

# IPv4 “End of Life” Proposals in the RIRs

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# Disclaimer

- These are my thoughts and opinions
- They do NOT necessarily represent the University of Minnesota, ARIN, or the ARIN Advisory Council
- Lots of things are still in flux, so, I'm not even sure that this presentation will accurately represent my opinions even next week

# What do I mean by IPv4 “End of Life”

- IPv4 is NOT going away anytime soon, don't worry about that
- But, by mid-2012, or sooner, you are not going to easily be able to get new IPv4 address assignments<sup>1</sup>

1. <http://www.potaroo.net/tools/ipv4/index.html>

# What do I mean by IPv4 “End of Life”

- So think of it as a vendor announcing the “End of Life” for one of their products
  - They usually announce a series of dates
    - When they will stop selling new product
    - When they will stop providing critical updates
    - When they will stop renewing support contracts
    - When they will stop support all together
- So in this analogy, sometime in 2012 you should expect the stock of the product called IPv4 addresses will run out.

# What do I mean by IPv4 “End of Life”

- So how are you going to Grow your network when there isn't any more IPv4 to be had?
- How is the Internet going to continue to Grow when there isn't any more IPv4 to be had?

# IPv6

- Yes, I believe the answer is IPv6
  - Others disagree though
- But, will we have “Universal Deployment of IPv6” by mid-2012?
- No, not even Global, let alone Universal
- Probably not even a majority of computers on the Internet will have IPv6 deployed and operating by end of 2012

# What are we going to do?

- Business as usual must and will Change
- The 3“Rs” of Environmentalism work for IPv4 too
  - Reduce
  - Reuse
  - Recycle
  - Renumber
  - Redeploy
  - Return
- So we need Policies for IPv4 “End of Life”

# IPv4 “End of Life” related Policies

- Global Policy for how IANA will allocate the last /8s
  - ARIN 2007-23
  - Approved by all RIRs
  - Awaiting ICANN action
- Global Policy for Allocation of IPv4 Blocks to Regional Registries
  - Just Proposed



# IPv4 “End of Life” related Policies

- Policy for what to do with the last /8 in each RIR
  - Similar Policy Proposals, limiting all allocations to minimum size and reserving a /16 for unforeseen circumstances
    - APNIC prop-062 - Approved
    - RIPE 2008-06 - Proposed
    - ArfiNIC afpol-v400901 - Proposed

# IPv4 “End of Life” related Policies

- Policy for what to do with the last /8 in each RIR
  - Reserve IPv4 space (/10) for IPv6 transition
    - ARIN 2008-5 – Approved
  - IPv4 Depleted Reserves, when /9 left limit all allocations to /21
    - ARIN (Unnumbered) – Proposed
  - Reserve IPv4 space (/12) for New ISPs
    - LACNIC LAC-2008-04 - Approved

# IPv4 “End of Life” related Policies

- Transfer Policies
  - ARIN 2008-2, Detailed Transfer Policy
    - Abandoned
  - ARIN 2008-6, Emergency Transfer Policy
    - Awaiting Board Review
  - ARIN, IPv4 Recovery Fund
    - In development by AC

# IPv4 “End of Life” related Policies

- Transfer Policies
  - APNIC prop-050, Very Liberal Transfer Policy
    - in discussion
  - APNIC prop-067, Basic Transfer Policy
    - in discussion
  - RIPE 2007-08, Basic Transfer Policy
    - Approved
  - No similar policy proposals in AfriNIC or LACNIC

# ARIN 2007-12

- IPv4 Countdown
  - Abandoned
  - Set a Date for the termination of IPv4 allocations

[http://www.arin.net/policy/proposals/2007\\_16.html](http://www.arin.net/policy/proposals/2007_16.html)

# ARIN 2007-16

- IPv4 Soft Landing
  - Abandoned
  - Set 4 Phases based on the number of /8s in IANA free-pool, with increasing utilization Requirements for new allocations

[http://www.arin.net/policy/proposals/2007\\_16.html](http://www.arin.net/policy/proposals/2007_16.html)

# ARIN 2007-18

- Global Policy for the Allocation of the Remaining IPv4 Address Space
  - Abandoned, in favor of 2007-23
  - Describes a slightly different process for the allocation of the final remaining IPv4 space to the RIRs

[http://www.arin.net/policy/proposals/2007\\_18.html](http://www.arin.net/policy/proposals/2007_18.html)

# ARIN 2007-23

- End Policy for IANA IPv4 allocations to RIRs
  - Adopted pending ratification by ICANN
  - Describes the process for the allocation of the final remaining IPv4 space to the RIRs
  - Reserves a /8 for each RIR

[http://www.arin.net/policy/proposals/2007\\_23.html](http://www.arin.net/policy/proposals/2007_23.html)



# ARIN 2008-2

- IPv4 Transfer Policy Proposal
  - Abandoned, in favor of 2008-6
  - A detailed transfer policy created by the Advisory Council
  - Limits intended to prevent speculation, and unnecessary disaggregation of the route table
  - Maintains current “Needs Based” justification for additional address space

[http://www.arin.net/policy/proposals/2008\\_2.html](http://www.arin.net/policy/proposals/2008_2.html)

# ARIN 2008-5

- Dedicated IPv4 Block to facilitate IPv6 deployment
  - Adopted, to be implemented no later than May 2009
  - Reserves /10 of IPv4 for IPv6 transition mechanism
  - Min allocation /28, Max allocation /24

[http://www.arin.net/policy/proposals/2008\\_5.html](http://www.arin.net/policy/proposals/2008_5.html)

# ARIN 2008-6

- Emergency IPv4 Transfer Policy Proposal
  - Awaiting Board Review
  - A very simple transfer policy authorizing transfers for 3 years upon implementation
  - Maintains current “Needs Based” justification for additional address space

[http://www.arin.net/policy/proposals/2008\\_6.html](http://www.arin.net/policy/proposals/2008_6.html)

# ARIN unnumbered

- IPV4 Depleted Reserves
  - Proposed, accepted for development by AC
  - Once ARIN drops below an equivalent of a /9, all allocations will be limited to a /20 in a 6 month period
  - Intended to prevent a run on the IPv4 Bank and a sudden depletion of the IPv4 reserves

<http://lists.arin.net/pipermail/arin-ppml/2008-December/012726.html>

# ARIN unnumbered

- IPV4 Recovery Fund
  - Proposed, accepted for development by AC
  - ARIN will provide financial incentives to return IPv4 address space
  - Those who need space will place bids for new space with ARIN
  - Intended to be a cost recovery model

<http://lists.arin.net/pipermail/arin-ppml/2009-January/012948.html>

# ARIN unnumbered

- Allocation of IPv4 Blocks to Regional Registries
  - Proposed, accepted for development by AC
  - Address space returned to RIRs should be returned to IANA for redistribution among all RIRs and not remain in the RIR it was returned to

<http://lists.arin.net/pipermail/arin-ppml/2009-January/012963.html>

# Conclusion

- Lots Going On – Pay Attention Please
- Implement IPv6 ASAP
- Return unused Legacy IPv4 address space
  - Through Transfers or Directly to ARIN
- Explain these issues to you CIO and other Management
- Consider the ARIN Legacy RSA
  - You will need to sign it if you want to Transfer Addresses