

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

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 – SARA 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 and Addressing
 - Routing on IP addresses that have additional meaning assigned to them
 - Routing on additional fields in IP packets
 - Wider (neglected) routing research concerns
 - We hope this meeting will help expose some general points that we can apply to our work
- 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 Address 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 Giotas, 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 scalability and performance considerations of service routing?
- Are new approaches dependent on new hardware/software?
 - Does this matter? What about deployment models?
- Can we enhance 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*

- 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)
- 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 and semantic addressing is viable
 - Plot a problem space for semantic routing and semantic addressing
 - Examine the implications and consequences of semantic routing and semantic addressing to 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 place on the SARA mailing list
 - Sign-up and archive at <https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=SARA>
 - Plan to discuss with Colin as soon as our ideas have crystalised