

2005-1
and
2006-4

Provider-independent IPv6 Assignments for End Sites

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Need for IPv6 PI Assignments

- Current policy allows for PI assignments for non-ISP's in IPv4 but not in IPv6
- There is currently no viable technology substitute for PI assignments for:
 - Multihoming (unicast and anycast)
 - Avoiding costly renumbering (provider lock-in)

Result

- There is currently no viable migration path for non-ISP's
- Non-ISP's with IPv4 PI assignments would have to fundamentally change the way they network and do business to use IPv6
- Not surprisingly this is a significant obstacle to widespread IPv6 deployment

Solution: IPv6 PI Policy

- Difficult road to consensus
 - 2005-1 v1: AS = PI was seen as too permissive. Many organizations have an AS number without IPv4 PI space.
 - 2005-1 v2: 100,000 node requirement was determined to be exceptionally restrictive. So few organizations would have qualified as to make it useless.

2005-1 v3: Current Proposal

- Requirements:
 - Must not be an IPv6 LIR
 - Must qualify for an IPv4 assignment or allocation under **current** policy
- Note:
 - Viable IPv6 based criteria have been elusive, mainly due to a lack of experience with IPv6 PI assignments
 - It is expected that as experience is gained this transition based policy will evolve into an IPv6 exclusive policy

2005-1 v3: Assignment Size

- /48 minimum size
- Larger sizes available with justification based on HD ratio of number of /64 subnets used
- It is expected that these assignments will be made out of a separate block set aside for this purpose
- Draft has been updated to reserve a /44 for each PI assignment

Land Rush?

- One of the primary concerns expressed about these policies is the possibility of creating an ASN or IPv6 “land rush.” This land rush would create a irreversible growth in the BGP route-table.
- 2005-1 is no less restrictive than 2002-3 which has been in effect since May 18, 2004.
- According to ARIN assignment statistics, there has not been an ASN or IP land rush since implementation of 2002-3.
- If a land rush did start, the ARIN BoT could suspend this policy for review under their emergency authority.

More Similar than Different

- 2005-1 and 2006-4 come from similar motivations
- 2005-1 and 2006-4 have more in common than different
 - The 2006-4 text was written as a compromise to further the deployment of IPv6 and to attempt to quell the concerns about the IPv6 PI land rush.
- Authors of the two policies have come to consensus on most outstanding issues
- Either policy is probably better than no policy
- Policy today isn't policy forever
 - It can be changed in the future

Coming to Consensus

- During yesterday's discussions the authors agreed on a couple of items that should be harmonized between the two policies.
- These are items where we believe there is wide spread agreement.
 1. Include an explicit requirement in 2005-1 to require blocks be assigned from a specific block to facilitate filtering
 2. Include a reserved /44 block in the 2005-1 policy
 3. Remove the confusing "end-site" requirement from 2006-4
- We would like to focus our attention today on the initial assignment qualification requirements and initial assignment sizes
- There are differences between the two policies on subsequent assignment growth. We don't believe that these difference are large enough that they couldn't be "fixed" in a future policy revision.

IPv6 PI Policy Comparison

	2005-1	2006-4
Requirements for an initial assignment	<ul style="list-style-type: none"> • Eligible for any IPv4 assignment (e.g. /22 for multihomed sites, /20 for non-multihomed sites) 	<ul style="list-style-type: none"> • Currently multihomed with IPv4 • Have an assigned IPv4 /19 or larger • Using at least 80% of an IPv4 /19
Assignment Size	<ul style="list-style-type: none"> • Minimum size is /48 • Assignments larger than /48 are envisioned to be made based on the current HD ratio of /64 subnets (e.g. org can show intended utilization of > 33,869 subnets) 	<ul style="list-style-type: none"> • Minimum size is /48 • Also provides for a /48 equivalent to be assigned to each active ASN
Future Assignment Criteria	<ul style="list-style-type: none"> • No specific requirements: “when the need for additional subnets is justified” • Assignments larger than /48 are intended to be made based on the current HD ratio of /64 subnets (e.g. org can show intended utilization of > 33,869 subnets) 	<ul style="list-style-type: none"> • Assignment doubles when 50% of /64 subnets are used or 50% of /48 per ASN assignments are used • Larger than /44 treated as LIR • Maximum size is /44

Choice is Good

- Three principle areas of difference remain:
 - Initial requirements
 - Criteria for larger than /48 assignment
 - Criteria for expanded/additional assignment
- Hope to gain consensus on the following points:
 - A PI policy is needed
 - The common elements of these two policies are acceptable
 - Community preference for one or the other policy's version of the three remaining differences

(revised) 2005-1 Policy statement:

Add new subsection in section 6.5 of the NRPM:

6.5.8. Direct assignments

6.5.8.1. To qualify for a direct assignment, an organization must:

- a) not be an IPv6 LIR; and
- b) Qualify for an IPv4 assignment or allocation from ARIN under the IPv4 policy currently in effect.

6.5.8.2. Direct assignment size

Organizations that meet the direct end site assignment criteria are eligible to receive a direct assignment. The minimum size of the assignment is /48. Organizations requesting a larger assignment must provide documentation justifying the need for additional subnets. These assignments shall be made from a distinctly identified prefix and shall be made with a reservation for growth of at least a /44 and at least 1 bit to the left of the initial allocation.

6.5.8.3. Subsequent Assignment Size

Additional assignments may be made when the need for additional subnets is justified. When possible assignments will be made from an adjacent block to allow the combined block to remain a single aggregate route.

(revised) 2006-1 Policy statement:

6.5.8. Direct assignments to end sites

6.5.8.1. To qualify for a direct end site assignment, an organization must meet all of the following criteria:

1. not be an LIR;
2. be currently multihomed using IPv4;
3. have a direct assignment from ARIN of at least a IPv4 /19 and can show the current utilization of 80% of an IPv4 /19 equivalent.

6.5.8.2. Direct assignment size to end sites

Organizations that meet the direct end site assignment criteria are eligible to receive a direct assignment of /48 out of a reserved /44.

Organizations with multiple ASNs may be assigned a prefix large enough to permit a /48 to be assigned to each ASN.

Direct Assignments shall be allocated from a separate super-block to allow for LIRs to filter.

6.5.8.3. Subsequent direct assignments to end sites

Organization's assignment size may be increased to the next larger prefix (to a maximum of /44) when the organization demonstrates any of the following criteria:

1. 50% of the assigned /64 subnets are utilized
2. 50% of the /48 subnets are assigned and utilized to unique ASN assignments

Organizations which request and can justify assignments larger than /44 shall qualify as LIRs and must make application for an allocation under policies applicable to an LIR, except that they shall be exempted from the requirement to assign addresses to other organizations.

Only one direct assignment may be made to an end site organization under Section 6.5.8