Native Short Addressing for LLN Expansion

draft-li-6lo-native-short-address-00

Guangpeng Li, David Lou, Luigi Iannone, Peng Liu
November, 2021
Clarification of Scope and Revision of Title & Authors

- Title update:
  - Native Short Address for Internet Expansion ➔
  - Native Short Addressing for Low power and Lossy Networks Expansion

- Scope of the document has been better detailed
  - Routing/Forwarding IP packets across a LLN (Low power and Lossy Network) where:
    - Nodes' geo-location is fixed
    - Logical topology changes due to unstable radio connectivity (not physical mobility)

- New co-authors:
  - Peng Liu from China Mobile
  - David Lou, Huawei Technologies
  - Luigi Iannone, Huawei Technologies (me)
Complete revision of Section *NSA Allocation*

- Better formalization of the Allocation Function
  
  \[
  AF(\text{role}, f, l) = \text{address of the node performing the function}
  \]
  
  + (\text{role} = \text{leaf} ? \ b(l++; b(f++))
  + (\text{role} = \text{leaf} ? '1': '0'),
  
  in which, \( f \) and \( l \) are the indexes of respectively the forwarders and the leaves at this layer (starting at 0).

- Added step-by-step example of AF usage

- Specification now include possibility to revise/modify the allocation function

- Further clarifications about NSA addresses, IPv6 addresses, and width of the routing tree
Refine Description of Routing Mechanisms

- Revised text explaining forwarding operation
- Added flow-chart for further clarification of the procedure
Revised communication with external nodes (beyond NSA domain)

• Revised text about routing toward/from a destination outside the NSA domain
  • Internet IPv6 domain

• Defined new ICMPv6 message to accommodate communication toward external node
  • Root node to provide back mapping between external IPv6 address and an NSA address

NSA Mapped Address Advertisement
Other updates

• Text polishing

• Figure polishing/simplification

• Better highlight NSA format benefits

• IANA Section been revised

<table>
<thead>
<tr>
<th>Bit Pattern</th>
<th>Page</th>
<th>Header Type</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0101TTNH</td>
<td>10</td>
<td>LONPAN NSA IP (LONPAN NIP)</td>
<td>[This Document]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>NSA Hopped Address for External IPv6 Address</td>
<td>[This Document]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>259</td>
<td>ICMPv6 Type request and Code allocation</td>
<td></td>
</tr>
</tbody>
</table>
Thanks to those who helped improve the document

• Thanks Pascal for providing background papers and for the discussion on issues like
  • limit of children nodes
  • renumbering
• Thanks Dominique and Matthew contributing to the discussion
• Thanks Carles for pointing out the issues about scope of NSA
• Thanks Adnan Rashid for pointing out formatting problems of document
• Thanks Michael for comments in the mailing list
• Thanks Chairs of 6lo for providing time slot for NSA

• Welcome any further feedback ...
  • ... joining the effort 😊
Next Steps:

• Authors consider to have addressed all issues and ask the WG to consider to adopt this work as a WG item!

THANKS!