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The Digital Commons: Escape from Capital?

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Section list

1.0 Introduction

This thesis analyses a selection of digital commons projects using a range of theoretical tools, to assess their relationship to the capitalist mode of production. The projects studied are Linux, a piece of computer software; the Wikipedia encyclopedia; and Open Street Map, a database of geographic information. Where necessary, I will also include examples from other digital commons projects. The Digital commons have been defined by Mayo Fuster Morell as

> information and knowledge resources that are collectively created and owned or shared between or among a community and that tend to be non-exclusivedible, that is, be (generally freely) available to third parties. Thus, they are oriented to favor use and reuse, rather than to exchange as a commodity. Additionally, the community of people building them can intervene in the governing of their interaction processes and of their shared resources [1]

The status of these projects as digital commons is maintained through the licenses they are released under, which define rights allowing relatively unhindered inspection, use, modification and redistribution of the artefacts so assembled [2]. These licences further prevent the projects being enclosed or privatised, as any modifications must be returned to the commons.

The digital commons has further been hailed as communist [3], anarcho-communist [4], anti-capitalist [5] and neighbourly [6]. These descriptions all point to a form of social organisation that operates outside any direct exchange relationship, not demanding any money or other commodities in return for accessing its use-value, instead offering

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1   Mayo Fuster Morell, 'Governance of Online Creation Communities: Provision of Infrastructure for the Building of Digital Commons' (Ph.D., European University Institute, 2010), 5, http://www.onlinecreation.info/?page_id=338.

2   Free Software Foundation, Inc., 'The Free Software Definition', *GNU Project - Free Software Foundation*, 2010, https://www.gnu.org/philosophy/free-sw.html.

3   Eben Moglen, 'The dotCommunist Manifesto', 2003, http://emoglen.law.columbia.edu/publications/dcm.html.

4   Richard Barbrook, 'The High-Tech Gift Economy', *First Monday* 3, no. 12 (7 December 1998).

5   Andre Gorz, *The Immaterial: Knowledge, Value and Capital*, trans. Chris Turner (London; New York; Calcutta: Seagull Books, 2010), 125.

6   Richard Stallman, *Free Software Free Society: Selected Essays of Richard M. Stallman*, ed. Joshua Gay, 2nd ed (Boston, MA: GNU Press, Free Software Foundation, 2010), 3.

a more social way of conducting relations around the artefacts assembled. In addition, due to the nature of the licenses under which the artefacts of the three case studies are released, and as noted by Eric Raymond, there is little potential for dictatorial behaviour, or the hierarchical organisation of those who take part in the assembly and maintenance of the projects [7]. Commoners are relatively free to take part in a project or not, and to have their views heard on a basis of equality. As such, the methods employed by the projects offer the possibility of an escape from the prevailing current system of production and consumption, the state of affairs which dictates all relationships must be capitalistic, all human existence can be expressed through exchange in a 'free' market which is the ultimate device for allocating resources. However, as I will argue in the analysis that follows, in part three of this thesis, the digital commons may not be as egalitarian and non-exploitative as its proponents present it. It further appears to offer another area of activity that has become enclosed by capitalist relations.

The mode of production that characterises the digital commons represents the third paradigm of production since The Middle Ages, the first being land-based production, in the form of growing crops, renting land, grazing cattle or using simply processed materials such as wood and stone for construction. During the Industrial Revolution, a second mode of production came to the fore, organised around the mass manufacture and consumption of a proliferating range of material goods, from clothes, furniture and kitchen utensils, to pens and cars. With the progressive decline of this manufacturing base, it has been argued, the capitalist system has become increasingly reoriented around immaterial production based on service work, education, affective labour and the manipulation of symbols and images [8].

Each of these stages of capitalism has been characterised by a consistent push to commodify common pool resources and mobilise them in the pursuit of private gain. In the first phase, this took the form of the appropriation of common land and later encompassed the drive to privatise state owned assets and enterprises, each of which were built through mass human labour. In its present incarnation over the last 50 years of capitalist accumulation, it has sought to enclose immaterial artefacts. Cultural works such as folk music are enclosed by recording and

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7   Eric S. Raymond, *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*, ed. Tim O'Reilly, 2nd ed. (Sebastopol, California: O'Reilly, 2001), 88.

8   Michael Hardt and Antonio Negri, *Empire* (Cambridge, Mass: Harvard University Press, 2000), 285.

publishing companies, with assistance from their employees, musicians such as Jimmy Page [9] and Mick Jagger. Pharmaceutical companies are patenting life forms and traditional knowledge which is then sold for profit [10]. During the computer revolution of the 1970s and 1980s, a number of software projects were privatised, despite the unpaid labour by numerous students, academics and other unnamed contributors [11]. All of these represent a privatisation of the immaterial commons.

There has been a continual tension between this impetus to enclose and the idea of the commons, as store of collectively owned and managed resources, operating outside the reach of the market, and governed by the same commoners who maintain and use the artefacts [12]. Through an aversion to privatisation of the cultural commons, there is thus an indication of resistance not only to modern capital and its desire to enclose, but to any form of hierarchical, transcendent structure. This thesis follows this dialectic of commons and enclosure into the digital arena.

The analysis I will carry out focusses on an examination of the digital commons relative to the capitalist mode of production, through Karl Marx's *Capital, Volume 1* [13], and *Economic and Philosophic Manuscripts of 1844* [14], the first of which is the defining critical analysis the capitalist mode of production, while the second lays out a detailed study of alienation due to capitalist waged labour. It is pertinent to use Marx's work as he describes important aspects of the capitalist mode of production, the particular concepts I will use here are class, commodities, alienation, commodity fetishism and the extraction of surplus-value to produce profit.

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9   Kembrew McLeod, *Freedom of Expression®: Resistance and Repression in the Age of Intellectual Property* (Minneapolis, MN: University of Minnesota Press, 2007), 33.

10 Ibid., 40.

11 Peter Wayner, *Free for All: How Linux and the Free Software Movement Undercut the High-Tech Titans*, 1st ed (New York: Harper Business, 2000), 42.

12 Charlotte Hess and Elinor Ostrom, 'Ideas Artifacts and Facilities: Information as a Common Pool Resource', *Law and Contemporary Problems* 66, no. 111 (2003): 112.

13 Karl Marx, *Capital: A Critique of Political Economy*, trans. Ben Fowkes, vol. 1, The Pelican Marx Library (Harmondsworth: Penguin Books in association with New Left Review, 1976).

14 Karl Marx, *Economic and Philosophic Manuscripts of 1844*, ed. Dirk J. Struik, trans. Martin Milligan (New York: International Publishers, 1959).

However, a series of writers in the 1960s and 1970s identified a break with Marxist tradition, partly as a result of the failure of the May 1968 strikes and revolt in Paris, and turned to the work of various American sociologists writing on postindustrialism [15] to explain these problems. This group included Foucault, Baudrillard and Lyotard, who posited a turn from modernity to postmodernity, and an attendant dissatisfaction with the supposedly totalising nature of Marx's theories. Marx carried out his analyses of the capitalist mode of production in a period when production was dominated qualitatively by the the male labourer carrying out physical tasks in the factory to produce material goods. However, as demonstrated by theorists including Daniel Bell in his work *The Coming of Post-Industrial Society* [16] this model is no longer characteristic of capitalist production, at least in Western nations. Since the 1950s in the USA, and later in Western Europe, the dominant mode of production has shifted to immaterial labour, which encompasses the knowledge economy and service industry [17]. One of the results of this shift was a conflict with traditional Marxist economics and the model of the waged labour as the sole generator of wealth. Secondly, as the revolts had demonstrated, the workers should no longer be thought of as the sole agents of revolution, students having taken a leading role in the events of 1968.

This conflict resulted in three divergent but related strands of thought. Firstly there were those who suggested the situation was congruent with Marxist thought, the events of 1968 and changes to labour–capital relations represented nothing more than an intensification of modernity, and the existing theories were still valid. They further contended that although there was an increase in the numbers carrying out intellectual and affective labour, the dominant model was still the mass production of material goods, an the base/superstructure model remained intact. Jameson's work *Postmodernism, or the Cultural Logic of Late Capitalism* [18] was a defining piece, which argued that Marxism was still appropriate, but the precise model had now shifted to that of late, or international, capitalism.

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15 Nick Dyer-Witherford, *Cyber-Marx: Cycles and Circuits of Struggle in High-Technology Capitalism* (Urbana: University of Illinois Press, 1999), 166.

16 Daniel Bell, *The Coming of Post-Industrial Society: A Venture in Social Forecasting* (London: Heinemann Educational Books, Ltd., 1974).

17 Ibid., 16.

18 David Jameson, *Postmodernism, or the Cultural Logic of Late Capitalism*, n.d.

A second group suggested this was not the case, pure Marxism was incompatible with the new models of production and consumption, and importantly social struggles, thus requiring addenda to account for postmodernity and its focus on language as a critical element [19]. This trajectory of thought was itself split into two sub-groups, characterised by those who took a post-Marxist perspective, and those who took an autonomous-Marxist position. The first sub-group, whose position was summarised by Laclau and Mouffe's *Hegemony and Socialist Strategy: Towards a Radical Democratic Politics* [20], suggested the labour-capital relations which lies at the heart of Marxist thought is an oversimplification, that there are many struggles at play, and thus moving beyond capitalism is no longer the sole aim of any social struggle, but one of many [21].

The latter sub-group represents an acknowledgement that Marxist theory and postmodern theory need not be opposed to each other, that there are possibilities to account for both. It developed out of studying Italian social struggles in the 1960s and 1970s, the definitive works being those by Antonio Negri and Mario Tronti, although notable mentions should also go to Maurizio Lazzarato and Franco Berardi. The Italian struggles of this period were of interest to this group as they did not follow the pattern of formal labour action, as was common in Western labour movements of the time, but were regarded as unofficial, not emanating from, or being sanctioned by, any political party or labour union [22]. This tallied with the events of 1968 in Paris, when many were disillusioned by the French Communist party's apparent collusion with the government, through their lack of support for, or even understanding of, the revolt [23]. Further, the autonomist position advanced by Negri declared a change to the model of the wage factory or office worker as the sole source of wealth, suggesting instead that "the factory spreads throughout the whole of society … production is social and all activities are productive." [24], thus recognising a

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19 Dyer-Witherford, *Cyber-Marx*, 168.

20 Ernesto Laclau, *Hegemony and Socialist Strategy: Towards a Radical Democratic Politics* (London: Verso, 1985).

21 Ernesto Laclau and Chantal Mouffe, 'Hegemony and Socialist Strategy', in *Post-Marxism: A Reader*, ed. Stuart Sim (Edinburgh: Edinburgh University Press, 1998), 14.

22 Michael Hardt and Paolo Virno, eds., *Radical Thought in Italy: A Potential Politics*, vol. 7, Theory Out of Bounds (Minneapolis, MN: University of Minnesota Press, 1996), 2.

23 Dyer-Witherford, *Cyber-Marx*, 166.

24 Antonio Negri, 'Interpretation of the Class Situation Today: Methodological Aspects', in *Theory and Practice*, ed. Werner Bonefeld, Richard Gunn, and Kosmas Psychopedis, vol. 2, Open Marxism (London: Pluto Press, 1992), 85.

change to the mode of struggles against capital, rather than a relegation of the labour-capital relation, as Laclau and Mouffe proposed. Simultaneously, they suggested, production has taken on the characteristic of cooperation, that is the collaboration of workers who relate to each other as peers, rather than through rigid hierarchies [25], which echoes Marx's writings on the "general intellect" [26] and cooperation [27]. This collaborative, social model of production requires a certain freedom for workers, a freedom which coupled with an increase in the communicative and technical skills required for immaterial labour, of workers, and indeed non-workers, raises troubling questions for capital [28]. Further, as the collaborative method labour is fundamentally common it demonstrates further the model of exploitation of the commons, in this case the immaterial commons, which is prevalent under capitalism.

Examining the three possibilities that thus present themselves as a result of the Marxist/postmodern discord, I have chosen the Autonomist Marxist position as instigated by Negri and others, and developed by Hardt and Negri in their Empire trilogy. I have selected this route rather than the pure Marxist or post-Marxist route, as the latter appears to downplay the centrality of capital as the overarching element oppressing the lives of most ordinary people, merely listing it as one of the factors which struggles must focus upon. This is an untenable position in a period where capital has become more powerful than ever, has enclosed more than ever, and is

The pure Marxist method, while still critically important and central to any analysis of capitalist relations is fundamentally incompatible with certain aspects of modern labour. This is particularly so for the methods used in the digital commons, which refute any attempt to quantify in a meaningful way the work carried out, thus demonstrating the invalidity of abstract labour in this situation. As such, my analysis will focus upon Marxist theories, and bring in theories from *Empire* [29], *Multitude* [30] and *Commonwealth* [31] by Hardt and Negri, where

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25 Maurizio Lazzarato, 'Immaterial Labor', in *Radical Thought in Italy: A Potential Politics*, ed. Michael Hardt and Paolo Virno, vol. 7, Theory Out of Bounds (Minneapolis, MN: University of Minnesota Press, 1996), 135.

26 Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy*, trans. Martin Nicolaus (London: Allen Lane, 1973), 706.

27 Marx, *Capital*, vol. 1, chap. 13.

28 Lazzarato, 'Immaterial Labor', 136.

29 Hardt and Negri, *Empire*.

30 Michael Hardt and Antonio Negri, *Multitude: War and Democracy in the Age of Empire* (London: Penguin Books, 2004).

31 Michael Hardt and Antonio Negri, *Commonwealth* (Cambridge, Massachusetts: Belknap Press of Harvard University Press, 2011).

appropriate. These latter texts continue the trajectory Negri traced in the 1970s, and offer a prescient analysis of the current state of the world and capitalism. The first volume of the three has further been labelled as the "Communist Manifesto for the 21st century" [32], recognising its continuation of Marx's thesis of the struggle between capital and labour.

My argument that the digital commons presents a possible escape from capitalism will be examined through detailed studies of three initiatives that have been widely seen as exemplary demonstrations of the digital commons in action. The first instance, the development of the Linux operating system kernel software, has become one of the flagship illustrations of the free software movement, in which commoners develop a part of a computer operating system which is available at no charge to anyone who wishes to use it. It further, although this was not the original intention for it, competes effectively with proprietary software such as UNIX and Microsoft's Windows. The other two cases, Wikipedia and Open Street Map, provide a way into the analysis of collaborative ventures that mobilise a wider range of commoners to assemble archives of information, in the two cases under consideration here, an encyclopaedia and a database of geographical information. This thesis will also examine how far the narratives promoted by enthusiasts of these and other digital commons initiatives correspond to the outcomes of their actions, and how far these instances of the digital commons are subject to processes familiar from studies of the capitalist mode of production.

Immediately following the introduction, I have included a section on the use of language, recognising that the words we use are not neutral, that they imply much about the world around us, while making it appear natural and unquestionable. That section thus sets out words which I will and will not use throughout the rest of the thesis, with explanations for their choices.

Following this, is a description of the three projects I will analyse. Linux [33] and Wikipedia [34] have both been

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32 Slavoj Žižek, 'Have Michael Hardt and Antonio Negri Rewritten the Communist Manifesto for the Twenty-First Century?', *Lacan Dot Com*, 2001, http://www.lacan.com/zizek-empire.htm.

33 Wayner, *Free for All*.

34 Phoebe Ayers, Charles Matthews, and Ben Yates, *How Wikipedia Works: And How You Can Be a Part of It* (San Francisco, CA: No Starch Press, 2008); Andrew Lih, *The Wikipedia Revolution: How a Bunch of Nobodies Created the World's Greatest*

analysed in depth on many occasions, while Open Street Map has received relatively little attention as a target for sociological analysis. As such, the description of the former projects will firstly be drawn from a number of sources, focussing on secondary sources in the form of books, magazine articles and blog posts. These will be backed up with some primary sources from those who take part in the projects. Secondly, as extensive research on these projects already exists, I will not be repeating it here. My own involvement in Open Street Map since 2007 forms the basis of much of the research conducted into that project, thus it will include more primary sources, from documentation and emails written by members of that project, and further be more detailed, as there has been so little written on it previously.

In the third section, I will test the argument that the digital commons poses an alternative to capitalist relations. In order to do so I will draw on the above texts to pose five questions about this thesis:

1. Does the digital commons reproduce or challenge class divisions and relations?

At the centre of Marx's thesis on capitalism is class, defined as whether or not a given person owns the means of production. In Marx's period, the means of production corresponded to land, factories, tools, raw materials and all the other items necessary to produce the material commodities of the day. These were firmly in the hands of the few, leaving the majority with the necessity of selling their labour in order to survive. Within the digital commons, there is a tendency to share resources, to allow the primary artefacts, that is the code, knowledge or geographic data to be freely used, with few restrictions on access. This initially suggests a challenge to class relations, rendering all who take part as one class, coinciding with Marx's pronouncements in the *Communist Manifesto* [35]. This analysis will draw heavily on the work of Erik Olin Wright, specifically his paper *Understanding Class: Towards an Integrated Analytical Approach* [36], in which he takes an integrated approach to analysing class, based upon Marxist, Weberian and stratification analyses.

2. Does the digital commons produce commodities?

The permissive licensing of the digital commons suggests that as there is little possibility of direct payment being

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Encyclopedia, 1st ed (New York: Hyperion, 2009).

35 Karl Marx and Friedrich Engels, *The Communist Manifesto*, trans. Samuel Moore (Harmondsworth: Penguin, 1967), 105.

36 Erik Olin Wright, 'Understanding Class: Towards an Integrated Analytical Approach', *New Left Review* no. 60 (2009): 101–116.

made in exchange for the products, the artefacts assembled will consequently not be commodities. While this is generally true for money exchange, Marx points out that money is merely one form of commodity, albeit a universal form [37]. I contend that within digital commons projects there are a number of other exchange mechanisms in play. For instance, all commonly-used licences require attribution to the original author, suggesting a return of some kind is demanded. This chapter will inspect the three projects under consideration to test this question.

3. Is taking part in the digital commons alienating?

Everyone who assembles digital commons artefacts is free to use them as they wish, implying they are not alienated from their labour. However, due to the permissive licensing, the tasks which the products are put to use are not necessarily always to the benefit of those who assemble them, or within their control. For example, high frequency trading systems in the world of finance are dominated by Linux, possibly to the detriment of those who do not have large sums of money to invest in risky trades [38]; Open Street Map data is now being used by Microsoft [39], previously an avid opponent of the digital commons, who have made numerous interventions against the movement. Similarly, variants of the BSD operating system have been co-opted by Apple to form the basis of their OSX, a decision which upset a number of members of that community, again pointing to the possibility of alienation of labour.

4. Are the artefacts of the digital commons fetishised as commodities?

Commodity fetishism is the process of obscuring the social relations inherent in the assembly and use of a commodity. The artefacts of the digital commons suggest a different relationship. Those commoners who assemble the artefacts often have their name recorded against their work, and also their contact details. This affords the possibility of maintaining a closer relationship between those who make and those who use the artefacts, revealing the artefacts are the product of human labour, not a mystical object with magic properties. This chapter will examine this thesis in more depth.

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37 Marx, *Capital*, 1:180–181.

38 Joab Jackson, 'How Linux Mastered Wall Street', *ITWorld*, 2011, http://www.itworld.com/open-source/193823/how-linux-mastered-wall-street.

39 The Bing Team, 'Bing Engages Open Maps Community', *Bing Community*, 2010, http://www.bing.com/community/Site_Blogs/b/maps/archive/2010/11/23/bing-engages-open-maps-community.aspx.

5. Is surplus-value extracted from the digital commons?

The three nominal leaders of each of the three projects I will be analysing, Linus Torvalds of Linux, Jimmy Wales who heads Wikipedia and Steve Coast of Open Street Map, all appear to derive significant benefits from the projects they are involved in, out of proportion to the work they carry out. This situation resembles a capitalist enterprise, with the associated accruing of profit through the extraction of surplus-value created by others. In the case of Coast and Torvalds, their association with these projects has directly led to well-paid positions at various technology institutions, frequent magazine interviews and guest appearances at conferences. I will use Marx's theories on surplus-value to assess whether these three accrue capital in the traditional sense of the word, or extract other forms of capital instead of money, specifically symbolic capital as referred to by Bourdieu in his *Forms of Capital* [40] and *Practical Reason* [41]. This form of capital represents accruing kudos or prestige by carrying out acts seen as worthy by others, rather than the accumulation of money.

To conclude in section 4, I will draw together the results of these five analyses, and comment upon the overall situation of capitalist relations within the digital commons. Where pertinent, I will offer suggestions for methods to combat these situations, possibly drawing on already existing themes and methods within the digital commons.

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40 Pierre Bourdieu, 'The Forms of Capital', 1986, http://www.marxists.org/reference/subject/philosophy/works/fr/bourdieu-forms-capital.htm.

41 Pierre Bourdieu, *Practical Reason: On the Theory of Action*, ed. Brian McHale, trans. Gisele Sapiro, Loïc Wacquant, and Randal Johnson (Stanford, CA: Stanford University Press, 1998).

1.1 Language

A language is a reflection of its culture, and importantly reflects power interests [42]. We find that many words in use today, in many realms, appear benign, neutral, and merely as pointers towards a set of concepts. What is not so immediately clear or obvious is the effect these words have upon how we behave. While writing this piece, I encountered numerous difficulties in choosing which words to use to describe different concepts, situations, items and people.

Production and consumption are two words that cause particular problems, their use implying a set of commodity relationships, born out of our modern capitalist system. As Rifkin points out, the meaning of the word consumption is "to lay waste, to pillage, to exhaust and deplete" [43]. The most important thing about a consumer item thus being that the consumer ensures there is none of it left, ignoring any use-value they may find in it, thus echoing the commodity nature of it, that is the importance of exchange-value relative to use-value. There have been various linguistic attempts to break away from the production-consumption dichotomy, some of the most recent being the idea of prosumption, and produsage [44], the first of which was ably dismantled by Comor [45]. Both concepts construct those who interact with commodities as a person who produces and consumes, and both miss the mark by failing to offer a substantive critique of what consumption and production are, their effects upon the world at large and their relationship to capitalist modes of production.

The related terms, producer and consumer exacerbate this problem presuppose a class system and a division of

42 Pierre W. Orelus, *Rethinking Race, Class, Language, and Gender: A Dialogue with Noam Chomsky and Other Leading Scholars* (Lanham, MD: Rowman & Littlefield, 2011), 117.

43 Jeremy Rifkin, *The Age of Access: How the Shift from Ownership to Access Is Transforming Modern Life* (London: Penguin, 2000), 141.

44 Axel Bruns, *Blogs, Wikipedia, Second Life, and Beyond: From Production to Produsage*, Digital Formations v. 45 (New York: Peter Lang, 2008).

45 Edward Comor, 'Contextualizing and Critiquing the Fantastic Prosumer: Power, Alienation and Hegemony', *Critical Sociology* 37, no. 309 (20 September 2010): 310–328, doi:10.1177/0896920510378767.

labour, in which one group of individuals makes things, and another group uses them [46]. If the digital commons in particular and the commons/communism in the larger sense are to become more prominent as the thesis here partly indicates, then the use of words to describe how we relate to the commons need to be chosen carefully.

The first, and most obvious decision was to not label people who are involved in the commons, but to refer to them by the immediate function they are carrying out. So, for example, I decided not to call a Linus Torvalds "a coder" as that renders him static, objectifies him and indicates a division of labour, but rather to label the work he does on the Linux kernel as coding or contributions. To put it another way, Linus Torvalds is not *an* anything, but *the* Linus Torvalds, the only member of a set made up of himself. He is unique, not merely another example of something or other [47].

However, this only partly rectifies the problem, and still implies a division of labour, as the language indicates there are still those who mainly produce, and those who mainly use. Thus, how do we indicate a potential destruction of the differences between the two, a removal of class barriers, as demonstrated in section 3.2? As I am discussing the commons and our relations to it, I have settled on the word 'commoner', which will apply equally to anyone who comes into contact with the digital commons, regardless of why or how, whether they are contributing code, using the artefacts or writing documentation.

A similar situation exists with the language we use to describe the things of the digital commons themselves, in this case the Linux operating system kernel, the Open Street Map geographic database and the Wikipedia encyclopedia. It would be simple to refer to them as products or content, but this is problematic, aince as Stallman suggests in an essay which partly inspired this chapter: "It regards these works as a commodity whose purpose is to fill a box and make money. In effect, it disparages the works themselves." [48].

To resolve this, I will refer to the things as artefacts, a word which in this context brings with it relatively little baggage, although this in itself only resolves part of the problem. Artefacts are an intermediary in the social

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46 Wright, 'Understanding Class'.

47 David Graeber, *Debt: The First 5,000 Years* (Brooklyn, NY: Melville House Printing, 2011), 158.

48 Stallman, *Free Software Free Society*, 94.

relations of people, and thus like the people are continually evolving. They are elements of communication which reflect social reflections. Unlike a purely commercial relationship based on sharing and reciprocity is assumed to be ongoing. Thus, again to suggest a thing is "an" anything renders it as fixed and unchanging. The attentive commoner accessing this work has no doubt already noticed the refusal to use the word Contents when referring to the sections which this artefact is comprised of.

2.0 Overview

This chapter lays out an overview of the digital commons in general, explaining some key concepts essential to understanding its development, and in the following three chapters explains relevant parts of the history, methods, and effects of the three case studies I will examine later. The overview of the three projects will be roughly organised under the following sub-headings. These sub-headings loosely encompass the "Six Ws", a series of questions posed in various settings including journalism [49], police interviews, project management and social research. They also roughly chart a trajectory from the early beginnings of the project, through the development of methods and mechanisms and the expansion to a wider community, to widely-recognised quality, and influence beyond the project.

Project summary

An outline of what the project is, the key personnel, how and why it came into existence.

Contribution mechanisms

I will then move on to the mechanisms of contribution, including brief technical descriptions where necessary.

Community

The third section will describe the community, how its members interact, how disputes are settled, and any governance issues.

Wider significance and influence

The three projects being analysed are all significant in the wider world, and have influenced many realms within computing and elsewhere. This section will detail these.

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49 Owen Spencer-Thomas, 'Writing a Press Release', *Owen Spencer-Thomas*, 20 March 2012, http://www.owenspencer-thomas.com/journalism/media-tips/writing-a-press-release.

2.1 The Digital Commons

The Digital Commons is a subset of the wider cultural commons, which includes all the ideas, information and creative works in the public domain and available for use outside the price system. From the beginning of modern capitalism the idea of a common pool of freely available cultural resources has been in tension with the notion that symbolic goods constitute a form of private property to be sold or rented out in return for payments to their owner, who might be either the original creator, the company responsible for producing and distributing them, or a combination of the two.

This shift in the conception of artists and authors coincided with the move from patronage to markets as the primary source of income, raising the question of how creative workers could be appropriately recompensed when reproductions of their works were circulating in the public domain. The answer was the institution of intellectual property regimes centred around copyright, giving authors and publishers sole ownership and the exclusive right to reproduce a designated work for a set period of years. These provisions did not however apply to the myriad anonymous works, such as folk songs, tunes and tales, that were the common currency of everyday celebration and festivity, recounted and performed primarily for no recompense. This extensive common pool of cultural resources provided a rich resource for generations of professional practitioners, aided and abetted by companies wanting to convert freely available material into saleable cultural commodities.

As an alternative to this unprotected pool of cultural resources, stands the digital commons, which covers many areas of immaterial artefacts, and is protected from privatisation by copyleft licenses which demand they remain as common. There are currently over 100,000 pieces of free software available at Sourceforge.net [50], a popular free software portal. In addition to this are further projects hosted on other free software hosting sites, such as github.com, freshmeat.com, as well as those hosted by the maintainer, including the larger projects such as Linux, Libre Office and Mozilla Firefox. Laurence Lessig and James Boyle further applied the concept to artistic works including books, poems, music, art and photographs, when they launched Creative Commons and its associated licences in 2002; there are now 362,000 music tracks on the music site Jamendo [51], in excess of 200 million photos

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50 Sourceforge, 'Download Free Open Source Software', *Sourceforge*, 2013, http://sourceforge.net/directory/.

51 The Jamendo Team, 'Wishes', *Jamendo*, 2012, http://marketing.jamendo.com/Wishesjamendo/index.html.

on Flickr [52], over 4 million articles on the English version of Wikipedia alone [53], and no doubt many millions of artefacts in other locations. The digital commons encompasses a substantial arena, despite smear tactics by companies such as Microsoft, and ideologically-based fears that anything made for free, often by volunteers with little formal training, can be of any use.

The three projects which have been chosen for this work are all prominent within the digital commons, while being from three separate realms, namely software in the form of Linux, knowledge (Wikipedia) and data (Open Street Map). Nevertheless, all three strands and thus all three projects have their roots in the same idea, that of freedom for information, and there are some commoners who contribute to more than one of the projects, thus blurring the distinction between them. Further, they are all important in mainstream areas of life, Linux being popular for computer servers, particularly on the web, and as part of the Android smart-phone environment; Wikipedia for access to general information; and Open Street Map being used by Apple and Microsoft for their online mapping services.

The particular licensing schemes of these artefacts was developed as a response to moves to enclose and commodify previous works under copyright. Ironically, none of these works would be protected were it not for the processes of copyright which I outline below.

Prior to the Royal Charter received by the Stationers' Company in 1557, and the enactment of the Statute of Anne in 1710, the idea of copyright and any intellectual property rights were close to non-existent, at least when compared to today's capitalist copyright legislation. Before these events, any control over publishing of material had been more concerned with censorship, and restricting the flow of, for example, Lutheran texts in the time of Henry VIII. In this pre-copyright period, before the spread of Caxton's printing press, any immaterial cultural artefact, such as a song, a story or a poem was passed on from person to person, often being modified as it went, whether through mistake, a wish to embellish, or for any other reason a person decided. The idea of an artefact being static, as they

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52 Yahoo! Inc., '200 Million Creative Commons Photos and Counting!', *Flickr Blog*, 5 October 2011, http://blog.flickr.net/en/2011/10/05/200-million-creative-commons-photos-and-counting/.

53 Wikipedia contributors, 'Statistics', *Wikipedia, the Free Encyclopedia* (Wikimedia Foundation, Inc., 28 January 2013), https://en.wikipedia.org/wiki/Special:Statistics.

are in the age of mechanical reproduction, would have seemed alien. As such, no-one could lay claim to a work, they were generally the work of many, and controlling their spread would have been close to impossible.

Through the seventeenth, eighteenth and nineteenth century, there was a vast enclosure process of common land in the United Kingdom and other Western nations, a process of forcing the peasantry off the land, and thus requiring them to take on waged labour as a means of supporting themselves. A similar process of privatisation was later carried out with human labour: capitalist organisations were employing increasing numbers of workers to produce commodities, thus enclosing the products of manual labour. At the beginning of the 18th century, in capitalist nations including Britain and later the US, copyright rules similar to those we recognise today were put in place, vesting the right to ownership of an intangible, immaterial property in the hands of the nominal creator, being the person who recorded it, either on film, paper, audio recording device or other medium.

This notion of copyright, however, required other changes to society, particularly in the area of recognising the origin of a work. Without a designated creator, the work could not be owned by anybody. Throughout the Middle Ages in Europe, cultural production was widely identified with mastery of a set of craft skills and much of what was made was unsigned or unattributed. This relative anonymity ended with the invention of authorship in the Renaissance, a move given impetus by the publication of Giorgio Vasari's hugely influential work, *The Lives of the Artists* [54], which described the painters and sculptors he featured, not as makers, masters of their craft, but as creators, a term previously used exclusively to describe God's creation of the world in the Biblical book of Genesis. The notion that cultural creators were God-like in their power to see beyond the horizons of mundane perception and their ability to conjure up entirely new worlds and experiences using only the force of their imagination laid the basis for new claims to reward. Exceptional creativity was seen to deserve exceptional payment. Once the ideas of authorship and copyright had been embedded in society, capitalists were able to enclose not only the material commons, but the immaterial commons, closing off a substantial portion of the world's cultural heritage.

During the past three centuries of intellectual property, numerous pieces of obviously societally created works have been privatised, been described as created by one person. This process accelerated during the 20th century, with artists such as Woody Guthrie, The Rolling Stones and Led Zeppelin appropriating the works of others. In all cases,

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54 Giorgio Vasari, *The Lives of the Artists*, World's Classics (Oxford ; New York: Oxford University Press, 1991).

further unauthorised use of what became their material has been prevented by their estate or music label. In a particular irony, the first of these artists made his fame in part through being an unabashed socialist who believed in common property and sung about the evils of privatisation [55]. In his defence, Guthrie made numerous statements that he was happy for others to 'steal' the songs he performed, the protection of his work appears to be the decision of the guardians of his estate since his death. The documentary *RiP!: A Remix Manifesto* goes into some detail on the use of a particular guitar riff, tracing its use via Robert Johnson, Muddy Waters and Jimmy Page of Led Zeppelin, noting how the latter copyrighted it and claimed the royalties, despite it being the work of countless blues and folk musicians over many decades, none of whom he acknowledged nor shared royalties with [56]. There are further echoes of this enclosure in the world of patented medicines. Various drug companies discover treatments for diseases, based upon traditional remedies as developed by civilisations over hundreds of years, a practice particularly common in the Amazonian rain forest. The knowledge is not considered formal and thus owned until it is written down by Western academics, patented and turned into a saleable product. The drug companies make large profits, the people who developed the treatment over hundreds of years get nothing [57].

A similar process of enclosure has happened in the 20th century in the realm of computer software. Heavy regulation of the telephone system in the United States included a provision for AT&T to put together a so-called blue sky division called Bell Laboratories, that is a part of that company which would undertake research which did not have an immediately obvious profit. A variety of key technologies were created, including the transistor and the C computer programming language. Also developed was UNIX, a computer operating system, a computer operating system being a coherent collection of pieces of software which allows a person to control a computer as he or she desires, including not only the applications with which the user interacts directly, such as an email client or web browser, but also the underlying software which processes data, interacts with hardware and allows connections to networks. The software was originally developed as a side project by Ken Thompson and colleagues to play a computer game, but later became one of the most important operating systems in the West, being extensively used by universities and large corporations [58]. As a further part of AT&T's charter, they were required to

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55 McLeod, *Freedom of Expression®*, 23–27.

56 Brett Gaylor, *RiP!: A Remix Manifesto* (Documentary, Canal D, B-Side Entertainment, 2008).

57 McLeod, *Freedom of Expression®*, 52–56.

58 Simson Garfinkel, Daniel Weise, and Steven Strassmann, eds., *The UNIX-Haters Handbook* (San Mateo, CA: IDG Books, 1994),

share UNIX, including the source code, with various institutions [59]. Source code is the text commands which are later converted into a piece of software which a computer can execute, allowing a person using the software to exert control over it. As part of this sharing, those who used UNIX made modifications and improvements to the code, and submitted them back to Bell Laboratories for inclusion in later releases. In 1984, as part of the neoliberalisation policies of the Reagan administration, AT&T was deregulated, amongst other things allowing the UNIX software to be treated as any other intellectual property [60]. The company began selling copies of the software, charging extra for source code and forcing anyone who received it to sign a non-disclosure agreement, thus preventing it from being redistributed. They also did not acknowledge or pay for any of the improvements made by those outside AT&T, most of them having been given to that company in a very informal manner, with no thought of copyright ownership. This enraged a number of university academics including Richard Stallman, who had been informally contributing to the software for many years, and modifying it for their own purposes [61]. The process of no longer releasing source code to those who used the software, and importantly allowing it to be passed on, was repeated at many other software companies. One particular instance was highlighted again by Richard Stallman. The Artificial Intelligence Lab he worked in had a Xerox printer, and software written by Xerox to control it. The source code for the software had previously been given alongside the printer, allowing those who used it to make modifications which were appropriate to their use. Later, upon receiving a newer printer, the source code was not available, and modifications could thus not be made [62]. Stallman was again affected by the decision to enclose software, when the AI Lab switched from the freely shared Incompatible Timesharing System to proprietary software from Digital. As the software was proprietary, changes could not be shared, which Stallman decided was an unforgivable, unsociable act. He quit his position and started the GNU project, which promised a free-to-share UNIX compatible system [63].

The name of this project reflects a common practice when choosing monikers for free software projects: the use of recursive acronyms. In this instance, GNU stands for GNU's Not Unix, reflecting the influence of the earlier

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59 Wayner, *Free for All*, 34.

60 Ibid.

61 Ibid., 42.

62 Stallman, *Free Software Free Society*, 49.

63 Ibid., 7–8.

operating system. The question is then often asked "What does GNU mean?", to which the reply is, of course, "GNU's Not Unix", and so on. Some may notice that any letter would suffice here, the G is arbitrary and could be the letter A, Q or anything else. It did however allow the abbreviation to be an acronym and to form an English word, an antelope-like creature which is reflected in the choice of logo. A similar naming method was used for the PNG, or "PNG's not Gif", image format. Gif is an image format which was enclosed by patents until 2000, and could not be released as free software, thus inciting the creation of PNG [64]. In an effort to generalise the animating philosophy behind the GNU initiative, Stallman formed the Free Software Foundation, and released the software under a license he wrote named the GPL, or General Public License. The principle of the license revolves around The Four Freedoms, which guarantee the following for a piece of software:

0. The freedom to run the programme, for any purpose

1. The freedom to study how the programme works, and change it to make it do what you wish. Access to the source code is a precondition for this.

2. The freedom to redistribute copies so you can help your neighbour.

3. The freedom to distribute copies of your modified versions to others. By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this [65].

The first freedom is numbered "0" rather than "1" in reference to a programming convention in which most collections of data, such as a list of dates or names, are numbered from zero rather than one, and Stallman followed this convention when collecting together the essential freedoms of software.

A number of other licences were later written by Stallman, including the LGPL or Library (later Limited) General Public License; the Affero General Public License and the FDL, or Free Documentation License. These were again concerned with free software, or in the latter case with its documentation, with subtle changes for different situations, but were aligned with the same principles.

The various licences were later modified, to prevent groups trying to get around the requirements to share with the community. A variety of other, similar licences were also written at the Berkeley campus of University of

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64 Ibid., 148.

65 Free Software Foundation, Inc., 'The Free Software Definition'.

California; the Apache Institute, a free software umbrella movement and Massachusetts Institute of Technology. These are respectively known as the BSD, or Berkeley Software Development; Apache and MIT licences. Between them, these four groups of licenses account for the majority of free software released over the last 30 years [66].

In 2002, Laurence Lessig and James Boyle, legal academics at Harvard University, formed 'Creative Commons', an institution to promote the free distribution of creative works. As Lessig was at pains to point out, he supported the basic principle of copyright but was opposed to its current application in the United States, which he saw as too far-reaching and draconian, and an unwarranted barrier to the circulation and adaptation of ideas and expressive forms necessary to stimulate creativity and innovation. They released a number of licences, known as the Creative Commons licences. These were similar to the GPL written by Stallman, in that they enforced a set of freedoms for the re-use of artefacts. They were however designed not for computer software, but for artefacts including stories, poems, music, photographs and art. They are also modular, thus simplifying the process of adding or removing clauses, including allowing or disallowing commercial uses of the artefacts so licensed.

Intellectual property in most capitalist nations consists of three, or sometimes four, areas. These are copyright, trademarks, patents and sometimes databases. Of these four areas, as discussed above, copyright is well covered by digital commons licences which aim to limit or prevent enclosure of an artefact. A license is not required to protect a patent and make it part of the commons, anyone wishing to ensure an idea cannot be enclosed need only publish it in detail. If anyone else wishes to patent it at a later date, objectors can point to the original work as an existence of prior art, thus invalidating the patent claim and ensuring the idea can be used by anyone, it remains in the commons. This may change however, as a proposal in the United States suggests that only ideas which have been patented will be recognised by the US Patent and Trademark Office as prior art [67]. The cost of filing a patent, particularly one which is valid worldwide, will thus preclude most commoners from ensuring an idea remains in the commons.

Trademarks in the world of the digital commons are dealt with through the same channels as they are in the

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66 Sourceforge, 'Download Free Open Source Software'.

67 Kurt Mackie, 'Q&A: A Patent Attorney Explains How the "America Invents Act" Will Affect Tech', *Redmondmag.com*, 20 September 2011, http://redmondmag.com/articles/2011/09/20/impact-of-america-invents-on-tech.aspx.

proprietary world: they are registered with the relevant office for one's jurisdiction, and protection from then on is provided, with possible recourse to court action in the case of a transgression. Numerous digital commons names and logos are protected, for instance the word Linux belongs to Linus Torvalds [68], Open Street Map's moniker is owned by the OSM Foundation and the Wikimedia Foundation holds monopoly control of the word Wikipedia. This has proved contentious in some areas, for instance the Mozilla Foundation, who assemble numerous projects including the Firefox web browser and Thunderbird email client, refuse to let their logo and names be used, except under strict conditions. These conditions do not conform to the Debian Free Software Guidelines, a tight set of conditions under which the Debian project operates. These guidelines are based upon the four freedoms outlined by Stallman, but include additional terms which further protect the commons [69]. Various changes to Firefox and Thunderbird made by the Debian project prevent it from being included in that operating system with its usual logos and names, they are instead referred to as Iceweasel and Icedove, and have different logos [70]. This has caused debate within various digital commons communities, some suggesting Debian are being pedantic for insisting upon sticking slavishly to their guidelines, some unimpressed with Mozilla for exerting such tight control over a logo and name, which runs contrary to the values of the digital commons.

Latterly, those involved in the digital commons have turned their attention to data projects, the first large intervention in this area being Open Street Map. Although it was initially licensed under Creative Commons, it is now released under the ODbL or Open Database License. Data is handled somewhat differently to other types of intellectual property, as it makes no claim on the artefacts themselves, but gains it status and thence protection "if there has been a substantial investment in obtaining, verifying or presenting the contents of the database" [71]. Thus, it is the particular collection and arrangement of data which can be protected, and the Open Database License reflects this.

68 Linux Foundation, 'Linux Trademark Institute', *The Linux Foundation*, 2012, http://www.linuxfoundation.org/programs/legal/trademark.

69 Bruce Perens to debian-announce mailing list, 'Debian's "Social Contract" with the Free Software Community', 4 July 1997, http://lists.debian.org/debian-announce/debian-announce-1997/msg00017.html.

70 Mike Connor to submit@bugs.debian.org, 'Using Firefox as the App Name Without Official Branding Is Still a Trademark Violation', 27 February 2006, http://bugs.debian.org/cgi-bin/bugreport.cgi?bug=354622.

71 UK Crown, 'The Copyright and Rights in Databases Regulations 1997', *Legislation.gov.uk*, 1997, http://www.legislation.gov.uk/uksi/1997/3032/regulation/13/made.

Prior to all of these and indeed the advent of the capitalist mode of reproduction however, cultural, informational and scientific works had long been shared openly, by default. A specific license such as those provided by Creative Commons and the GNU project were not required. It is only since the introduction of copyright and the default position of "All rights reserved" that the necessity for these licences has arisen. To count the works created under this pre-capitalist schema would be close to impossible, and probably meaningless, such has been the cross-pollination of ideas and artefacts.

2.2 Linux

Project summary

Linux is an operating system kernel, in the UNIX tradition. A kernel is a key piece of software in an operating system, which negotiates access to computer hardware, allowing instructions from software to be executed in an appropriate manner at an appropriate time, with predictable results. The situation prior to the development of Linux was as follows: UNIX and its descendants were coming out of a period of almost complete dominance of desktop and server computers, new operating systems including MacOS from Apple, Microsoft's Windows, and Microsoft's and IBM's OS/2 were changing the scene. These companies presented unified, consistent, monolithic operating systems maintained and strictly controlled by one vendor, thereby avoiding the situation where UNIX software written for say Hewlett Packard's version of UNIX would not work correctly on Sun's UNIX, despite claims of consistency [72]. Simultaneously, the GNU project was gaining in popularity, its various component tools were mature and usable. However one critical element, the Hurd kernel, was not usable, being orders of magnitude slower than similar UNIX kernels.

The Linux project began in 1991 with Linus Torvalds, a Finnish computer science student, announcing he was going to create an operating system kernel in the UNIX tradition. The word UNIX refers to a variety of things, firstly it was a computer operating system, a collection of software which allows a user to control a computer as he or she desires. Originally conceived at AT&T in the 1960s, the copyright is now owned by Novell, although the technology has since been licensed to companies such as HP, Sun and Digital, who all release their own variants, all slightly different. Secondly, alongside the development of UNIX came the UNIX philosophy, an informal set of values and concepts which include:

- Small is beautiful.

    Build a program that does one thing well. UNIX gives one the ability to connect such programs together easily.

- 10 percent of the work saves 90 percent of the problem.

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72 Garfinkel, Weise, and Strassmann, *The UNIX-Haters Handbook*, 10.

UNIX was never designed to be the system which solves all problems. It purposely ignores certain difficult problems.

- Solve the problem, not the machine.

    Build programs while ignoring the underlying machine or operating system as much as possible.

- Solve at the right level, and you will only have to do it once, [73]

taken together these tenets define a system which is designed from the outset to be flexible and thus capable of a wide range of tasks. Out of this philosophy came another referent to UNIX, the Single UNIX Specification, a prestigious standard which any operating system can be assessed against. Currently, six operating systems including Apple's OSX and IBM's z/OS [74] conform to this standard, although a number of systems including most Linux and BSD systems are informally considered close [75]. These systems are thus described as UNIX-like, in that they behave in a way consistent with the original UNIX created in the 1960s.

The impetus behind Linux was to build a kernel broadly similar to Minix [76], an earlier UNIX-like project developed by Andrew Tannenbaum. Torvalds and the writer of that project had previously exchanged angry words over the direction the project was taking in an online discussion. Linux was initially described by Torvalds as a "hobby", carried out between studies. According to his own account, he was not per se interested in plugging the gap for a kernel in the GNU system, or producing a Minix-clone which anyone would be seriously interested in using [77]. Rather, at least initially, he was solely concerned with learning about the then new and unusual hardware which was the 386 processor [78], and decided the way to do this was to write an operating system which took advantage of its features. This reliance upon a feature set only present in the 386 microprocessor was in direct contravention of the UNIX philosophy [79], and caused problems later when the code was ported to other processor architectures. The

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73 Don Libes and Sandy Ressler, *Life With UNIX: A Guide for Everyone* (New Jersey: Prentice-Hall PTR, 1989), 38–39.

74 IBM, 'Preview: IBM z/OS V1.9 Advanced Infrastructure Solutions for Your Business Needs' (IBM, 6 February 2007), http://www-306.ibm.com/common/ssi/rep_ca/8/897/ENUS207-018/ENUS207018.PDF.

75 Robert Love, *Linux System Programming: Talking Directly to the Kernel and C Library*, 1st ed (Beijing ; Cambridge: O'Reilly, 2007), 7.

76 Linus Torvalds and David Diamond, *Just For Fun: The Story of an Accidental Revolutionary*, 1st ed. (Harper Business, 2001), 81.

77 Ibid., 85.

78 Ibid., 62.

79 Libes and Ressler, *Life with UNIX*, 38.

processor is a physical component inside a computer, which executes commands and processes data. The 386 processor architecture was one of a group which were together known as x86 and had been released by Intel in the late 1980s, as part of new hardware that IBM had designed for home and office work. There are many other architectures, each with their own specific use cases.

Contribution mechanisms

Torvalds posted the first release of the code on a website hosted by a friend, who gave the project its name. Torvalds had initially suggested Freax to the person hosting the project on a web server, and on being rejected, reluctantly accepted Linux, his second choice, maybe to his benefit [80]. He sent emails to friends and to a Minix email discussion list, requesting people review the code, and to send him suggestions and modifications if they desired. Several did so, and where they were perceived as beneficial by him, Torvalds included them in his releases [81]. At first, he adapted a fairly loosely defined set of rules for who could use Linux, and how. At a later date, the code was released under a formal license, the GNU GPL, or General Public License [82], which by this point had become a well-established license under which a considerable number of pieces of software had been released. The GNU project was started by Richard Stallman in 1981 to provide a free alternative to UNIX [83]. However, as stated above it was missing a usable kernel, so Linux was a welcome alternative. When it reached usable status, the new kernel was packaged by various third parties with the GNU software, to make several usable free software operating systems.

As Linux became more capable and more popular, more people sent modifications to Torvalds, which had a two-fold effect. Firstly, he was no longer able to vet all code sent to him, so he enlisted a number of fellow commoners whom he could trust to take over the various parts of the kernel. So for instance, Andrew Morton is now almost entirely responsible for managing certain aspects of file access [84] and David S. Miller for networking. Torvalds has lately reduced the amount of code he writes, his role now mainly involves selecting submissions written by others.

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80 Torvalds and Diamond, *Just for Fun*, 88.

81 Ibid., 95.

82 Ibid., 96.

83 Stallman, *Free Software Free Society*, 9.

84 Jeremy Andrews, 'Interview: Andrew Morton', *Kernel Trap*, 14 February 2002, http://kerneltrap.org/node/10.

Secondly, Torvalds moved management of the project to a version control system named Bitlocker, a type of software for managing large software projects, particularly those with many contributors. However, the software was soon found to be not entirely suitable for the task, and being proprietary it could not be significantly modified. Torvalds therefore initiated the development of the Git version control software, released under the GPL, which was more suited to the style of project Linux was becoming. This software was not only released under a free license, but also marked a philosophical shift in the operation of version control systems. Traditional version control, such as employed in the SVN, Bitlocker and CVS projects, relies on a central node or repository, to which all source code changes and additions are submitted, suggesting a hierarchical model of contributors with Torvalds or whichever project leader at the top. The model which Torvalds employed for Git gives the option for each node to be a repository in its own right, philosophically equal in status to any other node. Under this system, any commoner could easily and in a consistent manner share code with any other without requiring a central node to negotiate the transfer, and modifications could be easily accepted by any commoner. Torvalds has since remarked that he now has two projects named after him: one directly from his name and one from his nature, git being English slang for a difficult, unpopular person.

Community

Despite the code for Linux being the result of the collaborative effort of thousands of people, some volunteers, others paid by capitalist organisations such as Red Hat and Google, Torvalds is seen as the creator of the project. The front cover of a book he wrote for example refers to him as "Creator of Linux" [85].

After finishing university, Torvalds was approached by computer processor design company Transmeta in 1997 [86]. At the time, Transmeta were one of Silicon Valley's major movers. They had venture capital funding and backing from Microsoft co-founder Paul Allen [87], and they were seen as a great hope for knocking Intel off its dominant position as manufacturer of generic computer processors, through what was very innovative technology at the time. However, their technology suffered from some fundamental problems, the company was taken over in 2009 and

85 Torvalds and Diamond, *Just for Fun*.

86 Ibid., 141.

87 Ephraim Schwartz and James Niccolai, 'Transmeta Unveils Futuristic Crusoe Chip', *CNN*, accessed 15 January 2013, http://articles.cnn.com/2000-01-19/tech/crusoe1.idg_1_transmeta-crusoe-linux?_s=PM:TECH.

wound up, leaving Intel a near monopoly in the manufacture of x86 processors as used in most laptop, desktop and server computers. Torvalds was targeted, partly for his abilities as a programmer and project manager, but also because he was, by then, a significant name in computing [88]. Apart from Transmeta, there were a number of unsolicited job offers from other companies, including Sun Microsystems and Apple. At the same time, various companies not employing him attempted to capitalise on his fame and use it for their own ends [89].

In common with many other areas of human activity, free software and other areas of the digital commons have various conferences around the world, and Torvalds [90], along with other well-known names in the digital commons world, such as Eric Raymond, Steve Coast, Richard Stallman, Laurence Lessig and Jimmy Wales [91] are in high demand as speakers. He has also been offered book deals [92], and is regularly interviewed by technology [93] and mainstream media organisations [94].

Since 2003, Torvalds has been working for the Linux Foundation, a non-profit organisation which receives several million dollars of funding per year from various private commercial enterprises such as Google, Samsung and Hitachi [95]. This organisation employs him to work full time on managing the kernel code, the reasoning being that Linux and Torvalds are now so important to the general field of computing that it and he must be well supported, and not rely solely on one company as with Transmeta.

Torvalds is seen as the ultimate authority when deciding what is committed to the "stable" Git repository for Linux, but as in any project involving more than one person, there are various disagreements over what is committed.

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88 Torvalds and Diamond, *Just for Fun*, 143.

89 Ibid., 152.

90 Britta Wuelfing, 'Linus Torvalds in Live Streaming from LinuxCon', *Linux Magazine Online*, 2009, http://www.linux-magazine.com/Online/News/Linus-Torvalds-in-Live-Streaming-from-LinuxCon.

91 Amar Toor, 'Jimmy Wales, Mary Gardiner Address Wikipedia's Gender Gap at Wikimania Conference', *The Verge*, accessed 15 January 2013, http://www.theverge.com/2012/7/15/3160926/jimmy-wales-wikipedia-gender-gap-kate-middleton-wedding-dress.

92 Torvalds and Diamond, *Just for Fun*.

93 Gary Rivlin, 'Leader of the Free World', *Wired*, November 2003, http://www.wired.com/wired/archive/11.11/linus_pr.html.

94 Leo Kelion, 'Linus Torvalds Reflects on Linux', *BBC News*, 2012, http://www.bbc.co.uk/news/technology-18419231.

95 Linux Foundation, 'About Us', *The Linux Foundation*, 2012, http://www.linuxfoundation.org/about.

Some of these are trivial, some fundamental, and most are played out for all to see if they desire, either in frequent flamewars on the Linux Kernel Mailing List, or within messages attached to patches submitted for inclusion within the code.

Aside from Torvalds' stable and repository, there are well-known and trusted repositories and so called patch-sets maintained by a variety of other commoners, including Ingo Molnar, who adds 'real-time' performance, useful in systems where precise timing is essential, such as audio and video editing, also medical equipment [96]. There are also certain modifications made by Google as part of the Android phone operating system [97], which are not included by Torvalds, and others made available by controversial commoner Con Kolivas who has occasionally challenged the dominant thinking of established names such as Torvalds and Molnar. This is in distinction to Microsoft's Windows and Apple's OSX, for which there is one version and one version only, as prescribed by the copyright owner. The user cannot adjust the released version of the software to the extent which the Linux kernel, or any free software, can be modified. Apple includes a large amount of free software with its operating system, however the core functionality of the system, particularly the kernel and most parts of the user interface cannot be modified.

Wider significance and influence

The use of Linux with the rest of the GNU system has resulted in a controversy over the years relating to naming. Stallman, wishing to have the efforts of the GNU contributors attributed and to demonstrate the importance of GNU as an instigator of free software, insists all systems which include GNU use that in the name [98]. So, for instance, the Debian distribution is properly styled as Debian GNU/Linux, which is acceptable to Stallman. A distribution otherwise known as an operating system, is a collection of pieces of software, in the case of Debian, currently around 29,000 [99], to make a complete, functional operating system for a computer, including not only common tools

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96 Thomas Gleixner and Ingo Molnar to Linux Kernel mailing list, '2.6.29-rc4-rt1 [LWN.net]', 2009, https://lwn.net/Articles/318949/.

97 Greg Kroah-Hartman, 'Linux Kernel Monkey Log', 2010, http://www.kroah.com/log/linux/android-kernel-problems.html.

98 Free Software Foundation, Inc., 'GNU/Linux FAQ', *GNU Project - Free Software Foundation*, 2013, https://gnu.org/gnu/gnu-linux-faq.html#whycare.

99 Software in the Public Interest, Inc. and others, 'News -- Debian 6.0 "Squeeze" Released', *Debian*, 2013, http://www.debian.org/News/2011/20110205a.

which the user interacts with directly, such as a web browser, email client, spreadsheet editor and music player, but also the hidden but essential tools such as libraries for reading music files, drivers for interfacing with hardware, software for decrypting and encrypting wireless communications and tools for debugging software. Debian is one of the earliest free software distributions, dating from 1993, and is also known by its tag-line "The Universal Operating System", due to its wide use on a variety of architectures. However, other distributions such as Linux Mint miss out the GNU part which Stallman demands, while some such as Ubuntu include neither GNU nor Linux as part of the title. There is an ongoing debate on the issue, with some suggesting that if titles include GNU and Linux, they should also include the titles of all the other major parts which make up a distribution. The recommended suggestions of major software will generally but not necessarily include the 'X.org' windowing system, 'KDE' desktop environment and 'Libre Office' office suite, Firefox web browser, Thunderbird email client and others, although this list is somewhat arbitrary, based upon a vaguely-defined idea of major. Various attempts have been made to assess which software is most significant, for instance comparing software by the number of lines of code [100].

To further confuse the naming debate, the word Linux is commonly used to refer to any operating system which includes the Linux kernel, although this has been further blurred by a number of so-called Linux distributions including alternative kernels. So for instance Debian also offers the option of the Hurd [101] and kFreeBSD kernels, which alter its name to Debian GNU/Hurd and Debian GNU/kFreeBSD respectively. This ability to use one of several kernels was inherited from the UNIX philosophy, which amongst other things suggests that software be constructed to allow data to be exchanged easily, and attempt to do one simple thing and no more [102]. This results in a modular set of software with well-documented protocols for data exchange which can be readily chained together to complete more sophisticated tasks, and is common throughout free software projects. Another example of this would be a mail stack, that is a collection of software to manage the various aspects of email. A typical stack requires a number of parts: a mail transport agent which delivers mail to the correct location on the appropriate computer, a component to allow client software to access the mail, and an email client or reader which the user

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100 Terry Hancock, '"GNU", "Linux", or Neither...?', *Free Software Magazine*, 2007, http://www.freesoftwaremagazine.com/columns/gnu_linux_neither.

101 Software in the Public Interest, Inc. and others, 'Debian GNU/Hurd', *Debian*, 2011, http://www.debian.org/ports/hurd/.

102 Libes and Ressler, *Life with UNIX*, 37.

interacts with directly to send and read email, via the other components. In the first case, this could be one of several including Postfix or Exim. In the second, one of Dovecot or Courier, the latter of which can also perform the functions of a mail transport agent. Thunderbird, Evolution, Roundcube or Claws are some of the clients which would be suitable for the third member of the list. In each case, each will conform to the necessary specifications and standards, allowing each to be used regardless of which other tools are employed. This concept is not as common in the proprietary software world, where for example using the email situation described above, if one chose the Microsoft mail server Exchange, which incidentally will only run on the Windows operating system, one would also be required to use Outlook, as most other clients are unable to reliably connect to Exchange. There has been much effort to reverse-engineer the Microsoft Exchange communication protocols so other clients can connect, but the work is not complete, and Microsoft refuse to release the specifications, claiming intellectual property rights over them. This restricts the choices of users when selecting a mail stack, and artificially inflates Microsoft's sales. This is common throughout the proprietary software world, and is part of what is known as vendor lock-in. That is if a user does not carefully select their software, their choices later may be reduced possibly to zero, leaving them effectively locked in to using one provider. Similar situations may be seen with Autodesk's AutoCAD and Revit 3D design software, which use the proprietary DWG and RVT file formats and Adobe's InDesign, whose default file format is also proprietary [103]. Thus any work done in those pieces of software cannot later be edited or viewed with other software, the user is prevented from changing, and thus locked into their original choice.

The word Linux may also be used when referring to the discussion topics of Linux User Groups, of which there are several thousand around the world, generally in and around cities and universities [104]. The original purpose was to gather a community around Linux so commoners could assist each other with modifying, installing and using it, as at the time, in the 1990s, it was considerably more difficult to use than the proprietary offerings from Microsoft and Apple. Most Linux user groups now include discussion on other free software [105], other digital commons projects

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103 Scribus, 'Why Scribus Doesn't Support QuarkXpress and Other Major Publishing Applications', *Scribus Wiki*, 2008, http://wiki.scribus.net/canvas/Why_Scribus_doesn%27t_support_QuarkXpress_and_other_major_publishing_applications.

104 Kendall Clark and Rick Moen, 'What LUGs Exist?', *Linux User Group HOWTO*, 2007, http://www.tldp.org/HOWTO/User-Group-HOWTO-3.html.

105 David Cooper to Nottingham Linux User Group talk mailing list, '[Nottingham] the Demise of Gnome-3', 2012,

such as Open Street Map [106] and Wikipedia, and the concept of free and open in general. The groups generally converse via email discussion groups, forums and instant chat, and organise physical meetings around the presentation and discussion of digital commons topics. In a similar manner, the term Linux is also used when discussing Linux conferences, many of which are held annually around the world, and which similarly to Linux User Groups, commonly discuss a range of issues related to the digital commons [107].

Writing in a book named after the concept, Eric Raymond describes the model of The Cathedral and The Bazaar [108], which he uses to contrast the traditional model of software development with that used by the Linux project. The former is characterised by a small number of highly-skilled individuals who work together in a close-knit team [109], while the latter is a model which allows anyone to take part, widely distributes software code, and welcomes patches and bug reports from anyone who wishes to submit them. The bazaar model had been practised prior to Torvalds starting Linux, including within the free software community, when he threw open participation to anyone who desired to be included, this rapidly increased the development of the software. The model was so successful that almost all later projects have followed Torvalds lead, and consider improvements from anyone who sends them. This laid the groundwork for the later Web 2.0 movement, demonstrating that projects such as Wikipedia and Open Street Map could be successful without closely guarding development and only allowing a select few to contribute. This process was codified in Linus' Law, which states "Given enough eyeballs, all bugs are shallow." [110].

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http://mailman.lug.org.uk/pipermail/nottingham/2012-May/015308.html.

106 Simon Vass, 'OpenStreetMap with David Farthing', *Uganda Linux User Group*, 11 April 2012, http://www.linux.or.ug/events/2012/04/openstreetmap-david-farthing.

107 linux.conf.au 2013 and Linux Australia, 'Schedule', *Linux.conf.au*, 2012, http://linux.conf.au/programme/schedule.

108 Raymond, *The Cathedral and the Bazaar*.

109 Ibid., 31.

110 Ibid., 30.

2.3 Web 2.0

Before describing Wikipedia, we need to briefly describe the environment it was born into, and that it has since gone some way towards defining. To do so I will describe the changes to the world wide web which have occurred in the past 10 years, particularly focussing on software and platforms which have simplified the technical process of contributing to projects, and assisted collaboration.

At first glance, the three projects analysed here share similar properties. They all aim to be as open as possible to all, and their artefacts are all released under an open/free license allowing re-use, modification and distribution. However, there is a subtle but important difference between Linux on the one hand, and Wikipedia and Open Street Map on the other. The latter two are to a certain extent grounded in an interpretation of the world which most people can understand and grasp, with certain levels of fuzziness, while Linux represents an increasingly abstract view of a world. One of the results of this difference is the number of commoners who are technically capable of taking part. Since May 2005 the Linux project has had contributions from nearly 8,000 commoners [111]. There is no readily available data from earlier periods, but looking at the statistics in the report cited above, there are unlikely to have been significantly more contributing in the preceding 14 years. Wikipedia, in contrast, attracted contribution from nearly 126,000 registered commoners in the 30 days prior to 21st January 2013, plus an unknown number of commoners who contributed without registering. Open Street Map had over 16,000 commoners contributing to the project in the month of December 2012 [112]. These figures represent not only a quantitative difference to Linux, but a qualitative difference. More contributors means more people from different backgrounds, ethnicities, education levels, which results in a richer base of information. This can sometimes result in clashes between people with different understandings of how the world is, and also a requirement to account to those people when assembling the project. These should not be regarded as negatives, but rather as demonstrations of being radically inclusive [113].

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111 Jonathan Corbet, Greg Kroah-Hartman, and Amanda McPherson, *Linux Kernel Development: How Fast It Is Going, Who Is Doing It, What They Are Doing, and Who Is Sponsoring It* (The Linux Foundation, 2012), 7, http://go.linuxfoundation.org/who-writes-linux-2012.

112 OpenStreetMap contributors, 'OpenStreetMap Statistics', 2013, http://www.openstreetmap.org/stats/data_stats.html.

113 Lih, *The Wikipedia Revolution*, 76.

The original intent of the world wide web had been to include read and write capabilities from the beginning. However, although the first browser Tim Berners-Lee assembled was a browser-editor, the editing feature was dropped along the way to the actually existing examples of the web, and the initial services offered became read-only, with control by the editors who hosted the content [114]. The web 2.0 phenomenon was much heralded as people realised the web was gradually changing in the early to mid-2000s. Many were excited about the prospects, some were unsure what it meant, while others suggested it was nothing more than a buzz-word, a catchphrase, intended to drive further enthusiasm for the web and result in another bubble [115]. In hindsight perhaps, it is easier to see the substance behind that phrase. Both Tim Berners-Lee [116], who had done a great deal in the early 1990s towards developing the world wide-web (as distinct from the internet, which dates to the 1960s), and Tim O'Reilly [117], made bold pronouncements as to the forthcoming "read/write web", and how it would enrich the user experience, by allowing and promoting bi-directional communication and mass collaboration through web platforms. Prior to this, the majority of communication via the web had been unidirectional, broadcast from one to many, similar to the so-called 'old media' the internet was supposed to upend. An author produced some content, be it text, music, images or some other form, and then provided it for others to access, read, listen to or use in some other manner. There was very little scope to allow or encourage other users to comment on, edit, or otherwise critique the work directly. The options for commenting on content were mainly limited to responding to the author via email or some other one-to-one communication method, which was clumsy, non-immediate and also required the original author to intervene, or by the respondent hosting the response, activities which required technical resources and skills, and would make any attempt at free-flowing conversation difficult. This situation hampered collaborative work, as it left each nominal producer and consumer distant to each other, and in a somewhat hierarchical relationship. This ran against the original ethos of the internet, which had envisaged a decentralised network, with each node having the same status as all others.

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114 Ibid., 52.

115 Andrew Orlowski, 'What Is Web 2.0? You Redefine the Paradigm', *The Register*, 11 November 2005, http://www.theregister.co.uk/2005/11/11/web_two_point_naught_answers/.

116 Paul Miller, 'Sir Tim Berners-Lee: Semantic Web Is Open for Business', *ZDNet*, accessed 1 February 2013, http://www.zdnet.com/blog/semantic-web/sir-tim-berners-lee-semantic-web-is-open-for-business/105.

117 Tim O'Reilly, 'What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software', *O'Reilly Media*, 30 September 2005, http://oreilly.com/web2/archive/what-is-web-20.html.

Platforms to allow a more cohesive conversation had been developed and distributed since the birth of the internet, but for several reasons they were not particularly well-used. As they they did not have a graphical interface, they were difficult to use, requiring knowledge of arcane text commands. They also required an internet connection, which was still relatively uncommon, and were often seen in wider circles as nerdy, unsociable and strange. There were no equivalents to Wordpress.com, Twitter and Facebook, which provide a simple hosting service, and allow quick interaction with data and other people. Numerous platforms were developed in the early 2000s which changed this situation in two important ways, at the same time as internet costs decreased. Firstly, they allowed nominal readers to collaborate and critique existing work, and become part of a collective creative process. Secondly, they greatly simplified the technical aspect of hosting artefacts, reducing costs. Two of the best known and well-used of these are the blogging platform Wordpress and the wiki software Mediawiki [118], although notable mentions should go to Drupal [119] and Joomla. These pieces of software fall under the category of 'Content Management System', or CMS, which apart from being an incredibly vacuous title which suggests commodification [120], is an all-inclusive way of saying:

> a computer program that allows publishing, editing and modifying content as well as maintenance from a central interface. Such systems of content management provide procedures to manage workflow in a collaborative environment [121].

The CMS allows a commoner with relatively few skills and little time to very quickly customise their site for appearance, upload artefacts, and to set access rights to potentially allow others to do the same. From there, other commoners who have editing rights, but who are again relatively low-skilled technically, can add artefacts via a graphical user interface which is designed to resemble other software they may already have access to, such as an email client or word processor. Other commoners can then add their own views in response to the views laid out in the original piece, edit the piece directly or create their own artefacts, depending upon the permissions given by the commoner who administers the site. This concept has now been taken on in the proprietary world not only at a

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118 Wikimedia Foundation, 'Terms of Use', *Wikimedia Foundation*, 22 September 2012, https://wikimediafoundation.org/wiki/Terms_of_use.

119 Drupal.org, 'About Drupal', *Drupal.org*, 2013, https://drupal.org/about.

120 Stallman, *Free Software Free Society*, 95.

121 Karl Paulsen, *Moving Media Storage Technologies: Applications & Workflows for Video and Media Server Platforms*, 1st ed. (Focal Press, 2011), 381.

software level with packages such as Microsoft's .NET CMS [122] and Huddle [123], but via commercial websites which facilitate collaborative discussion. Facebook, Twitter and Myspace are perhaps the most obvious examples, but the comments sections in newspapers such as *The New York Times* and *New Zealand Herald* should also be included. Where a commoner wishes to make a response which is more than a simple comment, the concept of 'pingbacks' enables a link to be made to another CMS, thus ensuring that more sophisticated responses can be included in the collaborative process.

Prior to this point, in the sole significant formal manifestation of the digital commons, the free software world, the existing tools had not been a problem. Even the most advanced use of collaborative tools was orders of magnitude less difficult to master than the skills necessary for contributing to the Linux kernel or other software projects. These tools, including Subversion, Mercurial and Concurrent Versions System not only allowed coders to send modifications and additions to code, but also to comment on existing work, thus building up a rich, many-dimensioned conversation around the artefacts being assembled.

Since Laurence Lessig and James Boyle launched Creative Commons in 2002, more and more commoners were adding to digital commons projects outside the foundational realm of software, branching out into more projects such as Wikipedia, which a larger number of commoners had the necessary knowledge and skills to take part in. Facilitating the widening participation at a technical level, however, required tools with a much lower barrier-to-entry, otherwise a large number of commoners would continue to be excluded from contributing in the way they wished.

A range of web-hosted, user-editable documentation, usually in the form of wiki and forums, is now common for free software projects, and indeed any work for the digital commons, for publishing information about the project, such as frequently asked questions, help manuals, project roadmaps, instructions for using the artefacts and anything else related. These resources have ensured that though a commoner may not be able to add to the primary artefact being assembled, they can still make valuable contributions. They also allow quick publishing of technical

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122 Microsoft Corporation, '.NET CMS', *Windows Web App Gallery*, 2013, http://www.microsoft.com/web/gallery/cmsaspnet.aspx.

123 Leena Rao, 'Huddle Lands $10.2 Million To Expand Collaborative Workspaces To The U.S.', *TechCrunch*, 2013, http://techcrunch.com/2010/05/17/huddle-lands-10-2-million-to-expand-collaborative-workspaces-to-the-u-s/.

details, and are used by the more skilled members of the community to communicate.

The word wiki holds more meaning than first appears. The origins of the word are Hawaiian, and the word translates as 'quick' [124], a connotation reflected in the fact that its style of contribution encourages those who may only want to participate occasionally, with for example a spelling correction, or short note. The learning curve for those wishing to participate is also rapid, for anyone who has already used the world wide web, and the basic syntax resembles natural text. More advanced syntax, for example adding bold, making tables, including images is relatively straightforward also, should the user desire to learn [125].

This principle of including everyone who may want to take part was taken further when Open Street Map was conceived. Richard Fairhurst, one of the early programmers involved with the project began developing 'Potlatch' soon after the project's conception, with the aim of providing an easy entry into mapping. Traditional Geographic Information Systems tools such as ArcGIS, apart from being proprietary and expensive, are difficult and slow to master, presenting a barrier to those who do not have the time or skills, but are competent enough to understand the concept and add useful information. Potlatch uses a very simple point-and-click interface for adding lines and nodes, and labelling the resultant geometry. Latterly, there have been various packages developed for smart phones which allow a commoner to add basic location data even more simply, with virtually no mapping or cartography skills required. With the advent of GPS in mobile devices, this mapping has got still easier. Further, there are various tools such as Open Street Bugs which allow someone with relevant data to contribute to click on a map, and type in information. Others who view the area may then convert the information to geographic data, and remove the note [126].

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124 Ward Cunningham, 'Correspondence on the Etymology of Wiki', *C2 Wiki*, 2005, http://c2.com/doc/etymology.html.

125 Ayers, Matthews, and Yates, *How Wikipedia Works*, 145–149.

126 OpenStreetMap   contributors,   'OpenStreetBugs',   *OpenStreetMap   Wiki*,   25   January   2013,
https://wiki.openstreetmap.org/wiki/OpenStreetBugs.

2.4 Wikipedia

Project summary

Wikipedia was launched in 2001 by Jimmy Wales and Larry Sanger [127]. The aim of the project was to create an online, user-editable encyclopedia of everything, as Wales later put it: "Imagine a world in which every single person on the planet is given free access to the sum of all human knowledge. That's what we're doing" [128]. It was seen as a counterpoint to Nupedia, an encyclopedia started by the same pair, but written by experts, and approved through a hierarchical process. This project had struggled from the start, as it involved an onerous 7-step submission and review process [129]. It closed after 3 years with 94 articles, while in contrast Wikipedia now hosts over 24 million articles across 285 languages [130] and is, according to Alexa, a highly-regarded site which measures web traffic, one of the top 10 most visited sites on the web today [131].

At its inception, the content of Wikipedia was licensed under the GNU Free Documentation License, a license, as we noted earlier, originally written for computer software documentation by Richard Stallman. It has similar provisions to the GNU General Public License, in that anyone who receives a copy of the text so licensed it free to copy, redistribute, modify and use the work for any purpose. When the Creative Commons licenses were released in 2002, however, they immediately appeared to be more suited to Wikipedia. In 2008 a debate was started followed by a referendum on the site, the result of which was a switch to the Creative Commons CC-BY-SA License. Articles on Wikipedia are now licensed for use under either the CC-BY-SA alone, or both, depending upon how the individual contributors to an article allow their work to be used.

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127 Ayers, Matthews, and Yates, *How Wikipedia Works*, 46.

128 Slashdot,   'Wikipedia   Founder   Jimmy   Wales   Responds',   *Slashdot*,   28   July   2004, http://slashdot.org/story/04/07/28/1351230/wikipedia-founder-jimmy-wales-responds.

129 Lih, *The Wikipedia Revolution*, 38.

130 Wikimedia Foundation and Wikipedia contributors, 'List of Wikipedias', *Wikimedia Meta Wiki*, 28 January 2013, https://meta.wikimedia.org/wiki/List_of_Wikipedias.

131 Alexa Internet, Inc., 'Wikipedia.org Site Info', *Alexa*, accessed 2 February 2013, http://www.alexa.com/data/details/traffic_details?url=en.wikipedia.org/wiki/Main_Page.

Wikipedia was initially delivered and edited through the UseModWiki software which could be accessed via a web browser, and did not require a commoner to install any other software. As the number of pages increased rapidly in late 2001, it proved unsuitable, and a replacement was launched early the next year, but that in turn soon stumbled on the number of pages and edits expected of it, as the popularity of the site continued to increase almost exponentially. The more robust and scalable Mediawiki software was released in the middle of 2002, developed by the Wikimedia Foundation. This Foundation is an umbrella organisation set up to oversee Wikipedia, and which also runs Wiktionary, Wikibooks, Wikiversity and a range of other sites dedicated to sharing knowledge. The software is released under the GNU General Public License version 2, and as such qualifies as Free Software. The software is also used by a number of other organisations, including other online encyclopedias and publicly-accessible knowledge sites, technology companies Novell and Intel, the US Government, and the United Nations.

Wikipedia has a somewhat hierarchical structure, with formal titles for some commoners who contribute, including Administrator, Bureaucrat and Reviewer [132]. Positions are by nomination and vote, and grant various powers to that person, although Jimmy Wales has played down the importance and relevance of these powers, stating they are "merely a technical matter" [133]. Various pages on Wikipedia note this power structure and mock Jimmy Wales and those who desire to "be in the seat at his right side" [134], suggesting that there is more to the situation than Wales claims. There have also been rare cases of more arbitrary displays of power, particularly by Wales, who appears to have rather more control than most members of the bureaucracy.

Part of the reason for these power structures are various legal situations which have caused controversies, including a New Zealand celebrity being named on his Wikipedia page as the recipient of name suppression after his trial for assault on a woman. His article was quickly altered to remove the offending information, but as all history for articles is stored in public, the text can be found. As the servers for Wikipedia are located in the United States, they are not compelled to follow New Zealand law and entirely remove the information in this instance, but nonetheless

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132 Wikipedia contributors, 'Statistics'.

133 Jimmy Wales to WikiEN-l mailing list, '[WikiEN-l] Sysop Status', 11 February 2003, http://lists.wikimedia.org/pipermail/wikien-l/2003-February/001149.html.

134 Wikipedia contributors, 'Wikipedia:Edits Per Day', *Wikipedia, the Free Encyclopedia* (Wikimedia Foundation, Inc., 4 January 2013), https://en.wikipedia.org/w/index.php?title=Wikipedia:Edits_Per_Day&oldid=530651491.

there are potential legal issues around this behaviour. The rationale behind storing all previous versions of the page is it allows those who edit to "be bold", an aspect of the wiki much promoted, as it encourages commoners to write where they may not otherwise, for fear of breaking or damaging something [135]. A more serious incident occurred in 2005, when John Seigenthaler discovered his article incorrectly linked him to the John F. Kennedy assassination of 1963, and had remained uncorrected until he discovered it [136]. These controversies and others of a similarly damaging nature to Wikipedia have resulted in various controls over editing. For instance, in the case of edit wars which spiral out of control, members of the hierarchy can be called upon to adjudicate, anyone that has made the same edit 3 times, in spite of it being reverted, being censured. A reversion is a one-click act to undo an edit made to a site, accessed through the "History" tab which is available on every page. There are numerous other measures which can be used to preserve the integrity of the site, such as temporarily or permanently blocking an IP address or range of IP addresses. The latter of these is often carried out due to vandalism, so for instance anyone attempting to anonymously edit from AUT University in Auckland, New Zealand is blocked, and required to sign in, due to past occurrences of malicious editing from the IP address range associated with that insitution. Other measures include semi-protection, or full protection of pages deemed sensitive, such as that of George W. Bush. Both of these protections require any commoner editing to be signed in, which may not appear to be a block to a vandal, but it makes the task of vandalism more onerous than it otherwise might be, quickly discouraging those who are not particularly committed to making any serious point or other. There are further protections and community norms for all living persons, in an attempt to avoid any possibility for slander or libel [137]. This has since been extended to include discouraging people from editing their own article, although this is obviously difficult to police.

Since Wikipedia has attained its place in the top ten most popular web sites, and gained a number of articles which surpasses that of traditional encyclopedia, much has been made of comparisons with similar stores of knowledge, particularly those distributed in physical books, and there have been numerous comparisons of the accuracy of articles. A major study in the *Nature* journal found wikipedia had only 50% more errors per article than

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135 Wikipedia contributors, 'Wikipedia:Be Bold', *Wikipedia, the Free Encyclopedia* (Wikimedia Foundation, Inc., 29 January 2013), https://en.wikipedia.org/w/index.php?title=Wikipedia:Be_bold&oldid=535487251.

136 Lih, *The Wikipedia Revolution*, 9–10.

137 Wikipedia contributors, 'Wikipedia:Protection Policy', *Wikipedia, the Free Encyclopedia* (Wikimedia Foundation, Inc., 1 February 2013), https://en.wikipedia.org/w/index.php?title=Wikipedia:Protection_policy&oldid=535954368.

Encyclopedia Britannica [138]. In June 2012, Britannica announced they would no longer be releasing a paper encyclopedia; there is speculation whether it can continue in any form [139].

Contribution mechanisms

Bots, slang which is short for robots, carry out a significant number of edits at the project, and are the source of a contentious debate over their use. Since the early days, bots have been used for many minor edits, such as checking to make sure all animals have a certain set of characteristics included in their article, or reformatting a page in a particular way for consistency. This changed in late 2002, when the unemployed Derek Ramsey spent several weeks writing a bot which then automatically created over 30,000 articles in the space of a week, increasing the number of articles in Wikipedia by over 60%. Most were of stub class, that is short pieces of text stating a few facts about the subject, all of which were cities, towns and villages in the USA [140]. Uproar ensued, with many suggesting this was nothing more than a data dump, as there had been no conscious human involvement. Further, he appeared to have broken an important rule at Wikipedia, that is that the project is not a collection of facts [141]. As the commotion died down, it became clear that mass edits by bots were not necessarily a bad thing, they incited many to add details for a settlement they would not previously have thought to write about, thus bringing in many commoners to make casual edits. They further encouraged others to write semi-automatic bots which assisted commoners with spell-checking, in much the same way as one can check spelling in software such as Libre Office, that is by being fed a list of potentially misspelt words which are either corrected or ignored, based upon the input of a commoner. There was no previous consensus on using bots for this type of work, and as Sanger had suggested, any bad edits could easily be revoked, thus Ramsey's actions come under the commonly-accepted mantra of "be bold" [142], that is to do as you wish, safe in the knowledge that any damage is unlikely to be permanent, anything can

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138 Jim Giles, 'Internet Encyclopaedias Go Head to Head', *Nature* 438, no. 7070 (14 December 2005): 900–901, doi:10.1038/438900a.

139 Britannica Editors, 'Change: It's Okay. Really.', *Britannica Blog*, accessed 1 February 2013, http://www.britannica.com/blogs/2012/03/change/.

140 Lih, *The Wikipedia Revolution*, 99–103.

141 Wikipedia contributors, 'Wikipedia:What Wikipedia Is Not', *Wikipedia, the Free Encyclopedia*, 21 February 2013, https://en.wikipedia.org/w/index.php?title=Wikipedia:What_Wikipedia_is_not&oldid=539382608.

142 Wikipedia contributors, 'Wikipedia', 29 January 2013.

be easily reverted. As a counterpoint to this automatic generation of pages, there are people such as a commoner who edits Wikipedia under the moniker Bumm13, real name unknown. He has made so-called dot maps for towns of the United States, that is a map of an area with a dot placed to show the location of an object of interest, relative to the entire region. Taking the lead from Ramsey's mass import of data on towns, he created dot maps for the entirety of several states, the total made being in the low thousands, all by manually making maps with graphics software. Doubtless there are more efficient and speedy ways to do this, but regardless he continues, with a professed lack of ability to programme anything, being at the root of the method he chose [143].

Community

In common with a significant number of other digital commons sites, and indeed most online discussions, Wikipedia debates have occasionally descended into 'flame wars', that is vitriolic arguments over a particular piece of information. These disputes are often also associated with edit wars, with two or more people or groups continually editing and re-editing an item. Notable incidents include the geographical extent of the city of Paris [144], the nationality of Nikolai Tesla and the capitalisation of the title to a Star Trek film [145]. Detractors point out the irrelevancy of these debates, and suggest the protagonists give up and concentrate their energies on something useful such as "curing cancer" [146]. This flaming, or abuse via the messaging system and Talk pages is strongly frowned upon, commoners who contribute are urged to be polite, make rigorous arguments and follow a set of guidelines which encourage neutral points of view. This framework is at the root of Wikipedia's collaborative effort, proscribing an overarching set of values, while giving remarkable latitude for commoners who contribute to sort out disputes amongst themselves. As Larry Sanger suggests though, any rules which are put in place are not binding [147], commoners are free to ignore them as they desire. Although the set of basic tenets known as the five pillars of Wikipedia are not contestable, the remaining rules or conventions are recorded in Wiki pages which are themselves

[143]Lih, *The Wikipedia Revolution*, 110.

[144]Wikipedia contributors, 'Talk:Paris/Archive 1', *Wikipedia, the Free Encyclopedia* (Wikimedia Foundation, Inc., 2005), http://en.wikipedia.org/wiki/Talk:Paris/Archive_1.

[145]Wikipedia contributors, 'Talk:Star Trek Into Darkness', *Wikipedia, the Free Encyclopedia* (Wikimedia Foundation, Inc., 31 January 2013), https://en.wikipedia.org/w/index.php?title=Talk:Star_Trek_Into_Darkness&oldid=535922148.

[146]Ibid.

[147]Lih, *The Wikipedia Revolution*, 76.

editable, and can be modified by anybody. They are thus continually open for debate, and in line with Sanger's pronouncement are not set in stone.

Although this is true of the rules, due to the way a number of articles are informally policed by community members who have no particular privileges, any changes which are not accompanied by extensive explanation and research will be quickly reverted, with little debate. This can lead to the situation where once a page is deemed complete or somewhat stable by one group who regard it as 'theirs', it can be very difficult for others to break in and change information to what may not be generally accepted. There are thus many small pockets of conservative behaviour which have been created through Wikipedia, although they are difficult to detect and mobilise against, as each is so small in scope.

The number of editors, articles, and also the rate of change of articles increased dramatically for the first 6 years of operation, but since 2006 the increase per day has tailed off considerably. There have been several suggestions put forward for this, most suggesting it is because there are few things left to write about, most new articles are about increasingly insignificant items, concepts or events, or record new events as they happen.

Wider significance and influence

Wikipedia has inspired many other similar sites, which are sometimes direct rivals to it. They include Conservapedia and Metapedia, which both claim to offer an oppositional viewpoint to the alleged "liberal bias" of wikipedia, on topics including evolution, creationism, birth control and the holocaust [148]. Members of the Stormfront forum, one of the largest white supremacist websites in the world, actively encourage other members to use Metapedia instead of Wikipedia, as the latter is considered to be "Jew-biased" [149]. This follows on from a series of notorious debates Stormfront members took part in. Those who were part of the Stormfront community objected to the way they were portrayed, and mobilised several from their community to edit the site as they desired. Those who were mobilised to edit were encouraged to be polite, argue in a constructive, positive fashion, or they would be

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148 Conservepedia contributors, 'Conservapedia:About - Conservapedia', *Conservapedia*, 22 April 2012, http://conservapedia.com/index.php?title=Conservapedia:About&oldid=977191.

149 robinhood2012, 'Wikipedia Is Jew Biased', *Stormfront*, 23 July 2012, http://www.stormfront.org/forum/t898942-3/#post10451811.

rebuffed and ignored, in apparent contravention to the fascistic beliefs and behaviour displayed on the forum.

Although Wikipedia itself is averse to any kind of overt political statements internally, as discussed above, it has taken part in various political actions in the wider world. Along with other websites both large and small, Wikipedia took part in a day of self-censorship on January 18th, 2012, to protest a piece of legislation named SOPA, or Stop Online Piracy Act, which web activists claimed was an Act which would allow mass censorship by the US Government [150]. The protest took the form of redirecting requests to Wikipedia to a page which outlined the effects SOPA would have, suggesting it could mean many sites being taken off line.

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150 The Washington Post, 'SOPA Petition Gets Millions of Signatures as Internet Piracy Legislation Protests Continue', *The Washington Post*, 19 January 2012, sec. Business, http://www.washingtonpost.com/business/economy/sopa-petition-gets-millions-of-signatures-as-internet-piracy-legislation-protests-continue/2012/01/19/gIQAHaAyBQ_story.html.

2.5 Open Street Map

Project summary

Open Street Map was started in 2004 by Steve Coast, and was seen as part of the much-vaunted "Web 2.0", or "Read/Write web" detailed in earlier sections. The intention of the project is to be a

> project that creates and distributes free geographic data for the world. We started it because most maps
>
> you think of as free actually have legal or technical restrictions on their use, holding back people from
>
> using them in creative, productive, or unexpected ways. [151].

This was a twofold challenge, firstly to a range of proprietary online mapping services, an arena which was later to be dominated by Google with their 2005-released Maps service, and secondly to Government-funded mapping services, represented by the UK agency, Ordnance Survey, which had been mapping that country since 1791 [152]. Ordnance Survey produce high-quality printed maps, while Google turned the mapping industry on its head by offering a service which while it professes to be free, takes advantage of a quirk of the English language, which unlike Spanish and other languages including French and Italian, collapses the words 'gratis', free from cost, and 'libre', free from restrictions, into one. As Coast suggests, Google Maps and similar offerings from Yahoo! and Microsoft are indeed free from cost, that is it is gratis to use them, but there are restrictions on what can be done with the service, as outlined in the Terms and Conditions [153]. Specifically, there are three which are important here. While Google provides tiles or images representing the map, the underlying data which they are created from is not available. Secondly, the tiles cannot be redistributed by third persons unless explicit permission is given by Google. Thirdly modifications cannot be made, due to the lack of underlying data and permission to do so. Ordnance Survey, while not at the time offering an online service, possessed large amounts of data, paid for by the UK government and hence its citizens, but any access to it required a payment, and for the user to enter into a restrictive agreement which prevented redistribution of the data or its derivatives. While not considered of the same calibre technically as Google, there are numerous other online services, such as Wises.co.nz in New Zealand and

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151 OpenStreetMap contributors, 'Main Page', *OpenStreetMap Wiki*, 9 January 2013, https://wiki.openstreetmap.org/wiki/Main_Page.

152 The Bing Team, 'Bing Engages Open Maps Community'.

153 Google, 'Google Maps/Earth Additional Terms of Service', *Google*, 1 March 2012, https://www.google.com/intl/en_ALL/help/terms_maps.html.

UBD.com.au in Australia. These services originally provided their own map tiles, which were distributed under similar terms to Google Maps. Latterly, most have been unable to compete and have either disappeared, or taken to using data and tiles provided by Google. Initially this access was also free, although lately, Google have begun charging customers for mass access to tiles, in cases where they make over 25,000 map loads per day [154]. The lack of freedom for data provided by Ordnance Survey and Google, particularly the former, was the impetus to create Open Street Map, which aimed to be a mapping service without these restrictions [155]. In contrast, the relative lack of restrictions on use of government data in some countries, such as USA and New Zealand, stimulated a number of small projects, but without the reach, coherence and detail of Open Street Map. One such project is NZOGPS, the New Zealand Open GPS project. This utilised data provided by Land Information New Zealand, a government department, whose appointed task is to compile land registry information, although they also collect data on a variety of other geographical entities.

The alert commoner reading this work may notice the name Open Street Map is somewhat misleading, as the project is about more than solely streets, including as it does the locations of power stations, parks, sea buoys, supermarkets, trees, coastlines and thousands of other items both physical and conceptual. Further, the project is not as such a map, but a geographical location database. This database can be employed to create maps, and this is indeed a common use, but as we shall see later, there are many more applications for such information. The project would therefore be more accurately known as Open Geographical Database.

The license the geographic data was originally released under was the Creative Commons CC-BY-SA. Creative Commons licenses are made up of a number of modular codes, which signify different permissions and restrictions. In this case, the CC indicates the license is one of the Creative Commons type. The BY clause, literally meaning who the work is by, stipulates that any time the work is passed on, the names of the creators must be included. The third code in the name, SA or share-alike, tells users that these conditions must be carried over to any derivatives, or works made by modifying the original. Licenses by Creative Commons include several other codes, such as ND,

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154 Caleb Garling, 'Open Source Maps Gain Ground as Google Paywall Looms', *Wired*, 9 January 2012, http://www.wired.com/wiredenterprise/2012/01/openstreetmap-google/all/1.

155 OpenStreetMap contributors, 'History of OpenStreetMap', *OpenStreetMap Wiki*, 19 November 2012, https://wiki.openstreetmap.org/wiki/History.

or no derivatives, which preclude any modifications from being made, and NC, which prevents the work from being used in any commercial applications. The Open Street Map license closely resembles the "four freedoms" which Stallman insisted software must have in order to be classed as "free" [156]. Since the initial choice of this license, an extensive debate has taken place in various communications channels over the suitability of that license for geographic data, on the grounds it is more suited to artistic works such as photographs, music, art and stories than it is for data.

The area of intellectual property is somewhat murky and arbitrary when distinguishing between copyright and data for the purposes of selecting an appropriate license, as the latter is generally a collection of facts which cannot be copyrighted, and thus instead relies upon "sweat of the brow", that is it is considered property as considerable work has gone into collecting it [157]. In 2009 the OSM Foundation, a not for profit organisation set up to oversee the OSM data, and to manage the infrastructure behind the Open Street Map website, instigated a discussion around license change [158]. This discussion and the ensuing decision took 3 years, resulted in a switch to the Open Database License [159], and caused major disruptions to the project. Due to a significant number of mappers refusing to re-license their contributions under the new license, their work was removed from the OSM database in July 2012 [160]. Mappers left, there were many heated arguments [161] and warnings that posts to the list would be moderated [162], a suggestion was made to close one of the major communications platforms for Australia [163], a serious consideration for this type of

156 Free Software Foundation, Inc., 'The Free Software Definition'.

157 UK Crown, 'The Copyright and Rights in Databases Regulations 1997'.

158 OpenStreetMap Foundation, 'License/We Are Changing The License', *OSMF Wiki*, 3 September 2010, http://www.osmfoundation.org/wiki/License/We_Are_Changing_The_License.

159 OpenStreetMap contributors, 'Open Database License', *OpenStreetMap Wiki*, 29 October 2012, https://wiki.openstreetmap.org/wiki/ODBL.

160 OpenStreetMap contributors, 'Redaction Bot Progress Map', *OpenStreetMap Wiki*, 7 August 2012, https://wiki.openstreetmap.org/wiki/Redaction_bot_progress_map.

161 Richard Fairhurst to Open Street Map talk Australia mailing list, '[talk-au] Going Separate Ways', 11 July 2011, http://lists.openstreetmap.org/pipermail/talk-au/2011-July/008349.html.

162 Richard Weait, '[talk-au] Talk-au Moderation', 11 July 2011, http://lists.openstreetmap.org/pipermail/talk-au/2011-July/008350.html.

163 Steve Coast to Open Street Map talk mailing list, '[OSM-talk] Hitting Reset on Talk-au', 11 July 2011, http://lists.openstreetmap.org/pipermail/talk/2011-July/059319.html.

project, and bad feelings continue to this day. Later, after a decision had been made over the license, the project was

forked to created Free Open Street Map under the original CC-BY-SA license [164].

Contribution mechanisms

After Coast launched the Open Street Map website, it was quickly made available to the wider public, and

promoted via various sites frequented by likely contributors [165]. Alongside the release of the map data, a suite of

tools have been continuously developed and modified to assist in the editing, distribution and processing of data,

the majority of which are also released under free software licences. Amongst these were two editors, Potlatch, the

title of which is taken from a word used by American First Nations people for gift, and JOSM, or Java Open Street

Map. Java is a popular programming language which allows software to be run on any operating system without

modification. At a technical level, these editors allow a contributor to draw points, lines and relations, the latter

being a virtual combination of other items, such as a collection of roads to make up a bus route, which could then

be 'tagged' with text values to indicate various attributes of the item being added to the database. For example a

segment of one carriageway of the M25 motorway in England is tagged as follows:

bicycle = no

carriageway_ref = B

foot = no

highway = motorway

horse = no

lanes = 3

lit = yes

maxspeed = 70 mph

motor_vehicle = designated

name = London Orbital Motorway

odbl = clean

164 fosm contributors, 'FOSM :: The Free Wiki World Map', 2013, http://fosm.org/.

165 Slashdot, 'Online Collaboration Creates "Map-Making For the Masses"', *Slashdot*, accessed 2 February 2013, http://science.slashdot.org/story/07/12/31/0635206/online-collaboration-creates-map-making-for-the-masses.

    oneway = yes

    ref = M25

    source:maxspeed = UK:motorway

    source:ref = local_knowledge [166],

and part of the University of Auckland in New Zealand has the following tags:

    amenity = university

    campus = City

    name = University Of Auckland

    ref = 400 [167].

Initially, the sole way to add an item was to collect a GPS trace by physically visiting its location, by for example travelling the route of the motorway in a car, and then importing the resultant trace into the OSM database. The route would then show up in the editor being used and could be traced by the user and tags added. Yahoo! later entered into an agreement with Open Street Map, which would allow commoners contributing to the map to trace over aerial photographs which were a part of that company's mapping service. Permission was given to derive a work from the copyrighted photographs, without tainting the CC-BY-SA nature of the project. When using the aforementioned Potlatch or JOSM, or any of the other editors available, the images are shown, allowing a user to recognise items from the air, draw them in and tag them. While greatly accelerating the pace of data collection, on the ground mapping is still required. Crucially the names and other data about most items can not be ascertained from the air, although for some items such as motorways, large buildings, large rivers, a reasonable guess can often be made. This put mapping within the reach of those who did not have a GPS device, and also brought about the "armchair mapper" [168], a commoner who could map without leaving their computer, for instance drawing in buildings, roads, parks, data for which could then be collected by others. As an example of a creative and useful application of the data, a tile set called 'NoName' was created. This highlighted all roads without a name, by adding

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166OpenStreetMap contributors, 'OpenStreetMap | Way | London Orbital Motorway (4208532)' (OpenStreetMap, 23 October 2012), http://www.openstreetmap.org/browse/way/4208532.

167OpenStreetMap contributors, 'OpenStreetMap | Way | University Of Auckland (23894350)' (OpenStreetMap, 7 April 2011), http://www.openstreetmap.org/browse/way/23894350.

168OpenStreetMap contributors, 'Armchair Mapping', *OpenStreetMap Wiki*, 29 September 2012, https://wiki.openstreetmap.org/wiki/Armchair_mapping.

red casing to the road. This map could then be printed off, and used by an on-the-ground mapper to guide them in locating collect unnamed roads which had been added by an armchair mapper.

The quality of aerial photographs which mappers can trace from varies considerably across the world, and numerous mappers have asked whether it is possible to trace from tiles used by Google in their Maps, Street View and Earth products, or to copy the names and other information directly. The reasoning generally goes along the lines that as the roads, building, parks and other items are facts, they cannot be copyrighted, thus anyone can copy from anywhere [169]. However, a number of jurisdictions recognise the concept of database rights, either as a separate strand of intellectual property, or as part of copyright. Further, some data providers insert fake items into their information. These serve two purposes. Firstly they alert the provider to unauthorised copying, and secondly as the fake locations are a creative work, they fall under copyright, thus strengthening the provider's claim to copyright infringement in jurisdictions where collections of data are not explicitly protected. A more convincing argument generally used to discourage copying from Google and other copyrighted sources is that the legal services Google can call upon dwarf those which Open Street Map could afford. These aerial photographs have been supplemented by various out of copyright maps, such those from the 1960s and earlier made by Ordnance Survey which are now in the public domain. These have since been made available online, and certain items have been traced, although this still requires local knowledge, as much may have changed in the intervening years. They are particularly useful for the myriad footpaths in the countryside, the GPS mapping of which would take a considerable amount of time.

Open Street Map followed Wikipedia in initially allowing anyone to add data without registering, but this was changed in 2007, when an email address was required to register, and all edits were recorded against a username. This has latterly been used to find who has been making mistakes, and then to contact the mapper, and assist with training or correction, or to bulk delete data viewed as incorrect. Usernames are mostly free form, they must include text, but do not have to correspond to the legal name of the person.

Alongside individual mappers adding data, mass data imports have been a constant fixture in Open Street Map, one

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169 Peteris Krisjanis to Open Street Map talk mailing list, '[OSM-talk] Google Street View Copyright Question', 9 September 2009,
    http://lists.openstreetmap.org/pipermail/talk/2009-September/041635.html.

of the first major imports being the AND data set, donated by mapping company Automotive Navigation Data [170]

and including information on the whole road network for The Netherlands, later followed up with data for India and

China. Mass imports are also informally regulated by the community, with a set of precise suggestions [171] to be

carried out before importing any data. Anyone not following these is likely to see their imports removed en masse

by local mappers unhappy with their data being polluted or deleted, a task which is relatively simple given the tools

employed on the site. There are numerous incidences of significant errors found in imports, whether from

government or private sources, the data set from the US Government being a prime case of this. For these reasons

and the problems mass data can bring even when it is correct, a number of commoners with significant experience

of Open Street Map are often suspicious of any mass imports and only tend to proceed carefully, with the support

and inclusion of all around them. When imports do proceed and a piece of data will overwrite that already in the

database, data mapped by members of the Open Street Map community is almost always preferred to data from an

import [172].

In a parallel instance to importing data into Open Street Map, Wiktionary, a project set up by the same group who

run Wikipedia, also has mass imports. Copyright laws in various nations mean dictionaries from the early 20th

century are moving to the public domain, making their information available to any and all. Various imports are

continuously working to improve Wiktionary with this data. A side-effect is that there area very few human editors

to that project any more, as their edits are very likely to be written over by one of the mass imports, thus providing

a further reason why imports are viewed with caution, they are seen as having the potential to kill the community.

A number of governments release information collected by their governments under permissive terms, for example

all works by the United States Government are in the public domain. In 2007, an import of US geographic data was

carried out, adding several million points and lines to the data set, vastly increasing the coverage and depth of the

data in the US. Unfortunately the data was very low quality, and required a huge effort over many years to correct

it, a clean up which is ongoing [173]. In early 2008, the New Zealand Government agency, Land Information New

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170 OpenStreetMap contributors, 'AND Data', *OpenStreetMap Wiki*, 27 December 2012, https://wiki.openstreetmap.org/wiki/AND.

171 OpenStreetMap contributors, 'Imports', *OpenStreetMap Wiki*, 2010, http://wiki.openstreetmap.org/wiki/Imports.

172 OpenStreetMap contributors, 'Disputes', *OpenStreetMap Wiki*, 18 February 2011, http://wiki.openstreetmap.org/wiki/Disputes.

173 OpenStreetMap   contributors,   'TIGER   Fixup',   *OpenStreetMap   Wiki*,   4   January   2013,

Zealand gave permission for its data to be used in Open Street Map, releasing it under a CC-BY-SA license, a step towards a Government move to provide all data under permissive terms as part of the NZ GOAL or Government Open Access License [174] project. The import of this data has been carried out much more slowly, partly due to not wishing to make the same mistakes as the US Government data import, partly due to lack of resources, and partly to ensure the community is involved and all views are taken account of. After four and a half years of discussion, planning, trials and building import tools, the data import began in late 2012. The method selected involves as many people as want to be involved, using tools which are purposefully designed to be little more complicated than those already used for editing map data, while attempting to ensure those importing data do not unintentionally interfere with each other. Despite the move to permissive licensing which allowed this to occur, logistically getting access to data is not so simple. For example, The New Zealand Fire Brigade has repeatedly denied access to its suburb boundary information, considered the definitive source of this information, citing safety concerns [175]. As an aside, it became clear through my involvement with the Open Street Map project that numerous government agencies collect the same data, with different degrees of precision and accuracy, but apparently do not share it amongst themselves. So, for instance, road data is separately collected in New Zealand by at least the aforementioned Land Information New Zealand, plus the New Zealand Transport Agency, the New Zealand Fire Service and local councils.

Although the data collected within Open Street Map has relatively few legal restrictions on its use and modification, applying the data requires technical skills and in the case of processing the entire data set, expensive hardware due to its size. Until recently for example, rendering the data to create maps, required extensive understanding of databases and other advanced technical knowledge. More recently, simpler to use, although less resource efficient methods have been developed, such as the desktop rendering software Maperitive [176]. While easier to use, they are not suitable for processing large data sets, such as the entire planet, or even for medium or

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https://wiki.openstreetmap.org/wiki/TIGER_fixup.

174 State Services Commission, 'New Zealand Government Open Access and Licensing Framework', *Government ICT Directions and Priorities*, August 2010, http://ict.govt.nz/programme/opening-government-data-and-information/nzgoal/read-nzgoal.

175 Ed   Corkery,   'Response   from   the   Fire   Service',   *NZ   Official   Information   Blog*,   2009, https://officialinfo.wordpress.com/2009/04/17/response-from-the-fire-service/.

176 Igor Brejc and OpenStreetMap contributors, 'Maperitive', *Maperitive*, 2012, http://maperitive.net/.

large countries such as Germany, USA and UK. However, the Cloudmade company offers a service which allows anyone to generate tile sets according to their own specifications. The detail with which these sets can be defined is limited, and use of them on an external site requires registration with Cloudmade.

Community

There are few formal rules for mapping, although mappers are made aware that their work may be re-edited, and that they should not take this personally. There is also no formal quality assurance, mappers are technically free to do as they wish, although depending upon the area, those edits perceived as inadequate by local mappers are likely to get reverted quickly, for instance in urban areas of Germany, Netherlands and UK which have a high density of commoners contributing data. Disputes do occurs, however as in Cyprus, where the ongoing political disagreement between Turkish and Greek Cypriots over which is the true owner of Cyprus spilled over into a naming dispute in 2007 [177]. Some Turkish commoners wished to designate locations with their Turkish names, while those of Greek descent desired to label them with their Greek names, an exchange followed which went through numerous cycles before a request for assistance was sent to one of several community contact points. After lengthy discussions between many commoners, this was partly resolved by a commoner suggesting the idea of naming an item in multiple languages. This allowed the introduction of multiple names for an object, so whereas previously there had only been the 'name' tag available to label an item, this was supplemented with a name tag for each language, following the ISO 639-1 standard for language codes. In this case the 'name:tk' and 'name:el' tags were used. Maps or other outputs can then be created in whichever language is desired, by altering the rules for generating that output. For instance, during the dispute, a village was named as follows by a commoner who identified as Turkish:

name = Ozanköy

old_name = Kazaphani

place = village

and then changed to the following by a commoner who self-identified as Greek:

name = Kazaphani

place = village [178],

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177 David   Janda,   '[OSM-talk]   Advice   Needed   -   Dispute   Regarding   Names   in   Cyprus',   2007,
      http://lists.openstreetmap.org/pipermail/talk/2007-November/019670.html.

Since the introduction of the language/country-specific 'name' tags, the naming scheme resembles this form:

    name=Ozanköy

    name:el=Καζάφανι

    name:tr=Ozanköy

    name:en=Ozankoy

    name:old=Καζάφανι

    name:disputed=Ozanköy

    name:recognized=Kazaphani

    name:signpost=Ozanköy [179]

This can be seen in other locations with contested or multiple languages, so for example the Cape Reinga to Bluff walking trail in New Zealand is tagged as follows:

    name = Te Araroa

    name:mi = Te Araroa

    name:en = The Long Pathway [180]

However, this has not entirely solved the problem: the 'name' tag still exists, and is still seen as more prestigious than either of the language specific tags, as it is perceived as the default for an item. This too is changing however, as uses of the data become more sophisticated and aware of languages other than English: Jochen Topf's Multilingual Maps Test is a fine example of this [181].

Commoners are encouraged to work together to resolve all problems local to themselves, requesting help from a barely-existing hierarchy is often met with the response that no one member of OSM has greater rights than any other, so there is nothing say Steve Coast or any of the other senior, trusted commoners should do, despite appearing to take the place of a transcendent government. In the case this is not sufficient, volunteers offer to

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178 Ibid.

179 OpenStreetMap contributors, 'WikiProject Cyprus', *OpenStreetMap Wiki*, 10 June 2012, https://wiki.openstreetmap.org/wiki/Cyprus.

180 OpenStreetMap contributors, 'OpenStreetMap | Relation | Te Araroa (1598878)', OpenStreetMap (OpenStreetMap, 21 June 2012), http://www.openstreetmap.org/browse/relation/1598878.

181 Jochen Topf and OpenStreetMap contributors, 'Multilingual Maps Test', *Multilingual Maps Test*, 2012, http://mlm.jochentopf.com/.

mediate [182], often after lengthy discussions via one of several communications channels, but this is again neither imposed nor controlled by any hierarchical organisation. The mediation is further careful to facilitate a settlement between the two parties, rather than trying to impose a suggested solution upon the groups with differing views. There are 'working groups', which are self-selecting teams who decide to implement some set of coordinated values, but again they have no formal power, although there is a certain strength in numbers. This is in marked contrast to Wikipedia, where on occasion, someone with the ability to do something has done so. One particularly notorious event at that project involved Jimmy Wales using his power to settle a dispute. Care needs to be taken here, lest the administrators overstep the line described by Raymond, when he suggested they tread carefully and respect others who contribute [183].

This notion of commoners local to an area knowing best has been extended further, although again informally, to include in the last instance resorting to "on the ground rule", i.e. that mapping by a commoner who is local to a given area is preferred over mapping by someone from a remote location, or carrying out a mass import [184]. Despite not being enforced through any legal, juridical mechanisms, it has become constituted as a community norm which commoners are strongly encouraged to follow.

In a blog post entitled "Then you win", a reference to the final line of a quote popularised by Gandhi, Steve Coast announced that after much lobbying of the UK Government, Ordnance Survey data would be gradually released under a permissive license, allowing it to be included within Open Street Map and similar projects [185]. The title of the blog post also obliquely referenced a previous disagreement between Open Street Map and Ordnance Survey, when the latter had given a presentation comparing the data of the two projects. Coast objected not to the comparison, but to Ordnance Survey using data from Open Street Map which was several months old, surmising that the Government-funded organisation considered Open Street Map enough of a threat to compare the two, but also felt the need to purposefully misrepresent the project.

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182 OpenStreetMap contributors, 'Disputes'.

183 Raymond, *The Cathedral and the Bazaar*, 88.

184 OpenStreetMap contributors, 'Disputes'.

185 Steve Coast, 'Then You Win: Ordnance Survey to Open Data', *OpenGeoData*, 17 November 2009, http://old.opengeodata.org/2009/11/17/then-you-win-ordnance-survey-to-open-data/index.html.

Wider significance and influence

In 2007, Steve Coast set up a private company called Cloudmade, and later attracted venture capital funding million from Greylock [186]. The company intended to turn a profit by selling services based upon the data collected for Open Street Map, which by this point was rivalling various proprietary services in coverage. Although the accuracy was stated as being "good enough" [187] for most ordinary people who required a map or similar device, it did not approach that arrived at by government services or a well-funded private sector. This move to sell services has since been emulated by a number of other private organisations, such as Geofabrik based in Germany [188] and Koordinates of New Zealand [189].

As the quality of the data has improved, various other private companies have taken an interest, and use the data for their own services. Bing maps, a Microsoft service, offers the data as an alternate to their maps sourced from proprietary providers [190]. Apple also provides access to tiles rendered from Open Street Map data, although there is debate as to how much this is a rebuff to Google after various recent disagreements by the once close partners [191]. At the same time, and connected to this first event, two other significant developments occurred. Firstly, Steve Coast was offered a senior position by Microsoft in their map division [192]. Secondly, Bing allowed their tiles to be used in various OSM editors, for the purpose of tracing [193]. In some areas these images were of far higher resolution than those provided by Yahoo!, and allowed more data to be observed and added by 'armchair mappers', rapidly

186 CloudMade, 'About CloudMade', *Cloudmade*, 2013, http://cloudmade.com/about.

187 Robert Capps, 'The Good Enough Revolution: When Cheap and Simple Is Just Fine', *Wired*, 2009, http://www.wired.com/gadgets/miscellaneous/magazine/17-09/ff_goodenough?currentPage=all.

188 Geofabrik GmbH Karlsruhe, 'The Company', *GEOFABRIK*, 2012, http://www.geofabrik.de/geofabrik/geofabrik.html.

189 Koordinates, 'About Koordinates', *Koordinates Support*, 18 July 2011, http://support.koordinates.com/entries/20285786-about-koordinates.

190 The Bing Team, 'Bing Engages Open Maps Community'.

191 Juliette Garside, 'Apple Heads Toward Google-free iPhone as YouTube App Is Dropped', *The Guardian*, 7 August 2012, http://www.guardian.co.uk/technology/2012/aug/07/apple-google-iphone-youtube-app-dropped.

192 Richard Weait, 'OpenStreetMap Founder Steve Coast Joins Bing', *OpenGeoData*, 2010, http://opengeodata.org/openstreetmap-founder-steve-coast-joins-bing.

193 The Bing Team, 'Bing Engages Open Maps Community'.

extending the reach, precision and accuracy of Open Street Map's coverage [194].

Google, realising the power available through crowdsourcing, the mobilisation of large numbers of mappers who do not necessarily have high technical skills or training, has released a set of tools inspired by Open Street Map, named Google Map Maker. Users are encouraged to add data in areas which Google Maps do not cover, such as Jamaica, and to correct data in existing areas. In contrast to mapping on the Open Street Map project, the resultant map can be used by Google as they desire, without attributing the mapper or allowing derivative works to be made, although as the license is non-exclusive the data can be redistributed by the person who contributes [195].

After the 2010 Haiti earthquake, a number of commoners realised the maps available for that country were of very low quality, hampering relief efforts. A call was put out to the community to assist, mainly via armchair mapping, and within a very short time, the detail was vastly increased [196]. Various institutions used drones to take very high resolution aerial photographs of the area post-earthquake, while Google allowed its copyrighted data to be used [197], and these inputs were then provided to Open Street Map to assist tracing, further improving the data. Since the Haiti response, an informal group which calls itself HOT, or Humanitarian Open Street Map Team has formed. The specific focus of this group is improving coverage of permissively licensed map data in areas around disasters such as earthquakes, floods and tsunamis [198]. In the two years since, there have been interventions to improve the maps in Japan, Pakistan, Italy and Turkey amongst others. A similar effort occurred in 2011 after the Christchurch earthquake, when an informal request was made by a group involved with the relief effort. Before and after maps of the building structures in Christchurch were required, mapping of the road network being already complete. Again, parts of the community were enlisted via the OSM discussion email list, and within a short time, the vast majority

194 OpenStreetMap contributors, 'Armchair Mapping'.

195 Google, 'Google Map Maker Terms of Service', *Google*, 9 August 2012, http://www.google.com/mapmaker/mapfiles/s/terms_mapmaker.html.

196 Clark Boyd, 'Online Mapping Helps Haiti Relief Efforts', *PRI's The World*, 22 January 2010, http://www.theworld.org/2010/01/online-mapping-helps-haiti-relief-efforts/.

197 OpenStreetMap contributors, 'WikiProject Haiti/Imagery and Data Sources', *OpenStreetMap Wiki*, 22 November 2012, https://wiki.openstreetmap.org/wiki/WikiProject_Haiti/Imagery_and_data_sources.

198 Humanitarian OpenStreetMap Team, 'Using OpenStreetMap for Humanitarian Response & Economic Development.', *Humanitarian OpenStreetMap Team*, 2011, http://hot.openstreetmap.org/weblog/.

of pre-earthquake structures, along with trees, fences and walls in Christchurch city centre were traced, from previously existing photographs provided by Microsoft. Various problems outside the control of those involved with Open Street Map prevented the tracing of post-earthquake photos from being carried out, ironically the aerial photographs could not be provided to the community due to problems over rights of use.

Kibera is part of the Nigerian city of Lagos, and in Western eyes forms a notorious slum or informal cluster of dwellings into which millions of dollars of aid are poured each year [199]. The local government, despite realising the problems of the area, has done little to alleviate the problems, so there is little in the way of maps. This causes problems for aid workers, although this is also partly due to the unstable, rapidly changing nature of the infrastructure. CloudMade set up a fund in 2010 to provide grants and mapping equipment to assist mapping in areas which had "hardly been mapped" [200], one of the first of which went to map Kibera. The mapping is carried out by those on the ground, by commoners. Similarly, funding by the community has been provided to send a mapper to Antigua and other poorly-mapped areas [201].

199 Martin Robbins, 'The Missing Millions of Kibera', *The Guardian*, 1 August 2012, http://www.guardian.co.uk/science/the-lay-scientist/2012/aug/01/africa-propaganda-kibera.

200 Nick Black, 'OpenStreetMap Grants', *CloudMade*, 2008, http://blog.cloudmade.com/2008/03/17/openstreetmap-grants/.

201 Slashdot, 'OpenStreetMap Sends UK Volunteer Mapper To Antigua', *Slashdot*, 27 May 2009, http://news.slashdot.org/story/09/05/27/1920227/openstreetmap-sends-uk-volunteer-mapper-to-antigua.

2.6 Summary

Over the preceding pages, I have presented a brief overview of the digital commons, its history, methods, beliefs and quirks, and sketched out the development and operating procedures of the three projects which I will be examining here. These cases have been chosen to represent a diverse scope of works which can be copyrighted and that make up the digital commons: one is a software project, one is concerned with location data and one with encyclopedic information. They are also significant projects within the movement, being flag-bearers for the concrete practise of the maxim "information wants to be free" [202]. Now that we have an understanding of the digital commons, we can proceed to the analysis, the details of which are described in section 1.

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202 Roger Clarke, 'Roger Clarke's "Information Wants to Be Free ..."', *Roger Clarke's Web-Site*, 2013, http://www.rogerclarke.com/II/IWtbF.html.

3.0 Analysis

This section will cover the analysis of the projects laid out in the previous chapter. A series of analytical frameworks will be used, as detailed in section 1.1.

3.1 Class

In this chapter, I will use *Understanding Class: Towards an Integrated Analytical Approach* by Erik Olin Wright [203] to examine how far class divisions operate within the digital commons. Wright has made his reputation as the leading exponent for Marxist sociology of class but in this paper he argues that class analyses under contemporary conditions also need to draw on insights from Weber and stratification research. Thus, the three approaches to class which he outlines, and which I will be using here are:

1. Stratification, which

> "focuses on the process through which individuals are sorted into different positions in the class structure or marginalized altogether. Where analyses of opportunity hoarding draw attention to the exclusionary mechanisms connected to middle-class jobs, the stratification approach helps to specify the individual attributes that explain which people have access to those jobs, and who is excluded from stable working-class jobs. [204]

2. Weberian, which

> identifies opportunity hoarding as the central mechanism that differentiates 'middle-class' jobs from the broader working class by creating barriers restricting the supply of people for desirable employment. The key issue here is not who is excluded, but simply the fact that there are mechanisms of exclusion that sustain the privileges of those in middle-class positions. [205], and

3. Marxist, which "identifies exploitation and domination within the fundamental class division in capitalist society: that between capitalists and workers. " [206].

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203 Wright, 'Understanding Class'.

204 Ibid., 109–110.

205 Ibid., 109.

206 Ibid.

The digital commons, with its permissive licensing, non-hierarchical connections and communications and sharing of knowledge at all levels, appears at first sight to refuse class divisions and render all who contribute and take part as one class, that of commoner. Eric Raymond's essay *The Cathedral and the Bazaar*, exemplifies this attitude, when he speaks of "a great babbling bazaar of different agendas and approaches (aptly symbolised by the Linux archive sites, which would take submissions from *anyone*)" [207]. This suggests a mode of interaction which is inclusive, rather than exclusive, allowing all to speak, unregulated by external forces. However, this view of the digital commons ignores who actually takes part, in what way, and the barriers, perceived or otherwise, to others. Looking at the demographics of participation, research reveals that a significant proportion are well-educated, western [208] males [209] in their 20s, 30s and 40s with an education [210] and employment [211] in technology-related fields. This is in part due to the nature of some of the projects: they are mainly technical, requiring an understanding of somewhat advanced concepts which are based in a certain positivist tradition, which in turn demands a certain type of education and cultural background.

This situation corresponds with Wright's first analysis, that is the "individual attributes and life conditions" [212] approach, which states that "Attributes such as sex, age, race, religion, intelligence, education, geographical location, and so on, are held to be consequential" [213]. As Wright goes on to explain, "Some of these attributes are acquired at birth, others later in life; some are stable, others quite dependent upon a person's specific social situation, and may accordingly change over time" [214]. In the case studies examined here and in the wider digital commons, the most important attribute is clearly education, which is important for all of our case studies. In order

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207 Raymond, *The Cathedral and the Bazaar*, 22–23.

208 Ruediger Glott, Philipp Schmidt, and Rishab Ghosh, *Wikipedia Survey – Overview of Results* (United Nations University, March 2012), 4, http://www.wikipediasurvey.org/docs/Wikipedia_Overview_15March2010-FINAL.pdf.

209 Andrea Holliger, *The Culture of Open Source Computing: An Annotated Bibliography*, Bibliography (Boulder, CO: National Center for Women & Information Technology, University of Colorado, 1 November 2007), 1, http://www.ncwit.org/resources/culture-open-source-computing.

210 Glott, Schmidt, and Ghosh, *Wikipedia Survey – Overview of Results*, 7.

211 Corbet, Kroah-Hartman, and McPherson, *Linux Kernel Development*, 8.

212 Wright, 'Understanding Class', 102.

213 'Erik Olin Wright - Understanding Classs -- NLR 60.pdf', n.d., 102.

214 Ibid.

to contribute to Wikipedia, a commoner requires a knowledge of some "notable" [215] event, person, place or other concept or object in the world. Similarly, to add value to Open Street Map, one needs to know the location of items one may wish to see on a map. Both of these rest upon knowledge or understanding of the world around us, and thus most commoners are likely to have something they can contribute. They further require knowledge of how to use the specific tools, although as detailed in section 2.3, attempts to simplify taking part in the read/write web have been largely successful, and contributing has been made considerably easier than it once was. This is not to say no-one is excluded, tables within Wikipedia for instance still being a major problem for those without patience and the ability to think in abstract ways [216]. Taking part in Linux requires much higher skills, which in turn necessitates a higher education, either from university or possibly self-taught via many of the tutorials and informal support groups available across the web. Access to a computer and fast internet connection are also essential to joining in with these projects, and while this is not a problem in most urban and semi-urban areas in Western countries, outside these areas, costs rise dramatically and transfer speeds drop, while for those who are not in Western countries, the cost of a computer can be far outside their means. Regardless of education and skills, contributing to one of these projects also requires time, which necessitates a stable income, living situation and other life conditions which facilitate and do not interfere with detailed technical work of a somewhat cerebral nature. Taking examples given by Wright, those living in "dire poverty " or "squalid apartments" may be less able to contribute than those with "extravagant wealth" who live in "gated mansions" [217], due to external pressures upon their life which demand a large proportion of their time be taken up with the basics of life.

Importantly though, there are efforts within these projects to expand the range of people who can take part, and simultaneously there are few conscious efforts to exclude others. As we will see in chapter 3.5, there is a gain for project leaders, in our case Torvalds, Wales and Coast, through expanding the number of commoners who come into contact with the artefacts. The symbolic wealth returned to these three increases as more commoners take part, thus demonstrating a desire to include as many as possible, with as many different backgrounds as possible. There

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215 Wikipedia contributors, 'Wikipedia:Notability', *Wikipedia, the Free Encyclopedia* (Wikimedia Foundation, Inc., 20 February 2013), https://en.wikipedia.org/w/index.php?title=Wikipedia:Notability&oldid=538627862.

216 Jonathan Fildes, 'Wikipedia "Too Tough for Many"', *BBC*, 14 January 2011, sec. Technology, http://www.bbc.co.uk/news/technology-12171977.

217 Wright, 'Understanding Class', 102.

appears to be little "opportunity hoarding enforced by the legal rules of property rights" [218], the mechanism that Wright's reading of Weber's class analysis identifies as the central method for preserving the privileges of professional occupations. As Wright explains, "In order for certain jobs to confer high income and special advantages, it is important for their incumbents to have various means of excluding others from access to them." [219] and "One way of doing this is by creating requirements that are very costly for people to fulfill *[sic]*. Educational credentials often have this character" [220]. As noted earlier, there are barriers to entry, through requiring commoners to grasp somewhat abstract concepts and learn to use software tools. However, as we have discussed at length, the overarching rubric of the digital commons states that "information wants to be free" [221]. This information includes education, and manifests in tutorials [222], electronic communications methods aimed specifically at those with few skills [223], and a desire in most forums to assist anyone who asks.

Examining Wright's analysis further, we can see that the communication medium assists in further breaking down mechanisms of exclusion. As he states,

> marriage bars and gender exclusions restricted access to certain jobs for women until well into the 20th century in most developed capitalist countries; religion, cultural criteria, manners, accent - all of these have constituted mechanisms of exclusion. [224].

However, as Fleishman somewhat tongue-in-cheek stated, "on the internet nobody knows you're a dog" [225], which demonstrates the difficulty of knowing a person's attributes, and thus deliberately discriminating against them. This

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218 Ibid., 106.

219 Ibid., 104.

220 Ibid.

221 Clarke, 'Roger Clarke's "Information Wants to Be Free ..."'

222 OpenStreetMap contributors, 'Video Tutorials', *OpenStreetMap Wiki*, 12 September 2012, https://wiki.openstreetmap.org/wiki/Video_tutorials.

223 OpenStreetMap Foundation, 'Newbies Info Page', *Open Street Map Mailing Lists*, 2013, http://lists.openstreetmap.org/listinfo/newbies.

224 Wright, 'Understanding Class', 105.

225 Glenn Fleishman, 'Cartoon Captures Spirit of the Internet - New York Times', *New York Times*, 14 December 2000, http://www.nytimes.com/2000/12/14/technology/14DOGG.html?pagewanted=1&ei=5070&en=f0518aafeccf36fd&ex=1183089600.

should not be taken to suggest there is any active discrimination against groups which are generally disadvantaged in wider Western society, digital commons projects are usually welcoming to all who wish to participate.

The impetus towards inclusion in the assembly process also takes such forms as grants by Open Street Map to those in poorer areas [226], or for mappers to travel to less well-mapped regions [227]. The second of these however suggests the grants are perhaps not entirely about empowering those who are at a lesser status in relation to Open Street Map, as they are about improving the map data. In the example referenced above, rather than encouraging a local commoner to take part, thus empowering him or her, money and time were instead spent on sending a commoner from the UK, a person who had been involved in the project for many years. We can also look at such groups as the Ada Initiative, named after Countess Ada Lovelace, allegedly the world's first computer programmer, which has as its aim "supporting women in open technology and culture" [228]. This group is funded by a range of organisations including the Mozilla Foundation, the Linux Foundation and Google, and is one of a number of such groups involved in the digital commons, all with the aim of advocating for an under-represented group to become more active, and to be included.

Despite this attempt to account for anyone who wishes to take part, there are occasionally examples of those within digital commons projects using methods to ensure only a certain type of person gets to take part. This takes the form of such instructions as "RTFM", or "read the fucking manual" [229], when those with extensive knowledge are asked what they deem to be a simple question. It is framed as encouraging the person to think for themselves, to find and read any relevant documentation before asking questions, although the humorously hostile manner suggests it is not entirely about being helpful. It thus sometimes ensures those who do not have the required knowledge are excluded. To both groups, this can appear as something which is an attribute of the disadvantaged, a lack of theirs and something to be fixed by them, thus marking it as a combination of both the stratification and Weberian approach to class. This approach is considerably less common than it used to be, perhaps partly due to the changes brought about by Web 2.0. As we discussed earlier, this progression introduced huge numbers of people to

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226 Black, 'OpenStreetMap Grants'.

227 Slashdot, 'OpenStreetMap Sends UK Volunteer Mapper To Antigua'.

228 The Ada Initiative, 'Supporting Women in Open Technology and Culture', *The Ada Initiative*, 2013, http://adainitiative.org/.

229 Denis Howe, 'RTFM', *FOLDOC*, 2010, http://foldoc.org/RTFM.

the digital commons, thereby dwarfing the number of highly-skilled commoners contributing to advanced coding projects, who were more likely to utter this reply.

There are further limits to the apparent benevolence of destroying the class barriers. As will be noted in the surplus-value analysis in chapter 3.5, the project leaders privatise a certain amount of symbolic wealth generated by contributions to the project. The exploitation inherent in this move, and the unequal accruing of such capital demonstrates there are still barriers in place. In the case of Torvalds, Wales and Coast, they are still identified as the creators and originators of the project, despite their quantitatively small contribution [230], and it is important they retain this status, to continue accruing the symbolic capital generated by others. Groups including the Mozilla Foundation, responsible for the Firefox web browser and Thunderbird email client, and The Document Foundation [231], who oversee the Libre Office office suite, have a rotating board who oversee the project, and thus no one easily identifiable person who gains credit. Open Street Map have also latterly gained a board whose role is "encouraging the growth, development and distribution of free geospatial data and to providing *[sic]* geospatial data for anyone to use and share" [232]. Simultaneously, Steve Coast has become less prominent in the project, and control of resources are gradually begin shifted to the Foundation, which in some areas are now seen as the controlling entity of the project. This shift in responsibility has also partly occurred within Linux and Wikipedia, although in each case there is still one identifiable person seen as nominally leading the project.

Two important parts of a digital commons project which a given individual or group does retain control over are the name, which is sometimes trademarked, and the web address, both of which are monopoly-controlled. The trademark Linux is owned by Linus Torvalds, and the kernel.org website, which hosts the kernel he controls, is also effectively controlled by him, is recognised as *the* source for the kernel. The resources controlled by the Open Street Map Foundation include the domain name, over £50,000 of donations in the 2010-2011 financial year [233], and

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230 Corbet, Kroah-Hartman, and McPherson, *Linux Kernel Development*, 9.

231 The Document Foundation, 'Board', *The Document Foundation*, 2013, https://www.documentfoundation.org/foundation/board/.

232 OpenStreetMap Foundation, 'OpenStreetMap Foundation', *OpenStreetMap Foundation*, 17 November 2012, http://www.osmfoundation.org/wiki/Main_Page.

233 OpenStreetMap Foundation, 'Finances/Income 2011', *OpenStreetMap Foundation*, 5 November 2012, http://www.osmfoundation.org/wiki/Finances/Income_2011.

sole access to the servers and other infrastructure which support mapping [234]. This infrastructure includes the majority of the most popular electronic communications methods which are used to discuss mapping. The importance of this control was demonstrated on a recent occasion when a number of contributors to an Open Street Map mailing list were warned with being barred from the list, on account of the language and methods used in a debate [235]. The mailing list is governed by the Open Street Map Foundation, which has somewhat arbitrarily appointed itself as the overseer of Open Street Map, based upon a donation of computer hardware and elections with a small, unrepresentative set of commoners who contribute to the project. The Foundation constitutes itself as an overarching body, and thus any action it takes is not governance by the commons, but by elected bureaucrats who claim to represent the commoners who take part. The Open Street Map Foundation further holds the power to temporarily or permanently block any users, IP addresses or software, in an attempt to prevent any behaviour they view as damaging [236]. As has been suggested by Fuster Morell, one of the key elements of the commons is that "the community of people building them can intervene in the governing of their interaction processes and of their shared resources" [237], but in this case a structure has been put in place which allows one group to exclude others from a set of resources. This thus resembles what Wright identified as being Marxist class structures, in this case "the ability to control the activities of others" [238]. He went on to state: "As in the Weberian tradition, power and legal rules which enforce social closure are important in defining the basic structure of social positions - particularly private ownership of the means of production" [239]. The means of production for our case studies are the servers, web domain and project title, and although they are not owned privately, they are controlled by a small group.

As Raymond notes, there are limits to the power which can be wielded though, the leader(s) must consider the community before acting, lest the project be forked [240] and a breakaway movement formed. This potential is

234 OpenStreetMap Foundation, 'About', *OpenStreetMap Foundation*, 2013, http://blog.osmfoundation.org/about/.

235 Mikel Maron to Open Street Map talk mailing list, '[OSM-talk] Moderation', 3 February 2013, http://lists.openstreetmap.org/pipermail/talk/2013-February/066134.html.

236 OpenStreetMap contributors, 'Data Working Group', *OpenStreetMap Wiki*, 25 January 2013, https://wiki.openstreetmap.org/wiki/Data_working_group.

237 Fuster Morell, 'Governance of Online Creation Communities: Provision of Infrastructure for the Building of Digital Commons', 5.

238 Wright, 'Understanding Class', 107.

239 Ibid., 108.

240 Raymond, *The Cathedral and the Bazaar*, 88.

illustrated by an incident at Wikipedia, when a majority of the commoners who edited the Spanish Wikipedia left the site after the prospect of advertising was brought up [241]. The commoners who left started a single-language competitor to Wikipedia, with strong rules preventing commercialism, and it was many years until the Spanish Wikipedia recovered from this withdrawal of labour. Wales' control over the symbolic capital in this case was rapidly dissipated by key commoners moving elsewhere. He retained control over the physical infrastructure and web domain, but these are of little use without anyone to contributing to articles.

In each of the cases detailed above, a small group makes decisions about how work will be carried out, forcing those who contribute to do as they wish, or leave the project. One could argue this is for the good of the project, to assure the quality of the data, but as we will see in section 3.5, it is in the interests of the leaders of each project that it proceeds as they desire, thus enabling them to accrue as much symbolic capital as possible. Further, it appears that what is good for the project is decided by a small number of commoners, who form a technocratic elite which is unprepared to accept the questioning of assumptions about the organisation of the world, such as property relations. As is stated on one of Wikipedia's policy pages, "Our purpose is to build an encyclopedia, not to test the limits of anarchism." [242], along with other statements that Wikipedia is not trying to be democratic or assist any other progressive politics, but is merely concerned with technical objectives, thus ignoring the social relations which underlie any human interaction. The domination they exert can potentially lead to examples of exploitation, that is ensuring the commoners do as requested, in order to benefit the leaders. This aligns with Wright's suggestion, that "In relations of exploitation and domination, it is not simply the case that one group benefits by restricting access to certain kinds of resources or positions; in addition, the exploiting/dominating group is able to control the labour of another group to its own advantage" [243].

A common answer to suggestions of wrongdoing by project leaders is that anyone at any point can fork the project, take the artefacts and start their own [244], but such is the symbolic capital possessed by the project leaders and administrators, that anyone attempting this move will generally struggle. Further, forking a project will only fork

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241 Lih, *The Wikipedia Revolution*, 138.

242 Wikipedia contributors, 'Wikipedia', 21 February 2013.

243 Wright, 'Understanding Class', 107.

244 Raymond, *The Cathedral and the Bazaar*, 72.

the primary artefact, that is the code, data or knowledge, it does not permit those who fork to take any other resources, such as the infrastructure which the project is supported by.

Following the recent license change at Open Street Map initiated and overseen by the Open Street Map Foundation [245], a certain set of commoners refused to re-license their contributions under the new license, so rather than merely discard these, a competitor to the project, named Free Open Street Map, or FOSM, was started [246]. As a result, the influence which Steve Coast and the Open Street Map Foundation hold over the new project is less than the power they hold over Open Street Map, partially dissolving the capital-labour relations constructed around Coast, although due to the small number taking part in the project, and its lack of visibility, the effect has been minor. Nonetheless, this represents an example of the domination and thus exploitation exerted by Coast and the Open Street Map Foundation being challenged.

From the preceding analysis, we can see that within the digital commons, there are tendencies to not reproduce the class relations prevalent throughout wider society. Information and knowledge are shared widely, demonstrating an aversion to a Weberian class model. There are class boundaries based upon individual attributes, particularly in the area of who does not take part, but importantly there are moves to erode these. Further, there are examples of classical Marxist exploitation and domination through control over resources, to aid the accumulation of symbolic capital through surplus-value, but in both cases, this is extremely mild.

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245 OpenStreetMap Foundation, 'License/We Are Changing The License'.

246 Fosm contributors, 'FOSM :: The Free Wiki World Map'.

3.2 Commodities

In section 2, we saw that there are two methods through which digital commons artefacts come into being. They are either assembled voluntarily by commoners who map, write and code in their own time, unpaid by anyone, or by employees paid by an organisation. These organisations may be profit-seeking, as in the case of Google employing Linux developers, or AND Automotive Navigation Data collecting road data which is later donated to Open Street Map. Or they may be non-profit, in the case of the Linux Foundation employing Linus Torvalds, or the US and New Zealand Governments allowing data collected with public money to be incorporated into the Open Street Map database.

Examining the first group, those who volunteer without pay, there is little given in exchange for their labour. Some observers have suggested that the commoners who volunteer are 'paid' through the non-monetary returns on their labour – gratitude, thanks, and a feeling of contentment, of helping one's fellow humans, either through public [247] or private communications channels. As David Graeber points out however, gratitude is neither economically equivalent to the work carried out, nor even a repayment, but more an acknowledgement that the debt cannot be repaid, and implicitly should not be, as it is not a debt in the way we commonly understand it in a predominantly capitalist society, but instead represents an ongoing social relation between the commoners who code or map and the commoners who use. Any calculated, equivalent, payment would signify a wish to end the relationship, as it would imply a cancelling of debts, leaving no remaining ties between the commoners [248]. When discussing commodities, Marx reminds us that "in order to become a commodity, the product must be transferred to the other person, for whom it serves as a use-value, through the medium of exchange" [249]. As there is no exchange, or rather as one side of the exchange is a token, an acknowledgement of a social rather than economic debt, the artefacts assembled voluntarily by commoners cannot be commodities.

The situation in which artefacts are assembled by workers employed by capitalist organisations is slightly more

247 Open Source Mac, 'Free Mac Software, All Open-source, All OS X', *Open Source Mac*, 2014, http://opensourcemac.org/; Twitter Developers, 'Open Source Thanks', *Twitter Developers*, 2013, https://dev.twitter.com/opensource/thanks.

248 Graeber, *Debt*, 131–133.

249 Marx, *Capital*, 1:131.

complicated. Here the worker's labour power is bought by employers including Red Hat, AND and Google, and used to produce a piece of code, data or knowledge which the company then controls. The organisation employing that person takes ownership of the code, knowledge or data, implying a commodity exchange, or the exchange of a use-value for another use-value, labour-power for code or data. As Marx suggested, the reason the labourer must sell her labour-power, and not the products of her labour, is that she is unable to produce the latter without the capitalist, since to do so she must possess the means of production, which she does not [250]. For our software coders, mappers and writers, this situation is different. In the time of immaterial labour, the widespread dissemination of the means of production such as mobile phones, computers and the internet through society, together with training and encouraging large parts of the population to use these technologies, places production of a significant type of immaterial artefact somewhat in the hands of the masses [251], although unevenly across the globe [252]. Further, the method of production, that is collaboration, communication and cooperation is inherently held and developed in common, it is a product of the workers relating to each other, not provided by the capitalist [253]. Linux, Wikipedia and Open Street Map are all the results of the mobilisation of commoners who communicate, collaborate and assemble artefacts through using this technology, somewhat outside the control of capital. One could argue that Red Hat or AND owns the networks and computers that the paid labourer relies upon, but these are so low in price that each worker is likely to have their own independent access to each, and can thus work with others regardless of capital's intervention. As Hardt and Negri suggest, "Brains and bodies still need others to produce value, but the others they need are not necessarily provided by capital and its capacities to orchestrate production" [254]. Michael Hardt has further explained how capital must not get close to production, or it risks upsetting the networks of collaboration and production. This distance is maintained by not allowing its managers to interfere in the work carried out [255], and by leaving workers to self-organise, self-manage and make horizontal connections both with those inside the organisation, and others without.

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250 Ibid., 1:272–273.

251 Hardt and Negri, *Empire*, 298–300.

252 Dyer-Witherford, *Cyber-Marx*, 84.

253 Hardt and Negri, *Multitude*, 147.

254 Hardt and Negri, *Empire*, 294.

255 Michael Hardt, 'The Common in Communism' (Leuk, Switzerland, 2009), http://www.youtube.com/watch?v=Q_Ey5ioS4GU.

Marx stated that under conditions of capitalist waged employment, labour power is exchanged for salary, which is measured, quantified and calculated as equivalent, unlike those between commoners as we discussed above. It is a cold commercial relationship, with no hint of the ongoing relationships Graeber discusses. After each pay day, the workers and the capitalists are square, ready to start their relationship again for the next pay period. As Hardt and Negri, amongst others explain however, measuring this exchange quantitatively under contemporary conditions of immaterial labour is incredibly difficult [256]. They detail a common response [257] to this, as does Moulier Butang [258]. In industries such as high-technology and others relying on immaterial, collaborative labour, this measurement of reward is calculated through the abstraction of finance. Highly-skilled employees at companies including Google [259], Red Hat [260] and Microsoft are often paid partly in stock options, the reward to the employee being set in a pure market environment, unconnected to any attempt by the company to directly quantify what they produce. This is taken to its (il)logical conclusion in the case of Larry Page and Sergey Brin, the programmers who started Google. Each famously receives a $1 salary per year, relying solely upon their share ownership for income.

Once they have been exchanged for wages, the code, data and knowledge are then given to the community, and become artefacts of the digital commons. At this point of the transfer, each company who donates work does so with no expectation of any measured, quantified return for their gift of code or data, it is a pure use-value. However, as with commoners who volunteer their time, there is a return, acknowledges in various sources such as yearly reports by the Linux Foundation [261]; interviews with commoners such as Ingo Molnar naming their employers [262]; and articles in magazines both online and printed. This return is in the form of symbolic capital expressed as good will and positive corporate image. Marking the companies out as altruistic and benefiting the commons provides potential flow on effects, as users are more likely to access the services Google provide, through

256 Hardt and Negri, *Empire*, 356–357.

257 Hardt and Negri, *Multitude*, 150.

258 Yann Moulier-Boutang, *Cognitive Capitalism*, trans. Ed Emery (Cambridge: Polity Press, 2011), 136.

259 The Associated Press, 'Google Reprices Employee Stock Options', *CBS News*, 2009, http://www.cbsnews.com/8301-500395_162-4750463.html.

260 Reuters Limited, 'Red Hat Stock Soars High, Higher', *Wired*, 1999, http://www.wired.com/techbiz/media/news/1999/08/21255.

261 Corbet, Kroah-Hartman, and McPherson, *Linux Kernel Development*.

262 Britta Wuelfing, 'Ingo Molnar Tests New BF Scheduler', *Linux Magazine Online*, 2009, http://www.linux-magazine.com/Online/News/Ingo-Molnar-Tests-New-BF-Scheduler.

seeing them as non-exploitative.

I have thus demonstrated that the majority of transactions within the digital commons are not marked by commodification. The artefacts which each project sets out to assemble are given away, with no expectation of any return, although there are often small, tokenistic thanks given.

3.3 Labour and alienation

In this section, I will assess the digital commons, particularly the three projects I am analysing, looking for demonstrations of Marx's concept of alienation. I will analyse each of the four aspects of the alienation concept against the two methods through which digital commons artefacts are assembled: by those who make them as volunteers, and by those who work for capitalist organisations which donate work to the commons.

As Marx explained in *Economic and Philosophic Manuscripts of 1844* [263], the existence of the capitalist mode of production brings with it the concept of alienation. This condition, which occurs through the nature of waged labour, was summarised as a defining quality of capitalism by Tucker as follows:

> "Capitalism crushes our particularly human experience. It destroys the pleasure associated with labor,
>
> the distinctively human capacity to make and remake the world, and the major distinguishing
>
> characteristic of humans from animals" [264].

There are four dimensions of alienation, or four ways in which workers are alienated through capitalist waged labour:

1. Alienation from the thing made

2. Alienation from working [265]

3. Alienation from oneself

4. Alienation from other human beings [266]

The importance of alienated labour within the capitalist system was explained thus by Marx:

> *Private property* is thus the product, the result, the necessary consequence, of *alienated labor*, of the
>
> external relationship of the worker to nature and himself.
>
> *Private property* thus results by analysis from the concept of *alienated labor*, i.e., of *alienated man*, of

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[263] Marx, *Economic and Philosophic Manuscripts of 1844*.

[264] Kenneth H. Tucker, *Classical Social Theory: A Contemporary Approach*, 21st-century Sociology (Malden, MA: Blackwell Publishers, 2002), 98.

[265] Marx, *Economic and Philosophic Manuscripts of 1844*, 111.

[266] Ibid., 114.

estranged labor, of estranged life, of *estranged* man. [267]

Demonstrating that not only is alienation a consequence of the accumulation of capital, a side-effect, but a necessary pre-requisite of that mode of production.

1. Alienation from the thing made

The first of these arises from the capitalist who employs a labourer taking the thing the labourer has produced and claiming it as his own. As Hadden explained, "the product of labour is an objectification; labour is realized in an object. This object is lost to the worker and is appropriated by someone else" [268]. Thus the capitalist, through appropriating commodities produced by the worker, becomes worth more [269]. In relation to this, the worker becomes worth less: the capital he has created for the capitalist increases in size comparative to the value he is able to create in future, so diminishing him, and in the process revealing the dialectical nature of alienation [270]. For digital commons artefacts, it immediately appears that the first form of alienation can not exist: the objects brought into existence are licensed to the commons, and thus do not form private property. However, investigating further, we can see that there is more to this situation.

There has been an ongoing debate over the various licenses used in the digital commons, the paradigm case of which is between those who use the BSD-style licenses and those who use the GPL and its descendants, although the BSD is in a group which also includes the following licenses: MIT, Apache and CC-BY, while CC-BY-SA has a similarity to the GPL. This debate revolves around the relative freedom of the licenses, a somewhat nonsensical distinction - the idea that one thing can be 'more free' than another is a piece of linguistic gymnastics with no concrete meaning, only serving to obfuscate and polarise the debate by using emotional, evocative descriptions. What the debate should perhaps question is *who* is granted *which* rights or freedoms by the respective licenses. At any point, a work released under no copyleft licenses, such as the BSD can be closed off, made into private property, with the name of the original contributor as the only remaining nod to the commons origin. In contrast, those artefacts licensed as GPL or similar cannot be enclosed, they must remain commons in perpetuity.

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267 Ibid., 117.

268 R. W. Hadden, *Sociological Theory: An Introduction to the Classical Tradition* (Peterborough: Broadview Press, 1997), 78.

269 Marx, *Economic and Philosophic Manuscripts of 1844*, 108.

270 Ibid.

There have been numerous examples of this enclosure of no copyleft artefacts, perhaps the most notorious and high profile being that of two variants of BSD being incorporated into Apple's OSX. Apple was at the forefront of the personal computer revolution of the early 1980s, and continued to leave its mark through the 1990s, even after the removal of its original joint-owner Steve Jobs in 1985. Jobs went on to form NeXT, a company which developed an operating system based upon FreeBSD [271] and NetBSD [272], both Unix-like operating systems released under a variety of BSD licenses, which as such qualify as free software, and form a part of the digital commons. When Jobs was reinstated at Apple in 1999 as CEO, he brought the expertise from NeXT with him, which became part of Apple's operating system OSX [273]. They two BSD variants have an extensive community of contributors, and are actively developed to this day. Due to the lack of a share-alike clause in the BSD license, Apple were under no obligations to make their modifications public, their only requirement being to acknowledge those who had contributed to the original software. Releasing the modifications would not have been acceptable to that company, as selling OSX would have been virtually impossible, and it would have revealed important parts of Apple's technology, the methods and idea of which they wished to remain private. Some of the commoners who had contributed to the BSD operating systems were concerned about potential abuse [274] or unethical behaviour [275]: their work had been enclosed and the resulting work used to fatten the profits of Apple's shareholders. This prompted responses from other commoners that Apple were within their rights to do so, had complied perfectly with the license requirements, and had in fact done more than was required by releasing some pieces of code back to the commons, enough to assemble the 'Darwin' operating system [276].

The database engine SQLite forms another example of this enclosure of free software, and illustrates the problem

271 The FreeBSD Project, 'The FreeBSD Copyright', *FreeBSD*, 2013, http://www.freebsd.org/copyright/freebsd-license.html.

272 The NetBSD Foundation, Inc., 'NetBSD Licensing and Redistribution', 2013, http://www.netbsd.org/about/redistribution.html.

273 Amit Singh, 'What Is Mac OS X?', 2010, http://osxbook.com/book/bonus/ancient/whatismacosx/arch.html.

274 FreeBSD Forum contributors, 'Are There Any Examples of People Abusing the BSD Licenses?', *The FreeBSD Forums*, 25 April 2011, http://forums.freebsd.org/showthread.php?t=23319.

275 gnubeard, 'Is OSx Itself Even Ethical?', *InsanelyMac Forum, Apple Opinions and Discussion*, 17 August 2009, http://www.insanelymac.com/forum/topic/129934-is-osx-itself-even-ethical/.

276 Leander   Kahney,   'Apple's   Darwin   Evolves',   *Wired*,   27   March   2000, http://www.wired.com/science/discoveries/news/2000/03/35201.

which members of digital commons communities see with the public domain, although it could be argued that public domain works do not qualify as commons as its access is not managed by commoners, it is a free for all. This piece of software has reportedly been installed over 500 million times, although the explosion of smart phones since the estimate was made in 2007 render this figure incorrect by possibly an order of magnitude [277]. It is likely that each Windows, iOS, Android and Symbian phone produced in the last few years has at least one installation of SQLite, for the management of contacts and other user information. Of course, due to its public domain nature, neither Microsoft, Apple, Google nor Nokia respectively are required to provide details of their use of the software, so it is unlikely a precise estimate can be made.

Thus, in a somewhat perverse sense, the relative freedom of public domain quickly resolves to being one of apparent unfreedom, at least for those who subsequently use the software in its closed, proprietary forms. Similarly, as the original contributors to SQLite are unaware of its use, let alone have control over it, one could argue they are somewhat alienated from their work. A similar situation occurs with OpenBSD in the case of Apple using it, although through the requirements of the BSD license to acknowledge authors, the commoners who contributed have the assurance that their work is acknowledged, and can see where it is being used. Both SQLite and the variants of BSD have been turned into commodities, accessing their derivatives thus requires taking part in a producer-consumer relationship, thus giving up the freedoms which free software was intended to convey.

The two examples given above demonstrate a potential for the work of the commoners to be alienated. Although the workers donate their work to the commons, this does not stop it later being turned into private property, as it

> exists outside him, independently, as something alien to him, and that it becomes a power on its own confronting him. It means that the life which he has conferred on the object confronts him as something hostile and alien. [278]

This is not only the case for no copyleft artefacts. Those artefacts which are licensed under a copyleft license, such as the GPL and Creative Commons BY-SA can similarly be turned against their makers, although in more oblique, less apparent ways. Although the work cannot be privatised and sold, or otherwise exchanged for profit, there are a vast array of companies using digital commons works as a platform upon which other services are sold or otherwise

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277 SQLite, 'Most Widely Deployed SQL Database Engine', *SQLite*, 2013, https://www.sqlite.org/mostdeployed.html.

278 Marx, *Economic and Philosophic Manuscripts of 1844*, 108.

carried out. Typical examples of these are Red Hat and Canonical which provide support for businesses using the Red Hat and Ubuntu operating systems respectively. In this case, support means assisting users with tasks, investigating problems and in some cases writing code to fix bugs in the software. A similar situation occurs with Open Street Map, which has been adopted by Microsoft and Apple, and offered as an option for map layers within their Bing Maps and Apple Maps products. These services are not actually the product which the companies provide, they are merely a way for Microsoft and Apple to collect data about their users' locations which can then be mined for marketing opportunities, and also, to complete that circuit, used to show products which those users will be encouraged to buy. The Linux kernel also is used in the majority of high performance trading systems in various finance companies throughout the world, allowing commodity, currency, share and derivative trading at rates unattainable with proprietary systems [279]. Again, the companies which use the kernel are not selling it directly, but are selling services built in top of it. Each of these, while not alienating the thing itself, that is Linux or Open Street Map, creates new possibilities for capitalist enterprises to exploit commoners, by further enabling modes of privatisation. It could be argued, that such is the cost of Microsoft's Windows, that it forms a barrier to running giant server farms such as those owned by Google. Without the low price of Linux, they would not be able to run their search, calendar, email and other services which exploit users and alienate the products of *their* labour, enabling it to become a power which confronts them [280]. My definition of labour here extends beyond the traditional definition, to include those outside the factory and office walls, as described by Hardt and Negri. The users of Google's services are not employed directly by that company, but as they take part in the generation of value, by carrying out searches, sending emails and hosting code with Google, so they effectively become employees, paid in kind by free access to Google's products. Thus, although the digital commons artefacts cannot be privatised and are not alienated from those who make it, they have vastly accelerated the privatisation and hence alienation elsewhere.

As web services became more common during the dotcom boom in the late 1990s, so more and more websites were based upon Linux, the free software Apache web server software, and various other pieces of the digital commons. This presented a dilemma: was the person who accessed the website using the software, and thus entitled to any modifications made by the entity hosting it? If not, substantial changes to the software made by private organisations would be effectively locked off from the commons. If so, a large amount of the publisher's intellectual

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279 Jackson, 'How Linux Mastered Wall Street'.

280 Marx, *Economic and Philosophic Manuscripts of 1844*, 108.

property would need to be released under one of various free software licenses. Legal analysis of the license suggested that modifiers did not have to release the code in this circumstances, since the users were defined as those who hosted the code on their servers, not those who visited the website. To clarify the situation, the Affero GPL was launched in 2002, which demanded all parts of the work be released to the users, even if the software or data were hosted remotely to them, and thus not directly under their control [281]. This creates a direct challenge to the trend in modern business, that of renting access to a product, rather than transferring it in some substantial way to the user [282]. In the case listed above, for example, any financial company using a free software-based web service which was licensed under the Affero GPL for high frequency trading would have to release their code to their customers, who would not be required to keep it secret, thus putting at risk their competitive edge, partly attained through holding a monopoly over their modifications and providing a service based upon them. The Affero GPL is thus not so common amongst private profit-seeking organisations, although Canonical, the commercial backers to Ubuntu, use it for their 'Launchpad' software maintenance web suite [283]. In a similar vein, the -NC variants of the Creative Commons licenses, such as CC-BY-SA-NC are also not as common, as they do not permit any commercial use [284]. The method may appear different, but the end result is the same, they discourage the privatisation of some property of other, and thus resist alienation of the results of one's labour.

2. Alienation from working

The second dimension of alienation is through the worker's estrangement from the process of production. The result of this is that

> it does not belong to his essential being; that in his work, therefore, he does not affirm himself but
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> denies himself, does not feel content but unhappy, does not develop freely his physical and mental

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281 Free Software Foundation, Inc., 'Why the GNU Affero GPL', *GNU Project - Free Software Foundation*, 2012, https://www.gnu.org/licenses/why-affero-gpl.html.

282 Rifkin, *The Age of Access*, 4–5.

283 Canonical Ltd., 'Canonical Releases Source Code for Launchpad', *Ubuntu*, 2013, http://www.ubuntu.com/news/canonical-open-sources-launchpad.

284 Creative Commons, 'Attribution-Share Alike-Non-Commercial 3.0 New Zealand', *Creative Commons*, 2010, http://creativecommons.org/licenses/by-sa-nc/3.0/nz/.

energy but mortifies his body and ruins his mind. [285]

and further, "It belongs to another; it is the loss of his self" [286].

To demonstrate this aspect of alienation Marx compared factory labour of the 19th century with that of the pre-factory era, where craft workers mainly had control over the production process, and were able to take greater satisfaction from their work. As a denial of this situation in the digital commons, we can look first of all at the words of McKenzie Wark, when he extols the joy of hacking [287], and similarly those of Stallman who suggests it is "Playfully doing something difficult, whether useful or not, that is hacking." [288]. Andrew Lih gives a description of this joyous approach to contributing in a particularly revealing piece detailing a contributor to Wikipedia who made several thousand maps with very basic software and little automation.

> There is a special bond that is forged between a maker and his handmade product. Making dot maps may be an act of absurd inefficiency, but the showcase of the human spirit provided inspiration for others. Standing as exemplars, the dot maps encouraged bigger and better things by folks who didn't know such things were possible. [289]

The process the worker came up with was not at all efficient, in any capitalist organisation it would have been stopped immediately and replaced with something programmatic, but the particular commoner who carried out the work was not concerned. What did concern him was that he was using *his* process, that he had full control over how the maps were made. If at some later stage he does feel an urge to make the maps in a quicker manner, he is entirely at his liberty to do so, and owing to the communities around the projects, there will doubtless be numerous other commoners who would show him how to use a suitable application to do so. In this joy through work there is thus a denial of Marx's statement that "His labour is therefore not voluntary, but coerced; it is *forced labor*. It is therefore not the satisfaction of a need; it is merely a *means* to satisfy needs external to it." [290]

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285 Marx, *Economic and Philosophic Manuscripts of 1844*, 110.

286 Ibid., 111.

287 McKenzie Wark, *A Hacker Manifesto* (Cambridge, MA: Harvard University Press, 2004), para. 060.

288 Richard Stallman, 'On Hacking', *Richard Stallman*, 2013, http://stallman.org/articles/on-hacking.html.

289 Lih, *The Wikipedia Revolution*, 110–111.

290 Marx, *Economic and Philosophic Manuscripts of 1844*, 110–111.

Although there is a certain commodification of the artefacts the coders at Google and others assemble, their situation is wholly different to that of a worker in a proprietary software or data company. A significant number of high technology firms including Google have taken on a considerably flatter structure than traditionally exists in capitalist companies. Engineers are expected to self-organise with each other, not relying on managers to delegate work or otherwise interfere. Again, we recall Michael Hardt's words that capital cannot get too close to immaterial labour, lest it disrupt the organic, collaborative model of organisation [291]. As such, the workers at these firms are relatively free to assemble the artefacts as they see fit, giving them far more control over the entire process, and greatly reducing the alienation associated with commodity production.

In the case of works from the digital commons which are licensed with a copyleft license, such as the GPL or Creative Commons share-alike variants, a different set of circumstances occur. Any software or data such as Open Street Map, Wikipedia or Linux, cannot be enclosed, cannot be privatised, and cannot be directly used to make profit in the way OpenBSD and SQLite were used to. As such, the alienation between the workers and the product of their work is reduced in these cases, the commons is maintained by commoners, rather than being privatised and enclosed. Although I use the word enclosed here, there are different scales of enclosure. The most deleterious, in the case of the commons, is for the entity who privatises to own the copyright, in which case, that entity gains sole control over the work and all its derivatives, although these are generally prohibited. In the case of public domain and no copyleft licenses, although modifications can be made private, the original work cannot, it remains in the commons.

As has been shown, software projects such as Linux, data projects such as Open Street Map, when made by waged labour, brings into being artefacts which are less alienated than those released under a proprietary license. There is another side to this situation, however. As Linux, Open Street Map, Wikipedia and other works of the digital commons are immaterial, they can be copied at very low cost: in economic terms, the marginal cost is very close to zero. In this sense they differ from material goods, such as cars, clothes and furniture, which cannot be shared, cannot be copied. Thus, immaterial products which make up the commons occupy an unusual position: they can also be put to use by private organisations, with no damage to the thing itself. We could perhaps look at the potential damage to the brand of Open Street Map by its association with Microsoft, that company not being

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291 Hardt, 'The Common in Communism'.

particularly popular or trustworthy amongst digital commoners, based on past experiences. However, this would only affect the data's sign-value [292], not its use-value - it is still usable for the same things, were Microsoft not involved in the project, in fact it becomes more useful as Microsoft assist by providing aerial imagery and bringing it to a wider audience. The point at which a problem becomes clear is when we consider the commons at a bigger level. Taking one of the examples quoted above, where Linux is used for high frequency trading of financial instruments such as stocks and shares. It has been noted by several that this practise is deeply damaging, and accelerates the movement and freedom of capital around the world, as explained by Harvey [293]. Similarly, Open Street Map enables Apple, Microsoft and others to collect data about those who come into their services even more efficiently. I say come into contact here, as there is much evidence to suggest that it is not the service, such as Google search or email, which is being used, it is the person who interacts with the computer who is being used, is rendered a passive creature whose attention is sold to capitalist organisations [294]. This is somewhat reminiscent of the old poker adage warning players to be careful: Look around the table, if you can't see a sucker, it's you. In the case of Open Street Map, as individuals can not only react to and interact with items mapped by mapping companies, but about any item they wish to include on a map-like device, so the data about them which can be collected becomes ever more precise, clear, individualistic and thus better for targeting marketing and advertising. Again, the use of Open Street Map for this practise may damage its sign-value, but only to a minor amount, and will have little effect on the use-value, although there may be a small number who refuse to map due to the new uses of the data collected. It seems the process of privatisation is still in some circumstances able to take more from the commons than is returned, and that the coder or data collector has little say in how the works are used indirectly, thus causing problems elsewhere, and resulting in alienation, commodity fetishism and exploitation elsewhere. The works of the commons are no longer privatised, but the wealth and value generated by their non-exclusive use can be. We could look at this and say the commons is not being so well managed as it ought to be, it still allows and accelerates privatisation, although not directly of the thing itself in question, but this is hardly the point. If we accept that all of the commons is involved in all production, that in the age of immaterial labour we cannot demarcate one aspect or producer from another, then similarly we cannot demarcate the commons into

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292 Jean Baudrillard, *For a Critique of the Political Economy of the Sign*, trans. Charles Levin (Telos Press Publishing, 1981), 112.

293 David Harvey, *A Brief History of Neoliberalism* (Oxford: Oxford University Press, 2005), chap. 1.

294 Jason Fitzpatrick, 'If You're Not Paying for It; You're the Product', *Lifehacker*, 2010, http://lifehacker.com/5697167/if-youre-not-paying-for-it-youre-the-product.

pieces, and solely concentrate on one piece, we must be aware of how each artefact of the commons reflects on other pieces.

The perhaps obvious responses to this may be to use a license which specifies no commercial use, but there appears to be an ideological block here for most who contribute to the digital commons. Richard Stallman has often stated he does not have a problem with free software being used commercially, although of course there is a subtle difference between commercial and capitalist. This is despite his left-leaning views [295], and the majority of contributors, either coincidentally or not, take a similar position. Non-commercial licenses are generally dismissed as they restrict the number of entities who can use them, free software and open data are all about letting as many people as possible access the data or information, under the rubric "information wants to be free" [296]. The Affero GPL may provide a similar way out of the problem, but again this would be unlikely to appeal to businesses. One may question why this process is one-way, with capitalists profiting from the commons by taking advantage of its shareable nature, while not reciprocating by returning what capital generates, although the answer is trivial and predictable: capitalism is defined by unequal exchange and the absence of reciprocity.

The concept of the word creator, and its use to describe earthly, immortal beings is relatively new, and further obscures the debate here. The person who writes a piece of code; collects geographic data about some item such as a tree, road or house; or who writes down some information in Wikipedia, is seen in a legal sense as the 'creator' of that code, data or knowledge. Anything more than a trivial glance reveals this to be a gross misrepresentation of the situation. In the case of geographic data such as a road, the persons who physically laid the bitumen are equally part of the creation process of the data, as are the highway engineer who designed it, the administrators in a country's roads department, and the person who originally marked the route by walking a certain path between locations. However, none of these persons get a mention, nor any say over how the results of their labour, be it paid or otherwise, are utilised when the information is recorded in the Open Street Map database. This ownership of the data follows a Lockean theory of ownership through "homesteading", that is the first person to work on and

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295 Richard Stallman and Inne ten Have, *Cartoon-economists.png (PNG Image, 774x585 Pixels)*, 2007, http://stallman.org/images/cartoon-economists.png.

296 Clarke, 'Roger Clarke's "Information Wants to Be Free ..."'

improve an area of land takes ownership of it [297]. A similar concept is occurring in the digital commons, as a commoner initiates a project and homesteads a given area of the immaterial commons [298], carrying out work to improve some already-existing concepts, and claiming it as their own. It could thus be argued that the work of those who lay out the landscape, which is then mapped in Open Street Map are alienated from the products of their labour. Within Wikipedia, certain prominent persons involved in developing a concept which is written about will also be mentioned, but again the prestige often goes to a small group of people, ignoring others who take part. This results again in a small group attaining large amounts of symbolic labour, out of all proportion to the work they carry out, and thus again the unrecognised worker will "face the product of his activity as a stranger" [299]. A similar situation can be seen with Linux, which relies for its existence upon the existing programming language C, the computer which the code is written on, the network over which the project is coordinated and distributed, indeed even the spoken and written language employed to communicate between commoners. Wikipedia also has a reliance upon language, software, computer languages and network, plus the information in the encyclopedia itself describes many human achievements, situations, events and inventions. Each commoner who adds to the project gets a mention, but only those who directly add to the project, not those who had previously created value through making or doing the things which Wikipedia records. If this is the case, those who make the map or the software or the encyclopedia are only actually a subsection of the makers who contribute to its value, there are others that come before who are important also, but they are not named, their work has been alienated from them. Again, none of these projects are directly privatised, they remain part of the commons and thus do not confront the worker as something hostile and alien [300]. However, at the same time as the artefacts are brought into existence, so also is an amount of symbolic capital, which is privatised. Being privatised, and thus amassed by a few people, that is Jimmy Wales, Linus Torvalds and Steve Coast, it thus does confront workers, as it represents a vast amount of symbolic capital which they do not possess.

At this point, the importance of alienation becomes clear: if all are indeed involved in the generation of surplus-value, particularly in the time of immaterial labour, this fact must be obscured. Further, those who make must be

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297 John Locke, *Second Treatise of Government* (Indianapolis, IN: Hackett Pub. Co, 1980), 21.

298 Raymond, *The Cathedral and the Bazaar*, 76.

299 Marx, *Economic and Philosophic Manuscripts of 1844*, 110.

300 Ibid., 108.

divided into arbitrary groups, and the demarcation between who made what and who didn't, becomes essential. As soon as the process is understood as being collaborative, requiring the input of many, the arbitrary allocation of workers to one part of the process or another becomes impossible to support, impossible to sustain. Following on from this point, it thus becomes impossible for one group to justifiably extract profit via surplus-value.

At this point, a potential solution is suggested by Hardt and Negri [301] and Yann Moulier-Boutang [302], when they suggest a universal human wage, a guaranteed income for all. As all humans contribute to the generation of wealth in the time of immaterial labour [303], trying to determine who has been productive and who has not becomes virtually impossible. This universal wage is somewhat practised in the digital commons, as anyone can use the artefacts, regardless of the labour they have put in to assembling them, they are distributed in a way which enables anybody to make use of them and thus improve their lives. There are restrictions to this however, as we have seen, there is an unequal distribution of the symbolic capital, that wealth is relatively poorly distributed.

3.Alienation from himself

The third way in which workers can be alienated is from themselves, from their human potential [304].

> Indeed, labor, *life-activity*, *productive life* itself, appears in the first place merely as a *means* of satisfying a need – the need to maintain physical existence. Yet the productive life is the life of the species. It is life-engendering life. The whole character of a species – its species character – is contained in the character of its life activity; and free, conscious activity is man's species character. Life appears only as a *means to life.* [305]

The essence of humanity is thus to make self-conscious decisions, as distinct from animals which operate instinctively to the external environment. Due to the nature of alienated labour, humans become an animals, reducing their actions to those which will merely be a means to an end. For those who contribute to digital commons projects as volunteers, this is demonstrably not the case – taking part in the project is entirely voluntary,

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301 Hardt and Negri, *Empire*, 403.

302 Moulier-Boutang, *Cognitive Capitalism*, 156.

303 Hardt and Negri, *Empire*, 402.

304 George Ritzer, *Sociological Theory*, 3rd ed. (New York, NY: McGraw-Hill, 1992), 52.

305 Marx, *Economic and Philosophic Manuscripts of 1844*, 113.

as is the decision to fork it and form a new project, should one prefer not to take part in the way decreed by those who control a particular set of artefacts. Even a suggestion that a commoner contributing will increase the symbolic capital of the nominal leader, or other who extracts surplus-value, are unlikely to affect what a given commoner must do. There are usually many entry points into a project, from writing software to editing documentation, assisting new commoners to contribute or discussing philosophical aims and methods, all of which can mostly be accomplished as the commoner desires. There are few reasons a commoner would join a project purely as a means to the end of reproducing one's physical life, the apparent justification, if one were needed, is solely for one's enjoyment or fulfilment.

4. Alienation from other human beings

The fourth way in which a worker is alienated in his work through the capitalist mode of production, is from other workers. As Giddens states, human relationships become solely market relationships, workers relate to each other purely through the sale and purchase of commodities [306].

> An immediate consequence of the fact that man is estranged from the product of his labor, from his life activity, from his species being is the *estrangement* of *man* from *man*. When man confronts himself he confronts the *other* man. What applies to a man's relation to his work, to the product of his labor and to himself, also holds of a man's relation to the other man's labor and object of labor. [307]

This is perhaps the area where the digital commons most demonstrates its non-alienating nature. The majority of projects of any size, and certainly those we are investigating here, are built upon the free association of commoners. Indeed, even in the case of projects which are nominally by one person, this is still the case: bug reports will be submitted, feature-requests made, all of which requires communication and collaboration between commoners. Through various communications methods which are essential to each project, such as email, wikis, blogs, forums and instant messaging, there are many opportunities for debate, collaboration and decision-making. Most importantly though, this collaboration takes place as equals: there are few instances of exchange or hierarchy, property being commonly shared, with the exception of the omnipresent symbolic capital extracted by project

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306 Anthony Giddens, *Capitalism and Modern Social Theory: An Analysis of the Writings of Marx, Durkheim and Max Weber* (Cambridge: Cambridge University Press, 1971), 12.

307 Marx, *Economic and Philosophic Manuscripts of 1844*, 114.

leaders. Further, as Raymond notes, "you can't coerce effectively over a network connection, seeking power is right out." [308]. This denies the possibility of market relations which result in capitalist enterprises, it encourages and requires human-to-human connections, for workers to acknowledge the existence of other workers, and for each to share what he or she has done, rather than entering into relations via capitalists which insist it be alienated from them. This forms perhaps the key point of Richard Stallman's philosophy, which underpins the free software movement and thus the majority of the digital commons. He suggests that we each share what we have created, that we engage with our neighbours in a way which helps them, rather than giving the power to the capitalist, the proprietary software and data companies, to those who would alienate others for their own ends.

> This meant that the first step in using a computer was to promise not to help your neighbor. A cooperating community was forbidden. The rule made by the owners of proprietary software was, "If you share with your neighbor, you are a pirate. If you want any changes, beg us to make them." [309]

and

"A proposal to permit only one of you to use the program, while restraining the other, is divisive; neither you nor your neighbor should find it acceptable." [310]

As we have seen, the commoners who take part in the digital commons projects I am analysing, mostly do not suffer alienation as a result of their labour. Each commoner who takes part in the projects decides how he or she should approach the work, and does not have it taken from them after it is completed. Further, the methods through which the artefacts are assembled demand close cooperation with other human beings. However, there are issues with some artefacts, as they are often used in ways which the commoner who assembles them may not approve of.

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308 Raymond, *The Cathedral and the Bazaar*, 79.

309 Stallman, *Free Software Free Society*, 8.

310 Ibid., 47.

3.4 Commodity fetishism

Fetishism is a process associated with the production and distribution of commodities, which comes about partly due to the alienating nature of wage labour. The thing produced by wage labourers under the control of a capitalist is taken from them, and sold to a consumer, who is remote from the original worker. Consequently the relation between them is exchange, "they do not appear as direct social relations between persons in their work, but rather as material [*dinglich*] relations between persons and social relations between things" [311]. The buyer knows nothing of the producer, not their name, their work conditions, family life, upbringing, education or culture, The only information included with a commodity is usually restricted to the country of origin, although this is often more about supporting nationalism and lately reducing one's carbon footprint, than it is about enriching the social relationship between buyer and maker.

Marx suggested that due to the methods of commodity production, the value of an object that comes from the human labour put into its making is obscured by its and by its presentation as something with supposedly natural qualities which are of uncertain origin. This leads to the consumer encountering the commodity as if it was a fetish, an object with magical powers independent of the process involved in its production.

> Objects of utility become commodities only because they are the products of the labour of private individuals who work independently of each other. The sum total of the labour of all these private individuals forms the aggregate labour of society. Since they do not come into social contact until they exchange the products of their labour, the specific social characteristics of their private labours appear only within this exchange. [312]

and

> It is however precisely this finished form of the world of commodities - the money form - which conceals the social character of private labour and the social relations between the individual workers, by making those relations appear as relations between material objects, instead of revealing them

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311 Marx, *Capital*, 1:166.

312 Ibid., 1:165.

plainly. [313]

There have been many attempts to defetishise commodities, from Fair Trade organisations labelling coffee and chocolate as being produced ethically [314], to bakers in supermarkets signing packets of bread with their name, and car assembly workers riveting a plate with their name on to the engine block of a car they have built [315]. All acknowledge the social relationship between producer and buyer, and remind the consumer that the product was assembled by another human being.

The majority of digital commons projects, including those I am considering here, allow and in some cases demand that each commoner who contributes attach their name or contact details to their contribution. Each piece of code, knowledge or geographical data committed to a project can be stored with the user name of the person who committed it, along with a means to contact them, usually via email or some internal communications method. Immediately there is a partial defetishisation of the work, the relationship is revealed as being between humans. It further has the potential to become closer, to be more social. It is promoted in the digital commons projects as a pragmatic, technical decision, enabling lines of communication which would not otherwise exist, allowing mistakes to be fixed and education or assistance to be offered [316]. It is also evidence of a flatter structure than those which exist in most capitalist commodity-producing enterprises, enabling as it does communication between anyone and anyone else, with no hierarchy to negotiate, no management chain to deal with.

Hardt and Negri discuss this further in their Empire trilogy, suggesting that as immaterial labour has become the dominant paradigm of production in the Western world since the 1970s, it is necessary for capital to enable labourers to communicate with their peers directly, to utilise flatter structures, thereby removing the barriers to collaboration which exist when workers are required to communicate via chains of hierarchy. This communication is not only within the firm, but spills over, including firstly communication with suppliers, contractors, and others

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[313] Ibid., 1:168–169.

[314] Fairtrade Australia & New Zealand, 'What Is Fairtrade?', *Fairtrade Australia*, 2012, http://fairtrade.org.nz/page/what-fairtrade.

[315] Ron Perry, 'Mercedes-Benz AMG Photo Gallery', *Autobytel.com*, 26 August 2005, http://www.autobytel.com/mercedes-benz/luxury-cars/reviews/mercedes-benz-amg-photo-gallery-706/.

[316] OpenStreetMap contributors, 'Anonymous Edits', *OpenStreetMap Wiki*, 24 July 2012, https://wiki.openstreetmap.org/wiki/Anonymous_edits.

working on a project and secondly the involvement of all parts of the social sphere, resulting in, as Hardt and Negri suggest the situation in which "social relations completely invest the relations of production, making impossible any externality between social production and economic production" [317]. This stands in contrast to the Fordist mode of production which dominated manufacturing capitalism in which firstly every aspect of production was tightly managed, and secondly the boundary between work and non-work was rigid. The worker carried out value-creating activities in the factory or office, then ceased activity and went home, where he engaged in leisure activities which did not create value captured through capitalist mechanisms.

The degree to which the work is defetishised however varies from project to project. Within Wikipedia, anyone accessing a page can discover the user name of contributors to the information on a page by clicking on the 'History' link at the top. While users can record their user name against an edit by creating an account and signing in before making edits, and thus provide a means of communication via the internal Wikipedia messaging system, they are not required to do so. The likelihood of a commoner viewing the History to find out more about the commoner(s) who edited the page is generally low unless that commoner intends to do some editing, but it is available nonetheless. Further, each page also has a discussion page, again accessed via a link at the top of the page, labelled 'Talk'. The intention of this page is to facilitate discussion of any issues one considers relevant, which may or may not include structure, layout, sources and their quality, and commoners are encouraged to discuss any major changes here before making them. As mentioned earlier, these discussions sometimes become flamewars, a vitriolic and possibly abusive argument over some part of the article as in the debate over where the boundary to the city of Paris lay [318]. The communications methods of the project allow anyone to see what has gone on behind the artefact, thus demonstrating that it did not arrive fully formed, with no history, that it is the product of human labour, and importantly, of human collaboration. Although the arguments seem irrelevant and destructive to many, and allegedly discourage people from editing, they do reveal the passion which the commoners have, and the effort that goes into even the smallest details. 'Talk' pages also have a history, so any commoner can find out who has contributed what in the past, in cases where comments have been deleted, re-ordered or otherwise modified. The social relationships inherent in the assembly of the artefacts therefore is always present, the true nature of the labour can always be revealed.

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317 Hardt and Negri, *Empire*, 209.

318 Wikipedia contributors, 'Talk:Paris/Archive 1'.

With Open Street Map or Linux, the steps needed to reveal the origins of the work are more onerous, although still available. Open Street Map is similar to Wikipedia, in that the contributor's name and contact details can be reached while viewing the artefact, assuming the particular display of the data includes this information. Although displays of the data are required to attribute the commoners who contribute, this may be done en masse, as "OpenStreetMap contributors", rather than noting the user names of every individual. There are several methods in order to find the specific user name of a commoner who edited a piece of data,. The simplest is to access one of various visualisations of Open Street Map data, such as that made by mapping company 'ITO World' [319]. These visualisations provide maps which show the user name of the last person to edit a given area of data. This information, along with the user names of all others who have edited a particular piece of information, is also provided when using editing software, generally along with a means to contact them directly to ask questions, suggest modifications or otherwise collaborate.

To view the name of the person who last edited a part of the Linux kernel requires more steps. This cannot presently be done 'in situ' when using the artefact. Although technically this would be simple. It requires whoever is using the system to know they are using Linux, then to find the website, although this is trivial via any search engine, and finally to understand how to find who has contributed. Looking for the origins of a particular piece of code, rather than finding the names of all who have contributed, would require them to understand that for example they are using a particular driver, say for a Canon camera, to find out the name of that driver, and then to search through the repository to find who has contributed to that piece of code. Most distributions also allow access to the code by downloading it direct to the computer via the installed update manager, although it is arguable whether this would be simpler than the above method or not.

The general set of information is published by the Linux Foundation, who employ Linus Torvalds to manage the code. Each year they release a report naming who has submitted code, how much they have submitted, and various other pieces of information such as the members of Linux Foundation, and the amount they have donated [320]. As

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319ITO World Ltd, 'Auckland City', *ITO Osm Mapper*, 2013, http://www.itoworld.com/product/osm/map.

320Corbet, Kroah-Hartman, and McPherson, *Linux Kernel Development*.

with Open Street Map, there are various visualisations of data available, which show who has contributed what [321], although as the kernel is a somewhat abstract concept, they are somewhat more difficult to interpret than those for Open Street Map, which refer to a very concrete set of objects in the world around us.

The code for the Linux software, in common with a lot of software both free and proprietary, is stored and managed in a repository, through a type of software labelled variously as 'revision control' or 'source code management', in the case of Linux by the software 'git'. This software keeps track of changes made, including dates and authors. There are numerous pieces of software written to perform analyses of these repositories, including 'gitstats' and 'gitdm' [322], the latter assembled to enable the creation of yearly reports for the Linux Foundation mentioned above. These reports allow for much easier access than the somewhat terrifying prospect of inspecting a git repository by hand, and further facilitate a defetishisation of the Linux kernel, by giving those without certain technical skills the ability to access the data relatively simply and in a coherent, rationalised manner.

The majority of software released under a free software license includes an 'About' or 'Credits' dialogue box, which can be accessed via a menu within the software. This will generally contain the name, and one or both of the email address and website of some or all of the contributors, depending upon the size of the software and number of contributors. For large pieces of software, with a high number of commoners taking part, there will often be a link to a web page, which shows the complete list of those who have given code [323]. For other software, this information may be even more prominent, such as for 'Yaouh!', a piece of software for keeping maps on a phone or computer up to date, often used with Open Street Map. This aplication lists those who have contributed code, and those who have made useful suggestions directly in the interface, and is thus presented whenever the software is run [324].

For command line software, that is software controlled by typing commands rather than using a mouse, credits are

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321 anish, 'Comparison of Linux Kernel V2.6 Contributors by Commit Count', *Many Eyes*, 2012, http://www-958.ibm.com/software/data/cognos/manyeyes/visualizations/bfcebb38f8d711dda0a3000255111976.

322 Jonathan Corbet to Linux kernel mailing list, 'Gitdm V0.10 Available', 18 July 2008, https://lwn.net/Articles/290957/.

323 The Document Foundation, 'Credits', *LibreOffice*, 2012, https://www.libreoffice.org/about-us/credits/.

324 Carlo Minucci, 'File:Ac6f5c8808f7638921cb1b66abbde115.png', *Openmoko Wiki*, 2009, http://wiki.openmoko.org/images/f/f7/Ac6f5c8808f7638921cb1b66abbde115.png.

also available, through a collection of guides known as man pages. Man is short for manual, and each piece of software in a UNIX-like system generally has at least one man page. These pages contain a detailed list of most of the options for running the software, and usually finish with a list of authors, contributors, and sometimes influences and occasionally criticisms of other software [325].

We can contrast the above examples with, say, Microsoft's Office suite, or Autodesk's AutoCAD engineering drawing and modelling applications: both contain the 'About' dialogue present in most free software, but the names, email addresses or web sites of the coders are not included. The sole author is noted as being the company itself, unless it incorporates parts from other proprietary software, such as early versions of Internet Explorer which included parts of the Mosaic web browser [326].

Originally, putting together a free software UNIX system involved obtaining copies of software individually, sometimes by post [327]; compiling the software oneself; installing the correct 'dependencies', ensuring one had the correct version; choosing the correct settings; and other necessary setup steps. Compiling refers to turning human-readable source code into a piece of software, otherwise known as a binary, which runs on a computer. Dependencies are re-usable pieces of code which a piece of software relies on, rather than a coder having to re-programme existing functionality. An example would be a decoder for a type of music file. Although there are many music players, they will mostly rely on one of a small number of decoders. When the music player is installed on to a system, the decoder should also be installed.

Whereas installing software once required the very considerable attention and effort described above, the process has gradually been made simpler. While making free software accessible to more people, this has gradually changed the way the artefact influences and intervenes in the relationship between commoners. The first major step was the development of the package, of which there are two commonly-used types, 'Debian', devised by the Debian

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[325] linux.die.net, 'Man(1): Format/display On-line Manual Pages - Linux Man Page', accessed 1 January 2013, http://linux.die.net/man/1/man.

[326] Paul Thurrott, 'Microsoft and Spyglass Kiss and Make Up', *Windows IT Pro*, 1997, http://www.windowsitpro.com/article/news2/microsoft-and-spyglass-kiss-and-make-up.

[327] Stallman, *Free Software Free Society*, 12.

project, and 'Red Hat Package Management', from the Red Hat distribution. There are others, such as Gentoo's 'Emerge' system, but the principal remains the same. Package management systems had several impacts. Firstly, the software was ready compiled, so removing the necessity to understand how to use it, and the requirement for research and further potential contact with others who wrote and used it. It should be noted here that software compilation had already been vastly simplified, by the development of so-called 'make files', instructions which tell a compiler how to compile a piece of software. All the person administering the system generally needs do if a make file is included is to run a series of simple commands, usually provided in the documentation for the software. Increasingly these commands are identical for the majority of software. Secondly, the majority of settings were already chosen, generally to something fairly conservative, but adequate for most systems. Thirdly, and perhaps most importantly, the package listed dependencies, i.e. the other software which was required. These are in a form which the package manager can understand, so if a system is properly configured, with access to a package repository, a store of all packages available for that system, generally via the internet, the package management software will install all the dependencies, and then the software which has been directly asked for. These pieces of package management software have also changed significantly since their inception. Initially they were entirely command-line driven, and the system administrator would require some skill and involvement to achieve the required outcome. Latterly, the managers have been given graphical front-ends, enabling the use of a mouse, and further changes which have the effect of reducing the input required.

The person administering the system would still need to be aware of what was being installed, and an understanding that using say a certain music player also required a series of libraries, all of which had a variety of commoners involved in their assembly. Those who maintain the Ubuntu distribution have taken two major steps to reduce even this interaction however. Firstly, they include a piece of software named 'Popularity Contest' on each system which Ubuntu is installed upon. This software anonymously reports back to the Ubuntu servers which software is installed upon a system, and the data is used to choose the default software for the next Ubuntu release. As a piece of software becomes more popular, so it is more likely to appear, fully formed, and without intervention from the person administering the system, at install time in the next release. Secondly, in cases where the person administering the system does install some software beyond what is included by default, the graphical interface which he or she is encouraged to use, named 'Ubuntu Software Centre', hides the existence of the dependencies. No

longer does he or she have to understand or interact with the dependencies, explicitly install them, or even know they are required. All that he or she sees is a progress bar, which in our time of fast broadband has little to do with the size of the software, and thus signifies very little about the size of the software and the effort which has gone into assembling it. The libraries and other non-interactive software can be seen, installed and removed explicitly, but by default Ubuntu Software Centre hides them behind a very small button labelled "Technical items", the implication being that they are less important. This diminishes the contribution of some software and hence its contributors, further distorting the situation where all nodes in the network are of equal value and status, and further fetishising the software, obscuring the labour which has gone into assembling it.

Briefly comparing this to the process for installing software in proprietary operating systems, we see that Microsoft's Windows, which does not have any particularly reliable or popular package management software, requires users go to a website or other distribution point, copy the software on to their system, then manually install it, thus ironically fetishising it less than with recent versions of free software UNIX-like operating systems. This situation is gradually changing since the release of Windows 8, which includes the Windows Store [328], allowing users to install directly from a similar piece of software to the Ubuntu Software Centre, thus again fetishising the software in a similar way to that operating system. Apple's OSX is similar to Windows in that by default it has no package management software, but due to its origins in the UNIX world, OSX being a variant of UNIX, the re-working of existing package management software is relatively simple. 'Fink' [329] and 'Gentoo/Alt' [330] have brought package management to OSX, placing it in a similar position to Ubuntu and most other free software operating systems, with a similar fetishisation of the artefacts. Apple has introduced a similar piece of software to OSX, named the App Store, as has Google, with 'Google Play'. Although the package managers such as Ubuntu Software Centre obscure the full social relations behind the software being installed, they do not remove the possibility to 'get under the hood', that is look at what is going on, see how it works, and be in communication with other commoners in ways which are relatively open to control by those commoners. In the cases of Microsoft's Windows

328 Peter Bright, 'Win 8 App Store Revealed: More Money for Devs, Beta in Late February', *Ars Technica*, 2011, http://arstechnica.com/microsoft/news/2011/12/win-8-app-store-revealed-more-money-for-devs-beta-in-late-february.ars.

329 The Fink Project, 'Home', *The Fink Project*, 26 November 2012, http://www.finkproject.org/.

330 Gentoo Foundation, Inc., 'Gentoo/Alt: Gentoo on Alternate Platforms', *Gentoo Linux Projects*, 2012, http://www.gentoo.org/proj/en/gentoo-alt/.

Store and Apple's App Store, this potential control has been removed. Microsoft and Apple vet any piece of software submitted to their respective repositories, and control how and when it is distributed. The concept has similarly been taken on for the distribution of music, books, TV shows and films. Apple's iTunes is the best known of these, although there are similar offerings from Amazon and Barnes and Noble.

All of these technical advances have thus to some extent obscured the effort that goes into writing the software, have made it more fetishised. In choosing the easy-to-install repository, over understanding and manually installing from source code, we fetishise the speed and ease of installation, ignoring the use-value which the software contains.

While the majority of the popular free software UNIX distributions distribute software in this pre-packaged way, there are some which encourage the user to get more involved in the process of installation. Notable amongst these is 'Linux From Scratch', aka LFS, which as the name implies, requires the user to build their system from the separate components, and thus to understand what is happening. This necessitates an in-depth knowledge of the system, which in turn demands more contact with other commoners. Arch Linux and Gentoo take similar positions of encouraging commoners to understand more about the software on their systems using different methods, although the latter is moving towards the way more mainstream, popular distributions are put together [331]. As a final option, there is nothing to prevent any commoner individually obtaining the source code to each piece of software, compiling it, and building a system themselves, but this is relatively uncommon. Most are more interested in having a stable, reliable system, and wish to spend as little time as possible maintaining it.

Throughout the development of Open Street Map, a particular trait has become common amongst commoners who map. The trait, known as "tagging for the renderer" [332], takes the form of contributions including tags that are not necessarily correct for the item being represented, but which will ensure the item is displayed on the map at openstreetmap.org. A notorious example in 2008 involved a commoner who was new to mapping attempting to add a golf course to the database. At the time there were no tags available for greens, bunkers and the other components

[331] Andrew Barilla, 'Arch Linux: An End To My Distro Shuffle?', *OSNews*, 10 February 2004, http://www.osnews.com/story/5971.

[332] OpenStreetMap contributors, 'Tagging for the Renderer', *OpenStreetMap Wiki*, 22 November 2012, https://wiki.openstreetmap.org/wiki/Tagging_for_the_renderer.

of golf courses, so he instead labelled the various items with which ever tag would ensure they were rendered in the correct colour. So, for example, bunkers, which are generally a sandy brown, were tagged with landuse = farm, as this displays as brown on the openstreetmap.org map. After seeking advice from various other commoners, tags were created to appropriately map the golf course, and at the same time a more effective process for mapping was explained to him. This mis-tagging of items displays a fetishisation of the map as the use-value of the data was low, it could not be used to assemble any statistics for land use in that particular area. The most important thing to this commoner was the outwards appearance of what he had done, from this the map would appear correct, but the map obscures the data behind it, obscures its use-value.

The process of assembling digital commons artefacts includes continual feedback, there is a never-ending process of refinement built into most projects. A significant number of projects have a purpose-built bug tracker, usually based upon a piece of free software. Open Street Map has a number of projects associated with it which allow the submission of bugs in a very public manner. The most well-known of these is Open Street Bugs, which allows commoners to attach markers to a map, with notes containing advice or suggestions [333]. Further examples of this are a 'NoName' layer displayed until recently on the openstreetmap.org website, which displays red casing around streets without a name attribute, and Geofabrik's Inspector [334], which attempts to automatically highlight errors in the data. Similarly there bug trackers are those for Linux [335], and for the music composition software Ardour [336]. Wikipedia does not appear to have such a list, but the various 'Stub' categories [337] serve a similar function, displaying those pages which are lacking in detail [338]. As Marx suggested, "it is by their imperfections that the means of production in any process bring to our attention their character of being the products of past labour." [339]. thus showing through this very public display of errors a defetishisation of the artefacts, a demonstration that the

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[333] OpenStreetMap contributors, 'OpenStreetBugs'.

[334] Geofabrik GmbH and OpenStreetMap contributors, 'OSM Inspector', *Geofabrik Tools*, 14 February 2013, http://tools.geofabrik.de/osmi/.

[335] Linux kernel contributors, 'Main Page', *Kernel Bug Tracker*, 5 February 2013, https://bugzilla.kernel.org/.

[336] Ardour contributors, 'View Issues', *MantisBT*, 5 February 2013, http://tracker.ardour.org/view_all_bug_page.php.

[337] Wikipedia contributors, 'Category:Cattle Stubs', *Wikipedia, the Free Encyclopedia* (Wikimedia Foundation, Inc., 30 January 2013), https://en.wikipedia.org/w/index.php?title=Category:Cattle_stubs&oldid=359767300.

[338] Ayers, Matthews, and Yates, *How Wikipedia Works*, 7.

[339] Marx, *Capital*, 1:289.

object has not appeared out of nowhere, divorced from any human labour.

Summarising our findings, the fetishisation of the artefacts within the digital commons projects analysed occupies a somewhat shifting, unstable position. Each project makes connections between those who use the artefacts and those who assemble them, rendering each relationship as more social, but there are various moves which are diminishing these connection. I have identified a consistent move to simplify and accelerate access to each artefact, particularly those packaged as part of complete operating systems. This reduces any interaction required, and obscures the social nature of each artefact.

3.5 Surplus-value

Marx identified the generation of surplus-value as the means through which profit is created in a capitalist enterprise. It entails a capitalist employing workers to produce some use-value, but only paying them for a part of their work, sufficient to reproduce their own labour, and to produce offspring to be the next generation of labourers [340]. The capitalist then takes ownership of the work, sells it on the open market, and keeps the difference between the price it is bought for and the price it is sold for as profit. The capitalist can do so, as he has monopoly access to the means of production, a situation which came about in capitalist countries including the UK, by the forcible expulsion of the peasant classes from the land via processes including the Enclosure Laws [341]. This process, which peaked during the 18th and 19th centuries in UK, and which is currently being played out in sub-Saharan Africa [342], resulted in peasants, who previously had provided for themselves by growing crops and raising cattle on common land, being unable to do so, as access to the land now required a payment to the owner. This destruction of the possibilities for self-sufficiency forced them to seek waged labour with capitalists who monopolised the means of production in order to earn wages so they could buy the necessities of life. Through this process of extraction of surplus-value, the capitalist is able to enrich herself, without carrying out any labour, thus situating herself in contrast to workers, who can only gain wealth through selling their own labour. The situation may be clouded by the capitalist also taking a position of employment within the company they own or finance. For instance until recently, Bill Gates, majority owner of Microsoft was also the chief executive of that company. For this he received a salary, and thus occupied the position of, admittedly well-paid, wage labourer as well as capitalist.

Within the digital commons, there are a number of individuals who have gained substantial wealth, influence and fame, out of proportion to the labour they put in. Amongst these are the three founders and leaders of the projects I am analysing here: Steve Coast of Open Street Map, Linus Torvalds of Linux and Jimmy Wales of Wikipedia. As we found in section 2, each of these three were involved in the early work of their respective projects, and at one point were either the sole or one of a small number of people putting in effort. For many months, Linus Torvalds

340 Ibid., 1:275.

341 Ibid., vol. 1, chap. 27.

342 John Vidal, 'How Food and Water Are Driving a 21st-century African Land Grab', *The Guardian*, 7 March 2010, http://www.guardian.co.uk/environment/2010/mar/07/food-water-africa-land-grab.

was the only person contributing to Linux, while Steve Coast and Jimmy Wales had only a small number of other contributors taking part from an early stage. However, the idea is still commonly accepted as theirs, although in the case of Wikipedia, Larry Sanger also paid a significant part at the beginning and gains some acknowledgement for doing so.

As each of the primary artefacts, that is software code, geographic data and accumulated knowledge, which are brought into being by the three projects has a price of zero, they would each appear to have no exchange-value, thus confounding any attempt to extract surplus-value. This is only the case for monetary gain. As Marx stated, the extraction of surplus-value and the ensuing profit involves the conversion of money into capital, but as he also stated, money amongst other things is a commodity which is the "universal equivalent" [343]. Thus, the accumulation of any commodity through the extraction of surplus-value implies the existence of capital. If surplus-value is not extracted in the form of money, is it extracted in any other form? For the answer to this, we will turn to Bourdieu, and his work around capital, as outlined in *The Forms of Capital* [344] and *Distinction* [345]. In the first of these sources he lays out a theory of other forms of capital besides economic, specifically cultural and social. He later added to these three with symbolic capital, which he defined as

> the acquisition of a reputation for competence and an image of respectability that are easily converted into political positions as a local or national *notable.* It is therefore understood that they should identify with the established (moral) order to which they make their daily contributions [346]

He later added to this with the following

> Symbolic alchemy, such as I have described it, produces, to the benefit of the one who accomplishes acts of euphemization, transfiguration, or imposition of form, a capital of form which permits him to exert symbolic effects [347],

and

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343 Marx, *Capital*, 1:162–163.

344 Bourdieu, 'The Forms of Capital'.

345 Pierre Bourdieu, *Distinction: A Social Critique of the Judgement of Taste*, trans. Richard Nice (Cambridge, Massachusetts: Harvard University Press, 1984).

346 Ibid., 291.

347 Bourdieu, *Practical Reason*, 102.

> Symbolic capital is an ordinary property (physical strength, wealth, warlike valor, etc.) which, perceived by social agents endowed with the categories of perception and appreciation permitting them to perceive, know and recognize it, becomes symbolically efficient, like a veritable *magical power*: a property which, because it responds to socially constituted "collective expectations" and beliefs, exercises a sort of action from a distance, without physical contact. [348]

Symbolic capital can thus be seen as the credit gained by those who carry out acts seen as valuable by others, which can then be converted into the ability to command others to act, to carry out one's will. The valuable acts vary by culture, but in modern Western capitalist culture, they generally include acts of heroism during war [349], writing pieces of great literature [350], achieving feats of sporting prowess, carrying out acts of philanthropy and earning vast wealth through capitalist exploitation [351]. Since technology has taken on its current importance in our lives and assisted in the accumulation of capital, particularly during the last 30 years, valued activity now also includes successes in that field. As Time magazine [352] and others have not so eloquently put it "The Geek Shall Inherit the Earth" [353]. In the situations we are describing here, Coast, Torvalds and Wales have each gained symbolic capital, through carrying out work which others "identify with the established (moral) order" [354]. The tools they take part in assembling are useful to capital, as we have seen they are directly used by various capitalist organisation to further their own profits by lowering costs and increasing flexibility. At the same time their work is further seen as complying with an ideological imperative which states "information wants to be free" [355], which appeals to a large

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348 Ibid.

349 Dalia Gavriely-Nury, *The Normalization of War in Israeli Discourse, 1967-2008* (Lanham, MD: Rowman & Littlefield, 2012), 112.

350 Glenn Steinberg, 'Symbolic Capital and Canon Formation: Virgil, Dante, Chaucer', *Home Page of Glenn Steinberg*, 2003, http://gsteinbe.intrasun.tcnj.edu/tcnj/syllabi/Older/Fall2003/670.htm.

351 Nevil Gibson, 'National Treasures', *The National Business Review*, 28 July 2011, http://www.nbr.co.nz/article/national-treasures-ng-97939.

352 Lev Grossman, 'The Geek Shall Inherit the Earth', *Time*, 25 September 2005, http://www.time.com/time/magazine/article/0,9171,1109317,00.html.

353 Alexandra Robbins, *The Geeks Shall Inherit the Earth: Popularity, Quirk Theory, and Why Outsiders Thrive After High School* (Hyperion, 2011).

354 Bourdieu, *Distinction*, 291.

355 Clarke, 'Roger Clarke's "Information Wants to Be Free ..."'

set of commoners who take part in other digital commons projects. A further group, drawn from the technocratic elite, although not necessarily themselves commoners, will also voice their approval of the projects, perhaps praising the project leaders for making "pragmatic" decisions such as using a digital commons license for technical reasons [356]. This endorsement or tribute does not necessarily take the form of explicit praise, although there is much evidence of that [357], but can be in the form of a powerful or respected entity making use of the artefacts, such as financial institutions using Linux as the kernel of choice for high frequency trading systems [358], and Apple [359] and Microsoft employing Open Street Map data in their mapping services

There have been a number of operating systems, maps and encyclopedias, some of which have been successful, some not, some of which have been proprietary, some not. Each of our commoners who nominally started a project have seized upon a number of pre-existing ideas, and used them to assemble a project, which has then become known outside their circle, and seen as useful. Up until this point, it could be argued the wealth generated within the project was solely by the efforts of initial members, although as Hardt and Negri point out, this would be a difficult argument to sustain. They argue that in the era of immaterial labour, everybody is party to the generation of wealth [360], those who are employed and those who are not, those who are within the factory walls and those who are outside. Thus, trying to discern between those who add value and those who do not is futile and arbitrary. Torvalds himself notes this reliance on previous work, when he gives credit to Stallman and others who wrote software he relied upon [361], although we could probably also include Stallman in the group of those who extract surplus-value through the contributions of other commoners. Similarly, following on from statements in section 2.4, the assembly of Open Street Map relies on the labour of those who arrange the landscape and items upon it, and upon geological forces over billions of years, both of which occur prior to it being mapped. It is therefore already part of the natural commons regardless of the conditions under which it is released. Any privatisation of the work follows from the Lockean tradition which states that anyone who works on or improves a piece of land can claim it as their own [362],

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356 Raymond, *The Cathedral and the Bazaar*, 70.

357 Twitter Developers, 'Open Source Thanks'.

358 Jackson, 'How Linux Mastered Wall Street'.

359 Harry Wood, 'Apple Maps', *OpenStreetMap Foundation*, 2 October 2012, http://blog.osmfoundation.org/2012/10/02/apple-maps/.

360 Hardt and Negri, *Multitude*, 135.

361 Torvalds and Diamond, *Just for Fun*, 96.

362 Locke, *Second Treatise of Government*, 21.

as explained by Raymond [363] in relation to digital commons works. An identical situation exists for Wikipedia, as the articles written are based upon already existing artefacts, whether naturally occurring or human assembled.

As the works became better-known due to their high use-value, so more people joined in with the projects, further increasing its use-value. As Marx stated, workers employed by a capitalist enterprise own their labour [364], and are freely able to choose whether they sell it to one capitalist or another. So it is with Linux, Open Street Map and Wikipedia. Each is an opt-in project, and no-one is required to contribute even if they use the work. This has the bonus for Torvalds, Wales and Coast that it gives the illusion they are not exploiting the contributors, as each can leave at any time they choose, each takes part freely without coercion. These three leaders provide for a return to these additional commoners who contribute, by assembling a structure which allows the commoners who use the artefacts to find the name of those who assembled them. Thus, through partial defetishisation, the commoner who contributes can be recognised and hence rewarded in non-monetary form. Examining Marx's suggestion that the capitalist is required to pay the worker before the work is completed and exchanged in order to live [365], we can see that there is no such necessity in these cases. Although Maslow identified respect as an essential requirement to be human [366], it is of course not required in order to live, in the same way as food, shelter, oxygen and other examples from the lower levels of his hierarchy of needs.

The initial capital required to launch a project takes the form of both economic capital, such as support for Wikipedia from Jimmy Wales' company Bomis [367] and time and the cultural capital vested in the knowledge gained at by Wales' finance education [368] and Torvalds' study in computer science [369] or in industry [370]. At this point the symbolic capital of the founding commoner is likely low, although Wales possessed a small amount through his previous efforts with Nupedia, which allowed Wikipedia to attract a small number of commoners to contribute

363 Raymond, *The Cathedral and the Bazaar*, 77.

364 Marx, *Capital*, 1:271.

365 Ibid., 1:272.

366 Abraham Maslow, 'A Theory of Human Motivation', *Psychological Review* 50, no. 4 (1943): 370–396.

367 Ayers, Matthews, and Yates, *How Wikipedia Works*, 46.

368 Lih, *The Wikipedia Revolution*, 19.

369 Torvalds and Diamond, *Just for Fun*, 133.

370 Lih, *The Wikipedia Revolution*, 20.

immediately.

After this point, each commoner taking part in the project increases its value by carrying out labour, and adding to its use-value. However, in the case of all three of the projects under consideration here, the initial contributors continue to be seen as the main force behind the project. It is seen as 'theirs', despite the name of each commoner being attached to the pieces they add. The initial contributor does not however own the project, as contribution to it is firstly copyrighted to the person who wrote it, and secondly licensed very permissively, thus ceding control to anyone who cares to use it for whatever purpose. Thus, the work itself is not privatised, the code, data or knowledge is not owned by Linus Torvalds or any of the other project leaders. However, the popularity of each project, as outlined in section 2, generates huge amounts of symbolic capital, most of which is accumulated by the founding figures. For evidence of this return, we can look at a number of sources, Torvalds' book detailing his work on Linux for example is entitled *Just for Fun: The Story of an Accidental Revolutionary, by Linus Torvalds, creator of Linux* [371]. Some of the other commoners involved in Linux are mentioned in the book, though mostly anonymously, but before we even start reading, the idea that Linus Torvalds is the originator, the creator, of Linux is suggested in very large letters. Incidentally, the ghost writer for the book, who interviewed Torvalds for the content, and no doubt turned what he wrote into something more readable, gets his name on the front cover in much smaller letters than Torvalds. There are numerous other pieces which identify him as founder [372] or label him as "Leader of the Free World" [373] and "Father of the LINUX Operating System" [374]. This "myth of the entrepreneur" [375] is demolished by Jones and Spicer, amongst others [376], who remark that "belief and faith in the individual is truly remarkable." and that "this idea is out of touch with the realities of cooperative labour today" [377], which as Hardt

371 Torvalds and Diamond, *Just for Fun*.

372 Kristie Lu Stout, 'Reclusive Linux Founder Opens Up', *CNN.com*, 19 May 2006, http://edition.cnn.com/2006/BUSINESS/05/18/global.office.linustorvalds/.

373 Rivlin, 'Leader of the Free World'.

374 Richard Shippee, 'Linus Award Issue 14', *Linux Gazette*, 1997, http://linuxgazette.net/issue14/linus.html.

375 Howard Thorp, '"Free" Market Myths No.3: Entrepreneurs Create Wealth', *Capitalism Creates Poverty*, 11 March 2012, http://capitalism-creates-poverty.blogspot.co.nz/2012/03/free-market-myths-no3-entrpreneurs.html.

376 Tom Byers, Heleen Kist, and Robert I Sutton, 'Characteristics of the Entrepreneur: Social Creatures, Not Solo Heroes', in *The Technology Management Handbook*, ed. Richard C. Dorf (Boca Raton, Florida: CRC Press, 1998), 1–1.

377 Campbell Jones and André Spicer, *Unmasking the Entrepreneur* (Cheltenham, UK: Edward Elgar Publishing, 2009), 111.

and Negri argue, is that nothing originates from one person, in a cultural and social vacuum devoid of any history or prior work [378], thus echoing the words of Marx when he states that "Production by an isolated individual outside society … is as much of an absurdity as is the development of language without individuals living *together* and talking to each other" [379]. Similarly to Torvalds, Jimmy Wales [380] and Steve Coast [381] are listed in various places as the creator of their respective projects. Again, the presence of other contributors is acknowledged, and as detailed in the section on fetishism, each individual who has registered can be contacted through the project, but the majority of the symbolic returns always go to the first person to work on the project, the person who is identified as the founder or leader, often both. It appears the project leaders are willing to acknowledge the roots of some things and share them with the commons, but not others.

If we look at the statistics for Linux development, we can see that Linus Torvalds made approximately 0.4% of the contributions to the mainline repository between 2006 and 2012, a figure which places him outside the top 30 contributors, although even the top contributor, David S. Miller, has only contributed 1.2%, figures which are each a small part of the overall project [382]. This analysis is itself somewhat problematic however, as Torvalds spends much of his time vetting other people's code for inclusion, being responsible for signing-off 2.4% of commits between slate 2010 and early 2012 [383], thus making his input mainly managerial. The report cited above compares commoners by the lines of code they add along with other quantitative measures, and although this approach is tempting and simple, it is not without issue, as it implies all contributions are equal, all lines of code are the same at some level. At this point, we step away from Marx's notion of abstract labour, the suggestion that a certain amount of labour, expressed as time, will create a certain quantity of value, that is the time which is "socially necessary for the production of a use-value" [384]. The time taken to write a line of code or approve a piece of code cannot be measured in any useful, consistent way, thus rendering the Marxist idea of abstract labour obsolete for immaterial

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378 Hardt and Negri, *Multitude*, 144.

379 Marx, *Grundrisse*, 84.

380 Valentine Low, 'Wikipedia Chief Jimmy Wales Marries', *The Times (London)*, 6 October 2012, sec. Technology, http://www.thetimes.co.uk/tto/technology/internet/article3560470.ece.

381 OpenStreetMap contributors, 'History of OpenStreetMap'.

382 Corbet, Kroah-Hartman, and McPherson, *Linux Kernel Development*, 9.

383 Ibid., 12.

384 Marx, *Capital*, 1:303.

labour [385]. For each of the projects analysed here, the work is heavily dependent upon communicating and cooperating with others, and the value is generated by this collaborative activity [386]. It is further of an immaterial nature which defies meaningful quantification [387].

The symbolic capital gained is continually reinvested, the name of the person who founded it remains attached to the project. This attracts others to it, who then begin working, and bring in increased symbolic capital. They are then themselves rewarded symbolically by having their name attached to the work they do, through statistics on Linux [388], Wikipedia [389] and Open Street Map [390] which show which commoners make the most prolific contributions and through other means, such as the project leader [391] or hierarchy [392] publicly thanking specific contributions. The attachment of the commoner's name to their inputs is critical, for the recognition at the centre of Bourdieu's definition of symbolic capital, which allows the work to be "perceived by social agents endowed with the categories of perception and appreciation permitting them to perceive, know and recognize it" [393]. Rather than the code, data or knowledge being privatised and converted into money capital, we can instead see a significant proportion of the symbolic capital which returns to the projects being captured disproportionately by its leaders. The accumulated capital then constitutes a resource that can be converted into money capital in the form of paid positions or other forms of financially rewarded activity.

At this point, the projects we are analysing in some ways resemble a capitalist organisation. Wales, Coast and Torvalds put in a certain amount of labour, adding value to the project, but the majority of the value is added by the

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385 Hardt and Negri, *Multitude*, 144–147.

386 Ibid., 147.

387 Ibid., 146.

388 Corbet, Kroah-Hartman, and McPherson, *Linux Kernel Development*.

389 Wikipedia contributors, 'Statistics'.

390 OpenStreetMap contributors, 'OpenStreetMap Statistics'.

391 Steve Coast to Open Street Map talk mailing list, '[OSM-talk] Sotm-EU11: Thanks to the Organisation Committee', 19 July 2011, http://lists.openstreetmap.org/pipermail/talk/2011-July/059450.html.

392 OpenStreetMap contributors, 'Lolcat of Awesomeness', *OpenStreetMap Wiki*, 13 June 2012, https://wiki.openstreetmap.org/wiki/Lolcat_of_awesomeness.

393 Bourdieu, *Practical Reason*, 102.

other commoners, and importantly through the collaboration between them. Wikipedia had 126,000 commoners editing articles in the month prior to January 21st 2013, over 16,000 commoners edited the Open Street Map database in the month of December 2012 [394] and Linux had nearly eight thousand commoners adding to its code between May 2005 and March 2012 [395]. The founding commoners brought to the project a certain amount of capital which was invested at the start. Torvalds was part way through a degree in Computer Science at the University of Helsinki when he began Linux, having been interested in computer programming for many years, and Steve Coast and Jimmy Wales had similar backgrounds and education in technology.

The symbolic capital generated is valuable in its own right, but it can also be converted into other forms of capital. Linus Torvalds is employed by the Linux Foundation, as that group, funded by 171 technology companies including Google, British Telecom and Samsung [396], perceives the importance of him concentrating on Linux full-time [397]. He thus has a very well-paid position, and was similarly employed by Transmeta between 1997 and 2003, although at a more modest salary [398]. A significant reason for this position and numerous other job offers [399] was the perception of the project [400], and the reflected glory it brought to that company. He also received stock options which became very valuable upon the company floating in 2000. Similarly, Steve Coast started his own company, Cloudmade in 2007, to profit from Open Street Map, and received venture capital funding from Greylock [401], funding which would not have been forthcoming were it not for the work of the thousands of commoners who take part in the project he started. He later went on to take a senior position at Microsoft, in the mapping division [402].

Jimmy Wales has also gained significantly from his involvement in Wikipedia. He is much sought after as a speaker

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394 OpenStreetMap contributors, 'OpenStreetMap Statistics'.

395 Corbet, Kroah-Hartman, and McPherson, *Linux Kernel Development*, 7.

396 Linux Foundation, 'Members', *The Linux Foundation*, accessed 14 January 2013, http://www.linuxfoundation.org/about/members.

397 Linux Foundation, 'About Us'.

398 Rivlin, 'Leader of the Free World'.

399 Torvalds and Diamond, *Just for Fun*, 153.

400 Ibid., 165.

401 CloudMade, 'About CloudMade'.

402 Weait, 'OpenStreetMap Founder Steve Coast Joins Bing'.

at conferences [403], as incidentally are Coast and Torvalds [404]. He has also recently married the former diary secretary of former UK Prime Minister Tony Blair after meeting her at the World Economic Forum in Davos, Switzerland, which as the *London Times* acknowledged, provides him with access to members of the British political elite, and the chance to pass on his libertarian economic and political ideas [405]. The symbolic capital has thus been exchanged for social capital, that is networks of individuals who can assist him if he requires [406].

In return for taking part in the project, the other commoners involved are rewarded with access to the artefacts of knowledge, code or data, and to a select few, with symbolic capital, for instance Ingo Molnar, Con Kolivas and Andrew Morton have received a certain amount of credit for the effort they put in, being reasonably well-known contributors to the Linux kernel, and in the case of Molnar, have a well-paid position at software company Red Hat [407]. However, the majority of commoners remain unknown to almost all who come into contact with the project, their only other reward perhaps being a sense of satisfaction at improving a project they see as worthwhile, although this would not count as symbolic capital under Bourdieu's definition due to the lack of recognition by others.

There are numerous data visualisations which show who has contributed the most, a table of fame if you will [408]. While these demonstrate the effort commoners others than Coast, Wales and Torvalds have put in, they also pit each contributor against each other, suggesting that each must try to be top. Whether this is a driver for many contributors remains to be seen, it may simply be the case that each are happy to be involved in the commons, to take part in a community project. My own long-term, albeit somewhat unstructured and anecdotal involvement in

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403 RSA Conference, 'RSA® Conference Announces Jimmy Wales, Founder of Wikipedia as Closing Keynote Speaker at RSA® Conference Europe 2012 in October', *Business Wire*, 15 May 2012, http://www.businesswire.com/news/home/20120515005740/en/RSA%C2%AE-Conference-Announces-Jimmy-Wales-Founder-Wikipedia.

404 Stan Schroeder, 'Linus Torvalds: Locked Down Technologies Lose in the End', *Mashable*, 18 November 2011, http://mashable.com/2011/11/18/linus-torvalds-apple-lockdown/.

405 Low, 'Wikipedia Chief Jimmy Wales Marries'.

406 Bourdieu, 'The Forms of Capital', 11.

407 Wuelfing, 'Ingo Molnar Tests New BF Scheduler'.

408 OpenStreetMap contributors, 'OpenStreetMap Statistics'.

and perusal of various mailing lists associated with these projects, suggests little stated desire by anyone to be top of the list. Indeed this approach is generally frowned upon, commoners are generally modest about their work, perhaps resorting to a "look at this thing I made here", without any fanfare [409]. If increased competition and the desire to be top does some drive commoners to contribute more, it would benefit the leaders, as for each extra contribution, they gain some capital. It also resembles the aggressive, competitive nature of employment in the capitalist world, where each worker can only succeed by stepping on her rival. Further, it would arguably render the artefacts more commodity-like, as each commoner would not be adding to them for use-value, but for their exchange-value, that is to gain increased symbolic capital.

Not all projects are structured in the same way as Open Street Map, Linux and Wikipedia. While each of these have a large number of contributors with one clear leader, a vastly larger number comprise one person. They include TangoGPS, for displaying maps, written by Marcus Bauer [410]; apmsleep, for putting a computer into sleep or suspend, written by Peter Englmaier [411] and a Pacman-emulating screen-saver, by Edwin de Jong [412]. These projects generally have a small number of simple, clearly-defined tasks to carry out, and as such can be managed by a single person who could be likened to a member of the petty bourgeois who provides a service and makes a living, but does not exploit the labour of others. Although there are many of these in the free software world, the concept does not appear to extend well to large data projects such as Open Street Map and Wikipedia, which are based on the mass labour of many individuals each contributing small pieces of interlinking information. There are however a number of projects which are written by a large number of contributors, but which do not have a clear leader, who is able to steer the project and collect profit by expropriating surplus-value as described above. These include Open Office and its fork Libre Office [413], and the Firefox web browser [414], both of which are governed by an elected committee, which although it takes the position of leading the project through a transcendent model of governance,

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[409] Jochen Topf to Open Street Map talk mailing list, '[OSM-talk] Multilingual Maps Demo', 30 November 2012, http://lists.openstreetmap.org/pipermail/talk/2012-November/065312.html.

[410] FoxtrotGPS, 'FoxtrotGPS - the Friendly FOSS GPS', accessed 14 January 2013, http://www.foxtrotgps.org/.

[411] linuxcommand.org, 'Apmsleep', *Linuxcommand.org*, 2004, http://www.linuxcommand.org/man_pages/apmsleep1.html.

[412] linuxcommand.org, 'Pacman', *Linuxcommand.org*, 2004, http://www.linuxcommand.org/man_pages/pacman1.html.

[413] The Document Foundation, 'Board'.

[414] Mozilla Foundation, 'Bylaws of Mozilla Foundation' (Mozilla Foundation, 2013), https://www.mozilla.org/foundation/documents/mf-bylaws.pdf.

is not able to extract profit in the same way as the three case study projects, partly due to the rotation of membership.

Having acknowledged the exploitation inherent in a certain type of project within the digital commons, I should perhaps comment on how and why this has come about, and the consequences of it. From a technical point-of-view, that is how and why the collection of data, writing of code occurred, that question is answered. The particular point I am interested in, is whether those who lead the projects are aware of their situation, whether it is the result of a conscious choice, and how they act upon it. In line with predictions by Raymond [415], Linus Torvalds has been careful to assess the impact of his decisions upon the project. He may have turned down a lucrative directorship and $10 million worth of stock options by a Linux-related company, but had no problems taking stock options from Red Hat and VA Linux, both with no demands for return, apparently as a 'thank you' from grateful entrepreneurs [416]. At the same time, he went to great trouble to include clauses in his contract with the Linux Foundation that meant its financial backers, including Google, Samsung and Red Hat, and indeed the Foundation itself, can not interfere in his work [417]. He has also made a conscious effort not to express allegiance to any operating system, although he has occasionally made vocal comments against or for various entities, such as when he labelled the most recent version of the GNOME "crazy" due to the steps back they had taken in usability [418]. He has similarly used an expletive-laden speech against nVidia for releasing graphic card drivers they release for Linux that are not as capable or stable as those for Windows [419]. Wales has also put his power to what one might argue is a public good, in assisting the UK Government to make taxpayer-funded research available to anyone [420], although one might also argue that any significant power is wrong, whatever its use.

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415 Raymond, *The Cathedral and the Bazaar*, 79.

416 Rivlin, 'Leader of the Free World'.

417 Linux Foundation, 'About Us'.

418 Lucian   Parfeni,   'Linus   Torvalds   Drops   Gnome   3   for   Xfce,   Calls   It   "Crazy"',   *Softpedia*,   2011,   http://news.softpedia.com/news/Linus-Torvalds-Drops-Gnome-3-for-Xfce-Calls-It-Crazy-215074.shtml.

419 Simon   Sharwood,   'Linus   Torvalds   Drops   F-bomb   on   NVIDIA',   *The   Register*,   2012,   http://www.theregister.co.uk/2012/06/18/torvalds_curses_nvidia/.

420 Alok Jha, 'Wikipedia Founder to Help in Government's Research Scheme', *The Guardian*, 1 May 2012, sec. Science, http://www.guardian.co.uk/technology/2012/may/01/wikipedia-research-jimmy-wales-online.

As we found earlier, within the digital commons there are certain elements of intellectual property which are managed and freely distributed amongst commoners, and some which are not. Any artefact which can be copyrighted, patented or stored in a database, where such a concept exists in law, are shared amongst commoners, they are managed by commoners, and are thus part of the commons, according to the definition in section 1.0. The only strand of intellectual property which is not communally owned and maintained is trademarks. For each of the cases discussed here, the name of the project is owned, it is monopolised and enclosed by a small group [421]. This may appear unusual, were it not for the preceding analysis of the accumulation of symbolic capital through the extraction of surplus-value. The symbolic capital which returns to a project only returns via the project name, the handle by which is it known in the world. For this symbolic effect to return to one place requires a single signifier, a reference point to which it can attach. The positive aspects of a given project must thence be collected, and the flip-side of this, the negative aspects be discarded. To do so requires a decision as to which aspects are part of the project and which are not. Rogue forks or low quality derivatives must be disassociated from the project, and the simplest way to do this is by control over a trademark, a trademark whose use can be withdrawn at the whim of its owner. Neither Linux, Open Street Map nor Wikipedia have so far wielded the ownership of trademark to deny anyone the use of their name, to exclude derivatives which are not appropriate. There are however numerous examples of this protection of the name, this brand management, occurring in various projects. The most visible of these is Richard Stallman insisting on the name GNU being part of the name for any distribution which includes software from that project. The quote below highlights certain key parts of the Free Software Foundation's argument of why we should always use the word GNU when describing such a system.

> "We began developing GNU in 1984 ... we led the way. We developed most of the central components, forming the largest single contribution to the whole system. The basic vision was ours too. In fairness, we ought to get at least equal mention." [422],

The sentence focusses on what 'we', that is the GNU developers, did. It demands respect for 'our' work, and the only way to get this respect is through the name of the project. It ignores the previous work by UNIX developers which established the philosophy upon which the GNU system is based, and all other influences in the world which played some unmeasurable part in the bringing into being of the software. At a second level, it adds an element of division to the digital commons, reintroducing the concept of mine and yours which are so damaging, and which

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421 Linux Foundation, 'Linux Trademark Institute'.

422 Free Software Foundation, Inc., 'GNU/Linux FAQ'.

are one of the key problems of capitalism, the suggestion that we must all accumulate for the sake of accumulation. To their credit, the GNU project did not use any legal mechanisms to protect GNU, relying instead on force of argument.

The Mozilla Foundation demands those redistributing Firefox and Thunderbird may only use those names and the logos of that software in ways controlled by them. They exercised this power when Debian GNU/Linux made a series of changes to the software, in order to include it in their distribution. The changes were not within the parameters allowed by Mozilla, who demanded the Debian project either stop using their trademarks, drop the software entirely, or release it in an unmodified form [423]. The Debian project relented, changed the names and logos also, and the symbolic capital of Mozilla's work was maintained.

In both cases above, the desire for ownership and control or of some aspect of a digital commons project, that is the symbolic capital accrued, is at odds with the general idea of freely sharing, and points to the accumulation of credit which drives some commoners.

The analysis carried out above, demonstrates surplus-value is not extracted in the traditional manner, in line with the lack of commodification of the artefacts. However, bringing in Bourdieu's notion of symbolic capital, it appears a small number of commoners associated with each project we have analysed, exploit the majority of those who contribute work. They do so by accumulating the prestige returned to the project, a significant portion of which goes to the head or initiator of the project. As Bourdieu remarked, this symbolic capital can be exchanged for other forms of capital, and two out of our three project leaders have improved their position monetarily, while the third has gained other benefits through this. Neither has attained the position of owners of capitalist companies, suggesting the exploitation is mild.

423Connor to submit@bugs.debian.org, 'Using Firefox as the App Name Without Official Branding Is Still a Trademark Violation'.

4.0 Conclusions

In the preceding chapters, I have explored the relationship between the digital commons and aspects of the capitalist mode of production, taking three iconic projects: the Linux operating system kernel, the Wikipedia encyclopedia and the Open Street Map geographical database as case studies. As a result of these analyses, it appears digital commons represent a partial escape from the domination of capital.

As the artefacts assembled by our three case studies can be accessed by almost anybody who desires, there appear to be few class barriers in place. At the centre of this is the maxim "information wants to be free" [424] underpinning the digital commons, which results in assistance and education being widely disseminated rather than hoarded. However, there are important resources whose access is determined by a small group in each project, rather than by a wider set of commoners. This prevents all commoners who take part in the projects from attaining their full potential, favouring one group and thus one set of values over others. Despite the highly ideological suggestion that anyone can fork a project at any time and do with it as they wish, which would suggest a lack of class barriers, there is significant inertia which makes this difficult to achieve. It should be stressed however, that the exploitation and domination existing within the three case studies is relatively minor when compared to typical capitalist class relations. Those who contribute are a highly educated elite segment of society, with high levels of self-motivation and confidence, which serves to temper what the project leaders and administrators can do.

The artefacts assembled cannot be exchanged as commodities, due to the license under which they are released, which demands that the underlying information, be it the source code, knowledge or geographical data always be available to anyone who comes into contact with the artefact, that it remain in the commons in perpetuity.

This lack of commoditisation of the artefacts similarly resists the alienation of those who assemble them. The thing made by workers can be freely used by them, they make significant decisions around how it is assembled, and due to the collaborative nature essential to the process of assembly, constructive, positive, valuable relationships are built with collaborators, both within the company and without. This reinforces Stallman's suggestion that free

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[424]Clarke, 'Roger Clarke's "Information Wants to Be Free ..."'

software, and thus the digital commons is a more social way of being [425].

Further, the method through which the artefacts are assembled reduces the likelihood of fetishisation. The work is necessarily communal, and involves communication and association between those commoners who make and those who use. This assists the collaboration essential for such high quality artefacts, and simultaneously invites a richer relationship between those commoners who take part. However, as has been shown, recent changes have shown there are situations where the social nature of the artefacts is being partially obscured, in favour of speed, convenience and quality, thus demonstrating a possible fetishisation.

The extraction of surplus-value is, however, present. The surplus extracted is not money, but in the form of symbolic capital. This recognition from others can be exchanged for other forms of capital, enabling the leaders of the three projects investigated here to gain high paying, intellectually fulfilling jobs, and to spread their political beliefs. While it appears there is thus exploitation of the commoners who contribute to these projects, it is firstly mild, and secondly does not result in a huge imbalance of wealth and opportunity, although this should not be seen as an apology for the behaviour which goes on. Whether in future this will change, and the wealth extracted will enable the emergence of a super-rich as seen in the likes of Bill Gates, the Koch brothers and Larry Ellison remains to be seen, but it appears unlikely.

There are however ways in which these problems could be overcome. At present, the projects are centred upon one website, and an infrastructure and values, all generally controlled by a small group who are often self-selected, or selected by some external group with their own agenda. This reflects a hierarchical set of relationships, which could possibly be addressed through further decentralisation of key resources. For examples of this, we can look at YaCy [426], a search engine released under a free software license. The software can be used in one of a number of ways, the most interesting of these is network mode, in which several computers federate their results together. Each node searches a different set of web sites, which can be customised, the results from each node are then pooled, thus when a commoner carries out a search, the terms are searched for in the databases of several computers, and the results aggregated. This model of decentralisation prevents one entity taking control over what are a large and

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425 Stallman, *Free Software Free Society*, 8.

426 YaCy, 'Home', *YaCy - The Peer to Peer Search Engine*, 2013, http://yacy.net/.

significant set of resources, and thus decreases the possibility of exploitation, domination and the other attendant problems of minority control or ownership over the means of production.

Addressing the problem of capitalists continuing to extract surplus, requires a technically simple, but ideologically difficult, solution. There is a general belief within the projects discussed that any use of the artefacts is fine, so long as the license is complied with. Eric Raymond, author of the influential book on digital commons governance and other matters, *The Cathedral and The Bazaar,* and populariser of the term open source, is perhaps most vocal about this, stating that the copyleft tradition of Stallman's GNU is overly restrictive of what people, by which he means businesses, can do, and that BSD-style, no copyleft licenses are the way forward [427]. The majority of commoners taking part do not follow his explicit preference for no copyleft licenses, but nonetheless have no problem with business use of the artefacts, suggesting that wide spread use makes the tools better, and that sharing is inherently good. It appears they either do not have a problem with this, or perhaps more likely do not understand that this permissiveness allows for uses that they might not approve of. Should this change, a license switch to something preventing commercial use is one possibility.

427 Raymond, *The Cathedral and the Bazaar*, 68–69.

Appendix A: Glossary

This work goes into some technical detail around computer software and hardware, and other non-sociological concepts. These concepts are explained below in brief, and also in the text at the point where they first appear.

BSD - Berkeley Software Development, a part of the University of California, United States. Also a family of free software Unix-like operating systems developed or originating there. Also a family of free software licenses developed to release that operating system under.

close off - a process of taking a piece of software previously in the public domain, making modifications, and releasing under a proprietary license. Some entities have attempted to illegally close off free software. Somewhat analogous to the enclosure of common land in England in the 18th and 19th centuries

copyleft – a digital commons license which demands derivatives inherit the license of the original, that is that they must also be released as digital commons

CPU/central processing unit - see processor

Creative Commons - a project to advance the permissive distribution of works such as stories, music, poems, photographs. Started by Laurence Lessig and James Boyle in 2002. Also a set of licenses designed for the permissive distribution of works

database - a collection of data stored in an ordered manner, with relations between different pieces of data, thus allowing sophisticated inferences to be drawn.

Debian GNU/Linux - a free software, Unix-like operating system. Although it includes the Linux kernel, it also includes the option to use kFreeBSD, a variant of the BSD kernel, and Hurd, as alternatives to Linux. One of the first collections of free software to include Linux

desktop environment – a cohesive set of software which provides a graphical user interface for a computer, and assists a user, through graphical feedback, to control the computer

driver - a piece of computer software which allows other software to interact with a piece of computer hardware, such as a graphics card, monitor or network interface

free software - software released under a permissive license, thus allowing any person with the technical means to modify, re-distribute, run and examine the source code as they see fit

four freedoms – rules for a piece of software to be considered free. They are:

5. The freedom to run the program, for any purpose (freedom 0).

6. The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.

7. The freedom to redistribute copies so you can help your neighbor (freedom 2).

8. The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this. [428]

GNU - software project to develop an entire computer operating system which is free software, initiated by Richard Stallman in 1983. GNU is a recursive acronym for GNU's Not UNIX, in deference to its similarity to the original UNIX operating system

GPL - General Public License, a family of free software licenses, which observe the four freedoms. Written by Richard Stallman and maintained by the GNU project

graphics card - a piece of computer hardware which produces output suitable for displaying images on a monitor. More specifically, a particular type of graphics card which carries out certain computation and manipulation of

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[428] Free Software Foundation, Inc., 'The Free Software Definition'.

images.

Hurd - operating system kernel which is part of the GNU system. The Hurd kernel is not usable after 25+ years of development; most free software operating systems use the Linux kernel, or a variant of the BSD kernel

interpreted computer language - software source code which is compiled into a binary, which a computer can run. Java, C and C++ are the most common interpreted languages. See also non-interpreted computer language.

IP address – a numerical label assigned to each device (e.g., computer, printer) participating in a computer network that uses the Internet Protocol for communication. It is supposedly unique for each device, and allows data to be transmitted to its intended location.

kernel - a part of an operating system which manages access to, and controls, the hardware. Requires drivers to interface with each piece of hardware

library - a piece of software which encapsulates a small set of functions, for instance decoding a music file, manipulating mathematical data or generating image files. The library does not accept input from or provide output directly to the user, but is used by other pieces of software which the user interacts with, such as a music player or mathematical analysis package.

Linux - a free software operating system kernel, started in 1991 by Linus Torvalds. Also used informally to refer to free software operating systems, or to free software in general, although these uses are not accurate and confuse many.

Linux Mint - an operating system based upon Ubuntu

Minix – a computer operating system written mostly by Andrew Tenenbaum, in the UNIX tradition. An influence upon Linus Torvalds

non-interpreted computer language - software which is only written as text code, it is not compiled before being used. Python, Perl and Javascript are the most popular non-interpreted languages.

open source software - a superset of free software, the phrase was designed to to businesses, as free software was unappealing, as it implied something with no cost, and thus of low quality. The phrase open source is often used to refer to the digital commons, although this is at best not entirely accurate, and in some cases entirely misleading.

operating system - a collection of software which allows a user to control a computer, and thus to carry out tasks of his or her choice

processor - a piece of computer hardware which processes data and carries out calculations

proprietary - software, data or other immaterial artefacts which are released under a non-free license, and have strict controls placed on the use, distribution and modification of the artefact

renderer - a piece of software which outputs images from a set of data in a non-image format. In the specific case of Open Street Map and GIS in general, it produces graphical map tiles from a set of geographic data

scheduler - a part of an operating system kernel which negotiates which software will have access to the processor at any given time, when multiple pieces of software are running at once

sound card - a piece of computer hardware which allows the playback and recording of sound

source code – a series of computer commends written in a computer language, which forms software.

source code management - a piece of software for managing changes and access to a collection of software source code

Ubuntu - a free software, Unix-like operating system. Currently (2013) the most popular within this group. Ubuntu is based upon Debian GNU/Linux

UNIX - an operating system, developed at AT&T's Bell Labs in the 1960s, originally by Dennis Ritchie and Ken Thompson. Popular at large institutions and universities. Later the technology was licensed and developed by a number of large companies such as IBM, Apple and Hewlett-Packard to become a range of operating systems which were inconsistently compatible with each other.

UNIX-like - an operating system which behaves similarly to the original Unix, via following the Unix philosophy.

UNIX philosophy - a set of values which underlie most Unix software. The values are not enforced, but rather recommended.

Appendix B

This thesis was written entirely using free software on the Ubuntu platform, which is a UNIX-like operating system including the Linux kernel and the GNU toolchain amongst many other parts. Critical for this work were the GNOME desktop environment, Libre Office office suite, the Zotero citation software, Firefox web browser, gedit text editor for assembling drafts, Unison synchronisation software for backups, the PDF.js and Evince PDF viewers, and the Rhythmbox music player.

It also includes my own modifications to the Zotero citation software which enable the simple extraction of citation metadata from email discussion list archives.

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