

== Service Routing and Addressing ==

Wednesday 10th November 2021 18.30-20.00 UTC

Webex: [https://htf-paris.my.webex.com/htf-paris.my-en/j.php?](https://htf-paris.my.webex.com/htf-paris.my-en/j.php?MTID=m760a9ed9560f76ad31a54a64d945ca86)

[MTID=m760a9ed9560f76ad31a54a64d945ca86](https://htf-paris.my.webex.com/htf-paris.my-en/j.php?MTID=m760a9ed9560f76ad31a54a64d945ca86)

YouTube: <https://www.youtube.com/watch?v=cx2G5QxS9Eo>

Note taking: <https://etherpad.wikimedia.org/p/service-routing-and-addressing-10-11-21>

Materials: <https://github.com/danielkinguk/sarah/edit/main/conferences/ietf-112/materials>

Mailing list: <https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=SARAH>

1. Moderator's Introduction

Adrian Farrel, Old Dog Consulting

5 minutes

2. End-To-End Privacy for Identity & Location with IP

Gregor Haywood, St Andrews University

20 minutes

From WebEx Chat

Dino to everyone: 6:45 PM LISP implements this for IPv4 and IPv6 in

<https://datatracker.ietf.org/doc/draft-ietf-lisp-eid-anonymity/>

from Dino to everyone: 6:45 PM can use ephemeral IPv6 EIDs (your NIDs) over IPv4 locators, if your network has an IPv4 underlay

(Virtual) Microphone

Andrew Alston: How do you deal with LI, if I receive a court order?

Gregor Haywood: This operates like a VPN

Andrew Alston: Ah, some countries have stated that VPNs might be illegal

Gregor Haywood:

From WebEx Chat

from Dino to Everyone19:55

The answer to your question with respect to the draft about in LISP, you can look up the ephemeral EID in the mapping database at the time you care about who owns the packet

from Dino to Everyone19:55

you have to capture mapping state often and have restricted access to do so

from Dino to Everyone19:55

what the mapping system will give you is ONLY the Locator

3. RICE: Remote Method Invocation in ICN

Michał Król, City University, London

<https://conferences.sigcomm.org/acm-icn/2018/proceedings/icn18-final9.pdf>

20 minutes

You can see the slides and follow along at

https://github.com/danielkinguk/sarah/blob/main/conferences/ietf-112/materials/Krol-function_execution_in_icn.pdf

The YouTube link is <https://www.youtube.com/watch?v=cx2G5QxS9Eo>

From WebEx Chat

from Dirk Kutscher to Everyone 20:10 - Bit of background: <https://dirk-kutscher.info/publications/cfn/>

from Dirk Trossen to Everyone 20:15 - Does the named function as a service require the use of ICN as the underlying network technology?

from Michał Król to everyone: 7:17 PM - @Dirk, it requires the router to be aware what function is being requested in every packet. Theoretically, you could implement it on something different than ICN (e.g., using deep packet inspection) but ICN seems to make it much easier I believe.

(Virtual) Microphone

(later)

4. Internet Centrality and its Impact on Routing

Geoff Huston, Chief Scientist, APNIC

20 minutes

From WebEx Chat

from kireeti to Everyone 20:10 - I'm a bit confused. I guess this is not a BoF-ish meeting, but we've jumped into solutions rather than discussing charter (?)

from Adrian Farrel to Everyone 20:11 - @kireeti - it is very far from a BoF. These are three papers / opinion pieces being presented for your interest

from kireeti to Everyone 20:13 - okay, attitude readjustment in progress

from kireeti to Everyone 20:13 - thanks, adrian

from Adrian Farrel to Everyone 20:18 - @Michal and @Dirk. An alternative that some people seem to be suggesting is to find a way to "shim" this information into or near the IP header

from Adrian Farrel to Everyone 20:19 - ...or to map services to specific IP addresses

from Dirk Trossen to Everyone 20:19 - @Michal understood that ICN provides the name-centric routing, which allows for the dynamicity you want. It comes back to something I mentioned some years back in another side meeting on 'service routing over L2', namely that the dynamicity required for service routing ought to be aligned with the capability to establish service endpoint in the network. Your example shows that it's really easy and quick but a standard DNS+IP system just won't do here.

from Dirk Trossen to Everyone 20:20 - @Adrian indeed, using an IPv6 shim is another approach but it's the dynamicity requirement that drives the WHY you would want to do this.

from Dirk Kutscher to Everyone 20:20 - Clarification on Michal's talk: I have to admit that I'm not sure what "semantic routing" is supposed to mean, but the RMI system presented here is not relying on application-awareness in the forwarding system. The system would forward based on hierarchical name prefixes. You can devise routing protocols for that that leverage prefix aggregation, such as NLSR (<https://named-data.net/doc/NLSR/current/>) -- but like other link state routing this is application-agnostic.

from Adrian Farrel to everyone: 7:21 PM - *An* explanation of what "semantic routing" might mean is sketched in <https://datatracker.ietf.org/doc/html/draft-farrel-irtf-introduction-to-semantic-routing>

from Dirk Trossen to everyone: 7:23 PM @DirkK there was no indication that "semantic routing" may mean application-awareness in the network.

from Tony Li to everyone: 7:23 PM That's not the infrastructure, that's centralization of providers.

from Andrew Alston to everyone: 7:24 PM Well - the "limited-domain" issue actually contributes to this as well

from Dirk Kutscher to everyone: 7:24 PM @DirkT, is IP routing == semantic routing?

from Tony Przygienda to everyone: 7:24 PM problem well known in economics since light houses in England monopolized. Basically platform effects.

from Eric Vyncke to everyone: 7:24 PM It depends what is 'infrastructure'

from Luigi Iannone to Everyone 20:24 Doesn't the infrastructure need to follow?

from Tony Przygienda to Everyone 20:25 and it has never been proven to actually converge in any concise or systematic way ;-). Isn't life as a routing guy wonderful ?

from Lixia to Everyone 20:25 @Luigi, we touched on this question earlier: depending on your definition of how the overlay works

from Dirk Trossen to Everyone 20:26 - @DirkK If we take a starting point of 'minimal semantics' being a pure IP address based input into routing, then yes, it is semantic routing. But the focus of the discussion has been given on 'semantic enhancements' so pure IP routing is not what the discussion is after - my 2cents

from Luigi Iannone to Everyone 20:27 - @lixia: it is a bit different, not matter which overlay you use if your traffic is skewed and centralized and you are an operator you evolve the infrastructure to serve that skewed traffic

from Lixia to Everyone 20:27 - @DirkT, the question is not so much of 'minimal vs max semantics'. Rather, the question is what are being identified.

from Dirk Trossen to everyone: 7:28 PM - @DirkK coming back to the NLSR reference, yes, it is important to recognize that named forwarding is acting on aggregated name prefixes. So good clarification, indeed, for those being less familiar with ICN

from Lixia to everyone: 7:28 PM - identifying data/object/functions versus identifying location/interfaces. As I said in an earlier meeting (Monday?): oil is not water and the two don't mix well

from Antoine Fressancourt to everyone: 7:28 PM - @Luigi actually there are tussles around operators that are not evolving their infrastructure quickly enough to cope with this skewed traffic

(Free Vs Google in FR)

from Dirk Trossen to Everyone20:29 - @Lixia agreed - what is being identified is indeed important. I understand that from years of ICN

from Jari Arkko to Everyone20:29 - Geoff: if the enemy is on the path, we've definitely made a LOT of progress. But if the enemy is at server... much less so.

from Dirk Trossen to everyone: 7:29 PM - @Jari I feel that this punch line will be coming...

from Luigi Iannone to everyone: 7:30 PM - @Antoine: this proves that there is pressure to make the infrastrucutre follow the centralization ... which is my point ;-)

from Andrew Alston to everyone: 7:30 PM - Well - they are building their own - but often are willing to sell fiber pairs on those systems at build time

from Jari Arkko to everyone: 7:30 PM - Maybe so Dirk :-)

from Dino to everyone: 7:31 PM - @geoff, we are already there (referring to ACN)

from Dirk Kutscher to everyone: 7:33 PM - Nice analogy ;-)

from Tony Li to Everyone20:34 - What about the long tail?

from Lixia to Everyone20:35 - Geoff's talk is in the context of IP: where is *IP* transit now. If there is agreement on "app contric network", we just need different way of networking, that'd have different transit.

from Dirk Trossen to Everyone20:35 - @geoff what are the possible services (maybe along the long tail as Tony asks) that may break with the central model? DLTs? DLT-based eIDs? ...

from Dino to Everyone20:35 - @geoff - a basic question should my cell phone talk directly to your cell phone if we live in the same neighborhood? Shouldn't we use direct WiFi and not have anyone else involved, shouldn't we be able to send packets when there is no Internet connetion?

from Giles Heron to Everyone20:35 - @Tony, isn't Geoff arguing that the long tail is incredibly long and thin, and hence no longer economic to maintain?

from Tony Li to Everyone20:36 - The fact that we haven't turned it off is evidence that we're still using it.

from Toerless Eckert to Everyone20:36 - long tail has to buy CDN space, not transport capacity

from Dirk Kutscher to Everyone20:36 - Transit would be a special case

from Jari Arkko to Everyone20:36 - One address is enough for everybody?

from Olaf Kolkman to Everyone20:36 - How did you call this talk again? "Death on Transit on Steroids" ?

from Dirk Kutscher to everyone: 7:37 PM - @Olaf, here you have it.

from Andrew Alston to everyone: 7:37 PM - not sure I totally agree with this - yes - transit is a dying business - yes - the cdn content is growing - but - there is also another point - this diverts from where users are using things like sd-wan and others built over those isp networks - to ensure that they have diversrsity - and thats a growing business

from Olaf Kolkman to everyone: 7:37 PM - Ha!

from Tony Li to everyone: 7:38 PM - If it was dying, we'd see transit providers not buying bandwidth.

from Andrew Alston to everyone: 7:38 PM - so - I agree with a lot of it - but I also see major differences - the transit is dying - but the uses for the global network are still very much there

from John Scudder to everyone: 7:38 PM - Imminent death of the Net predicted. GIFs at eleven.

cedric.westphal@futurewei.com to everyone: 7:39 PM - @tony: at what rate are transit providers buying bandwidth? Are they keeping up with traffic growth?

from Lixia to everyone: 7:39 PM - @John Scudder: when IP came along, we didnt say mminent death of the Net, but mminent death of telecom

from Jari Arkko to everyone: 7:40 PM - Shared network is dead, long live the new shared standardized set of CDNs (+ FB/Goog) :-)

from jeffT to everyone: 7:40 PM - Most BW is in private use by hyperscalers

from John Scudder to everyone: 7:40 PM - And they're all dead, right? ;-) (But my quote is at least 30 years old.)

from Andrew Alston to everyone: 7:40 PM - tony - simple answer - no - nowhere close - but - there is a lot more interfacing between providers in other ways

from cedric.westphal@futurewei.com cedric.westphal@futurewei.com to everyone: 7:40 PM This ties back to the IETF111 talk by Scott Shenker: how do you bring back these CDN/hyperscalers functionalities onto the shared internet

from Tony Li to everyone: 7:40 PM - If it ain't broke, don't fix it.

from Andrew Alston to everyone: 7:40 PM - our traffic levels in the last 8 years have grown by thousands of percentage points - the transit - nowhere close - but - we have seen a growth in inter-connection to other providers for shared services like I3vpns etc

from Dirk Trossen to everyone: 7:40 PM - @cedric is it a technical or economic question?

from Lixia to everyone: 7:41 PM - it is about application / content networking

from Michael Richardson to everyone: 7:41 PM - Geoff always manages to make me sad with irrefutable truth.

from Tony Li to everyone: 7:41 PM - All of this is because Geoff doesn't like economic reality.

from Michael Welzl to everyone: 7:41 PM - @cedric IETF111 talk by Scott Shenker => do you have a pointer? Which group was this in?

from cedric.westphal@futurewei.com cedric.westphal@futurewei.com to everyone: 7:41 PM @Michael: this same side meeting @111

from Dirk Trossen to everyone: 7:41 PM @Michael Same group here

from Erik Kline to everyone: 7:41 PM I fee like I need a stiff drink...

from Michael Welzl to everyone: 7:42 PM Wow, it's over like this? I'm depressed now!

5. Open Discussion

20 minutes

From WebEx Chat

from Antoine Fressancourt to everyone: 7:42 PM - Heads up, we might work on how end user arbitrate between CDNs, and it is an interCDNet ;-)

from Dirk Trossen to everyone: 7:42 PM - @Michael see <https://www.youtube.com/watch?v=xMoqj4w3R6k>, see talk at 10:44

from Michael Welzl to everyone: 7:43 PM @Dirk fantastic, thanks!

from cedric.westphal@futurewei.com cedric.westphal@futurewei.com to everyone: 7:43 PM

@DirkT: more of a sanity check. If transit providers buy bandwidth at the same rate that FB/Google/Akamai build their own private inter-DC networks, then I would question Geoff's take

from Tony Li to everyone: 7:44 PM - If true, then there would be non-transit access ISPs.

from Dirk Trossen to everyone: 7:44 PM - @cedric it goes back to Tony's point: would we notice its switch-off. It may go down in ratio but may still be of value

from cedric.westphal@futurewei.com cedric.westphal@futurewei.com to everyone: 7:44 PM - in the US, earthlink was valuable for dial-up Internet long after DSL...

from cedric.westphal@futurewei.com cedric.westphal@futurewei.com to everyone: 7:45 PM - (in response to @DirkT...)

from Olaf Kolkman to everyone: 7:48 PM - @Andrew: working on your resume yet? ;-)

from Andrew Alston to everyone: 7:49 PM - @Olaf nah - we have a long way to go :) and there is a lot of innovation in my role to go - I would be if I were a normal network engineer though

from rv to everyone: 7:49 PM - following Geoff: imminent death for universal connectivity and permissionless innovation. I'd guess there remains more value on the long tail than Geoff claims.

from Andrew Alston to everyone: 7:49 PM - because innovate or die - but I don't think you can say that innovation isn't lucrative - even in a constrained environment, and in fact especially in a constrained environment

from Lixia to everyone: 7:49 PM - One big factor that big guys dominate: users are faceless/powerless, controlled by the big guys -- if we don't change this fact, big guys control the world.

from Dirk Trossen to everyone: 7:50 PM - @Lixia what role do policy initiatives play here, e.g., on decentralization (in EU - EBSI)?

from Andrew Alston to everyone: 7:51 PM - its useful - the question is - would you be prepared to pay for it :)

from Lixia to everyone: 7:52 PM - I see 3-leg stool that keeps balance, regulation is one of the three, the other two: econ and tech solution. as I said in my blog: if the only way to build apps are in the cloud, regulation alone won't be very effective

from Dirk Trossen to everyone: 7:53 PM - @Lixia So policy does play a role though - surely not in isolation though!

from Andrew Alston to everyone: 7:53 PM - My experience of regulation is that its done a huge amount of damage unless - and I stress this - unless - its limited to very specific areas - general overregulation is what's kept pricing in places on my continent at the hundreds of dollars a meg mark

from Dirk Trossen to everyone: 7:53 PM - ...you indeed need the technology to go along with the desired decentralization

from Andrew Alston to everyone: 7:54 PM - which is great if you manage to find a way in as a provider - its not great for the consumer

from phb to everyone: 7:55 PM - Astonishes me how Meetecho, Zoom and WebEx are all the same feature set with completely different applications.

from cedric.westphal@futurewei.com cedric.westphal@futurewei.com to everyone: 7:55 PM - @Andrew: one regulation that is good for customer is monopoly regulation. Maybe that's the one type that would apply here.

from Andrew Alston to everyone: 7:56 PM - @cedric yes - regulations that get rid of monopolies is useful - I also support carefully drafted regulation about duct sharing for example

from Dino to everyone: 7:56 PM - thanks @geoff - still unpacking your answer ;-)

from Andrew Alston to everyone: 7:56 PM

I don't support regulations where states start getting involved in what data is flowing across what networks and how networks are run

from Andrew Alston to everyone: 7:57 PM - we have to be careful when we talk about regulation - because it's a very wide topic

from Dirk Trossen to everyone: 7:57 PM - @cedric hmm, like a search engine redirecting to its own shopping sites - reminds me of today's loss of appeal **against 2.4b EU fine by some internet player**

from Lixia to everyone: 7:57 PM - Regarding current efforts, let me just share one quote: "We cannot solve our problems with the same thinking we used when we created them." Albert Einstein.

from Dino to everyone: 7:58 PM - @lixia, then let's stop trying to predict the future but instead create it LOL

from Andrew Alston to everyone: 7:59 PM - Definitely the reverse - we're seeing a huge growth in certain vendors actively pushing gear to the states to sniff traffic etc - certain DPI providers are heavily pushing tech to autocratic governments

from Dirk Trossen to everyone: 7:59 PM - @dino attribution :-) !

from cedric.westphal@futurewei.com cedric.westphal@futurewei.com to everyone: 7:59 PM
@dirkT that's one example. The EU seems to be a bit more aggressive (cf. Microsoft back in the day), the US is more aligned with big business.

from Lixia to everyone: 7:59 PM - Geoff: that is NOT a nice academic thought!!

from Dino to everyone: 8:00 PM - @dirk - same source as Lixia's

(Virtual) Mic Questions

Adrian: Is the transit dying as a potential of total traffic, or absolutely?

Geoff: After Netflix made some massive incursions, 70% of the local traffic was Netflix. Previously we made our money as an ISP via Europe and North America. Maintaining a global routing system is expensive and I am providing content connectivity that offers little value to me, and no one is able to pay the cost of it.

Andrew: We are a company (ISP) that is investing in global routing, and fibre connectivity. If the network are islands, and I keep seeing "limited domain" in IETF draft after draft. What dangers does it create when we break down standardisation.

Geoff: When we removed the telephone company as the global orchestrator, it was clear what was happening. The standards organisations became the provider of orchestration of interconnectivity, it could be physical, software. Now no single provider can provide a single system. CDN point-of-presence will be eventually move into the developing world. Transit will become niche opportunities.

Adrian: Are limited domains solutions, or part of the problem?

Gregor: I don't think so.

Dino: I will build a decentralized use case for emergency use. If we live in the same neighborhood and a storm has taken out Internet, but if I have power should be not be able to communicate directly, without going via CDN or larger network

Geoff: Many things are useful, but typically our industry make things that generate revenue. However these major events are not typical, and unless consumers are willing to pay for it, it's not going to happen. Money is focused on the application level, those app developers and ISPs are no longer willing to subsidize the network layers.

Toerless: I have heard you mention ISOC and IETF challenges, and leadership discussions. What are your thoughts?

Geoff: I follow DNS discussions, the role applications and how they can be steered to the data center. The implication of fragmentation, a referential DNS function. The battlefield is there but I don't hear IETF leadership discussing it, I don't think people realize the DNS tension, including privacy.

Jari: Privacy implications - Market situation, content requirement and physics (latency) affecting topology changes

Geoff: There is tension here, at the app level. All this thought about New IP and content references, a fine though academically but it's not really where the industry wants to push. The IETF is great at solving yesterday's problems. The issue is the folks that are solving tomorrow's problems don't want to share the tech, because the value to them is potentially billions.

6. Proposal for a Research Group

Adrian Farrel

5 minutes

Adrian: We have been considering some of the issues around routing on additional information that can be carried in packets. We are calling this concept "semantic routing" and it has led to several Internet-Drafts on the topic.

Adrian: Following up on this, we have put together some text on motivation and what work we might propose to do in the IRTF to coordinate and advance research in this area with special attention to how the routing infrastructure might be stressed.

Adrian: We have had some early discussions on this with Colin Perkins as IRTF chair and with one of the COIN RG chairs. There is some possibility that this work overlaps with existing research groups (such as ICNRG and COINRG) and we will carry on those discussions. In the mean time, we would really welcome your thoughts and opinions on the draft charter that you can find on our github pages.