

# How to Navigate Getting IPv4 Addresses in a Post Run-Out World

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A decorative graphic consisting of several horizontal lines of varying lengths and colors (teal, white, and light blue) extending from the right side of the slide towards the center.

# Background

- Traditionally RIRs (and their predecessors) were the primary source of IPv4 addresses.
- Prior to the introduction of CIDR, addresses were given out in 3 sizes: 256 addresses, 65,536 addresses, or 16,777,216 addresses.
- This, along with a number of other factors, led to a misallocation problem.
  - There are only 4.3 billion IPv4 addresses, and a significant portion of them were registered to organizations that were either underusing the space, or not using it at all.

# Background

- With IPv4 exhaustion looming, and IPv6 adoption not prevalent enough to halt the need for additional IPv4 space, the RIRs stepped in to address the misallocation issue.
- In June of 2009, ARIN implemented a transfer policy.
- A transfer market took some time to develop, as ARIN continued to have a “free pool” of IPv4 space to delegate to members.
- In September of 2015, ARIN ran out of “free space.”

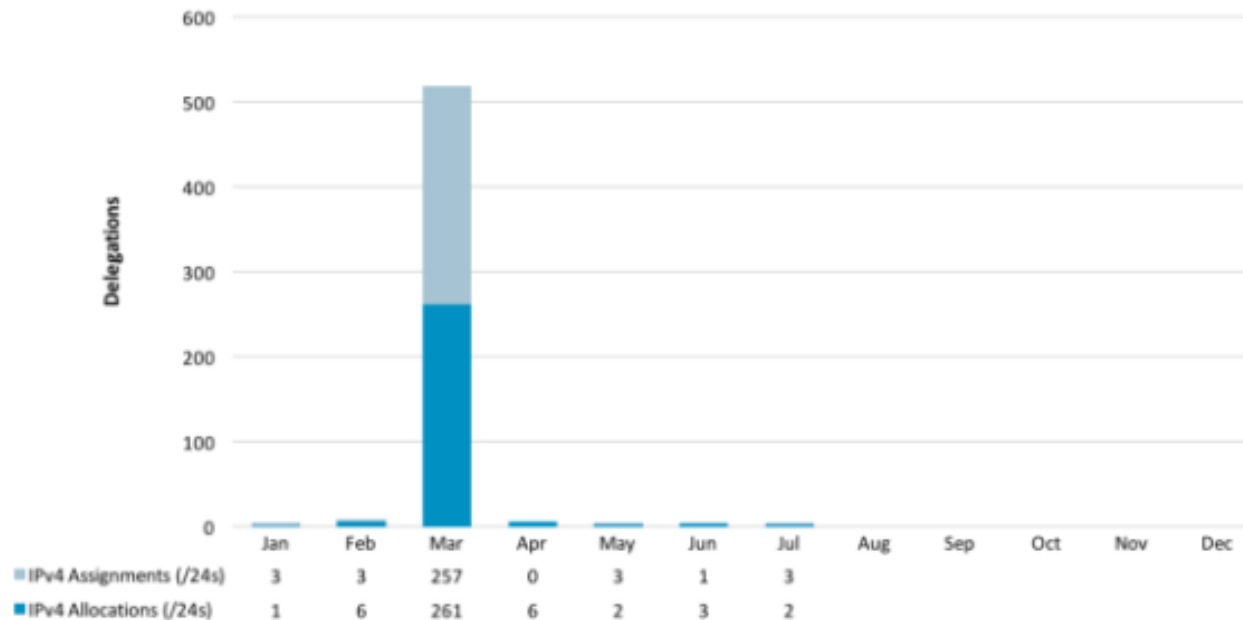
# Present Situation

- Organizations seeking “free space” can apply to be placed on ARIN’s waiting list.
- Currently, the wait list is 392 requests long.
  - The oldest requests on the list are from July 2015 (all for a /20 and larger).
  - The oldest request for a /24 is from October 2015.
- Applying for the waitlist vs. applying for pre-approval.
  - The waitlist only requires you to provide justification for a 3 month supply.
  - It’s worth providing them with justification for a 24 month supply so that you do not have to provide additional justification information if you decide to abandon the waitlist.

# Present Situation

- Despite the existence of a waiting list, the primary source of IPv4 addresses is now the IPv4 market...

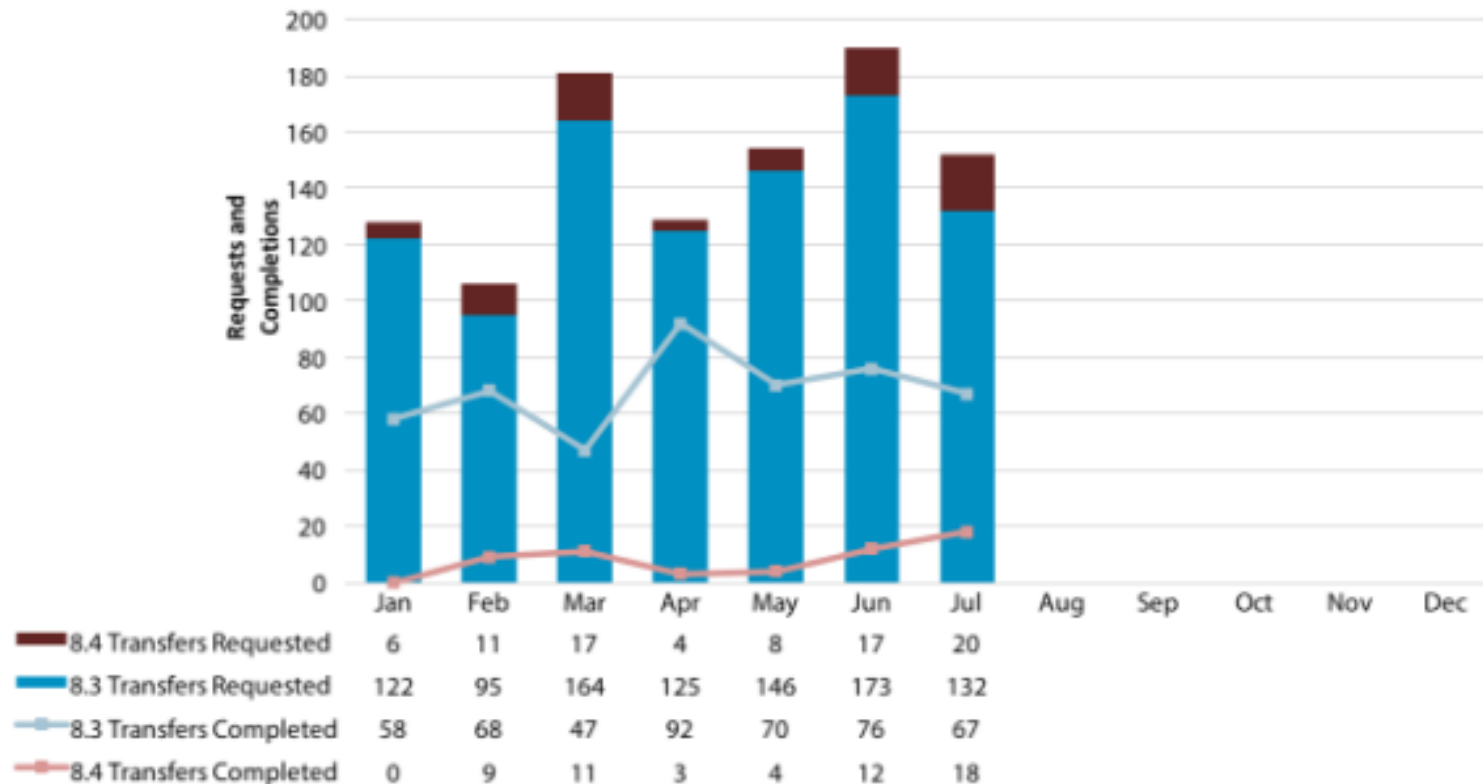
2016 IPv4 Delegations Issued By ARIN  
(listed in /24s)



*\*/24 (class C) equivalents are used as the "common denominator" for measuring the larger (/19s, /16s, etc.) networks that ARIN actually allocates. One /19 equals 32 /24s. One /16 equals 256 /24s.*

# Present Situation

2016 8.3 & 8.4 Transfers Requested and Completed



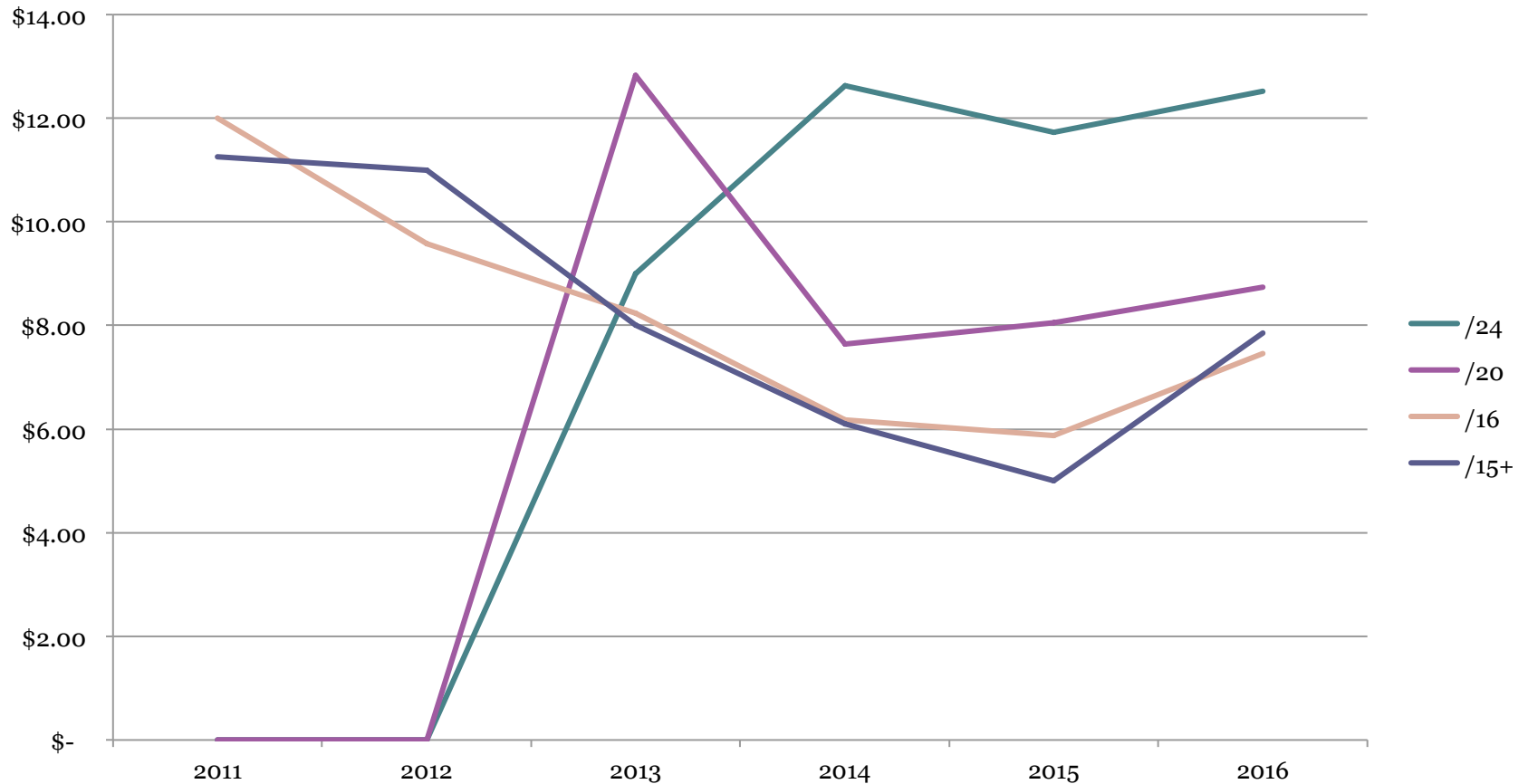
8.3 Transfers are those addressed by the "8.3. Transfers to Specified Recipients" section of the NRPM and 8.4 Transfers are referenced in the "8.4. Inter-RIR Transfers to Specified Recipients" section. 8.4 Transfers were allowed by policy effective 31 July 2012.

# Best Practices for Acquiring IPv4 Address Space

- **Assess your situation**
  - **How much space do you need?**
    - How much space can you qualify for with your RIR?
      - Applying for pre-approval
    - How far into the future do you want to plan?
      - Futures contracts vs. immediate transfers
  - **When do you need it by?**
  - **What should you budget?**

# Pricing Trends

## Average Price Per IP 2011-2016

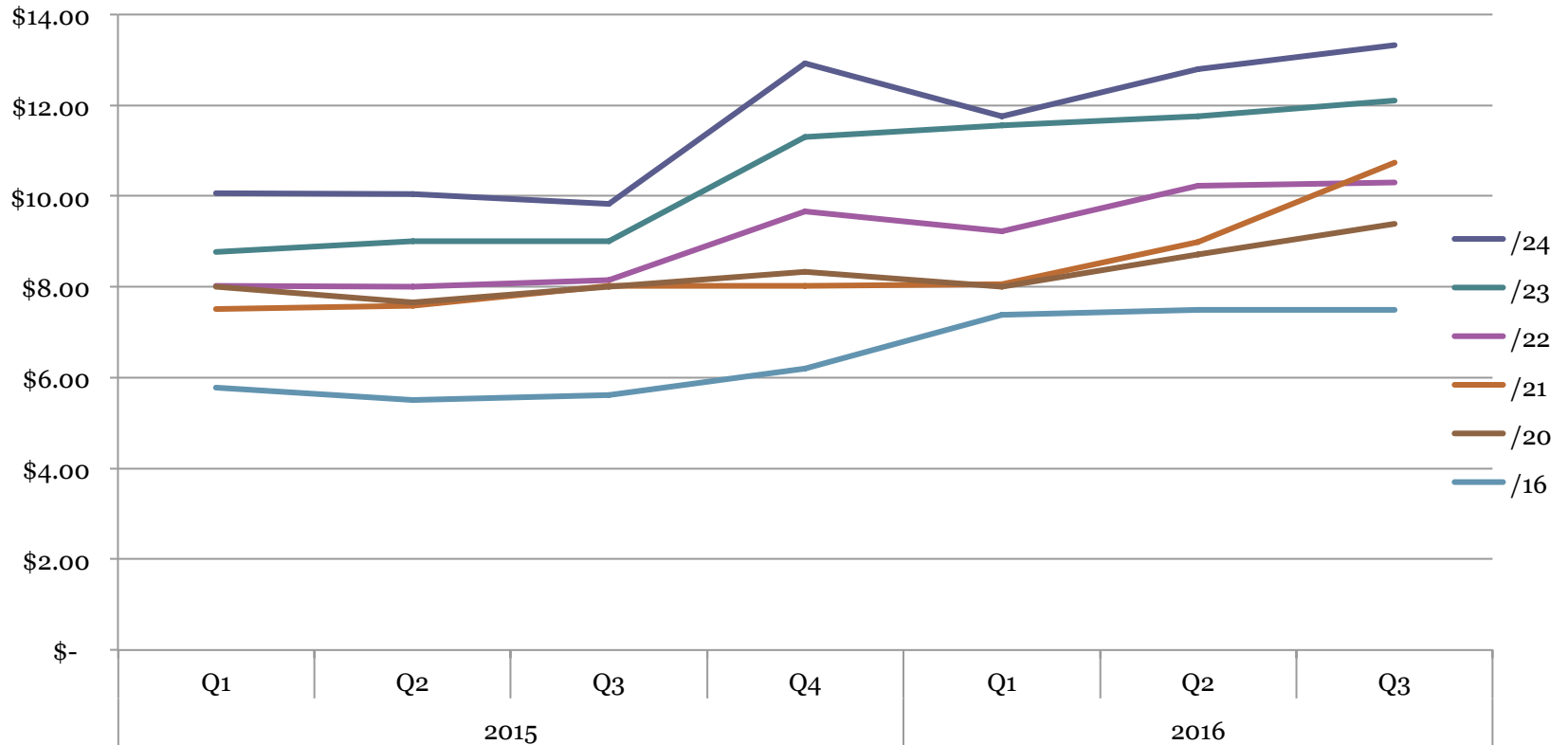




# Pricing Trends

## Average Price per IP Quarterly

### 2015-2016



# Best Practices for Acquiring IPv4 Address Space

- Be Aware of RIR Policies
  - **ARIN**
    - Backwards looking: 80 utilization of all space already registered to your org, in aggregate
    - Forwards looking: 24 month plan to use the space being transferred to you
    - 1 year hold period
    - Inter-RIR with APNIC & RIPE
  - **RIPE**
    - From another RIPE entity: no needs
    - From an ARIN/APNIC entity: plan to utilize 50% of space being transferred to you in 5 years
    - Inter-RIR with ARIN & APNIC
  - **APNIC**
    - Same needs requirements as ARIN
    - Inter-RIR with ARIN & RIPE
    - NIRs!

# Best Practices for Acquiring IPv4 Address Space

- Be prepared to provide DETAILED justification information to ARIN. ARIN will ask about...
  - Connectivity services and products your organization provides
  - Upstream providers and peers
  - IP addresses currently in use in your network
  - Projected use of requested space in the next 30 days, 12 months, and 24 months
  - Network topology
  - List of each logical subnet you plan to create along with a description of its purpose and outline of the 30 day, one year and two year host counts for each

# Best Practices for Acquiring IPv4 Address Space

- **Diligence**
  - **The address space itself**
    - Checking blacklists, etc.
    - Either diligence prior to signing contract or make APA subject to your diligence and approval of the address space
  - **The seller**
    - Make sure the address space is registered to the company you are buying it from
      - 2 exceptions:
        - The addresses are registered to a subsidiary (get evidence of relationship between companies)
          - If you are on a timeline, be aware of potential 8.2 M&A transfers that might be required
        - The seller is a bankruptcy estate or similar entity (contract should be with the Trustee, get court documents to confirm that the entity contracting with you is in fact the entity appointed by the court and that the IP addresses fall under the assets they have authority to sell)

# Best Practices for Acquiring IPv4 Address Space

- Tips for avoiding issues with registration hijackers and other bad actors
  - Compare the registration date of the IP addresses with how long the seller has been in business. If the seller is a newer company and the space is listed as registered to them in the '90s, be diligent about investigating chain title—they should be willing to provide you with evidence.
  - Keep an eye out for red flags with unknown entities. If something seems unusual for a business transaction, investigate.
  - Be cautious of anyone who tells you “Don’t worry about the details, I’ll handle everything.” Your organization should be involved throughout the process, and your seller (or their broker) should openly communicate with you about the process.
  - Structure your contract to protect your organization from risks. Don’t release payment to the seller until the addresses are in your organization’s name. Use an escrow account or delay payment until the transfer is complete.

# Best Practices for Acquiring IPv4 Address Space

- Structuring Contracts
  - Timing of Transfer(s) and Payment(s)
    - Immediate Transfer
      - Typically payment goes into escrow, then transfer of the entire space purchased is immediately transferred
    - Futures Contract
      - Space is transferred over time as the buyer is able to qualify with the RIR
      - Payment can be paid in a number of different ways, depending on the needs of the parties and the level of trust between them

# Best Practices for Acquiring IPv4 Address Space

- **Tips for a Smooth Transfer Process**
  - Understand RIR policies that apply to your transfer before you buy
  - Get your ducks in a row in advance with regards to your justification information
  - Apply for pre-approval
  - Do your diligence
  - Structure contracts to minimize risks
  - Pay attention to your ARIN Online account