V4Escrow

We recycle IPv4 and promote IPv6!

Recognized IPv4 Broker in:

RIPE NCC RIPE NETWORK COORDINATION CENTRE

APNIC

ARIN American Registry for Internet Numbers FACILITATOR

IPv4 Transfers

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ENOG 11 - 8 June 2016

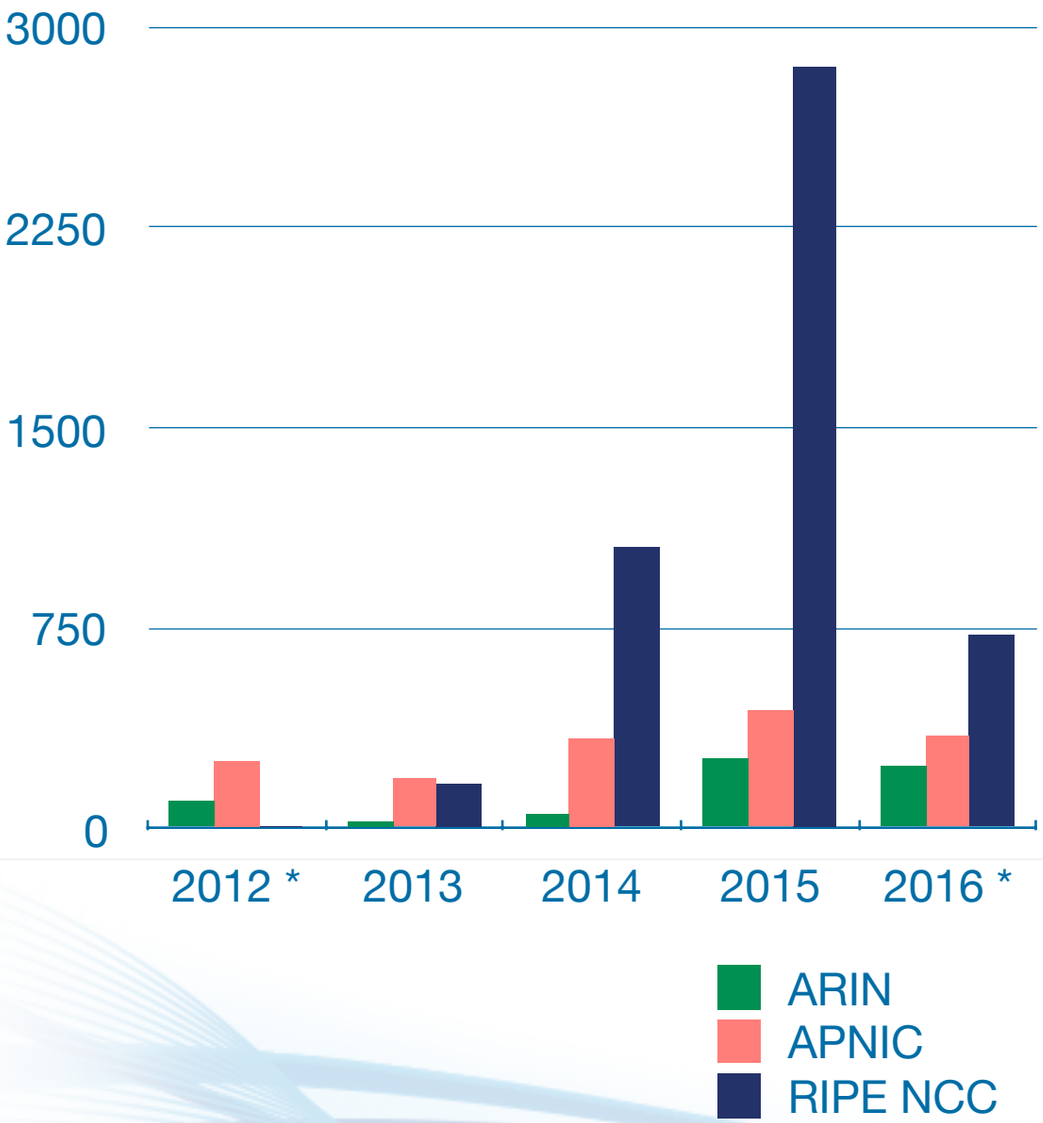
Transfer Statistics

Receiving RIR	2012 and before	2013	2014	2015	2016
ARIN # of IP blocks	102	30	59	264	239 *
APNIC # of IP blocks	251	189	343	442	348 **
RIPE NCC # of IP blocks	10	171	1055	2853	729 **
Total # of IP blocks	363	390	1457	3559	1316
ARIN # of IPs	6,819,584	5,128,448	4,745,472	34,145,024	2,541,056 *
APNIC # of IPs	3,435,008	1,962,240	3,851,264	6,311,168	3,316,736 **
RIPE NCC # of IPs	65,536	1,977,344	9,645,568	10,833,920	2,467,584 **
Total # of IPs	10,320,128	9,068,032	18,242,304	51,290,112	8,325,376

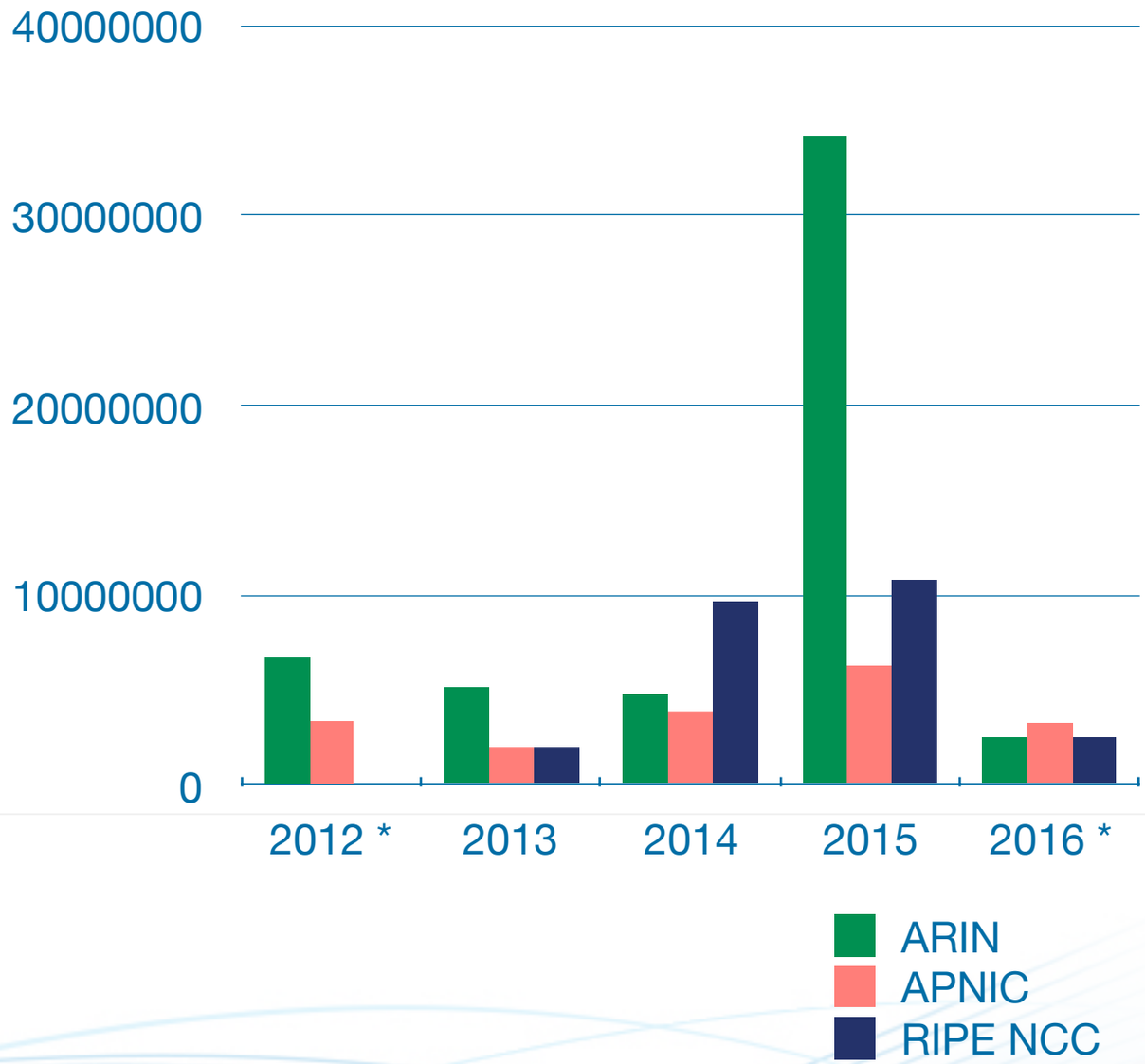
* January - April ** January - May

Transfer Statistics

Number of Transfers



Number of IP Addresses



* 2012 stats show transfers before and during 2012

* 2016 stats show transfers Jan to May for RIPE and APNIC and Jan to April for ARIN

Transfer Statistics - RIPE NCC

- Policies for transfers:
  - Intra-RIR policy since Dec 2008 - First IPv4 Transfer in Oct. 2012
  - compatible Inter-RIR transfer policy with ARIN and APNIC since October 2015
- Run-out on 14 September 2012
- Number of transfers increased since IPv4 policy clean-up in February 2014
- Number of LIRs increased with more than 50% since runout
- 556 PI transfers since November 2014 totaling 569,344 IPs
- 45 Inter-RIR Transfers from ARIN totaling 2,480,896 IPs
- 5 Inter-RIR Transfers from APNIC totaling 15,360 IPs
- 2 Inter-RIR Transfers FROM RIPE totaling 1536 IPs
- 2016 - probably the first year to see a slowdown in number of transfers in RIPE

Transfer Statistics - APNIC

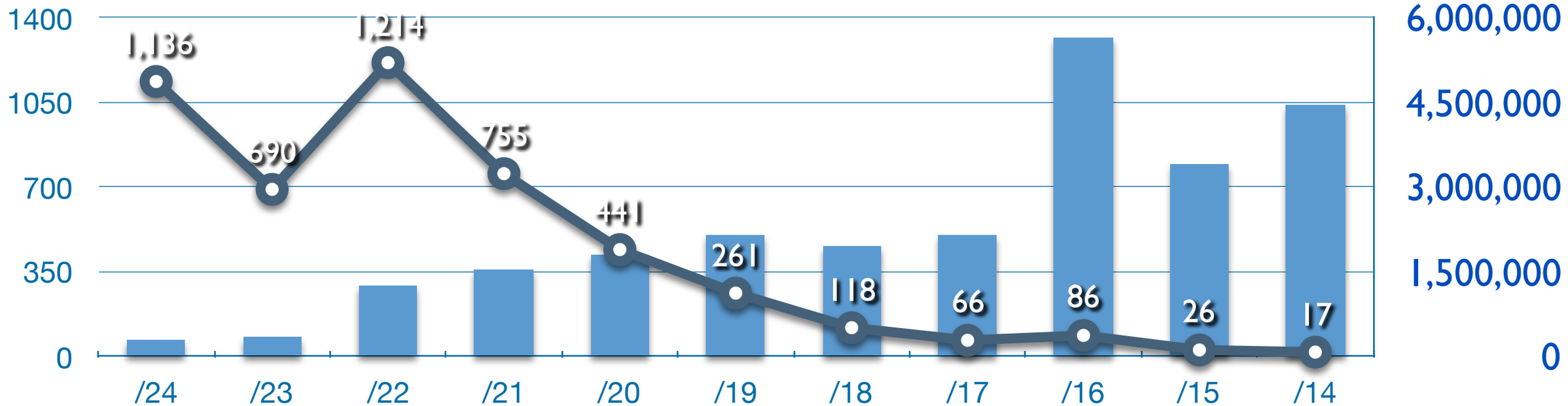
- Policies for transfers:
  - Intra-RIR policy since February 2010 - First IPv4 transfer in Nov. 2010
  - compatible Inter-RIR transfer policy with ARIN since August 2011 and with RIPE NCC since October 2015
- Runout on 15 April 2011
- IP transfers within APNIC
  - number of transfers and total number of IPs increased with about 50% every year
- Inter-RIR Transfers from ARIN
  - 6 in 2012, 17 in 2013, 94 in 2014, 71 in 2015, 20 in 2016 *
- Inter-RIR Transfers from RIPE
  - none yet

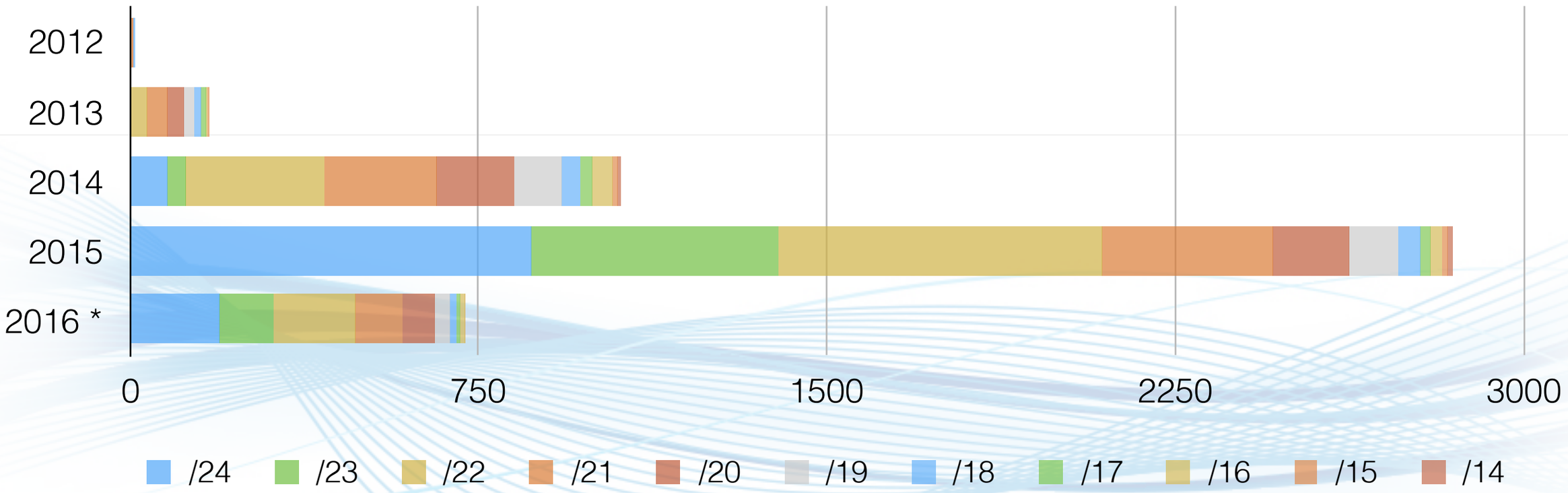
Transfer Statistics - ARIN

- Policies for transfers:
  - Intra-RIR policy since June 2009 - First IPv4 Transfer in Oct. 2009
  - compatible Inter-RIR transfer policy with APNIC since July 2012 and with RIPE NCC since October 2015
- Run-out on 24 September 2015
- IP transfers within ARIN
  - number of transfers and total number of IPs increased in 2015 and continues to grow and are surging since run-out
- Inter-RIR Transfers from RIPE
  - one in 2016 *
- Inter-RIR Transfers from APNIC
  - 3 in 2015, 2 in 2016 *

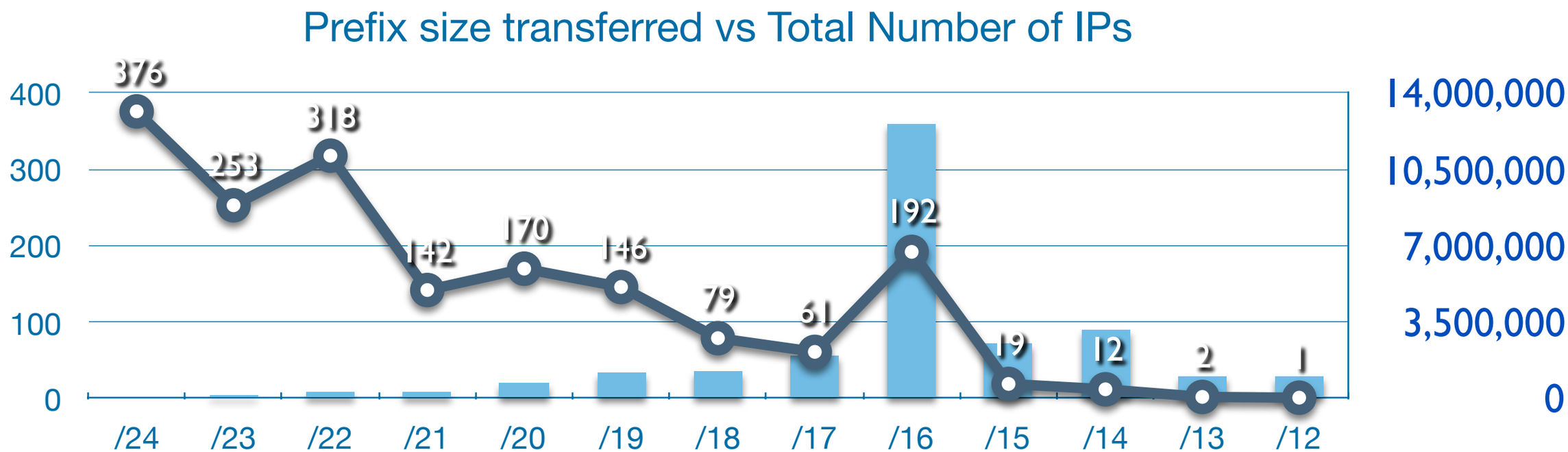
Transfer Statistics - RIPE NCC

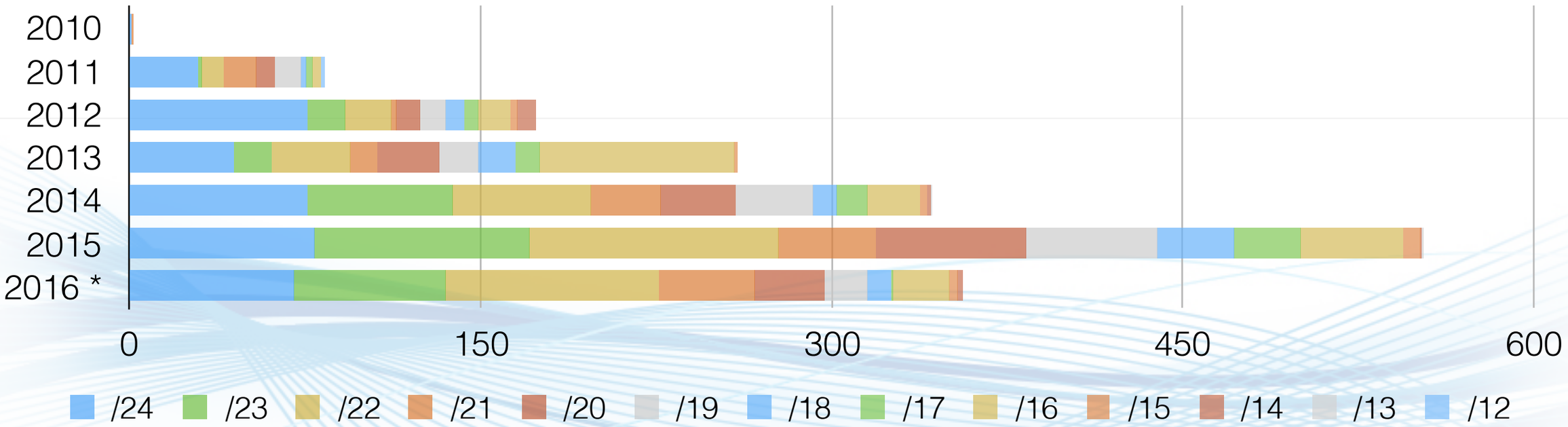
Prefix size transferred vs Total Number of IPs



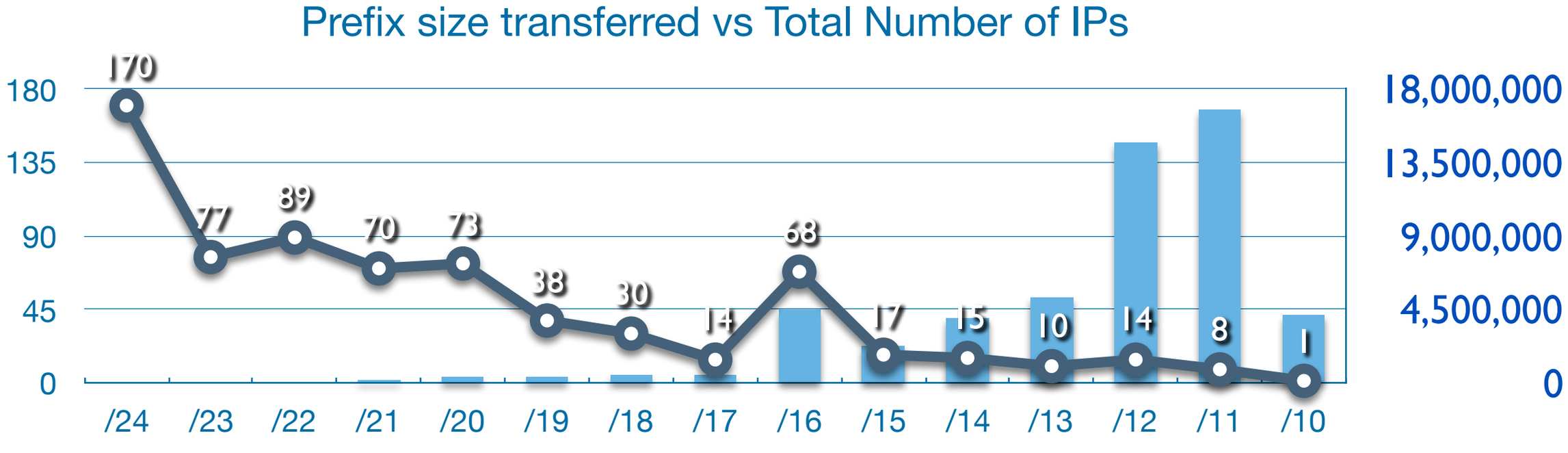


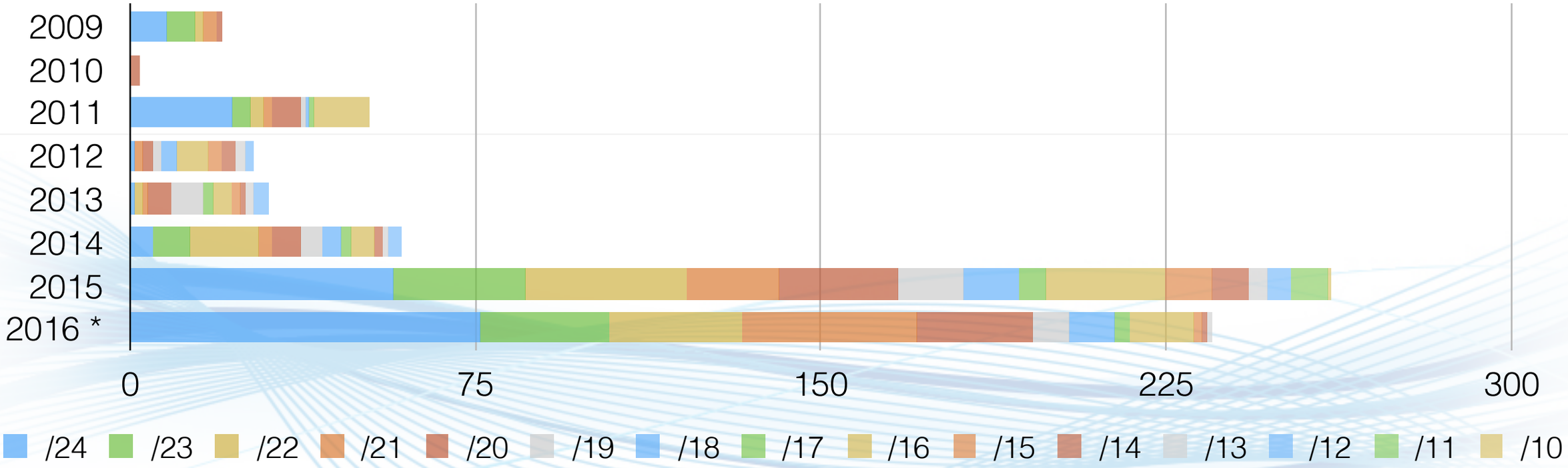
Transfer Statistics - APNIC



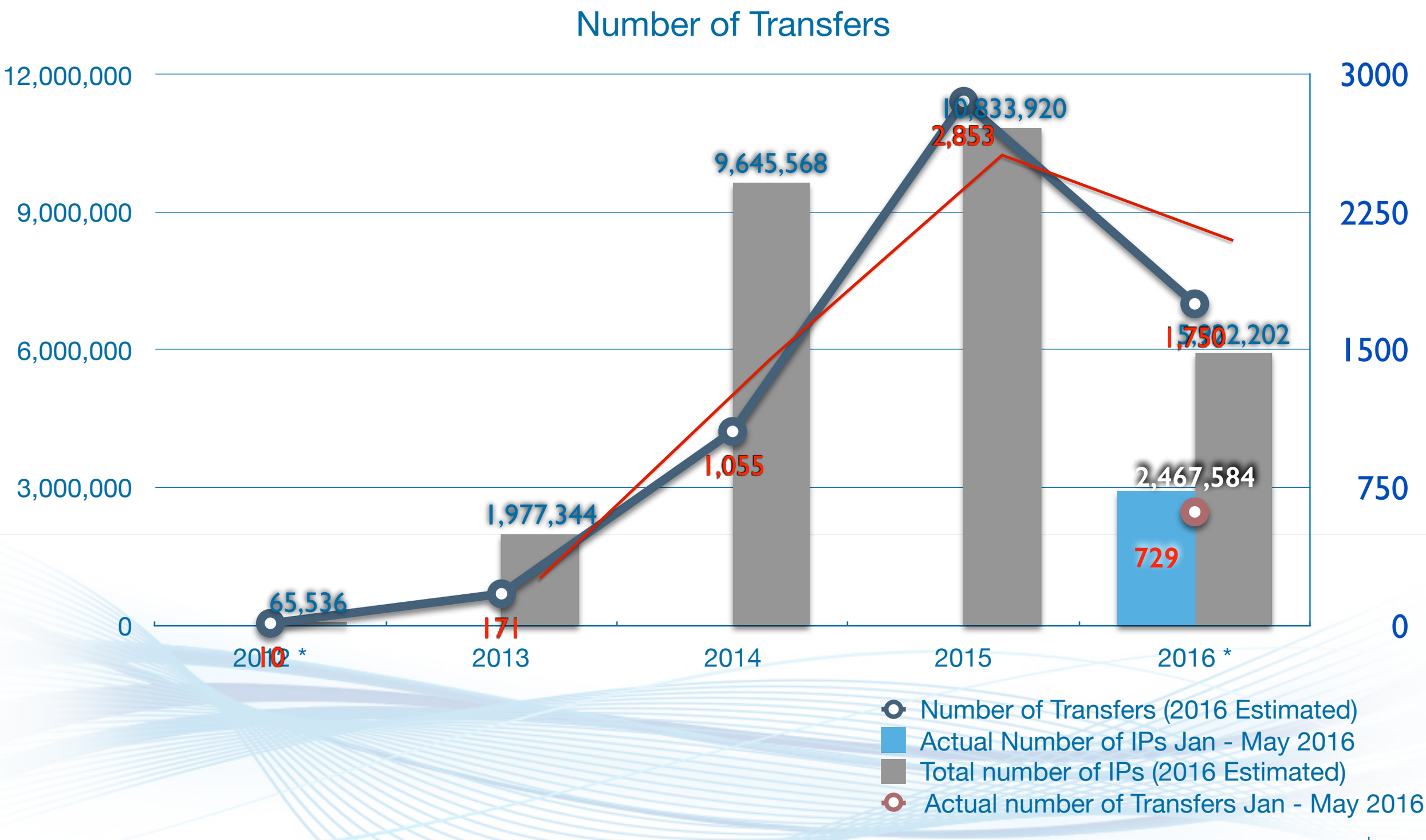


Transfer Statistics - ARIN

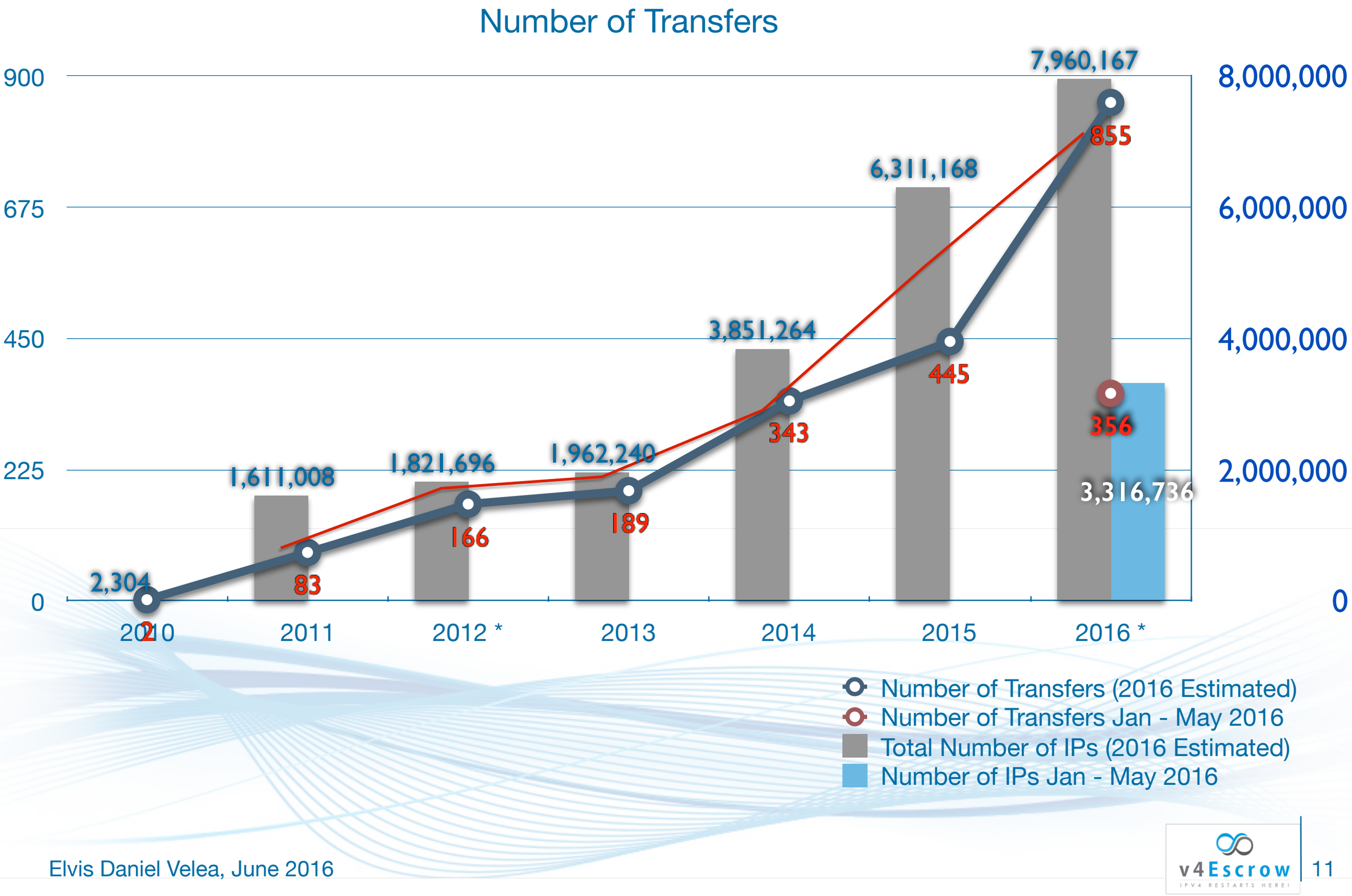




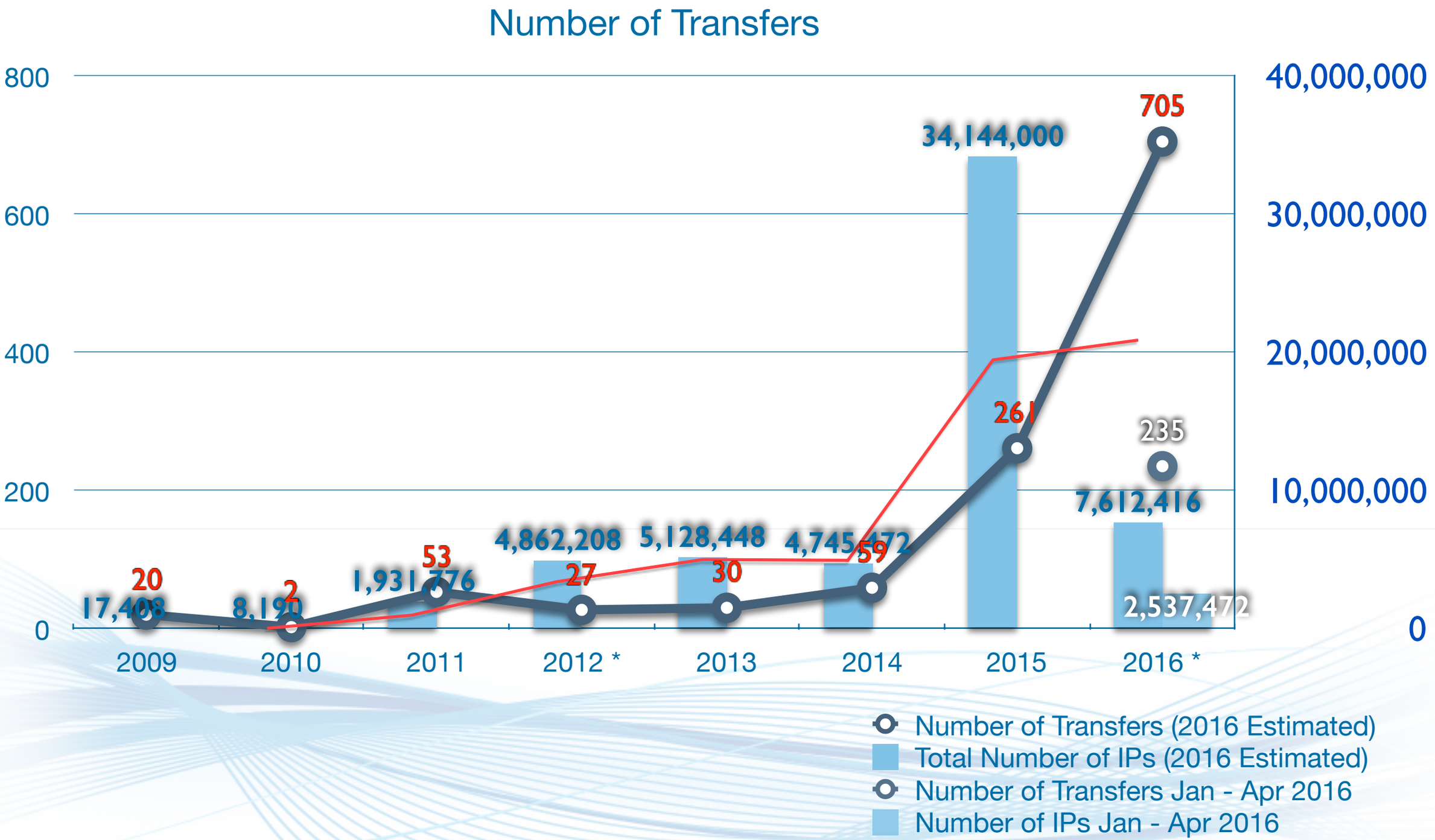
Transfer Statistics - RIPE NCC



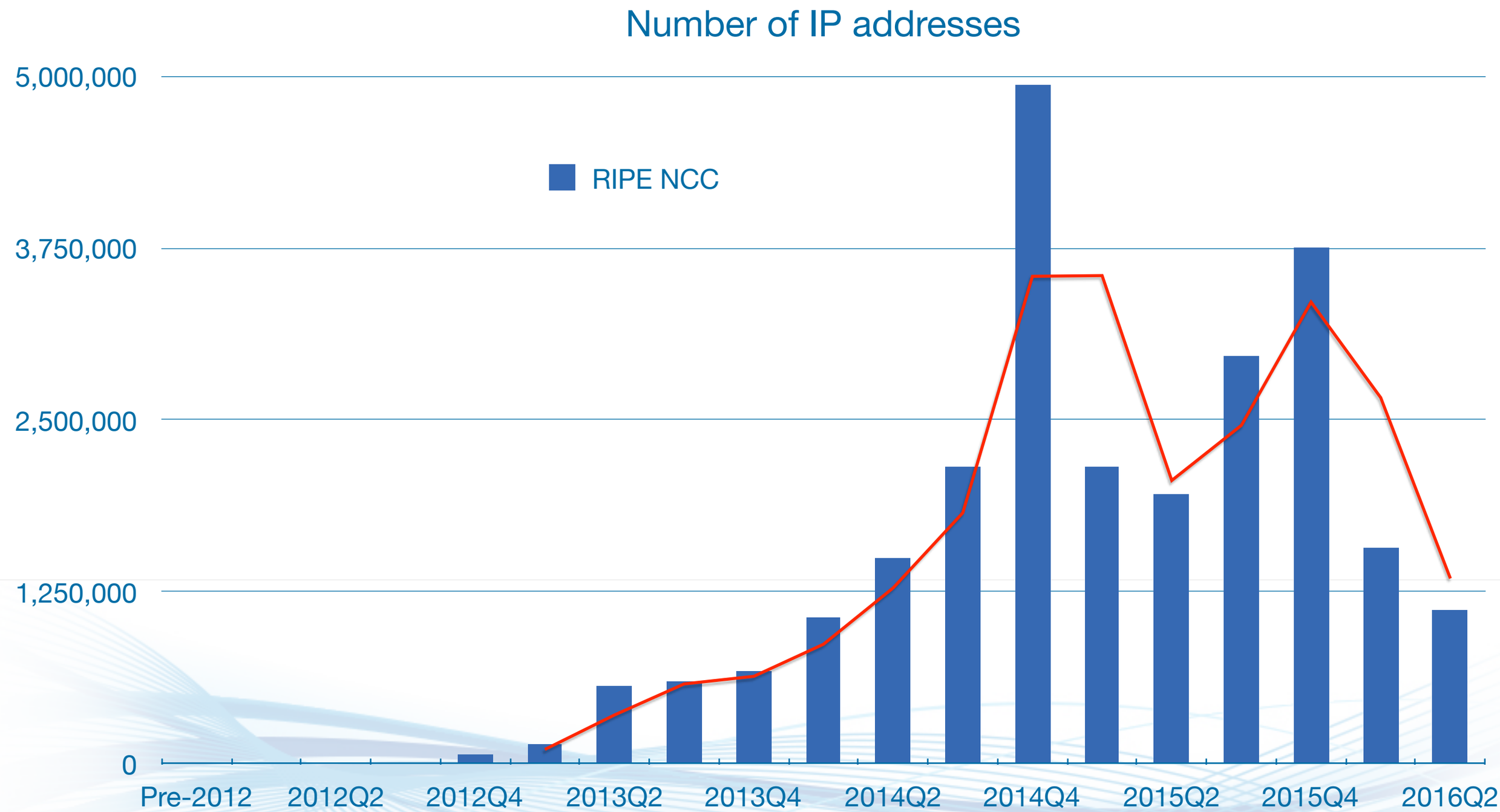
Transfer Statistics - APNIC



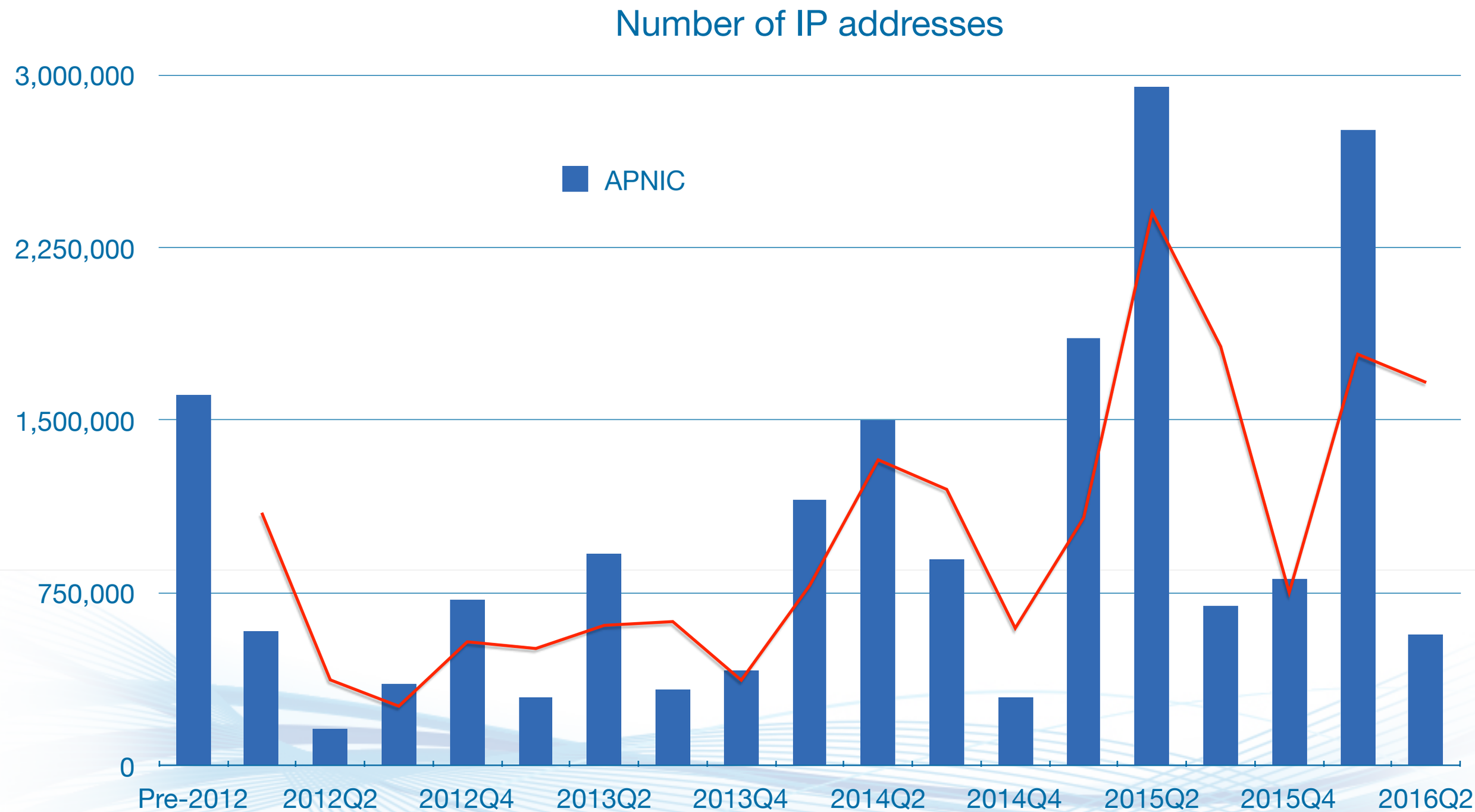
Transfer Statistics - ARIN



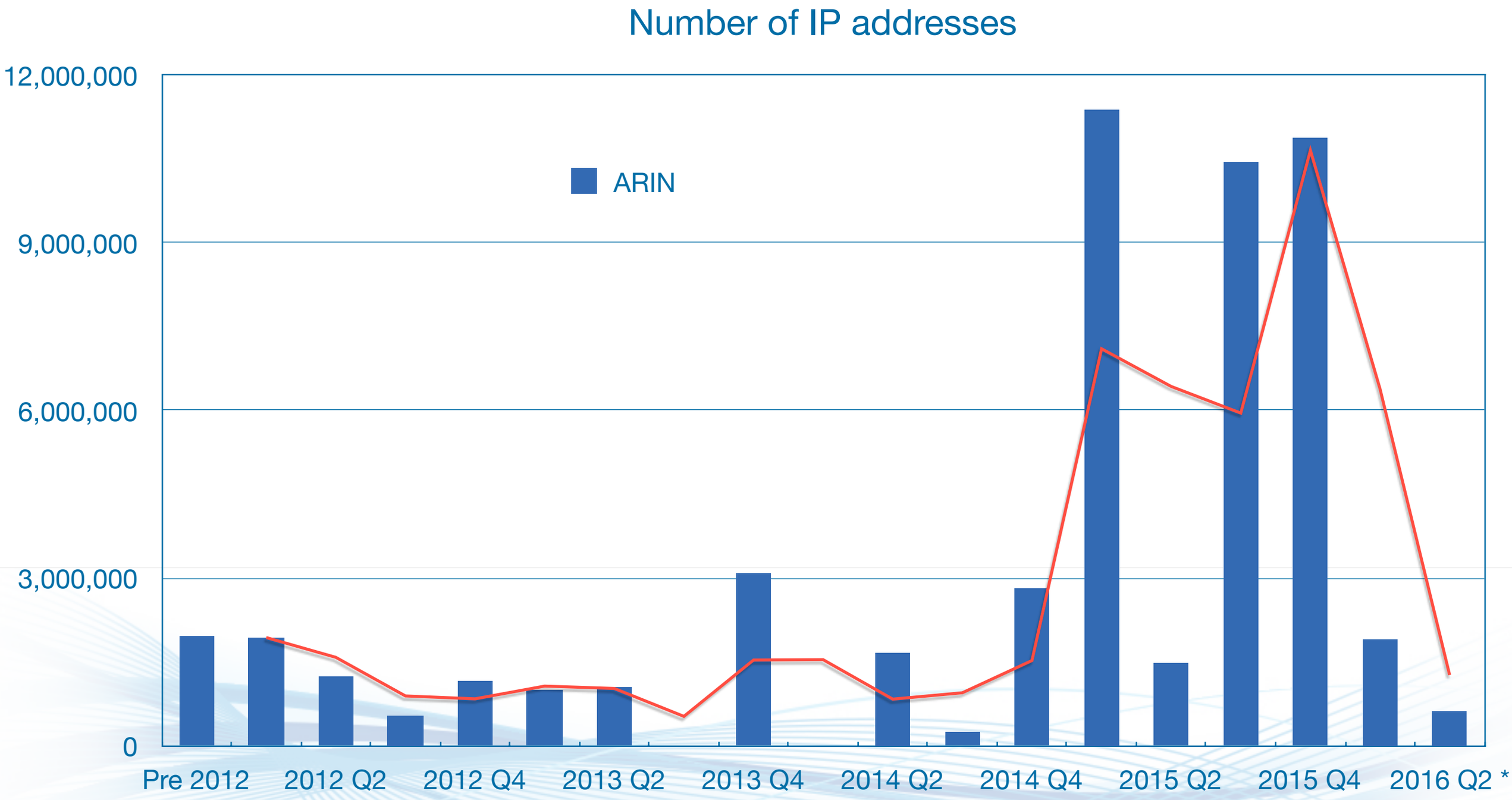
Transfer trends



Transfer trends



Transfer trends



V4Escrow's predictions are accurate

- V4Escrow was asked during Menog14 in **2014** to make a prediction on the number of IPs transferred in 2014. We estimated that **1x/8** will have been transferred and were **98%** right.

- During Menog15 in **2015** we also predicted that **4x/8s** will have been transferred globally in 2015. According to the publicly available stats, 3.06 /8s were transferred and recorded in the RIR stats making our prediction **76%** accurate.
  - Geoff Huston showed in a presentation at APNIC41 that 14M IP addresses have, apparently, been transferred but are not recorded in the RIR databases (probably subject to futures contracts)
- Considering the 3.05 /8s transferred and recorded and the 14M IPs seen in the routing table but not recorded in the database, we can say that the 4 /8s prediction was also **98%** accurate.

- Based on previous predictions which were spot-on, we predicted in March 2016 at Menog16 that the number of IPs transferred in 2016 will decrease to **2.5x/8s**.
- In 2016 (January to 1st of June - ARIN only until May) - 8,321,792 (**~0.5x/8**) IPs have been transferred.
  - 1st observed slowdown of the IPv4 market - less large blocks (/16 to /12) being transferred
  - expecting to see a big player (/8) in the market as demand still exists but no supply of /16 or larger

Lessons learned

- Contact Geo-IP providers once you receive an IP block through a transfer
  - your customers will be seen in the country of the transferor for the first few months.
- Ask for a blacklist report on the IP block or check major blacklisting providers.
- If you are they Buyer - request the seller to forward you the abuse reports for the IP addresses transferred to you
  - the Seller will continue to receive abuse reports for at least 6-12 months for the IP addresses transferred because abuse reporters do not update their databases and continue to send the reports to the ‘old’ abuse contact
- Start routing immediately, hijacks do happen very often
- If you do not transfer the IP block through a broker, make sure the person that you talk to has corporate authorization to transfer to you. Ask for PoA (Power of Attorney).
- Have a price in mind before you contact a Broker or the other party for the transfer.

Pricing - observed vs estimated

- Runout in ARIN in 2015 affected pricing - prices started to go up in ARIN
- RIPE Inter-RIR transfer policy caused prices to harmonize between ARIN and RIPE
- Price trends have reversed, prices have increased since ARIN Runout
  - minimum price observed was in 2012-2014 - $5/IP (ARIN) and $7/IP (RIPE)
    - a lot of IPv4 available on the market
  - current prices have harmonized at $10-$12/IP
    - only a few large blocks (/16 or larger) available on the market
    - many transactions (/17 and smaller) observed at $12-$14/IP
    - several small transactions at even $15-$20/IP
- Large IP blocks (/8s) added to the market may draw prices down
- Maximum price still to be observed but we estimate it to grow above $25/IP

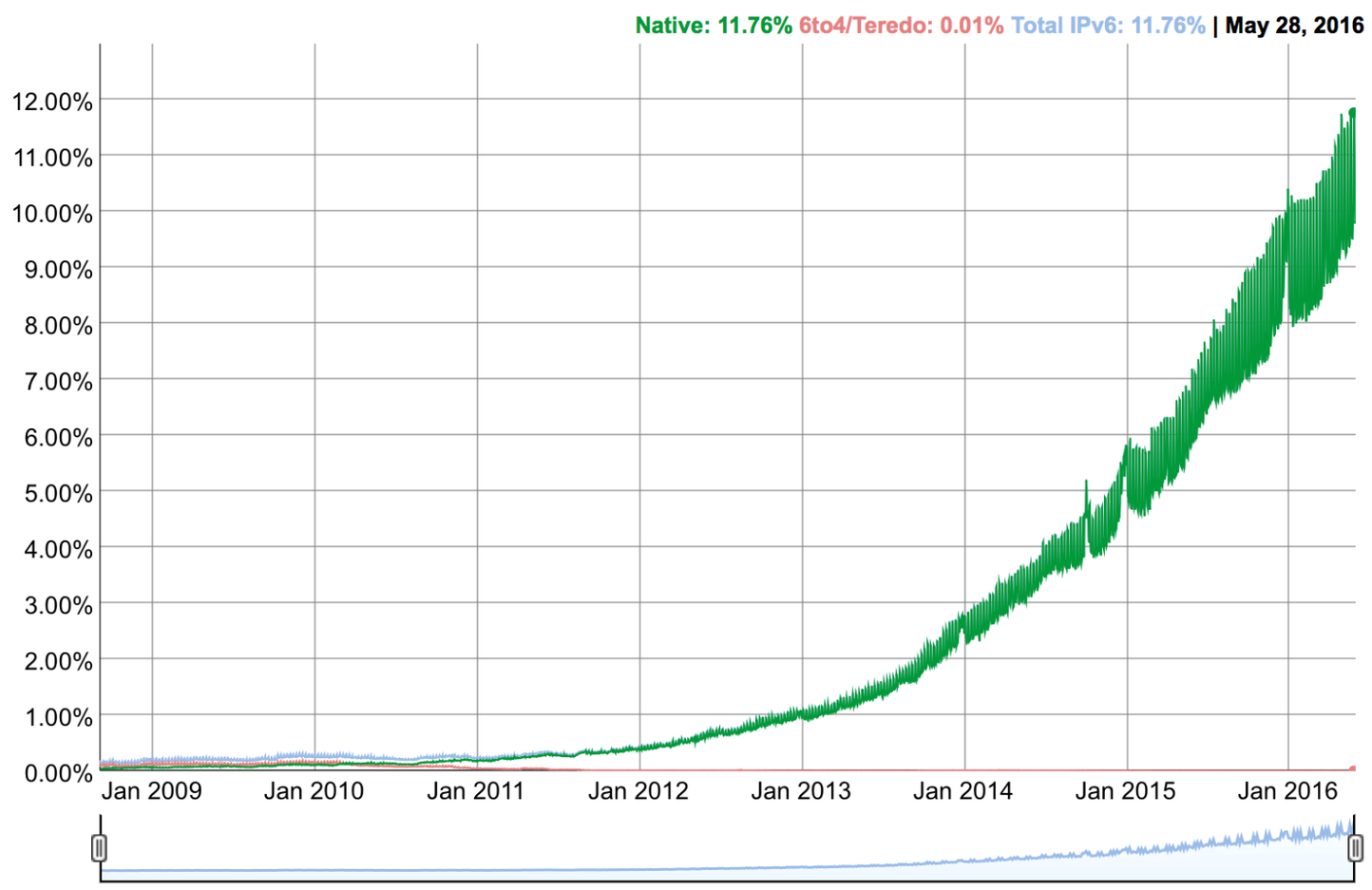
/22s - Price vs Policy vs IPv4 Market

- “The ability to open additional LIR accounts was confirmed at the RIPE NCC General Meeting on 27 May 2016 when members voted to approve the following resolution:
- "The General Meeting approves the ability of RIPE NCC members to create additional LIR accounts.”
- The RIPE NCC is now working on creating the processes to implement this resolution.” - RIPE NCC e-mail June 7th 2016

- Current policies were conceived with the idea that the last /22 will be used by members to migrate to IPv6. However, current market reality shows that many consider it a method to make profit.
- Price for /22 in RIPE is ~$3,8/IP in the first year and ~$1.5/IP/year after that
- Thus - lowest price per IP in the RIPE Region is set by the RIPE NCC at ~$5/IP
  - RIPE NCC still has ~15M IPs to distribute at this ‘price’
  - anyone can request one or more /22s (1024 IPs) from the RIPE NCC - no need based policy

- Price for small blocks in APNIC is ~$1/IP/year if you request a /21
  - APNIC still has ~8,5M IPs to distribute at this ‘price’
  - one can request up to a /21 from APNIC as long as you can estimate a need in 2 years

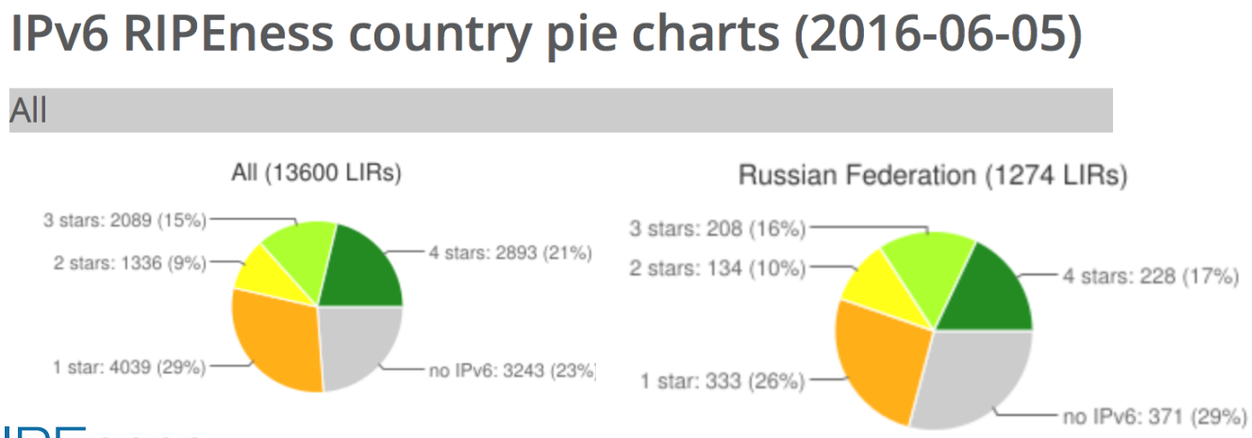
IPv6



- as per Google site
  - measured since 2008
  - virtually 0 before 2012
  - 100% growth in 2012 up to 1.1%
  - 150% growth in 2013 up to 2.8%
  - 100% growth in 2014 up to 5.6%
  - 95% growth in 2015 up to 10.4%
  - now at 11.75% worldwide - slowdown of growth in 2016

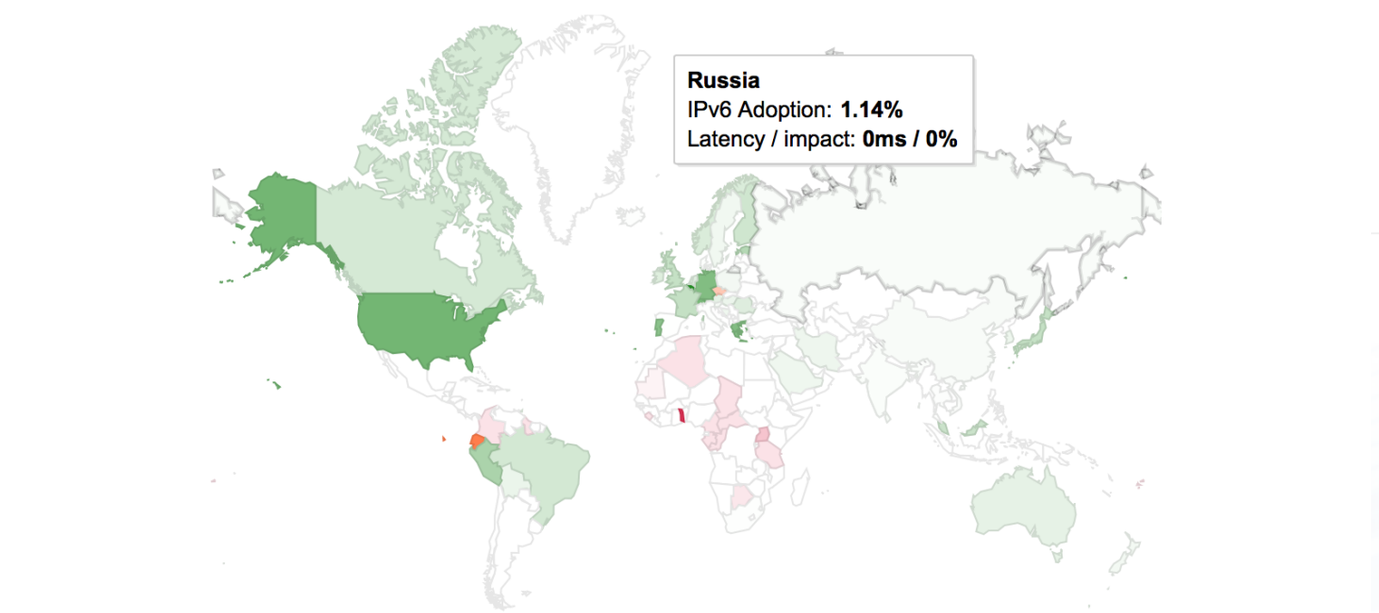
IPv6 in Russia

- IPv6 adoption in Russia
  - only at 1,14% according to Google
  - 17% with 4 * RIPEness
    - compared to 21% in RIPE
  - max 3.6% LIRs in Russia have 5 * RIPEness



Listing of LIRs qualifying for *all* five stars

Access (last 6 months)	Access (last month)	Content	LIR
		100.0 %	CJSC "TSI Service"
		100.0 %	CJSC Scientific-Production Association Progressive Technologies
		49.2 %	City-Telekom LLC
96.8 %		29.3 %	Comfortel Ltd.
		53.8 %	Dremuchij Les Ltd
		49.9 %	Fastnet LLC
44.0 %	25.0 %		Federal State Educational Institution of Higher Professional Education M.V.Lomonosov Moscow Sta
		100.0 %	Gorizont Ltd
		72.2 %	Informatsionnye Tekhnologii LLC
		24.0 %	Internet-Hosting Ltd
		79.3 %	Intersvyaz-2 JSC
		26.8 %	LANTA Ltd
32.4 %			LLC "Dream Industries"
18.6 %		62.9 %	LLC "KomTehCentr"
		46.8 %	LLC "MASTERHOST"
83.3 %			Limited Liability Company GoldenInternet



- low IPv6 adoption = higher IPv4 prices in a few years

Elvis Daniel Velea, June 2016

Questions ?

v4Escrow

IPV4 RESTARTS HERE!

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