

Just Another Measurement of Extension header Survivability (JAMES)

[draft-vyncke-v6ops-james-01](#)

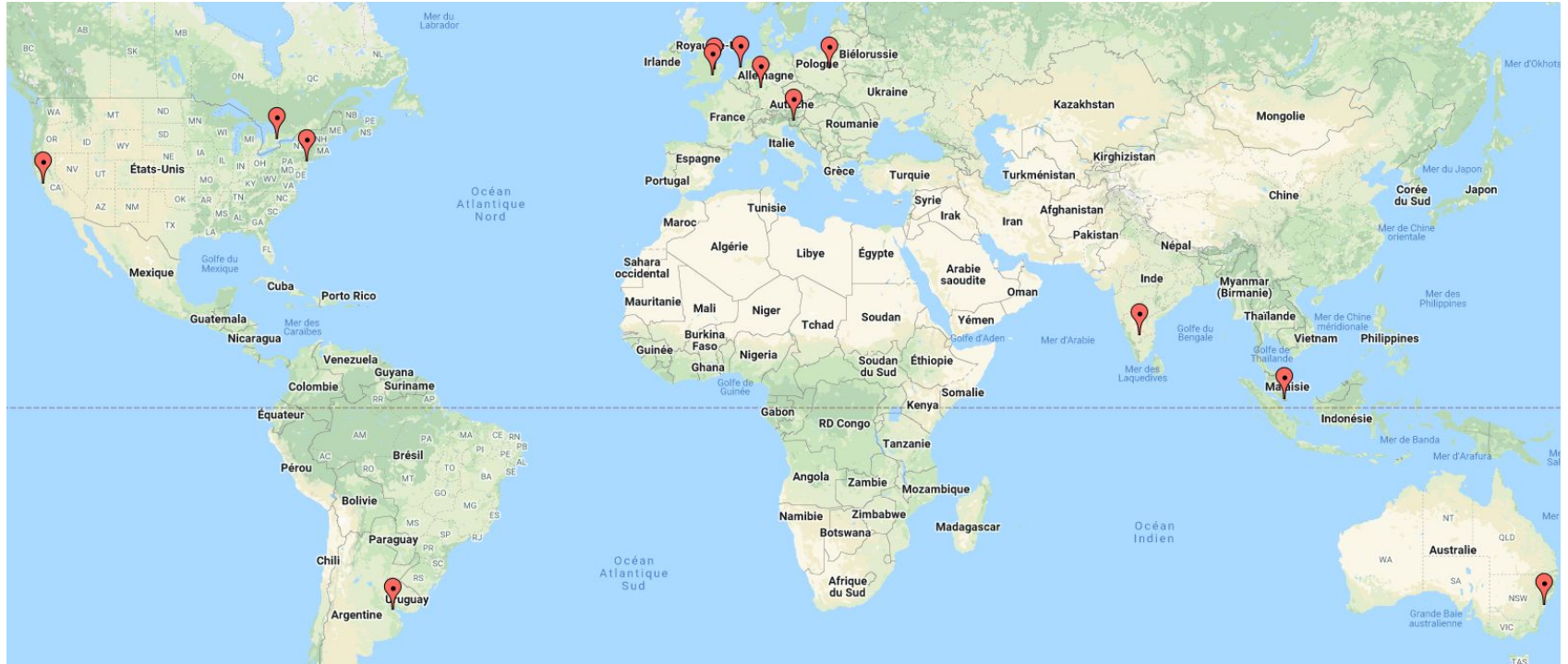
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IPv6 Council #13, Mechelen
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Introduction

- [RFC7872](#): “Observations on the Dropping of Packets with IPv6 Extension Headers in the Real World”.
- JAMES, a different methodology with more recent results.
- Hop-by-Hop Options not usable over the Internet?
- Hot topic in 6man WG:
 - [draft-ietf-6man-hbh-processing-00](#) (IPv6 Hop-by-Hop Options Processing Procedures)
 - [draft-ietf-6man-eh-limits-00](#) (Limits on Sending and Processing IPv6 Extension Headers)
- What about other EHs and some IP protocols ?

JAMES - Vantage points

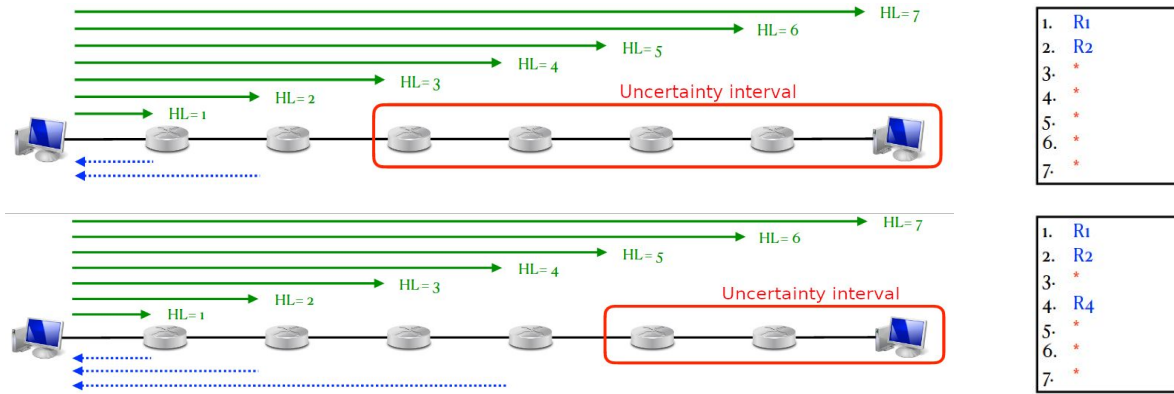


JAMES - Methodology

- Traceroute-like technique
- Each pair (13 VMs) is tested in both direction
- Experiments (UDP and TCP):
 - Hop-by-Hop and Destination Options (sizes 8, 16, 32, 64, 128, 256, 512)
 - Routing Header (types 0-6)
 - Fragment Header (atomic, non-atomic)
 - Authentication Header
 - No Next Header (protocol 59)
 - Ethernet (protocol 143 RFC 8986)
- Probe traffic is marked as proposed in [draft-vyncke-opsec-probe-attribution-01](#)
- Drop responsibility is attributed per hop, then per AS (see next slide)

Drop Responsibility Attribution

- At hop level: probe as much as possible



- At AS level:

- Uncertainty interval as small as possible (best case: size = 1)
- Corner cases: shared link between ASs, (un)identified ASn before/after the hop

Early results

- Hop-by-Hop Options... **unreliable**
- Destination Options:
 - size = 8 or 16... **pass**
 - size \geq 32... **unreliable** (size 32 \rightarrow 93%, size 64 \rightarrow 42%, size 128 \rightarrow 5%)
- Routing Headers:
 - types 0 and 4... **unreliable** (only resp. 81% and 69% pass)
 - types 1, 2, 3, 5, 6... **pass**
- Fragment Headers:
 - atomic... **unreliable** (only 70% pass)
 - non-atomic... **pass**
- Authentication Headers... **pass**
- No Next Header / Ethernet... **pass**
- Drop attribution (WIP): more details in the draft

Next steps

- Operator Survey:

https://docs.google.com/forms/d/1wzPdS_McuwIhI0c963ZZHO4sd_Cd2IIs0oNBuvGxM_Y/

- Extend the topology

- Looking for IPv6 VM in Africa / China
- Probing beyond the vantage points ? (BGP prefixes ? Alexa ?)

- Improve the drop responsibility attribution algorithm:

- per hop: reduce the uncertainty interval
- per AS: use *bdrmapit* ?

Thank you !

<https://gitlab.uliege.be/Benoit.Donnet/james>