Pre 🍴 Talk

working with Akamai

to improve HTTP(S) traffic flows

Thomas Mangin – LINX 97 – 20th and 21st February
Thank you to Ronan Mullally from Akamai Technologies for his help

The players

Ronan Mullally, playing for team

A large CDN, "generator" of "desirable" content

And "Me", playing for team exa networks

An Akamai peer

The game

Better, Happier Peering

Exa Networks

Education & Business ISP
Eyeball Network

10 Gb National Core
- London, Manchester, Leeds ring
- Bradford, Sheffield Q1, more locations soon

100 Gb within POPs (using Arista 7280R series)

DSL/FTTC traffic
slightly over   2/3 comes from Manchester
slightly under 1/3 comes from Telehouse Docklands

Leased Lines
"even split" London, Manchester & Leeds

Dark Fiber
Bradford & Leeds (ATM)

Exa Networks

Most traffic inbound
- **1/3 Akamai**
- **1/3 Google**
- Apple, Microsoft, Netflix, Limelight, Amazon, Facebook
  ("the usual suspects", traffic volume varying depending on the week)
- The *very* long tail

Our own 'in-house' **content filtering** solution
HTTP and HTTPS traffic - proxied & trans-proxied
Bringing back some traffic from London to Manchester

We provide Akamai with some **transit** for their IXLeeds cluster
(As it will be *very* visible on our AS-Stats graphs)
Not selling AS30740 transit otherwise (but friends and family)

Very **open peering policy** (1,000+ IPv4 & IPv6 eBGP sessions)
We may need to reduce the number of sessions at some point

Exchange ▾ ASN	Speed RS Peer
Peering sessions with Akamai	
IX Leeds 30740	10G ○
IXManchester 30740	10G ✓
LINX LON1 Main 30740	10G ✓
LONAP LON0 30740	10G ✓

Looking over a long period

IXLeeds' Akamai cluster sending to Asia, using the transit link we provide them

Change

Some transit | **Much less transit**

KPN | HENET | LONAP | LINX | IXLEEDS | IXMAN | AMSIX | FRANCEIX
JANET | AKAMAI
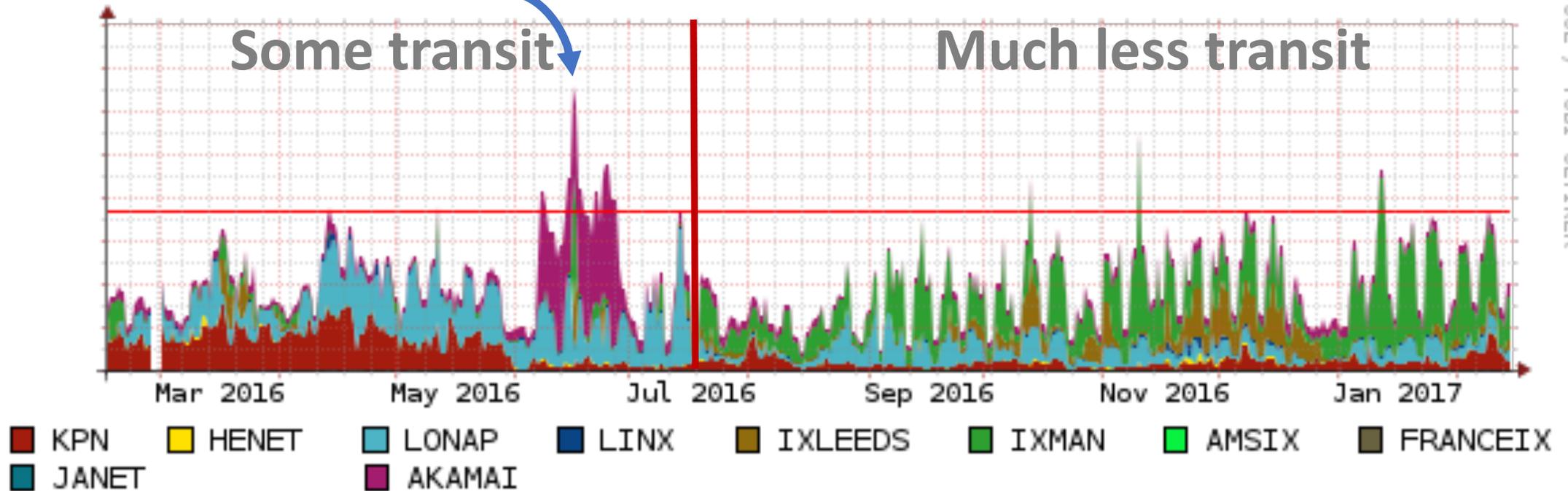
Mostly from LoNAP | **Mostly from IXManchester**

Something happened during the summer 2016 !

~~BGP~~ DNS Based Routing

"Adding" a recursive DNS server per POP, we AnyCasted our DNS service IPs in:

- London
- Manchester
- Leeds

Previously the setup was Active / Passive using LocalPref.

A DNS server failure will cause another POP DNS to be used.

AnyCasting DNS

Eating our own dog food, ExaBGP is used to announce all our /32 service IPs, including for DNS.

Detect DNS failure and stop announcing the service IP should DNS fail to resolve.

Let me Google that for you:
"exabgp healthcheck anycast DNS filetype:pdf"

PowerDNS

And we love PowerDNS / dnsdist. You can do some funky things with it, like use LUA to manipulate DNS answers.

Leeds
Manchester
London

Explanation: from the mouth of the network

(UK peering forum presentation)

How does it work?

The 'secret sauce' of a CDN is its ability to direct end-users to content

We call this Mapping

Proper Mapping makes the world a better place
- better performance
- lower cost
- happy networks
- Happy Users

Akamai maps using DNS lookups
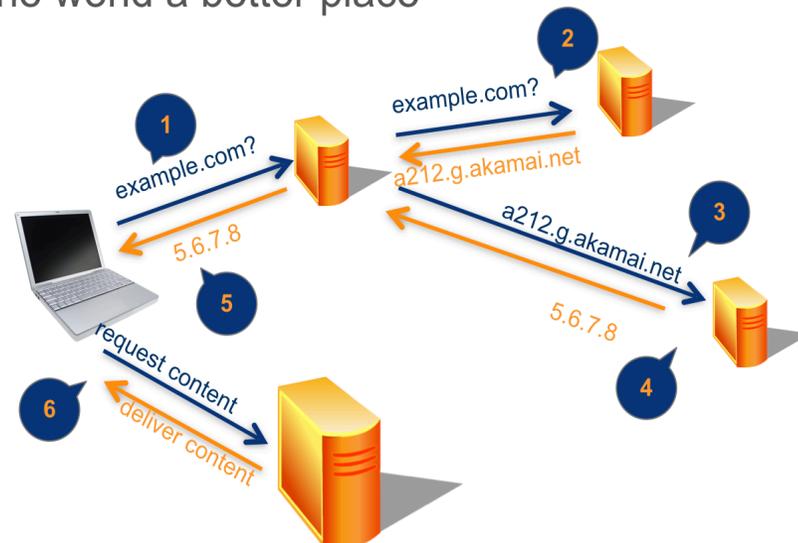
©2015 AKAMAI | **FASTER FORWARD™**

Akamai needs to know where your DNS are
(or they will need to guess from latency)

Your user will be served based on its DNS resolver
(DNS in London or 8.8.8.8, traffic from London)

DNS traffic level matters
If a DNS is not generating enough traffic, it will be consolidated with others.

Akamai monitor and maps your DNS servers
(path taken, latency, packet loss, …)
Packet loss/congestion on a link affect the decision

If you are using RFC 7871, let Akamai know, they may take advantage of it.

Client Subnet in DNS Queries
https://tools.ietf.org/html/rfc7871

AS20940 - Akamai International B.V. - IPV4
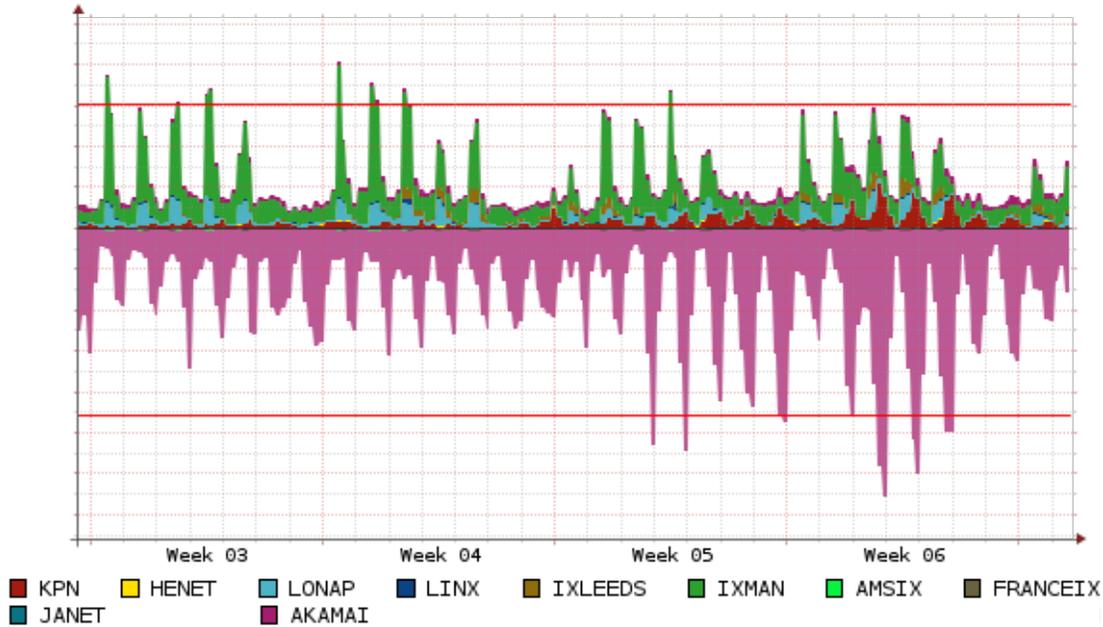
Traffic coming mostly from

1 - IXManchester   (green)
2 - LoNAP   (light blue)
3 - Transit in Manchester (red)
4 - IXLeeds   (brown'ish)
5 - The rest

This and last weeks are "quieter school holiday" weeks but the ratio is still representative.

Trying to understand that data, let's put some price on the 10Gb links:

LON1   - £834 pcm   (£424 LON2)
LoNAP - £375 pcm   (so LoNAP cheaper in London)
IXMan - £350 pcm

Regional peering traffic level is not affected by the price of other IXes.

(sorry for the colours, not my favorite neither!)

AS20940 - Akamai International B.V. - IPV4
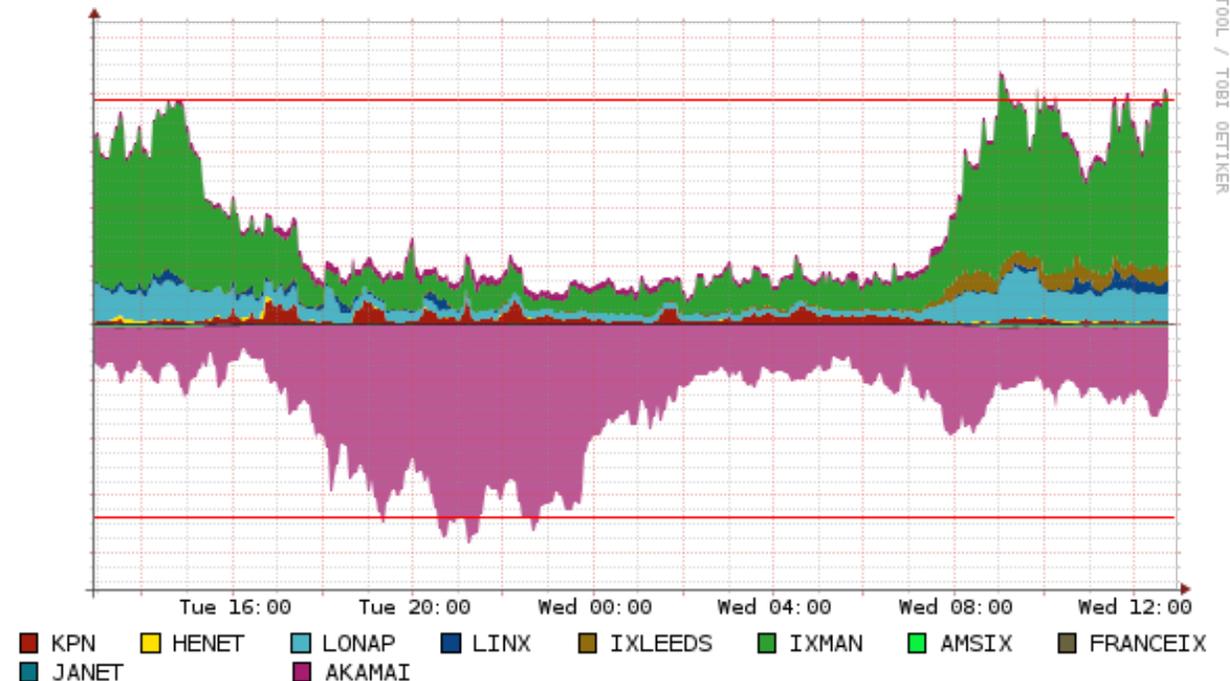
"Surprising" changes
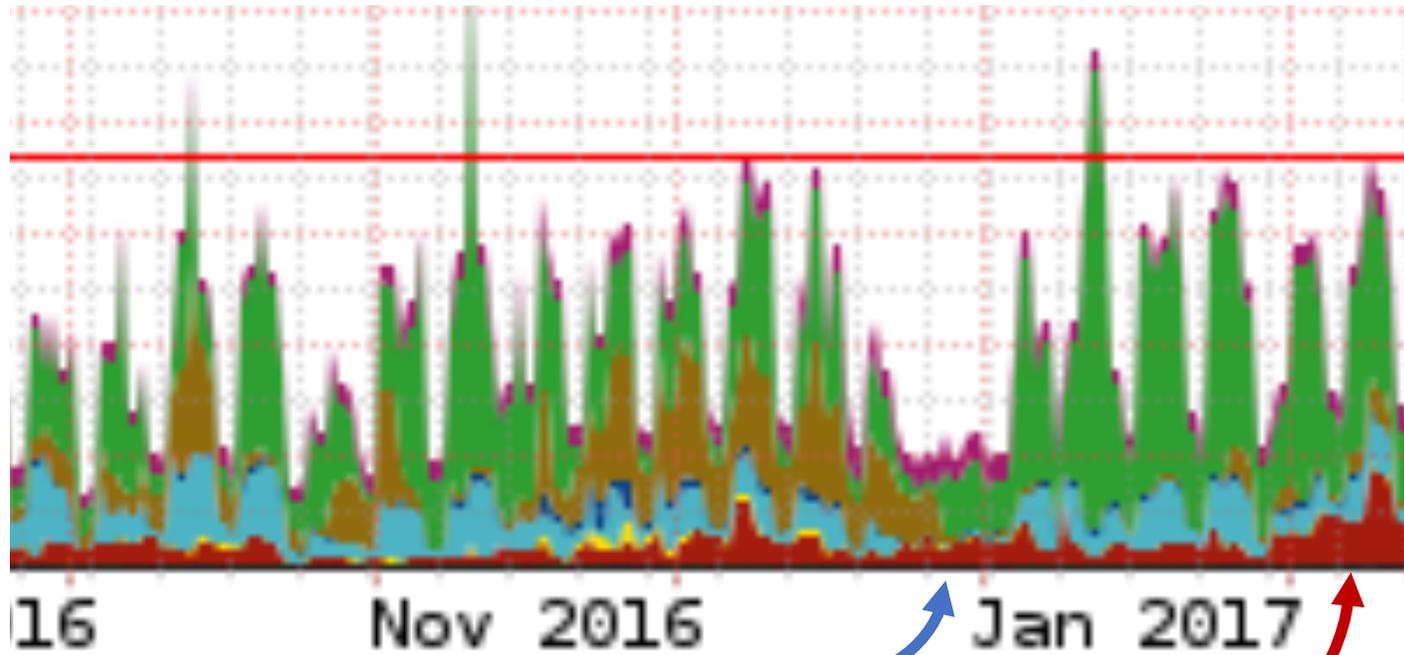
Another change

Most likely as we do not peer in Amsterdam

Akamai most likely decided to consider our Leeds DNS to be "logically" in Manchester (due to low DNS query volume).

Not all Akamai clusters are born equal (content cached, size, etc.).

Akamai's mapping is dynamic and changes to adapt to current conditions

- do not expect notifications
- the beast is "auto-magical"
- a bit like BGP ...

LINX is a great place to catch up with Akamai and discuss their current "policies". Ronan could not be here today but feel free to contact him.

Conclusion

Installing more DNS resolvers …
improved cache locality, making for a better end-user experience

- Moved some flows from London to Manchester
  Reduced our London / Manchester core traffic

- Only worth it if you have multiple peering points
  And eyeballs in different POPs

- If you want more traffic from regional exchanges
  Setup some regional DNS

- DNS failure can cause traffic re-routing
  Changing core link utilisation