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Self-organization in Open Source Communication Networks. Red Académica Electrónica de CLACSO -RAEC- (CLACSO's Electronic Academic Network -EANC-) case.

Abstract:

Throughout 1980 two main processes started. The first process was the creation of an area of free information exchange at a low cost and with a diversity of collaborators.

The first revolution in the Internet based on the newsgroups, the ftp, the electronic mail and the emergence of the free software were the paradigm of the new world in information. Today, we can think about the existence of are new elements to be linked to this paradigm, such as free encyclopedias, the open source scientific publication, the genomic information, etc.

The second process witnessed how huge industries (pharmaceutical, food and agriculture, means of transport, software packing companies) were being built.

These industries are now trying to reach the property or the control of the use of information and knowledge and there is a strong pressure to increase the control upon the spreading of knowledge and information by using a mixture of technical and legal tools. These two tendencies are opposed in various cases and these clashes are shaping up the future.

In Argentina and in Latin America, these two trends are growing due to the emergence of projects that put special emphasis on the appropriation of the Internet technology in order to create communication networks, using open source technologies, such as the case of the RAEC. Red Académica Electrónica de CLACSO (CLACSO's Electronic Academic Network -EANC-) with regard to the generation, creation, utilization, storage and transfer of information on one hand, and the benefits and the sources of innovation in the evolution of this Network at concentrating on open technologies, on the other hand. The fact is to show and cast some light on the deep debate about how knowledge shall be dealt in Argentina in the next years, taking into account values and typical styles of our country and how this is related to the use of digital technology.

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First process - Preliminary inquires

Since halfway through the seventies, the e-mail lists, the cooperative work in institutions such as the IETF (Internet Engineering Task Force, sources of open source standards publicly discussed and led by individuals), the RFC (Request for Comments, standard documentation on the Internet) have been going around. It was the Internet the one that has enabled this process, which was at first exclusively limited to the virtual communities of hackers, to spread out. The innovation of the software has thus come out from state-of-the-art scientific research laboratories, in which everything used to be put at risk throughout the '60s and the '70s, and from companies' equipment to grant a much vaster social field. In fact, the Internet, as a connection structure, constitutes the form of the molecular organization of this fantastic cycle of immaterial production. Even in the '80s the BBS (Bulletin Board System. Electronic Boards, Fidonet (BBS network, created in 1984 and made up by thousands of on-line communication amateurs), Usenet (group of people exchanging articles within one or more newsgroups, universally or locally acknowledged by a subject), and the Electronic mail have supplied platforms conducted by the user with a more sophisticated and specialized functionality. The latter allowed two ways of connecting to the Internet: 'on-line' or 'differed'. The classification was very simple: 'differed' meant that the only service they had was the electronic mail, and 'on-line' was all the rest, already known today as FTP, WWW, IRC, etc.

Due to the monopoly established by the law of privatization of ENTel, only the firm Telintar (a company formed by Telefónica and Telecom, the ENTel's heiresses) was able to give the on-line service at international level. And this company offered the service ONLY to educational or research institutions. That was why the only institutions having a complete Internet connection were the Science and Technology Secretariat, the University of Buenos Aires, the National University of La Plata, the National University of Cordoba, the National Commission of Atomic Energy and a few more (the Comisión Nacional de Actividades Espaciales (National Commission of Space Activities) had its Internet connection through another via and other legal resource). Obviously, this service was not free and each institution paid a monthly fixed canon of ~6,000 us\$.

The fact that these institutions had the Internet connection did not mean that they were able to provide it to everyone who wanted it. On one hand, each institution fixed a policy; in the case of the UBA, the organism who had to manage the network policy was the Centro de Comunicación Científica - CCC- (Scientific Communication Center -SCC-, or the CESPI in La Plata. All in all, they were the ones who decided which type of connection they would give to a 'customer', whether 'differed' (electronic mail only) connection or 'on-line' connection.

But there were also private companies that offered 'differed' connection ONLY (because of that fact about the monopoly...). So, those who wanted to have electronic mail had two possibilities:

- a. having an account in a computer at any institution
- b. having an electronic address at home

Option a) was typical of students from some University. The only way to find out the possibility was to get in touch with the person in charge of the computing resources of the Institution and ask for the relevant requirements.

Option b) was typical of those who hired a private service, although it could also be granted by a public Institution (depending on its policy). To gain access to this service it was necessary to have a computer (it could be that old 4-MHz XT), a modem (from 300 baud onwards) and a telephone line at home.

We can mention the following institutions among others:

- The Science and Technology Secretariat, where the ReCyT functioned, which connected scientific institutions, universities, public departments, schools and non profit foundations. It provided electronic mail and other Internet services.
- Red de la Universidad de Buenos Aires – REDUBA- (Network of the University of Buenos Aires: It provided Internet services to professors, researchers, students and other academic institutions at national level. It provided electronic mail, and, in some Colleges, all Internet services. It emerged in 1986 through the initiative of a group of professors and students from the Computing and Exact Sciences Department, which started to work on the RAN project - Red Académica Nacional- (National Academic Network). In 1988 they carried

out the first international communication through a digital network, between the UBA and the University of California, in Los Angeles (UCLA).

- Health Network –OPSARG-. It linked hospitals and professionals working in public institutions. It provided electronic mail.
- Red Teleinformática Académica –RETINA- - REd TeleINformática Académica- (Tele-computing Academic Network): Created by the Asociación Ciencia Hoy (Association Science Today). It connected users from scientific institutions. It emerged with an important financial support of the Fundación Antorchas.

RETINA established agreements with the CRIBABB, CERIDE, Centro Atómico Bariloche –CAB- (Bariloche Atomic Center) and with the Instituto de Astronomía y Física del Espacio –IAFE- (Space Astronomy and Physics Institute) for the user's service and the test of the communication software between the nodes.

The national traffic was carried out through ARPAC, the public network of data transmission (the only available means at the time). The international traffic was channeled from the nodes, through ARPAC, to the State Department, which had an analogical 9600-bps link, with SURANet.

RETINA regarded the only way out with other countries as insufficient; therefore, an agreement with the University of Chile (UCH) was signed, which counted on a 64-kbps dedicated link, at the time, with the University of Maryland.

By virtue of that agreement, RETINA's nodes could have access, via ARPAC International, to the central node of the Chilean network, and from then on, they could continue through the channel to Maryland. In the reverse order, in order to make the messages for RETINA's users reach their destination, the UCH got in contact with the nodes through Chilepac, the Chilean public Network.

Due to the low speed of the ARPAC network and the increasing cost of this means of transmission, RETINA was forced to find another means of communication.

A solution was quickly found for the national traffic, since the data transmission was deregulated. The installation of V-Sat links was contracted, being these links replaced later by SCPC 64-Kbps links, between CRIBABB, CAB, the Embalse Nuclear Power Station and the Constituyentes Atomic Center.

- Los Pinos II. It provided electronic mail, newsgroups, shareware programs with free distribution and teleconferences. Average cost: 20 monthly dollars.
- The Argentinian Compuserve subsidiary provided on-line access to Compuserve International, which at the same time has a gateway with the Internet. The average fare was around 100 dollars.
- ITINET (ex-Delphi) was an on-line information and service system. It supplies electronic mail, but also the possibility of performing telnet with remote computers (the cost of the overseas connection is chargeable to the user). There were conferences, newsgroups, shopping areas and distribution of news from international agencies. The average cost of the electronic mail was around 50 dollars and the 'on-line' services varied according to the communication time.
- Satlink supplied companies and individuals with an Internet output at 27 dollars a month. The subscription included, among other services, electronic mail, newsgroups and entertainments.
- Publinet provided electronic mail and some 'on-line' services. It did not charge for time but for traffic. The basic subscription was 29 pesos plus VAT.

Some of those companies provided differed gopher and WWW, which was quite interesting for learning what they consisted of, but too slow for the user to get discouraged. It was estimated that in some months' time -if there was a previous decision from Telintar, which monopolized international communications- the 'on-line' cost would go down just enough to become more accessible.

In the '90s up to 2000, many of these platforms were outshone in view of the emergence of the WWW.

Throughout nearly two years, RETINA asked TELINTAR, the bearer of the monopoly on international communications, for the supply of an international high-speed, point-to-point link, at a fixed cost, without getting any answer from the mentioned company.

In the '90s, the Comisión Nacional de Telecomunicaciones –CNT- (National Commission of Telecommunications) authorized the Asociación Ciencia Hoy, for its RETINA project, to install by itself or by third parties the required link to be able

to provide researchers with efficient access to the Internet services. In view of the lack of answer by TELINTAR, a 64-kbps link was installed, whose download in the USA was agreed with the National Science Foundation to be performed in its router of Homestead, Florida. A few months later, the capacity of that link was increased to 128 kbps, at the proposal of the NASA, which was in charge of the improvement costs, in order to reach a good connectivity with the Comisión Nacional de Actividades Espaciales (CONAE).

The international link was carried to 256 kbps due to the increasing demand from the new institutions that had joined RETINA.

Through agreements with Secyt, the Ministry of Justice, the Ministry of Foreign Affairs and Impsat, the national connectivity was enhanced, enabling those networks that were accessed through the USA before to be reached more efficiently.

With the objective of keeping the quality of service, the bandwidth of the satellite link with Homestead was increased to 512 kbps.

The international bandwidth was doubled, taking the connection with Sprint to 1 Mbps.

With the objective of improving the connectivity of the academic networks in Argentina, an agreement with Impsat was achieved to take the link with RECYT to 2 Mbps.

At the ends of the '90s the bandwidth of the international link was doubled again and RETINA gets integrated to CABASE as another way of improving the national connectivity.

El Consejo Interuniversitario Nacional –CIN- (National Inter-university Council) awards RETINA the administration of the RIU -Red de Interconexión Universitaria- (University Interconnection Network) particularly, to perform it during the important change of topology to which the RIU should be submitted, according to the new agreement held by the CIN with TELECOM.

A POP from RETINA is added into the IMPSAT's Teleport for the access of the institutions that take part in the network with a superior bandwidth.

In 2001 the intention letter with the UCAID (University Consortium for Advanced Internet Development) is signed for the integration of RETINA to the Consortium Internet2. On December 12th the international 45-Mbps access to Internet2

is inaugurated in the auditorium of the Rector's office of the National Technological University in Buenos Aires.

Finally, in 2002 together with other eighteen Latin American countries the CLARA alliance -Cooperación Latinoamericana de Redes Avanzadas- (Latin American Cooperation of Advanced Networks) is constituted to make the interconnection of South America, Central America and the Caribbean with the advanced networks from Europe and the other regional networks feasible.

It is carried out the participation in the ALICE project of interconnection of Latin American academic networks with GEANT, the European academic network.

This scene shows how intricate the first Internet revolution in Argentina was.

Today, we can think that there are new types of elements to be linked to this paradigm: the groups type hacklabs or medialabs; furthermore, even the effort to put documentation and translations on-line, finds in the web a favorable space for its development, being such a space an opening to effective possibilities for collaboration and reciprocal enrichment, not only between the development teams and the users but between the users themselves, as well.

Forums through the web ("webBBS" or weblogs) or the newsgroups from software users, are very rich in this productive traffic of knowledge, in this exchange of experiences and inventive among these, which, undoubtedly, contribute to the code improvement, but, above all, allow the constitution and broadcasting of a know-how among users, as well as the innovation of the possible uses of a certain software. The cyberspace is the unlimited area where this fantastic collective intelligence is displayed.

The foundational work by Tim Berners Lee (1997) about web rules was based on the peer-to-peer collaboration among the scientists all around the world. Communication networks, such as Peer to Peer type Gnutella (-decentralized networks to share files- lack a central server and all the elements connected to the network are simultaneously servers and customers. They are able to exchange any type of files, text documents, photographs or videos) and instantaneous messenger type ICQ, Nupedia (combination of free software and free encyclopedia), Debian (association of individuals having the common cause of creating a free

operative system) and others of the sort, have each of them a different story that have led them to develop different technical and social strategies, and to carry out some or all the collaborative principles of the free Software.

Moreover, hackers and their philosophy of work took on the discussion of the development pattern for the free software as an alternative model and quite different from the development of the traditional software. Even though they defined themselves as individuals that were devoted to program passionately, they also believed that to share the information and work out free softwareⁱ was a duty for them.

The Free Software Foundation, (FSF,) managed by Richard Stallmanⁱⁱ, started the creation of an operative system that could be freely distributed among its users, Gnu/Linuxⁱⁱⁱ. From the very beginning, most of the participants developing free software belonged to universities and research laboratories, whose financing came from science academies, financing government agencies and private institutions of I + D^{iv}. This movement of software flourished since 1984 by integrating the work of the above scientific institutions and generating a cooperative pattern of network production, called bazaar pattern^{iv}.

The development of public property based on this pattern was exponential to such an extent that great part of the technology on which the Internet is based today, from the operative system Unix to the network protocols, comes from those years. In order to prevent private interests from appropriating this work, Stallman invented the concept of copyleft (1989), with the political purpose of guaranteeing the free traffic of the knowledge contained into the software and the possibility for everyone to contribute to its improvement^v. So, since the spreading of personal computers and the access to the Internet, the movement of the free software reached its critical mass, it stopped being a thing just for some hackers^{vi} and became a phenomenon of liberated social cooperation (Vidal, 2001). But not only does the free software refer to the programmers' right to have the code sources^{vii} at their disposal; it means the freedom to copy and redistribute those programs as well.

Furthermore, it is worth mentioning that the hacker culture carried out by computing science in the '60s, had the necessary tools and the source code of most programs at its disposal. That is, collaboration

and joint work was part of the habits of a scientific community since its early beginning.

But in the '90s, that pattern reached a crisis point and went through a second process, in which a privatizing and mercantilist pattern began to emerge.

In this way, programs began to sell as commercial items and only with the binary code in order to hide the programming techniques from the competitors. The new industry of software began to be supported on the legislation about copyright. The Unix world was fragmented into several privatized versions and gradually incompatible among each other. What was up to then a habitual practice became a crime: the hacker that shared the code and cooperated with other individuals began to be regarded as a "pirate". This context explains the subsequent peak of Microsoft empire and others: the business of proprietary software was awakening.

From the community of free software itself there have been attempts to explain these phenomena through the theory of games^{viii}. The classical dilemma between "collective property" versus "selfish attitude" is surpassed by an axiom that vaguely reminds of the "prisoner's dilemma" of the theory of games: the cooperation is preferable also from a selfish perspective. The "prisoner's dilemma" was used to study the concept of rational choice and to illustrate the conflict existing between the individual benefit and the collective property^{ix}; it meant a great surprise to the mathematicians, psychologists, economists and biologists that have studied in depth the diverse strategies of the theory of games^x. In the free software it means the desire that everybody has the same freedom we do have at our disposal.

Stallman, R. was the first in raising the question about the struggle for the freedom of information and divulgation starting from the free software in his book: *"The right to read"* (1984). Another referent of the above discussions is Raymond, E., the author of *The cathedral and the Bazaar* (1997), a classical work in the world of the free software, which contrasts the bazaar pattern to a model of software production, which he called "cathedral pattern"^{xi}, based on the need of an architect managing a rigidly structured and hierarchical staff and the strict control of errors. As another dimension of analysis, we can point out that the activity of these networks is organized on an autonomous basis. Not only can the developers of these networks find but also should find the way of organizing that, their collective activity. It can be clearly seen there how it

is possible for individuals to carry out common activities without any external direction. The novelty introduced by these networks is that they set in motion a non-commanding cooperation pattern^{xii}. What is more, the lack of leadership, corporate or hierarchical control, seem to be a sine qua non condition: there, where command reappears, either under a proprietary interest or under its authoritarian variant, the pattern fades away, becomes exhausted and in the end disappears. No one can demand, there is no guarantee and there is no money as a stimulus to work^{xiii}. At the same time, cooperation is a phenomenon that produces a positive feedback: nobody enjoying the benefits of the free software may avoid promoting the use of it. Therefore, the community keeps a certain proselytizing tone, besides having a more or less generalized perception that the power and the future of the pattern depend very directly on the fact that there are quite a lot of people taking part actively in its development. In these networks there is the coexistence of an approach that is based exclusively on the efficacy, the technical and productive superiority that the bazaar pattern generates, with another one that puts cooperation, ethics and freedom in the first place^{xiv}. The sector that goes beyond the technical superiority and that carries out a bet in favor of the ethical dimension of the free software relies on the strength of the movement and at the time being no alarm is perceived in this sense. It is considered that pattern of the free software production cannot be privatized and recovered by the market, which is reinforced legally (the GPL), technically (the superiority in various magnitude orders of what has being created through the bazaar pattern in contrast with proprietary systems) and politically (some of the most significant promoters of the free software come from countercultural movements or sympathize with causes pro civil rights). However, there is no reason for rejecting a more critical reading capable of making us be alert: the capitalism has been able to "recover", privatize and market nearly all the aspects of production and life, from the material to the immaterial point of view. A materialist ethics that regards freedom and social cooperation as the best way to defend something that is good for everyone and that finds other stimuli different from the economic benefit^{xv}; there is a very important background political matter that differentiates them clearly: whether the software can be privatized or not. Whereas for the pragmatic sector this is not relevant, for Stallman and those who emphasize the ethical vision, this is a central and non negotiable subject: the software, quite different from immaterial property, cannot be

owned, since it can be enjoyed by an indefinite number of individuals without depriving nobody of having it at their disposal at the same time^{xvi}. These characteristics make competitiveness in these networks to have no sense at all, since no competence relationship is established among developers. On the contrary, it is profitable for all the individuals involved, that developers help each other, taking advantage of the others' work and enjoying, consequently, the benefits of cooperation.

As we can see, The "Self-organizational approach" for developing information products has been fantastically successful, particularly in the area for which it has been developed. On the other hand, apart from the software, there are other important successful projects of the Open Source, such as the Red Académica Electrónica de Clacso www.raec.clacso.edu.ar, a project of writing and open publication, database, radio, video, bibliography and wiki. The interesting point in the RAEC is that it does not constitute a technical innovation and it does not concern the matter of whether a certain information is worthy of credit or not.

What the RAEC is developing is to modify the parameters of the production of knowledge through its wiki and to draw out a new pattern for carrying out the content through collective contributions in CLACSO's network, and eliminating the role of the traditional author (social scientist) that is opposed to CLACSO's full text digital library, which keeps the pattern of the traditional author and just modifies the process of broadcasting or divulgation of ideas and knowledge in social sciences.

However, especially outside the software's domain, open source projects remain relatively marginal. This can be partly explained through the relative novelty of the approach and, above all, because it is motivated by the fact that they are complex collaborative processes, in which social bonds, gratuitousness and self-organization are also like this. The current development pattern is based on a specific number, though not acknowledged, of conditions restricting its applicability to more diverse contexts, as for example the production of literary works. The space delimited by these conditions is quite large and not completely explored yet. Only a few could have predicted the success of Wikipedia (an international project managed by volunteers, with the scope of creating a free and gratuitous encyclopedia), only three years ago, although the free Software had already reached success in that moment. However, it is clear to do research on how

these networks, such as RAEC, are going to maintain themselves in the future within a world with such generosity. Can it turn out to happen that what is gratuitous at present might provide great value in the future? To what extent may the generosity that is in the domain of these networks at present become wealth in the future?

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ⁱ The word "free" refers to freedom, not gratuitousness. To get GNU software a price may be paid or not. Anyway, once the software is achieved, there are three specific types of freedom for using it. Firstly, the freedom to copy the program and give it out; secondly, the freedom to change the program as desired, because of having complete access to the source code; thirdly, the freedom to distribute an improved version contributing, thus, to build the community.

- ⁱⁱ Researcher of the Artificial Intelligence Laboratory of the Massachusetts Institute Technology (MIT). It was 1984; he left the MIT and works together with other hackers interested in the GNU project.
- ⁱⁱⁱ Free operative system based on Linux nucleus. The [Proyecto GNU](#) started in 1984 with the scope of developing a complete operative system type Unix from [software libre](#). See <http://www.gnu.org>.
- ^{iv} According to Raymond, the bazaar programming is summarized in three principles: 1) liberating quickly and often; 2) distributing responsibilities and duties as much as possible and 3) being open even as far as promiscuity in order to encourage cooperation at the most. Even though these rules are observed, the bazaar pattern is not always possible: it can only take place in an environment of freedom, cooperation, community and having the open code available.
- ^v The GPL or Licencia Pública General (General Public License) is the legal expression of the copyleft concept. As time went by, the GPL has become the foundation of the free software, its legal bastion, and constitutes, for many people, an extraordinary exercise of legal engineering: with the GPL it is assured that works arising from cooperation and collective intelligence do never stop being public property freely available, and that any development derived from it may become public and free, as if by magic. The copyleft made use of the international laws of copyright to turn them over, since it protects the use instead of the property.
- ^{vi} The word hacker does not refer to "computing pirate", but in its original meaning, just as Eric Raymond, for example, defines it: "There exists a community, a shared culture of expert programmers and networks gurus, whose history can be traced from decades before to the first shared time mini-computers. The members of this culture coined the word hacker".
- ^{vii} By having the source code at one's disposal it is possible to locate errors and correct them, and even to detect the existence of maligned code (virus), which power companies and groups may possibly introduce into the programs and closed operative systems, as a way of controlling and striking privacy.
- ^{viii} See, for example, Juan Antonio Martínez's article, "Free Software (Software libre): an approximation from the games theory", in Linux Actual, num 11.

- ^{ix} The creators of the "prisoner's dilemma" illustrated it as follows: two people, detained and suspect of committing a crime are placed in separate cells and are interrogated. Each one is invited to betray the other colleague, turning into a repentant individual. What is going to happen depends on what both prisoners do, and none of them knows what the other has said. If both shut their mouths (that is, if they mutually cooperate, according to the games theory), they will be condemned to a minimum punishment of one year due to lack of evidence. If they accuse each other (that is, they do not mutually cooperate, according to the games theory), they will serve a three-year penalty. But if only one of them accuses the other, he/she will receive a reward (and will be free), while his/her accomplice shall go to prison for five years. In view of this dilemma, and supposing that both of them are motivated by a rational interest and that they cannot speak to each other in order to make an agreement, it seems as if the only rational option is to mutually accuse in order to minimize the punishment (he/she shall be free if his/her accomplice shuts the mouth and shall serve a three-year penalty if he/she speaks; instead, he/she may be given a five-year penalty if he/she shuts the mouth and his/her accomplice speaks). The most rational option will force them to accuse mutually and get a greater punishment. Unless the player is unwary, he/she will have to reject the most desired solution for both – the cooperation (that is, staying quiet). This dead-end dilemma has made generations of games theoreticians become crazy, and only by means of a variant called the "repentant prisoner's dilemma", which consists of being able to play the game several times while observing the other's behavior, could they find a way-out condition.
- ^x See Richard Dawkins' work: *The selfish gene*, published in its second edition in 1989. The chapter: "Good boys finish first" is especially relevant for this matter .
- ^{xi} It should be more precise to call the hierarchical and planned pattern that Raymond describes in his article: "pyramid pattern"; the "cathedral pattern" does not correctly describe the phenomenon, since the construction of gothic cathedrals was owed to the 'compagnons', nomadic and itinerant groups of the bricklayer, carpenter, blacksmith, etc. sort, who built them here and there, spreading works with no division between manual and intellectual craft, and with a decentralized and autonomous planning and construction: "To the ground plan of the gothic compaignon, the metric plan on the architect's paper is opposed exterior to the work." (Gilles Deleuze and Félix Guattari, *Mil mesetas (A thousand plateau)*, Pre-Texts, 1988).
- ^{xii} In the *Grundrisse*, a text that prefigures our times more than a hundred years before, Karl Marx resorts to the general word intellect (or "general intellect") to refer to the collection of the types of abstract knowledge (of "epistemological paradigms", as we would say at present), which, at the same time, constitute the epicenter of social production and organize the whole context of life. A "brain" or general intellect, based on cooperation and abstract knowledge, including scientific knowledge, which tends to become, by virtue of its autonomy with regard to production, non less and non more than the main productive force, pushing the parceled-up and repetitive work of the industrial production to a marginal position.
- ^{xiii} "In fact, a lot of people are going to program with no monetary incentive at all. Programming has an irresistible fascination for some individuals, usually for the best ones in the area." (R. Stallman, *El Manifiesto (The Manifest) GNU*, 1985)
- ^{xiv} "It may be possible that in the long run the culture of the free software succeeds, not because the cooperation is morally correct or because the 'appropriation' of the software is morally incorrect (supposing that the latter is really believed, which is not certain neither for Linus nor for me), but just because the commercial world cannot win an evolutionary armament race to the free software communities, which can set greater orders of qualified time magnitude into a problem than any company." (Eric Raymond, "La catedral y el bazar" (The cathedral and the bazaar), 1997)
- ^{xv} "There is no scarcity of professional musicians that go on with their business although they have no hope of making their living through this way. [...] For more than ten years, several of the best programmers in the world have been working in the Laboratorio de Inteligencia Artificial [from the MIT] (Artificial Intelligence Laboratory) for much less money than what they could earn in another places. They got various kinds of non monetary bonus: fame and esteem, for instance. And creativity is also enjoyed; it is a prize in itself." (Richard Stallman, *El Manifiesto GNU*, 1985)
- ^{xvi} "Since I dislike the consequences derived from the fact that everybody captures information, I should regard the fact when somebody does so as

wrong. Specifically, the desire to be granted a reward on account of the own creativity, does not justify to deprive the world in general of all or part of that creativity." (Richard Stallman, El Manifiesto GNU, 1985).