

Expanding Internet Routing Visibility with BMP

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Joint work with:
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Cristel Pelsser



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

One example: The RIPE stat looking glass

Looking Glass

Share

130.79.0.0/16

X

Filter anywhere in AS Path

+ Include

+ Add

- Exclude

+ Add

357 peers

announcing 130.79.0.0/16

originated by 2259

and seen by 23 RRCs

AS Path	174 2200 2259
Communities	-
Large Communities	-
Extended Communities	-
Origin	IGP
Next Hop	130.117.255.1
Peer	130.117.255.1 at RRC25
Last Updated	2025-11-26T06:44:37Z

AS Path	2027 2200 2259
Communities	2027:65000 2027:65010 2027:65011 2200:1001 2200:1010 2200:2200
Large Communities	-

Used by operators to e.g.,
verify routes to their prefixes

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 peer with us!

bgproutes.io

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

We launched our website
a few months ago!



<https://bgproutes.io>
You can peer with us!

bgproutes.io prioritises coverage (i.e., *percentage of ASes sharing data*)
whereas RIS and RouteViews prioritises historical depth

	Open peering policy	Perpetual data retention
bgproutes.io		
RIPE RIS RouteViews		

bgproutes.io

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

1. All data is public and accessible effectively
2. Provide new interactive dashboards
3. Aggregate data from all public repositories



<https://bgproutes.io>
You can peer with us!

With bgproutes.io, *no need to download and process tons of MRT files!*

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Users can access past data via
a simple, flexible and fast API

Users can access real-time data via
a websocket-based stream

Users can still access the data from an MRT archive

bgproutes.io

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

1. All data is public and accessible effectively
2. **Provide new interactive dashboards**
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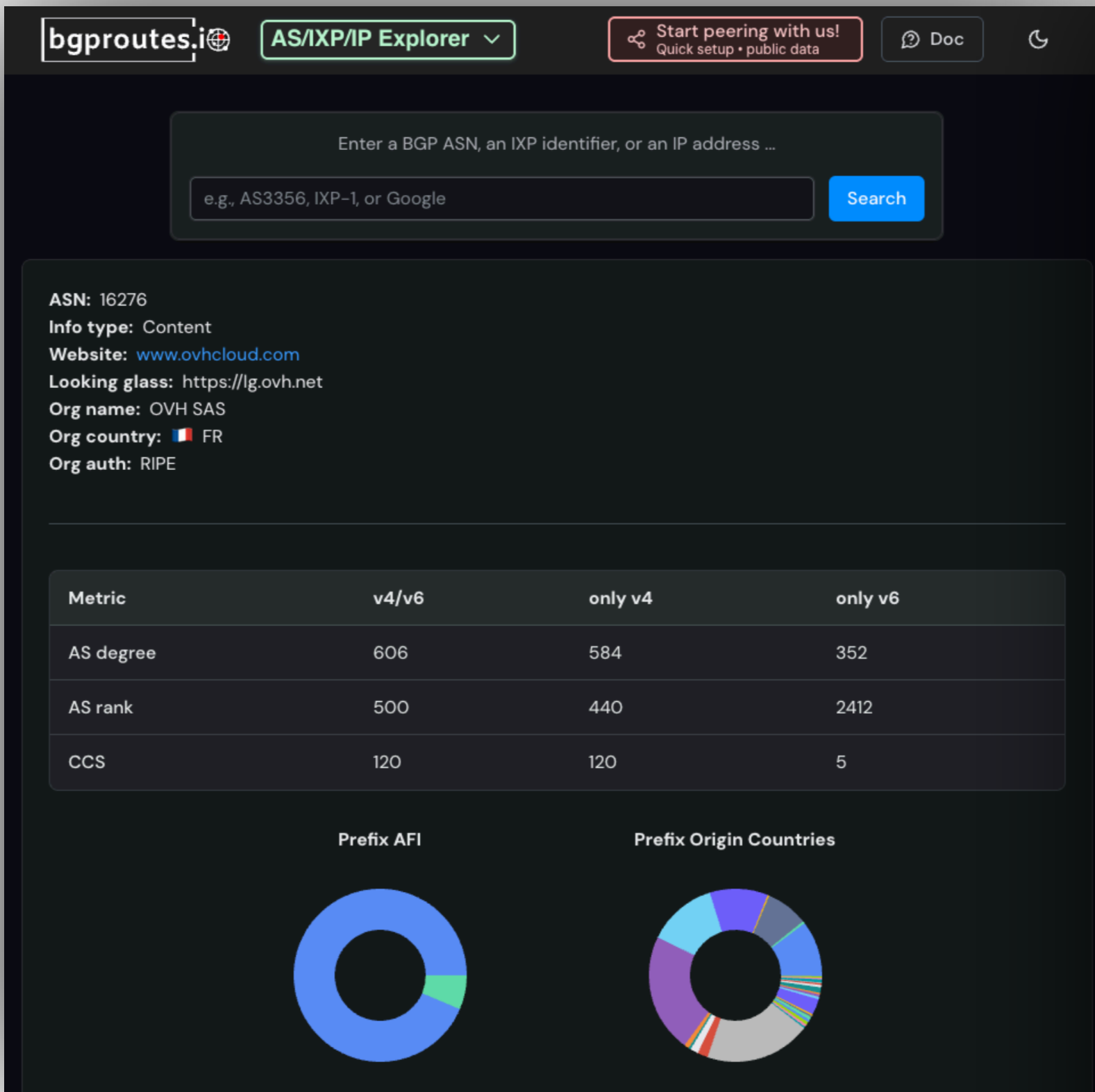


<https://bgproutes.io>
You can peer with us!

**bgproutes.io provides three dashboards
to help users navigate the collected data easily**

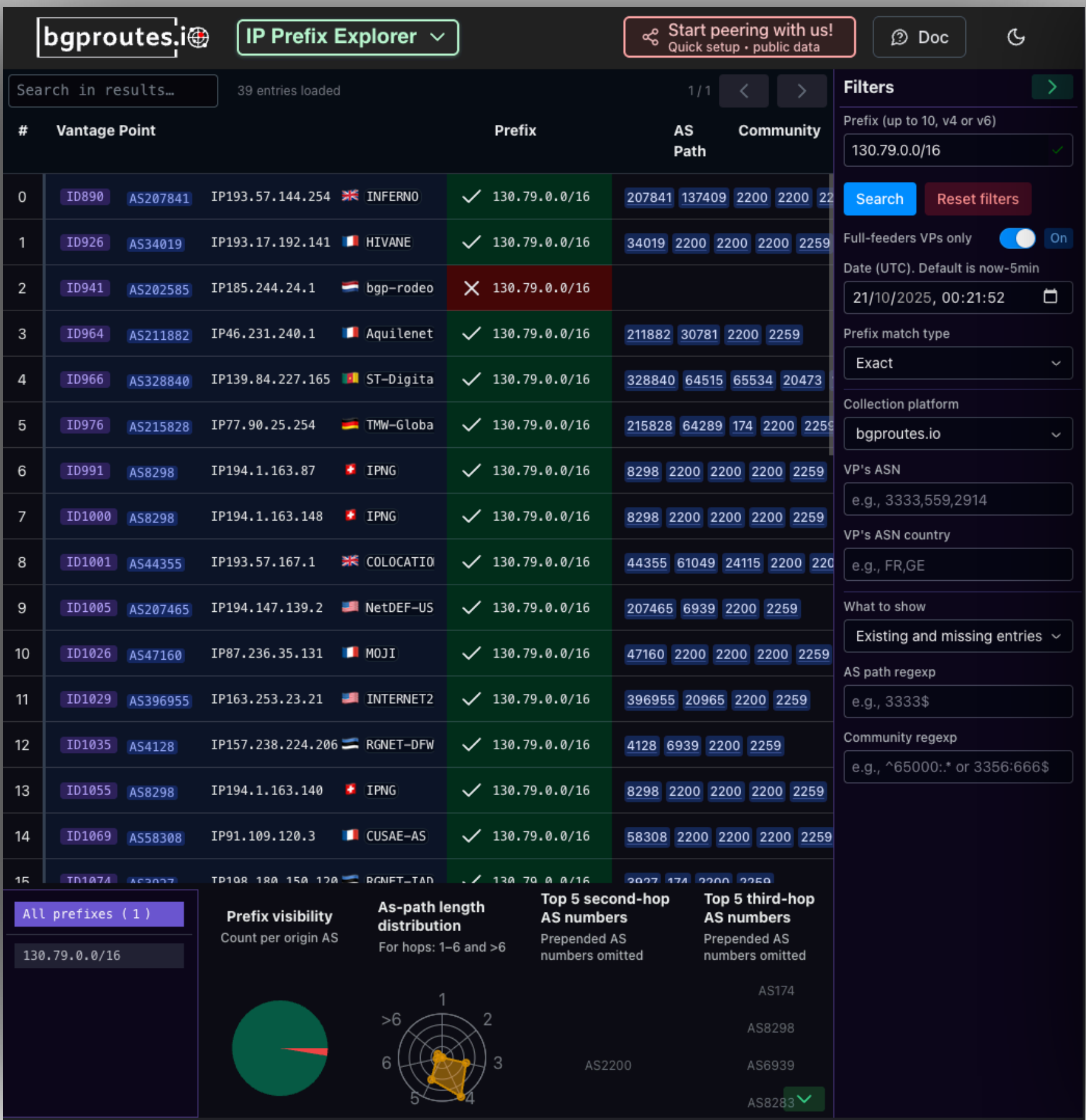
bgproutes.io provides three dashboards to help users navigate the collected data easily

AS Explorer



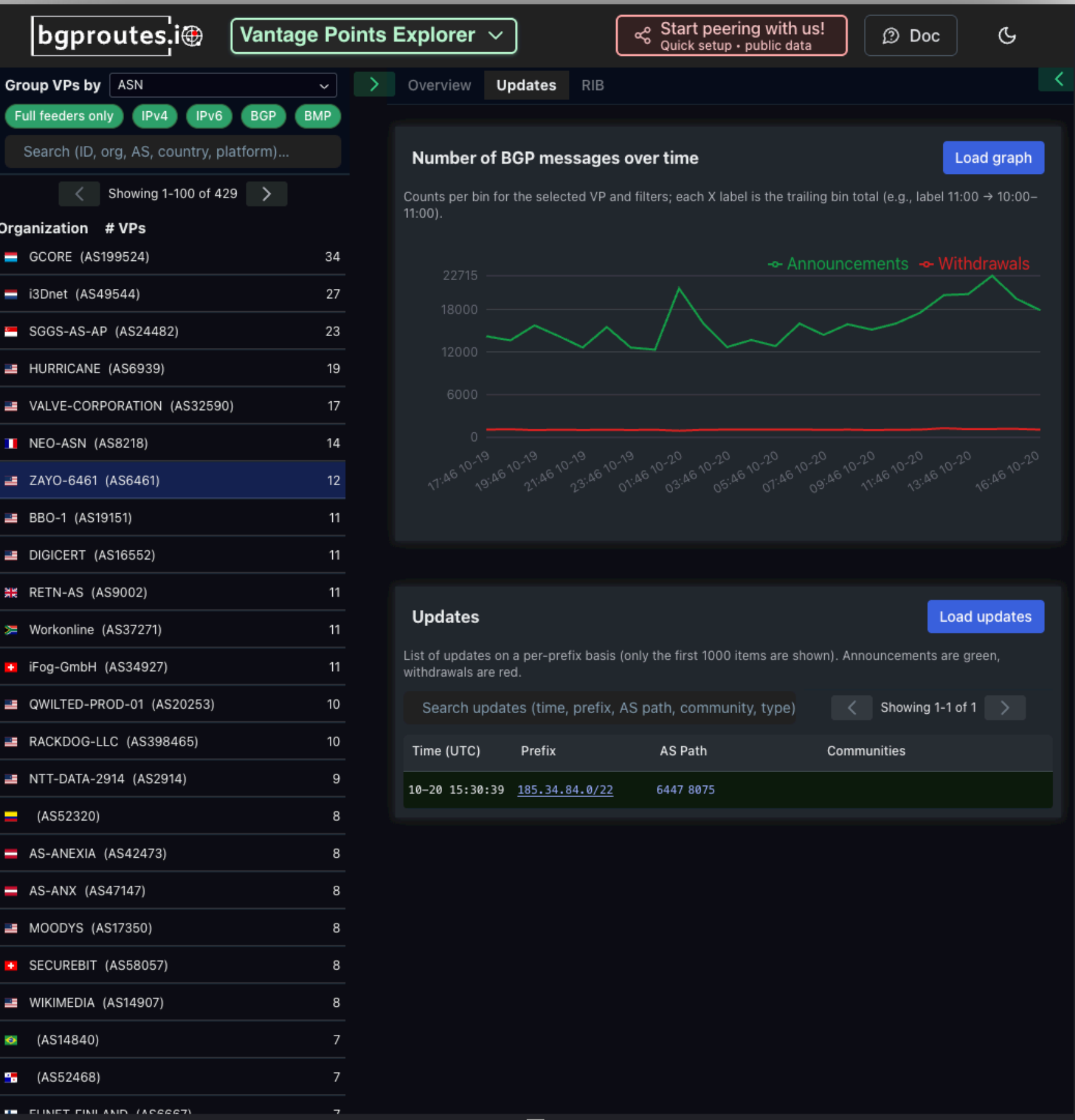
<https://as-explorer.bgproutes.io>

Prefix Explorer



<https://looking-glass.bgproutes.io>

Vantage Point Explorer



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

bgproutes.io

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

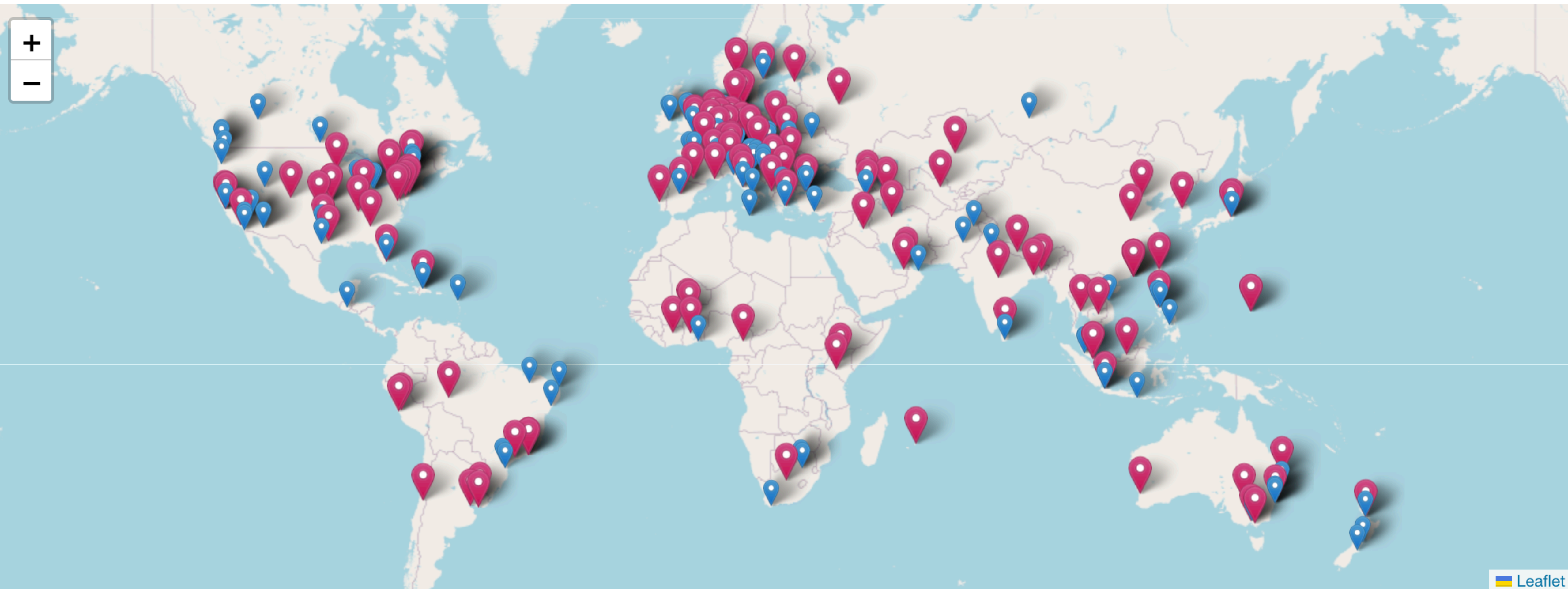
1. All data is public and accessible effectively
2. Provide new interactive dashboards
3. **Aggregate data from all public repositories**



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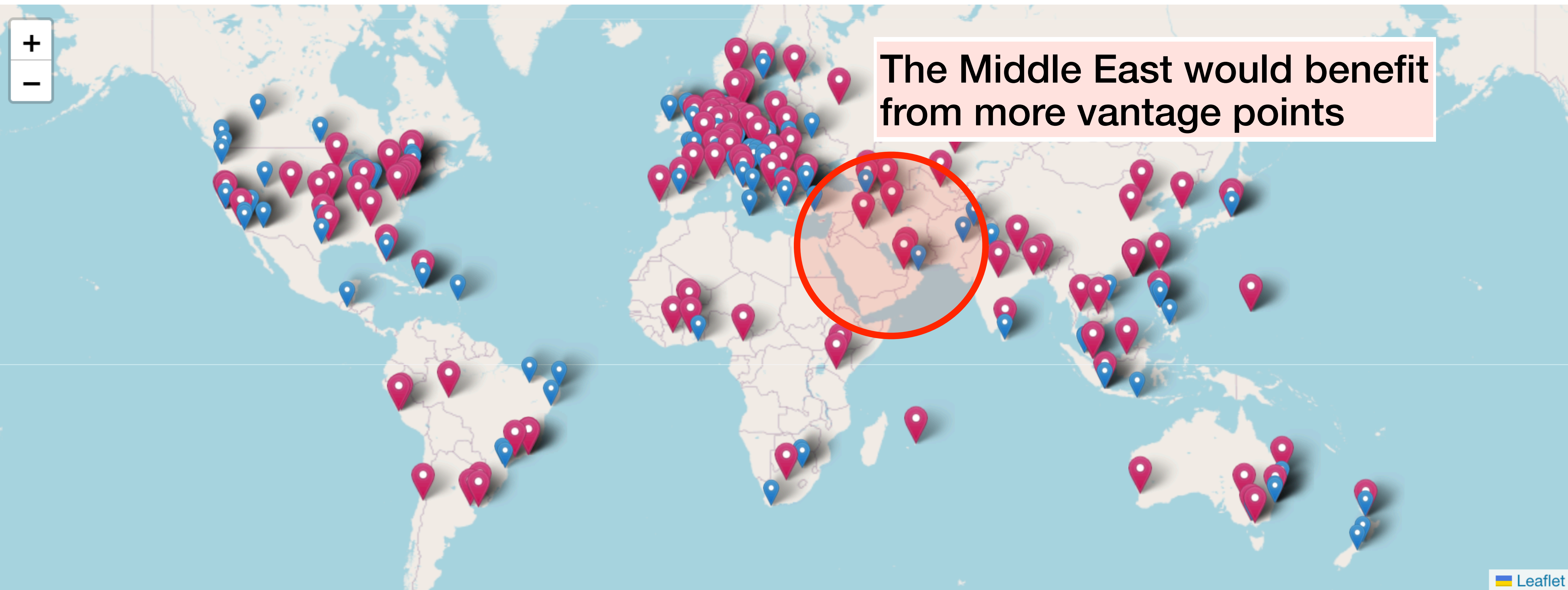
Beyond its own peers, bgproutes.io aggregates data from all public platforms: RIPE RIS, RouteViews, PCH and CGTF RIS

>5000 VPs worldwide



**Aggregating data from all platforms is useful but not sufficient:
fewer than 2% of ASes share data with a public platform**

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Outline

1. Increasing coverage is hard

2. BMP to the rescue

3. How to connect

4. How to use the data

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Challenge #1: It is difficult to motivate operators to share data

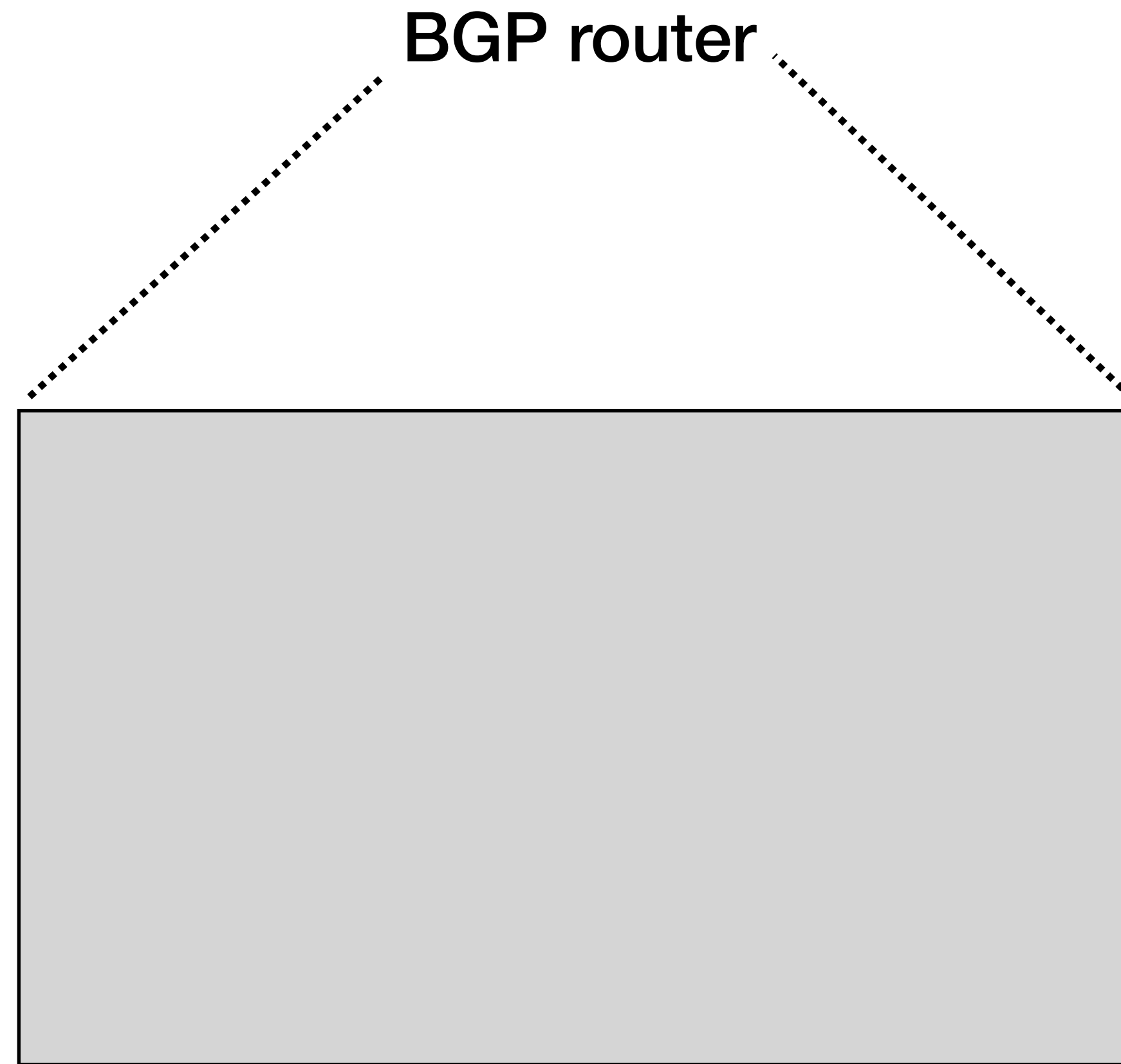
Challenge #1: It is difficult to motivate operators to share data

There is no direct incentives for operators to share data

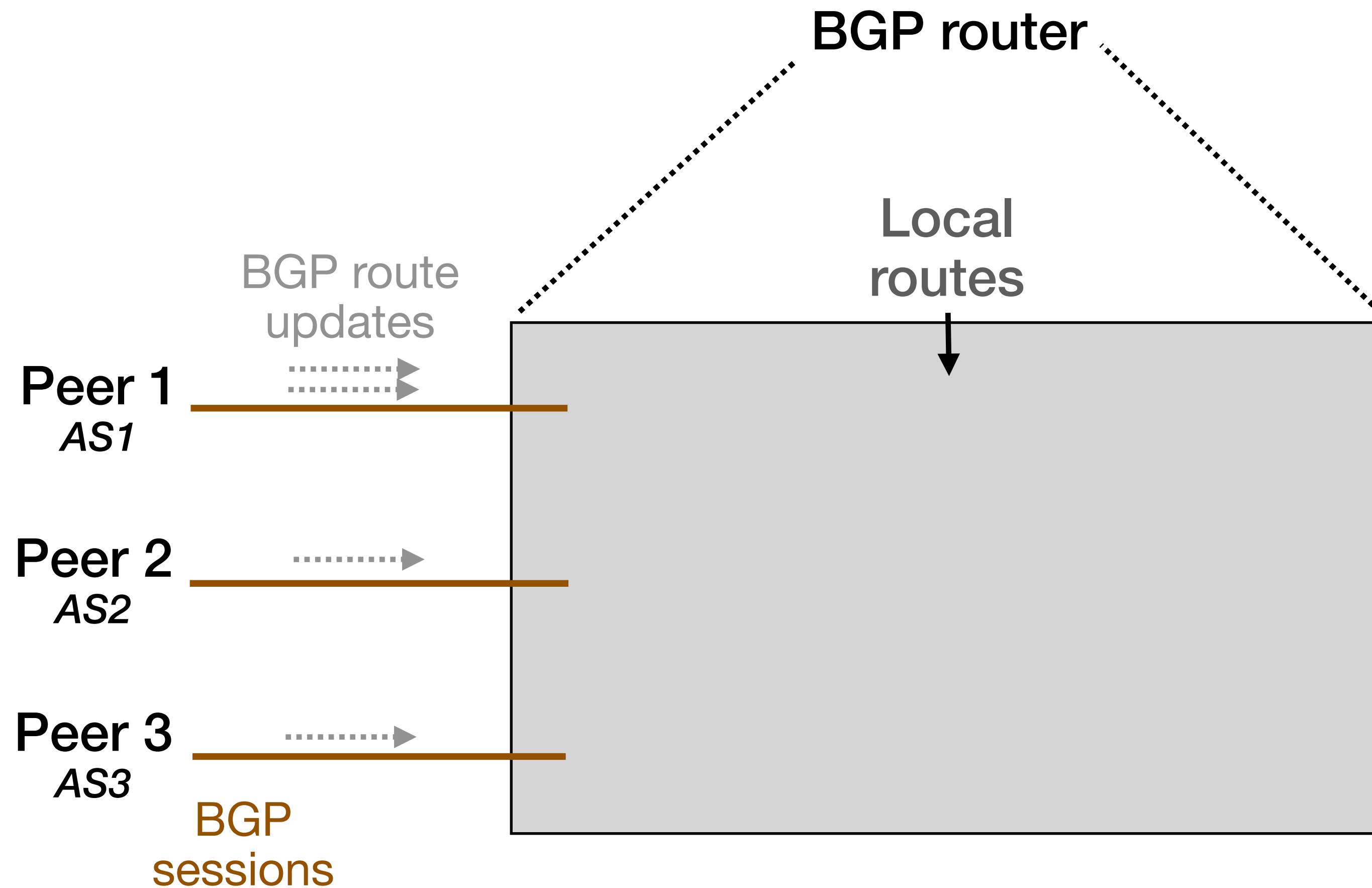
We do not know what we are actually missing

It's an effort for operators to install and maintain the BGP session

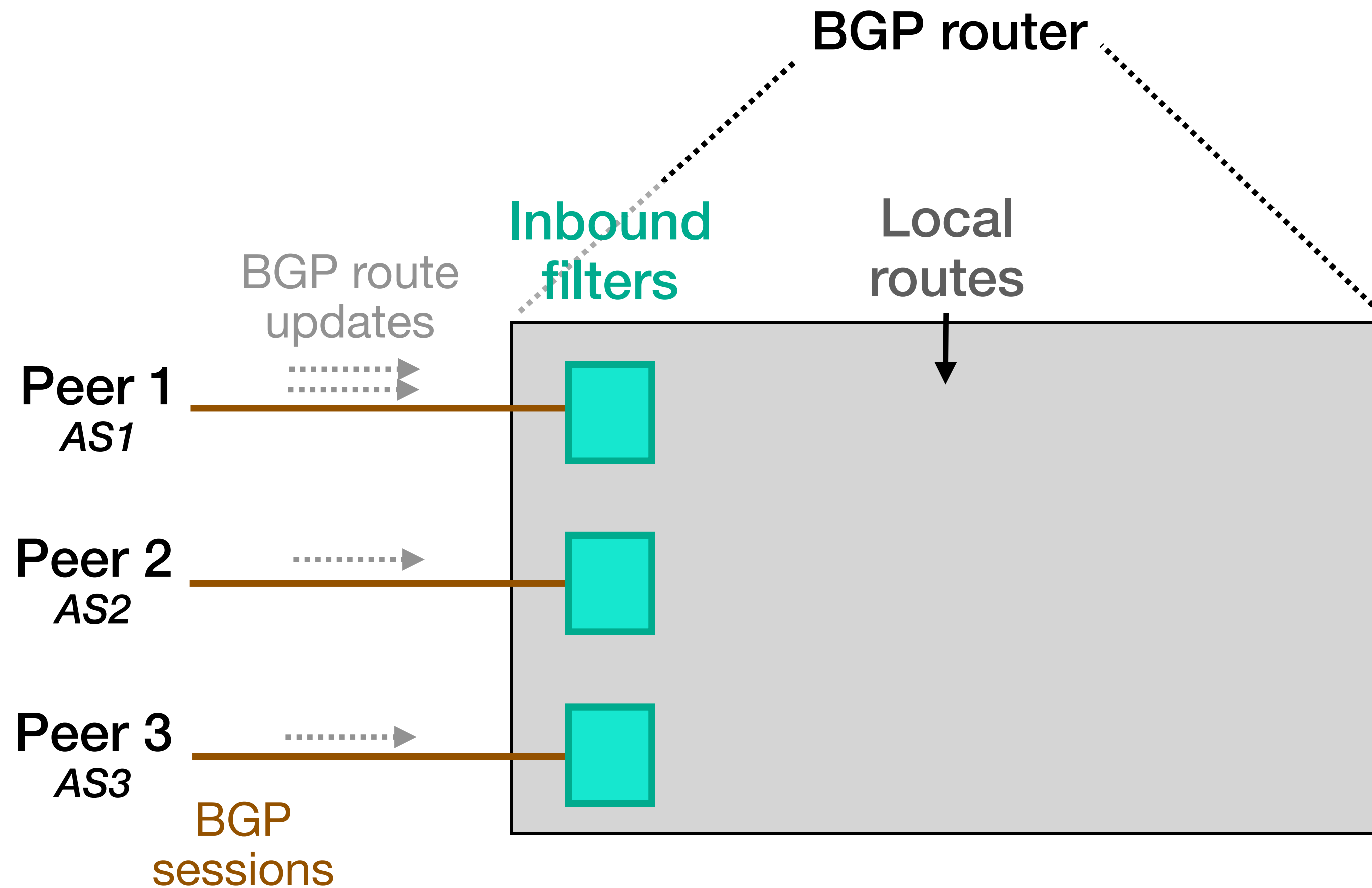
Challenge #2: Even when an operator agrees to share data, only a small fraction of its routes are visible due to BGP route hiding



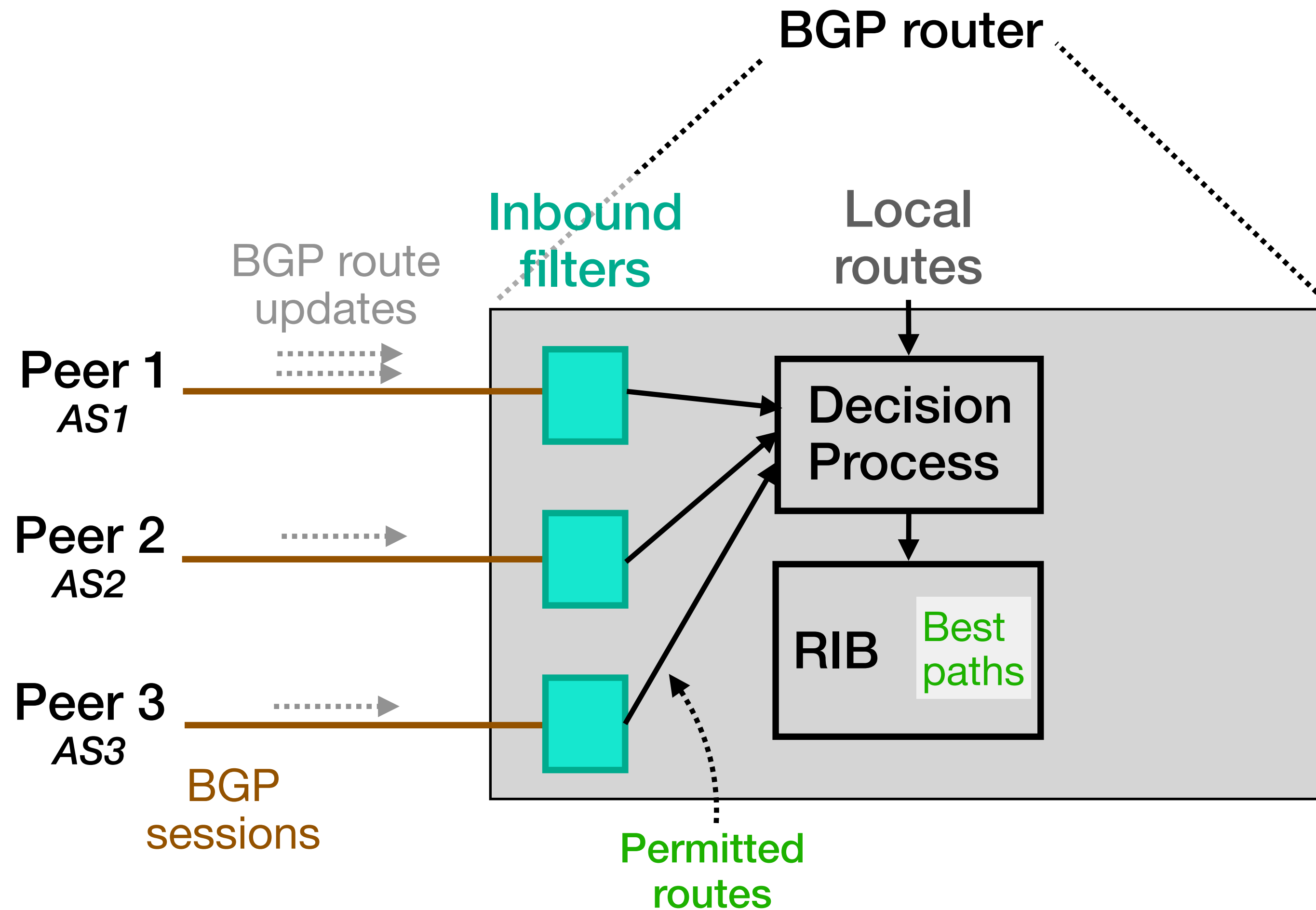
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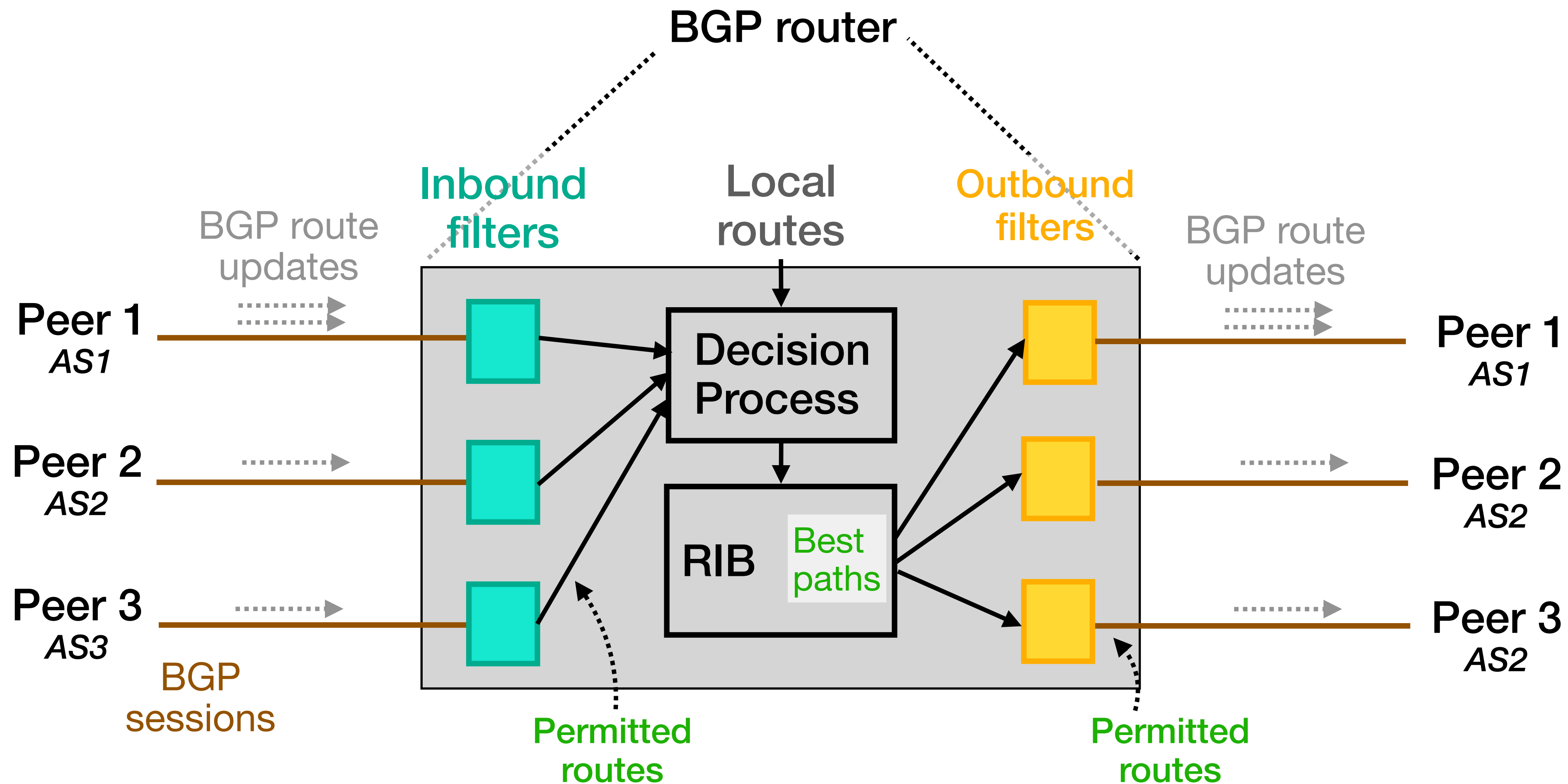
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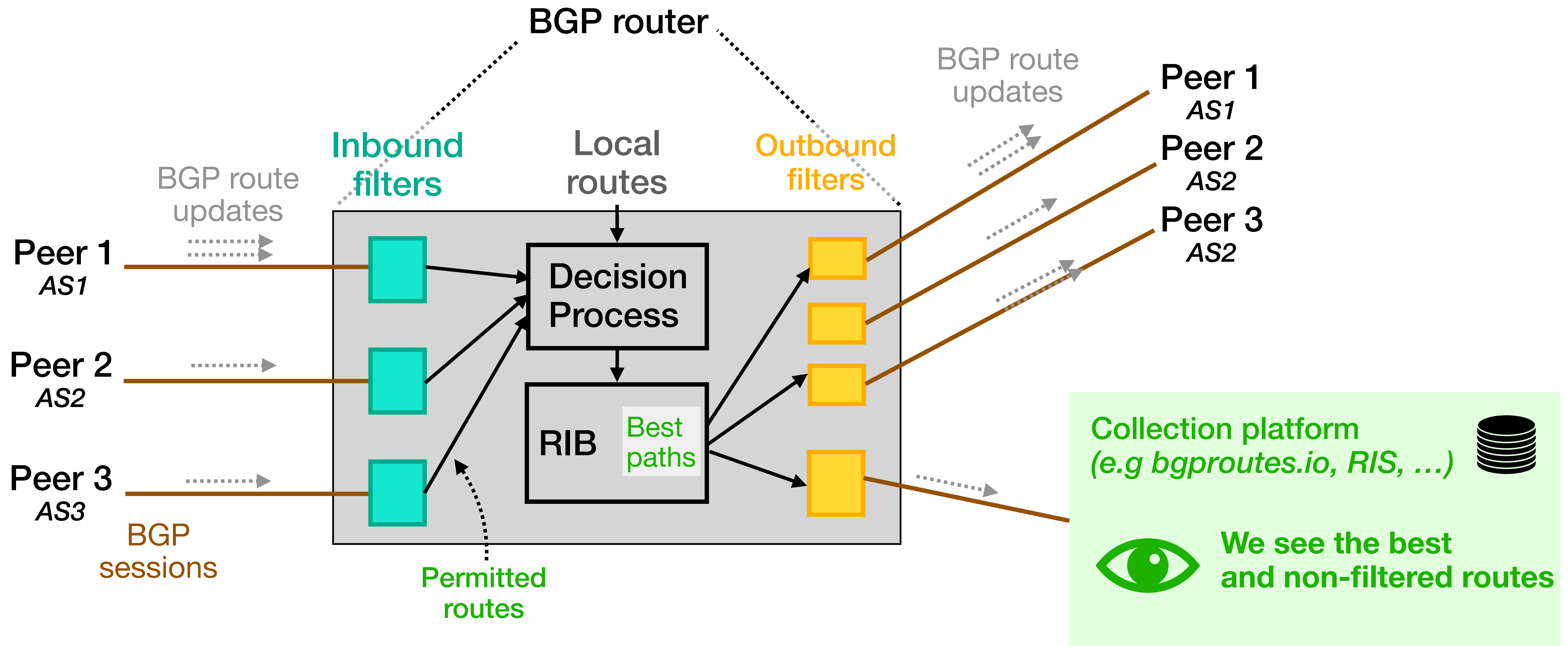
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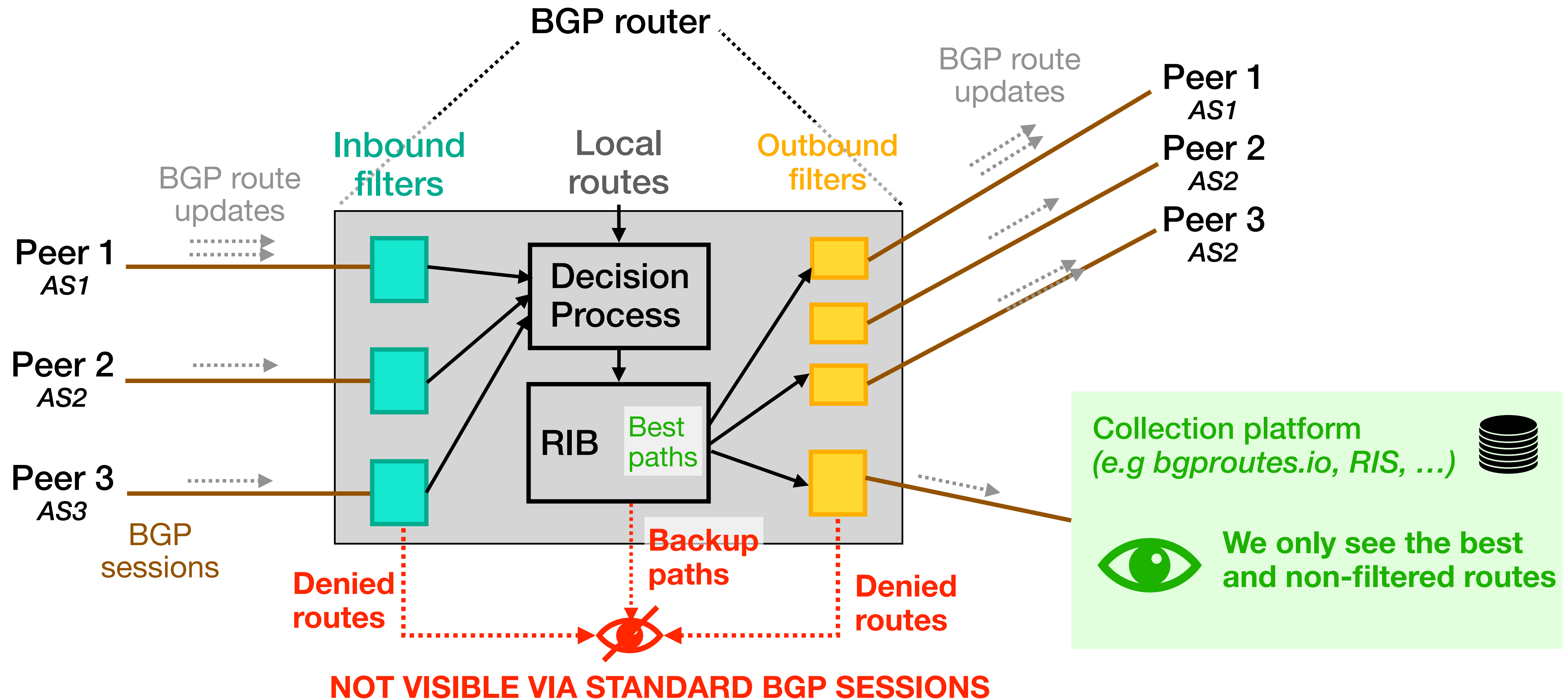
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Outline

1. Increasing coverage is hard

2. **BMP** to the rescue

3. How to connect

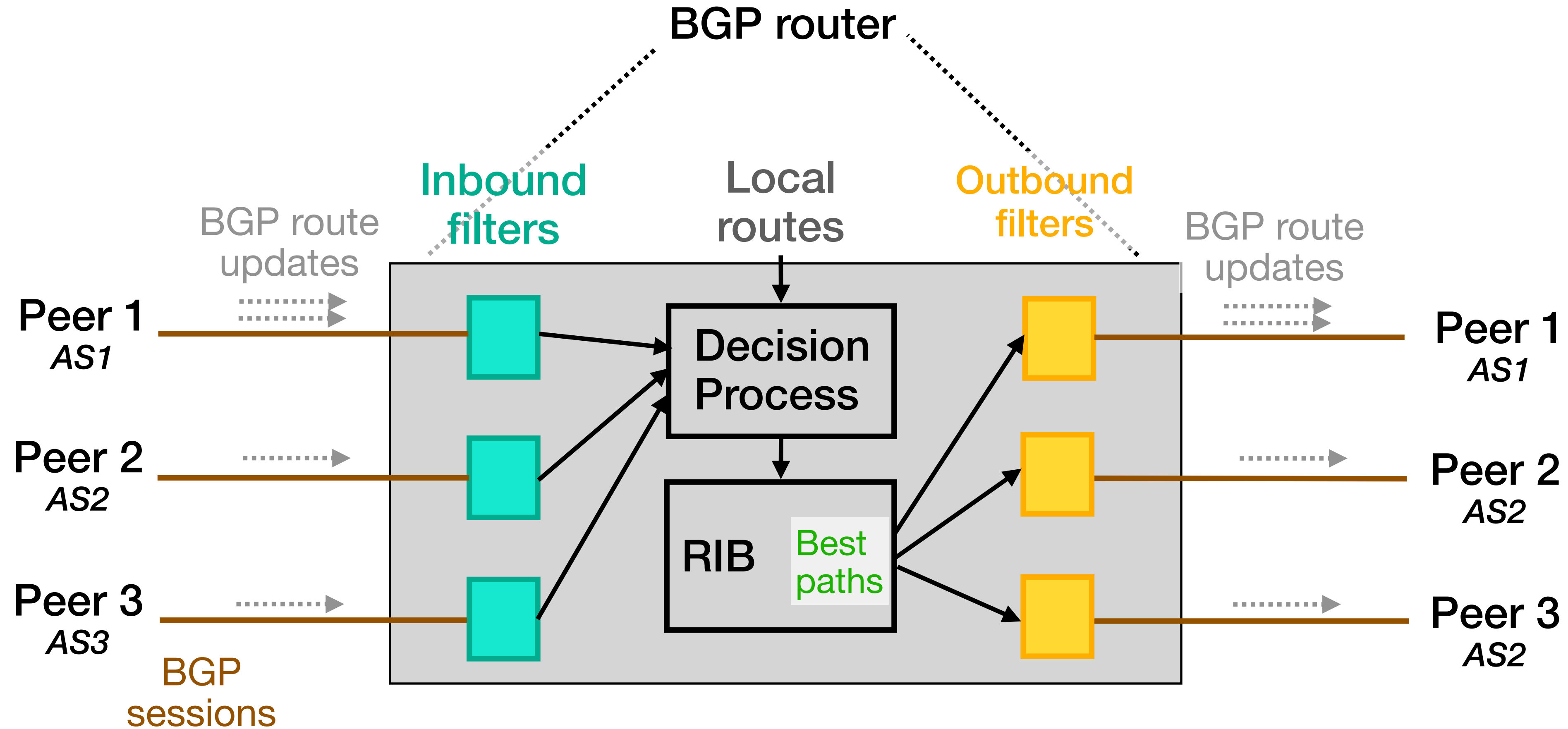
4. How to use the data

The BGP Monitoring Protocol (BMP) has two main advantages over standard BGP sessions when used for monitoring

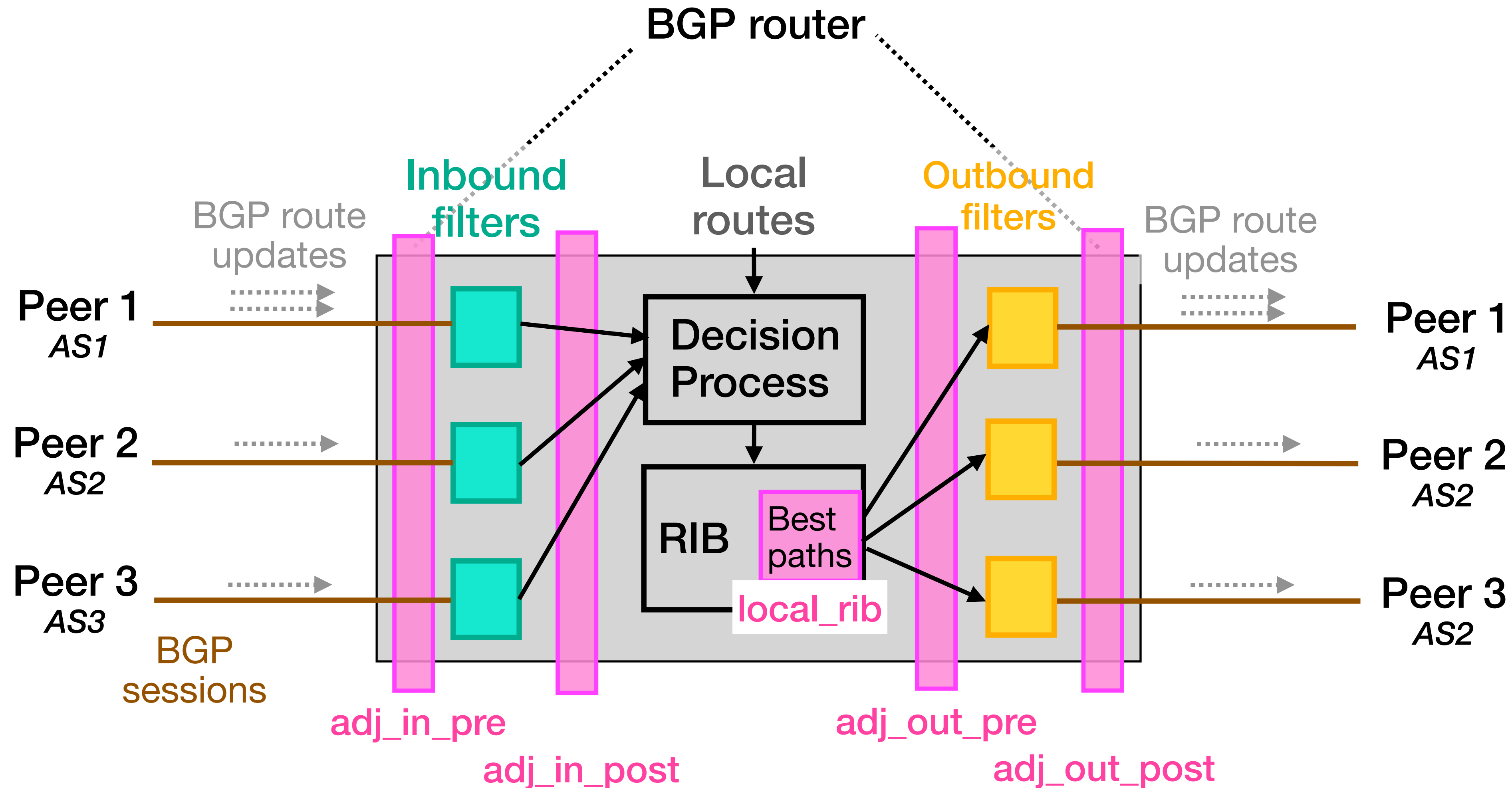
- ✓ It provides all route updates on a per-peer basis
- ✓ It provides route updates at all stages of the BGP processing pipeline

➔ It's also simple to configure

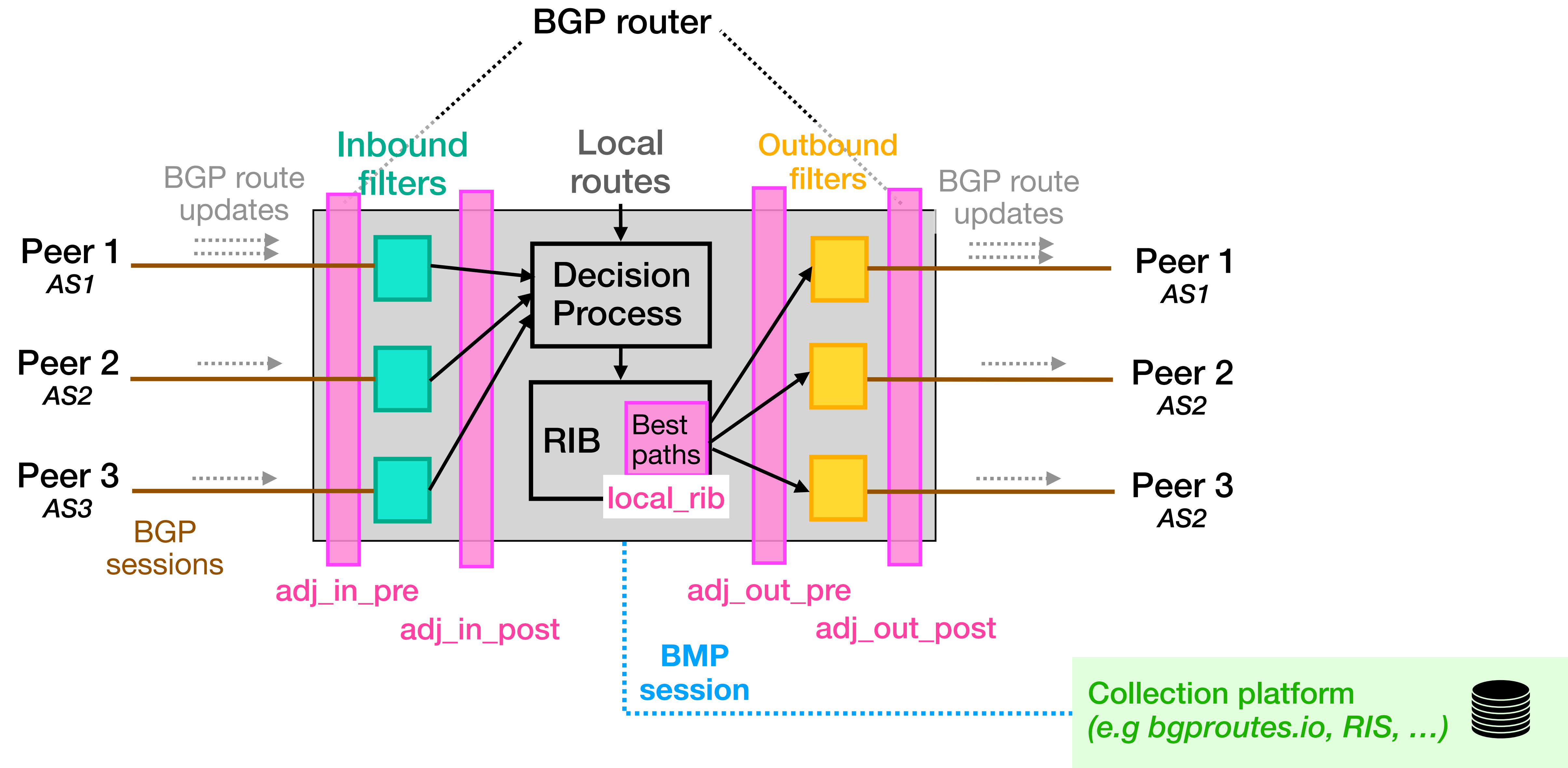
BMP allows to collect routes at every stage of the BGP router



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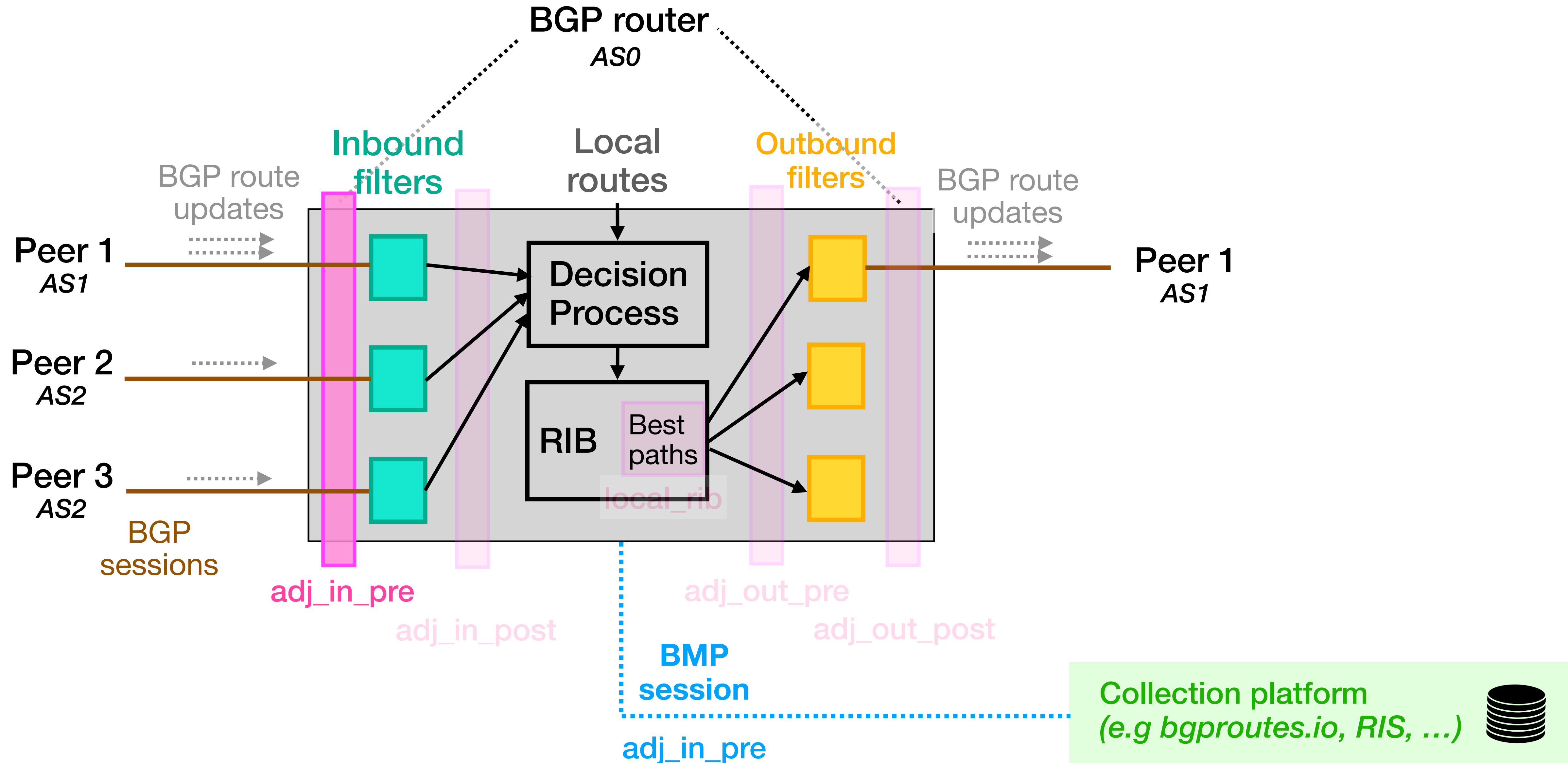


BMP allows to collect routes at every stage of the BGP router

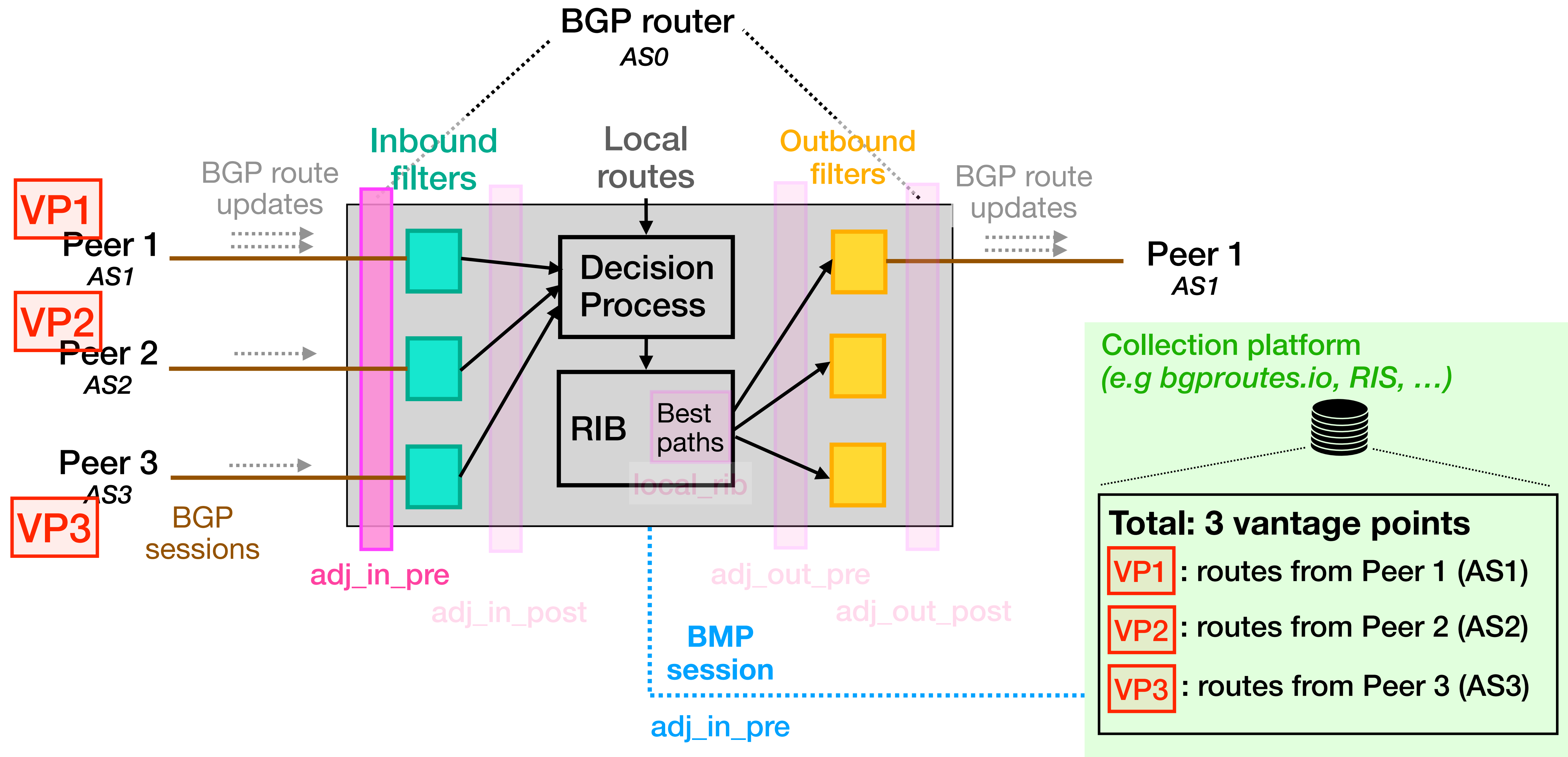


We recommend exporting data for the adj_in_pre only

We recommend exporting data for the `adj_in_pre` only



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**Connecting to bgproutes.io with BMP
is fully automated and requires minimal efforts**

Connecting to bgproutes.io with BMP is fully automated and requires minimal efforts

The image shows the header and main content area of the bgproutes.io website. The header is dark grey with the logo on the left, navigation links in the center, and buttons on the right. The main content area has a dark blue background with a network diagram of nodes and lines. On the left, there's a large heading and a paragraph. On the right, there's a vertical list of statistics. At the bottom left, there are two promotional banners.

bgproutes.io Services Vantage points 

[Start peering with us!](#) [Log In](#) 

We make BGP data analysis

bgproutes.io collects BGP routes from operational routers, a.k.a. Vantage Points (VPs), and delivers them through a **fast, unified, and intuitive** interface.

Vantage points ⓘ
4739

Coverage ⓘ
1.7%

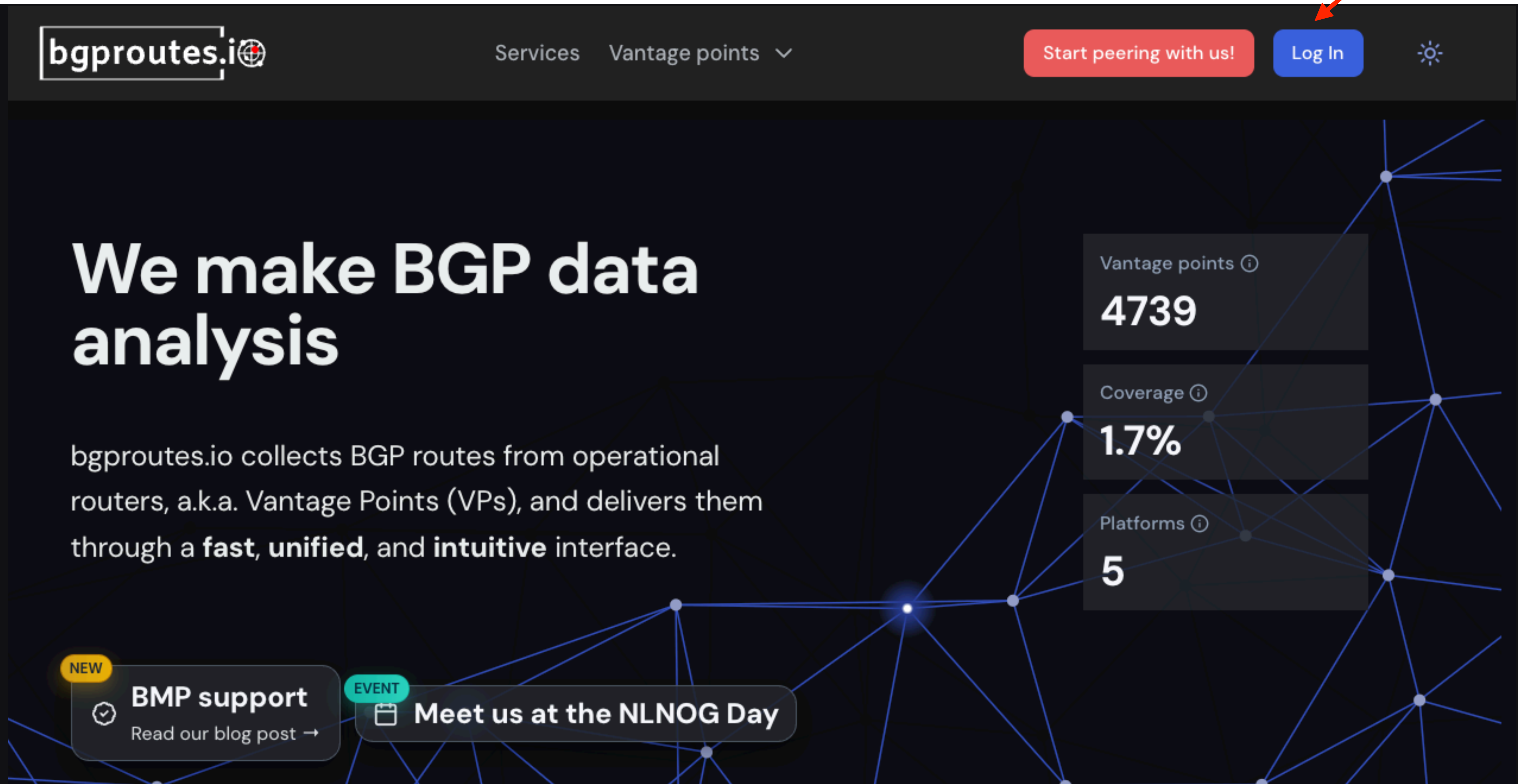
Platforms ⓘ
5

NEW  **BMP support**
Read our blog post →

EVENT  **Meet us at the NLNOG Day**

Connecting to bgproutes.io with BMP
is fully automated and requires minimal efforts

1. Log in with your
PeeringDB account



The screenshot shows the bgproutes.io website with a dark theme and a network diagram background. The navigation bar includes the logo, 'Services', 'Vantage points' with a dropdown arrow, a red 'Start peering with us!' button, a blue 'Log In' button (highlighted by a red arrow from the instruction box), and a settings icon. The main content area features a large heading, a descriptive paragraph, and a statistics sidebar. At the bottom, there are two promotional banners.

bgproutes.io Services Vantage points ▾ Start peering with us! Log In ⚙

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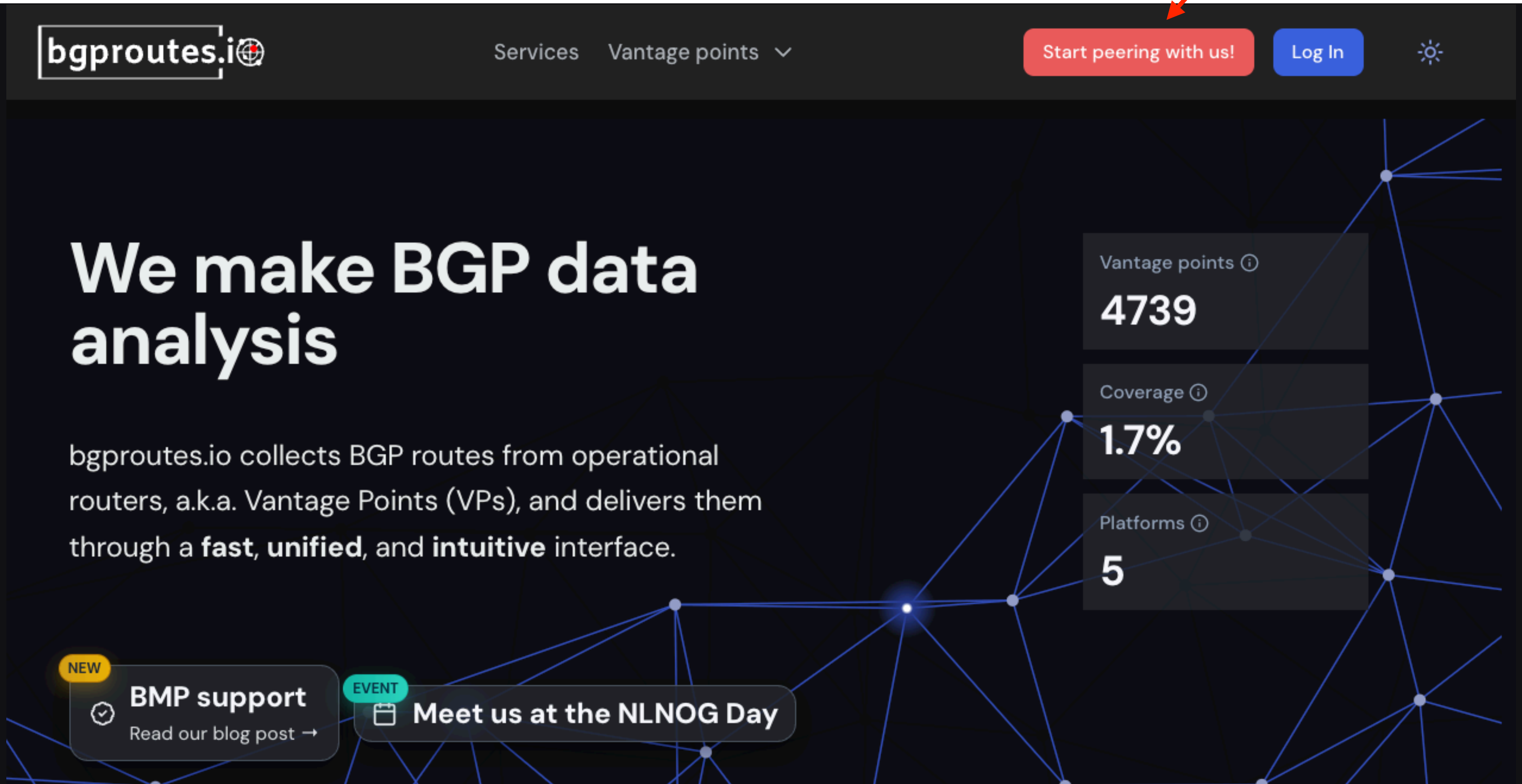
Platforms ⓘ
5

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2. Click on the red
“*start peering with us*” button



The screenshot shows the bgproutes.io website. The header includes the logo, navigation links for 'Services' and 'Vantage points', and buttons for 'Start peering with us!' (highlighted with a red arrow) and 'Log In'. The main content area features a large heading 'We make BGP data analysis' and a paragraph explaining that bgproutes.io collects BGP routes from operational routers (Vantage Points) and delivers them through a fast, unified, and intuitive interface. On the right, a sidebar displays three statistics: 'Vantage points' (4739), 'Coverage' (1.7%), and 'Platforms' (5). At the bottom, there are two promotional banners: 'NEW BMP support' with a link to read a blog post, and 'EVENT Meet us at the NLNOG Day'.

bgproutes.io

Services Vantage points

Start peering with us! Log In

We make BGP data analysis

bgproutes.io collects BGP routes from operational routers, a.k.a. Vantage Points (VPs), and delivers them through a **fast, unified, and intuitive** interface.

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1.7%

Platforms ⓘ
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NEW BMP support
Read our blog post →

EVENT Meet us at the NLNOG Day

Connecting to bgproutes.io with BMP is fully automated and requires minimal efforts

STEP #1 Submit your connection details

Select the VM with whom you want to connect.

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

5.78.83.182 (US-hillsboro) ▾

Enter the IP address your router will use to connect.

We'll use this to prepare our infrastructure to accept the connection from your router. Make sure your router uses this IP as the source address when establishing the BMP session.

Your IP address

Tell us in which AS is your router.

We use this information in our infrastructure and the public API.

2200 ▾

Exclude specific peers (optional)

Some routers (e.g., FRRouting) export BMP data for all BGP neighbors and don't let you choose which peers to include. If you'd rather not share data for specific neighbors, enter a comma-separated list of ASNs below. Any BMP updates coming from these ASNs will be ignored and not published.

e.g., 64496,64512

Use destination port **45678** when connecting your BMP router to bgproutes.io.

To ensure data quality and platform stability, we reserve the right to remove



**3. Complete and submit the form
so our infrastructure is ready
to accept your BMP session**

Outline

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**When accessing the data,
the collection protocol (BGP or BMP) is transparent to the user**

Example 1: Building a looking glass with the API

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

```
# Let's retrieve some vantage points (BGP and BMP)  
vps = vantage_points(source=['bgproutes.io', 'ris', 'pch'])
```

Example: Building a looking glass with the API

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vps = vantage_points(source=['bgproutes.io', 'ris', 'pch'])
```

```
# Finally, we retrieve the rib for some prefixes and print them for every VP
```

```
response = rib(  
    vps,  
    date="2025-09-30T15:00:00",  
    prefix_exact_match=['65.169.6.0/23', '91.106.223.0/24', '105.77.0.0/16'])  
  
print(response)
```

Example 2: Using our dashboards

Example 2: Using our dashboards such as the Vantage Point Explorer

https://vp-explorer.bgproutes.io

bgproutes.io

Vantage Points Explorer

Start peering with us!

Quick setup · public data

Doc

Group VPs by

ASN

Full feeders only

IPv4

IPv6

BGP

BMP

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

<

Showing 1-100 of 425

>

Organization	# VPs
 GCORE (AS199524)	32
 VALVE-CORPORATION (AS32590)	25
 i3Dnet (AS49544)	22
 SGG-S-AS-AP (AS24482)	16
 HURRICANE (AS6939)	15
 NTT-DATA-2914 (AS2914)	12
 BBO-1 (AS19151)	9
 DIGICERT (AS16552)	9
 (AS52320)	8
 (AS52468)	8
 AS-ANEXIA (AS42473)	8
 FIBERBY (AS42541)	8

Filters

>

Data AFI

both

Match type

Prefix

exact

e.g., 8.0.0.0/8

Start date (UTC)

24/11/2025, 19:16

End date (UTC)

Irrelevant for RIB queries

25/11/2025, 19:16

AS path regexp

e.g., 3333\$

Community regexp

e.g., 65000:.*

Bin size (min)

Only relevant for updates graph

60

Message type

Only relevant for updates queries

both

Example 2: Using our dashboards such as the Vantage Point Explorer

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bgp

routes.io

Vantage Points Explorer

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Group VPs byASN

Full feeders onlyIPv4IPv6BGPBMPSearch (ID, org, AS, country, platform)...

<Showing 1-100 of 425>

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(AS52468)

8

AS-ANEXIA (AS42473)

8

FIBERBY (AS42541)

8

FIBERBY(AS42541)<X

Search VPs (ID, ASN, IP, protocol, platform)...

<Showing 1-8 of 8>

ID292🇳🇱bgpris2001:7f8:13::a504

ID2100🇳🇱bgprouteviews2001:7f8:1::a504:

ID62689🇩🇰bgpbgproutes193.104.135.79

ID36412🇩🇰bgpbgproutes193.104.135.78

ID2012🇳🇱bgprouteviews80.249.212.84

ID623🇩🇰bgpris193.239.118.106

ID36411🇩🇰bgpbgproutes2a03:5440:1::79

ID36413🇩🇰bgpbgproutes2a03:5440:1::78

Filters>

Data AFIboth

Match typePrefixexacte.g., 8.0.0.0/8

Start date (UTC)26/11/2025, 00:59

End date (UTC)Irrelevant for RIB queries27/11/2025, 00:59

AS path regexp e.g., 3333\$

Community regexp e.g., 65000.*

Bin size (min) Only relevant for updates graph60

Message type Only relevant for updates queriesboth

Example 2: Using our dashboards such as the Vantage Point Explorer

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

bgp

routes.io

Vantage Points Explorer

Start peering with us!
Quick setup • public data

Doc

Group VPs byASN

Full feeders onlyIPv4IPv6BGPBMP

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

<Showing 1-100 of 425>

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FIBERBY(AS42541)<X

OverviewUpdatesRIB

Search VPs (ID, ASN, IP, protocol, platform)...

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ID292🇳🇱bgpris2001:7f8:13::a504

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ID: 36411ASN: 42541Organisation: 🇩🇰 FIBERBYIP address: 🇩🇰 2a03:5440:1::79Platform: bgproutesRIB size v4: 0RIB size v6: 228986Protocol: bgp

Uptime Changes

StatusDate (UTC)

No uptime data.

Filters<

Data AFIboth

Match typePrefixexact ▾e.g., 8.0.0.0/8

Start date (UTC)26/11/2025, 00:59📅

End date (UTC)Irrelevant for RIB queries27/11/2025, 00:59📅

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Vantage Points Explorer

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Full feeders only

IPv4

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BGP

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FIBERBY(AS42541)

Overview

Updates

RIB

Search VPs (ID, ASN, IP, protocol, platform)...

Showing 1-8 of 8

ID292

bgp

ris

2001:7f8:13::a504

ID2100

bgp

routeviews

2001:7f8:1::a504

ID6268

bgp

bgproutes

193.104.135.79

ID36412

bgp

bgproutes

193.104.135.78

ID2012

bgp

routeviews

80.249.212.84

ID623

bgp

ris

193.239.118.106

ID36411

bgp

bgproutes

2a03:5440:1::79

ID36413

bgp

bgproutes

2a03:5440:1::78

Number of BGP messages over time

Load graph

Counts per bin for the selected VP and filters; each X label is the trailing bin total (e.g., label 11:00 → 10:00–11:00).

Announcements

Withdrawals

01:59 11-26

04:59 11-26

07:59 11-26

10:59 11-26

13:59 11-26

16:59 11-26

19:59 11-26

00:59 11-27

Updates

Load updates

List of updates on a per-prefix basis (only the first 1000 items are shown).
Announcements are green, withdrawals are red.

Filters

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both

Match type

Prefix

exact

e.g., 8.0.0.0/8

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26/11/2025, 00:59

End date (UTC)

27/11/2025, 00:59

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which results in hundreds of VPs**

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bgproutes.io

Vantage Points Explorer

Group VPs by

BMP parent ASN

Full feeders only

IPv4

IPv6

BGP

BMP

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

<

Showing 1-5 of 5

>

Organization	# VPs
 NOK-IP-NET-LABS (AS38016)	110
 ABICOM (AS48213)	87
 Sdnbucks (AS205755)	26
 Stocade (AS214809)	22
 RGNET-DFW (AS4128)	12

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bgproutes.io

Vantage Points Explorer

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NOK-IP-NET-LABS(AS38016)

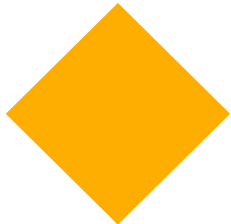
Showing 1-100 of 110

ID1880		bmp	bgproutes	2001:7f8::a2dc:0
ID1777		bmp	bgproutes	80.81.192.6
ID1785		bmp	bgproutes	80.81.192.168
ID1819		bmp	bgproutes	206.82.104.65
ID1881		bmp	bgproutes	2001:7f8::a4c8:0
ID1815		bmp	bgproutes	206.82.104.24
ID1797		bmp	bgproutes	80.81.194.114
ID1793		bmp	bgproutes	80.81.193.223
ID1820		bmp	bgproutes	206.82.104.73
ID1826		bmp	bgproutes	206.82.104.106

AS38016 exports data for 110 VPs via a single BMP session

These VPs are peers with whom AS38016 connects over DE-CIX

Expanding Internet Routing Visibility with BMP

BMP		BGP	
	Supported by most routers, but not all (e.g., MikroTik)		Supported by all routers
	Simple to configure a session		Very simple to configure a session
	One session can provide data for dozens of VPs		One session provides data for only one VP (Add-path can help)
	Provide all routes, including filtered or non-preferred ones		Only provide the non-filtered best routes



<https://bgproutes.io>
You can peer with us!