

How bgproutes.io supports latest technologies such as RPKI ROV, ASPA, and BMP

Current sponsors:



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University of Strasbourg

Joint work with:

Thomas Alfroy
Cristel Pelsser

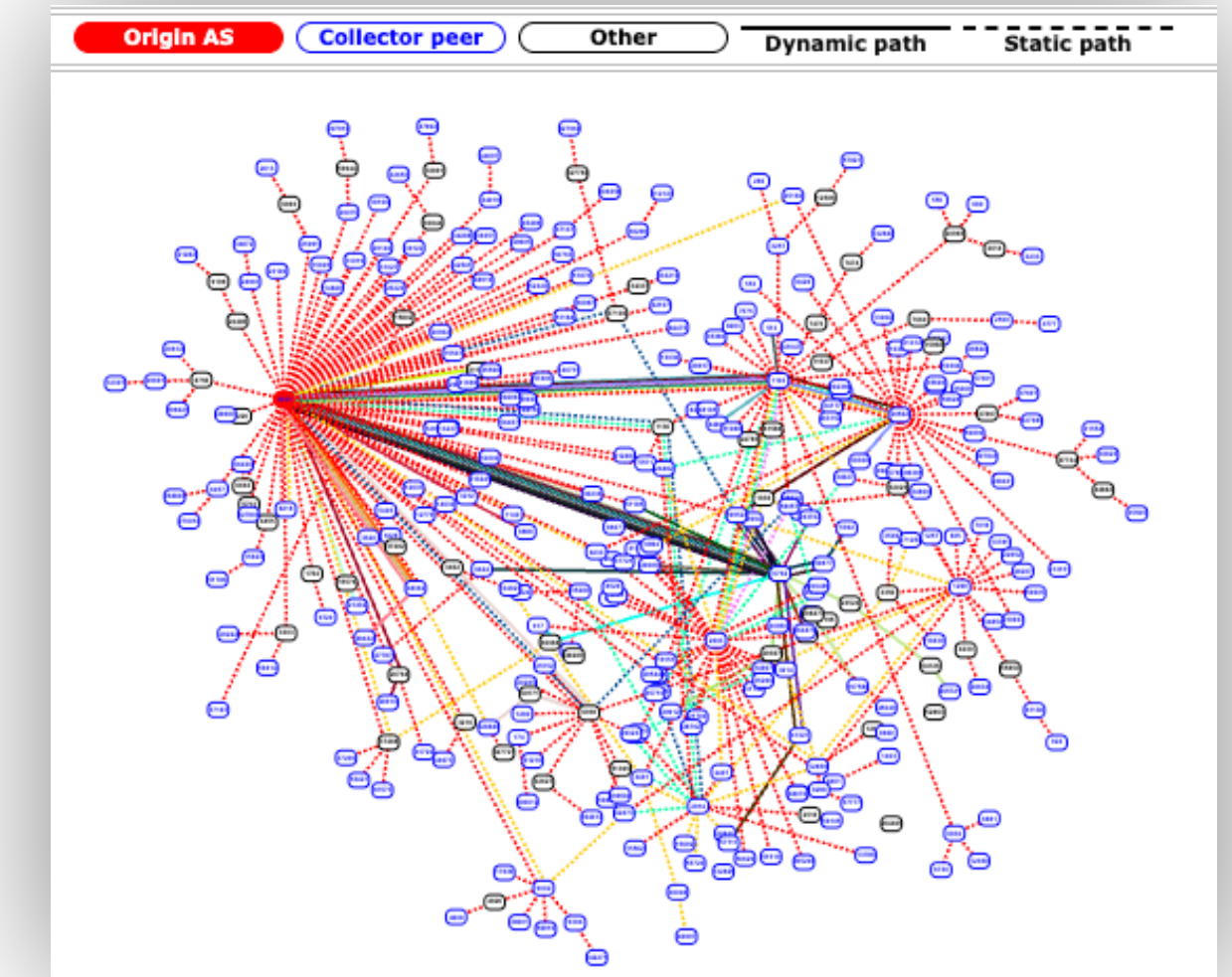


BGP data collected from real BGP routers is essential for understanding and monitoring Internet routing

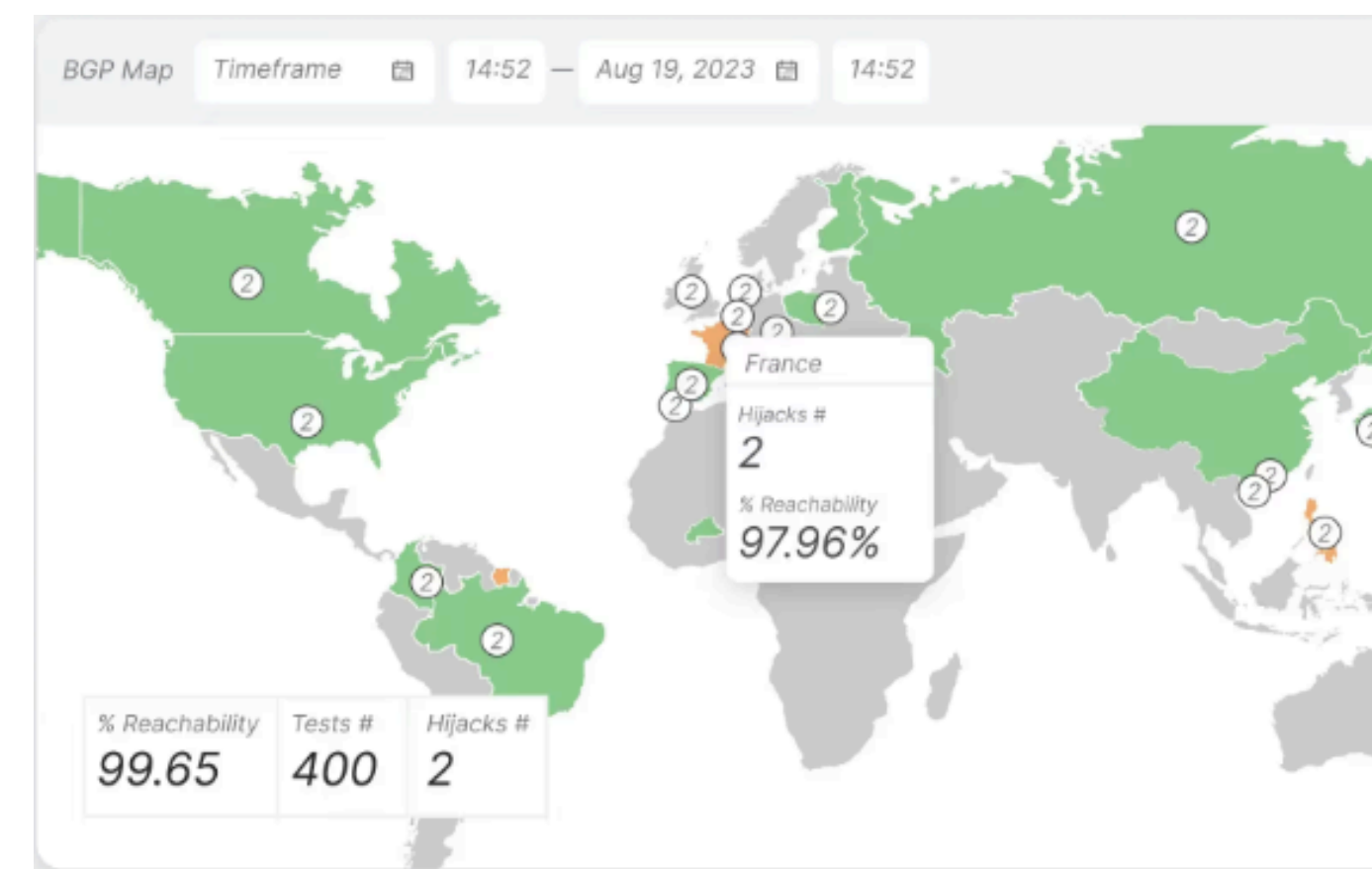
arrangements between ASes.

AS Rank ▲	AS Number ▼	Organization		cone size (ASes) ▼
1	3356	Level 3 Parent, LLC		53982
2	1299	Arelion Sweden AB		41919
3	174	Cogent Communications		37559
4	3257	GTT Communications Inc.		36334
5	2914	NTT America, Inc.		26976
6	6939	Hurricane Electric LLC		21697
7	6762	Telecom Italia S.p.A.		20271
8	6453	TATA COMMUNICATIONS (AMERICA) INC		19334
9	6461	Zayo Bandwidth		18116
10	3491	PCCW Global, Inc.		11530

CAIDA's AS rank



BGPlay
RIPEStat



Catchpoint's BGP map

The three longstanding platforms that collect, archive, and publicly share BGP data are RIPE RIS, RouteViews and PCH



▶ RIS and RouteViews collect and store data from ~1500 BGP routers (*a.k.a. "vantage points"*)

bgproutes.io

Our new next-gen BGP route collection platform



<https://bgproutes.io>

You can contribute data

bgproutes.io

Our **new** next-gen BGP route collection platform

We launched it
1.5 years ago



<https://bgproutes.io>

You can contribute data

BGP data collection platforms typically pursue two main objectives

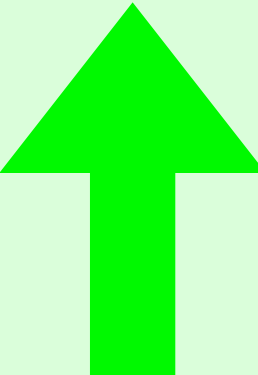
High coverage

Perpetual data retention

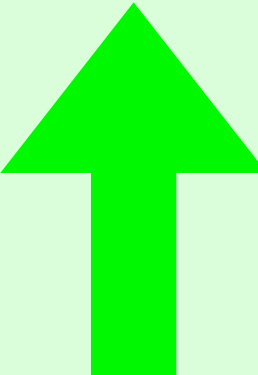
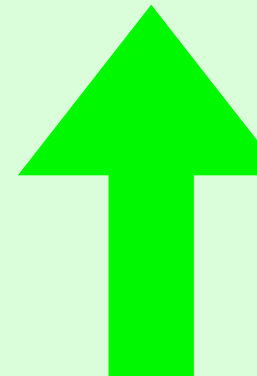
BGP data collection platforms typically pursue two main objectives that are not easily compatible

Priority	
High coverage	Perpetual data retention

BGP data collection platforms typically pursue two main objectives that are not easily compatible

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	High coverage	Perpetual data retention
RIPE RIS RouteViews	Lower priority	High priority 

BGP data collection platforms typically pursue two main objectives that are not easily compatible

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	High coverage	Perpetual data retention
RIPE RIS RouteViews	Lower priority	High priority 
bgproutes.io	High priority 	Lower priority

bgproutes.io

Our new **next-gen** BGP route collection platform

- ✓ New strategies for high coverage (e.g., BMP)

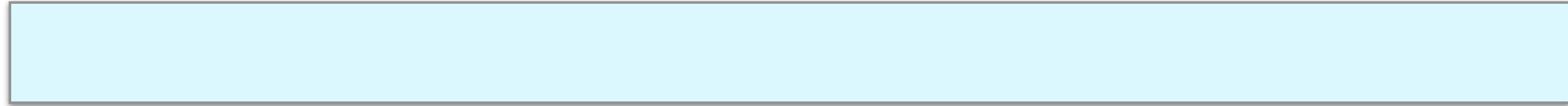


<https://bgproutes.io>

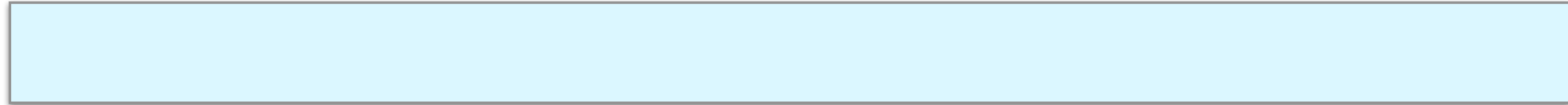
You can contribute data

bgproutes.io relies on three ingredients to increase its coverage

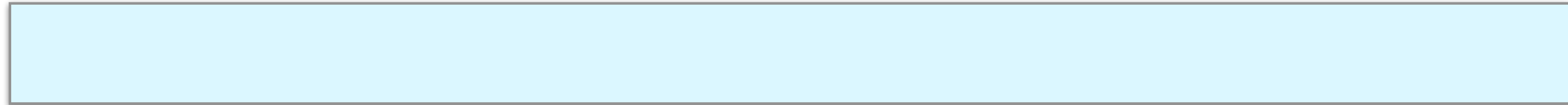
Ingredient #1



Ingredient #2



Ingredient #3



bgproutes.io relies on three ingredients to increase its coverage

Ingredient #1

Automated peering establishment

Ingredient #2

Ingredient #3

bgproutes.io simplifies, automates
and opens BGP data contribution to every ASN

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Network operators can authenticate
using PeeringDB

Network operators just have to fill
a form to start peering with bgproutes.io

Step #1: Submit your connection details

Select the VM with whom you want to connect.

185.216.75.11 (USA) ▾

i We recommend selecting the VM with the lowest latency to your router for more accurate timestamps.

Tell us with which IP address we should start peering.

Your IP address (v4 or v6)

Tell us with which AS number we should start peering.

2200 ▾

Our AS number is **65000**.

i We will soon make iBGP sessions possible. They will be recommended as updates with the NO_EXPORT community will still be forwarded to our platform through iBGP.

Submit

Today, **bgproutes.io** collects BGP data from ~100 networks

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This is useful, but far from sufficient for accurate monitoring

bgproutes.io relies on three ingredients to increase its coverage

Ingredient #1

Automated peering establishment

Ingredient #2

Data aggregation

Ingredient #3

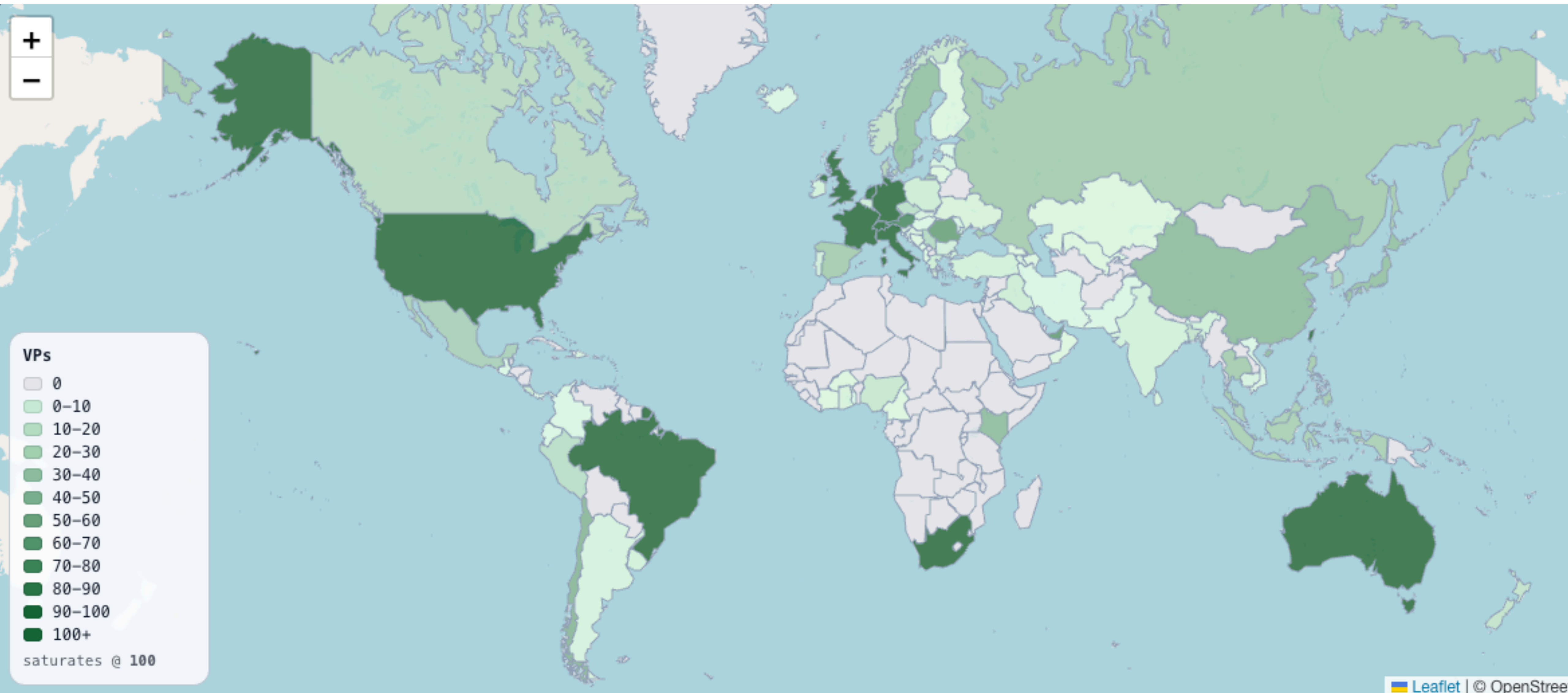
bgproutes.io increases coverage by centralising all the data collected by RIPE RIS, RouteViews, PCH, CGTF into a single database

Data providers ⓘ

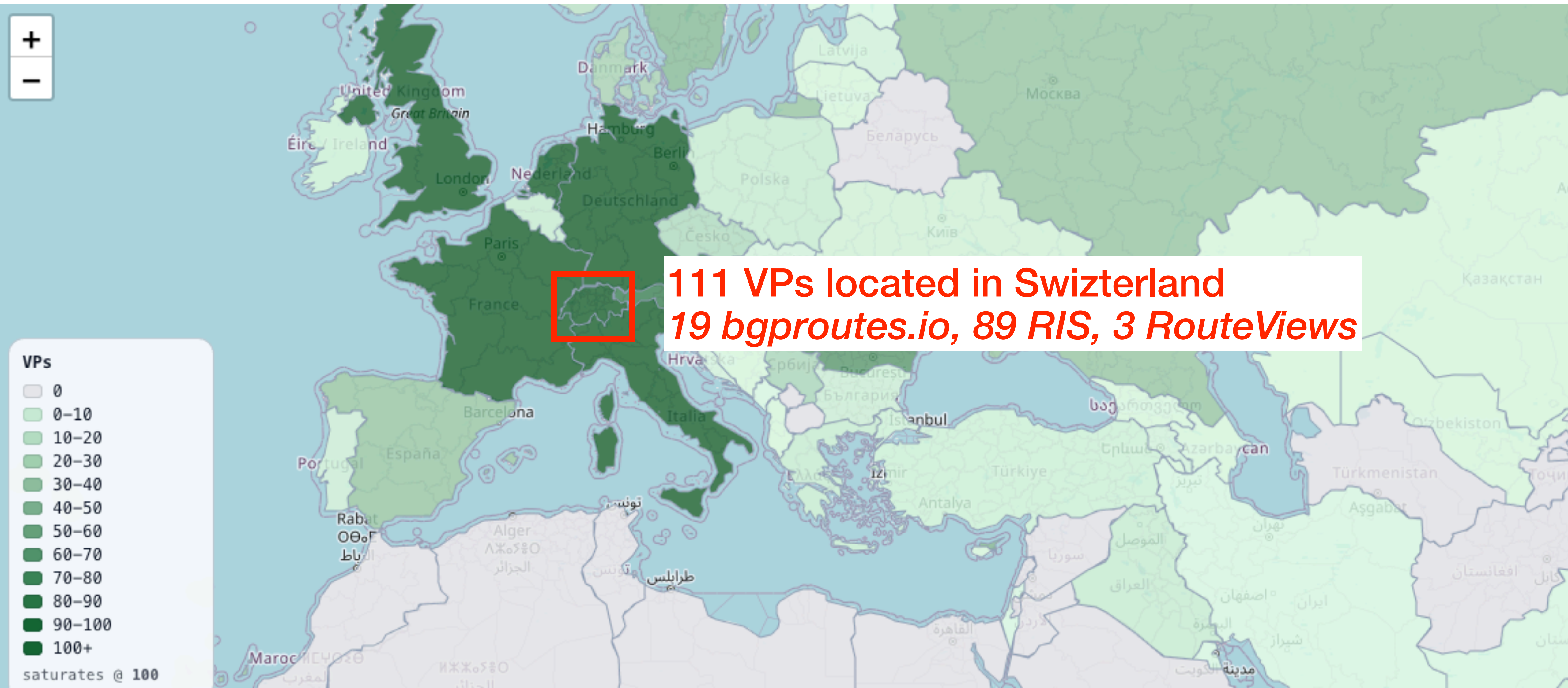
Name	Number of vantage points
bgproutes.io	v4: 33 v6: 8
RIPE RIS	v4: 833 v6: 695
RouteViews	v4: 745 v6: 706
PCH	v4: 2150 v6: 397
CGTF RIS	v4: 16 v6: 51

<https://vp-explorer.bgproutes.io>

bgproutes.io already stores data
for more than 5000 vantage points



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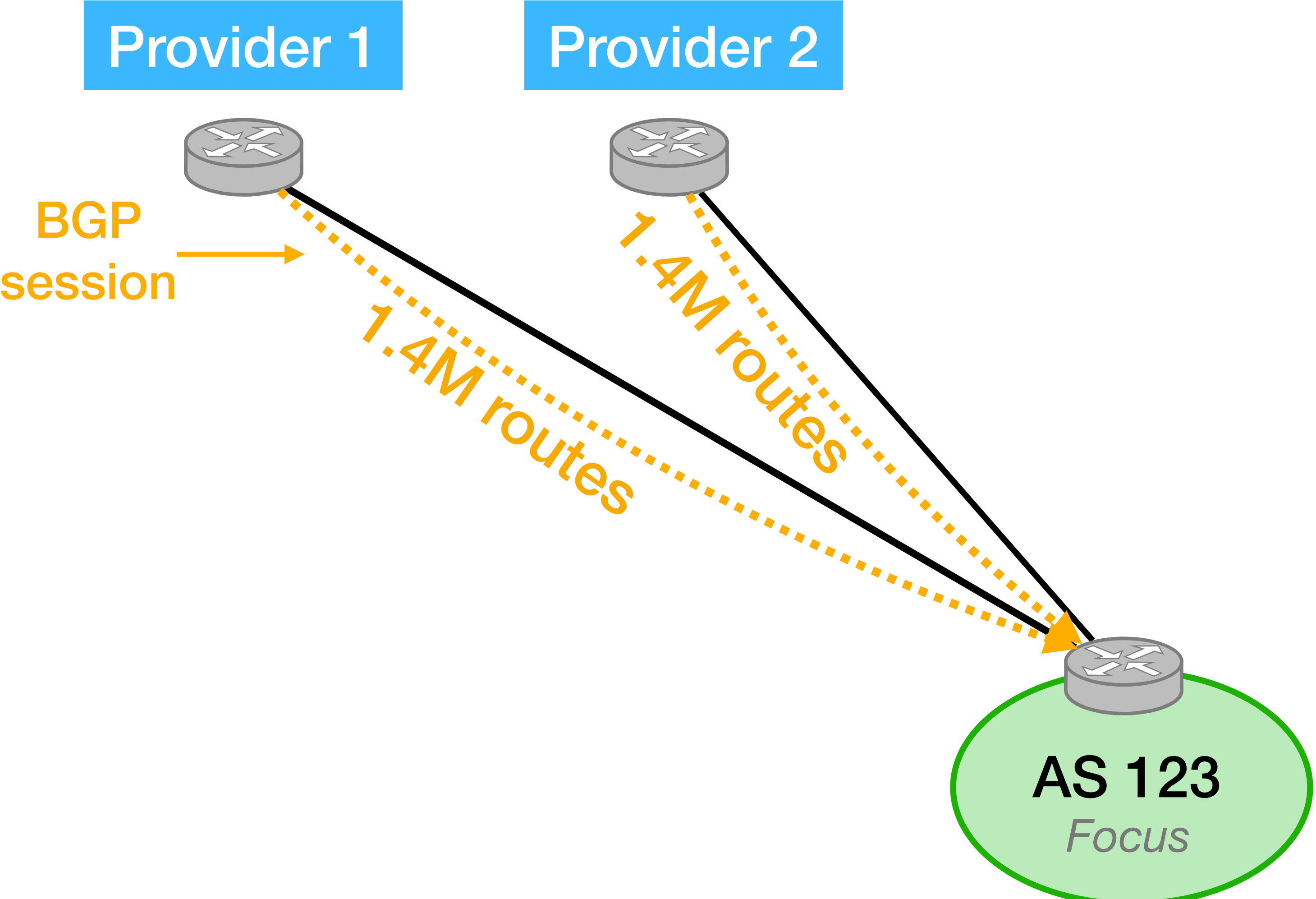
Data aggregation

Ingredient #3

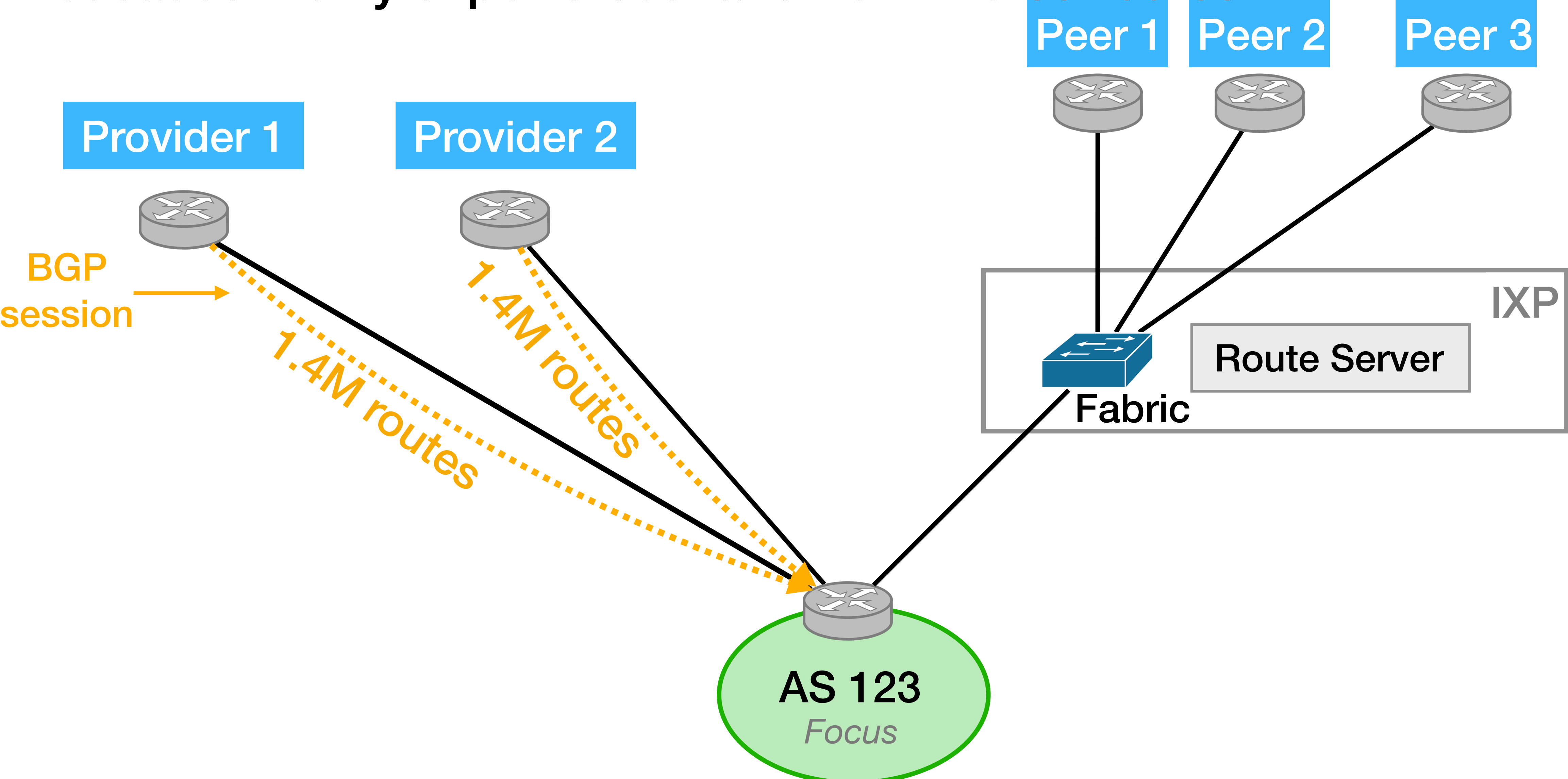
BMP

BGP wastes useful information when used for monitoring because it only exports best and non-filtered routes

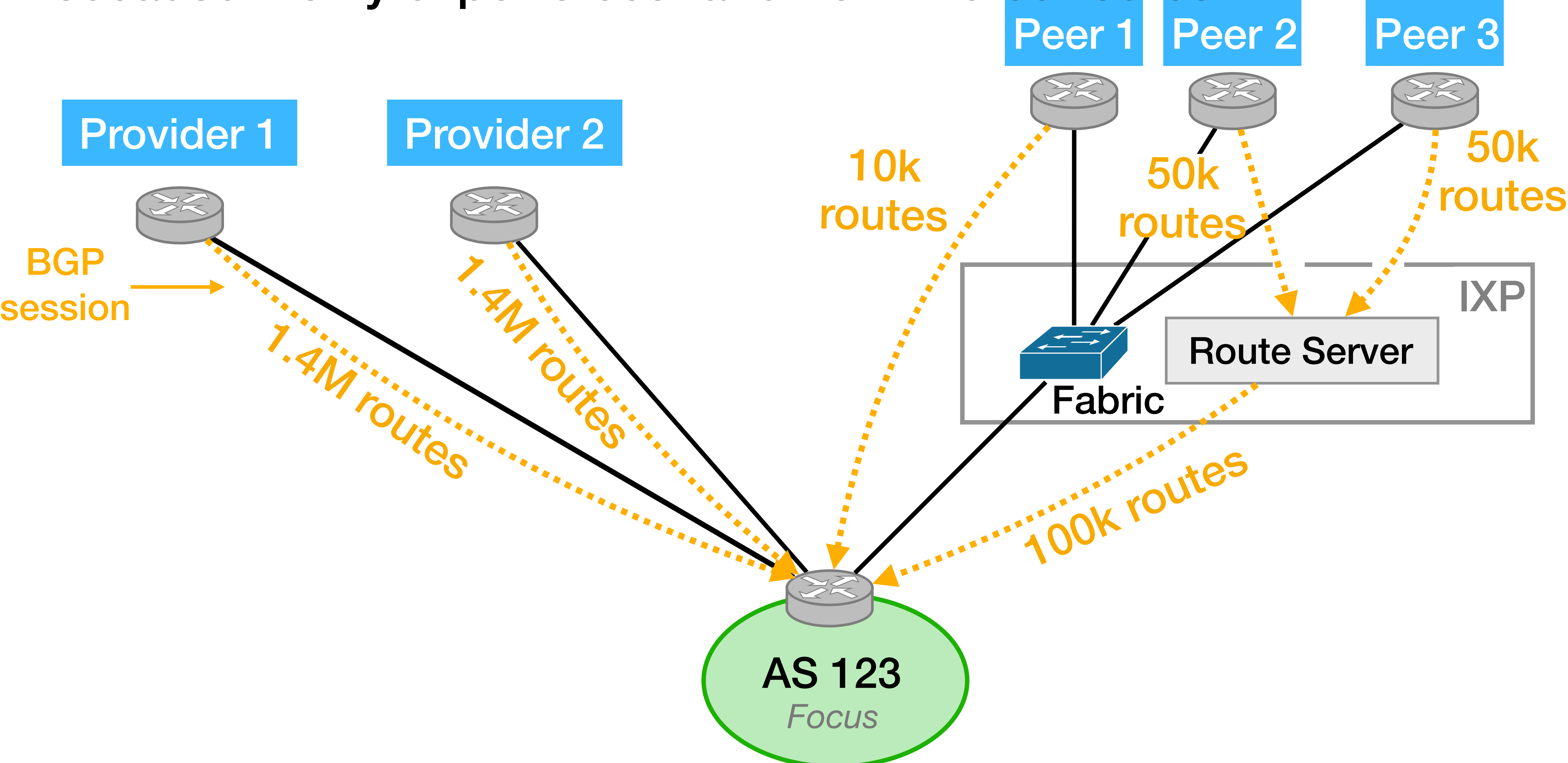
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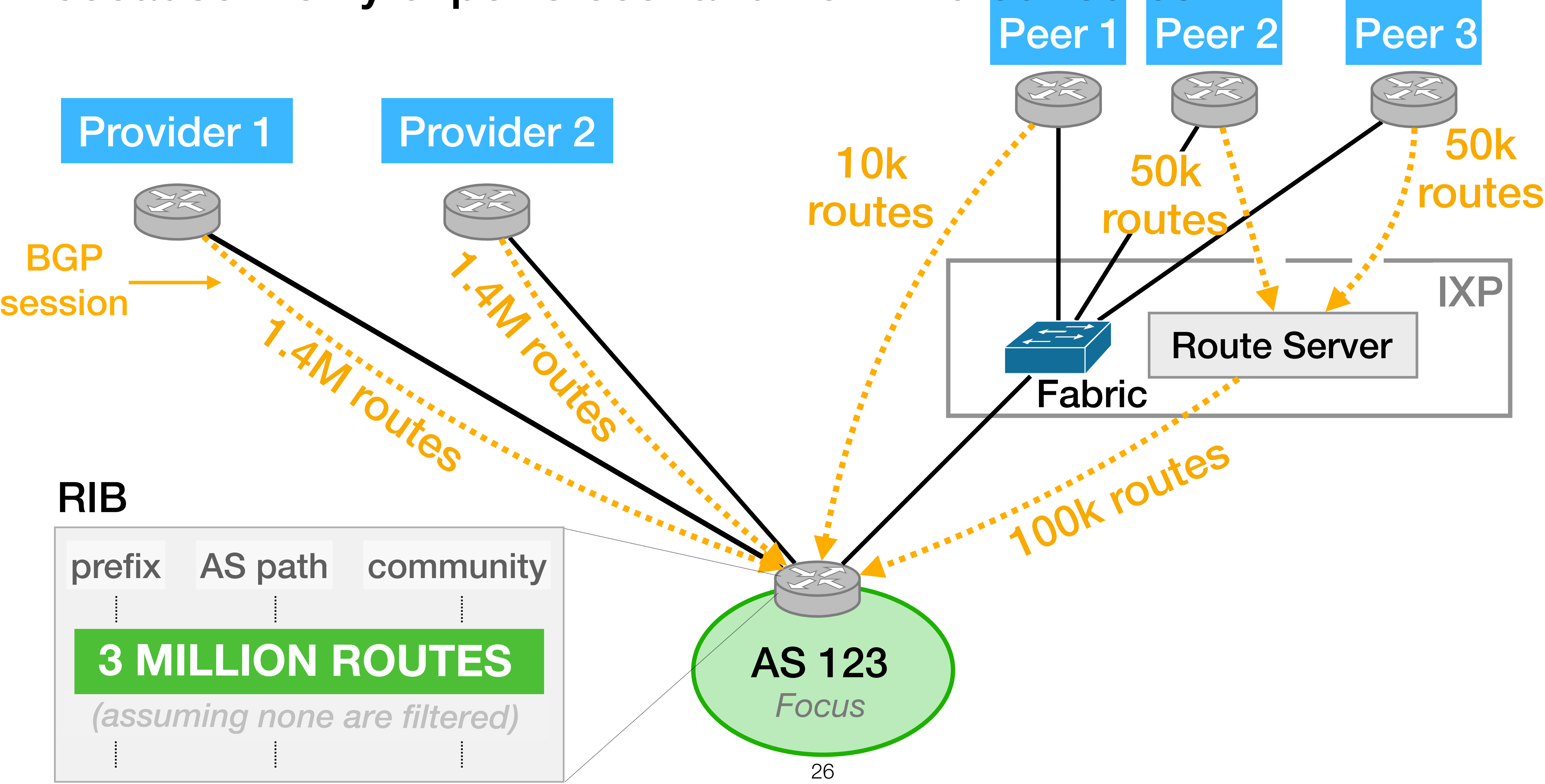
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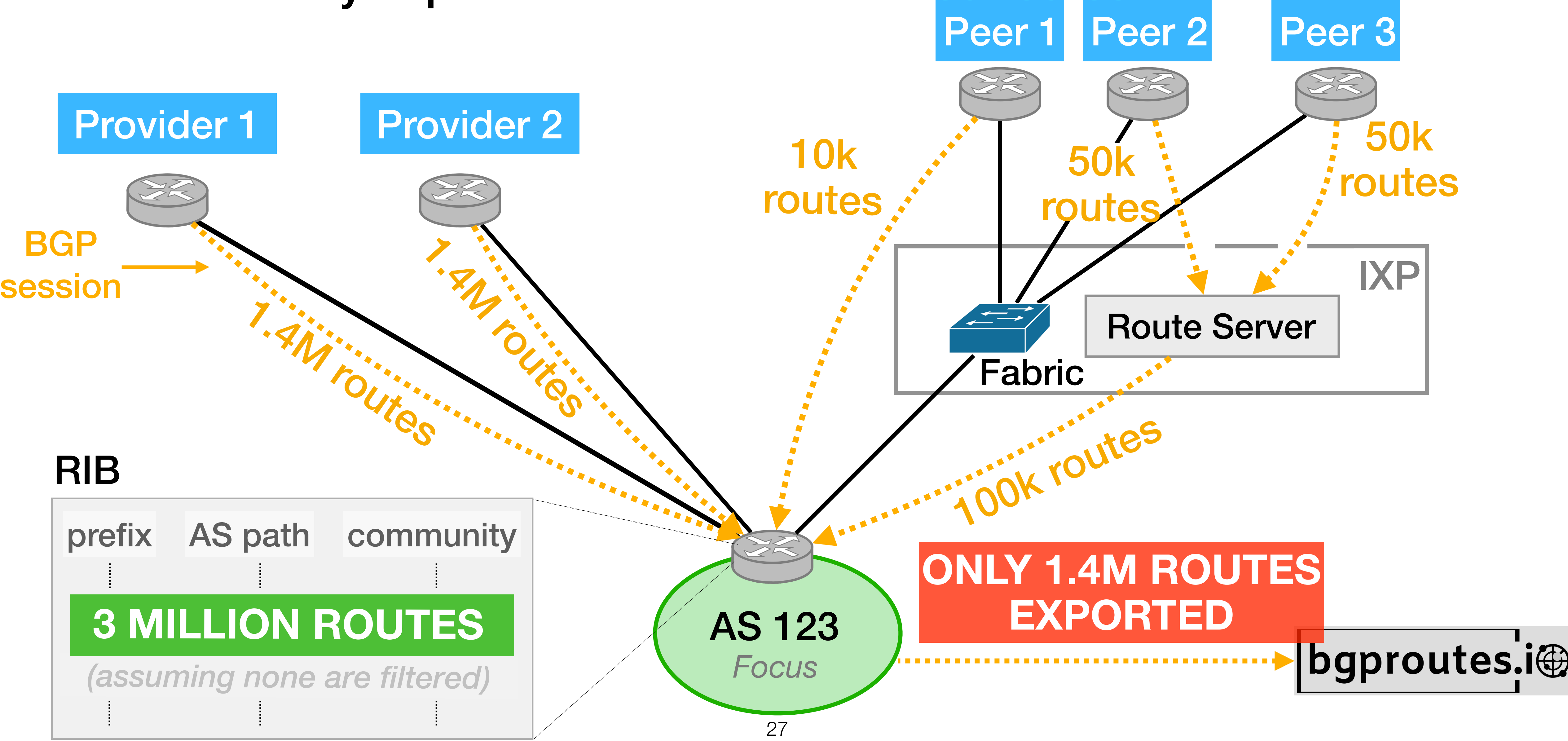
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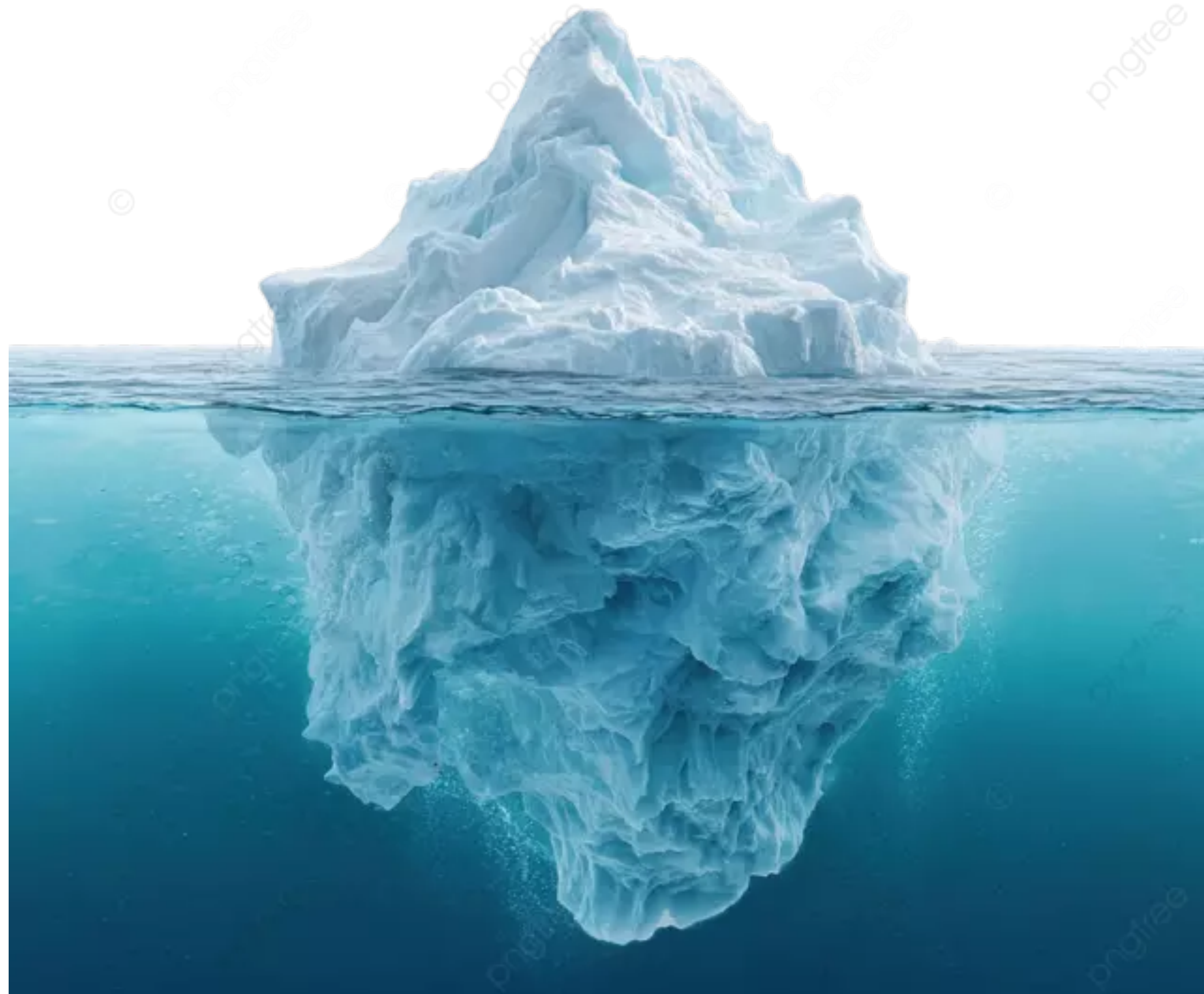
BGP wastes useful information when used for monitoring because it only exports best and non-filtered routes



The iceberg analogy works well here

Routes collected from BGP sessions
are the top of the iceberg

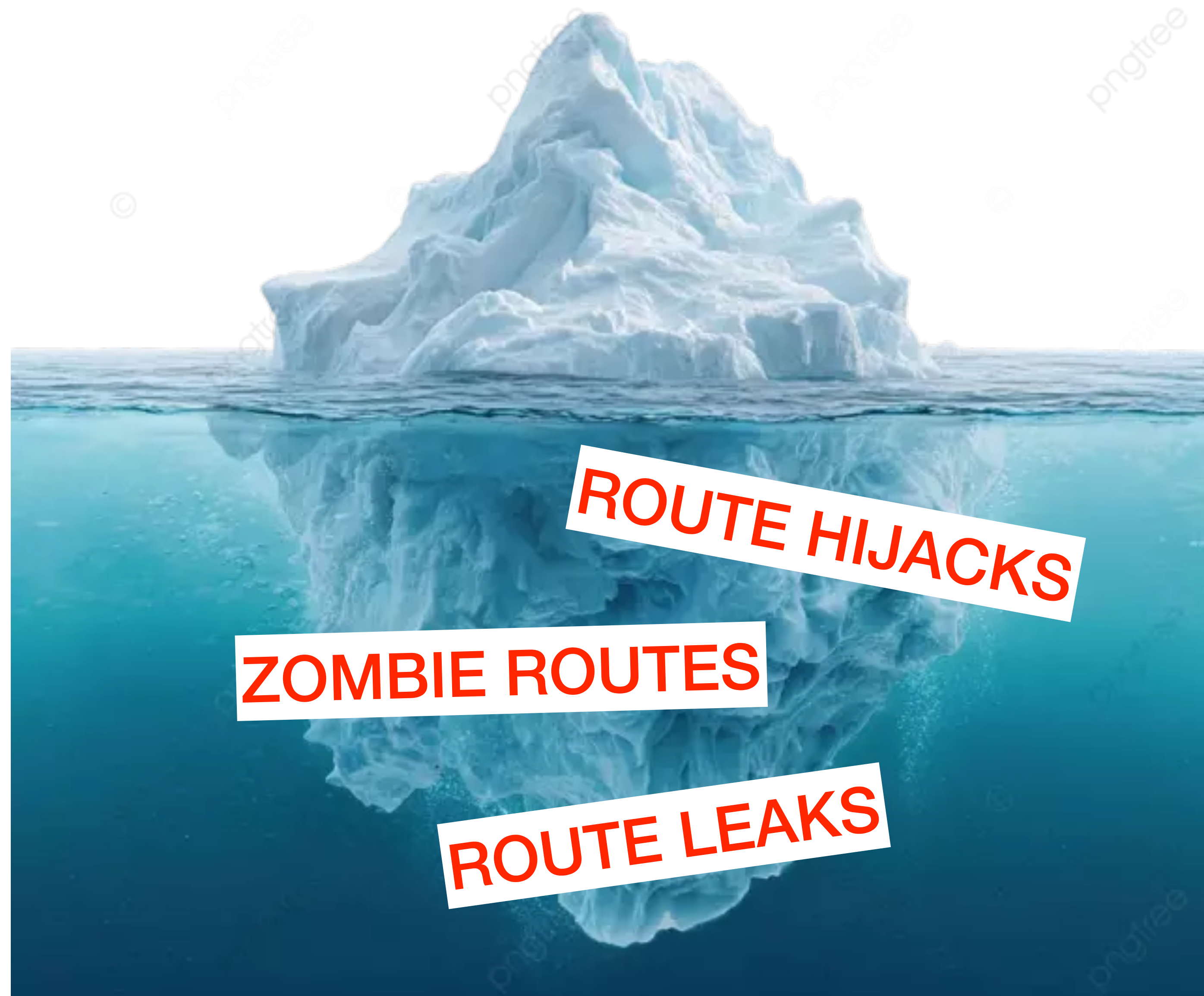
Most remain invisible



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Routes collected from BGP sessions are the top of the iceberg

Most remain invisible



bgproutes.io can gather BGP route updates
via the BGP Monitoring Protocol (BMP) – *and it is a game changer!*

- ✓ BMP exports all route updates received from every peer
That means, backup routes are exported!

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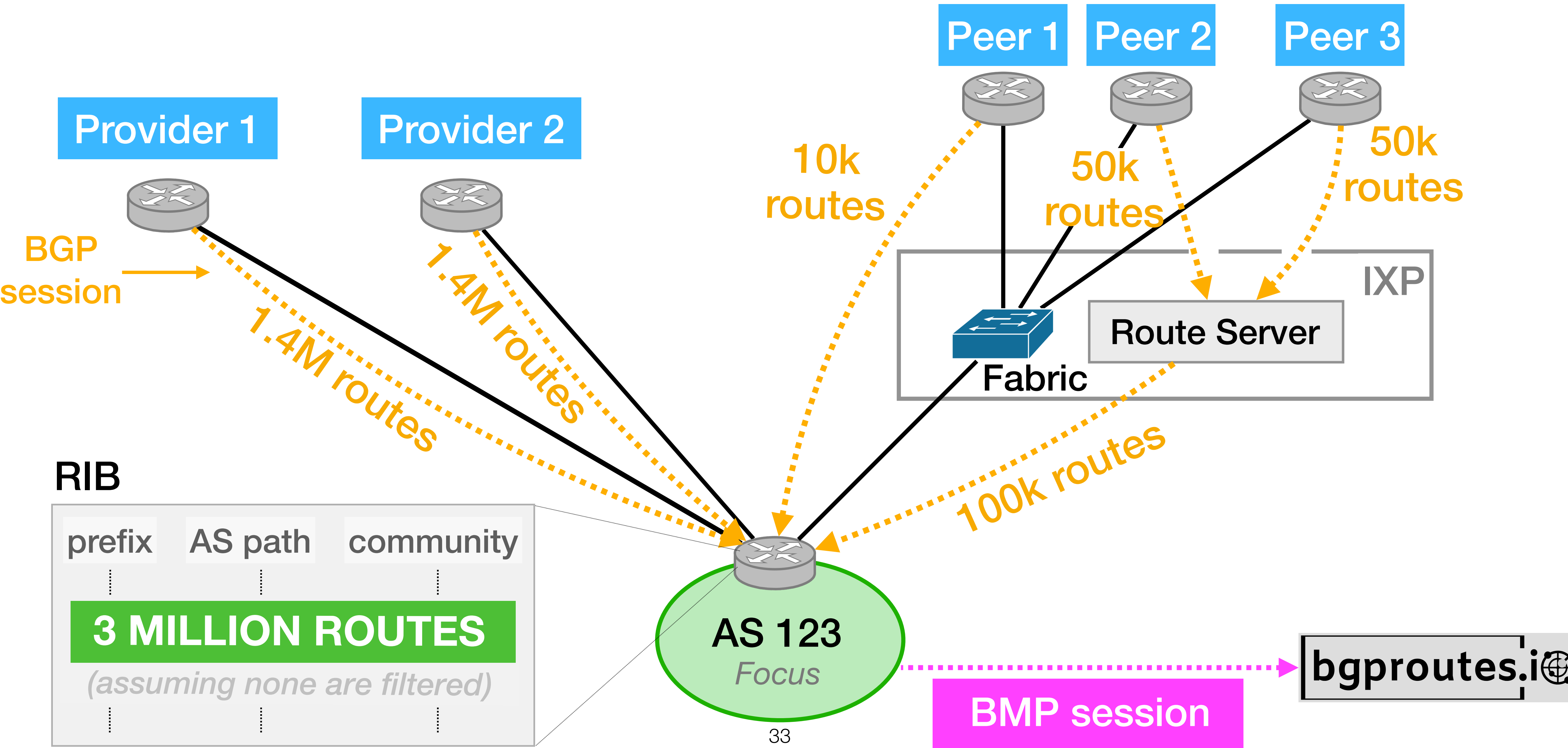
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Including the pre-filter stage – which is not the case with BGP Add Path

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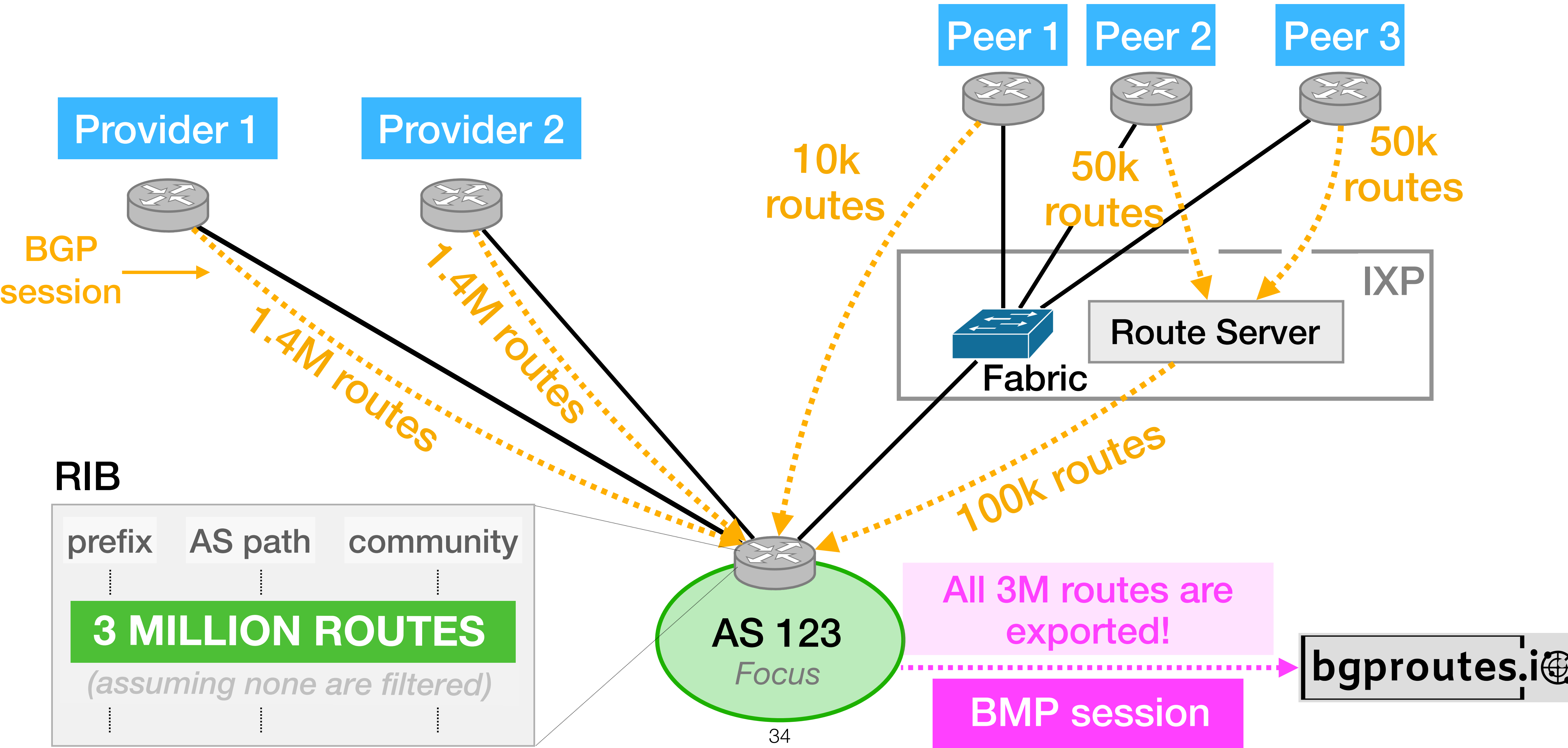
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➔ BMP is also simple to configure

With BMP: no more useful information wasted




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bgproutes.io has ~39 BMP sessions with 19 networks
and the previous example translates well in practice

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Example: **Edge-connect (AS328365)** from South Africa  exports all routes it receives from 465 peers!

- One IPv6 full feed from Hurricane Electric
- Few feeds from IXP route servers (e.g. NAPAfrica, INX-ZA)
- Hundreds of feeds from bilateral sessions through IXPs

Several BMP sessions export data for more than 100 peers!
They are visible in our dashboard “Vantage Points Explorer”

The screenshot shows the bgproutes.io Vantage Points Explorer dashboard. At the top left is the logo 'bgproutes.io' and a 'Vantage Po' button. Below the logo is a dropdown menu labeled 'Group VPs by' with 'BMP parent ASN' selected. There are several filter buttons: 'Full feeders only', 'IPv4', 'IPv6', 'BGP', and 'BMP'. A search bar is present with the placeholder text 'Search (ID, org, AS, country, platform)'. Below the search bar is a pagination control showing 'Showing 1-17 of 17'. The main content is a table with two columns: 'Organization' and '# VPs'. The table lists several organizations with their respective VPs counts.

Organization	# VPs
 Edge-connect (AS328365)	465
 TWDS-AS-TW (AS18041)	144
 WEDOS (AS197019)	136
 LANLEB-IU13 (AS14773)	124
 NOK-IP-NET-LABS (AS38016)	111
 ABICOM (AS48213)	95

Several BMP sessions exports data for more than 100 peers!
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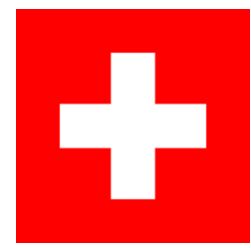
The dashboard shows the following data:

Organization	# VPs
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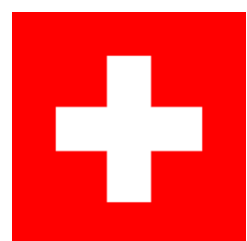
ID	Organization	IP
ID17990	bgproutes	196.223.30.219
ID17810	bgproutes	2001:43f8:6d1::7:
ID17959	bgproutes	196.223.30.2
ID17923	bgproutes	2001:43f8:6d1::26
ID17856	bgproutes	2001:43f8:1f1::16
ID17785	bgproutes	196.60.70.2
ID17880	bgproutes	2001:43f8:6d1::7:

INX-ZA route server

NAPAFRICA route server



Canton of Appenzell Ausserrhoden is already connected with BMP!



Canton of Appenzel Ausserrhoden is already connected with BMP!

bgproutes.i Vantage Points Explorer

Group VPs by BMP parent ASN

Full feeders only IPv4 IPv6 BGP BMP

Search (ID, org, AS, country, platform)...

Showing 1-21 of 21

Organization	# VPs
FUNKFEUER (AS35492)	84
Stocade (AS214809)	44
glauca-carrier (AS202359)	40
Sdnbucks (AS205755)	37
ERTIUS-NET (AS213576)	34
OVH (AS16276)	24
KANTONAR (AS211452)	16
OuestNetwork-RouteServ... (AS49451)	15
NMFN (AS32697)	12

Showing 1-16 of 16

ID	Platform	IP/ASN
ID9094	bgproutes	91.232.229.253
ID9102	bgproutes	193.34.198.16
ID9108	bgproutes	2001:7f8:15c::1
ID9097	bgproutes	77.109.183.173
ID9096	bgproutes	91.232.229.22
ID9105	bgproutes	2001:7f8:66::42
ID9099	bgproutes	193.34.198.1
ID9107	bgproutes	2001:7f8:15c::2
ID9100	bgproutes	2001:7f8:66::22
ID9104	bgproutes	2001:1620:1000::2

Rheintal IX

Init7

SwissIX

bgproutes.io

Our new **next-gen** BGP route collection platform

- ✓ New strategies for high coverage (e.g., BMP)
- ✓ Support the latest security standards (ROV, ASPA)



<https://bgproutes.io>

You can contribute data

bgproutes.io stores each collected route along with its RPKI ROV and ASPA status inferred at the time the route is received

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Route Origin Validation: Verify that the origin of an AS path is legitimate
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ASPA-based Validation: Verify that there is no valley-free violation in the AS path

Possible outcome:

Upstream **Valid** or
Upstream **Invalid** or
Upstream **Unknown**

And

Downstream **Valid** or
Downstream **Invalid** or
Downstream **Unknown**

bgproutes.io

Our new **next-gen** BGP route collection platform

- ✓ New strategies for high coverage (e.g., BMP)
- ✓ Support the latest security standards (ROV, ASPA)
- ✓ New API and dashboards



<https://bgproutes.io>

You can contribute data

Collecting more data is useful

But only if users can effectively process it

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Current MRT archives consist of 1000+ compressed files for updates and RIB dumps

BGP data is intermingled across all these files

➔ MRT is hard to process

The image shows two overlapping screenshots of a file directory listing. The top screenshot is titled "Index of /bgpdata" and shows a list of sub-directories from 2001.10/ to 2002.07/. The bottom screenshot shows a sub-directory listing for "a/2025.05/RIBS" with individual files named "rib.20250501.0000.bz2" through "rib.20250501.2000.bz2".

Name	Last modified	Size	Description
Parent Directory		-	
2001.10/	2004-02-23 20:19	-	
2001.11/	2004-02-23 20:20	-	
2001.12/	2004-02-23 20:27	-	
2002.01/	2004-02-23 20:36	-	
2002.02/	2004-02-23 20:46	-	
2002.03/	2004-02-23 20:56	-	
2002.04/	2004-02-23 21:08	-	
2002.05/	2004-02-23 21:19	-	
2002.06/	2004-02-23 21:29	-	
2002.07/	2004-02-23 21:40	-	

Name	Last modified	Size	Description
rib.20250501.0000.bz2	2025-05-01 00:00	85M	
rib.20250501.0200.bz2	2025-05-01 02:00	85M	
rib.20250501.0400.bz2	2025-05-01 04:00	85M	
rib.20250501.0600.bz2	2025-05-01 06:00	85M	
rib.20250501.0800.bz2	2025-05-01 08:00	85M	
rib.20250501.1000.bz2	2025-05-01 10:00	87M	
rib.20250501.1200.bz2	2025-05-01 12:00	88M	
rib.20250501.1400.bz2	2025-05-01 14:00	88M	
rib.20250501.1600.bz2	2025-05-01 16:00	88M	
rib.20250501.1800.bz2	2025-05-01 18:00	88M	
rib.20250501.2000.bz2	2025-05-01 20:00	88M	

Typical MRT archive

bgproutes.io comes with a **simple** and **fast** API that provides **high-granularity** access to BGP data

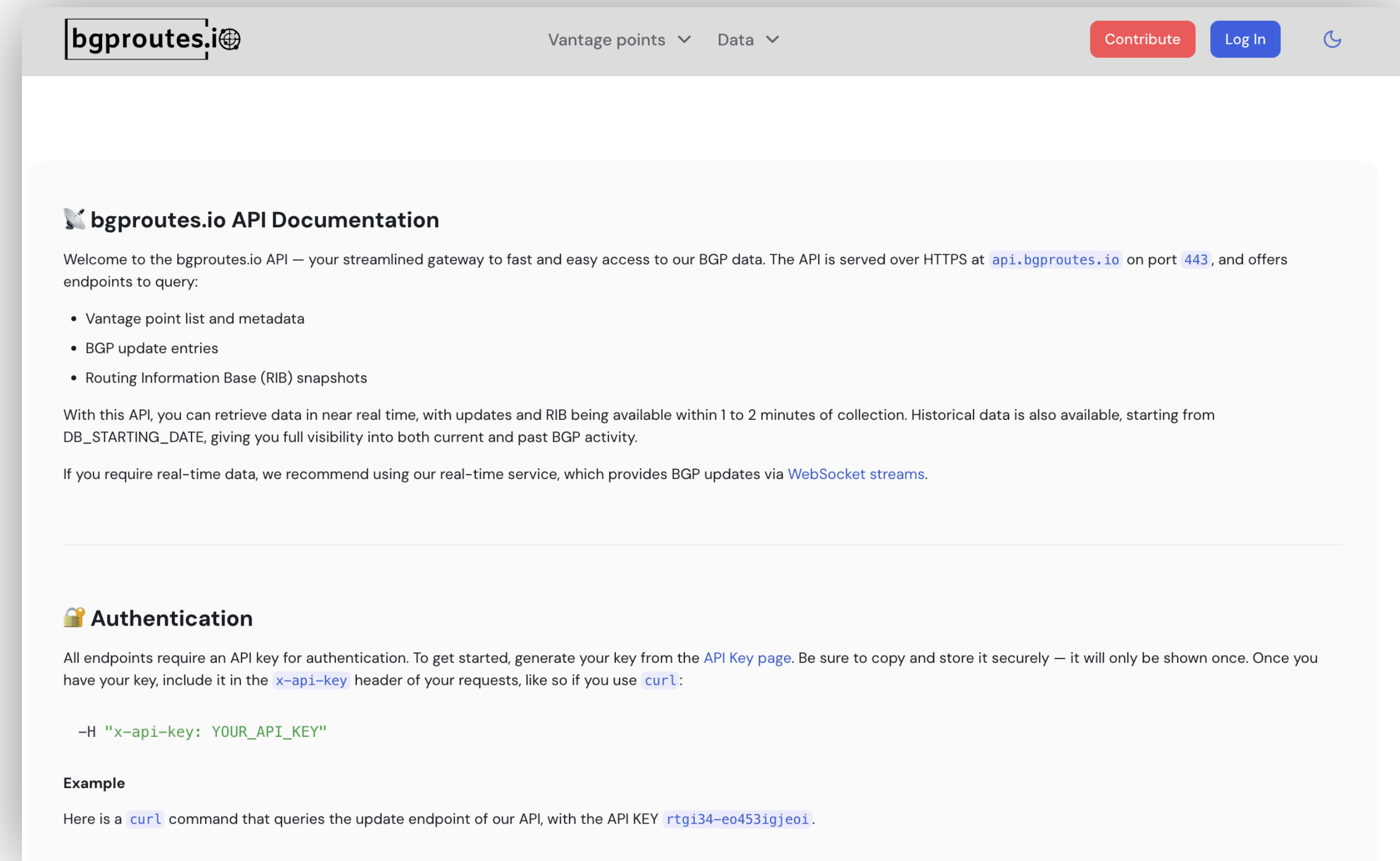
The API offers four endpoints:

vantage_points

updates

rib

topology



bgproutes.io/data_api

Imagine a network operator trying to retrieve all BGP updates for which their ASN appears in the AS path on April 28, 2026

```
# Let's use our Python client to retrieve the data  
from pybgproutesapi import vantage_points, updates
```

Imagine a network operator trying to retrieve all BGP updates for which their ASN appears in the AS path on April 28, 2026

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# Let's use our Python client to retrieve the data
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# Let's retrieve the vantage points to use
vps = vantage_points(source=['bgproutes.io', 'ris'])
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vps = vantage_points(source=['bgproutes.io', 'ris'])

# We retrieve updates and print them for every VP
for vp in vps:
    vp_upd = updates(
        vp,
        start_date="2026-02-10T00:00:00",
        end_date="2026-02-11T00:00:00",
        aspath_regexp="(^| )3( |$)"

    print(vp_upd)
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Example of an output

Time	Prefix	ASPath
T1	1/24	1-3-7
T2	2/24	3-9-4
T3	3/24	2-4-3
T4	4/24	3-4-5

Each returned update includes the RPKI ROV and ASPA status

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    )
    print(vp_upd)
```

Example of an output

Time	Prefix	ASPath	ROV status	ASPA status
T1	1/24	1-3-7	Valid	Up-valid Down-invalid
T2	2/24	3-9-4	Unknown	Up-valid Down-valid
T3	3/24	2-4-3	Invalid	Up-invalid Down-invalid
T4	4/24	3-4-5	Valid	Up-valid Down-Unknown

Other attributes omitted for space

Users can filter BGP route updates based on their ROV or ASPA status

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T4	4/24	3-4-5	Valid	Up-valid Down-Unknown

Other attributes omitted for space

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... *and easily compute statistics!*

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99.3% are
Unknown

There are fewer than 1000
ASPA objects so far

Statistics computed
in February 2026

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... *and easily compute statistics!*

Example: Let's analyse ASPA for downstream AS paths
using all collected updates within a 2-hour timeframe

99.3% are
Unknown

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0.04% are
Invalid

Potential route leaks!

Statistics computed
in February 2026

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... and easily compute statistics!

Example: Let's analyse ASPA for downstream AS paths using all collected updates within a 2-hour timeframe

99.3% are
Unknown

There are fewer than 1000
ASPA objects so far

0.04% are
Invalid

Potential route leaks!

0.7% are
Valid

Most involve short AS paths
(avg length: 2.6)

Statistics computed
in February 2026

bgproutes.io provides four dashboards, and more will come soon

**AS
Explorer**

General info about
ASes, prefixes, IXPs

**Prefix
Explorer**

“Giant”
looking glass

**Vantage Points
Explorer**

List all VPs and
provide statistics

AS Rank

Rank ASes based
on various metrics



<https://bgproutes.io>

You can contribute data

*Current
sponsors:*



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or reach out at contact@bgproutes.io*