



Weird and broken BGP on the Internet

Swinog 36, 14-Nov-2019
Martin Winter, Hurricane Electric



“Real-Time BGP Toolkit”

A quick Introduction

Traditional Looking Glass

Looking Glass

Welcome to Hurricane Electric's Network Looking Glass. The information provided by and the support of this service are on a best effort basis. These are some of our routers at core locations within our network. We also operate a public route server accessible via telnet at route-server.he.net.

Routers

Europe

☒ NIKHEF Amsterdam

☐ Itconic, Barcelona

☐ Telenor, Belgrade

☐ IPB CarrierColo Berlin

☐ Sitel, Bratislava

☐ Interxion Brussels

☐ NXDATA-1, Bucharest

☐ CE Colo Victor Hugo 1

☐ Interxion Copenhagen

☐ Interxion Dusseldorf

☐ Equinix Dublin (DB2)

☐ Interxion Frankfurt

☐ Equinix Geneva (GV1)

☐ GlobalConnect, Hamburg

Amsterdam, NL

Barcelona, ES

Belgrade, RS

Berlin, DE

Bratislava, SK

Zaventem, BE

Bucharest, RO

Budapest, HU

Copenhagen, DK

Düsseldorf, DE

Dublin, IE

Frankfurt, DE

Geneva, CH

Hamburg, DE

Commands

☐ Ping

☐ Traceroute

☐ BGP Route

☒ BGP Summary (IPv4)

☐ BGP Summary (IPv6)

Arguments

IP/Hostname:

☐ Raw output (no tables)

- ▶ **Classic Looking Glass shows view of single entity**
 - View of routing table from various location within the network of the same company

Traditional Looking Glass

core1.ams1.he.net> show ip bgp summary								
Local AS Number		6939						
Number of Neighbors Configured		972, 897 up						
Number of Routes Installed		3418476 (293988936 bytes)						
Number of Routes Advertised		120385048 (7191230 entries) (345179040 bytes)						
Number of Attribute Entries		758203 (68238270 bytes)						
Neighbor Address	ASN	State	Time	Rt:Accepted	Rt:Filtered	Rt:Sent	Rt:ToSend	
80.249.208.1	1200	ESTAB	30d18h48m	3	1	110649	0	
80.249.208.26	26496	ESTAB	25d22h39m	38	0	110649	0	
80.249.208.27	29075	ACTIV	457d 1h52m	0	0	0	110649	
80.249.208.29	8304	ESTAB	3d 0h 6m	23	0	110649	0	
80.249.208.30	8529	ESTAB	80d15h32m	302	0	110649	0	
80.249.208.32	12871	ESTAB	2d 9h29m	12	0	110649	0	
80.249.208.33	559	ESTAB	11d 0h49m	119	0	110649	0	
80.249.208.34	1103	ESTAB	3d22h59m	194	4	110649	0	
80.249.208.35	12859	ESTAB	40d11h50m	65	0	110649	0	
80.249.208.37	2686	ESTAB	38d19h12m	382	0	110649	0	
80.249.208.38	4589	ESTAB	80d15h32m	127	1	110649	0	

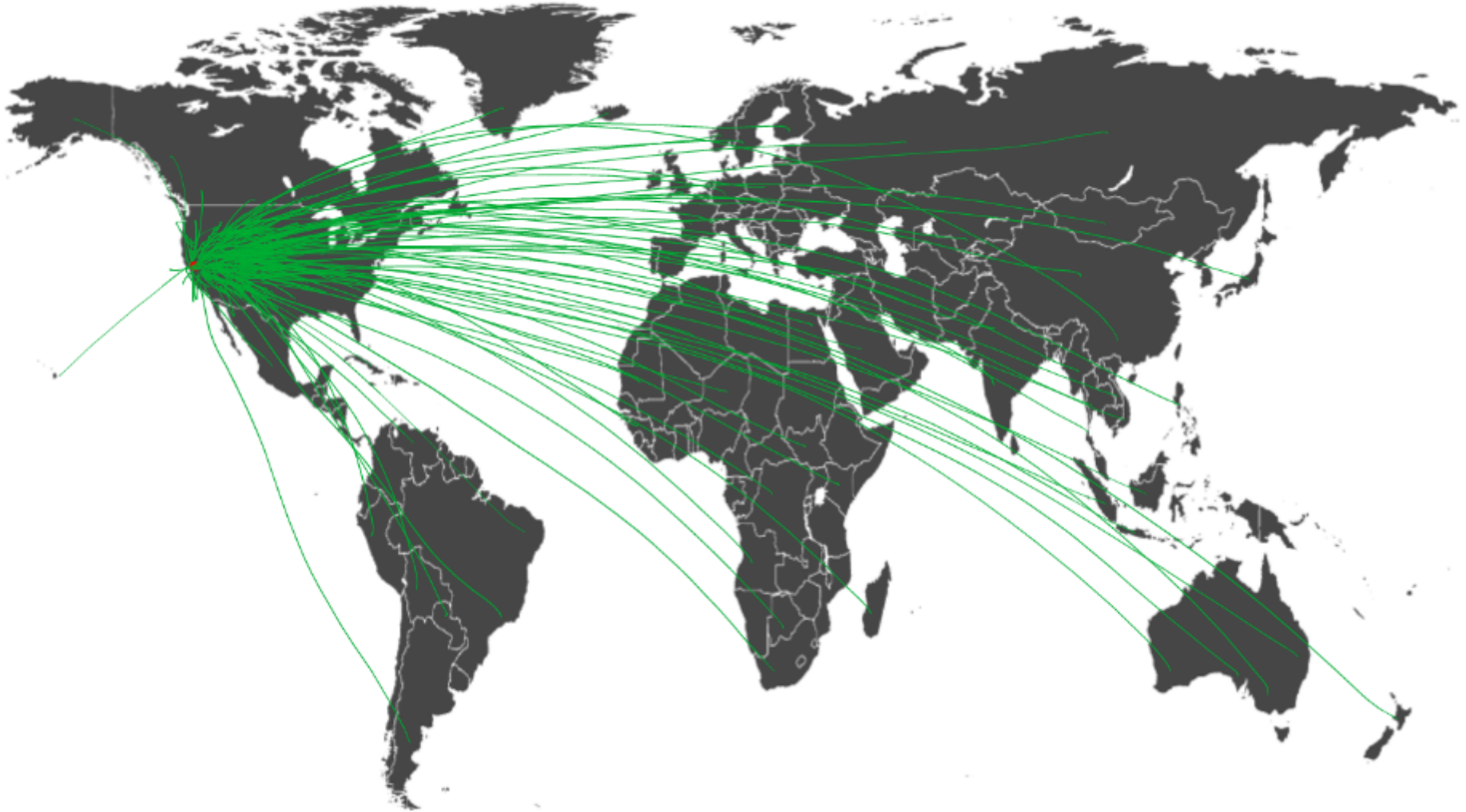
- ▶ **Classic Looking Glass mostly simple router output**
 - Showing current data from a single router at specific location.



“Real-Time BGP Toolkit”

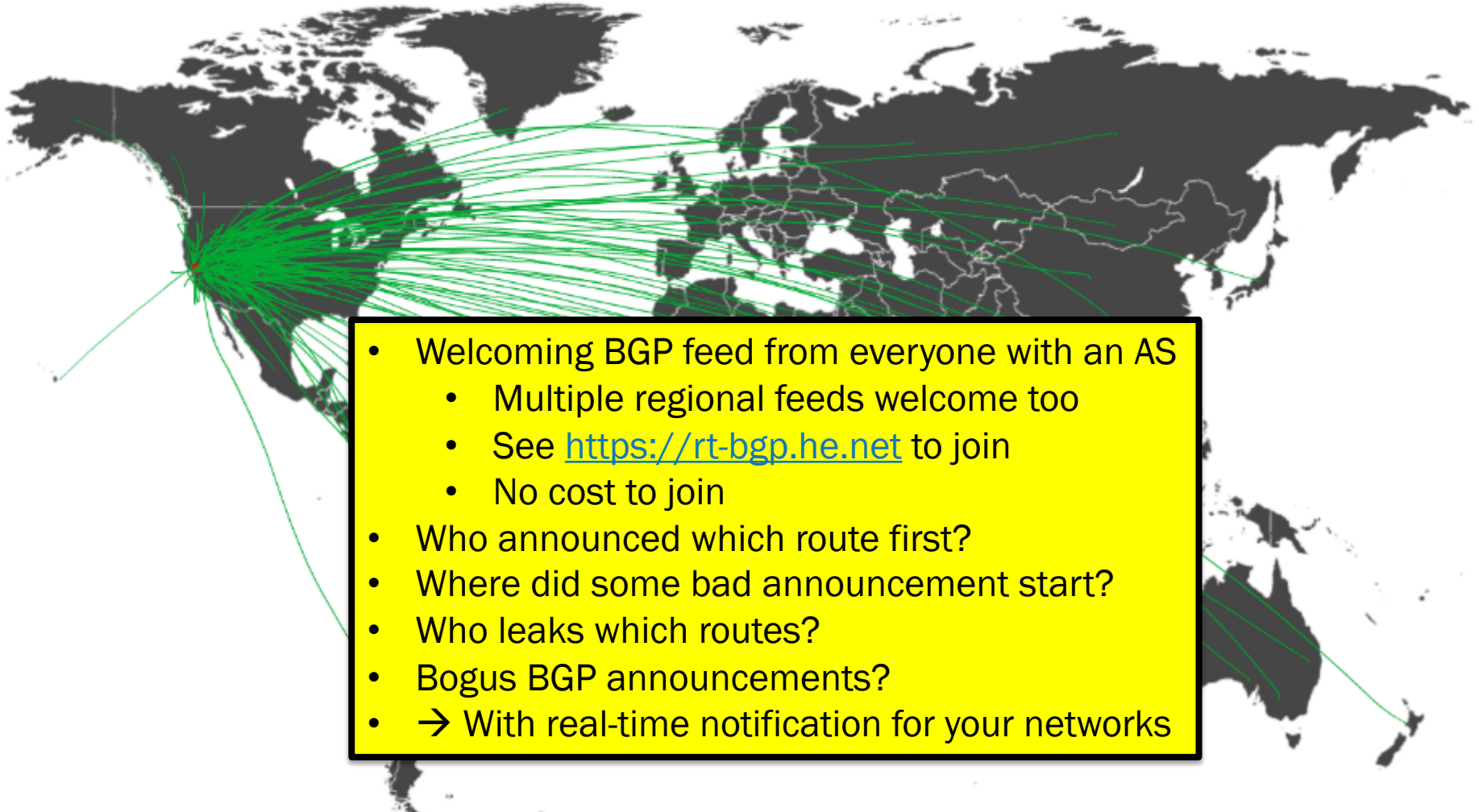
Breaking the single Entity view

Getting feeds from everywhere



Breaking the single Entity view

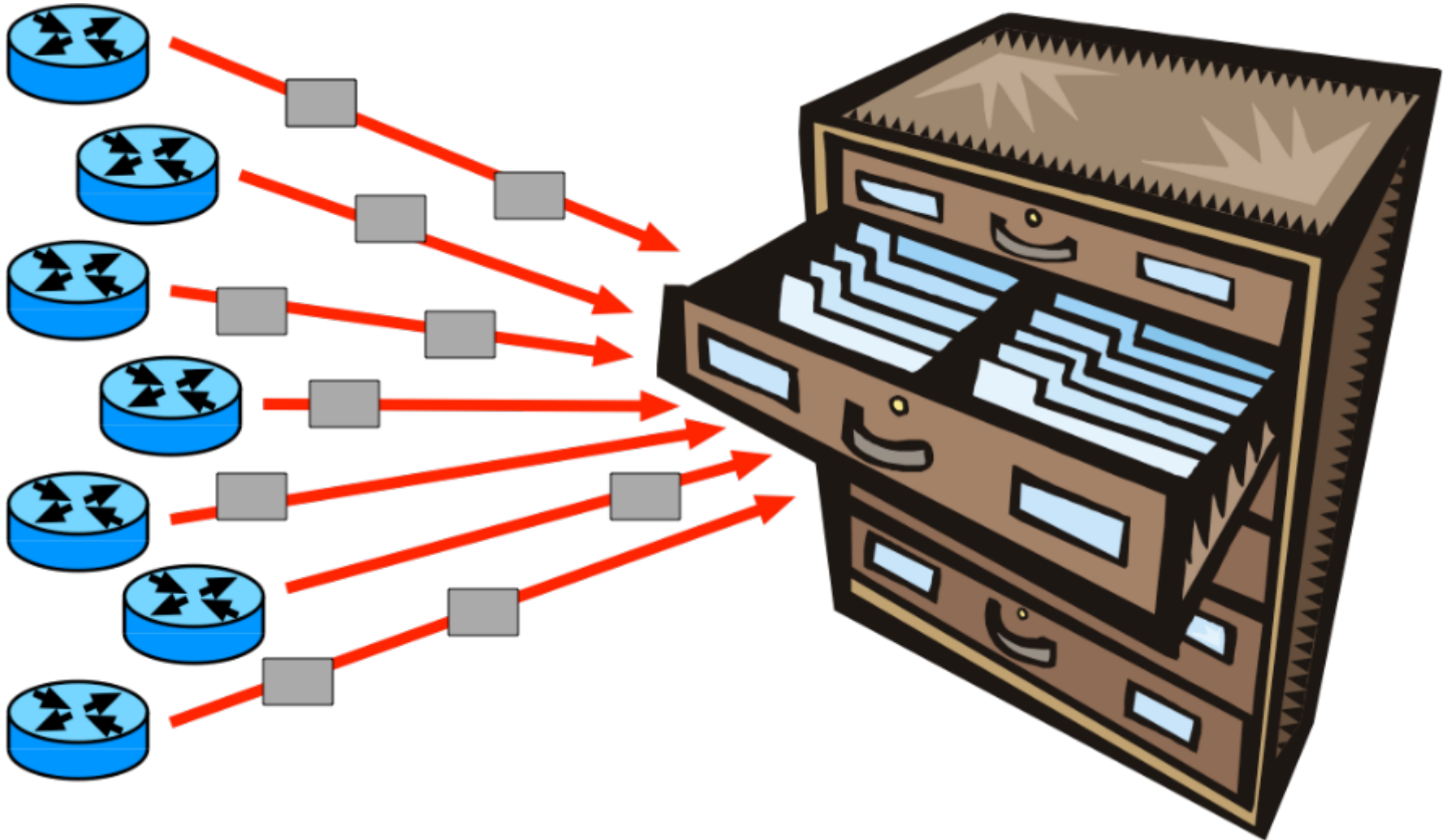
Getting feeds from everywhere



- Welcoming BGP feed from everyone with an AS
 - Multiple regional feeds welcome too
 - See <https://rt-bgp.he.net> to join
 - No cost to join
- Who announced which route first?
- Where did some bad announcement start?
- Who leaks which routes?
- Bogus BGP announcements?
- → With real-time notification for your networks

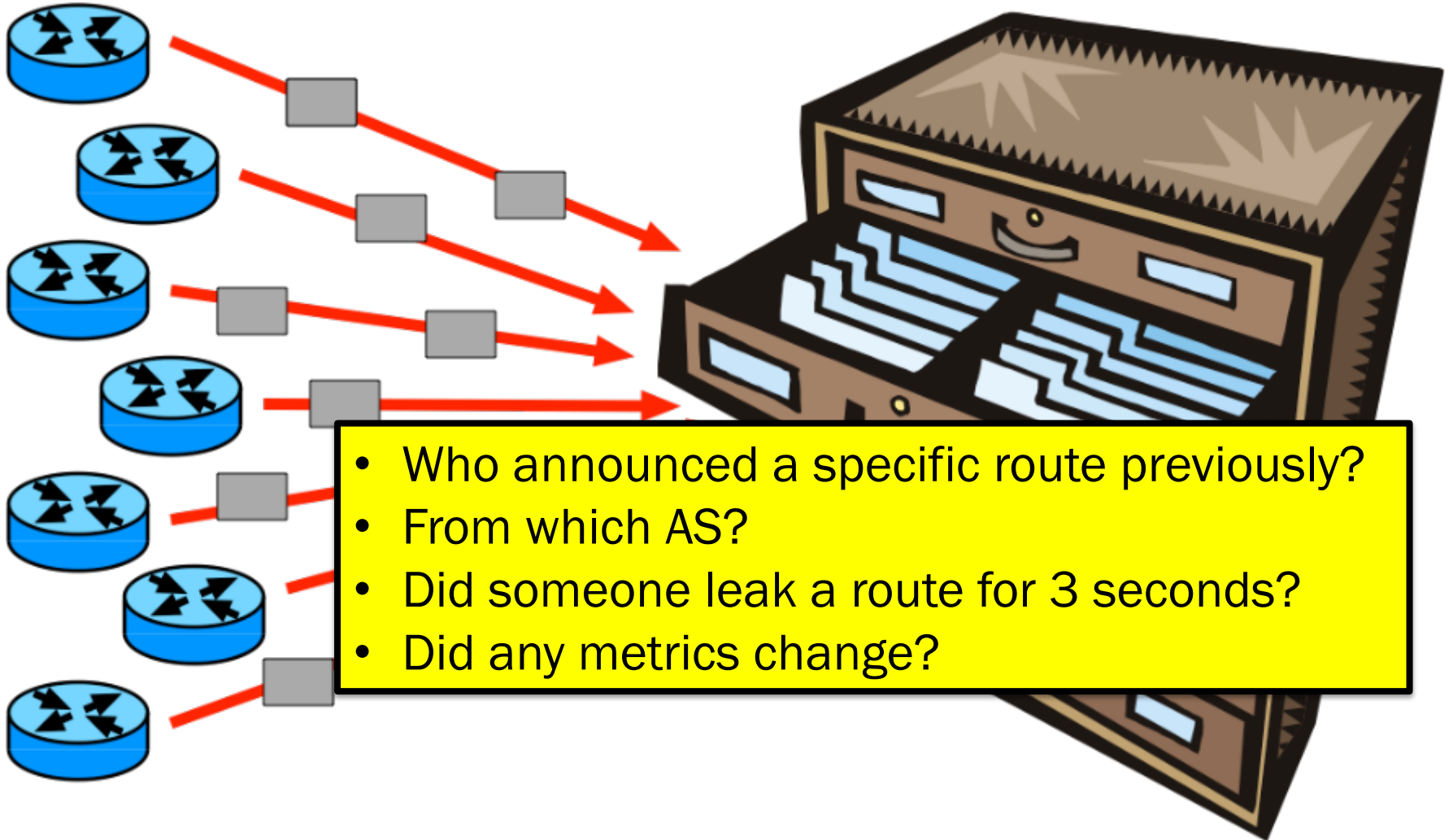
Not just Real-Time. History too

Store it all. Every single update. From every peer.



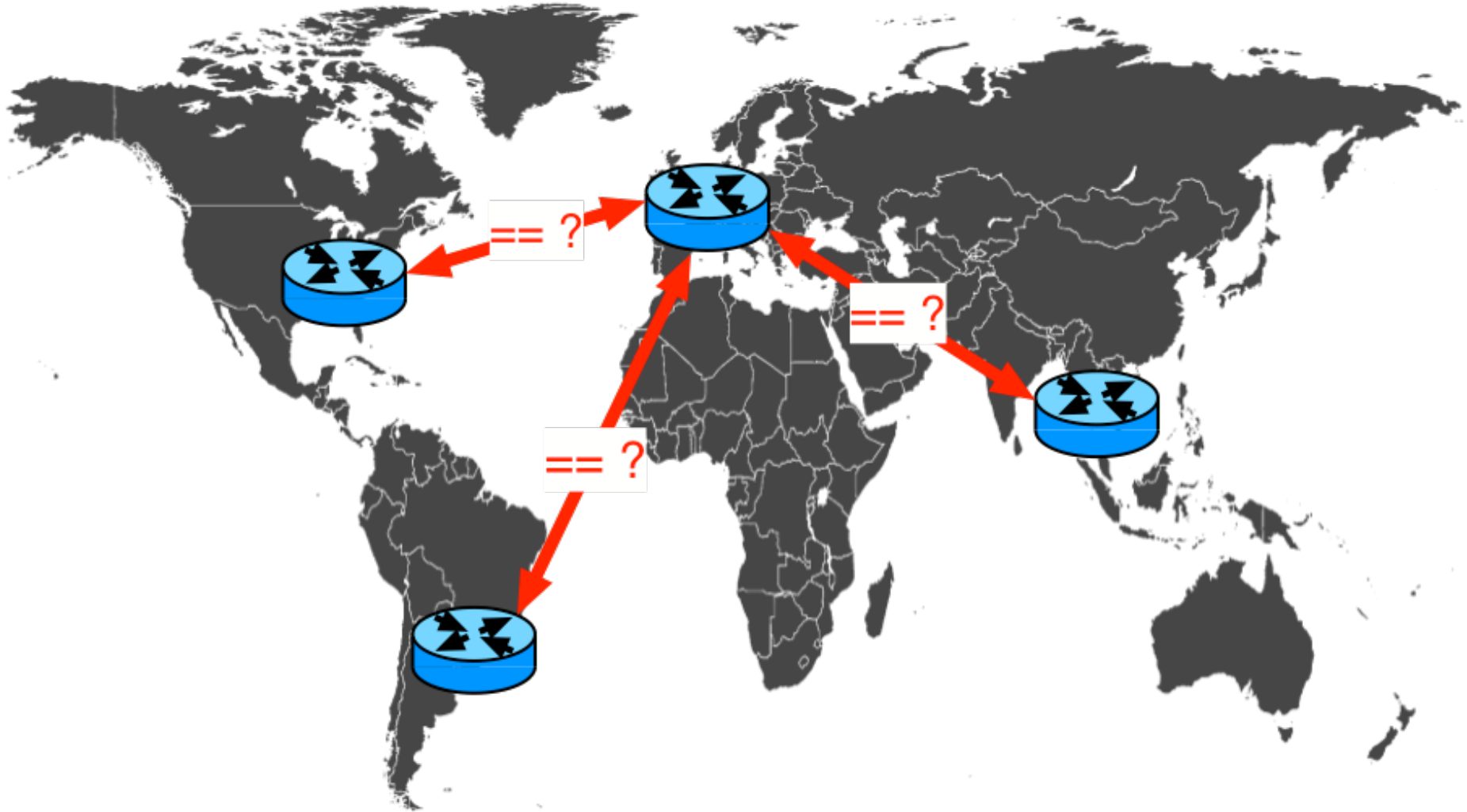
Not just Real-Time. History too

Store it all. Every single update. From every peer.



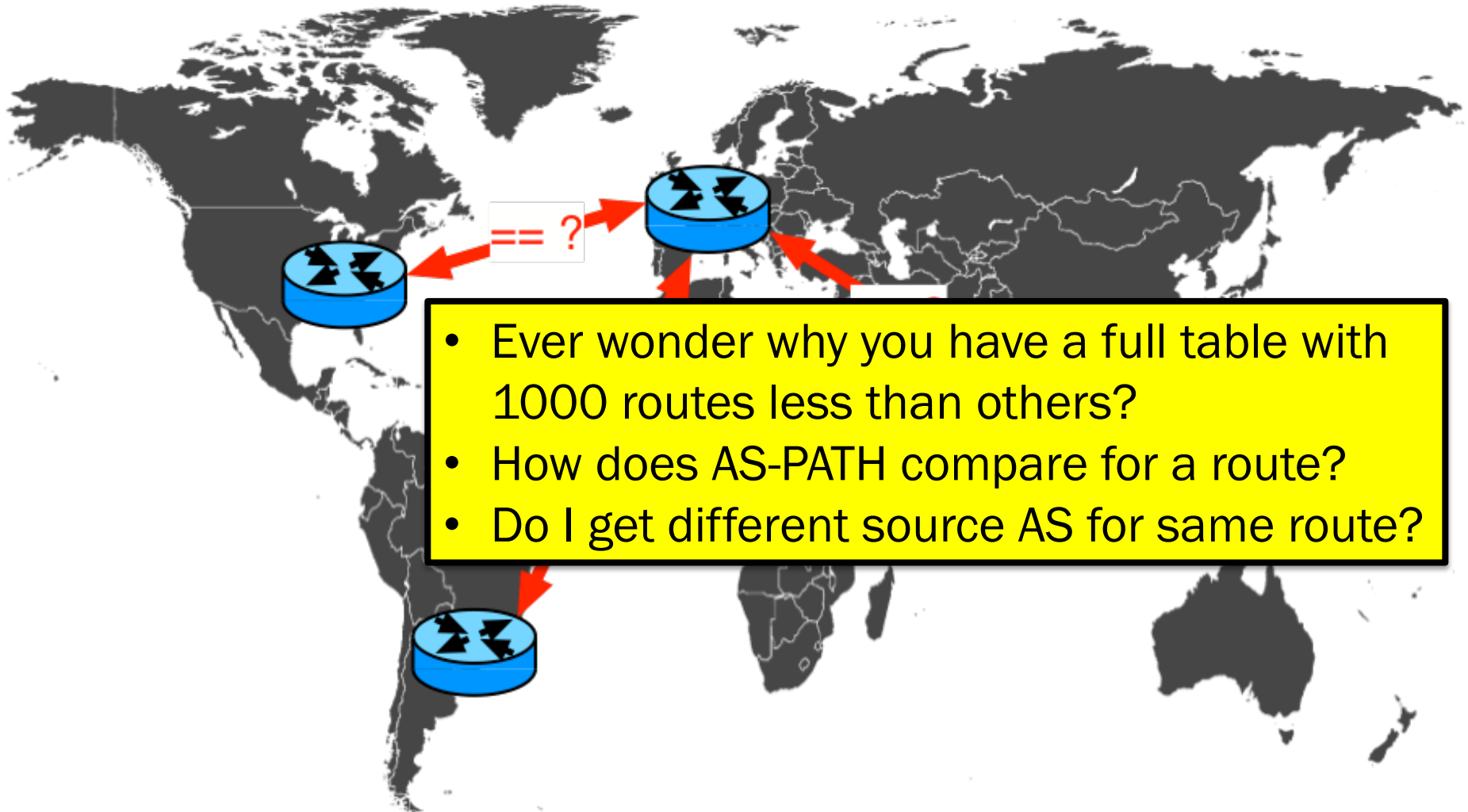
Compare the BGP feeds

Compare BGP routes between ISPs



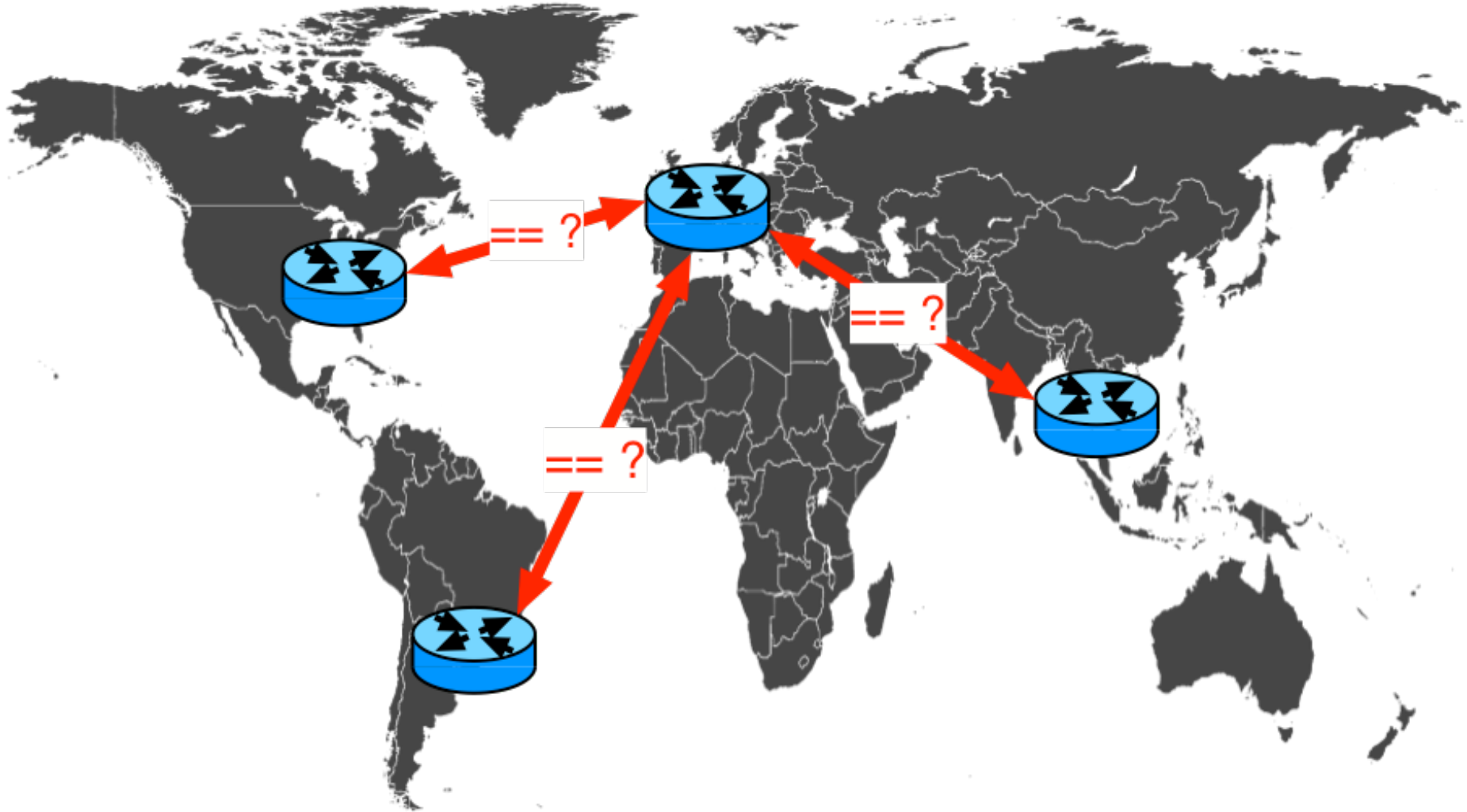
Compare the BGP feeds

Compare BGP routes between ISPs



Compare the BGP feeds

Compare BGP routes between ISPs



Register routes with your AS

Get notifications on important events



AS 64496:

IPv4:

192.0.2.0/24

198.51.100.0/24

203.0.113.0/24

IPv6:

2001:DB8::/32

Contact:

bgpops@as64496.net

Register routes with your AS

Get notifications on important events

AS 64496:

IPv4:

192.0.2.0/24

Notifications for

- Routes seen announced with different source AS (Hijack?)
- More specific blocks are seen (Hijack?)
- Various bad announcements

Contact:

bgpops@as64496.net

Current features

- ▶ **Search for specific route (Current and past specified time)**
 - Show all current paths received for the route
 - Search for peers which don't have the prefix
 - Highlight different source AS for route
- ▶ **Search for specific AS number**
 - Show all routes received from the AS
- ▶ **Unassigned AS number reports**
 - Show routes sourced by unassigned AS numbers
 - Show routes with unassigned AS anywhere in AS path

Unassigned AS Report – Prefix view

Current view of prefix



BGP Prefix Report: 102.164.120.0/24

Summary: Prefix announced by 20 peer(s).

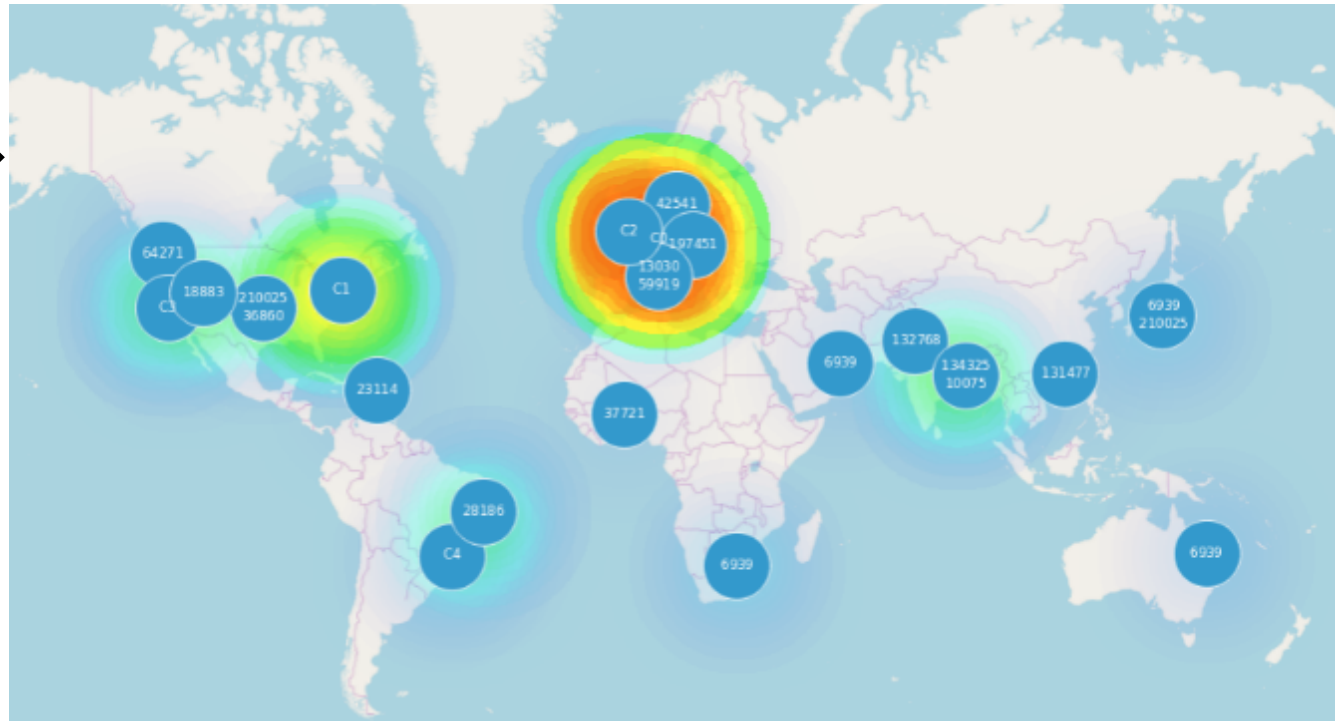
When

Peer	AS Path	Origin AS
72.52.98.53	10555 15096 6939 1299 174 16637 20294	328292
195.47.195.254	196624 8495 174 16637 20294 64513 *	328292
65.49.27.154	6939 1299 174 16637 20294 328292	328292
213.144.128.184	13030 16637 20294 328292	328292
65.49.27.157	6939 1299 174 16637 20294 328292	328292
213.144.128.212	13030 16637 20294 328292	328292
185.66.192.6	201701 50629 174 16637 20294 64513 *	328292
185.142.180.67	48111 16097 16637 20294 328292	328292
65.49.27.153	6939 1299 174 16637 20294 328292	328292
65.49.27.156	6939 1299 174 16637 20294 328292	328292
213.144.128.191	13030 16637 20294 328292	328292

65.49.27.156	6939 1299 174 16637 20294 328292	328292	Not Set	2018-05-14 13:01:03
213.144.128.222	13030 16637 20294 328292	328292	Set (1)	2018-05-14 13:00:37
65.49.27.158	6939 1299 174 16637 20294 328292	328292	Not Set	2018-05-14 13:00:34
165.254.255.2	15062 2914 174 16637 20294 328292	328292	Set (0)	2018-05-14 13:00:38

Current features

- ▶ **Timeline of updates for a given prefix**
- ▶ **Hijacking detection (routes are registered with account)**
 - Detect more specific routes
- ▶ **Route Flapping Report**
- ▶ **BGPplay**
- ▶ **Heatmap →**





BGP Fun and weird stuff

A look at the state of BGP on the Internet

BGP Propagation across the world

- ▶ **Announcement (and Withdraw) of a single IPv4 and IPv6 route**
 - Measure how the announcements propagates across the world
 - Test route is from AS202261 (NetDEF)
 - single BGP connection behind AS13030 (Init7)
 - No multihoming

BGP Propagation IPv4 Announce

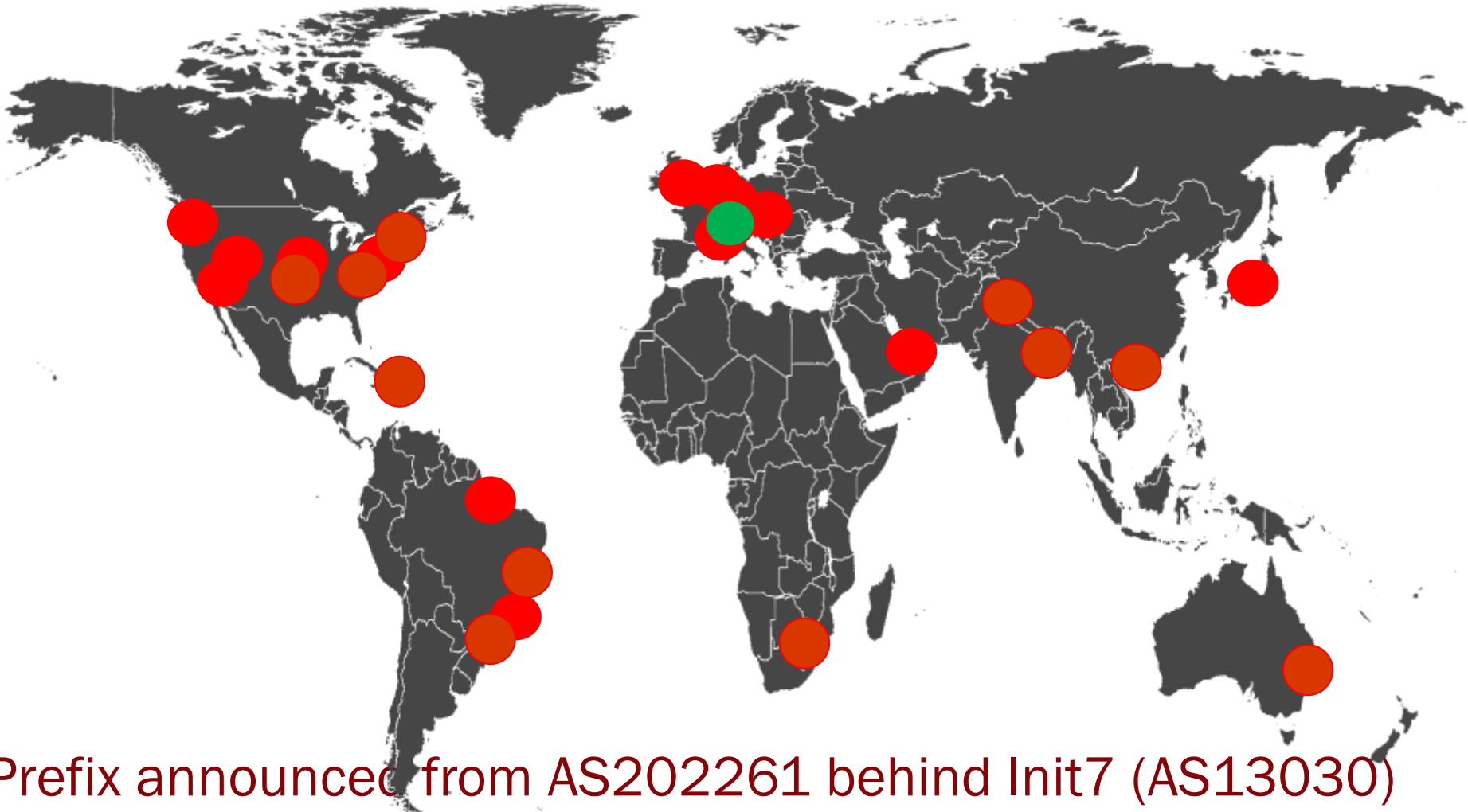
First announce: XXSL in NL: 210025 206499 34549 33891 13030 202261

First Init7: US (Los Angeles): 13030 202261 (+124ms)

First Swiss: CloudFactory: 58299 13030 202261 (+53s)

Init7 Swiss: 13030 202261 (+207s)

Last Announce (DE): 206499 34549 13101 13030 202261 (+272s)



Prefix announced from AS202261 behind Init7 (AS13030)

BGP Propagation IPv4 Announce

Details of the Announcement

Event	Time (s)	ISP	Country	Announced AS-Path
announce	0	XXSL	NL	210025 206499 34549 33891 13030 202261
announce	0.121	XXSL	US	210025 206499 34549 33891 13030 202261
announce	0.124	Init7	US-West	13030 202261
announce	0.156	Cofractal	US-West	26073 6939 13030 202261
announce	0.288	HE	JP	6939 13030 202261
announce	0.305	Brno University	CZ	197451 6830 1299 13030 13030 202261
announce	0.305	Brno University	CZ	197451 6830 1299 13030 202261
announce	0.369	Snijders	NL	15562 2914 13030 202261
announce	0.449	Maedel	DE	203478 64515 65534 20473 13030 202261
announce	0.538	HE	Dubai	6939 13030 202261
announce	0.546	XXSL	NL	210025 206499 34549 1299 13030 202261
announce	0.556	Brno University	CZ	197451 6830 1299 13030 202261
announce	0.651	XXSL	US-Middle	210025 206499 34549 1299 13030 202261
announce	0.904	XXSL	US-Middle	210025 38001 7473 13030 202261
announce	1.203	XXSL	NL	210025 38001 7473 13030 202261
announce	1.729	FiberNet Comm	US-West	18883 5056 1299 13030 202261
announce	7.269	NoAccess	US-West	15096 6939 13030 202261
announce	7.523	Freifunk	DE	201701 49009 12731 13030 202261
announce	8.357	[[:blank:]]-Clan	DE	196624 8495 31025 13030 202261
announce	10.432	DN-Systems	DE	42034 9066 9145 13030 202261
announce	11.923	Freifunk	DE	201701 50629 13030 202261
announce	19.786	Init7	FR	13030 202261
announce	19.849	Brainbox	IT	59919 28716 13030 202261
announce	19.882	netShelter	DE	49697 13030 202261
announce	19.913	HE	US	6939 13030 202261
announce	19.955	meerfarbig	DE	34549 33891 13030 202261
announce	19.989	Finzeit	DE	60767 61438 39912 13030 202261
announce	19.991	EX Networks	UK	35266 13030 202261
announce	19.991	EX Networks	UK	35266 13030 202261
announce	20.093	rixCloud	US-West	64271 131477 6939 13030 202261
announce	20.105	Brainbox	IT	59919 13030 202261
announce	20.151	HE	BR-South	6939 13030 202261
announce	20.222	XXSL	JP	210025 206499 34549 33891 13030 202261
announce	20.446	meerfarbig	DE	34549 1299 13030 202261
announce	20.734	XXSL	JP	210025 38001 7473 13030 202261
announce	27.912	Asympto Net	DE	39533 6453 1299 13030 202261
announce	28.391	Westnetz	DE	48111 16097 33891 13030 202261
announce	30.493	Altarede	BR-South	28260 12956 1299 13030 202261
announce	31.486	XXSL	US-Middle	210025 38001 7473 13030 202261
announce	31.569	XXSL	NL	210025 38001 7473 13030 202261
announce	41.964	BancFirst	US-Middle	36860 174 1299 13030 202261
announce	47.507	Roller Network	US-West	11170 6939 13030 202261
announce	51.377	XXSL	JP	210025 38001 7473 13030 202261
announce	52.669	OpenFactory	CH	58299 13030 202261
announce	58.413	Westnetz	DE	48111 16097 13030 202261
announce	72.688	BancFirst	US	36860 174 1299 13030 202261
announce	83.703	HE	UK	6939 13030 202261
announce	83.788	Fiberby	DK	42541 13030 202261

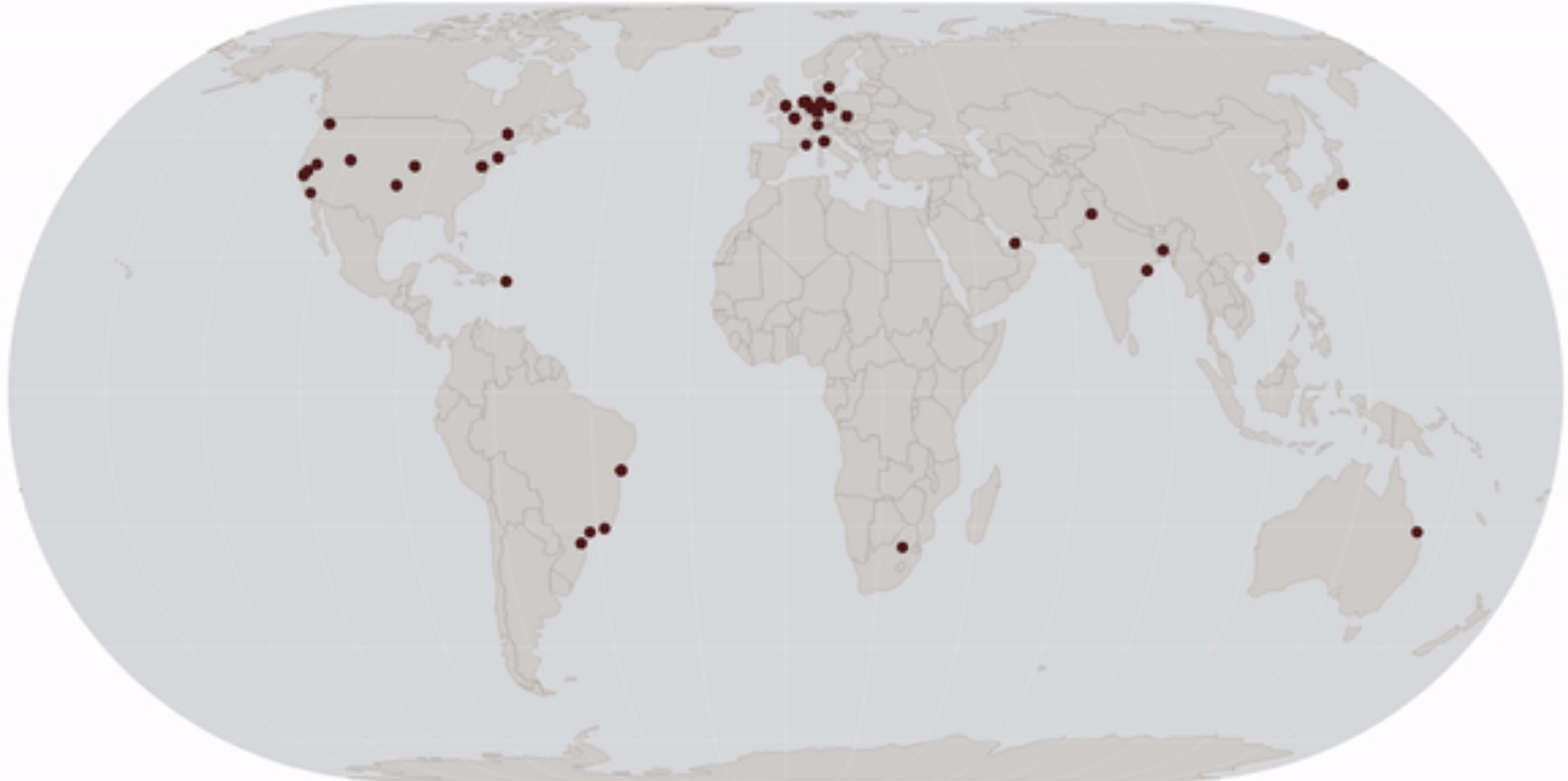
announce	83.79	Init7	US-East	13030 202261
announce	83.802	Velder	DE	62078 34549 33891 13030 202261
announce	83.84	Initq	DE	209152 34549 33891 13030 202261
announce	83.84	Initq	DE	209152 49697 39912 13030 202261
announce	83.84	Initq	DE	209152 49697 13030 202261
announce	83.881	Wifirst	FR	52075 13030 202261
announce	84.044	Five Network	IN-North	132768 9498 13030 202261
announce	84.289	EBOX	CA-East	1403 6461 13030 202261
announce	84.337	Initq	DE	209152 34549 1299 13030 202261
announce	84.419	Shanghai Huajuan	HK	131477 58879 4809 3320 13030 202261
announce	84.444	meerfarbig	DE	34549 13101 13030 202261
announce	84.53	Velder	DE	62078 34549 1299 13030 202261
announce	109.326	Certo Telecom	BR-South	28130 8167 7738 13030 202261
announce	114.22	Shanghai Huajuan	HK	131477 58879 2914 1299 13030 202261
announce	139.267	Certo Telecom	BR-South	28130 4809 16735 13030 202261
announce	148.335	Initq	DE	209152 34549 13101 13030 202261
announce	148.391	Velder	DE	62078 34549 13101 13030 202261
announce	199.295	Init7	UK	13030 202261
announce	199.339	netShelter	DE	49697 39912 13030 202261
announce	199.535	HE	US-West	6939 13030 202261
announce	199.546	Overkill	US-East	397444 397444 9009 13030 202261
announce	199.582	netShelter	DE	49697 13030 202261
announce	199.707	HE	AUS-East	6939 13030 202261
announce	199.719	Overkill	US-East	397444 20473 13030 202261
announce	199.744	Softcom	US-West	13427 6939 13030 202261
announce	200.024	ITS Telecom	BR-East	28186 3549 3356 1299 13030 13030 202261
announce	200.024	ITS Telecom	BR-East	28186 3549 3356 1299 13030 202261
announce	200.053	Critical Hub	PR	23114 13030 202261
announce	200.627	ITS Telecom	BR-East	28186 7738 13030 202261
announce	201.838	Vanneste	DE	49752 49697 49697 13030 202261
announce	207.104	Init7	CH	13030 202261
announce	207.156	Misaka	UK	57695 62240 13030 202261
announce	207.182	Misaka	US-East	57695 47553 3223 13030 202261
announce	207.263	M&M Networks	DE	206499 34549 33891 13030 202261
announce	207.342	Misaka	US-East	57695 47553 3223 13030 202261
announce	207.41	HE	ZA	6939 13030 202261
announce	207.539	FiberAtHome	IN-East	10075 9498 13030 202261
announce	207.695	EBOX	CA-East	1403 6461 13030 202261
announce	207.996	M&M Networks	DE	206499 34549 1299 13030 202261
announce	208.291	ITS Telecom	BR-East	28186 3549 3356 1299 13030 202261
announce	208.291	ITS Telecom	BR-East	28186 12956 1299 13030 202261
announce	208.293	Jetspot	IN-East	134325 134325 134325 134325 134325 134325 1
announce	208.593	ITS Telecom	BR-East	28186 7738 13030 202261
announce	208.677	Jetspot	IN-East	134325 134325 134325 134325 134325 134325 1
announce	208.956	GVA	FR	36924 2914 13030 202261
announce	211.984	BancFirst	US-Center	36860 174 1299 13030 202261
announce	224.453	Chronos	NL	202365 50673 13030 202261
announce	242.749	BancFirst	US-Center	36860 174 1299 13030 202261
announce	271.752	M&M Networks	DE	206499 34549 13101 13030 202261

BGP Propagation IPv4 Withdraw

First withdraw: Init7 in US Westcoast

Init7 in Switzerland: Withdraw after 3min, 30sec

Last withdraw: Vanneste in DE (after 10min, 30sec)



BGP Propagation IPv4 Withdraw

Details of BGP updates

event	time	ISP	Country	AS-Path
announce	0.000	Maedel	DE	203478 64515 65534 20473 1299 13030 202261
withdraw	0.024	Init7	US	
announce	0.192	Snijders	NL	15562 2914 13030 202261
withdraw	0.231	HE	Dubai	
withdraw	0.341	HE	JP	
announce	0.411	Cofractal	US	26073 6939 1299 13030 202261
announce	0.531	HE	Dubai	6939 13030 202261
announce	0.567	Brno University	CZ	197451 6830 1299 13030 202261
announce	0.640	HE	JP	6939 1299 13030 202261
announce	0.816	Brno University	CZ	197451 6830 1299 13030 202261
announce	0.872	HE	Dubai	6939 1299 13030 202261
announce	0.895	Maedel	DE	203478 64515 65534 20473 2914 13030 202261
announce	0.957	Snijders	NL	15562 2914 1299 13030 202261
announce	1.067	Brno University	CZ	197451 6830 1299 13030 202261
announce	1.067	Brno University	CZ	197451 6830 1299 13030 202261
announce	1.163	Maedel	DE	203478 64515 65534 20473 1299 13030 202261
announce	2.048	Brno University	CZ	197451 6830 1299 13030 202261
announce	2.065	Maedel	DE	203478 64515 65534 20473 2914 1299 13030 202261
withdraw	2.584	HE	Dubai	
announce	4.573	Westnetz	DE	48111 16097 33891 3320 13030 202261
announce	4.930	NoAccess	US	15096 6939 1299 13030 202261
announce	11.375	Snijders	NL	15562 2914 1299 13030 202261
announce	14.737	DN-Systems	DE	42034 9066 9145 174 1299 13030 202261
announce	19.492	EX Networks	UK	35266 13030 202261
announce	19.563	Brainbox	IT	59919 28716 13030 202261
announce	19.579	Freifunk	DE	201701 50629 33891 1299 13030 202261
announce	19.579	Freifunk	DE	201701 50629 13030 202261

BGP Propagation IPv4 Withdraw

Details of BGP updates

withdraw	19.702	Init7	FR	
announce	19.720	EX Networks	UK	35266 13030 202261
announce	19.762	Finzeit	DE	60767 61438 33891 13030 202261
announce	19.952	EX Networks	UK	35266 1299 13030 202261
announce	19.952	EX Networks	UK	35266 2914 13030 202261
announce	20.035	Finzeit	DE	60767 60474 58057 1836 13030 202261
announce	20.077	Brainbox	IT	59919 41327 13030 202261
announce	20.142	HE	US	6939 1299 13030 202261
announce	20.224	rixCloud	US	64271 131477 6939 1299 13030 202261
announce	20.326	netShelter	DE	49697 39912 33891 13030 202261
announce	20.326	netShelter	DE	49697 39912 1299 13030 202261
announce	20.364	HE	BR	6939 1299 13030 202261
announce	20.569	netShelter	DE	49697 39912 33891 3320 13030 202261
announce	20.569	netShelter	DE	49697 39912 1299 13030 202261
announce	21.233	netShelter	DE	49697 39912 1299 13030 202261
announce	21.523	netShelter	DE	49697 39912 1299 13030 202261
announce	21.766	netShelter	DE	49697 39912 33891 3320 13030 202261
withdraw	21.955	EX Networks	UK	
announce	21.955	EX Networks	UK	35266 3257 1299 13030 202261
announce	22.497	EX Networks	UK	35266 3257 1299 13030 202261
announce	25.453	Brno University	CZ	197451 6830 1299 13030 202261
announce	26.741	FiberNet Comm	US	18883 5056 1299 13030 202261
withdraw	26.934	Cofractal	US	
withdraw	27.299	HE	JP	
withdraw	27.368	Snijders	NL	
announce	28.672	[:blank:]-Clan	DE	196624 8495 13101 13030 202261
announce	28.848	Maedel	DE	203478 64515 65534 20473 3356 1299 13030 202261
announce	29.439	netShelter	DE	49697 39912 33891 1299 13030 202261

BGP Propagation IPv4 Withdraw

Details of BGP updates

...etc ... etc... until a few 100's of update later:

withdraw	269.041	EBOX	CA	
announce	269.306	Misaka	US	57695 47553 9009 13030 202261
withdraw	271.270	BancFirst	US	
withdraw	272.516	Misaka	UK	
withdraw	273.957	Overkill	US	
announce	274.401	Vanneste	DE	49752 58299 58299 13030 202261
withdraw	274.665	Vanneste	DE	
withdraw	280.031	Chronos	NL	
withdraw	293.012	Jetspot	IN	
withdraw	293.847	ITS Telecom	BR	
announce	298.309	Vanneste	DE	49752 137490 49004 9009 13030 202261
withdraw	298.618	Vanneste	DE	
announce	298.625	Vanneste	DE	49752 137490 60474 58057 1836 13030 202261
announce	299.314	Misaka	US	57695 47553 328383 327782 37100 13030 202261
withdraw	301.673	ITS Telecom	BR	
withdraw	448.760	Finzeit	DE	
withdraw	535.396	Initq	DE	
withdraw	653.782	Vanneste	DE	

BGP Flapping... most flapping Nets

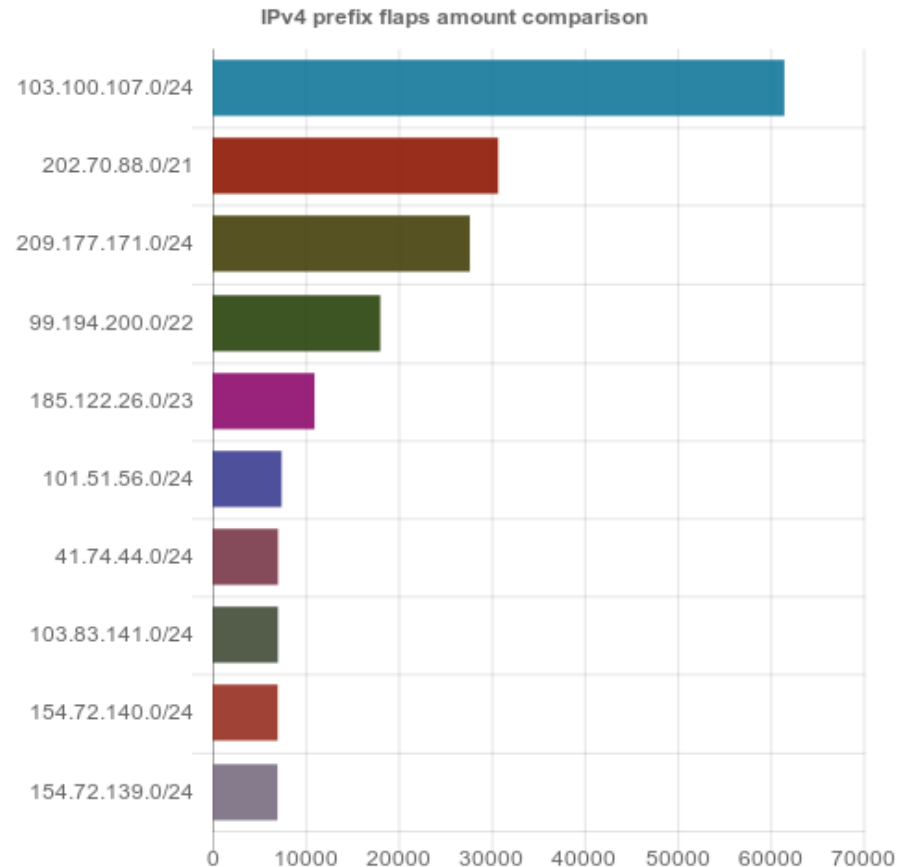
IPv4 flapping as seen from rt-bgp.he.net

Top 10 Prefix Flapping

IPv4 - Flapping

(next update in 35 seconds)

Prefix	Flap Amount
103.100.107.0/24	61508
202.70.88.0/21	30721
209.177.171.0/24	27674
99.194.200.0/22	18042
185.122.26.0/23	10971
101.51.56.0/24	7427
41.74.44.0/24	7044
103.83.141.0/24	7039
154.72.140.0/24	7010
154.72.139.0/24	6986



As seen by rt-bgp.he.net on Nov 12, 2019

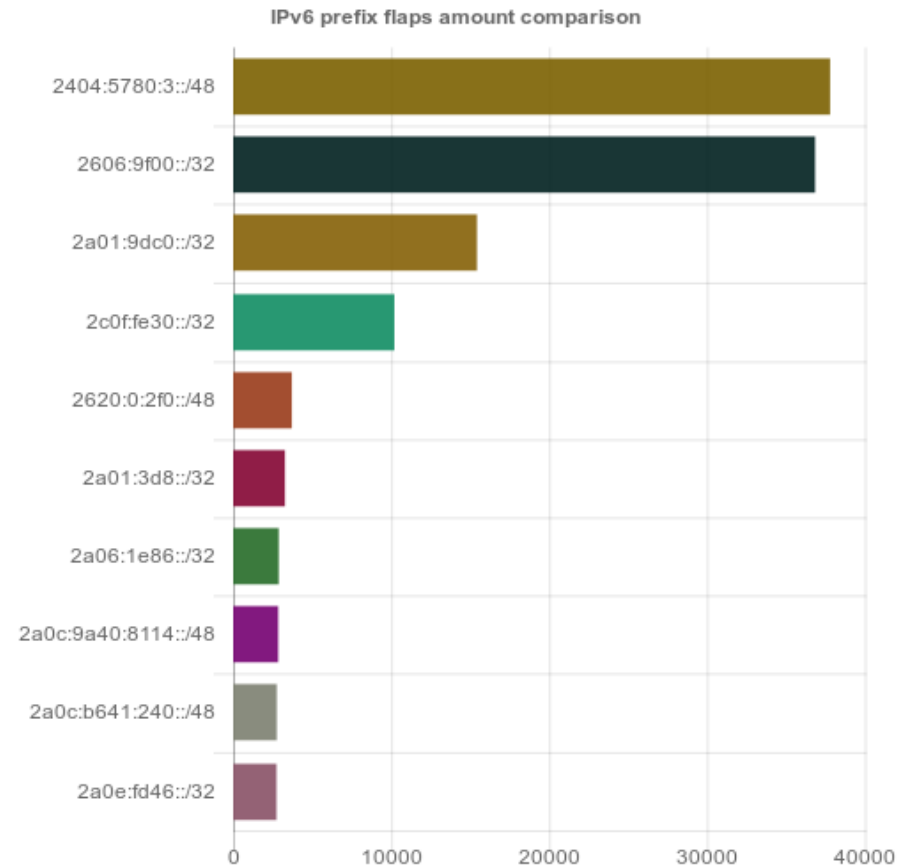
BGP Flapping... most flapping Nets

IPv6 flapping as seen from rt-bgp.he.net

IPv6 - Flapping

(next update in 43 seconds)

Prefix	Flap Amount
2404:5780:3::/48	37799
2606:9f00::/32	36850
2a01:9dc0::/32	15435
2c0f:fe30::/32	10203
2620:0:2f0::/48	3711
2a01:3d8::/32	3275
2a06:1e86::/32	2879
2a0c:9a40:8114::/48	2847
2a0c:b641:240::/48	2757
2a0e:fd46::/32	2739



As seen by rt-bgp.he.net on Nov 12, 2019

Flap – Detail: 103.100.107.0/24

AS62240 (Cloudvider) flaps between 1299 (Sprint), 174 (Cogent), 2914 (NTT) & 3257 (GTT)

Event	Time	AS Path	Communities
announce	00:00.000	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
withdraw	00:00.561		
announce	00:01.004	57695 62240 174 2914 20473 136165	174:21100 174:22008 57695:13000
announce	00:01.562	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
withdraw	00:02.952		
announce	00:03.182	57695 62240 3257 2914 20473 136165	3257:8110 3257:30187 3257:50002 3257:51100 3257:51102 57695:13000 62240:301
announce	00:03.936	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
announce	00:05.189	57695 62240 2914 3356 20473 136165	2914:420 2914:1203 2914:2201 2914:3200 57695:13000 62240:301
announce	00:05.649	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
announce	00:09.450	57695 62240 2914 3356 20473 136165	2914:420 2914:1203 2914:2201 2914:3200 57695:13000 62240:301
announce	00:09.909	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
announce	00:10.814	57695 62240 2914 3356 20473 136165	2914:420 2914:1203 2914:2201 2914:3200 57695:13000 62240:301
announce	00:11.422	57695 62240 3257 2914 20473 136165	3257:8772 3257:30331 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:11.652	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
announce	00:15.767	57695 62240 2914 3356 20473 136165	2914:420 2914:1201 2914:2202 2914:3200 57695:13000 62240:301
announce	00:16.913	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
announce	00:24.264	57695 62240 2914 3356 20473 136165	2914:420 2914:1201 2914:2202 2914:3200 57695:13000 62240:301
announce	00:24.870	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
announce	00:25.558	57695 62240 2914 3356 20473 136165	2914:420 2914:1201 2914:2202 2914:3200 57695:13000 62240:301
announce	00:26.780	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
announce	00:27.487	57695 62240 2914 3356 20473 136165	2914:420 2914:1201 2914:2202 2914:3200 57695:13000 62240:301
announce	00:27.946	57695 62240 3257 2914 20473 136165	3257:8059 3257:30183 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:28.382	57695 62240 2914 3356 20473 136165	2914:420 2914:1201 2914:2202 2914:3200 57695:13000 62240:301
announce	00:29.324	57695 62240 2914 20473 136165	2914:410 2914:1005 2914:2000 2914:3000 20473:17 20473:4000 57695:13000 62240:301
announce	00:29.554	57695 62240 2914 3356 20473 136165	2914:420 2914:1201 2914:2202 2914:3200 57695:13000 62240:301

Flap – Detail: 202.70.88.0/21

AS57695 (Misaka, US) flaps between 6939 (HE), 2914 (Bharti, IN) & 62240 (Cloudviper UK)

Event	Time	AS Path	Communities
announce	00:00.000	57695 62240 6939 15412 9304 23752	57695:13000 62240:201 62240:302
announce	00:00.230	57695 62240 1299 4637 9498 23752	1299:35000 57695:13000 62240:301
announce	00:24.427	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40530:9498 57695:12000 57695:12002
announce	00:26.092	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40529:9498 57695:12000 57695:12002
announce	00:26.662	57695 6939 15412 9304 23752	57695:12000 57695:12002
announce	00:30.884	57695 62240 6939 15412 9304 23752	57695:13000 62240:201 62240:302
announce	00:31.112	57695 62240 1299 4637 9498 23752	1299:35000 57695:13000 62240:301
announce	00:54.434	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40530:9498 57695:12000 57695:12002
announce	00:56.098	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40529:9498 57695:12000 57695:12002
announce	00:57.099	57695 6939 15412 9304 23752	57695:12000 57695:12002
announce	00:59.944	57695 62240 6939 15412 9304 23752	57695:13000 62240:201 62240:302
announce	01:00.402	57695 62240 1299 4637 9498 23752	1299:35000 57695:13000 62240:301
announce	01:24.177	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40530:9498 57695:12000 57695:12002
announce	01:26.110	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40529:9498 57695:12000 57695:12002
announce	01:26.648	57695 6939 15412 9304 23752	57695:12000 57695:12002
announce	01:30.671	57695 62240 6939 15412 9304 23752	57695:13000 62240:201 62240:302
announce	01:30.901	57695 62240 1299 4637 9498 23752	1299:35000 57695:13000 62240:301
announce	01:55.121	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40530:9498 57695:12000 57695:12002
announce	01:56.265	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40529:9498 57695:12000 57695:12002
announce	01:57.447	57695 6939 15412 9304 23752	57695:12000 57695:12002
announce	02:14.555	57695 62240 6939 15412 9304 23752	57695:13000 62240:201 62240:302
announce	02:14.785	57695 62240 1299 4637 9498 23752	1299:30000 57695:13000 62240:301
announce	02:24.192	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40530:9498 57695:12000 57695:12002
announce	02:26.106	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40529:9498 57695:12000 57695:12002
announce	02:27.095	57695 6939 15412 9304 23752	57695:12000 57695:12002
announce	02:30.623	57695 62240 6939 15412 9304 23752	57695:13000 62240:201 62240:302
announce	02:30.851	57695 62240 1299 4637 9498 23752	1299:35000 57695:13000 62240:301
announce	02:54.371	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40530:9498 57695:12000 57695:12002
announce	02:56.244	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40529:9498 57695:12000 57695:12002
announce	02:56.870	57695 6939 15412 9304 23752	57695:12000 57695:12002
announce	03:00.004	57695 62240 6939 15412 9304 23752	57695:13000 62240:201 62240:302
announce	03:00.291	57695 62240 1299 4637 9498 23752	1299:35000 57695:13000 62240:301
announce	03:24.257	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40530:9498 57695:12000 57695:12002
announce	03:26.025	57695 9498 23752	8714:65010 8714:65011 9498:1 9498:91 9498:9333 9498:23752 34111:9498 34911:9498 40529:9498 57695:12000 57695:12002
announce	03:26.971	57695 6939 15412 9304 23752	57695:12000 57695:12002
announce	03:45.295	57695 62240 1299 4637 9498 23752	1299:35000 57695:13000 62240:301

Flap – Detail: 209.177.171.0/24

AS62240 (Cloudvider, UK) flaps between 1299 (Sprint), 3257 (GTT) & 2914 (NTT)

Event	Time	AS Path	Communities
announce	00:00.000	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:00.576	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:01.037	57695 62240 174 1299 18465	174:21100 174:22012 57695:13000
announce	00:01.725	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:02.414	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:03.082	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:03.818	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:04.048	57695 62240 2914 1299 18465	2914:420 2914:1204 2914:2205 2914:3200 57695:13000 62240:301
announce	00:04.509	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:05.532	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:06.180	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:06.180	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:06.410	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:07.025	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:07.422	57695 62240 2914 1299 18465	2914:420 2914:1204 2914:2205 2914:3200 57695:13000 62240:301
announce	00:07.892	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:08.768	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:09.229	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:09.955	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:09.955	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:10.184	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:11.255	57695 62240 2914 1299 18465	2914:420 2914:1203 2914:2201 2914:3200 57695:13000 62240:301
announce	00:11.926	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:12.635	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:14.469	57695 62240 2914 1299 18465	2914:420 2914:1203 2914:2201 2914:3200 57695:13000 62240:301
announce	00:14.930	57695 62240 3257 1299 18465	3257:8772 3257:30389 3257:50002 3257:51200 3257:51204 57695:13000 62240:301
announce	00:15.432	57695 62240 3257 1299 18465	3257:8794 3257:30052 3257:50001 3257:54900 3257:54901 57695:13000 62240:301
announce	00:16.038	57695 62240 1299 18465	1299:35000 57695:13000 62240:301
announce	00:46.026	57695 62240 2914 3356 18465	2914:420 2914:1203 2914:2201 2914:3200 57695:13000 62240:301

Others of the top 10 IPv4 Flaps

▶ **99.194.200.0/22**

- AS62240 (Cloudviper) flaps between 3257 (GTT) and 174 (Cogent)

▶ **185.122.26.0/23**

- AS62240 (Cloudviper) flaps between 6453 (Tata), 2914 (NTT), 3257 (GTT) and 174 (Cogent)

▶ **101.51.56.0/24**

- AS62240 (Cloudviper) flaps between 6453 (Tata) and 1239 (Sprint)

▶ **41.74.44.0/24**

- AS62240 (Cloudviper) flaps between 6453 (Tata) and 1239 (Sprint)

▶ **103.83.141.0/24**

- Fun one! (next slide..)

▶ **154.72.140.0/24**

- AS62240 (Cloudviper) flaps 1299 (Telia) and 6453 (Tata)

▶ **154.72.139.0/24**

- AS62240 (Cloudviper) flaps 1299 (Telia) and 6453 (Tata)

Flap – Detail: 103.83.141.0/24

▶ @ 0.000 sec

- **AS-Path:** 57695 6939 17451 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 138847 138847
- **Communities:** 0:2906 0:6939 0:12876 0:12989 0:13335 0:15133 0:15169 0:16265 0:16276 0:16509 0:20940 0:22822 57695:12000 57695:12001

▶ @ 29.345 sec

- **AS-Path:** 57695 6939 17451 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 138847 138847
- **Communities:** 57695:12000 57695:12002

▶ @ 59.469 sec – same, repeated previous announcement

▶ @ 59.699 sec

- **AS-Path:** 57695 17451 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 138847 138847
- **Communities:** 8714:65010 8714:65011 17451:19000 57695:12000 57695:12001

▶ @ 60.326 sec

- **AS-Path:** 57695 17451 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 2914 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 38165 138847 138847 138847
- **Communities:** 8714:65010 8714:65011 17451:19000 57695:12000 57695:12001

▶ Repeat... every 2 minutes

Flap – Detail: 2404:5780:3::/48

AS2914 (Sprint) flaps between 174 (Sprint) and 20473 (Choopa)

Event	Time	AS Path	Communities
announce	00:00.0	15562 2914 174 20473 9558	2914:420 2914:1205 2914:2204 2914:3200
announce	00:01.0	15562 2914 174 20473 9558	2914:420 2914:1215 2914:2214 2914:3200
announce	00:05.0	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 20473:11 20473:4000
announce	00:06.0	15562 2914 174 20473 9558	2914:420 2914:1215 2914:2214 2914:3200
announce	00:06.1	15562 2914 174 20473 9558	2914:420 2914:1215 2914:2214 2914:3200
announce	00:06.1	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 15562:410 20473:11 20473:4000
announce	00:08.3	15562 2914 174 20473 9558	2914:420 2914:1219 2914:2204 2914:3200
announce	00:10.4	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 20473:11 20473:4000
announce	00:12.5	15562 2914 174 20473 9558	2914:420 2914:1219 2914:2204 2914:3200
announce	00:14.9	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 15562:410 20473:11 20473:4000
announce	00:15.3	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 20473:11 20473:4000
announce	00:16.5	15562 2914 174 20473 9558	2914:420 2914:1219 2914:2204 2914:3200
announce	00:20.8	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 15562:410 20473:11 20473:4000
announce	00:21.8	15562 2914 174 20473 9558	2914:420 2914:1219 2914:2204 2914:3200
announce	00:26.6	15562 2914 20473 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 20473:11 20473:4000
announce	00:26.9	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 15562:410 20473:11 20473:4000
announce	00:27.8	15562 2914 20473 20473 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 20473:11 20473:4000
announce	00:28.5	15562 2914 174 20473 9558	2914:420 2914:1219 2914:2204 2914:3200
announce	00:30.6	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 20473:11 20473:4000
announce	00:31.8	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 15562:410 20473:11 20473:4000
announce	00:31.8	15562 2914 174 20473 9558	2914:420 2914:1219 2914:2204 2914:3200
announce	00:31.9	15562 2914 174 20473 9558	2914:420 2914:1219 2914:2204 2914:3200
announce	00:36.7	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 20473:11 20473:4000
announce	00:37.6	15562 2914 20473 20473 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 20473:11 20473:4000
announce	00:37.7	15562 2914 20473 9558	2914:410 2914:1009 2914:2000 2914:3000 15562:410 20473:11 20473:4000
announce	00:37.9	15562 2914 174 20473 9558	2914:420 2914:1212 2914:2212 2914:3200
announce	00:38.8	15562 2914 174 20473 9558	2914:420 2914:1219 2914:2204 2914:3200

Flap – Detail: 2606:9f00::/32

Announce, Withdraw, Announce, Withdraw, Announce...

Event	Time	AS Path	Communities
announce	00:00.0	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	00:05.4		
announce	00:09.9	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000 15562:410
announce	00:10.5	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	00:15.5		
announce	00:19.8	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000 15562:410
announce	00:20.1	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	00:25.4		
announce	00:30.3	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	00:35.1		
announce	00:40.0	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000 15562:410
announce	00:40.2	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	00:45.1		
announce	00:50.3	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	00:55.2		
announce	01:00.3	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000 15562:410
announce	01:00.7	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	01:05.5		
announce	01:10.1	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	01:14.8		
announce	01:20.0	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000 15562:410
announce	01:20.2	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	01:25.7		
withdraw	01:25.8		
announce	01:25.8	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000 15562:410
announce	01:31.0	15562 2914 30640	2914:410 2914:1008 2914:2000 2914:3000
withdraw	01:35.8		

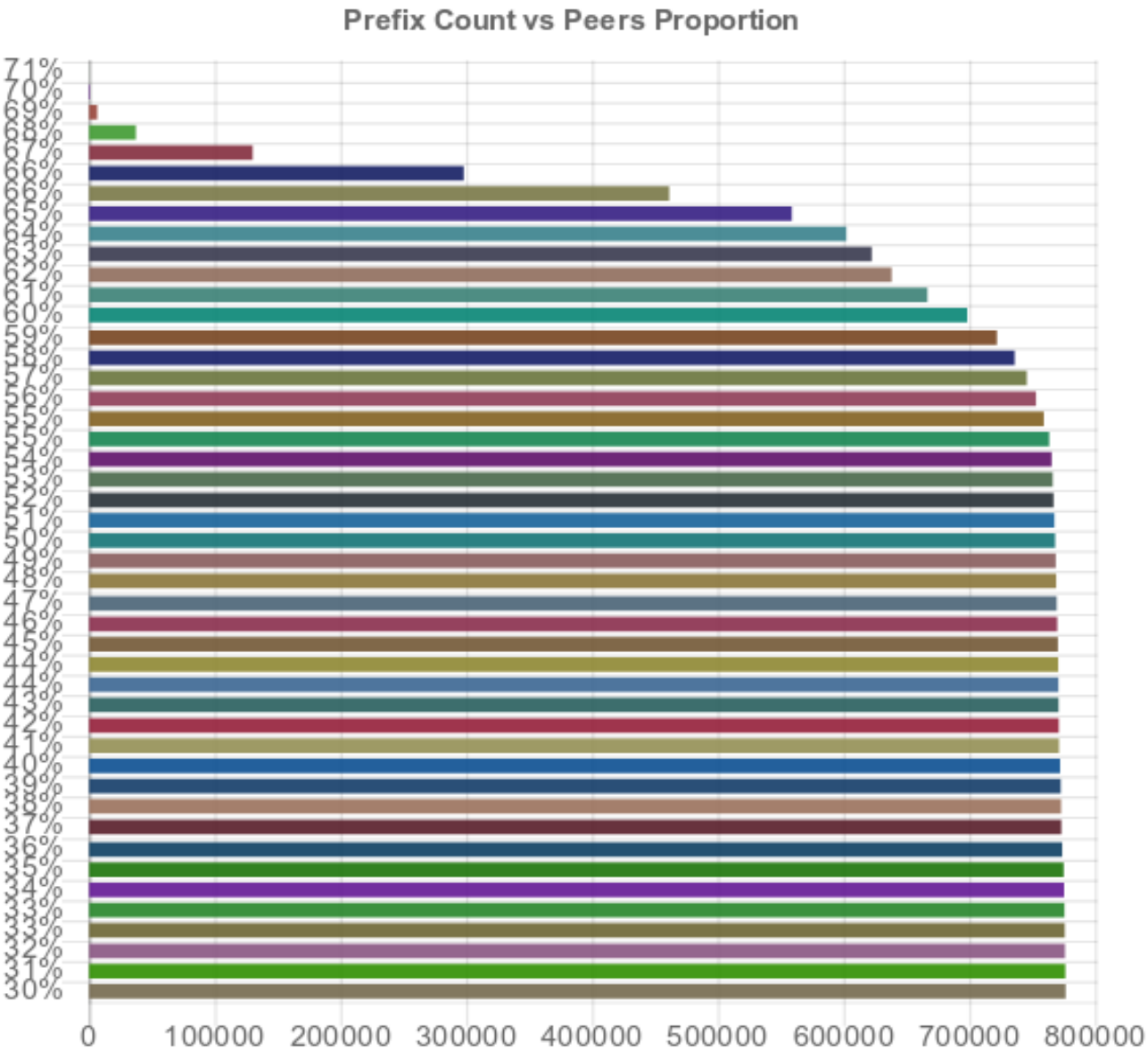
Flap – Detail: 2a0c:b641:240::/48

Can't decide on communities?

Event	Time	AS Path	Communities
announce	00:00.0	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402
announce	01:30.6	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402 6453:4000
announce	01:32.6	15562 2914 6453 9009 209724	2914:420 2914:1406 2914:2402 2914:3400 6453:2000 6453:3000 6453:3400 6453:3402 6453:4000
announce	01:33.5	15562 2914 6453 9009 209724	2914:420 2914:1009 2914:2000 2914:3000 6453:2000 6453:3000 6453:3400 6453:3402 6453:4000
withdraw	01:33.8		
announce	02:02.7	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402
announce	03:34.2	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402 6453:4000
announce	03:37.2	15562 2914 6453 9009 209724	2914:420 2914:1212 2914:2212 2914:3200 6453:3000 6453:3400 6453:3402 6453:4000
withdraw	03:48.2		
announce	03:48.2	15562 2914 6453 9009 209724	2914:420 2914:1212 2914:2212 2914:3200 6453:3000 6453:3400 6453:3402 6453:4000
announce	04:06.1	15562 2914 6453 9009 209724	2914:420 2914:1210 2914:2210 2914:3200 6453:3000 6453:3400 6453:3402
announce	04:06.3	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402
announce	05:36.9	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402 6453:4000
announce	05:38.9	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:2000 6453:3000 6453:3400 6453:3402 6453:4000
announce	05:39.8	15562 2914 6453 9009 209724	2914:420 2914:1406 2914:2402 2914:3400 6453:2000 6453:3000 6453:3400 6453:3402 6453:4000
withdraw	05:40.9		
announce	05:40.9	15562 2914 6453 9009 209724	2914:420 2914:1406 2914:2402 2914:3400 6453:3000 6453:3400 6453:3402 6453:4000
announce	06:13.2	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402
announce	07:43.0	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402 6453:4000
announce	07:45.2	15562 2914 6453 9009 209724	2914:420 2914:1203 2914:2201 2914:3200 6453:3000 6453:3400 6453:3402 6453:4000
announce	07:46.1	15562 2914 6453 9009 209724	2914:420 2914:1406 2914:2402 2914:3400 6453:2000 6453:3000 6453:3400 6453:3402 6453:4000
withdraw	07:46.4		
announce	08:14.1	15562 2914 6453 9009 209724	2914:420 2914:1219 2914:2204 2914:3200 6453:3000 6453:3400 6453:3402
announce	08:15.3	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402
announce	09:45.1	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402 6453:4000
withdraw	09:48.0		
announce	10:16.8	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402
announce	11:48.3	15562 2914 6453 9009 209724	2914:420 2914:1206 2914:2203 2914:3200 6453:3000 6453:3400 6453:3402 6453:4000
announce	11:50.4	15562 2914 6453 9009 209724	2914:420 2914:1004 2914:2000 2914:3000 6453:2000 6453:3000 6453:3400 6453:3402 6453:4000
announce	11:51.2	15562 2914 6453 9009 209724	2914:420 2914:1007 2914:2000 2914:3000 6453:2000 6453:3000 6453:3400 6453:3402 6453:4000

“Full Routing Table”

Prefix	Peers Proportion
35.204.0.0/15	71%
70.32.128.0/19	71%
23.236.48.0/20	71%
35.200.0.0/14	71%
35.228.0.0/14	71%
64.233.160.0/19	71%
8.34.208.0/21	71%
8.35.200.0/21	71%
23.251.128.0/19	71%
35.184.0.0/13	71%
35.220.0.0/14	71%
35.224.0.0/14	71%
35.232.0.0/14	71%
35.236.0.0/14	71%
8.8.4.0/24	71%
8.8.8.0/24	71%
8.34.216.0/21	71%
8.35.192.0/21	71%
70.32.131.0/24	71%
70.32.129.0/24	71%



“Full Routing Table”

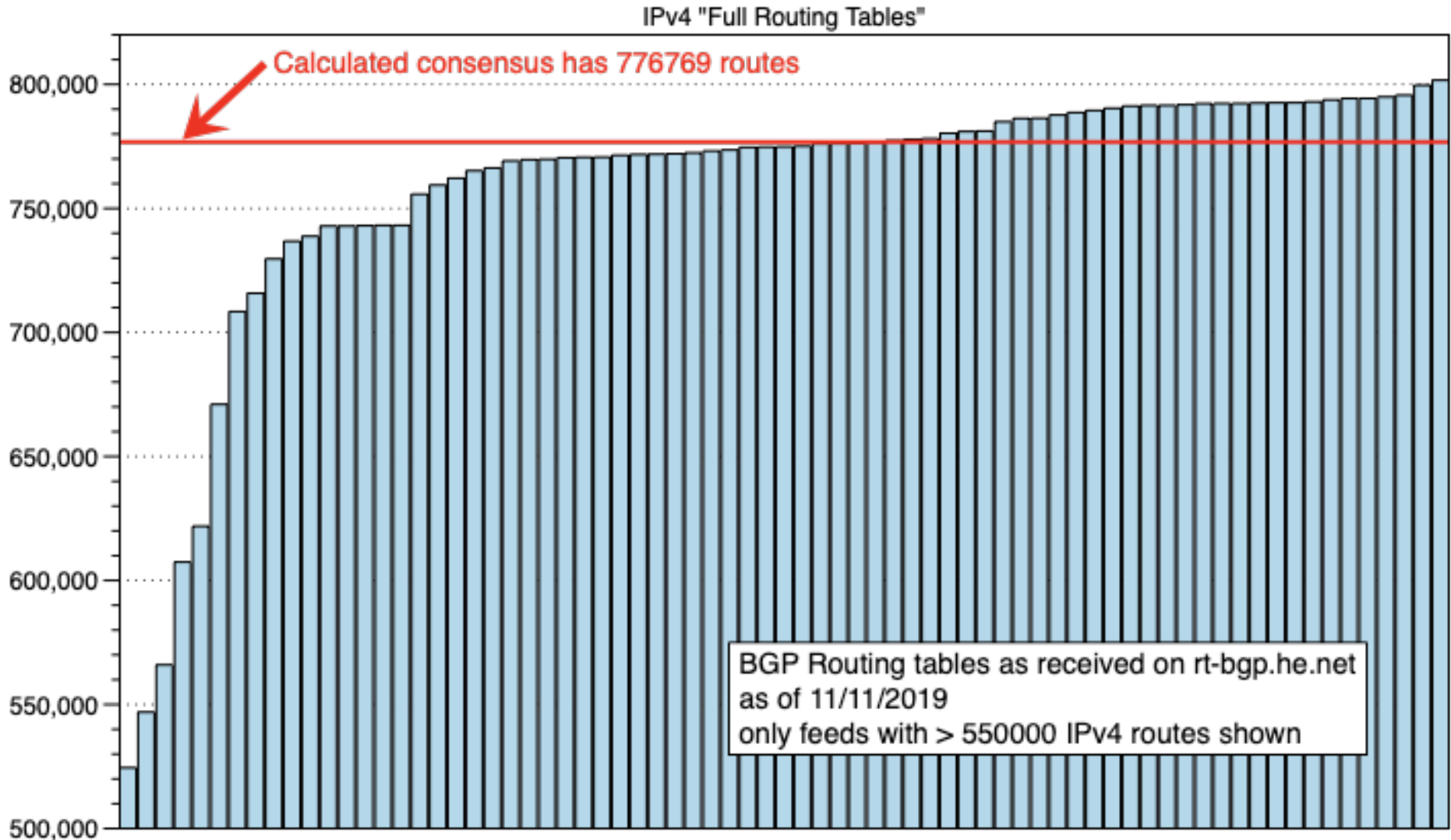
So, you think you have a full routing table?

► Comparing Routing Tables

- If a route is announced by “most” peers, then it’s counted as part of the full routing table
- Calculated “Consensus” on Nov 11, 2019 with
 - 776’769 IPv4 Routes
 - 76’319 IPv6 Routes
- Comparing the BGP feeds on rt-bgp.he.net against the full table
 - Not just route count – compare the actual routes
 - How many routes are missing?
 - How many routes are extra?

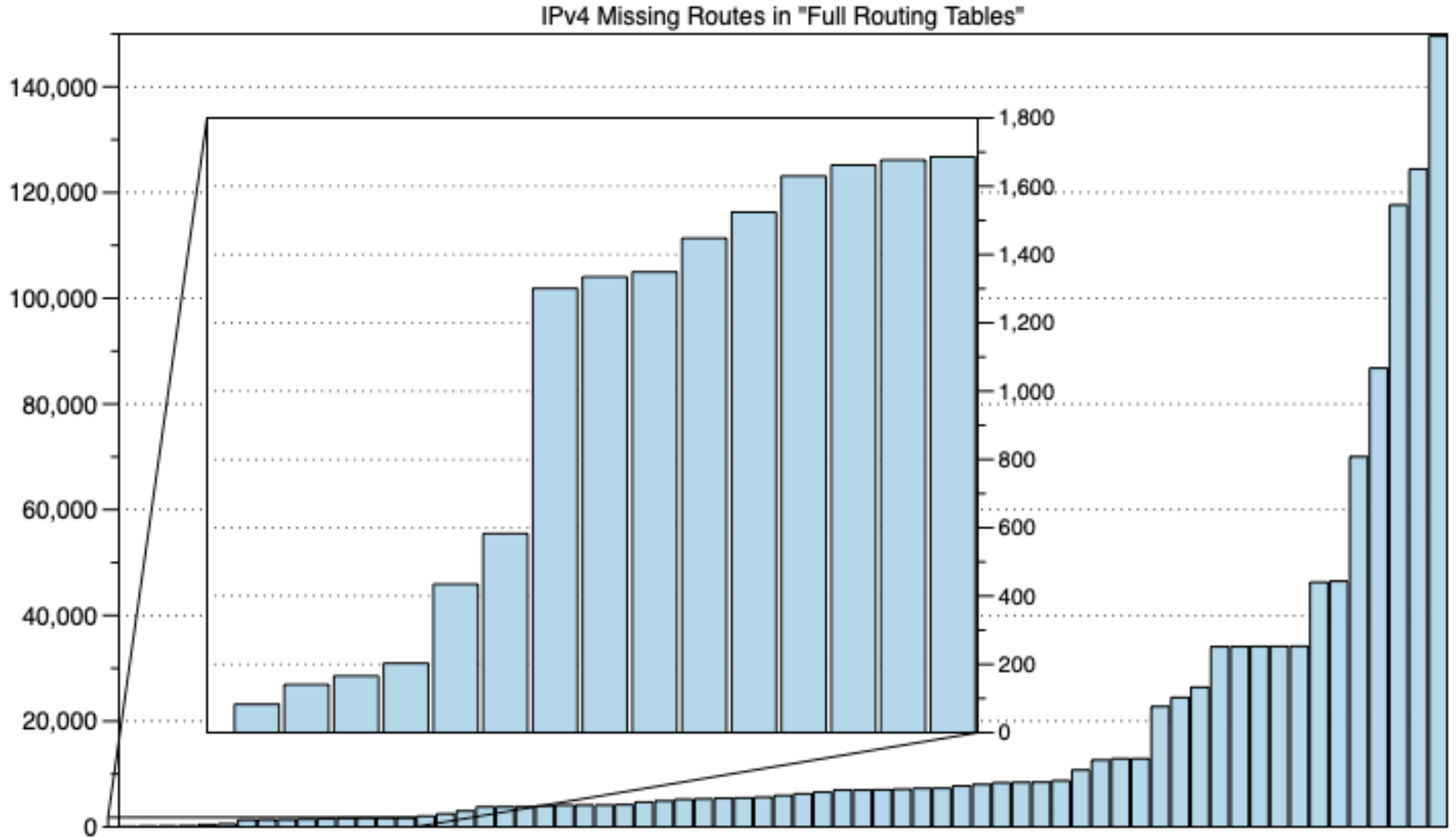
“Full Routing Table” - IPv4

What is a “full routing table” ?



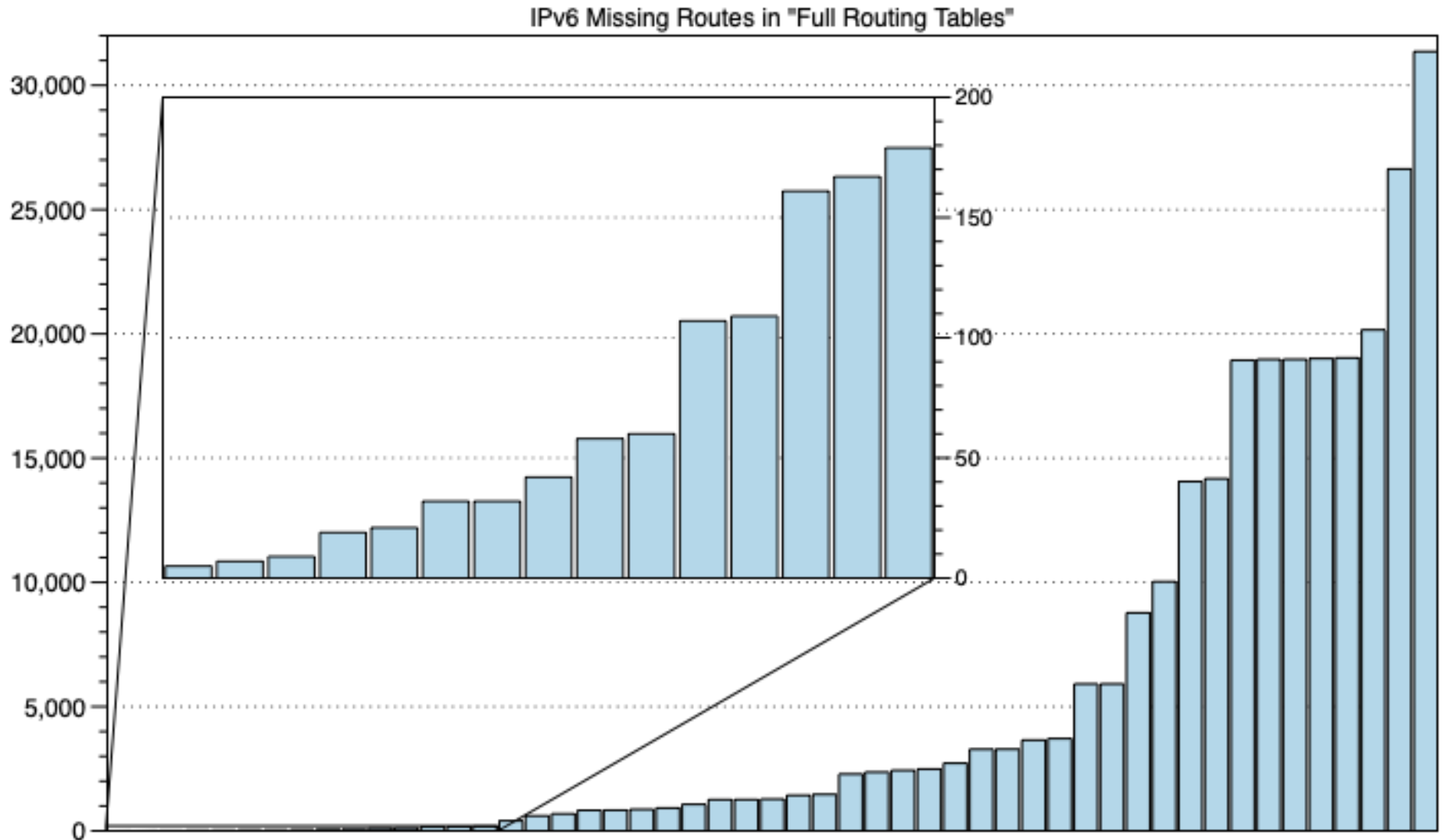
“Full Routing Table” - IPv4

Missing Routes from consensus (same peers)



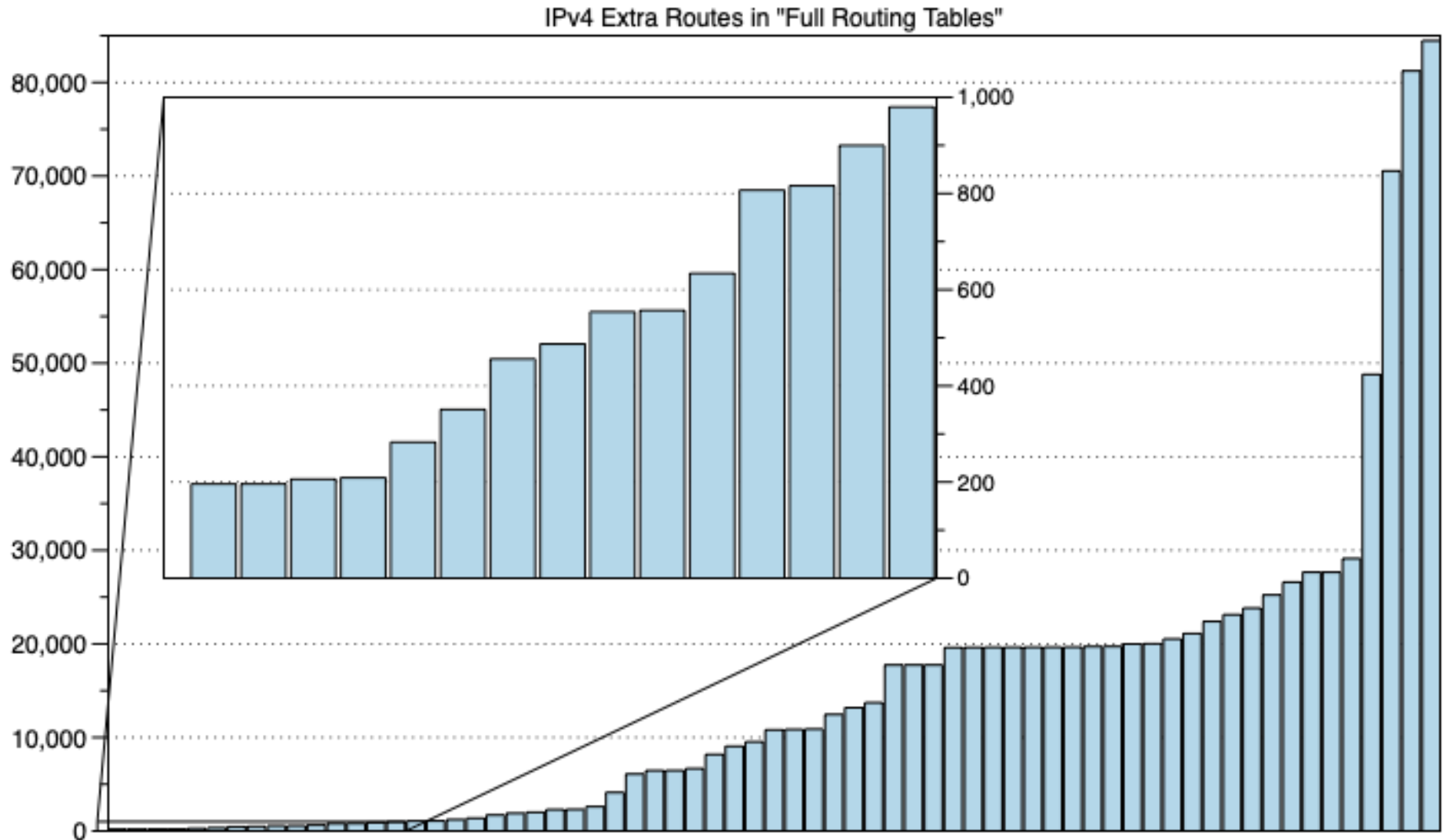
“Full Routing Table” - IPv6

Missing Routes from consensus (same peers)



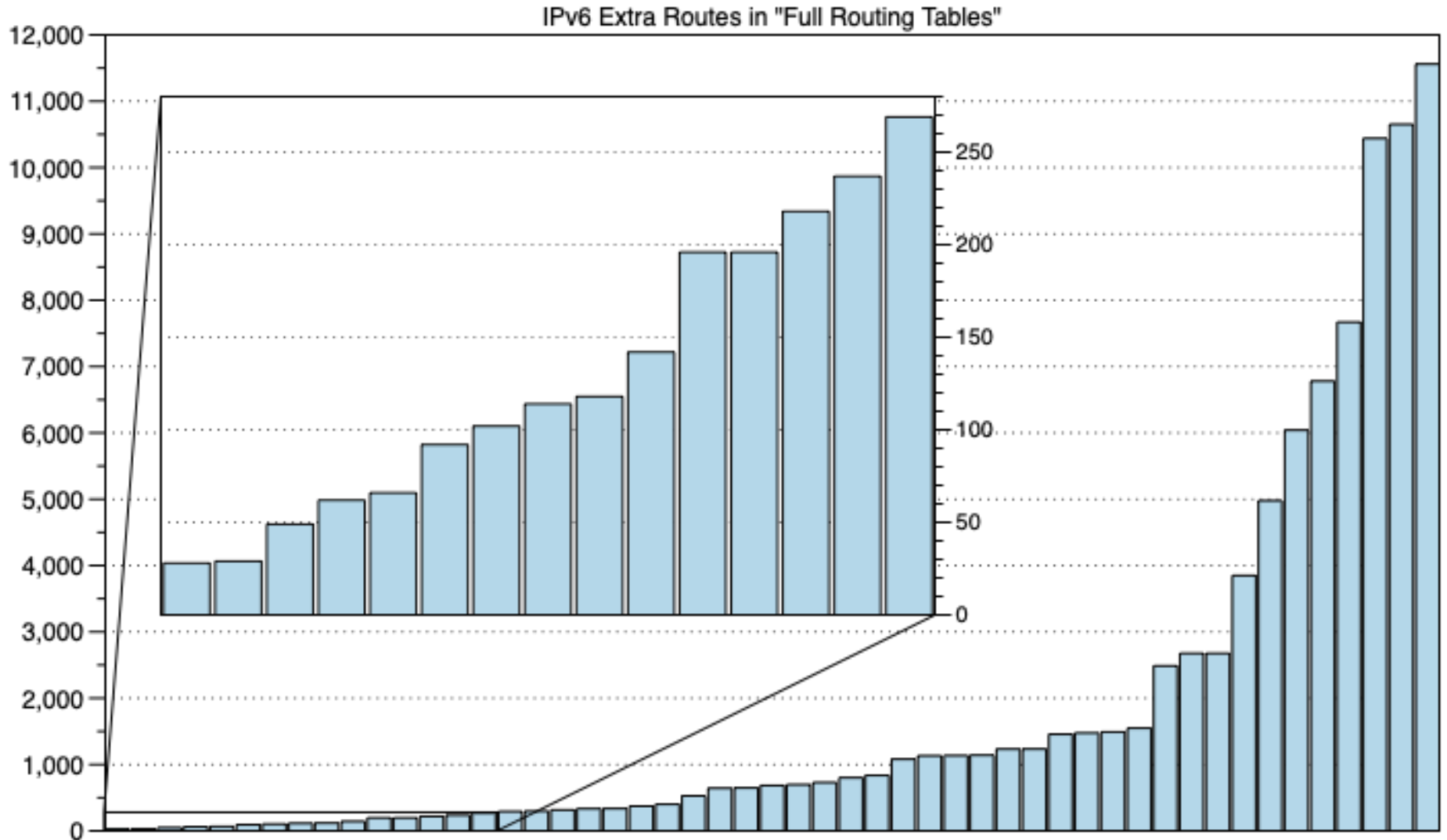
“Full Routing Table” - IPv4

Extra Routes (not part of calculated consensus)



“Full Routing Table” - IPv6

Extra Routes (not part of calculated consensus)



Unassigned AS-Numbers

Ignoring the leaks of private AS space

AS Path	Peer Address ▾	Prefix ▾	When ▾
52075 2914 3356 16637 36974 327074	46.193.247.196	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC
131477 6939 16637 36974 327074	154.48.252.34	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC
52075 6939 16637 36974 327074	46.193.247.196	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC
49752 58299 6939 16637 36974 327074	2a09:11c0:f1:bbf8::2	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC
15096 6939 16637 36974 327074	64.71.180.66	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC
49752 137490 6939 16637 36974 327074	2a09:11c0:f1:bbf8::2	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC
49752 137490 6939 16637 36974 327074	2a09:11c0:f1:bbf8::2	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC
49752 137490 6939 16637 36974 327074	2a09:11c0:f1:bbf8::2	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC
1403 174 16637 36974 327074	198.58.198.255	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC
52075 6939 16637 36974 327074	46.193.247.196	2001:43f8:b20::/48	2019-11-05 20:43:46 UTC

Unallocated !

Anyone filtering ??

BGP Attribute 21 ??

AS_PATHLIMIT

- ▶ Anyone remember [draft-ietf-idr-as-pathlimit](#)
- ▶ Hint: Expired 12 years ago
- ▶ From the draft:

This document describes the 'AS path limit' (AS_PATHLIMIT) path attribute for BGP. This is an optional, transitive path attribute that is designed to help limit the distribution of routing information in the Internet.

By default, prefixes advertised into the BGP graph are distributed freely, and if not blocked by policy will propagate globally. This is harmful to the scalability of the routing subsystem since information that only has a local effect on routing will cause state creation throughout the default-free zone. This attribute can be attached to a particular path to limit its scope to a subset of the Internet.

BGP Attribute 21 ??

AS_PATHLIMIT

► Seen from from 3 originating AS

- 2 out of 3 answered inquiry
- Both use the same firewall vendor (Palo Alto Networks)
- Still supported in current code (as of 8.1)
 - <https://www.paloaltonetworks.com/documentation/81/pan-os/web-interface-help/network/network-virtual-routers/bgp/bgp-redist-rules-tab>

Set AS Path Limit	Enter an AS path limit for the redistributed route in the range 1-255.
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HURRICANE ELECTRIC
INTERNET SERVICES

Try It

<https://rt-bgp.he.net>

Peer with it

AS 393338

Set up peering at <https://rt-bgp.he.net>

(create an account & login, then look for the menu option to add peering)

Contact Us

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