

Routing Security & Internet Routing Growth in the Pacific

Philip Smith
PacNOG 36
Rarotonga
24th November 2025



UNIVERSITY OF OREGON



Routing Security

- Routing Security best practices have been considered vital for the Internet's operation since the mid-1990s
- Now has a catchy title (Mutually Agreed Norms for Routing Security aka MANRS), but the fundamentals are the same
- Implement the MANRS recommendations:
 1. Prevent propagation of incorrect routing information
 2. Prevent traffic with spoofed source addresses
 3. Facilitate communication between network operators
 4. Facilitate validation of routing information



MANRS



UNIVERSITY OF OREGON



Routing Security

- Prevent propagation of incorrect routing information
 - Make sure your clients are only announcing their address space to you
 - Verify that it is indeed their address space and their ASN
 - If it is not listed in the RIR databases as theirs, do **NOT** route it
 - Make sure you are only announcing your and your clients' address space to upstreams and peers
 - Make sure you only accept prefixes you expect from your peers
 - Make sure you do not allow unassigned or reserved addresses and ASNs
- This means:
 - Filter **ALL** EBGP sessions
 - Be aware: most BGP implementations are **permissive** by default



UNIVERSITY OF OREGON



Routing Security

- Prevent traffic with spoofed source addresses
 - We have had a tool for this since the late 1990s – it is called “Unicast Reverse Path Forwarding” and is implemented in the hardware of router platforms
 - Do **NOT** buy access routers that cannot do uRPF regardless of what the vendor tells you
 - uRPF must be implemented on all edge facing interfaces, whether access customers, datacentre customers, wireless customers,...
 - Implementing uRPF will go a long way to help global efforts to deal with the menace of denial-of-service attacks
 - How good is your network?
 - <https://www.caida.org/projects/spoofer/>



UNIVERSITY OF OREGON



Routing Security

- Facilitate communication between network operators
 - Know how to get hold of the NOC of your peers and upstreams
 - Make sure you have a PeeringDB entry
 - If you have an ASN, create an entry, even if you aren't at a peering point or a data centre – it is visibility!
 - Make sure your organisation's technical contact details are up to date for your IP address and ASN holdings at your RIR (Route and AS-Objects)
 - Take part in your local network operator group/online network forum
 - Don't hide away, and then expect the world to help you when you have a problem



UNIVERSITY OF OREGON



Routing Security

- Facilitate validation of Routing information
 - Route Origin Authorisation has been available and deployable since 2013
 - All entities with IP address holdings must sign their ROAs
 - The ROA is a cryptographically signed object linking the IP address being announced to the ASN originating it.
 - Network operators are widely encouraged to drop invalid ROAs
 - This is a route which has either the incorrect origin ASN or incorrect subnet size when compared with existing ROAs
 - Many operators drop invalids, more need to – this is called Route Origin Validation
 - This stops incorrect announcements from appearing and propagating across the Internet routing system



UNIVERSITY OF OREGON



How to implement Routing Security

- Check operational best current practices and ensure that routing equipment deployed is up to date with the latest BGP features
- Sign your ROAs at your RIR
- Deploy ROV in your network
 - Especially if you are a transit provider, carry the full BGP table, etc
- Take part in your NOG community
 - Hiding away out of sight will not help you when you have a routing security issue that you need the community to assist with fixing



UNIVERSITY OF OREGON



Routing in the Pacific

- Routing Security should be top-most of all network operator's daily concerns
- However, the global routing table shows this is simply not the case
- Global IPv4 Routing Table is growing...
 - Yet IPv4 address space is more or less exhausted
- Global IPv6 Routing Table is growing...
 - Is IPv6 deployment still in full swing though?
- My concern: the Pacific region is getting more and better connections, with high bandwidths – this makes the Pacific a more lucrative target for bad people!



UNIVERSITY OF OREGON



IPv4 Routing Report 20th November 2025 (Tokyo)

BGP routing table entries examined:	1014091
Prefixes after maximum aggregation (per Origin AS):	393034
Deaggregation factor:	2.58
Unique aggregates announced (without unneeded subnets):	502002
Number of IPv4 prefixes with a valid ROA:	583550
Number of IPv4 prefixes with an invalid ROA:	1454
Number of IPv4 prefixes with no ROA:	429087
Total ASes present in the Internet Routing Table:	77559
Prefixes per ASN:	13.08
Origin-only ASes present in the Internet Routing Table:	66612
Origin ASes announcing only one prefix:	27088
Transit ASes present in the Internet Routing Table:	10947
Transit-only ASes present in the Internet Routing Table:	551
Average AS path length visible in the Internet Routing Table:	4.7
Max AS path length visible:	57
Max AS path prepend of ASN (37447)	53
Prefixes from unregistered ASNs in the Routing Table:	1045
Number of instances of unregistered ASNs:	1084
Special use prefixes present in the Routing Table:	1
Prefixes being announced from unallocated address space:	497
Number of addresses announced to Internet:	3103122048
Equivalent to 184 /8s, 245 /16s and 226 /24s	
Total number of prefixes smaller than registry allocations:	332732

Global per AS IPv4 prefix count summary

ASN	No of nets	/20 equiv	Max Agg	Description
16509	14203	37116	5388	AMAZON-02, US
9808	13464	8760	120	CHINAMOBILE-CN China Mobile Communications Group
8151	12561	3317	579	UNINET, MX
12479	7295	1711	149	UNI2-AS, ES
7545	6068	833	595	TPG-INTERNET-AP TPG Telecom Limited, AU
4538	5014	4193	77	ERX-CERNET-BKB China Education and Research Netw
39891	4833	298	66	ALJAWWALSTC-AS, SA
11492	4789	317	804	CABLEONE, US
22773	4701	3111	366	ASN-CXA-ALL-CCI-22773-RDC, US
9498	4534	539	317	BBIL-AP BHARTI Airtel Ltd., IN
9009	4023	382	2287	M247, RO
7552	3979	1332	28	VIETEL-AS-AP Viettel Group, VN
7155	3861	286	85	VIASAT-SP-BACKBONE, US
20940	3860	3395	126	AKAMAI-ASN1, NL
7713	3715	1044	66	TELKOMNET-AS-AP PT Telekomunikasi Indonesia, ID
6327	3691	1320	83	SHAW, CA
10620	3458	463	1101	Telmex Colombia S.A., CO
45899	3325	1869	99	VNPT-AS-VN VNPT Corp, VN
396982	3298	4860	477	GOOGLE-CLOUD-PLATFORM, US
56046	3246	827	182	CMNET-JIANGSU-AP China Mobile communications cor



UNIVERSITY OF OREGON

AfriNIC APNIC ARIN LACNIC RIPE NCC



What about IPv6 ?

IPv6 Routing Report 20th November 2025 (Singapore)

BGP routing table entries examined:	225678
Number of IPv6 prefixes with a valid ROA:	144758
Number of IPv6 prefixes with an invalid ROA:	1017
Number of IPv6 prefixes with no ROA:	79903
Total ASNs present in the IPv6 Routing Table:	35444
Average AS path length:	4.6
Longest AS path:	34
Total Origin ASNs present in the IPv6 Routing Table:	35098
Paths with bogon ASNs present in the IPv6 Routing Table:	7



UNIVERSITY OF OREGON



Global IPv6 per AS prefix count summary (Singapore)

ASN	No of Nets	Description
9808	6964	CHINAMOBILE-CN China Mobile Communications Group Co., Ltd., CN
16509	5387	AMAZON-02, US
7552	3958	VIETEL-AS-AP Viettel Group, VN
45609	3562	BHARTI-MOBILITY-AS-AP Bharti Airtel Ltd. AS for GPRS Service, IN
18403	3395	FPT-AS-AP FPT Telecom Company, VN
13335	2629	CLOUDFLARENET, US
11172	2077	Alestra, S. de R.L. de C.V., MX
39891	2010	ALJAWWALSTC-AS, SA
56041	1749	CMNET-ZHEJIANG-AP China Mobile communications corporation, CN
24547	1735	CMNET-V4HEBEI-AS-AP Hebei Mobile Communication Company Limited, CN
32098	1629	TRANSTELCO-INC, US
17622	1618	CNCGROUP-GZ China Unicom Guangzhou network, CN
36183	1610	AKAMAI-AS, US
28573	1578	Claro NXT Telecomunicacoes Ltda, BR
6167	1459	CELLCO-PART, US
12479	1423	UNI2-AS, ES
56046	1421	CMNET-JIANGSU-AP China Mobile communications corporation, CN
17072	1403	TOTAL PLAY TELECOMUNICACIONES SA DE CV, MX
38266	1389	VIL-AS-AP Vodafone Idea Ltd, IN
47331	1256	TTNET, TR



UNIVERSITY OF OREGON

AfriNIC APNIC ARIN LACNIC RIPE NCC



Non-routable ASNs

Network	Path
N*> 64.76.168.0/24	2914 3356 19583 650950000 650950004
N*> 143.68.201.0/24	2914 3356 721 721 27064 1540 421005094 421005093 421005092 421005091 421005124 421005123 421005122 421005121
N*> 143.68.202.0/24	2914 3356 721 721 27064 1540 421005094 421005093 421005092 421005091 421005134 421005133 421005132 421005131
N*> 143.68.203.0/24	2914 3356 721 721 27064 1540 421005094 421005093 421005092 421005091 421005144 421005143 421005142 421005141
N*> 143.68.204.0/23	2914 3356 721 721 27064 1540 421005094 421005093 421005092 421005091 421005154 421005153 421005152 421005151
V*> 154.81.158.0/24	138128 1411109 141109 141109
N*> 195.12.105.0/24	6461 9002 35168 21299 15549 4000010001

Network	Path
V*> 2620:131:3009::/48	2914 6453 4755 58419 58419 58419 58419 584195 58419 58419 58419 58419



Documentation ASN

IANA Reserved ASN

Private ASN



UNIVERSITY OF OREGON



IPv4 Prefixes using Deprecated AS_SET

Net Originated	AS Path
5.1.48.0/21	2497 12389 15493 {8998}
5.10.23.0/24	2497 2914 60610 {12703}
8.41.202.0/24	2497 3356 30372 {40179}
14.141.135.0/24	2516 6453 4755 {30548}
15.0.64.0/18	2497 7018 33 13979 {8035}
15.8.64.0/18	2497 7018 33 13979 {8034,8035}
15.20.64.0/18	2516 1299 2686 2154 {21302}
15.36.64.0/18	2687 25888 {21326}
15.44.64.0/18	2687 25888 {21326}
20.137.160.0/20	2516 3356 206 {4237}
37.52.0.0/14	2497 174 6849 {6877}
38.225.68.0/22	2497 3257 26554 33125 {397171}
41.91.0.0/16	2516 6762 8452 24863 37069 {37069}
41.91.244.0/23	2497 5511 8452 24863 37069 37069 {37069}
41.128.181.0/24	2497 5511 24863 {6500}
...	
208.131.184.0/23	2497 1299 23520 30689 {10278,10292}
208.163.52.0/24	2497 174 23520 30689 {10278,10292}
209.137.136.0/21	2516 1299 4459 4459 4459 4459 4459 {32699}
209.137.141.0/24	2497 3356 4459 {32699}
212.47.156.0/24	2516 6762 34170 34170 {199524}
213.186.96.0/19	2516 1299 6849 {6877}
216.81.32.0/21	2516 1299 19366 {396975}
216.110.102.0/24	2497 1299 23520 14813 14813 14813 14813 14813 {11139}
216.126.96.0/20	2497 577 22573 {6058}
216.126.104.0/22	2497 577 22573 {6058}
216.126.110.0/24	2497 577 22573 {6058}
216.126.116.0/24	2497 577 22573 {6058}
216.221.208.0/22	2497 3356 26585 26585 {26585}
216.221.212.0/22	2497 3356 26585 26585 {26585}
216.221.220.0/22	2516 3356 26585 26585 {26585}
216.255.240.0/20	2516 3356 30444 {400908}

IPv6 Prefixes using Deprecated AS_SET

Net Originated	AS Path
2001:480:240::/48	2497 701 668 687 {687}
2001:510::/32	2497 6453 376 {36786}
2001:678:6d0::/48	2497 3216 212748 {212748}
2001:4220::/32	2497 174 8452 24835 {36935}
2402:4640::/33	2497 4788 38044 {23736}
2402:4640:8000::/33	2497 4788 38044 {23736}
2402:7500::/32	2497 9505 9924 9924 9924 9924 9924 9924 {24158}
2402:8100::/32	2497 3491 55644 {38266,45271}
2604:d440::/32	2497 2914 8151 396966 {19244}
2605:48c0::/32	2497 174 397504 {36040}
2605:ab80::/32	2497 3356 46792 {46792}
2606:7900::/32	2497 2914 26479 {397872}
2607:f390::/32	2497 3257 32440 {2055}
2607:f7a8:600::/39	2497 1299 46887 46887 {397488}
2607:f7a8:c00::/39	2497 1299 46887 46887 {21687}
2a00:6480::/32	2497 3320 35548 35548 35548 35548 {29018}
2a01:4a40::/29	2497 3257 44814 {214378}
2a02:6680::/32	2497 3257 8551 8551 8551 8551 16116 {211612}
2a03:6b00::/40	2497 3356 8529 48832 {36040,141180}
2a05:f940::/29	2497 1299 24785 39647 {16131}
2a07:41c0::/32	2497 3257 62240 {62240}
2c0f:ef68::/32	2497 174 37662 {211612}
2c0f:f088::/32	2497 3257 30844 328471 328471 328471 {36040,328471}



UNIVERSITY OF OREGON



List of Unregistered ASNs

The complete list in use:

940 1017 1277 1636 1782 3744 4846 4879 4883 6081 6485 6565 7064 10425 11011 11044 11072 11091 11223 11490 11575
11610 11618 11636 11835 11969 12114 12140 12240 13339 13342 13492 13980 14167 14350 14461 14605 14727 14808 14902
14908 15178 15200 15220 15804 16546 16615 16666 16929 17219 18462 18591 18805 19081 19176 19202 19396 19507 19533
19629 19708 19926 20090 20210 20227 20263 20271 21649 21695 21861 21884 21942 22271 22272 22484 22538 22539 22733
22736 22774 22830 23021 23190 23288 23357 23411 23425 23448 23476 23658 23985 25600 25641 25647 25779 25800 25920
26016 26122 26171 26250 26295 26345 26443 26483 26582 26712 26758 26961 26971 27247 27289 27361 27470 27593 28144
28330 29763 29829 30004 30248 30384 30426 30442 30457 30550 31781 31806 31880 32068 32175 32187 32302 32510 32534
32596 32856 32916 33051 33223 33417 33484 33625 33640 33684 36102 36264 36304 36465 36528 36679 36831 36893 36900
36911 36928 37320 37434 37442 37476 37537 37586 37703 38055 40077 40186 40356 40600 40687 40726 40751 40804 40891
40920 40951 46086 46104 46123 46211 46224 46228 46472 46673 46676 46772 46815 46876 46913 47044 47089 52760 52845
52879 53367 53419 53657 53715 53737 53771 53775 53810 53929 53947 54215 54231 54278 54338 54339 54739 54779 55015
55069 55203 61760 62641 62770 62801 62820 62964 63277 63387 63401 64011 64339 65100 65540 65542 65547 65555 65593
65777 65778 65782 65989 66500 66666 132387 135323 137518 138030 139303 140094 140230 140865 149438 150698 151615
204653 227171 255546 262318 262509 262640 262745 262947 262992 263364 264136 264177 264493 265039 265056 265441
266151 266224 266404 266577 267170 267645 268858 269036 269049 269275 270291 270666 270715 270749 270773 272681
273693 297889 327869 327878 327933 328007 328144 328149 328226 328248 328485 328771 329008 364344 393266 393305
393476 393515 393614 393808 394108 394140 394187 394260 394293 394374 394402 394634 394713 394721 394754 394936
394939 395195 395270 395293 395312 395350 395376 395377 395406 395527 395531 395557 395667 395697 395888 395908
395930 396314 396324 396330 396334 396426 396831 396894 397157 397461 397492 398120 398213 398282 398294 398474
398829 399382 399618 400274 400565 1411109 650950000 650950004 421005091 421005092 421005093 421005094 421005121
421005122 421005123 421005124



UNIVERSITY OF OREGON



Number of IPv4 prefixes announced by prefix length

/1:0	/2:0	/3:0	/4:0	/5:0	/6:0	/7:0	/8:18
/9:14	/10:41	/11:94	/12:297	/13:580	/14:1194	/15:2095	/16:13702
/17:8292	/18:13566	/19:24983	/20:45330	/21:52520	/22:113291	/23:105177	/24:632200
/25:697	/26:0	/27:0	/28:0	/29:0	/30:0	/31:0	/32:0

20th November 2025 ↑

20th November 2024 ↓

/1:0	/2:0	/3:0	/4:0	/5:0	/6:0	/7:0	/8:16
/9:16	/10:36	/11:91	/12:295	/13:576	/14:1169	/15:2056	/16:13178
/17:8288	/18:13751	/19:24598	/20:45074	/21:52400	/22:112395	/23:100552	/24:592557
/25:669	/26:0	/27:0	/28:0	/29:0	/30:0	/31:0	/32:0



UNIVERSITY OF OREGON



Number of IPv6 prefixes announced by prefix length

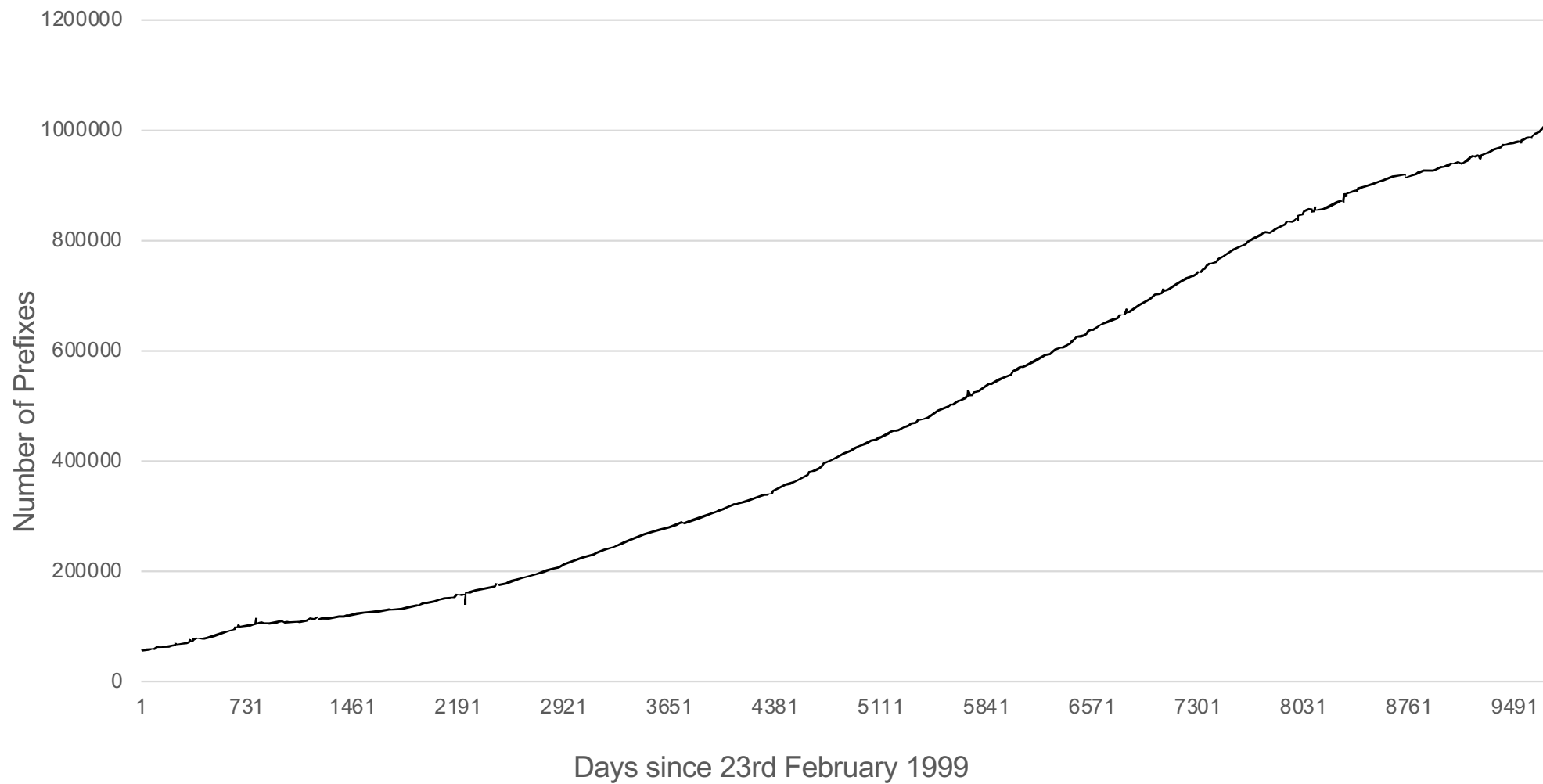
/16:1	/17:0	/18:0	/19:1	/20:14	/21:3	/22:6	/23:6
/24:40	/25:11	/26:19	/27:19	/28:151	/29:5112	/30:793	/31:342
/32:25789	/33:4170	/34:3866	/35:1467	/36:8216	/37:1110	/38:2462	/39:1734
/40:21110	/41:1535	/42:2830	/43:1271	/44:21895	/45:3928	/46:4815	/47:6906
/48:100837	/49:0	/50:0	/51:1	/52:4	/53:1	/54:0	/55:0
/56:31	/57:0	/58:0	/59:0	/60:0	/61:0	/62:0	/63:0
/64:291							

20th November 2025 ↑

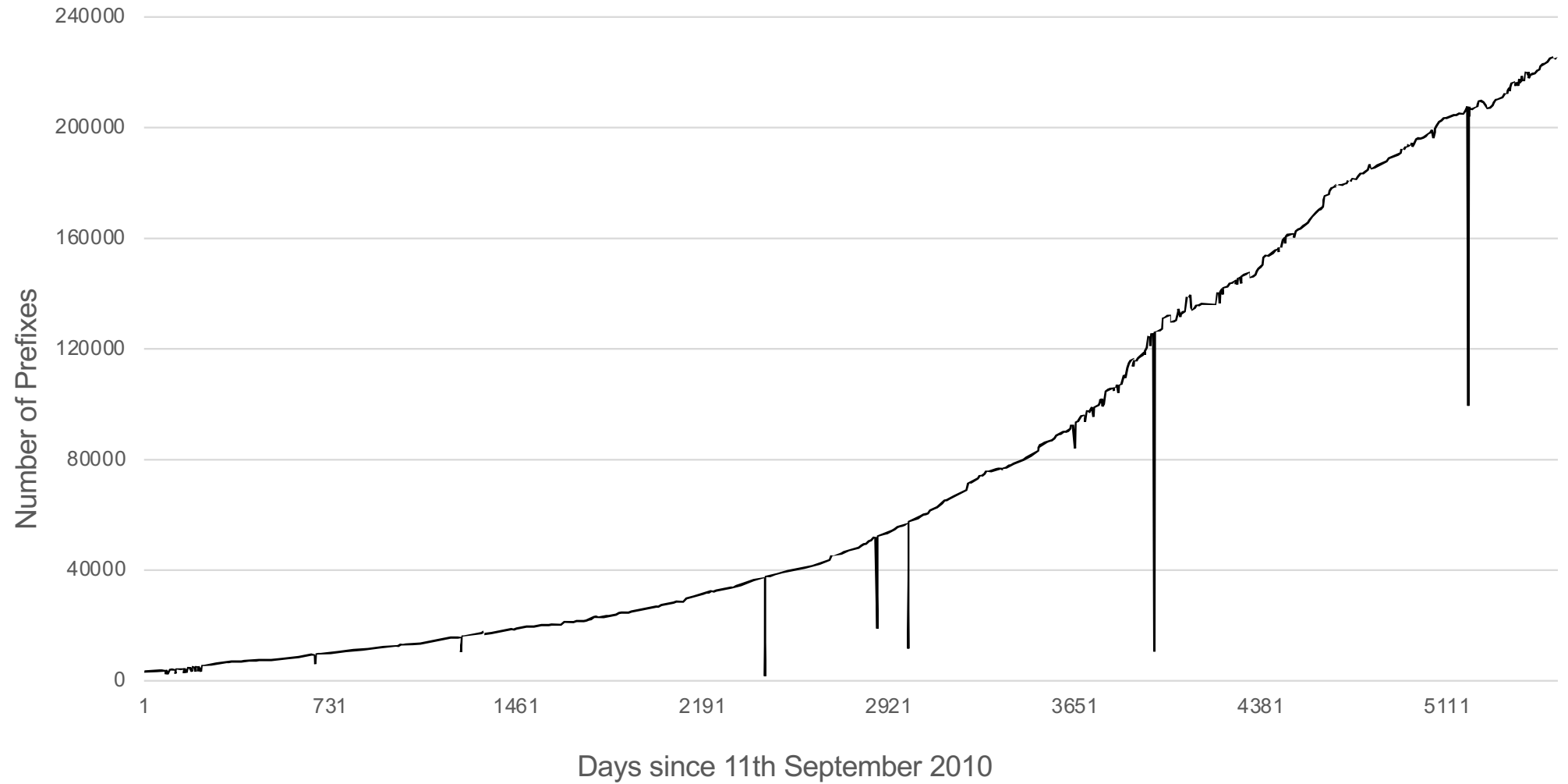
20th November 2024 ↓

/16:1	/17:0	/18:0	/19:1	/20:13	/21:3	/22:6	/23:7
/24:33	/25:11	/26:20	/27:20	/28:149	/29:5327	/30:608	/31:335
/32:24868	/33:3852	/34:3422	/35:1182	/36:7284	/37:1028	/38:2109	/39:1591
/40:18199	/41:1242	/42:2395	/43:1086	/44:19467	/45:2610	/46:4073	/47:5932
/48:95280	/49:1	/50:0	/51:3	/52:50	/53:3	/54:2	/55:4
/56:46	/57:2	/58:2	/59:2	/60:1	/61:0	/62:0	/63:0
/64:683							

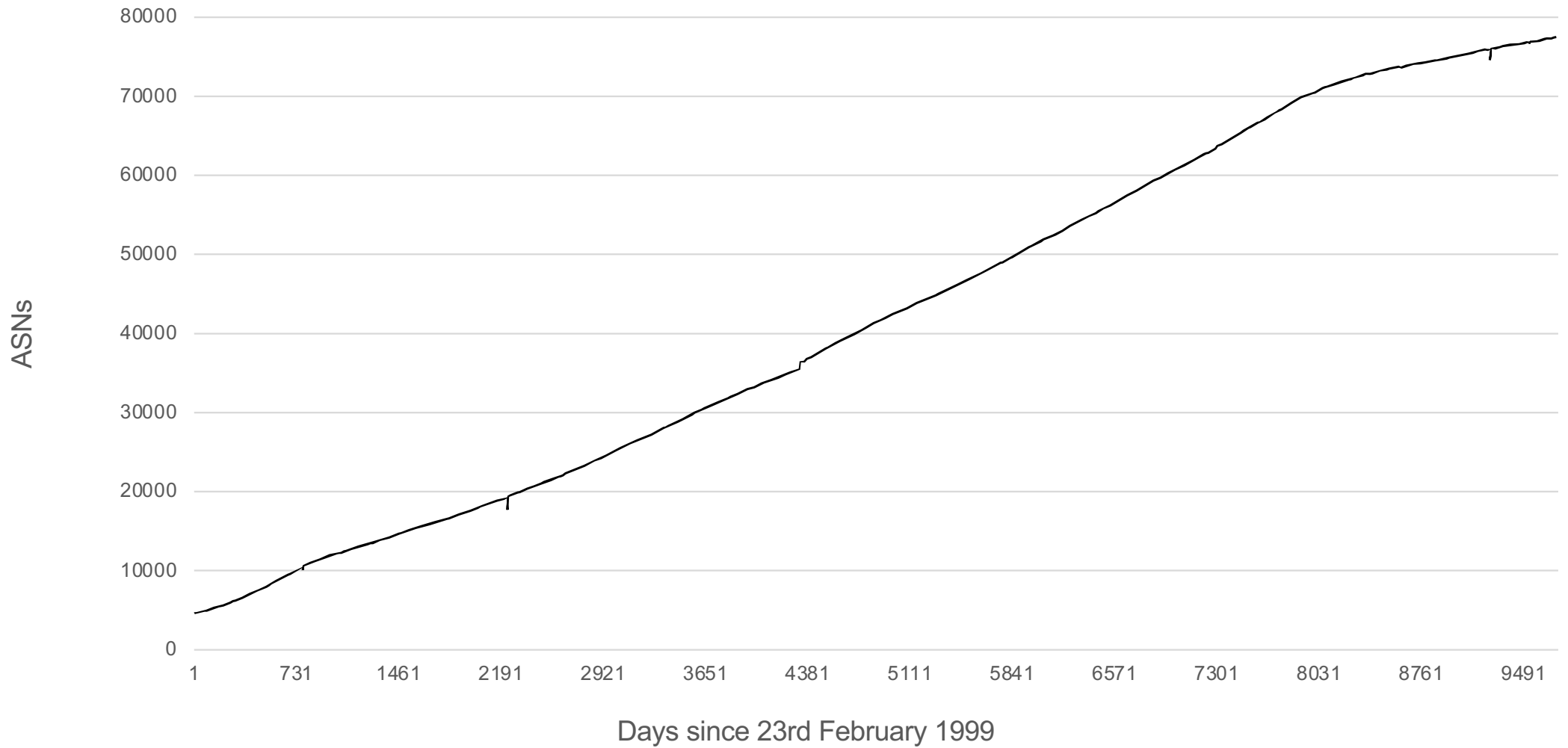
Global IPv4 Routing Table



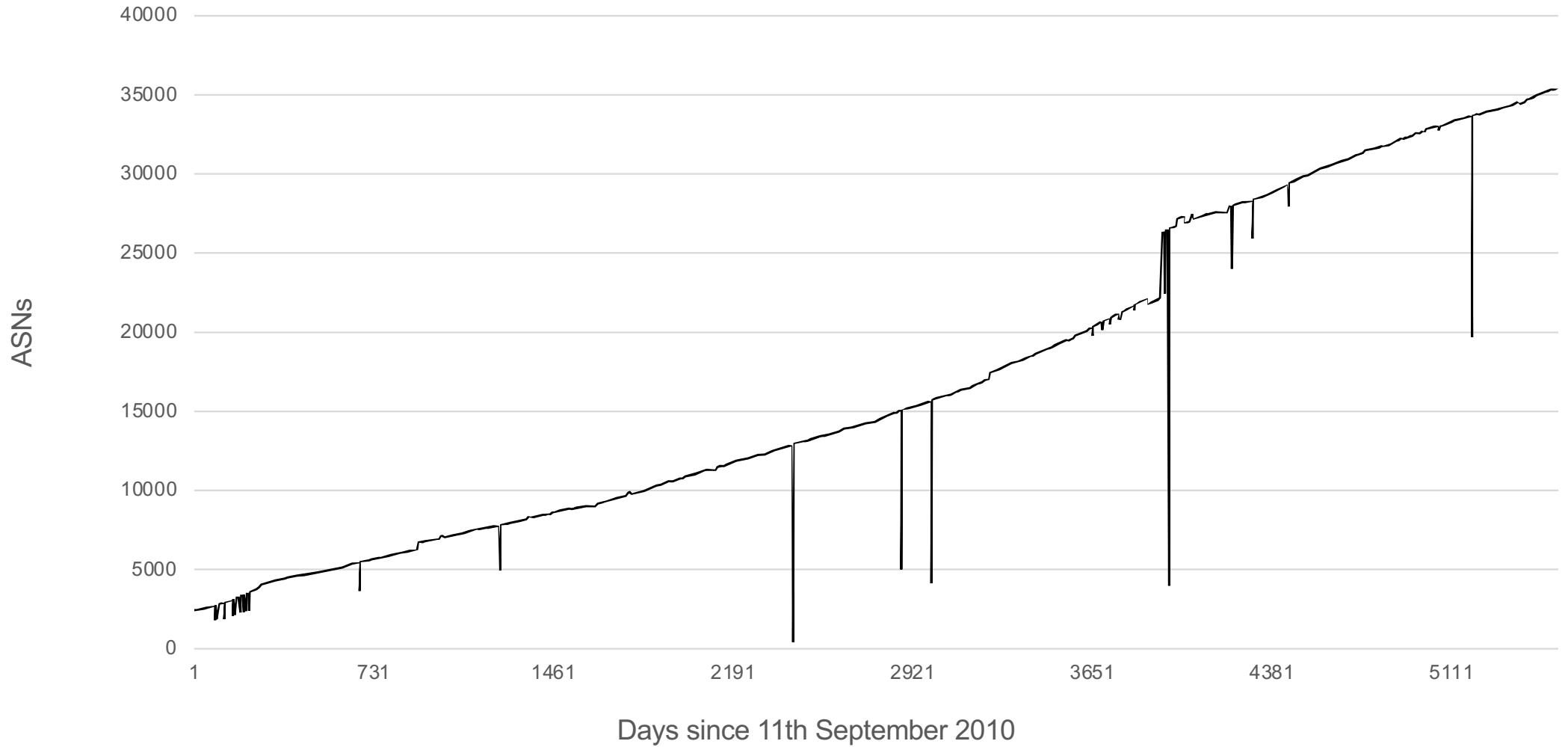
Global IPv6 Routing Table



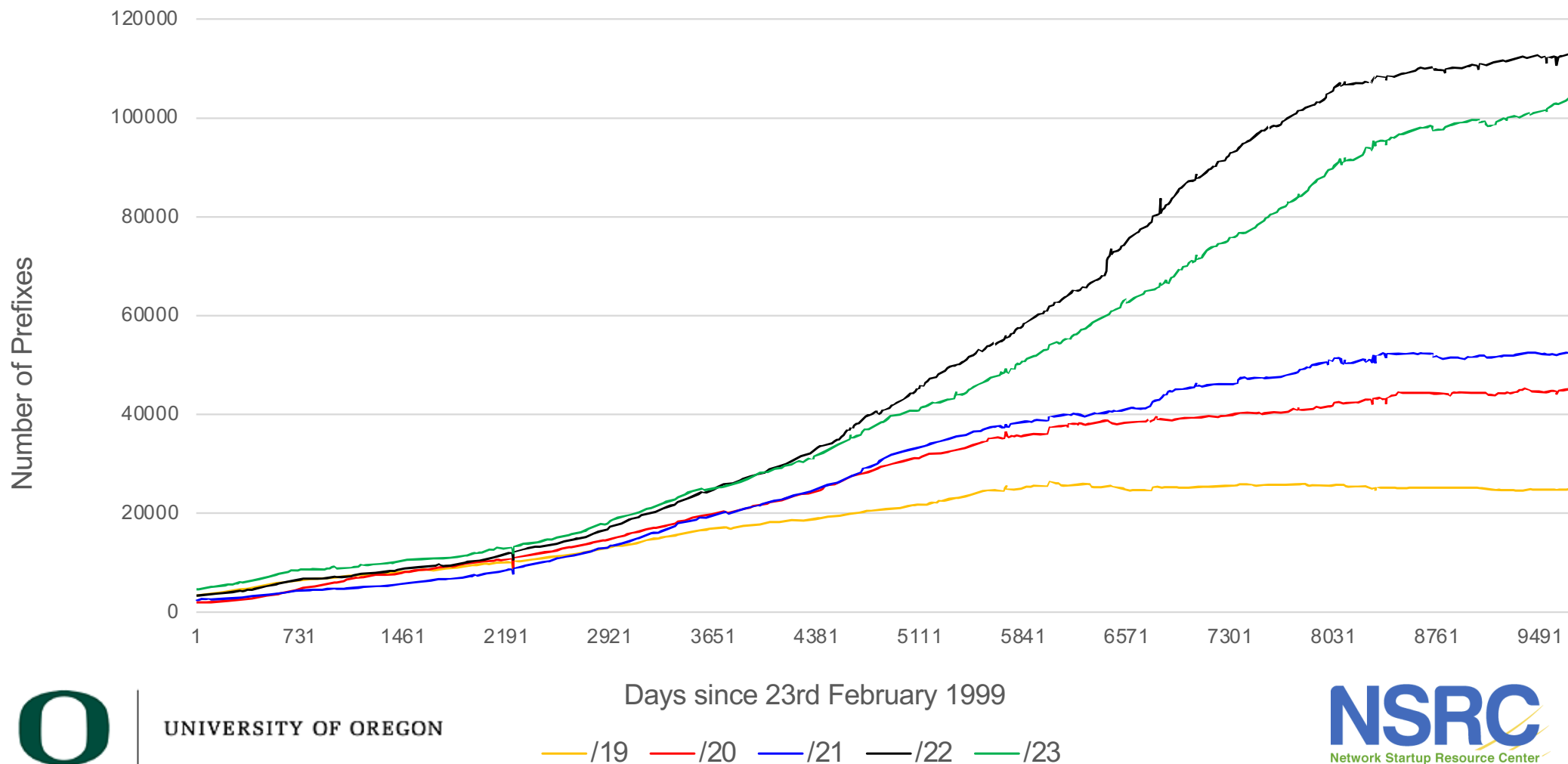
IPv4 AS Growth



IPv6 AS Growth



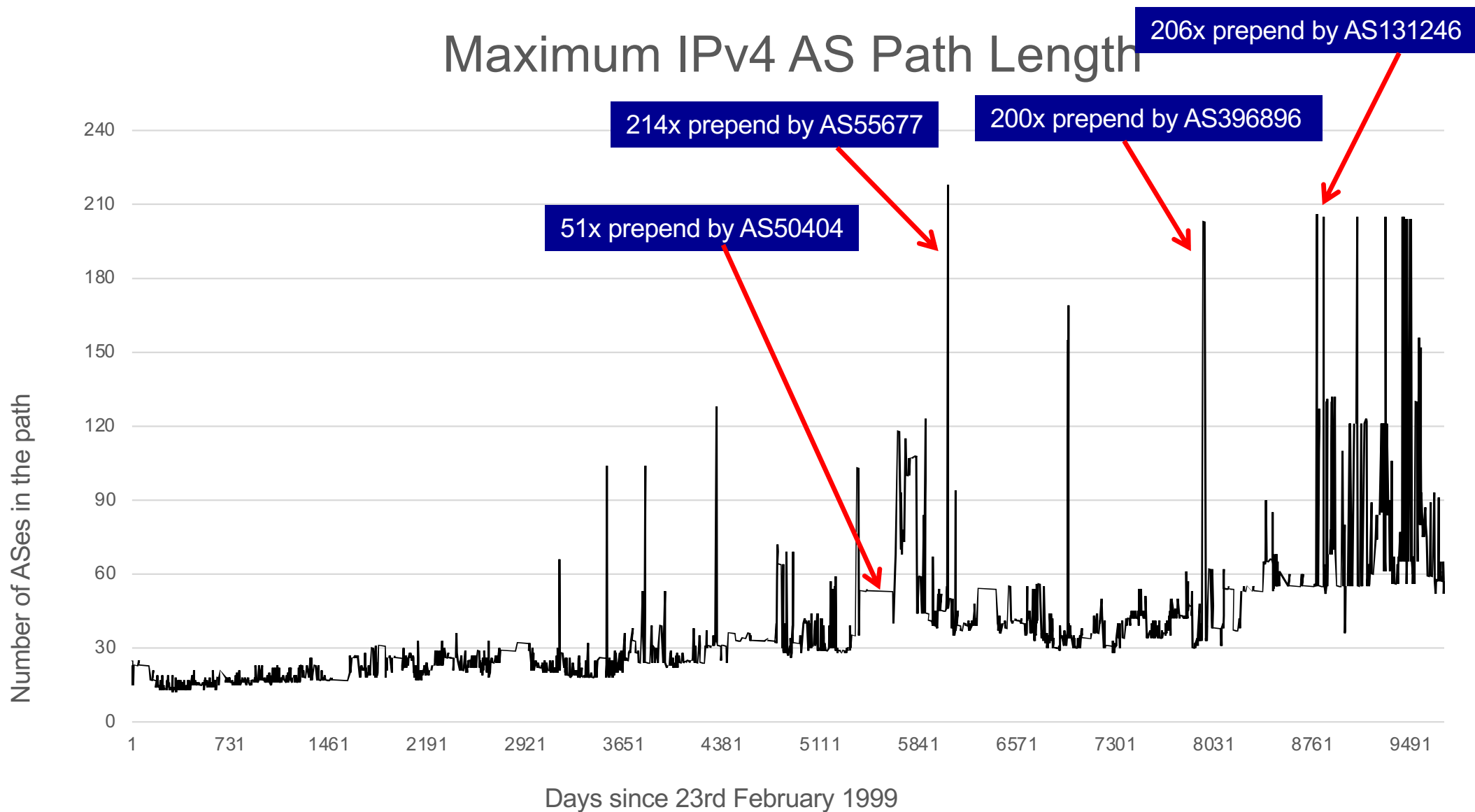
IPv4 Prefix sizes announced



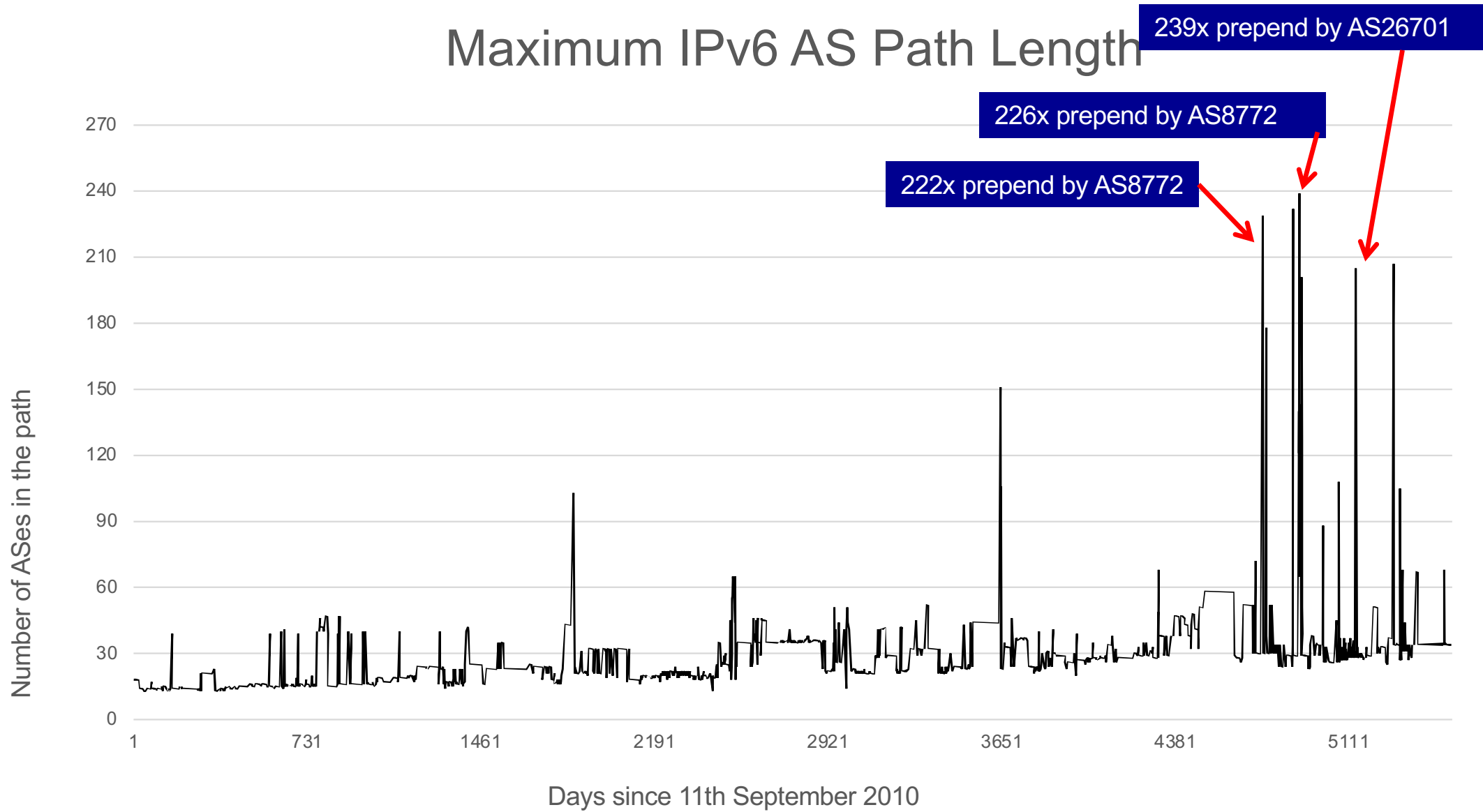
UNIVERSITY OF OREGON



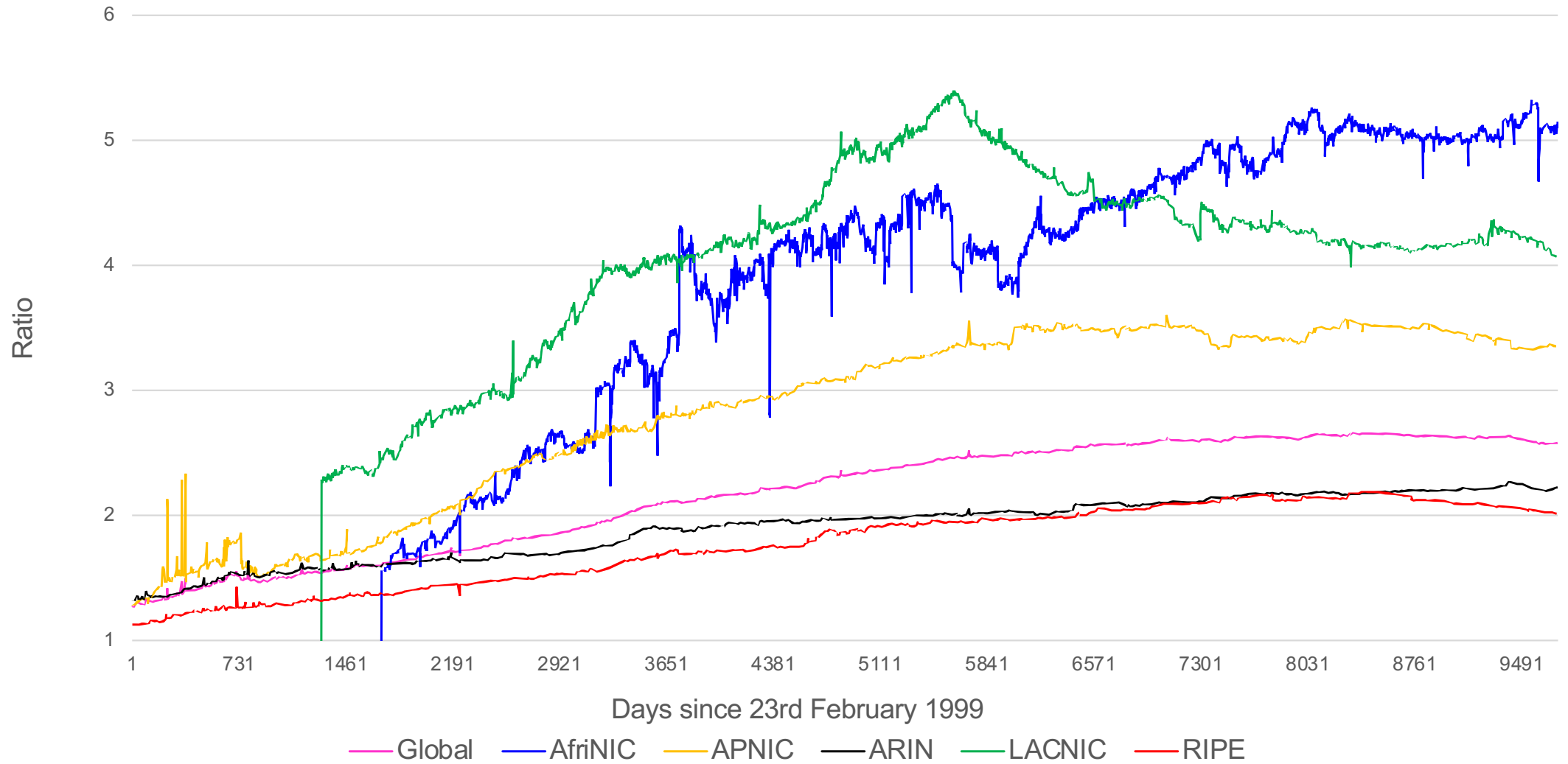
Maximum IPv4 AS Path Length



Maximum IPv6 AS Path Length



Deaggregation: RIR Regions vs Global



American Samoa Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
23657	41	3	5	BLUESKY-AS-AP Blue Sky Communications, AS
9751	20	1	14	ASTCA-AS-AP AMERICAN SAMOA TELECOMMUNICAT

Cook Islands Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
10131	18	2	1	CKTELECOM-CK-AP Telecom Cook Islands, CK
152093	1	0	1	VAKANETLIMITED-AS-AP VakaNet Limited, CK

FSM Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
45193	5	0	3	AS45193 FSM Telecommunications Corporatio
139759	3	1	3	FMTELECOM-AS-AP FSM Telecommunications Co
38875	3	1	3	AS38875 FSM Telecommunications Corporatio
58524	2	0	2	AS58524 FSM Telecom, FM
142139	1	0	1	BOOMINC-AS-AP Boom! Inc., FM



UNIVERSITY OF OREGON



Fiji Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
4638	93	6	9	IS-FJ-AS Telecom Fiji Limited, FJ
38442	25	5	4	VODAFONEFIJI-AS-FJ Vodafone Fiji Limited,
45355	9	3	7	DIGICELPACIFIC-1-AP Digicel Fiji Limited,
141470	7	1	1	GOVNET-AS-AP ITC Services, FJ
45349	6	0	3	TFL-AS-AP Telecom Fiji Ltd, FJ
9241	5	3	2	FINTEL-FJ Fiji International Telecommunica
135647	2	0	2	AFL-AS-AP Airports Fiji Limited, FJ
149429	1	0	1	RBOF-AS-BRS Reserve Bank of Fiji, FJ
137890	1	0	1	WALESILTD-AS-AP Walesi Ltd, FJ
136921	1	0	1	FNU-AS-AP Fiji National University, FJ
132248	1	0	1	RBOF-AS-AP Reserve Bank of Fiji, FJ
24390	1	16	1	USP-AS-AP The University of the South Pac

French Polynesia Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
9471	212	15	11	ONATI-AS-AP ONATI, PF
56017	23	1	4	VITI-AS-PF VITI, PF
138179	12	1	6	PMT-AS-AP PACIFIC MOBILE TELECOM, PF
55943	6	2	4	ONATI-AS-AP ONATI, PF
139263	1	0	1	UDLPF-AS-AP Universite de la Polynesie Fr

Guam Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
3605	23	23	9	ERX-KUENTOS-AS Guam Cablevision, LLC., GU
9246	10	9	8	GTA-AP Teleguam Holdings, LLC, GU
395400	6	16	2	UNIVERSITY-GUAM, GU
17456	5	1	5	PDSGUAM-USTransport-AS-GU-AP Pacific Data
152735	1	0	1	CPDCL-AS-AP Guam Exchange, GU
56200	1	0	1	GCC-NETOPS-GU Guam Community College, GU
23676	1	0	1	MARIIX-GU Mariana Islands Internet Exchan

Kiribati Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
134783	8	1	3	ATHKL-AS-AP Amalgamated Telecom Holdings
154100	1	0	1	BNL-KIR1-AS-AP BNL Tarawa, KI
132486	1	0	1	OCEANLINKLTD-AS-AP OCEAN LINK LTD, KI

Marshall Islands Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
24439	14	1	5	NTAMAR-AS-AP MARSHALL ISLANDS NTA ISP AS
213205	7	0	6	COOLBE-CA, MH
205009	2	0	2	HDMS, MH
50183	1	1	1	CENTURY-LTD, MH

Nauru Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
140504	5	0	5	DIGICELNAURU-AS-AP Digicel Nauru Corporat
55722	4	2	1	CENPAC-AS-AP Cenpac Net Inc, NR
141368	3	0	1	ICT-NR-AS-AP ICT, NR

New Caledonia Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
18200	16	10	7	OPT-NC-AS-AP Office des Postes et Telecom
56089	8	9	7	OFFRATEL-AS-AP OFFRATEL, NC
17480	8	6	7	CANL CANL, NC
56055	5	4	5	MLS-NC Micro Logic Systems, NC
45345	5	3	5	NAUTILE-NC-AS-AP Nautile, NC
136402	3	0	1	NTL-NC-AS-AP Nautile SARL, NC
134405	3	0	2	DATASERVICESPACIFIC-AS-AP Data Services
141695	2	0	2	PACIFICCOMMUNITY-AS-AP Pacific Community,
45461	2	1	2	TELENET-AS-AP TeleNet, NC
147030	1	0	1	MYNET-AS-AP Mynet, NC
141197	1	0	1	PACIFICCOMMUNITY-AS-AP Pacific Community,
140718	1	0	1	EPI-AS-AP ENGIE PACIFIQUE INFORMATIQUE,
137243	1	0	1	ISI-AS-AP INGENIERIE DES SYSTEMES DES INF
131248	1	0	1	CANL-PRO GOTV, NC

Niue Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
55885	5	0	1	ISP-NU No. 1 Commercial Center, NU

Northern Mariana Islands Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
7131	83	9	16	PTIPACIFICAINC-AS-AP PTI Pacifica Inc.

Palau Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
17893	7	1	3	PALAU-AS-AP Palau National Communications
133897	2	0	1	PEACCDPT-AS-AP Palau Equipment Co. Inc.,
58932	2	0	1	PMCI-AS-AP Palau Mobile Communications



UNIVERSITY OF OREGON



Papua New Guinea Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
58460	48	3	13	DIGICELPNG-AS-AP Digicel PNG Ltd, PG
55792	44	2	3	DATEC-PNG-AS-AP Datec-PNG, PG
38009	24	2	3	TELIKOM-PNG-AS-AP Telikom PNG Satellite
139898	17	1	5	DCL-AS-AP Digitec Communications Limited,
17828	10	3	6	PNGDATACOLIMITED-AS-PG PNG DATACO LTD, PG
134151	6	0	1	STC-AS-AP Steamships Ltd, PG
63945	6	0	2	DIGITECPNG-AS-AP Digitec PNG Limited, PG
136587	5	0	3	PNGDATACOLIMITED-AS-AP PNG DATACO LIMITED
136239	5	0	2	CLICKPACIFICLTD-AS-AP CLICK PACIFIC LTD,
133137	4	0	1	BEMOBILEPNG-AS-AP Bemobile LTD, PG
45924	3	1	2	GLOBAL-AS-AP Global Technologies Limited,
152477	2	0	1	LBL-AS-AP LOTIC Bige Limited, PG
151398	2	0	1	CCPL-AS-AP Credit Corporation PNG Limited
142269	2	0	2	KINA-AS-AP KINA BANK, PG
138506	2	0	2	PNTL-AS-AP PNG Nambawan Trophy Ltd, PG
137054	2	0	1	OCL-AS-AP OFC, PG
136940	2	0	1	COMSATLTD-AS-AP ComSat Ltd, PG
132786	2	0	2	BOPNG-AS-AP Bank of Papua New Guinea, PG
153781	1	0	1	WIL-AS-AP Wintop Investment Limited, PG
153621	1	0	1	GIT-AS-AP GIT LIMITED, PG
152655	1	0	1	DIGICELPNG-AS-AP Digicel PNG Ltd, PG
151647	1	0	1	RTD-AS-AP Rural Tech Development, PG
147024	1	0	1	BTLTB-AS-AP bikpla.net, PG
146949	1	0	1	NSFL-AS-AP National Superannuation Fund
140665	1	0	1	KINECTLIMITED-AS-AP KINECT LIMITED, PG
139783	1	0	1	GCL-AS-AP Genesis Communications PNG Limi
139778	1	0	1	CARPENTERS-AS-AP DALTRON, PG
138902	1	0	1	EMSTRET1-AS-AP Emstret Holdings Ltd, PG
136802	1	0	1	LHL-AS-AP LBP Holdings Limited, PG
134605	1	0	1	COMSERVPNGLTD-AS-AP Comserv PNG Ltd, PG

Samoa Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
17993	37	2	3	VODAFONESAMOA-AS-AP Vodafone Samoa Limit
38800	6	1	5	DIGICELSAMOA-WS-AS-AP Digicel Samoa Ltd,
38227	3	1	2	CSLSAMOA-WS-AS-AP Computer Services Limit
153053	1	0	1	LTSCl-AS-AP Lesamoa.net, WS
150321	1	0	1	SOTPREP-AS-AP Secretariat of the Pacific
139679	1	0	1	OEC-AS-AP Office of the Electoral Commiss

Solomon Islands Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
45891	28	2	2	SBT-AS-AP Solomon Telekom Co Ltd, SB
132468	7	1	5	SATSOL-NET-SB SATSOL LIMITED, SB
132462	4	0	1	BEMOBILESI-AS-AP Bemobile Solomon Islands
139609	2	0	1	SISCC-AS-AP Solomon Islands Submarine Cab
139277	2	0	1	SIG-AS-AP Solomon Islands Government ICT
134525	2	0	2	SBT-AS-AP Solomon Telekom Co Ltd, SB
24013	2	0	2	SB SB Professional Services, SB
150403	1	0	1	SINPF-AS-AP Solomon Islands National Prov
150349	1	0	1	PVEL-AS-AP Pacific Vaizeds Enterprise Ltd
142279	1	0	1	SOLITECHLTD-AS-AP Solitech Ltd, SB

Tokelau Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
55523	7	0	3	TELETOK-AS-AP Telecommunications Tokelau
198147	2	0	1	TK2, TK
57382	2	0	1	TK1, TK

Tonga Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
38201	11	1	4	KALIANET-PUBLIC-AS-AP Tonga Communication
132831	8	1	5	TOKOWIRELESSLTD-AS-AP TokoWireless Limite
38198	4	1	1	DIGICELNET-TO Digicel Tonga Ltd, TO
132579	2	0	2	TONGACABLELIMITED-AS-AP Tonga Cable Limit

Tuvalu Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
23917	6	2	1	TTC-AS-AP Tuvalu Telecommunications Corpo



UNIVERSITY OF OREGON



Vanuatu Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
9249	32	2	4	VUTELECOM-AS01-VU-AP Telecom Vanuatu Limi
43357	18	1	13	OWL Owl Limited, VU
45935	11	1	4	WNL-AS-AP Wantok Network Limited, VU
132429	4	0	3	DIGICELVANUATU-VU Digicel Vanuatu LTD, VU
132254	2	0	1	PRIMADC-AS-AP PRIMA DC LIMITED, VU
132228	2	0	2	VANGOV-AS-AP Vanuatu Government, VU
136996	1	0	1	PACIFICNETWORKS-AS-AP Pacific Networks,
133383	1	0	1	VANGOV-AS-AP Vanuatu Government, VU
132797	1	0	1	VANUATU-AS-AP Vanuatu Internet Exchange
45495	1	0	1	INTERCHANGE-AS-VU-AP Interchange Ltd., VU
23959	1	0	1	OWL-AS-AP Owl Limited, VU

Wallis & Futuna Aggregation Savings Summary

ASN	No of nets	/20 equiv	MaxAgg	Description
45879	14	1	3	OWF-AS-AP Orange Wallis & Futuna, WF



UNIVERSITY OF OREGON



Closing Observations

- Routing Security is not just filters on BGP sessions!
 - It is all about making serious efforts to stop the propagation of incorrect routing information
 - What are you doing about unassigned address space and ASNs?
 - Have you signed your ROAs and implemented ROV?
 - Have you implemented uRPF on your access?
- Routing Security and Routing Table growth go hand in hand
 - How is your aggregation looking?
 - Do you see the weird things shared in this presentation?
 - What's your plan now?



UNIVERSITY OF OREGON



Questions?

This document is a result of work by the Network Startup Resource Center (NSRC at <http://www.nsrc.org>). This document may be freely copied, modified, and otherwise re-used on the condition that any re-use acknowledge the NSRC as the original source.



UNIVERSITY OF OREGON

