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Project Meshnet And The Politics Of Scientific Practice

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ABSTRACT

I seek to demonstrate that innovative, socially circumscribed use of networking technology is changing the possibilities and practices of grassroots political movements, and conversely, that a politics of resistance aimed against real and perceived sociopolitical circumstances is shaping the use of technology. I examine the Project Meshnet community's endeavor to create a decentralized alternative to the current, global Internet infrastructure as residing both in the context of decentralized but still institutionally-guided technology production and in the context of recent social movements characterized by decentralized, non-hierarchical power structures, mutual aid, and other features. I conducted this research using the participant-observation method along with in-depth, one-on-one interviews. I present most of my findings in the tradition of "thick description", detailing Project Meshnet and its broader, technical and social contexts.

While Project Meshnet's official focus remains on the scientific pursuit of building a more secure and stable computer network, participants often provide a political impetus for their participation in terms of rectifying uneven political and economic power distributions. This appears as participants seek to use their technology to subvert centralized control over network access (i.e., by Internet Service Providers) and as they frame their model of decentralized, non-hierarchical participation as a possible template for other kinds of political action, in the vein of prefigurative strategies employed by social movements (Maeckelbergh 2011).

As a kind of free software project mixed with overtly political ideals of technological and social decentralization, Project Meshnet embodies its politics within its scientific practice while that practice enables a means for subtle, decentralizing political action, even as participants reflexively shape their public image, broaden their scientific aims, and work for a more equal world as a kind of group bridging scientific and social movements.

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CHAPTER 1

INTRODUCTION

Thesis Statement

I seek to demonstrate that innovative, socially circumscribed use of networking technology is changing the possibilities and practices of grassroots political movements, and conversely, that a politics of resistance aimed against real and perceived sociopolitical circumstances is shaping the use of technology.

Project Meshnet: The Community

The community around which I conducted my research exemplifies this phenomenon and includes software developers, hardware maintainers, and network users brought together through "Project Meshnet". Its mission is to build the Hyperboria Network, an alternative internet infrastructure based on a novel combination of old and new technologies, that has no centralized ownership or authority, and is directed toward the goal of creating a disruption-resistant network infrastructure "designed to facilitate the free flow of information" or prevent censorship. Ultimately, Project Meshnet's aim is to

replace the corporate- and government-owned internet infrastructure with individual- and community-operated networks linked together into a decentralized internet infrastructure on a global scale primarily using wireless technologies (MeshWiki Contributors 2013). Thus, Project Meshnet's cooperative modification and synthesis of available technologies alongside a social effort to grow local, community networks into a global-scale system mirrors recent social movement trends of decentralization, horizontalism, anticapitalism, and grassroots-based globalization; portrays particular configurations of hacker values; and exemplifies a form of creative resistance to the dominant political-economic paradigm in the vein of prefigurative political practice (Coleman and Golub 2008; Milberry 2012; Graeber 2010; Juris 2008, Schoonmaker (2007); Tim Jordan 2009; Harding 2012; Maeckelbergh 2011).

Overshadowing the political side of Project Meshnet is its status as a cooperatively-developed software project. Many, if not most participants wish to highlight the intellectual face of their group, as some even describe participation as nothing more than standard forms of action that hallmark production of freely-licensed software. Still, the motivating reasons behind participation frequently include contention against power; freeing or enabling access to knowledge; power and resource decentralization; and related, non-mainstream—perhaps even radical—political notions. Additionally, the model of organization used in this production, was first pioneered by the quietly political Free Software Movement (Coleman and Golub 2008). Though today, the wider Free Software community is something of an institution with both highly political and apolitical projects and users, its attempts to shift power have been largely successful and have been accomplished through atypical strategies of contention via the legal system. The global community whose cultural context arose from the Free Software Movement provides the framework for participation as freely-licensed software projects usually follow organizational approaches similar to those found in recent social movements: decentralization, consensus-building, autonomy of action, and mutual aid.

Overall, this work investigates the intentional creation of a locally-based and globally-connected community born out of political ideals and the scientific labor of Free Software development, problematized by a growing user community with varied conceptions of personal and group goals. Furthermore, this research sheds light onto the individual and community level motivations, theories, and practices behind constructive and subdued political action in a globalized, hegemonic power structure, and the ways in which scientific institutional structures unfold into ideologies and practices of the political sphere (and vice versa). Finally, the role played by individual agency in shaping the goals, strategies, and implementation of digitally-based grassroots (political) projects is highlighted by this research, as the role of core developer, or builder, and the role of activist are adopted, mixed, and contest one-another.

These aspects are important as the community itself attempts to define itself in terms of its scientfic practices versus its political possibilities, despite the outward appearance of a political project. Rather than a static entity that is either scientific or political, I intend to show both sides of Project Meshnet as they appeared in my observations and as they are crafted by discourse among and action by participants. Along with admitted flaws in their technological approach to reworking internet infrastructures, the community reformulates and widens its own intellectual scope. While there seems to exist little concern for diversity of participant's identities as seen in recent social movements, Project Meshnet participants pay great attention to issues of centralization among their own, internal power structures as they co-create network infrastructure and social community. The community also maintains an awareness of the possibilities their organizational model could open if applied beyond the context of software production to solve wider-reaching problems stemming from political and economic centralization.

Literature Review

The majority of scholarly literature pertinent to this research falls under three general categories: social movement theory, theory that explores the intersections of technology and politics at all scales, and frameworks that attempt to categorically define the politics of recent, digitally-based activism in its wider sociocultural and historical contexts. To preface these works, I will briefly discuss a few of the major concepts relating computer networking (as a socio-historical and technological phenomenon) and recent political movements.

Harding shows that from its initial design, the internet was engineered along horizontal principles of autonomous and decentralized, consensus-based decision-making (Harding 2012). Since that time, however, corporations have colonized large swaths of the internet's infrastructure and content (Milberry 2012:113; Kahn and Kellner 2007:4–6), and, because of the digital divide and the contingent role of technology in either perpetuating or rectifying inequalities in general, the potential for democratic fulfilment via the internet is viewed as "contested terrain" (Kahn and Kellner 2007:21). On one side, this may be seen in corporate and governmental colonization of the internet writ large, while the other would be grassroots resistors against this encroachment. Here, the term "resistance" is, by Tim Jordan's (1999:17) definition, opposition to overtly "repressive" forms of power as well as to the less-direct means of domination. Beyond more recent political events, this sets the frame for viewing Project Meshnet as a (piece of a larger) social movement and as a Scientific/Intellectual Movement (Frickel and Gross 2005) akin to the flows of people and ideas found in academic settings.

Useful to an analysis of Project Meshnet as a group practicing contentious politics, and in opposition to centralized and "linear" conceptions of social change employed in social movements of the 1960s through the 1980s, the prefigurative approach to protest strategy entails a non-teleological means to achieve goals sought by recent movements.

The notion of prefiguration as "the creation of alternatives in the here and now" (2011:2–3, 16) appear to be a suitable frame for Project Meshnet's political tactic. According to Juris, prefiguration, alongside other features of modern social movements, are conceived in terms of "unevenly distributed... cultural dispositions" inhered by the logic of networks: non-hierarchical linking of independent units; unimpeded flow of information; decentralization and horizontalism; and "self-directed networking" (Juris 2008:11). Perhaps unsurprisingly, given the digital context, many of these "cultural dispositions" are found fairly uniformly throughout the Project Meshnet community. Indeed, these describe not only the technologies employed—that is, the actual network being constructed—but the intended use for the network, bringing about a more horizontal, decentralized technosocial reality.

Methods

In order to assess the work of Project Meshnet as a component of the wider political landscape, and more specifically, in terms of social movements, I focus on both the personal political beliefs and the subjective experiences of those people involved with Project Meshnet, as well as taking into consideration the group's organizational forms and practices, history, and affinities with other, similar projects and movements. I also intended to uncover self-identified and implied political alignments and actions of individuals, as well as the subjective motivation for and perceived importance of participation in Project Meshnet. Additionally, I asked individuals to describe their experiences as part of the Project Meshnet community, focusing particularly on knowledge of past and planned political action and discussion. Finally, I also took into account the future aspirations, expectations, and goals in relation to participation in Project Meshnet, and more broadly, to their visions of possible political futures.

To conduct this research, I used the #ProjectMeshnet and associated channels on Internet Relay Chat (IRC), which allows for encryption to ensure confidentiality. Addi-

tionally, I employed other platforms available on Project Meshnet's Hyperboria network in order to expand possibilities for communication with the group.

Given the nature of the Hyperboria network, which requires non-standard computer-to-computer links in order to gain access to the network, simply connecting mu devices to the network entailed the contribution of resources to the functioning of the network. In other words, when connected to Hyperboria, my machines also helped the nearest devices in the network to find and communicate with one-another; through this aspect of Project Meshnet, I became a participant as well as an observer from the start.

For data collection, I employed two strategies. First, I recruited ten interested participants from the Project Meshnet community to take part in anonymous interviews thirty minutes to an hour in length. Interviews were limited to adults over 18 years old, and in order to obtain consent and to filter out those younger than 18, I set up an online form requiring participants to confirm their adult age status and their agreement to participate in the study. Because this group was expected to have a slight tendency toward anonymity and privacy, private IRC channels were chosen as the preferred medium for conducting interviews. Preliminary communication with the group at non-optimal times was positive, indicating a general willingness to participate in the study.

In order to gain entry, I employed a Project Meshnet-specific means to prove my willingness to participate: I set up a personal server in my home which was permanently connected to the Hyperboria network, acting not only as a relay for traffic within the network as previously described, but as a platform to host a blog for use as both a research tool to garner interest and gather comments, and as a medium through which this research was presented back to the Project Meshnet community. As a second form of data collection, I analyzed written (and other) primary sources, of political and technical nature from content available on the "normal" internet and on Project Meshnet's Hyperboria network.

These written sources were used to gauge general worldviews and attitudes about

politics during the research process, providing a more general overview, and in some cases, further background about interview participants, which allowed for more in-depth discussion. Much of this data also informed my descriptions of the field site in Chapter Three. Finally, I juxtaposed the data yielded from these methods against the applicable scholarly works within my literature review in order to tease out the articulations between science and politics as they manifest in Project Meshnet.

CHAPTER 2

LITERATURE REVIEW

Introduction

Project Meshnet, as a technologically-oriented community formed around the intentional creation of autonomously-controlled, decentralized internet infrastructure, represents an inherently political set of beliefs and practices embodied by its "members." This endeavor may represent new modes of resistance politics, but before delving into the task of bringing the concepts of politically-oriented social movements to bear on Project Meshnet as a techno-social phenomenon, many basic assumptions and definitions must be considered, given the wide range of culturally-rooted points of articulation with technology that provides the context around which this group of people interact. Thus "the internet," "hackers," "social movements," "liberalism," "horizontalism," and a host of other themes will become apparent. Therefore, this literature review is designed to provide a firm base from which to conduct a study of politics and the internet.

First, basic definitions relating to the technological structure of the internet must be fleshed out alongside a discussion of the social-historical aspects of networked communication technologies, first from the side of powerful corporate and government entities and

then from the side of the less powerful, but socially and politically pertinent, technology-centered groups that generally tend to work opposite hegemonic interests—at least to some degree. A focus on the political leanings of these groups will precede a discussion of social movements broadly, following further definitions relating to radical-democratic politics. Then, a more specific examination of recent iterations of movement politics and their affinities with network-based communication will lead into a consideration of primarily internet-based social movements, as elements of these are relevant to understanding Project Meshnet, paying particular attention to the political backgrounds of the involved parties. Next, various theoretical frames for understanding the organization of groups residing in cyberspace and the digitally-mediated forms of political involvement at all scales will be considered. Finally, this review will end with a brief consideration of literature that discusses ethnographic methods as they relate to the anthropological study of the internet.

The "Digital"

While the sentiment may seem quaint at this point thirty or so years into widespread personal computing, it bears repeating that computers are not simply another office tool, but general purpose machines which facilitate totally new modes of existence relative to the greater part of recorded human history. The analog/digital dichotomy is synthesized by Horst and Miller (2012:5) who define the "digital" specifically "as everything that has been developed by, or can be reduced to, the binary," a practice particular to humans by which any kind of data may be stored, modified, and transmitted in a code consisting solely of the numbers one and zero. The digital realm, then, references a wide sphere in which human communications are compressed spatially and temporally, representing a new domain of interaction not known a century ago.

The Internet, the Web, Darknets, and Cyberspace: Definitions and History

Next, the internet as a strictly technological entity must be clearly understood in historical context, rather than simply being defined as a global network of computers. With the arrival and spread of computing devices that, by the mid-1960s, could be used through physical links over long distances, a need for standardized computer-to-computer communication was made apparent due to the idiosyncratic nature of early computer systems (Jordan 1999:33–34). Through the U.S. government's initial research and development program called "ARPANET," standards for inter-computer communication and the basic computer networking infrastructures were put into place, leading to what is now known as the internet (Jordan 1999:33–34).

While the word "internet" specifically refers to the physical, computer-to-computer hardware infrastructure that enables digitally mediated human-to-human communication, providing the basis for instance, of services like Internet Relay Chat, Instant Messaging, or e-mail; the "World Wide Web," or simply "the web," represents a higher ordering of more permanently-available information intended for human consumption and provides "simple means of utilizing all the resources of the Internet" (Jordan 1999:45). Tim Berners-Lee along with other scientists at the European Organization for Nuclear Research (CERN) developed this medium of communication in order to present a multimodal (text, video, sound, etc.) form of communication in which each piece of available information could be linked with others hypertextually—that is, in reference to other information—in a theoretically open-ended and simple-to-use manner (Jordan 1999:43–44). The major artifacts of the Web, then, are websites, which are clearly different from the "cables and computers" (Tim Berners-Lee, quoted in Jordan 1999:45) that comprise the internet itself. Project Meshnet thus may be seen to follow patterns relating to both of these concepts: while the

ultimate aim for the community involves replacing the internet, much of the Hyperboria network's substance is to be found among various web pages available only on that network. Here, however, another term may be useful for understanding the place of Project Meshnet among competing internetworked computer infrastructures.

Darknets

Steve Mansfield-Devine (2009) provides a general explanation of a "darknet," a catch-all term that, importantly, was initially used in reference to Project Meshnet prior to a deliberate shift in brand image. These networks generally mix the use of the public, centralized internet with "decentralised... peer-to-peer technology" while taking steps to ensure separation of the darknet from the wider internet (Mansfield-Devine 2009:4). The author makes a distinction between darknets that are used by both socially legitimate (the U.S. government) and socially illegitimate (subversive and criminal) darknet-using actors, and among both groups, these more closed networks may be used for many reasons: sharing media, protecting secrets, subverting censorship, etc. (Mansfield-Devine 2009:4–5). Although the good-versus-evil dichotomy under which users of darknets are categorized is simplistic and lacks analytical depth for directly exploring and understanding the practices of people involved with Project Meshnet, Mansfield-Devine (2009:6) acknowledges that such networks may be socially beneficial in certain circumstances, particularly in resistance to government oppression. Overall, this article provides a cursory overview of Project Meshnet's techno-social precursors and peers from the viewpoint of a non-social scientist, and as such, insight is gained from a perspective within the dominant discourse of the security state (see also Marx 2004; Deibert and Rohozinski 2010).

Cyberspace

While "digital," "internet," "web," and "darknet" all comprise descriptors relating more to physical infrastructure, a term is needed that encompasses human interactions as they articulate with that infrastructure. The notion of "cyberspace" was initially nurtured in science fiction writing beginning in the 1969s and provided a "visionary" frame of reference from which inspiration for the planning and implementation of real-world human-computer interaction was drawn (Jordan 1999:5). Not only do the creative origins of "cyberspace" reflect the social movement strategy of political prefiguration discussed below, Jordan's (1999:5) notion that the interplay between science fiction and real-life development functioned as something of a feedback loop, influencing one another as both developed holds commonality with Christian Fuchs's (2006) work on the concept of self-organization.

Drawing on that body of work, Fuchs (2006:275) defines cyberspace more narrowly as "a global technologically mediated space of cognition, communication, and co-operation, a sphere of production, reproduction, and circulation of human knowledge." "Social self-organization" refers to the unfolding described by Giddens' structuration theory that encompasses the co-creation of people and the structures in which they live, ultimately resulting in unique, emergent systems (Fuchs 2006:275–276). Fuchs (2006:277) conceives of the internet as two interacting systems—one consisting of technical infrastructure and the other a network of agents—in which objectified knowledge embodied in the former allows for the subjective appropriation of that knowledge in the latter through "production, communication, and co-operation" on the social end of the dialectic. While Fuchs (2006:278) generally refers to the World Wide Web to provide example in his depiction of the internet as a self-organized system (websites being structures inseparable from the links between one another and the agents who construct them), the web, as previously noted, is only one part of the internet, and the concept of self-organization extends beyond the basic

infrastructure and into the political realm, a point further examined below.

The Infrastructure of Cyberspace: Governments and Corporations

A recent and similar picture of the digitally-networked realm called "cyberspace" emerges from Ronald Deibert and Rafal Rohozinski (2010) in their attempt to come to a more well-rounded understanding of people's conception of modern technology as a liberating mechanism or as a harbinger of dystopian social control, a theme that will be relevant to this study, especially in relation to the subjective experiences of participation within the Project Meshnet community. Here, the authors concern themselves with the binary of "liberation and control" used to describe the social uses of technology, citing both social change fomented through the use of the internet and the ability of digitally-based systems to invade privacy on a scale unimaginable a century ago (Deibert and Rohozinski 2010:43–44). However, the authors suggest that this dichotomy is not analytically appropriate given the ever-shifting and contingent nature of the interactions between people and communication technology (c.f. Fuchs (2006)) that is amplified in complexity due to the globalized nature of the internet as it exists currently (Deibert and Rohozinski 2010:44–45). To specify more clearly the techno-social complexity of the internet from this frame of reference, the authors explain that the interactions between countless actors—mostly in private settings, and frequently through corporately-owned and government-controlled channels—produce and are products of the "physical infrastructure, software, regulations, and ideas" that form cyberspace (Deibert and Rohozinski 2010:45).

Kate Milberry (2012:112) demonstrates that from the outset, the internet was engineered with decentralization and horizontalism (notions that originated in networking theory but now carry political meanings discussed below) as key features, primarily for

ease of use and for future extension of the infrastructure. However, corporations have since colonized large swaths of the internet's infrastructure and content (Milberry 2012:113), often with governmental support (Dahlberg and Siapera 2007:4–6). Colonization of the web appears rooted in the technology industry itself and began in the mid 1990s as many corporate producers of computing equipment (Microsoft, the now-defunct Sun Microsystems) along with younger enterprises became attracted to the internet upon the advent of the World Wide Web; this was manifested in attempts to monopolize the production and distribution of web-browsing software (Jordan 1999:47). Critical theorists observe that the dominant liberal-consumer model of internet politics, by which individuals are given political choices predetermined by authorities (i.e. voter registration campaigns aimed at maintaining the hegemony of bipartisan representative democracy) reifies neoliberal discourses and represents a great political-economic neutralization during the colonization of the internet. Despite the ethic of consumer capitalism gaining prevalence within, the internet still remains a platform for "radical democratic practice" (Dahlberg and Siapera 2007:4–6).

Thus, Deibert and Rohozinski (2010:48–55) argue that visions of technological "liberation" ought to be tempered by the social reality of corporate and government "securitization" measures as seen in the passage of laws—especially those related to the broadly-defined area of intellectual property—indirect and direct censorship, and surveillance, as well as criminal elements that take part in malicious activities and individual acts of politically-motivated sabotage and espionage taking place within and around cyberspace. While the ongoing issues surrounding the corporate-government intellectual property racket represents another part of the history of internet colonialism by capitalist interests, the aspects of censorship and surveillance are notable for their potential impacts on society, and the subjective concerns they may engender among participants in Project Meshnet.

Governments, beyond providing the initial research and funding that resulted in

the construction of much of the early internet infrastructure (the other portion emerged from privately-owned, corporate computer networking endeavors), began to regulate the social uses of the internet, again, with the rise of the World Wide Web. This phenomenon is particularly manifested in the practice of censorship as exemplified in a sweeping internet censorship law that went into effect in 1996, was struck down by the U.S. Supreme Court, and has since been followed by similar efforts there and abroad with varying rates of success (Jordan 1999:36, 40, 47; Deibert and Rohozinski 2010). Above all, the threat of censorship by dominant voices appear to be the primary driving factor behind the creation of Project Meshnet.

The internet is also implicated in the surveillance mechanisms of governments, law enforcement organizations, and military entities, as well as corporations and the general public (Marx 2004:18, 22–23). While Gary Marx (2004:16–17) concedes that all cultures contain some elements of surveillance, he indicates that people's emotional responses to modern surveillance techniques are frequently negative, and calls for examination of the context in which the various forms of surveillance are enacted in order to better understand its changing role in society.

Individual knowledge of widespread surveillance by corporate and government interests, then, may be another impetus for participation in Project Meshnet. Following Marx's (2004) directive, the subjective perception of and attitudes toward the phenomena of digital censorship and surveillance will be key in untangling the motivational roots of those involved in the endeavor. Recent revelations of widespread government surveillance via the internet, the web, wireless networks, etc. (The Guardian 2013) underscore the importance of this aspect of the project.

The Infrastructure of Cyberspace: Grassroots Resistance, Hackers, and Geeks

From these notions of corporate and government colonization of a cyberspace that formerly entailed a high degree of freedom and experimentation, resistance to those encroachments must be considered. The term "resistance" is, by Jordan's (1999:17) definition, opposition to overtly "repressive" forms of power as well as to the less-direct means of domination through the conditioning of subjective experience in a manner conducive to maintaining that hegemony. For Project Meshnet, then, the question is not only how, but against whose power, specifically, is this community resisting? Furthermore, what forms do these perceived power relations take?

In order to even consider these issues, then, an examination must be made of the other end of the power continuum as represented by individual geeks, hackers, and everyday internet users. These individuals compose the "grassroots and populist" movements to place networks and their software and hardware infrastructures under control of individuals noted by Jordan (1999:45) as the "force" that has primarily shaped the internet alongside, but in opposition to, the corporate and government spheres.

Hacking: Definitions and Historical Threads

Coleman (2011:512) defines "hackers" as a set of people generally involved with creating, modifying, and maintaining hardware, software, and networks while "geeks" are defined as slightly less technically inclined, but hold in common with hackers cultural and ethical viewpoints and are technologically savvy enough to contribute artistic, communicative, and other skills; both identities are often self-labels. Moreover, hackers and geeks of all stripes are said to be involved in politically-channeled labor, working to alter the technological infrastructure by, for example, challenging privacy-encroaching social networking

sites by producing community-built alternatives (Coleman 2011:515). Most Project Meshnet participants identify along these lines, and the historical roots of their group identities must be unpacked in relation to their techno-political forebears, taking special consideration of the Free Software movement as one of the major models from which Project Meshnet is drawn.

Coleman and Golub (Coleman and Golub 2008) recount the history of hacking, and its resultant impacts in precisely this manner, paying particular focus to the interplay between culture, political ideology, and technology. In this publication, the authors propose three ethical frameworks under which hackers generally operate, each of which embodies various value systems concerning, for example, free speech, privacy, and "freedom and liberty" in general; and these are conceptualized as "shifting genres" that articulate currently in diverse and culturally-rooted ways with the classic concept of "liberalism" (Coleman and Golub 2008:256–258).

Cypherpunks and the Free and Open Source Software Movements

First considered is the genre labeled "cypherpunk," born in an academic context during the 1970's upon the invention of a digital form of cryptography whereby data could be encrypted and transmitted safely via unprotected channels (Coleman and Golub 2008:259). The political ethos of the Cypherpunks, who were eventually responsible for illegally releasing powerful encryption methods to the public on a mass scale, liberating the technology from its primary use by corporations and governments, falls along the lines of a concept of "negative freedom"—that is freedom from domination—while the Free and Open Source Software movements embody a more "positive" notion of freedom centered around open access to knowledge and code (Coleman and Golub 2008:259–261). The popularization of "free software" and liberated knowledge is attributed the activism of computer scientist Richard Stallman beginning in the 1980s. During this time, Stallman began

producing a freely-licensed, modifiable replacement for a major proprietary computer software system (Coleman and Golub 2008:261) as a response to corporate restrictions on the free flow of information—particularly, source code—and attempts to stretch notions of private property to cover the realm of information (a topic treated below). The tactical reaction by the nascent Free Software community manifested in the creation of new "legal models" for copyrighting source code (Wark 2006:321) that guaranteed the free use of software by users and producers alike. A creative element in the Free Software community still carries utilitarian undertones through politically-bracketed, legal subversion of copyright law as ultimately represented in the adoption of software licenses mandating the user's right to modify and redistribute software source code as they please (Coleman and Golub 2008:261–263).

Here, however, the "Free" and the "Open Source" portions of "Free and Open Source Software"—that is, the notion of "Free Software" and "Open Source Software"—must be disambiguated along their separate attitudes toward intellectual property. While the former strictly adheres to the freedom of information in any context—thus denying the notion that ideas can be owned—the latter arose in the late 1990s as a means for capitalist enterprise to harness the grassroots production and cost-saving practices of the Free Software Movement (Milberry 2012:114–115), such as allowing software users to send in patches, or corrections, to an otherwise proprietary program's source code. Thus, Open Source subsumes the more radical orientation toward totally free access to information drawn from liberalism and embodied by Free Software under the auspices of neoliberal privatization. Also notable is that while Free Software advocates initially denied political intent, an essentially radical orientation toward property and free speech belie this assertion (Coleman 2004:508).

"Transgressive" or "Underground" Hackers

A final genre of liberalism is expressed by "underground" hackers attempting to undermine the hegemonic dominance of government and corporations through "transgressive" acts, and hold, alongside the F/OSS community, an ethic that values "autonomy and... self-expression" (Coleman and Golub 2008:263–264). Transgressive hackers are historically situated in the exploitation of phone-system exploitation beginning in the 1960s, a practice known as "phreaking," while today, the community practices are quite diverse consisting of illegal software sharing, digital breaking-and-entering, and other forms of illicit computer network-facilitated activities (Coleman and Golub 2008:264–266).

Hacking and Society

At this point, the roles and practices of hackers are explored deeply at the expense of the so-called geeks, primarily because of the former's primacy as an analytical concept for understanding modern "relations of power and technology": hacking is not simply a dialectic of business-friendly and revolutionary creative production as seen in the Free Software-Open Source Software dichotomy outlined above, but is the materially-embedded practice of modifying technology (Tim Jordan 2009). Although Coleman and Golub (2008) appropriately delineated the sanctioned and normative aspects of hacking, its practitioners are often viewed as holding an affinity with the "illicit," yet all are truly faced with an expectation to demonstrate technical proficiency—a mechanism used to define social relations (Tim Jordan 2009) as the modification of technology modifies the channels of digitally-mediated interaction by which hacker organizations are structured.

Thus, there exists a dialectic, especially apparent in the Free Software and associated movements, in which software determines the role of hackers even as they "redetermine" the capabilities of that technology (Tim Jordan 2009). As a result, Tim Jordan (2009) notes that for hacking, technological determinism does not take on a compelling

role, but a constraining and enabling one he labels "affordance" which sets a conceptual framework by which to understand that although no one technology may be universally applied to any problem, technologies are always targets for reuse and reinterpretation in ways not originally conceived. Therefore, hacking, broadly conceived, may be seen as the communal engagement with "constant determinitive affordances" within the techno-social realm (Tim Jordan 2009), encompassing the agency side of the self-organization of the internet as conceived by Fuchs (2006). Participants in Project Meshnet, then, may be seen to fall under one or several of Coleman and Golub's (2008) categories of hacker liberalism, but are more likely to embody aspects of each; from here, Tim Jordan's (2009) more broadly conceived framework for understanding the practice of hacking may be used to clarify the articulations between the technological and social worlds these people inhabit.

Hacking and Political Economy

The history of hacking—particularly the Free Software variety—may be framed in regard to the overall political economy of capitalism. For example, the advent and rise to prominence of an "informational capitalism" that is centered around the commodification and control of information via the laws and ideology surrounding "intellectual property" has been juxtaposed against a nineteenth-century land grab in Britain known as the "enclosure movement." On the other hand, the oppositional realm of ideas drawn from the Free Software Movement revolves around the "informational commons" in which information sharing becomes not only a priority but a protected mandate for individuals participating in the "creative appropriation" (Coombe and Herman 2004:561, 567–568; Wark 2006:321–322) of culture (i.e. software) for new ends.

Importantly, the productive aspect of the Free Software Movement that led the vanguard in the creation of this publicly-oriented technological realm, revealing that the consumerist element of capitalism has not totally subsumed the techno-social sphere of

human interaction (Coleman 2013:3). In fact, the ease with which digital culture may be created and shared has led to open access to and decentralized production of culture in general becoming political focal points, demonstrating a trend of "decommodification" against the capitalist norm (Horst and Miller 2012:5).

Common Ground Between Recent Social Movements and (Computer) Networks

Put another way, the introduction of digital technology into mainstream culture has, at the very least, has rendered questionable the colonization of capitalism into every aspect of life while simultaneously enabling alternate modes of creation and participation. Project Meshnet, its predecessors, and its ideological peers may be viewed as practicing an overt resistance to and covert avoidance of negative aspects embedded in the dominant political economy. Furthermore, anarchist-rooted, anti-authoritarian political strands are found in the articulation of liberalism and technological innovation (Horst and Miller 2012:5), and lend concepts for understanding recent social movements (Graeber 2010; Juris 2008) while also providing another model for understanding the practices of Project Meshnet.

Contrary to common media depictions of anarchists as property-destroying thugs, Graeber (2010:123) links anarchism as a "form of practice" within an anti-authoritarian ethical framework that is guided by "principles of self-organization, voluntary association, direct action, and mutual aid"; and, in the end, forms the core approach in recent social movements. Delineating anarchism as a set of practices rather than a type of identity (Graeber 2010:124) is useful in understanding the political context guiding the actions against globalized neoliberalism at the turn of the century as well as articulations with other cultural features such as the feminist intellectual tradition and the Quaker religion.

Juris (2008:11) notes several features of recent, anarchism-inspired activist politics that hold commonality with certain aspects of networking, especially those previously acknowledged but not explained. Specifically, these practices are horizontalism, diversity, autonomy, and consensus. Another aspect mentioned—that of freely-accessible information—will be addressed in the continued discussion of geeks and hackers below.

Horizontalism

As a political phenomenon, horizontalism refers to a rejection of hierarchy in the organizational structure and practices of both society writ large and within groups that adhere to this principle (Harding 2012:5). More specifically, horizontal politics consists of autonomous, consensus-based decision making processes as a foil to the dominant paradigm—that is, it is in diametric opposition to the stratification of power inherent within the current political order (Harding 2012:7). Overarching these aspects of horizontalism in general is a notion of diversity that encompasses both the identities and ideologies of involved parties—both individual and group—and the "tactics" by which identity and ideology are expressed politically (Harding 2012:14, 77).

Concerning the politics of Project Meshnet, applying this aspect of horizontalism in the analysis stage is not be immediately useful when pointed toward identity as a whole, given the absence of overt identity markers in cyberspace; but an assessment geared specifically toward revealing the ideological diversity (or lack thereof) is key to conceptualizing the politics of the community. In this case, the concept of diversity is perhaps more useful as it relates to a multiplicity of tactics or the ability for participants in Project Meshnet to contribute to the endeavor in several ways, for example through coding and testing software, providing infrastructure, etc.

Autonomy, Decentralization, and Consensus

The notion of "autonomy" embodies the liberty of individuals and groups to determine their own courses of action within a larger community sphere, implying that autonomous groups are free from the domination of others (Harding 2012:14). The manner by which autonomy is achieved may be seen in terms of decentralization.

Drawing further from Harding (2012:11) to better understand autonomy as the concept unfolds in practice, political power that is spread among many individuals in a given group of people, rather than concentrated in the hands of the few may be said to be "decentralized." Therefore, "decentralized" describes the organizational structure of a network of autonomous groups, and also denotes a tactic for achieving autonomously-determined political, the ends that may be seen as a direct application of horizontal principles in general (Harding 2012:11). This tactic consists of aggregating power from the bottom up through the shifting of responsibility to the smallest units ("individuals and affinity groups") while simultaneously rendering them less accountable to, nor subject to much external influence within and without the larger-scale political project, thereby leaving the decentralized network strengthened against disruption on the level of the political movement as a whole (Harding 2012:11). Thus, Project Meshnet's decentralized Hyperboria network, composed of autonomous units owned by autonomously-acting individuals may be viewed as horizontally formed and may be interpreted as reflecting its creators' political intent.

The final aspect of horizontally-oriented politics resides in the notion of consensus-based decision-making processes that are embedded in the themes of diversity, autonomy, and decentralization, as these ideas are brought to bear on the acts that determine the future directions of the autonomous groups (Harding 2012:77). Consensus as the preferred method of planning in the absence of hierarchy specifically refers to enabling the participation of any interested party as all voice their opinions, and "agreements" are made to

accommodate the full spectrum of those voices (Harding 2012:14, 77). Taking the angle of decision-making, then, leads to a consideration of Project Meshnet's mode(s) of planning in regard to the group's overall direction, and at a lower level in which the infrastructure and social norms of use for the Hyperboria network are collectively established.

Radical Democracy

"Radical democracy" (Dahlberg and Siapera 2007) may be used as a broad term that denotes an embodiment of these political notions as they are conceived and acted upon in order to bring about new, more egalitarian forms of social organization. Thus, equality, liberty, and community, as they roughly correspond with diversity, autonomy, and consensus-based organizational methods, are seen as the major concepts of radical democracy that are continuously being reformulated in the theories and practices of emergent political endeavors (Dahlberg and Siapera 2007:7). As mentioned previously, these concepts may be reflected in the actual software design and use of Project Meshnet itself; this embedding of human values within technology is known as "technical code," and occurs both in the production and use of the internet (Milberry 2012:111–112), thus providing an analytical concept for discerning the articulations of anarchist-based political features as well as the aspects of liberalism with Project Meshnet participant's political ideologies.

Social Movements

To more clearly conceive of these features of radical democracy in terms of the wider social movements in which they have been and are being practiced, some of the more recent academic frameworks for understanding the phenomena of social movements must first be considered. This will be followed by an examination of the intersections of recent social movements, technology, and hacking.

McCarthy and Zald's (1977:1217–1219) Resource Mobilization Theory is macroscopic in scale, focusing generally at the structural level, highlighting "social movement organizations" and "social movement industries" as the key units of analysis of the groups composing a social movement, which is defined as, "a set of opinions and beliefs in a population which represent preferences for changing some elements of the social structure and/or reward distribution in a society" (McCarthy and Zald 1977:1217). The units of analysis are presented as having a hierarchical relationship: the authors' conception of social movement organizations as being composed of the former makes this clear (McCarthy and Zald 1977:1218–1219), showing that in relation to the horizontal politics embraced by social movements today, this framework is somewhat out of date. Furthermore, the macroscopic level of focus entails a loss of fine-grained analysis of action by the individual and small groups that compose a social movement on the ground.

Nonetheless, Resource Mobilization Theory points to the presence of multiple group actors and highlights the importance of their motivations and tactics in relation to the overarching social sphere of which they are a part. In the case of Project Meshnet, then, Resource Mobilization Theory would view its social movement aspects in terms of the community's overarching goals—that is the creation of independent infrastructure—and the means by which the community can accomplish them; in this case, the participation and resources of its members in the creation of that infrastructure.

Political Process Theory as proposed by Tarrow (1998) provides another definition of social movements that bypasses some of these issues, and serves as a more comprehensive framework for explaining how social movements actually function in action, rather than simply describing their form. According to Tarrow (1998:2–3), the central process of social movements is "contentious collective action," that is, collective action set within a frame of "contentious politics." While "collective action" is treated as more-or-less self-evident—it can take many forms and is normally institutionally sanctioned—"contentious politics" refers to confrontation between "ordinary people" and those in power: "elites,

authorities" and the more general category, "opponents" (Tarrow 1998:2–3). "Contentious collective action," then, is seen generally as practiced by groups marginalized from institutional participation as they propose "new or unaccepted claims" through confrontational challenges to dominant authority by which the groups lay claim to power (Tarrow 1998:3–4). Embedded socially, these "sustained" contentions with authoritative entities require solidarity among a diverse set of interests and affiliations spread out over a wide geographical area, usually through the establishment of a collective identity (Tarrow 1998:4).

From these concepts, Tarrow (1998:4–5) defines a social movement as comprised of "collective challenges, based on common purposes and social solidarities, in sustained interaction with elites, opponents, and authorities." While the first three aspects of this appear to hold true to the phenomenon of Project Meshnet, the final one may not fall in the sense of direct confrontation, but rather a continuous subversion of authority through the creation of alternatives.

Scientific/Intellectual Movements

Here, Project Meshnet holds more in common with Frickel and Gross' (2005:226) Scientific/Intellectual Movements (SIM) which generally involves more "mundane actions" (writing code, performing administrative tasks for network maintenance) rather than "public confrontations" in their displays of contentious activity. Although this framework draws mostly from the older Resource Mobilization Theory of social movements and is geared toward understanding intellectual changes that usually take place within hierarchical, institutional structures, usually academic in nature, (Frickel and Gross 2005:206–208, 213), when taken alongside the previously discussed theories, the concept of a SIM allows for a more nuanced understanding of Project Meshnet as a form of collective action.

To be defined as a "SIM," the movement must have at least a semi-coherent "semi-coherent"program" for scientific or intellectual change or advance" that must be "con-

tentious relative to normative expectations within a given scientific field" (Frickel and Gross 2005:206–207). SIMs are considered political in nature, but primarily because they seek to redistribute power and resources to further scientific or intellectual goals, and similarly to how a social movement would contend for resources in the wider political-economic sphere, "organized, collective action" is the hallmark of behavior within a SIM (2005:207). The final criteria presented by the authors involves describing a given program as temporally bound and variable in "intellectual aim and scope" (2005:208).

Politics and Cyberspace:

The Alterglobalization Movement to Present

According to Coleman and Golub (2008:271) the generally leftist- and specifically anarchist-rooted anti-corporate globalization movement has introduced political notions of the horizontal variety into the hacker sphere (Coleman and Golub 2008:271). Juris's (2008) ethnographic work covers the unfolding of this extended social process variously termed the "anti-corporate," "alterglobalization," or "anti-globalization" movement, paying specific attention to the roles of computer networks as they were both used as tools for communication and as a model after which protest might be organized. Along similar lines, Kahn and Kellner (2007:18, 33) propose that the technopolitical sphere must play a part in the survival of radical democracy, and development in this arena must be guided by "articulation" with issues in the real world, as seen in Project Meshnet's attempt to counter the consolidation of control over computer networks by corporations and governments.

Recently, the internet has become popular as a standard medium for political activity, but as opposed to mainstream broadcast media, the near-instant communicative and interactive nature of networked computers potentially opens new channels for marginalized groups aimed at "radical structural transformation" (Kahn and Kellner 2007:19–20), thus

showing the internet's usefulness to social movements by the standards of both Resource Mobilization and Political Process models. Additionally, because of the digital divide and the possibilities of technology to either perpetuate or even out inequalities, the potential for democratic fulfillment via the internet is viewed as "contested terrain" (Kahn and Kellner 2007:21), thus placing the global internet as a site of social movement action according to Tarrow's (1998) definition. These trends may be summed up in Kelty's (2005:188) argument that the core political issue in "highly technical societies" centers around the control and ownership of political participation.

Milberry (2012:109–110) provides the category of "tech activism" to denote a political sphere of action informed by the Free Software Movement in which software authors subsume goals of the alterglobalization movement into the software they produce, extending and protecting the internet as a platform for on- and offline democratic possibilities. As opposed to the dominant form of globalization born out of capitalism, Schoonmaker (2007:1000–1001, 1017) specifies the role of tech activism in building new global communities through grassroots effort—"globalization from below," a hallmark goal of the alterglobalization movement—acknowledging the possibilities of using free software to meet the infrastructural needs of such projects.

Hacktivism

Another conceptual tool useful for understanding computer-mediated social movement practices is that of "hacktivism," defined by Juris (2007:3) as a general phenomenon in which computing technology is employed for political purposes, while the generalized "hacker ethic" transcends the technological sphere and meets with the philosophical. In particular, this conception of hacktivism is concerned with articulations between digitally-mediated communication and real-world action, thus within this frame, Juris (2007:2–3, 6) places Electronic Civil Disobedience (ECD) as a tactic of "hacktivism" that holds close kin

with with non-digital, direct action, yet notes this as a contested form of action, given that some perceive ECD as antithetical to the hacker ethic that centers around information freedom, decentralized organizational forms, and learning through "exploration." Along similar lines, Jordan (2007:79–84) proposes two categories of hacktivism: the Digital Correctness and Mass Action, and the latter is rooted, as in the case of Juris's (2007) Electronic Civil Disobedience, in the tactical sphere of the alter-globalization movement. Opposite the "Mass Action" form of hacktivist practice, the former category of "Digital Correctness" hacktivism is related to the Free Software Movement, is underpinned by notions of information freedom, and is focused on the infrastructural components of radical democracy.

Untangling the relation of Project Meshnet in terms of tech activism, digital correctness hacktivism, and mass action hacktivism is key to a proper analysis of its historical roots. Juris's (2007:6) hacktivism is useful because Project Meshnet's primary focus is on altering ubiquitous digital as well as physical "spaces" conducive to horizontal interaction. It appears that the concept of digital correctness as a particular expression of this will be the most applicable to the situation, yet although this constructive form of online activism embodied by Project Meshnet indeed creates "entirely new" forms of political possibilities, a tension exists in its decentralizing and democratizing mission in that users of the underlying software rely on expert knowledge of a smaller community of people within the group (Coleman 2011:515–516; Horst and Miller 2012:5; Jordan 2007:86–87).

Prefigurative Politics

Furthermore, links between Project Meshnet and the alterglobalization movement may be found either directly through historical links, or more likely, indirectly through theoretical borrowings not only due to its mission's horizontal focus, but also due to its expression as a prefigurative social movement. Prefiguration is one of the core theoreti-

cal components born out of horizontally-organized political projects (Harding 2012:14), and in opposition to centralized and "linear" conceptions of social change employed in social movements of the 1960s through the 1980s, the prefigurative approach to protest strategy entails a non-teleological means to achieve goals set by more recent movements (Maeckelbergh 2011:4–6). As seen in the intentional organization of the alterglobalization movement along horizontal principles, encouraging multiple voices and decentralization of power—practicing the exercise of power in a manner opposite the hierarchically-structured corporate and government entities championing a single discourse of neoliberalism—the notion of prefiguration as "the creation of alternatives in the here and now" (2011:2–3, 16) will be useful in staging an analysis of the political implications inherent in Project Meshnet at the level of the social movement. Indeed, the concept of prefigurative politics may serve as one of the more powerful conceptual articulations linking Project Meshnet as a politically-oriented entity and the alterglobalization and following movements.

The extent to which Project Meshnet may accurately be classified as prefigurative political movement may be considered in terms of what Casas-Cortes, et al. (2008) call "knowledge practices" of social movements. In this view, social movements are considered hotbeds of idea creation, leading to the formation of bodies of knowledge which in turn frame the subjective perception of "the political" and are indispensable for understanding actions taken within that sphere (Casas-Cortés, Osterweil, and Powell 2008:19–20, 25, 27–28). In their theory of Scientific/Intellectual Movements, Frickel and Gross (2005:222) describe the act of framing—that is, the way in which social movement and SIM "participants collectively represent the movement to insiders and outsiders"—as most deeply relating to individual and group identity. Therefore, careful attention is be paid to Project Meshnet's image as it is portrayed collectively (i.e., through its website and other media) and individually.

Recursive Publics

For conducting analysis at the community scale, Kelty's notion of a "recursive public" may be useful. This notion of a "recursive public" is defined by Kelty (2005:186) as a kind of "social imaginary" hallmarked by a group's collective conception and implementation of their own means and forms of association. The recursive public is associated with the creative practices of "geeks" (according to definitions set forth in this literature review, these people would be called hackers)——"building [hardware], coding... and sharing"—toward the end of constructing and maintaining the infrastructure necessary for an idealized "free and open internet" that mediates the interactions between people in the community and with networking technologies as well as between the technologies themselves (Kelty 2005:200–201). Part of, if not the entire Project Meshnet community, may be viewed as a recursive public, as it not only provides voice to alternative conceptions of future political possibility, but labors to set those alternatives in motion through technical means (Kelty 2005:201–202, 204–205) as explored above. More importantly, as the recursive public is concerned with social imaginaries, relating the community in terms of shared identity, and ultimately, forms of social solidarity through shared practices, the concept helps place Project Meshnet within the Political Process definition of social movements proposed by Tarrow (1998).

Subactivism

On the level of the individual, Bakardjieva (2009:96) proposes that "subactivism" exists below the realms of public political institutions and "subpolitical" social movements, encompassing micro-scale behavior that is politically and/or ethically framed; occurs in the the borderlands between public and private; and hinges on personal empowerment. Here, the author posits a gap between subpolitical activist practice and day-to-day use of the internet which may be bracketed by politics, but provides little power to effect

widespread change (Bakardjieva 2009:102–103). Project Meshnet, however, may be seen as a mediator (2009:103) between these spheres of political participation through the construction of a platform for every-day internet use in which subjective political "positioning" may occur in debates about the future of the network or in more superficial circumstances of general political discussion; but which exists within the bounds of and in reference to the larger "imagined community" (Bakardjieva 2009:96) centered around network structures intentionally designed to circumvent perceived barriers to democracy.

Through prefiguration and knowledge practices, recursive publics, and subactivism, a full suite of analytical tools is made available for the study of a technologically-oriented political endeavor that is primarily fomented in the realm of cyberspace, yet is concerned with and oppositional to the flows of power in the non-digital world.

Digital Methods

At this point, this literature review has covered basic concepts for understanding the internet, cyberspace, and the major players who shape them; the politics of those players as they articulate with culturally-embedded liberal ideals and anarchist-rooted social movement practices; and an overview of a few forms that digitally-mediated social movements have taken, alongside a brief sketch of some analytical tools that may be useful in studying a digitally-based community with an inclination to political action. Still, a final area of literature surrounding this topic—digital methods—remains to be discussed.

Beaulieu (Beaulieu 2004:144) explores the methodological boundaries between study of the internet as community and as technology, specifically in relation to ethnographic notions of objectivity. In one sense, ethnography on the internet is conceived as less intrusive given the ability of the ethnographer to "lurk," gathering data with little direct participation with the community (Beaulieu 2004:146–147)—while "casing out" Project Meshnet by way of Darknet Plan and Dorknet Reddit forums was relatively easy

to accomplish, direct participation with the community is a prerequisite to access to the Hyperboria network and the primary source material contained within, a task that required far more intrusion into participants' lives. Instead of attempting to maintain a strict scientific gaze and because of the discourse-mediating nature of the internet, I sought to understand the politics of Project Meshnet not from a strict objective standpoint, but as an intersubjective representation of the community in which individuals act upon shared value sets as detailed through interview and supplemented by primary source material (Beaulieu 2004:149–150). Beaulieu (2004:154–156) warns that the latter, text-oriented method needs a "value added" component when employed as a major source of information, my intention was to use these "inscriptions and traces" as supplemental to real-time interview and experiential data in order to alleviate this concern.

The following chapters dedicated to describing the fieldsite draw heavily on static, written content to provide an overview of the locations in which this research took place. Such "traces and inscriptions" that I encountered include technical documents aimed at engineers, public comment threads in various digital locations, archived wiki articles, and other forms of discourse in which I did not directly participate, but simply observed while "lurking." However, the term "lurking" intones that anyone could play observer, and while this is true for a portion of the field sites that exist in the standard internet, the Hyperboria network is currently difficult to access for the average internet user. Thus, many of the "traces and inscriptions" contained within are valuable due to the difficult-to-access, emic stance granted me by the Project Meshnet community.

For ethnographic approaches to cyberspace, Freidenberg (Freidenberg 2011:265) identifies four aspects of a truly virtual ethnography: users of the internet (in this case, Hyperboria) form the field site; their experiences are the primary concern; virtual communications, a opposed to "face-to-face" are privileged; and "information exchange" is acknowledged as the main component of digitally-mediated "interaction." Brigitte Jordan (2009:185), on the other hand, makes a distinction between "virtual ethnographies" which

are accomplished strictly within a "virtual world" (i.e., within the game world of World of Warcraft) and "hybrid ethnographies" that examine the production and use of internet-based technology in everyday life. Given Project Meshnet's real influence on the world, a virtual ethnography would not unfold under either author's fairly straightforward definitions, although the first three aspects listed by Freidenberg (2011) aptly described my basic expectations prior to conducting this research, particularly as it fit my intention to collect primary written sources. Although it would capture the sense that Project Meshnet is oriented above all toward action within the "real" world, the insistence of data collection for a hybrid ethnography via face-to-face interviews (Brigitte Jordan 2009:185) removes the possibility of a hard-line application of this concept to my work. Furthermore, the notion of the digital fieldsite presented in this thesis is more nuanced and important to understanding the context of group participation than simply understanding "the people" that inhabit them, as Freidenberg (2011) posits. Therefore, the outcome of this research may be conceptualized as a synthesis between virtual- and hybrid-type ethnography where some manual data collection focuses on disparate sites and rather transient snippets of discourse while the rest was to be gained through real-time, one-on-one—yet not visually face-to-face—interviews.

Throughout the literature review process, locating works on internet-based research in the social sciences proved more challenging than I expected. I had particular difficulties acquiring methods literature that was ethnographically oriented and was not produced for marketing or other fields that lie beyond my academic interests. Ultimately, much of my research program was executed on general anthropological methods training and having some familiarity with the community's technological and cultural context in advance. This "context in advance" lends to an autoethnographic flair to some parts of this as I detail my own experiences in the wider Free Software community leading up to this research, and as I describe my own means of participation in a textual environment.

In the preceding pages, I have attempted to lay out definitions and key concepts

perceived as important to understanding Project Meshnet, alongside a socio-historical examination of the internet from the global to the individual level. Theoretical viewpoints regarding political alignments and social movements in relation to those agents—individual and communal—as they played a role in shaping the internet, and as they maintain a presence both digitally and socio-politically have also been considered. Finally, a (very) brief overview of some concepts related to practicing anthropological methods within digital channels has been taken into account, setting the stage for a study of Project Meshnet and politics.

CHAPTER 3

METHODS

In the following chapter, I relay the methods I employed while working in the digital field, employing a formal style to address such issues as obtaining consent, maintaining participant anonymity and privacy, and appropriately representing the community. In this section, I discuss more computer applications with which most readers will be unfamiliar: the set of tools found on the computers of systems administrators and programmers, which has evolved behind the scenes for several decades and which effectively provided me an environment for data collection, analysis, and dissemination of results. Through this rather mundane exposition[1], I provide maximum transparency about my work while allowing the reader an up-close glimpse into the utilitarian culture surrounding this community at a higher level.

Time frame

In total, I spent a little over a year-and-a-half observing Project Meshnet. The majority of this time—close to one year, beginning around November 2012—was spent as

[1]This section reads much like a common form of blog post found among the programming scene in which the author discusses their "workflow" or particular system they have created to accomplish their labor/work.

an outsider looking in. As of November 2013, upon being approved for human research by the Institutional Review Board, I set out to actually begin proper fieldwork within Hyperboria proper, taking about a month to fully prepare. By time the spring semester of school began, I had started engaging the community more fully, but with care. While I completed my fieldwork during this period of time, often using the ethnographic methods course (Centellas and Haenfler 2014) in which I was participating to better adhere to pre-set deadlines, an issue with which I sometimes have trouble. At the end of my field work, I had spent five months fully participating within the community.

Methodological approaches

Following my initial proposal, I employed two different methods for data collection, one which might be loosely classified as "participant observation" and the other as formal, semi-structured interviews.

Participant observation

What I am calling "participant observation" in this particular digital setting entailed multiple paths of action. The first was the collection and analysis of content available through clearnet and Hyperboria channels. This includes blog, magazine, and newspaper articles; Reddit threads; websites; social media feeds; and more. Additionally, I have spent nearly three months within IRC channels, both allowing me to interact and to store logs for future analysis, even when I was not around at that very moment in time to observe directly.

Most important to my own participation within the Project Meshnet community was the process of building and maintaining a website. Constructing this website served several purposes throughout the course of my research. Because Project Meshnet is very

much action-focused (you will just as often find discussion about writing code as politics), taking the time to build and host it myself (I hope) showed the community that I was dedicated and willing to put effort into contributing back to the community. This is not to say that simply doing research and providing it back to the group would not be a contribution, as I certainly hope it will be, but I desired to show—up front—that I could and would participate.

Still, my website served several functions beyond this: for one, it acted as a place where people might find out who I was and why I was in Hyperboria in the first place, even if there was no other apparent way to contact me at the time. More importantly, my website acted as a place for me to post ethnographic writing, to allow the community to see, for example, how I wished to represent them, and to allow input before the final work was published.

Finally, I was able to participate in other capacities beyond providing a website of my own. Beyond utilizing my propensity for audio transcription as I detailed above, I have also helped another community member brainstorm and proofread for a distributed outreach and documentation project deigned to facilitate recruiting and teaching the basic, necessary skills for participation in Hyperboria. Other times, I have simply participated as a "regular person" would, using social media websites and IRC channels to converse in an every-day manner, discussing music, literature, philosophy and so forth.

Interviews

Toward the end of my period of heavy research, I began the process of seeking out interviews. My method for recruitment was very simple: I spammed (that is, repeatedly messaged) the most populous IRC channel at least twice a day for about two weeks, asking publicly if anyone was interested in participating in an interview, along with a message directing those who were interested to contact me in a private channel for their participa-

tion to remain discreet.

In total, nine people responded directly and we (usually) began immediately. One other interview emerged in the public IRC channel before I decided to send the person a consent form in private, given that we were fairly heavily discussing my research topics one-on-one in a crowded chat room. Although they declined to "sign" the consent form, this person gave assent in our private discussion under the condition that they might review anything I wrote regarding them before publishing, to which I agreed.

The other nine interviewees completed the consent process at the beginning of each interview. On my website, I had a non-published page with my IRB-approved text establishing the rules and protocols of the research process. At the bottom of the page sat a button which a participant would press to acknowledge their understanding and agreement with the terms. With that button press, my server would send an e-mail to itself notifying my that an individual had asserted their willingness to participate. Essentially, each interview has a corresponding e-mail with a time stamp occurring during the same time as that interview, establishing proof that I obtained consent while protecting the participant's identity. The e-mail did not leave the network and the server collected no user data, so this method seemed a secure enough means to accomplish this task. Following the imperatives of free software, I also provided a link to the source code and reasoning behind using this process to obtain consent.

Of the individuals I interviewed, around half (by them either telling me outright, or by inference) were fairly core members in the group, either having been "founding" members or otherwise heavily invested in the long term prior to my arrival. Those who did not indicate that they had been around Hyperboria for as long nonetheless all participate in notable ways within the network contributing code to cjdns, creating services for others in the community to use, conducting outreach activities, and interacting with one-another via various social media.

I took time to modify my original set of research questions during the participant-observation phase of my research. This was due in part to an ethnographic methods course where I learned that it was not unacceptable to expand and improve my research design as I began to collect data (Centellas 2014). In due time, I not only broadened my inquiry to include discussions about other technologies related to mesh networking, but I also began to to develop more concise and relevant questions for use during the process of conducting formal interviews, all of which took place in April of 2014.

The questions are roughly broken down by category, with the first centering around open-ended definitions. These were important not as a "test" to see if the interviewees knew what they were talking about, but I chose them in an attempt to bring out the different viewpoints within the community, for example, in relation to notions of privacy. These definitions were followed by two general questions addressing why and how people might participate in Project Meshnet.

Next, I addressed the interviewee's personal experiences within Hyperboria as well as their participation in local mesh networks. I followed this section with a brief detour to discuss cryptocurrencies, another technology that harbors aspects of decentralization, and that is sometimes perceived as potentially disruptive to society.

Finally, I asked questions about politics, framing the question in terms of the interviewee's "ideal" or "vision of" society that they would like to live in, how participating in Project Meshnet might (or not) work toward that vision, and what kinds of structural aspects might need to change to realize that world. I also asked about the division of knowledge and skills between technically-minded "insiders" and the non-skilled "outsiders", both in terms of access to and participation in Hyperboria as well as ignorance toward the sociopolitical circumstances of technology by the general populace. Before exiting our private conversations, I asked participants which medium they would prefer to receive a final copy of this research and to choose a pseudonym unless they would rather me choose[2].

[2]Most participants wished to receive PDF versions of this thesis via e-mail. It is published to an-

Although those were the formal kinds of questions I used during each interview[3], I began to warn people in advance of what to expect, namely, that I preferred to use the questions as a guide, but that I would likely dig further into what they said and ask them to expound. Additionally, I forewarned that I would often asking seemingly obvious, stupid questions that I should probably know, and that they should simply treat me as if I knew nothing. Last, I would include that I was not looking for "dictionary definitions", but that I was seeking their personal point of view.

Overall, I believe this approach was effective. Nobody appeared to become irritated when I asked obvious questions, but instead humored me to what might have felt like a ridiculous degree at some points. There were times where IRC failed to be a good medium for conducting an interview, either because of technical circumstances (randomly becoming disconnected from IRC) or because one or another of us (but usually me) might respond before the other was finished talking. Unlike other forms of instant message, an IRC chat has no indicator whether the other person was typing. One convention that an interviewee used was to place a single "." on a separate line to indicate that they were finished speaking. Another who was interested in "protocol" wound up doing the same at my suggestion, but both of these were toward the end of the research program. This will be something to keep in mind for future research using IRC or other real-time chat channels.

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thro.hype and to other Hyperboria services so that those who wished to download it may do so. In regard to pseudonymity, all interviewees who are quoted or participants who are mentioned are identified in a style similar to internet handles, as most did not use their given names. Also, prior versions of this document show that I initially decided to scrub the identity of certain names of services and software, however, these names are all publicly available or advertised via Clearnet channels. As such, I decided to unmask them for the sake of readability and to provide some acknowledgment of the community's efforts in lieu of authorial citations limited by the requirement of participant pseudonymity.

[3]Throughout interview recruitment, I offered the list of questions in the public IRC channel, normally as a link to a page on anthro.hype. Usually, I would present this page to supplement my explanation when people asked about the process or nature of my research.

Data Storage, Manipulation, and Analysis

The bulk of data stored on my computer consists of various web sources, which I saved and archived using the Zotero reference manger (Github Contributors 2015); a set of observational field notes; and IRC chat logs—both public channels and private conversations. Most of this information is stored using plain-text file formats. While a bit odd in the age of ubiquitous what-you-see-is-what-you-get word processing, the plain-text system allowed me to use many old and new command-line programs to operate on this data, formatting and extracting information in very precise ways.

The classic text editor is the quintessential type of tool in the programming/systems administrator/hacker world, and was also irreplaceable in my work as a researcher and prose writer. In particular, I used a rather alien piece of software called Vi-Improved, or simply, Vim (Moolenaar 2014). Vim is a text editor (not office software; think Notepad) that is known for its keyboard-based and "modal" interface. More importantly, it has the power of "regular expressions" built in, which can allow complex searching, navigating, and editing tasks to be performed with relative ease compared to traditional office software or paper-and-pen methods. For example, skipping back-and-forth across headings (i.e. within the source to this file), with my particular setup, is trivial. To do so requires only two button presses,

```
[[
]]
[]
][
```

in order to move the cursor, respectively, the previous or next primary heading, and the previous or next secondary, tertiary, etc. heading. Similarly, single-stroke commands for deletion, copying, pasting, and so forth are the hallmark of this software. I do not

feel it necessary to go into more detail as to why these sorts of commands are valuable to touch-typists with much to write and re-write, but suffice it to say that Vim serves as an indispensable tool for editing text. When combined with other CLI-based tools, such as The Silver Searcher or ag (Greer 2015), the text-based paradigm which I have described above has it's distinct advantages. For example, I can navigate to the directory in which I maintain my scrubbed logs and input the command

```
ag decentralization *
```

to search all of the files for the lines where the word "decentralization" occurs. Even better, I can use

```
ag -C3 autonom *
```

to output each line including the root "autonom-" with three lines of context before and after each instance.

Beyond utilitarian benefits in processing and editing texts, the—perhaps most—value gained by using plain text to store my work is for plain-text's long-term compatibility. Having my thesis encoded in this objectively simpler (in terms of ones and zeros needed to store the data) format is beneficial over a using a word processor format as it is usable without the need for any one, particular organization's software. It is "system agnostic" and will therefore have a much longer lifespan in terms of what kinds of machine, and therefore people, are able to utilize it.

Where this approach might be seen to fall short (although I am investigating other, text-based solutions) is the ability to leave hideable notes and obvious, long-term highlights. I made up for this by using the commenting feature available in the pandoc variety of markdown, annotating important lines in the following manner:

```
[timestamp] INT: I love growing plants. <!--affinity with plants-->
```

In this way, I annotated all ten interviews, and was able to easily search for any line containing a "<!--". Better still, I quickly concocted a script using some of the GNU text processing tools in order to distill comments further, stripping out all syntax but the comments themselves (in order to reduce visual noise on my screen) with the option to display line numbers and participant's initials for fast manual scanning of concepts across the data.

While in the field, on the other hand, I did not rely on these kinds of tools, but instead began emergent, inductive analysis as interviews proceeded. Early in the interview process, I began hashing out my ideas to participants, proposing my recurring thoughts as they became relevant to what the participant seemed to be saying at the time. By at least the third interview, I usually brought up at least one of my hunches per interview. For example, I spoke with numerous people about what appears to me as a correlation between technical focus (specifically focus, *not* skill) in the labors of creating and maintaining Project Meshnet and Hyperboria in contrast to, perhaps, visions of what Project Meshnet should or could be, leading into larger tensions between activism and science that retain the majority focus in the following chapters.

Special challenges

Although there were plenty of personal challenges inherent in researching from home rather than removing myself from a "normal" context into the "exotic"—such as being overcome with the urge to throw my laptop out of the bedroom window in frustration when, for example, I was mysteriously unable to connect to Hyperboria for three days—there are other, more pressing issues which deal with my participation within a network that is partly public-facing and partly a private, friend-of-a-friend network, pointing to the need for me to share my research not only with the individuals who participated in in-depth interviews, but to the community as a whole.

As I have briefly mentioned , my intention to provide my work back to the community, especially before it was published, has always been at the forefront of my mind. I consider it a contribution to the Free Software community, after having used my fair portion of their freely-given labor to improve aspects of my life (I wrote every single paper in graduate school using Vim; without the Free Software community, this research would never have been conceived).

More important was a striking comparison made by the participant who verbally (that is, textually over IRC) consented to participate in the research rather than "sign" the form I had provided on my website. This refusal to agree to the terms I had proposed stemmed first from the mistrust any reasonable political radical ought to have of an outside, institutionally-based researcher, but more deeply, this individual challenged the notion of Hyperboria as a "public" space for observation, instead equating my observational work with recording private discussions poolside at a Las Vegas hotel. While this may or may not be the viewpoint of others within the group (no other interviewee brought this up, or even seemed hesitant upon reading the consent form), it certainly underscores my self-imposed requirement for me to not only run this section by that participant (as per our agreement) but to ensure that the entire community was able to view and suggest changes to the document before publication. The first draft of this document was available from Spring 2014 to the Fall of 2015 from Anthro.hype. During the fall, I published the final draft to Hyperboria's most-used media-sharing website, as hardware failure left Anthro.hype disconnected from Hyperboria.

With that, there is always the element of exploitation that may be felt between the researcher and the researched, and this can go in both directions. For example, if I refused to publicly post my thesis and source files, this would be exploiting the Project Meshnet community as much as if I gave unscrubbed data to police on demand. At the same time, if the people in the community demanded that my thesis only highlight certain political alignments or if the community wanted it to read like an infomercial for Project Meshnet,

this would be taking advantage of me and my position as a researcher. I took care not to misrepresent participant's views, and hoped for a mutually beneficial relationship with the community. I attempted to make participants aware of these power issues in social science research prior to publication in the interest of the safety and dignity of our communities.

Finally, I should note that my research program virtually ignored demographic markers of the participants. This seems to be a particularly glaring omission, especially during private interview sessions, but I made this choice on purpose. Although it was not stated directly to me, this community was well aware that authorities monitor and disrupt similar groups (Ed Pilkington 2014). Thus, I made a good-faith attempt to demonstrate that I only wished to track a small portion of their non-digital life (primarily political attitudes). Not only does this follow the hacker tradition of maintaining more or less separate identities between the analog and digital realms, but it also provides a safeguard of greater anonymity in the case my data is compromised by an outside entity. While a few (white, male) participants did elect to post pictures of themselves on various social media, the majority did not.

CHAPTER 4

FIELDSITE:

TECHNICAL OVERVIEW

The following two chapters address the qualms anthropologists sometimes have regarding the discipline's research paradigm, in particular considering the choice of a "site" for research in "the field". More interestingly, I hope to present a lay-of-the-land view of Project Meshnet's physical and digital presence. I begin the following with a brief consideration of anthropological ideas about our own history, sites and practices. Then, I describe the current internet—referred to as the Clearnet within the Project Meshnet community—and Hyperboria, Project Meshnet's experimental network, as multi-layered fieldsites and my interaction within those spaces, especially focusing on my participation and experience within the community,.

To address the former, I proceed with more formal descriptions and perhaps with a more "objective" tone. This is in part due to the fact that much of what I noted about the Clearnet side of Project Meshnet and Hyperboria came from my own stance as an outsider, prior to fully immersing myself within Hyperboria. I believe this approach to be appropriate considering that nearly anyone could retrieve the same data and perform the same

analysis from that perspective. Additionally, this portion details aspects that are common across many free and open-source projects–namely, the circumstances of decentralized, non-authoritarian, and horizontal production that often take place at a global scale. I also cover more technical ideas about how Hyperboria functions differently from the Clearnet.

In the following chapter, I detail Hyperboria more from an insider's perspective. Although I remain in a fully descriptive mode, with an awareness of theory and my social-scientific purpose that brought me to the field, I focus less on a location-by-location, categorical breakdown of Hyperboria's several sites of interaction or discourse. Instead I focus on my personal experience within and leading up to my participation in Hyperboria, paying special consideration to the medium of Internet Relay Chat (IRC) which was central to this side of my data collection process. In this section, I also cover some aspects of my personal and political background which enabled and inspired me to participate in anthropological fieldwork among the Project Meshnet community in the first place.

Old and new ideas about anthropology in "the field"

Anthropology is considered a "field science" with origins alongside nineteenth-century naturalism (i.e., zoology, botany, and geology). Fitting with images of that era, anthropologists are romanticized as lone, white, macho, explorer-types who learn the language and culture of a remote village filled with an untouched, exotic "Other" set of people by means of long-term participation in "their" world (Gupta and Ferguson 1997:6–8, 10–12). Despite the fact that this is, by and large, a dead role, conceptions of the researched, the researcher, and the field site in which research takes place are still shaped by this history (Gupta and Ferguson 1997:11–18,).

In response to these circumstances, Gupta and Ferguson (1997) and others more recently (Westbrook 2009) have proposed alternative conceptions of the field and its associated methods, taking into account sociocultural globalization, transnational capitalism,

and the generally atomized, disjointed quality of existence in the altmodern way of life. Emerging notions of what a contemporary anthropological field looks like and what is done "there" involve juxtaposing a geographically "bounded" site with non-locality or multisitedness; exoticism with marginality; a strict scientific gaze or humanistic savior complex with a bent toward linking "different knowledges" to open up the realms of political possibility (Gupta and Ferguson 1997:35–40; Westbrook 2009:11, 14).

Indeed, some qualities of this research still follow the old patterns: I am a lone, white, man. Project Meshnet, as an organization, has not been the subject of research and has not received wide public attention, while Hyperboria, as a digital location, is uncharted territory. I do, in a sense, seek to collect and describe the ways of existence here, to bring the life of participants—and importantly, the cultural context of the community—to the scientific record. At the same time, my interest lies not in hauling in a taxidermic museum specimen, but to further explore particular technologies, ideals, and means of organizing a community; how they intertwine; and how they might be used to effect a more equal world.

The [digital] field

Project Meshnet as a group of people and as a political movement/ideal/goal—its nebulous framing mirrors the transience of digital existence—exists in a variety of locations and therefore should be considered multi-sited. The apparent ubiquity of computer network-based interaction also intones "non-local" as an appropriate descriptor. I prefer to focus on the former term as it may be used to underscore the material realities of computer networks beyond the screens at our fingertips, a concern hidden from most computer users. Another reason for this is the common use of the term "site" in reference to web-based internet services: here, the divide between "digital" versus "physical" locations, as far as common linguistic convention goes, is irrelevant to most.

At the most basic level, all computer networks span multiple, physical locations: people communicate with one-another by connecting electronic devices with others which reside elsewhere in physical space (next door or Kansas or Russia). Within these physical spaces, bodies are engaged in the labor of developing software and manipulating hardware, providing others with access to digital locations that generally manifest as "services" like blogging platforms, e-mail providers, social media websites, etc. These digital locations, of course, facilitate all manner of communication and action between people across the globe.

Because of temporal, geographic, and material constraints described below, much of my own perspective was limited to the second-order, digital realm. That is not to say that I have absolutely zero experience in some of the real-world activities of a Meshnet participant. I will describe what I mean by this more fully below, but for now, it is sufficient to say that the majority of this research involved communication through digital channels in specific, digital settings.

Holding to Gupta and Ferguson's (1997) notion of a multi-sited field, we may generally consider the Project Meshnet community to exist in two, digital spaces: the standard internet, known colloquially as "the Clearnet", and Hyperboria. These two networks provide overlapping spheres of discourse and action even as the physical infrastructures are shared, extended, and modified for political ends that entail the divorce of the latter from the former.

The Clearnet

I have covered the history and basic infrastructure of the Clearnet in my overview of available literature, but it would serve well to briefly review a distilled version: it has been generally characterized as a contest between institutions of the military and economy against grassroots groups over access, free speech, etc.; from the beginning, and for engineering reasons, the Clearnet was designed with network decentralization, horizontalism,

and consensus-based decision-making in mind.

Since the early days of the internet, however, the infrastructure has increasingly become centralized. For example, as part of the cjdns documentation notes, "IP address allocation, currently... is done by a central organization which assigns IP addresses", and similarly, the Domain Name System (DNS; converts text like "google.com" to numerical internet addresses) is managed in a hierarchical way (Delisle n.d.). The overseers of the basic internet communication standards are non-government organizations such as the Internet Corporation for Assigned Names and Numbers (ICANN), founded at the behest of the U.S. government to take over the job of controlling internet address allocation (Contributors 2014a).

While issues relating to the Clearnet infrastructure provide the impetus for Project Meshnet in the first place, it is inescapable that Project Meshnet exists in Clearnet locations, and more often than not, while sharing Clearnet infrastructure.

Reddit and Internet Relay Chat

Discussing the inner workings of the Clearnet as physical infrastructure is important, but in describing the locations of Project Meshnet—those previously-mentioned services—the digital realm must be considered as the key sites of discourse and action. The earliest I discovered were the /r/darknetplan (actually titled "Meshnet Plan"), /r/darknetplanhw, /r/dorknet, and /r/hyperboria Reddit forums which often attract outsiders bringing their questions and (sometimes hostile) criticism to the community (DarkNetPlan Redditors n.d.; DarknetplanHW Redditors 2014; Dorknet Redditors n.d.; Hyperboria Redditors n.d.).

These spaces can be quite public, judging by the amount of "subscribed" readers which, as of Spring 2014, totals over 37,000 people (/r/darknetplan draws 99% of this following), and the style of communication can vary from individual to community-level

address in text or multimedia form. Given the size of the audience and breadth of topics, it is easy to see this as an important space for negotiating with the wider public the meanings and possibilities of darknets, meshnets, decentralization, political-economic opportunities and events, technological advancement, allied or competing projects, infrastructural possibilities, and other subjects.

Another service, Internet Relay Chat (IRC), generally features significantly less in amount, but more immediately accessible community voices. Rather than a large and popular forum with a static mode of communicating over time frames that may span days or longer, IRC on the Clearnet feels a bit more intimate: newcomers often seek out Project Meshnet's IRC channels to find one-on-one help with technical issues and further questions about Project Meshnet. Because it occurs in real-time, communication via IRC takes a more conversational form compared to the generally lengthier, public-facing messages on Reddit that more closely follow the conventions of language.

Most importantly, Clearnet IRC serves as a meeting ground for individuals willing to share their connection into the Hyperboria network. In this way, IRC might be considered a gateway to Hyperboria, despite the fact that peering—connecting one node to another, as in peer-to-peer—with public and potentially "unknown" peers runs counter to the security model of the network and, perhaps to a lesser extent, intentions to grow the network from the ground up (Project Meshnet Participant 2014). Truly, it was not until later that I realized how the Hyperboria network contrasted with these Clearnet locations, as entry is slightly guarded and some community members conceive it more as a private network.

With that, the ability to discover and use IRC is itself considered a good indicator of basic skill, or at least, willingness to learn. In fact, interacting via IRC is is little known among the non-programming, non-"hacker" populace in general, but is used heavily among these groups. Indeed, Clearnet IRC was my first site of contact with the community. Be-

yond my ability to arrive in this place, my brief speech about my purpose and willingness to participate in the community as researcher–that is, my capacity to contribute–provided enough reason for some individuals to provide me access to the Hyperboria network.

Collaborative version control and documentation

This separation of public, Clearnet locations and the experimental, semi-private Hyperboria network is best understood within the context of the practices of software production that allow for the growth of Hyperboria, and, in the end, the structuring of a totally user-built-and-controlled network. The core technology—and hence the network itself—is considered to be in an "alpha" or "testing" state, a level of software development early in the production stage and normally only dealt with by developers themselves (Contributors 2014b). Put another way, if the software were proprietary and developed by a for-profit corporation, the "alpha" software would be available only to developers within the company. However, due to the nature of production in Free Software (Free Software) communities, access to cjdns is actually open to a wider audience of potential contributors and users than the single person or organization that initiates and maintains the project.

Concerning this aspect, two tools employed by the wider Free Software community as well as Project Meshnet must be discussed. These tools are version control programs and documentation software—specifically, the wiki. Git is a widely-used, distributed (read: decentralized) version control tool built for programmers (Git 2014), and many web-based services exist for using this tool to share and collectively improve code in a public setting, based on individual interest and capacity to participate.

In the greater Free Software world, several web-based front-ends exist for Git, the most popular of which is GitHub (2014). It might come as no surprise that this location is the Clearnet hub from which the cjdns software (in code form) is accessed. In such a setting, the individual is granted ultimate control over how their particular "branch" of

the software is modified, accepting changes as they please, based more or less on trust and confidence in contributors' skill, as people offer up modifications for individual review.

Disputes over the direction of a project may be resolved by the creation of "forks", or branches of the code that are not intended for developmental purposes, but to derive an alternative to the software from which they came for political or utilitarian purposes (or both). While forking may splinter software development and surrounding communities, this has not happened within Project Meshnet's core software, but the practice demonstrates an interesting tension found in free/open-source software-based groups that exists between "distributing" the production and storage of source code; the hierarchy implicit in the means of cooperation (the version control software requires that the project has a "leader" with a "master" copy and veto power); and the ways in which that potential authoritarianism in this technologically-mandated hierarchy may be circumvented through social means.

Wikis are the other major tool in Free Software communities: on the Clearnet and Hyperboria, the MeshWiki is the primary source of documentation for the basic software, hardware, and techno-social practices of Hyperboria. At this location, documents are written collectively, and the editors are clearly knowledgeable of the subjects presented. MeshWiki contributors in general, then, seem likely to already be involved in Project Meshnet from the "inside".

Much of the MeshWiki's content revolves around acquiring and running the cjdns software, connecting to Hyperboria, maintaining secure nodes, deploying hardware, and troubleshooting common problems. It also contains lists of available services and websites accessible through the Hyperboria network, similar to the yellow pages in a telephone book. But more than a user-oriented how-to guide of the MeshNet, the MeshWiki provides a more formalized means of crafting a collective identity and pursuing collective goals. An example can be found in Project Meshnet's founding documents, some of which are

archived at the MeshWiki. One in particular appears to have been created before the labels "Project Meshnet" or "Hyperboria" were even conceived. This "todo list" calls for, among other things, the group to conduct research and decide on a name before making a public announcement to draw interested people of all capacities to participate in the endeavor. In this vein, the MeshWiki stands less as a source of technical information and more as a permanent record of topics considered important to the community. Archival uses are highlighted when considering that version-controlled histories are available for each article, lending the MeshWiki a quality of historical continuity lacking in an IRC channel where logs *might* be available or on Reddit where the chronology of posts could be obscured by popularity or censorship.

Other Locations and Thoughts

Certainly, Project Meshnet's presence may be found among other Clearnet-facing digital locations, such as ProjectMeshnet.org, a static website with visually interesting and short introductions to the technologies and pursuits of the group, along with a blog and directions leading to other websites with relevant information. These other locations include blogs and other websites which are available both from the Clearnet and from within Hyperboria. Through Reddit, IRC, Git(Hub), the MeshWiki, and other Clearnet locations, Project Meshnet—both as technopolitical idea and as community—is made available to to the billions of every-day internet-users on the planet, despite the current size and particular barriers to entering Hyperboria which will be addressed more fully in the following section. Furthermore, these digital locations facilitate interaction between those people within and without the meshnet. Interactions in these places expose the insider process of creating the Hyperboria network's infrastructure through public coding and documentation practices while also guarding the collective identity of Project Meshnet and access to the Meshnet through discourse as seen, for example, in the "Darknet versus Meshnet ver-

sus Clearnet as appropriate terms" debate, a recurring issue on Reddit despite definitions provided by the community in the sidebar (DarkNetPlan Redditors n.d.). Again, access and collective image are a concern due to the network's experimental nature, yet the imperative of political outreach is apparent as people already participating in Hyerboria shape meaning and public perception of the endeavor through these Clearnet channels.

Hyperboria

Hyperboria is a network created using the cjdns software, which allows computers to route internet traffic between one-another in a new way. cjdns works in contrast to some of the major flaws in the Clearnet's design, from a security standpoint. A conference speech given by the software's original author described the many possible actors (from three-letter government agencies, to corporations, to malicious individuals), the kinds of attacks they perform at all scales, and the relative likelihood of each one occurring. It followed that cjdns, in many—if not the majority—of cases provided a solution to each of these issues at an infrastructural level.

Meshnet infrastructure

By "infrastructural" level, I mean that there are certain, built-in features in a cjdns network because the software works at a low level such that a cjdns-enabled device can connect to others via WiFi, Ethernet, and other means, without required access to the Clearnet. For example, unlike the Clearnet infrastructure, every piece of communication on a cjdns-based network is encrypted automatically. Each machine in a cjdns network also retains a unique (yet user-changeable) address, regardless of physical location. The only traffic visible in a cjdns network is between one device and its immediate peers, which ideally would mean between two friends, family members, neighbors, or otherwise mutually

trusting individuals.

There are other features of cjdns, but these highlight the purpose of the software: to facilitate secure, "mesh" networking. Several interviewees, for example, have noted that the term "Clearnet" means exactly that: clear, and insecure. This is not to say that cjdns facilitates "darknets", but as one user described it, Hyperboria is an "opt-in pseudo-darknet", highlighting both the horizontal nature—in that, one chooses to become a part of the network, a practice accompanied by trusting, consensual relationships—and the communication security inherent in the network's technical and social design.

Besides mutually-beneficial relationships and security, cjdns-based meshnets (and, arguably meshnets in general) challenge the notion of fixed location which is inherent in the old Internet infrastructure. For example, my household, like any other terminus in the Internet is assigned a unique IP address, which might look something like "8.8.8.8" (this is a DNS server, not my home). However, this IP address is only unique to my location, not to each device at that location. At my house, again, like many others, a wireless router mediates all of the internet traffic between our house and the outside world. Without special configuration,then, my household's e-mail service or my hosted-at-home blog is not accessible from the outside world. If I were to move the device that hosted these services to another location, I would have to make further adjustments to account for a change in IP address. Running cjdns, however, I could host my website on my laptop here in Oxford, Mississippi, turn the device off (the website would be down, but...), drive to a city with a local meshnet, reconnect to the network halfway across the continent from where I began, and my website would still be accessible through its usual address.

A final, important aspect of the basic infrastructure provided by cjdns relates to decentralization more directly, and is seen as effectively preventing censorship: "Nodes", as machines running cjdns are known, may come and go without the network as a whole being affected. This is due to the decentralized, peer-to-peer means of connecting, and

may be contrasted—albeit superficially[1]—with the Domain Name System (DNS), which houses a finite number of servers at a finite number of locations to direct the entire directory of website names (think of it like the phone book your computer uses to connect "google.com" with it's IP address). If this network of servers were to be taken offline, the entire internet-as-most-know-it (that is, easy access to the web) would disappear. In cjdns, the no domain name system has taken precedence. Instead, the efforts of directing traffic are encoded into the system in a distributed manner, meaning each device in the network carries some of the responsibility for sending traffic to its destination. The distribution of computational effort brings along with it a more localized, aspect of interpersonal relationships which are symptomatic of the move from centralized gateways for network access to a grassroots, socially-powered use of technology. It is also interesting to note that despite Hyperboria's lack of an "official" domain name system, a few community-run solutions have been proposed and tested to varying degrees of success, demonstrating the free software ethos of "see a need, fill a need".

[1]One participant attempted to improve my technical soundness here, but my point was less to show an exact contrast to the functioning of Hyperboria than to depict the practical differences in connecting without *need* for a DNS, or more generally, for less centralized approaches. Additionally, the real reasons for Hyerboria's interesting properties are a bit over my head and are definitely out of reach for most academic readers of this document. For the sake of completeness, and more importantly, for scientific rigor, I have included this participant's response verbatim:

> "clearnet's UNreliability is actually not related to DNS. It's more about BGP and routing and star topology. DNS will work pretty much the same on Hype as it does on clearnet now reliability-wise *for thin clients*, except you can (and should) [have] more like 10 than 2 intermediate DNS servers, and all of them have to go down to leave you without name resolution.
>
> Although the actual domain name data will be stored in a distributed manner in the namecoin blockchain, so you could run your own DNS server that doesn't rely on availability of any other DNS server, Namecoin DHT (like any other DHT) needs bootstrapping and that's always centralized anyway. People don't seem to have a problem with that in bitcoin, but still."

Hyperboria proper

As I have alluded, more than one network based on cjdns is known to exist, according to several interviewees. The largest and most well-known of these is Hyperboria. Hyperboria, again, is an experimental mesh network which combines local meshnets, often based on wireless technologies, with an "internet overlay" which allows users like myself to connect to one-another using the current, Clearnet infrastructure. I mentioned previously that the term "darknetplan" was a misnomer. More meaningfully, however, this name is a holdover from a previous project that was abandoned in late 2011. As one interviewee told me, "around that time an anonymous operation called 'OPdarknet' was going on to bust child porn sites and we often got confused so I came up with a new brand". Around the same time that the Project Meshnet "brand" was conceived, cjdns was nearly complete, and the name Hyperboria was chosen to represent the first network. The small group from the previous project reunited under these circumstances, and as the interviewee concluded, "the rest is history." Today, the network consists of over 1000 nodes, as stated on one Hyperboria-based blog, and the user estimate stands at around 200 people. One interviewee, Employee, described many of the participants as young (under thirty) while invoking the archetypal image of the aging computer wizard: "there's not a lot of greybeards here". Indeed, this appears to be the case, and besides the heavy youth involvement, the other apparent generalization that may be made about Hyperboria is the fact that it is, much like the Internet in small, a cosmopolitan place with participants hailing from all habitable continents. It is likely that many who participate are white males like myself, but I do not have hard data for this. Hyperboria retains several ties to the Clearnet as most people currently experience it: many services are available by web, often providing similar experiences—for example, cloud sharing, social networking, and collaborative version controlling–as the clearnet would typically do. However, these websites, though they are important in that they provide content in an easily-accessible manner to the largest amount of people possible (who do you know that doesn't know how to use a

web-browser?) are not necessarily the most important sites of interaction and discourse within the community. Certainly, Hyperboria's status-sharing service (think Twitter, although the "statuses" may be significantly longer) facilitates a great deal of discourse in a single, well-known place, often on the scale of days or weeks at a time. The same, but to a lesser extent in terms of popularity, applies to Hyperboria's Reddit clone, yet the older, simpler IRC protocol remains the most highly valued medium of socialization,for both practical (real-time, stable) and historical reasons (it's simply how hackers communicate).

IRC revisited

Hanging out in IRC, as the joke in Hyperboria goes, sometimes feels like playing a game to see who can remain silent for the longest time. Other times, it is vibrantly alive, with groups of people holding conversations one over the other. Frequently, these conversations are full of things—interesting data structures only available in a specialized programming language or the benefits of a particular hardware configuration—that I understand only halfway before I am lost in a technical abyss. This was not unexpected, given that IRC is a place where technically-minded folks gather to create a complex piece of software and maintain an infrastructure based on it.

I knew about HypeIRC, the main (but not only) IRC server on the Hyperboria network since fairly early in my research process (it is listed publicly, even to Clearnet users on the MeshWiki), yet I did not visit until my attention was directed there by the Benevolent Dictator who told me, "most of the things you're observing did not happen by accident but like most social systems, what of Hyperboria that is apparent to the passer-by is largely the tip of the sociological iceberg. The real back-story starts on #irc". Shortly after, another member of the community invited me more directly by providing one of the addresses where I might access the HypeIRC server.

Tying back to the notion, once again, of location and infrastructure, an IRC

"server" usually (and HypeIRC is no exception) consists of a group of several machines which each host a different instance of the IRC daemon[2]. As a result, individuals may connect by way of the IRC protocol to two different, physical servers which are also linked via the IRC protocol. Despite the fact that the two server machines have different addresses, locations, and connected users, the IRC daemon synchronizes the machines to create a single communications hub.

Server computers linked in such a fashion are known as "federated", and federations of different types of services than IRC—including some web-based technologies—are in use on Hyperboria and elsewhere. This was important to note, according to one interviewee, because choosing federated services might provide a solution to the tension between infrastructural decentralization and the decentralization of services (or more precisely, the software models used to provide services), a far-reaching point of contention that was at the forefront of the community's discourse as of the time of this research.

I will revisit this issue in the following chapters, but at this point, the important aspect is that HypeIRC is a service not necessarily under the control of one individual, but a group of consenting peers who provide resources as they are able to the wider community. Suffice it to say that as a federation, HypeIRC relies less on the centralization of information than a single website (which is, more or less, the context for practically all of the web and therefore much of the internet as most experience it), yet it does centralize communications more so than peer-to-peer file-sharing, the model most similar to Hyperboria's infrastructural scheme.

[2]A "daemon" is the "server" program in a client/server software system. For example, Apache is a daemon for the HTTP protocol, which is accessed by client software—that is, a web browser.

CHAPTER 5

FIELDSITE:

SOCIAL LANDSCAPE

Continuing the theme of digital field site, I use this chapter to convey a more insider, socially-oriented description of Hyperboria and the Project Meshnet participants who inhabit it. I first describe the social context of Free Software production, describing a model which lends a light hierarchy to otherwise decentralized, autonomous efforts. I then detail my own entry into the insider spaces, as well as the circumstances leading up to and surrounding my own participation in Project Meshnet.

Benevolent Dictator

Prior to examining the Hyperboria community's favored, most active sites of interaction, some background of Hyperboria's social organization is needed, and for this, a short analysis of the term "Benevolent Dictator" provides an interesting window on the group as producers of freely licensed software. Drawing from the source to which community members most frequently directed me for technical information, "Benevolent Dictator is a term of endearment used sometimes used to label those who head some Free Soft-

ware projects." These individuals "retain the final say in disputes or arguments within the community," but also remain open and accommodating in order to maintain community solidarity (Wikipedia Contributors 2014).

Below the surface, this term is an ironic depiction of the realities of hierarchical organization among software engineers, reinforcing the notion of a single leader with editorial control, despite an open, easy-going manner. While I have discussed the possibilities of forking as potential action against a rogue—perhaps malevolent—dictator, the community's use of this label indicates to me that this humorous acknowledgment masks a deeper, embedded wariness toward authoritarianism in general.

There certainly exists a reality where the original author of the underlying software may choose to ignore a patch submitted to the code base by a (normally) trusted user, or otherwise go against the wishes of the community as a senior manager might do in a workplace environment. When this is the case, however, the circumstances of free software development licenses render this situation unlike a workplace: the Benevolent Dictator may be overthrown as individuals may leave their project with no financial repercussion and may begin work a competing project, using the same code in the original project.

In other words, the irony of this term speaks to a tension between organizational styles. On the one hand is the voluntary association which hallmarks decentralized production of Free Software and on the other is the top-down control an individual may exert over their own work, despite the ultimate lack of control given the publication of code under free software licenses. Indeed, the emergence, or even necessity of hierarchy in this context is painted as an inevitable but not intractable problem by the use of this term. It must be made clear, however, that the amount and kind of control the Benevolent Dictator has is limited to the development of the core software, and not the use of the software to facilitate the Hyperboria community at large. As with the published code, users are able to shape the network in whatever ways they see fit, providing resources and content

as they choose.

Ultimately, then, this examination of "benevolent dictators" sets the stage to distinguish between development of cjdns and the construction of a network and its community, or more succinctly, the distinction between Project Meshnet as a Free Software project and as a network of activists that will be explored more fully in the following chapters. Before this, a more full understanding of a "day in the life of" participation in Hyperboria is required, as I detail my own circumstances of participation.

Entry

At the time I was invited into HypeIRC, I had already been "lurking", or otherwise, "hanging out" in Project Meshnet's Clearnet IRC channels on and off for a month. I also had access to Hyperboria itself, had published my website, and was participating in Social media. While the importance of HypeIRC to the community was made obvious to me by BD and the other person, after making my way there, I soon realized how different my experience of HypeIRC would be compared to the Clearnet channels.

As some interviewees and others speaking within HypeIRC explained, the Clearnet channels of communication made the Project Meshnet/Hyperboria community are often considered "lost" to those who do not understand what the project is about. Frequently, these Clearnet-only channels are flooded with requests for access to Hyperboria, along with a barrage of questions easily answered in available (but not always easy-to-find) documentation, or suggestions that do not match up with the aims of Project Meshnet. Of course, how Hyperborians frame their expectations and goals for the experiment is another ordeal altogether and will be discussed elsewhere.

HypeIRC itself, then, stands in archetypal contrast to those outside channels. This is not to say that there are no silly questions or horsing around: of course, there is a "res-

ident troll" who famously (within the network, at least) played a prank on a globally-recognized figure in the Free/Open Source Software community. This goes on along with the regular banter of video games, television, music, programming languages, workplaces, and other, every-day discussions which knit the community together. That is, HypeIRC is not solely built of programmer sweat, even though much of the network's labor is mediated here.

One way in which this labor mediation typically plays out is in collaboration between people who are writing and testing—or debugging—the core infrastructure software or services which run on the Meshnet (usually those that are community-oriented rather than personal). Another way in which HypeIRC facilitates the labor of building the meshnet can be found as community members orient newcomers by aiding them in configuring devices and local networks and by directing them to points of interest and utility within the community. For example, my research focus has led people the whitepaper which outlines the sociopolitical goals and technical specifications of cjdns, while practically everyone is referred to an unofficial orientation document called peers.txt.

Beyond HypeIRC's centrality in regard to the social activities that occur there, as one interviewee, Knife, pointed out, the importance lies not only in the real-time, group-oriented nature of communicating by IRC, but by the fact that "everyone (or nearly everyone)... can be found on HypeIRC". Knife did not exaggerate this statement, and my relatively late arrival was nonetheless very beneficial in several respects, not least for the high volume of informative and entertaining discussions that I observed. Ultimately, this new perspective allowed me to better hone my understanding of what was important within the community before I seriously pursued one-on-one interviews.

More to the point, what I learned over the course of two months of almost-daily observation and (where it infrequently was pertinent, given my technical skills, or possible, given my time zone, for me to do so—indeed, my chat software, as with most in the

community, usually remained awake even when I was not) participation in IRC confirmed that many of my initial questions were either poorly framed, misdirected, or otherwise not relevant to the situation at hand. Eleven months of lurking, paying careful attention to the Project Meshnet community via outside, Clearnet-accessible resources such as Reddit, and, to a lesser extent, the websites (blogs and so forth) within Hyperboria essentially prompted me to ask questions which, I believe, might have rendered my project in a similar light to those outsiders considered to be encroaching on the Clearnet side of Project Meshnet. I discuss the changes and enumerate the final interview questions below, after I discuss my prior experience and observations in the wider free/open source community leading up to this research.

Read the Fucking Manual (RTFM)

My experiences leading up to my participation—in fact, my discovery of Project Meshnet in the first place—tie deeply with my personal use of the GNU/Linux operating system (GNU Project n.d.; Torvalds 2014). Released in the early nineties by the now-cult-hero Linus Torvalds, Linux—once the forbidding realm of computing reserved for programmers, system administrators, and hackers—is currently accessible to the majority of computer users with very little technical expertise (Contributors 2014c). The source code of Linux is open for public viewing and contribution, although, like in Project Meshnet, Torvalds remains the Benevolent Dictator For Life (Wikipedia Contributors 2014).

Until relatively recently, I had only been exposed to the computers loaded with software from the two corporations that traditionally dominate the operating system market. When I finally discovered Linux as a bottom-up endeavor with an actual community of users (see, for example, the classic document "Linux is NOT Windows" (Humphries n.d.)), many values embedded in the Linux community meshed well with mine as an anarchist: do-it-yourself ethos within a community-based, mutual aid system; freedom to explore,

re-use, and build on others' work; opportunity to participate (or not) in whatever ways you are willing and able; among other aspects. I was also attracted to the broader politics of the Free Software world which broadly embodies its views in real processes to facilitate the decentralized production of software and to enable the creation and dissemination of knowledge around those projects.

A few years prior to this writing, I entered the Free Software community by installing one of the more popular variants of Linux called Ubuntu. This task was easy enough to accomplish with no negative experience involved. Although I had some specialized knowledge of what was going on (for instance, the concept of "partitions" in a hard drive), it was not in any way enough to give me an actual advantage over a typical computer user when first considering this option, particularly with the wealth of information available online. When all was said and done, my device, when running Linux, had all the same functionality and a more-or-less familiar interface, as it did with the stock software.

As I used this operating system and began to explore the Linux community further, I discovered that a great many users supplemented (if not outright replaced) the familiar graphical environment with the "old-school" command-line interface (CLI). The reasons for this are part historical, given that GNU (GNU is Not Unix) was initially conceived as replacements for the text-based and proprietary Unix operating system, with Linux following suit (the fact that they are usually found together is tangential; the point here is that they are text-oriented at the core) (Contributors 2014d; Contributors 2014c). Here, people were chaining together programs—not building new ones—to automate aspects of their computing environment. I was certainly intrigued by this concept, but did not find much use for the practice at the time.

Eventually, I became bored using Ubuntu, and felt that I had ceased to learn interesting and useful aspects of an operating system that was supposed to be transparent in

its inner workings. Fortunately, there exists a wide range of "distributions" built around the core Linux software, which differ in regard to default user interfaces as well as core functions such as the management of software packages. Often, the engineers of these distributions adhere to various and publicly-stated design philosophies. After considering a few options, I decided to give Arch Linux (Vinet and Griffin 2014) a try.

Arch Linux is notorious for the precise reason that I sought to use it: the unofficial community slogan is "RTFM", or "Read the Fucking Manual". Essentially, a new installation of Arch Linux will leave you with nothing but a prompt for the CLI. Indeed, Arch, as it is commonly known, is not geared for newcomers. It is especially designed for those who already have a working knowledge of how a Linux system operates, what maintenance should be done, and how to use the CLI. Alternatively, it is commonly suggested that those interested in learning those skills seek out this particular form of Linux, and so it was a natural fit. Indeed, I learned more during the first week of using Arch Linux than in the six months I had worked with Ubuntu.

Most importantly, this experience led me to become skilled at manipulating my computer predominantly through keyboard-centered methods. I will not hash out their disputes over preferred interfaces, but instead, I would point out that this means of interaction is most commonly found among the Linux-using population, and more specifically among those who are programmers, web developers, system administrators, hackers and the like. Indeed, setting up and using cjdns more or less *requires* the use (and preferably, actual understanding) of the command-line interface.

In order to actually administer a server to host a website, or really, contribute to Hyperboria in a meaningful fashion, this background knowledge became indispensable, not to mention that the side-effects of engaging in this particular learning process (such as knowing where and how to look for new resources or documentation) enhanced my ability to navigate and hold intelligent discussions with the community. In all, I owe my capacity

to participate in Project Meshnet/Hyperboria to the ideal of RTFM, which pointed me to the particular forms of knowledge that enable Hyperboria and the Free Software world writ large.

Text and history

I bring up my journey to text-oriented means of interacting with my devices not to proselytize technical know-how to other anthropologists, but to point to a different mode of interacting with common technology that is not usually found among the general, computer-using populace (judging by online community sizes). For many years, proprietary operating systems that function with little transparency to the user have been dominant, overshadowing Linux with inner-workings that are widely available. In addition to the transparency of its source code, Linux systems treat every file in the system as plain-text with great ramifications for how data may be collected, processed, stored, and used.

Similarly, the every-day use of command-line interfaces are far overshadowed by point-and-click, graphical interfaces that came into widespread use around the same time as the internet. Yet to this day, code—including that for user applications, network infrastructure, websites, and simple scripts—is still written in, stored as, and compiled from plain-text sources. Therefore, In the greater Free Software community, the command line interface and plain-text treatment of information is viewed as the right choice for its simplicity, system-wide consistency, years of collected documentation, and its power to easily automate redundant tasks. This is especially important given that, in several conversations, Hyperboria was likened to the internet in it's beginning stages, another historical thread that has carried on through this community.

This topic was brought up by an interviewee called Mano. Mano approached this from a practical angle of what may be done in the context of a network that resembles

the early internet, such as talking to any computer regardless of its position behind a household wireless router (which usually impedes access to devices from the outside world). For example, because the command-line interface underlying Linux treats all data as pure text and all files in the system as containers for text (whether the text is binary ones and zeroes or written human language is irrelevant), Mano can use a one-line command usually designed to "concatenate and print" human-readable text to send a music file from one computer in the network to another. Besides any kind of convenience inherent in using the interface itself, this person sees this kind of human-computer interaction as useful in several ways, considering it in turn as "fast, secure, [adding] no extra network load," while highlighting the outside constraints on "normal" computer use by pointing out that "no third party... stores my files, [and there are] no transfer quotas".

However, the historical links between Hyperboria and the early internet go deeper than the text interface. When I asked Employee, who considered himself on the older side of what he called "Lost Generation", to explain how he saw the resemblance he had mentioned earlier in the interview, he replied, "the kind of 'say what's on your mind' mentality is here[.] nobody watches what they are saying[.] people feel a sense of security and obscurity here and just kind of are themselves". This is contrasted with the current internet which is "all baby pictures and wedding photos".

That is, rather than crafting an ideal image of oneself on Facebook, "speak your mind", "be direct", and "be honest" become central tenets in Hyperboria. Of particular importance, Employee noted that while this is particularly applicable to HypeIRC, "really all irc servers still have this flare". Among other text-privileged forms of communication, Employee drew a link between an early network software developer, a "proto-Hyperborian", who was instrumental in blowing open the doors of computer network-based communication through the release of the original Bulletin Board System (or "BBS", as Employee called it) software.

Beyond this, others have noted that the historical alignment with the early internet may be found in the fact that it is a do-it-yourself ordeal: if you want a service that is not available, start up that service. Because this is the case, as I noted previously, some aspects of the network are transient, however, it has been the case that when a participant no longer has the resources or desire to run a critical service within the network (such as a home-grown Domain Name System) that the project is passed on to a member or group who is able to maintain that service. Thus, while there is an element of independence, there still remains the sense of shared responsibility to others that is a hallmark of community.

What "community" actually means—how members define themselves, the goals of the group, and their own participation within–will be treated in a more specific way in the following chapter, yet it is important, as these examples have shown, to see that people within are hyper-aware of their own circumstances. The reflexivity demonstrated by participants not only encompasses aspects of using technology on a personal level (for example, being mindful of security), but extends to thoughtful reflection on the organization and functioning of the Hyperboria community internally and as part of the larger context of the political and technological ecosystems of which they are a part, fitting within Kelty's definition of a recursive public (2005). Early in my interviews, Zeus pointed to this theme, confirming in the process my assumption that most Hyperborians were of the do-it-yourself, independent sort:

> bg How would you describe the difference between meshnet and clearnet?
>
> ZE At this point I think the most notable characteristic of the mesh is the type of people that the mesh has attracted
>
> . . .
>
> bg Right, I see, and back at your first answer, would you mind telling me a little about why you think the people are the most notable aspect of the mesh?

ZE there seems to be an implicit common value system

ZE like an ideology

ZE the only people who come here seem to be those that recognize the value of anarchy

ZE or like the challenge of having to take care of themselves

bg what are some of those values, specifically? (I think I know, being that I consider myself an anarchist, but pretend that i don't)

ZE hehe

ZE criticality is valued

. . .

ZE I think the people here are somewhat idealistic. You have to believe that you can have some positive impact on the world to engage in this kind of activism

ZE self-sufficiency can be taken to mean that it's literally 'everyone for themselves'

. . .

ZE and I just want to make clear that we definitely rely on each other

ZE someone helped me get on the network

bg right, it's kind of an interesting tension

ZE and sat [on Clearnet IRC] and coached me through debugging when things broke

ZE but then, those who got help still hang out on [on Clearnet IRC] and help troubleshoot

ZE if you're security-minded, though, you likely understand that the biggest risk is the user

bg how does that security-mindedness play into the community relying on one-another?

ZE the result often seems like teasing

ZE if you haven't been around for a while, maybe

ZE but there's a kind of group scrutiny that I find really useful

ZE it's like a security hive-mind

bg so rather than, say, leading to mistrust of users, it leads to close examination of what one is actually going on?

ZE tell people what you're building, in what language, and there's likely someone else working through the same kind of thing

bg strike the "one"

ZE you're likely to get trolled at some point, but people here aren't malicious

ZE they'll run a portscan on you, but then tell you if you have an open hole

ZE and how to patch it, if you don't know

ZE the user might be the problem, but the people around here are problem solvers

bg excellent

ZE but there's a certain amount of interest that's expected

ZE I think

bg interest in what, exactly?

ZE in understanding what terminal commands mean, mostly

ZE you shouldn't have to be told something twice

ZE (especially not on irc, where there's a log of the conversation

ZE)

ZE so, diligence?

ZE interest isn't the best word for what I mean

bg as a personal characteristic, cool. i see what you mean

ZE you might get told to RTFM

ZE which is rude, but not unreasonable

Situatedness, Politics, Marginality

Zeus' view of Hyperboria as a group of autonomous but mutual aid-oriented, diligent, skilled, and most strikingly, critically-aware group of people (in their words, those who "value... anarchy"; autodidacts, "do-it-yourself"-ers, and "leaders" by others) demonstrates aspects of free software projects in general, pointing to characteristics of scientific practices, yet the aspect of critical awareness stands out, perhaps hinting at the subdued political side of the community. That is, these are all features of the experimental labors of creating the software infrastructure, and at the same time they also describe the values of the community in general, framing the political attitudes held within.

Again, the dialectic between science and politics, engineering and activism will remain a large focus of the following chapters as the roles performed and identities described by participants are considered. For now, the importance lies in the fact that community members note these distinctions when defining their own positions within the group and society, which in turn are frequently discussed in economic, political, social-organizational, and, in general, systemic terms.

As the participants of Project Meshnet interpret their world, it becomes my job as an ethnographer to interpret the interpretations (Geertz 2006:9, 14, 452–453) in order

to understand those situated knowledges used to craft their worldviews and practices. I have already discussed this in part, addressing the textual nature of participation and some of the tools-of-the-trade in Free Software production, and while these aspects may render Hyperborians as something of an "exotic" group to study as an anthropologist, my focus here is more toward the political marginalization faced by those who are trying to convince others that the basic means of communication ought to be rethought and rebuilt at a fundamental level. Besides the obvious fact that the anarchist and similarly-aligned denizens of Hyperboria do not hold politically mainstream views, their merging of these outlooks within the Free Software context to yield new political possibilities begs scrutiny even further. Although a decentralized network might seem logical following the decentralized model of Free Software production, a glance through /r/darknetplan will show that globally-focused idealism does not sit well with many onlookers.

Regardless of the hostility that might be found against the group from without, it is in my personal and academic interest to take seriously what I have been allowed to observe and what I have been told while participating in Hyperboria, and to write in a balanced way about the collective experience. As an anarchist drawn to a project—like many interviewees—by the notion of autonomous efforts of individuals and small groups; by the lack of a central authority; by the freedom to experiment and explore; I have good reason to be interested in the outcomes of Project Meshnet in hopes of understanding other, more liberating ways in which humans might exist.

On the other hand, it is my explicit purpose to perform anthropological research, framing much of my interests in social science terms for those proverbial, institutional "outsiders" (from the Hyperboria perspective) to understand. In doing this, I aim to provide a unique viewpoint for the participants in the Project Meshnet community as a person in between the technical and the political, the activist and the scientist. On the other side, I hope to demonstrate how democratized, science-based engineering and deeply felt political beliefs unite in Hyperboria, drawing on theories of fellow social scientists and

providing new insight with the unique juncture of ideas present in this location.

Anthropological Data in a Digital Setting and Scientific Validity

I was reminded more than once by concerned community members that what I was doing was not exactly science. "Surveys that don't have very statistical oriented questions", one person warned, "are not very conclusive." This is not an uncommon reaction to anthropologists doing fieldwork among people involved (broadly speaking) in scientific practices (Centellas 2014), so I attempted to describe the experience, purpose, and validity of using ethnographic methods, pointing to an early portion of my methods chapter which I had posted to my website. I also shared some source materials from the ethnographic methods class in which we discussed these very issues.

While this latter approach might seem strange among other disciplines, I felt it appropriate given the context of participation in Project Meshnet. As I have previously noted, these individuals are highly scientifically-minded (they do well with learning and using jargon to more clearly delineate concepts) and have a strong bent toward transparency and information freedom. It follows that my action in this regard mirrored another way in which I was often presented with group knowledge. That is, by being given links to original sources, for example, to the cjdns whitepaper or to Wikipedia pages in order to explain basic concepts such as the "walled garden"[1], it felt appropriate to reciprocate with source material. This tactic seemed satisfactory, perhaps because it plays a deeper role within this curious and skeptical group of people.

Truly, the frequent referencing of unaffiliated, outside sources that detailed political ideologies, historical information, common definitions, and other information made me

[1] A "walled garden" references a situation in which software service providers such as Facebook attempt to lock users into a single platform—that is, a single channel of communication.

feel at home as a social scientist. These websites, technical documents, blog posts, and other media provided me a greater contextual understanding for our digital setting, and I reference many of these throughout this thesis. Importantly, the fact that Wikipedia was shared as an authority for common knowledge with such a high frequency has bolstered my use of that source many times throughout this thesis. Of course, many other types of data were shared between individuals in the group and the community as well as to me directly, and this included conference proceedings and journal articles from professional organizations; news pieces from institutional and independent sources; music, movies, memes and other images; personal art, literature, and other creative works; and of course, source code.

Perhaps more interesting than the content of what was shared among the group was the fact that none of the content I encountered appeared unlicensed. While I know for certain that participants have at the least a lax attitude toward copyright infringement and at most a burning desire to end the grip of monopolistic patent holders by any means, very little, if any, publicly-available content would be considered "pirated" or stolen. Take into account a service called urlCloud, a primary source of content on Hyperboria: the terms-of-service prohibit the posting of material that is not licensed for sharing. So, I was free to record a song licensed under the public domain and upload it to urlCloud, whereas I was not allowed to post last Sunday's copyrighted episode of television fantasy violence.

Although I cannot vouch that Hyperborians absolutely do not privately share illicit content among themselves, the public faces of the community bear witness to the more institutional, "within the system" manner of resistance embodied in the political aims of the project. Furthermore, these aspects shed light on the construction of group identity beyond the carefully crafted discourses visible to the outside of Hyperboria like the aforementioned debate about Clearnet versus darknet versus Hyperboria as appropriate terms.

By way of action (directing me to a movie posted on a major, Clearnet-based, so-

cial video sharing site to explain a particular educational strategy) and practice (prohibiting the posting of copyrighted content on Hyperboria's major, file-sharing service), the community distinguishes itself from the stereotyped image of a "darknet" of child pornography, murder-for-hire, and other socially unacceptable behaviors perpetuated by mass media and the security state (see discussion of darknets in chapter two).

Instead of totally shunning the Clearnet, it is employed when necessary. At the same time, the community polices itself to avoid policing from the outside. These positions seem to stand in opposition to community motives that hope to render the Clearnet unnecessary and that wish to liberate channels of knowledge dissemination.

CHAPTER 6

DATA

In this chapter, I present the themes that arose during the interview phase of my fieldwork, given that much of my observational material has already been reviewed. In the previous chapters, I described various tools and modes of participation I encountered in the digital field in order to depict the digital landscape generally surrounding the Hyperboria community. Here, I further describe the community using the individual views of those who create Hyperboria, especially considering how participants consciously disambiguate Project Meshnet from other, similar projects; describe the roles, goals, and visions within the community; and perceive outsiders. I also include a brief exploration of cryptocurrencies from the Hyperborian perspective.

Definitions

Besides developing a better understanding of the group's attitudes, asking participants to provide their own, basic definitions also helped to disambiguate group identity and technical aspects of Hyperboria against TOR and other, alternative networks. Many interviewees juxtaposed Project Meshnet to its peers when asked to distinguish between Clearnet and meshnet as well as the concept of private and public, and when asked to

generally define decentralization. While a few, important, worldview-related issues arose during this portion of the interview process, the disambiguation of the community's purpose as a particular kind of network is often constructed in opposition to other, similar projects, indicating particular political strategies girded by technical innovation.

TOR in particular was mentioned most frequently, as its infrastructure was purposed to deflect a particular form of network surveillance—or in the information security language employed by many in the Hyperboria community, an "attack"—thus focusing their efforts on protecting the anonymity of the user by hiding them in a sea of other users (The Tor Project, Inc. 2014). TOR is well known for this strategy, which is equated strongly with protecting the identity of user, even with some known flaws inhered by the network's design[1]. I cannot overstate the importance of TOR for providing a practical means of enhancing internet security and for popularizing this kind of technology, but I wish to to indicate the relative newness of the cjdns infrastructure which, as indicated in the previous chapter, does not place anonymity as its core function (or even at the periphery, as will be shown). Instead, cjdns was designed to be more of a cure-all path to internet security, using novel protocols for determining a machine's (but not necessarily the user's) identity and always-on encryption.

As TOR, then, operates on a principle of mistrust—information is bounced randomly around the network to hide the user's actions—Hyperboria follows a trust-based path, often referred to as the "web of trust" model, which requires the users to carry some degree of knowledge about people/machines with whom they connect. Of course, this does not mean your traffic is visible to everyone: encryption masks all transmitted data, and your identity is only known to those with whom you choose to directly connect.

Although nodes in both the TOR network and Hyperboria are volunteer-run, the latter *requires* actual social interaction in order to participate. If someone wishes to use the TOR software, they may simply install it and join the network. On the other hand,

[1]The TOR software is in active development, and security patches are regularly made available.

cjdns requires that individual peers exchange information which often includes the less-secure, Clearnet address of the machines to be connected. While this does present potential problems with growing a base of users (discussed below), the important aspect is that anonymity, and to a lesser degree, absolute privacy are not as highly valued on Hyperboria as in other alternative networks.

Taken to the extreme, the very basic notions of privacy and anonymity were contested when Employee noted that, to them, privacy and anonymity run counter to one-another, as generally, those who communicate without sharing their identity are up to no good, including individuals and institutions (i.e., offering a death threat). Instead, Employee sees "countermeasures against anonymous activity" as impinging on privacy, pointing to the bulk collection of communications metadata by the NSA. Prior to expressing these sentiments and upon being asked what pseudonym he would prefer, Employee offered me his full name and address.

Others in the group certainly do not feel the same about privacy and anonymity. Garfield, for example, upon my indication that " 'real names' or 'real nicks' " would be scrubbed from my data replied, "Who uses real names anymore?". Between these two extremes sits most of the interviewees' individualized conceptions of public and private. Several times the ideas were equated simply with "encrypted" and "not encrypted" or "what is visible to outsiders" and "what is not visible to outsiders", unsurprisingly finding common ground in notions of computer networking. Throughout, there appeared no consensus on the meaning much less the overall importance of private and public as concepts.

Truly, these issues cut to the root of the disambiguation of the terms "Clearnet", "meshnet", and "Darknet". TOR, with the focus on hiding activity is absolutely a "Darknet", with "Clearnet" standing in direct opposition, as everything is visible. As Knife said, "security and encryption is tacked on as an afterthought to most base internet protocols". While historically and homologously appropriate comparisons have been made equating

the work of Project Meshnet with the creation of a Darknet, the term "meshnet" was adopted in order to distinguish not only from the negative connotations discussed above, but for the very nature of the technology itself as decentralization-focused, rather than privacy-oriented. Thus, the efforts of Project Meshnet cover a much larger field of contemporary issues with the access and use of global communications infrastructure, a point made well by Dega: "[TOR] focuses on anonymity but you can't have that without true decentralization".

The concept of decentralization, then, lies at the heart of Hyperboria above all, and is the link between trust and privacy mentioned above. Less contested than definitions of private and public or Clearnet and meshnet, interviewees often defined decentralization in systemic terms reminiscent of an engineer: of "removing central points of failure" or, as noted by Prolific, "removing the need for those central points of failure without actually removing them", succinctly pointing to the mode of resistance embodied in the production of an alternative infrastructure. This political aspect which includes horizontalism and anti-authoritarianism will be discussed more fully elsewhere, but is alluded to in Topaz's definition of a decentralized system as one without "a single highest point of authority". Of current importance is the fact that Prolific, Topaz, and their peers (sometimes with prompting and sometimes without) drew upon conceptions of decentralization to describe not only computer networks but also to modes of social, political, and economic organization familiar within Hyperboria and on the macroscopic level.

Frequently, I was treated to very concise definitions for centralization and decentralization, as well as the previously-discussed "federation", even as my promptings against dictionary definitions in favor of subjective viewpoints brought out more rich descriptions and associations. The same applied even more so to the other terms about which I inquired, with answers reminiscent of a rigorous taxonomy presented in a STEM lecture. However, these answers were provided several times along with a warning about critical awareness: not only in terms of how specific aspects of technological knowledge and

worldviews ought to be defined, but the frames within which the questions were asked in the first place. This critique absolutely embodied prohibitions against black-and-white thinking, and instead acknowledged the non-discrete nature of the notions of public and private, or centralized and decentralized, as did interviewee Manuel Pages. Not only does the Project Meshnet community operate in terms of institutional, scientifically-minded delineations of reality, but individuals are also unafraid to challenge those definitions to offer critical, novel viewpoints and approaches with a more activist, outside-of-the-box, or experimental tone.

Purpose and Participation

That decentralization was the key feature of Hyperboria's mission became even more clear to me as I asked interviewees to explain why "people" in general should be interested in participating in an an alternative internet infrastructure project. At the most basic level, the reasons could be reduced to implementing real solutions to actual problems of centralization, but primarily include encroachment by governments and corporations over the global flows of information.

Often, interviewees described Hyperboria's purpose more particularly along these two lines: decentralization for personal, security benefits—particularly with the individual user in mind—and decentralization for the greater good of society. For example, Knife pointed to their own use of highly centralized services given for free by the same, major search engine and web-based e-mail (webmail)[2] provider that currently partners with the

[2]Webmail highlights one of the most prominent fusions of internet protocols into web-based services. E-mail protocols—traditionally Simple Mail Transfer Protocol (SMTP) for sending and Post Office Protocol (POP3) or Internet Message Access Protocol (IMAP) for receiving—have older roots than the web's Hyper Text Transfer Protocol (HTTP), and the existence of a diverse array of client programs client programs even today reflects this fact. (i.e., Microsoft's Outlook, Apple's built-in Mail program, Mozilla's Thunderbird, and many proprietary and freely-licensed alternatives). Gmail, et al., utilize the power of the classic internet protocols through a web portal. Such aggregation of protocols into web-based graphical interfaces is a form of centralization in which users become dependent on a single piece of software (the web browser) and a single service provider for the majority of their computer use, creating both security

University of Mississippi, leading to undue dependence on services that exist to amass large amounts of data, and in Knife's view, "allowing them far more power than they should have". The case of webmail sheds light on these problems because it represents one of those colonizing forces present on the internet, as the backend infrastructure (an e-mail server) and the front-end infrastructure (the web-based e-mail cliient) is controlled by a single entity. For the individual, this may be harmful as the free (gratis, in terms of money) service actually cost data, which is mined for advertising and social control purposes. For an institution like the University of Mississippi, not only may the data be mined (i.e., communications about research projects) , but if Google's systems were compromised, so would the communications infrastructure used by the institution.

On the other, more socially-oriented perspective toward participation, Prolific takes a less contentious orientation to highlight cooperative, social solidarity-building behavior, stating that working to decentralize communications is important,

> "Because participating in a centralized [network] doesn't reward [people] for their effort. You send all your love to the ISP and get a bill for your troubles. When you don't help others, you risk needing help when nobody wants to help you. Participating in mesh nets is one way to help others. Participating in an ISP is not".

Here, Prolific hints at the psychological and economic rewards of mutual aid that coincide with decentralized efforts while Dega brought up the possibility of using mesh networks to bring modern communications infrastructure to underserved people around the globe. Rather than the structure of free software leading to this end, it is the economic reality that is of importance, in particular, the ability of cjdns to impart on relatively inexpensive (e.g., $40 USD) hardware the capabilities to facilitate communication infrastructures independent of those guarded—or worse—not offered by Internet Service Providers.

and sustainability issues.

Ultimately, the goal in the wider social domain is extending information access (equated with power) to those most in need, bringing about, as Cupcakes envisioned, "wikipedia for rural areas".

Importantly, this practical view of decentralization is described not simply as extending access to those without. It is also is viewed as a safeguard for free speech, politically framed in anti-censorship terms. Instead of anonymizing the producers and consumers of content to subvert censorship, the solution of decentralizing the infrastructure of content storage, retrieval and so forth is equated with removing power from corporate and government hands. With no central point of potential disruption, a mesh network is difficult to compromise, and this hampers the ability of would-be censors to prevent access.

Digital Sandbox

Returning from the politically bracketed facets of decentralization to more personally-oriented, utilitarian and scientific concerns, Zeus described the benefits of participation in terms of efficiency, drawing on the metaphor of locally-sourced food which requires less energy to bring from farm to table as opposed to the centralized model of corporate food production: literally, a decentralized network distributes the work and eases overall energy required to route electrons by, for example, cutting out the middle-man of Domain Name Systems. Manuel Pages, on the other hand, approached this question by pointing to the novelty of such a decentralized system. In it, they explained, cjdns is an "enabler"—allowing a person within a group "to do something he or she couldn't do before [the] enabler was there (or could do [inefficiently])"—resulting in a new, open-ended group space for experimentation. To clarify their point, they drew on the notion of "play":

"we can build toys (computer games, things to entertain kids with, mathemat-

> ical theories that have no immediate application) and sometimes these toys can change the world (EVE Online, LEGO, Category Theory) but most of the times those are just toys[.]"

To a similar end, Employee sees the greatest benefit to participation in its educational potential as participants explore new technologies and, more importantly, where "young, curious minds [congregate] in one place to understand the world". Bringing the scientific aspect into focus, Employee does not see Project Meshnet as *the* or even *a* "solution" to sociopolitical problems per se, but instead as a "promising" hint of what the future could hold. Here, Employee and some others adopt a realist stance that balances some of the idealism within the community. As Employee states,

> "those who see it as a solution will learn when it fails [.] it's important to have something you care about fail[.] even if it's inconsequential[,] it's important to you[,] you know? and it's a learning experience that can't be replaced or taught[.]"

While others do not expect ultimate failure of the network, there still exists a wariness of placing too much hope in changing society at large through a single, technological approach. For instance, Mano sees the benefits that a change in infrastructure might bring in regard to security, but predicts that if the network grew to a large enough size, users would behave in much the same way as they do when utilizing the current internet infrastructure to communicate. This is in part due to disparities in the degree of infrastructural decentralization at both the hardware and software levels, a point discussed more thoroughly in the following chapter.

Science and Activism

By this point, it is clear that the nature of participation in Hyperboria is at least twofold, sometimes manifesting as scientific experimentation and sometimes as activism—indeed, both "science experiment" and "activism" were used as one-liner descriptions of Hyperboria. It is along these lines, then, that participants often reported the motivation for their involvement working in Project Meshnet in the first place. For the most part, individuals first discovered the community either by stumbling upon Project Meshnet by chance, as I did through social media, or they were directly invited by like-minded individuals.

At times, people were drawn by the notion of building and collaborating with others on a software project, and many described previous and current involvement with outside free/open source software projects. Sometimes, these outside projects were said to have aligned with the general, sociopolitical goals of Project Meshnet, while others valued the chance to build with highly skilled peers. When not seeking to build, some were simply looking to participate in an alternative network for the security aspects and found Hyperboria through personal research or through introduction by a friend. As this implies, the two interests—scientific and political—often overlap, as individuals not only seek safety, but desire to use their engineering skills to resist and redirect the power held by those entities viewed as undermining the internet as a safe means of communication.

Broadly, these entities are governments and corporations. The state spying apparatus (the NSA, the "Five Eyes" network of English-speaking intelligence agencies, etc.) was the most frequently noted adversary among the group. Also mentioned are the non-profit, but government-sanctioned standards organizations that regulate, for example, the delegation of domain names (as discussed in the previous chapter) and act as central points of authority in the current internet infrastructure. Also challenged are technology corporations of all varieties, but specifically, big data (i.e., Google, Facebook) and Internet Service

Providers (ISP) are mentioned.

The latter group—particuarly the ISPs—ultimately receives the most challenge from the Project Meshnet community, as cjdns turns each machine in a network into its own provider, handling the flow of internet traffic. Thus, a "local"—although not a large nor extremely useful—ISP can be created with a single, repurposed WiFi router, truly capturing the essence of a meshnet at the smallest level. The points of contention against these entities primarily revolve around questions of who has access to what resources and under what circumstances, particularly, control over the resource of information. This will be explored more fully in the following chapter; here, I wish to highlight the fact that cjdns stands out as a software project aimed at technologically resolving political-economic problems. By applying the principles of science to create a new network with the purpose of undermining institutional control over the means of communication, the community brings acts of engineering into the realm of the political.

In the digital field, it is one experience to read and understand the Benevolent Dictator's technical and political purposes for creating cjdns, as this is clearly delineated in the whitepaper written in the register of the engineering profession ("whitepaper" is a term used in engineering and business domains, and refers to a guiding, technical document). It is quite another to witness and hear stories about the unfolding of Hyperboria-the-community on top of the cjdns infrastructure. Throughout, I found that two, major roles are claimed within Hyperboria: that of the "builder" and that of the "activist". While interviewees employed the specific word "activist" several times to identify themselves, the word "builder" was used less, though other substitutions such as "core developer" (of cjdns) were used.

Despite these unofficial titles, both roles require high levels of technical skill, some of which overlap quite a bit in the overall scheme of things. Even basic participation in Hyperboria more or less entails at least some knowledge of programming or scripting lan-

guages as well as the practices of collaborative software production and deployment, without which, so much as installing and configuring the required software would become a near-impassable obstacle.

The difference in the roles of builder and activist lies in the focus of their participation in accordance with their interpretations of the community's goals. In short, the people Manuel Pages (a self-labeled "activist") described as "builders" tend to focus on the technical aspects of writing the core cjdns software with the intention to build a "robust network" from an engineering standpoint, and who were less likely to define the community's existence beyond that of a free/open source software project. At least one interviewee went so far as to claim that any goals beyond this scope are invalid and should not necessarily be pursued, perhaps taking the realistic stances exemplified by Employee and Mano to a cynical extreme. This role may be considered as holding close kin with that of the scientist or engineer, and perhaps is more regulated than that of the activist, given the more structured environment and culturally ingrained practices surrounding this role.

Those who adopt the "activist" identity, on the other hand, focus their attention toward improving the Hyperboria network itself. Many lend their time by creating and improving services (usually) for use by the community and by developing new software consistent with the design of cjdns. Both of these activities overlap with the labors of the builders, thus "activists", as the title suggests, most often distinguish their roles by performing outreach to the world beyond Hyperboria, attending not only to growing the network, but also to bridging the technological knowledge gap that exists between outsiders and insiders, an important aspect further discussed below. The role of the activist, then, appears to enjoy some greater degree of autonomy in their work, not simply for the range of possible paths, but also the lack of, really, any kind of authority that might prevent a user from employing the resources at hand (their technical knowledge, equipment, social skills and relationships, etc.) to accomplish a goal that they themselves determine.

As I have stated previously, both roles may be adopted by one person concurrently and throughout their participation within the community, yet they are not completely fluid categories. Consider that most people could perform the "activist" role, while having relatively little technical knowledge—this is evident in that my own participation would be considered "activist" in this context—and thus be a (mostly) self-sufficient, contributing member of the community, while the bar for entry into the "builder" role is somewhat higher, requiring much more specific knowledge (for example, of the entrails of networking technologies) and a higher level of trust for code to be written and accepted. Those performing the activist role, then, enjoy more autonomy in their explorations and practically no authority designating whether or not their effort may be accepted into the main body of work, as opposed to the conventions of free/open source software production where participants have more rules to follow (for instance, the formatting of code to meet aesthetic requirements) and a central authority that (while benevolent and not totally in control) has something of a final say. That is, a modification to cjdns may or may not be accepted by the group, but no one may prevent a person from independently launching a blog with network-wide availability.

On one hand, builders are creating the means for Hyperboria to exist. On the other, activists are using the infrastructure and it's built-in, novel capabilities to bring about further technological advancement as well as to grow the network. Although one seems to reside atop the work of another, builders would have no purpose in coding cjdns without a group of people willing to implement and experiment with it in the first place. Furthermore, it is important to note that neither term necessarily implies or rejects any individual political choice, as even the hard-line individual above envisions political possibility in (other) technological innovation and the embrace of the ideals of free speech and unimpeded communication.

Visions and Labor

Dega stated that when Project Meshnet was born,

> "we all decided that it would be in the best interest of the project not to be politically affiliated with any cause or government. The project itself is neutral, we still have our own personal views but I believe its more important to view the project as a scientific endeavor and not a political one"

While Project Meshnet itself is the public face of Hyperboria that draws on politically-charged topics to encourage outsiders to partake in building a global meshnet, even this core member privileges the engineering frame over the activist. This is not to say, as discussed above, that the community is always viewed in this way—indeed, there are those self-described activists, who view the actions of the community as inherently political, as well as the fact that many were initially drawn to the community for political reasons. Truly, when asked about visions of future political possibility and how participation in the community aligns with those visions, most interviewees demonstrated, as Dega predicted, how the endeavors of Project Meshnet do become political.

In the interest of politeness (hopefully minimizing people's apprehensions about discussing politics with a virtual stranger) and to avoid steering participants into one-liner responses, I did not ask the interviewees to state their political affiliations outright. Instead I framed the question of future possibilities in terms of an "ideal" society, asking participants to especially consider their preferences in terms of politics. In this section of the interview, I expected and received macro-scale depictions that I believe provide an equivalent—and likely, a more nuanced understanding—of the community's political views than directly prompting for partisan or philosophical alignments.

I did not receive answers indicating the presence of normative, liberal values such as "I want to see more people vote!", or "I want everyone to be treated equally under the

law!". On the contrary, I was frequently treated to utopian visions[3] stemming from values embodied in the anarchist and libertarian traditions. Often—and perhaps unsurprisingly—these were framed in terms of technological "progress" or "evolution".

Many people envisioned the world free from the domination of others, valuing local autonomy; anti-authoritarianism; and horizontal, consensus-based decision-making. Mano, for instance, drew on the ideals of "the hippie movement", hoping for a world where emotional freedom and sincerity in relationships is valued above all else. The theme of honesty is extended to the political sphere by Zeus as they noted the failures of representative democracy, in which politicians are systemically compelled to break the trust of the represented. Overall, most structured their responses on the values of decentralized, consensus-based politics where people are free to explore, experiment, and build as long as they do not encroach on the rights of others to do the same.

Underlying most interviewees' political imagination was the theme of technologically-driven social change leading to a more egalitarian political-economy—that is, a system in which power and economic imbalances are substantially reduced, if not eliminated. Such a radically equal society is not a new idea, but it was not a common sentiment in the wider, public sphere at the time interviews took place. Topaz, for example, indicated that their vision would include a system that supported open-ended, non-dominating, and creative work, which world would be achieved as technological and social progress complement one-another to bring about a new, global awareness. Dega's interest is aligned, but more explicit, as he indicated his desire to see a resource-based economy whereby technological advances enable the global management of resources to eliminate scarcity. In turn, economic inequalities and mundane or dangerous work disappear, thus freeing individuals to pursue their own interests without the need for

[3]I do not mean "utopian" as a euphemism for "unrealistic", as this is presumed from the question at hand. I am trying to convey an idea more like "socioeconomic egalitarianism"—that is, political and economic systems that radically minimize inequalities between participants—underlying the discussion of decentralization as an equalizing force, and it seems to have encompassed many community member's wishes for the future.

centralized, top-down control structures. Along similar lines, Cupcakes pointed to the already-in-use, highly effective model of organization found in Free Software communities,

> "where there isn't a defined structure until one is created out of need. So, for instance, there will be a project leader (or leaders), but no one's required to participate in that project, and if the leaders make decisions that people don't agree with, they'll fork; have a fork gain enough momentum and they're not the leaders anymore[.] more importantly, we've seen this model *work*. We've put together huge bodies of code - not just web browsers that are arguably better than their commercial partners, but entire operating systems - out of largely volunteer effort. And it's not just things that we look at and say 'oh, yeah, I can see why writing that might be fun', but things that would be terrible and the opposite of fun to write have been written[.]"

This exposition connects the bigger picture of social change proven, real-world practices, hinting at the self-organizational manner in which these larger goals might emerge. This intersects with Prolific's notion of an anarchist-like, decentralized, and locally-oriented system where larger-scale tasks (implementing a continent-wide infrastructure or dealing with a large-scale emergency, for example) would be accomplished on an as-needed basis where those individuals and communities who had the ability and motivation to participate would do so. Again, mutual aid and grassroots cooperation underlie the power distribution in Hyperboria's collective political imagination.

Concerning the question of how participation in Project Meshnet fits with realizing their political ideals, Zeus also cited the successes of the free/open source software model whereby, "distributed projects... demonstrate the effectiveness of self-organization", valuing the bottom-up, emergent approach of collective action. Others focused on how a secure, global communications infrastructure would aid those with marginalized political views—as Mano pointed out—preventing a "government from dictating... what I can and

cannot think". Topaz, too, felt strongly about overcoming censorship, citing the silencing of political ideologies and a strong "will for change" that is "actively suppressed by the media", pointing to the subversion of censorship built into the design of Hyperboria.

Prolific also saw the project as contention against encroachment of the internet, but more fully and at the local rather than ideological level, noting that some of the "tactics" employed by nation-states and corporate interests to "dismantle local communities" are thwarted given the focus on decentralization over anonymity. As another person has pointed out, nodes that are made to behave badly will be noticed and may be shunned from the group, or in other words, the social nature of Hyperboria—linking friend-to-friend in a web of trust—overcomes the tactics of disruption that may be used when identities remain secret.

In a vein perhaps more consistent with a "builder" viewpoint, Manuel Pages noted that centralized systems are needed by many people, and that "for people like us to survive in [these] conditions is... not to touch the systems but instead build really small alternatives," pointing to the economic, utilitarian efficiencies of decentralization, and highlighting quite well the notion of prefigurative political strategy. Instead of directly challenging the legitimacy of government and corporate control, building alternatives with like-minded people becomes the focus.

However, this statement also highlights the issue of the technically skilled, politically motivated Hyperboria insider versus the majority of outsiders who are not. While this addresses the disambiguation between scientific/intellectual movements versus social movements, I will focus briefly on the longstanding division between creators and maintainers of technology versus the average person. In our case, this translates into the programmers/system administrators/hackers and the (personal, corporate, academic, etc.) users of those technologies.

Sometimes within the Hyperboria community (as surely as it is found within the

wider free/open source software culture), an ambivalence and sometimes outright contempt for the average user may be found among the more highly skilled engineers, as is apparent in the Benevolent Dictator's one-time handle "TheUsersAreTheProblem". Barring short-term bad moods, the significance of this sentiment lies in alienation between producers and consumers of software, with producers volunteering their time and skills to create and hapless users often returning nothing except "filing bugs that are their own fault" (i.e., through mis-configuring or not reading included documentation). The role of the user—roughly commensurate with "outsider" in the case of Hyperboria—is of a person unaware of the technical and also—in this particular case—political circumstances of outsider's use or perception of the technology. Prolific makes an interesting observation of this behavior, labeling it "willful incompetence":

> PR People are taught at a very early age that everyone has certain specialized skills, and only fools try to act outside that criteria.
>
> PR example is how you go to a teacher instead of fighting the bullies.
>
> PR The other factor is that people are punished for being skilled. The more skill you express, the more people put pressure on you, and they won't help you in return at all, only give you money.
>
> PR That's pretty much what homework is.
>
> PR with an IOU for a degree in return
>
> PR The result is that people are very reluctant to even consider that they are capable of acting outside their "caste" so to speak, and even more reluctant to admit that publically, for fear of being forced to work more without compensation.
>
> . . .
>
> PR So when I ask people to help me build a mesh network they almost universally answer that they're no good with computer stuff.

While Prolific sees "unsupervised play" and "unstructured education" as possible means to solve o this issue, others see that the technological requirements imbued by changing economic and social circumstances will bring about a greater awareness of these realities to the "average" user. For instance, Manuel Pages described how their parents—through Manuel's intervention—had become critically aware of the broad, techno-social landscape. In one instance, a family member began sending e-mails warning friends and other kin of a recent, major vulnerability in the internet infrastructure within minutes of its announcement—a moment that could not have occurred a decade prior to Manuel Pages' intervention.

Still others frame this problem in terms of the "division of labor" between programmer and user or builder and activist. Several see this as an inevitable, even necessary thing. Certainly at the current historical juncture, it would be unreasonable to expect "the masses" to learn the C programming language, or for everyone to begin interfacing with their computers via a command line, simply for decentralized networking. The time and effort necessary to adopt these skills would carry too great a cost for every participant—in time, the globe—who would at some point create a meshnet and join Hyperboria.

Yet it remains an unsolved problem that the majority of people to whom this decentralization project might have the largest benefit and most worldview-challenging impact—typical internet users—are considered by most participants to be unaware of the most basic technological or political circumstances surrounding their use of technology. Therefore, the majority of current computer users are viewed as incapable of participation. Perhaps, as one participant noted, this will change simply over the course of history, as revelations such as those made by Edward Snowden begin to give these issues a public focus.

Besides the more long-term implications of the insider/outsider issue, within Hyperboria, rectifying it is not high on the list of priorities. Certainly, there are participants

such as Zeus who are building software (i.e., an easy-to-set-up web server) and testing methods (such as a peering party) to facilitate the introduction of new, unskilled people into the meshnet, yet the primary focus for many in the community remains inward, to perfect the infrastructure software and encouraging only those who can effectively contribute their skills to the network to join. I must also note that despite some disagreement about overarching goals, builders and activists do not really harbor enmity between one-another. True, an activist-type may not be a highly accomplished programmer that actively contributes to cjdns software development, but a typical builder does not look down on activists for a lack of skill, disagreeing over the politicization of the project instead. Because both roles inhabit similar knowledge domains, a more or less amicable social environment is maintained by the group.

Cryptocurrencies and Other Technologies

These visions for the future, goals of Project Meshnet/Hyperboria/cjdns, and conceptions of roles within and without the community—and of course, this thesis as a whole—are broadly concerned with the topic of mesh networking. However, there are other interests within the community. In one discussion on Hyperboria social media, a participant named Snowcrash, envisioned a future where current, centralized systems are rendered irrelevant through technology, citing in particular three-dimensional printing and cryptocurrencies. The latter struck me as important, given the presence, for example, of a HypeIRC channel dedicated to this technology as well as the presence of at least one cryptocurrency "mining" operation within Hyperboria. This aspect of the community emerged as I was conducting my fieldwork, and I used an opportunity presented by an ethnographic methods class assignment to expand my research focus to include a discussion of this technology.

Cryptocurrencies, according to interviewees, operate in a decentralized manner,

with the functions of central banks being replaced with an encrypted "block chain" of zeros and ones that is distributed among all devices that are made to participate. Over time, cryptocurrency software infrastructures are programmed to "grow" the amount of zeros and ones until a given set of time, limiting the amount of currency in circulation to a finite amount. Value, as with any currency, is imbued socially, but because the only central authority is programmatic, social manipulation of supply (and therefore value) becomes far more difficult to accomplish. Being accepted first and most famously in the black markets of TOR, cryptocurrencies have moved into a more mainstream position, with many local and some large businesses accepting payment in this form. Within the Project Meshnet community, the actual use of cryptocurrencies for commerce is not yet existent, although it is anticipated by some. In one case, a local meshnet organization successfully raised funds using cryptocurrencies, which has in turn allowed members an expanded focus toward research and development, outreach, and the provision of services.

The other, more pressing reason that cryptocurrencies caught my attention was due to talk within the community about merging the technology with the infrastructure of the meshnet. My first thought was that this might lead to monetization of the mesh network, and my interest was in the ways this might conflict with or support the ideals and goals of the community. In one way, this aspect was discussed in terms of routing traffic, and the other in terms of providing Domain Name services, however, in neither case was overt monetization of the network seen as a planned feature. Instead, these technologies would be used to account for contributions and use of the network or the decentralized registration of site-specific names, and although individuals might choose to charge for access on a local basis, most were opposed to this possibility. Those who were not fundamentally against monetization were not in favor of profit motives, rather they proposed the provision of ISP services the vein of a non-profit, local, and socially beneficial service rather than a corporate venture.

Many others either claimed an outright anti-capitalist label or hinted that they

believed in that direction. Most strikingly, the benefits of cryptocurrencies on a social level were seen several times to lead not to an anarcho-capitalist or libertarian free-market utopia, but instead to a de-legitimization of the notion of currencies in general, and more specifically, a de-legitimization of the central authorities (governments and banks) that produce them. This argument stems from the fact of value, as mentioned above, that is socially imbued: regardless of physical paper or digital bits, currencies are "not real". The implications of this stance is made poignantly by Cupcakes who said, "cryptocurrencies, and currencies in general, feel like a bit of a cheap hack to solve problems that arise from not having that [antiauthoritarian, decentralized, creativity-oriented] system today :)", specifically,

> "things that socialists traditionally point to as problems: people starving even though there is enough food in the world today to feed them, unequal distribution of medical care, unequal opportunity from birth, classism, and the like. The tech world is nice because it allows us to break free of many of the problems that come with being born in an unfavorable situation, but it doesn't solve all of them, and it doesn't work for everyone."

Here, cryptocurrencies and utopian possibilities are thrown at odds with one-another as currency itself is framed as a treatment for symptoms rather than a cure for social disease. This demonstrates the liberatory potential to be found in current, decentralizing technologies, and also serves as a tacit acknowledgment of the global digital divide, where thirty years into the age of personal computing, access to the clearnet even in "developed" nations still remains sharply unequal (ICT Data and Statistics Division 2015) not to mention access to knowledge about computer programming and networking. While imagining equality, but critically tempering expectations for the role

of technology, Cupcakes demonstrates again the two layers of political aspirations and scientific advancement which intertwine in Project Meshnet, setting the stage for the primary angle of social-scientific analysis.

CHAPTER 7

ANALYSIS

I have presented the fieldsite of Hyperboria to convey the social realities of participating in Project Meshnet, and I have discussed the data I gathered one-on-one in an attempt to portray—in their own words—a well-rounded picture of their group identity. I now seek to map these findings with theory found in the academic literature of digital politics, prior to a final discussion of how science and politics meet within this movement of people. Through this, I intend to show how these findings align with my original proposition that new technologies and social practices emerging from their use represent a change in decentralized politics, and at the same time, that political-economic circumstances are driving these new, social uses of technology.

Hacker Identity

In Chapter 2, I discussed labels of identity that are frequently adopted by politically active denizens of the "digital generation", specifically, those of the "geek" and "hacker" as defined by Coleman (2011:512). More or less all Hyperborians could be portrayed as "hackers" under these terms while a few, if asked under this rubric, might consider themselves "geeks". While I did not pose this question to the community members

for the sake of brevity and politeness (as I mentioned previously, many are attuned to gray thinking, shunning hard-and-fast categories) the point is that the labors in the Hyperboria community involve the full spectrum of abilities Coleman (2011) noted as split between the two categories. Indeed, this is a network of highly-skilled individuals involved with creating, modifying, and maintaining hardware, software and networks while simultaneously participating in the creative, communicative work Coleman (2011:512) delegated to geeks.

Instead of defining the division of labor that is "hacker" and "geek" within Hyperboria, participants are best described as adopting the roles of "builder" and "activist", as I proposed in Chapter 4. In this context, a "builder" would most likely self-define as a "core developer" while an activist might not only self-identify as such, but they would tend to spend less time hacking cjdns code, directing their efforts to using—really, "testing"—the network by creating services, attracting new members, and actively participating in the major network locations. Both roles, under Coleman (2011)'s distinction, would fall more to the side of "hacker" than geek (i.e., an activist launching a social media service), though activists appear more likely to participate in activities of "geeks" as part of their efforts (drafting the visual design of that website).

Hacker genres of liberalism and anarchist practices

To examine Hyperborians' identity further, it is useful to revisit the historical and current trends in hacking described by Coleman and Golub (2008), namely, the Cypherpunks and the Free/Open Source Software Movement. First, both were born out of an institutional, academic context, that is arguably different from Hyperboria which, despite the relative youth of the participants, and the status of many as students—was born in the context of software production pioneered by the Free Software movement. In a way, this might be considered an institutional context, but the organization of Free Software production is, as the interviewees and I have described, decentralized and horizontal to a

greater degree than academia. This is evident primarily given the fact of voluntary association over the forced requirements to begin or maintain a career. Ironically, participation in Free Software development in a voluntary manner sometimes serves to launch careers in the IT industry, yet this is a side effect rather than an end goal for the majority of contributors and is unseen in the Project Meshnet community.

Next, and more to the point made by Coleman and Golub (2008:259–261), the Cypherpunks and Free Software Movement are known to promote different kinds of freedom. Cypherpunks embodied negative freedom, or freedom from domination (of corporations and governments), whereas the Free Software Movement embodies positive freedom, or freedom to access, explore, and build. Thirty years later, Project Meshnet at face value seems to be oriented more to the former—at least, this was my initial impression when I first learned of the project—but in reality, both kinds of freedom are highly regarded among participants. On the "negative" side of freedom, the community members participate in order to defend against censorship and other forms of control utilized by ISPs and state-sponsored spying apparatuses. Freedoms of speech (particularly in technical and creative expression) and equality of access reflect the "positive" notion of freedom found in Hyperboria and is evidenced as the technology provides a means to promote new, DIY avenues for communication; a new space to promote techno-social experimentation; and new possibilities for expanding communications infrastructure to those who might not otherwise have access.

A third variety of hacking, according to Coleman and Golub (2008:263–264), falls under the "transgressive" ethical framework that values "autonomy", exploration, and "self-expression", but often with tactics that skirt the boundaries of legality. While Hyperborians espoused similar values, their methods of action are not illicit and hold more in common with the practices and political nature of the Free Software Movement. It is possible that some individuals might hold a preference for "transgressive" ethics and tactics, just as some participants most highly value cryptographically-ensured privacy along

the lines of the Cypherpunks. In all, Hyperboria is not typically a target for transgressive actions nor is it a base from which these tactics are launched. What may be drawn from the transgressive variety of hacker ethics is the attraction to open-ended "play" that the network enables versus the more necessity-based or utilitarian ethic embodied in many free software projects, and indeed, in the production of cjdns.

It is important to see the community as a whole generally rejecting illicit tactics alongside black-and-white notions such as private and public, as their immediate goals are scientific and are mostly premised on values underlying the Free Software Movement. These value sets embraced throughout these hacker communities are called "genres of hacker liberalism" by Coleman and Golub (2008), and I have shown that pieces of all of them may be found in Project Meshnet. From my data, I also contend that while this group draws on the tradition of "liberal" thought, their ethics manifest as anarchist practice, not simply as the participants self-labeled or implied their political beliefs, but through their actions within an emergent, self-organized system of production based on autonomous decision-making, mutual aid, and voluntary association.

Political hacking in the 21st century

In part, Project Meshnet is a product of historical circumstance: all of these "genres" have roots that are forty and fifty years old at the time of this writing. Coleman and Golub (2008:271) themselves assert that the anti-corporate, anti-globalization movement of the late 1990s and early 2000s introduced horizontal political notions into hacker culture writ large. Thus, it is important to return to frameworks proposed by other digital culture scholars focusing on more recent, overtly techno-political action in order to examine the leap between hacker philosophies backed by liberal thought and the anarchist/libertarian leanings apparent in Hyperboria.

Of particular interest is Milberry's (2012) conceptual category of "tech activism"

which is a political sphere of action informed by the Free Software movement, but where the goals are drawn from the alterglobalization movement—that is, contestation of the global, neoliberal hegemony. Similarly, Schoonmaker (2007) previously had defined a form of "globalization from below" whereby new, global communities are created through grass-roots efforts and the use of free/open source software infrastructure to facilitate communications between the local and global. Project Meshnet follows this pattern to an extent, creating new network infrastructure designed with decentralization in mind. On the other hand, the community's opponents differ slightly and their work is not directly intended to facilitate further political action. Rather than Hyperboria being used as a platform for activists—though it might make a good choice for some purposes—its real political value lies in the possibility for mass use of the underlying technology, which would undermine corporate and government control over the internet not only as people stopped using the Clearnet, but as those entities are less able to manipulate the meshnet.

Less directly related to the alterglobalization movement, but very much pertinent to distinguish Project Meshnet's place among current internet-based activism is Juris' (2007) concept of "hacktivism". This descriptor speaks to the phenomenon in which computing technology is employed for political purposes in a more general way than implied by Milberry (2012). Rather than "Electronic Civil Disobedience" (ECD) or "Mass Action" forms of hacktivism which—while having similar philosophical roots—tactically resemble protest movements in the non-digital sphere and which characterize the work of more "transgressive" groups, the notion of "Digital Correctness" hacktivism better describes the endeavors of Project Meshnet. Within Project Meshnet there exists an overarching concern for information freedom (anti-censorship) and a focus on longer-term infrastructural aspects in bringing about a better world (Juris 2007; Jordan 2007:79–84).

On a practical level, the technological innovation that cjdns brings to Hyperboria works in the opposite direction of the Electronic Civil Disobedience or Mass Action forms of hacktivism popularized by Anonymous, et al. as the actions are not short-term, one-off

defacement of websites or releasing sensitive data from private servers. Instead, participants on Hyperboria take action with a long-term, macro-scale scope and use constructive tactics as opposed to targeted actions sometimes considered destructive or malicious.

Within this frame, participation in Hyperboria stands out in the tradition of the Free Software Movement that preceded it as characterized by the emergent structure of the project. While using the same model to orchestrate labor, their differences stem primarily from their respective goals: although the issues overlap, participants in Project Meshnet intend to change the infrastructural means rather than legal circumstances of participation in computer networking. Specifically, the Hyperboria community noted their distaste for capitalist economic methods, envisioning horizontal political-economic structures facilitated through mass decentralization, supporting the "Digital Correctness" aim to radical democracy. Additionally, this aspect of the community supports Horst and Miller's (2012:3) noted trend of general "decommodification" inspired by the fruits of digitally-driven decentralization, as participants labor to decommodify computer network access and to protect the content within from encroachment. Using Milberry's (2012:113) frame of reference, this represents a reaction against corporate and government colonization over the means of communication—an aspect important to defining Project Meshnet's political nature. Indeed, within Hyperboria, there are no access fees, no advertisements, nor, as far as I observed, any form of capitalist practice.

Beyond the features of radical democracy (Dahlberg and Siapera 2007) apparent in Project Meshnet alongside the anticapitalist ethic—particularly autonomy, voluntary association, horizontal decision-making and mutual aid—the community's commitment to the last even beyond the shared labors of programming is most visible. One participant spoke of the group as a "security hive-mind", for example, such that they may, without asking permission, scan your node for vulnerabilities, "but then tell you if you have an open hole and how to patch it, if you don't know". This is something of a contrast to the image of the skilled insider versus unskilled outsider or even the "RTFM" ethic of inde-

pendent, self-education embraced in some corners of the free software world. While there is also reported a meritocratic, perhaps somewhat competitive, aspect in contributing to the network (especially envisioned as important when or if the network grows to a larger size), the component of mutual aid along with the other attributes that follow in the anarchist tradition of recent social movements seem to overshadow this more liberal aspect. At first brush, it would seem that a meritocracy implies hierarchy—against the overarching theme throughout the interview process—and therefore, further research might focus on navigation of this contradiction here and in the greater free software community.

DIY community

Along with the builder/activist paradigm Project Meshnet's community is twofold: a free software project and a network of machines and people similar to the early internet emerging from that software project. The development of cjdns brings with it all of the social and material trappings of decentralized Free Software production, and at the same time, this software is designed to enable users to decentralize their communications infrastructure. Out of the possibilities afforded users by cjdns, the Hyperboria network was born.

Through outreach from the community, unofficially under the name "Project Meshnet", this experimental network grew in users and in connected devices. With this added complexity, the free software project became less of a stand-alone ordeal, but included another layer of community organization and cultural expression facilitated by the technology. For as much miscellaneous content (source code, multimedia, personal blog posts) to be found in this portion of the community, Hyperboria also became a platform to further engineering goals and to facilitate discussion about how to best utilize the network's novel properties. Broadly applied by Fuchs (2006) to cyberspace, the self-organization principle may be seen at work in Hyperboria, as new forms of technical agency are being

provided—via decentralized ownership of the means of communication—and as a feedback loop between free software project and its user-community's network.

Near the end of conducting fieldwork, some in the community began pointing out that while one layer of infrastructure (the low-level hardware communications handled by cjdns) could be decentralized using the community's method, it became apparent that most of the network software with which users interact suffers from the issue of centralization. Aside from some "federated" services like HypeIRC, most of the popular locations in Hyperboria and the Clearnet utilize the web, and nominally, a website is controlled by a single person, is hosted on a single machine, or otherwise has a critical, single point of failure. Although some appeared dismayed that this issue had not been considered in cjdns' early design, others seemed more fatalistic: users would behave in the same patterns regardless of the underlying infrastructure, unless provided with alternatives and reason to use them. A few proposed peer-to-peer-style solutions as a possible means to decentralize services such as social networking.

Essentially, this discourse demonstrates Jordan's (2009) description of a hacker community in which the roles adopted by participants are guided by the underlying software, even as that software is modified by its creators: the community is engaged with "determinitive affordances"—techno-social features that constrain or enable particular paths of action. Along the same lines, Kelty (2005) describes a recursive public in which participants collectively imagine and produce their own means and forms of association as they apply their effort to recreating a "free and open" internet. Although Hyperboria is not exactly a "public" space, it is a platform intended to subvert censorship and aspires (or at least, is a prototype) to a global mesh network by which the proverbial "free and open" internet is re-created through decentralizing production, ownership, and maintenance of the network's infrastructure. Kelty's (2005) idea describes Project Meshnet well, in part, because participation is genuinely driven by its own, unique infrastructure project on top of which builders and activists alike are consciously formulating their own paths to participa-

tion. Furthermore, Hyperboria is representative of a recursive public given its low-key and highly reflexive politics: rather than creating loud noises about decentralization in front of the public and adversaries, Project Meshnet provides a space for those techno-political discussions to take place and for the road map to the future, as it were, to be drafted.

Because the Meshnet is literally intended as a replacement for the internet, labeling the community's prevailing political tactic as "prefiguration" that involves "the creation of alternatives in the here and now" (Maeckelbergh 2011:2, 14) seems very appropriate. This is not without precedent in the history of digital politics: the free software community, at first a very small effort to protect user freedom against proprietary monopolies, took the time to develop and use their novel licenses to gently subvert the legal grounding of their opponents in a way that mirrored a future of knowledge sharing. Indeed, some interviewees stated that their ideal political-economic world would be modeled similarly to the decentralized production of free software, now a global endeavor of unprecedented scale and scope of effort, while a surprising number hoped that similar practices could preface widespread elimination of economic scarcity and social inequalities as more and more institutions are decentralized (i.e., manufacturing via 3D printing technologies, finance through cryptocurrencies; both represent other prefigurative strategies for social decentralization), and, in some cases, are rendered unnecessary.

Movements

While I have presented my own political biases and maintained a high awareness of them when considering my research and thesis statement, the presence of multiple and overlapping social roles presents a relatively neutral opportunity to examine Project Meshnet as a kind of movement-of-people (or a subset of one) that involves the practices of both science and activism. I will demonstrate this by discussing Project Meshnet in the context provided by Frickel and Gross' (2005) Scientific/Intellectual Movement (SIM) as

well as Tarrow's (1998) Political Process Theory of social movements.

First, it is of great interest that no interviewees nor other community members with whom I interacted ever actually used the term "resistance" for their activities, instead favoring terms like "activism" or outright denying political engagement. Additionally, a consensus on *group* identity on the whole seems to be constructed around the community's technical achievements and intellectual pursuits rather than their political goals which showed a bit more variability from person to person[1]. For these reasons, it appears that I initially mislabeled my thesis in favor of painting Project Meshnet like my initial impression of a political venture. As cjdns development in a free software setting, along with building new infrastructure within Hyperboria, strongly portrays characteristics of a SIM, I posit that much of the action within the community covertly[2] takes the form of resistance against institutional forms of power, even when energy and attention is primarily directed to creation and experimentation. Indeed, an apparent pattern of political belief seems to converge around leftist values.

The subdued political aspect of Project Meshnet's official business is not without precedent in the hacker sphere, as I have detailed above. In the same way that Coleman (2004:508) details the radical approach to concepts of property and free speech in the Free Software Movement despite their initial denial of political intent, so too does Project Meshnet officially deny political involvement. At the same time, participants frequently espouse radical ideas about the (re)distribution of power: these individuals wish to decentralize the internet, removing the need for centralized, authoritarian gatekeepers (ISPs)

[1]Interestingly, I believe the largest disputes within the community did not occur because of political differences but due to technical disagreements. For example, some discussions around decentralizing hardware infrastructure versus decentralizing software services became rather heated. Both were well-intended toward similar political goals, yet the technical solutions (or lack thereof) posed greater challenge to consensus-making. Apparently, at least one major developer exercised their right to free association and, as I understand it, took leave from the community (temporarily, in the end) partly due to the apparent intractability of this issue.

[2]"Covertly" may be read as "subtly". I do not intend to depict a false air of intrigue that is not present in the community. Both political and technical matters are openly discussed in Hyperboria's public channels, but the latter takes the forefront of concern.

and negating centralized threats to privacy and security (state surveillance). Here, two of Tarrow's (1998:2–4) criteria for social movements are met: the need for "opponents", and the proposal of "new or unaccepted claims". Toward the latter, engineering a grassroots replacement for the internet is a novel and quite ambitious project, while the community's political imagination is filled with unaccepted claims. Particularly outside of mainstream political discourse is participants' vision of a decentralized, horizontal, voluntary, and mutual-aid-based social world free from domination of authoritarian rule and coinciding with the individual freedom to explore, experiment, and create. The expression of radical economic equality and anti-capitalist sentiment also plays into this realm of unaccepted ideas.

Within both SIMs and social movements, identity is built through the act of framing, used "to represent the movement to insiders and outsiders" (Frickel and Gross 2005:222). From what I witnessed as an outsider, it appeared (even by their own advertising) that Project Meshnet was a political organization, yet I later learned that many insiders (including "activist"-leaning folks) wished to play up the scientific aspect to the outside world, highlighting the identification of the project as just another free software project. Quickly after establishing an insider perspective, the experimental, scientific nature of the network became quite clear to me as I made use of the underlying technology and listened to fellow Hyperborians. For example, at the time of the interview process, there were intermittent "black holes" due to a bug in the cjdns software. Interviewees reported these service outages becoming less frequent over time, explaining the issue in engineering terms. Essentially, eliminating the network's instabilities were the highest priority goals of the Hyperboria community, as the network was growing and the theoretical components of cjdns were consistently being tested with more and more connections.

Still, while in this "participant" position—at least, one in which insiders were comfortable speaking candidly with me—many acknowledged the inherent political implications of the project as those implications aligned with their views. I believe that this

contention between engineering and politics relates back to the fact of the division of labor between "builder" and "activist" within the network. Perhaps viewing the roles in terms of "knowledge practices" within the community, whereby each role accesses slightly different, yet overlapping, realms of knowledge which frame political participation (Casas-Cortés, Osterweil, and Powell 2008), as those authors posit this as the defining feature of contemporary social movements. In this case, the knowledge system required to participate as a builder involves experience of the norms and tools required for participation in a free software project along with familiarity with specialized networking protocols, low-level systems programming skill. The activist role is much less constrained in the kinds of knowledge required (notwithstanding the baseline that aligns with essential hacking skills and/or participation in free software projects), making room for the creative freedom treasured by participants as they may apply their preferred programming languages, pursue artistic endeavors, or conduct outreach.

From the overlapping knowledge practices between these two roles, we can observe the the interdependence of cjdns-the-software-project and Hyperboria that has emerged: as the success of the network relies on feats of engineering, the project's identity as scientific community is no surprise. Still, the interests and actions of the activist users—many of whom were drawn by the software's potential to subvert institutional control—highlight the community's inherent political nature yet again. Perhaps my shift from an early understanding of Project Meshnet's public face (a political entity) to seeing the community as a scientific endeavor is due not simply to perspective gained after participation and interviewing, but to a potential change in the community's strategy for attracting a wider variety of contributors. After all, scientific evidence is probably more palatable to their present audience (developers, web designers, knowledgeable users) than spreading the political worldviews reflected in many participants' day-to-day use of cjdns and associated technologies. From this standpoint, the political aspects of Hyperboria manifest somewhat like Bakardjieva's (2009) "subactivism", although this notion seems to imply less

technological aptitude in favor of the average user's ability to politically engage via digital technologies. More important is the contradiction between politicizing a scientific project while maintaining that the project is strictly scientific. erhaps the community lost its initial political fervor, began to grow, and started to experience effects of a small-scale echo chamber, but it is also possible that the shift in branding that appears to have happened more than once ("Darknet Plan" to "Project Meshnet"; seemingly politicized advertising to denial of political intent) is simply tactical. In other words, to create a replacement infrastructure, the focus must lie in improving technology, not in direct political confrontation with authorities.

Relevant to the community's desired scientific face is the fact that SIMS are not usually considered political phenomena, and when they are, it is normally under circumstances in which there is a push to redistribute power and resources to pursue a given intellectual paradigm (Frickel and Gross 2005:207). In the long term, Project Meshnet's political goals seem to lend it more toward a social movement giving its focus of scale, seeking redistribution of power and resources on a (global) society-wide scale rather than among their own, specially privileged (in terms of knowledge and skill) group. However, within the immediate context of the free/open source software community—especially in the niche of alternative networking software—the notion of SIM applies more fully, as these projects do share and sometimes vie not only for the attention of the wider community or for a user base, but for developers who will bolster the intellectually-oriented program of software development, the "organized, collective action" (Frickel and Gross 2005:207) of Project Meshnet. While there might be some competition between cjdns and other programs (software and intellectual), it seems indirect as their functional goals (network decentralization versus individual anonymity)—and thus political appeal to this particular group—diverge.

This political appeal indeed appears to originate in the imaginations of participants as the technology allows network freedom like the proverbial "old days" and where individ-

uals resurrect old techniques; craft new services with relatively less constraints to publish and access; and collaboratively experiment within a small-but-growing, decentralized network. Many were first drawn to participation by this very fact, and believe that this and other technologies could play a large role in mass decentralization for the betterment of human society. Additionally, issues of equality—particularly in an economic sense—appeared frequently, highlighting an anti-capitalist sentiment that seemed to underlie many participants' worldviews. This became clear as most participants were decidedly against monetization of the network in any form while some shared dreams of participation in a decentralized, post-scarcity economy. Again, this aspect of future visions hearkens back to prefigurative social change that best characterizes the political strategy of Project Meshnet and also presents the strongest link between the Project Meshnet community's hacker ethics and the goals of the alterglobalization (Maeckelbergh 2011) and Occupy movements. Although Maeckelbergh (2011:14) seems to imply that prefigurative *strategy* requires direct "confrontation" (i.e., as a consensus-making platform is used by protesters in the street to decide a course of action), Project Meshnet's variety of confrontation—or contentious action as described below—appears more subtly. Instead of direct contestation of power, cjdns as a piece of software breeds Hyperboria, or "opens up the space necessary for experiments in horizontal democracy," (Maeckelbergh 2011:14). Indeed, as much as participation is officially driven by ideals of technological advancement, or simply toying with new technology, the goals of actual participants vary significantly, a distinguishing characteristic of social movements that employ prefigurative strategy (Maeckelbergh 2011). Importantly, it is the "scientific" practice that is free software production which provides the model for participation that interviewees offered as a guide for other kinds of social change. Besides being geared toward altered global "governing structures", the intention to spread the same kinds of decentralized practice hallmarks prefigurative social movement strategy (Maeckelbergh 2011:14) and best represents the community's blending of knowledge domains (Casas-Cortés, Osterweil, and Powell 2008) (that is, software creation and

political organization).

Another distinction between Project Meshnet as a social movement and SIM is apparent in the tension between the unspoken, fragile hierarchy of a free/open source software project and the dedication to horizontalism within the community's structure and political ideals. SIMs, as they take place in hierarchical, institutional settings (as in the question of resource distribution above), are well known to have specific, internal "leaders" (Frickel and Gross 2005). While it is true that free software production is a much more flexible and horizontal model of practice than a bureaucratic, institutionally-defined system, it is not disputed that the Benevolent Dictator envisioned, designed, and wrote the proverbial rough draft of cjdns—along with its openly political whitepaper (Delisle n.d.). Also, while it is something of a stretch, it is interesting to observe the similarities of the borrowing of ideas (or the revival of old ideas; both for purposes of critique or improvement/expansion) in an intellectual program to the practice of forking software (for reviving dead projects or because of technical/political disputes) within a free/open source software project. In the case of Hyperboria, this phenomenon takes place, again, as its inhabitants explore and create new, digital spaces, creating a landscape much like the early stages of the Clearnet but with almost three decades of knowledge about that landscape's previous abilities and a better grasp of its new potential.

In the context of Project Meshnet as a whole—not just from the viewpoint of the builders—this aspect of hierarchy does not hold. Instead, Hyperboria, like the activist role, is far less constrained by institutional norms and lacks anything like a leader, although one participant has been criticized for running several services, potentially centralizing aspects of participation. When BD limits their own participation to writing code and stops hanging out in HypeIRC, the community carries on, and would likely continue improving (or create a fork of) cjdns even if the Benevolent Dictator stopped writing code. The potential to subvert hierarchy is a part of the "confrontation"—both internal and external—Maeckelbergh (2011:14) describes as continuously in play within social move-

ments. Concerning prefiguration and the historical trends in hacking discussed previously, the community built atop cjdns behaves in a similar way to the features of modern social movements under the legacy of the alter-globalization movement and described by Juris (2008). These include a diversity of participants (the weakest of the indicators, yet somewhat tenable by the coexistence of builder and activist roles), a framework for autonomous action—this can be summed up by the "see a need, fill a need" trope—and the horizontal, consensus-based power distributions that hallmark anarchist practice (Juris 2008; Graeber 2010).

Finally, and perhaps most importantly, is the aspect of contentious action. It is true that SIMs contend among one another for resources, but there is also a requirement for the intellectual program to be contested by other paradigms (Frickel and Gross 2005:206) as can be seen, for example, in many posts on Reddit (both within /r/darknetplan, et al., as well as in other technological and political Reddit forums; Redditors in general have a reputation as a critical, borderline vicious group of people). Indeed, some bring tough technological questions to the discussion, seeking a reason to participate in Project Meshnet rather than the TOR project, I2P or any of the other alternative networks with which Project Meshnet tacitly competes for developers and users.

On the other hand, there is less a requirement of action *against* a social movement by other groups to satisfy the definition of "contentious action", although it manifests itself in many that have been documented (i.e., police brutality against marching protesters). The participants of Project Meshnet are quite aware that action by authorities is a possible, even likely, occurrence, for example, by sponsoring spies and instigators (Ed Pilkington 2014). Along with government surveillance of political groups in general, I suspect such problems associated with transgressive hacking inspired the community's orientation to a more transparent, trust-based model for participation in the network. Indeed, it is this notion of challenge, or "contentious action" against an "opponent" or more specifi-

cally “elites” and “authorities”, that demarcate a social movement (Tarrow 1998:2–3) most clearly from a SIM.

In the case of Project Meshnet—despite the official, apolitical charter espoused by the community—those authorities being contested are Internet Service Providers, first and foremost, followed by state spy agencies and other actors who systematically maintain control or further encroach the internet through walled gardens, prohibitive costs, claims to private ownership of infrastructure, or nefarious means. In spite of its research goals centered around software production and infrastructural decentralization, the subtleties of creative, long-term protest are clearly evident in the community’s motives as they are embedded and negotiated through individual use of technology and through the discourse enabled by those technologies. Theoretically, as participants model the world in which they wish to participate and begin to implement their own, small-scale changes, in turn, the hierarchical models become technologically obsolete and politically illegitimate. This form of political action—a tactic—may be considered longer-term resistance versus the typically shorter-term bouts of protest stereotypical of social movements. The scale of production time and the presence of long-term, engineering goals provides the counterpoint to ephemeral gatherings (even the semi-permanent encampments of Occupy) and the diversity of contentious topics that were voiced through recent social movements. Finally, rather than presenting ideas directly to the face of power, Project Meshnet does not address anyone with grievances, instead addressing its message to people under the rule of the powerful and enabling those people to have more control over their means of communication.

Conclusion

While neither “Social Movement” nor “Scientific/Intellectual Movement” broadly captures the actual position of Project Meshnet, I would argue that the group ought to

be viewed as existing in a continuum between the two. Project Meshnet should remain unlabeled in this respect due, partly, to the slight, intra-group tension between their purpose as scientists and their goals as activists—even as the roles overlap. Far from being archetypal of a sterile laboratory or a radical political faction, the contingent state of self-definition via discourse and practice within the community instead points to an emergent, techno-political phenomenon that is at once scientific exploration and subtle, creative protest against current power structures.

Within the frame of the Free Software Movement—itself a product of scientific institutions—Project Meshnet has a point of reference for achieving goals of power redistribution through non-confrontational contention. This is the key difference between an archetypal, feet-in-the-streets social movement whereby groups of people voice dissent directly to power, usually in the form of protest. The vilification of Ferguson, Missouri protesters by mainstream and social media, who in 2014 marched and redistributed/destroyed resources to protest police violence, stands in stark contrast to the institutionally-sanctioned practices of the—probably white, male youth—participants of Project Meshnet. Largely, diversity is one of the areas in which Project Meshnet does not fall in line with trends in recent social movements characterized by the meeting and consensus-making by many different identity groups. This apparent lack of diversity, particularly as it relates to gender, is seen as a participant noted that a popularized Hyperboria would likely be saturated with "baby pictures and wedding photos". I do not wish to characterize this participant, cjdns production, or Hyperboria to be sexist in nature, as I observed little behavior characteristic of "cyber jocks", bro coders, or otherwise macho, overly sexualized attitudes toward participation by women. Instead, this participant was referring to the technical disconnect between the average developer and the average user of software, lamenting the loss of intimate, creative space with their research partners. The problem arises in the base assumption that these researchers are not necessarily interested in "baby pictures" and the like, thus assuming male participation as the norm an indeeed,

that men would not be interested in such activities. In reality, the topic of gender never arose during my interview or observation processes, and rather than overt discrimination against participation, this is more like a case of colorblindness (genderblindness?) with roots that I have observed in the wider Free Software community. Here, participation is technically open to all, but where the required resources—skills, equipment, etc.—are not equally accessible to all demographics.

In some ways, the spread of motivating factors—the diversity of ideas within and about Project Meshnet—somewhat balance out the apparent lack of regard to diversity in general. Despite revealing little attention to this issue and therefore running counter to current social movement trends, the complaint against content such as personal photographs does highlight the actual problem, noted by several participants, that corporate-driven "big data"—that is, the ubiquitous gathering of all available information for marketing and other purposes—is dangerous to individual freedom, extending to the voluntary behaviors of internet users by which their data is harvested. While I would personally agree with this sentiment, it runs somewhat against the grain of anarchistic self-determination as an example of the patriarchal trope that "experts know best", yet the unique expertise of the group is partly what aligns Project Meshnet as Scientific/Intellectual Movement insulated in the Free Software paradigm of production rather than a totally outward-facing social movement for sweeping political change. Though their political scope may be wide, the revolutionary intellectual paradigm applies to a very specific subset of knowledge and technical practices employed to produce networking software.

Along with the theme of segregated expertise, participants could—from a critical perspective—represent budding technocrats, though I sincerely do not think any participants I encountered aspired to become digital overlords through their technical knowledge, especially considering their expressed political values. Although one participant garnered some suspicion from a few peers for maintaining too many popular Hyperboria services,

most (including that participant) held strong convictions toward bettering the condition of all people through decentralization-enabling technologies. Those who denied politics a place in their descriptions of Project Meshnet seemed most interested in play and traditional, linear progress in the research domain, rather than issues of power and control. As it stands, the plan to globally decentralize internet access with cjdns-based technology could result in a loose network of community-based operations, possibly headed by technically-minded people (or groups of them), perhaps creating creating an unforeseen kind of technocratic control over networks and information. The caveat lies in the trust-based nature of mesh networking and the concept of social interaction required to join: perhaps it is preferable to delegate control over access and use of technology to trusted, local individuals and groups rather than large, corporate ISPs who may be compromised by state spying apparatus. Indeed, this is the gist of Maeckelbergh's (Maeckelbergh 2011) thesis on prefigurative strategy, as centralized entities are replaced with more decentralized alternatives, even while those alternatives are continuously formulated with an awareness of potentially centralizing forces within.

More importantly, the community recognized the problem that is the knowledge gap between average users and creators of technology. Some were resigned to making a small change by removing power from centralized technocrats and delegating it to local, more trustworthy technical experts (or anticipated no change at all, valuing the learning process). Others took the long view—necessary in an infrastructure project conceived in terms of decades—in which the future may hold a more technologically literate populace that would understand and care about their own circumstances for participation. Ultimately, whether Project Meshnet participants are technocrats or the vanguard of mass, decentralized ownership of communications infrastructure remains to be seen.

Current issues with proprietary hardware and the centralization of the higher levels of computer-based networking (i.e., non-federated, non-peer-to-peer services) currently prevent total, grassroots-driven decentralization. The Project Meshnet community is aware of

the possibilities afforded by the Free Software model when applied to freely-licensed hardware designs (an interest shared by the broad Free Software community) and has taken the matter of service centralization as one of deep concern, as Hyperborians collaborate to create new software projects that complement a cjdns-powered, decentralized infrastructure. More than anything else, this represents the expansion of Project Meshnet's Scientific/Intellectual paradigm, as participants claim more territory for scientific exploration beyond their original scope, even as the original motivating forces for the research remain and are rendered in more complex detail than the initiation of the intellectual project itself.

The concept of "free hardware" designs is young, and while the current cost of long-distance network hardware puts some dent in the plan of obsoleting the Clearnet, Hyperborians are still reliant on major corporations for devices and ISPs or governments for long-distance connections. This is not to mention the digital divide whereby access even to simple devices is limited to the world's wealthier inhabitants while the poor do not. Again, this issue falls further from the political imagination of participants as their scientific aims currently center on creating a stable network, and more distantly, to expand that network's global reach. Protection of network access and technically feasible extension of network access to those without is a greater concern in the community than the fact that many do not have access to digital devices. Truly, I do not know if this is an example of relatively wealthy (on a global, not national scale; these are mostly student-aged people after all, a age category not known for its wealth), privileged people not recognizing a root problem of access, or whether this is the result of ignoring this problem, as the group has less ability to fix the root cause while global internet access is increasing without their efforts (ICT Data and Statistics Division 2015). Either frame for this omission demonstrates the privilege participants seem to enjoy in regard to device access, but that aside, the community presses forward with other goals more narrow in political scope, yet contingent on these problems being rectified for total success.

Still, builders and activists alike press forward in scientific endeavor, working on contributing solutions that may solve other, real problems. While this endeavor is indeed intellectual on its face, deeper motives for participation direct individual labor against the powers of centralized control, the generalize political track shared with the alterglobalization movement. Instead of a feet-in-the-streets confrontation against state authorities, participants employ their technical skill to create a new alternative capable of rendering obsolete hierarchical power structures, sharing in a model of participation that reflects their preferred future society. This embodies a creative form of protest more akin to a boycott, though rather than not buying a specific good, participants seek to invent a better product. Contrasted with gendered language, a lack of diversity, or an experts-only club, more often than not, participants recognized a vast world of sociopolitical and economic inequalities that follow alongside the ability to securely and consistently access computer networks. Indeed, most interviewees hoped the decentralized model of their labor may be applied to rectify these problems in the wider scale, and that the work they have contributed in the Free Software context may be of more immediate use as a tool to contest digital colonization by those who are able. The positioning of digital "barn raising" cum political process embodied in Project Meshnet is described quite well by Maeckelbergh (2011:15):

> "When power is assumed to always play a role in human interaction, political structures that increase equality need to be continuously reinvented, and they need to be reinvented in a way that is catered to specific contexts, specific inequalities, and specific goals. There is no one size that fits all form of equality. Social change is a continuous process for which everyone is responsible."

Rather than remaining a static, unchanging entity of one particular kind—scientific or political—the model used by Project Meshnet embodies a dynamic flow of people and ideas conceived as a long-term, creative project and also as a potential threat to current

power holders. As practices of a science-oriented free software production inform and allow for new kinds of politically-based technological experimentation, so too are the politics of resistance embedded into the use of technology as necessities of security and dreams of mass decentralization provide the impetus for participation. Thus, Project Meshnet's historical context between SIM and long-form social movement; nebulous dual identity as an experimental, engineer-activist community serve well to demonstrate the central point of my thesis that innovative, socially circumscribed use of networking technology is changing the possibilities and practices of grassroots political movements, and conversely that a contentious politics of resistance aimed against real and perceived sociopolitical circumstances is shaping the use of technology.

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