Neighbor Management Policy for 6LoWPAN


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IETF100

History:
IETF97: Presented the problem statement, without the draft
IETF98: First draft, sample reservation policy described
IETF99: WG Adopted
IETF100: Clarifications
Some background...

• Top memory elements (Contiki for cc2538dk)
  
  • Routing Table (1rec=52B, 100rec=5200B)
  
  • Neighbor Table (1rec=64B, 100rec=6400B)
  
  • Packet Buffers (IPv6 MTU = 1024B)
  
  • Blah, blah…
Why Neighbor Management?

• Challenges
  • High node density networks
  • Limited memory for nbr cache

• Expectation of neighbor mgmt
  • Improved network stability, reduced churn in routing adjacencies
  • Once the neighbor is accepted, the associated resources are guaranteed

• Trivial policies
  • Replace LRU entry
  • First come first serve
Holistic approach towards neighbor mgmt

PRE = PANA Relay Element aka Join Proxy
PaC = PANA Client aka Pledge
PAA = Auth Server aka Join Registrar/Coordinator

Neighbor cache @ N3

<table>
<thead>
<tr>
<th>MAC addr</th>
<th>LL IP addr</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1_mac</td>
<td>N1_llip</td>
<td>Routing_parent</td>
</tr>
<tr>
<td>N2_mac</td>
<td>N2_llip</td>
<td>Routing_parent</td>
</tr>
<tr>
<td>N5_mac</td>
<td>N5_llip</td>
<td>Routing_child</td>
</tr>
<tr>
<td>PaC_mac</td>
<td>PaC_llip</td>
<td>AUTH_inprogress</td>
</tr>
</tbody>
</table>

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Already authenticated & joined nodes

PaC ---- New

New joining node

6LoWPAN
Signaling recommendation for Neighbor mgmt

- Implicit mechanism
- Implicit mechanism works only if there is a way to send negative status if NCE addition fails
  - For e.g. PANA, there is no way for PRE to respond back with negative status.
  - NDP signaling also signals failure, if required.
Proposed policy...

• Basic principles
  • Reservation based policy
  • Identify impact of eviction
    • Categorization based on it...
  • Insertion reason (RPL_parent, RPL_child, Other) is attached with every NCE
Issues with reactive policy

• Whatever I presented as of now is reactive ...
• There are limitations ...
• Guidance:
  • A proactive approach to signal NCE metric
Discussions

• Contiki implementation ongoing. Major part of it already in master.
• One proprietary implementation is already there ...
Thank You