IPv6 Unique Local Addresses
Update on IETF Activity

ARIN Public Policy Meeting
April 2005
Objectives

• Define a Private / Local Scope Use IPv6 address pool
  • Use in context of:
    • Addressing for isolated networks
    • Persistent local-context addresses (independent of provider-based addresses)
    • VPN-styled interconnection of local network contexts
Site Locals and IPv6

• But wasn’t this Site Local Addresses in IPv6?
  • Shortcomings of site locals – see RFC 3879
  • Proposal of a “better alternative” to site local address prefix
    • Retain: Simple, stable and “private”
    • Remove: Explicit scope declaration
    • Add: Non-ambiguous addresses
Unique Local Addresses

- “Local” Use instead of “Global” Use
  - Private addresses in terms of routing scope
  - Global addresses in terms of uniqueness

- Attributes:
  - Single address pool subdivided into /48 prefixes
  - Each prefix is intended to be unique
  - Not intended to be globally routed
    - Easily filtered at network “edges”
  - Is intended to be locally routed in context of various forms of private use
  - No hierarchical super-structure
  - Not aggregatable
  - Not provider-based addresses
IPv6 ULA Address structure

```
<table>
<thead>
<tr>
<th>ULA Prefix Type</th>
<th>Assignment Type</th>
<th>“Global” ID</th>
<th>Subnet ID</th>
<th>Interface ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC00::/7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```
ULA Addresses

• Two Address Pools:

  • Locally Defined Addresses:  FD00::/8
    • Assignment type = 1
    • Self selection of a /48 prefix
    • No coordinated registration records maintained
    • No global AAAA or PTR DNS records

  • Centrally Assigned Addresses:  FC00::/8
    • Assignment type = 0
    • Defined as a set of prefixes to be assigned by a common registry function
    • Uniquely assigned address prefixes
    • May be in the global DNS, but not in the global IPv6 routing table
    • Current status appears to be dormant within the IETF IPv6 Working Group
Locally-Assigned Local addresses

draft-ietf-ipv6-unique-local-addr-09.txt

Approved by IESG – in RFC Editor Queue

- Specification of the unique* local address structure
- Specification of the common selection prefix: FD00::/8
- Suggested random self-selection of the unique* 40 bit identifier:
  $\text{trunc}(\text{SHA-1}(\text{local time . local EUI-64}), 40\text{bit})$
- Address selection algorithm inferred as local preferred over global
- Not to be added into the Global DNS
  - Requires split horizon (two-faced) DNS
  - May also require non-authoritative synthesis of PTR records for local addresses
- Caveats about leakage into the public global routing tables

* almost unique!
Centrally-Assigned Local addresses

draft-ietf-ipv6-ula-central-01.txt

IETF IPv6 Working Group draft – currently dormant

- Specification of centrally-allocated unique local addresses
- Specification of the common address prefix: FC00::/8
- Central Allocation Registry:
  - Available to anyone in an unbiased manner
  - Permanent with no periodic fees
  - Allocation on a permanent basis, without any need for renewal and without any procedure for de-allocation
  - Provide mechanisms that prevent hoarding of these allocations
  - The ownership of each individual allocation should be private, but should be escrowed
- May be entered in the global DNS
- “Inadviseable” to route in a public context
Some Related Questions

• How can leakage of ULA prefixes in the global routing table be prevented?
• How can leakage of locally assigned prefixes in the DNS be prevented?
• Is this a surrogate mechanism for the distribution of IPv6 unicast address prefixes?
• Is assured uniqueness important?
• Are these prefixes useable in the context of an IPv6 identity space?
• What is the problem space that such addresses are intended to solve?
Thank you

Comments?