Background

- Softwires Charter and RFC4925 state multicast is a requirement
- Softwire Mesh Unicast methods have been defined. Where is the Multicast?
- MVPN-like schemes can achieve “many-to-one” mapping
- “One-to-one” mapping (Internet-style multicast) is needed
Update from last IETF

draft-xu-softwire-mesh-multicast-00

Possible solutions discussion for IPv6-over-IPv4

- Limit IPv6 address space
- Approximate “one-to-one”
- Inter-AFBR signaling

draft-xu-softwire-mesh-multicast-01

- Give two solutions for IPv6-over-IPv4
  - Limit IPv6 address space
  - Inter-AFBR signaling
Mesh multicast framework

I-IP Transit Core

E-IP

AFBR

S

R

E-IP

AFBR

E-IP

AFBR

E-IP

AFBR

R

I-IP Tree

E-IP Tree
IPv4-over-IPv6

RFC 5496
### Group address mapping

<table>
<thead>
<tr>
<th>0</th>
<th>16</th>
<th>96</th>
<th>127</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFXY</td>
<td>ISP assigned</td>
<td>IPv4 address</td>
<td></td>
</tr>
</tbody>
</table>

The next 10 octets are assigned by ISP
Actions performed by AFBR

- Receiving a PIM message:
  - Downstream AFBR
    - If next-hop is IPv6: Perform PIM message conversion
  - Else: Just forwarding

- Upstream AFBR
  - If the prefix is ISP assigned: Translate it back
**IPv6-over-IPv4 - Difficulty**

Because of larger space of IPv6 address

- I-IP IPv4 multicast address limitations: Not all IPv4 multicast addresses are available

- Hard to map without collision
Solution 1: Limit IPv6 address space

- Pick up a portion of IPv6 addresses

- “IPv4-Embedded IPv6 Multicast Address Format” (draft-boucadair-behave-64-multicast-address-format-01) provides a guideline

- The lower bits are treated as Flow_ID
Solution 2: Inter-AFBR signaling

Upstream AFBR is given a signal for translating
Summary

- Only need changes on AFBR

- Reduce redundant traffic compared to MVPN-like schemes

- IPv4-over-IPv6 is mature, IPv6-over-IPv4 needs more details