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)
    
    \[ P_{\text{collision}} \leq B_{\text{soto}}(2^{62}, 5000) = 5.4 \times 10^{-12} \]

- 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 $\rightarrow$ 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 omitted 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 $\sim$ Working Group Draft?