LISP Mapping Versioning

Discussion

Luigi Iannone
Damien Saucez
Olivier Bonaventure
Quick update from the mailinglist

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Luigi/Damien, can you think about these issues so we can discuss them:

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(2) With what we have in the spec right now, the nonce is also a version number but it works in one- direction. And an SMR allows the side that needs the update to have it send a Map- Request.

What I want you guys to think about and articulate is what the pros and cons of "comparing" the two approaches. Rather the pros and cons of each. The later has been articulated as you said.

What I want to understand is if we can get your pros without having to make more changes. Because the map-versioning ID makes a lot of changes (data packet change, new message type in a Map-Update, and removing loc-reach-bits) so I am judging the benefit given this cost.

Now, one other thing. Since we are currently all thinking about locator reachability algorithms, and if we do an RLOC-probing algorithm, and if we use Map-Requests and Map- Replies as the probes, you have a built-in update mechanism with no other cost. That is, if you have to probe for liveness, you can also get the latest and greatest mapping data from the site. So something to think about.

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• [http://www.ietf.org/mail-archive/web/lisp/current/msg00692.html](http://www.ietf.org/mail-archive/web/lisp/current/msg00692.html)

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Mapping Version Numbers

Example from: http://www.ietf.org/mail-archive/web/lisp/current/msg00617.html
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SMR + Nonce

draft-ietf-lisp03.txt:
LISP Nonce: is a 24-bit value that is randomly generated by an ITR.

Example from: http://www.ietf.org/mail-archive/web/lisp/current/msg00617.html
Quick update from the mailinglist

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No more changes....

- not after the last three months...... ;-)
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3.2.2. Complexity of Network-Based Probing

Network-based implementations must keep per-destination egress point liveness. The complexity of probing in a network-based implementation can be thought of as follows:

Let \( N \) = the number of EID-prefixes in a network element's cache
Let \( L_i \) = the number of locators for EID-prefix \( N_i \)
Let \( M \) = the number of source locators

Then the complexity of network-based probing, \( P_{\text{network}} \), can be described as

\[
O(P_{\text{network}}), \text{ where } P_{\text{network}} = M \times \sum_{i=0}^{N-1} L_i
\]

Note that a network-based probing scheme might have an advantage here because a single EID-prefix may cover many correspondent hosts. That is, \( \sum_{i=0}^{N-1} L_i < \sum_{i=0}^{C-1} D_i \)

- How many RLOCs a famous site can probe?
- How many probes a famous site can reply to?
  - Not saying is not feasible, but we have the interest to keep signaling load very very very low.
  - Active measurements research proves that the “active” approach does not scale
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Mapping Version Numbers

On decapsulation by checking the source version number the ETR sends a Map-Request

Example from: [http://www.ietf.org/mail-archive/web/lisp/current/msg00617.html](http://www.ietf.org/mail-archive/web/lisp/current/msg00617.html)
On decapsulation by checking SMR bit + Nonce, the ETR sends a Map-Request.

When to reset the SMR bit?

Example from: [http://www.ietf.org/mail-archive/web/lisp/current/msg00617.html](http://www.ietf.org/mail-archive/web/lisp/current/msg00617.html)
Mapping Version Numbers

On decapsulation by checking the destination version number the ETR sends a Map-Request piggy-backing updated mapping

Example from: http://www.ietf.org/mail-archive/web/lisp/current/msg00617.html
SMR + Nonce

TTL expiration
Clock Sweep (24h in actual spec)

Example from: http://www.ietf.org/mail-archive/web/lisp/current/msg00617.html
SMR+Nonce vs. Versioning

- SMR+Nonce
- Mapping Versioning
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Where to put Version Numbers?

The Locators listed in a Map-Reply are numbered with ordinals 0 to n-1. The Loc-Reach-Bits in a LISP Data Message are numbered from 0 to n-1 starting with the least significant bit numbered as 0. So, for example, if the ITR with locator listed as the 3rd Locator position in the Map-Reply goes down, all other ITRs at the site will have the 3rd bit from the right cleared (the bit that corresponds to ordinal 2).

If many changes occur to a mapping over a long period of time, one will find empty record slots in the middle of the locator-set and new records appended to the locator-set. At some point, it would be useful to compact the locator-set so the loc-reach-bit settings can be efficiently packed.

May this cause problem with draft-meyer-lisp-mn-00.txt?

Reach Bits are a hint: [http://www.ietf.org/mail-archive/web/lisp/current/msg00546.html](http://www.ietf.org/mail-archive/web/lisp/current/msg00546.html)
Where to put Version Numbers?

- FreeBSD User Space (Control Plane)
- FreeBSD Kernel Space (Data Plane)
- Encap/Decap Routines
- LISP (MapTables)

Mapping Distribution Protocol (Daemon)

<table>
<thead>
<tr>
<th>S</th>
<th>E</th>
<th>rsvd-flags</th>
<th>Nonce</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Version = 69

Map-Request: Version = 666

Map-Reply: Version = 70

0                   1                   2                   3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Src Mapping Version = X |   Dst Mapping Version = Y |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|S|E| rsvd-flags| Nonce |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

Version = 70
Pros & Cons

• SMR+Nonce+Reachbits
  • PROS
    • Implemented

• CONS
  • Unidirectional
  • Heavy Control Plane
  • ReachBit have a “loose” meaning

• Mapping Versioning*
  • PROS
    • Versioning
    • Bidirectional
    • Lighter Control Plane
    • Helps in keeping signaling overhead low
    • Security & Mobility
  • CONS
    • To be implemented

*Does not mean to get rid of Nonce + SMR + Reachability bit in the Map-Reply
Next Steps...

- WG deciding if it is worth to work on mapping versioning
- If no, let’s go for beers
- If yes, synch with LISP Dev Team to agree on details
  - Update draft
  - and let’s go for beers anyway....