



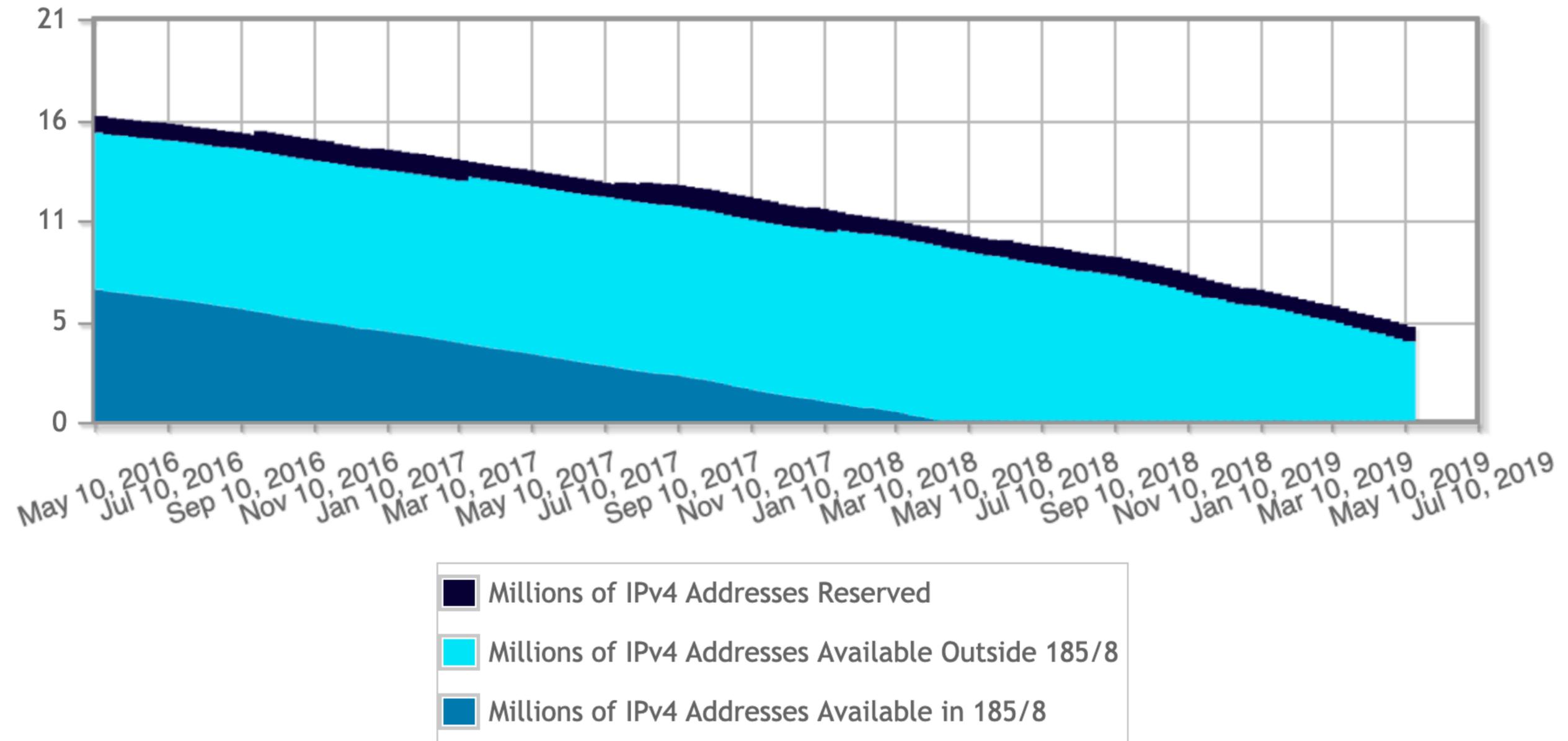
RIPE NCC
RIPE NETWORK COORDINATION CENTRE

Handling IPv4 Runout

...while focusing on IPv6



RIPE NCC IPv4 Pool – Last 36 Months





**Will IPv4 Last Until
Rotterdam?**

Current Status



	IP Addresses	/22s
Total IPv4	4.151.040	4053
Contiguous /22s	3.162.112	3088
Reserved /16	65.536	64
Fragments		965

Consumption Rate (Allocations)	
January	393
February	414
March	470
April	500
Six Month Average	475

When Will We Run Out?



- **According to current consumption rate:**
 - Contiguous /22s: Late November 2019
 - Incl. the Reserved /16: Early December 2019
 - Incl. Fragments: Early February 2020

- **But it will likely be much sooner...**
 - At RIPE 77 the estimation was May/June 2020



**Then Comes a
Waiting List**

Preparations Have Started



It involves a lot of work:

- Review our procedures
- Plan complex changes to our internal/external software
- Updates to our documentation
- Ensure clear communication with our stakeholders

Goals



- Be ready as early as possible
- Keep things simple
- Ensure fairness and transparency
- Efficiency: automate as much as possible
- Keep members and other stakeholders informed
- Learn from the experience of reaching the final /8 in 2012

New Policy Proposal



2019-02 v2: IPv4 Waiting List Implementation

- “First come, first served” waiting list for IPv4 allocations
- When the equivalent of a /22 can no longer be allocated
- The size of allocations is reduced from /22 to /24
- For LIRs without an allocation from the RIPE NCC
- IPv4 blocks smaller than a /24 are kept aside



If Accepted...

- **Timelines until exhaustion are not affected**
- More LIRs will receive a small(er) chunk of IPv4
- Reduced waiting time
- Less attractive for speculators



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- Timelines until exhaustion are not affected
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Recovered IPv4 Addresses (2016-2018)	
2016	83,712
2017	106,368
2018	53,824

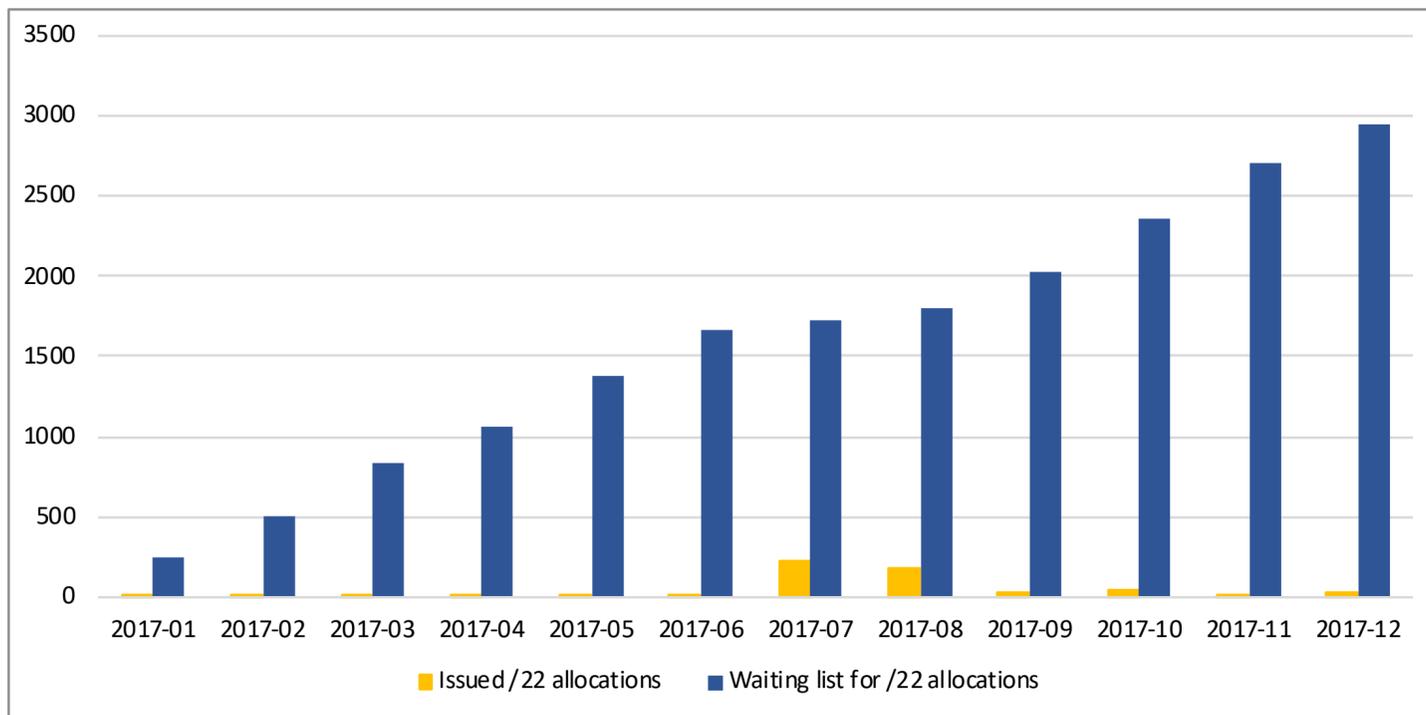
Will accommodate 320 requests per year, compared to 80 under current policy



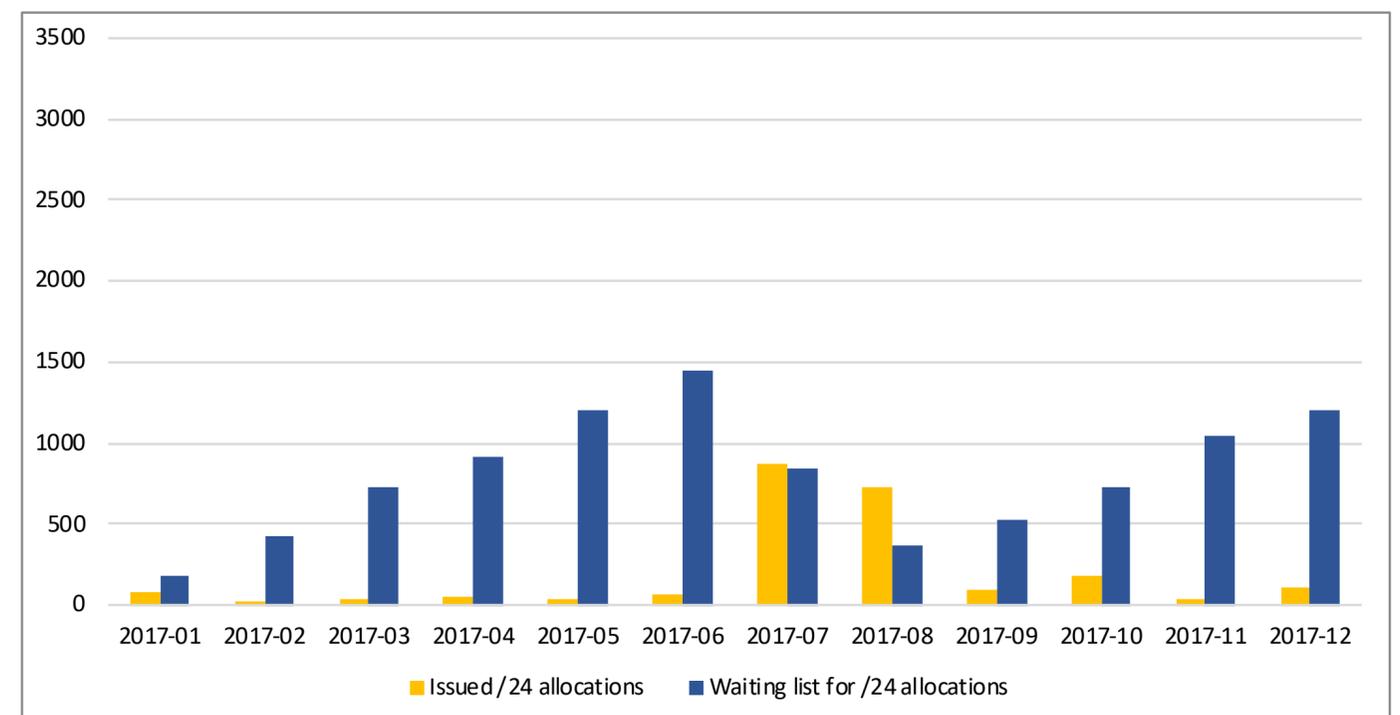
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- **It will reduce waiting time**

Model with /22s



Model with /24s





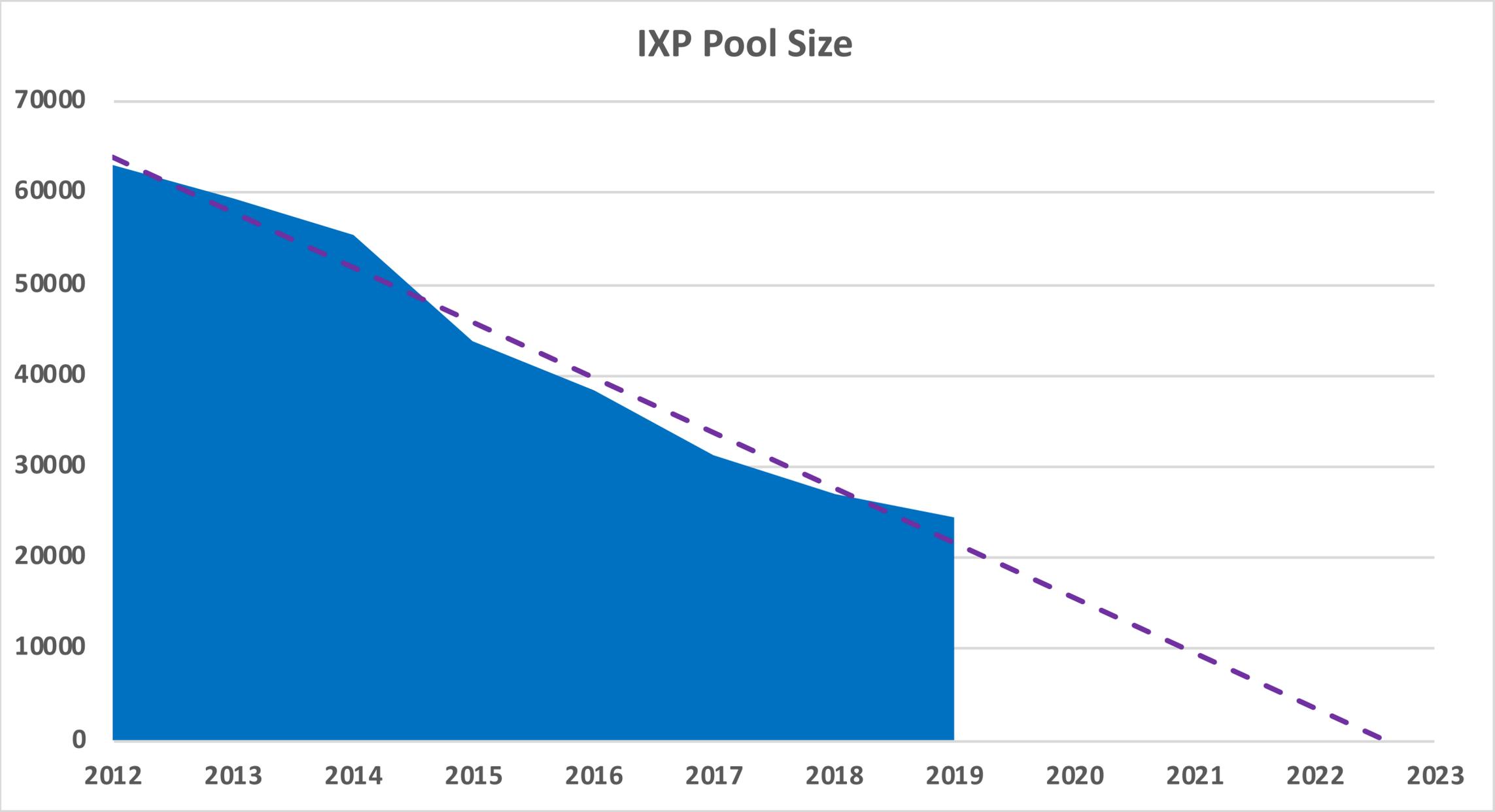
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Expanding IXP Pool: Last Call!

Expected Depletion of IXP Pool





IXP Pool Size

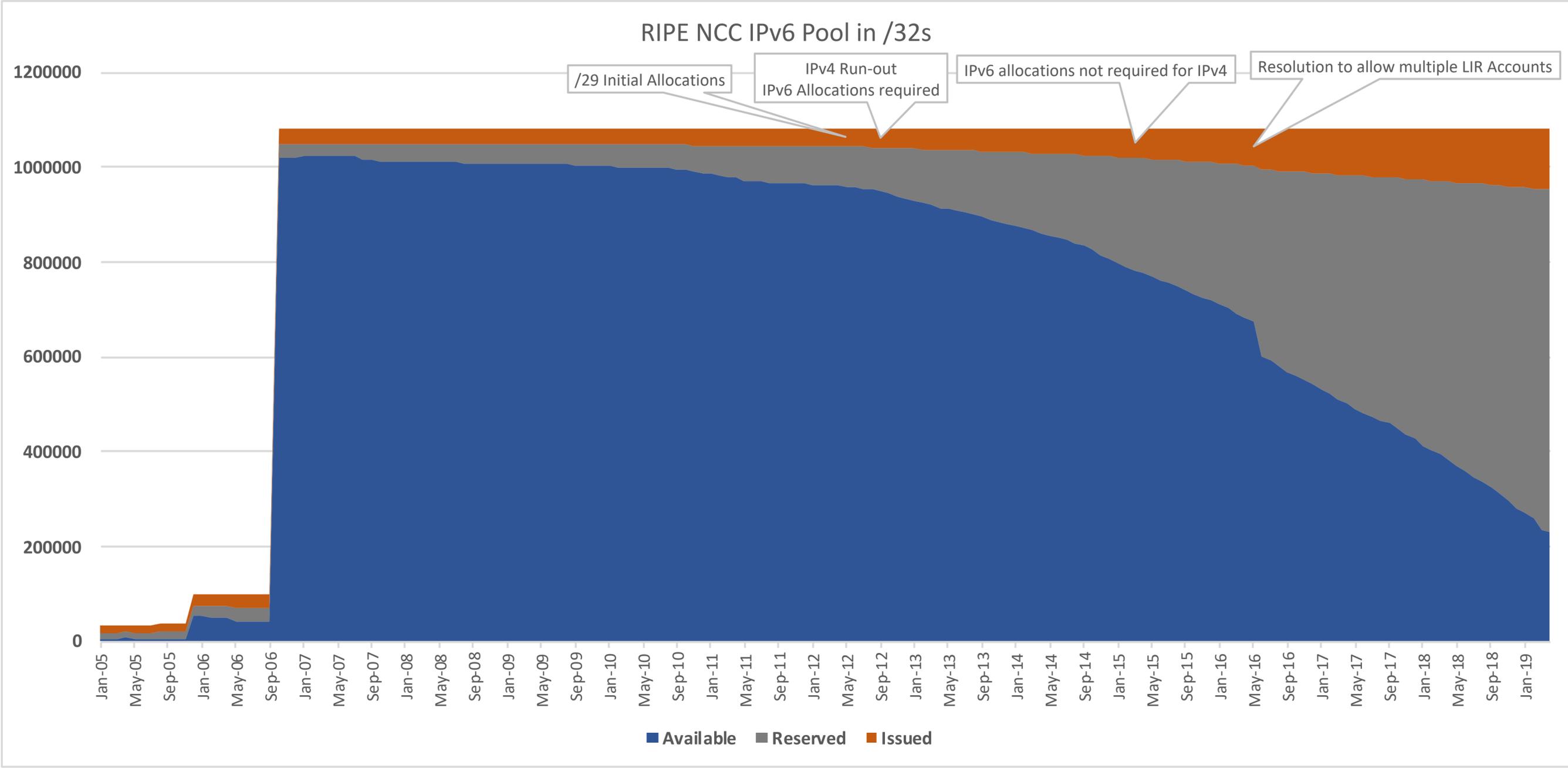
- A /16 is held in reserve for IXPs (ripe-720)
- IXPs are considered a key part of the Internet ecosystem
- PDP takes at least four months
- Is the pool size large enough?
- If not, it's time to act!



IPv6:

Not All Runouts Are Bad

Distribution History



We Are Getting More



IANA Policy For Allocation of IPv6 Blocks to RIRs:

- “A RIR is eligible to receive additional IPv6 address space from the IANA when ... The RIR's available space of IPv6 addresses is less than 50% of a /12.”
- Our current IPv6 Available Space is equal to 21.7% of a /12
- RIPE NCC to be the first RIR to request a second /12 from IANA!



Stockpiling IPv6

IPv6 Allocations per Member



Number of allocations	Members	Total Allocations
1	13013	13013
2	681	1362
3	167	501
4	74	296
5	33	165
6	19	114
7	22	154
8	7	56
9	15	135
10	12	120
11	11	121
12	6	72
13	8	104
16	1	16
17	1	17
18	4	72
19	1	19
20	1	20
21	1	21
28	1	28
31	1	31
52	1	52

Factors

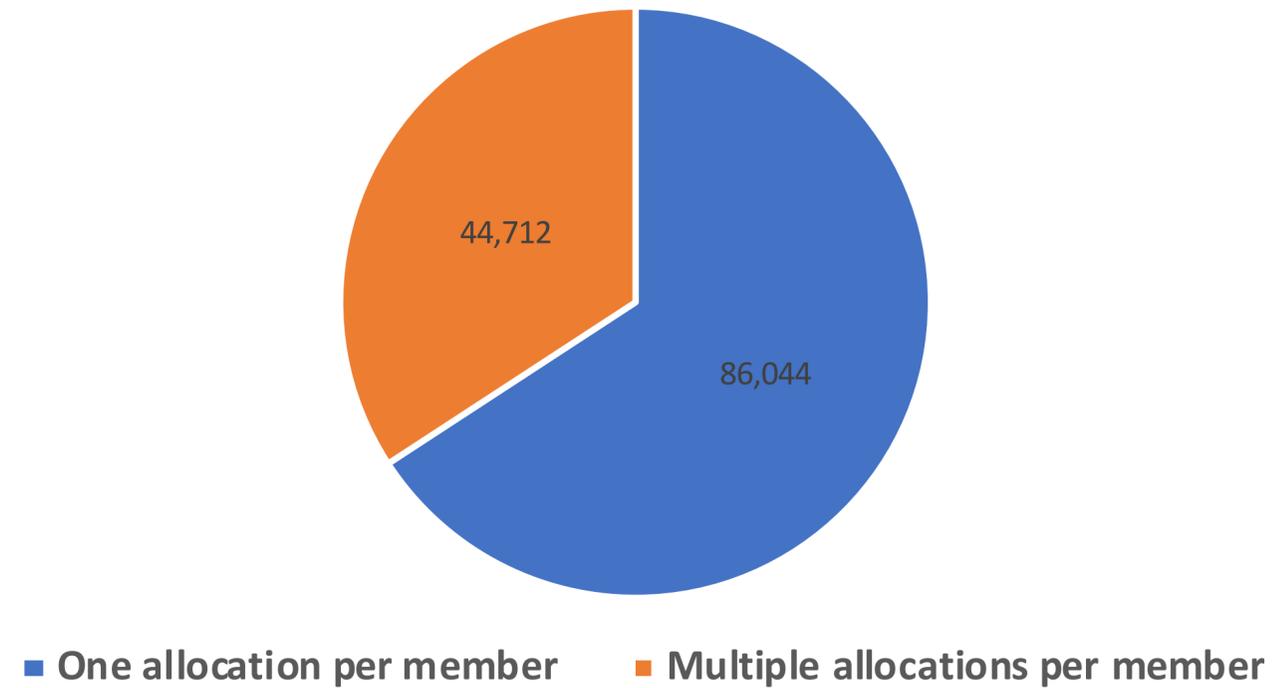


- A /29 per LIR (not per organisation)
- IPv6 can be transferred without restrictions
- Multiple LIR accounts are allowed

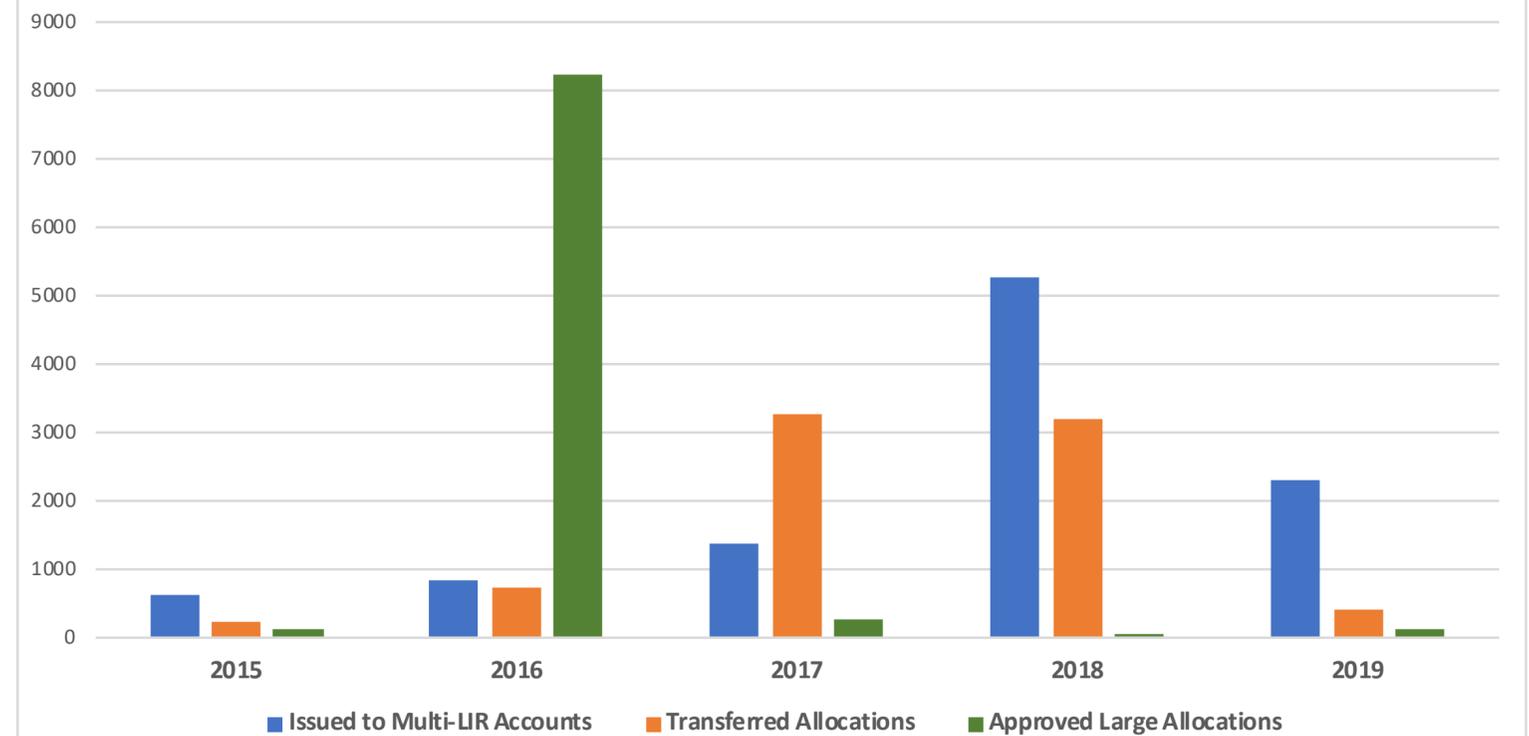
A Growing Trend



Size of IPv6 Allocations in /32s



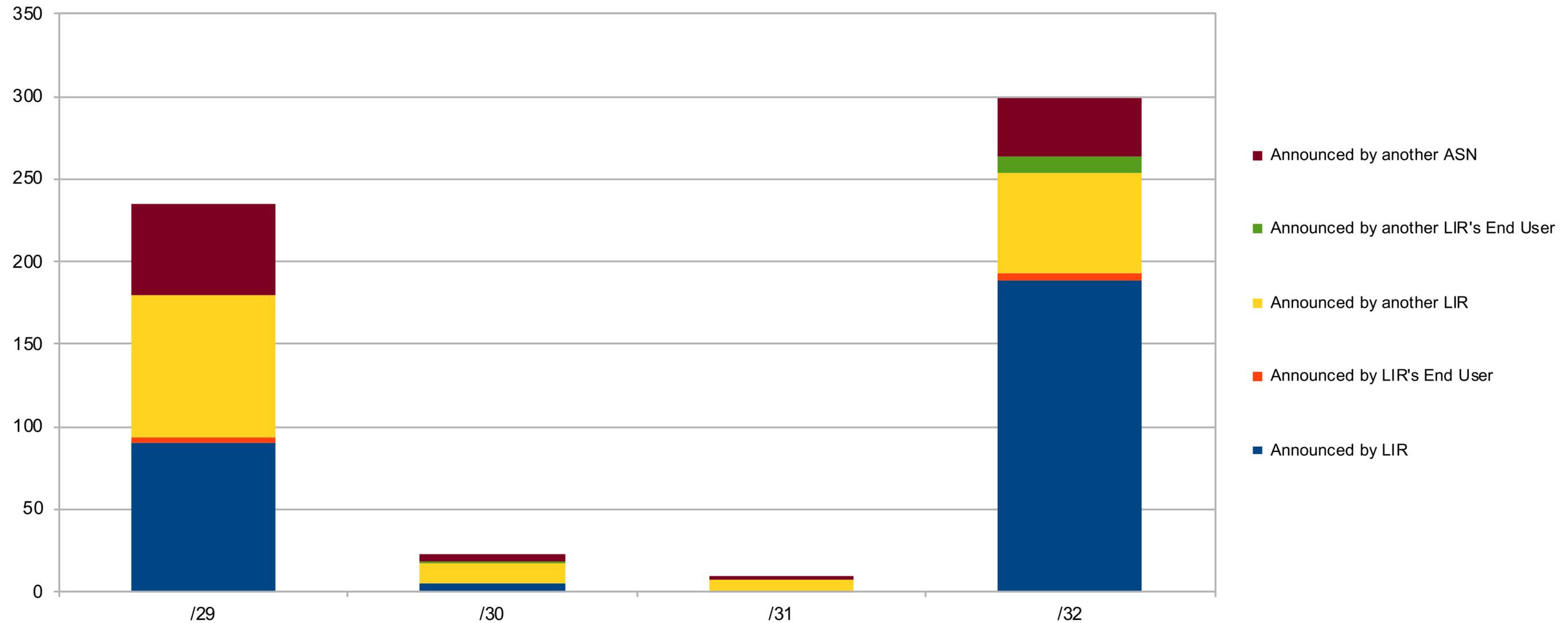
Size of IPv6 Allocations in /32s



Members With More Than Five IPv6 Allocations



How These Allocations are Announced



Stockpiling IPv6



With a focus on the registry and our function as an RIR:

- **Is it an issue?**
- **Should something be done?**



Questions



nikolas.pediaditis@ripe.net

Discussion Topics



- **Last call: shall we increase the size of the IXP pool?**
- **Stockpiling IPv6 - is it an issue?**