DHT-Oriented Architecture: A Prototype

Maxwell Krohn, Jeremy Stribling, Michael Walfish

jmm@pdos.lcs.mit.edu

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Old Goal: Separate Location and Identity

- An IP address conflates:
  - Network location
  - Identity, sort of
- So?
- Well, that means:
  1) Mobility, multihoming, renumbering awkward
  2) Tough to reach hosts behind NATs

Subject of Demo
Recent Proposal: DOA

- Hosts get flat identifiers (EIDs)

<table>
<thead>
<tr>
<th>EID: iuv8h...</th>
<th>EID: gbyjgx...</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP: 18.26.4.245</td>
<td>IP: 66.59.66.4</td>
</tr>
</tbody>
</table>

- Transport connection bound to EID pair
- IP addr gives only routing information

Packet Format

- IP Header
- SRC EID
- DST EID
- Transport Header (TCP or UDP)
- Body
Recent Proposal: DOA, cont’d

- EIDs passed out of band; map to an IP addr
- Assume a mapping service in the sky:

<table>
<thead>
<tr>
<th>EID</th>
<th>IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>8iabv2hmbsipse49qertgb5muury79tk</td>
<td>66.59.66.4</td>
</tr>
<tr>
<td>gbyjgxf6pkninur7jirpzjc3ftwpvfdp</td>
<td>18.26.4.245</td>
</tr>
<tr>
<td>iuv8h9r7qxyckfjh4whcsd3ufw4acp6i</td>
<td>18.26.4.245</td>
</tr>
</tbody>
</table>
DOA in a Nutshell

Problem: identifiers are flat! How to map them to actual IP addresses?

Claim: DOA addresses NAT difficulties
Reaching NATed Hosts in DOA

- EIDs of NATed hosts map to NAT’s IP
- NATs use the host identifier, EID, to demux
- Many servers behind NAT on same TCP port
Our High-Speed, State-of-the-Art Cluster
Demo of DOA Prototype

> ssh iuv8h9r7q.DOA
Conclusion

DOA:
1) permits the location/identity split, which:
   - supports multi-homed hosts (not discussed)
   - accommodates hosts behind NATs
2) uses a DHT to map flat EIDs → IP addr
3) has no chance of ever being deployed