



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

240/4 As Seen by RIPE Atlas

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The RIPE NCC has run out of IPv4 Addresses



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Today, at 15:35 (UTC+1) on **25 November 2019**, we made our final /22 IPv4 allocation from the last remaining addresses in our available pool. We have now run out of IPv4 addresses.



Classful IP Addressing (PRE-1993)



| Class | Start IP address | End IP address | Application |
|---------|------------------|-----------------|---------------------|
| Class A | 0.0.0.0 | 127.255.255.255 | Unicast |
| Class B | 128.0.0.0 | 191.255.255.255 | Unicast |
| Class C | 192.0.0.0 | 223.255.255.255 | Unicast |
| Class D | 224.0.0.0 | 239.255.255.255 | Multicast |
| Class E | 240.0.0.0 | 255.255.255.255 | Reserved for Future |

240/4



- Class E became 240/4 in CIDR notation, but remained reserved
- There have been several discussions on various forums to repurpose 268 million reserved addresses.
- Two IETF drafts were also proposed:
 - V-Fuller et al suggested to reclassify 240/4 as unicast address space.
 - Wilson et al suggested redesignation from future use to limited use to large private Internets.

Unofficial use of 240/4



- There have been reports of unofficial private use of 240/4
 - We use data from RIPE Atlas probes to find evidence of 240/4 in the wild.
 - We took snapshot of traceroute, ping and dns data for 1 May 2022.
 - There were no results for ping and dns measurements however we found 14.4 M traceroutes.
 - Almost all the traceroutes originated from two Amazon ASes (AS16509 and AS14618).

Example: unofficial use of 240/4



Probe id : 1003371

Source IP: 172.31.9.43 (Origin AS: 16509)

Destination IP : 142.250.199.46 (Destination AS: 15169)

| hop | hop address |
|-----|-----------------|
| 1 | 244.5.0.1 |
| 2 | 240.0.144.6 |
| 3 | 242.1.179.129 |
| 4 | 52.93.9.133 |
| 5 | 52.93.9.88 |
| 6 | 15.230.29.158 |
| 7 | 72.14.222.244 |
| 8 | 172.253.77.227 |
| 9 | 108.170.240.164 |
| 10 | 142.251.230.225 |
| 11 | 142.251.230.208 |
| 12 | 108.170.250.1 |
| 13 | 108.170.229.109 |
| 14 | 142.250.199.46 |

Active measurements



- We performed traceroutes to milliways.taht.net (255.255.255.254) from all the probes.
- We find 87% of traceroutes from a total had timeouts.
- We also found that 34 probes were able to reach 255.255.255.254. All of these probes are hosted in AS701 (Verizon Business).

Conclusions



- Our work is the first to provide insights on the use of 240/4 address space and validates its usage by cloud providers, including Amazon and Verizon Business.
- We can expect to see more hints of the uses of this range in the future in Internet measurement data especially for cloud providers.
- If left unchecked, it will be challenging to assign this address space for any other use in the future.



Conclusions

- Why are these network providers using 240/4 address space internally?
- The majority of members of the network community agree IPv6 is the future. Why is there still a market for IPv4 and why are hyper-giants like Amazon and Alibaba investing to buy more IPv4 addresses?
- Do you think this problem needs attention ?

Further reading



- <https://labs.ripe.net/author/qasim-lone/2404-as-seen-by-ripe-atlas/>
- <https://news.ycombinator.com/item?id=32566730> (Reached front page of hacker news)



Questions



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