ARIN + NANOG

ON THE ROAD

Madison, WI

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Part 1

IPv4 Depletion

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Director, Registration Services

ARIN's IPv4 Inventory

As of 2 Sept 2014, ARIN has 0.76 /8 equivalents of IPv4 addresses remaining

IPv4 inventory published on ARIN's website: www.arin.net

Updated daily @ 8PM ET

Prefix Length Breakdown

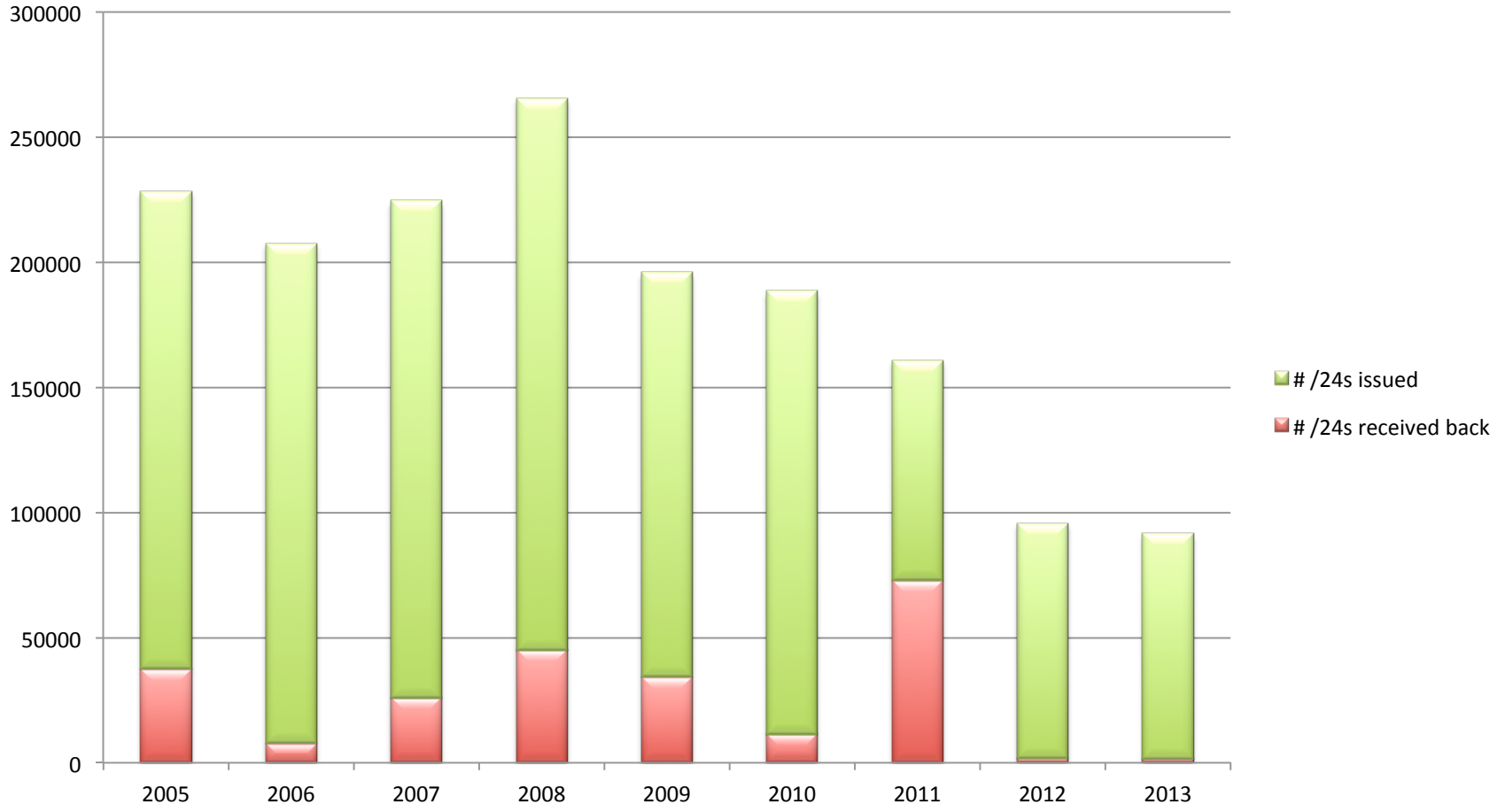
REMAINING IPV4 INVENTORY	
Discrete Block Size (CIDR)	**Number of Blocks Available**
/10	1
/11	2
/12	2
/13	1
/16	9
/17	6
/18	5
/19	6
/20	10
/21	85
/22	87
/23	440
/24	1056

Per policy, a /10 was reserved out of the last /8 to facilitate IPv6 deployment and that space is not included in our inventory count.

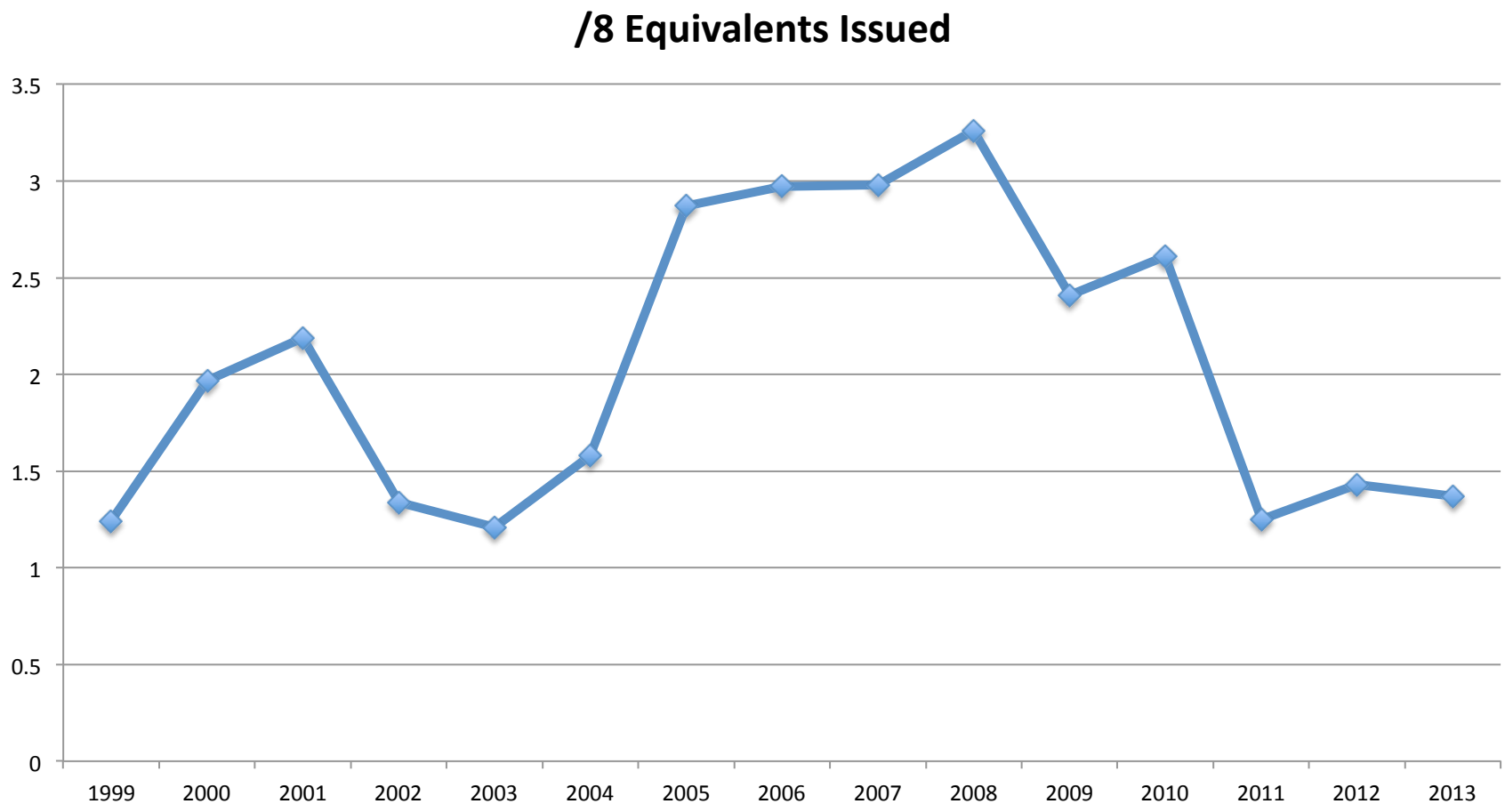
IPv4 Churn

- IPv4 addresses go back into ARIN's free pool 4 ways
  - Return = voluntary
  - Revoke = for cause (usually nonpayment)
  - Reclaimed = fraud or business dissolution
  - IANA issued – per global policy for "post exhaustion IPv4 allocation mechanism by IANA"
- 3.54 /8s recovered since 2005
  - /8 equivalent returned to IANA in 2012
- /11(May 2104) & /12 (Sept 2014) issued by IANA

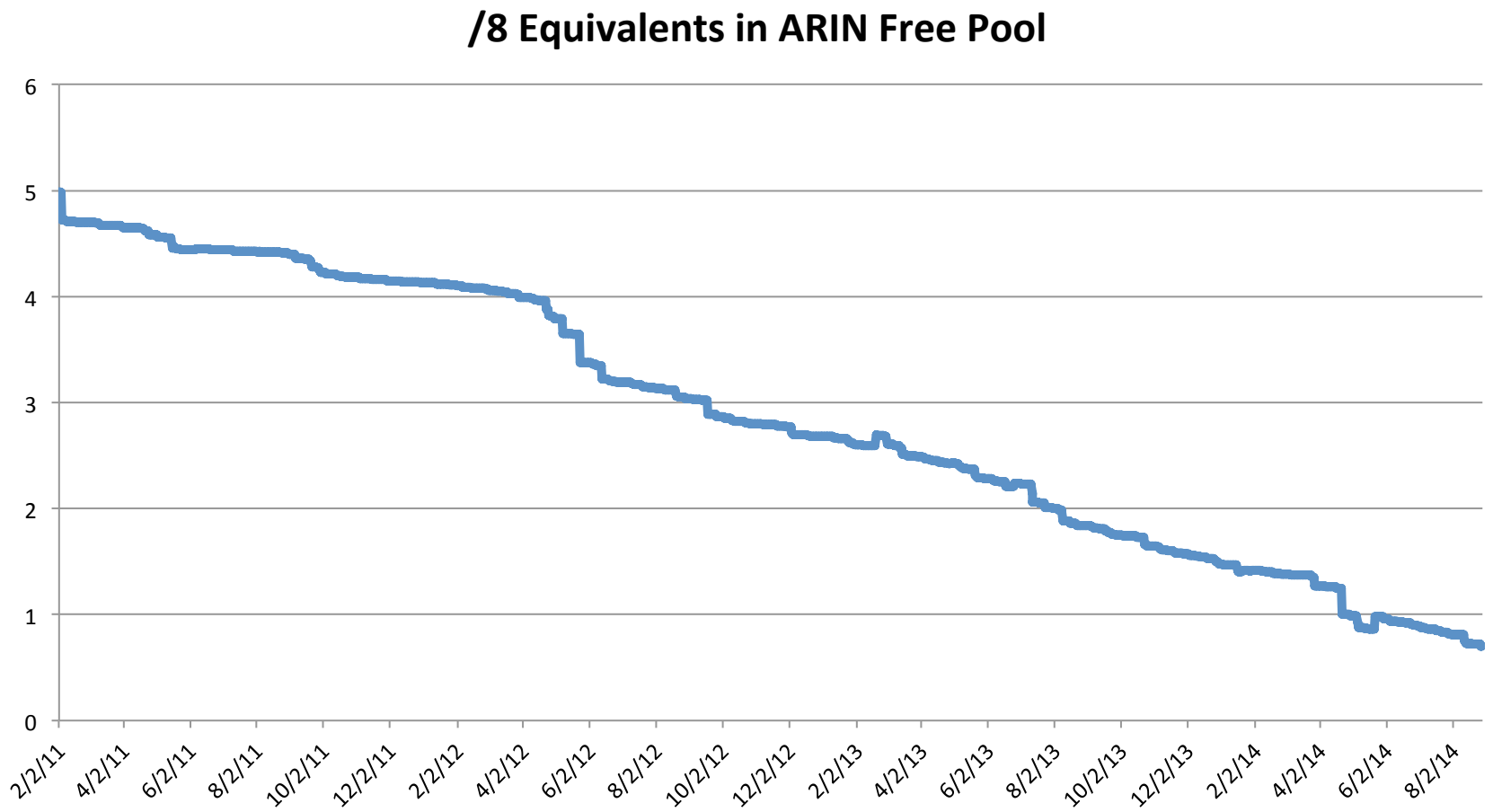
Burn Rate vs. Churn Rate



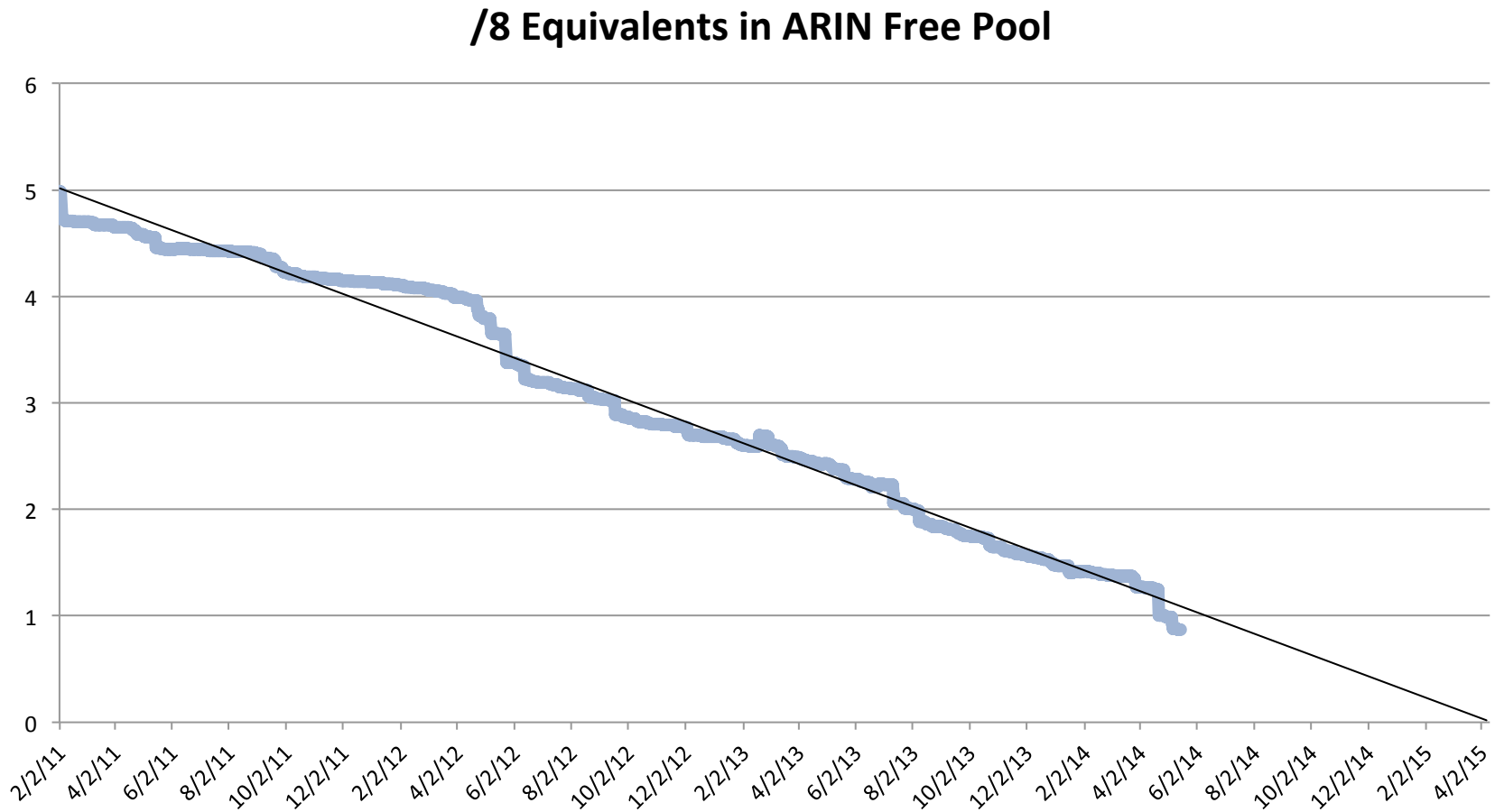
IPv4 Annual Burn Rate



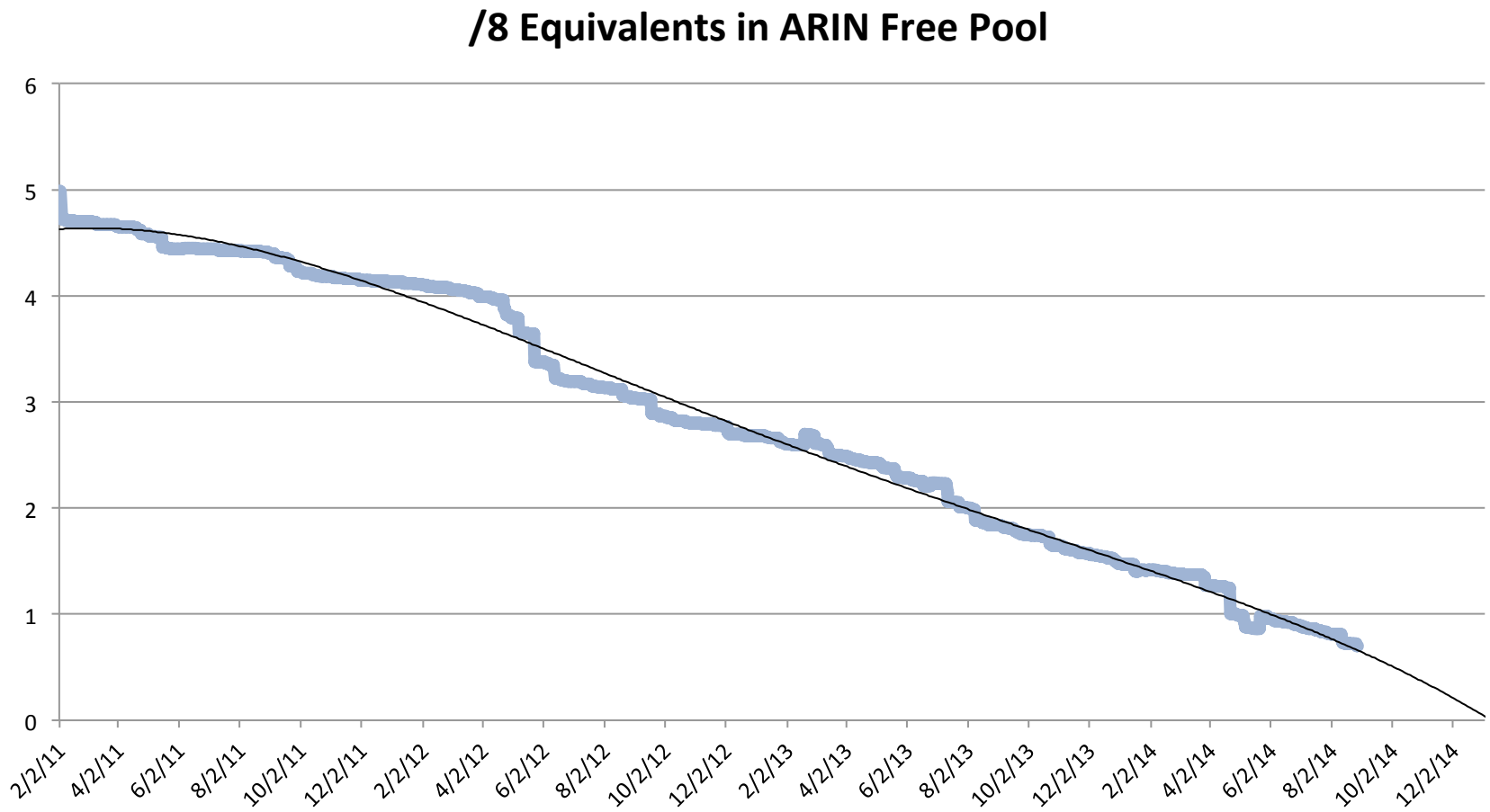
ARIN's IPv4 Free Pool



Linear Depletion Projection



"Run On The Bank" Projection



Which Projection is More Likely?

- Probably somewhere in the middle, but it only takes one unexpected very large request (e.g. /10) to change things completely

- Policy requirement to only fill requests with one block will prevent large ISPS from depleting all of the small blocks

IPv4 Countdown Plan – Phase 4

- Started at 1 /8 equivalent left
- All IPv4 requests team-reviewed and processed on a first in, first out basis
- Org has 60 days from approval to complete payment and RSA
- IPv4 hold period drops to 2 months

Part 2

Obtaining IPv4 and IPv6 from ARIN

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Director, Registration Services

New IPv4 Policy – "Reduce All Minimum Allocation/ Assignment Units to /24"

- Will be implemented on 17 Sept 2014
- /24 minimum allocation/assignment
- No longer a multi-homed requirement

Minimum Requirements for IPv4 - ISPs

- ISPs qualify for a /24 by having one /24 reassigned and efficiently used
- Allocations > /24 based on demonstrated utilization history and renumbering (if applicable)
- Allocation size not based on predicted customer base (see Slow Start policy NRPM 4.2.1.4)
- 3 month supply per policy

IPv4 ISP Data Typically Requested

- Static: Mapping of static IPs/subnets to customer names and street addresses
- Dynamic: List of all dynamic pools with prefix/range assigned, area served (location), peak util %
- Internal Infrastructure: Mapping of internal subnets with description and # IPs used

Example

Dynamic pools:				
Subnet assigned	**city/region served**	**service type (xDSL, wireless, etc)**	**# customers served**	**peak util %**
199.43.0.0/26	Reston, VA	Wireless	37	62%

Static assignments to customers, such as leased line, colocation, or virtual private/dedicated servers			
IP/Subnet	**Company/Customer Name**	**Address**	**Contact Information**
199.43.0.13	Sam Jones	123 Any Street, Any Town USA 12345	email@example.com
199.43.0.14	ABC Company	123 My Street, My Town USA 12345	abc@example.com
199.43.0.16/29	XYZ Manufacturing	123 This Street, This Town USA 12345	xyz@example.com

Shared web hosting platforms			
IP/Subnet	**Domain**	**Address**	**Contact Information**
199.43.0.65	example.com	123 Any Street, Any Town USA 12345	email@example.com

Internal utilization	
IP/Subnet	**Device Name/purpose**
199.43.0.67	core router
199.43.0.68 -	
199.43.0.71	DNS Server for internal domains
199.43.0.72	mx1. mail exchanger

Other IPv4 ISP Data Requested

- Typically ask for:
  - Customer justification data
- If necessary, may ask for:
  - Customer contact information and proof of customer payments
  - Proof of equipment lease/purchase

Minimum Requirements for IPv4 – End Users

- /24 minimum assignment size
- Show 25% immediate utilization rate (within 30 days) and 50% projected one-year utilization rate
- If requesting additional assignment, must show that each previous assignment is 80% utilized

IPv4 End User Data Requested

- Subnet mapping for previous ARIN assignments
  - Each subnet with description and # IPs currently used
- Planned subnet mapping for requested block
  - Each subnet with description, # IPs used within 30 days, # IPs used within one year

Example

Subnet Mapping for Existing Block(s)			
Subnet	**Description**	**Geographic Location**	**IPs in use**
192.192.1.0/29	Mail servers - rDNS	Reston VA	5
192.192.1.16/28	Database cluster	Reston VA	14
192.192.1.64/26	Staff VPN Access	Ashburn VA	53

Subnet Mapping for Requested Block				
Subnet	**Description**	**Geographic Location**	**30-day use**	**1-year use**
x.x.x.0/26	NAT pool	Reston VA	40	60
x.x.x.64/27	Database cluster	Reston VA	20	30
x.x.x.96/29	Mail Servers - rDNS	Reston VA	4	7
x.x.x.104/29	Web Servers	Reston VA	3	6
x.x.x.128/26	Staff VPN Access	Ashburn VA	28	43

The Bottom Line

- ARIN has v4 space today, but can't guarantee future availability
- Plan appropriately to ensure continued growth of your network
  - Waiting List
  - Specified Recipient Transfers
  - IPv6

Qualifying for IPv6 - ISPs

- Have a previous v4 allocation from ARIN **OR**
- Intend to multi-home **OR**
- Provide a technical justification which details at least 50 assignments made within 5 years

IPv6 ISP Data Typically Requested

- If requesting more than a /32, a spreadsheet/text file with
  - # of serving sites (PoPs, datacenters)
  - # of customers served by largest serving site
  - Block size to be assigned to each customer (/48 typical)

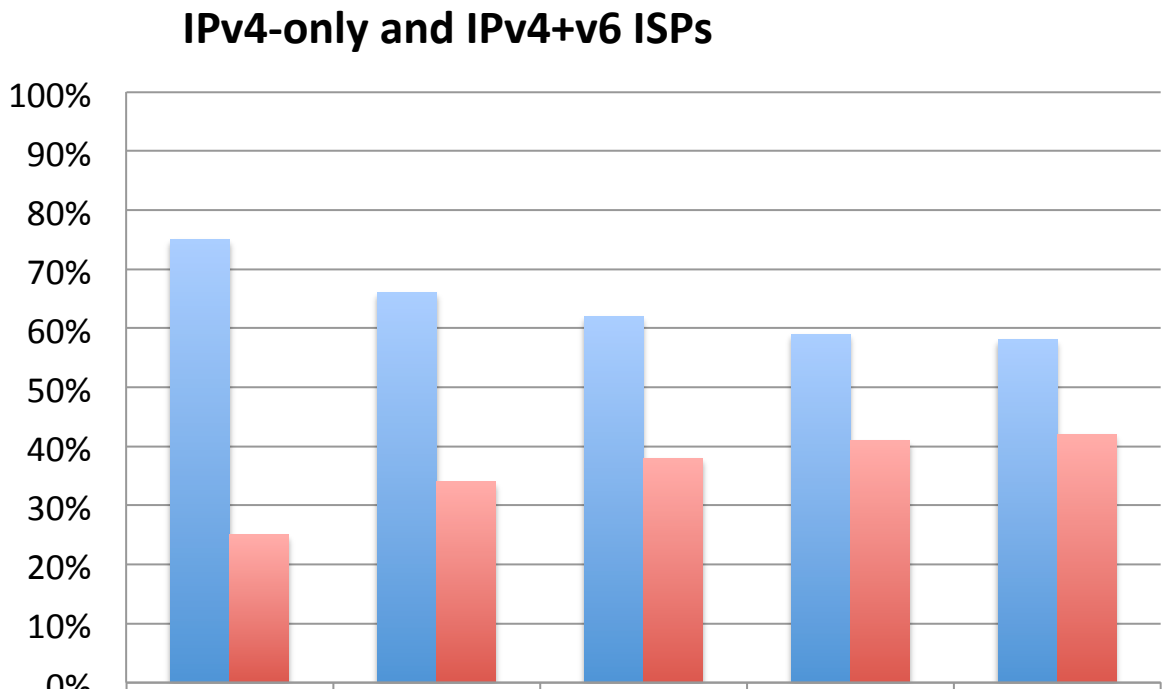
Qualifying for IPv6 – End Users

- Have a v4 direct assignment **OR**
- Intend to multi-home **OR**
- Show how you will use 2000 IPv6 addresses or 200 IPv6 subnets within a year **OR**
- Technical justification as to why provider-assigned IPs are unsuitable

IPv6 End Users – Data Requested

- List of sites in your network
  - Site = distinct geographic location
  - Street address for each
- Campus may count as multiple sites
  - Technical justification showing how they're configured like geographically separate sites

ISP Members with IPv4 and IPv6



	2010Q3	2011Q3	2012Q3	2013Q3	2014Q3
% IPv4 Only	75%	66%	62%	59%	58%
% IPv4 and IPv6	25%	34%	38%	41%	42%

***4,818 total members**

Q&A