

# Resource management: IPv4 depletion and IPv6 registration

Australian IPv6 Summit 2007  
Canberra ACT

Leo Vegoda  
Manager, Number Resources  
IANA



# Overview

- ▶ About IANA
- ▶ Resource registries
  - ▶ IPv4
  - ▶ IPv6
- ▶ Resource management
- ▶ Education and outreach role



Where is IANA?

# IANA's role

- ▶ 3 main areas of responsibility
  - ▶ Protocol registration
  - ▶ DNS management
    - ▶ root DNS
    - ▶ .arpa and .int
  - ▶ Internet number resource management
    - ▶ IPv4, IPv6 and AS Numbers

# IPv4 registries

- ▶ IPv4 address space
- ▶ Multicast address space
  - ▶ Requests received from the public
  - ▶ Reviewed by an IESG designated expert

# IPv4 registries

**NOT TO  
SCALE**



# IPv4 registries

ipv4-address-space

**NOT TO  
SCALE**

# IPv4 registries

ipv4-address-space

multicast-  
addresses

**NOT TO  
SCALE**

# IPv6 registries

- ▶ IPv6 address space
- ▶ IPv6 unicast assignments
  - ▶ Where each RIR has a /12
- ▶ IPv6 special purpose address registry
  - ▶ TEREDO and ORCHID assignments
- ▶ IPv6 multicast registry

# IPv6 registries

**REALLY  
NOT TO  
SCALE**

# IPv6 registries

ipv6-address-space

**REALLY  
NOT TO  
SCALE**

# IPv6 registries

ipv6-address-space

unicast-  
assignments

**REALLY  
NOT TO  
SCALE**

# IPv6 registries

ipv6-address-space

unicast-  
assignments

iana-  
special

**REALLY  
NOT TO  
SCALE**

# IPv6 registries

ipv6-address-space

unicast-  
assignments

multicast-  
addresses

iana-  
special

**REALLY  
NOT TO  
SCALE**

# RIR address space management

- ▶ /12 assignments to RIRs
  - ▶ /32 minimum allocations to LIRs
    - ▶ /48 assignments to end users
- ▶ Room for a million allocations to LIRs
- ▶ /12 chosen based on sparse allocation (binary chop) allocation method

# RIR address space management

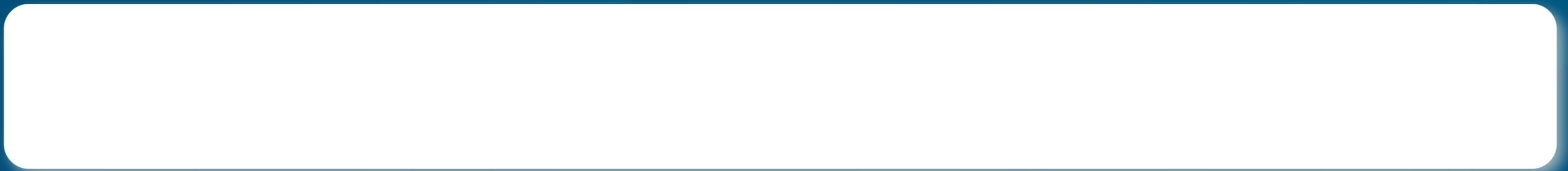
- ▶ /12 assignments to RIRs
  - ▶ /32 minimum allocations to LIRs
    - ▶ /48 assignments to end users
- ▶ Room for a million allocations to LIRs
- ▶ /12 chosen based on sparse allocation (binary chop) allocation method

**ACTUAL SIZE  
MAY VARY**

# Binary chop

**SO  
NOT TO  
SCALE**

# Binary chop



**SO  
NOT TO  
SCALE**

# Binary chop

1

**SO  
NOT TO  
SCALE**

# Binary chop

1

2

**SO  
NOT TO  
SCALE**

# Binary chop



**SO  
NOT TO  
SCALE**

# Binary chop



**SO  
NOT TO  
SCALE**

# Binary chop



**SO  
NOT TO  
SCALE**

# Binary chop



**SO  
NOT TO  
SCALE**

# Binary chop



**SO  
NOT TO  
SCALE**

# Binary chop

- ▶ Sparse allocation maximises potential aggregation
- ▶ APNIC uses this mechanism
- ▶ The other RIRs don't



# Registry management

- ▶ XMLification
  - ▶ XML backend
  - ▶ Multiple publication formats
  - ▶ Support for non-Latin character sets
- ▶ XML directorate have been asked to review the registry schemas

# Resource management

- ▶ IPv4 address space reclamation
  - ▶ 14.0.0.0/8 recovery
- ▶ 46.0.0.0/8 returned by BBN
- ▶ 49 and 50.0.0.0/8 status updated to reserved

# Discussion areas



# Discussion areas



- ▶ Potential for IPv4 market: formal or informal
  - ▶ Ongoing discussion in all 5 RIR communities

# Discussion areas



- ▶ Potential for IPv4 market: formal or informal
  - ▶ Ongoing discussion in all 5 RIR communities

# Discussion areas



- ▶ Potential for IPv4 market: formal or informal
  - ▶ Ongoing discussion in all 5 RIR communities
- ▶ Encouraging IPv4 reclamation
  - ▶ Working with RIRs to reclaim unused address space

# Discussion areas



- ▶ Potential for IPv4 market: formal or informal
  - ▶ Ongoing discussion in all 5 RIR communities
- ▶ Encouraging IPv4 reclamation
  - ▶ Working with RIRs to reclaim unused address space

# Discussion areas



- ▶ Potential for IPv4 market: formal or informal
  - ▶ Ongoing discussion in all 5 RIR communities
- ▶ Encouraging IPv4 reclamation
  - ▶ Working with RIRs to reclaim unused address space
- ▶ Used but unallocated address space
  - ▶ Article in IPJ
  - ▶ Talks at operators meetings

# Discussion areas



- ▶ Potential for IPv4 market: formal or informal
  - ▶ Ongoing discussion in all 5 RIR communities
- ▶ Encouraging IPv4 reclamation
  - ▶ Working with RIRs to reclaim unused address space
- ▶ Used but unallocated address space
  - ▶ Article in IPJ
  - ▶ Talks at operators meetings





Thank you

[leo.vegoda@icann.org](mailto:leo.vegoda@icann.org)

