



# Life After IPv4 Depletion

Leslie Nobile

# Overview



- ARIN's current IPv4 inventory
- Trends and observations
- Ways to obtain IP addresses post IPv4 depletion
  - IPv4
  - Transfers
  - IPv6

# IPv4 Reality Check



- ARIN has already depleted some larger prefix sizes (/8, /9, /10)
- We expect to deplete to the /16 level in the near future
- Soon after that, only /24s will remain
- Eventually, only blocks reserved via policy will remain in ARIN's inventory

# Current IPv4 Inventory



**Available inventory:**  
**.24 /8 equivalent**



**Other inventory:**

- **Quarantined space (60 day hold)**
  - **~19 /16 equivalents held** in “quarantine” to clear filters (returned and revoked space)
- **Reserved space**
  - **64 /16s (1 /10)** for NRPM 4.10 “Dedicated IPv4 block to facilitate IPv6 Deployment”
  - **218 /24s** remaining in the /16 for NRPM 4.4 “Micro-allocation”
  - **~8 /16** equivalents needing further research (reclaimed space that needs further chain of custody research)

# Current IPv4 Prefix Inventory



Block Size (CIDR)	Number of Blocks Available
<b>/11</b>	<b>1</b>
<b>/12</b>	<b>1</b>
<b>/13</b>	<b>2</b>
<b>/15</b>	<b>1</b>
<b>/16</b>	<b>1</b>
<b>/18</b>	<b>1</b>
<b>/19</b>	<b>1</b>
<b>/20</b>	<b>3</b>
<b>/21</b>	<b>55</b>
<b>/22</b>	<b>26</b>
<b>/23</b>	<b>221</b>
<b>/24</b>	<b>668</b>

# Current IP Resource Inventory- Extended FTP Stats



- Joint project, provided by all 5 RIRs
  - Accountability and Transparency
    - Shows which RIR is responsible for which resources
    - Identifies inconsistencies and overlaps
- Daily snapshot of all ARIN **issued resources**; **available resources**; and **reserved resources**
  - All “other inventory” from previous slide shows up as reserved
  - Note that 8.3 transfers show up as issued, but 8.2 transfers do not as they retain their original issue date
- <https://www.arin.net/knowledge/statistics/rir.html>

# Can ARIN's IPv4 Free Pool Increase?



- 4 ways that IPv4 addresses get back into ARIN's free pool
  - **Return** = voluntary
  - **Revoke** = for cause (usually non-payment)
  - **Reclaim** = fraud or business dissolution
  - **IANA issued** – per global policy for “post exhaustion IPv4 allocation mechanisms by IANA”
    - **/11** (issued 5/14), **/12** (issued 9/14) and **/13** (issued in 3/15) by IANA to each RIR
- 3.54 total /8s recovered by ARIN since 2005

# Trends and Observations

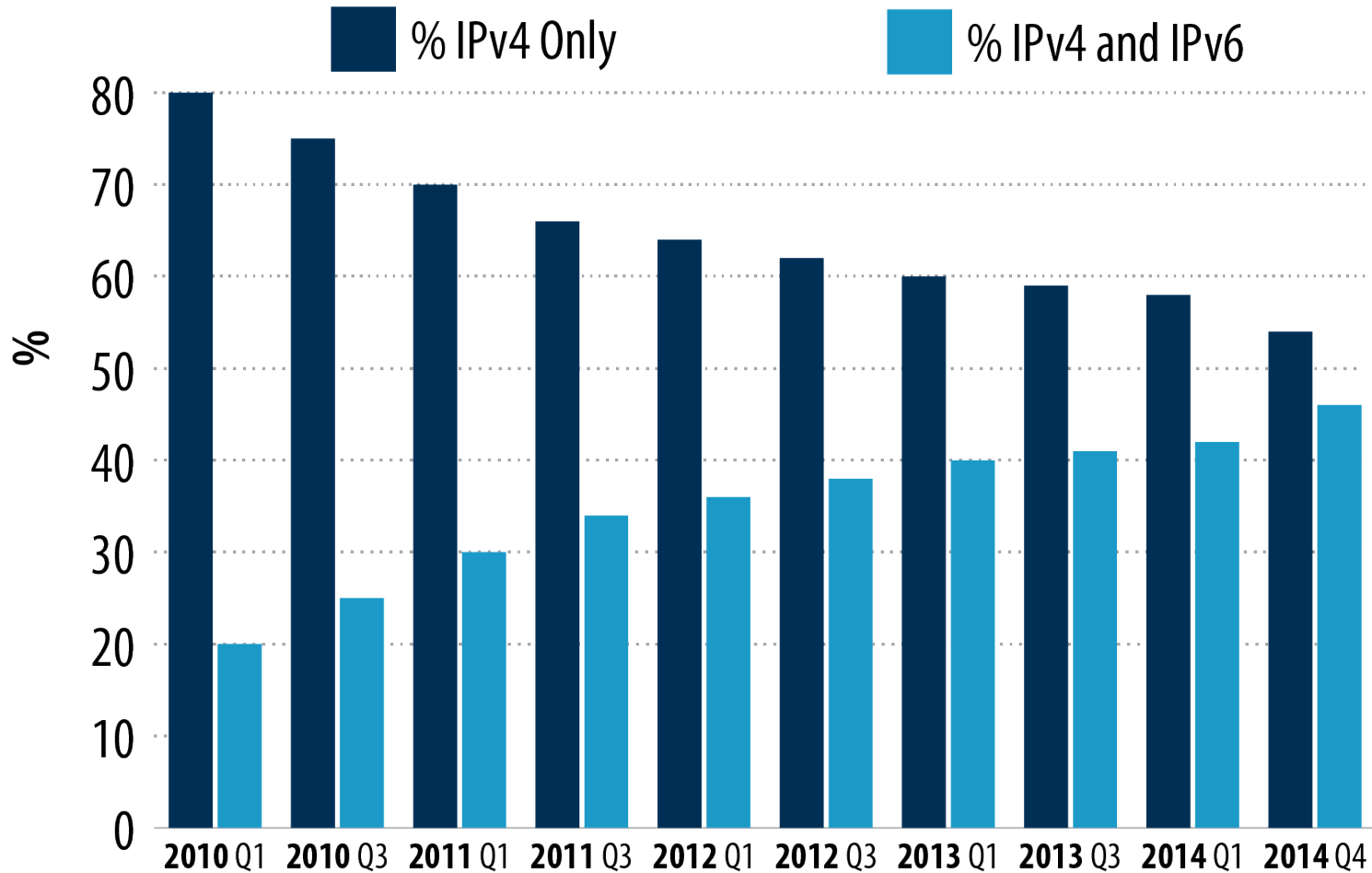


	IPv4 Requests	IPv6 Requests	Transfer Requests (NRPM 8.2,8.3 & 8.4)
2011*	2,863	1,425	446
2012	2,974	878	504
2013	3,377	771	539
2014	3,634	710	571

**\*Feb, 2011 - IANA global free pool depletion**



# ISP Members with IPv4 and IPv6



~5,000 ISP subscriber members as of April 1, 2015

# Options for Growing Your Network Post-IPv4 Depletion



- Check ARIN inventory to see if anything new has been added
- Apply for IPv4 resources and opt to be placed on the waiting list
- Explore market transfers (NRPM 8.3 or 8.4)
  - Utilize Specified Transfer Listing Service (STLS)
  - Get pre-approved for 8.3 or 8.4 transfer
- Request IPv6 resources

# Check ARIN's IPv4 Inventory



As of 09 April 2015, ARIN has **0.24** /8 equivalents of IPv4 address space remaining

IPv4 inventory published on ARIN's website: [www.arin.net](http://www.arin.net)

Updated daily @ 12AM ET

# IPv4 Waiting List



- Starts when ARIN can't fill a qualified request (approved prefix size not in inventory)
  - Option to specify smallest acceptable block size
  - If no block available between approved and smallest acceptable, option to go on a waiting list of pre-qualified recipients
- Oldest request filled first (based on approval date)
  - E.g. - if ARIN gets a /16 back and the oldest request is for a /24, we issue a /24 to that org
- One approved request on list at a time
- Limit of one allocation or assignment every 3  
12 months

# Types of Transfers



- Mergers and Acquisitions (NRPM 8.2)
- Transfers to Specified Recipients (NRPM 8.3)
- Inter-RIR transfers (NRPM 8.4)

# Transfers to Specified Recipients (NRPM 8.3)



- Allows orgs with unused IPv4 resources to transfer them to orgs in need of IPv4 resources
- **Source**
  - Must be current registrant, no disputes
  - Not have received addresses from ARIN for 12 months prior
  - Ineligible for further addresses from ARIN for 12 months after
- **Recipient**
  - Must demonstrate need for 24-month supply under current ARIN policy

# Inter-RIR Transfers (NRPM 8.4)



- RIR must have reciprocal, compatible needs-based policies
  - Currently APNIC, soon to be RIPE NCC
- **Transfers from ARIN**
  - Source cannot have received IPv4 from ARIN 12 months prior to transfer or receive IPv4 for 12 months after transfer
  - Source must be legitimate holder of space
  - Recipient meets destination RIR policies
- **Transfers to ARIN**
  - Recipient meets ARIN policies

# Specified Transfer Listing Service (STLS)



- Voluntary service intended to facilitate specified transfers (8.3 and 8.4)
- All participants have access to each others contact information
  - **Listers**: have available IPv4 addresses
    - Resources must be covered under RSA/LRSA
  - **Needers**: looking for IPv4 addresses
    - Must be pre-approved under ARIN policy to be listed
  - **Facilitators**: available to help listers and needers find each other
- Public summary provided
  - Lists number of available and needed IPv4 address blocks



# Pre-approvals for Specified Transfers (NRPM 8.3)



- Pre-approval based on 24 month need
  - Valid for 2 years, not subject to re-verification within that timeframe
- Must meet current ARIN policy
- Accessed in ARIN on-line account via the **“Transfer Resources”** button

# Tips for Faster Processing



- Make sure you are applying under the correct transfer policy
- Make sure that all registration information is current and accurate
- Involve ARIN as early as possible
  - Make sure a contemplated specified transfer meets ARIN requirements before finalizing
- Use ARIN's STLS or request pre-approval in advance of the transfer
- Provide detailed information to support 24 month need

# Requesting IPv6 - ISPs



- **ISP Criteria**

- 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

# Data ARIN Will Typically Ask For - ISPs



- 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)

# Requesting IPv6 – End Users



- **End user criteria**

- 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

# Data ARIN Will Typically Ask For – End users



- If requesting more than a /48, a spreadsheet/text file with
  - 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

# Summary



- ARIN will deplete its IPv4 available pool sometime this year
- There are still ways to obtain IPv4 address space
  - Returns/revocations/reclamations/IANA distributions into the free pool
  - Special use policies (reserved /10 for IPv6 facilitation, reserved /16 for micro-allocations)
  - Market transfers
- IPv6 is abundant and easy to qualify for!

