



Internet Routing Table Analysis Update

Philip Smith

SANOG 39

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Dhaka, Bangladesh



Motivation

- 1998: No one was publishing any Internet routing table analysis
 - Only CIDR-Report reporting on top 20 contributors to routing table, and top 20 bad aggregators
- With support of APNIC, my weekly report started from 23rd February 1999:
 - Routing table size
 - CIDR-Report style reporting on a per-RIR basis
 - ...and many other interesting features
- Started recording global IPv6 table in September 2010

IPv4 Routing Report 8th May 2023

| | |
|---|------------|
| BGP routing table entries examined: | 921157 |
| Prefixes after maximum aggregation (per Origin AS): | 349170 |
| Deaggregation factor: | 2.64 |
| Unique aggregates announced (without unneeded subnets): | 448372 |
| Total ASes present in the Internet Routing Table: | 74402 |
| Prefixes per ASN: | 12.38 |
| Origin-only ASes present in the Internet Routing Table: | 63833 |
| Origin ASes announcing only one prefix: | 26242 |
| Transit ASes present in the Internet Routing Table: | 10569 |
| Transit-only ASes present in the Internet Routing Table: | 436 |
| Average AS path length visible in the Internet Routing Table: | 4.3 |
| Max AS path length visible: | 55 |
| Max AS path prepend of ASN (265020) | 50 |
| Prefixes from unregistered ASNs in the Routing Table: | 1081 |
| Number of instances of unregistered ASNs: | 1081 |
| Special use prefixes present in the Routing Table: | 1 |
| Prefixes being announced from unallocated address space: | 620 |
| Number of addresses announced to Internet: | 3059798912 |
| Equivalent to 182 /8s, 96 /16s and 211 /24s | |
| Total number of prefixes smaller than registry allocations: | 307538 |

APNIC Region

| | |
|--|--|
| Prefixes being announced by APNIC Region ASes: | 244227 |
| Total APNIC prefixes after maximum aggregation: | 69438 |
| APNIC Deaggregation factor: | 3.52 |
| Prefixes being announced from the APNIC address blocks: | 238361 |
| Unique aggregates announced from the APNIC address blocks: | 97957 |
| APNIC Region origin ASes present in the Internet Routing Table: | 13427 |
| APNIC Prefixes per ASN: | 17.75 |
| APNIC Region origin ASes announcing only one prefix: | 3960 |
| APNIC Region transit ASes present in the Internet Routing Table: | 1801 |
| Average APNIC Region AS path length visible: | 4.5 |
| Max APNIC Region AS path length visible: | 26 |
| Number of APNIC addresses announced to Internet: | 773570304 |
| Equivalent to 46 /8s, 27 /16s and 191 /24s | |
| APNIC AS Blocks | 4608-4864, 7467-7722, 9216-10239, 17408-18431 |
| (pre-ERX allocations) | 23552-24575, 37888-38911, 45056-46079, 55296-56319, 58368-59391, 63488-64098, 64297-64395, 131072-151865 |
| APNIC Address Blocks | 1/8, 14/8, 27/8, 36/8, 39/8, 42/8, 43/8, 49/8, 58/8 to 61/8, 101/8, 103/8, 106/8, 110/8 to 126/8, 133/8, 175/8, 180/8, 182/8, 183/8, 202/8, 203/8, 210/8, 211/8, 218/8 to 223/8 |

Global per AS IPv4 prefix count summary

| ASN | No of nets | /20 equiv | Max Agg | Description |
|-------|------------|-----------|---------|---|
| 8151 | 11263 | 3328 | 593 | Uninet S.A. de C.V., MX |
| 9808 | 9486 | 8706 | 40 | CHINAMOBILE-CN China Mobile Communicati |
| 16509 | 8282 | 10783 | 2930 | AMAZON-02, US |
| 12479 | 7282 | 1707 | 141 | UNI2-AS, ES |
| 7545 | 5727 | 787 | 694 | TPG-INTERNET-AP TPG Telecom Limited, AU |
| 4538 | 4863 | 4192 | 75 | ERX-CERNET-BKB China Education and Rese |
| 39891 | 4833 | 286 | 59 | ALJAWWALSTC-AS, SA |
| 11492 | 4534 | 300 | 609 | CABLEONE, US |
| 20940 | 4080 | 3399 | 164 | AKAMAI-ASN1, NL |
| 45899 | 4054 | 1877 | 47 | VNPT-AS-VN VNPT Corp, VN |
| 7155 | 3975 | 281 | 51 | VIASAT-SP-BACKBONE, US |
| 8551 | 3884 | 370 | 37 | BEZEQ-INTERNATIONAL-AS Bezeqint Interne |
| 22773 | 3587 | 3057 | 283 | ASN-CXA-ALL-CCI-22773-RDC, US |
| 7713 | 3560 | 1043 | 65 | TELKOMNET-AS-AP PT Telekomunikasi Indon |
| 6327 | 3525 | 1320 | 64 | SHAW, CA |
| 10620 | 3518 | 508 | 855 | Telmex Colombia S.A., CO |
| 7552 | 3227 | 1331 | 21 | VIETEL-AS-AP Viettel Group, VN |
| 16625 | 3117 | 1578 | 2358 | AKAMAI-AS, US |
| 749 | 3101 | 54980 | 2353 | DNIC-AS-00749, US |
| 12389 | 2952 | 2292 | 909 | ROSTELECOM-AS, RU |

AfrINIC APNIC ARIN LACNIC RIPE NCC



What about IPv6 ?

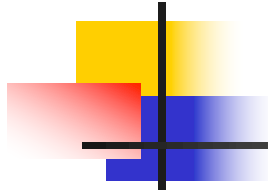
IPv6 Routing Report 8th May 2023 (London)

| | |
|--|--------|
| BGP routing table entries examined: | 171005 |
| Number of IPv6 prefixes with a valid ROA: | 84842 |
| Number of IPv6 prefixes with an invalid ROA: | 606 |
| Number of IPv6 prefixes with no ROA: | 85557 |
| Total ASNs present in the IPv6 Routing Table: | 30541 |
| Average AS path length: | 4.9 |
| Longest AS path: | 58 |
| Total Origin ASNs present in the IPv6 Routing Table: | 30250 |

Global IPv6 per AS prefix count summary (London)

| ASN | No of Nets | Description |
|-------|------------|--|
| 11172 | 5347 | Alestra, S. de R.L. de C.V., MX |
| 9808 | 4355 | CHINAMOBILE-CN China Mobile Communications Group Co., Ltd., |
| 16509 | 3430 | AMAZON-02, US |
| 45609 | 2438 | BHARTI-MOBILITY-AS-AP Bharti Airtel Ltd. AS for GPRS Service |
| 17622 | 2315 | CNCGROUP-GZ China Unicom Guangzhou network, CN |
| 7552 | 2196 | VIETEL-AS-AP Viettel Group, VN |
| 24547 | 1827 | CMNET-V4HEBEI-AS-AP Hebei Mobile Communication Company Limit |
| 28573 | 1827 | Claro NXT Telecomunicacoes Ltda, BR |
| 45271 | 1756 | ICLNET-AS-AP Idea Cellular Limited, IN |
| 12479 | 1622 | UNI2-AS, ES |
| 17623 | 1447 | CNCGROUP-SZ China Unicom Shenzen network, CN |
| 36183 | 1369 | AKAMAI-AS, US |
| 32098 | 1336 | TRANSTELCO-INC, US |
| 39891 | 1326 | ALJAWWALSTC-AS, SA |
| 38266 | 1280 | VIL-AS-AP Vodafone Idea Ltd, IN |
| 13335 | 1276 | CLOUDFLARENET, US |
| 17072 | 1253 | TOTAL PLAY TELECOMUNICACIONES SA DE CV, MX |
| 22773 | 1238 | ASN-CXA-ALL-CCI-22773-RDC, US |
| 56046 | 1132 | CMNET-JIANGSU-AP China Mobile communications corporation, CN |
| 62240 | 1122 | CLOUIDER Clouvider - Global ASN, GB |

AfriNIC APNIC ARIN LACNIC RIPE NCC



Non-routable ASNs for IPv4

| Network | Path |
|----------------------|--|
| N*> 41.85.127.0/24 | 30844 22355 420000000 |
| N*> 41.174.100.0/22 | 30844 30969 64631 |
| N*> 41.174.112.0/21 | 30844 30969 64631 |
| N*> 41.174.160.0/20 | 30844 30969 64631 |
| N*> 41.175.128.0/20 | 30844 30969 64631 |
| N*> 102.212.180.0/24 | 30844 36962 64945 |
| N*> 102.221.75.0/24 | 6453 174 327708 36873 36873 761467 |
| N*> 103.123.12.0/24 | 6453 3491 4826 17828 17828 17828 17828 1440665 |
| V*> 150.107.29.0/24 | 6453 1273 4651 4651 4651 135063 135063 103563 135063 103563 136523 |
| N*> 196.216.75.0/24 | 30844 37485 65200 |
| I*> 202.185.181.0/24 | 9930 65295 |
| I*> 202.185.188.0/24 | 9930 65295 |
| N*> 206.42.66.0/24 | 30844 37447 65510 |
| I*> 211.25.240.0/22 | 9930 65295 |
| I*> 211.25.244.0/22 | 9930 65295 |

IANA Reserved ASN

Private ASN

AS9930 – Time Telecom Berhad

AS17828 – PNG Dataco Ltd

AS22355 – Frogfoot Networks

AS30969 – Zimbabwe Online

AS36873 – Celtel Nigeria

AS36962 – MTN Zambia

AS37447 – Wang New Zealand

AS37485 – Liquid Zimbabwe

AS135063 – POP NIX Company Limited



Non-routable ASNs for IPv6

| Network | Path |
|-------------------------|---|
| N*> 2001:948::/29 | 2603 {224,1653,39590,64530,64540,64541,64565,65002,65003,65004,65005,65006,65007,65008,65009,65010,65011,65430} |
| N*> 2001:448a:5010::/48 | 6453 174 7713 64505 |
| N*> 2001:448a:5050::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:5051::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:5052::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:5053::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:5054::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:5055::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:5056::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:5057::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:5058::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:5059::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:505a::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:505b::/48 | 6453 174 7713 64501 |
| <snip> | |
| N*> 2001:448a:50bc::/48 | 6453 174 7713 64500 |
| N*> 2001:448a:50bd::/48 | 6453 174 7713 64500 |
| N*> 2001:448a:50be::/48 | 6453 174 7713 64500 |
| N*> 2001:448a:50bf::/48 | 6453 174 7713 64500 |
| N*> 2001:448a:c050::/48 | 6453 174 7713 64501 |
| N*> 2001:448a:c0b0::/48 | 6453 174 7713 64500 |
| N*> 2407:2840::/48 | 58453 9808 56040 65270 58828 |
| N*> 2a0c:a641::/32 | 6453 3257 8781 42298 65540 |

Documentation ASN

Private ASN

AS2603 - Nordunet

AS7713 – Telekom Indonesia

AS56040 – China Mobile

AS58828 – Guangdong Rural Credit Union

AS42298 – Ooredoo



Deprecated AS Set

- Use of BGP AS Set is not recommended
 - RFC6472/BCP172 (December 2011)
- There are still some in both IPv4 and IPv6 BGP tables
 - IPv4 has 263 entries
 - IPv6 has 35 entries

IPv4 Prefixes using Deprecated AS_SET

| Net Originated | AS Path |
|------------------|---|
| 5.28.168.0/21 | 3356 6453 12849 {8894} |
| 8.41.202.0/24 | 13789 13789 13789 13789 13789 13789 13789 13789 13789 30372 {40179} |
| 15.36.64.0/18 | 7660 4635 2687 25888 {21326} |
| 20.133.40.0/21 | 3356 22562 {17916} |
| 20.137.0.0/21 | 3356 21877 {4237} |
| 20.137.160.0/20 | 3356 206 {4237} |
| 20.137.176.0/20 | 3356 21877 {4237} |
| 20.137.240.0/20 | 3356 21877 {4237} |
| 23.56.208.0/24 | 701 20940 {12222} |
| 23.200.20.0/24 | 3257 20940 20940 {12222} |
| 23.217.64.0/19 | 1299 8151 20940 20940 {16625} |
| 24.49.144.0/20 | 3257 22646 {400511} |
| 37.52.0.0/14 | 1299 6849 {6877} |
| 37.142.0.0/17 | 6762 8657 12849 {21450,205209} |
| 37.142.128.0/17 | 1299 8657 12849 {21450} |
| 37.221.128.0/19 | 3257 3255 {62384} |
| 41.196.32.0/20 | 6762 8452 24863 {37069} |
| 41.196.34.0/23 | 3257 8452 24863 24863 24863 24863 24863 24863 {37069} |
| 41.215.160.0/20 | 6762 37613 37030 {37140} |
| 41.215.162.0/24 | 6762 37613 37030 {37140} |
| ... | |
| 216.16.208.0/20 | 3257 22646 {400511} |
| 216.55.208.0/21 | 6327 15830 {394255} |
| 216.110.102.0 | 3491 23520 14813 {11139} |
| 216.126.96.0/20 | 577 22573 {6058} |
| 216.221.208.0/22 | 3356 26585 26585 {26585} |
| 216.221.212.0/22 | 3356 26585 26585 {26585} |
| 216.221.220.0/22 | 3356 26585 26585 {26585} |
| 216.241.2.0 | 6461 52320 52468 52468 52468 52468 18747 {27651,65552} |
| 216.241.10.0 | 6461 52320 52468 52468 52468 52468 18747 {52411} |
| 216.245.192.0/19 | 174 46475 {397666} |
| 217.24.112.0/20 | 12389 {28860} |
| 217.25.32.0/20 | 1299 3301 25146 {41943} |
| 217.27.240.0/20 | 1299 2914 29006 {36483} |
| 217.65.248.0/21 | 174 3255 {59671} |
| 217.112.32.0/20 | 1273 3216 30943 30943 30943 30943 {40966} |

IPv6 Prefixes using Deprecated AS_SET

| Net Originated | AS Path |
|---------------------|---|
| 2001:410::/32 | 7660 22388 11537 6509 {271,7860,8111,10972,53904} |
| 2001:510::/32 | 7660 22388 11537 6509 376 {36786} |
| 2001:678:16::/48 | 7660 2516 12389 45029 42385 {20764,42385,43832} |
| 2001:678:6d0::/48 | 7660 2516 1273 3216 212748 {212748} |
| 2001:6a0::/32 | 7660 2516 6939 8664 {8890} |
| 2001:6d0:8000::/48 | 8359 8985 {42385} |
| 2001:df0:2f40::/48 | 7660 2516 6939 149290 {1234,4321} |
| 2001:4220::/32 | 7660 2516 1273 24835 {36935} |
| 2001:4220::/33 | 7660 2516 1273 24835 {36935} |
| 2001:43f8:1700::/47 | 7660 2516 37271 32437 328365 {31128} |
| 2001:4818:5000::/36 | 577 15830 {30715} |
| 2402:4640::/33 | 7660 2516 4788 38044 {23736} |
| 2402:4640:8000::/33 | 7660 2516 4788 38044 {23736} |
| 2402:7500::/32 | 4713 2914 9924 9924 9924 9924 9924 9924 9924 9924 9924 {24158} |
| 2403:8400::/48 | 9498 17917 {36040} |
| 2404:c000::/32 | 7660 2516 7473 45147 {16625,17727,55818} |
| 2404:c000::/33 | 7660 2516 7473 45147 {16625,55818} |
| 2600:140f:d400::/48 | 4637 55410 {16625} |
| 2604:7ac0:e00::/40 | 3356 12213 {29802} |
| 2606:5c80::/32 | 7660 2516 577 15830 {394255} |
| 2606:b400:8814::/48 | 3356 7160 {7160} |
| 2607:f280::/31 | 7660 2516 174 14615 {46218,398053} |
| 2607:f280::/32 | 7660 2516 3356 14615 {398053} |
| 2607:f390::/32 | 7660 22388 11537 32440 {2055,17244} |
| 2607:f7a8:600::/39 | 3257 46887 {397488} |
| 2607:f7a8:800::/39 | 3257 46887 {395749} |
| 2607:f7a8:c00::/39 | 3257 46887 {21687} |
| 2620:1b2::/36 | 16735 26673 {64966} |
| 2800:800:930::/48 | 2914 3491 14080 {26611} |
| 2800:800:950::/48 | 2914 3491 14080 14080 14080 14080 14080 14080 14080 14080 14080 {26611} |
| 2800:800:960::/48 | 2914 3491 14080 {26611} |
| 2800:800:970::/48 | 2914 3491 14080 14080 14080 14080 14080 14080 14080 14080 14080 {26611} |
| 2a00:6480::/32 | 7660 2516 3320 35548 35548 35548 35548 {29018} |
| 2a02:2578:2001::/48 | 3356 39386 51375 {211612} |
| 2a02:6680:1::/48 | 174 8551 16116 {211612} |
| 2a09:bd00::/48 | 12389 45029 42385 {20764,42385,43832} |
| 2a0e:b2c4::/30 | 2914 3356 9002 212748 {212748} |



Unassigned resources

- Use of unassigned address space is rampant
 - Currently 620 unassigned prefixes in IPv4 routing table
- Use of unassigned ASNs is also a big problem
 - Currently 540 unassigned ASNs in use
- Many are transited by well known / reputable operators
 - Why??

List of Unregistered Origin ASNs

The complete list in use:

940, 1636, 3507, 4879, 6081, 6485, 6565, 7064, 10425, 10475, 10981, 11011, 11044, 11091, 11223, 11316, 11490,
11610, 11636, 11784, 11825, 11945, 11969, 12169, 12176, 12240, 13224, 13317, 13339, 13342, 13492, 13717, 13722,
13980, 14015, 14076, 14167, 14350, 14428, 14461, 14545, 14605, 14651, 14889, 15037, 15178, 15200, 15220, 15329,
15804, 16615, 16666, 16679, 16769, 16804, 16860, 17341, 18591, 18691, 18781, 18798, 18805, 18821, 18838, 18976,
19081, 19140, 19142, 19176, 19359, 19507, 19533, 19708, 19987, 20118, 20190, 20200, 20227, 20421, 20443, 20447,
21584, 21695, 21861, 21942, 21986, 22160, 22271, 22272, 22484, 22538, 22539, 22694, 22698, 22733, 22736, 22743,
22774, 22778, 22830, 23021, 23176, 23190, 23194, 23262, 23288, 23357, 23411, 23448, 23507, 23985, 25568, 25600,
25641, 25647, 25800, 25831, 25978, 26016, 26018, 26051, 26140, 26171, 26286, 26295, 26341, 26345, 26520, 26643,
26682, 26701, 26712, 26750, 26758, 26759, 26799, 26861, 26922, 26961, 26986, 27174, 27180, 27247, 27284, 27289,
27291, 27335, 27426, 27470, 29763, 29782, 29829, 29855, 30004, 30037, 30104, 30155, 30426, 30442, 30544, 30550,
30581, 30699, 31781, 31813, 32021, 32103, 32121, 32187, 32282, 32346, 32358, 32497, 32534, 32596, 32772, 32801,
32842, 32916, 33008, 33017, 33027, 33051, 33123, 33137, 33177, 33223, 33232, 33245, 33394, 33417, 33484, 33492,
33625, 33684, 35941, 36002, 36077, 36264, 36267, 36283, 36357, 36465, 36679, 36774, 36893, 36900, 36928, 36945,
36979, 37010, 37034, 37103, 37155, 37162, 37169, 37320, 37338, 37442, 37475, 37476, 37544, 37555, 37591, 37672,
37703, 38055, 39991, 40004, 40186, 40255, 40279, 40503, 40600, 40687, 40745, 40751, 40909, 40920, 46086, 46123,
46226, 46228, 46233, 46355, 46472, 46559, 46673, 46766, 46772, 46815, 46876, 46916, 47044, 47069, 47086, 47089,
52578, 53025, 53059, 53298, 53367, 53419, 53552, 53657, 53715, 53771, 53775, 53786, 53854, 53886, 53929, 53947,
54209, 54215, 54218, 54231, 54278, 54338, 54424, 54753, 54776, 54787, 55126, 55227, 55289, 56096, 62641, 62770,
62801, 62820, 62828, 63092, 63125, 63190, 63198, 63248, 63305, 63387, 63401, 63433, 64011, 64203, 64339, **65540**,
65544, **65646**, **65777**, **65778**, 65989, 133457, 133866, 134458, 137245, 137276, 138032, 138465, 138611, 140667,
141432, 141687, 142626, 147295, 227171, 230105, 262495, 262509, 262692, 262992, 264493, 265039, 267948, 268652,
269104, 271349, 271442, 271675, 271724, 327869, 327924, 327933, 328007, 328078, 328123, 328149, 328226, 328248,
328369, 328771, 393218, 393266, 393305, 393314, 393320, 393377, 393446, 393491, 393587, 393958, 393980, 394076,
394156, 394183, 394293, 394402, 394519, 394607, 394721, 394787, 394788, 394879, 394936, 394939, 395270, 395282,
395350, 395376, 395377, 395438, 395514, 395522, 395556, 395557, 396015, 396330, 396451, 396894, 396993, 397607,
397658, 398118, 398829

List of Unregistered Origin ASNs

Far too many to list. See <http://thyme.apnic.net/current/data-badAS>:

| Bad AS | Designation | Net Originated | Transit AS | Transit AS Name |
|--------|-------------|-----------------|------------|------------------------------|
| 3507 | UNALLOCATED | 5.105.69.0/24 | 213035 | AS-SERVERION Serverion B.V., |
| 3507 | UNALLOCATED | 5.105.206.0/24 | 213035 | AS-SERVERION Serverion B.V., |
| 33492 | UNALLOCATED | 8.6.184.0/23 | 33650 | COMCAST-33650, US |
| 33123 | UNALLOCATED | 8.10.69.0/24 | 11168 | SCC, US |
| 12169 | UNALLOCATED | 8.15.207.0/24 | 32787 | PROLEXIC-TECHNOLOGIES-DDOS-M |
| 53775 | UNALLOCATED | 8.20.88.0/24 | 7029 | WINDSTREAM, US |
| 62828 | UNALLOCATED | 8.21.130.0/24 | 3356 | LEVEL3, US |
| 393266 | UNALLOCATED | 8.23.52.0/24 | 46887 | LIGHTTOWER, US |
| 396894 | UNALLOCATED | 8.28.201.0/24 | 46887 | LIGHTTOWER, US |
| 394936 | UNALLOCATED | 8.33.224.0/24 | 22442 | HOU-PHONOSCOPE, US |
| 54338 | UNALLOCATED | 8.33.241.0/24 | 6461 | ZAYO-6461, US |
| 18798 | UNALLOCATED | 8.40.106.0/24 | 6461 | ZAYO-6461, US |
| 395438 | UNALLOCATED | 8.42.206.0/24 | 3356 | LEVEL3, US |
| 396451 | UNALLOCATED | 12.6.254.0/24 | 7018 | ATT-INTERNET4, US |
| 13342 | UNALLOCATED | 12.17.5.0/24 | 174 | COGENT-174, US |
| 26345 | UNALLOCATED | 12.21.93.0/24 | 40264 | TWC-40264-WI-MN-UPPERMI-C3, |
| 26341 | UNALLOCATED | 12.33.109.0/24 | 7018 | ATT-INTERNET4, US |
| 21861 | UNALLOCATED | 12.37.59.0/24 | 7018 | ATT-INTERNET4, US |
| 33684 | UNALLOCATED | 12.37.144.0/24 | 7018 | ATT-INTERNET4, US |
| 13317 | UNALLOCATED | 12.44.10.0/24 | 7018 | ATT-INTERNET4, US |
| 63305 | UNALLOCATED | 12.49.58.0/24 | 7018 | ATT-INTERNET4, US |
| 33684 | UNALLOCATED | 12.68.34.0/24 | 6461 | ZAYO-6461, US |
| 31781 | UNALLOCATED | 12.71.107.0/24 | 7018 | ATT-INTERNET4, US |
| 21861 | UNALLOCATED | 12.106.212.0/24 | 7018 | ATT-INTERNET4, US |
| 12169 | UNALLOCATED | 12.109.164.0/24 | 32787 | PROLEXIC-TECHNOLOGIES-DDOS-M |

List of Unregistered Origin ASNs

Far too many to list. See <http://thyme.apnic.net/current/data-badAS>:

| Bad AS | Designation | Net Originated | Transit AS | Transit AS Name |
|--------|-------------|----------------|------------|------------------------|
| 37442 | UNALLOCATED | 41.57.124.0/22 | 37204 | TELONE, ZW |
| 37442 | UNALLOCATED | 41.57.124.0/23 | 37204 | TELONE, ZW |
| 37442 | UNALLOCATED | 41.57.124.0/24 | 37204 | TELONE, ZW |
| 37442 | UNALLOCATED | 41.57.125.0/24 | 37204 | TELONE, ZW |
| 37442 | UNALLOCATED | 41.57.126.0/24 | 37204 | TELONE, ZW |
| 37442 | UNALLOCATED | 41.57.127.0/24 | 37204 | TELONE, ZW |
| 37103 | UNALLOCATED | 41.57.214.0/24 | 37613 | Dolphin-Telecom-AS, GH |
| 37103 | UNALLOCATED | 41.57.215.0/24 | 37613 | Dolphin-Telecom-AS, GH |
| 37155 | UNALLOCATED | 41.72.0.0/23 | 17400 | EBONET, AO |
| 37155 | UNALLOCATED | 41.72.2.0/23 | 17400 | EBONET, AO |
| 37155 | UNALLOCATED | 41.72.4.0/22 | 17400 | EBONET, AO |
| 37155 | UNALLOCATED | 41.72.8.0/21 | 17400 | EBONET, AO |
| 37155 | UNALLOCATED | 41.72.16.0/21 | 17400 | EBONET, AO |
| 37155 | UNALLOCATED | 41.72.24.0/21 | 17400 | EBONET, AO |
| 37155 | UNALLOCATED | 41.72.32.0/20 | 17400 | EBONET, AO |
| 37155 | UNALLOCATED | 41.72.56.0/23 | 17400 | EBONET, AO |
| 37155 | UNALLOCATED | 41.72.60.0/23 | 17400 | EBONET, AO |
| 37155 | UNALLOCATED | 41.72.62.0/24 | 17400 | EBONET, AO |
| 37169 | UNALLOCATED | 41.72.240.0/24 | 16058 | Gabon-Telecom, GA |
| 37544 | UNALLOCATED | 41.74.32.0/24 | 15964 | CAMNET-AS, CM |
| 37544 | UNALLOCATED | 41.74.39.0/24 | 15964 | CAMNET-AS, CM |
| 37544 | UNALLOCATED | 41.74.40.0/24 | 15964 | CAMNET-AS, CM |
| 37544 | UNALLOCATED | 41.74.44.0/24 | 15964 | CAMNET-AS, CM |
| 37162 | UNALLOCATED | 41.76.25.0/24 | 37012 | ComSysGH-AS, GH |
| 37320 | UNALLOCATED | 41.77.64.0/21 | 29614 | GHANATEL-AS, GH |
| 37475 | UNALLOCATED | 41.77.208.0/22 | 15964 | CAMNET-AS, CM |

List of Unassigned IPv4 addresses

Far too many to list (over 600!!). See <http://thyme.apnic.net/current/data-add-IANA>:

| Unassigned Network | ASN Information | AS Name |
|--------------------|-----------------|--|
| 23.139.232.0/24 | Origin: 211619 | MAXKO, HR |
| 23.139.232.0/24 | Transit: 42864 | GIGANET-HU GigaNet Internet Service Prov |
| 23.140.216.0/24 | Origin: 27176 | DATAWAGON, US |
| 23.140.216.0/24 | Transit: 20278 | NEXEON, US |
| 23.141.0.0/24 | Origin: 395350 | UNASSIGNED |
| 23.141.0.0/24 | Transit: 11426 | TWC-11426-CAROLINAS, US |
| 27.100.7.0/24 | Origin: 56096 | UNASSIGNED |
| 27.100.7.0/24 | Transit: 45455 | TH-2S1N-AP Two S One N Co Ltd, Internet |
| 41.57.124.0/22 | Origin: 37442 | UNASSIGNED |
| 41.57.124.0/22 | Transit: 37204 | TELONE, ZW |
| 41.57.124.0/23 | Origin: 37442 | UNASSIGNED |
| 41.57.124.0/23 | Transit: 37204 | TELONE, ZW |
| 41.57.124.0/24 | Origin: 37442 | UNASSIGNED |
| 41.57.124.0/24 | Transit: 37204 | TELONE, ZW |
| 41.57.125.0/24 | Origin: 37442 | UNASSIGNED |
| 41.57.125.0/24 | Transit: 37204 | TELONE, ZW |
| 41.57.126.0/24 | Origin: 37442 | UNASSIGNED |
| 41.57.126.0/24 | Transit: 37204 | TELONE, ZW |
| 41.57.127.0/24 | Origin: 37442 | UNASSIGNED |
| 41.57.127.0/24 | Transit: 37204 | TELONE, ZW |
| 41.57.203.0/24 | Origin: 206283 | YAHSAT-FRANKFURT, AE |
| 41.57.203.0/24 | Transit: 3491 | BTN-ASN, US |
| 41.57.204.0/24 | Origin: 206283 | YAHSAT-FRANKFURT, AE |
| 41.57.204.0/24 | Transit: 3491 | BTN-ASN, US |
| 41.57.205.0/24 | Origin: 206283 | YAHSAT-FRANKFURT, AE |
| 41.57.205.0/24 | Transit: 3491 | BTN-ASN, US |

List of Unassigned IPv4 addresses

Far too many to list (over 600!!). See <http://thyme.apnic.net/current/data-add-IANA>:

| Unassigned Network | ASN Information | AS Name |
|--------------------|-----------------|--|
| 41.76.25.0/24 | Origin: 37162 | UNASSIGNED |
| 41.76.25.0/24 | Transit: 37012 | ComSysGH-AS, GH |
| 41.77.64.0/21 | Origin: 37320 | UNASSIGNED |
| 41.77.64.0/21 | Transit: 29614 | GHANATEL-AS, GH |
| 41.77.208.0/22 | Origin: 37475 | UNASSIGNED |
| 41.77.208.0/22 | Transit: 15964 | CAMNET-AS, CM |
| 41.77.240.0/21 | Origin: 35251 | NETLAB, CA |
| 41.77.240.0/21 | Transit: 8100 | ASN-QUADRANET-GLOBAL, US |
| 41.78.60.0/22 | Origin: 6762 | SEABONE-NET TELECOM ITALIA SPARKLE S.p.A |
| 41.78.60.0/22 | Transit: 2516 | KDDI KDDI CORPORATION, JP |
| 41.78.204.0/22 | Origin: 37475 | UNASSIGNED |
| 41.78.204.0/22 | Transit: 15964 | CAMNET-AS, CM |
| 41.79.128.0/22 | Origin: 37475 | UNASSIGNED |
| 41.79.128.0/22 | Transit: 15964 | CAMNET-AS, CM |
| 41.138.192.0/24 | Origin: 20598 | CYBERSPACE-AS Autonomous System number f |
| 41.138.192.0/24 | Transit: 37613 | Dolphin-Telecom-AS, GH |
| 41.191.240.0/21 | Origin: 37103 | UNASSIGNED |
| 41.191.240.0/21 | Transit: 37613 | Dolphin-Telecom-AS, GH |
| 41.191.240.0/24 | Origin: 37103 | UNASSIGNED |
| 41.191.240.0/24 | Transit: 37613 | Dolphin-Telecom-AS, GH |
| 41.191.241.0/24 | Origin: 37103 | UNASSIGNED |
| 41.191.241.0/24 | Transit: 37613 | Dolphin-Telecom-AS, GH |
| 41.191.242.0/24 | Origin: 37103 | UNASSIGNED |
| 41.191.242.0/24 | Transit: 37613 | Dolphin-Telecom-AS, GH |
| 41.191.243.0/24 | Origin: 37103 | UNASSIGNED |
| 41.191.243.0/24 | Transit: 37613 | Dolphin-Telecom-AS, GH |

List of Unassigned IPv4 addresses

Far too many to list (over 600!!). See <http://thyme.apnic.net/current/data-add-IANA>:

| Unassigned Network | ASN Information | AS Name |
|--------------------|-----------------|--|
| 196.46.154.0/23 | Origin: 28683 | SBIN, BJ |
| 196.46.154.0/23 | Transit: 174 | COGENT-174, US |
| 196.50.21.0/24 | Origin: 328149 | UNASSIGNED |
| 196.50.21.0/24 | Transit: 37061 | Safaricom, KE |
| 196.52.0.0/24 | Origin: 398252 | BRC-YORKNE-01, US |
| 196.52.0.0/24 | Transit: 15164 | UPNLLC, US |
| 196.52.16.0/21 | Origin: 18710 | GKG-NET, US |
| 196.52.16.0/21 | Transit: 13876 | FIBER-64, US |
| 196.52.70.0/24 | Origin: 32780 | HOSTINGSERVICES-INC, US |
| 196.52.70.0/24 | Transit: 13213 | UK2NET-AS, GB |
| 196.53.30.0/24 | Origin: 13213 | UK2NET-AS, GB |
| 196.53.30.0/24 | Transit: 3257 | GTT-BACKBONE GTT, US |
| 196.53.64.0/24 | Origin: 13213 | UK2NET-AS, GB |
| 196.53.64.0/24 | Transit: 3257 | GTT-BACKBONE GTT, US |
| 196.53.113.0/24 | Origin: 30277 | DFW-DATACENTER, US |
| 196.53.113.0/24 | Transit: 393398 | ASN-DIS, US |
| 196.54.72.0/23 | Origin: 26341 | UNASSIGNED |
| 196.54.72.0/23 | Transit: 701 | UUNET, US |
| 196.63.128.0/19 | Origin: 58931 | LIHGL-AS-AP 24.hk global BGP, HK |
| 196.63.128.0/19 | Transit: 139646 | HKMTC-AS-AP HONG KONG Megalayer Technolo |
| 196.63.160.0/19 | Origin: 58931 | LIHGL-AS-AP 24.hk global BGP, HK |
| 196.63.160.0/19 | Transit: 139646 | HKMTC-AS-AP HONG KONG Megalayer Technolo |
| 196.195.4.0/24 | Origin: 131284 | ETISALATAFG-AS-AP Etisalat Afghan, AF |
| 196.195.4.0/24 | Transit: 38193 | TWA-AS-AP Transworld Associates Pvt. Ltd |
| 196.195.15.0/24 | Origin: 131284 | ETISALATAFG-AS-AP Etisalat Afghan, AF |
| 196.195.15.0/24 | Transit: 38193 | TWA-AS-AP Transworld Associates Pvt. Ltd |

Number of IPv4 prefixes announced by prefix length

| | | | | | | | |
|----------|-----------|-----------|-----------|-----------|------------|-----------|------------|
| /1:0 | /2:0 | /3:0 | /4:0 | /5:0 | /6:0 | /7:0 | /8:16 |
| /9:14 | /10:39 | /11:103 | /12:298 | /13:578 | /14:1196 | /15:2050 | /16:13461 |
| /17:8245 | /18:13834 | /19:25155 | /20:44224 | /21:51231 | /22:109545 | /23:97693 | /24:550516 |
| /25:742 | /26:0 | /27:0 | /28:0 | /29:0 | /30:0 | /31:0 | /32:0 |

22nd April 2023↑

22nd April 2022↓

| | | | | | | | |
|----------|-----------|-----------|-----------|-----------|------------|-----------|------------|
| /1:0 | /2:0 | /3:0 | /4:0 | /5:0 | /6:0 | /7:0 | /8:16 |
| /9:13 | /10:41 | /11:102 | /12:307 | /13:592 | /14:1203 | /15:2059 | /16:13529 |
| /17:8256 | /18:13906 | /19:25201 | /20:43709 | /21:52332 | /22:108562 | /23:96003 | /24:530061 |
| /25:831 | /26:0 | /27:0 | /28:0 | /29:0 | /30:0 | /31:0 | /32:0 |

Number of IPv6 prefixes announced by prefix length

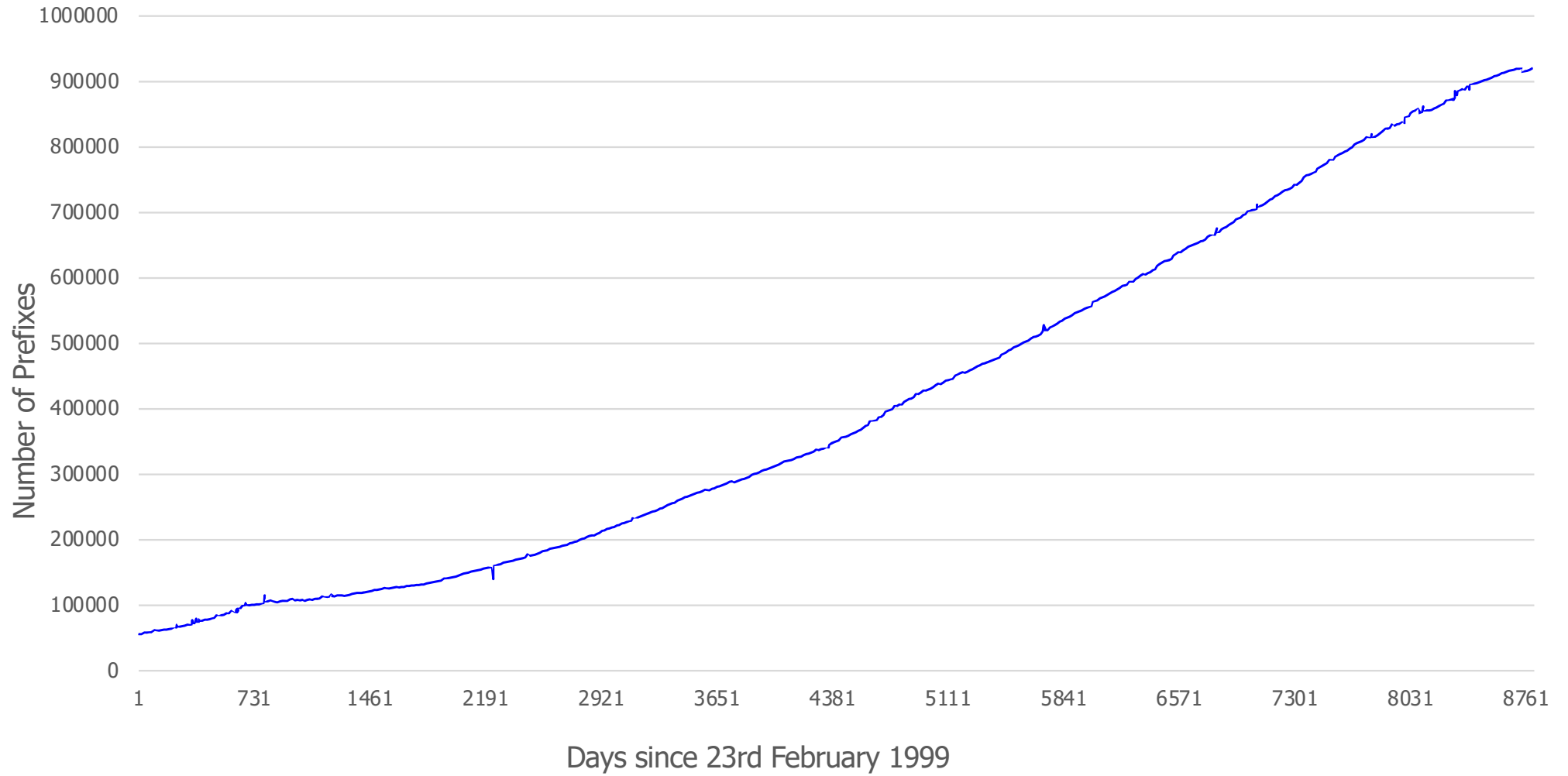
| | | | | | | | |
|----------------------|-----------------------------|----------|----------|-----------|----------|----------|----------|
| /16:1 | /17:0 | /18:0 | /19:1 | /20:14 | /21:3 | /22:7 | /23:7 |
| /24:30 | /25:8 | /26:16 | /27:20 | /28:197 | /29:4322 | /30:591 | /31:304 |
| /32:22913 | /33:3063 | /34:2617 | /35:1066 | /36:6153 | /37:949 | /38:1670 | /39:1461 |
| /40:13913 | /41:930 | /42:2445 | /43:1044 | /44:14914 | /45:1748 | /46:3116 | /47:3587 |
| /48:84730 | /49 → /128: FILTERED by ISP | | | | | | |

22nd April 2023↑

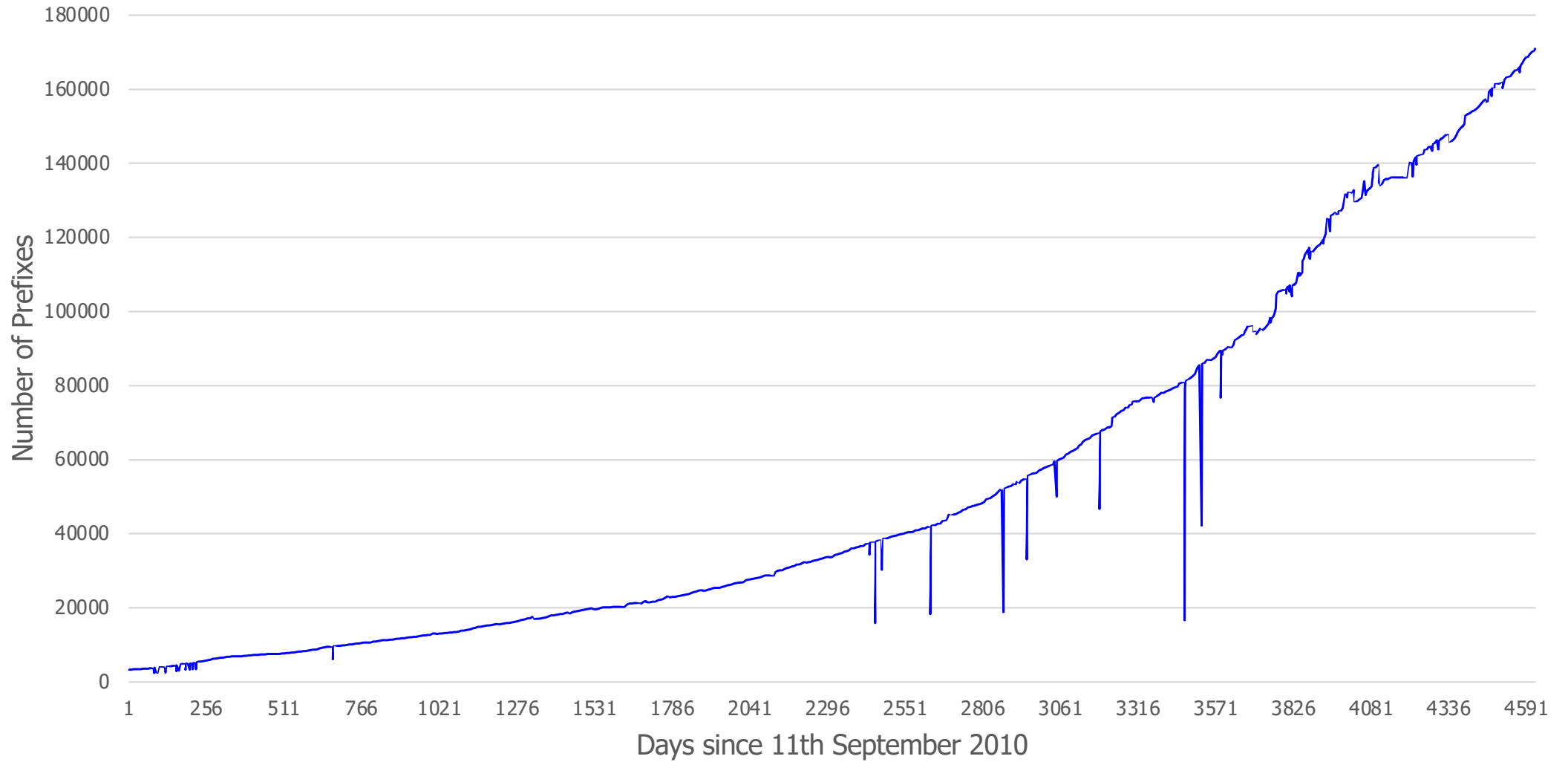
22nd April 2022↓

| | | | | | | | |
|----------------------|-----------------------------|----------|----------|-----------|----------|----------|----------|
| /16:1 | /17:0 | /18:0 | /19:1 | /20:15 | /21:3 | /22:7 | /23:7 |
| /24:29 | /25:8 | /26:15 | /27:28 | /28:188 | /29:4151 | /30:527 | /31:217 |
| /32:21650 | /33:2588 | /34:2260 | /35:875 | /36:5463 | /37:928 | /38:1651 | /39:1248 |
| /40:11720 | /41:739 | /42:2863 | /43:1068 | /44:11377 | /45:1175 | /46:2841 | /47:2255 |
| /48:69600 | /49 → /128: FILTERED by ISP | | | | | | |

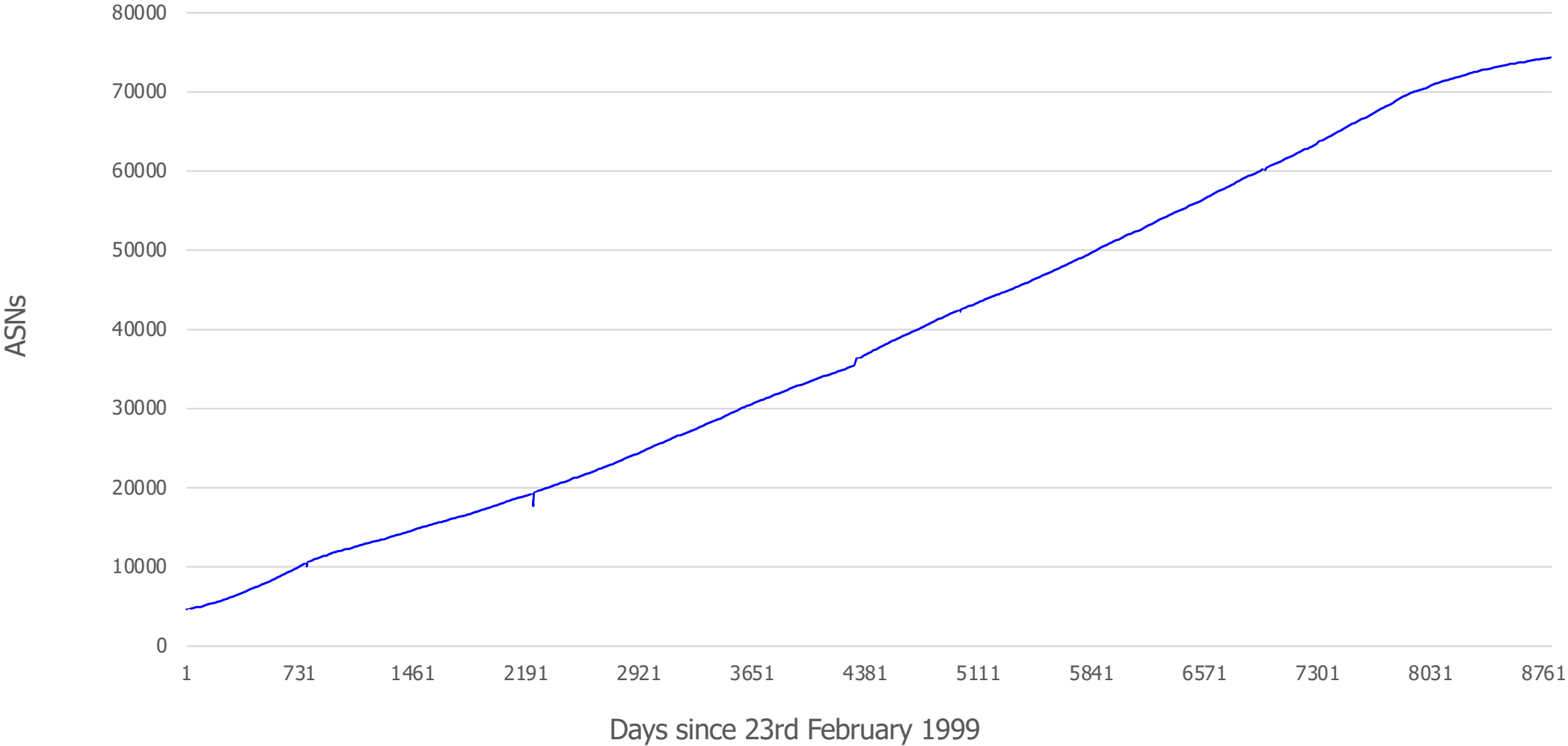
Global IPv4 Routing Table



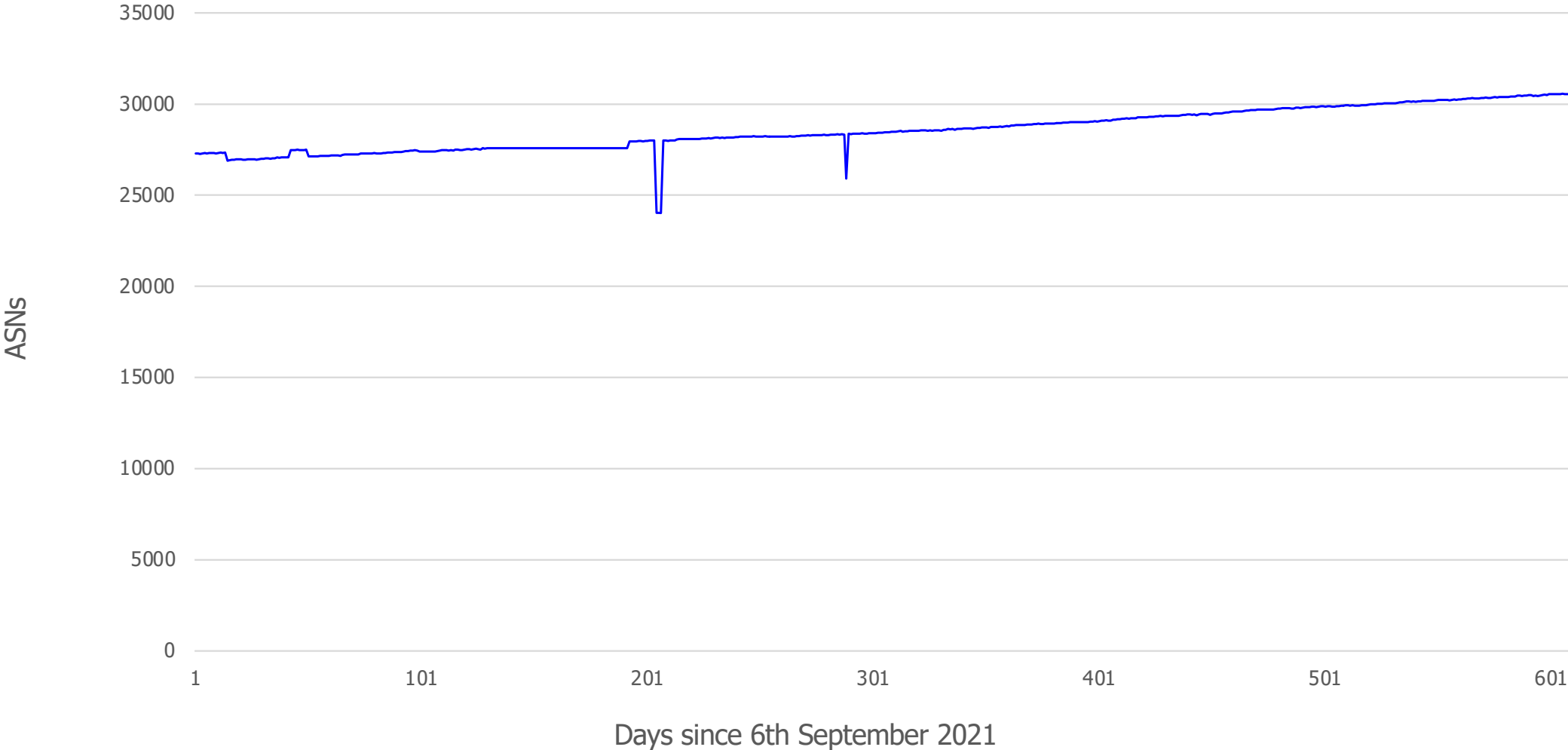
Global IPv6 Routing Table



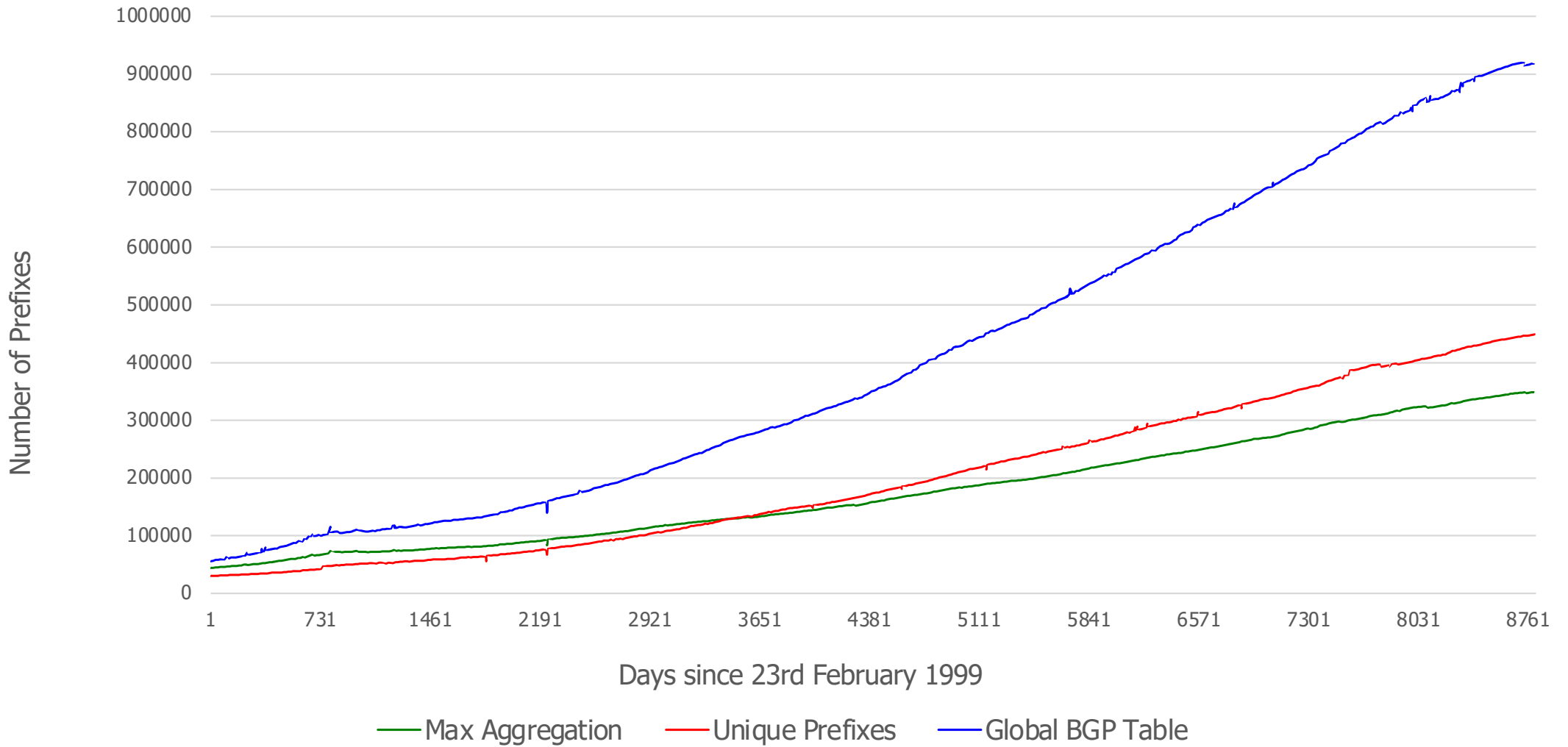
AS Growth



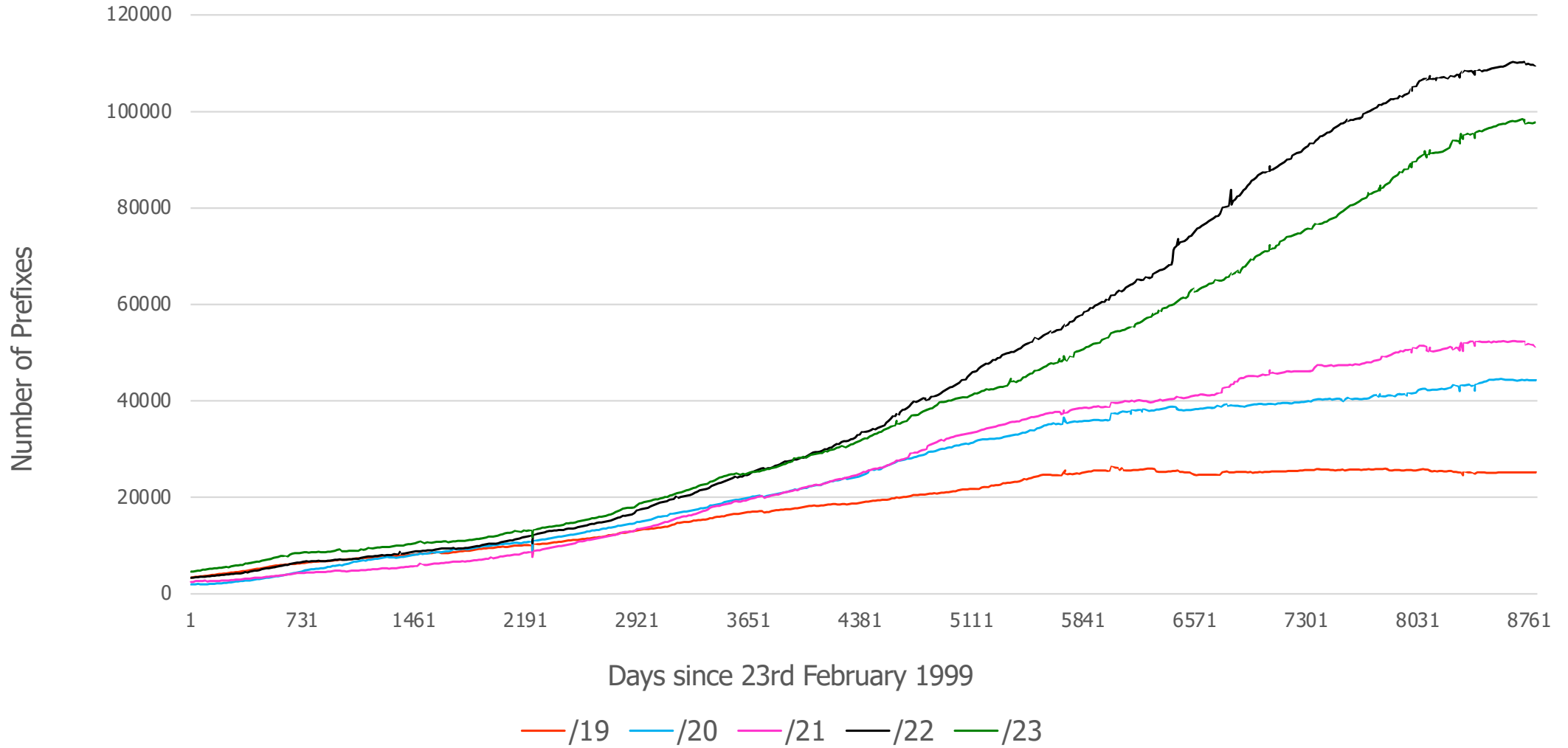
IPv6 AS Growth



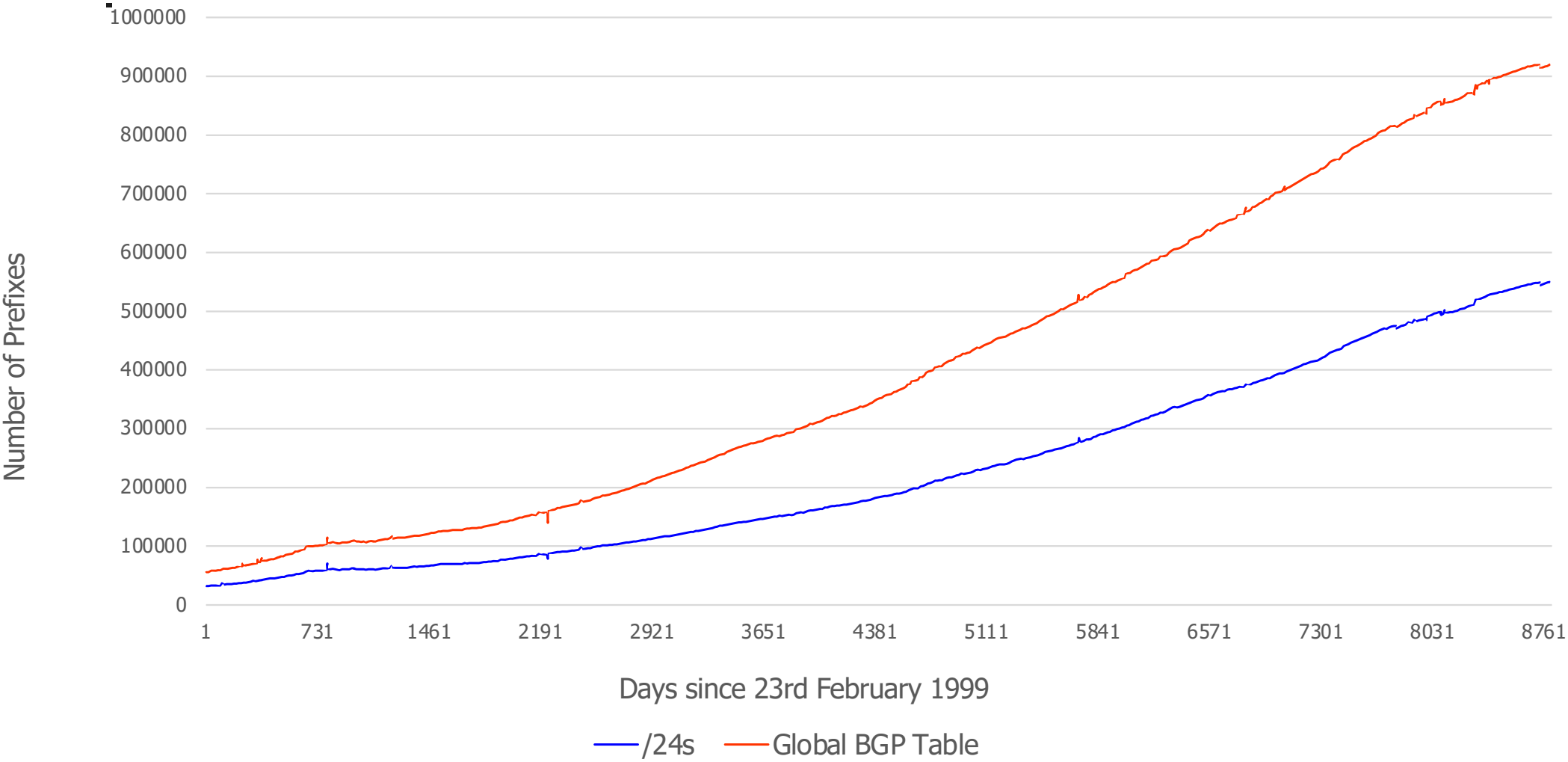
IPv4 Max Aggregation vs Unique Prefixes



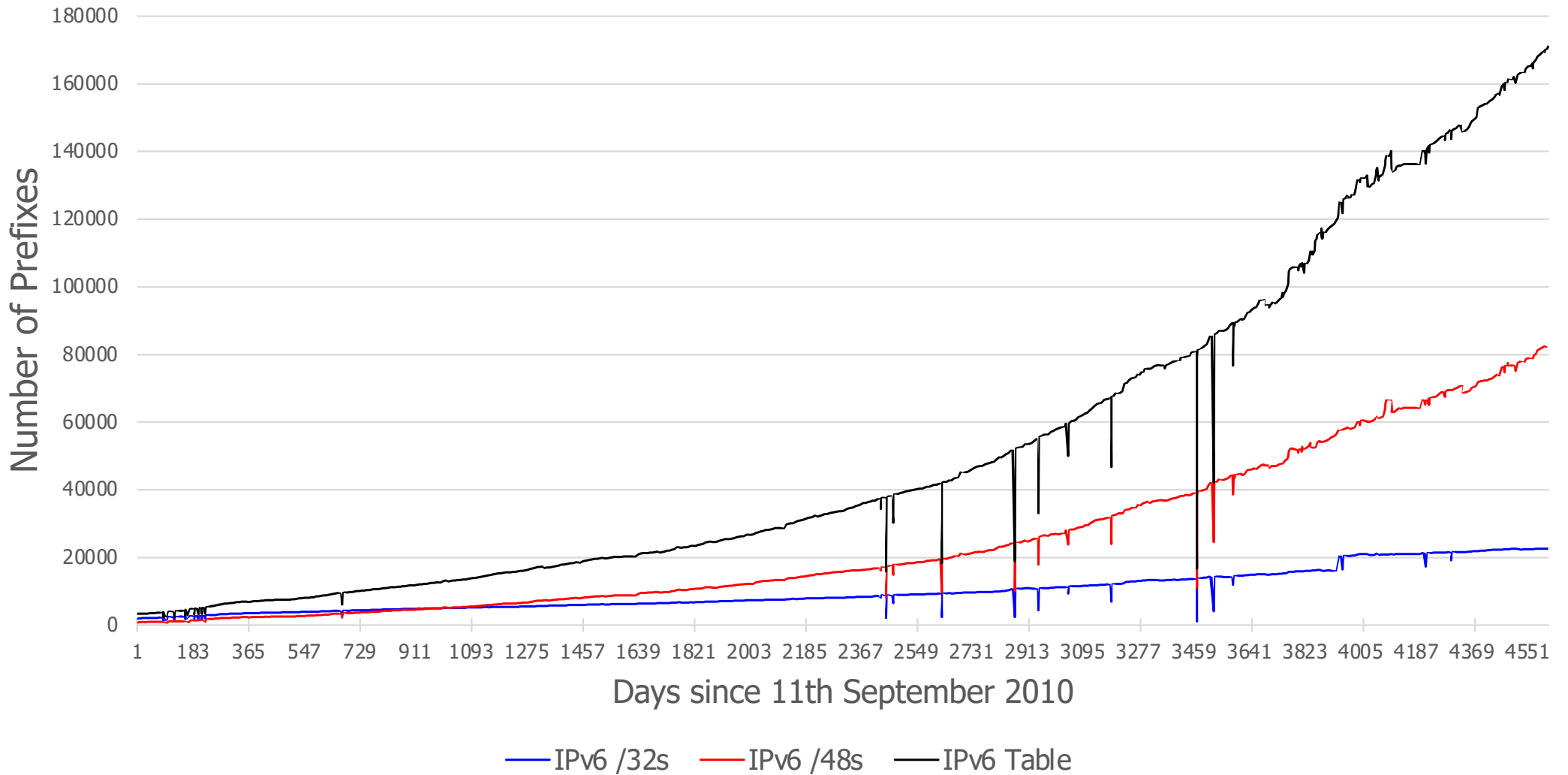
IPv4 Prefix sizes announced



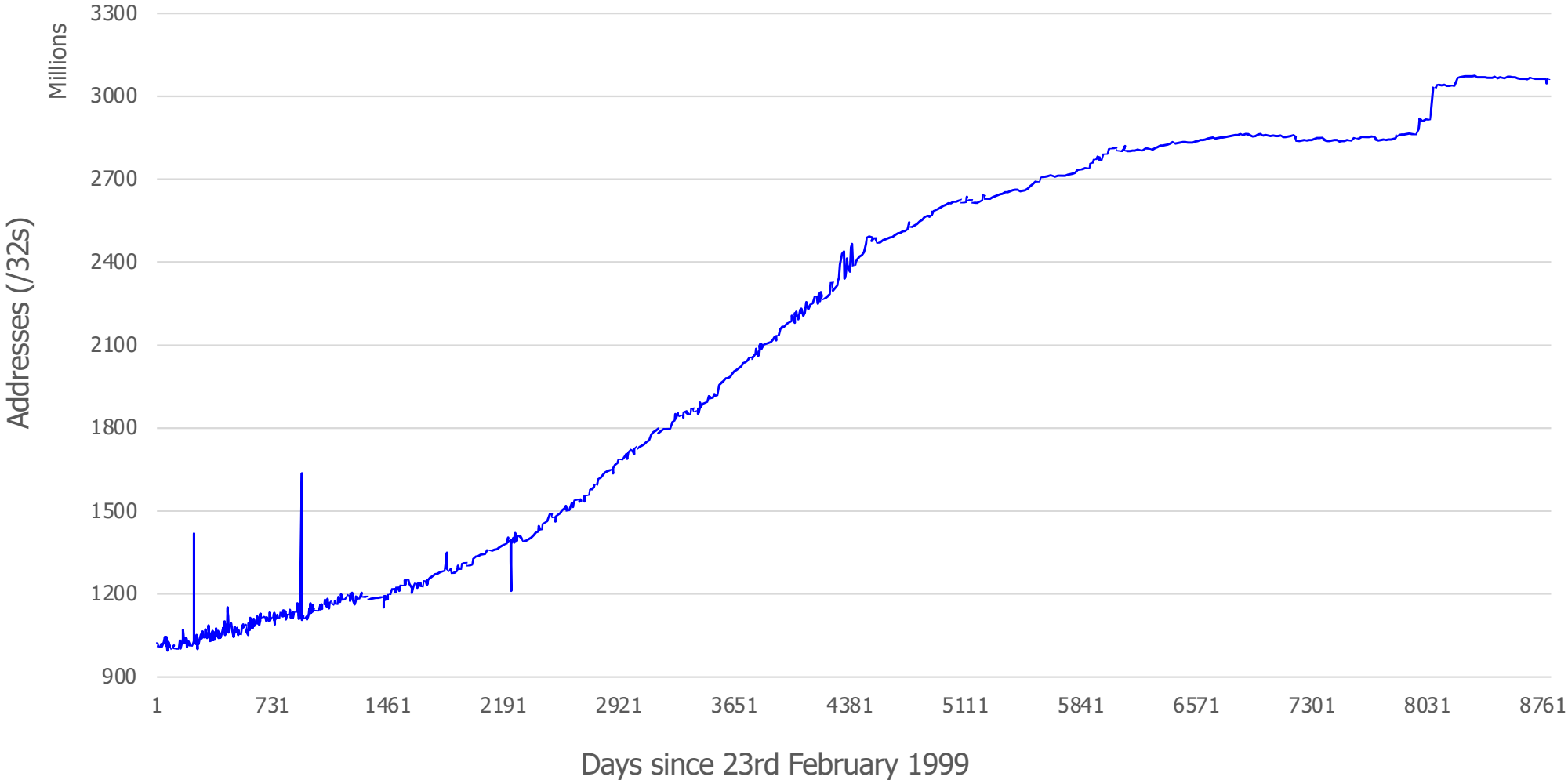
IPv4 /24s announced



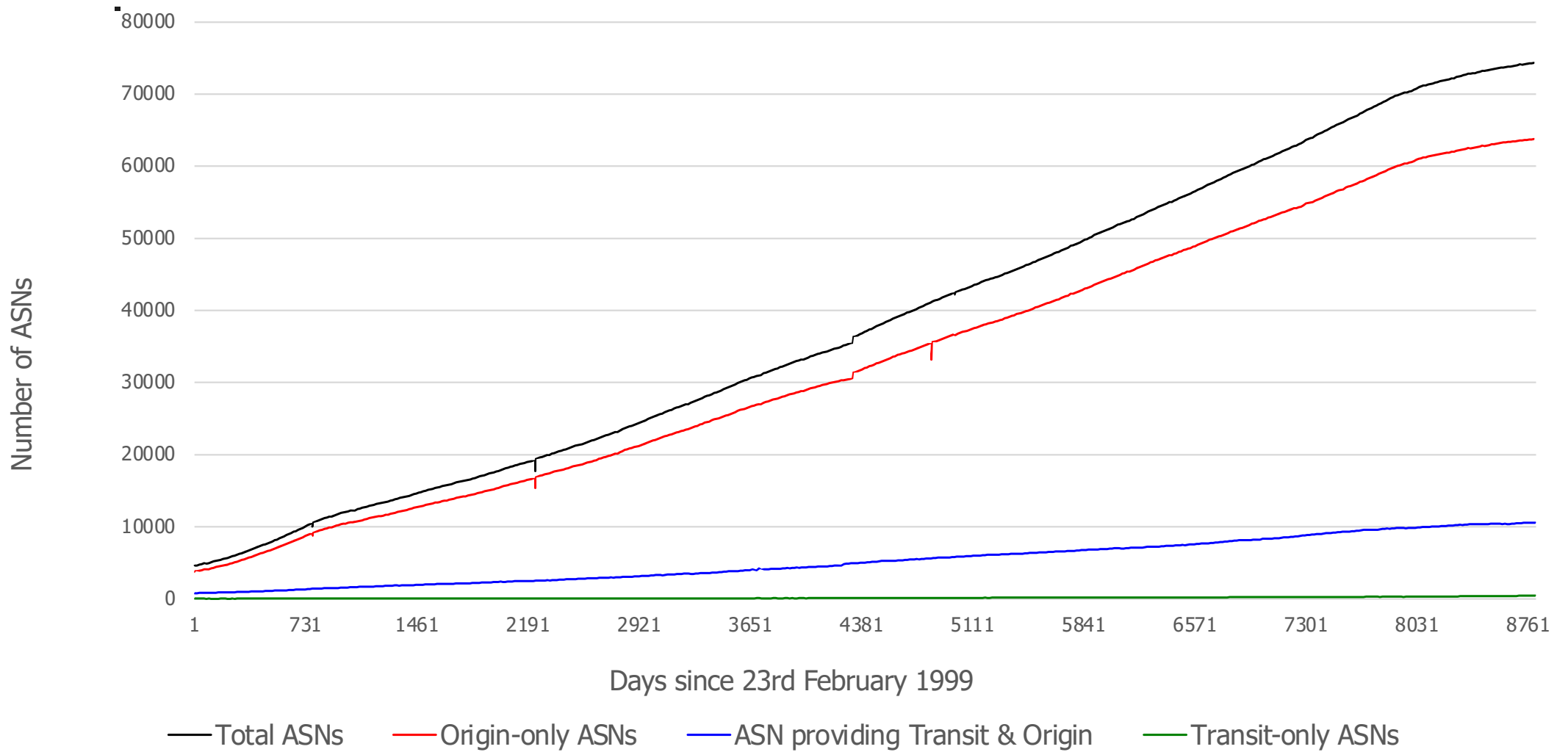
IPv6 /32s vs /48s



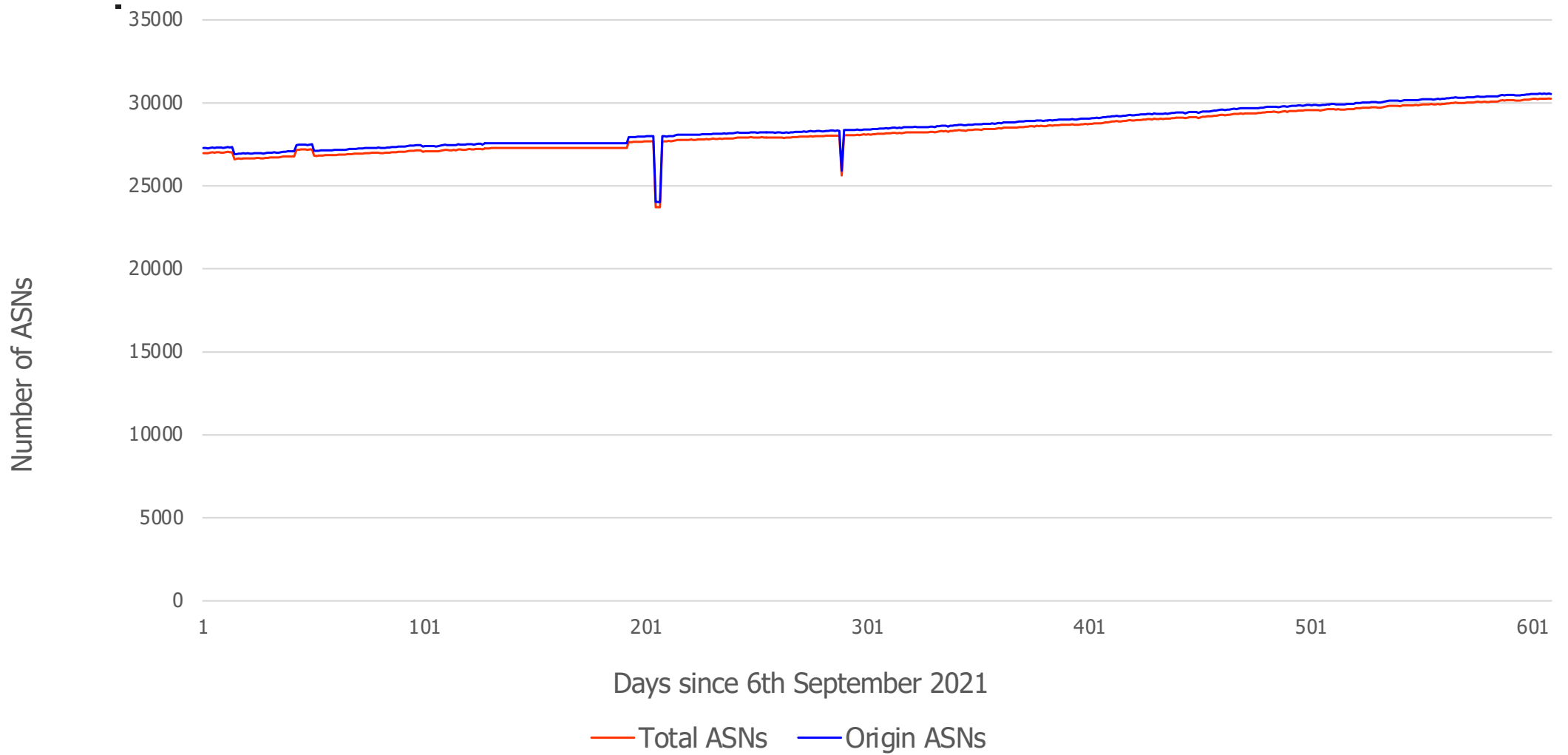
IPv4 Address Space announced



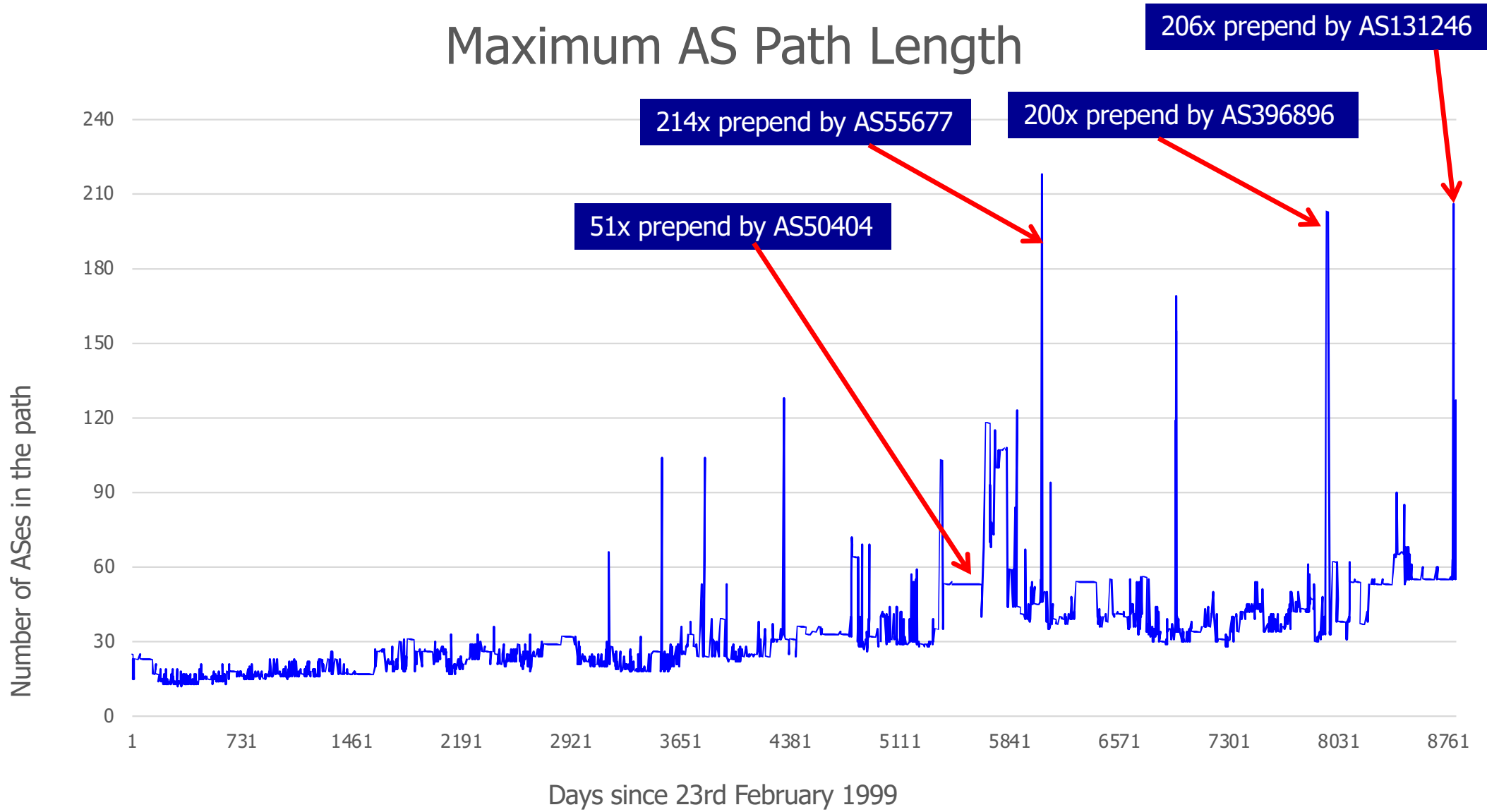
IPv4 AS Announcements



IPv6 AS Announcements



Maximum AS Path Length





Looking at Deaggregation in IPv4

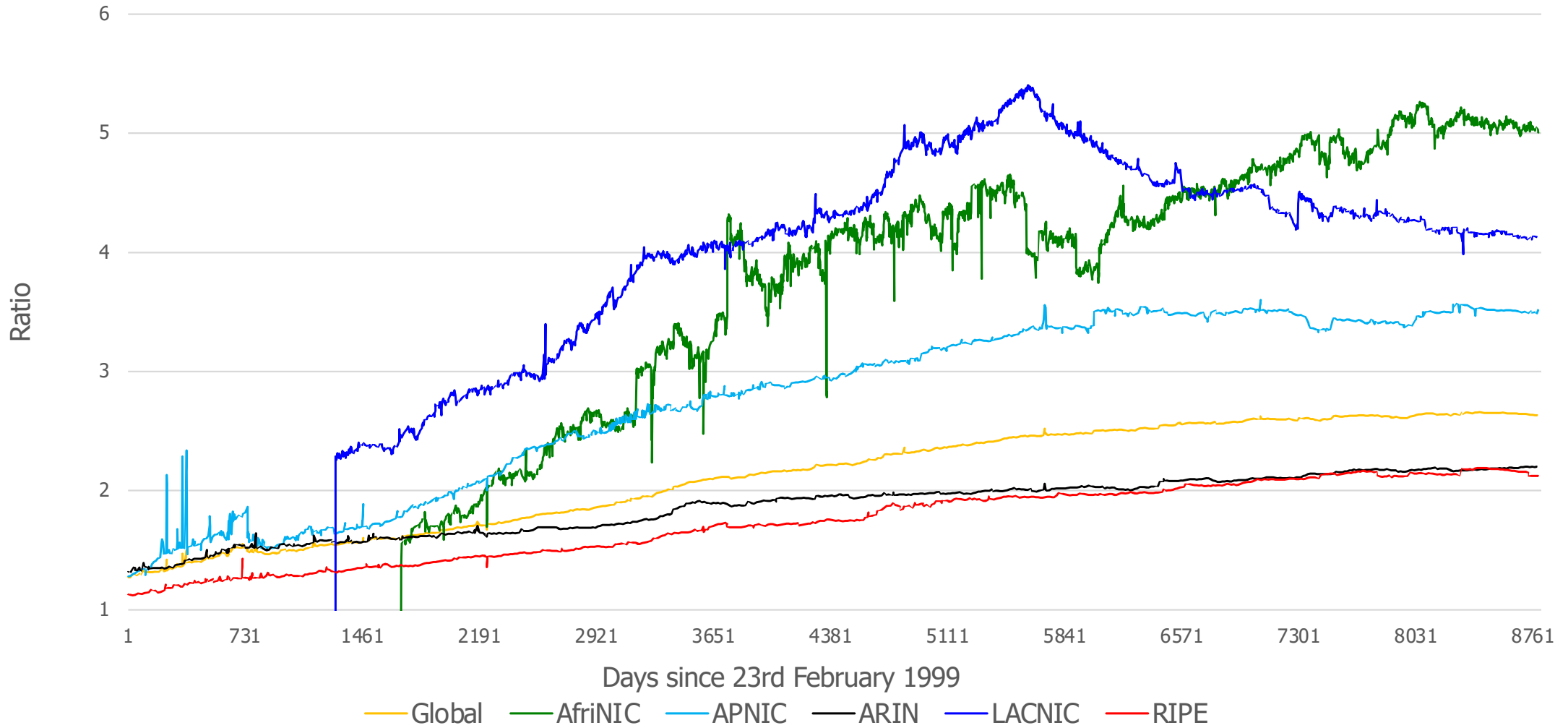
- Routing Report
 - One summary takes BGP table and aggregates prefixes by origin AS
 - Called “Max Aggregation” in report
 - Global and per RIR basis
 - <http://thyme.apnic.net/current/>
- Calculates **Deaggregation** Factor:
 - Measure of Routing Table size/Aggregated Size
 - Global value has been increasing slowly and steadily since “records began”



April 2023

- **Total Prefixes**
- Global BGP Table
 - 919k prefixes
- North America
 - 269k prefixes
- Europe & Middle East
 - 259k prefixes
- Asia & Pacific
 - 243k prefixes
- Latin America & Caribbean
 - 118k prefixes
- Africa
 - 29k prefixes
- **Deaggregation Factor**
- Global Average
 - 2.63
- North America
 - 2.20
- Europe & Middle East
 - 2.12
- Asia & Pacific
 - 3.50
- Latin America & Caribbean
 - 4.13
- Africa
 - 5.03

Deaggregation: RIR Regions vs Global



Asia Pacific Aggregation Savings Summary

| ASN | No of Nets | Savings | Description |
|-------|------------|---------|---|
| 9808 | 9486 | 9446 | CHINAMOBILE-CN China Mobile Communications Grou |
| 7545 | 5727 | 5033 | TPG-INTERNET-AP TPG Telecom Limited, AU |
| 4538 | 4863 | 4788 | ERX-CERNET-BKB China Education and Research Net |
| 45899 | 4054 | 4007 | VNPT-AS-VN VNPT Corp, VN |
| 7713 | 3560 | 3495 | TELKOMNET-AS-AP PT Telekomunikasi Indonesia, ID |
| 7552 | 3227 | 3206 | VIETEL-AS-AP Viettel Group, VN |
| 9498 | 2950 | 2714 | BBIL-AP BHARTI Airtel Ltd., IN |
| 18403 | 2302 | 2277 | FPT-AS-AP FPT Telecom Company, VN |
| 45090 | 2184 | 2105 | TENCENT-NET-AP Shenzhen Tencent Computer System |
| 4755 | 2181 | 1985 | TATACOMM-AS TATA Communications formerly VSNL i |
| 4766 | 2551 | 1960 | KIXS-AS-KR Korea Telecom, KR |
| 24560 | 2385 | 1939 | AIRTELBROADBAND-AS-AP Bharti Airtel Ltd., Telem |
| 23969 | 1925 | 1909 | TOT-NET TOT Public Company Limited, TH |
| 9829 | 1918 | 1884 | BSNL-NIB National Internet Backbone, IN |
| 45609 | 1894 | 1555 | BHARTI-MOBILITY-AS-AP Bharti Airtel Ltd. AS for |
| 56047 | 1508 | 1474 | CMNET-HUNAN-AP China Mobile communications corp |
| 56041 | 1457 | 1387 | CMNET-ZHEJIANG-AP China Mobile communications c |
| 56046 | 1415 | 1322 | CMNET-JIANGSU-AP China Mobile communications co |
| 9583 | 1767 | 1198 | SIFY-AS-IN Sify Limited, IN |
| 17488 | 1261 | 1148 | HATHWAY-NET-AP Hathway IP Over Cable Internet, |

<http://thyme.apnic.net/current/data-CIDRnet-APNIC>

Afghanistan Aggregation Savings Summary

| ASN | No of Nets | Savings | Description |
|--------|------------|---------|---|
| 38742 | 69 | 55 | AWCC-AS-AP Afghan Wireless Communication Compan |
| 55330 | 69 | 52 | GCN-DCN-AS AFGHANTELECOM GOVERNMENT COMMUNICATI |
| 17411 | 44 | 38 | IO-GLOBAL-AP Io Global Services Pvt. Limited, A |
| 131284 | 49 | 37 | ETISALATAFG-AS-AP Etisalat Afghan, AF |
| 55424 | 33 | 23 | INSTATELECOM-AS-AP Instatelecom Limited, AF |
| 132471 | 27 | 20 | MTNAFGHANISTAN-AS-AP MTNAFGHANISTAN, AF |
| 45178 | 25 | 19 | ROSHAN-AF Main Street, House No. 13 Wazir Akbar |
| 138322 | 30 | 13 | AWCC-AS-AP Afghan Wireless Communication Compan |
| 133066 | 11 | 7 | ANS-AS-AP Ariana Network Services Co, AF |
| 134134 | 10 | 5 | NORTHTELECOM-AF North Telecom, AF |

Bangladesh Aggregation Savings Summary

| ASN | No of Nets | Savings | Description |
|-------|------------|---------|---|
| 23688 | 249 | 241 | LINK3-TECH-AS-BD-AP Link3 Technologies Ltd., BD |
| 23956 | 184 | 179 | AMBERIT-BD-AS AmberIT Limited, BD |
| 24342 | 150 | 145 | BRAC-BDMAIL-AS-BD BRACNet Limited, BD |
| 17806 | 106 | 103 | MANGOTELESERVICE-AS-BD Tire-1 IP Transit Provid |
| 58715 | 123 | 101 | EARTHTELECOMMUNICATION-AS EARTH TELECOMMUNICATI |
| 23923 | 105 | 97 | AGNI-AS Agni Systems Limited, BD |
| 7565 | 84 | 82 | BDCOM-BD Rangs Nilu Square, 5th Floor, House 75 |
| 17469 | 90 | 81 | ACCESSTEL-AS-AP Access Telecom BD Ltd., BD |
| 9230 | 84 | 79 | BOL-BD-AP Bangladesh Online Ltd., BD |
| 24323 | 92 | 77 | AAMRA-NETWORKS-AS-AP aamra networks limited, BD |

India Aggregation Savings Summary

| ASN | No of Nets | Savings | Description |
|-------|------------|---------|---|
| 9498 | 2950 | 2714 | BBIL-AP BHARTI Airtel Ltd., IN |
| 4755 | 2181 | 1985 | TATACOMM-AS TATA Communications formerly VSNL i |
| 24560 | 2385 | 1939 | AIRTELBROADBAND-AS-AP Bharti Airtel Ltd., Telem |
| 9829 | 1918 | 1884 | BSNL-NIB National Internet Backbone, IN |
| 45609 | 1894 | 1555 | BHARTI-MOBILITY-AS-AP Bharti Airtel Ltd. AS for |
| 9583 | 1767 | 1198 | SIFY-AS-IN Sify Limited, IN |
| 17488 | 1261 | 1148 | HATHWAY-NET-AP Hathway IP Over Cable Internet, |
| 55410 | 910 | 881 | VIL-AS-AP Vodafone Idea Ltd, IN |
| 45820 | 945 | 845 | TTSL-MEISISIP Tata Teleservices ISP AS, IN |
| 38266 | 759 | 714 | VIL-AS-AP Vodafone Idea Ltd, IN |

Sri Lanka Aggregation Savings Summary

| ASN | No of Nets | Savings | Description |
|--------|------------|---------|---|
| 9329 | 131 | 120 | SLTINT-AS-AP Sri Lanka Telecom Internet, LK |
| 18001 | 76 | 62 | DIALOG-AS Dialog Axiata PLC., LK |
| 132045 | 63 | 58 | AIRTEL-AS-ISP Bharti Airtel Lanka Pvt. Limited, |
| 45224 | 60 | 57 | BELLNET-AS-AP Lanka Bell Limited, LK |
| 5087 | 84 | 46 | LANKA-COM Lanka Communication Services, LK |
| 17904 | 21 | 19 | SLTASUL-LK Sri Lankan Airlines, LK |
| 45356 | 25 | 18 | MOBITEL-LK Mobitel Pvt Ltd, LK |
| 17470 | 16 | 13 | HUTCHISON-LK Hutchison Telecommunications Lanka |
| 132447 | 10 | 8 | HUTCHISON-LK 234, Galle Road, Colombo 4, LK |
| 38229 | 8 | 6 | LEARN-LK Lanka Education & Research Network, NR |

Nepal Aggregation Savings Summary

| ASN | No of Nets | Savings | Description |
|--------|------------|---------|---|
| 45899 | 4054 | 4007 | VNPT-AS-VN VNPT Corp, VN |
| 17501 | 219 | 208 | WLINK-NEPAL-AS-AP WorldLink Communications Pvt |
| 23752 | 108 | 102 | NPTELECOM-NP-AS Nepal Telecommunications Corpor |
| 4007 | 78 | 66 | SUBISU-CABLENET-AS-AP Subisu Cablenet Pvt Ltd, |
| 4613 | 70 | 64 | MOS-NP Mercantile Office Systems, NP |
| 38565 | 61 | 57 | NCELL-AS-NP Ncell Pvt. Ltd., NP |
| 24550 | 57 | 51 | WEBSURFERNP-AS-NP Websurfer Nepal Internet Serv |
| 45650 | 45 | 29 | VIANET-NP Vianet Communications Pvt. Ltd., NP |
| 55915 | 33 | 25 | CLASSIC-NP Classic Tech Pvt. Ltd., NP |
| 139922 | 26 | 16 | SMNPL-AS-AP Simple Media Network Private Limite |

Pakistan Aggregation Savings Summary

| ASN | No of Nets | Savings | Description |
|--------|------------|---------|---|
| 17557 | 1025 | 989 | PKTELECOM-AS-PK Pakistan Telecommunication Comp |
| 23674 | 495 | 470 | NAYATEL-PK Nayatel Pvt Ltd, PK |
| 9541 | 562 | 464 | CYBERNET-AP Cyber Internet Services Pvt Ltd., P |
| 132165 | 368 | 319 | CONNECT-AS-AP Connect Communications, PK |
| 45669 | 320 | 313 | MOBILINK-AS-PK PMCL LDI IP TRANSIT, PK |
| 59257 | 227 | 215 | CMPAKLIMITED-AS-AP CMPak Limited, PK |
| 58895 | 210 | 154 | EBONE1-PK Ebone Network PVT. Limited, PK |
| 23966 | 163 | 151 | LDN-AS-PK LINKdotNET Telecom Limited, PK |
| 38264 | 209 | 147 | WATEEN-IMS-PK-AS-AP National WiMAXIMS environme |
| 136525 | 136 | 126 | WANCOMPVTLTD-AS-AP Wancom Pvt Ltd., PK |

Maldives Aggregation Savings Summary

| ASN | No of Nets | Savings | Description |
|--------|------------|---------|---|
| 7642 | 127 | 114 | DHIRAAGU-MV-AP DHIVEHI RAAJJEYGE GULHUN PLC, MV |
| 24016 | 52 | 49 | RAAJJEONLINE-AS Focus Infocom Private Limited, |
| 55944 | 48 | 44 | OOREDOO-MV Ooredoo Maldives Plc, MV |
| 136238 | 6 | 2 | SATLINKPVT LTD-AS-AP SatLink Pvt Ltd, MV |

Bhutan Aggregation Savings Summary

| ASN | No of Nets | Savings | Description |
|--------|------------|---------|--|
| 134715 | 13 | 9 | GTA-AS-AP Government Technology Agency, BT |
| 136039 | 6 | 4 | NANO-AS-AP NANO, Bhutan, BT |
| 141680 | 3 | 1 | SUPERNET1-AS-AP SuperNet Infocomm, BT |



IPv4 Observations

- Routing table continues to grow
 - Linear growth for last 8 years
 - Even though total address space announced has levelled off over the last 3 years
- /24 announcements continue to grow
 - Clearly many operators are deaggregating down to the smallest prefix size considered routable
 - Do operators still filter prefix sizes smaller than /24?
 - (A few /25s through /32s are visible)
- Overall global deaggregation ratio growth has slowed
 - Significant improvements in Latin America



IPv6 Observations

- Routing table growth has continued in 2023
 - How to interpret this?
- /48 announcements continue to grow rapidly
 - Operators seem to believe that IPv6 /48 needs to be treated like IPv4 /24 🙄😞
- Noticeable increases:
 - According to RIR allocation boundaries
 - Along nibble boundaries



Internet Routing Table Analysis Update

Questions?