Service Routing and Addressing

A Side Meeting at IETF-112

Wednesday 10th November 2021, 18:30 UTC

- Open meeting to discuss new work on service routing and addressing
- Bring in some speakers from outside the IETF
- Discuss the implications for routing and for research

Moderator : Adrian Farrel (adrian@olddog.co.uk)

Note Well

This is a reminder of IETF policies in effect on various topics such as patents or code of conduct. It is only meant to point you in the right direction. Exceptions may apply. The IETF's patent policy and the definition of an IETF "contribution" and "participation" are set forth in BCP 79; please read it carefully.

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Definitive information is in the documents listed below and other IETF BCPs. For advice, please talk to WG chairs or ADs:

- BCP 9 (Internet Standards Process)
- BCP 25 (Working Group processes)
- BCP 25 (Anti-Harassment Procedures)
- BCP 54 (Code of Conduct)
- BCP 78 (Copyright)
- BCP 79 (Patents, Participation)
- https://www.ietf.org/privacy-policy/ (Privacy Policy)

More information at https://www.ietf.org/about/note-well/

Logistics

- **This meeting will be recorded!**
- 90-minute meeting
- Webex
  - https://htf-paris.my.webex.com/htf-paris.my-en/j.php?MTID=m760a9ed9560f76ad31a54a64d945ca86
  - Please keep yourselves on mute
- Interaction
  - Questions – Raise your hand in WebEx, moderator will call on you to speak
  - Chat window – Feel free to chat there and speakers may be able to respond
  - Questions and discussion – May be time after each speaker, but also have a dedicated slot on the agenda
  - Follow-up discussion – SARAH mailing list
    https://www.jiscmail.ac.uk/cgi-bin/webadmin?SUBED1=SARAH&A=1
- Live stream
  - https://www.youtube.com/watch?v=cx2G5QxS9Eo
- Etherpad (notes, comments)
  - https://etherpad.wikimedia.org/p/service-routing-and-addressing-10-11-21
- Materials
  - https://github.com/danielkinguk/sarah/edit/main/conferences/ietf-112/materials
  - The recording will also be posted here

Context and Related Work

- The organisers have a specific focus
  - Research into Semantic Routing
    - Routing on additional semantics carried in packets
  - Wider (neglected) routing research concerns
  - We hope this meeting will help expose some general points that we can apply to our work
- draft-farrel-irtf-introduction-to-semantic-routing - An Introduction to Semantic Routing
  - An introductory overview
  - datatracker.ietf.org/doc/html/draft-farrel-irtf-introduction-to-semantic-routing
- draft-king-irtf-semantic-routing-survey - A Survey of Semantic Internet Routing Techniques
  - Standards, experiments, and research
  - datatracker.ietf.org/doc/html/draft-king-irtf-semantic-routing-survey
- draft-king-irtf-challenges-in-routing - Challenges for the Internet Routing Infrastructure (Introduced by Changes in Routing Semantics)
  - Architectural questions, considerations and challenges
  - https://datatracker.ietf.org/doc/html/draft-king-irtf-challenges-in-routing
- draft-galis-irtf-sarnet21-report - Report on the SARNET 2021 workshop
  - Semantic Addressing and Routing for Future Networks
  - Part of High Performance Switching and Routing 2021 conference (HPSR-21)
  - https://datatracker.ietf.org/doc/html/draft-galis-irtf-sarnet21-report-01
- draft-iannone-routing-and-addressing-manifesto - Innovation in Internet Routing and Addressing
  - A call to arms for researchers in routing and addressing
  - https://datatracker.ietf.org/doc/draft-iannone-routing-and-addressing-manifesto

Routing Research Concerns

- Understand the **key drivers** for new routing solutions
  - New services and use cases
  - Support specialized environments, while enabling interconnection to/via Internet
  - Make routing systems more secure and robust
- Better understand the **benefits** and **drawbacks** of applying new routing ideas to “limited domains”
  - How well do different routing mechanisms scale and does it matter?
  - How to ensure interconnection to the Internet?
- What are the **impacts** of new routing proposals on the existing routing infrastructure?
  - How can routing research be made independently verifiable and “reproducible”?
  - How do you contrast an entirely new routing mechanism with modifications to existing tools?
    - What is the cost-benefit?
- Where should **research be discussed**, and what needs to be **standardised**?

Agenda

1. Moderator's Introduction
   Adrian Farrel, Old Dog Consulting
   (5 minutes)
2. The ties that un-bind: decoupling IP from web services and sockets for robust addressing agility at CDN-scale
   Vasileios Giotsas, Cloudflare Inc. and Lancaster University
   (20 minutes)
3. RICE: Remote Method Invocation in ICN
   Michał Król, City University
   (20 minutes)
4. Centralization of service provisioning and the impact on routing
   Geoff Huston, Chief Scientist, APNIC
   (20 minutes)
5. Open Discussion
   (20 minutes)
6. A Proposal for a New Proposed Research Group in the IRTF
   (5 minutes)

Discussion

- Open questions to presenters
  - Please raise your hand in WebEx

- What are the key drivers for considering routing on service information?
- What are the scalability and performance considerations of service routing?
- Are new approaches dependent on new hardware/software?
  - Does this matter? What about deployment models?
- Can we revitalize service routing by carrying additional semantic information in packets?
  - What information?
  - What are the privacy implications?
- What should we do better in research for semantic routing?
  - How do we grow the group of people who understand service routing requirements?
  - What forums exist for sharing and discussing this research?
- How do we build security, privacy, and OAM into routing research from day one?

- Continue discussion on the SARAH list
  - https://www.jiscmail.ac.uk/cgi-bin/webadmin?SUBED1=SARAH&A=1

Idea for a Proposed Research Group

No Time To Discuss Now
Just a Heads-Up

- Background
  - Per RFC 7418 work in the IRTF needs a clear focus
  - We believe that this is different from other previous work
    - NewIP efforts
    - Previous FIPE side meetings
    - Scope and charter of existing RGs such as COINRG, ICNRG, and PEARG
  - We have some spent some time developing our ideas and focusing in on some aspects of routing in the Internet
  - We see key innovation that requires dialogue between researchers and IETF practitioners
- There seems to be some interest in discussing routing and addressing research
- There is an active mailing list
  - Semantic Address Routing and Hardware (SARAH) list : https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=SARAH
- This is the third side meeting looking at recent research around routing and addressing
  - IETF-111 : Routing research challenges arising from evolving beyond and revitalizing the Internet
  - Interim meeting : Evolving Routing Security in the Internet
- Some recent conference workshops
  - 28th International Conference on Telecommunications, June 2021 : Special session “Re-thinking the Data & Forwarding Plane for 6G and More”
  - IEEE International Conference on High Performance Switching and Routing, June 2021 : Workshop on “Semantic Addressing and Routing for Future Network (SARNET-21)”
  - 29th IEEE International Conference on Network Protocols, November 2021 : 2nd Workshop on New Internetworking Protocols, Architecture and Algorithms (NIPAA)
- Some related Internet-Drafts
  - https://datatracker.ietf.org/doc/html/draft-king-irtf-challenges-in-routing/ “Challenges for the Internet Routing Infrastructure Introduced by Changes in Address Semantics”
  - https://datatracker.ietf.org/doc/html/draft-king-irtf-semantic-routing-survey/ “A Survey of Semantic Internet Routing Techniques”
  - https://datatracker.ietf.org/doc/html/draft-galis-irtf-sarnet21-report “Semantic Addressing and Routing for Future Networks (SARNET-21) Workshop Report”
  - https://datatracker.ietf.org/doc/draft-iannone-routing-and-addressing-manifesto “Innovation in Internet Routing and Addressing”
    - Signatories at https://etherpad.wikimedia.org/p/routing.addressing.manifesto

Idea for a Proposed Research Group

No Time To Discuss Now
Send Email to the List

- We have a plan to float a draft charter for a Proposed Research Group in the IRTF
  - "Routing in the Internet with Semantic Enhancements" (RISE)
  - Discussing this with the IRTF chair and COIN RG
- Objectives
  - Provide a forum to introduce researchers working on semantic routing into the IRTF
  - Encourage research and debate into semantic routing systems and architectures to include considerations of limited domains and their interconnection, additional routing functions, and the scaling, stability, and security of systems with different routing semantics
  - Work on challenges faced by routing systems in the Internet as pressure is placed on them by increasing demands from applications for predictable, differentiated, quality-enhanced connectivity, and service functions
- Proposed Scope
  - Survey and discuss work related to supplementing the semantics of the source and destination IP addresses, and routing on those semantics and on additional information in the various fields carried in the packets
  - Identify challenges to the Internet routing systems that may be mitigated or exacerbated by semantic routing proposals.
  - Determine the basis for deciding whether semantic routing is viable
    - Plot a problem space for semantic routing
    - Examine the implications and consequences of semantic routing for the Internet architecture and routing within the Internet
- Practicalities
  - Two documents on github for all to see (https://github.com/danielkinguk/sarah/tree/main/RISE)
    - Motivation : Background information and explanation of why we think this is a research topic
    - Draft charter : A starting point for discussion of what a Proposed RG might do
  - Discussion can take plane on the SARAH mailing list
    - Sign-up and archive at https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=SARAH
  - Plan to discuss with Colin as soon as our ideas have crystalised