IPv6 in an office

UKNOF, Manchester, 2018

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The Scene

- Small companies
- 4 to 80 staff
- Not leased lines
- Not 4 figure routers, but maybe 4 figure FW
- Probably don’t have inhouse IT.

IPv6

- Kind of easy to setup on hosted servers
  - Test, AAAA record and add to monitoring
- ISPs can do it
- Home connections it do now
- Been around for a while
- Middle of the ground companies will struggle

Order Confirmation

THIS IS NOT AN INVOICE This document details goods/services you have ordered from us and the prices we will charge. If you have not placed the order or the prices are not as you expect contact us immediately. We will issue an invoice when we supply the goods/service detailed.

ANDREWS & ARNOLD

Andrews & Arnold Ltd
Enterprise Court, Downmill Rd, BRACKNELL, RG12 1QS
Tel 01344 400 000 Fax 01344 400 001 www.aa.gg

Invoice Address

Peter Kershaw
Provu Communications Ltd
4 Peel Street
Marsden
HUDDERSFIELD West Yorkshire
HD7 6BR

Account No:	A6658A
Document No:	O5030187A
Date:	2005-03-10 09:04:53
Issued:	2005-03-10 09:06:00
Payment terms:	With order
Paid:	0000-00-00 00:00:00

New broadband internet 01484 847684

This is the setup/equipment for your new broadband internet connection.

Qty	Description	Unit	Cost
	ADSL broadband Migration from another ISP MIGRATE 01484 847684		
	IP addresses for 18 machines included		
	IP6 address allocation included		
	Service invoiced for payment on 1st of each month		

Pro IPv6

- To be clear, it is the way forwards

In the olden days

- Order ADSL from Zen, BT, AAISP ….
- Plug the router in
- It works
- Always on internet
- Google/facebook works
- Background technology – PPP, v4, DHCP, NAT
- Probably wired, with a switch

Roll on a few years

- Still an office
- A few more staff (maybe 10 people now)
- Might have started using google docs, slack, voip …..
- No internet = out of business

Summon the IT people

- Problem: “facebook went down”
- Answer: “<techno mumbo jumbo, outage, BT’s fault, loss of sync> We could sell some internet failover”

- How much?
  A grand + a second internet connection at £30 a month
  boss: cool

Noddy failover

- Sonicwall, Draytek ...
- 2 WAN
- Ping to detect outage
- 2 ISPs
- Nat
- This is everywhere.

So IPv4 nat failover is easy

- Office network stays the same
- Changing ISP doesn’t change the addressing of your internal machines

```
# ip route del default via
141.170.10.193 dev eth0.200
```

Behind scenes

- Router has policy route for different default gateway for different source
- Nat to different source addresses
- Delete routes that fail

My Views

- The middle sized router market is not IPv6 ready
- The people who install this kit are not at all IPv6 ready

IPv6 changing ISP

- All your internal addresses change.
- So I swapped ISPs at work
- Our printers all stopped
- Because of internal rules about which IPv6 addresses could print.
- And the printers changed IP when we changed ISP.

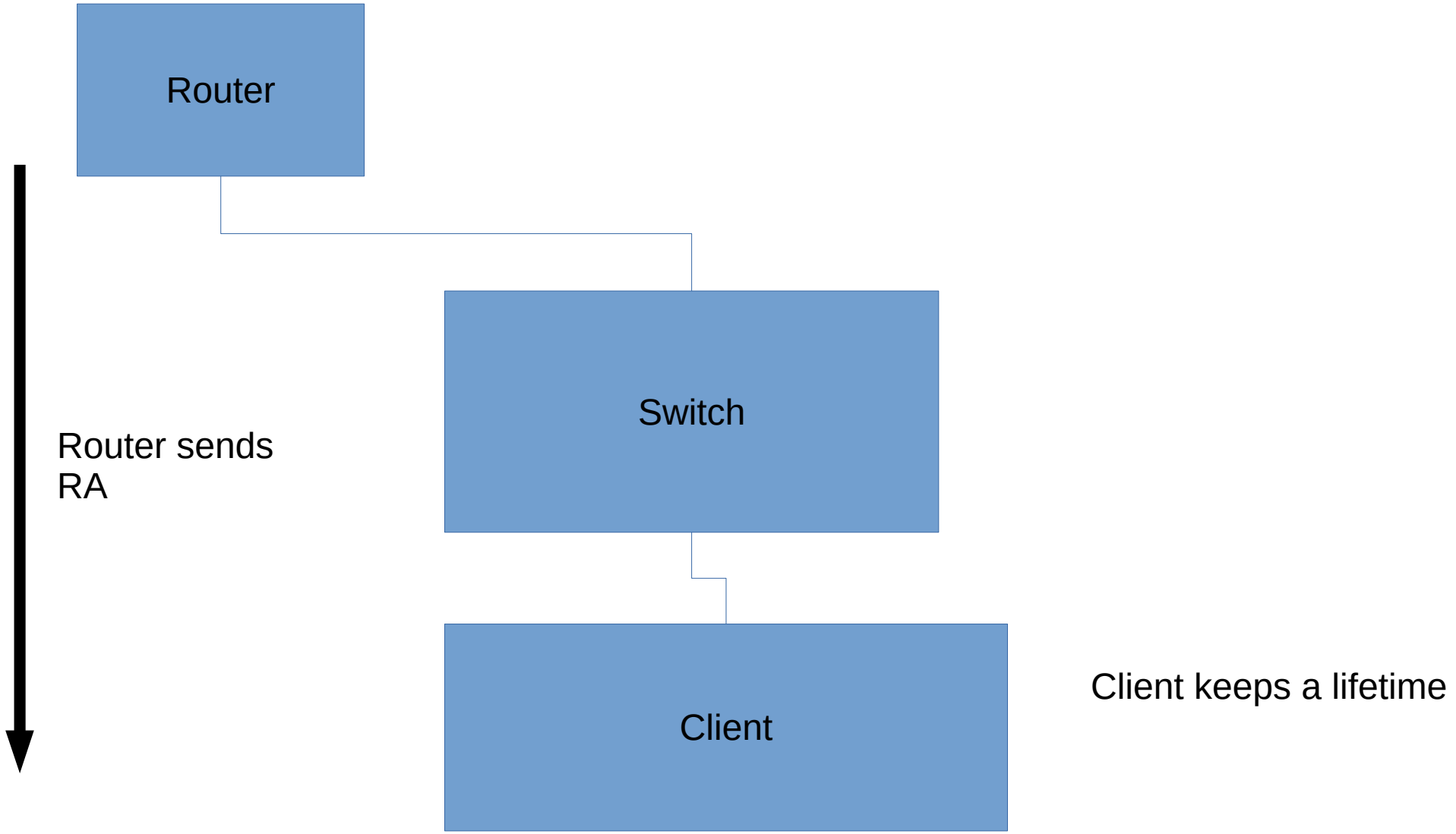
Can’t you just forget IPv6?

- Well, maybe.
- Have an outage, turn off v6?
- Well, no, people want facebook/google

Until you need IPv6

- I did this
- 2 ADSL ISPs into same router
- One ISP messed up IPv6
- IPv4 failed over
- Smart person said – lets just turn off router announcements and use v4
- NFS stopped working for all the office desktops

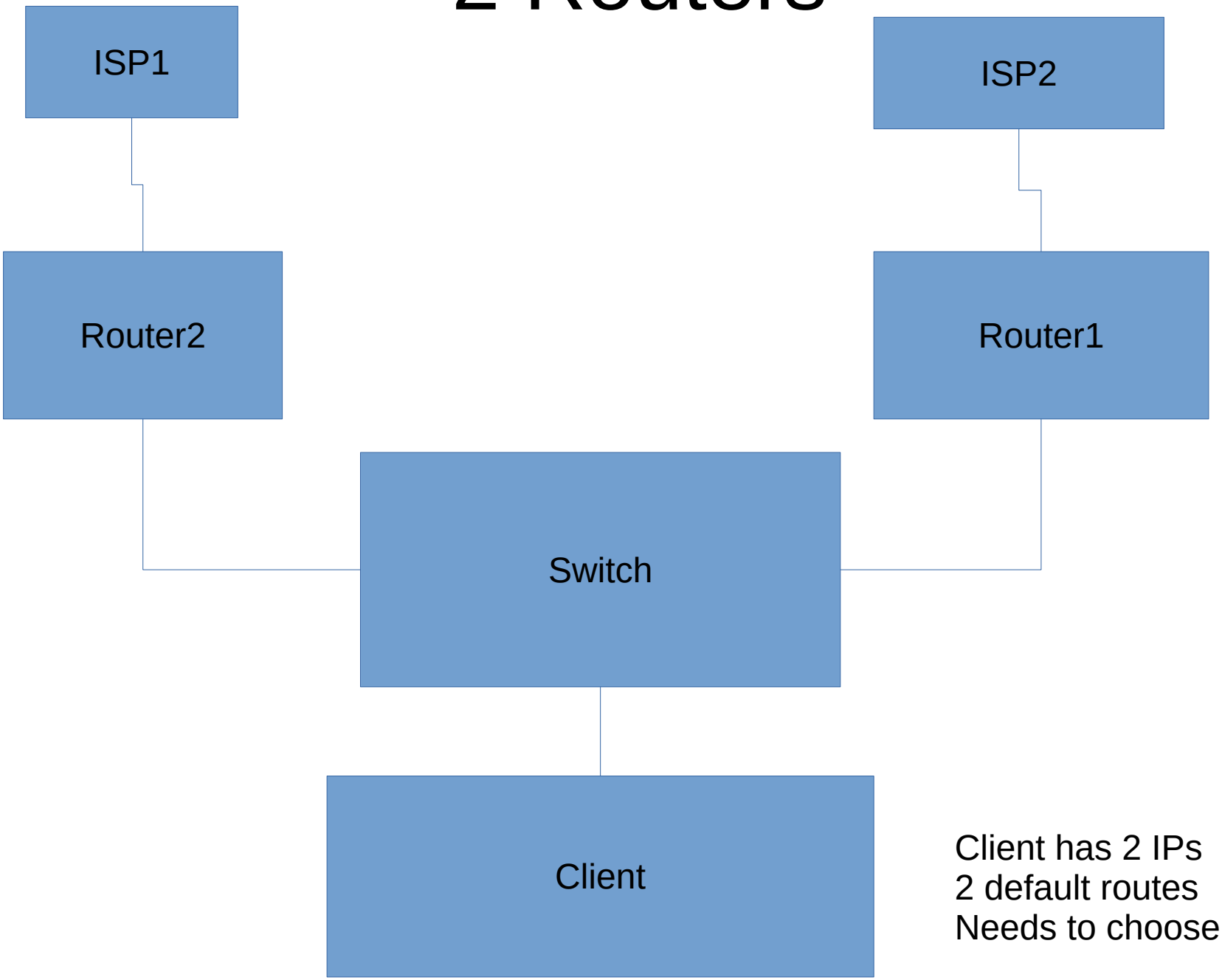
Router Announcement



Just Connect 2 routers

- 2 routers, 2 ISPs, 1 switch
- All your PCs end up with IPv6 from both ISPs
- In theory, if PPP goes down, router stops router announcements (sky do this)
- IPv4 is going to go crazy with 2 DHCP servers, so prob best to drop IPv4.
- Not really good for any kind of server.
- I reckon doesn’t work for iPhone
- In theory, can set preferences on router

2 Routers



Client has 2 IPs
2 default routes
Needs to choose address

One router, 2 networks, 2 ISP

```
interface eth0.245
{
  AdvSendAdvert on;
MaxRtrAdvInterval 400;
AdvDefaultLifetime 9000;
MinRtrAdvInterval 200;
# ISP1
   prefix 2a00:1a80:5:1::/64
  {  AdvPreferredLifetime 600;
   };
#ISP2
  prefix 2001:8b0:175:1::/64
  {  AdvPreferredLifetime 0;
   };
};
```

2 connections from same ISP

- So multiple connections from the same ISP
- AAISP do this well
- Talk talk line + BT Line + 4G dongle
- Gets around BT failures, BT maintenance etc
- Still a point of failure in ISP

Others

- SADR
  - Different routing table for per source ip
  - Saves policy rousting
- IPv6 source address selection (RFC6724)
- Eric Vyncke proposed at IPv6 council that SADR plus OSPF between all routers would work
  - My view is that OSPF is towards the complicated end
  - Clients still have to choose which source address to use

Could you NATv6?

- Well yes,
- But, then kind of defeats the advantages of V6

V6 With PI

- Get an AS Number, IPv6 PI space
- Costs £100 a year
- Setup – looks easy, probably harder
- 2 routers
- I don’t think sustainable for every business in the UK to do this.

And really

- By the time you've done BGP for v6 …
- The cost to join RIPE isn't too far away
- 2000 euro + 1400 euro per year.

Further reading

- http://www.ipv6.org.uk/wp-content/uploads/sites/204/2018/01/Vyncke-20171205-UK-IPv6-multihoming-v3.pdf
- Also believe Pete from Mythic presented at ITEF – I’ve not seen the videos

The End