Support for adjustable Maximum router lifetimes per-link

draft-krishnan-6man-maxra-03

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Background

• IPv6 Neighbor Discovery (RFC4861)
  – Specifies the maximum time allowed between sending unsolicited multicast Router Advertisements
  – It also specifies the maximum router lifetime

• It allows the limits to be overridden by link-layer specific documents (i.e. per link-type)
Why?

• Multicast is very inefficient on certain links
  – (e.g. Wi-Fi) [draft-vyncke-6man-mcast-not-efficient-01]
• Due to fixed protocol constants defined in RFC4861 it is very difficult to relax the multicast timers for ND
• This document specifies updates to IPv6 ND
  – for relaxing the maximum time allowed between sending unsolicited multicast RAs (MaxRtrAdvInterval)
  – as well as for relaxing the maximum router lifetime (AdvDefaultLifetime)
The relationship between $AdvDefaultLifetime$ and $MaxRtrAdvInterval$

- We use a ratio $K$ that is defined as

$$K = \frac{AdvDefaultLifetime}{MaxRtrAdvInterval}$$

to express how many RAs can be guaranteed to be sent before the router lifetime expiry
How to select K?

• On a perfectly stable network, on a theoretically perfect link with no losses
  – It would be sufficient to have K just above 1

• On a real link which allows for some loss
  – Use K\geq2 in order to minimize the chances of a single router advertisement loss causing a loss of the router entry
K and packet loss

- K can also be characterized based on packet loss probability and required reliability
- On a network with 1% packet loss probability
  - K=1 -> Outage probability=1%, Reliability=99%
  - K=2 -> Outage probability=0.01%, Reliability=99.99%
  - K=3 -> Outage probability=0.0001%, Reliability=99.9999%
Updates to RFC4861

• Update the constants to
  \( \text{MaxRtrAdvInterval} \leq 65535 \)
  \( \text{MaxRtrAdvInterval} < \text{AdvDefaultLifetime} \leq 65535 \)

• Relaxes RA sending behavior
  – \( \text{AdvSendAdvertisements} \) can be set to FALSE while still allowing router to respond to solicited RAs
Open comments

• The document has addressed all the comments received as of the deadline
• Two reviews received during IETF week (Thank you!!)
  – Jinmei Tatuya’s review
  – Ian Farrer’s review concerning relationship to DHCPv6 prefix delegation
Next Steps

• Questions?
• Adoption as working group draft?