Swamp Space 2026

IP4 Prefixes Past to Present

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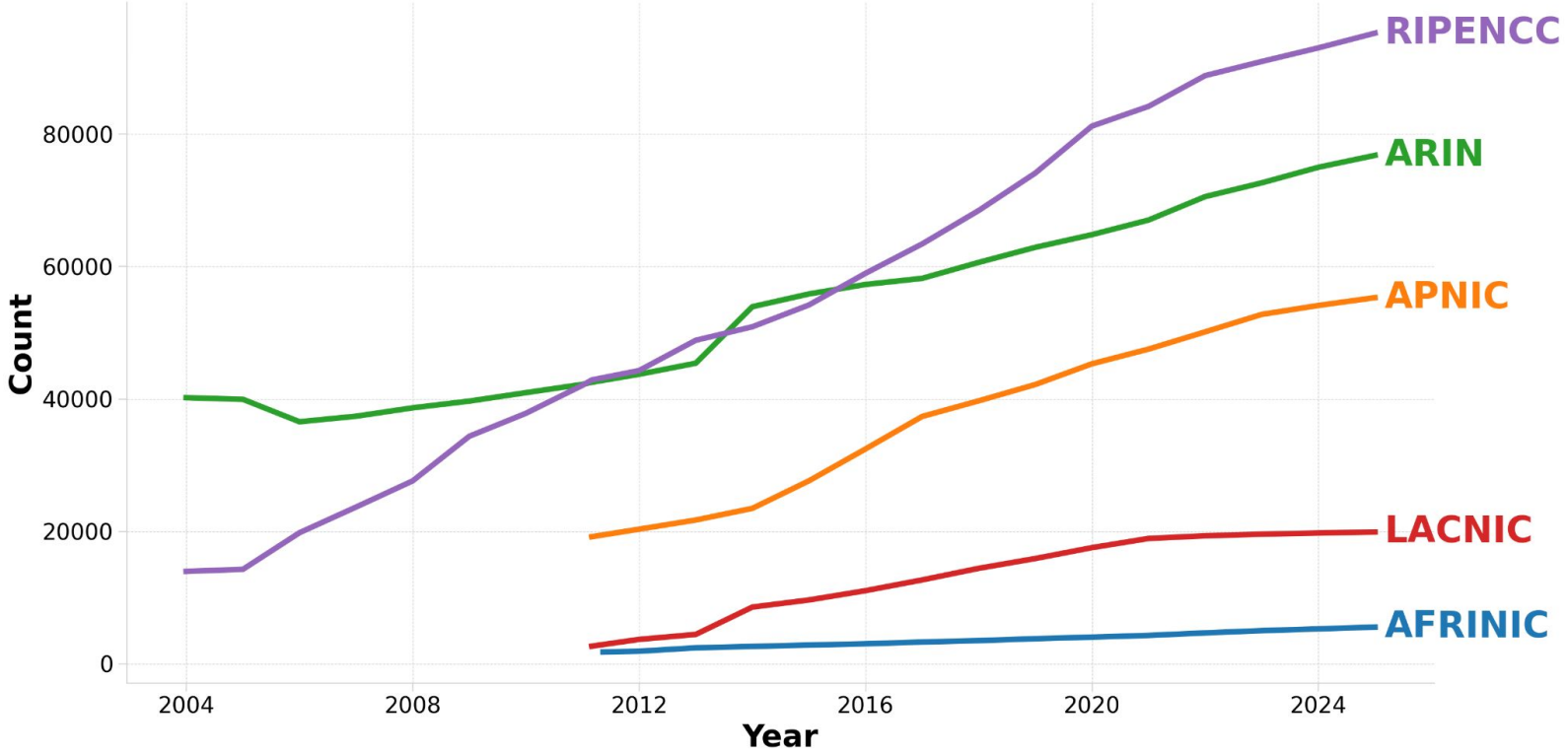
Outline

- RIR IP4 records through history
- The original swamp
- Last of the free pool
- Transfers and legacy break-ups
- The leasing market
- Routing changes and challenges
- The reputation landscape in perspective

RIR IP4 records through history

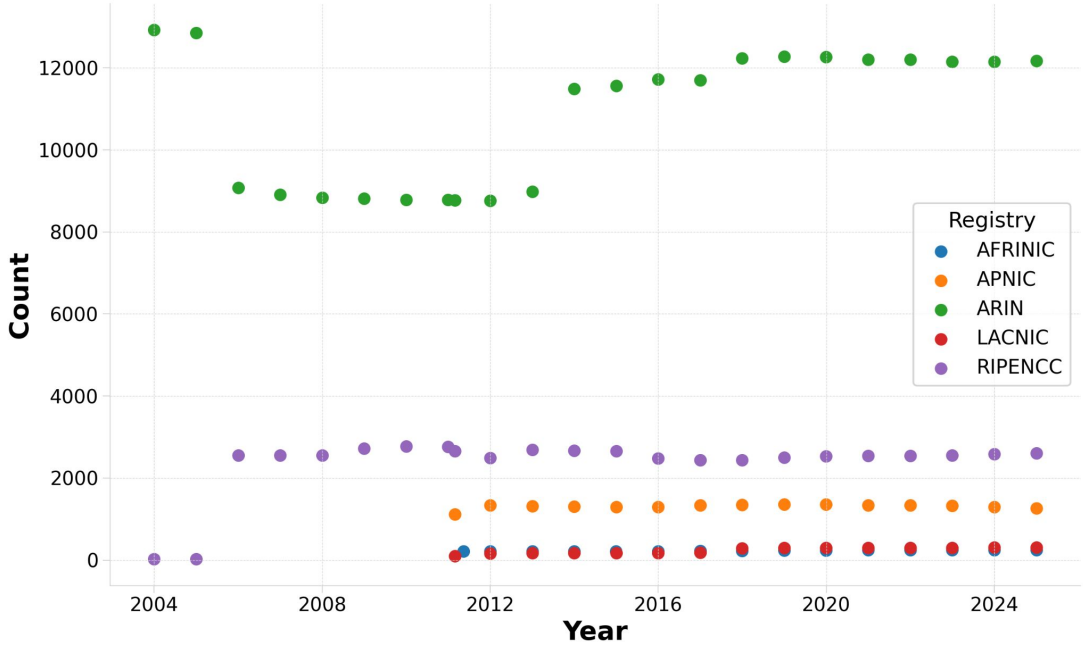


BGP route vs. RIR IP4 record

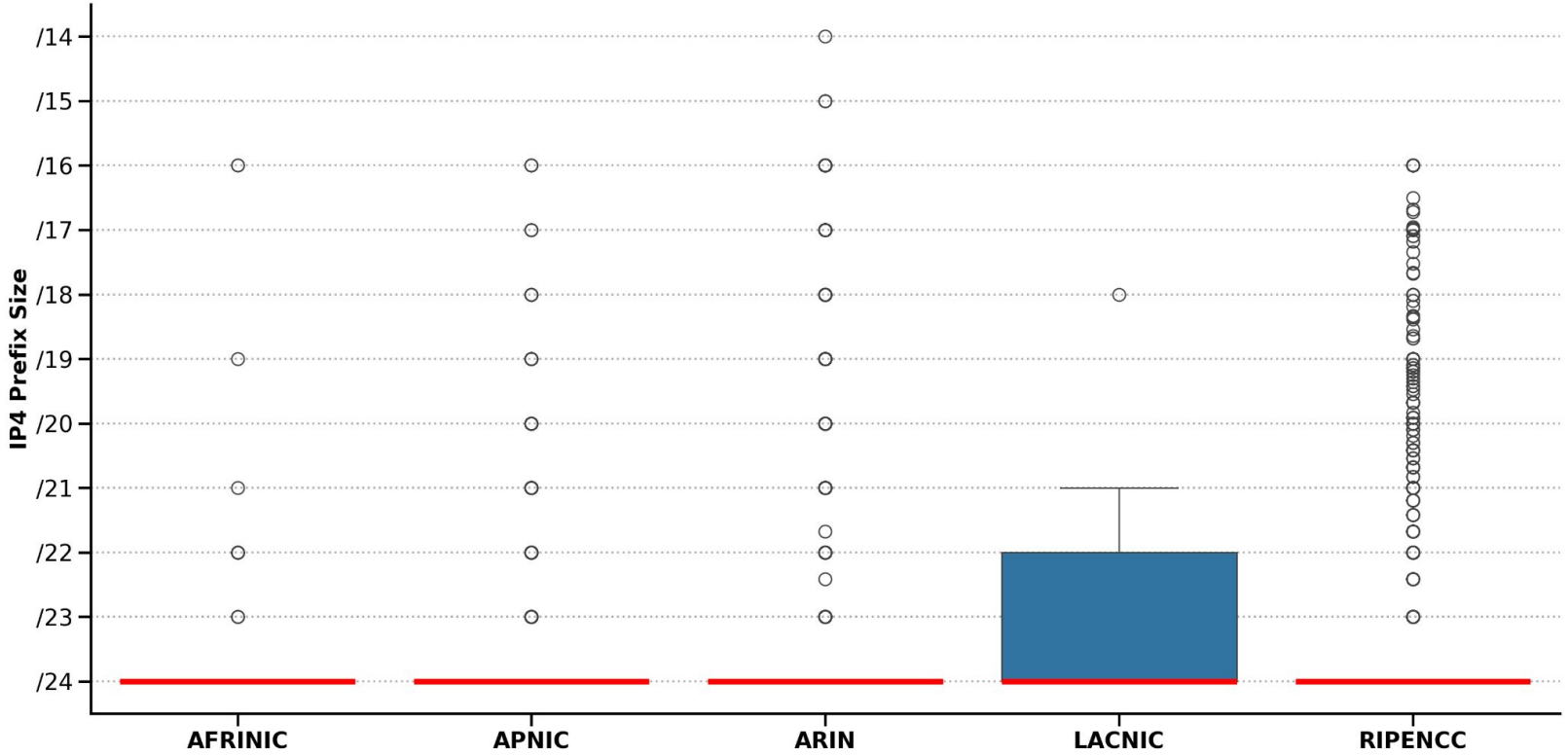
- tf-csirt.org A RR == 193.174.13.55
- Covering BGP route == 193.174.0.0/15
- Covering RIPE IP4 record ==
  - 193.174.0.0 | 65536 | 19930901
- Where is RIR 193.175.0.0/16?
  - 193.175.0.0 | 65536 | 19931229

The original swamp - 192/8 RIR records

- Legacy class C
- 192/8 in practice
- Lots of /24s
- BGP implications



192/8 records today by RIR+prefix



Last of the free pool (LoFP)

- IANA exhausted IP4 in 2011
  - One final /8 was given to each RIR
- 102/8 -> AFRINIC
- 103/8 -> APNIC
- 104/8 -> ARIN
- 179/8 -> LACNIC
- 185/8 -> RIPE

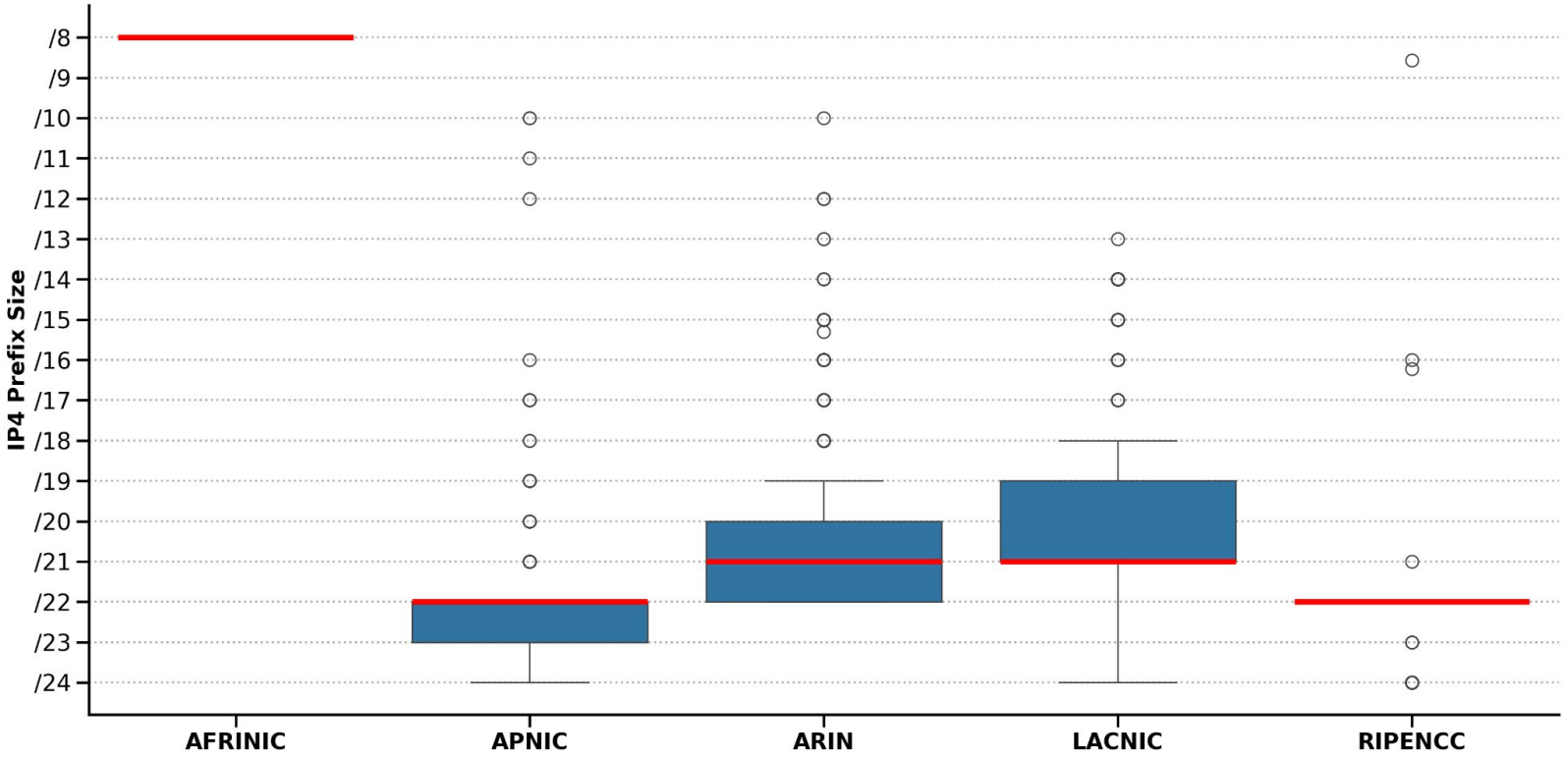
LoFP allocation and usage 2014

RIR	/8	# dispersed	% of total
AFRINIC	102	0	0
APNIC	103	4,987,392	30
ARIN	104	16,606,208	99
LACNIC	179	16,776,192	99
RIPE	185	5,291,776	32

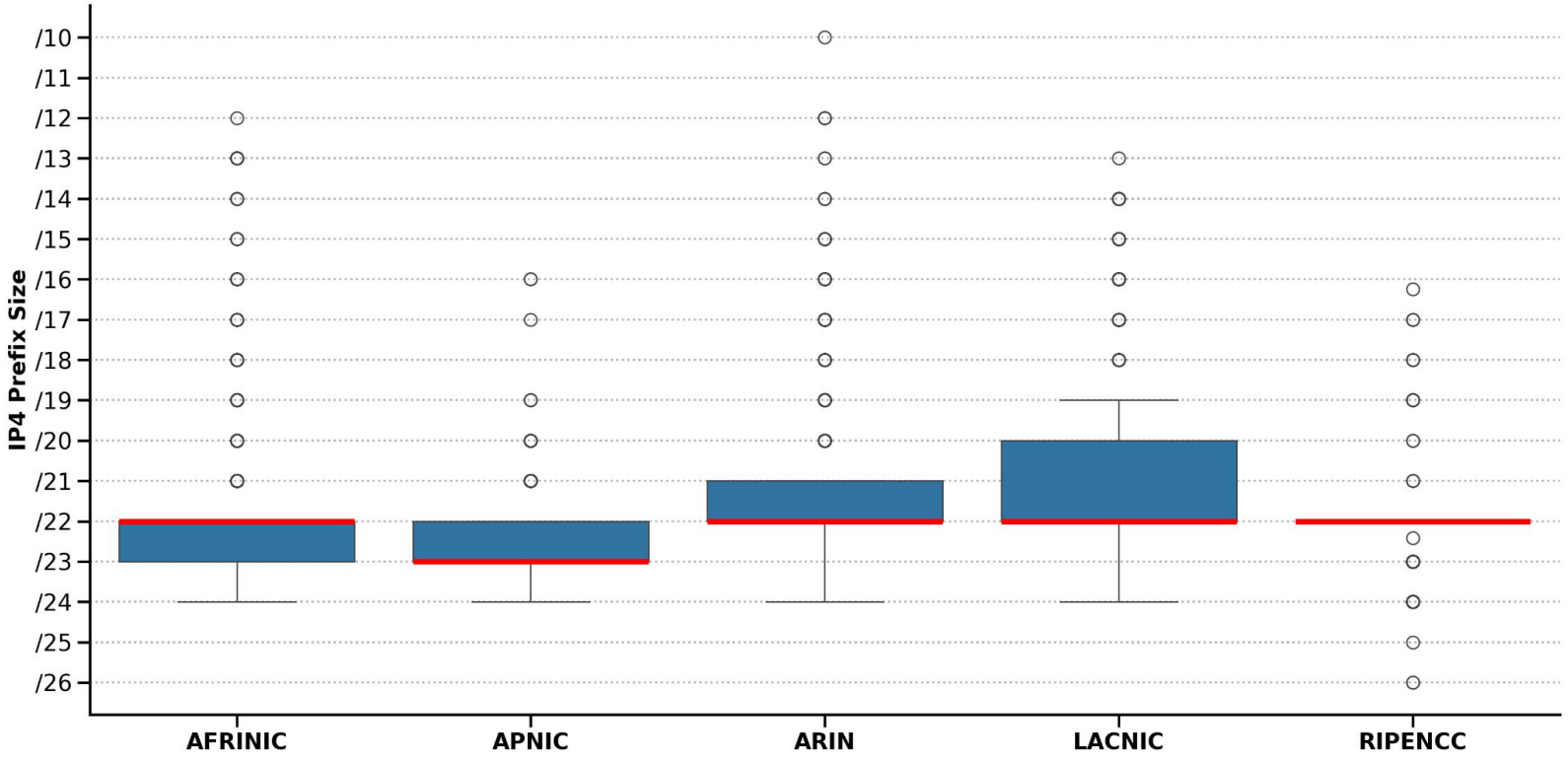
LoFP allocation and usage 2024

RIR	/8	# dispersed	% of total
AFRINIC	102	14,532,864	87
APNIC	103	16,261,888	97
ARIN	104	16,773,120	99
LACNIC	179	16,777,216	100
RIPE	185	16,677,888	99

LoFP 2014 prefix size distribution



LoFP 2024 prefix size distribution



Swamp and LoFP routing 2011

RIR	/8	# dispersed	% of total	routes	addresses	% of total
AFRINIC	102	0	0	0	0	**0**
APNIC	103	823,296	5	909	439,040	**2.6**
ARIN	104	0	0	0	0	**0**
LACNIC	179	0	0	0	0	**0**
RIPE	185	4,194,304	25	3	67,840	**0.4**
legacy	192	12,581,120	75	7373	5,980,928	**36**

Swamp and LoFP routing 2014

RIR	/8	# dispersed	% of total	routes	addresses	% of total
AFRINIC	102	0	0	12	721,920	4
APNIC	103	4,987,392	30	**8919**	3,196,160	**19**
ARIN	104	16,606,208	99	**1961**	15,274,560	**91**
LACNIC	179	16,776,192	99	**2976**	16,011,264	**95**
RIPE	185	5,291,776	32	**6255**	3,795,968	**23**
legacy	192	15,900,672	95	**10,343**	9,162,757	**55**

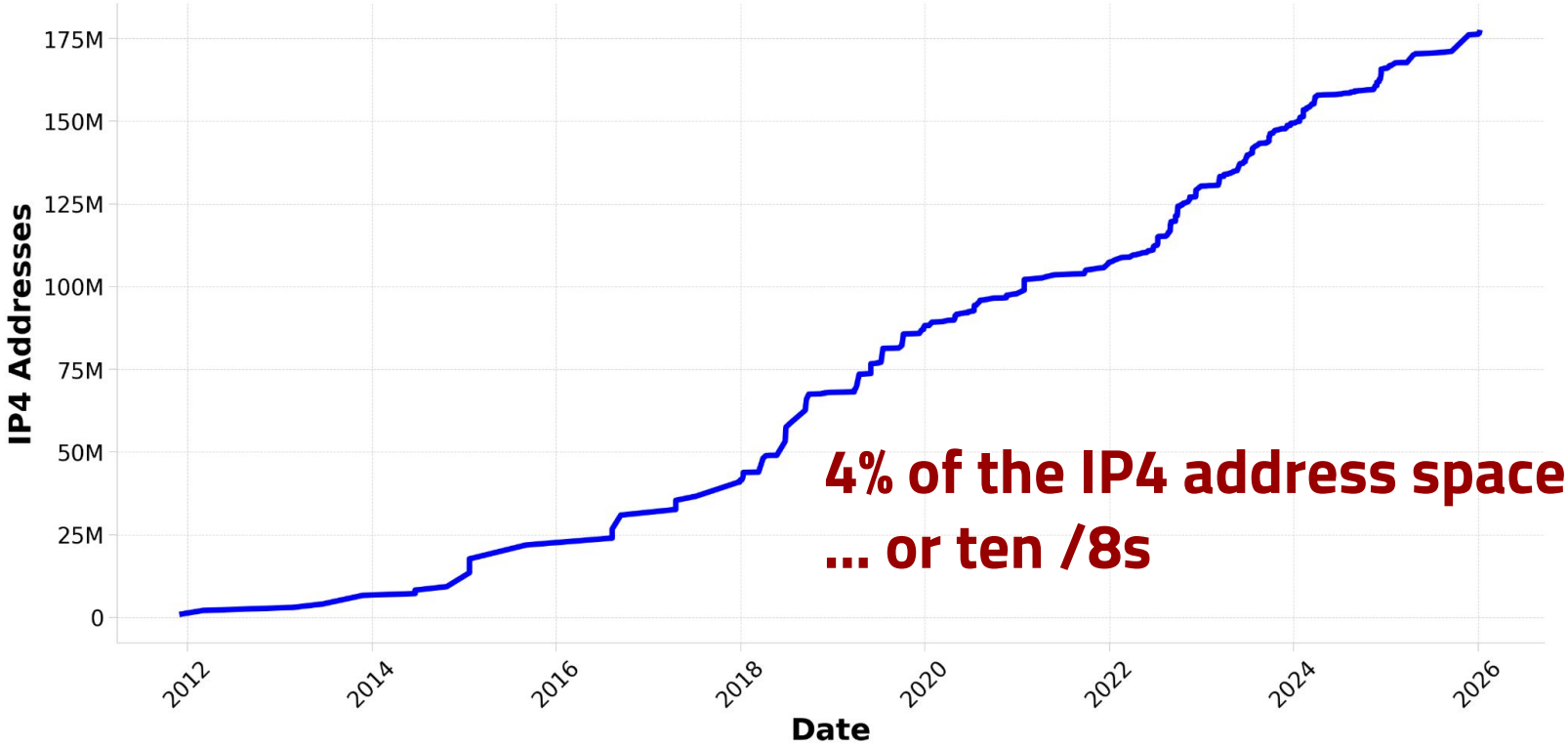
Swamp and LoFP routing 2024

RIR	/8	# dispersed	% of total	routes	addresses	% of total
AFRINIC	102	14,532,864	87	7970	13,626,112	81
APNIC	103	16,261,888	97	**42,660**	12,150,728	**72**
ARIN	104	16,773,120	99	7033	15,991,808	95
LACNIC	179	16,777,216	100	5973	16,565,760	99
RIPE	185	16,677,888	99	**34,143**	14,578,176	**87**
legacy	192	16,585,728	99	14,526	10,320,960	62

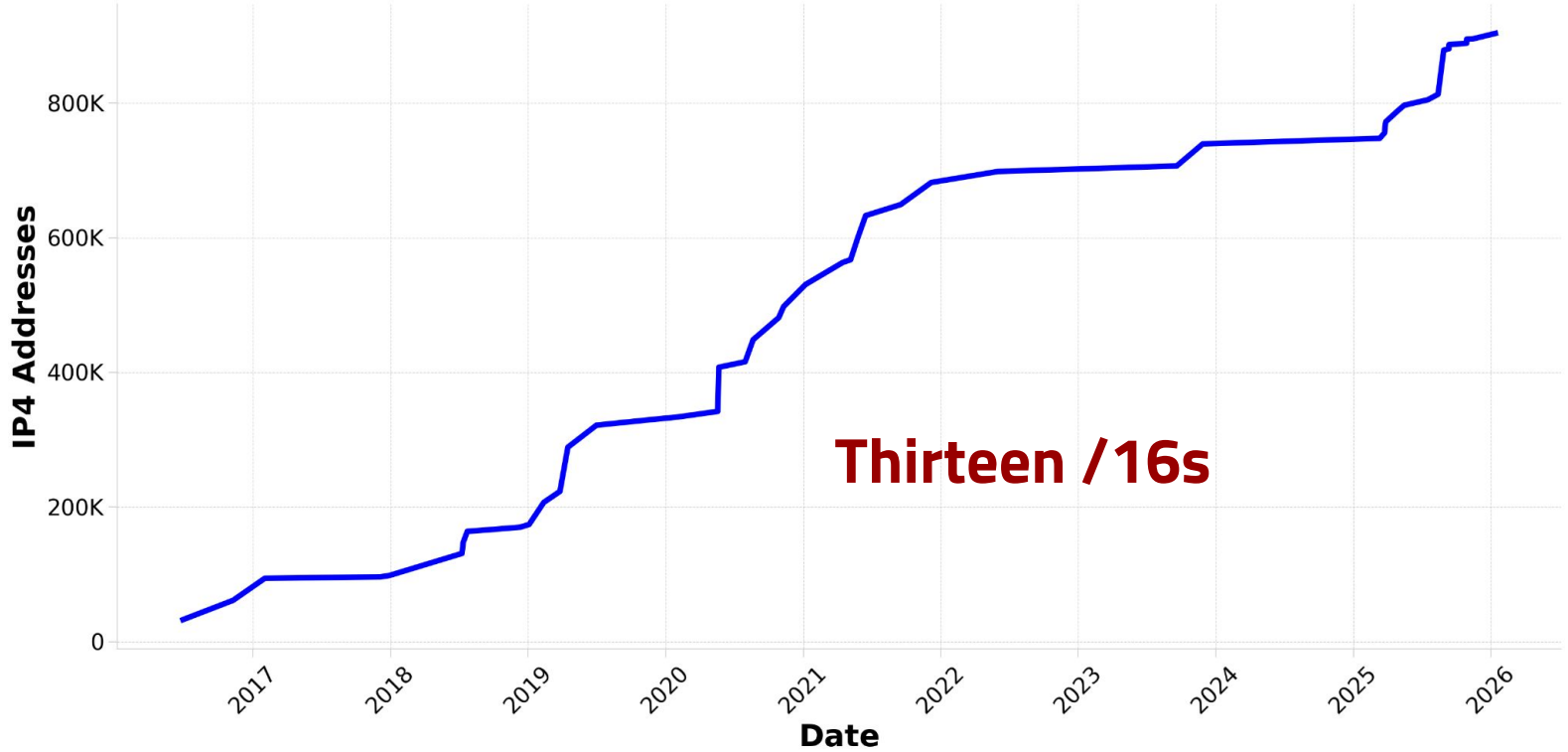
Internet resources move

- As of 2024
  - 376 of APNIC's LoFP is in another RIR
  - 38 of ARIN's LoFP is in another RIR
  - 2 of LACNIC's LoFP is in another RIR
  - 18,557 of RIPE's LoFP is in another RIR

ARIN region IP4 transfers to Amazon



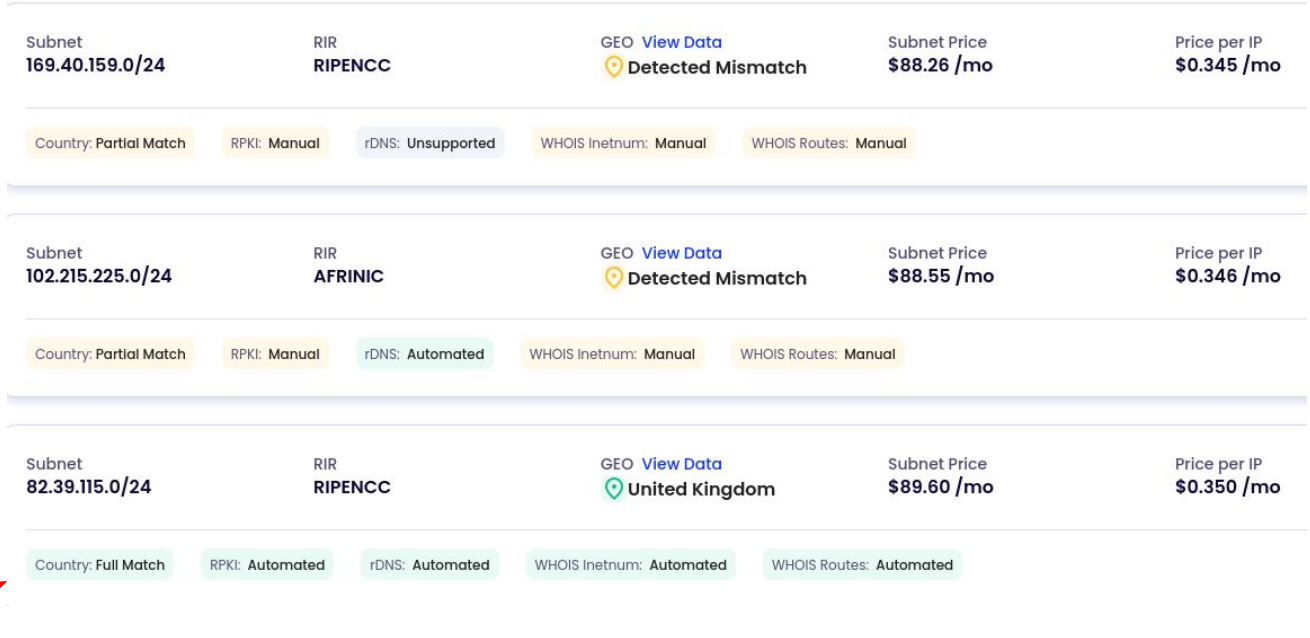
University transfers out of ARIN



The Internet resource market

- IP4 addresses have value
  - Some more than others
- /24 transfers go for $6000 - $10,000 USD
  - Two /15s sold for $7.5 million recently
- /24 monthly lease currently ~ $100 USD
- ASNs and IP6 for sale too
  - But readily available from RIRs

The leasing market features



County: Full Match

Leased address usage

- Brokers want to protect address reputation
  - May regularly scan, watch block lists
- Announcing leased addresses into BGP
  - Most upstreams will validate rights
  - Letter of Authorization, RIR database update, RPKI ROA object, email verification

The IP address reputation landscape

- The swamp is the new normal, its all IP4 now
- Who is gobbling addresses is “interesting”
- What addresses getting gobbled can be too
- Address reputation and geoloc are big business
- The reason for IP6 is increasingly financial
- Exercise care in buying/selling resources

Thank you

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