Press release
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Transit for-Peering "TP4" Interconnection for Cost Reduction in Internet traffic

A new research study carried out by Institute IMDEA Networks proposes a new type of interconnection between Internet Service Providers (ISPs) named “T4P” (Transit for-Peering). TP4 allows two diverse ISPs to peer without exchanging monetary payments. This hybrid interconnection is intended to strengthen Internet connectivity by liberating peering from economic constraints and actually reducing the total transit bill of the ISPs involved.

The Internet consists of interconnected networks owned by a multitude of companies called ISPs (Internet Service Providers). The variety of interconnection arrangements between ISPs is dominated by two main types, namely IP (Internet Protocol) transit and peering. With IP transit, one ISP - called the customer - pays to another ISP – called the provider - for delivery of both upstream and downstream global Internet traffic. Since the interconnecting infrastructure is dimensioned to handle traffic peaks, the transit charges are for the peak traffic. The transit prices are also subject to economies of scale, i.e., the larger is the traffic on the transit link; the lower is the price per unit of traffic. In order to reduce their transit traffic and thus their transit costs, two neighboring ISPs can directly interconnect with each other through a so-called peering arrangement. Peering can take place through a dedicated physical link between the two ISPs or at an IXP (Internet eXchange Point) that provides a shared infrastructure for peering. In settlement-free peering, the two ISPs exchange their own customer traffic without paying each other for the traffic. Because such reciprocity does not always satisfy both partners, paid peering has emerged. From a technical point of view, paid peering is the same as settlement-free peering: the two ISPs exchange their own customer traffic only. However, one paid-peering ISP pays the other a monetary compensation for the interconnection.

Why is the traffic-based reciprocity not always a sufficient compensation in peering arrangements? While some ISPs focus on connecting content providers, others shift their attention to last-mile services and connect residential users. The last-mile infrastructure for connecting the users requires larger investments than for connecting the content providers. Hence, the last-mile ISPs try to extract payments from content-provider ISPs. Also, due to the high costs, the last-mile ISP market usually sees little competition, and content-provider ISPs have limited alternative means for reaching the users.

While paid peering becomes more common, conflicts between content-provider ISPs and last-mile ISPs emerge and disrupt the Internet connectivity. Recently, after content provider Netflix became a customer of Level 3, Comcast threatened Level 3 to terminate their peering link and thereby prevent Level 3 from reaching the end users of Comcast. Although Level 3 offered to

resolve the conflict through technical means (e.g., by upgrading its communication infrastructure and making routing more beneficial for Comcast), Comcast rejected the offer and terminated the peering, temporally disrupting connectivity for a portion of the Internet.

To mitigate such tensions and strengthen the Internet connectivity, we propose T4P (Transit for-Peering), a new type of ISP interconnection that allows two diverse ISPs to peer without exchanging monetary payments. In T4P, one peer provides the other one a transit service for some of its traffic as an incentive to maintain the interconnection. T4P is a promising alternative to paid peering due to the economies of scale in transit pricing. By shifting transit traffic from one ISP to the other, T4P succeeds in reducing the total transit bill of both ISPs. This cost saving gives T4P an economic edge over paid peering in maintaining the interconnection.

The authors evaluated the T4P concept using real data from six IXPs. The data collection uses an OCR (Optical Character Recognition) tool that transforms traffic images into numeric data. The tool was developed and used for the data collection by Dr. Rade Stanojevi for a previous joint project: CIPT: Using Tuangou to Reduce IP Transit Costs. Additionally, the authors employed transit prices published on the website of Voxel, a medium-size transit provider. The data-driven evaluation shows that T4P can provide significant savings, up to ten thousand Euros per month for some pairs of ISPs at the examined IXPs.

The study "T4P: Hybrid Interconnection for Cost Reduction" was recently presented at NetEcon 2012 (7th Workshop on the Economics of Networks, Systems, and Computation), the premier network-economics workshop held in conjunction with IEEE INFOCOM 2012 (31st Annual International Conference on Computer Communications), which took place at the end of March, in Orlando, Florida, USA on March 30th. The publication is authored by Ignacio Castro and Sergey Gorinsky of Institute IMDEA Networks.

Read more:T4P: Hybrid Interconnection for Cost Reduction

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About us

IMDEA Networks Institute, promoted by the Regional Government of Madrid, is a research organization on computer and communication networks whose multinational team is engaged in cutting-edge fundamental science and technology. As a growing, English speaking institute located in Madrid, Spain, IMDEA Networks offers a unique opportunity for pioneering scientists to develop their ideas. IMDEA Networks has established itself internationally at the forefront in the **development of future network principles and technologies**. Our team of highly-reputed researchers is designing and creating today the networks of tomorrow.

Some keywords that define us: 5G, Big Data, blockchains and distributed ledgers, cloud computing, content delivery networks, data analytics, energy-efficient networks, fog and edge computing, indoor positioning, Internet of Things (IoT), machine learning, millimeter-wave communication, mobile computing, network economics, network measurements, network

security, networked systems, network protocols and algorithms, network virtualization (software defined networks – SDN and network function virtualization – NFV), privacy, social networks, underwater networks, vehicular networks, wireless networks and more…

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