UKNOF Talk
From Plan A to Plan B

Making IPv6 Real

Sam Defriez – Head of Networks

- Despite the name Community Fibre are not….

- Although we are very proud of our presence within much of London's social housing

- Largest FTTH provider in London
  - Fastest ISP in UK 2018 – thinkbroadband.com speed tests
  - 5 *'s on Trustpilot
  - XGS-PON – alt-net – disruptor?!
- Why IPv6 rollout?

- **What we wanted to achieve**
  - **Roll out IPv6 to our customers without spending money**
  - Best Consumer ISP ISPA award... doh
  - IPv4 is expensive now
  - First step towards a v6 to v4 translation strategy?
  - Nice simple plan A

- **We made some interesting discoveries along the way**
  - Good ways to break your own network
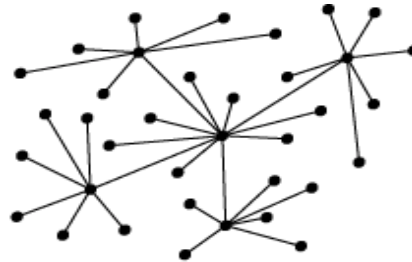 - That the IPv6 internet has some major blackholes

- **Pre-IPv6 Project Network Design:** Distributed DHCPv4 design

- *PLAN A*: Use the cabinet router to provide DHCPv6 with PD to dual stack customers.
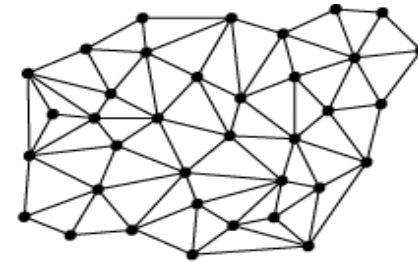 - However we hit a few problems…

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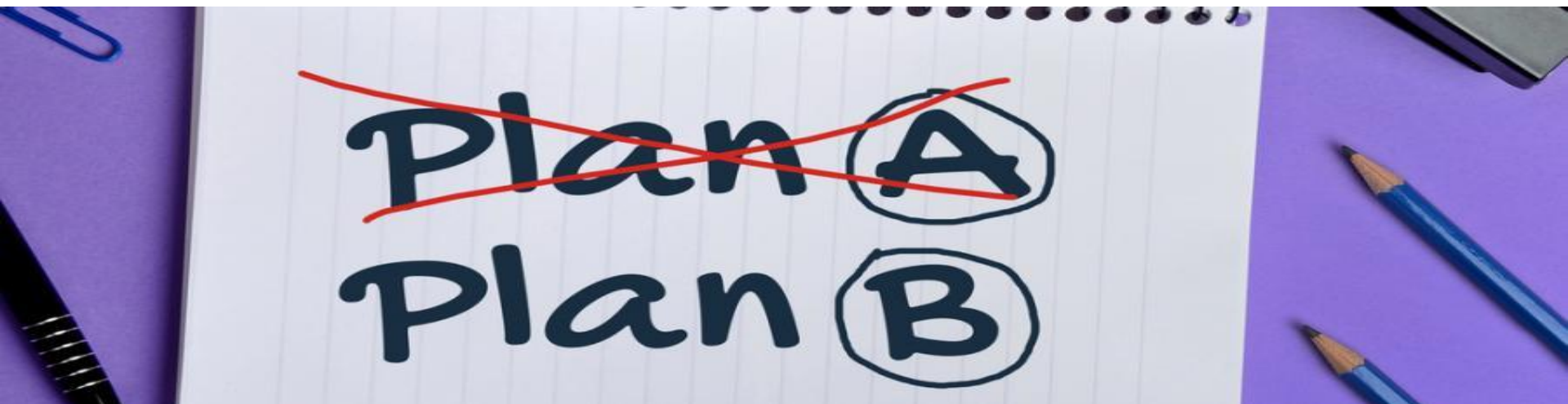
- *PLAN B*: Centralised DHCP design
  - OLT as DHCPv6 relay
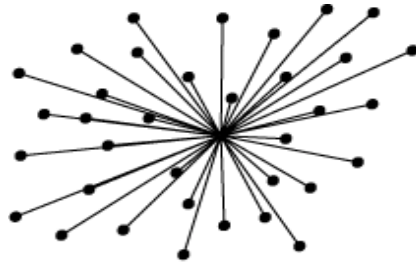
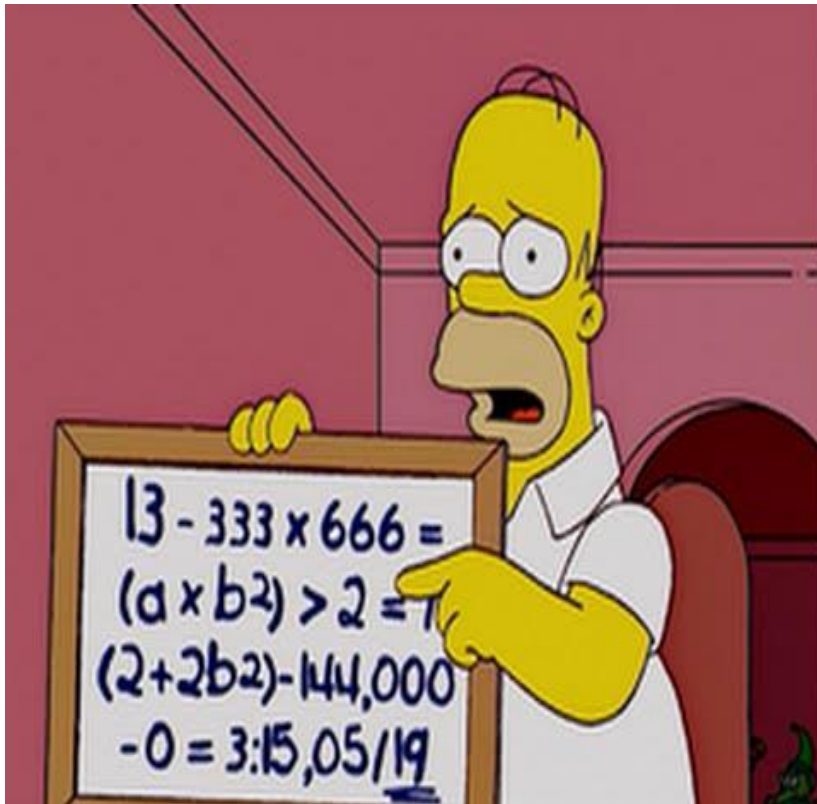centralised   decentralised   distributed

- **Multiple advantages to this centralised design.**
  - Simpler DHCP management, and logging
  - Increased functionality
  - Free options
  - Centralised design (above) looks a lot like our logo

- **DHCPv6 first, DHCPv4 later**
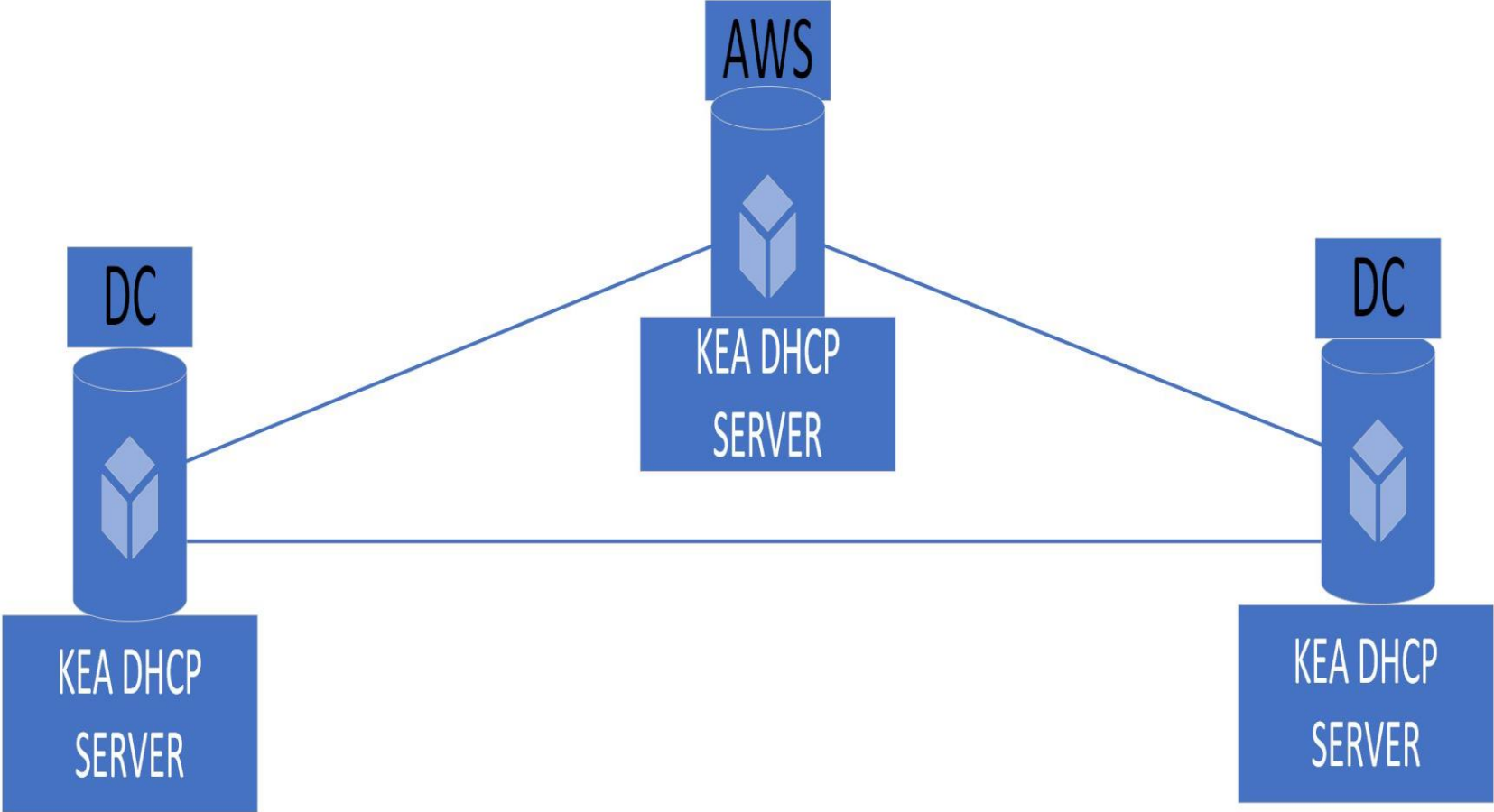
- We have 75 PoPs and a /29 v6 block from Ripe.
  - /48's to our customers

- **More addresses please Ripe**

- **Kea – ISCs newest open source DHCP server**

- **Quickly able to test**
  - Newbie (us) friendly

- **Kea met requirements:**
  - DHCPv4 server
  - DHCPv6 server + PD
  - Static assignments for v4 and v6
  - Forensic logging of customer to IP
  - Redundancy
  - Flexible REST API

Community *Fibre*

- Circa 20% of our PoPs do not have an OLT that supports IPv6 DHCP relay.
- Equipment refresh required
- It's very hard at present to make a case for spending money on IPv6 migration strategies
  - Finance – "How much will it make us?"
  - Engineer – "Nothing at the moment, but at some stage v4 will be deprecated"
  - Finance – "Come back to me nearer to that date."
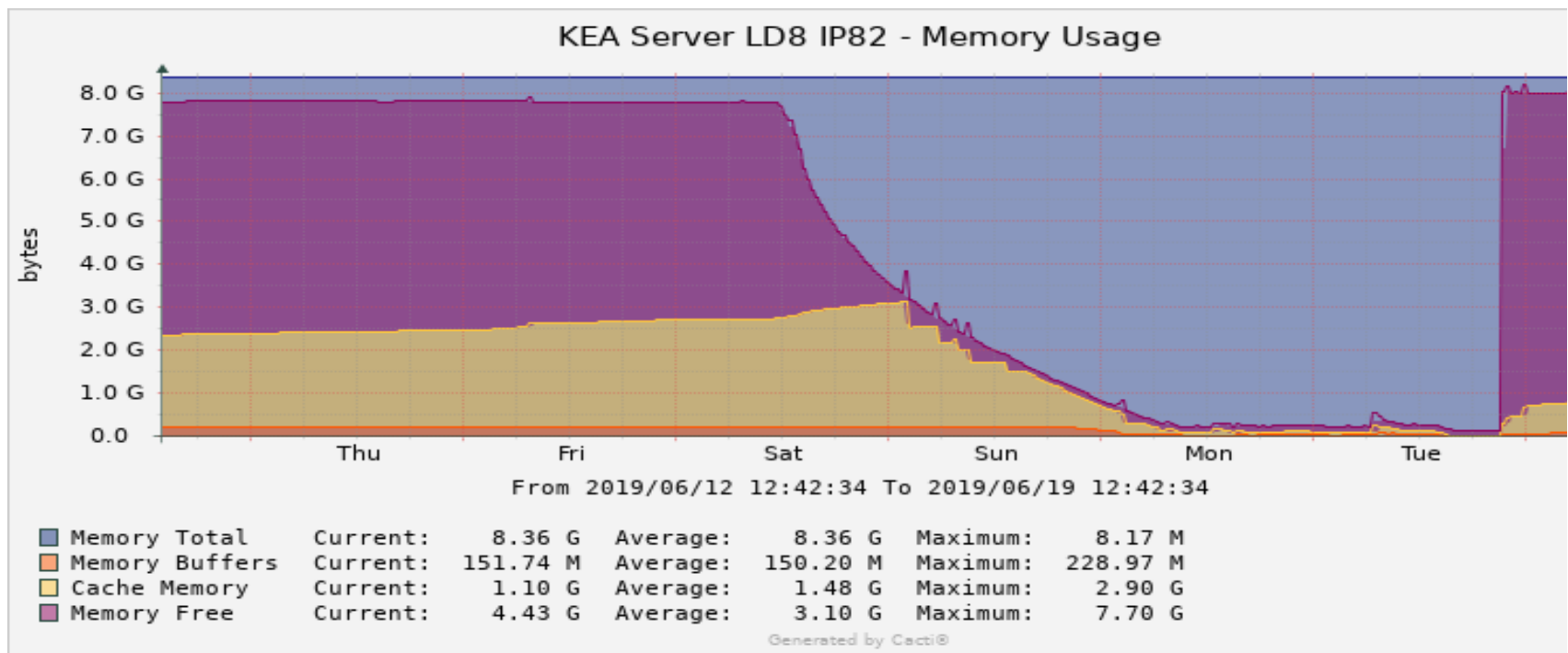- An entirely logical argument.

CommunityFibre

- A few self caused issues. Oops.
  - Automation fail.
  - Gateway address as a lease
  - Swiftly rectified but still...

Where is all the v6 traffic?

2A02::2/64

2A02::2

2A02::3

DOUBLE FACEPALM
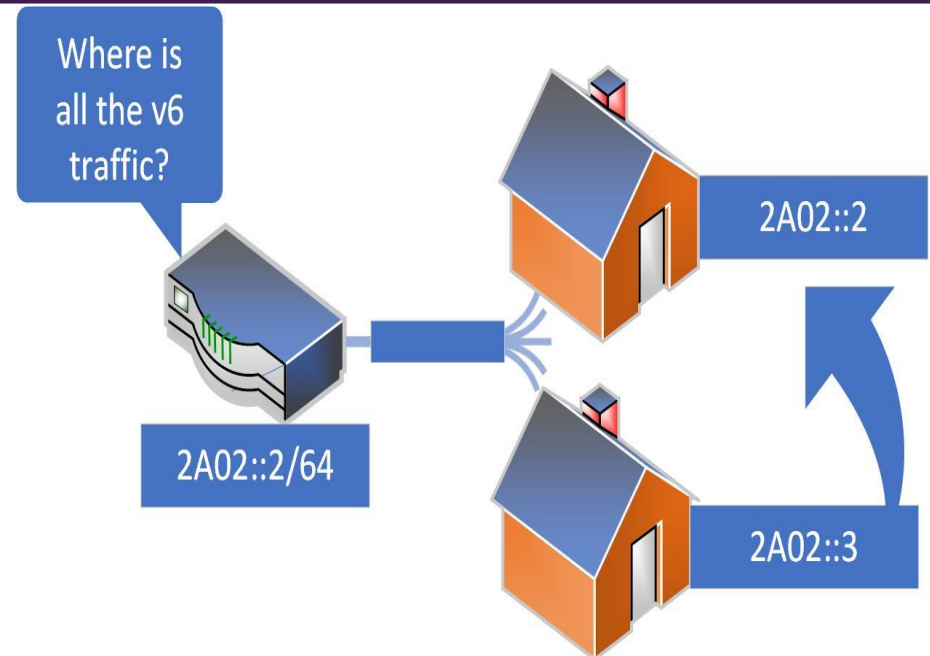
- Cogent!
  - Upon first testing IPv6 in the lab we could not reach Google.
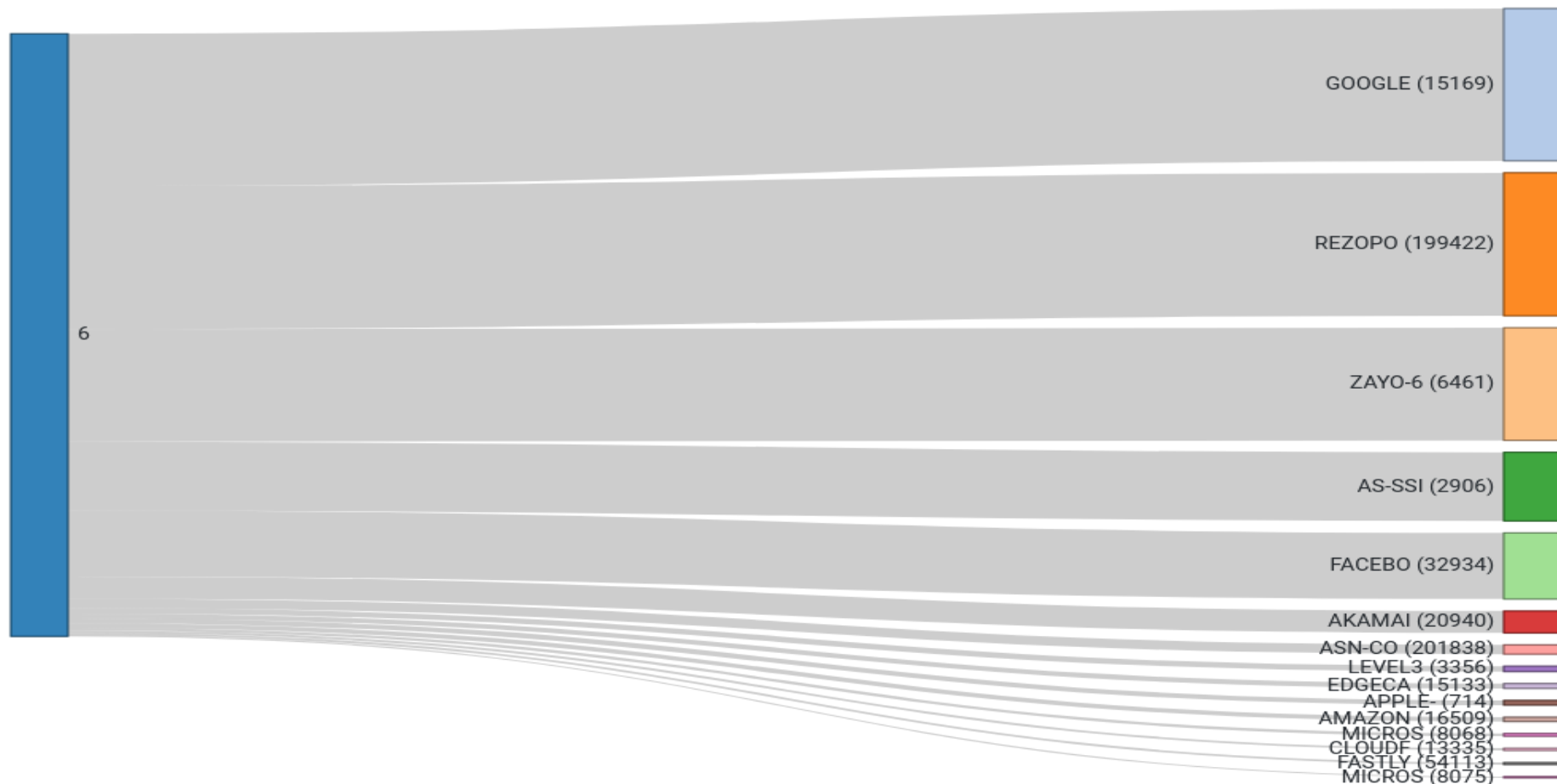 - Cogent blackhole to Google
  - Cake needed?

- # CPU / memory exhaustion
    - 100% CPU use and resulting memory exhaustion.
    - Kea HA bug - issue concurrently handling inbound client requests and partner lease updates in some situations
    - Fixed in v1.6
    - The graph of server death…..

KEA Server LD8 IP82 - Memory Usage

From 2019/06/12 12:42:34 To 2019/06/19 12:42:34

		Current:		Average:		Maximum:	
■	Memory Total	Current:	8.36 G	Average:	8.36 G	Maximum:	8.17 M
■	Memory Buffers	Current:	151.74 M	Average:	150.20 M	Maximum:	228.97 M
■	Cache Memory	Current:	1.10 G	Average:	1.48 G	Maximum:	2.90 G
■	Memory Free	Current:	4.43 G	Average:	3.10 G	Maximum:	7.70 G

Generated by Cacti®

- Around 20% of our traffic now running over IPv6
  - Expected destinations – Google, Facebook, Netflix, Twitch etc.

Top INET Family, Src AS Number by Average bits/s

6

GOOGLE (15169)

REZOPO (199422)

ZAYO-6 (6461)

AS-SSI (2906)

FACEBO (32934)

AKAMAI (20940)
ASN-CO (201838)
LEVEL3 (3356)
EDGECA (15133)
APPLE- (714)
AMAZON (16509)
MICROS (8068)
CLOUDF (13335)
FASTLY (54113)
MICROS (8075)

- We like Kea ☺

- ISC support is superb

- **Key take-aways**
  - Don't set the default gateway as an available lease address
  - Don't rely on Cogent with a default-route for IPv6
  - Do test Kea if you run DHCP servers and see if you like it