Gratuitous Neighbor Discovery. Creating Neighbor Cache Entries on First-Hop Routers

draft-ietf-6man-grand-01

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Quick Recap

Problem: a host start sending traffic, the return flows arrive to the router, no neighbor cache entry, packets dropped until address resolution completes.

Solution:

- Nodes advertise their addresses by sending unsolicited NAs
- Routers create STALE entries
Status: WGLC
Changes since -00
'Host' Replaced With 'Node'

- RFC4861:
  - Node: an IPv6-enabled device.
  - Host: a node which is not a router.

- Benefits of routers announcing their addresses:
  - Next-hops for routes etc
Perform GRAND For All Addresses

Announcing Link-Local Addresses too.

- Easier to implement.
- Why not?
- Might be beneficial in some corner cases or in future.
Modification to RFC4861 section 7.2.6

Moving the proposed update a few paragraphs below.
Most Important Update: Avoiding Disruption (Duplicated Addresses)
Unsolicited NA Received, no Entry

1. “Rightful” owner (host A) joins the network, sends packets.
2. Another host (host B) assigns the same optimistic address and sends an unsolicited NA.
3. Return traffic arrives to the router

Would unsolicited NA introduce disruption?
Host A sends from IP_A

Router receives packets to IP_A
Sends mcast NS

NA (S=1, 0=0) received from B

IP_A: INCOMPLETE
IP_A: MAC_B REACHABLE

NA (S=1, 0=1) received from A

IP_A - MAC_A REACHABLE

Traffic to A dropped

Host B configures Optimistic IP_A
Host A sends from IP_A

Router receives packets to IP_A

R. sends unicast NS

Host B configures Optimistic IP_A

DAD fails

R. sends mcast NS

NA (S=1, 0=1) from A

IP_A: MAC_B

STALE DELAY PROBE

Traffic to A dropped

IP_A - MAC_A REACHABLE

With ietf-6man-grand

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Unsolicited NA Received, no Entry

Max. additional impact on the rightful owner:

\[
\text{DELAY\_FIRST\_PROBE\_TIME} + (\text{MAX\_UNICAST\_SOLICIT} - 1) \times \text{RETRANS\_TIMER}
\]

\[
5000 + (3 - 1) \times 1000 = 7000 \text{ ms} = 7 \text{ secs}
\]
Disruption Probability is Rather Low

Two hosts start using the same IPv6 address within tens of ms (time for first return packet to arrive)

Is it bad enough?
QUESTIONS?
COMMENTS?