Hands on BGP: Announcing and Steering an IPv6 Prefix

Rayhaan Jaufeerally

Network Security, ETHZ
Lab page: `https://bgplab.rayhaan.net/` (username "netsec", password "perrig")

Name: ..... Prefix: `2a0d:d741:n::/48`

Your prefix is `2a0d:d741:n::/48`, where `n` is your number *in hexadecimal*.
Student 10 has `2a0d:d741:a::/48` and student 26 has `2a0d:d741:1a::/48`.

1 Who Announces the Address You Are Using?

Task 1.1 *Find your IPv6 address.* Open `https://bgp.tools` in a browser: the top of the page shows the address you are connecting from, the prefix it belongs to, and the network that announces that prefix.

Your IPv6 address: its prefix: announced by AS:

....

....

Task 1.2 *Ask the registry.* The RIPE database records who holds address space (`inet6num`, or `inetnum` for IPv4) and who may announce it (`route6`, `route`). Look up your IPv6 address, then your lab prefix:

```
whois <your IPv6 address>        whois 2a0d:d741:<n>::/48
```

Your IPv6 address: held by (`netname`) `origin` AS:

....

....

Your lab prefix: `origin` AS is it announced right now?

....

....

2 Announcing Your Prefix

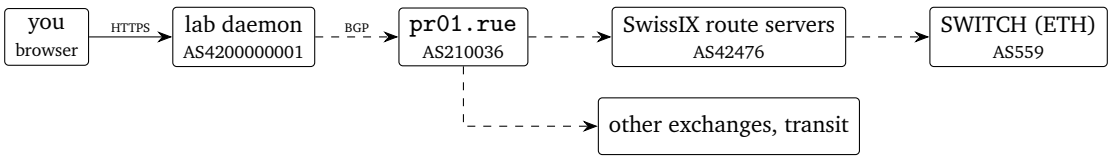


Fig. 1. The lab. Dashed arrows are BGP sessions; everything right of `pr01.rue` is the real Internet.

Task 2.1 *Announce.* Open `https://bgplab.rayhaan.net/` (username "netsec" password "perrig"). Enter your name as *owner* and your prefix, and press *Announce*.

Task 2.2 *Read what you sent.* Click *bytes* next to your route and hover over the coloured segments.

AS number(s) in `AS_PATH`: attribute carrying your prefix:

....

....

Task 2.3 *See it from outside.* Wait a moment, then look your prefix up on `https://bgp.tools/super-lg`.

Origin AS the world sees: an AS path you found:

....

....

The lab daemon's AS4200000001 is missing from that path. Where did it go, and why?

.....

.....

Task 2.4 *Reach it.* The router answers for every address in the lab space, so your prefix is reachable exactly when your announcement got out: `ping -6 2a0d:d741:<n>::1`

Reachable from: ☐ laptop on the university network ☐ phone on mobile data

3 Steering Your Prefix with Large Communities

A Large Community is a tag added to a route. It can have any meaning that the network which issued it decides. In BGP large communities, the first part is the AS number and the subsequent two integers are up to the interpretation of that network.

Large community	Read by	Effect
`210036:0:0`	`pr01.rue`	announce nowhere …
`210036:1:42476`	`pr01.rue`	… except to AS42476, the SwissIX route servers
`42476:0:0`	SwissIX	send to no member …
`42476:1:559`	SwissIX	… except AS559, SWITCH, the network ETH is part of

Task 3.1 *One exchange only.* Announce your prefix again with `210036:0:0` and `210036:1:42476`; announcing a prefix you own replaces it. Before you look: who do you expect to still see it?

.....

.....

Wait a moment, then check on `https://bgp.tools/super-lg` and with `ping`.

Reachable from: ☐ laptop on the university network ☐ phone on mobile data

Task 3.2 *To SWITCH only.* Add `42476:0:0` and `42476:1:559` to the two you already have and announce again. Our router now tells only the route servers, and they tell only SWITCH.

Reachable from: ☐ laptop on the university network ☐ phone on mobile data

Is your prefix still visible on `https://bgp.tools/super-lg`? Explain what you see.

.....

.....

Task 3.3 *Use of large communities.* You steered routing in two networks you do not operate, using nothing but numbers attached to a route. What stops you from attaching a community that one of *their* upstreams acts on?

.....

.....

Task 3.4 *Clean up.* Withdraw your prefix and see how long it takes to go away.