The Case of AS59645

Making it ping and doing stupid things

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Disclaimer

- I know this is the MPI slide template, but I am speaking for myself, and not on behalf of my employer
- AS59645 is not a project of MPI-INF and, for what it's worth, not affiliated with the MPI-INF besides for me being employed there
- I am reporting on personal experiences of running an AS, yet through the lese of me also being a measurement-ish researcher
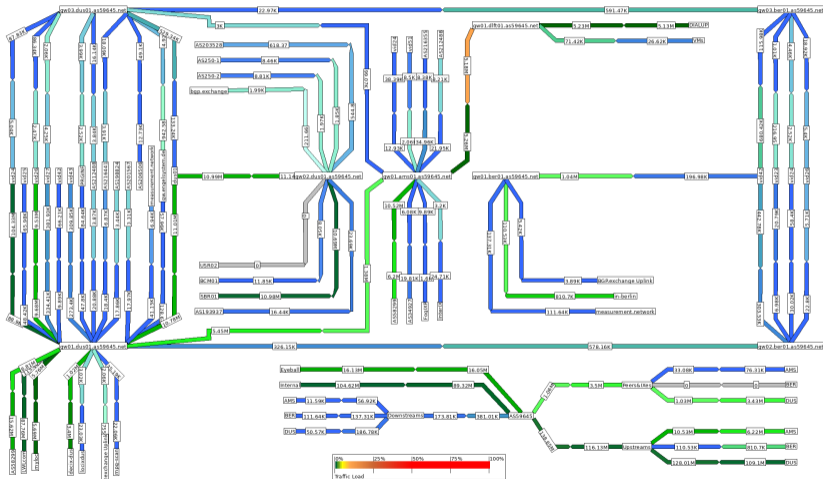
What is AS59645?

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- 5 IPv4 and 10 IPv6 prefixes (7 /24's of IPv4[1], 1048577 /48's of IPv6)
- 6 Upstreams
- 9 Downstreams
- 34 Gbit of (theoretical) outbound bandwidth
- Present at two 'real' IXPs and three 'more like virtual' IXPs
- Registered: 31 Jan 2022 (21 months old)

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[1]Got kind of lucky to have applied for IPv4 PI in 2009...

But why?!

- First of all: Everyone needs a hobby, and I am kind of an operator at heart... and that's not really what happens in my day-job
- Learning; You don't learn how to run things on the Internet's core if you don't happen to work in a company that does
- Independence. Like, seriously. My network, my rules. No funny spamming neighbors. If I move, I take my IP with me
- Giving back to the wider community...

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Learning

- Running networks was always a thing for me
- 'The Internet' used to be a network of networks following the *end-to-end* principle
- Many 'hosted' networks are *different*; Think about the NAT66 stuff in Azure, the NAT44 stuff in EC2...
- Sometimes you just want to setup something and that gets easier if you have a couple of IPs handy

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Independence

- I tend to talk a lot about centralization & cloudification in my work; Might be nice to demonstrate that it's *'not that hard'*
- As a researcher, it helped me to do *some* research more easily (see also `measurement.network`)
- As I got lucky, and have some v4, it is for sure cheaper than renting when I just want to try some stuff...
- It is surprisingly difficult to get a network with working reverse DNS via (not for) IPv6 and DNSSEC

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Giving back...

- I see bleak for the future (see 13 Propositions) and fear capability loss
- Being an LIR and running my own AS allows me to support people in doing similar things; So there are people enabled to run things
- I can host a bit of infrastructure (sensors, RIPE Atlas Anchor, NLNOG Ring Node, etc.)
- I can provide services that are *useful*, like:
    - https://measurement.network/
    - https://bttf-whois.as59645.net/
    - https://email-security-scans.org/
    - https://v6only-resolver.measurement.network/
    - https://engelsystem.de/
    - dig @2a06:d1c7:: .

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Doing stupid things...

- Setting up things that are not necessarily smart:
  - Domain-fronting for commonly censored news websites
  - Making it ping-things
- Home tunnels to get proper IP at home (also legacy)
- Tor bridges
- Trying out new(tm) things for 'big networks' not stable enough for 'big networks'

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Debugging stupid things...

- Some NGO had an issue feeling a bit rate-limited by AS3320 (DTAG)
- Traced this to MTU issues...
- There is a lot more debugging you can do when you control inbound and outbound up to the DFZ (pcap or didn't happen)
- Ultimately slaying a 16y old QEMU RTL8139 bug
  .oO(who still knows that NIC?)
- `https://doing-stupid-things.as59645.net/`
  `networking/debugging/mtu/2022/11/14/time-to-be-real.html`

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Getting Resources

- In the RIPE region, natural persons can hold resources and become members
- IANA - RIR (RIPE, LACNIC, AFRINIC, APNIC) - LIR (..., Me, ...)
- Different Types of resources (in the RIPE region)
  - PI (Provider Independent); Direct assignments to end-users, cannot be further sub-assigned
  - PA (Provider Aggregatable); Allocations to LIRs from which they can make assignments
  - AS Numbers; Always direct assignments. Come in 16 and 32 bit.

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Becoming an LIR

- Apply with the RIPE NCC
- Send a couple of documents
- Pay Sign-Up fee (EUR 1,000 + tax) and first year's membership fee (EUR 1,550 + tax)
- Request initial allocation (/32-/29 IPv6, ASN, queue on IPv4 waiting list to maybe somewhen get a prefix)

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Just getting PI

- Find a sponsoring LIR
- Sign LIR agreement
- Ask LIR to apply for /48 PI + ASN
- LIR is charged EUR50 + Tax per year for the PI prefix; ASNs *currently* free
- LIR will usually charge *you* more than their direct costs, commonly EUR100/year for PI and EUR50/Year for an ASN
- *SOMEHOW* get IPv4 (at least a /24):
  - Buy (EUR15k+)
  - Rent (EUR100+/month)
  - Nope, don't, don't even think about it.

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Getting Connected: The proper way

- Get colocation in a proper colocation facility (usually at least EUR200/month)
- Put at least one router, a switch, and some servers into that rack
- Get cross-connects to IXes and potential upstreams (usually 40-100EUR/month)
- Get RPKI and IRR data in order
- Agree on pricing with the IXes/Upstreams
- Setup sessions, get announced, make it ping

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Getting Connected: YOLO COLO!

- Get *any* device that can run a routing daemon
- Get free tunnel upstream from any of the fun free upstream options
- Get RPKI and IRR data in order
- Setup sessions, get announced, make it ping*

*There is a teny-weny-tiny-tweeny point about this not actually being a good thing... see the next slides...

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Some words of caution...

- This is playing with sharp knifes:
  - There are two types of BGP operators:
    Those who caused an international incident, and those who are lying.
  - With OSPF you can break your network in ways you don't understand.
    With BGP you can break everyone's network in ways noone understands.
- There is more to this than just costs; This is not a packed Raspi you can
  leave in a box for some time if you don't feel like it. Think of it as a pet; It
  means responsibility.
- Funny YOLO COLO!!! setups just for the sake of it make the world worse:
  - Routing table bloat
  - Getting below 1500MTU
  - ...

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    - IPv4 Exhaustion and too large early allocations
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Conclusion

- Is it fun?
  - Yes.
- Should you do it?
  - Maybe?
  - Maybe not?
  - I'm a (not-so-useful) Dr.(-Ing.), not a(n Internet) cop, Jim.
- Is it useful?
  - Well, in a burning world moving towards full-scale societal collapse while losing people with a full end-to-end understanding of its most important technology stacks due to the increasing complexity and introduction of multiple layers of abstraction driven by the practical needs of large businesses, cloud companies, and market incumbents, further reinforcing the role of people as *users* and *consumers* of content provided via a centralizing Internet...
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Answers

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  - Start each day with an Apple
  - Make an evening jog a thing
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Slides, Presentations, Papers:

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