

Tim Bray

IPv6 in small businesses
v2

Today

- Some history
 - 20 years
- Some lessons
- And some thoughts for the future

My (IPv6) History

- In 2004 (yes, 20 years ago)
- In an old bank building, between a pub and a coop. (Up North)
- ADSL arrived in the village
- And there an IPv6 Tick box on the order form.



The Beginning

- Just a toy, something to try.
 - Tunnelled and later native
- Initially flaky, but they it just works
- Facebook went down IPv6. And facebook went down on IPv6 too.

In the middle

- So from 2010 ish, if your ISP cared then IPv6 just worked.
- Dual stack

Roll on a few years

- Decent support in things like printers, network switches.
- Less support in SIP phone
- We connected to our database servers with IPv6

Printers

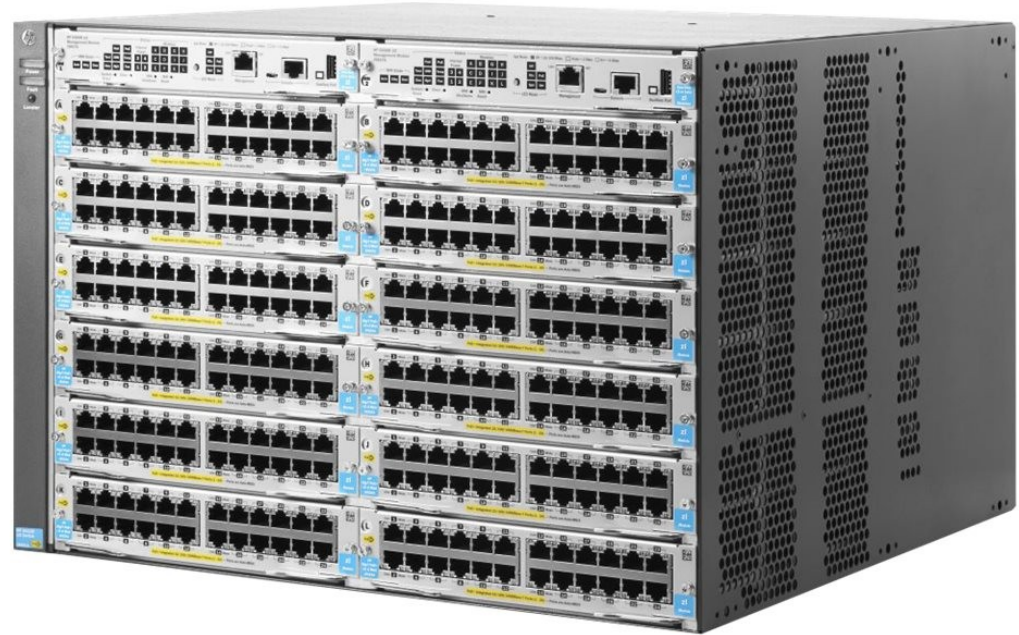
- So when your IT person helpfully updates the printer server to address all your printers by IPv6
- And your ISP messes up
- And you failover, so all the networks renumber ...

So

- This just led to getting some IPv6 PI + AS + multihoming

Just nice

- Network in the office like you learnt at networking class.
- Few bodes.
- Subnet per port is possible



HP 5412

IPv6 (only) day

- The day that twitter didn't work
- But facebook and google did, so nobody really noticed. The internet wasn't down.

But I'm interested in IPv6

- On the best solution
- And I get it
- I wasn't a typical business customer

So what can V6 Bring

- Commercially
- And where people say 'yes I want'
 - Or I need

The Split

- The little folk, use whatever the ISP provides.
 - Probably using IPv6 already without even knowing
- The big folk
 - With a networks team
 - Probably know what they are doing

The Middle

- Do what their IT people tell them
- No (seen) commercial reason to deploy IPv6
- Often married to failover boxes.
 - Things that are not best practice

Typical kit

- Probably has a rack, routers switches
- Some line of business apps, probably onsite
- CCTV
- Printers, \$stuff
- 25 PCs, staff wifi
- VPN – maybe remote desktop

Background

The number of private sector businesses in the UK at the start of 2023 was

5.6 million

5.51 million businesses were small (0 to 49 employees)

36,900 businesses were medium-sized (50 to 249 employees)

8,000 businesses were large (250 or more employees)

<https://www.gov.uk/government/statistics/business-population-estimates-2023/business-population-estimates-for-the-uk-and-regions-2023-statistical-release>

Seen vs Unseen

- There many businesses we see, like shops, petrol stations
- And there are so many unseen businesses

Most companies do as their IT
person tells them

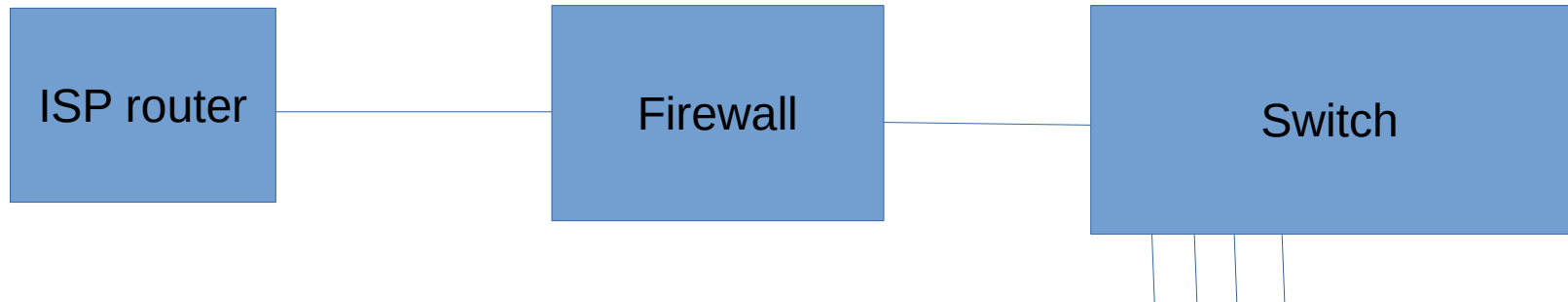
- And they are married to IPv4 + nat

IPv4 Nat is embedded

- It's 192.168.1.
-
- Changing is like trying to make a guinea pig eat dog food

The Ugly

- Double nat for high end firewalls
 - Because asking for small routed block is too much hard work

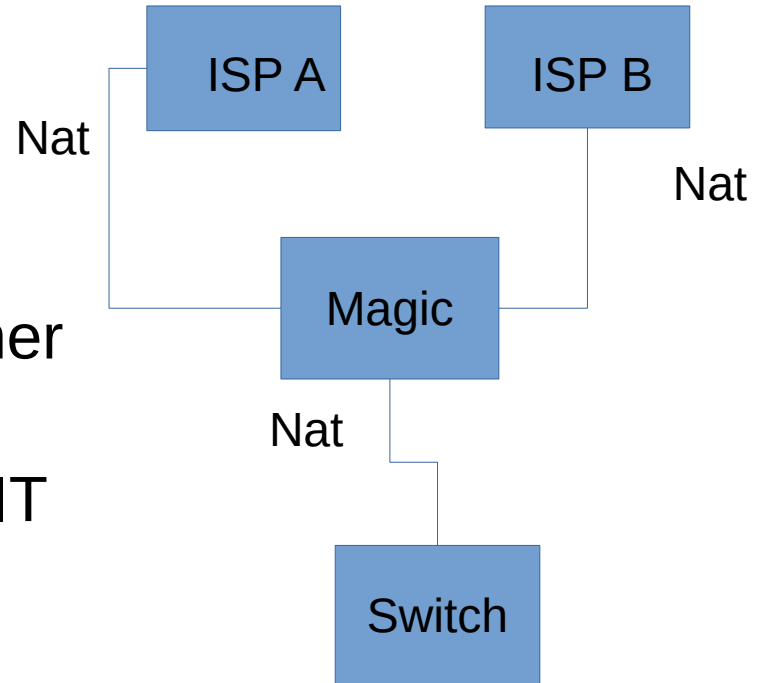


The login and fix

- I've remoted into hundreds of corporate networks, to `Fix the Phones`.
- And really I fixed the interwebs
- And nat port exhaustion was a problem
- And bufferbloat

Failover boxes

- Everywhere
- Double nat
- Ping 8.8.8.8
- If it's down, send that traffic the other way.
- They are just not the best, the the IT chap wants to sell it
- Draytek, untangled, TP Link ...



The client doesn't know

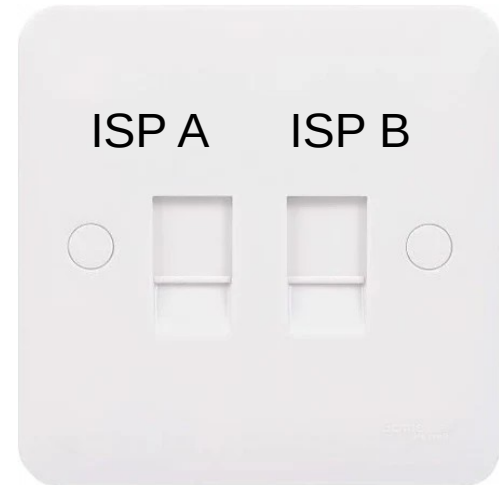
- They might get some time outs, or need to reconnect. The phone/PC not that aware that the underlying networks has changed.

The firewall/router gap

- Routers (firewalls) cost £30 or £3000
- The middle doesn't sell well
- The higher ends are sold
- The bottom ends are given away

Human needs

- If something is broken, humans desire to fix it
 - And feel happier if they have done something.



Future thoughts

- ISP help
- The (better) IPv6 failover
- Network Isolations
- Port exhaustion
- Practical IPv6

ISPs (can) make V6 easy

- DHCP PD
- Or allocate a /56 and have a standard router address in the first subnet. (It's ::5 on BTnet)
- Which just makes it so easy to split of vlans

ISP support

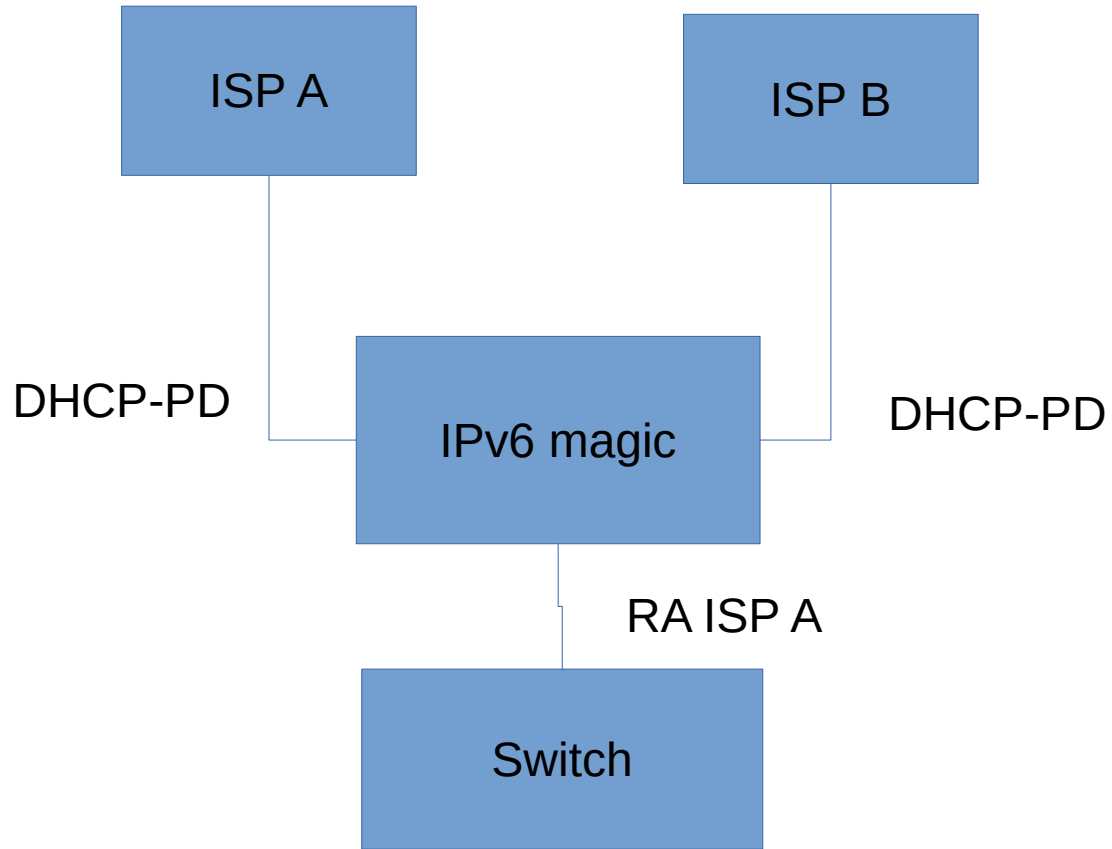
- IPv6 is not forefront in many ISPs
- On the quiet
- Not in the documentation

Port exhaustions

- The main use of IPv6 is 1 address per client.
 - As opposed to 1 IPv4 address per 50 clients in an office
- One person runs a port scanner, nat router chokes a bit, ~~internet~~ twitter goes down

Better Failover

- So inspired by Jen Linkova's work on IPv6, and some ideas at the Manchester roundtable.
- A failover device could PD on 2 upstream connections, and provide downstream RA for the preferred connection.
- And ping6 2001:4860:4860::8888
- And on failover, change the router address



Continued ..

- The client knows it has a new IP address, so the apps on client know.
 - Like a SIP phone could force a re-register
 - A clever phonecall could IP hop.
- Cons – not so great for hosting services
 - But services could update their DNS when they see their IP change.

Network Isolations

- “So the computers that take credit card payments are on a separate network for PCI”
- So yeah, a different switch, on a double nat.
- But with IPv6 and PD, the new `double nat` could be a PD, separate address.
- Routing switches could have a `PD vlan` button.

Practical

- If you don't add IPv6, somebody else will
- 2 linux servers, same ethernet, dhcp IPs, depends on lease fixing
- Sneakily add static IPv6 to both machines,

PI

- If you have a lot going on in your organisation, get some PI space

Final thought

- IPv6 just works on starlink
 - But I haven't tested DHCP-PD (yet)
- Give people a way to learn and tinker
 - Home server on IPv6
- Internet.nl - test v6, dnssec
- Test your websites

So that's all

- Please challenge, ask and share your ideas too