Details

- Ref. Name:
  AFPUB-2011-v4-004-draft-01(GPP-IPv4-2011)
- Old Ref:
  NA
- Status:
  Awaiting Ratification
- Date:
  29 Apr 2011
- Author:

  - **Douglas Onyango** ondouglas[at]yahoo.com
  - **Alejandro Acosta** alejandro.acosta[at]bt.com | British Telecom
  - **S. Moonesamy** sm+afrinic[at]elandsys.com
  - **Nicolas Antoniello** nantoniello[at]gmail.com
  - **Medel Ramirez** medel[at]globetel.com.ph | Globe Telecom, Inc
  - **Masato Yamanishi** myamanis[at]bb.softbank.co.jp | Softbank BB Corp
  - **Philip Smith** pfs[at]cisco.com | Cisco Systems

1) Summary of the Problem Being Addressed by this Policy Proposal

The IANA has now exhausted its pool of IPv4 /8 blocks, having distributed its remaining IPv4 addresses according to the "Global Policy for the Allocation of the Remaining IPv4 Address Space".[1] However, there is the possibility that IANA will receive returned addresses post-exhaustion of its pool of /8s.

An earlier global policy proposal authored by a team consisting of people from each of the five RIRs reached consensus at four RIRs, and was subsequently endorsed by these RIRs' Boards. In the AfriNIC region, this was AFPUB-2009-v4-002, "Global policy proposal for the allocation of IPv4 blocks to Regional Internet Registries". To see the proposal reference number for this proposal in all five RIRs, see Appendix A.

The version approved in the fifth region was substantially rewritten by the ARIN community to meet some of their concerns. However, given the nature of the rewrites, it would have been difficult to reconcile that version with the version that reached concensus in the other four RIRs. Therefore, some members of the ARIN community wrote a new global proposal, "Global Policy for IPv4 Allocations by the IANA Post Exhaustion", which has been adopted in the ARIN region. it is AFPUB-2010-v4-003-draft-02 . To see the proposal reference number for this proposal in all five RIRs, see Appendix A. However, there are significant issues with AFPUB-2010-v4-003-draft-02. These are:

The reclamation pool could be exhausted by RIR(s) with high allocation rates after the first (or first few) allocation period(s). There are two main reasons RIRs will have differing allocation rates after the IANA pool is exhausted:

1. Rate of Internet growth in the region
2. Policies developed by different regions governing how the last part of their IPv4 addresses are to be managed.

In response to IPv4 exhaustion, some RIR communities have chosen to apply policies to a part of their last IPv4 addresses that aim to assist with a smooth transition to IPv6. An effect of such policies is that it can slow down the consumption of IPv4 addresses allocated under these policies. This side effect would put RIRs that have chosen to adopt such policies at a disadvantage, as they will take far longer to qualify for space under AFPUB-2010-v4-003-draft-02 compared to RIRs that have chosen not to adopt such policies. Therefore, to ensure that regional variation in runout policy amongst RIRs is accounted for, it is important to have an IANA redistribution method that can continue to provide resources to RIRs over more than one (or only a few) allocation periods.

- The definitions of when an RIR is considered to be "exhausted", and therefore eligible for space from IANA, should be more flexible given the very different RIR policy environments and the number of addresses available at any given time.

Phoca PDF

- Under the redistribution formula proposed in AFPUB-2010-v4-003-draft-02, it is possible for one RIR to be the single eligible RIR in the first IANA allocation period and for that RIR to claim the entire reclamation pool. It is also possible that only one RIR could be eligible during subsequent allocation periods, and take the total IANA pool available at that time.

To prevent this from happening, it is better to have a formula that would allow RIRs to take only a certain fraction of the IANA pool at each allocation period.

A problem with both AFPUB-2009-v4-002 and AFPUB-2010-v4-003-draft-02 is related to the policy for the return of addresses by the RIRs to IANA:

- In AFPUB-2009-v4-002, the return of addresses to the reclamation pool was mandatory. This restriction was of significant concern to the ARIN community.

- In AFPUB-2010-v4-003-draft-02, return of addresses by RIRs is optional, but there is nothing to prevent an RIR which has contributed nothing towards IANA's return pool from claiming part, or indeed all, of the return pool.

2) Summary of How this Proposal Addresses the Problem

This proposal describes the process that IANA will follow to allocate IPv4 resources to Regional Internet Registries (RIRs) after the central pool of addresses is exhausted.

The processes for how IPv4 space may be placed in the IANA Recovered IPv4 Pool is out of the scope of this proposal.

- Because of the two above issues, this new proposal separates the return of address space to the IANA from the redistribution of that space by the IANA. Instead, the authors of this new proposal treat the return and redistribution as two separate issues that should be treated as separate policies.

A problem with AFPUB-2009-v4-002, AFPUB-2010-v4-003-draft-02, and the first version of AFPUB-2011-v4-004-draft-01 is that attempts to find ways to make "eligibility" and "exhaustion" meet the differing needs of all five RIRs caused problems for at least of the RIRs.

- To avoid this situation, this second version of AFPUB-2011-v4-004-draft-01 invokes the precedent of last global policy for IPv4 distribution by the IANA[1] to propose an alternative

way to distribute space from the IANA. That is, that there be an equal distribution of addresses between all RIRs

3) The Proposal

Upon adoption of this IPv4 address policy by the ICANN Board of Directors, the IANA shall establish a Recovered IPv4 Pool to be utilized post RIR IPv4 exhaustion as defined in Section 1. The Recovered IPv4 Pool will initially contain any fragments that may be left over in the IANA. It will also hold any space returned to the IANA by any other means.

3.1) Recovered IPv4 Pool:

The Recovered IPv4 Pool will be administered by the IANA. It will contain:

a) Any fragments left over in the IANA inventory after the last /8s of IPv4 space are delegated to the RIRs

- The IANA inventory excludes "Special use IPv4 addresses" as defined in BCP 153 and any addresses allocated by the IANA for experimental use.

b) Any IPv4 space returned to the IANA by any means.

The Recovered IPv4 Pool will stay inactive until the first RIR has less than a total of a /9 in its inventory of IPv4 address space.

When one of the RIRs declares it has less than a total of a /9 in its inventory, the Recovered IPv4 pool will be declared active, and IP addresses from the Recovered IPv4 Pool will be allocated as stated in Section 4.2 below.

3.2) Allocation of returned IPv4 address space by the IANA:

a) Allocations from the IANA may begin once the pool is declared active.

b) In each "IPv4 allocation period", each RIR will receive a single "IPv4 allocation unit" from the IANA.

c) An "IPv4 allocation period" is defined as a 6-month period following 1 March or 1 September in each year.

d) The IANA will calculate the size of the "IPv4 allocation unit" at the following times:

Phoca PDF

- When the Recovered IPv4 Pool is first activated
- At the beginning of each IPv4 allocation period

  To calculate the "IPv4 allocation unit" at these times, the IANA will use the following formula:

  IPv4 allocation unit = 1/5 of Recovered IPv4 pool, rounded down to the next CIDR (power-of-2) boundary.

  No RIR may get more than this calculation used to determine the IPv4 allocation unit even when they can justify a need for it.

  The minimum "IPv4 allocation unit" size will be a /24. If the calculation used to determine the IPv4 allocation unit results in a block smaller than a /24, the IANA will not distribute any addresses in that IPv4 allocation period.

3.3) Reporting

The IANA may make public announcements of IPv4 address transactions that occur under this policy. The IANA will make appropriate modifications to the "Internet Protocol V4 Address Space" page of the IANA website [2] and may make announcements to its own appropriate announcement lists. The IANA announcements will be limited to which address ranges, the time of allocation, and to which Registry they have been allocated.

4) Pros/Cons

Advantages:

The policy provides a mechanism for the ongoing distribution of IPv4 address space, while removing the areas of AFPUB-2009-v4-002 that were problematic for the ARIN community, and removing the problematic areas of AFPUB-2010-v4-003-draft-02. That is, the proposal:

- Permits regional variation in runout policy amongst RIRs to be accounted for in the distribution of the Recovered IPv4 Pool
- Prevents the possibility of a single RIR being eligible to be allocated the entire Recovered IPv4 Pool in the first (and perhaps only) allocation period
- Removes two areas of policy that have failed to reach agreement in previous attempts at this proposal
  - How addresses should be placed in the Recovered IPv4 pool
  - References to how transfers should or should not take place

Disadvantages:

This proposal does not provide details of how address space may be returned to the IANA IPv4 Recovered Pool.

5) Timetable for implementation

Once consensus has been reached in each of the five RIR regions, the policy will be forwarded to ICANN for approval and then implemented by the IANA

6) References

1. "Global Policy for the Allocation of the Remaining IPv4 Address Space" http://www.icann.org/en/general/allocation-remaining-ipv4-space.htm
2. "IANA IPv4 Address Space Registry", February 2011 http://www.iana.org/assignments/ipv4-address-space/ipv4-address-space.xml

7) Appendix A

Proposal number given to "Global policy proposal for the allocation of IPv4 blocks to Regional Internet Registries" in each of the five regions:

- AfriNIC: AFPUB-2009-v4-002
- APNIC: prop-069
- ARIN: ARIN-2009-3
- LACNIC: LAC-2009-01
- RIPE: RIPE 2009-01

Proposal number given to "Global Policy for IPv4 Allocations by the IANA Post Exhaustion" in each of the five regions:

- AfriNIC: AFPUB-2010-v4-003-draft-02
- APNIC: prop-086
- ARIN: ARIN-2010-10
- LACNIC: LAC-2010-04
- RIPE: RIPE 2010-05

Phoca PDF

History

2011-02-11	RPD mailing list first informed of the proposal's submission to the ASO-AC. <https://lists.afrinic.net/pipermail/rpd/2011/001258.html>
2011-04-28	Proposal formally submitted into the AfriNIC policy process. <https://lists.afrinic.net/pipermail/rpd/2011/001481.html>
2011-05-06	Proposal posted to the AfriNIC website. <https://lists.afrinic.net/pipermail/rpd/2011/001560.html>
2011-06-08	Proposal discussed at AfriNIC-14 in Dar es Salaam and gains consensus. <https://lists.afrinic.net/pipermail/rpd/2011/001759.html>
2011-07-29	Last Call starts <https://lists.afrinic.net/pipermail/rpd/2011/001840.html>
2011-08-03	Last Call ends
2011-09-09	PDWG co-chairs declare consensus <https://lists.afrinic.net/pipermail/rpd/2011/001853.html>