Workshop on technical and legal aspects of peer-to-peer television
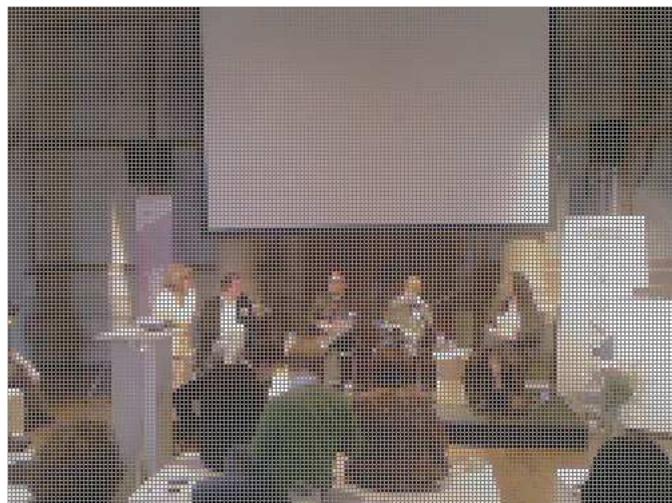

Creative Commons Netherlands & TU Delft
Friday, 17 March 2006, Felix Meritis
Keizersgracht 324, Amsterdam

Text by Martijn Arnoldus, Creative Commons NL
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More than 90 participants attended the Workshop on technical and legal aspects of P2P-television on 17 March 2006, in Amsterdam. During the workshop Delft University of Technology presented the newly developed Tribler software. That P2P-software is part of the I-Share research project. The participants shared ideas about this kind of open source software can be used by public and commercial television broadcasters. Near the closing of the workshop William Valkenburg of the Dutch Public Broadcaster announced that the Dutch public broadcasters would shortly sign a 'letter of intent' to start a pilot project using Tribler. In the pilot some TV-productions will be made available to and through the Tribler P2P-system. The pilot will also focus on the possibilities for making content available under Creative Commons licenses.

The curiosity about P2P-systems among television companies is understandable. P2P-networks (or peer-to-peer-networks) rely on the computing power and bandwidth of the participants in the network rather than concentrating it in a relatively low number of servers. This system makes it possible to broadcast TV-programmes at little or no cost. It also offers possibilities for launching new internet-TV-stations. If the TV-broadcasters would use P2P-technology they would no longer face high costs of data distribution.

However, when using P2P-technology it is important to carefully deal with copyrights. P2P-networking does not go well together with contemporary copyright regulations. Creative Commons licenses may offer a solution for some legal bottlenecks associated with P2P-networks. During the workshop researchers, TV-producers from The Netherlands and from abroad, and experts in the field of licensing discussed the current state of affairs in the use of P2P-technology and Creative Commons licenses.

Welcome and introduction

Chair: Monique de Haas, Dondersteen Media

**Workshop objectives
Syb Groeneveld – Creative Commons
Netherlands**

'It is a special day today!'

With those words Syb Groeneveld opened the
workshop on technical and legal aspects of P2P
television. The workshop came exactly one year
after the first European Creative Commons
meeting, which was held at the Creative Capital
Conference (www.creativecapital.nl) at the same
location. Syb pointed out that the workshop
could not have come at a more appropriate moment for more than one reason.

First, a month earlier the European Broadcasting Union organized the seminar 'From P2P to
broadcasting'. Rather than associating P2P-networks with piracy, the seminar's organizers
called for a more positive attitude towards the challenges and promises of P2P. Second, just a
week before the workshop podcasting pioneer Adam Curry won a case in court about the
publication of some photos in the Dutch magazine Weekend. Weekend had taken the pictures
from Curry's pages at Flickr.com, where he had published them under a Creative Commons
license. The magazine, however, did not take notice of the full license text and illicitly used the
pictures for commercial purposes. Finally, within one week from the workshop the Blender
Foundation will release, in cooperation with Montevideo, an animation movie that has been
completely made from open content material. What is more, the movie is to be released under a
Creative Commons license.

Syb then gave a short overview of Creative Commons. Although still a rather young movement,
Creative Commons is present all over the world. The body of material licensed with Creative
Commons licenses is steadily growing. The Creative Commons licenses offer a flexible
alternative to standard 'all rights reserved' copyright. Using Creative Commons licenses does
not mean the author has to give up his copyright. On the contrary, Creative Commons licenses
build on existing copyright regulations. They offer the author the possibility to grant certain rights
to all users of his work, as long as particular requirements are met (like attribution, non-
commercial use, no derivative works, or the requirement to publish derivative works using the
same license).

At the end of his introduction Syb summarized the objectives of the workshop:
- to explore current P2P-systems;
- to study the possibilities of P2P-technology in the Dutch broadcast and narrowcasting
  environment;
- to investigate legal aspects of the use of Dutch Creative Commons licenses in P2P-TV.

I-Share programme
Inald Lagendijk – Professor in ICT, Delft University of Technology

Professor Inald Lagendijk gave an introduction about the Freeband/I-Share Project. The goal of the I-Share Project is to develop a vision for communication in The Netherlands, a programme that is leading in The Netherlands, a knowledge position in ambient intelligent communication. P2P is one of the ways to share – but it certainly is not the only one.

The I-Share project will investigate the sharing of resources in, what has been coined, virtual communities consisting of heterogeneous and transient nodes and networks. Virtual communities are (virtually bounded) groups of nodes that are willing to share resources and to help each other for the benefit of individual and system performance. As a particular case the project considers the sharing of resources for the processing of multimedia streams, as this faces the sharing nodes with significant challenges in terms of volume of data, processing requirements, and security (Digital Rights Management).

Research focuses on mechanisms for trust, willingness, resource discovery and sharing mechanisms in virtual communities (work package 1), as well as mechanisms for distributed and layered content-processing algorithms utilizing the resource sharing in virtual community (work package 2). Demonstrations and validation of the developed algorithms and software are planned in collaboration with the so-called Freeband project Personal Network Pilot 2008 and with a number of associated European research projects.

Professor Lagendijk outlined that Tribler, as a new P2P-system, is of interest to I-Share. In the international arena P2P-TV is increasingly seen as a visible and innovation-driving alternative to server-client IP-TV. The message of the I-Share project for the rest of the world, and in particular for those attending the workshop, is that one should be aware of the rapidly emerging technology. Professor Lagendijk finished by inviting the audience to think of technological issues that should be solved if P2P-TV is to be installed and implemented.

Session 1: P2P Systems

Interesting ways to deliver interesting content
George Wright – Senior Producer, BBC Interactive Television

George Wright of the BBC gave a concise overview of 'the state of play' in the world of media and television. He listed some of the technologies and challenges that are coming up, like HDTV, SAT, maybe DTT, and user generated content. What is more, new challenges also come in the shape of new devices like interactive media players, multicast and the BBC's Creative Archive. And in the shape of new customer demands like 'I want it realtime and DVD quality!' These kind of demands also result in more hybrid challenges. To stick with Wright's way of putting it: 'realtime video + realish time data = hard'. People expect ever more from their television set, and want the same over IP.

In a world in which every channel is just one click away the BBC sometimes deliberately restricts the access to content. The way in which the BBC distributes has three main features. First, it is a one-to-many-system. That is an expensive system to set up, but it is easy to scale. Second, the BBC wants to be reliable. People expect to plug and play. Third, the system is fast. Switching analogue channels is still the benchmark to beat.

Furthermore, Wright made it clear that the TV-broadcasters face a major challenge in selecting content and in helping people to navigate. 'There is so much content out there that could be broadcasted', Wright noticed. 'There are 14,992 programmes you missed last week. How do you navigate that?' The BBC-way to archive old Eastenders episodes, for example, is to publish them as 'Eastenders Thursday, Eastenders Wednesday', and so on.

Wright summarized BBC's attitude as 'reluctant distributors'. According to the senior producer the BBC looks at other people and then copies what they are doing. The BBC usually stand on others' shoulders. However, if it comes to new (P2P-)distribution models the BBC has no one to look to now.

Trends and statistics in Peer-to-Peer
David Ferguson – Vice president of Engineering, CacheLogic

Where is P2P today? This was the question David Ferguson of CacheLogic asked in his presentation. CacheLogic provides intelligent network solutions to the ISP/Telecom sector. Ferguson showed the audience a large number of figures and graphics to make clear that the usage of P2P-technology is widespread and growing. On average one-third of all internet users

in OECD countries have downloaded using P2P. Yet, P2P is a global phenomenon and it is all about video. Video accounts for over 60 percent of all content distributed in P2P-networks. On a global scale, the average size of downloaded files is well over 1GB. In Asia the average figure even exceeds 2,5GB.

'Can P2P be stopped?' Ferguson asked after showing his impressive stats on P2P-usage. Taking the RazorBack2 case as an example, Ferguson made clear that it had not impact at all on eDonkey traffic levels. In other words, P2P is here to stay. The landscape has, however, changed quickly. Companies that had been initially fighting P2P-technology now seem to embrace the technology. Ferguson mentioned Warner Bros as an example.

Ferguson continued by asking whether or not the industry can provide a scalable P2P-platform for the delivery of television. It turned out to be question with a big question mark. Part of the problem associated with P2P-television is the network infrastructure. ADSL and Cable Modem were designed for asymmetric traffic, and the asymmetry is increasing! (download:upload, ADSL: 11:1, ADSL 2: 24:1). What is more, almost all P2P-file sharing is international (over 90 percent) and therefore expensive. All upstream capacity has been consumed.

Ferguson concluded by drawing attention to the different ways in which broadcasters and Internet Service Providers (ISPs) perceive P2P-technology. The dilemma for ISPs is that P2P drives end user to adopt broadband and that it provides a source rich media, but at the same time it utilizes networks in the worst possible way from an economic perspective. This makes P2P expensive for ISPs, whereas it is a cheap solution for broadcasters.

Official release of the Tribler.org P2P-TV software
Johan Pouwelse – Senior researcher TU Delft
Huib de Ridder – Professor in Industrial Design, TU Delft

Johan Pouwelse gave a 25-minutes presentation about Tribler, outlining that P2P is a 'hot topic', and that it requires operational systems. Tribler, developed by Delft University of Technology (and the Free University of Amsterdam) is the newest addition to the family of operation systems. Pouwelse gave an overview of the evolution of electronic sharing, starting with the pre-1990s floppy and tape and finishing with the 2006 introduction of Tribler.

Pouwelse stressed the need for an alternative. P2P has 85 million addicted users, but it seems to be a social norm that P2P is equal to theft. P2P is a disruptive force because it allows cheap information distribution, because it is superior to IPTV, because it is robust, because there is no need for the man-in-the-middle, and because direct interaction between the creator and his audience is possible.

Keeping this disruptive image in mind, Pouwelse presented a vision: near-zero cost infrastructure for content distribution. Key elements of this infrastructure are 100,000 channels,

communities, used by millions, support of content creation, applications that should include amateur journalism, video blogs, and that would turn every webcam into a TV-station. Tribler should be the first step towards the realization of this vision.

Why is Tribler different from other BitTorrent-like systems? The differences between current systems and Tribler's new approach is that every user helps with the content and forward video to others. Important features of Tribler include:

1. BitTorrent compatible
2. Social base (built on top of social network; solves incentives problem; community co-design)
3. Overlayconnect (BitTorrent: 1 file=1 swarm, Tribler enables inter-swarm communication)
4. Strong peer authentication (person oriented, abstract IP away, pseudonimity, connect between Tribler peers)
5. Megacaches (peers exchange and store, share memories with friends, altruism levels)
6. Semantic clustering (understand taste of user, exchange of preferences, store preferences in Megacache, buddycast message)
7. Download booster (download == upload, adsl upload bottleneck, donate upload to friends, download at Max ADSL speed)

Finally, Tribler is fully open source.

After the first introduction by Pauwelse, Huib de Ridder talked about P2P-software as 'social software' in more detail. He argued that with software like Tribler it is very important to understand the user. What the user wants is to get it fast, 'come to me' instead of 'I go and get'. A new feature of Tribler is the option to 'lend' bandwith to peers in the networks.

De Ridder showed four clusters of psychological factors that help to stimulate more users to cooperate. These factors come in addition to economic incentives to cooperate. The four clusters arise from an inventory of 22 state-of-the-art internet sharing applications.

The first clusters is social distance, and measures the 'relations' between users in the network. Social visibility shapes the second cluster. One can think of forums, reputation, or donation as components of this cluster. The third cluster identified by De Ridder is named user profiling. Registered membership is an example of a tangible indicator in this cluster. Power of collectivity is the fourth cluster. Factors like quality of service and tagging belong to this cluster.

Session 2: P2P for broadcasting

The future of digital broadcasting
Cory Doctorow – BoingBoing & Craphound
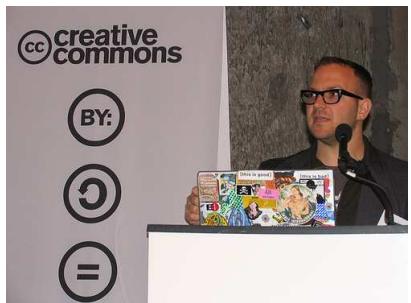
At the start of his talk Cory Doctorow warned the audience that he would speak very fast. Immediately he moved on to internet business and new business models for the digital age. Illustrating how 'technology giveth and technology taketh away', Doctorow explained a number of examples of business that are not ready for the internet. One of the statements made by Doctorow was that if your business criminalizes the majority of internet users, it is NOT internet-ready. It should not come as a surprise that reference was made to digital rights management (DRM). Doctorow used the example of CD versus DVD. If you want to put a DVD on your iPod by ripping it you're a criminal. Now CDs are open and more uses and business has evolved thanks to the CD. Doctorow concluded that if a business strategy results in tens of millions of dollars invested in protection, lawsuits, etc. it is not an internet business model.

Doctorow went on about DRM. It is the technology for what you do with media after you acquire it. Under DRM what you get is that everything has to be owned by someone. So, Doctorow reasoned, it won't work in open models. When you have technology you should have the right to know it, understand it and improve it. Implementers should not resist that users modify work.

Doctorow continued about DRM, by outlining the failure of DRM-technology to achieve what it is meant to. An illustration of this is the mean time that passes between the moment a DRM music file appears at iTunes and the moment it surfaces at eDonkey: just 180 seconds. According to Doctorow, the problem with DRM is that no one buys media *because* of the DRM. DRM is no incentive to pay. What you need to do is to find a way to be better than P2P-networks. What works is enabling conversation.

To conclude his fast talk Doctorow gave an urgent message to the audience: your best strategy is not to fight the future.

Web Archives and P2P
Julien Masanès, European Internet Archive

The American Internet Archive is already here. In Europe there is a far advanced plan to construct a European Internet Archive. In his lecture, Julien Masanès, one of the pioneers talked about that initiative in relation to P2P-technology. He suggested his talk could go two directions. First, the European Internet Archive is a big content repository that consumes lots of bandwith. The pioneers have always believed P2P might be a solution for circulation of open content. The other direction the talk could take, was that the European Internet Archive may be a good step towards building a memory for the internet. The half-life for resources on the

internet is two years on average. This means that after two years only half of the content that could originally be found, is still available. Masanès is convinced a way of improving the memory of the internet should and will come from collaboration networks and not from individual organizations.

The European Internet Archive monitors how content is being used? A web archive has been operational since 1996, which takes a snapshot of content every 2 months. Currently, it collects over 4 billion pages per crawl (50 TB/mo). The collecting is done by Alexa Internet. Storage, access and preservation are done by the Internet Archive. Masanès concluded that we do not know exactly what the role of the archive will be in future. It may be a model for collaborative archiving.

The evolution of the mediaspace
Kari-Hans Kommonen, Media Lab Helsinki

Yet another perspective on the potential roles of P2P-networks was presented by Kari-Hans Kommonen. He talked about the digitalization of society, which is evident in at least three forms. First, electronic devices are turning into digital computers. There hardly is an electronic device left today that is not to some extent a digital computer. Second, information is increasingly stored as digital bits. Third, the communication of devices increasingly takes place in the shape of digital networks.

As a result software is rapidly becoming more important than hardware. You can implement computers as any other functionality (phones, video, TV, etc.). Little by little all the devices are using their identity through the integration of functions (look at smart phones). They all become multi-purpose digital devices. They are, Kommonen argued, fantastic platforms for software evolution. Hardware becomes less and less important, software importance is increasing. Kommonen illustrated this by referring to his cell phone. He told the audience that he has no emotional connection to the machine at all, but an intimate one to the information inside.

Software is infinitely more flexible than any hardware-based technology. Digital systems therefore tend to replace old systems in all areas of life (money, trade, transport, access control, identification, media, and so on) because of their efficiency. The seamy side of the developments is that people cannot choose if they want to be part of it. Choices are made by powerful organizations (corporations, governments), and by experts. The redesign of society in the digital age is going on in all domains: everyday life, structures, systems, functions, processes, making a living, competing, media…

To Kommonen there are two key issues. First, who can design in the digital age and how? Second, who can discuss in the digital age and how? Hardware is ubiquitously available. The key question therefore is access to software. Here, intellectual property rights become the most important tool for access control. The media 'is' where society thinks. Society negotiates its beliefs and designs. Media access in the past can be characterized by the question: 'can I write

in the newspaper or speak on TV?'. In today's world access to the media depends on the software (thus on IPR).

Essentially media space has become a peer-to-peer environment. Kommonen argued that it can, however, be designed to work like any old structure. The key challenge is therefore to move towards a better utilization of P2P, emerging social media practices, and evolving new designs.

DRM & Licensing systems
Frank Kamperman – Philips Research

Frank Kamperman from Philips Research gave a lecture about digital rights management. DRM is an umbrella term referring to any of several technologies used to enforce pre-defined limitations on software, music, etc. Kamperman outlined that the purpose of DRM is to enable new content distribution channels and business models. Protection of content is necessary as losses to piracy already total $4.2 billion.

Using a couple of slides Kamperman explained how Encrypted Content Keys, usage rules and licenses determine the business models for DRM. In contrast to the lectures that were given earlier, Kamperman stressed the problematic of protecting DRM from hacking.

Going a bit further into detail Kamperman outlined the differences between device-based DRM and person-based DRM. In the first system, there is a direct link between the content and the device. Content can be used on (only) that device. Other devices might also be allowed, but only when they have been added to the 'rules' of the system. With person-based DRM the link is between content and a particular person. That person may access the content from different devices, but no other person can.

When it comes to sharing and distributing content, Kamperman explained that the distribution mechanism does not really matter. Encrypted material can be shared in P2P-networks. It just cannot be opened. Kamperman argued that there are several advantages to DRM. It enables secure content distribution, runs on any existing P2P/communication network, there is no large server park required, and it allows for business model differentiation.

Session 3: Aspects for implementation

Panel debate
Paula Le Dieu – Director iCommons
Esther Hoorn – Institute for Information Law
Willem Valkenburg - Representative Public Broadcaster
Cory Doctorow – BoingBoing & Craphound

The final part of the workshop came in the shape of a panel debate. Paula le Dieu, former director of iCommons, Esther Hoorn of the Institute for Information Law, Willem Valkenburg of the Dutch Public Broadcaster and Cory Doctorow gave their views on P2P-television and Creative Commons. Esther Hoorn started off with an overview of Creative Commons. She noted that Creative Commons enables flexible business models, that end users want involvement in sharing. They want to be able to find content, and they want to find what they may do with the content. Hoorn concluded that in general licenses mirror the social views of users. Creative Commons licenses can facilitate sharing, using, and improving. They reduce cost of right clearances, but do not offer a solution for 'orphan works'.

Paula Le Dieu willingly added some additional figures about Creative Commons. There are now over 8 million images in Creative Commons archive. There is a rapidly growing arena of open content. Creative Commons licenses are translated to the jurisdictions of 26 countries, with Mexico releasing just hours after the workshop as the 27th jurisdiction.

Cory Doctorow joined the debate to talk about Creative Commons as an 'offer to professionals'. Doctorow stated that his problem as a SF-author is not piracy, it is obscurity. The experience of every author who did a free download has been much better than they expected. Hoorn added that this also goes for scholarly publishing.

Willem Valkenburg announced that the Dutch public broadcasters will join in a Tribler pilot. The public broadcasters view Tribler as a way to experience with the social component in the

software. However, Creative Commons licenses are still a problem because of shared IP-rights. What is needed first of all is a clean sweep of content. If the clean sweep succeeds a lot of content could be made available to the public. In this context Valkenburg mentioned the success of 'uitzending gemist', a service provided by the public broadcasters to enable viewers to watch programmes they missed on the internet. He warned, though, that bandwidth is becoming a serious problem. Valkenburg also noted that from a cost-perspective P2P is not very important to Dutch public television.

Clean sweeping really is the 'holy grail', Le Dieu argued by referring to the BBC's Creative Archive. Prohibitive factor remains the rights acquisition and the BBC owns very little of its own archived material. That really is a problem. Doctorow added another problem. The 'non-use' of commercial rights you might be sitting on prevents content from being openly published.

Valkenburg continued about the rights issue. He stated that since the Geneva seminar one month earlier the attitude has changed. Broadcasters are now aware of what is going on. They understand they have to re-examine the rights issues and resolve the issue now for the future. But you need an example first to show the people how useful.

But could open content initiatives stimulate or more or less force the use of creative commons licenses, someone in the audience wanted to know. Valkenburg responded that when you buy a programme and are on a tight budget, it is cheaper to lease the programme. That has been the ordinary way of working for the last decades. However, in future the public broadcasters will have to deal differently with the rights when they acquire them.

Le Dieu agreed. The future will be concurrent uses: no one thinks it is strange to see a movie on television one night and be able to buy a DVD of it the next day. What is more, Le Dieu concluded, open content is an excellent way to put your country on the map. There is a future for open content in P2P-television.