4rd Address Mapping

draft-despres-softwire-4rd-addmapping-01

Issues left open in draft-01 of the MAP design team

(IPv4 Residual Deployments across IPv6 domains, generic for Encapsulation and Double Translation, Stateless)

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Multiple BR prefixes

- The exit BR from a CE must be one whose PA has been used to build the CE IPv4 address or prefix
- Multiple BR prefixes are therefore necessary in a domain
- A BR can have several IPv4 PAs, and as many mapping rules (=> see impact on DHCPv6 format)
Max CE prefix – an Example

A+P DST address : XXXX XXXX XXXX
Matching Rule-IPv4-prefix : AAAA e.g. /16
IPv6 prefix of this rule : EEEE EEEE E e.g. /36

=> A+P address : AAAA BB BB CDDD

BBBB = IPv4 suffix
DDD = Max PSID (Port-set ID)

=> Max CE prefix : EEEE EEEE EBBB BDDD

It reaches ANY of the following types of DST CEs:

<table>
<thead>
<tr>
<th>CE prefix length</th>
<th>Prefix</th>
<th>Nb of v4 add</th>
<th>Nb of ports</th>
<th>Sharing ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>/60</td>
<td>EEEE EEEE EBBB BDD</td>
<td>1</td>
<td>60</td>
<td>256</td>
</tr>
<tr>
<td>/56</td>
<td>EEEE EEEE EBBB BD</td>
<td>1</td>
<td>960</td>
<td>16</td>
</tr>
<tr>
<td>/52</td>
<td>EEEE EEEE EBBB B</td>
<td>1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>/48</td>
<td>EEEE EEEE EBBB</td>
<td>16</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- IPv4 prefixes, addresses, shared addresses, are all supported (generality)
- One mapping rule supports various sharing ratios (simplicity)
Node Implementations with Max CE prefix

- IPv6 Packets that reach a CE for 4rd processing have several possible values of IPv6 DST addresses. (They reach the CE because they all start with the CE IPv6 prefix)
- This is an implementation constraint, but **not a novelty**: Translation algorithms have it for DST nodes that support multiple IPv4 addresses (BRs and CEs that are assigned IPv4 prefixes shorter than /32).
- In deployments where Max-CE-prefixes aren't used (CE-prefix lengths in Mapping rules, and no CE having IPv4 prefixes < /32), and if useful for faster processing of real non-4rd IPv6 packets, 4rd packets can still be received at a fixed exclusive prefix.
Fixed PSID offset = 4

PORTS: > 0 | PSID | any value

Offset < 4 >

1. Fixed PSID-offset => no parameter needed (simplicity)
2. Offset = 4
   a. The PSID is nibble-aligned (easy interpretation in hexadecimal)
   b. High sharing ratios are supported (SR = 2048 => 30 ports per CE. It may become useful for IPv6-capable mobile phones)

NOTE: 4096 ports are excluded (vs. only 1024 if Offset = 6), but the number of ports is reduced by only less than 4.8 % => acceptable in view of a. and b.
Proposal

Include in the MAP design:

1. Multiple BR prefixes with choice determined by source CE prefix
2. Max CE prefixes in IPv6 addresses
3. Fixed PSID offset = 4