

Optimistic DAD

`draft-moore-ipv6-optimistic-dad-02`

- Avoids DAD Delay during Address Configuration
- Modifies behaviours defined in:
 - ◇ RFC 2461 “Neighbor Discovery for IPv6”
 - ◇ RFC 2462 “IPv6 Stateless Address Autoconfiguration”to allow communication to begin immediately.
- Precedent for this work in:
 - ◇ `draft-koodli-mobileip-fastv6-00` (Oct 2000)

Address Collision

- For a randomly chosen suffix, the odds of collision are 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 due to:
 - ◇ Weak PRNG / Insufficient RNG Entropy
 - ◇ Manufacturer Error
- Problems caused by undetected address collisions are difficult to analyse.
- ▶ Some form of Duplicate Address Detection (DAD) is needed.

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

- 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 2.4.18, only a few hundred line patch.
- A number of pathological cases tested using an intentionally broken random address generator.

Future ?

- Further testing on diverse platforms.
- Individual Draft \rightsquigarrow Working Group Draft ?