

SLAAC's Reaction to Renumbering Events

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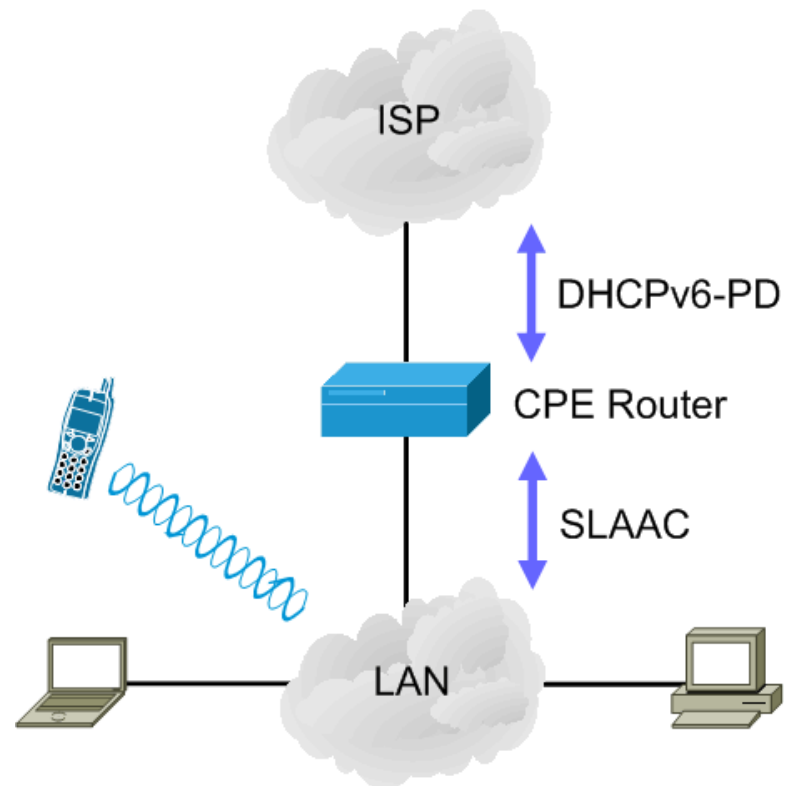


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Problem Statement

Introduction

- Sample scenario:



Problem statement

- 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 requests a new prefix via DHCPv6-PD
 - The new prefix is announced on the LAN
- What about the previous prefix?
 - It is still there!
 - Announced lifetimes allow continued use for days to months

Problem statement (II)

- Result:
 - Old addresses are maintained
 - Quite frequently, such addresses are preferred
 - Old routes are maintained
- What does this mean?
 - IPv6 connectivity may fail
 - Connectivity with new owner of prefix not possible
 - In dual-stack scenarios, it may mean more IPv4 traffic
 - Due to Happy Eyeballs

Operational Mitigations

Deployments that avoid the problem

- **Sites that use stable prefixes**
- Pro's
 - Nice for law-enforcement – prefix identifies the user!
 - Upon reboots CPE gets same prefix so... no problem!
- Con's
 - Some provisioning systems reportedly don't support this
 - Bad for user privacy – **RFC4941 mostly useless with stable prefixes!**
 - Some ISPs want to charge extra for stable prefixes – ala IPv4

There is no spoon. The network should be resilient!

Deployments that avoid the problem (II)

- **CPEs that record leased prefixes on stable storage**
- Many (most?) simply don't
- It's tricky, anyway
 - They have to be able to record many prefixes
 - Lease times of days/months, and reboots may be frequent
 - And should announce them for remaining leased time
- You cannot rely on the CPE recording prefixes on stable storage

There is no spoon. The network should be resilient!

Protocol Improvements

How we think it should be solved

- **Get rid of stale addresses and router in a timelier manner**
- If the same router advertises a new prefix (but not the previous one), assume the prefix has become stale
- Count number of consecutive RAs from same router with PIOs that do not include the previous prefix:
 - After one such RA, unprefer the addresses
 - After N additional ones, remove the addresses and routes

This solves the problem at the hosts themselves

How we think it should be solved (II)

- This issue begs a number of questions...
- Does it really make sense for Prefix Lifetime > Router Lifetime?
 - In the context of RFC8028, it doesn't make much sense
 - Announce the prefix for the whole lease time, but never with lifetimes larger than the Router Lifetime.
- What's the point of announcing a prefix with a lifetime of one month?
 - Just keep the addresses in the event of dead router?

Making appropriate usage of timers can help legacy hosts

Ongoing Work

Ongoing work at the IETF

- We published two different IETF I-Ds
- draft-gont-v6ops-slaac-renum
 - Problem statement and operational mitigations
- draft-gont-6man-slaac-renum
 - Protocol improvements

The problem will not be solved unless you get involved

Questions?

Thanks!

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IPv6 Hackers mailing-list

<http://www.si6networks.com/community/>



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