



# IPv4 Transfer Statistics

Analytic View

Alain Durand, May 25<sup>th</sup> 2016

# Questions For This Study

## **A. IPv4 Transfer Market Health**

- 1) What is the concentration of address holders?
- 2) Is the transfer market dominated by a few buyers?
- 3) Is there a regional direction of transfer?
- 4) What is the size distribution of transferred blocks?
- 5) How are things changing over time?

## **B. Impact on the routing table**

Do transfers impact the size of the routing table?

## **C. Registry Accuracy**

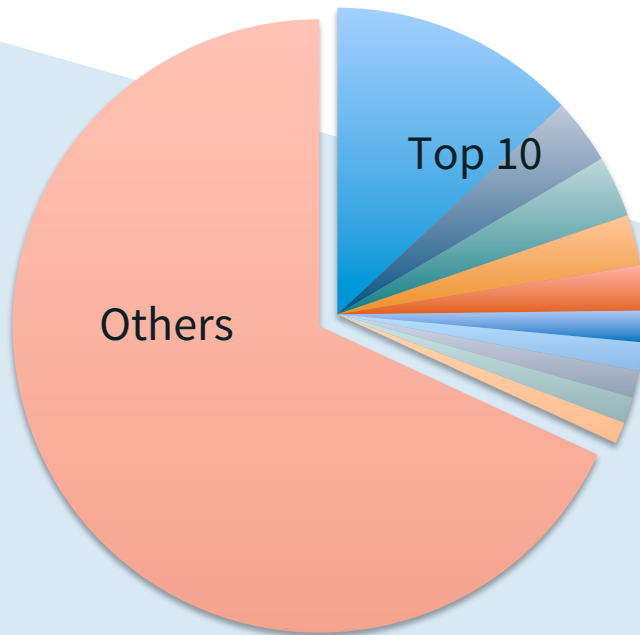
Does the WHOIS database accurately reflect who controls resources?

# A.1) Share of the Top 10 Address Holders per Region:

## 01/01/2016: ARIN, APNIC & RIPE

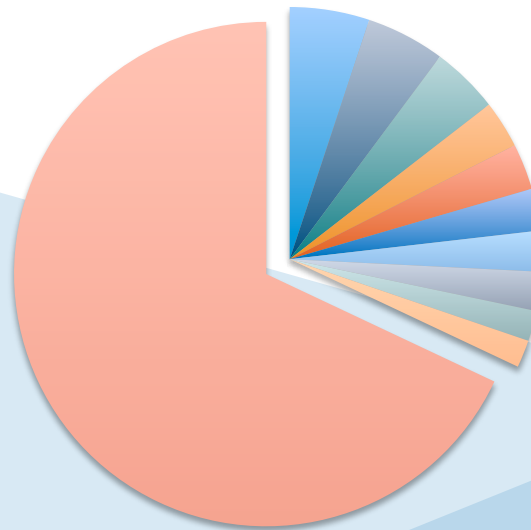
Source: delegated-extended files from ARIN, APNIC & RIPE

**ARIN**



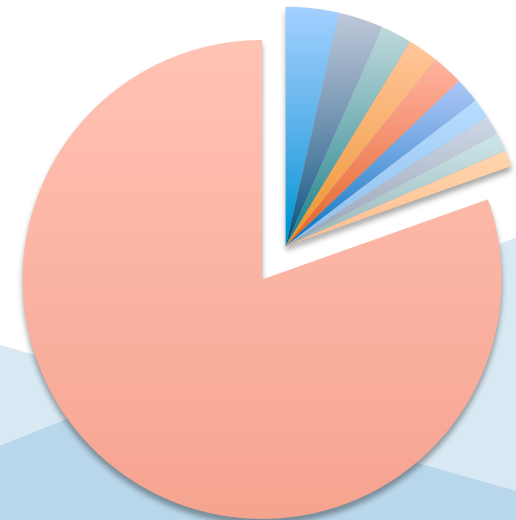
**Total: 1.7 billion**  
**Top 10: 32%**

**APNIC**



**Total: 863 million**  
**Top 10: 32%**

**RIPE**



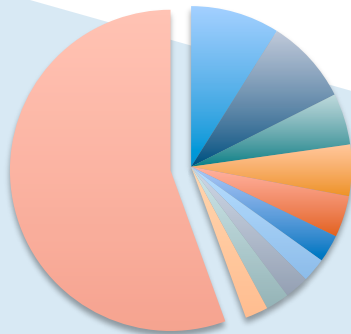
**Total: 802 million**  
**Top 10: 20%**

# A.1) Share of the Top 10 Address Holders per Region:

## 01/01/2016: LACNIC & AFRINIC

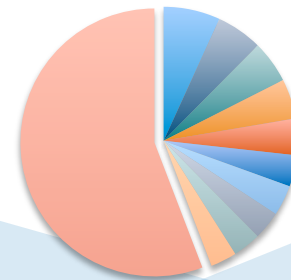
Source: delegated-extended files from LACNI & AFRINIC

**LACNIC**



**Total: 180 million**  
**Top 10: 44%**

**AFRINIC**



**Total: 87 million**  
**Top 10: 44%**

# A.2) IPv4 Address Transfer Recipients: 2014/2015

Source: ARIN, APNIC, RIPE: APNIC & RIPE transfer stats files

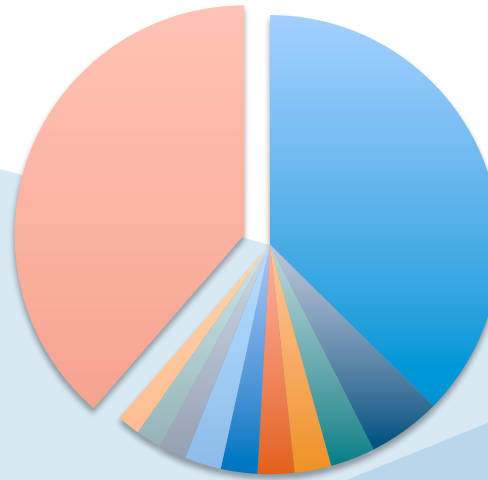
ARIN statistics do not provide any data about the identity of transferors and transferees.

**ARIN**



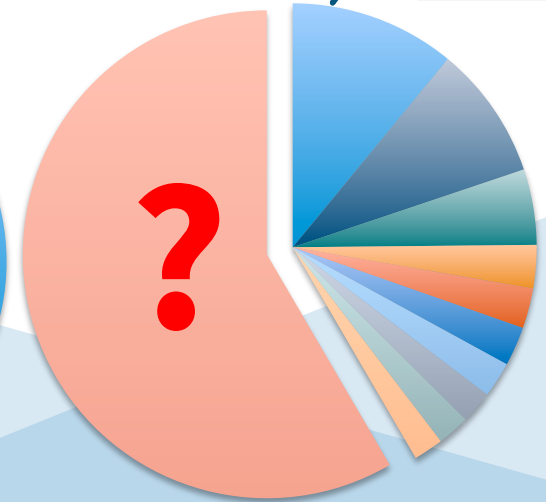
**Total: 38.9 million**  
**Top 10: ??%**

**APNIC**



**Total: 10.2 million**  
**Top 10: 61%**

**RIPE**



**Total: 18.3 million**  
**Top 10: 42%**

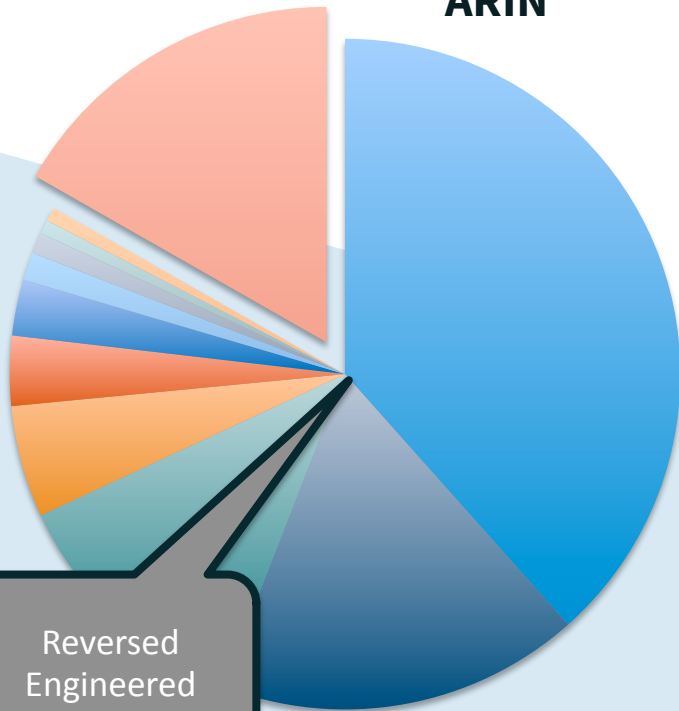
RIPE does not report on "legacy" transfers

# A.2) IPv4 Address Transfer Recipients: 2014/2015

Source: ARIN, APNIC, RIPE: APNIC & RIPE transfer stats files

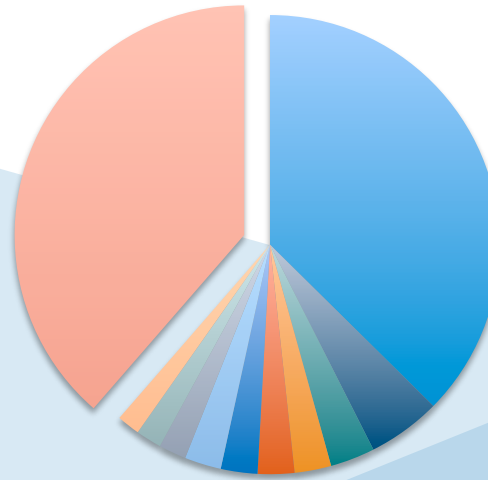
Source: : variations of delegated-arin-extended

ARIN



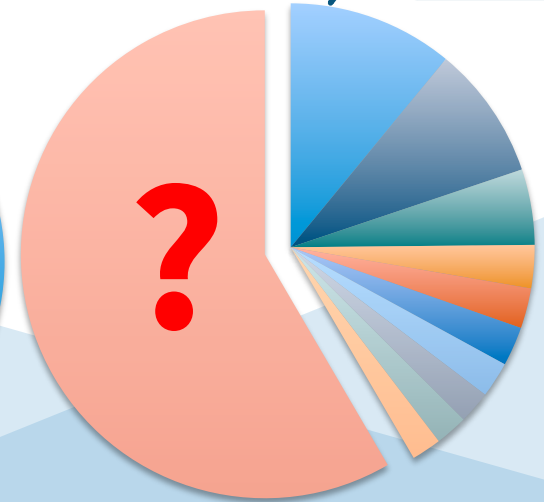
**Total: 38.9 million**  
**Top 10: 83%**

APNIC



**Total: 10.2 million**  
**Top 10: 61%**

RIPE

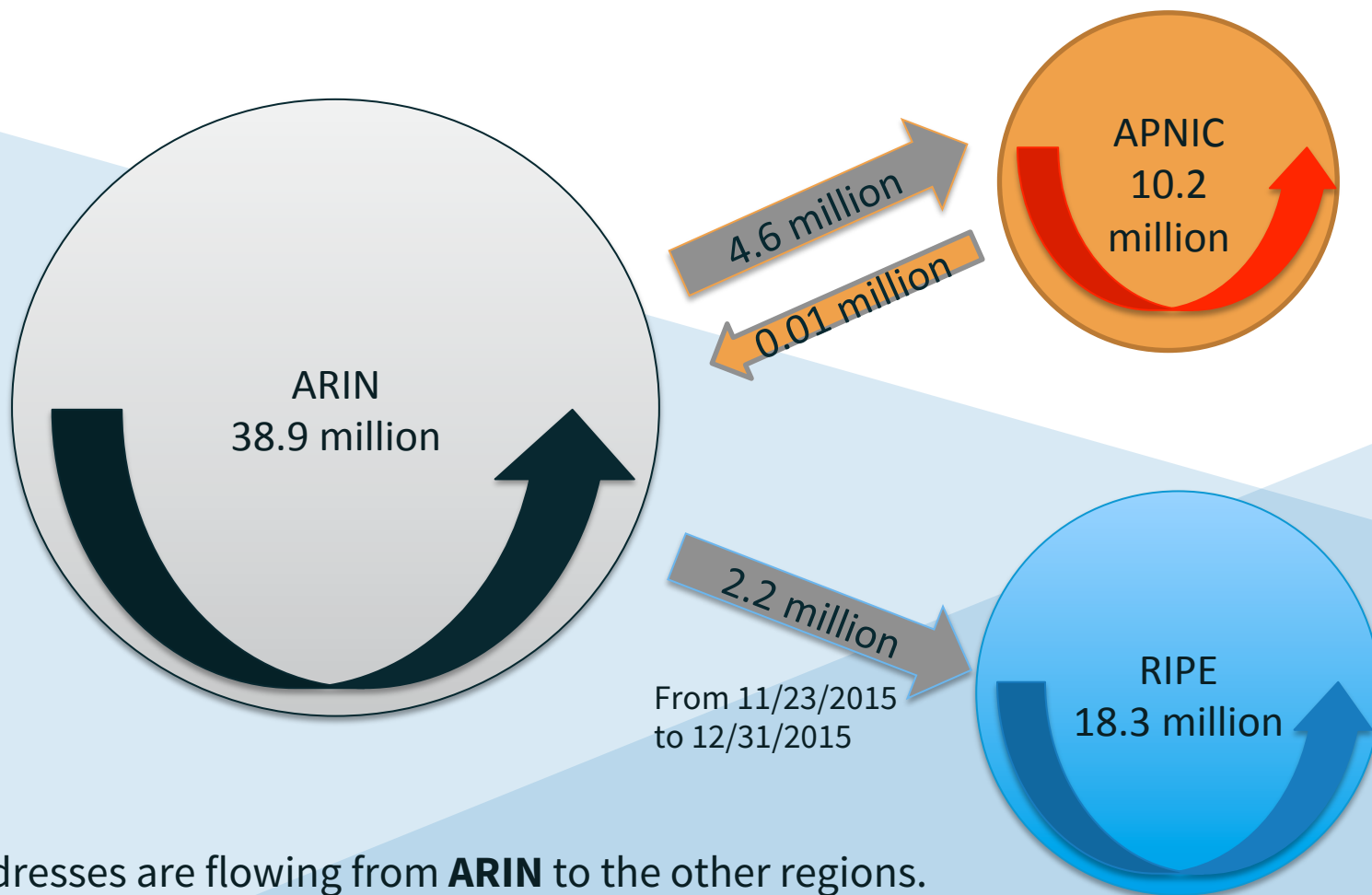


**Total: 18.3 million**  
**Top 10: 42%**



# A.3) IN-Region vs OUT-of-Region 2014-01-01 to 2015-12-31

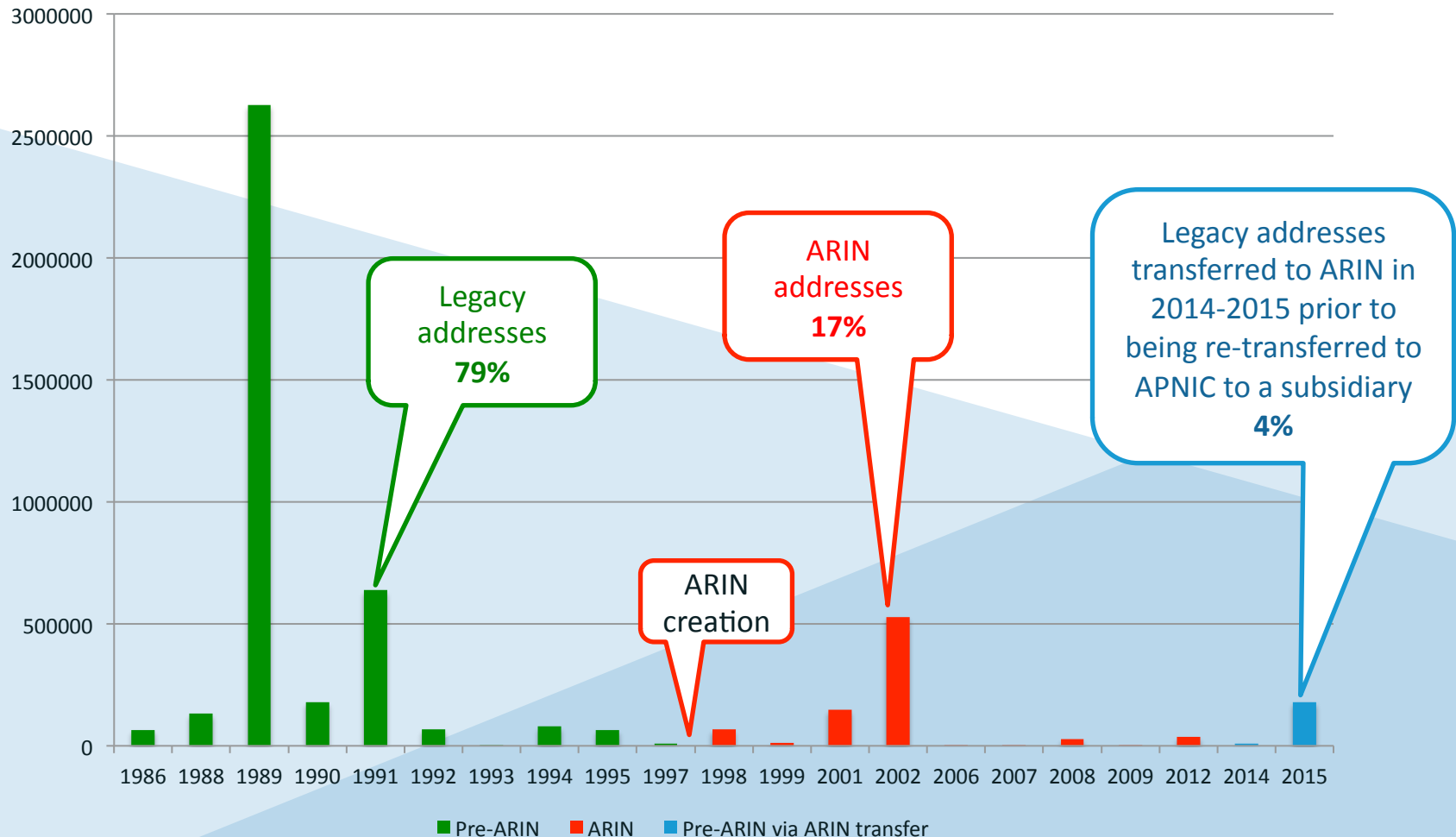
Source: ARIN, APNIC, RIPE: APNIC & RIPE transfer stats files



Addresses are flowing from **ARIN** to the other regions.

# A.3) How “Old” Were ARIN Addresses Transferred to APNIC? 2014-01-01 to 2015-12-31 2014-2015

Addresses Transferred By Previous Registration Date

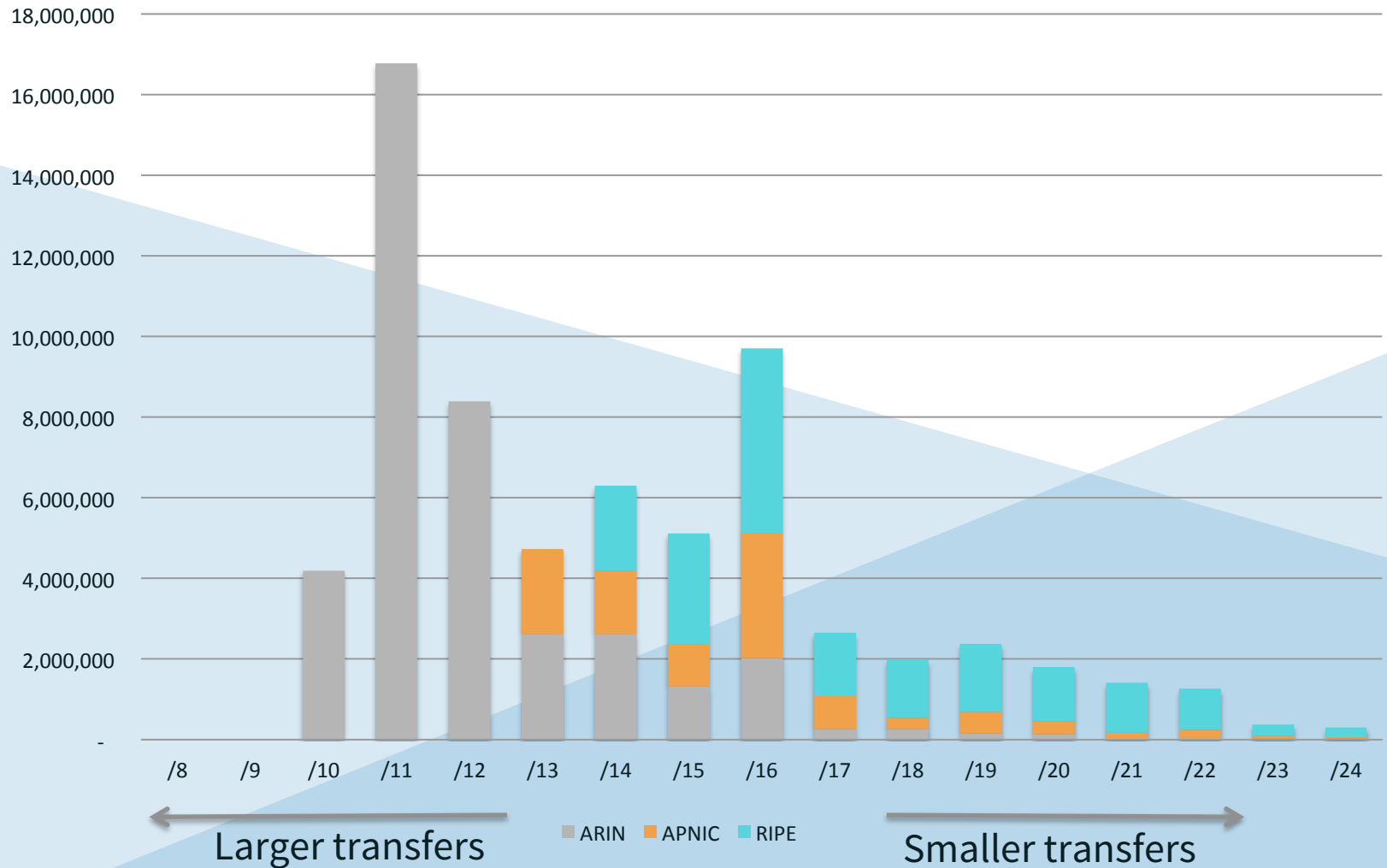




# A.4) Distribution of Address Block Size in Transfers 2014-01-01 to 2015-12-31

Source: ARIN, APNIC, RIPE: APNIC & RIPE transfer stats files

**Addresses Transferred per Size of Address Block Transferred**

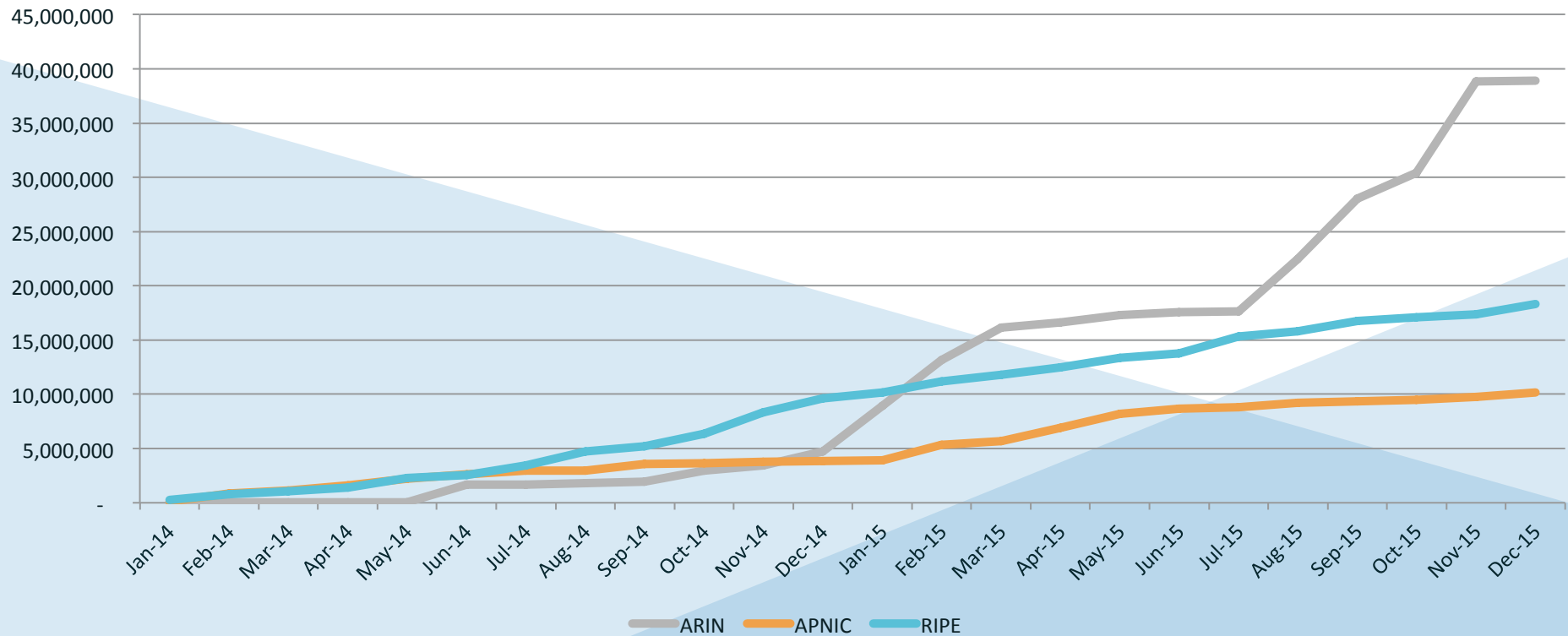


# A.5) Evolution Over Time

## 2014-01-01 to 2015-12-31

Source: ARIN, APNIC, RIPE: APNIC & RIPE transfer stats files

### Cumulative Number of Transferred Addresses



# B) Growth of RIRs IPv4-Delegated Table

Source: delegated files

Counting increases of IPv4 assigned or allocated entries over the last 4 years

	ARIN..	APNIC..	RIPE..	LACNIC..	AFRINIC..	Total..
1/2012	43,739	19,806	44,130	3,714	1,926	113,315
1/2013	45,410	21,144	48,643	4,001	2,145	121,343
1/2014	52,047	22,742	50,004	7,800	2,382	134,975
1/2015	54,438	26,773	51,319	9,373	2,582	144,485
1/2016	56,852	31,616	56,105	10,798	2,857	158,228
4 Years later:	+30%	+60%	+27%	+191%	+48%	+40%

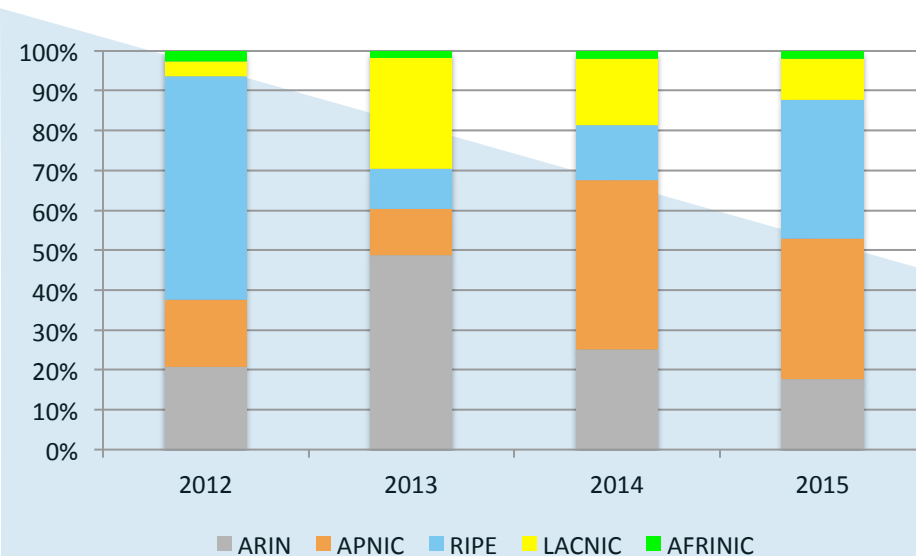
## Why is this important to track over time?

The global BGP table derives from the RIR table and contains about 600,000 entries on Jan 1<sup>st</sup> 2016, roughly 4 times the number of entries in the RIR table (due to factors including internal de-aggregation and traffic engineering). Any increase in the RIR table could then create a significant surge in the BGP table.

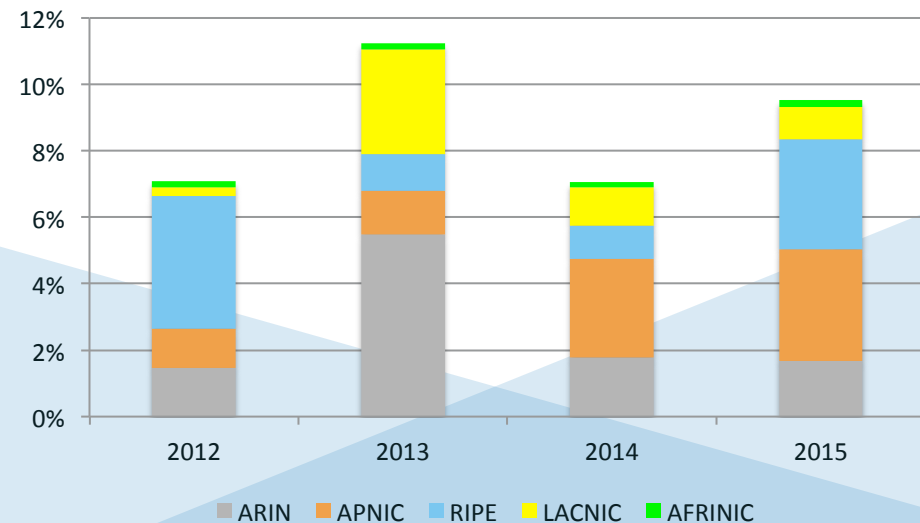
# RIR Contributions to IPv4-Delegated Table Growth Year over Year

Source: delegated files

## Relative Contribution



## Absolute Contribution



## C) Need-Based Policies and Private Contracts

The effect of need-based policies is to limit the size of the address block being transferred to the actual assessed need of the recipient.

They do not prevent **private contracts** between parties such as **Letter of Authorizations** and **Options**.

Such contracts and are **not recorded publicly**, thus it is **impossible to measure** the number of IPv4 addresses under those contracts and **evaluate the concentration of this derivative market**.

# Note about Statistics Collection

ARIN, APNIC & RIPE report different data about transfers.

	Origin Org Id	Dest. Org Id	Original Block	Transferred Block	Previous Registration Date	New Registration Date	Country of Origin	Country of Destination	Format
ARIN				✓		✓			WEB
APNIC	✓	✓		✓	✓	✓	✓	✓	TXT
RIPE	✓	✓	✓	○		✓			JSON

Note: ○ RIPE does not report transfers of legacy blocks

**This makes data analysis across regions difficult.**