Some New Basic LISP Features

LISP Working Group - Berlin IETF
July 2016

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Agenda

• Briefly Present (but in their entirety):
  • draft-farinacci-lisp-name-encoding-00
  • draft-farinacci-lisp-geo-00
  • draft-farinacci-lisp-eid-anonymity-00
We can encode a “distinguished-name” in an EID-record or RLOC-record with AFI encoding

- Use AFI=17 and null terminate ascii string
- Provides for self-documenting mapping database records
- Provides for multi-stage lookups and groupings
- Supported by LISP-DDT with no changes

- Lookup for /root/dino/slides/berlin
- Matches /root/dino at DDT-root’s children
- Where /root/dino/slides/berlin are registered to Map-Server
Example

lispers.net
Scalable Open Overlay Networking

Site name: lispers.net. EID-prefix: [1]'g-xtr1'. registered: yes, dynamic

Description:
Last registerer: [0]104.155.143.86, xTR-ID: 0xcd098572b0b0cbf3, site-ID: 0
First registered: 23:38:43, last registered: 0:00:31, auth-type: sha2, registration flags: p-s-I-t-r-m-n
Default registration timeout TTL: 180 seconds
Forcing proxy Map-Reply: yes
Forcing proxy Map-Reply for xTRs behind NATs: yes
Send drop-action proxy Map-Reply to PITR: no
Proxy Map-Reply action: not configured
Allowed RLOC-set: any

Registered RLOC-set (replacement-semantics):
[0]104.155.143.86, state: up-state, up/uw/mp/mw: 0/0/255/0, rloc-name: "xtr1"
[0]10.240.106.249, state: up-state, up/uw/mp/mw: 254/0/255/0, RTR
[0]130.211.169.66, state: up-state, up/uw/mp/mw: 254/0/255/0, RTR

Individual registrations: none

Tue Jun 28 20:10:25 UTC 2016 - Uptime 23:40:47, Version 0.333
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We already can encode geo-coordinates as RLOC-records

Add a radius (in km) to draw a geographical sphere

Now we have “geo-prefixes” (in 2D or 3D)

Can be encoded as EID-records or RLOC-records

Can test if an EID is in a geographical area

Can make RLOC selection based on signal quality as well as considering latency requirements
<table>
<thead>
<tr>
<th>geo-locations</th>
<th>[1000]</th>
<th>no (ams)</th>
<th>--</th>
<th>never</th>
<th>never</th>
<th>--</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1000] 'san-jose'</td>
<td>yes (dynamic)</td>
<td>0:00:08</td>
<td>[0] 104.155.10.225</td>
<td>23:46:31</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[1000] 'new-york'</td>
<td>yes (dynamic)</td>
<td>0:00:08</td>
<td>[0] 104.155.10.225</td>
<td>23:46:31</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[1000] 'paris'</td>
<td>yes (dynamic)</td>
<td>0:00:08</td>
<td>[0] 104.155.10.225</td>
<td>23:46:31</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[1000] 'london'</td>
<td>yes (dynamic)</td>
<td>0:00:08</td>
<td>[0] 104.155.10.225</td>
<td>23:46:31</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[1000] 'tokyo'</td>
<td>yes (dynamic)</td>
<td>0:00:08</td>
<td>[0] 104.155.10.225</td>
<td>23:46:31</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[1000] 'sjc'</td>
<td>yes (dynamic)</td>
<td>0:00:08</td>
<td>[0] 104.155.10.225</td>
<td>23:46:31</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[1000] 'cdg'</td>
<td>yes (dynamic)</td>
<td>0:00:08</td>
<td>[0] 104.155.10.225</td>
<td>23:46:31</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
</tbody>
</table>

**lispers.net**

**Scalable Open Overlay Networking**

**Site name:** geo-locations

**EID-prefix:** [1000] 'paris'

**Registered:** yes, dynamic

**Description:**

- Last registered: [0] 104.155.10.225, xTR-ID: 0x390233f69b43f60, site-ID: 0
- First registered: 23:46:31, last registered: 0:00:08, auth-type: sha2, registration flags: p-s-l-t-r-m-n
- Default registration timeout TTL: 180 seconds
- Forcing proxy Map-Reply: yes
- Forcing proxy Map-Reply for XTRs behind NATs: no
- Send drop-action proxy Map-Reply to PITR: no
- Proxy Map-Reply action: not configured
- Allowed RLOC-set: any

**Registered RLOC-set (replacement-semantics):**

- [0] 204.108.108.248, state: up-state, up/ulw/ipmp/mw: 0/0/255/0, oopo: 00:42:14-0-15-7-34-18-8
- [0] 100.200.200.200, state: up-state, up/ulw/ipmp/mw: 254/0/255/0, RTR

**Individual registrations:**

- [0] 130.211.169.66, state: up-state, up/ulw/ipmp/mw: 254/0/255/0, RTR

---

**lispers.net**

**Scalable Open Overlay Networking**

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- [0] 130.211.169.66, state: up-state, up/ulw/ipmp/mw: 254/0/255/0, RTR

**Individual registrations:** none
Example

Run **lig** on EID: ___________ to Map-Resolver: ___________ count (1-5): ___________ no-nat: □ Submit

Run **rig** on EID: ___________ to any DDT-node: ___________ follow-all-referrals: □ Submit

Run **geo-test** on geo-point: [1000]'cdg' for geo-prefix: [1000]'paris' Submit

**lispers.net**
Scalable Open Overlay Networking

Geo-Point: 49-0-14-N-2-34-15-E (49.003889, 2.570833), EID [1000]'cdg'
Geo-Prefix: 48-51-12-N-2-20-55-E/100 (48.853333, 2.348611), 100 kilometer radius, EID-prefix [1000]'paris'
Distance: 23.36 kilometers, point is **inside** of circle

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A client system can use ephemeral EIDs

Randomly allocates a value in 2001:5:fffe::/64

Register ephemeral-EID with current RLOC-set

Source from the ephemeral-EID

Server knows where you are

Simply a mobility problem, solved with a mobility solution

No changes to the LISP protocol
Example

---

**client-side**

ephemeral-EID

2001:5:ffff::<rng>

**server-side**

EID

dfd4::4

---

xTR

RLOC

172.17.0.3

---

Core Network

---

xTR

RLOC

172.17.0.4

---

ping6
Example

```
root@xtr3:/dino/code/apps# py ping-from-eid.py dfdf4:4 loop 3
Configure 2001::ffff::d1ce:240e on interface lo ... succeeded
Start ping6 from 2001::ffff::d1ce:240e to dfdf4:4 ...
PING dfdf4:4(dfdf4:4) from 2001::ffff::d1ce:240e : 56 data bytes
64 bytes from dfdf4:4: icmp_seq=2 ttl=62 time=100 ms
64 bytes from dfdf4:4: icmp_seq=3 ttl=62 time=187 ms
64 bytes from dfdf4:4: icmp_seq=4 ttl=62 time=186 ms
64 bytes from dfdf4:4: icmp_seq=5 ttl=62 time=184 ms
64 bytes from dfdf4:4: icmp_seq=6 ttl=62 time=183 ms
64 bytes from dfdf4:4: icmp_seq=7 ttl=62 time=180 ms
64 bytes from dfdf4:4: icmp_seq=8 ttl=62 time=279 ms
64 bytes from dfdf4:4: icmp_seq=9 ttl=62 time=277 ms
64 bytes from dfdf4:4: icmp_seq=10 ttl=62 time=275 ms
--- dfdf4:4 ping statistics ---
10 packets transmitted, 9 received, 10% packet loss, time 9013 ms
rtt min/avg/max/mdev = 188.774/216.156/279.000/43.453 ms
Deconfigure 2001::ffff::e929:4489 on interface lo ... succeeded
Start ping6 from 2001::ffff::e929:4489 to dfdf4:4 ...
PING dfdf4:4(dfdf4:4) from 2001::ffff::e929:4489 : 56 data bytes
64 bytes from dfdf4:4: icmp_seq=2 ttl=62 time=250 ms
64 bytes from dfdf4:4: icmp_seq=3 ttl=62 time=247 ms
64 bytes from dfdf4:4: icmp_seq=4 ttl=62 time=247 ms
64 bytes from dfdf4:4: icmp_seq=5 ttl=62 time=247 ms
64 bytes from dfdf4:4: icmp_seq=6 ttl=62 time=244 ms
64 bytes from dfdf4:4: icmp_seq=7 ttl=62 time=243 ms
64 bytes from dfdf4:4: icmp_seq=8 ttl=62 time=243 ms
64 bytes from dfdf4:4: icmp_seq=9 ttl=62 time=240 ms
64 bytes from dfdf4:4: icmp_seq=10 ttl=62 time=239 ms
--- dfdf4:4 ping statistics ---
10 packets transmitted, 9 received, 10% packet loss, time 9015 ms
rtt min/avg/max/mdev = 239.451/245.437/250.853/3.454 ms
Deconfigure 2001::ffff::e929:4489 on interface lo ... succeeded
```

### LISP-MS Site Information:

<table>
<thead>
<tr>
<th>Site Name</th>
<th>EID-Prefix or (S,G)</th>
<th>Registered</th>
<th>Last Registerer</th>
<th>Last Registered</th>
<th>First Registered</th>
<th>Registration Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>any [0]</td>
<td>no (ams)</td>
<td>--</td>
<td>never</td>
<td>never</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>[0]0x3.9.32</td>
<td>yes (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:00:24</td>
<td>0:05:24</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[0]dfdf4:3::32</td>
<td>yes (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:00:24</td>
<td>0:05:24</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[0]d-xr43</td>
<td>yes (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:00:22</td>
<td>0:05:24</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[0]d-xr43</td>
<td>yes (dynamic)</td>
<td>[0]172.17.0.4</td>
<td>0:00:22</td>
<td>0:05:22</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[0]0201::5::[eabb:gif6e]</td>
<td>no (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:01:45</td>
<td>0:02:18</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>[0]0201::5::8a20:a7de/128</td>
<td>no (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:01:30</td>
<td>0:02:07</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>[0]0201::5::7612:5728/128</td>
<td>no (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:01:30</td>
<td>0:01:56</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>[0]0201::5::3000:a220/128</td>
<td>no (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:01:19</td>
<td>0:01:45</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>[0]0201::5::8127:95bd/128</td>
<td>no (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:01:15</td>
<td>0:01:41</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>[0]0201::5::d1ce:240e/128</td>
<td>yes (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:00:23</td>
<td>0:00:23</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[0]0201::5::e929:4489/128</td>
<td>yes (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:00:12</td>
<td>0:00:12</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
<tr>
<td>[0]0201::5::1861:2db1/128</td>
<td>yes (dynamic)</td>
<td>[0]172.17.0.3</td>
<td>0:00:01</td>
<td>0:00:01</td>
<td>p-s-l-t-r-m-n</td>
<td></td>
</tr>
</tbody>
</table>
Questions/Comments/Tomatoes?