

# What happened to IP Addresses in 2023?

*Geoff Huston AM*

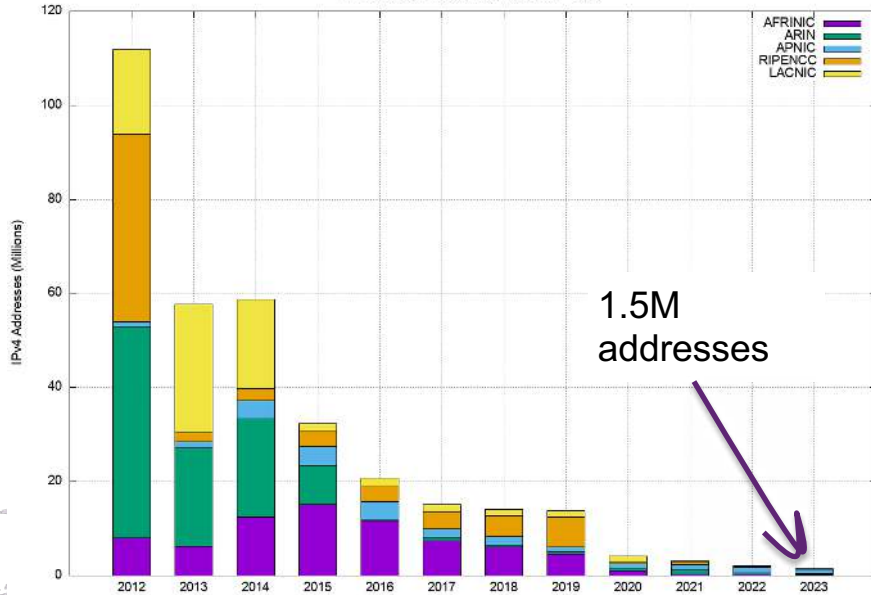
*Chief Scientist, APNIC*

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# IPv4 Address Allocations

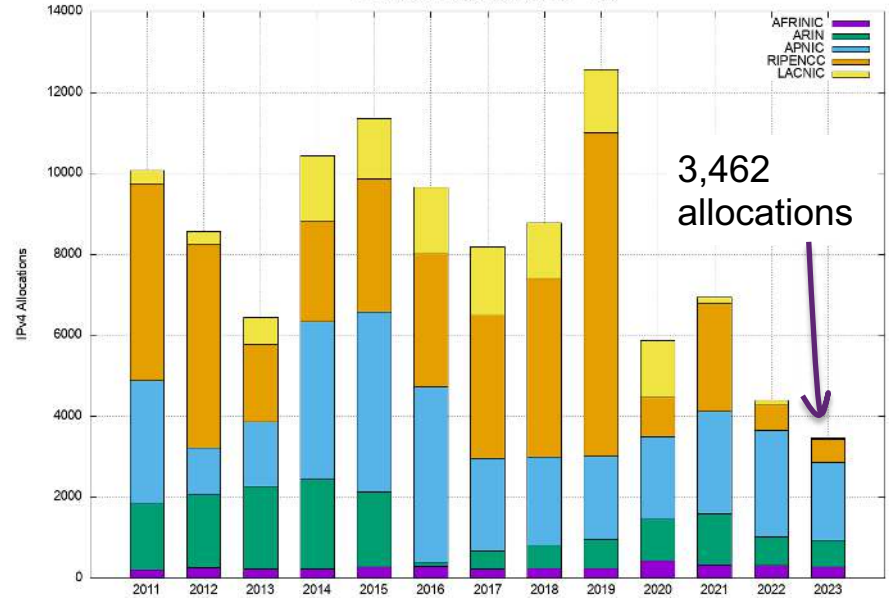
## Addresses

IPv4 Address Allocations by RIR 2012 - 2023



## Allocation Transactions

IPv4 Address Allocations by RIR 2012 - 2023



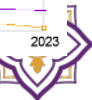
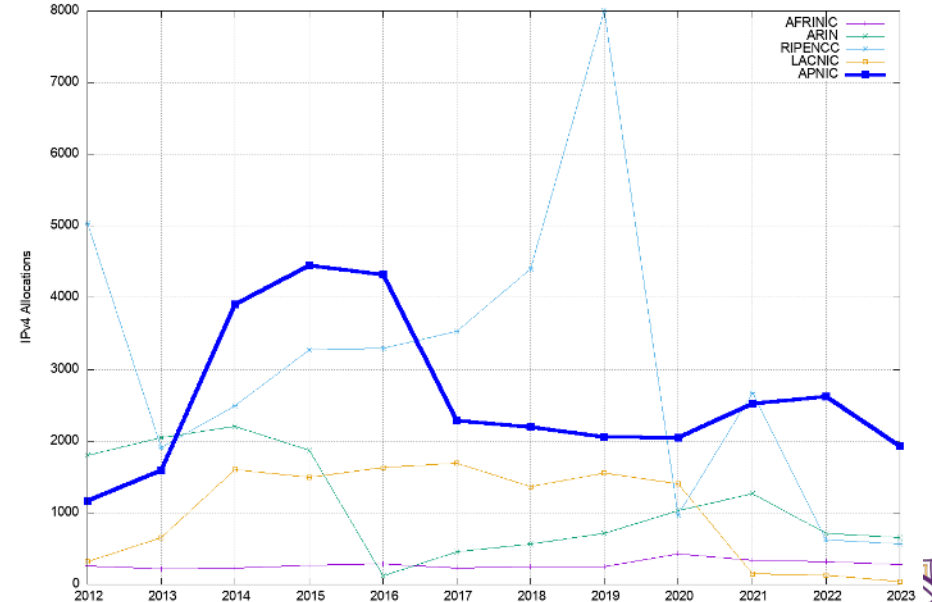
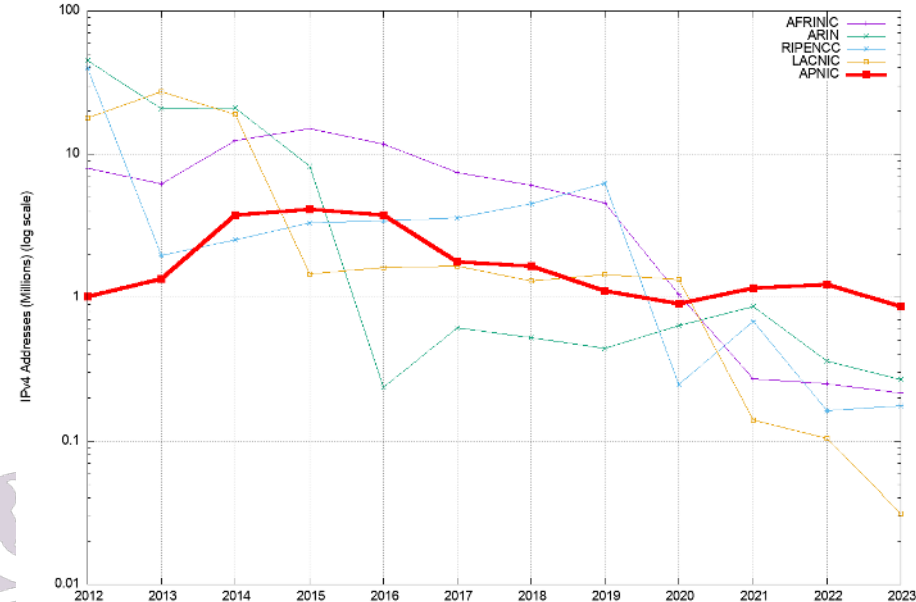
# IPv4 Address Allocations

## Addresses

## Allocation Transactions

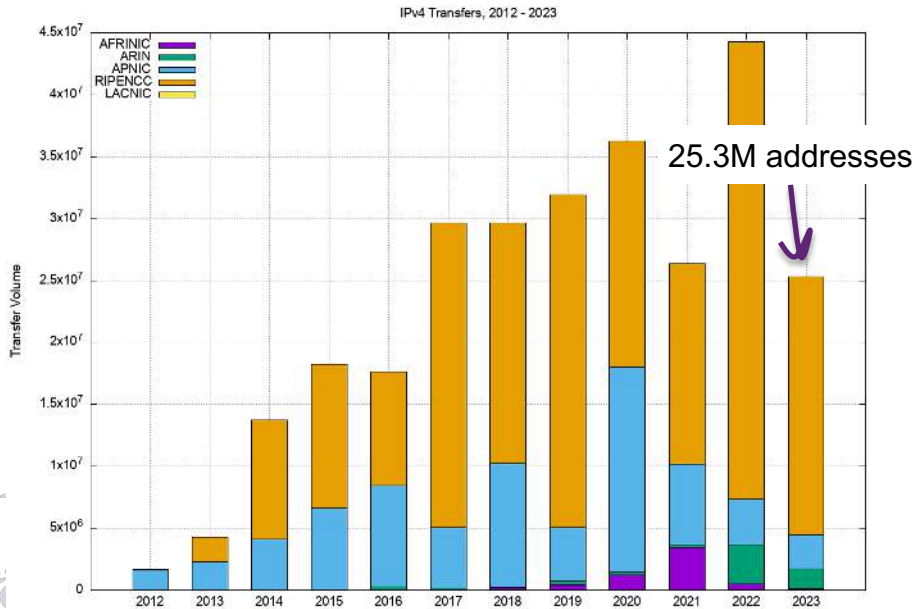
IPv4 Address Allocations by RIR 2012 - 2023

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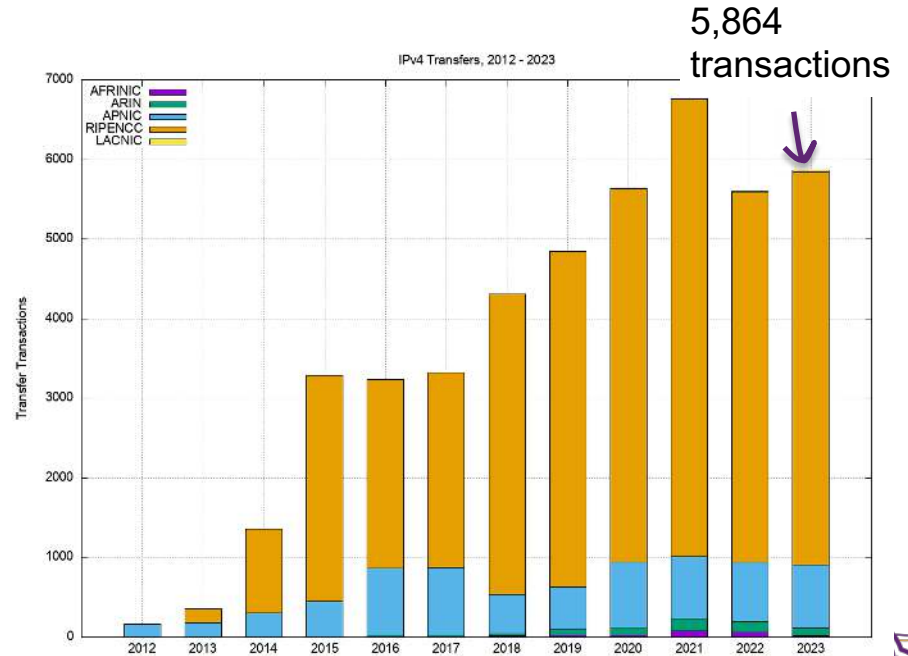


# IPv4 Address Transfers

## Addresses



## Transfer Transactions



# Who's Selling and Who's Buying

## Selling

Rank	CC	Addresses	Source Economy
1	US	7,942,912	USA
2	GB	2,858,240	UK
3	NL	1,927,680	Netherlands
4	JP	1,495,296	Japan
5	GR	1,032,192	Greece
6	RU	904,704	Russia
7	DE	821,504	Germany
8	IT	727,808	Italy
9	SE	626,432	Sweden
10	BE	528,384	Belgium
11	AU	466,944	Australia
12	ES	428,544	Spain
13	IQ	400,128	Iraq
14	FR	388,864	France
15	IN	355,328	India

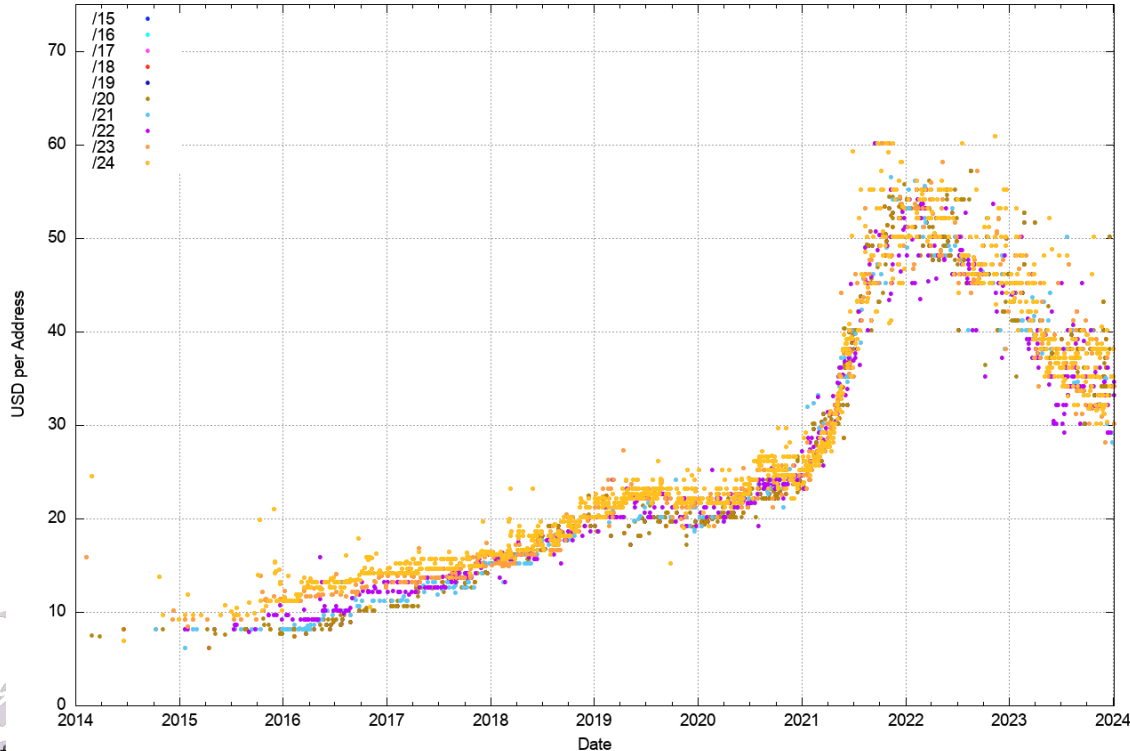
## Buying

Rank	CC	Addresses	Destination Economy
1	GB	8,518,400	UK
2	US	3,424,000	USA
3	NL	1,830,400	Netherlands
4	GR	1,044,224	Greece
5	JP	938,496	Japan
6	DE	880,640	Germany
7	RU	697,088	Russia
8	SE	685,056	Sweden
9	SG	558,336	Singapore
10	BE	540,928	Belgium
11	FR	428,288	France
12	ES	421,120	Spain
13	IT	396,544	Italy
14	IQ	391,168	Iraq
15	PL	347,040	Poland



# Transfer Pricing

Unit Price of Traded IPv4 Addresses (From Hilco Streambank)

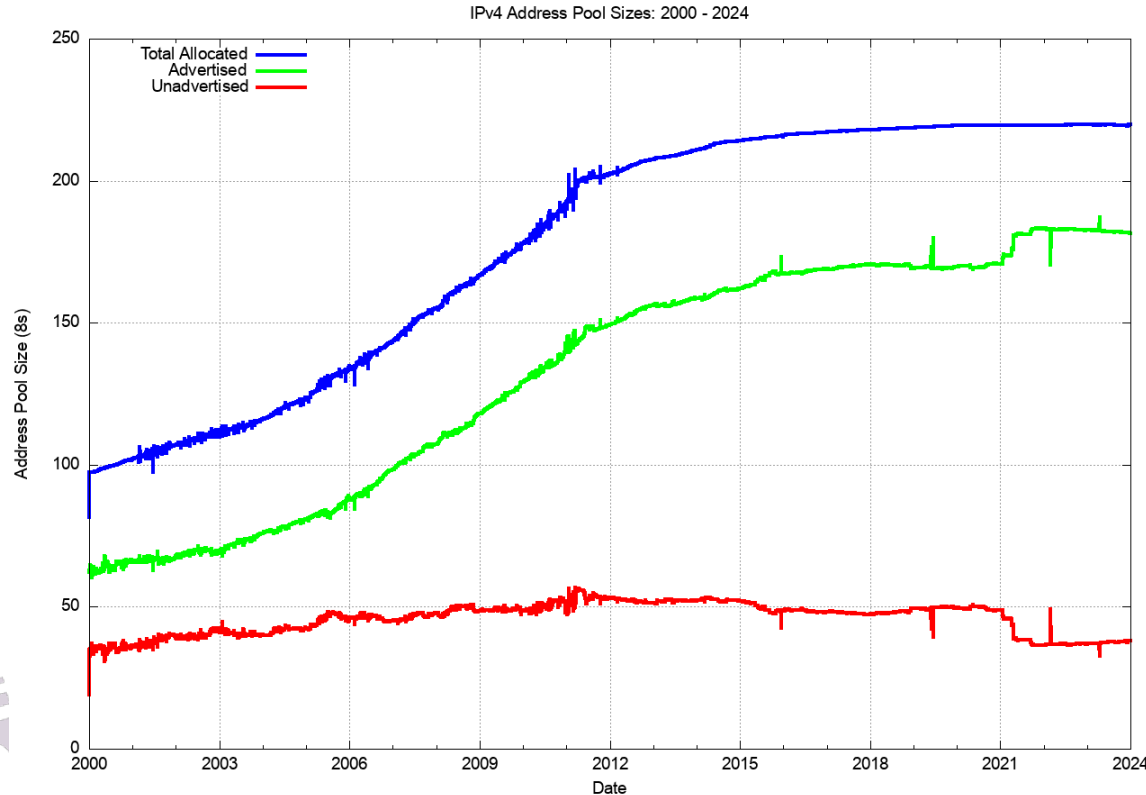


The market price per address doubled across 2021 to peak at the start of 2022

The average price dropped by 35% since the 2022 peak

The variance in prices has increased significantly since 2022

# Are Transfers recovering unused addresses?



Allocated Address Pool

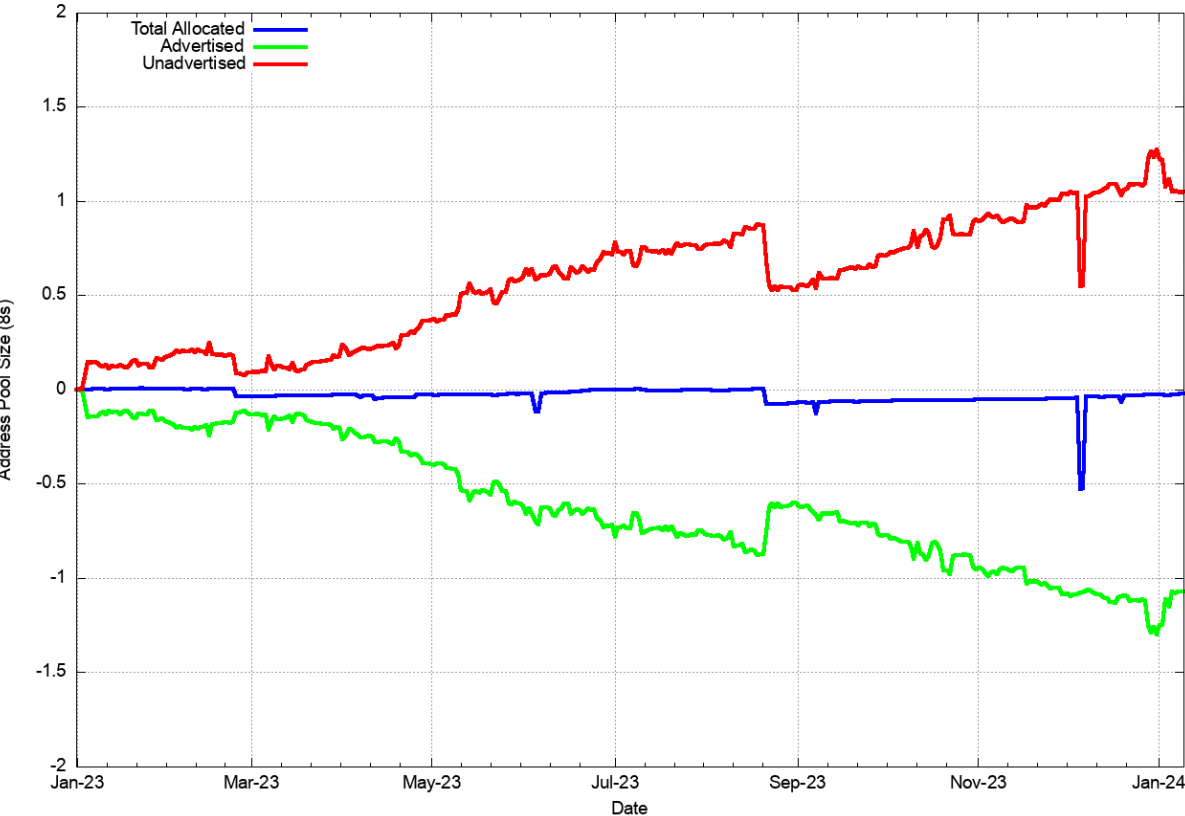
Advertised Address Pool

Unadvertised Address Pool



# Are Transfers recovering unused addresses?

IPv4 Address Pool Sizes: 2023



Unadvertised Address Pool  
+19M addresses

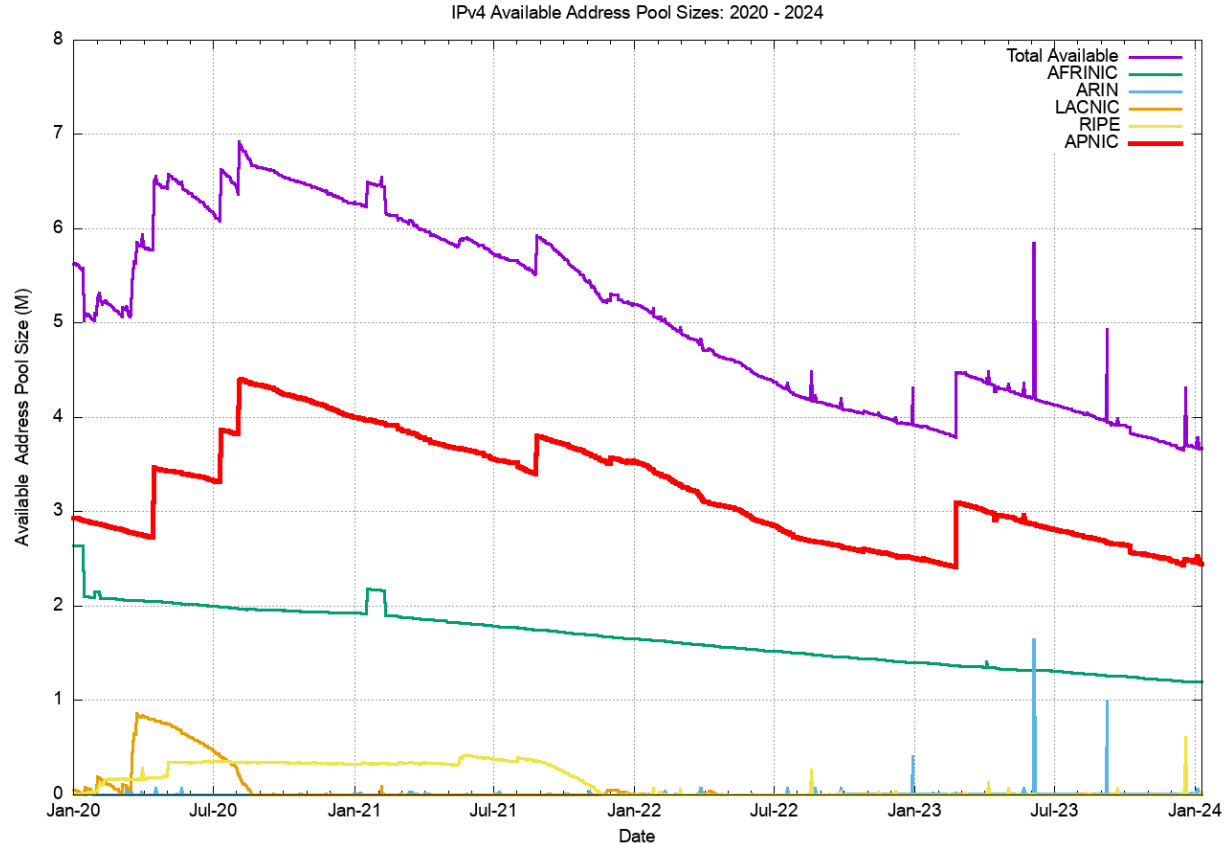
Allocated Address Pool  
-0.4 M addresses

Advertised Address Pool  
-18.5M addresses





# RIR "Available" Address Pools



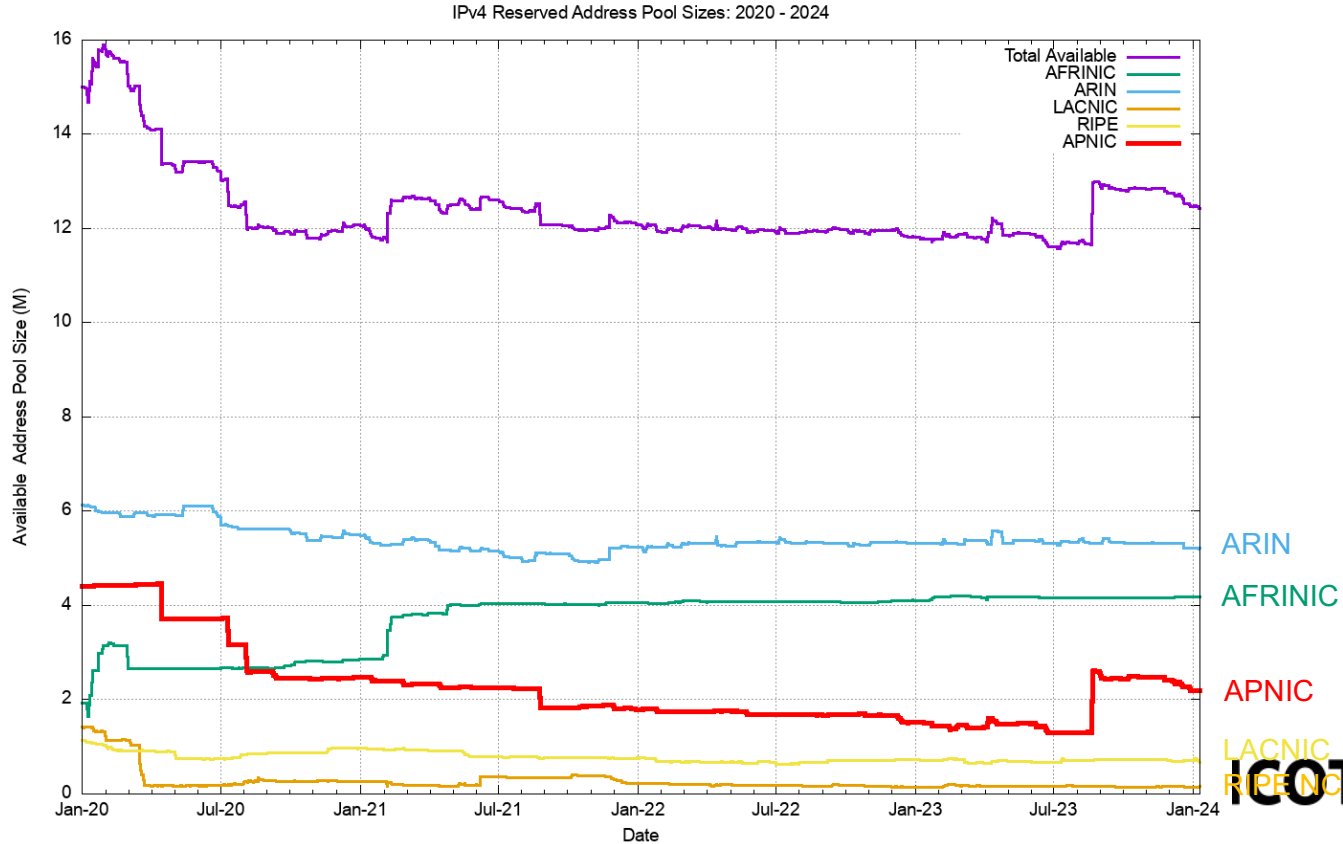
Only APNIC and AfrinIC have residual available address pools

APNIC

AFRINIC



# RIR "Reserved" Address Pools



# IPv4 in 2023

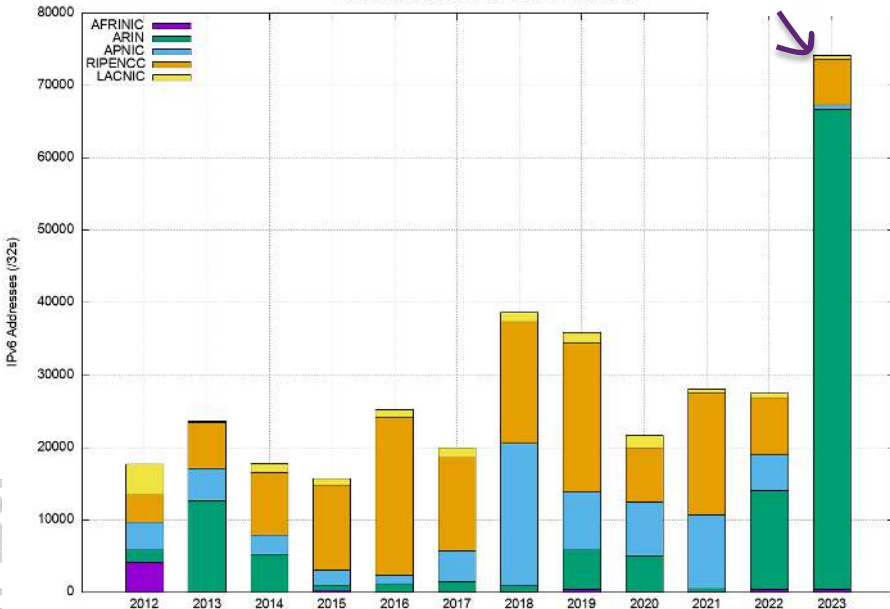
- IPv4 scarcity pressure continues to fall across 2023:
  - **Signs of market saturation in many mature Internet markets**
  - More IPv6-accessible service deployments relieving IPv4 NAT pressures for ISPs
  - Lower market prices for IPv4 addresses
  - Lower pressure to release unadvertised addresses through the transfer market

# IPv6 Address Allocations

## Addresses

74,000 /32 addresses

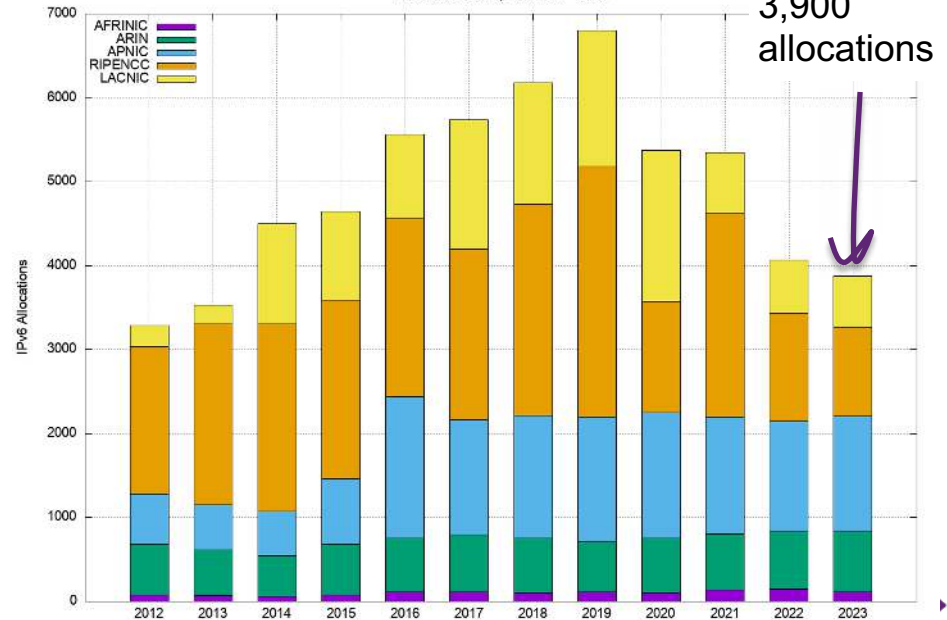
IPv6 Allocated Addresses by RIR 2012 - 2023 (/32s)



## Allocation Transactions

3,900 allocations

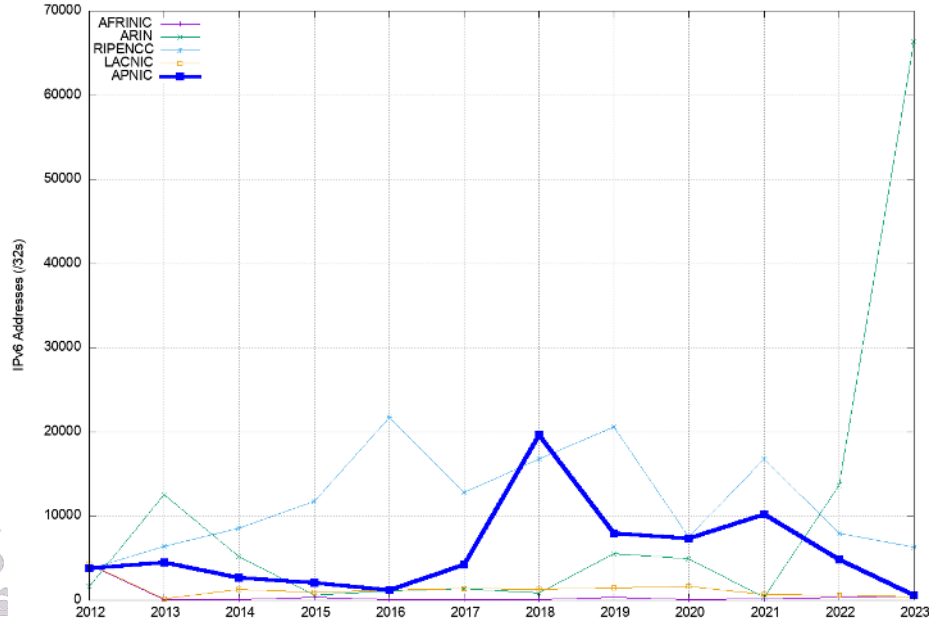
IPv6 Allocations by RIR 2012 - 2023



# IPv6 Address Allocations

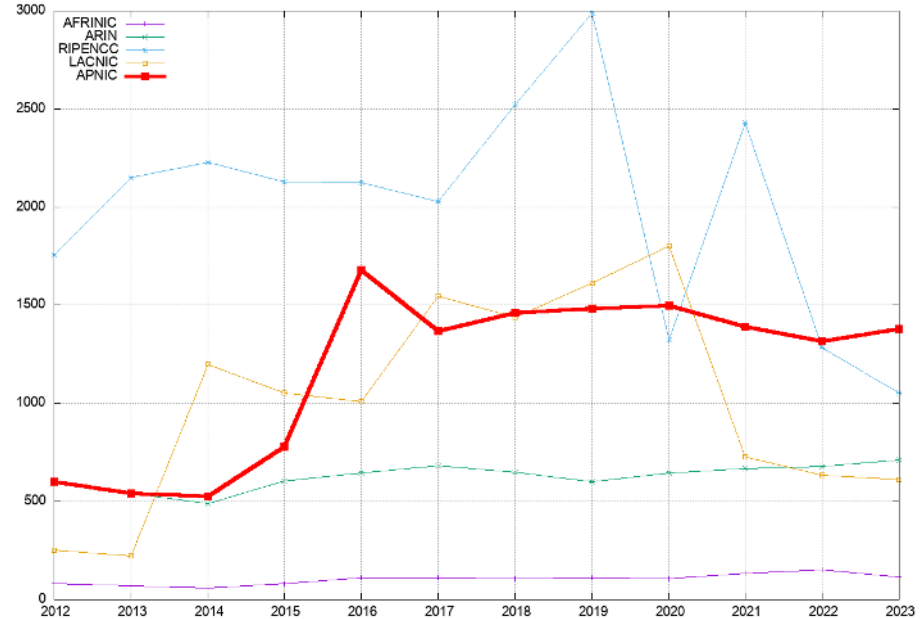
## Addresses

IPv6 Allocated Addresses by RIR 2012 - 2023 (/32s)

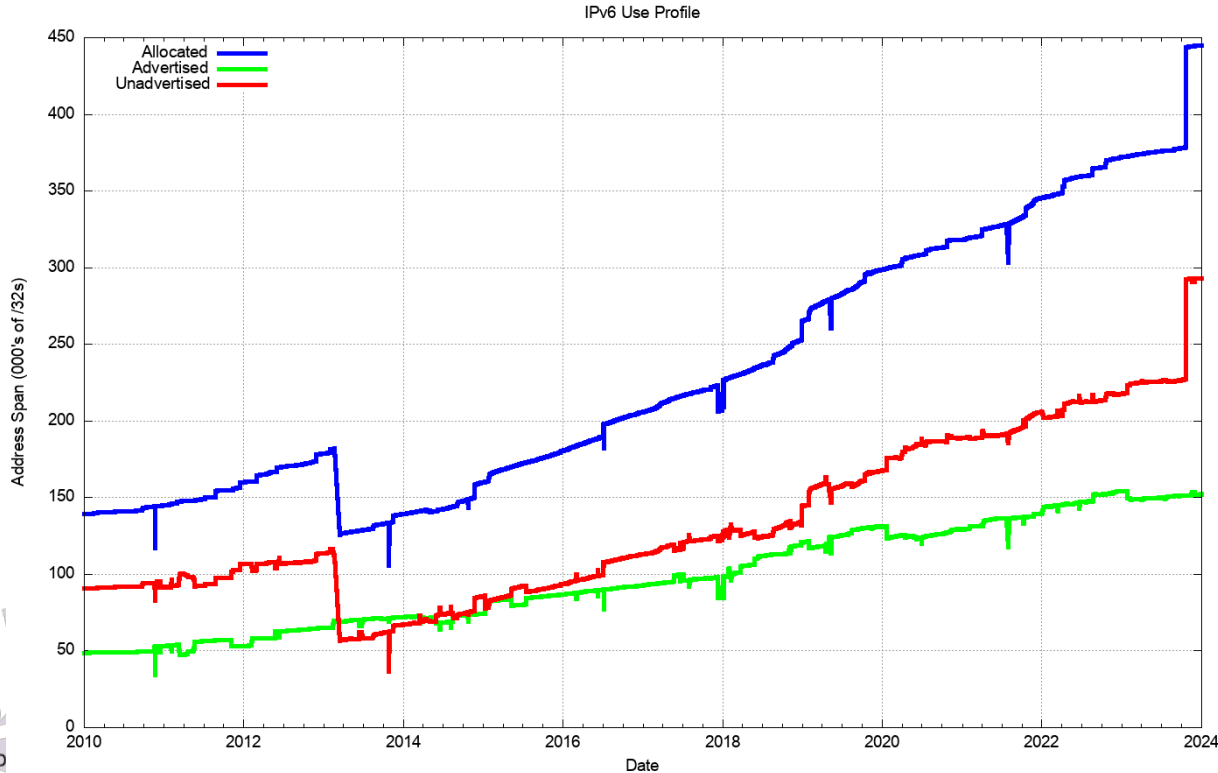


## Allocation Transactions

IPv6 Allocations by RIR 2012 - 2023



# IPv6 Address Pools



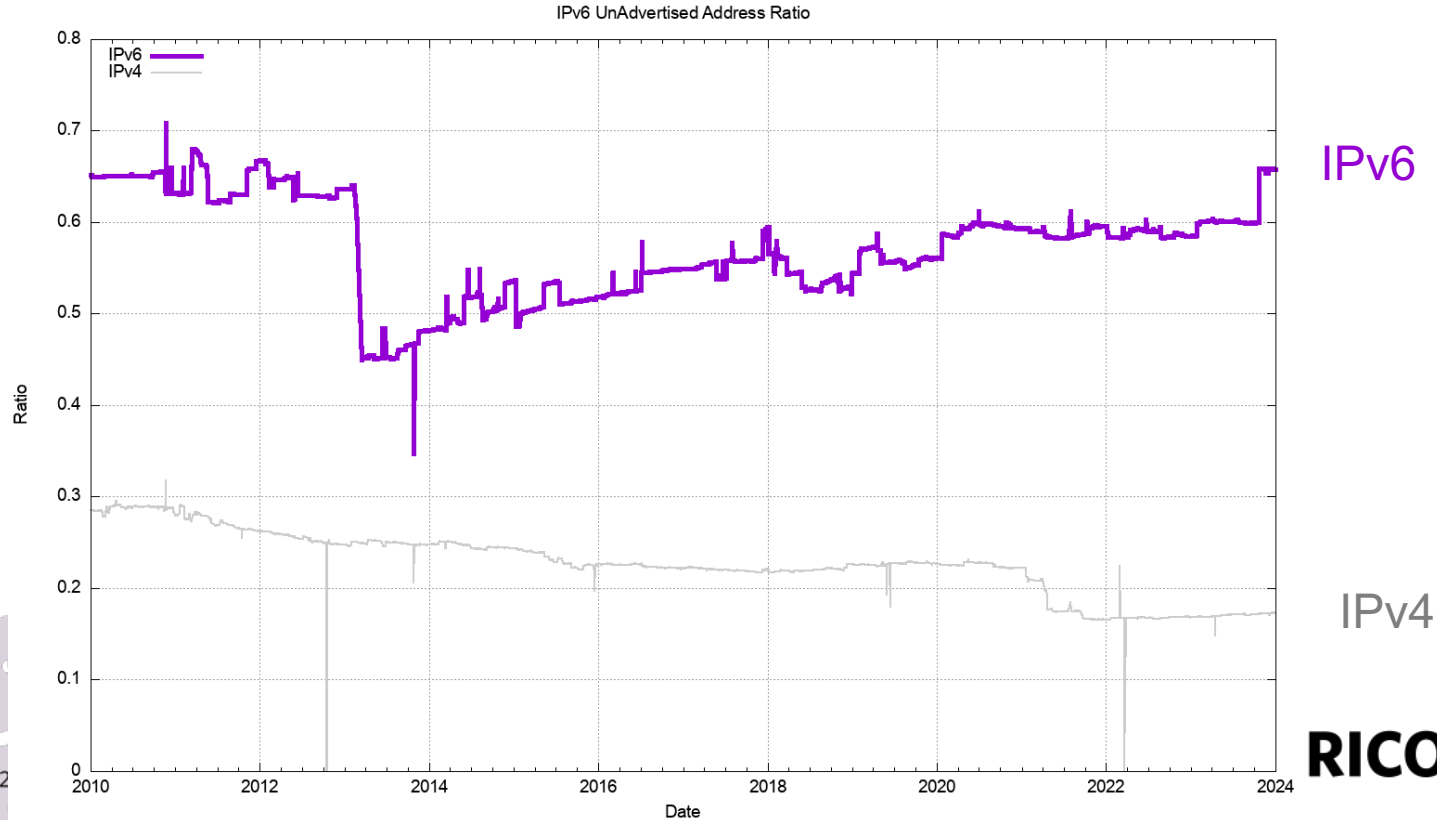
Allocated Address Pool

Unadvertised Address Pool

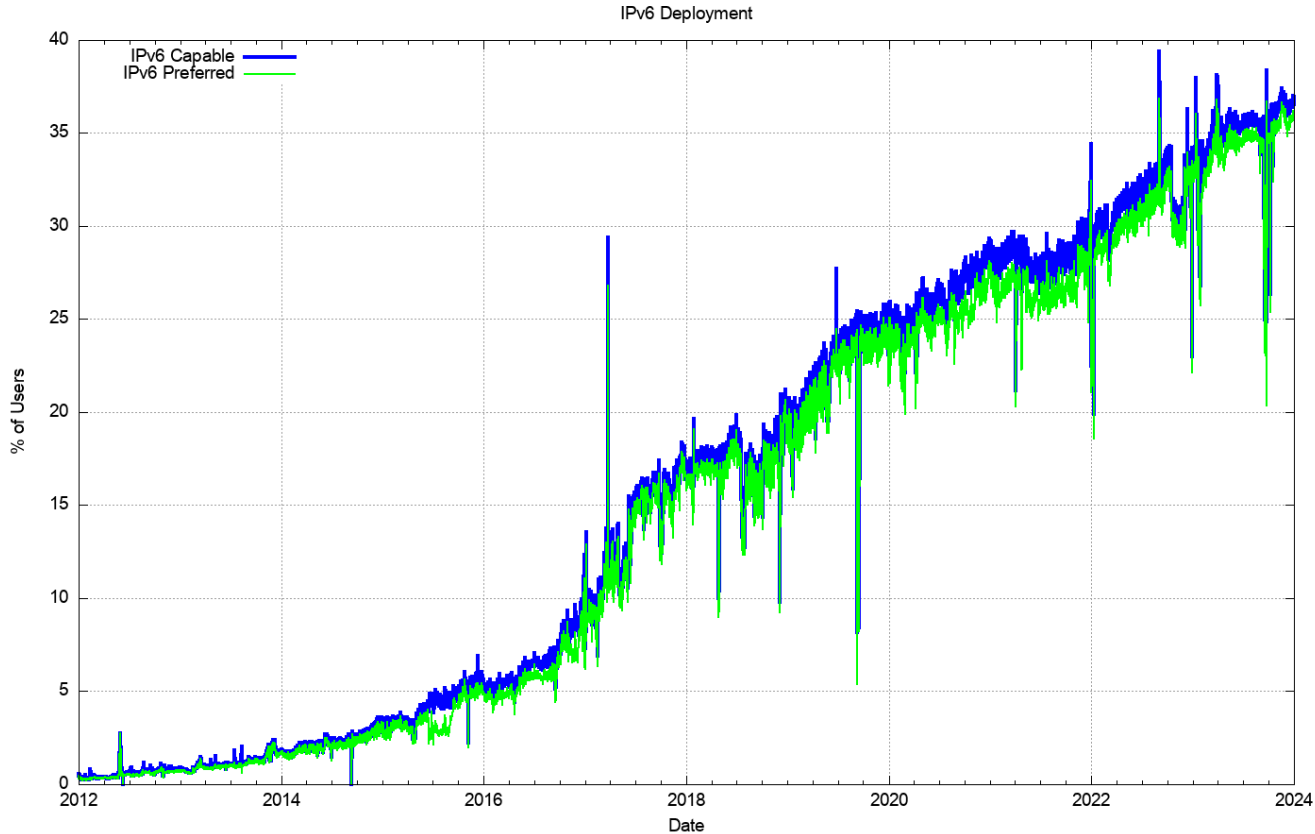
Advertised Address Pool



# Unadvertised : Advertised Ratio



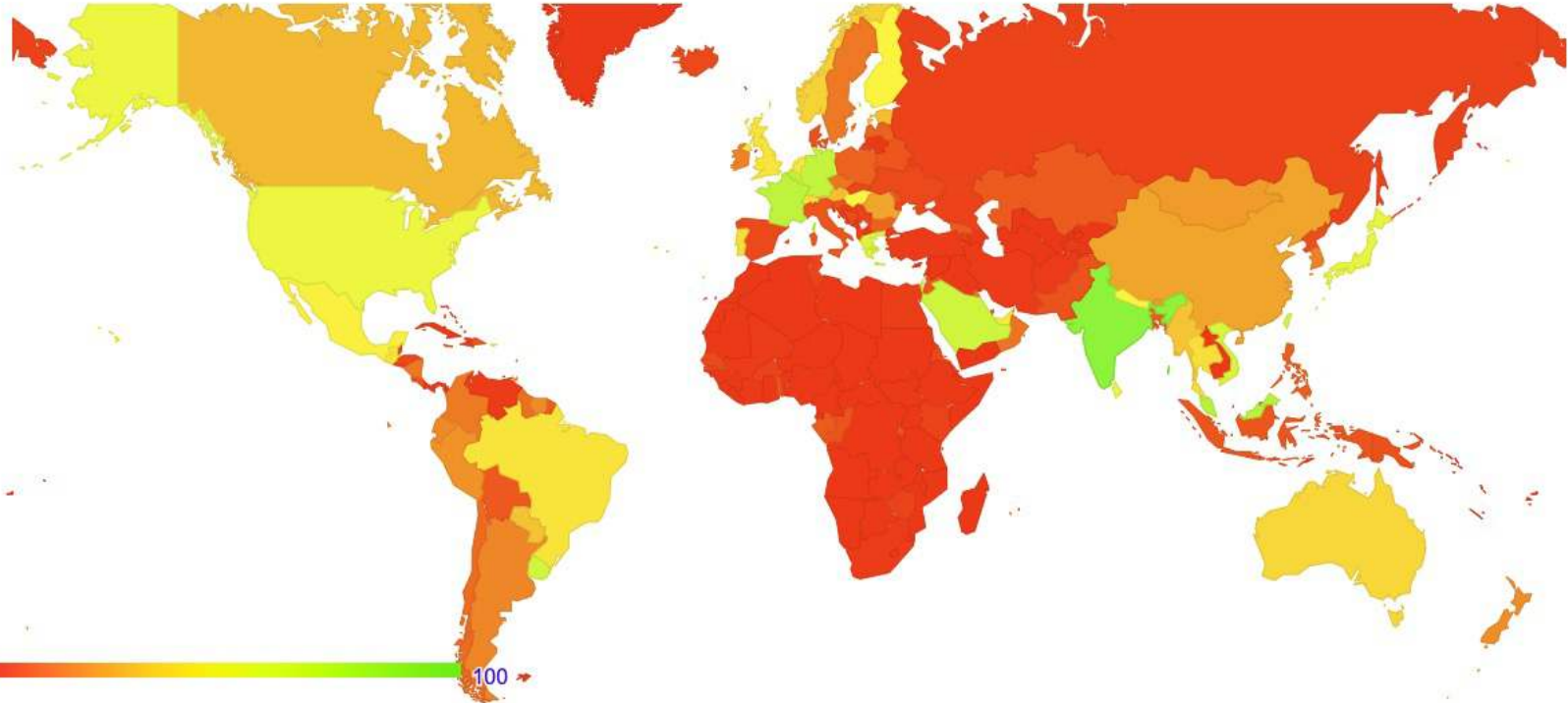
# IPv6 Deployment





# IPv6 Deployment

IPv6 Capable Rate by country (%)



# IPv6 in 2023

- 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 address allocations in IPv6 mean that there is no pressure to deploy IPv6 using highly efficient deployments
- IPv6 address consumption rates are tapering off – are we reaching a market saturation point?

Thanks!

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**2024**  
**APRICOT**  
**APNIC 57**  
**BANGKOK, THAILAND**  
21 February – 1 March 2024



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