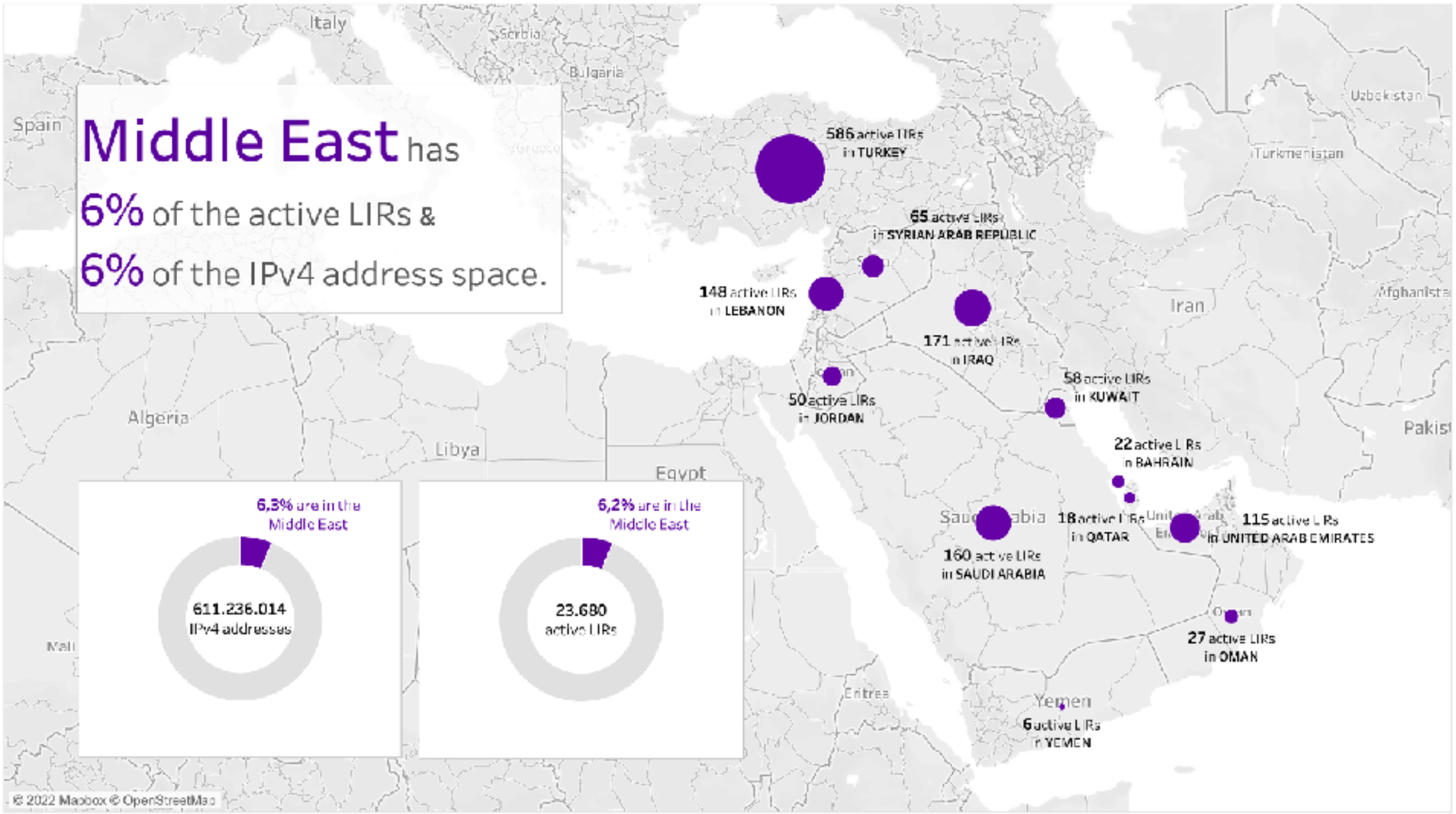
RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE NCC Government Roundtable

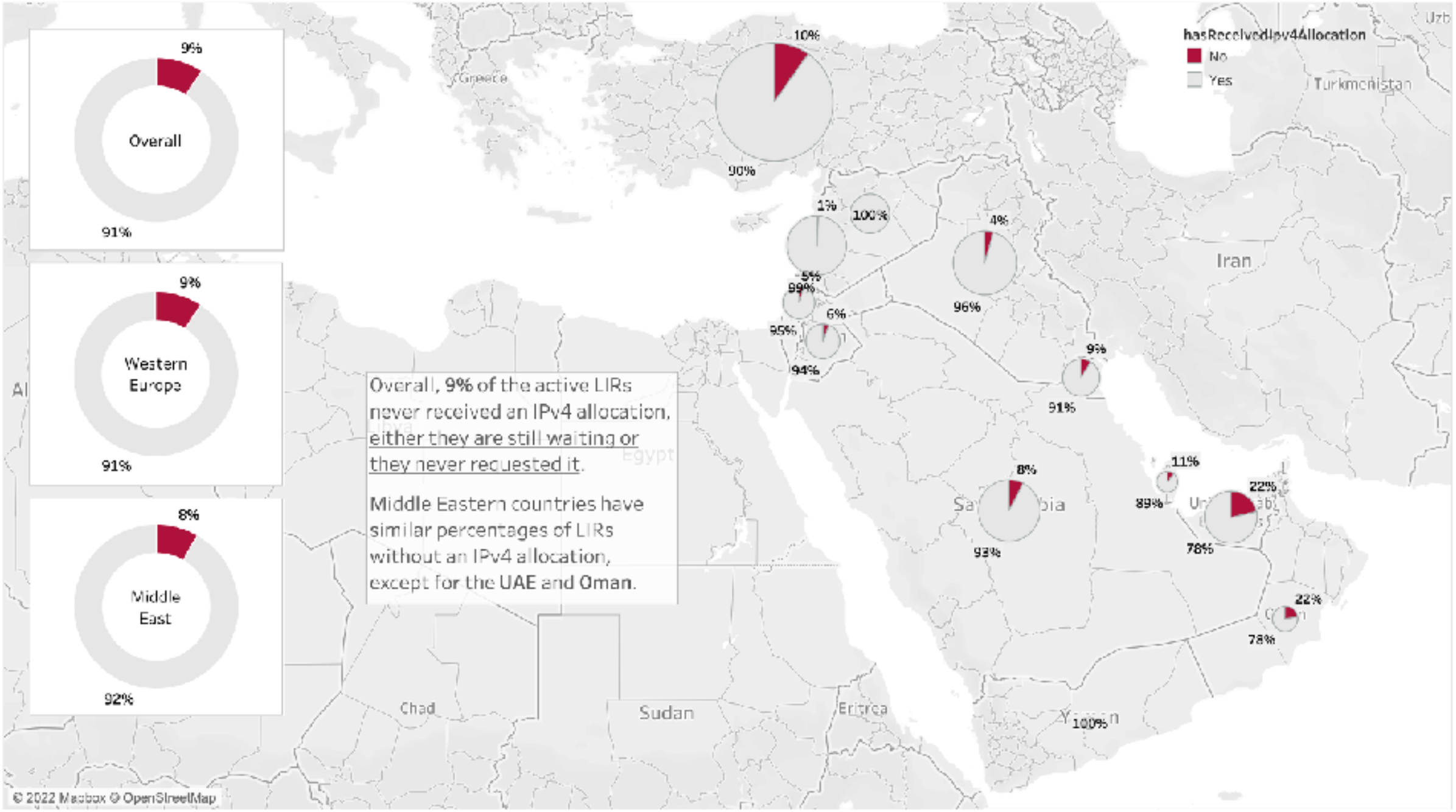
Statistics PoV

Internet Resources & Routing

LIRs in MENOG Region



IPv4 in MENOG Region



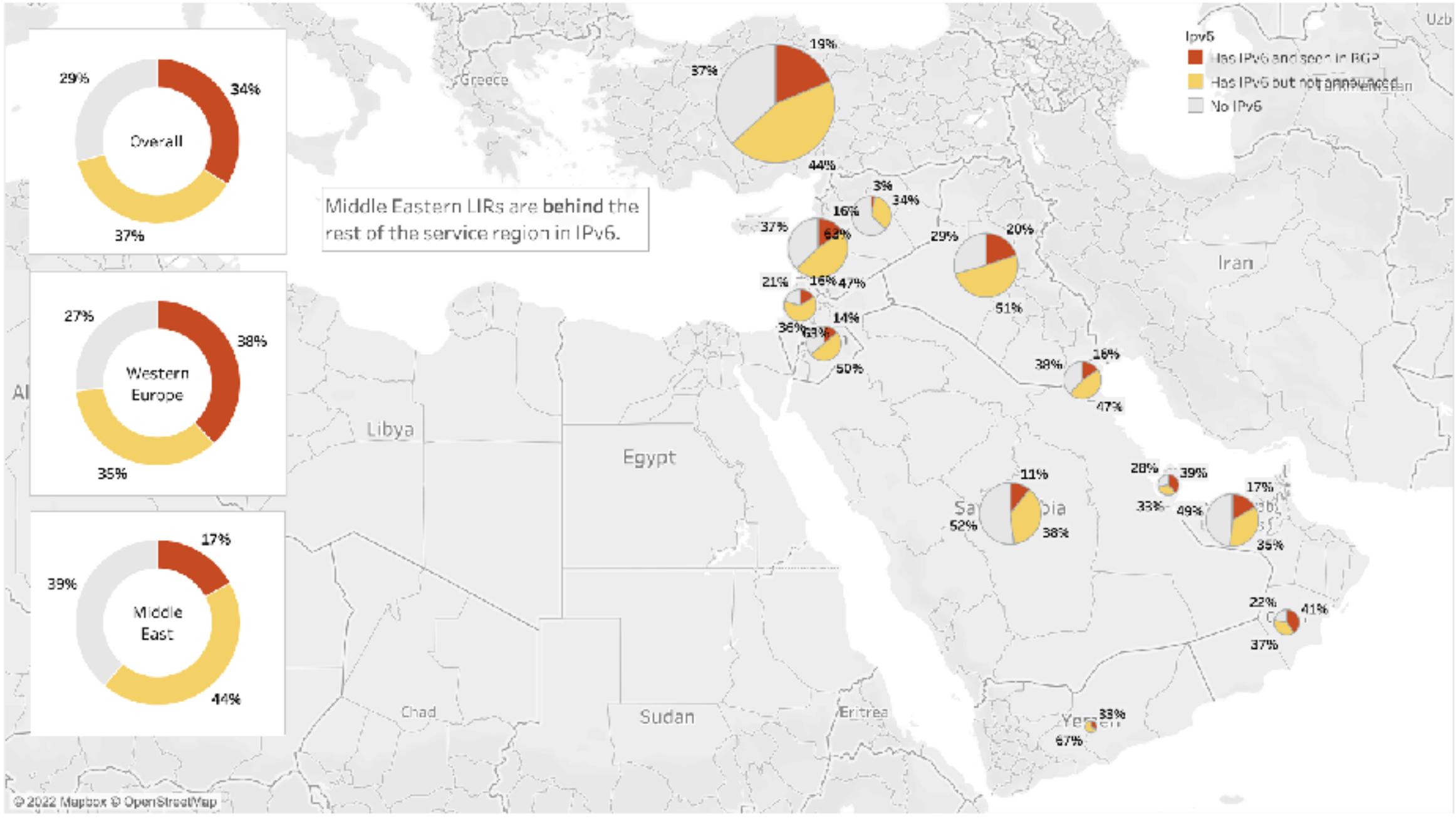
IPv4 in MENOG Region

Country Name	Reg Id	Legal Name	Year of Acti..	
UNITED ARAB EMIRATES	ae.dpworld-fze	D P World FZE	2010	12 y.o.
	ae.dfm	Dubai Financial Market (DFM) PJSC	2011	11 y.o.
	ae.centroid	Centroid Solutions DMCC	2020	2 y.o.
	ae.digital	DIGITAL 14 LLC	2020	2 y.o.
	ae.adarama	Acara Middle East FZE	2021	1 y.o.
	ae.oryxlabs	Oryxlabs Technologies - Sole Proprietorship L.L.C.	2021	1 y.o.
	ae.horizon	Horizon Technology-Fzco	2022	1 y.o.
	ae.cloudhost3	Rajesh Sajnani trading as CLOUD HOST TECHNOLOGY	2022	1 y.o.
	ae.bamboozle2	Bamboozle Web Services MEA FZ-LLC	2022	1 y.o.
	ae.pinelabsuae	PINE LABS PAYMENT SERVICES PROVIDER L.L.C	2022	0 y.o.
	ae.mebridge	ME BRIDGE TELECOM FZCO	2022	0 y.o.
	ae.p	Sever Digital Network Services LLC	2022	0 y.o.
	ae.stormwall	StormWall FZE LLC	2022	0 y.o.
	ae.datatech	DATATECH LABS MIDDLE EAST DMCC	2022	0 y.o.
	ae.cloudhost4	Rajesh Sajnani trading as CLOUD HOST TECHNOLOGY	2022	0 y.o.
	ae.skytell	SKYTELL FZ LLC	2022	0 y.o.
	ae.adports	ABU DHABI PORTS COMPANY PJSC	2022	0 y.o.
	ae.rcstechnologies	RCS Technologies FZE LLC	2022	0 y.o.
	ae.lir	LIR Limited	2022	0 y.o.
	ae.universalsat.com	UNIVERSAL SATELLITE COMMUNICATION DMCC	2022	0 y.o.
	ae.basra	Basra Energy Company Limited	2022	0 y.o.
	ae.iqweb llc	IQWeb FZ LLC	2022	0 y.o.
	ae.digitalcity	Digital City FZE	2022	0 y.o.
	ae.airserver	Mahdiar Rafiee	2022	0 y.o.
	ae.arvancloud	ARVANCLOUD GLOBAL TECHNOLOGIES L.L.C	2022	0 y.o.
OMAN	om.bankmuscat	Bank Muscat SAOG	2020	3 y.o.
	om.nbosaog	National Bank of Oman SAOG	2020	2 y.o.
	om.ahlibank1	Ahli Bank SAOG	2020	2 y.o.
	om.alizzbank	Alizz Islamic Bank SAOC	2021	2 y.o.
	om.ufcoman	Unitec Finance Company SAOG	2021	1 y.o.
	om.banknizwa	Bank Nizwa SAOG (PJSC)	2022	1 y.o.

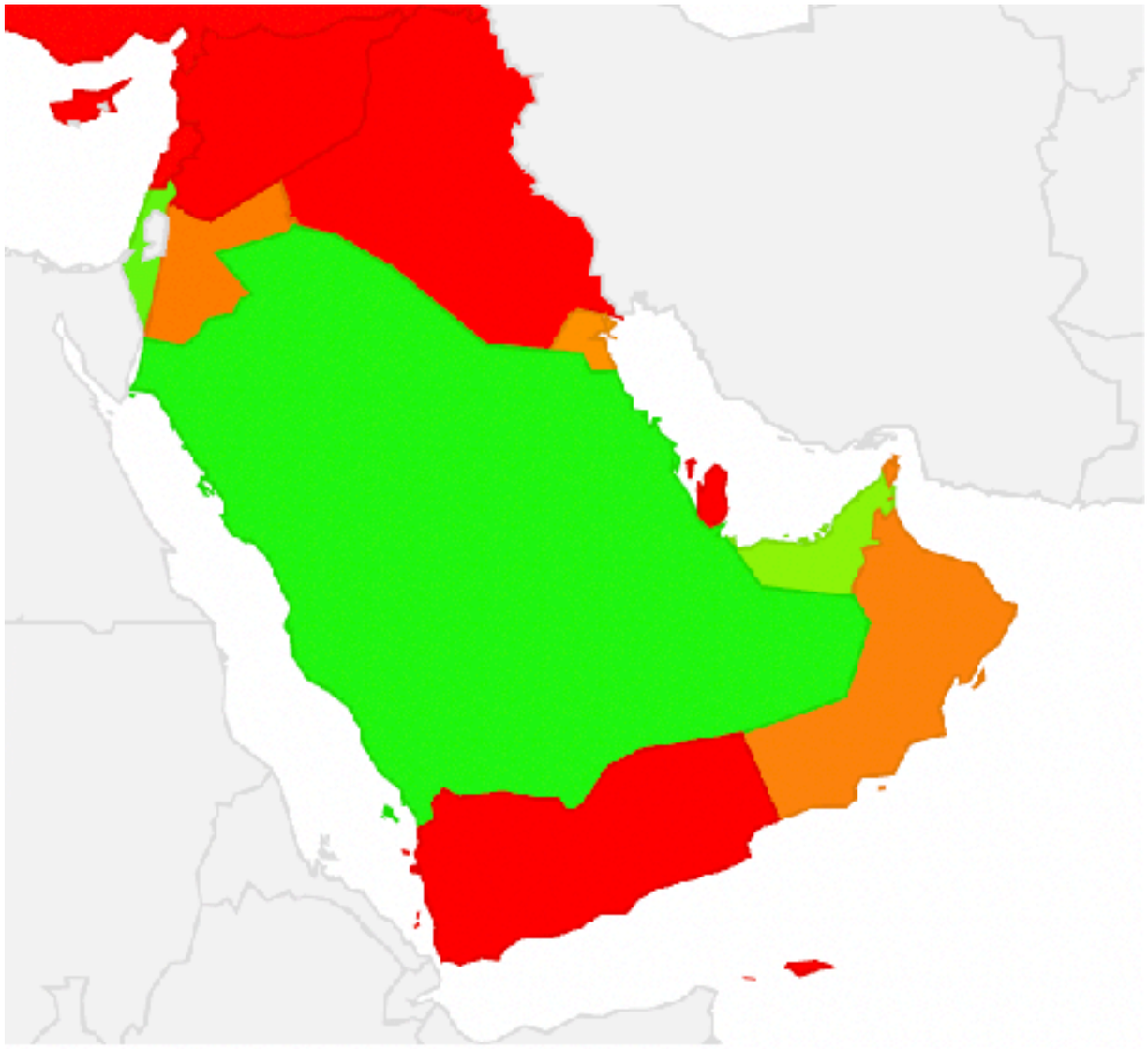
LIRs that never received an IPv4 allocation from the UAE and Oman are only a few years old.

DP World and DFM have been around for over a decade but they **have PI assignments!**

IPv6 in MENOG Region



IPv6 Usage Stats



Source: APNIC

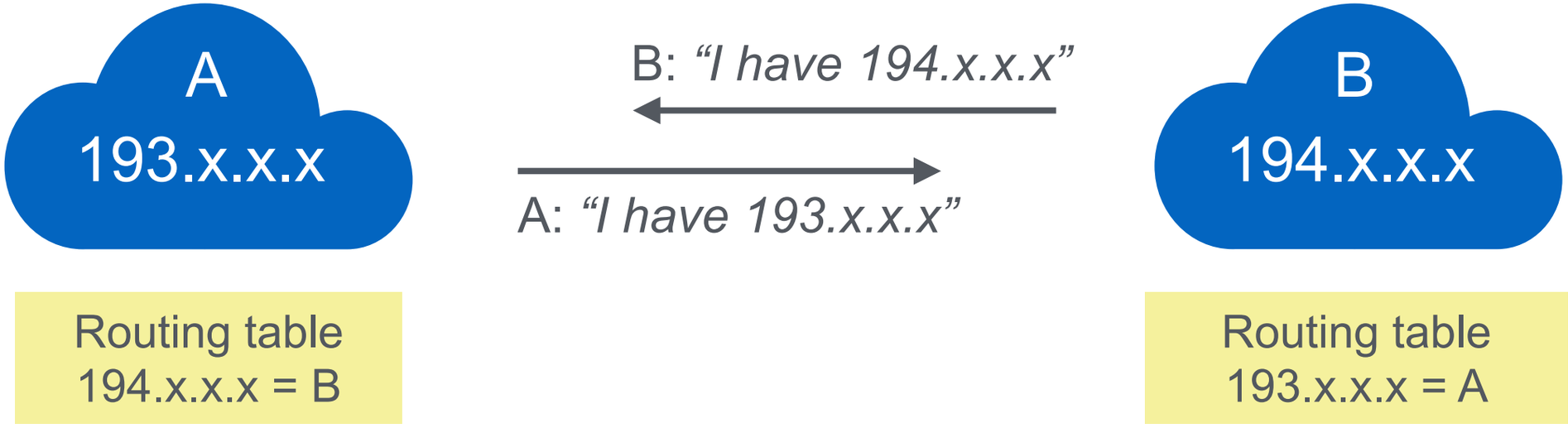
Country	%
KSA	61.64
UAE	47.35
Kuwait	18.61
Oman	16.88
Jordan	16.65
Lebanon	1.13
Syria	0.67
Qatar	0.24
Iraq	0.12
Palestine	0.11
Bahrain	0.09
Yemen	0.08

Routing on the Internet

Can I trust B?

Is A correct?

"BGP protocol"



Accidents Happen

- Fat Fingers
  - 2 and 3 are really close on our keyboards….

- Policy Violations (leaks)
  - Oops, we did not want this to go on the public Internet
  - Infamous incident with Pakistan Telecom and YouTube

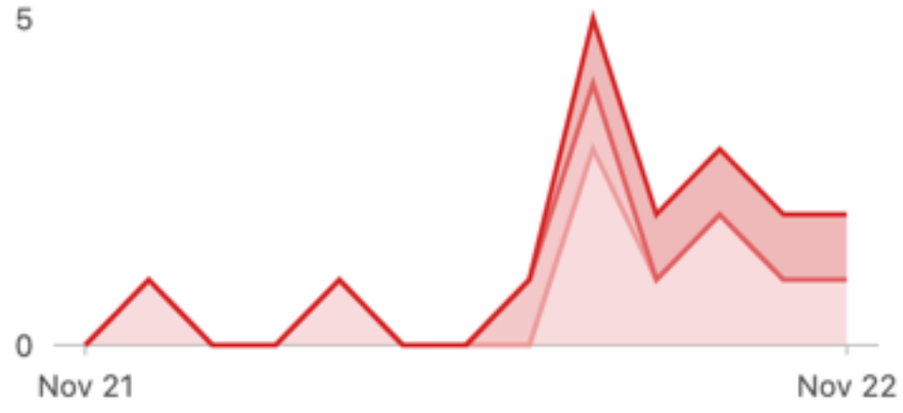
Incidents Are Common

- 2021 Routing Incidents Review
  - 775 possible Hijacks (2255 in 2020)
  - 830 possible Route Leaks (1260 in 2020)
  - 9868 Bogon announcements (9059 in 2020)

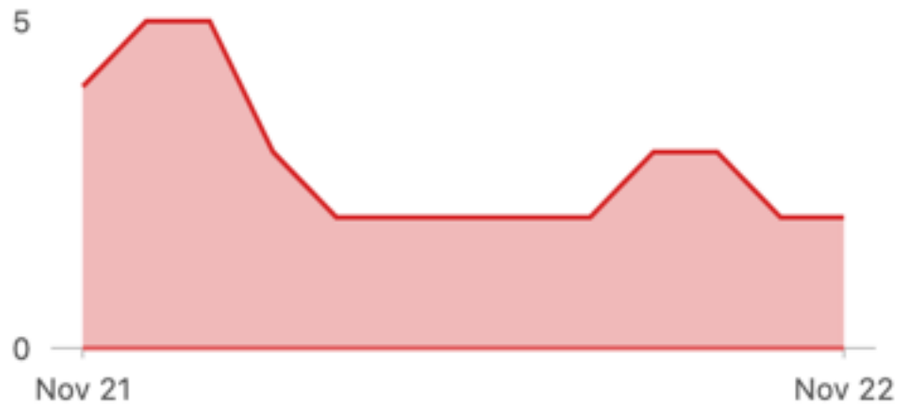
Source: MANRS & https://bgpstream.com

Effects on global routing

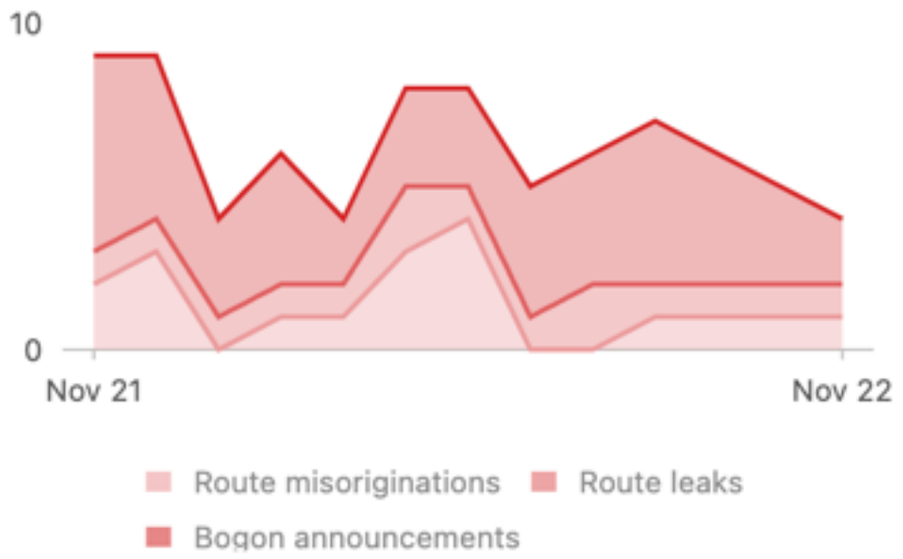
UAE



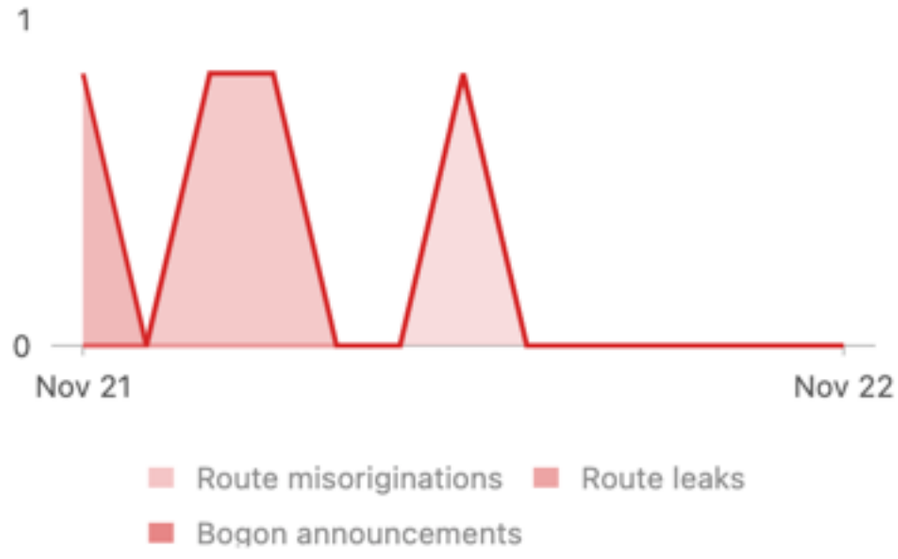
Qatar



KSA

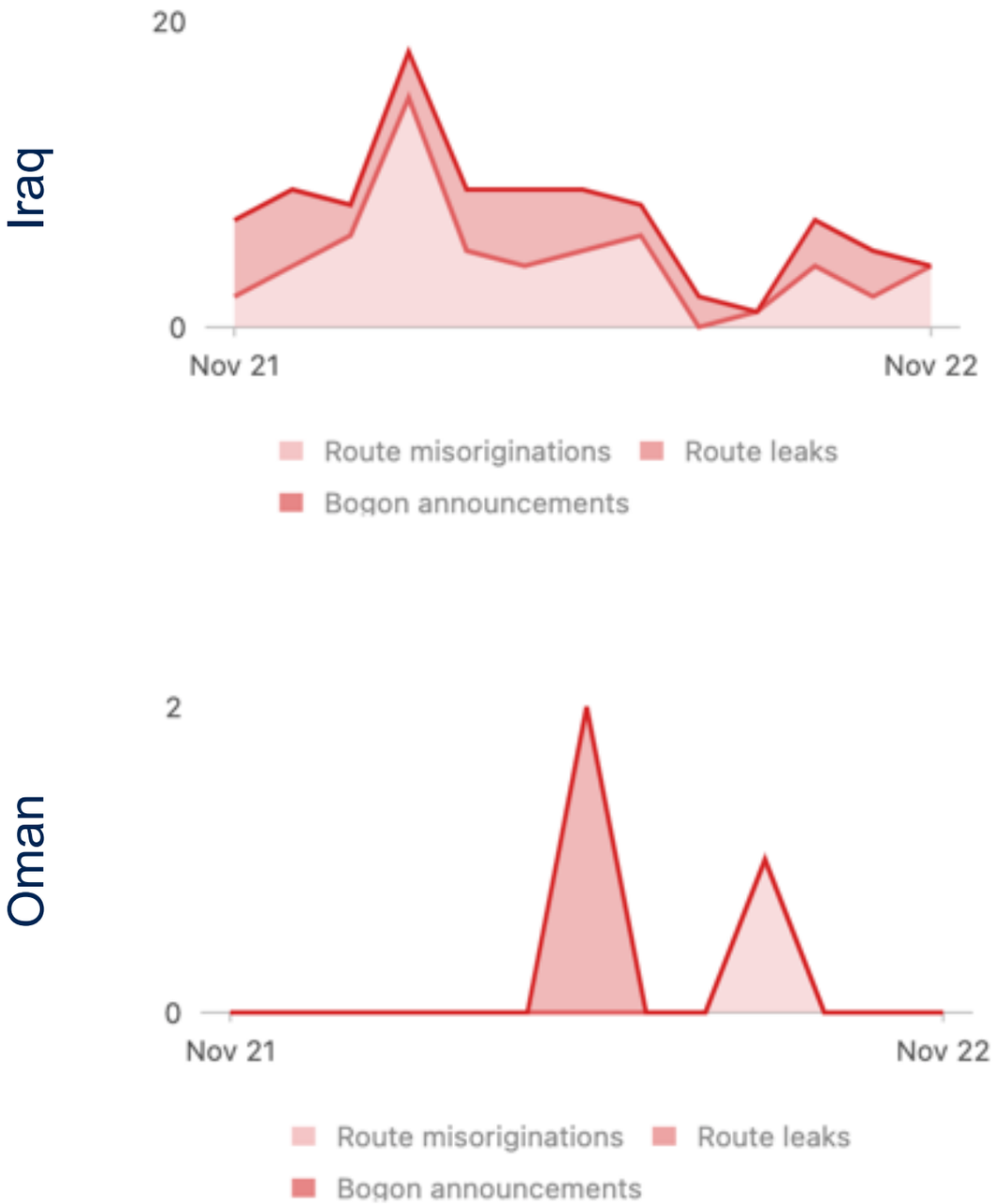


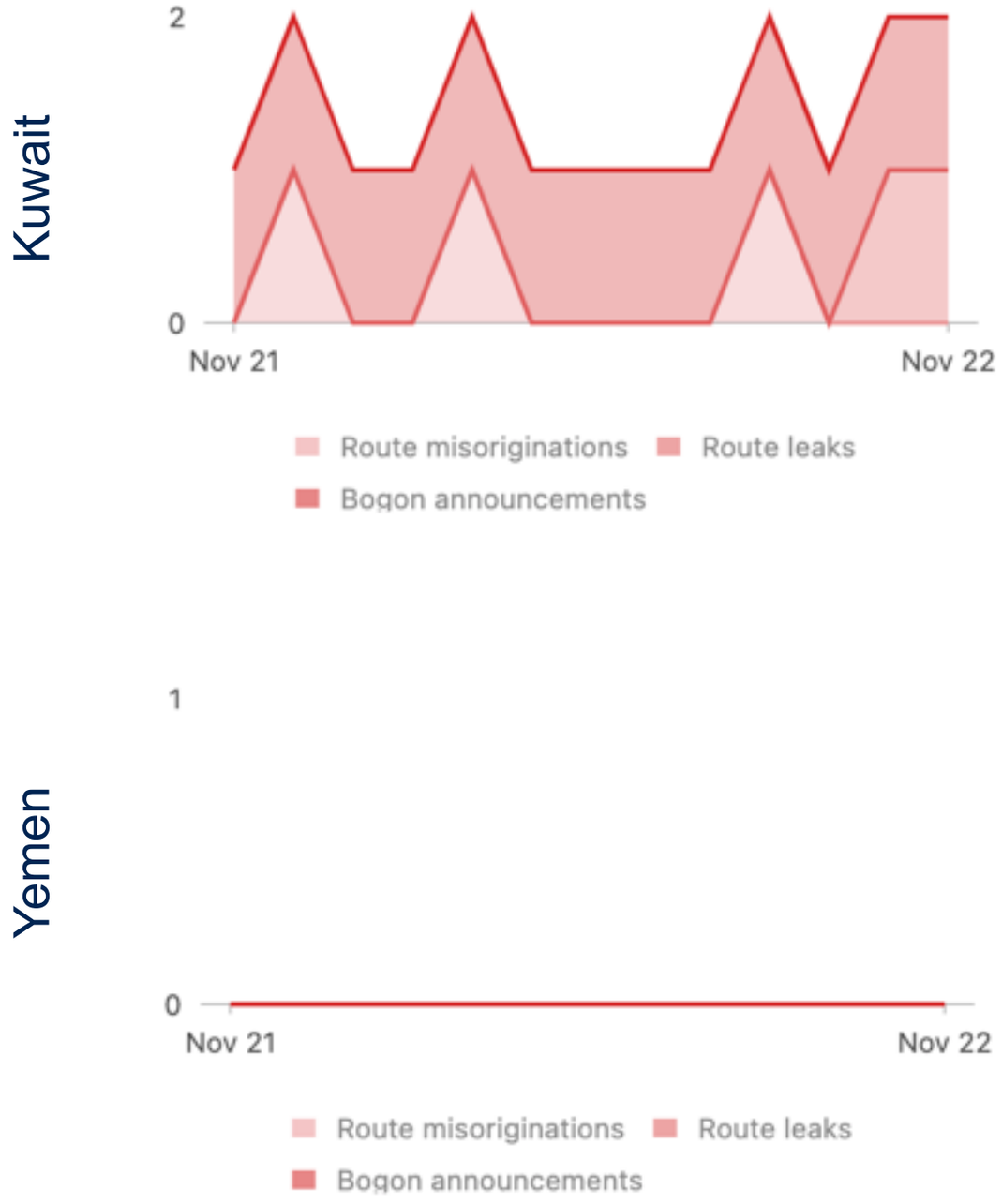
Bahrain



Source: https://observatory.manrs.org

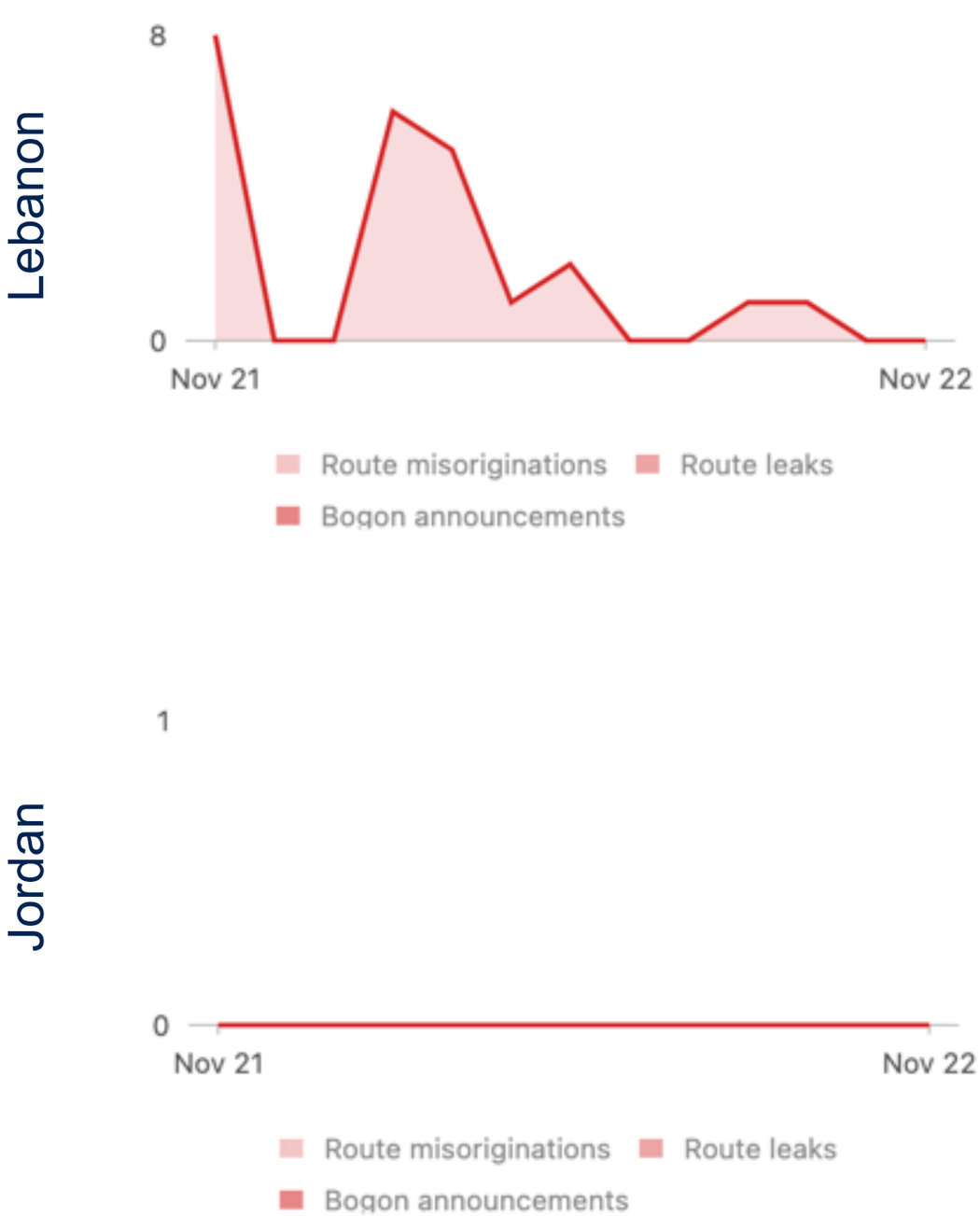
Effects on global routing

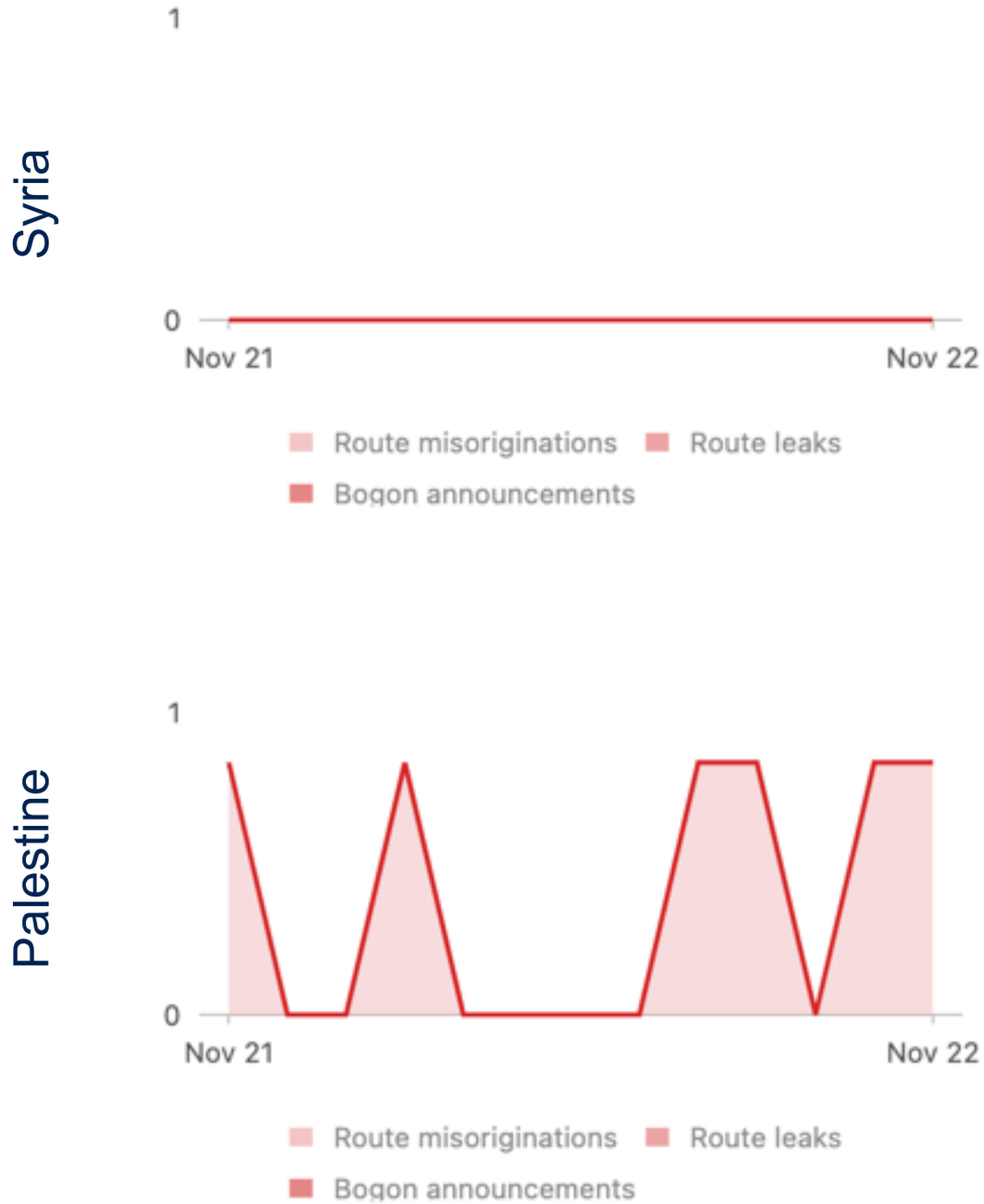




Source: https://observatory.manrs.org

Effects on global routing





Source: https://observatory.manrs.org

Resource Public Key Infrastructure

Ties IP addresses and ASNs to public keys

Follows the RIR hierarchy

Authorised statements from resource holders

- “ASN X is authorised to announce my Prefix Y”
- Signed, holder of Y

Two elements of RPKI

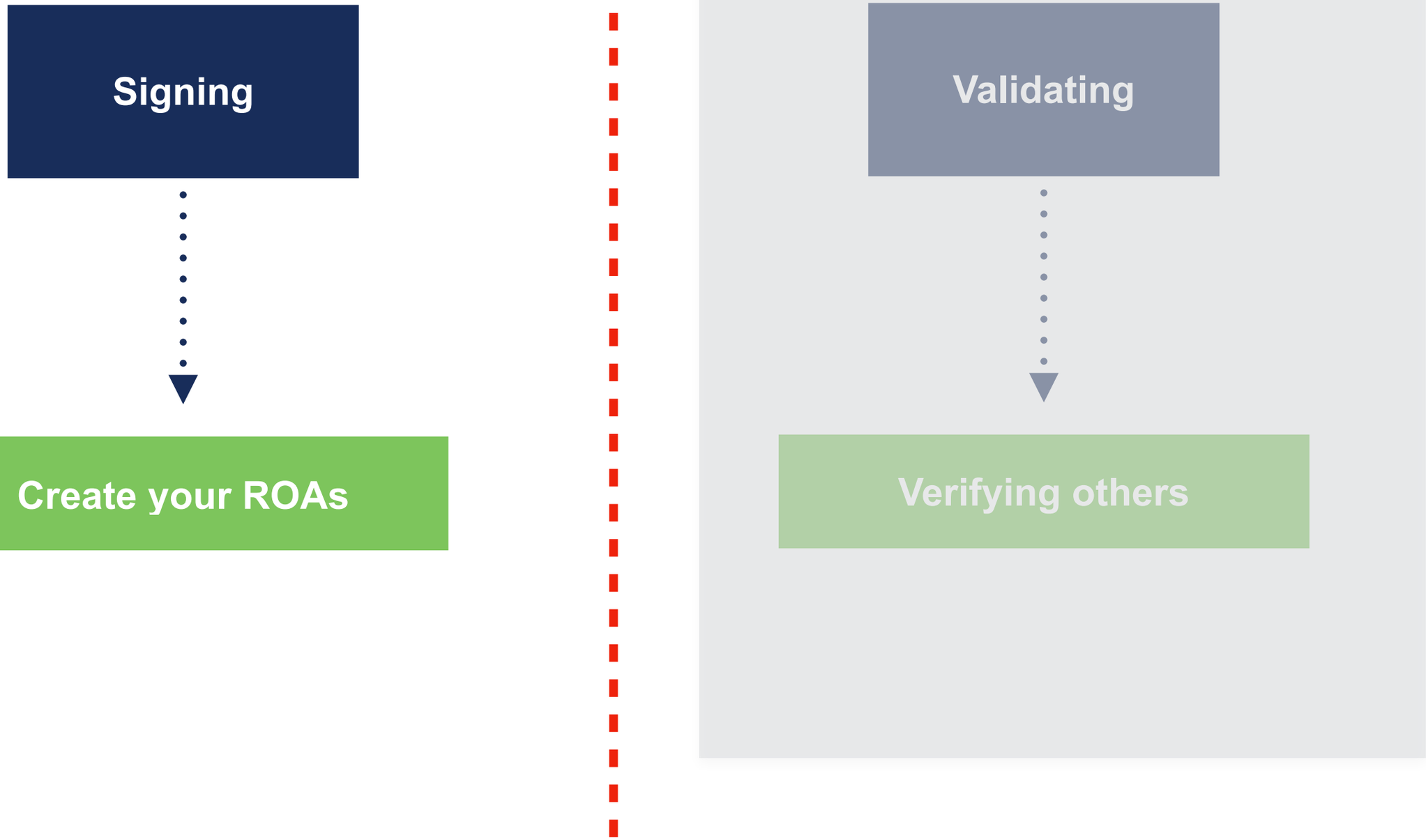
Signing

Create your ROAs

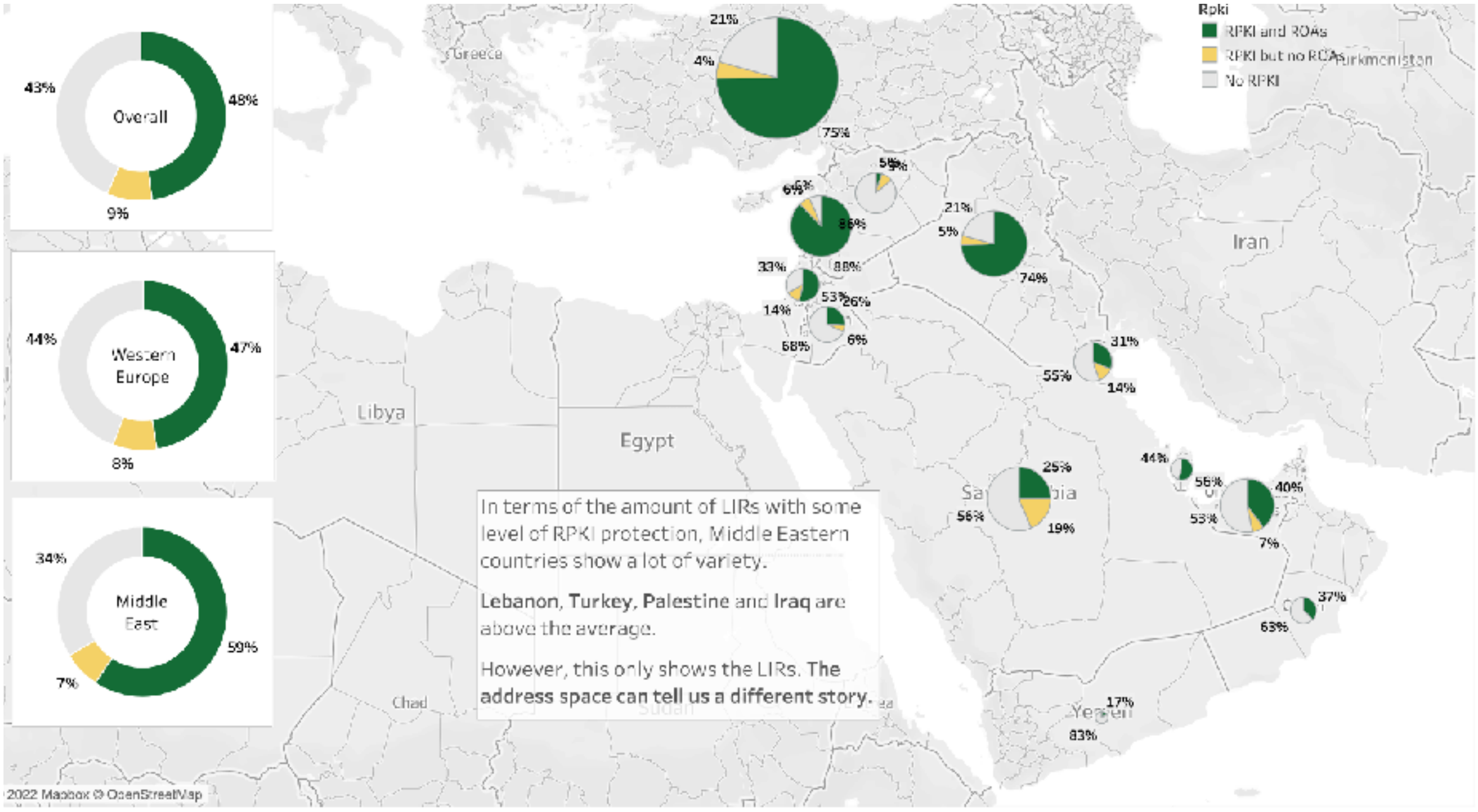
Validating

Verifying others

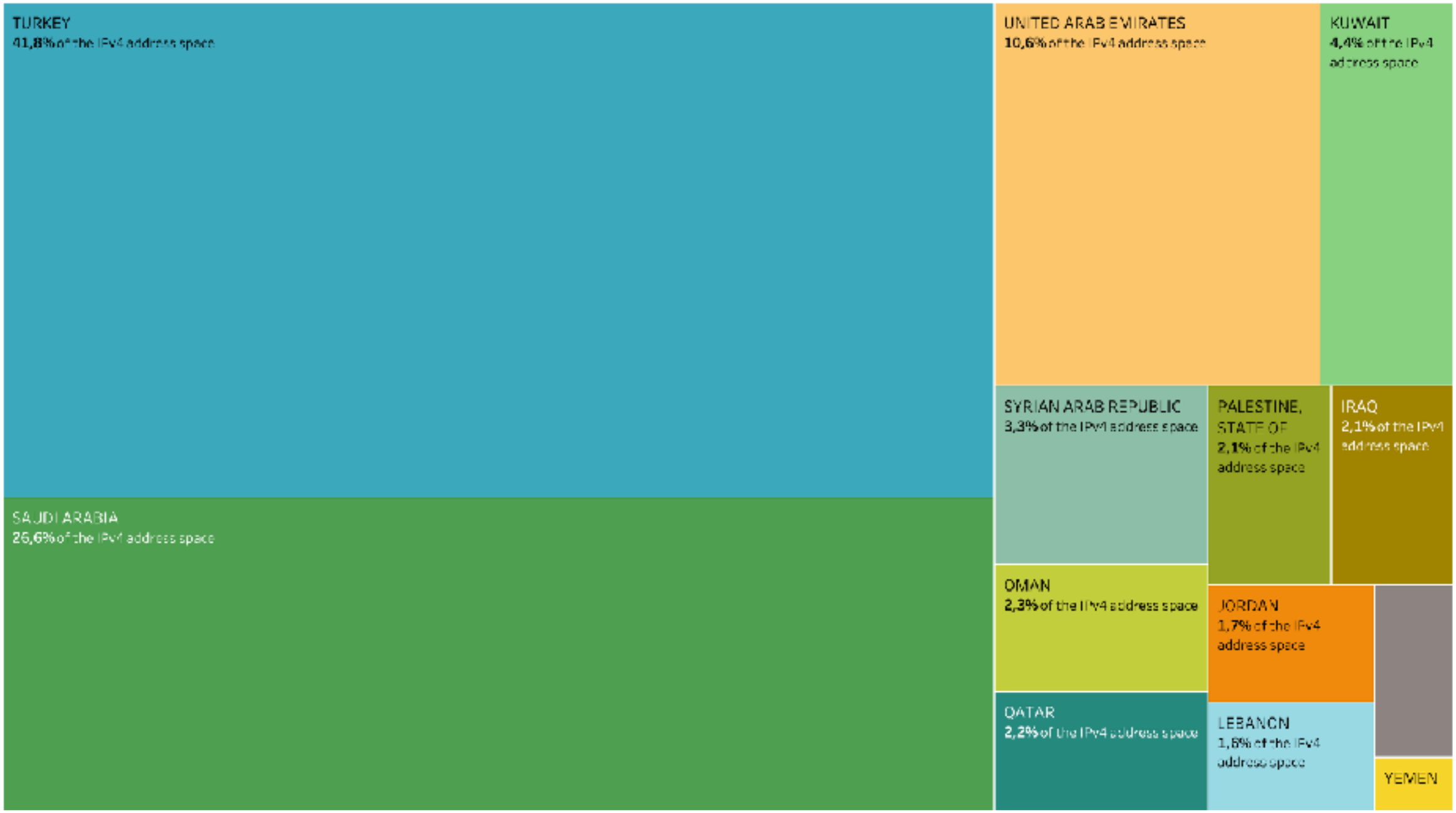
Two elements of RPKI - Signing



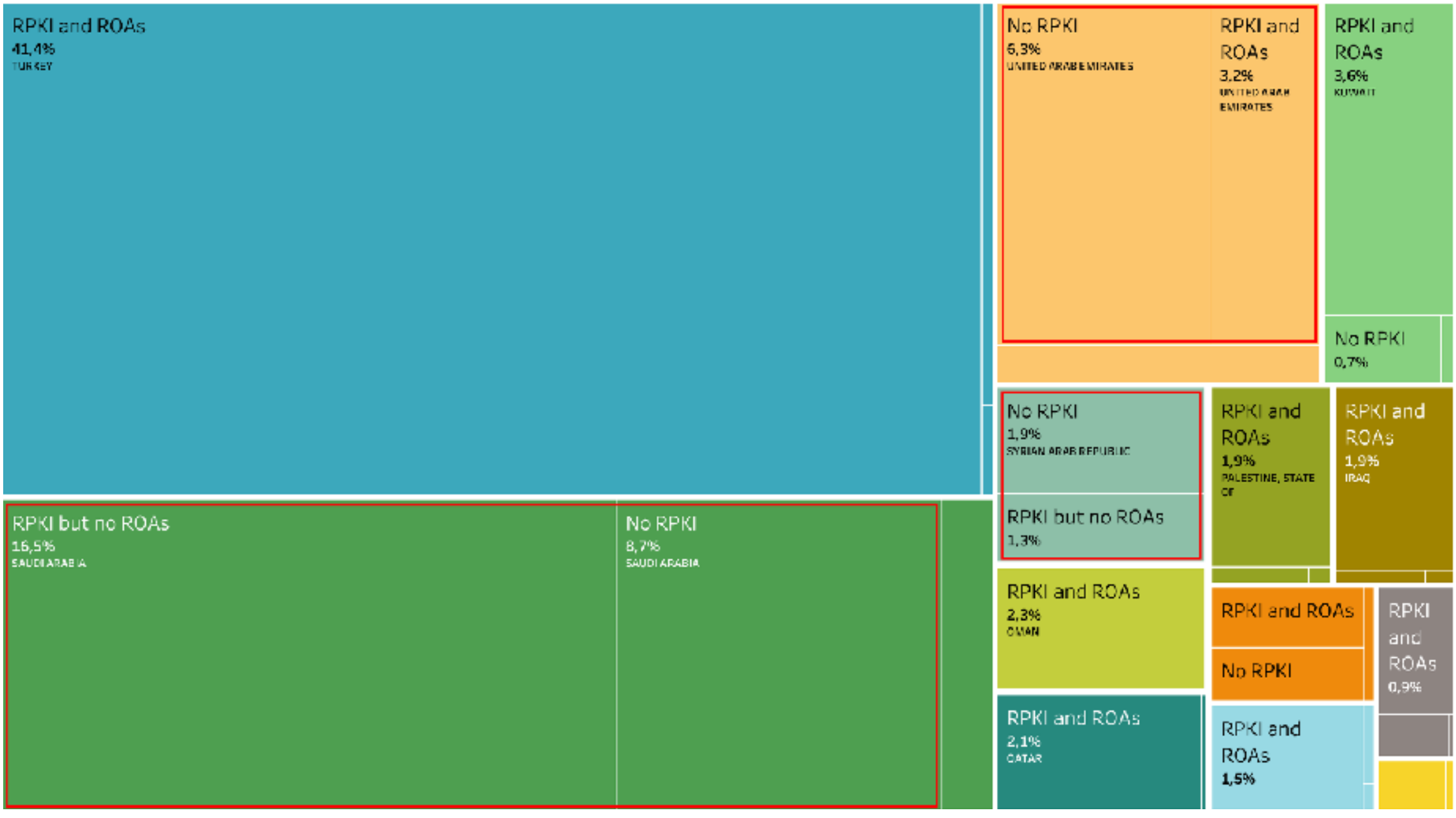
RPKI in MENOG Region



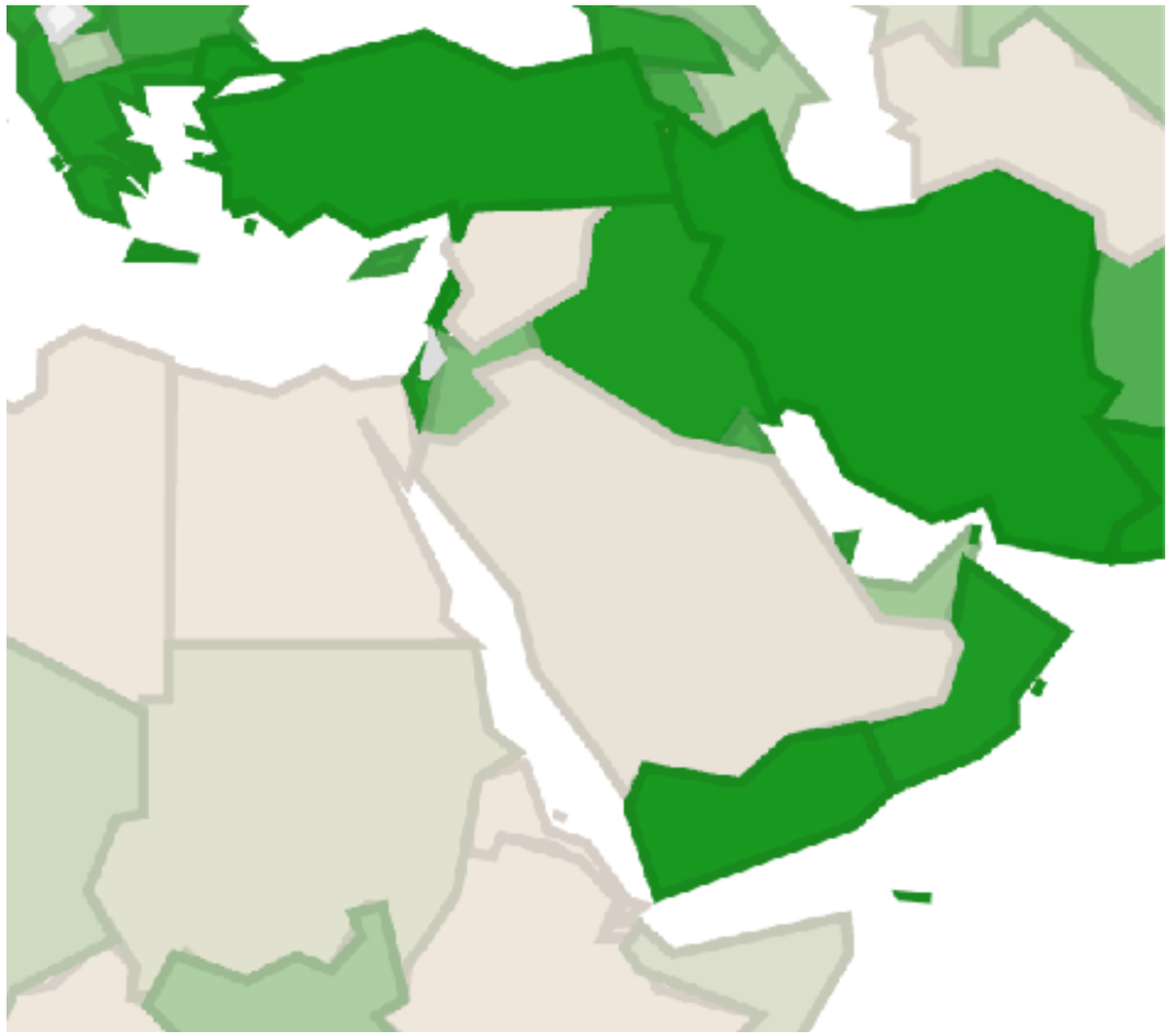
Address Space in MENOG Region



Address Space w/o RPKI



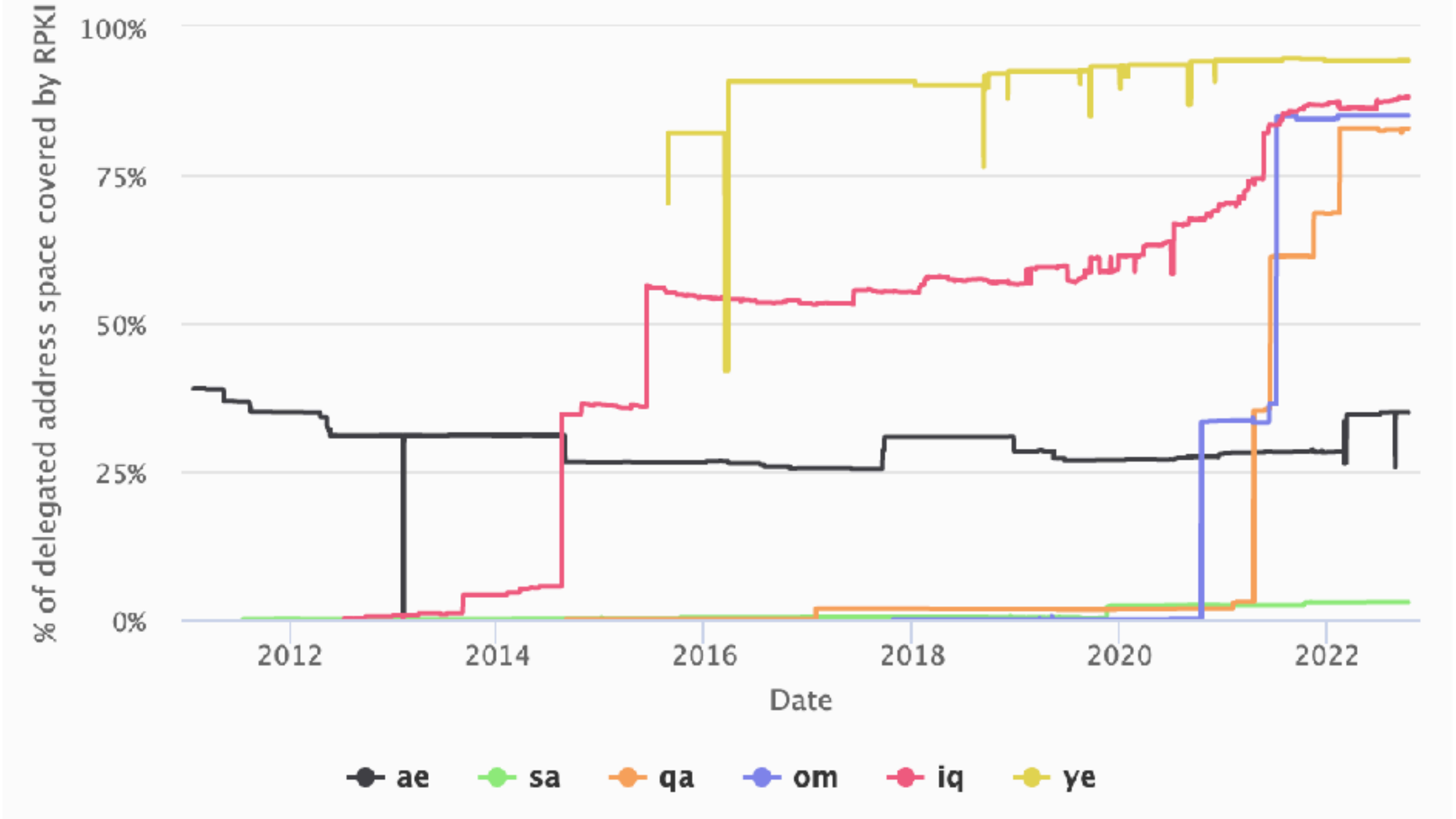
% IPv4 space covered by ROAs



Source: RIPE NCC

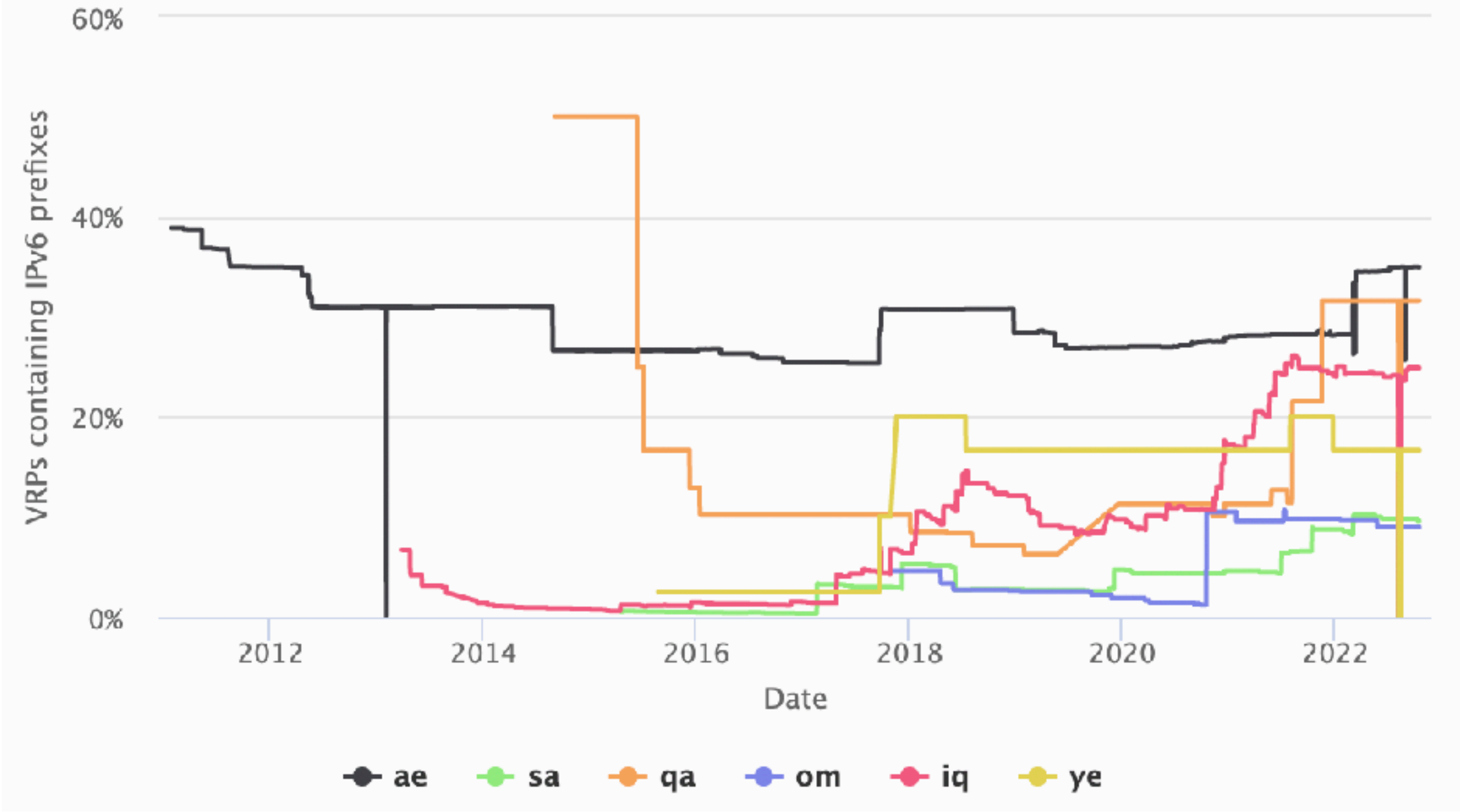
Country	%
Lebanon	97.28
Yemen	95.66
Iraq	94.86
Oman	94.02
Qatar	83.82
Kuwait	73.9
Bahrain	71.78
Jordan	50.17
Palestine	50.08
UAE	35
KSA	3.13
Syria	0.87

Historical View of RPKI Adoption (v4)



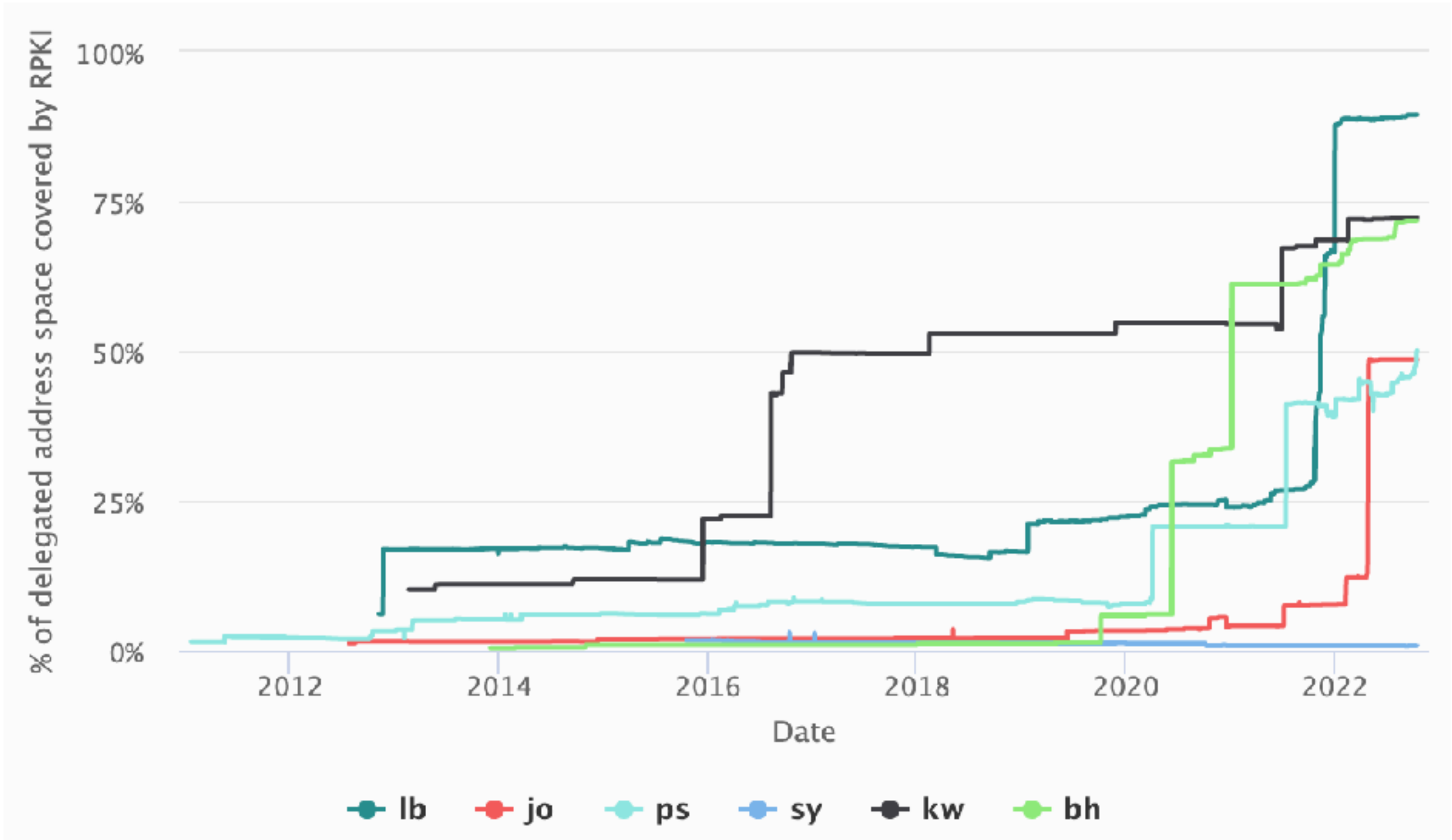
Source: https://stat.ripe.net/

Historical View of RPKI Adoption (v6)



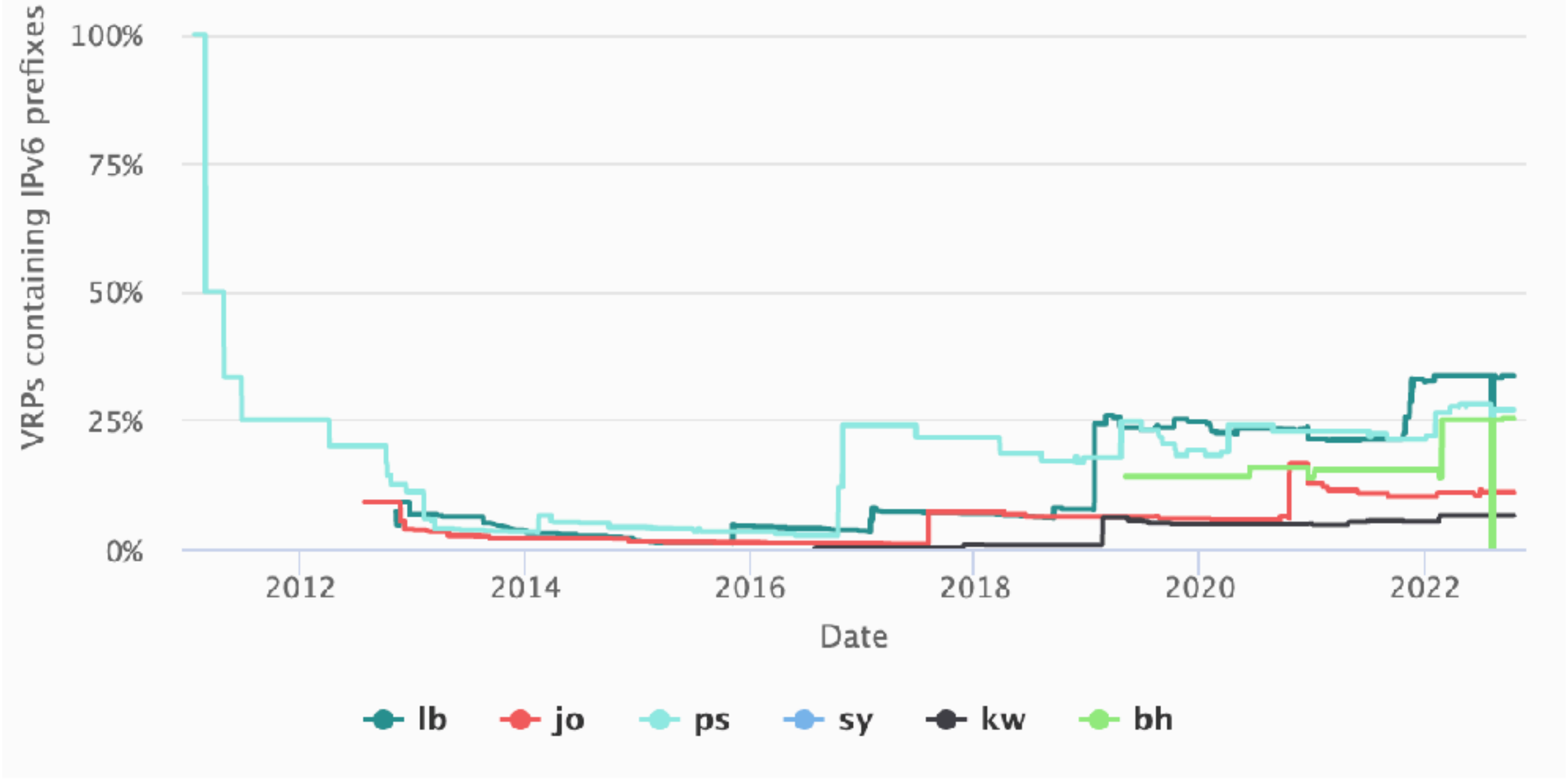
Source: https://stat.ripe.net/

Historical View of RPKI Adoption (v4)



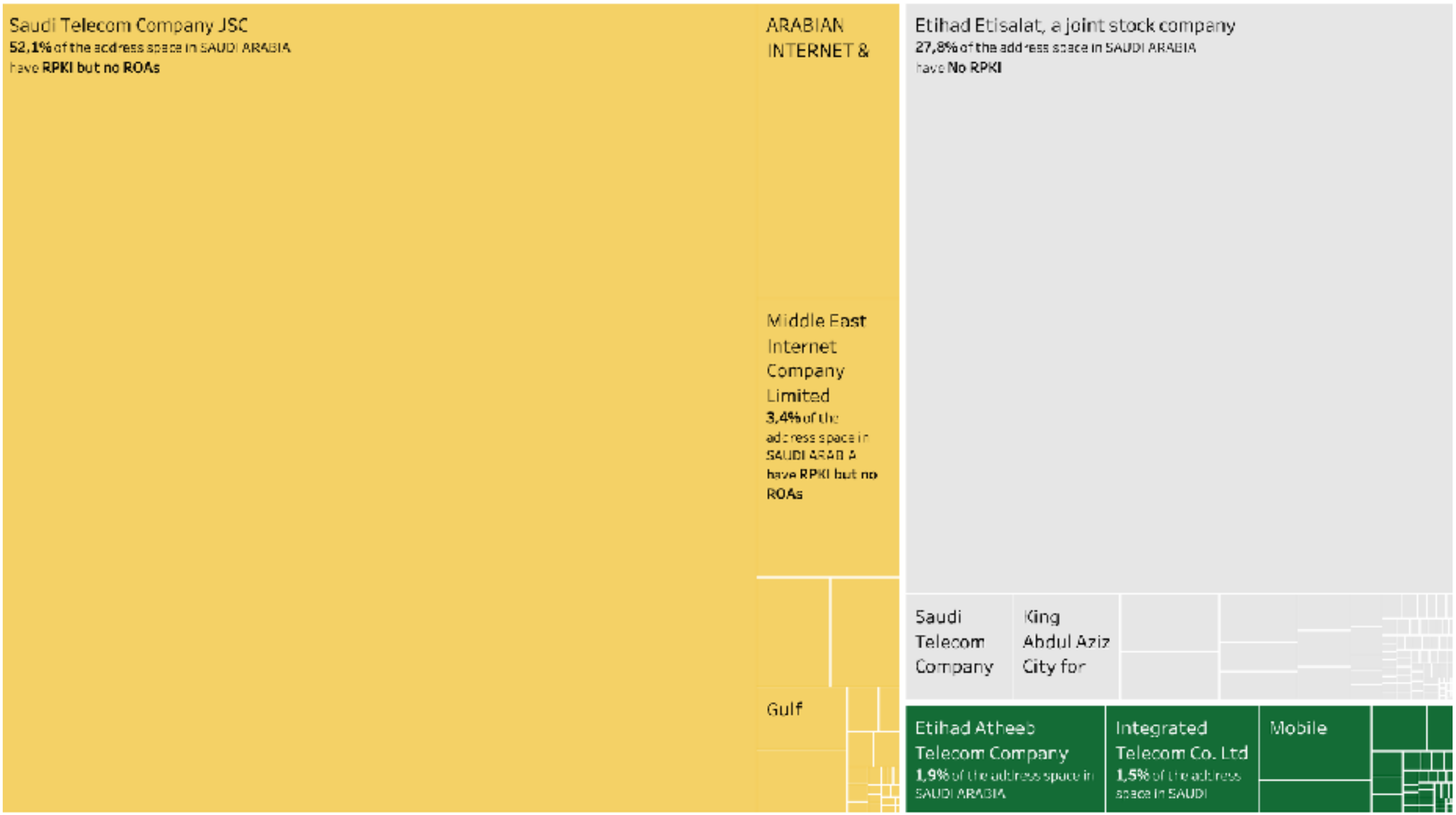
Source: https://stat.ripe.net/

Historical View of RPKI Adoption (v6)

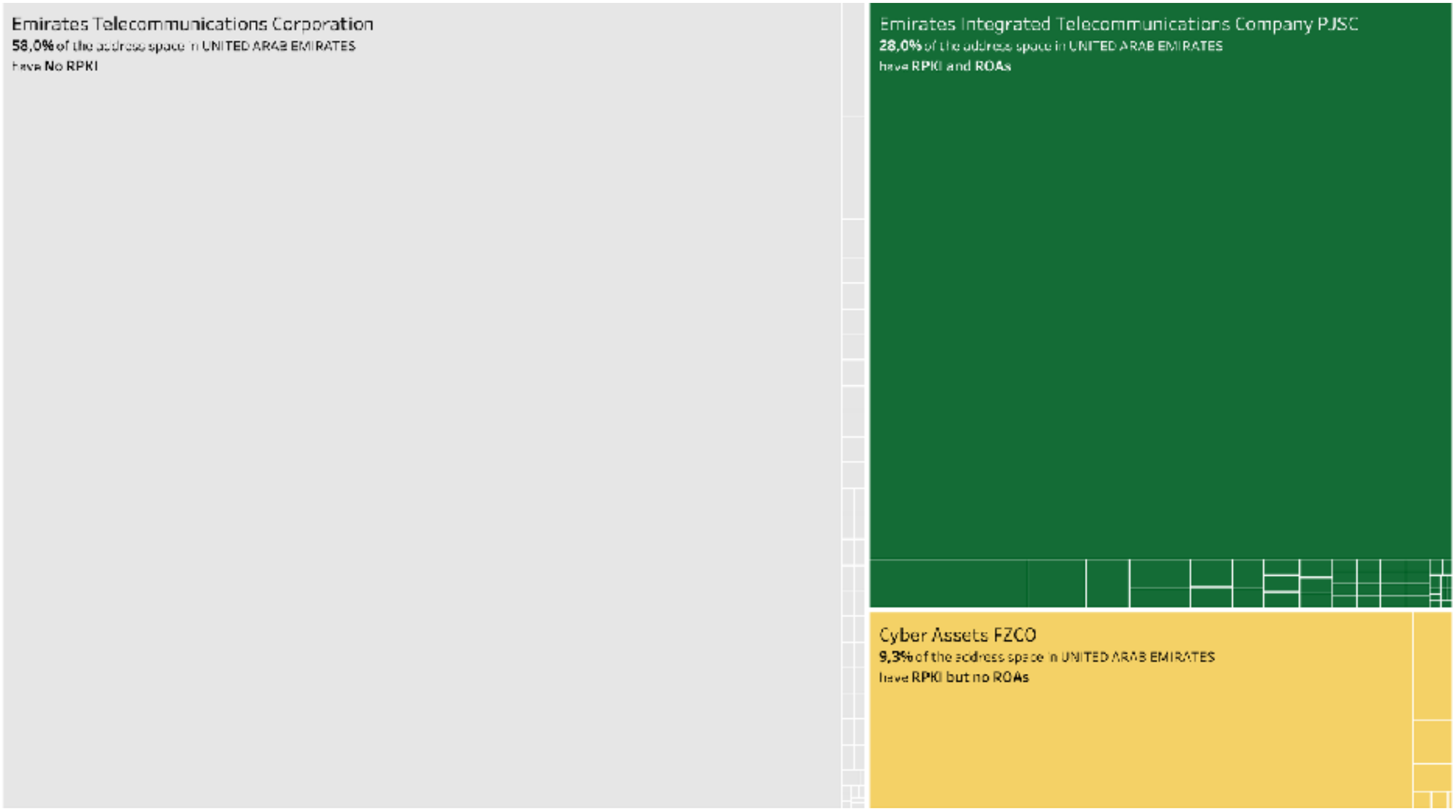


Source: https://stat.ripe.net/

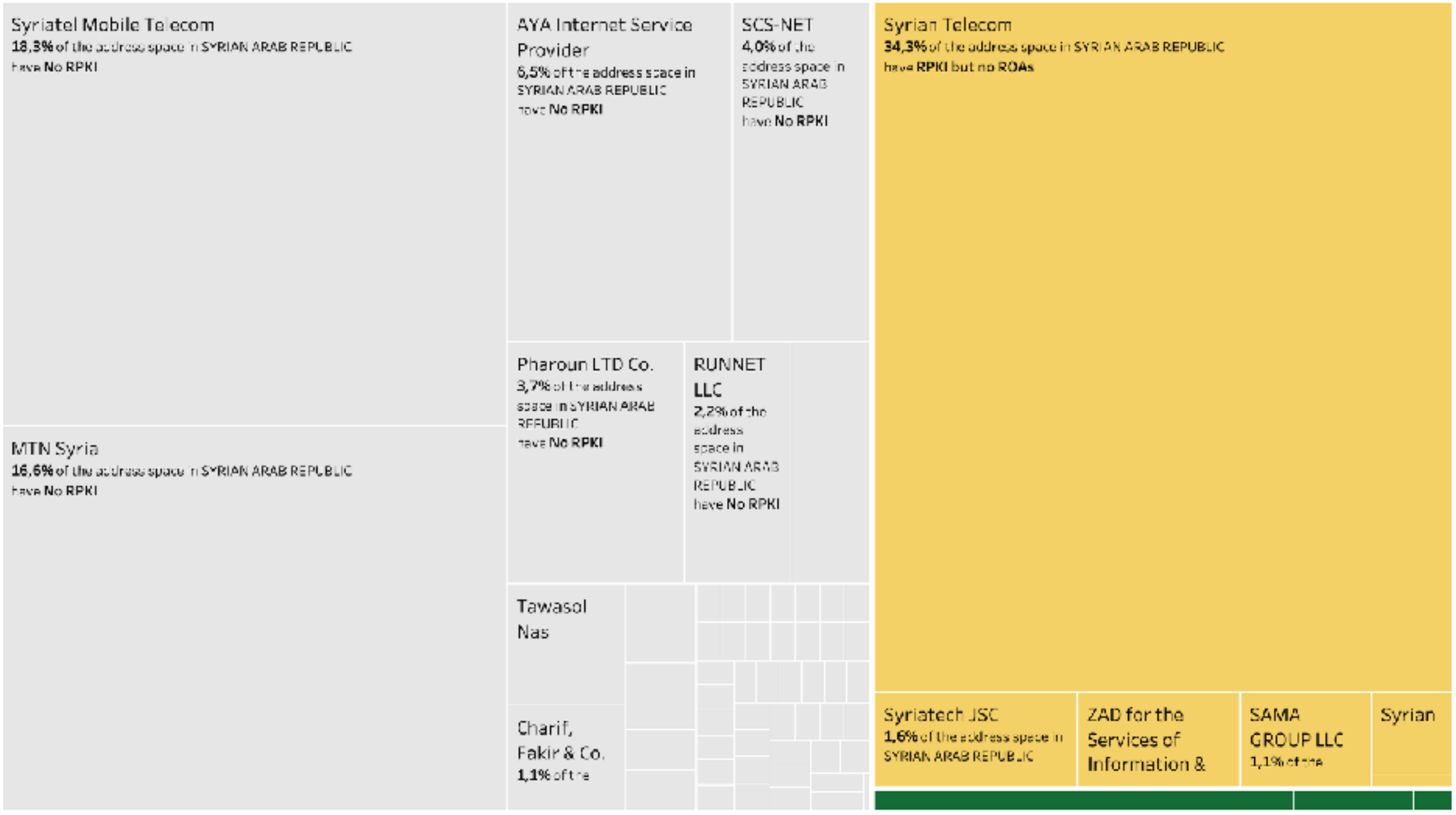
LIRs w/o RPKI or ROA - KSA



LIRs w/o RPKI or ROA - UAE

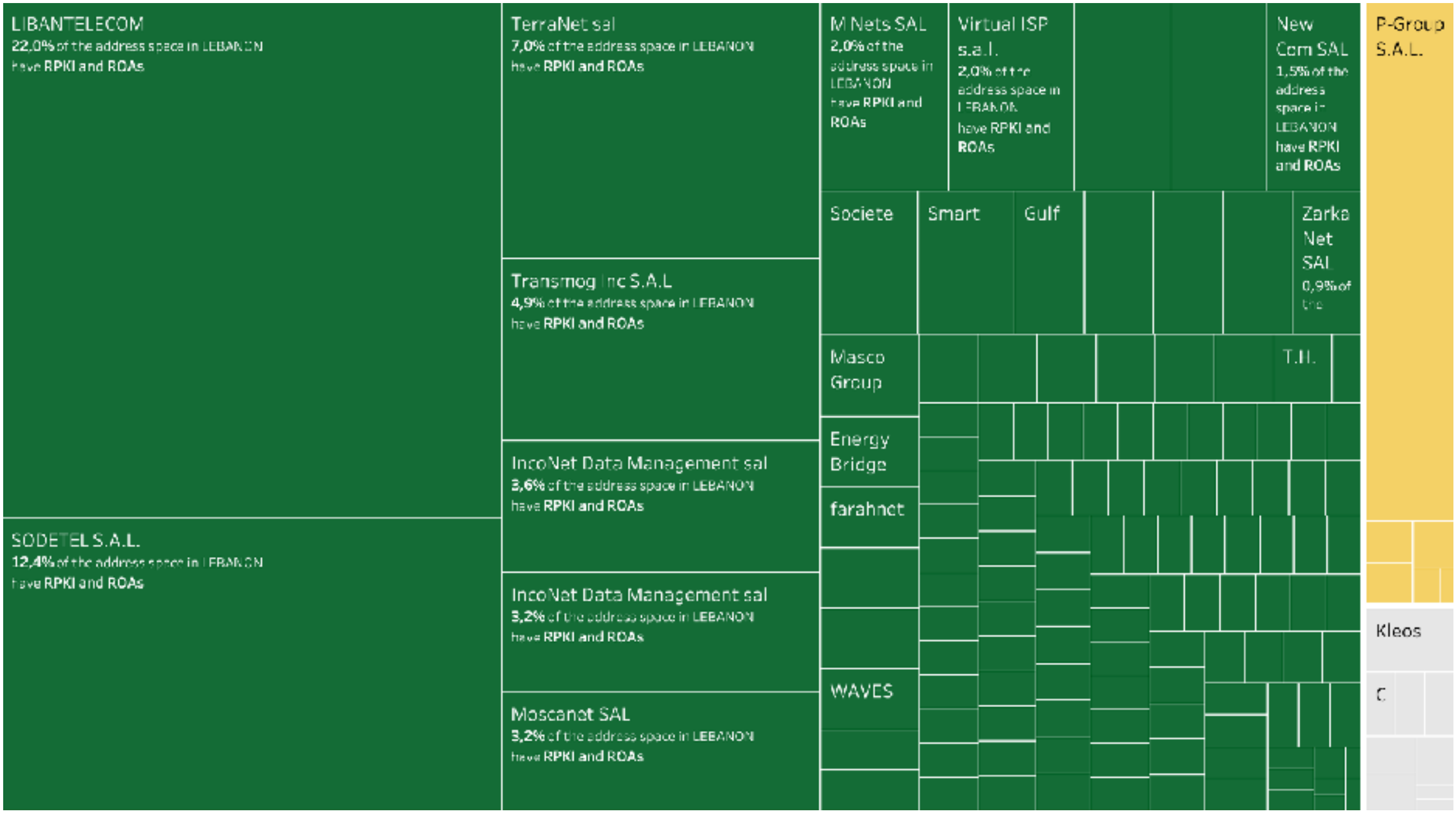


LIRs w/o RPKI or ROA - Syria

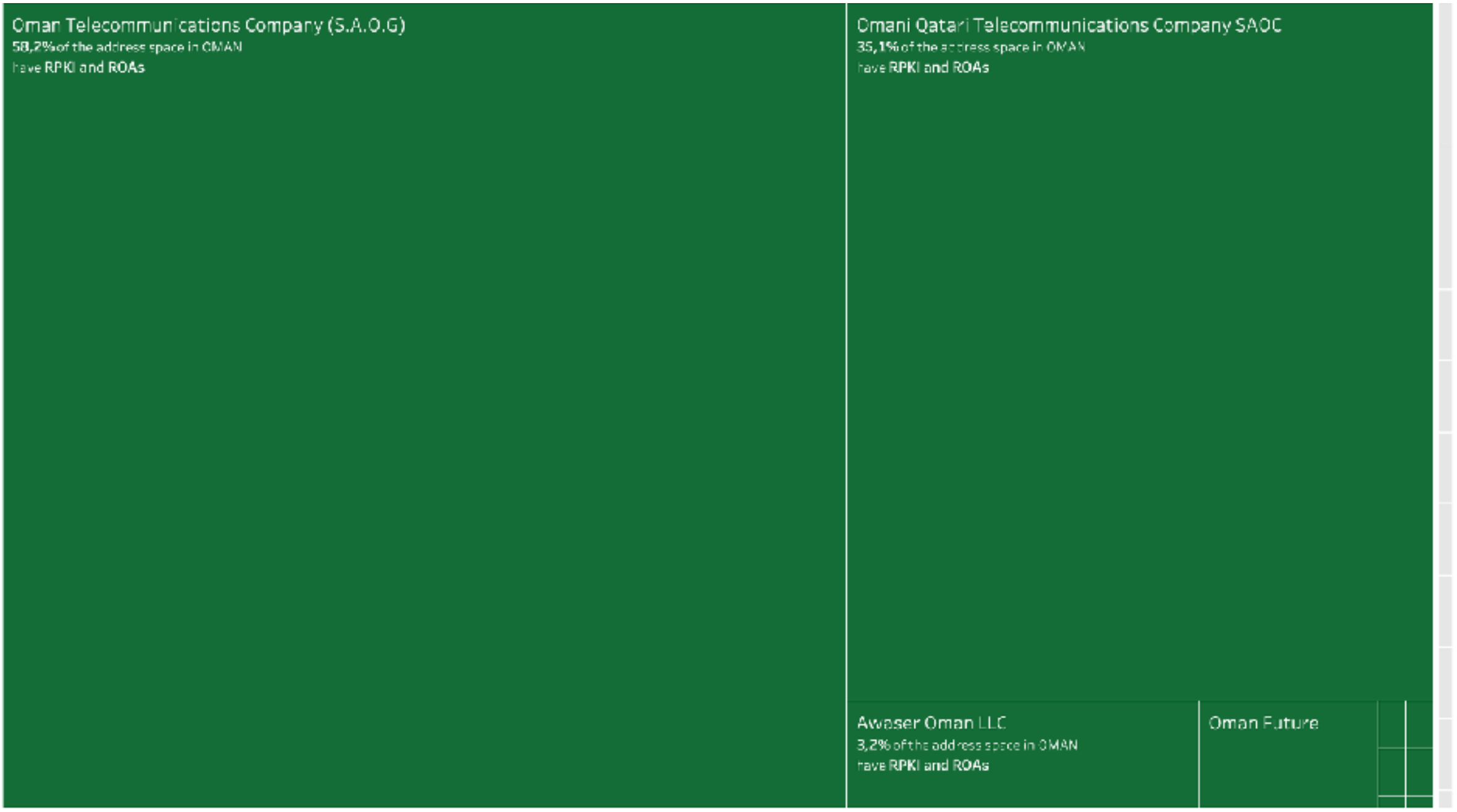


LIRs w/o RPKI or ROA - Turkey

LIRs w/o RPKI or ROA - Lebanon



LIRs w/o RPKI or ROA - Oman



Catalysts

- Knowledgable technical community
- Active digital ecosystem in the country
- Role of regulators?
- Role of peering facilities/providers & IXPs

Importance of IXPs

- Keeping the traffic local as much as possible
- Healthy IXPs scene correlated with good network resiliency
- Makes communities/countries attractive for CDNs
- Inter-IXP opportunities? 13+ IXPs in Middle East

Two elements of RPKI - Validating

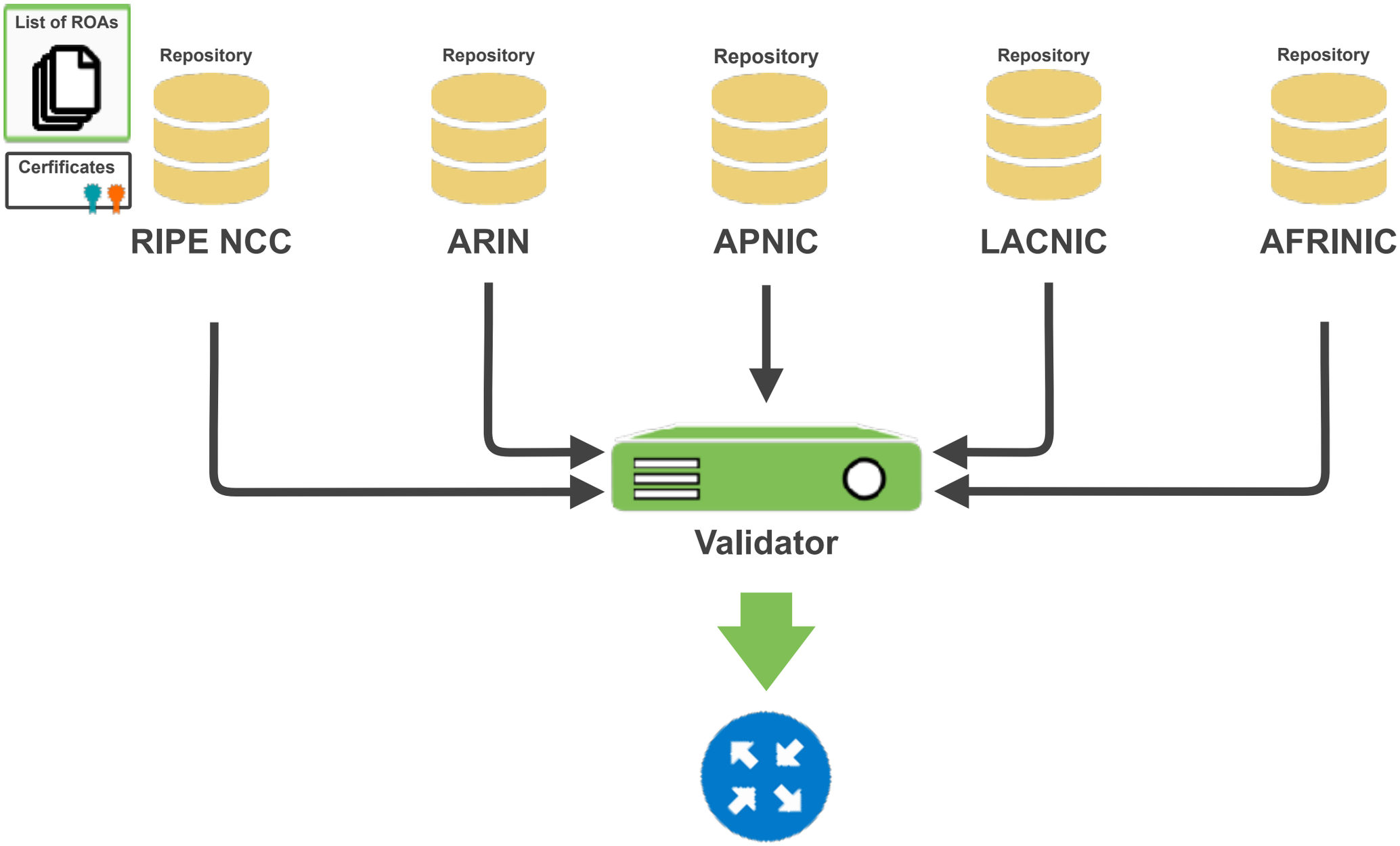
Signing

Create your ROAs

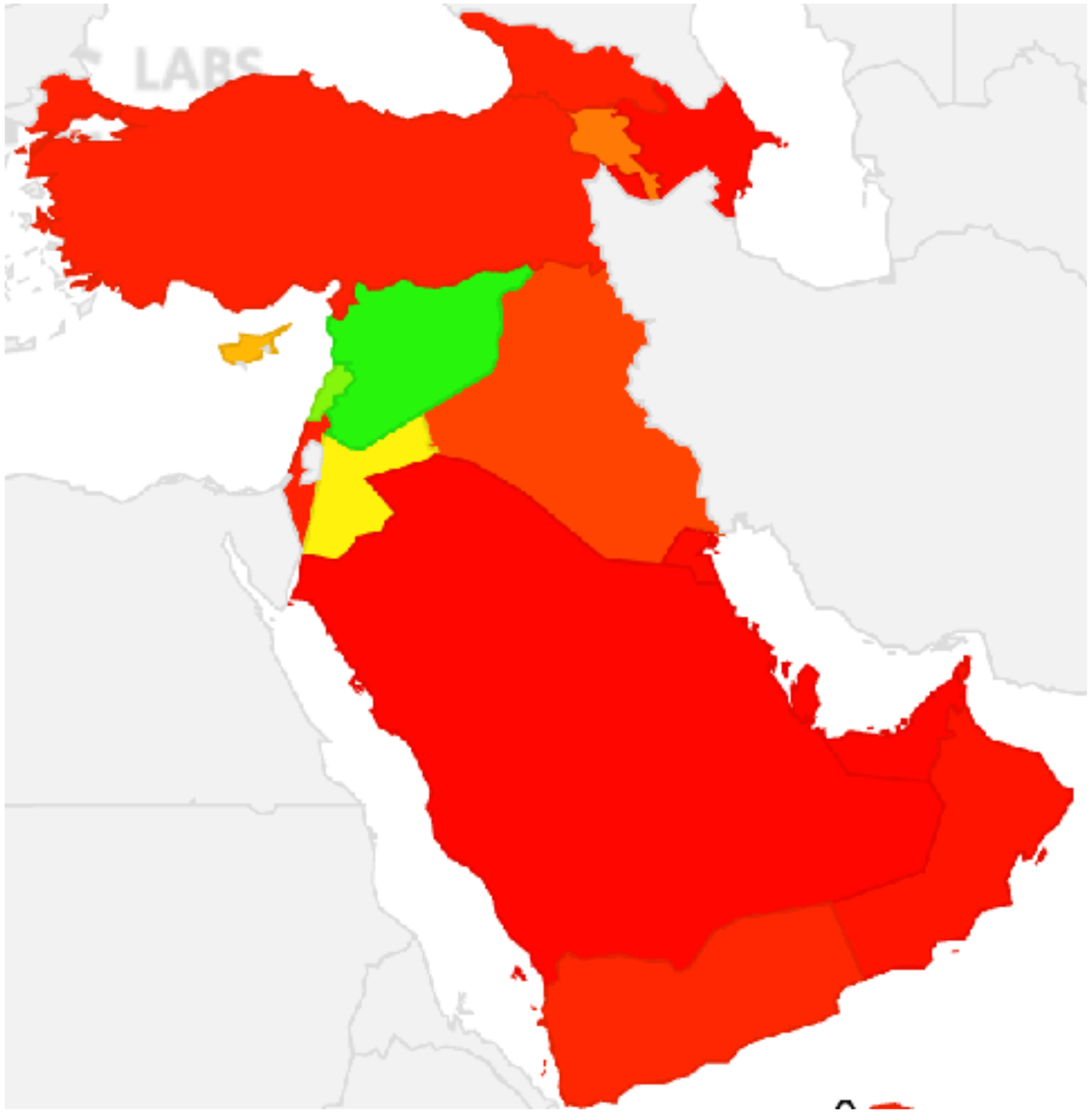
Validating

Verifying others

Relying Party



% Use of RPKI Validation (ROV)



Source: APNIC

Country	%
Syria	86.28
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Iraq	12.40
Yemen	7.26
Palestine	6.19
Oman	3.56
Kuwait	2.19
KSA	1.82
UAE	1.18
Qatar	1.17
Bahrain	0.74

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Open Discussion