



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

The Internet Landscape in Southeast Europe

As Seen by the RIPE NCC

Desiree Miloshevic | 5 April 2023 | SEE Roundtable Meeting

RIPE NCC



- One of five **Regional Internet Registries** in the world
- Also provide a number of **technical services** and **tools**:
 - K-root
 - RIPE Atlas
 - RIPEstat
 - RIS
- Involved in **public policy** discussions and **Internet governance**

RIPE NCC Internet Country Reports



- Showcase RIPE NCC **data** and **measurement platforms**
- Bring value to **local technical communities**
- Support **Internet development** throughout service region
- Inform **public policymaking**

RIPE NCC Internet Country Report



- Southeast Europe report published in 2020
<https://labs.ripe.net/country-reports/>
- Covers Albania, Bosnia and Herzegovina, Croatia, Kosovo, Montenegro, North Macedonia, Serbia and Slovenia



Highlights



- IPv4 shortage in region
- Most IPv4 transfers stay within region
- IPv6 capability very low throughout region
- Routing is generally efficient
- Moderate diversity in international connectivity



Figure 1:
Growth in the number of Local Internet Registries over time

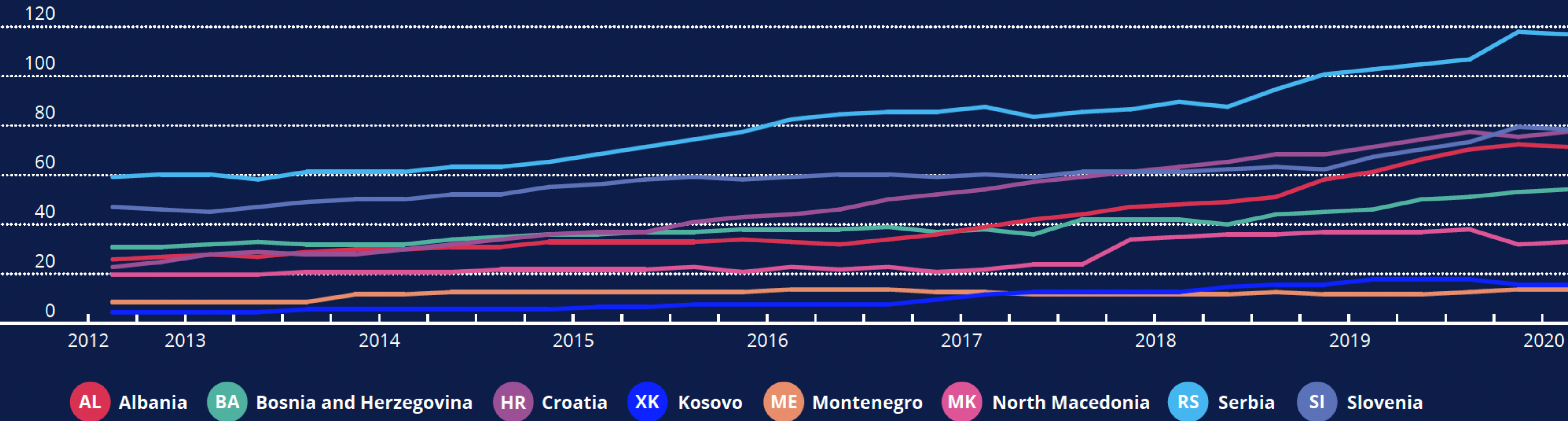


Figure 2:
IPv4 address holdings by country

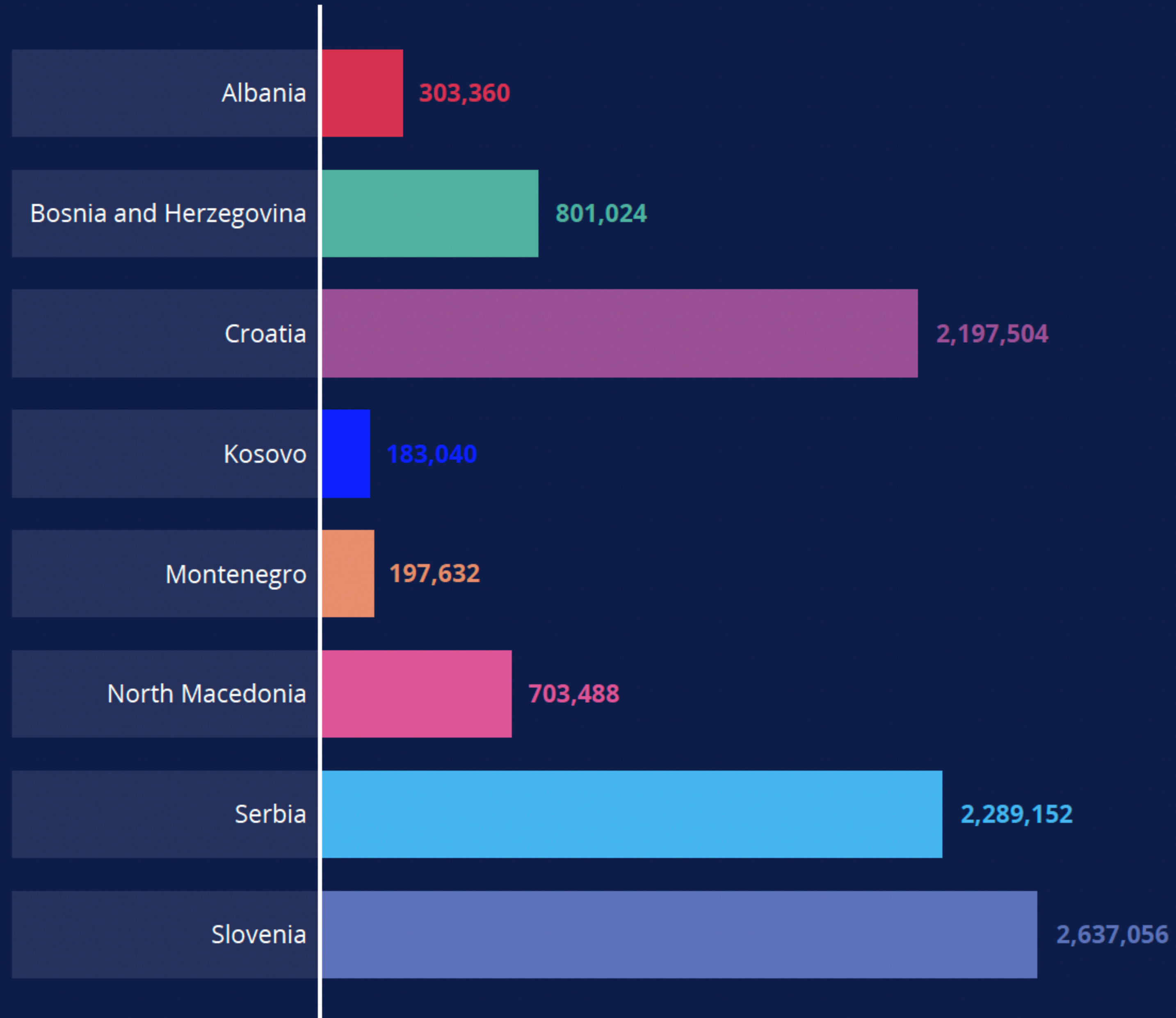
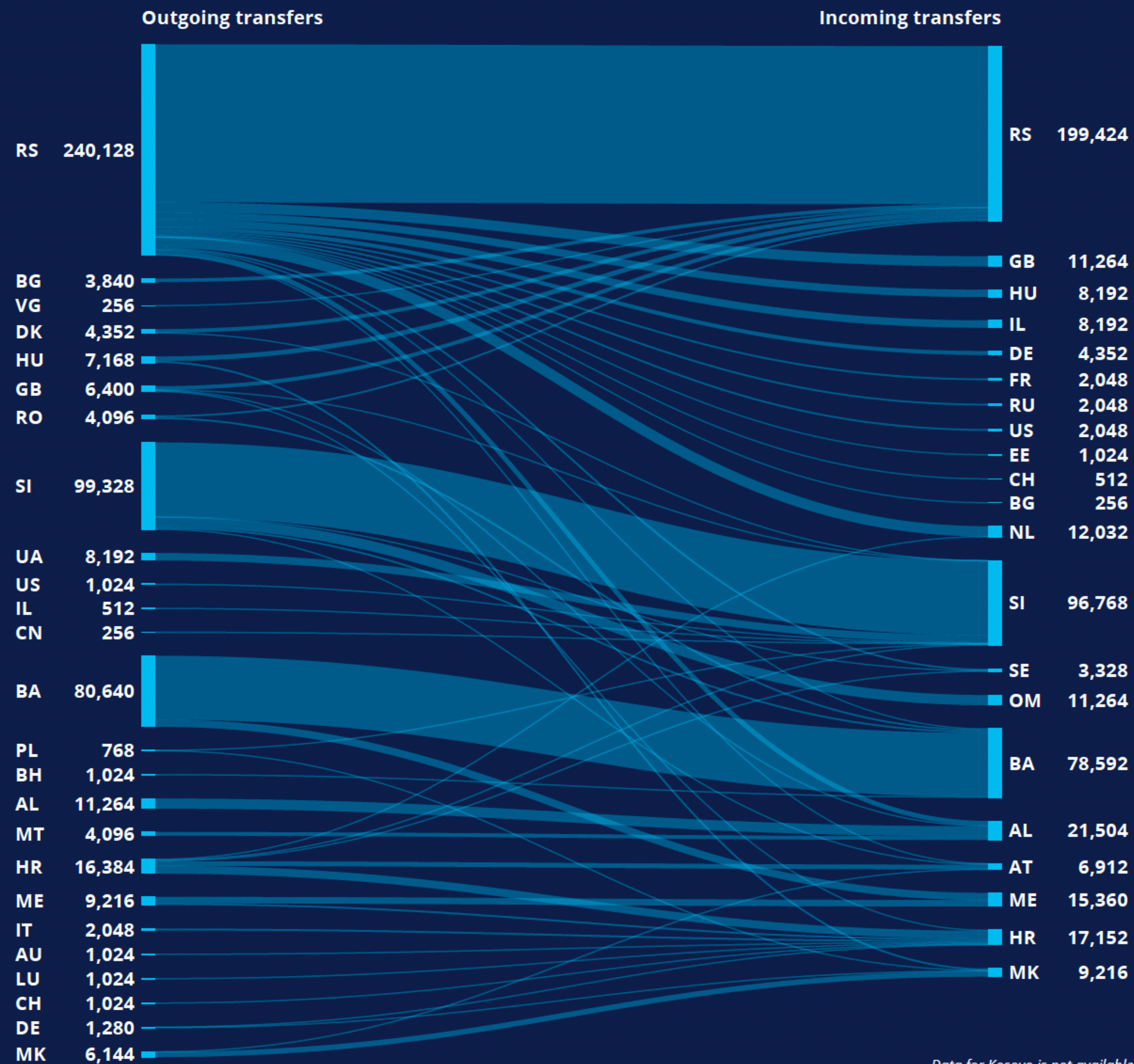


Figure 5:
IPv4 transfers within, into and out of Southeast Europe between April 2013 and February 2020



Data for Kosovo is not available

IPv6 in SEE



- **Very low IPv6 capability** rates compared to much of Europe
 - At the time of the report in 2020, ranged from **0-12%** across region
- Not much change since:
 - Albania: **6-8%**
 - Bosnia and Herzegovina: **8-11%**
 - Croatia: **3-5%**
 - Montenegro: **<1%**
 - North Macedonia: **<1%**
 - Serbia: **5-7%**
 - Slovenia: **12-14%**

IPv6 challenges



- According to RIPE NCC Survey 2019:
 - 35% of SEE respondents said **IPv6 was main technical challenge** (second to network security)
 - 57% of SEE respondents said they would **need more IPv4** in coming 2-3 years
 - 20% of SEE respondents said they had **fully deployed IPv6**
- IPv6 remains the **only sustainable solution** for future growth
 - NAT (address sharing) has its limits
 - 5G, IoT, smart cities and emerging technologies require IP addresses
 - Governments and regulators, ISPs, IXPs, network operator groups (NOGs) all have a role to play



Figure 9:
K-root locations reached from within Southeast Europe (IPv4)

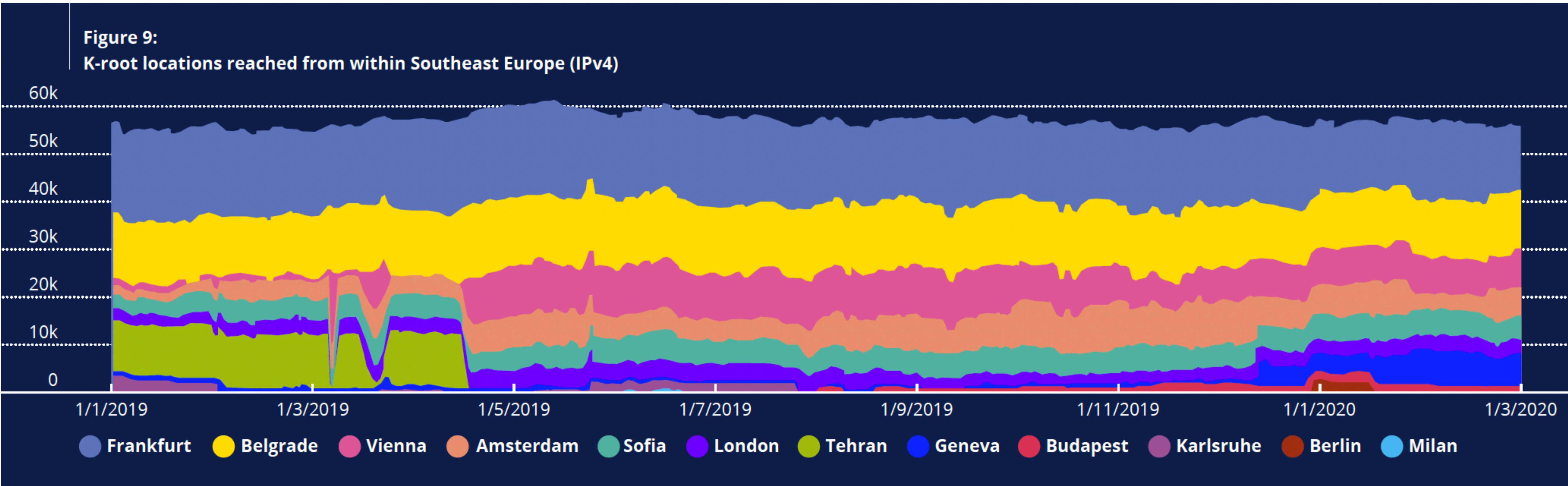




Figure 13:
Out-of-region traffic paths

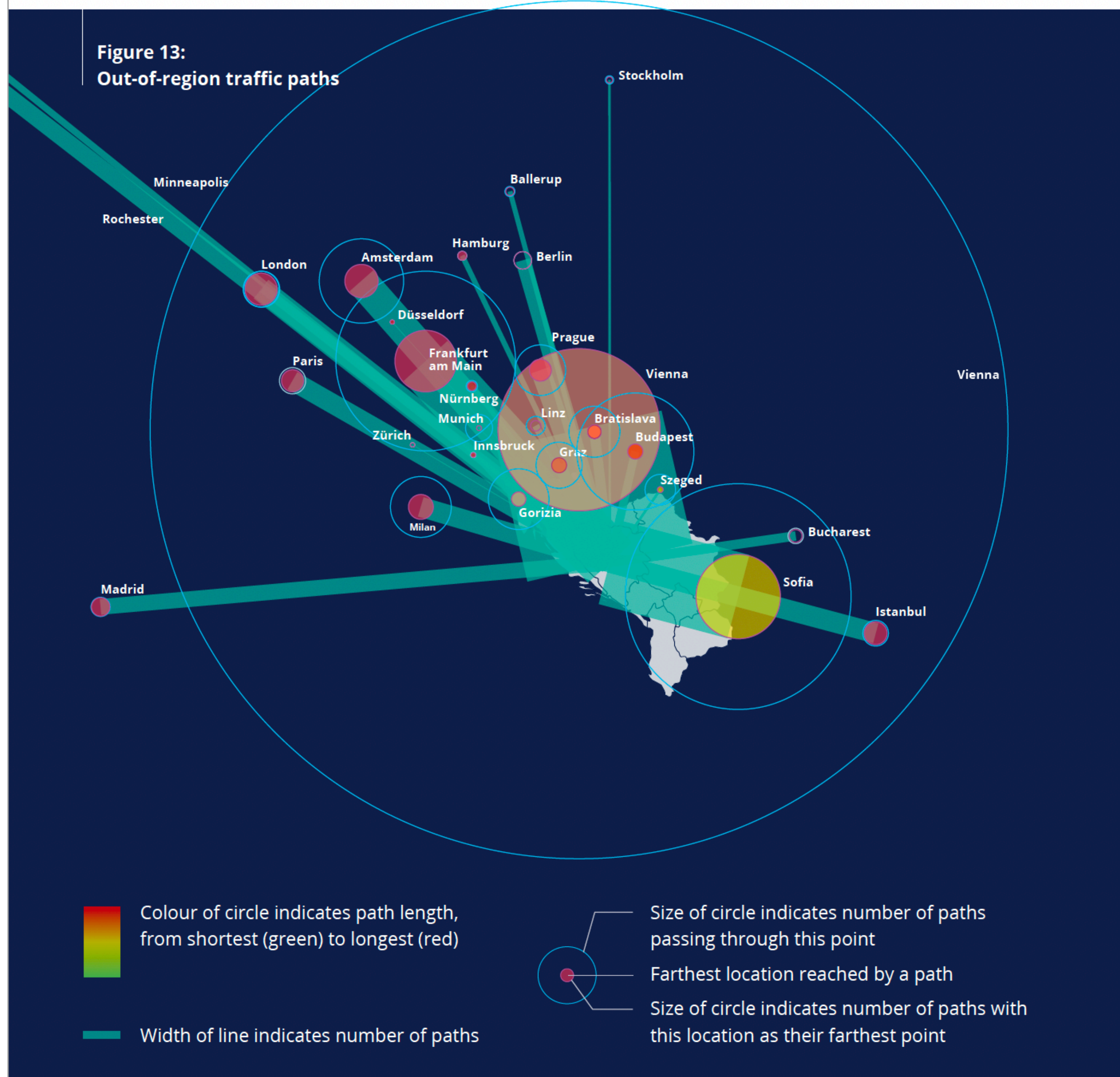
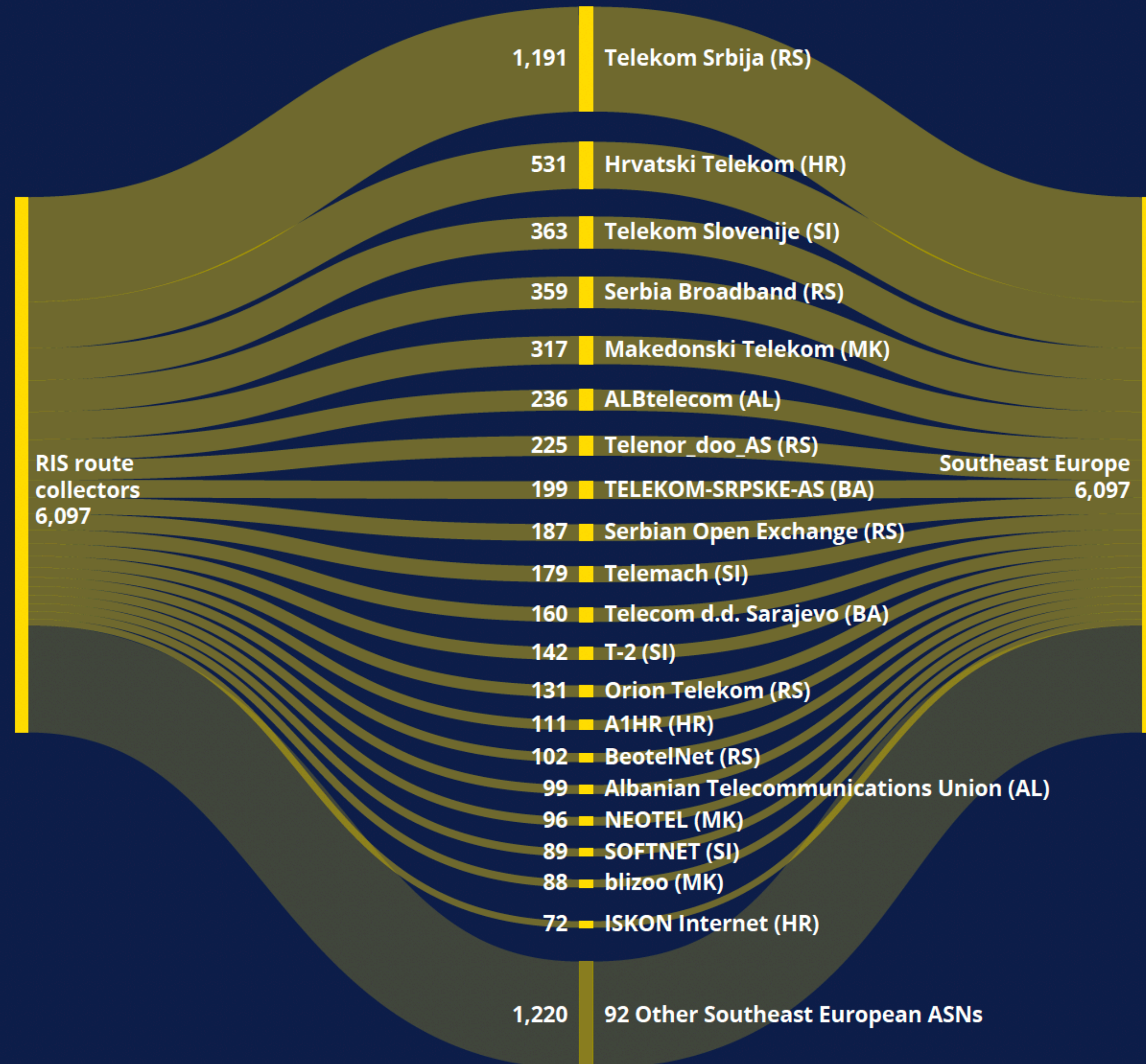


Figure 15:
Providers announcing Southeast European prefixes as seen by RIS route collectors



Routing Security in SEE



- RPKI (Routing Public Key Infrastructure) uptake quite high in SEE
- Current amount of IPv4 space covered by ROAs:
 - Albania: 91%
 - Bosnia and Herzegovina: 82%
 - Croatia: 24%
 - Montenegro: 77%
 - North Macedonia: 26%
 - Serbia: 83%
 - Slovenia: 92%

A few parting thoughts...



- These reports are always evolving
- Please get in touch and tell us what is useful
ppig@ripe.net
- We can provide data and training on many topics
- Lots of interesting articles on RIPE Labs
<https://labs.ripe.net>



Questions



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