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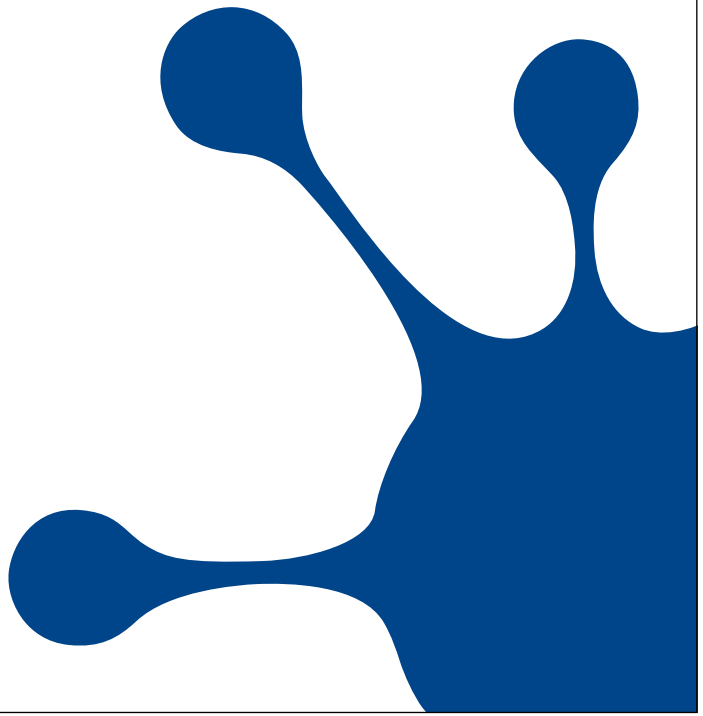
THE HISTORY OF PEERING IN EUROPE AND WHAT THIS CAN TEACH US ABOUT THE FUTURE

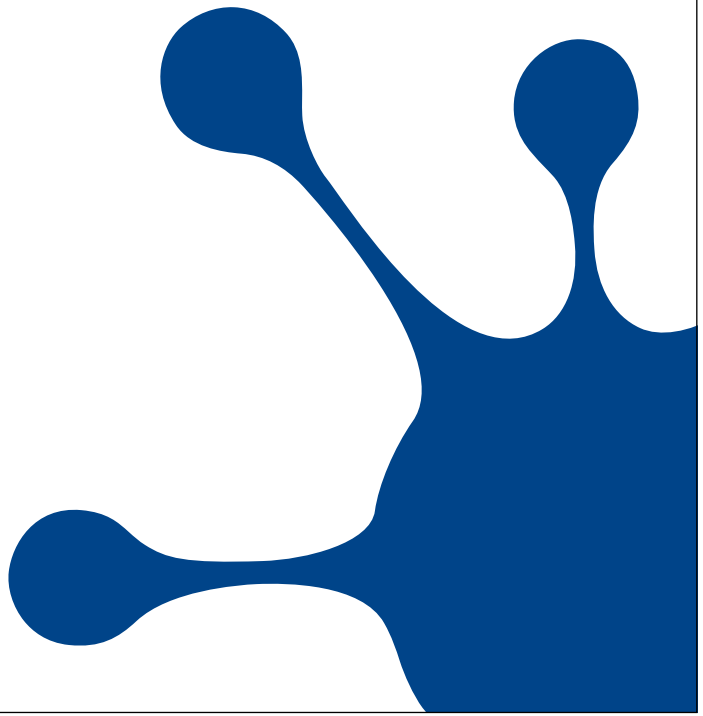
APRICOT 2013

SINGAPORE



APRICOT2013, Singapore, Kurt Erik Lindqvist, kurtis@netnod.se

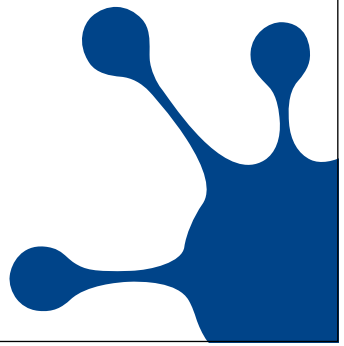
FIRST A VERY QUICK DÉJÀ VU



History of peering in Europe

Basically divided into three phases

1. Early and mostly academic days, 1993-1995
2. Early commercial days, mid to late 1990's
3. Modern times



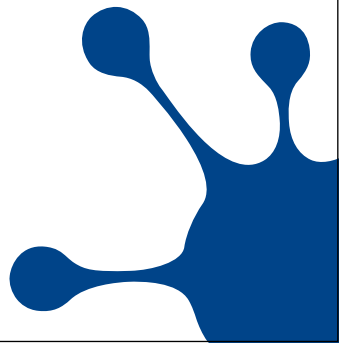
Early and academic days

No competition

People 'wired up' where possible

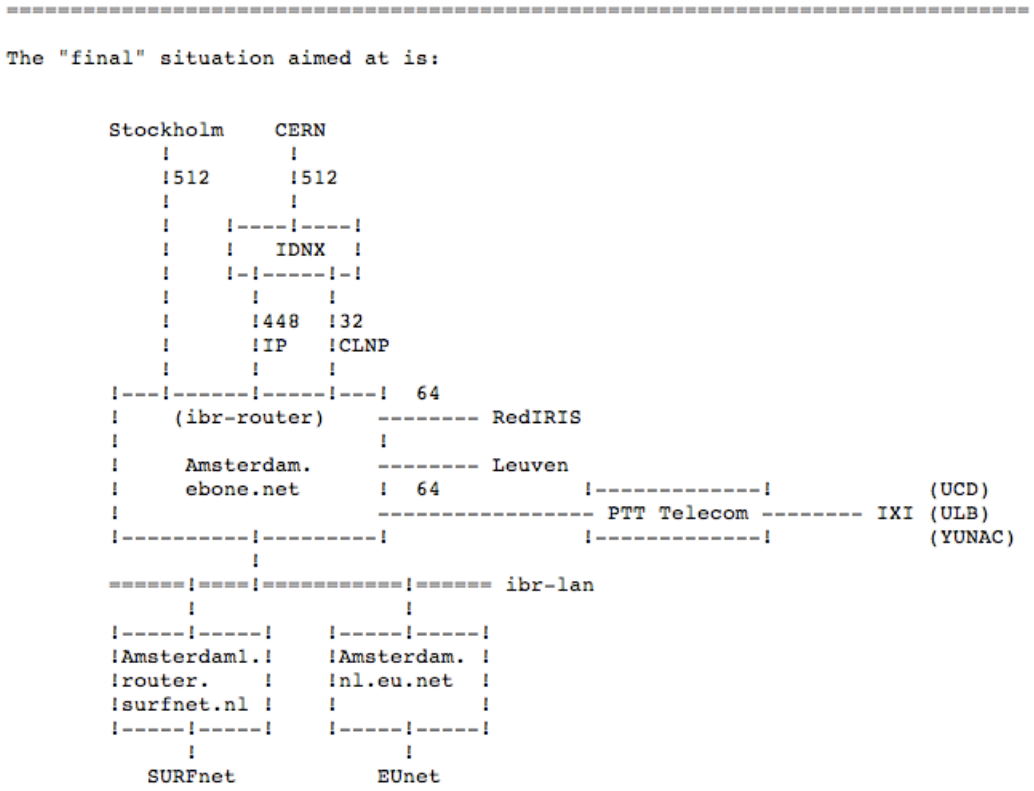
Great co-operation among all parties

Traffic mostly UUCP email and news



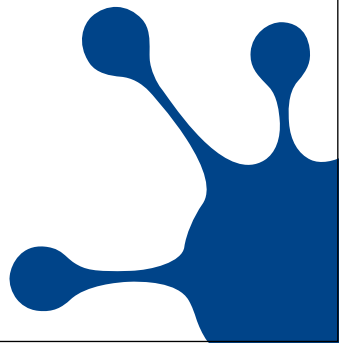
Early and academic days

One of the first larger interconnects was the IBR-LAN at CWI in Amsterdam



Early commercial days

- Educational network funding shifts to universities
- Players are starting to form peering policies
- The basic rule of "both networks that peer must benefit" is emerging
- The first commercial service offerings are starting to use peering as service differentiation

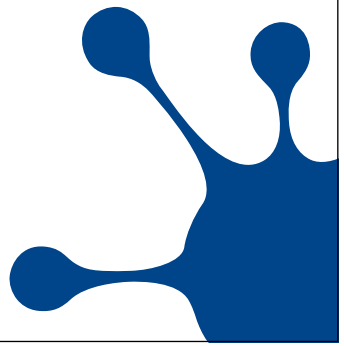


History of peering in Europe

EMERGED AS A WAY TO SAVE ON COSTS

- For transport capacity (that was kept 'artificially' high by ex/PTTs and half-circuit pricing)
- For transit / transatlantic costs

INTERNATIONAL CIRCUITS WHERE LOW BANDWIDTH SO DELAY WAS LESS OF AN ISSUE IN THE EARLY DAYS



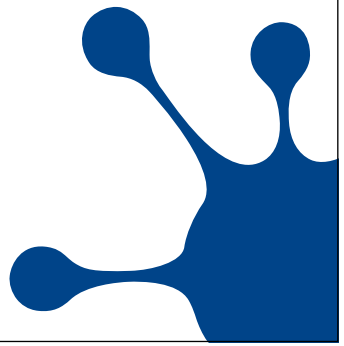
History of peering in Europe

In the early European Internet, most traffic was destined for the US as most content was US based

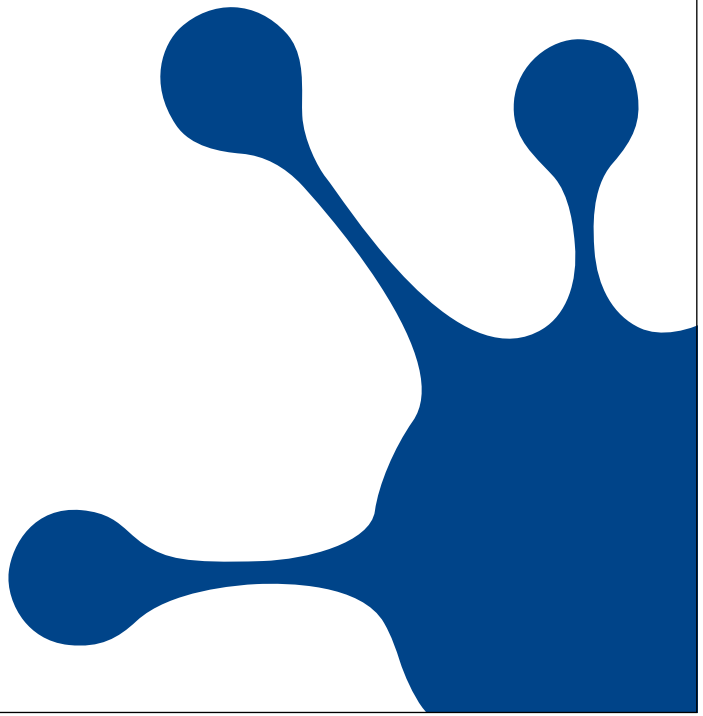
Over (modern) time, more content was developed in Europe

- **Mainly to meet localized interest, culture and language**

Local content changed the traffic flows, and changed the interconnect landscape



PUT ANOTHER, AND MORE GRAPHICAL WAY



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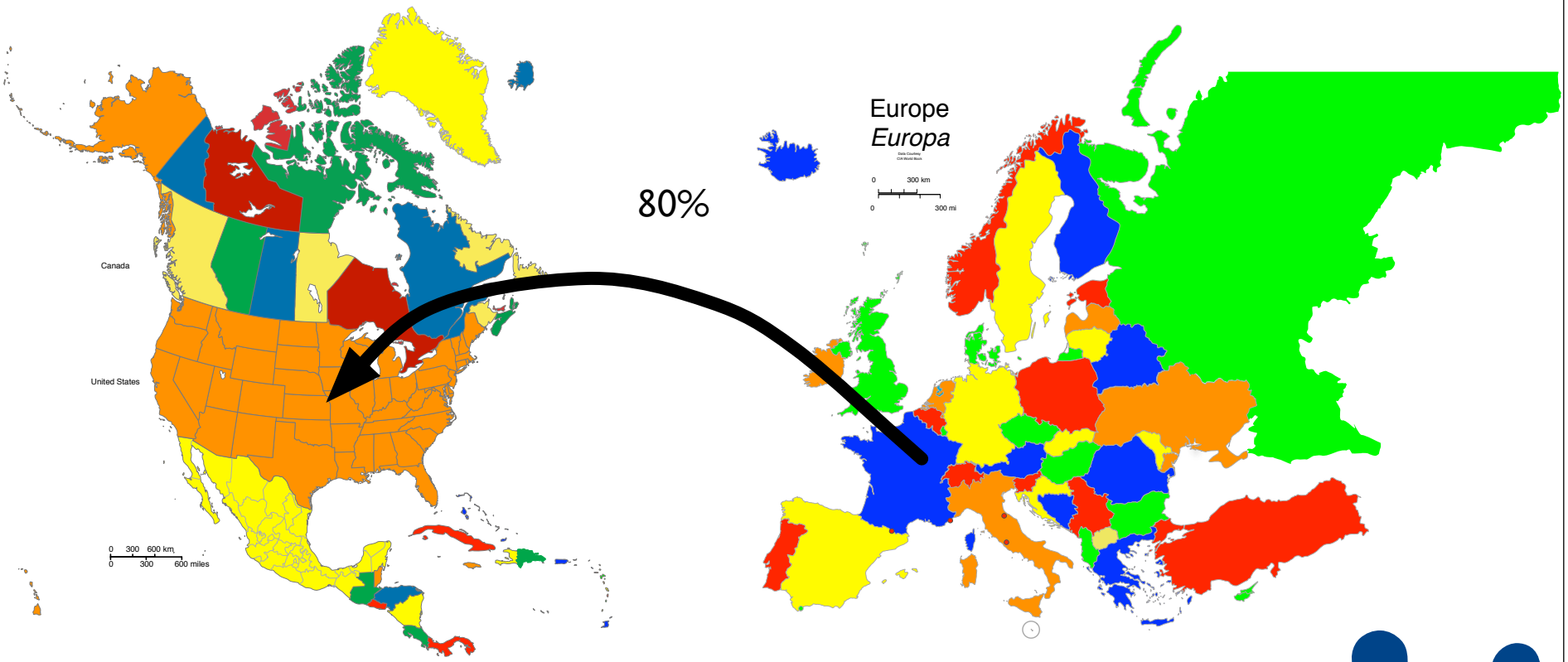
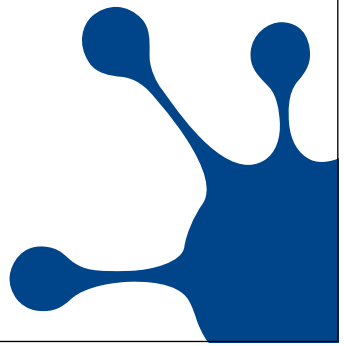
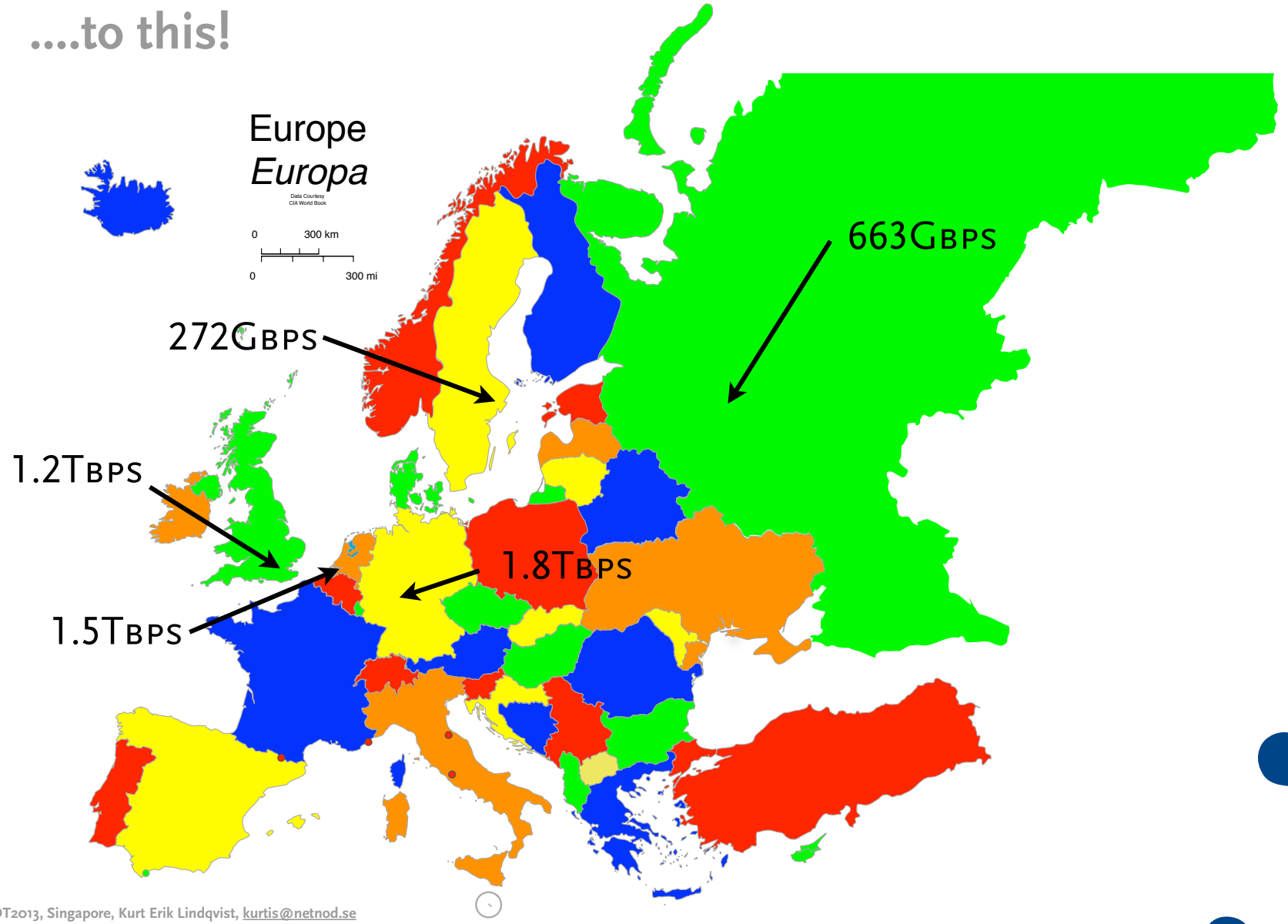
We went from this...



...to this...



....to this!

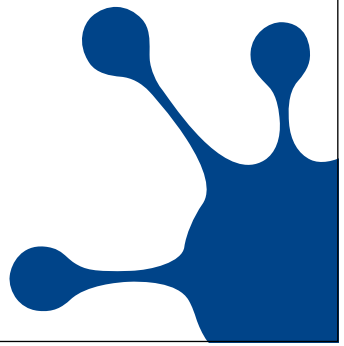

Europe
Europa
Data Courtesy
CIA World Book
0
300 km
0
300 mi
663Gbps
272Gbps
1.2Tbps
1.8Tbps
1.5Tbps

History of peering in Europe

As can be seen on the previous slide traffic shifted to be localized to language regions around 2001

Keeping traffic local helped with "customer experience", and became (at least partly) a goal in itself

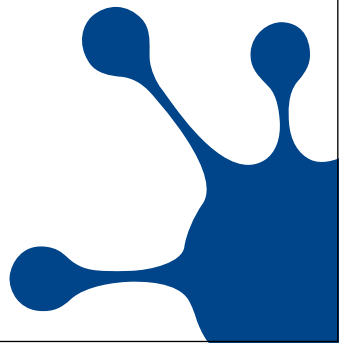
Hot potato routing helped and meant that transport costs were shifted to the peer as quick as possible



History of peering in Europe

While hard to prove, the dense interconnects in Europe helped innovate services and content

At a time when transit prices and transport prices where high, peering provided a way to lower end-user costs and stay competitive against mostly foreign (US based) providers



So what do I gain from peering?

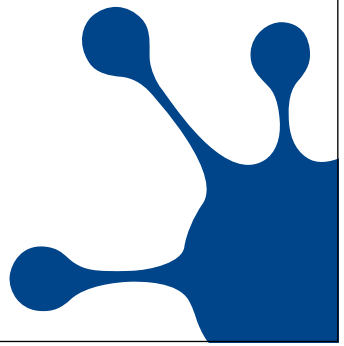
Keeping regional/national traffic regional and local is always good

- **Cheaper, Better performance - will help to develop local content**

Redundancy

- **You are no longer dependent on a single provider as upstream and their current operational status**

Control - allows you greater control of traffic flows

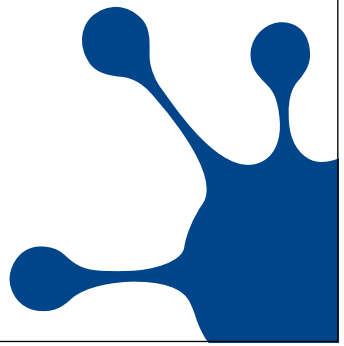


But where do I peer?

Can be done via private or public peering

Public peering and the establishment of Internet Exchange Points (IXPs) followed in the deregulation of Europe (as consequence of more operators - not of deregulation)

Establishing neutral ground where traffic can be exchanged with multiple parties to the price of one connection will benefit the exchange of traffic



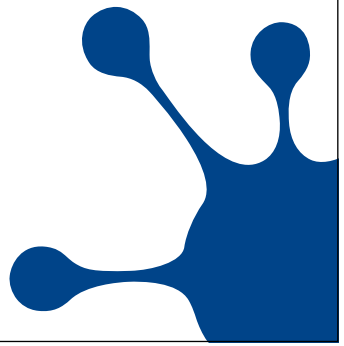
But how much difference does it make?

A small asian provider with a 2xSTM-1 connecting to Linx in London peers away 100Mbps.

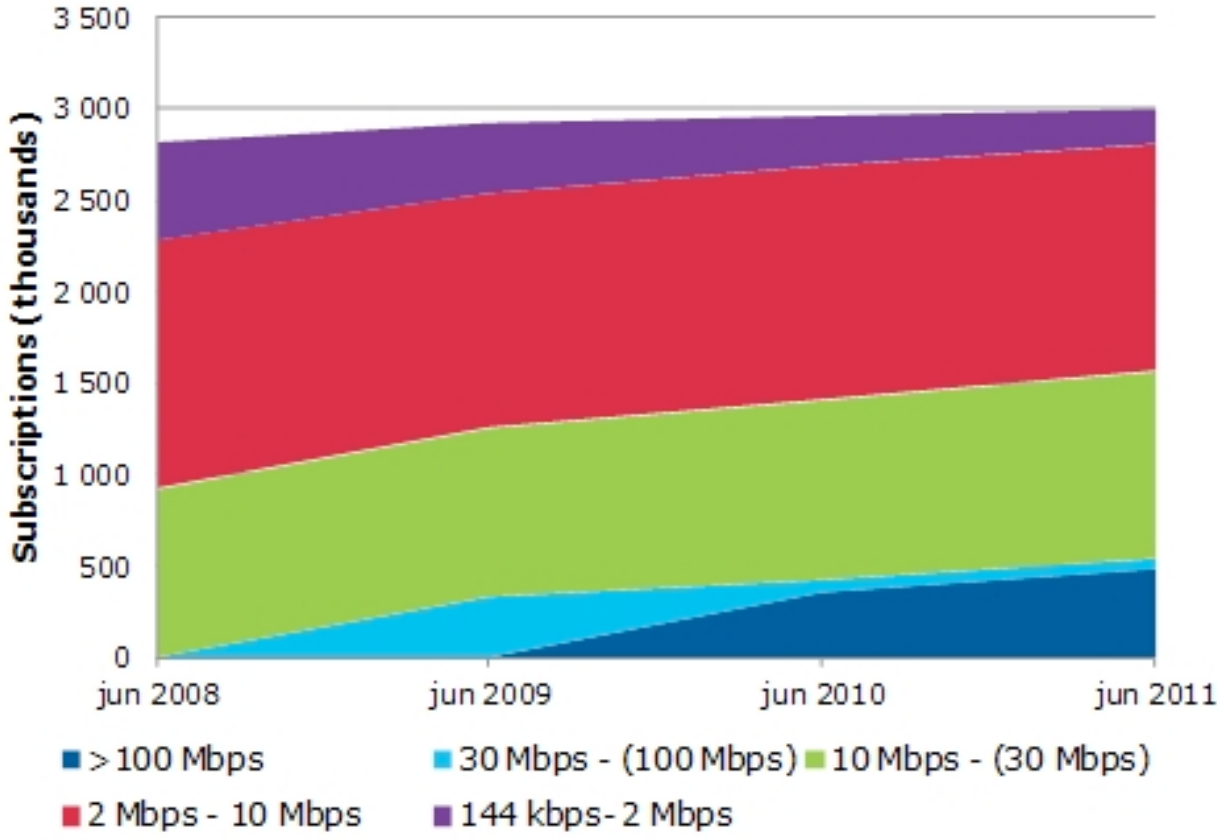
- **Started with a satellite uplink and then picked up 11k routes from the route-servers and 40k routes in total**
- **With only little traffic to offer and little effort**

Peering abroad doesn't always make sense, but be sure to make the numbers

But peering nationally almost always makes sense

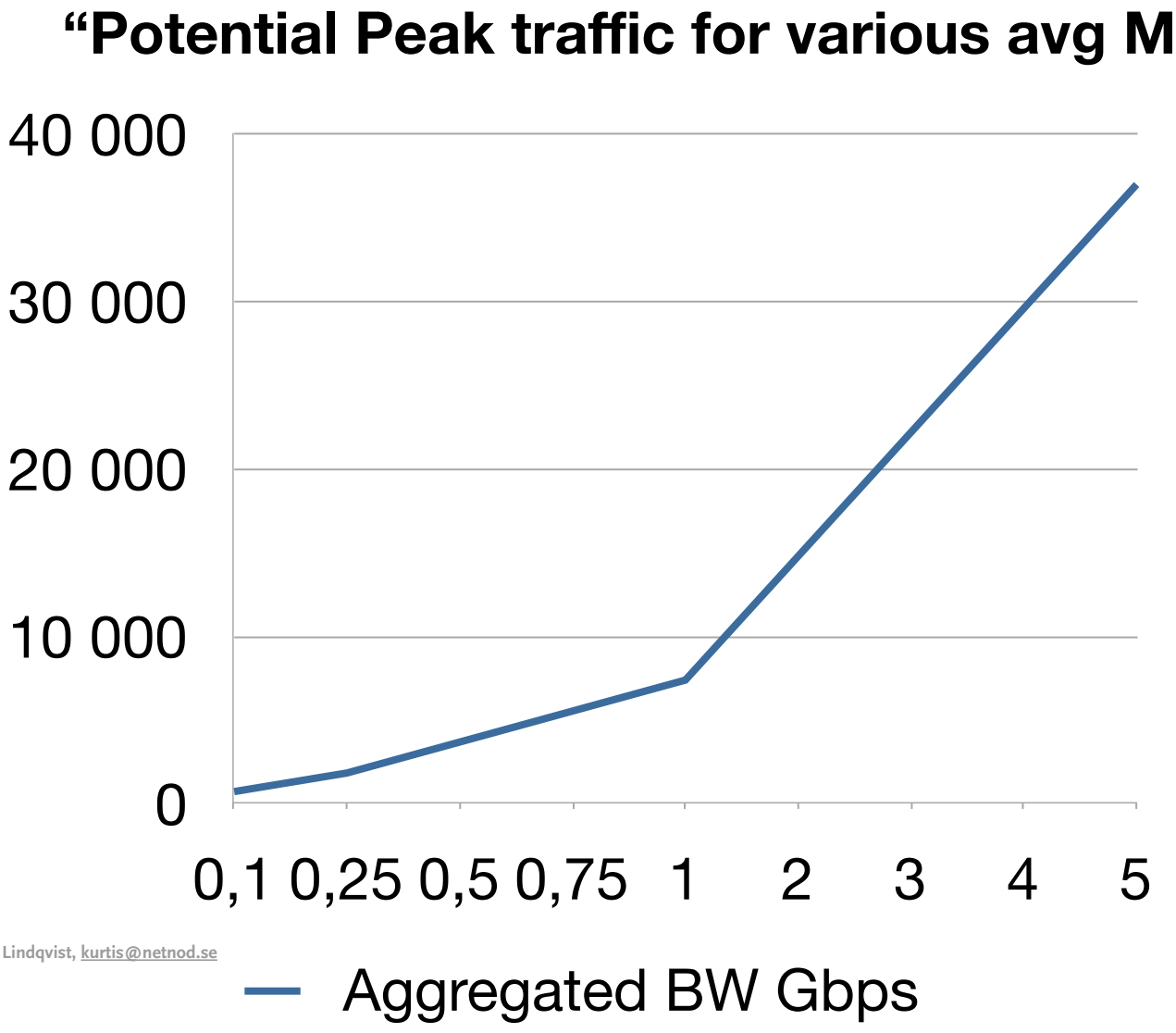


Let's take a random example country

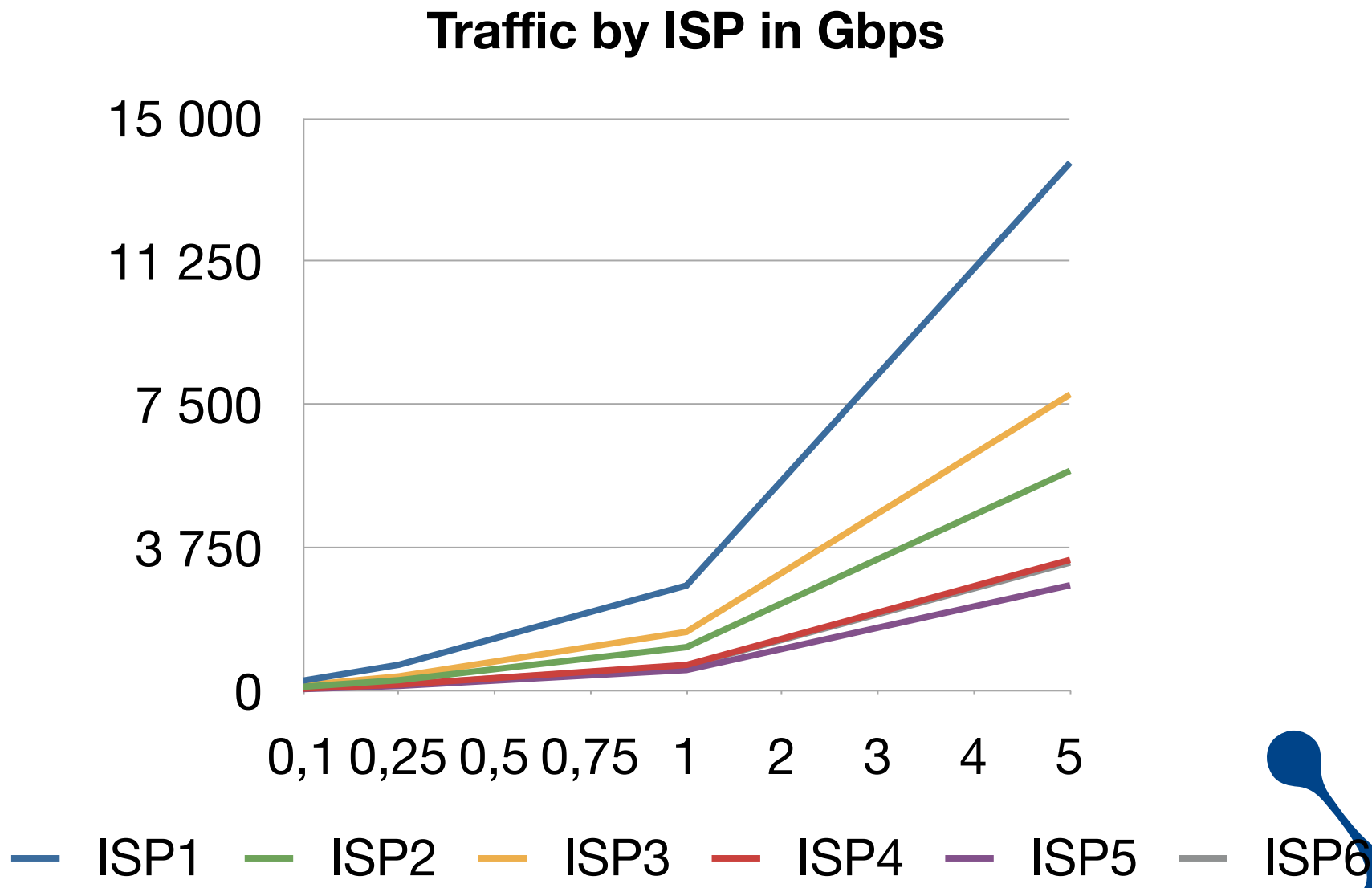


DATA SOURCE: SVENSK TELEMARKNAD 2011

7 400 000 Internet subscribers

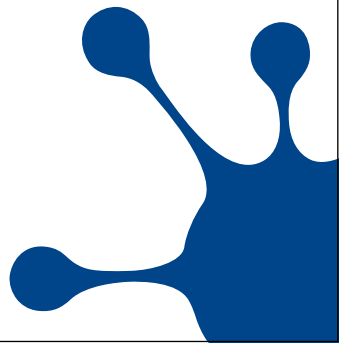


Total data per ISP

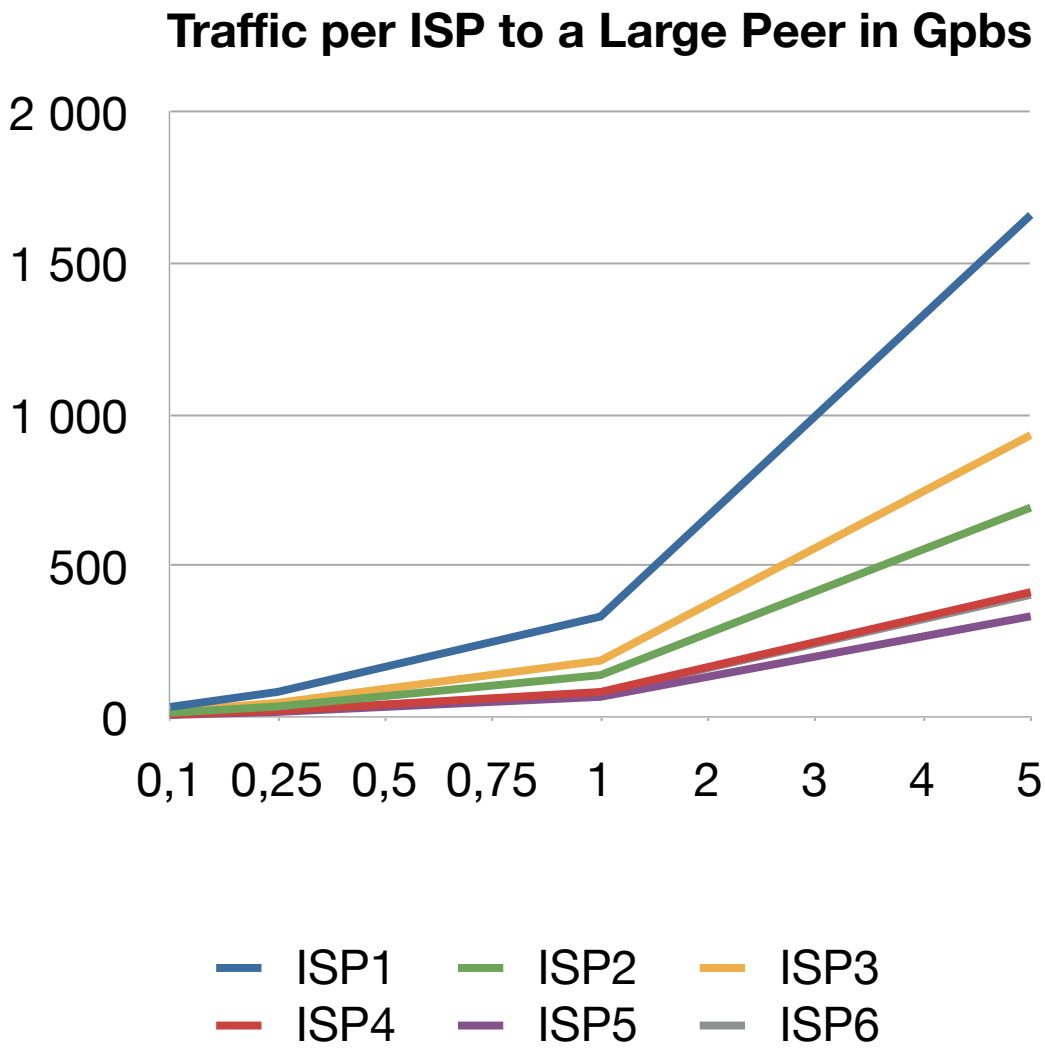


Data source: Marketshare according to Svensk Telemarknad 2011

Warning! Very Hypothetical example to follow!



Data per ISP / Large peer



According to http://ddos.arbornetworks.com/2010/10/google-breaks-traffic-record/

Google then had 8-12% of the Internet traffic. Let's assume 12%, and that that is true in general

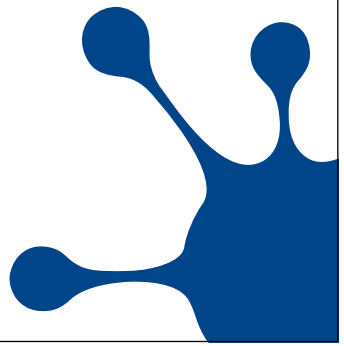
Is this a problem?

No!

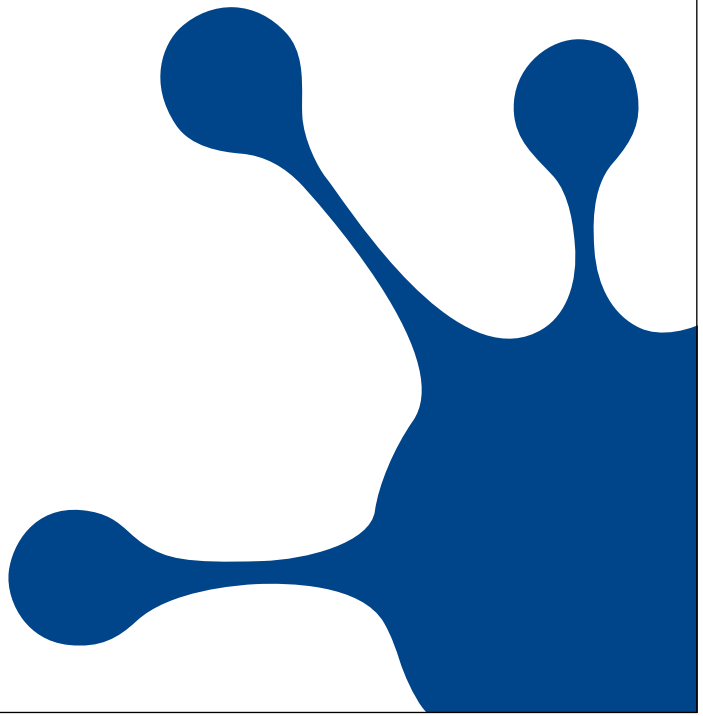
- We got 100G coming
- We peer at so many points
- We have so much transit

Yes!

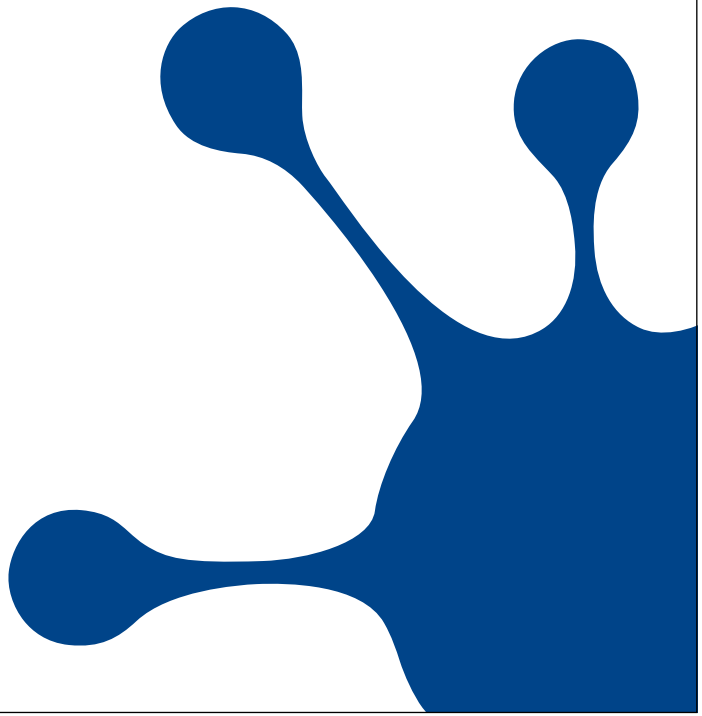
- 100G will be too much shared faith
- We can't back-haul this
- We can't afford to send this over transit...
- Our customers will kill us over the latency



IS THERE ANOTHER SOLUTION?



YES!



Another random example...

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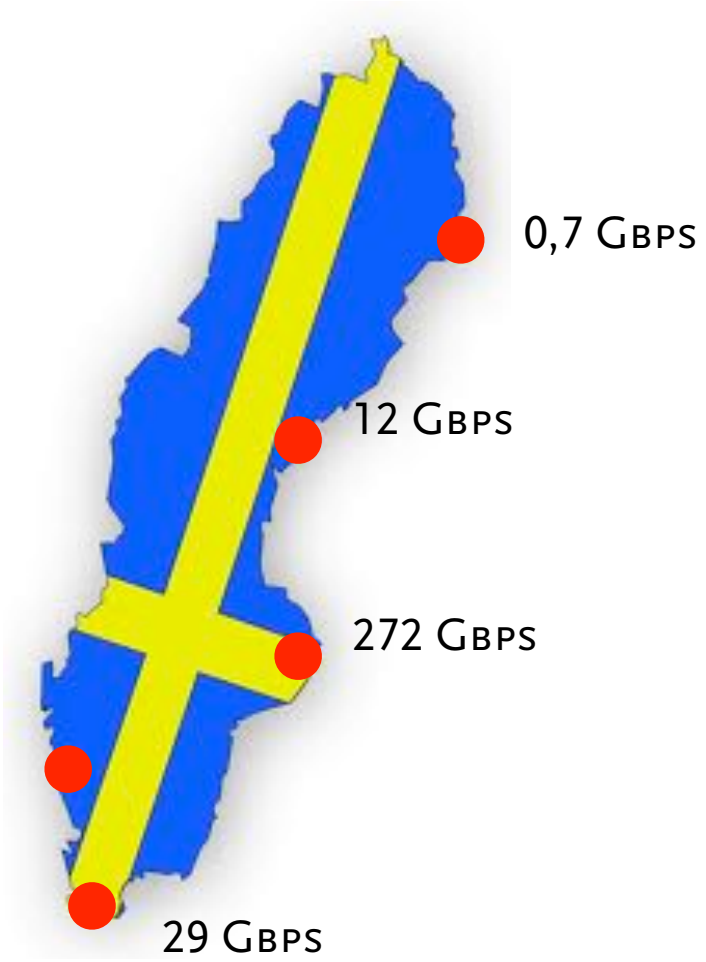
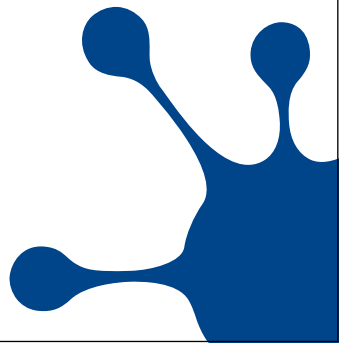


Why the imbalance ?

(More or less) Only eyeballs peering outside Stockholm

Content backhauled to Stockholm



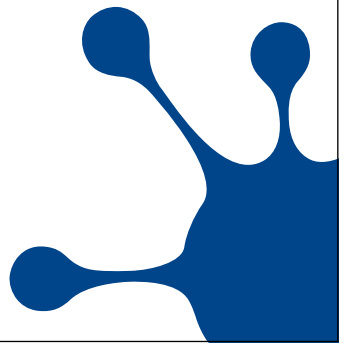
Is history repeating itself?

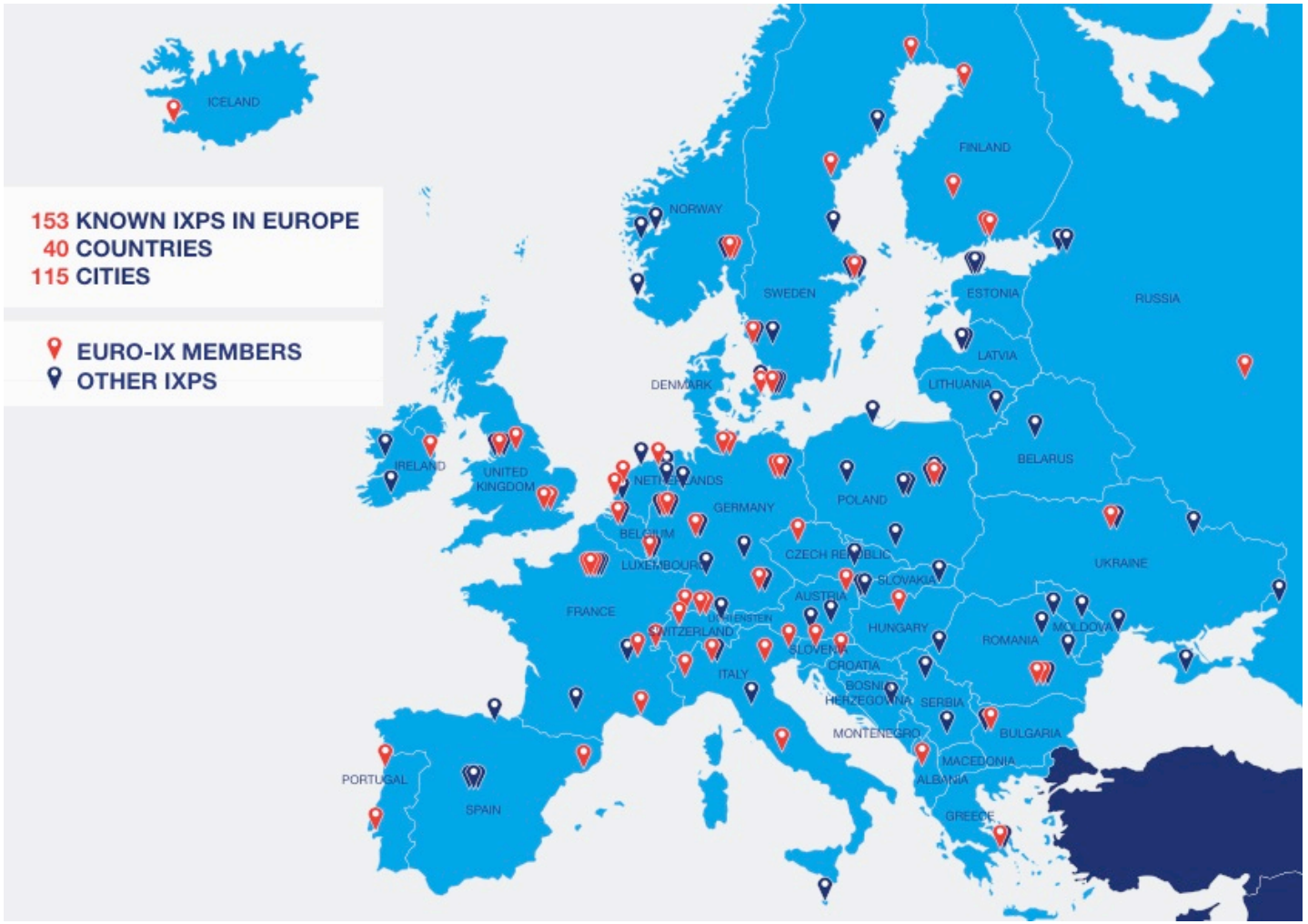
Maybe

CDNs / Content is already doing more and more local / extended peering

They might just be ahead of the curve

Europe already have some of the most extensive peering mesh, but it's still pretty concentrated





DATA SOURCE: EURO-IX

Local peering

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Redundancy

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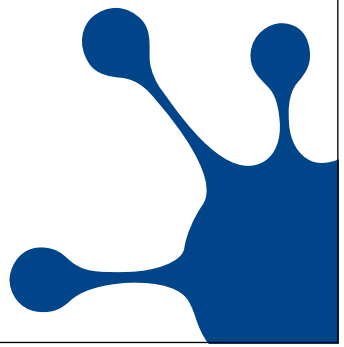
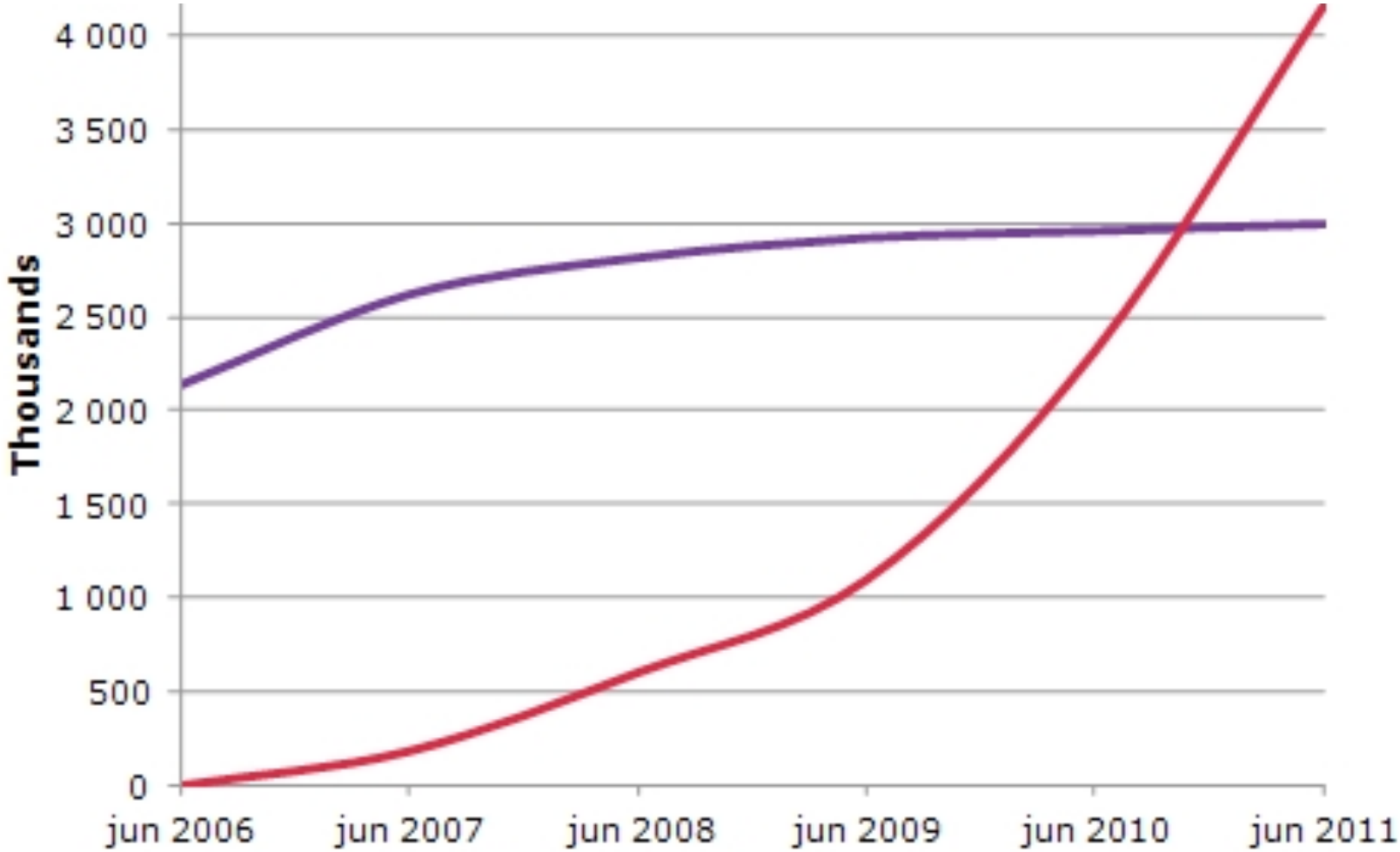


There might be one saver..



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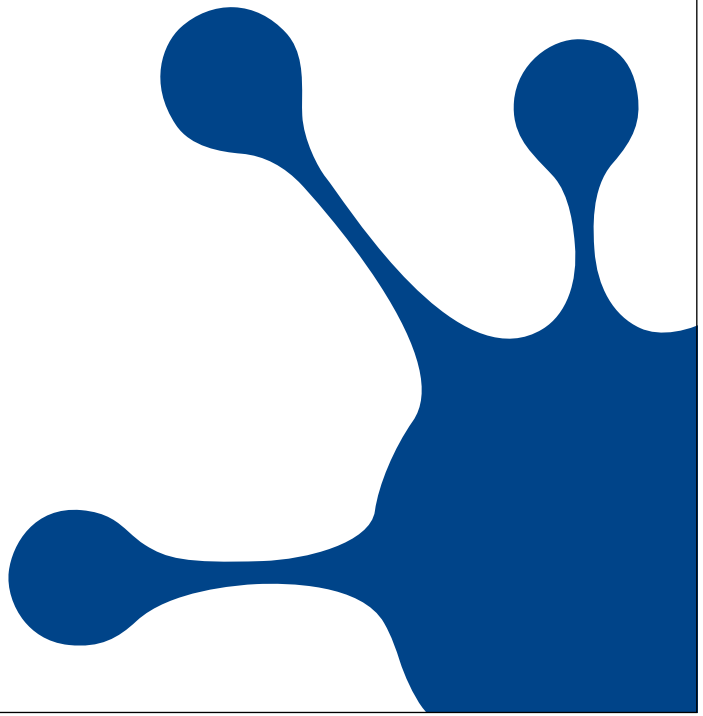
And a lot of thanks to Per Bilse for a lot of the ideas and history!