

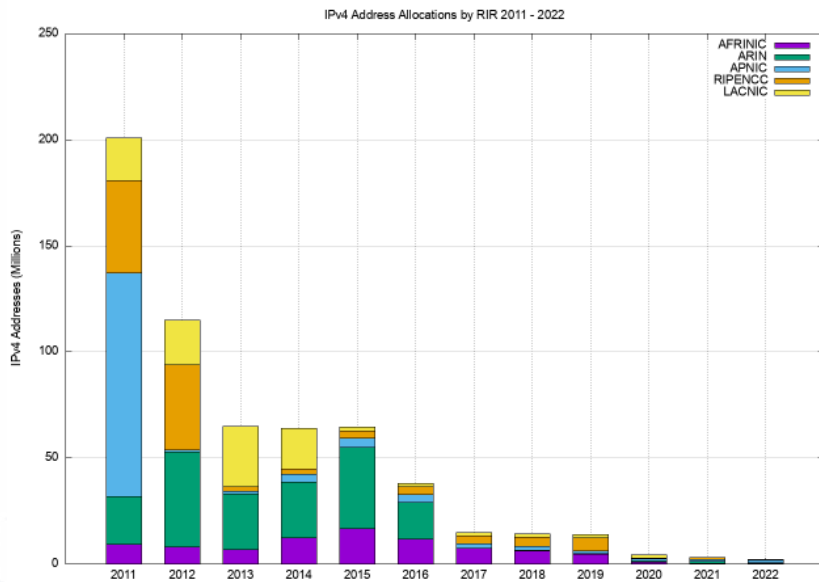
What happened to IP addresses in 2022?

Geoff Huston

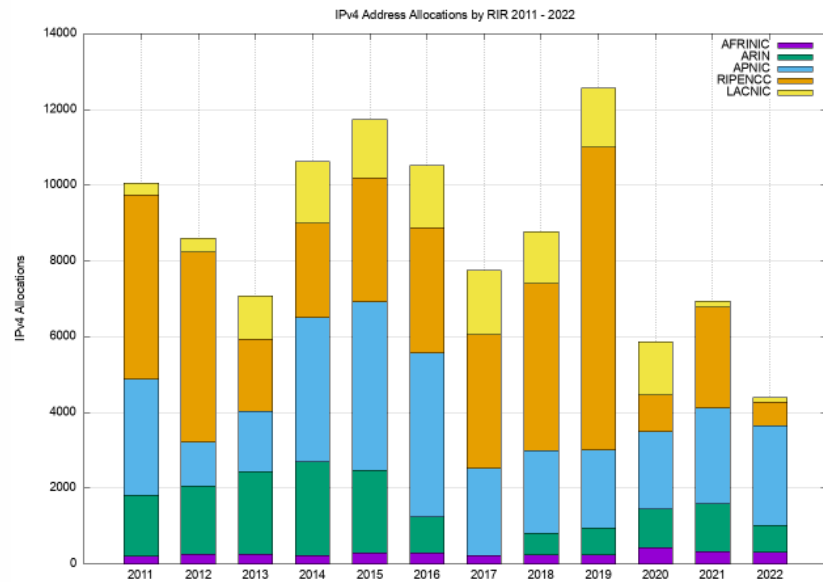
Chief Scientist, APNIC

IPv4 Address Allocations

Addresses

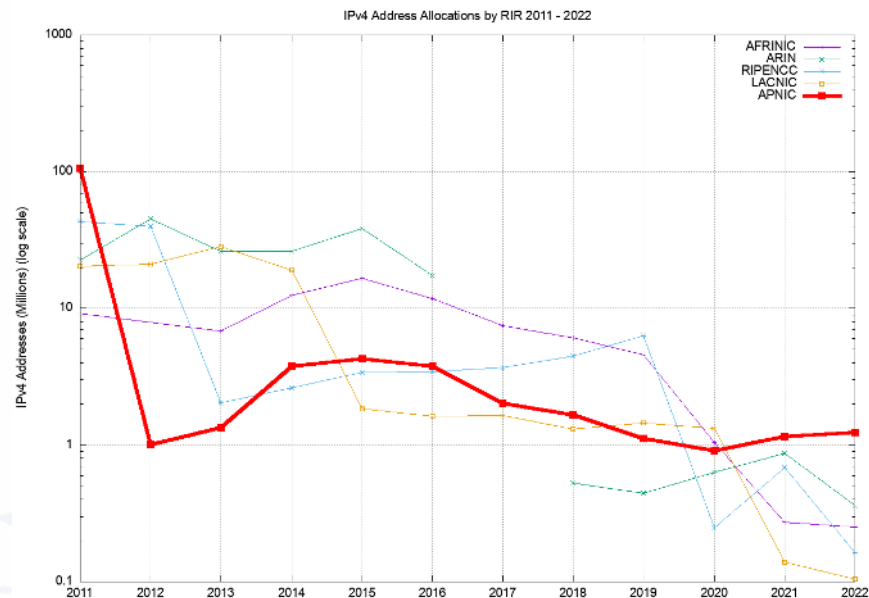


Allocations

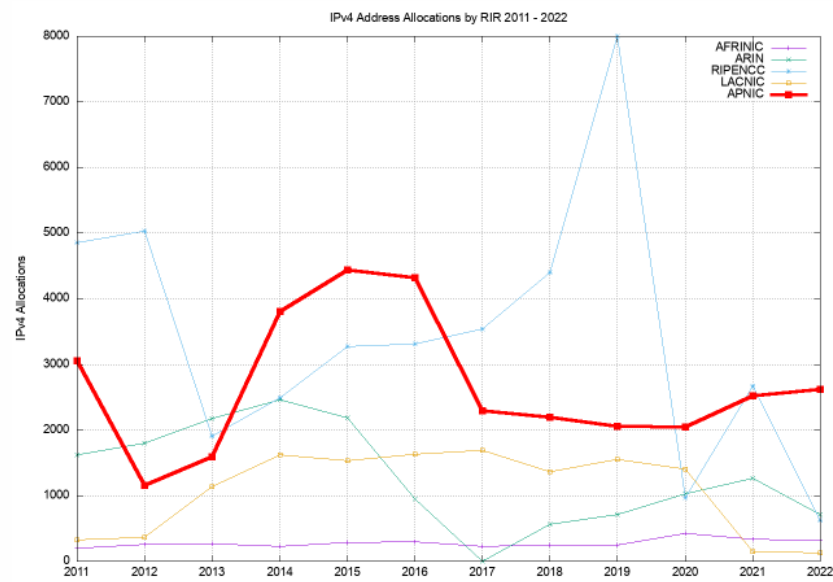


IPv4 Address Allocations

Addresses

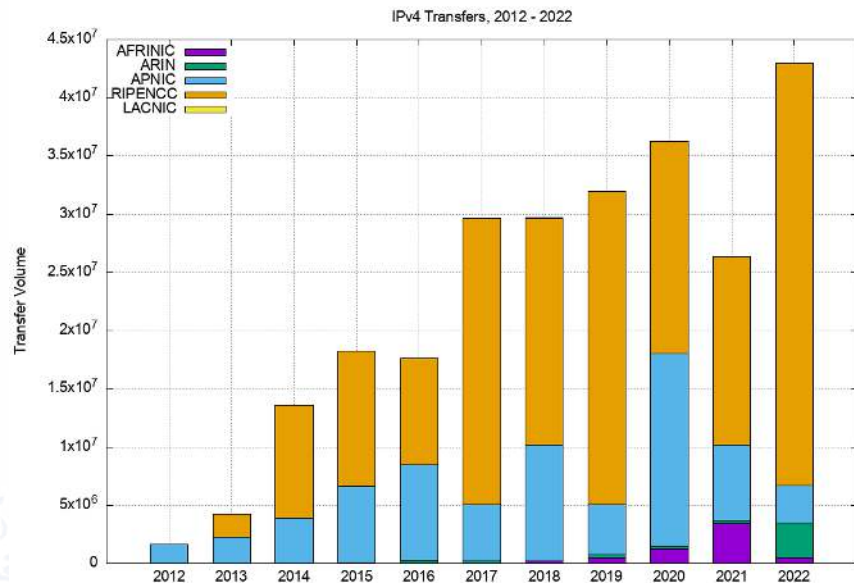


Allocations

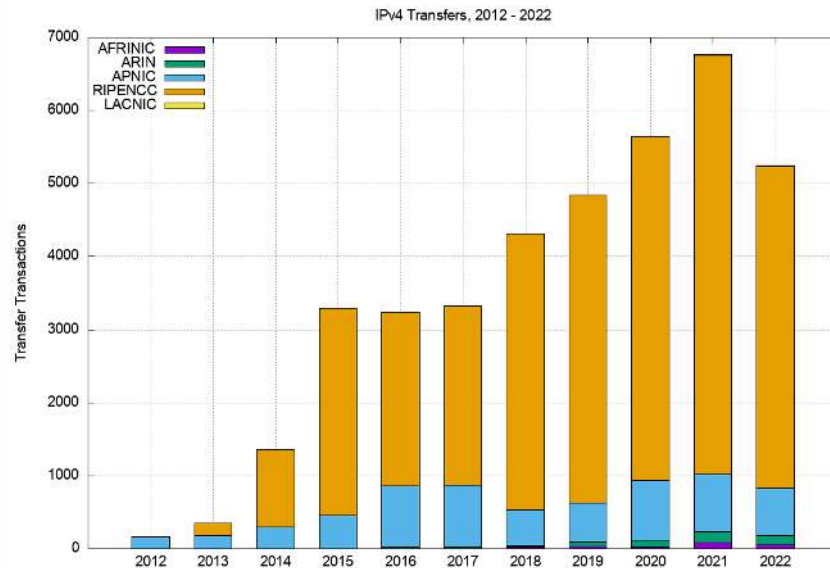


IPv4 Address Transfers

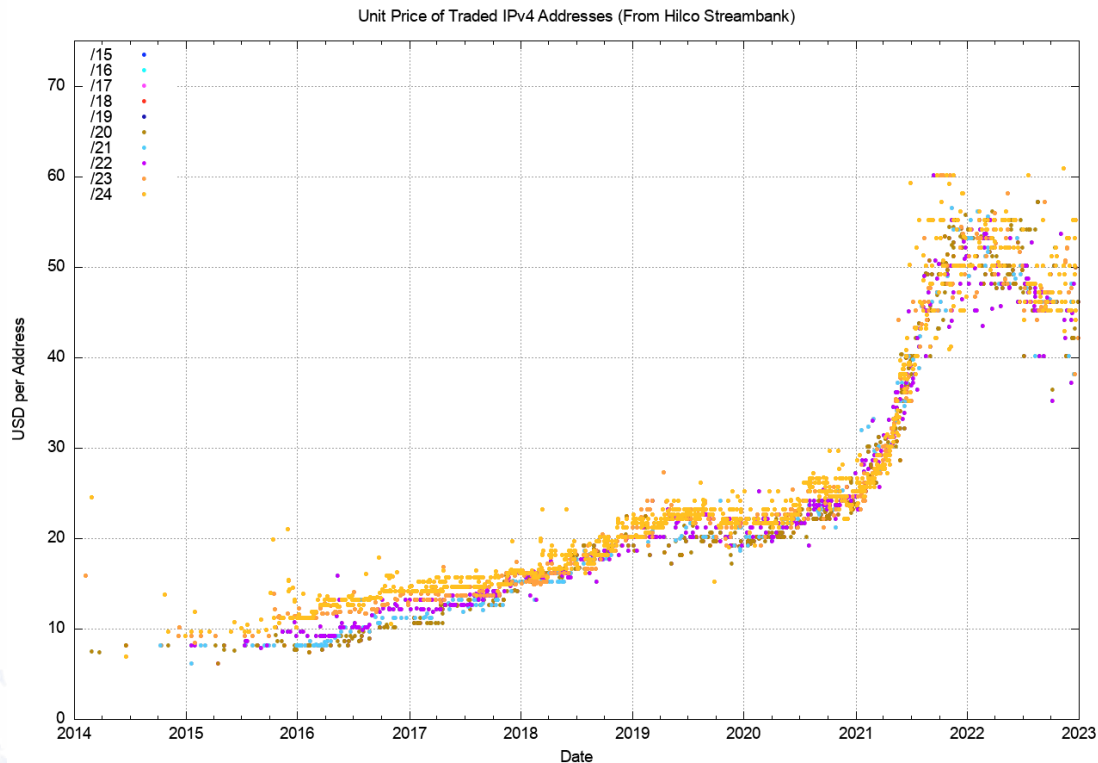
Addresses



Transfers



Transfer Pricing



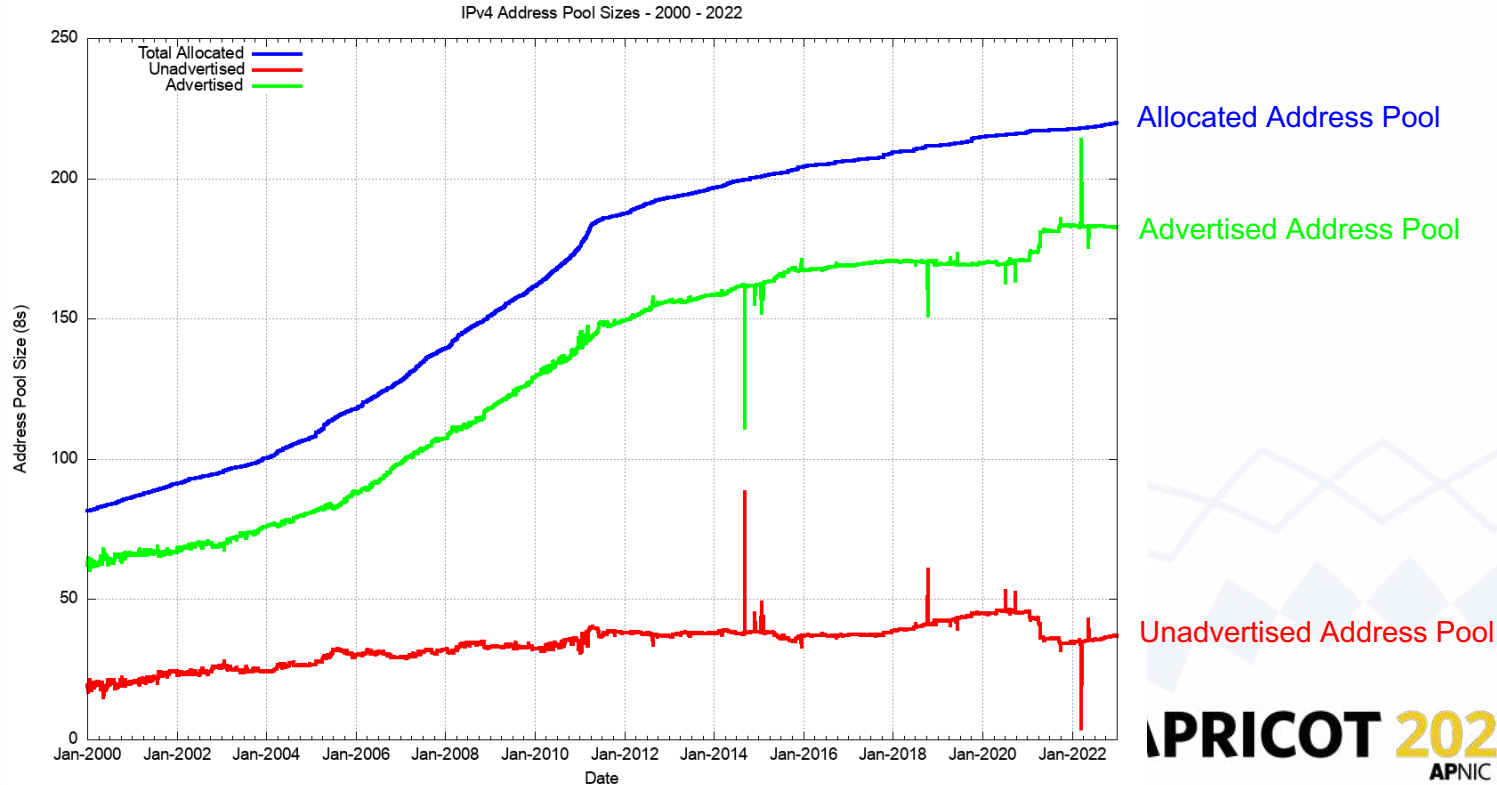
The market price per address doubled across 2021

The average price dropped by 20% across 2022

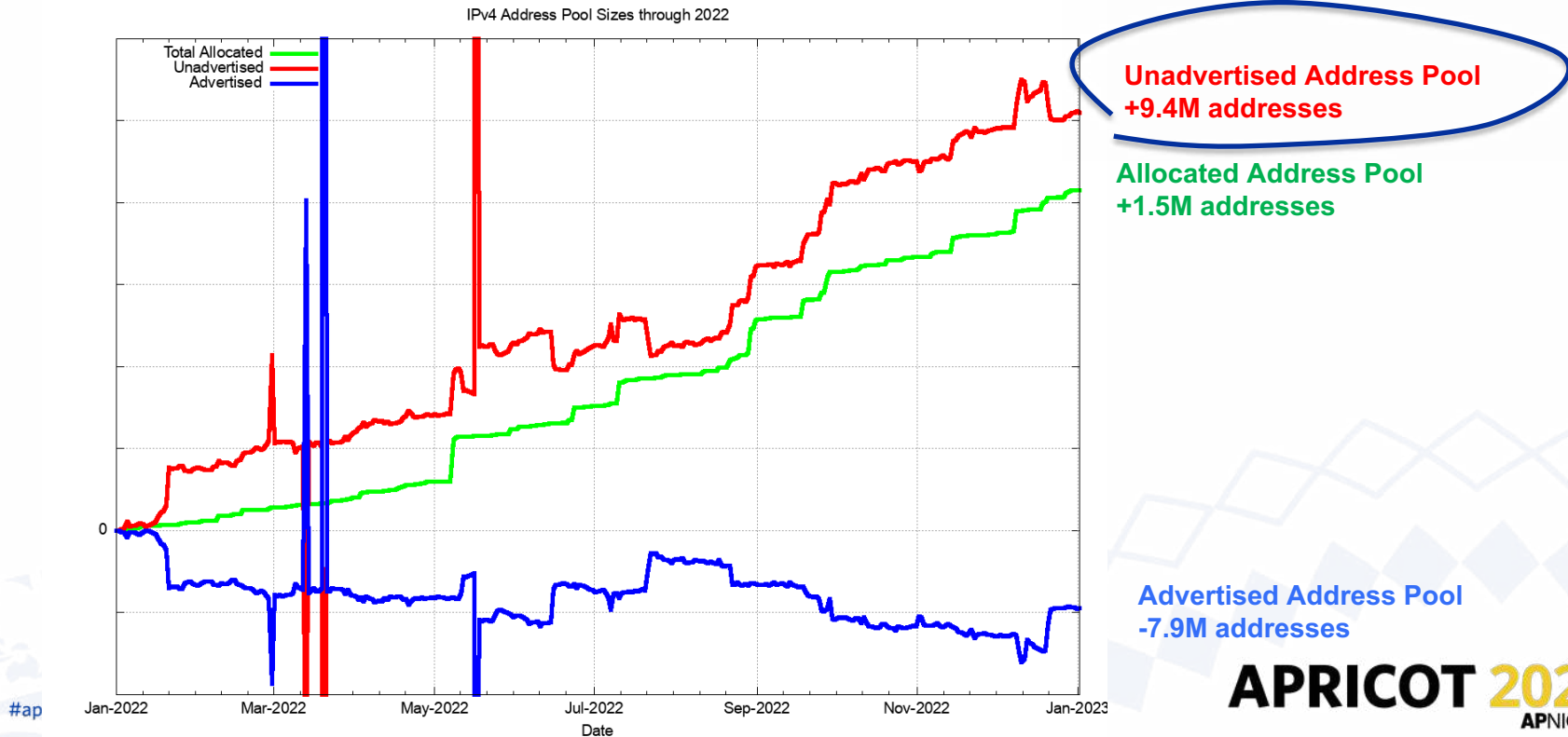
The variance in prices has increased significantly in 2022



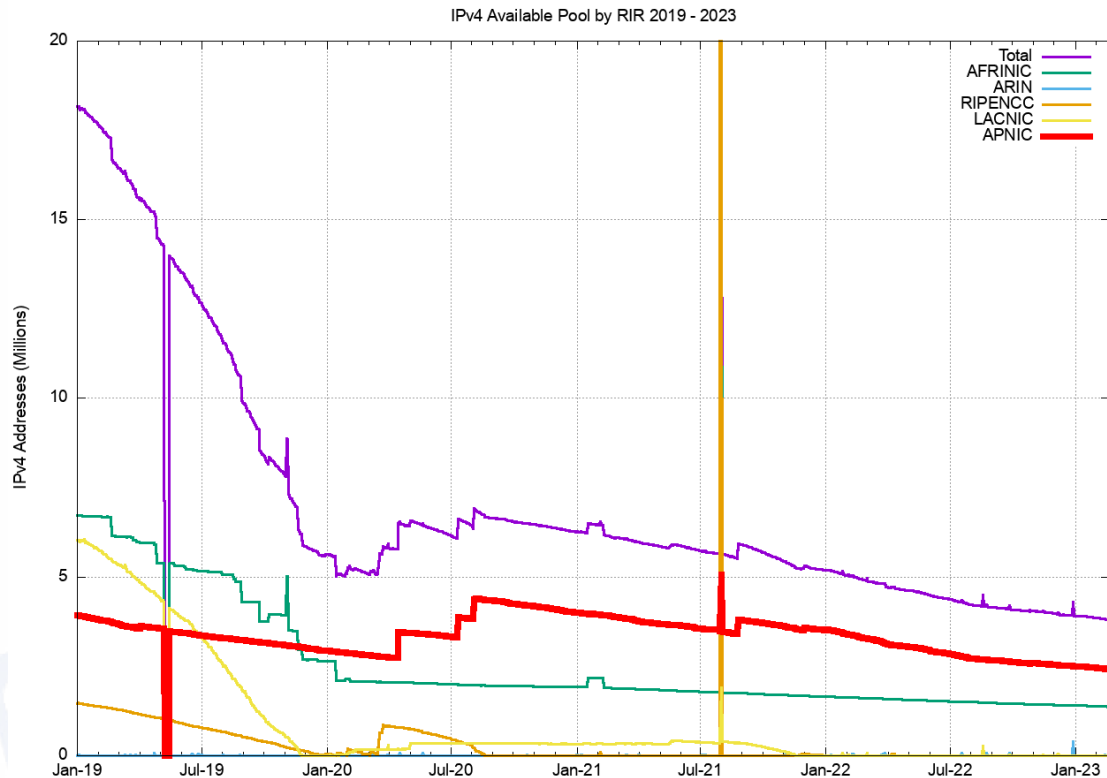
Are Transfers recovering unused addresses?



Are Transfers recovering unused addresses?

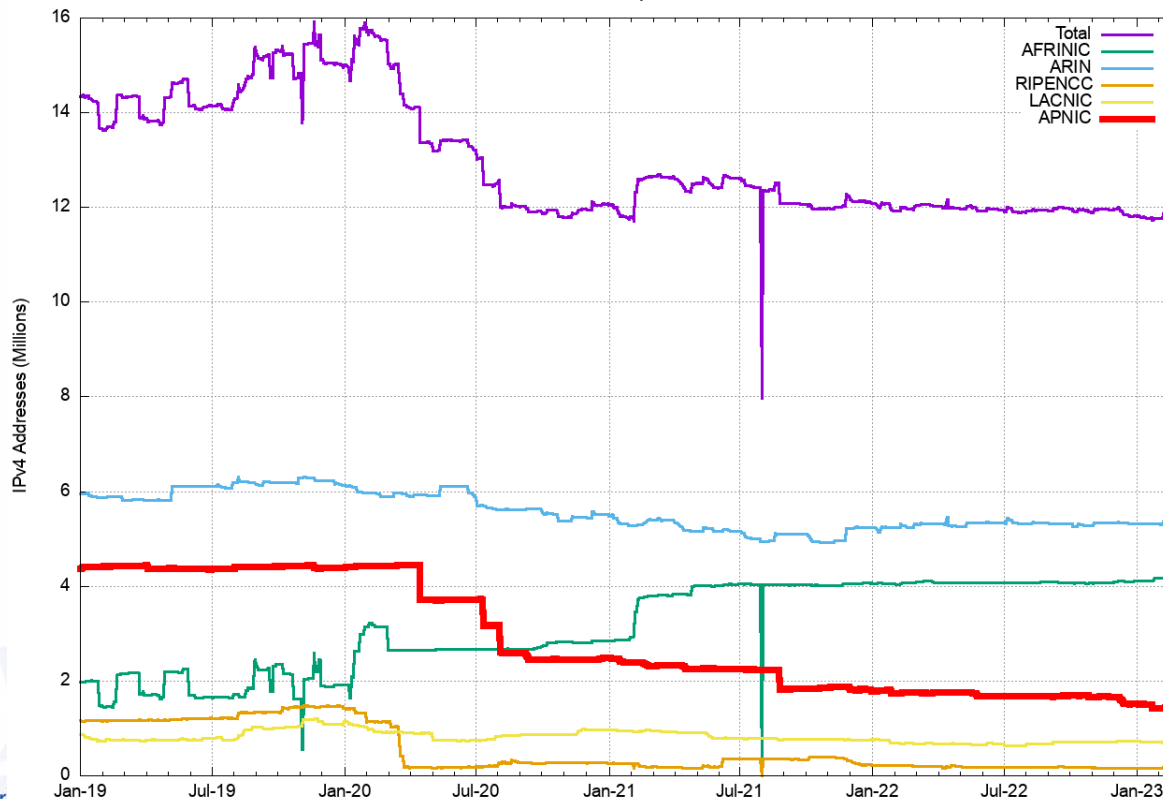


RIR “Available” Address Pools



RIR “Reserved” Address Pools

IPv4 Reserved Pool by RIR 2019 - 2023



ARIN

AFRINIC

APNIC

LACNIC
RIPENCC

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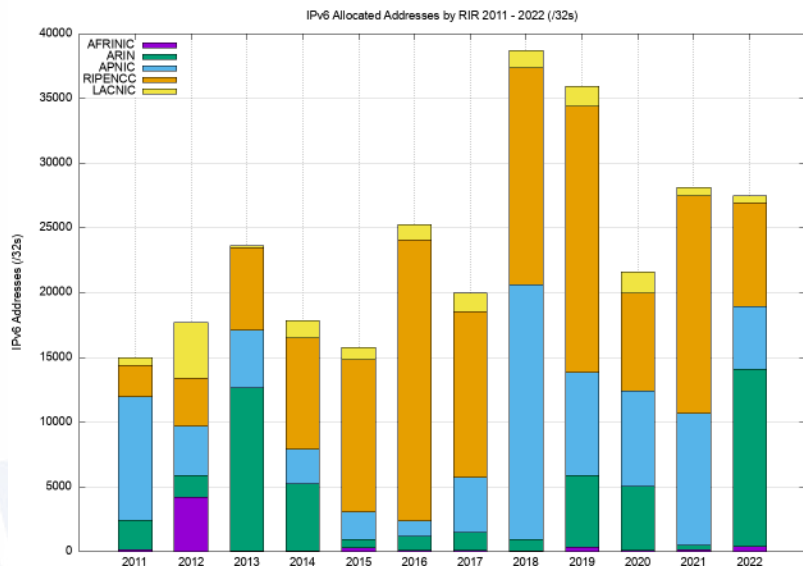


IPv4 in 2022

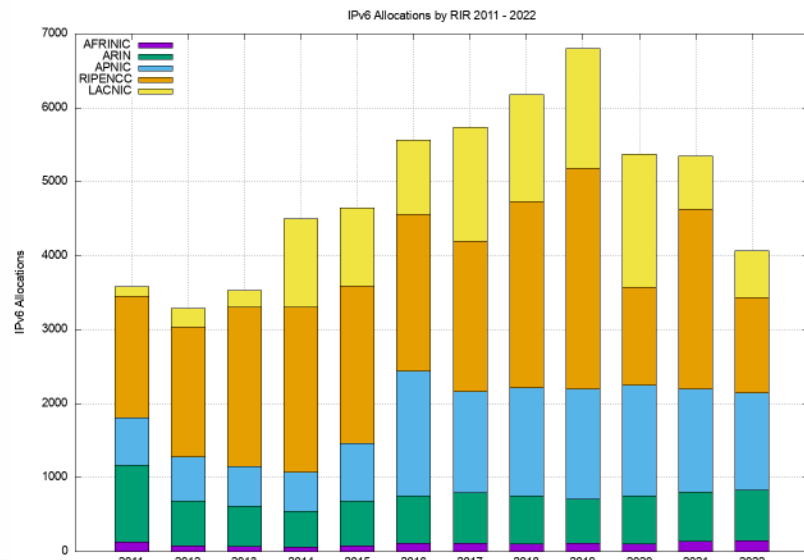
- Scarcity pressure appears to have reduced in 2022:
 - More IPv6-accessible service deployments relieving IPv4 NAT pressures for ISPs
 - Lower market prices for IPv4 addresses
 - Lower pressure to release unadvertised addresses
 - No common perception of imminent collapse of IPv4 markets

IPv6 Address Allocations

Addresses

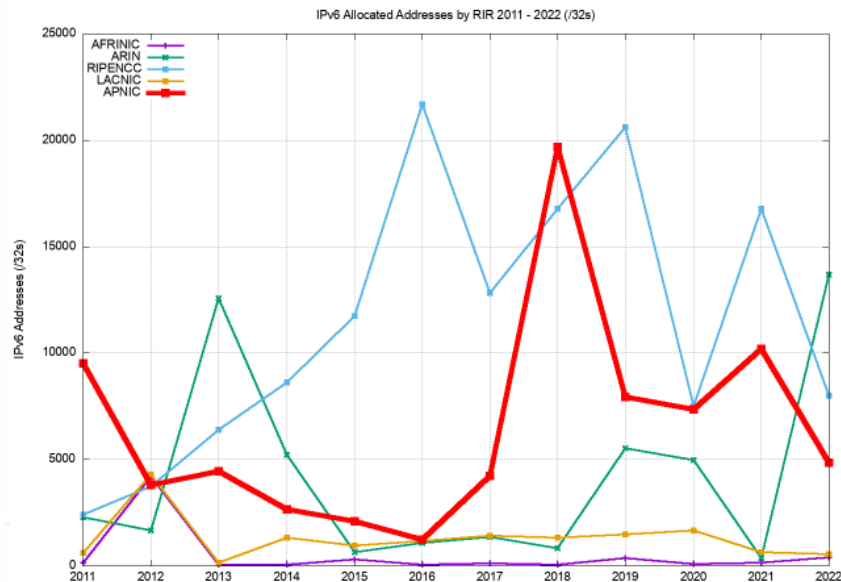


Allocations

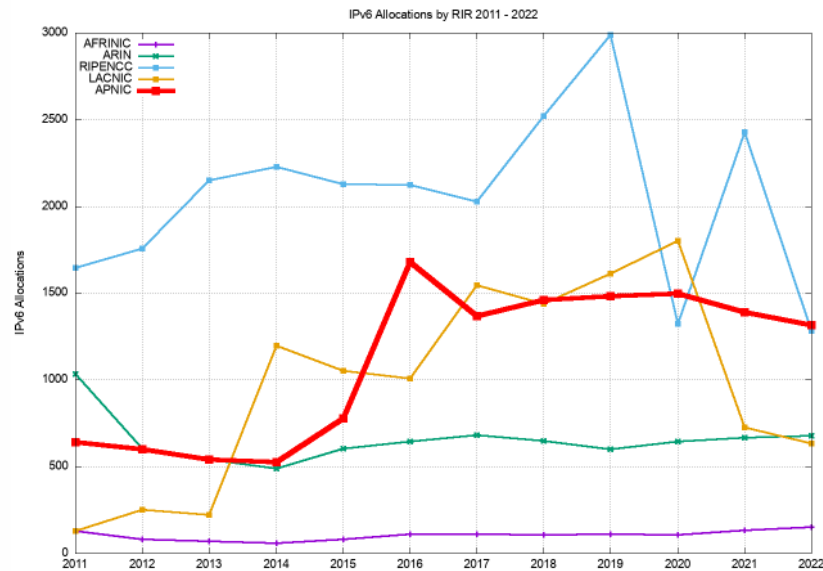


IPv6 Address Allocations

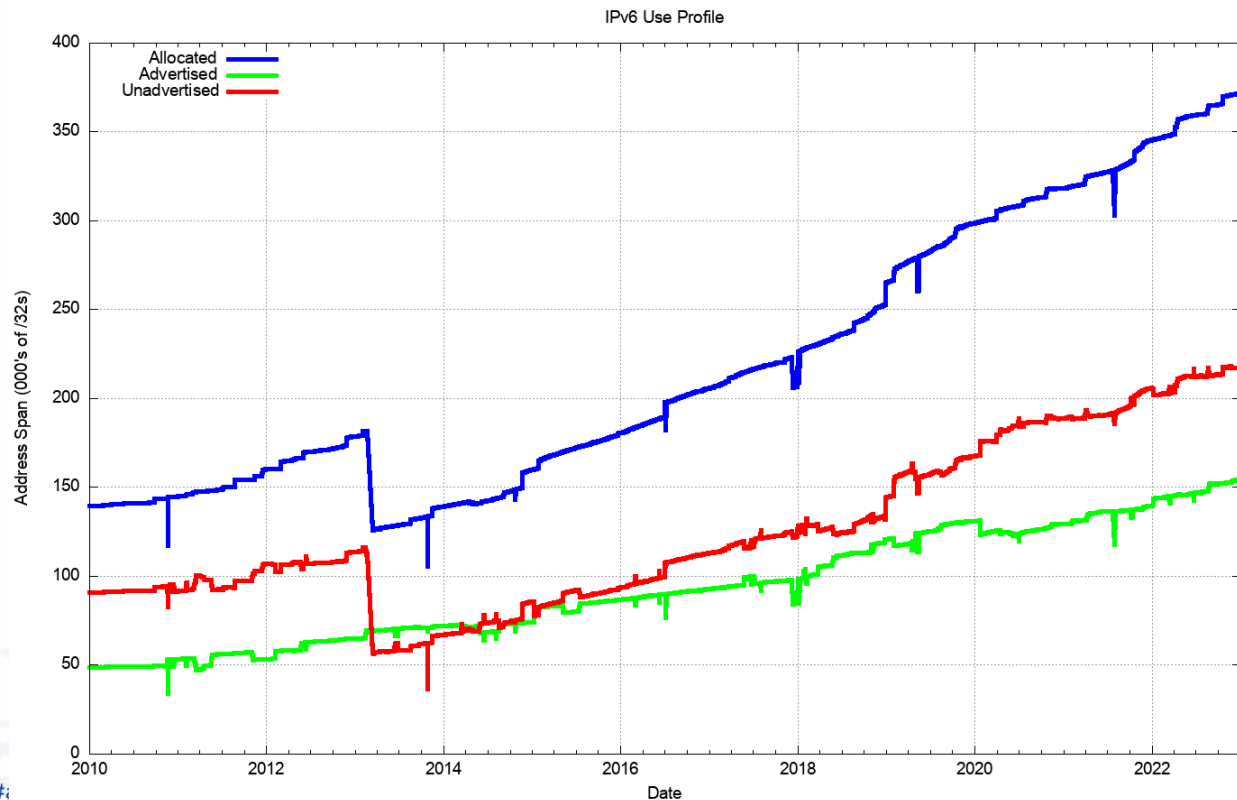
Addresses



Allocations



IPv6 Address Pools



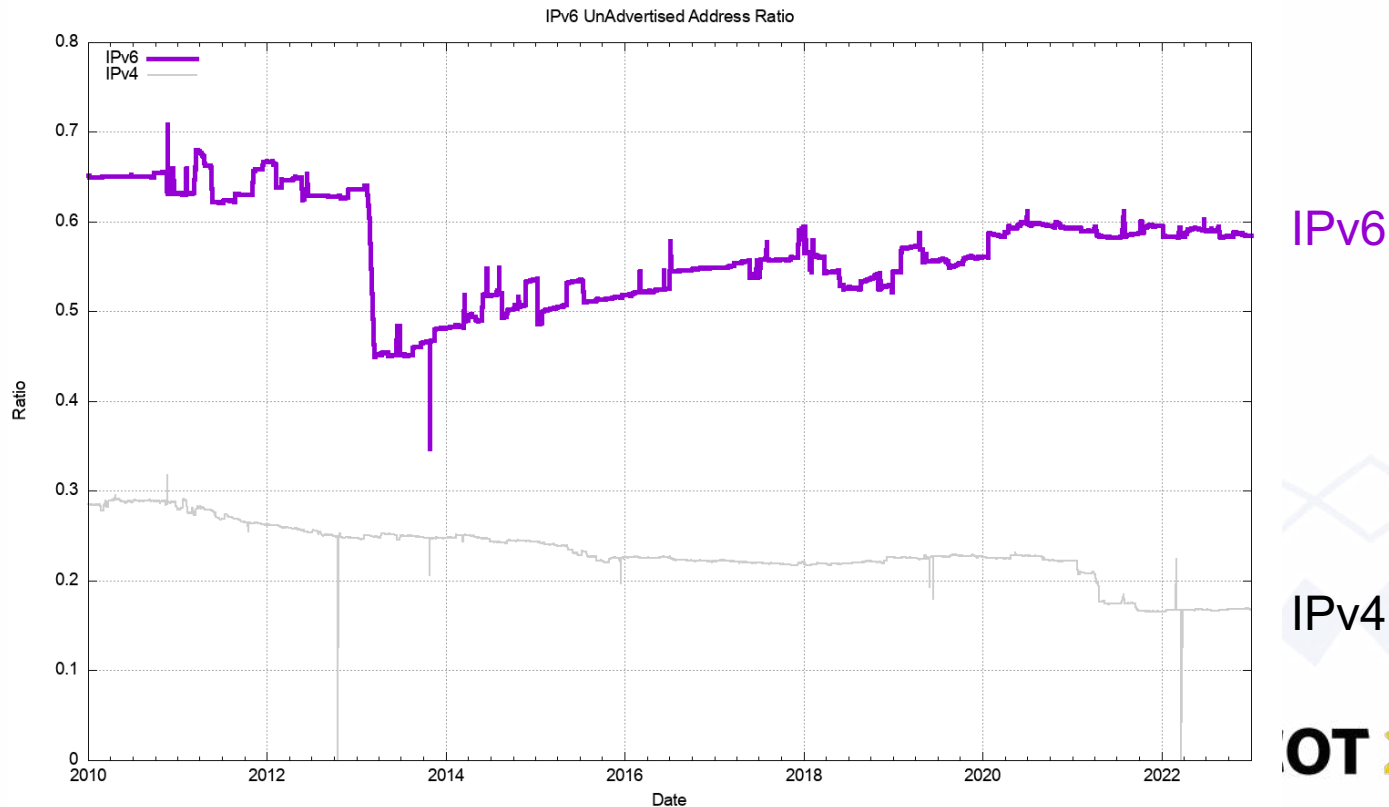
Allocated Address Pool

Unadvertised Address Pool

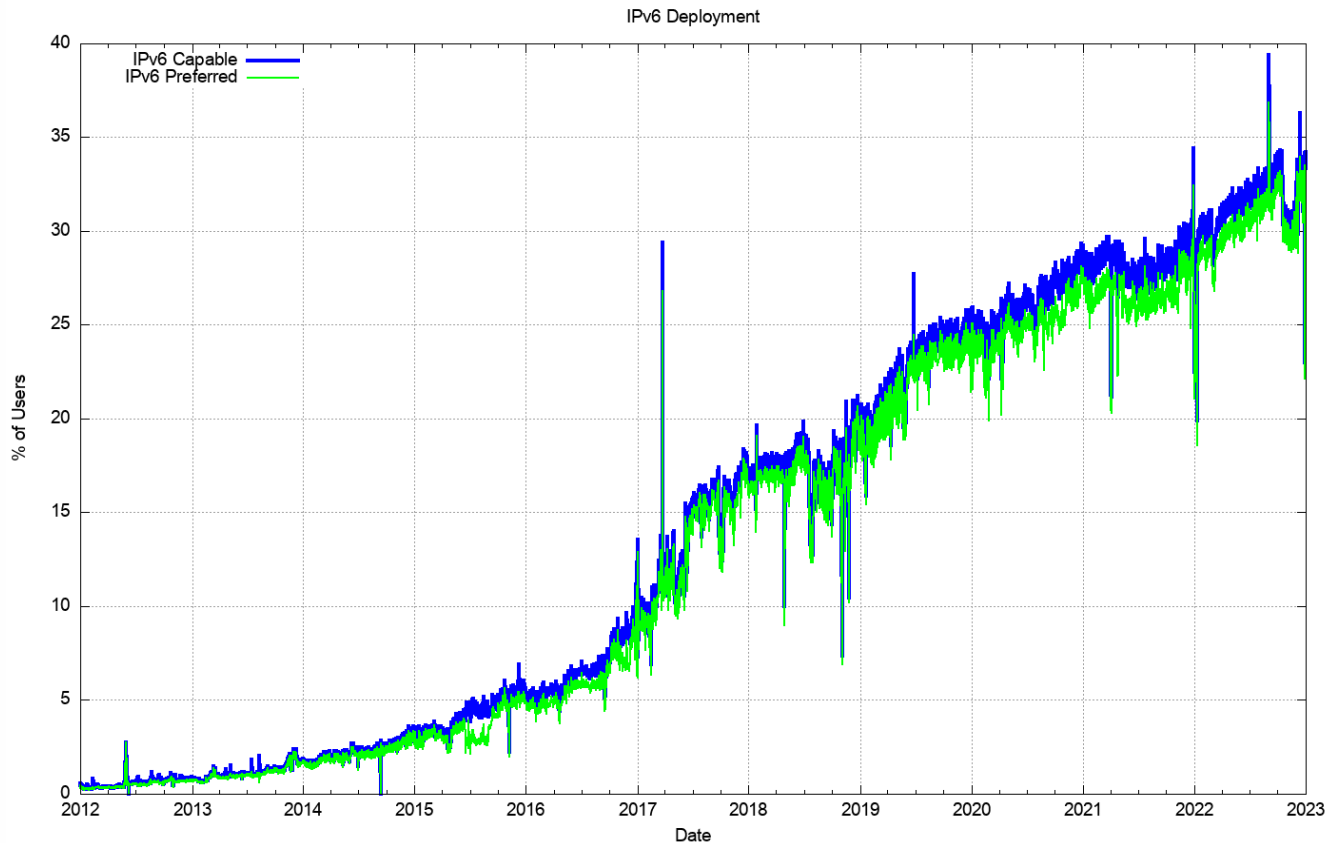
Advertised Address Pool



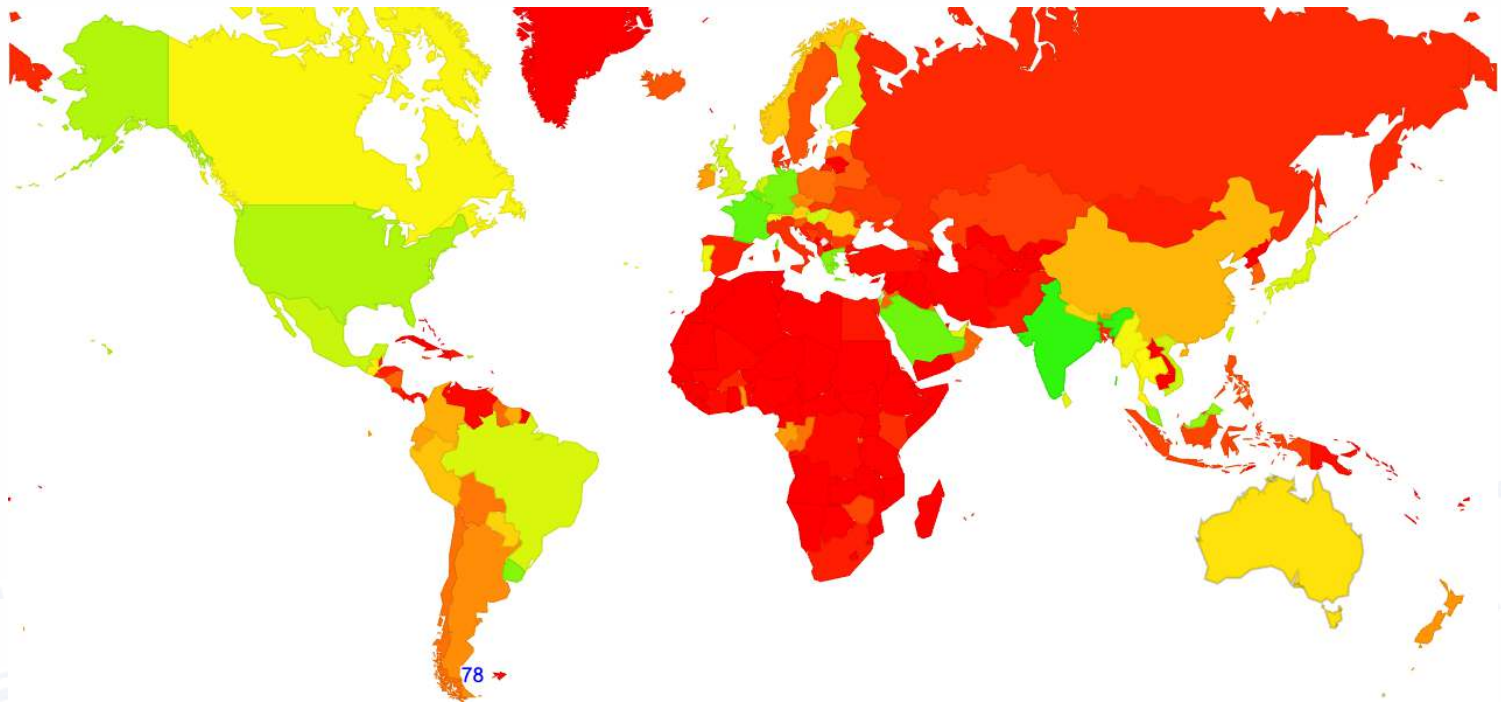
Unadvertised : Advertised Ratio



IPv6 Deployment



IPv6 Deployment



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

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MANILA, PHILIPPINES

20 February – 2 March 2023

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