Signalling DHCPv6 Prefix Delegation Availability to Hosts

draft-collink-6man-pio-pflag-00

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Problem statement

- Companion to draft draft-collink-v6ops-ent64pd

- IPv6 hosts almost always have multiple addresses
  - Link-local, stable, privacy, 464xlat, multiple prefixes/renumbering, …

- On some networks, tracking all addresses is a scaling problem
  - Some enterprise APs drop packets after X (=6, 8, …) addresses per host
  - Solution: /64 per host with DHCPv6 PD

- Other networks, (e.g., home network with a /60) have no problem with lots of addresses, but don’t have enough prefixes for PD-per-host

- This draft defines a way to tell the host which prefix (PIO or PD) to use
Proposed solution

● Add a new P flag to the PIO
  ○ “If you understand this flag, please use DHCPv6 PD instead of SLAAC in this prefix”

● Why in the PIO?
  ○ Must be available to the host before it does SLAAC => must be in RA
  ○ Specific to the particular prefix
    ■ Might want to use SLAAC for ULA and PD for global space
    ■ In a multihoming situation, not different upstreams might support different mechanisms
Using the delegated prefix

- Host MAY use as many addresses as it wants

- Host MAY use prefix to assign IPv6 addresses to internal components such as VMs and containers

- If permitted by host policy, host MAY use prefix to extend the network
  - => host MUST use DHCPv6 PD hint for prefix size sufficient to use SLAAC
  - Note: this is already possible in IPv4 and in IPv6 via NAT44 / NAT66
Re-numbering

- Host tracks every (unexpired) PIO with P=1
  - Keep DHCPv6 PD running as long as at least one such prefix exists
  - Start SOLICITs or RENEWs (to every server) when such a prefix appears or is deprecated
    - Should this be a REBIND instead, so that any potential new servers can reply?

- Why not RECONFIGURE?
  - Not widely implemented, difficult to use (requires authentication)
Multihoming

- If multiple PVDs on link, every packet’s source address must match next-hop

- Host shall maintain the mapping between delegated prefixes and routers (relay) link-local addresses so Rule 5.5 can be used
  - (yet unclear) what if relay is not collocated with the router

- Why not PVD option in DHCPv6?
  - Previous work in this area was blocked by an IPR claim

- Why not ICMPv6 redirects?
  - Redirects not specific to source address
Next steps

- WG adoption?
  - … assuming v6ops adopts draft-collink-v6ops-ent64pd (call will be issued shortly)
Questions?