None of us really knew what we were doing, we just made it up as we went along.

(Part 3 – Oh God, yes, there's more)

We're careering towards the end of the 1990s – what was happening in the UK Internet scene at the time?

Paul Thornton

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UKNOF43
Manchester
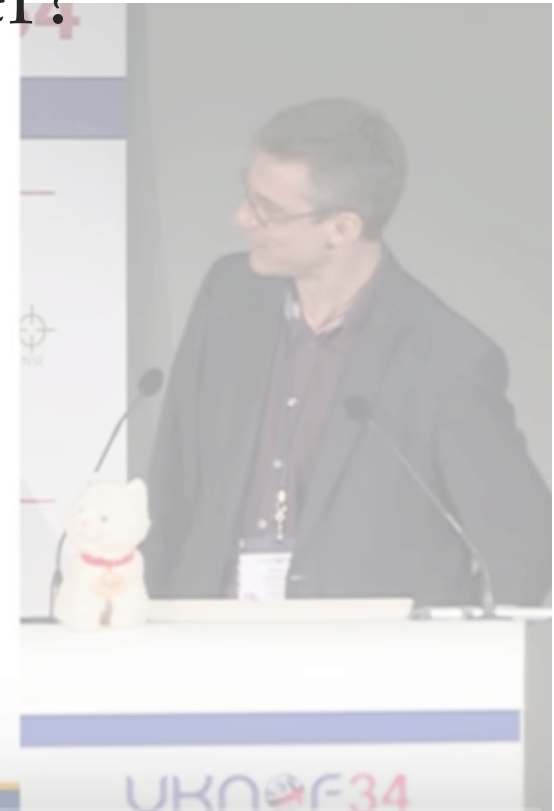*9 April 2019*

Previously at UKNOF34

What did the ISPs of the day offer?

Leased Lines – Older PoPs had Cisco AGS+ routers with about 25 serial ports each, one per X.21 connection.

How did they do it?

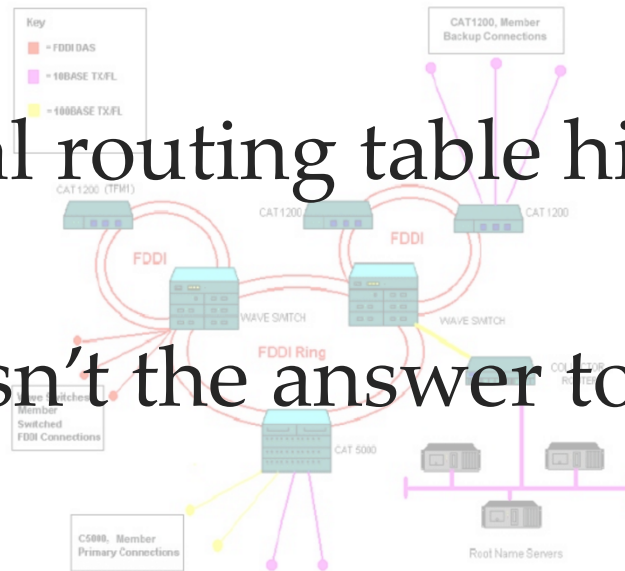Whose kit did they use?

Did it even work?

Previously at UKNOF37

IXPs needed more than 100M

The global routing table hit 50K routes!

FDDI wasn't the answer to ~~all~~ any of our problems

Will this Internet thing make it to Y2K?

AS1290 (again)

I returned to PSINet in 1999 as part of the new datacentre engineering team at the new LHC.

Building a Datacentre - Tips

Don't start with a mothballed office building that's never been fitted out.

It won't have enough riser space.

It certainly won't have enough power.

But it was (apparently) cheap!

Building a Datacentre

So off we went, to see the PSINet flagship DC in Herndon.

Building a Datacentre

So off we went, to see the PSINet flagship DC in Herndon.

It looked pretty decent...

Building a Datacentre

We had this:

We were going to
need to speed up
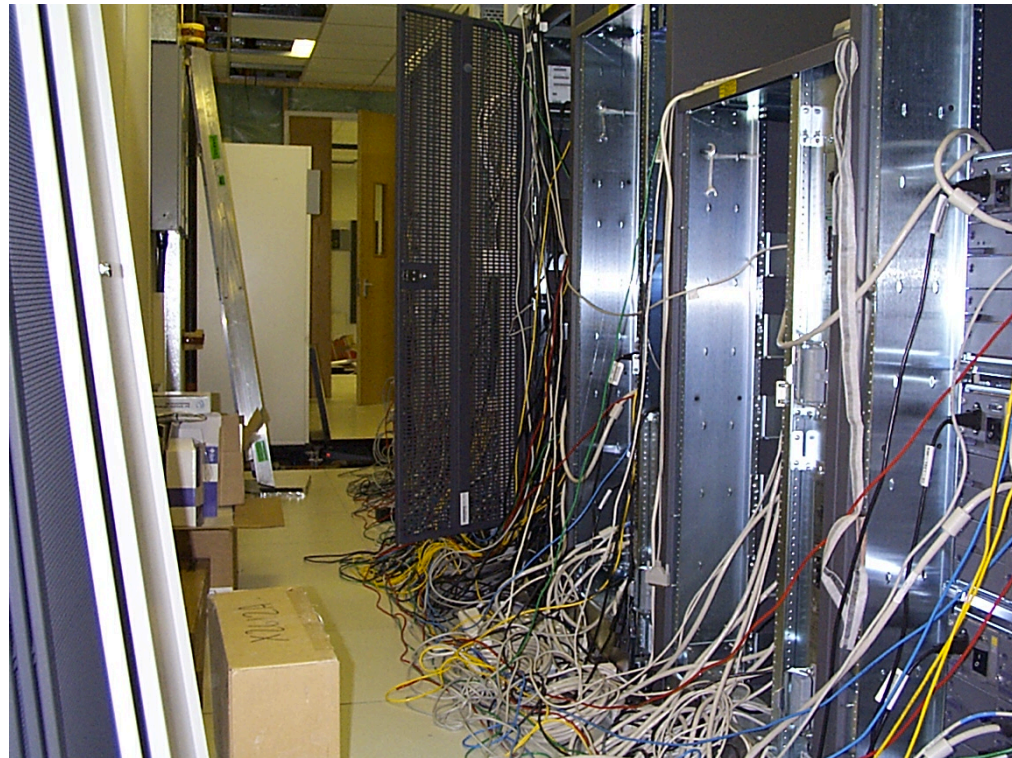the builders.

Building a Datacentre – Progress

We rapidly became involved in the DC fit out.

No good worrying about routers and servers if there wasn't a floor or power.

But, naturally, sales had <u>already</u> sold things that we needed to deliver last week!
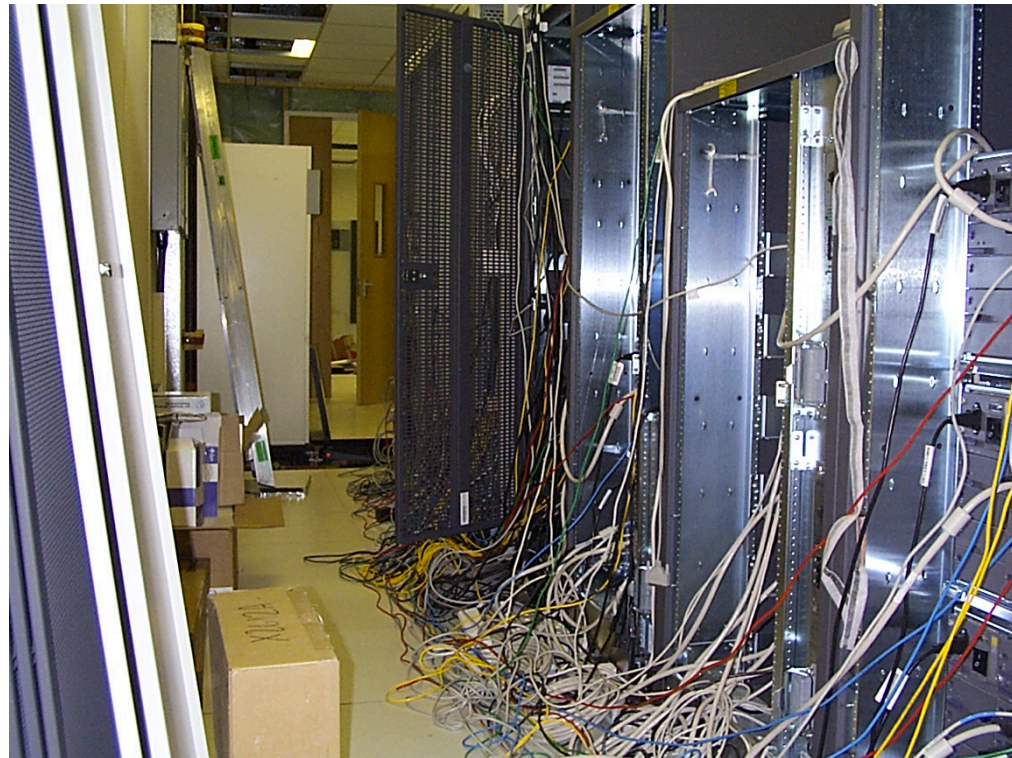
Building a Datacentre

BOO.com – the poster child of the .com era – sprawled messily over several racks in a temporary area.

Building a Datacentre

BOO.com – the poster child of the .com era – sprawled messily over several racks in a temporary area.

All of this kit needed to be professionally cleaned to remove dust – at great expense.

Building a Datacentre – Connectivity

What was the connectivity like?

Initially, a single 45M circuit back to Telehouse, terminated on a 7204. This was limiting.

Diverse dark fibre installed back to Telehouse but the LHC fibre PoP not ready for it (this was all in the days of expensive SDH kit).

Building a Datacentre – Connectivity

So we did what any impatient engineer would do...

I stole a pair of dark fibres and lit it at 1G Ethernet back to Telehouse. Connectivity at >45M solved for the time being.

The PSI fibre NOC were not happy that their fibre had been re-purposed, but they were in Canada so distance was on our side!

Building a Datacentre – Network

What was the network infrastructure?

DC design placed it in its own AS, as a downstream customer of PSI.

Cisco GSR (12000) as border routers.

Extreme switching layer below them.

The GSR was a beast for the time – 2.4Gbit/sec capacity backplane.

Building a Datacentre – Network

The GSR was a beast for the time – 2.4Gbit/sec capacity backplane.

3x one port STM-4 cards

2x one port Gig-E cards
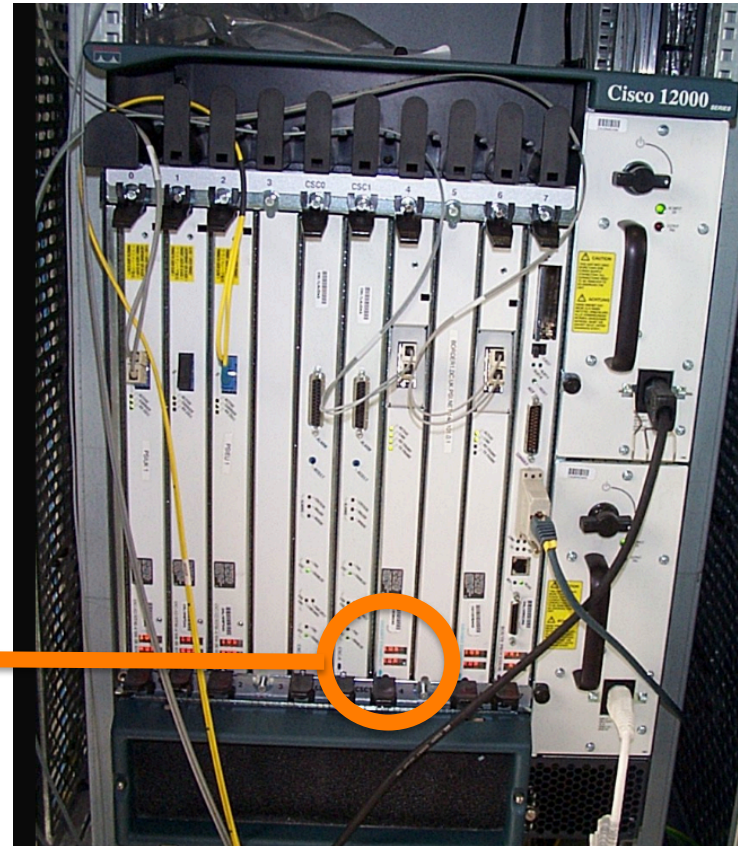
Building a Datacentre – Network

The GSR was a beast for the time – 2.4Gbit/sec capacity backplane.

3x one port STM-4 cards

2x one port Gig-E cards

Line cards had 2x 4 line dot-matrix displays. Normally said IOS RUN … but exposed in MIB …
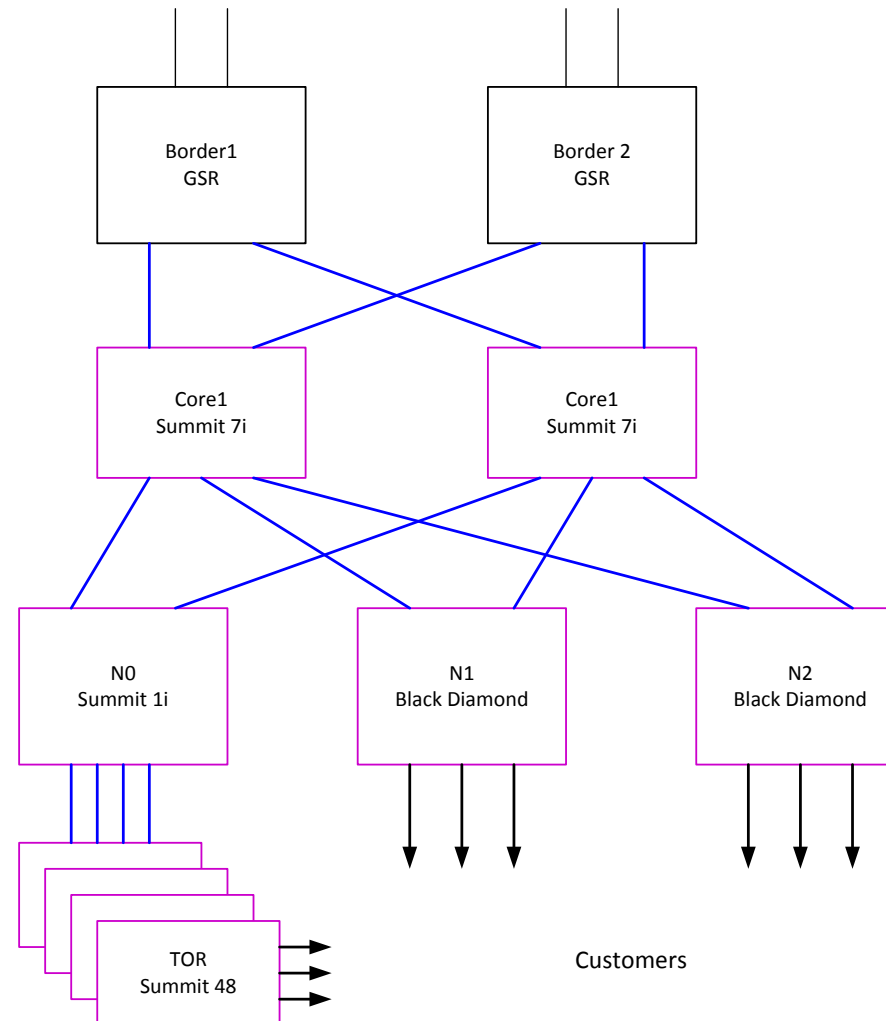
Building a Datacentre – Network

Extreme Summit 7i used as core switches.

We had the concept of 'neighbourhoods' of racks. For open colo areas, a Black Diamond provided lots of 10/100 Ethernet ports.

For dedicated web hosting areas, ToR switches (Summit 48) were used, with Summit 1i as aggregation layer.

Building a Datacentre – Network

Re-drawn from memory yesterday as I couldn't locate anything original.

Border1
GSR

Border 2
GSR

Core1
Summit 7i

Core1
Summit 7i

N0
Summit 1i

N1
Black Diamond

N2
Black Diamond

TOR
Summit 48

Customers

Building a Datacentre – Servers

Managed web servers were Cobalt Raq 2/3, HP Netservers or Sun 250/450.

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Managed web servers were Cobalt Raq 2/3, HP Netservers or Sun 250/450.

Customers offered choice of Red Hat Linux or Windows NT on the HP Netservers.

Load balancing, if required, was F5.

Customer firewalls were Checkpoint/Nokia.

No-one had thought of extra office space or development space for the engineering team.
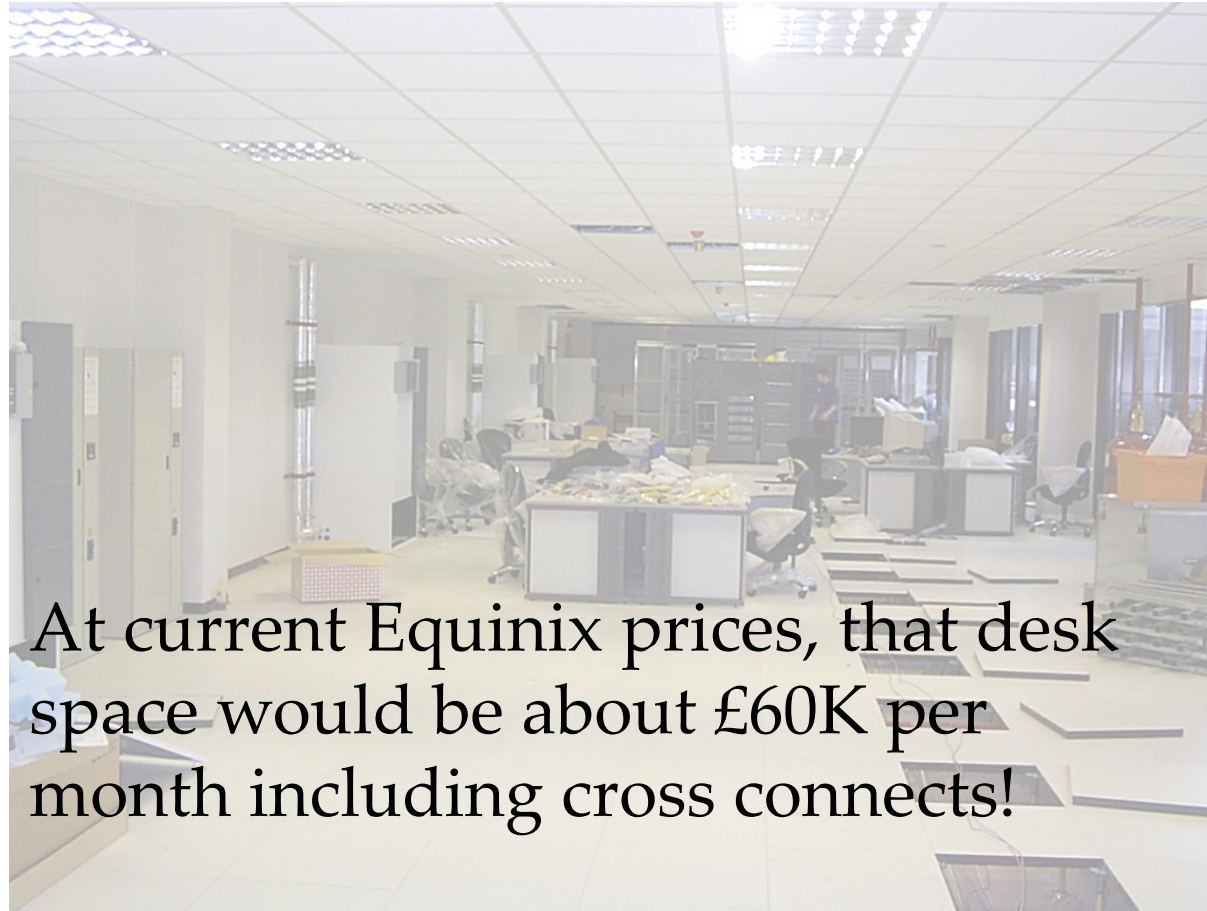
Building a Datacentre

So we built our own on the DC floor.

Building a Datacentre

So we built our own on the DC floor.

At current Equinix prices, that desk space would be about £60K per month including cross connects!

Building a Datacentre – The fun

Film crews were an unexpected bonus

The boat chase scene near the start of *The World Is Not Enough* came through Millwall dock.

Watched from the LHC roof whilst a stuntman dressed as James Bond exceeded the speed limit on the dock.

Sums it all up – there is no escape for you.

Building a Datacentre – Opening

Finally officially opened in July 1999

Official opening required a maintenance staff member sitting on the roof of the lift car to ensure it didn't get stuck and incarcerate senior execs from the US.

We finally ironed most of these problems out by the end of the year.

Y2K

The endless *What If* discussions with consultants during 1999.

Like many others, we were more worried about 2038 than ~~19100~~ 2000.

What happened on new year's eve?

DECEMBER 31, 1999
11:59 PM

JANUARY 1, 2000
12:01 AM

Y2K

The LINX staged a conference bridge for members from around 2230 UTC on 1999-12-31.

I was on it.

By ten past midnight, we'd resorted to discussing the Queen's hat to pass the time.

All that planning clearly paid off.

Football

PSINet were a global sponsor of Euro 2000

This was the first time a major sporting event had a "useful" website.

Football

Due to the restrictive broadcast rights, there was no streaming video or audio.

There was a text running commentary though; plus match fixtures, reports and background information.

Globally load-balanced across 5 PSINet DCs/ PoPs

Football

DNS-based load balancing with F5 Big IP global traffic manager.
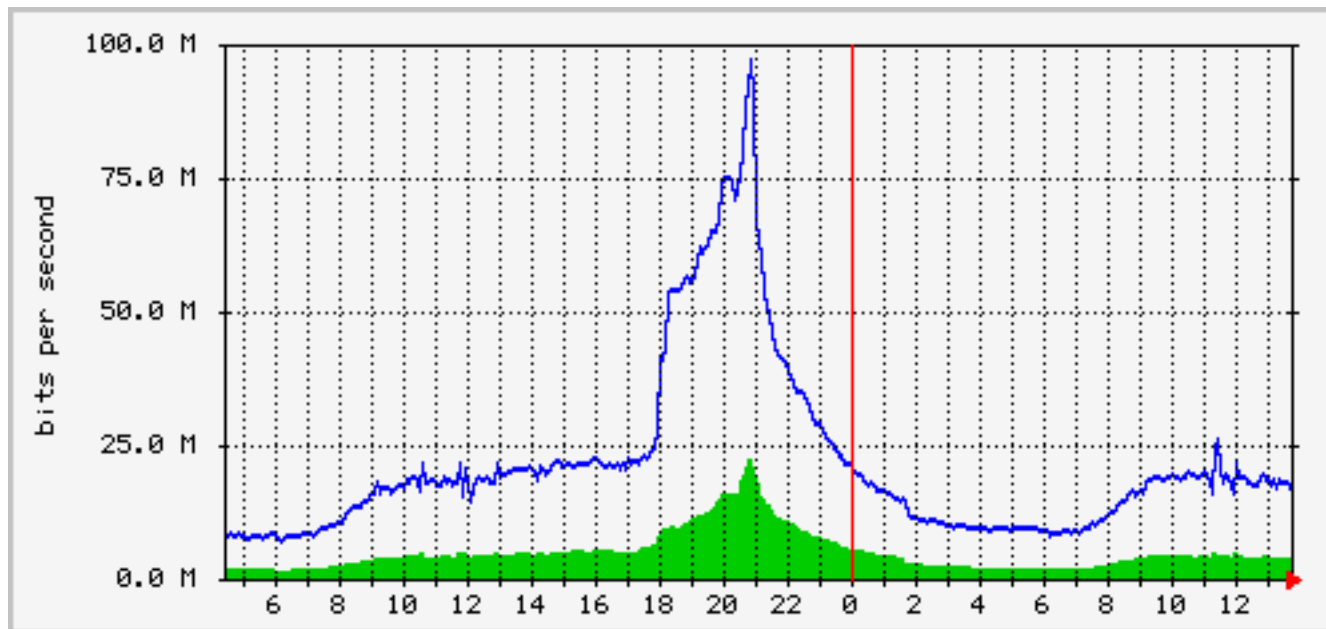
Local load balancing used Arrowpoint boxes.

If I recall correctly, we had some very early adoption of anycast for some server IP addresses across PSI's network.

Football

A whopping 1Gbit/sec of total capacity available.
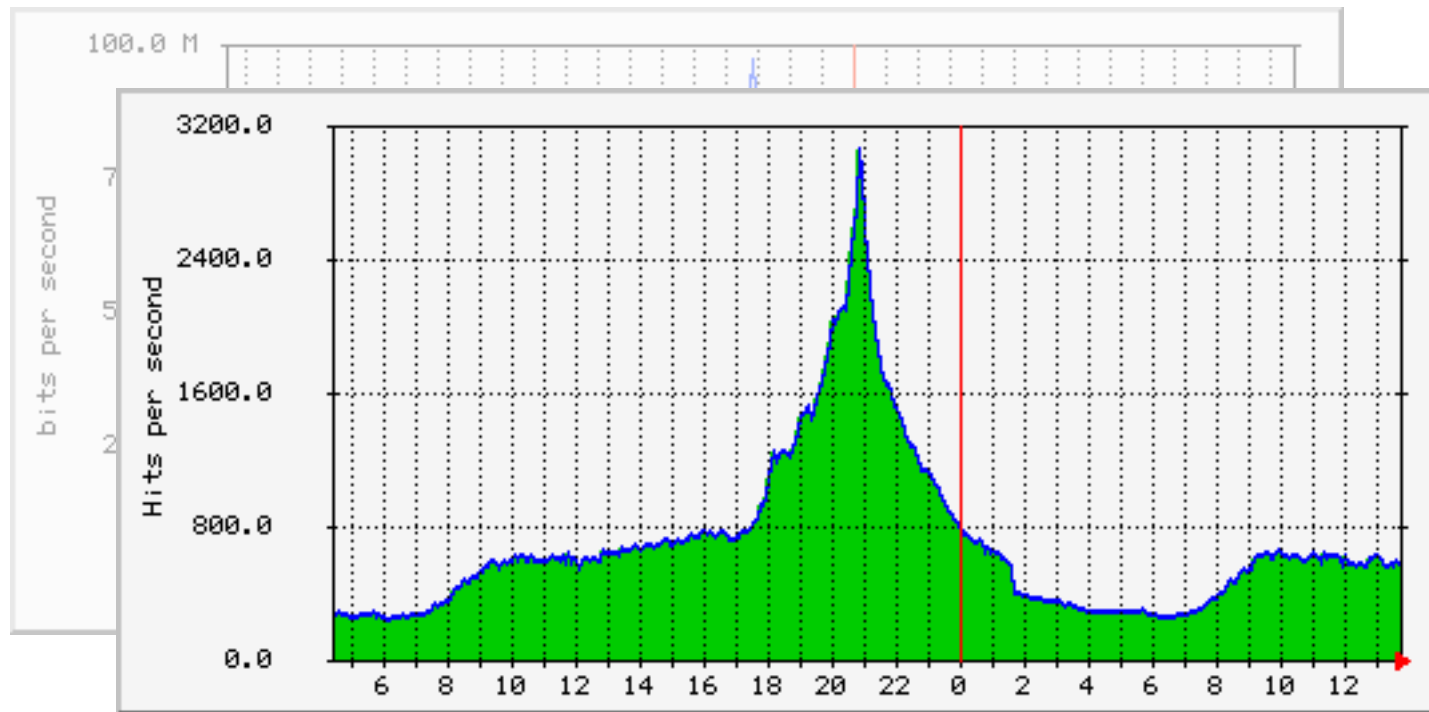
Football

A whopping 1Gbit/sec of total capacity available.

And it used just under 100Mbit/sec

Football
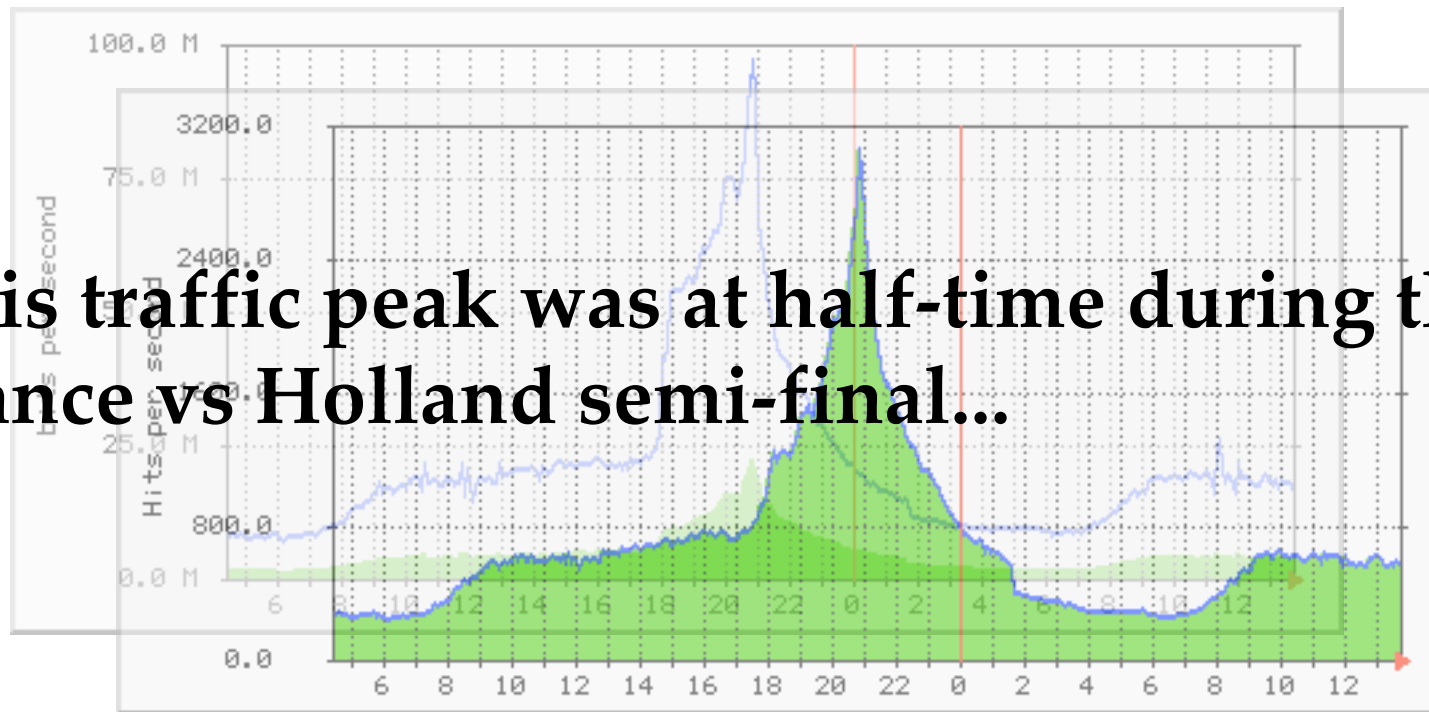
A whopping 1Gbit/sec of total capacity available.

Peak web traffic was ~3k hits /sec.

Football

A whopping 1Gbit/sec of total capacity available.

This traffic peak was at half-time during the France vs Holland semi-final...
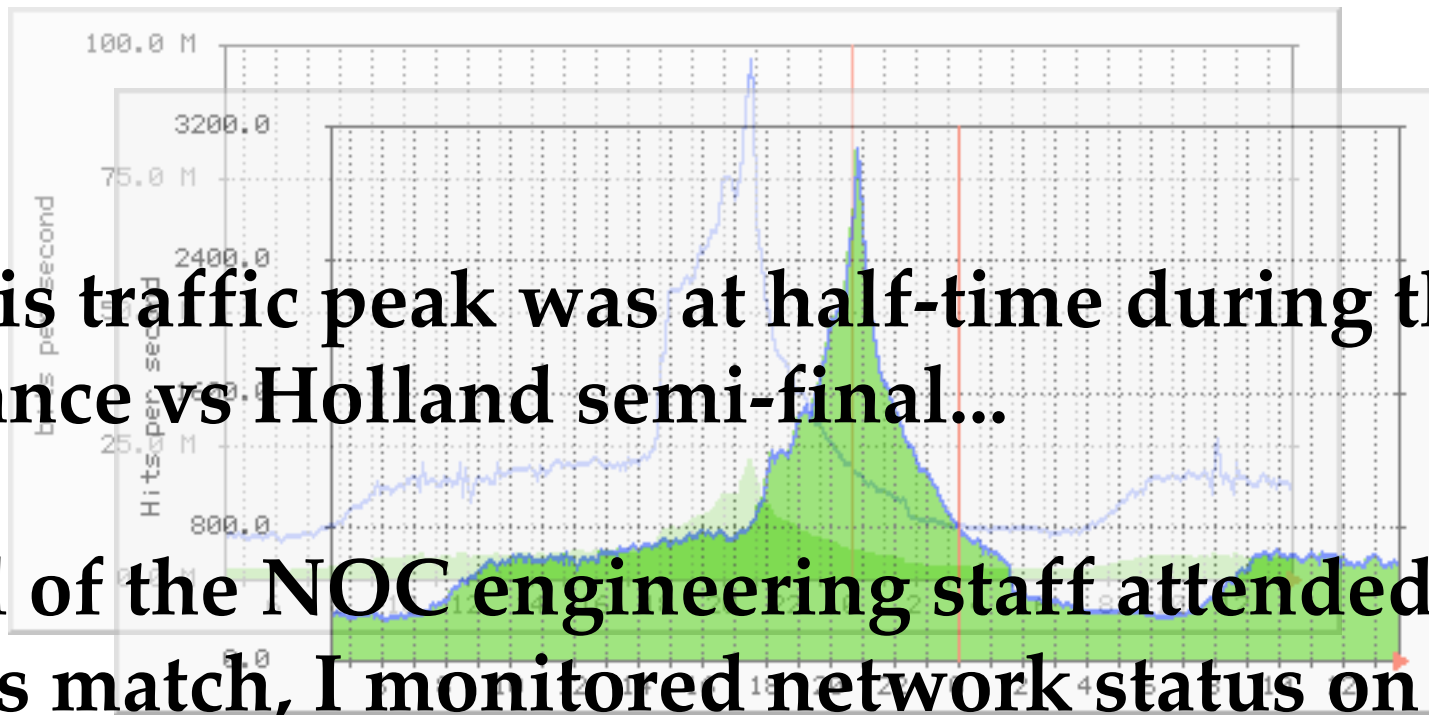
Football

A whopping 1Gbit/sec of total capacity available.

This traffic peak was at half-time during the France vs Holland semi-final...

All of the NOC engineering staff attended this match, I monitored network status on a Nokia Communicator by my feet.

Football

For those of you who can't (or won't) remember...
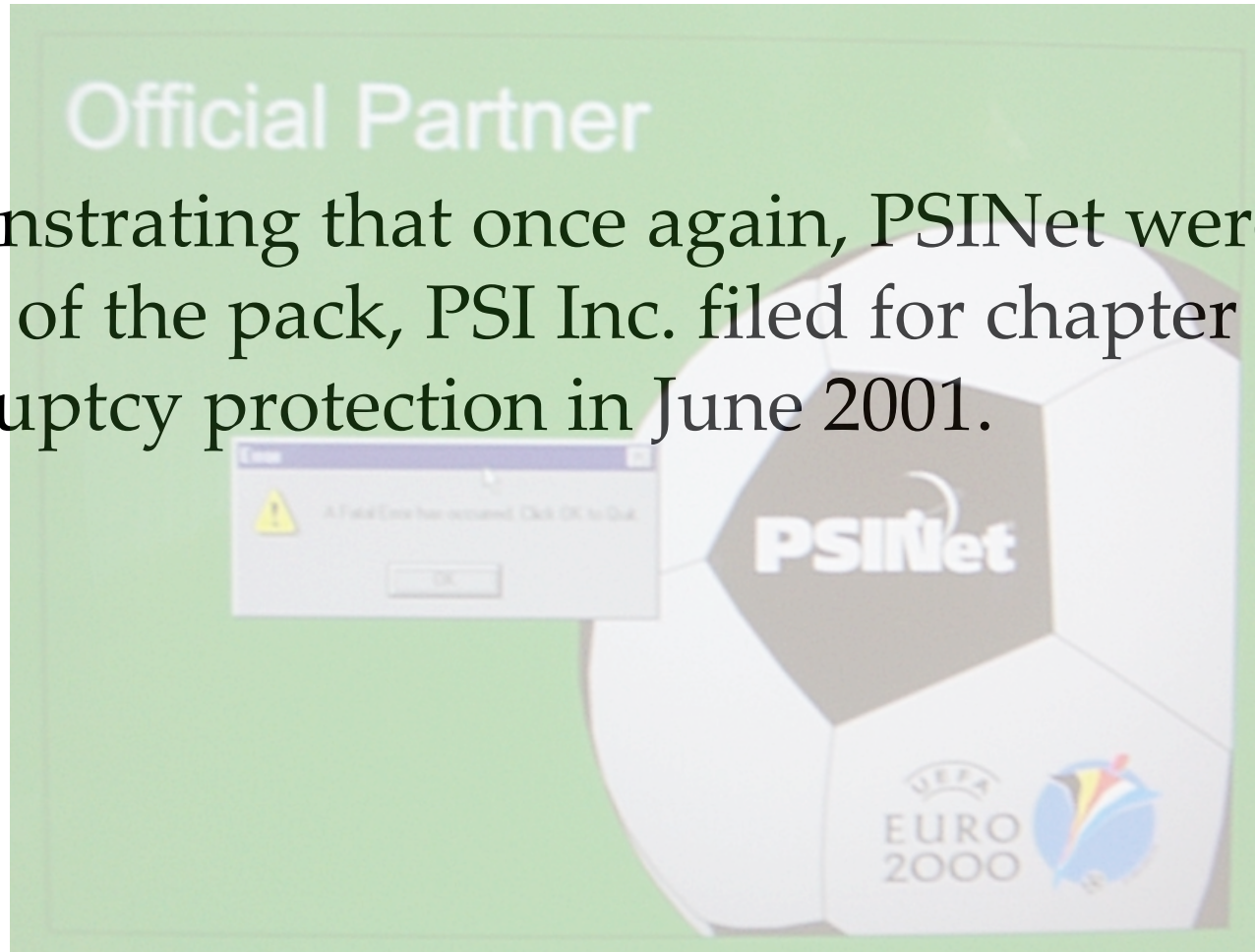

... This is a Nokia 9210 Communicator.

Metaphors for things to come?

That message reads: "A fatal error has occurred"

Metaphors for things to come?

Demonstrating that once again, PSINet were ahead of the pack, PSI Inc. filed for chapter 11 bankruptcy protection in June 2001.

Metaphors for things to come?

Demonstrating that once again, PSINet were ahead of the pack, PSI Inc. filed for chapter 11 bankruptcy protection in June 2001.

Rumours that this was caused by my expenses claims whilst working for them in Australia are greatly exaggerated.
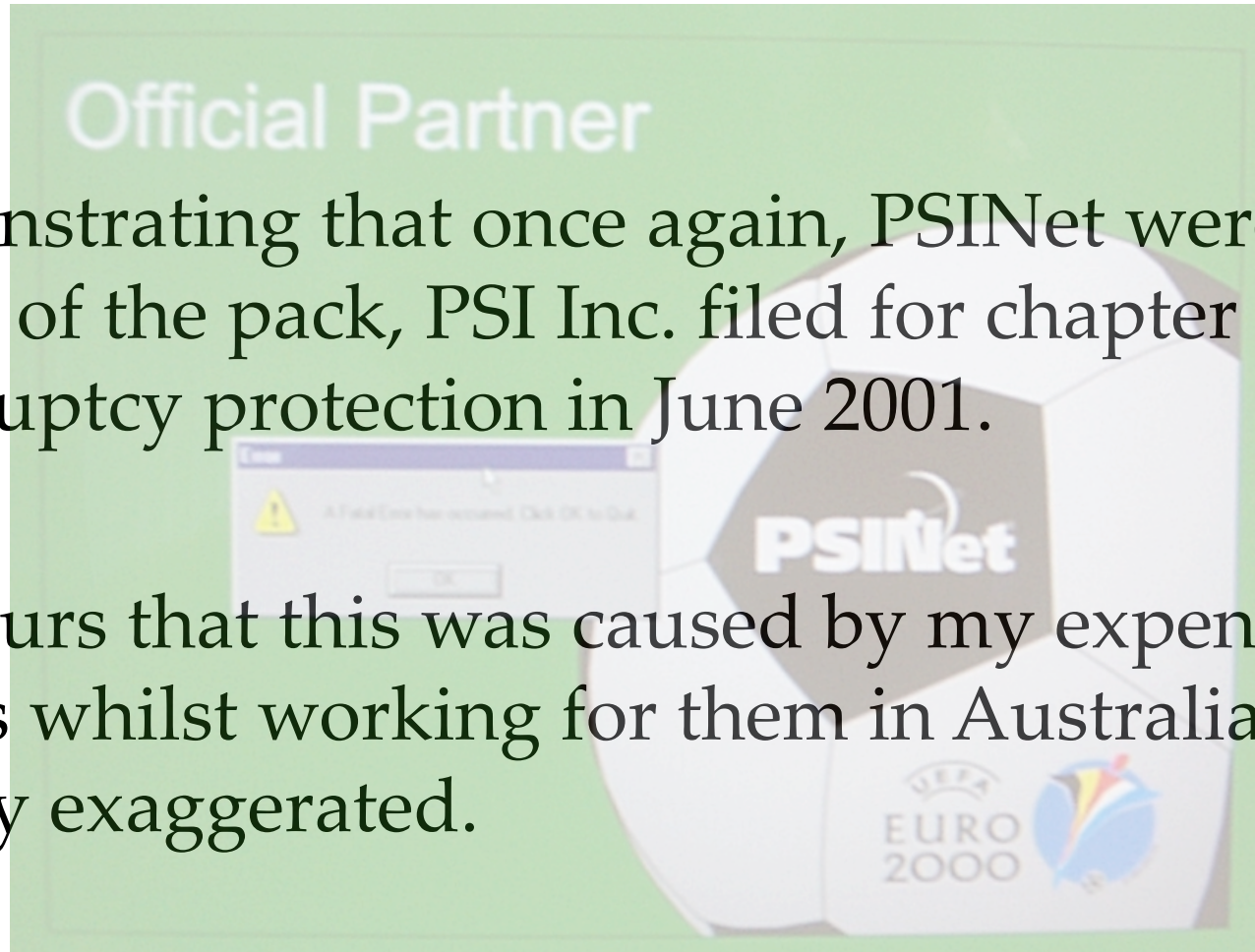
Any Questions?

This series of presentations, diagrams, router configurations and other tidbits I managed to locate can be found at:

http://www.prt.org/history

Remember, folks, AS174 has been the go-to AS for your peering spats for over two decades.

PRTsystems   www.prtsystems.ltd.uk

Thank you

PRTsystems

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UKNOF37
Manchester
20 April 2017