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Improving the Reaction of Customer Edge Routers to IPv6 Renumbering Events

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Introduction

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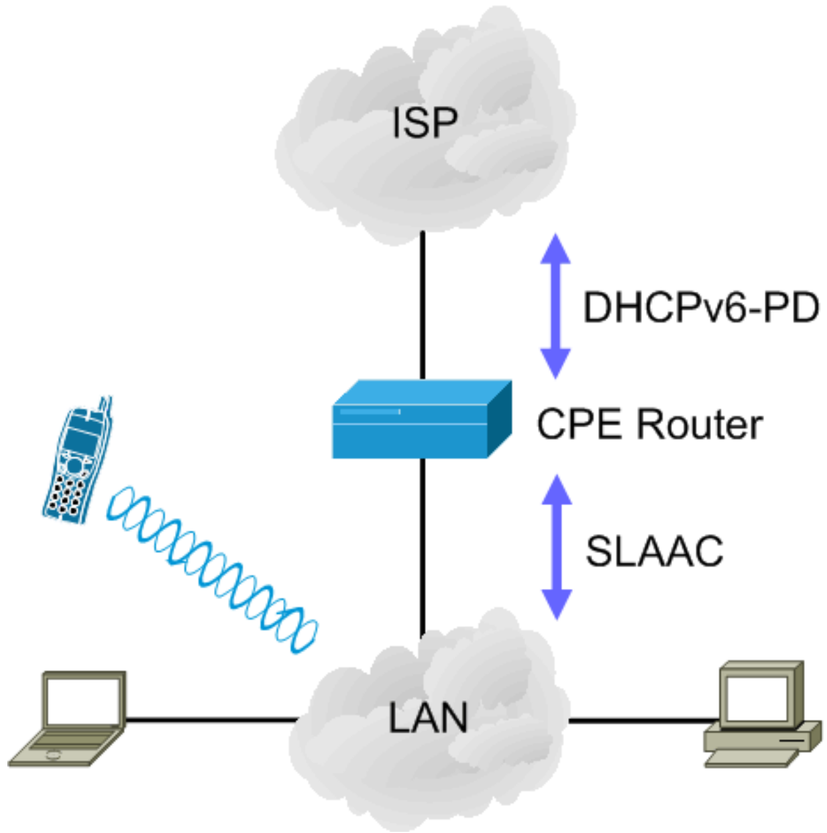
Typical IPv6 deployment



Problem scenario

- **CPE router is hard-rebooted. CPE router crashes and reboots**
- **What happens when the CPE router comes back to life?**
  - Quite frequently it has no state of previously-leased prefix
  - It thus request a new prefix via DHCPv6-PD
  - The new prefix is announced on the LAN
- **What about the previous prefix?**
  - It is still there!

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What we did at the IETF

- **Document the problem:**
  - RFC8978
- **Engineer changes to IPv6 SLAAC**
  - draft-ietf-6man-slaac-renum
- **Engineer recommendations for Customer Edge (CE) Routers**
  - RFC9096
  - **This is the subject of this presentation!**

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Requirements

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Do NOT DHCPv6-RELEASE

- Some CE routers send DHCPv6-RELEASE messages when rebooting
- This introduces flash-renumbering scenarios unnecessarily
- Requirement:
  - Do NOT automatically send DHCPv6-RELEASE messages when rebooting

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Interface LAN-side/WAN-side

- **Some CE routers announce prefixes on the LAN-side for longer than the DHCPv6-lease**
  - e.g. the DHCPv6 lease is 4 hours, but LAN-side lifetimes are e.g. 1 month
- **This may cause SLAAC hosts to employ stale prefixes**
- **Requirement:**
  - **SLAAC and DHCPv6 lifetimes on the LAN-side must never span past the received DHCPv6 lifetimes on the WAN-side**

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LAN-side option lifetimes

- Some CE routers announce SLAAC options with lifetimes that span past the DHCPv6-lease time
- This may cause hosts on the LAN-side to employ stale information when flash-renumbering events occur
- Requirement:
  - SLAAC and DHCPv6 option lifetimes must never span past the received DHCPv6 lifetimes on the WAN-side

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Signaling stale information

- If the CE route can store DHCPv6 lease information on stable storage, it may detect flash-renumbering events
- Renumbering events may be signaled on the LAN-side, and hosts may readily remove stale information
- Requirement:
  - If possible, store DHCPv6 lease information on stable storage
  - When possible, DO signal stale information on the LAN-side

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More appropriate lifetimes

- **Current SLAAC lifetimes are inappropriate:**
  - Preferred Lifetime (AdvPreferredLifetime): 604800 seconds (7 days)
  - Valid Lifetime (AdvValidLifetime): 2592000 seconds (30 days)
- **Requirement:**
  - **Employ more appropriate lifetimes.**
    - ND_PREFERRED_LIMIT: 2700 seconds (45 minutes)
    - ND_VALID_LIMIT: 5400 seconds (90 minutes)

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Conclusions

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Conclusions

- We originally analyzed this problem in RF8978
- We have now produced recommendations for CE routers in RFC9096
- Keep it in mind for your RFPs!

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Questions?

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Thanks!

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