Optimistic DAD

`draft-moore-ipv6-optimistic-dad-04`

- Avoids DAD Delay during IPv6 Address Configuration
- Modifies behaviours defined in RFC 2461, RFC 2462 to allow communication to begin immediately.
- Applicable to any situation where a node must configure an address quickly.
  - ◇ Mobile IPv6
  - ◇ HIP? MOBIKE? Multicast?

History

- Precedent for doing DAD optimistically in `draft-koodli-mobilip-fastv6-00` (Oct 2000) and in discussion on the MobileIP WG and at IETF-54.
- However, this new version uses no new flags or signals, and is interoperable with non-Optimistic nodes and routers.
- Presented to MobileIP WG at IETF-56.

Address Collision

- For a randomly chosen suffix, the probability of a collision is vanishingly small.
  - ◇ see also `draft-soto-mobileip-random-iids-00` (Jan 2002)
    $P_{collision} \leq B_{soto}(2^{62}, 5000) = 5.4 \times 10^{-12}$
- However, not all addresses will be so well chosen, and problems caused by undetected address collisions are difficult to analyse.
- Thus some form of DAD is still wise.

Pessimistic → Optimistic

- Address Configuration is far more likely to succeed than fail.
- Rather than *pessimistically* waiting for failure, we *optimistically* begin using the address.
- We remain *tentative* for the standard time, listening for *defensive* NAs.
- We avoid causing disruption in the case of a collision.

Neighbour Caches

- An entry in a node's Neighbour Cache (NC) indicates a peer that that node is talking to.
- To prevent disruption of active sessions, we ensure that we never override entries in our Neighbours' NCs.
- There are three mechanisms by which hosts affect their neighbours' NC entries:
  - ◇ Neighbour Advertisements (NAs)
  - ◇ Neighbour Solicitations (NSs)
  - ◇ Router Solicitations (RSs)

NA Modifications

- We use the existing *Override* flag, also used by Proxy Neighbour Discovery.
- NAs can only override existing NC entries if their *Override* flag is set.
- All NAs sent while *tentative* **MUST** have the *Override* flag cleared.

NS and RS Modifications

- NSs and RSs may carry Source Link Layer Address Options (SLLAOs).
- SLLAOs can override existing NC entries.
- SLLAOs **MUST** be ommitted where allowed by RFC2461/2.
- Messages where SLLAO is required by standards **MUST** not be sent.
- Let the router redirect traffic for Neighbours not in our NC.

Implementation

- We have implemented most features as a patch to Linux 2.4.19, only a few hundred line patch.
- A number of pathological cases tested using an intentionally broken random address generator.
- Independently implemented by Ed Remmel of Elmic Systems.

Future

- Testing for interoperability
- Assess suitability for non-MobileIPv6 situations.
- Individual Draft $\rightsquigarrow$ Working Group Draft?