Identifier Locator
Addressing with IPv6

Network virtualization without encapsulation
draft-herbert-nvo3-ila-02

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Address split

<table>
<thead>
<tr>
<th>Locator</th>
<th>Type</th>
<th>Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Locator</td>
<td></td>
<td>○ 64 bits identifier of physical hosts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Routable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Not used as connection endpoint</td>
</tr>
<tr>
<td>● Identifier</td>
<td></td>
<td>○ 64 bit logical endpoint address of virtual node</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Routable to an translator (NVE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Used as connection endpoint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Typed to allow different modes</td>
</tr>
</tbody>
</table>
Flow example

1) Destination: 3333::1
2) Destination: 2222:1::1

3) ILA redirect 3333::1->2222:1::1

Application send to 3333::1 (e.g. from DNS)

ILA router/NVE

Translate 2222:1::1 to 3333::1, app receives from 3333::1

4) Send directly to destination 2222:1::1
## ILA use cases

<table>
<thead>
<tr>
<th>USE CASE</th>
<th>DESCRIPTION</th>
<th>SCALING # NODES</th>
<th>RATE OF MAP UPDATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC task virtualization*</td>
<td>Assign every task an IP address</td>
<td>10’s of millions</td>
<td>1000’s</td>
</tr>
<tr>
<td>DC virtualization</td>
<td>Assign “everything” and IP address</td>
<td>Up to 10’s of billions</td>
<td>Millions</td>
</tr>
<tr>
<td>Multi tenant virtualization</td>
<td>VNID + Vaddr (VMs)</td>
<td>10’s of millions</td>
<td>1000’s</td>
</tr>
<tr>
<td>5G mobility</td>
<td>Every UE has identifier</td>
<td>Billions maybe more</td>
<td>Millions</td>
</tr>
</tbody>
</table>

* Currently being deployed
Advantages of ILA

- **Not encapsulation**
  - No on the wire overhead
  - No MTU, UDP checksum, or other tunneling issues

- **No changes to transport layer**
  - Checksum neutral translation
  - Application, DNS only deal with untranslated globally router addresses

- **Open source implementation**
  - Linux host side implementation
  - ILA router in XDP, VPP
Checksum neutral mapping

- Like RFC6296
- Good csum on wire without needing to access L4 headers
- Use low order 16 bits in identifier as a checksum adjustment value (SIR->ILA)
  - csum-adjust += csum_diff(SIR-prefix - locator)
- Reverse operation going ILA->SIR
Status

- Deploying for task virtualization @FB
- ILA router
  - BPF/XDP program being developed
  - VPP program at hackathon IETF 96
- Control plane
  - BGP initially
  - Resolution/redirect protocol for ILA hosts
IETF interactions

- Presenting @5gangip BOF
- ILA/VPP hackathon event
- Hyper Scale Address Management initiative
- Identifier-locator BOF?
- ILA (data plane or control plane) in nvo3 or other WG?