Carrying Geo Coordinates in BGP

Draft-chen-idr-geo-coordinates-01
Enke Chen, Naiming Shen, Robert Raszuk
IETF 96, Berlin
Geo Location in Routing
(From Acee’s slides at IETF 95)

- P2P, P2MP, and Hybrid automatic link cost
- Find-My-Router Apps
- Proximity services in content sharing and SFC
- Network topology maps
- Dynamic DNS loadsharing
- Traffic matrix of location pairs
- Same ‘subnet’ over WAN and ECMP
- Future routing/service/mgmt apps
- Static provisioning, utilize additional information or GPS capable device
Why Geo Coordinates in BGP

• Certainly for inter-domain
• BGP Path selection in overlay network
• “Service chaining function” optimization
• Replace or supplement community-based location tagging
Geo Coordinate Capability

- Flag: U, N, E, A, M
- Location Uncertainty in centimeter
- Latitude and Longitude in milliseconds
- Altitude is a signed integer, in centimeter or meter
- Mostly for EBGP when IGPs are accessible
# Geo Coordinate Attribute

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

- **AS Number**
- **BGP Identifier**
- **Reserved**
- **Location Uncertainty**
- **Latitude Degr.**
- **Latitude Milliseconds**
- **Longitude Degr.**
- **Longitude Milliseconds**
- **Altitude**

- One or more such tuples
- Usual policies - prepend / override / strip
How to Use It

• Local policy dictates
• Location based services
• Tie-breaker in path selection
• MED advertisement
Security

• Increase of attack vector
• Geo location information can be sensitive, proprietary or physical security/safety related
• Implementation MUST allow removing of the attribute
• Deploy mechanisms for session security and content integrity