IP Addressing with References (IPREF)

draft-augustyn-intarea-ipref-00
IETF 116 Yokohama 2023
Addresses with References

• Reference
  - an opaque unsigned integer: 134276

• IPREF Address
  - IPv4 or IPv6
  \- 192.0.2.123 + 3427
  \- 2001:DB8::123 + 2371
  - actually, any network address + reference
Only Private Networks

• IPREF is for *private* networks

• *private* – to – *private* only

• ...but notice, ‘public’ addresses are merely exposing hosts located on *private* networks.
Private Networks

DNS:
B4  AA  2001:db8::bbb:2 + 4286

encoding network: 10.128.0.0/10
2001:db8::bbb:2 + 4286  =>  10.128.222.14

Internet

encoding network: fdee:eeee::/64

2001:db8::aa:1

GWA

GWB

2001:db8::bbb:2

172.17.1.5

A5

2001:db8::222:b4

B4

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waldemar@wdmsys.com
Address Rewriting

<table>
<thead>
<tr>
<th>src</th>
<th>172.17.1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>dst</td>
<td>10.128.222.14</td>
</tr>
</tbody>
</table>

unknown source: 172.17.1.5
allocate: 2001:db8::aaa:1 + 3159

<table>
<thead>
<tr>
<th>src</th>
<th>2001:db8::aaa:1 + 3159</th>
</tr>
</thead>
<tbody>
<tr>
<td>dst</td>
<td>2001:db8::bbb:2 + 4286</td>
</tr>
</tbody>
</table>

source ipref: 2001:db8::aaa:1 + 3159
encode as: fdee:eeee::aaa:11

<table>
<thead>
<tr>
<th>src</th>
<th>fdee:eeee::aaa:11</th>
</tr>
</thead>
<tbody>
<tr>
<td>dst</td>
<td>2001:db8::222:b4</td>
</tr>
</tbody>
</table>

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IPREF Name Resolution

- IPREF addresses are publishable
- Works just like standard DNS name resolution
  - for example host: b4.example.com
    2001:db8::bbb:2 + 4286
- Probably needs a new record type...
  - like AA
- ...but works fine with TXT records for now
IPREF Notes

• IPREF operates entirely within layer 3
• IPREF gateways may be edge routers but don’t have to be
  − may be located inside local networks behind edge routers
  − may be placed ‘behind NAT’
• Only IPREF gateways deal with references
  − gateways strip references before forwarding to local networks
  − all local hosts, routers, and switches are standard
  − all Internet hosts, routers, and switches are standard
• IPREF does not replace anything
  − does not replace IPv4 or IPv6
  − does not replace VPNs, NAT, or firewalls
The End