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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