Network and P2P as source of cultural manifestation in Brazil. The example of Submidialogia network.

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1 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.

2 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 their 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.

2.1 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.

2.1.1 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[3]. It helps online activists and protester website to track and map "the diffusion of email forwards, political calls-to-action, and online petitions."[4] 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.

[1] He chose those places because for people in Massachusetts, those were really far away cities.
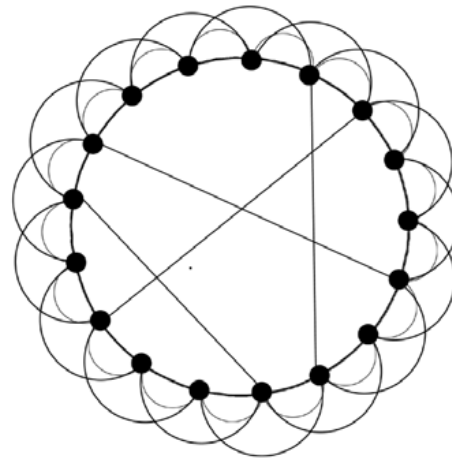[2] Albert-László Barabási (2003, p.29) said that citing Thomas Blass.
[3] http://forwardtrack.eyebeamresearch.org
[4] From projects website description http://forwardtrack.eyebeamresearch.org/#download. Last accessed on January 2006.

2.1.2 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 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).
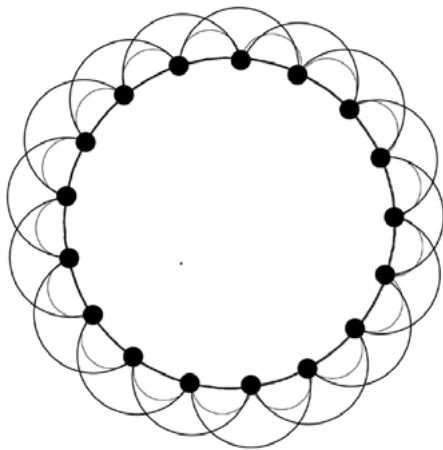
Figure 1. Circle without cross-links   **Figure 2**. Circle with cross-links

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 S, 2003).[5]

2.1.3 Hubs, power law and free-scale

Figure 3. Example of hubs using the map of an airline company in Brazil.[6]

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[7] 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]

Hubs are also called connectors, because they are the ones that keep the network connected. Barabási (2003, p.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,

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[5] 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, $C=2y/z(z-1)$"

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

[7] Barabási (2003, p.70) uses the maps or USA to illustrate that.

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, p.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 placed randomly. In 1999, Barabási (2003, p.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.

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]
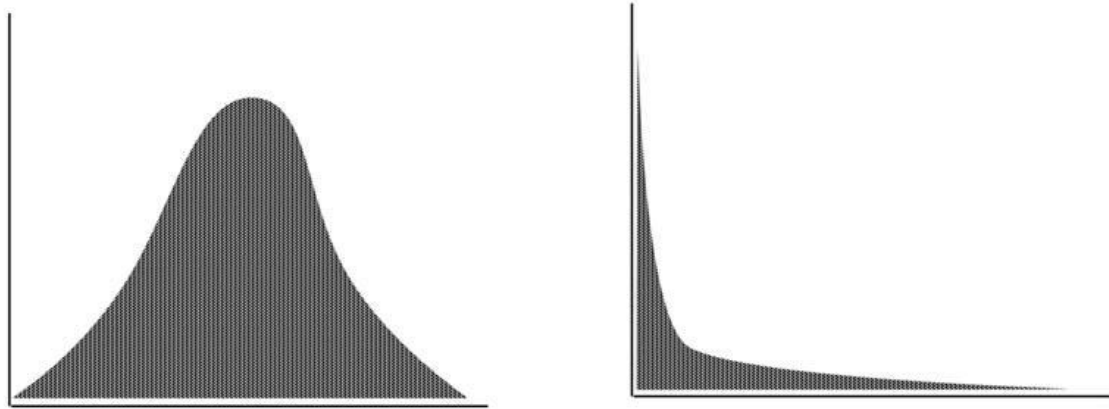
Figure 4. Example of bell curve graph (left) and Power-law curve graph (right).

2.1.4 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, p.87; Dorogovëtìsev and Mendes, 2003, p.121; Chen, 2004, p.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. (Calarelli, Capocci et al., 2002; Chen, 2004, p.42; Pastor-Satorras and Vespignani, 2004, p.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.

3 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.

In order to explain the moment from now, this complex, organic, network culture, Mark Taylor (2001, p.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.

4 Network 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[8] 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 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, p.181). They are what "Internet was supposed to be."

5 Submidialogia Network

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[8] Conference website www.re-activism.net. October 2006.

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.

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.

Figure 5. Submidialogia#2 discussion on Free Software with the participation of Claudio Prado. Olinda, 2006.

5.1 Submidialogia discussion list

The Submidialogia discussion list, hosted at riseup.net[9], 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.

5.2 Submidialogia Meetings

Submidialogia[10] 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.

5.2.1 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

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[10] http://submidialogia.descentro.org/

the house is part of the practice, in place and period we are trained to be able to tolerate and respect differences.

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]

Figure 6. Cooking and discussion at Submidialogia#4 in Belém, PA, 2009.

5.2.2 *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)[11]

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[11] FDL url: http://www.gnu.org/copyleft/fdl.html

published the book. The same day it was released the printed version; the book was uploaded freely on the Internet[12]. 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[13]. 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.

This year, at Submidialogia#4 held in Belém, a week before the World Social Forum[14], 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]
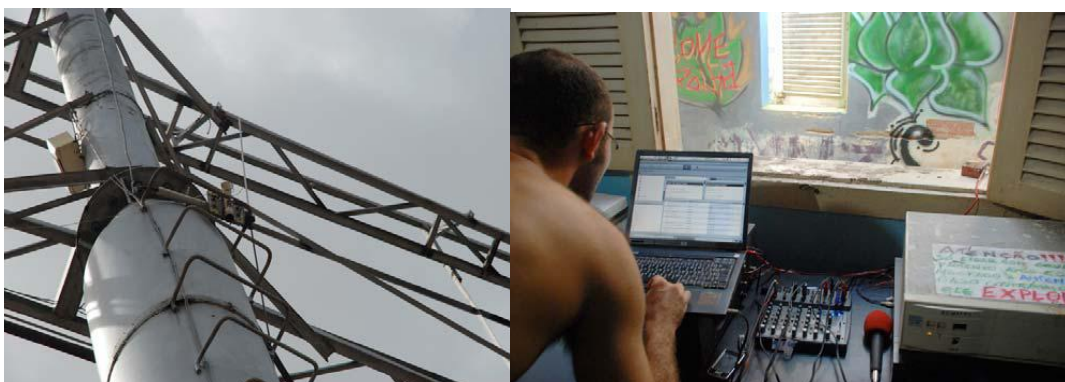
Figure 7. Radio at Submidialogia#4 - Belém, 2009.

6 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

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[12] Url of the book: http://livros.karlabrunet.com/sub3.htm
[13] http://www.lencois.art.br
[14] URL: http://www.forumsocialmundial.org.br

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.[15]

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[15] 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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