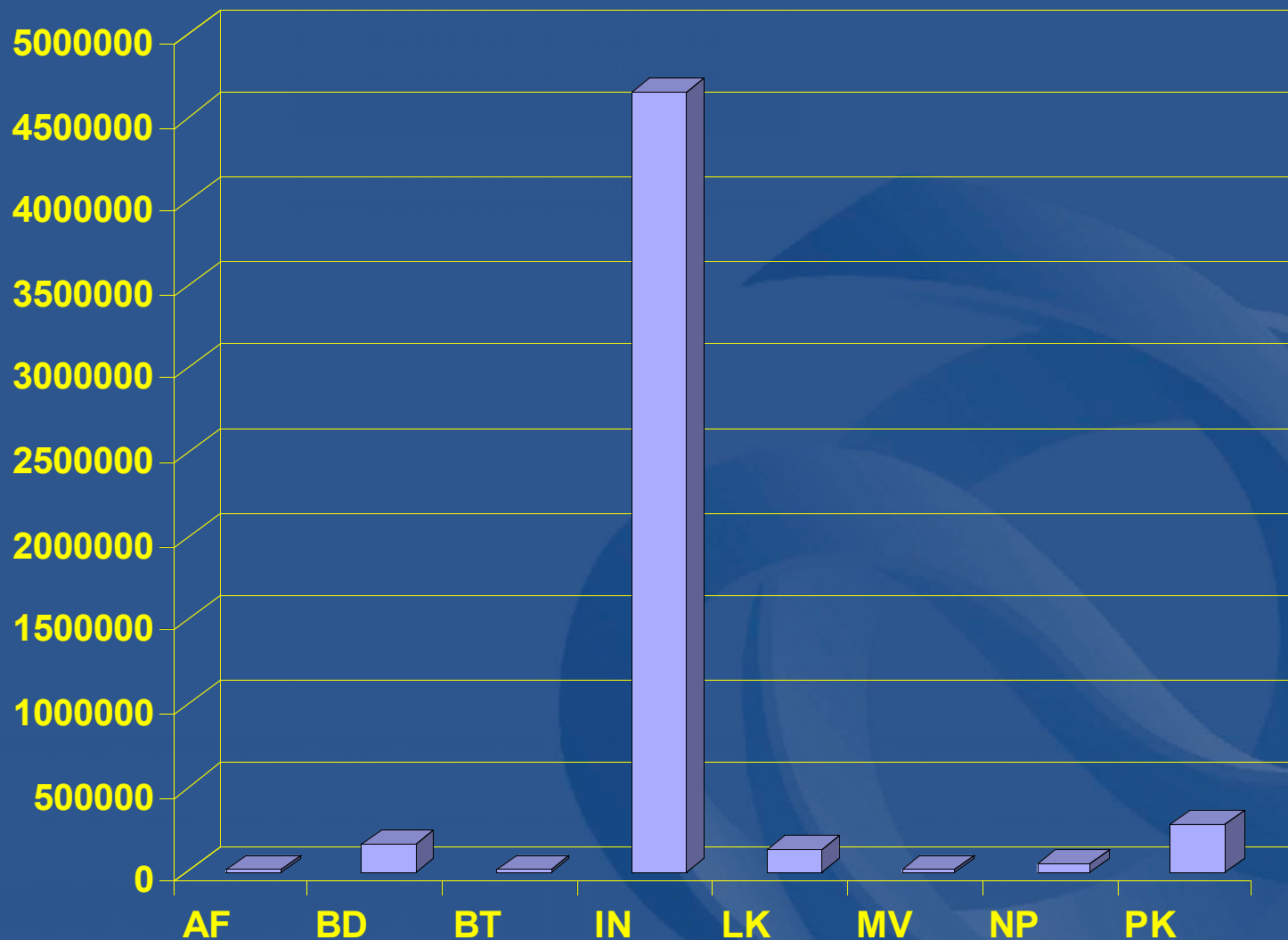   - (203 members in South Asia)
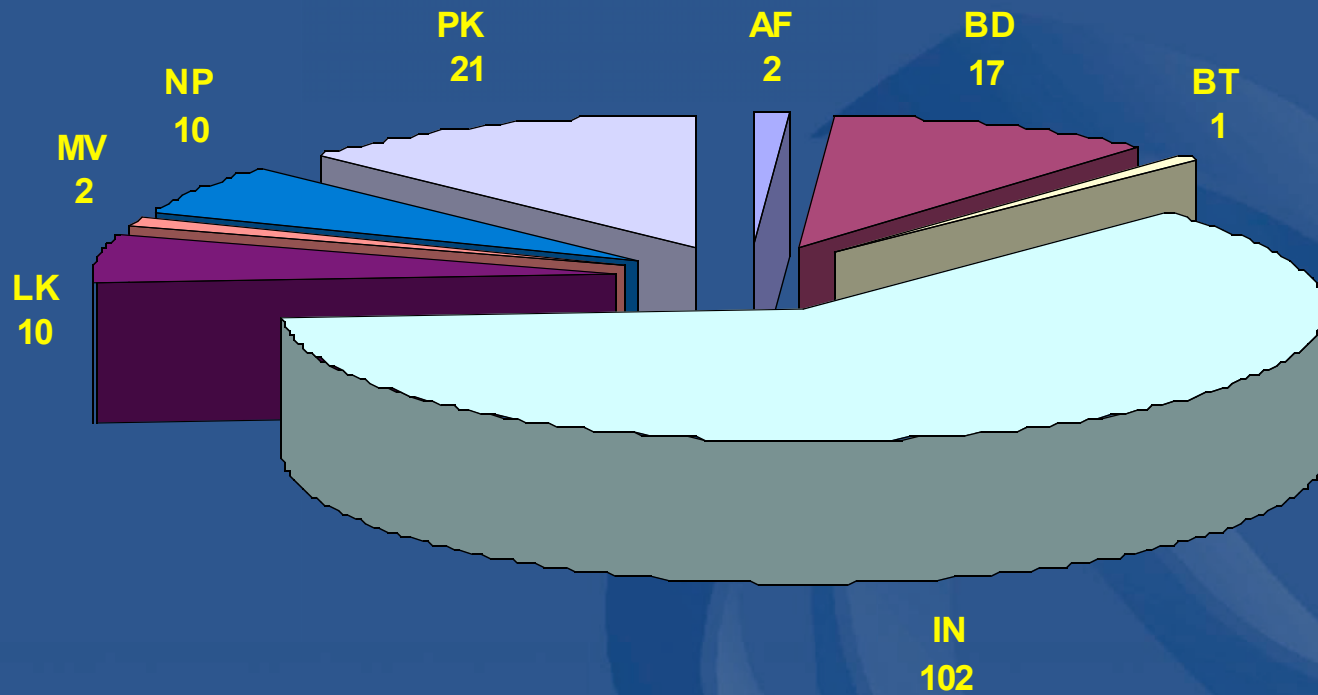
IP allocations in the Asia Pacific

(Regional 363k)

Eastern Asia 166M

South-Central Asia 5.3M

SANOG IV 3.1m

South-East Asia 7.9M

Oceania 7.5M

Africa 20k

Total IPv4* allocations in S Asia

*4 IPv6 allocations in India, no others in S Asia

Total ASN allocated in S Asia

APNIC members in S Asia

AF 2
BD 27
BT 1
IN 113
LK 11
MV 2
NP 7
PK 40
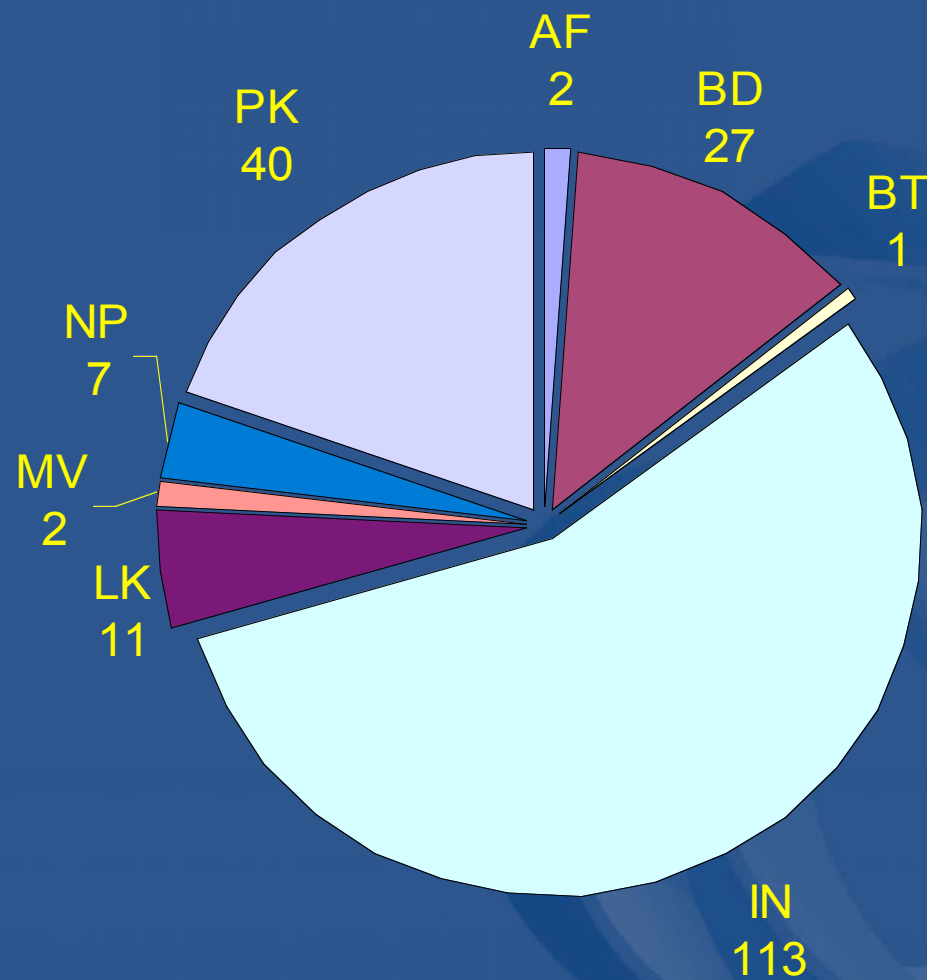
Now some more questions to you…

- What is your experience with Internet resources?
  - Are you a member of APNIC?

- Have you participated in IP policy development before?
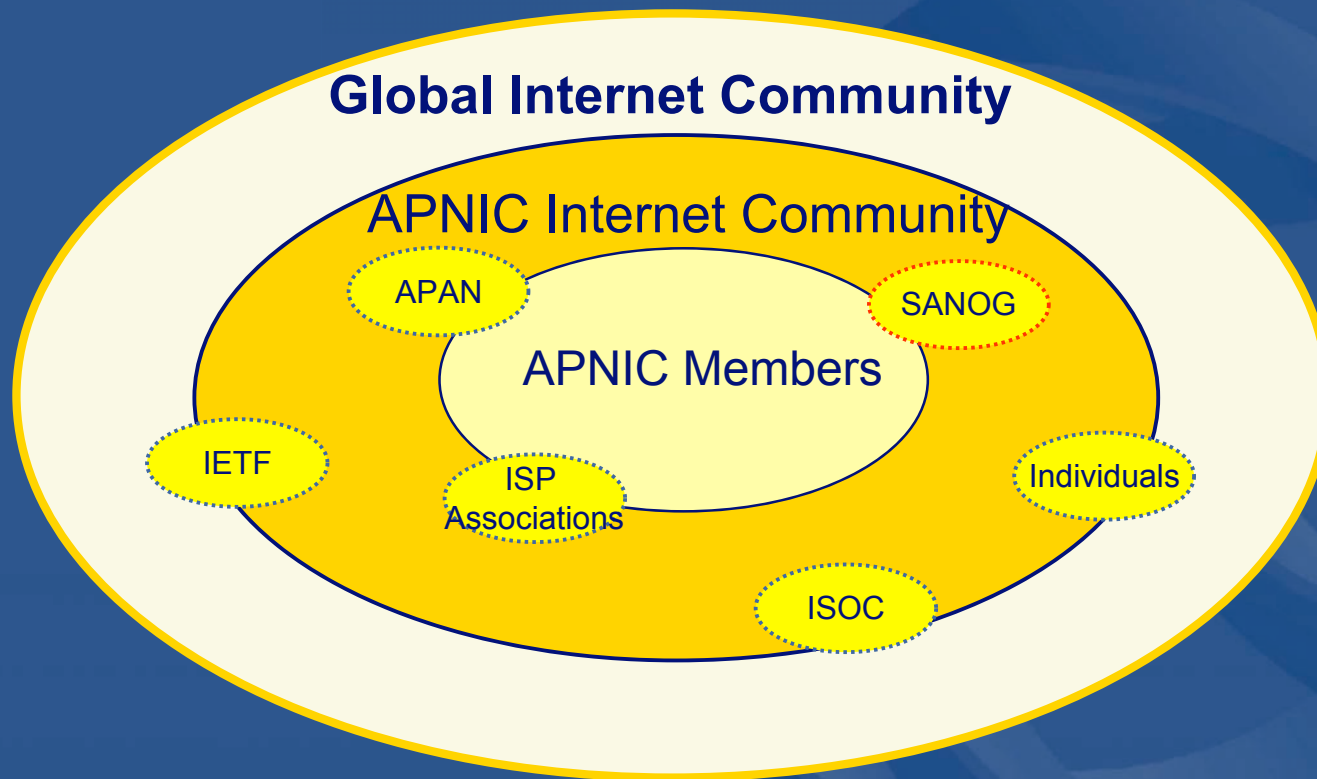
- What do YOU see as the Internet resource issues for the SANOG community?

Questions ?

Policy Development in the Asia Pacific
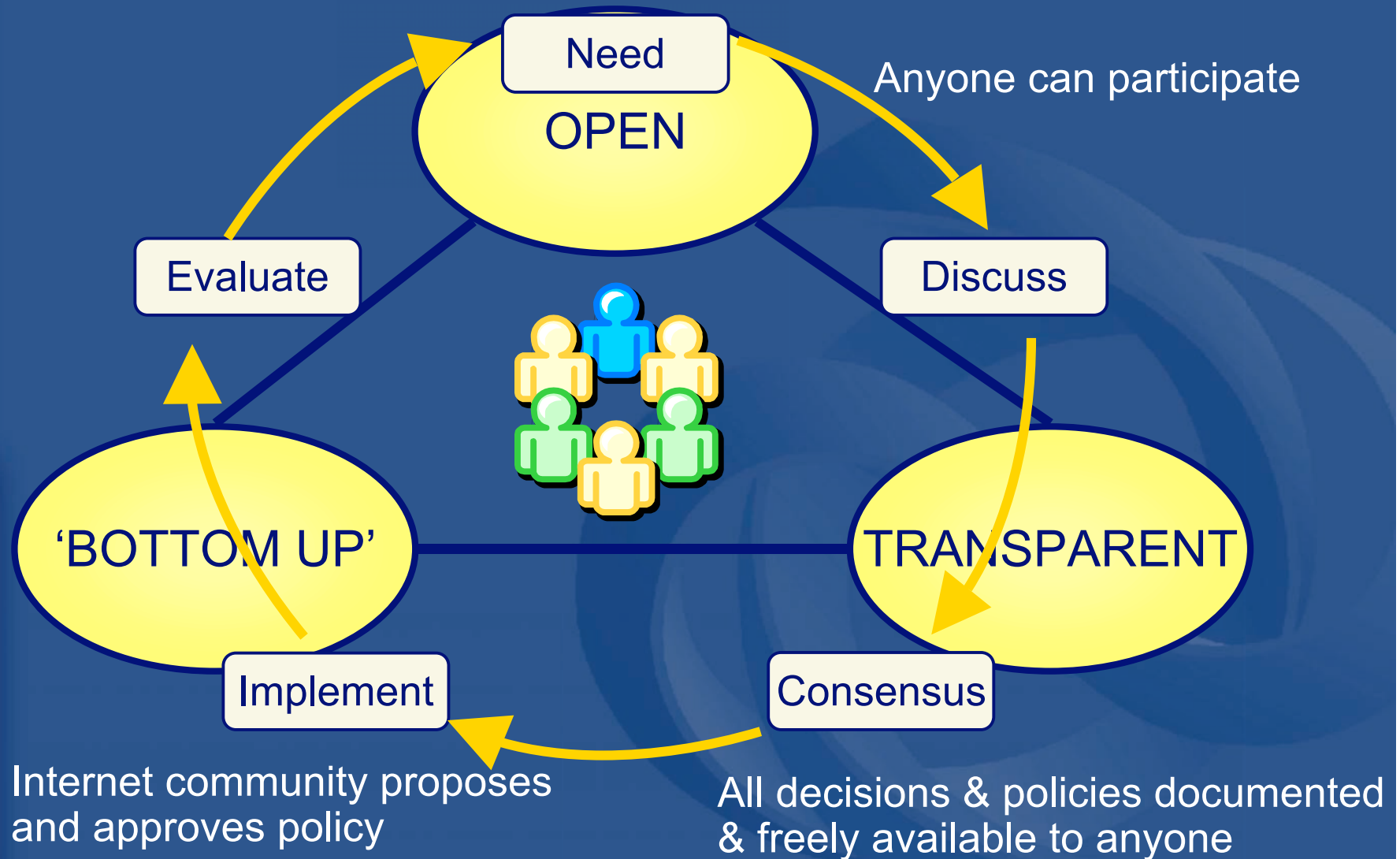
The APNIC Community

&

the Policy Development Process

You are part of the APNIC community!

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

Global Internet Community

APNIC Internet Community

APAN

SANOG

APNIC Members

IETF

ISP Associations

Individuals

ISOC

– A voice in regional Internet operations through participation in APNIC

APNIC

Policy development cycle

Need

OPEN

Anyone can participate

Evaluate

Discuss

'BOTTOM UP'

TRANSPARENT

Implement

Consensus

Internet community proposes and approves policy

All decisions & policies documented & freely available to anyone

Elements of the process

WGs: semi formal, volunteer group
- work on a particular project /issue (eg. 'Broadband')

Member Meeting

MM: forum specific to APNIC business
- eg. fee structure, election of executive council & endorsement of policy decisions

Working Groups

Open Policy Meeting & Mailing Lists

Special Interest Groups

SIGs: Formal groups
- Discuss broad areas of policy relevant to the APNIC internet community

BOFs: Informal meetings to exchange ideas
- eg. CA BOF, Network Abuse BOF, Training

Birds of a Feather

The policy development process

Need Discuss Consensus Implement

Proposal
(4 w before meeting)

ML
discussion

Meeting
discussion

Consensus

Report
to AMM

Consensus

Comment period
(8 weeks)

Consensus

EC endorsement

Implementation
(3 months)
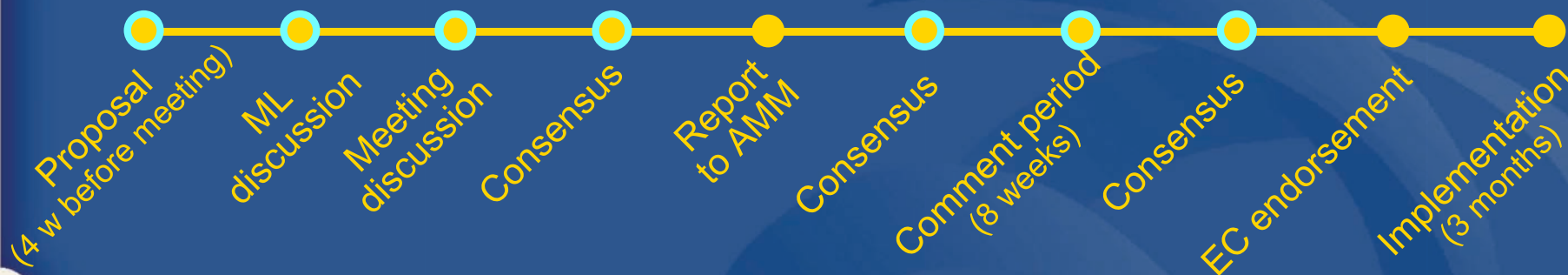
You can participate!

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Why should I bother to participate?

- Responsibility as an APNIC member
  - To be aware of the current policies for manag[ing] address space allocated to you

- Business reasons
  - Policies affect your business operating environment and are constantly changing
  - Ensure your 'needs' are met
  - Money matters $$

- Educational
  - Learn and share experiences
  - Stay abreast with 'best practices' in the Internet

Training

Questions ?

IP Address Management

The development of
the RIR System
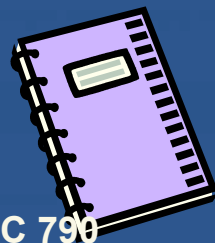
IP allocation pre-1992

DDNNIC

iana

**RFC 1261
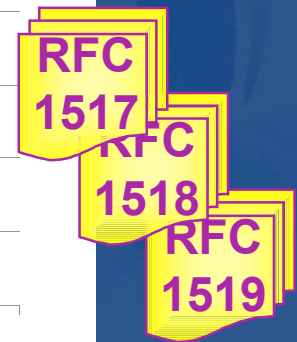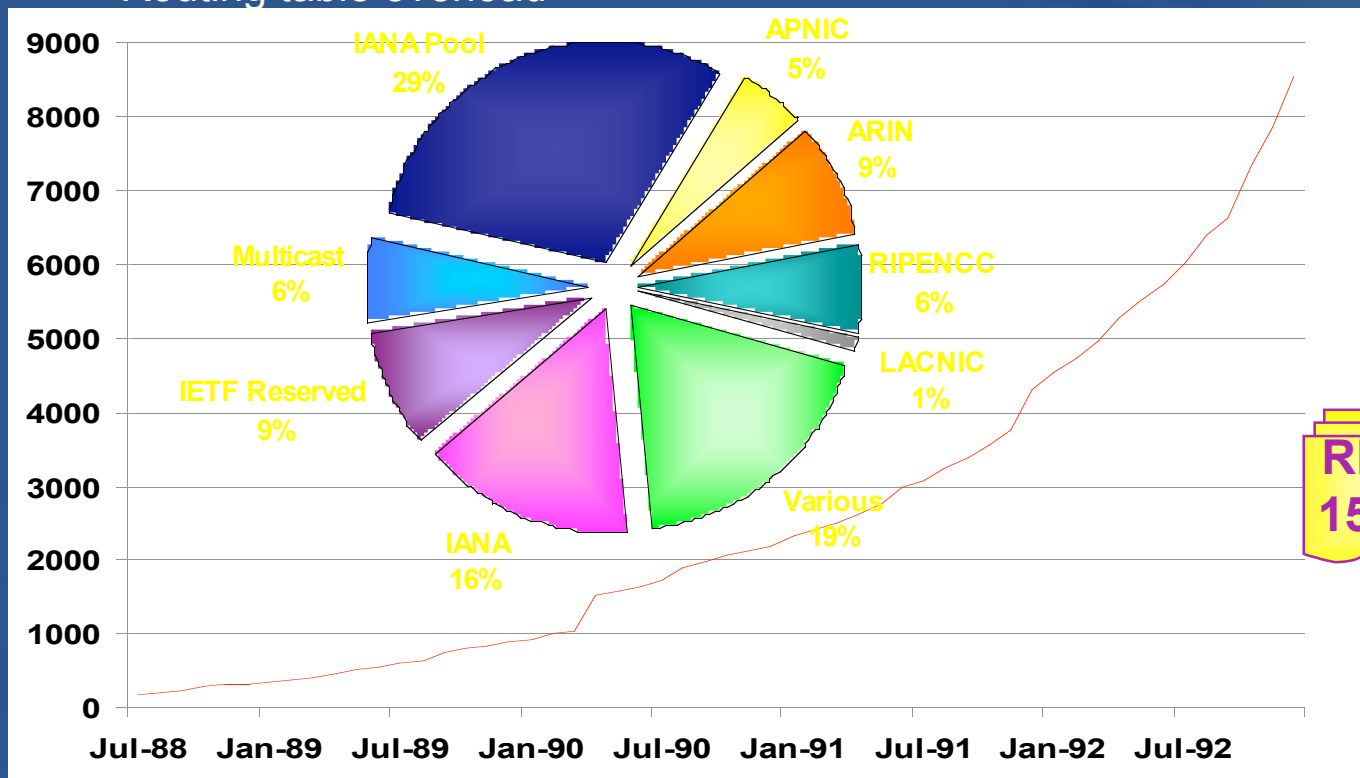1991**

**RFC 1020
1987**

**RFC 790
1981**

"The assignment of numbers is also handled by Jon. If you are developing a protocol or application that will require the use of a link, socket, port, protocol, or network number **please contact Jon to receive a number assignment**."

Early address management

- Early 1990's: Internet scaling problems
  - Address depletion
    - Classful architecture (class A, B, C)
  - Routing table overload

RFC 1517

RFC 1518

RFC 1519

Address management today

What are the main (IPv4) address management objectives?

- What did we learn from history?

Address 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

Questions ?

IPv4 Lifetime Expectancy
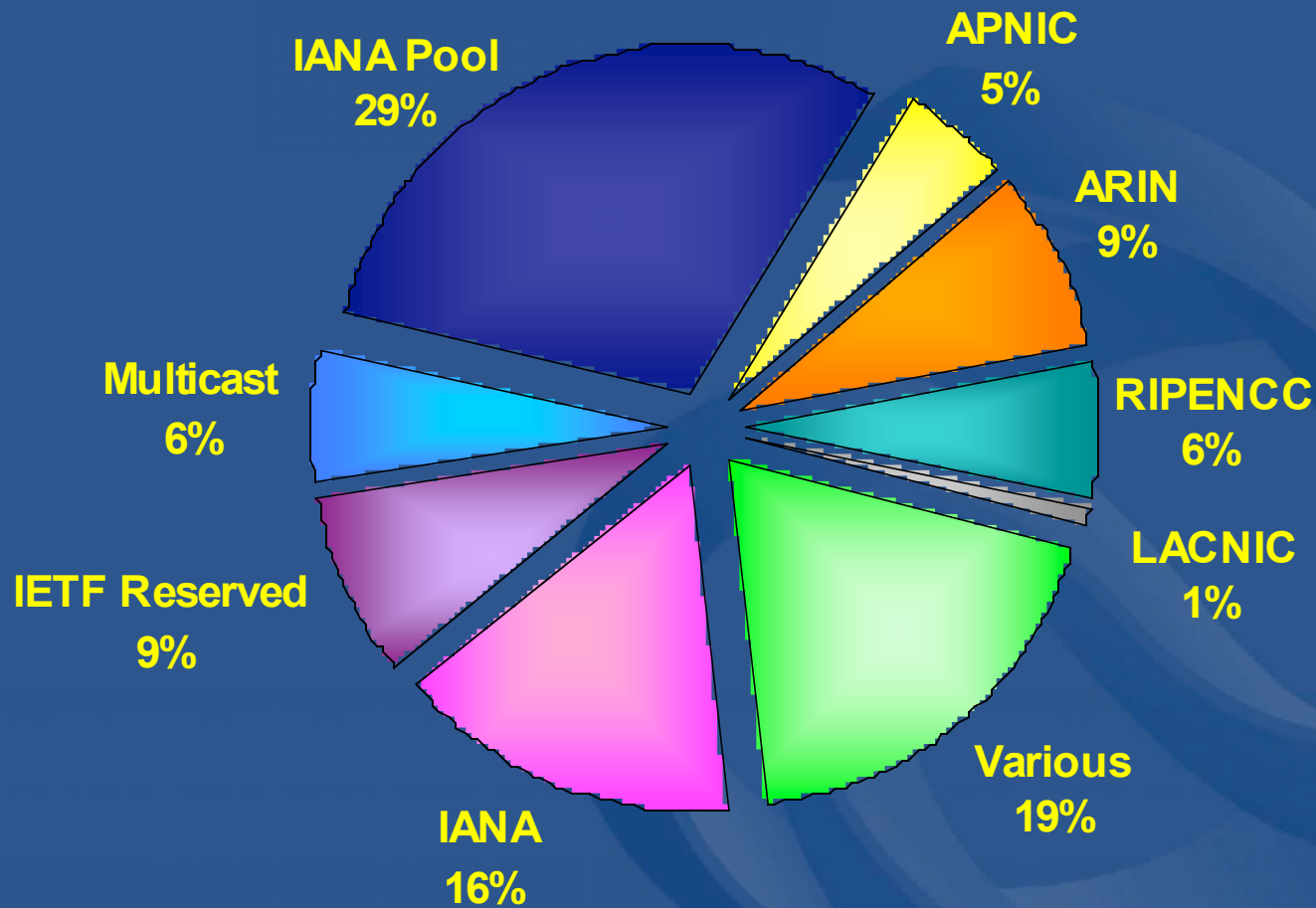
- Are we running out of IP addresses?

IPv4 lifetime

- How many of you have heard that we are running out of IPv4?

- How many think it's true?
  - If not now, then when…?

Global IPv4 allocations

Are we running out of IP addresses?

- Recent media reports claiming we are running out of IP addresses
  - Some claim we've already run out in some parts of the world

- But what are the facts?
  - *Is the IPv4 sky falling?*

- Geoff Huston, chief scientist at APNIC, has studied the IPv4 consumption rates

Conclusions of Huston's study

- Analysis of IPv4 allocation rates and the BGP routing table
  - Address space predicted to last ~20-40 years
    - Depending on the model adopted
  - Conclusions based on a model – reality will be different!
- IPv4 address space not yet exhausted
  - But impossible to predict future
    - Policies & market change, new technologies emerge
- IPv6
  - Necessary to start now – transition will take time!

Full presentation of Geoff Huston's
study is available at the following URL

http://www.potaroo.net/ispcolumn/2003-07-v4-address-lifetime/ale.pdf
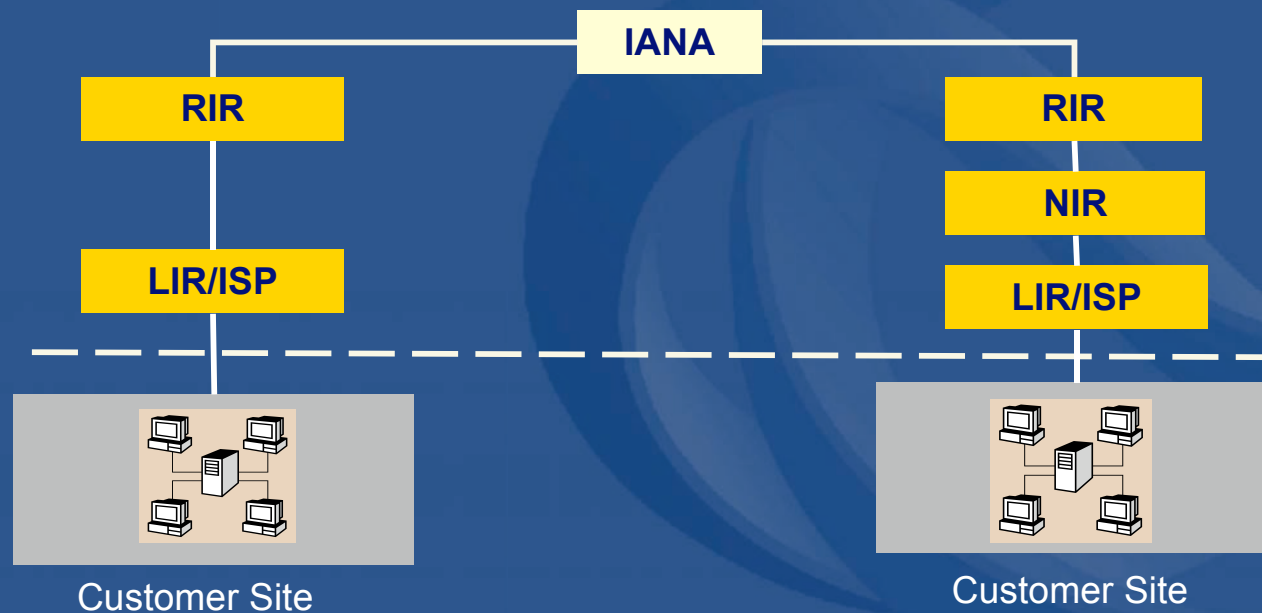
Recommended Reading! ☺

Questions ?

APNIC

IPv6

What's IPv6?

- How many of you have heard about IPv6?

- What do you know about IPv6?

- How many of you have an IPv6 allocation?

IPv6 - Internet for everything!

IPv6 addressing

- 128 bits of address space
    - 16 billion billion addresses available
- Hexadecimal values of eight 16 bit fields
    - X:X:X:X:X:X:X:X (X=16 bit number, ex: A2FE)
    - 16 bit number → 4 digit hexadecimal number

Customer Site   Customer Site

IPv6 address policy goals

Efficient address usage
- Avoid wasteful practices

Aggregation
- Hierarchical distribution
- Limit routing table growth

Registration
- Ensure uniqueness
- Facilitate troubleshooting

Minimise overhead
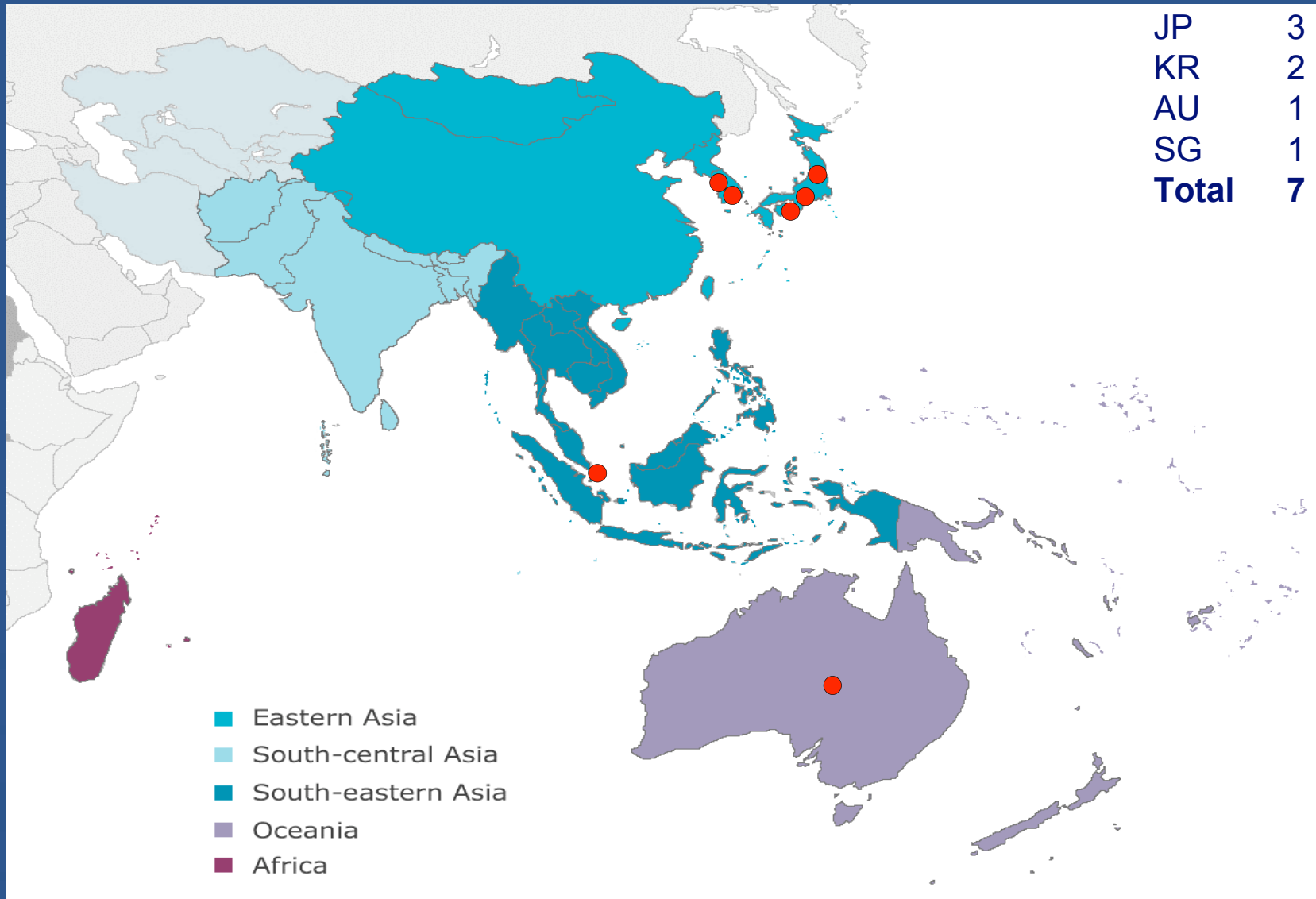- Associated with obtaining address space

Uniqueness, fairness and consistency

What's different and why?
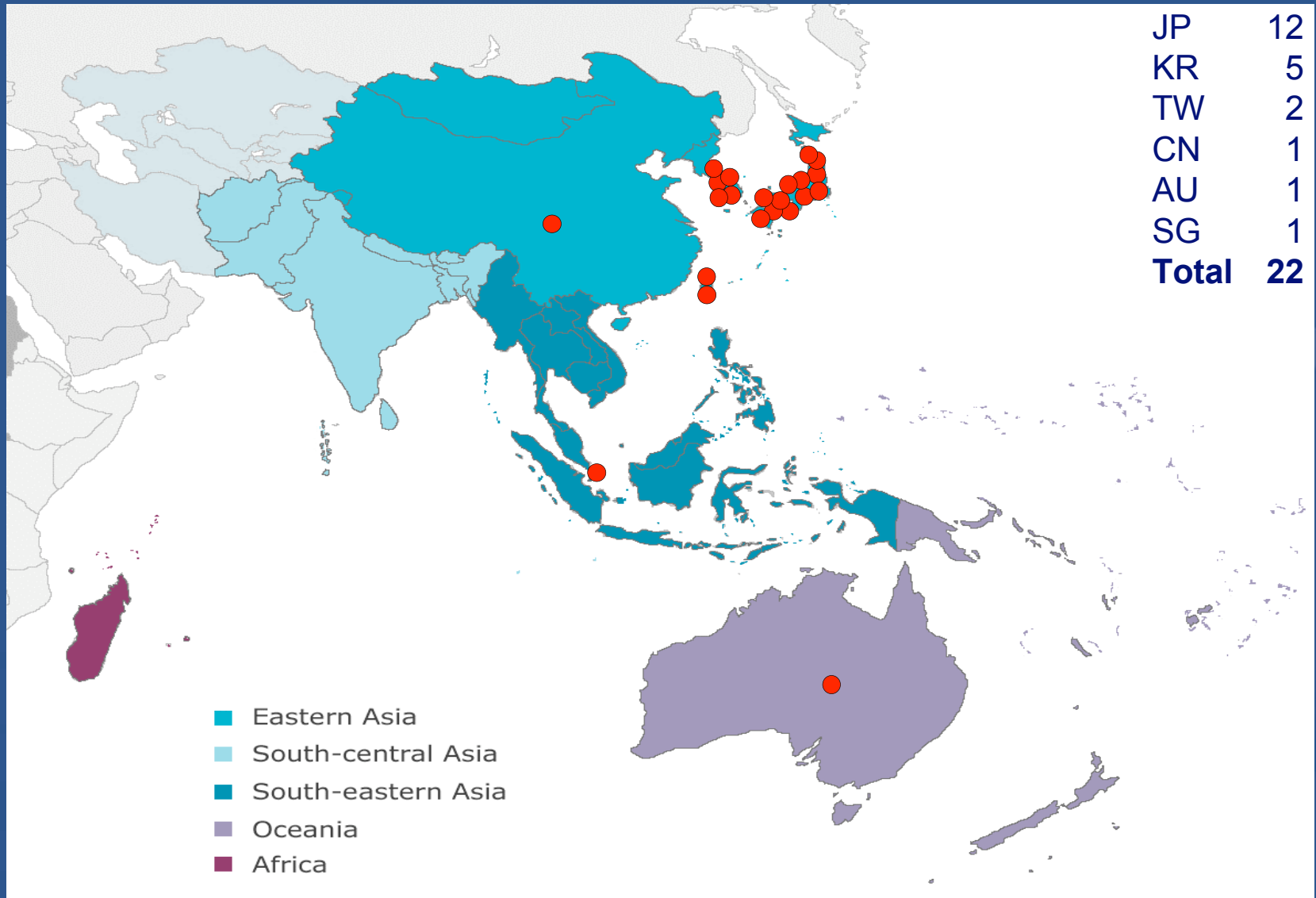
- What's different in the IPv6 goals?

- Why are the IPv6 goals different from those in IPv4?

IPv6 Allocations in Asia Pacific 1999

JP	3
KR	2
AU	1
SG	1
Total	**7**

Eastern Asia
South-central Asia
South-eastern Asia
Oceania
Africa

IPv6 Allocations in Asia Pacific 2000
(cumulative total)

JP	12
KR	5
TW	2
CN	1
AU	1
SG	1
Total	**22**

Legend:
- Eastern Asia
- South-central Asia
- South-eastern Asia
- Oceania
- Africa

IPv6 Allocations in Asia Pacific 2001
(cumulative total)

JP	29
KR	11
TW	2
CN	1
AU	2
SG	1
HK	1
MY	1
Total	**48**

■ Eastern Asia
■ South-central Asia
■ South-eastern Asia
■ Oceania
■ Africa

Asia Pacific Network Information Centre

APNIC

IPv6 Allocations in Asia Pacific 2002
(cumulative total)

JP	50
KR	15
TW	7
CN	4
AU	4
SG	4
HK	2
MY	2
PG	1
TH	3
IN	1
Total	**93**

Eastern Asia
South-central Asia
South-eastern Asia
Oceania
Africa

APNIC
Asia Pacific Network Information Centre

IPv6 Allocations in Asia Pacific 2003
(cumulative total)

JP	64
KR	18
TW	13
CN	9
AU	6
SG	5
HK	2
MY	3
PG	1
TH	3
IN	1
PH	1
ID	3
NZ	1
Total	**130**

Legend:
- Eastern Asia
- South-central Asia
- South-eastern Asia
- Oceania
- Africa

Asia Pacific Network Information Centre

APNIC

IPv6 Allocations in Asia Pacific 2004
(cumulative total)

JP	78
KR	31
TW	16
CN	14
AU	8
SG	5
HK	4
MY	5
PG	1
TH	5
IN	4
PH	2
ID	5
NZ	2
VN	2
MO	1
Total	**183**

- Eastern Asia
- South-central Asia
- South-eastern Asia
- Oceania
- Africa

Asia Pacific Network Information Centre

APNIC

Questions ?

Current address policy

FAQ, Case studies & discussion

FAQ – Internet resources

- *Are IP addresses (like domains) allocated on a per country basis?*
  - No, there's nothing intrinsic in IP that binds it to a country-based distribution model

- *Can I buy IP addresses or AS numbers?*
  - No, Internet resources cannot be bought or sold. It goes against the goals of responsible management

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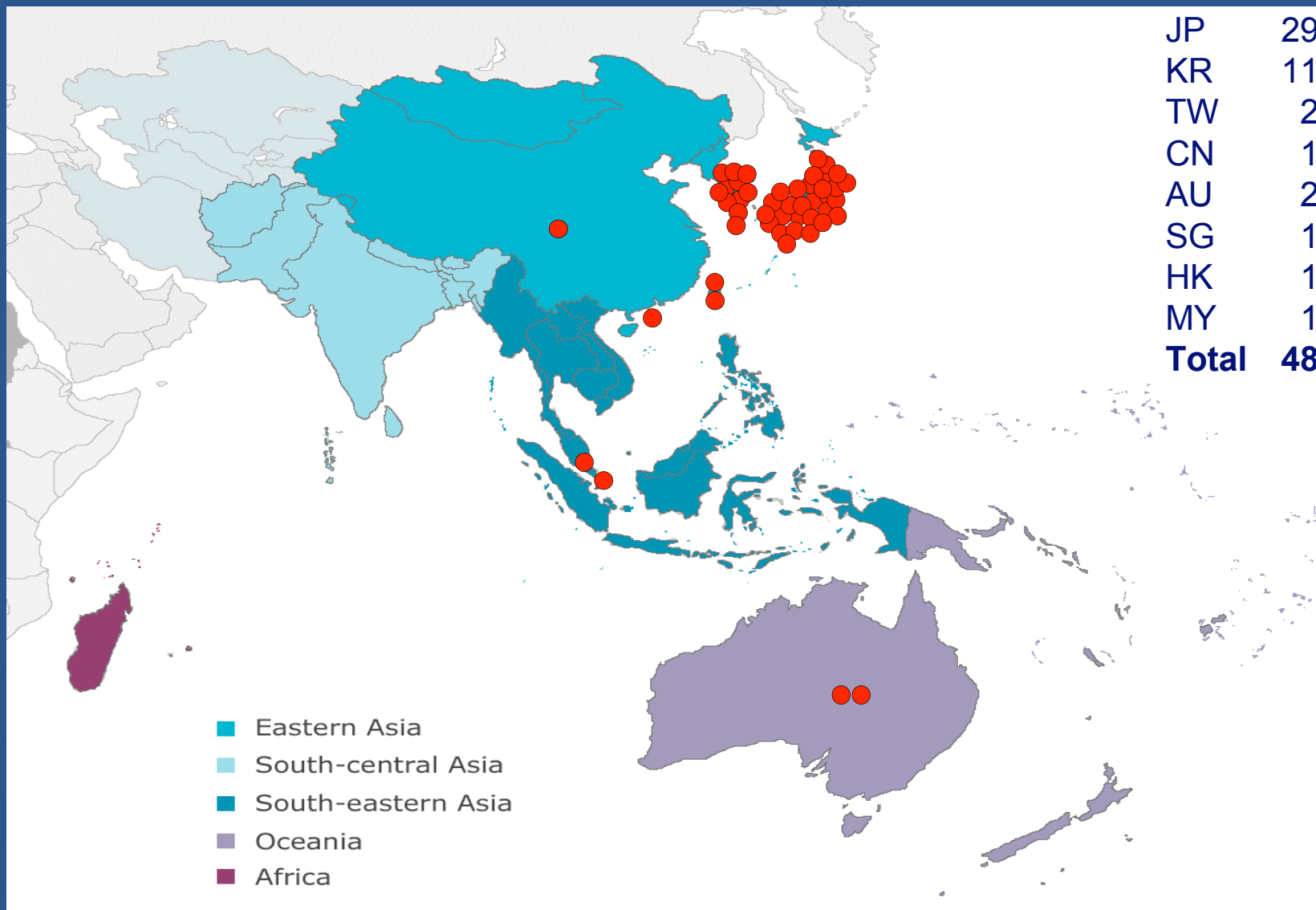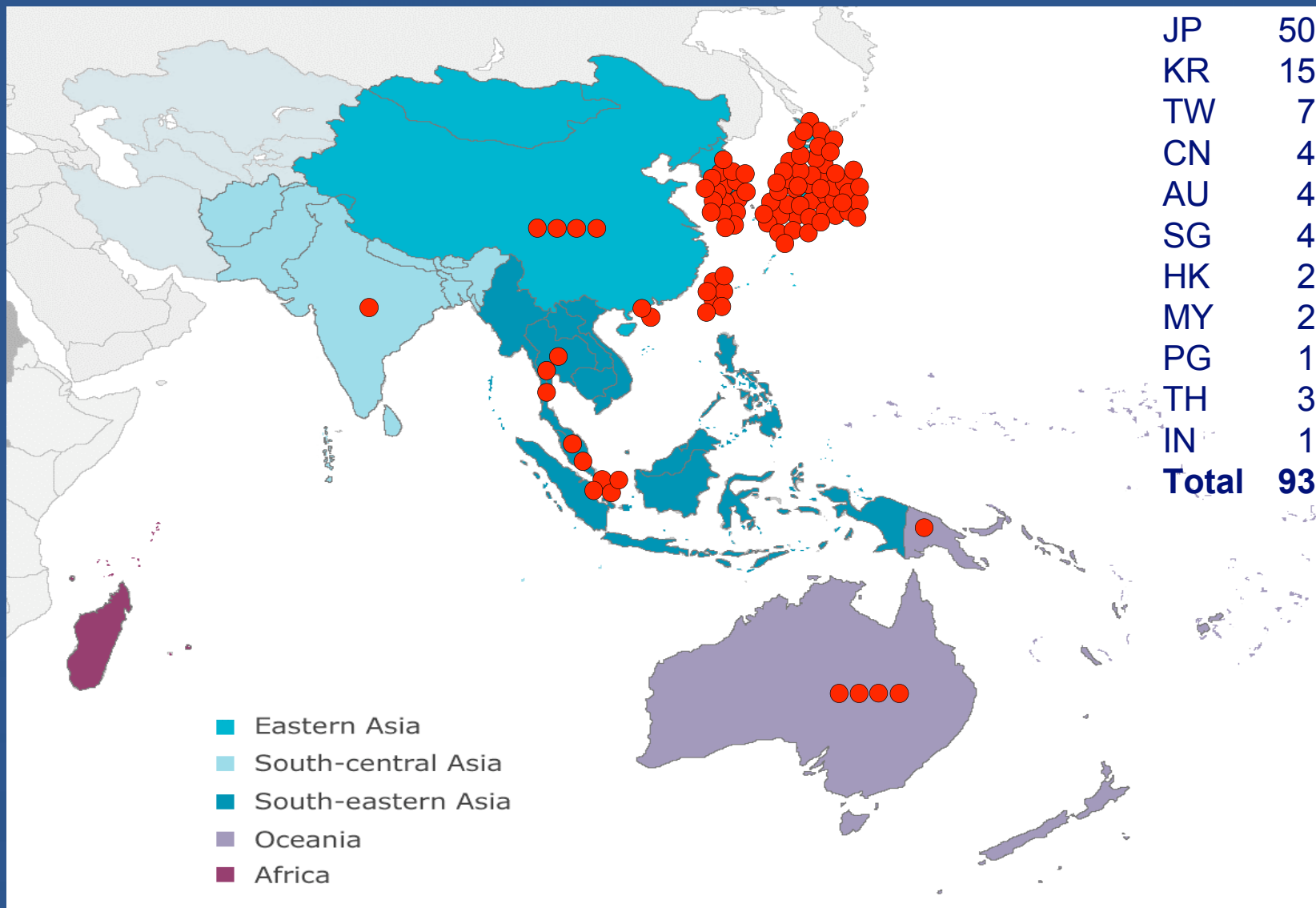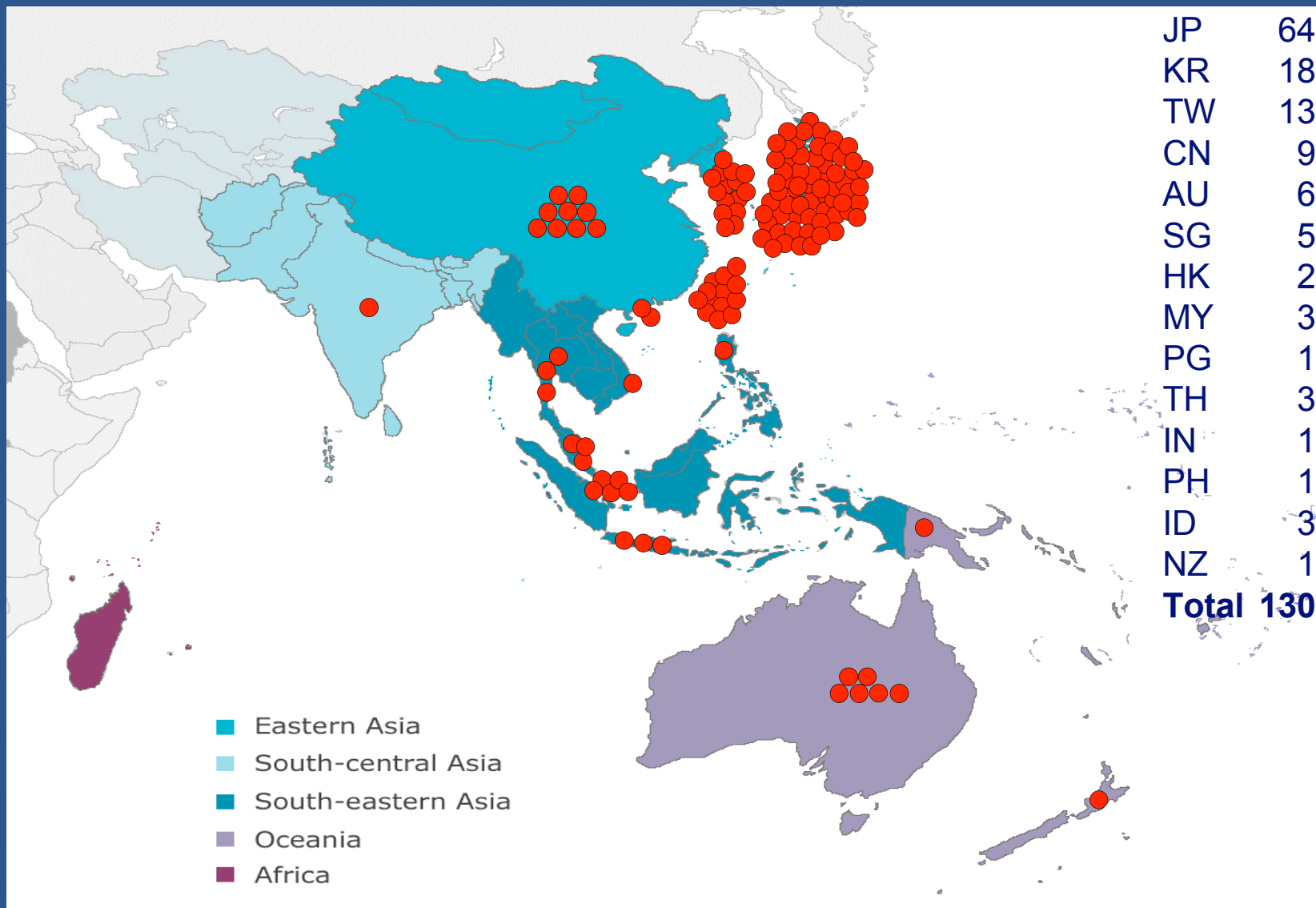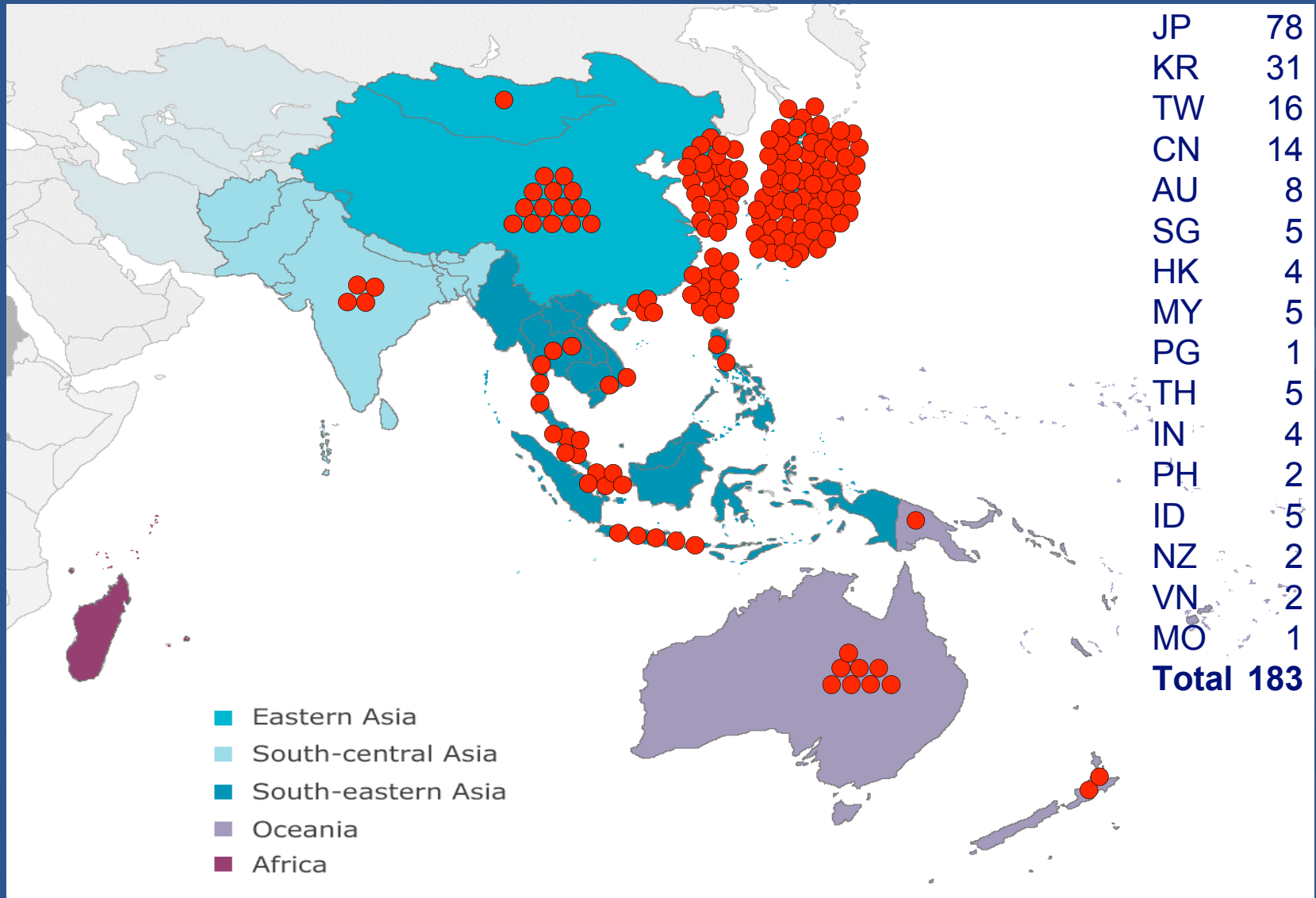
Your thoughts: Internet Resources

- What would happen if Internet resources were sold and bought like any other commodity?

- Is it a good thing for APNIC to recover unused (historical) address space?

FAQ – Providing IP addresses

- *Why should I give out IP addresses to my downstream ISPs and customers?*
    - By assigning your customers IP addresses…
        - You are building long-term relationships
        - You are providing a more complete solution
        - You are reducing the risk of losing your customers
        - You are being a good Internet citizen

    - IP address distribution is part of your responsibility as an LIR

    - This is considered best current practice across the world

FAQ – Getting addresses

- *My upstream provider doesn't want to give me IP addresses. What should I do?*
  - Get another provider! ☺
  - Approach APNIC
    - Contact <helpdesk@apnic.net> - we can talk to your provider
    - We can try to find another solution for you
      - If you meet the allocation criteria, you could become an APNIC member and receive an independent allocation

Some definitions.. a recap

- What is the difference between an 'assignment' and an 'allocation'?

- What do we mean by 'portable' and 'non-portable' address space?

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')

Allocation and Assignment

APNIC
Allocates
to APNIC Member

APNIC Member
Allocates
to downstream

Assigns
to end-user

Downstream
Assigns
to end-user

Customer / End User

/8

APNIC Allocation

/21

Member Allocation

/23

Sub-
Allocation

/27   /26

/24   /25   /26

Customer Assignments
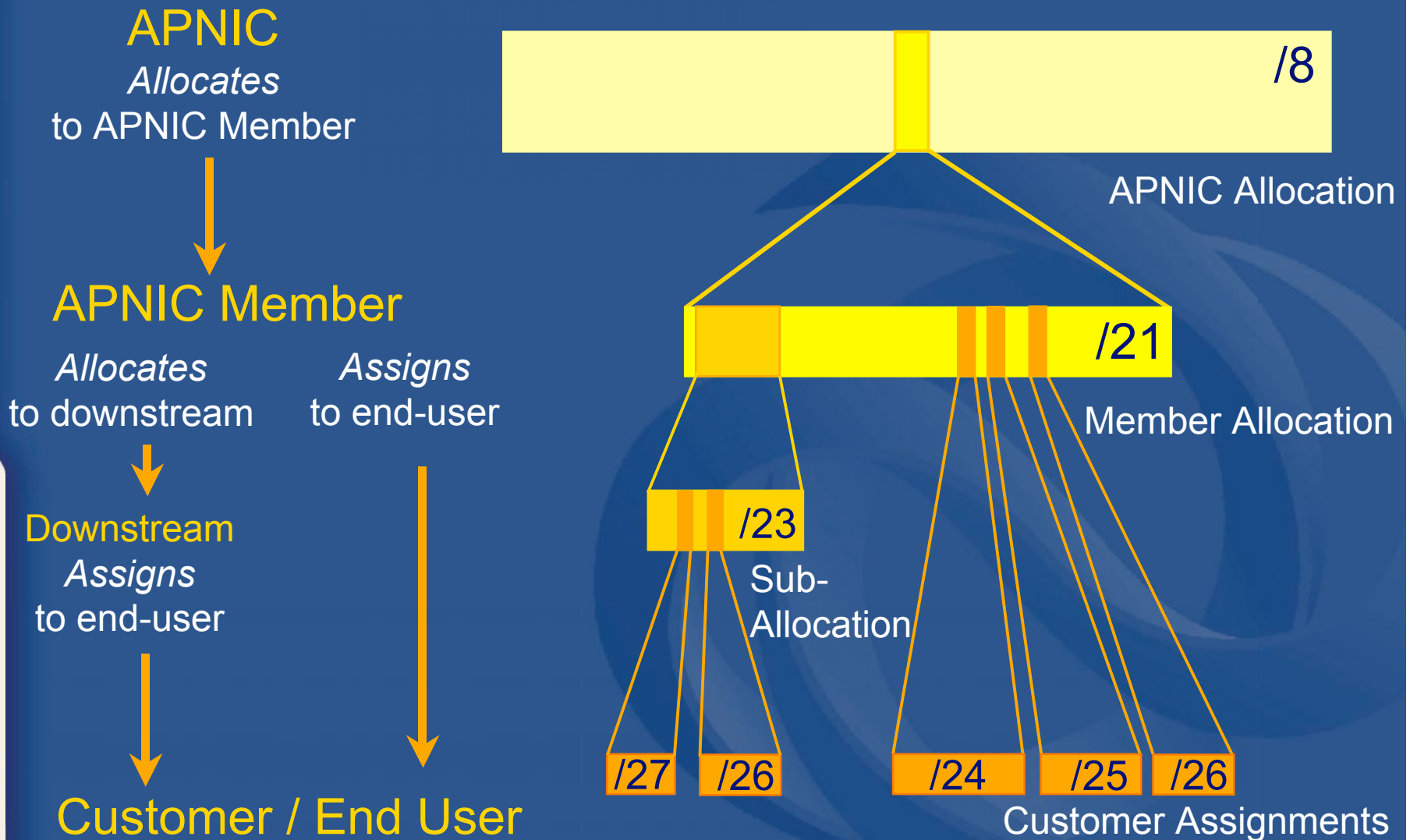
Portable & non-portable

Portable Assignments

– Customer addresses independent from ISP
  • Keeps addresses when changing ISP
– Bad for size of routing tables
– Bad for QoS: routes may be filtered, flap-dampened

Non-portable Assignments

– Customer uses ISP's address space
  • Must renumber if changing ISP
– Only way to effectively scale the Internet
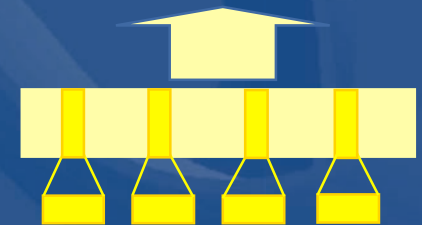
FAQ – IPv4

- *Do I have to become an APNIC member to get address space?*
  - No, you can get a non-portable assignment or a sub-allocation from an upstream provider
  - Or you can get a portable assignment for multihoming

- *Are there criteria for getting an allocation? And what size do you get?*
  - The minimum allocation size is a /21 (2048 addresses)
  - Yes, there are criteria, see next slide…

IPv4 allocation criteria

- The minimum allocation size and criteria have changed (August 2004)
  - Based on community consensus, the criteria has been lowered
    - Previous criteria considered too high by many

New criteria

1a. Have used a /23 (512 addresses) from upstream provider
  - Demonstrated efficient address usage

  OR

1b. Show immediate need for /23
2. Detailed plan for use of /22 (1024 addresses) within 1 year
3. Renumber to new space within 1 year

http://www.apnic.net/docs/policy/proposals/prop-014-v001.html

Your thoughts: Minimum Allocation

- Why is a minimum allocation necessary? Can't people just get whatever they need?

- What are the criteria for a minimum allocation?

Your thoughts: NAT

- Are many of you using NAT?
  - If so, why?

- Is there a perception that NAT should be used to conserve IP addresses?

192.168.2.3 → NAT → 202.12.29.211
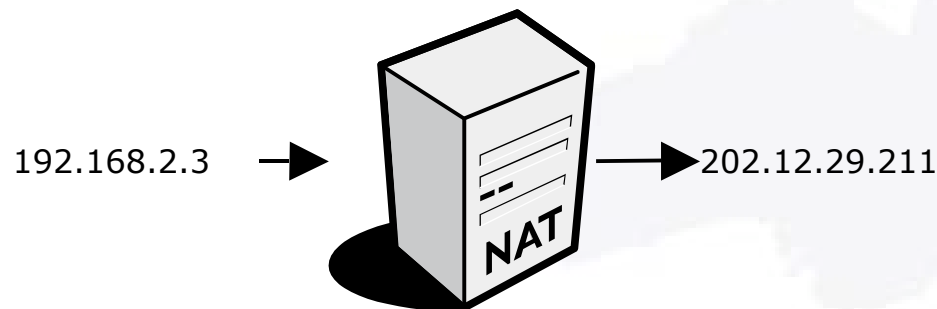
FAQ - NAT

- *Should we use NAT where possible in our networks to conserve IP addresses?*
    - The use of NAT is entirely up to you. APNIC does NOT require you to use NAT to conserve IP addresses
    - NAT…
        - Removes transparency
        - Makes troubleshooting more difficult
        - It creates a single point of failure
        - It increases the complexity

- *If we are using NAT, can we get public addresses from APNIC if we wish to convert the network from private to public?*
    - Yes! (Provided you meet the criteria for the minimum allocation)

Case study - NAT

- *We have only 16 public IP addresses, but we have 520 private addresses for our customers behind NAT. Can we include the private addresses in our request for an allocation from APNIC?*

    - Yes, the private addresses should be included In this case, it represents a total of 536 addresses which meets the criterion of a /23 immediate/past need
        - (So if you can also show a need of a /22 within a year, you qualify for the minimum /21 allocation)

FAQ – IPv6

- *What are the criteria for getting an IPv6 allocation?*

  - You will need to show that you have a detailed & realistic technical plan to make at least 200 /48 customer assignments within two years

  - (You also need to be an LIR)

IPv6

FAQ – IPv6

- *We just learned that criteria for getting an IPv6 allocation. What if I can't show a detailed plan to connect 200 customers?*

  – The policy was made very flexible to encourage the deployment of IPv6. You need to show a plan, just an intention (Don't get restricted by 200 customers)

FAQ – IPv6

- *How many IPv6 allocations have been made in South Asia?*

    – Out of a total of 183 allocations in the region, 4 have been made in South Asia (all in India)

Your thoughts: Routing Table

- How does the growing Global Routing Table affect individual ISPs?

- What can You do to keep the Global Routing Table growth at a minimum?
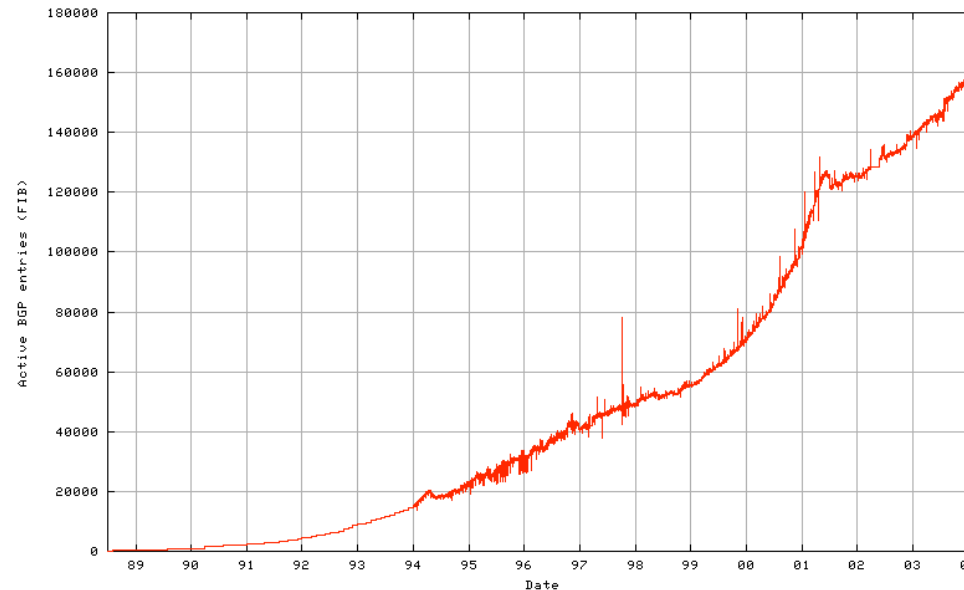
FAQ – Policy development

- *So who decides on all these policies?*
  - Policies are made by the Internet community through a open and transparent, bottom-up process. Anyone interested can participate!

- *So it's not Son then?*
  - Nope! ☺

Your thoughts: Policy Development

- As a member of the Internet community, do you believe that policies affect you?

- What policies do you think should change?

- What steps will you take to change policy?
  - What do YOU see as the barriers to participating?

Some more questions for you ?

- How many of you configure your reverse DNS?

- Do you know what 'lame delegation' is?

Lame delegations policy – new!

- Objective of this new policy
  - To repair or remove persistently lame DNS delegations

- DNS delegations are lame if
  - Some or all of the registered DNS nameservers are unreachable or badly configured

FAQ – Lame delegation policy

- *Why should I care about lame DNS?*
  - Delays in service binding for clients using affected address ranges
  - Refusal of service due to failures during DNS processing
  - Increased DNS traffic
  - Lame DNS reverse delegations affect network users and third parties

FAQ – Lame delegation policy

- *I have just received an email from APNIC stating that my name-servers are lame Why did I receive this email?*

  – You received this because you are listed as one of the contacts in the object
    - You may be an 'admin-c', 'tech-c' or 'zone-c' contact person

FAQ - Lame delegation policy

- *I have received an email from APNIC saying my reverse DNS is 'lame'. What should I do?*

  - Fix the Lameness
  - Correct the name server
    http://www.apnic.net/info/faq/lame-del-faq.html#5

Lame delegation removal procedure

- Identify potential lameness.
  - (two points of test, AU & JP)
- Test the DNS reverse delegation
  - (15 day test period).
- Attempt to notify the domain holder
  - (45 day notice period).
- Disable lame DNS reverse delegation.
  - (If not corrected at end of notice period)

Lame delegation removal procedure (contd…)

- Applicable to each nameserver entry listed in domain objects

- If all nserver entries in a particular domain object are disabled for persistent lameness
  - the entire domain will be withdrawn from the DNS
  - reverse DNS lookup will terminate in the APNIC nameservers with an NXDOMAIN response

Privacy of WHOIS database assignments

- How many of you know that database assignments are by default no longer visible in the APNIC whois database?

- How many of you know why?

Motivation for customer privacy policy

- 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 privacy

- Policy implementation
  - Completed in September 2004
  - New system developed
    - Public data
      - Includes portable addresses (inetnum objects), and other objects e.g.route objects
      - Public data: must be visible
    - Private data
      - Can include non-portable addresses (inetnum objects)
      - Members have the option to make private data visible
  - Customer assignments
    - Should be private data
    - Can be changed to be public data (public data is an optional choice)

FAQ- Privacy of WHOIS database assignments

- *Where are my customer assignments?*
  - When the privacy of customer assignment policy was implemented, all customer assignments were moved to a private WHOIS database

  - However you can still see your customer assignments through 'MyAPNIC'

FAQ- Privacy of WHOIS database assignments

- *How do I move the customer assignment from private database to public customer & vice-versa ?*
  - Use MyAPNIC!

APNIC

What do you see in MyAPNIC?

Public records

Private records

If you query this data in the APNIC Whois Database!!!!

How to move an object from public to private

Go to "Move to private"

Questions ?

Next steps

Internet resource issues in the SANOG community

- *Let's review…*

- Ok, so I have an opinion. How do I express it?

① Contact APNIC staff / SIG chair

② Participate on the mailing list

③ Participate in the meetings

Expressing Your opinion (1)

1 Contact APNIC staff / SIG chair

- Speak to us here! ☺
  - We want to hear your thoughts!
  - We can help channel your feedback

- email: `<helpdesk@apnic.net>`

Helpdesk

- Contact the SIG-chairs directly
  - Policy-SIG: Takashi Arano
    - email: `<sig-policy-chair@apnic.net>`
  - Overview of all SIGs:
    - http://www.apnic.net/community/lists/

Expressing Your opinion (2)

2 — Participate on the mailing list

- Mailing Lists:
  - APNIC: http://www.apnic.net/community/lists/
  - Discuss on the SANOG mailing list!

  - Policy-sig: <sig-policy@apnic.net>
    - Read archives at: http://www.apnic.net/mailing-lists/sig-policy/

- Send in a formal proposal

- Put forward a suggestion, ask a question
 - Start a discussion!

Expressing Your opinion (3)

Participate in the meetings

- Come to an APNIC meeting!
  - Apply for fellowship
  - Give a presentation
  - Voice your opinions
  - Discuss with others

- Follow webcasts, transcripts and jabber chat
  - Webcast at http://streaming.apnic.net/meetings/18/plenary/pw-intro.mov
  - Transcripts at http://www.apnic.net/meetings/18/docs/transcripts/dns-sig.txt

- Participate through the SANOG meeting!
  - SANOG is part of the APNIC community

Come to the APNIC meeting!

19th APNIC Open Policy Meeting
16 – 25 February 2005   Kyoto – Japan
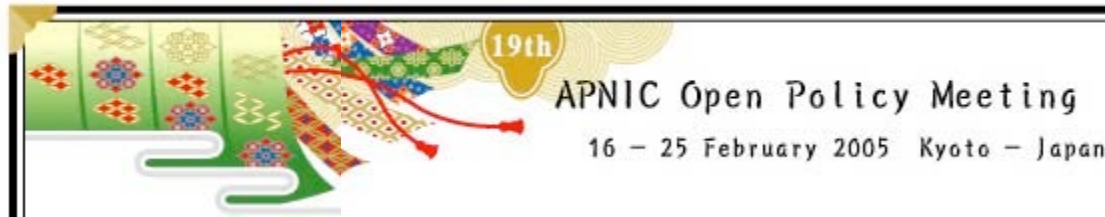
Next meeting in conjunction with

APRICOT 2005

Kyoto, Japan 16-25 February

- Participate in policy development
- Attend workshops, tutorials & presentations
- Exchange knowledge and information with peers
- Stay abreast with developments in the Internet
- View multicast online
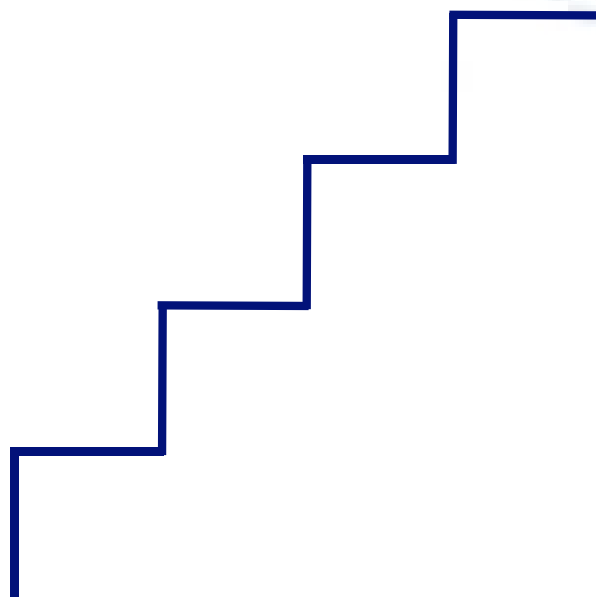- Provide your input in matters important to you

http://www.apnic.net/meetings/

Your steps

- What steps will You be taking to participate in the APNIC community?

Thank You

Don't be a stranger… ☺

Material available at: www.apnic.net/training/recent/