Operational Considerations & Problems of Running Multiple IPv6 Prefixes

(draft-liu-v6ops-running-multiple-prefixes)

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Motivations

- Multiple-Addresses-Per-Interface is a basic feature of IPv6

- Multiple prefixes might be common in IPv6 networks, particularly, multi-homing site networks.

- This draft is to
  - identify operational considerations for running multiple addresses/prefixes from operational perspective
  - caution operators to notice the problems; or provoke solutions
  - eventually, help to improve the applicability of IPv6

Scenarios

- Multiple-Addresses-Per-Interface
  - Normally, an IPv6 enabled host would have at lease 2-3 addresses:
    - Link-local address
    - GUA address (SLAAC or DHCPv6)
    - Privacy address (SLAAC)/Temporary address (DHCPv6)
  - Even more if SLAAC/DHCPv6 Co-exist or ULAs are in use .etc.
- Multiple prefixes co-existing scenarios
  - Multi-scope prefixes: link-local, ULA, GUA
  - Multi-homing: multiple PA prefixes
  - Service Prefixes: IPTV .etc

Operational Considerations & Problems (1/4)

- Multiple-Addresses-Per-Interface
  - Legacy network management tools may not support multiple addresses per interface
  - ND cache of gateway devices in a big L2 networks might be overflowed
    - A dual-stack and DHCPv6/SLAAC co-existence host might take approximate 4-8 times (or even more due to implementation) cache space than IPv4
    - Some campuses/enterprises are in favor of adopting L2 networks for low budget and less configurations

Operational Considerations & Problems (2/4)

- Multiple provisioning of prefixes
  - Multiple provisioning domains
    - Multi-homing or service prefixes can result in more than one network provisioning domains on a single link
    - Current DHCP doesn't distinguish provisioning domains, thus the host would not be able to associate configuration information with provisioning domains.
    - MIF WG [draft-ietf-mif-mpvd-arch] is working on it
    - For current deployment, the administrators are recommended to avoid multiple provisioning domains on the same link
  - Multiple provisioning methods for IPv6 address
    - [draft-ietf-v6ops-dhcpv6-slaac-problem]

Operational Considerations & Problems (3/4)

- Address selection on hosts
  - Legacy implementations based on old standard (RFC3484) have inconsistent behavior against the new standard (RFC6724)
    - ULA specific rules: RFC3484 doesn't distinguish ULA prefixes in default policy table
    - ULA+IPv4: RFC6724 prefer IPv4 over ULAs; RFC3484 is the opposite
  - Support for address pair failover
    - But Shim6 has not been widely supported yet

Operational Considerations & Problems (4/4)

- Exit-router selection
  - In multi-homing networks with multiple PA, if the ISPs enable ingress filtering at the edge, then the outgoing packets with ISP A prefix MUST be routed to ISP A upstream link. Otherwise they will be filtered.
  - Currently there is no well-used solution to guarantee the above requirement.
    - The administrators of multi-homing network might have to communicate with ISPs for not filtering prefixes
    - [draft-troan-homenet-sadr] and [draft-baker-rtgwg-src-dst-routing-use-cases] both document the technical requirements

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Next Steps

- Solicit more reviews, comments and contributions
- Adopt the draft?

Thank you!

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