Why NAT64 must win.

The Long Term View.

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Transitional Technology

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change
cambire, to
thing) in place

Technology to facilitate transitioning of the internet from its initial and current infrastructure to the successor addressing and routing system of **IPv6**.
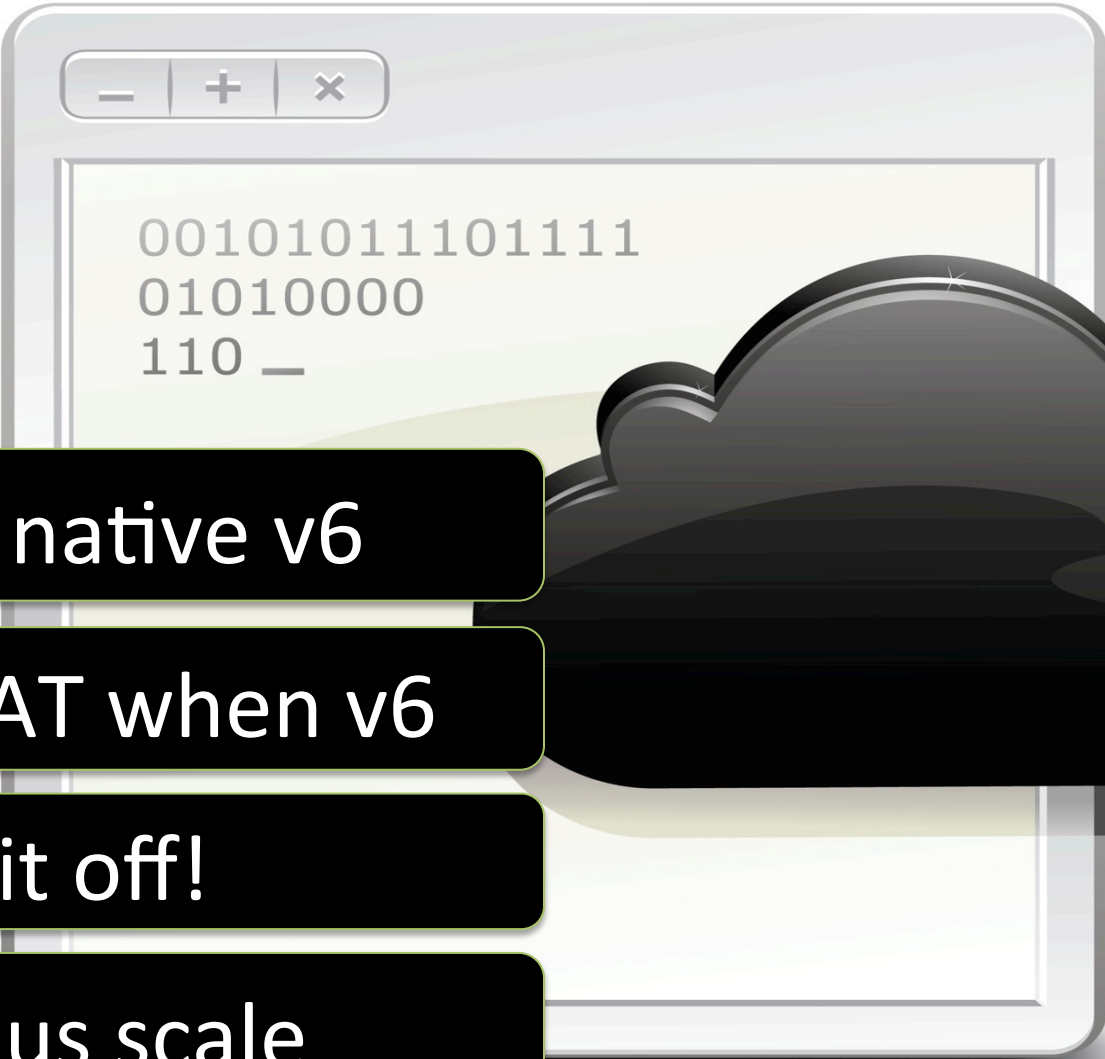
Transitional Technology

Necessary **hacks**" that add a new cost burden to ISPs, hurt the end user's experience, and disrupt the pace of innovation at content producers.

Necessary Features

A step to native v6

Sidestep NAT when v6

Turn it off!

Enormous scale

Turn it off!

This point is key. If we can't turn off the NAT one day, it becomes a new cost of doing business. Transition = **temporary**.
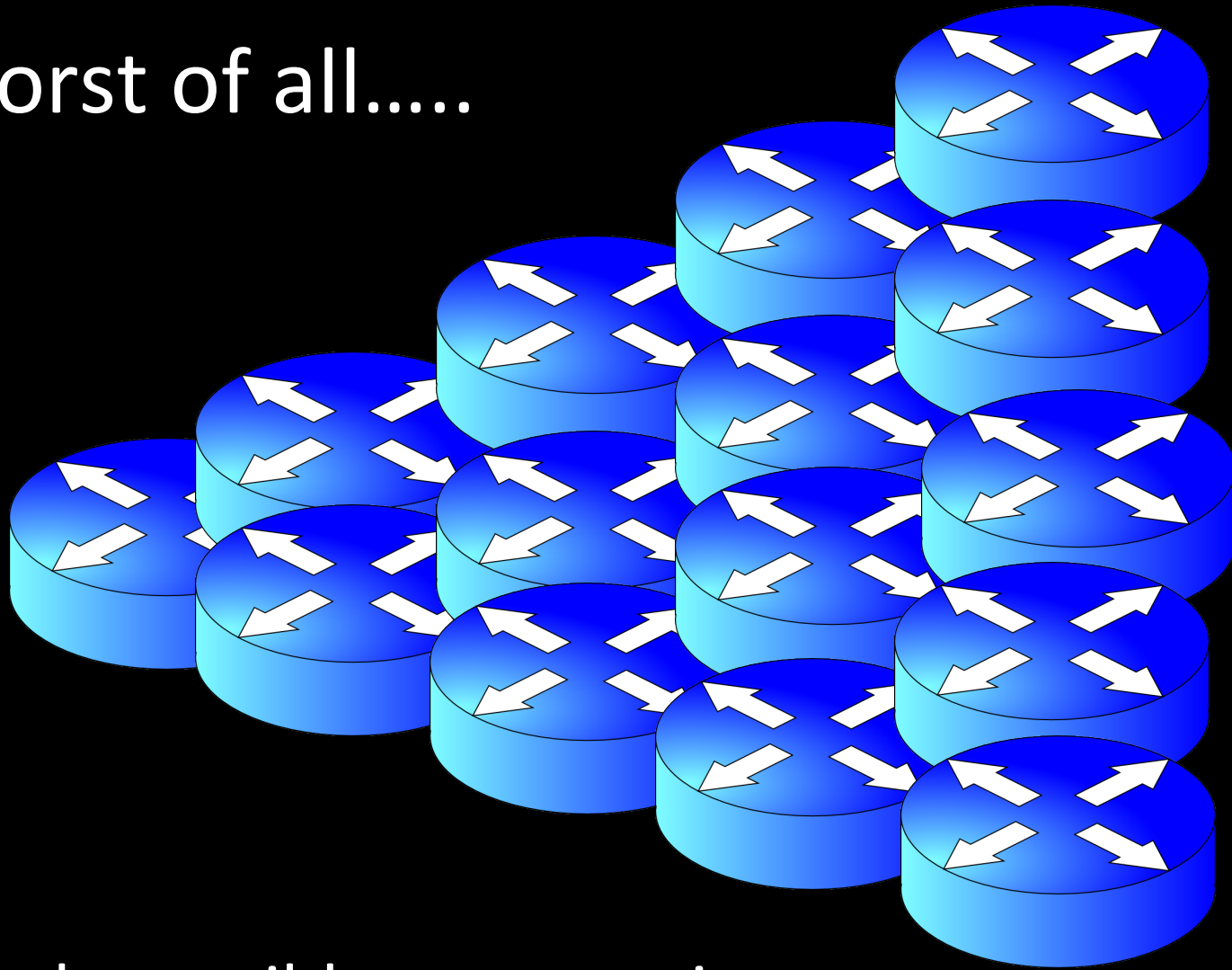
NAT44 – does it pass the test?

NAT 444444444

Not transitional.

Buy now, pay later. And later. And later. Is this your vendor's preferred solution?
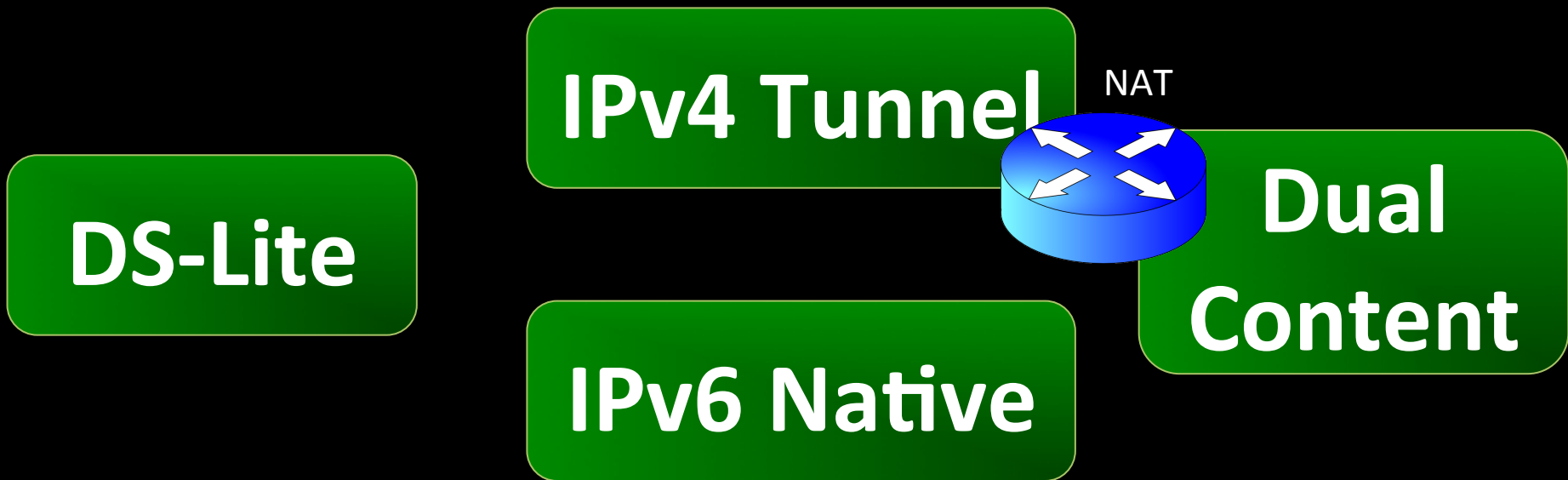
Amazingly, this technology has traction – but even if it could work for access ISPs, what will hosting companies do?

Worst of all…..

The only possible outcome is more
NAT, more boxes, more COST….

DS-Lite – does it pass the test?

IPv4 Tunnel NAT

DS-Lite

Dual Content

IPv6 Native

DS-Lite is non-deterministic.
Where will dual-stack content be routed?
Are you sure? **Always?**

This is where you always want
requests from dual-stacked users to go…

```
ip96-131:~ andy$ dig +short a www.youtube.com
youtube-ui.l.google.com.
173.194.34.70
173.194.34.71
173.194.34.72
173.194.34.73
173.194.34.78
173.194.34.64
173.194.34.65
173.194.34.66
173.194.34.67
173.194.34.68
173.194.34.69
ip96-131:~ andy$ dig +short aaaa www.youtube.com
youtube-ui.l.google.com.
2a00:1450:400b:c00::5d
```
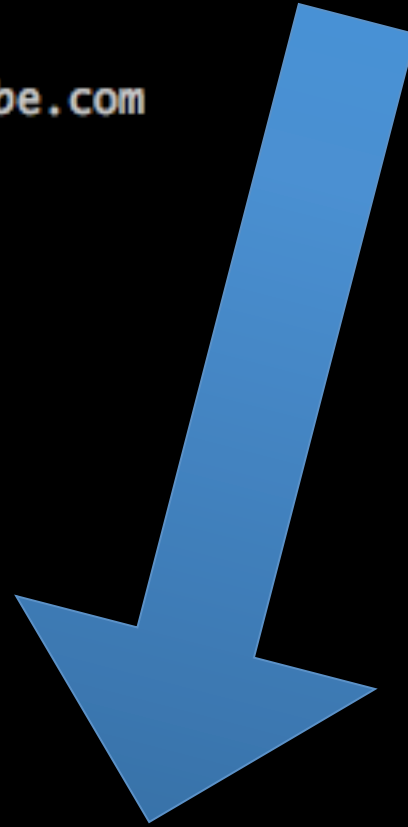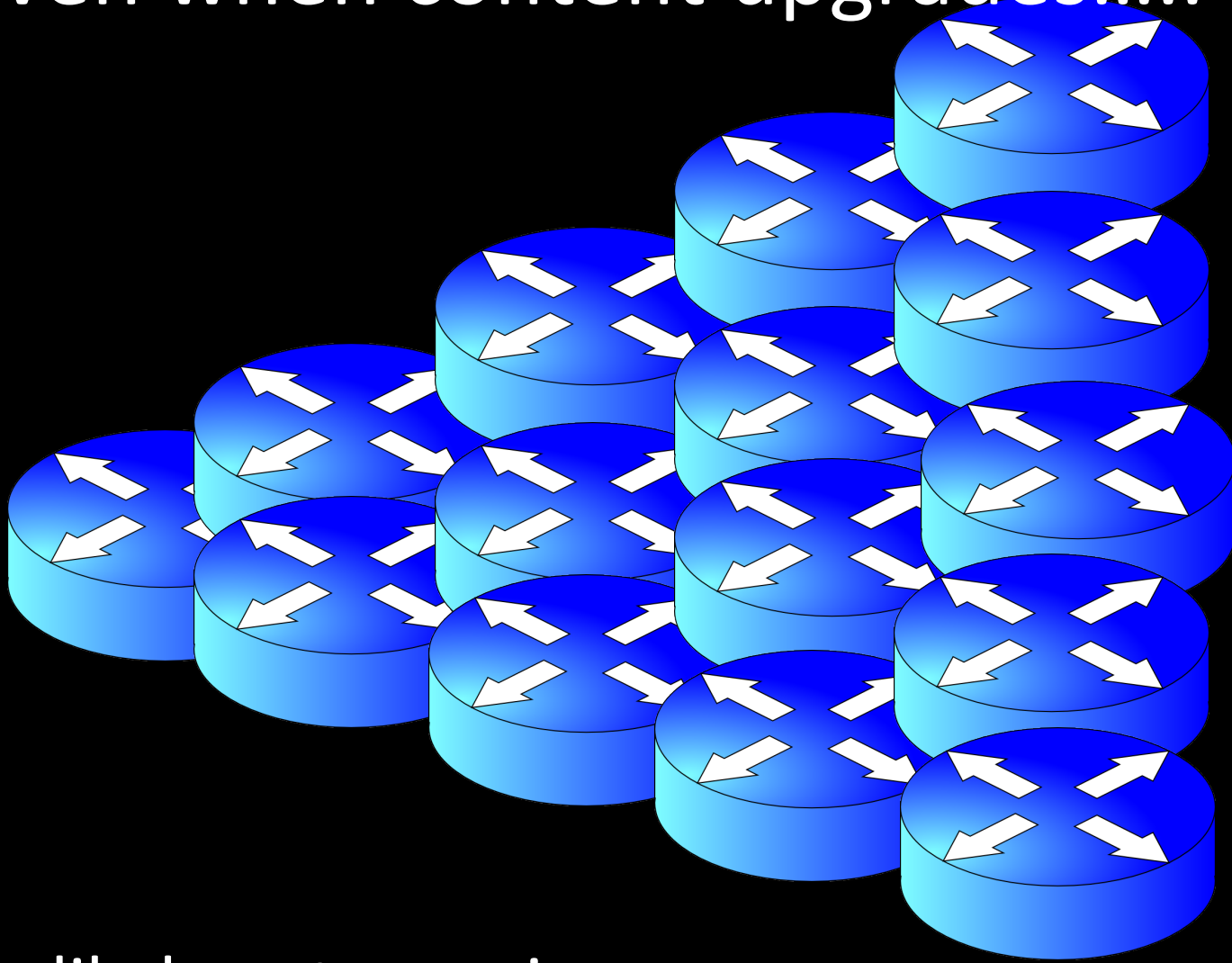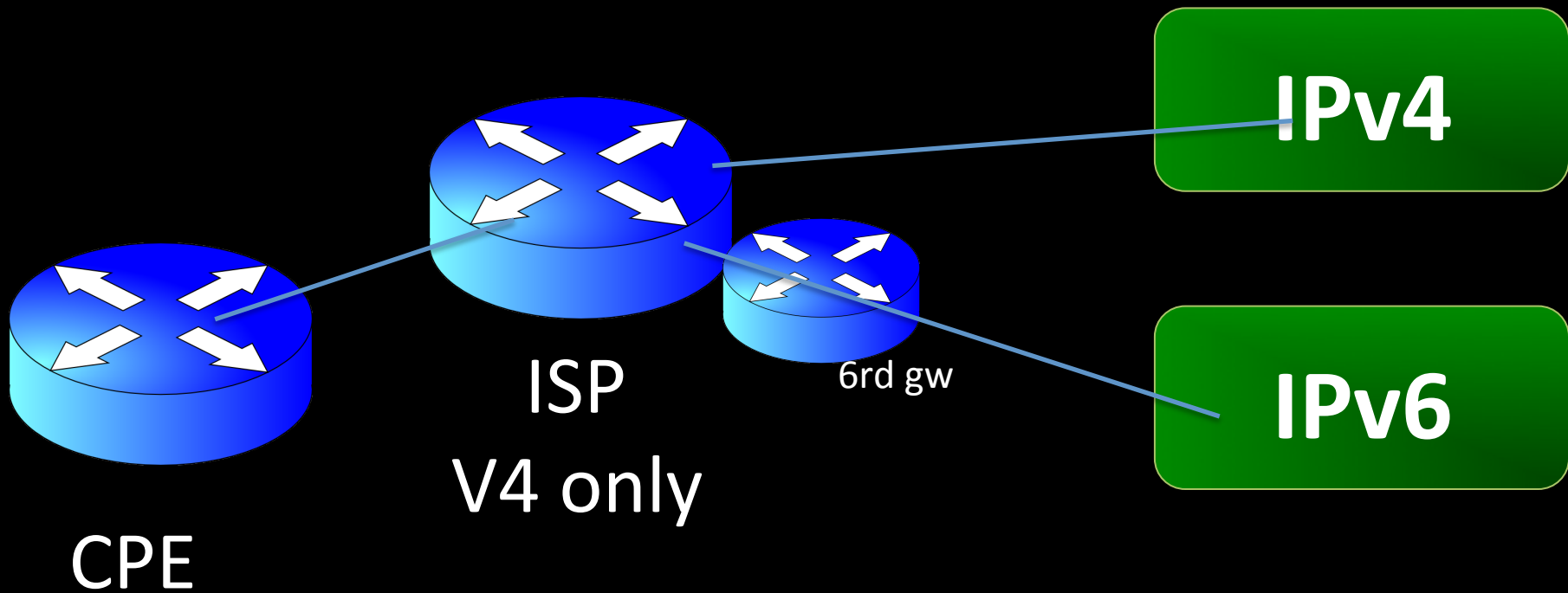
…. In order to avoid the request traversing your NAT
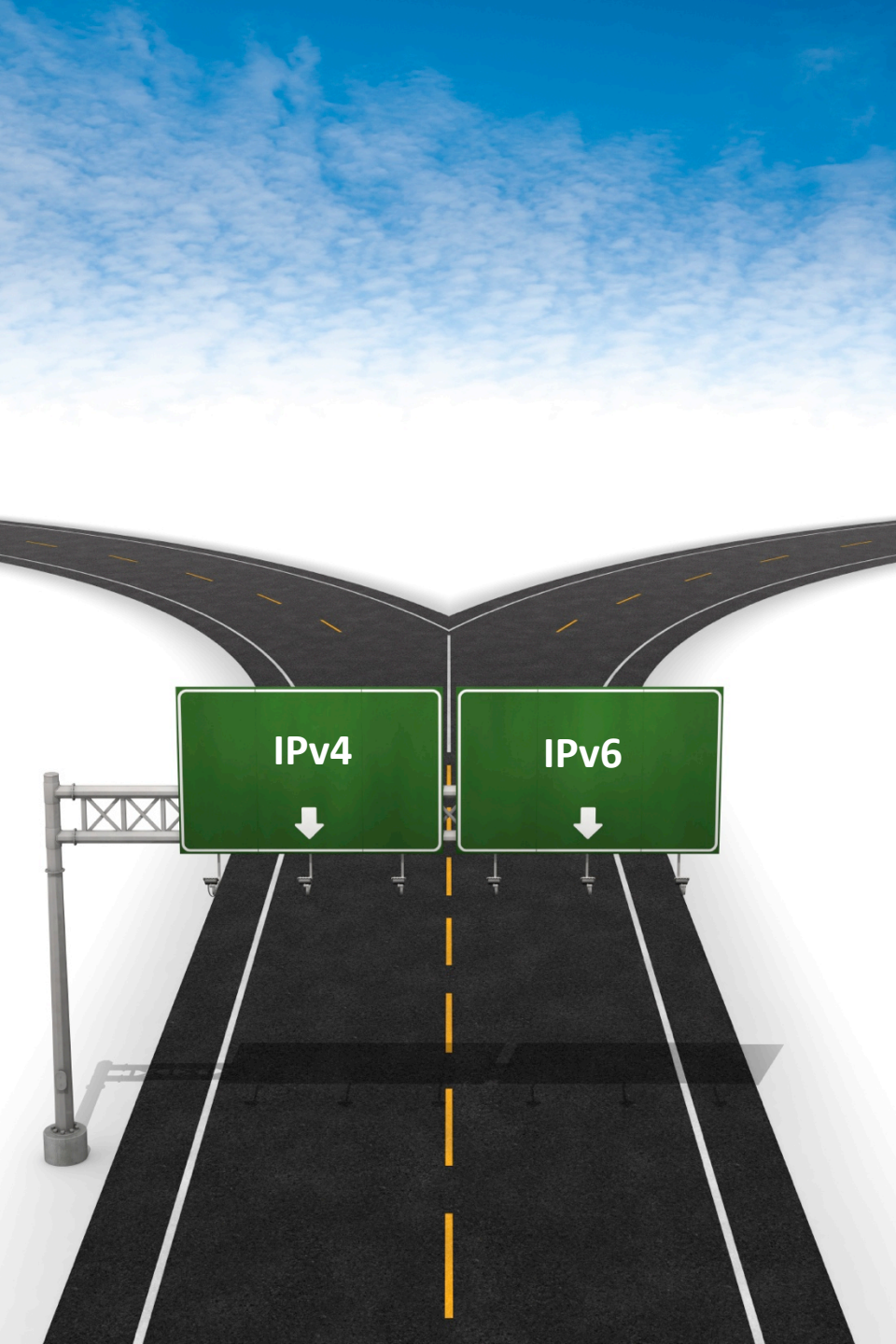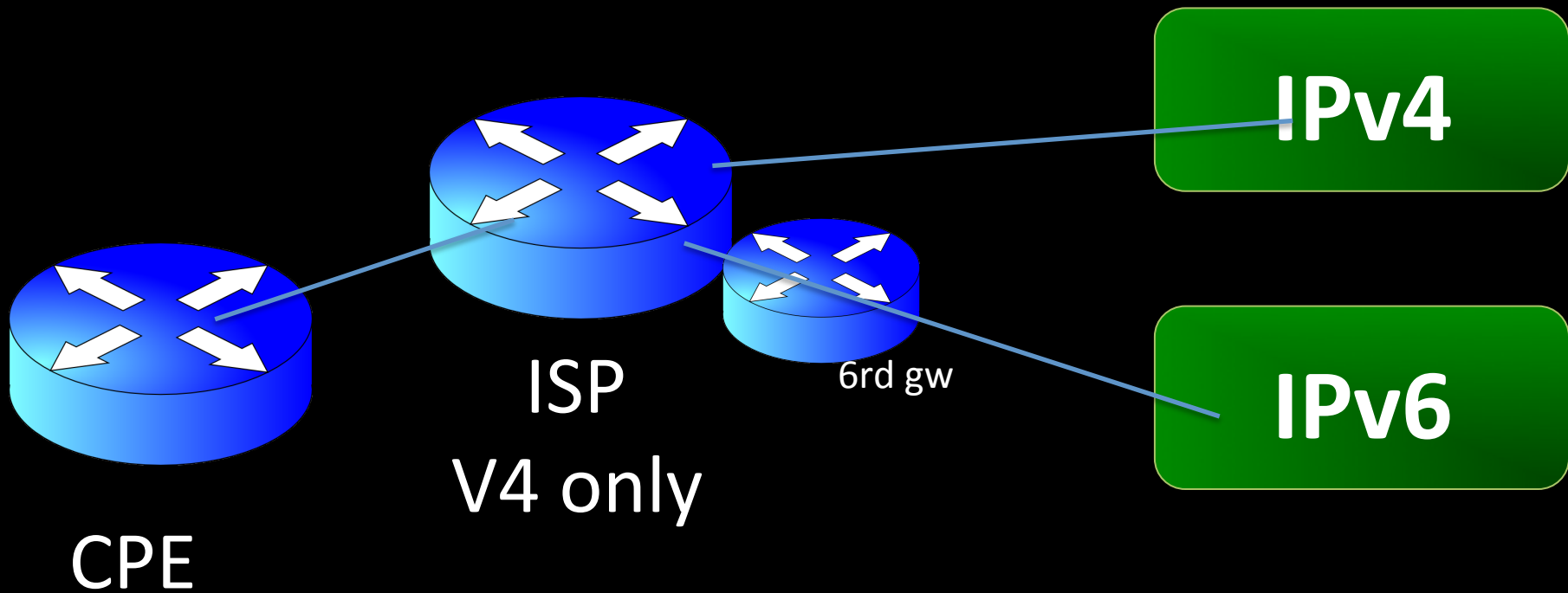
See GeoffTV, RIPE64

So even when content upgrades……

A very likely outcome is more
NAT, more boxes, more COST….

6rd – does it pass the test?
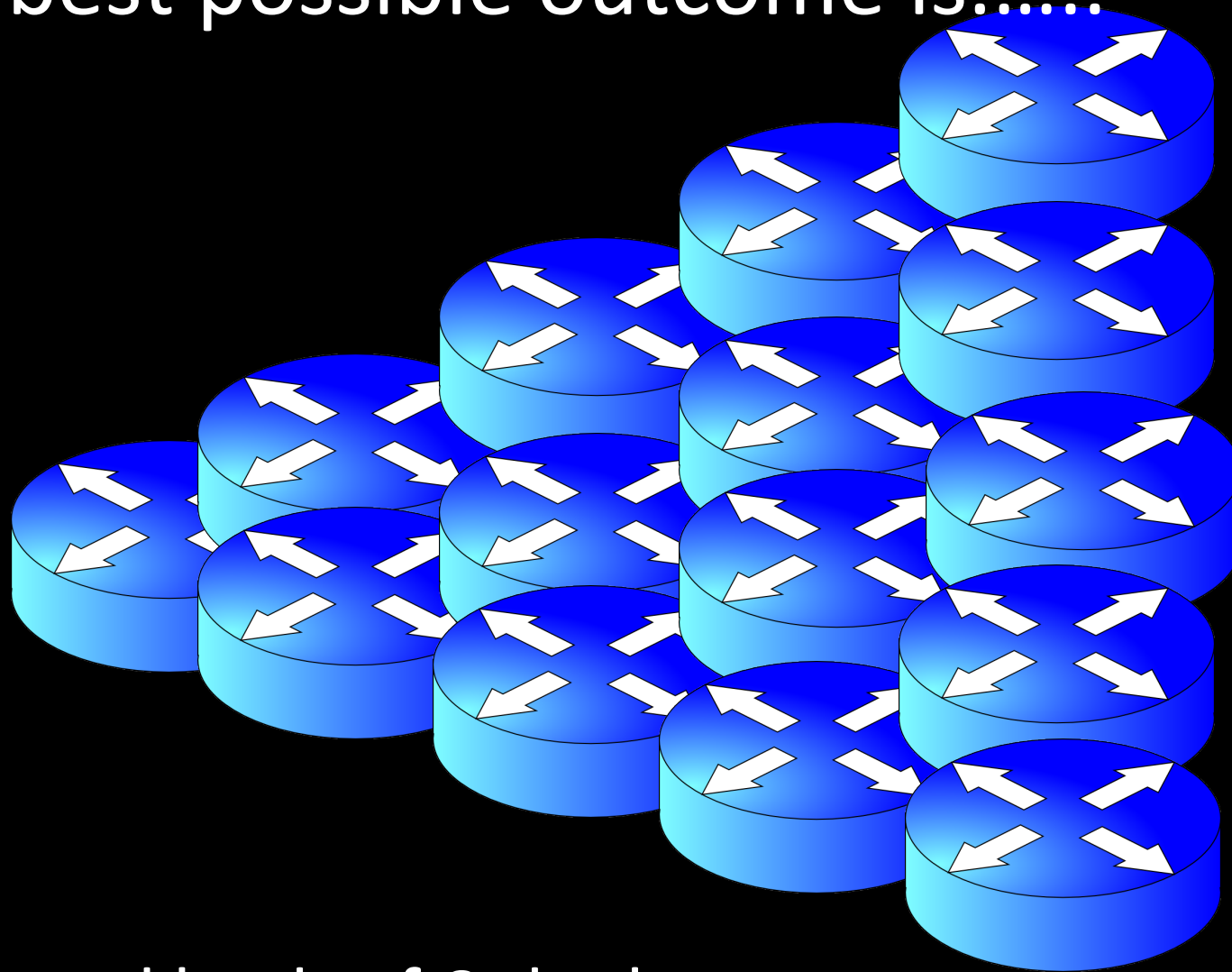
IPv4

IPv6

ISP
V4 only

6rd gw

CPE

Here, the isp has to do extra work, but only for IPv6. What happens when IPv6 traffic grows ?

IPv4

IPv6

ISP
V4 only

6rd gw

CPE

Does this seem counter-intuitive
to anyone in the room ?

The best possible outcome is…….

Loads and loads of 6rd relays
(and complexity, and COST)

MAP

IPv4

A+P-like

Encap V6

V6 native
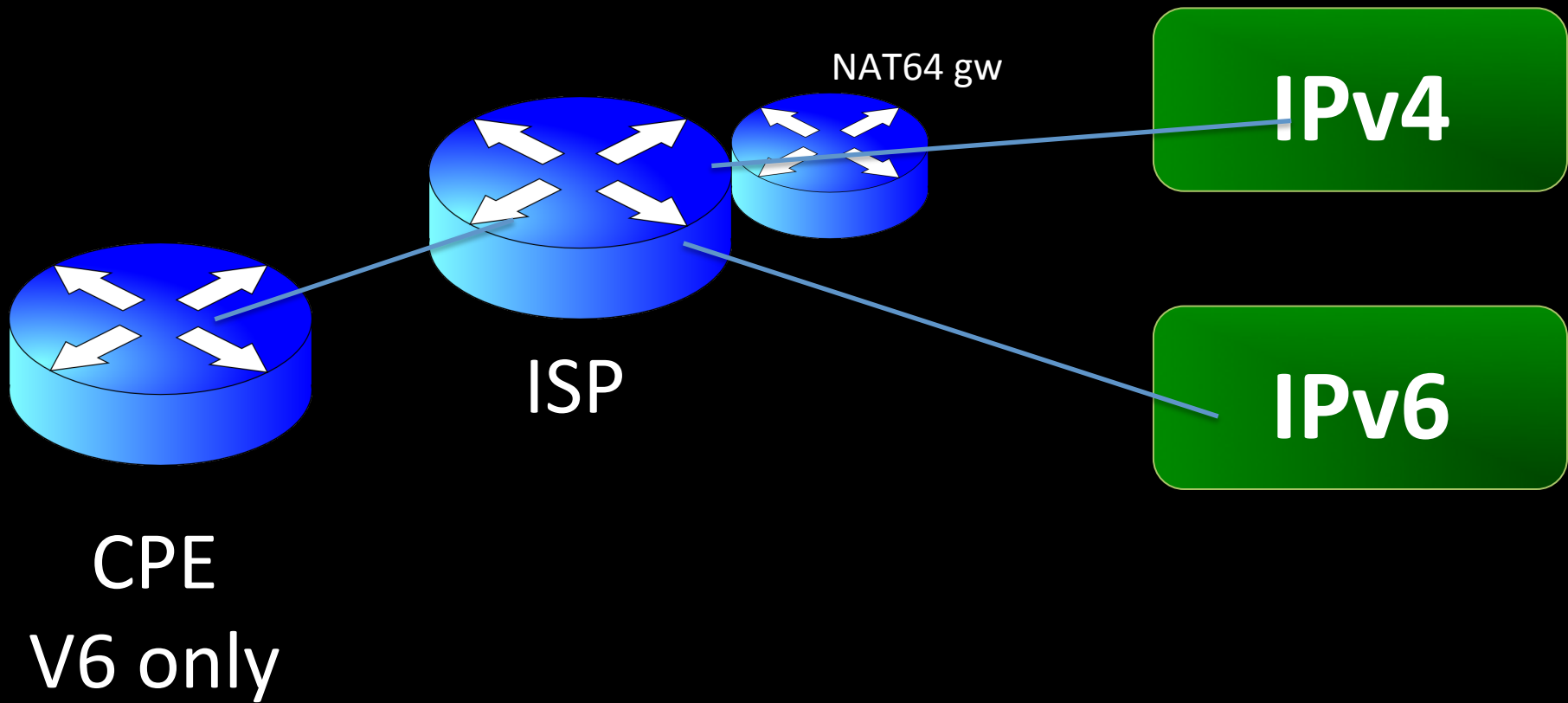
Decap v6

IPv4

Better, but..

Does not address exhaustion

Pointless without dual stack
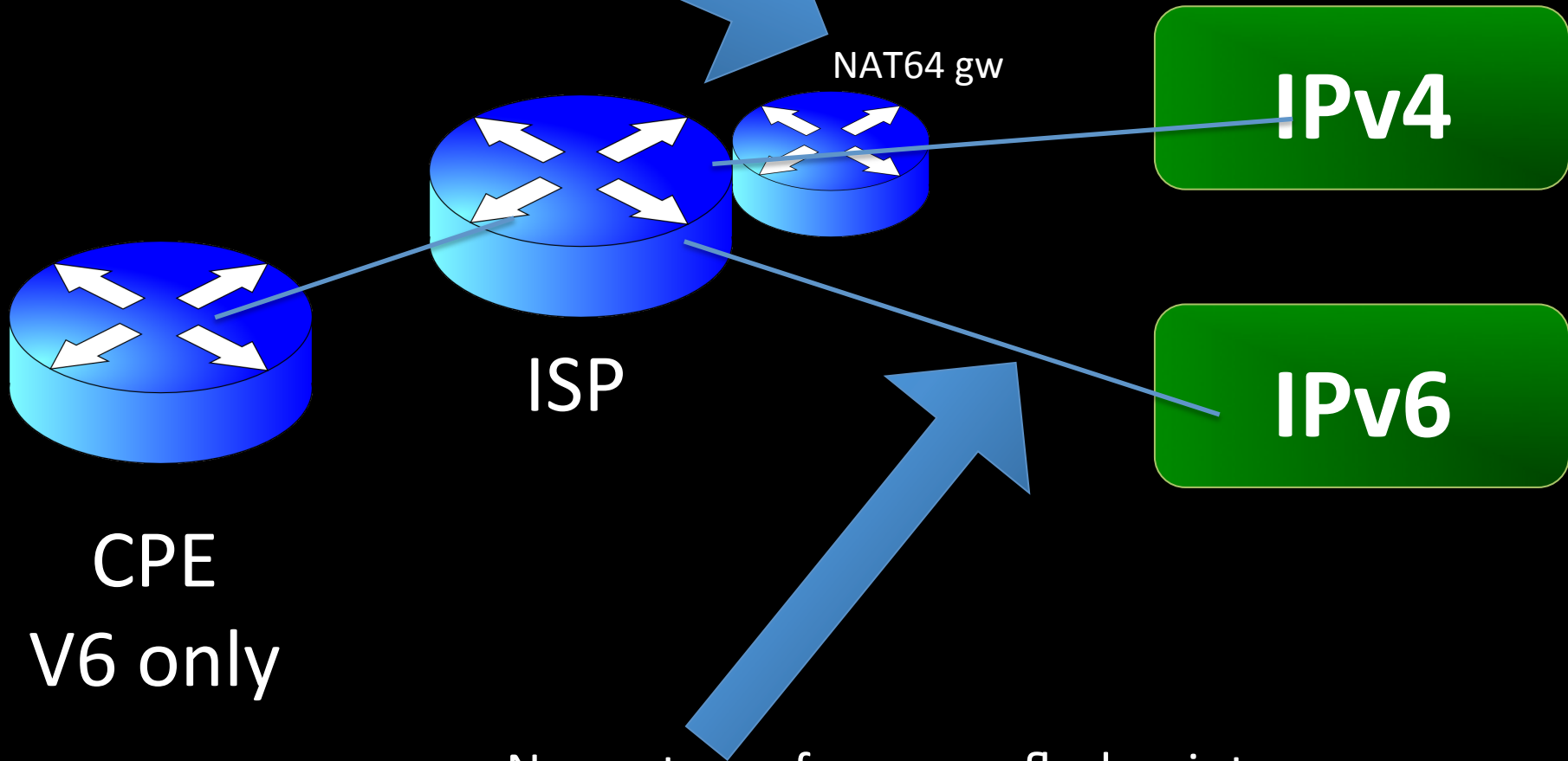
Risk that you still need more boxes

Why is this so hard?

NAT64 – does it pass the test?

NAT64 gw

IPv4

IPv6

ISP

CPE
V6 only

Here the ISP has to translate IPv4 traffic. It's growing today, but what about in the future? Where do we want to end up?

Nasty performance flashpoint

NAT64 gw
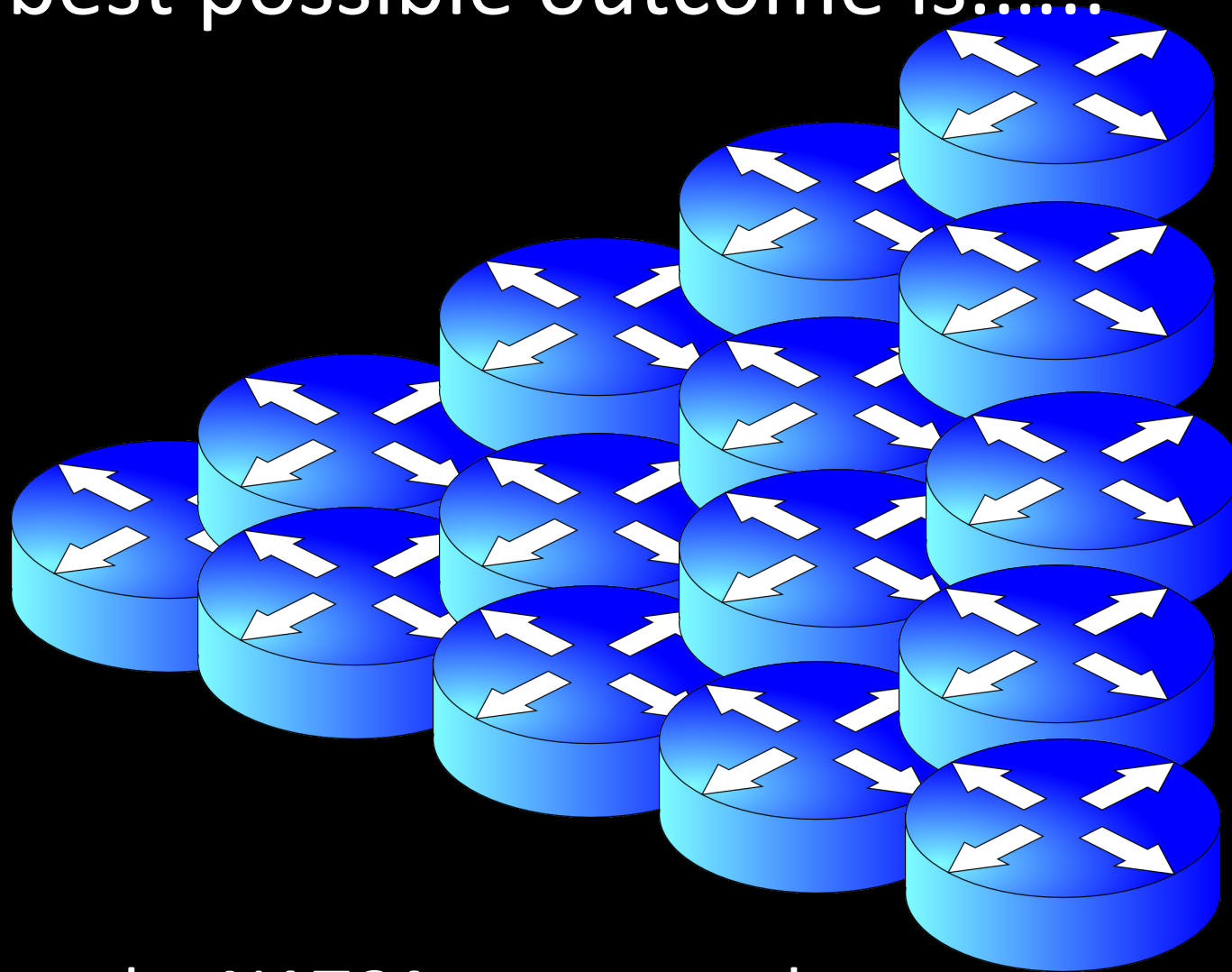
IPv4

IPv6

ISP

CPE
V6 only

No nasty performance flashpoint
… incentive to support IPv6 on content hosts!

A genuine step towards native IPv6.

The best possible outcome is…….

In time, the NAT64 estate can be reduced or even turned off!

But.... The breakages

IP Literals

End to end v4 apps

V4 only hosts

Does this mean all transitional tech is flawed?

No, it means that we get the internet we deserve

Where do we want to be?

Provide incentive for dual-stack content/apps

Attempt to upgrade end users

Any Questions?

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