



ARIN Update

**CTU ICT Roadshow
Grenada**

**Nate Davis
Chief Operating Officer**

2011 Focus

- Continue development and integration of web-based system (ARIN Online)
- Outreach on IPv6 adoption
- DNSSEC and Resource Certification (RPKI)
- Continue participation in Internet Governance forums

Public Facing Development Efforts

- WHOIS-RWS deployed in June 2010
- ARIN Online development progressing steadily
- DNSSEC
 - Now signing zones (for those ARIN manages)
 - Interfaces to allow insertion of DS records coming end of Q1 2011
- RPKI
 - Rolling out production service in Summer of 2011*
 - Pilot available at <http://rpki-pilot.arin.net>

*Pending Board Approval

2011 Outreach Events

Ongoing participation in various local, national and international forums, focus on IPv4 depletion and IPv6 adoption. Events include:

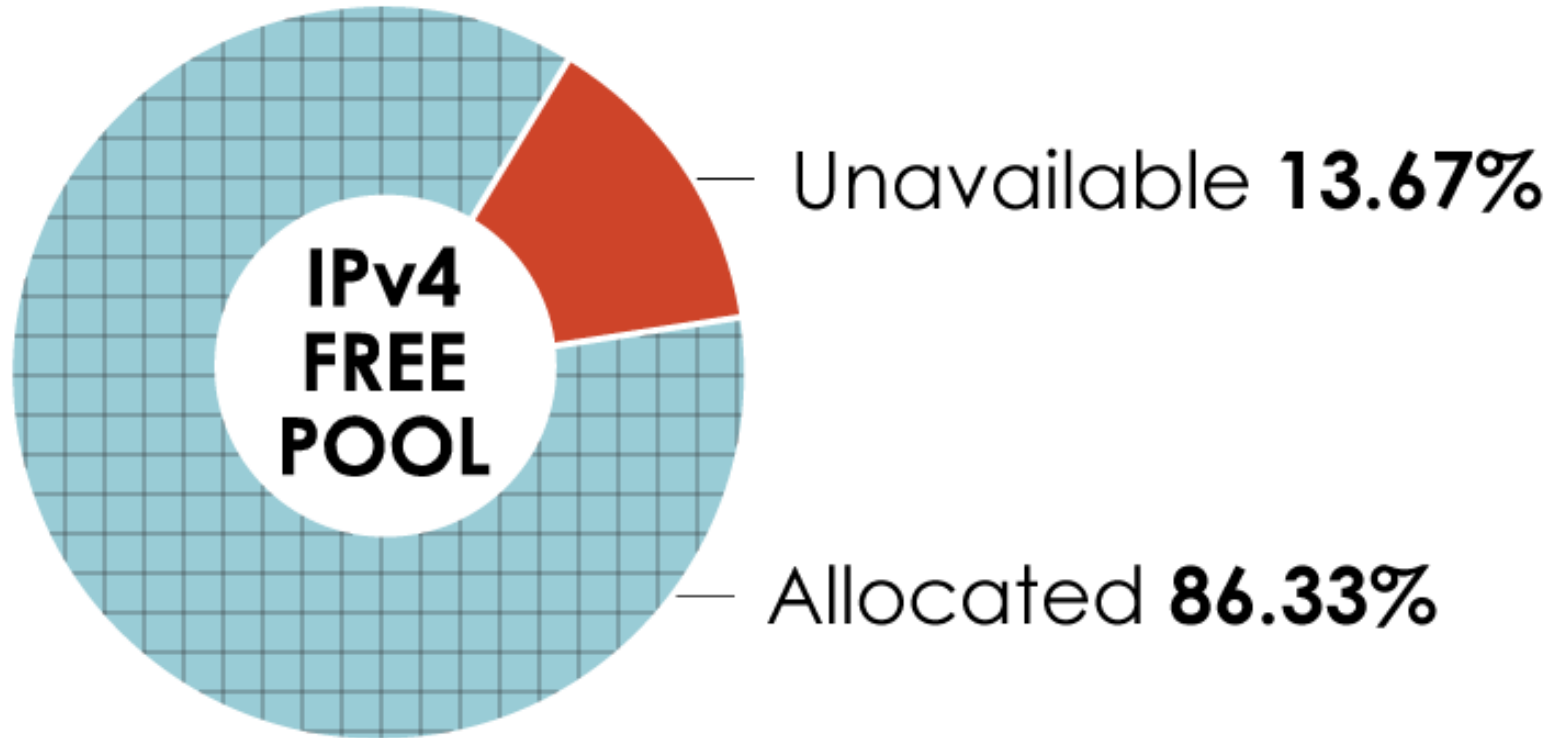
- CES
- Pacific Telecom Conference
- Cable Labs
- Joint Techs / Internet2
- ICT roadshow events
- TTVN
- IT Roadmap
- Game Developers Conference
- Enterprise Connect
- Satellite 2011
- Rocky Mountain IPv6 Summit
- Interop
- CANTO
- FOSE
- HostingCON



IPv4 Depletion and IPv6 Uptake

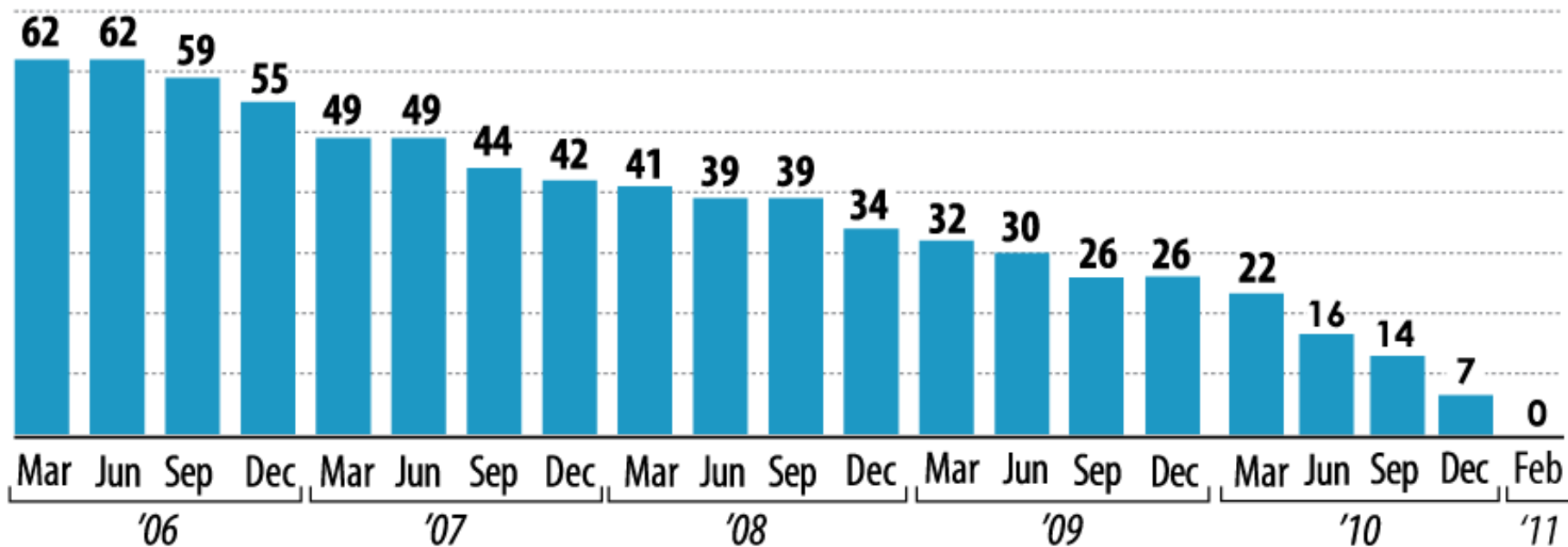


IPv4 Address Space Utilization



* as of 3 February 2011

Available IPv4 Space in /8s



IPv4 Depletion Situation Report

Each RIR received its last /8 IPv4 address block from IANA on **3 February 2011**.



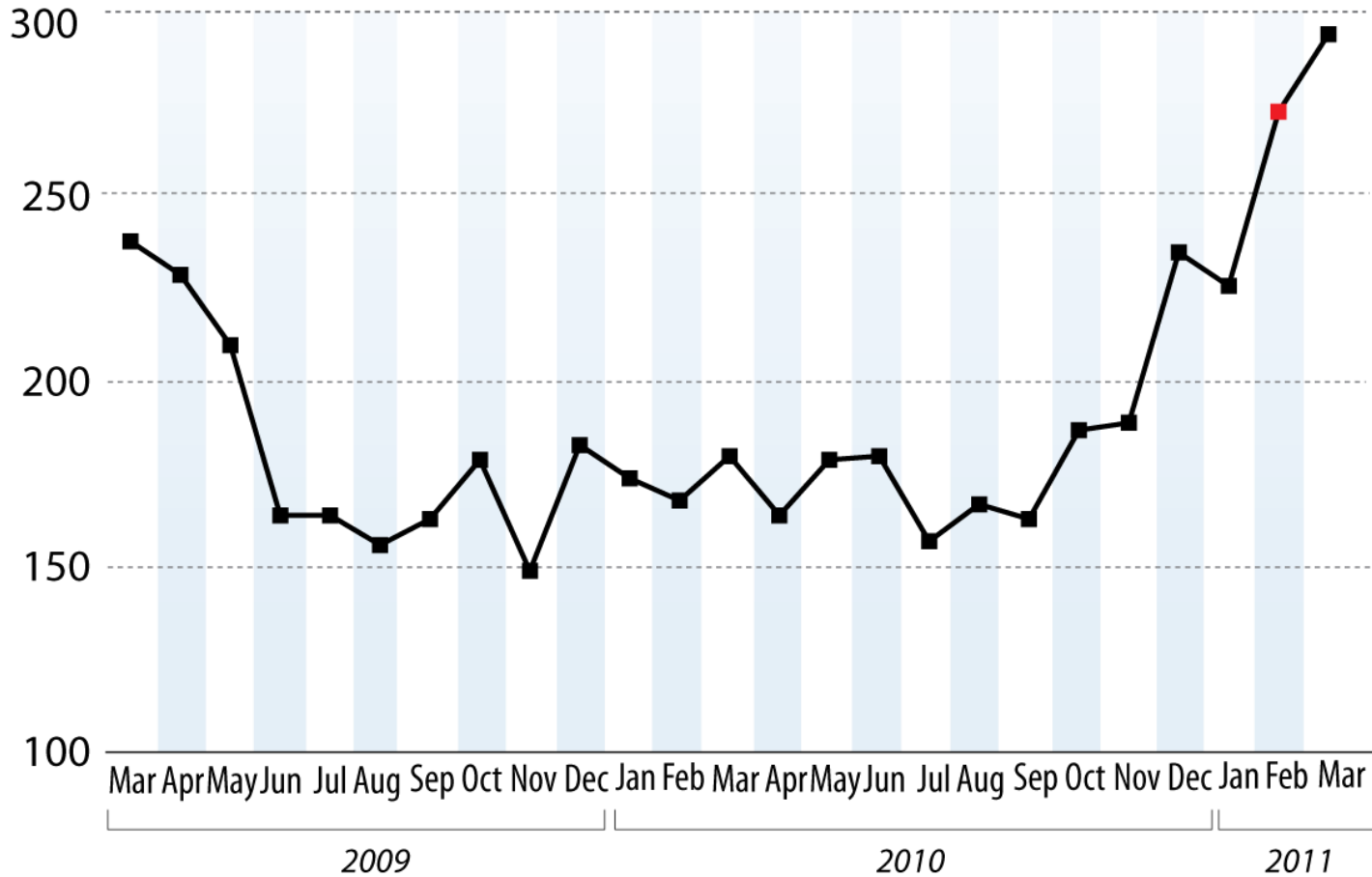
- While each RIR currently has IPv4 addresses to allocate, it is impossible to predict when each RIR will run out. Current Estimate to ARIN depletion – January 2012 (?)
- ARIN publishes an inventory of available IPv4 addresses, updated daily, at www.arin.net.

Current ARIN IPv4 Inventory

(as of 31 Mar 2011)

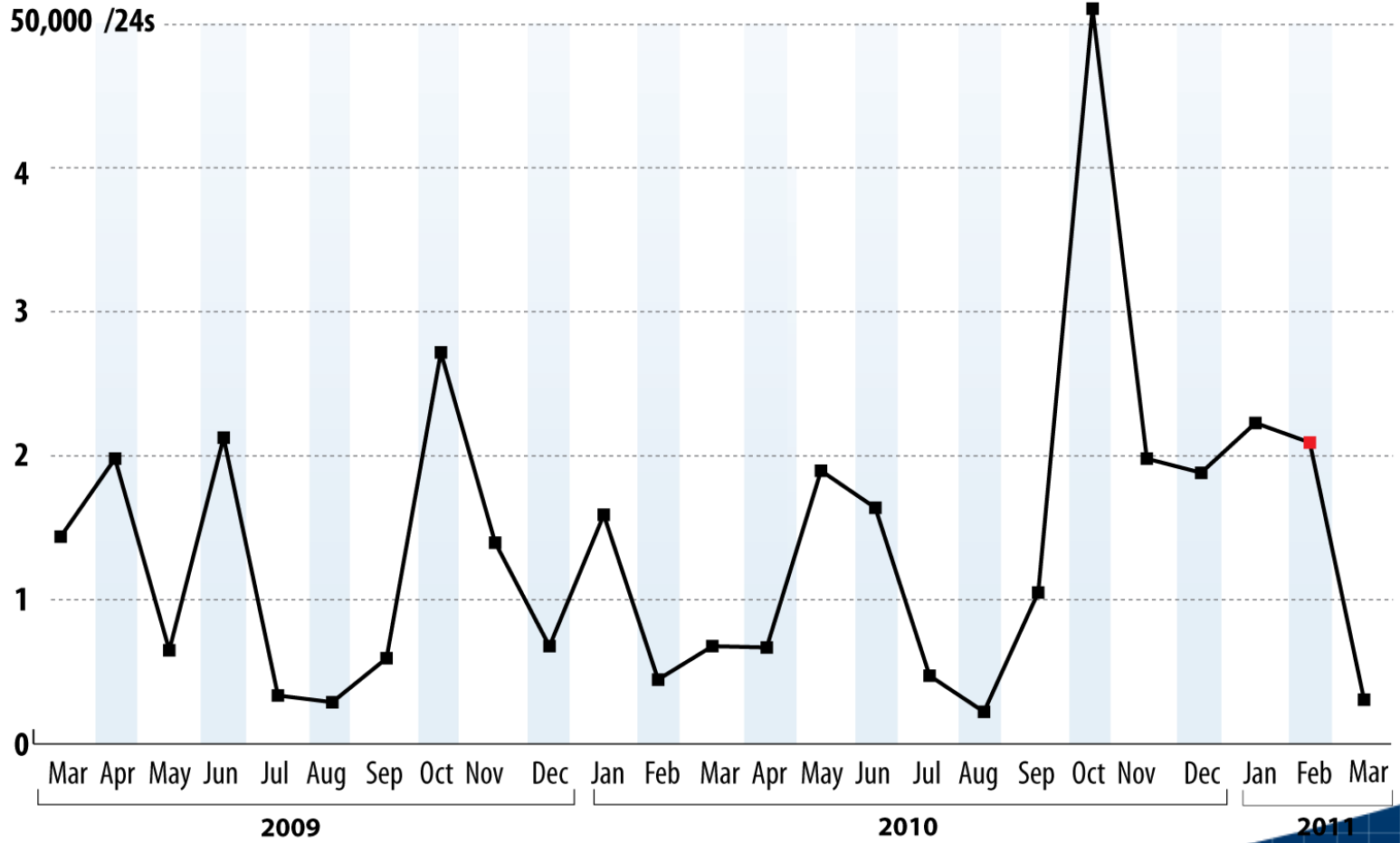
- 5.16 /8 equivalents in the pool of **“available addresses”**
- 9.22 /16 equivalents in the **“returned bucket”**
(voluntarily returned)
- 1.80 /16 equivalents in the **“revoked bucket”**
(revoked due to non-payment of fees)
- 262.08 /16 equivalents in the **“held bucket”**
(de-registered from Whois, but still routed)
 - 254 /16s are Interop, the remaining 8.08 /16s are held
(because still routed)

IPv4 Requests Received



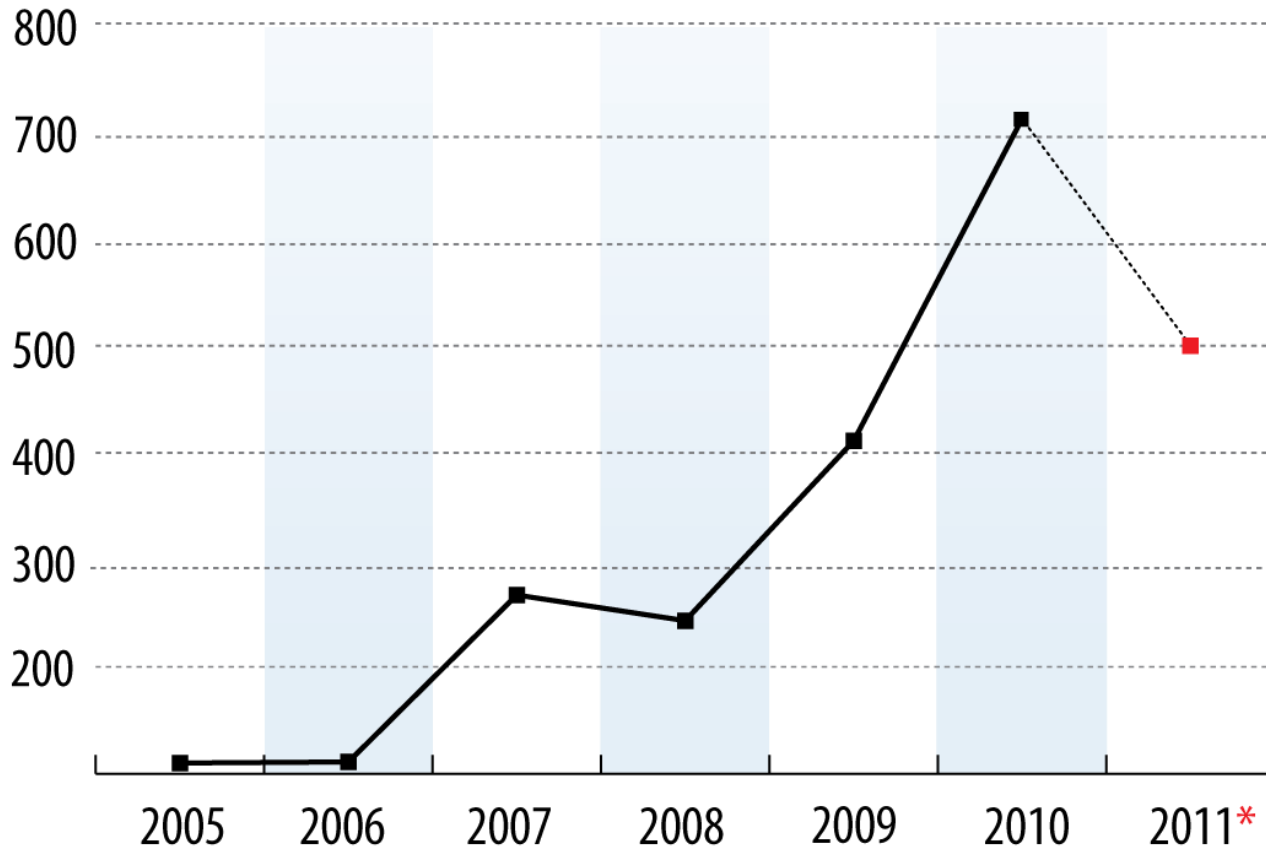
■ IANA exhaustion, Feb 3, 2011

IPv4 Addresses Issued (in /24s)



■ IANA exhaustion, Feb 3, 2011

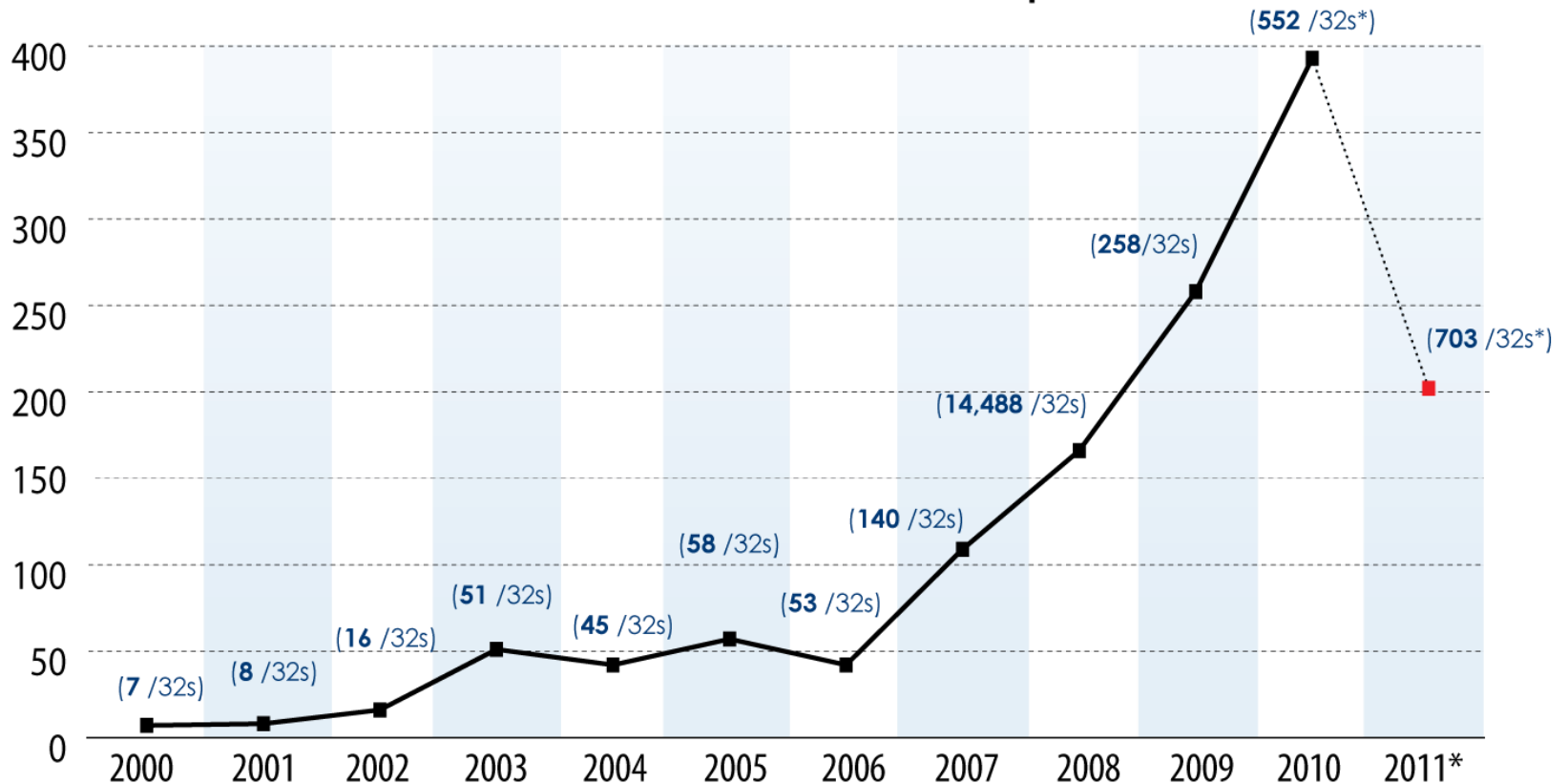
IPv6 Requests Received



*through Mar 31 2011

IPv6 Allocations Issued

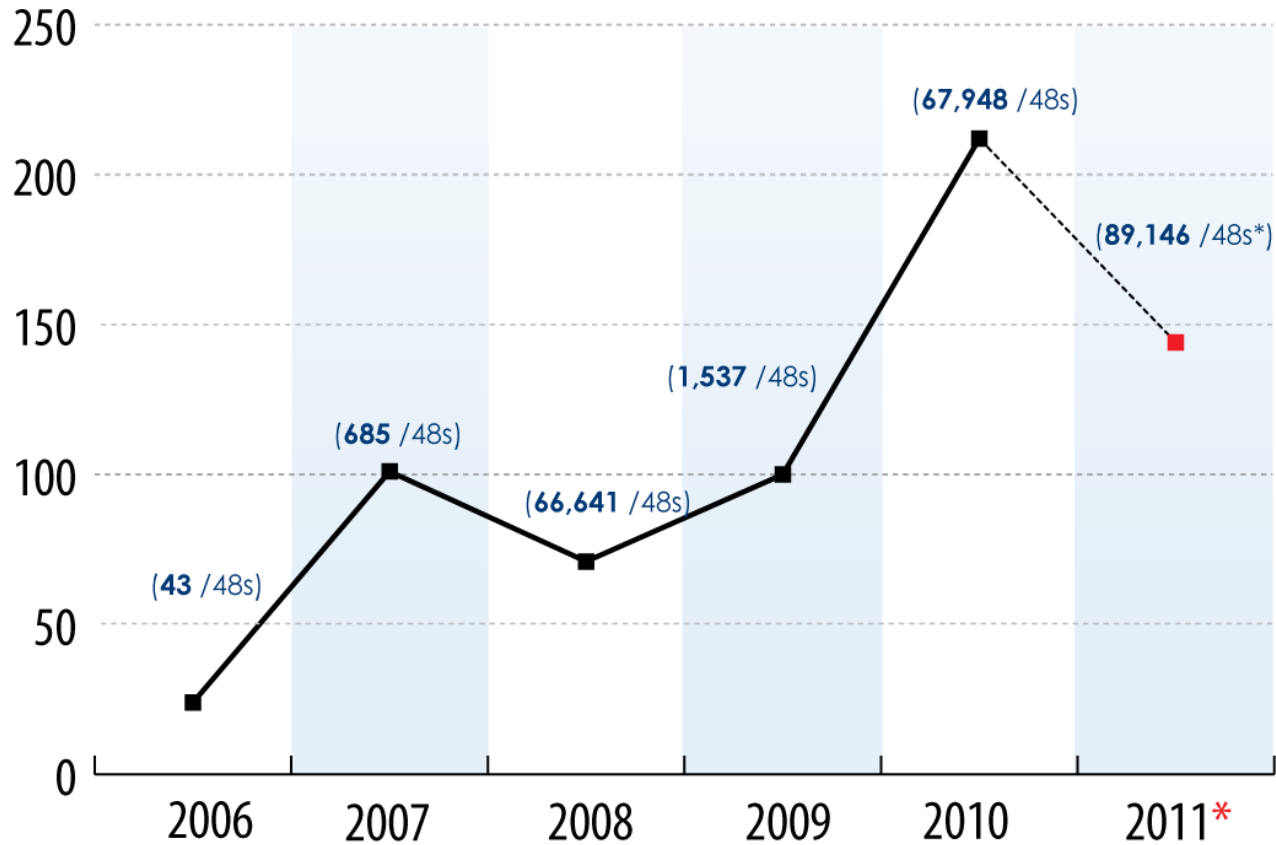
Number of Allocations Issued Each Year and the Number of /32 Equivalents



*through 31 Mar 2011

IPv6 Assignments Issued

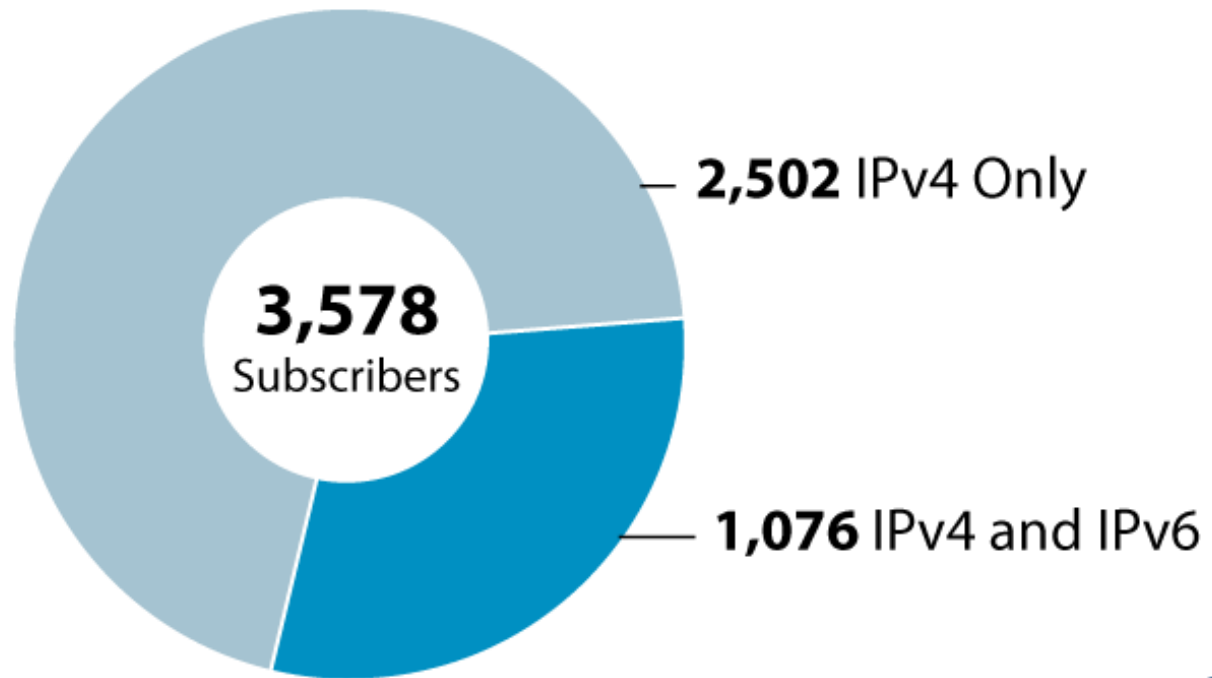
Number of Assignments Issued Each Year and the Number of /48 Equivalents



*through 31 Mar 2011

IPv4 vs IPv6 Subscribers

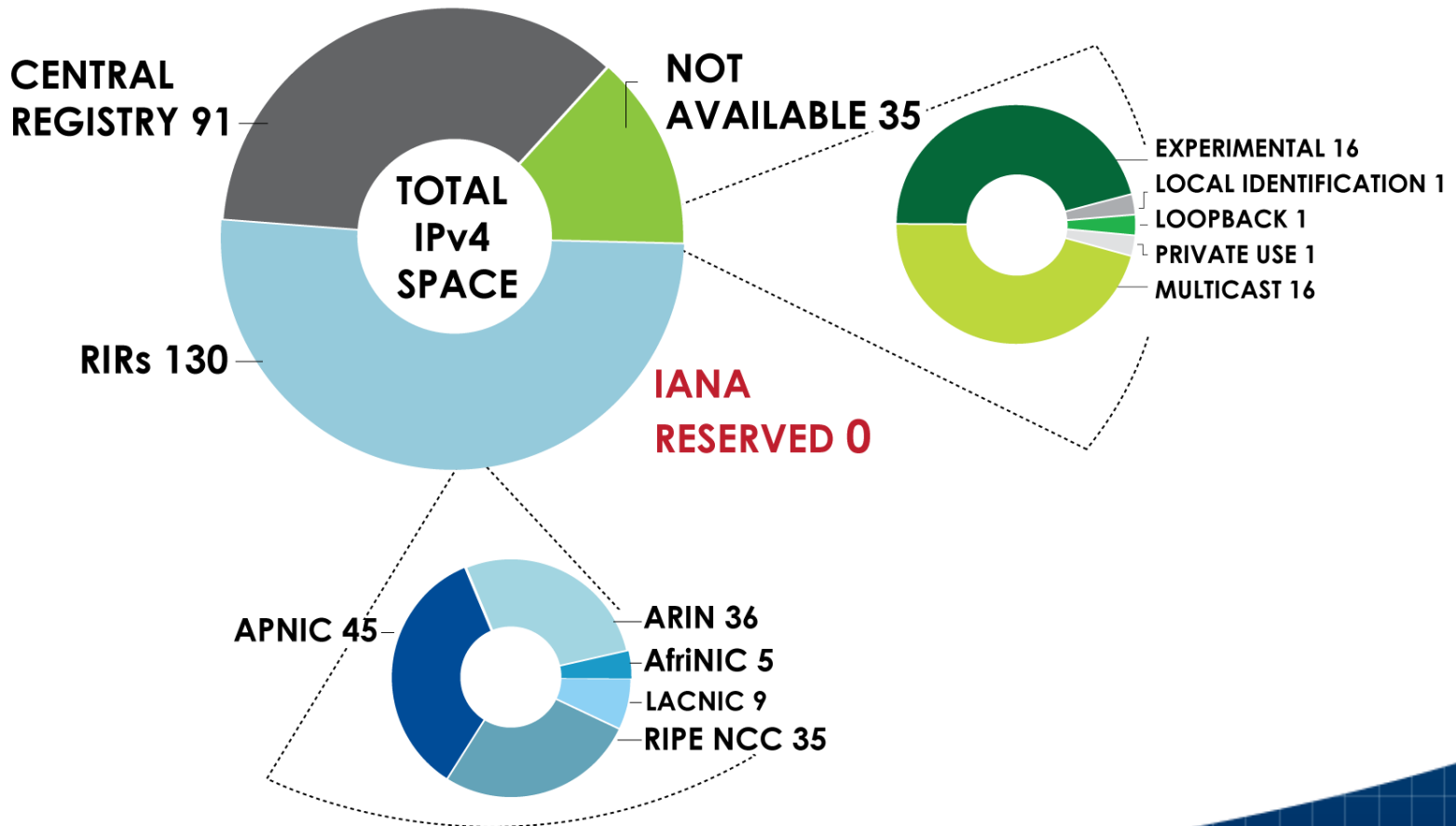
- 3,578 IPv4 ISP subscribers today
 - 2,502 (70%) do not have IPv6 allocations, yet (30%) do!



IPv4 ADDRESS SPACE

What is the status of each of the 256 /8s?

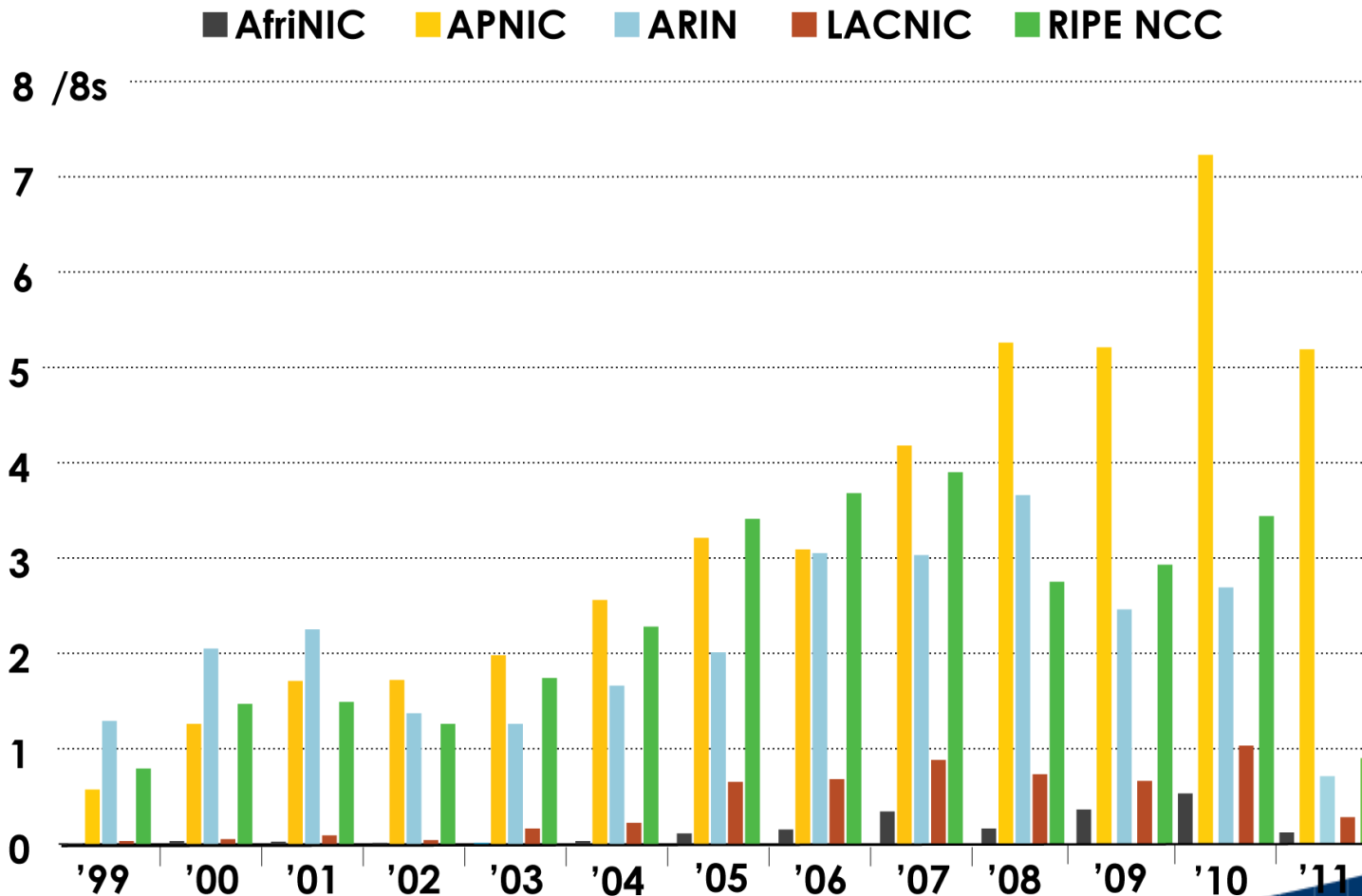
STATUS OF 256 /8s IPv4 ADDRESS SPACE



IPv4 ADDRESS SPACE ISSUED

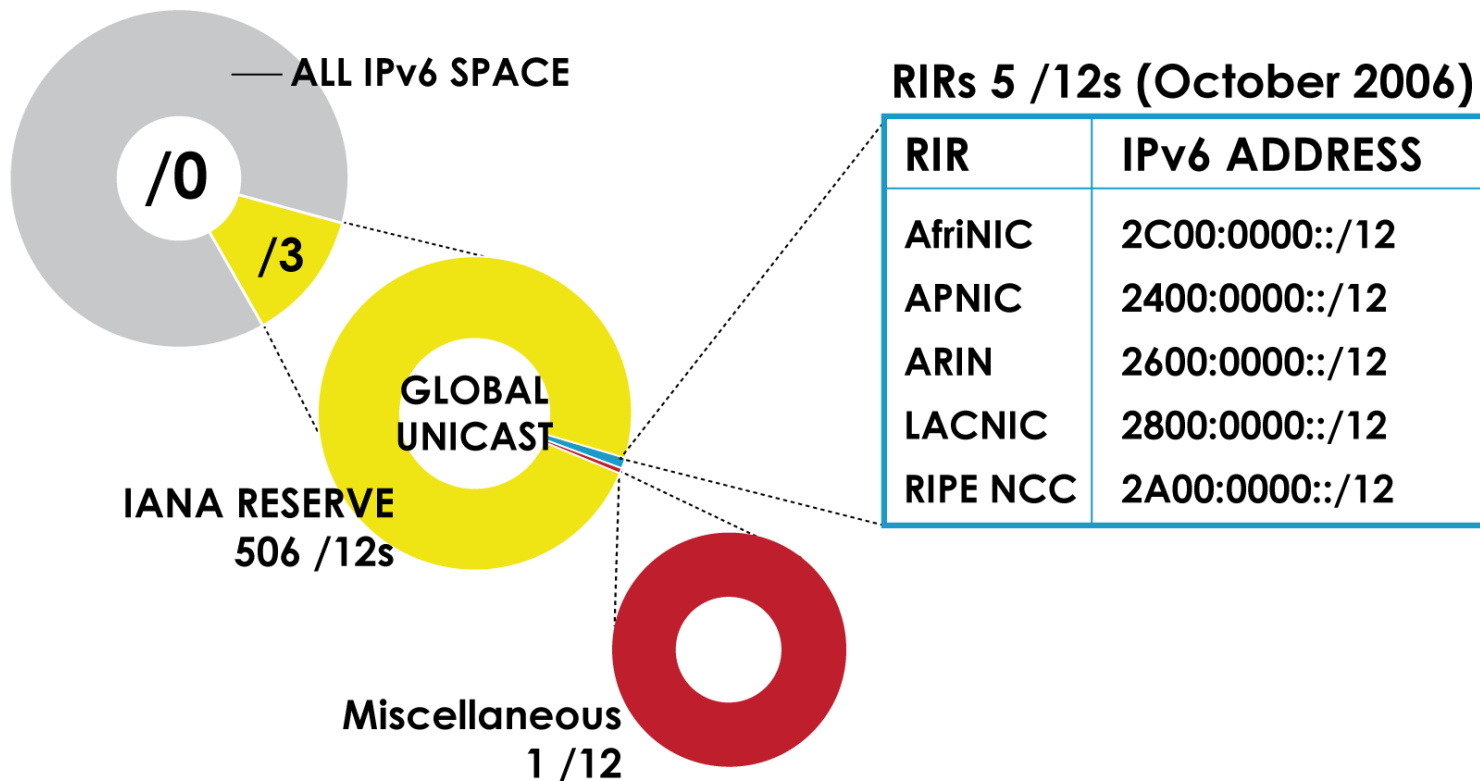
(RIRs TO CUSTOMERS)

In terms of /8s, how much space did each RIR issue by year?



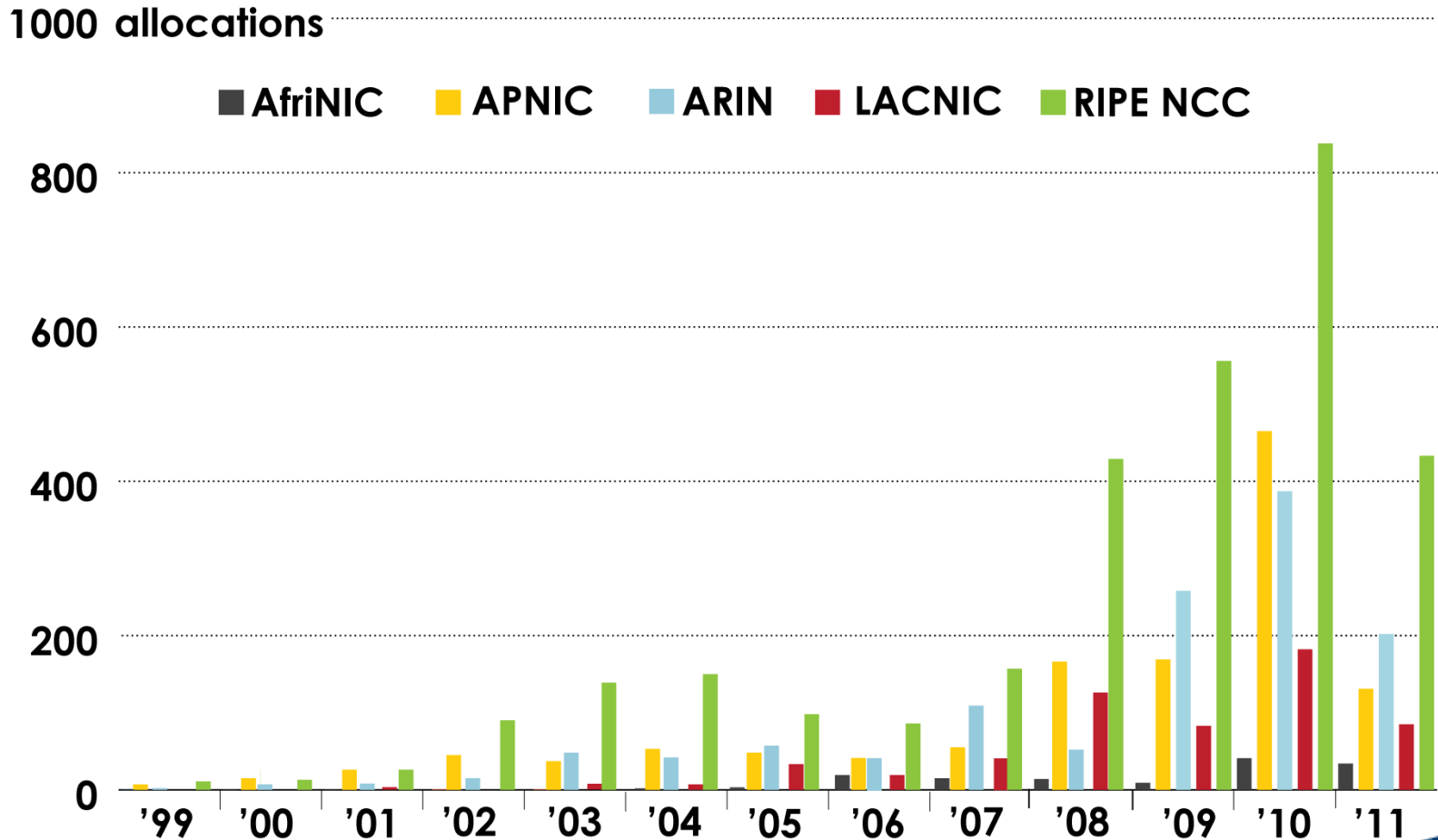
IPv6 ADDRESS SPACE

How much has been allocated to the RIRs?

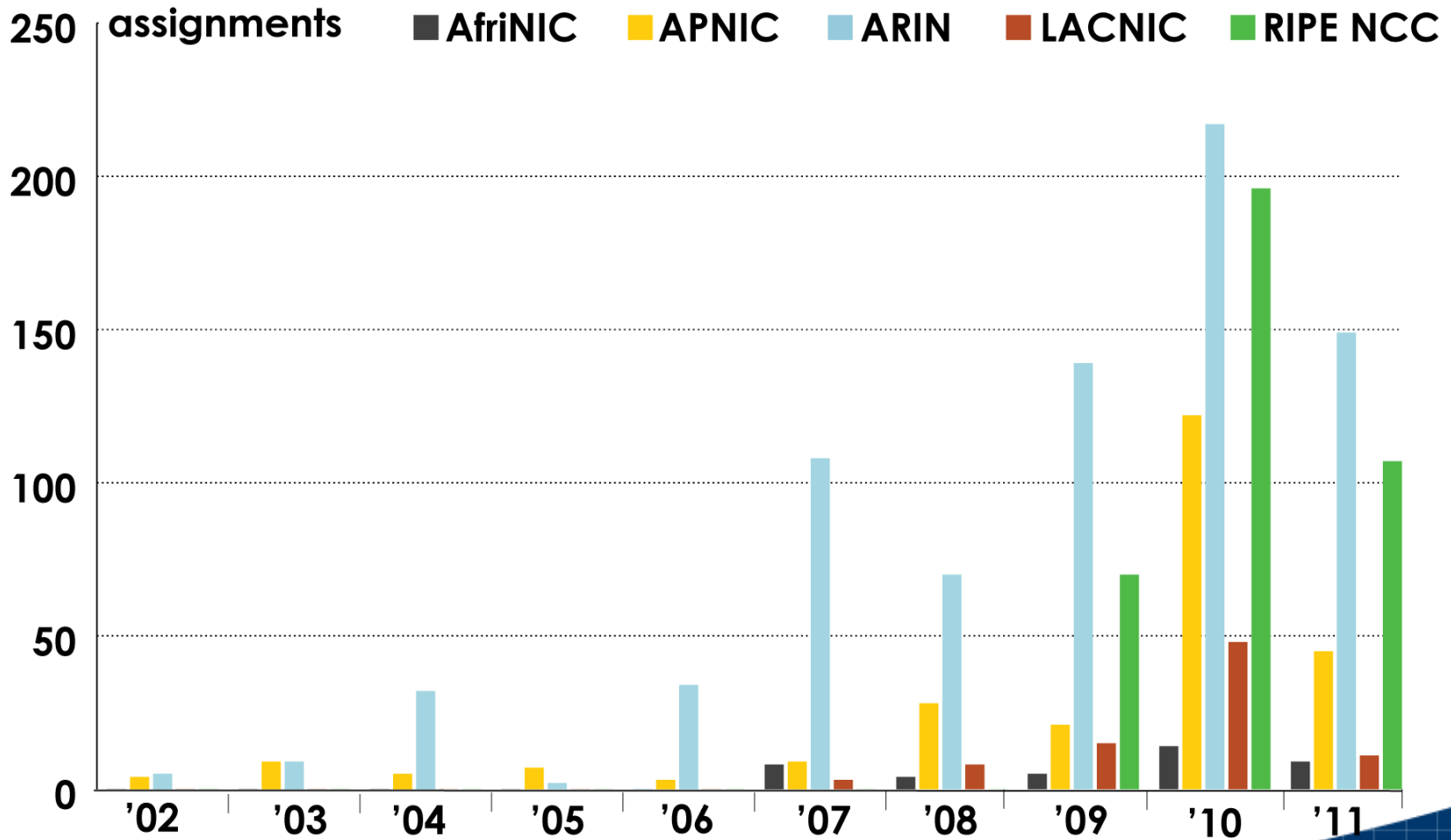


IPv6 Allocations RIRs to LIRs/ISPs

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



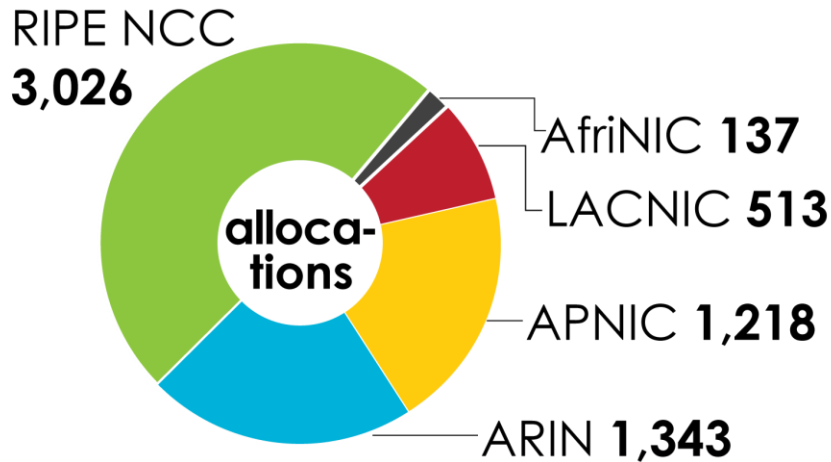
IPV6 ASSIGNMENTS RIRS TO END-USERS



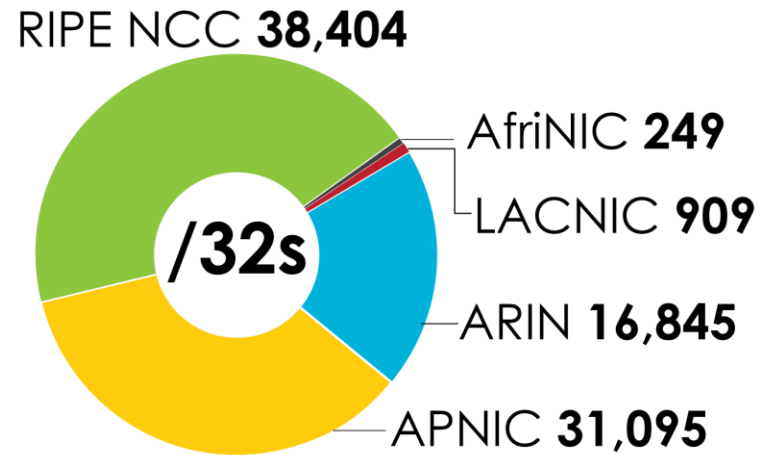
IPv6 ALLOCATIONS RIRs to LIRs/ISPs

(Jan 1999 – Mar 2011)

How many total allocations have been made by each RIR?



In terms of /32s, how much total space has each RIR allocated?



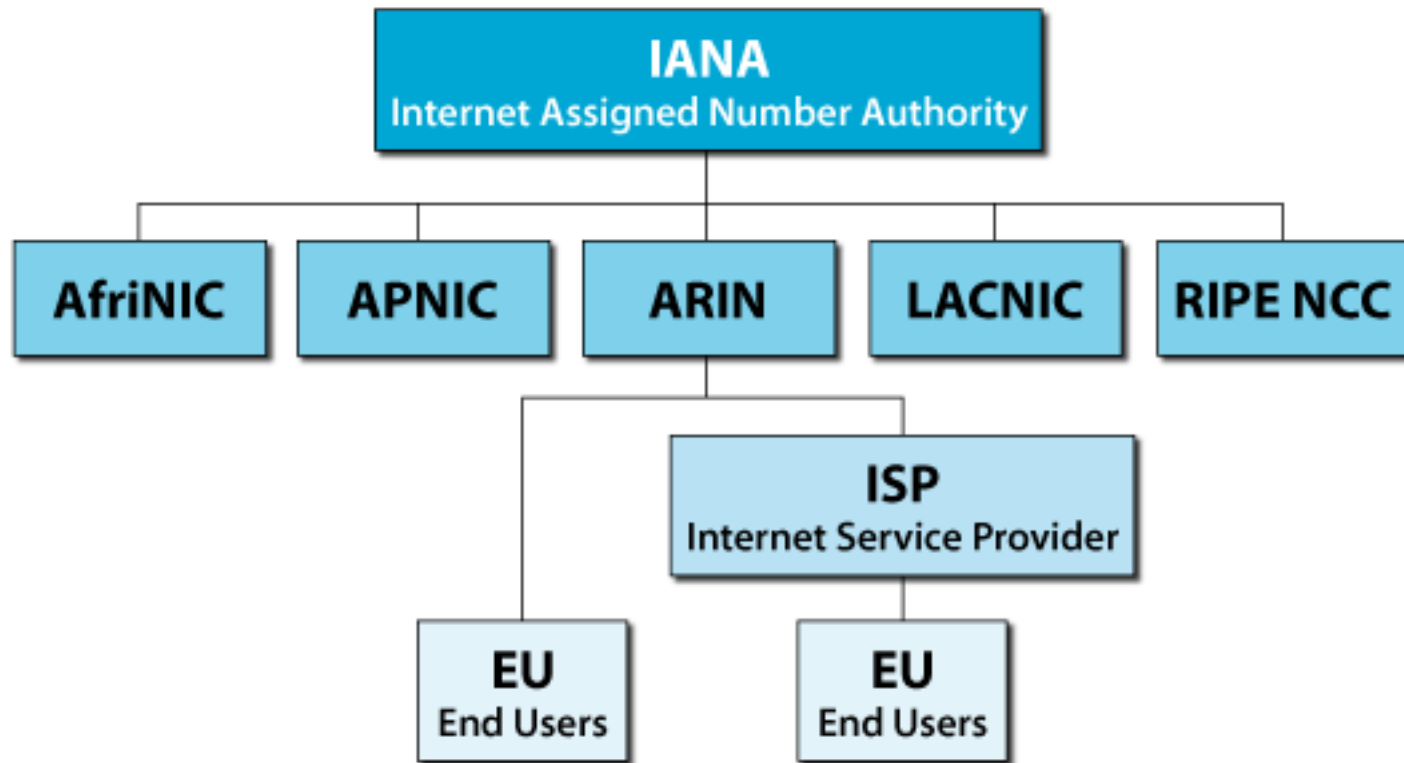
IPv4 Depletion Situation Report

- Each RIR received its last /8 from IANA on 3 February 2011.
- The IANA free pool of IPv4 addresses has reached 0%.
- While each RIR currently has IPv4 addresses to allocate, it is impossible to predict when each RIR will run out. However APNIC recently ran out.
- ARIN publishes an inventory of available IPv4 addresses, updated daily, at **www.arin.net**.

ARIN's Role in Number Resources



Number Resource Distribution



What ARIN Does...

ARIN is one of five Regional Internet Registries (RIRs) in the world. Like the other RIRs, ARIN:

- Provides services related to the technical coordination and management of Internet number resources
- Facilitates policy development
- Participates in the international Internet community
- Is a nonprofit, community-based organization governed by a member-elected executive board

Getting IP Address(s)

- Generally you should obtain from your service provider
- ARIN will assign resources directly to end users if you qualify under current community based policy
 - Multiple service provider (Multihomed)
 - Meet a certain utilization (size)
 - Experimental / Critical Infrastructure
- Similarly, ARIN will allocate resources to ISPs consistent with policies (many)

ARIN Policy Process

- Documented decisions that determines the management of Internet number resources in the ARIN region
- **Anyone** can participate
- Guided by our documented Policy Development Process
- Sheppard by elected Advisory Council of volunteers
- Participation via two annual public policy meetings and mailing list (arin-ppml@arin.net, must subscribe)

Details:

www.arin.net

ARIN Call to Action



ARIN Board Advises Internet Community on Transition to IPv6

ARIN and the other Regional Internet Registries have distributed Internet Protocol version 6, IPv6, alongside IPv4 since 1999. To date, ARIN has issued both protocol versions in tandem and has not advocated one over the other. ARIN has closely monitored trends in demand and distribution for both protocol versions with the understanding that the IPv4 available resource pool would continue to diminish.

The available IPv4 resource pool has now been reduced to the point that ARIN is compelled to advise the Internet community that transition to IPv6 is necessary for any applications that require ongoing availability from ARIN of contiguous IP number resources.

On 7 May 2007, the ARIN Board of Trustees passed the following resolution:

RESOLUTION OF THE BOARD OF TRUSTEES OF ARIN ON INTERNET PROTOCOL NUMBERING RESOURCE AVAILABILITY

WHEREAS, community access to Internet Protocol (IP) numbering Resources has proved essential to the successful growth of the Internet; and,

WHEREAS, ongoing community access to Internet Protocol version 4 (IPv4) numbering resources can not be assured indefinitely; and,

WHEREAS, Internet Protocol version 6 (IPv6) numbering resources are available and suitable for many Internet applications,

BE IT RESOLVED, that this Board of Trustees hereby advises the Internet community that migration to IPv6 numbering resources is necessary for any applications which require ongoing availability from ARIN of contiguous IP numbering resources; and,

BE IT ORDERED, that this Board of Trustees hereby directs ARIN staff to take any and all measures necessary to assure veracity of applications to ARIN for IPv4 numbering resources; and,

BE IT RESOLVED, that this Board of Trustees hereby requests the ARIN Advisory Council to consider Internet Numbering Resource Policy changes advisable to encourage migration to IPv6 numbering resources where possible.

Implementation of this resolution will include both internal and external components. Internally, ARIN will review its resource request procedures and continue to provide policy experience reports to the Advisory Council. Externally, ARIN will send progress announcements to the ARIN community as well as the wider technical audience, government agencies, and media outlets. ARIN will produce new documentation, from basic introductory fact sheets to FAQs on how this resolution will affect users in the region. ARIN will focus on IPv6 in many of its general outreach activities, such as speaking engagements, trade shows, and technical community meetings.

IPv4 & IPv6 - The Bottom Line

- We're running out of IPv4 address space.
- IPv6 must be adopted for continued Internet growth.
- IPv6 is not backwards compatible with IPv4.
- We must maintain IPv4 and IPv6 simultaneously for many years.
- IPv6 deployment has begun.



IPv6 Deployment has begun

RIRs have been allocating IPv6 address space since 1999.

Thousands of organizations have received an IPv6 allocation to date.

ARIN has IPv6 distribution policies for service providers, community networks, and end-user organizations.

IPv4 & IPv6 Coexistence

Today, the Internet is predominantly based on IPv4.

For the foreseeable future, the Internet must run both IP versions (IPv4 & IPv6) at the same time. (When done on a single device, this is called the “dual-stack” approach.)

Deployment is already underway. Today, there are organizations attempting to reach your mail, web, and application servers via IPv6...

Action Plans

What does this mean for:

- Broadband Access Providers?
- Internet Service Providers?
- Internet Content Providers?
- Enterprise Customers?
- Equipment Vendors?
- Government Organizations?

Call to Action

Your customers want access to the entire Internet, and this means IPv4 and IPv6 websites.

Offering full access requires running IPv4/IPv6 transition services and is a significant engineering project.

Multiple transition technologies are available, and each provider needs to make its own architectural decisions.



Call to Action

Plan out how to connect businesses via IPv6-only and IPv4/IPv6 in addition to IPv4-only.



Businesses are beginning to ask for IPv6 over their existing Internet connections and for their co-located servers.

Communicate with your peers and vendors about IPv6, and confirm their timelines for production IPv6 services.

Call to Action

Content must be reachable to newer Internet customers.



Content served only via IPv4 will be accessed by IPv6 customers via transition solutions run by access providers.

Plan on serving content via IPv6 in addition to IPv4 as soon as possible.

Call to Action

Mail, web, and application servers must be reachable via IPv6 in addition to IPv4.



Open a dialogue with your Internet Service Provider about providing IPv6 services.

Each organization must decide on timelines, and investment level will vary.

Call to Action

There was probably limited demand for IPv6 in the past.

Demand for IPv6 support will become mandatory very, very quickly.

Introduce IPv6 support into your product cycle as soon as possible.



Call to Action

Coordinate with industry to support and promote awareness and educational activities.

Adopt regulatory and economic incentives to encourage IPv6 adoption.

Require IPv6 compatibility in procurement procedures.

Officially adopt IPv6 within your government agencies.



IPv6 Adoption Needs

IPv6 address space

IPv6 connectivity (native or tunneled)

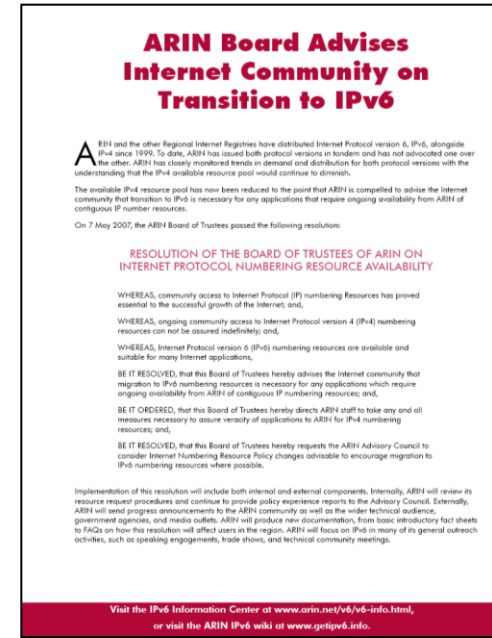
Operating systems, software, and network management tool upgrades

Router, firewall, and other hardware upgrades

IT staff and customer service training

Resources

- IPv4 IANA Free Pool Depletion
https://www.arin.net/resources/request/ipv4_depletion.html
- IPv6 Wiki
- Information Page at
www.arin.net/knowledge/v4-v6.html
- Outreach Microsite:
www.TeamARIN.net
- Social Media at ARIN
www.arin.net/social.html
- ARIN Board Resolution
- Letter to CEOs



Learn More and Get Involved

Learn more about IPv6

www.arin.net

www.getipv6.info

www.TeamARIN.net

Get Involved in ARIN

Public Policy Mailing List

Attend a Meeting

<http://www.arin.net/participate/>

LINKS TO RIR STATISTICS

- RIR Stats:
www.nro.net/statistics
- Raw Data/Historical RIR Allocations:
www.aso.icann.org/stats
www.iana.org/assignments/ipv4-address-space
www.iana.org/assignments/as-numbers
www.iana.org/assignments/ipv6-unicast-address-assignments

Thank You