

Efficient No-Path DAO for RPL Storing MOP

Problem Statement & Solution

<https://tools.ietf.org/html/draft-jadhav-roll-efficient-npdo-00>

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IETF98

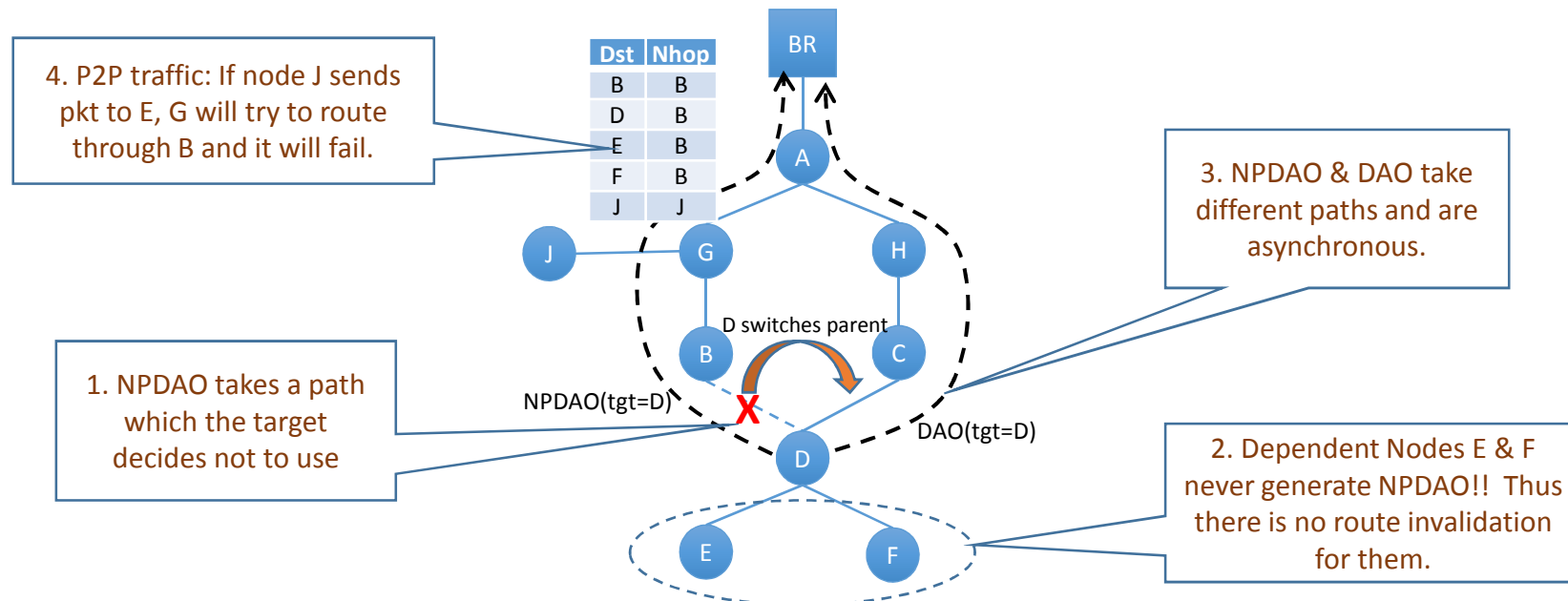
History:

IETF95 - Presented the problem statement

IETF96 - Presented existing solutions based on comments rcvd and why those fall short

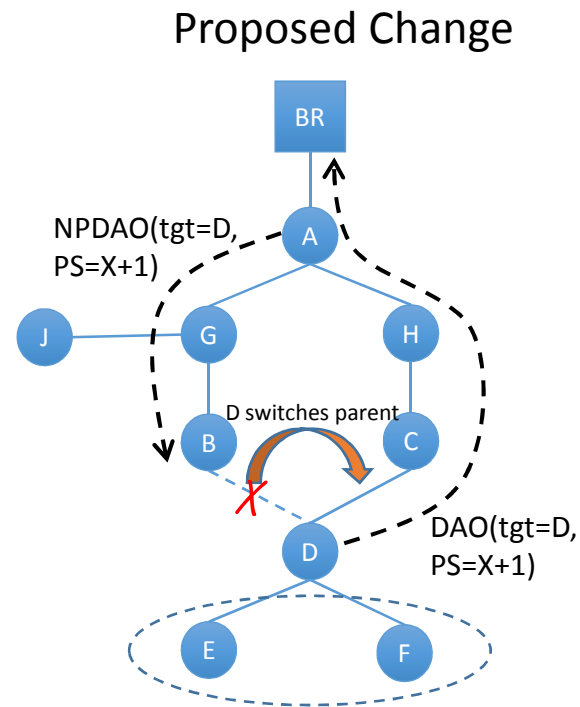
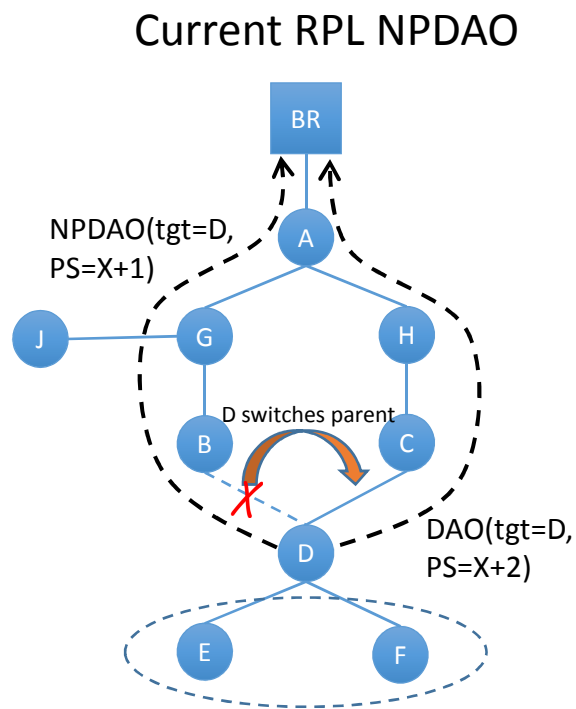
Problems with NPDAO (copied from IETF96)

1. NPDAO messaging depends on previous link which the node decided to no longer use
2. No route invalidation for dependent nodes
3. Possibility of route downtime caused by async operation of NPDAO and DAO
 - If NPDAO reaches before DAO, then the route will be unavailable till the time DAO reaches the all common parent nodes (A & BR in the example below).
4. Impact on P2P traffic because of NPDAO inefficiency



Solution

- *Common Parent to initiate the route invalidation based on next-hop change for the given target.*
- Next-hop change is detected by common parent when it receives a DAO on behalf of the target node from the new path.



PS = PathSequence
Tgt = Target

Solution perspective...

Solution wrt problems mentioned before:

1. NPDAO messaging now follows an established path
2. Route invalidation for dependent nodes now possible
 - When the DAO on behalf of the dependent node reach common parent, common parent can initiate invalidation.
3. Possibility of Route downtime because of async operation of NPDAO and DAO is now eliminated.
 - DAO and NPDAO operation are now in sync and thus no chance of route downtime.

Other Advantage:

1. Reduced NPDAO control overhead.
 - Now NPDAO only traverses along the network segment which has been impacted by the switch (as opposed to sending it all the way upstream)

Changes to (NP)DAO message

- An I flag (Invalidate flag) is sent in the DAO (as part of TIO option) by the target when the target switches parent. This informs the common parent to act i.e. originate NPDAO.
- NPDAO generated by common parent needs to flow downstream, an R (reverse) flag is set in the NPDAO to signal this change.

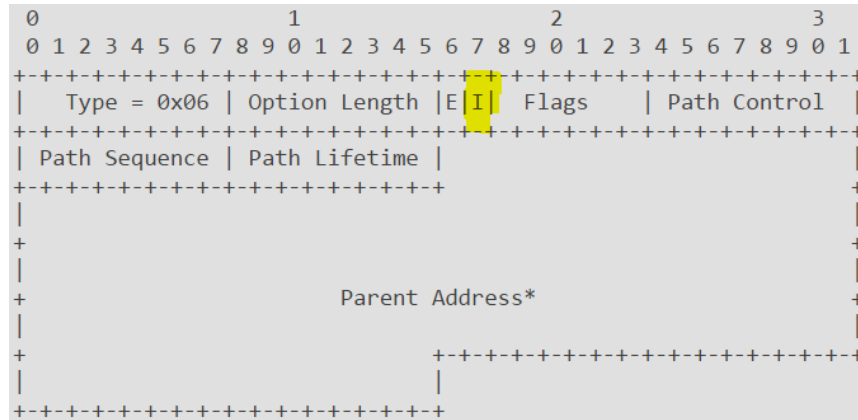


Figure 2: Updated Transit Information Option (New I flag added)

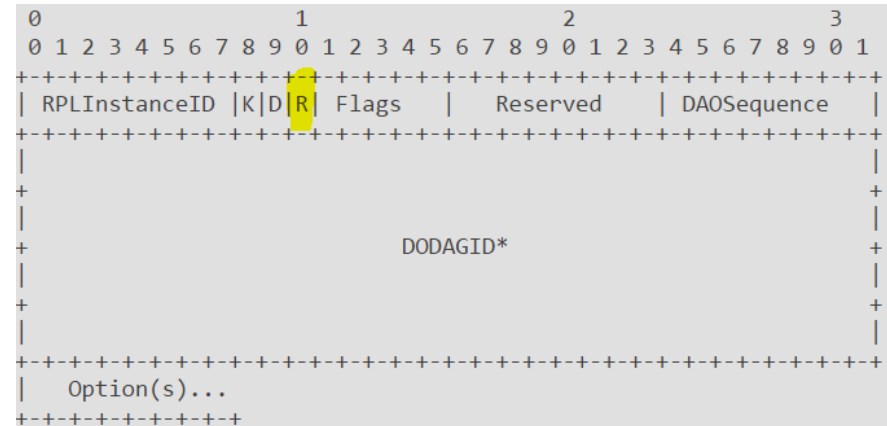


Figure 3: Updated DAO base object (New R flag added)

Next Step

- WG Adoption?
 - The problem has been chartered :
“a solution to the problems due to the use of No-Path DAO Messages to the IESG”

Thank you