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# TRAMMS

Traffic Measurements and Models in Multi-Service Networks

TRAMMS IP Traffic report n3, June  
2008

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*Providing Internet Traffic Patterns from real-life User Application Usage*

## **Abstract**

The Celtic TRAMMS project (<http://projects.celtic-initiative.org/tramms/>) measures and analyzes IP traffic in European access networks. The IP traffic report gives a brief summary of the results. It is available to the public, by download from the project website.

Through the cooperation with network operators, among others some Swedish municipal networks and Spanish networks, TRAMMS has a detailed picture of the traffic in today's access networks, including applications usage. The results in this issue are from measurements of 6000 CMTS (Cable Modem Termination System) customers in a Spanish network during 11 days at the beginning of 2008. The report includes as well results from measurements of 250.000 GPRS/UMTS customers in a Spanish network during 1 month at the beginning of 2008.

In addition to the measurement results shown, this Newsletter includes a comparison between the observation in the Swedish municipal network and the Spanish network under study within the TRAMMS project.

## P2P applications in the fixed network

As long as the fixed network is concerned, it is clear that the peer-to-peer (P2P) traffic dominates the bandwidth, with a share of 77 %. This figure is similar to the one obtained for the Swedish network studied in the “TRAMMS IP Traffic Report no1” Newsletter. The main difference with the previous study is that the outbound traffic is not as large, due to the difference in the access technology. Nevertheless, the P2P applications are the main contributors to the outbound traffic with a share of 85% of the total outbound traffic in the network. Streaming media, such as e.g. HTTP media stream and RTSP and the like, make up a small fraction of the bandwidth, around 3% of the total volume (the same way it did in the Swedish network).

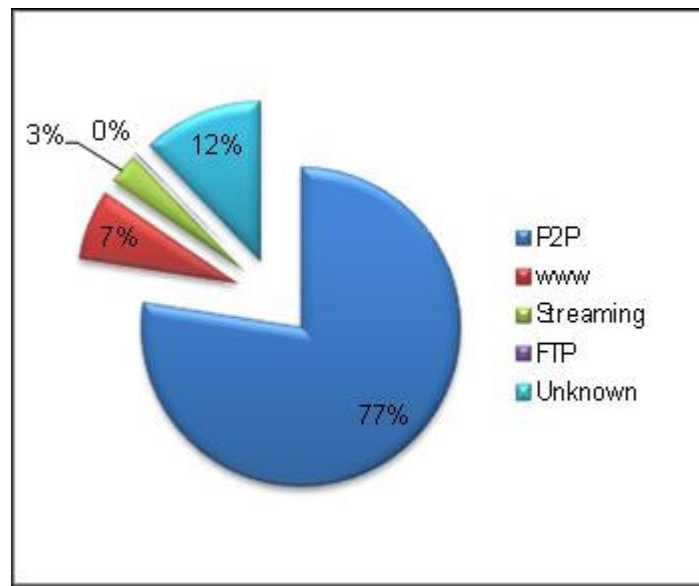


Figure 1. Categorized applications in per cent of total bandwidth on the fixed network<sup>1</sup>

The P2P application that is by far most popular (in terms of traffic volume) is eDonkey, with a share of 68 % of the total volume, which can be seen in Figure 2. This differs from the Swedish network where BitTorrent was the dominant. Second, is BitTorrent (23 %), followed by Ares (4%), Thunder and Pando with only 1% each. Another difference between the Swedish and Spanish network is that the second most traffic

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<sup>1</sup> “Unknown” stands for applications that are not readily identified by the measurement system. This can be because of unseen applications (proprietary applications used in the network) and obfuscated P2P protocols. The measurement device is continuously updated to support this applications and are usually around 3-5 percent of the network traffic. In this case the traffic is most probably encrypted and obfuscated eDonkey

generating application in Sweden, namely Direct Connect, is barely used in the Spanish network.

With the present information it is quite hard to explain the difference in the P2P application usage. One important factor when it comes to what applications to use, is the social factor, people do what they see as more common. In this situation people in Sweden use what other people in Sweden use and people in Spain use what other people in Spain use. However, there should be a reason for the up taking of one or another in each country, at least before the use is spread and seen as common. There might be many reasons that make one or another application be more successful in one or another country, like usage easiness, type of contents, freshness of contents, bandwidth needs or even cultural issues. Most likely it is a combination of these or other factors what make people use eDonkey or BitTorrent. Due to this personal factor, it is thought that some short of customer questionnaires would be necessary in order to gain more insight on this issue.

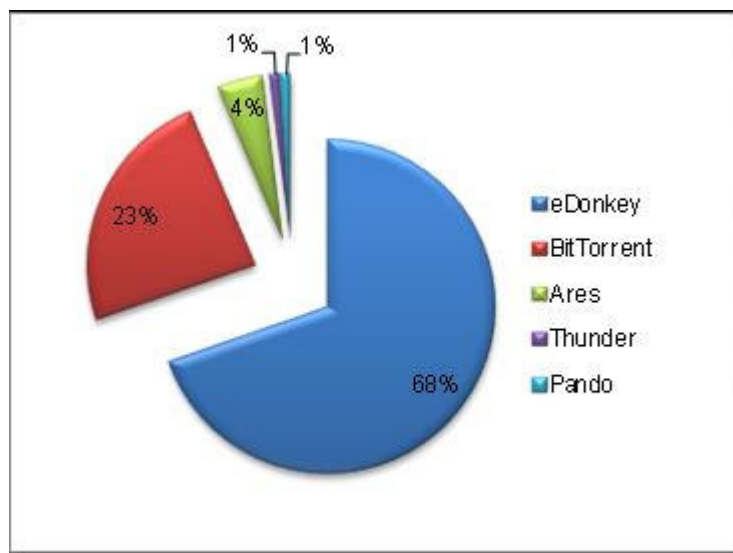


Figure 2. P2P applications, share of total P2P bandwidth on the fixed network

### P2P applications in the mobile network

In the case of the mobile network, the predominant application is the web browsing with a share of 36% of the total volume, notwithstanding the P2P applications have a quite important share (17%). The fraction of the media stream is also considerably large being 7% of the total.

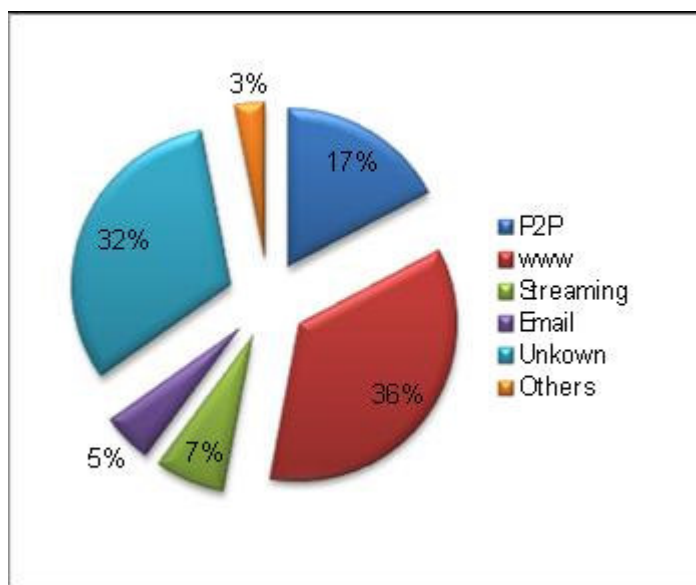


Figure 3. Categorized applications in per cent of total bandwidth on the mobile network<sup>2</sup>

Among the P2P applications eDonkey is, by far, the most used (in terms of traffic volume). This situation is in line with the P2P usage in the Spanish fixed network. However, the difference among P2P applications is larger in the mobile network than in the fixed network. Thus, the share of eDonkey is 93% of the P2P traffic, whereas BitTorrent represents 5%, and Ares and PPLive only 1% each.

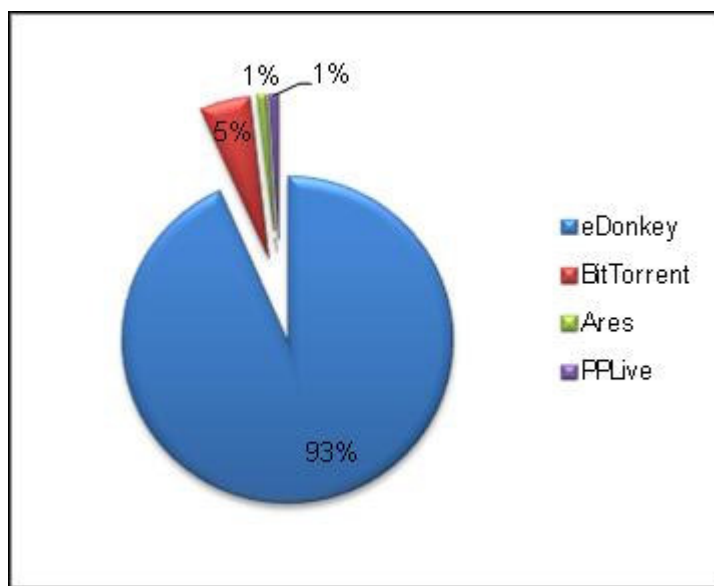


Figure 4. P2P applications, share of total P2P bandwidth on the mobile network

<sup>2</sup> A later analysis of the “Unknown” traffic showed that most of it was eDonkey encrypted

## Streaming applications in the fixed network

The mostly used (in terms of traffic volume) streaming protocol is HTTP media stream, which is the one used by e.g. Youtube. As is shown in Figure 5, this protocol has a share of over 70 % of the total streamed traffic. The rest of the streamed content comes from many other applications, which all have a quite small share of the total. The second largest application for streaming content does not reach over 10 % of the total streamed content.

With this regard, the Spanish and the Swedish networks look alike. Not only on the type of applications that are used for media streaming, but even in the traffic volume shares per media stream application/protocol. The only difference is that while in Sweden RTSP media stream is the second largest traffic generator and PPLive is the third, in Spain PPLive is the second most traffic generator and RTSP media stream is the fifth.

This observation is most likely caused by the fact that the measurements presented in this Newsletter are done over a cable TV operator network. In this type of network, there is no IPTV traffic on any kind. Hence, the VoD traffic associated to the IPTV services disappears. This would explain the difference in percentage of RTSP media stream traffic between the Swedish (where there is IPTV traffic) and the Spanish networks

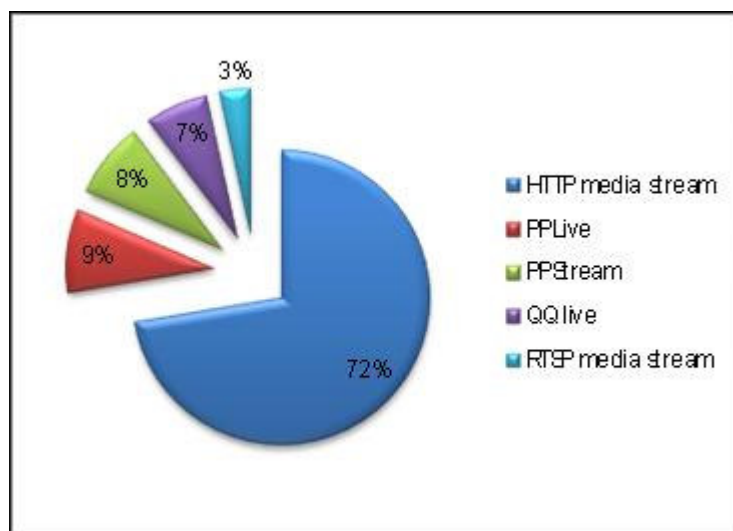


Figure 5. Streaming protocols, in per cent of total streamed traffic on the fixed network

## Streaming applications in the mobile network

In the case of the mobile network the difference between the HTTP media stream and the other applications is even bigger than in the fixed case. Hence, 96% of the media streamed traffic is HTTP based. Regarding the less traffic volume consuming applications, PPLive is once again the second largest with 3%, followed by RTSP media stream with 2% of the total media streamed traffic volume.

The most plausible explanation for this difference between the fixed and the mobile networks is the bandwidth needs. Being PPLive a P2P application, it might have certain demands on the traffic (especially in outbound traffic) that the mobile access network is not able to fulfill. Accordingly it is normal that the usage of P2P TV applications (PPLive, PPStream, QQLive) is more spread in the fixed than in the mobile network.

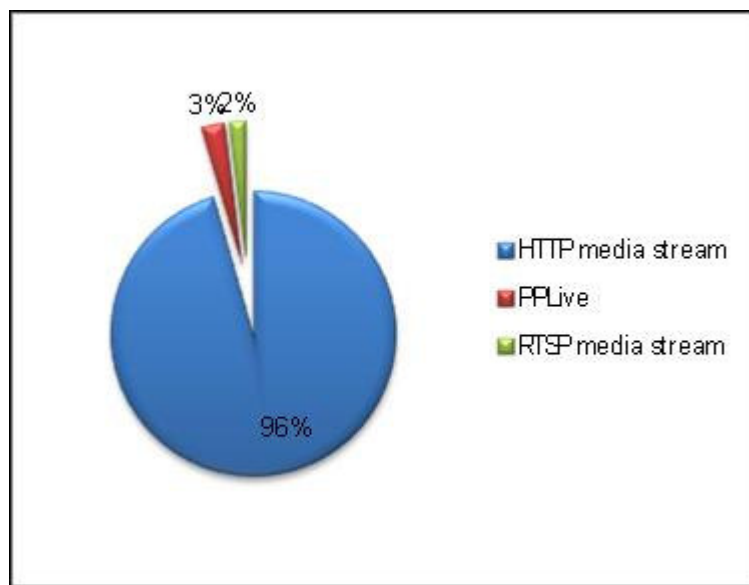


Figure 6. Streaming protocols, in per cent of total streamed traffic on the mobile network.

## **About these measurements**

The measurements reported here are performed with deep-packet/deep-flow inspection, and the results in this report are from one Spanish network with ~6000 CMTS customers, performed during 11 days in the beginning of 2008, and 250.000 GPRS/UMTS customers during 1 month in the same timeframe. With the measurement technique used, the unknown traffic is usually in the order of 10 % in the case of the fixed network and 30% for the mobile network. For more information on project results, please check the public deliverables, that will be posted on the project web site.

If you would like to receive the public reports about results from the traffic measurements done in TRAMMS, please indicate this in an email to [tramms-info@celtic-initiative.org](mailto:tramms-info@celtic-initiative.org)