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Internet Landscape and Network Resiliency

in South East Europe

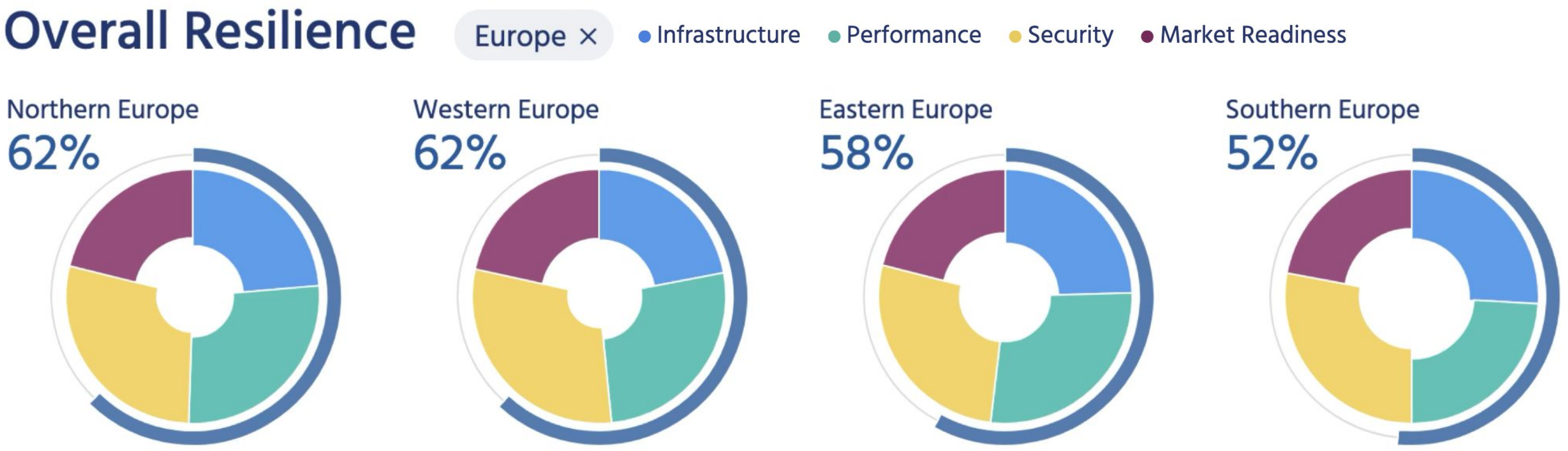
Jelena Ćosić | RSNOG| November 2024

Internet resilience

[ˈɪntənɛt rɪˈzɪlɪəns] noun

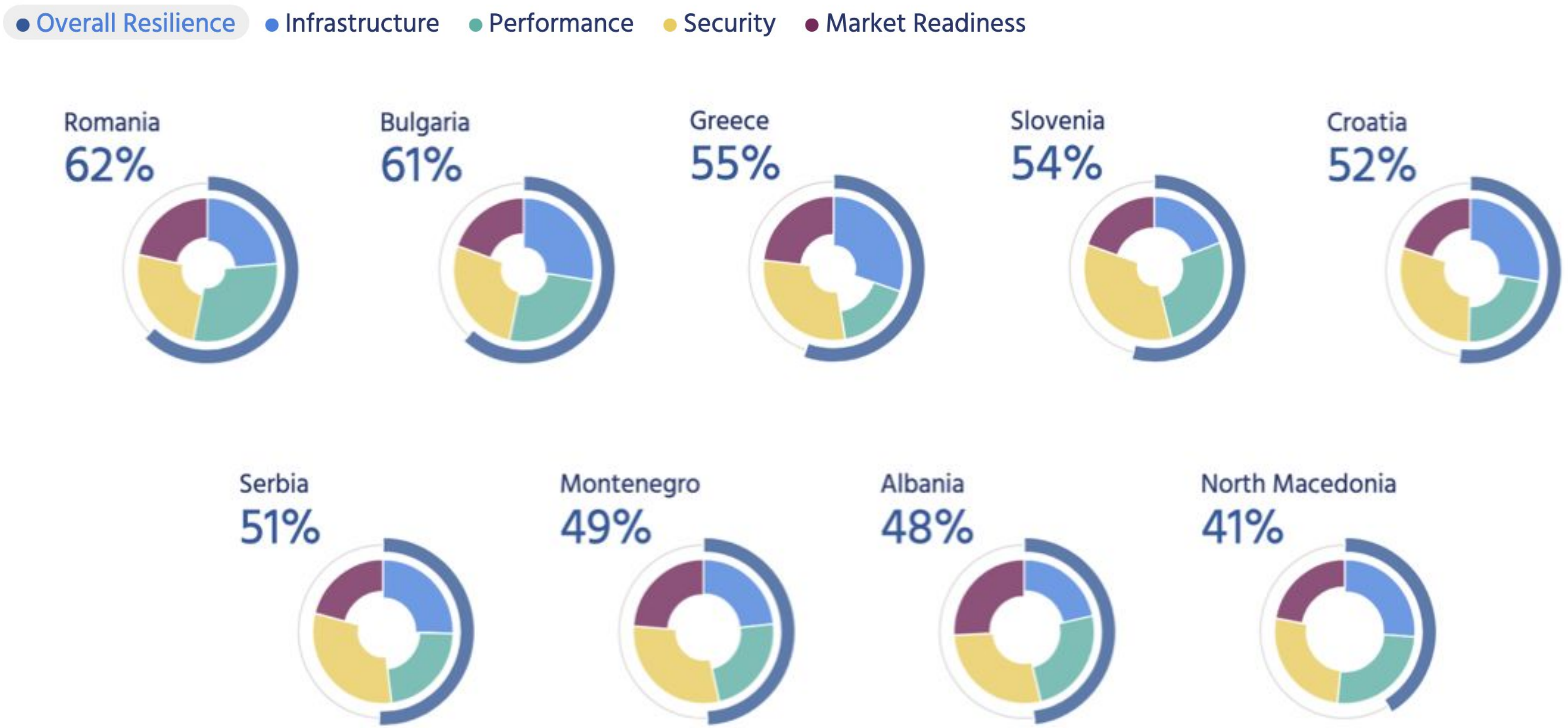
The capacity of a country or region's Internet infrastructure to maintain stable and reliable service despite disruptions.

Internet Resilience Index



Internet Society Pulse:
pulse.internetsociety.org/resilience

Internet Resilience Index



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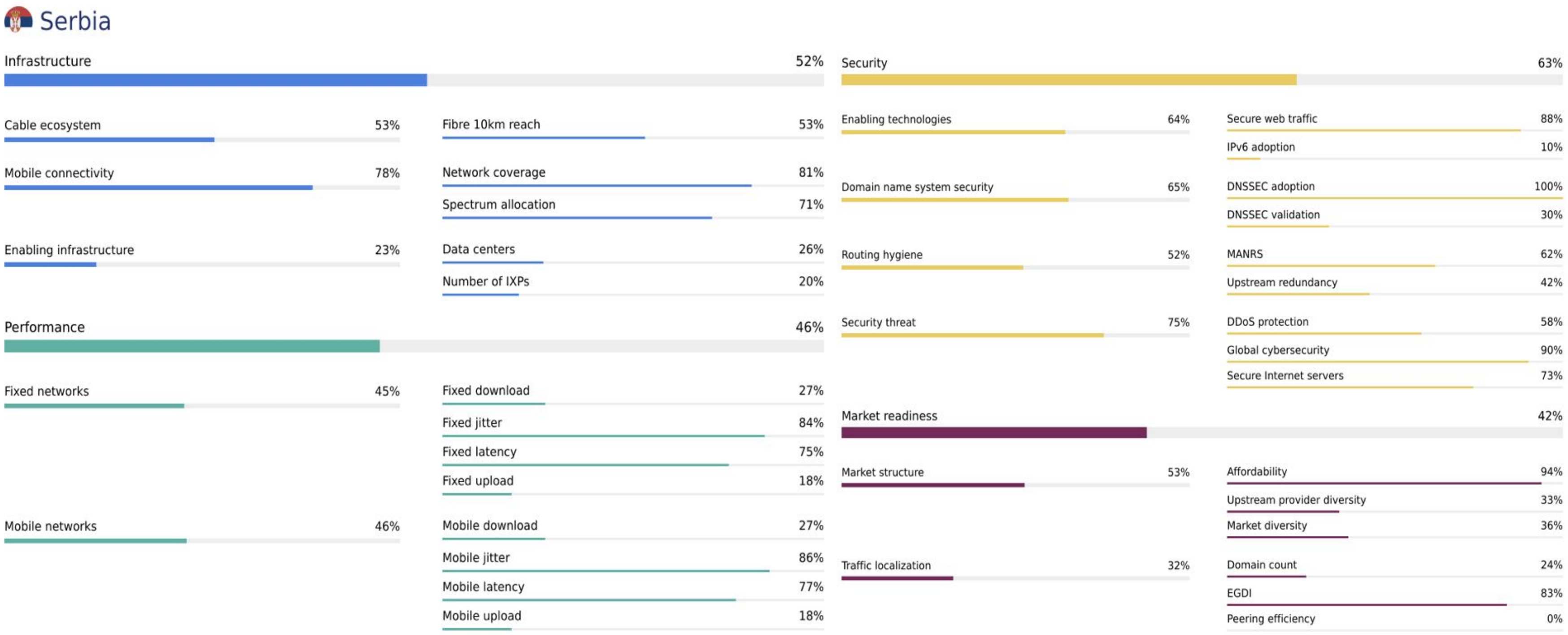
Internet Resilience Index



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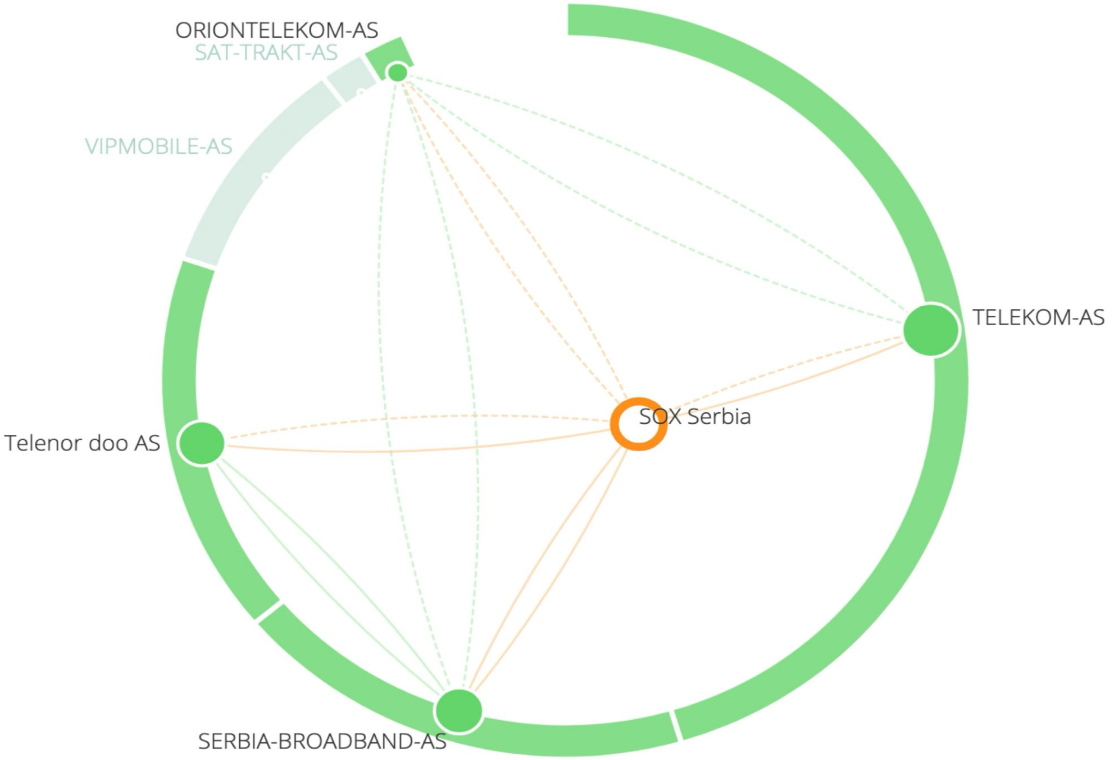
Market readiness

Market structure

Peer-to-peer connections: Serbia

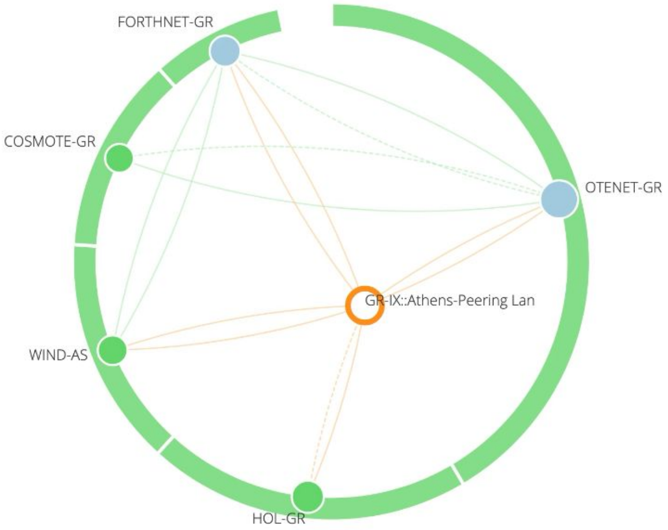


The sketch show how end-users interconnect within a country.

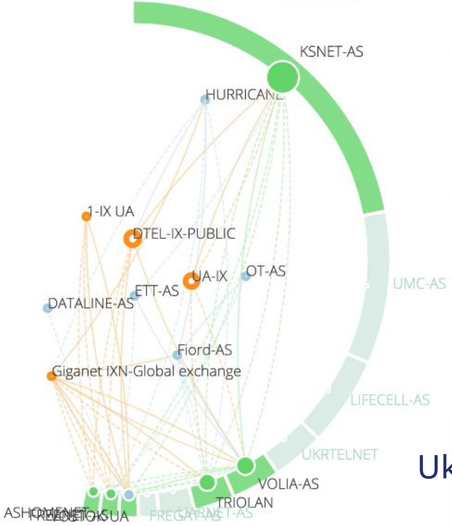
It illustrates the peer-to-peer fabric at a specific point in time and provides insight into how networks interconnect users.

jedi.ripe.net/peer-to-peer

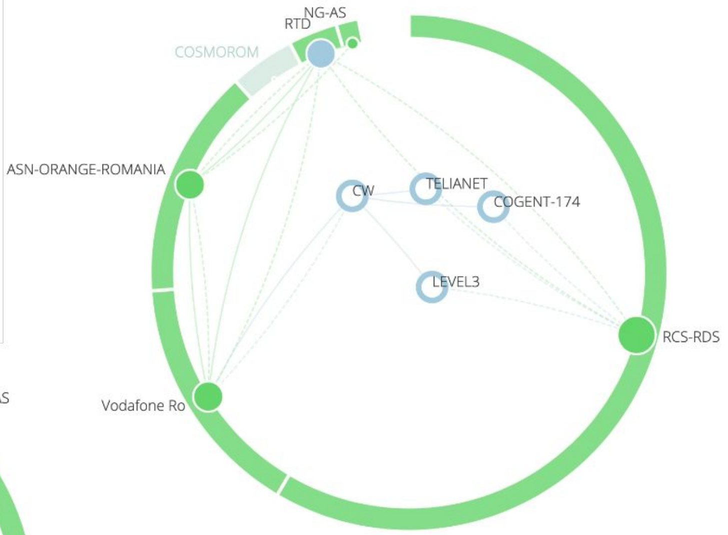
Peer-to-peer connections: Greece, Romania and Ukraine



Greece



Ukraine



Romania

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Market structure

Country	HHI score
AL	0.7147
RO	0.4001
GR	0.3706
MK	0.3573
SI	0.3557
HR	0.3486
ME	0.3363
RS	0.2747
BA	0.2459
BG	0.1908

The Herfindahl-Hirschman Index (HHI) is an economic measure of market concentration.

We calculate the HHI using APNIC data on networks serving users in a specific country. Only networks with over 1% of users in that country are included.

By converting percentages to fractions, we obtain an HHI ranging from 0 (no concentration) to 1 (monopoly).

Data source: APNIC

Telecom Serbia

HQ:
Belgrade, Serbia

Size:
12,000+ employees

Market share across SEE region:
Bosnia and Herzegovina - 26.5%
North Macedonia - 0.05%
Montenegro - 44%
Serbia - 48%

A1

HQ:
Vienna, Austria

Size:
17,000+ employees

Market share across SEE region:
Bulgaria - 22.5%
Croatia - 32.5%
North Macedonia - 36%
Serbia - 9%
Slovenia - 20%

United Group

HQ:
Amsterdam, The Netherlands

Size:
14,000+ employees

Market share across SEE region:
Bosnia and Herzegovina - 20%
Bulgaria - 33.5%
Croatia - 16%
Greece - 32%
Montenegro - 10.5%
Serbia - 21.5%
Slovenia - 30.5%

Deutsche Telecom

HQ:
Bonn, Germany

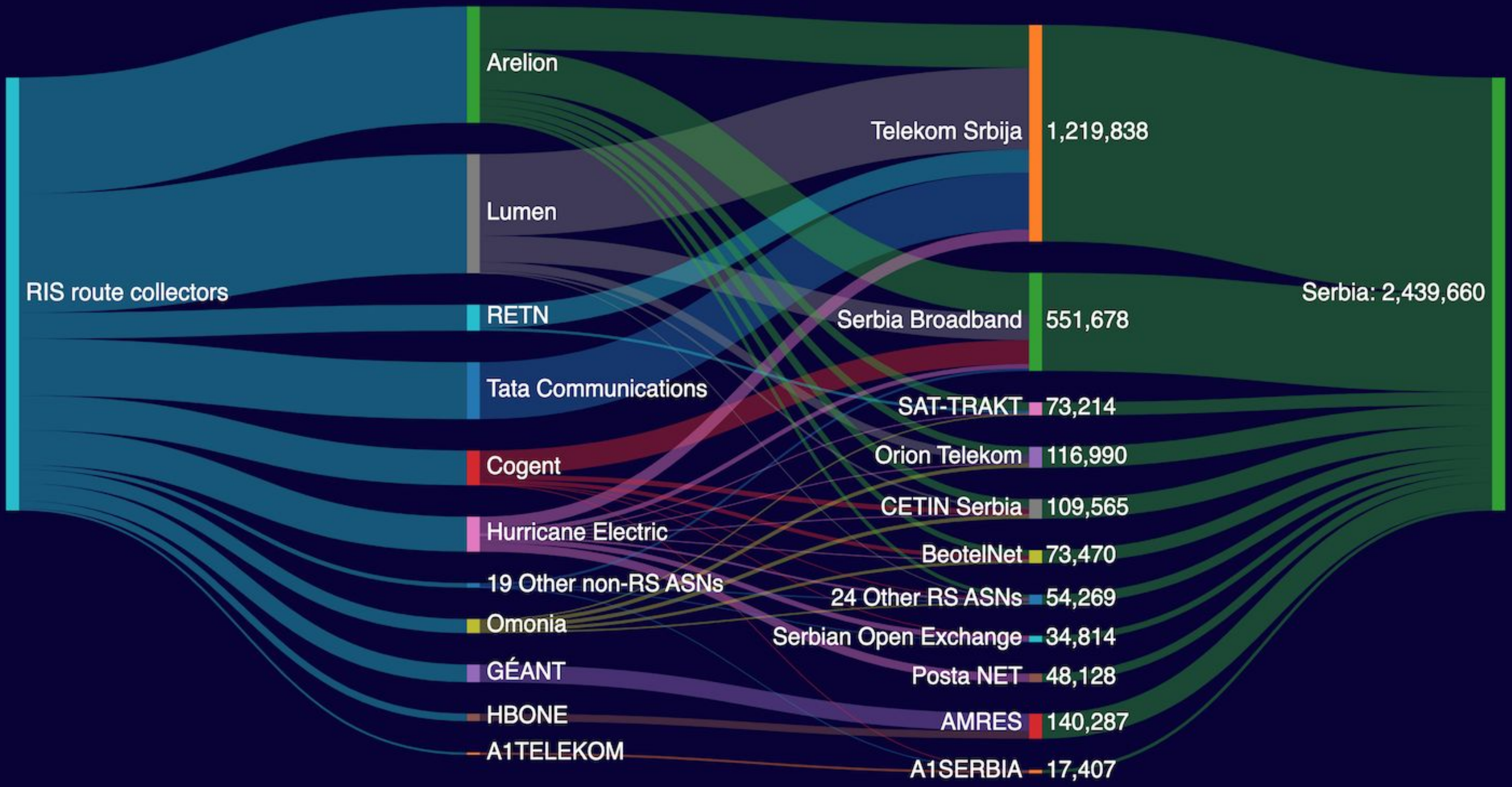
Size:
207,000+ employees

Market share across SEE region:
Bosnia and Herzegovina - 11%
Croatia - 47%
Greece - 51.5%
Montenegro - 36%
North Macedonia - 43%
Romania - 4%

Market readiness

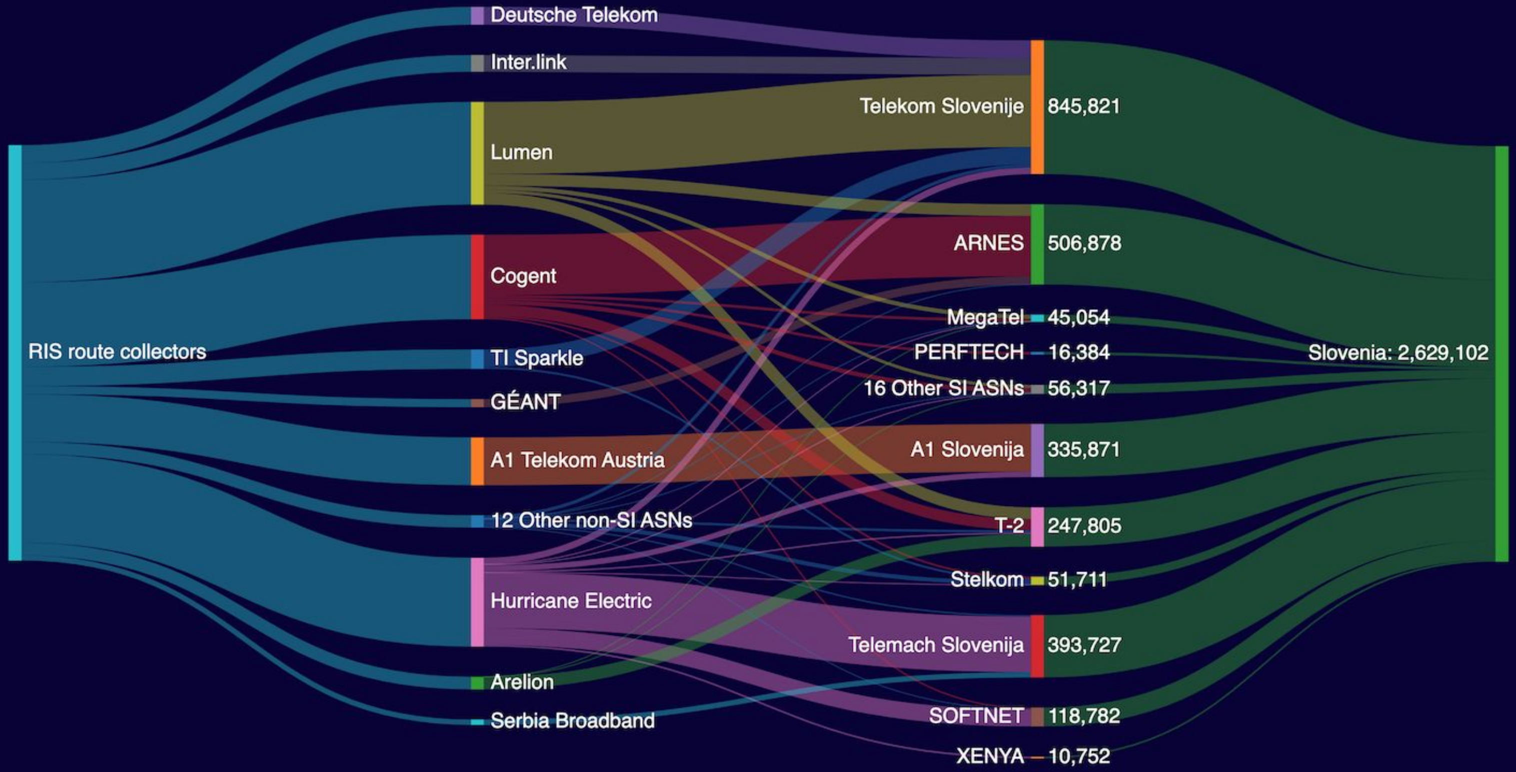
Upstream provider diversity

Upstream operators providing connectivity into Serbia



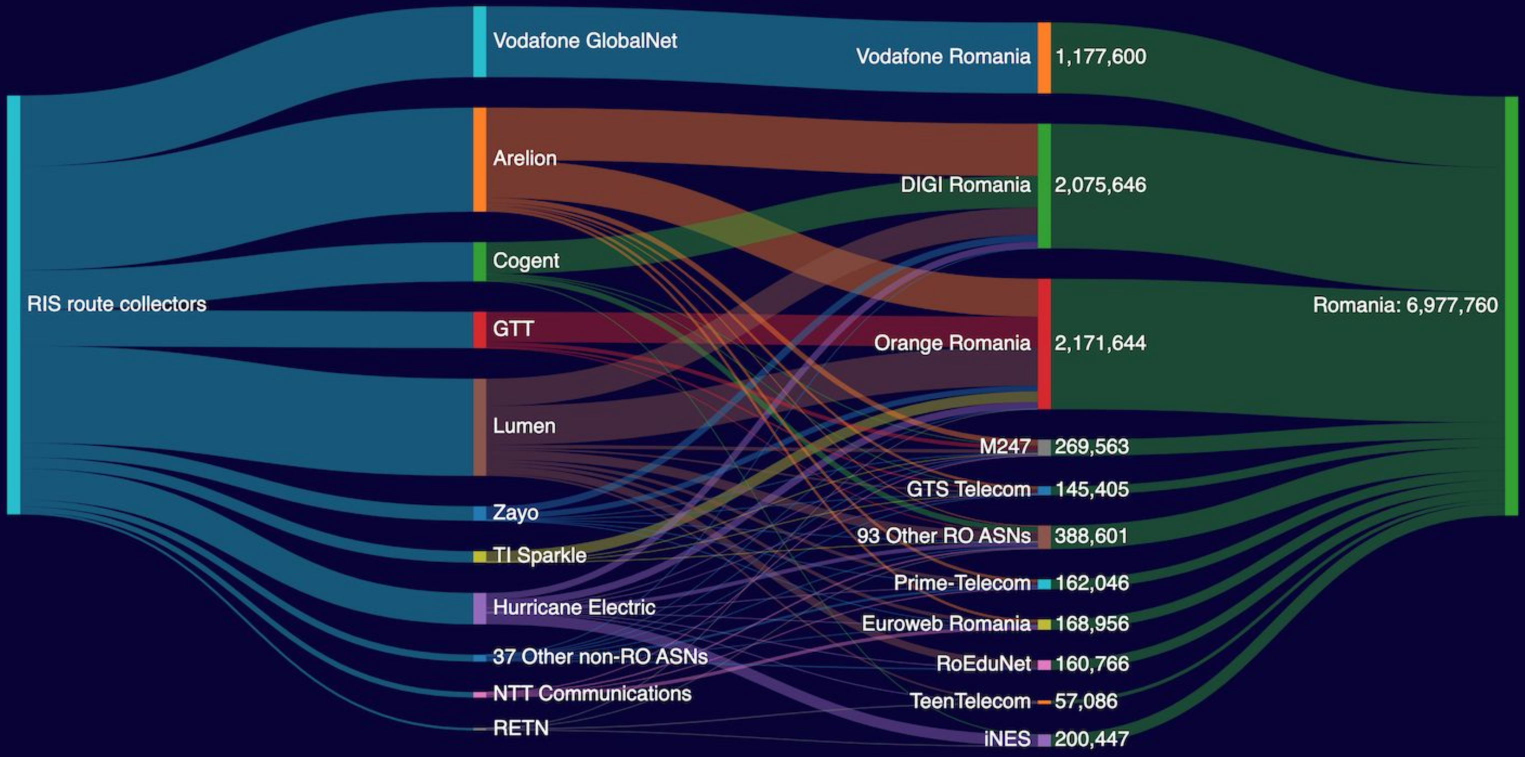
Data source: RIPE RIS

Upstream operators providing connectivity into Slovenia



Data source: RIPE RIS

Upstream operators providing connectivity into Romania



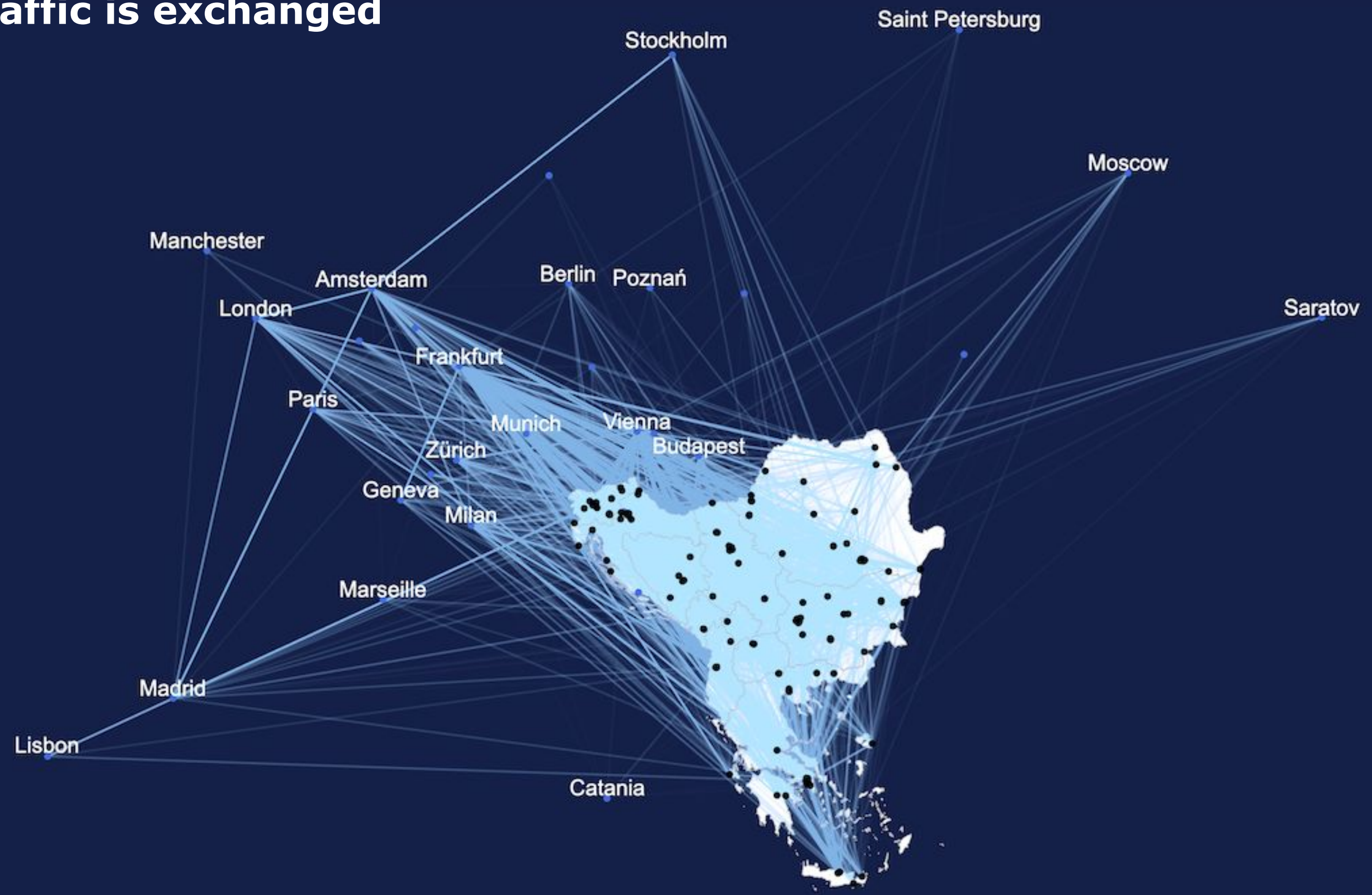
Data source: RIPE RIS

Market readiness

Traffic localisation

How regional traffic is exchanged

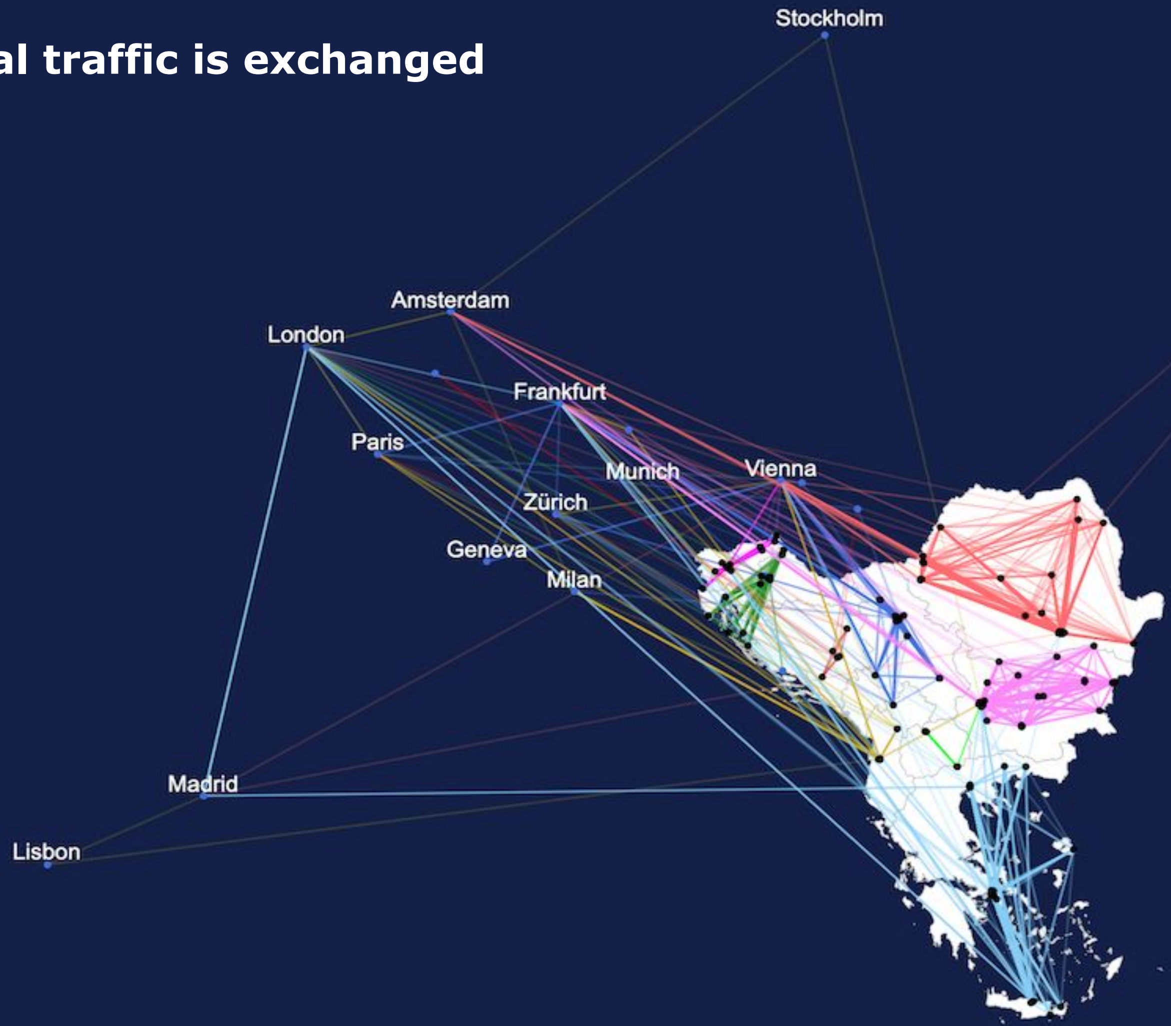
In region



Data source: RIPE Atlas

How regional traffic is exchanged

Per country



Data source: RIPE Atlas

Infrastructure

Enabling infrastructure

Number of IXPs

Data source: PeeringDB

Cloud, CDN and OTT leaders in IXP participation

Provider	SOX	InterLAN	RoNIX	CIX	BIX.BG	GR-IX	ANIX	IXP.mk
Google	100G	100G	40G		400G			
Microsoft Azure	20G	20G		40G	200G	200G		
AWS	40G				200G	200G		
Meta	200G	200G	200G		200G		30G	
Cloudflare	40G	100G	10G	40G	20G	200G		20G
Fastly					200G			
Netflix		100G	100G					

Data source: PeeringDB

Highlights

- The (former) state telecommunications operators still exert a lot of influence. There are smaller numbers of independent providers than we see in some other parts of Europe.
- Routing within the region is generally efficient, although we observed a few anomalies that likely reflect the various peering arrangements that different networks have in place.
- There is a modest amount of diversity in terms of the routes available to traffic flowing into the region, the dominant role played by incumbents.

Questions
& Comments ?

jcosic@ripe.net

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THANK YOU!