Reserved: Dissecting Internet Traffic on Port 0

Aniss Maghsoudlou

Oliver Gasser

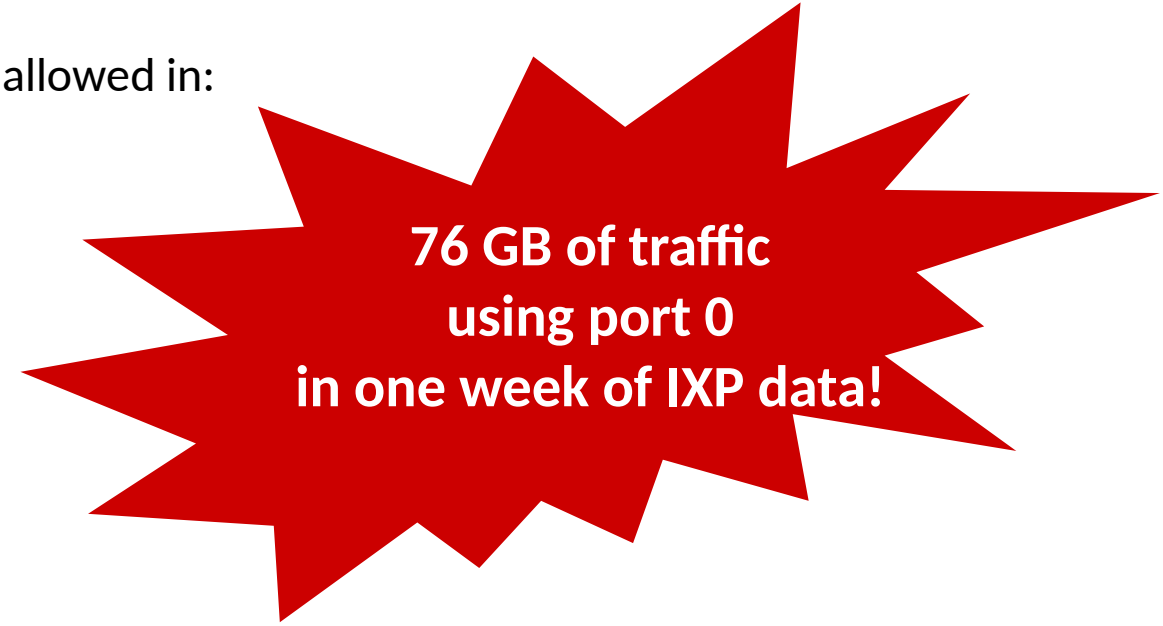
Anja Feldmann

Max Planck Institute for Informatics

Why Port 0?

Using port number 0 is not allowed in:

- TCP [RFC 1340]
- UDP [RFC 8085]
- UDP-Lite [RFC 3828]
- SCTP [RFC 4960]



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Previous Work and Our Approach

- Luchs and Doerr, and Bouharb et al. study Port 0 traffic
- Both used Darknets as data sources.
- **We use traffic from a large European IXP:**
  - At the IXP we see real traffic instead of just scanning artifacts in darknets
  - Bidirectional analysis is possible
- We add Active measurement to identify servers.

Data Overview

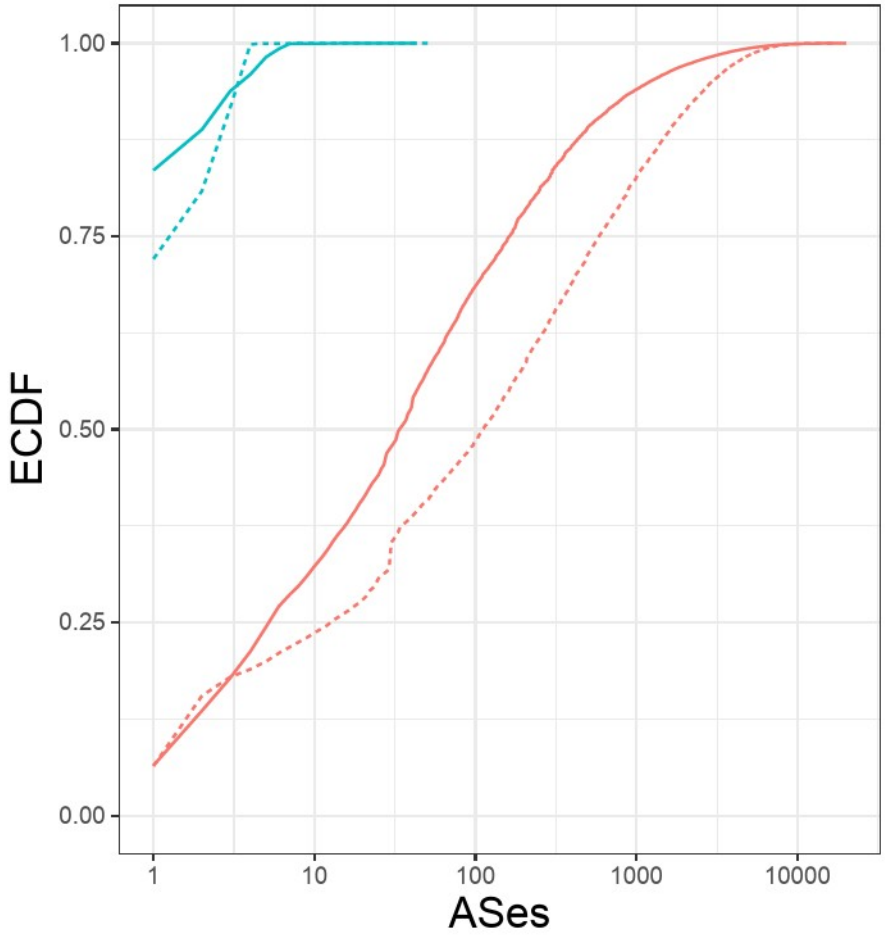
- One week of IPFIX flow data
- 31 TB traffic, 45 Billion packets in total

Port 0 traffic:

```
flows from 2019-09-01 to 2019-09-07 where
        (srcport = 0 or dstport = 0)
and (protocol = UDP or TCP or UDP-lite or SCTP)
```

Data Overview

- 76 GB (0.2%), including 103 million packets port 0 traffic
- > 99% of the traffic…
  - has set source and destination port to 0
  - In IPv4 uses UDP, in IPv6 uses TCP
  - is one-directional
- 16% of the source IP addresses in IPv4 were servers (in IPv6 0%)



IPv4: 50% originates from 111 ASes, goes to 33 ASes

IPv6: 90% originates from 3 ASes, goes to 3 ASes

IPv4
IPv6

Destination ASes
Source ASes

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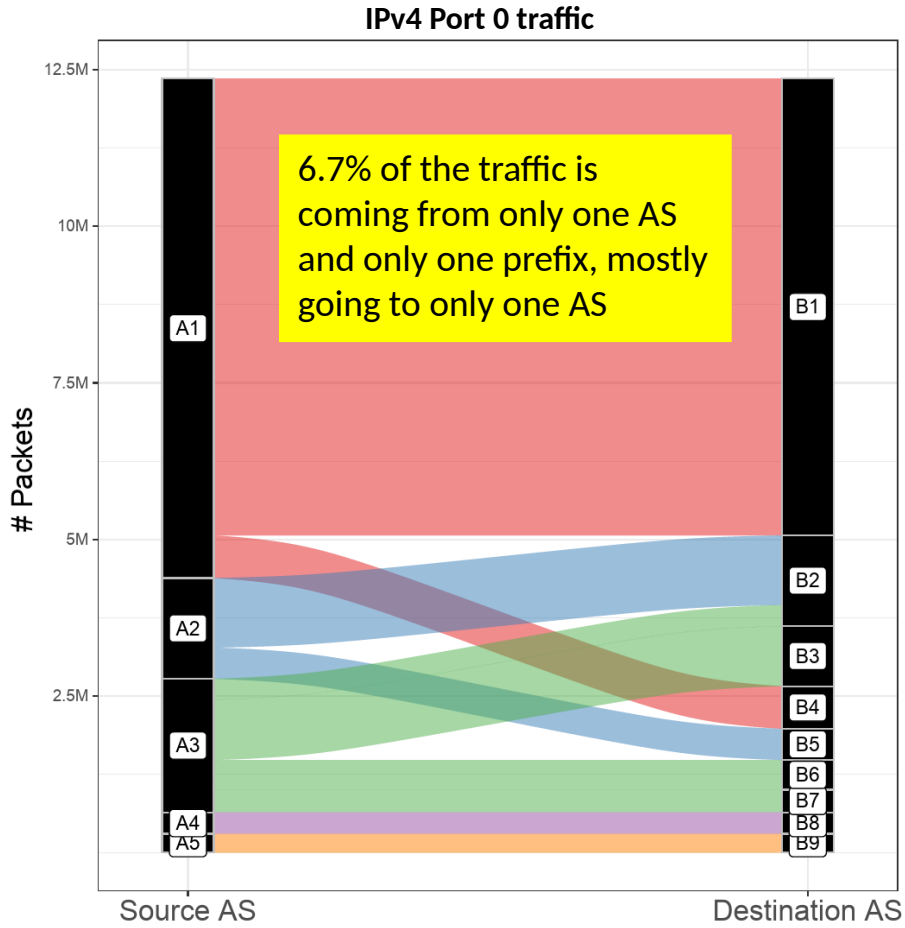

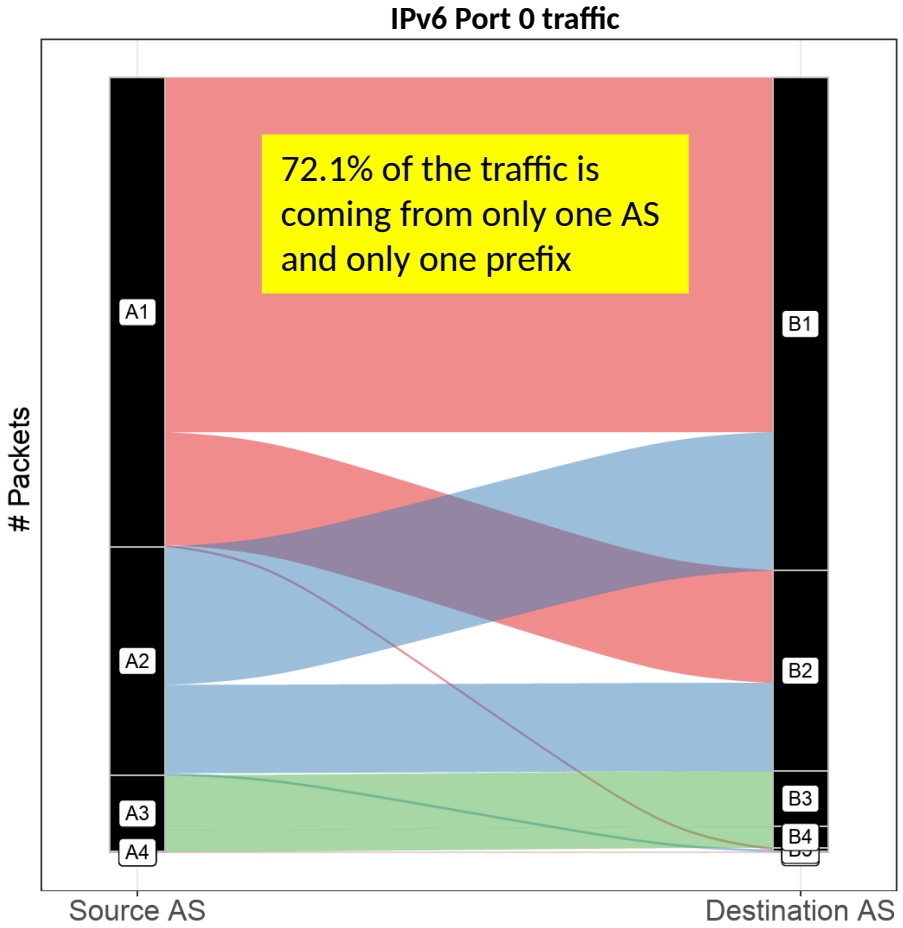

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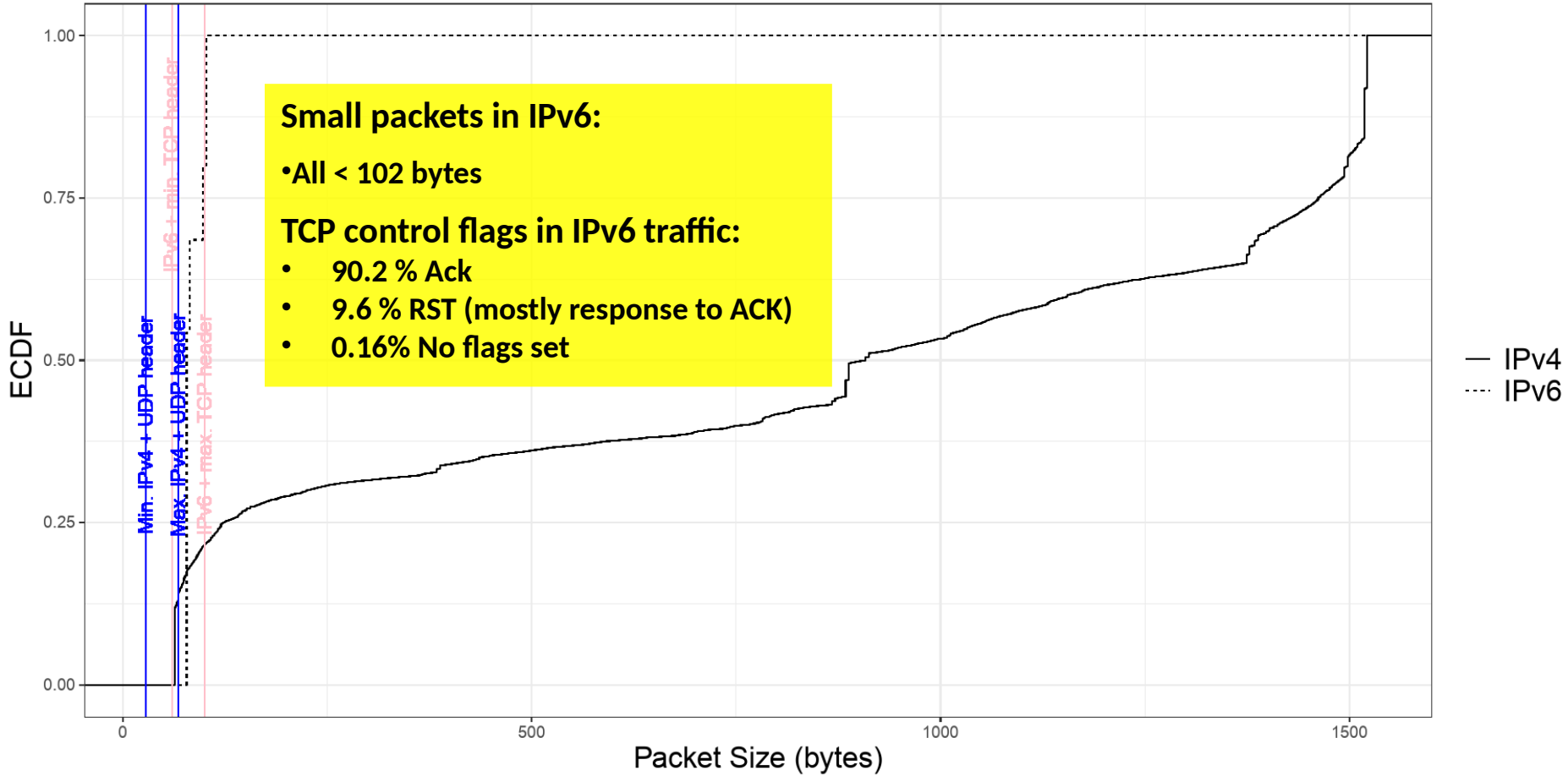

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Conclusion

Key Observations

- Too much port 0 traffic in the Internet.
- Mostly one-directional, mostly UDP in IPv4 and TCP in IPv6.
- IPv6 packets are relatively small
- Small number of ASes contribute to a large share.

Future Work:

- Longer timespans of IXP data
- Active measurement of port 0 traffic to see how networks filter port 0 traffic

Thank You!

Aniss Maghsoudlou (Presenter)

aniss@mpi-inf.mpg.de

https://www.mpi-inf.mpg.de/inet/people/aniss-maghsoudlou/

Oliver Gasser

Oliver.gasser@mpi-inf.mpg.de

https://www.mpi-inf.mpg.de/inet/people/oliver-gasser/

Anja Feldmann

anja@mpi-inf.mpg.de

https://www.mpi-inf.mpg.de/inet/people/anja-feldmann/

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