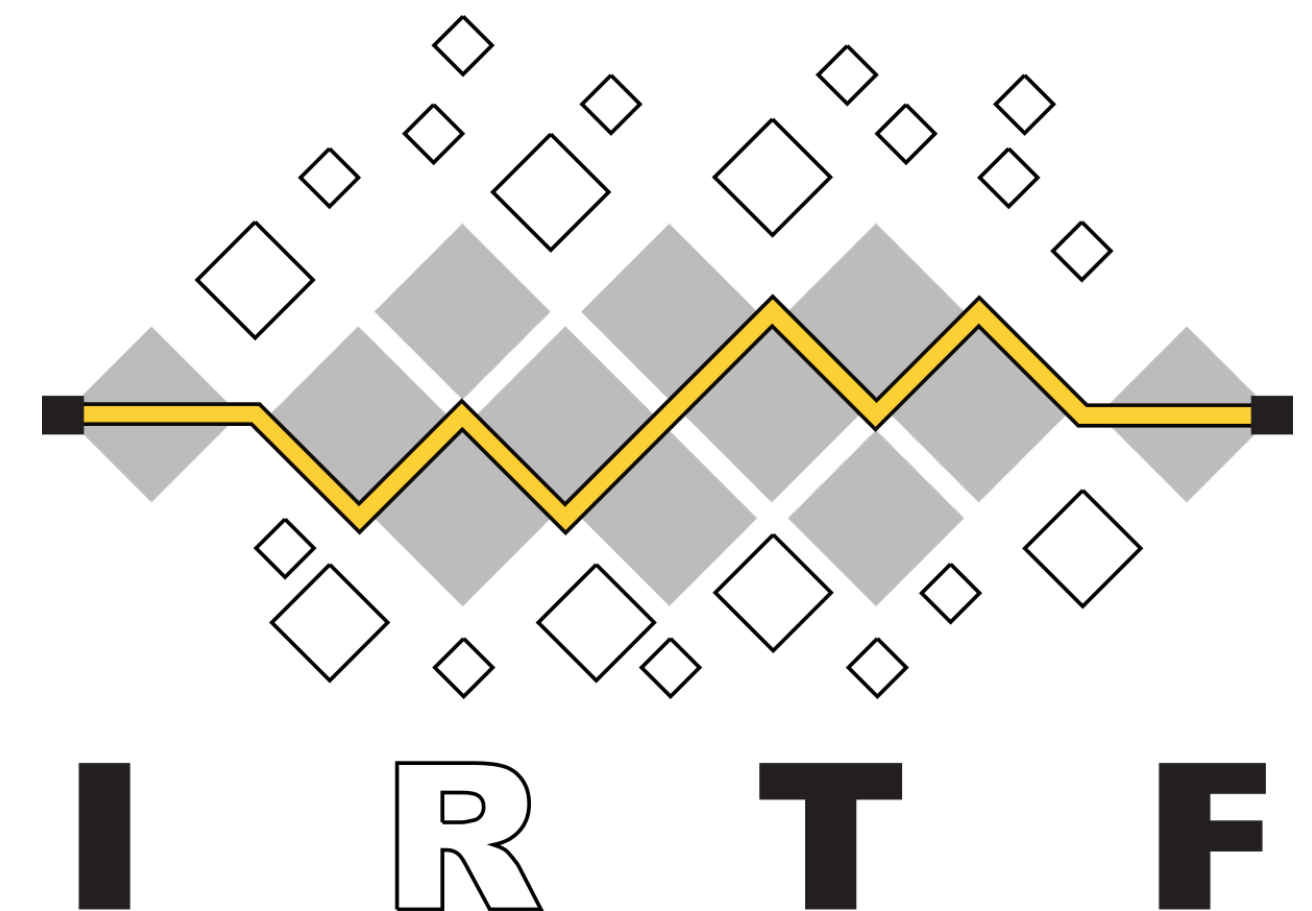


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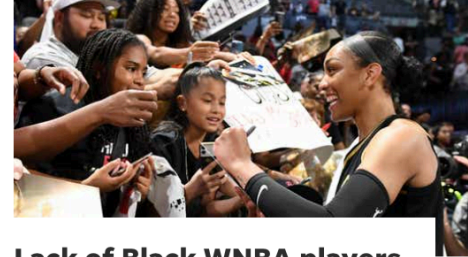


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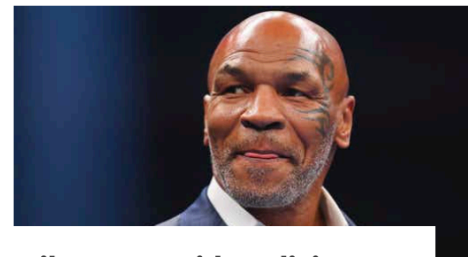


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Lack of Black WNBA players with signature shoe is gigantic problem



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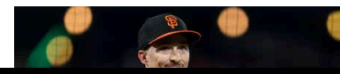
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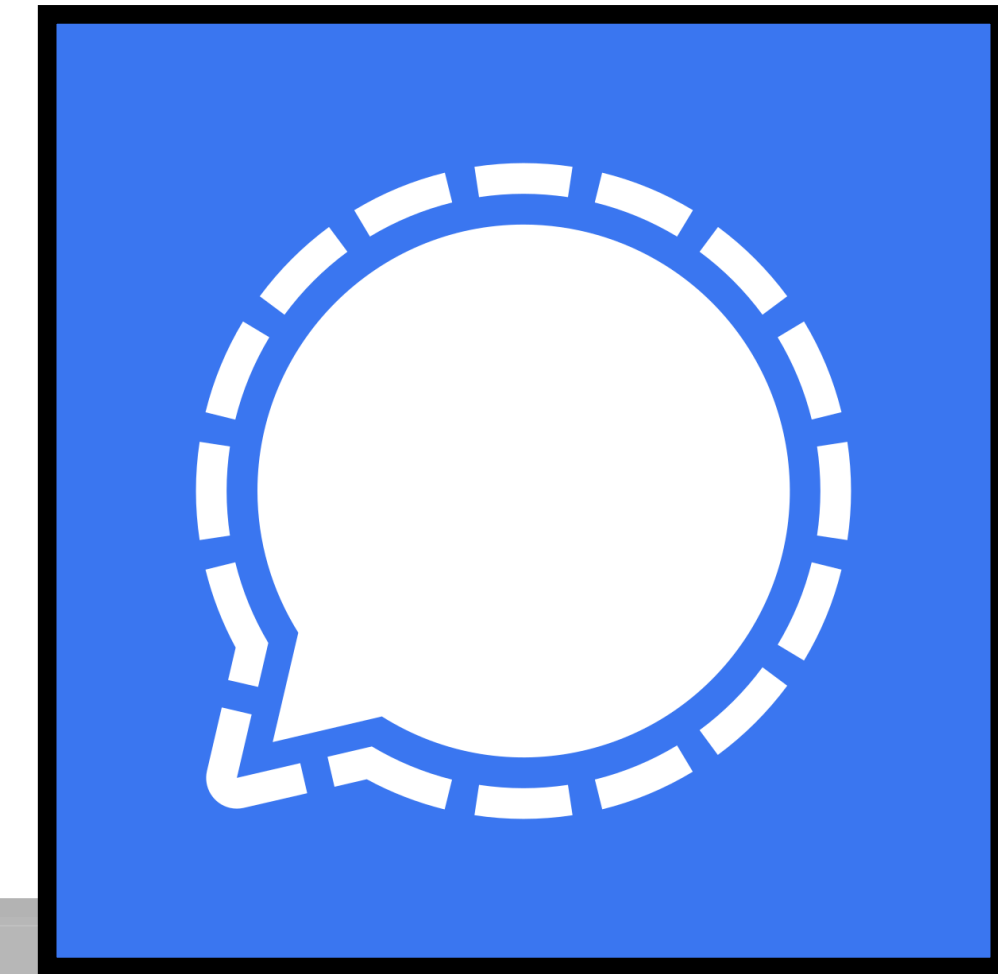
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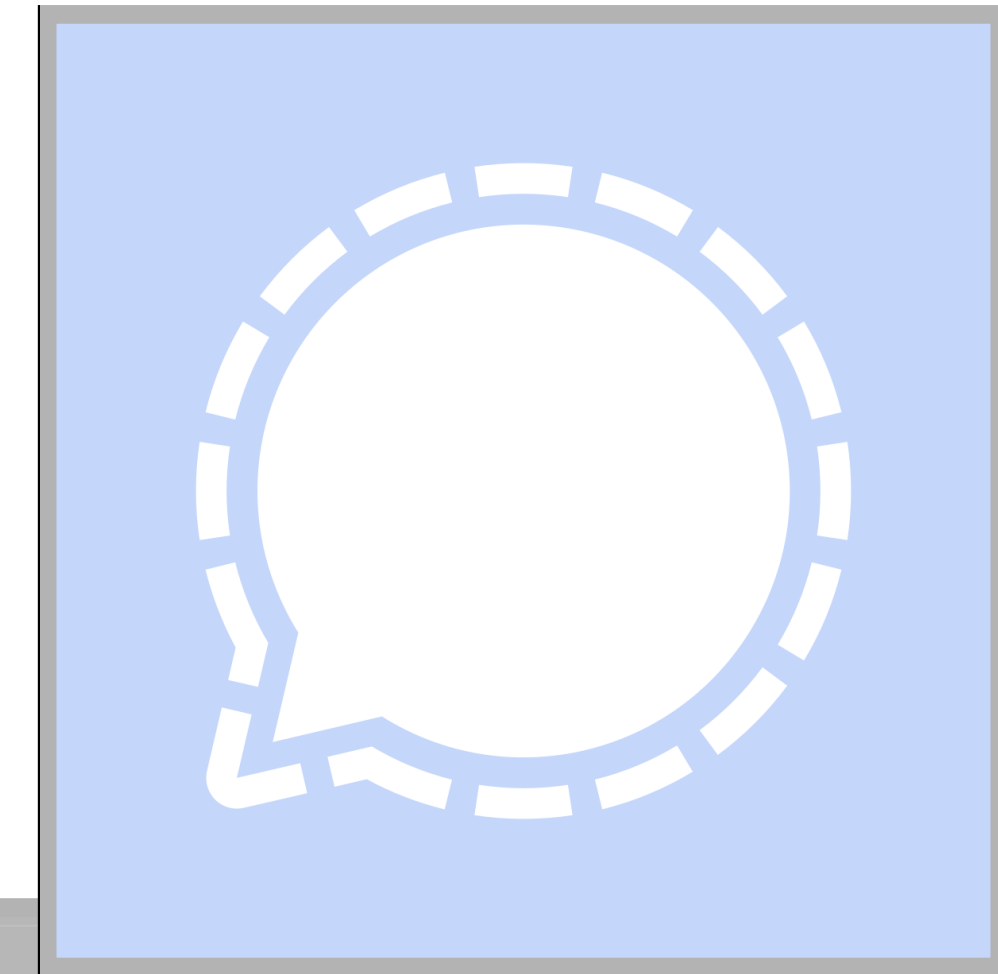
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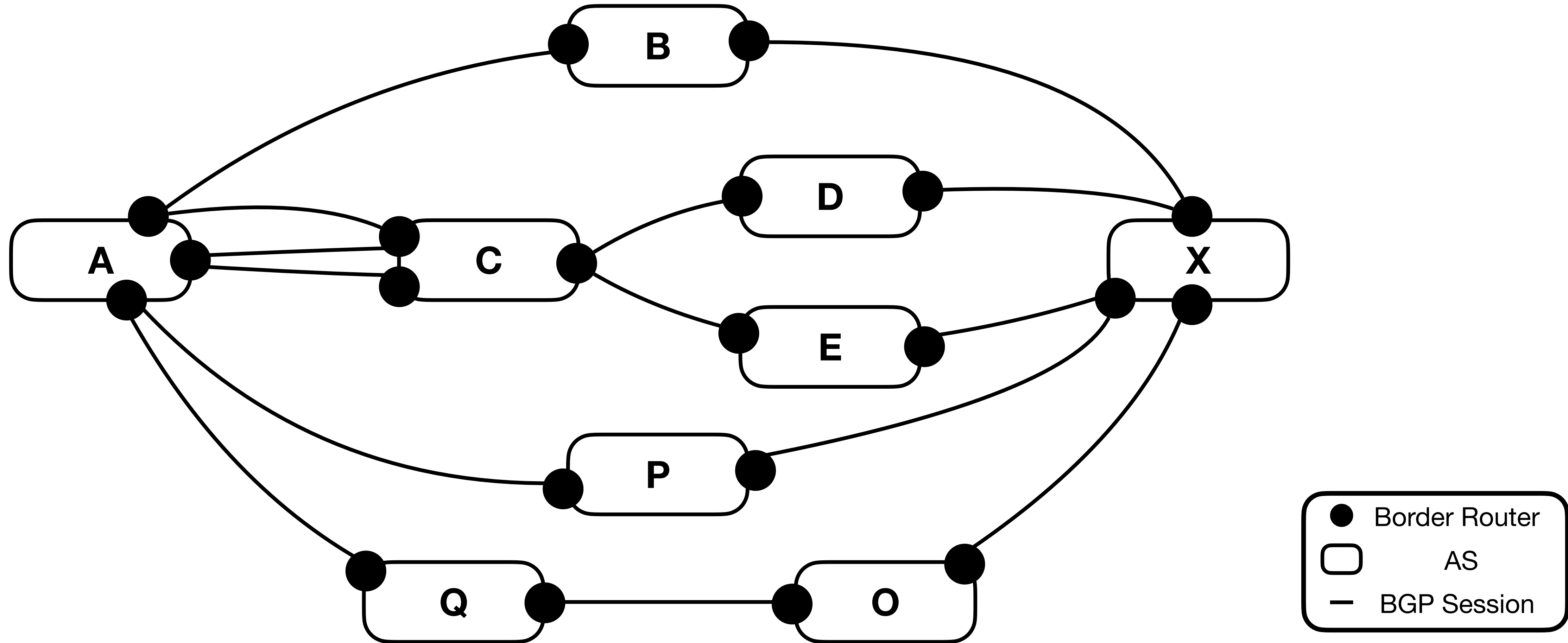
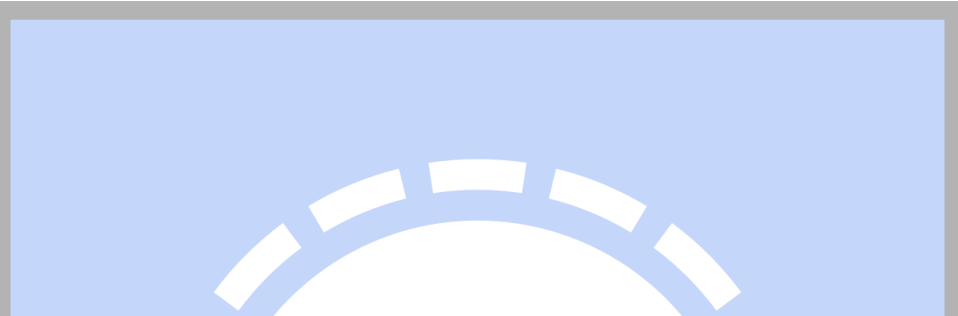
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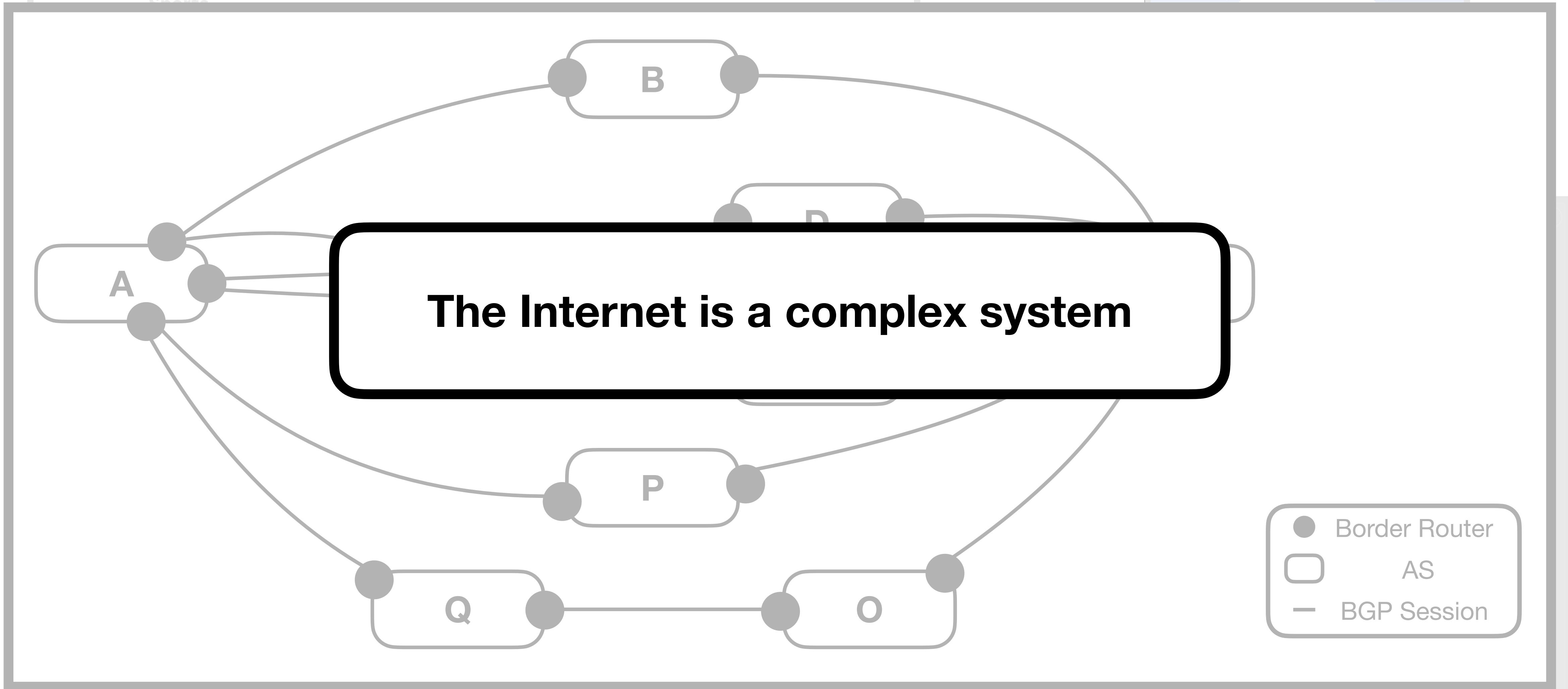
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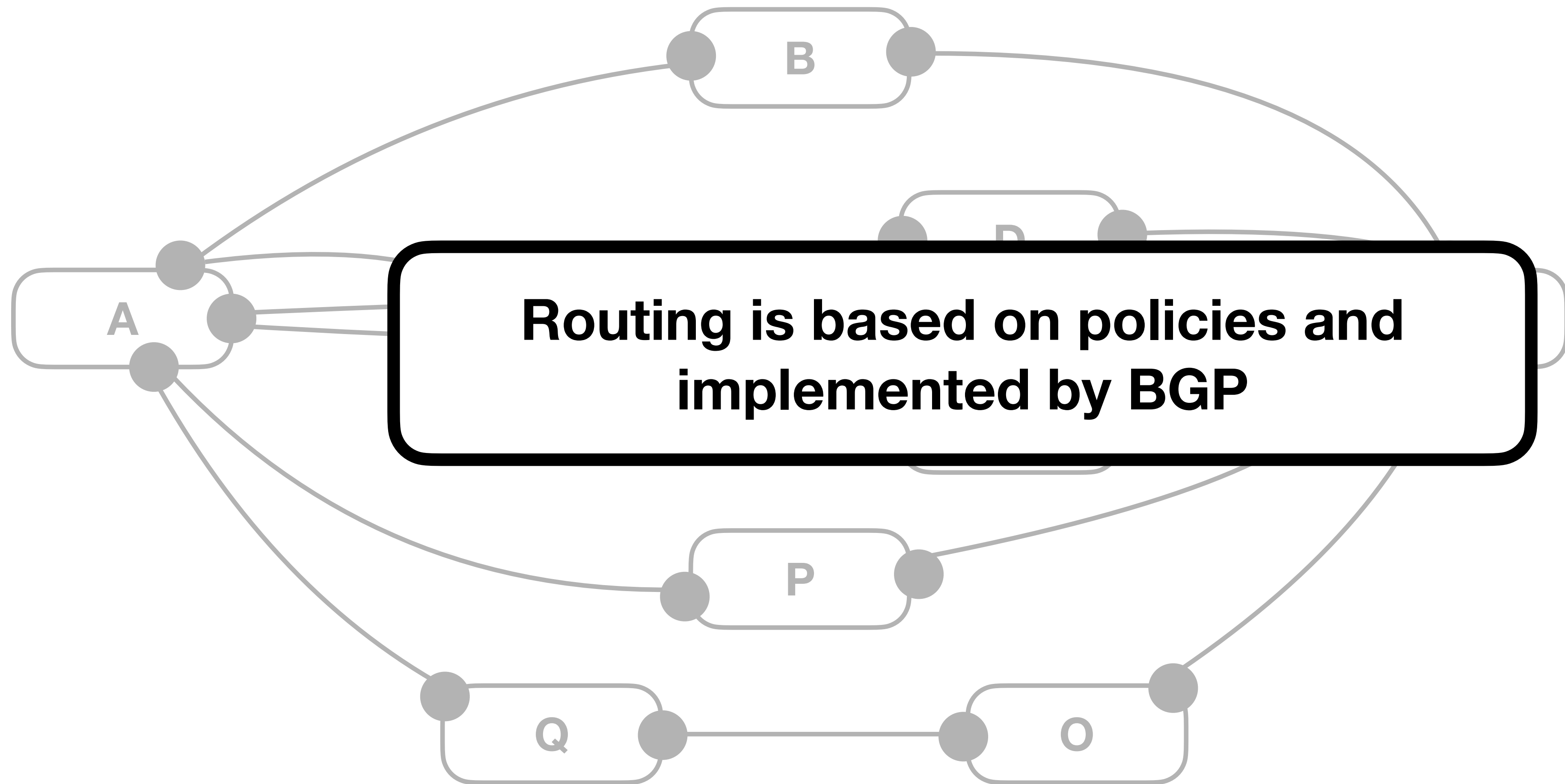
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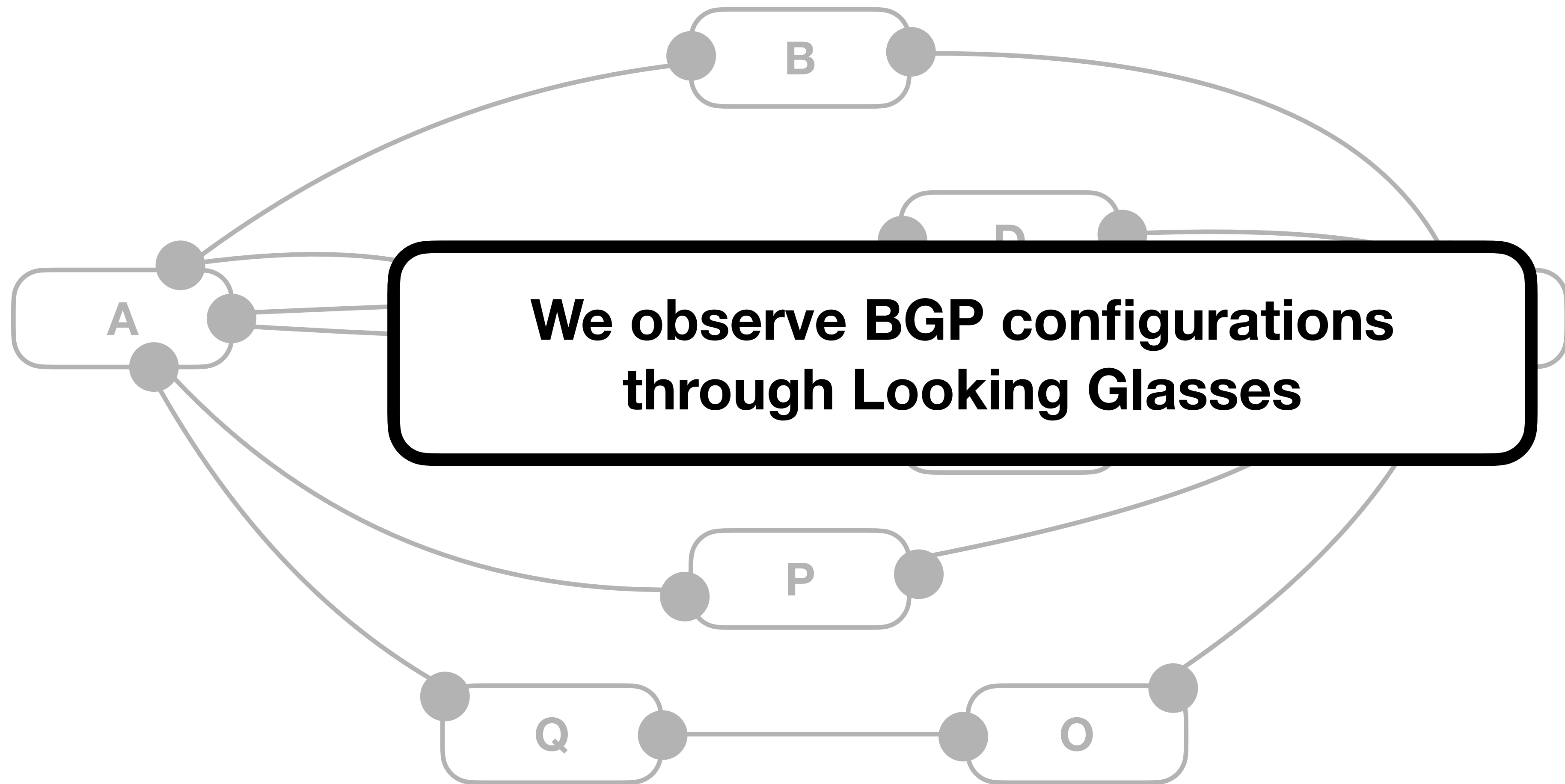
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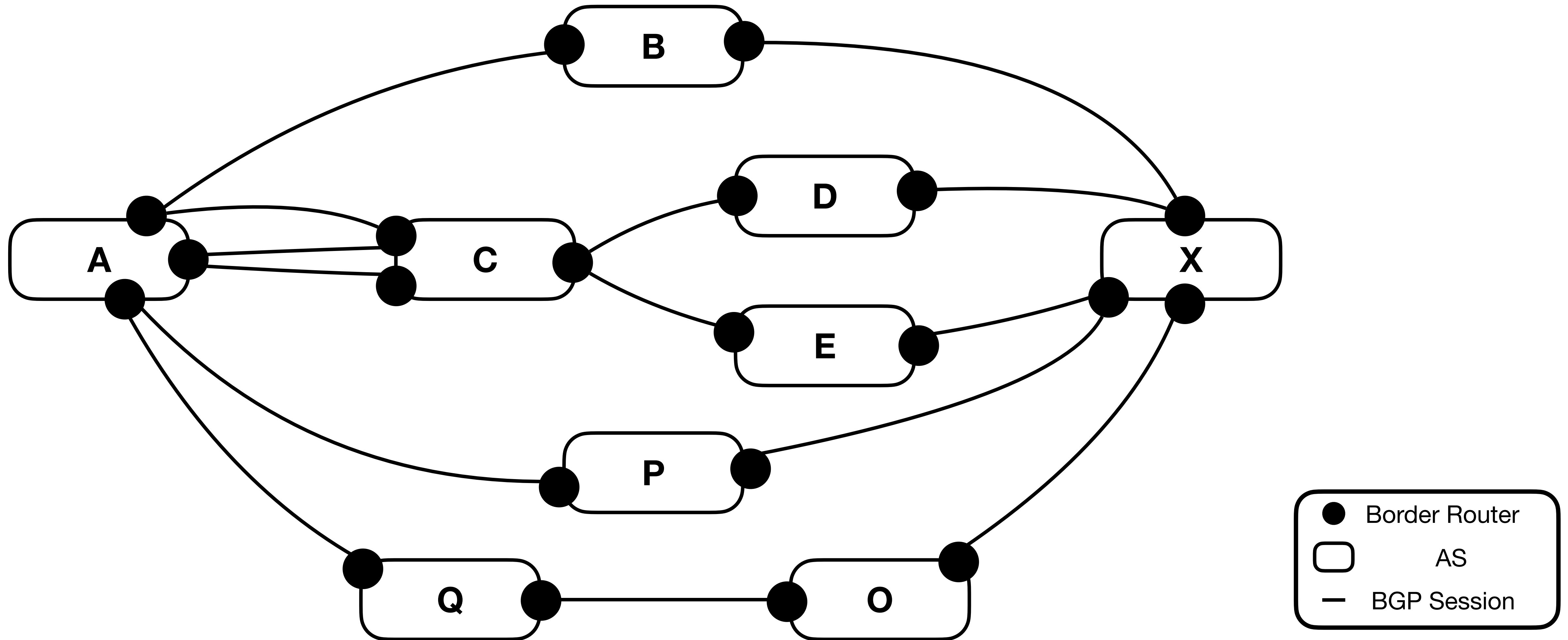


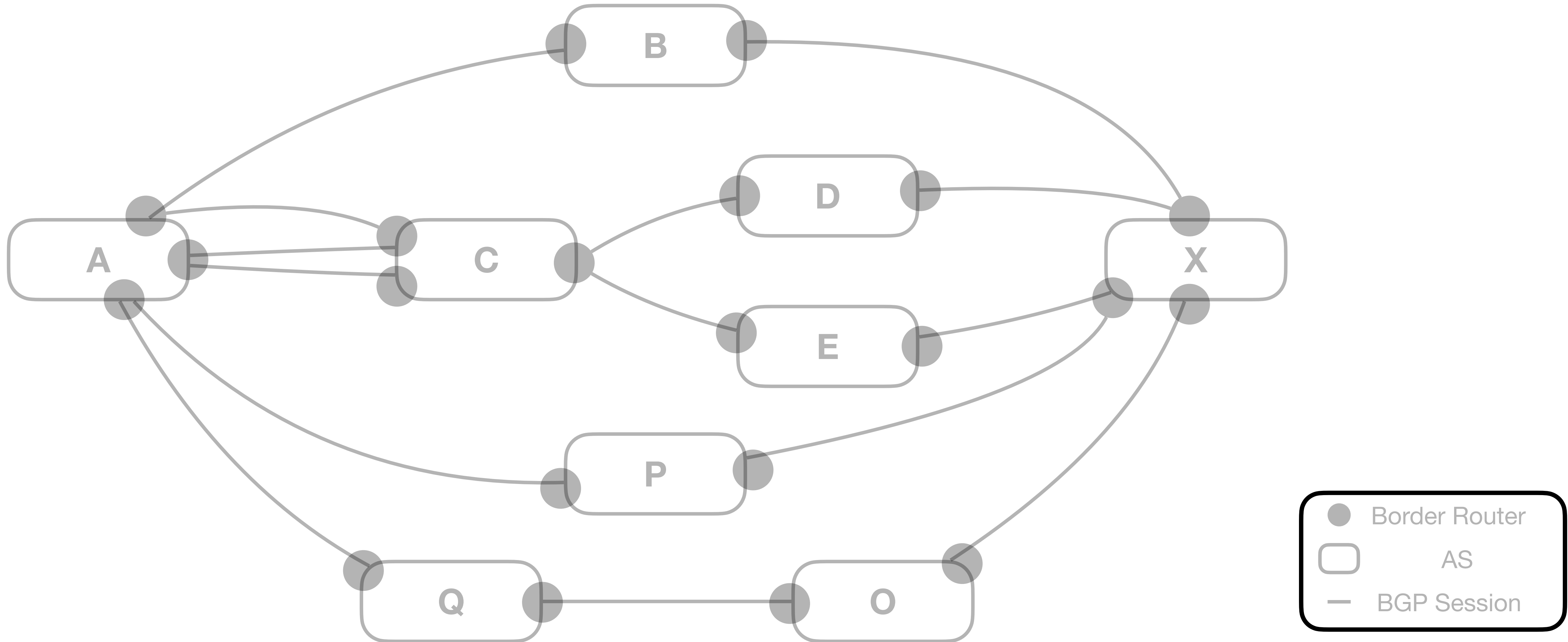


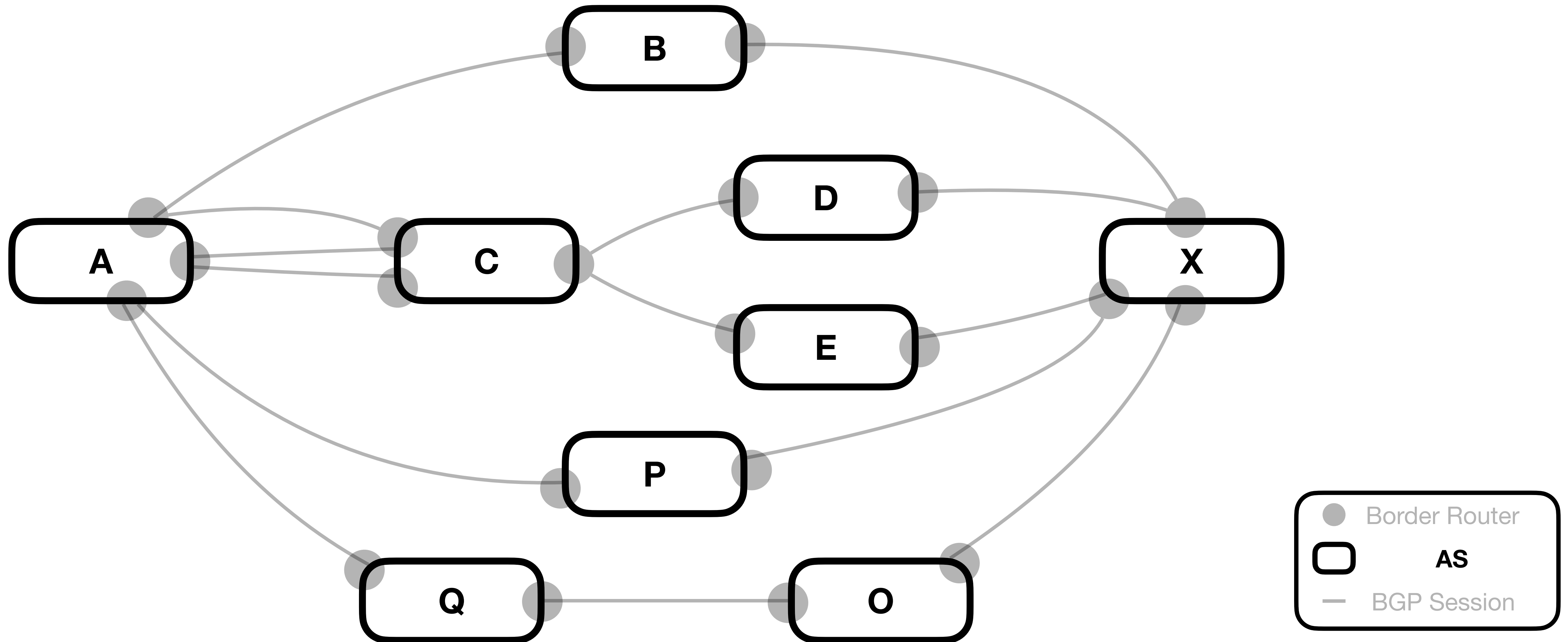
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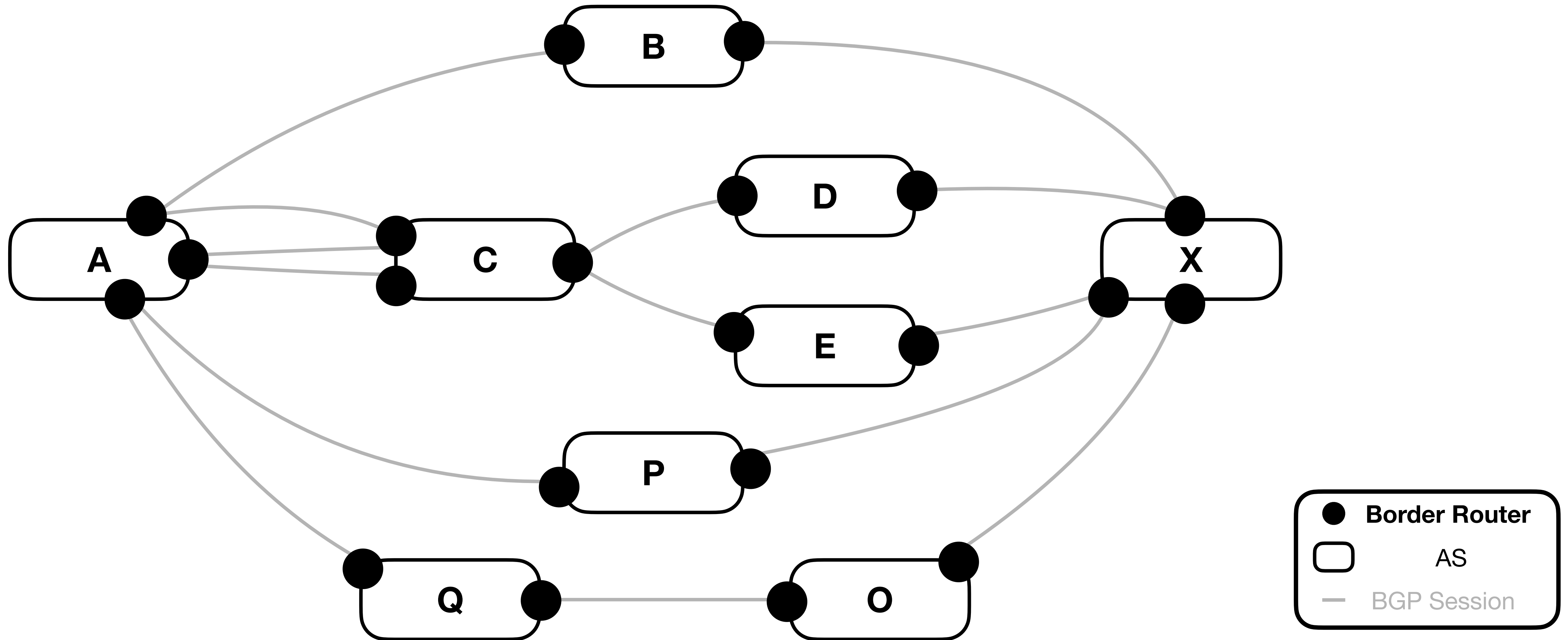


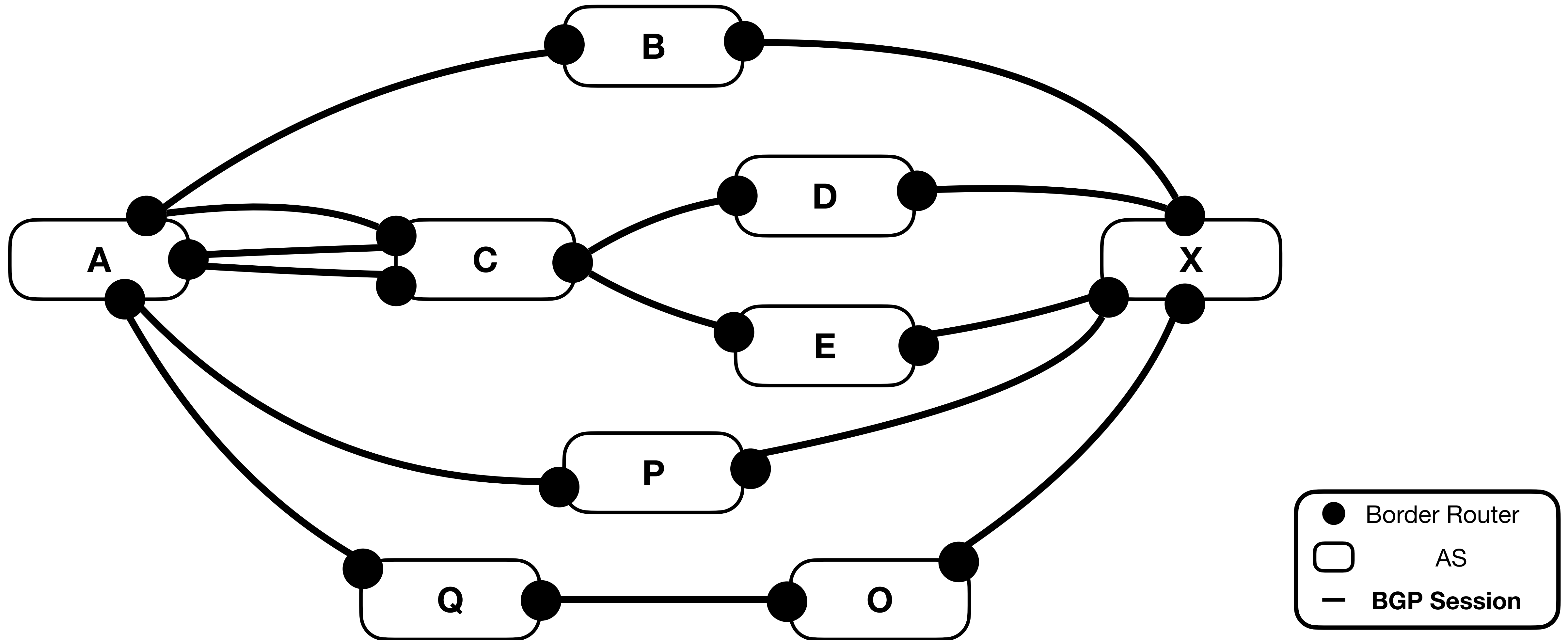
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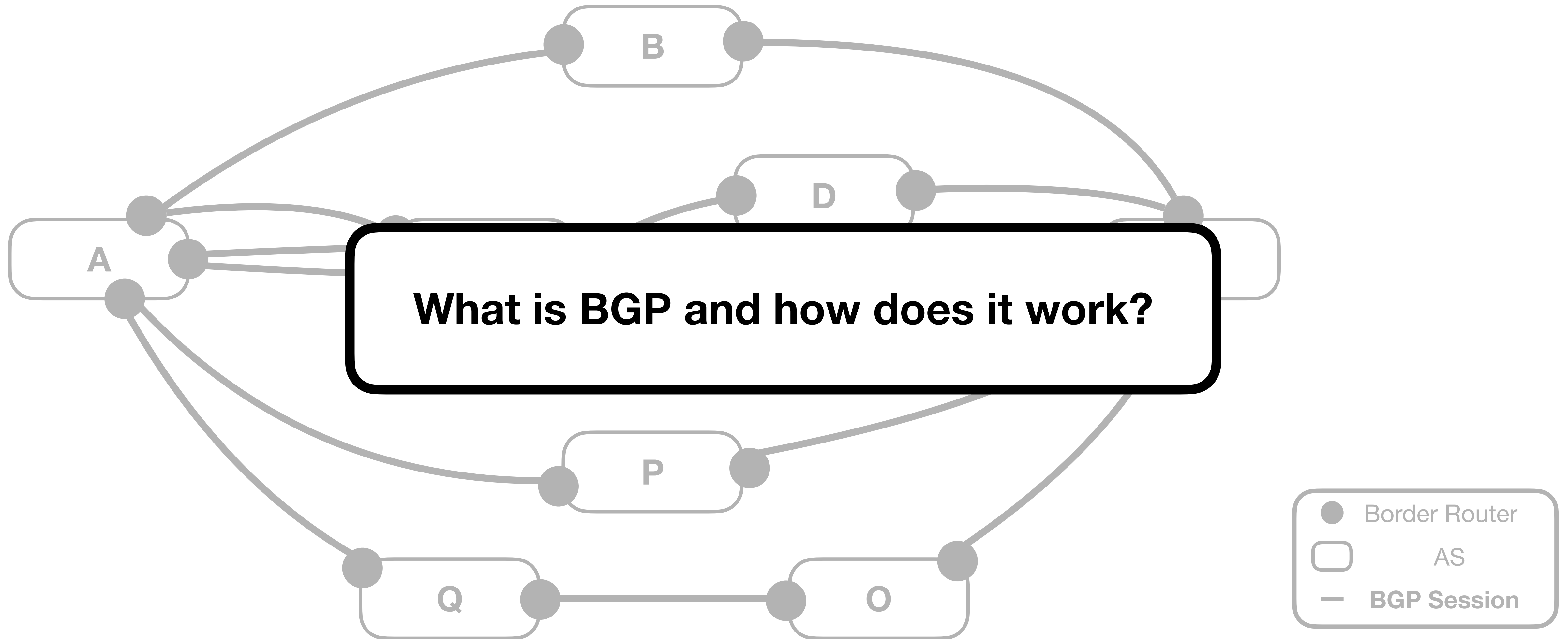


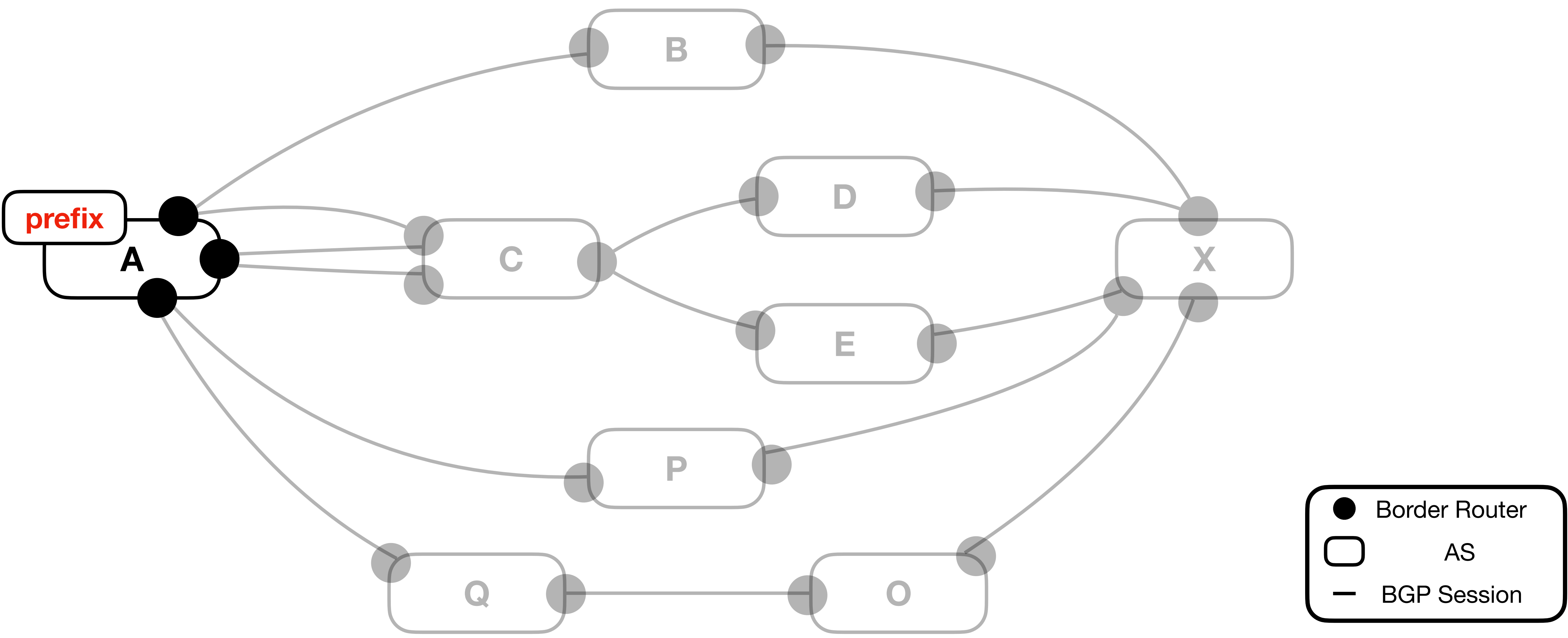




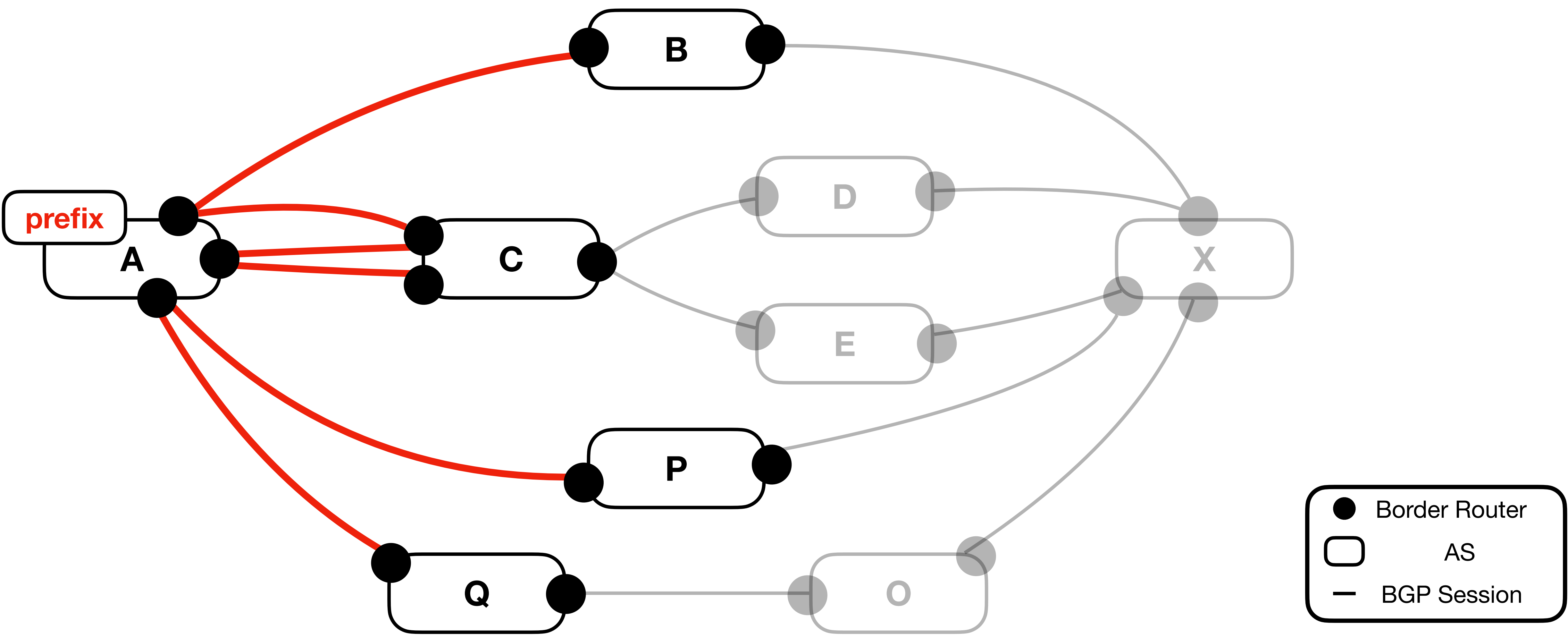


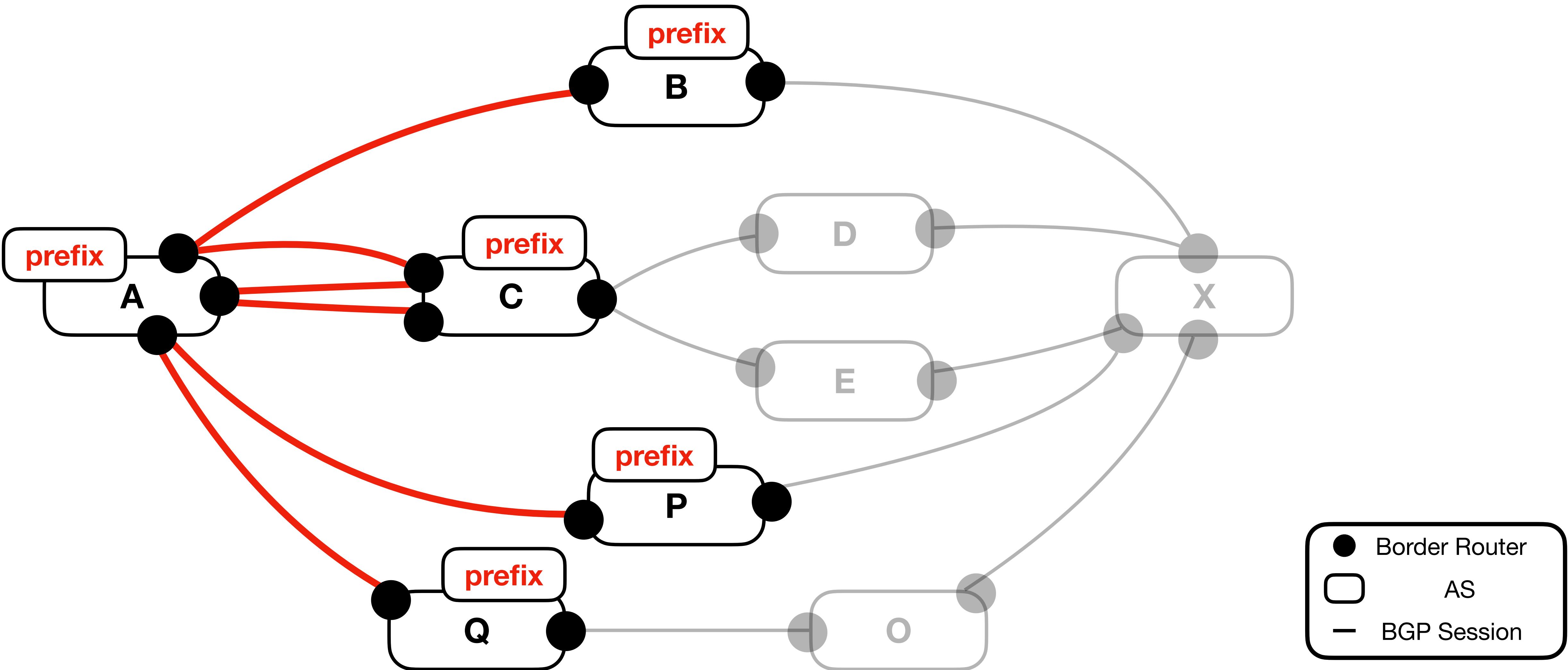




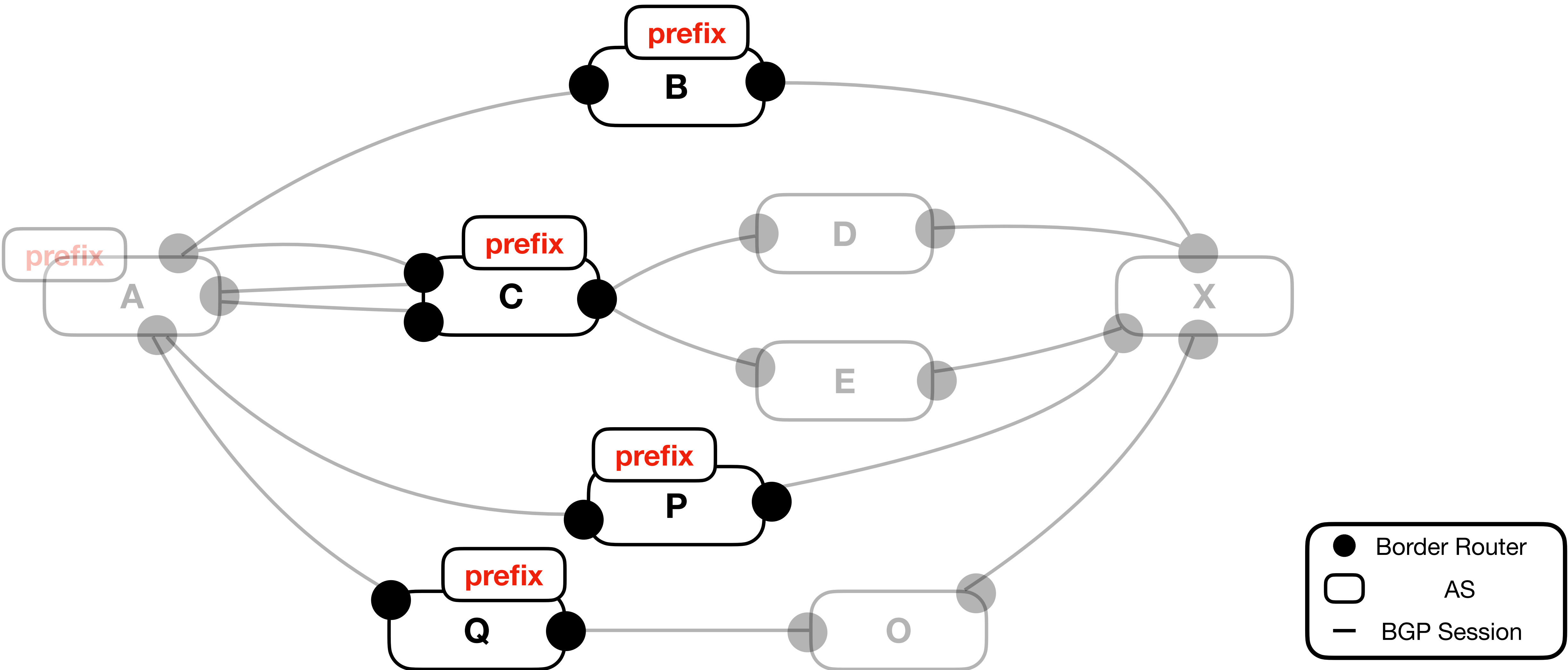


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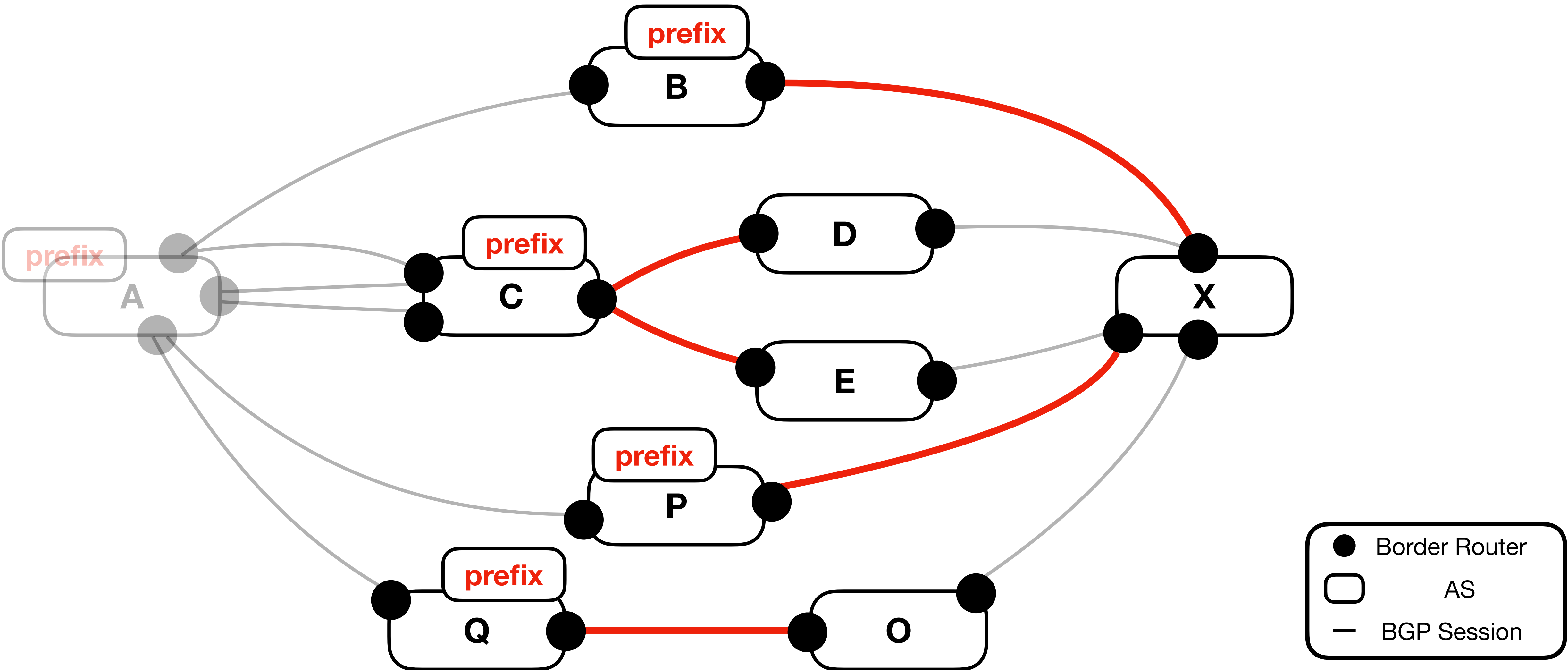




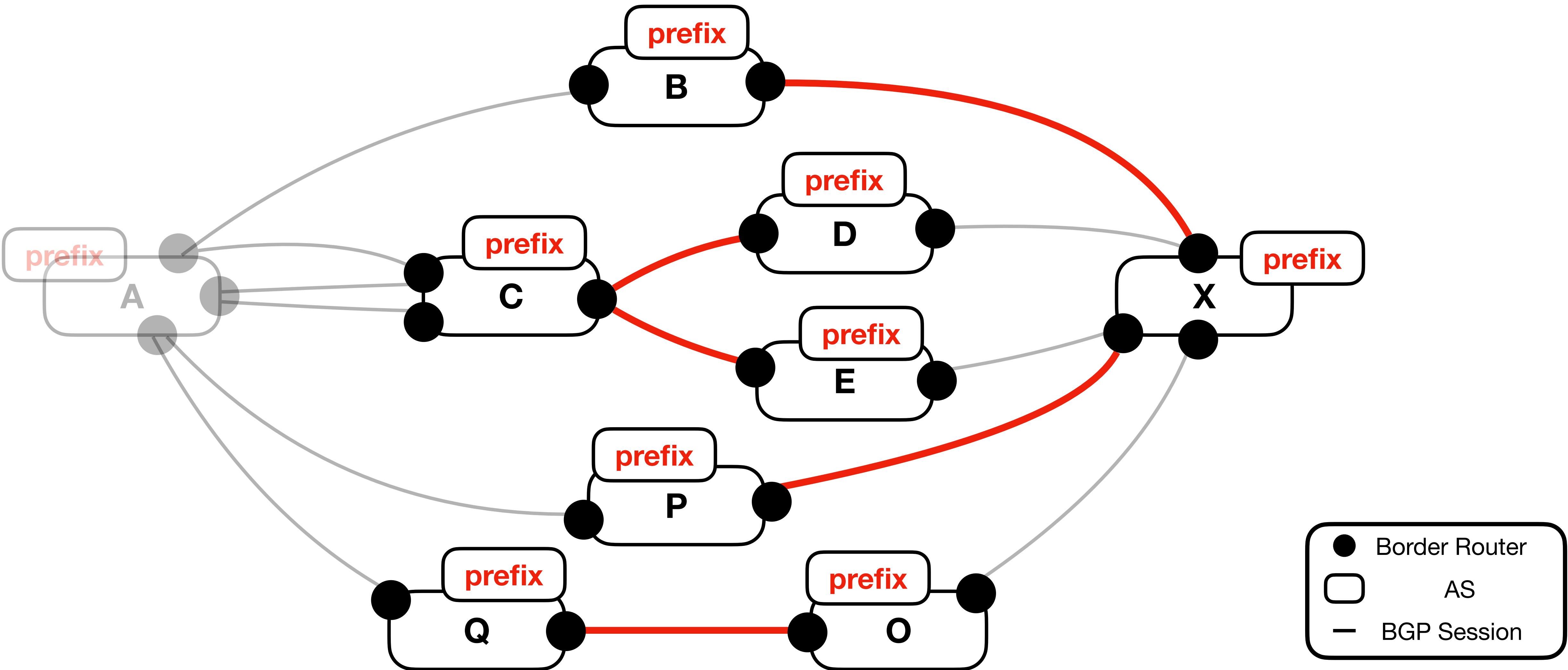
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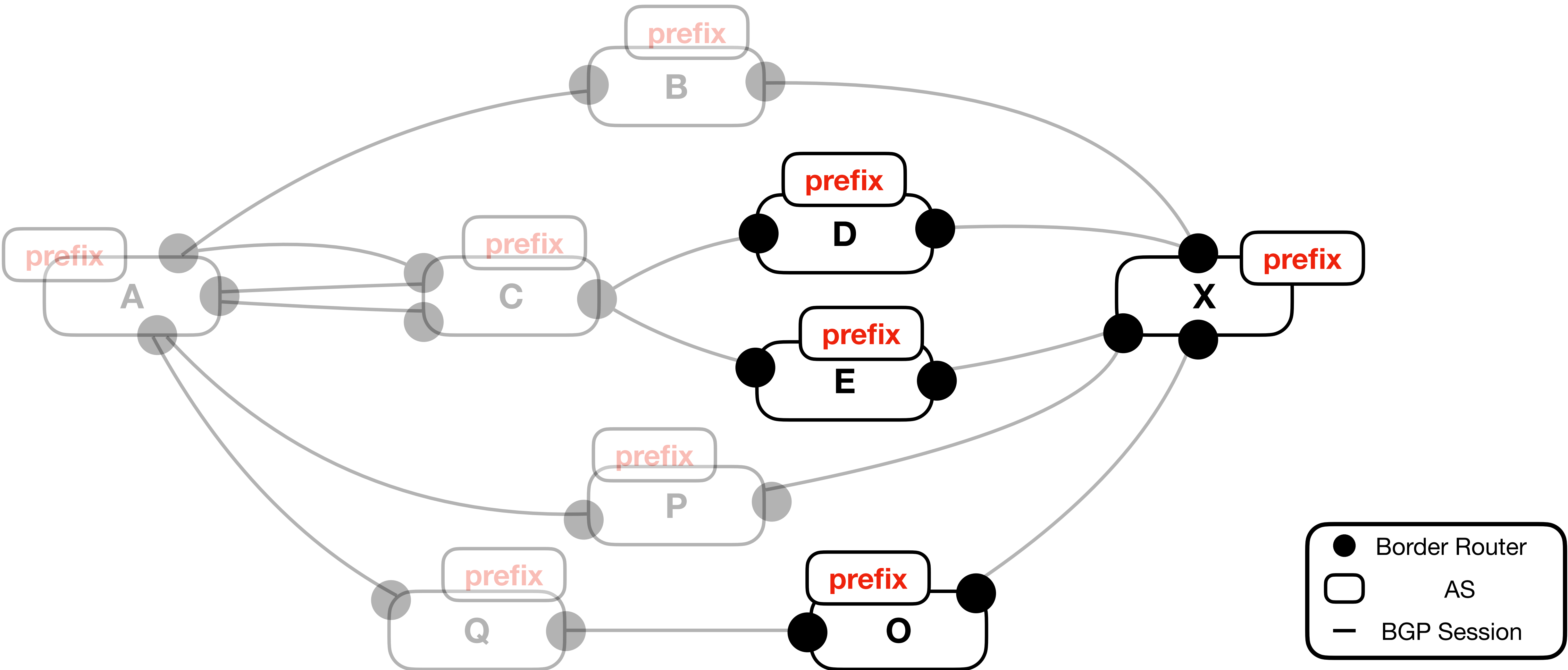
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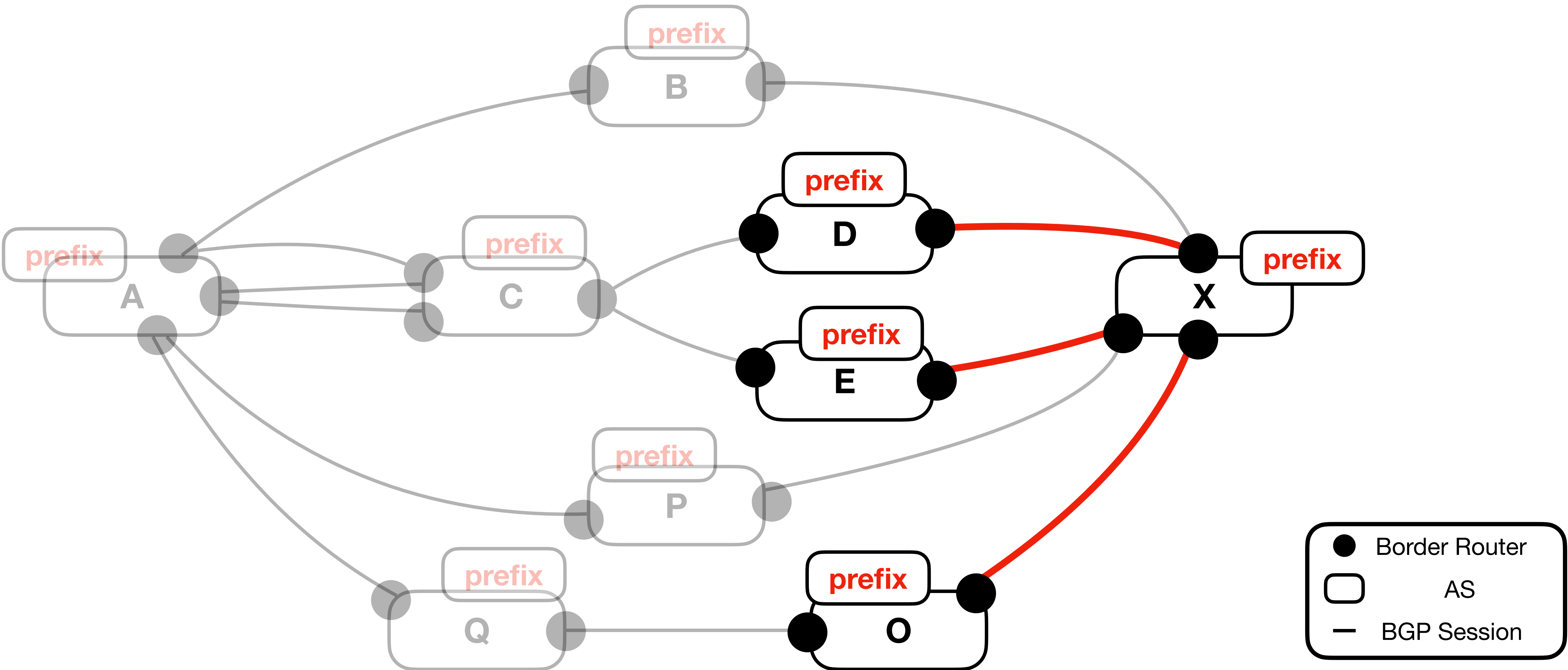
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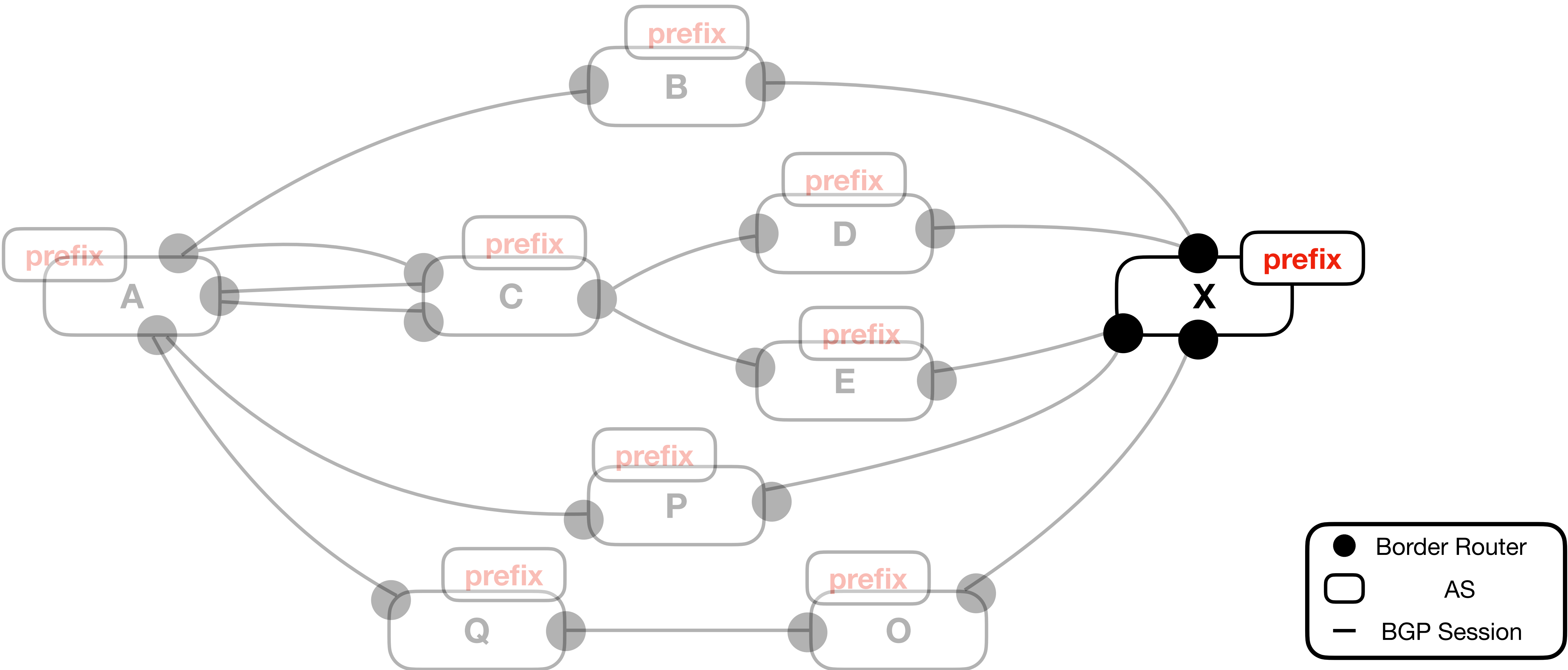
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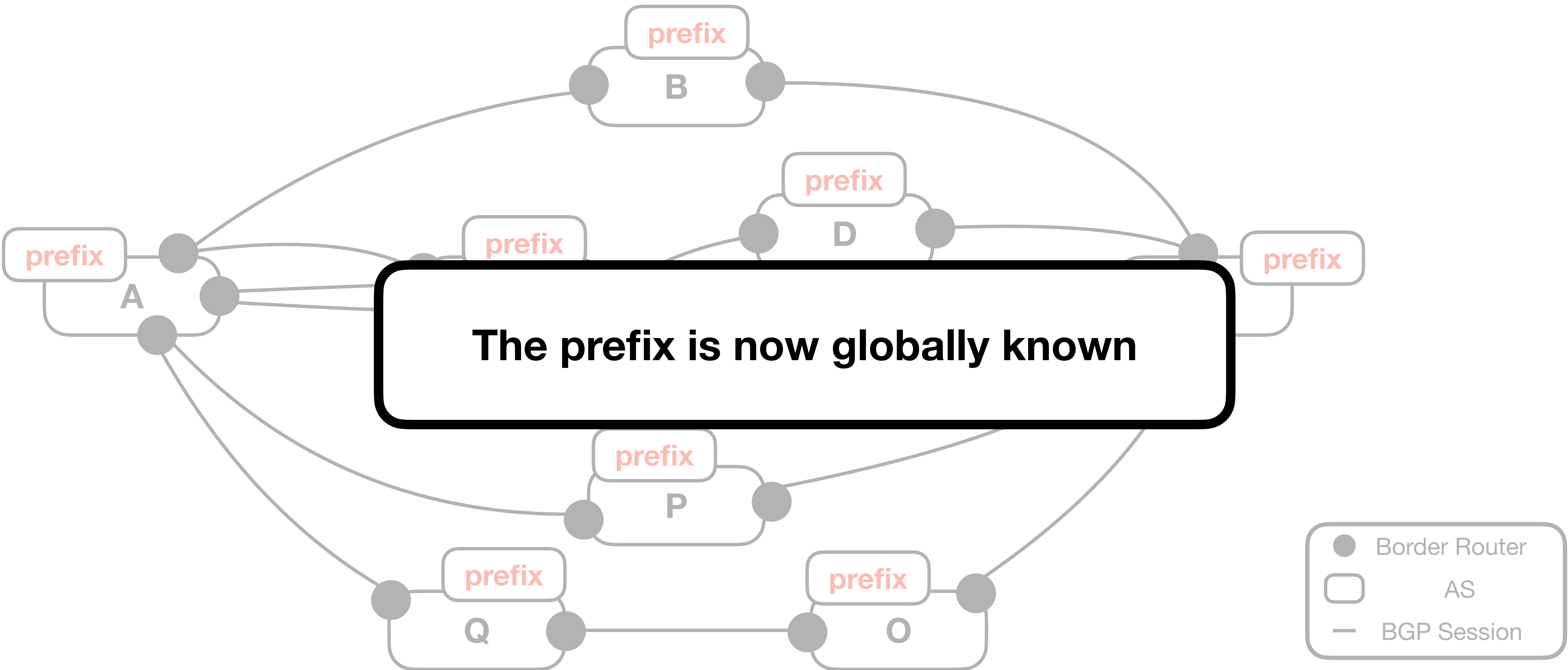
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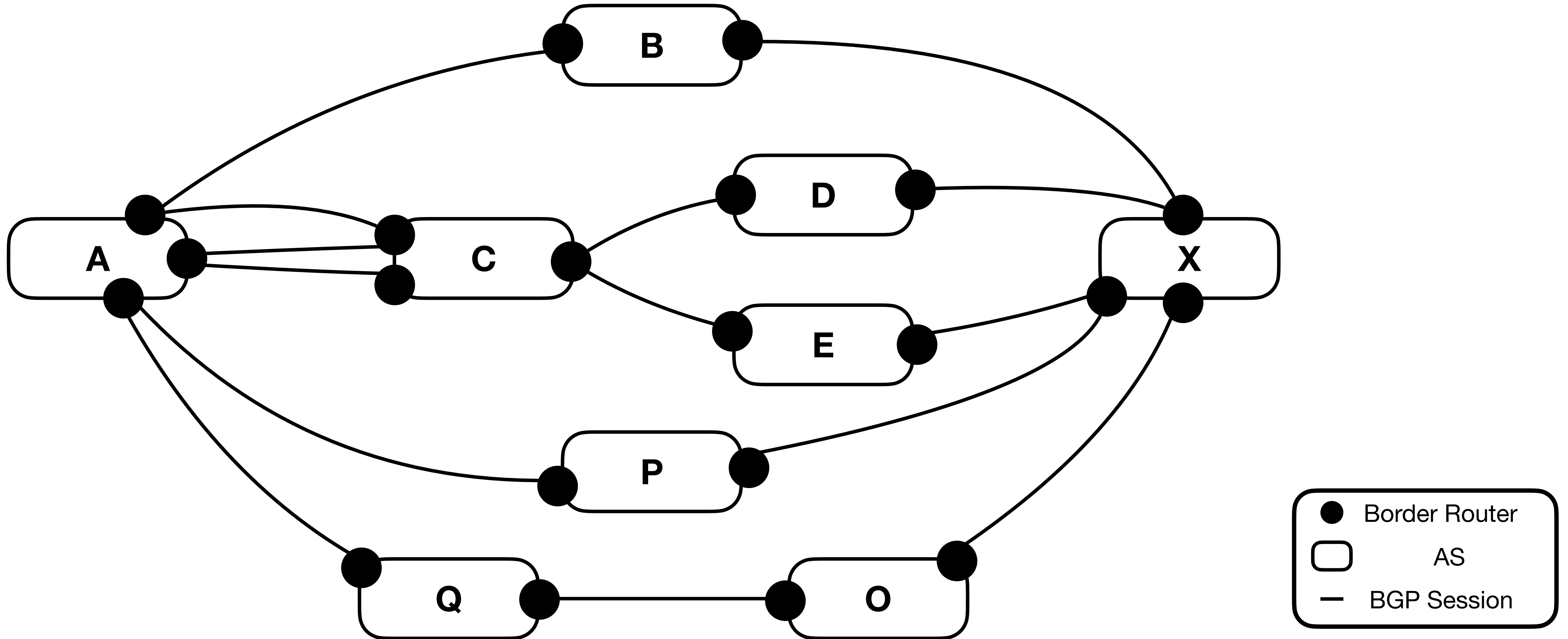


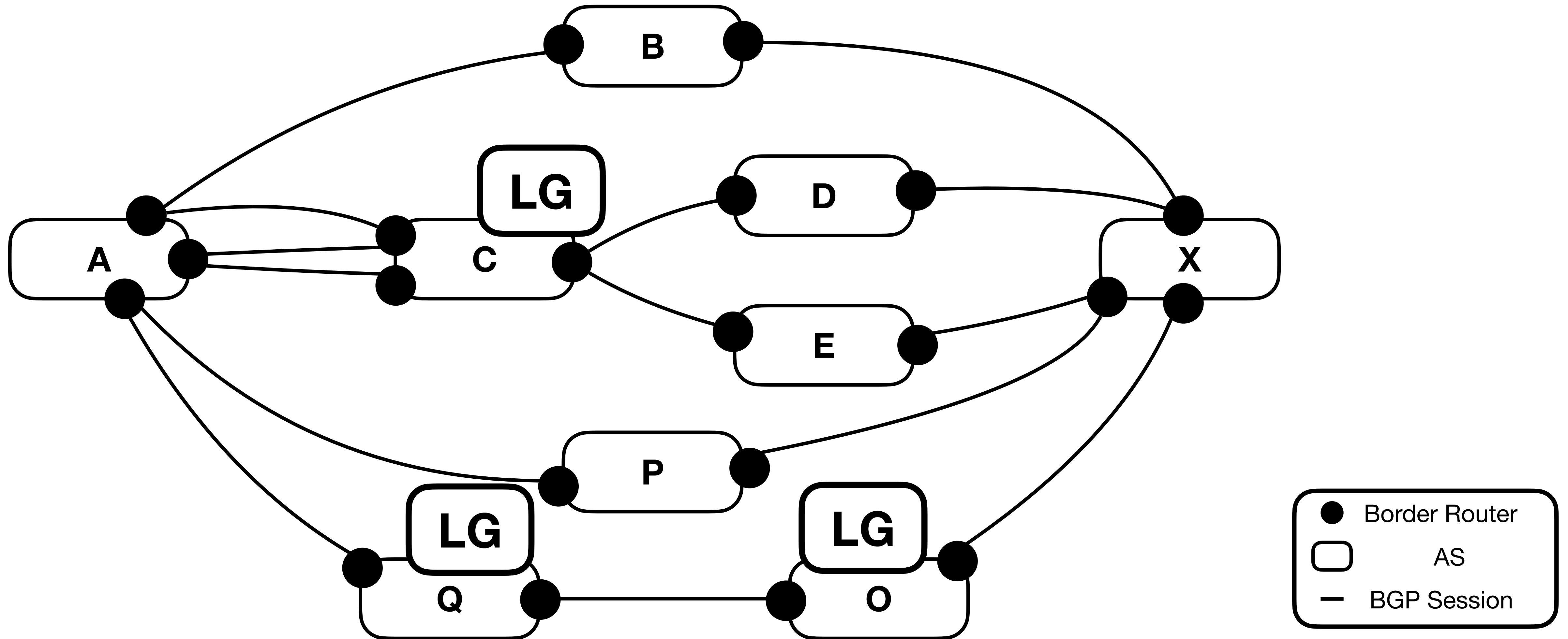
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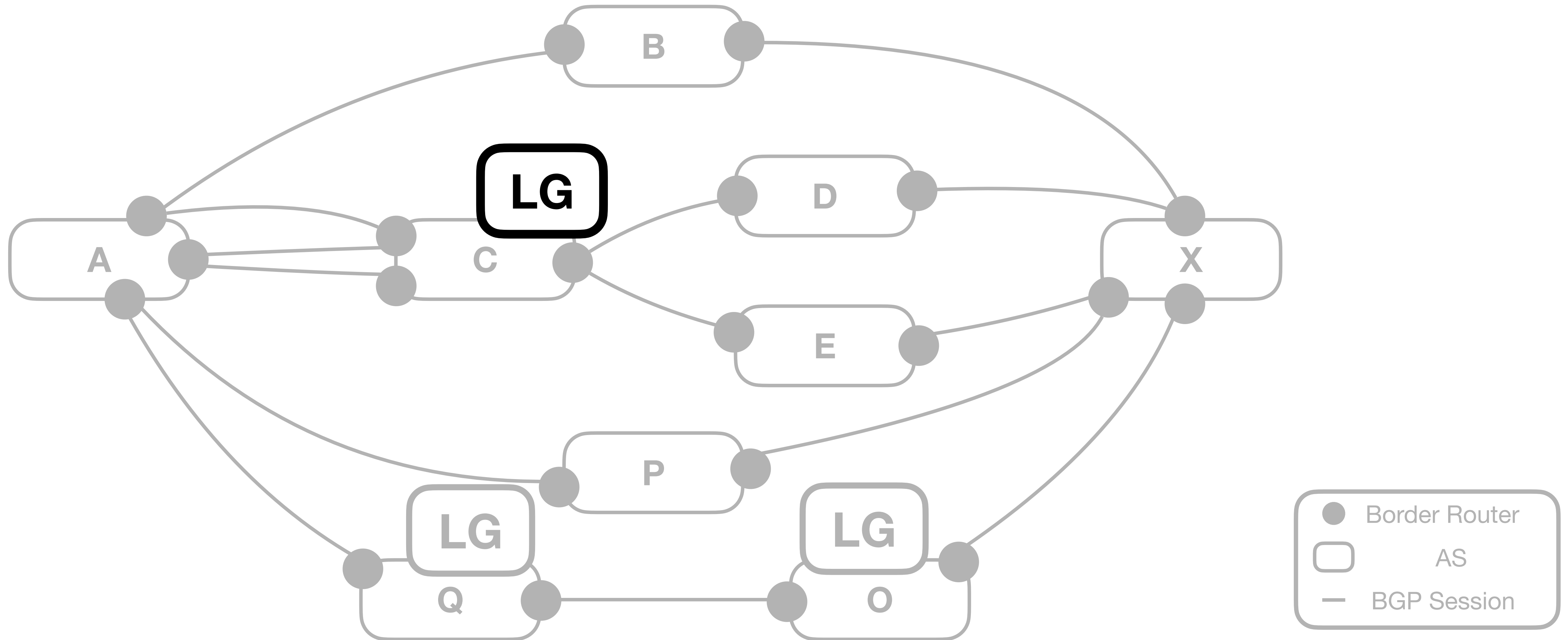
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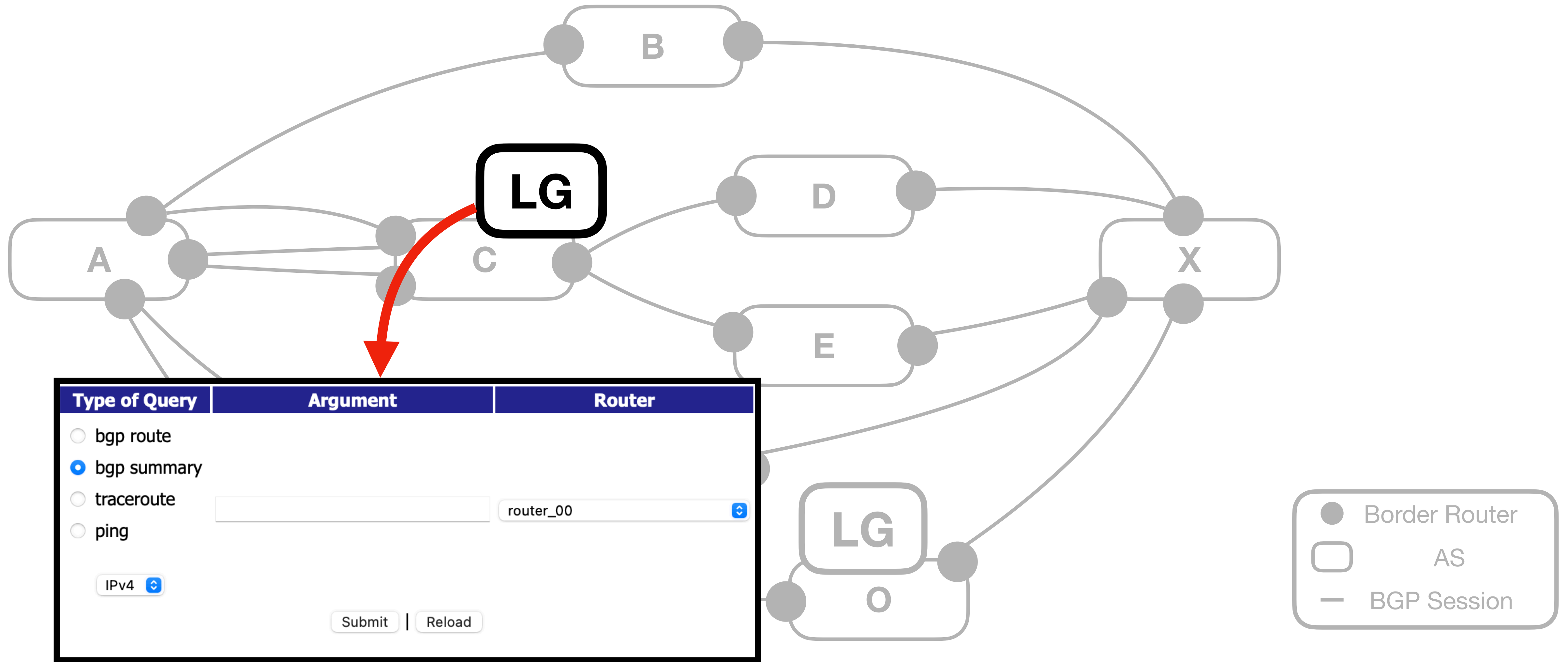




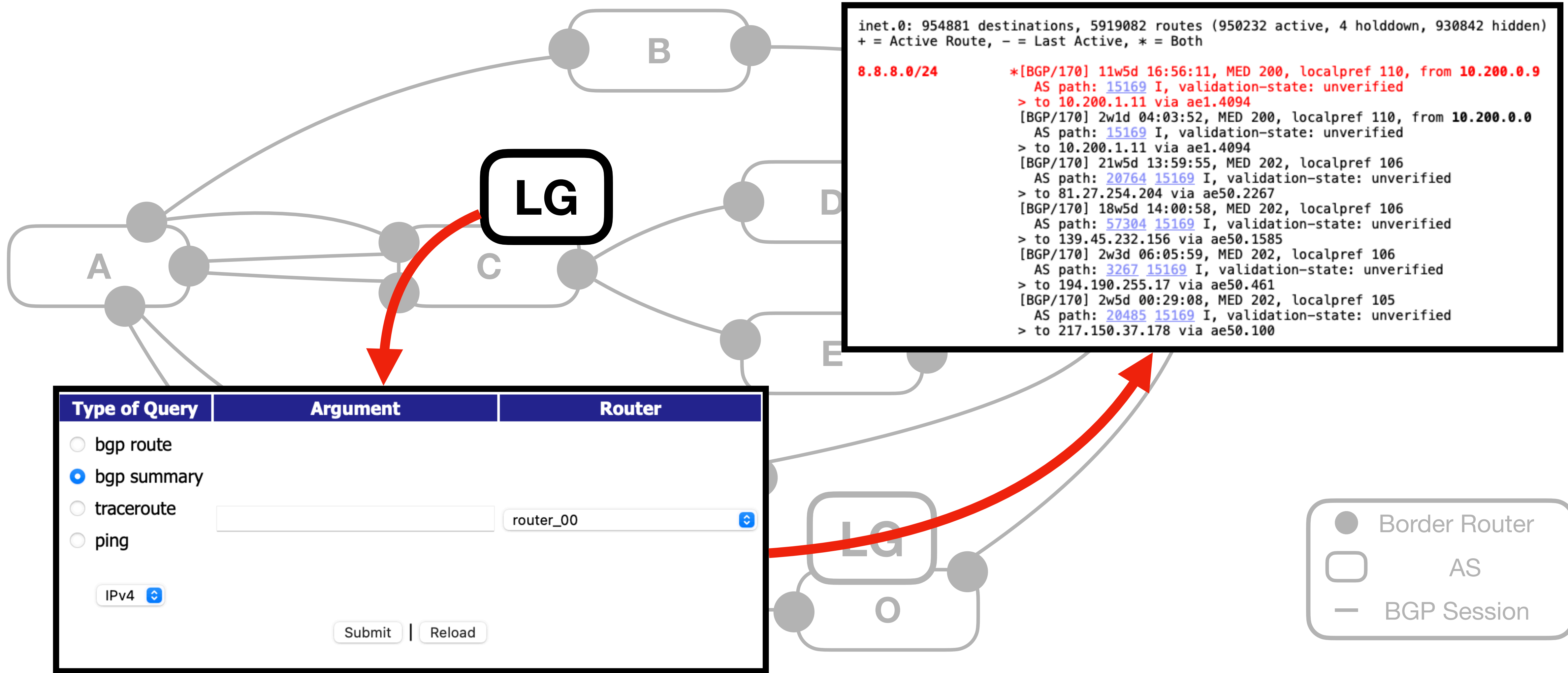
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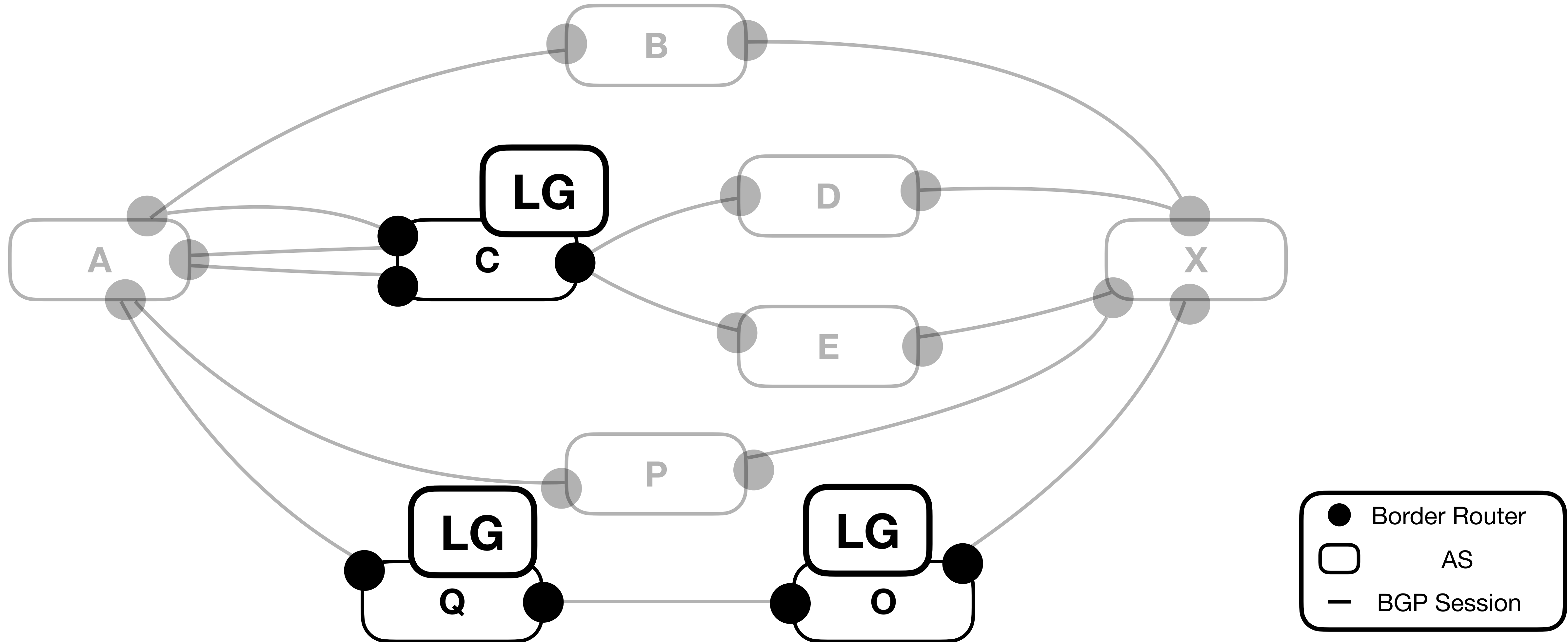
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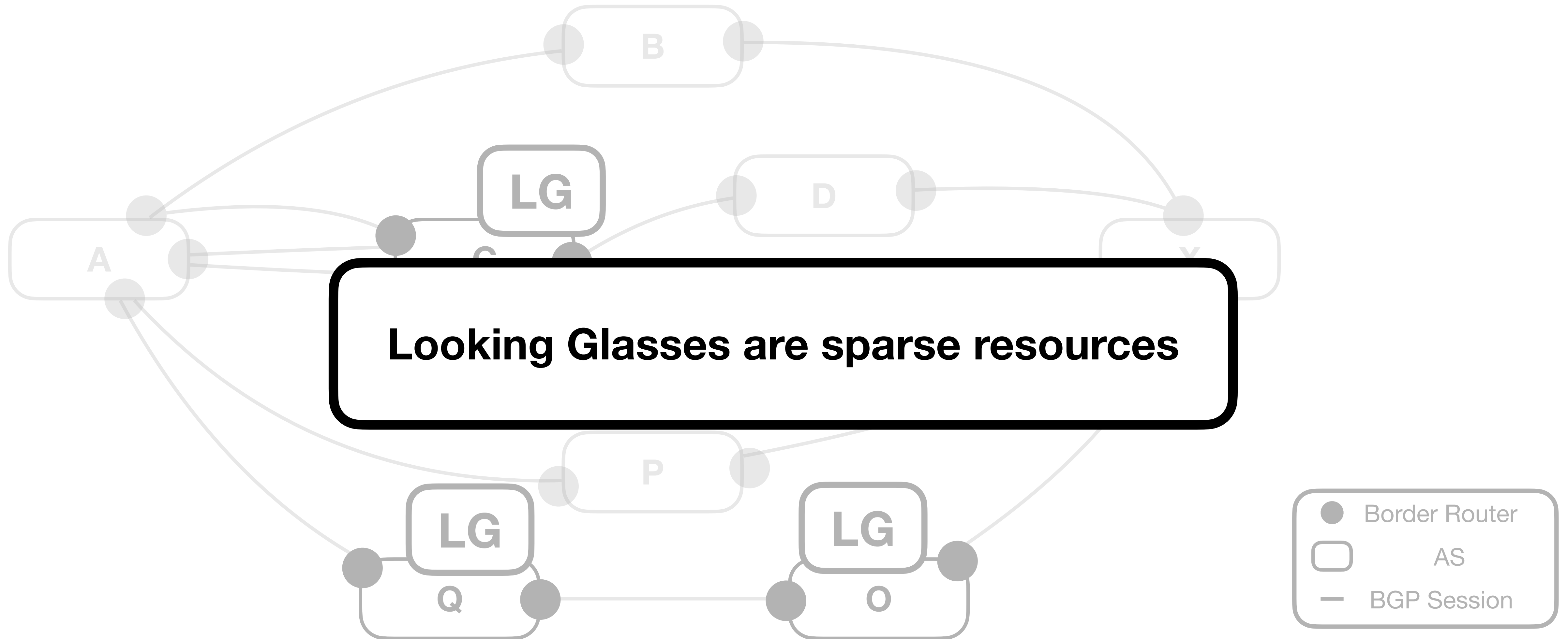
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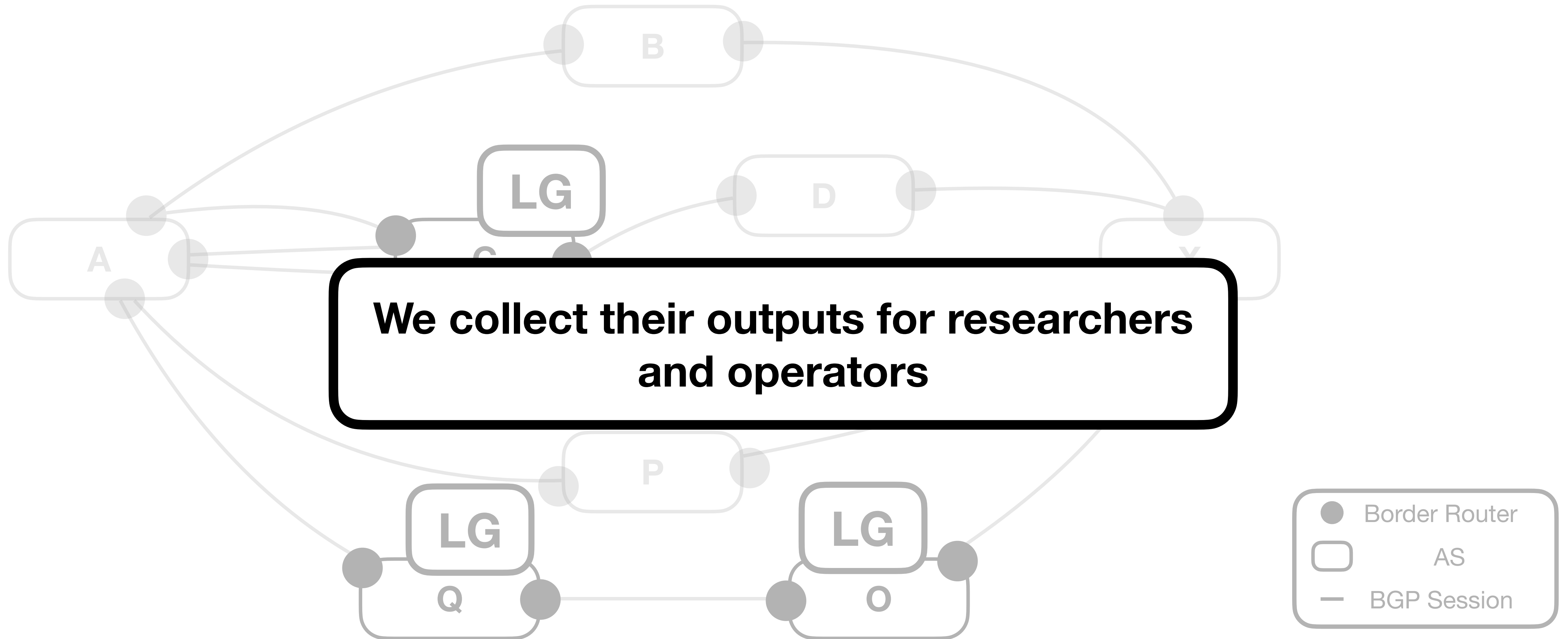
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<http://lg.overthewire.com.au/lg.cgi>
<http://noc.perspektivbredband.se/lg>
<http://lg.zettagrid.com/lg>
<https://lg.nexon.com.au>

robots.txt

forbidden

captcha

...

<http://lg.ucanet.ru>
<http://lg.pinspb.ru/>
<http://lg.daticum.com/lg>
<http://lg.unibit.ru>
<http://lg.inn.ru/>
<http://lg.virtuaoperator.pl>
<http://lg.zummer.su>
<http://lg.telefonet.ru>
<http://lg.globenet.net/lg/lg.cgi>
<http://lg.telindustelecom.lu>
<https://lg.atlex.ru/lg/>
<https://www.76telecom.com.br/lg/>
<http://lg.nordu.net/lg.cgi>
<http://lg.ch.as1836.net>
<http://lg.gin.ru>
<https://lookingglass.sunet.se/lg.cgi>
<http://lg.supranet.net/lg/lg.cgi>
<http://lg.m-online.net/lg>
<http://lg.spt.vn>
<http://noc.fregat.net/lg>
<http://lg.overthewire.com.au/lg.cgi>
<http://noc.perspektivbredband.se/lg>
<http://lg.zettagrid.com/lg>
<https://lg.nexon.com.au>

robots.txt

forbidden

captcha

...

<http://lg.ucanet.ru>
<http://lg.pinspb.ru/>
<http://lg.daticum.com/lg>
<http://lg.unibit.ru>
<http://lg.inn.ru/>
<http://lg.virtuaoperator.pl>
<http://lg.zummer.su>
<http://lg.telefonet.ru>
<http://lg.globenet.net/lg/lg.cgi>
<http://lg.telindustelecom.lu>
<https://lg.atlex.ru/lg/>
<https://www.76telecom.com.br/lg/>
<http://lg.nordu.net/lg.cgi>
<http://lg.ch.as1836.net>
<http://lg.gin.ru>
<https://lookingglass.sunet.se/lg.cgi>
<http://lg.supranet.net/lg/lg.cgi>
<http://lg.m-online.net/lg>
<http://lg.spt.vn>
<http://noc.fregat.net/lg>
<http://lg.overthewire.com.au/lg.cgi>
<http://noc.perspektivbredband.se/lg>
<http://lg.zetagrid.com/lg>
<https://lg.nexon.com.au>

robots.txt

forbidden

captcha

...

<http://lg.ucanet.ru>
<http://lg.pinspb.ru/>
<http://lg.daticum.com/lg>
<http://lg.unibit.ru>
<http://lg.inn.ru/>
<http://lg.virtuaoperator.pl>
<http://lg.zummer.su>
<http://lg.telefonet.ru>
<http://lg.globenet.net/lg/lg.cgi>
<http://lg.telindustelecom.lu>

robots.txt

Final list contains 155 LG URLs

<https://lookingglass.sunet.se/lg.cgi>
<http://lg.supranet.net/lg/lg.cgi>
<http://lg.m-online.net/lg>
<http://lg.spt.vn>
<http://noc.fregat.net/lg>
<http://lg.overthewire.com.au/lg.cgi>
<http://noc.perspektivbredband.se/lg>
<http://lg.zettagrid.com/lg>
<https://lg.nexon.com.au>

...

<http://lg.ucanet.ru>
<http://lg.pinspb.ru/>
<http://lg.daticum.com/lg>
<http://lg.unibit.ru>
<http://lg.inn.ru/>
<http://lg.virtuaoperator.pl>
<http://lg.zummer.su>
<http://lg.telefonet.ru>
<http://lg.globenet.net/lg/lg.cgi>
<http://lg.telindustelecom.lu>

robots.txt

How do we collect their outputs?

<https://lookingglass.sunet.se/lg.cgi>
<http://lg.supranet.net/lg/lg.cgi>
<http://lg.m-online.net/lg>
<http://lg.spt.vn>
<http://noc.fregat.net/lg>
<http://lg.overthewire.com.au/lg.cgi>
<http://noc.perspektivbredband.se/lg>
<http://lg.zettagrid.com/lg>
<https://lg.nexon.com.au>

...

LGS

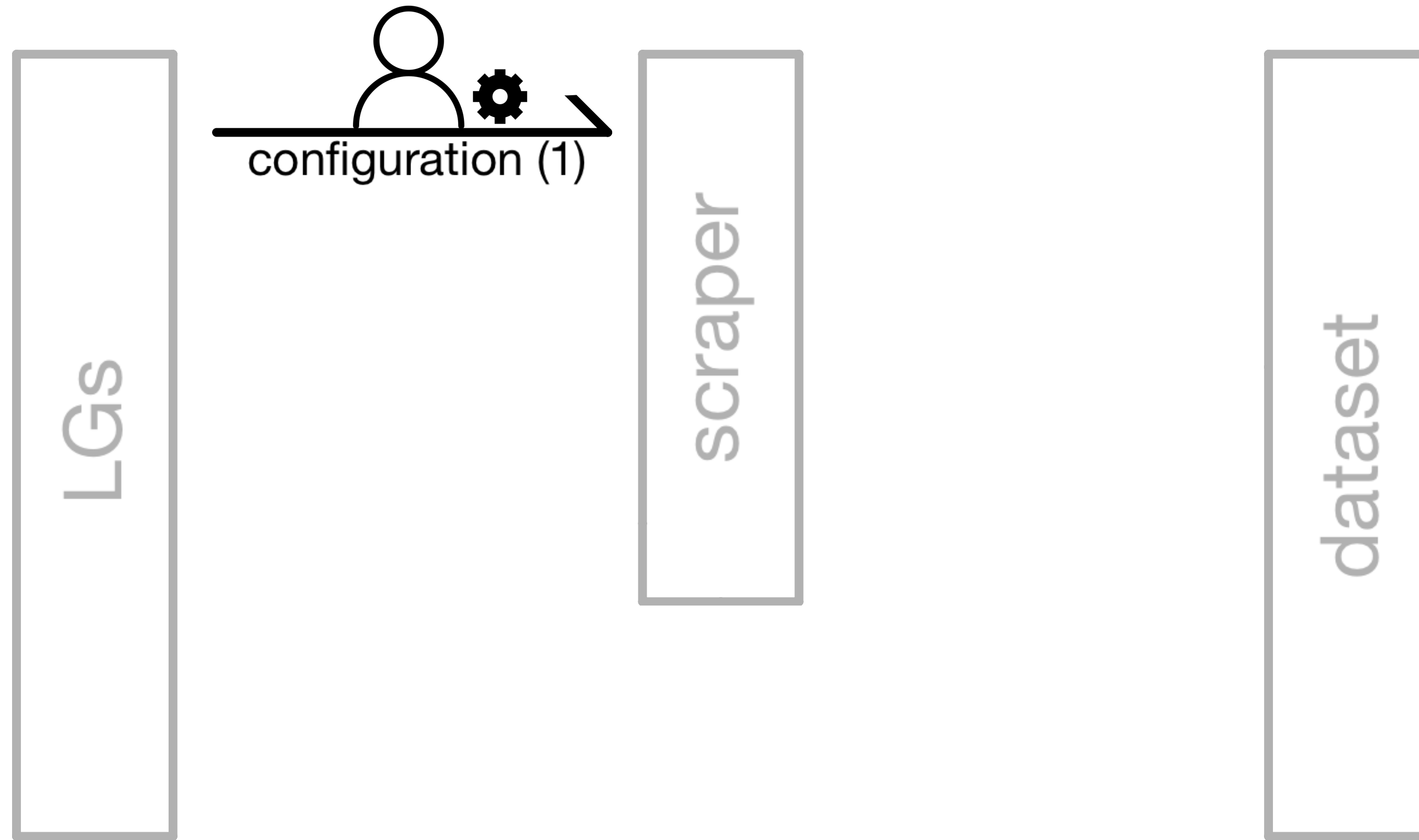
LGS

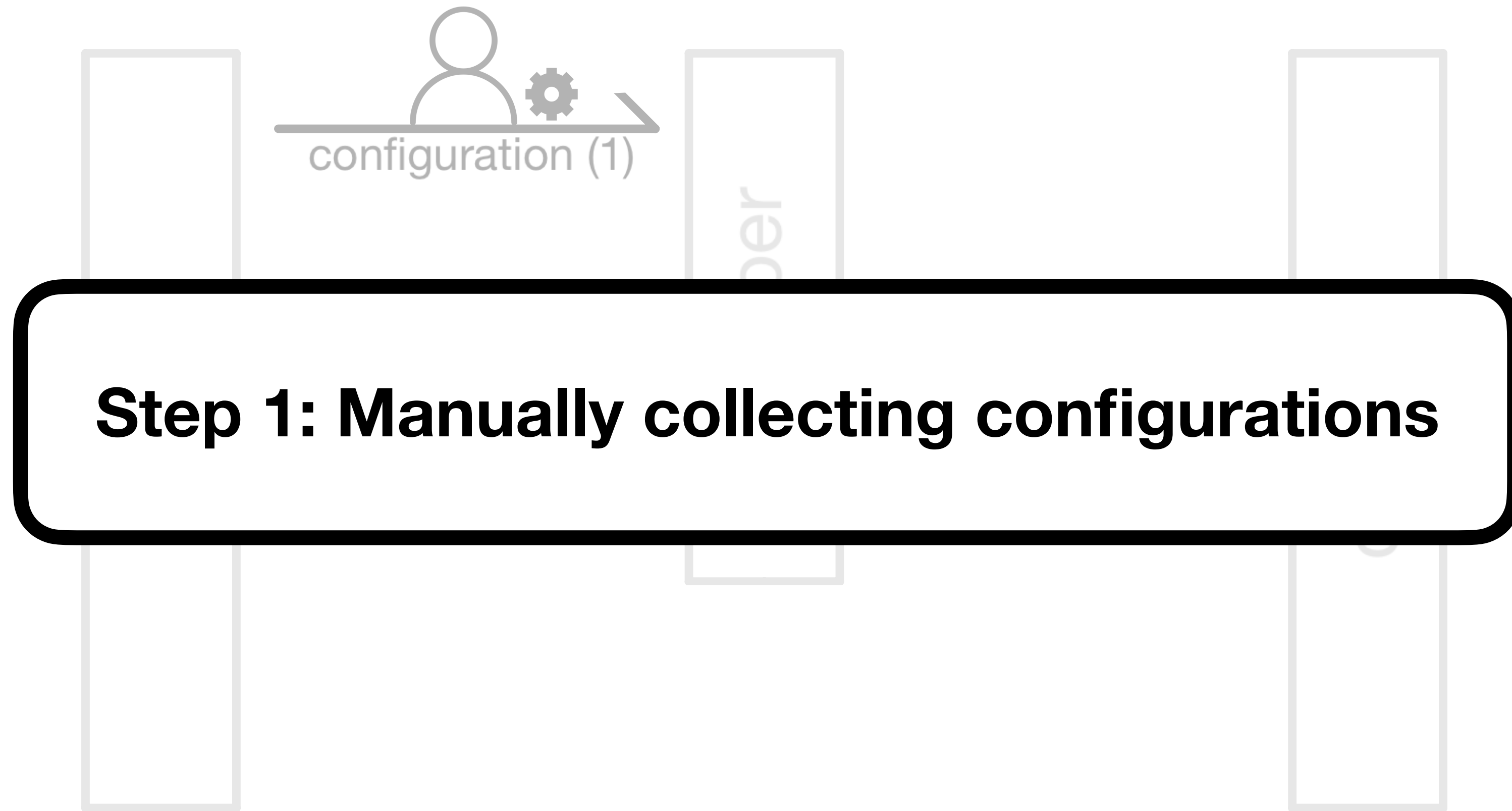
dataset

LGS

scraper

dataset





ASN:

URI: `http://lg.xyz.net`

queries:

`show_route: //input[@name="route"]`

`show_summary: //input[@name="summary"]`

`ping: //input[@name="ping"]`

`traceroute: //input[@name="traceroute"]`

`parameter: //input[@name="parameter"]`

`routers: //select[@name="routers"]`

`submit: //button[@id="submit"]`

`output: //pre`

LGS

Type of Query	Argument	Router
<input type="radio"/> bgp route		
<input checked="" type="radio"/> bgp summary		
<input type="radio"/> traceroute	<input type="text"/>	<input type="text" value="router_00"/>
<input type="radio"/> ping		

IPv4

|

ASN:

URI: http://lg.xyz.net

queries:

```
show_route: //input[@name="route"]
show_summary: //input[@name="summary"]
ping: //input[@name="ping"]
traceroute: //input[@name="traceroute"]
```

```
parameter: //input[@name="parameter"]
```

```
routers: //select[@name="routers"]
```

```
submit: //button[@id="submit"]
```

```
output: //pre
```

LGS

Type of Query	Argument	Router
<input type="radio"/> bgp route		
<input checked="" type="radio"/> bgp summary		
<input type="radio"/> traceroute		
<input type="radio"/> ping		

IPv4

Submit | Reload

router_00

ASN:

URI: http://lg.xyz.net

queries:

show_route: //input[@name="route"]

show_summary: //input[@name="summary"]

ping: //input[@name="ping"]

traceroute: //input[@name="traceroute"]

parameter: //input[@name="parameter"]

routers: //select[@name="routers"]

submit: //button[@id="submit"]

output: //pre

LGS

Type of Query

Argument

Router

bgp route

bgp summary

traceroute

ping

IPv4



router_00



Submit

Reload

ASN:

URI: `http://lg.xyz.net`

queries:

`show_route: //input[@name="route"]`

`show_summary: //input[@name="summary"]`

`ping: //input[@name="ping"]`

`traceroute: //input[@name="traceroute"]`

`parameter: //input[@name="parameter"]`

`routers: //select[@name="routers"]`

`submit: //button[@id="submit"]`

`output: //pre`

LGS

Type of Query	Argument	Router
<input type="radio"/> bgp route		
<input checked="" type="radio"/> bgp summary		
<input type="radio"/> traceroute	<input type="text"/>	<input type="text" value="router_00"/>
<input type="radio"/> ping		

IPv4

|

ASN:

URI: http://lg.xyz.net

queries:

show_route: //input[@name="route"]

show_summary: //input[@name="summary"]

ping: //input[@name="ping"]

traceroute: //input[@name="traceroute"]

parameter: //input[@name="parameter"]

routers: //select[@name="routers"]

submit: //button[@id="submit"]

output: //pre

LGS

Type of Query	Argument	Router
<input type="radio"/> bgp route		
<input checked="" type="radio"/> bgp summary		
<input type="radio"/> traceroute	<input type="text"/>	<input type="text" value="router_00"/>
<input type="radio"/> ping		

IPv4

|

ASN:

URI: `http://lg.xyz.net`

queries:

`show_route: //input[@name="route"]`

`show_summary: //input[@name="summary"]`

`ping: //input[@name="ping"]`

`traceroute: //input[@name="traceroute"]`

`parameter: //input[@name="parameter"]`

`routers: //select[@name="routers"]`

`submit: //button[@id="submit"]`

`output: //pre`

LGS

Type of Query	Argument	Router
<input type="radio"/> bgp route		
<input checked="" type="radio"/> bgp summary		
<input type="radio"/> traceroute	<input type="text"/>	<input type="text" value="router_00"/>
<input type="radio"/> ping		

IPv4

|

ASN:

URI: `http://lg.xyz.net`

queries:

`show_route: //input[@name="route"]`

`show_summary: //input[@name="summary"]`

`ping: //input[@name="ping"]`

`traceroute: //input[@name="traceroute"]`

`parameter: //input[@name="parameter"]`

`routers: //select[@name="routers"]`

`submit: //button[@id="submit"]`

`output: //pre`

LGS

```
inet.0: 954881 destinations, 5919082 routes (950232 active, 4 holddown, 930842 hidden)
+ = Active Route, - = Last Active, * = Both
```

```
8.8.8.0/24
```

```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
```

```
AS path: 15169 I, validation-state: unverified
```

```
> to 10.200.1.11 via ae1.4094
```

```
[BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
```

```
AS path: 15169 I, validation-state: unverified
```

```
> to 10.200.1.11 via ae1.4094
```

```
[BGP/170] 21w5d 13:59:55, MED 202, localpref 106
```

```
AS path: 20764 15169 I, validation-state: unverified
```

```
> to 81.27.254.204 via ae50.2267
```

```
[BGP/170] 18w5d 14:00:58, MED 202, localpref 106
```

```
AS path: 57304 15169 I, validation-state: unverified
```

```
> to 139.45.232.156 via ae50.1585
```

```
[BGP/170] 2w3d 06:05:59, MED 202, localpref 106
```

```
AS path: 3267 15169 I, validation-state: unverified
```

```
> to 194.190.255.17 via ae50.461
```

```
[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
```

```
AS path: 20485 15169 I, validation-state: unverified
```

```
> to 217.150.37.178 via ae50.100
```

ASN:

URI: `http://lg.xyz.net`

queries:

`show_route: //input[@name="route"]`

`show_summary: //input[@name="summary"]`

`ping: //input[@name="ping"]`

`traceroute: //input[@name="traceroute"]`

`parameter: //input[@name="parameter"]`

`routers: //select[@name="routers"]`

`submit: //button[@id="submit"]`

`output: //pre`

LGS

```
inet.0: 954881 destinations, 5919082 routes (950232 active, 4 holddown, 930842 hidden)
+ = Active Route, - = Last Active, * = Both
```

```
8.8.8.0/24
```

```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
```

```
AS path: 15169 I, validation-state: unverified
```

```
> to 10.200.1.11 via ae1.4094
```

```
[BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
```

```
AS path: 15169 I, validation-state: unverified
```

```
> to 10.200.1.11 via ae1.4094
```

```
[BGP/170] 21w5d 13:59:55, MED 202, localpref 106
```

```
AS path: 20764 15169 I, validation-state: unverified
```

```
> to 81.27.254.204 via ae50.2267
```

```
[BGP/170] 18w5d 14:00:58, MED 202, localpref 106
```

```
AS path: 57304 15169 I, validation-state: unverified
```

```
> to 139.45.232.156 via ae50.1585
```

```
[BGP/170] 2w3d 06:05:59, MED 202, localpref 106
```

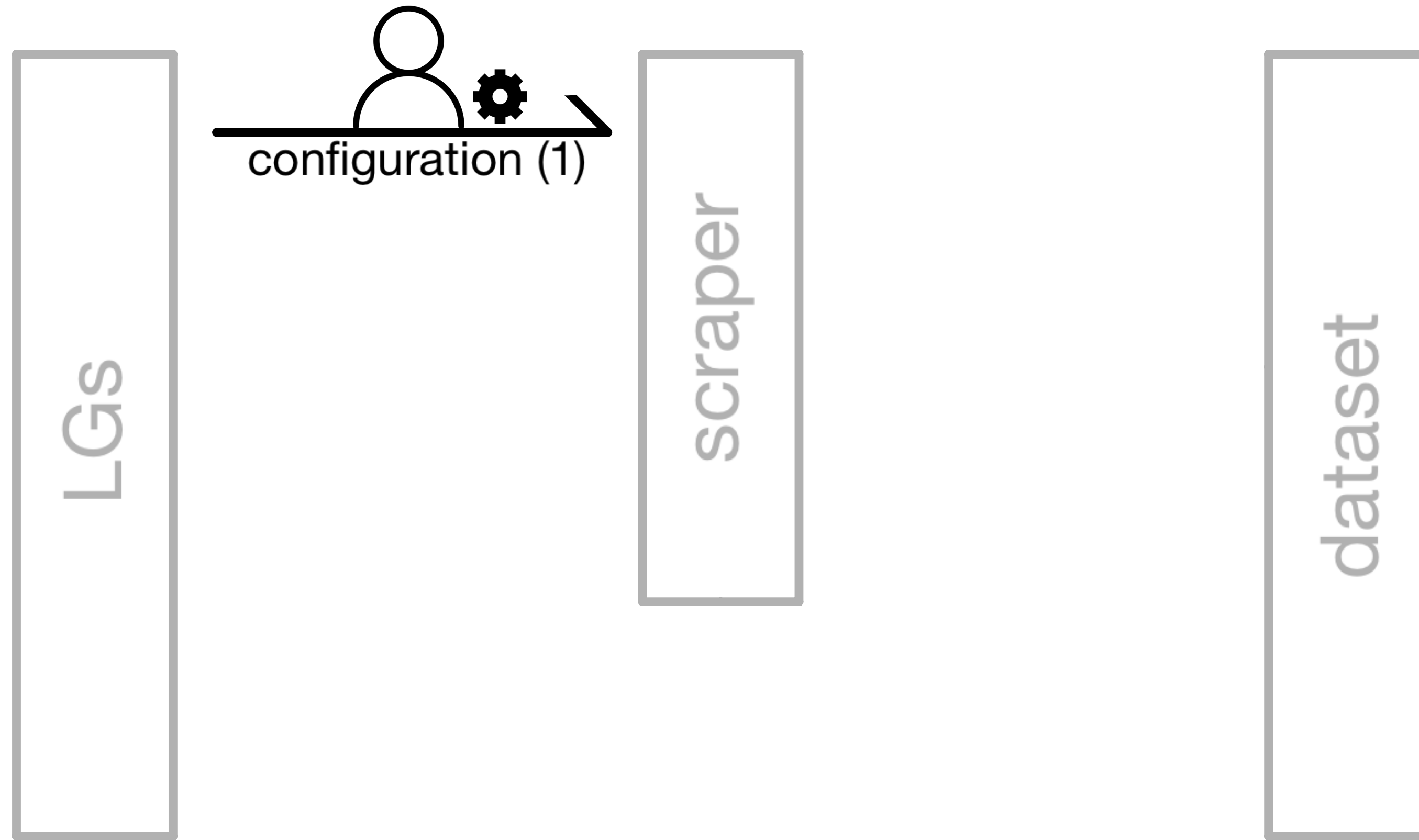
```
AS path: 3267 15169 I, validation-state: unverified
```

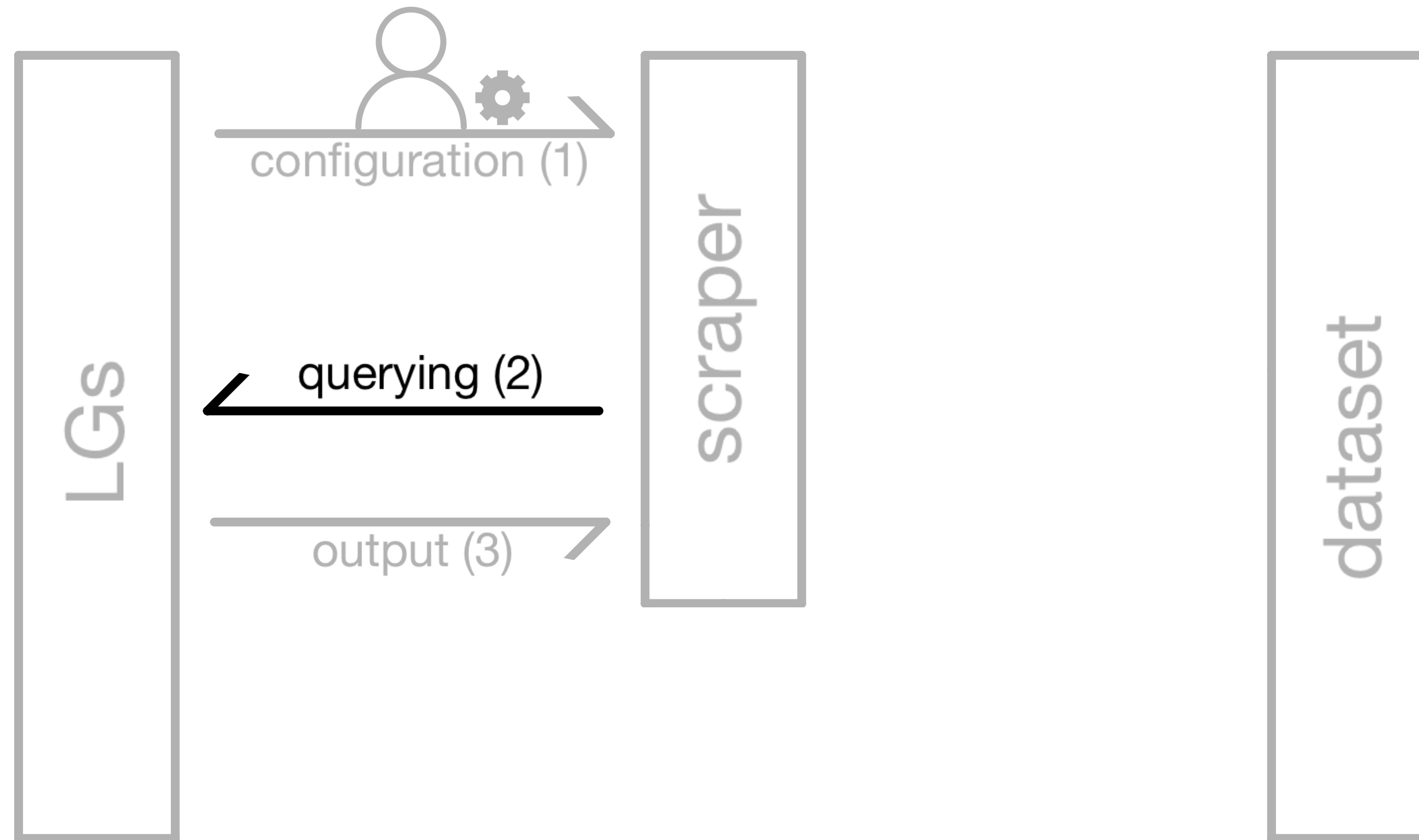
```
> to 194.190.255.17 via ae50.461
```

```
[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
```

```
AS path: 20485 15169 I, validation-state: unverified
```

```
> to 217.150.37.178 via ae50.100
```







Step 2: Querying the Looking Glasses

Type of Query	Argument	Router
<input type="radio"/> bgp route <input checked="" type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text"/>	<input type="text" value="router_00"/>
<input type="button" value="IPv4"/>	<input type="button" value="Submit"/> <input type="button" value="Reload"/>	

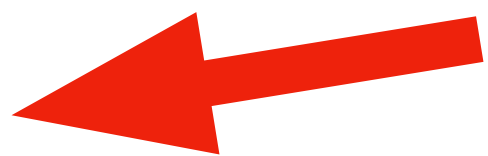
LG

SC

output (3)

dataset

Type of Query	Argument	Router
<input type="radio"/> bgp route <input checked="" type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text"/>	<input type="text" value="router_00"/>
<input type="button" value="IPv4"/>	<input type="button" value="Submit"/> <input type="button" value="Reload"/>	



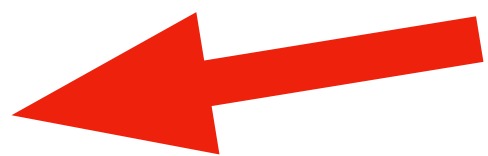
LG

output (3)

SC

dataset

Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route		
<input type="radio"/> bgp summary		
<input type="radio"/> traceroute	<input type="text"/>	router_00
<input type="radio"/> ping		
IPv4		
Submit Reload		



LG

SC

output (3)

dataset

Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route <input type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text"/>	<input type="text" value="router_00"/>
<input type="text" value="IPv4"/>	<input type="button" value="Submit"/> <input type="button" value="Reload"/>	

LG

output (3)

SC

dataset

Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route <input type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text" value="prefix"/>	<input type="text" value="router_00"/>
<input type="text" value="IPv4"/>	<input type="button" value="Submit"/> <input type="button" value="Reload"/>	

LG

output (3)

SC

dataset

Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route <input type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text" value="prefix"/>	<input type="text" value="router_00"/>
IPv4		

Which prefixes do we use?

Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route <input type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text" value="prefix"/>	<input type="text" value="router_00"/>
IPv4		

**We use all RIS routing beacons
(9 IPv4 + 29 IPv6)**

Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route <input type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text" value="prefix"/>	<input type="text" value="router_00"/>
<input type="button" value="IPv4"/>	<input type="button" value="Submit"/> <input type="button" value="Reload"/>	

LG

output (3)

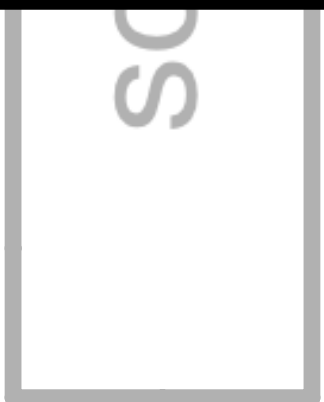
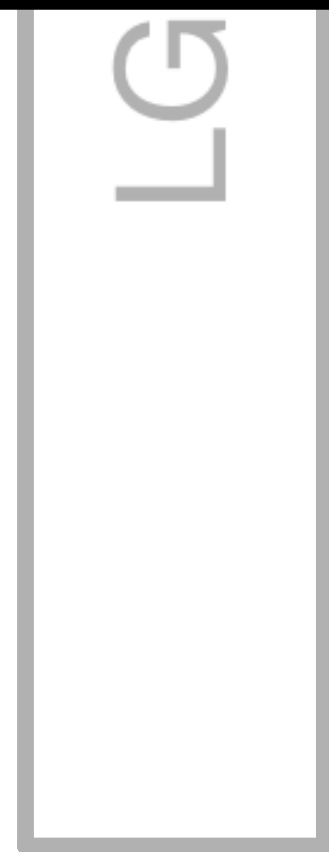
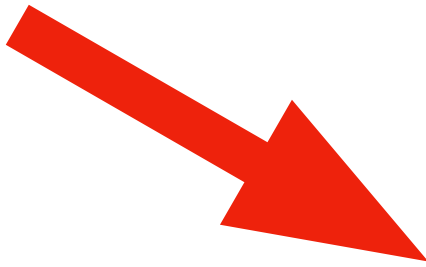
SC

dataset

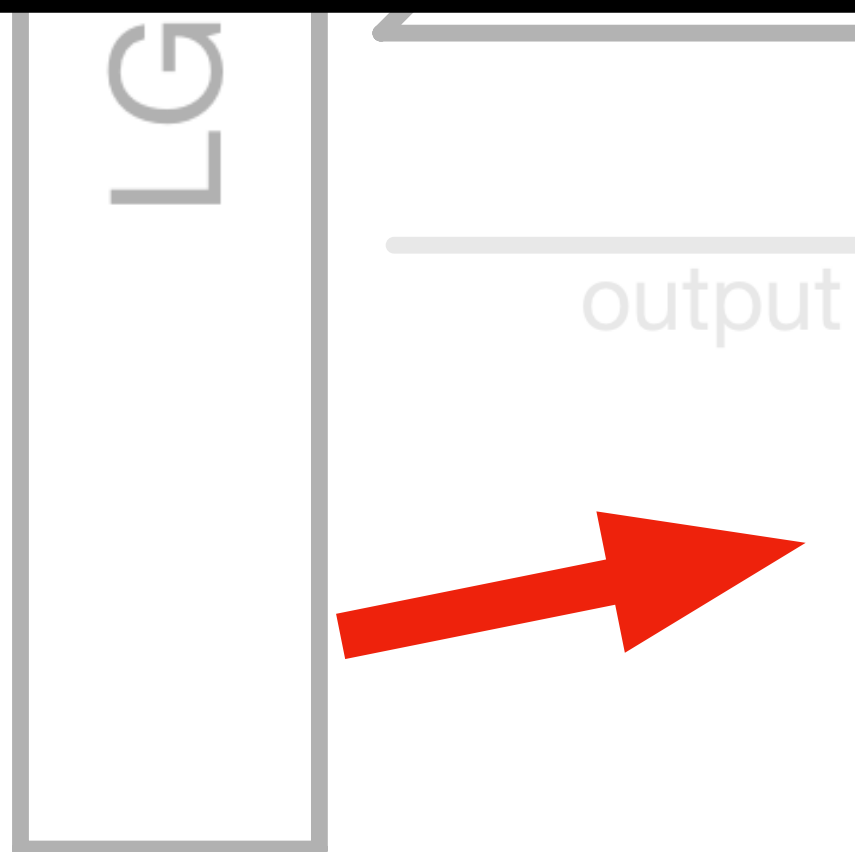
Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route <input type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text" value="prefix"/>	<input type="text" value="router_00"/>
IPv4		

We iterate through all available routers of each Looking Glass

Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route <input type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text" value="prefix"/>	<input type="text" value="router_00"/>
<input type="text" value="IPv4"/>	<input type="button" value="Submit"/> <input type="button" value="Reload"/>	



Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route <input type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text" value="prefix"/>	<input type="text" value="router_00"/>
<input type="button" value="IPv4"/>	<input type="button" value="Submit"/> <input type="button" value="Reload"/>	



```

*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 21w5d 13:59:55, MED 202, localpref 106
  AS path: 20764 15169 I, validation-state: unverified
> to 81.27.254.204 via ae50.2267
[BGP/170] 18w5d 14:00:58, MED 202, localpref 106
  AS path: 57304 15169 I, validation-state: unverified
> to 139.45.232.156 via ae50.1585
[BGP/170] 2w3d 06:05:59, MED 202, localpref 106
  AS path: 3267 15169 I, validation-state: unverified
> to 194.190.255.17 via ae50.461
[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
  
```

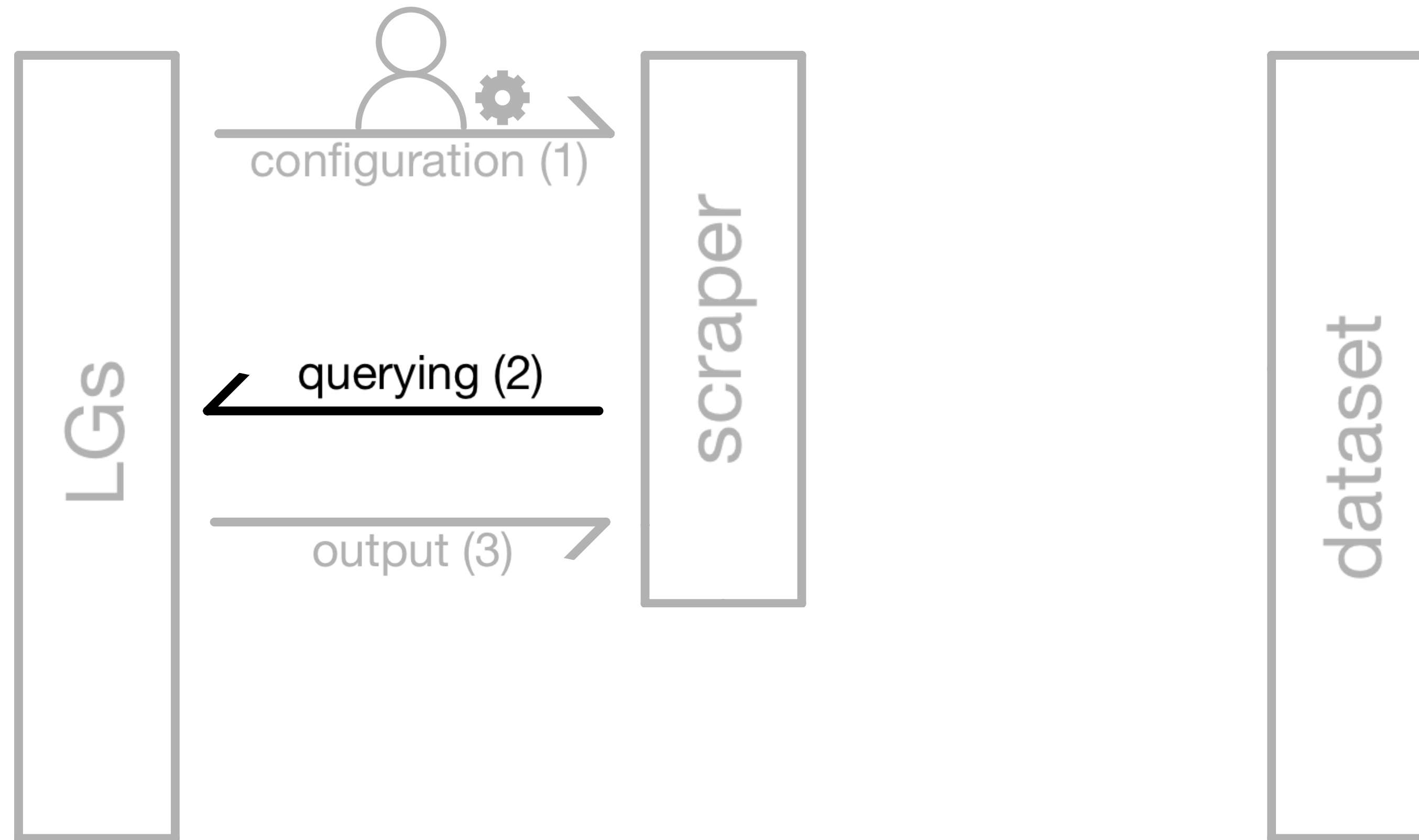
Type of Query	Argument	Router
<input checked="" type="radio"/> bgp route <input type="radio"/> bgp summary <input type="radio"/> traceroute <input type="radio"/> ping	<input type="text" value="prefix"/>	<input type="text" value="router_00"/>
<input type="button" value="IPv4"/>		

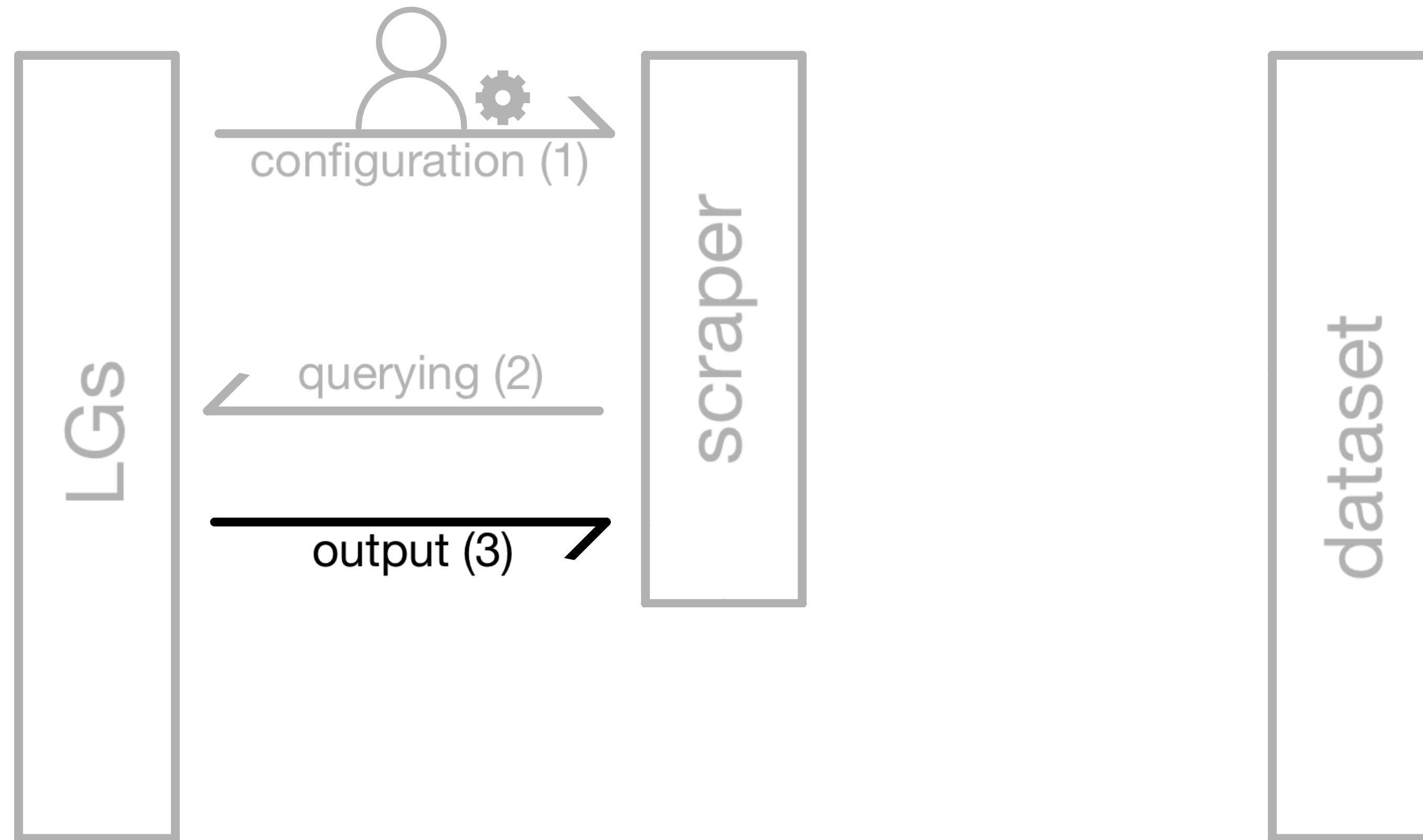
We collect one snapshot every 4 hours

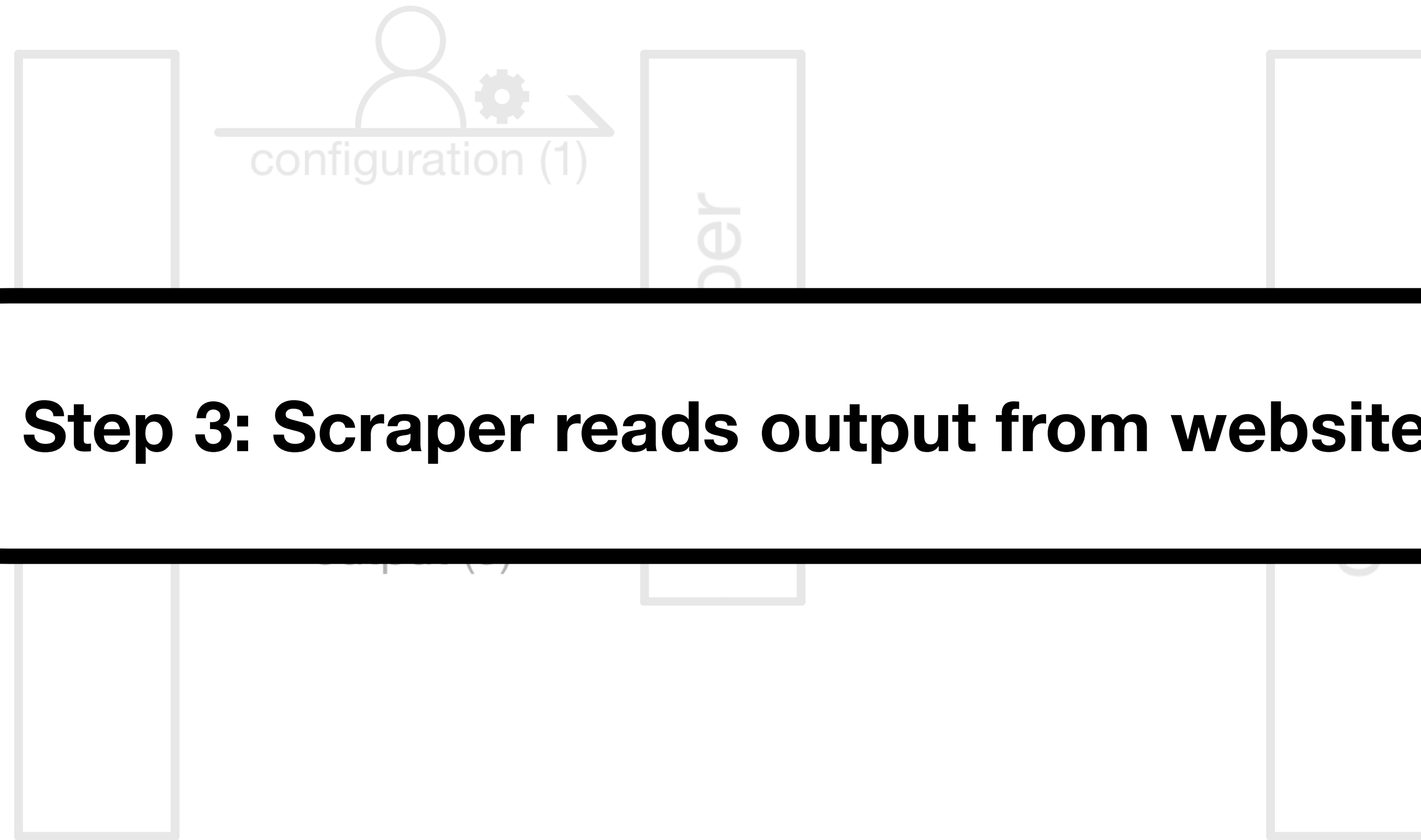
```

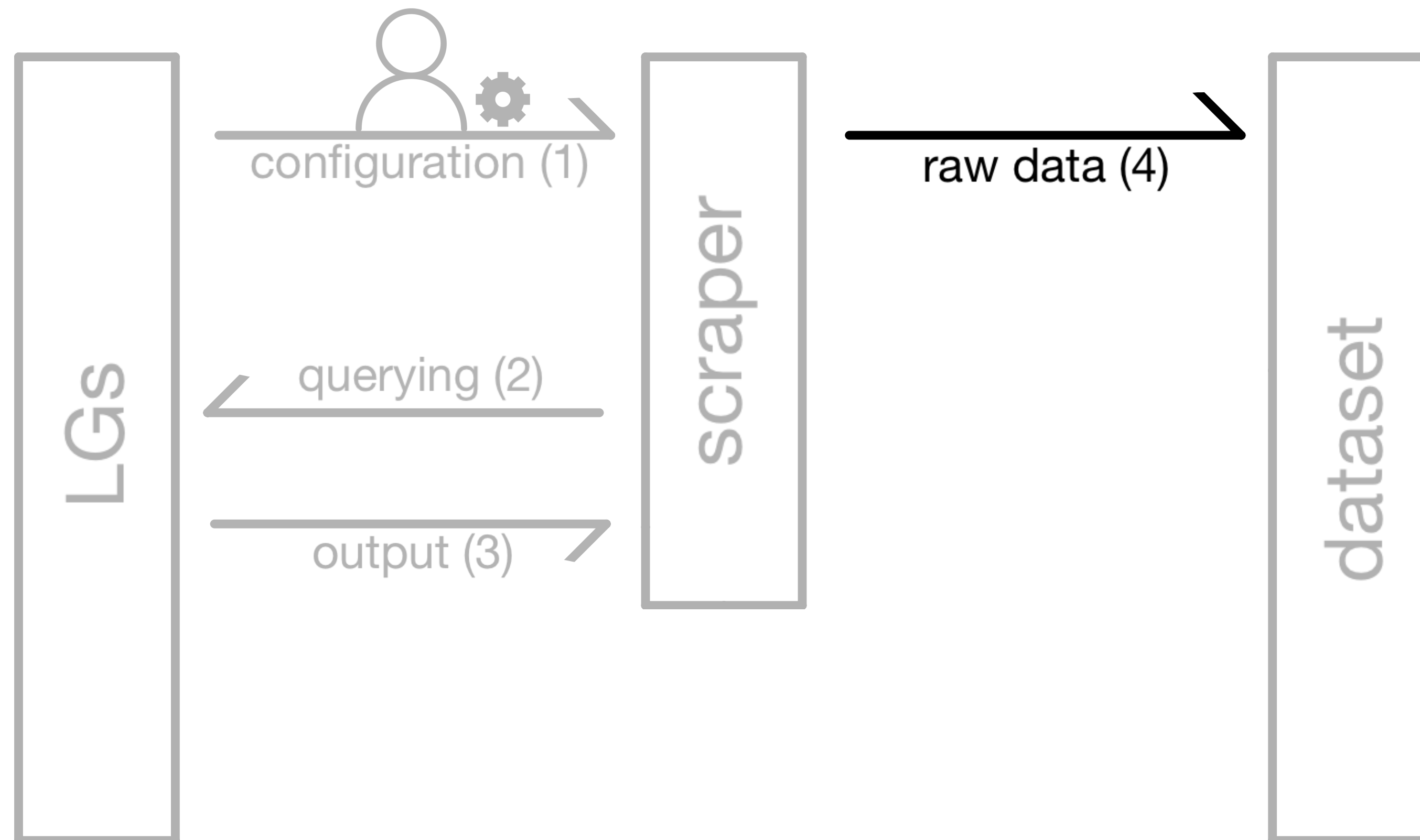
[BGP/170] 21w5d 13:59:55, MED 202, localpref 106
  AS path: 20764 15169 I, validation-state: unverified
> to 81.27.254.204 via ae50.2267
[BGP/170] 18w5d 14:00:58, MED 202, localpref 106
  AS path: 57304 15169 I, validation-state: unverified
> to 139.45.232.156 via ae50.1585
[BGP/170] 2w3d 06:05:59, MED 202, localpref 106
  AS path: 3267 15169 I, validation-state: unverified
> to 194.190.255.17 via ae50.461
[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100

```





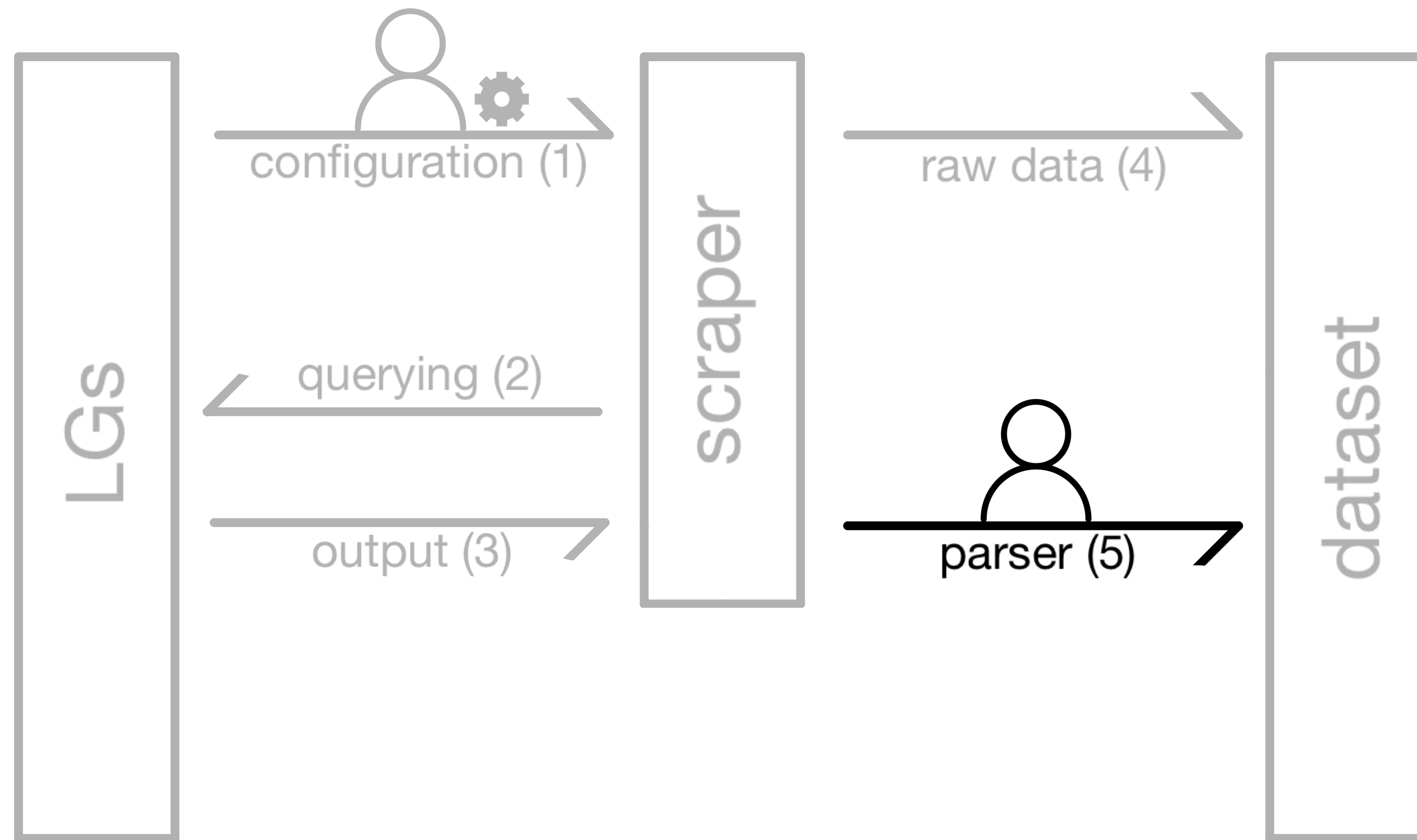


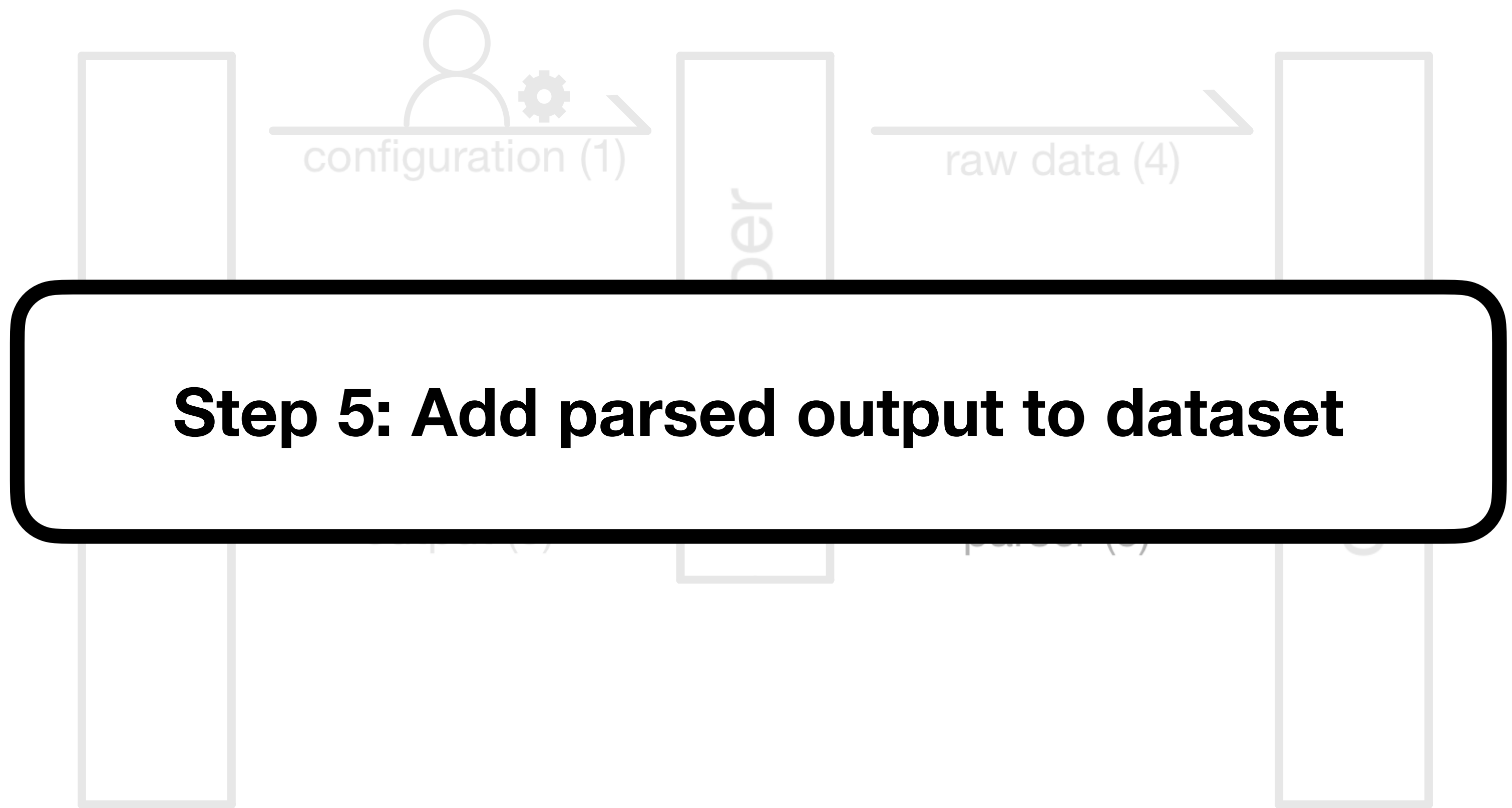




```
inet.0: 954881 destinations, 5919082 routes (950232 active, 4 holddown, 930842 hidden)
+ = Active Route, - = Last Active, * = Both
```

```
8.8.8.0/24      *[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
                  AS path: 15169 I, validation-state: unverified
                  > to 10.200.1.11 via ae1.4094
                  [BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
                  AS path: 15169 I, validation-state: unverified
                  > to 10.200.1.11 via ae1.4094
                  [BGP/170] 21w5d 13:59:55, MED 202, localpref 106
                  AS path: 20764 15169 I, validation-state: unverified
                  > to 81.27.254.204 via ae50.2267
                  [BGP/170] 18w5d 14:00:58, MED 202, localpref 106
                  AS path: 57304 15169 I, validation-state: unverified
                  > to 139.45.232.156 via ae50.1585
                  [BGP/170] 2w3d 06:05:59, MED 202, localpref 106
                  AS path: 3267 15169 I, validation-state: unverified
                  > to 194.190.255.17 via ae50.461
                  [BGP/170] 2w5d 00:29:08, MED 202, localpref 105
                  AS path: 20485 15169 I, validation-state: unverified
                  > to 217.150.37.178 via ae50.100
```





```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 21w5d 13:59:55, MED 202, localpref 106
  AS path: 20764 15169 I, validation-state: unverified
> to 81.27.254.204 via ae50.2267
[BGP/170] 18w5d 14:00:58, MED 202, localpref 106
  AS path: 57304 15169 I, validation-state: unverified
> to 139.45.232.156 via ae50.1585
[BGP/170] 2w3d 06:05:59, MED 202, localpref 106
  AS path: 3267 15169 I, validation-state: unverified
> to 194.190.255.17 via ae50.461
[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
```

```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 21w5d 13:59:55, MED 202, localpref 106
  AS path: 20764 15169 I, validation-state: unverified
>
>
>
>
> to 194.190.255.17 via ae50.461
[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
```

Each LG output shows (multiple) BGP routes

```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 21w5d 13:59:55, MED 202, localpref 106
  AS path: 20764 15169 I, validation-state: unverified
> to 81.27.254.204 via ae50.2267
[BGP/170] 18w5d 14:00:58, MED 202, localpref 106
  AS path: 57304 15169 I, validation-state: unverified
> to 139.45.232.156 via ae50.1585
[BGP/170] 2w3d 06:05:59, MED 202, localpref 106
  AS path: 3267 15169 I, validation-state: unverified
> to 194.190.255.17 via ae50.461
[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
```

```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
  AS path: 15169 I, validation-state: unverified
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[BGP/170] 21w5d 13:59:55, MED 202, localpref 106
  AS path: 20764 15169 I, validation-state: unverified
> to 81.27.254.204 via ae50.2267
[BGP/170] 18w5d 14:00:58, MED 202, localpref 106
  AS path: 57304 15169 I, validation-state: unverified
> to 139.45.232.156 via ae50.1585
[BGP/170] 2w3d 06:05:59, MED 202, localpref 106
  AS path: 3267 15169 I, validation-state: unverified
> to 194.190.255.17 via ae50.461
[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
```

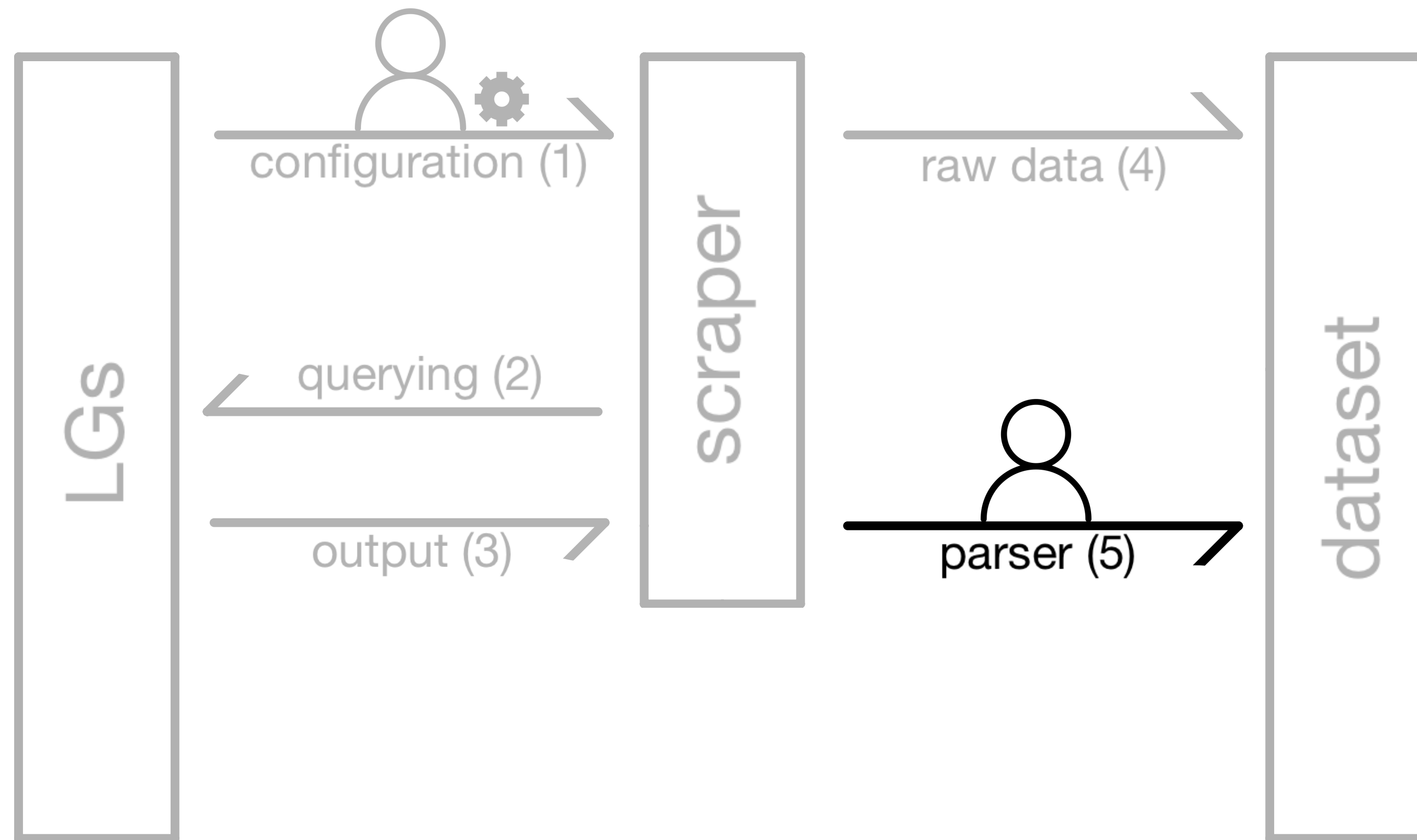
```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
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[BGP/170] 18w5d 14:00:58, MED 202, localpref 106
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> to 139.45.232.156 via ae50.1585
[BGP/170] 2w3d 06:05:59, MED 202, localpref 106
  AS path: 3267 15169 I, validation-state: unverified
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  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
```

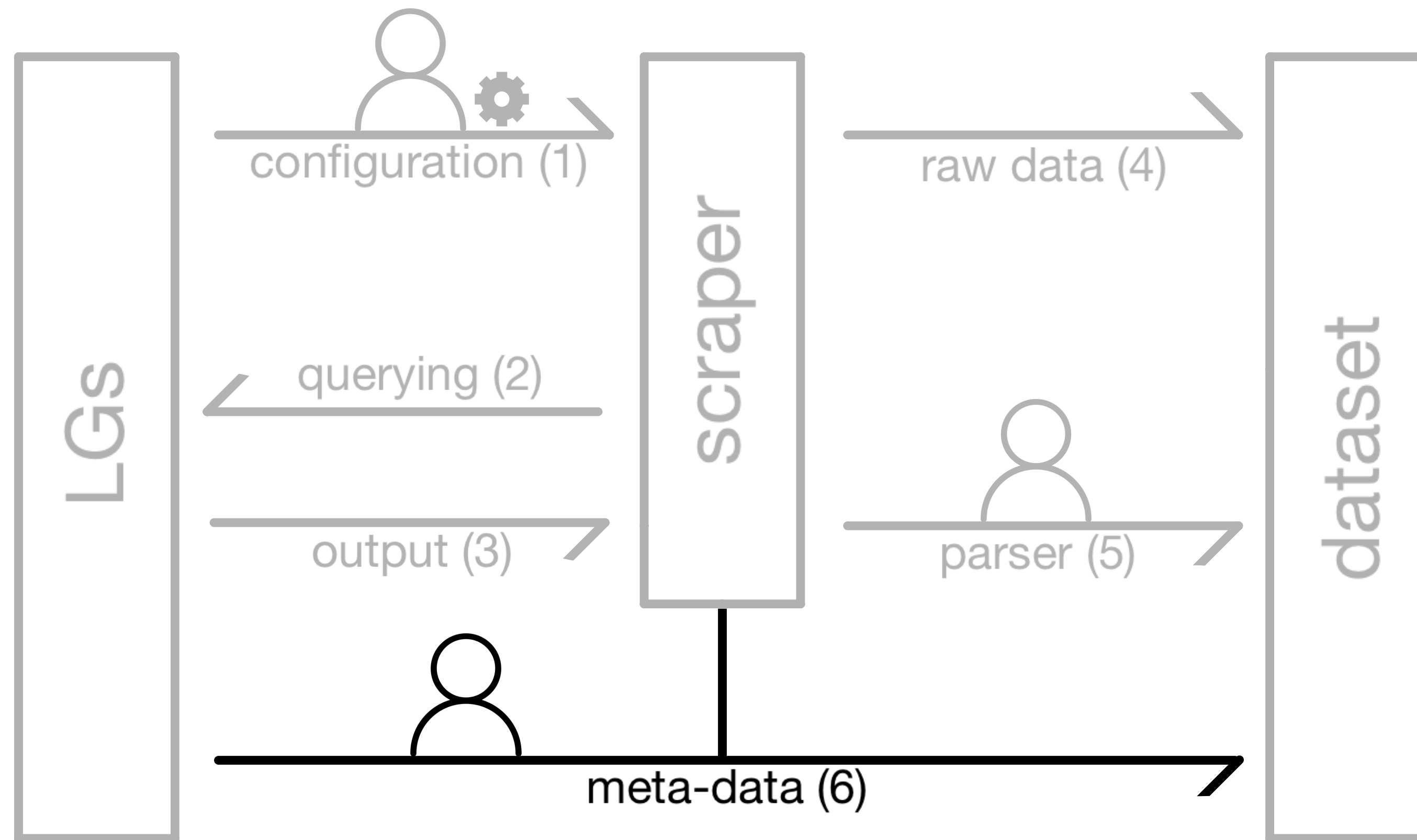
```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
[BGP/170] 2w1d 04:03:52, MED 200, localpref 110, from 10.200.0.0
  AS path: 15169 I, validation-state: unverified
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[BGP/170] 21w5d 13:59:55, MED 202, localpref 106
  AS path: 20764 15169 I, validation-state: unverified
> to 81.27.254.204 via ae50.2267
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[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
```

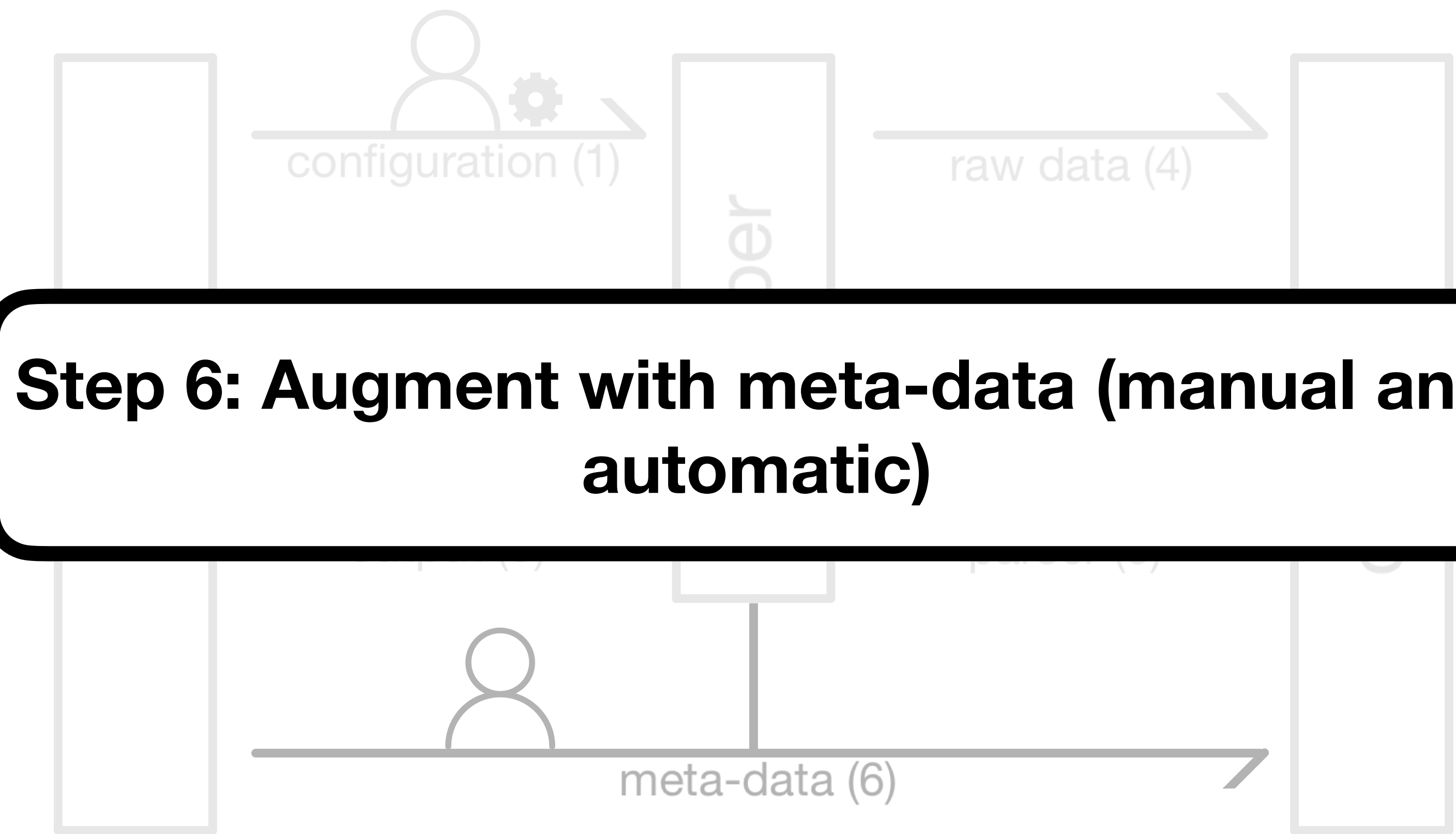
```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
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  AS path: 3267 15169 I, validation-state: unverified
> to 194.190.255.17 via ae50.461
[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
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```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
  AS path: 15169 I, validation-state: unverified
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[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
```

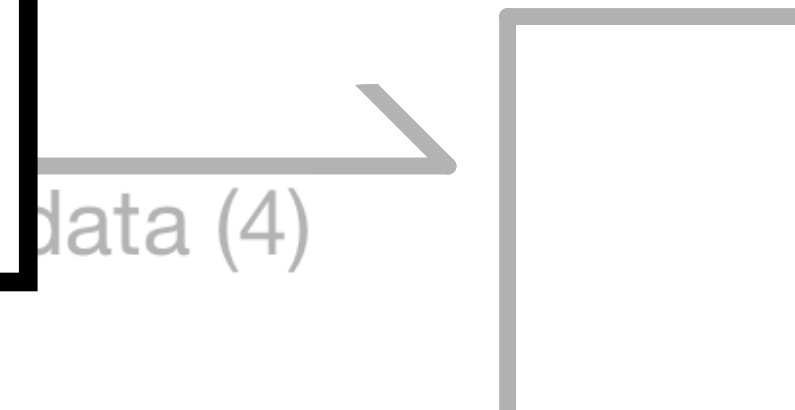
```
*[BGP/170] 11w5d 16:56:11, MED 200, localpref 110, from 10.200.0.9
  AS path: 15169 I, validation-state: unverified
> to 10.200.1.11 via ae1.4094
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[BGP/170] 2w5d 00:29:08, MED 202, localpref 105
  AS path: 20485 15169 I, validation-state: unverified
> to 217.150.37.178 via ae50.100
```







Type of Query	Additional parameters	Node
<input checked="" type="radio"/> bgp summary <input type="radio"/> bgp route <input type="radio"/> icmp-traceroute <input type="radio"/> ping	<input type="text" value="139.19.64.62"/>	<input type="text" value="rr201.moscow"/>
<input type="button" value="Submit"/> <input type="button" value="Reset"/>		

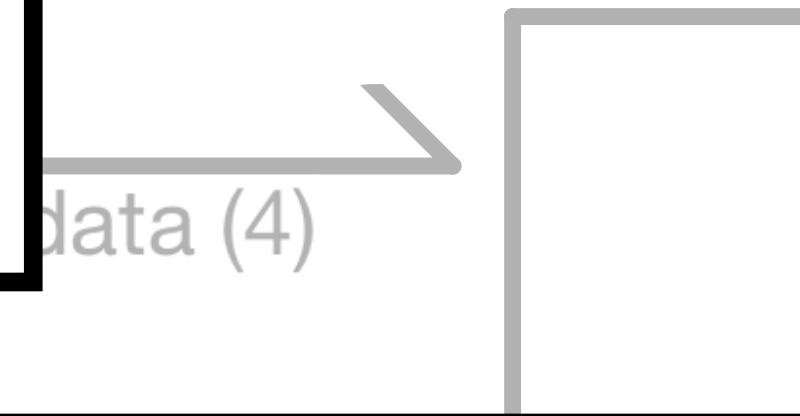


LGS

SPT AS7602 Looking Glass

Type of Query	Additional parameters	Node
<input type="radio"/> bgp <input type="radio"/> ping <input checked="" type="radio"/> trace <input type="button" value="IPv4"/>	<input type="text"/>	<input type="text" value="TWTelecom (AS4323)"/>
<small>* remote LG script</small>		
<input type="button" value="Submit"/> <input type="button" value="Reset"/>		

Type of Query	Additional parameters	Node
<input checked="" type="radio"/> bgp summary <input type="radio"/> bgp route <input type="radio"/> icmp-traceroute <input type="radio"/> ping	139.19.64.62	rr201.moscow ▾
<input type="button" value="Submit"/> <input type="button" value="Reset"/>		



SPT AS7602 Looking Glass

LGS

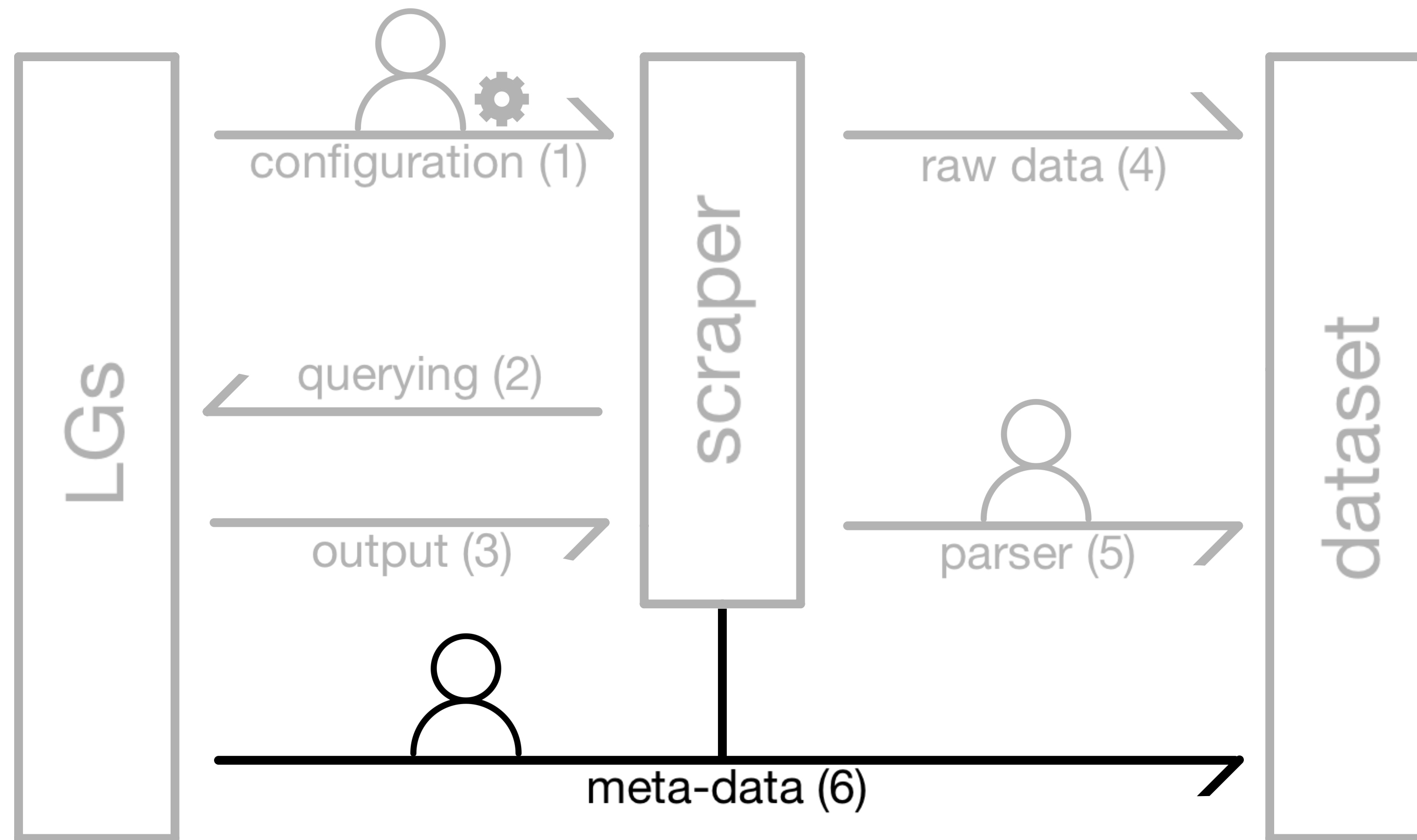
Type of Query	Additional parameters	Node
<input type="radio"/> bgp <input type="radio"/> ping <input checked="" type="radio"/> trace <input type="button" value="IPv4 ▾"/>		TWTelecom (AS4323) ▾ <small>* remote LG script</small>
<input type="button" value="Submit"/> <input type="button" value="Reset"/>		

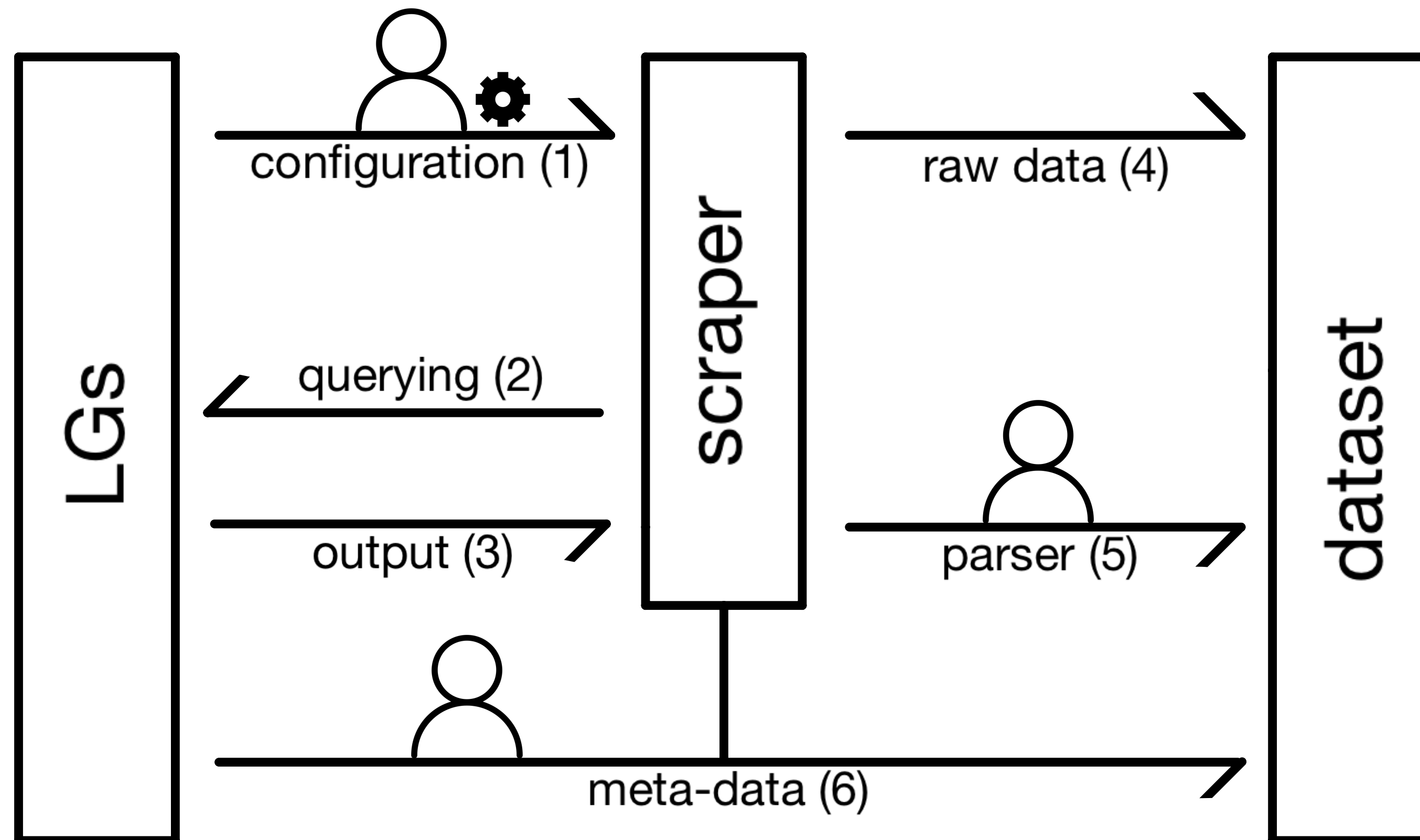
Type of Query	Additional parameters	Node
<input checked="" type="radio"/> bgp summary <input type="radio"/> bgp route <input type="radio"/> icmp-traceroute <input type="radio"/> ping	139.19.64.62	rr201.moscow ▾
<input type="button" value="Submit"/> <input type="button" value="Reset"/>		

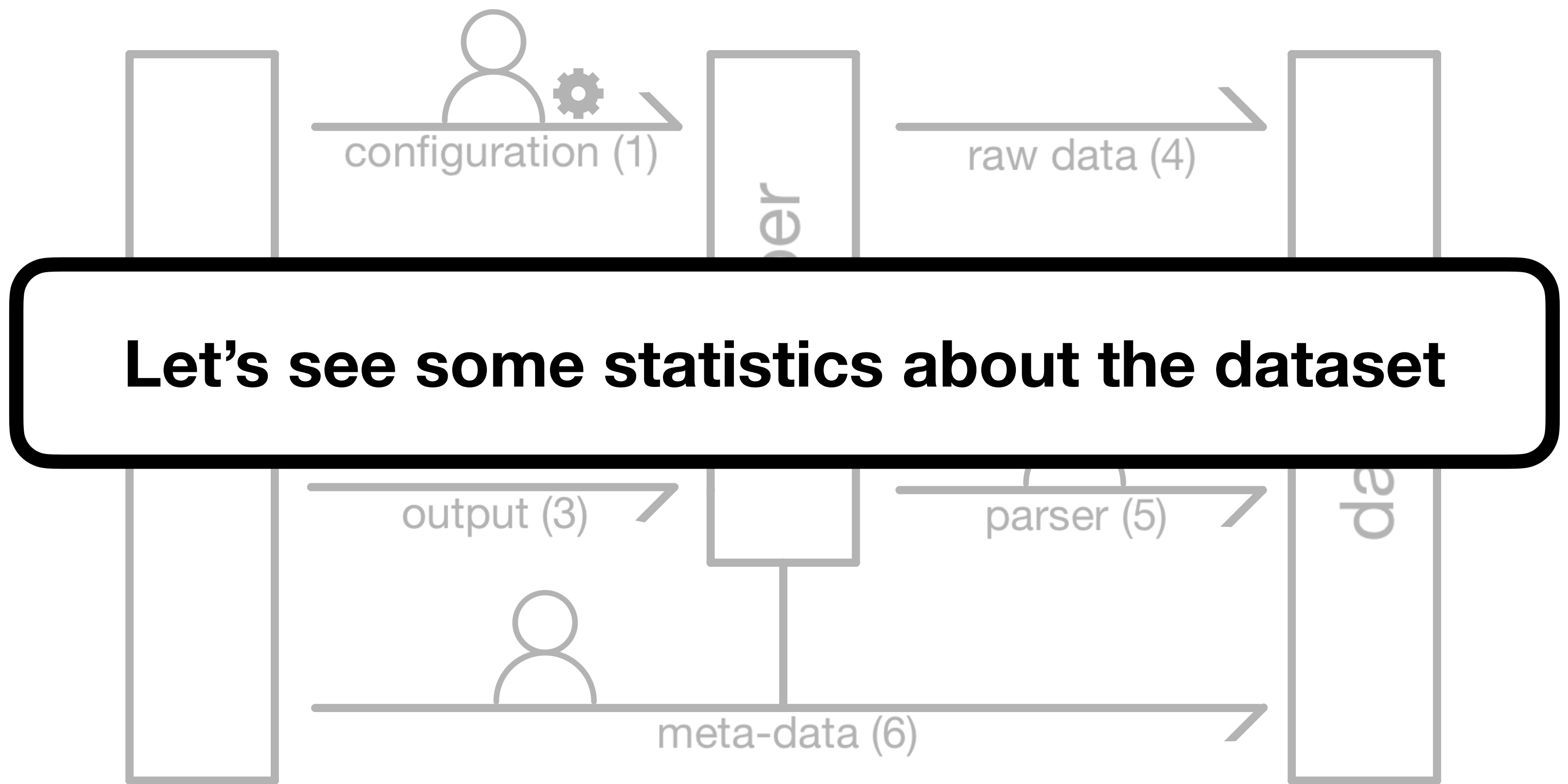
SPT AS7602 Looking Glass

Type of Query	Additional parameters	Node
<input type="radio"/> bgp <input type="radio"/> ping <input checked="" type="radio"/> trace <input type="button" value="IPv4 ▾"/>		<input type="text" value="TWTelecom (AS4323)"/> ▾ <small>* remote LG script</small>
<input type="button" value="Submit"/> <input type="button" value="Reset"/>		

LGS







- Started collection on **26th of January 2024**

- Started collection on **26th of January 2024**
(Have historical data since **31st of August 2023**)

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(Have historical data since **31st of August 2023**)
- We collected a total of **36.477.925 BGP routes**

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- We collected a total of **36.477.925 BGP routes**
 - Average **25526**

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(Have historical data since **31st of August 2023**)
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 - Average **25526**
 - Maximum **35608**

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(Have historical data since **31st of August 2023**)
- We collected a total of **36.477.925 BGP routes**
 - Average **25526**
 - Maximum **35608**
 - #LGs **167**

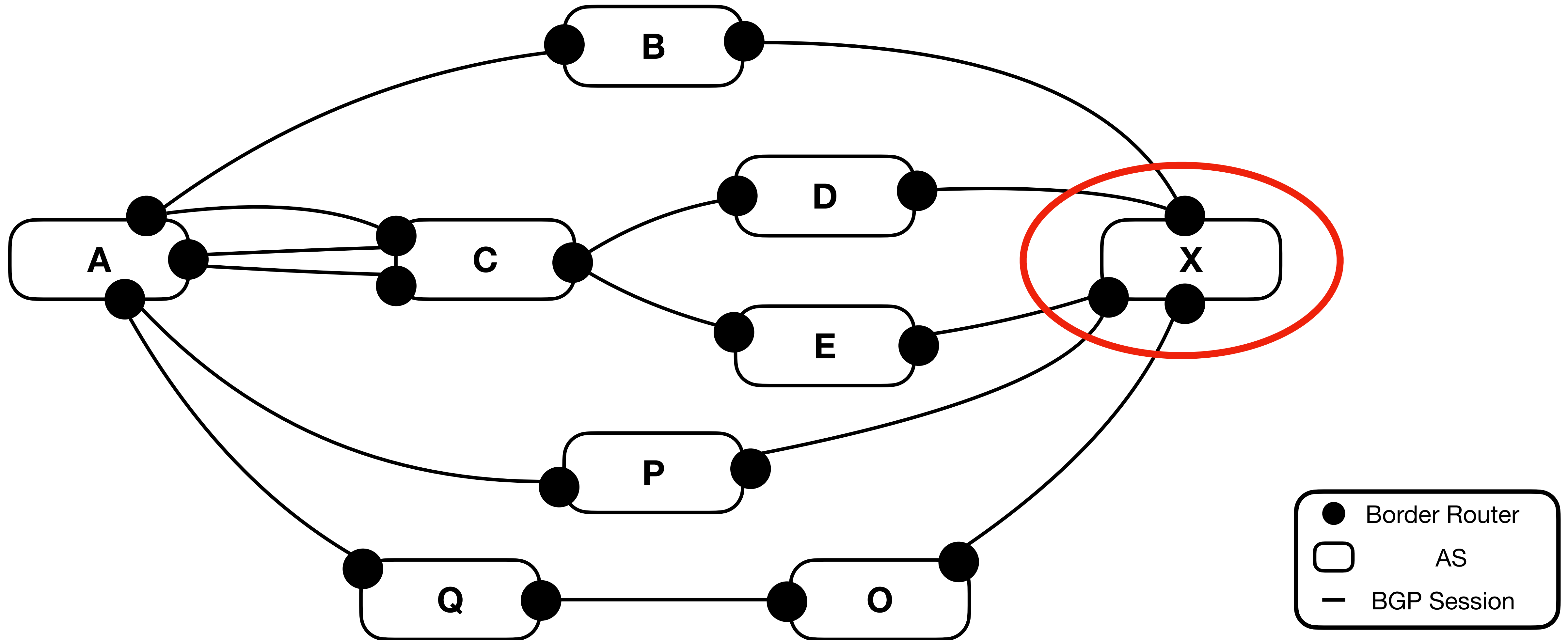
- Started collection on **26th of January 2024**
(Have historical data since **31st of August 2023**)
- We collected a total of **36.477.925 BGP routes**
 - Average **25526**
 - Maximum **35608**
 - #LGs **167** (more because of historical data)

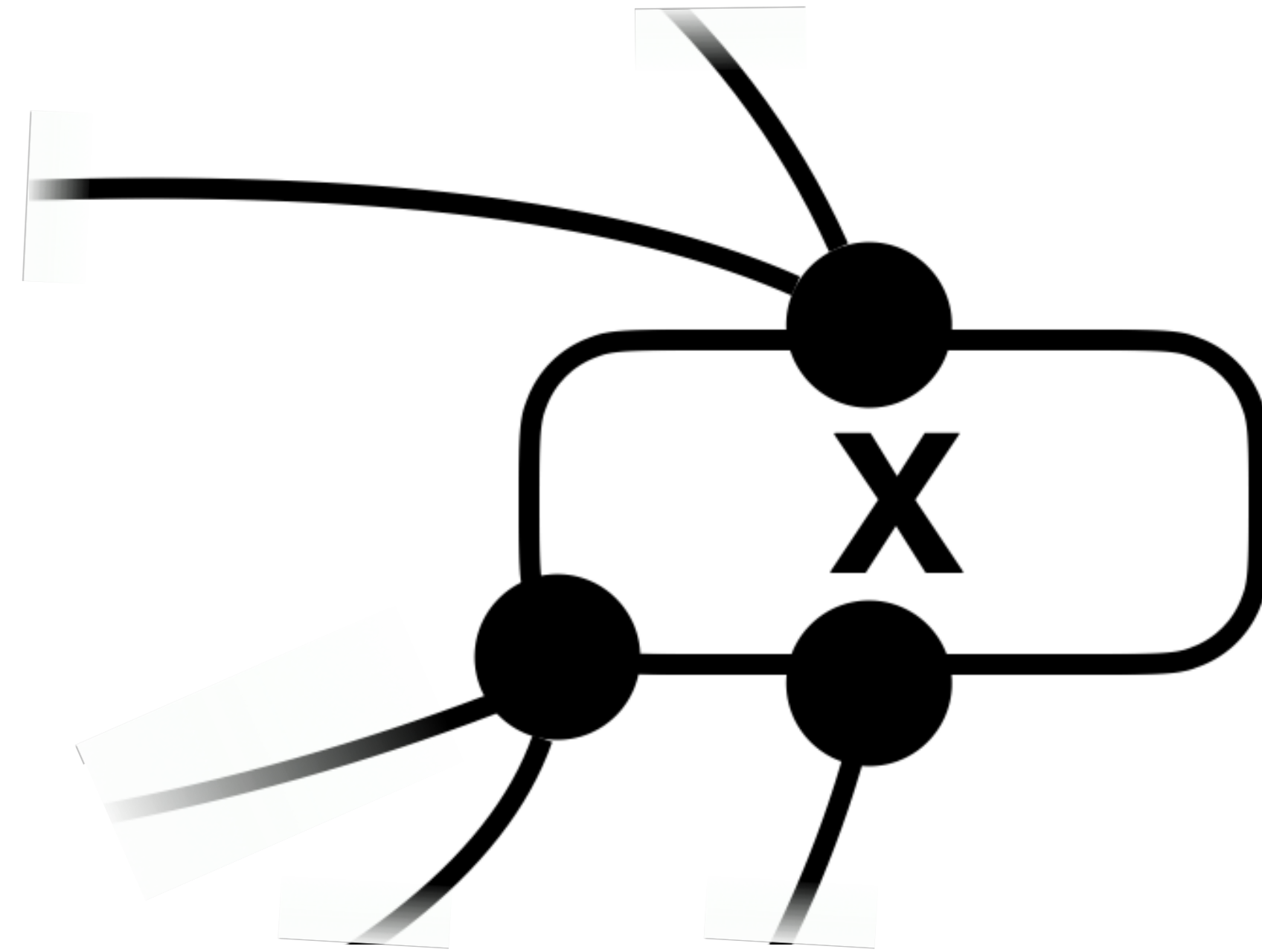
- Started collection on **26th of January 2024**
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 - Average **25526**
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- Started collection on **26th of January 2024**
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 - Average **25526**
 - Maximum **35608**
 - #LGs **167** (more because of historical data)
 - #ASNs **173**
 - #Routers **559**

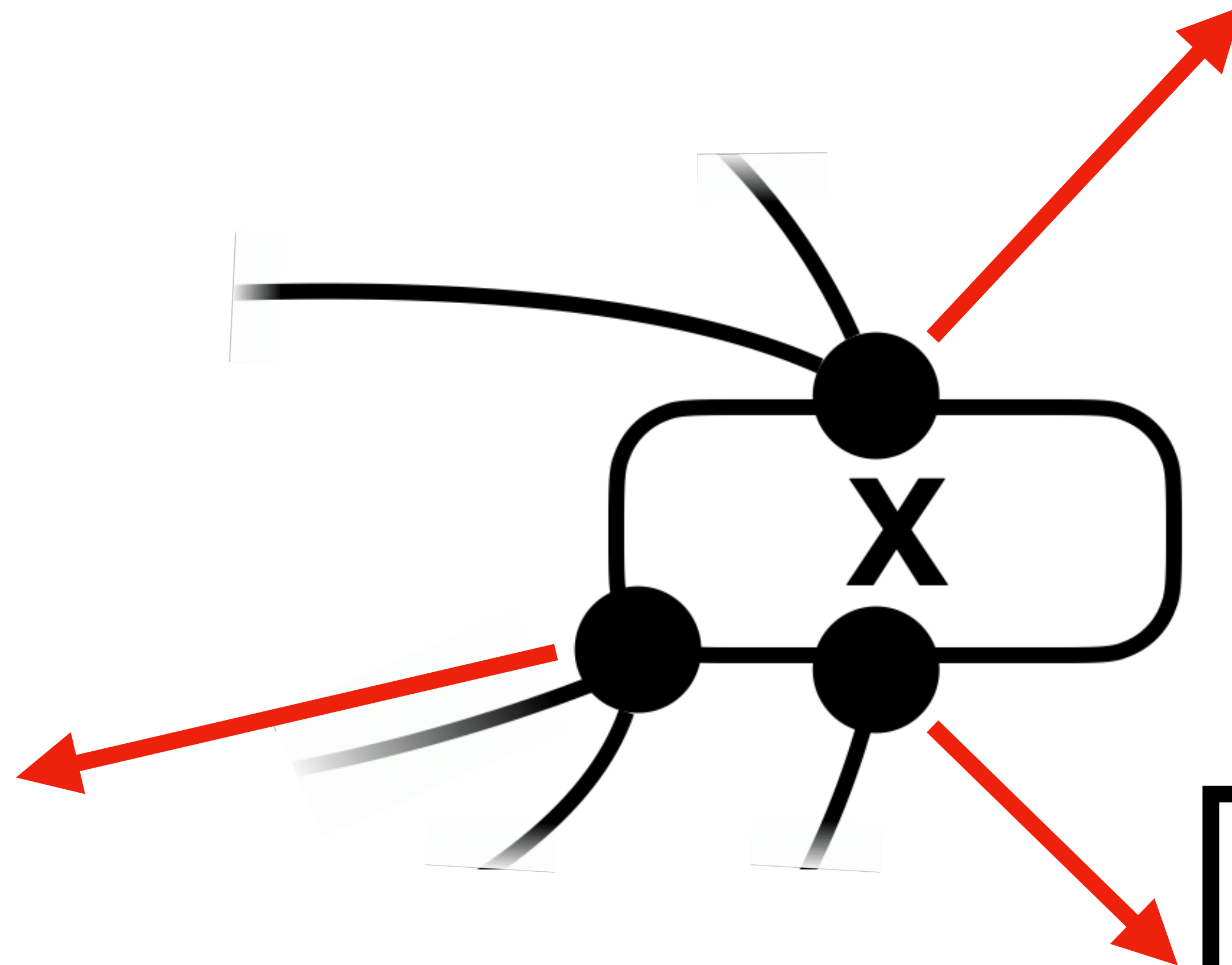
- Started collection on **26th of January 2024**
(Have historical data since **31st of August 2023**)
- We collected a total of **36.477.925 BGP routes**
 - Average
 - Maximum
 - #LGs **167** (more because of historical data)
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What can we do with this dataset?





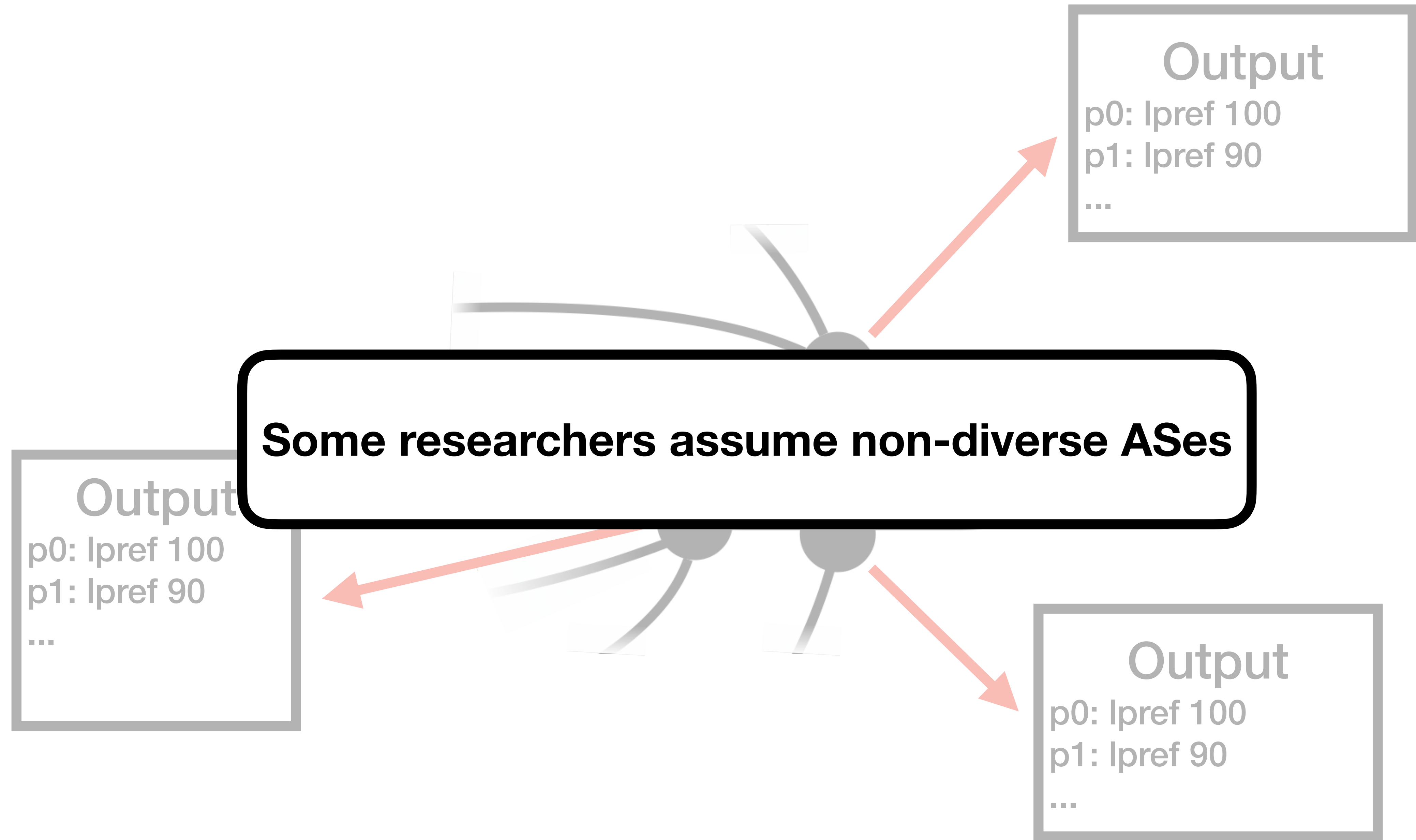
Output
p0: lpref 100
p1: lpref 90
...



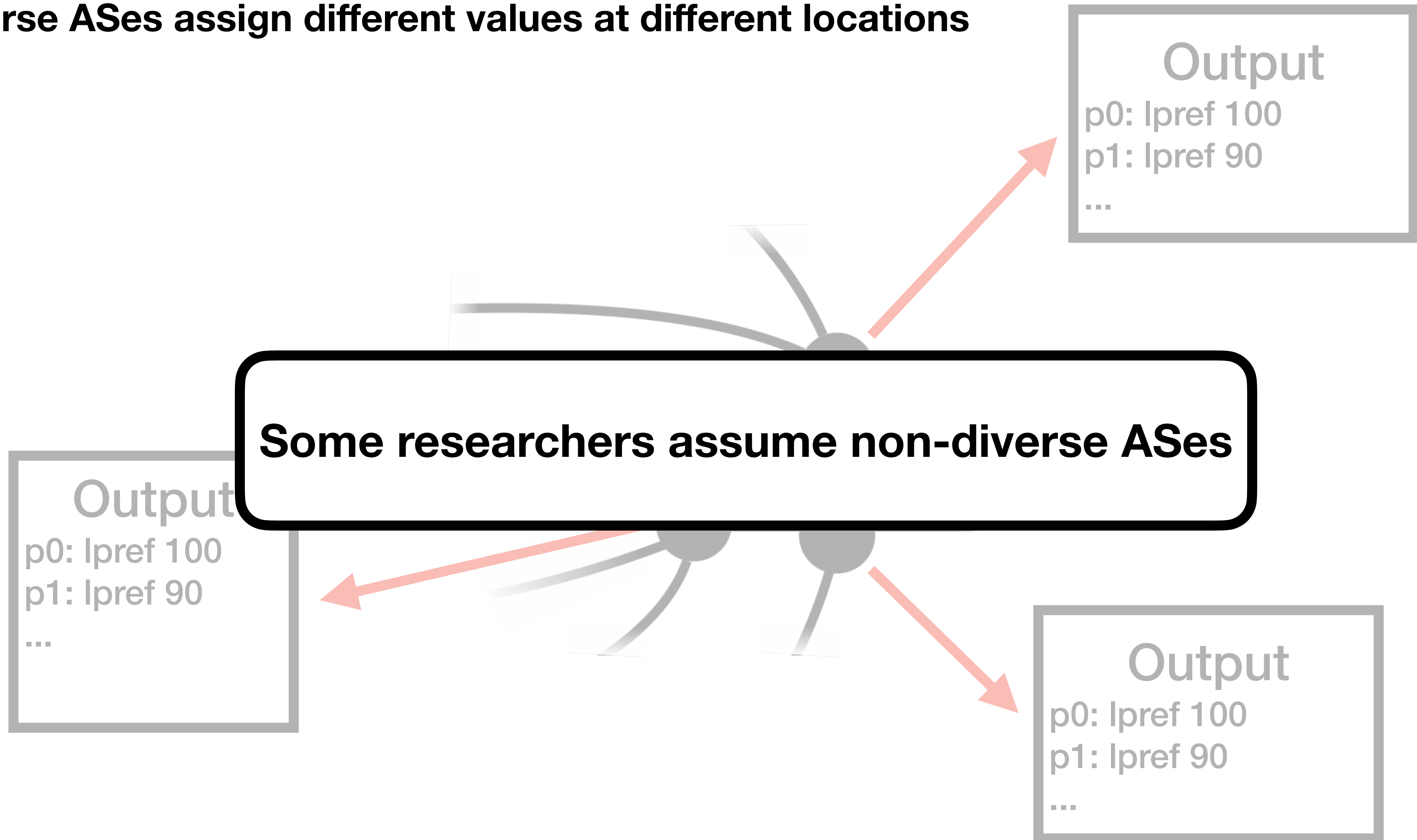
Output
p0: lpref 100
p1: lpref 90
...

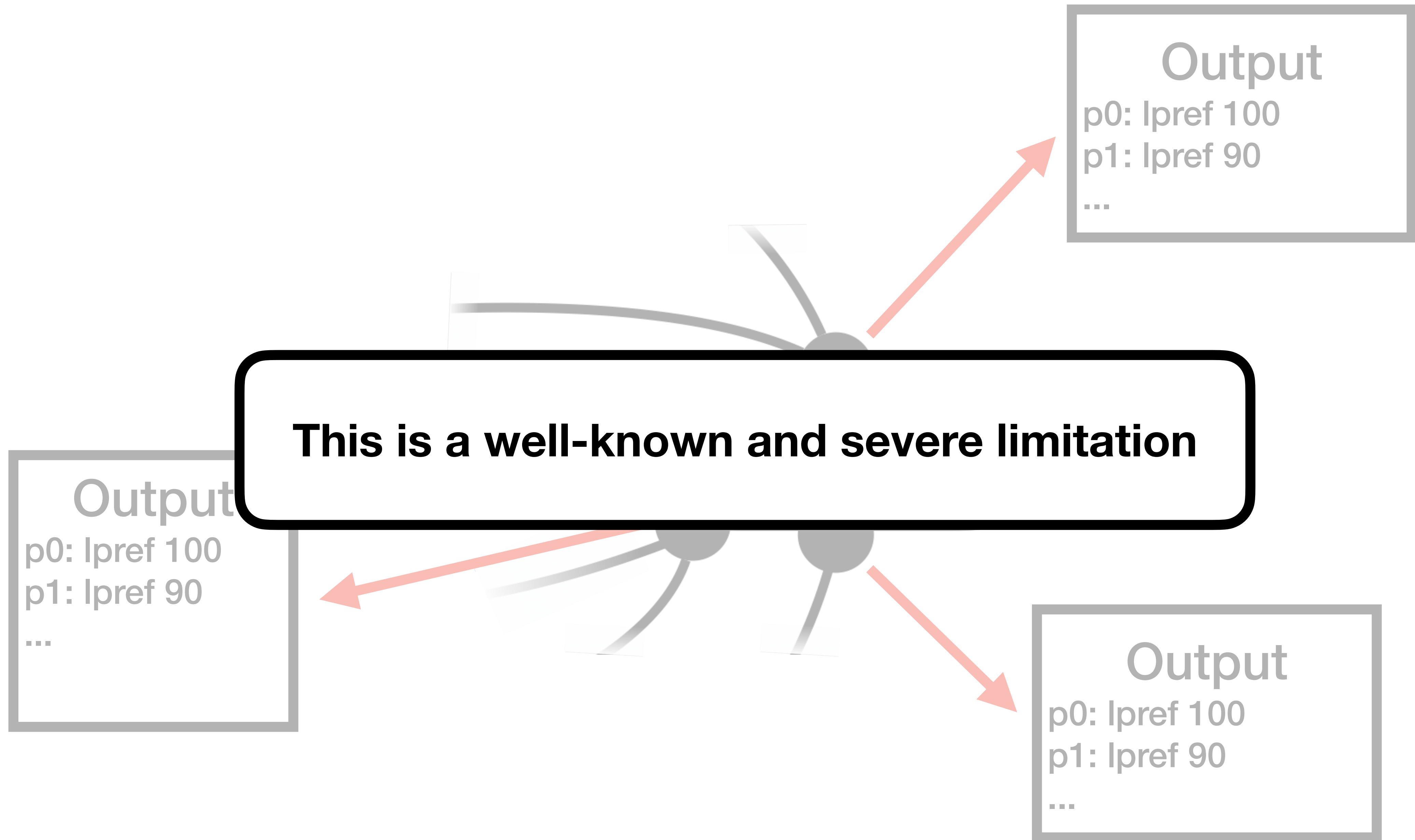
Output
p0: lpref 100
p1: lpref 90
...

Some researchers assume non-diverse ASes



***diverse ASes assign different values at different locations**





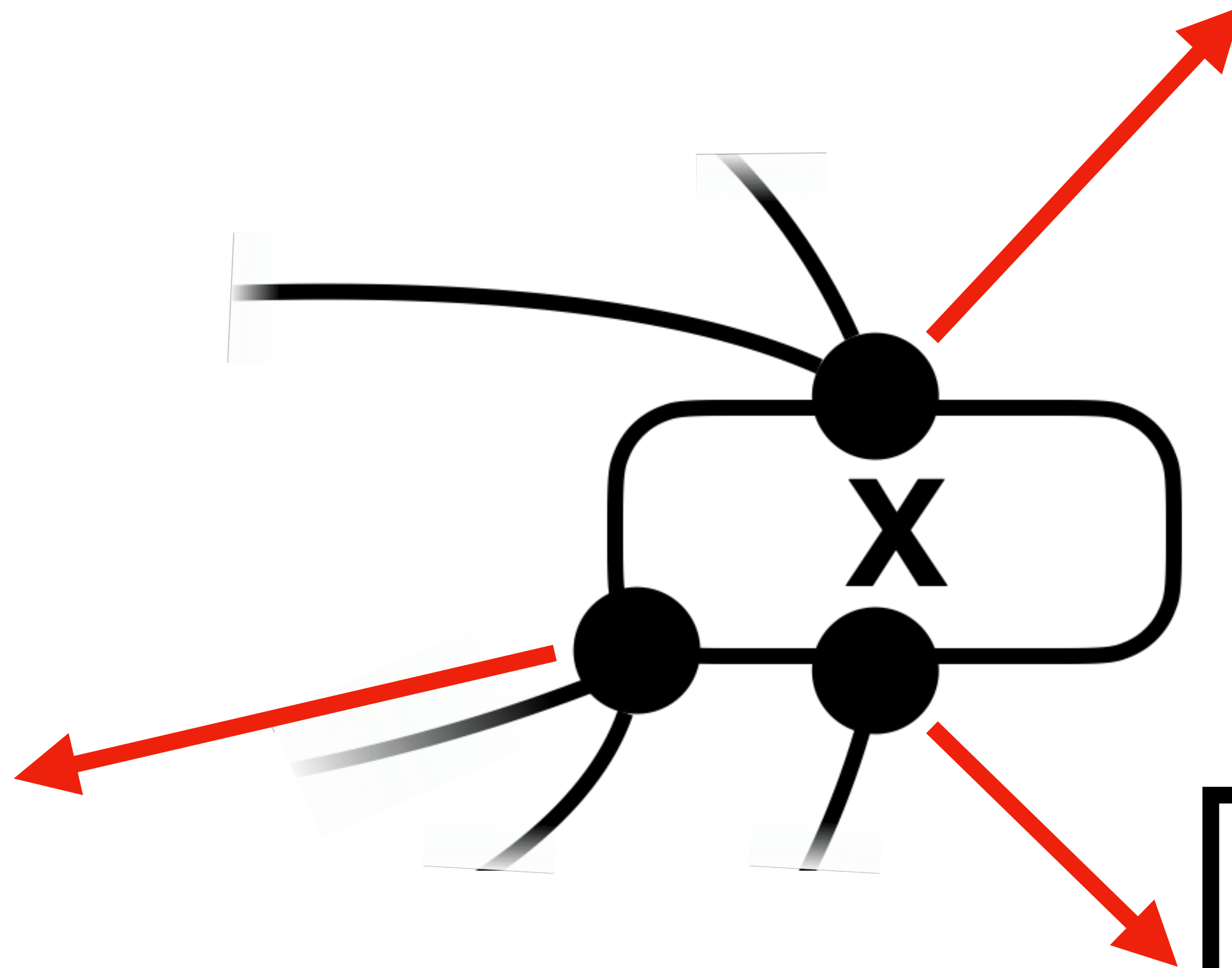
We can analyze diversity with our dataset

Output
p0: lpref 100
p1: lpref 90
...

Output
p0: lpref 100
p1: lpref 90
...

Output
p0: lpref 100
p1: lpref 90
...

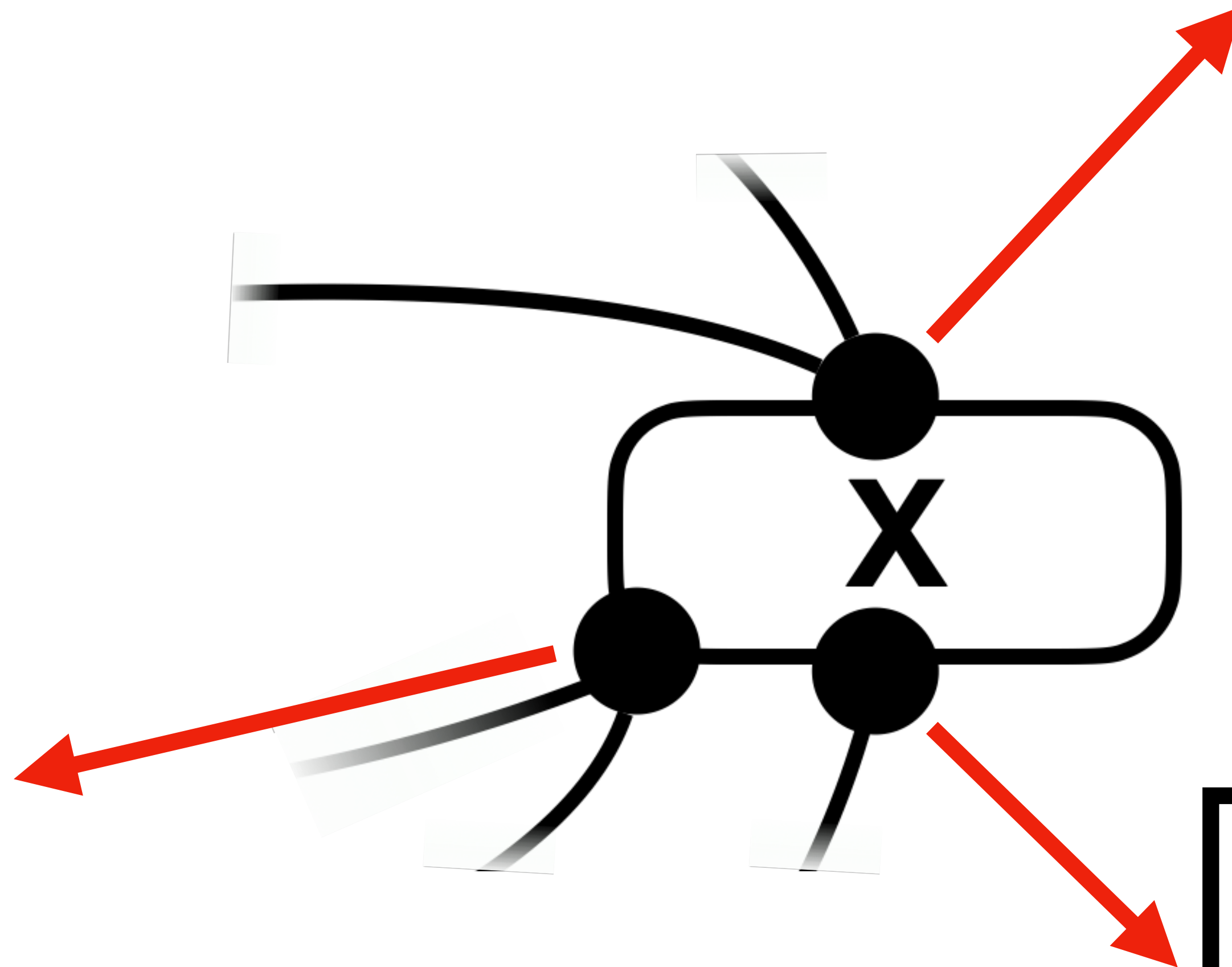
Output
p0: lpref 100
p1: lpref 90
...



Output
p0: lpref 100
p1: lpref 90
...

Output
p0: lpref 100
p1: lpref 90
...

Output
p0: lpref 100
p1: lpref 100
...



Output
p0: lpref 100
p1: lpref 90
...

Output
p0: lpref 100
p1: lpref 90
...

Diverse ASes in our Dataset with respect to:

Diverse ASes in our Dataset with respect to:
AS path diversity

Diverse ASes in our Dataset with respect to:

AS path diversity

local preference diversity

Diverse ASes in our Dataset with respect to:

AS path diversity

local preference diversity

BGP communities diversity

Diverse ASes in our Dataset with respect to:
AS path diversity

local preference diversity

BGP communities diversity

Diverse ASes in our Dataset with respect to:
AS path diversity (148 ASes total)

local preference diversity

BGP communities diversity

Diverse ASes in our Dataset with respect to:

AS path diversity (148 ASes total)

➔ 55/148 (37%)

local preference diversity

BGP communities diversity

Diverse ASes in our Dataset with respect to:

AS path diversity (148 ASes total)

➔ 55/148 (37%)

local preference diversity

BGP communities diversity

Diverse ASes in our Dataset with respect to:

AS path diversity (148 ASes total)

➔ 55/148 (37%)

local preference diversity (142 ASes total)

BGP communities diversity

Diverse ASes in our Dataset with respect to:

AS path diversity (148 ASes total)

➔ 55/148 (37%)

local preference diversity (142 ASes total)

➔ 51/142 (36%) for AS path

BGP communities diversity

Diverse ASes in our Dataset with respect to:

AS path diversity (148 ASes total)

➔ 55/148 (37%)

local preference diversity (142 ASes total)

➔ 51/142 (36%) for AS path

➔ 56/142 (40%)

BGP communities diversity

Diverse ASes in our Dataset with respect to:

AS path diversity (148 ASes total)

➔ 55/148 (37%)

local preference diversity (142 ASes total)

➔ 51/142 (36%) for AS path

➔ 56/142 (40%)

BGP communities diversity

Diverse ASes in our Dataset with respect to:

AS path diversity (148 ASes total)

➔ 55/148 (37%)

local preference diversity (142 ASes total)

➔ 51/142 (36%) for AS path

➔ 56/142 (40%)

BGP communities diversity (88 ASes total)

Diverse ASes in our Dataset with respect to:

AS path diversity (148 ASes total)

➔ 55/148 (37%)

local preference diversity (142 ASes total)

➔ 51/142 (36%) for AS path

➔ 56/142 (40%)

BGP communities diversity (88 ASes total)

➔ 36/88 (41%)

Diverse ASes in our Dataset with respect to:

AS path diversity (148 ASes total)

➡ 55/148 (37%)

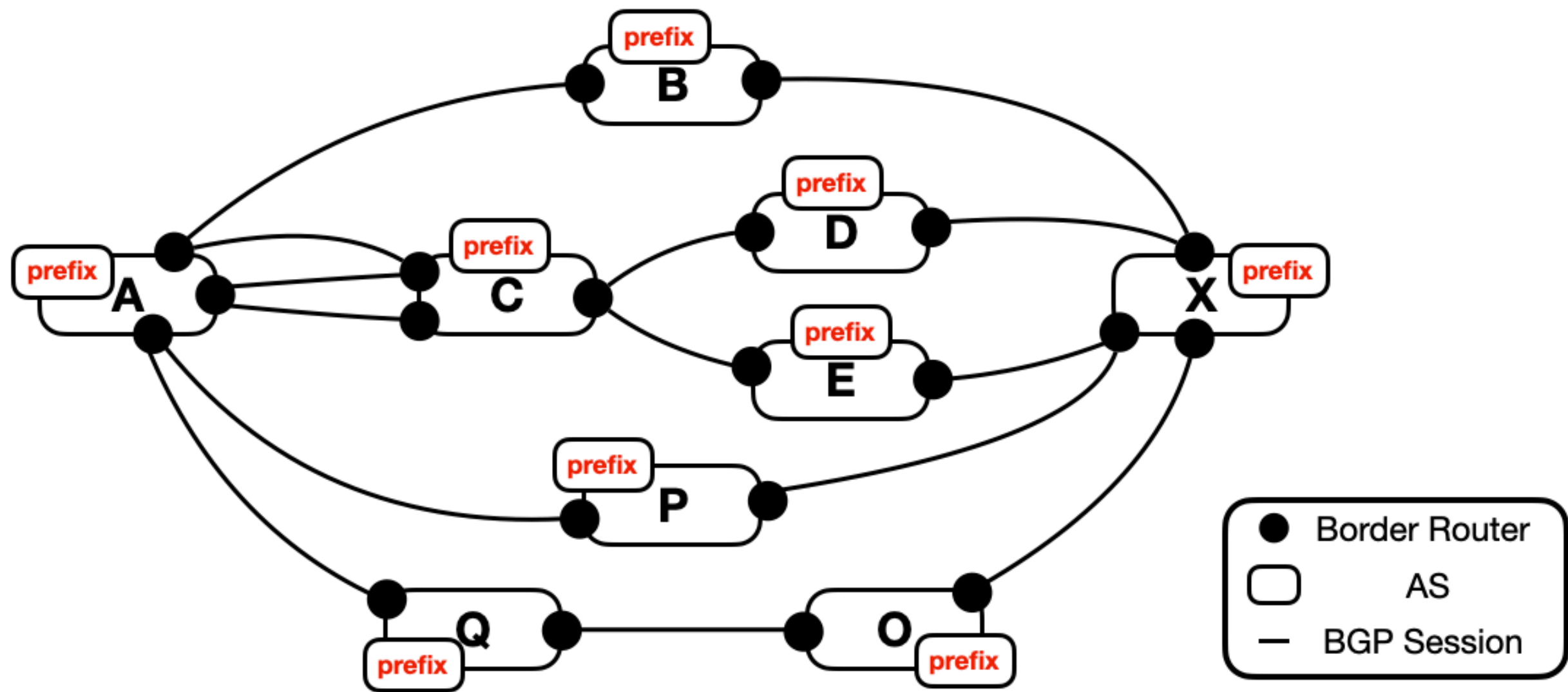
local preference diversity (142 ASes total)

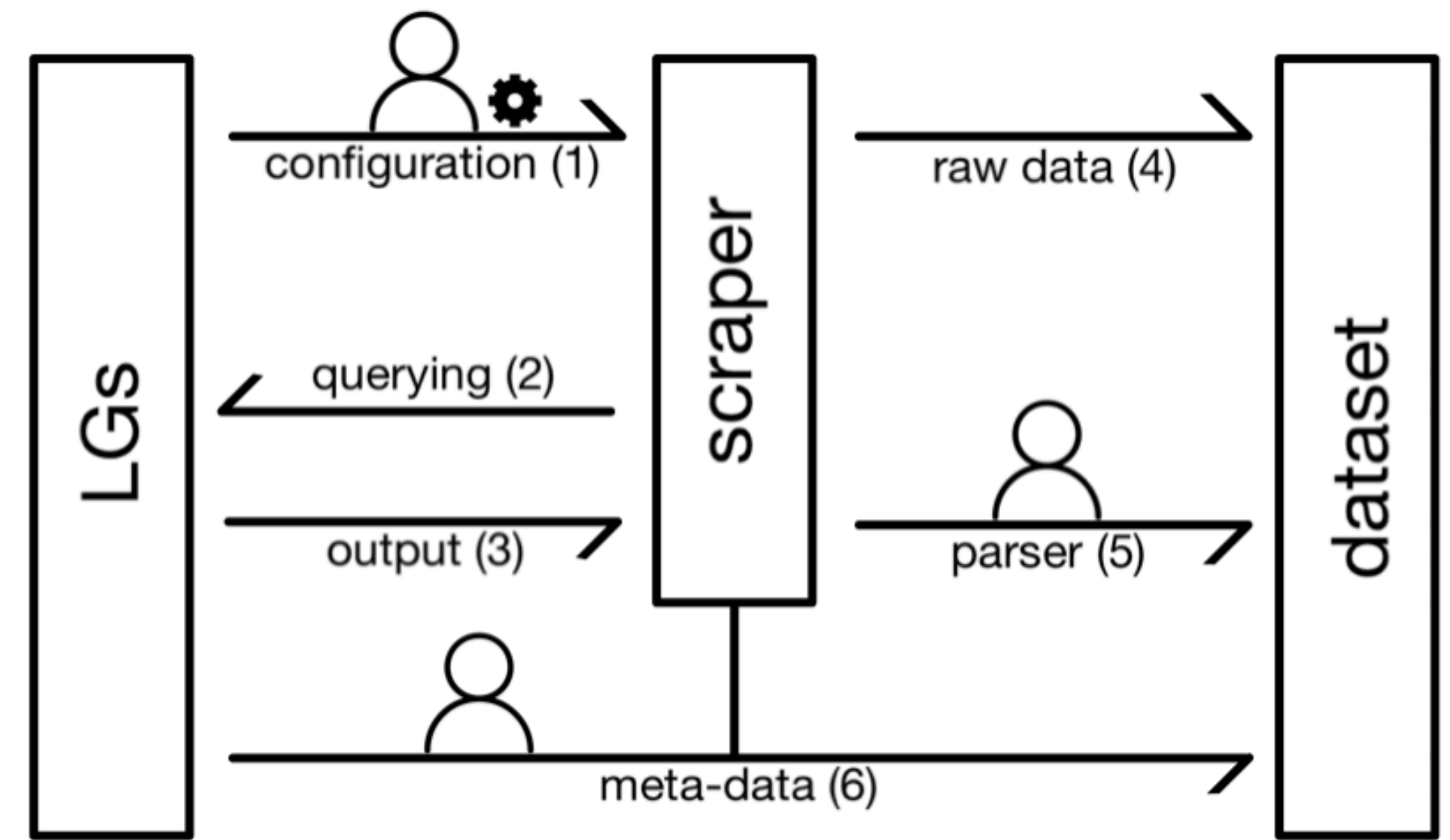
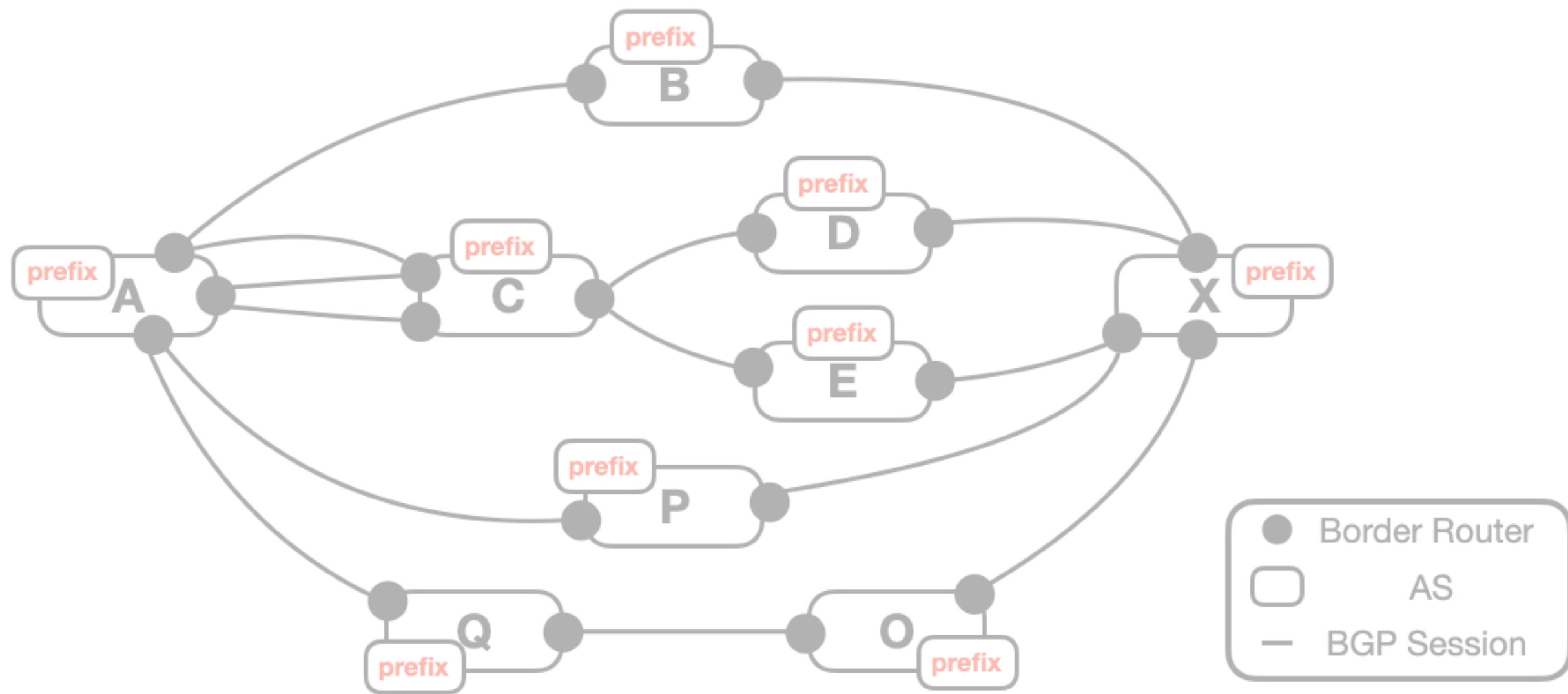
➡ 51/142 (36%) for AS path

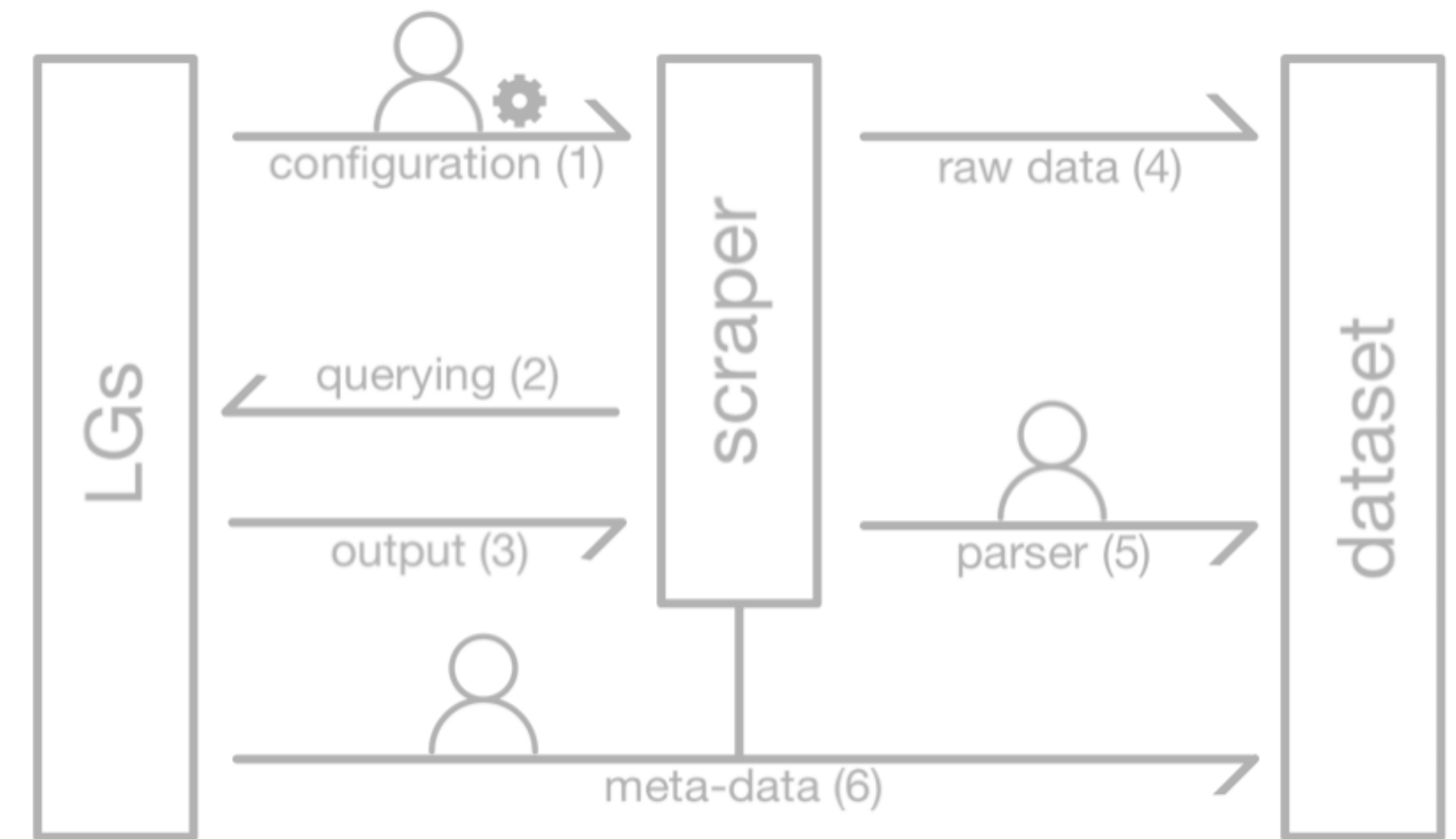
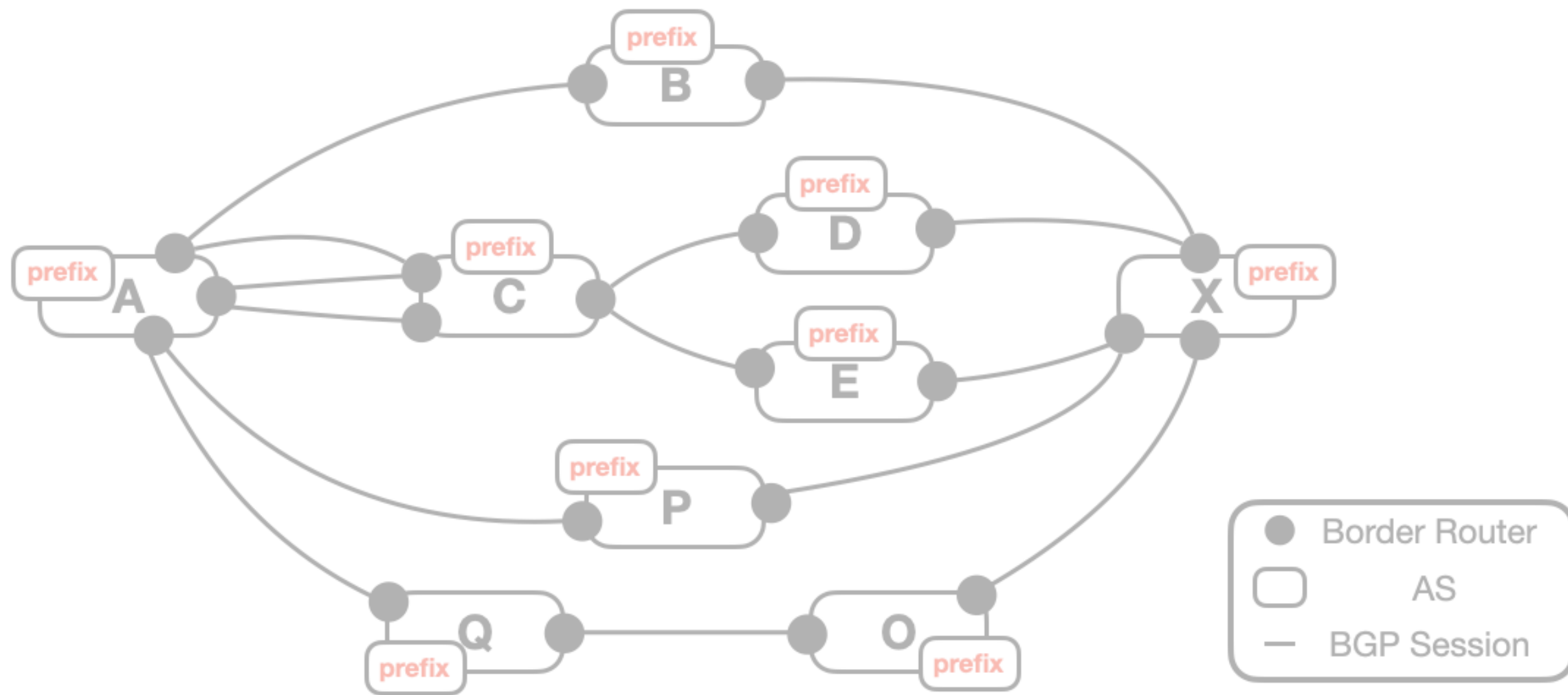
➡ 56/142 (40%)

BGP communities diversity (88 ASes total)

➡ 36/88 (41%)

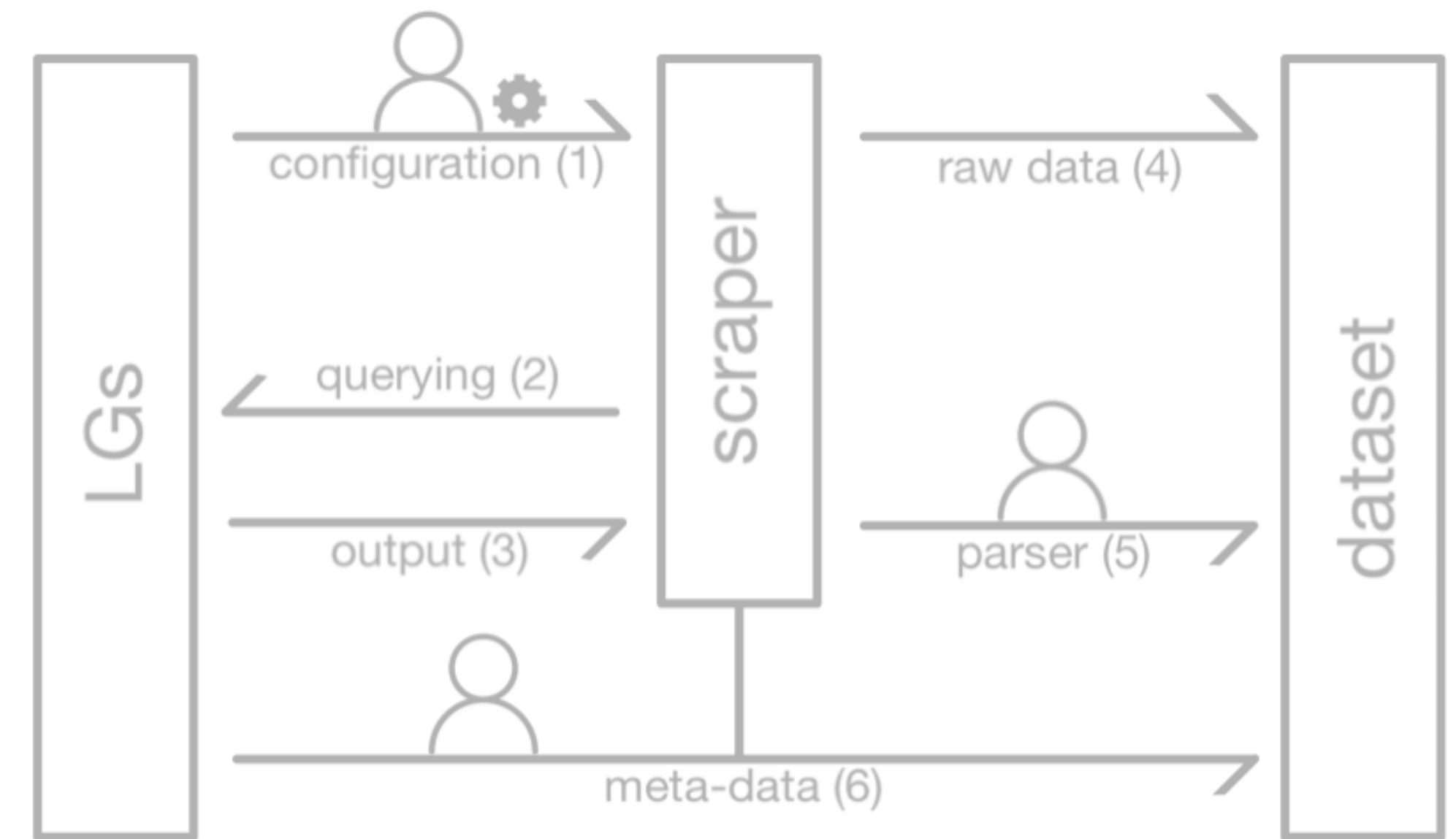
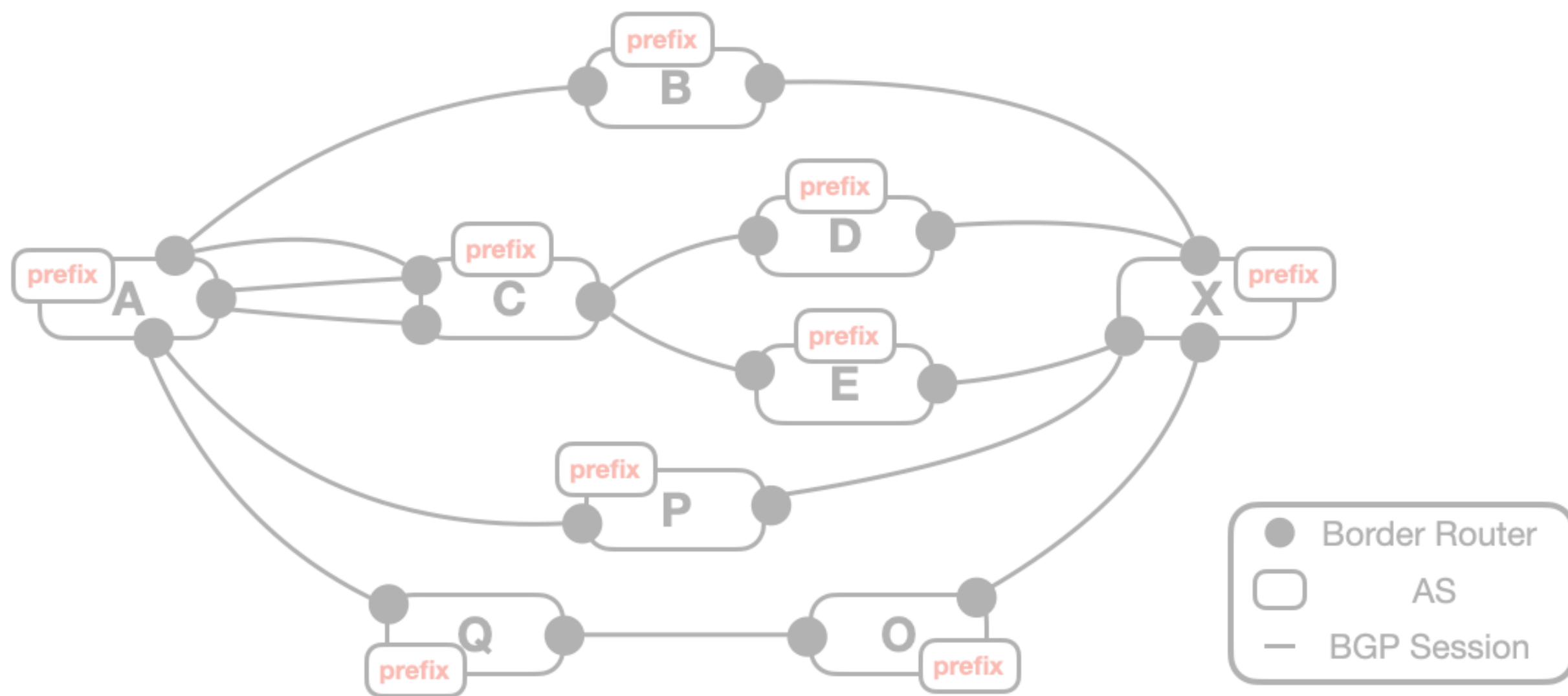






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 - Maximum **35608**
 - #LGS **167** (more because of historical data)
 - #ASNs **173**
 - #Routers **559**

Overview



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**Diverse ASes in our Dataset with respect to:
AS path in diversity (148 ASes total)**

➡ **55/148 (37%)**

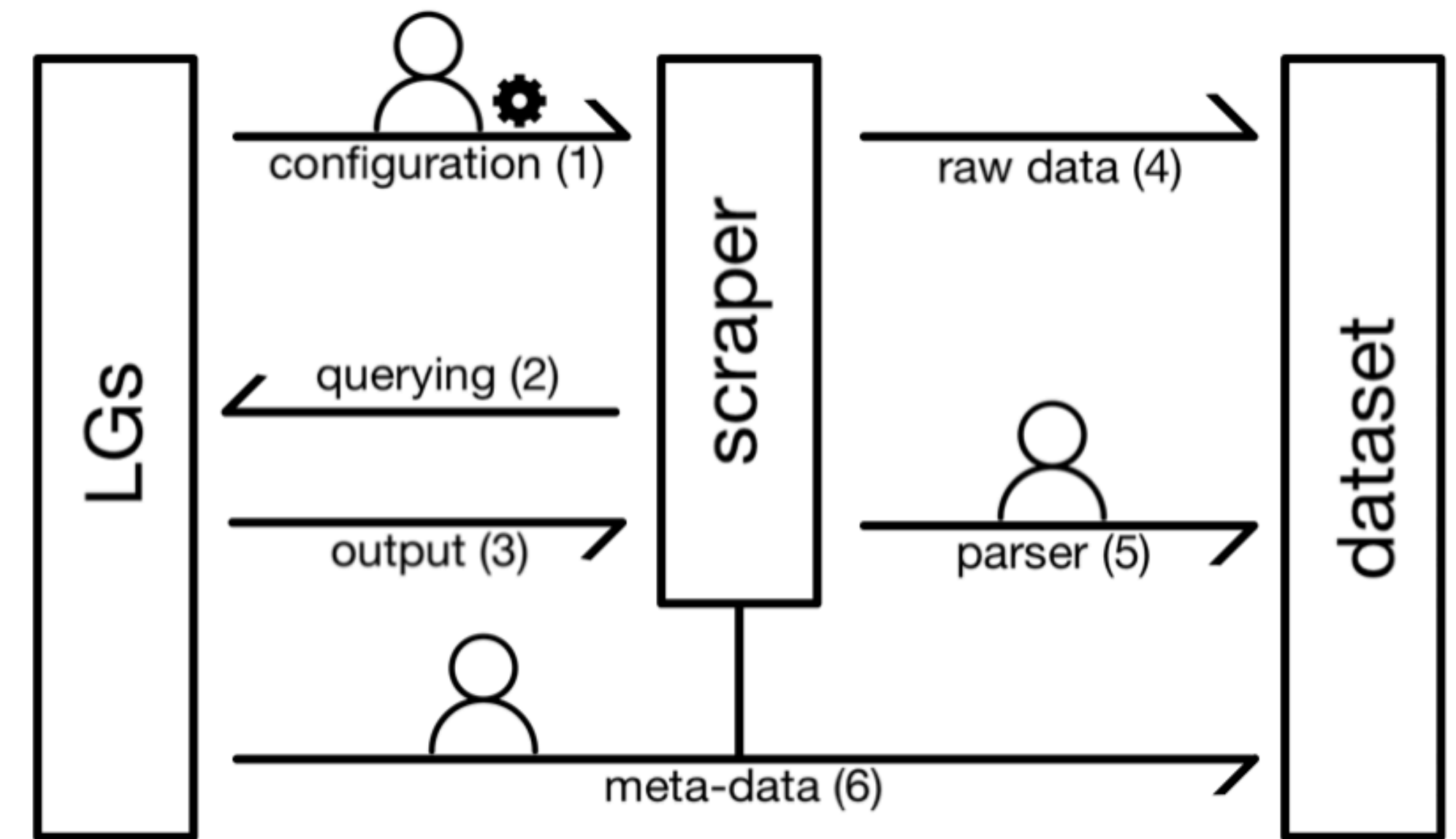
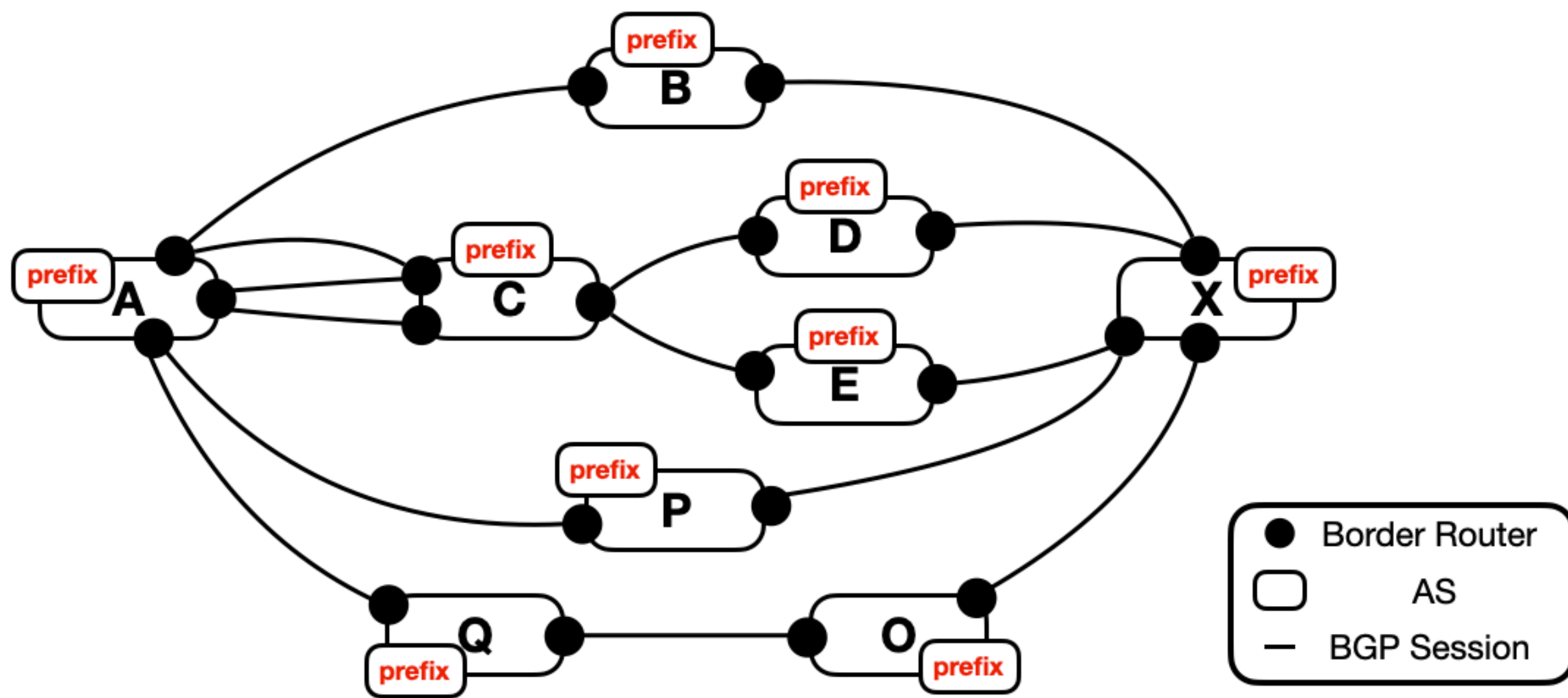
local preference diversity (142 ASes total)

➡ **51/142 (36%) for AS path**

➡ **56/142 (40%)**

BGP communities diversity (88 ASes total)

➡ **36/88 (41%)**



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AS path in diversity (148 ASes total)

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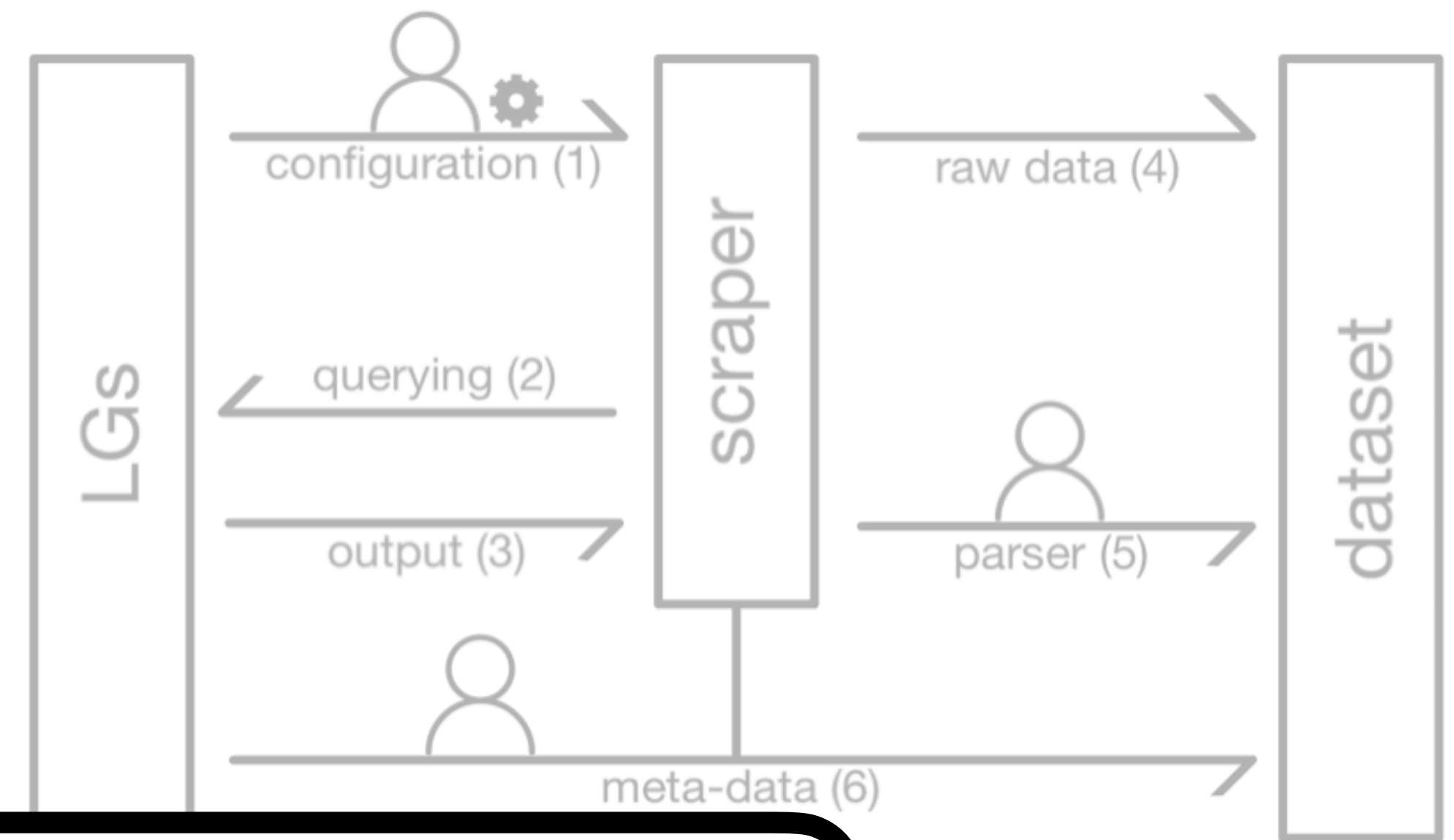
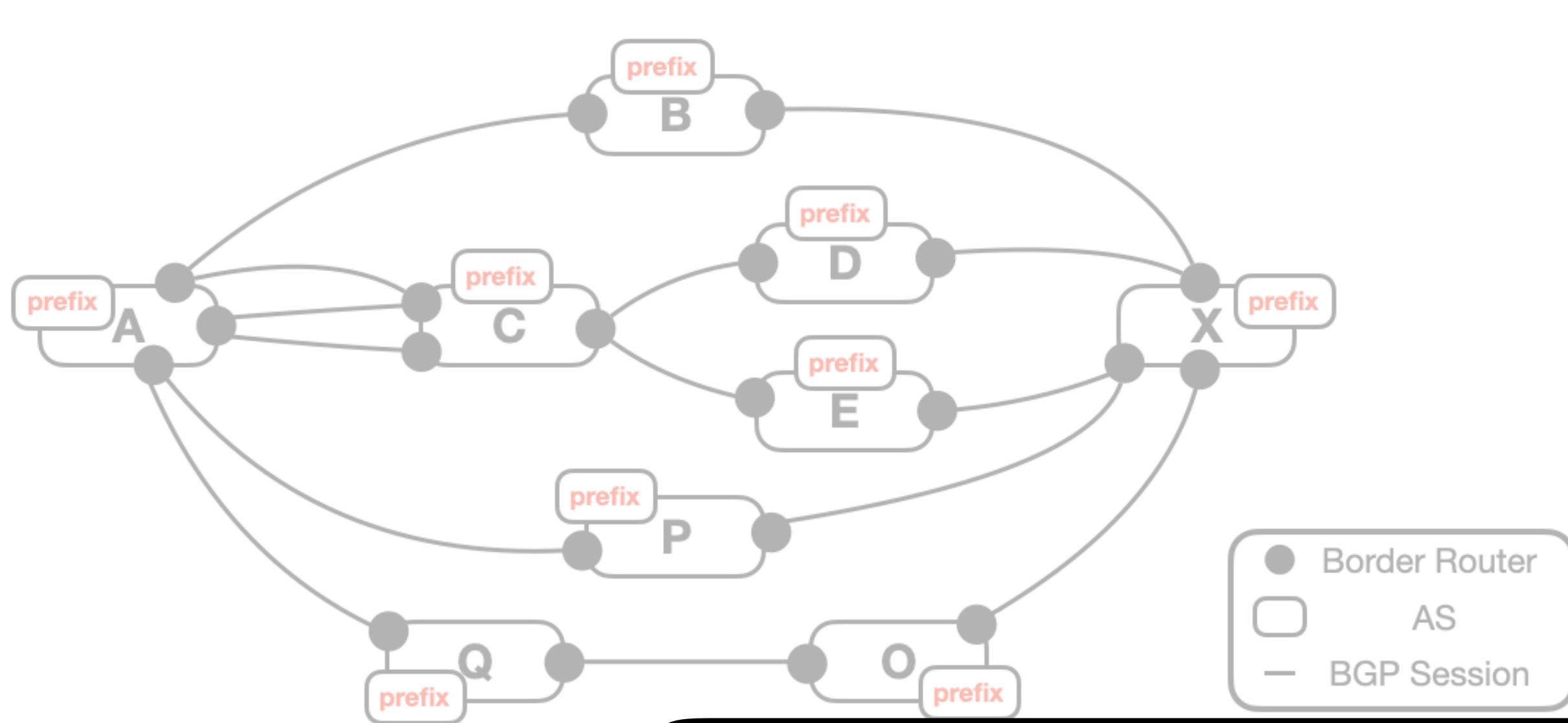
local preference diversity (142 ASes total)

➡ 51/142 (36%) for AS path

➡ 56/142 (40%)

BGP communities diversity (88 ASes total)

➡ 36/88 (41%)



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- Started collection (Have historical data)

dataset with respect to: (ASes total)

→ 55/148 (37%)

- We collected a total of **36.477.925 BGP routes**
 - Average **25526**
 - Maximum **35608**
 - #LGs **167** (more because of historical data)
 - #ASNs **173**
 - #Routers **559**

local preference diversity (142 ASes total)
 → 51/142 (36%) for AS path
 → 56/142 (40%)

BGP communities diversity (88 ASes total)
 → 36/88 (41%)

Backup Slides

