Internet Addressing -

Problem Statement and Considerations

IETF 115 – Philadelphia + Online

Yihao Jia, Dirk Trossen, Luigi Iannone, Nirmala Shenoy, Paulo Mendes, Laurent Toutain, Donald Esatlake 3rd, Peng Liu, Abraham Y. Chen, Dino Farinacci
Recap since the last episode .....
Status and Next Steps

• The content of the documents is:
  • **Problem Statement**: Provides example scenarios that the existing Internet addressing place is a potential hindrance for Internet service provisioning
  • **Gap Analysis**: Investigate the properties of Internet Addressing, their extensions, identifying gaps that have been filled but also new issues introduce

• But the original **purpose** of the documents was to bring the community to discuss addressing

• Despite a difficult start current documents contain the IETF community input
  • various facets and opinions gathered on the mailing list discussions
  • the side meeting during IETF 112
THANKS!
QUESTIONS? / COMMENTS?

This is a documented community effort

Worth thinking about WG adoption

Worth thinking about next steps beyond these drafts?
(Community discussion needed)

But also looking forward

Conclusion @ IETF 113

IETF 113 – INTAREA WG
Good news: We did not fall on deaf ears

• INTArea Chairs were gently willing to issue the call for adoption

• The IESG+IAB retreat came around and these documents were on the agenda
  • And IESG+IAB members did some fine analysis…. (see next few slides)
  • [https://trac.ietf.org/trac/iesg/wiki/RetreatInfo](https://trac.ietf.org/trac/iesg/wiki/RetreatInfo)

Thursday, May 19, 2022

Morning Session: IESG + IAB

Scribe: Cindy

• 9:30 IETF Special Interest Groups / Routing / Architecture Evolution / Semantic Routing (Routing ADs) + Internet addressing gaps (Eric V/Colin)
• 11:30 Break
• 12:00 Routing security (Russ) Slides
• XX:XX (if time permits) Leadership guidance to the community on term-limit thoughts (Wes; move to Thu or parking lot)

13:00-14:00 Lunch in Ohlone People Foyer

Afternoon Session: IAB Only

Scribe: Cindy

• 14:00 Welcome and "What the IAB should be doing"
• 14:45 Metaverse proposal (Cullen)
• 15:30 "Break"
• draft-iab-protocol-maintenance (David)
• Liaison manager pipeline review (Tommy/Deborah/Wes)
• Growing potential IAB chair candidates (Lars)
Feedback from IAB+IESG

Situation at

The documents still need to be refined and completed

• (we are not done yet)

- draft-jia-intarea-internet-addressing-gap-analysis-02
- draft-jia-intarea-scenarios-

From draft-jia-intarea-scenarios-problems-addressing-03:
"At this stage, this document does not provide a definite answer nor does it propose or promote specific solutions to the problems here portrayed. Instead, this document aims at stimulating discussion on the emerging needs for addressing,..."
Fixing Concerns about wording

- Address the concern about draft-jia-addressing-gap-analysis
  - On the use of “gap analysis” since no solution is provided
  - On the wording making sometimes look IP address as an “issue”

- Action: replace old document with brand new one on “addressing-considerations”
Internet Addressing Considerations

<table>
<thead>
<tr>
<th>Table of Contents</th>
<th>Table of Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>1. Introduction</td>
</tr>
<tr>
<td>2. Properties of Internet Addressing</td>
<td>2. Properties of Internet Addressing</td>
</tr>
<tr>
<td>2.1. Property 1: Fixed Address Length</td>
<td>2.1. Property 1: Fixed Address Length</td>
</tr>
<tr>
<td>2.2. Property 2: Ambiguous Address Semantic</td>
<td>2.2. Property 2: Ambiguous Address Semantic</td>
</tr>
<tr>
<td>3. Filling Gaps through Extensions to Internet Addressing Properties</td>
<td>3. Extending the Internet Addressing Properties</td>
</tr>
<tr>
<td>3.1. Length Extensions</td>
<td>3.1. Length Extensions</td>
</tr>
<tr>
<td>3.1.1. Shorter Address Length</td>
<td>3.1.1. Shorter Address Length</td>
</tr>
<tr>
<td>3.1.2. Longer Address Length</td>
<td>3.1.2. Longer Address Length</td>
</tr>
<tr>
<td>3.1.3. Summary</td>
<td>3.1.3. Summary</td>
</tr>
<tr>
<td>3.2. Identity Extensions</td>
<td>3.2. Identity Extensions</td>
</tr>
<tr>
<td>3.2.1. Anonymous Address Identity</td>
<td>3.2.1. Anonymous Address Identity</td>
</tr>
<tr>
<td>3.2.2. Authenticated Address Identity</td>
<td>3.2.2. Authenticated Address Identity</td>
</tr>
<tr>
<td>3.2.3. Summary</td>
<td>3.2.3. Summary</td>
</tr>
<tr>
<td>3.2.4. Semantic Extensions</td>
<td>3.2.4. Semantic Extensions</td>
</tr>
<tr>
<td>3.2.5. Utilizing Extended Address Semantics</td>
<td>3.2.5. Utilizing Extended Address Semantics</td>
</tr>
<tr>
<td>3.2.6. Utilizing existing or extended header semantics</td>
<td>3.2.6. Utilizing existing or extended header semantics</td>
</tr>
<tr>
<td>3.2.7. Summary</td>
<td>3.2.7. Summary</td>
</tr>
<tr>
<td>3.3. Overview of Approaches to Extend Internet Addressing</td>
<td>3.3. Overview of Approaches to Extend Internet Addressing</td>
</tr>
<tr>
<td>3.4. A System view on Address</td>
<td>3.4. A System view on Address</td>
</tr>
<tr>
<td>4. Issues in Extensions to Internet Addressing</td>
<td>4. Concerns in Extensions to Internet Addressing</td>
</tr>
<tr>
<td>4.1. Limiting Address Semantics</td>
<td>4.1. Limiting Address Semantics</td>
</tr>
<tr>
<td>4.2. Complexity and Efficiency</td>
<td>4.2. Complexity and Efficiency</td>
</tr>
<tr>
<td>4.2.1. Repetitive encapsulation</td>
<td>4.2.1. Repetitive encapsulation</td>
</tr>
<tr>
<td>4.2.2. Compounding issues with header compression</td>
<td>4.2.2. Compounding issues with header compression</td>
</tr>
<tr>
<td>4.2.3. Complicating Traffic Engineering</td>
<td>4.2.3. Complicating Traffic Engineering</td>
</tr>
<tr>
<td>4.3. Security</td>
<td>4.3. Security</td>
</tr>
<tr>
<td>4.4. Fragility</td>
<td>4.4. Fragility</td>
</tr>
<tr>
<td>4.5. Summary of Issues</td>
<td>4.5. Summary of Issues</td>
</tr>
<tr>
<td>5. Summary of Concerns</td>
<td>5. Summary of Concerns</td>
</tr>
<tr>
<td>6. Conclusions</td>
<td>6. Conclusions</td>
</tr>
<tr>
<td>7. Security Considerations</td>
<td>7. Security Considerations</td>
</tr>
<tr>
<td>8. IANA Considerations</td>
<td>8. IANA Considerations</td>
</tr>
<tr>
<td>9. Informative References</td>
<td>9. Informative References</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>Acknowledgments</td>
</tr>
<tr>
<td>Authors’ Addresses</td>
<td>Authors’ Addresses</td>
</tr>
</tbody>
</table>

- ToC already shows the work done but there is a lot more throughout the document

**IP Addressing is good: how to make it even better?**
Possible Next Steps Considered

Next steps?

- IRTF
- IAB workshop
- New WG
- Keep in intarea
New WG

- This will require IETF consensus
- Gathering more ideas, point of views
- Possibly less academic (what about SCION & RINA ?)
- Possibly more pragmatic: not boiling the ocean but incremental moves
- Charter should
  - Focus on problem space
  - Not venture too soon on solution space

Option if the community considers to continue having a larger discussion
- The documents are not exhaustive but cover all the important identified facets but does not mean everything should be solved at the same time or (solved at all)
- Let’s be green and not boil the ocean

Source: https://docs.google.com/presentation/d/1_9ZANi9YOyYOAjdWq5IG9lvF6IPwJ2GpUqJsWuHfByE/edit#slide=id.p1
Fits the intarea WG charter

“The Internet Area receives occasional proposals for the development and publication of RFCs that are not in scope of an existing working group and do not justify the formation of a new working group. The INTAREA WG has a secondary role to serve as the forum for developing such work items in the IETF."

“(1) WG consensus on the relevance for the Internet at large.

... 

(5) Agreement by the ADs, who, depending on the scope of the proposed work item, may decide that an IESG review is needed first.”

Consensus for adoption and publication
What is the most preferred option to consider for the next steps in the area of Internet addressing?

- Open discussion on received feedback on Internet Addressing Considerations & Next Steps

- Tomorrow Friday 29th July 8:00 Local time
  - More Info: https://trac.ietf.org/trac/ietf/meeting/wiki/114sidemeetings#point5
  - Onsite Room: Philadelphia South

IP Addressing is good: how to make it even better?
Backup
Current intarea drafts lack research focus – wide range of topics, cites little new research*, make no clear proposals

- Ad-hoc and mobile, traffic engineering, security, variable length addressing, locator-identifier separation, proxies and privacy addresses, geographic routing, named services and data, new forwarding semantics

Potentially interesting research around novel forwarding semantics, addressing that identifies services and data, protecting user privacy by changing the way addressing and routing work – but existing research groups cover these areas

SCION is a separate effort – parts have been previously presented in PANRG, which has an interim in June on this topic

- Some ongoing research (scalability, trustworthy path selection); some potential for standardisation

*155 refs, only 15 less than 5 years old, 4 of those unrelated to addressing/routing

Source: https://docs.google.com/presentation/d/1_9ZANi9YOyYOjdaWg5IG9iF6ljPwJ2GpUgJsWuHfByE/edit#slide=id.p1
IAB Workshop

- After all, this could be a major architecture change – or help understand how the work relates to existing activities
- Could include SCION & RINA
- Could end up in recommendations for next steps (see next slides)