



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

Feedback From RIPE NCC Registry Services

The Aim of this Update



- To report back to the RIPE community:
 - The feedback that we receive from LIRs
 - Highlighting potential problem areas
- Asking for guidance on these topics
- Providing input to the community for policy discussions



Status Hierarchies in the RIPE Database

Problem Statement

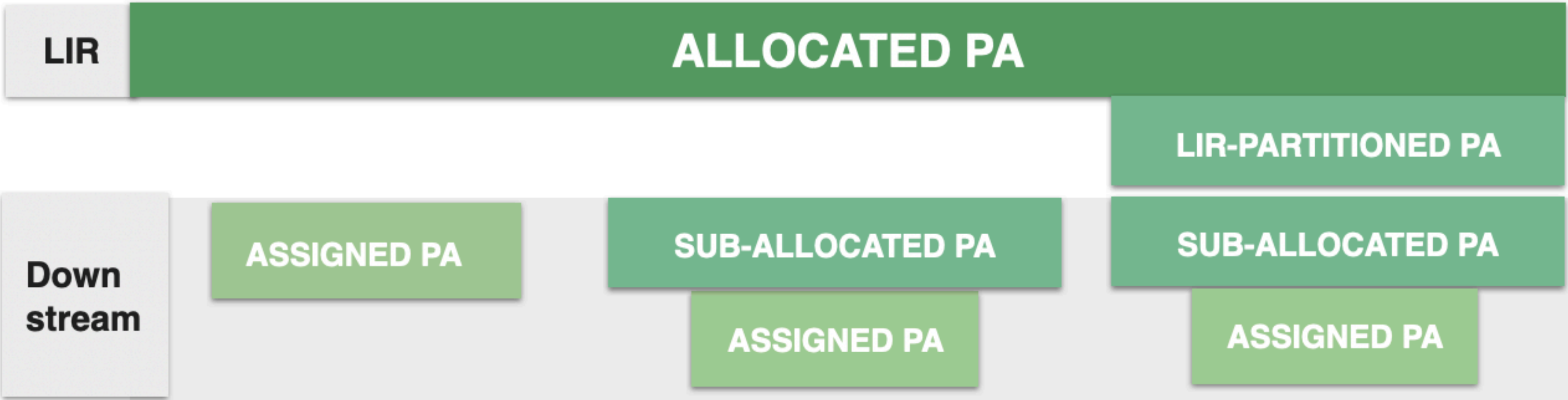


“There seems to be a misalignment between the way some of our members want to register their sub-allocations and assignments in the RIPE Database and their need to be compliant with RIPE Policies”

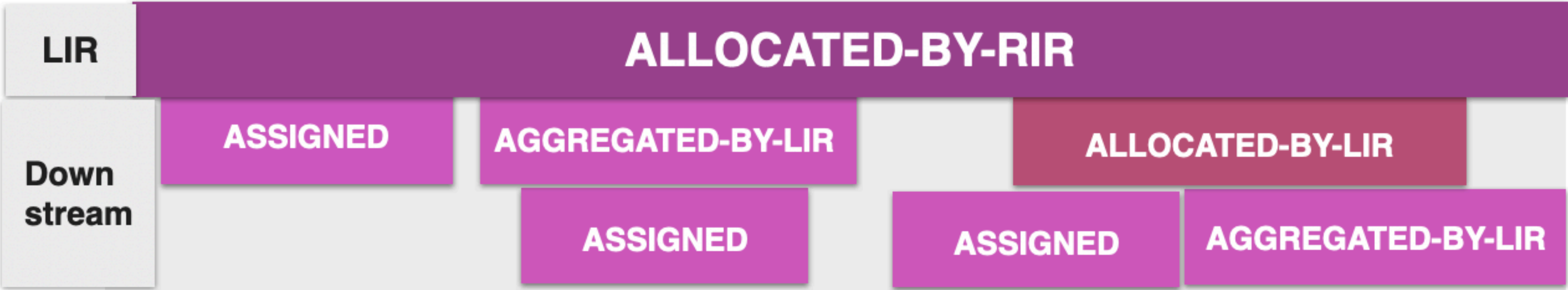
Object Status Hierarchy



IPv4



IPv6



Policy Requirements



IPv4 Policy

- 5.3 Sub-allocations

Sub-allocations are intended to aid the goal of routing aggregation and **can only be made** from allocations with a status of "ALLOCATED PA".

[...]

LIRs may make sub-allocations to multiple downstream network operators.

- 7.0 Types of Address Space

SUB-ALLOCATED PA: This address space has been **sub-allocated by an LIR** to a downstream network operator that **will make assignments from it**.

Policy Requirements



IPv6 Policy

- Nothing specific, but the RIPE database statuses are
 - ALLOCATED-BY-LIR
 - AGGREGATED-BY-LIR
- Neither of the two policies specify a minimum size for sub-allocations and the RIPE Database has no limit either
 - Do sub-allocations smaller than /24 in IPv4 and /48 in IPv6 make sense?

Some Facts



- No limitations in the RIPE Database for creating inet(6)nums with status "SUB-ALLOCATED PA", "LIR-PARTITIONED PA", "ALLOCATED-BY-LIR", "AGGREGATED-BY-LIR" under inet(6)nums with the same status.
- This often results in chains of inet(6)nums that have the same status
- This is not fully aligned with the text in IPv4 and IPv6 Policies
- Multiple layers of sub-allocations might be useful for some LIRs

Reality In The RIPE Database



		Objects 1st Level	Maximum number of levels	Objects additional levels
IPv4	SUB-ALLOCATED PA	4109	3	227
	LIR-PARTITIONED PA	5808	5	1256
IPv6	ALLOCATED-BY-LIR	7586	7	3327
	AGGREGATED-BY-LIR	7279	3	265

Reality In The RIPE Database



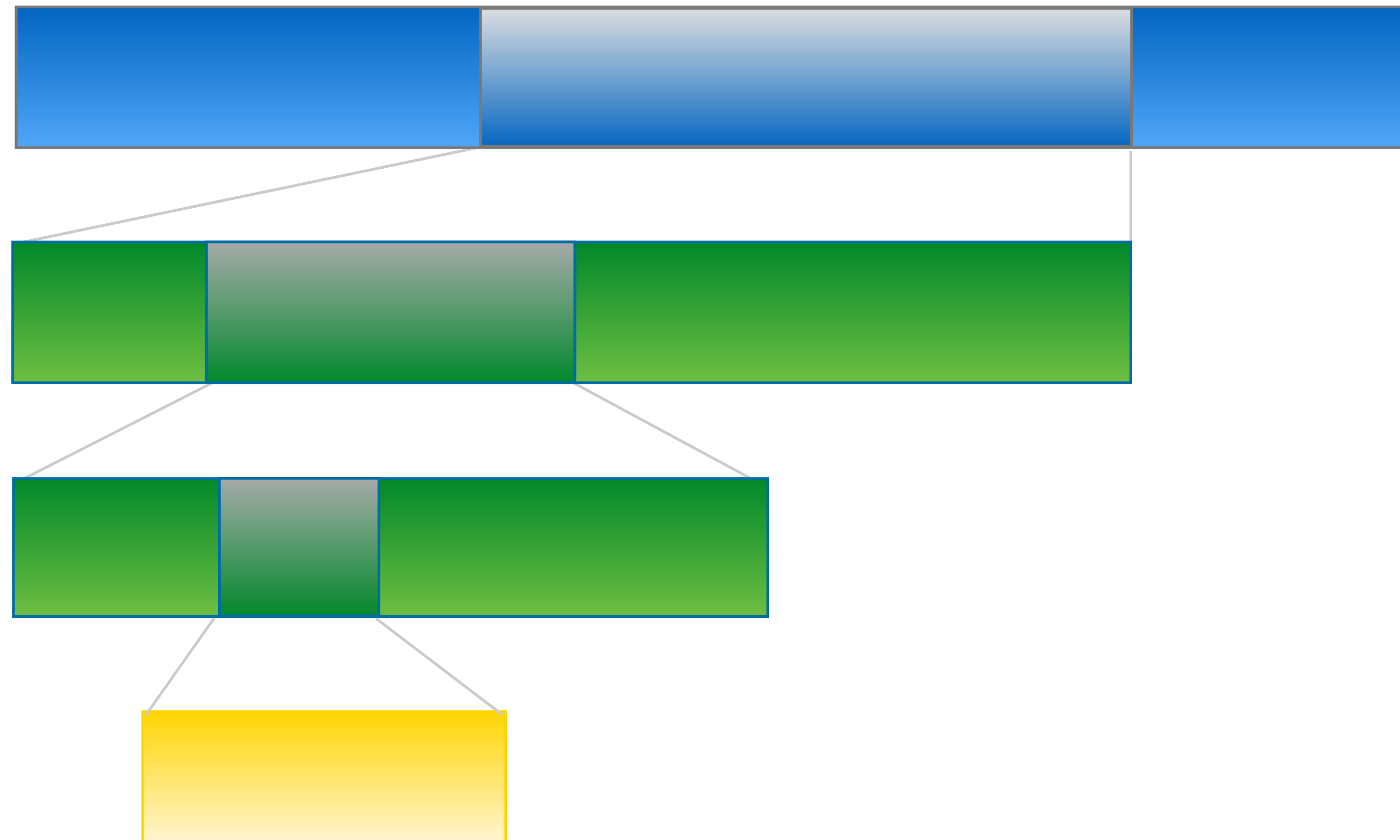
- 2,918 “SUB-ALLOCATED PA” objects have no more specifics
- 3,324 “LIR-PARTITIONED PA” objects have no more specifics
- 33,238 objects with a mix of “AGGREGATED-BY-LIR” inside “ALLOCATED-BY-LIR” and vice visa

Examples of User Stories



- A multi-national company makes sub-allocations to its national branches, which make smaller sub-allocations to their multiple daughter companies. These daughter companies can then create and maintain assignments for their networks.
- A government with a large IPv6 block makes plans to sub-allocate this to the state level, to make sub-allocations to counties or municipalities, which then will make assignments to schools, libraries, etc.

Desired Status Hierarchies



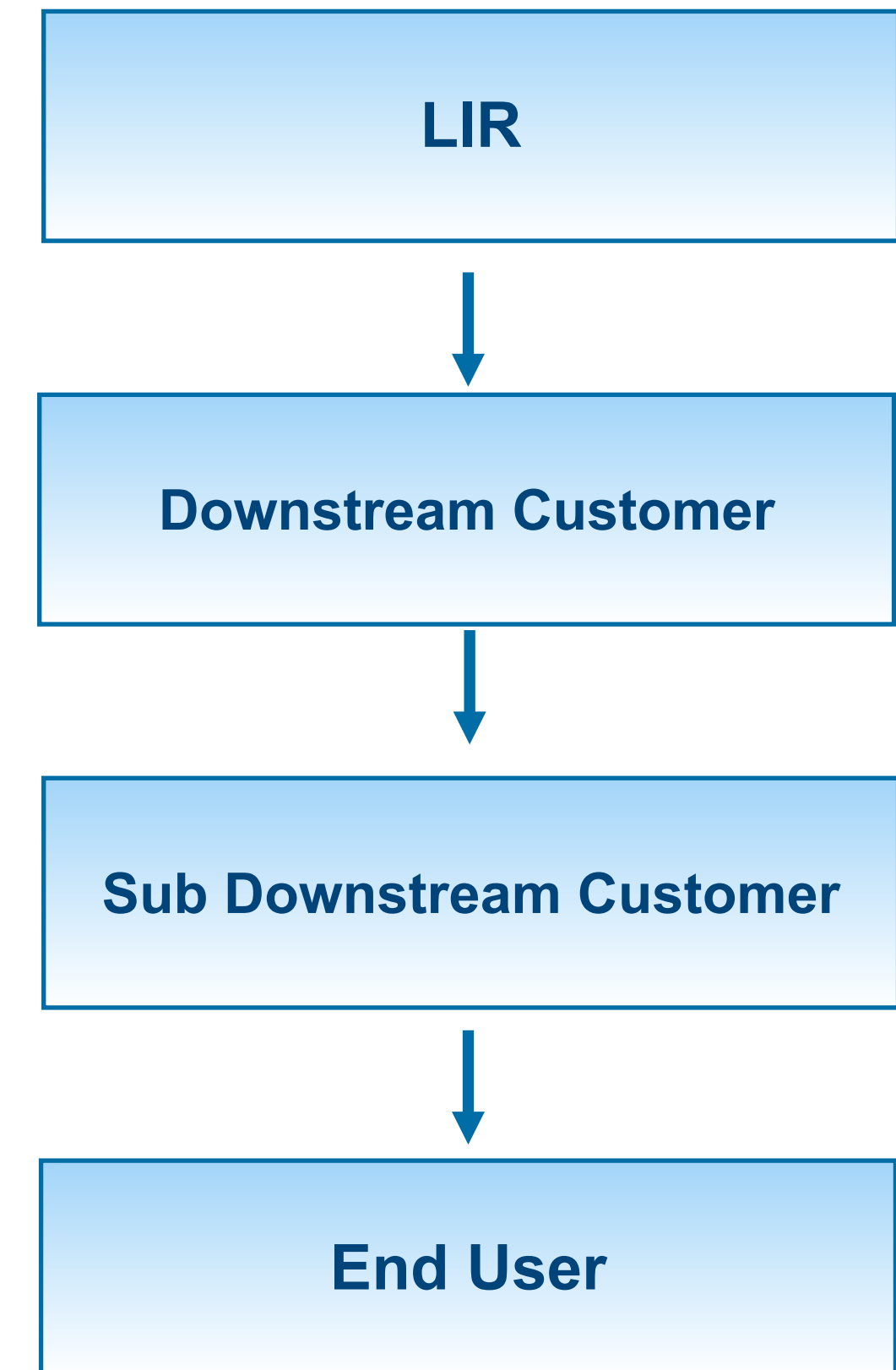
Allocation



Sub-allocation



Assignment



Community Feedback



- This issue was raised in the AP WG mailing list during last summer
- Three responses received so far
- Some support for allowing multiple layers, especially for IPv6

Questions



- Should inet(6)nums with these “status:” values be allowed to be created inside one another?
- Should there be a limit on the minimum size of a sub-allocation?
- Do we need a policy update?

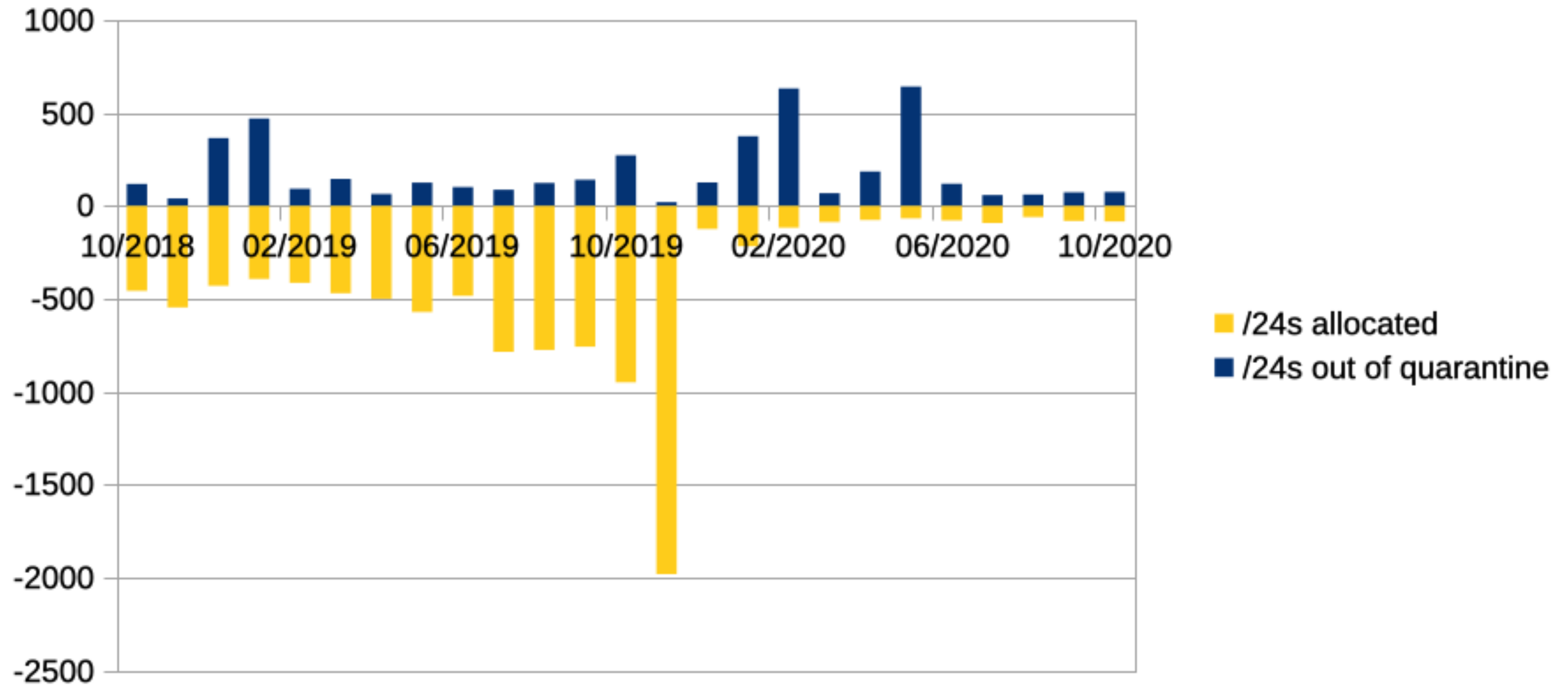


One Year After IPv4 Runout

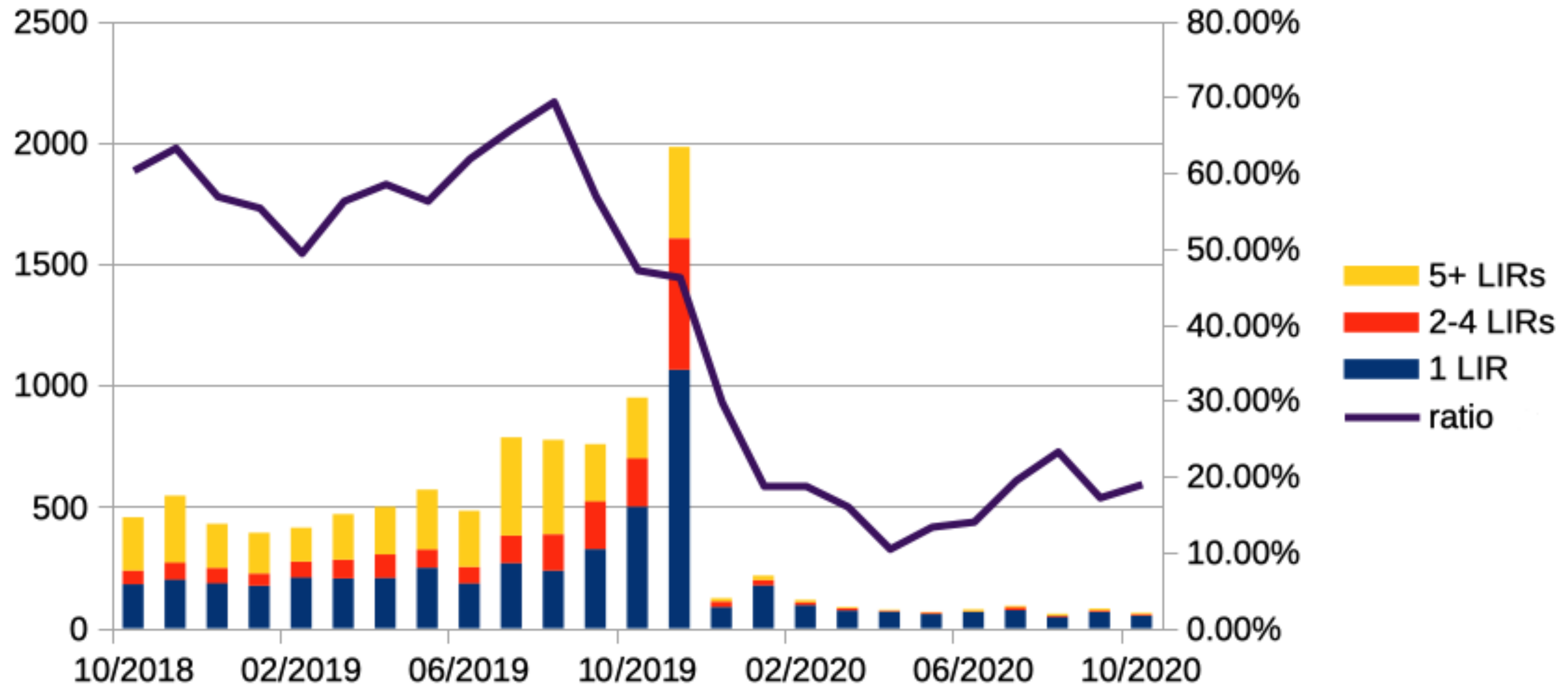
Distribution of Returned IPv4 Space

- 1,083 allocations issued in total since IPv4 runout
- We currently issue 80 allocations on average per month
 - Before COVID-19 the rate was approximately double
- 1,321 /24s in our free pool
- 995 /24s in quarantine

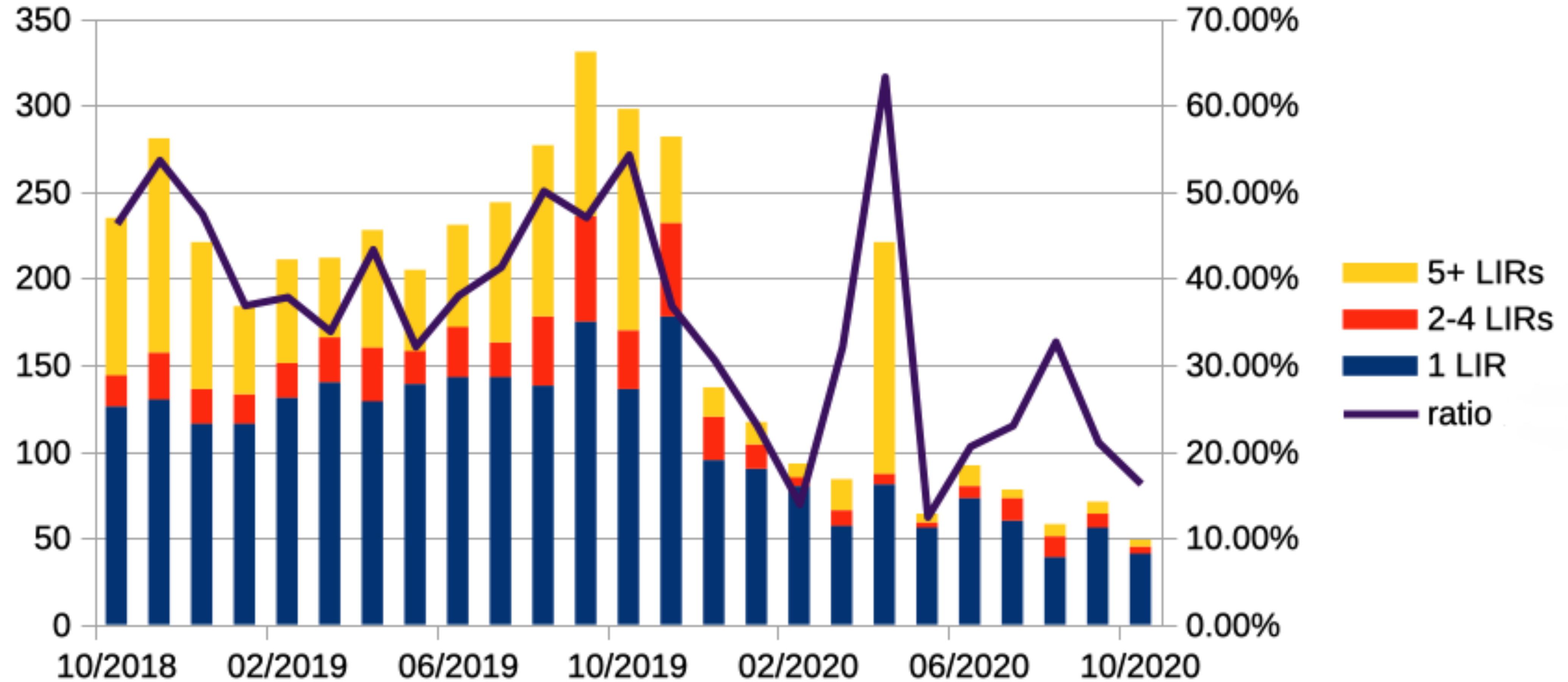
IN/OUT Flow of IPv4



Ratio of IPv4 Allocations to Multiple LIRs



Ratio of IPv6 Allocations to Multiple LIRs





Stockpiling IPv6 Update

Some Numbers

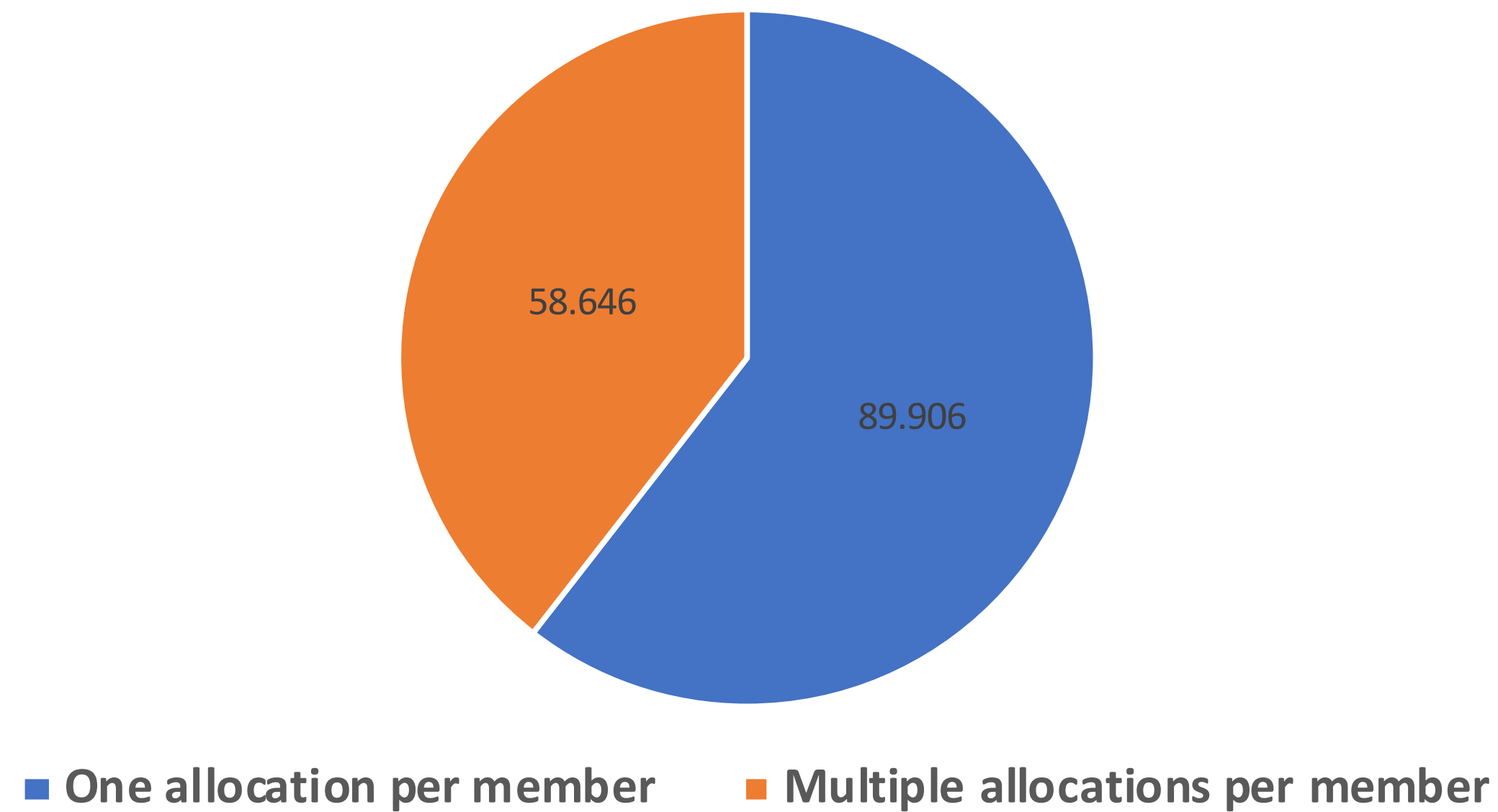


Size	Number of Allocations	Number of LIRs
/29	1	13636
/28+	2 - 3	1070
/27+	4 - 7	219
/26+	8 - 15	50
/25+	16 - 31	41
/24+	32 - 63	2
/23+	64 - 91	2

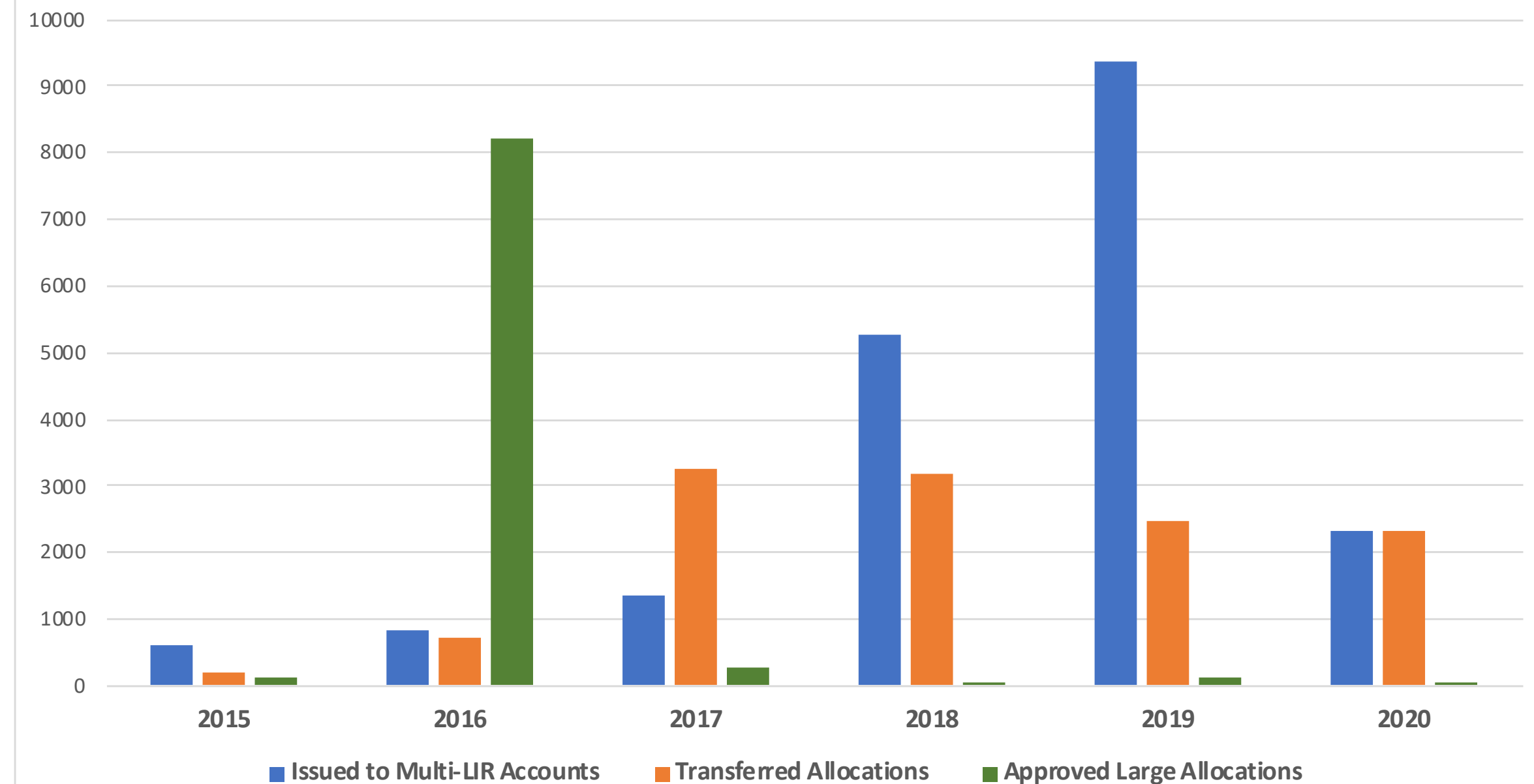
A Growing Trend



Size of IPv6 Allocations in /32s



Size of IPv6 Allocations in /32s



- We have already used a /17 from 2a10:0000::/12 within ± 6 months

Questions For Discussion



- Is this within the intent of the IPv6 Policy?
- Did the policy proposal 2018-01: “Organisation-LIR Clarification in IPv6 Policy” work as intended?
 - An allocation per LIR (not per organisation)
- Do we need to make any changes to the IPv6 Policy?
- Should there be any restrictions to IPv6 transfers?



Unused ASNs

AS Number Clean-up



- **Unused ASNs:**
 - Issued by the RIPE NCC or transferred at least one year ago
 - Not announced for at least 6 months
- **Since RIPE80, we contacted LIRs for 350 unused ASNs**
 - 134 ASNs were returned to the free pool and 70 ASNs are pending for return
- **Overall, half of the unused ASNs are being returned**
 - We have contacted LIRs responsible for 1,600 ASNs
- **There are 5,643 ASNs not being advertised in the routing system**

Unused ASNs



- **The RIPE NCC does not charge for ASNs**
 - We are the only RIR doing so
- **No real incentive for ASN holders to return them**
- **There are as many ASNs issued that remain unused, as the number of ASNs in our free pool**
- **Abandoned ASNs are vulnerable to hijacks and malicious intent**
- **The solution to this problem might not lie in the RIPE Policy, but...**

This Might Help A Little



- **ASN Assignment Policy:**

"If an organisation no longer uses the AS Number, it should be returned to the public pool of AS Numbers."

- **Should we consider replacing “should” with “must”?**
- **If yes, should a time frame be defined for an ASN to be considered as “unused”?**



Questions



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