Internet Addressing -
Problem Statement and Gap Analysis

IETF 112 – Online

2021.11.09
CONTENT

Part 1: Recap and Updates on these 2 drafts

Part 2: Feedbacks from the related Side Meeting
RECAP: Problem Statement

• Provides **example scenarios** that the existing **Internet addressing** place is a potential hindrance for Internet service provisioning
  • Constrained devices
  • Dynamically changing topology
  • Traffic steering
  • … …

• Identifies the **issues** behind **Internet addressing** in these scenarios:
  • **Efficiency:** Energy consumptions for large encapsulation overhead [**Constrained devices**]
  • **Effectiveness:** Frequently routing protocol updates [**changing topology**]
  • **Complexity:** Dynamically update policy table (binding policies to IP addresses), and Dynamically distribute policy table to action node [**Traffic steering**]
  • … …
RECAP: Gap Analysis

- Investigate the properties of Internet Addressing
  - **Fixed Address length** through 32/128 bit length
  - **Ambiguous Address Semantic** with explicit locator and implicit identifier
  - **Limited Address Semantic Support** with mainly prefix-based only semantics
- Investigate extensions that patch the **Addressing Properties** on those **Challenge Scenarios**
  - Extensions themselves are **explicitly proof** for **the potential gaps**
  - Identify the **gaps that filled** by these extensions according to their **methodologies**.
- Investigate the **residual gaps** left by the extensions and **new issues** introduced by them
  - **Complexity and Efficiency** [residual gaps]: Repetitive/Re- encapsulation, Path Stretch, ...
  - **Extensibility** [new issues]: dramatically increase the **complexity** and **Fragility** for scenarios with multi-extension co-existence.
Updates

  • Shaping the scenarios descriptions to make it intensively focus on Internet addressing
  • Simplify the *problem statement* section into a more explicit and clear conclusion

  • Update the extensions to properties
  • Simplify the *Conclusion* section to make it more straightforward and clear
Part 1: Recap and Updates on these 2 drafts

Part 2: Feedbacks from the related Side Meeting
SIDEMEETING: Summary

Purpose: Jumpstart a wider discussion that can be carried over to the mailing list to follow up

• Focus on problems and gaps and whether architectural approach may help
• An experiment to discuss drafts beyond list, with insights from panelists and community at large
  • Huge amount of exchange (142 messages), possibly worth weeks or even months of email exchange
  • Still going through messages to deflect discussions onto list
    -> Discussion experiment successful but may not scale to every -00 draft, but still...

Metadata:
• Time: Nov 8th, 2021 (Monday) at 18.00-19:00 UTC [1 hour]
• Attendance Number: 64 (61 Webex + 3 Youtube live stream)
• Panelists: Dino Farinacci, Robert Moskowitz, Michael Richardson, Dirk Kutscher, Nirmala Shenoy, Laurent Toutain
• Agenda: Introduction (15min) + Open Discussion (45min +20min)
• Material at https://github.com/Iannone-Luigi/Addresing
• YouTube video of meeting: https://www.youtube.com/watch?v=vwtoCvluREA
SIDEMEETING: Key Insights

• Lots of discussion and viewpoints, so topic seems to be of interest
  -> Funnel that discussion in the way forward

• There seems to be a larger architectural discussion looming, where (revisiting the) addressing may just be the outcome
  • We will continue to drive the addressing discussions with current drafts
  • We will also attempt to capture the larger architectural points in possible future material
  -> Need to determine where to have that discussion and what other outcomes there could be

• Past concepts, such as the OSI model or variable length addressing, seem to have had concepts that made a lot of sense in preventing some of the issues we see today in Internet addressing
  • What are they? Can we tease them out? What are their impact?
  -> Enrich gap analysis draft beyond currently listed extensions to IP

• Replacing IP is not the aim but evolving IP in the light of existing deployments
SIDEMEETING: Selected Exchanges During the Meeting

• **On addresses and identifiers**
  - “we have to make apps do less with the network, have less knowledge about addresses” (Dino Farinacci)
  - “URLs find services, it is what you want not where to get it - have to redefine what "where" really means anymore” (Dino Farinacci)

• **On privacy**
  - “and for privacy, you make addresses (EIDs) ephemeral” (Dino Farinacci) “or don't require them” (Dirk Kutscher)
  - “I need to secure my C2 so that someone cannot take control of my UA. But I cannot effectively hide that my UA is up in the sky over you...” (Robert Moskowitz)

• **On security**
  - “But I would really like to point out that security is the #1 challenge facing Internet today, not the speed.” (Lixia Zahng)
  - “@lixia, and it is a problem because all our packets flow to 6 big boys” (Dino Farinacci)

• **On future use cases**
  - “lets talk about new features we want in the network” (Dino Farinacci)
  - “I would take CDNs (and hyperscaler edge-to-cloud systems) as examples of relevant use cases that could be served better.” (Dirk Kutscher)

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Chat messages are available on [https://github.com/Iannone-Luigi/Addresing](https://github.com/Iannone-Luigi/Addresing) for all to view in more detail

• Will go through them thoroughly to deflect more discussion onto INT-area list
SIDEETING Take-away & Conclusion

• **Volume** of discussion was positive
  • Lots of chat messages, lively discussion, going over time to continue

• Enough **content** of discussion to create follow-on threads on list
  • Will go through meeting material to create those threads

• Identified rich set of **contributors** having views on addressing and larger issues
  • Looking into adding contributors as co-authors

• Reflect community input into **revised PS and GA drafts**
  • May also look into adding statements as contributions into revised drafts

**Contributors welcome to join in this effort!**
Internet Addressing - Worth Thinking? **YES!**

**THANKS!**

QUESTIONS? / COMMENTS?

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