Inclusiva-net: #4

Networks and P2P Processes

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From July 6th to 10th, 2009
Directed by Juan Martín Prada

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Inclusiva-net:

Inclusiva-net is a platform dedicated to the research, documentation, and circulation of network culture theory. Its main study and documentation areas are the processes of social and cultural inclusion of telecommunication networks and their effects in the development of new artistic practices and critical knowledge production.

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Michel Bauwens

To the Finland Station, a 21st Century Update

http://p2pfoundation.net

This essay consists of three parts. The first part is a general presentation of the nature of the present crisis, and how we can possibly/realistically expect a renewed period of growth. The second part explains the role of peer to peer dynamics in this re-orientation of our political economy, while the third part explains its political implications, and the possibilities for a phase transition towards a post-capitalist society, centered around peer production.

Part one:
understanding the present crisis

The nature of the present crisis

my understanding of the present crisis is inspired by the works on long waves by Kondratieff, and how it has been updated in particular by Carlota Perez, in her work: *Technological Revolutions and Financial Capital.* This work has recently been updated and re-interpreted by Badalian and Krovorotov.

The essential understanding of these approaches that economic history can be understood as a series of long waves of technological development, embedded in a particular supportive institutional framework. These long waves inevitably end up in crisis, in a Sudden System Shock, a sign that the old framework is no longer operative.

Why is that so?

These waves have a certain internal logic. They start with a period of gestation, in which the new technology is established, creating enthusiasm and bubbles, but cannot really emerge because the institutional framework still reflects older realities. This is followed by a period of maturation, marked by institutional adaptation, massive investment by the state, and productive investment by business, leading to a growth cycle. Finally, a period of decline and saturation, in which the state retreats, business investments become parasitic, leading to a contraction cycle with speculative financial bubbles, which ends in a Sudden Systemic Shock (1797, 1847, 1893, 1929 or 2008).

To understand the current period in this framework, some dates are important:

- 1929 as the Sudden Systemic Shock ending the previous long wave.
- 1929-1945: gestation period of the new system.
- 1945-1973: maturation period, the high days of the Fordist system based on cheap domestic oil in the US.
- 1973: inflationary oil shock, leading to outward globalization but also speculative investment and the downward phase ending in the Sudden Systemic Shock of 1929.

The important thing is this, every long wave of appr. 50-60 years has been based on a combination of different structural developments in production and distribution. Whilst modern economics is totally focusing on the monetary side of things, the crisis is only explainable if we also look on the physical side.

So each long wave cycle was an interplay of

- 1. A new form of energy (f.e. the UK domination was based on coal, the US domination was based on oil); in the beginning of a new

wave, the newly dominant power has particular privileged access to a cheap domestic supply, which funds its dominance; when that cheap supply dries up, a (inflationary) crisis ensues, which forces that power outwards, to look for new supplies in the rest of the world. This results in both dynamic globalization, but also in the awakening of a new periphery. Because the last phase is linked to globalization and the control of external energy supplies, it is also strongly correlated to military overstretch, which is a crucial factor in weakening the dominance of the main player.

- 2. Some radical technological innovations (no more than 3 according to the authors); The 3 last ones: 1830: Steam and railways, 1870: Heavy engineering, 1920: Automotive and mass production.
- 3. A new 'hyper-productive' way to 'exploit the territory'; This is where land use comes in. For the last period, though the overall benefits are contested industrial agriculture and the 'Green Revolution' did lead to a jump in agricultural production capacity. The last 'parasitic' phase of a long wave cycle is then also marked by hyper-exploitation of existing land base. The example of the dust bowl in the American mid-West is an example. This accumulation of problems in turn lead to the search for new methods of land-use that can be used to develop new types of land for the next up cycle.
- 4. An appropriate financial system: i.e. the new type of public companies, and New Deal type investments (such as the Marshall Plan) in the growth cycle phase, morphing into the parasitic investments of casino capitalism in the second phase. Importantly, Badalian and Krovorotov note that each new financial system was more socialized than the previous one, for example the joint stock company allowing a multitude of shareholders to invest.
  In the growth phase, the newly expanded financial means fund the large infrastructural investments needed to create the new integrated accumulation engine; in the declining phase, the financial system overshoots the capabilities of the productive economy, becomes separated from it, and starts investing in parasitic investments.
- 5. A particular social contract. Here also, we can see waves of more intensive 'socialization'. For example, the Fordist social contract created the mass consumer in the first phase, based on social peace with labour, while in the second parasitic phase, the part going to worker's was drastically reduced, but replaced by a systemic indebtedness of consumers, leading to the current Sudden System Shock.
- 6. A particular way of conceiving of the organization of human institutions, in particular the conception of the types of businesses and the management-workers relations, but also internally, the types of collaboration amongst employees and between employees and management.
- 7. As we mentioned above, each wave has been dominated by a particular great political power as well, and in the second phase of expansion, a new periphery is awakened, creating the seeds for a future wave of dominance by new players. For example, the U.S. was peripheral for the long wave occupied by the British Empire, but became dominant in the next phase.

Roots of the current crisis

It is important not to forget the essential characteristics of the contraction cycle: what enables growth in a first phase, becomes an unproductive burden in the second, declining phase of the wave.

If we review the 6 factors, it's easy to see where the problems are:

- 1. The era of abundant fossil fuels is coming to an end; after Peak Oil, oil is bound to become more and more expensive, making oil-based production uneconomical. Nuclear Power is no real replacement for this, as its own raw material is equally subject to depletion, and it poses many long-term problems through its waste products.
- 2. The era of mass production, based on the car, requires a too heavy environmental burden to be sustainable, and is/was heavily dependent on cheap energy for transportation.
- 3. Industrial agriculture destroys the very soils that it uses and is mainly based on depletable petroleum-derivates.
- 4. The financial system is broken and the $10 trillion bailout drains productive investments towards unproductive parasitic investments.
- 5. The Fordist social contract, broken in the 80s, has led to the increased weakening of the Western middle class and a generalized precarity, which no longer functions after Sudden System Shock.
- 6. The old dominant power, the U.S. can no longer afford its dominance, and has awakened the periphery, most likely East Asia. The powers that see the opportunity to compete are looking for new societal structures that help them emerge. They cannot rely on the strategies of the dying long wave to achieve these goals, but must invent new ones.

Seeds of the new

What are the innovations that we can expect if a new wave is to occur?

- 1. The technology for renewable energy has been developed, but needs at least $150b annual investments in the U.S. alone, in order to become economical. A Green New Deal would jumpstart the new energy era. The wasteful heavy energy usage of the fossil fuel era will need to be replaced by smart precision-based energy usage. Solar energy will probably be the backbone of renewables but can be supplemented by other forms.
- 2. The era of mass production is ready to be replaced by more local production in small series, based on developments such as flexible and rapid prototyping based manufacturing, mass customization, personal fabrication and additive fabrication, multi-purpose machinery. This flexible system of manufacturing is faster, cheaper, more adaptive, more compatible with solar and renewable energy, can only thrive by deepening participative engagement, thus requiring the re-awakening of production intelligence and personal initiative that were discouraged

by the various forms of the industrial system, including the systems based on central planning.

- 3. Post-industrial organic agriculture has already proven more productive than destructive industrial agriculture, but needs to be generalized; land use needs to be re-expanded within cities where vertical agriculture can be developed more intensively. This form of agriculture uses diversity as its backbone and works with the most sophisticated feedback cycles of nature. It saves also human labour time.

- 4. The seeds of the new financial system, based on increased socialization towards civil society, have been developed in the last few decades: 1) sovereign wealth funds re-insert the public good in investment decisions; 2) Islamic banking and similar mechanisms avoids the hyper-leveraging that destroyed the Wall Street system; 3) microfinance broadens entrepreneurship and financing to the 'base of the pyramid'; 4) crowdfunding mechanisms, social lending and various credit commons approaches expand the availability of credit; 5) flow money approaches through a circulation charge to discourage parasitic investments.

- 5. The periphery of newly emergent countries has been awakened and will in all likelihood lead to a dominance of the East-Asian region. However, opportunities for other emergent players are still open, providing they find the appropriate local integration of the productive resources of the new long wave. In this context, we can see the emerging success of Brazil, while Russia has its enormous landmass as immense and under-exploited productive resource.

- 6. Social media and the internet, now used primarily by civil society and networked individuals, will profoundly change the nature of businesses and other human organizations. Business and work organization needs to go to a profound redesign process to incorporate the hyperproductive benefits of social media.

Peer-to-Peer and the new social contract

A new long phase has been historically associated with an upsurge of the role of the state and the public sector, which alone can undertake the necessary investments which private investment cannot take up in the early phases.

However, we need to be aware of one of the fundamental characteristics of the new period, which is a revival of the role of civil society. The internet is enabling the self-aggregation of civil society forces in the creation of common value, i.e. through peer production. Global communities have shown themselves capable to be hyper-productive in the creation of complex knowledge products, free and open source software, and increasingly, open design associated with distributed manufacturing.

This means that a hybrid form of production has emerged that combines the existence of global self-managed open design communities, for-benefit associations in the form of Foundations which manage the infrastructure of cooperation, and an ecology of associated businesses which benefit and contribute from this commons-based peer production.

These companies, which enable and empower the social production of value, have become the seeds for the dominant companies of the future (Google, eBay, etc...). Companies will need to open up to co-design and co-creation, while the distribution (miniaturization) of the means of physical production, liberates the possibilities for smaller more localized production units to play more essential roles. We believe that the role of solely profit driven multinational companies, without any roots in local communities, is reaching its historical end, and will be replaced increasingly by new models of entities combining profit with the realization of social and public goods. Socially-conscious investment, sovereign wealth funds, micro-finance, social entrepreneurship, fair trade and the emergence of for-benefit entities point to this new institutional future of entrepreneurship. For the state form, this means morphing from the welfare or neoliberal state models, to that of the Partner State, which enables and empowers social production.

The new social contract therefore will mean:

- 1. Expanding entrepreneurship to civil society and the base of the pyramid.
- 2. New institutions that do well by doing good.
- 3. Social financing mechanisms based on peer to peer aggregation.
- 4. Mechanisms that sustain social innovation (co-design, co-creation) and peer production by civil society.
- 5. Participatory businesses and other human organizations.
- 6. Focus on more localized precision-based physical production in small series, but linked to global open design communities.

The new long wave that we are hypothesizing is of course speculative, and needs some caveats.

First of all, it cannot occur without a long period of disruption and adaptation, also needed for the deleveraging of debt of the previous period.

Second, though long waves have structurally occurred in the last 2 centuries, the severe crises related to the depletion of fossil fuels, but also the impact of climate change, could possibly derail such a scenario.

It may also be that, as the current infinite growth system is incompatible with the survival of the biosphere, that these cyclic tendencies may be overturned and interrupted by a more fundamental crises, involving the very survival of capitalism.

Nevertheless, I think that there is a real possibility of a next long wave, based on a new social contract, where netarchical capitalists and peer producing communities will play a larger role. This long wave may likely be interrupted half-way.

What we deem likely is the following: 1) a period of deleveraging and restructuration; 2) a new upturn cycle of the new wave.

However, it is when the upturn hits the first halfway crisis of a Kondratieff Wave, in the context of deepening resource and climate change related crises and challenges, that the crisis of the present system

will become systemic, and open up the possibility of a further phase transition, to a form of post-capitalism which is compatible with the survival of the biosphere.

The new modality that has been emerging before the crisis as an emergent new social, political and economic practice is the peer to peer dynamic; it is at present an emergent phenomenom. We believe that its uptake will speed up during the deleveraging and adaptation crises, in order to become a new part of the new social contract, during the new upturn of the Kondratieff cycle. At the end of this half-cycle, when peer to peer may achieve some form of parity, the systemic crises may then lead to the new system becoming the dominant meta-system, while the market system may be the new subsystem integrated in the new system.

With this context set, we can now explain the importance of the peer to peer dynamic itself.

Part two: the economics of P2P

General introduction

Peer to peer social processes are bottom-up processes whereby agents in a distributed network can freely engage in common pursuits, without external coercion, i.e. permissionlessly undertake actions and relations. This requires not just 'decentralized' systems, but 'distributed' systems, through which individuals can cooperate. Distributed networks do have constraints, forms of internal coercion, that are the conditions for the group to operate, and they may be embedded in the technical infrastructure, the social norms, or legal rules. Despite these caveats, we have here a remarkable social dynamic, which is based both on voluntary participation in the creation of common goods, which are made universally available to all.

Peer to peer processes are emerging in literally every cranny of social life, and have been extensively documentation in the 9,000+ pages of documentation at the Foundation for Peer to Peer Alternatives, and many other places on the Web.

P2P social processes more precisely engender:

- **Peer production:** wherever a group of peers decided to engage in the production of a common resource.
- **Peer governance:** the means they choose to govern themselves while they engage in such pursuit.
- **Peer property:** the institutional and legal framework they choose to guard against the private appropriation of this common work; this usually takes the form of non-exclusionary forms of universal common property, as defined through the General Public License, some forms of the Creative Commons licenses, or similar derivatives.

Peer governance combines the free self-aggregation between individual skills and universally broadcast tasks, processes for communal validation

of excellence within the broader pool of input, and defense mechanisms against private appropriation and sabotage. Peer governance differs from hierarchical allocation of resources, from allocation through the market, and even from democracy, as these are all mechanisms for dealing with scarce resources. Peer governance essentially aims, and often succeeds, in making sure that no formal 'representative group' can take decisions separate from the community of peer producers.

These new property forms have at least 3 characteristics:

- They are aimed against the private appropriation of the commonly created value.
- They are aimed at creating the widest possible usage, i.e. they are universal common property regimes.
- They keep the sovereignity with the individual.

The third aspect is why peer property fundamentally differs both from private property and collective property.

Private property is individual but is exclusionary, it says, what is mine is not yours.

But state, that is collective property, is also exclusionary, but in another sense: it says, it is ours, but it means that you no longer have the sovereignity. It's from us, regulated by a bureaucracy or representative democracy, but it is not really yours. The collective has taken over from the individual, and more often than not, coercion is involved.

But the General Public License, or the Creative Commons licences are different. Common property is not collective property.

Using them, the individual gets full attribution, i.e. the recognition of his personal property. You are freely sharing your sovereignity with others. This is especially clear in the Creative Commons licensing schemes, where the individual gets a whole gamut of options for sharing. You remain fully in control, i.e. "sovereign", and there is no coercion involved.

It is important to note that peer production is a form of "generalized", on non-reciprocal, exchange. It is not a gift economy, based on direct exchange or obligation. So peer production is not to be equated by cooperative production for the market: participation has to be voluntary, there is no direct reward (but many indirect rewards) in the form of monetary compensation. The process itself is participative. And the outcome is similarly free, in the sense that anyone can access and use the common resource. In reality, most peer production projects are intertwined with a smaller core of people who may get paid, and use finances to create an infrastructure so that the peer production may occur.

If we look at peer production as a mode of production, as a process involving a input, 'processing', and output phase, then we can say that it requires the following:

- Open and free raw material that can be used permissionlessly. Thus, peer production either requires the creation of such open and free

raw material by the producers themselves, or materials that are in the public domain or in a commons format already.

– The process is participatory with a design that is geared towards inclusion and a posteriori validation, not exclusion through a priori filtering of the participants.

– The output is universally available and therefore, uses peer property formats or in other words: a Commons.

As the Commons-oriented output creates a new layer of open and free input for further transformation and processing, we have here the requirements for social reproduction of the system, called the Circulation of the Common by Nick White-Dyerford.

Looking at these three inter-related paradigms of open and free, participation, and the Commons, we can then easily understand while movements striving for these conditions and social practices, are arising in almost every single field of human activity.

The conditions for peer production to emerge are essentially: abundance and distribution. Abundance refers to the abundance of intellect or surplus creativity, to the capacity to own means of production with similar excess capacity. Distribution is the accessibility of such abundant resources in fine-grained implements, what Yochai Benkler has called modularity or granularity. Again we could talk about the distribution of intellect, of the production infrastructure, of financial capital.

It is important to distinguish two spheres. In one sphere, our digitally-enabled cooperation, reproduction of non-rival knowledge goods, such as software, content, open designs, takes place at marginal costs, and there is only no loss by sharing, but actually a gain, through network effects. Such free cooperation can only be hindered 'artificially', through either legal means (intellectual property regimes) or through technical restrictions such as Digital Rights Management, which essentially hinder the social innovation that can take place. In this sphere, a non-reciprocal mode of production becomes dominant, since resources are not rival, and you're not losing, but gaining, through giving. In the sphere of material production, where the costs of production are higher, and we have rival goods, we still require regimes of exchange, or regimes of reciprocity. Notice that in a sphere of virtual abundance, where copying is trivial, there is no tension between supply and demand, and hence no market.

Post-capitalist aspects of peer to peer

Peer production, though embedded in the current political economy and essential for the survival of the cognitive forms of capitalism, is therefore essentially post-capitalist. Essentially because it is outside wage dependency, outside the control of a corporate hierarchy, and does not allocate resources according to any pricing or market mechanism.

Similarly, peer governance could be said to be post-democratic, because it is a form of governance that does not rely on representation, but where participants directly co-decide; and because it is not limited to the political field, but can be used in any social field. Peer governance is non-

representational, and this is essentially so because what the networked communication affords us, is the global coordination of small groups, and therefore, the peer to peer logic of small groups can operate on a global scope. Hierarchies, the market, and even representative democracy, are all but means to allocate scarce resources, and do not apply in the context where abundant resources are allocate directly through the social process of cooperation. However, since the pure peer to peer logic only fully functions in the sphere of abundance, it will always have to insert itself in the forms that are responsible for the allocation of resources in the sphere of material scarcity. Peer governance based leadership seems a combination of invitational leadership, i.e. the capacity to inspire voluntary cooperation, and a posteriori arbitrage based on the reputational capital thus obtained. However, the process of production itself is an emergent property of the cooperating networks.

Finally, peer property is a post-capitalist form of property because it is non-exclusionary, and it creates a commons with marginal reproduction costs. There are two main forms of peer property. One is based on the individual sharing of creative expression, and is dominated by the Creative Commons option which allows an individual to determine the level of sharing. The other is applied to commons-based peer production, and takes the form of the General Public License or its derivatives or alternatives, and requires that any change to the common, also belongs to the common.

The hyper-productive nature of peer to peer

Pre-capitalist class societies are based on coercive extraction of surplus value and hierarchical allocation of resources. Capitalism is based on the part real and part fictional process of equal exchange of value. In other words, we can say that coercive societies are based on the extrinsic motivation of fear, while capitalism is based on the extrinsic motivation of self-interest.

Peer production structurally eliminates extrinsic motivation and replaces it with intrinsic motivation, or in other words passion. It is psychologically the most potent and productive form of human motivation. In addition, the market only allows, at best, for win-win scenarios of mutual interest, but is structurally designed to ignore externalities. Corporate firms can only strive for relative quality in a competitive environment, but peer producing communities strive structurally for absolute quality. As an object-oriented sociality based on the construction of universally available common value, peer production inherently strives for positive externalities, and lacks much of the motivation to create negative externalities for the sake of profit.

The combination of all these characteristics create a hyper-productive mode of production, and a asymmetrical competition with pure for-profit firms relaying on wage labour and closed intellectual property.

This allows us to formulate the bold hypothesis of the Law of asymmetrical competition, which states that:

Any for-profit company based on closed IP, faced with the competition of a peer producing community, a for-benefit association managing the

infrastructure of cooperation, and an ecology of businesses based on a commons, will lose that competitive race.

(This hypothesis would explain the gains of Linux over Microsoft, the rise of Wikipedia as compared to Britannica, as being models for many other examples of asymmetrical completion.)

An entity based on innovation-impeding intellectual property, appropriation of common social value which discourages free contributions, and striving for relative quality (hence consciously substandard products), cannot in the long run survive the challenge of an open competition based on peer production.

However there is an important corollary to this first law, which explains the necessity of hybrid forms, and why peer production can be embedded within an overall capitalist context.

The corollary law is this:

Any peer production community, which creates a sustainable management for its infrastructure of cooperation and an ecology of businesses which can fund it, will be more competitive than a community which fails to do so.

Pure non-reciprocal production can only occur within a sphere of relative abundance, charactherized by the free aggregation of human brains, ownership or easy access to computers, and socialized access to the networks, such as the internet. However, if peer production is collectively sustainable as long as it can maintain a similar level of volunteerism (offsetting departures with newcomers), it is not so for the individuals concerned. In addition it also requires a additional infrastructure of cooperation, which may have to operate on top of the internet. For example: it may need costly servers in case of success. Peer production cannot therefore fully escape the monetary sphere nor its requirements, demanding hybrid formats.

We will detail this below but in short, we can observe that successful peer projects combine:

- The freely self-aggregating community.
- A for-benefit association, usually in the form of a nonprofit Foundation, which funds and manages the infrastructure of cooperation.
- An ecology of businesses that practice benefit-sharing, returning part of the profit obtained from selling added value to the market, back to the commons on which their value-creation is based. Such businesses therefore fund the infrastructure of cooperation, hire many of the participants, and thereby maintain the viability and sustainability of their respective Commons.

Adaptation of cognitive capitalism to peer to peer

So far, empirical evidence suggests three emerging forms of adaption between the sphere of peer to peer cooperation, and the institutional and market fields.

– The sphere of individual sharing, think YouTube, where sharers have relatively weak links to each other, creates the Web 2.0 business model. In this model, an ethical economy of sharing, co-exists with proprietary platforms which enable and empower such sharing, in exchange for the selling of the aggregated attention

– The sphere of commons-oriented peer production, based on stronger links between cooperators, think Linux or Wikipedia, usually combines a self-governing community, with for-benefit institutions (Apache Foundation, Wikimedia Foundation, etc...), which manage the infrastructure of collaboration, and a ecology of businesses which create scarcities around the commons, and in return support the commons from which they derive their value.

– Finally, crowdsourcing occurs when it is the institutions themselves which attempt to create a framework, where participation can be integrated in their value chain, and this can take a wide variety of forms. This is generally the field of co-creation.

There is a mutual dependence of peer production and the market. Peer production is based on the achievements and surplus of the existing market-dominated society, and on the income that can be generated through participation in the market; on the other hand, market players are increasingly dependent and profiting from social innovation.

Because of the law of asymmetrical competition, i.e. the hyperproductive nature of peer production, corporations are driven to adapt substantially to the new practices and new players emerge that are based on an alliance with peer production. The companies that do so are more competitive than those who do not, creating a new sector of 'netarchical capitalism' which empowers and enables social innovation and peer production to occur.

Corporations have a dual role in this, because of their contradictory nature. They have to sustain cooperation and sharing, i.e. the openness that creates value, but also have to enclose part of the value, as they are competing with others in a scarcity-based marketplace.

We must note that monetary value that is being realized by the capital players, is—in many if not most of the cases, not of the same order as the value created by the social innovation processes. The user-producers-participants are creating direct use value, videos in YouTube, knowledge and software in the case of commons-oriented projects. This use value is put in common pool, freely usable, and therefore, does not consist of scarce products for which pricing can be demanded. The sharing platforms live from selling the derivative attention created, not the use value itself. In the commons model, the abundant commons can also not be directly marketed, without the creation of additional 'scarcities'.

What does all of this mean for the market sphere?
It is now possible to create all kinds of use value without, or with only a minimal, or with only a posteriori, intervention of capital. We are dealing with post-monetary, post-capitalist modes of value creation and exchange, that are both immanent, i.e. embedded, to the market,

1–http://www.fims.uwo.ca/people/faculty/dyerwitheford/

but also transcendent to it, i.e. operating outside its boundaries. Capital is increasingly dependent, and profiting in all kinds of ways, from the positive externalities of such social innovation.

So the challenge can be described as follows: 1) we have a process of social innovation which creates mostly non-monetary value for the participants; 2) we may have an increasingly huge gap between the possibility of creating post-monetary value, and the derivative exchange values that are realized by enterprise; 3) the participants engaged in such passionate production and innovation, mostly cannot find in such processes an answer to their own sustainability.

Hence, the impossibility to realize more than just a small partial monetary value, from the point of view of most commercial players. Increasing precarity for the participants of social innovation. In other words, the current market model does not have a reverse process of redistribution for the value that is being created.

This might of course be a temporary crisis, but we do not believe it is. The reason is that the market can only indirectly and partially provide monetary compensation for processes which are not motivated by such compensation. What we need therefore are more general redistributive processes that allow society and the market to give back part of the value that is being so created.

One possibility is the further development of transitional labour market measures (protect the worker, not the job), which recognize the flexibility and mobility of contemporary careers. But this needs an important add-on development: the realization that contemporary workers are moving not just from job to job, but also from jobs to non-jobs, and that in fact, what is most useful and meaningful for them (and the market, and society) are not the paid jobs for the market, but the episodes of passionate production. It seems to me therefore that a more general measure, not linked to the job, but conceived as a repayment for, and enabler of, social innovation, is needed. The name of that general measure is most probably some form of basic income.

Likely expansion of peer production principles to material production

Peer production naturally occurs in the sphere of immaterial production. In this sphere, the access to distributed resources is relatively easy. Large sections of the population in the Western countries are educated, and can have a computer at their disposal. And the costs of reproduction are marginal.

The expansion of peer production is dependent on cultural/legal conditions. It requires open and free raw cultural material to use; participative structures to process it; and commons-based property forms to protect the results from private appropriation. Hence is a circulation of the common obtained [the concept is from Nick Dyer-Whiteford (1)], through which peer production virally expands.

However, peer production is not limited to the sphere of immaterial production.

First of all, any physical production process, needs to be immaterially designed, and open design is not fundamentally different, though it is more complex, that collaborative knowledge or free software production. So, peer production can work for the design phase of physical production, provided a good infrastructure is available for such co-design.

Physical resources can be shared, if they are available in a distributed format. For example: computers and their files and processing power. Cars can be pooled. Money can be pooled as in the P2P financial exchanges such as Zopa or through mutual credit systems. Wealth acknowledgement procedures can be the basis of the creation of complementary currencies.

Rapid tooling and prototyping, desktop manufacturing, personal fabricators and 3D printers, multi-purpose machinery and other similar developments may and will lower the threshold of participation, creating more modularity and granularity in new fields. In fact, we may observe that the same tendency to miniaturization, which led to the networked computer, is taking place in the domain of physical machinery. Given the decrease in the cost of physical capital, it becomes easy to imagine the combination of open design communities, with cooperative forms of relocalized physical production.

Such expansion is not just a natural extension of technical evolution, but has structural and therefore political impediments. The centralized capital formats of contemporary neoliberal anti-markets obviously impede such expansion. But even with such constraints, the scope for the expansion of peer production is significant.

Again, we will make the following caveat. In the immaterial sphere, non-reciprocal peer production is likely to become dominant. In the field of scarcity, we will see the rise of peer-informed modes of production. This means that markets forms are starting to change, changing from a logic of pure capitalism (making commodities for exchange, so as to increase capital), to logics where the logic of exchange is subsumed to the logic of partnership. Think about fair trade (a market subjected to peer arbitrage), social entrepreneurship (profit used to sustain social goals), base of the pyramid inclusional capitalism, and the many political-social movements that aim to divorce market forms, from the infinite growth logic of capitalism, such as the natural capitalism movement in the U.S.

In the last two-three years, we have witnessed the renewed emergence and rapid growth of craft communities, a maker movement, distributed desktop manufacturing through commercial platforms, and a free and open hardware movement. Open hardware is growing very fast, with companies such as Arduino and Buglabs providing living exemplars and role models, and are inventing their own platforms and infrastructures such as the Open Source Hardware Bank.

The latter is particularly significant as it shows that open hardware producing communities, such as the ones around the Arduino electronic circuit boards, are creating their own business ecologies.

They are combining the existing triarchical commons model (community, foundation, business), with a solution to the cost recovery problem typical for physical production. Because of this, they are emerging as viable alternatives to the traditional corporate models, and thanks to the inherent hyperproductivity we have argued above, slated to play an increasingly dominant role.

To prosper, and expand beyond its current confines in the sphere of immaterial production, more distributed infrastructures will be necessary, complementing the already existing communication infrastructures:

- Distributed energy: this requires a move away from centralized energy production based on depletable fossil fuels, and towards a home and neighborhood based infrastructure producing renewable energy.
- Distributed and multiple currency systems: meta-currency platforms will allow local and virtual (affinity-based) communities to produce exchange mechanisms that are not based on compound interst and fractional reserve banking and can both promote specialized in-community exchange, protect from globalized dislocation, and create an alternative infrastructure of inter-community and inter-individual exchange.
- Open and distributed manufacturing: distributed capital goods with radically lower thresholds such as the ones being developed today, need to be reconfigured and integrated in a vision of relocalized production, in the context of a global cooperation with open design communities.

Part three: the politics of P2P

P2P theory as the emancipatory possibility of the age

Our current political economy is based on a fundamental mistake. It is based on the assumption that natural resources are unlimited, and that it is an endless sink. And it creates artificial scarcity for potentially abundant cultural resources. This combination of quasi-abundance and quasi-scarcity destroys the biosphere and hampers the expansion of social innovation and a free culture.

In a P2P-based society, this situation is reversed: the limits of natural resources are recognized, and the abundance of immaterial resources becomes the core operating principle.

The vision of P2P theory is the following:

- 1. The core intellectual, cultural and spiritual value will be produced through non-reciprocal peer production.
- 2. It is surrounded by a reformed, peer-inspired, sphere of material exchange.
- 3. It is globally managed by a peer-inspired and reformed state and governance system, a “partner state which enables and empowers the social production of value”.

Because of these characteristics, peer to peer can be said to be the core logic of the successor civilization, and is a answer and solution to the structural crisis of contemporary capitalism.

Indeed, because an infinite growth system is a logic and physical impossibility with a limited natural environment, the current world system is facing a structural crisis for its extensive growth. Currently consuming resources at the rate of 'two planets', it would need four planets if countries like China and India would obtain equity with the current Western levels of consumption. Because of the ecological and resource crisis that this causes, the system is ultimately limited in its extensive expansion.

However, its dream for intensive development in the immaterial sphere is equally blocked, since the sphere of abundance and direct social production of value through peer production, creates an exponential growth in use value, but only say a linear growth in the market opportunities in its margins.

The current world system is facing a similar crisis to that of the slave-based Roman Empire, which could no longer grow extensively (at some point the cost of expansion is greater than the benefits of added productivity), but could not grow intensively either, since that would demand autonomy for the slaves. Hence, the feudal system emerged, which refocused on the local, where it could become much more productive and grow 'intensively'. Serfs, which were tied to the land but now had families, a fixed part of their produce, and a much lighter taxation load, were substantially more productive than slaves. The domain-based lords took a substantially lesser part of the surplus. Today, extensive growth is ultimately blocked, but intensive growth in the immaterial sphere requires a substantial reconfiguration which largely transcends the current system logic.

Similarly, the current structural crisis causes a reconfiguration of the two main classes (just as the slave owners had to become feudal lords, and the slaves had to become serfs). At present, we see the emergence of a netarchical class of capital owners, who are renouncing their dependence on the present regime of immaterial accumulation through intellectual property, in favour of a role as enablers of social participation through proprietary platforms, which cleverly combine open and closed elements so as to ensure a measure of control and profit, while knowledge workers are reconfiguring from a class that was dissociated from the means of production, to one that is no longer dissociated from its means of production, as their brains and the networks are now their socialized means of production. (However, they are still largely dissociated from autonomous means of monetization.) It would be fair to say that currently, peer production communities are collectively sustainable, but not individually, leading to a crisis of value and widespread precarity amongst knowledge workers.

The solution would in my opinion point in the following direction:

– The private sector recognizes its increasing dependence on the positive externalizations of social cooperation, and together with the public authorities, agrees to a new historical compromise in the form of a

basic income; this allows the sphere of cooperation to thrive even more, creating market benefits.

– The sphere of the market is dissociated from infinite-growth capitalism (how this can be done would require a separate article, but the key would be a macro-monetary reform such as those proposed by Bernard Lietaer, associated with a new regime that extends the production of money from private banks to the social field, through open money systems).

– The sphere of peer production creates appropriate 'wealth acknowledgement systems' to recognize those that sustain its existence, and systems exist which can translate that reputational wealth in income.

Peer governance and democracy

As peer to peer technical and social infrastructures such as sociable media and self-directed teams are emerging to become an important if not dominant format for the changes induced by cognitive capitalism, (2) the peer to peer relational dynamic will increasingly have political effects.

As a reminder, the P2P relational dynamic arises wherever there are distributed networks, i.e. networks where agents are free to undertake actions and relationships, and where there is an absence of overt coercion so that governance modes are emerging from the bottom-up. It creates processes such as peer production, the common production of value; peer governance, i.e. the self-governance of such projects; and peer property, the auto-immune system which prevents the private appropriation of the common.

It is important to distinguish the peer governance of a multitude of small but coordinated global groups, which choose non-representational processes in which participants co-decide on the projects, from representative democracy. The latter is a decentralized form of power-sharing based on elections and representatives. Since society is not a peer group with an a priori consensus, but rather a decentralized structure of competing groups, representative democracy cannot be replaced by peer governance.

However, both modes will influence and accommodate to each other. Peer projects which evolve beyond a certain scale and start facing issues of decisions about scarce resources, will probably adapt some representational mechanisms.

In fact, there are a few things we can already say about the emerging templates of peer governance. In the sharing mode, centered about the sharing of individual expression, where network ties are relatively weak, proprietary third party platforms are responsible for the setting of design rules which have to enable sharing and demand some form of openness that creates the value, but balanced by their need to capture that value, with the exist possibilities and mobilization power of the sharing communities acting as a counterweight. In the commons-oriented form of peer production as seen in free software for example,

2–http://blog.p2pfoundation.net/category/cognitive-capitalism

we see the emergence of a triarchical model, combining self-aggregating 'permission-less' and self-governed community; with a for-benefit association (usually a NGO in the form of Foundations) that manages the infrastructure of cooperation, and subjected to formal democratic rules; and an ecology of businesses creating market value on top of the commons, while returning some of its profit in the form of benefit sharing towards the Foundation or community, thereby insuring the continuation of the Commons on which they depend. These forms templates that will be increasingly used in the expanding field of social production, but are not as such applicable to the polis as a totality.

Representative and bureaucratic decision-making can and will in some places be replaced by global governance networks which may be self-governed to a large extent, but in any case, it will and should incorporate more and more multistakeholder models, which strives to include as participants in decision-making, all groups that could be affected by such actions. This group-based partnership model is different, but related in spirit, to the individual-based peer governance, because they share an ethos of participation.

Towards a partner state approach

Partner state policy is an approach in which the state enables and empowers user communities to create value themselves, and which also focuses on the elimination of obstacles.

The fundamental change in approach is the following. In the modern view, individuals were seen as atomized. They were believed to be in need of a social contract that delegated authority to a sovereign in order to create society, and in need of socialization by institutions that addressed them as an indifferentiated mass. In the new view however, individuals are always-already connected with their peers, and looking at institutions in such a peer-informed way. Institutions therefore, will have to evolve to become support ecologies, devising ways to create infrastructures of support.

The politicians become interpreters and experts, which can guide the issues emerging out of civil society based networks into the institutional realm.

The state becomes a at least neutral (or better yet: commons-favorable) arbiter, i.e. the meta-regulator of the 3 realms, and retreats from the binary state/privatisation dilemma to the triarchical choice for an optimal mix between government regulation, private market freedom, and autonomous civil society projects.

A partner state recognizes that the law of asymmetric competition dictates that it has to support social innovation to it utmost ability.

An example I recently encountered was the work of the municipality of Brest, in French Brittany. There, the "Local Democracy" section of the city, under the leadership of Michel Briand, makes available online infrastructures, training modules, and physical infrastructure for sharing (cameras, sound equipment, etc...), so that local individuals and groups, can create cultural and social projects on their own. For example, the

3–http://www.wiki-brest.net/index.php/Territoires_Sonores

Territoires Sonores project (3) allows for the creation by the public of audio and video files to enrich custom trails, which is therefore neither produced by a private company, nor by the city itself. In other words, the public authority in this case enables and empowers the direct social production of value.

The peer to peer dynamic, and the thinking and experimentation it inspires, does not just present a third form for the production of social value, it also produces also new forms of institutionalization and regulation, which could be fruitfully explored and/or applied.

Indeed, from civil society emerges a new institutionalization, the commons, which is a distinct new form of regulation and property. Unlike private property, which is exclusionary, and unlike state property, in which the collective 'expropriates' the individual; by contrast in the form of the commons, the individual retains his sovereignty, but has voluntarily shared it. Only the commons-based property approach recognizes knowledge's propensity to flow everywhere, while the proprietary property regime requires a radical fight against that natural propensity. This makes it likely that the commons-format will be adopted as the more competitive solution.

In terms of the institutionalization of these new forms of common property, Peter Barnes, in his important book Capitalism 3.0, explains how national parks and environmental commons (such as a proposed Skytrust), could be run by trusts, who have the obligation to retain all (natural) capital intact, and through a one man/one vote/one they would be in charge of preserving common natural resources. This could become an accepted alternative to both nationalization and deregulation/privatization.

I would surmise that in a successor civilization, where the peer to peer logic is the core logic of value creation, the commons is the central institution that drives the meta-system, and the market is a peer-informed sub-system that deals with the production of rival physical products, along with a pluralist economy that is augmented with a variety of reciprocity-based schemes.

A set of concrete proposals

Just as social innovation and peer production is hyperproductive and 'competitive' in the sphere of corporate competition, so they are also advantageous for any public authorities adopting them in their own territorial spheres.

This gives political leverage to a set of three inter-related proposals, that would sustain a further expansion of peer production:

Here's my proposal, of what we need as transitional measures to further stimujlate social production: .i.e. **a set of 3 interlocking institutions, each with its own complementary mission and objectives:**

1) Institute for the Protection and Development of the Commons
This is an institution that effectively supports the creation and maintenance of the commons,

– by diffusing knowledge about the legal and institutional means of creating and protecting them

– by creating a supportive infrastructure of cooperation that facilitates the creation of commons-oriented initiatives by those who have more difficulties accessing such necessary infrastructure

– by maintaining relations with, and supporting the operation and maintenance of the for-benefits institutions that are most often associated with commons oriented initiatives

Example: the public support for social value creation in the French city of Brest.

2) Institute for Open Business
This institution supports the creation of market value in cooperation with the Commons, in ways that are compatible and do not deplete commons-based value creation. Typically, this is the kind of Institution that would support open source software businesses, open textbook publishers, etc. and support young and starting enterpreneurs who want to engage in such.

Example: the OSBR.Ca initiative in Toronto, Canada.

3) Institute for Benefit-Sharing and Commons Recognition
This institution focuses on patronage and various forms of support that do not destroy the peer to peer logic of voluntary contributions.

– it creates a priori prizes, awards, bounties to support individuals involved in commons-based value-creation.

– in cooperation with the companies (stimulated by previous open business institute), it stimulates benefit-sharing practices from companies that profit from commons created value. It acts as a meta-regular for such practices, identifying weak spots and stimulating solutions for them.

– it creates a posteriori patronage arrangements for individuals with a proven record in commons-based value creation.

– it studies and proposes policies for the overall stimulation of commons-based value creation.

A renewed progressive policy centered around the sustenance of the Commons

What does it mean for the emancipatory traditions that emerged from the industrial era?

I believe it could have 2 positive effects:

– a dissociation of the automatic link with bureaucratic government modalities (which does not mean that it is not appropriate in certain circumstances); proposals can be formulated which directly support the development of the Commons.

– a dissocation from its alternative: deregulation/privatization; support for the Commons and peer production means that there is an alternative from both neoliberal privatization, and the Blairite introduction of private logics in the public sphere.

The progressive movements can thereby become informational rather than a modality of industrial society. Instead of defending the industrial status quo, it becomes again an offensive force (say: striving for an equity-based information society), more closely allied with the open/free, participatory, commons-oriented forces and movements. These three social movements have arisen because of the need for an efficient social reproduction of peer production and the common.

Open and free movements want to insure that there is raw material for free cultural production and appropriation, and fight against the monopoly rents accorded to capital, as it now restricts innovation. They work on the input side of the equation. Participatory movements want to ensure that anybody can use his specific combination of skills to contribute to common projects, and work on lowering the technical, social and political thresholds; finally, the Commons movement works on preserving the common from private appropriation, so that its social reproduction is insured, and the circulation of the common can go on unimpeded, as it is the Commons which in turn creates new layers of open and free raw material.

These various movement come in the usual three flavours:

– Transgressive movements, such as young and old filesharers, which show that the legal regime has to be changed.

– Constructive movements, which create a framework for new types of social relationships, such as the Creative Commons movement, the free software movement, etc...

– Reformist or radical attempts to change the institutional regime and adapt it to the new realities.

I personally believe that these movements will not create new political parties, but that these networks of networks will indeed look for political liaison. While peer to peer is a regime that combines equality and liberty and therefore potentially combines elements from various sides of the political spectrum, I believe the left is particularly apt to forge an alliance with the new desires and demands of these movements. It remains to be seen whether new political and cultural expression of the emerging free culture, such as the Swedish Pirate Party, will change that expectation by creating a new kind of political force, more directly in tune with peer production communities.

There is also a connection with the environmental movement. On one side, the culturally-oriented movements fight against the artificial scarcities induced by the restrictive regimes of copyright law and patent law; on the other side, the environmental movement fights against the artificial abundance created by unrestricted market logics. The removal of pseudo-abundance and pseudo-scarcity are exactly what needs to happen to make our human civilization sustainable at this stage. As has

been stressed by Richard Stallman and others, the copyright and patent regimes are explicitly intended to inhibit the free cooperation and cultural flow between creative humans, and are just as pernicious to the further development of humanity as the biospheric destruction.

Finally, restoring the balance between a scarcity-recognizing material regime, and a abundance-recognizing immaterial regime, cannot be seen as separate from the efforts of social forces to obtain more social justice, thereby linking the new open/free, participatory and commons-oriented forces with emancipatory social movements.

There is therefore a huge potential for such a renewed movement for human emancipation to become aligned with the values of a new generation of youth, and achieve the long-term advantage that the Republicans had achieved since the 80s.

Conclusion: what needs to be done?

Let's recall some of our points, and see how the movement against artificial scarcity and for sustainability intersect.

We live in a political economy that has it exactly backwards.

We believe that our natural world is infinite, and therefore that we can have an economic system based on infinite growth. But since the material world is finite, it is based on pseudo-abundance.

And then we believe that we should introduce artificial scarcities in the world of immaterial production, impeding the free flow of culture and social innovation, which is based on free cooperation, by creating the obstacle of permissions and intellectual property rents protected by the state.

What we need instead is a political economy based on a true notion of scarcity in the material realm, and a realization of abundance in the immaterial realm. Complex innovation needs creative and autonomous workers that are not impeded in their ability to share and learn from each other.

In the world of immaterial production, of software, text and design, the costs of reproduction are marginal and therefore we see emerging in it non-reciprocal peer production, where people voluntary engage in the direct creation of use value, profiting from the resulting commons in a general way, but without specific reciprocity.

In the world of material production, where we have scarcity, and costs have to be recouped, such non-reciprocity is not possible, and therefore we need modes of neutral exchange such as the markets, or other modes of reciprocity.

In the sphere of immaterial production, humanity is learning the laws of abundance, because non-rival goods win in value through sharing. In this world, we are evolving towards non-proprietary licences, participatory modes of production, and commons-oriented property forms. Positive forms of affinity based retribalization are emerging.

But in the world of scarce material goods, a series of scarcity crises are brewing, global warming being just one of them, that is creating the emergence of negative forms of competitive tribalizaition.

The logic of abundance has the potential of leading us to a reorganization of our world to a level of higher complexity, moved principally by the peer to peer logic.

The logic of scarcity has the potential of leading us to generalized wars for resources, to a descent to a lower form of complexity, a new dark age as was the case after the disintegration of the Roman Empire.

So the challenge is to use the emergent logic of abundance, and inject it into the world of scarcity.

Is that a realistic possibility?
In the immaterial world of abundance, sharing is non-problematic, and the further emergence and expansion of non-reciprocal modes of production will be very likely. "Together we know everything", is a rather achievable ideal.

In the material world of scarcity, abundance is translated into three key concepts that can change human consciousness and therefore economic practices. The notion of 'together we have everything' seems not quite achievable, we therefore need transitional concepts.

The first concept is the distribution of everything. This means that instead of abundance, we have a slicing up of physical resources and the physical means of production, so that individuals can freely engage and act. This means an economy that moves towards a vision of peer-informed market modes such as fair trade (a market mechanism subjected to peer arbitrage of producers and consumers seen as partners), social entrepreneurship (using profit for conscious social progress). Objective tendencies towards miniaturization of the physical means of production makes this a distinct possibility: desktop manufacturing enables individual designers; rapid manufacturing and tooling are diminishing the advantages of scale of industrial production, and so do personal fabricators. Social lending creates a distribution of financial capital; and the direct social production of money through software is not far away from being realized in various parts of the world (see the work of Bernard Lietaer); If indeed scarcity will create more expensive energy and raw material, a re-localisation of production is likely, and peer-informed modes of production will be enabled to a much greater extent.

The second concept is sustainability. Since an infinite growth system cannot last indefinitely, we need to move to new market concepts as described by the throught schools of natural capitalism (David Korten, Paul Hawken, Hazel Henderson), capitalism 3.0 (Peter Barnes' proposal to use trust as property forms because they impose the preservation of capital), cradle to cradle design and production processes so that no waste is generated. We need to move to a steady-state economy (Herman Daly), which is not necessarily static, but where greater output from nature, is dependent on our ability to regenerate the same resources.

The third concept is that of sufficiency or 'plenty'. Abundance has not just an objective side, it has a subjective side as well. In the material economy, infinite growth needs to be replaced by sufficiency, a realization that status and human happiness can no longer be dependent on infinite material accumulation and overconsumption, but will become dependent on immaterial accumulation and growth. Having enough so that we can pursue meaning and status through our identity

as creative and collaborative individuals, recognized in our various peer communities.

Only a rich experience economy can avoid a culture of frustration and sacrifice, and the repressions and unhappiness that such could entail. This experience economy however, will not just be created by commercial franchises, but there will also be the direct social production of cultural value. Businesses and peer communities, enabled and empowered by a partner state, will have to create a rich tapestry of immaterial value, and the thicker the surrounding immaterial value of being, the lighter our attachment to mere having will be.

Scenarios for the current meltdown

How does the current meltdown/slump, which started with the financial collapse in the fall of 2008, affect the above vision, elaborated before this non-linear emergence of crisis.

There are two ways to read the crisis. The first is, inspired by Carlota Perez work on long-term cycles, is to see the current crisis as the end of the cycle which started in 1945, first with a 30-year high-growth phase, then with a low-growth neoliberal phase, based on stagnating wages and debt-fueled consumption, financed by the new Asian powers. As this model, and the immense financial bubble it created fails irrevocably, we could expect, after a long slump that will last at least a decade, a new expansion fase of capitalism, based on green capitalism and the change of institutions by the internet revolution (a process which has only happened in civil society and at institutional margins, without resulting in a new equilibrium). In such a scenario, a new social compact would be struck with the new structure of social demands created by the emergence of peer to peer, allowing it to grow from its present seed phase, to a level of parity at the end of the next growth phase. If our interpretation of the impossibility of infinite growth in a finite natural system is correct, the ultimate failure of attempted green capitalism, would set the stage for a phase transition, in which the peer to peer system, would become the core of the new society, as explained in the body of our text. I have called this the high road towards peer to peer, because, despite the cyclical crisis moments, the transition could still be relatively smooth, replacing the former structures at a very high level of productivity, minimizing social pain.

There are two possible derailments with this scenario. The first is that the failure by the Obama administration to structurally reform the system and break the power of the predatory financial caste, so impoverishes the possibilities of the state, that no means are left for social policies, leading to global dislocation, and a turn by humanity towards resilient communities, using P2P-inspired models on a local scale. The second derailment refers to the combined effects of the structural problems of capitalism as a system, and not just to its long cycles. In this scenario, the accelerating issues around climate change, peak oil and resource depletion, become to severe and do not allow for the generation of a new expansion phase. This element alone, which can be combined with the first one, also leads to global dislocation, and to the resilient communities

scenario, involving a 'low road' towards peer to peer, in the context of immense social pain.

Relation to the former Marxist scenarios of social change

All of the above can be read as an argument with the previous Marxist theories of social change.

I would summarize the political attitude of the socialist movement as: workers need to take power, then change society towards a new economic and political social structure.

But this has never been how phase transitions from one form of civilization to another really happened.

Change from slavery to feudalism happened because some slave-owners, undoubtedly under pressure for example from slave revolts in the context of a collapsing state infrastructure, started to turn their slaves into coloni, and an increasing number of them did so, creating the conditions for a phase transition towards feudalism. The fundamental change could happen because of a congruent set of changes both between those that produced, and those that managed and profited from the production.

Change from feudalism to capitalism happened because, in the context of a crisis of feudalism after the 16th century, part of the nobility could see the superior productivity of capitalist enterprise, and funded and joined such projects, leaving behind their peers who stayed tied to the land. As the crisis intensified and the new hybrid capitalist class became dominant, political revolutions finalized the phase transition.

Socialism did not have a superior mode of production which could change capitalist society from within, and prepare for the phase transition.

In contrast, the hyperproductivity of peer production has already created a new class of netarchical capitalists, investing in social production, and already taking power through the Obama administration. By investing in hybrid forms of peer production, they paradoxically strengthen the post-capitalist logics within capitalist society. It is the congruence between peer producers and netarchical capitalists which is driving the change, eventually causing the seed form of peer production to rise to parity level, perhaps leading to the ultimate phase change.

Within a declining and crisis-ridden system which is destroying the biosphere, the congruent social forces of peer producers and netarchical capitalists is creating the conditions for a ulterior phase change.

The political struggle today is to help sharing communities defend and promote their interests with the platform owners; and to help autonomous commons-oriented peer producing communities to maintain their autonomy as they cooperate with their business ecologies, thereby changing the very practices of the corporations.

So what is happening is that within the old, new successful patterns are being created, and that these patters start synergistically interacting to form an integrated alternative set of social practices.

As this new sphere grows, it creates a living alternative within the declining global system, forming a real alternative that can inspire the social movements still rooted in the capitalist world of labour, creating the conditions for political and social transformations of the mainstream structure of society.

Such a change if it occurs would be congruent with what we know about phase transitions in the past.

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Net Art and Pro-Commons Activism

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1—See, for example, Eric S. Raymond, "The Cathedral and the Bazaar" (2006) [on-line] URL: http://www.catb.org/~esr/writings/cathedral-bazaar/homesteading/

The space around us increasingly lacks areas that are not private, fenced or restricted. Common space in cities is usually limited to common transit spaces (highways, sidewalks, etc.) or has been replaced by places for meeting and socializing provided by shopping and leisure centres, scenarios where the shared, enthusiastic presence of thousands of people in their free time is a necessary condition for active commercial activity. What is public space today? That is one of the most relevant questions arising at present, a central theme of inquiry for all critical thought and especially for the most socially committed artistic proposals.

Unfortunately, the concept of "the commons" is often understood not as something that belongs to everyone but rather as something that belongs to no one and therefore is worthless, given that it lies outside the systems of appropriation and exchange that comprise market systems.

There can be no question that in a reconsideration of what the commons means nowadays, nothing has played a more influential role than the Free Software and Open Source movements. Faced with the oligopolies of the proprietary software industry, it was necessary to recover the cooperative, non-proprietary environment that characterized the development of software prior to the early 1970s. Richard Stallman's creation of the *Free Software Foundation* (1985) following AT&T's paralyzation of the *Unix* open source operating system and the establishment of the *GNU General Public License* have comprised the most significant initiatives in maintaining the principle of the commons in technological development. They spurred an entire current based on the inevitable identification of software (understood as a cultural code) and language, which found it inconceivable to *purchase the words of a language for exclusive use.*

We are currently witnesses to the beginning of a new era in working for the generation of a field of "the commons" in the context of networks. Now more than ever paths are being explored toward opening up, reusing and transferring both software and contents. And although contradictions do exist between the official ideology of Open Source culture and its actual practice (1), it is increasingly clear that the conviction is gaining force that the fundamental principles of action models set forth in the concept of "Free/Libre & Open Source Software" (FLOSS) are applicable to any service and even reach beyond the world of computers. This applicability involves the transformation of a certain production model into a highly distributable model, the possibility of using any asset, modifying and adapting that asset to one's own needs, distributing it freely, etc.

Certainly today there is great excitement as we see that some of the fundamentals of free and open source software can also be applied to the field of contents and data available on the Web, which brings us to the dawning of an emerging trend towards "free data" ("free" meaning both free of charge and freely available). This path, however, still has huge obstacles. The most significant one is that, at present, almost none of the large repositories of data generated by users on the most frequently used Web 2.0 platforms is easily reusable for forming other, different databases (although they may be reusable in technological terms, in almost all cases, that is strictly forbidden by the companies that manage

those repositories). This is surely one of the great paradoxes of Web 2.0: the combination of public material as content and containers subject to the private domain.

Net art works as the commons

There is no question that artistic creations, like many other creative activities where the author's subjectivity is part of what is created, have great difficulty when the freedom and premises of free and open source software are applied to them. The most frequent limits are licences based on "some rights reserved", exclusively permitting some freedom in the use of these productions in a more or less free distribution of the work. It is clear that the inclusion of the freedom and premises that characterize free and open source software to the field of artistic creation signifies a radical questioning of the concept of authorship, brought into question time and again by the creative tendencies linked to digital remix strategies.

Regardless of the possible adaptation of the freedom and premises of FLOSS to the field of net art, it cannot be denied that the emergence of manifestations of net.art in the mid-1990s constituted one of the events that most clearly placed artistic practices within the field of the production of "common goods". The immaterial nature of online work, fully accessible through the Internet from any location, is an extreme reclaiming of the identification of artistic proposals with "the commons". In opposition to this notion, various attempts at marketing net art works which have been carried out by galleries and museums have shown a transfer of the context of the art-institution and the logic of its market to the Internet setting. However, it was also one of its most paradoxical representations. Selling or trying to sell a work of net art means buying something that cannot be exchanged, which is inherently something that cannot be sold.

These attempts at imposing market systems continued the process already begun with the development of video art and subsequent artistic manifestations on CD-ROM. These attempts using media designed for mass distribution ended up being limited, paradoxically, to a small number of copies in limited editions (2). This combination of a media-based artistic strategy and an anti-media social application comprised antimony that still plagues digital artistic manifestations. In this trend or its consent, the medium was considered solely in regard to its characteristics and linguistic or conceptual research potential, with no thought to the social dimension of its technical nature.

In reality, upon acquiring a net art work, one actually acquires only the place where it is located (only the URL, as the indication of where it is stored can be commercially appropriated). In this sense, the situation is contrary to that of the possession of an object art work, whose characteristics are fundamentally comprised of the possibility of moving it around in space, all the possible benefits its owner could derive from the exclusive nature of its possession being dependent on that, as well as hiding it or enjoying it exclusively, commercial exchange, etc. As a result, the power held by the owner of a net.art work is limited to a paradoxically "counter-media" use of the medium. This, on occasions, took the form of restricted access to it, acting against the exclusive

2—Many of the most representative net art artists' attempts to include their work in the art market are quite clear. A good example is the On & Off exhibit (2006) at the Bryce Wolkowitz gallery at which works were sold such as *ASCII History of Moving Images (Psycho)* (1999) by Vuk Cosic, described by the gallery as "Java applet, hard drive, monitor", in an edition of 4 copies, or the work by Olia Lialina and Dragan Espenschied titled *Online Newspaper (Wall Street Journal, Europe)* from 2004, composed of the following components: "Html file, hard drive, monitor", also in an edition of 4 copies.

3—http://www.vote-auction.net

4—http://www.gwei.org

5—This transfer took place via GTTP Ltd. (Google To The People Public Company).

essence of the medium, which is interconnection and free, permanent, multiple and simultaneous access. However, with regard to the works carried out for the Web, the only concept of possession is understood as something identical to the common right to experience them.

The Circulation of Common Goods as a Work Subject

If part of network art can be considered as one of the most radical forms in which artistic creation is identified with the creation of a commons, we should also remember that reflection on the sale of common goods and rights in the Network Society is seen as one of its major thematic cores, especially in recent years. A good of example of this is the project *Vote-Auction* (3) (2000) by UBERMORGEN.COM, which offered citizens with a right to vote in the 2000 US presidential election the option of selling their vote on the Internet to the highest bidder. This proposal, of selling that which cannot be sold, marketing something which is a non-transferable individual right, was a parody of the increasing approximation between democracy and capitalism that takes place in the Network Society, as well as a satire of the electoral industry, understood here as an essential factor in the consumer logic in democratic functioning.

There are also quite a few online projects on how to coordinate, organize and plan the activity of sharing (which in the digital field means that, by sharing, no one loses any of what they share) and that understand this type of practice as a specific type of politicized artistic production. Given their concern about how goods and capital circulate on the networks, many of these artistic-activist projects place a priority on a reflection on how common goods circulate, on the various possible types of common goods (an identification that is parallel to the Marxist one of different types of capital), as well as ways in which forming groups or associations is possible where sharing can take place or where the proliferation of the commons is feasible.

Precisely, another project by UBERMORGEN.COM, carried out with Alessandro Ludovico and Paolo Cirio, titled *GWEI-Google Will Eat Itself* (4)(2005), was about the more or less obvious processes of subjugation of all communicative dynamics in the network-system to the commercial interests of only a few companies. Based on Google's "AdSense" programme, this project served to criticize the system of commercial appropriation generalized on the Internet network by this US company. The idea was to turn its income system from advertising into a self-cannibalizing system; the money obtained through Google ads placed on a specific network of Web sites would be used to buy shares in Google, which would subsequently be transferred to their users (5). Of course, the proposal was a parody; the estimated time it would take until all Google shares were acquired and transferred to the public domain of users of the application was over two hundred million years.

Net Art and "Peer to Peer" Processes

Clearly, given that for years many online activism proposals focused their efforts on the analysis of how exchanges are produced on the Web and

6—http://www.ninsight.at/tsunami/

on how common goods circulate, inevitably many of them soon devoted their main research to P2P (peer-to-peer) networks and the social dynamics they have generated.

Since the mid-1990s, the use of P2P networks (distributed networks comprised of nodes that function simultaneously as clients and servers) has skyrocketed. These communication networks are among users, which makes many services they need available, such as many process cycles or large bandwidth or storage resources. In addition to enabling file sharing directly among multiple users, P2P networks make countless communication services possible. Some examples include: telephone communications, video conferencing, television, and even decentralized information distribution systems that escape censorship in a highly efficient way, such as *Freenet*), entertainment (multi-player games), and distributed computation (for example, P2P networks are used for projects such as *Tsunami Harddisk Detector* (6) by Michael Stadler), among many other possible services.

All of these uses are legal. However, at present, the majority of the most popular P2P networks are utilized by users for illegal downloads of movies and music under copyright. Therefore, the applications of these networks and the anonymity they enable have many facets and purposes. Digital piracy is precisely the greatest threat posed by these networks and that is why their development, even for completely different uses, will be increasingly controlled and hindered. There is no question that since the beginning of this decade, we have witnessed continuous questioning of these networks from business and institutional circles that see them as the main instrument for carrying out infractions of intellectual property law. Moreover, when majority media mention P2P networks, they usually speak exclusively about these illegal practices, which implies their continual criminalization.

In this respect, a growing number of people think that instead of attempting to halt what seems to be an inevitable process, the efforts of businesses in the audiovisual sector should be directed at designing new business models in which P2P networks are seen as a new field offering possibilities and opportunities, not as a terrible threat. Thus, those who oppose the anti-piracy measures being taken in many countries affirm that the music industry is making a huge mistake by continuing to focus its business expectations on the sale of CDs. Trying to prevent the proliferation of copies of something so easily reproducible (once something has been digitalized, it will inevitably circulate over the Web) is an anachronistic standpoint based on the belief that business based on anti-Web logic is still possible, when the fact is that we are fully immersed in the Network Era. Nor should we forget that the problem of digital piracy is something that has its roots in the past. It is curious that many software companies who already suffered from massive piracy of their programmes prior to the appearance of P2P never did much to prevent the circulation of thousands of pirate copies of their products. In fact, on many occasions it has been stated that the almost complete dominance of Photoshop, for example, as compared to other graphic editors, would not have been possible if Adobe Systems Incorporated had not permitted the more or less secret use of its programme by people who were not willing or able to pay for it. In contrast to the logic of

traditional capitalism, which consists of the sale of material goods whose value is based on scarcity, this proves that in cyber culture, the value of any digital good always increases with its distribution (7).

These issues are so relevant and up to date that their presence is continuous as a central theme in many artistic and digital activism practices on the Web. There is a large group of initiatives whose critical foundation can be exemplified in another project by UBERMORGEN.COM, Paolo Cirio and Alessandro Ludovico: *Amazon Noir* (8) (2006). This project aimed to get Amazon.com, the well-known online bookstore, to offer users complete volumes of books on sale, free of charge. This was achieved by an application designed for that purpose by the Firefox search engine, to be installed in each user's computer, which made it possible to transform the "Search inside the book" function that Amazon.com offered to all users on its Web site to "browse" through the book by using the search words chosen by the user. In this way, over 3,000 books were downloaded and distributed via P2P networks (Gnutella/G2, BitTorrent, FastTrack, ed2k) between April and October 2006. What is most interesting about this initiative is that the authors of this application did no more than enhance a service provided by Amazon.com bookstore itself. That is, a restrictive system was used and subverted to enable downloads of the complete work.

Another well-known project related to forms of piracy against Amazon.com is *Pirates of the Amazon* (9) (2008) created by two students at the Piet Zwart Institute of Rotterdam. It was also based on a Firefox application that enabled changing the Amazon.com page format on the user's search engine, by placing a button that read "Download 4 Free" over each product, CD, DVD or book for sale. The application included links in each button to "free" copies of each product available on The Pirate Bay (10). Thus, it was possible to make purchases on Amazon.com without paying anything. This "add-on" did not download any files of its own, given that it was a simple interface between the Web pages of Amazon.com and The Pirate Bay, it being the user's choice whether to make the free (and illegal, according to the laws of many countries) download of the file.

In sum, as opposed to those who conceive of P2P networks as a way of democratizing access to cultural contents, others see them as merely swarms of users grouped together solely out of their interest in downloading films and music for free. However, those two positions take into account only a tiny part of the multitude and complexity of aspects at play in the dynamics inherent to peer-to-peer networks. Therefore, other perspectives must be included in this debate, which is at the forefront today, that make it possible to reflect more broadly on P2P networks, transcending mere diatribes as to the legality or illegality of the uses that can be made of them. The proposal would be to talk less about P2P networks and more about social and production processes based on the P2P network model.

Therefore, what is proposed is to broaden the terms of discussion with special emphasis on the huge social potentials of the systems and processes in networks based on P2P structures, looking at their capacity to consolidate voluntary social organization forms to develop

7—See John Perry Barlow, "Vender vino sin botellas la economía de la mente en la Red Global", *El Paseante* n.27-28, Ediciones Siruela, Madrid, 1998.

8—http://www.amazon-noir.com/

9—http://www.pirates-of-the-amazon.com

10—http://thepiratebay.org/

participatory social processes and collective cooperation in networks in all areas of human activities.

Certainly, there are many hugely interesting elements that characterize P2P networks and are perfectly applicable to the development of forms of social and productive relations both in and out of the Web. Firstly, the lack of a specific structure of P2P networks makes them immensely adaptable and flexible. Order in them arises not out of organizational development but rather from a permanent mixture in an intensely alive chaos motivated by each participant's actions in generating dynamics of exchange and production of contents. And we must remember that structures close to the transition to chaos are usually very fertile for the generation of fruitful changes and evolution on all levels of culture.

We must also mention some of the most significant elements of the P2P model: the fact that there is no a priori selection for participation. As stated by Michel Bauwens, "The capacity to cooperate is verified in the process of cooperation itself"12, given that validation is provided by the community in this type of organization model, where participants are filtered "a posteriori". This does not mean that the P2P network model has no hierarchy, but rather that it is formed by flexible hierarchies based on merit, which is also always considered as a necessary catalyst for participation (12). The P2P philosophy depends to a large extent on a meritocracy system that awards the most privileges and the fastest access to more content to those who share the most (the BitTorrent protocol, for example, is based on this principle; the system awards those who share the most, making the highest number of connections to download nodes available to them).

P2P networks have mechanisms for their operation that are ideally based on social relations that make publicly available a set of what are considered universally common goods, resources that are not subject to price or market systems. However, the fact that the production model based on P2P architectures is not based on economic compensation does not mean that the model turns its back on the market. It proposes the possibility of an economy whose central axis is principles of the commons, in an attempt to reduce the dominance of proprietary strategies. If supply and demand is the major motivating component of the market economy, here the motivations are quite varied and different. The result of peer-to-peer production is a collective good, the commons. Therefore, "losing" something can only be understood in this context as remaining outside of any possible exchange relationship.

Undoubtedly, the GPL licence, open source initiatives and Creative Commons constitute some of the fundamental conditions of production forms based on P2P networks. These possibilities are gaining significance in relation to concepts such as "P2P production", "P2P property" or "P2P governance".

We must also remember that P2P networks make it possible to regulate interactions among participants which do not, however, restrict the heterogeneity of their members. That is why the P2P theory has unity in diversity as its core theme, which could also be called "a Post-Enlightenment universalism"(13).

11—According to Michel Bauwens, "The capacity to cooperate is verified in the process of cooperation itself. Thus, projects are open to all comers provided they have the necessary skills to contribute to a project. These skills are verified, and communally validated, in the process of production itself" in "The Political Economy of Peer Production" (2005), in *C-Theory*, [on-line] URL: http://www.ctheory.net/articles.aspx?id=499 [Retrieved: 2 November 2007].

12—Ibid.

13—See Michel Bauwens, "Peer to Peer and Human Evolution" [on-line] URL: http://p2pfoundation.net/Manifesto [Retrieved: 2 November 2007].

14—http://www.p2pfoundation.net/index.php/3.4_Placing_P2P_in_an_inter-subjective_typology>

15—Michel Bauwens, "The Political Economy of Peer Production", Cit.

16—Alan Page Fiske, *Structures of Social Life: The Four Elementary Forms of Human Relations*, New York, Free Press Macmillan, 1991.

The P2P model leads toward a reformed market that opens up new ways of determining the value of things. It arises out of the need for alternative systems in many areas in which the logic of economic exchange based on that of the market is either not suitable or completely inappropriate, as inferred by the possibility of paying for ideas with other ideas, for example. It is very important to point out that P2P economies are based on the value of the use of things. The intention is to make the value of use freely accessible universally (a value that must emerge without the intermediation of companies or corporate agents of production or distribution).

It must be made very clear that the P2P model consists of creating and sharing common goods, not in turning what belongs to someone else into common goods. If the piracy operating on P2P networks is circulated as a common good, that is, something that belongs to us all, but was not conceived as such, then that "commons" is created by illegally freeing a private good. This process—regardless of whether it is illegal or desirable, or not—should not be considered an example of the P2P action model. The social and productive model based on the structure of P2P networks does not consist of this. Its ways of producing the commons must always be based on free and open production, not on acts of liberating what has not been liberated by its authors or owners.

Thus, the artistic-activist proposals which reflect on the P2P model use as an argument the emancipatory potential of certain aspects immanent in the connected mob, especially as related to the principles of "panarchy" and network government, showing a large variety of work lines related to the immobilization assumptions of the economic colonization of telecommunications networks. For example, some recent proposals like *don-x-change* (2009) by Laura Bey, that aim to show the social possibilities of P2P networks and processes, point to the ideals on which these networks are based: free cooperation among peers, equality among participants, placing or forming goods considered commons in circulation, the participation and communication of many to many, etc., revealing the affirmation of P2P logic as a political programme of its own. Bey's project shows very clearly that the P2P model consists of non-reciprocal community participation (14), that is, P2P is not a system of reciprocity. Indeed, in the P2P model, each person contributes and receives, not in terms of equality but rather each contributes according to his or her abilities and wishes, and takes according to his or her needs (15). This work by Bey, a fictional programme for the Gnutella2 network, uses a subtle display of metaphors and language games with the user, to show the need for users of P2P networks and protocols to be more than mere swarms of persons whose only common interest is each person's own interest in downloading films or music. Certainly, P2P networks must reach a stage of real community, in which participants manage to consolidate forms of voluntary social organization, where the goods placed in circulation act intensely as mediators for specific social relations, and do not only satisfy common interests or needs.

Other projects focused on P2P dynamics are centred on what Alan Page Fiske presented in *Structures of Social Life* (16) as a universal grammar of human relations. These forms of exchange that have co-existed historically over thousands of years, although some always

prevailed over others. The point was to try to show how some of them are being reactivated or intensified today, characterized as new and in other terms, such as the social and productive model based on P2P logics. The irony characteristic of some projects, such as *P2P Applied* (2009) by Rene Zangl, suggests interesting ideas about how to recover on digital networks some of the exchange forms that constituted the essential bases in anthropological studies since their beginning. Some of the fundamental notions on which they operate are: plays of equality (I should give something of equal value for what I have received to maintain the same status); systems inherent to price (exchange of the same value); communal sharing (donation to form part of a collective resource; and so on.

Explorations of what is called "commons-based peer production" (17), "open manufacturing", or "wikinomics" (18) are recurring features of many new projects of network art. On occasions, these explorations are specified in a production model based on the cooperation of autonomous agents, the coordination of the creative energy of a huge number of people, joining the efforts and enjoyment of a multitude of singularities, in which each of the members has different abilities, quite diverse knowledge, different "properties" that are added together and creatively complement the others'. Projects such as Perry Bard's work titled *Man With a Movie Camera: The Global Remake* (19) (2008), a collaborative development of a recreation of the well-known film made by Vertov in 1929, are good examples of this type of extreme approach to "open work".

The range of network art proposals operating on the dynamics of the P2P model also included those initiatives specifically focused on concrete uses of P2P networks and clients, two lines of work that have barely been developed. The first consists of projects using P2P networks as the only possible context for the existence of the work, in which the work is subject to the operating dynamics of the Web. Good examples of this work line are the video projects carried out since 2006 by Anders Weberg (20) , which exist only as long as other users share them on P2P networks, or those projects whose main axis for reflection are specific actions in the use of these networks, which occurs in works like *N.A.G. Network Auralization for Gnutella* (21) (2003) by Jason Freeman, centred in the file search process on the Gnutella network.

The second is much more developed at present, composed of projects that study alternate forms of surfing and visualizing data flows on these networks. These initiatives are proposals for the development of interfaces that are completely different from the usual ones, such as *Minitasking* (22) (2002), a free client to search the Gnutella network, or *Torrent Raiders* (23) (2007) by Aaron Meyers, a project based on dynamic visualizations of BitTorrent users' activity which, through aesthetics much like a video games arcade, brings up interesting questions related to privacy, surveillance and piracy on P2P networks.

17—See Yochai Benkler, "Coase's Penguin, or Linux and the Nature of the Firm", [on-line]
URL http://www.benkler.org/CoasesPenguin.html

18—See Don Tapscott and Anthony D. Williams, *Wikinomics: La Nueva Economía de las Multitudes inteligentes (Wikinomics: The New Economy of Intelligent Crowds)*, Paidós, Barcelona, 2009.

19—http://dziga.perrybard.net/

20—http://www.p2p-art.com/

21—http://www.turbulence.org/Works/freeman/

22—http://minitasking.com

23—http://www.torrentraiders.com/

Andrew Whelan

Leeching Bataille: peer-to-peer potlatch and the acephalic response

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the states of excitation ... *the illogical and irresistible impulse to reject material or moral goods that it would have been possible to utilize rationally (in conformity with the balancing of accounts). Connected to the losses that are realized in this way ... is the creation of unproductive values; the most absurd of these values, and the one that makes people the most rapacious, is glory. Made complete through degradation,* glory, *appearing in a sometimes sinister and sometimes brilliant form, has never ceased to dominate social existence; it is impossible to attempt to do anything without it (Bataille 1985: 128-129).*

Introduction

There are significant problems with 'gift economy' accounts of peer-to-peer (P2P). In what follows this argument is advanced on several grounds. Firstly, empirically: it may have been at one time that P2P operated *like* a gift economy, and it may be now that some elements of the P2P ecology operate *like* gift economies. But certain social and structural facets of 'free culture' online generate serious problems for conventional gift economy readings. In addition, there are notorious problems with conceptualising the actual *practice* of gifting and how it can best be understood in relation to reciprocity: the consequences of the ideology of the 'pure' gift and so on.

Secondly, then, there are good *theoretical* grounds for questioning the appropriateness of the gift model for P2P. There are inherent features of the theory of the gift and the model of reciprocity involved which tend to "elide inequalities of power" (Osteen 2002: 3). Furthermore, regarding P2P, the gift has often been picked up only partially; with deployments retaining elements of the economism the theory of the gift attempts to overcome. Many references to the anthropology of the gift in relation to P2P dilute significantly both the totality of the gift in the anthropological accounts Mauss drew on, and the enormous importance accorded to the gift and what it stands for in Mauss, Bataille, and numerous others.

Thirdly, the gift economy reading *does not go far enough*. It misconstrues P2P as utopian, positive, progressive, reciprocal, communal. It pretends that the 'good guys' (the 'pirates') are not (or not *only*) hyperconsumers. It underplays the extent to which downloaders and the monopolistic content producers are locked together in a grotesque embrace. It fails to grasp the consequences of Mauss's account of the gift (let alone Bataille's) when it asserts that P2P exchange is assessable as a utilitarian good, a good with calculable benefits, when in fact P2P presents a kind of supereconomics or antieconomics. It misidentifies a naïve and faulty model of the political in a contested and problematic social and cultural practice. It fails to account satisfactorily for the incredible responses to P2P from state and corporate agencies (for the *violence* of that particular gift). In short, it doesn't work, and it also obscures from view some of the most important aspects of P2P; it artificially isolates P2P from the *total social phenomenon* in which it is embedded: the 'general economy' (Bataille 1988).

The consequences of P2P

P2P, we are informed, has had massive cultural and economic effects.

These effects can no longer be restricted to their online aspect. They have resulted in and continue to produce legislative changes on a global scale: restricting access; consolidating the centralised control and distribution of content; extending the temporal duration of this control; and threatening extraordinary punitive losses to those found to be in violation of this legislation. Indeed, some of this legislation (specifically, ACTA, the Anti-Counterfeiting Trade Agreement) is currently being formulated on an international level, without public consultation. This legislation is seemingly undermining 'the rule of law' insofar as it normalises covert corporate surveillance, mandates disclosure

and thereby threatens the privacy of 'pirates' (of internet users and individuals in general), circumvents due process and judicial oversight, and obliges internet service providers (ISPs) to surrender information concerning their subscribers. The extraordinary notion of 'graduated response' (currently being debated in several countries) presumes guilt on the part of copyright violators, and suggests a further unusual business model for ISPs: terminating relations with their consumers at the behest of another industry. Some of these developments involve shifting responsibility for pursuing copyright infringers from content owners to state authorities, altering the priorities of enforcement agencies who presumably have other issues to contend with (terrorism, people smuggling, contraband etc.). These moves are unusual in that the blunt and audacious pressure applied by content producers, and friendly responses from state agencies, render so publicly visible the alliances and priorities of the stakeholders involved in reformulating the cultural, legal, and economic landscape – all as a response to practices emergent from P2P. We should be asking why this is happening from a distance sufficient to provide tenable answers.

The demonstrably gross excessiveness, illogicality, and plain irrationality of these manoeuvres is simultaneously mirrored by the frenzy of exchange and consumption which characterises P2P, and indicative of the necessity of approaches beyond 'copyfight'; approaches which link the individual and the social and the psychological and the physical.

Arguments about freedom of speech and fair use etc., although justifiable and compelling, are, in the terms within which this paper is articulated, not necessarily the correct, final grounds with which to account for P2P. The position argued here is in support of P2P and opposed to the draconian approaches to it thus far pursued. The law and common practice are fundamentally divergent, and this is no longer tenable; in fact it makes further mockery of a system already in the throes of a legitimation crisis. For Dennis, the current copyright machinations are

> *the latest and onerous manifestation of 'low intensity conflict,' of a cultural guerrilla war that pits a subset of well-heeled and well-positioned Boomers against their children and grandchildren ... The conceptual coherence and persistence of these efforts point to a demographically-defined, and increasingly probable period of Digital Prohibition. The politics of Prohibition are alive and well; the population and objects have changed, but the general game resembles that of 1930s America*
> [DENNIS, 2009]

It is this conflict which has seen the Pirate Party's entry into the European Parliament, a significant gesture on the part of those angered by the Pirate Bay verdict. And in line with Dennis's perspective, the stance assumed here is one which seeks to contextualise the entire mess in terms of misapprehensions and obfuscations concerning the nature of exchange, the nature of 'the economy', and the nature of 'culture'. These elements are parts of an *ecology* best understood in a holistic way; I hope to gesture towards such an understanding in this paper.

The gift is the form of what we are given by consumer capitalism, and superabundance, P2P gluttony and abject glory (in a variety of

subcultural art forms, and a variety of approaches to the ordering and dissemination of information) are the sullied return, the perfect gift back. For Mauss (and Bataille) the gift economy is a *total social phenomenon*, incorporating religious, economic, aesthetic, moral etc. realms (Mauss 1990: 3). It would be ill-advised to solely consider the economic consequences of disruptive technology such as P2P without also taking cognisance of consequences in other domains (domains segmented by economism and other boundaries). The law is the area most usually publicised, for good reason. But there are also significant ramifications for cultural and aesthetic practices.

The anthropology of exchange under capitalism

Durkheim held that "civil religion" would in contemporary societies have to take the place of the old religions (Northcott 1999: 196). Capitalist consumerism is the official civil religion *par excellence* in contemporary Western society. Where consumerism is civil religion, it is the means by which meaningfulness is produced, and exchange without money is this *excessive* consumerism. Ritzer suggests that:

> *Consumers do not merely engage in social psychological machinations that create illusory meanings for commodities lacking in substance. They also engage in rituals, narratives, and social networks in brand communities that serve as a base for modifying brands and their meanings*
> [2007: 212]

Given the success with which consumer capitalism as a meaning system operates, it is unsurprising that investments of meaning in cultural commodities, and thus their circulation, should exceed the control held over them.

Arguments describing P2P as piracy and theft are moral arguments about *wastefulness* and *excess*, arguments that *things must be monetised*. These arguments obscure the extent to which cultural products are socially and psychologically meaningful for their consumers: "the legalistic regime of copyright is in this sense bound to fail, in that it tries to shield off a field (everyday culture) which is in itself infinitely wider" (Andersson 2009: 73). This is one of the reasons why there is such conflict about cultural goods; we retain a contradictory moral perspective that cultural goods are also *public* goods. Hence museums, libraries, archives, etc.. But 'stygmergic' museums and archives (of which P2P is an example) seem to be intolerable; beyond the pale. Their success and efficiency, compared with the lumbering centralisation of proprietary models, make a paradoxical contribution to their demonisation.

This misrecognition (seemingly made in bad faith) of the social value of cultural commodities is one of the reasons why peer-to-peer is likened to morally and legally sanctionable theft, despite the following point: the 'gift' is non-rivalrous (nothing is actually *taken*, instead something is *duplicated*); and a download is *not* equivalent to a lost sale. People download who may buy the release or in some other way remunerate the producer, and also people download the release who otherwise would not hear it at all. In neither of these cases can it be said in a

straightforward sense that a 'theft' has occurred or that the producer has lost something due to P2P. This is the case also in wholesale, profit-driven reproduction of copyright content in developing economies. The music industry "estimates that it loses about $4.6 billion every year to physical piracy"; that a third of all CDs sold are counterfeit (Lessing 2004: 63). However, in developing economies the prices of legitimate CDs originating in the West are simply beyond the reach of most consumers: if they do not buy the pirated copy, they won't hear that release. The content industries thus depict themselves as victims of their own greed and, on the basis of the sympathy this dubious position is supposed to generate, intend to overhaul the framework within which intellectual property is managed – in their favour, and against both the interests of consumers and artists, and the vast potentials of the emergent technological infrastructure.

The principle point, however, is the inviolability of consumerism. This is why the hysterical response arises. Excess is a response to excess. The issue in Bataillean terms is not the acquisition of goods and wealth, by 'amoral' means or otherwise, it is the expenditure, the *dissipation* of wealth: "human sovereignty is assured not through the accumulation of profit but through the form of consumption that creates no use-value, the consumption of excess, the generation of waste and loss" (Jenks 2003: 101).

For Bataille, as for Mauss, the gratuitous dissipation of value in potlatch is *sacrificial*. It has *religious* properties. The logical extension of the civil religion of consumerism is this excess of which Bataille speaks. The rejection of worldly value is an affirmation of spiritual value. The destruction of the profane affirms the sacred. The Maussian gift cements both social and spiritual relations simultaneously. And it is on these grounds that the endearing gift reading of P2P draws its power. We want to believe that there is something outside of the market holding a solidary 'we' together, or that such a thing is at least possible, that we can still imagine a social bond outside of the commodity and pecuniary exchange. The idea that, through our technology, our diligence, our collective knowledge, our standing together against 'The Man', and, flatteringly, our *taste*, we might reconstitute the social along lines of reciprocal kindnesses is deeply appealing. That the fantasy is articulated around the online exchange of virtualised mass commodities, by atomised private individuals accruing usually nonfungible cultural capital, perhaps shows how impoverished our field of vision concerning alternatives to the current state of affairs has become.

Empirical issues with the application of the gift model to P2P

References to P2P as a reciprocal gift economy are widespread (Katz 2004, Levine 2001, McGee and Skågeby 2004, Rojek 2005, Vaidhyanathan 2004, Wark 2006). In a sequence of papers, Giesler (2006a, 2006b), together also with Pohlmann (2003a, 2003b), has elaborated subtle gift readings of P2P. In this research, the customary Maussian conception of gift economies is attenuated to its limits to account for the following:

> *First, a [P2P] gift is always a perfect copy of an mp3 file stored on the donor's hard drive. Second, a donor is usually a recipient and a recipient is usually a donor at the same time but not to each other. Third, it is the recipient and not the donor who initiates a gift transaction. Fourth, donor and recipient are anonymous and gift exchange is usually not reciprocal … Reciprocity in social networks does not necessarily involve total reciprocity between two individuals, but the social obligation to give, accept, and 'repay' – which means to reciprocate within the network*
> [Giesler and Pohlmann 2003b: 2].

This is *metareciprocity*, a generalised, any/many reciprocity order (Giesler 2006b: 33). Giesler and Pohlmann are at pains to point out some of the inherent contradictions around this form of exchange, but this has not diminished the popular interpretation of P2P as progressive, emancipatory, resistant: a "movement … that publicized the utopian potential of the Internet as subcultural community and bearer of a gift economy" (Kahn and Kellner 2003: 302). Land romanticises P2P as an element of "a wider strategy of guerrilla 'information warfare' based in an anarchic form of nomadic resistance to the State control and regulation of cyberspace" (2007: 187). Hall similarly refers to accounts of P2P, "with its large-scale distribution and sharing of copyrighted content … having the potential to produce a form of digital communism" (2009: 25).

However, this utopianism is undercut by empirical detail. As far back as 2000, Adar and Huberman "found that nearly 70% of Gnutella users share no files, and nearly 50% of all responses are returned by the top 1% of sharing hosts" (2000). This is not a gift economy; it is more like a *leeching* free-for-all. Leeching (downloading without uploading) is one of the most significant issues with gift economy accounts of P2P: many downloaders are all too familiar with 'please seed' comments on torrent link pages. *Some* P2P programs feature inbuilt features to minimise this free-riding. For instance, some BitTorrent platforms allow for monitoring the share ratio of downloaders, and some slow download speeds for those with poor ratios. These technological attempts at reinforcement demonstrate that the symmetry between self-interest and altruism which P2P ideally instantiates in the (normative) gift economy model is not being achieved. Some older P2P programs allow one to ban leeches. It could be argued that banning is itself a metareciprocal gift, a generalised 'paying it forward', insofar as it encourages the leech to share. But it also implies that the banner anticipates at least the *possibility* of exchange: where this is absent, movement shuts down completely. Metareciprocity is *not* generalised to the leech; donors, where they have the option, gift only those from whom they can expect to get something in return. Leeching implies that the gift reading is untenable because of excessive free-riding, and introduces mistrust into the system at the same time that it reinforces selfishness and suspicion on the part of gifters.

Leeching, however, is not the only issue with gift economy readings of P2P. In Mauss, the gift economy is an exchange system where the *status* that accrues to gifters plays a crucial role. The gift is not 'pure'; it is always understood to be an element in a reciprocal web. This aspect of the theory of the gift is often omitted from accounts of P2P as gifting, which tend to stress utopian and egalitarian elements: the spontaneous emergence of a community of fans taking distributive control into their

1–The ritualistic nature of this competition is evinced by '.nfo wars', the stylised vituperation presented in text documents distributed with releases (Whelan 2008: 69-71). The intensity of the competition is evident from the idea of '0day' ('zero day'), which refers to the public dissemination of an unofficial version of the release on the day it officially comes out (references are also made to '0hour'). Of course, there is also much cachet in distributing releases *before* they officially come out.

own hands and so on. The iteration of status on and around P2P is a complex phenomenon, but as regards current purposes, there are two significant issues worth mentioning, both related to *elitism* of different kinds at different points in the system.

At the top of the distributive pyramid of P2P is the *warez scene*, a secretive collection of highly structured, hierarchical groups who compete to be the first to issue pirated releases.(1) In one of a whole sequence of thoroughly symbiotic but plausibly deniable relationships characteristic of P2P and the cultural and economic milieu of which it is a part, the warez scene customarily exhibits complete contempt towards the 'lamers' of P2P (AboutTheScene 2008, Cooper and Harrison 2001, Ernesto 2009). Warez groups consider P2P users to be leeches jeopardising their own activity – at the same time that they are dependent on P2P users to spread their name alongside the releases they (re)produce. The sources of much of the content on P2P are actively opposed to the distribution of that content; the warez scene attitude towards P2P is not all that different from that of the RIAA.

The second form of elitism which disrupts the gift reading occurs at a more local, and perhaps therefore more significant level. Online as elsewhere, subcultures and fan cultures are fiercely protective of their independence and of perceived threats by both market incorporation and mass audience dilution. 'Cybersubcultures' are frequently exclusionary in effect if not in intent. The subcultures whose emergence and relative popularity is intimately tied to P2P (for the sourcing of raw material, production software and information about how to use it, and the material constituting the genre), are in their guardianship of authenticity relatively 'closed' rather than 'open'. This does not imply that there is something 'wrong' with such subcultures; merely that their reluctance to open their boundaries renders gift readings of their social practices inappropriate. These subcultures, largely independent from mass media but circulating within the same P2P channels as mass media artefacts, are some of the most significant sociocultural phenomena to emerge alongside P2P, but their visibility is despite, rather than because, of their subcultural stance. Such is the nature of prestige and subcultural capital on and around P2P that:

> *Information is the most important thing, but information does not have fixed intrinsic value. The essence of information is secrecy; the utility of information comes from its movement*
> [ENG 2002: 23]

Amongst those heavily involved in musical subcultures online the orientation to knowledge and its dissemination follows that described by Eng in relation to *otaku* cultures. Within niche and specialised genres, the social value of information lies in its *selective* mobility rather than its dispersal. It can be very rewarding, but also difficult and time-consuming, to learn about obscure or niche material. In such subcultures, practitioners exhibit an elitist devotion to arcane, professionally redundant knowledge concerning the 'canon'; 'cool' or 'insider' status is demonstrated through elliptical displays of this knowledge. This can be demonstrated by a cursory Google search for the term 'Pancake Repairman'. This P2P username is indicative: it stands for exceptionally

broad yet redundant fan knowledge, and is used also to derogate such knowledge by those in possession of *even more obscure* knowledge of the same form. The structure of subcultural capital is such as to value the *possession* of such knowledge (alongside an ethic of independent research) rather than its *distribution*; such knowledge and the resources it refers to are not simply *given away*, they must instead be *earned*. Those with the most to gain from subcultural participation must put in the most work, those with the most to lose from subcultural dilution are extremely wary of the further distribution of the resources through which their subcultural capital is constituted.

When we consider the broader context within which P2P operates, other problems with the gift reading become evident. Perhaps most significant among these is the shift to direct download link sites (DDL), such as Rapidshare and Megaupload. These are hosting services where archived albums etc. can be stored, and a hyperlink then posted pointing to where the album can be downloaded: client-server rather than P2P architecture. DDL now accounts for up to 30% of all HTTP traffic (Anderson 2008), and the ascendance of DDL has some notable implications. Firstly, DDL is emphatically *not* a gift economy, it entails no return. Secondly, DDL services are very popular on mp3 blogs, which sometimes post multiple albums daily. These mp3 blogs, and the comparative ease and reliability of DDL for the blog users, can also be understood as responses to P2P superabundance. Mp3 blogs are effectively *new gatekeepers*, filtering content the quality, relevance and value of which can on P2P be difficult to determine. Mp3 blogs post at least some 'metadata' concerning the releases they link to; on P2P it can be difficult to sort, categorise, or prioritise the vast amount of unfamiliar material. The rise of DDL can be attributed variously to the prevalence of leeching on BitTorrent, copyright issues around P2P, and the throttling of P2P by ISPs. Ever diminishing storage, hosting and bandwidth costs play a further role. DDL arises at the point where superabundance, attention deficit, consumer fatigue, and technological development make P2P an inconvenience for the retrieval of material rather than a solution to artificial monopolistic market restrictions.

Thirdly then, and perhaps most importantly, one of the things we often lose sight of in the P2P debates is that the current political and cultural situation (and our aspirations for it) is strongly associated with the level of technological development. The shift to DDL is notable, because it is increasingly doing the work that *used* to be done by P2P. It is tempting to speculate, therefore, that the popularity of P2P is due to its efficiency and success *at a certain level of technological development*. The consequence is that the social and cultural practices around P2P may be, like those around other naturalised technologies (vinyl, the QWERTY keyboard, the internal combustion engine and so on), artefacts of the level of development, or, to frame it from the other end: "the prime conceptual models through which we understand the world in a given era can be derived from the machinic metaphors of that era" (Andersson 2009: 97n10).

If we consider the ideological and theoretical underpinnings of the gift economy reading of P2P, there are further empirical features which cast doubt upon that reading. It is important to bear in mind the inferential features of the gift economy model, what it implies rather than explicitly

states. Positive valuations of file-sharing as gifting suggest that it counters the monopolistic control of distribution by multinational conglomerates, that it empowers consumers and fans in terms of an increased array of choices, that it reconstitutes fan communities online which may otherwise be dispersed and atomised, and that it is a means for consumers to signal to each other their aesthetic choices, and thus a democratisation of the dominant regimes of taste. This is a description of a noble and valuable social practice: "filesharing exposes people to new music that they won't hear anywhere else" (Rodman and Vanderdonckt 2006: 2598). Furthermore, P2P "not only threatens the commercial viability of large homogenous record companies, but it also clears space for the distribution of indigenously created forms of music" (Ritzer 2007: 208). But the sort of material actually circulating on P2P does not lend credence to this description. 80% of the music transfers on P2P consist of 5% of the available material – the 'mainstream' material. The other 95% of rare or niche material constitutes only 20% of transfers (Page and Garland 2009: 3). P2P, then, is principally used for the exchange of material which is already ubiquitous. On the one hand, this somewhat undermines the argument that P2P is impacting on the income of struggling independent artists. On the other, it indicates that P2P is not having a particularly significant impact on the hegemony of the culture industry and the content it produces.

Is P2P subversive?

The prevalence of the gift economy ideal is the consequence of a conjuncture of perceived social and cultural phenomena around P2P. Chief among these are the clouding, as it were, of P2P activity by fandom and subcultural engagement, and the (mis)reading of P2P as a form of political action. These perspectives are linked but can be disambiguated. On both counts, the normative account of P2P as a gift economy can be shown to be associated with aspects of the cultural and political environment in which P2P arises which, under closer inspection, tend to undermine the positive valorisation of P2P. And on both counts this positive valorisation can be shown to be linked to a broader anxiety about the collapse of the social and the political, and a subsequent search for reconstructed meaning emerging through the "loss amidst monumental abundance" which characterises contemporary hyperconsumerism (Ritzer 2007: 195). Let us consider each count in turn.

Regarding subculture, the significance of active fandom practices in the constitution and articulation of subjectivity and sociality is well documented (see, for example, Baym 2000, Cova et al. 2007, DeNora 2000, Gray et al. 2007). However, emphasis on fandom is indicative also of the reductive redefinition of agency under neoliberalism as consumer sovereignty *only*. Where people are defined by their engagements with cultural artefacts, they are defined by their engagement with *commodities*. The gift reading of P2P depicts the tables turning in this scenario by picturing consumers seizing control of the means of distribution. As Giesler and Pohlmann put it, P2P users:

seek to consume music in ideological opposition to the well established principles of a functionally differentiated system of modern music production and consumption in the triangle of commodification, copyright and

corporations and against the ongoing de-sacrilization of music into the profane sphere of capitalist markets throughout the past 130 years
[2003a: 4].

People want to be affirmed in their affective investment in and ownership of the culture they love. One way of doing so is by re-enchanting commodities as gifts, *re-sacralising* content through redistributing it 'beyond' the market. The commodity system is refigured as amoral, and simultaneously bypassed by a moralistic discourse of anonymous gift exchange. Hence P2P participation is said to produce a *warm glow* (Levine 2000: 29-30). This affective mechanism emerges in part as a response to the sense of 'nothingness' Ritzer describes (2007). Yet P2P is still really an "island of consumption" within commodity culture (Halnon 2004: 748), albeit a 'piratical' one. It is a set of consumption practices usually used for consuming mass commodities; parasitic upon the industry and market mechanism it ostensibly undermines. Every island of consumption, of course, inescapably involves consumption (Ritzer 2005: 190). The implication for P2P users, in Adorno's words, is that "their revolts against fetishism only entangle them more deeply in it" (1991: 46).

The conception of P2P as a form of resistant political action arises at least in part from the draconian responses to it and the feedback loop this produces. Hence a political manifesto is now articulated around P2P. However, it is important to question the flowthrough here from self-interested and isolated individual action to (the political manipulation of) the unintended collective consequences of such action:

these P2P-based technologies are seen as aggregated totalities (this is what they are usually referred to as in debates on the phenomenon) embodying altruism, community or even resistance, [but] individual user intention arguably only plays a parenthetical role
(Andersson 2009: 86).

'Resistance by association' does not necessarily ramp up into concerted collective political action, although, as is customary in democracies, certain actors may exploit such behaviour and perceptions of it so as to advance their own agendas. Leeching suggests at least that the vast majority of P2P users engage with the technology because it is convenient to do so, not because they espouse some radical political agenda. Why should downloading *X-Men Origins: Wolverine* for nothing be considered a form of political activism?

Technology has no inbuilt social, cultural or moral meaning, that meaning is emergent from its use. Similarly, the history of radio piracy (Johns 2009), and indeed the history of piracy on the high seas (Land 2007) demonstrate that there is no unitary (let alone progressive) political coherence around the notion of 'piracy'. P2P can be construed as libertarian, anarchist, leftist, neoliberal etc. (Hall 2009: 25-26). The history of innovative media technology is simultaneously a history of 'piracy', and of the social struggle about it (Lessig 2004: 53-61). P2P activity is perhaps better thought of as an inchoate *gesture* extending capitalist distribution in a disruptive way, rather than a form of political dissent. As Liu suggests of 'cool' (and P2P is *definitely* cool):

2–*Acéphalité* in Bataille referrs variously to 'the chiefless crowd', the tribe which sacrifices its own leader; and to the loss of sovereignty and existential security associated with the death of God (Pefanis 1991: 138n26).

Cool is the protest of our contemporary 'society without politics.' It is the gesture that has no voice of its own and can only protest equivocally within the very voice of the new rationalization. It is the incest of information that secretly 'nixes' the exchange of information [2004: 294].

'Subversion' does not undermine capitalism; it markets it. 'Rebellion' is intimately associated with the emergence of contemporary capitalist consumerism. Symbolic resistance is just that: symbolic. Heath and Potter present

a quick list of things that, in the past fifty years, have been considered extremely subversive: smoking, long hair for men, short hair for women, beards, miniskirts, bikinis, heroin, jazz music, rock music, punk music, reggae music, rap music, tattoos, underarm hair, graffiti, surfing, scooters, piercings, skinny ties, not wearing a bra, homosexuality, marijuana, torn clothing, hair gel, mohawks, afros, birth control, postmodernism, plaid pants, organic vegetables, army boots, interracial sex. Nowadays, you can find every item on this list in a typical Britney Spears video (with the possible exception of underarm hair and organic vegetables) [2004: 294].

The crucial difference with P2P is that the content industry is reluctant to market what it perceives to be its own obsolescence, and has not (*yet*) determined how to properly monetise P2P, tending to favour instead the acephalic mechanisms we are familiar with: technological impediments, threats and intimidation, and the legal extension of proprietary control. (2) It is ironic that the apolitical self-interest of music fans should finally appear to exceed the parameters of cool-as-(marketable)—transgression so familiar to the mass music market (Barbrook 2007). What we are witness to with P2P is then the customary engine of competitive capitalist consumerism; *creative destruction* in full effect.

The glory of the gift

These aspects render a return to Bataille (as opposed to simplistic applications of the Maussian model) apposite. Bataille extends the theory of the gift derived from classical anthropology by placing novel emphasis on potlatch, sacrifice and their relations as models of gifting. He does so to articulate a critique of bourgeois society, a critique describing a miserly acephalic order, which has repressed and 'lost' its desire to reconstitute and revitalize the social order through the ritual destruction of value (it has 'forgotten' that this is the basis of sociality). In Bataille's vision, the fundamentally baseless and irrational *faith* in utility and economic rationality under capitalism has led to a situation where "any social revival is now transitory, limited to moments of violation. Violation and recognition serve no higher purpose: they institute a headless oscillation between a violence which is not far from love and a recuperation of order which incites its own transgression" (Ramp 2003: 129). The Bataillean gift of potlatch serves well to account for the ambivalence, contradiction, and incoherence which permeate both sides of the P2P debate.

For Bataille, potlatch

is at once the essence of the gift and the opposite of the principle of reciprocity (understood as equilibrium or equivalence); it is the very form of the unreturnable gift, and as such institutes the possibility of transgression of any material or symbolic economy. Instead of reciprocity there is waste, loss; whatever breaks the closure of a system of balanced exchanges. The non-productive expenditure (dépense) of potlatch is the figure of antieconomic and antiutilitarian excess … 'a sacrifice without return and without reserves'

[FROW 2003: 32]

Thus Bataille's psychology also has something to offer in terms of accounting for the hypocritical, illogical, have-you-cake-and-eat-it glee with which P2P users diligently download all the cultural commodities the mass market offers, while asserting that through doing so they will 'kill' (sacrifice) 'the industry'. Through this ritualistic sacrament a sense of the social is brought back to a sort of half-life; glory and power accrue to the participants of potlatch, simultaneously affirming and denying the contradictory values of our culture. Ambivalence is constitutive. For these reasons, it seems that P2P follows Bataille's potlatch rather than Mauss's gift, and that P2P and the culture and politics around it might best be considered *revolting* rather than *revolutionary*.

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Peerless: The Ethics of P2P Network Disassembly

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Enmeshed with a global economy, every bit of 'free' information carries its own microslave like a forgotten twin.
[M. Pasquinelli, *Animal Spirits* (2009), p. 75]

In theory, peer-to-peer (P2P) networks embody a model of collaboration that, we are told, spells out the end of the monopoly and heralds a new era of equality and creativity. At its most idealistic, discourse on P2P describes a paradigm where all participants are equal and where they voluntarily and freely cooperate with each other in the production of common goods that can be appropriated by anyone, replacing inflexible top-down hierarchies with open modes of production and communication that value cooperation and reciprocity over maximization of profit. While the positive impact of successful P2P projects is evident, here I want to contest the status of P2P as an alternative and question some of the norms or values behind the model. The larger thesis of my work is that a network is a machine for increasing participation while simultaneously maintaining or deepening inequalities between its participants (due to network laws such as preferential attachment). The question, then, is how P2P networks replicate or contradict the logic of non-P2P networks (specifically, digital technosocial scale-free networks). For instance, while P2P networks may indeed democratize access to cultural contents, we still need to ask: Whose culture are they making accessible? Is P2P part of the same network processes that normalize monocultures? And if so, what kind of resistance to hegemony might be embodied by the peerless, those outside P2P networks?

The rise of the Digital Commons

While, technically speaking, P2P is just a particular form of network structure, it has come to represent a revolutionary (some would say anti-capitalist) mode of production and social organization. What exactly makes this structure so revolutionary? Most digital networks are set up as a system of *servers* that transmit data to *clients* so that the distribution of resources is centralized, the production of goods is organized hierarchically, bandwidth is allocated according to one's means to pay for it, and ideas are considered intellectual property protected by law. In contrast to this centralized architecture, there are no servers and clients in P2P networks because all nodes can simultaneously play the role of server and client as needed. Because there are no dedicated servers, a P2P network has no center.

Because P2P networks still rely on the Internet's basic infrastructure of servers and clients to operate, P2P can be described as a decentralized network structure *superimposed* over a centralized network structure (I will return to this later). What this decentralized structure achieves is the horizontal or 'open' production and dissemination of resources, the redistribution of bandwidth according to one's needs through ad-hoc connectivity, and the free exchange of ideas unconstrained by intellectual property laws. One consequence of eliminating the distinction between server and client is that peers can engage each other on equal terms: all peers own their own means of production, they can all access the network in the same way and have the same chance to cooperate, and they all have the same opportunities to derive value from a good. Reward is measured

not by profit, but by the opportunities to increase one's knowledge, exercise one's creativity, and increase one's reputation among peers. The result is a commons-based peer production system in which goods can be allocated with no need for monetary compensation: proponents of P2P recognize that digital goods, unlike material goods, can be effortlessly and infinitely reproduced, and it is therefore useless to try to create an artificial scarcity to regulate their exchange.

According to supporters of P2P, the power of collective intelligence behind this model is significantly redefining society at large. Its influence has expanded beyond the Open Source and Open Content movements to areas like governance, education, science and spirituality. These changes—we are told—are nothing short of a revolution in moral vision, a "breakthrough in social evolution, leading to the possibility of a new political, economic, and cultural 'formation' with a new coherent logic" (P2P Foundation, 2006). Furthermore, P2P is not just ephemeral theory but an actual social practice that signals a major transformation to come:

> *At a time when the very success of the capitalist mode of production endangers the biosphere and causes increasing psychic (and physical) damage to the population, the emergence of such an alternative is particularly appealing, and corresponds to the new cultural needs of large numbers of the population. The emergence and growth of P2P is therefore accompanied by a new work ethic (Pekka Himanen's Hacker Ethic), by new cultural practices such as peer circles in spiritual research (John Heron's cooperative inquiry), but most of all, by a new political and social movement which is intent on promoting its expansion. This still nascent P2P movement, (which includes the Free Software and Open Source movement, the open access movement, the free culture movement and others) which echoes the means of organization and aims of the alter-globalization movement, is fast becoming the equivalent of the socialist movement in the industrial age. It stands as a permanent alternative to the status quo, and the expression of the growth of a new social force: the knowledge workers.* [Bauwens, 2005]

There are, however, some serious limitations behind the idealistic sentiments expressed in this rhetoric. The P2P network is a heterotopia in the sense in which Foucault uses the term: an 'Other Space' with a dual meaning—at once an alternative and a confirmation of the impossibility of alternatives. When the curtain is lifted, we can see that the 'breakthrough' in social and economic evolution that P2P is said to represent is built on top of the same old capitalist structures: while peers can redistribute bandwidth amongst themselves, they must first rent it from an ISP; the production of common goods still depends to a large extent on goods that only some can afford and whose production usually entails exploitation (the production of electronic circuitry, for instance, is at some level still dependent on the surplus labor of the Congolese miner or the maquiladora worker, etc.).

In short, the decentralization of resources and the deregulation of property is made possible only through the centralization and regulation that profit maximization requires. While there are no dedicated servers in P2P networks information must still flow through a dedicated server at some point, because P2P networks are built for the most

part (with notable exceptions) on top of the same Internet we all rent from corporations, not a separate Internet. *The only reason this world without money is possible is because it is built on top of a world where money is everything.* Thus, P2P is at once a success and a failure, both a self-sustaining organism and a parasite that cannot live without its host. Baudrillard's observations about simulacra become highly applicable here: just like the absence of freedom in a prison functions as a convenient way to conceal the fact that the whole of society is carceral, the Digital Commons that P2P networks create serves to conceal the fact that online sociality was from the beginning—and is only increasingly becoming—subordinated to the logic of capitalism.

P2P and the 'new socialism'

The desire to believe that P2P networks are functional alternatives to capitalism is an expression of a rather romantic view of technological progress called *digitalism*. According to Pasquinelli, digitalism is "a basic designation for the widespread belief that Internet-based communication can be free from any form of exploitation and will naturally evolve towards a society of equal peers" (2009, p. 66). To the extent that proponents of the Digital Commons (Free Software, Open Source, Creative Commons, etc.) believe that digital reproduction can supplant material production in a way that engenders more equality and is better for the environment, they are adhering to a form of digitalism. In the process, unfortunately, they are obscuring the fact that a horizontal democracy of nodes still relies on the surplus labor of an unequal Other.

> *Politically, digitalism believes in a mutual gift society. The Internet is supposed to be virtually free from any exploitation, tending naturally towards a democratic equilibrium and natural cooperation. Here, digitalism works as a disembodied politics with no acknowledgement of the offline labour sustaining the online world* (a class divide *that precedes any* digital divide)*. Ecologically, digitalism promotes itself as an environmentally friendly and zero-emission machine against the pollution of older Fordist modes of industrial production, and yet it is estimated that an avatar on Second Life consumes more electricity that the average Brazilian"*
> [Pasquinelli, 2009, pp. 72-73, emphasis in original].

We are all familiar with digitalism arguments that portray Web 2.0 companies like Flickr and Twitter as the heralds of a new form of socialism (see Kelly, 2009, on *Wired Magazine*, for instance). If nothing else, this glorification of the equality-producing qualities of corporate-controlled sociable media serves to remind us of Paolo Virno's observation that, as a way to assuage the revolutionary flames it tends to fan by creating so much inequality, capitalism "keeps providing its own kind of 'communism' both as a vaccine, preventing further escalation, and an incentive to go beyond its own limitations" (2004, *A Grammar of the Multitude*, p. 18). P2P is part of this process, functioning as an internal communism that makes capitalism seem less savage, as well as a laboratory for the proto-capitalist modes of production of tomorrow.

Not for nothing did Virno call post-Fordism the "communism of capital" (ibid, p. 110). Post-Fordism is not about the production of material goods

in the assembly line, but about the creative production of knowledge and culture through social relations outside the factory. It is the privatization of the public domain. This new form of exploitation, according to Hardt and Negri, translates into "the expropriation of cooperation and the nullification of the meanings of linguistic production" (2000, p. 385). We see it as much in the commercialization of hip-hop as in the adoption of P2P or open models by corporations. Big companies have recognized a business opportunity and are plucking the fruits of P2P collaboration in order to reinsert them into the market as commodities. In the name of 'social collaboration' and 'gift economies,' the users are put to work for corporations. While there are attempts to protect immaterial labor under new collective forms of ownership or 'peer property' (GNU, Creative Commons, etc.), the fact that these models carry within them the ghosts of exploitation cannot be escaped. New models of sociability emerge, but they become organized under a structure where every aspect of the public is owned, hosted, or powered by private interests. A quick look at the Terms of Use of any Web 2.0 company will reveal as much. And yet, although in essence it is just an experimental expression of private property, peer production is accepted because it gives the illusion (which might be correct superficially) of being more equitable and inclusive. By furthering a capitalist technologizing of sociality peers are not exactly engaged in the formation of a pure commons, but promote a trend where—to paraphrase Vandenberghe (2002)—the social is increasingly subordinated to the economy, as opposed to the economy being only one dimension of the social.

Of course, things are not hopeless and P2P is anything but pointless. There are opportunities for resistance and creation in this process. We can respond, as Virno suggests, by "absorbing the shocks or multiplying the fractures that will occur in unpredictable ways" (2004, p. 18). Despite capitalism's attempts to expropriate them, the new models of collaboration opened up by P2P can be fruitful if they are converted into authentic political platforms that revitalize the public sphere. P2P does not have to be a "*publicness without a public sphere*" (ibid., p. 40). It does not have to pose as socialism while increasing our submission to a capitalist order. But for that we might need to think beyond nodes and peers.

The decline of cyber piracy

Peers are beautiful parasites. The heterotopias they create expose the fissures in the system and are testaments to the fact that other ways of thinking are possible. Today, the image in the mirror of a world without inequality might be mostly an illusion, but at least it reminds us there is a mirror in which such projections are possible. Furthermore, while most P2P projects remain small-scale experiments, one recent phenomenon reminds us that P2P can seriously disrupt and threaten the status quo on a mass scale. I'm speaking of the piracy of digital music. Reliable figures are difficult to come by, but according to the RIAA $12.5 billion USD are lost every year because of the piracy of music files. But digital piracy has not been merely about the redistribution of wealth by making digital goods affordable to audiences who would otherwise not be able to acquire them. According to Dyer-Witheford and de Peuter, "mass levels of piracy

around the planet indicate a widespread perception that commodified digital culture imposes artificial scarcity on a technology capable of near costless cultural reproduction and circulation" (2009).

Of course, the rhetoric behind the image of the digital pirate as a cultural and counter-capitalist revolutionary should be questioned. For one, while global piracy continues to rise, in some countries it is drastically diminishing or at least not growing. According to the RIAA, since 2004 the percentage of Internet-connected households that have downloaded music from P2P networks has not increased. Similarly, a survey conducted by the Business Software Alliance reports that the percentage of youth who downloaded music, movies and software without paying declined from 60% in 2004, to 43% in 2006, to 36% in 2007 (Youth Downloading Study Fact Sheet, 2006). I am not praising or lamenting the decline of this illegal form of exchange, buy merely pointing out that the largest experiment in P2P adoption seems to be contracting in some areas as pressure to conform to social norms—such as the respect for private property—begin to reassert themselves. Secondly, I want to ask: if P2P was about empowering individuals to participate in the creation and free exchange of culture, whose culture are most pirates reproducing and circulating with their open source P2P file sharing clients? Notwithstanding the litany of counter-cultural practices (hacking, mashing, modding, circuit-bending, speedrunning, etc.) that P2P has facilitated or influenced, the fact remains that for most people, pirating involves the rather uncritical consumption of mass media, the downloading of the latest Hollywood blockbuster or teen idol musical hit.

As some have realized, piracy supplies a tremendous boost to the big artists by popularizing their work, making them even bigger players in the market. The logic of the network reasserts itself: the rich nodes are still getting richer through preferential attachment (the linking to popular nodes). Digital piracy cannot escape the dynamics that make the network a machine for widening inequalities, not closing them. True, businesses need to adjust to the new dynamics of the industry, but the smart ones will figure out how to capitalize on this 'communism.' Thus, it is incredulous to believe that P2P sharing for the masses will significantly undermine monopolies by creating a *long tail* of diverse cultural alternatives. In an attention economy where traffic equals wealth (even if it is in terms of reputation, not money), the small-time cultural producer can only aspire to become one of the massively shared commodities. Get rich or die trying. Meanwhile, the pirate has only reaffirmed his or her role as consumer in the process. Unlike the piracy of the 17th Century, this form of appropriation or 'stealing' only serves to increase the value of the good being stolen. The sharing of monocultural goods (and the production of derivatives from these goods) that P2P models facilitate is a form of *ultimate consumerism* in which production becomes the new consumption. It is 'ultimate' because social relations outside the market are now commodified through P2P processes and placed inside (or more exactly, superimposed *over*) the market, and 'ultimate' because by remixing monocultural goods and making them available for others to consume we end up paying for the things we produce. Or as Doc Searls says of user-generated content: "the demand side supplies itself" (2006).

Whereas mass media established a monopoly of communication characterized by the unidirectional flow of information from one to many, digital technosocial networks have increasingly come to represent a monopsony of communications where the flow of information is from many to one (whereas a monopoly is defined by the presence of a single seller, a monopsony is defined by the presence of a single buyer). We are *all* producers now, but since we want to maximize the chances of our products being seen by others, we must take our cultural products to the one buyer that can make our content go viral: the Flickrs and Facebooks of the world (although they don't really *buy* our content; we *pay*—through advertisements if nothing else—for the privilege of having it hosted there). Digital technosocial networks allow for the sharing of information according to models that seem democratic and egalitarian (models such as peer-to-peer and many-to-many), but in terms of the network infrastructure that aggregates and disseminates this information, the model is increasingly that of many users willingly submitting their content to one buyer who manages it and derives profit from it in unequal proportion.

The atopia of disassembly

If we are really interested in alternatives, perhaps we should consider the possibility that we might need to look beyond the logic of the network, and past the exclusion of peers—the exclusion that establishes that a non-peer is irrelevant to the network.

In my work, I argue that digital technosocial networks—including P2P networks—function not just as metaphors to describe sociality, but as full templates or models for organizing it. Since in order for something to be relevant or even visible within the network it needs to be rendered as a node, digital technosocial networks are constituted as totalities by what they include as much as by what they exclude. I propose a framework for understanding the epistemological exclusion embedded in the structure and dynamics of digital technosocial networks, and for exploring the ethical questions associated with the nature of the bond between the node and the excluded other.

The logic of the network—the network episteme, so to speak—rests on a principle I refer to as nodocentrism. One property of networks, as Castells (2000, p. 501) suggests, is that the distance between nodes within the network is finite: while any two given nodes might not be directly linked, they are connected through the indirect links that form the network itself, and information can reach them even if it encounters the occasional barrier. But at the same time the distance between a node and something outside the network is, for all practical purposes, infinite. A location on the periphery of the network is separated from the network by a barrier that cannot be breached, unless the location becomes part of the network. Thus, nearness in a network is constituted on the basis of nodes recognizing only other nodes. In the context of digital technosocial networks, we can say that social reality is mediated through a nodocentric filter, and since the distance between a node and something that is not in the network is infinite, only elements that are in the network are rendered as socially near (regardless of whether they are physically near

or far). Nodocentrism is the assertion that only nodes need to be mapped, explained, or accounted for. Nodocentrism means that while networks are extremely efficient at establishing links between nodes, they embody a bias against knowledge of—and engagement with—anything that is not a node on the same network. If it is not a node in the network, it is not real—it might as well not exist as far as the network is concerned. In essence, nodocentrism is a reductionism that eliminates everything but the reality of the node. The network consequently defines the limits of what individuals are capable of knowing, shaping subjects through what is included or excluded from the universe of knowable things, and through what is rendered as near or far in relation to the network. Thus, the question of what is knowable—what is included or excluded from the network—has ethical implications: to include something is to accord to it certain rights and privileges, whereas to exclude something is to deny it a seat in the assembly.

I then propose the concept of the paranodal, which encompasses the space outside and between the nodes, as a way to theorize a resistance to the network, and as a countermeasure to the logic that eliminates everything but the reality of the node. Contrary to its representation in diagrams depicting networks, the outside of the network is not empty but inhabited by multitudes that do not conform to the organizing logic of the network. These peripheries play an important role in giving nodes their identity and history, as changes in this space result in changes to the structure and purpose of the network. Furthermore, the paranodal acts as a site from which we can articulate a subjectivity separate from the network, from which we can unthink the network episteme and disidentify from the network. For Rancière (ref), political subjectivization or identity formation happens precisely through a process of disidentification: parts of society disidentify themselves from the whole; individuals and groups recognize themselves as separate from the mainstream. Thus, to use Rancière's terminology, the paranodal is the part of those who have no part; it is the place where we experience—or at least are free to theorize—what it is like to be outside the network.

Poverty in the network is explained not so much by exclusion (as the 'digital divide' theories suggest) but by inclusion under nodocentric terms that increase inequality. It is easier than ever to join a network, but once inside, the architecture of the network makes it nearly impossible to escape the dynamic that widens the gap between the wealthy hubs and the impoverished nodes. It is under these economic circumstances that the ethical resistance of the paranodal becomes important, because the peripheries of the network represent the only sites from which it is possible to un-think the network episteme, helping to conceptualize new models of identity and sociality.

Peers and paranodes

P2P networks do not escape the exclusionary framing of nodocentrism, and it is from this point of departure that we can begin to ponder the benefits of thinking beyond the peer. P2P might be a rejection of the commodity form, but as we have seen, this rejection is constructed over the old structures of labor and capital that make the commodity form

possible in the first place. In capitalism, exploitation happens when the workers, who do not own their own means of production, are made to produce more than what they need to satisfy their needs; the capitalist uses this surplus labor to generate wealth. Brilliantly, P2P circumvents the model by calling attention to the fact that a surplus of digital goods can be created effortlessly, removing the need for exploitation, and by facilitating the distribution of tools that puts the means of production into the hands of more people. However, because this happens over a network and socio-economic structure where not everyone has the access and knowledge to participate in the Digital Commons, P2P's 'alternative' consists only in a postponement of exploitation: removing it from the pristine sphere of the digital commons by relegating it (or *externalizing* it, in economic terms) to other spheres. P2P is—again, paradoxically—an alternative to the capitalist economy that cannot exist without the capitalist economy—a parasite that cannot afford to bleed its host to death. Remove that economy from underneath it—remove the millions of dollars invested in developing microchips and financing warlords that control the mining of Coltan through slavery and rape—and the alternative will cease to exist (Coltan is a mineral found in the Congo necessary for the production of many electronic devices). Once the threat of mass piracy is brought under control, P2P will stabilize into a boutique economy, a gift economy for closet anarchists that poses no real challenge to capitalism.

Plainly put, there is no way to escape the fact that the nodocentrism that organizes digital networks—whether they be centralized or decentralized—is an expression of subordination to the rules of capital. But by accepting the inevitability that, for something to matter, it must be digital and networked, we limit our ability to imagine alternatives. Even if we were to accept the claim that P2P network architecture engenders publics instead of markets, we should not put aside Kierkergaard's critique of publics as nihilistic systems intended to facilitate the accumulation of information while postponing action indefinitely. While Kierkergaard was putting down newspaper media, his critique couldn't be more fitting in the age of Web browsers, RSS aggregators and bitTorrent clients.

P2P is indeed a brilliant failure. It allows for the proliferation of parasites, of heterotopias built on top of host systems. This is the first step in disentanglement, in escape. Parasites are useful because they signify that resistance has conceptualized the first step in unthinking the problem.

> *The breeding ground of disobedience does not lie exclusively in the social conflicts which express protest, but, and above all, in those which express defection... Nothing is less passive than the act fleeing, of exiting. Defection modifies the conditions within which the struggle takes place, rather than presupposing those conditions to be an unalterable horizon; it modifies the context within which a problem has arisen, rather than facing this problem by opting for one or the other of the provided alternatives.*
> [Virno, , 2004, p. 70]

While parasites may not be able to completely flee the system (they cannot survive without the host), they are able to dissidentify from the host. Peers/parasites are therefore the first to unthink the logic of the

system, to 'modify the conditions within which struggle takes place.' Furthermore, parasites can form anywhere. Since the network template is everywhere, commodifying sociality everywhere, it stands to reason that resistance—what Hardt and Negri call *the will to be against* (2000, p. 210)—should also be everywhere. Effective resistance, therefore, should not just be a heterotopia—an *elsewhere*—but an atopia—an *everywhere*. "If there is no longer a place that can be recognized as outside, we must be against in every place" (ibid., p. 211). This is where we might encounter the conceptual limits of the peer. P2P is an expression of the will to be against, but it is an expression that only exists in one place and always in relation to the host—a commons built on a small corner of the market. Unlike the parasite, the peerless paranode aims to be not only inside or outside the host, but where the host no longer *is*. P2P might be a good start to *being against* the network in one place: the network itself. But authentic alternatives will need to contemplate what it means to unthink the network altogether, to defect from its logic. The paranode, more than the peer, might be better positioned for such a defection.

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Juan Freire

Roundtable: P2P Economies and Forms of Production

Universidade da Coruña and EOI Business School

On Wednesday 8 July a roundtable discussion was held on P2P Economies and forms of production. Participants were Gonzalo Martín, María Ptqk, Rubén Díaz (from Zemos98) and Rubén Martínez (from YProductions). While all four participants understand and apply the P2P concept in their practice, they have opposing (or complementary) positions. They provided us with theoretical standpoints from which they reflected on and analyzed P2P models as part of the economic and political system. Moreover, they are all to some extent "practitioners" of the P2P production model as applied to the business environment and/or cultural production (including amateur or alternative practices).

To moderate the roundtable, I published an initial provocation that spurred some reflections by the guests prior to the roundtable. During the debate, an initial position statement was made, followed by open debate among the guests and the audience. Below, I have presented each guest's reflections by combining their prior texts and the initial presentations at the event and a set of personal conclusions on what was discussed. More than a synthesis, this document aims to document the debate to contribute the elements that will enable the reader to reach his or her conclusions and/or continue the discussion.

Initial "provocations" by Juan Freire (1)

1) Let's take a deliberately simplified, black-and-white look at a minimum of two apparently radically opposed positions on the economic and political meaning of the production forms based on the P2P model:

—P2P as "pure markets", with no type of contribution or regulation by authorities, seen as markets in the broad sense, where exchanges are not always, or even mainly, monetary.

—P2P as the "new Socialism", but again, it is "Socialism without a State" that does not overcome models based on the market economy [this position was taken recently by Kevin Kelly in an article in Wired (2), which Lawrence Lessig responded to and refuted(3)].

2) Let's forget the "wishful thinking" that paints P2P and digital culture as new Utopias without taking into account the essential prior conditions for this type of transformation. Therefore, let's ask what is needed to make these Utopias possible. Is P2P economically sustainable? What economic strategies are feasible? What structures and powers come into question and probably end up declared as "enemies" which aim to fight for their own survival?

3) Is there a sole definition of P2P? And/or P2P fundamentalism? Is it acceptable (necessary) to carry out adaptations to the basic or essential P2P concept to make it feasible and operative? One example of these adaptations is Medialab in its role as organizing intermediary and process facilitator or the use of open APIs as "substitutes" for free software.

4) The danger of corporate appropriation of P2P production (P2P as a new form of biopolitics). Example: crowdsourcing.

Contribution by María Ptqk (4)

... Unless the wind makes me change, the idea I'll bring to the table is that making P2P out to be a productive model is a trick to sell us a 2.0 version of the same old story. We can call it Digital Neo-liberalism. If we are talking about creating models, I would say that it's one thing to talk about P2P as a file sharing system and a social symbol of the fight against intellectual property regimes (long live The Pirate Bay). It's quite different to take it as a model for productive organization applicable outside eMule, in the real economy and on a global scale.

P2P as pure markets / P2P as a new Socialism

I'll take the bait set out in Juan's first provocation (in black and white extremes, as he said) about the existence of two antagonistic models of P2P. On the one hand, seeing P2P as "pure markets", with no contribution or regulation by the authorities of any kind, as markets in the broad sense, where exchanges are not always or even mainly monetary. On the other hand, P2P as a "new Socialism" but again, a "Socialism with no State", which overcomes models based on the market economy (this position was recently advocated by Kevin Kelly in an article in Wired, which Lawrence Lessig has responded to and refuted).

1–Original post:
http://nomada.blogs.com/jfreire/2009/07/4-encuentro-inclusiva-net-en-medialab-prado-economas-y-formas-de-produccin-p2p.html

2–http://www.wired.com/culture/culturereviews/magazine/17-06/nep_newsocialism

3–http://www.lessig.org/blog/2009/05/et_tu_kk_aka_no_kevin_this_is.html
http://www.lessig.org/blog/2009/05/on_socialism_round_ii.html

4–Previously expressed in her post:
http://ptqkblogzine.blogspot.com/2009/07/el-p2p-y-la-nueva-nueva-economia.html

Even if I try to see things in black and white extremes, I cannot see the difference between the two models. Or rather, if I do, what I see are two ways of saying the same thing. Beyond the terminology (pure market vs. new Socialism), the two theories head in the same direction given that they involve exchanges with no external contribution, carried out by individual entities (whether persons or not, they are individualized, that is, defined by their autonomy and not by their interdependence) and they are considered equals (peer-to-peer: between equals).

If the P2P productive model is just that (non-contribution, individualism and the fiction of equality), Margaret Thatcher and Ronald Reagan already invented it plenty of years ago. It is the neo-liberal model that magazines like Wired and the groups it influences try to apply to the digital environment. Lessig says so in his critique of Kelly's text. That is not Socialism at all, regardless of whether it is new or old. It is simply Web 2.0, or civil society, or what Adam Smith called "the invisible hand of the market". Or, as they say now, the new New Economy.

The New Socialism of Silicon Valley

In "The New Socialism: Global Collectivist Society Is Coming Online" (yeah), Kelly defines this new organizational form as derived from "technologies that base their power on social interactions" and defines it thus: "When masses of persons who own the means of production work toward a common goal and share their products with each other, when they contribute work without a salary and enjoy its fruits freely (free of charge), it is not unreasonable to call that Socialism".

It has the following features:

—**In the new socialism there is no class struggle**. As stated, inequality is eliminated from the reasoning at one fell swoop and that's that. *Eeeeverybody* has Internet access and an iPod, *eeeeverybody* uploads and downloads files on the Web, *eeeeverybody* speaks English and we all write with Latin characters.

—**The new socialism operates at the level of culture and economics but not at the level of governance.** As if culture and the economy were not governed. Once again, the old myth of the invisible hand. The fact that it is invisible does not mean there is no hand.

—**The new socialism is propagated through an Internet without borders.** Kelly forgets about the censorship of the Internet in many countries, and the economic, cultural barriers to access to knowledge and language barriers (the most used languages on the Web include Persian, Chinese and Arabic).

—**The new socialism is based on decentralization**. Indeed, there is Google to show how decentralized the Internet is. Or MySpace, or Microsoft or Facebook. Users are decentralized but, as in all large industries, the service providers tend to be concentrated.

—**The new socialism is based on the gift economy.** Kelly fails to mention who makes a profit out of users' free work. Or should we nationalize Google? Or MySpace? Or Facebook?

—**In the new socialism users hold the means of production**. No. They hold a part of them (knowledge and time) but they do not possess the infrastructure, the most popular applications on the social Web, or the profits (the social benefits are accrued by users but not the economic profit—unless we accept the ultra-liberal axiom which states that if only a handful of people get very rich, then things are going well in Spain).

—**In the new socialism there are no hierarchies**. Right. It makes no difference whether you are Mark Zuckerberg or an Indian entering codes in Bangalore. We're all equals. Peer-to-peer.

Organized networks

When I think of a productive model, I think of an economic model and a social model and this can only be a political model. And what is political by definition must involve the collective dimension—because the sum of the parts is not equal to the parts—and especially, the difference, that is, the management of otherness, of those who are not equal to me—for unfortunately we do not live in a world of peer-to-peer sharing. Can one imagine a political model based on the digital environment that ignores the reality of the information economy? Personally I'm much more enthusiastic about the Organized Networks Theory of Ned Rossiter:

The celebration of network cultures as open, decentralized, and horizontal all too easily forgets the political dimensions of labour and life in informational times. Organized Networks sets out to destroy these myths by tracking the antagonisms that lurk within Internet governance debates, the exploitation of labour in the creative industries, and the aesthetics of global finance capital. (...) Why have radical social-technical networks so often collapsed after the party? What are the key resources common to critical network cultures? And how might these create conditions for the invention of new platforms of organization and sustainability?

In reality what I find inspiring about Kelly's text is a meta-reading of, as Rossiter says, "after the party". The discourse on innovation, the need to find answers, to invent new productive forms... Whatever, as long as uncertainty is reduced and we can get rid of this awful fear in our guts. *New Socialism? 2P2 Economy? Open Source Society? Whatever. But keep my business running.*

Some additional notes on the presentation at the roundtable

As a summary of the text and her contribution, María Ptqk offered clear criticism of the concept of a "new Socialism" as used by Kevin Kelly (which would in reality be equivalent to a pure market): the supposed class struggle does not exist (inequality continues); the new model operates in the economy of culture but not in the economy of governance; barriers still exist (languages, access, censorship...); the technological industry is nowhere near decentralized in its structure; in the supposed gift economy, the profits of work are not given freely; users do not really possess the means of production, especially not the infrastructure...

5–Expressed previously in his post: http://www.zemos98.org/spip.php?article1336

She says that Kelly's proposal would actually be better as an example of the "neo-liberal model" and in fact, the magazine where the article appeared, Wired, can be considered "representative" of the large technological industry.

The challenge of P2P does not lie in technology but rather in the transformation of social organization. P2P is based on the idea of peers, but exchanges never take place between true equals. A true P2P model should include the collective (the whole is greater than the sum of its parts) and an acknowledgement of the inequality inherent to society, and therefore, develop specific strategies to combat this asymmetry.

Contribution by Rubén Díaz (5)

File-sharing via P2P tools involves an "out of place" ("fuera de lugar") practice. From the paradigm of orthodox economic policy, natural law and liberal thought, it is true that common spaces are considered "public" and therefore, they "can become political". At the same time, they pull away from economic interests due to a perspective which separates the control of the State and Market in a dichotomous fashion. However, many of the goods that circulate through networks are considered merchandise with an owner. The intellectual property of those assets functions according to mercantile property logic. And private property falls within the scope of the economy, a sphere that is differentiated from what is public, a space that belongs to individuals and to free trade. This head-on clash between the logic of exchanging what is private within a space of the sharing economy upsets established common sense (constructed as giving meaning to power as opposed to a supposed minority that identifies and labels itself as a homogenous group called "the Internet sector" or "P2P culture").

Federico Guzmán cites French economist Serge Latouche in "Código fuente: la remezcla" (Source Code: the Remix):

The act of donating exists even in the heart of global society and runs throughout market society [...]. It is a historical phenomenon of creative, innovative social reaction in the face of the failure of development [...]. In fact, an absolute market does not exist, given that the fundaments of social exchange cannot be based on the law of supply and demand.

This paradox, which has been defended in economic anthropology (Clastres or Sahlins), is even more visible today with the use of new digital tools. This new twist (giro) has provoked renewed interest in the discussion of the malleability of the "natural order of things" in our political-economic model. This involves nothing less than recovering some very old ideas (gift and counter-gift economies were studied by the likes of Mauss or Godelier, Kropotkin's mutual support (apoyo mutuo) as a complement to the *struggle for life* that serves as the basis for Social Darwinism, Panarchy (panarquismo) or the philosophy used as a starting point for Internet pioneers, as reflected in the liberties of free software (software libre) or in texts like the declaration of independence of cyberspace (declaración de independencia del ciberespacio), where they imagined a space for cooperation and creativity more highly valued

for its use than its monetary worth: “Your legal concepts about property, expression, identity, movement and context do not apply to us”).

Reflecting on new political economy programmes requires at least twice as much effort from users (citizens).

— Firstly, in understanding that the economic paradigm currently at work is only a convention, a social contract that can be reinterpreted, as it is not pre-ordained. That there is still time to recover the spheres of reciprocity and redistribution given the abuse of mercantile exchange that is omnipresent (sometimes, absurdly, even within the domestic sphere) and that it does not go against nature. That, as Chomsky stated in his warning to Internet users (“Aviso al navegante”) in 1998, we have “the chance to possess these technological instruments instead of letting large corporations have them. That requires coordination among groups opposed to that monopolization, using technology creatively, with intelligence and initiative to foster education, for example”.

— Once we get over the shock, if we manage to recover from the trauma, we are faced with a second task that may sound even wilder to some: daring to clarify the inequalities between the welfare society and the commons society. Finding the differences between a sensation of scarcity and abundance and satisfaction.

The “media that form the masses” (as Agustín García Calvo likes to say) identify our society with a set of values that never consider making even a timid defence of work sharing and reducing time spent on production in favour of free time (they are not even familiar with the idea of basic income). The media, who place the interests of the companies controlling them ahead of what is in everyone’s interest, do not reflect on the possibilities offered by examples like P2P networks to reduce intermediaries, eliminate bureaucratic steps, or reduce infrastructure expenses. The self-organization and self-management this technology makes possible find no place there because, as stated by Castells, if your goal is to maintain power, you leave no room for participation, local politics or collective design. Building a new economic and political paradigm would imply a new paradigm for education and communication (nuevo paradigma para la educación y la comunicación).

To reduce the fatigue that will result from those efforts, we will need more mediators (and fewer media, thinking of Martín Barbero), “hubs” and human search engines (if we leave the interpretation to Google “we won’t be lucky”), facilitators who (to use the expression by Emmanuel Rodríguez in “El gobierno imposible. Trabajo y fronteras en las metrópolis de la abundancia” The Impossible Government: Work and Frontiers in the Metropolises of Abundance) know how to translate for a “moral majority” the idea of “a new social contract”. It must be one that will increase our awareness as users and citizens of the need to participate in and reclaim the commons, demanding an equitable redistribution of wealth (both material and immaterial), given the transnational private monopolies and other imperialist interests we see the State yielding to in times of crisis in a clear, flagrant way.

As our aim is to reach the goal without needing a defibrillator, my interest in P2P networks does not lie in attaining what is truly “desirable” (that

"wishful thinking" Juan Freire suggests we forget to stimulate debate) or in the "primitivism" de going back to the "kula" practiced by the Argonauts of the Western Pacific on the Trobriand Islands. There is a debate that is of greater urgency than the one about P2P technologies and tools: the one about possible new models of production, distribution, circulation and consumption arising from the social attitude that is making unstoppable gains as a result of peer-to-peer sharing.

Some additional notes about the presentation at the roundtable

Rubén Díaz's contribution, seen from an economic policy standpoint, suggests a separation between what is public (equivalent to the commons) and the market (the economy). P2P permits circulation within a public asset space, although some of them are still subject to ownership (that is, they are private). These public spaces are defined as "out of place" spaces that give rise to "out of place" practices.

He offers two ideas to strengthen the P2P economy: an "unnatural" social contract (which therefore can be modified) and the juxtaposition between the welfare society and the commons society. In the latter, the market yields to different exchange spheres such as reciprocity and redistribution.

Contribution by Gonzalo Martín

He presents his position by describing a professional conflict, given that his clients make a living due to copyright law, and he suggests an approach based on economic policies and work organization.

In his opinion, many 19th century words are used to discuss 21st century matters. Language can block thought by placing us in a trench. His point of view is based on understanding that networks are a sub-stratum with a liberal or libertarian tendency due to their voluntary membership and the abolition of intellectual property (which eliminates a monopoly on ideas).

The network phenomenon implies a transformation in work organization, a good example being new forms of event organization. New pros and cons arise: rapid growth as distributed profits are generated and difficulty in finding a sustainable model (the critical mass needed is difficult to attain).

Contribution by Rubén Martínez

He continues along the lines of the previous contribution, suggesting that language is important in enabling the articulation of a discourse. The language of the debate about P2P reuses technological terms out of necessity, which leads to the danger of falling into techno centrism by exaggerating the importance of technology.

In cognitive capitalism the essential resources are knowledge, which is intangible. Cooperation (social relationships) generates value but these

6–See: http://elastico.net/archives/2009/03/los_procomunes.html y http://www.ypsite.net/blog/?p=1199

new resources are becoming scarce (as happened in the past when natural resources were exhausted). As a result, what used to be a response to one form of capitalism ended up generating value for the capitalist system.

In his opinion, the mere use of P2P technology does not modify the social and economic model. Technology introduces no kind of ideology given that collaboration and participation are processes that can be of interest to "both sides". For example, in cities, social participation has been used for the creation of a "city brand name" while in companies, participation often leads to the model of *crowdsourcing*.

He refers to examples of transformation based on P2P social models:

—The Platoniq group and their commons knowledge bank project (Banco de Común de Conocimientos or BCC). Based on P2P models, it produces participants' social roles (someone teaches and someone learns). He wonders how to generate a different device.

—Research by Ronaldo Lemos(6) on Brazilian *tecnobrega* (Cheesy Techno), where a device is generated that alters the cultural industry. Copyright is completely ignored.

Based on these cases, he wonders whether models like BCC or Medialab Prado, which reproduce conventional roles, are always "bad" (that is, they reproduce the conventional model in spite of their commitment to P2P).

Lastly, he reaffirms his basic agreement with the other participants in their criticism of Kevin Kelly's ideas. However, he establishes the existence of slight differences that lead us to constitute "two sides" (perhaps based on the perversion of the debate and the use of old concepts) and end up turning into qualitative differences: pessimists and their "out of place" practices versus optimists and their incremental strategies.

Reflections on the debate and some final ideas

The debate clearly reflected both positions (the two "sides" defined by Rubén Martínez), although a majority of the guests and audience had critical "pessimistic" positions, in keeping with the typology of the segment of the public interested in the programme developed by Medialab Prado. Although everything that was discussed was interesting, perhaps this clear positioning ends up conditioning and oversimplifying positions, since the conversation was focused on differences which prevented the exploration of points in common or of the diversity that may exist within each of the two positions. My final sensation of the results of that debate is a certain deception or pessimism about our inability (and especially mine as the moderator) to generate a constructive conflict resulting in opening up new opportunities for collaboration, which go beyond ideological differences. This problem not only applies to roundtables that reflect the society we live in where we focus too much on pointing out differences, forgetting the possibilities of finding a way of "meeting" on common ground (paradoxically, we were at an "international meeting").

Perhaps meeting opportunities could be explored if we reflect on the confrontation, which arose at several points in the debate, between pessimists and optimists. In my opinion, optimism and pessimism are always relative positions that say little of the future but do say a lot about our attitude toward the future. Perhaps that is why, indirectly, they can end up predicting the future if we are not able to overcome the paralyses they generate.

Optimists tend to forget to maintain a critical attitude and therefore do not look for needed changes. Pessimists fall into melancholy and do not really fight for the changes they paradoxically believe are needed. Both end up defending the status quo. What is of most interest is an attitude that is simultaneously optimistic and pessimistic or changing one's attitude depending on the context. Each person should at least try to behave guided by the attitude opposite to their character.

As a conclusion to this report, I would set forth two ideas that I personally think arose from the debate and will define the nature of new forms of production and organization that would characterize the P2P economy:

— P2P networks are practice communities (which have existed historically, such as in the case of artisans and scientists), not mere technological processes. Social organization is based on an always temporary, unstable social contract. The truly disruptive nature of P2P arises when it provokes changes in models of the production and organization of work and relations of control and power.

— At the risk of oversimplifying, two models of knowledge production in the digital economy can be defined:
"P2P networks" in which, based on information, cognitive processes are generated that generate knowledge which is disruptive but possibly not very profitable in economic terms (or, alternatively, networks offer little capacity for making profit from the knowledge generated).
"corporations" that provide digital services that use huge databases to generate knowledge via *data mining*. This knowledge is banal to a large extent but is hugely profitable given that it enables incremental processes and feeds scale economies.

Bodó Balázs and Lakatos Zoltán
P2P and Cinematic Movie Distribution in Hungary

Bodó Balázs, Budapest University of Technology and Economics
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In this paper we analyze data collected from three of the biggest Hungarian bittorrent based file-sharing communities between 2008 May-June, and Hungarian cinema distribution data from the same period. We asked if the number of downloads for any given film correlates with ticket sales, revenues, the number of cinemas where the film was shown or any other statistical data on the traditional movie distribution infrastructure we had access to. Our results show that 3 out of 4 downloaded films were not available in Hungarian cinemas and only 1 out of 30 downloaded films actually screened when it was downloaded. We have found that it is the time difference between releases that (and only that) defines to what extent a film is downloaded. Although we could not find a direct, causal effect of the marketing related variables to the number of downloads, we have established that it marketing power defines what gets uploaded to P2P networks. Finally, we have found no causal connection whatsoever between any of the cinematic and online popularity measures.

This work started in 2006 with the publication of (Bodó, Halácsy, Korsós, Prekopcsák, & Szalai, 2007). Our colleagues of that study, Prekopcsák Zoltán and Korsós Milán of Kitchen Budapest continued to work with us in this study and proved to be of invaluable help throughout the work. Ducsai Tamás and Halász Péter, students at the Budapest University of Technology and Economics (BUTE) were instrumental in designing, implementing and running the crawler. Without them it would have been much more difficult to accomplish this study. We are also indebted to Veszelovszki Zsolt and his staff at the online program guide port.hu for letting us use their database. Vincze Gábor, a PhD candidate at BUTE has helped us with infrastructure and with his insights for which we are grateful. And last but not least we would like to thank those anonymous hundreds who helped us in pairing torrents with movie titles. Thank You

Introduction

Though the unauthorized reproduction of someone else's creative output (for fame or for profit) is as old as creativity itself (Alford, 1995; Lendvai, 2008), it was the advent of the technologies of mass reproduction which has made it an everyday, mass phenomenon. Free riding on an already existing investment is always profitable. Even if there are firm institutions to curb this practice (such as copyright laws and treaties), the potential gains are so huge, that up until the era of file-sharing, we hardly see anyone resisting the temptation of reaping huge sums by copying without asking first. Even though the reasons that called pre-internet pirates into existence vary greatly (Bodó, in press) there is one thing that is common in all of them: their love of and quest for profit.

Online, peer-to-peer file swapping is unique in the sense that those who participate in it are not interested in the potential monetary gains. Of course there are many in the digital age who do unauthorized copying of CDs, DVDs, software, etc for profits, but this type of activity dwarfs in comparison with the number of those individuals who engage in the non-profit gift economy of online file-sharing.

If monetary incentives do not explain P2P file-sharing, we have to examine other factors that drive this activity. In this paper we hope to shed light on one factor among the many which may explain online file-sharing. That factor is the failure of traditional markets. By traditional markets we mean the well-established institutions that engage in the marketing, distribution, retailing, lending of cultural goods: libraries, cinemas, broadcasters, video rental outlets, etc. By the failure of these institutions we mean such a deficiency (lack of retail outlets, price, lack of variety, etc) that leaves a sizeable demand on the market unserved.

With the identification of such failures we hope to serve several aims. First we would like to explain why P2P file-sharing—something that many actors from the traditional markets see an undesirable, or even as criminal activity— is so popular. Second, we hope that we can urge the traditional actors to do whatever they can to improve on those points in their businesses that contribute the most to these market failures. Third, we hope to help policy makers in devising a consumer and citizen friendly policy environment in which citizens, consumers on the cultural markets do not get prosecuted and punished for acting up if the traditional actors don't, or—due to structural deficiencies—simply cannot.

In this paper we describe our findings from measuring the traffic of movies on three Hungarian, bittorrent based file-sharing networks between May and June, 2008. During this period we have tracked the new titles that appeared on these networks, the location of individual users and the instances of users downloading, seeding, uploading these titles. We are therefore able to tell who, downloaded what from where for how long. We compare this dataset to another set of databases that track the performance of the traditional movie distribution system: cinemas. We have mapped the geographical distribution of the cinema network, and analyzed the distribution patterns that are defined by the producers and distributors of audiovisual works.

By matching these two datasets we were able to estimate to what extent file-sharing traffic can be explained by the way traditional markets operate.

Previous research on the effects of file-sharing on traditional markets

We see file sharing networks as markets, with their own logics of supply and demand. It is clear, that the workings of these peer-to-peer markets differ greatly from the rules of traditional markets.

The source of these differences may be:

— *Price*. The zero price at file-sharing network is much lower than the price set by the competition of street pirates and lower than the monopolist price set by the traditional producers/distributors. Though traditional actors are convinced that one cannot compete with something that is free, it is clear that price alone cannot explain the existence of P2P markets.

— *The timing of putting goods on various markets*. While traditional actors utilize release windows to discriminate among different markets to extract the highest profits, file sharing networks honor the quickest releasers the highest, fuelling a race that makes new titles available in the same time at all territories worldwide. This competition can significantly lower the amount of time a potential consumer needs to wait before he or she can enjoy a work. As citizens in the global media sphere, consumers around the globe (from India to Brazil) are exposed to the marketing efforts in the most important western markets. This exposure generates some demand on markets which in most cases need to wait a considerable amount of time before the producers are willing to sell their wares there. P2P markets offer an instant gratification in such cases.

— *The size of the catalogue, the variety of supply*. Digital platforms, even though they promise to solve the bottlenecks of physical distribution, are yet to solve the problem of titles being out of print. Legal hurdles, lack of resources, business considerations hinder the release of all back catalogs in digital format. On the other hand, as file-sharers do the digitization, storage, transmission of titles they deem worthy, there is a good chance that any title that has at least one person to care for, will be available, bringing out of print works back into the market (Bodó, 2006; Freeman, November 2008).

— *File sharing is a social activity*. (Becker & Clement, 2006; Condry, 2004; J. Cooper & Harrison, 2001; M. N. Cooper, March 2005; Giesler & Pohlmann, 2003; Huang, 2005; Hunter & Spitz, 2003; Keenan, November 2008; Manuel, 1993; Marshall, 2004; Rojek, 2005; Strahilevitz, 2003) In fact, the first file sharing service, Napster was created to solve the problem of fans chatting about music, but not able to show to each other what they are talking about. File sharing networks are indeed online communities organized around special interest P2P hubs.

Since 1999, when Napster, the first P2P technology appeared on the Internet, a growing body of research has emerged on the impact of file-sharing on traditional markets of cultural goods. (Becker & Clement, 2003; Blomqvist, Eriksson, Findahl, Selg, & Wallis, ; Dejean, 2008; Digital Music Report 2006, 2007; Domon & Nakamura, 2007; The Economic Impact of Counterfeiting and Piracy, 2008; Givon, Mahajan, & Muller,

1995; Ram D. Gopal, Bhattacharjee, & Sanders, 2006; R. D. Gopal & Sanders, 1998; Gu & Mahajan, 2004; Huang, 2005; IFPI, 2001, 2006; Liebowitz, 2006; Oberholzer-Gee & Strumpf, 2007; Peitz & Waelbroeck, 2006a, 2006b; Rob & Waldfogel, 2006; Sheikh, Rashed, Qudah, & Peace, 2006; Zentner, 2006) The results are more than ambiguous: there are (mostly industry sponsored) studies that link file-sharing to massive economic losses in the cultural industries, while others find little or no correlation between file-sharing activity and sales data. Still others find positive effects of file-sharing in the case of certain groups of artists, and in relation to overall social welfare. This variety of often contradicting findings only demonstrates that it is impossible to take file-sharing out from those cultural, economic, legal, social contexts in which the users of these services are situated. File-sharing *per se* might be a truly networked, global phenomena, but its impact on the traditional markets of culture are as local as those markets and its customers are.

We would like to add to this body of research by digging into the workings of a segment of the cultural markets of a post-communists country 20 years after its re-integration into the global flows of capital and culture.

Why cinemas and file-sharing?

Though technically it would have been possible to measure the flow of any cultural goods swapped online, we have settled on focusing on films for several reasons.

Conducting such a study requires access to a wide variety of data beyond file-sharing traffic alone. In order to be able to assess the impact of file-sharing on traditional distribution channels, one naturally needs an exact picture of those markets: what is being sold on the market, at what price, where, for how long, with what success. In other words one needs detailed statistics on the production/distribution/consumption patterns on the traditional markets. The studies mentioned above rely heavily on publicly or commercially available data on the workings of the given traditional market they are investigating. This is possible only because such data is collected and published by either governmental organizations, trade groups or third party organizations.

In Hungary there are very few such data sources. The market research databases are completely missing or are still underdeveloped, and even if individual members of the trade do have data on the shelf life of their wares, they are reluctant to share it with anyone. The problem of data scarcity on the working of traditional markets was the foremost factor determining which aspect of file-sharing we should deal with. We could not acquire access to any meaningful data on the music market: music publishers, industry members do not release useful data, and there is no third party data available either. On the other hand we were able to get access to the database of port.hu, an online program guide which contains screening information on each and every cinema in the country from 2000 onwards.

The second factor that determined our decision to measure film traffic was methodological. We had to decide between analyzing a sample of all file-sharing traffic, and trying to analyze the whole population of a

selected field. The decision between focusing on films or focusing on music was determined by several factors: the number of titles to track, certain characteristics of the users and the characteristics of file-sharing hubs we could track.

In itself alone, the sheer number of titles could have been a determining factor. According to the Internet Movie Database there are around 1 million movie, TV and entertainment titles globally, while at cddb.com which collects music published in CD format, there are more than 6 million albums and over 80 million tracks. This nearly two orders of magnitude of difference (if we take the track as the unit of consumption) is further aggravated by the specificities of the markets of these two different cultural products. In the local movie markets the mainstream US producers share the market with a few European and Hungarian films. The overwhelming majority of these titles are from the last few years (Kanzler, 2009). The number of titles on the movie market at any given time is therefore limited to a small fraction of all possible titles. According to the port.hu database there were only 11805 different titles shown in Hungarian cinemas between 2000 and 2008, and 2008 has seen only 202 new releases.

Tracking music titles would have been a much more difficult task. To put the above number in perspective, on a popular Hungarian file-sharing service examining one randomly chosen user we have found more than 53.000 tracks in her classical and jazz collection alone. There is much more room for diversity in musical tastes, due to the lower cost of music production, free access to music through various online and offline channels, etc. This means that supply and demand on the traditional and on the file-sharing markets are made up of a narrower selection of fewer titles in the case of movies, and a wider selection of a larger number of titles in the music domain. This creates a significant difference in the number of movie and music titles which can be observed at any given time. As a result we decided on tracking movies as the number of movies to track was more manageable.

Certain demographic variables have also contributed to this decision. Hungarian users have a relatively low command of foreign languages: according to a 2005 research (Szénay, 2005) only 9 percent of the 15-44 age group holds a certificate for English as a foreign language. This fact alone limits the demand for foreign language films, but certainly does not affect demand for foreign music, further aggravating the difference described above. The importance the language dimension is stressed by the early appearance (~2001) and the huge popularity of Hungarian online fansubbing communities that translate films, Tv series and produce freely downloadable subtitles.

Finally there are certain technical aspects that make tracking movies so much easier than tracking music. The prime vehicle for movie-sharing is the bittorrent protocol, due to its comparative advantage in terms of speed compared to other protocols, such as DC++, or direct downloading from a web server. Music sharing is partly track based, where bittorrent speed and efficiency factors are lost in comparison to other protocols. Music also has other important vehicles of digital transmission such as file-hosting services (like rapidshare) and streaming. These (non-P2P) alternatives are inconvenient for sharing large movie files, therefore

movie sharers tend to concentrate around a few popular file sharing hubs, among which bittorrent hubs are clearly preferred due to the speed of the network. In turn music sharers are scattered among a number of protocols and services making them much harder to track.

In conclusion: by deciding to track movies on Hungarian file-sharing networks and in cinemas we were able to gather all the film sharing data from the 3 biggest Hungarian torrent networks and compare this data to a detailed program database which tracks film distribution in cinemas.

Changes in the Hungarian movie distribution infrastructure

To put the current state of the Hungarian movie distribution infrastructure into perspective, one needs to go back to the decade before 1989. Due to the seemingly limitless state sponsorship and a strong cultural drive of the ruling party elite (György, 2005) Hungary enjoyed a dense network of libraries, cinemas, and other cultural institutions. Most villages had some kind of a multi-functional institution, a small cultural center that served as a concert or meeting hall, but could be converted into a screening hall as well. The high number of cinema screens (and libraries) during the eighties reflects this situation.

Year	Number of libraries	Cinema Screens
1980	10,498	3,624
1981	10,490	3,552
1982	10,272	3,556
1983	10,010	3,700
1984	9,580	3,794
1985	9,647	3,745
1986	9,320	3,600
1987	9,049	3,279
1988	8,731	2,943
1989	8,215	2,608
1990	7,350	1,960
1991	6,585	1,025
1992	5,848	697
1993	5,264	638
1994	4,727	595
1995	4,468	597
1996	4,248	558
1997	4092	594
1998	3,908	628
1999	3,786	604
2000	3,585	564
2002		498
2004		464
2007		369

Source: Central Bureau of Statistics

The collapse of the planned economy in 1989 put an end to the financial background of this network. The sudden collapse of the infrastructure was of course not limited of cinemas. It encompassed each and every field in the formerly state sponsored cultural industries including production and distribution of films, performances, books, etc. (Cserta, 2002).

Beyond the changes in the basic political and economic governing principles, several other factors also contributed to the post-1989 transformation of the movie distribution infrastructure.

— With the disappearance of public funding, ticket prices rose rapidly which occurred alongside the sudden and dramatic drop in per capita GDP and therefore a drop in disposable income.

— Profit oriented private companies replaced the access-conscious state distributors, releasing fewer copies to fewer cinemas, focusing their distribution efforts on high density markets only, denying local cinemas the possibility of displaying the latest releases.

— Municipal owners of the cinemas had little funds to maintain, modernize the buildings and the equipment of movie theatres (Borsos, 2007. november), as a result these institutions quickly became run down and/or were privatized and put to other use.

— In the second half of the 1990's , the rapid proliferation of cable TV, VHS and DVD players, later the cheap far-eastern home theatre sets posed a serious competition as well. At the end of 2008, 52% of the Hungarian adult population owned a PC/laptop, 59% reported owning a VHS player, 64% owned a DVD player, while 68% had a cable tv subscription. (Source: Szonda Ipsos, National Media Analysis, 2008 december).

These external factors resulted in rapid changes in the structure of the movie distribution infrastructure of the country:

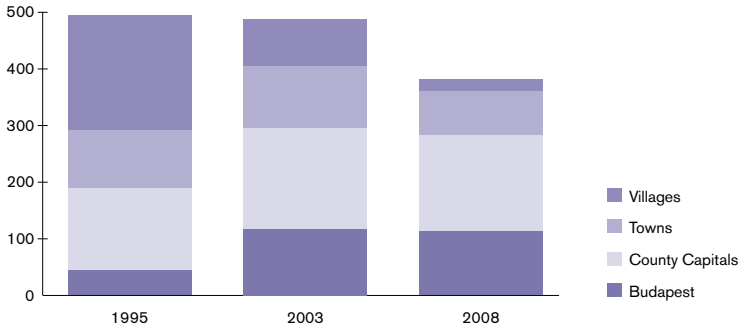
— The number of screens literally decimated compared to the 1980s.

— The remaining screens recessed to bigger urban centers leaving (in 2006) as much as 99% of villages, and 70% of towns without a cinema screen. On another level: in 57% of the Hungarian statistical regions there are no settlements with cinemas. (Borsos, 2007).

— The screens in urban centers are more and more located in shopping malls, and operated by a handful of US owned companies. Such multiplexes controlled 49% of all screens, 50% of all seats, sold 76% of all tickets, and controlled 84% of all revenues in 2008. It goes without saying that multiplexes have a fundamental effect on what is being shown in cinemas, skewing movie supply towards popular US titles.

— Public subsidies aimed at reconstructing smaller "arthouse" cinemas that show movies outside of the mainstream culture did nothing to change the uneven distribution of cinemas and resulted in upgrading already established institutions without founding new ones. (Borsos, 2007, november).

Número of cinema screens in Hungary



Source: Central Bureau of Statistics, National Film Bureau

In conclusion: in the last two decades movie theatres, along with other cultural retailers have receded to where effective, solvent demand was to be found: into urban centers. "The quick change in the economic and legal environment erodes the basic cultural supply. This is true in qualitative, content-wise terms, in terms of the physical state of infrastructure, costs of operation and in human resources, which is an especially serious problem because due to their cheap accessibility these institutions were mostly used by lower income social groups in need for an access to cultural goods."(Bárdosi, Lakatos, & Varga, 2004) This process of regression proved to be a fatal one: the lack of solvent demand and adequate funding ruined the distribution infrastructure, and the collapse of the distribution infrastructure left those unserved who had been able to pay for these services, but who weren't numerous enough to be served economically.

The shift from independent cinemas with one or two screens to multiplexes in shopping malls also transformed the content that was shown in movie theatres. Multiplexes focus on the few most profitable titles, while those institutions that could serve midlist titles (to borrow a term from the publishing industry) have all but vanished. The lack of cinemas is a problem in itself, but it also generates another one: the lack of diversity in titles.

The structure of P2P file-sharing markets

The structure of illegal online content (films, music, TV programs, e-books, software, etc) markets is a complex one, where P2P users sharing with and downloading from each other represent only the last step in an intricate and mostly hidden pyramid of middlemen, who participate in the process of acquiring, digitizing and distributing cultural items intended for official release. Based on Howe (January 2005) before a release hits the file-sharing networks, there are several groups whose participation is needed to make something widely accessible.

There are the insiders, [i]ndustry and theater employees [who] run their own straight-to-video operations. Hackers looking for prerelease videogames target company servers. And before that long-awaited CD hits Amazon.com, moles inside disc-stamping plants have already got a

copy."(Howe, January 2005). Then, release groups digitally repackage multi-gigabyte movie files for easy online distribution, rip CDs into mp3, or create cracks that bypass DRM. Many release groups have exclusive relationships with sites on the top of the distribution hierarchy. When a file appears on a so-called top-site, the distribution chain-reaction begins. Couriers step in to copy and transfer files from the top-sites to lower-level dump sites, and then from there to P2P networks and hubs. The couriers are working for such rewards as fame and respect, or for props from their peers and credits redeemable for goods on upper levels of the pyramid (b-bstf, Summer 2004). The P2P using public mostly trades what is made available for them through these distribution channels. However, local (in many instances semi-amateur) release groups and individuals also participate in the digitization and publication processes, releasing mostly locally relevant titles to local hubs.

This structure of the underground cultural markets suggests two different factors that shape the supply of pirated online goods. On the one hand there is a steady stream of the global supply of the most recent titles. Weeks or months before the official release dates music, film, software is made available through the shadow distribution pyramid. At the same time, local releasers and individuals continuously release titles the local community deems important. Such local releases are either user-localized releases of global titles, such as vernacular fan-subbed releases, or different versions (DVD rips, TV rips, etc) of officially localized titles already on the market. The balance between the global and the local releases for a given hub is defined by the demographics and by the interests of the community that gathers around a specific hub.

File-sharing is undoubtedly a mass phenomenon and this massive demand for such services has called to life a wide variety of file-sharing protocols and each of these protocols support a number of different business models. Bittorrent for example is a file-sharing protocol, the method which describes how peers can connect and communicate with each other. Likewise, Gnutella, Freenet, etc. are similar protocols with different technical characteristics. Apart from a small number of these protocols, which are proprietary, software developers are able to develop a variety of client software to connect to the network.

Open protocols also enable the proliferation of services that coordinate the users using any given protocol. Sometimes called hubs, at other networks trackers, these services serve as meeting points for users who wish to share and download, or engage with each other in any other fashion. It is up to the service providers to decide what kind of business model they want to adopt. Some hubs operate in a truly communitarian fashion: the system administrators finance the operating costs of an open, ad-free service, as they believe they are engaged in a cultural/political mission. Others follow a closed, ad-supported model. The notorious Pirate Bay is a global, open torrent tracker, which exposing its users to advertising content, it is however unclear whether ad revenues cover the operating costs of the service. On the other end of the scale we find open, for-profit distributors: illegal warez servers which sell a flat rate access for a relatively high monthly fee as well as authorized distributors who operate their services with the approval of rights-holders.

Services / clients	Open service (anyone can become a member)	Closed (invitation only) service
Non-profit (with no ad revenue / without membership fee / donations based)	Elite DC Hub service (DC protocol) Soulseek client (soulseek protocol)	Karagarga tracker (bittorrent protocol)
Ad supported	Piratebay tracker (bittorrent protocol) Mininova tracker (bittorrent protocol)	Bithumen tracker (bittorrent protocol) Ncore tracker (bittorrent protocol)
For profit (adware / spyware / membership fee)	Kazaa client (fasttrack protocol) Bearshare client (Gnutella protocol)	Stealth warez ftp servers

It should be clear though that—apart from the warez FTP servers, which not being a P2P service should not be included in this table anyway—all of these services are free for the users in the sense that they cannot request and they don't receive any compensation neither from the tracker service nor from their fellow users for uploading or downloading content through these services. There are however several third party services which build on these networks, offering, for example server space for seeding files, enabling individual users to achieve a higher upload ratio thus more downloads for them. We do not take such services into account in this report, as their use is no way necessary to participate in file-sharing.

Apart from their business models we can differentiate file-sharing services according to their membership policies. An open service means that there are no registration requirements, or that gaining membership is easy. Closed services accept a limited number of users only, usually through invitation by an existing member. Openness has obvious advantages: the more connected people there are, the wider the catalogue and the faster the downloads are. On the other hand openness raises several issues: that of free-riding and that of the risk of being caught and litigated if rights-holders think the services breach—or help users breach—copyright.

Both of these factors have played a role in the proliferation of closed/secretive services in the last few years. Invitation only services offer a good solution to the problem of anonymous users free-riding on others and/or polluting the catalog with garbage. At the same time it offers some level of protection against rights-holders who hope to solve what they perceive as a threat to their business by taking legal actions against individual users as well as service providers. Exclusivity has always served a third, non-related function in the file-sharing scene as well: the social hierarchy of the scene is created, maintained and measured by having access to certain sites: members of the most exclusive services are the highest ranking in the unofficial sub-cultural hierarchy.

Apart from these third type of sites that wish to maintain their exclusivity at all costs, all other torrent tracker services need to balance their interests between having a relatively large userbase, and limiting the access to their services, therefore they all allow new users to join their services from time to time.

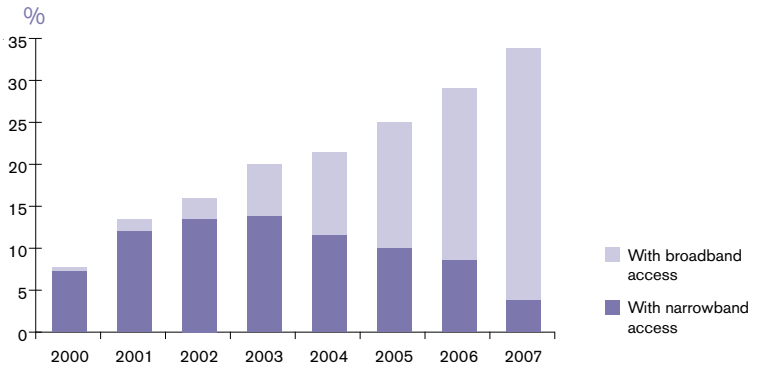
The Hungarian file-sharing scene

Although sharing computer files is as old as computers themselves, the first mainstream file sharing applications emerged at the turn of the new millennium.

First released	P2P Protocol
July 1999	Freenet
September 1999	Napster
November 1999	Direct Connect
March 2000	Gnutella
September 2000	eDonkey2000
April 2001	BitTorrent

By 1999 all the necessary preconditions for wide-scale file-sharing were already in place: reasonable size individual digital libraries, an increasing level of PC penetration and bearable download times even with a modem. Nevertheless, it was at the colleges, equipped with broadband connections, where file-sharing first took off.

Online population and broadband access in Hungary, 2000-2007



Source: National Communications Authority

College networks also hosted the few first Hungarian file-sharing hubs. The first Hungarian hub using the DC protocol started in 2001 and by 2002 as many as 6 hubs were running. All of these were on university networks, and only started to move to dedicated servers at commercial hosting services around 2004, when dealing with university network administrators became more difficult (Az Elite Hub történelme). In the meantime residential broadband access started to gain momentum.

The first Hungarian bittorrent tracker, bitHUmen started in July, 2004 with a few hundred users (sct, 2009 február 01. 15:20). Soon others followed. With the rapid growth of residential broadband access the number of trackers and the number of users increased rapidly. At the end of 2008 the top 10 Hungarian torrent trackers had the following registered user-base and peer numbers (blue represents trackers participating in our study):

Tracker	Registered users	Peers (downloaders + uploaders) on 2008. december 28
nCore	78,612	308,330
Independence	68,315	90,327
Moobs	59,989	125,913
bitHUmen	51,318	218,731
Malacka	45,067	24,054
PREtorians	39,979	39,250
1st Torrent	37,692	46,811
GigaTorrents	35,001	95,085
Spiryt	33,349	17,898
Blue-Dragon	31,826	66,153

Source: http://asva.info/2008-magyar-bittorrent-trackerei-2008-12-29.html

This of course does not provide us with any real estimate on how many file-sharers there actually are in Hungary. Simply totaling the number of users for each tracker would result in taking into account those users more than once who are registered at multiple trackers. Others, who are not members of these sites would go unaccounted for. According to one estimate there were around 300.000 file sharers in Hungary in early 2008. (Turcsán, 2008. február 7) Based data from countries with similar population sizes (Huygen *et al.*, 18 February 2009) we need to conclude that this figure of 300.000 downloaders must be a very conservative estimate.

Trackers we tracked

We have decided to track 3 of the most popular Hungarian bittorrent trackers: bitHUmen, nCore and Independence. The choices were made based on reputation, stability, number of users/peers, number and type of titles and finally access. Information on these dimensions were based on interviews of and recommendations by community members.

BitHUmen service is the oldest Hungarian tracker with a solid reputation and a committed community. BitHUmen is also the world's 26th most sought after tracker in terms of the number of invitation requests found on the Internet (sharky, December 17, 08). It is relatively ad-free suggesting a non-profit operation.

NCore, another closed Hungarian hub we have tracked, ranks #40 in the same list. The specialty of this tracker is that it accepts releases from outside of "the scene", the unofficial circle of trusted release groups. Anyone can release on nCore, which means a wider variety of titles, but sometimes also lower quality and lower download speeds. nCore is also an ad based service.

Independence is a relative newcomer compared to the other two. Any user can register to the site, however registration is not free. Independence therefore reaches out to those users who cannot get into the other, more reclusive trackers and offers them a chance to buy themselves into a world they cannot otherwise have access to. This, and the site's strong emphasis on monetizing its user-base seemed

to create a bad reputation for the site and its owner among Hungarian file-sharers, who seem to deem such an unabashedly commercial approach objectionable. Nevertheless exactly because of its relative openness we included it in our study.

Even if there is apparent (social) value in exclusiveness, all the torrent tracker services need to balance their interests between exclusivity and the advantages of a wide user-base, therefore they all let new users join the service from time to time. It is possible to join theses services, even if it takes some time and effort. In the case of bitHUmen and nCore, we decided to track these closed /invitation only services, and we interpreted their entry barrier as a variable that separates casual file-sharers from those who engage in file-sharing in a more systematic fashion.

Methodology of torrent traffic tracking

There are several approaches to measuring peer-to-peer file-sharing traffic (Chu, Labonte, & Levine, 2002; Gummadi *et al.*; Guo *et al.*; Pouwelse, Garbacki, Epema, & Sips, 2005; Saroiu, Gummadi, & Gribble, 2002; Schulze & Mochalski, 2008; Sen & Wang, 2002) utilizing deep packet inspection techniques, protocol level sampling or other approaches. Our decision to develop a new method was the result of a simple factor: as we do not have access to any data source that would let us connect IP addresses to settlement level geographical data. As geographic analysis is crucial in our research, we needed to come up with a different approach that enabled us to acquire user location data.

Luckily the most popular/influential torrent tracker services have all enabled their users to communicate on their user profile pages the settlement where they live. Not everyone has filled out this field in his/her profile, and there are significant differences in the list of settlements these services offered their users to choose from. Nevertheless in 40% of the cases we had proper location information which gave us enough torrent traffic data for the research to be feasible.

Our approach therefore focuses on the hubs that serve the Hungarian file-sharing community instead of monitoring the actual data flows over the network.

Besides serving as community hubs, providing users with self-identification and communication (forums, ratings, polls, etc) services, torrent trackers coordinate the P2P flock. They maintain the information about which user has which part of which file in the network. The users need to communicate with the tracker if they want to download or share something from the others, as it is the server which knows which user has the necessary piece of the file in question. Therefore the server knows, and publishes this type of information which is then relatively easy to gather.

Open-access hubs are easy to monitor, as they do not make an attempt to hide their activities. Closed hubs require more precaution, so the monitoring activity does not get detected by the administrators of the site. Such a monitoring effort raises several ethical issues. We have addressed these issues on several levels. First we gather only such data that is available for each and every ordinary member of the torrent tracker. We

respected the privacy decisions of the site administrators, and did not try to gather more information that was intended by them to be public. Also, we did everything we could to respect and protect the privacy of the individuals who use these services. We did not collect any information that could be used either by us or by other parties to connect the online user profiles with real life identities. On the other hand we did engage in a monitoring effort without the knowledge and consent on either the site administrators or the users. This was necessary as acquiring the same amount and depth of information from the administrators of these sites would have been impossible: either because they don't archive such information, or because they do everything they can to protect their communities. Before, during and after the data gathering period we have communicated clearly to the Hungarian file sharing scene that we are doing research on the effect of file-sharing on traditional markets. We were also trying to be present in the online discussion boards so we could personally answer any questions about the research.

In order to achieve a non-intrusive, difficult-to-detect monitoring of closed hubs we have developed the appropriate monitoring technology. The software has three main functionalities: (1) Its crawler collects data from the torrent hub, (2) the parser extracts relevant information, stores in a (3) database and instructs the crawler on which page to crawl next.

The crawler

The crawler collects the traces of the data flow generated by the torrent communities. As the torrent-tracker is the information hub to which all users go for new downloads, it contains relevant information on what is accessible at any given moment through the given hub. The tracker also contains information on the health and status of the torrent files, it contains the profiles of the users, offering us a chance to extract some information on the users themselves. The crawler crawls these pages to extract every possible information available on the hub through the web interface.

The task of ensuring data quality requires that we crawl the hub (or parts of the hub) frequently. The status of freshly released popular titles (like a Hollywood blockbuster) changes quickly: dozens of users can appear and disappear from the downloading flock within minutes. This requires an intensive presence of the crawler on a site that tries to do everything it can to protect its users from scrutiny and possible prosecution. By dispersing the queries among a number of different proxies we were able to conduct an aggressive but non-intrusive, non-detectable monitoring.

The parser

The parser has three tasks. First it extracts the relevant data from the files sent by the crawler. Second, it anonymizes user related data and dumps all the data into the database. It also adjusts the frequency by which the crawler needs to request a specific page. To avoid data loss we crawl popular, thus quickly changing pages more often than pages of less popular or dead torrents. The parser adjusts the time of the next crawl of a page based on the amount of changes in the flock around the torrent since the last crawl.

1—(1) A database of the connections between users and torrent files. Each connection accounts for a different case, whereby users downloading several different torrent files appear in separate lines in the form of individual "transactions". Both the users and the torrent files are identified. This is a comprehensive database as it includes all the transactions that occurred on the three selected Hungarian trackers between May 1st and June 30th 2008. (2) A database with information on torrents: size, upload and creation date, tracker, etc. using unique identification. (3) A table linking torrent files to film titles. (Films, just like torrent files, have a unique identification code.) (4) A user database with all available information on the users registered at the three torrent trackers in our data collection. User location is of particular importance as it allows for examining the geographical aspect (availability of films downloaded within users' catchment area). (5) A geographical database with elementary information on settlements, including distances between pairs of them. This is especially useful when exploring the relative shortage of films within one's catchment area.

2—(1) Detailed box office data (release dates, number of tickets sold, revenue, copies, etc.) for Hungarian releases between February 2004 and December 2008.

3—(1) Screening dates, times, cinema locations for each film screened in Hungary after the year 2000. (2) A cinema database with the geographical parameters of the cinemas including the name of its location, seats, etc.

Data cleaning, title identification

The torrent files form the basis of the analysis, representing movie titles. This data needs further cleaning as there are several issues to be solved. Even in the case of global releases of global titles there might be several competing versions of the same title in various formats (VCD, DVDrip, CAM), released at different times, by different release groups.

For example the fourth installment in the Die Hard movie franchise is available under the following names: *07.11.17.Live.Free.Or.Die.Hard.Blu.Ray.All.Disk@Ht, Die Hard - Quadrilogy. Untouched Box Set.Nordic, Die. Hard.SE.Trilogy.BOXSET.PAL.6DISC.DVDR-SPLiNTER, Die Hard Series, Die.Hard.4.0.Yippee.Ki.Yay.Edition.2DiSC.NORDiC.PAL.DVDR-ViSiON, DIE_HARD_4_0. PAL. R2. SUBS DK,NO,SE.FI. DVD9, Live Free Or Die Hard (La Jungla De Cristal 4), Die.Hard.4 x264.720p, Die Hard 4. 720p BluRay AC3-5.1 x264, Die Hard 4, Die Hard 4.0, Die Hard 4.0 (Live Free or Die Hard) 2007 DUTCH!, Die.Hard.4[2007]MultiSub.DvDR-Gothicmaster.*

It is clear that all of these versions contain the Die Hard 4 movie. The consolidation of these versions and establishing the connection with the titles stored in other datasets was a difficult task. We needed to consolidate more than 7000 movie torrent files that were uploaded within the examined timeframe with nearly 12.000 movie titles that track traditional markets. Proxies such as IMDB ID proved to be massively unreliable, and automatic pairing algorithms provided noisy results. Therefore we decided to crowdsource the task of pairing and asked the file-sharers themselves to participate in connecting torrent files with titles. The results were beyond every expectation: several hundred anonymous users finished this task in less than a week, with very few (less than 1%) errors.

Similar, but much smaller task was to standardize user location info.

Additional Data sources

Our focus being the relationship between peer-to-peer trading and movie distribution of films, we had to conduct our data mining and analysis in a way that accounts for the multiple connections that exist between these two domains. As explained above, torrent files were identified making it possible to analyze not simple torrent but content-related trading patterns. Without meticulously linking torrent files to specific film titles, we could not have undertaken a content-oriented analysis of the peer-to-peer networks. The content oriented analysis was further supported by acquiring and cross referencing the following data sources:

Data from the p2p network (1)	**Box office statistics (2)**
Location of downloader Title of movie Time of the download Length of the download / upload activity	Title of the movie Date of release No. of tickets sold in the year of release Box office revenue (in HUF) in the year of release No. of copies
Cinema program guide (3)	**IMDB (Internet Movie Database, where available)**
Location of the cinema Title of the movie No. and date of screenings	Title of the movie User rating score No of rating votes Thematic categories

Using these sources, we were able to analyze in detail the relationship between a film's peer-to-peer and cinema distribution within a two months timeframe between May 1st and June 30th 2008.

Results

Basic user statistics

Various estimates put the overall number of Hungarian file-sharers between 3-600.000 users. During our overall monitoring period (between March and December, 2008) we have encountered 187.000 users on three trackers. The number of individuals behind these online avatars is probably smaller due to overlapping user-bases. In the time-window we encountered 63.000 users.

We were able to identify the location of the users in 24.000 (37%) cases. If we compare this data to the distribution of Hungarian citizens and Hungarian broadband subscribers among different settlement types, we need to conclude that the P2P users we were able to identify are tend to concentrate in the capital and in the biggest urban centers and we can find them underrepresented in small towns and villages. The fact that the village residents are underrepresented in our study can be explained to a certain degree by the fact that the sites in our study offered only limited lists of settlements for their users to choose from, and these hardly include the smaller settlements. Nevertheless, this skewedness was observable even if the tracker (nCore) had an extensive selection of settlements to offer.

Settlement type	Hungary (in thousands)		Broadband subscribers in June 2007 (in thousands)		P2P users with known location	
	Sum	10,182	Sum	1,106	Sum	23,845
1 Budapest	1,778	17%	334	30%	7259	30%
2 County capital	1,821	18%	234	21%	8055	34%
3 Town	3,395	33%	343	31%	7044	30%
4 Village	3,188	31%	194	18%	1487	6%

Sources: National Bureau of Statistics, National Communications Authority

This user-distribution hints that the diffusion of (invitation-based) file-sharing is more successful in urban centers with rich and complex social interactions. As membership on these services can be acquired through the invitation of an active member, without the proper social network it is difficult to get into these services. Living in a relatively poor media environment with limited access to different forms of entertainment might be a motivational force to seek out alternative access channels on the internet, but even if such a drive exists, we could not confirm its existence is this study. The file-sharing population in our study lives in places with relatively rich and varied access to different media and other forms of entertainment.

The relative richness of the media environment is also stressed by the fact that only 21% of the users live in a settlement where there was not a

single cinema screening in our time-window. This figure rises to 24% if we only include cinemas with more than one screenings per week.

Basic movie statistics

We identified 4838 films in our study, which we sorted into five categories according to their download and movie availability. As for the latter we defined three categories: one includes films that were screened when we tracked the downloads. Another category includes those films of which we know the cinematic distribution data. If we could not find such data for a film, we regard it as 'Not screened' even if it was screened but only a long time ago (i.e prior to 2004).

The distribution of films among the categories is shown in the following table.

	Downloaded	Not downloaded
Screened in the download window	152 (3.1%)	592 (12.2%)
Screened sometime before the download window	776 (16%)	627 (13%)
Not screened	2,691 (55.6%)	N/A
Sum	3,619 (74.8%)	1,219 (25.2%)

We found that nearly 75% of all the *downloaded* films are in the 'Not screened' category. Such a high proportion could be an indicator of the importance of peer-to-peer networks in the diffusion of cinematographic content, as it suggests that one main motivation behind downloading is *scarcity* on the legitimate market. But before accepting this conclusion we should note, that we lack conclusive data about the DVD (sales and rental), television (broadcast, cable, satellite and IPTV) and legitimate online distribution channels therefore we cannot readily accept (or reject) the scarcity model on the content side.

However it is clear that release windows strictly define when, in what format is the content available on the market and for how long. The traditional system of audiovisual content distribution therefore places strict rules on the accessibility of content. Accessibility can be limited temporally: DVD distribution rights expire, broadcast dates pass. It can be limited geographically: the closest retail outlet might be inconveniently far away. P2P downloading can bridge both types of limitations.

The basic statistics (see next page), however, do not support the temporal scarcity suggestion. The mean life-span of torrents is significantly lower than the mean life-span of movies in the cinema in every category. This is clearly the result of the file-sharing technology we have observed.

Unlike the DC++ file-sharing hubs, that usually prescribe a minimum amount of data to be offered in a shared library, bittorrent trackers require that the user balances his/her upload/download ratio around 1.0. This technical setup has some serious implications on how content is distributed and consumed on each network. Users around DC++ hubs form large, searchable archives, where the amount of data shared is in

itself a source of pride and social recognition. Bittorrent, on the other hand discourages the emergence of large individual shared libraries as such large libraries offer little reward in terms of the valuable upload ratio. As most of the downloads of a new torrent file concentrate to the first few days of its lifespan, those who wish to gain some upload credit, need to be able to offer, therefore download titles that are or will be downloaded by others. As the reward comes from serving a title to the highest number of users in as short time as possible, the lifespan of the titles on bittorrent networks are short, with the overwhelming majority of the downloads occurring in the first few days of the torrent's existence. These findings apply to the observed closed, Hungarian torrent trackers. Open, global trackers, like The Pirate Bay have larger user-bases therefore the chances to find older content are higher. We can also expect that despite the language difficulties, at least some of the local users use these latter, global services, and get content that is not available on local trackers from those services. We, however are unable to monitor such activity, therefore we can only suspect the existence of such usage pattern.

Geographical scarcity, however, might still apply: of all the distribution channels (apart from terrestrial broadcasting) internet endpoints are the densest in the geographical sense. The data to confirm the geographical scarcity is readily available, and some preliminary tests confirmed the significance of this dimension, however, we currently lack the detailed analysis of this variable.

Detailed analysis

The detailed statistics of the 5 categories are shown in the following table:

+T1 (next page)

From these data we can formulate some hypotheses.

H1: The more recent a film is, the more it is downloaded.

Even though Cat. 5 has the most overall downloads, it is only due to the high number of films in this category. The average number of downloads is the highest (1042) in those cases when the film is available in the cinemas as well. Relatively recently screened films (in Cat. 3) have significantly lower appeal (190), while films without cinematic support have the fewest downloads in average. What is true for the demand side is also true for the supply side: we see the same ranking in regard to the life-span of the torrents. Users seem to seed recent films longer.

H2: Marketing power matters

If we look at the market data of cinematic distribution, we can observe significant deviations in Cat. 2. It seems that three factors, the number of copies the film starts with, the number of theatres it is shown and the number of screenings are significantly lower in Cat. 2. These factors are controlled by the distributor and they strongly correlate with the size of the marketing budget of a movie. A saturation release in the Hungarian movie market means opening a film with 30-40 copies, and screening it in around 250-300 cinemas 3-400.000 times. It seems that such films tend to show up on the P2P networks as well, populating Cat. 1, while films with narrow releases, fewer copies, more limited geographical reach populate Cat 2.

Macro-statistics of theatrical distribution and peer-to-peer traffic (base = all transactions)

Film categories Variables		1 Within time frame: screened AND downloaded	2 Within time frame: screened AND NOT downloaded	3 Prior to time frame: screened AND downloaded	4 Prior to time frame: screened AND NOT downloaded	5 DID NOT screen AND downloaded	Sum
Torrent life-span (days)	Mean	79	0	40	0	24	22
	Maximum	617	0	439	0	440	617
	Sum	11,970	0	30,998	0	65,771	108,739
	Std Deviation	99	0	41	0	33	39
Number of downloads	Mean	1,042	0	190	0	129	135
	Maximum	9,108	0	2,579	0	6,736	9,108
	Sum	158,358	0	147,357	0	346,844	652,559
	Std Deviation	1,874	0	247	0	335	461
Film life-span (days)	Mean	110	126	103	102	.	110
	Maximum	418	417	409	410	.	418
	Sum	16,757	74,525	79,959	63,955	.	235,196
	Std Deviation	137	136	108	107	.	118
Screenings	Mean	2,636	434	1,785	1,487	0	615
	Maximum	12,588	11,789	14,008	11,284	0	14,008
	Sum	400,623	256,689	1,384,916	932,073	0	2,974,301
	Std Deviation	2,735	1,161	2,356	2,196	0	1,604
No. of theaters where film screened	Mean	63	19	69	60	0	23
	Maximum	249	286	301	301	0	301
	Sum	9,635	11,087	53,533	37,326	0	111,581
	Std Deviation	49	35	72	69	0	50
Revenue (million HUF)	Mean	93	20	68	58	0	10
	Maximum	676	405	686	556	0	686
	Sum	8,270	2,340	14,613	8,367	0	33,590
	Std Deviation	126	47	96	91	0	46
Tickets sold	Mean	99,064	27,107	78,673	68,703	0	11,928
	Maximum	853,926	501,098	826,129	610,135	0	853,926
	Sum	8,816,665	3,144,467	16,914,660	9,961,981	0	38,837,773
	Std Deviation	149,989	58,240	116,819	106,648	0	53,849
Tickets per screening	Mean	24	17	23	21	.	21
	Maximum	121	55	101	70	.	121
	Sum	2,136	1,921	4,895	3,095	.	12,046
	Std Deviation	17	8	13	11	.	13
Copies	Mean	18	7	17	16	0	2
	Maximum	41	41	43	43	0	43
	Sum	1,690	828	2,917	1,773	0	7,208
	Std Deviation	11	8	9	10	0	7
Time between cinematic and p2p releases (weeks)	Mean	104	122	239	244	.	199
	Maximum	410	410	410	410	.	410
	Sum	15,882	72,239	185,246	153,205	.	426,572
	Std Deviation	138	135	129	124	.	142
Time between last screening and time frame (weeks)	Mean	0	0	136	143	.	91
	Maximum	0	0	408	409	.	409
	Sum	0	0	105,420	89,353	.	194,773
	Std Deviation	0	0	120	117	.	116

Data from Cat 3&4 suggests that the effect of marketing power diminishes over time as less marketed films eventually show up on the P2P networks.

The correlation table (seen in the next page) helps us formulate a third hypothesis:

H3: There is a connection between the popularity of a movie in the cinemas (in terms of the number of ticket sold) and the popularity on the P2P networks.

The correlation table for the entire population shows a statistically significant, weak positive correlation between box office popularity and the number of downloads, which might be a result of the aforementioned marketing effect. Besides, in other sub-sections of the data, we should look for negative correlation, to check if the P2P and the cinema markets supplement each other.

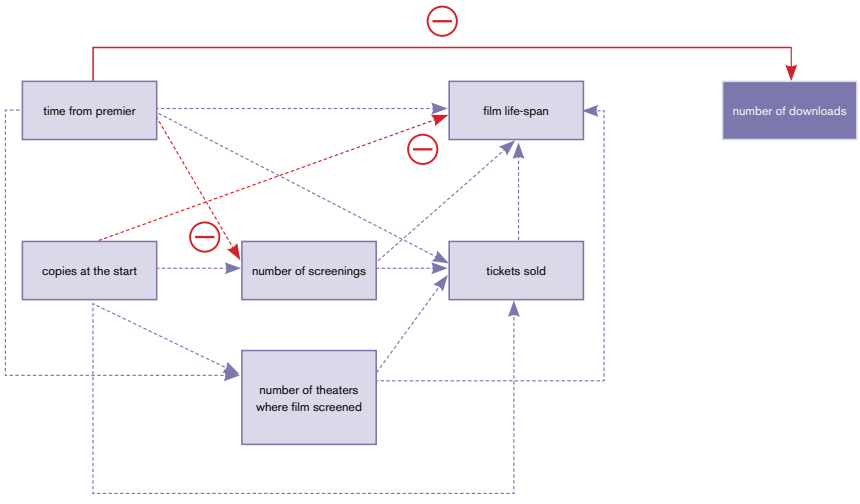
The correlation table for the whole population has few surprises. The number of downloads is positively correlated with the number of screenings, theatres, copies and tickets sold. These correlations are, however, weak.

The relatively strong, positive correlation between the time since a movie was last screened and the number of theatres, and the copies shows the contraction of the Hungarian cinema network: in the past movies started with more copies and were shown in more theatre.

+T2 (next page)

We have built a regression model to directly measure the effect of the aforementioned variables to the number of downloads. We have defined a path model that tries to explain the number of downloads with the distributor-controlled factors, such as the number of copies and the time between the movies' official and P2P release date.

Path model for downloads (between April and June 2008)
variant: tilm categories = 1. 2. 3. 4. 5. (n = 4838)
$R^2 = 0.034$



Correlations of theatrical distribution and peer-to-peer traffic (base = cat, 1, 2, 3, 4)

		Torrent life-span (days)	Number of downloads	Film life-span (days)	Screenings	No. of theaters where film screened	Revenue (million HUF)	Tickets sold	Tickets per screening	Copies	Time between cinematic and p2p releases (weeks)	Time between last screening and time frame (weeks)
Torrent life-span (days)	Pearson Corr.	1										
	Sig. (2-tailed)											
	N	4,838										
Number of downloads	Pearson Corr.	**0.654**	1									
	Sig. (2-tailed)	0.000										
	N	4,838	4,838									
Film life-span (days)	Pearson Corr.	**-0.073**	-0.093	1								
	Sig. (2-tailed)	0.001	0.000									
	N	2,147	2,147	2,147								
Screenings	Pearson Corr.	**0.126**	**0.116**	-0.043	1							
	Sig. (2-tailed)	0.000	0.000	0.046								
	N	4,838	4,838	2,147	4,838							
No. of theaters where film screened	Pearson Corr.	**0.073**	**0.054**	**0.000**	**0.883**	1						
	Sig. (2-tailed)	0.000	0.000	0.994	0.000							
	N	4,838	4,838	2,147	4,838	4,838						
Revenue (million HUF)	Pearson Corr.	**0.097**	0.075	0.104	**0.880**	0.736	1					
	Sig. (2-tailed)	0.000	0.000	0.014	0.000	0.000						
	N	3,256	3,256	565	3,256	3,256	3,256					
Tickets sold	Pearson Corr.	**0.083**	**0.056**	0.147	0.867	0.733	**0.991**	1				
	Sig. (2-tailed)	0.000	0.002	0.000	0.000	0.000	0.000					
	N	3,256	3,256	565	3,256	3,256	3,256	3,256				
Tickets per screening	Pearson Corr.	**0.068**	0.002	0.206	0.599	0.562	**0.804**	**0.828**	1			
	Sig. (2-tailed)	0.108	0.967	0.000	0.000	0.000	0.000	0.000				
	N	565	565	565	565	565	565	565	565			
Copies	Pearson Corr.	**0.131**	**0.156**	-0.123	**0.931**	**0.942**	**0.757**	**0.737**	**0.512**	1		
	Sig. (2-tailed)	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000			
	N	3,178	3,178	487	3,178	3,178	3,144	3,144	453	3,178		
Time between cinematic and p2p releases (weeks)	Pearson Corr.	**-0.044**	**-0.131**	**0.606**	**-0.008**	**0.171**	**0.086**	**0.122**	**0.174**	0.040	1	
	Sig. (2-tailed)	0.040	0.000	0.000	0.697	0.000	0.041	0.004	0.000	0.375		
	N	2,147	2,147	2,147	2,147	2,147	565	565	565	487	2,147	
Time between last screening and time frame (weeks)	Pearson Corr.	**0.022**	**-0.063**	**-0.273**	**0.034**	**0.207**	**0.003**	**0.004**	**0.007**	**0.198**	0.599	1
	Sig. (2-tailed)	0.319	0.004	0.000	0.118	0.000	0.949	0.923	0.873	0.000	0.000	
	N	2,147	2,147	2,147	2,147	2,147	565	565	565	487	2,147	2,147

** Corr. is significant at the 0.01 level (2-tailed)

* Corr. is significant at the 0.05 level (2-tailed)

Regression coefficients for the explanatory model of a film's popularity among downloaders
(base=Cat. 1, 2, 3, 4, 5)
R^2=0,034

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Error Std.	Beta			Lower Bound	Upper Bound
1	(Constant)	248.17	75.16		3.30	0.00	100.47	395.87
	t_from_premier time between cinematic and P2P releases (weeks)	-0.33	0.16	-0.10	-2.08	0.04	-0.64	-0.02
	rkopia copies (residual)	36.85	20.36	0.12	1.81	0.07	-3.16	76.85
	rsum_cin no. of theaters where film screened (residual) film (residual)	-53.12	30.79	-0.10	-1.72	0.09	-113.63	7.40
	rsum_scr screenings (residual)	4.71	16.61	0.02	0.28	0.78	-27.93	37.36
	rnezoszam tickets sold (residual)	-16.00	11.56	-0.09	-1.38	0.17	-38.72	6.72
	rf_life_span film life-span (residual)	-4.79	65.23	0.00	-0.07	0.94	-132.98	123.41
a	dependent variable: d_torrent_max no. of downloads							

In the regression model the weak correlations disappear, the residual effects of the independent variables on the number of downloads as the dependent variable are statistically insignificant apart from a weak negative effect of the time that elapsed between the cinematic and P2P releases. Recent films have somewhat higher downloads and as time passes, demand on the P2P networks fades with the memories of the users. This supports our H1 hypothesis.

Interestingly, we could not find any causal relationship between movie popularity in cinemas and movie popularity on P2P networks, therefore in this population we need to reject H3.

We should remember, however, that for the films in Cat 3, 4 and 5 the DVD market availability probably plays a significant role in the fate of P2P downloads, therefore it makes little sense trying to explain the number of downloads in these categories with cinematic distribution data only.

As a result, we limit our further analysis to the first two categories, i.e. to those films that were screened in the P2P observation timeframe.

As a first step we confirmed that the number of copies, i.e marketing power is the relevant factor in determining whether the film will be available on P2P networks parallel with the cinematic distribution. We did this by running a regression in which the dependent variable was a binary variable of the film being downloadable on the P2P networks. This regression confirmed that films with copies below a certain threshold such as niche films, art-house movies, films with limited marketing budgets, locally produced films are slow to get to the P2P networks.

The limited marketing efforts fail to generate enough interest from the Hungarian release-scene to re-release a foreign torrent of the film, or to produce an original local release from cinema sources. In these cases releasers just wait for the DVD to come out and rip that long after the cinema-life of the film is over.

With this step we narrowed our study to those films which screened and were downloaded in the same time.

+T3 (netx page)

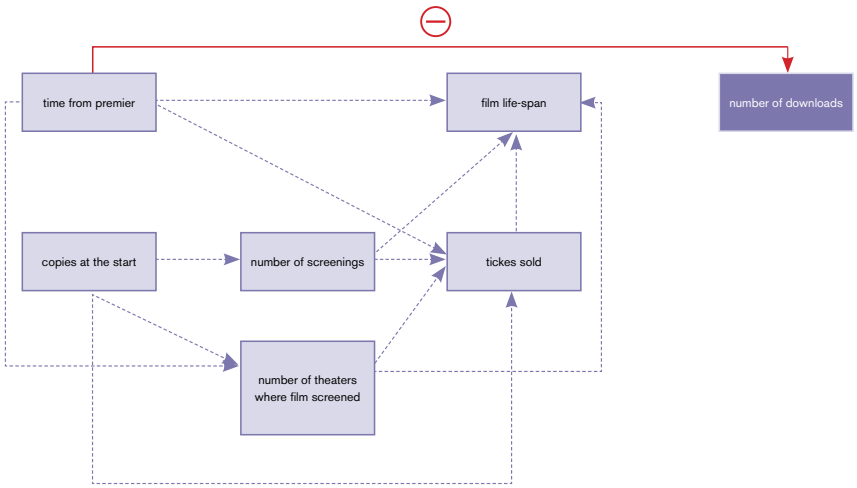
In the correlation table we find a weak, negative correlation between the number of tickets sold and the number of downloads, which, unlike in the previous case, suggests a substitution effect. On the other hand the fact that the number of screenings and the number of theatres are negatively correlated with the number of downloads suggests that a scarcity effect is in the background.

The regression model, however confirms neither of these suggestions.

Path model for downloads

variant: film categories = 1 (WITHIN time frame and DOWNLOADED, n=1528)

$R^2 = 0.04$



Correlations of theatrical distribution and peer-to-peer traffic (base=Cat. 1)

		Torrent life-span (days)	Number of downloads	Film life-span (days)	Screenings	No. of theaters where film screened	Revenue (million HUF)	Tickets sold	Tickets per screening	Copies	Time between cinematic and p2p releases (weeks)	Time between last screening and time frame (weeks)
Torrent life-span (days)	Pearson Corr.	**1**										
	Sig. (2-tailed)	0.000										
	N	92										
Number of downloads	Pearson Corr.	**0.703**	**1**									
	Sig. (2-tailed)	0.000	0.000									
	N	92	92									
Film life-span (days)	Pearson Corr.	**-0.253**	-0.299	1								
	Sig. (2-tailed)	0.015	0.004	0.000								
	N	92	92	92								
Screenings	Pearson Corr.	**0.060**	**-0.078**	**0.098**	**1**							
	Sig. (2-tailed)	0.572	0.458	0.352	0.000							
	N	92	92	92	92							
No. of theaters where film screened	Pearson Corr.	**-0.018**	**-0.130**	**0.335**	**0.827**	**1**						
	Sig. (2-tailed)	0.867	0.215	0.001	0.000	0.000						
	N	92	92	92	92	92						
Revenue (million HUF)	Pearson Corr.	**-0.003**	-0.127	0.282	**0.837**	0.693	1					
	Sig. (2-tailed)	0.975	0.245	0.008	0.000	0.000	0.000					
	N	86	86	86	86	86	86					
Tickets sold	Pearson Corr.	**-0.018**	**-0.144**	0.320	0.811	0.678	**0.976**	1				
	Sig. (2-tailed)	0.868	0.186	0.003	0.000	0.000	0.000	0.000				
	N	86	86	86	86	86	86	86				
Tickets per screening	Pearson Corr.	**-0.068**	-0.130	0.351	0.501	0.491	**0.802**	**0.846**	1			
	Sig. (2-tailed)	0.532	0.234	0.001	0.000	0.000	0.000	0.000	0.000			
	N	86	86	86	86	86	86	86	86			
Copies	Pearson Corr.	**0.065**	**-0.006**	-0.033	**0.809**	**0.707**	**0.685**	**0.646**	**0.477**	1		
	Sig. (2-tailed)	0.537	0.958	0.752	0.000	0.000	0.000	0.000	0.000	0.000		
	N	92	92	92	92	92	86	86	86	92		
Time between cinematic and p2p releases (weeks)	Pearson Corr.	**-0.256**	**-0.295**	**0.999**	**0.087**	**0.328**	**0.271**	**0.308**	**0.352**	-0.035	1	
	Sig. (2-tailed)	0.014	0.004	0.000	0.409	0.001	0.012	0.004	0.001	0.737	0.000	
	N	92	92	92	92	92	86	86	86	92	92	
Time between last screening and time frame (weeks)	Pearson Corr.	**.(a)**	**.(a)**	**.(a)**	**.(a)**	**.(a)**	**.(a)**	**.(a)**	**.(a)**	**.(a)**	.(a)	.(a)
	Sig. (2-tailed)	.	.	.	.	.	.	.	.	.	.	0.000
	N	92	92	92	92	92	86	86	86	92	92	92

** Corr. is significant at the 0.01 level (2-tailed)

* Corr. is significant at the 0.05 level (2-tailed)

Regression coefficients for the explanatory model of a film's popularity among downloaders
(base=Cat. 1)
R^2=0,041

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1428.77	218.84		6.53	0.00	993.18	1864.36
	t_from_premier time between cinematic and P2P releases (weeks)	-9.48	3.17	-0.33	-2.99	0.00	-15.79	-3.18
	rkopia copies (residual)	-24.57	176.34	-0.02	-0.14	0.89	-375.57	326.43
	rsum_cin no. of theaters where film screened (residual)	-45.65	179.50	-0.03	-0.25	0.80	-402.93	311.62
	rsum_scr screenings (residual)	-100.04	178.26	-0.06	-0.56	0.58	-454.86	254.78
	rnezoszam tickets sold (residual	-28.22	157.41	-0.02	-0.18	0.86	-341.53	285.10
	rf_life_span film life-span (residual)	-225.77	189.60	-0.13	-1.19	0.24	-603.16	151.63
a	dependent variable: d_torrent_max no. of downloads							

Again, only the time difference between the release dates has a causal effect on the number of downloads: most recent films are downloaded the most. The marketing power only influences what gets uploaded, but has no effect on the downloads. Film popularity, overall film quality (expressed in box office revenue) is also insignificant: we cannot pinpoint the effects of word-of-mouth information dissemination.

The explanatory power of the model has risen compared to the model that included all 5 categories, although it is still very low. This low explanatory power only reinforces our belief that the P2P markets and the cinema market are in fact two separate markets. Though there are common factors, such as marketing power, that control demand on both markets, we could find little communication between the two domains.

As for our hypotheses: we have found strong evidence both in the narrow and in the wide model that it is the time difference between cinematic and P2P releases that really defines to what extent a film is downloaded. H1 is therefore accepted.

Although we could not find a direct, causal effect of the marketing related variables to the number of downloads, we have established that it certainly defines what gets uploaded to P2P networks. The number of copies define what becomes available on P2P networks, therefore we can accept H2.

As for the connection between cinematic and online popularity: we have found no causal connection whatsoever between any of the cinematic and online popularity measures. H3 is therefore rejected.

Conclusion

Cinematographic supply has a dual role in shaping downloading activity:

—its shortages expand its horizon

—its marketing efforts define its focus.

Box office numbers however fail to explain peer-to-peer demand for movies. While peer-to-peer supply is triggered by media presence, the P2P demand has little connection with the cinematic market. This lack of correlation suggests that the cinema distribution market has little to fear from the downloaders. Though P2P users react to the same incentives as cinemagoers, the two markets do not substitute each other.

Though the P2P market might have a significant effect on the DVD market, we suspect something altogether different than a direct substitution with either of the traditional distribution channels. What we witness here is the birth of a new distribution format. It is not TV, it is not really the infinite video library of The Pirate Bay, and it does not quite resemble the online video outlets either.

As the amount of archival content is limited, on these P2P networks it is clearly not the search activity that links suppliers (uploaders with a specific title) with the demand (prospective downloaders). Instead, the focal point of the user activity on a bittorrent hub tends to be the page which lists the latest, newest torrent files available through the tracker. Each hub offers a continuous stream of new content and users decide which they will download. This consideration can be strategic (if they download a title only to gain from sharing it to others) or can reflect a genuine interest in the title. Nevertheless, the traffic on each tracker is defined by the rhythm of new uploads. In this sense the users of torrent trackers resemble to a crowd of TV watchers, who consume what the programmer (those who control what gets uploaded) offers to them. On some sites the programming is democratic, as there are no restrictions on uploading. On other sites, users enjoy the selection of trustworthy release groups. Some sites even specialize along cultural, thematic, linguistic niches, setting up their own, thematic P2P channels.

The strong competition among a plethora of torrent trackers suggests that the true value of a P2P hub lies in its power to offer an attractive content bundle.

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Civil Rights in the Creative Age

by EXGAE for the Ministerial Forum for Creative Europe,
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Over the last few years we have witnessed several attacks on civil rights and freedoms in the name of artists and in the name of the concept of "intellectual property". People are usually surprised when I say this, but lets go back and look at the facts. I will speak here as a citizen but even more as an artist, a curator or a cultural practitioner in general, because extremely devastating cultural policies are being implemented in our name, in order to protect our "intellectual property", they tell us, and against our will.

Often to "protect" us we hear the use of the word "piracy".

Just yesterday the French minister of culture, Ms Albanel used it here.

The word is used to purposefully mix up two different phenomena, in order to protect cultural industry interests. I personally doubt that these are the interests of the artists, creativity and society, but I'll come back to this later on.

The two phenomena they are mixing up are, on one hand, the idea of the private exchange of information and knowledge and, on the other, every body's right to get paid for their work. Of course nobody should do business with other people's creative works without paying the author fairly (and I'm not referring to the precarious jobs, like scriptwriting, offered by the cultural industry....)

The spread of this intentional mix up can be devastating.

This is not a frivolous problem. We have gotten used to digital tools and the Internet as we know it now, but this doesn't mean that this marvellous space of horizontal creativity is safe from being privatised for ever one day. And the modifications that are in process, in the name of art and creativity, can bring consequences that are devastating to our everyday life.

This is not science fiction.

For example the so called "telecommunication package" will be voted this coming Monday in the European community. This legislation could leave open the posibility for an agreement between your internet provider and the private royalties management agencies to monitor your traffic content, and without needing the permission of a judge. If they don't like it, your internet access can be completely cut off. The governments of France, Spain, Italy and England inbetween others are trying to implement this same agreement in their countries at this very moment, with strong opposition from civil society, but the support of the industry. This is not science fiction: one month ago we very narrowly avoided the success of a European vote to extend copyright from 50 to 95 years after the death of the artist. And it's not over, the vote will come up again.

As you can see , this is not science fiction. This is reality.

The main problem is that there is more than simply economic issues at stake. We are also playing for the very idea of what culture is and for the right to access to information (which has taken us a couple of centuries to gain).

The cultural industry, often via the voice of royalties management companies and governments, has redefined this concept for their private benefit and their own financial interest.

So, often, when we hear the word "culture", they are in fact referring to the "entertainment industry".

And when they talk about "pirates" they are referring to each and every one of us.

I am myself a great "pirate" and there are many other pirates in this room, using pirated pictures for their powerpoint presentations as we have seen in this 2 days.

The anachronistic concept of intellectual piracy is an excuse.

The social phenomenon of P2P, the file sharing system on the Internet, can't be written off in such a simplistic way. We are talking here about the 70% of all Internet users, that is an absolute majority of the European population.

It is simplistic and dishonest to try and divide the population into those who copy and those who buy, because we all do both things.

It's like saying that those who cook without buying recipe books are gastronomic pirates.

The fact that I use the Internet to compile music and that this turns me into a music lover, ends up feeding my desire to go to concerts and buy my favourite CDs. Only the record industry's greedy delirium could possibly think that people have to buy the thousands of records accessible now in the digital era on the net, when they want to hear them.

It's simply not true that if we share we will stop appreciating artists and originals.

Have people stopped buying The Bible just because it is in the public domain?

Will people stop going to the cinema to see a new Spielberg movie? Will Spielberg no longer be a millionaire? I don't think so. Maybe he will be a bit less of a millionaire, but Does the entire European population really have to care about the fluctuations of Spielberg's millions?

Culture is bound to keep producing community, emotions and wealth, as well as investments, as it always has and always will. In the digital age, more and more people dedicate themselves to developing their natural creativity based on what they learn directly from others through the net. And others can see their work and they can become well known an make a living from this, also through the net. People won't stop appreciating those who create. Just the opposite, those who create become more familiar and closer to us. We all become creators. We are losing appreciation, but not for the artists—for the middlemen.

Until recently, the culture industry was the main middleman between artists and audiences. This middleman is now the Internet.

We are now in the period with the highest levels of production and consumption of culture in history.

I can carry an mp3 player in my pocket with thousands of songs from all corners of the world. Does this mean I am being detrimental to the diffusion of culture?

The business opportunities that emerge from the greatest level of cultural consumption in history are immense. But there are new game rules that involve active users who access information directly, without turning to the slow, expensive system of middlemen.

In this new world of consumer-producers in which everybody can easily access culture and its means of transmission and production, the culture industry as we know it is coming to an end. It has to restructure itself.

It is up to the companies themselves to restructure the industry in an innovative way, by investing in the new possibilities rather than trying to hold them back, without hindering fair competition, without hindering the real creation of new jobs—new kinds of jobs linked to access and not to exploitation. And governments shouldn't paralyse the progress of society in general, destroying its new creative ecosystem just when it is flourishing like never before. And in a time of crisis, this is a problem of governance.

It is absurd to protect the culture industry as if the Internet and the digital had never been invented.

Cultural production has to adapt to the new form of democracy, and not the other way around.

Copying and its benefits are behind all of this.

Why is copying demonised when it is the basis of all learning?

We continuously absorb knowledge by imitating, copying and sampling. Knowledge comes about through imitation and copying. There is no other way to do it.

Any kind of cultural creativity or new knowledge is based on received information, which means that no new creation is completely original, or even possible, without the existence of a collectively built heritage.

Digital information and sharing is the memory of our time. Attacking digital copying is teaching our children that sharing is bad, it is like banning people from sharing with their memories, what they have learned; not allowing people to repeat what they've heard or watched, stopping people from lending books to friends or humming a song. Basically, it means banning communication in the communication age. How Strange!

There is no way the information society can coexist with the policy that is being proposed and enforced based on the cultural industry's perspective. In fact, if they succeed, the information society will disappear and be replaced by an "entertainment industry society". This crisis is no time for such a joke.

If we look back in Spanish and European history, we have a flagrant example of a private institution that, allied with governments, managed to impose its point of view on society at a time when a new technological transformation —the printing press—allowed a much wider access to knowledge. It was called the Inquisition, and it managed to impose its own interests for centuries through book burning, by banning science and condemning thousands of people to death. It's targets were not called pirates, they were called heretics, but it's the same thing. It also managed to hold Western cultural and technological progress back for a couple of centuries.

Something identical is happening in the digital age.

Today, there is also a minority who oppose the new printing press, unfairly holding back the increasing free circulation of knowledge.

Although they prefer us to have a different impression, the Internet is actually full of creators. Only a tiny percentage of them have any connection to the culture industry.

Those who want to apply the so called Sarkozy/Bruni model (which Ms Albanel, was defending the other day in the French parliament, saying that access to the Internet is not a fundamental right) those who criminalise filesharing on the net totally overlook the thousands of artists who allow their work to be shared by using free licences. They also ignore the privacy of all Internet users and the democratic benefits of breaking the control of information. This is very important for us in Spain since free Internet allowed us to prevent a coup d'etat on the 13th of March, 2003.

If P2P networks are criminalised, we all lose: we lose freedom, we lose democracy, we lose privacy, we lose wealth and freedom of expression.

The biggest sharing tool ever created by human beings, the library of Babel that humanity has long dreamed of, could end up becoming the largest form of social control ever created.

Restricting P2P networks won't defend the rights of a few misunderstood millionaire artists and the helpless entertainment industry. It will limit, fragment and hold back the tool that has changed the way we understand the world, culture, progress, and even business.

For 4 years, people all around Europe and the United States were asking their governments to control the price of housing and to stop supporting the unlimited greed of the housing and mortgage industry. Governments were asked to protect the right to housing, not only in itself, but also as a tool for a more balanced economy. The governments didn't listen to their citizens. This led to this immense catastrophe we are experiencing now, this absolutely foreseeable crisis.

Now once again, in terms of access to knowledge, we ask governments to work for the people and not for private interests.

Therefore, as citizens, we clearly DEMAND governments and the European community:

10 necessary and urgent measures to protect the knowledge society for the good of everybody

—1. That any restrictions placed on filesharing (P2P) networks be considered to be an act comparable to the Inquisition and an attack on the fundamental human right to access to knowledge, guaranteed in constitutions and in international treaties all over the world. We in Europe must defend that no restrictions be imposed on fundamental freedoms and rights without a prior judicial ruling.

—2. That royalty management associations become what they really are: private organisations that ONLY AND EXCLUSIVELY manage the "accounts" of their members, who are just a specific section of artists. That public bodies reinvest general royalties profits in infrastructures for the benefit of citizens, such as arts education or the digitalisation of teaching.

—3. That artists, if they so wish, be paid mainly for their creations and not for the exploitation they generate.

— 4. The abolition of all "digital levies" that indiscriminately sanction all citizens in the name of "payment for creation" and all attempts to penalize a behaviour that is not criminal.

— 5. That artworks become part of the Public Domain within periods that are of benefit to creativity and society. To allow more than one generation to live from somebody's work is a way of encouraging parasitism and creative stagnancy, and deactivating reinvestment. We ask that works become public domain within a reasonable period of time, according to the kind of work, with a maximum of 30 years.

— 6. That there be no requirement to seek an author's permission for the reproduction, transformation or diffusion of artistics, scientific or technical works that have already been presented publicly, when the purpose is educational, teaching or scientific research in the public sphere, as long as the author's name is included and all moral rights respected.

— 7. Likewise, when the copyright for any kind of work is held by government institutions, such work should immediately become part of the public domain for any purpose whatsoever. Barak Obama is already heading in this direction.

— 8. That the "right to quote" be defended in all cases as a vehicle for the democratic development of the information society.

— 9. The elimination of the concept of "redundant profit" from anything relating to cultural production.

— 10. The elimination of the mandatory nature of payment for public communication and payment for private copy.

Do we really want to follow in the footsteps of Pakistan, China, France and Sudan? Do we want to live in countries in which governments are afraid of the creativity of their citizens? Will we allow Mickey Mouse to condition the future of knowledge and culture?

Not in my name.

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Héctor Fouce

Beyond the Crisis in the Music Industry: P2P Networks, Music and Generational Cultural Experience

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Introduction: in search of the P2P social context

There is no question that one of the great achievements arising from the boom of P2P systems—regardless of issues related to whether they are legal or not—is that an unprecedented climate of social debate has been created in Spain. The ratification of the LSSI (Information Society Services Law) and of several modifications to Intellectual Property Law to adjust it to the digital environment have turned what could have been a dark area dominated by hackers and lawyers, into an everyday topic of conversation in classrooms, workplaces and busses. Surprisingly, it has even become one of the hot topics dividing the current administration and the opposition, in a rather curious role reversal between the Left and the Right, Social Democrats and Liberals.

However, this debate related to P2P has centered on whether file-sharing is legal or not and on digital fees, as well as on relations with the hard-hitting crisis in the music industry. Though these matters are relevant and lie at the heart of the most significant issues arising from P2P, they have overshadowed a reflection on how P2P networks have changed cultural experience as related to music.

For those of us who work in the field of communication and music, P2P networks are above all a social space, social tools providing people with new cultural materials that lend meaning to their experience, define their identity and express their cultural way of being. Therefore, when the Fundación Alternativas, through its "Observatory of Culture and Communication" (http://www.falternativas.org/occ-fa), asked me to carry out research on digital music in Spain (Fouce, 2009), I could hardly leave out a section that, while tentative and exploratory at this preliminary stage, examines the ways that P2P networks have changed the way people consume music, the social practices linked to that consumption, and how music is currently valued.

The idea was to explore how the experience of music has changed as the youngest generations—those who have lived in a digital environment since childhood—have joined this cultural universe, compared to the experience of young adults who use digital environments at work and in their free time but came to them at a later age. I was interested in their different experiences as related to music. First, those of the generation that came of age using vinyl records and cassette tapes and experienced the first wave of digital music when CDs came on the market, and witnessed the first music sharing systems, from Napster to Kazaa. Second, in contrast, those who have recently entered adolescence and have never known what it is to flip over a vinyl LP or buy a CD: instead, they constantly listen to music they download from the Internet. Third, between the two extremes, is the generation now at university, born when music was not yet a digital environment but just as it won its independence and reached young people, with the explosion of networks and the decline of the music industry.

Before sharing some of the value assessments made by each group, I would like to mention several considerations. First, as will be seen,

the use of P2P networks, or digital environments of any type, cannot be considered isolated practices. Instead, they are part of a universe of diverse cultural practices, some falling within what can be called analogue culture, such as reading the newspaper or listening to the radio, which interact with new media that also characterize contemporary culture, such as mobile phones, in what has been called digital convergence.

A second consideration, which is obvious but no less necessary, is that both positions are legitimate in the debate that usually arises about P2P practices as to whether the subject is legal or not: those who wish to earn their living from music have a right to be paid for their work while at the same time those who demand an open culture that places our common heritage before attempts at privatization are also right (Lessig 2005, Fouce 2002, 2005, 2006). There are multiple possible positions that lie between the two and it is quite likely that the right answer lies somewhere in the middle. It is essential to accept this to understand that the problems generated in this digital music environment are more than just the excesses of a few crazy 21st century anarchists, or greedy multinationals who care only to make huge profits for their shareholders. It is true that each of those elements is part of this argument but they cannot be the only bricks used to build a debate that actually gets somewhere.

At this point, a new prior consideration must be addressed: the crisis in the music industry exists, it is deep, it will be lasting, and it will generate a new business model though, as Lasica (2006) wryly pointed out, very few people know what that will be like. In Spain, from 2003 to 2008, the recording industry generated revenues six times smaller than before. No business can hold out against this type of decline in its figures. Of course it is also true that record companies have shown—as has occurred historically since radio was invented- tremendous short-sightedness in understanding change, buttressing themselves behind aggressive legal measures, the use of defensive technologies whose only merit has been to offend and complicate users' lives, and a discourse that is both that of the victim and the victimizer.

The E-España report by the Fundación Orange presented the day before the public presentation of this article was happy to report that regarding cinema and music, the use of P2P networks had decreased in favour of a larger market share for streaming systems like Spotify. 42% of users used P2P systems while a growing 38.5% already used streaming systems. This news was without a doubt excellent for the industry but perhaps not very good for those who stand for a plural culture. That is because streaming systems reflect the logic of a portal, a centralized and therefore controlled space that grants users access to contents filtered and organized by the server. That is, in contrast to the subversive potential (perhaps it will be necessary to address the extent of this term at another time) shown in the distributed scheme of the Internet, large corporations (not only recording companies but also those seen as their fundamental enemies in this scenario: telephone companies) are attempting to reconstruct the logic of a culture based on gate keepers.

Lastly, it must be taken into account that the distributed architecture of P2P shows a marked asymmetry between providers and consumers. As

pointed out in the report *Navegantes en la red* (AIMC, 2009), very few people admit to uploading music to P2P networks (only 7.1%) while a good percentage of surfers (36.2%) download songs from the Web. In light of this data, one must insist that although P2P networks permit exchanges among peers, that equality is more theoretical than real.

The digital environment: natives, immigrants and accents

This research is based on the premise that digital culture marks a significant generation gap. Mark Prensky (2001) coined the terms distinguishing between digital natives and immigrants to try to understand the different ways of relating to knowledge that take place among those who grew up in the culture of videogames, computers and the Internet and those who approach these cultural environments with interest but maintain other cultural logics. In Prensky's words, these digital immigrants keep their accent; that is, the ways they think, work and organize information belong to analogue lettered culture. Digital natives (Prensky, 2001, 2), among other things,

are accustomed to receiving information quickly. They like parallel processes and multitasking. They prefer graphics to text instead of the reverse. They prefer random access, such as hypertext. They operate better when working in a network. They are motivated by frequent, instantaneous gratification and rewards. They prefer games to serious work.

In his report *El tam-tam de los nativos digitales*, Joseba Elola (2008, 36) adds other elements that define digital culture:

They can't stand waiting—everything they want is just a click away. They don't want to listen to anything long or boring, they flee from a linear sequence of information, they want to take part in the process, and click on what interests them. They are not passive content consumers, they are active: they create contents, send each other videos, photos they have retouched and edited, they are very creative. (...) They pay partial attention to several things at once. Their brains have a more complex processor.

This research, therefore, used age as a variable in selecting interviewees, in view of the different life experiences set forth in the introduction. Three group interviews were held, one with students in the 3rd year of ESO (Obligatory Secondary Education) (GESO), one with university students (GUNIV) and one with young adults between ages 25 and 35 (GJA). It is evident that both the methodology and samples are limited and the applicability of the findings can be criticized due to this underlying simplicity. However, I hope that this research serves as a way of identifying major aspects that can be covered in greater detail in subsequent work.

All the age groups admit to using the Internet to download large quantities of music. However, the groups value it differently: the adults compare new music-related practices to those formerly used. "Buying a CD was a whole ritual. You bought the CD, you got home, you opened

it, and you looked at the booklet: wow, it's gorgeous! You read the lyrics while you listened to it... Sometimes you had to go to a bunch of shops looking for a CD you couldn't find. Now all you've got is a file you can erase if you don't want it" (GJA).

Among the youngest group, it is striking to see how advanced the media convergence is between personal computers and mobile phones. The latter is just another musical accessory: songs are downloaded from the Internet, sent to the mobile and then sent to friends, using Bluetooth if they are nearby, even sharing the mobile or the headphones, each friend using one ear bud to listen.

Each age group downloads different kinds of music. While university students and adults continue to download entire albums—"then if you don't like a song you just click and skip it" (GJA)—of their favourite groups, the youngest group download single songs that are currently in vogue. Instead of talking about groups or performers, their discussion is about genres and songs. When asked what kind of music they listen to, they mention a remarkable variety of styles: the same person may like hip-hop, reaggeaton, Bisbal and heavy metal. This is surely linked to the fact that adolescence is the time when one discovers and defines one's musical identity, and to do so one must explore all the available music on offer.

Adults use P2P to try to manage albums they already had in a digital format. "I had all the Violent Femmes' vinyl albums and I downloaded them in MP3. I still listen to the same rock music as 15 years ago, I don't keep up with new stuff" (GJA). The youngest group shows little interest in using the option of free downloads to explore new music or new groups, compared to university students and adults. "Thanks to YouTube, MySpace or Last.fm you often end up listening to things that have nothing to do with the group you started out with and that's good" (GUNIV).

The adults see continuity with analogue-type cultural practices, such as buying the newspaper and specialized music magazines: "I buy *El País* newspaper on Fridays, I get the list from the EP3 supplement on new trends, I look up the names of those groups on Google, and I download their music and listen to it" (GJA). Downloads are thus seen as a complementary form of information, as a way of being able to judge whether the music critics are right about their assessments, and as a way of accessing new territories.

Assessments of the influence of the quantity of music available or the quality of what is heard varies with age, although one must take into consideration that with age, the amount of free time individuals have to spend listening to music and providing themselves with musical resources (not only songs but also newspapers, magazines, concerts and so on) also varies. If we consider that adults are interested in finding new things along with rebuilding their music collections in digital format, listening related to the vast amount of music on offer loses value. "You want to have it all, although sometimes you don't have time to listen to it. That creates a certain anxiety. You say, "Oh God, there's so much I still have to get" (GJA).

With respect to the moral assessment of using P2P systems, the issue is again perceived differently according to age and circumstances. Pure digital natives, who have grown up with the practical experience that music is like water from the tap, show no reluctance about downloading music from the Internet. Among adults, however, past and current experiences are compared: "I stole some records from El Corte Inglés and when I did, I felt so guilty, a sweaty, nervous wreck, terrified they'd catch me. That doesn't happen when you download music from the Internet"(GJA).

However, there is no age difference when it comes to finding a justification for using P2P systems: everyone does and it is impossible to persecute all citizens for something that is socially acceptable. In this respect, the campaigns carried out by the music industry and the Ministry of Culture seem to have no effect on the public, regardless of age. "Nobody pays any attention to those campaigns, if you go to the movies and they put one on, you keep talking to your friends till the movie starts (GESO). "They hit you over the head with it so often, you just ignore it. Plus, the punishments for this kind of thing make no sense, you get more years for downloading something from the Internet than for stealing it from a shop" (GUNIV).

Across the board, the industry is criticized for defending a washed up business model—"The companies make albums worse" (GESO)—and there is distrust of the radio, which is seen as subject to the recording industry's criteria. "I don't trust the radio much. I used to listen to Top 40 but at some point you realize what's really behind it all and then you stop listening to it" (GUNIV). Among the adults, who are generally better informed about how the music industry works, suspicion extends to include royalty management companies as well, as personified in Spain by the SGAE: "There are fees on a lot of things and I don't know if the charges are made in a fair manner" (GJA).

In answer to these criticisms and distrust of those who usually "prescribe" music, strong tendencies—which are even stronger among younger people—are arising where people turn to recommendation systems linked to groups (MySpace) and users' tastes (Last.fm). "I use MySpace to find out about the groups that interest me" (GESO) "When I hear about a group, first I look them up on MySpace, because you don't have to download anything, and plus, it takes you from one group to another" (GJA) "MySpace is much better than the radio, and you choose what you listen to" (GUNIV)

There is lukewarm protest against the royalty tax, which increases with age and the amount of information, but generally, the common attitude is that the tax makes it legal to download music. "If you have bought a CD, you can do whatever you want with it" (GESO).

A large percentage of the opinions expressed in the three groups lend credence to those who, like Anderson in *The Long Tail* (2005), claim we are dealing with a new paradigm in the music industry. Prior to the appearance of P2P systems, only the sale of a few albums was profitable: the ones in the centre of the sales curve. "It's not sufficient for a great

documentary to have a potential audience of a half a million people around the nation; what counts is how many of them are in the northern part of Rockville (...) In the tyranny of physical space, an audience that is too widely spread geographically is like no audience at all.

In an abundance-based economy, however, like P2P distributions, popularity no longer holds a monopoly on profitability: thus, business in the music era will be done by making available to users the greatest possible quantity of options so the total of bit by bit demand yields profits.

In this new type of economy, it is more costly to assess products than to produce them. This is the new innovation of the digital economy: to date, the industry acted as a filter that determined what deserved to be recorded, interacting mainly with the radio, which favoured the maintenance of the mainstream. **Now, the ability to filter, and therefore, control of what is available, has been distributed.**

The cultural consequences arising from this new model, produced by the confluence of recommendation systems and the ability to find material through P2P, is that, as pointed out by Anderson (2005), many users are discovering that their cultural tastes are not as *mainstream* as they had thought, and that they like some things that only a few other people also like.

In addition to providing the model for a new form of culture and economy, P2P music networks have proved to be an interesting laboratory for economic analysis. Economists Sandulli and Martín Barbero (2004) stated it thus: "P2P networks have shown that for an extremely large network of anonymous, non-altruistic members, behaviour guided by each member's own interests is sufficient to generate sustainable cooperation over time without free-riding behaviours posing a threat to the existence of the network".

Conclusions: continuities of experience, needs for research

One of the first lessons to be gleaned from users of P2P music networks is that these networks are not only technological environments. If we want to understand this boom, they must be understood as phenomena occurring within cultural experiences and contexts: they are not a radical break, even for those who lived through the boom of CDs and the radio. We are all both digital and analogue: our everyday activities and social experiences establish continuities in which one can buy the newspaper and read it in a bar and later download the album praised by our favourite music critic. These continuities are also time-based: no matter how much technologies may change, there are ways of making things like personal preferences and customs last, habits that are generational at times.

The research I have presented here is clearly only a glimpse offering a limited view of the complexities offered by the new musical environment. More research is needed to find out what cultural

significance P2P has on our way of life and our culture. More extensive and more intensive research over a longer time period and a larger number of interviewees will offer elements serving to create a more detailed cartography of a phenomenon that has clearly changed the cultural and economic—and maybe also the political—forms of our contemporary environment.

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Ál Cano Santana and collaborators (1)

Guifi.net: Peer-to-peer network and Free Social Web for collective empowerment

al@blogmail.cc
Electronic address for this document (expanded version):
http://en.blogxpopuli.org/wiki/Release_of_subjectivities_and_relationships_between_subjects_by_means_of_technological,_cultural_and_organizative_mechanisms (4)

Guifi.net is a free citizens' network with over 8,000 interconnected nodes (mainly in Catalunya but currently in the process of expanding worldwide) where users develop and own the network. Its users also provide the network with servers, services and content, thereby maintaining the files shared therein outside governmental control.

Free Web is a philosophy for the use and development of a Social Web or Web 2.0 where users maintain control of software, protocols, formats, servers, network, and the social relations and contents generated through them.

This article explores and identifies the technological, psychological and social mechanisms activated for the deprivation of freedoms in the creation of psycho-social subject in the framework of cognitive capitalism or capitalism on intangible goods. Secondly, it experiences the release of subjectivities based on critical methodologies such as the creation of technological and discursive tools and the execution of new organizational practices. All of the above made possible by the door opened by the philosophy of Free Software, understood in this case as a perspective to bring liberation to the fields of technoscience, the cultural productions and the sex-affective and kinship. Other theoretical frameworks applied are actant-rhizome ontology (ANT) and Queer theory. All of this demonstrates the multiplicity of factors operating in various manifestations we consider representative of the phenomenon of taking away liberties: among others, the case of what is known as the Social Web or Web 2.0 and specifically the construction of communication via traditional electronic mail and construction of a network of private communication financed with public monies.

The results obtained were the facilitation of a personal and collective process of empowerment and self-enabling, the enrichment of personal and group communication and the creation of accessible knowledge. All have fostered the liberation of public subject positions with the power to carry out political actions.

Introduction

This study is based on studies related to the free software movement. This is a social movement based on technological development, strongly consolidated worldwide, in operation for over twenty years and which has already achieved its main objective: to create a completely free computer operating system (5).

This objective falls within another more general goal: to establish an independent moral, political and legal frame of reference as an alternative to the development and distribution of proprietary software, a response to the ideology of taking away the liberties that were operating in the field of software technology in the early 1980s and which have continued in other fields like cultural productions through the 1990s and into the 21st century to date. These ideologies are characterized by the search for economic profit through trading immaterial goods beyond ethics or the social good and through carrying out practices that hinder software development (Stallman, 2004) and that use technology and the law to close down culture and control creativity (Lessig, 2005), among others. This ideology is implicit on many occasions, but a theoretical reference can be found in Bill Gates' book titled *The Path to the Future* (1995).

From this base, previously studied by other authors, other proposals have arisen based on freedom, which, as a whole, have come to be known as the free culture, free knowledge, or copyleft movement. They have involved a number of studies of technoscientific knowledge that can be classified as "Theories of Free Knowledge" or a "Free Software Perspective". This is the case of initiatives for the liberation of cultural contents such as *Creative Commons* (Lessig, 2005), initiatives to create free communication

1—This text was written by multiple voices. The practice of what is called knowledge generation is never an individual practice, no matter how hard the capitalist logics that operate in academic circles insist that is so. Creation is always a practice involving a variety of actants, and the creation of this text was carried out in that way—the only feasible way—with the intention of reclaiming this practice as a political act, in favour of the production of and collective access to knowledge providing more liberties to people, such that it forms the basis of a more just society.

2—http://www.gnu.org/copyleft/fdl.html

3—http://creativecommons.org/licenses/by-sa/2.5/

4—This web site is a wiki-web for collective writing. Feel free to make modifications, in accordance with the "scholarly paper" format. In relation to any doubts or discussions about the article, use the "discussion" tabs on the related page.

5—We mean "free" here as defined by the *Free Software Foundation* (Stallman, 2004).

networks such as *World Summits on Free Information Infrastructures* and their *Wireless Commons*, proposals to create political and development organizations such as the *Plataforma Internacional por el Software y el Conocimiento Libres* and its *Libre Organización* or proposals for the liberation of human relations carried out by the *Blogx Populi* group and its. These emergent initiatives operate in several social fields such as information and communication technologies, cultural production and collective action and they all work in the field of constructing psychosocial subjects as free or deprived of liberties.

In the copyleft movement, this ideology is built on a common base of ethical attitudes and activities related to freedom, collaborative work, the publication of contents, the opening up of its productions and opening toward the new actors involved.

The ideology of taking away liberties, however, is built on the imposition of restrictions with proprietary technologies (proprietary software, Digital Restrictions Managers or DRM, private communication networks), laws that control and restrict development (software patents, medication patents, restrictive copyrights, laws against inverse engineering, a royalties tax on private copies, royalty taxes for libraries, laws regulating social organization, organization in political parties, marriage laws, mercantile and corporate laws) and with social norms restricting expression and communication (patriarchy, family, heterosexual orientation taken as the norm, monogamy, implicit norms that impose restrictions of the personal to the private sphere).

This article addresses two of the initiatives carried out with the intention of bringing the liberation of subjectivities to two techno-social areas: telecommunications networks and the social web.

Guifi.net and the liberation of telecommunications

Guifi.net is a wide area telecommunications network (6) comprised by its users. Given the open, inclusive nature of the initiative, it is currently the largest citizen web of webs in the world (7). Also due to its open nature, to become part of the network, one follows its usage licence, Wireless Commons (8), based on the GNU GPL free software licence. The researcher has collaborated in technical tests of coverage, in carrying out social chats, configurations, putting actors in contact, etc.; that is why she is part of guifi.net and is recognized as such by the community.

Guifi.net is also a space for research and development for the adaptation of technologies to the purposes inherent to an open network. That is why it generates social and technological knowledge and thanks to that structure, the methodological tool was developed enabling the building of technological, cultural and organizational mechanisms which also construct public-political-free subjectivities. Moreover, although guifi.net does not aim to defeat traditional networks, thanks to its critical production it has been able to contribute to un-black-boxing the construct of "telecommunications network". There is a reason that the phrase for subscribing to news is "Talla els fils que et lliguen" (Cut the cords that bind you).

6—At the time of writing, these lines have over 7,800 nodes, cover 11,000 kilometres in links—which is a large part of Catalunya—and are growing exponentially.

7—http://www.elpais.com/articulo/portada/Noticias/Gurb/red/inalambrica/libre/conecta/23/municipios/elpcibpor/20061005elpcibpor_2/Tes/

8—In sum: You are free to use the network for any purpose provided that you do not hinder network functioning or the freedom of other users. You are free to know what the network is like, its components and how it works. You are free to use the network for any kind of communication and disseminate its functioning. By joining the network, you help to extend these freedoms on the same terms. http://guifi.net/en/WCL_EN

9—Mesh topology is a network topology in which each node is connected to one or more of the other nodes. Therefore, it is possible to take messages from one node to another by different routes. If the mesh network is completely connected, there can be no interruptions whatsoever in communications. Each server has its own connections with all the other servers.

If there is a form of representing the shape of radio waves in a rhizome, it is the new mesh-type network (9) we are carrying out in Gràcia (Barcelona), any point of which can connect to any other, wherever it is, with the sole condition that "they can see other". In this sense, in the course of the research, a proposal was made to structure the concepts of philosophical theory on free networks, dynamic routing technologies, radios and four communities that are involved: *Guifi.net*, *Gràcia Sensefils*, *Xarxa Sensefils Cooperativa*, *Freifunk*; achieving the constitution of the first node that connects the four networks in the Gràcia area of Barcelona.

Creating the Free Network: an integrating node of Guifi.net

On 28 April 2008, a meeting was held at the local Infoespai among members of *Gràcia SenseFils*, *Xarxa SenseFils Cooperativa*, *Guifi.net*, *Badalona Wireless* and the German *Freifunk* free network. We met after two years of working separately and several months of coordination. Our goals and practices were different. Basically, some were in favour of giving priority to being able to have Internet connections in a cooperative way, and others to developing free networks. Fortunately, all shared the basis of freedom in telecommunications according to the *Wireless Commons* licence. The objective was to create a node for the free telecommunications network according to the model of *Guifi.net*, also making it a special node that would propose the development of dynamic routing protocols. This was done thanks to the help of a guest from *Freifunk*—a German network characterized by making intensive use of dynamic routing protocols—who is also the main developer of one of those protocols. To build the node, materials from various members were used (main board, radios, antennae, boxes) that were assembled, constituting the node as a whole.

The node that was created is located on one of the rooftops in the central Plaza de Sol, in Gràcia (Barcelona) and it brings together the networks of Gràcia SenseFils, Xarxa SenseFils Cooperativa and Guifi.net. This node has the most routing technologies in the area to enable the integration of all the networks involved and facilitates the future development of an automated expansion of the network. The technologies it uses are OLSR, BATMAN and BMX.

The node is open and can be accessed through the Internet at this address: 195.160.225.38, on Guifi.net at this address: 10.139.6.70 and in its space in the Gràcia area at a frequency of 2.4GHz, channel 1 and essid ch01.mesh.guifi.net. For the first time, technological integration has made it possible for networks with partially distant goals and methodologies to interconnect to reach points farther away that would not otherwise have been possible.

From Web 2.0 to Free Web

Historical background of Web 2.0 through a case study of electronic mail

In 1971, Ray Tomilson developed what we know today as "e-mail" or "electronic mail". He did so while working at BBN (prior to working at Arpanet), based on the programmes SNDMSG and CYPNET. The

former made it possible to send messages to various users within the same machine and the latter made it possible to send messages to other machines. Although his superior said that what he was doing was worthless, by 1973, 75% of the traffic at ARPANET was already electronic mail. Today, this type of message exchange via machines connected in a network in an everyday practice for all Internet users.

The socio-political implications of this popular tool are what interested the project BlogMail. We particularly wish to question the logics that have instituted electronic mail as a form of private communication. Along with postal correspondence, telephone calls and face-to-face conversations, e-mail can be considered part of individual communication media. Traditionally, it is assumed that these media put certain individuals into contact with each other (Beneyto, 1973), which distinguishes them from instruments for communication with nuclei previously classified by affiliation or membership ("group or collective communication media", such as presentations in scientific centres or congresses) or to transmit messages in an indirect, unilateral way to an anonymous audience with no discrimination at all ("mass communication", such as lectures with no individualized invitations or political rallies) (Beneyto, 1973).

Therefore, electronic mail, like postcards, is private in principle and not made to be brought immediately into the light. An e-mail is written for a sole recipient, or for only a few people, that is, expressly for those to whom it is written, with no intention that it will be read by others who are not explicitly its recipients. We are convinced that this conception is not innocent and denotes a serious limitation to the creative potential of everyday communication. In sum, we understand that the privatization of e-mail takes away political power from the private lives of persons.

At first glance, one might believe that the private nature of e-mail is a legacy from postal mail. However, the matter is more complex. Several phenomena have favoured the privatization of these electronic messages. Basically, we would point out four:

– The intervention of companies, starting in the 1980s, that hoped to market an offer of access to the Internet and its services. For those entities, it was much more profitable to sell individualized packages in which, for example, electronic mail was shown as a solution for personal use. In addition, public mail also requires a network where it would be published and that is now being sold separately. Companies sell greater power capacity (10) at a higher price, but in general, it does not lead to a rise in costs (11).

– The appearance of spam in 1994, which made public dissemination of electronic mail addresses a problematic matter.

– The foundation of programmes such as Echelon or Carnivore, that aimed to control populations through surveillance of electronic information.

– The systematic goal of discrediting hacking in the media, portraying it as an action aimed at indiscriminate or malicious use of computer services (including e-mail).

10—Under the name of bandwidth, fixed IPs, and technical matters that give agency to the *customer*.

11—In fact, for example, servers that maintain dynamic IPs make it most costly to maintain fixed IPs, given that the latter do not require servers.

Each of these phenomena has made it necessary—and imperative, at times—to assure the privacy of electronic mail. To attain higher revenue from the sale of network services, companies have designed and sold e-mail as an individual tool. In addition, to keep from being victims of industrial espionage, massive deliveries of commercial electronic mail, governmental surveillance, or any other curious onlooker, social movements and cyber-rights groups have fought to limit and defend private life in the electronic sphere.

However, the scenario around the controversy about privatizing information on the Internet would not be complete without examining the other side of the coin. These initiatives are antagonistic: they directly or indirectly confront governmental, commercial and individual surveillance systems. Nonetheless, they are not concerned with questioning the logic that underlies said controversy. They leave intact the production models for information, wealth and subjectivity in contemporary society.

Various groups interested in making information circulate freely have been working on this issue. A paradigmatic example is the work done by contra-information groups such as Indymedia, Pangea, SinDominio and Nodo50 . These networks of activists and journalists foster the greater visibility of the agendas, activities and achievements of social movements, especially in what has come to be known as the anti-globalization or "Another World is Possible" movement. Basically, however, they are opposed to the centralization of media at the global level and its centralized, uni-directional communication model, as well as its ties to established power and its economic interests.

However, in spite of the significance of their work related to "free speech", counter-information groups do not see the existence of "private life" on the Internet as a problem. Other experiences do point in that direction. They are related to hacker ethics (Himanen, 2001) and their knowledge production model, which operates based on cooperative technical action and the free distribution of their products via the network. Free software communities are a clear example of this matter. BlogMail is one of these experiences.

What we propose here is to carry out a public electronic mail service. We are going to perform in a sort of activist ethnography to change the electronic mail creation tool to one that allows us to carry out the social change we want to take place, and design and build the technological and/or social tools that will foster this change. To do so, we put together the Blogx Populi research, intervention and social engineering group.

For us, the existence of a "private sphere" on the Internet is a symptom of how far the limitation of liberties has gone in contemporary society. The distinction between public and private information has political implications that cannot be ignored.

The root of the word "private" comes from Ancient Greek: it means "to be deprived of politics". More recently, various authors have returned to this matter and have stated the following:

What is private life deprived of? Simply, of life, which is cruelly absent. People are as deprived of communication and self-realization as possible. One should say: of making their own personal history.
[Debord, 1961, p. 45]

Proprietary software keeps users in a state of division and impotence. Division because each user is forbidden to help others, or distribute copies; and impotence because users do not have the opportunity to change the programme or find out what it does.
[Stallman, 2004, p. 78]

Based on the above, we affirm that the production and distribution of "private" information has a political nature that has been expelled from the private sphere. Thus, only collective or mass exchanges can have political power. Currently, the personal is relegated to the private sphere. It is an attempt to "deprive" it of political power but, as feminist Lesbians used to say in the 1970s, "The personal is political" (12).

For the liberation of software and services that support the social web

Much has been said since 2004 when O'Reilly presented an article about novelties arising at that time in the world of the Internet related to the constant exchange of content based on social relations. What is known as the social Web or the much more commercial name of Web 2.0 began to be used to refer to all the services which mainly used the Web as the main interface and were based on participatory and/or dynamic Web sites. The title of O'Reilly's article pointed in a commercial direction: What Is Web 2.0. Design Patterns and Business Models for the Next Generation of Software, and presented Web 2.0 to refer to a second generation of the Web based on communities of users and special range of services, such as social networks, blogs, wikis and folksonomies. According to O'Reilly, Web 2.0 fosters collaboration and the agile exchange of information among the people who use it.

In contrast, voices against the new denomination argued that it was simply a commercial strategy to publicize certain companies and not an in-depth study of the reality of the Internet and that no qualitative leap had been taken in Web space.

What is certain is that change was gradual and around 2004 most services were based on what is now called a Web 1.0 structure: that is, infrequently updated, static web pages that did not allow interaction with users.

Whether a reality or the result of O'Reilly's article and lectures and the millions of people who coined the term (an Internet search of "Web 2.0" gets millions of hits), it is certain that in the so-called first world we use information and communication technologies to carry out our social relations. Call it Web 2.0, call it the Social Web, call it whatever you want. Nowadays, we read information on the web written by users like us and we can collaborate, correct or subscribe to them. The fixed text and images of Web 1.0 have been expanded to include audio and video, Web sites that are updated without having to be reloaded, maps in motion... and it serves as a cultural and artistic platform for millions of photographers, video artists, musicians and artists of all kinds worldwide who find that Web 2.0 offers them a platform for making themselves

12—It is not possible to attribute this sentence to a sole author. By the late 1940s, there were already theoretical productions that refer to this matter but during the 1970s, a multitude of texts appeared, especially following the 1969 publication of Carol Hanisch's essay titled "The personal is political" in the Redstockings collection titled "Feminist Revolution". In the essay, discussing her experience with women's groups for over a year in New York and Gainesville, Hanisch stated: "One of the first things we discover in these groups is that personal problems are political problems. There are no personal solutions at this time". Hanisch's original text can be found at: http://scholar.alexanderstreet.com/download/attachments/2259/Personal+Is+Pol.pdf

known, where they can interact with what was formerly known as “the public” and has now become constant feedback.

The gateway to social communication on the Internet was opened by electronic mail in 1971. It was followed by chats and forums, first of all, and then a huge number of instant messaging and IP telephone communications services. With the advent of the so-called Web 2.0 came blogs, video on demand, wikis, and radio stations. Some of these services are free (as in freedom), such as the extremely popular Wikipedia and Menéame, as well as others that are not as popular. However, many popular services are based on proprietary software (see Web 2.0 table).

The title of O’Reilly’s article actually refers to the next software generation; it was not solely about Internet services over the Web. Therefore, it is clear that the business model is based on offering a direct service on the software, not the software itself, or even a software license. The software exists and serves as the basis of Web 2.0. O’Reilly’s article is also about the eminently social nature of services related to software. We will discuss each point separately.

Web interface

Initially, social communication handled by cybernetic networks was multi-protocol in nature; that is, one could access it in multiple ways. For example, electronic mail has a variety of communication protocols (SMTP, POP, IMAP), with communication via the Web (Web mail) only one of these options, developed some time later.

At present, the fact that the majority of these services offer their sole communication interface via the Web has the advantage of making them accessible from any computer with a Web client, but the underlying drawback is that the user has no control over the software that is executed on a remote machine from which the user receives only the processed html, losing not only the source code of the programme with which the user is interacting but also access to the binary code.

The social nature of software

Projects like Wikipedia have proved that the best way to build knowledge is when it is carried out collectively. Projects such as delicious or delirious show that the World Wide Web can be categorized, provided someone is willing to do.

This Web classification and indexing model is called the folksonomies model, which requires constant participation from its users. In what some voices are calling Web 3.0, this will no longer be the case, as the model to be adopted is based on folksonomies. It is what is called the Semantic Web. That is, until an automated classification becomes feasible technologically, the community of users will have to carry out that task, without being paid for it. Some have started to say that this is abusive.

Problems with using proprietary software on Web 2.0

The problem is that a large percentage of social web services are built on proprietary software, where users must grant rights to the contents produced to use the service, and are excluded from participation in the organization that manages the service. Users must use proprietary protocols and formats owned by the organization that manages the

service and depend on a proprietary network. Consequently, large corporations maintain control of a large quantity of personal information as well as the social relations and links established on the web.

—Censorship on Flickr
—Reappropriation of copyright by MySpace
—Political censorship on YouTube
—Google reads your e-mail for advertising purposes
—Worms attack users of Facebook and Myspace

Conclusions

Personal and collective empowerment and self-enabling
We found that personal and collective empowerment and self-enabling is related to our research subject. Members of the community (no longer called users, given that they have come to form part of the managing group) acquired information technology and telecommunications engineering knowledge as a result of the following: being able to use technological and communication tools that free up communication, private life and the organization of sexual-affective matters; making these tools accessible as free software tools; the use of the blogmail.cc and guifi.net free web portals, which use only free software, with access to the contents, organization, protocols, and the network; facilitating access to technical sources, such as the source code, configuration files, and manuals.

The members of the various projects considered the tools as their own and developed information technology abilities that were not in keeping with their former position as subjects. These abilities have also been useful to them in other areas of their lives.

This empowerment of users took place not only in the acquisition of technical knowledge; users also obtained the possibility of sharing knowledge of a variety of subjects, including some traditionally relegated to the private sphere such as sexual practices or the organization of relatives not based on the biological family. Access to this knowledge has made us take it into account for our own practices.

Enrichment of personal and group communication
An additional result was the enrichment of personal and group communication, not only through the socialization of the projects at various presentations at congresses but also directly, given that it fostered physical group communication as it brought issues that had been relegated exclusively to the private sphere into the physical world, the broader social field, and the fields where the communication actually took place (cyberspace, for electronic mail; the Web, for guifi.net; polyamorous communities, for codes for sexual-affective relations). This unexpected result has not only brought knowledge, interactions and their agency to the public; the public has also filled the place where the contents were being produced and/or discussed. Enabling access in cyberspace to sources of public knowledge to masses of people meant that this knowledge reaches public space in everyday interactions. For example:

From a reader of mailblogs to a person who has a public electronic mail account:
Felicities, I read the email the university sent you that says they have given you your degree.

Or from a person who has a public email account to a regular reader of mailblogs:
I haven't had time to read my mail the last few days. Have I received any urgent mail?

And the answer:
Yes, they've responded to the bureaucratic matter you are waiting to hear about."

Empowered subject positions and accessible knowledge
The conclusions from all of these projects are that all these interactions, productions, acquisition of knowledge and political empowerment have not taken place in the use of the proprietary communication tools offered by Yahoo! or Microsoft, nor do we foresee that they will take place in the new creation of the EMD Valldoreix proprietary wireless telecommunications network (just as they have not taken place so far based on the proprietary telecommunications networks in existence to date) and they do not take place in persons on the lower level of the hierarchy of current sexual-affective relations. In fact, these interactions, productions, acquisition of knowledge and political empowerment become impossible to practice and even unthinkable. Work based on proprietary technology turns users into passive subjects with no possibility of experiencing practices, nor even the chance to think of them. This deprivation is much clearer for subjectivities as they are enrolled in new projects, which they have expressed in the following terms:

For example, taken from the field diary related to telecommunications networks:

I signed up for Internet at home with Telefónica[...], every day, the connection wouldn't work, I'd call them on the phone, they wouldn't fix the problem and there was nothing I could do. Now that I'm in the guifi.net project, when the connection breaks down, I locate what needs to be fixed myself—a router usually has to be restarted—and it usually takes me only five minutes. [...] I do it with the free software tools the community made available and which helped me learn how the network I use works.

The initiatives are independent of each other. Each project works to attain its own objectives in a specific field. Although they all work for a general goal related to freedom, they do not attempt to meet their goals through each other. Even in public presentations of guifi.net, the term "germà gran" (older brother) is used for the Free Software movement and links to free hardware and open standards are developed. Adherence to them is a choice to show affiliation but not a requirement, as is adhering to the norms of the "Wireless Commons" license. In practice, these links are made to a great extent but not entirely.

The analysis of this practice in accordance with our Free Software theoretical framework (Stallman, 2004, p.25) is for the purpose of at least partially pursuing its objectives until it has been completely built. That is,

it is considered legitimate to use proprietary tools if they serve to create free tools, provided that there are no free tools to carry out the same task. In any case, this subject is a product of internal tensions and negotiations to find out if some of the tools used are free or not and whether free tools actually exist for carrying out certain tasks.

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Florencio Cabello Fernández-Delgado

P2P Radio as a "Comedy of the Commons": Mesh Networks and the Democratization of the Radio Spectrum

Universidad de Málaga/Ulex

Introduction

This paper is based on reflections arising over the course of the seminar on Lawrence Lessig's work *Code: Version 2.0* held at the Universidad Libre y Experimental de Málaga in the first semester of 2009. Actually, instead of "reflections", it is based on interference: the interference that reading the chapter titled "Free Speech" (specifically, the section "The Regulators of Speech: Distribution") (1) provoked in our thinking regarding how to shape the claims related to a commons at the heart of communications networks. I would like to thank Raúl Benítez and especially Gabriel Ochoa for their contributions on the subject.

The general demand for common spaces in this field has existed since the beginning of what have become today's widespread reflections and initiatives related to the (re) conquest of the communicative, creative and intellectual commons, all of which identify themselves as heirs to the philosophy and practice of the successful free software movement. In this sense, special inspiration comes from the metaphor of "layers" that Yochai Benkler borrowed from network architects back in 2000 to frame his commitment to constructing a communicative commons that encompasses all levels of the "information environment":

As the digitally networked environment matures, regulatory choices abound that implicate whether the network will be one of peer users or one of active producers who serve a menu of prepackaged information goods to consumers whose role is limited to selecting from this menu. These choices occur at all levels of the information environment: the physical infrastructure layer—wires, cable, radio frequency spectrum—the logical infrastructure layer —software—and the content layer. At the physical infrastructure level, we are seeing it in [...] the question of open access to cable broadband services, and the stunted availability of license-free spectrum. (2)

This understanding of how the communications system works based on a consideration of three layers was taken up the following year by Lawrence Lessig in *The Future of Ideas* (3) to call for a commons in the area of the physical infrastructure of communications. Thus, the same year the information commons received a fundamental impulse in its "content layer" through the founding of the Creative Commons organization by Lessig (and others), Lessig said:

... Second, we should force the government to give up its obscenely wasteful hoarding of spectrum. When radios were stupid and clear channels were necessary, this hoarding made sense. But the government is not using this spectrum with stupid radios. The most advanced work being done in "software-defined radios"—radios that would, like chameleons, change their character to fit the protocol in the context that works best—is being done by the same group that gave us the Internet—the Defense Advanced Research Projects Agency (DARPA). DARPA is researching software-defined radios that share spectrum smartly. It is, in other words, building the Internet in the air.(4)

This approach has recently been adopted closer to home, taking on a larger role given the debate about the use of the "digital dividend" arising from the imminent "analogue black-out" and the implementation of Digital Terrestrial Television (TDT), whose greater efficacy in its use of

1—Lawrence Lessig, *El Código* 2.0, Madrid, Traficantes de Sueños, 2009, pp. 430-437.

2—Yochai Benkler, "From Consumers to Users: Shifting the Deeper Structures of Regulation", in *Federal Communications Law Journal*, 52, 2000, p. 562. Available at: www.law.indiana.edu/fclj/pubs/v52/no3/benkler1.pdf (last retrieved: 1 July 2009).

3—Lawrence Lessig, *The Future of Ideas. The fate of the commons in a connected world*, New York, Random House, 2001, pp. 23-25 and 240-245.

4—*Ibid.*, p. 242.

the spectrum will free up dissemination frequencies on the UHF and VHF bands that until now were used by conventional analogue television.

Beyond the (limited) repercussions of these discussions in academic circles, we consider of special note two artistic-political projects that, since 2006, have been aiming at encouraging the democratic debate on the electromagnetic spectrum in Spain: "Reclaim the Spectrum" (5) and "The Atlas of Electromagnetic Space"(6), conceived of by Jose Luis de Vicente (the former was a group exhibit at the 2006 Festival Zemos 98, and the latter, an interactive installation in collaboration with Irma Vilà and Bestiario that has been posted on a website which must be visited by those interested in the subject). As Juan Freire explains in "Arte y política alrededor del 'ladrillo digital'"(7), both projects seek to remove the veil of invisibility surrounding the spectrum through a virtuoso graphic presentation of the structure and topology of this "unexplored *terra incognita*"(8), which goes beyond the merely descriptive to fully enter political territory as it makes it possible to "completely, and critically, visualize the political economics of the use of this spectrum"(9).

+G1 +G2

The urgency of the democratic debate that these projects aim to encourage becomes even more evident at this time, as Spain's Ministry of Industry, Tourism and Trade has announced its project for a Royal Decree that will establish how the bandwidth of frequencies from 790 to 862 MHz will be assigned as of 2015 for, among other things, bandwidths for mobile services(10). This confirms the questions brought up by the aforementioned Jose Luis de Vicente in his presentation of "Reclaim the Spectrum":

And yet, we know very little about the spectrum: who owns it, how is it managed, and how its uses are determined. In spite of being a supposedly scarce, precious resource, its regulation is rarely subject to processes of public scrutiny; discussing it is not a political priority. The "masters of the spectrum" (the military, the radio broadcasting industry, and telecommunications operators) have for decades enjoyed the exclusive use of its most useful frequencies, while it is precisely in the insufficient public frequencies open to all where some of the most socially beneficial innovations have taken place, such as wireless Internet access networks. [...] At a time when standard users like third generation mobile telephone companies and wireless users are in conflict, reclaiming the right to decide about the most fertile uses of the spectrum for society has become an urgent priority. Do we really need more TV channels and video messages on our mobile phones? Do we want technologies that allow us to be participatory agents or merely consumers? (11)

That said, this document does not aim to take part in the general debate on the use of the electromagnetic spectrum but rather to focus specifically, along the lines of Lessig's statements quoted above, on matters pertaining to the radio spectrum, that is, the part of the electromagnetic spectrum with frequencies between about 3 Hz and about 300 GHz. This range of radiofrequencies is divided into various sections used for different purposes (from radio broadcasting, television, and telephone communications to radars, WI-FI transmissions, RFID systems for radio frequency identification and so on). Of those, I will address that of *radio broadcasting*.

5—http://www.zemos98.com/reclaimthespectrum (last retrieved: 1 July 2009).

6—http://spectrumatlas.org/spectrum/ (last retrieved: 1 July 2009).

7—Juan Freire, "Arte y política alrededor del 'ladrillo digital'", in soitu.es, 27 March 2008. Available at: http://www.soitu.es/soitu/2008/03/25/pieldigital/1206460679_324219.html (last retrieved: 1 July 2009).

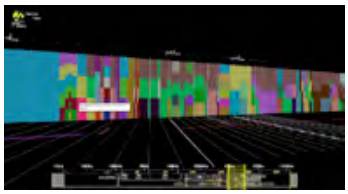
8—Presentation of the NOW Project, whose April 2008 issue contained the presentation of the Atlas del Espectro Electromagnético: http://www.cccb.org/now/es/projecte (last retrieved: 1 July 2009).

9—J. Freire, *op. cit.*

10—Ministerio de Industria, Turismo y Comercio, "El Gobierno regula el uso del 'dividendo digital'" (press release), 2 June 2009. Available at: http://www.mityc.es/es-ES/GabinetePrensa/NotasPrensa/Paginas/dividendodigital020609.aspx (last retrieved: 1 July 2009).

11—http://www.zemos98.org/festivales/zemos988/reclaim/intro.htm (last retrieved: 1 July 2009).

G1—*Atlas Project*, illustration provided by Jose Luis de Vicente (CC BY-NC 3.0 Spain).



G2—*Atlas Project*, illustration provided by Jose Luis de Vicente (CC BY-NC 3.0 Spain)

12—Yochai Benkler and Lawrence Lessig, "Net Gains", in The New Republic, 14 December 1998. Available at: http://www.thadk.net/ideas/lessigcopyright.html (last retrieved: 1 July 2009).

In addition, it is important to point out that the proposals of Lessig's that I will present succinctly below are not a discussion on the uses that this or any other government assigns to available frequencies on the radio spectrum. They question the role that the government takes on to justify its control of that assignment. Therefore, let us accept the invitation to a pause for reflection that Lessig and Benkler called for in 1998 in a joint article ("CBS" can be replaced by the media conglomerate of the reader's choice):

But, before the government proceeds to auction (or to give away) even more spectrum to the few, shouldn't we at least pause to ask where we will be if the promise of spreadspectrum technologies comes true? If spectrum can be shared, does the Constitution really permit the state to silence the many so that CBS can speak? (12)

The "tragedy of the commons" to the rescue

Liquidating the system of allocating spectrum by the State, or the more recent, lucrative system of allocating property rights to spectrum via an auction to the highest bidder? Sharing the spectrum? Bringing an end to the privileges of the few so that everyone can speak? Many people think of these and other pressing questions as soon as they hear proposals such as those mentioned, that shock us because they undermine basic communicative tenets we believed were based on natural considerations. For hadn't we agreed that the radio spectrum was a "scarce and precious" resource prohibited to the majority for our own good—that is, to prevent a communicative polyphony from collapsing it?

On this point, Lessig draws on his knowledge as an expert in Constitutional Law to challenge such assumptions with the unequivocal demand of the rights guaranteed by the First Amendment to the US Constitution with respect to freedom of speech: "[the] Congress shall make no law [...] that limits the freedom of speech or of the press". According to him, if everyone has a right to speak, then the State must categorically justify that its intervention is essential to foster a wise distribution of the available spectrum and, as a consequence, must persecute those citizens who exercise that right disobeying its centralized assignment. Here is where the allusion to the "tragedy of the commons" appears.

To give a very brief explanation, the term "the tragedy of the commons" comes from the article "The Tragedy of the Commons" published in 1968 by biologist Garrett Hardin in the journal Science. Although an in-depth reading of the text reveals more complex nuances (related to the need, for instance, to monitor dumping of polluted waste into public territory to avoid getting locked into a system of "fouling our own nest"), this article has become widely known as a basic reference to justify the unsustainability of self-regulated management of available resources based on the existence of a commons, as well as to legitimize the regime of private property as the most efficient in this sense. As an illustration, Gardin used the example of a field used in a communal manner by livestock farmers to explain how each of them, in the desire to maximize their benefits by taking as much livestock there to graze as they could, ended up leaving the field barren through applying a logic of individual profit that ruins them all in the end:

Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. (13)

It is precisely the assumption of the inevitable tragedy that the commons would lead us to which Lessig uses as the basis of the justification offered by the State in preserving its central role in the allocation of various slices of the radio spectrum, be it directly through licences or indirectly via auctions. Indeed, if the spectrum were a scarce resource that could be impoverished through widespread use, then the State would have the obligation to restrict its use to a few operators and "to silence the many", who would be reduced to the position of merely receiving broadcasts, always from outside sources. In sum, even though the Constitution grants us all the right to free speech, we should accept the restrictions imposed on us by the State with respect to radio broadcasting given that they are due to the very nature of the spectrum. Lessig says, "Radio waves, in this view, are delicate invisible airplanes, which need careful air traffic controllers to make sure disaster doesn't strike."(14)

But what if the above were untrue? Or to be more precise, what if it were only true given one particular radio broadcasting architecture and not true for others? Would it make sense then to continue using nature as the inexorable guarantee of the State's privilege to give or take away citizens' speech? On this point, Lessig is very clear: "...what most of us think we know about radio is wrong. Radio waves are not butterflies. They don't need the protection of the federal bureaucrats to do their work."(15)

To back up that statement, Lessig begins with a use of the spectrum with which most of us are increasingly familiar: that of Wi-Fi networks. This wireless technology system for network connections is characterized by not using any licences or deeds of ownership to organize the use of a small fraction of the spectrum (mainly frequencies of 2'4/5 GHz), opting to share it via a distributed regulation based on IEEE 802.11 standards. Without ignoring the clear limitations of this example, Lessig uses it to knock down the cliché that any use of the radio spectrum not controlled by State intervention will lead inevitably to collapse, underlining the fact that no computer connected to a Wi-Fi network needs those "careful air traffic controllers" to tell it when it can and cannot broadcast.

Following this line of reasoning, Lessig invites us (as he does throughout the remainder of *Code: Version 2.0*) to avoid the dead ends built on so-called "natural" fallacies that only lead to powerless inertia and instead, to begin to reason in terms of design and architecture. In terms of code, in fact: a code that is truly malleable given that it is determined by human decisions. In this sense, and with respect to the threat of a "tragedy of the commons" applied to the ether of the radio spectrum, the founder of Creative Commons unequivocally points to alternative designs to optimize its use:

Congestion is certainly a possible consequence of spectrum usage. But the critical point to recognize [...] is that the possibility congestion depends upon the design. WiFi networks can certainly become congested. But a different architecture for "sharing" spectrum need not. (16)

13—Garrett Hardin, "The Tragedy of the Commons", in Science, vol. 162. no. 3859, 13 December 1968, p. 1244. Available at: http://www.sciencemag.org/cgi/content/full/162/3859/1243 (last retrieved: 1 July 2009).

14—L. Lessig, *El Código 2.0*, p. 433.

15—*Idem.*

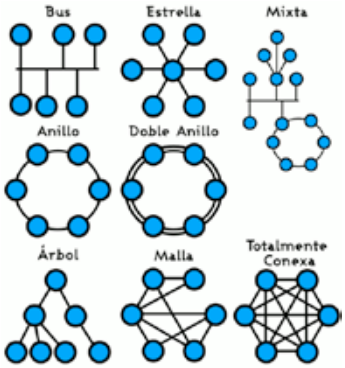
16—*Ibid.*, p. 435.

17—*Idem*.

18—Graphics taken from the article "Las redes de malla; más que una ventaja, una revolución", published on 21 December 2007 on the blog Crónicas para el futuro. Available at: http://cronicas-futuro.blogspot.com/2007/12/como-casi-todos-sabemos-las-redes-son.html (last retrieved: 1 July 2009).

19—See: http://grouper.ieee.org/groups/802/11/Reports/tgs_update.htm (last retrieved: 1 July 2009).

20—Aggelos Bletsas, "Collaborative (Viral) Wireless Networks", September 2004. Available at: http://web.media.mit.edu/~aggelos/viral.html (last retrieved: 1 July 2009).



G3—Comparative graph of network topologies taken from the blog Crónicas para el futuro (CC BY-SA 3.0 Spain) (18)

"The Comedy of the Commons": P2P Radio and Mesh Networks

How then can one conceive of a different architecture for "sharing" spectrum that does not inevitably lead to congestion as it gains an increasing number of users? On this point, Lessig once again fosters a radical shift in our outlook in proposing a new metaphor that is familiar to us all, that of P2P (peer to peer) file-sharing networks, which illustrates quite well how it is possible to make the transition from the former tragic versions to the true promise of "a comedy of the commons":

Just as peer-to-peer technologies such as BitTorrent harness the bandwidth of users to share the cost of distributing content, users within a certain mesh-network architecture for spectrum could actually increase the spectrum capacity of the network. Under this design, then, the more who use the spectrum, the more spectrum there is for others to use— producing not a tragedy of the commons, but a comedy of the commons. (17)

Without daring to go into detail, I will attempt to give a simple explanation of what mesh network architecture consists of and how its application to wireless mesh networks is conceived. Mesh network topology defines a way of assigning a route for data transmission via a structure in which each node of the network is connected to the rest of the nodes, acting as both broadcaster and receiver. In this way, mesh topology guarantees the reliability and robustness of the network because it not only avoids jammed points inherent to mass dissemination schemes based on a central node, but also adds redundancy to the transmission, so that the fall of one does not affect the network as a whole, which is able to find alternative routes by *hopping* from node to node until the data reaches its destination.

+G3

The implementation of this topology to decentralized wireless networks is defined by IEEE Standard 802.11s [still in draft form (19)] and it makes it possible to conceive of the creation of a network of connected radios such that their capacity increases by adding new nodes to the mesh. This is similar to what happens in P2P networks when the increase of sources (users) rebounds in the availability of a bigger bandwidth and consequently in elevating the exchange speed. In this sense, Lessig specifically mentions the MIT research project "Collaborative (Viral) Wireless Networks" that aims to propose viral mesh network schemes whose capacity is directly proportional to the number of connected nodes:

Cooperation could lead to substantial total (network) transmission power savings or increased spectral efficiency [...] under certain conditions and the goal of this research is to provide distributed and adaptive cooperation algorithms that could be applied in practice. (20)

In sum, the reference to how P2P networks function illustrates Lessig's call for a radical democratization and optimization of the radio spectrum via a mesh network architecture where each node is intercommunicated with all the other nodes in the network and combines reception and transmissions operations, acting as a router for sending packages by the most efficient route (that which avoids potential breakdowns in

nodes without blocking the entire network and takes the most direct route to its destination). In such a set-up, just like file-sharing networks, it is understood that there are no grounds for sustaining the tragic reconvening of those (tele) communications outlooks that sanction the privileges of prevailing expression, stubbornly clinging to claims of the threat posed by opening the spectrum to *dumb receivers*.

This then would be the technological materialization (albeit wireless) of the transition "from consumers to users" that Benkler called for in 2000. In this transition, restrictions expressly arising from licences and property rights to the spectrum would be fully delegitimized given that, as stated by Lessig, except for certain technical specifications that could be set by the State (certifying devices, establishing power limits on transmitters, and so on), "Once the protocol is agreed on, no further regulation is required." (21)

In sum, I consider that the technological exploration discussed by Lessig in *Code: Version 2.0* with a view to fostering the sharing of the radio spectrum through mesh networks is fully included in the inspiring claim by Benkler (that he reclaimed subsequently) to a communicative commons that encompasses the liberation of each of the "levels of the information environment", in the concrete case of what is called the "physical layer". These and other proposals have been collected recently in movements such as the Catalan Guifi.net (whose worldwide pioneering work I suggest be evaluated with maximum attention) (22) and the U.S. Open Spectrum (23), who work for dissemination and claims that are becoming increasingly significant due to the inevitable urgency of the aforementioned question posed by Lessig and Benkler over ten years ago. I will close this text with that question as testimony that the interference that was present at its origin has at least given me the certainty that we are presented here with a decisive debate for the future of the commons: "If the spectrum can be shared, does the Constitution really permit the state to silence the many so that CBS can speak?"

21—L. Lessig, *El Código 2.0*, p. 436.

22—See http://www.guifi.net

23—For more information on Open Spectrum, I recommend the list of Frequently Asked Questions available at: http://www.greaterdemocracy.org/OpenSpectrumFAQ. For much more detailed and precise explanations of the technologies used in the demand for an "open spectrum" (including not only mesh networks, but also solutions based on "software-defined radio" and "broadened spectrum"), see Robert J. Berger, "Open Spectrum: A Path to Ubiquitous Connectivity", in *Queue*, vol. 1, number 3, May 2003. Available at: http://queue.acm.org/detail.cfm?id=864028 (last retrieved: 1 July 2009).

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Karla Schuch Brunet

Network and P2P as Source of Cultural Manifestations in Brazil. The Example of Submidialogia Network

IHAC/Federal University of Bahia

Introduction

The proposal of this communication is a research on P2P network having the example *Submidialogia*, a network that I am part of it since 2005. In a country with geographic extensions as Brazil, the use of P2P network has an important role in the way we produce culture. This paper presents how network, collective creation and emergence are embedded in some practices of digital Brazilian culture as the case of Submidialogia, a group formed to debate and produce changes on digital culture.

As a non-hierarchic self-organized network of less than 200 people spread over the five regions of Brazil, Submidialogia uses a discussion list as the starting point of its manifestations. The network is a way to connect a variety of small projects and events that take place in different parts of the country. It is a voluntary social organization to debate the politics of digital culture and to manifest on diverse subjects ranging from technology and ecology to gender issues.

Free cooperation and the democratization of content are basis of the practices of Submidialogia. And these practices can come out of the discussion list or from the meetings that we organize very year. They emerge in a variety of forms, such as the creation of books (GPL licensed), CDs, public intervention, community radio, activism, computer literacy, mappings, software and hardware experimentation, discussion panels, workshops, performances, image exhibition and video festival.

Since 2005, Submidialogia is being active and could create a fluent and large network of people and manifestations that have repercussions in different sectors of society. It presents the potential offered by network structures, many to many communication and P2P collaborations to provoke changes on digital culture in Brazil.

Network Theory

Networks are systems of interconnected elements and they are studied by all scientific perspectives, from biology and mathematics to sociology. Scientists have turned theirs eyes to complex networks that surround our lives in almost any dimension. Some familiar networks are road networks, friendship networks, business networks, epidemics network, and they can be analyzed by applying network theory to it. In the past decade, theorists (Garton, Haythornthwaite *et al.*, 1997; Degenne and Forsé, 1999; Bernard, 2000; Saper, 2001; Buchanan, 2002; Barabási, 2003; Chen, 2003; Dorogovëtìsev and Mendes, 2003; Monge and Contractor, 2003; Strogatz, 2003; Basagni, Conti *et al.*, 2004; Pastor-Satorras and Vespignani, 2004) are trying to explain how these networks function, change, grow, and shape. Following there is a brief synthesis of it.

Network properties

There are many characteristics of networks that are relevant to this paper. In understanding network theory is easy to get an overall grasp of how Internet, activism and collective creations work. The characteristics here displayed are: six degrees of separation, small world, free-scale, rich-gets-richer, fittest-get-richer and complexity.

1–He chose those places because for people in Massachusetts, those were really far away cities.

2–Albert-László Barabási (2003: 29) said that citing Thomas Blass.

3–From projects website description http://forwardtrack.eyebeamresearch.org/#download. Last accessed on January 2006.

Six Degree of Separation

Many authors (Degenne and Forsé, 1999; Watts, 1999; Bernard, 2000; Saper, 2001; Buchanan, 2002; Barabási, 2003; Chen, 2003; Monge and Contractor, 2003; Strogatz, 2003; Basagni, Conti *et al.*, 2004) use the famous study by Stanley Milgram to explain small-world theory. In 1967 Stanley, a social psychologist, wanted to find out how interconnected people were in the USA. He sent letters to people in the Midwest (Wichita, Kansas and Omaha, Nebraska) (1) and asked them try to send back to a determined person in Boston. People could only send the letters to persons they knew at personal basis. And if they did not know the person, they should forward to someone they thought could be shortest way to the addressee, that is, a person they considered could know someone in Boston. Each receiver was supposed to write a log on the letters, and detach a postcard from the letter folder to send back to Harvard University. Therefore Milgram could keep a track on them. The result was an average of 5.5 degrees from the first person to the final receiver. Rounding up to 6, one can get the "six degrees of separation" theory. It is said that Milgram didn't use this expression (2) but his study led to the assumption.

Nowadays "six degrees of separation" got really popular, from a Broadway play to Hollywood movies talking about it. People say that there is a degree of six people between you and anybody else in the planet. It is only an assumption because Milgram study was done only with people in the USA.

A network project that clearly illustrates the degrees of separation theory is ForwardTrack (http://forwardtrack.eyebeamresearch.org). It helps online activists and protester website to track and map "the diffusion of email forwards, political calls-to-action, and online petitions." (3) It is incredibly easy to see all the level of separation. It does that using the USA map, Internet users are asked to fill out name, zip code, state and e-mail. One can read the message of the email to be sent as a protest and also add a personal comment to it. So an animated map shows an initial image of the first person started the petition, as a red dot. Then the animated map moves to the fist level, a lot more dots appear on the map, at the second level, more dots, then third, fourth, fifth and so on. It is a way to see how the campaign is getting more and more affiliates. There are blue dots that show your contribution to the campaign; more people you invite to protest, more blue dots will appear. The dots are placed on the map based on the zip code the person filled in. The project is a great visual example to show how one person can make a difference in an activist campaign. And it does that using the six degrees separation theory as a stimulator.

Small worlds

The assumptions of people in the world being separated by only six connections lead to a conclusion that the world was not that big, actually investigations leaded to a supposition of a small world. In the late 1990s, Duncan J. Watts and Steven H. Strogatz mathematically explained the small world problem by drawing a graph (Watts, 1999; Buchanan, 2002; Barabási, 2003; Monge and Contractor, 2003). They started by trying to solve a problem of how crickets could sync, from there moved to social network. And based on the degree of separation, they came out with a clustered graph for network. Their idea was to use order and randomness to construct the graph. Thinking in social network, one person knows

4–Dorogovëtìsev and Mendes, based on the work of Watts and Strogatz, explained: "the clustering coefficient C of a vertex is the ratio between the total number of all possible edges between all these nearest neighbours, $C=2y/z(z-1)$"

5–Map was extracted from the airline website. Last Accessed January 2006. http://www.revistaicaro.com.br/258/mapa/brasil_final_conv.htm

6–Barabási (2003: 70) uses the maps or USA to illustrate that.

somebody else, that one knows another one and continues forming a circle [figure 1]. But, despite of it, there are people that also know other people in the group; those create cross-links [figure 2]. And depending on the number of this cross-links, a network is more or less clustered (Watts, 1999; Buchanan, 2002; Barabási, 2003).

+F1 +F2

The graph explained the small world problem. It is only necessary few extra cross-links to make a small world. Relating to social network, in order to contact somebody in Thailand, it is only necessary to have a friend that knows somebody there to shorten the path. It is not necessary to go all around the circle to reach the other side, there are shortcuts, and those are the cross-links. Cluster coefficient can be calculated to give the density of connections. There are formulas to calculate the maximum linkage and based on that, the density of the network (Dorogovëtìsev and Mendes, 2003). (4)

Hubs, power law and free-scale

Hubs are extraordinary nodes in the network because they are usually very high connected, with links to many parts of the network. Therefore, they are central parts of a network. Following Barabási (6) example, a good illustration is a map an airline routes. One can see that some airports get more flights that other, and to reach a determined location one might have to go through those. [See figure 3]

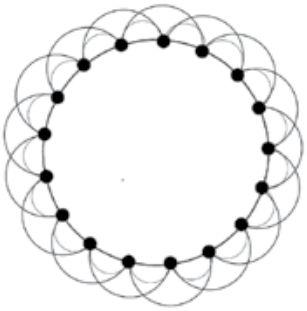
+F3

Hubs are also called connectors, because they are the ones that keep the network connected. Barabási (2003: 64) describe hubs saying:

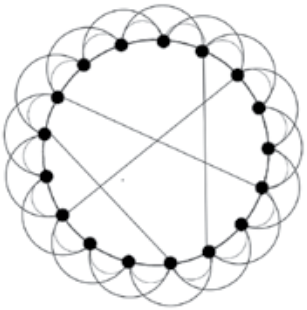
The attention to hubs is well deserved. Hubs are special. They dominate the structure of all networks in which they are present, making them look like small worlds. Indeed, with links to an unusually large number of nodes, hubs create short paths between any two nodes in the system. Consequently, while the average separation between two randomly selected people on Earth is six, the distance between anybody and a connector is often only one or two. Similarly, while two pages on the Web are nineteen clicks away, Yahoo.com, a giant hub, is reachable from most Webpages in two to three clicks. From the perspective of the hubs the world is indeed very tiny.

Understanding hubs can be useful to other areas of knowledge, as how the network of the Internet is formed and, for example, the spread of diseases like AIDS. According to network theory, to slow down the spread of diseases as such, it is more important to work with the central hubs than with the whole population. These groups, the connectors, are responsible for keeping the network active and growing. So the best strategy is to focus the campaign in educating people that belong to the connector group and not the general public. When these connectors get stopped, the network is broken and the spread of the disease slow down significantly (Buchanan, 2002: 183).

The majority of the networks that surround us are not evenly distributed, if that was the case, in a network all the nodes should have more or less the same number of links. But as we easily see in the WWW for example, some webpages get millions of links and others only a few dozens. This shows that hubs are common in these kinds of networks and that links are not

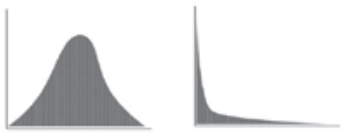


F1—*Circle without cross-links*



F2—*Circle with cross-links*

F3—Example of hubs using the map of an airline company in Brazil. (5)



F4—*Example of bell curve graph (left) and Power-law curve graph (right).*

placed randomly. In 1999, Barabási (2003: 70), after analyzing the amount of incoming links to a webpage, realized that some networks are distributed using a power-law degree, they called these scale-free networks.

+F4

In mathematics, power-law is a way to show that the values are not distributed uniformly, as well there is a continuous decreasing curve. The counterpart is a bell curve, when the majority of the values have similar numbers and huge difference from those to the maximum and minimum. The Web is distributed by power-law, the great majority have few links while a small number of websites have millions of link. [See figure 4 for Bell curve and Power-law graphics].

Rich-get-richer and fittest-get-richer

How networks ruled by hubs and power-law are formed is the next question. One point could be seniority, nodes there are earlier in the network are more probable to have more links. When new nodes are added they have to compete with the ones that are already there and have gotten many links. Consequently, by being a young node, it gets less links than a older other. Well that can explain a bit, but not enough. Hubs are also created by preferential attachment or also called preferential linking. A new node is created and linked to nodes with high number of connections, so this new one gets greater chances to attract more connection. It is the rule, the rich-get-richer (Barabási, 2003: 87; Dorogovëtìsev and Mendes, 2003: 121; Chen, 2004: 41).

Despite of preferential attachment, another way to a network grow and hubs might emerge is fittest-get-richer. Caldarelli, Capocci, Los Rios and Muñoz (2002) studied networks growth by nodes that are added not having in consideration popularity as in preferential attachment. The nodes are added based on the fitness of the node, and the fittest ones are the ones that attract a greater number of nodes. (Caldarelli, Capocci *et al.,* 2002; Chen, 2004: 42; Pastor-Satorras and Vespignani, 2004: 112).

Therefore, studying the way networks grow is essential to understand how websites get more and more links. Rather than wait and see, network projects can (as many do) search for ways to become hubs and attract more connection, and consequently, more collaboration.

Network and Complexity

In a book called The moment of complexity: emerging network culture, Mark C. Taylor describes his theory of complexity and the network culture. According to him, the society we live today is the "network culture". The grid format we were used before is now replaced by a network format. Taylor (2001) uses examples from architecture to explain his theory. The grid would be the example of a work by Mies van der Rohe, the Illinois Institute of Technology. It is ordered, simple, squared (grid like design), pure architectures, industrial vision, and an easy image... While the network example is Frank Gehry's Guggenheim Museum Bilbao. It is confusing, complex, with lots of curves, mixed media, communication technology, and a difficult image... He considers that nowadays we live in a network culture, the grid from the modernist time did not disappear but transformed in a new dynamic, organic and complex form, the network.

7–Conference website www.re-activism.net. October 2006.

In order to explain the moment from now, this complex, organic, network culture, Mark Taylor (2001: 202) says that

As the networks passing through us become more complex and the relations at every level of experience become more extensive and intensive, the speed of change accelerates until equilibrium disappears and turbulence becomes a more or less permanent condition. While occasioning confusion, uncertainty, and sometimes despair, this inescapable turbulence harbors creative possibilities for people and institutions able to adapt quickly, creatively, and effectively. Those who are too rigid to fit into rapidly changing world become obsolete or are driven beyond the edge of chaos to destruction.

In this current network culture there is an increasing mixture of ideas, images, sounds, words. It is a huge hypermedia that leads to a new cultural and learning approach. This complexity is the terrain where the network projects here studied are developed. It is important to have in mind the network culture organic and fluid status in order to analyze and describe any project.

Networks and P2P

Another more defined description of P2P is by Michel Bauwens. In a paper entitled Peer to Peer and Human Evolution. On "the P2P relational dynamic" as the premise of the next civilizational stage, presented at Re-activism (7) conference in Budapest, he wrote:

P2P is a network, not a hierarchy (though it may have elements of it); it is 'distributed', though it may have elements of centralization and 'decentralization'; intelligence is not located at any center, but everywhere within the system. Assumed equipotency means that P2P systems start from the premise that 'it doesn't know where the needed resource will be located', it assumes that 'everybody' can cooperate, and does not use formal rules in advance to determine its participating members. Validation of knowledge, acceptance of processes, are determined by the collective. Cooperation must be free, not forced, and not based on neutrality (i.e. the buying of cooperation in a monetary system, taking the form of a neutral exchange). It exists to produce something. It enables the widest possible participation.
[Bauwens, 2005]

Michel (2005) uses P2P to explain a new model for civilization, according to him, first there was the "pre-modern" type of cooperation where the cooperation was forced and the quality was low. Example would be during the feudalism system, when slaves were obliged to "cooperate." Then the "modern" type, where the cooperation is neutral and the quality is average. Example can be in the capitalist society that one "cooperates" for money in exchange. And last is the "P2P" type, the synergetic, where people cooperate voluntarily and the quality is high. He considers the *University of Openness* a good example. It is an open university were anyone can cooperate to a collective learn.

Many theoreticians (Giesler and Pohlmann, 2002; Spinello, 2003; Lessig, 2004; Roettgers, 2004; Vaidhyanathan, 2004; Bauwens, 2005) present P2P as a model of using the Internet as a tool for sharing, and free sharing is an essential aspect of culture. Accordingly, a network

F5—*Submidialogia#2 discussion on Free Software with the participation of Claudio Prado*. Olinda, 2006.

of computer users, it is a network of people, and these people opened them to an enormous variety and amount of content. As a result, culture items could be free. These practices are "free, open, decentralized, uncommercializable, ungovernable, and uncensorable," says Siva (2003: 181). They are what "Internet was supposed to be."

Submidialogia Network

Submidialogia network was created with the intention to foment and debate digital culture in Brazil. Active since 2005, the network is formed by different people, from different parts of the country, who are searching for a space to interact with the politics of digital culture.

The network does not interact only within itself, nevertheless, it interrelate with others networks in Brazil and abroad. Examples of other networks that we are related to are: Metareciclagem, Bricolabs, Descentro, and Nettime among others.

It is important to highlight that Submidialogia network is a network of people and projects, and a good number of these people are hubs in terms of digital culture and free software in Brazil. In this case, the hubs are responsible for the visibility of the network and the spread of ideas and practices. It only takes one of these people to make popular one of our actions, as, for example, the annual meetings.

Another implication of Submidialogia is to have a balance between theory and practice. We use the email list to discuss and foment the reflection upon contemporary theories, but we have the encounters to put in practices what we have been talking for weeks or even months. And our practice is strictly related to free software. Therefore, the use of free software and its popularization is one of the aims of this network.

+F5

Since we are very engaged on the politics of digital culture in Brazil, we praise for the use of a type of software and license that is coherent with our speech. And we try to negotiate with the government, specially the Ministry of Culture, to assure the politics of this use. Many of the participants of the Submidialogia network are or were part of some projects to foment digital culture in Brazil as "Pontos de Cultura" (Culture Spots) or "Casa Brasil" (Brazil's House). See figure 5, a photo of a discussion at Submidialogia#2 involving Claudio Prado, from the Ministry of Culture/Pontos de Cultura, held in 2006.

Submidialogia discussion list

The Submidialogia discussion list, hosted at riseup.net (https://lists.riseup.net/www/info/submidialogia), has 180 subscribers and a fluency of about 400 emails per month. The list is an open and non-moderated space to instigate the debate, generate manifestations, propose collaborations, create practices and build projects. It is often seen at the list a search for collaborations on projects or the intention to replicate in a determined place a project that was done in a different part of the country.

Some of the discussions brought to the list are very informative, like news or announcements related to the subject, and others instigate activism and political debate. An example of email activism was the flood of emails sent to the Catholic Church because of the excomulgation of a victim of rape. In less than a week, a great amount of emails reached the mailbox of the Obispo with petitions of people asking to be excomulgated too. As well, during election periods, the list is a repository place to brainstorm forms of activism and denouncement. It is a fact that many cyber-activist practices in Brazil came out of a discussion that took place, among others, on the Submidalogia list.

Submidialogia Meetings

Submidialogia (http://submidialogia.descentro.org/) generates small events throughout the year in many places of Brazil, these events can be workshops, discussion panels, lectures, festival, exhibition, get together or get to know meetings. In addition to the small events, there are larger meetings once a year, nicknamed as [dis]conferences, to produce art, to debate the politics of digital culture in the country and to manifest on different subjects ranging from technology and ecology to gender issues.

These yearly meetings have the participation of not only Brazilians but also of foreigners interested in the digital culture and its politics in the country. We had the participations of people from Argentina, Germany, England, Ireland, Austria, Belgium, Spain, United States and Mexico among others.

There is no pre-determined subject for these encounters and projects to happen, they emerge from the expectations of the group, sometimes comes from a thread on an email. Usually, we choose to do the meetings far from the huge media centers, like São Paulo or Rio de Janeiro. On the contrary, they take place on small towns or on a capital in the Amazon region.

Depending on the location and the people who will attend, we create and transform the programme of the meeting. Usually we use a non-moderated wiki, so anyone involved can be a part of this decision-making. It is a completely open platform where people can propose debates or action, decide the date and time, and post it, there is no censorship or moderation. Any sort of proposition that is made, it is accepted by the group. And because of that, the programme is always changing. Sometimes, for example, during the second day of the event someone decides to propose a talk, so he or she looks for an open space on the schedule and adds his/her proposition. At the same time, it is hard plan ahead; the meeting is organic and grows as it goes by.

Immersion and the SubCasa

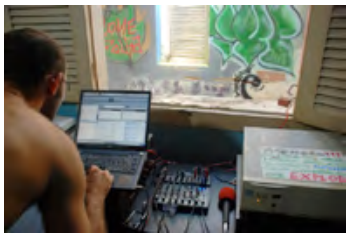
SubCasa (SubHouse) is the name we give to the house we rent to stay together during the days of the event. The house is the accommodation for a great number of people, about 40, ranging from different age groups, religion, regions of the country, accents, language usages, costumes, alimentation habits, etc. And in this place, we all have to live together in a certain harmony during the week of the meeting; it is an immersion on Submidialogia. The sharing and self-organization of the house is part of

8–FDL url:
http://www.gnu.org/copyleft/fdl.html

9–Url of the book:
http://livros.karlabrunet.com/sub3.htm

10–URL:
http://www.forumsocialmundial.org.br

F6—*Cooking and discussion at Submidialogia#4 in Belém*, PA, 2009.



F7—*Radio at Submidialogia#4.* Belém, 2009.

the practice, in place and period we are trained to be able to tolerate and respect differences.

+F6

Usually, we use the space of the house to create an atmosphere for production, creativity and interaction. While cooking, we held discussions on what we eat and about the economic and cultural process involved on that. [See figure 6 for a photo of the Subcasa cooking]

SubProdutos

SubProdutos (SubProducts) are the bits and pieces that result from the submidialogia's meeting, those can be CDs, books, websites, artworks, video, performances, community radio, mapping projects, interviews... These *SubProdutos* are the results of the practices we develop during the meeting, as many of these practices emerge from the encounter, frequently they are not planed, they popup or work as a documentation of the experience.

In 2008, we organized a book with articles based on Submidialogia#3 meeting. The subject ranged from the politics of digital culture in Brazil to art and performances. Moreover, a university press under the FDL (Free Documentation License) (8) published the book. The same day it was released the printed version; the book was uploaded freely on the Internet (9). It is mandatory for us that this kind of documentation of the events has to be copyleft, otherwise our speech would be empty.

Another example of a *SubProduto* is a project we produced in the meeting in Lençois, BA, the *Lençois Mapping Project* (www.lencois.art.br). During 4 days, local habitants, especially kids, created an artistic map of urban experimentation of the small town. Having asked to wander around town with a mobile phone and record (through image and sound) what they wanted, they highlighted different parts of the town drawing a line of their path. The result, and documentation of the practice, is a colored animated drawn map with photos, audios and videos that perform theses kid's experimentations of their own place.

+F7

This year, at Submidialogia#4 held in Belém, a week before the World Social Forum (10), a community radio was created to broadcast the discussion taking place in the SubCasa as well the radio programs about gender issue, ecology and social movements produced specially to this occasion. [See figure 7]

Final Considerations

Concluding, the Submidialogia network can be used as an example of cultural manifestations in Brazil. It is a practice of many theories on networks and on P2P model of decentralized and democratic sharing. To this network can be applied the small world theory by Duncan J. Watts (1999) and Steven H. Strogatz (2003), it is clustered as the majority of its participants have cross links to others, they collaborate together inside Submidialogia but also are connected through other projects.

The hubs at Submidialogia, as Barabási (2003) proposes, are an important key to keep the network connected. Here, the hubs are very connected

persons who have initiative to start organizing the yearly meeting or to create the *SubProdutos*. Consequently, the activity of the network depends on them. And in a group of 180 participants, we can say that about 25 are hubs, what makes the configuration of the network not to be centralized.

Many authors cited earlier in this paper state that P2P is not only a structure but also a model for sharing, for cooperation, for collective creation. Michel Bauwens (2005) uses P2P to explain the moment of society where people cooperate voluntarily. Accordingly, Submidialogia is a P2P network to cooperation where anyone who is interested can participate, contribute and help to (re)invent digital culture in Brazil. (11)

11–Some audiovisual material: Photos Submidialogia2 http://karlabrunet.com/eventos/ev074.htm; Photos Submidialogia3 http://www.flickr.com/photos/karlabrunet/sets/72157603649006892/; Photos Submidialogia4 http://www.flickr.com/photos/karlabrunet/sets/72157616623988730/; Submidialogia Video http://www.youtube.com/watch?v=Yt4JWds48Ac

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Kirsty Boyle and Catarina Mota

OpenMaterials: P2P Theory in Practice

Kirsty Boyle: http://www.onnai.com
Catarina Mota: http://www.catarinamota.com/bio.html

http://openmaterials.org

OpenMaterials is a research group dedicated to open investigation and experimentation with DIY production methods and uses of materials.

This project was initiated by Catarina Mota and Kirsty Boyle in 2009. It was during Interactivos?'09: Garage Science, hosted by Medialab Prado, that Catarina and Kirsty met, along with the core of the openMaterials collaborators. It was also at this time that the idea for creating an open research platform investigating materials was conceived.

Interactivos?'09: Garage Science was an intensive project development workshop (January 28 through February 14, 2009) and a seminar that explored practices where art, science and technology meet. Participants were invited to turn the Medialab Prado into a garage laboratory where low-cost, accessible materials were used to develop objects and installations that combine software, hardware and biology.

During the workshop we built a fully functional RepRap machine. This machine is now permanently available at the Medialab Prado for use by the community at large to turn their ideas into physical things. RepRap is an open source project for building a self-replicating 3D printer which is capable of producing real objects. A RepRap machine enables creative and inventive possibilities to explore art, science and technology, giving 'citizen scientists' the power to manufacture and share designs and experiments in an open and distributed way. In this context, DIY refers to being self-reliant by completing tasks autonomously, and promotes the ability of the ordinary person to learn to do more than he or she thought was possible. The evolution of desktop 3D printing brings advanced fabrication and prototyping technology to people everywhere who wish to learn how to make things previously considered improbable.

Alongside the RepRap project, other projects developed during Interactivos?'09: Garage Science included the Fruit Computer Laboratory (Laboratorio de ordenadores-fruta) by Alejandro Tamayo and Garage Astrobiology-Microbes and EMF (Astrobiología de garaje-Microbios y campos electromagnéticos) by Andy Gracie, who are also now active openMaterials collaboraters.

The format of the Interactivos?'09: Garage Science series provided us with the opportunity to not only connect as individuals and as creatives, but has now formed long term collaborative partnerships and future opportunities for many of the participants. It soon became clear during our discussions that we were not only interested in novel fabrication and DIY processes, but also very committed to exploring and experimenting with a broad range of materials.

As we were interested in DIY fabrication and experimenting with different materials in our art work, we were soon faced with a series of questions: What websites list materials? Where are the materials? How do we make these materials DIY? Realizing that there were no simple answers to these questions and that accessible information was scarce when compared to other areas, such as hardware, we also did not want to keep our research private, and felt that by sharing our experiences we could all work together, albeit remotely, on learning about materials.

In the spirit of the open source software and hardware movements, we began discussing how we could promote materials to be researched and developed in a public, collaborative manner. We see materials as an open

resource, and wish to establish an open process for exploring and sharing knowledge, techniques and applications related to materials science.

Inspired by Eric Raymond's comment in 'The Cathedral and the Bazaar', regarding the bazaar style which he described as "a great babbling bazaar of differing agendas and approaches", we hope to encourage discourse and experimentation with the broadest range of materials and processes possible. We aim to promote the concept of 'open materials', but believe we are also establishing a model for P2P 'open research', which presents a range of opportunities and possibilities.

OpenMaterials is thus intended as a platform to share ideas, knowledge, resources and discoveries, document experiments and processes, as well as provide a means of connecting people. We aim to do that by:

- gathering relevant resources (such as news, scientific articles, papers, artworks, videos, etc) and share them via blog posts and links.
- publishing in-depth articles and interviews with other researchers and artists.
- creating a grand repository of relevant materials, tools and techniques, accessible and editable by all those interested in this research area. This wiki will contain all the data we collect during our research, and our attempt at creating a comprehensive and useful resource for all those who wish to work with or just learn more about smart materials. We will strive to provide accurate descriptions of the different types of materials, as well as detailed information on physical properties, uses, techniques and hacks, where to get them, who's using them and who's improving them. In this context, one very important issue that needs to be addressed is the matter of classification. We are currently discussing ways in which to categorize materials in an intuitive way that can become clear and easy to navigate for all.
- experimenting, documenting our experiments, and sharing them via tutorials, detailed explanations, and video demonstrations. From ceramic, paper, textiles, polymers, metal, semiconductors, biomaterials, smart materials, and tools we are open to exploring all methods and applications related to materials.
- maintaining an open call for collaborators and welcoming any and all we want to contribute to this pool of knowledge.
- forming a network of individuals and a groups around the world, while encouraging and participating in open and public discussions of all the issues at play in open source systems and in open materials in general. The openMaterials website was launched in April 2009, and already there is a huge amount of interest and support. We recently formed an alliance with the Open Manufacturing movement, an email list which was initiated by Nathan Cravens. The list was formed after discussions with Michel Bauwens on the P2P research list about starting a group for Open Manufacturing.

Above all OpenMaterials aims to inspire others to experiment and share knowledge, ideas, experiences, connections.. which we believe is the key to the future of successful open source everything, and subsequent abundance.

Currently the openMaterials collaborators are Catarina Mota (Portugal), Kirsty Boyle (Australia), Erika Lincoln (Canada), Anab Jain (India/ UK), Alejandro Tamayo (Colombia), Dr. Marc Dusseiller (Switzerland), Jefferey Walker (United States), Andy Gracie (UK/Spain) and Hiroya Tanaka (Japan). The majority of group were involved in the Interactivos?'09: Garage Science and met at Medialab Prado in Madrid, and enjoy working in a distributed but connected way sharing research relating to materials.

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Antoine Fressancourt

Mobile Peer-to-peer systems: Overview, issues and potential usages

Engineer in Ator Worldline

Introduction

Mobile devices are now everywhere. These personal devices are used for interpersonal communications (phone call, video call, SMS) but they are also increasingly used to access the internet or to retrieve information from connected applications while on the go. In several poor countries, mobile Internet access even surpasses fixed internet access. Meanwhile, the mobile internet world is a much more controlled and constrained environment. Limitations come from the capacity of the terminal, from the connectivity technologies available on the device or from restriction policies applied by mobile network operators. Nevertheless, efforts are made to use mobile IP network connectivity at its full capabilities, and to allow mobile terminals to share contents they are now able to produce: contextual information, multimedia documents... In order to circumvent the constraints imposed by mobile network operators, one can imagine developing an alternative to centralized network models in order to give the user the possibility to access a new range of services. The best way to do it is to set up a peer-to-peer platform.

In this article, we will try to figure out how the principles of peer-to-peer networks apply to mobile networks, and how they can be used to serve mobile communication or contextual applications. First, we will present peer-to-peer networks from a general point of view. Then, we will see how the concepts of peer-to-peer networks can be used in two kinds of mobile networks: mobile ad-hoc networks and mobile operated cellular networks. After that, we will focus on some of the problematic related to the use of peer-to-peer network technologies in mobile cellular networks. Finally, we will give some examples showing how peer-to-peer technologies can be used in mobile applications.

General presentation of peer to peer networks

For many people, peer-to-peer is a synonym for illegal file sharing. In the context of the workshop, peer-to-peer can be more accurately described as a collaborative form of content production, be it an article on the wiki, a set of open source specifications for electronic components or a multimedia content. But peer-to-peer can be given a rather technological definition.

From a computer science perspective, as stated in Wikipedia, “A peer-to-peer computer network is a network that relies on computing power at the edges (ends) of a connection rather than in the network itself. Peer-to-peer networks are used for sharing content like audio, video, data or anything in digital format. Peer-to-peer network can also mean grid computing.”

According to this definition, all the nodes are equal in a peer-to-peer network, in opposition to the client-server model. All the resources are spread in the network and shared among the nodes participating in the network: computing power, bandwidth or storage capacity. This provides robustness to the system because the failure of one node in the network does not harm the collaboration of the others, whereas a server crash is dramatic in a client-server model.

1—Napster: http://www.napster.com/

2—JXTA: https://jxta.dev.java.net/

3—Skype: http://www.skype.com/

Moreover, providing a service in a peer-to-peer network is less costly than in a client server model. Indeed, when you want to propose a service to a broad number of users in a client-server fashion, you have to design your server in order to handle the requests for service from your targeted audience. You may require a high bandwidth, a lot of processing power and a significant storage capacity to allow every possible user to access it, while in a peer-to-peer network the cost is shared by all the nodes in the network.

Nevertheless peer-to-peer networks also have some drawbacks. It can be tedious to locate resources in a peer-to-peer network, whereas the resource locating mechanism is fairly simple in a client-server model as all the information is centralized. This is the reason why some peer-to-peer applications use servers to discover resources in the network (typically, Napster (1)). This is one of the characteristics that can be used to categorize peer-to-peer networks.

Categorization of peer-to-peer networks

Peer-to-peer networks have been built using different kinds of architectures and internal logics. Those systems were designed in order to adapt to the specificities of the networks on top of which they operate and to the characteristics of the applications using them. For instance, some applications like real time communications require being able to identify a single node quickly in a large network, while others such as file sharing focus on locating the same resource in different end nodes in order to retrieve the resource more reliably. Thus peer-to-peer applications and overlays adopted a wide range of approaches to solve the specific issues they want to tackle, and they can be categorized according to these approaches.

Several criteria can be used to characterize peer-to-peer networks. First, we can discriminate peer-to-peer systems according to the organization of the nodes. Sure, every node should be able to connect to any other node in a pure, peer-to-peer approach. Meanwhile, in order to allow the operation of the network when it is quite large, several networks adopt organization principles. In those networks, nodes are organized together in order to limit the number of connections they have to maintain and to keep message routing feasible in the network. These organization principles often aim at optimizing the network for application-specific purposes.

Besides, network can be discriminated according to the role nodes can play in the network. Ideally, every node is strictly equivalent to the others, but in some networks, disparities appear because some nodes have more resources available, or on the contrary are not capable enough to operate on the network. In order to address this kind of issues, some peer-to-peer networks such as JXTA (2) or Skype(3) have introduced the concept of supernodes. These nodes are specific nodes that hold more resources than most of the other peers. Least capable nodes can delegate some specific operations to these peers. They can also play a more important role in routing operations as they are often more stable in the peer-to-peer network, i.e. present for a longer period of time.

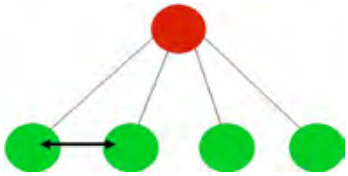
At last, the resource discovery mechanism adopted in the peer-to-peer network is an important criterion, because the way nodes locate and access resources shared within the network is what ties these networks

4—*Pair-à-Pair: Architectures et Services*, Fabrice le Fessant (in french) http://www.forumatena.org/presentations/FabriceLeFessant.pdf

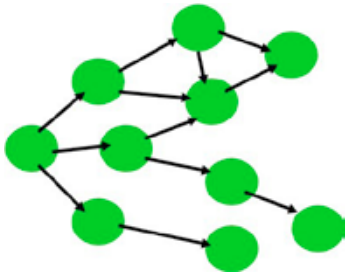
5—Emule: http://www.emule-project.net/

6—Edonkey: http://en.wikipedia.org/wiki/EDonkey_network

7—Gnutella: http://www.the-gdf.org/



F1—Directory networks



F2—Flooding networks

together. This is the main problem to address when moving an application from a client-server model to a peer-to-peer model, and efficient delivery methods are a key to the operation of these decentralized systems.

These three criteria help defining five classes of peer-to-peer networks (4): Directory networks, Flooding networks, Distributed Hash Table networks, Epidemic networks and Social networks.

+F1

Directory networks are peer-to-peer networks where connected peers register the resources they share on a directory. This directory can be centralized, or distributed among a set of directory servers or supernodes. In those network, resource discovery is performed by interrogating the directory, which can also be used to perform bootstrapping operations for peers willing to connect to the network. This kind of peer-to-peer network is the closest from the classical client-server model, and was mainly used in Napster, Emule (5) or Edonkey (6), which are quite old peer-to-peer applications. The centralization of the directory is a weakness in the system, which armed the operation of Napster when it was asked to stop its operation. Meanwhile, these systems allowed peer-to-peer networks to gain popularity and soon their weaknesses were addressed by flooding networks.

+F2

Flooding networks appeared to bypass the relative centralization of directory networks. In these networks, resource discovery is performed by sending messages to every neighboring peer. When a node receives such a discovery message, it looks up in its own resources if it has a match, and if not, it relays this message to its own neighbors. When a node has a resource matching the request, it sends back an answer to the peer that relayed the message, and the answer makes its way to the originator of the request. From this description, it can be intuitively understood that this process generates a lot of messages on the network. Besides, a given node can receive the same request from multiple neighbors. This drawback is the main issue of flooding networks. Indeed, these networks are not efficient because there is a big signaling overhead, i.e. the number of messages sent on the network for discovery and network management is too high compared to the useful traffic. Despite this drawback, flooding networks have been used in the first versions of the Gnutella (7) network, and proved being successful in the absence of more efficient alternatives.

Distributed hash table networks are now among the most efficient peer-to-peer networks. In these networks, peers are logically organized. This organization follows a resource distribution algorithm based on global resource identifiers. These identifiers are computed using hashing functions. The nodes in the network organize themselves on a logical ring, where their location is given by their hash identifier. When a resource is shared on the network, its localization is under the responsibility of the node whose hash is the closest to the resource's hash identifier. When a node wants to locate this resource, it sends a message on the network to the responsible node using a logical routing algorithm. The algorithms behind these networks are less simple than in the two other kinds of network, but the use of a logical organization in the network makes discovery operations faster, and the network can operate in a much more

efficient way while the nodes don't have to maintain as many connections to neighboring nodes as in flooding systems. Besides, these network can use the concept of supernodes by setting up parallel logical networks only gathering those more powerful nodes to take in charge specific operations, thus using the most interesting concept of directory networks. Most of the research work done in the peer-to-peer area is done on these networks, and they are adopted in research projects such as Chord (8) or Pastry (9), standardized peer-to-peer communication systems or new applications such as Azureus (10).

Epidemic networks have appeared recently to propose another approach to the problems solved by distributed hash table networks. Indeed, epidemic networks tend to adopt a random approach to build a peer-to-peer network overlay. In these networks, peers tend to organize themselves in order to maximize the use of a given resource (Bandwidth, computing power...). Peers in the network exchange information about this resource with their neighbors of course, but also with other nodes participating in the network selected randomly. This random selection aims at avoiding deadlocks or performance degradation due to rapid, dynamic changes in the network. These networks are not implemented in many systems, but promising researches are made within the framework of the Tribbler (11) application or of the BuddyCast (12) project.

Social network are peer-to-peer networks where peers connect according to a previous knowledge of the other peers. Indeed, those peers connect because they know each other, and want to share resources among their community. Those networks may become more and more popular in the future because of the level of trust between the peers. This trust is a good way to tackle peer-to-peer network monitoring from copyright owners or people who want to reduce the sharing of illegal downloads on peer-to-peer systems. Nevertheless, these networks may result in a rather inefficient sharing of resources because of the size of the communities where resources are shared.

Applying peer-to-peer concepts in mobile networks

The huge improvements of mobile networks in term of bandwidth and the new capabilities of mobile devices such as personal digital assistants or mobile phones raised some interests in order to develop peer-to-peer applications for mobile devices. In our view, mobile peer-to-peer systems are systems where mobile devices can collaborate together and with fixed devices without the intervention of a central server. These systems can either connect together spontaneously in an ad-hoc fashion, or use telecom operator's mobile networks to connect to peer-to-peer systems on which they may collaborate with fixed peers.

Mobile Ad-Hoc Networks or MANETs are spontaneous networks established between wireless devices without any router intervention. These networks do not organize according to a predefined topology, and they may be set up for a quite short period of time. These networks may be standalone, or connected to a larger network if one device can share its connection to such a network. The spontaneous networks

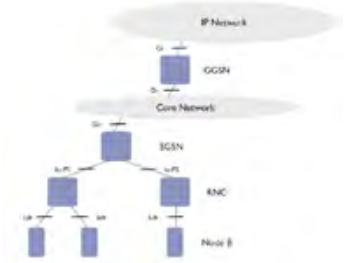
8—Chord: http://pdos.csail.mit.edu/chord/

9—Pastry: http://research.microsoft.com/en-us/um/people/antr/Pastry/

10—Azureus: http://azureus.sourceforge.net/

11—Tribbler: http://www.tribler.org/

12—Buddycast: http://www.jet.net/buddycast/



F3—*GPRS Architecture*

established between Bluetooth devices are perfect examples of mobile ad-hoc networks. In these networks, the routing of packets must be done by the end node himself. This raises a problem if two nodes must communicate indirectly through multiple hosts. A large number of researches have been made to address this problem, and two kinds of protocols have been designed for mobile ad-hoc networks. In networks using proactive routing protocols, every host in the network keeps track of the routes to reach every other host in the network. As one may expect, proactive routing is not scalable in networks that are by definition unstable. Using distance vector routing would lead to slow convergence of the routing algorithm after a network change, and link state routing would require a lot of calculations in the hosts every time a change in the network is detected i.e. often according to the nature of ad-hoc networks. The reactive routing protocols are much more scalable. In this approach, a route is established only when needed. This may slow down the establishment of a connection but hosts don't need to handle the management of any routing table.

Those networks are interesting in many regards, but the scope of these networks is quite narrow. Indeed, MANETs are at most citywide networks, while one may want to cooperate with peers who are farther than that. Mobile collaboration to peer-to-peer networks using telecom operator's 2G or 3G data networks offers the possibility to collaborate in larger networks. This kind of application using cellular data networks has benefited from the development of UMTS or EDGE networks which now cover a larger area in most countries where those networks are operated, and from the evolution of the pricing model for these connections, which are now affordable. Flat rate offers even reach the market in countries where the competition between mobile operators is strong. Besides, mobile devices now have enough storage capacity and computing power to participate in peer-to-peer networks, and they even have cameras and microphone that allow them to produce and edit multimedia content that can be shared on those networks. But there are some specific issues to tackle in order to collaborate to peer-to-peer networks using GPRS or UMTS IP connectivity.

+F3

Most of these issues are related to the structure of mobile cellular networks and to network management policies adopted by most telecom operators. First of all, when we consider the architecture of mobile cellular networks, UMTS, HSDPA or GPRS, we can observe that those networks have a pyramidal structure. On the schema you can see below, mobile devices are connected to either a node-B or a base station (BTS), but the data takes the form of a regular IP datagram on the interface between the SGSN and the GGSN. This has an influence because the traffic and signaling can't take shortcuts when a mobile peer tries to connect to a peer that is under the responsibility of the same node-B or BTS. Besides, in such networks, mobile peers don't have the possibility to broadcast messages on the network, so this kind of messages can't be used for bootstrapping or discovery operations. In mobile networks, the possibility for a given mobile to establish a data connection to an IP network is a costly resource for mobile network operators, which restrict the use of some protocols or transport methods on their networks. To

13—JXME (JXTA for J2ME): https://jxta-jxme.dev.java.net/

tackle these limitations, first the peer-to-peer systems have to be efficient and to avoid sending too many discovery or network maintenance messages on the network in order to reduce its footprint. Thus, the discovery mechanism and the architecture of the peer-to-peer network have to be adapted to this constraint. Besides, in order to maintain its reachability in networks where network address translation is often done in a very ephemeral way, mobile peers have to refresh regularly their connection to their neighbors in order that they know how to reach them. At last, even if mobile devices are more capable than a few years ago, they are still less powerful than fixed workstations who may participate in the same peer-to-peer systems. For instance, the operation of these mobile peers on the peer-to-peer network has a power cost, and reduce the battery life of these devices through the intensive use of data connections.

The use of the concept of supernode is a good way to tackle these different issues. Indeed, in fixed-mobile peer-to-peer networks, mobile peers could collaborate with a fixed peer for tedious operations such as the discovery of resources within the network or maintaining the connectivity of the mobile peer through the operator's network address translation system. In case the mobile operator restricts the use of some protocols, the fixed peer can also take in charge the network protocol translation operations. This way, all the operations that are made difficult by the structure of the mobile data network or by management policies are done by the fixed peers. Those peers then provide the mobile peer with the capability to fully interact with the other peers in the network. They should be selected according to an automatic mechanism, based on their stability in the network or on the amount of available resources they share. As we have seen before, this supernode concept is available on both centralized and distributed hash table networks. Given the less centralized nature of distributed hash table networks, this kind of system is particularly adapted to the implementation of peer-to-peer systems in a mobile cellular data network environment.

Among the different experimentations related to mobile peer-to-peer systems, JXME is particularly interesting. JXME (13) stands for JXTA Mobile Edition. It is a side project of JXTA, an open source peer-to-peer framework sponsored by Sun which implements a broad set of discovery and network management mechanisms to set up large peer-to-peer systems. JXME takes advantage of the protocols designed by the JXTA community to set up a virtual network layer on top of GPRS or UMTS network, using the ability of mobile devices to use the TCP/IP protocol stack with small modifications. Two versions of JXME have been developed. The first version is known as the proxied version because mobile JXME peers had to use a fixed relay peer to access the services of the JXTA network. The relay, which had to be configured manually, acted on behalf of the mobile peer to forward queries on the network and to trim received advertisements. The development of the first version of JXME has been stopped when the definition of JXTA 2.0 protocol stack has been published. Now, the JXME community tries to develop a proxyless version of the JXME platform. This platform will be compatible with fixed hosts running JXTA 2.0. Mobile hosts running the second version of JXME are expected to support the reception of messages in binary format as well as in XML format, as JXME will incorporate an XML parser. Besides,

14–Bittorrent: http://www.bittorrent.com/

15–Qik: http://www.qik.com/

they should not use any statically-configured relay to perform operations on the JXTA network, and thus they should be able to propagate their advertisements alone. This project is very promising but lacks being used in a real world application. Nevertheless its use of the supernode concept and its adoption of java as a programming language make it a good project to experiment mobile and hybrid peer-to-peer systems.

Applications of mobile peer-to-peer systems

In the last few years, several developers have implemented mobile clients to popular peer-to-peer file exchange systems such as Gnutella or Bittorrent (14). These clients have not been really successful because they don't make an efficient use of the network connectivity, resulting in high network consumption. But peer-to-peer technologies can be used in a much more clever way to serve typically mobile usages.

First, peer-to-peer systems can be used to set up real-time collaborative applications. Communication can either be the main purpose of these applications, like in Skype, or an enabler serving another purpose. For instance, mobile peer-to-peer systems may be used for multiplayer gaming in order to allow players involved in the same game to exchange information together on their positioning and actions. In those applications, the use of peer-to-peer systems compared to a classical client-server approach significantly reduces the load on the server, and also helps reducing the message transmission delay, which is critical in real-time collaboration applications. For those applications, peer-to-peer systems prove being more scalable as they adapt to the number of connected peers by design.

Besides, peer-to-peer systems can also be used by mobile devices to share the content they are able to produce with the others. Indeed, mobiles can now be considered as multimedia content production endpoints because they have a camera and microphone. Besides, those devices contain a lot of personal multimedia content (personal pictures, music...) that a user may want to share with its community. At last, these devices can also broadcast live audio and video contents. On the internet, a range of services such as Qik (15) provide users with the ability to stream media to their community, but these services are centralized. Those services could be proposed in a peer-to-peer fashion, which would make it a pure software service, while centralized content sharing platforms require maintaining an infrastructure to store the content or to give access to the mobile broadcasting the content. Such peer-to-peer systems are called application layer multicast services because they mock up the functioning of multicast networks to spread content among peers.

Mobiles can also be used as contextual information sources. This information comprises location of course, but also local usage of the device (on a phone call, on mute...), agenda or list of contacts in the phone book. This information may be used in a broad range of contextual services, form social platform to community local information platforms. The use of this information raises privacy and security concerns, but peer-to-peer solves most of the issues raised by the upload of this information on a centralized platform. Indeed, if the information is not shared using a

16–Opera Unite: http://unite.opera.com/

17–Servidor web para Móviles de Nokia: http://opensource.nokia.com/projects/mobile-web-server/

centralized platform, then nobody is able to gather global information by monitoring the service on a central point, and user keep control on their contextual information.

Such principles also apply to more static personal information. As most users have a special relationship to their device, and don't share it with other people contrarily to a fixed computer, we can see these devices as personal markers, holding information about their user. Thus, mobile devices can be seen as personal data repositories on which user have a full control on what they want to share with others. Applications allowing sharing such information already exist in both the fixed and mobile world, with projects like Opera Unite (16) or Nokia's Mobile web server (17), but these initiatives rely on services provided by either Nokia or Opera in order to locate the user. Those services could benefit from peer-to-peer systems as this would decentralize the discovery service. This way, those services would not rely on a small set of central nodes to operate correctly. Besides, those services could be used as data backend for social network services. Thus, all the data shared on these services would be located on a user premise, and thus it would be under full control of the user. This approach of peer-to-peer systems goes against the global cloud computing trend, where all the data is moved to servers in the network, and decentralized systems tend to give an original answer to most concerns related to data portability and user privacy on those cloud services.

Conclusion

In this article, we have presented peer-to-peer systems from a technical point of view, and we explained how they could apply to mobile networks. Although only few mobile applications use these concepts, the potential of mobile peer-to-peer allows us to envision a broad range of applications taking advantage of the decentralized nature of these networks to propose social services. Besides, peer-to-peer systems could give a technically interesting alternative to build social network services on which data are kept under the full control and responsibility of the user.

Javier de la Cueva
Conversations at Medialab-Prado

http://derecho-internet.org/

AA: Andoni Alonso
JC: Javier de la Cueva
VRJ: Vicente Ruiz Jurado

1—This text is a fairly literal transcription of the Roundtable Discussion titled «Redes P2P: Derecho, Filosofía, Tecnología, Política» (P2P Networks: Law, Philosophy, Technology, Politics) held at Medialab Prado on 9 June 2009. Due to its length, the entire discussion has not been transcribed. The complete version can be seen at the following URL: http://medialab-prado.es/article/mesa_redonda_redes_p2p_derecho_filosofia_tecnologia_politica

JC
First of all, I want to say thank you for the invitation and it's always a pleasure to be back with friends. I'd like to introduce Andoni Alonso and Vicente Ruiz Jurado and since I'm not sure who to begin with, I'll start with what they've got in common.

Going back to what the word hacker means, I think I'm with two people now who are both hackers, each in his own profession and each in his own way. As everyone knows, no one can proclaim themselves a hacker because that's a sign of vanity. It's like in the Tao tradition: if you think you're on the Tao path, then you're not. Anyone who says they're a hacker immediately stops being one, so only other people in the community can call you a hacker. A hacker is a specialist, a hack is a blow with an axe, a hack is a brilliant answer to an intelligent question. And going to back to my introductions, I'd like to tell two stories about the characters here with me—for, in addition to hackers, they are characters—and thank them very much for being here.

One day I went to a bookstore and like a good bookworm I saw a book there titled «La Nueva Ciudad de Dios» (The New City of God). I looked it over a little. The publisher was a good one—Editorial Siruela—and it came with a CD. I started skimming through it... it was by someone named Andoni Alonso... Who was the "nutcase" who wrote it? And obviously, I bought it.

AA
Oh, so you're the one who bought the book...

JC
Yup, that was me. I was the one who bought the book.
(Laughter)

I admit at the beginning I found it a bit difficult so I saved it to read in the summer. I finished it and realized it filled in some gaps because nowadays we live in a world of action but a world in which, except for extraordinary examples like Antonio Lafuente, who is sitting here and whom I would also like to thank, knowing how busy he is... Suddenly what one begins to see is that a body of thought begins to take shape that is rigorous, academic, and which lends historical perspective to a completely up-to-date scenario. Since it is so current, we often think it has nothing to do with the past but actually a lot of what is taking place nowadays, like the struggles between parties and critics of freedom, is as old as the history of humanity.

And that was the first time I heard of someone named Andoni Alonso, a Basque, who wrote books, sold with a CD, published by Siruela, and that were really quite interesting. Then one day I was fortunate to meet him in person but even back then at the beginning of our friendship, he didn't admit that I was "the one" who bought his book. In fact, I just found out right now.

I'd like to tell another story, about Vicente. On 3 December 2006, I was at a well-known bar-restaurant in Salvador de Bahía with Vicente, Jefferson Assumçao, a member of the Advisory Panel to Brazil's Ministry of Culture, and Antonio Martins, the representative of Le Monde Diplomatique in Brazil. We were drinking beer on that hot day as the

blocos were practicing outside, on 3 December. We were so surprised, when we left the restaurant and found everyone dancing in the streets. We asked if it was Carnaval already and they told us that, at that time of year, they practiced every Sunday. At that table, Vicente told us how information architecture should be. From Vicente I have learned words like *prosumer* and concepts like "the power of one". Vicente explained his project to us there, outlining it on paper napkins: the Kune Project.

The Kune Project is a collaboration project based on a protocol called XMPP. It's a completely decentralized, distributed project, so each person can use it in their own computer and not depend on a web centric structure or a company. In addition, the Kune Project is based on the same libraries used for Gmail. It was such a coincidence that, three years later, Google launched Google Wave, which is the same idea as Vicente's, a project that has been developed but carried out with greater capacity. This brings me to a reflection on this country where we live—Arguiñano just called it a sub-developed country and I agree completely. I also proclaim myself a yokel because we live in a country where it's a shame that brains like Vicente's are forced to operate in a hostile environment. Because if you don't think like everyone else, you're already operating in a hostile environment and he's having problems but that precise technology, this Google Wave, had already been designed and there is already a code that works in the Kune Project with the same concept as Google Wave, designed a few years ahead of that by a Spanish man at a table in a bar in Salvador de Bahía.

And that's Vicente Ruiz Jurado. He is one of the quiet people who do things without a word, a practitioner of Wu Wei, and he does the things he needs to without needing any notoriety.

So I'm here with two people from whom I have learned a lot. It is truly an honour to have them here. What I had in mind, which we all discussed earlier, is not to have a roundtable made up of a series of lectures followed by audience participation. If that's what we wanted, we'd have three lectures on three different days. Instead, I would like to sort of recreate here the atmosphere of having beer in a bar, which is what happens after all the meetings at Medialab. Over beer is when people really feel comfortable—they start telling you about their projects and give their spiels and of course I do the same, in self defence. I want to bring that spirit here, as we cover the four topics we have set —Law, Technology, Politics and Philosophy—one by one, with everyone taking part in the conversation, to make things go as smoothly as possible.

So I'd like to start out with a question that may be a bit surprising. It has nothing to do with P2P but in the world of technology where we live, and of Twitter, which is for sending very few bits to P2P networks, which is for sending and moving all the tweets in the world
Where does this leave poetry?
(Silence. Laughter)

JC
Remember now—we're in a bar, drinking beer.

VR
I don't know. I think everything can become poetry. In the end, codes are

poetry and the only thing a poet wants, according to Dolina, an Argentine radio commentator I like very much, is for people to love him or her, right? Or an artist, right? And I think all kinds of productions, at the end of the day, are not much different from that. You may aim to have your work rhyme more or less but, like architects, everyone wants their work to last over time.

JC
I bring this up for a reason, because poetry is one of the foundations of community, of humans, and so we may lose some of the manifestations of artistic spirits if we only talk about mathematics. There can also be beauty in mathematics but I'd like to start with poetry as an introduction to our discussion of virtual communities, on the people who collaborate, on understanding among people, on sharing, on collaborating, on competing, and so forth and so on. That's a bit about the content of my beginning.

AA
One of the Internet's principal features is that you can find the entire poetic heritage, or almost everything that's worthwhile, or most of it right there, directly. And since I'm a bit unorthodox, that's proof of peer to peer sharing because the people who post it have sensibility and want to share. There are thousands of pages, blogs, and so on where people post the poems you like, that move you, et cetera. That's as far as traditional poetry goes.

21st Century poetry, if such a thing exists, consists of two endangered species: the first are essayists and the others are poets, at least in this country. But in any case, what matters is knowing, in our own experience, how many times we have received an e-mail that moved us. Something written by a friend, a loved one, someone close to us, that has really touched us. That's a feeling that's quite close to poetry and it exists. There are completely different poetic forms, there are micro-stories... we're broadening its scope. We may not really have a concept of "the poet" now—the Great American Poet, you know? I'm certain you're not able to be that now. I do believe in beauty—be it literary, architectural, et cetera. We have to look for it in places other than where they tell us we will find it. You have to be, well, we are, as you said, interested in the whole hacker thing, so let's hack poetry too. Well, it's been hacked. The French Ulipo group has already hacked poetry. They took Rimbaud's syntax and filled it in with Baudelaire's vocabulary and the program automatically generated thousands and thousands of sonnets with that name. Somebody might say, well, that's kind of silly or just a technical accomplishment, but I think it's more than that. I think they are new possibilities and in that sense, it's not so much a matter of where poetry but rather that we are able to see it and recognize it wherever it may be.

JC
(To the audience) What do you think?

Gabriel
I don't know if you're familiar with this but there are several fairly unusual programming languages, speaking of poetry. One is called Whitespace and it's based on the number of spaces and tabs that you set up, which can then be translated into a program. I saw another one where you drew a square, I can't remember the author, it was a fairly

simple square with little squares and colours and in the end, that was a Helloworld. I think it's relevant.

JC
I think poetry is one of a community's needs and when we're talking about peer-to-peer networks, a community exists even though we don't know each other, even though nowadays we begin our friendships on the Internet and then we meet in person. In the case of Andoni, first you find out about his ideas at a bookshop and then you meet him personally but in the case of Vicente, first you find out about him on the Internet and then you meet him in person. I think we have a spiritual way of seeing things. I'm not talking about religion but about a spiritual way, and thus to what point peer-to-peer networks can contribute to spreading an ideology, an ideology that could be based on transmitting poetry, on transmitting contents, on transmitting texts and transmitting notes.

VRJ
I don't know. One of the features of peer-to-peer that I like best is design—that really is Wu Wei, not-doing, design "is shared by default". I wish more things in our every day lives had that type of design, things are shared through design—it induces and leads to good practices. I don't know if I'm explaining myself clearly. Then of course I think it does have an influence at that level.

AA
I'd like to insist that, curiously enough, the people who are preserving traditional poetry are users and that's very beautiful. I imagine that Antonio Machado would be very proud to know that he is in 14,000 blogs that are spreading and connected. That's also an important point because in general people say that in peer-to-peer sharing or perhaps the general public doesn't know about all the philosophy behind it, they just go to BitTorrent to download a film, a practice I'm not going to comment on, I think they have the right to do it, it seems like, how can I explain, as if in reality we were consuming, but just as a matter of cheap free consumption and it's not that, it's something more, the fact that that poetry is preserved... the idea is that there is a poetic type of knowledge that people have decided to preserve, and I think that's extraordinarily valuable.

JC
What we all agree on very much is that we know that the cycle of a cultural product, or an entertainment product, lasts three years at the most and from then on, it's no longer available in that product becomes completely indifferent. The industry is only interested in producing that product's obsolescence. It is precisely peer-to-peer networks that are enabling access to all the cultural and entertainment products that you would otherwise have no possibility of accessing. Thanks to peer-to-peer networks, we have the possibility to have access to those cultural products. What we are doing, or could be doing, is obvious because after the ruling on 2 July by the Commercial Court in Barcelona, we don't know which way things will go, but we could always say file-sharing is not protected by law but it is something people do continuously and that way, our cultural heritage is being protected, because the people who are not protecting our cultural heritage are the cultural producers and the entertainment producers.

And I think what you said is very interesting, that we should share by default. You have to take positive action to say "I do not want this file to be shared" or what I want to do is take something out of this shared file. I also remember this was one of the subjects we discussed related to the Kune Project, where we tried to ensure that everything that was by default was done very carefully, carefully analyzed and this brings us to the topic of the law. In short, technology itself is making users consent to things that they don't know about and if users want to modify that consent, they have to take a positive action to remove that shared file or to remove something from that file.

This relationship between the law and codes is very interesting because the code—and we saw this during the war about Menéame, about whether the code allows people to vote and whether the votes were hidden or not—that there is a very direct relationship between giving your consent and the TCP/IP protocol and then there's a slightly higher level, which are options on programs on different variables of their configuration.

Am I getting into some kind of mental confusion or do you agree?

AA
I understand you and I think that's true.

VRJ
I'd like to share the example I always give, moving away from digital topics. Once I saw some portable bathrooms on a social forum and I loved the design. The design had a spring that kept the lid up. For the lid to be down, you had to sit down. It wasn't necessary to argue or show 50% of the population that they had to raise the lid not to splash it simply through the design. If you used it standing up, the lid was up. It's sort of that kind of design by not doing, that I find very similar to peer-to-peer networks: you don't have to tell people "you've downloaded this file, so share it", no, the minute you start downloading it, you are already sharing it. The file you're downloading is something you're already sharing. You haven't even pointed to the file, and the file you're downloading is being shared.

JC
Andoni, what project are you working on now? Because I know you were very busy with two books you were about to finish and your publishers were breathing down your neck, pressuring you to hand in your drafts instead of giving them the whole book. That's the problem with publishers: when they pressure too hard, in the end, what they publish are drafts.

AA
One is about digital diasporas, coming out at the University of Nevada, which is a real disaster in terms of copyright and rights. I'll tell you the story. There are always problems and the latest one I've got is that one of the contributors is a professor, at Leeds University, I think. He's Nigerian and he was working on an Oprah show, the famous Oprah. At one point, Oprah stated that she was from a Nigerian tribe and claimed she was a victim of colonial brutality.

This author shows that the tribe was a fiction invented by the English and therefore, Oprah is completely mistaken. Then he quotes her, taking

an extract of the program's script, and they wouldn't let us publish it because we were violating copyright. Of course, I don't know if I've just become jaded but this is a television program, people talk, it's a script, and if he is saying that Oprah—if you'll forgive me—is a fool because she didn't know what she was talking about, you have to prove it and you have to quote her literally. Okay, well, the last thing we heard, it had to be changed, rephrased, and so forth and so on. That's one of the projects.

And the other one is about knowledge communities, which I'm working on with Antonio, also for the University of Nevada, which is also a "pain in the ass", as they say in America, but anyway...

JC
What's that one about?

AA
it was a con friends but the only people who really talked about knowledge communities were you and I, [he's amid the audience] Antonio, the others just talked about whatever they felt like, as usual, well, one talked about art... No, actually, there were two... Nacho Rodríguez from Fundación Rodríguez did a good job in that respect but the rest of the people... I still think they're very new to the academic world and you're talking with people who really don't understand you. Downloading something from the Web, for the majority of academics, is a wicked thing one does when home alone with the door closed and generally we all know what kinds of things they are.

JC
Plus, it makes you blind.
(Laughter)

AA
Exactly.

JC
And you, Vicente, tell us a little about the Kune Project.

VRJ
About Kune, you were really over the top.

JC
Not at all.

VRJ
I think Google's done an impeccable job and has left me and all other current Web initiatives in the dust. I think it's very, very good. We were working on it, but we hadn't got to that point—though we certainly would have liked to!

For me, Kune is simply the fruit of many years working on a way to enable people to share knowledge. And for them to form groups, affinity groups. We saw that the Free Software model was fantastic, whether it's to make a computer work or create a file-sharing program and in the end, the fruits of that collective work are shared and we wanted to adapt it to other models, just go ahead and say sure, why not to an ecology project and what we did was simply take the most frequently used software

creation tool—Sourceforge—which Savanah all the free software factories are based on and adapt them to any kind of project.

Of course, that started in 2002 and with time, we realized that the tools are wonderful but ordinary people find them difficult to use. Kune aims to simplify the use of this type of technology as much as possible, so people can create their project or their web space without needing any Web knowledge at all. And the second subject I find most interesting and devoting less time to is file-sharing, not applied so much to bits as to other types of goods, services. And how we can translate it, like we adapted Free Software to other areas of knowledge, of the commons—how the file-sharing experience can be translated to other experiences and at this time, that's very necessary.

Audience
Could you give a bit of a technical explanation of the Kune Project? In detail, not so much in general terms.

VRJ
We basically use GWT. I don't know if you're familiar with it—it's a Google toolkit that you basically programme in Java and you get results in HTML and JavaScript. How is it translated? In the end, you have a sole application, like it was on the desktop but on the Web. You can make it as complex as you want. For example, with typical programming frameworks, even the most famous ones like Rails, you couldn't do something like Google Docs, it's too complicated. With GWT, you can do it with no problem, the same way you do a word processor, you can do it on the Web. I suggest you take a look at it. I don't know if you've seen the presentation of Google Wave—it will surprise you. It's done 100% with GWT.

Audience
Is it a free tool?

VRJ
Yes, completely. Apache Licence. Look into the Web subject, you should take a look at it.

JC
GWT has an Apache licence but the Kune Project has an Affero licence, Affero GPL, you could say, it's even more free.

I wanted to emphasize that earlier point a bit and have you tell us how you decided which architecture, based on which architecture, why you chose that architecture model instead of a Web centric model, and you made that choice, because I do remember that conversation in Salvador.

Oh, dear, you don't.
(Laughter)

VRJ
Yes, I remember it. Really, at a distributed level, the experience of Jabber, for example. Jabber is the protocol Gmail uses for chats. And it's a completely decentralized protocol, anyone can set up their server and take part like anyone else. And there are models like those of Yahoo or Microsoft that are chat protocols but they are completely closed and then based on the protocol you can build other things, for example,

collaborative publishing. And we were interested in enabling people to build these cultural spaces and for them to be interrelated but not to make the sites or provide this service because we weren't interested in that level of effort nor politically in monopolizing anything. We wanted it to be as distributed as possible and if the world social forum wanted to operate it, they could and then they could be interrelated with each other. Perhaps we're moving away a bit from file sharing. I'm talking about my book.

JC
No, because I wanted to focus this part of the Roundtable on organizational topics because a large part of law and especially all of political law is the law of organizations. Traditionally law and fundamentally administrative law have studied the law of organizations extensively. I think there are two relevant aspects of the organizational model that we haven't seen up to now. First of all, the shared goods of these organizations or the product these organizations work with are information products, so moving these goods, as we know, costs almost nothing and cloning is immediate. The problem that can upset that organizational system is an asymmetry in the speed of the Web and so in that respect, I don't know if you'll agree with me that file-sharing networks escape from that asymmetric Web system we have with lots of download capacity but very little for uploads, with which they want to keep us in the role of consumers instead of being producers of information and prosumers.

It is my idea suitable or am I going off over the top again?

AA
I agree. That is, if we want to have completely non-hierarchical structures, you have to have symmetry in speed, I agree with you, and I think that we are talking about political subjects of social organization, I think that's the subject, and also about fight, about social organization and about other things. I don't know if my impression is that we really have a fight that I think boils down to two things, civil society, whatever that means, and company-state, company dash state, because in the end they're the same thing. Yes, I agree with you.

VRJ
I also see a distribution of roles. We used to have a model of television and radio where we were out there like a bird with an open beak and they fed us and now we have a model where you can be a poet or you can be... and then, as far as classification goes, we're all librarians, Google is the fruit of our work, that is, we point out what's most relevant and what isn't, and in the end, we can be producers, distributors, consumers of cultural goods but also of other things.

JC
That repeats the model of other already existing organizations and I know you've participated in them a lot, haven't you, Vicente?

VRJ
Well, in addition to my more geeky side, I consider myself an ecologist and I take part in some projects, especially agro-ecology, producing vegetables. In the end they are trust networks and what is shared

goes beyond vegetables. And we're looking for applications of things like file-sharing networks to structure sharing this kind of objects, for example I participate in a seed bank and although we have a pretty large scale operation, because we produce for six or seven cooperatives, what we were interested in was how to make sure others copy it, this code, because in the end it's code, lots of people copy it and then there is sharing, it fosters sharing the kinds of seeds we're interested in protecting. If you want I can tell you more details about it to explain it more clearly.