SURVEY ABOUT RUNNING INTERNATIONAL IPTV PROJECTS – STANDARDS, SPECIFICATIONS AND FUTURE DIRECTIONS

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ABSTRACT

Along the development and requirements of moving picture as part of file transmission technology in the Internet, interdependencies between radio, TV and internet broadcasting (IPTV) the author makes an outline of running business models. The article explains how different these projects are, which motivations stand behind them and which limits they have to face. It names evolving standards, specifications and organizational methods. The other main focus besides the technological one is on the economic impact of IPTV, its relation to Google's powerful advertising market initiatives, to international projects and to the private sponsoring program of the European Union and the EBU (European Union Broadcasting). Further emphasize is put on the P2P-Next-project, its technological principle, its community impact and its accelerative effects in the arising IPTV market. Regarding to this the author shows the dimensions and limits of capacity growth (Cisco Study), the role of open source solutions and licensing within the vivid scenario of IPTV as well as some long term consequences to private TV broadcast market.

INTRODUCTION

At the end of the 90's around the turn of the century, the first affords were made to spread moving picture through the internet. The companies Apple with its famous program Quicktime and Realnetworks were responsible for the development of streaming technologies. After internet technology by alternative transmission means became ever more interesting for a growing amount of business models, also software giant Microsoft engaged itself on the slow-growing market. Techniques bet on server/client systems. Most of the internet users at that time were still attached with ISDN or dialup modems to the internet. In common, basis of technology at that time consisted of two factors:

1. The development of file formats, which did not have to be downloaded completely from the internet, but were playable already during the loading procedure;

2. The media were stored by software (buffering) on the computer of the consumers, to guarantee a trouble free reproduction (practically as a virtual data dam).

BUSINESS MODELS

The offers at that time were not competitive because of missing range and rendering quality compared with similar means of transmission like classical television or DVD. However within the field of radio broadcast this looked already different: by the introduction of DSL-technology and new account models, with ISPs (flat rates) it was no more problem to receive radio through internet. Today you hardly find any radio broadcast which does not offer live stream. For quite a time (from 1998 to 2004) it was to be good form at classical television stations to offer their formats over internet too. The magic word "video on demand" went through the whole industry. For pure news broadcasting services like CNN, N-TV, or BBC immediately it became a practical obligation to make their program accessible live by the internet.

The business model was simple: the initiators expected more spectators since television reached the consumer also at their workplace. That business model did not work. The internet television became a victim of its own success. After the tragedy of 09/11 many news stations were forced to switch off their streaming offers from their websites. One the one hand the capacity of lines and servers were overloaded in such a manner that there was no transmission possible anymore. The costs on the other hand took their toll: while a pure audio stream of an internet radio requires in an hour per user only about 100 MB, video files in TV quality require nearly one Gigabyte (GB) capacity. If you even wish to offer HD-TV it requires considerably more. In this case 1.8 GB per user and per hour traffic capacity is required and this costs a lot of money.

Beside classical senders again and again there were also efforts of content providers to use the streaming technologies for the spreading of special interest formats. Until the end of the 90's a strong growth market was expected here too. The key word for this was "Business-TV", where another trend became visible: Many start-up companies purged into an euphoric gold rush attitude, as it sounded perfect to disseminate television fast and simply over the common internet. The technology became ever less expensive. But extremely high traffic costs should be avoided as nobody expected an audience of millions and airtime should be sold excellently, since the intention was to address a selected target group directly – in conventional TV business, a fantastic precondition. However you mostly didn't see anything from live-TV by the internet at these dotcoms – most of the offers resembled a

conglomeration for self-advertisement. Spectators were missing completely. The most eminent problem of the "internet TV" broadcasters consisted in the quality of their content. Television is a mass media and money can be gained in this business only with a measurable ratio earn. In order to achieve a good rating, you must offer good content – and this costs money. The situation of internet TV broadcast is the case as in ordinary television broadcast: it is the most expensive what exists in this business, the production of contents, which is accepted by the consumer. Of course for this you need expensive professionals.

YOUTUBE AND OTHERS

After 2004 the internet became ever more a general information medium. Everything could be found on the internet in digital form, on what also conventional mass media reported. Live content was not anymore the guarantee for the success of a portal. The user behaviour of the internet developed more and more in such a way that the user arranges his information for his own purposes. 2005 the portal YouTube started. In November 2005 YouTube received 3.5 million US dollar from the silicone Valley venture capital provider **Sequoia Capital**, which had helped also Google during the initial financing. In April 2006 the young company got additional 8 million US dollar from Sequoia. Soon about 65.000 new videos were high-loaded day by day and 100 million clips were watched daily (status: October 2006).

The popularity of **YouTube** can be explained with the large community, which can up-load video files and is able as well to evaluate as to put its comments on them. Since its establishment YouTube rapidly ascended to be the most prominent video portal in the internet. At the present we presume a market share of approximately 45 per cent. The evaluation of YouTube rose from US $ 600 million in the spring 2006 to 1.5 billion US dollar in the autumn of the year. According to a New York Post report there were companies such as Viacom, Disney, AOL, eBay and Rupert Murdoch's News Corporation – the parent company of the New York Post – interested in a purchase of YouTube. By the purchase of the portal MySpace for 580 million US dollar in the year 2005 Murdoch's media empire sounded the bell for new internet purchase intoxication. On October the 9th 2006 YouTube was bought from the search engine operator **Google** for 1.31 billion Euro (in shares).

For conventional mass media meanwhile YouTube & Co. has become a genuine problem. The advertising economy recognized since long that such on demand content portals represent an outstanding platform. Not only that you can advertise purposefully, it is also easily possible to receive by evaluation of the "user behaviour" direct conclusion of his habits and preferences.

CURRENT SITUATION

IPTV is the keyword of the media industry in the present – but what is behind it?

An exact definition does not exist. IPTV is a mixture of technical achievements deriving from transmission of moved picture contents by the internet. IPTV is not even defined whether it concerns itself with the transmission of Live pictures or video on demand services.

In the video on demand business (**VoD**) the fight is in full activity. YouTube, according to the statement of a study of a prominent American IT enterprise, was responsible for scarcely 10 % of the world-wide data traffic in the internet in the year 2007. This conclusion is a result of own computations of Ellacoya network, a provider of telecommunications solutions. This US company at the same time determined a decrease of Peer to Peer Traffic (P2P). After four years, in which the **P2P**-data transfer was absolutely dominating, it is now for the first time HTTP traffic prevails again. 10 % of data traffic is a lot; until now each company went bankrupt which tried to put at stake one per mill of it. Server costs must be about the range of a million.

However, **Google** seem to speculate on a long-term basis on the success of the market. Nearly since two years YouTube is already in the possession of Google and for not more than a couple of weeks Google began to experiment with advertisement. Also in this matter Google shows up to be extremely generous: if somebody places his content at YouTube he can select whether he wishes additional advertisement or not – if the upload procedure permits it. Thus he gets a good piece from the cake. The advertisement runs directly over the Google cash cow service Adsense, the only division of the company, which makes profits. Since a long time Google is no search engine anymore. It is the **largest** advertising marketing company in the world. The expensive investment in YouTube will be worthwhile for Google; it is a credit on rates. It is not all about for YouTube to earn money compellingly by advertisement by videos being switched, but rather to bring a market promptly under control.

Google already took in the internet advertising market for scarcely 2 years. Because of the purchase of DoubleClick Google nearly can't be caught up any longer. In the future Google intends to be not only the number one provider in on line advertisement, but also in newspaper advertising, in radio spots **and TV** ad and to make thus media agencies and even advertising agencies redundant. Google has built up its own department with not less than 1000 employees, whose task consists of adapting and transferring AdWords to radio broadcast purposes – project name: AdSpots. This shows to be a thorn in the side of the advertising industry since Google can offer more favourable Spot seconds with the systematic of AdWords by practically selling an entire AdWords package: beside advertisement in the Web also that in print, radio and TV.

Concerning the dissemination of video content YouTube is meanwhile a important factor. TV producers start to bring television sets on the market which access the portal by network interface. The classical media companies recognized the trend too: Meanwhile every media giant has its own **Myvideo.com**, Clipfish, Sevenload or LiveLeak.com portal. After the fight for the VOD market seems to be

nearly decided, a new fight for a long-contested market begins – the spreading of conventional TV broadcasters on the internet. The difference to the well known dot.com blister is small but fine and is more detailed than before. Formerly the promoters tried to spread internet television or to bring the internet into the television – today thoughts tend to go rather to spread the television with the support of the internet.

In the last six months systems appeared on the market, which makes conventional television program by the internet accessible. In **China** this branch is mostly widespread by the CCTV service at the moment. There are two main reasons that conventional television is moving along this way just now and as slowly as it does:

1. While VOD services like YouTube only offer many different clips of an average play length below 3 minutes, and above that very often in bad quality, you have to admit that the users of **live-TV contents** by live stream watch the program for several hours and in a substantially high quality. This needs a multiple from traffic than YouTube.

2. There are problems with the **rights** and their clarification. While YouTube bet on user generated content, of which rights are free usually, TV broadcasters have to clarify the rights for every film they show. German TV market e.g. is one the most expensive ones, since a broadcaster who sends in Germany, and offers its service to German speaking audience also in Austria, Liechtenstein, Luxembourg, in parts of Switzerland, Italy, and Belgium, has to buy the rights for any of these countries. Above this, in such contracts at present the spreading in the internet is excluded since years and would cause additional costs.

EUROPE AND RELEVANT PROJECTS

In the last years TV broadcasters negotiated well with their partners, and film lenders slowly accommodate the media corporate groups with their needs. Also on Peer2Peer there are already existing alternatives for quite some time. **Octoshape**, a Denmark company, developed a plug-in which makes it possible to receive conventional live streams as P2P stream. The list of the customers is long, especially international, national foreign broadcasters like the Deutsche Welle, TVE – Televisión Española as well as the EBU European Broadcasting Union, the union of the broadcasting stations of the European Union ruled under public law. Also the parliamentary television of the European Union offers a live stream through Octoshape. But the European Union as well as the EBU slowly withdraw themselves from the Octoshape program and invest into its own open source solution.

At the beginning of March a consortium and institutes of European universities were established in order to launch the P2PNext project. Altogether 21 partners from the field of private economics and research are involved in the European Union promotion project P2P-Next. One goal is the development of a European-wide "NEXT generation" distribution system for internet television on the basis of P2P-technology. The European Union provides 14 million Euro for the development of the related programs (in its **"7th Framework"**-program Financing program for the promotion of the research and the capacity to compete of the technology industry in the European Union). Private investors and the EBU invest further 5 million Euro. A substantial technical aspect in the context of the project is the efficient distribution of new content by P2P-technology solutions. The dissemination of content which already many users received by P2P-technology solutions is simple: Everybody can offer contents once purchased for his part as „Seed". The distribution of new content in a P2P-network can prove itself to be difficult because of small Seed numbers. This applies particularly with contents, which very many users wish to see in real time if possible, as for instance sports broadcasting.

The **P2P-Next-Project** is going beyond the pure technical aspects and dimension. Also legal and regulation aspects are important and covered, because P2P-protocols are known for the use in illegal file-sharing and therefore have some kind of "bad reputation". To strike against the provisos against P2P-technology activities are going on to show up to network providers in which way "legal" P2P technologies can be applied for serious distribution of services. A further juristic aspect is already clarified: the outcome of the main Software technology will be **open source**. The project duration will be up to 4 years and first system tests will run in May 2008 within the online broadcast of the Eurovision Song Contest. The leading hand is with **VTT**, the Technical Research Centre of the University of Helsinki. The technological basis of the project has also been provided by the VTT – the P2P exchange bourse **Tribler**.

The P2P-Next project is showing up new dimensions – it is the first one, where different partners from different disciplines (research / industry) and countries are engaged to set up adequate specifications and standards. Furthermore it is the first project in this area which not only related to PC / Internet reception but also related to **set top based television** (TV sets).

The American company Zattoo has developed a system for cost free distribution of a broadcast. The software is working based on the P2P principle – like the exchange bourses. Accordingly no traffic costs occur on the provider side. Every body, who is receiving the broadcast is also distributing it. The network load is distributed among the users. For Zattoo just the provision of manageable network capacities is necessary. An interesting feature of the **business model** is that the advertisements are faded in just in case of a channel change – and also user specific data are collected, reflecting the user behavior. At present **Zattoo** achieved to gather up to 25 German-speaking broadcasts and in the following weeks the complete broadcast offer of ARD and ZDF (again approx 25 programs) would be applied. In this way Zattoo has established a service based on the broadcast of 50 German-speaking broadcasts within just one year.

AGAIN GOOGLE AND YAHOO AND OTHERS

As well some days ago **Google** has pronounced to provide life stream services via YouTube for this year. What

Google is planning in detail is not clear at the present and published. – it is just quite mysterious.

Yahoo is already present with an online live streaming offer. Within live.yahoo.com everybody can switch on and connect his webcam. It is to be assumed that Yahoo is more oriented on somekind of „live video blog“ than on broadcast of high quality content.

A further interesting and serious project is Joost, which is driven by developers and P2P pioneers of the first exchange bourse **Kazaa**. After several struggles in copyright and IPR issues Kazaa was closed. But the technological development was followed up – and out of Kazaa the VOIP messenger **Skype** has derived – also capable for video conferencing via P2P.

Joost is just oriented on English speaking clients and VOD end users. Since end of March also Joost is experimenting with the broadcast of live content, e.g. sport broadcast of NCAA (National Collegiate Athletic Association). With respect to VoD services Joost has access to content of considerable and namable content providers – mostly from the US market. For the beta phase contracts are closed with **Paramount**, Warner Bros., Viacom, Endemol and Turner Broadcasting System. Joost defines itself not as a pure IPTV service, but is grounding in the community aspect and issue.

FUTURE DIRECTIONS

Meanwhile it is not the question if “IPTV will come up”, but rather “which kind of technology will be prosperous”. For the international network providers the broadband capacity is the main problem. A prognostic study of Cisco says that already next year the consumer IT traffic will reach and overtake the business traffic.

Accordingly within the next four years the consumer traffic will increase by 58% a year, whereas the business traffic will increase just by 21% a year. So in the year 2011 monthly **28 Exabytes** (28 Billion Million Bytes) will flow via the networks as IP Traffic – hereby 3/5 as consumer traffic – as predicted by Cisco.

The biggest contribution to this fast growth will be the IPTV traffic. So in 2011 only 40% of the IP traffic will be conventional internet traffic. The rest of 60% will be due to commercial video services, which are distributed via IP (in 2005 the part of pure internet traffic was proportionally 80%). The major part of the IPTV signals will be the «Internet Video-to-TV traffic». That is due the fact that at present the predominant «Internet Video-to-PC traffic» is dominated by short formats of low quality however the «Video-to-TV traffic» consists of long term formats with higher quality. The so far biggest part of IP traffic – the P2P traffic – will be quadrupled and will reach in 2011 a volume of **two Exabytes** per month as the Cisco prediction says.

On the long run it is expected that open standards will come up in the market. The providers of IPTV offers and the network providers are called for being oriented on **common unique standards** to get the traffic under control. This will be handled by mirror- and Proxy-server distributing the net capacity on the network.

The media industry has to be focused on the development of new business models. So far used licensing rights for content are going out of time. General and international wide new rules for distribution licenses for program supplier have to be established and/or reworked. At present every broadcast station needs a state-approved license – vendors like Joost are broadcasting already without any license. The **governmental regulation** could not been fulfilled. – It seems that the regulation will be achieved by the market itself. In future sanctions against program vendors will be ruled by an international adaptation of the civil and criminal law. The entertainment industry has to agree on open standards like already made by DVB in the field of digital broadcast. In the past the industry could impose the user with special types of systems – but nowadays the industry has to learn to be oriented on the demands given by the user.

The future will be **OPEN SOURCE** – individual offers – open standards. On the long run software packages like WindowsMedia or RealNetworks will loose their market influence due missing compatibility. Who in future still will prefer old license models, DRM and proprietary codecs will be “punished” by the user and audience via disinterest. At the present companies like Google, LiveLleak, Zattoo and Joost already show up, that it is possible to make winnings just based on “new” business models. Already at the present in the US most of 20% of the current ABC TV series hits, like CSI, Dr. House and Co are not consumed via classical TV but via the streaming platform http://go.com (a joint venture of ABC, Disney, ESPN).

CONCLUSION

What will be the television in future? What is the influence of IPTV on today’s markets?

The future economical situation of conventional private broadcast stations, whose business model is solely based on advertisement and whose market value is still determined by audience ratings will be not the best – no to say: it will be worst and black.

By entering of IPTV the advertisement industry has the main advantage. Based on IPTV there will exist no uncertain representative quotas – there will exist certain and precise accounts and statistics. On the long run the influence of IPTV will result in the decrease of the conventional private television. In Europe public broadcaster will only exist furthermore, if a common European rule framework could be established based on a European common broadcast governmental contract. In the future the costs for the technical installation of a broadcast television station via Net will be just a fraction of the conventional ones. This yields self-evidently in an increase of the broadcast vendor spectrum. Accordingly this will influence the advertisement market – the incomes via advertisement will decrease. The distribution of News and information will solely be done by international cooperating broadcast joint ventures.