

The History of Peering in Europe and What This Can Teach Us About the Future

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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 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

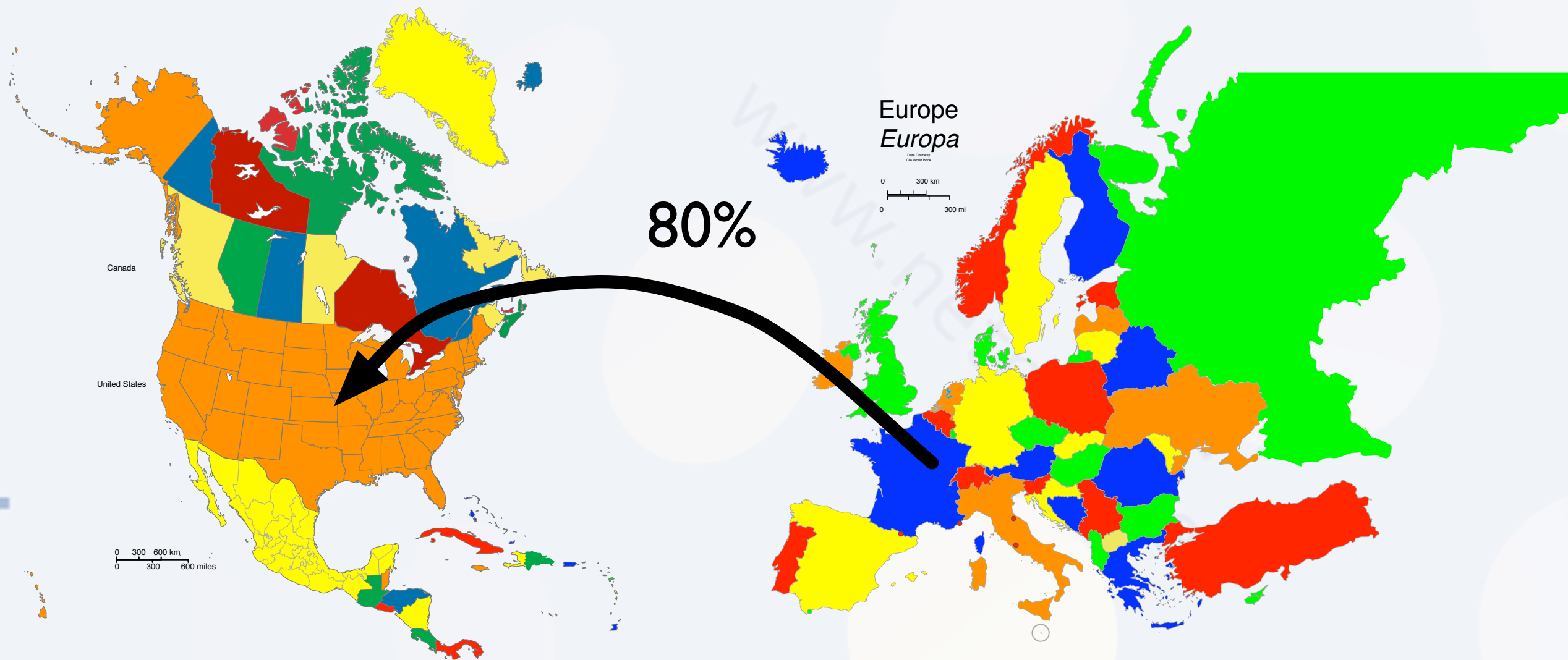
- Emerged as a way to save on costs
 - For transport capacity (that was kept 'artificially' high by ex/PTTs and half-circuit pricing)
 - For transit / transatlantic costs
- International circuits where low bandwidth so delay was less of an issue in the early days

History of peering in Europe

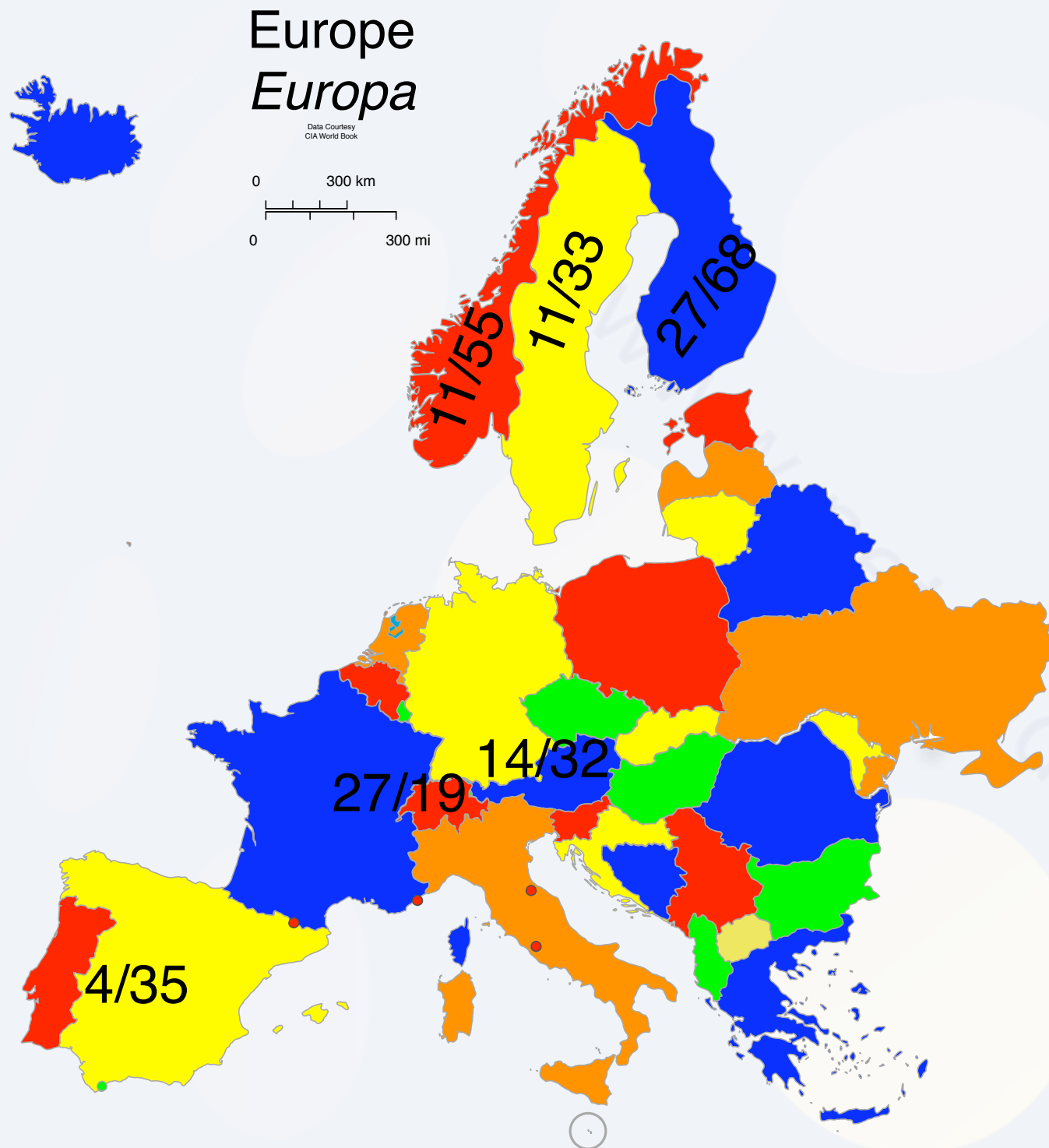
- In the early European Internet, most traffic was destined for the US as most content was US based
- Over (modern) time, more content was developed in Europe
 - Mainly to meet localized interest, culture and language
- Local content changed the traffic flows, and most likely changed the interconnect landscape

Put another, and more
graphical way

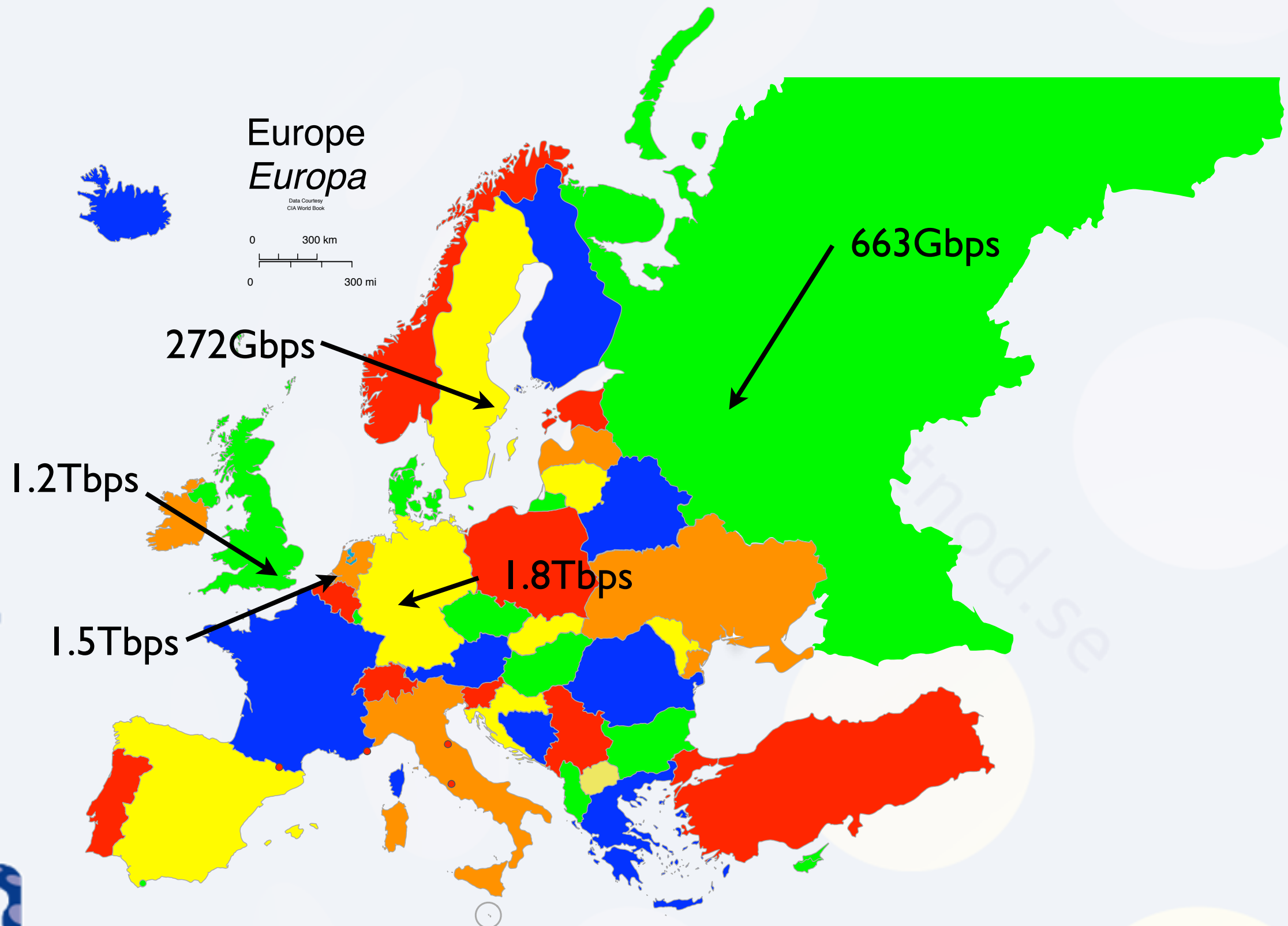
We went from this....



...to this...



....to this!



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

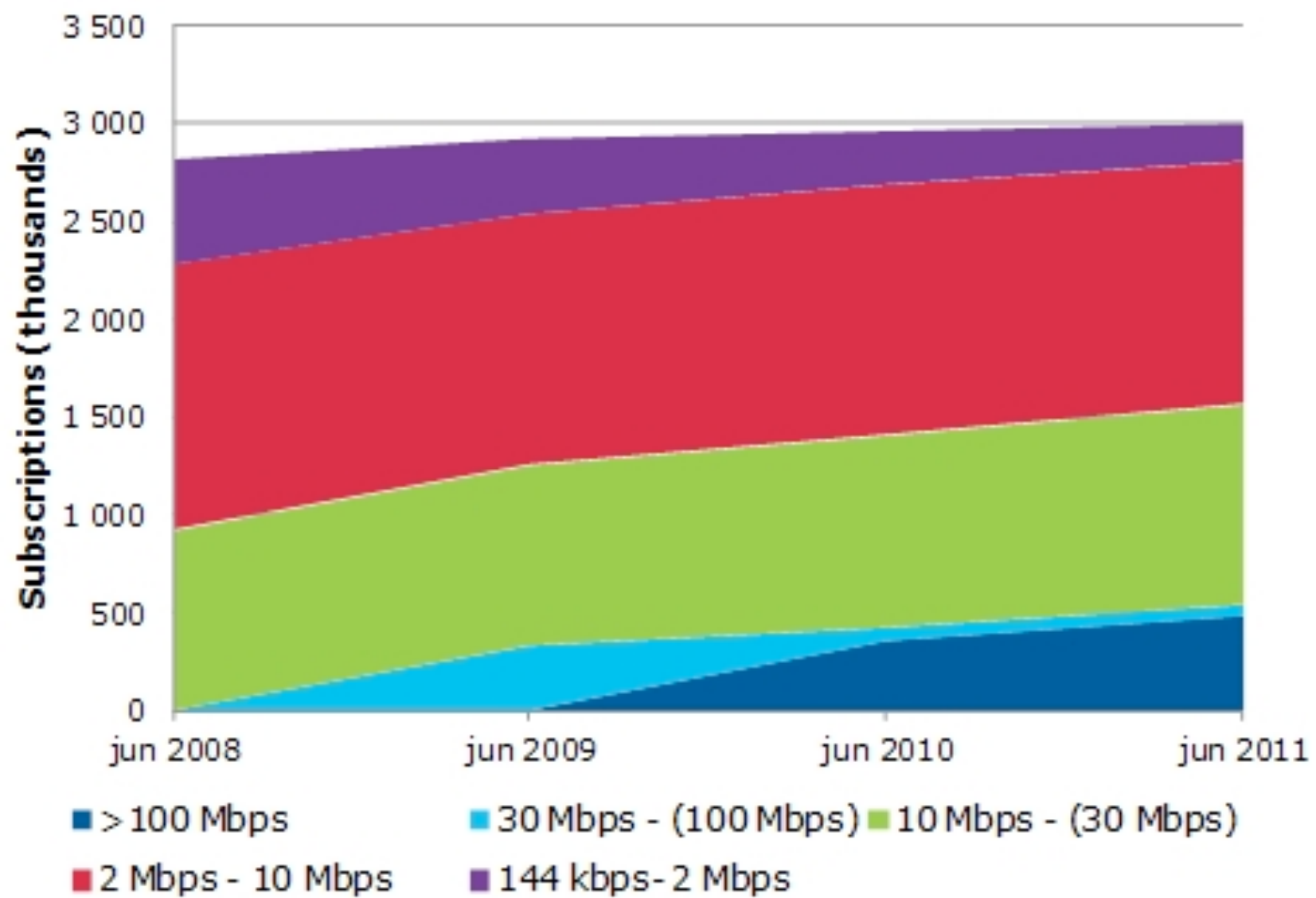
- While hard to prove, the dense interconnects in Europe helped innovate services and content
- At a time when transit prices and transport prices were high, peering provided a way to lower end-user costs and stay competitive against mostly foreign (US based) providers



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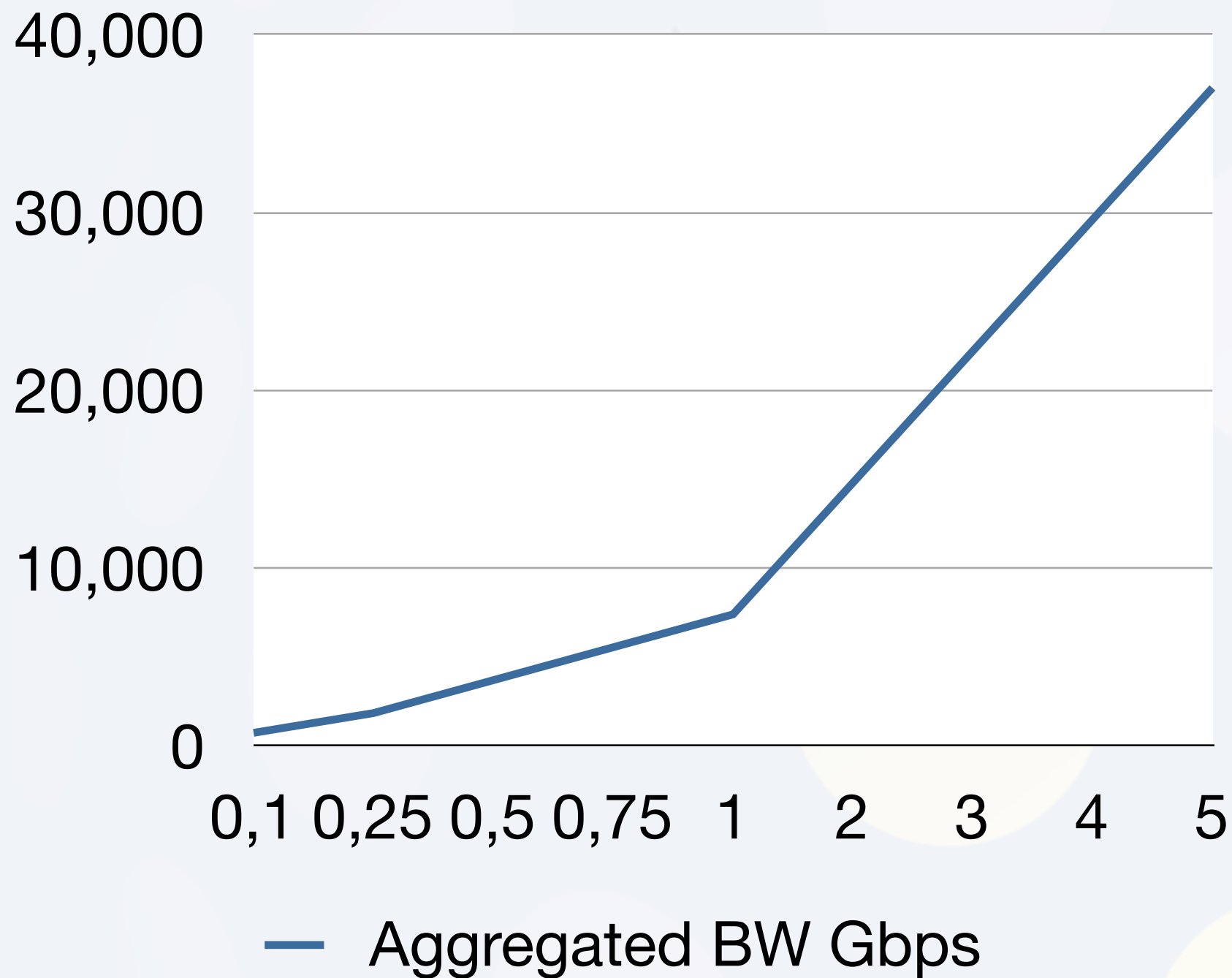
Let's take a random
example country





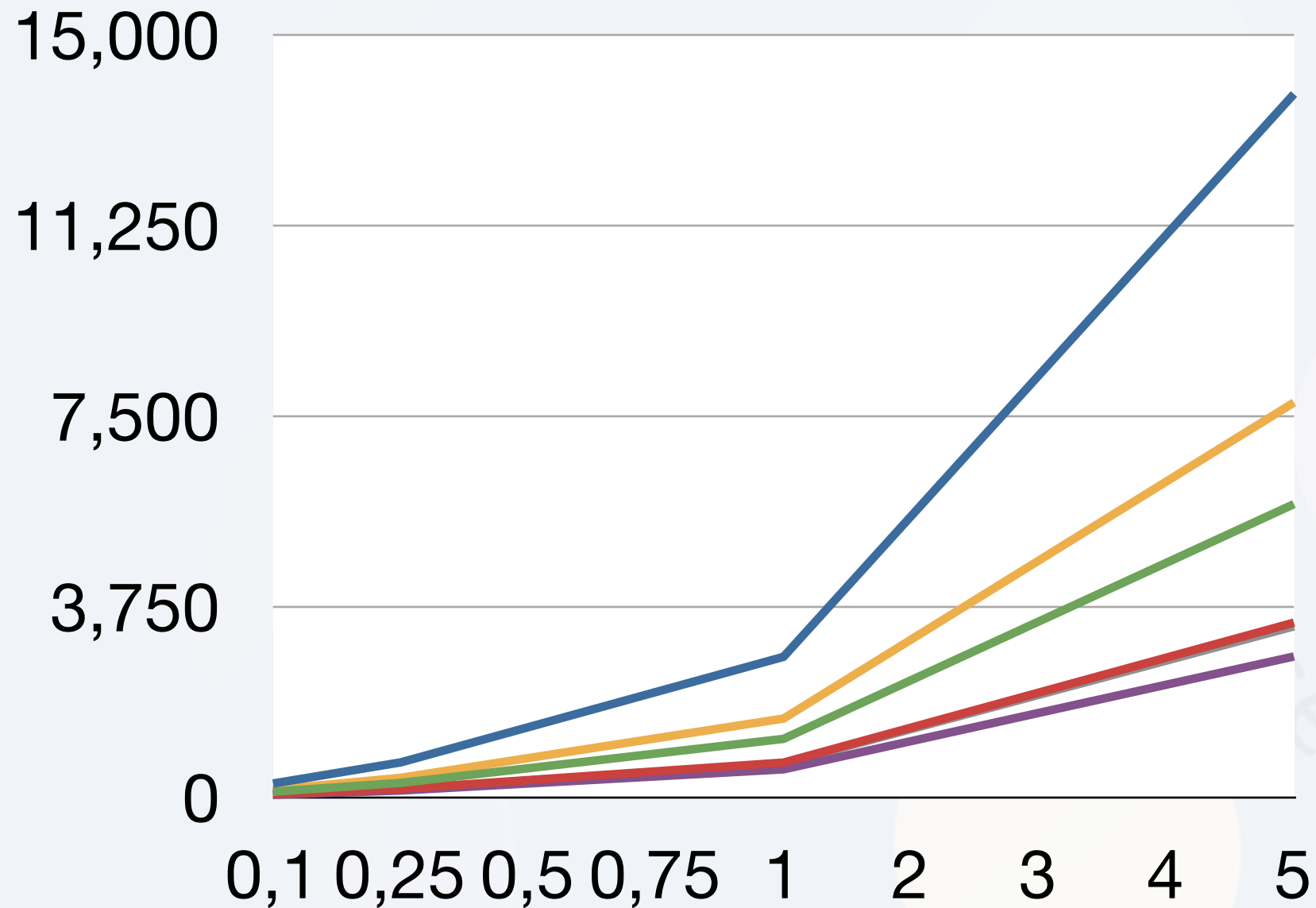
7 400 000 Internet subscribers

“Potential Peak traffic for various avg Mbps”



Total data per ISP

Traffic by ISP in Gbps

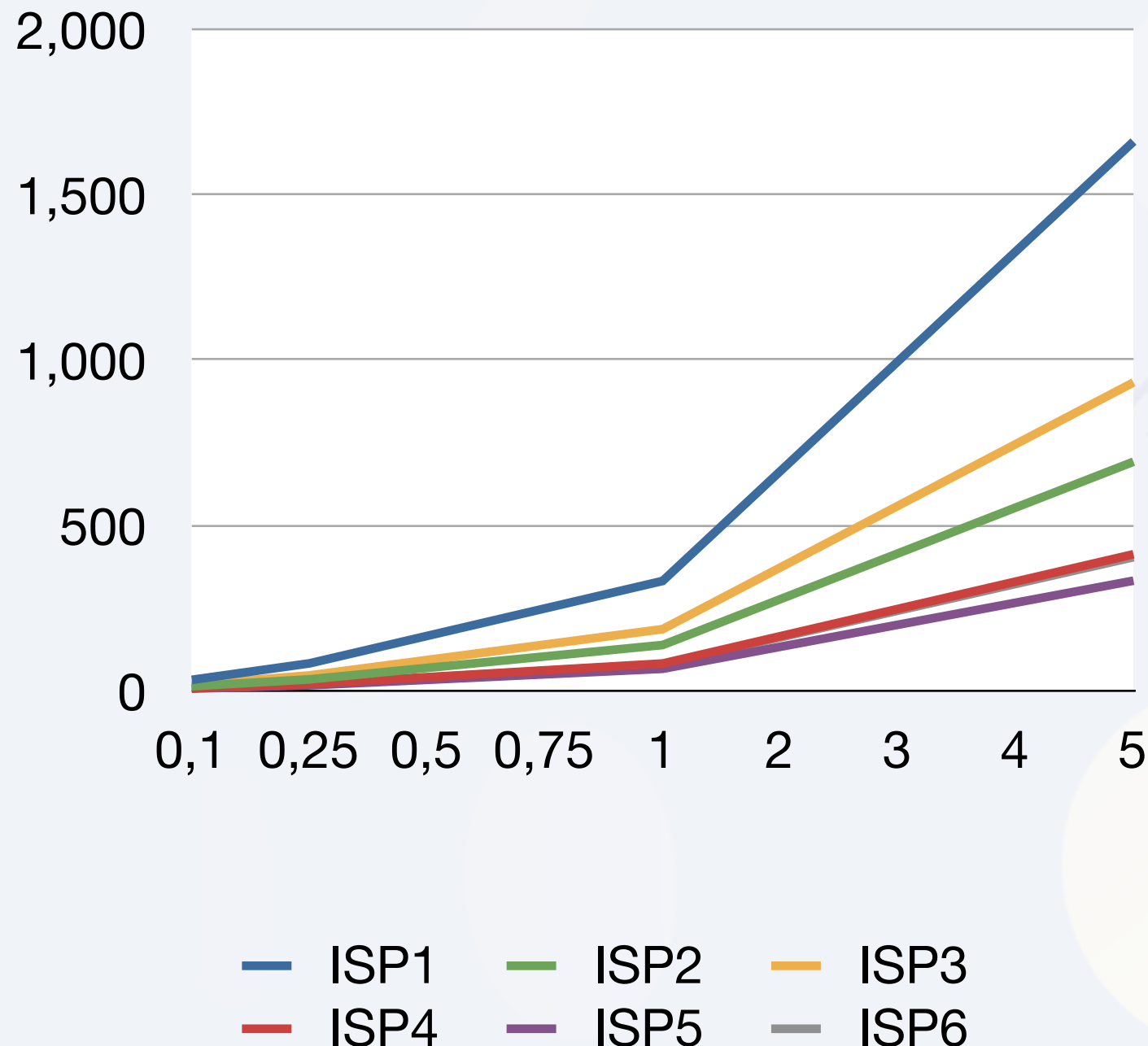


ISP1 ISP2 ISP3 ISP4 ISP5 ISP6

**Warning! Very Hypothetical
example to follow!**

Data per ISP / Large peer

Traffic per ISP to a Large Peer in Gpbs



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!

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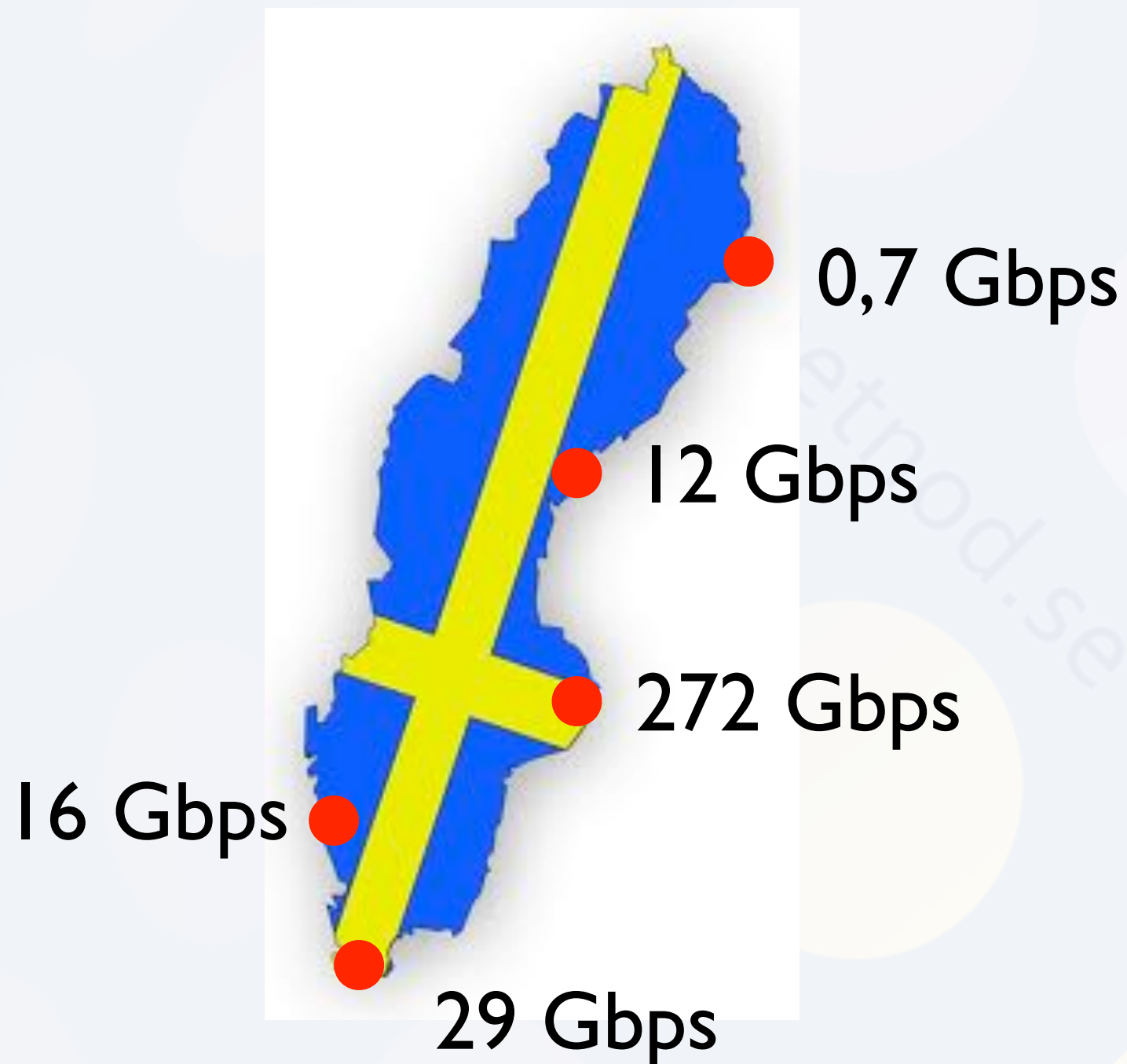
Another random example...



Another random example...



Another random example...

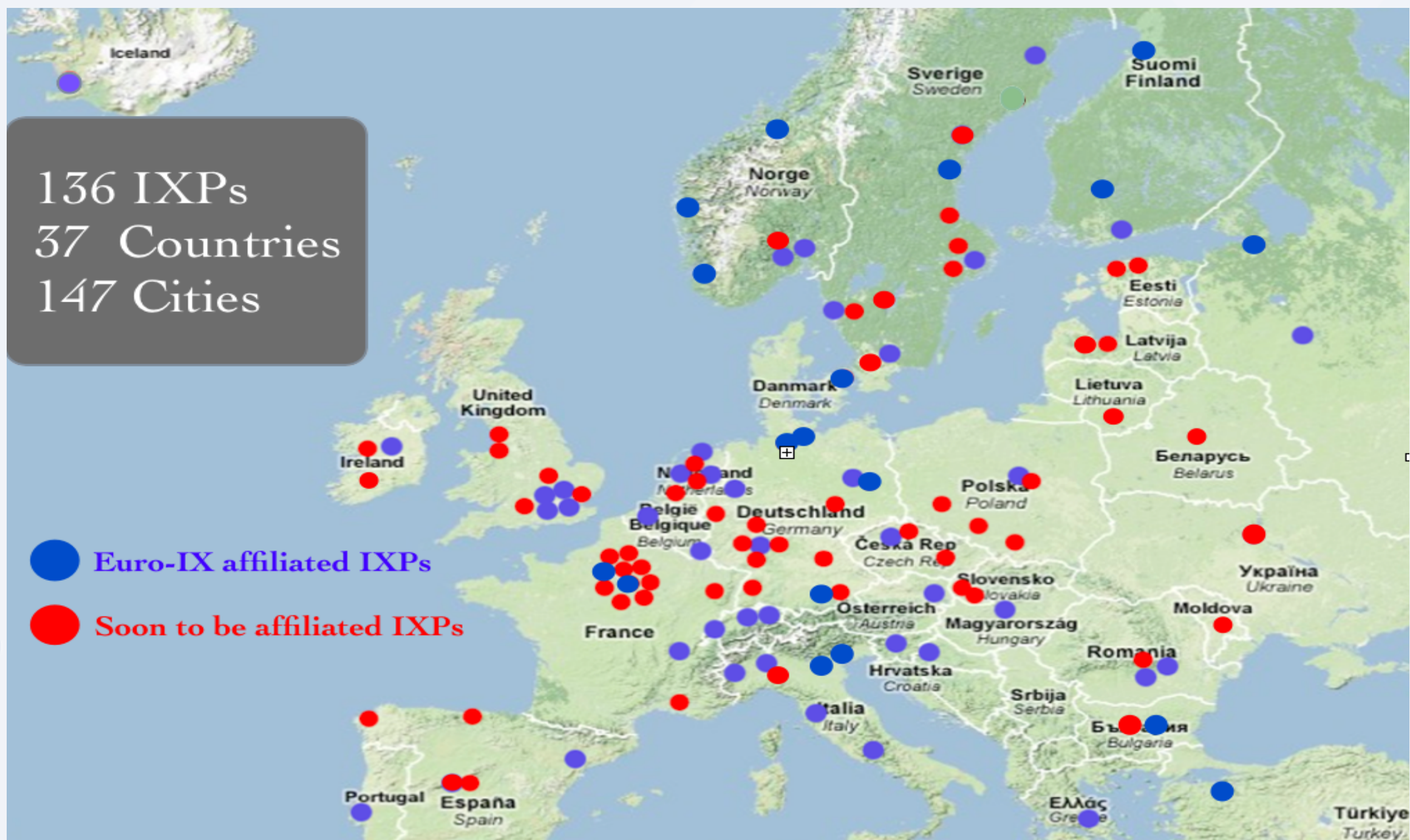


Why the imbalance ?

- (More or less) Only eyeballs peering outside Stockholm
- Content backhauled to Stockholm

Is history repeating itself?

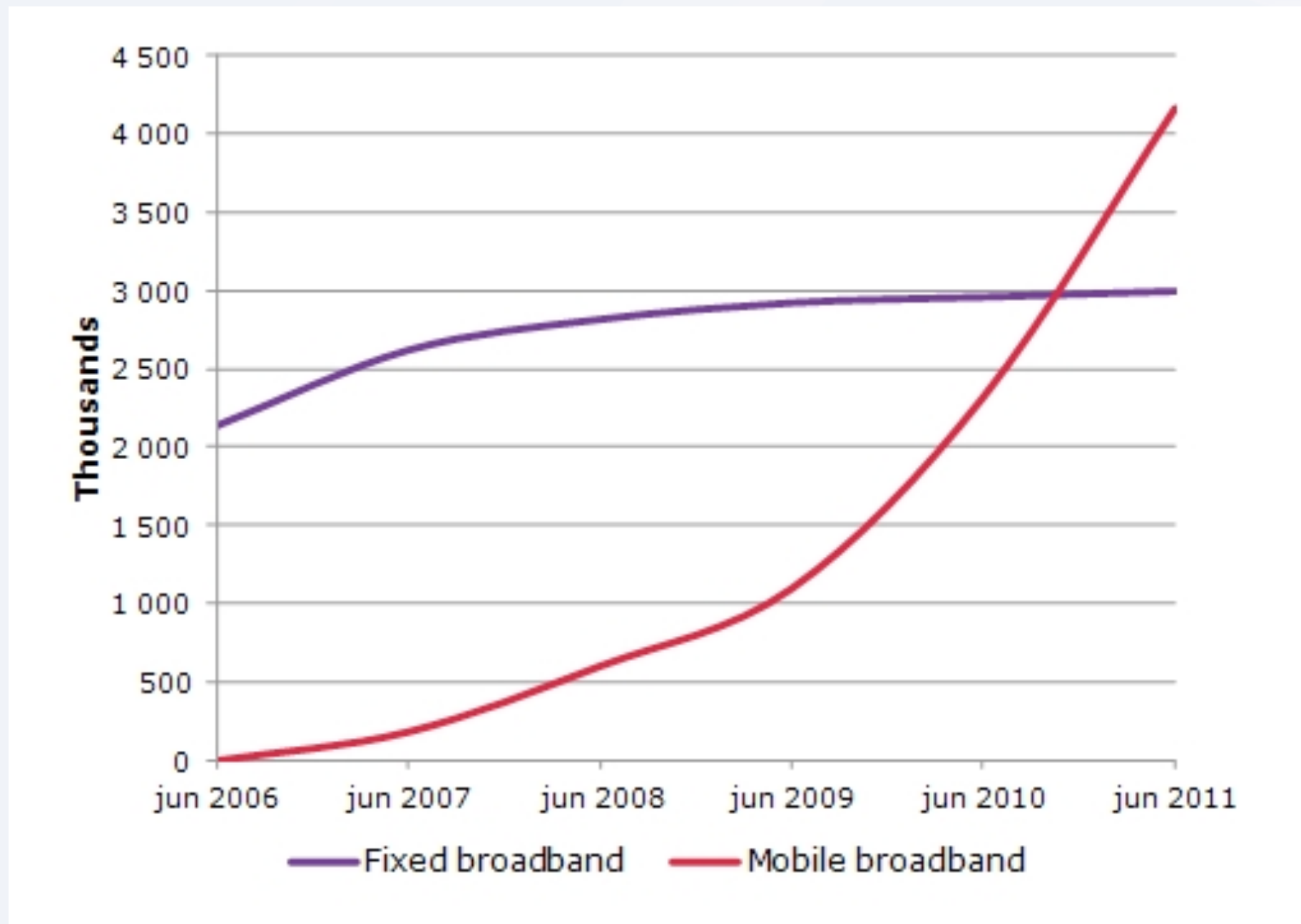
- Maybe
- CDNs / Content is already doing more and more local / extended peering
- They might just be ahead of the curve
- Europe already have some of the most extensive peering mesh, but it's still pretty concentrated



Local 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

There might be one saver..



?

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