Geolocation Compass: Geolocalized Data Registry and Forwarding for ICN Networks

Dante Pacella
Verizon Labs
dante@verizon.com

Mani Tadayon
Verizon Labs
mani.tadayon@verizon.com

Ashish Sardesai
Verizon Labs
ashish.sardesai@verizon.com

Venkat Josyula
Verizon Labs
venkat.josyula@verizon.com

March 2017
Abstract and Background

Namespace forwarding in ICN:

• Benefits: provides information centric view instead of network or host centric view
• Drawbacks: network-wide advertising of names of new or changing services difficult to scale

Proposal solves aforementioned issue by:

• Registering services to local geolocation-aware nodes
• Including geolocation information in Interest
• Forwarding Interests based on geolocation coordinates and range
Geolocation Compass Overview

Producers:
Register geolocalized services to Geolocation Compass nodes with geolocation coordinates, serving radius, and other parameters

Consumers:
Request content by providing POI and/or ROI (geolocation coordinates plus search radius)

Geolocation Compass:
Forwards consumer requests to nearest geolocation nodes that have registrations for the service that can satisfy the consumer’s Interest
Geolocation Compass Service Registration

Example: Registration Table on G3

<table>
<thead>
<tr>
<th>Service Identifier</th>
<th>Geolocation Coordinates</th>
<th>Serving Radius (meters)</th>
<th>Registration Validity (Epoch)</th>
<th>Producer ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>x,y,z</td>
<td>100</td>
<td>1489516340+600</td>
<td>P1</td>
</tr>
<tr>
<td></td>
<td>x1,y1,z1</td>
<td>100</td>
<td>1489516340+600</td>
<td>P2</td>
</tr>
<tr>
<td>Humidity</td>
<td>x1,y1,z1</td>
<td>100</td>
<td>1489516340+600</td>
<td>P2</td>
</tr>
<tr>
<td>Business Hours</td>
<td>x2,y2,z2</td>
<td>1000</td>
<td>1489516340+43200</td>
<td>P3</td>
</tr>
<tr>
<td>Traffic Conditions</td>
<td>x4,y4,z4</td>
<td>800</td>
<td>1489516340+60</td>
<td>P5</td>
</tr>
</tbody>
</table>
Geolocation Compass Forwarding

Example of namespace modification:
/GEO/BusinessHours/GC=39.008756,N,77.470131,W,82.4,M,33.9,M/ACME
Geolocation Compass Forwarding

Example of namespace modification:
/GEO/BusinessHours/GC=39.008756,N,77.470131,W,82.4,M,33.9,M/ACME
Summary

Geolocation Compass:

• Provides a scalable and distributed mechanism for efficient access to real-time relevant and geolocalized data

• Consumer requests for content are forwarded using geolocation-based routing algorithms to Compass nodes closest to relevant Producers

• Namespace modifications are proposed to facilitate routing from non-Compass nodes to Compass nodes and between two Compass nodes as well

• Producers can advertise services through Compass nodes using a highly scalable, reliable and extensible Registration mechanism
Thank you.