DAD Optimization

- IPv6 WG work item:

  ◇ *Investigate approaches to optimize or eliminate Duplicate Address Detection (DAD) to [reduce] the delays incurred by DAD when there is a change of network attachment points.*

  ◇ *Publish a document defining DAD optimizations.*

- Goals / Milestones:

  ◇ *Dec 04: Submit document defining DAD optimizations to the IESG for Proposed Standard*

Optimistic DAD

`draft-ietf-ipv6-optimistic-dad-01`

- Accepted as WG draft at IETF-59.

- Modifies behaviours defined in RFC 2461 / 2462 to allow communication to begin immediately.

- Originally in response to MobileIPv6 requirements, but applicable to any situation where an IPv6 host must configure an address without delay.

Issues List

`http://www.ctie.monash.edu.au/ipv6/fastho/opti_dad_issues.html`

- Only lists issues raised since the details stablized: individual draft -04 and WG drafts -00 and -01

- Doesn't list the multitude of helpful spelling and grammar corrections, or all the terminology nits.

- I will review all emails before -02.

04-2 & 04-3 & 00-3

- Definition of 'Well Distributed' is problematic.

- Section 3.4 ('DAD vs DIID') has been considered in RFC2462bis.

- Section 3.3 ('Address Generation') is inappropriate / out of scope for OptiDAD.

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- New text does not use that definition.

- Section 3.4 removed from OptiDAD.

- Section 3.3 moved to 'Appendix A'.

00-2, 01-5: Address States

Pekka Savola: I don't think the memo is clear enough how a Tentative address on an ON compares to the tentative address on a standard node?

NEW TEXT: This draft introduces a new address state, 'Optimistic', which is used to mark an address which is available for use but which has not completed DAD. Protocols which do not understand this state should treat it equivalently to 'Deprecated' [...]

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New text needs further work ('draft', 'flag', the exact status of a no-longer Optimistic Address)

04-4: RA SLLAO Option

- Routers may choose not to include SLLAO in their RAs "to facilitate in-bound load balancing over replicated interfaces" [RFC2461].

- OptiDAD depends on RAs with SLLAO, so can OptiDAD honestly claim to be compatible with unmodified routers?

- I don't see this as a problem: routers will typically include the SLLAO, and OptiDAD will fall back to default behaviour if it isn't there.

$$\Downarrow$$

unchanged

00-4: Manual Address Suitability

Should OptiDAD be allowed on (for example) manually configured addresses?

It's not clear what the probability of collision has to be before OptiDAD is not an optimization.

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With the removal of 'Address Generation', this is no longer a draft requirement, but it is retained in the explanatory text.

04-1, 01-3: Unsolicited NAs

- Draft explicitly mentions that nodes MAY choose to send unsolicited NAs

- This behaviour may be useful for predictive handovers, but is not necessary to specify in OptiDAD. There are concerns about its safety.

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NEW TEXT: A node MUST NOT send any unsolicited Neighbor Advertisements from an Optimistic Address, unless the Override flag is cleared (O=0).

00-6: IsRouter flag

An RS from an Optimistic Address with no SLLAO will not change
the LL address in neighbours' caches, but will clear the 'IsRouter'
flag if that address collides with a router.

$$\Downarrow$$

NEW TEXT: An address collision with a router may cause
neighbouring routers' IsRouter flags for that address to be cleared.
However, routers do not appear to use the IsRouter flag for anything,
and the NA sent in response to the collision will reassert the IsRouter
flag.

01-2: Collisions with Proxy ND

If a neighbour is just preparing to begin communication with the address, eg: it has a NC entry for the address in state 'INCOMPLETE', the optimistic advertisement may cause an incorrect NC entry to be created in state 'STALE' and queued packets to be sent to an incorrect destination.

In general, the defending NA will have the Override flag set (O=1), and so this will correct the incorrect entry almost immediately. **However, if the defending NA has the Override flag cleared (for example when the address is in use by proxy) the defending advertisement will not override this incorrect NC entry.**

In any case, the NC entry will remain in state 'STALE', and thus the disruption will be recoverable, albeit slowly, by the standard Neighbour Unreachability Detection mechanism.