Feb 21 2013

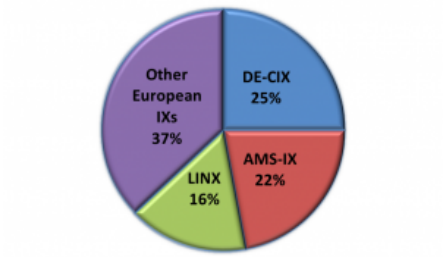
European Internet Traffic: Indicator of Growth and Competition in Digital Services – A summary

Blog Editor



In a recent blog, LSE Tech argued that the European telecommunication sector's business structure is experiencing significant challenges. Here, **Patrik Karrberg, Jonathan Liebenau** *and* **Silvia Elaluf-Calderwood** *takes one step further by looking at the current dynamics of the internet routing businesses. The authors claim that the increasing importance of internet exchanges could be expected to affect pricing, act as a catalyst for how traffic is routed in the physical infrastructure, and be seen as an important institution for the European internet economy. A continuous monitoring and data gathering about the evolving market for interconnection in Europe can contribute to a regime of efficient ex-post regulation.*

The internet routing business used to be dominated by one-to-one paid for transit where large telecom operators offered global internet access to smaller players who paid per volume. As of November 2012, the industry organization Euro IX had 139 members including the top three internet exchanges who carry about 63% of total traffic in Europe: DE-CIX in Frankfurt, AMS-IX in Amsterdam, and LINX in London. These are large exchanges with peak traffic well above 1Tbps. These giant exchanges are followed by a few with close to or above 500Gbps (CERN, Moscow, Stockholm, Paris). The majority of exchanges handles much smaller traffic volumes, but still contributes to a Europe-wide network of such exchanges.



Approximate share of traffic through European IXs. Source: Euro-IX; authors analysis

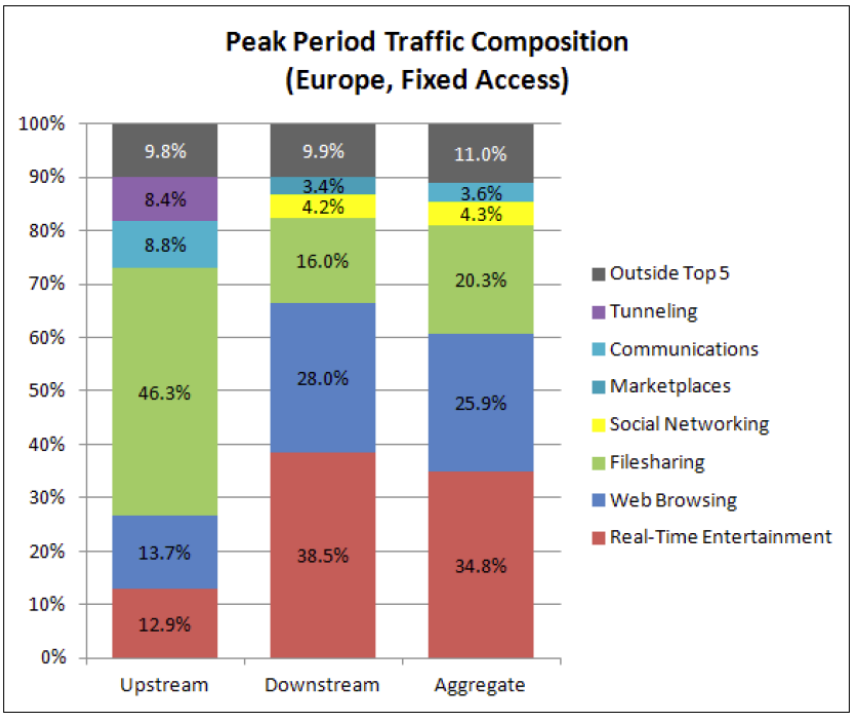
While public peering allows many networks to interconnect via a more cost-effective shared connection, private peering is the direct interconnection between only two networks that offers exclusive, dedicated capacity. We estimate that at least 20% of all traffic in European internet exchanges is peered privately.

The figure below shows how real-time entertainment is the largest traffic type in Europe (video and audio), followed by web browsing, file sharing, social networking, and communications (mainly VoIP).

Aggregate traffic composition in Europe (Sandvine 2012)

In the UK the major generators of content online are all video providers: BBC iPlayer (5.1%), Netflix (2.51%), Lovefilm (1.46%), and 4oD (1.1%), but due to their regional character and restrictions, they fail to be among Europe's top ten services overall. In the US, Netflix is the main traffic driver with 29% of composite traffic and the analyst firm Sandvine estimate that Netflix alone accounts for one-third of capacity infrastructure costs in the US (Sandvine 2012).

Arbor Networks estimated in February 2010 that 60% of Google's traffic was channeled through direct interconnects that link its data centres to one another. Assuming this share has not decreased, and combined with estimations (Sandvine 2012) of



Youtube making up about 20% of aggregate traffic, this would indicate that at least some 12% of peak time traffic in Europe consists of Google's privately routed YouTube traffic. During interviews we have further confirmed our preliminary belief that privately peered traffic makes up at least 20% of total traffic volume in Europe.

Using data from individual exchanges and Euro-IX, we have observed traffic volumes through all European internet exchanges and estimated average total exchange speeds for public peering to be approximately 8.7Gbps in October 2012. If we take the conservative estimate that privately peered data volumes correspond to 20% of total peered traffic, this yields total peered internet traffic of 10.9Gbps and a total volume of some 3600 PB (petabyte) per month. When comparing our own estimates to those of Cisco's Visual Networking Index, we note that traffic through the internet exchanges only make up about 30% of Cisco's estimated total traffic on the internet. This is explained by the fact that Cisco includes managed IP traffic and other traffic observed at the end-points of the network that do not necessarily pass through the internet exchanges.

European internet traffic estimates 2012 (PB / month)	Total internet traffic in Europe	Of which real-time entertainment*
Traffic in European IX (LSETech estimates 2012)	3,594(30% of Cisco total estimates)	1,258(29% of Cisco total estimates)
Cisco VNI total traffic estimates (2012)	11,930	4,358

*Internet traffic as observed in internet exchanges versus Cisco's total estimates. * Source Cisco VNI 2012: real time entertainment defined as consumer internet video.*

Our research in progress raises questions relevant to interconnection pricing and the relation between internet players:

1. *How do internet exchanges affect peering and transit prices?*

There are strong indicators of a correlation between internet peering prices in the large exchanges and overall European transit prices. This influences business models and could affect how to charge for internet traffic.

2. *How can a deregulated market for peering be sustained by internet players?*

There is a functioning self-regulated market for peering agreements. However, if disagreements on pricing results in users ending up being disconnected, we could expect to find more pressure on regulatory authorities to intervene. It is our view that all stakeholders should engage in negotiation based on greater information transparency to avoid such interventions if the consensus is for a functioning regime of self-regulation.

3. *How can an evidence-based policy for peering be sustained by regulators?*

The whole community needs accessible data on internet traffic to enable evidence-based policy: while we can measure a great deal about traffic on the internet, there remains a great deal that is obscure, incommensurate or inaccessible. The first implication is that strategic decisions could be ill-informed among firms, and the second is that policy-making is suffering from a lack of evidence to support effective interventions. This is an area where further scholarly work could lead to strengthening existing self-regulatory regimes.

The monitoring of the internet is supported by the research community's role in facilitating evidence based debate and data. LSETech would like to invite industry representatives to assist us in these data gathering efforts.

Note: this blog post is part of a broader internal report written by Jonathan Liebenau, Silvia Elaluf-Calderwood and Patrik Karrberg as part of LSE Tech, partly supported with research funds from the European Telecommunications Network of Operators (ETNO). The full report will be available shortly.

This article gives the views of the authors, and not the position of the London School of Economics.

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This entry was posted in broadband, convergence, digital economy, Europe, internet, internet economics, Jonathan Liebenau, LSE Tech, Patrik Karrberg, policy, Research, Silvia Elaluf-Calderwood and tagged internet economics, internet metrics, internet traffic, IXs, measurements, UK. Bookmark the permalink.