



# IPv6: The Future of the Internet?

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# Overview

Introduction to APNIC

Introduction to IPv6

Obtaining IPv6 Address Space

References and RFCs

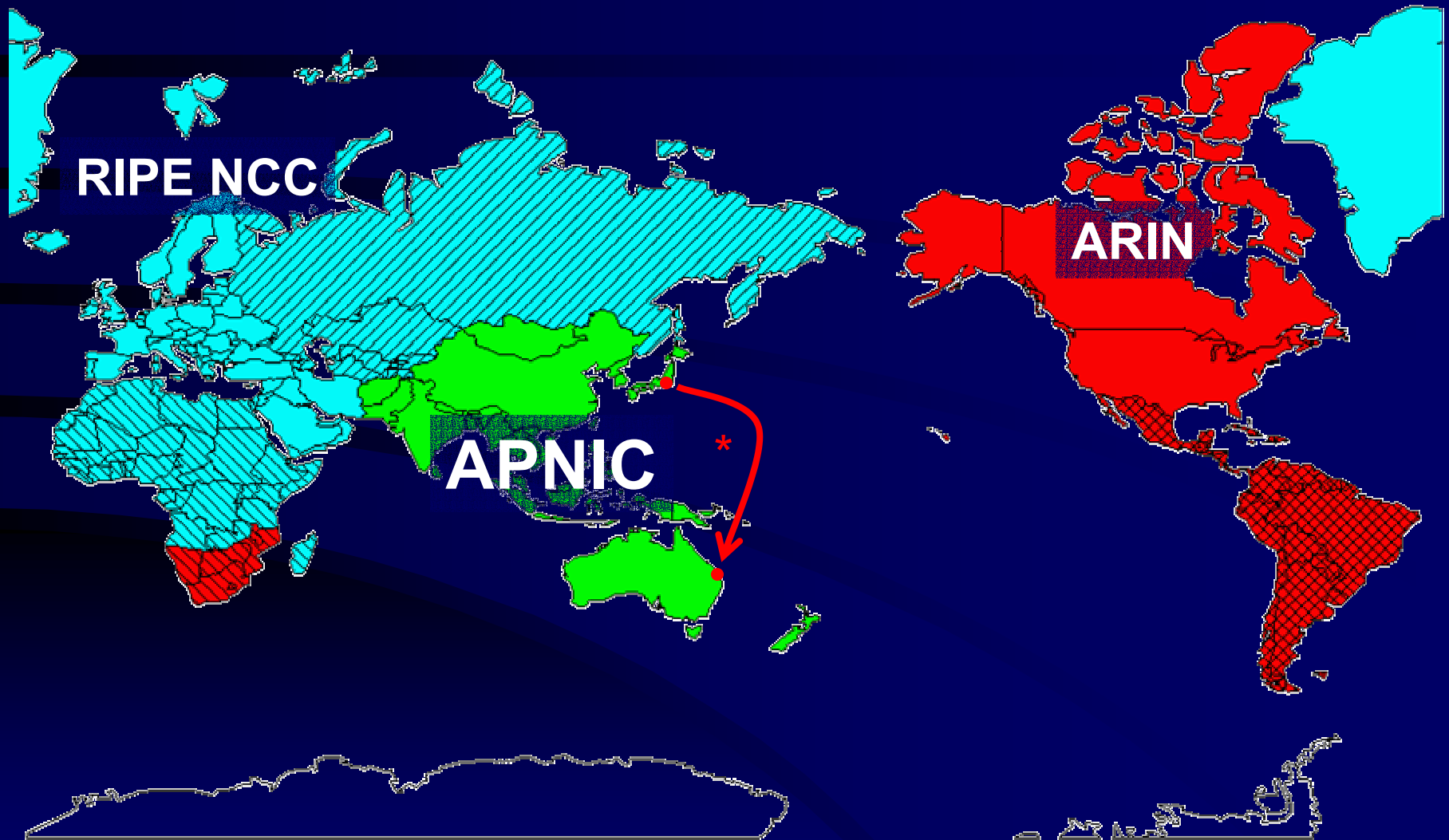


# What is APNIC?

- Regional Internet Registry (RIR) for the Asia Pacific Region
  - Resource registration, allocation and support
  - IP addresses, AS numbers, in-addr.arpa domains
- Membership-based organisation
  - Non-profit, neutral and impartial
- ***Not: an operations forum***
- ***Not: a standards development body***



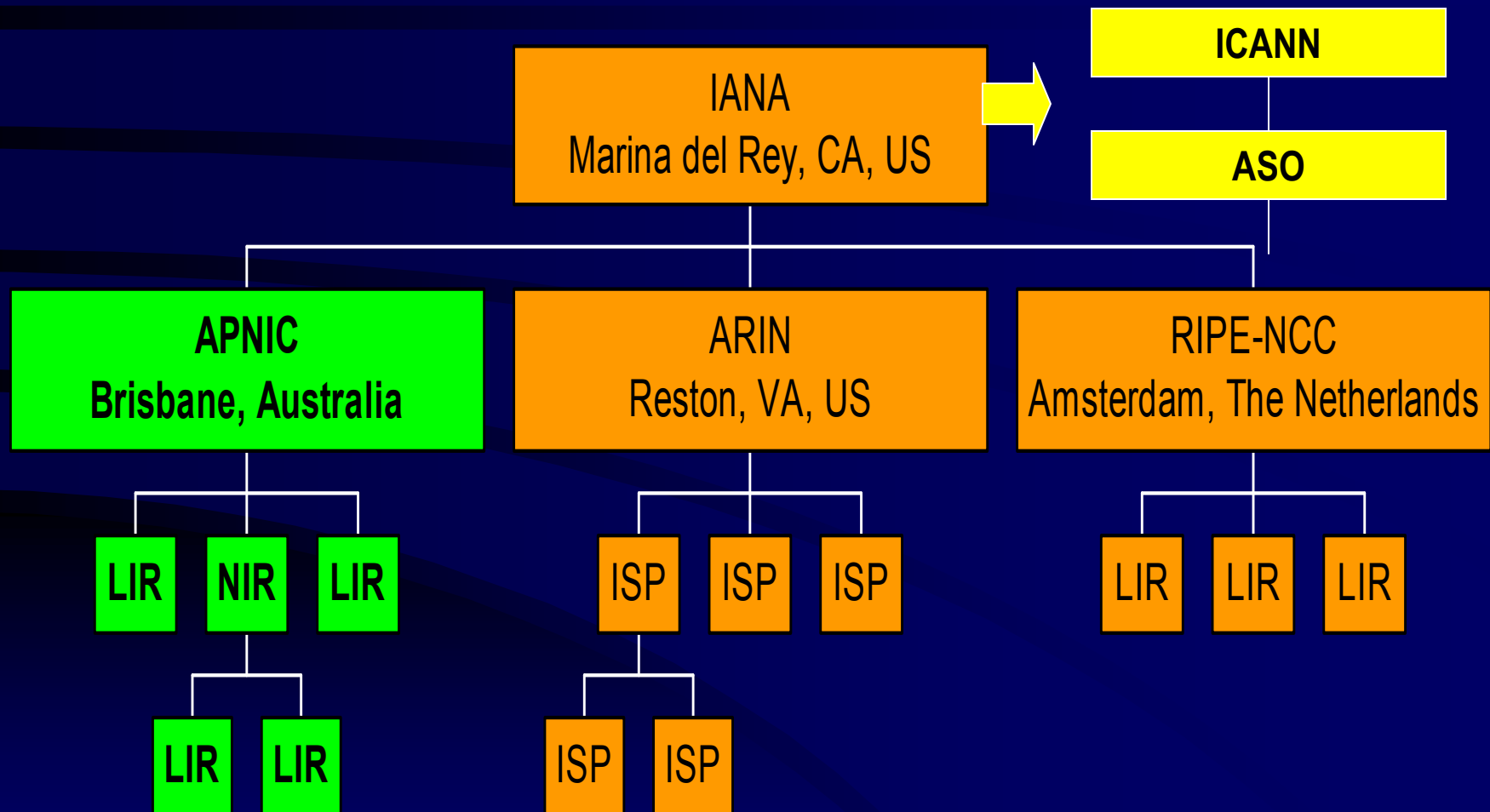
# APNIC Region



\* Relocation 1998

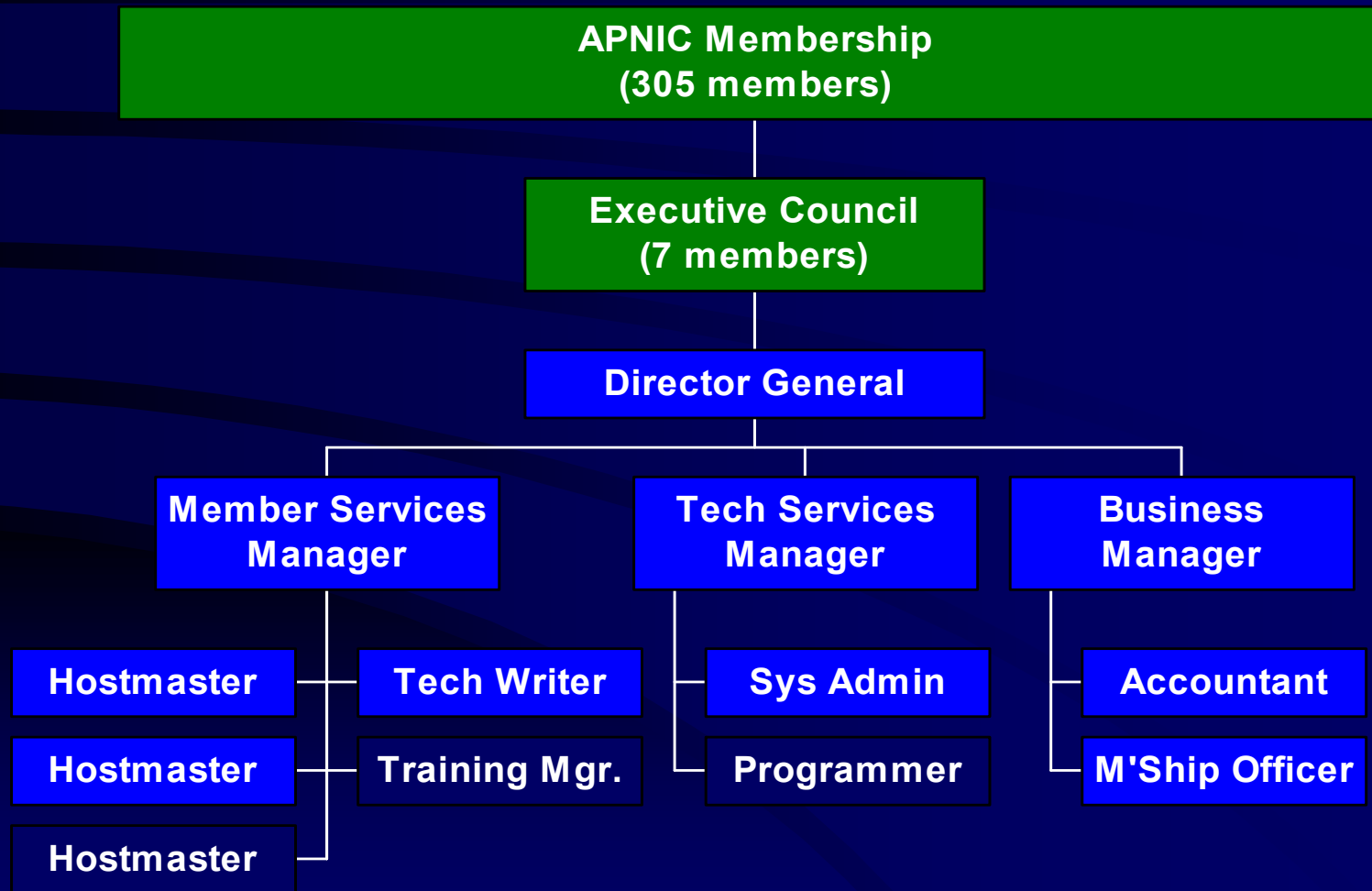


# Internet Registry Hierarchy





# APNIC Structure





# APNIC Services

## Resource allocation

- Internet (IP) addresses
- Autonomous system (AS) numbers
- *In-addr.Arpa* domains

## Resource registration

- Registration service
- Registration servers: “whois” and reverse DNS

## Member training and support



# Recent Developments

## Secretariat relocation

- Started Feb 1998, completed Aug 1998

## Capacity building

- Systems, services, staffing

## Documentation activities

- Review and update, restructure

## Training services

- Started at APRICOT





## Introduction to IPv6

*“Take the internet where no other network has gone before!”*

- Vint Cerf



# IPv6 Terminology

## TLA (top level aggregator)

- Transit providers & exchange points will work directly with regional registry

## NLA (next level aggregator)

- Mainly ISPs connected to transit providers will make most of the end-user assignments

## SLA (site level aggregator)

- The end-user (16bits of address space)

## Interface ID

- Host



# IPv6 Design Goals (ipng)

## Addressing and Routing

- uniform hierarchical addressing
- simplify routing and renumbering

## Eliminate Special Cases

- minimise need for NAT

## Minimise Administrative Workload

- simplify renumbering when moving ISP etc
- provide more address space

## Security

- encryption, authentication and integrity

## Mobility

- autoconfiguration, prefix migration



# IPv6 Addresses

Aggregatable global unicast format - RFC2374



Bootstrap process - RFC2450



Special TLA ID 0x0001



# IPv6 Hierarchy

## Format prefix 1

- TLA: 8192 IDs (not counting reserved space)
- NLA: 16 million IDs per TLA
- SLA: 65,000+ IDs per NLA

## Bootstrap process

- subTLA: 8192 ids
- NLA: 512,000+ IDs per subTLA



# Current IPv6 Networks

- 6bone
  - 'Official' experimental network
  - <http://www.6bone.net>
- 6ren
  - IPv6 research and educational networks
  - <http://www.6ren.net>



# IPv4/IPv6 Transition (ngtrans)

## Transition Strategies

- Dual IPv4/IPv6 stacks
- IPv6 over IPv4 Tunneling
- SOCKS based IPv6/IPv4 gateway

## Related Documents

- Next Generation Transition Working Group
- <http://www.ietf.org/html.charters/ngtrans-charter.html>



# IPv6 Timeline

- 1995: RFC 1884 IPv6 address architecture
- 1997: RFC 2073 unicast address format
- 1998: RFC 2460 IPv6 protocol specification
- 1998: 6bone network deployed
- 1999 May: RIRs submit IPv6 policy document to IANA
- 1999 June: policy document revised
- 1999 July: IANA approve policy document and allocate sub-TLA space to the RIRs





# Obtaining IPv6 Address Space

## Read the policy document

- <http://www.apnic.net/drafts/IPv6/IPv6-policy-280599.html>

## Submit IPv6 subTLA request form

- <http://www.apnic.net/drafts/IPv6/draft-IPv6-request.htm>

## Some points to remember during bootstrap

- Need to be an APNIC member
- Need 3 AS peers in the default free zone
- Plan to provide IPv6 service
- 6bone experience or 40 IPv4 customers



# IPv6 Related RFCs

RFC 2373: IP version 6 addressing architecture

RFC 2374: An IPv6 aggregatable global unicast address format

RFC 2460: Internet protocol, version 6 (IPv6) specification

RFC 2461: neighbor discovery for IP version 6 (IPv6)

RFC 2462: IPv6 stateless address autoconfiguration

RFC 2463: Internet control message protocol (icmpv6)

Current proposed standards include:

RFC 1886: DNS extensions to support IP version 6

RFC 1887: An architecture for IPv6 unicast address allocation

RFC 1981: path MTU discovery for IP version 6

RFC 2023: IP version 6 over PPP

.... Too many to list



# IPv6: The future of the Internet?

Questions?