

# What happened to IP addresses in 2022?

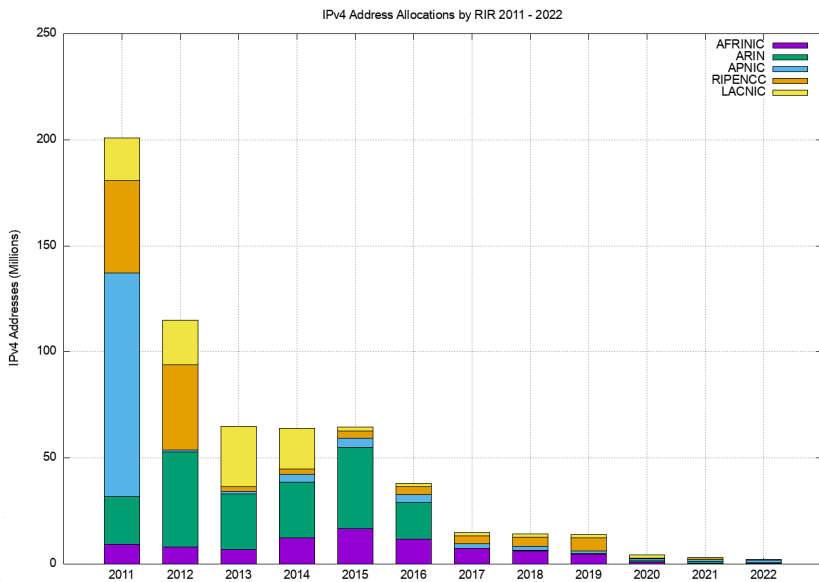
*Geoff Huston*

*Chief Scientist, APNIC*

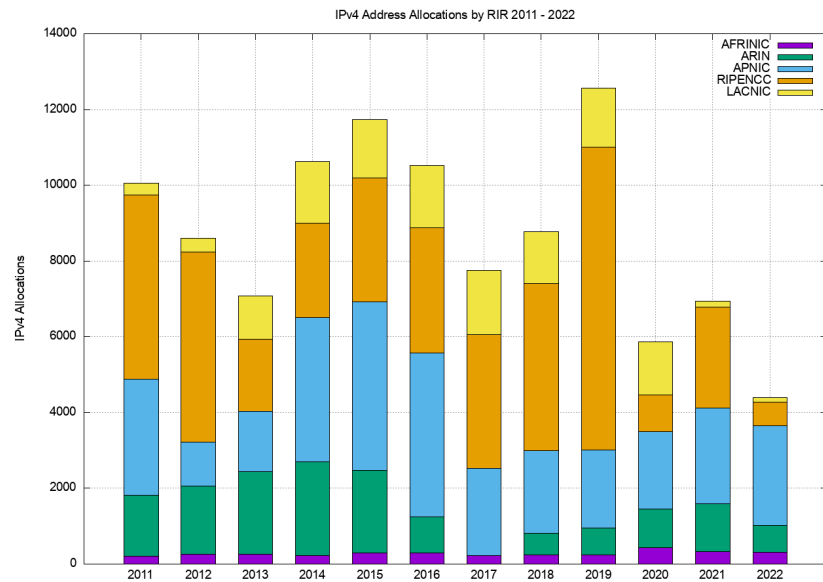
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# IPv4 Address Allocations

## Addresses

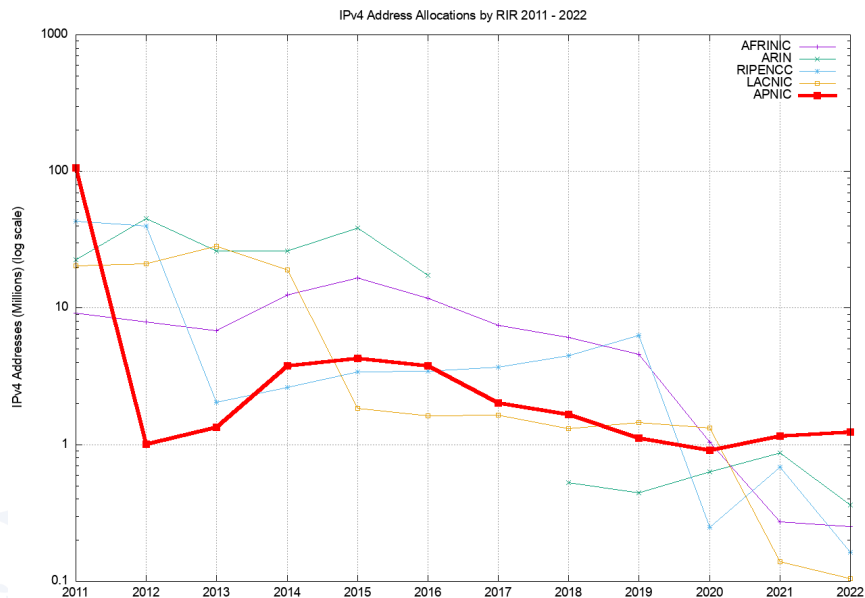


## Allocations

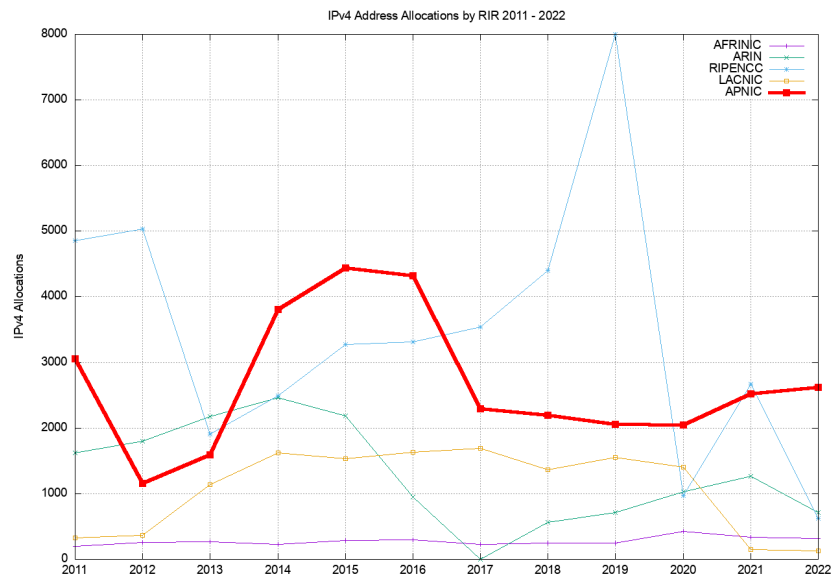


# IPv4 Address Allocations

## Addresses

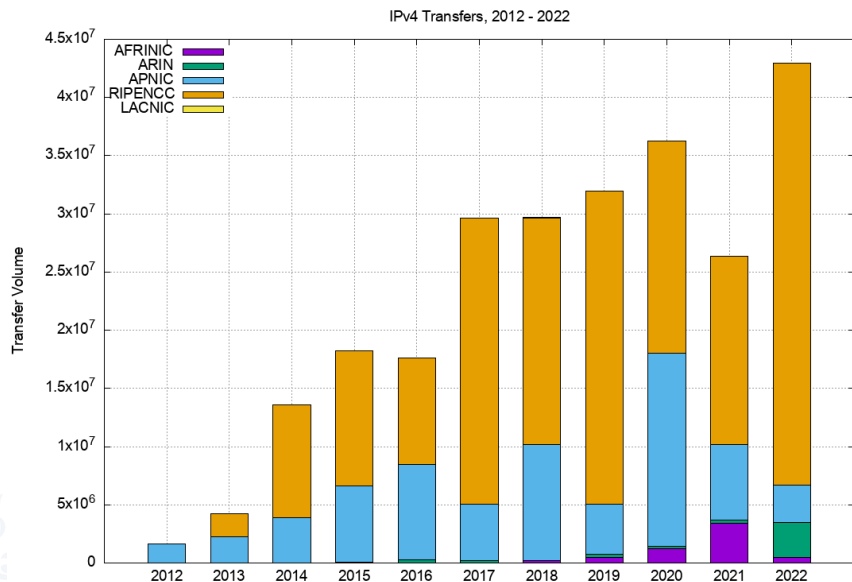


## Allocations

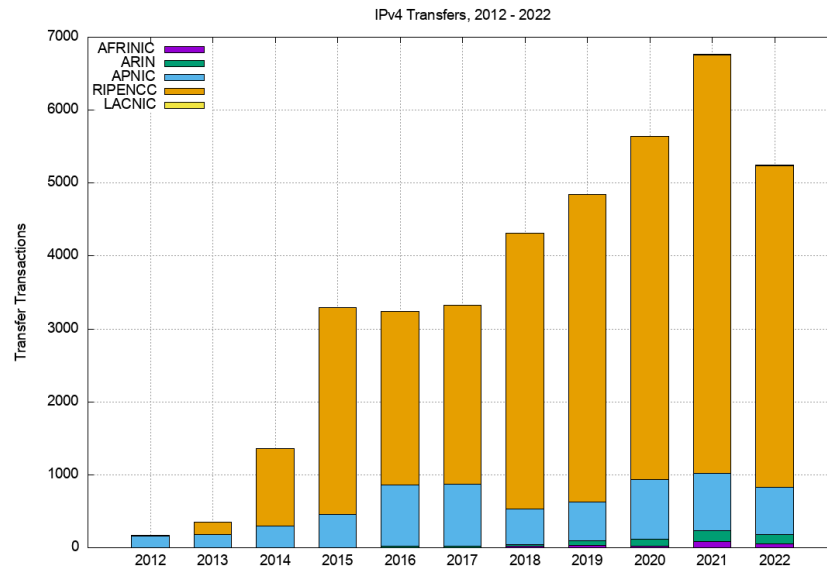


# IPv4 Address Transfers

## Addresses

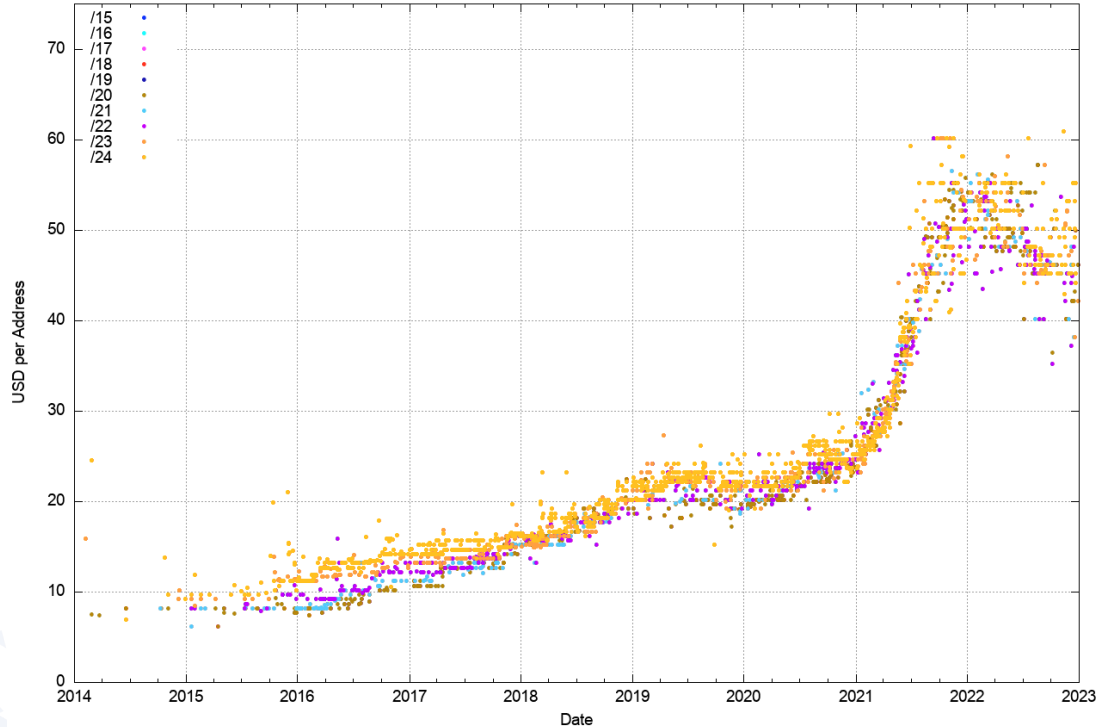


## Transfers



# Transfer Pricing

Unit Price of Traded IPv4 Addresses (From Hilco Streambank)

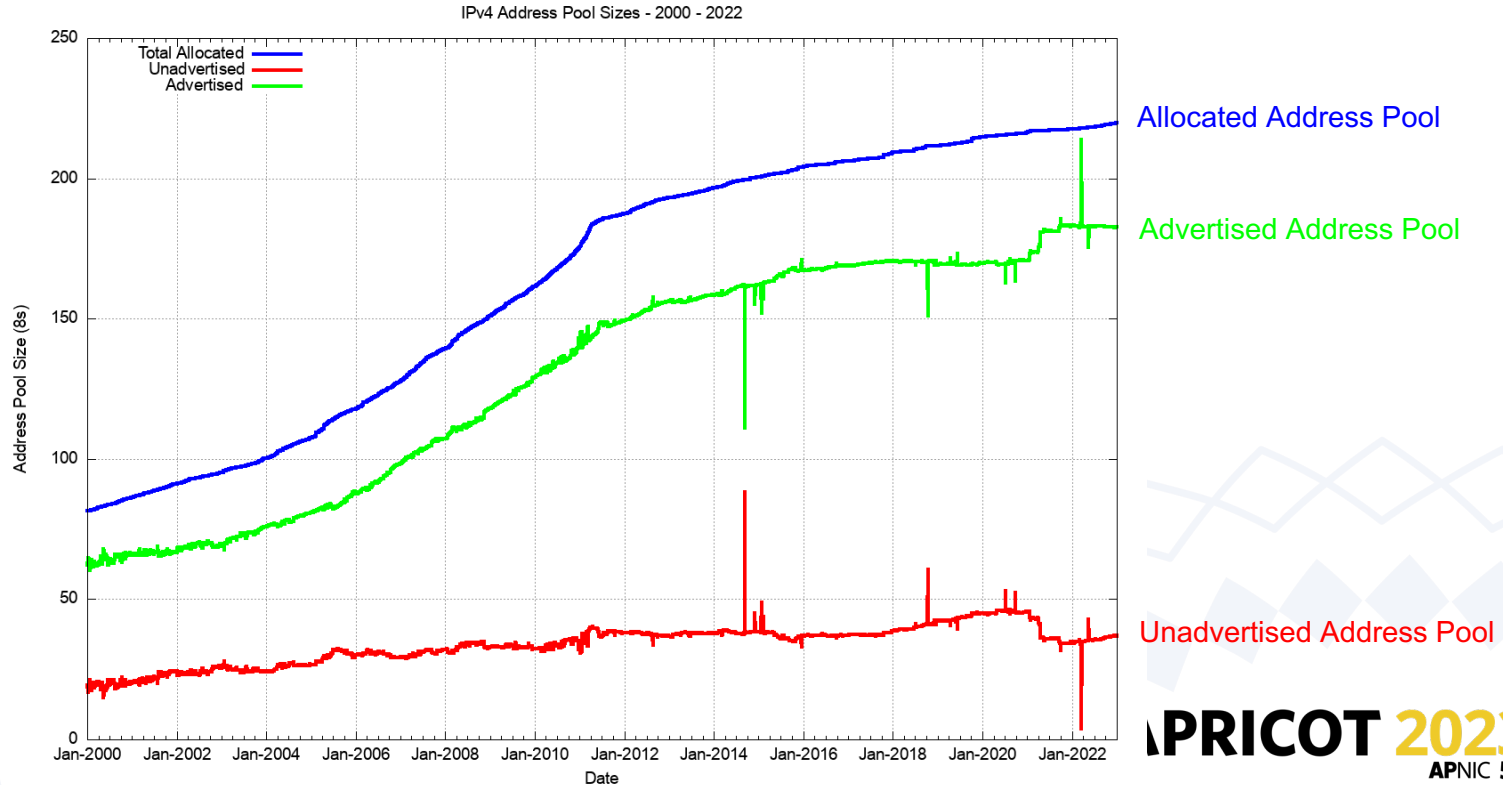


The market price per address doubled across 2021

The average price dropped by 20% across 2022

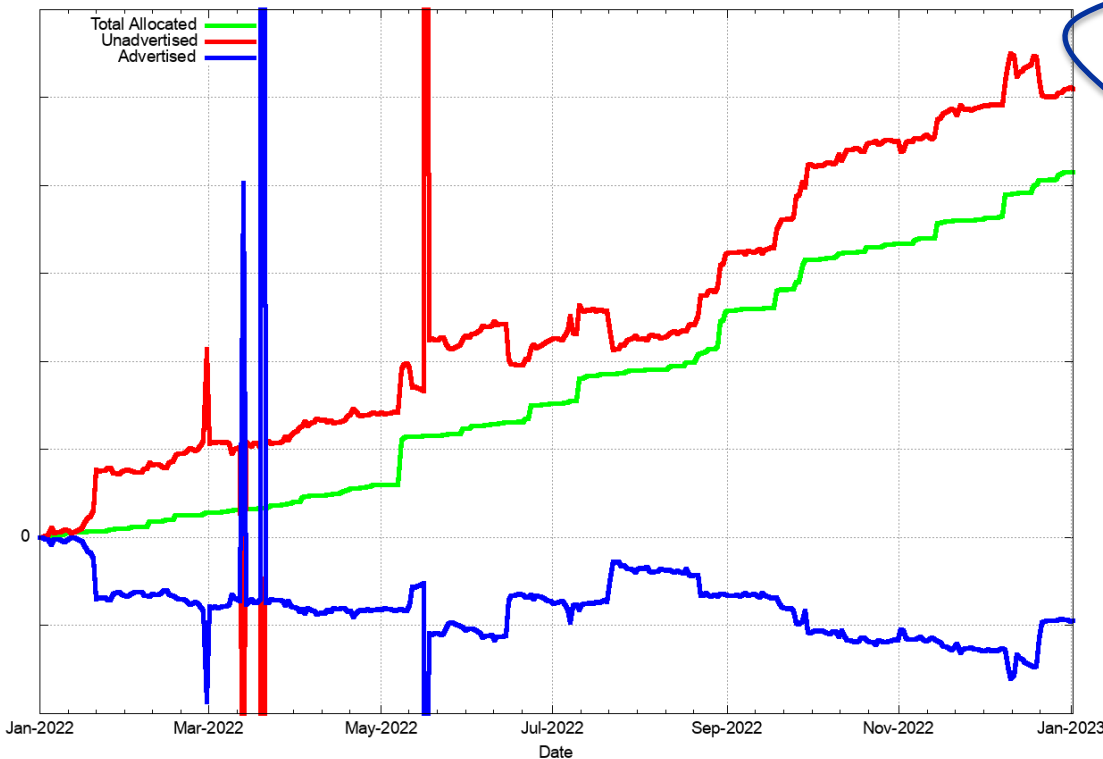
The variance in prices has increased significantly in 2022

# Are Transfers recovering unused addresses?



# Are Transfers recovering unused addresses?

IPv4 Address Pool Sizes through 2022



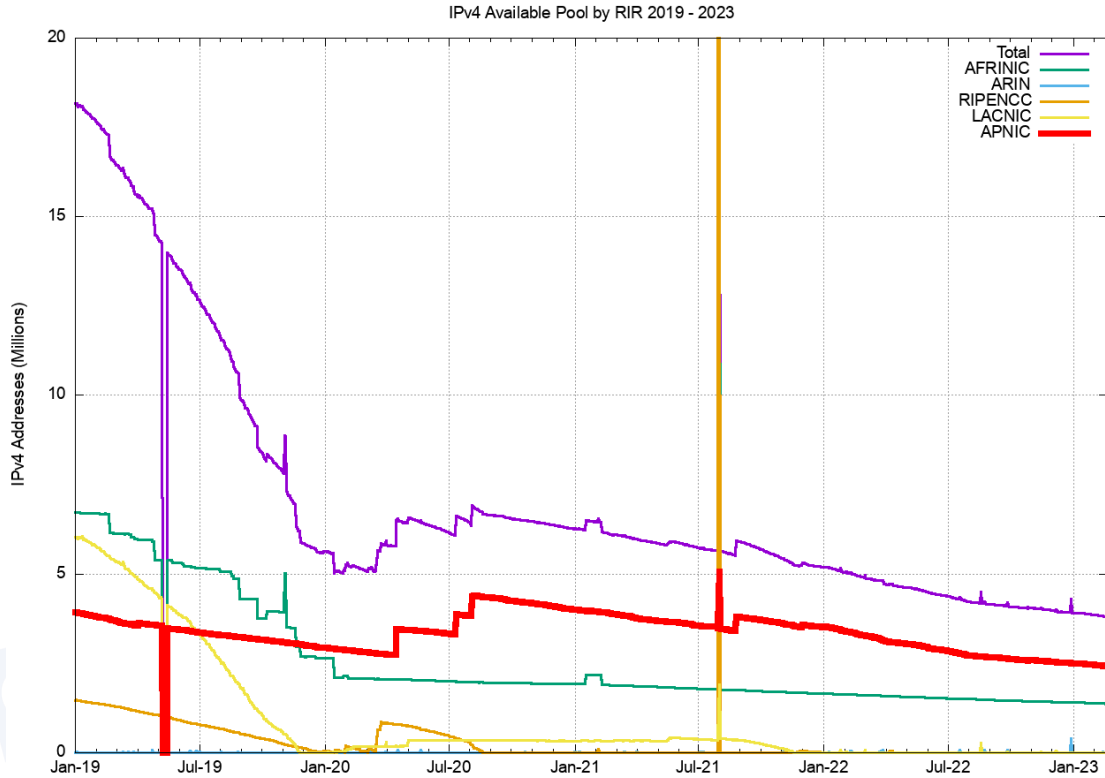
**Unadvertised Address Pool**  
**+9.4M addresses**

**Allocated Address Pool**  
**+1.5M addresses**

**Advertised Address Pool**  
**-7.9M addresses**



# RIR “Available” Address Pools



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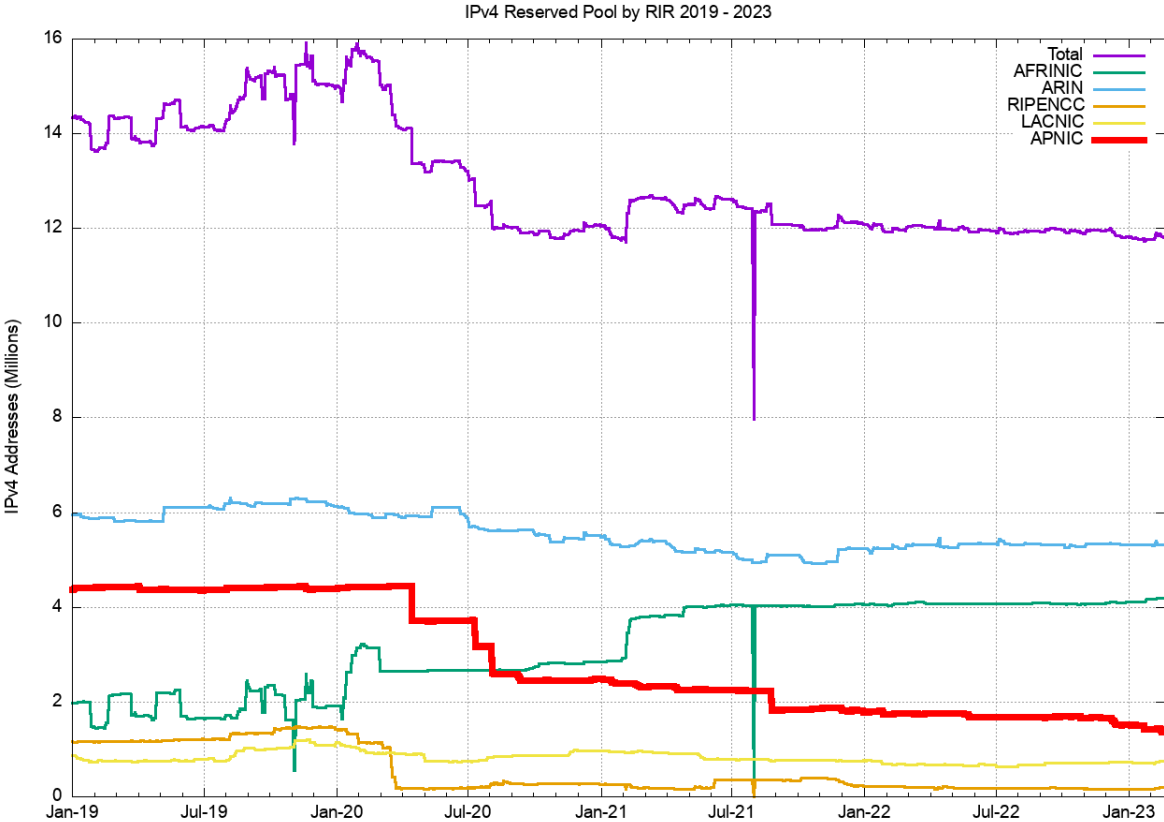
APNIC  
AFRINIC  
ARIN  
LACNIC  
RIPE NCC

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# RIR “Reserved” Address Pools



ARIN  
AFRINIC

APNIC  
LACNIC  
RIPE NCC

#apr

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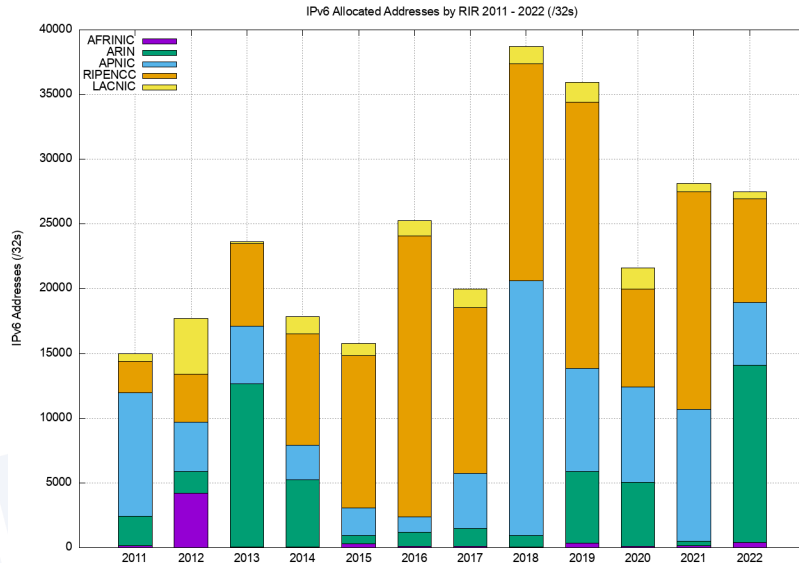


# IPv4 in 2022

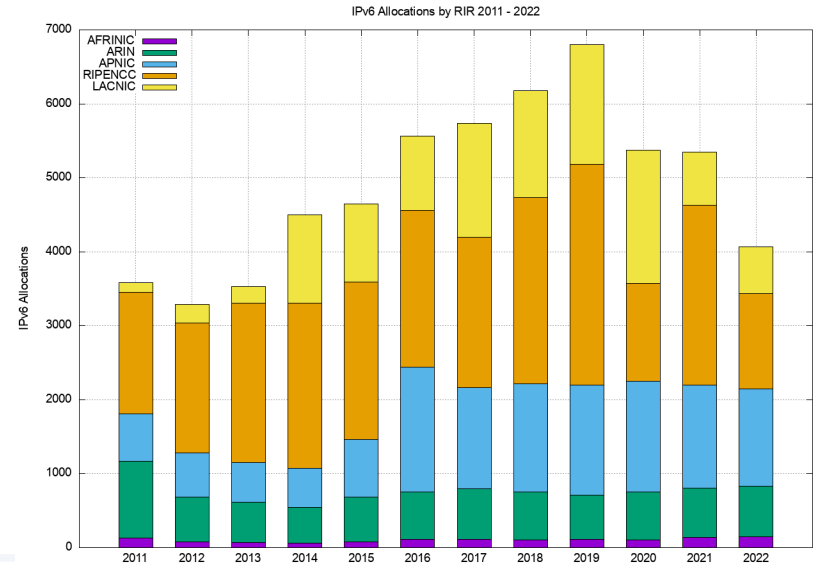
- Scarcity pressure appears to have reduced in 2022:
  - More IPv6-accessible service deployments relieving IPv4 NAT pressures for ISPs
  - Lower market prices for IPv4 addresses
  - Lower pressure to release unadvertised addresses
  - No common perception of imminent collapse of IPv4 markets

# IPv6 Address Allocations

## Addresses



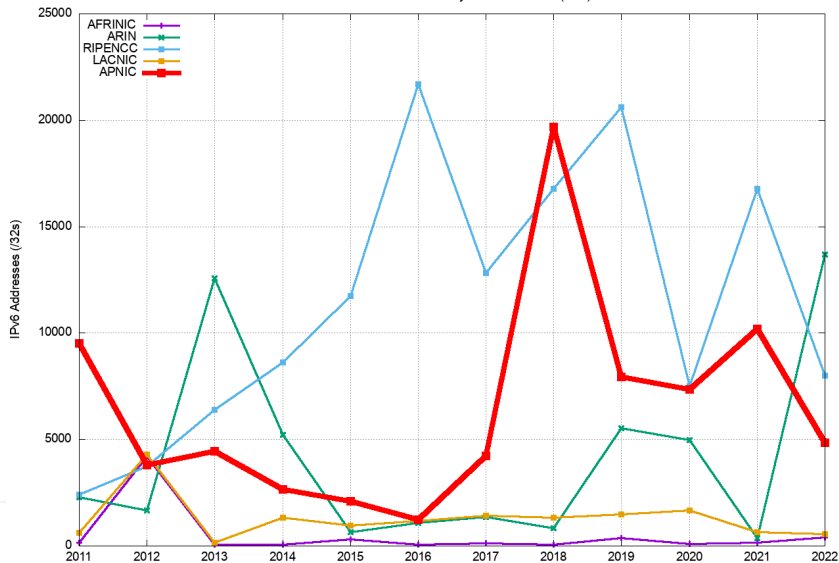
## Allocations



# IPv6 Address Allocations

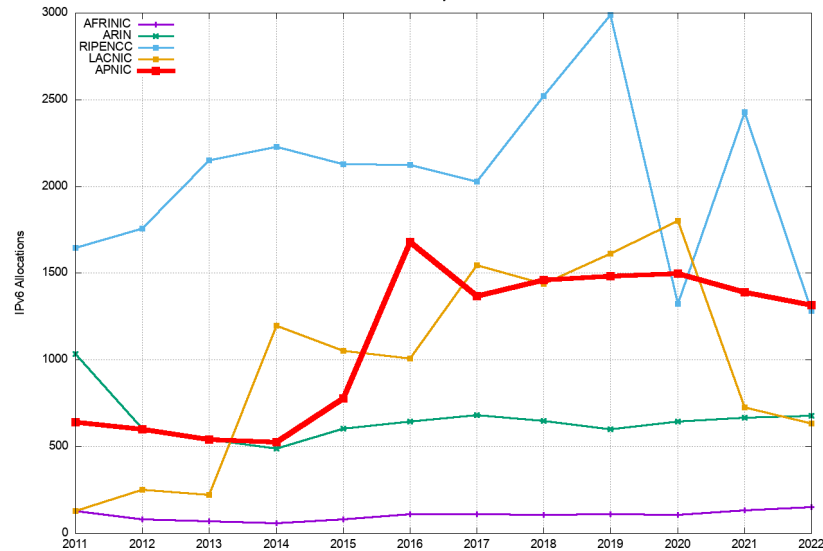
## Addresses

IPv6 Allocated Addresses by RIR 2011 - 2022 (/32s)

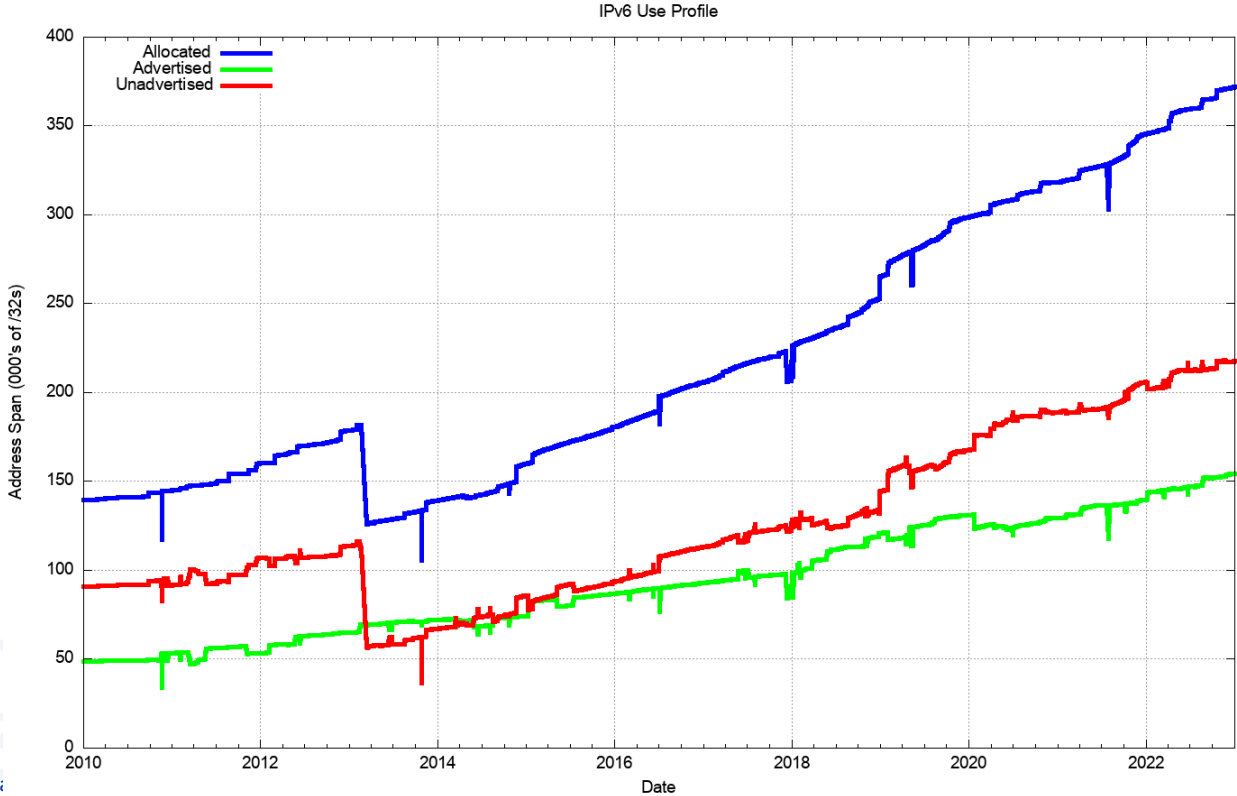


## Allocations

IPv6 Allocations by RIR 2011 - 2022



# IPv6 Address Pools



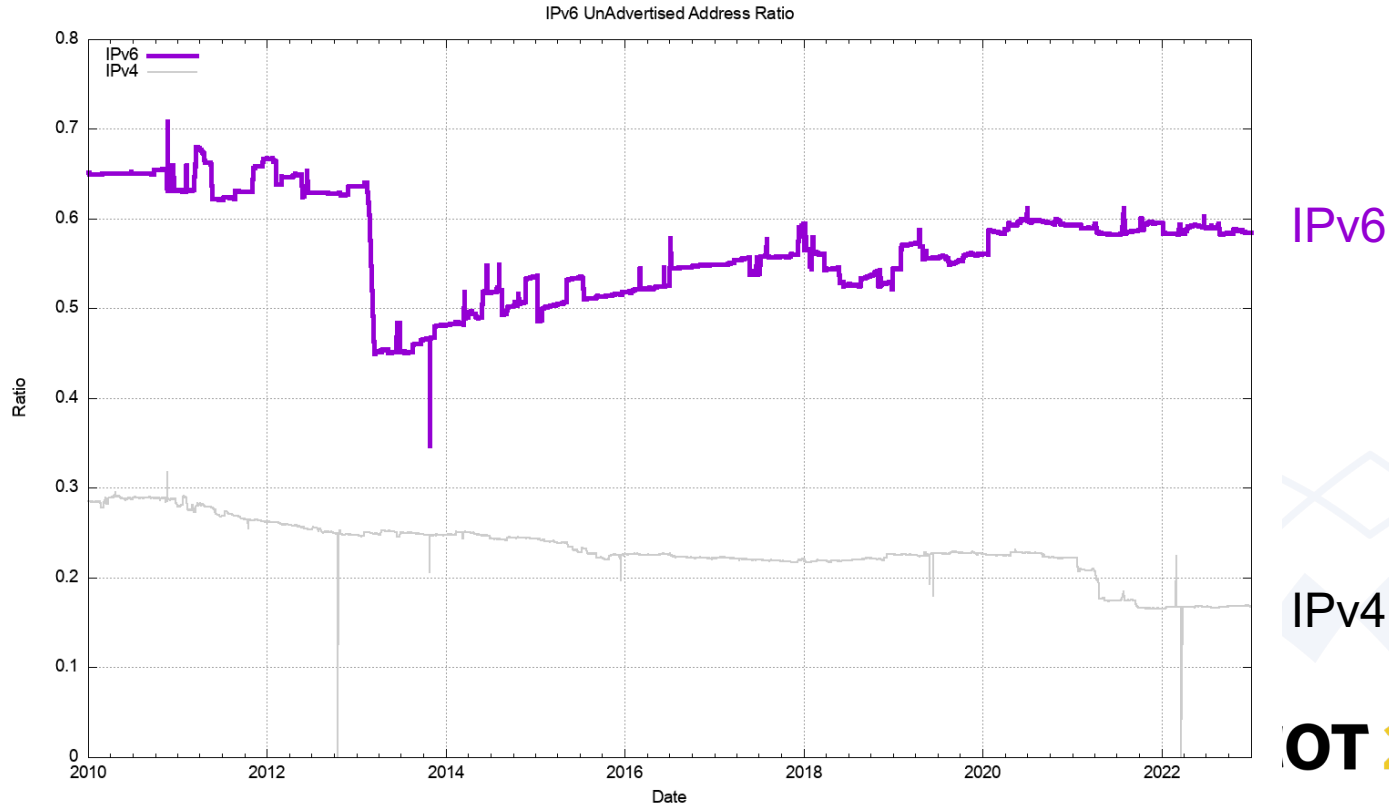
Allocated Address Pool

Unadvertised Address Pool

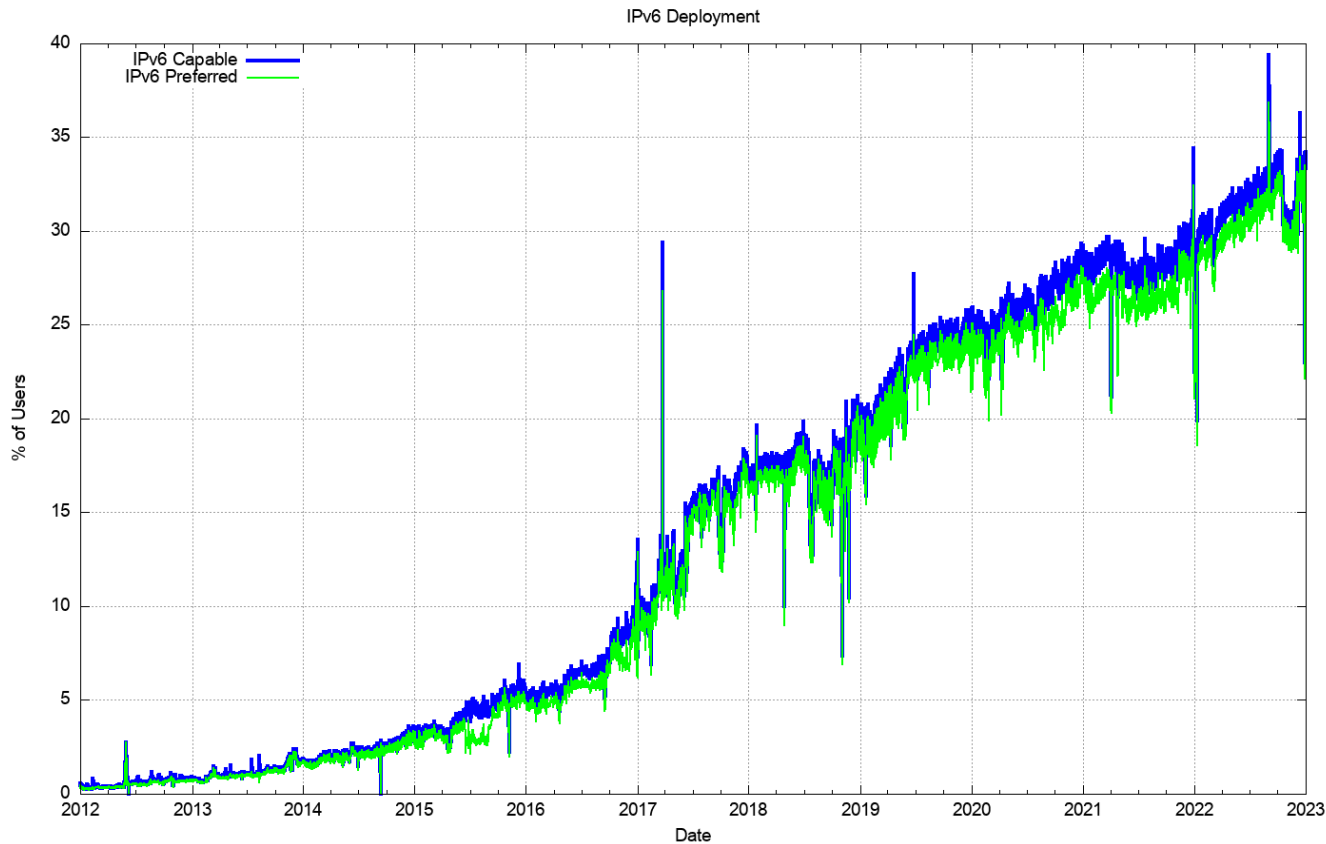
Advertised Address Pool



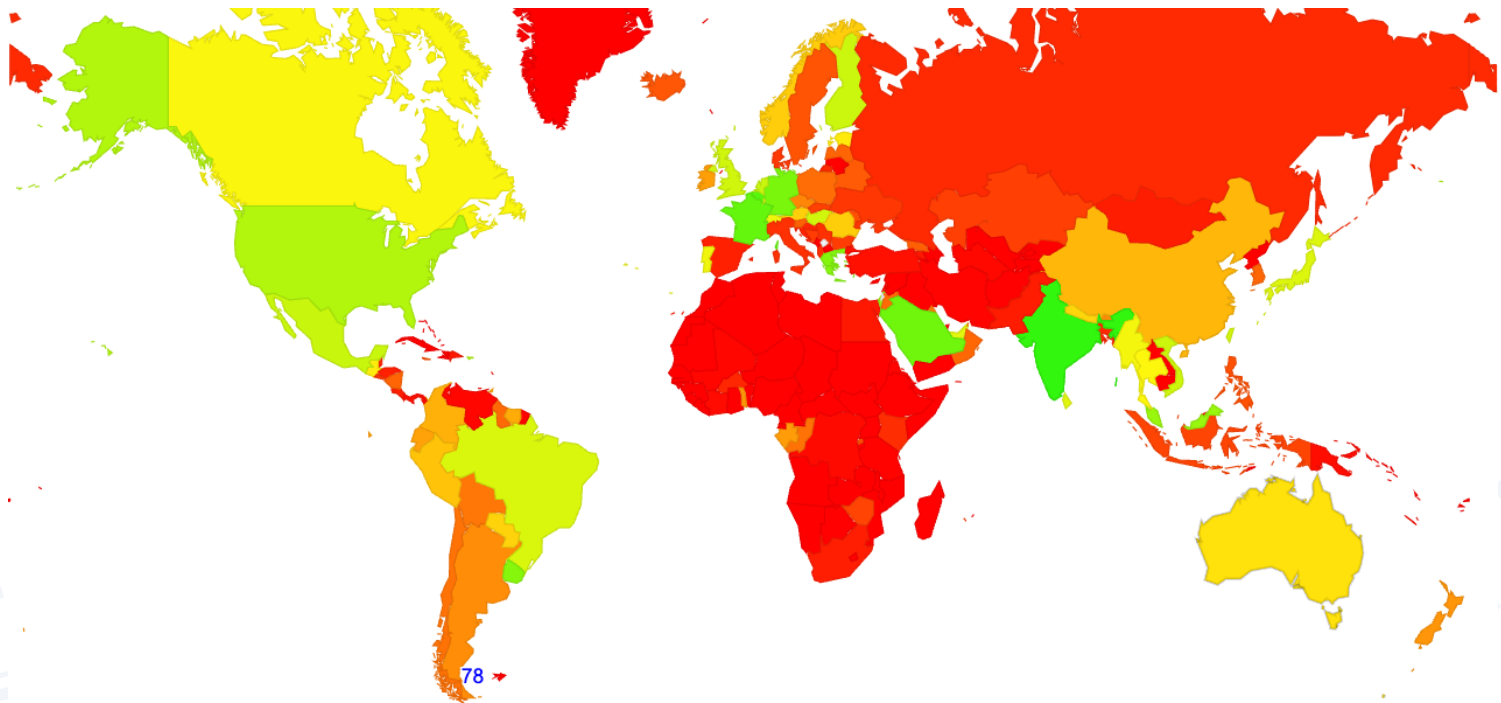
# Unadvertised : Advertised Ratio



# IPv6 Deployment



# IPv6 Deployment



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# IPv6 in 2022

- Steady IPv6 deployment in access networks is allowing more services to operate in dual stack mode
- This is relieving pressure on the IPv4 address pools
- Large allocations in IPv6 mean that there is no pressure to deploy IPv6 using highly efficient deployments

# 2023 APRICOT APNIC 55

MANILA, PHILIPPINES

20 February – 2 March 2023

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