IPv6 Unique Local Addresses
Report on IETF Activity

Policy SIG
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APNIC18, Nadi, Fiji
Geoff Huston
Unique Local Addresses

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

- Objectives
  - Single address pool subdivided into /48 prefixes
  - Each prefix to be globally unique
    - or “probably” unique
  - Not intended to be globally routed
    - Easily filtered at ‘edges’
  - Is intended to be locally routed in context of various forms of private use
  - No hierarchical structure
  - No provider addresses
ULA pools

• Two address pools
  • Local self-assigned ULA prefixes
  • Centrally assigned ULA prefixes

• Why Two?
  • Local    FD00::/8
    • Self selection of a prefix
    • No coordinated registration records maintained
    • Probably unique, but not definitely unique
  • Central   FC00::/8
    • Prefixes assigned by a registry function
    • Registration records are maintained
    • Globally unique prefixes
IPv6 ULA Address structure

- Interface ID: 64 bits
- Subnet ID: 16 bits
- "Global" ID: 40 bits
- ULA Prefix Type: 7 bits
- Assignment Type: 1 bit

ULA Prefix: FC00::/7
Locally assigned local addresses

`draft-ietf-ipv6-unique-local-addr-05.txt`

- Specification of the unique local address structure
- Specification of the self-selection prefix: FD00::/8
- Random self-selection of the unique* 40 bit identifier: $\text{trunc} (\text{MD5(local time . local EUI-64)}, 40\text{bit})$
- Intended to overlay provider (global) ID, with each numbered entity having common low 80bits (subnet ID, Interface ID)
- Address selection algorithm inferred as local preferred over global
- Requires split horizon (two-faced) DNS
- May also require non-authoritative synthesis of PTR records for local addresses

* almost unique!
Centrally assigned local addresses

draft-ietf-ipv6-ula-central-00.txt

• Specification of centrally-allocated unique local addresses

• Specification of the centrally managed prefix: Fc00::/8

• Attributes of the Allocation Registry:
  q Available to anyone in an unbiased manner.
  q Permanent with no periodic fees.
  q Allocation on a permanent basis, without any need for renewal and without any procedure for de-allocation.
  q Provide mechanisms that prevent hoarding of these allocations.
  q The ownership of each individual allocation should be private, but should be escrowed.

• Random selection of a unique global prefix
Open issues with ULAs and IPv6

• This effort poses a number of followup questions in the context of the IPv6 architecture, including:
  • How could ‘leakage’ of ULA prefixes into the global routing table be prevented?
  • Why is prevention of such leakages an important objective?
  • Is this destined to become a surrogate mechanism for distribution of IPv6 unicast prefixes?
  • How does host-based address selection work for multi-addressed hosts?
  • How does a two-faced DNS server know when to provide responses that include local address values?
  • Should local addresses be used by preference?
  • Should local addresses be used at all when global addresses exist?
  • Is this yet another attempt to re-run the 8+8 architecture?
  • Are these prefixes the seed of a IPv6 identity space?
Thank you!

• Questions