

2010-8: Rework of IPv6 Assignment Criteria

David Farmer

ARIN XXVI

2010-8: What does it do?

- Replaces 6.5.8 with new language
- Attempts to restate in clear plain language
- Removed direct references to IPv4 policy
- General goal: Provide sufficiently large initial assignments rounded up to nibble boundaries to reduce routing table growth

2010-8: What does it do?

- Allows end-users that meet **one** of the following Criteria to receive a minimum allocation of /48 or larger
 - Having a previous IPv4 allocation
 - Are or immediately becoming IPv6 Multihomed
 - Have 1000 or more hosts in network
 - Provide a technical justification indicating why IPv6 addresses from an ISP or other LIR are unsuitable

2010-8: What does it do?

- For end-users with multiple sites, allows a up to a /48 per end-user site
- Based on the concept that, Site = Location
 - **NOT** Site = Organization
- Total Assignment based on number of sites rounded up to the next nibble boundary
- Eliminates HD-Ratio, replaces it with 75% threshold of sites

2010-8: What does it do?

- Provide for larger sites
 - Requiring 25% utilizations of subnets (16,384) to receive larger than /48 for a site (location)
- Subsequent assignments require 75% utilization of all assignments in total
- Subsequent assignments normally made by expanding a current assignment
- When that is not possible a new assignment will of the next nibble boundary will be made

2010-8: What does it do?

- End-users SHOULD consolidate into a single aggregate when possible
- Any unused assignments MUST be returned to ARIN

2010-8: Changes in Queue

- **Clause c of 6.5.8.1**

“c. By having a network that makes active uses of a minimum of 2000 IPv6 addresses within 12 months, or;”

Make similar changes in the example and the rationale

- **Add subnet clause to 6.5.8.1**

“d. By having a network that makes active uses of a minimum of 200 /64 subnets within 12 months, or;”

move current clause .d to .e

2010-8: Staff Comments

- As a consequence of rounding to nibble boundaries a fee increment occurs between /44 (1-12 sites) and /40 (13-192 sites)
- Staff finds the policy text in the following sections to be unclear and confusing, which makes it difficult for staff to implement
 - Sections 6.5.8.2.1, 6.5.8.2.2, 6.5.8.2.3, 6.5.8.3

2010-8: Discussion Questions?

- Should we keep host counts?
 - Probably need it until well after IPv4 run-out
- Is Site = Location the correct concept to use?
- HD-Ratio VS. 75% threshold
- If you want to keep HD-Ratio, what does that mean for an End-User?

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Questions/Comments?

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Appendices

2010-8: The Proposal

6.5.8. Direct assignments from ARIN to end-user organizations

6.5.8.1 Initial Assignment Criteria

Organizations may justify an initial assignment for addressing devices directly attached to their own network infrastructure, with an intent for the addresses to begin operational use within 12 months, by meeting one of the following criteria:

- a. Having a previously justified IPv4 end-user assignment from ARIN or one of its predecessor registries, or;
- b. Currently being IPv6 Multihomed or immediately becoming IPv6 Multihomed and using an assigned valid global AS number, or;
- c. By having a network consisting of a total of 1000 or more hosts, or;
- d. By providing a reasonable technical justification indicating why IPv6 addresses from an ISP or other LIR are unsuitable.

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Examples of justifications for why addresses from an ISP or other LIR may be unsuitable include, but are not limited to:

- An organization that operates infrastructure critical to life safety or the functioning of society can justify the need for an assignment based on the fact that renumbering would have a broader than expected impact than simply the number of hosts directly involved. These would include: hospitals, fire fighting, police, emergency response, power or energy distribution, water or waste treatment, traffic management and control, etc...
- Regardless of the number of hosts directly involved, an organization can justify the need for an assignment if renumbering would affect 1000 or more individuals either internal or external to the organization.
- An organization with a network not connected to the Internet can justify the need for an assignment by documenting a need for guaranteed uniqueness, beyond the statistical uniqueness provided by ULA (see RFC 4193).
- An organization with a network not connected to the Internet, such as a VPN overlay network, can justify the need for an assignment if they require authoritative delegation of reverse DNS.

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6.5.8.2 Initial assignment size

Organizations that meet at least one of the initial assignment criteria above are eligible to receive an initial assignment of /48. Requests for larger initial assignments, reasonably justified with supporting documentation, will be evaluated based on the number of sites in an organization's network and the number of subnets needed to support any extra-large sites defined below.

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6.5.8.2.1 /48 per site

An organization may request up to a /48 for each site in its network, including any sites that will be operational within 12 months. Where a site is a discrete location that is part of an organization's network.

In the case of a multi-tenant building, each organization located at the site may separately justify a /48 for its network at the site.

A campus with multiple buildings may be considered as one or multiple sites, based on the implementation of its network infrastructure. For a campus to be considered as multiple sites, reasonable technical documentation must be submitted describing how the network infrastructure is implemented in a manner equivalent to multiple sites.

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6.5.8.2.2 Extra-large site

In rare cases, an organization may request more than a /48 for an extra-large site which requires more than 16,384 /64 subnets. In such a case, a detailed subnet plan must be submitted for each extra-large site in an organization's network. An extra-large site will receive the smallest prefix such that the total subnet utilization justified does not exceed 25%. Each extra-large site will be counted as an equivalent number of /48 sites.

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6.5.8.2.3 Larger initial assignments

Larger initial assignments will be determined based on the number of sites justified above, aligned on a nibble boundary using the following table:

More than 1 but less than or equal to 12 sites justified, receives a /44 assignment;

More than 12 but less than or equal to 192 /sites justified, receives a /40 assignment;

More than 192 but less than or equal to 3,072 sites justified, receives a /36 assignment;

More than 3,072 sites justified, receives a /32 assignment or larger.

In cases where more than 3,072 sites are justified, an assignment of the smallest prefix, aligned on a nibble boundary, will be made such that the total utilization based on the number of sites justified above does not exceed 75%.

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6.5.8.3 Subsequent assignments

Requests for subsequent assignments with supporting documentation will be evaluated based on the same criteria as an initial assignment under 6.5.8.2 with the following modifications:

- a. A subsequent assignment is justified when the total utilization based on the number of sites justified exceeds 75% across all of an organization's assignments. Except, if the organization received an assignment per section 6.11 IPv6 Multiple Discrete Networks, such assignments will be evaluated as if it were to a separate organization. Organizations may have multiple separate assignments that should be considered in total, due to previous subsequent assignments made per clause 6.5.8.3.c below, or through Mergers and Acquisitions in section 8.2.
- b. When possible subsequent assignments will result in the expansion of an existing assignment by one or more nibble boundaries as justified.
- c. If it is not possible to expand an existing assignment, or to expand it adequately to meet the justified need, then a separate new assignment will be made of a size as justified.

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6.5.8.4 Consolidation and return of separate assignments

Organizations with multiple separate assignments should consolidate into a single aggregate, if feasible. If an organization stops using one or more of its separate assignments, any unused assignments must be returned to ARIN.

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Rationale:

This proposal provides a complete rework of the IPv6 end-user assignment criteria, removing the dependency on IPv4 policy, providing clear guidance in requesting larger initial assignments, and eliminating HD-Ratio as criteria for evaluating end-user assignments.

The HD-Ratio is replaced with a simplified 75% utilization threshold based on nibble boundaries for end-user assignments. This threshold is somewhat more restrictive for larger assignments, while slightly less restrictive for the smaller /44 assignments, than the HD-Ratio.

However, in both cases it is much easier for an end-user to understand the policy criteria that applies to them.

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The following general concepts are included:

- Previously justified IPv4 resources may be used to justify the need for IPv6 resources
- Internet multihoming is sufficient justification for an IPv6 end-user assignment in and of itself
- Networks with more than 1000 hosts have a justified need for IPv6 resources; as is the case in current policy, it is just more clearly stated without relying on a reference to, and the consequences of, IPv4 policy
- Other end-users must justify why an ISP or LIR assignment is not sufficient for their needs
- Organizations with multiple sites may receive a /48 for each site in their network
- A campus with multiple buildings may be considered as one or multiple sites, based on the implementation of its network infrastructure
- Reservations are no longer necessary as ARIN has committed to sparse assignment for IPv6
- Providing sufficiently large initial assignments based on nibble boundaries along with sparse assignments will reduce route table growth caused solely by subsequent assignments

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The 25% subnet utilization for an extra-large site is proposed as the threshold for a larger prefix in order to allow an extra-large site enough room to create an organized subnet plan. Requiring denser usage would make it almost impossible for an extra-large site to maintain any kind of organized subnet plan. Furthermore, even at 25% utilization, more than 16,384 subnets are required to justify more than a /48 for a site. Few, if any, sites can actually meet or exceed this threshold.

The ARIN Board of Trustees should consider incentives that provide additional motivation for end-users to consolidate into a single aggregate per section 6.5.8.4 of this policy.

Timetable for implementation: Immediate