Local and Indirect Registration for Anchoring Handoffs

draft-dommmety-mobileip-anchor-handoff-00.txt

Gopal Dommety
gdommety@cisco.com
Problem

• In wide area deployment, the handoff latencies could be high.

• Handoff Latency includes:

  1. Message traversal between HA and FA
  2. Establishment of Secure Tunnels (IKE/IPSec)
  3. Establishment of Security Keys between HA and FA to be used during IKE or for Mobile IP Authentication

• Local and Indirect Registration

• Anchoring to reduce latency
Registration (Global)

- Authentication and Authorization using AAA
- Dynamic Key establishment for IKE and/or Mobile IP (KDC, AAA)
- Establishment of IP Sec tunnel using IKE (Shared Key or PKI)
- FA where Global Registration is performed is the Anchor FA
• Register with Anchor FA (FA 1)
• Avoid latencies due to latency components 1, 2, and 3
• Security Association between FA1- MN and between FA1- FA2
• Lifetime of local reg has to be less than remaining global lifetime
• Can perform global registration to optimize the path
Global Indirect Registration

- Register with Anchor FA (FA 1) and HA
- Avoid latencies due to latency components 2, and 3
- A Security Association is assumed between FA1 and FA2
- No Security Key is assumed between FA1 and MN
Anchor Advertisement Extension

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>+-----------------------------------------------+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Length</td>
<td>Reg-Type</td>
<td>Zone ID ...</td>
</tr>
<tr>
<td>+-----------------------------------------------+</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Used by Mobile (MN) to determine if Zone change occurred.
- Extension to the Mobile IP IRDP message
- Reg-Type: Type of Registration Supported (Local, Indirect)
- Zone ID: A unique value used to identify the Zone (Realm?)
  Can be extended with an additional field type of Zone ID type
## Anchor Registration Extension

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Length</td>
<td>Reg-Type</td>
<td>Resrvd</td>
</tr>
<tr>
<td>AnchorFA Address</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA Address</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zone ID........</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Authentication Extension**

<table>
<thead>
<tr>
<th>Type</th>
<th>Subtype</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Authenticator ...</td>
<td></td>
</tr>
</tbody>
</table>

- **Subtype**
  - FA-AnchorFA
  - MN-AnchorFA
Local Registration (MN)

- Lifetime is set to the lesser of the remaining lifetime of the last global registration and the one advertised by this FA.
- Currently only timestamp-based reply protection is supported (timestamp-based replay as specified in RFC 2002).
- CoA, Home Agent and Home Address are as in RFC 2002.
- MN-AnchorFA AE (Authentication Extension) is mandatory and is used in place of MN-HA AE.
- Anchor Registration Extension is included before the MH-AnchorFA AE. The Reg_Type field is set to LOCAL_REG.
Local Registration (AnchorFA)

- Checks for Invalid Zone ID, Unsupported Reg Type, FA AE, MN AE, and previous Global registration.
- Registration Lifetime requested has to be less than the remaining global registration lifetime, otherwise the lifetime is field is updated to the remaining global registration lifetime.
- On successful registration the AnchorFA creates an appropriate tunnel to the CoA and sets up routing such that datagrams that arrive destined to this mobile from HA-AnchorFA tunnel is tunneled to the via the AnchorFA-FA tunnel.
- If reverse tunneling is set, then the datagrams that come from the FA-AnchorFA tunnel and generated by this mobile (source address of the Mobile) are tunneled to the HA.
Local Registration (FA)

- Checks for Invalid Zone ID and Unsupported Reg Type.
- For Local Registration FA-AnchorFA AE is Mandatory. It is computed in place of the FA-HA AE.
- Sends the Registration Message to AnchorFA
- On receiving a successful Registration Reply from the AnchorFA, if the MN is using Foreign Agent CoA, the appropriate tunnel is created to the AnchorFA
Indirect Registration (MN)

- MN-HA AE is mandatory and AnchorFA-MN AE is optional.
- Lifetime is chosen a recommended in RFC 2002.
- Both timestamp-based and nonce based reply protection is supported.
- Anchor Registration Extension is included before the MN-AnchorFA AE. The Reg_Type field is set to GLOBAL_INDIRECT_REG.
Indirect Registration (FA/Anchor)

- FA: Same as local Anchor
- Anchor FA: Processing similar to FA
- HA: Regular RFC 2002 processing
- Creates Tunnel between FA and Anchor FA
Summary

- Two enhancements to reduce the handoff latency in a wide area deployment
- Local and Global Indirect Registration
- Anchoring to reduce the latency
Cisco may have IPR on material contained in this draft. Upon approval by the IESG of the relevant Internet standards track specification and if any patents issue to Cisco or its subsidiaries with claims that are necessary for practicing this standard, any party will be able to obtain the right to implement, use and distribute the technology or works when implementing, using or distributing technology based upon the specific specification(s) under openly specified, reasonable, non-discriminatory terms.
Comments and Suggestions

- Local and Indirect Registration for Anchoring Handoffs
  - draft-dommety-mobileip-anchor-handoff-00.txt
Comparison

- Regionalized Tunnels
- New Draft
- Hawaii/THEMA and types