

# IPv6: Internet Addresses Forever

Internet Governance Forum

17 November 2009

# Overview

- Motivation for IPv6
- IP Address Status
- IP Address management
- The Next Step: IPv6
- Conclusions

# The “Narrow Waist”

*Applications*

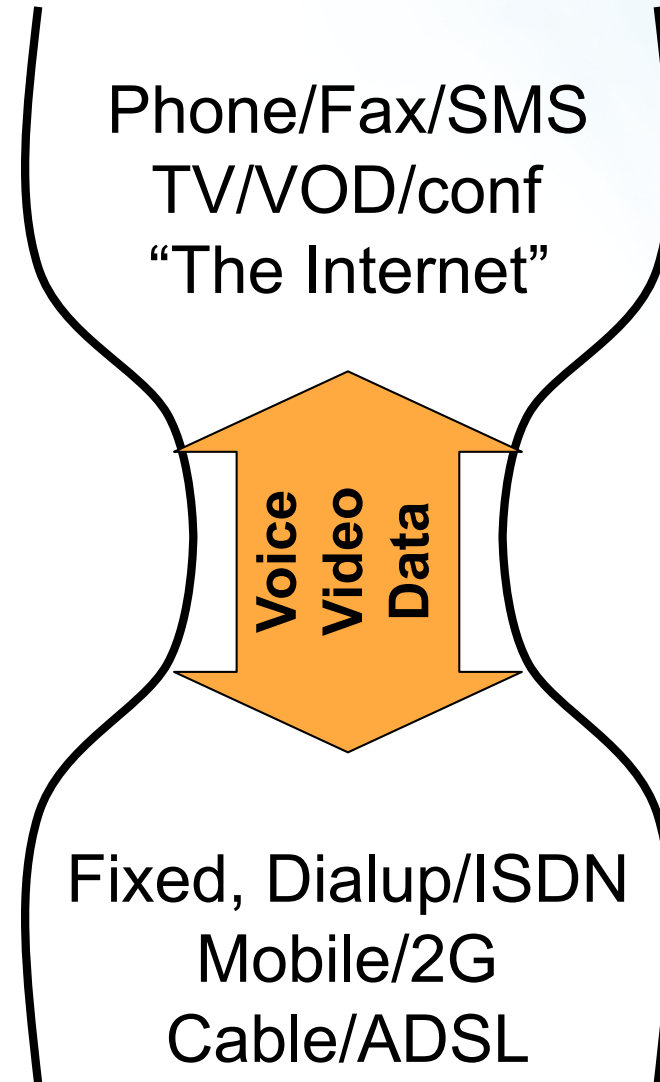
Phone/Fax/SMS  
TV/VOD/conf  
“The Internet”

*Network*

Voice  
Video  
Data

*Infrastructure*

Fixed, Dialup/ISDN  
Mobile/2G  
Cable/ADSL

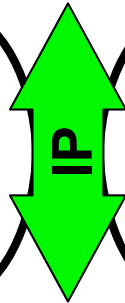


# The “Narrow Waist” – Tomorrow

*Everything over IP*

Voice, email, IM  
Video, TV, conf  
WWW+++

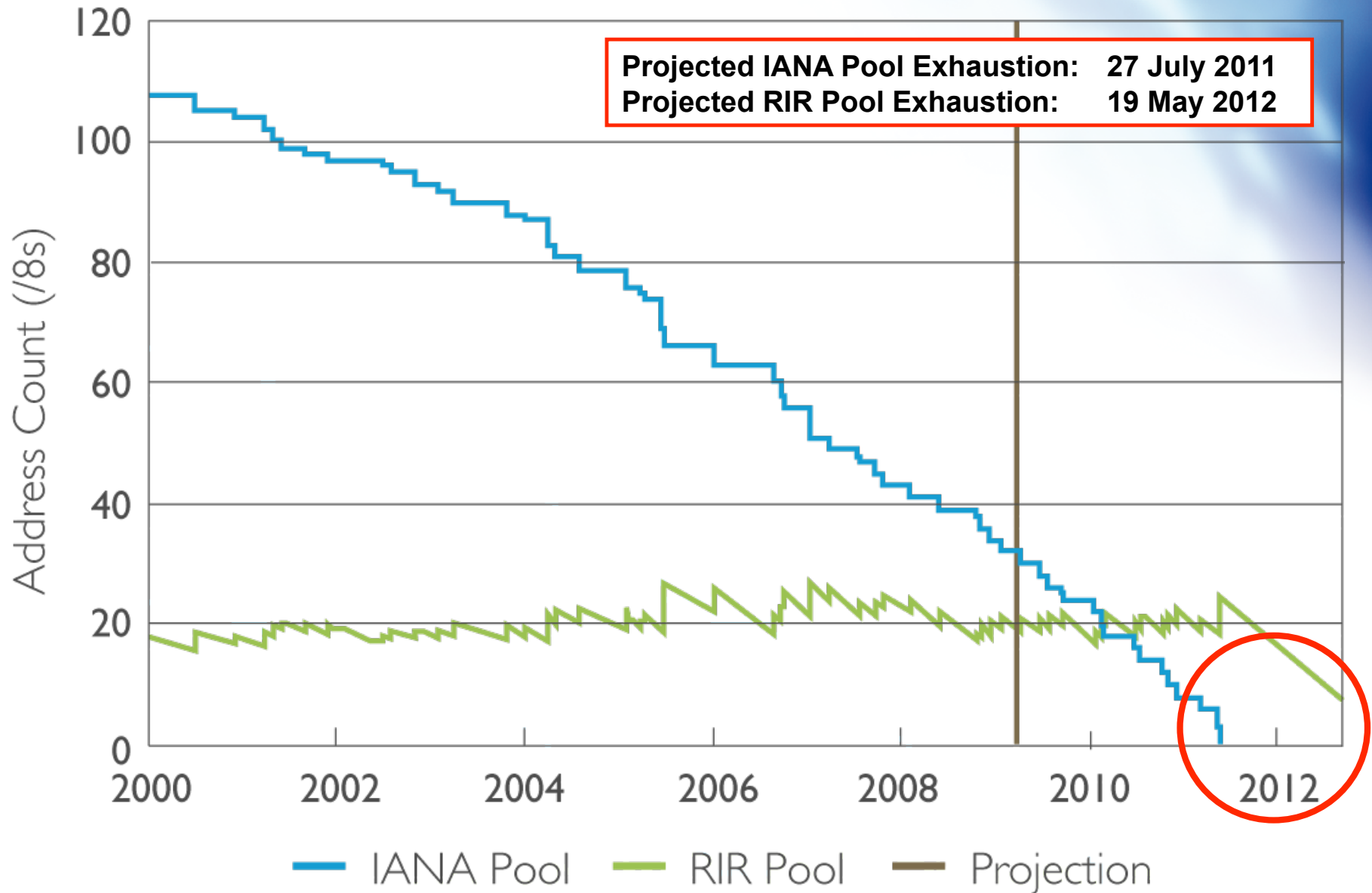
*Network*



*IP over Everything*

802.11\*/WiMax  
Mobile/3G  
Cable/\*DSL  
FTTH, ETTH

# IPv4 Consumption: Projection



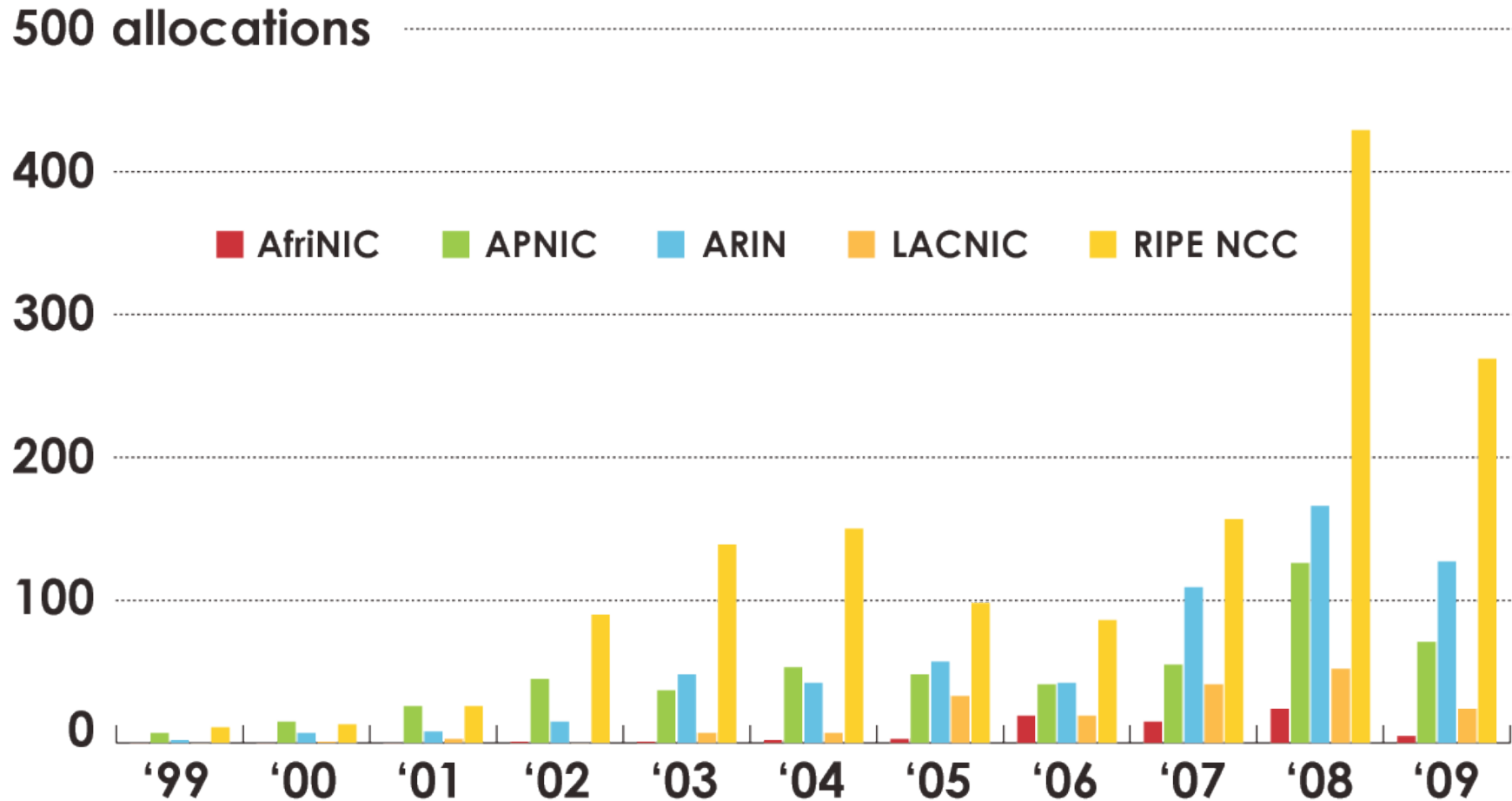
## A quick summary

- IPv4 addresses are a finite resource
  - Only about 10% remain
- But the demand for IP addresses will keep growing
  - More devices are requiring IP addresses
  - IP addresses are a pre-requisite for broadband penetration
- The remaining 10% is not large enough to support such demand
- ***IPv6 is the only solution !***



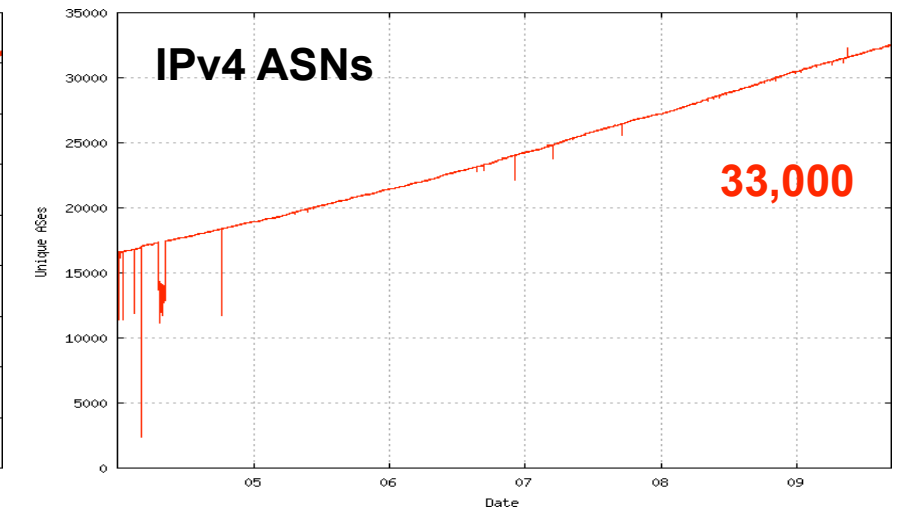
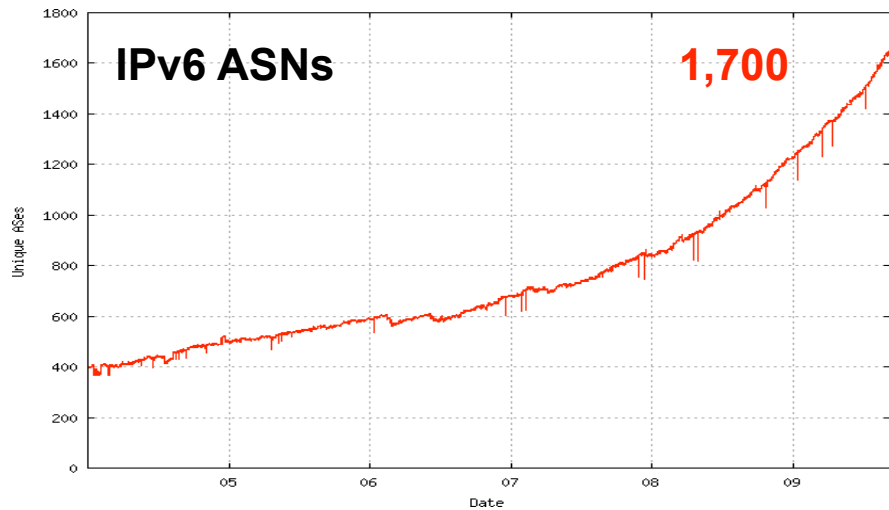
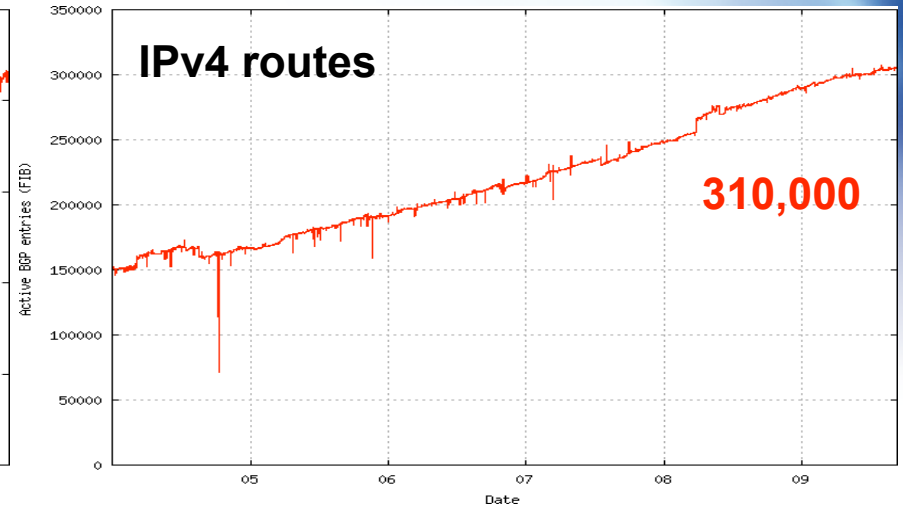
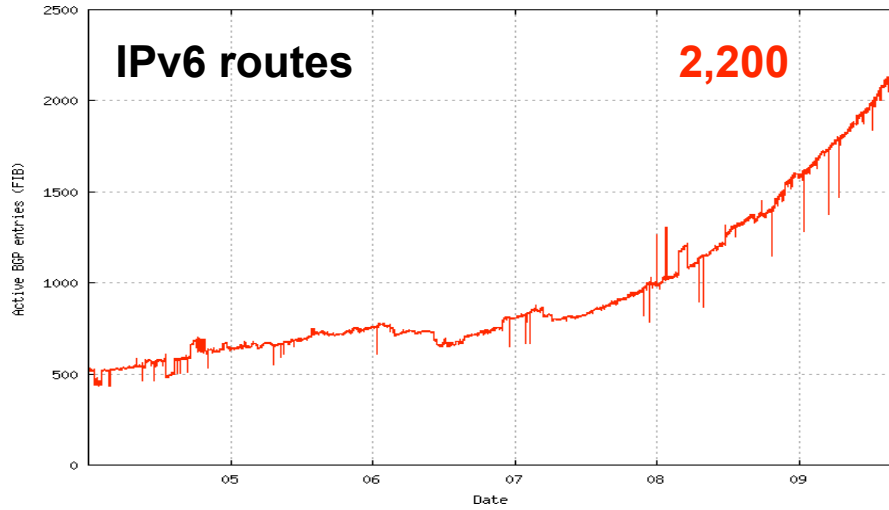
# IPv6 Allocations RIRs to LIRs/ISPs

How many allocations have been made by each RIR by year?



2001:610:240:0 193.0.0.202 62.109.128 195.048.02.03 178.12.02.02 2001:610:240 193.0.0.203  
 62.109.128 195.048.02.03 178.12.02.02 2001:610:240 193.0.0.202  
 193.0.0.203 2001:610:240:0 193.0.0.202 62.109.128 195.048.02.03 178.12.02.02 2001:610:240 193.0.0.203  
 2001:610:240:0 193.0.0.202 62.109.128 195.048.02.03 178.12.02.02 2001:610:240 193.0.0.203  
 Number Resource Organization

# IPv6 deployment



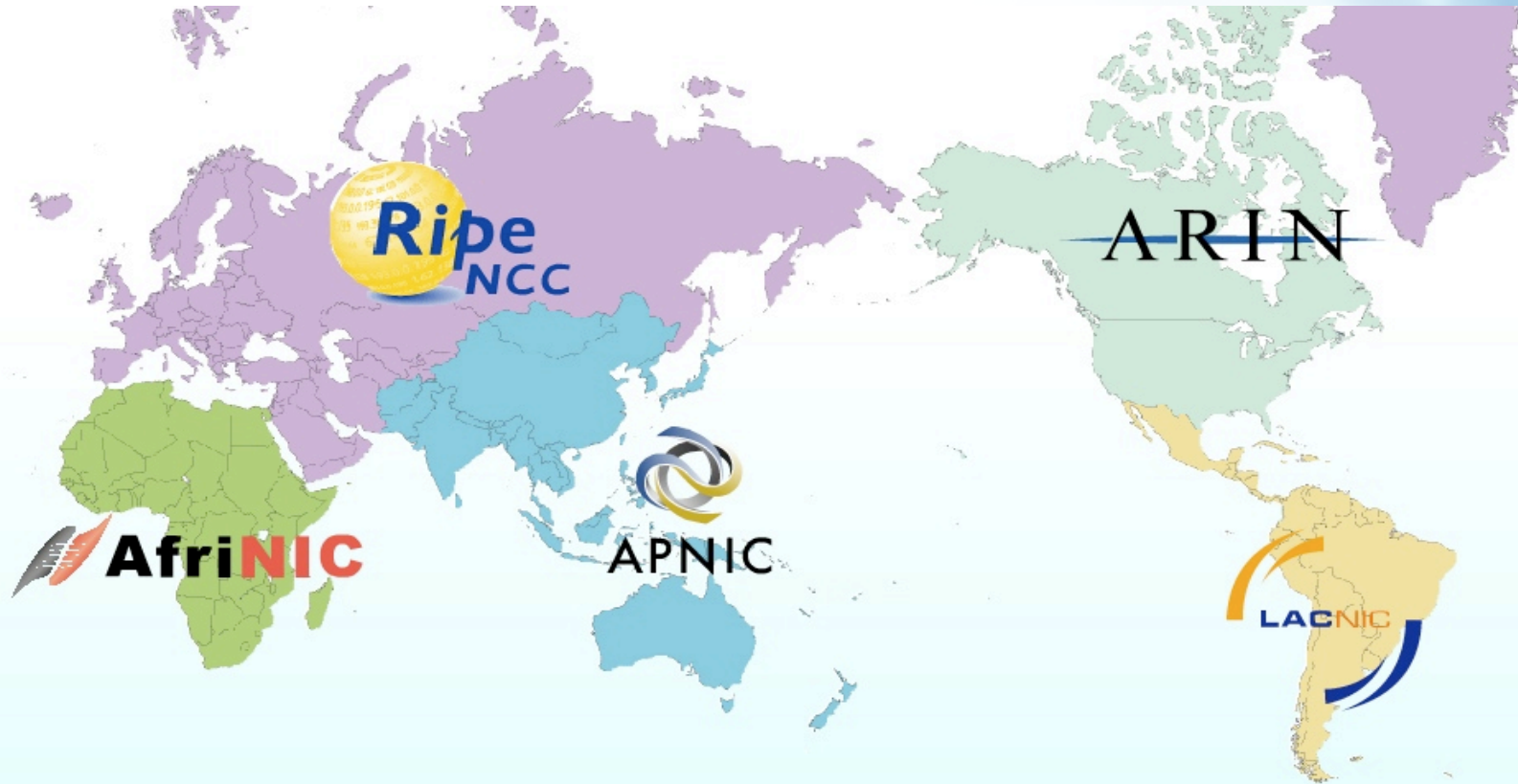




# How are IP Addresses Managed?

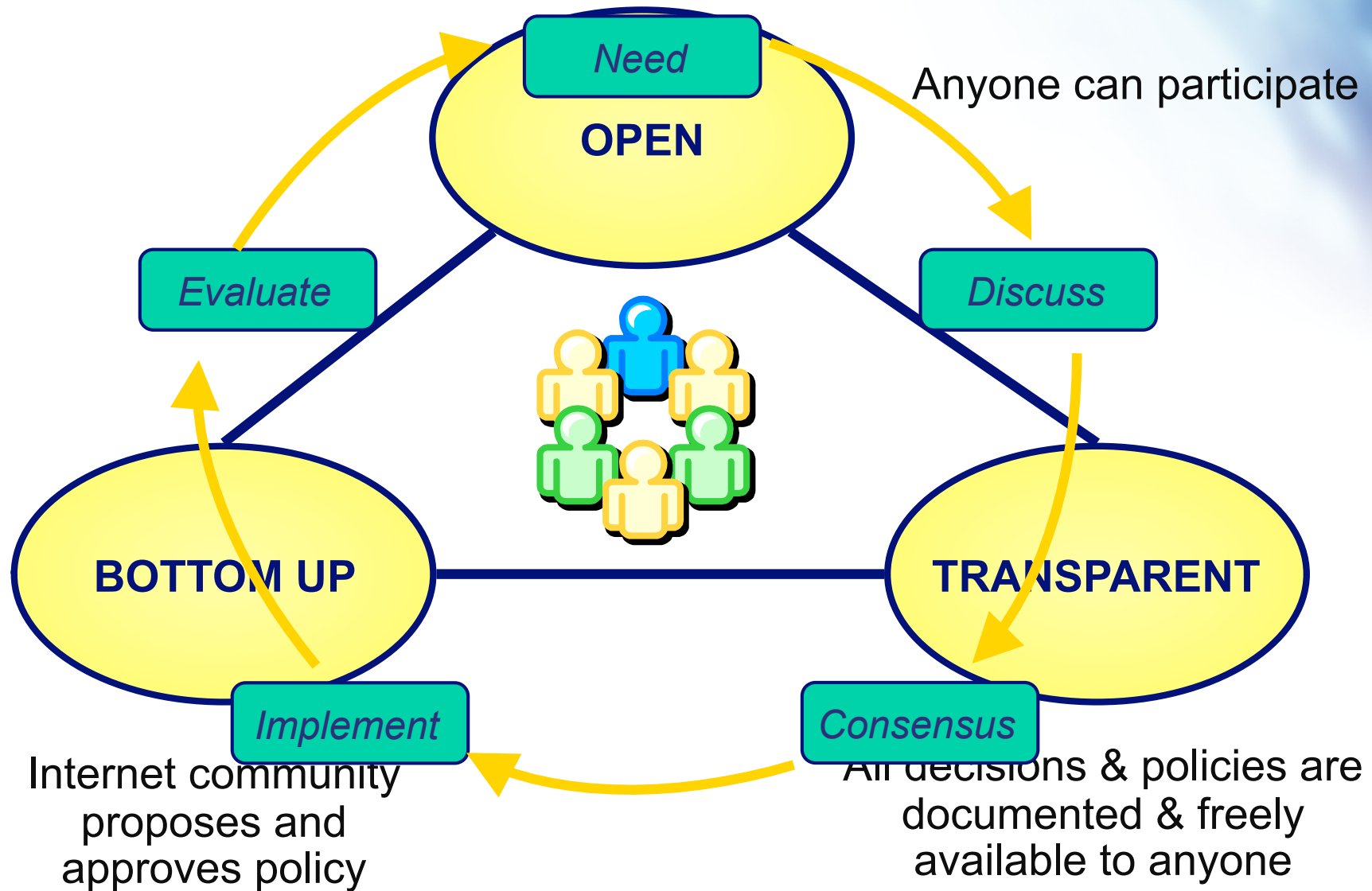
- Regional Internet address Registries
  - Open membership-based industry bodies
  - Non-profit, neutral, and independent
  - Allocation, registration and other services
  - Other services as required
- First established in early 1990s
  - Voluntarily by consensus of community
  - To ensure responsible address management, according to technical and administrative needs
  - To support Internet development
- In the “Internet tradition”
  - Consensus-based, open, and transparent

# Regional Internet Registries



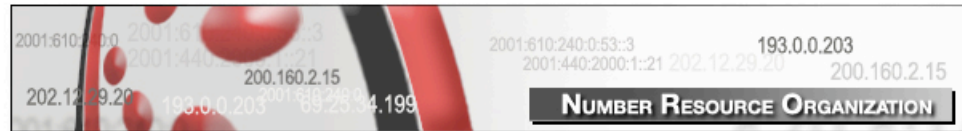
**1992: “...it is [now] desirable to consider delegating the registration function to an organization in each of those geographic areas.” (RFC 1338)**

# Open Policy Processes





# http://www.nro.net



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## news and announcements

**[3 September 2009]**

[APNIC Announces NRO NC Appointment](#)

**[28 July 2009]**

[NRO NC Call for Nominations - ARIN Region](#)

**[27 July 2009]**

[NRO Declaration on RPKI](#)

**[22 July 2009]**

[NRO NC Call for Nominations - RIPE NCC Service Region](#)

**[15 June 2009]**

[The NRO's Contribution to the OECD's Working Party on Communication and Infrastructure and Services Policy's \(CISP\) Session on IPv6 Deployment](#)

**[5 June 2009]**

[The NRO's Comments Submitted to the United States Department of Commerce, National Telecommunications and Information Administration's \(NTIA\) Notice of Inquiry \(NOI\)](#)

**[20 May 2009]**

[NRO Response to TSB 'Questionnaire on IPv6 Address Allocation and Encouraging the Deployment of IPv6'](#)

**[18 May 2009]**

[NRO Response to the National Advanced IPv6 Centre of Excellence \(NAv6\) Survey](#)

- [NAv6 response to NRO comments on the survey](#)

**MORE NEWS**

## what is the nro?

Formed by the [Regional Internet Registries](#) to formalise their co-operative efforts, the NRO exists to protect the unallocated Number Resource pool, to promote and protect the bottom-up policy development process, and to act as a focal point for Internet community input into the RIR system. [\[more\]](#)

## quick reference points

- » [NRO Memorandum of Understanding](#)
- » [NRO FAQ](#)
- » [ASO Memorandum of Understanding](#)
- » [ASO Memorandum of Understanding FAQ](#)
- » [ASO Web Site](#)
- » [RIRs and other Internet bodies](#)
- » [Getting Internet Number Resources](#)
- » [Training Programs of the RIRs](#)

## activities in internet governance

[NRO at ITU Telecom World 2006, Hong Kong](#)

[NRO and the Internet Governance Forum \(IGF\)](#)

[Activities at the World Summit on the Information Society \(WSIS\) - 2003-2005](#)

[NRO Comments to NTIA on ICANN](#)





## Where are we now

- IPv6 addresses are easy to obtain
  - Policies are established and stable
  - Minimal barriers to allocations
  - No reservations, but supply is huge
- IPv6 deployment strongly encouraged
  - Increasing promotion and awareness
  - Technical training and support
- Readiness is increasing and deployment is underway



# Government Responses

- Promote IPv6
  - To ISP and telco Industries
  - Encourage IPv6 readiness if not deployment
  - Opportunity to “leapfrog” to latest technology
- Specify IPv6
  - Government equipment procurement
  - Network servers and services
  - Public infrastructure deployments
- Require IPv6
  - To the extent possible (cf digital TV)

# The IPv4 revolution

- The 1990's – a new world of...
  - Cheaper bandwidth, switching
  - Lower operational costs
  - The PC revolution, funded by users
- The Internet boom
  - The dumb (and cheap) network
  - Technical and business innovation at the edges
  - Many compelling business cases for new services and innovation



# An IPv6 revolution...

- The 2010's – a new world of...
  - Commodity Internet: Broadband, mobile, always-on
  - Massive reduction in cost of consumer electronics
  - A network-ready society
- An IPv6 boom?
  - One unified ubiquitous pervasive network
  - 2–3 orders of magnitude larger than today
  - “Internet for Everything”
  - Bringing online the “Next 6 Billion”
- *Let's get ready for IPv6 !*



# *Thanks*

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